

# PROPELLER SHAFT & DIFFERENTIAL CARRIER

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# SECTION PD

## MODIFICATION NOTICE:

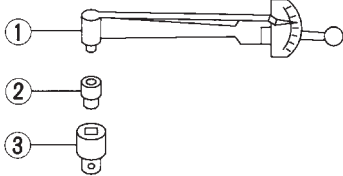
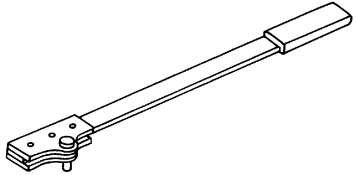
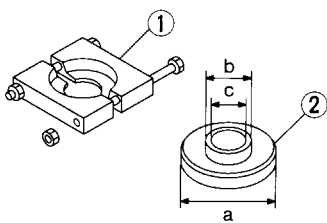
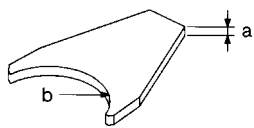
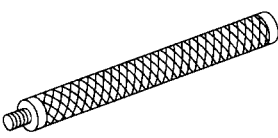
- Propeller shaft flange yoke has been changed.
- Rear final drive (C200) has been changed.
- Service data and specifications (SDS) have been changed.

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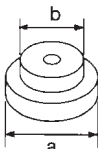
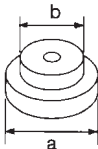
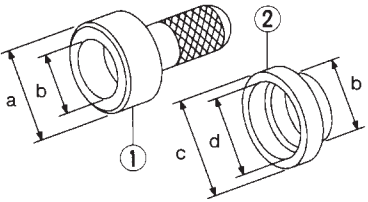
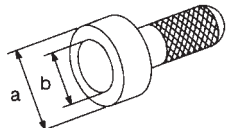
# PREPARATION

## Special Service Tools

Tool number Tool name	Description	Unit appli- cation
		C200
ST3127S000 Preload gauge ① GG91030000 Torque wrench ② HT62940000 Socket adapter ③ HT62900000 Socket adapter	 <p style="text-align: center;">NT124</p>	X
KV38108300 Drive pinion flange wrench	 <p style="text-align: center;">NT771</p>	X
ST3090S000 Drive pinion rear inner race puller set ① ST30031000 Puller ② ST30901000 Base	 <p style="text-align: center;">NT527</p> <p style="text-align: right;"> <b>a: 79 mm (3.11 in) dia.</b>  <b>b: 45 mm (1.77 in) dia.</b>  <b>c: 35 mm (1.38 in) dia.</b> </p>	X
KV38100600 Side bearing spacer drift	 <p style="text-align: center;">NT528</p> <p style="text-align: right;"> <b>a: 8 mm (0.31 in)</b>  <b>b: R42.5 mm (1.673 in)</b> </p>	X
ST30611000 Drift	 <p style="text-align: center;">NT090</p>	X

