



Royal
Nissan

1983 NISSAN PICK-UP

MODEL 720 SERIES



1st Revision

SERVICE MANUAL -SUPPLEMENT-

NOTE

The differential service procedures (using Kent-Moore Special Tools) contained in this supplement apply to all 720 pick-up trucks manufactured with Model R180, H190ML, H190A and C200 differentials.

**1983
NISSAN
PICK-UP**

**MODEL 720
SERIES**

**1st REVISION
SERVICE MANUAL
SUPPLEMENT**

FOREWORD

This Service Manual Supplement is designed as a guide for effective service and maintenance of the 1983 face lifted NISSAN pick-up. For service procedures other than those contained in this manual, refer to Service Manual — 1st Revision (1983 Datsun pick-up), Part No. 20099.

Please note that the information contained in this supplement pertains to model 720 pick-ups produced in Kyushu, Japan and Smyrna, Tennessee.

All information, illustrations and specifications contained in this manual are based on the latest product information available at the time of publication. If your NISSAN model differs from the specifications contained in this manual, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

QUICK REFERENCE INDEX

GENERAL INFORMATION

PROPELLER SHAFT & DIFFERENTIAL.....

STEERING SYSTEM

HEATER & AIR CONDITIONER

GI

PD

ST

HA



HOW TO USE THIS SUPPLEMENT

- ▶ This Service Manual Supplement, along with 1st Revision Service Manual Part No. 20099, is designed as a guide for servicing 1983 NISSAN 720 pick-up trucks.
- ▶ A list of **SPECIAL SERVICE TOOLS** is included in each section. The special service tools are designed to assist you in performing repair safely, accurately and quickly. For information concerning how to obtain special service tools, write to the following address:

Kent-Moore Corporation
29784 Little Mack
Roseville, Michigan 48066

Kent-Moore of Canada, Ltd.
5466 Timberlea Blvd., Unit 2
Mississauga, Ontario
Canada L4W2T7

NOTE: The Propeller Shaft and Differential section of this supplement contains complete differential overhaul procedures using Kent-Moore tools exclusively.

- ▶ **TROUBLE-SHOOTING AND CORRECTIONS** are also included in this section. This feature of the manual lists the likely causes of trouble and recommends the appropriate corrective actions to be taken.
- ▶ **SERVICE DATA AND SPECIFICATIONS** are also contained in this section.
- ▶ **A QUICK REFERENCE INDEX** is provided on the first page. Refer to this index along with the index of the particular section you wish to consult.
- ▶ The first page of each section lists the contents and gives the page numbers for the respective topics.
- ▶ The measurements given in this manual are primarily expressed with the SI unit (International System of Unit), and alternately expressed in the metric system and in the yard/pound system.
- ▶ The back cover of the manual provides maintenance data for quick reference.
- ▶ The captions **CAUTION** and **WARNING** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the vehicle.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the vehicle's safety will be jeopardized by the service method selected.

GENERAL INFORMATION

SECTION **GI**

CONTENTS

GENERAL VIEWS.....	*
IDENTIFICATION	GI-1
MODEL VARIATION	GI-4
LIFTING/TOWING POINTS	*

SPECIAL SERVICE TOOLS	*
STANDARD BOLT TIGHTENING TORQUES.....	*

*Refer to your 1983 NISSAN Pick-up Service Manual —
1st Revision.



GENERAL INFORMATION

— GENERAL INFORMATION NOTE —

This supplement contains service information that pertains to NISSAN 720 pick-up truck produced in Kyushu, Japan and Smyrna, Tennessee. Any differences between the two vehicles will be pointed out in the text. For your convenience, the Vehicle Identification Numbers (VIN's) are listed below in two separate groups. Use the VIN when any questions of vehicle origin is involved.

Group A Vehicle Identification Numbers - Smyrna, Tennessee produced vehicles

<u>Model</u>	<u>VIN</u>	<u>Model</u>	<u>VIN</u>
	(*)		
FL720	1N6FD01SXDC300001	KJL720	1N6JD06SXDC300001
KFL720	1N6FD06SXDC300001	ENL720	1N6ND02HXDC200001
NL720	1N6ND01SXDC300001	ENL720A	1N6ND05HXDC300001
NLG720	1N6ND02SXDC300001	NLY720	1N6ND01YXDC300001
KNL720	1N6ND06SXDC300001	NLGY720	1N6ND02YXDC200001
JL720	1N6JD01SXDC300001	KNLY720	1N6ND06YXDC300001
JLG720	1N6JD02SXDC300001	JLY720	1N6JD01YXDC300001

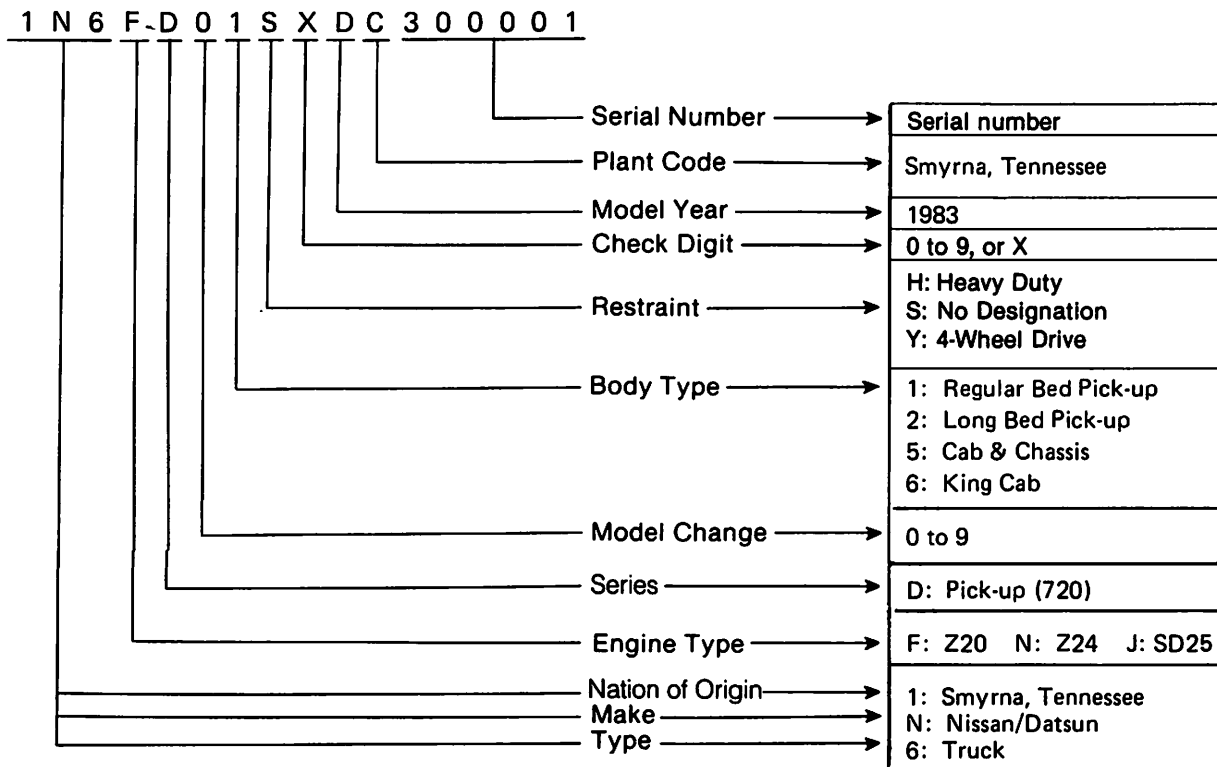
Group B Vehicle Identification Numbers - Kyushu, Japan produced vehicles

<u>U.S.A. Models</u>	<u>VIN</u>	<u>Canada Models</u>	<u>VIN</u>
	(*)		(*)
FL720	JN6FD01SXDW000001	NL720	JN6ND01SXEW300001
KFL720	JN6FD06SXDW000001	NLG720	JN6ND02SXEW300001
NL720	JN6ND01SXDW000001	KNL720	JN6ND06SXEW300001
NLG720	JN6ND02SXDW000001	JL720	JN6JD01SXEW300001
KNL720	JN6ND06SXDW000001	JLG720	JN6JD02SXEW300001
JL720	JN6JD01SXDW000001	KJL720	JN6JD06SXEW300001
JLG720	JN6JD02SXDW000001	ENL720	JN6ND02HXEW300001
KJL720	JN6JD06SXDW000001	ENL720A	JN6ND05HXEW300001
ENL720	JN6ND02HXDW000001	NLY720	JN6ND01YXEW300001
ENL720A	JN6ND05HXDW000001	NLGY720	JN6ND02YXEW300001
NLY720	JN6ND01YXDW000001	KNLY720	JN6ND06YXEW300001
NLGY720	JN6ND02YXDW000001	JLY720	JN6JD01YXEW300001
KNLY720	JN6ND06YXDW000001		
JLY720	JN6JD01YXDW000001		

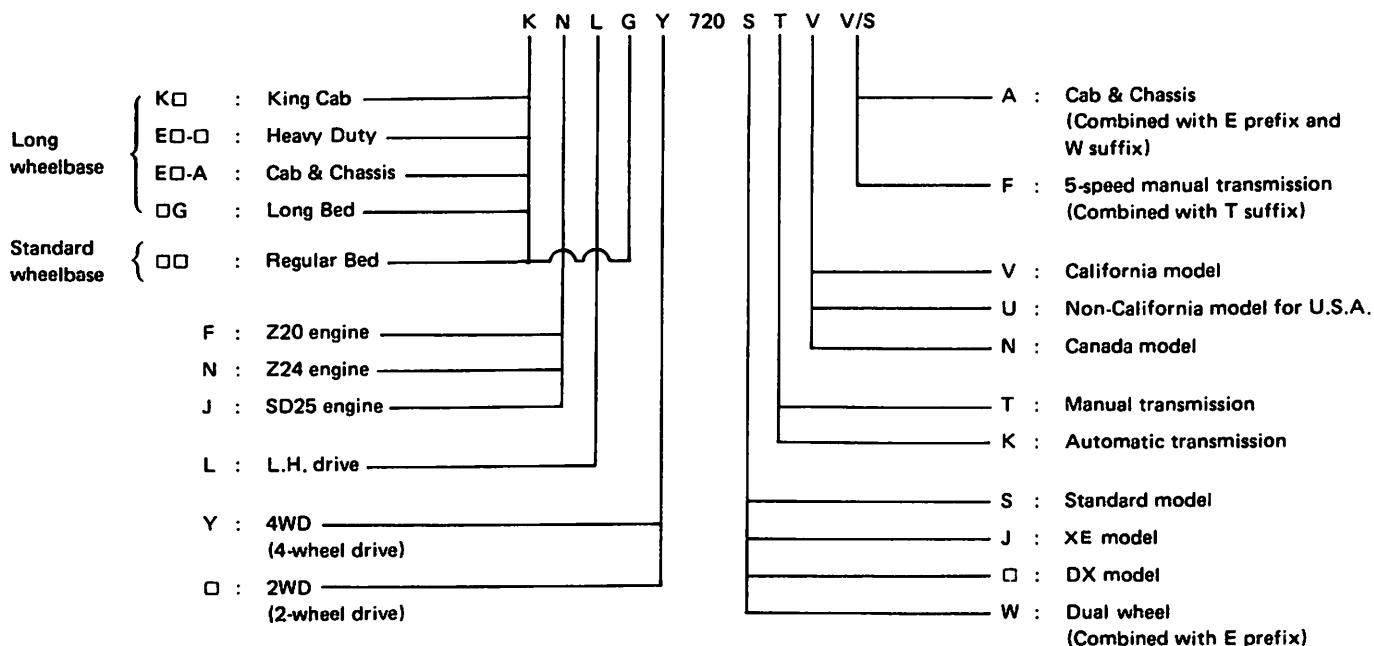
(*) check digit (0 to 9 or X)

GENERAL INFORMATION

HOW TO READ THE 17-DIGIT VEHICLE IDENTIFICATION NUMBER



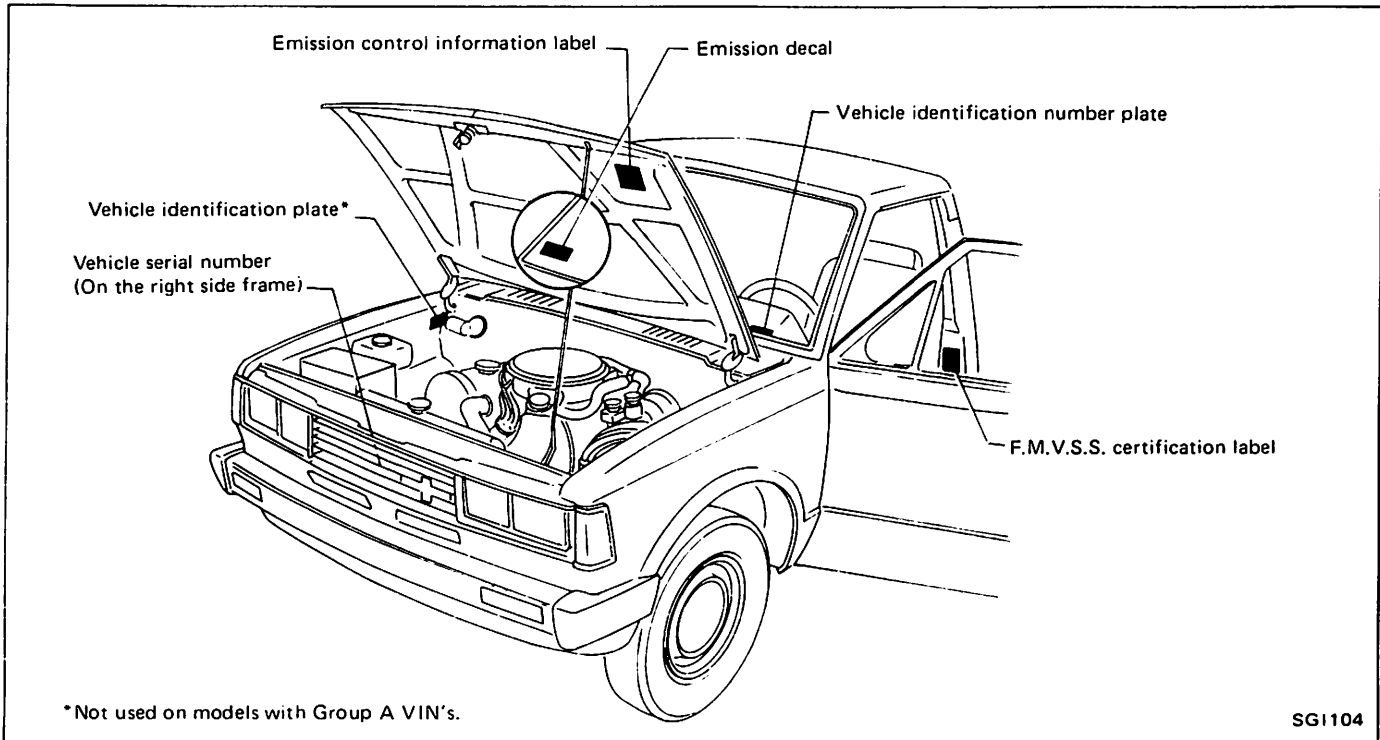
PREFIX/SUFFIX DESTINATIONS




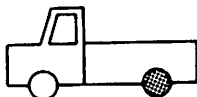
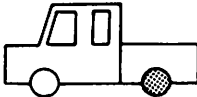
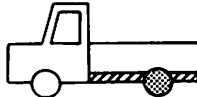
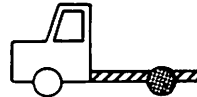

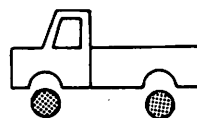
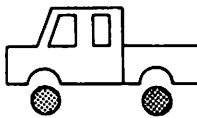
□: means no indications.

GENERAL INFORMATION

LABEL AND DECAL LOCATION



MODEL VARIATIONS

Class		Standard model			Heavy duty model	
Wheelbase		Standard wheelbase	Long wheelbase			
Model	2WD	 Regular Bed	 Long Bed	 King Cab	 Heavy Duty	 Cab & Chassis
	4WD	 Regular Bed	 Long Bed	 King Cab	—	—
Cab type		Regular Cab		King Cab	Regular Cab	
Bed type		Regular Bed	Long Bed	Regular Bed	Long Bed	—
Chassis type		Standard chassis			Heavy chassis	

Destination	Class				Model	Engine	Transmission	Transfer	Differential carrier		Road wheel size ... offset mm (in)	Tire	
									Front	Rear			
U.S.A. California	2WD	Standard models	Standard wheelbase	Regular Bed	STD	NL720STVF	Z24	FS5W71B	-	-	H190M	5-J x 14 ...40 (1.57)	A P195/75R14 B P185SR14
						NL720TVF							
						NL720KV							
				JL720TVF	SD25	FS5W71B							
			Long Bed	DX	NLG720TVF		Z24	L3N71B					
					NLG720KV			L3N71B					
				JLG720TVF	SD25								
		Long wheelbase	King Cab		KNL720TVF	Z24	FS5W71B						
				XE	KNL720JTVF								
				DX	KNL720KV			L3N71B					
		XE	KNL720JKV										
		Heavy duty models	Heavy Duty	Cab & Chassis	Single wheel	DX	KJL720TVF	SD25					
							ENL720TVF						
							ENL720TVFA	Z24					
	Dual wheel			ENL720WTVFA			C200		115 (4.53)*	E78-14 6PR			
4WD	Standard models	Standard wheelbase	Regular Bed		NLY720TVF	T100L	R180	H190A	5½ JJ x 15 ...40 (1.57)	P215/75R15			
			Long Bed		NLGY720TVF								
			King Cab		KNLY720TVF								

A - Used on models with Group A VIN's.
B - Used on models with Group B VIN's.

*For rear dual wheel models

MODEL VARIATION

Destination	Class				Model	Engine	Transmission	Transfer	Differential carrier		Road wheel size ... offset mm (in)	Tire								
									Front	Rear										
U.S.A. 49 State Vehicle	2WD	Standard models	Standard wheelbase	Regular Bed	STD	FL720STUF	Z20	FS5W71B	-	-	H190M	5-J x 14 ...40 (1.57)	P185/80R14							
						NL720STUF	Z24						A P195/75R14							
					NL720TUF	L3N71B								B P185AR14						
					NL720KU								SD25		FS5W71B					
					JL720TUF	Z24	L3N71B													
			NLG720TUF	SD25	FS5W71B															
			NLG720KU					JLG720TUF					SD25							
			Long wheelbase	King Cab	STD	KFL720STUF	Z20							FS5W71B	A P185/80R14					
						DX	KNL720TUF	Z24					B P195/75R14							
					XE	KNL720JTUF	L3N71B								P185SR14					
	DX	KNL720KU			KJL720TUF	SD25														
	XE	KNL720JKU					ENL720TUF	Z24	FS5W71B											
	Heavy duty models	Heavy Duty	Cab & Chassis	Single wheel	ENL720TUF	Z24				FS5W71B	C200	115(4.53)*	E78-14-6PR							
					Dual wheel		ENL720TUF	ENL720WTUFA												
							ENL720TUF		ENL720TUF											
	4WD	Standard models	Standard wheelbase	Regular Bed	STD	NLY720TUF	Z24	FS5W71B	T100L	R180	H190A	5-1/2-K x 15 ...40 (1.57)	P215/75R15							
						Long wheelbase								Long Bed	NLGY720TUF					
															King Cab	KNLY720TUF				
			Long wheelbase	King Cab	DX	Single wheel								ENL720TUF		Z24	FS5W71B	C200	115(4.53)*	E78-14-6PR
														Dual wheel	ENL720TUF					
ENL720TUF															ENL720TUF					

A — Used on models with Group A VIN's.
 B — Used on models with Group B VIN's.

*For dual rear wheel models

Desti- nation	Class				Model	Engine	Transmission	Transfer	Differential carrier		Road wheel size ... offset mm (in)	Tire	
									Front	Rear			
Canada	2WD	Standard models	Standard wheelbase	Regular Bed	STD	NL720STNF	Z24	FS5W71B	-	-	H190M	5-J x 14 ...40 (1.57)	A P195/75R14 B 185SR14
					DX	JL720TNF	SD25						
			Long wheelbase	Long Bed	STD	NLG720STNF	Z24						
					DX	NLG720TNF							L3N71B
				King Cab	GL	JLG720KN	SD25						
					GL	JLG720TNF	SD25						
		Heavy duty models	Heavy Duty	Cab & Chassis	Single wheel	ENL720JTNF	Z24	FS5W71B					
						ENL720JKN	L3N71B						
			Dual wheel	DX	ENL720JTNF	Z24	FS5W71B						
				DX	ENL720TNFA	Z24	FS5W71B						
	4WD	Standard models	Standard wheelbase	Regular Bed	ENL720WTNFA	Z24	FS5W71B	T100L	R180	H190A	115 (4.53) *	E78-14-6PR	
					DX	ENL720TNFA	Z24						
		Long wheelbase	Long Bed	NLY720TNF	Z24	FS5W71B							
				NLY720TNF	Z24	FS5W71B							
Standard models	Long wheelbase	King Cab	King Cab	NLY720TNF	Z24	FS5W71B	T100L	R180	H190A	115 (4.53) *	E78-14-6PR		
				NLY720TNF	Z24	FS5W71B							

A – Used on models with Group A VIN's.
 B – Used on models with Group B VIN's.

*For dual rear wheel models

PROPELLER SHAFT & DIFFERENTIAL CARRIER

SECTION PD

CONTENTS

PROPELLER SHAFT *	
GENERAL INSPECTION..... *	
PROPELLER SHAFT VIBRATION..... *	
REMOVAL AND INSTALLATION..... *	
PRIMARY PROPELLER SHAFT..... *	
FRONT AND REAR PROPELLER SHAFT..... *	
INSPECTION..... *	
PROPELLER SHAFT RUNOUT..... *	
FLANGE YOKE AND SLEEVE YOKE..... *	
JOURNAL AXIAL PLAY..... *	
REPAIR..... *	
CENTER BEARING (3S63H)..... *	
JOURNAL..... *	

FINAL DRIVE

TROUBLE-SHOOTING PROCEDURE.....	PD-1
SPECIAL TOOLS.....	PD-4
SPECIFICATIONS.....	PD-7

FRONT FINAL DRIVE

MODEL: R180.....	PD-8
SERVICE INFORMATION.....	PD-9
TIGHTENING TORQUES.....	PD-9
PREPARATION FOR DISASSEMBLY.....	PD-10
DISASSEMBLY.....	PD-15
PARTS INSPECTION.....	PD-19
ASSEMBLY.....	PD-20
PRELOAD/PINION HEIGHT ADJUSTMENT ..	PD-21
SIDE BEARING SHIM DETERMINATION.....	PD-26
FINAL VERIFICATION.....	PD-30
SEAL REPLACEMENT.....	PD-32
R180 ADJUSTMENT SHIM AND WASHERS..	PD-34

REAR FINAL DRIVE

MODELS: H190-ML, H190-A.....	PD-35
SERVICE INFORMATION.....	PD-36
TIGHTENING TORQUES.....	PD-36
PREPARATION FOR DISASSEMBLY.....	PD-37
DISASSEMBLY.....	PD-40
PARTS INSPECTION.....	PD-43
ASSEMBLY.....	PD-43
PRELOAD/PINION HEIGHT ADJUSTMENT ..	PD-44
SIDE BEARING SHIM DETERMINATION... PD-48	
FINAL VERIFICATION.....	PD-51
SEAL REPLACEMENT.....	PD-53
H190-ML, H190-A ADJUSTMENT	
SHIMS/WASHERS.....	PD-56



*Refer to your 1983 NISSAN Pick-up Service Manual — 1st Revision.

Differential Road Test and Diagnosis

BEFORE you remove the differential from a vehicle, perform a complete diagnosis. Road testing a vehicle to detect exact symptoms is essential for proper diagnosis. This will save time, since you may avoid over-

hauling the differential because of a noisy transmission or wheel bearing. A complete diagnosis will also tell you exactly where to look for defects during disassembly.

Road Test Procedure

A complete road test includes the following steps. Make a note of any malfunctions or noises.

DRIVING PROCEDURE	Noise Factors			
	Med.	Loud	Clunk	OK
1. Steady acceleration, light throttle.				
2. Steady acceleration, heavy throttle.				
3. Steady <u>d</u> eceleration, from high speed.				
4. Light deceleration — on and off accelerator pedal.				
5. Cruising at low speeds up to 30 - 45 MPH.				
6. Cruising at high speeds 45 MPH and over.				
7. Cornering, steady speed at part throttle.				
8. Cornering, deceleration and acceleration.				
9. Harsh shifts, first to second on straight road and around corners.				
10. Vehicle stopped, shift between first and reverse, brake applied.				
11. Shift between first and reverse, brake released.				

Interpreting the Road Test

Use the following Diagnostic Chart to isolate the problem.

Customer Comment	Probable Cause of Defect	Diagnostic Step — Road Test	Final Diagnosis — Shop Test
Whines at high speeds.	(A) Transmission speedometer gear. (B) Defective differential front pilot bearing (independent suspension models). (C) Defective wheel bearings.	(A) Drive vehicle at speeds 45 MPH and over. (B) If whine present on deceleration, this indicates front bearing or pilot bearing.	(A) With vehicle on lift, use hearing device to locate noise at transmission housing and gear cable. (B) Use hearing device to locate noise at front of differential housing and to make sure that the noise is not caused by wheel bearings or transmission problems.
Whines or howls at low speed under a load (heavy throttle or when 2 or more passengers occupy vehicle).	(A) Defective rear pinion bearing. (B) Improper pinion height causing poor tooth contact area.	(A) Drive vehicle at low speeds up a hill if possible, and under a load. If noisy, see (b) shop test. (B) Check noise factor on deceleration. If present, see (b) shop test.	(A) Using a hoist or jack and stand, run the vehicle to verify loudest noise using hearing device. Replace rear pinion bearing. (B) If noise is present on both acceleration and deceleration, it is most likely caused by improper pinion height. Be sure to take a pattern reading.
Whines or howls on deceleration only.	(A) Improper backlash. (B) Improper pinion height.	(A) Drive vehicle at all speeds. (B) If noise only present on deceleration, the problem can usually be corrected by adjustment of backlash or pinion height. If backlash is incorrect, you will also feel a slight clunk if you accelerate and decelerate quickly.	(A-B) Testing on a lift will usually not be beneficial as you would not hear the noise factor without deceleration load. Disassemble and check tooth pattern.

FINAL DRIVE — Diagnosis





Diagnosis Chart (cont'd)

Customer Comment	Probable Area of Defect	Diagnostic Step — Road Test	Final Diagnosis — Shop Test
Clunks when shifting or going around corners.	<p>(A) Differential hangers, bushings loose or worn.</p> <p>(B) Improper clearance of side gears.</p> <p>(C) Pinion mate shaft worn.</p> <p>(D) Improper backlash.</p>	<p>(A) Drive vehicle and shift under load and no load conditions. If the differential hangers are loose or the mounts are defective, the clunk will be heavy and felt through the entire body.</p> <p>(B-C-D) If more of a knocking sound, drive the vehicle around corners while shifting. This will increase the clunk effect.</p>	<p>(A) Check on hoist using pry bar. Replace defective parts.</p> <p>(B) If the vehicle clunks while testing on straight road, this indicates improper backlash.</p> <p>(C) If the vehicle clunks on straight roads when shifting and around corners, this indicates side gear clearance. Readjust or replace side gears.</p>
Howls or growls at all speeds	<p>(A) Defective gear set.</p> <p>(B) Defective side bearings.</p> <p>(C) Rear wheel bearings.</p>	<p>(A-B) Drive vehicle at various speeds to determine if noise changes tone under load or coasting.</p> <p>(C) Drive the vehicle around corners to see if the noise level is high around right or left turns.</p>	<p>(A-B) If the noise level changes very little, the problem is most likely bearings. If the noise level changed excessively, it is most likely the gear set.</p> <p>(C) If the noise level changed around corners, jack up one wheel at a time (use jack stand). Run in gear while one wheel is locked. Observe noise factor change. Use hearing device to isolate the loudest area (wheel bearing or side bearing).</p>
Leaks	<p>(A) Drive pinion shaft seal.</p> <p>(B) Cover gasket.</p> <p>(C) Loose plug.</p>	<p>(A) Road test to verify that the leak is not accompanied by a noise indicating a defective pilot or front pinion bearing.</p>	<p>(A-B) Place the vehicle on a hoist and inspect for loose pinion shaft seal or defective gasket.</p> <p>(C) Check the drain plug and plug socket (may be cracked around housing).</p>





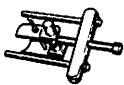
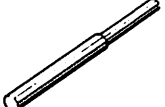

FINAL DRIVE SPECIAL TOOLS — Models: R180, H190-ML, H190-A, C200

(Listed in service procedure sequence)

A. Pre-Disassembly Inspection

ILLUSTRATION	TOOL NO.	DESCRIPTION	DIFFERENTIAL APPLICATION			
			R180	H190-ML	H190-A	C200
	J 8001-M	Metric Dial Indicator Set (J 8001-6 Dial Indicator only)	X	X	X	X
	J 25765-A	Pinion Preload Gauge	X	X	X	X
	J 25602-01	Universal Differential Holding Fixture		X	X	
	J 25604-01	Differential Holding Fixture	X			

B. Disassembly

ILLUSTRATION	TOOL NO.	DESCRIPTION	DIFFERENTIAL APPLICATION			
			R180	H190-ML	H190-A	C200
	J 8107-2	Side Bearing Puller Pilot (Use with J 22888) (Supersedes J 25797-2)	X	X	X	X
	J 22888	Side Bearing Puller (Use with J 25797-1, -2 or -3 as Required)	X	X	X	X
	J 22912-01	Rear Pinion Bearing Remover & Installer	X	X	X	X
	J 25774-A	Pinion and Axle Shaft Flange Wrench	X	X	X	X
	J 25810-A	Side Bearing Race Remover	X			
	J 25749	Pilot Bearing & Pinion Bearing Race Remover	X	X	X	
	J 25689-A	Fork Rod Pin Punch	X	X	X	X

FINAL DRIVE SPECIAL TOOLS — Models: R180, H190-ML, H190-A, C200
 (Listed in service procedure sequence)

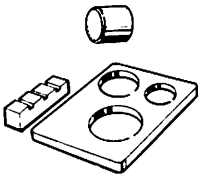

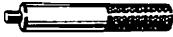




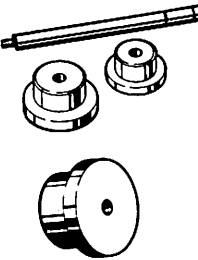
C. Preload/Pinion Height Adjustment

ILLUSTRATION	TOOL NO.	DESCRIPTION	DIFFERENTIAL APPLICATION			
			R180	H190-ML	H190-A	C200
	J 25269-B	Pinion Height & Preload Gauge Set Consists of: J 25269-23 Bolt & Nut	X	X	X	X
		J 23597-1 Arbor (Long Plunger)	X	X	X	X
		J 25269-4 (1 Req'd)	X			X
		J 25269-18 (1 Req'd)				X
		J 25269-18 (2 Req'd)		X	X	
		J 25269-1	X			
		J 25269-20 Gauge Plates			X	
		J 25269-30		X		
		J 33920				X
		J 25269-2 Rear Pinion Bearing Pilots	X	X	X	X
		J 25269-3 Front Pinion Bearing Pilots	X	X	X	X
		J 25269-26		X	X	X
		Bearing Preload Adapters J 25269-27	X			
		J 25269-29 Front Bearing Pilot Support	X	X	X	X
J 25269-24 Lead Preload Washers	X					
	J 26010-01	Rear Pinion Bearing Installer	X	X	X	X

FINAL DRIVE SPECIAL TOOLS — Models: R180, H190-ML, H190-A, C200

(Listed in service procedure sequence)

D. Side Bearing Adjustment and Assembly

ILLUSTRATION	TOOL NO.	DESCRIPTION	DIFFERENTIAL APPLICATION			
			R180	H190-ML	H190-A	C200
	J 25407-01	Side Bearing Measuring Set Consists of: J 25407-1 4-Step Gauge Block J 25407-2 Base Plate J 25407-3 Weight Block	X	X	X	X
	J 25805-01	Side Bearing Installer (Use with J 26090)	X	X	X	
	J 26090	Driver Handle (Universal)	X	X	X	
	J 8107-2	Side Bearing Puller Pilot (Use with J 22888) (Supersedes J 25797-2)	X	X	X	X
	J 25267	Side Bearing Shim Installer				X
	J 25273	Pinion Oil Seal Installer	X	X	X	
	J 25405	Pinion Oil Seal Installer				X
	J 25742	Pinion Bearing Race Installer Set Consists of:				
		J 25742-1 Driver Handle	X	X	X	X
		J 25742-2 Installer (Front)	X	X	X	
		J 25742-3 Installer (Front)				X
J 25742-5 Installer (Rear)	X	X	X	X		

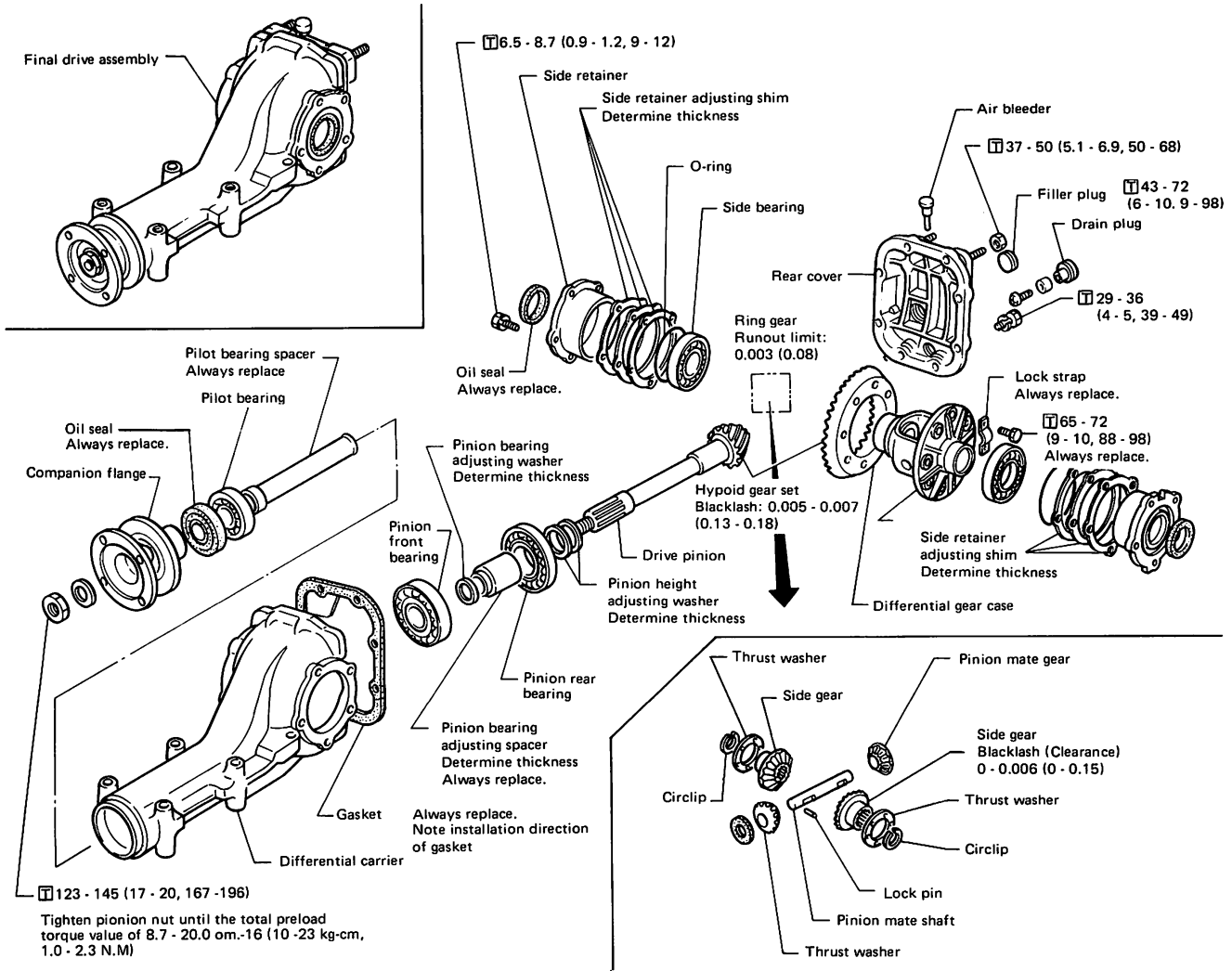
FINAL DRIVE — Diagnosis

General Specifications

Applied model	2WD				4WD	
	Z20 engine	Z24 engine			Z24 engine	
		M/T	A/T	Double tire	Front	Rear
Model	H190-ML			C200	R180	H190A
Type	Rigid axle suspension (Banjo type)			Cast center	*1	*2
Drive pinion preload adjusted by	Collapsible spacer				Solid spacer and washer	Collapsible spacer
Ring gear pitch diameter mm (in)	190 (7.48)			200 (7.87)	180 (7.09)	190 (7.48)
Gear ratio	3.364	3.545	3.700	4.375	3.889	3.889
Number of teeth (Ring gear/Drive pinion)	37/11	39/11	37/10	35/8	35/9	35/9
Oil capacity liter (US pt, Imp pt)	1.25 (2-5/8, 2-1/4)				1.0 (2-1/8, 1-3/4)	1.25 (2-5/8, 2-1/4)

*1: Independent suspension

*2: Rigid axle suspension (Banjo type)



FRONT FINAL DRIVE
— Model: R180 —
FRONT FINAL DRIVE — Model: R180

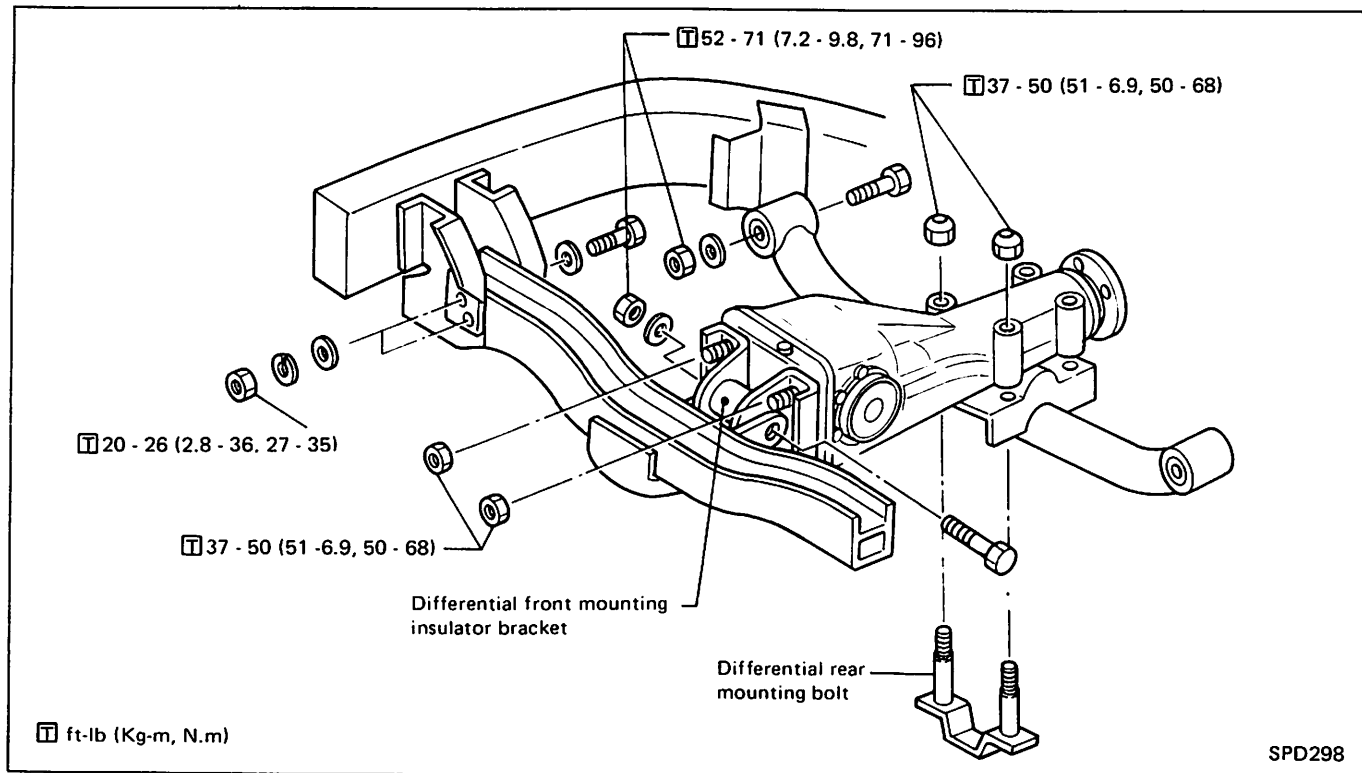
DIFFERENTIAL SERVICE INFORMATION

MODEL: R180

PROCEDURE SPECIFICATIONS	
Procedure	Specification
<ul style="list-style-type: none"> • Drive Pinion Preload (With front oil seal) in-lb (kg-cm, N.m) 	7.8-14.8 (9-17, 0.9-1.7)
<ul style="list-style-type: none"> • Side Bearing Adjusting Method 	Shim Washer
<ul style="list-style-type: none"> • Backlash: in (mm) <ul style="list-style-type: none"> — Drive Pinion to Ring Gear — Side Gear to Pinion Mate Gear (Between side gear and case) 	0.005-0.007 (0.13-0.18) 0-0.006 (0-0.15)
<ul style="list-style-type: none"> • Ring Gear Runout Limit in (mm) 	0.003 (0.08)
<ul style="list-style-type: none"> • Total Preload in-lb (kg-cm, N.m) 	8.7-20.0 (10-23, 1.0-2.3)

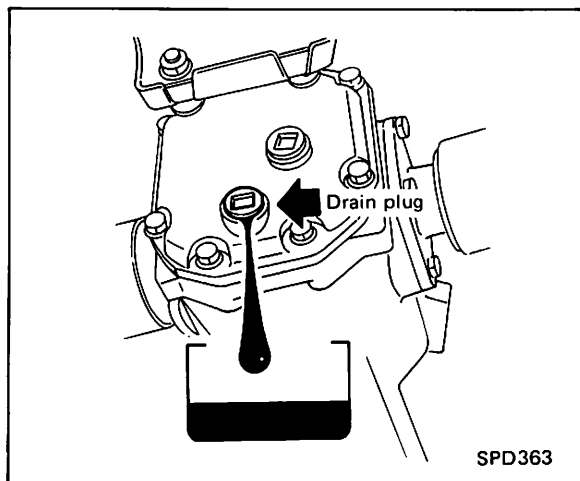
TIGHTENING TORQUES			
Unit	ft-lb	kg-cm	N.m
Drive pinion nut	123-145	17-20	167-196
Ring gear bolt	65- 72	9-10	88- 98
Companion flange to propeller shaft bolt	25- 33	3.5-4.5	34- 44
Drain and filler plugs	43- 72	6-10	59- 98
Side retainer bolt	6.5-8.7	0.9-1.2	9- 12
Rear cover bolt	29- 36	4- 5	39- 49
Differential carrier front mounting Carrier to bracket	37- 50	5.1-6.9	50- 68
Crossmember to bracket	52- 71	7.2-9.8	71- 96
Differential carrier rear mounting	37- 50	5.1-6.9	50- 68
Drive shaft to side flange bolts	20- 27	2.8-3.8	27- 37

Front Differential Carrier Mounting



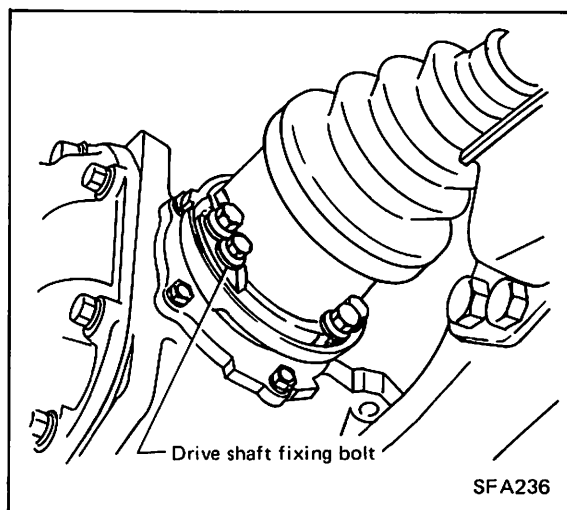
Preparation for Disassembly — Removal

1. Jack up front of vehicle and support it by placing safety stands. Refer to Section GI of your Service Manual.
2. Remove drain plug and drain gear oil.



3. Disconnect front propeller shaft. Refer to Propeller Shaft for removal.

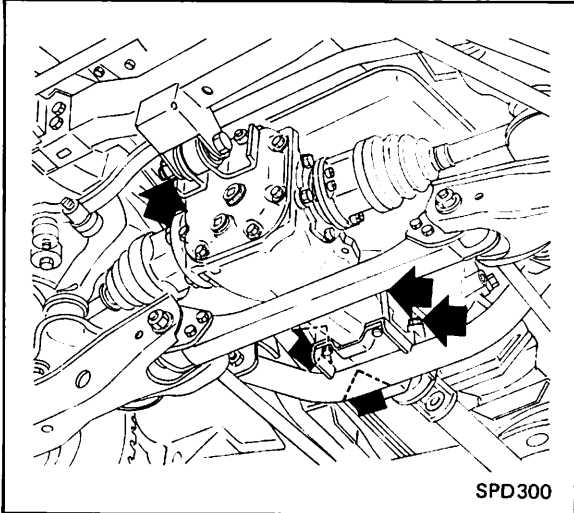
4. Remove bolts fixing drive shaft to side flange.



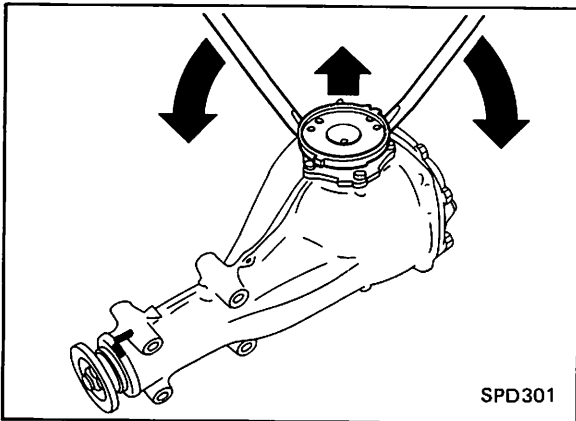
NOTE:
Do not remove boots.

Preparation for Disassembly — Removal (Con't)

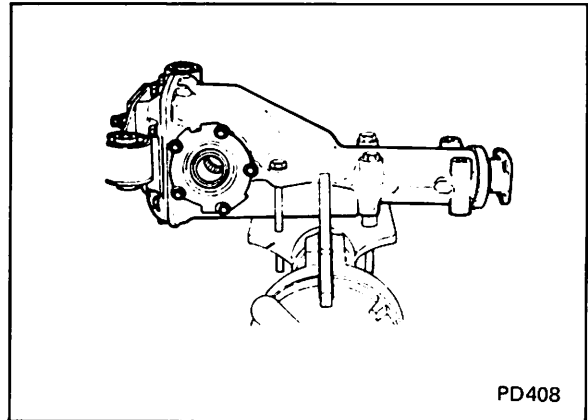
5. Disconnect fixing bolts that hold differential carrier onto crossmember.



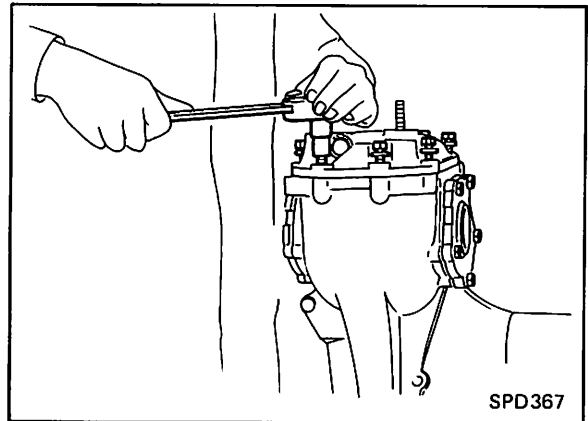
6. Remove differential carrier as assembly.
7. Remove side flanges by carefully prying them from the housing as shown.



