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1989 Mazda RX-7 Factory Service Manual

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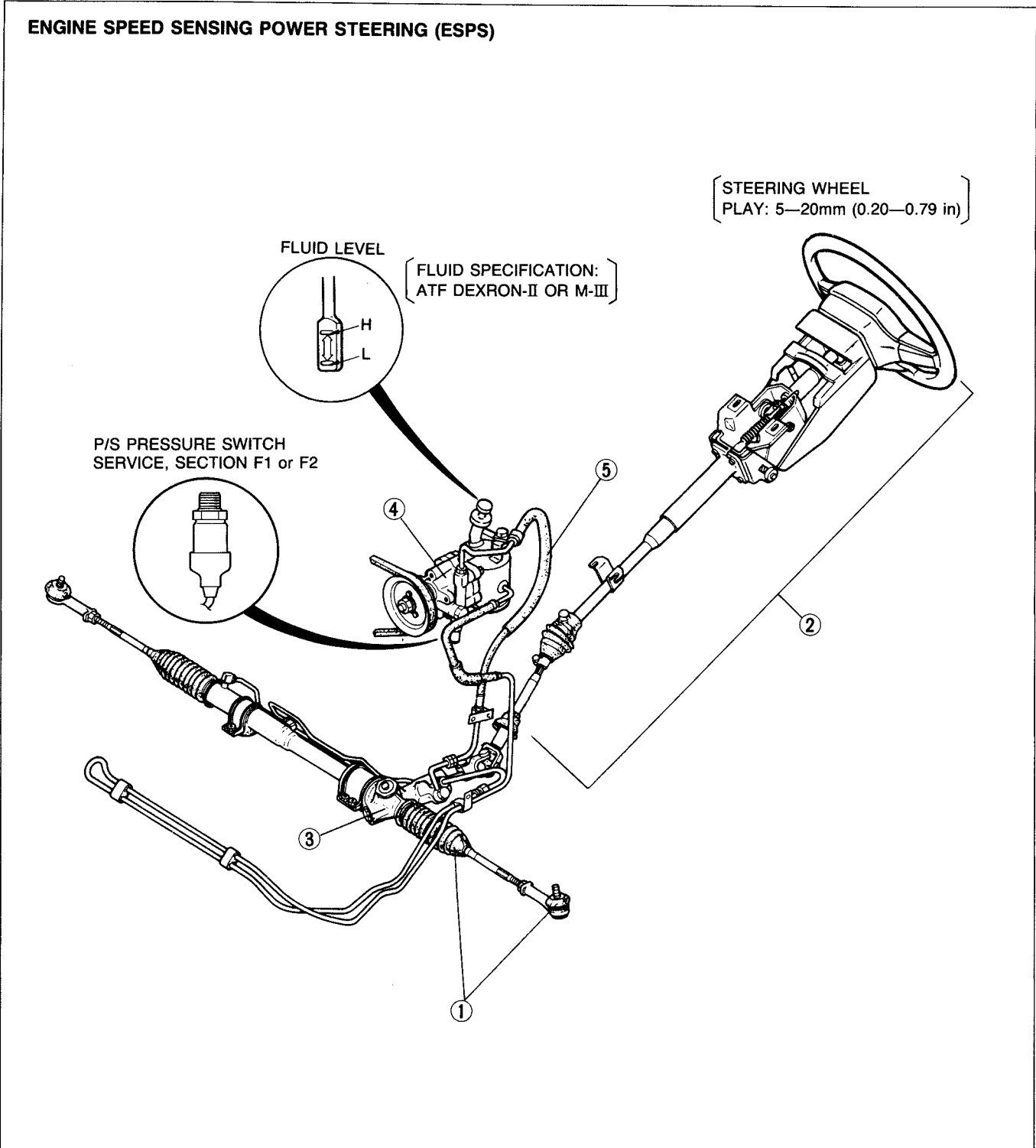
STEERING SYSTEM