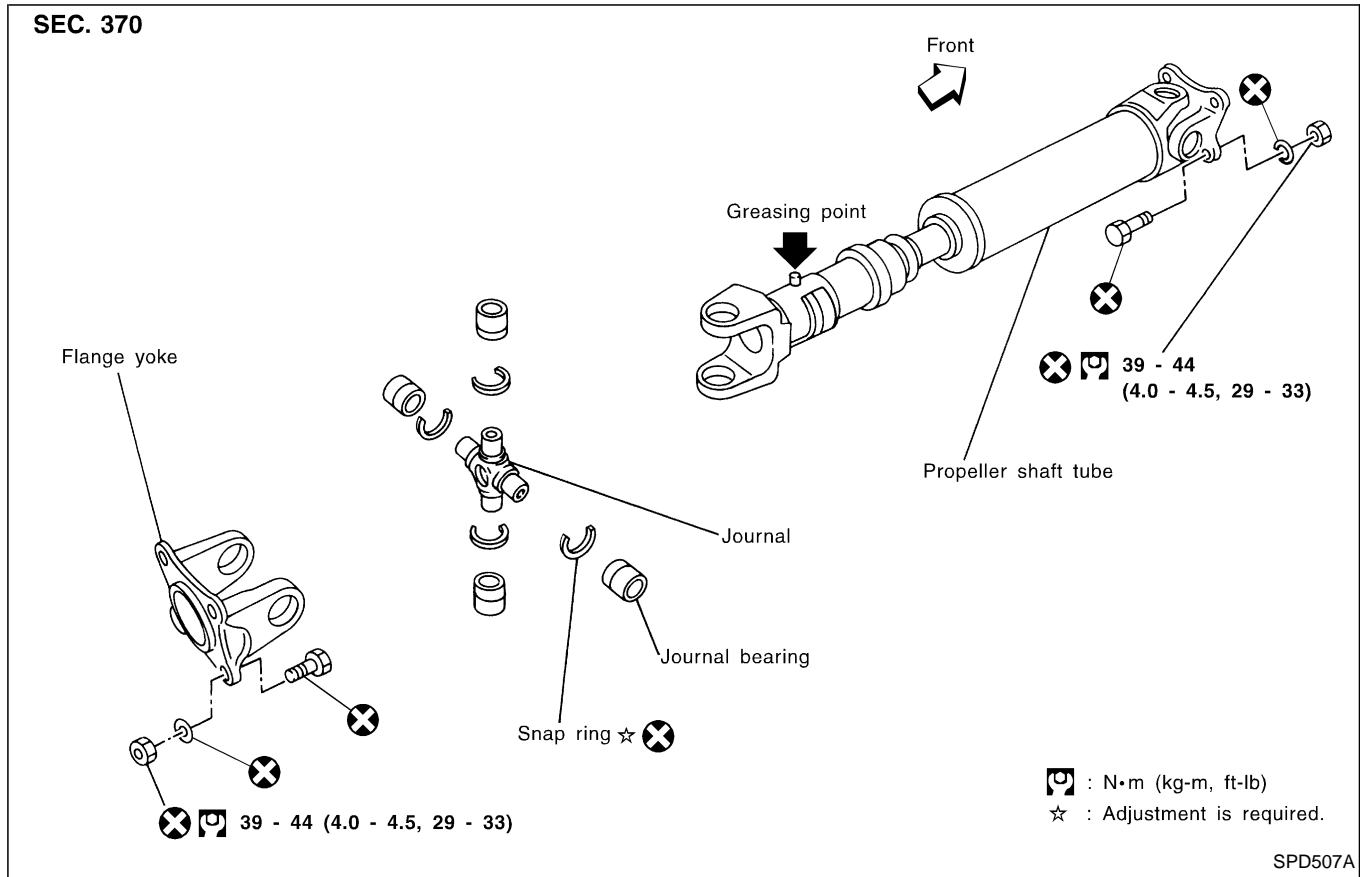
# PREPARATION

## Special Service Tools (Cont'd)

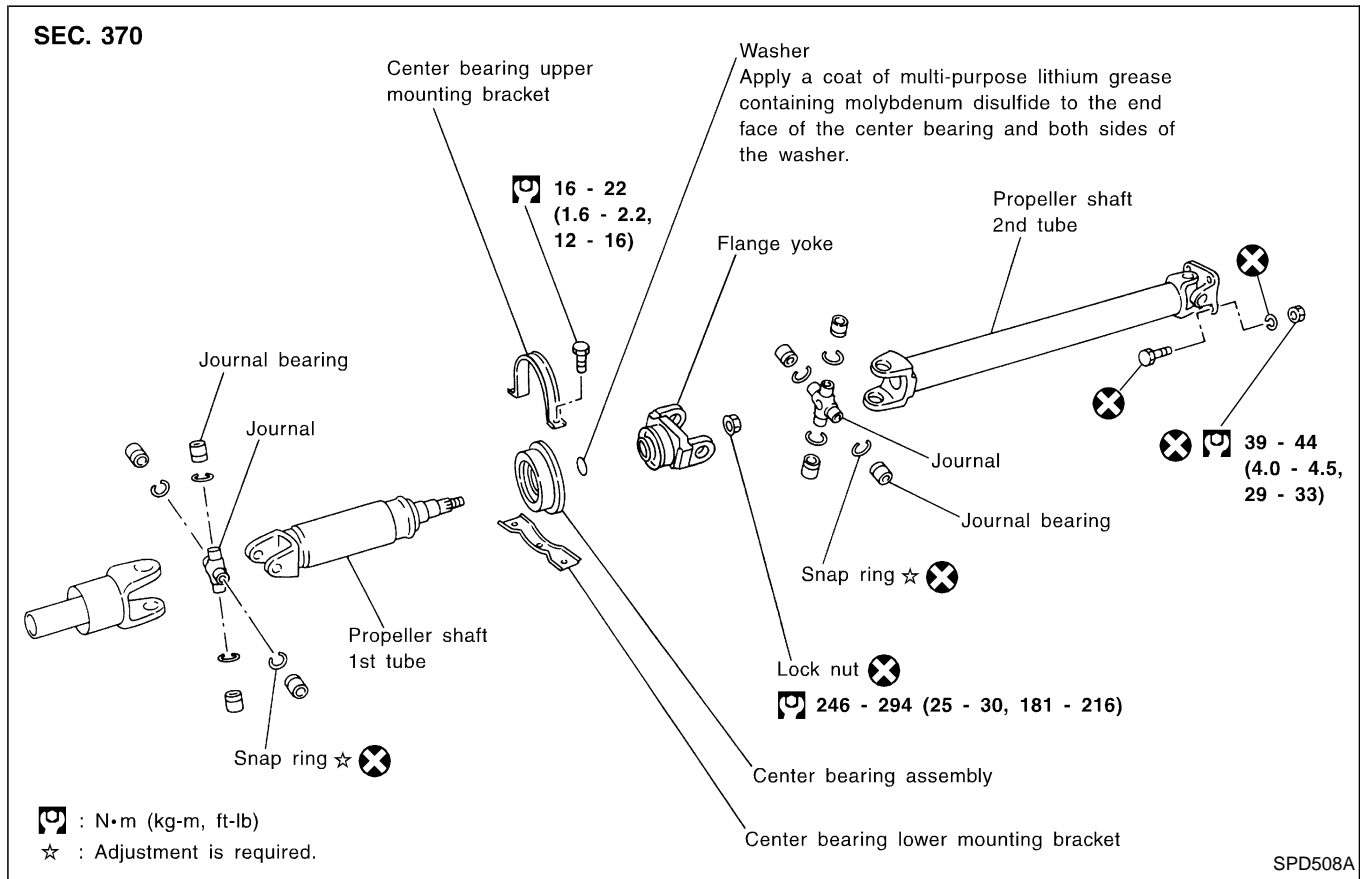
Tool number Tool name	Description	Unit appli- cation	GI	
				C200
ST30621000 Drift	 <p style="text-align: center;">NT073</p>	Installing pinion rear bearing outer race	X	MA EM LC
ST30613000 Drift	 <p style="text-align: center;">NT073</p>	Installing pinion front bearing outer race	X	EC FE
KV381025S0 Oil seal fitting tool ① ST30720000 Drift bar ② KV38102510 Drift	 <p style="text-align: center;">NT525</p>	Installing front oil seal (R180A, H233B) Installing rear wheel sensor rotor (C200)	X	CL MT AT TF
KV38100500 Gear carrier oil seal drift	 <p style="text-align: center;">NT115</p>	Installing front oil seal	X	FA RA BR ST RS BT HA EL IDX