8. Mount differential carrier on Tool J-26023.



9. Remove rear cover.



Pre-Disassembly Inspection

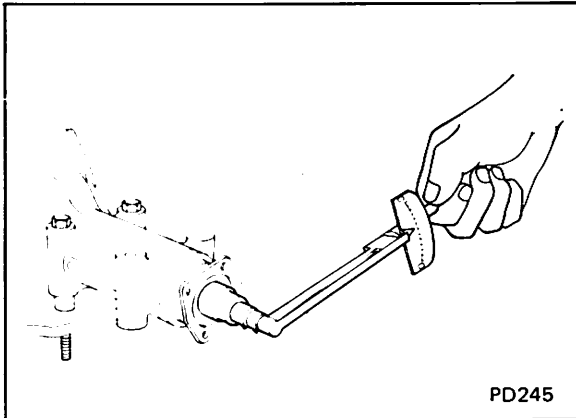
1. Check total preload with Tool J-25765A. If it is not within specifications, adjust it.

NOTE:

When checking preload, turn drive pinion in both directions several times to set bearing rollers.

Total preload:

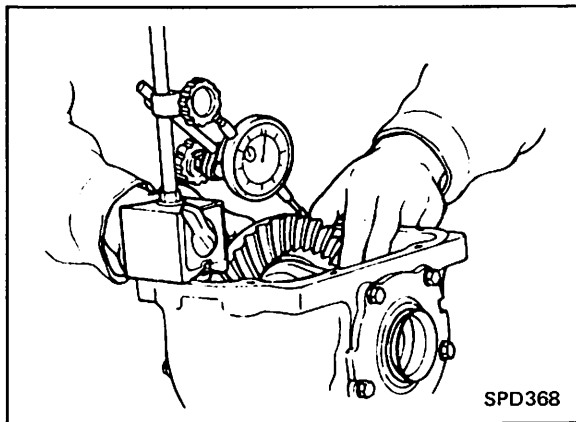
8.7-20.0 in-lb (10-23 kg-cm, 1.0-2.3 N.m)



2. Check backlash of ring gear with a dial indicator at several points. If it is not within specification, adjust it.

Backlash:

0.005-0.007 in (0.13-0.18 mm)



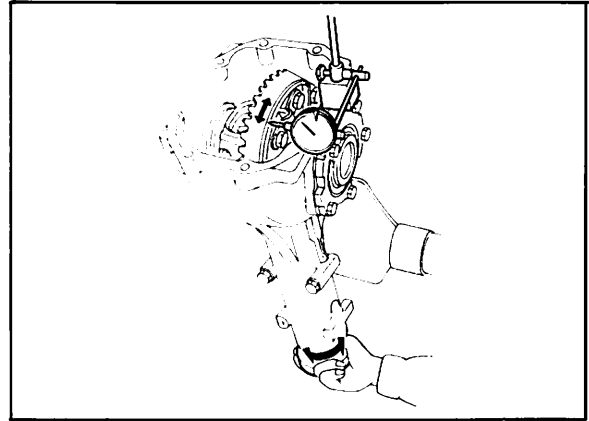
3. Check runout of ring gear with a dial indicator.

Runout limit:

0.003 in (0.08 mm)

NOTE:

When backlash varies excessively in different places, the variance may have resulted from foreign matter caught between ring gear and differential case.



If the runout is over specifications even after removal of the foreign matter, the hypoid gear set or differential case should be repeated.

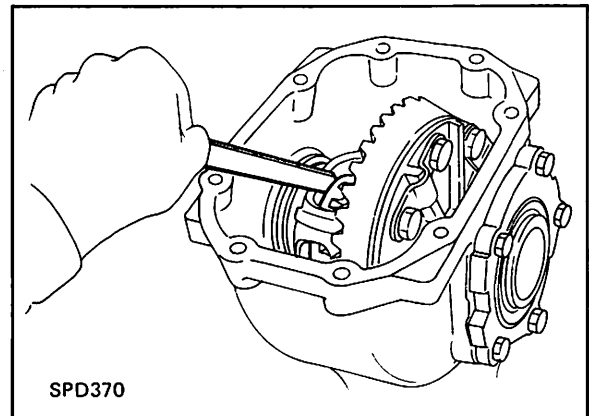
If the backlash varies greatly even when the runout of the ring gear is within specified range, the hypoid gear set or differential case should be replaced.

4. Check backlash of side gear. Using a thickness gauge, measure clearance between side gear and differential case.

If it is not within specification, adjust it by selecting side gear thrust washer.

Side gear clearance:

0.006 in (0.15 mm)



5. Check tooth contact, referring to Tooth Contact.

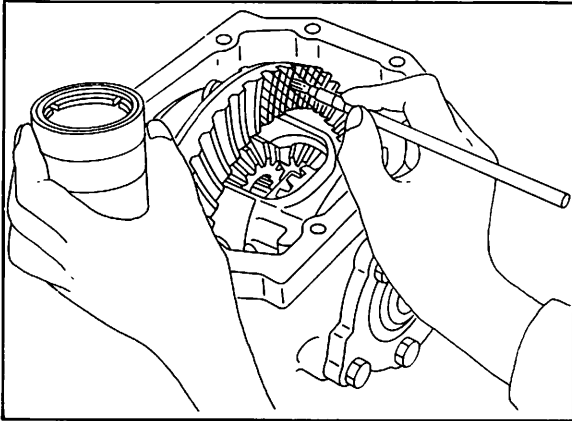
Tooth Contact

Gear tooth contact pattern check is necessary to verify correct relationship between ring gear and drive pinion.

Hypoid gear sets which are not positioned properly may be noisy, or have short life or both. With a pattern check, the most desirable contact for low noise level and long life can be assured.

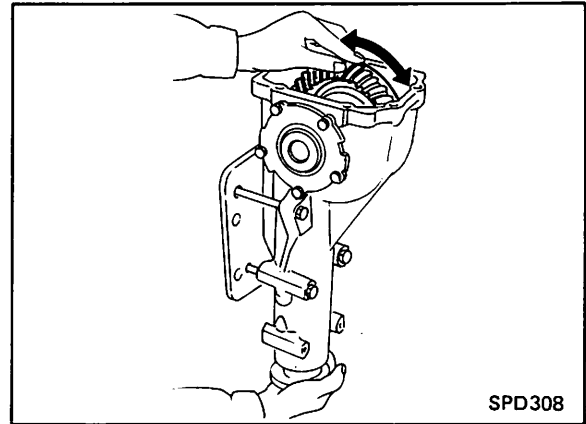
Check

1. Thoroughly clean ring gear and drive pinion teeth.
2. Sparingly apply a mixture of powdered ferric oxide and oil or equivalent to 3 or 4 teeth of ring gear **drive side**.



SPD357

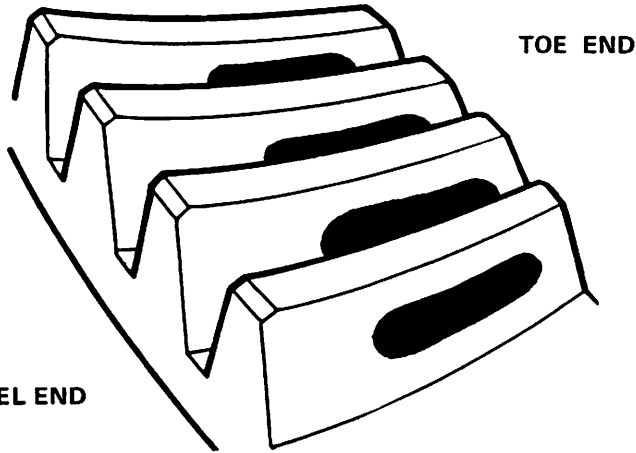
3. Hold companion flange steady by hand and rotate the ring gear in both directions.



SPD308

4. Compare contact marks left on the ring gear to those found in the following chart.

Tooth Pattern Interpretation

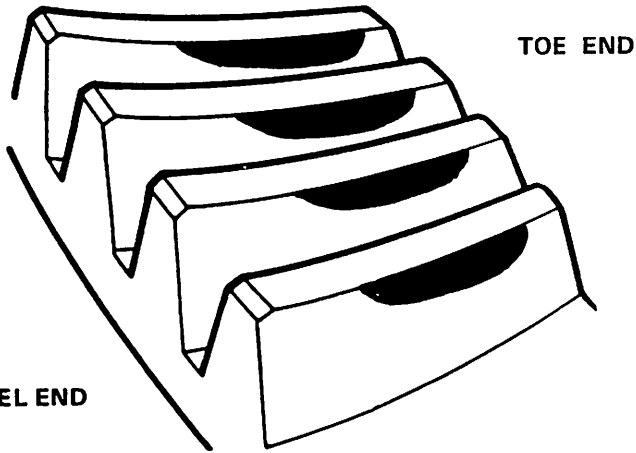


HEEL END

TOE END

Perfect tooth pattern.

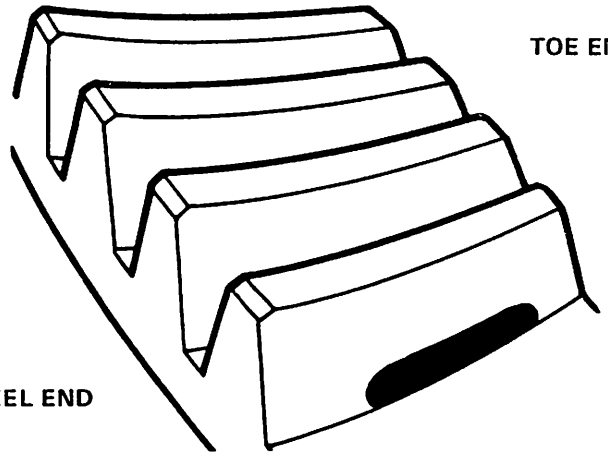
NOTE: A change in pinion height will also cause a change in backlash, so both will usually have to be adjusted.



HEEL END

TOE END

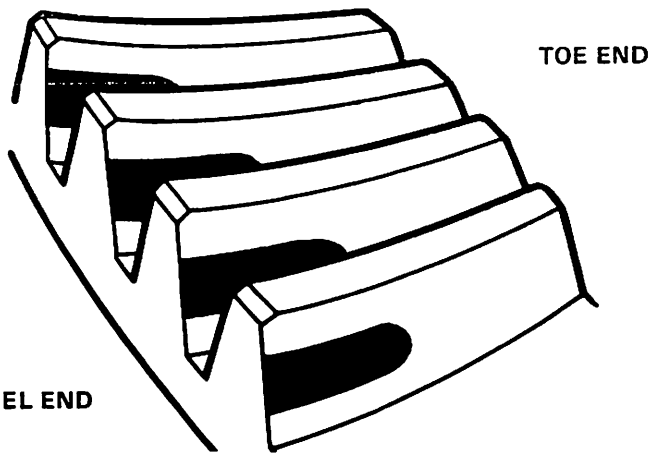
The pinion is too low. You will have to add to the shim(s) under the pinion.



HEEL END

TOE END

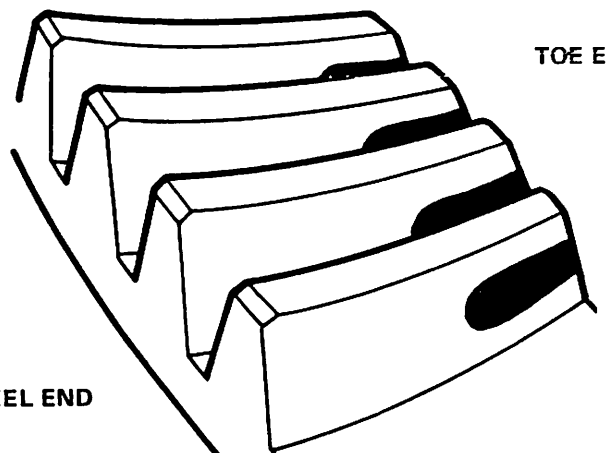
The pinion is too high. The shim(s) under the pinion will have to be decreased.



HEEL END

TOE END

There is too much backlash — the ring gear will have to be moved closer to the pinion.



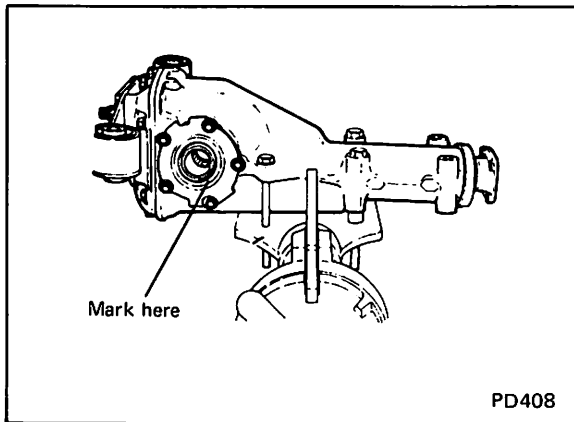
HEEL END

TOE END

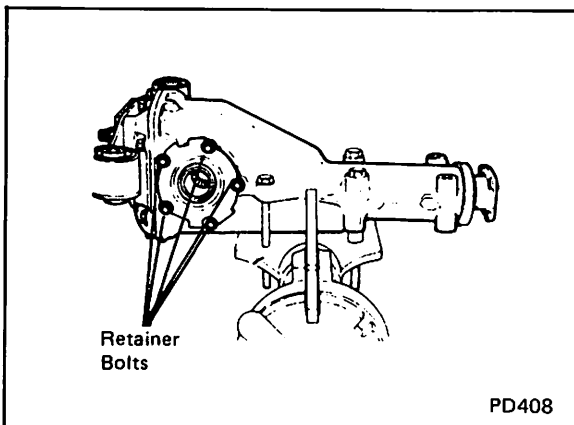
There is not enough backlash — the ring gear will have to be moved away from the pinion.

Disassembly

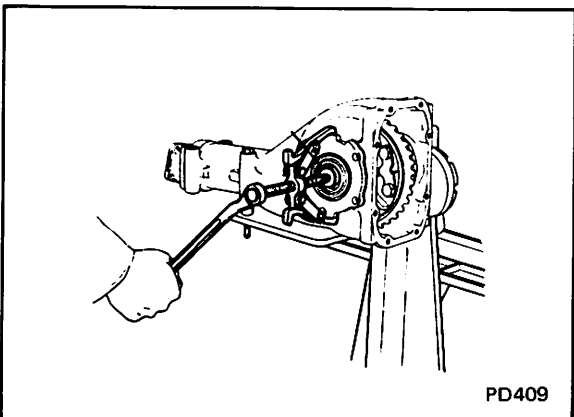
1. Mark one of the side bearing retainers to keep them from becoming mixed up during the overhaul.



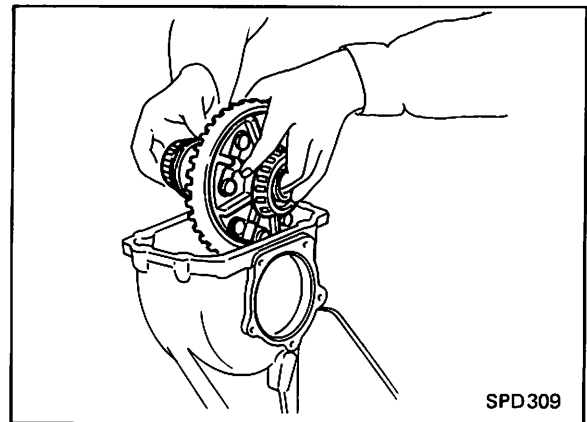
2. Remove the side bearing retainer bolts using a 12mm socket.



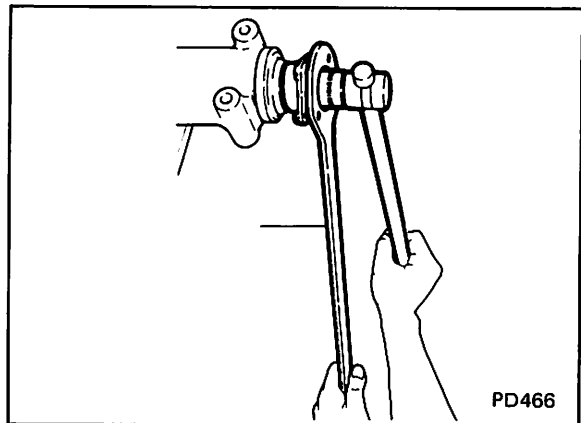
3. Remove the side bearing retainers. Usually they will slide out easily. Use Tool J-25810 if necessary.



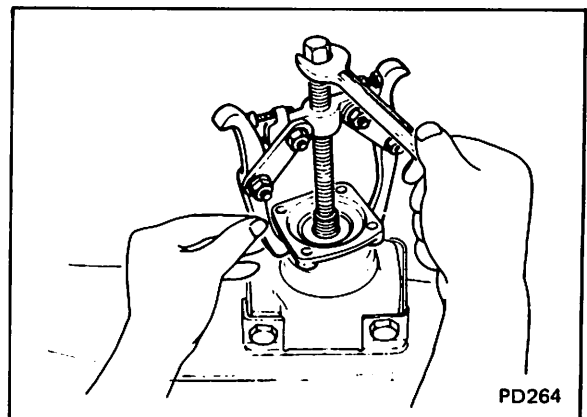
4. Turn the ring gear assembly until the open side of the case is facing you, and remove the case from the housing.



5. Attach the flange wrench J-25774 to the flange to prevent its turning, and remove the pinion shaft nut using a 27mm socket and breaker bar.

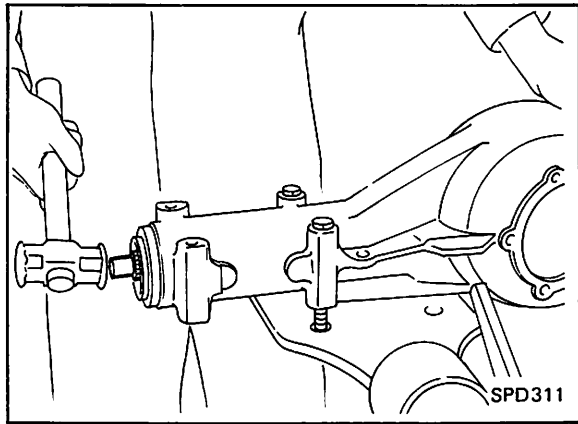


6. Remove the companion flange using Tool J-22888.

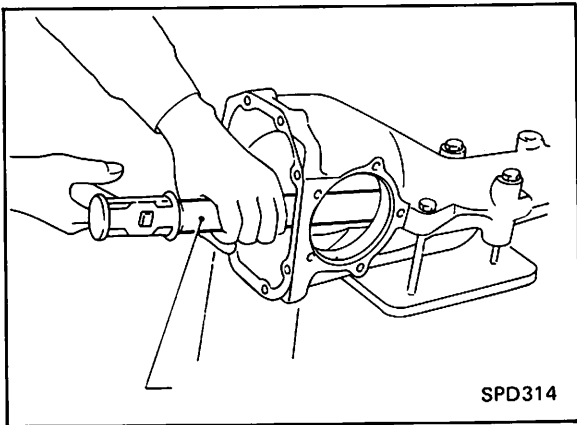


Disassembly (Con't)

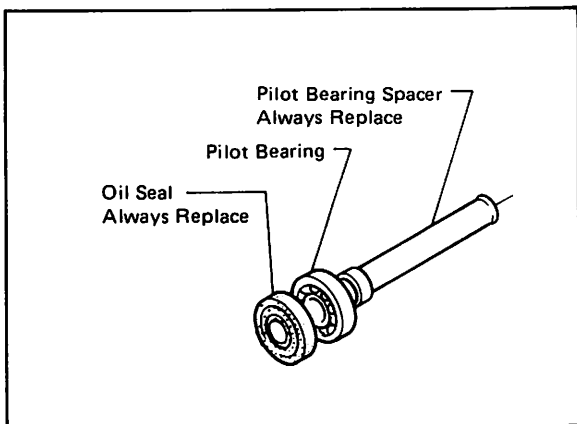
7. Drive the pinion through the housing using a brass drift and a heavy hammer. Keep the pinion head from being damaged.



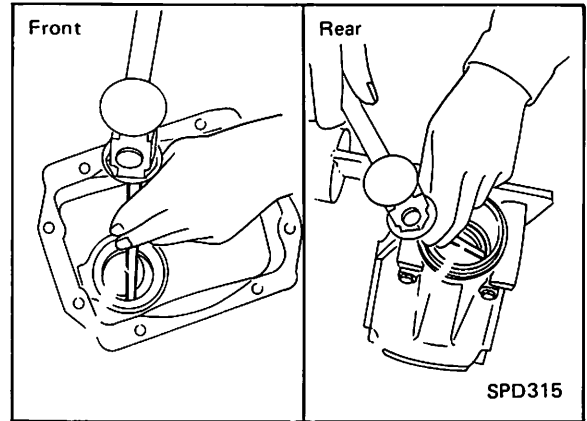
8. Slide the pilot bearing drift Tool J-25749-A into the open end of the housing, through the pinion bearings and sleeve. You will probably have to lift the sleeve with your finger before the drift will slide through.



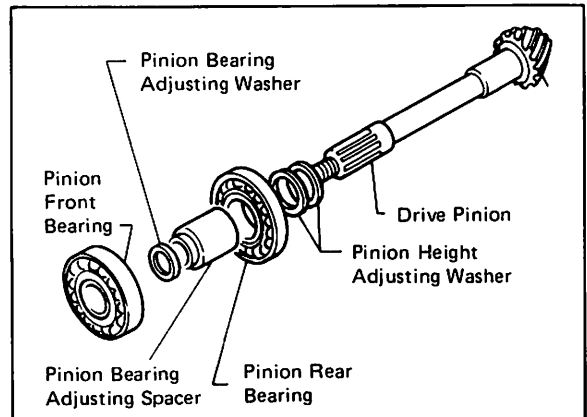
9. Using the drift and a heavy hammer, drive the drift on through the housing. This will remove the front pinion bearing spacer, pilot bearing and oil seal.



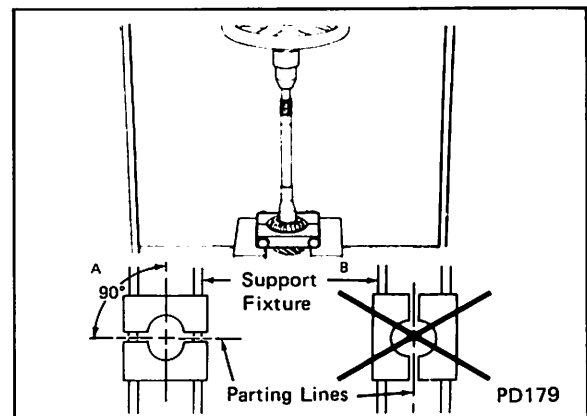
10. Remove both bearing races, using the same pilot bearing drift Tool J-25749. This completes the disassembly of the housing.



11. Remove the pinion bearing adjusting washer and spacer from the pinion shaft. Save the washer and spacer.



12. Remove the rear pinion bearing using a press and Tool J-22912-01. Be certain the parting line of the Tool is at a right angle to the support fixture of the press (A). This will prevent bending of the tool (B). Save the pinion height washer for re-use.

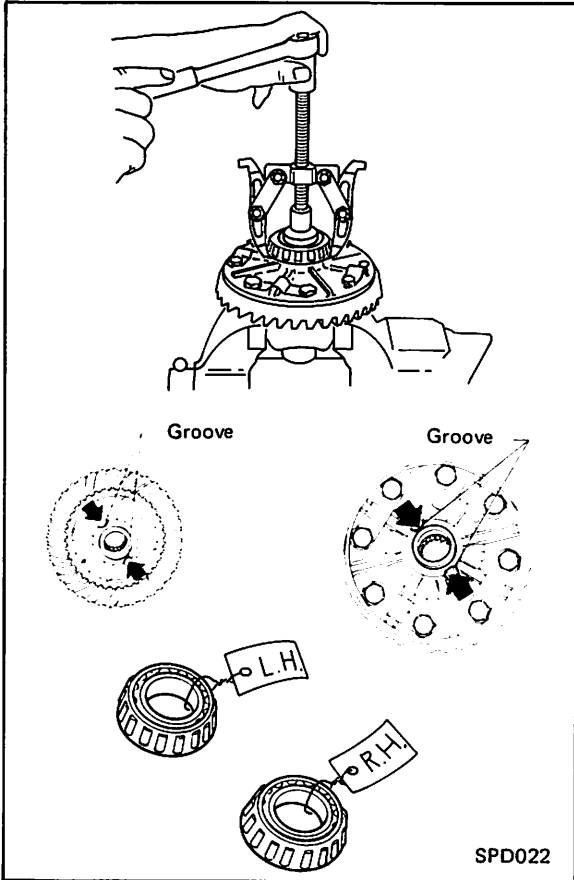


Disassembly (Con't)

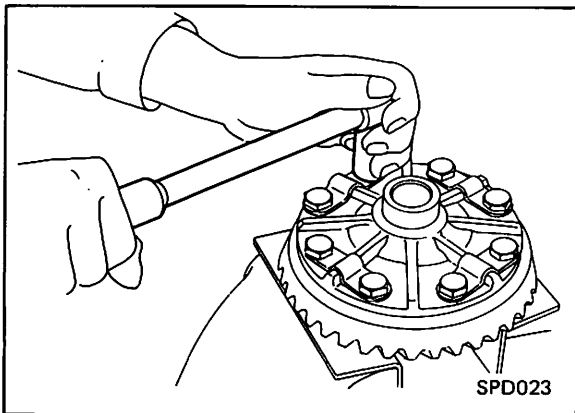
13. Attach the side bearing puller and pilot (Tools J-22888 and J-8107-02) to the side bearing, and remove both side bearings. Keep the bearings and races together.

NOTE:

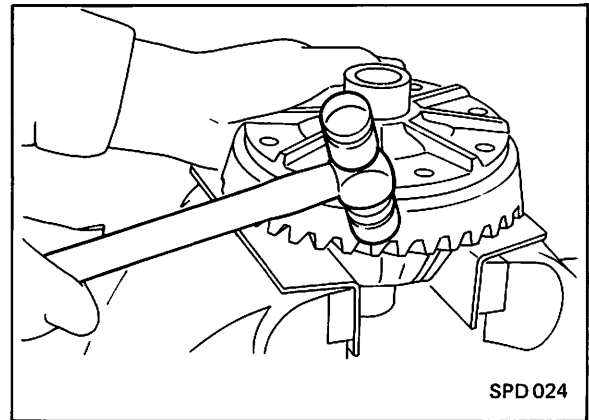
Be certain the puller catches the groove at the edge of the bearing inner race.



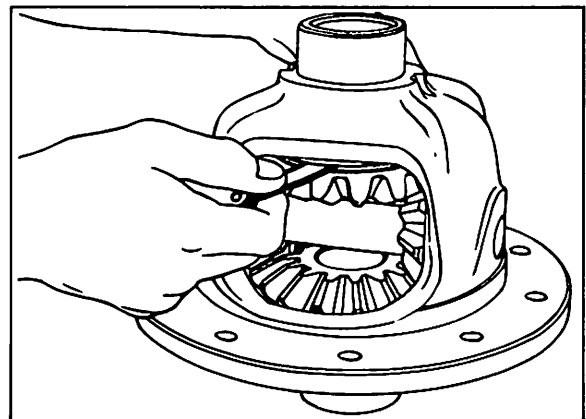
14. Flatten the lock tabs and remove the ring gear bolts in a criss-cross fashion, using a 17mm socket.



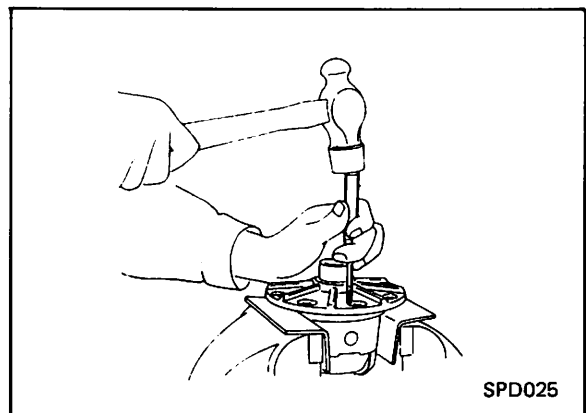
15. Tap the ring gear off the gear case using a plastic hammer. Tap evenly all around to keep the gear from binding.



16. Double check the side gear to gear case clearance previously measured during inspection. The clearance must be 0.006 in (0.15mm). If not, the side gear thrust washers will have to be changed during re-assembly.

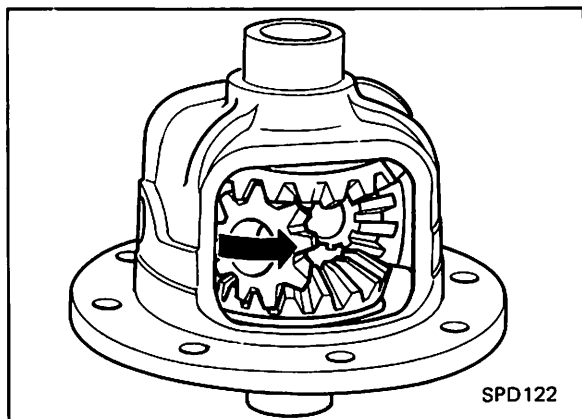


17. Using a long drift, drive the lock pin out of the gear case.

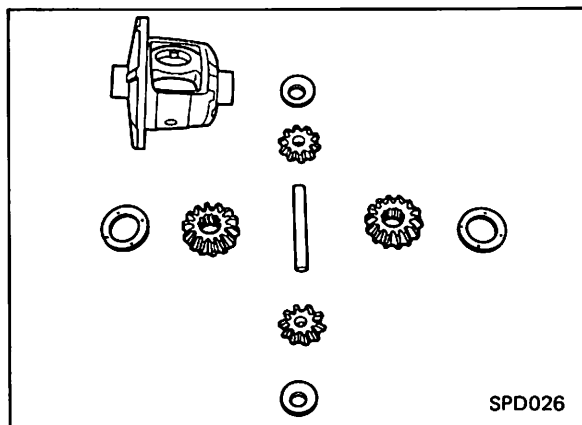


Disassembly (Con't)

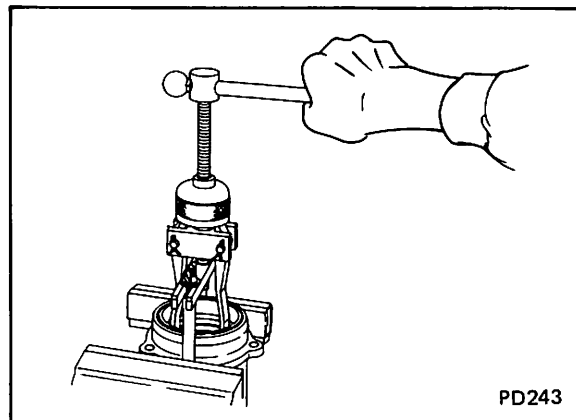
18. Draw out pinion mate shaft, then rotate pinion mate gears out of the case and remove side gears and thrust washers.



NOTE:
Put marks on gears and thrust washers so that they can be reinstalled in their original positions.



19. Remove the side bearing races, using Tool J-25810-A.

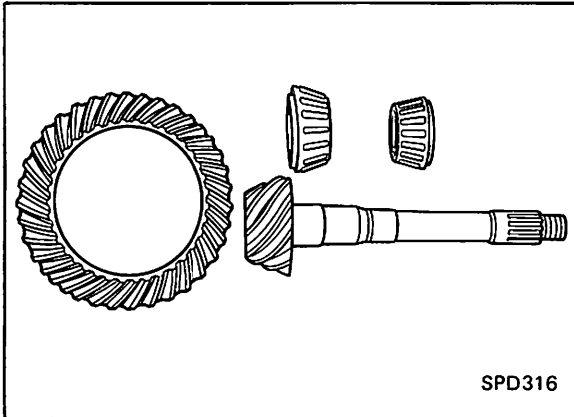


NOTE:
Remove the races each time this differential is overhauled. They will be measured during this procedure.

Parts Inspection

Disassembled parts should be cleaned thoroughly, then examined for wear or damage. Always repair or replace any damaged parts.

1. Check all gear teeth for scoring, cracking or chipping.

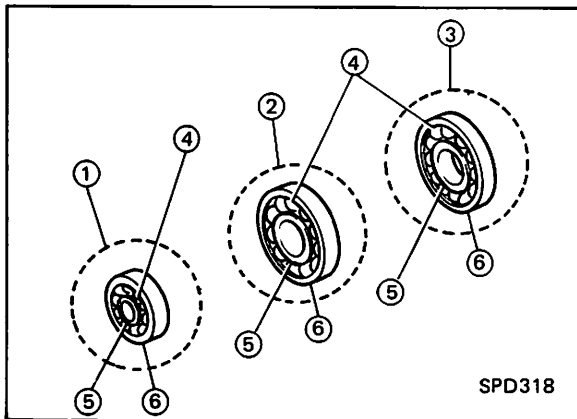


NOTE:

The ring gear and pinion shaft will always be replaced as a set.

2. Inspect bearing races and rollers for scoring, cracking, chipping or signs of excessive wear.

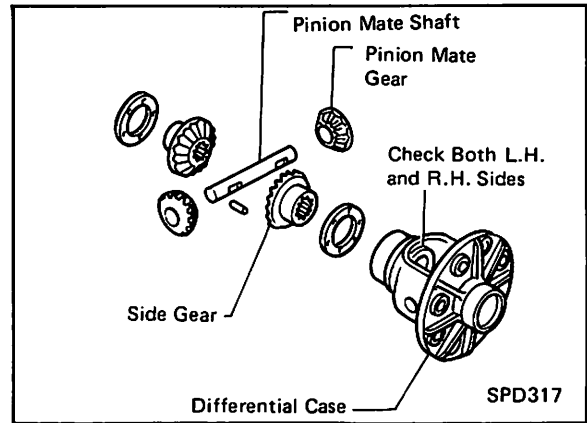
- | | |
|------------------------|--------------|
| 1 Front pilot bearing | 4 Roller |
| 2 Pinion front bearing | 5 Inner race |
| 3 Pinion rear bearing | 6 Outer race |



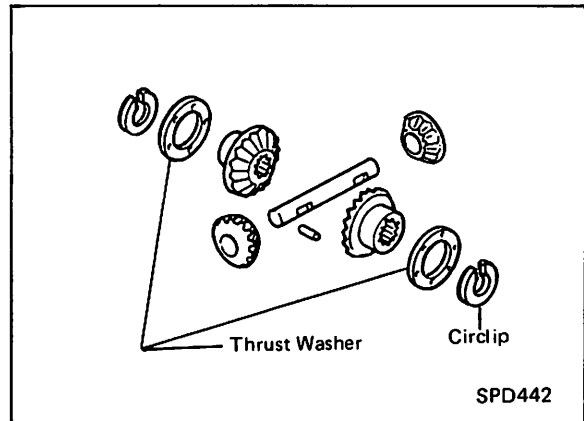
NOTE:

Pinion bearings should be replaced whenever pinion shaft/ring gear set are changed.

3. Check pinion mate shaft, pinion mate gear, side gear and thrust washers on differential case for scores and signs of wear, and replace as required.



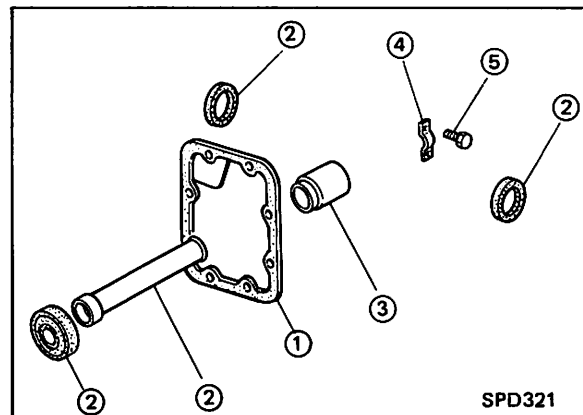
4. Inspect thrust washer faces. Small faults can be corrected with sandpaper.



NOTE:

The following parts must be replaced each time they are removed:

1. Gasket
2. Oil seals
3. Spacer
4. Lock straps
5. Ring gear bolt



Differential Case Assembly

Assembly should be done in the reverse order of disassembly, while making any necessary inspections and adjustments.

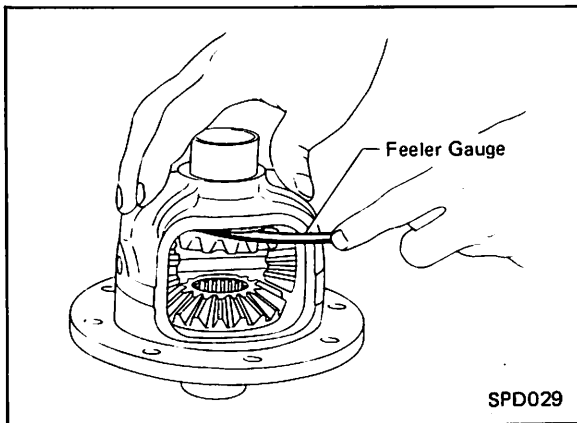
CAUTION:

- a. Arrange shims and washers to install them correctly.
- b. Thoroughly clean the surfaces on which shims, washers, bearings and bearing caps are installed.
- c. Apply gear oil when installing bearings.
- d. Pack recommended multi-purpose grease into cavity between lips when fitting oil seal.

1. Install pinion mate gears, side gears and thrust washers into differential case.
2. Fit pinion mate shaft.
3. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer.

Clearance:

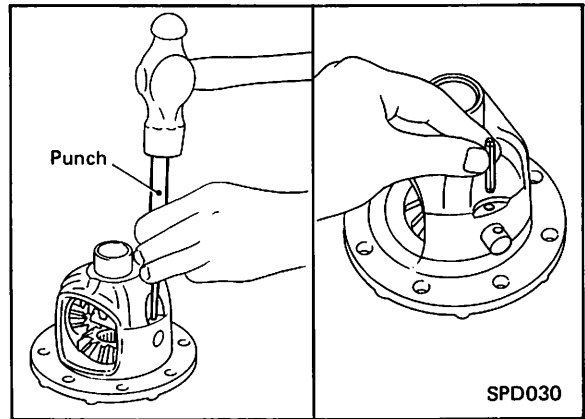
0-0.006 in (0-0.15 mm)



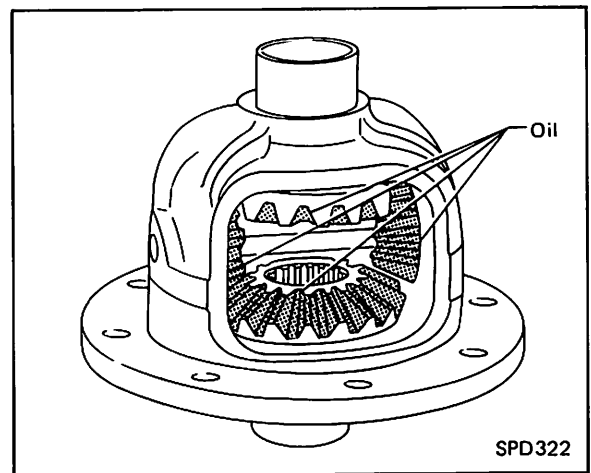
4. Install pinion mate shaft lock pin using a punch.

NOTE:

Make sure lock pin is flush with case.



5. Apply oil to gear tooth surfaces and thrust surfaces and check to see they turn properly.



6. Place ring gear on differential case and install new lock straps and bolts.

NOTE:

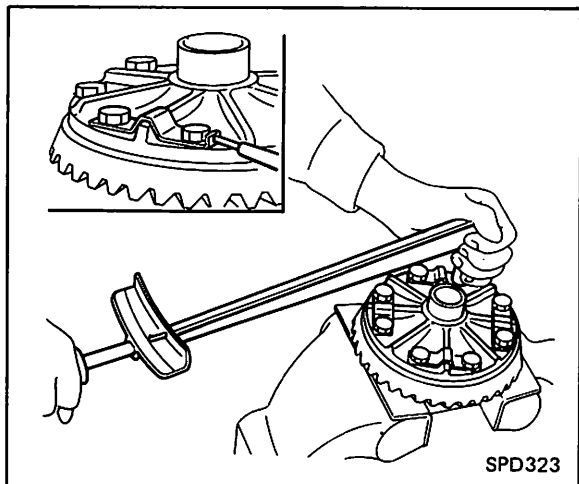
Tighten bolts in a criss-cross fashion, lightly tapping bolt head with a hammer.

Then bend up lock straps to lock the bolts in place.

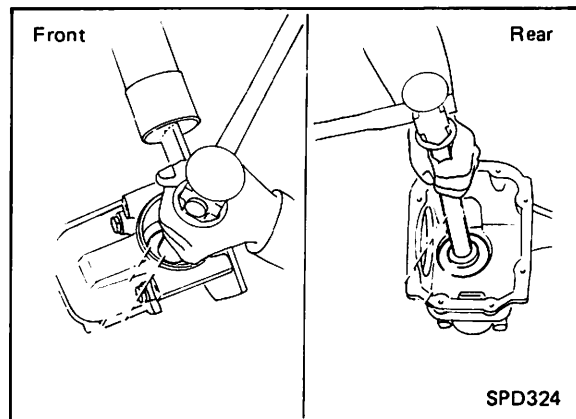
Torque:

65-72 ft-lb (9-10 kg-cm, 88-98 N.m)

Differential Case Assembly (Con't)



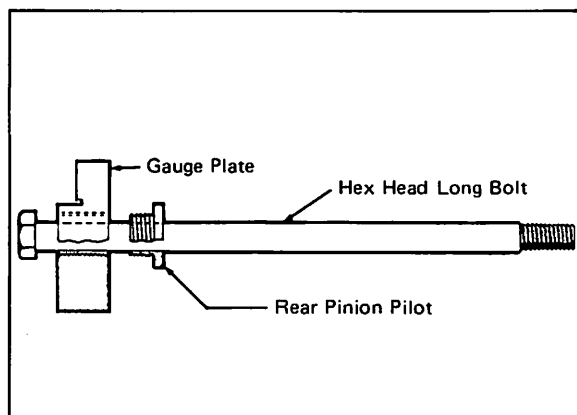
7. Press-fit front and rear bearing outer races using Tools J-25742-01, J-25742-2 (front) and J-25742-5 (rear).



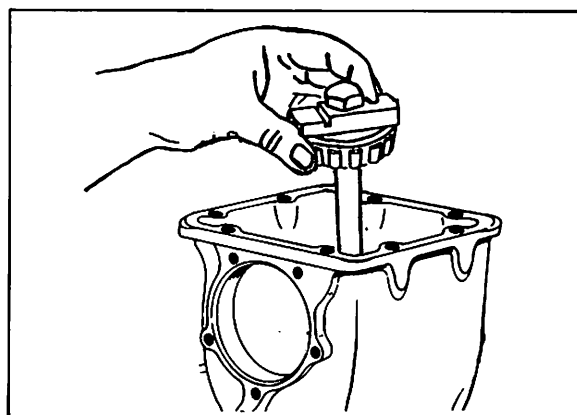
NOTE:
Be certain the bearing races are seated squarely in their respective bores.

Preload/Pinion Height Adjustment

1. Install bearing pilot into the gauge plate and slide over the long bolt.

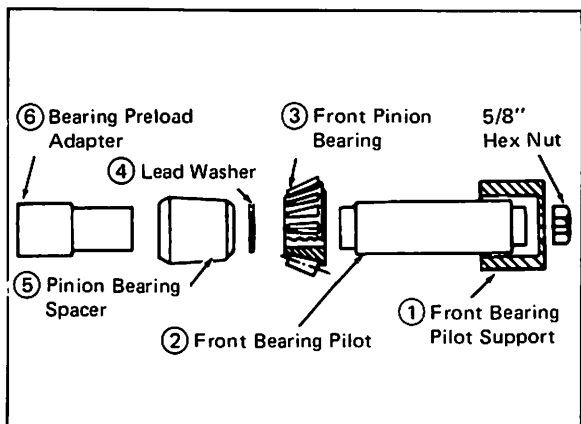


2. Install the rear pinion bearing in the differential case. Slide the long bolt and gauge plate through the bearing.



Preload/Pinion Height Adjustment (Con't)

3. Stand the front bearing pilot support onto the bench, then assemble the parts and tools as follows:



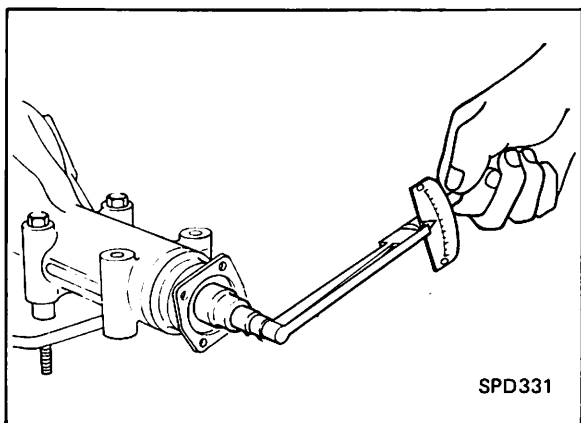
NOTE:

If a lead washer is not available, use a piece of thick roll solder (7) to obtain preload washer size.

4. Holding these parts together, slide the assembly over the long bolt into the differential housing. Install the support nut. Finger tighten the nut and ensure that all parts turn freely and are properly aligned.
5. Tighten nut carefully to obtain the correct preload.

Preload:

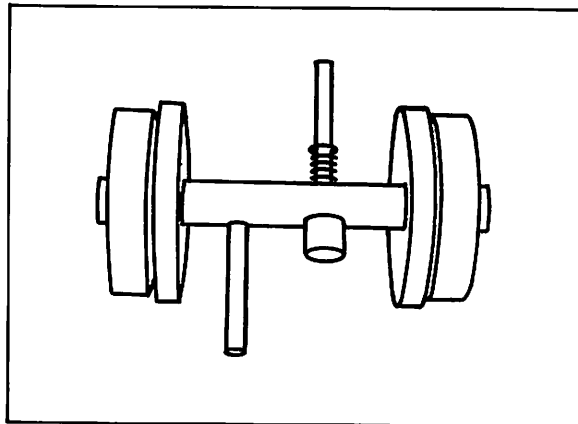
7.8-14.8 in-lb (9-17 kg-cm, 0.9-1.7 N.m)



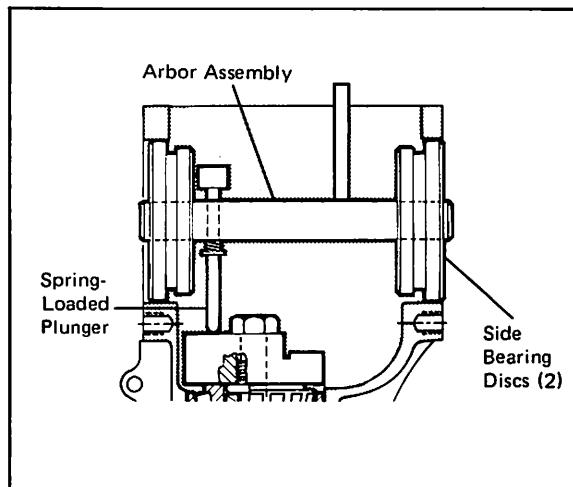
NOTE:

This concludes the preload adjustment for now. DO NOT DISASSEMBLE THE SPECIAL TOOLS AT THIS TIME. (The measurement of the lead washer, if used, will be taken after the pinion height adjustment.)

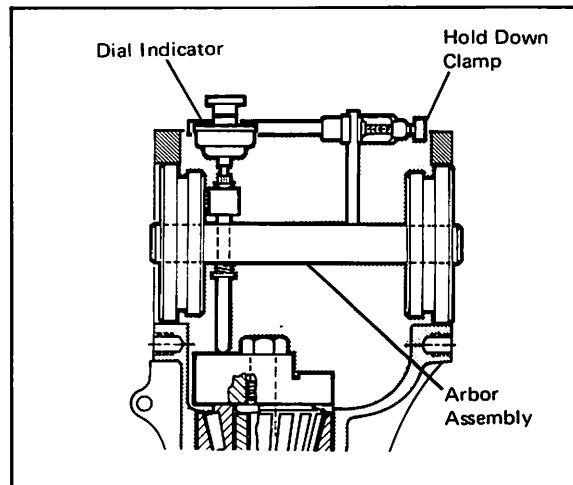
6. Install two discs with arbor assembly. Ensure that the arbor turns freely.



7. Lift the spring loaded plunger and place it on the face of the gauge plate (use the correct gauge plate step).



8. Install the dial indicator and tighten the hold down clamp.



Preload/Pinion Height Adjustment (Con't)

- To zero the dial indicator, rotate the arbor and plunger back and forth and note highest deflection, (the point where the needle changes direction). Now set the dial indicator at zero.

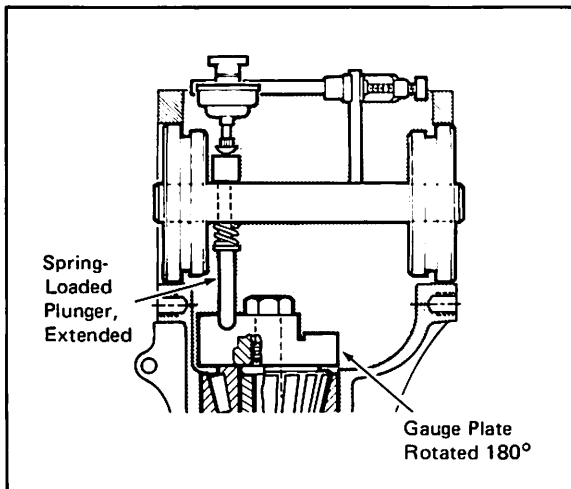
NOTE:

Use the chart below and the steps that follow the chart to determine correct pinion shim size.