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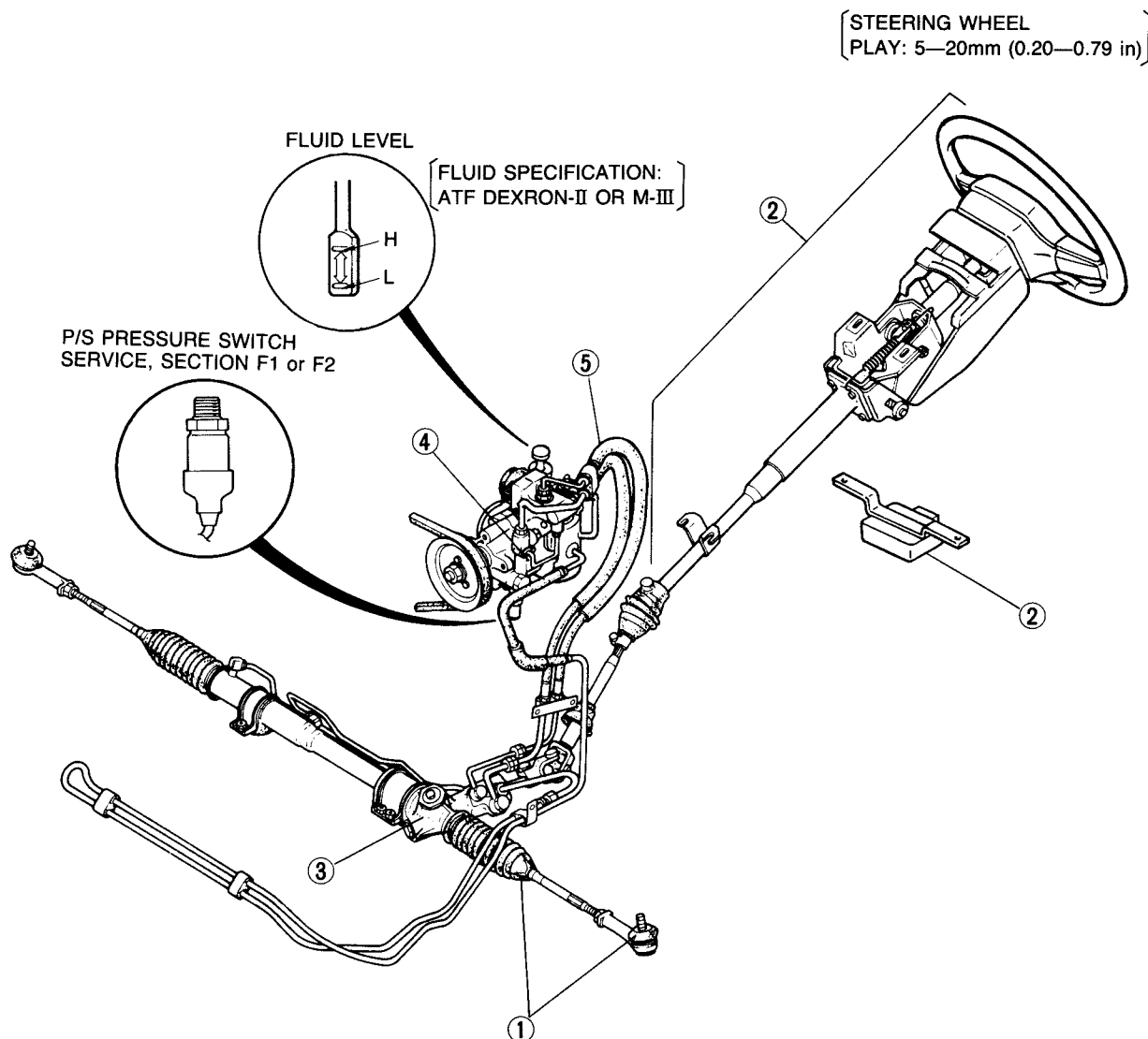
ENGINE SPEED SENSING POWER STEERING (ESPS)



97UONX-002

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2. Steering wheel and column			
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ELECTRONICALLY CONTROLLED POWER STEERING (ECPS)



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1. Boots		3. Steering gear and linkage	
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		6. ECPS control unit	
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N OUTLINE, ENGINE SPEED SENSING POWER STEERING

OUTLINE

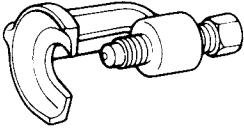
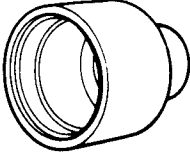
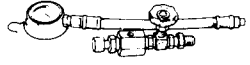
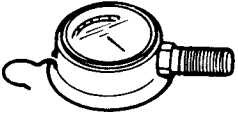
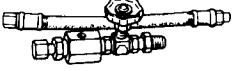
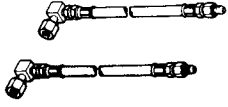
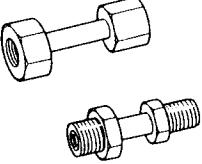
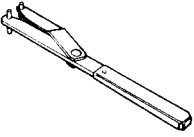
SPECIFICATIONS

Item	Type	Engine speed sensing power steering		Electronically controlled power steering
Steering wheel	Outer diameter	mm (in)	380 (15.0)	
	Lock-to-lock	turns	2.70	3.09
Steering shaft and joint	Shaft type		Collapsible	
	Joint type		2-cross joint	
	Tilt stroke	mm (in)	35 (1.38)	
Steering gear	Type		Rack-and-pinion	
	Gear ratio		∞ (infinite)	
Oil	Type		ATF DEXRON-II or M-III	
	Capacity	liter (US qt, Imp qt)	0.8 (0.85, 0.70)	