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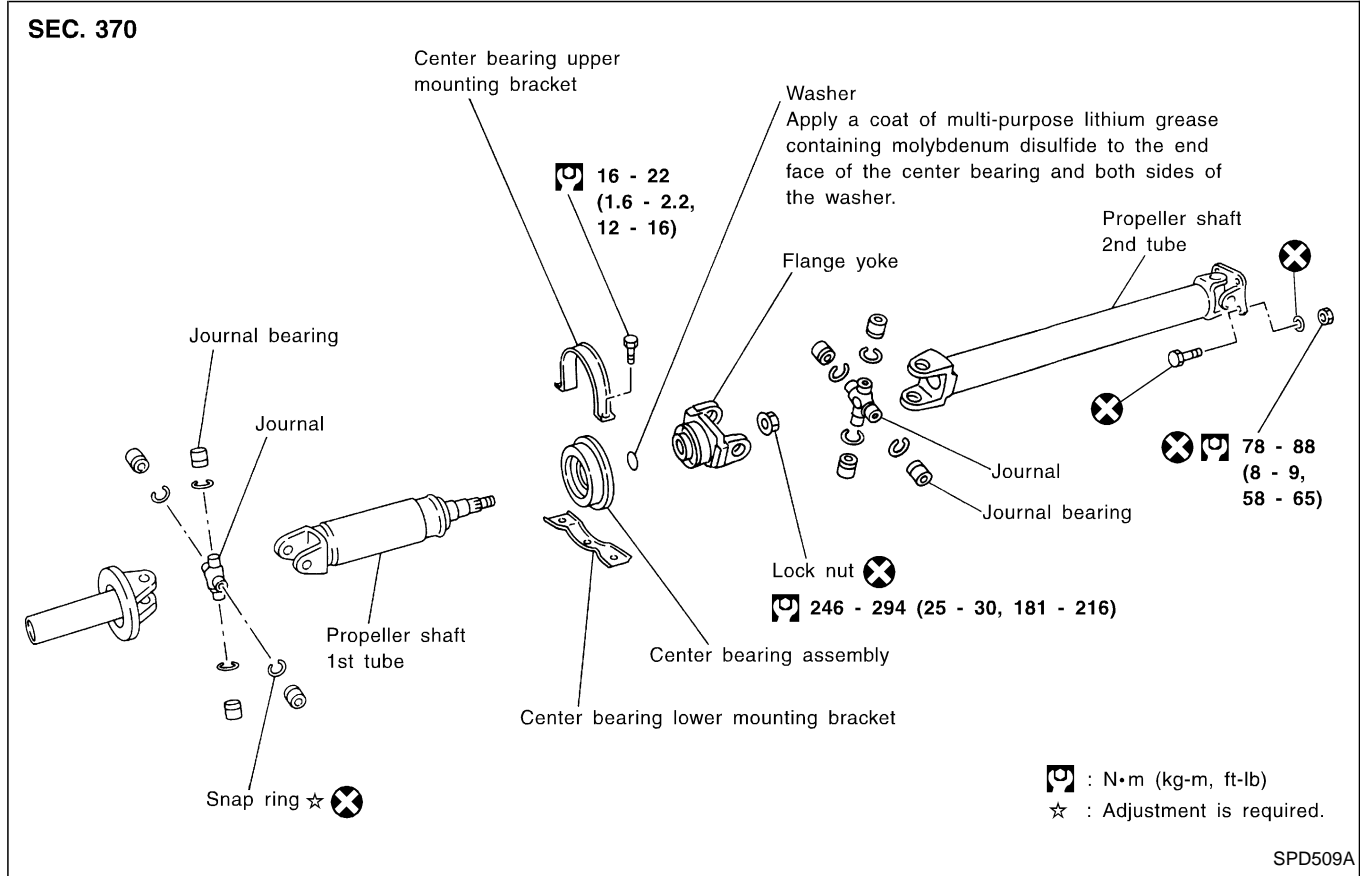
Front propeller shaft (Model 2F63H & 2F71H)



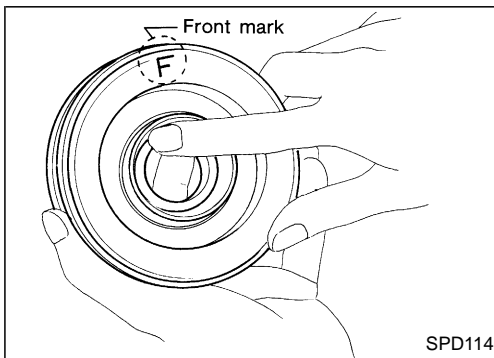
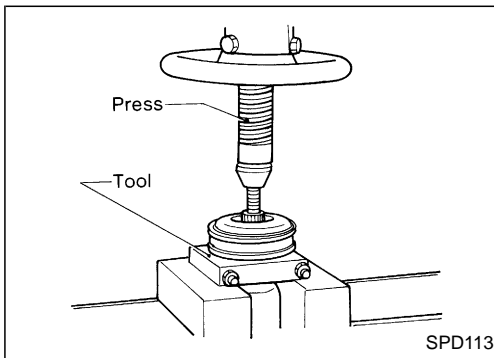
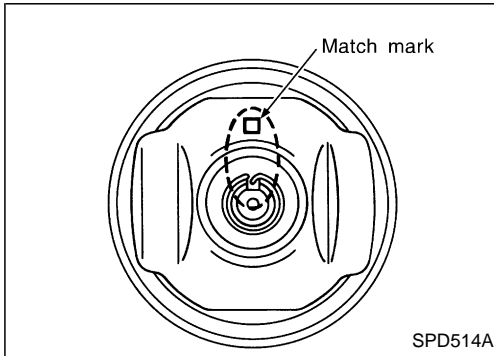
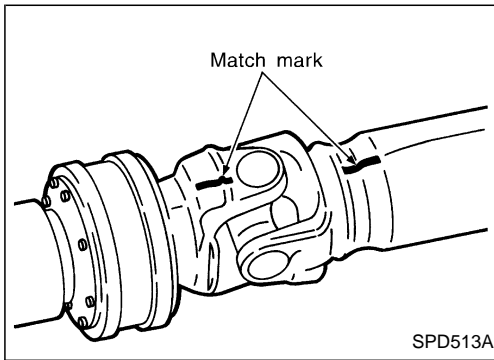
Rear propeller shaft (2WD models)