- | | | |
|----|----------|--|
| A. | 3.00 mm* | Standard Measure |
| B. | _____ | Dial Indicator Reading |
| C. | _____ | Add A + B = C |
| D. | _____ | Pinion Marking |
| E. | _____ | Pinion Shim Size
(Add or subtract D from C) |

*Standard R180 measure

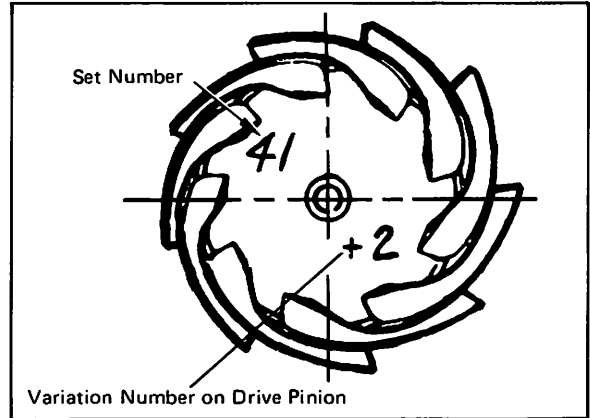
- Rotate the arbor assembly until the plunger falls off of the gauge plate and read the dial indicator. Repeat to ensure accuracy (Factor B).



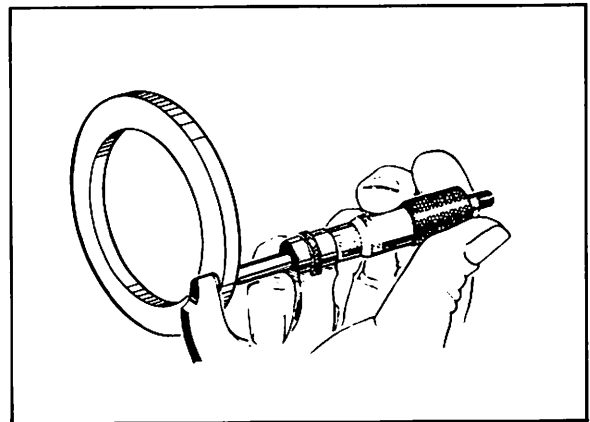
- Check the pinion head for the variation marking (Factor D). If the marking is a plus (+) **subtract** line D from line C. If it is a minus (-) **add** lines C and D.

NOTE:

If the pinion is unmarked or marked zero, then line C is your pinion shim size. Otherwise line E is the correct pinion shim size.



- Select the proper sized shim. As a precaution measure the shim to verify its dimensions.



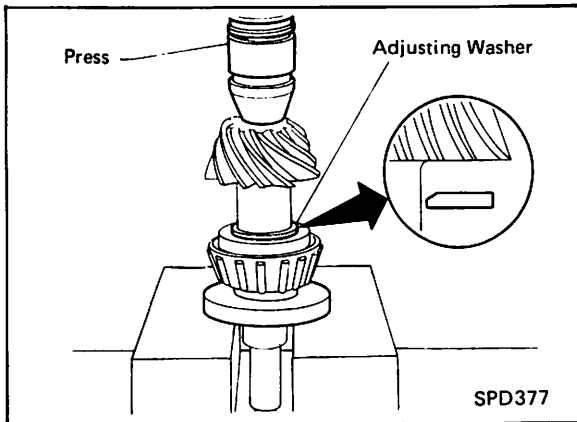
- To determine pinion bearing preload, disassemble the pinion height/bearing preload tool and measure the thickness of the lead washer. This is the correct size preload washer required. Discard the used lead washer.

NOTE:

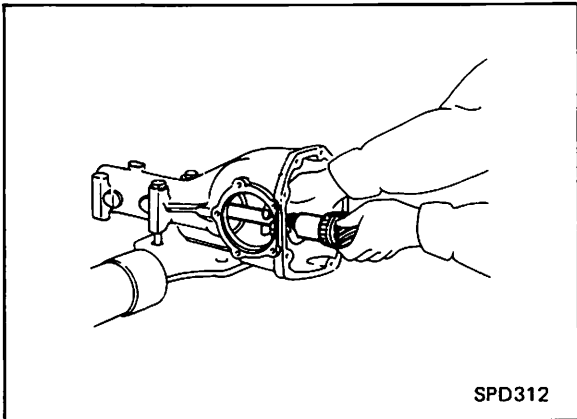
As a precaution, measure the preload washer to verify its dimensions.

Pinion Assembly

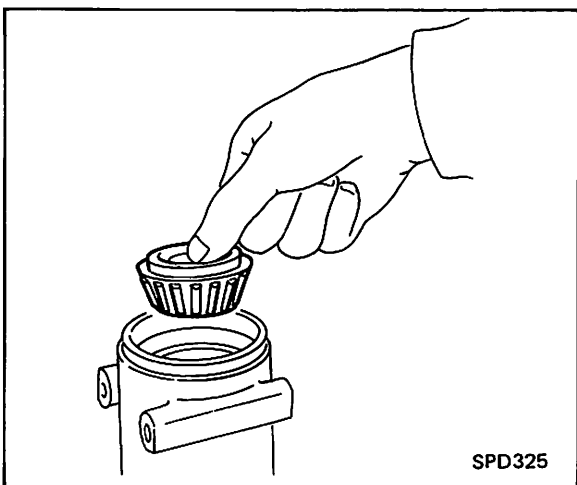
1. Place pinion shim on the pinion shaft, bevel side toward the gear. (Some shims are not beveled). Using the press stand, press the bearing on the shaft.



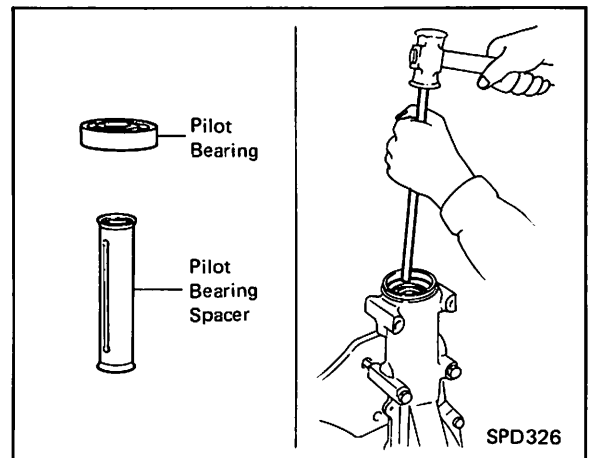
2. Install the spacer and preload shim on the shaft, and place the shaft in the housing. Make sure the bearing turns freely on its race.



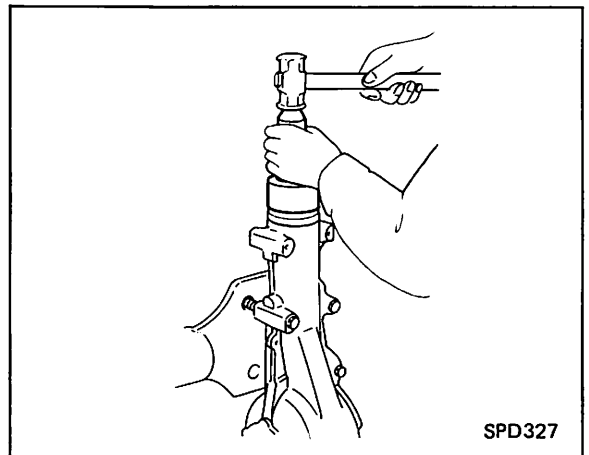
3. Slide the front pinion bearing on the shaft from the other end. Tap it down the shaft using Tool J-25863.



4. Install the spacer on the pinion shaft (either way is OK), and slide the pilot bearing on the shaft, tapping it with the Tool J-25863.

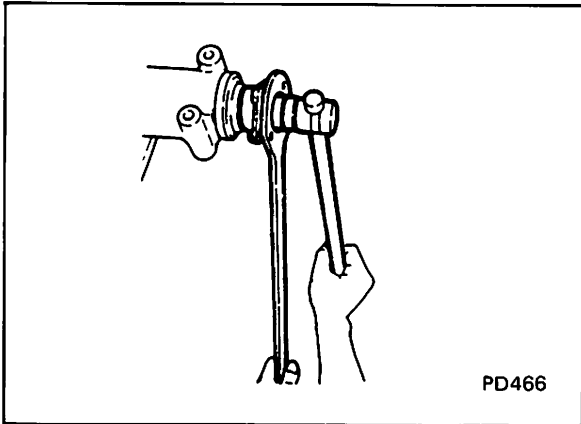


5. Install a new oil seal, using special Tool J-25405. Grease the seal with differential lubricant.



Pinion Assembly (Con't)

6. Hold companion flange with Tool and temporarily tighten pinion nut, until there is no axial play.

**NOTE:**

- a. If drive pinion lock nut is worn, replace it.
- b. Ascertain that threaded portion of drive pinion and pinion nut are free from oil or grease.

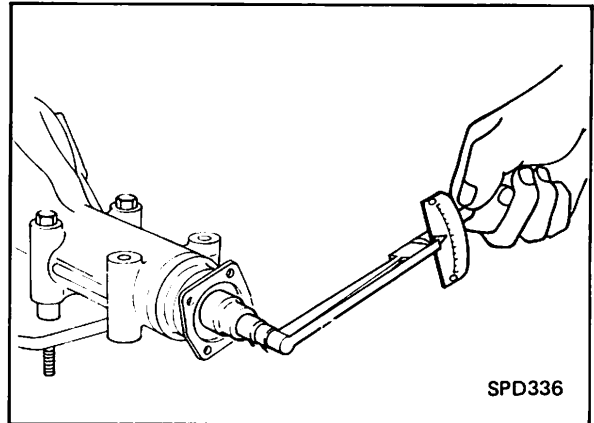
7. Tighten pinion nut by degrees to the specified preload while checking the preload with Tools.

NOTE:

When checking preload, turn drive pinion in both directions several times.

Preload:

7.8-14.8 in-lb (9-17 kg-cm, 0.9-1.7 N.m)



8. Torque drive pinion nut 123-145 ft-lb (17-20 kg-cm, 167-196 N.m).

NOTE:

This procedure will have to be repeated if:

- a. Maximum preload is achieved before the minimum pinion nut torque is reached.
- b. Minimum preload is not achieved before maximum pinion nut torque is reached.

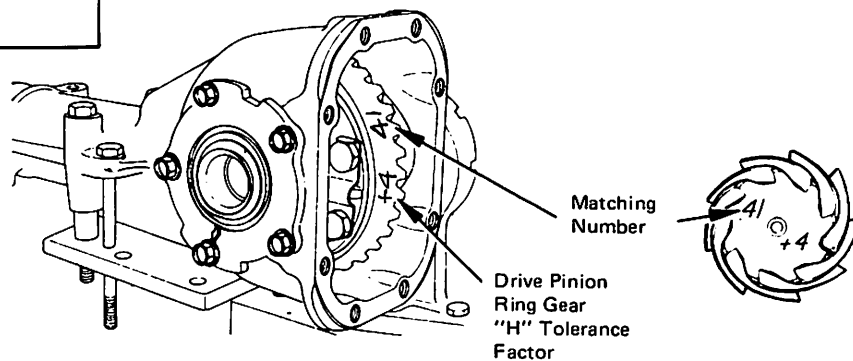
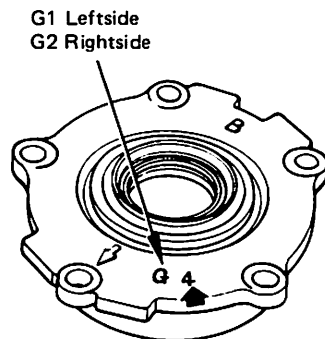
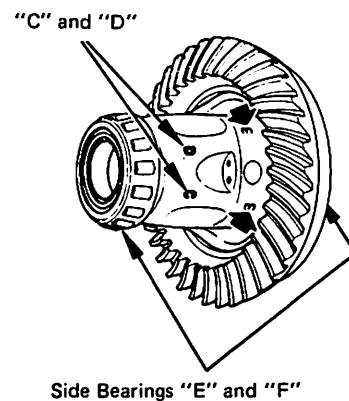
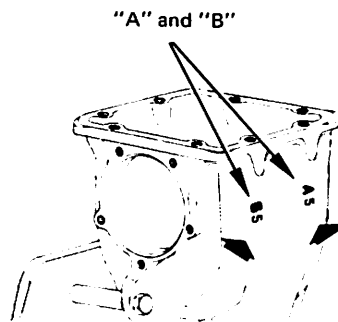
Side Bearing Shim Determination

Side bearing shim size is determined by a set of factors. Use the chart below to list these factors. The

location of these factors is found on the various differential components as shown below.

FACTOR LOCATIONS

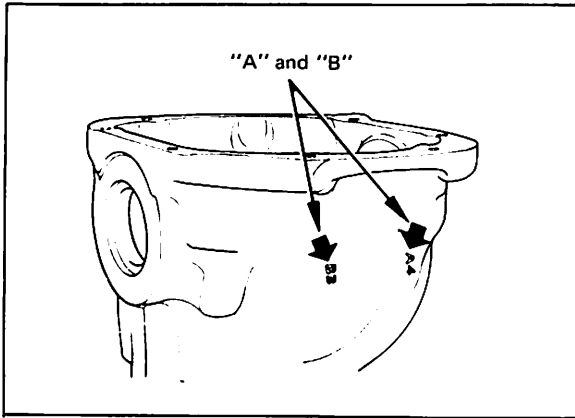
FACTOR CHART	
LETTERS	HUNDREDTHS OF A MILLIMETER
A — Left housing	
B — Right housing	
C — Gear case	
D — Gear case	
E — Left side bearing	
F — Right side bearing	
G1 — Left side bearing 180 retainer	
G2 — Right side bearing 180 retainer	
H — Ring gear: (+) or (-)	



Side Bearing Shim Determination (Con't)

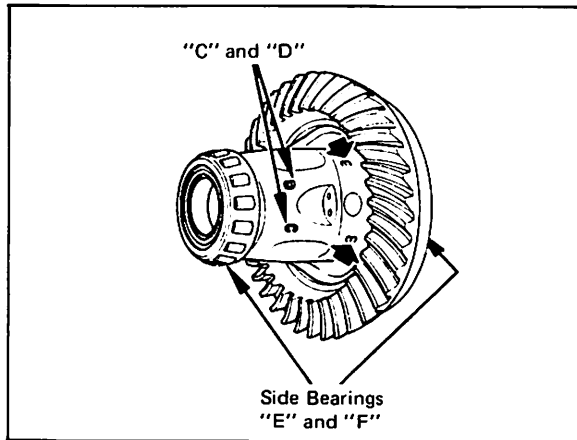
Using the factor chart to record your findings, proceed with the following steps to determine shim size.

1. Locate the numbers stamped on the carrier housing next to the letters "A" and "B" as shown. Record them as factors "A" and "B" on the chart.



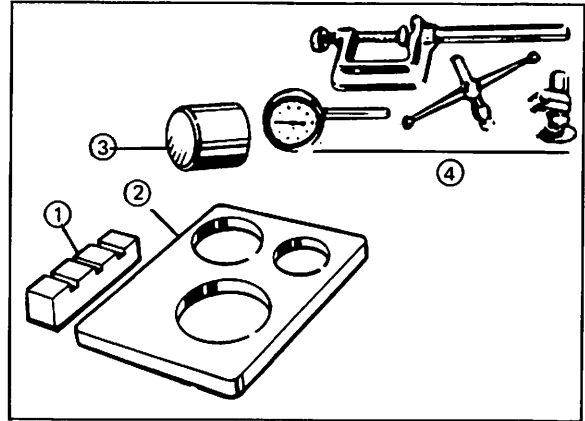
2. Locate the numbers stamped next to the letters "C" and "D" on the gear case. Record them as factors "C" and "D".
3. Measure how far under the standard thickness each side bearing is. Record these as factors "E" and "F".

NOTE:
Side bearing standard thickness is 20.00mm.

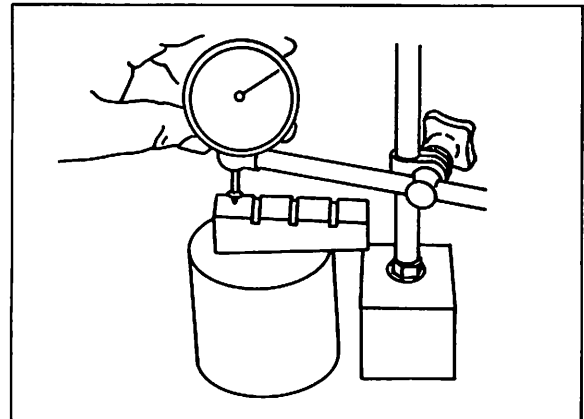


NOTE:
To measure side bearing thickness, the following tools are required.

1. J25407-1 Gauge Block
2. J25407-2 Base Plate
3. J25407-3 Weight Block
4. J8001-M Dial Set

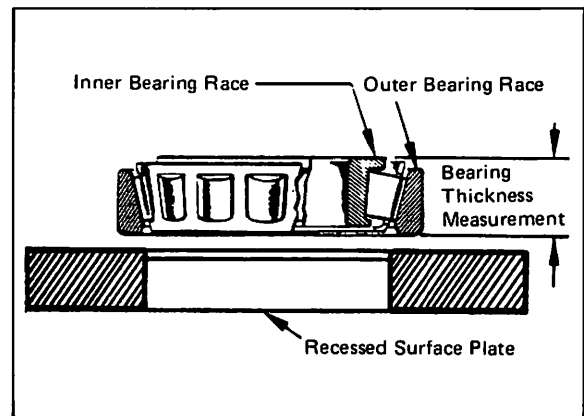


4. Mount the dial indicator on the base plate, place the 5 pound weight on the base plate and put the 20mm gauge block on top. Zero the dial indicator on the gauge block, as shown.



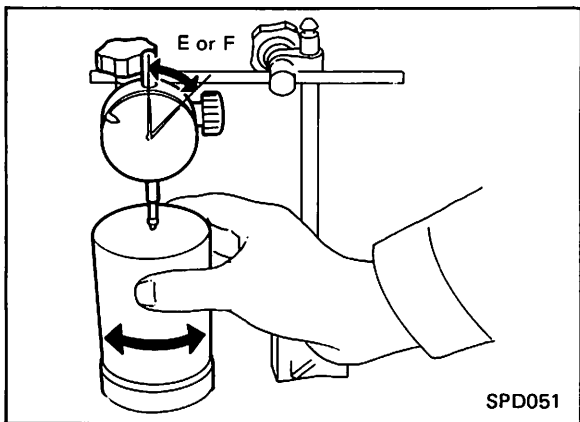
5. Carefully slide the gauge block out from under the dial indicator. Lift the weight block, and slide the bearing and race to be measured under the weight.

NOTE:
Make sure that the base plate has a recess in it and that the bearing will turn freely when positioned over the recess as shown.



Side Bearing Shim Determination (Con't)

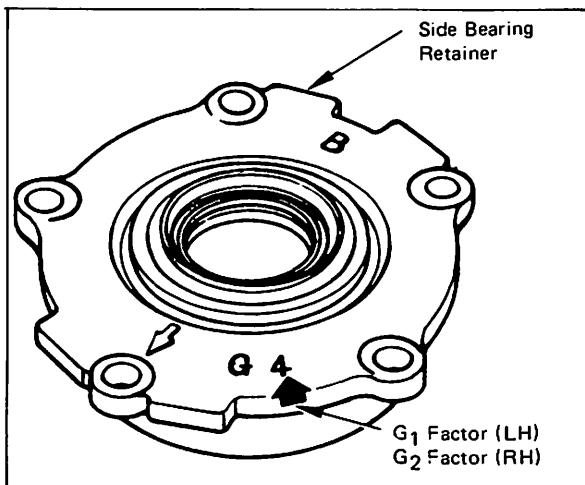
- Turn the weight a few times to ensure that bearing is properly seated. Watch the gauge while you do this. If the needle fluctuates erratically then the bearing is either dirty or defective and should be cleaned or replaced. If the reading is not erratic, note how far the indicator dropped. This will normally be .10-.30mm (.004-.012 in).



NOTE:

To avoid any confusion while calculating side bearing shims, it is absolutely necessary to stay with the metric system. If you measure anything in inches, the results MUST be converted to the metric system.

- Measure both bearings in the same way and mark the left side bearing measurement as factor "E" and the right as factor "F" on the list.
- Mark down the side retainer markings found on each of the retainer as shown.

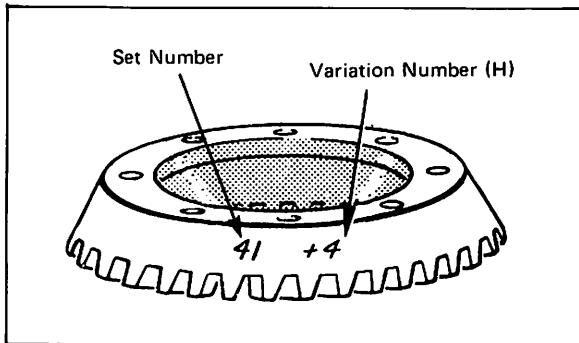


- Finally, look on the ring gear for markings. If you find a plus (+) or minus (-) sign followed by a number, this will be factor "H".

NOTE:

If the ring gear is unmarked, or zero use 0 as factor "H".

- Determine the shim size by using the formula shown below. Substitute each factor letter with its corresponding letter in the formula.



NOTE:

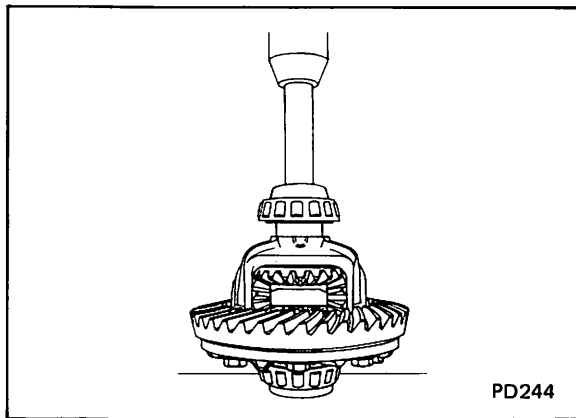
Please note that the formula for left and right side bearings are not the same.

Left side (T1): $A + C - G1 - D - E + H + .76$
 Right side (T2): $B + G2 + D - F - G + .76$

NOTE:

The calculations above can be double-checked by using a side bearing shim calculator.

- Select the correct size shim for each bearing. Measure the shim to ensure accuracy.
- Press on the side bearings, using drift J-25805. Be sure to protect the lower bearing as shown by using the puller adapter J-8107-2.

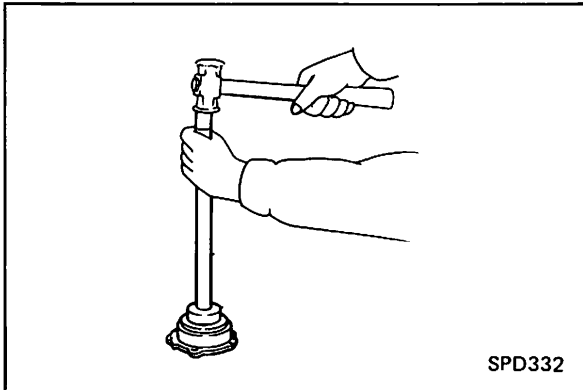


Side Bearing Shim Determination (Con't)

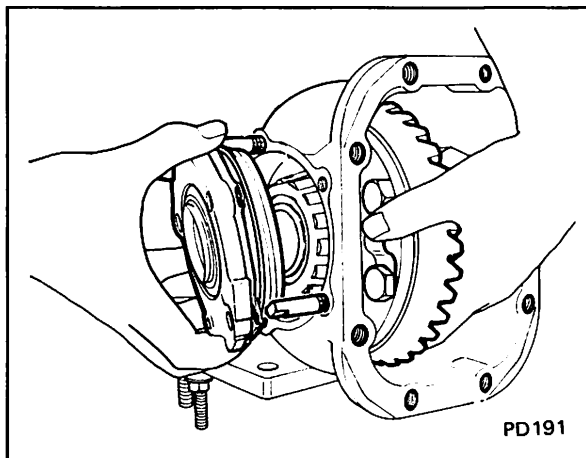
13. Install the bearing races, using Tools J-25805-01 and J-26090.

NOTE:

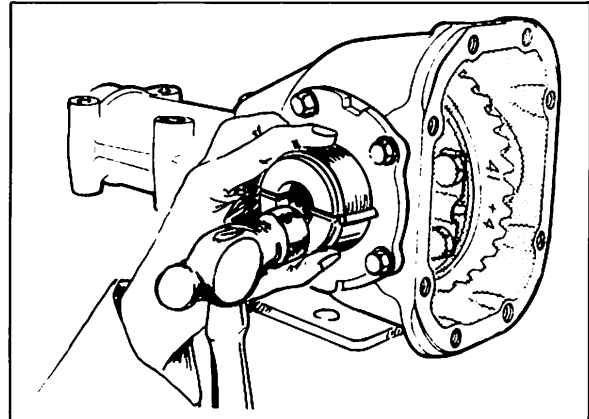
This will be much easier if you soak the retainer in very hot water for a few minutes to make it expand. The race will drop right in when correctly lined up.



14. Install the correct side bearing adjusting shim(s) then O-rings on each retainer.
15. Place the ring gear carrier assembly in the housing, then install the side bearing retainers in their proper places.



16. Install new oil seals in the retainers using drift J-25809 and a hammer.



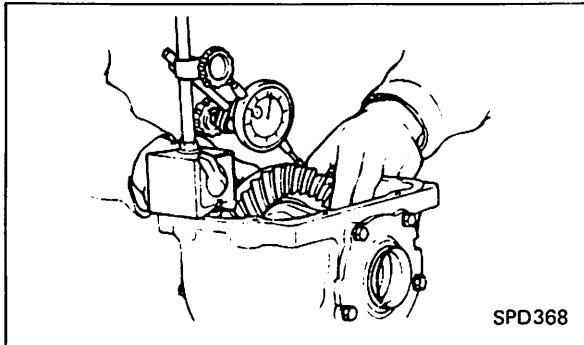
17. Install each side flange by sliding them onto the splines of the gear case.

Final Verification

1. Check backlash of ring gear with a dial indicator.

Backlash:

0.005-0.007 in (0.13-0.18 mm)

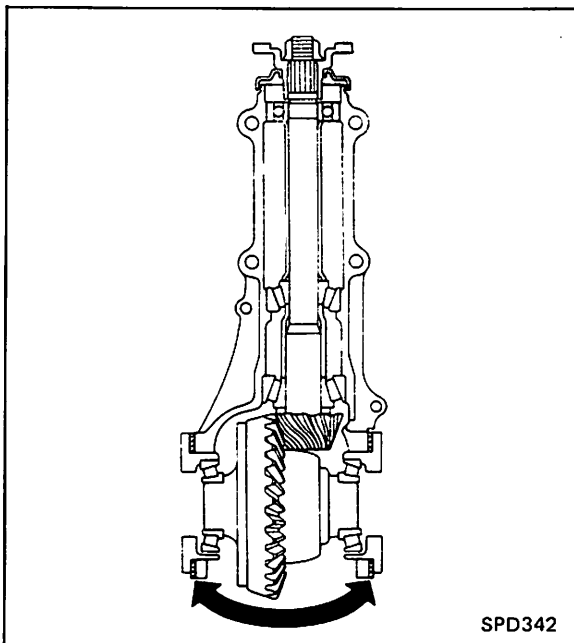


— If backlash is too small, decrease thickness of right shim and increase thickness of left shim by the same amount.

— If backlash is too great, reverse the above procedure.

NOTE:

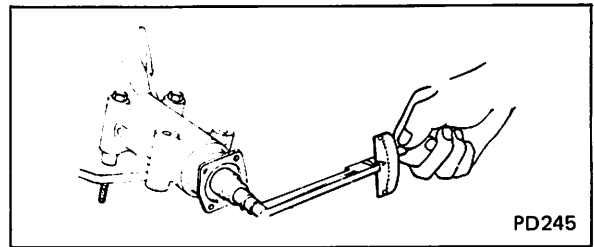
Never change the total amount of shims as it will change the bearing preload.



2. Check total preload with Tool J-25765-A.

Total preload:

8.7-20.0 in-lb (10-23 kg-cm, 1.0-2.3 N.m)

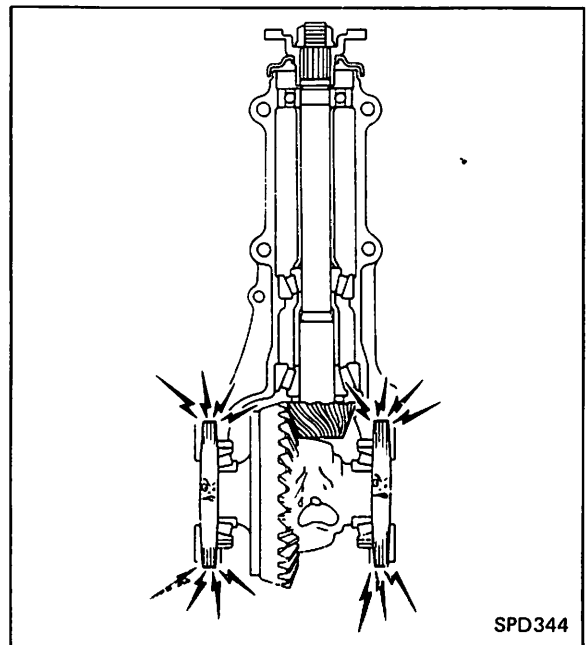


— If preload is too great, add the same amount of shim to each side.

— If preload is too small, remove the same amount of shim from each side.

NOTE:

Never add or remove different amount of shims to or from each side, or ring gear backlash will be changed.

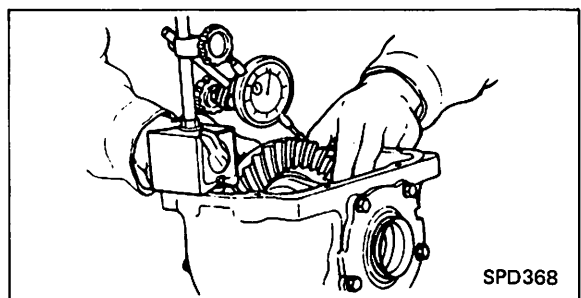


NOTE:

Check ring gear-to-drive pinion backlash because increase or decrease in thickness of shims will cause change of ring gear-to-pinion backlash.

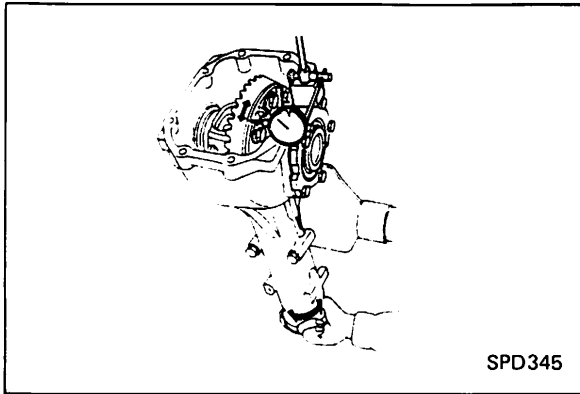
Backlash:

0.005-0.007 in (0.13-0.18 mm)



Final Verification (Con't)

3. Check runout of ring gear with a dial indicator.



— If backlash varies excessively in different places, the variance may have resulted from foreign matter caught between the ring gear and the differential case.

— If the runout is over specifications even after removal of the foreign matter, the hypoid gear set or differential case should be replaced.

— If the backlash varies greatly even when the runout of the ring gear is within a specified range, the hypoid gear set or differential case should be replaced.

4. Tooth contact check and adjustment:

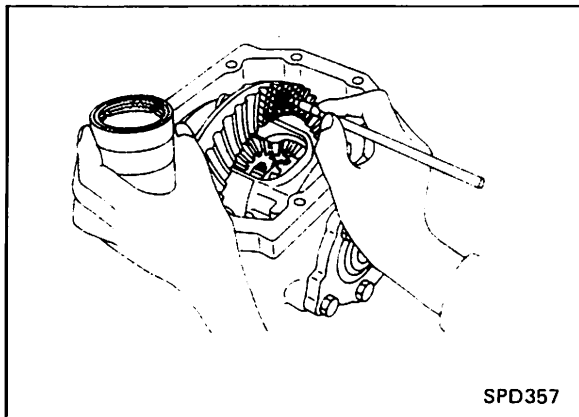
Finally, check for tooth contact pattern.

Refer to **Tooth Contact**.

Usually the pattern will be correct if you have calculated the shims correctly and the backlash is correct.

However, in extremely rare cases you will have to use trail-and-error processes until you get a good tooth contact pattern.

The tooth pattern is the best indication of how well a differential has been set up.



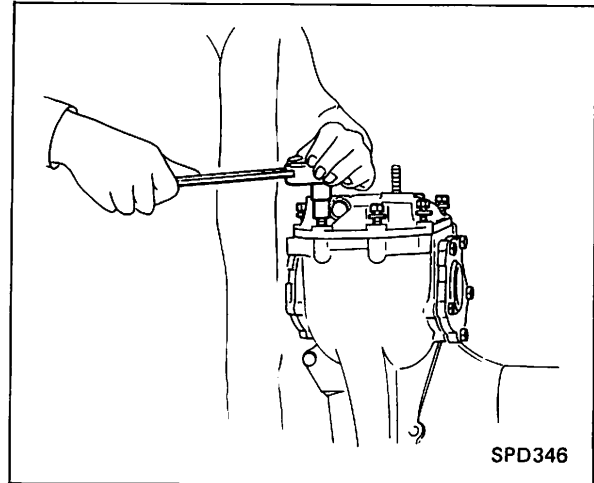
5. Install rear cover.

NOTE:

Gasket should be replaced by new one each time the differential carrier is removed.

Torque:

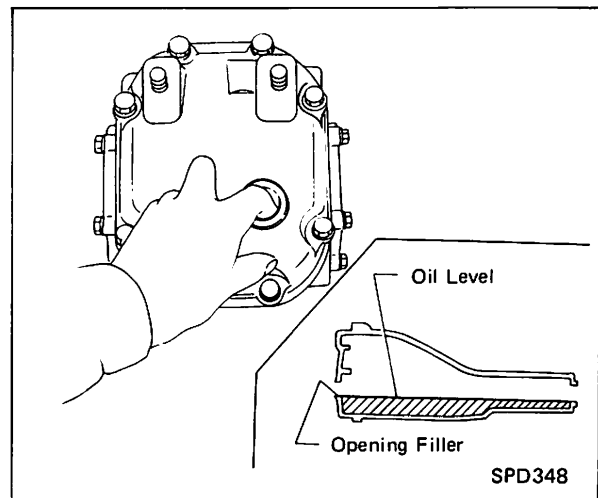
29-36 ft-lb (4-5 kg-cm, 39-49 N.m)



6. Install side flange.
7. Install differential carrier in vehicle and tighten nuts to the specified value.
8. Install drive shaft and front propeller shaft.
9. Then fill with gear oil, referring to Recommended Lubricants (see Section MA of your Service Manual).

Gear oil capacity:

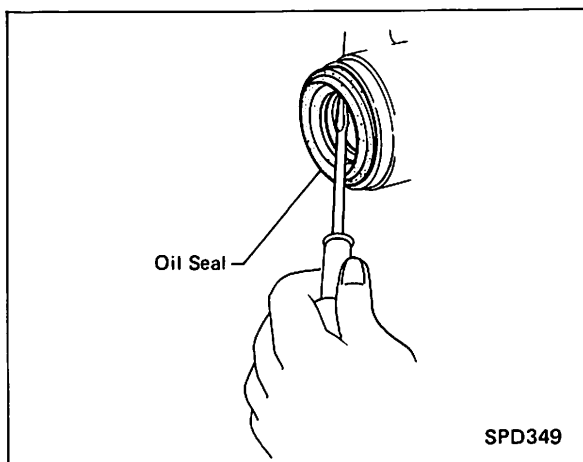
2-1/8 US pts (1.0 liters, 1-3/4 Imp pt)



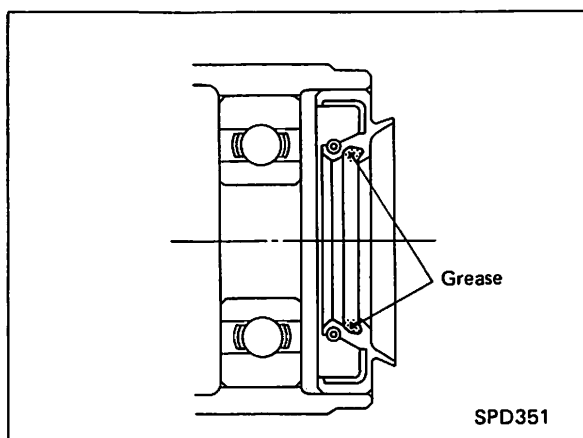
Front Oil Seal Replacement

The following is the procedure for replacement of the front oil seal with the differential installed on the vehicle.

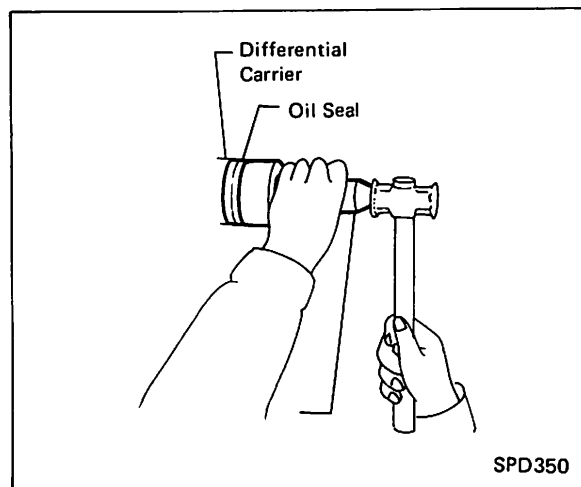
1. Drain gear oil.
2. Block the rear wheels. Raise the vehicle with a garage jack and position the safety stands.
3. Detach propeller shaft from companion flange of carrier (see Section PD of your Service Manual).
4. Remove the drive pinion nut using flange wrench J-25774 and a 27mm socket.
5. Extract the companion flange using Tool J-22888.
6. Remove oil seal.



7. Apply grease to the cavity between the oil seal lips of the replacement seal.



8. Install the new seal using Tool J-25405.



9. Fit companion flange the drive pinion, install the nut.

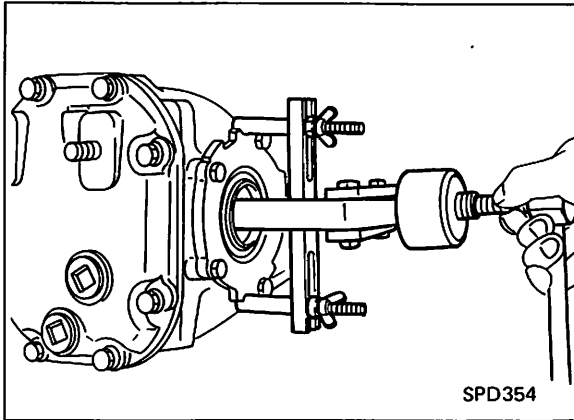
Torque:
123-145 ft-lb (17-20 kg-cm, 167-196 N.m)

10. Re-install the propeller shaft in the reverse order of removal. Check all torques.
11. Fill the carrier with the specified amount of gear oil.

Side Oil Seal Replacement

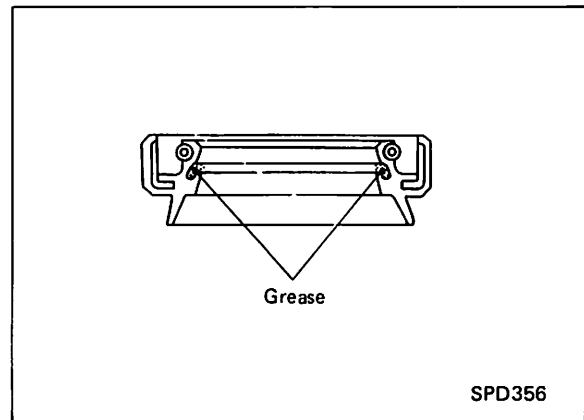
The following is the procedure for replacement of side oil seal with differential gear carrier assembly installed on the vehicle.

1. Remove side flange.
2. Remove seal using Tool J-25810A.



3. Install new oil seal in the retainer, tapping it with a soft hammer on opposite sides until it seats squarely.

4. Apply grease to cavity between oil seal lips.



5. Install the side flanges by sliding them onto the gear case splines.

— Pinion Height Adjusting Washer —

Thickness — in (mm)	Part No.
0.122 (3.09)	38154-P6017
0.123 (3.12)	38154-P6018
0.124 (3.15)	38154-P6019
0.125 (3.18)	38154-P6020
0.126 (3.21)	38154-P6021
0.127 (3.24)	38154-P6022
0.128 (3.27)	38154-P6023
0.130 (3.30)	38154-P6024
0.131 (3.33)	38154-P6025
0.132 (3.36)	38154-P6026
0.133 (3.39)	38154-P6027
0.134 (3.42)	38154-P6028
0.135 (3.45)	38154-P6029
0.137 (3.48)	38154-P6030
0.138 (3.51)	38154-P6031
0.139 (3.54)	38154-P6032
0.140 (3.57)	38154-P6033
0.141 (3.60)	38154-P6034
0.143 (3.63)	38154-P6035
0.144 (3.66)	38154-P6036

— Pinion Bearing Adjusting Washer —

Thickness — in (mm)	Part No.
0.090 (2.31)	38141-09400
0.091 (2.33)	38140-09400
0.092 (2.35)	38139-09400
0.093 (2.37)	38138-09400
0.094 (2.39)	38137-09400
0.095 (2.41)	38136-09400
0.0957 (2.43)	38135-09400
0.096 (2.45)	38134-09400
0.097 (2.47)	38133-09400
0.098 (2.49)	38132-09400
0.0988 (2.51)	38131-09400
0.099 (2.53)	38130-09400
0.100 (2.55)	38129-09400
0.101 (2.57)	38128-09400
0.102 (2.59)	38127-09400

— Side Retainer Adjusting Shim —

Thickness — in (mm)	Part No.
0.008 (0.20)	38453-21100
0.009 (0.25)	38453-21101
0.011 (0.30)	38453-21102
0.015 (0.40)	38453-21103
0.019 (0.50)	38453-21104

— Pinion Bearing Spacer —

Thickness — in (mm)	Part No.
2.055 (52.2)	38130-78500
2.063 (52.4)	38131-78500
2.071 (52.6)	38132-78500
2.078 (52.8)	38133-78500
2.086 (53.0)	38134-78500
2.094 (53.2)	38135-78500

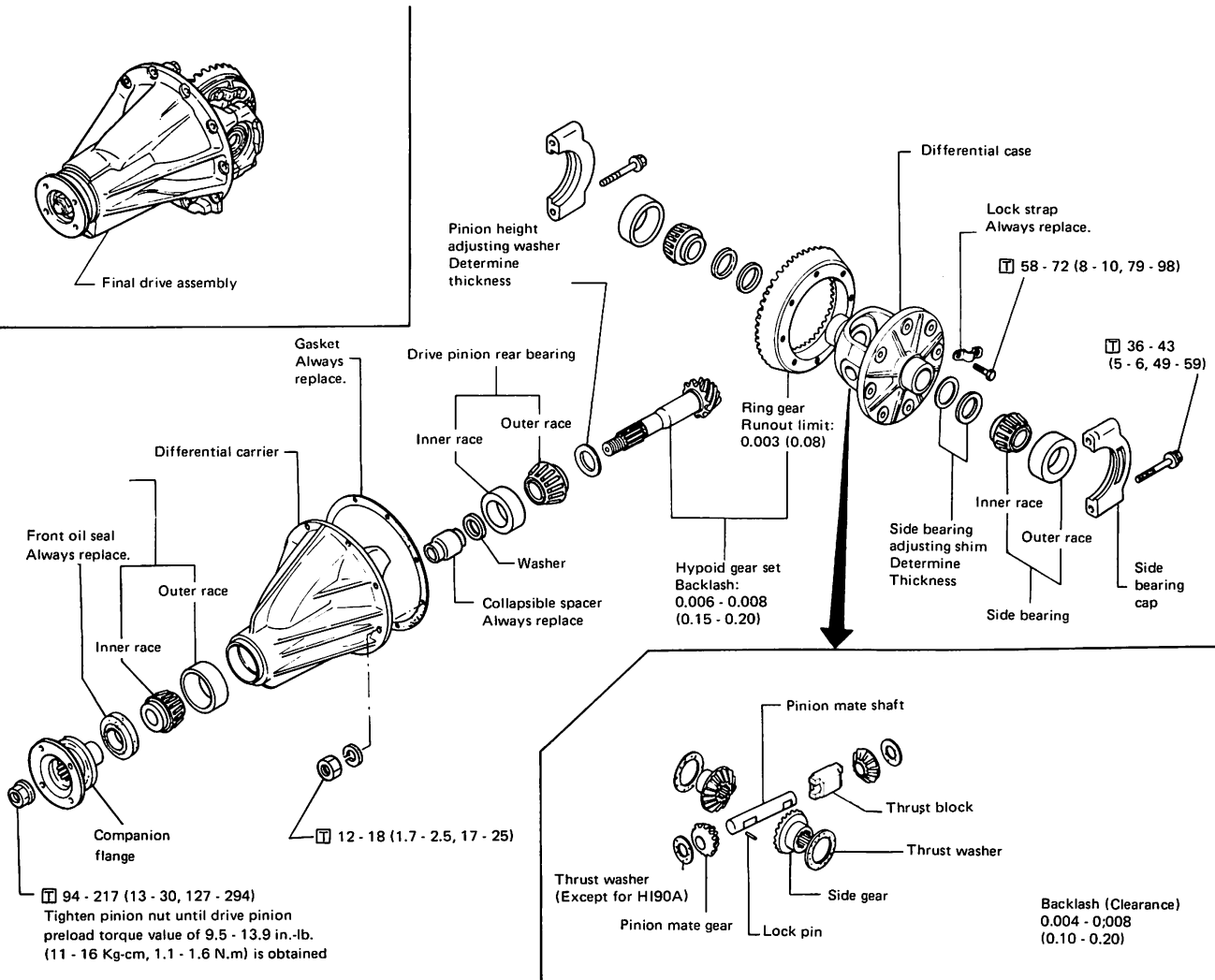
— Side Gear Thrust Washer —

Thickness — in (mm)	Part No.
0.030 (0.78)	38424-W2000
0.032 (0.83)	38424-W2001
0.034 (0.88)	38424-W2002

REAR FINAL DRIVE

— Model: H190-ML, H190-A —

PD-35



DIFFERENTIAL SERVICE INFORMATION

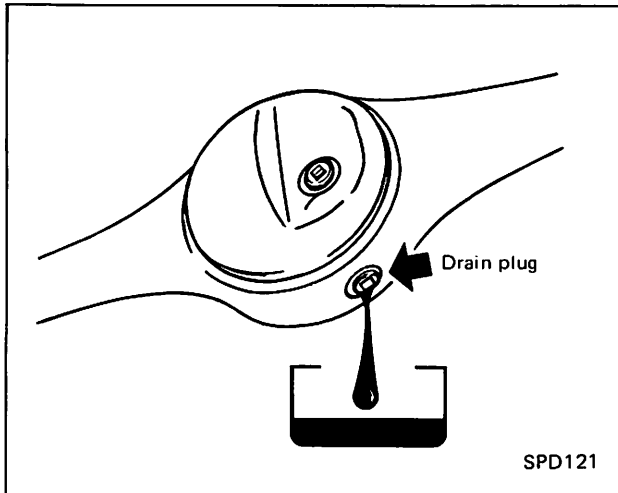
MODEL: H190-ML, H190-A

PROCEDURE SPECIFICATIONS	
Procedure	Specification
<ul style="list-style-type: none"> • Drive Pinion Preload (With front oil seal) in-lb (kg-cm, N.m) 	9.5-13.9 (11-16, 1.1-1.6)
<ul style="list-style-type: none"> • Side Bearing Adjusting Method 	Shim Washer
<ul style="list-style-type: none"> • Backlash: in (mm) <ul style="list-style-type: none"> — Drive Pinion to Ring Gear — Side Gear to Pinion Mate Gear (Between side gear and case) 	0.006-0.008 (0.15-0.20) 0.004-0.008 (0.10-0.20)
<ul style="list-style-type: none"> • Ring Gear Runout Limit in (mm) 	0.003 (0.08)
<ul style="list-style-type: none"> • Total Preload in-lb (kg-cm, N.m) 	10-19 (12-22, 1.2-2.2)

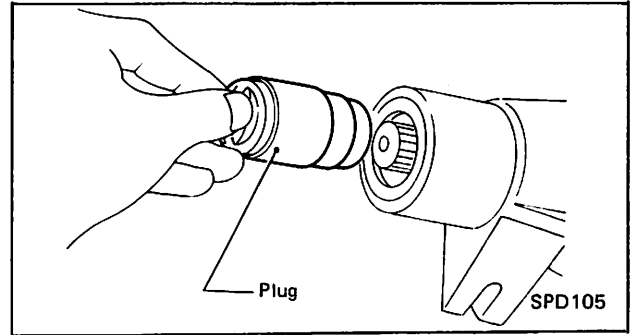
TIGHTENING TORQUES			
Unit	ft-lb	kg-cm	N.m
Drive pinion nut	94-217	13-30	127-294
Ring gear bolt	58- 72	8-10	78- 98
Side bearing cap bolt	36- 43	5- 6	49- 59
Drain and filler plugs	43- 72	6-10	59- 98
Companion flange to propeller shaft	17- 24	2.4-3.3	24- 32
Differential carrier to rear axle case	12- 18	1.7-2.5	17- 25

Preparation for Disassembly — Removal

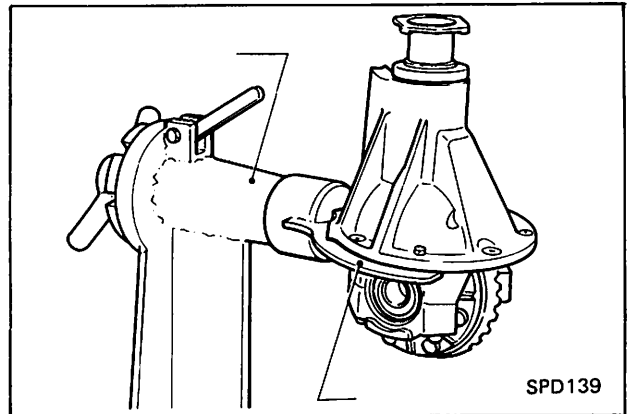
1. Jack up rear end of the vehicle and support it by placing safety stands under rear axle case (Refer to Section GI of your Service Manual).
2. Remove drain plug and drain gear oil.