## Rear propeller shaft (4WD models)



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## Disassembly

### CENTER BEARING

1. Place matching marks on flanges, then separate 2nd tube from 1st tube.
2. Place matching marks on the flange and shaft.
3. Secure the flange yoke with a vice and remove the lock nut.
4. Remove flange yoke using puller.
5. Remove center bearing using Tool and press.  
**Tool number: ST30031000**

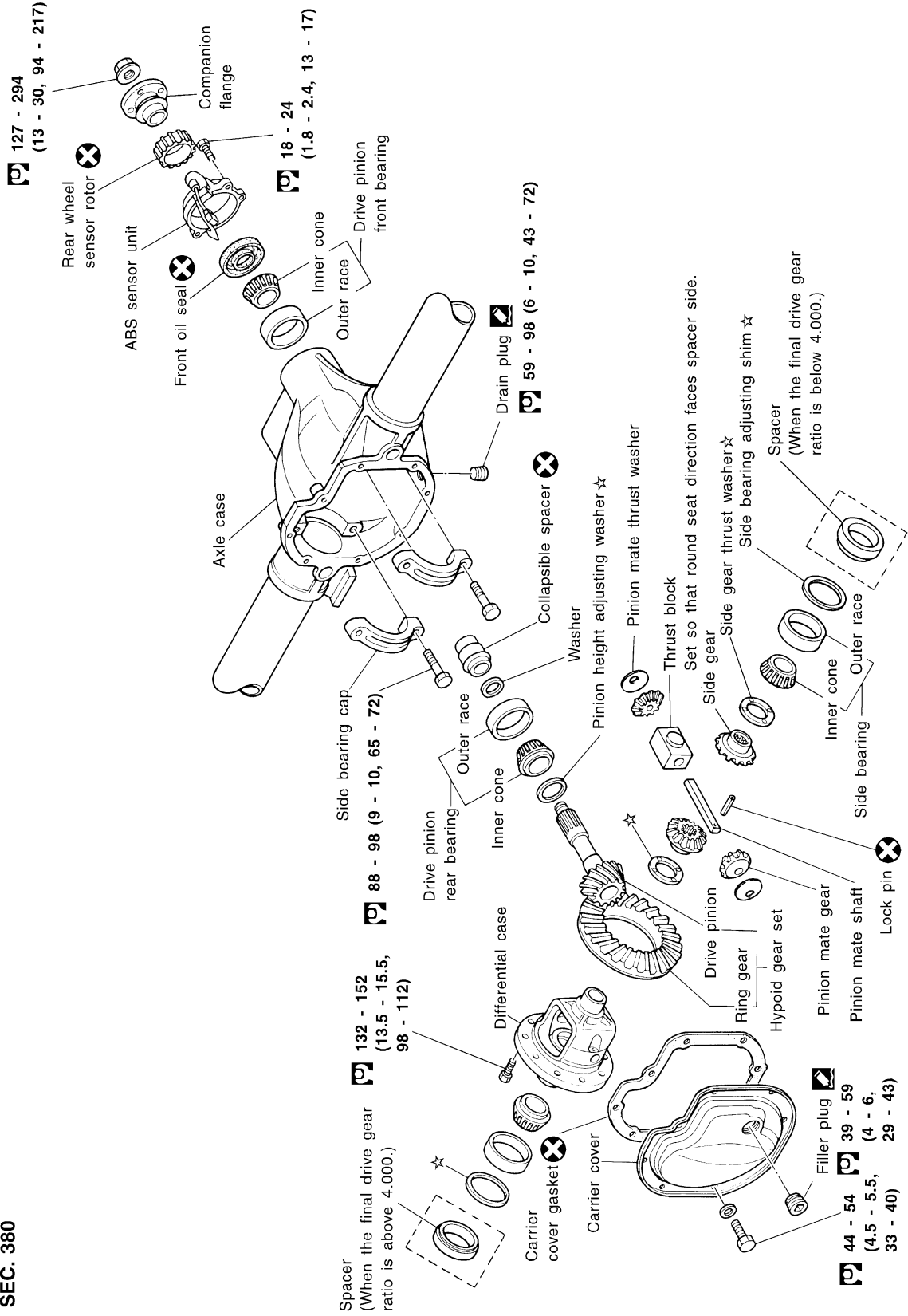
## Assembly

### CENTER BEARING

- When installing center bearing, position the "F" mark on center bearing toward front of vehicle.
- **Apply a coat of multi-purpose lithium grease containing molybdenum disulfide to the end face of the center bearing and both sides of the washer.**
- Stake the nut. Always use new one.
- Align match marks when assembling tubes.

## 2-pinion model

SEC. 380



- N·m** : N·m (kg-m, ft-lb)
- X** : Always replace when disassembled.
- ☆** : Adjustment is required.

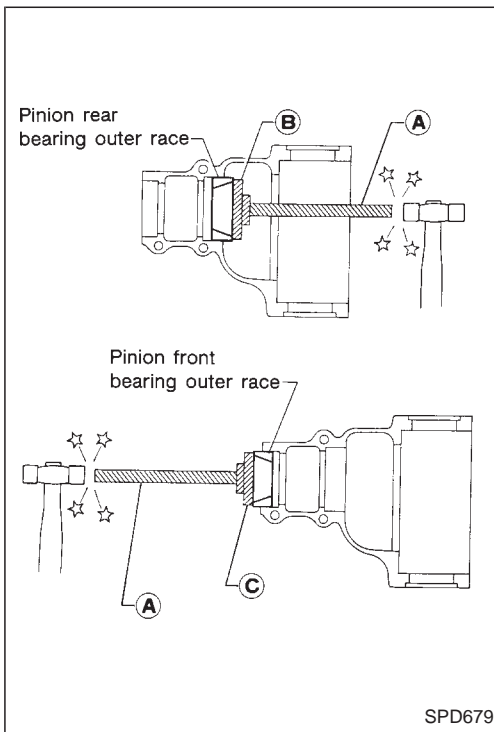
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### Differential Carrier

1. Press-fit front and rear bearing outer races with Tools.

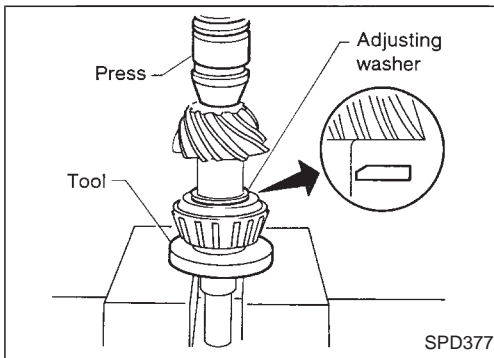
**Tool numbers:**

- Ⓐ **ST30611000**
- Ⓑ **ST30621000**
- Ⓒ **ST30613000**

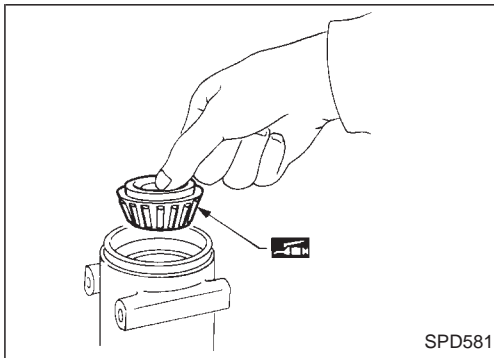


2. Select pinion height adjusting washer. Refer to "ADJUSTMENT" of original Service Manual.
3. Install pinion height adjusting washer in drive pinion, and press-fit rear bearing inner cone in it, with press and Tool.

**Tool number: ST30901000**

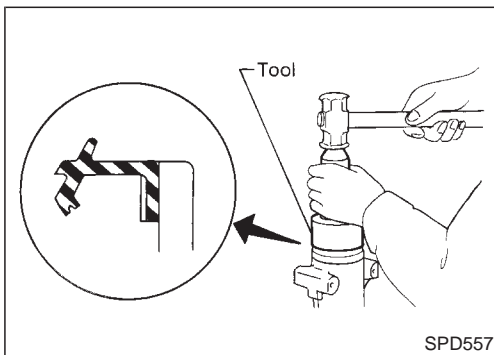


4. Place pinion front bearing inner cone in gear carrier.



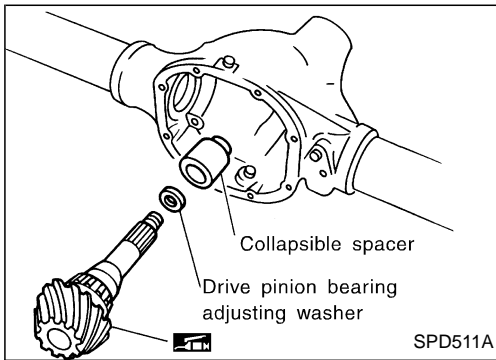
5. Apply multi-purpose grease to cavity at sealing lips of oil seal. Install front oil seal.

**Tool number: KV38100500**

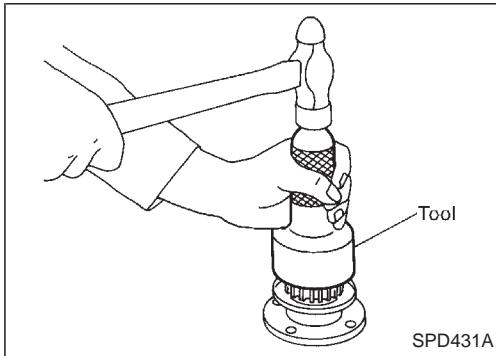




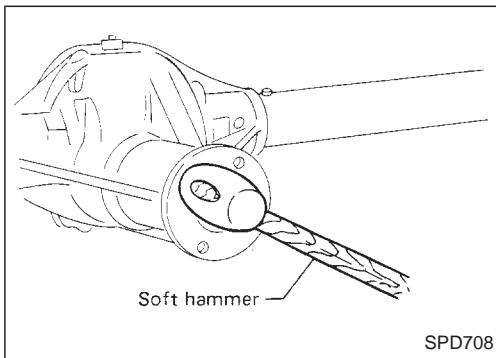
Differential Carrier (Cont'd)



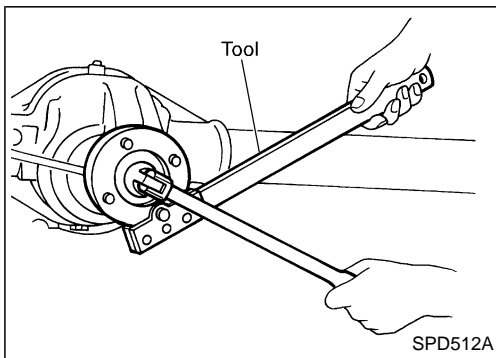
6. Place drive pinion bearing spacer, drive pinion bearing adjusting washer and drive pinion in gear carrier.