3. Remove the propeller shaft and rear axle shafts (Refer to Section RA of your Service Manual). Plug the rear end of the transmission rear extension housing.



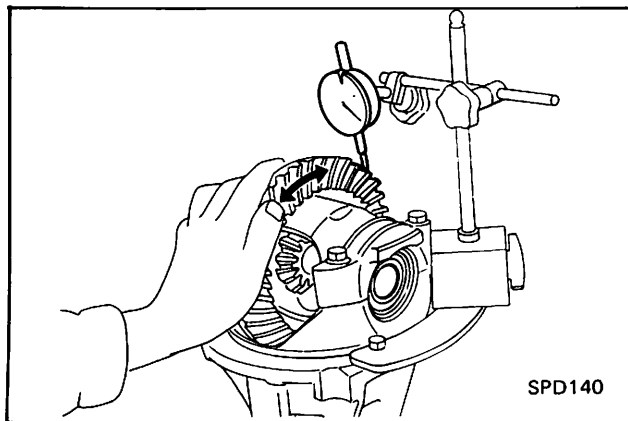
4. Loosen off nuts securing differential carrier to rear axle case, and take out differential carrier.
5. Mount differential carrier using Tool, J-25602-01.



Pre-Disassembly Inspection

1. Check ring gear backlash with a dial indicator at several points. If it is not within specification, adjust it.

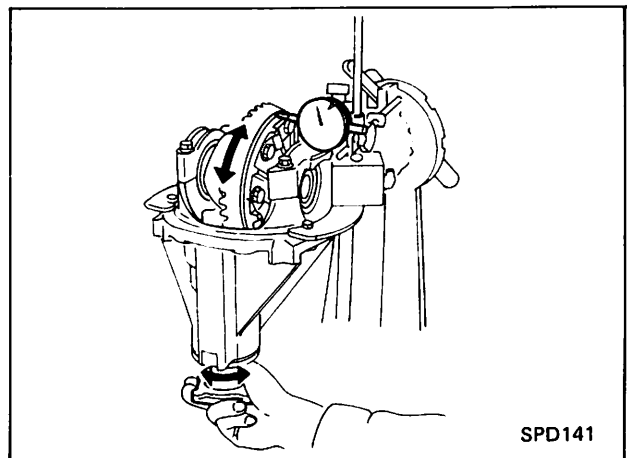
Backlash:
0.006-0.008 in (0.15-0.20 mm)



2. Check ring gear runout with a dial indicator. If it is over specification, hypoid gear set or differential case should be replaced.

NOTE:
When backlash varies excessively in different places, the variance may have resulted from foreign matter caught between ring gear and differential case.

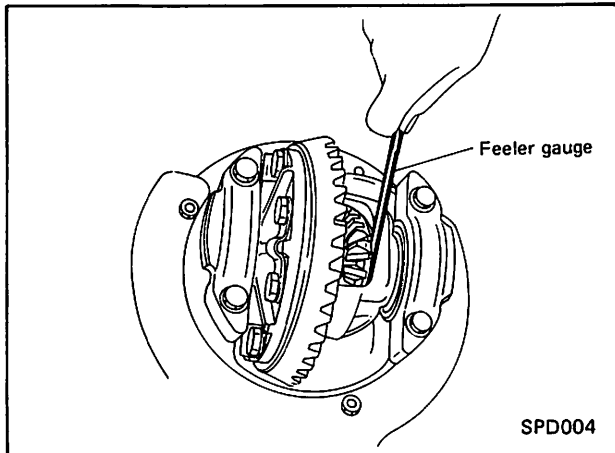
Runout limit:
0.003 in (0.08 mm)



Pre-Disassembly Inspection (Con't)

3. Check side gear backlash. Using a thickness gauge, measure clearance between side gear and differential case.

Backlash:
0.004-0.008 in (0.10-0.20 mm)



If it is not within specification, adjust it by selecting side gear thrust washer.

4. Check tooth contact, referring to **TOOTH CONTACT**.

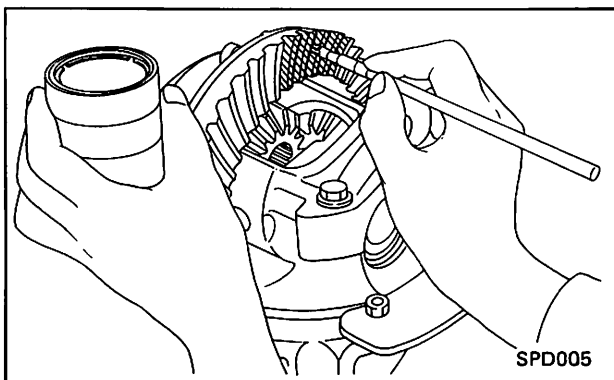
Tooth Contact

Gear tooth contact pattern check is necessary to verify correct relationship between ring gear and drive pinion.

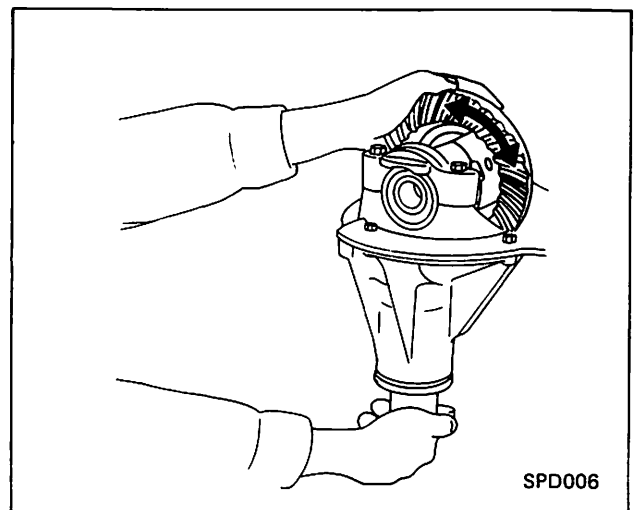
Hypoid gear sets which are not positioned properly may be noisy, or have short life or both. With a pattern check, the most desirable contact for low noise level and long life can be assured.

Check

1. Thoroughly clean ring gear and drive pinion teeth.
2. Sparingly apply a mixture of powdered ferric oxide and oil or equivalent to 3 or 4 teeth of ring gear drive side.

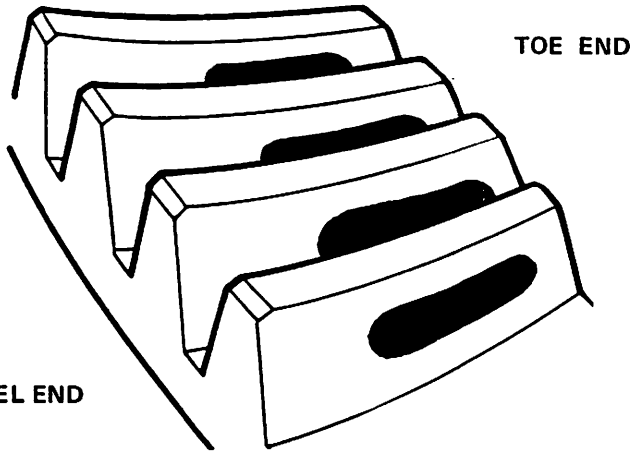


3. Hold companion flange steady by hand and rotate the ring gear in both directions.



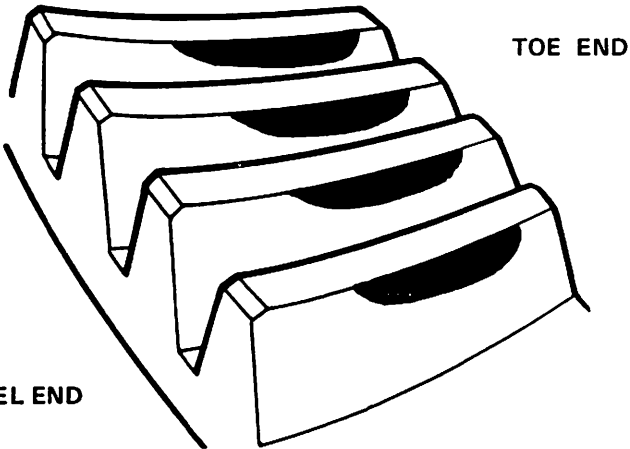
4. Compare contact marks left on the ring gear to those found in the following illustration.

Tooth Pattern Interpretation

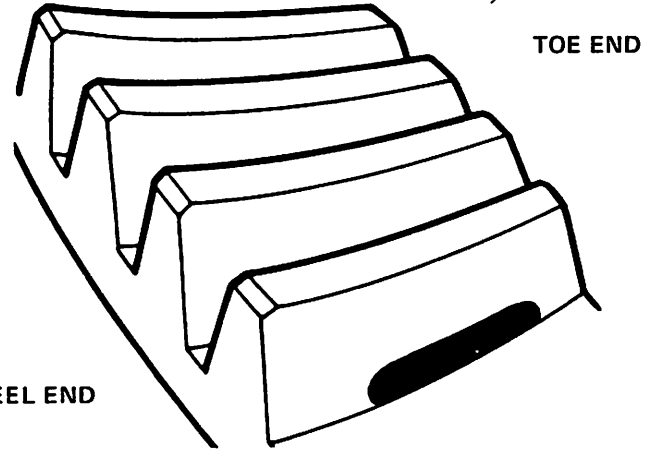


Perfect tooth pattern.

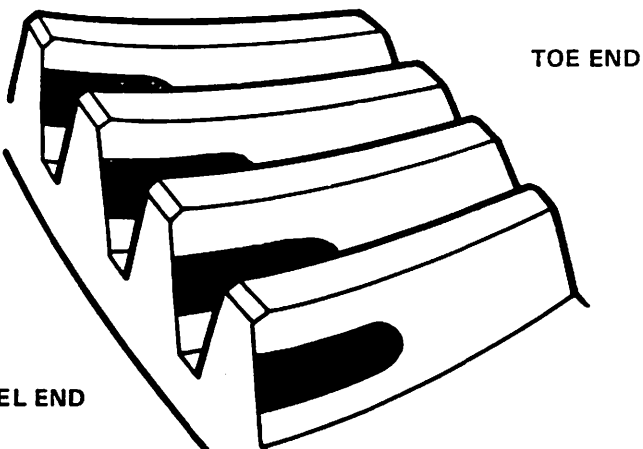
NOTE: A change in pinion height will also cause a change in backlash, so both will usually have to be adjusted.



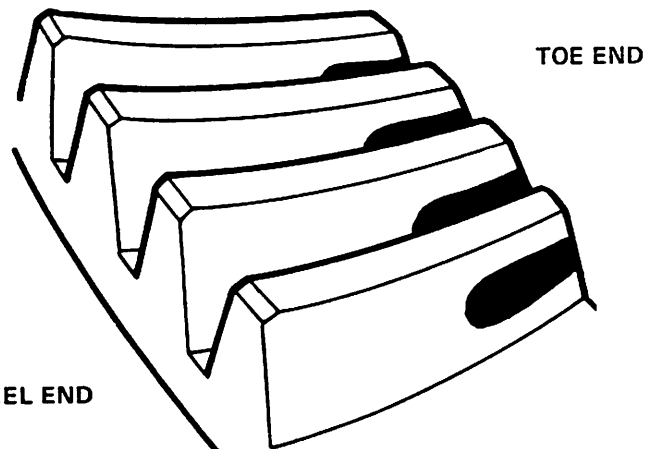
The pinion is too low. You will have to add to the shim(s) under the pinion.



The pinion is too high. The shim(s) under the pinion will have to be decreased.



There is too much backlash — the ring gear will have to be moved closer to the pinion.



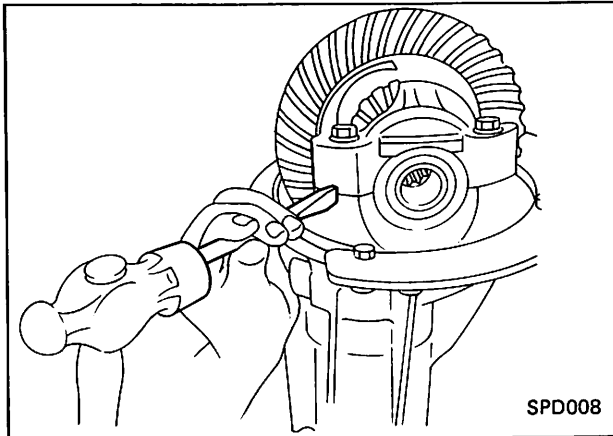
There is not enough backlash — the ring gear will have to be moved away from the pinion.

Disassembly

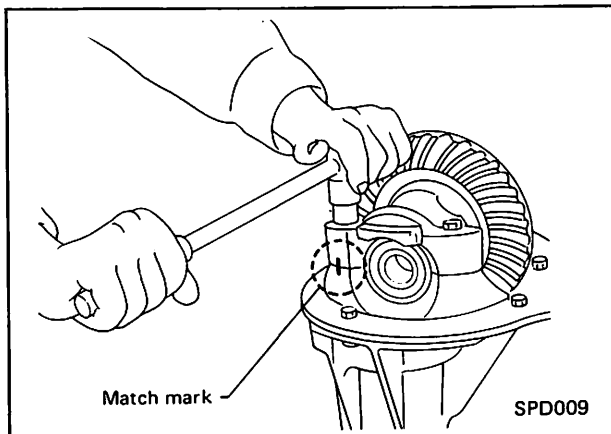
1. Mark the side bearing cap and case on one side to ensure proper assembly.

NOTE:

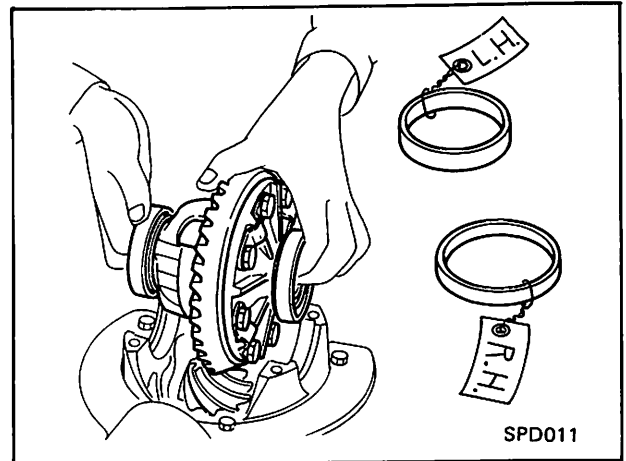
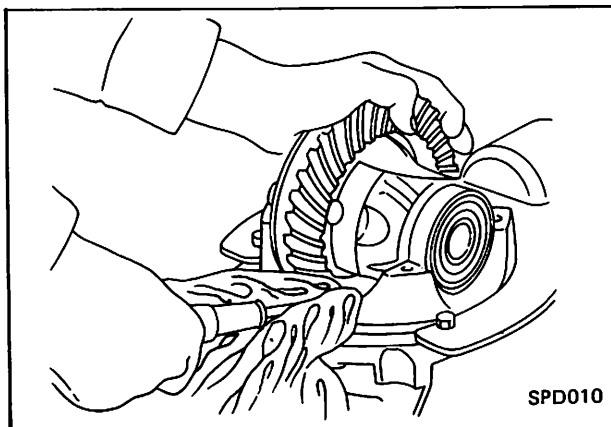
Bearing caps are line-bored and must be assembled in their original position.



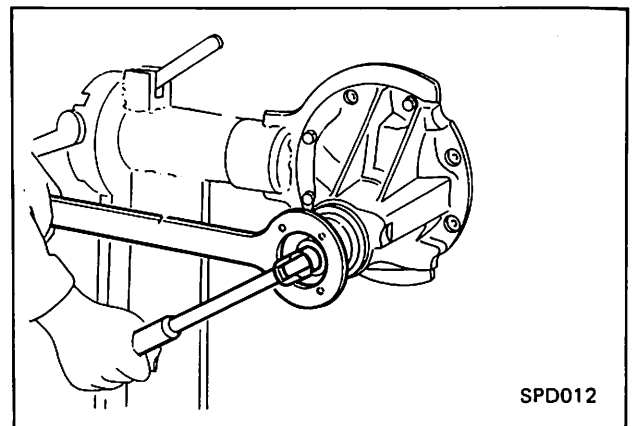
2. Remove side bearing caps using a 14mm socket.



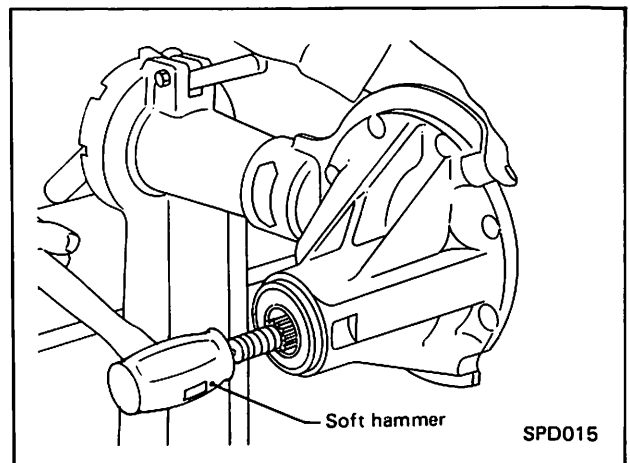
3. Using a pry bar, remove the ring gear assembly from the differential housing. Keep the bearing races with the corresponding bearings.



4. Attach the flange wrench J-25774 to the flange to prevent its turning, and remove the pinion shaft nut using a 27mm socket and breaker bar.



5. Drive the pinion through the housing using a brass drift and a heavy hammer. Be careful not to damage the pinion shaft threads. Pull the companion flange out by hand.

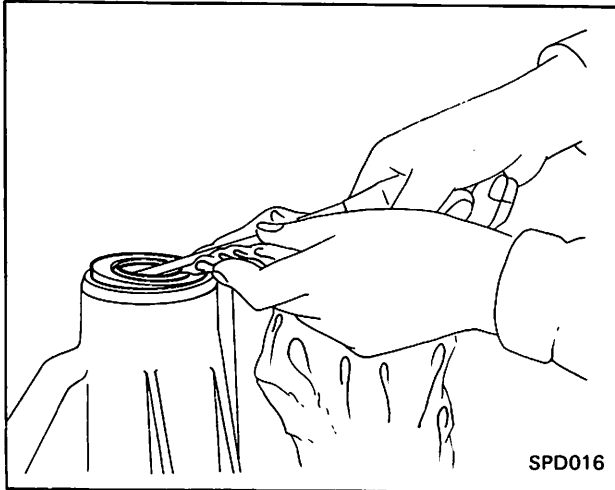


Disassembly (Con't)

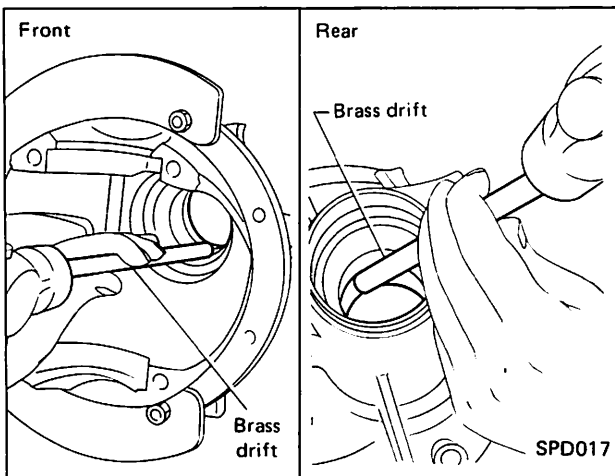
6. Remove the oil seal by prying up with a large screwdriver as shown.

NOTE:

Do this carefully to avoid scratching the housing bore with the screwdriver. Cover the end of the screwdriver with a rag as shown.

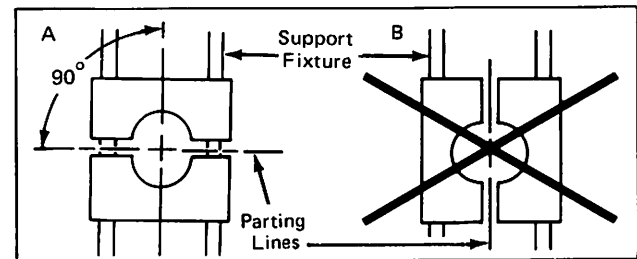
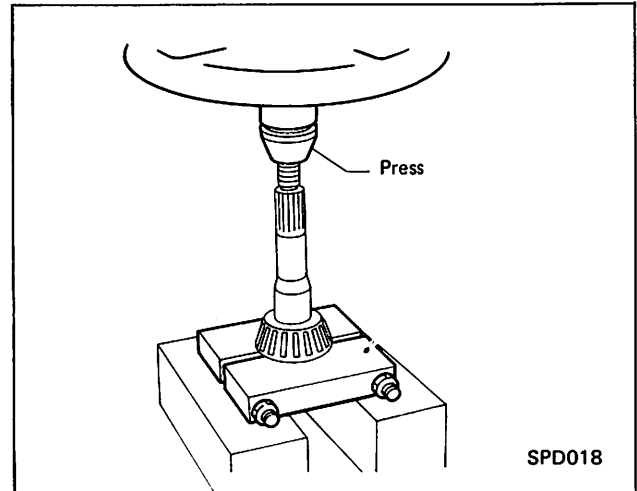


7. Remove the pinion bearing races using a brass drift.



8. Remove the preload shim and spacer from the pinion shaft. Sometimes the shim will be found sticking to the front pinion bearing. Save the shim and spacer.

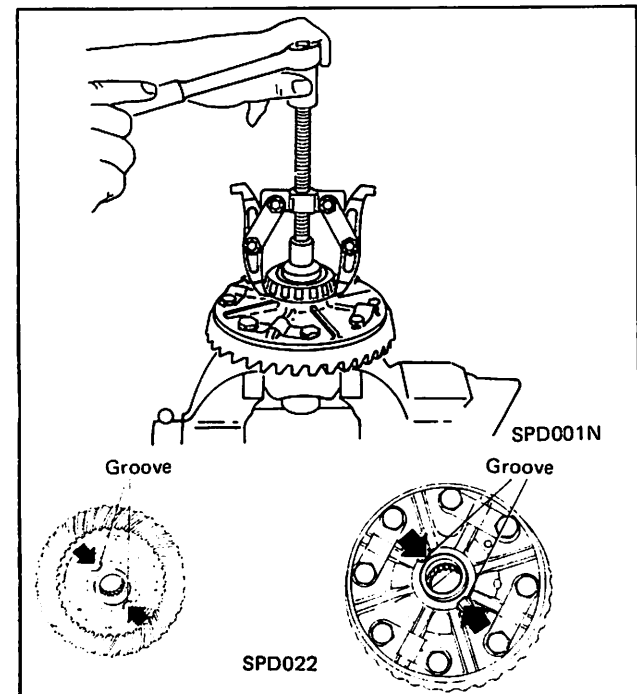
9. Remove the rear pinion bearing using a press and Tool J-22912-01. Be certain the parting line of the tool is at a right angle to the support fixture of the press (A). This will prevent bending of the tool (B). Save the pinion height washer for re-use.



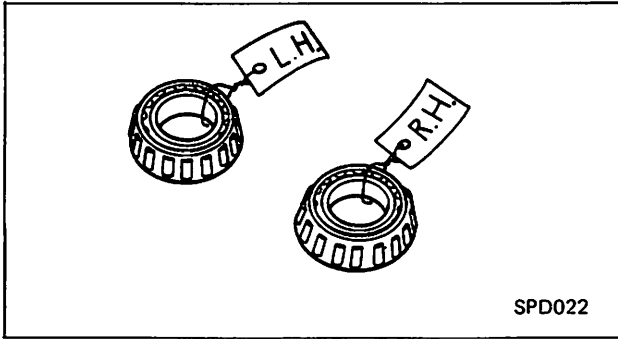
10. Attach side bearing puller Tools J-22888 and J-8107-02 to the side bearing and remove both bearings.

NOTE:

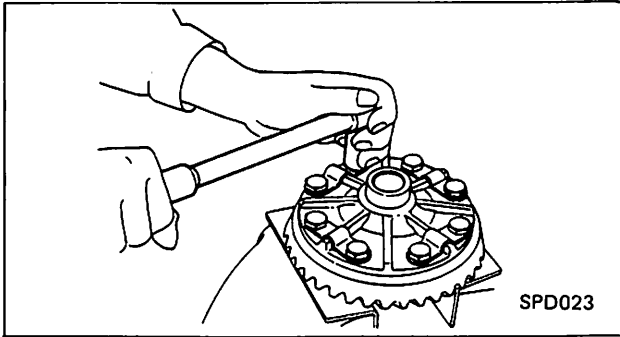
Be certain the puller catches the groove at the edge of the bearing inner race. Keep the left and right side bearings and races together.



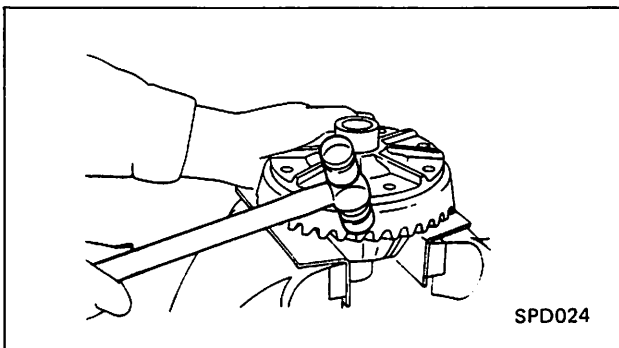
Disassembly (Con't)



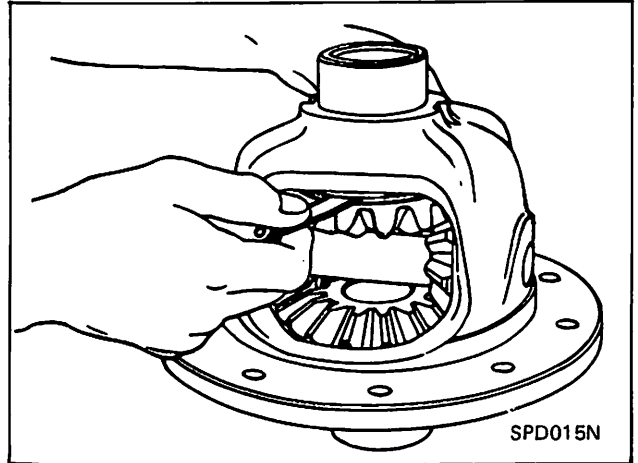
11. Flatten the lock tabs and remove the ring gear bolts in a criss-cross fashion using a 17mm socket.



12. Tap the ring gear off the gear carrier using a plastic hammer. Tap evenly all around to keep the gear from binding.

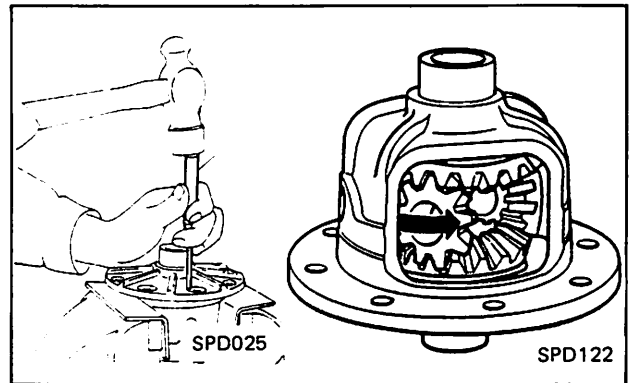


13. Double-check the side gear case clearance (previously measured during inspection). The clearance must be 0-0.006 in (0-0.15 mm). If not, the side gear thrust washers will have to be changed during re-assembly.



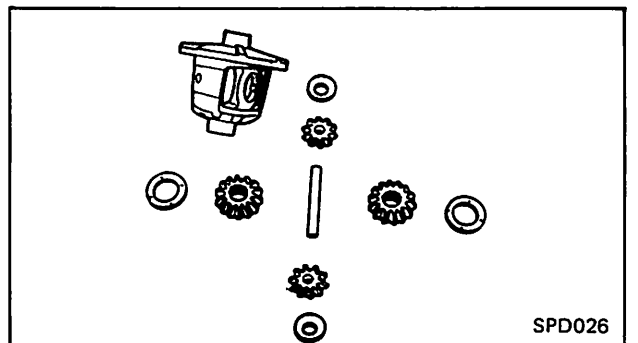
14. Using a long drift, drive the lock pin out of the gear carrier.

15. Draw out the pinion mate shaft, then rotate the pinion mate gears out of the case. Remove the side gears and thrust washers.



NOTE:

Put marks on the gears and thrust washers so that they can be reinstalled in their original positions.



Parts Inspection

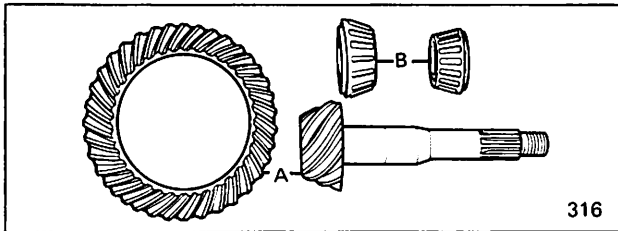
Disassembled parts should be cleaned thoroughly, then examined for wear or damage. Repair or replace any damaged or worn parts.

1. Check all gear teeth (A) for scoring, cracking or chipping.

NOTE:

The ring gear and pinion shaft will always be replaced as a set.

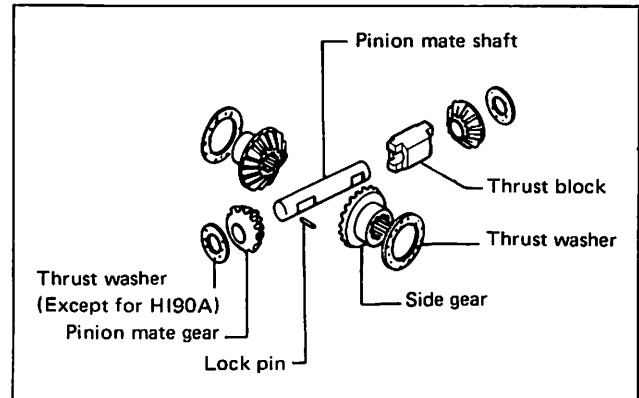
2. Inspect pinion bearing races and rollers (B) for scoring, cracking, chipping or signs of excessive wear.



NOTE:

Pinion bearings should be replaced whenever pinion shaft ring gear sets are changed.

3. Inspect:
 - a. Pinion mate shaft — for signs of wear or component distortion.
 - b. Side and pinion mate gears — for scoring, chipped or worn teeth.
 - c. Thrust block — for scoring or damage.

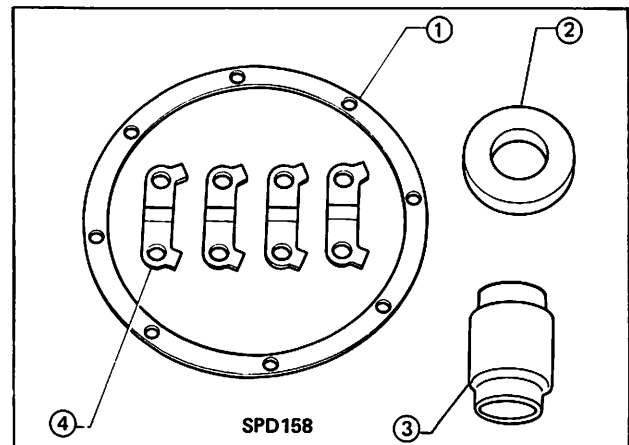


4. Inspect thrust washer faces. Small faults can be corrected with sandpaper.

NOTE:

The following parts should be replaced by new ones each time they are removed.

- ① Gasket
- ② Front oil seal
- ③ Collapsible spacer
- ④ Lock strap



Assembly

Assembly should be done in the reverse order of disassembly, while making any necessary inspections and adjustments.

PRECAUTION:

- a. Arrange shims and washers to install them correctly.
- b. Thoroughly clean the surfaces on which shims, washers, bearings and bearing caps are installed.
- c. Apply gear oil when installing bearings.
- d. Pack recommended multi-purpose grease into cavity between lips when fitting oil seal.

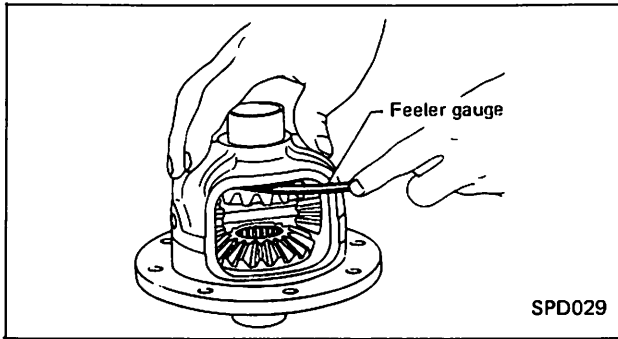
DIFFERENTIAL CASE

1. Install pinion mate gears, side gears and thrust washers into differential case.
2. Fit pinion mate shaft and thrust block.
3. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer (Refer to S.D.S.).

Side gear clearance:

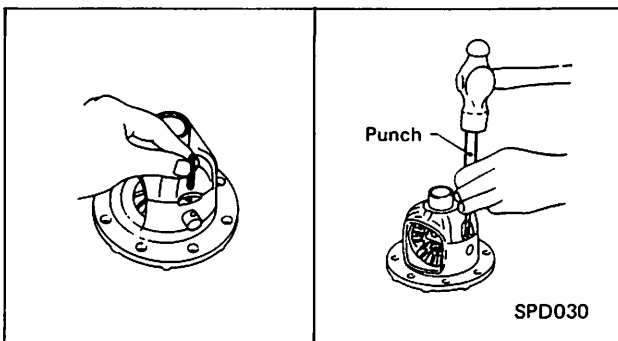
0.004-0.008 in (0.10-0.20 mm)

Assembly (Con't)



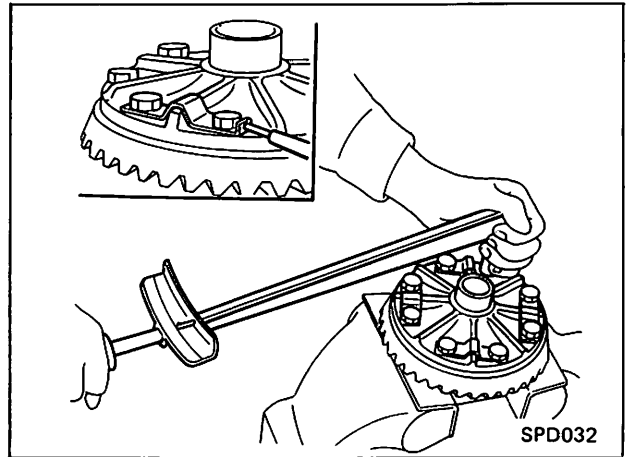
4. Install pinion mate shaft lock pin using a punch.

NOTE:
Make sure lock pin is flush with case.

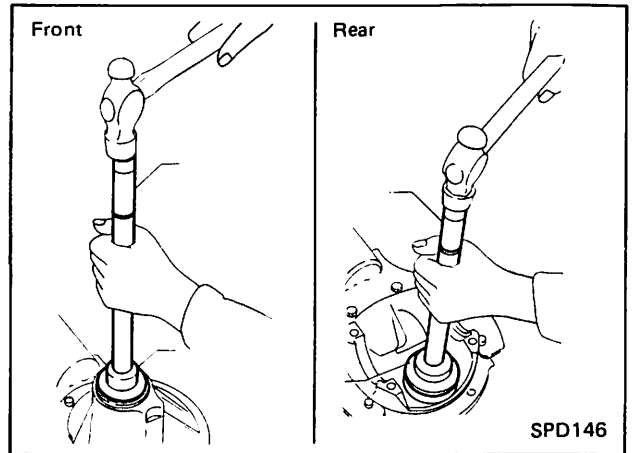


5. Install the ring gear, bolts and locking tabs. Torque 58-72 ft-lbs (8-10 kg.m/78-98 N.m). Tap the bolt heads with a hammer, then re-torque. Tighten bolts in a criss-cross fashion.

NOTE:
Do not assemble side bearings at this point.



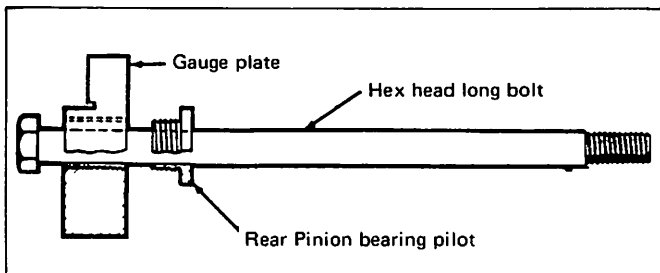
6. Using Tools J-25742-01 and J-25742-03, install pinion bearing inner and outer races. Be certain the races are seated squarely in their bores.



Preload/Pinion Height Adjustment

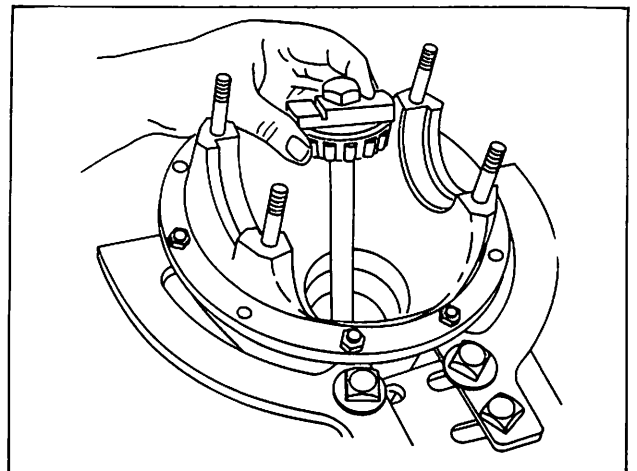
1. Install bearing pilot into the gauge plate and slide over the long bolt. Use special tools as shown below:

J25269-30 (H190-ML)
J25269-30 (H190-A)
J25269-23



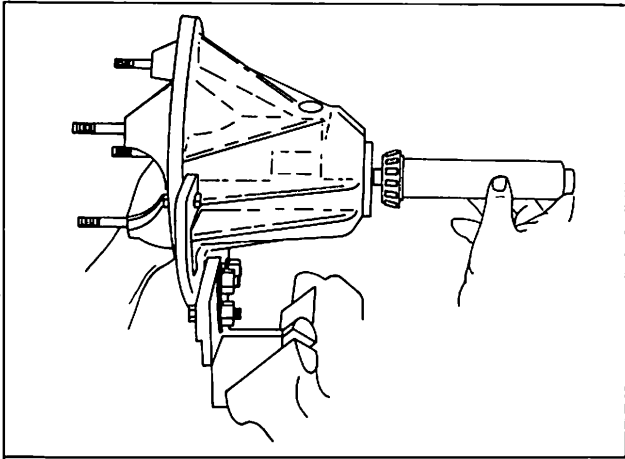
J25269-02 (H190-ML)
J25269-12 (H190-A)

2. Install the rear pinion bearing in the differential housing. Slide the long bolt and gauge plate through the bearing.

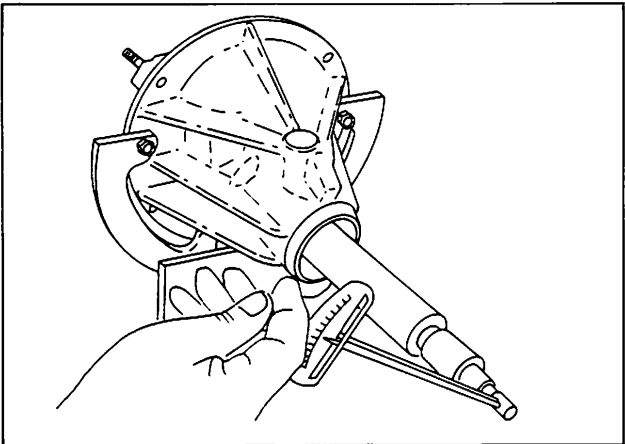


Preload/Pinion Height Adjustment (Con't)

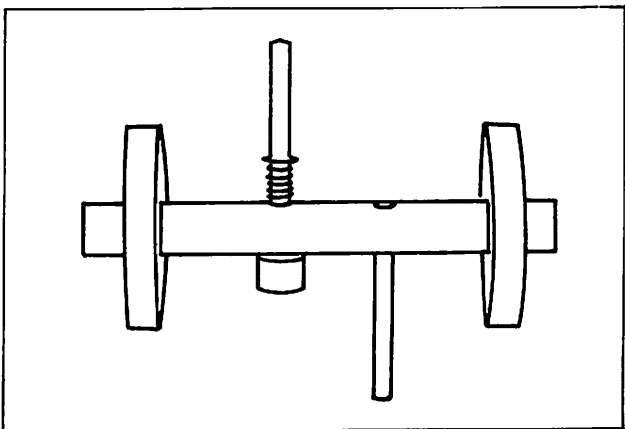
3. Holding these parts together, slide the assembly over the long bolt into the differential housing. Install the front bearing pilot support and support nut. Finger tighten the nut and insure that all parts turn freely and are properly aligned.



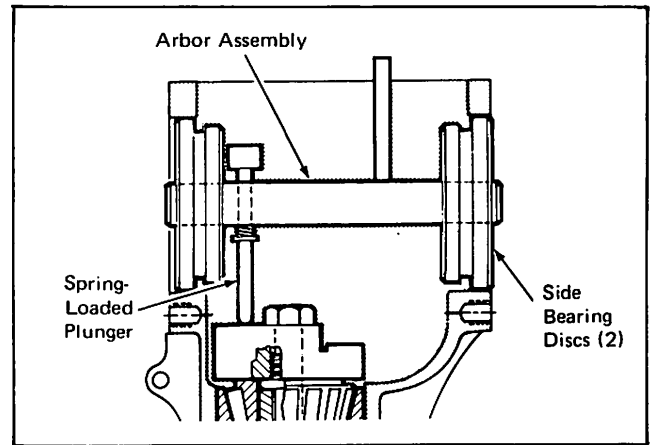
4. Tighten nut carefully to the correct preload of 8.7-11.3 in-lbs (10-13 kg-cm, 1.0-1.3 N.m).



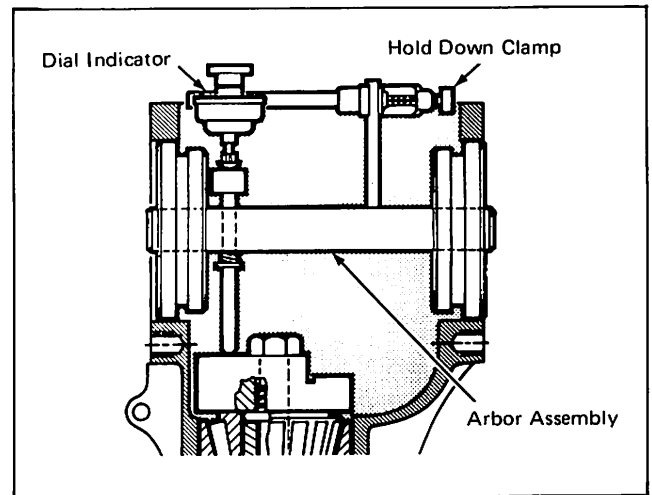
5. Install two discs with arbor assembly. Ensure that the arbor turns freely.



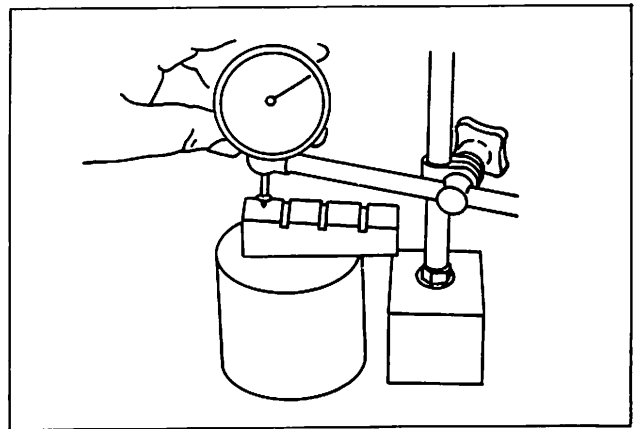
6. Lift the spring loaded plunger and place it on the face of the gauge plate (use the correct gauge plate step).



7. Install the dial indicator and tighten the hold down clamp.



8. To zero the dial indicator, rotate the arbor and plunger back and forth and note highest deflection, (the point where the needle changes direction). Now set the dial indicator at zero.



Preload/Pinion Height Adjustment (Con't)

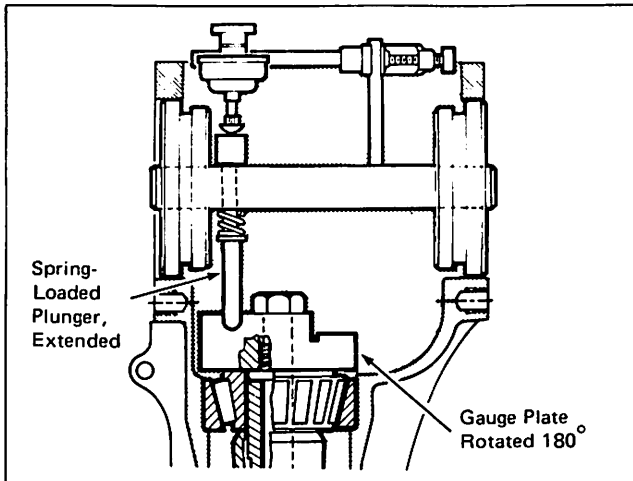
NOTE:

Use the chart below and the steps that follow the chart to determine correct pinion shim size.

A.	_____ mm*	Standard Measure
B.	_____	Dial Indicator Reading
C.	_____	Add A + B = C
D.	_____	Pinion Marking
E.	_____	Pinion Shim Size (add or subtract D from C)

*Standard measures: H190-ML — 2.00 mm
H190-A — 2.50 mm

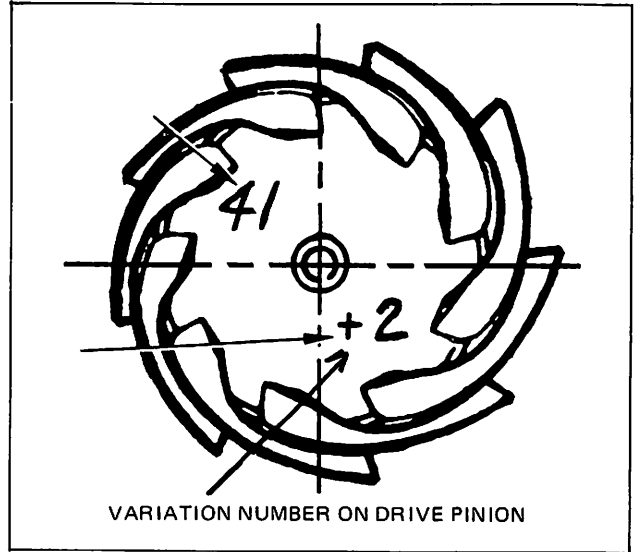
- Fill in the correct standard measure.
- Rotate the arbor assembly until the plunger falls off of the gauge plate and read the dial indicator. Repeat to ensure accuracy.