7. Insert sensor rotor into companion flange with Tool.  
**Tool number: ST30720000**  
8. Install ABS sensor unit on gear carrier.



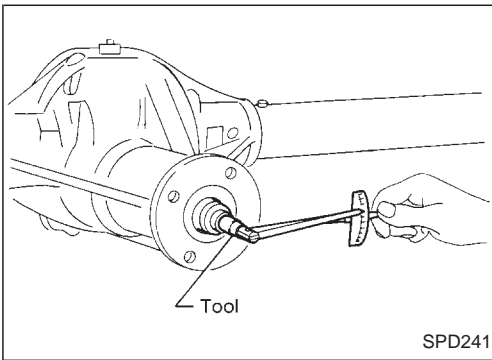
9. Insert companion flange into drive pinion by tapping the companion flange with a soft hammer.



10. Tighten pinion nut to 127 N·m (13 kg-m, 94 ft-lb).  
**The threaded portion of drive pinion and pinion nut should be free from oil or grease.**  
**Tool number: KV38108300**

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Differential Carrier (Cont'd)



11. Turn drive pinion in both directions several revolutions and measure pinion bearing preload.

**Tool number: ST3127S000**

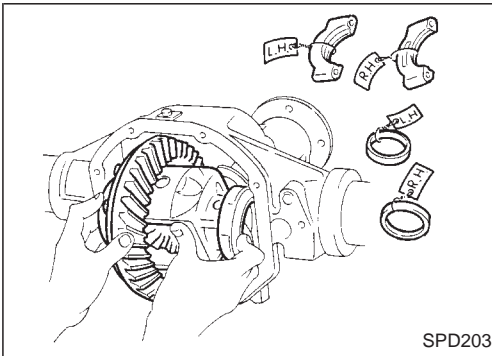
**Pinion bearing preload (With front oil seal):**

1.1 - 1.4 N·m  
(11 - 14 kg-cm, 9.5 - 12.2 in-lb)

**Pinion bearing preload (Without front oil seal):**

1.0 - 1.3 N·m  
(10 - 13 kg-cm, 8.7 - 11.3 in-lb)

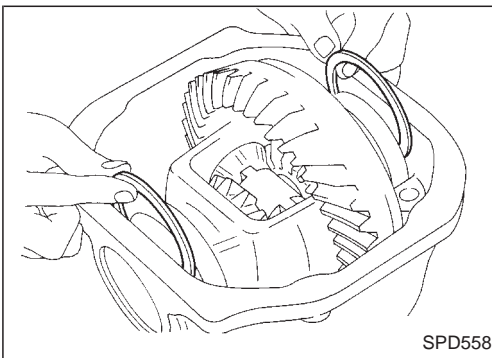
**When pinion bearing preload is outside the specifications, replace pinion bearing adjusting washer and spacer with a different thickness.**



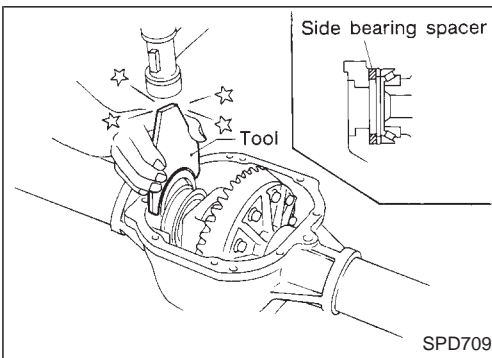
12. Select side bearing adjusting washer.

Refer to "ADJUSTMENT" of original Service Manual.

13. Install differential case assembly with side bearing outer races into gear carrier.



14. Insert left and right side bearing adjusting washers in place between side bearing and carrier.

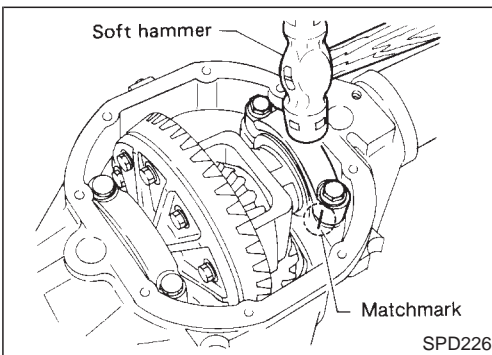


15. Drive in side bearing spacer with Tool.

**Tool number: KV38100600**

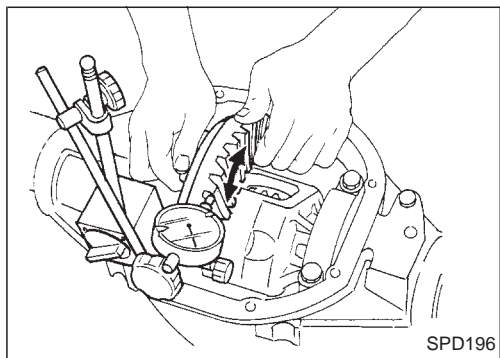
**CAUTION:**

**Be aware that the spacer is installed in different locations on different models. Refer to PD-7.**



16. Align mark on bearing cap with that on gear carrier and install bearing cap on gear carrier.

**Differential Carrier (Cont'd)**



17. Measure ring gear-to-drive pinion backlash with a dial indicator.

**Ring gear-to-drive pinion backlash:**

**0.13 - 0.18 mm**

**(0.0051 - 0.0071 in)**

- 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.