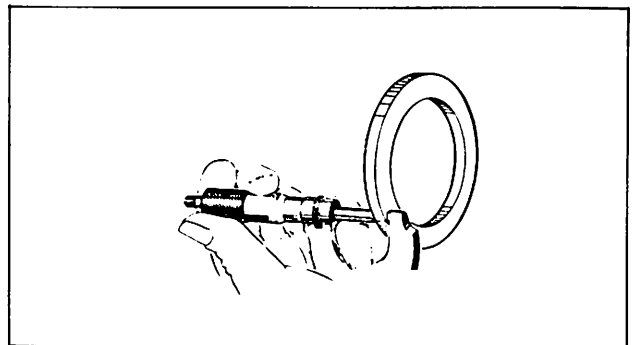
- Check the pinion head for the variation marking (Factor D). If the marking is a plus (+) **subtract** line D from line C. If it is a minus (-) **add** lines C and D.

NOTE:

If the pinion is unmarked or marked zero, then line C is your pinion shim size. Otherwise line E is the correct pinion size.

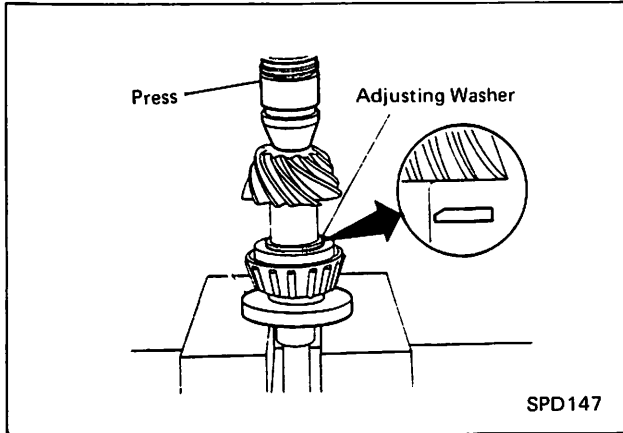


- Select the proper shim. As a precaution measure the shim to verify its dimensions.

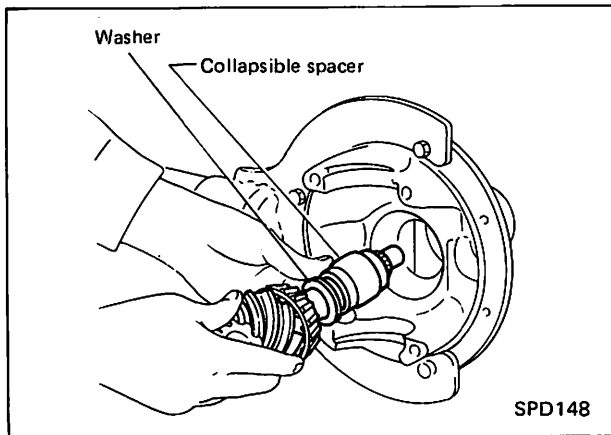


Pinion Assembly

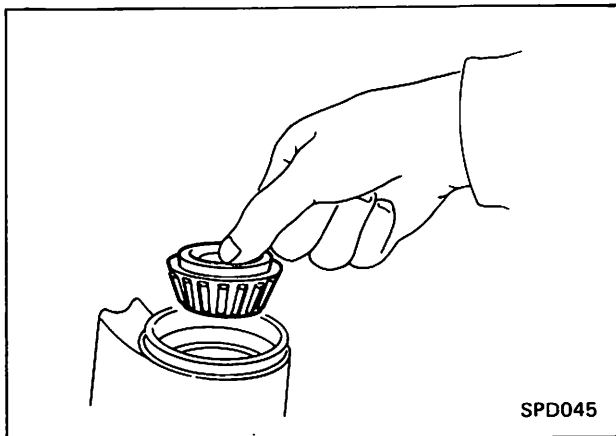
1. Place a pinion shim of the correct size on the pinion shaft, bevel side toward the gear. Using the press stand, press the bearing on the shaft.



2. Place a **washer** and a **new** collapsible spacer on drive pinion and **lubricate** rear bearing with gear oil, and insert it in gear carrier.



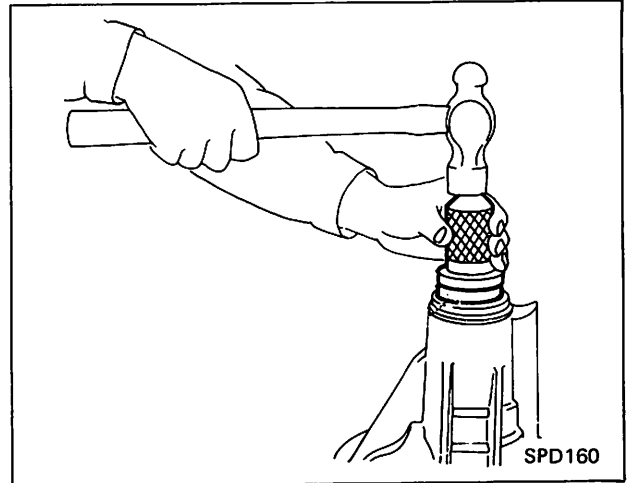
3. **Lubricate** front bearing with gear oil and place it in gear carrier.



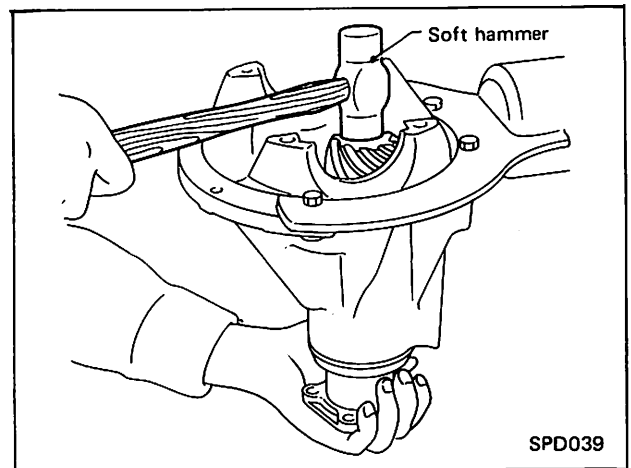
4. Using Tool J-25405, carefully fit a **new** oil seal into carrier.

NOTE:

Make sure oil seal is flush with end of carrier and apply multi-purpose grease into cavity between lips.



5. Install companion flange and hold it firmly. Insert drive pinion into companion flange by tapping its head with a soft hammer.

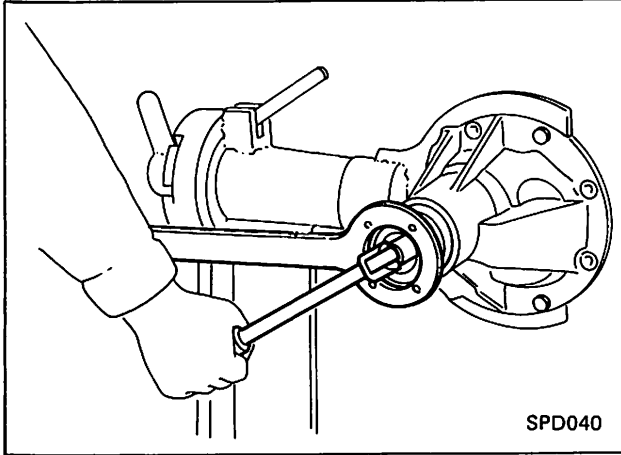


Pinion Assembly (Con't)

6. Hold companion flange with Tool and temporarily tighten pinion nut, until there is no axial play.

NOTE:

Be certain that threaded portion of drive pinion and pinion nut are free from oil or grease.



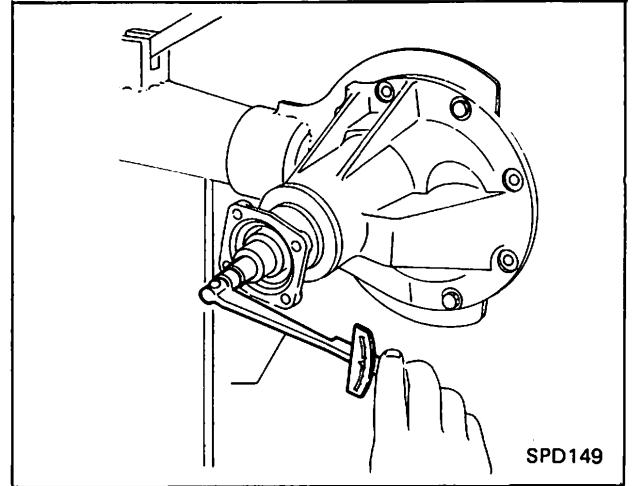
7. Tighten pinion nut by degrees to the specified preload while checking the preload with Tools.

NOTE:

When checking preload, turn drive pinion in both directions several times set bearing rollers.

Preload:

9.5-13.9 in-lb (11-16 kg-cm, 1.1-1.6 N.m)



8. Torque drive pinion nut:
94-217 ft-lb (13-30 kg-cm, 127-294 N.m)

NOTE:

This procedure will have to be repeated if:

- a. **Maximum** preload is achieved before the minimum pinion nut torque is reached.
- b. **Minimum** preload is not achieved before maximum pinion nut torque is reached.

CAUTION:

The preload is achieved by using the permanent set of collapsible spacer. So if an over-preload results from excessive turning of the pinion nut, the spacer should be replaced by new one.

Side Bearing Shim Determination

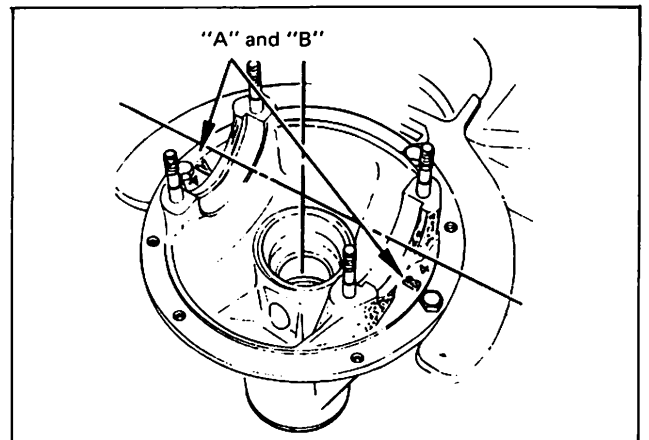
Side bearing shim size is determined by a set of factors. Use the chart below to list these factors. The

location of these factors is found on the various differential components as shown below.

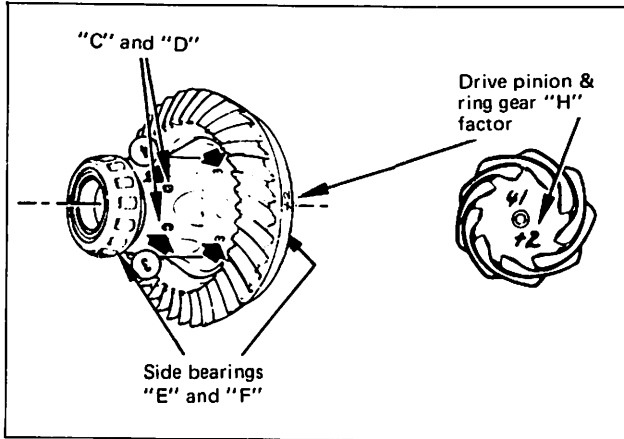
FACTOR LOCATIONS

FACTOR CHART

LETTERS	HUNDREDTHS OF A MILLIMETER
A — Left housing	
B — Right housing	
C — Gear case	
D — Gear case	
E — Left side bearing	
F — Right side bearing	
H — (+) or (-): ring gear	

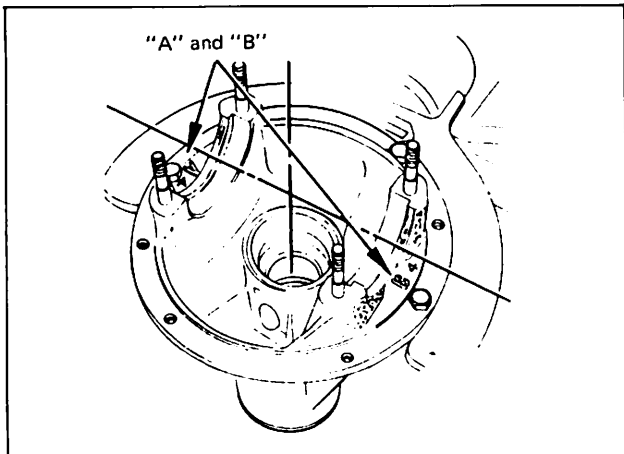


Side Bearing Shim Determination (Con't)

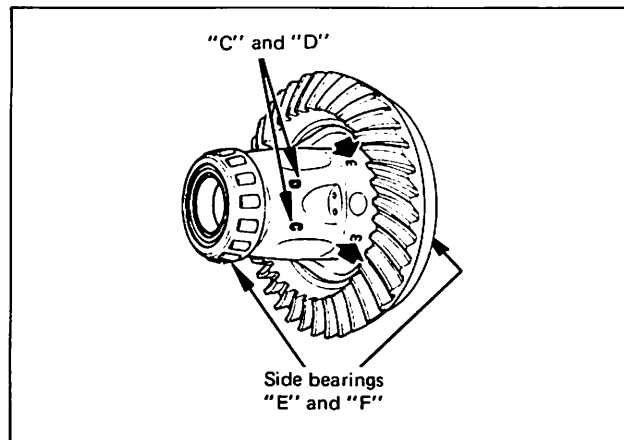


Using the factor chart to record your findings, proceed with the following steps to determine shim size.

1. Locate the numbers stamped next to the letters "A" and "B" on the carrier housing and record them as Factors "A" and "B" on the chart.



2. Locate the numbers stamped next to the letters "C" and "D" on the gear carrier. Record them as Factors "C" and "D" on the chart.



3. Measure how far under standard thickness each side bearing is, then record them as Factors "E" (left bearing) and "F" (right bearing). Use the illustration above as a guide for left and right bearings.

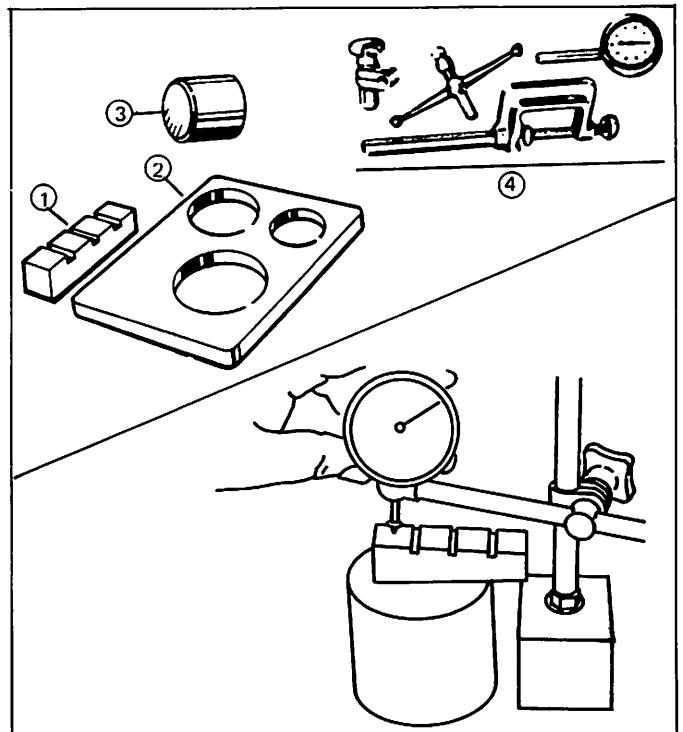
NOTE:

Side bearing standard thickness is 20.00 mm.

To measure side bearing thickness, the following tools are required.

1. J-25407-1: Step gauge block
2. J-25407-2: Base plate
3. J-25407-3: Weight block
4. J-8001-M: Dial indicator set

4. Mount the dial indicator on the base plate. Place the 5 pound weight on the plate and put the 20 mm gauge block on top. Zero the dial indicator.

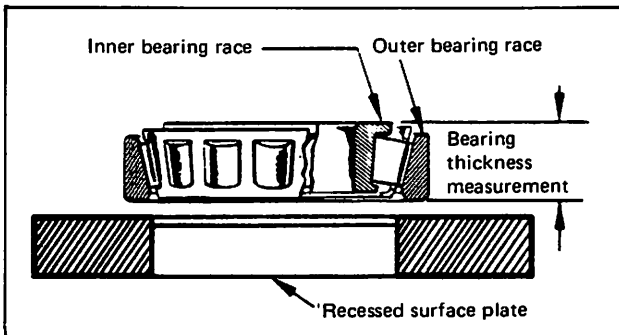


Side Bearing Shim Determination (Con't)

- Slide the gauge block out from under the dial indicator, then lift the weight block and slip the bearing and race under the weight.

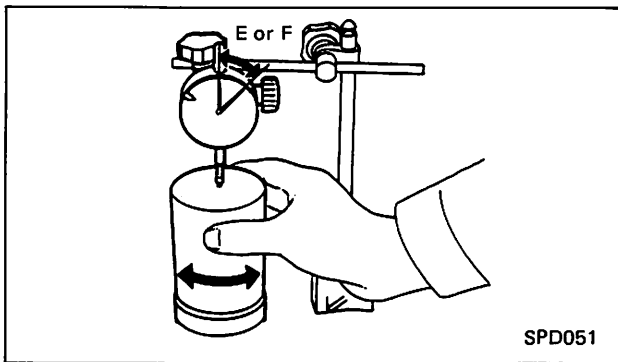
NOTE:

For each side bearing; place the bearing over the base plate recess as shown. Be certain it turns freely.



- Turn the weight to seal the bearing. Read the dial indicator's drop from zero. Write down the findings for each bearing on the list:

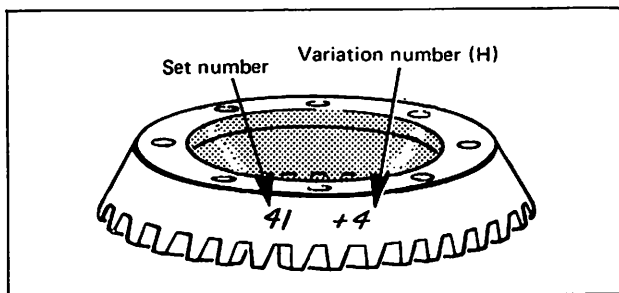
Factor E = left side bearing
Factor F = right side bearing



- Factor "H" on the list is the number marked on the ring gear.

NOTE:

If no variations number is found, substitute 0 on the list.



- Calculate the side bearing shim thickness using the formula below:

$$(T1) \text{ Left: } A - C + D + E - H = .18 \text{ mm}$$

$$(T2) \text{ Right: } B - D + F + H + .15 \text{ mm}$$

NOTE:

Substitute findings from the guide list for their appropriate letter in this formula.

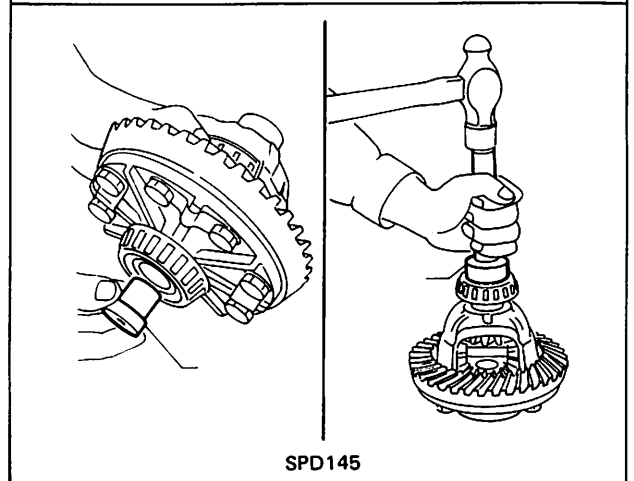
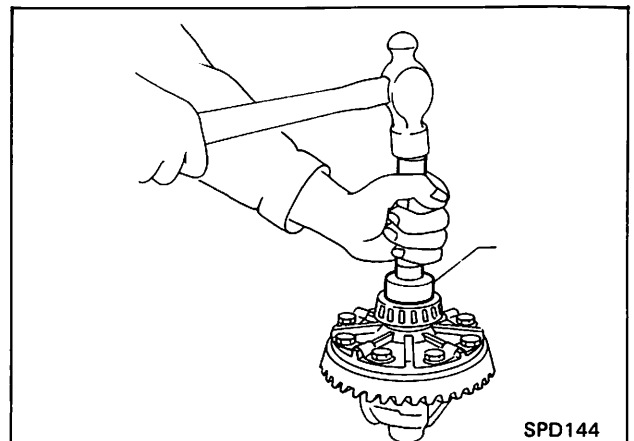
- Select the proper shims. Measure each shim to ensure accuracy.

NOTE:

If the exact thickness of washer is not available, use one that measures close to the calculated value. For example:

IF UNAVAILABLE —	USE
T = 0.30 mm (calculated size)	T = 0.38 mm (closest available size)

- Install the shims behind each bearing and using Tools J-25805-01 and J-8107-2, press on the bearings.

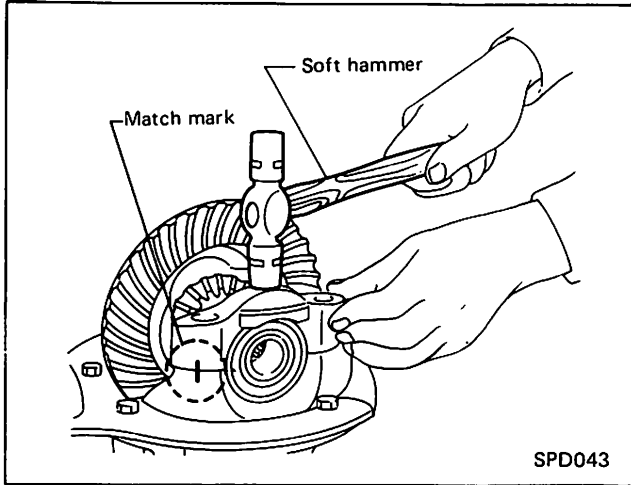


Side Bearing Shim Determination (Con't)

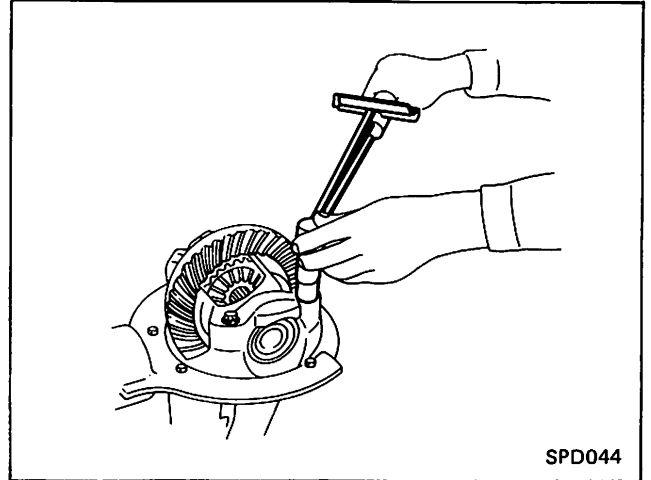
11. Mount the ring gear assembly in the case, then install the side bearing caps. Tap them lightly with a plastic hammer to seat them.

NOTE:

Be certain to use the alignment marks made during disassembly for proper cap/case assembly.

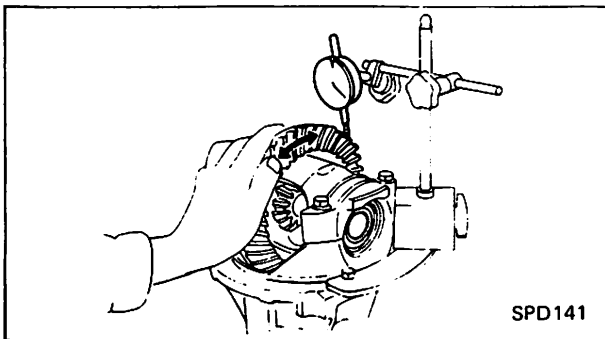


12. Install the cap fasteners and torque to 36-43 ft-lb (5-6 kg-cm, 49-59 N.m).



Final Verification

1. Check ring gear backlash with a dial indicator.
Backlash:
 0.006-0.008 in (0.15-0.20 mm)



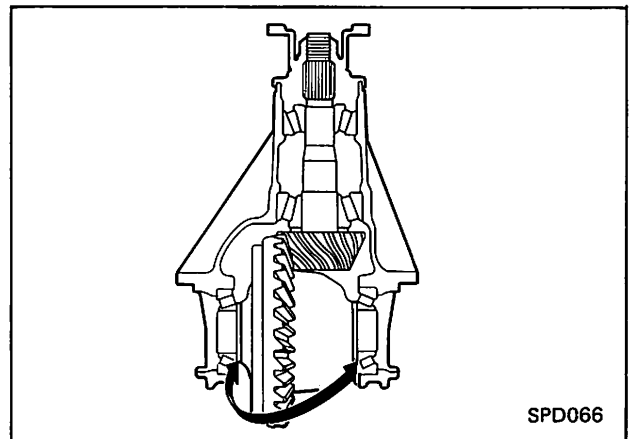
— If backlash is too small, decrease thickness of left shim and increase thickness of right shim by the same amount.

— If backlash is too great, reverse the above procedure.

NOTE:

Never add or remove from the total amount of shims or bearing preload will be changed.

2. Check total preload with Tool J-25765A.

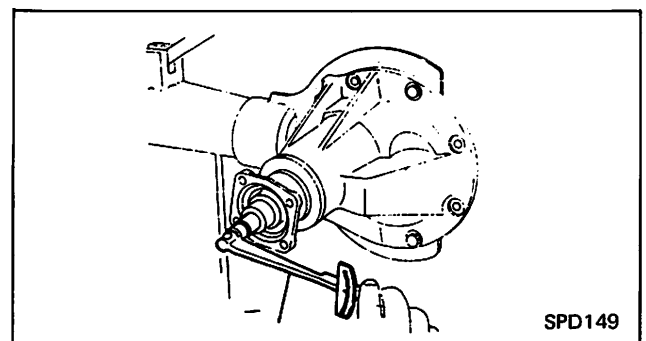


NOTE:

When checking preload, turn drive pinion in both directions several times to set bearing rollers.

Preload:

10-19 in-lb (12-22 kg-cm, 1.2-2.2 N.m)

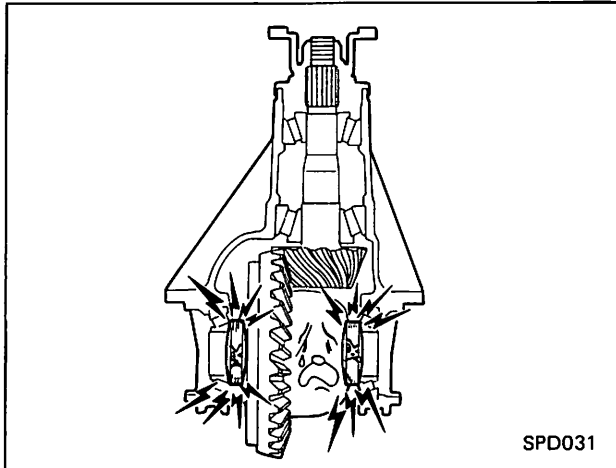


Final Verification

- If preload is too great, remove the same amount of shims to each side.
- If preload is too small, add the same amount of shims to each side.

NOTE:

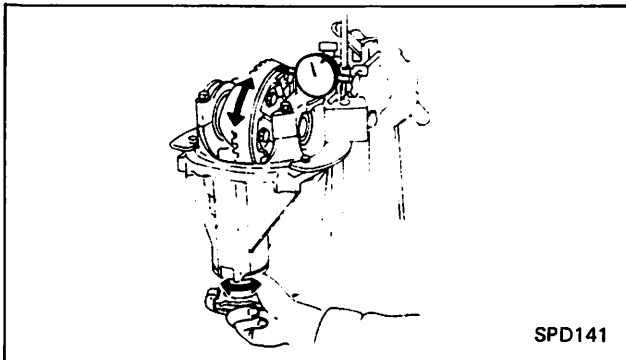
Never add or remove different amount of shims to each side or ring gear backlash will be changed.



3. Check ring gear runout with a dial indicator.

Runout:

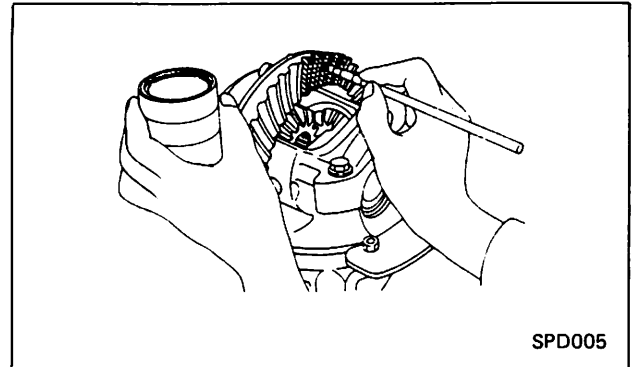
0.003 in (0.08 mm)



— If backlash varies excessively in different places, the variance may have resulted from foreign matter caught between the ring gear and the differential case.

— If the backlash varies greatly when the runout of the ring gear is within a specified range, the hypoid gear set or differential case should be replaced.

4. Finally, check for tooth contact pattern.



Refer to **TOOTH CONTACT**.

Usually the pattern will be correct if you have calculated the shims correctly and the backlash is correct.

However, in extremely rare cases you will have to use trial-and-error processes until you get a good tooth contact pattern.

The tooth pattern is the best indication of how well a differential has been set up.

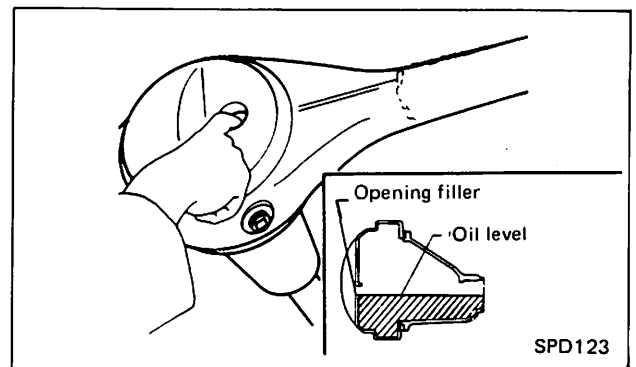
5. Install the differential carrier in the vehicle.

Gasket should be replaced by new one each time the differential carrier is removed.

Then fill with gear oil, referring to Recommended Lubricants (Section MA of your Service Manual).

Gear oil capacity:

2-5/8 US pt (1.25 liters, 2-1/4 Imp pt)



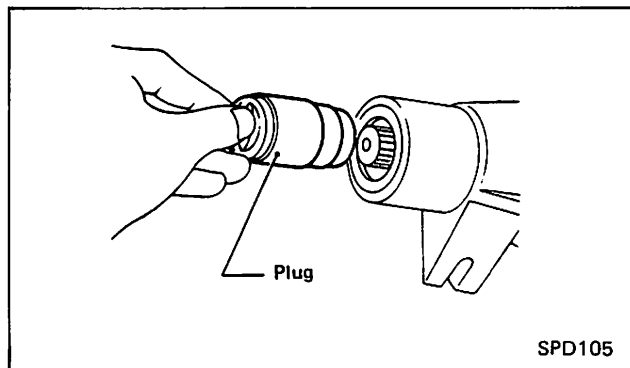
Front Oil Seal Replacement — Removal

The following is the procedure for replacement of the front oil seal.

1. Jack up rear of vehicle and support it by placing safety stands under rear axle case, referring to Section GI of your Service Manual.
2. Remove drain plug and drain gear oil.
3. Remove the propeller shaft (refer to Section PD of your Service Manual), then remove the rear axle shafts (refer to Section RA of your Service Manual).

NOTE:

Plug the rear end of the transmission rear extension housing as shown.

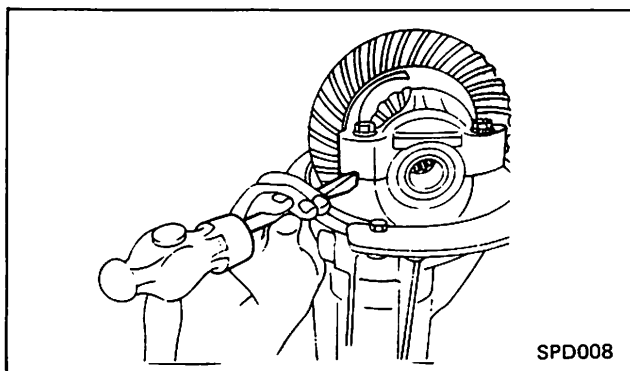


4. Loosen nuts securing differential carrier to rear axle case, and take out differential carrier.
5. Mount differential carrier on Tool J-25602-1.

NOTE:

Bearing caps are line-board during manufacture and should be put back in their original place.

Put match marks on one side of side bearing cap with paint or punch to ensure that it is replaced in proper position during reassembly.

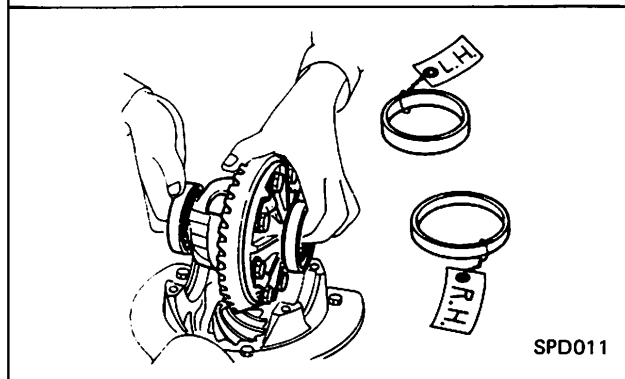
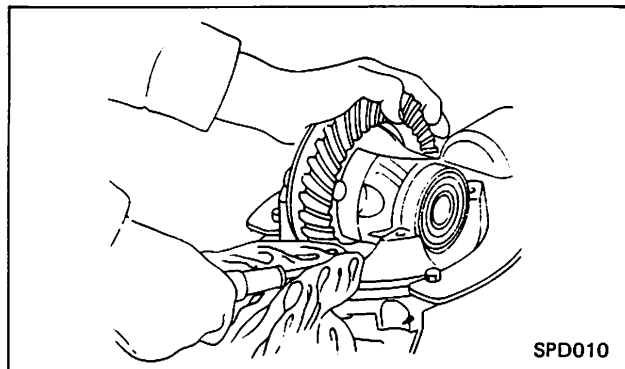


6. Remove the side bearing caps.

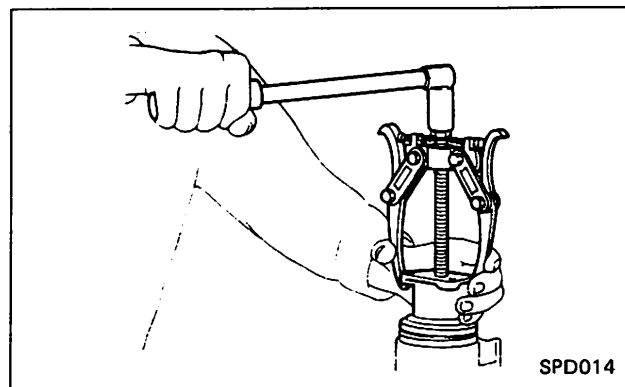
7. Using a pry bar, remove differential case assembly.

NOTE:

Keep the bearing races with their corresponding races.



8. Remove drive pinion nut with Tool J-25774A.
9. Remove companion flange with puller.



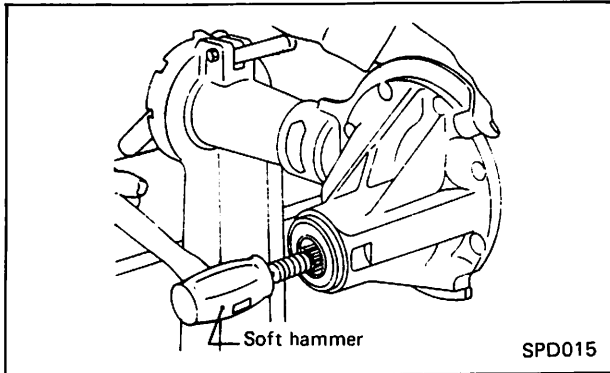
Front Oil Seal Replacement — Removal (Con't)

10. Remove drive pinion with soft hammer.

CAUTION:

Reinstall companion flange not on the pinion shaft to prevent damage to the shaft threads.

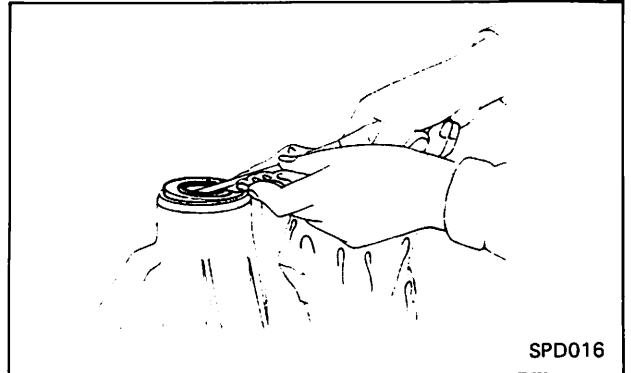
11. Remove collapsible spacer and washer from drive pinion.



12. Remove oil seal by prying up with a large screwdriver, and remove front pinion bearing inner race.

NOTE:

Do this carefully, so as not to scratch seal bore with screwdriver. Cover end of screwdriver with a rag.



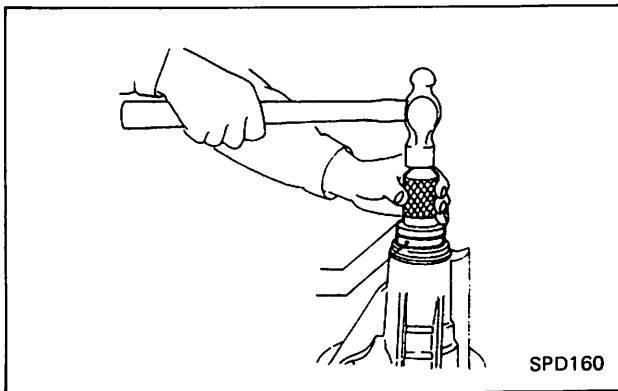
Front Oil Seal Replacement — Assembly

ASSEMBLY

1. Install the new seal using Tool J-25405.

NOTE:

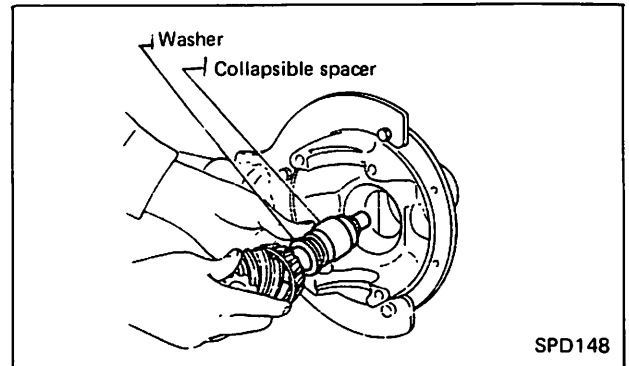
Be certain the oil seal is flush with the end of the housing. Apply a multi-purpose grease into the cavity between the oil seal lips.



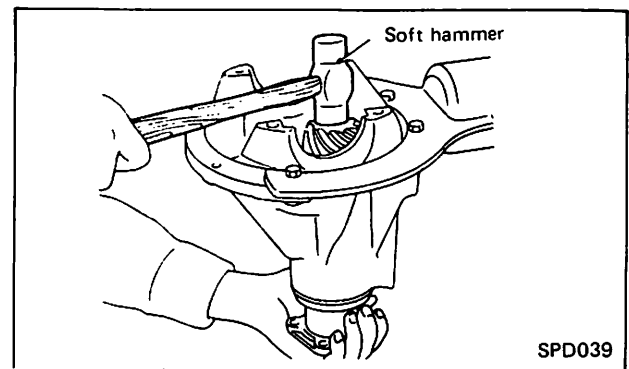
2. Place a washer and a new collapsible spacer on drive pinion and lubricate rear bearing with gear oil, and insert it in the gear carrier.

NOTE:

Always use a new collapsible spacer to ensure correct preload.



3. Install companion flange and hold it firmly. Insert drive pinion into companion flange by tapping its head with a soft hammer.

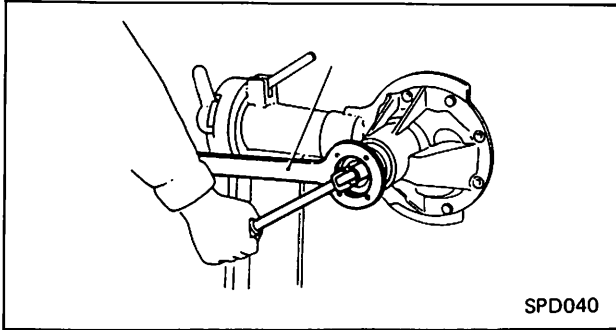


4. Hold companion flange with Tool J-25774 and temporarily tighten pinion nut, until there is no axial play.

Front Oil Seal Replacement — Assembly (Con't)

NOTE:

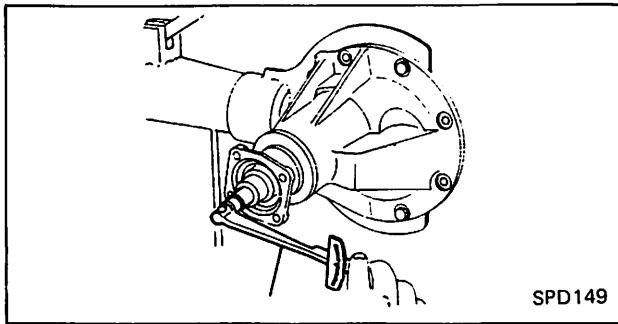
Be certain that threaded portion of drive pinion and pinion nut are free from oil or grease.



5. Tighten pinion nut by degrees to the specified preload of 9.5-13.9 in-lb (11-16 kg-cm, 1.1-1.6 N.m) using Tool J-25765A.

NOTE:

When checking preload, turn drive pinion in both directions several times to set bearing rollers.



CAUTION:

The preload is achieved by using the permanent set of collapsible spacer. So here, if an over-preload results from excessive turning of the pinion nut, the spacer should be replaced by new one.

6. Install differential case assembly and side bearing outer races into differential carrier, and install side bearing cap.

NOTE:

Tap on the cap with a soft hammer to settle it in the carrier. Be certain to use the alignment marks made during disassembly for proper cap/housing assembly.

7. Install the differential on the vehicle. Use a new gasket each time the differential housing is removed.
8. Fill the carrier with the specified amount of gear oil.

— Pinion Height Adjusting Washer —

Thickness — in (mm)	Part No.
0.101 (2.58)	38154-P6000
0.103 (2.61)	38154-P6001
0.104 (2.64)	38154-P6002
0.105 (2.67)	38154-P6003
0.106 (2.70)	38154-P6004
0.107 (2.73)	38154-P6005
0.108 (2.76)	38154-P6006
0.110 (2.79)	38154-P6007
0.111 (2.82)	38154-P6008
0.112 (2.85)	38154-P6009
0.113 (2.88)	38154-P6010
0.114 (2.91)	38154-P6011
0.115 (2.94)	38154-P6012
0.117 (2.97)	38154-P6013
0.118 (3.00)	38154-P6014
0.119 (3.03)	38154-P6015
0.120 (3.06)	38154-P6016
0.121 (3.09)	38154-P6017
0.123 (3.12)	38154-P6018
0.124 (3.15)	38154-P6019
0.125 (3.18)	38154-P6020

— Side Bearing Adjusting Shim —

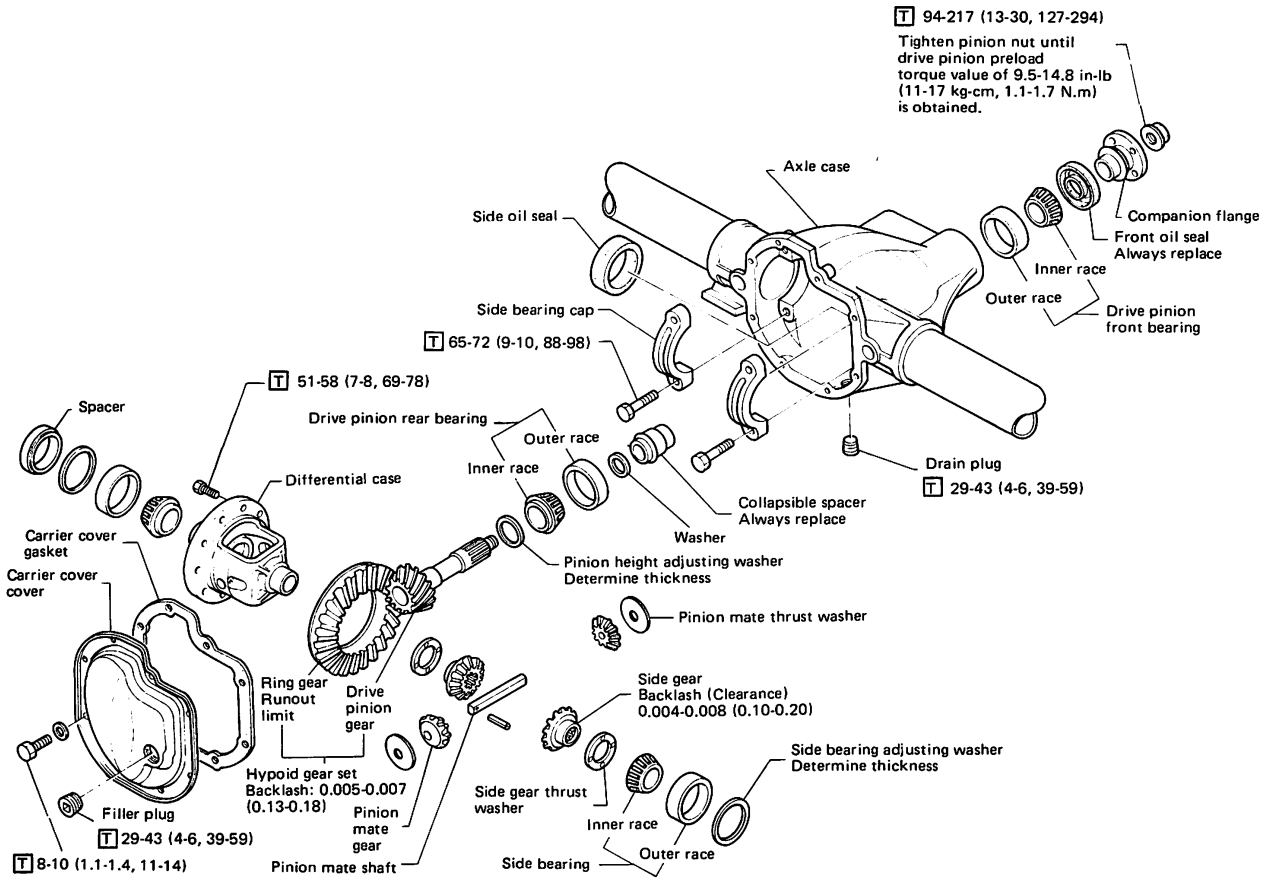
Thickness — in (mm)	Part No.
0.002 (0.05)	38453-27160
0.003 (0.07)	38454-27160
0.004 (0.10)	38455-27160
0.008 (0.20)	38456-27160
0.020 (0.50)	38457-27160

— Side Gear Thrust Washer —

Thickness — in (mm)	Part No.
0.030 (0.77)	38424-E3000
0.032 (0.82)	38424-E3001
0.034 (0.87)	38424-E3002
0.036 (0.92)	38424-R3003

REAR FINAL DRIVE

— Model: C200 —



T: ft-in (kg-m, N.m)
Unit: in (mm)

DIFFERENTIAL SERVICE INFORMATION

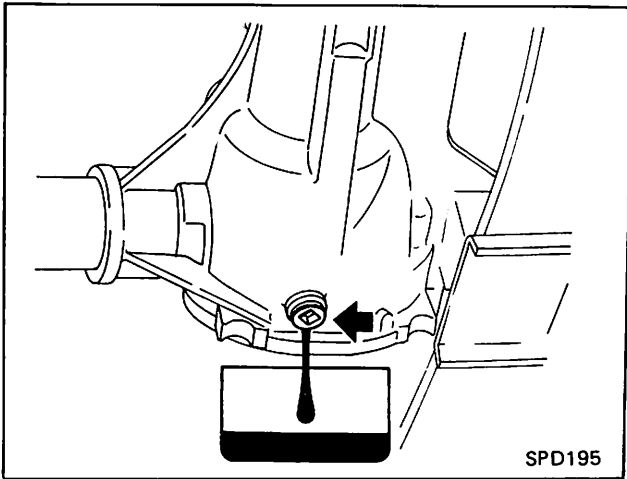
MODEL: C200

PROCEDURE SPECIFICATIONS	
Procedure	Specification
<ul style="list-style-type: none"> • Drive Pinion Preload (With front oil seal) in-lb (kg-cm, N.m) 	9.5-14.8 (11-17, 1.1-1.7)
<ul style="list-style-type: none"> • Side Bearing Adjusting Method 	Shim Washer
<ul style="list-style-type: none"> • Backlash: in (mm) <ul style="list-style-type: none"> — Drive Pinion to Ring Gear — Side Gear to Pinion Mate Gear (Between side gear and case) 	0.005-0.007 (0.13-0.18)
<ul style="list-style-type: none"> • Ring Gear Runout Limit in (mm) 	0.002 (0.05)
<ul style="list-style-type: none"> • Total Preload in-lb (kg-cm, N.m) 	10-20 (12-23, 1.2-2.3)

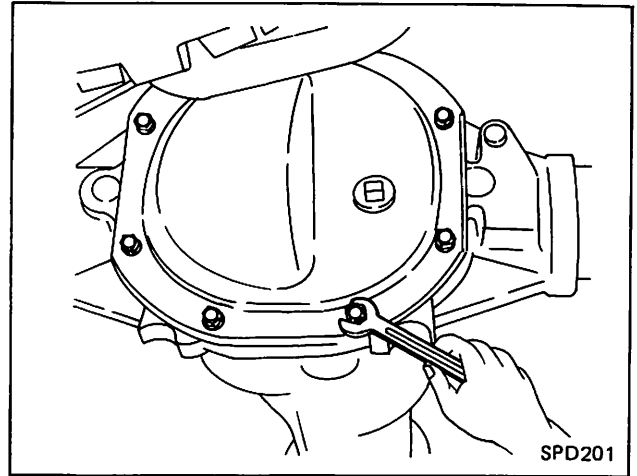
TIGHTENING TORQUES			
Unit	ft-lb	kg-cm	N.m
Drive pinion nut	94-217	13-30	127-294
Ring gear bolt	51- 58	7- 8	69- 78
Side bearing cap bolt	65- 72	9-10	88- 98
Drain and filler plugs	29- 43	4- 6	39- 59
Differential carrier to propeller shaft	58- 65	8.0-9.0	78- 88
Differential carrier rear cover bolt	8- 10	1.1-1.4	11- 14

Preparation for Disassembly-Removal

1. Remove the rear axle assembly. Refer to RA Section of your Service Manual.
2. Remove the drain plug and drain the gear oil.