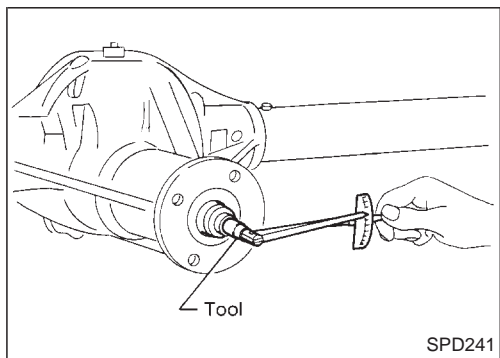
**Never change the total amount of shims as it will change the bearing preload.**

GI

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18. Check total preload with Tool.

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

**Total preload:**

**$P_1 + [0.3 \text{ to } 1.5 \text{ N}\cdot\text{m} (3 \text{ to } 15 \text{ kg}\cdot\text{cm}, 2.6 \text{ to } 13.0 \text{ in}\cdot\text{lb})]$**

**$P_1$ : Pinion bearing preload**

**Refer to SDS, PD-15.**

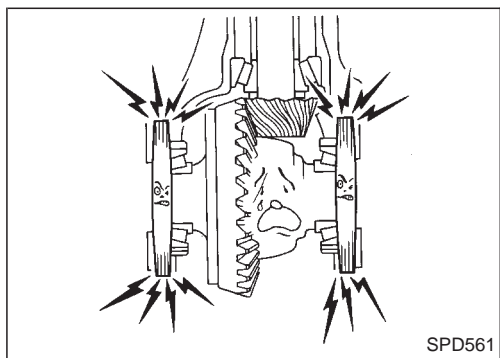
**Tool number: ST3127S000**

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

**Never add or remove a different number of shims for each side as it will change ring gear-to-drive pinion backlash.**

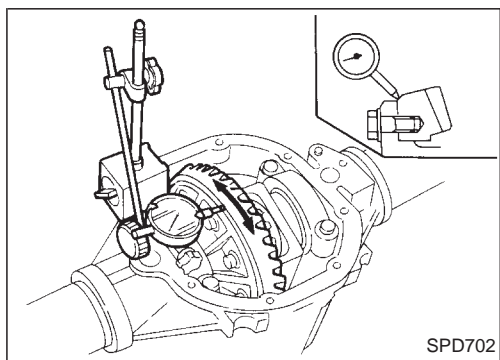
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19. Recheck ring gear-to-drive pinion backlash because increase or decrease in thickness of shims will cause change of ring gear-to-pinion backlash.

FA



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

**Runout limit:**

**0.05 mm (0.0020 in)**

- 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.

RA

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21. Check tooth contact.

Refer to "ADJUSTMENT" of original Service Manual.

22. Install rear cover and gasket.

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# SERVICE DATA AND SPECIFICATIONS (SDS)

## Propeller Shaft

### GENERAL SPECIFICATIONS

#### 2WD models

Applied model	Short body		Long body				
	Without ABS	With ABS	Without ABS		With ABS		
	M/T		A/T	M/T	A/T	M/T	
Propeller shaft model	3S71H						
Number of joints	3						
Coupling method with transmission	Sleeve type						
Types of journal bearings	Solid type (disassembly type)						
Shaft length (Spider to spider)	1st	641 (25.24)		541 (21.30)	641 (25.24)	541 (21.30)	641 (25.24)
	mm (in) 2nd	704 (27.72)	678 (26.69)	1,004 (39.53)		978 (38.50)	
Shaft outer diameter	1st	75 (2.95)					
	mm (in) 2nd	65 (2.56)					

#### 4WD models

Location	Front				Rear				
Applied model	TD25Ti	KA24E	KA24DE	QD32	TD25Ti	KA24E	KA24DE	QD32	
Propeller shaft model	2F71H	2F63H		2F71H	3S80B	3S71H		3S80B	
Number of joints	2				3				
Coupling method with transmission	Flange type				Sleeve type				
Types of journal bearings	Solid type (disassembly type)								
Shaft length (Spider to spider)	1st	565 (22.24)	546 (21.50)		565 (22.24)	377 (14.84)	396 (15.59)		377 (14.84)
	mm (in) 2nd	—				847 (33.35)	866 (34.09)	846 (33.31)	847 (33.35)
Shaft outer diameter	1st	50.8 (2.000)	50.8 (2.000)		50.8 (2.000)	65.0 (2.559)	75.0 (2.953)		65.0 (2.559)
	mm (in) 2nd	—				65.0 (2.559)			65.0 (2.559)

# SERVICE DATA AND SPECIFICATIONS (SDS)

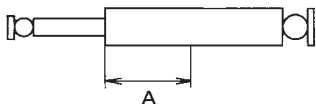
## Propeller Shaft (Cont'd)

### INSPECTION AND ADJUSTMENT

#### Front propeller shaft

Unit: mm (in)

Propeller shaft model	2F63H	2F71H
Journal axial play limit	0.02 (0.0008)	
Propeller shaft runout limit	0.6 (0.024)	
Measuring point A	134 (5.276)	137.5 (5.413)