3. Remove the propeller shaft and rear axle shafts. Refer to RA Section of your Service Manual.
4. Remove rear cover and rear cover gasket.

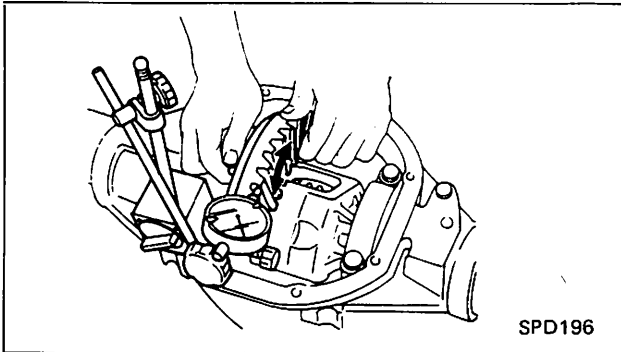


Pre-Disassembly Inspection

1. Check ring gear backlash with a dial indicator at several points. If it is not within specification, adjust it.

Ring Gear backlash:

0.005-0.007 in (0.13-0.18 mm)



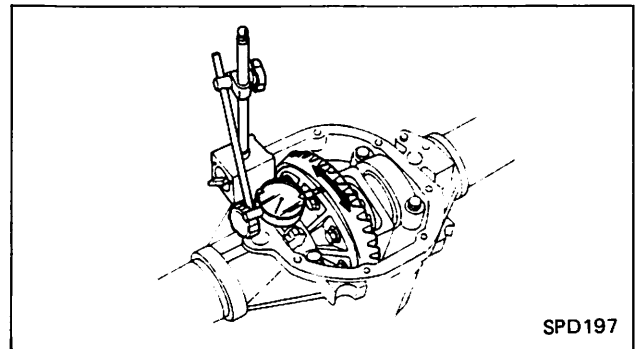
2. Check ring gear runout with a dial indicator. If it is over specification, hypoid gear set or differential case should be replaced.

NOTE:

When backlash varies excessively in different places, the variances may have resulted from foreign matter caught between ring gear and differential case.

Runout:

0.002 in (0.005 mm)



3. Check side gear backlash. Using a thickness gauge, measure clearance between side gear and differential case.

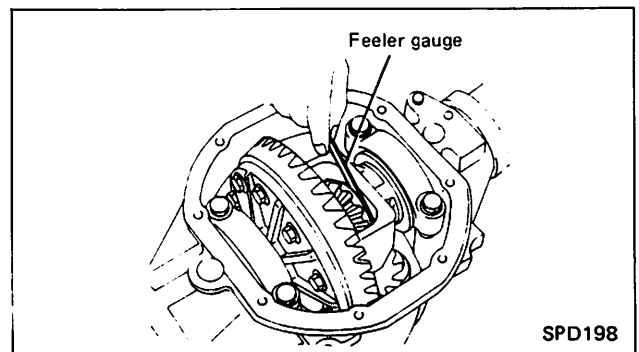
If it is not within specification, adjust it.

Side Gear backlash:

0.004-0.008 in (0.10-0.20 mm)

Clearance:

0.004-0.008 in (0.10-0.20 mm)



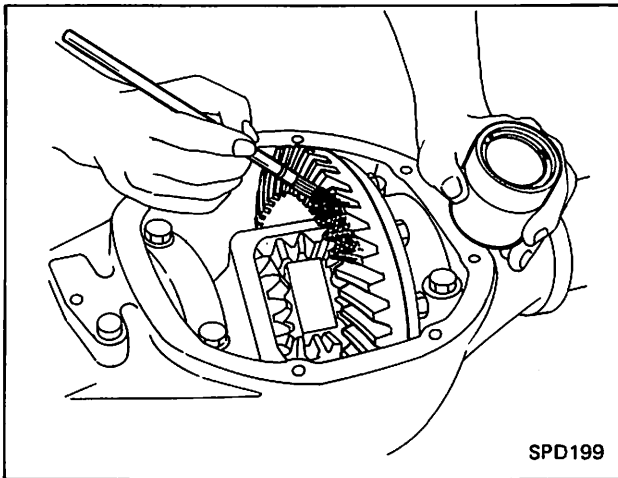
Tooth Contact

NOTE:

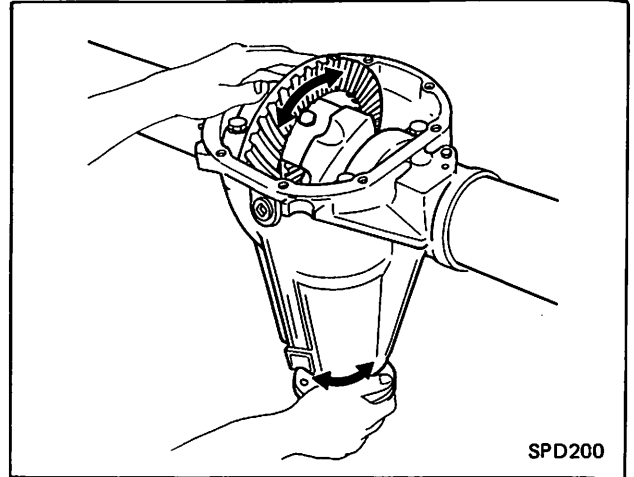
Gear tooth contact pattern check is necessary to verify correct relationship between ring gear and drive pinion.

Hypoid gear sets which are not positioned properly may be noisy, or have short life or both.

1. Check the gear tooth contact pattern.
 - a. Thoroughly clean ring gear and drive pinion teeth.
 - b. Sparingly apply a mixture of powdered ferric oxide and oil or equivalent to 3 or 4 teeth of ring gear drive side.

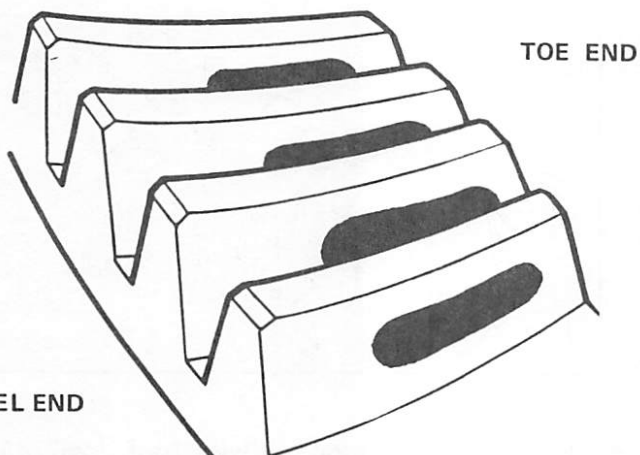


- c. Hold companion flange steady by hand and rotate the ring gear in both directions.



2. Compare contact marks left on the ring gear to those found in the following chart.

Tooth Pattern Interpretation

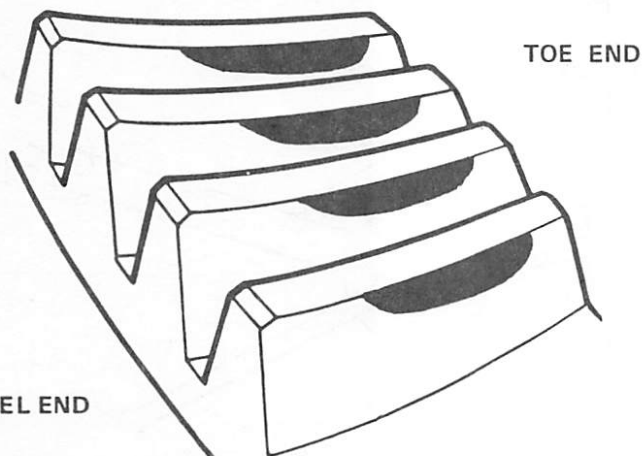


HEEL END

TOE END

Perfect tooth pattern.

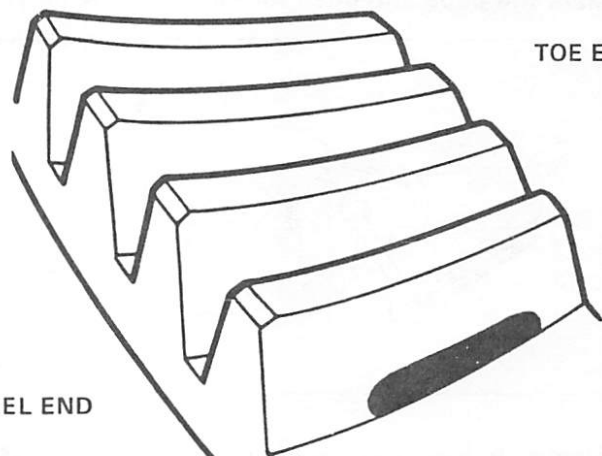
NOTE: A change in pinion height will also cause a change in backlash, so both will usually have to be adjusted.



HEEL END

TOE END

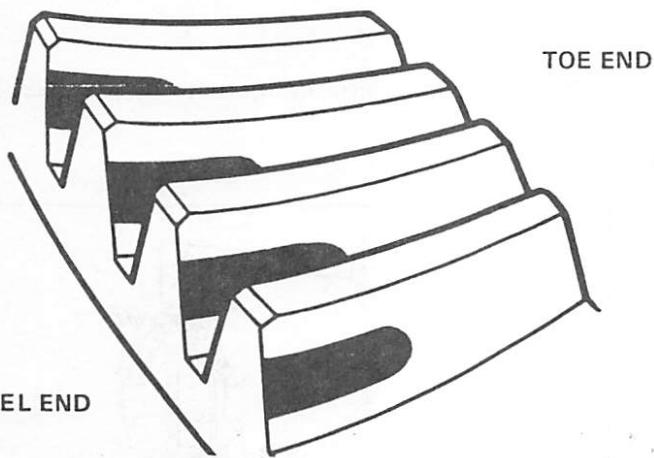
The pinion is too low. You will have to add to the shim(s) under the pinion.



HEEL END

TOE END

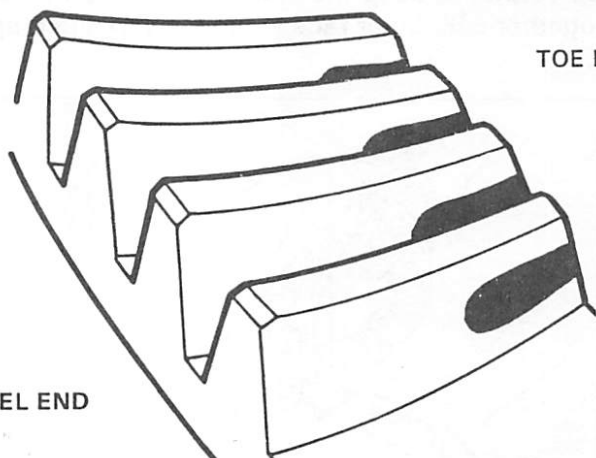
The pinion is too high. The shim(s) under the pinion will have to be decreased.



HEEL END

TOE END

There is too much backlash — the ring gear will have to be moved closer to the pinion.



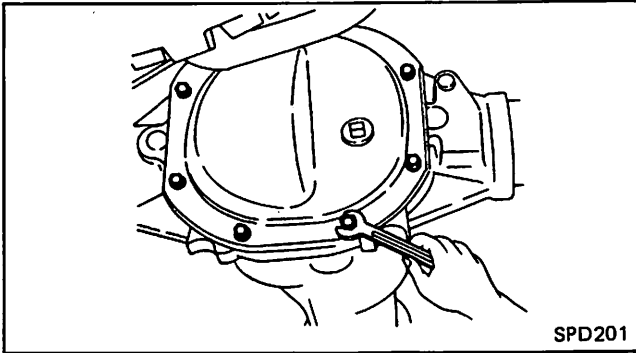
HEEL END

TOE END

There is not enough backlash — the ring gear will have to be moved away from the pinion.

Disassembly

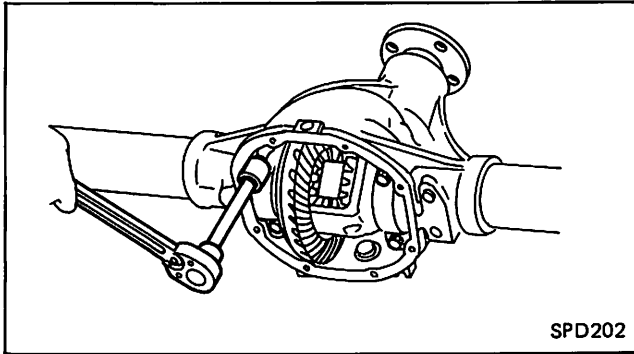
1. Remove rear cover and rear cover gasket.



2. Remove side bearing caps.

NOTE:

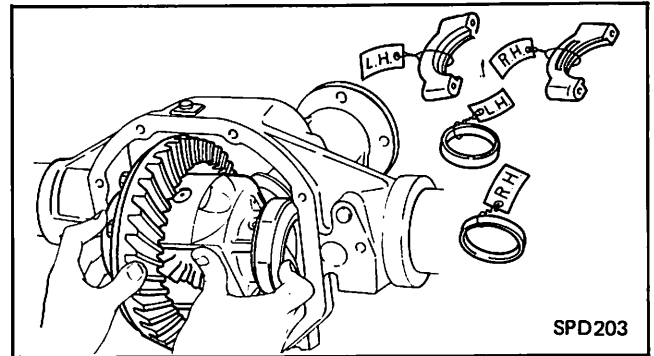
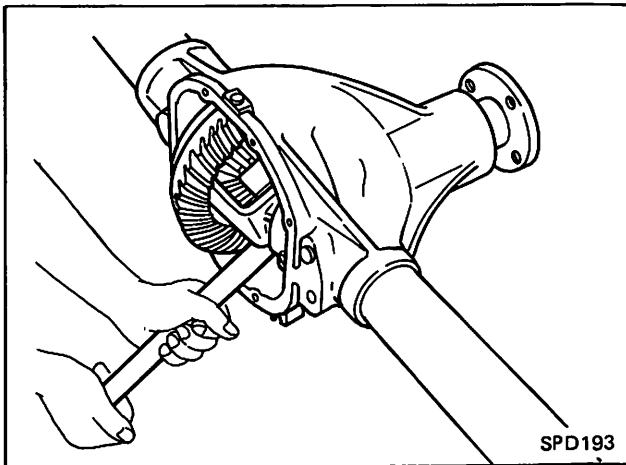
Bearing caps are line-board during manufacture and should be put back in their original places. Mark the caps and case for ease of assembly.



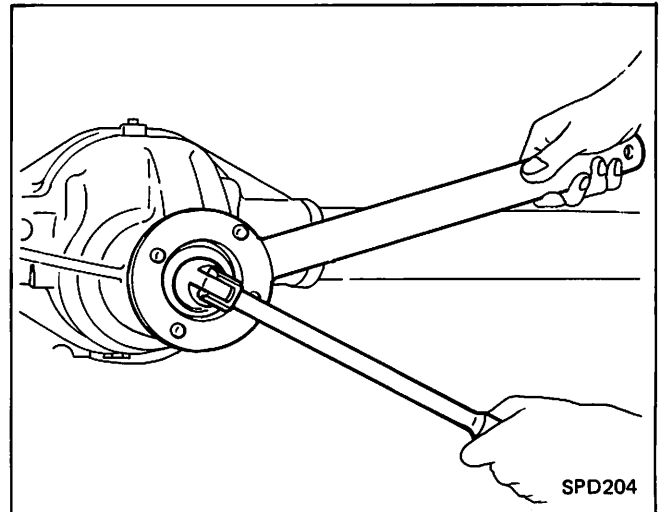
3. Using a pry bar, remove differential case assembly.

NOTE:

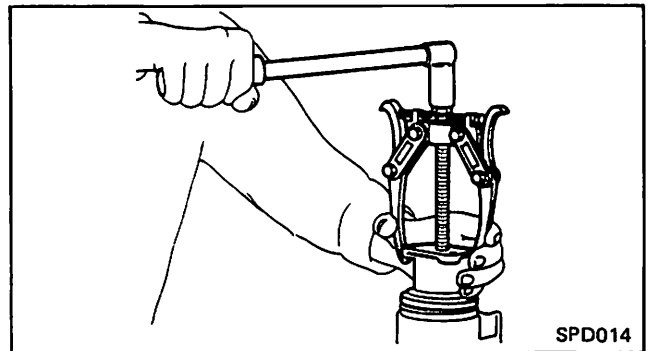
Be careful to keep the side bearing outer races together with inner race — do not mix them up.



4. Remove drive pinion nut with Tool. J-25774A.

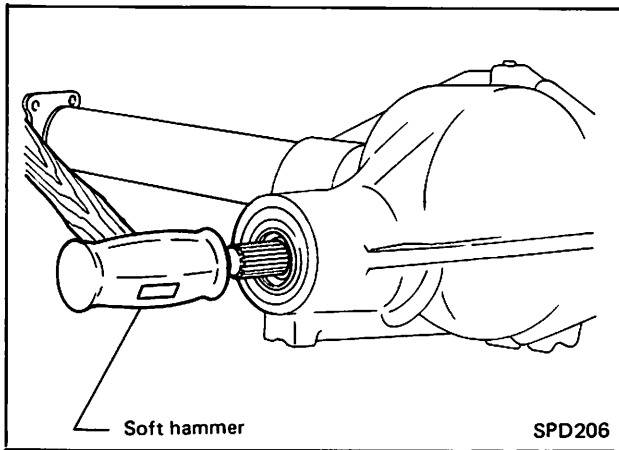


5. Remove companion flange with puller. J-22888.



Disassembly (Con't)

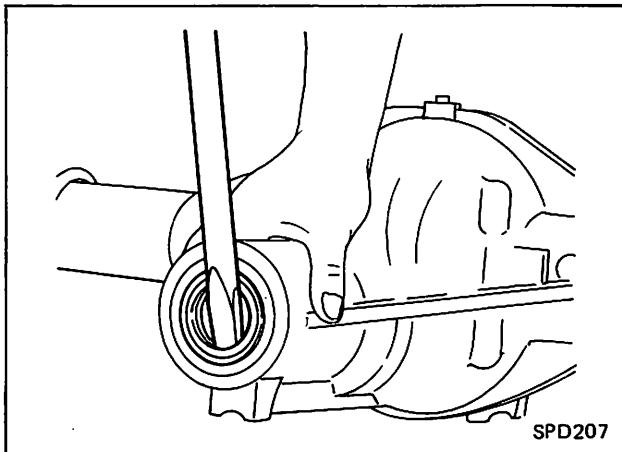
6. Remove drive pinion with soft hammer.



7. Remove oil seal by prying up with a large screwdriver, and remove front pinion bearing inner race.

NOTE:

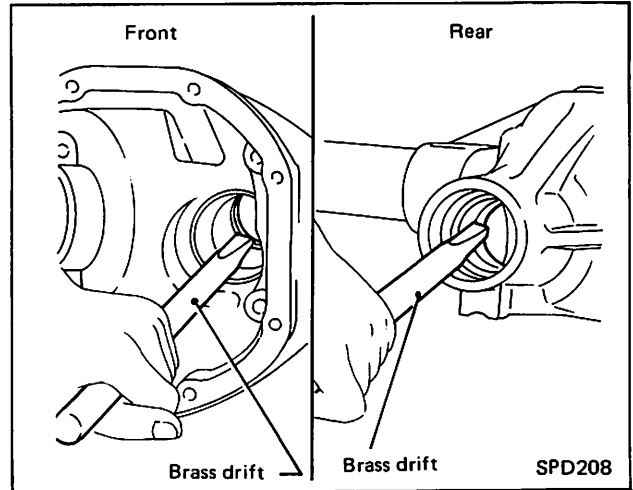
Do this carefully, so as not to scratch seal bore with screwdriver. Cover end of screwdriver with a rag.



NOTE:

Do not reuse oil seal once removed. Always install new one.

8. Remove pinion bearing outer race using a brass drift.

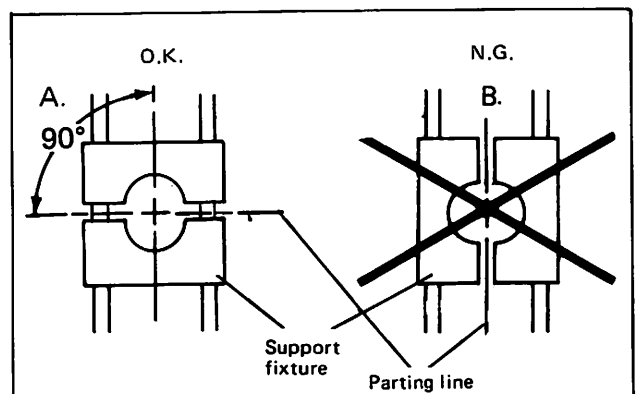
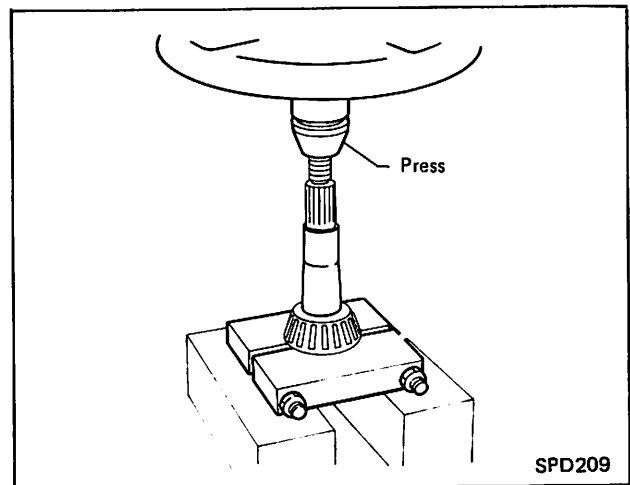


9. Remove collapsible spacer and washer from drive pinion.

10. Pull out rear bearing inner race with a press and Tool J-22912-01.

NOTE:

Care should be taken when setting Tool in press to make sure that parting line of Tool is a right angle to support fixture of press. This is to prevent banding Tool.

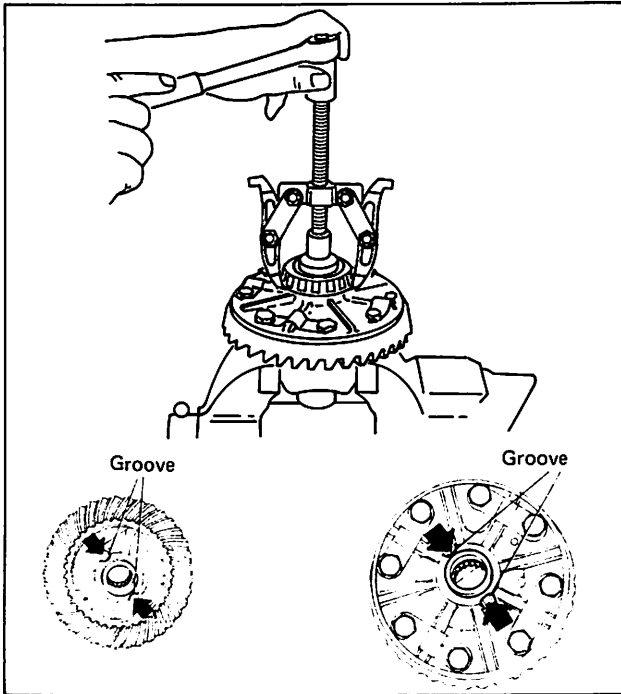


Disassembly (Con't)

11. Remove the side bearing inner race using Tools J-22888 and J-25797-02.

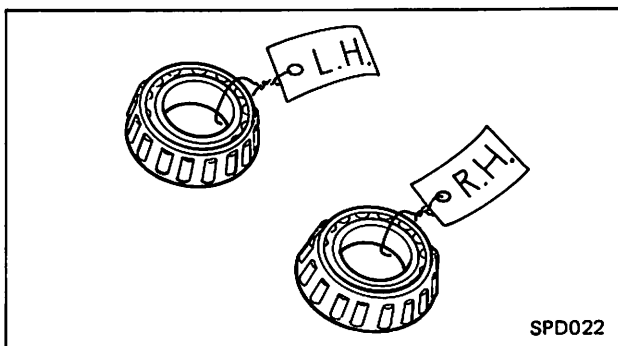
NOTE:

Be certain to engage the puller paws with the groove, not the bearing. The rollers should move freely.

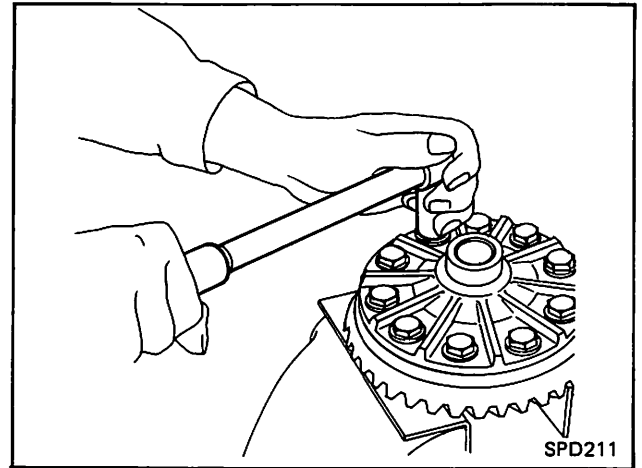


NOTE:

Keep left and right hand components together.



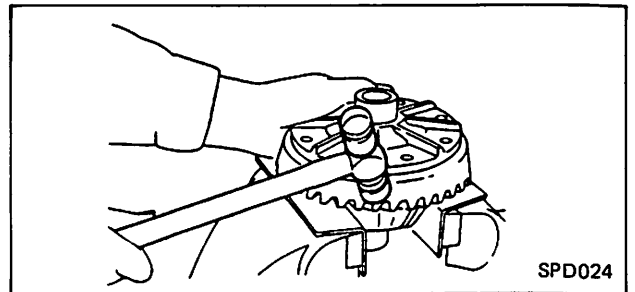
12. Remove ring gear by loosening ring gear bolts in a criss-cross fashion.



13. Tap ring gear off gear case using a soft hammer.

NOTE:

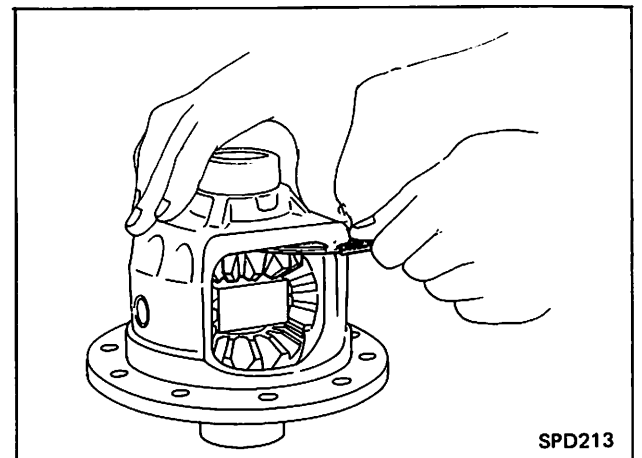
Tap evenly all around to keep ring gear from binding.



14. Before disassembling the gear carrier measure the side gear clearance. If the measurement is out of specification, the side gear thrust washers will have to be replaced.

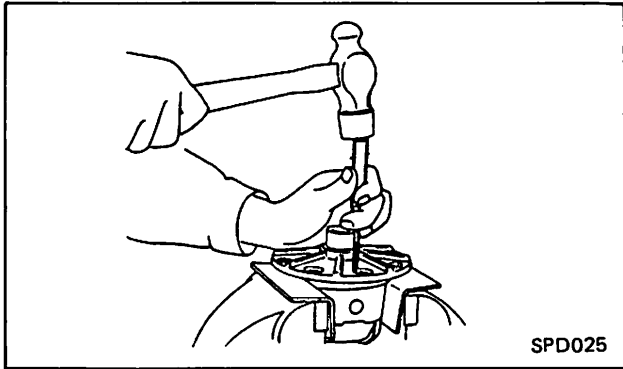
Side Gear Clearance:

0.004-0.008 in (0.10-0.20 mm)

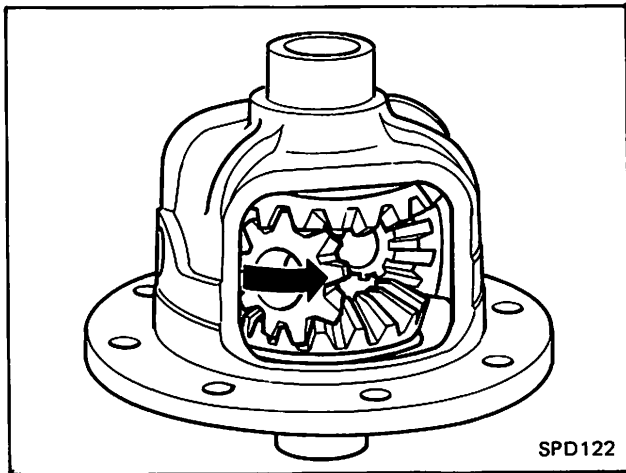


Disassembly (Con't)

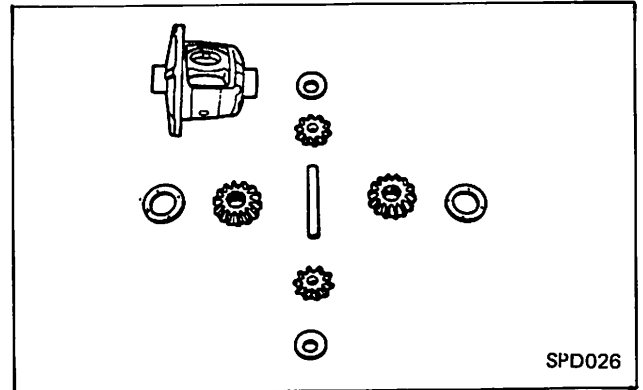
15. Drive out pinion mate shaft lock pin, with Tool J-25689-A from ring gear side.



16. Draw out pinion mate shaft, and rotate pinion mate gears out of the case and remove side gears and thrust washers.



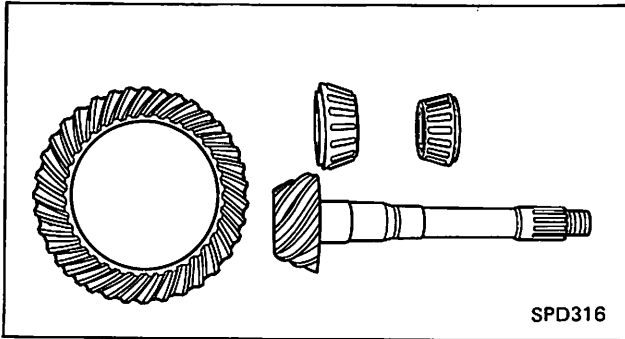
NOTE:
Put marks on gears and thrust washers so that they can be reinstalled in their original positions.



Parts Inspection

Disassembled parts should be cleaned thoroughly, then examined for wear or damage. Repair or replace any damaged parts.

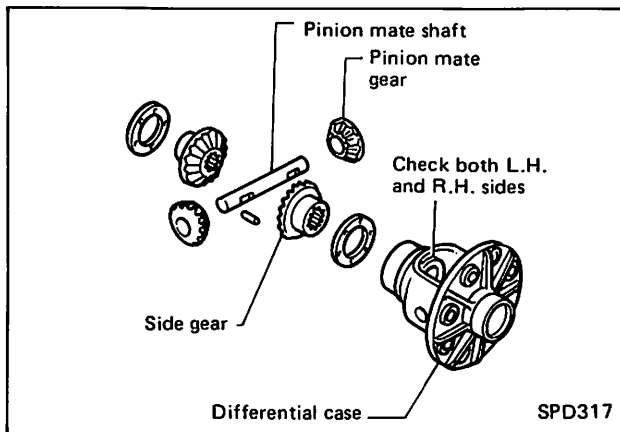
1. Check all gear teeth for scoring, cracking or chipping.



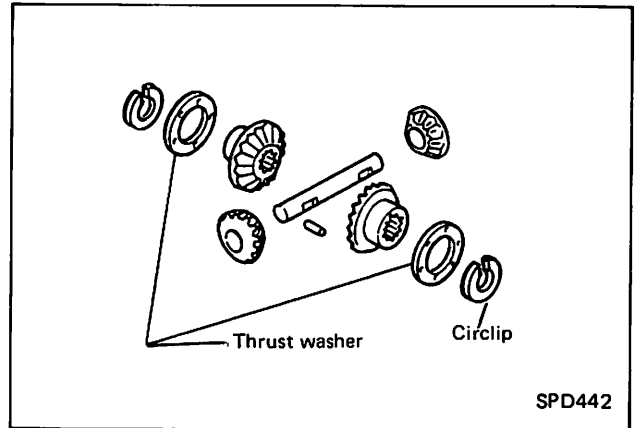
NOTE:

The ring gear and pinion shaft will always be replaced as a set.

2. Inspect bearing races and rollers for scoring, cracking, chipping or signs of excessive wear.
3. Check pinion mate shaft, pinion mate gear, side gear and thrust washers on differential case for scores and signs of wear.

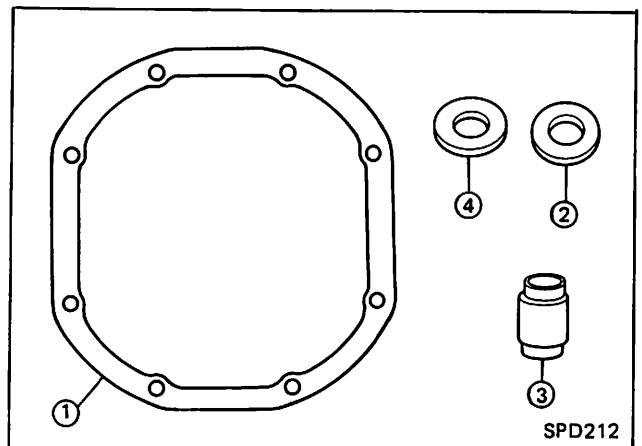


4. Inspect thrust washer faces. Small faults can be corrected with sandpaper.



5. The following parts should be replaced by new ones each time they are removed.

- ① Gasket
- ② Front oil seal
- ③ Collapsible spacer
- ④ Side oil seal



Assembly

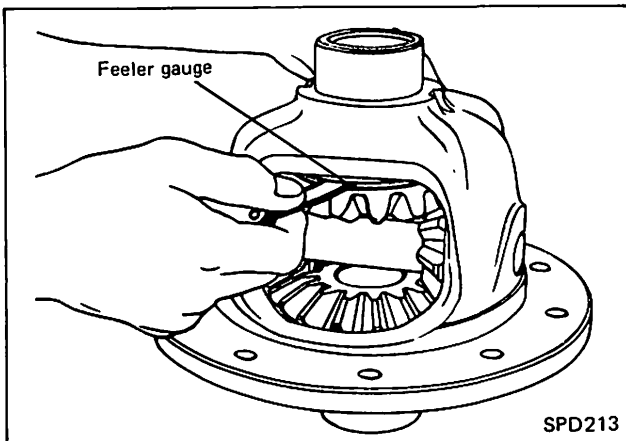
Assembly should be done in the reverse order of disassembly, while marking any necessary inspections and adjustments.

PRECAUTION:

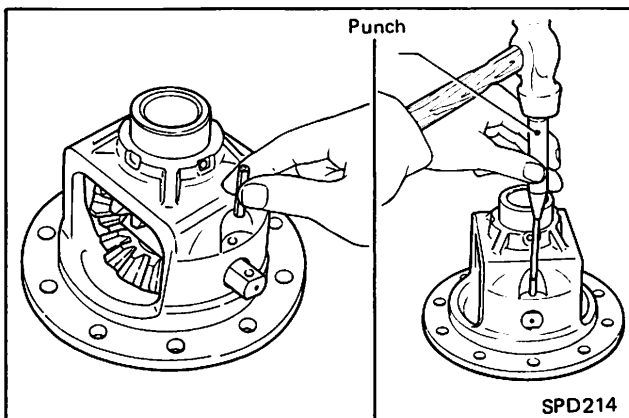
- a. Arrange washers to install them correctly.
- b. Thoroughly clean the surfaces on which spacer, washers, bearings and bearing caps are installed.
- c. Apply gear oil when installing bearings.
- d. Pack recommended multi-purpose grease into cavity between lips when fitting oil seal.

DIFFERENTIAL CASE

1. Install pinion mate gears, side gears, thrust washers and thrust block into differential case.
NOTE:
Be sure round seat of thrust block faces spacer side.
2. Fit pinion mate shaft.
3. Adjust clearance between rear face of side gear and thrust washer by selecting side gear thrust washer.



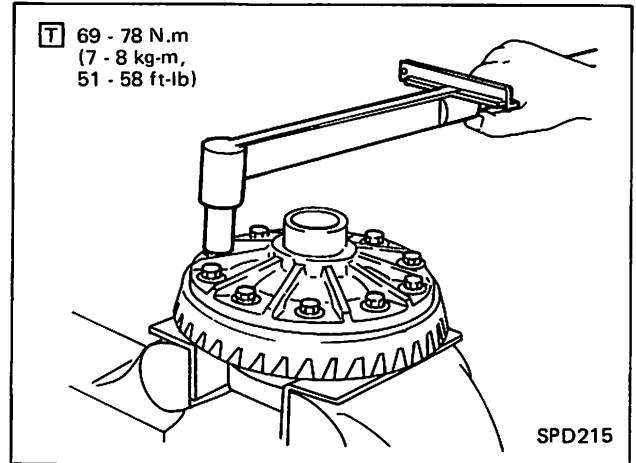
4. Install pinion mate shaft lock pin using a punch.
NOTE:
Make sure lock pin is flush with case.



5. Place ring gear on differential case and install locking tabs and bolts.

NOTE:

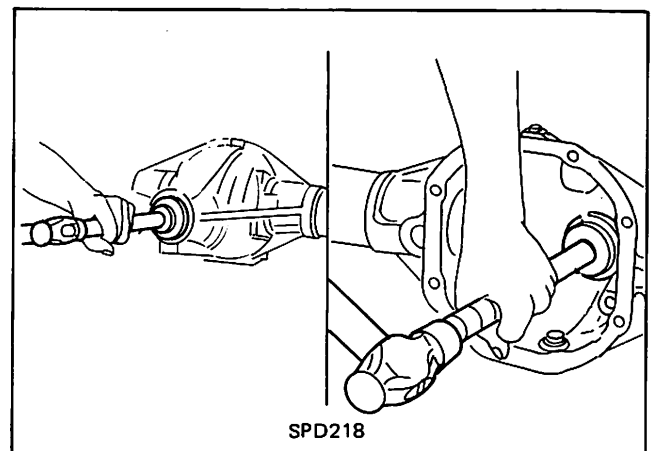
Tighten bolt in a criss-cross fashion, lightly tapping bolt head with a hammer.



6. Press-fit the bearing outer races using Tools J-25742-03 (front) and J-25742-05 (rear).

NOTE:

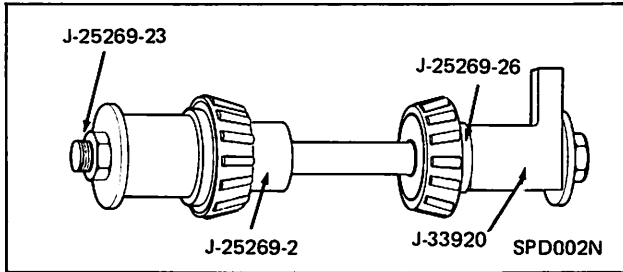
Be certain the bearing races are seated squarely in their bores.



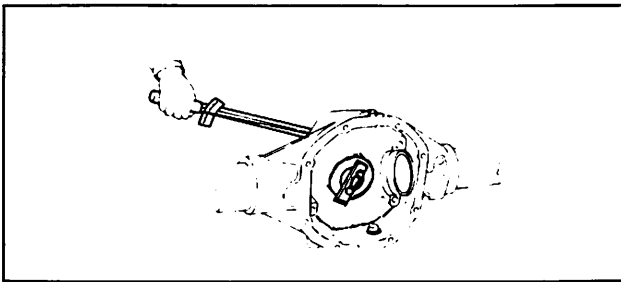
Preload/Pinion Height Adjustment

1. Fit rear bearing inner race on dummy shaft and install them on carrier.
2. Assembly (as shown) the pinion and these special tools.

J-25269-23 Bolt and washer assembly.
J-33920 Pinion height block.
J-25269-26 Bearing pre-load adaptor.
J-25269-2 Rear pinion bearing pilot.



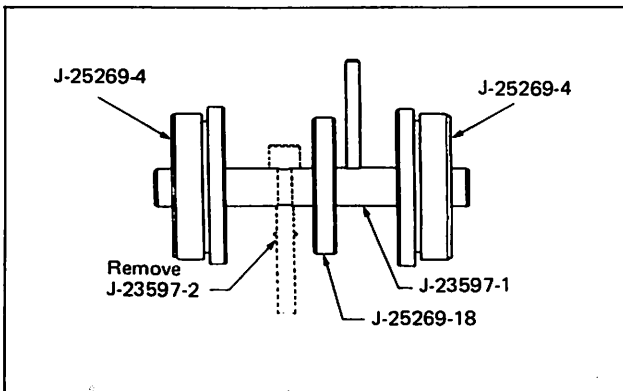
3. Install the special tool in the housing. Torque the companion flanged nut 5-9 in-lbs.



Proceed to pinion height adjustment.

4. Using the following components, complete the arbor assembly as shown:

J-23597-1 Arbor
J-25269-18 Gauge block
J-25269-4 (2)
J-25269-18 (1)

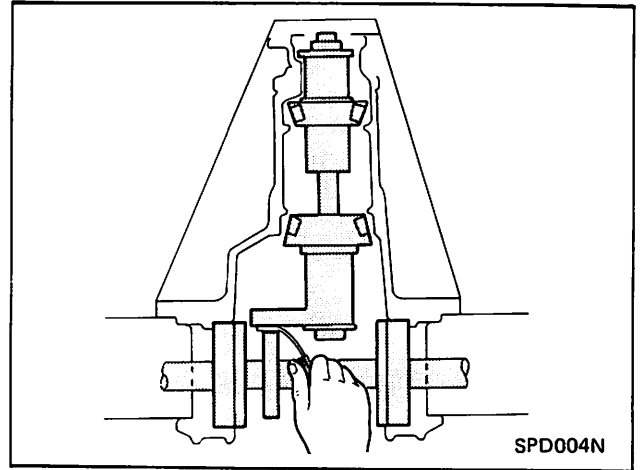


5. Place the arbor assembly into the differential housing and secure it using the side bearing caps. Torque the cap fasteners 65-72 ft.-lbs. (9-10 kg-cm, 88-98 N.m).

6. Place a feeler gauge between the pinion height block and arbor gauge, and write down the measurement.

NOTE:

Use only metric measurements in this procedure.



NOTE:

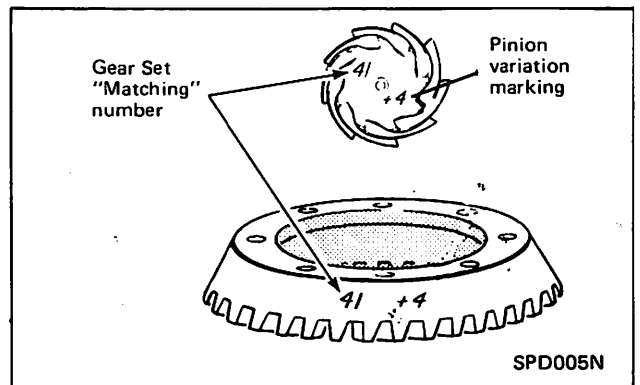
Use the chart below and the steps that follow the chart to determine correct pinion shim size.

A.	2.74mm	Standard measure
B.	+ . mm	Feeler gauge reading
C.	_____	Add A + B = C
D.	_____	Pinion marking
E.	_____	Pinion shim (add or subtract D from C)

7a. Put the reading from step 6 on line B.

7b. Add lines A + B and put the answers on line C.

7c. Write down the pinion variation marking on line D.

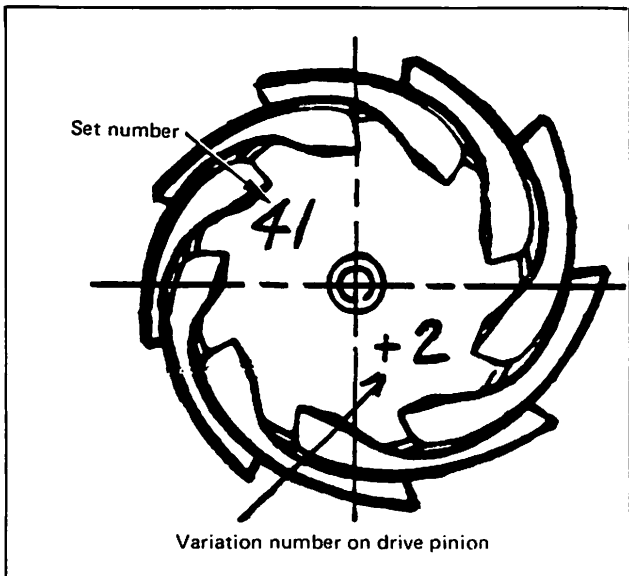


Preload/Pinion Height Adjustment (Con't)

NOTE:

The pinion variation marking and the gear set matching numbers are found on the pinion and ring gear as shown.

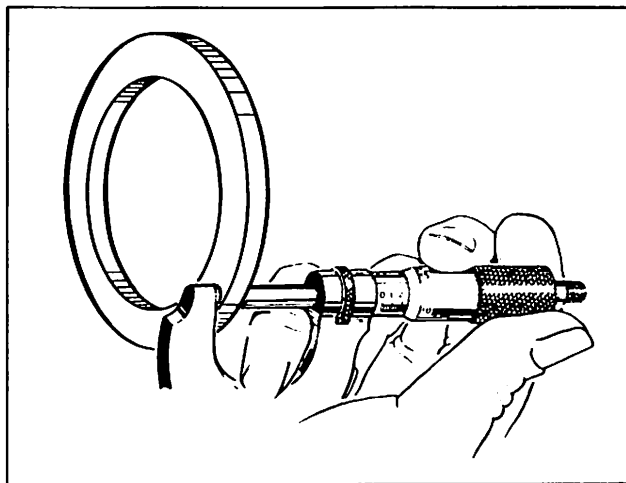
7d. If the variation marking is a plus (+), subtract line D from line C. If the marking is a minus (-), add lines C and D. The result is your pinion shim size.



NOTE:

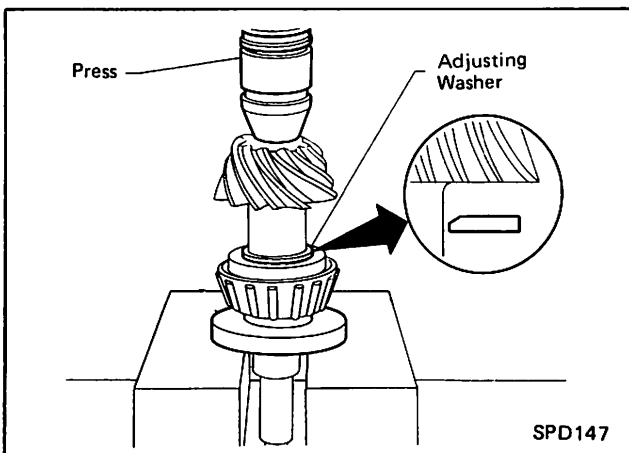
If the pinion is unmarked or zero, then line C is your pinion shim size.

8. Select the proper shim. As a precaution, measure the shim to verify its dimensions.

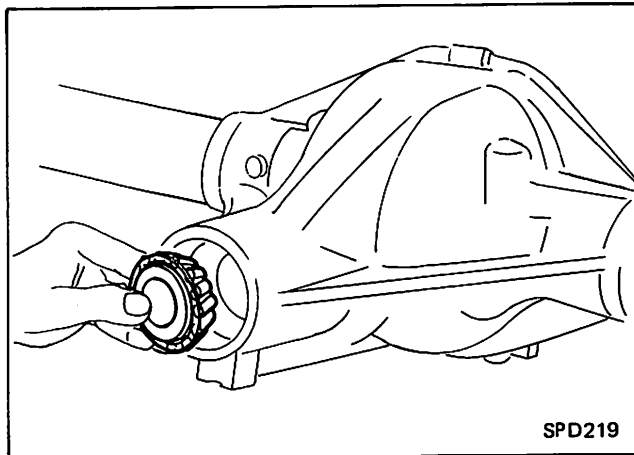


Pinion Assembly

1. Install the shim onto the pinion, level side down. Press the pinion bearing onto the shaft using Tool J-26010-01.

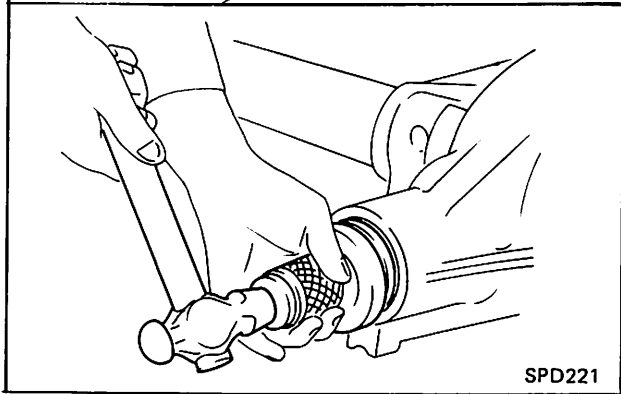
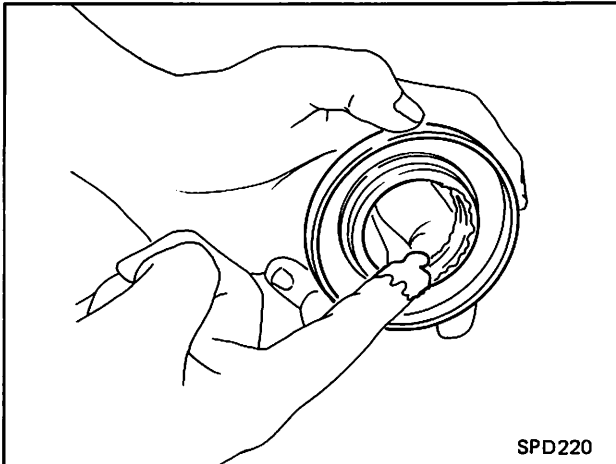


2. Lubricate the front bearing with gear oil and place it on top its race.

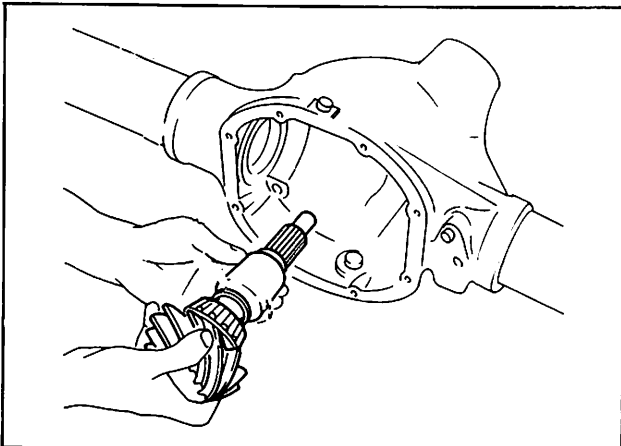


Pinion Assembly (Con't)

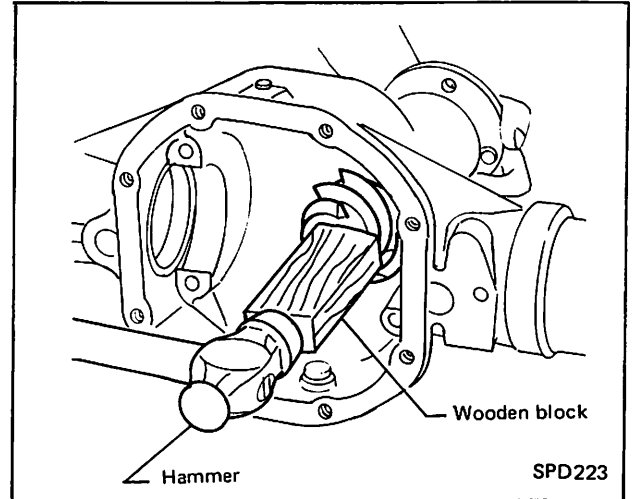
- Lubricate the pinion shaft seal up with gear oil and install it onto the case using Tool J-25273.



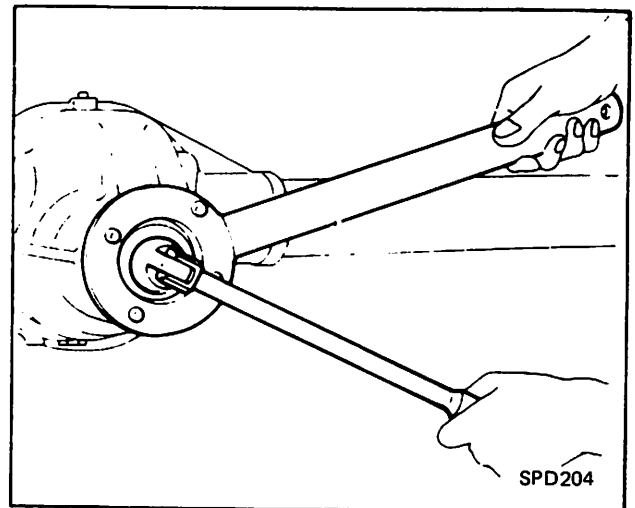
- Install the washer and then a new spacer onto the pinion. Lubricate the rear bearing with gear oil and insert the pinion shaft assembly into the case.



- Install the companion flange and hold it firmly. Using a hammer and a brass drift drive the pinion into the flange.



- Hold the companion flange with Tool J-25774-A and a 1/2" breaker bar, then tighten the pinion nut until there is no axial play. There should be **no** oil or grease on pinion and pinion nut threads at this point.



NOTE:
Be certain **not** to exceed the recommended pre-load or damage to the spacer will result and the pinion assembly procedure must be started over.

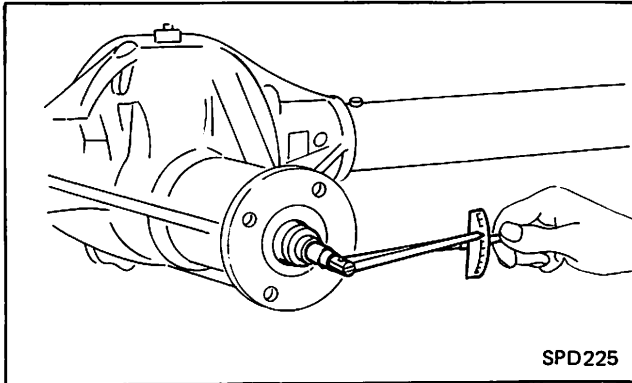
Pinion Assembly (Con't)

7. Tighten the pinion nut by very small degrees until the specified pre-load is achieved. When checking the pre-load, turn the drive pinion in both directions several times to set the bearing rollers.

Preload:

9.5-14.8 in-lb (11-17 kg-cm, 1.1-1.7 N.m)

8. Torque the driver pinion nut to 94-217 ft-lb (13-30 kg-cm, 127-294 N.m).



NOTE:

This procedure will have to be repeated if:

- a. Maximum preload is achieved before the minimum pinion nut torque is reached.
- b. Minimum preload is not achieved before maximum pinion nut torque is reached.

Side Bearing Shim Determination

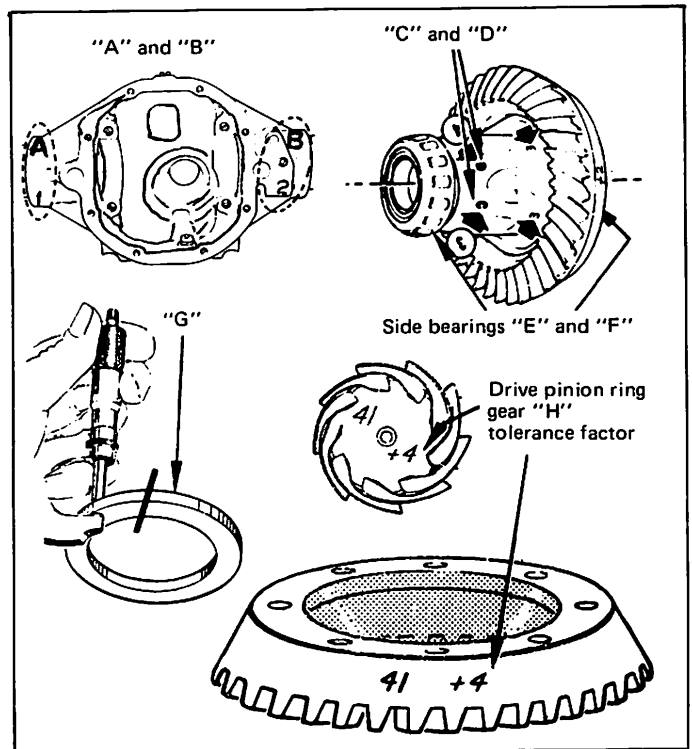
Side bearing shim size is determined by a set of factors. Use the chart below to list these factors.

The location of these factors is found on the various differential components as shown below.

FACTOR LOCATIONS

FACTOR CHART

LETTERS	HUNDREDTHS OF A MILLIMETER
A — Left housing	
B — Right housing	
C — Gear case	
D — Gear case	
E — Left side bearing	
F — Right side bearing	
G — Space measurement	
H — (+) or (-): ring gear	



Side Bearing Shim Determination (Con't)

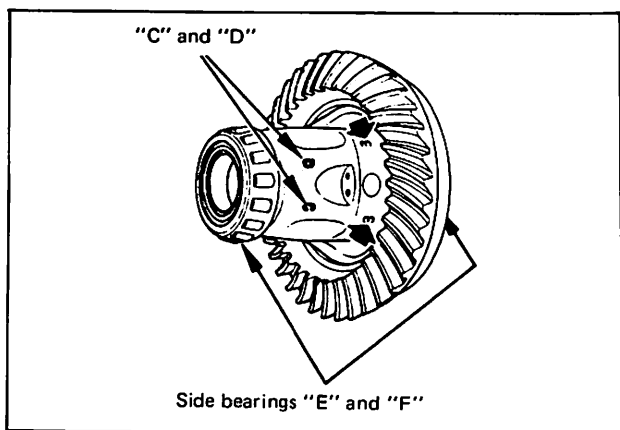
Using the factor chart to record your findings, proceed with the following steps to determine shim size.

1. Locate the numbers stamped next to the letters "A" and "B" on the carrier housing, and record them as Factors "A" and "B" on the chart.

NOTE:

Use the metric system only for this procedure. Any measurements taken in inches should be converted to the metric system.

2. Locate the numbers stamped next to the letters "C" and "D" on the gear carrier, and record them as Factors "C" and "D" on the chart.

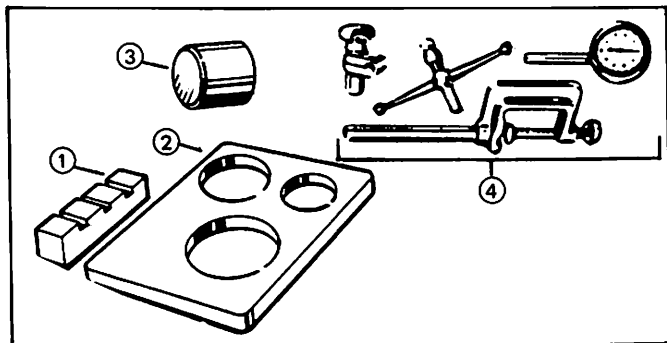


3. Measure the left (Factor E) and right (Factor F) side bearing as follows:

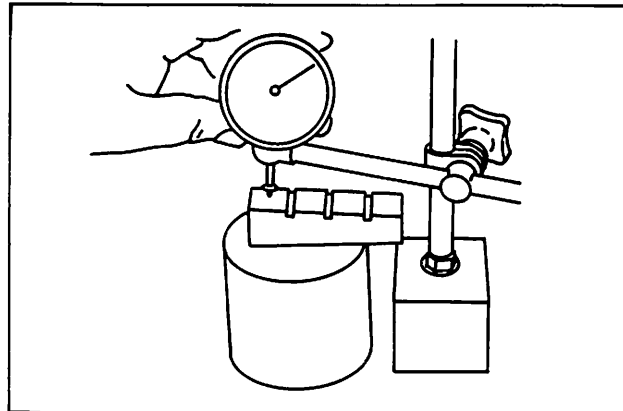
Tools:

Side Bearing Measuring Set (J-25407-01)

1. Gauge Block (J-25407-1)
2. Base Plate (J-25407-2)
3. Weight Block (J-25407-3)
4. Metric Dial Indicator Set (J-8001-M)



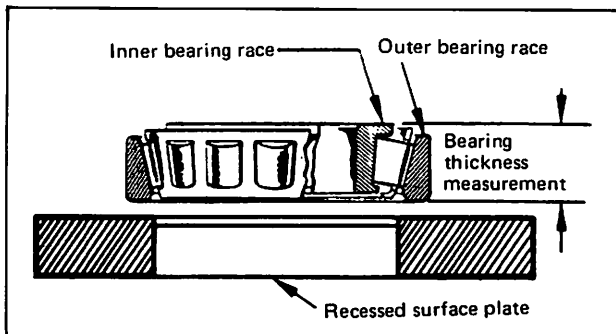
4. Mount the dial indicator on the base plate.
5. Place the 5 pound weight on the base plate and put the 21mm gauge block on top, then zero the dial indicator.



6. Slide the gauge block out from under the dial indicator, then lift the weight block and slip the bearing and race under the weight.

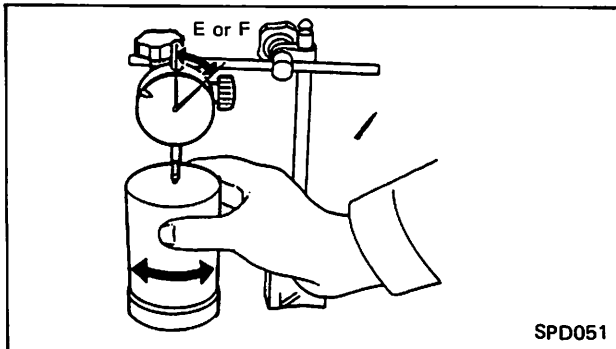
NOTE:

For each side bearing; place the bearing over the base plate recess as shown. Be certain it turns freely.



7. Turn the weight to seat the bearing. Read the dial indicator's drop from zero. Write down the findings for each bearing on the list:

E = left side bearing
F = right side bearing



SPD051

Side Bearing Shim Determination (Con't)

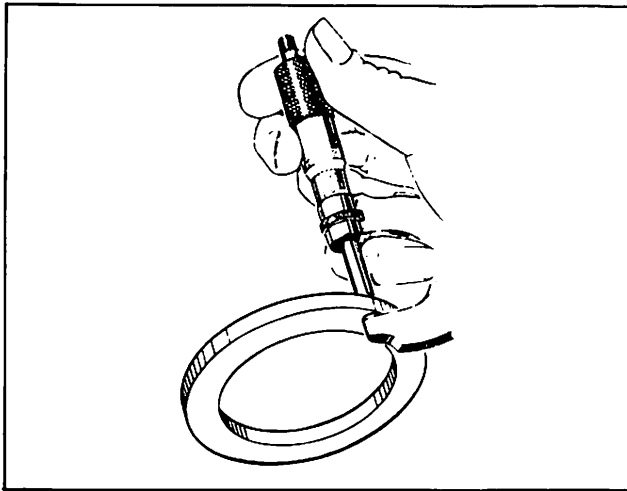
8. Using a micrometer, measure the thick left carrier spacer. Subtract this measurement from 8.10mm (standard thickness) to determine Factor G on the list.

For example:

Standard 8.10mm

Measured 8.08 mm

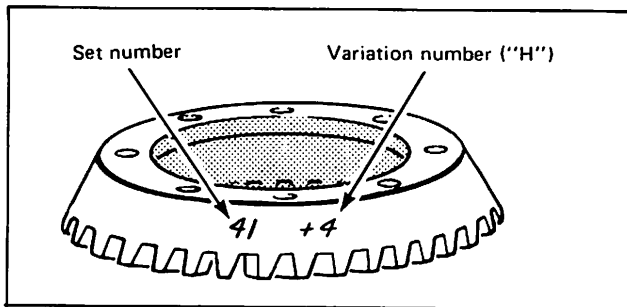
.02mm = Factor G



9. Factor "H" on the list is the variation number on the ring gear.

NOTE:

If no variation number is found, substitute 0 on the list.



10. Calculate the side bearing shim thickness using the formula below:

(T1) Left: $A - C + D + E - H + 2.05$

(T2) Right: $B - D + F + G + H + 1.95$

NOTE:

Substitute findings from the guide list for their appropriate letter in this formula.

11. Select the proper shim. Measure each shim to ensure accuracy.

NOTE:

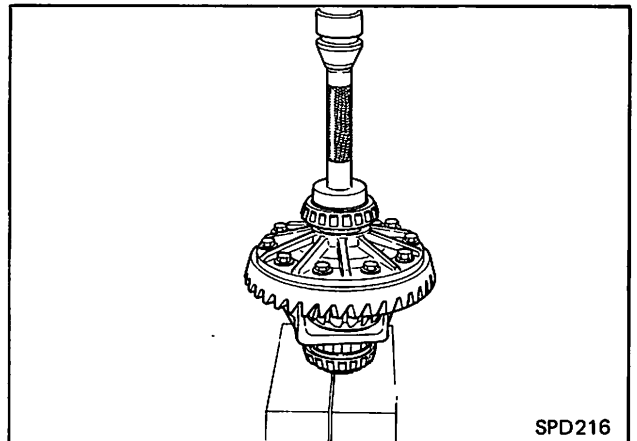
If you cannot find the desired thickness of washer, use washer so that thickness is the closest to the calculated value.

Example:

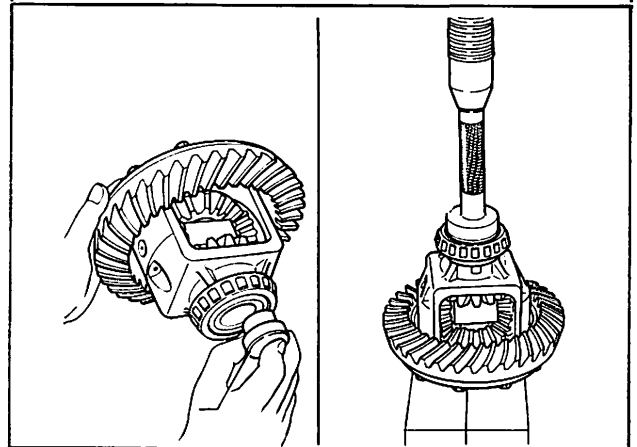
Calculated value..... T = 3.22mm

Use washer..... T = 3.21mm

12. Press on the bearings, using a press and the tools shown below.



SPD216



13. Set the correct sized shims into the housing, then install the case assembly into the housing. If necessary, tap lightly with a plastic mallet to seat the assembly.

14. Using Tool J-25267, drive the large spacer into position.

NOTE:

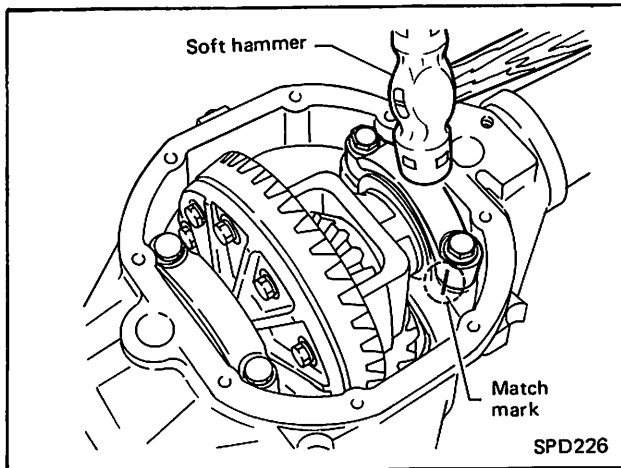
The large spacer was measured for Factor G in the calculation table.

Side Bearing Shim Determination (Con't)

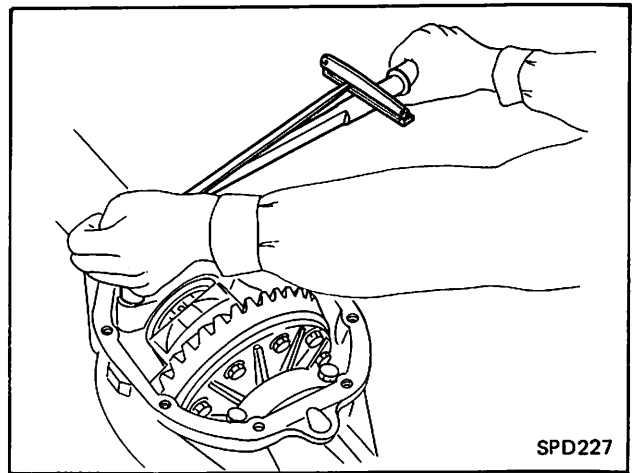
15. With the assembly in place, install the side bearing caps, tapping them into place if necessary.

NOTE:

Be certain to use the alignment marks made during disassembly for proper cap/housing assembly.



16. Torque the cap fasteners 65-72 ft-lbs (9-10 kg-cm, 88-98 N.m).

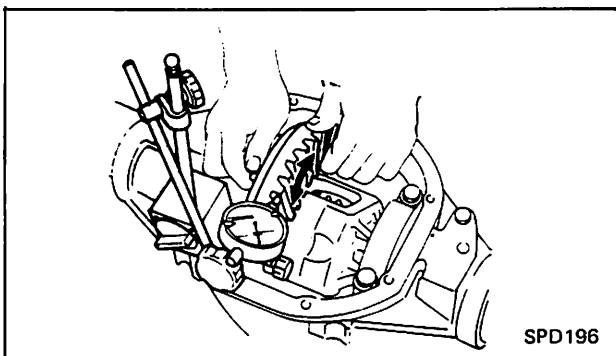


Final Verification

1. Check ring gear backlash with a dial indicator.

Backlash:

0.005-0.007 in (0.13-0.18mm)

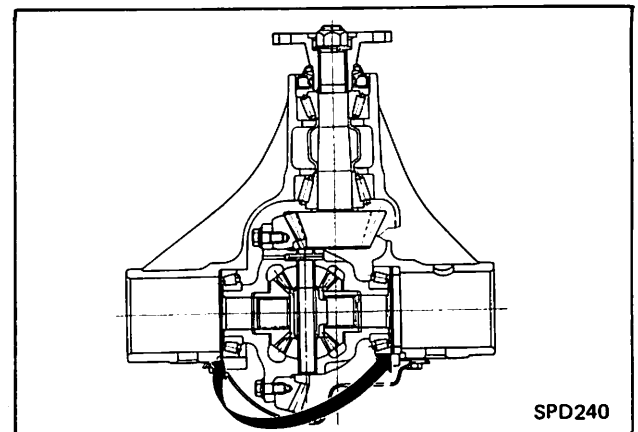


If backlash is too small, decrease thickness of left side bearing adjustment washer and increase thickness of right side bearing adjustment washer by the same amount.

If backlash is too great, reverse the above procedure.

NOTE:

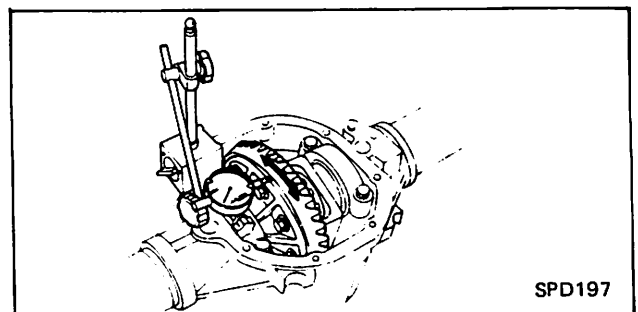
Never add or remove from the total amount of side bearing adjustment washer or gearing preload will be changed.



2. Check ring gear runout with a dial indicator.

Runout:

0.002 in (0.05mm)



Final Verification (Con't)

If backlash varies excessively in different places, the variance may have resulted from foreign matter caught between the ring gear and the differential case.

If the backlash varies greatly when the runout of the ring gear is within a specified range, the hypoid gear set or differential case should be replaced.

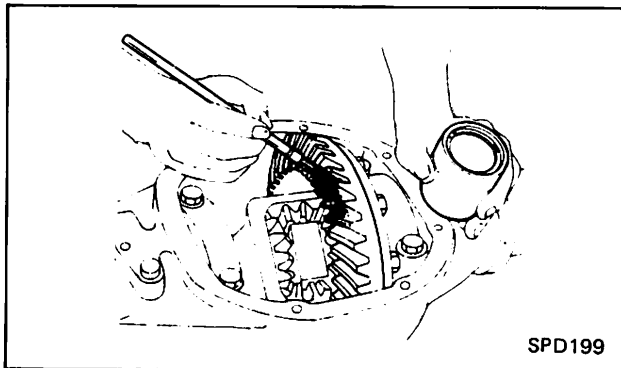
3. Finally, check for tooth contact pattern.

Refer to **Tooth Contact**.

Usually the pattern will be correct if you have calculated the washers correctly and the backlash is correct.

However, in extremely rare cases you will have to use trial-and-error processes until you get a good tooth contact pattern.

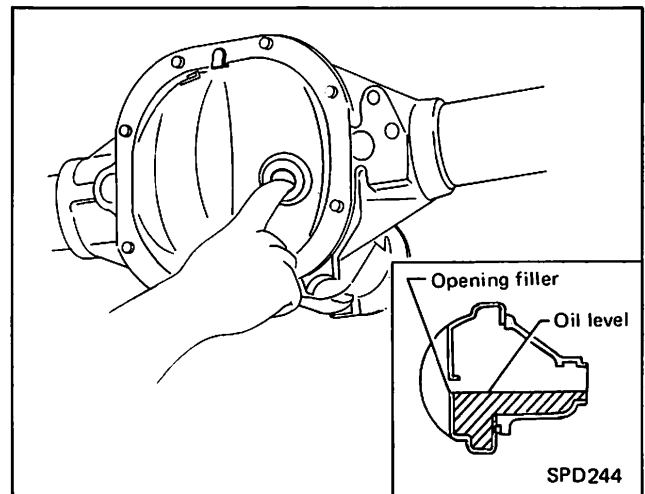
The tooth pattern is the best indication of how well a differential has been set up.



4. Install the differential carrier in the vehicle.
Gasket should be replaced by new one each time the differential carrier is removed.
Then fill with gear oil.

ASSEMBLY NOTES:

- a. Gear oil capacity —
2¾ U.S. pt (1.3 liters, 2¼ Imp pt)
- b. Drain/Filler plug torques —
29-43 ft-lb (4-6 kg-cm, 39-59 N.m)



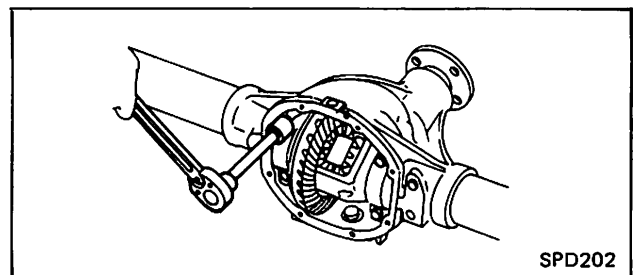
Front Oil Seal Replacement — Removal

The following is the procedure for replacement of the front oil seal.

1. Remove the rear axle assembly. Refer to section RA of your Service Manual.
2. Remove the drain plug and drain the gear oil.
3. Remove the rear axle shafts. Refer to section RA of your Service Manual.
4. Remove rear cover and rear cover gasket.
5. Remove side bearing caps.

NOTE:

Bearing caps are line-board during manufacture and should be put back in their original places. Put match marks on one side of the side bearing cap with paint or a punch to ensure correct assembly.

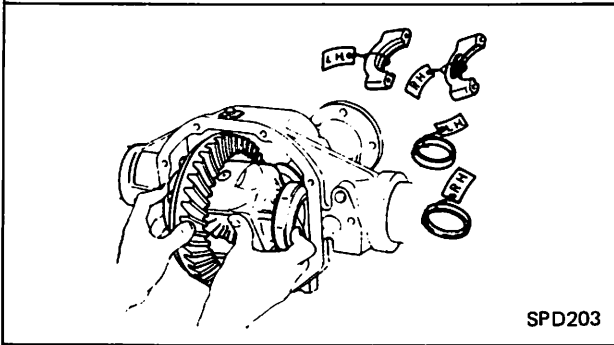
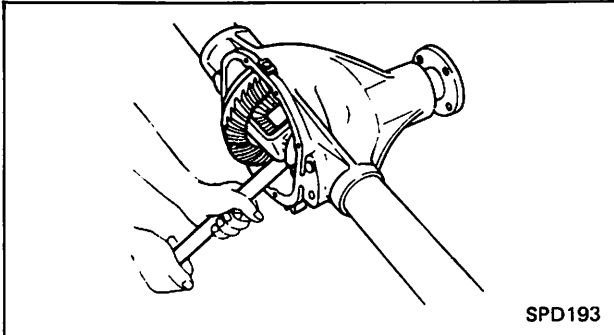


Front Oil Seal Replacement — Removal (Con't)

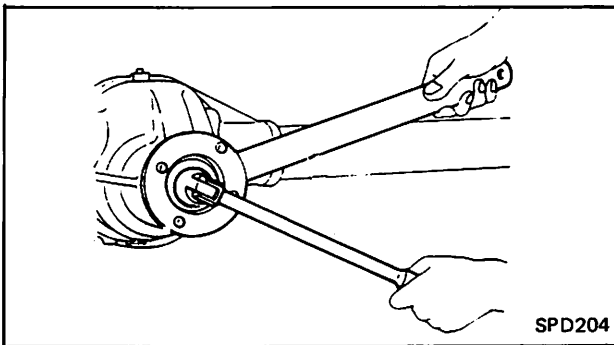
6. Using a pry bar, remove differential case assembly.

NOTE:

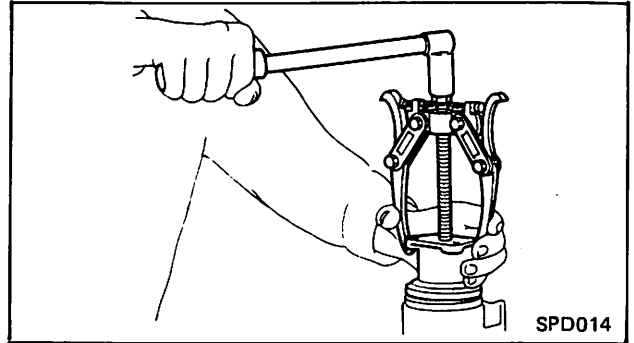
Be careful to keep the side bearing outer races together with inner race — do not mix them up.



7. Remove drive pinion nut.



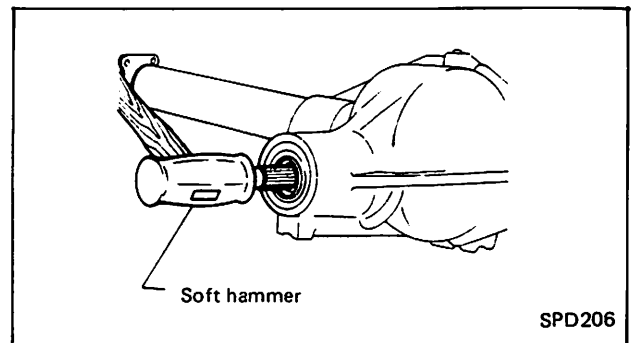
8. Remove companion flange with puller.



9. Remove drive pinion with soft hammer.

CAUTION:

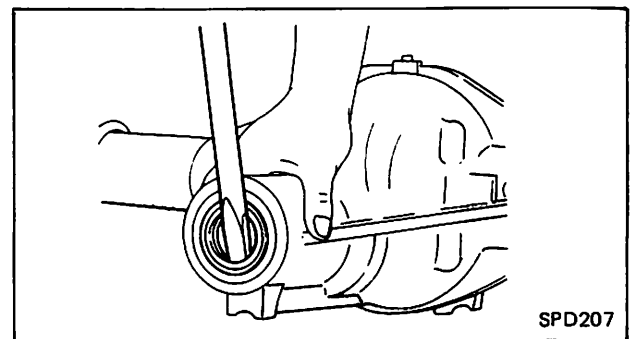
Reinstall companion flange nut on the pinion shaft to prevent damage to the shaft threads.



10. Remove oil seal by prying up with a large screw driver, and remove front pinion bearing inner race.

NOTE:

Do this carefully, so as not to scratch seal bore with screwdriver. Cover end of screwdriver with a rag.



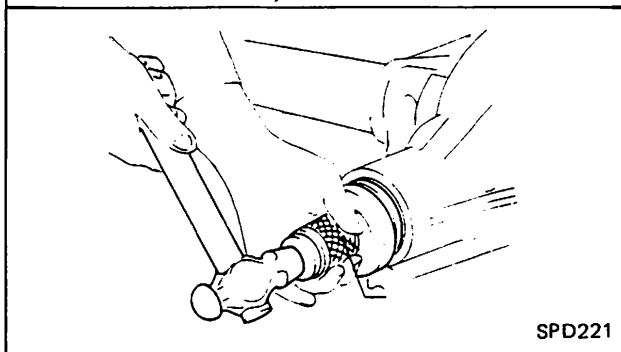
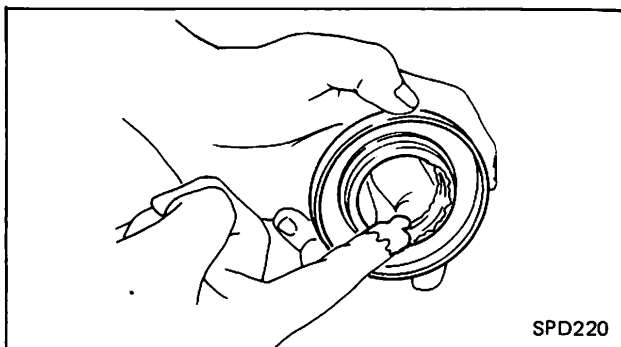
Front Oil Seal Replacement — Assembly

ASSEMBLY

- Using Tool, J-25273 carefully fit a new oil seal into carrier.

NOTE:

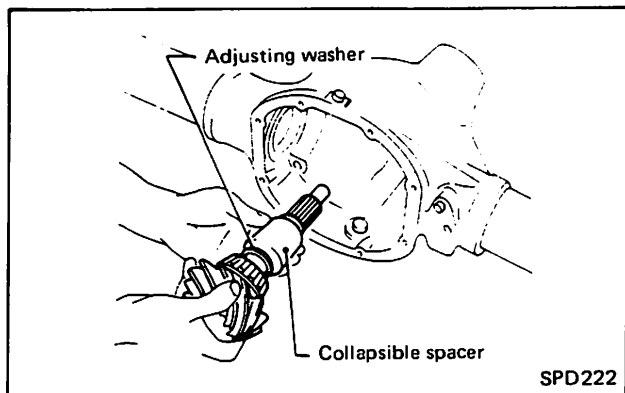
Make sure oil seal is flush with end of carrier and apply multi-purpose grease into cavity between lips.



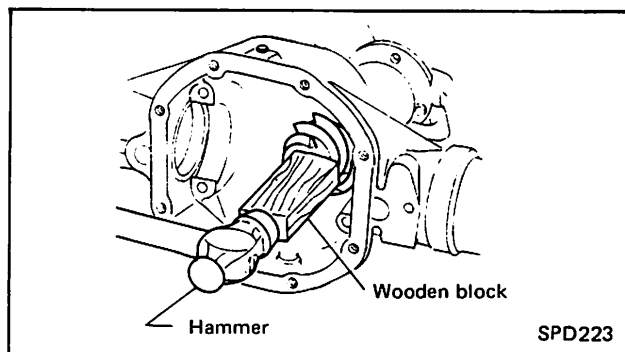
- Place a washer and a new collapsible spacer on drive pinion and lubricate rear bearing with gear oil, and insert it in gear carrier.

NOTE:

Always use a new collapsible spacer to ensure correct preload.



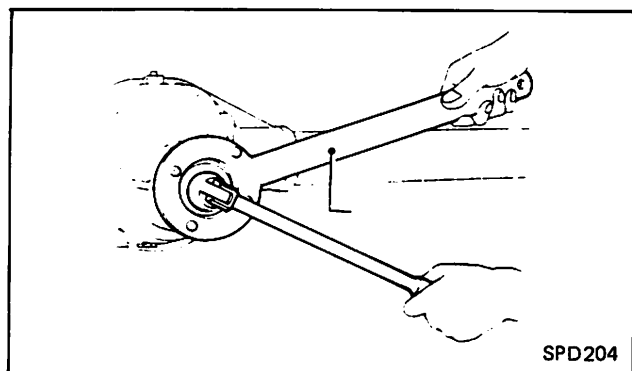
- Install companion flange and hold it firmly. Insert drive pinion into companion flange by tapping its head with a soft hammer.



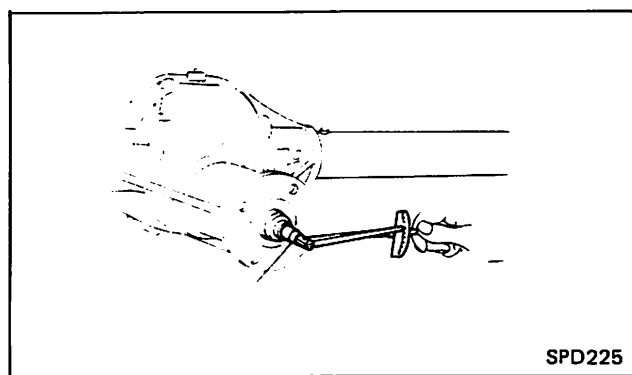
- Hold companion flange with tool J-25774A and temporarily tighten pinion nut, until there is no axial play.

NOTE:

Be certain that threaded portion of drive pinion and pinion nut are free from oil or grease.



- Tighten the pinion nut by degrees to the specified preload of 9.5-14.8 in-lb (11-16 kg-cm, 1-1.6 N.m) using tool J-25765A.

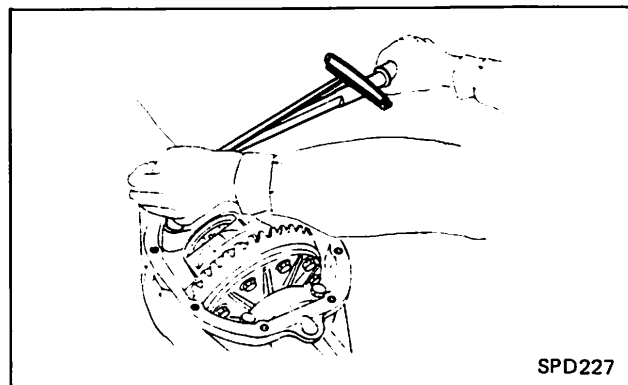
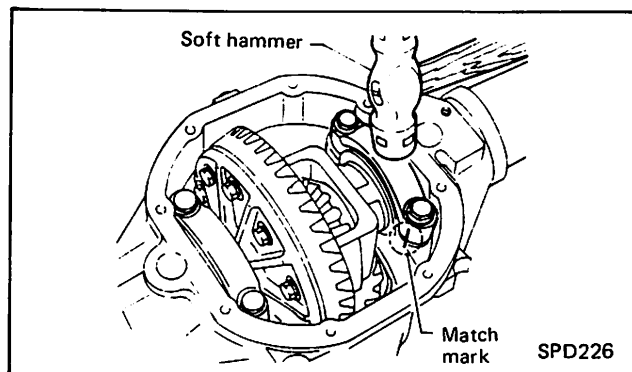


Front Oil Seal Replacement — Assembly (Con't)

6. Set the side bearing shims into the housing, then install the gear case assembly into the housing. If necessary, tap lightly with a plastic mallet to seal the assembly.
7. Using tool J-25267, drive the large spacer into position.
8. Install the bearing caps and torque the fasteners 65-72 ft-lbs (9-10 kg-cm, 88-98 N.m).

NOTE:

Tap on the cap with a soft hammer to settle it in the carrier. Be certain to use the alignment marks made during disassembly for proper cap/housing assembly.



9. Install the cover onto the housing, being certain to use a new gasket.
10. Fill the carrier with the specified amount of gear oil.

Pinion Height Adjusting Washer

Thickness — In (mm)	Part No.
0.122 (3.09)	38154-P6017
0.123 (3.12)	38154-P6018
0.124 (3.15)	38154-P6019
0.125 (3.18)	38154-P6020
0.126 (3.21)	38154-P6021
0.127 (3.24)	38154-P6022
0.128 (3.27)	38154-P6023
0.130 (3.30)	38154-P6024
0.131 (3.33)	38154-P6025
0.132 (3.36)	38154-P6026
0.133 (3.39)	38154-P6027
0.134 (3.42)	38154-P6028
0.135 (3.45)	38154-P6029
0.137 (3.48)	38154-P6030
0.138 (3.51)	38154-P6031
0.139 (3.54)	38154-P6032
0.140 (3.57)	38154-P6033
0.141 (3.60)	38154-P6034
0.143 (3.63)	38154-P6035
0.144 (3.66)	38154-P6036

Side Gear Thrust Washer

Thickness — In (mm)	Part No.
0.030 (0.77)	38424-N3100
0.032 (0.82)	38424-N3101
0.034 (0.87)	38424-N3102

Side Bearing Adjusting Shim

Thickness — In (mm)	Part No.
0.078 (2.00)	38453-N3100
0.080 (2.05)	38453-N3101
0.082 (2.10)	38453-N3102
0.084 (2.15)	38453-N3103
0.086 (2.20)	38453-N3104
0.088 (2.25)	38453-N3105
0.090 (2.30)	38453-N3106
0.092 (2.35)	38453-N3107
0.094 (2.40)	38453-N3108
0.096 (2.45)	38453-N3109
0.098 (2.50)	38453-N3110
0.100 (2.55)	38453-N3111
0.102 (2.60)	38453-N3112

STEERING SYSTEM

SECTION **ST**

CONTENTS

STEERING SYSTEM..... *	TROUBLE DIAGNOSES AND
STEERING WHEEL AND COLUMN *	CORRECTIONS *
MANUAL STEERING GEAR	SPECIAL SERVICE TOOLS *
(Model: VB56S) *	STEERING LINKAGE *
POWER STEERING SYSTEM	SERVICE DATA AND
(Model: PB48S) *	SPECIFICATIONS (S.D.S.) *
BLEEDING HYDRAULIC SYSTEM ST-3	

*Refer to your 1983 NISSAN Pick-up Service Manual —
1st Revision.

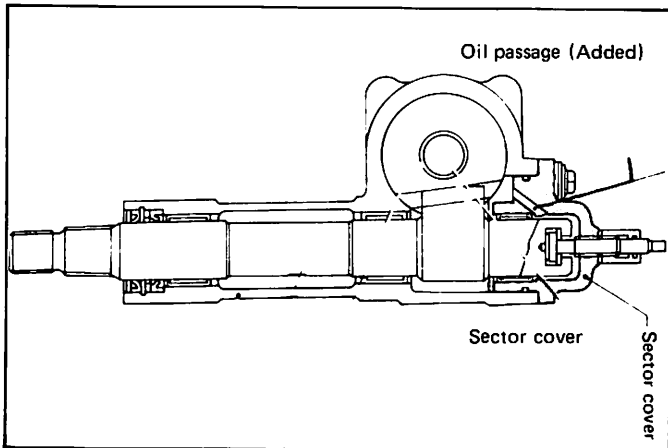


Bleeding Hydraulic System (PB48S)

The air bleeding procedure that follows supersedes the procedure found in Steering System Section (page ST-17) of Service Manual SM3E-720UU0 — 1st revision.

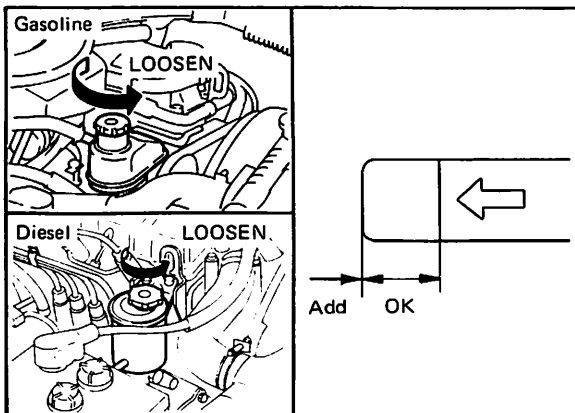
NOTE:

An oil passage has been added to the sector cover to assist in the air bleed procedure. This passage is found in almost all PB48S gears. Inspect the gear to determine if it is manufactured with an oil passage.

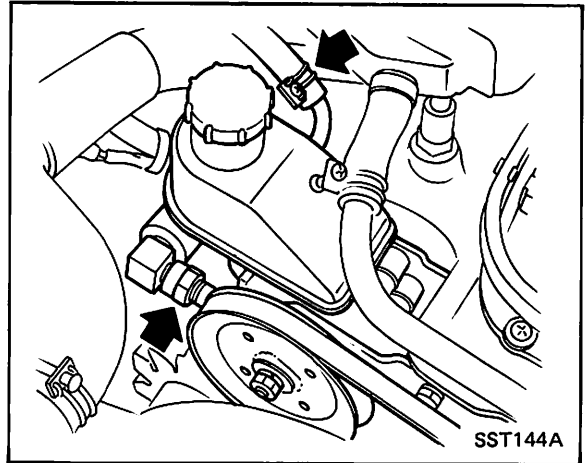


— BLEEDING PROCEDURE —

1. With the engine off, check the reservoir level and add Dexron automatic transmission fluid if necessary.



PF311



CAUTION:

Avoid spilling power steering fluid on the exhaust manifold, fan or drive belts.

2. Raise the vehicle until the front wheels clear the ground.
3. Alternately turn the steering wheel completely to the right and left ten (10) times, lightly touching the steering stops to the suspension lower link.

4. Run the engine at idle speed with the front wheels straight ahead.

CAUTION:





Do not hold the steering wheel in the lock position for more than 15 seconds at a time while the engine is running.

5. Turn the steering wheel one full turn to the left and then to the right. Repeat 5 times.
6. With the wheels straight ahead, bring the engine speed from idle to 3000 rpm. Repeat 3 times.
7. Stop the engine. Check the fluid reservoir and fill, if necessary.
8. Connect a transparent tube 2-3 feet long, 3/16 inch I.D. (or a windshield washer tube) to the air bleeder screw.

Bleeding Hydraulic System (PB48S) (Con't)

9. Quickly turn the steering wheel all the way to the right, then all the way to the left. The steering wheel stoppers should lightly touch the suspension lower link.