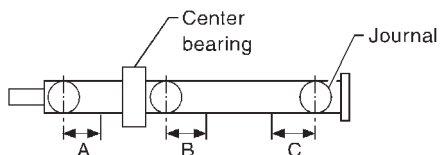


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#### Rear propeller shaft

Unit: mm (in)

Propeller shaft model	3S71H	3S80B
Journal axial play limit	0.02 (0.0008)	
Propeller shaft runout limit	0.6 (0.024)	
Measuring point		
A	162 (6.38)	
B	172 (6.77)	
C	192 (7.56)	



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# SERVICE DATA AND SPECIFICATIONS (SDS)

## Final Drive

### GENERAL SPECIFICATIONS

#### 2WD models

Applied model	TD25		KA24E		KA24DE, Z24S, TD27	
	Standard	Optional	Standard	Optional	Standard	Optional
Final drive model	C200					
	2-pinion	LSD	2-pinion	LSD	2-pinion	LSD
Oil capacity (Approx.) ℓ (Imp pt)	1.3 (2-1/4)					
Gear ratio	4.375		3.900		4.111 (4.375*)	
Number of teeth	Ring gear	35	39	37 (35*)		
	Drive pinion	8	10	9 (8*)		

\*: A/T model with KA24DE engine only

#### 4WD models

Applied model	TD25Ti		KA24E		KA24DE, QD32	
Front final drive	R180A					
	4-pinion					
Oil capacity (Approx.) ℓ (Imp pt)	1.3 (2-1/4)					
Rear final drive	Standard	Optional	Standard	Optional	Standard	Optional
	H233B		C200		H233B	
	4-pinion	LSD	4-pinion	LSD	4-pinion	LSD
Oil capacity (Approx.) ℓ (Imp pt)	2.8 (4-7/8)		1.3 (2-1/4)		2.8 (4-7/8)	
Gear ratio	4.875		4.625			
Number of teeth	Ring gear	39	37			
	Drive pinion	8	8			

# SERVICE DATA AND SPECIFICATIONS (SDS)

## Final Drive (Cont'd)

### INSPECTION AND ADJUSTMENT (C200)

#### Drive pinion preload adjustment

Drive pinion bearing preload adjusting method	Collapsible spacer
Drive pinion preload [P <sub>1</sub> ] N-m (kg-cm, in-lb)	
With front oil seal	1.1 - 1.4 (11 - 14, 9.5 - 12.2)
Without front oil seal	1.0 - 1.3 (10 - 13, 8.7 - 11.3)

#### Total preload adjustment

Total preload N-m (kg-cm, in-lb)	P <sub>1</sub> * + [0.3 to 1.5 (3 to 15, 2.6 to 13.0)]
Ring gear backlash mm (in)	0.13 - 0.18 (0.0051 - 0.0071)

\*: P<sub>1</sub>: Drive pinion preload

#### — Additional service for LSD model —

#### Differential torque adjustment

Differential torque N-m (kg-m, ft-lb)	88 - 108 (9.0 - 11.0, 65 - 80)
Number of discs and plates	
Friction disc	12
Friction plate	12
Spring plate	2
Wear limit of plate and disc mm (in)	0.1 (0.004)
Allowable warpage of friction disc and plate mm (in)	0.08 (0.0031)
Total thickness mm (in)	18.24 - 20.36 (0.7181 - 0.8016)

#### Available discs and plates

Part name	Thickness mm (in)	Part number
Friction disc	1.5 (0.059)	38433-C6002 (Standard type)
	1.6 (0.063)	38433-C6003 (Adjusting type)
Friction plate	1.5 (0.059)	38432-C6001
Spring plate	1.5 (0.059)	38435-C6011

### INSPECTION AND ADJUSTMENT (H233B)

#### Drive pinion preload adjustment

Drive pinion bearing preload adjusting method	Adjusting shim and spacer
Drive pinion preload [P <sub>2</sub> ] N-m (kg-cm, in-lb)	
With front oil seal	1.4 - 2.2 (14 - 22, 12 - 19)
Without front oil seal	1.2 - 2.0 (12 - 20, 10 - 17)

#### Available drive pinion preload adjusting shims

Thickness mm (in)	Part number
2.31 (0.0909)	38125-82100
2.33 (0.0917)	38126-82100
2.35 (0.0925)	38127-82100
2.37 (0.0933)	38128-82100
2.39 (0.0941)	38129-82100
2.41 (0.0949)	38130-82100
2.43 (0.0957)	38131-82100
2.45 (0.0965)	38132-82100
2.47 (0.0972)	38133-82100
2.49 (0.0980)	38134-82100
2.51 (0.0988)	38135-82100
2.53 (0.0996)	38136-82100
2.55 (0.1004)	38137-82100
2.57 (0.1012)	38138-82100
2.59 (0.1020)	38139-82100

#### Available drive pinion preload adjusting spacers

Length mm (in)	Part number
4.50 (0.1772)	38165-76000
4.75 (0.1870)	38166-76000
5.00 (0.1969)	38167-76000
5.25 (0.2067)	38166-01J00
5.50 (0.2165)	38166-01J10

#### Total preload adjustment

Total preload with front oil seal N-m (kg-cm, in-lb)	P <sub>2</sub> * + [0.3 to 0.4 (3 to 4, 2.6 to 3.5)]	
Ring gear backlash mm (in)	Gear ratio	
	4.636	0.10 - 0.15 (0.0039 - 0.0059)
	4.875 5.143	0.13 - 0.18 (0.0051 - 0.0071)

\*: P<sub>2</sub>: Drive pinion preload

GI  
MA  
EM  
LC  
EC  
FE  
CL  
MT  
AT  
TF  
PD  
FA  
RA  
BR  
ST  
RS  
BT  
HA  
EL  
IDX