Every time steering wheel is turned fully to the right, **open** air bleeder screw to expel air and then before turning it fully to the left, **close** air bleeder screw.

STEPS	1	2	3
STEERING WHEEL POSITION	 TURN WHEEL COMPLETELY RIGHT		 TURN WHEEL COMPLETELY LEFT
AIR BLEED SCREW	 OPEN BLEEDER SCREW	 CLOSE BLEEDER SCREW	

CAUTION:
 Be certain to close the air bleeder screw before turning the steering wheel to the left.

NOTE:

- A. For steering gears without an oil passage, the bleeding procedure be repeated at least 100 times to bleed the air out.
- B. For steering gears with an oil passage, the bleeding procedure must be repeated at least 10 times.

10. Run the engine at idle speed with the front wheels straight ahead.
11. With the steering wheel turned fully to the left lock position, bleed air by opening the air bleeder screw for a second, then closing it for a second. Repeat 10 times.
12. Turn the steering wheel all the way to the right and left 5 times.
13. For steering gears **without** an oil passage, repeat step 11 until all air is expelled.
14. Turn the wheels straight ahead, stop the engine and lower the vehicle.
15. Run the engine again. Turn the steering wheel to the left and right to be certain it moves smoothly. If it does, the hydraulic system is free of air.

HEATER & AIR CONDITIONER

SECTION **HA**

CONTENTS

HEATER

DESCRIPTION (Heater).....	HA-1
Air flow.....	HA-1
SERVICE PROCEDURES (Heater).....	*
ELECTRICAL CIRCUIT (Heater).....	*
TROUBLE DIAGNOSES AND CORRECTIONS (Heater).....	*

AIR CONDITIONER

DESCRIPTION (Air conditioner).....	HA-3
Air flow.....	HA-3
GENERAL SERVICE (Air conditioner).....	HA-5
Precautions.....	HA-5
Installing manifold gauge.....	HA-5
Handling refrigerant service can tap.....	HA-6
Discharging refrigerant.....	HA-6
Evacuating and charging refrigerant system.....	HA-7
Refrigerant level check.....	HA-10
Hose and pipe check.....	HA-11
Checking refrigerant leak.....	HA-11

PERFORMANCE TEST (Air conditioner).....	*
SERVICE PROCEDURES (Air conditioner).....	*
COMPRESSOR [Model VR4709 (YORK make)].....	*
COMPRESSOR [Model DKV-14B (Diesel-Kiki make)].....	*
ELECTRICAL CIRCUIT (Air conditioner).....	*
TROUBLE DIAGNOSES AND CORRECTIONS.....	*
SERVICE DATA AND SPECIFICATIONS (S.D.S.).....	*
SPECIAL SERVICE TOOLS.....	*

*Refer to your 1983 NISSAN Pick-up Service Manual —
1st Revision.

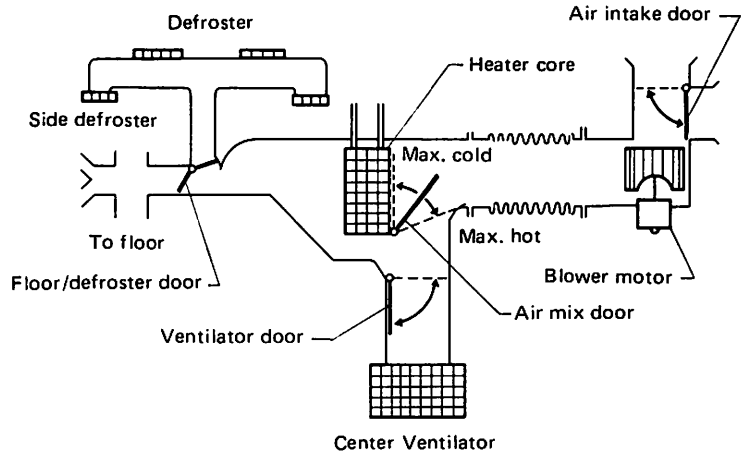


Air Flow Chart

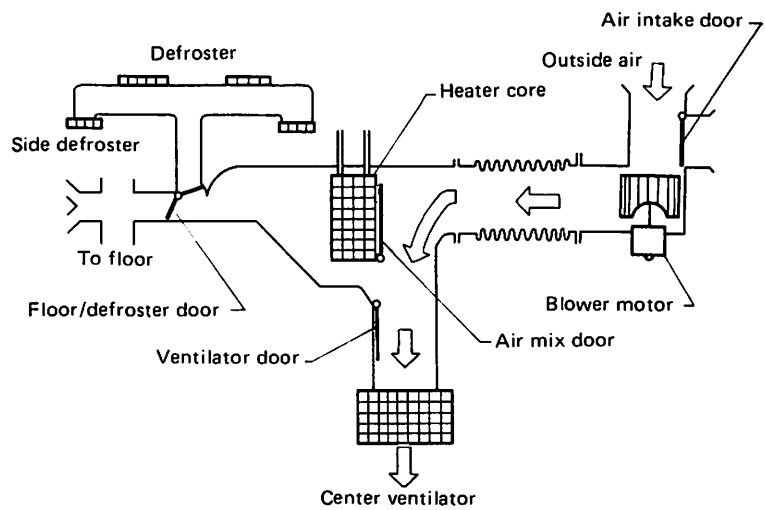
Controls

Air Flow

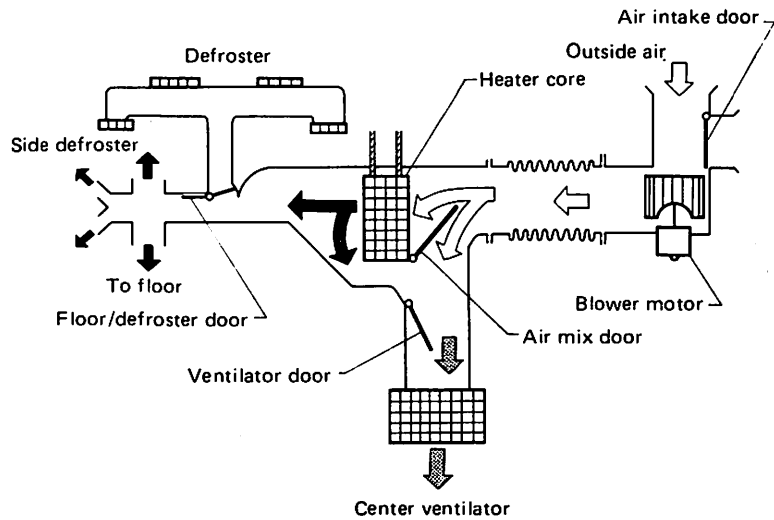
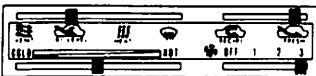
AIR FLOW
OFF



VENT position



B/L (BI-LEVEL) position

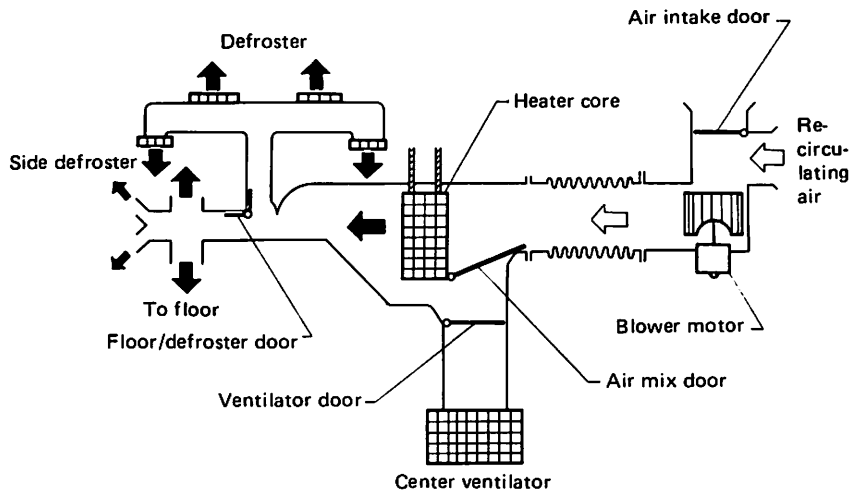
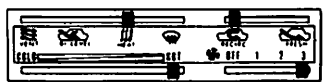


Air Flow Chart (Con't)

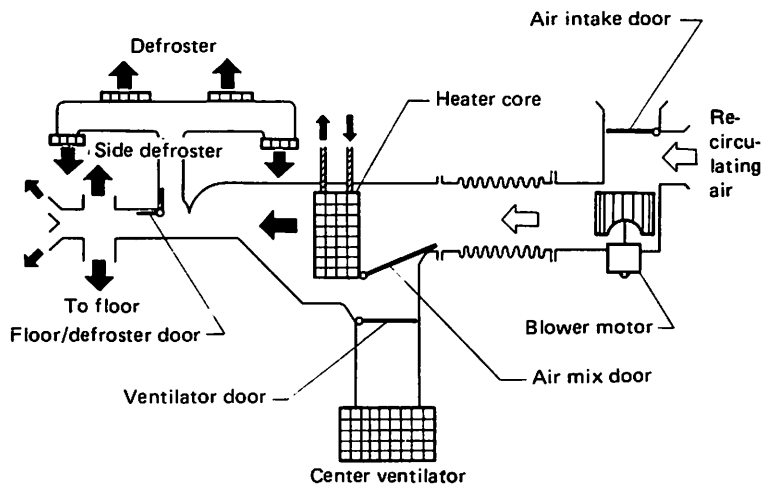
Controls

Air Flow

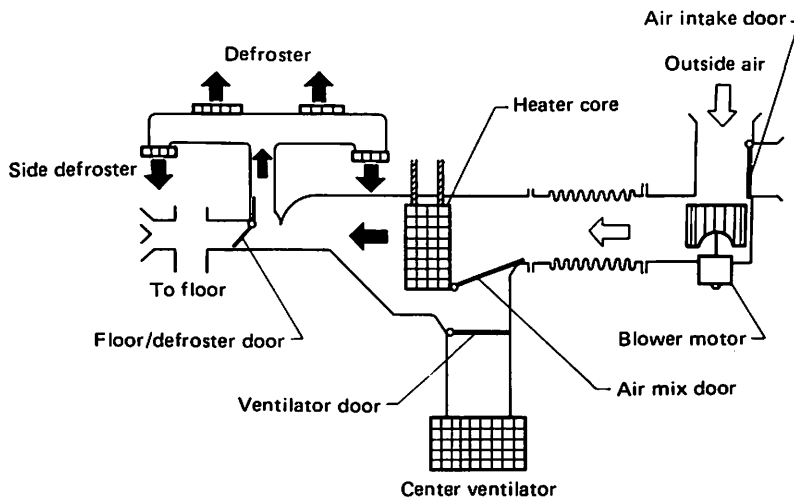
HEAT position



HEAT (Fast Heating) position



POSITION



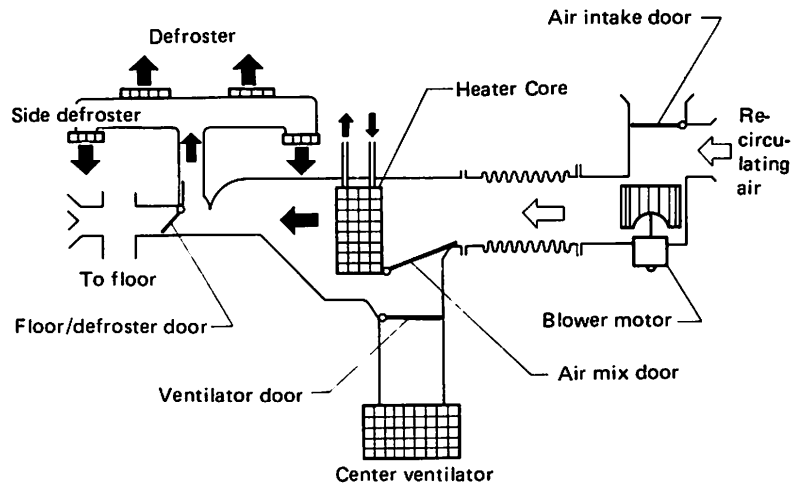
DESCRIPTION — Heater

Air Flow Chart (Con't)

Controls

Air Flow

 POSITION (Fast Defrosting)



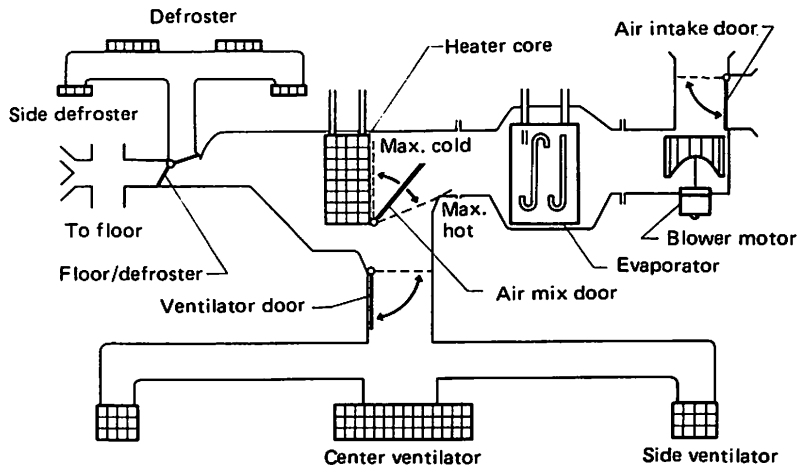
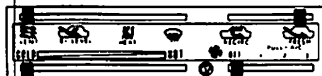
DESCRIPTION — Air Conditioning

Air Flow Chart

Controls

Air Flow

OFF



Air Flow Chart (Con't)

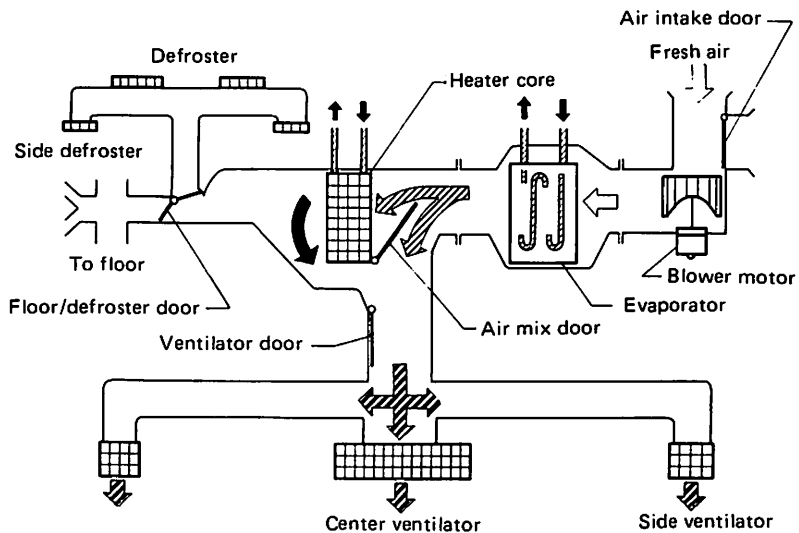
Controls

Air Flow

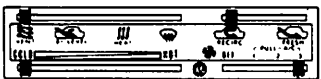
VENT-A/C-position



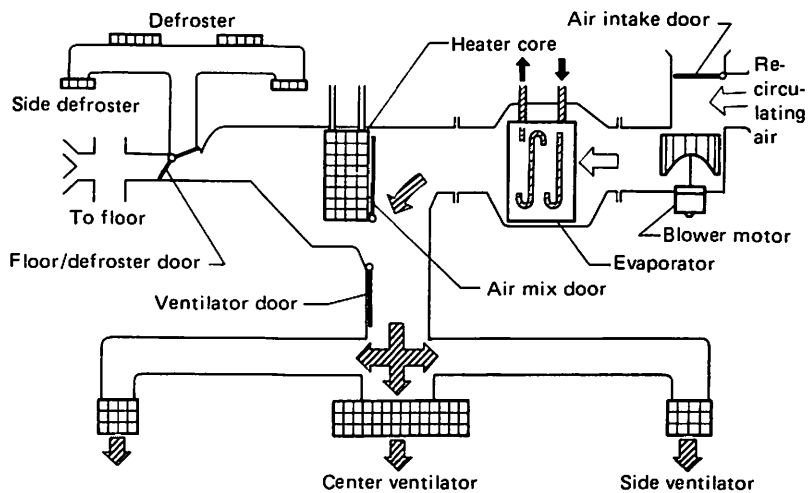
Pull



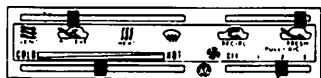
VENT-A/C-position
(Max. cooling)



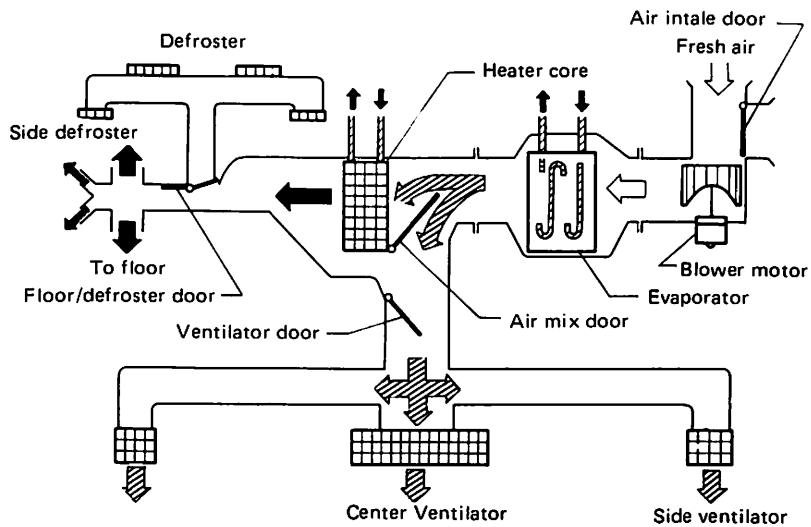
Pull



BI-LEVEL-A/C-position



Pull



Precautions

— WARNING: —

1. Since direct contact of liquid refrigerant with your skin will cause frostbite, always be careful when handling the refrigerant. Always wear goggles to protect your eyes when working around the system.
2. The refrigerant service container has a safe strength. However, if handled incorrectly, it will explode. Therefore, always follow the instructions on the label. In particular, never store it in a hot location [above 50°C (126°)] or drop it from any height.
3. The refrigerant gas is odorless and colorless and breathing may become difficult due to the lack of oxygen. Since the refrigerant gas is heavier than air and will lay close to the floor, be especially careful when handling it in small, confined spaces.

4. The refrigerant itself is nonflammable. However, a toxic gas (phosgene gas) is produced when it contacts fire. Special care is required when checking for leaks in the system with a halide torch.
5. Do not steam clean the system, especially the condenser, since excessive high pressure can build up in the system, resulting in explosion.
6. When connecting refrigerant lines, tighten within the specified torque using new O-rings to prevent refrigerant from leaking.

Installing Manifold Gauge

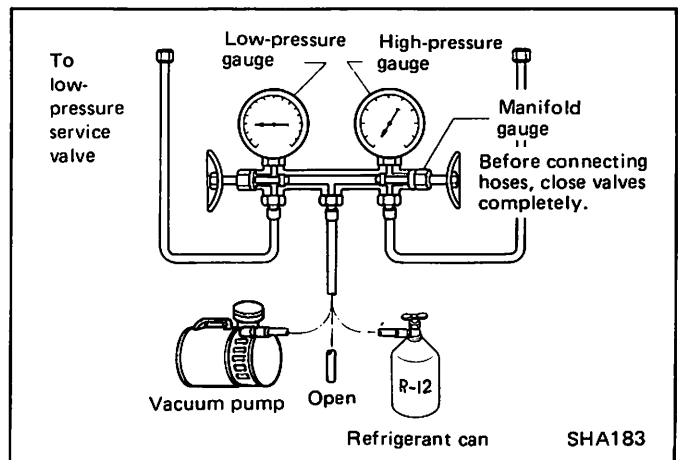
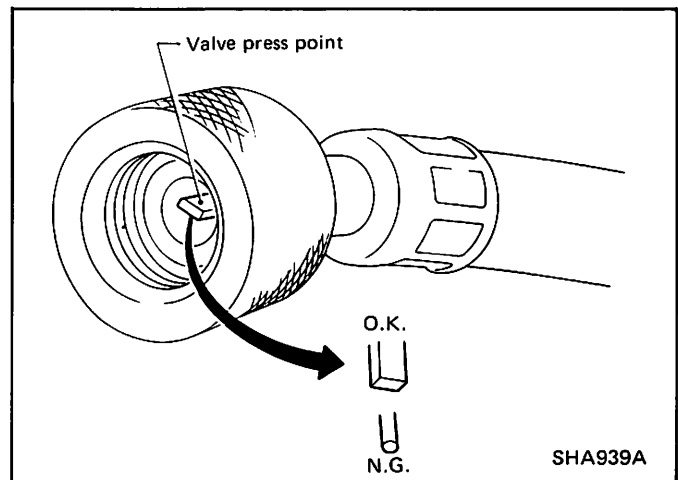
Hoses for the low-pressure service valve (suction valve) and high-pressure service valve (discharge valve) must be **securely** connected to "high" and "low" connection (respectively) on the manifold gauge.

Refer to identification marks ("S": Suction side on "D": Discharge side on compressor or Refrigerant Lines.)

When connecting or disconnecting manifold gauge to refrigerant line, fully close both valves of manifold gauge. This procedure **must** be done promptly.

Do not use manifold gauge whose press point shape is different. Otherwise, insufficient evacuation may occur.

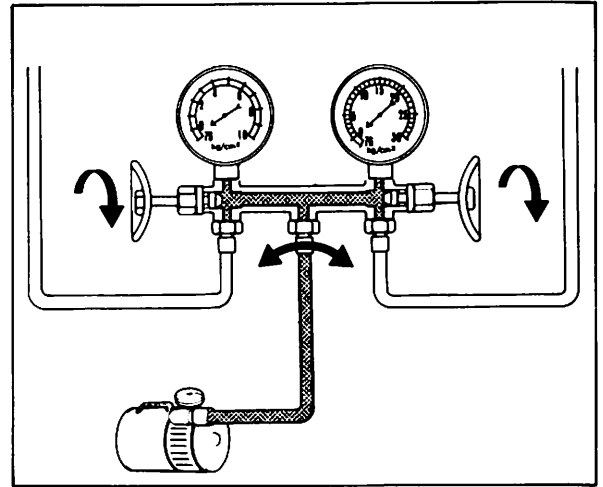
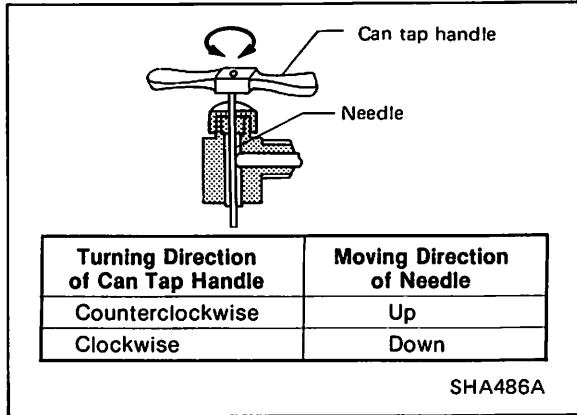
CAUTION:
Do not over-tighten valve cap.



Handling Refrigerant Service Can Tap

SERVICE NOTES:

- Before attaching can tap to refrigerant can, turn can tap handle fully counterclockwise to raise the needle.
- After connecting manifold gauge to refrigerant can, be sure to purge air from charging hose by loosening charging hose nut at manifold gauge.

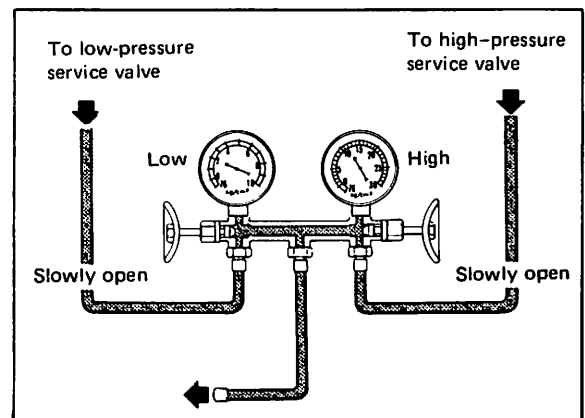


Discharging Refrigerant

The pressurized refrigerant gas inside the system must be discharged at a pressure approaching atmospheric pressure **prior** to evacuating refrigerant inside the system.

NOTE:

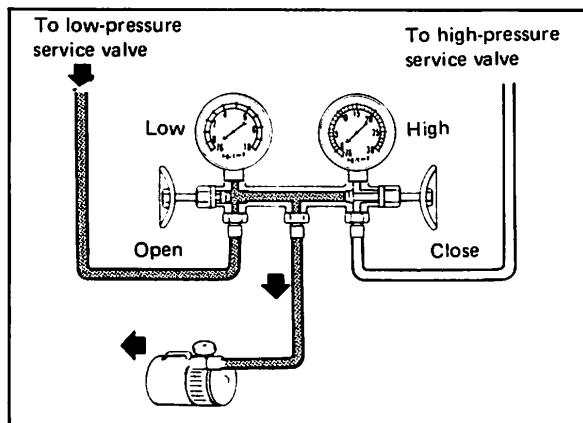
Do not allow refrigerant to rush out. Otherwise, compressor oil will be discharged along with refrigerant.



Evacuating/Charging Refrigerant System

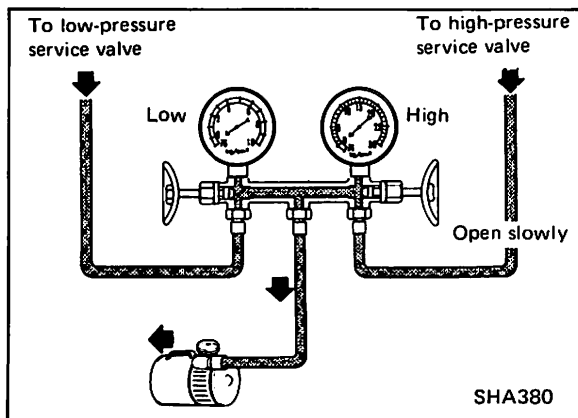
EVACUATING REFRIGERANT SYSTEM:

1. Discharge refrigerant from system until pressure reaches atmospheric pressure.
2. Connect center charging hose to vacuum pump.
3. Close both valves of manifold gauge fully. Then start vacuum pump.
4. Open low-pressure valve and suck old refrigerant from system.



5. When low-pressure gauge reading has reached to approximately 66.7 kPa (500 mmHg, 19.69 inHg), slowly open high-pressure valve.
6. When pressure inside system has dropped to 101.3 kPa (760 mmHg, 29.92 inHg), fully close both valves of manifold gauge and stop vacuum pump. Let it stand for 5 to 10 minutes in this state and confirm that the reading does not rise.

a. The low-pressure gauge reads lower by 3.3 kPa (25 mmHg, 0.98 inHg) per 300 m (1,000 ft) elevation. Perform evacuation according to the following table.



Elevation m (ft)	Vacuum of system* kPa (mmHg, inHg)
0 (0)	101.3 (760, 29.92)
300 (1,000)	98.0 (735, 28.94)
600 (2,000)	94.6 (710, 27.95)
900 (3,000)	91.3 (685, 26.97)

*: Values show reading of the low-pressure gauge.

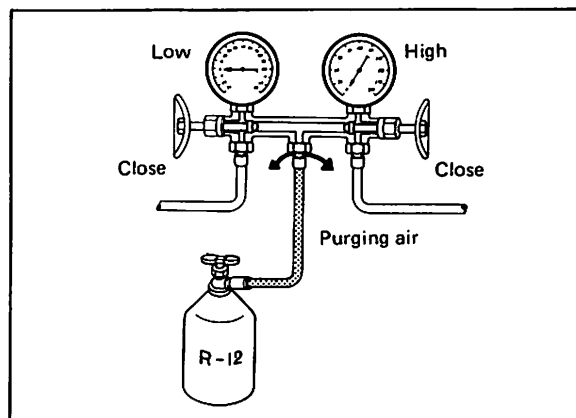
b. The rate of ascension of the low-pressure gauge should be less than 3.3 kPa (25 mmHg, 0.98 inHg) in five minutes.

If the pressure rises, or the specified negative pressure can not be obtained, there is a leak in the system. To repair the leak:

1. Charge system with a can of refrigerant [about 0.4 kg (0.9 lb)]. Refer to Charging Refrigerant.
2. Check for refrigerant leakage with a leak detector. Repair any leakages found. Refer to Checking Refrigerant Leak.
3. Discharge refrigerant again, and then evacuate system.

CHARGING REFRIGERANT SYSTEM:

1. Evacuate refrigerant system.
2. Close manifold gauge valves securely and replace vacuum pump to refrigerant can.
3. Purge air from charging hose.

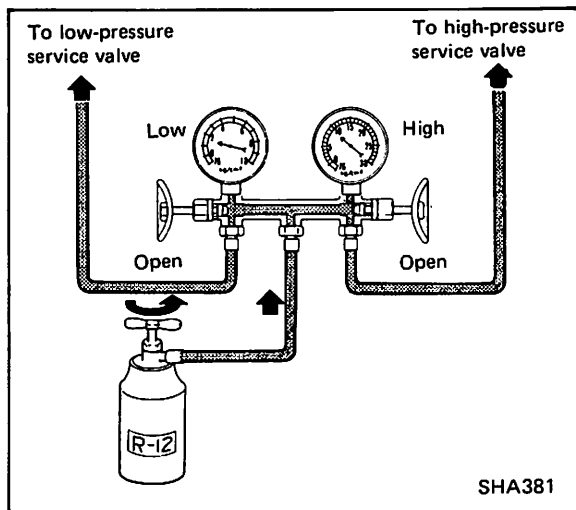


Evacuating/Charging Refrigerant System (Con't)

4. Charge refrigerant into system.

a. When charging refrigerant gas

Open high- and low-pressure valves of manifold gauge and charge refrigerant into system.

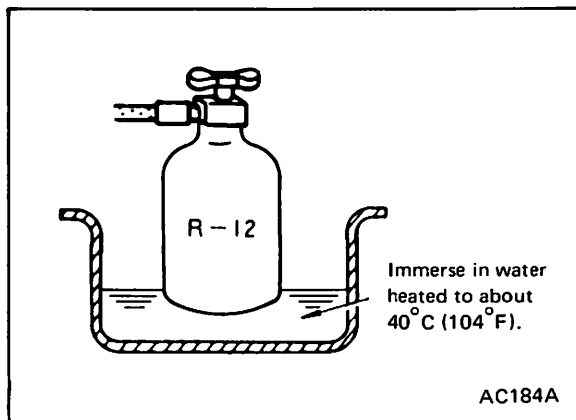


NOTE:

When refrigerant charging speed is slow, immerse refrigerant can in water, heated to a temperature of about 40°C (104°F), for a short time.

WARNING:

- Never warm the refrigerant in water heated above 52°C (126°F).
- Never use a blow torch or stove to warm the can.

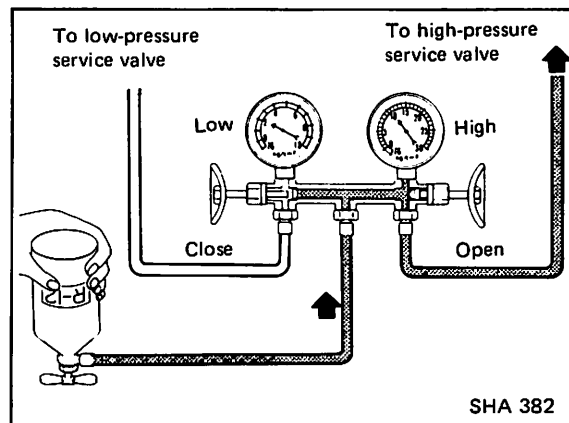


b. When charging liquefied refrigerant

Open high pressure valve of manifold gauge and charge liquefied refrigerant into system. Turn can upside down to reduce charging time.

CAUTION:

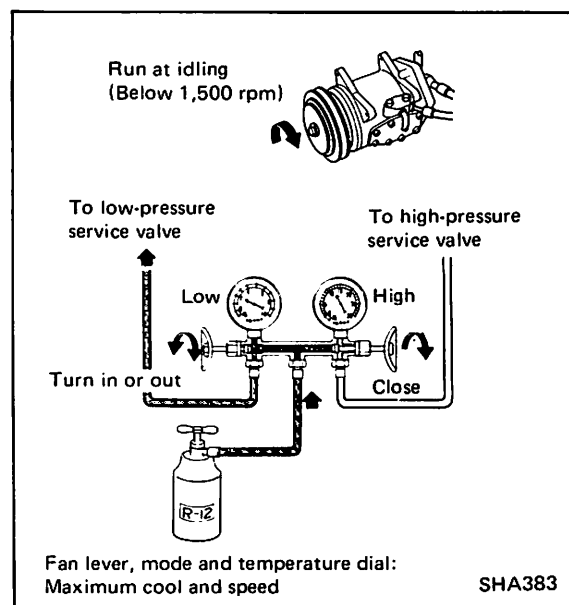
When charging refrigerant, do so only through the high pressure (discharge) service valve. When completed, manually turn over the compressor several times.



If charging rate slows, recharge the refrigerant while running the compressor.

WARNING:

Never charge refrigerant through high pressure side (discharge side) of system since this will force refrigerant back into refrigerant can, and the can may explode.



Evacuating/Charging Refrigerant System (Con't)

1. Charge refrigerant while controlling low-pressure gauge reading at 275 kPa (2.8 kg/cm², 40 psi) or less by turning in or out low-pressure valve of manifold gauge.

When refrigerant can is empty, replace it with a new one.

- Replacement should be done with both valves of manifold gauge closed.
- Be sure to purge air from charging hose.

2. Charge the specified amount of refrigerant into system by weighing charged refrigerant with scale. Overcharging will cause discharge pressure to rise.

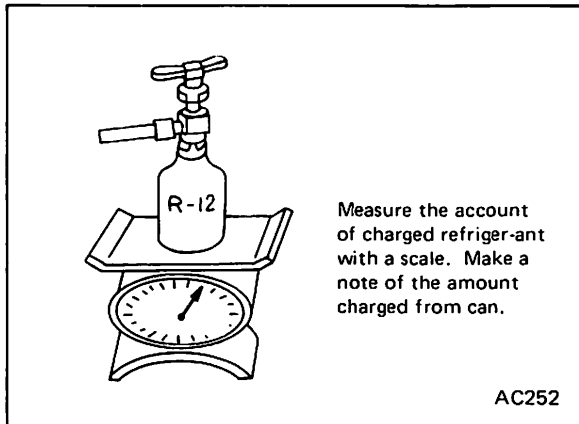
Refrigerant capacity:

Diesel-Kiki model

0.9-1.1 kg (2.0-2.4 lb)

YORK model

0.8-1.0 kg (1.8-2.2 lb)



NOTE:

Use the sight glass only for checking the amount of charged refrigerant. Refer to Refrigerant Level Check. The amount of charged refrigerant can be correctly judged by means of discharged pressure.

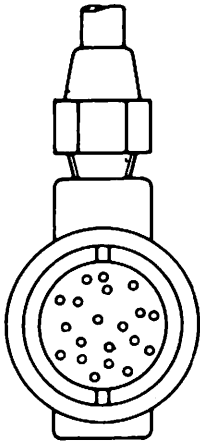
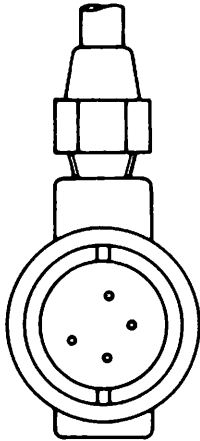
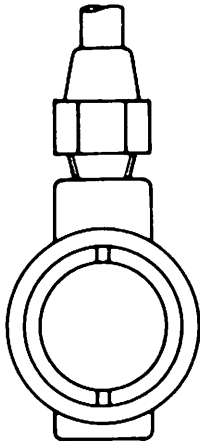
3. After charging, be sure to install valve cap on service valve.
4. Confirm that there are no leaks in system. Refer to Checking Refrigerant Leak.

NOTE:

Conducting a performance test prior to removing manifold gauge is a good service operation. Refer to Performance Test.

Refrigerant Level Check

1. Open door windows.
2. Start the engine.
3. Set air conditioner switch to "ON" position.
4. Set temperature lever to maximum cold position.
5. Set blower to maximum speed.
6. Check sight glass after the lapse of about five minutes. Judge according to the following table.

Amount of Refrigerant	Almost No Refrigerant	Insufficient	Suitable	Too Much Refrigerant
Check item				
Temperature of high pressure and low pressure lines.	Almost no difference between high pressure and low pressure side temperature.	High pressure side is warm and low pressure side is fairly cold.	High pressure side is hot and low pressure side is cold.	High pressure side is abnormally hot.
Side glass check.	Bubbles flow continuously. Bubbles will disappear and something like mist will flow when refrigerant is nearly gone. 	The bubbles are seen at intervals of 1 - 2 seconds. 	Almost transparent. Bubbles may appear when engine speed is raised and lowered. No clear difference exists between these two conditions. 	No bubbles can be seen.
Pressure of system.	High pressure side is abnormally low.	Both pressure on high and low pressure sides are slightly low.	Both pressures on high and low pressure sides are normal.	Both pressures on high and low pressure sides are abnormally high.
Repair.	Stop compressor immediately and conduct an overall check.	Check for gas leakage; repair as required. Replenish and charge system.		Discharge refrigerant from service valve of low pressure side.

a. The bubbles seen through the sight glass are influenced by ambient temperature. Since the bubbles are hard to see that comparatively low temperatures (below 20°C/68°F) it is possible that a slightly excessive amount of refrigerant could be used. Be sure to recheck the amount when it exceeds 20°C (68°F). In higher temperature the bubbles are easy to see.

b. When the screen in the receiver drier is clogged, the bubbles will appear even if the amount of refrigerant is normal. In this case, the outlet side pipe of the receiver drier becomes considerably colder.

Hose and Pipe Check

Check heater and air conditioner for damaged hoses or pipes due to interference or friction with adjoining parts.

- Repair minor damage to hoses or pipes.
- Replace parts when damage is major, or holes are found.

NOTE:

Carefully check hoses and pipes, especially those located close to moving parts or sharp edge of panel.

Checking Refrigerant Leak

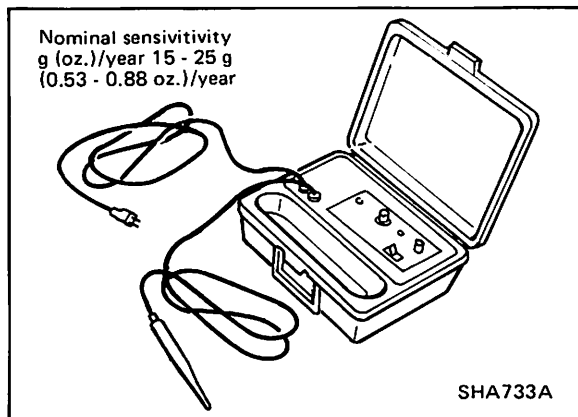
Conduct a leak test with electric leak detector whenever leakage of refrigerant is suspected and when conducting service operations which are accompanied by disassembly or loosening of connection fittings.

ELECTRIC LEAK-DETECTOR

The leak detector is a delicate device that detects small amounts of halogen.

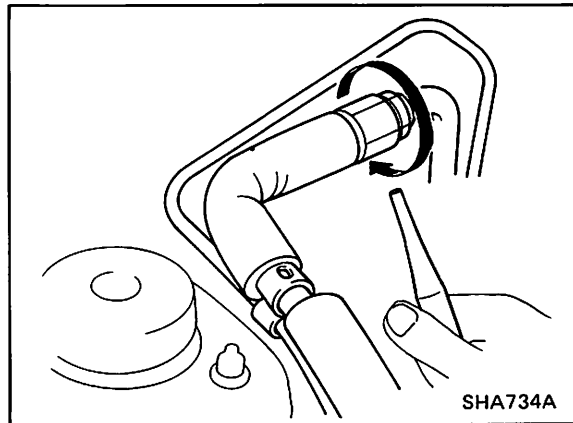
NOTE:

Follow manufacturer's instructions when using leak detectors.

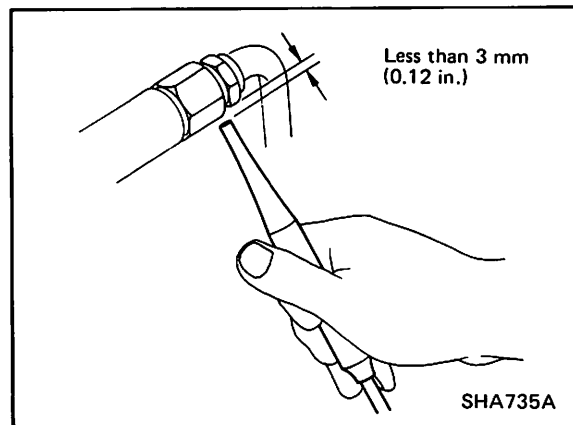


GENERAL PRECAUTIONS FOR HANDLING LEAK DETECTOR

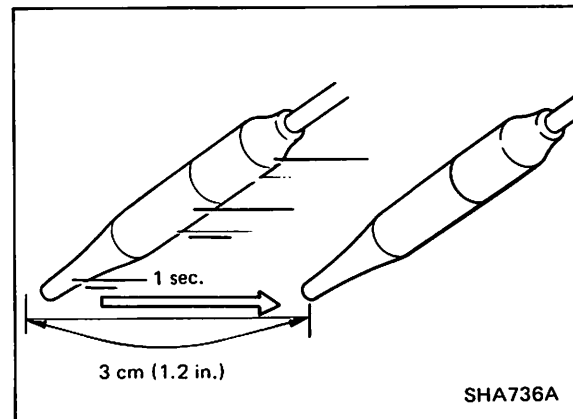
1. The probe must be correctly aimed at the point to be checked. Each fitting must be checked around its entire periphery. Refrigerant gas is heavier than air, so the underside of the fitting must also be checked.



2. The probe must be held as close as possible to the checking point, within 3 mm (0.12 in) of the object.



3. The detector requires a certain length of time to react to the gas. The moving speed of the probe must be maintained at less than 3 cm (1.2 in)/sec.



Checking Refrigerant Leak (Con't)

MEASUREMENT STANDARD

If any reaction is noted using a detector having a nominal sensitivity of 15 to 25 g (0.53 to 0.88 oz)/year, that portion checked must be repaired.

1. The nominal sensitivity of the detector is determined under the assumption that all the leaking gas is collected by the detector. Accordingly, the quantity of gas actually leaking can amount to five to ten times the indicated value. Generally speaking, leakage of 150 to 200 g (5.29 to 7.05 oz) of refrigerant can cause insufficient cooling.
2. Oil deposited during assembling must be wiped off before inspection. Refrigerant easily dissolves in oil, and the presence of oil can cause an error in measurement. This precaution is important when checking a used car for refrigerant leakage.
3. If any trace of oil is noted at and around connection fittings, it is a sure indication that refrigerant is leaking.

MAJOR CHECK POINTS

1. Compressor
 - a. Compressor shaft seal (rotate the compressor by hand)
 - b. Flexible hose connections
 - c. Front and rear head gaskets
 - d. Service valve
2. Condenser
 - a. Condenser pipe fitting
 - b. Condenser inlet and outlet pipe connections

3. Refrigerant lines
 - a. Line connections
4. Evaporator housing
 - a. Inlet and outlet line connections
 - b. Expansion valve

Insert a probe into drain hose to check for leakage inside cooling unit.

If a gas leak is detected, proceed as follows:

1. Check torque on the connection fitting and, if too loose, tighten to the proper torque. Refer to S.D.S. Check in your Service Manual for gas leakage with a leak detector.
2. If leakage continues even after the fitting has been retightened, discharge refrigerant from system, disconnect the fittings, and check its seating face for damage. Always replace even if damage is slight.
3. Check compressor oil and add oil if required.
4. Charge refrigerant and recheck for gas leaks. If no leaks are found, evacuate and charge system.

OFF-SEASON MAINTENANCE

Even in the off-season, turn the compressor for 10 minutes at least once a month by running the engine at idling rpm.

QUICK REFERENCE CHART: PICK-UP 1st Revision 1983

ENGINE TUNE-UP DATA Z20 & Z24

Item	Model	U.S.A.						Canada
		California			Non-California			
		Z24		Z20		Z24		
		2WD	4WD	2WD	4WD	2WD	4WD	
Idle speed	rpm	M/T	700:100	800:100	600:100	—	650:100	800:100
		A/T	650:100 (in "D" position)					
Ignition timing*	(degree B.T.D.C. at idle speed)		3:2*		5:2*	—		3:2*
Dash pot	rpm	M/T	—					
Touch speed		A/T	1,400 - 1,600					
Valve clearance (Hot)	mm (in)	Intake	0.30 (0.012)					
		Exhaust	0.30 (0.012)					
Compression pressure	kPa (kg/cm ² , psi)/rpm	Standard	1,177 (12.0, 171)/350					
		Minimum	883 (9.0, 128)/350					
Spark plug	Type	Intake side	BPR6ES					
Standard		Exhaust side	BPR5ES					
Tightening torque			N·m	kg·m	ft·lb			
Cylinder head			78 - 88	8.0 - 9.0	58 - 65			
Manifold bolt and nut			16 - 21	1.6 - 2.1	12 - 15			

*: Ignition timing should be checked with distributor vacuum hose disconnected and plugged up.

BRAKE

		Unit: mm (in)
Disc brake		
Pad minimum thickness		2.0 (0.079)
Rotor repair limit		
Runout		Less than 0.07 (0.0028)
Parallelism circumferential direction		Less than 0.03 (0.0012)
Minimum thickness		20.0 (0.787)
Drum brake		
Lining minimum thickness		1.5 (0.059)
Drum repair limit		
Maximum inner diameter		255.5 (10.06)
Radial runout		Less than 0.03 (0.0012)
Out-of-roundness		Less than 0.05 (0.0020)
Taper		Less than 0.04 (0.0016)

CLUTCH PEDAL

		Unit: mm (in)
Height		179 - 189 (7.05 - 7.44)
Free play		1 - 5 (0.04 - 0.20)

ENGINE TUNE-UP DATA SD25

Idle speed	rpm	700 ⁺¹⁰⁰ ₋₅₀		
Initial injection nozzle pressure	kPa (kg/cm ² , psi)	9,807 10,297 (100 - 105, 1,422 - 1,493)		
Dash pot touch speed	rpm	1,280 - 1,350		
Valve clearance (Hot)	mm (in)	Intake	0.35 (0.014)	
		Exhaust	0.35 (0.014)	
Compression pressure	kPa (kg/cm ² , psi)/rpm	Standard	2,942 (30, 427)/200	
		Minimum	2,452 (25, 356)/200	
Tightening torque		N·m	kg·m	ft·lb
Cylinder head		Main bolt	118 - 147	12 - 15 87 - 108
		Sub bolt	49 - 64	5.0 - 6.5 36 - 47
Manifold bolts or nuts			15 - 18	1.5 - 1.8 11 - 13



NISSAN MOTOR CO.
Service Product Information Department

WHEEL ALIGNMENT (Unladen*)

Applied model		2WD	4WD
Camber	degree	0° - 1°	0°10' - 1°10'
Caster	degree	1°10' - 2°10'	55' - 1°55'
Toe-in	mm (in)	Radial tire	2 - 4 (0.08 - 0.16)
		Bias tire	5 - 7 (0.20 - 0.28)
	degree	Radial tire	22° - 43°
		Bias tire	54° - 1°17'
Front wheel turning angle (full turn)	Inside	34° - 36°	31° - 33°
	Outside	30° - 32°	29° - 31°
Front wheel toe-out turn	Inside	20°	20°
	Outside		18°

*: Tankful of fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools, mats in designed position.

FRONT WHEEL BEARING

Item	Model	2WD	4WD	
Tightening torque	N·m (kg·m, ft·lb)	34 - 39 (3.5 - 4.0, 25 - 29)	147 - 196 (15 - 20, 108 - 145)	
Return angle	degree	45°	—	
Preload (At hub bolt)	New seal	Less than 28.4 (2.9, 6.4)	Wheel bearing lock nut Tightening torque N·m (kg·m, ft·lb)	78 - 98 (8 - 10, 58 - 72)
			Retightening torque after loosening wheel bearing lock nut N·m (kg·m, ft·lb)	0 (0, 0)
			Axial end play mm (in)	0 (0)
	Used seal	Less than 9.8 (1.0, 2.2)	Starting force at wheel hub bolt N (kg, lb)	A
			Turning angle degree	15° - 30°
			Starting force at wheel hub bolt N (kg, lb)	B
Wheel bearing preload at wheel hub bolt N (kg, lb)		7.06 - 21.09 (0.72 - 2.15, B - A)	1.59 - 4.74)	