97U0NX-004

ENGINE SPEED SENSING POWER STEERING

PREPARATION SST

49 0118 850C Puller, ball joint 	49 8038 785 Installer, boot 	49 1232 670A Gauge set, power steering 
49 1232 672 Gauge (Part of 49 1232 670A) 	49 1232 673 Valve body (Part of 49 1232 670A) 	49 H002 671 Adapter, power steering gauge 
49 F032 315 Adapter, power steering gauge 	49 W023 585A Adjust wrench 	

97U0NX-005

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Action	Page/Section
Steering feels heavy	Poor lubrication, foreign material, or abnormal wear of steering ball joint	Lubricate or replace	N- 6
	Stuck or damaged lower arm ball joints	Replace	Section R
	Improper steering pinion preload	Replace gear	N-12
	Damaged steering gear	Replace	N-12
	Malfunctioning steering shaft joint	Replace	N- 9
	Improperly adjusted wheel alignment	Adjust	Section R
	Malfunctioning steering gear	Replace	N-12
	Incorrect tire pressure	Adjust	Section Q
	Loose or damaged oil pump drive belt	Adjust or replace	Section C
	Low fluid level or air in fluid	Add fluid or bleed air	N-16,17
	Leakage of fluid	Repair or replace	—
	Insufficient oil pump pressure	Replace	N-14

TROUBLESHOOTING GUIDE (Cont'd)

Problem	Possible Cause	Action	Page/Section
Steering wheel pulls to one side	Incorrect tire pressure Unevenly worn tires Weak front spring Worn or damaged stabilizer and/or lower arm bushing Dragging brake Loose lower arm Improperly adjusted wheel alignment	Adjust Replace Replace Replace Repair Tighten or replace Adjust	Section Q Section Q Section R Section R Section P Section R Section R
General instability while driving	Incorrect tire pressure Damaged or unbalanced wheel Worn or damaged steering joints Improper steering pinion preload Weak front coil spring Worn or damaged stabilizer and/or lower arm bushing Malfunctioning shock absorber Improperly adjusted wheel alignment	Adjust Adjust or replace Replace Replace gear Replace Replace Replace Adjust	Section Q Section Q N- 9 N-12 Section R Section R Section R Section R
Shake (Steering wheel vibrates up/down)	Excessive tire or wheel runout Loose lug nuts Unbalanced wheel(s) Cracked or worn engine mount rubber Cracked or worn transmission mount rubber	Replace Tighten Adjust or replace Replace Replace	Section Q Section Q Section Q Section C Sections J1,J2,K
Shimmy (Steering wheel vibrates left/right)	Cracked or worn steering gear mount rubber Loose steering gear mounting bolts Stuck or damaged steering ball joint Excessive tire or wheel runout Loose lug nuts Unbalanced wheel(s) Incorrect tire pressure Unevenly worn tires Malfunctioning shock absorber Loose shock absorber mounting bolts Stuck or damaged lower arm ball joint Cracked or worn suspension bushings Damaged or worn front wheel bearing Improperly adjusted front wheel alignment	Replace Tighten Replace Replace Tighten Adjust or replace Adjust Replace Replace Tighten Replace Replace Replace Adjust	N-12 N-12 N- 6 Section Q Section Q Section Q Section Q Section R Section R Section R Section R Section R Section R Section M Section R
Excessive steering wheel play	Worn steering gear Worn or damaged steering joints Worn or damaged lower arm bushing Loose steering gear mounting bolts Worn linkage or tie-rod ball joint	Replace Replace Replace Tighten Replace	N-12 N- 9 Section R N-12 N- 6
Poor steering wheel return	Incorrect tire pressure Stuck or damaged steering joints Improperly adjusted front wheel alignment Improper steering pinion preload Ball joint not operating smoothly Steering shaft contacting something	Adjust Replace Adjust Replace gear Replace Repair	Section Q N- 9 Section R N-12 N- 6 N- 9
Abnormal noise from steering system	Loose oil pump Loose steering gear Loose oil pump bracket Loose oil pump pulley Drive belt loose/tight Air in system Malfunctioning steering gear Malfunctioning oil pump Obstruction near steering column or pressure hose Loose steering linkage Worn steering joints	Tighten Tighten Tighten Tighten or replace Adjust Bleed air Replace Replace Repair or replace Tighten or replace Replace	N-14 N-12 Section C N-14 Section C N-17 N-12 N-14 N- 9 N- 6 N- 9

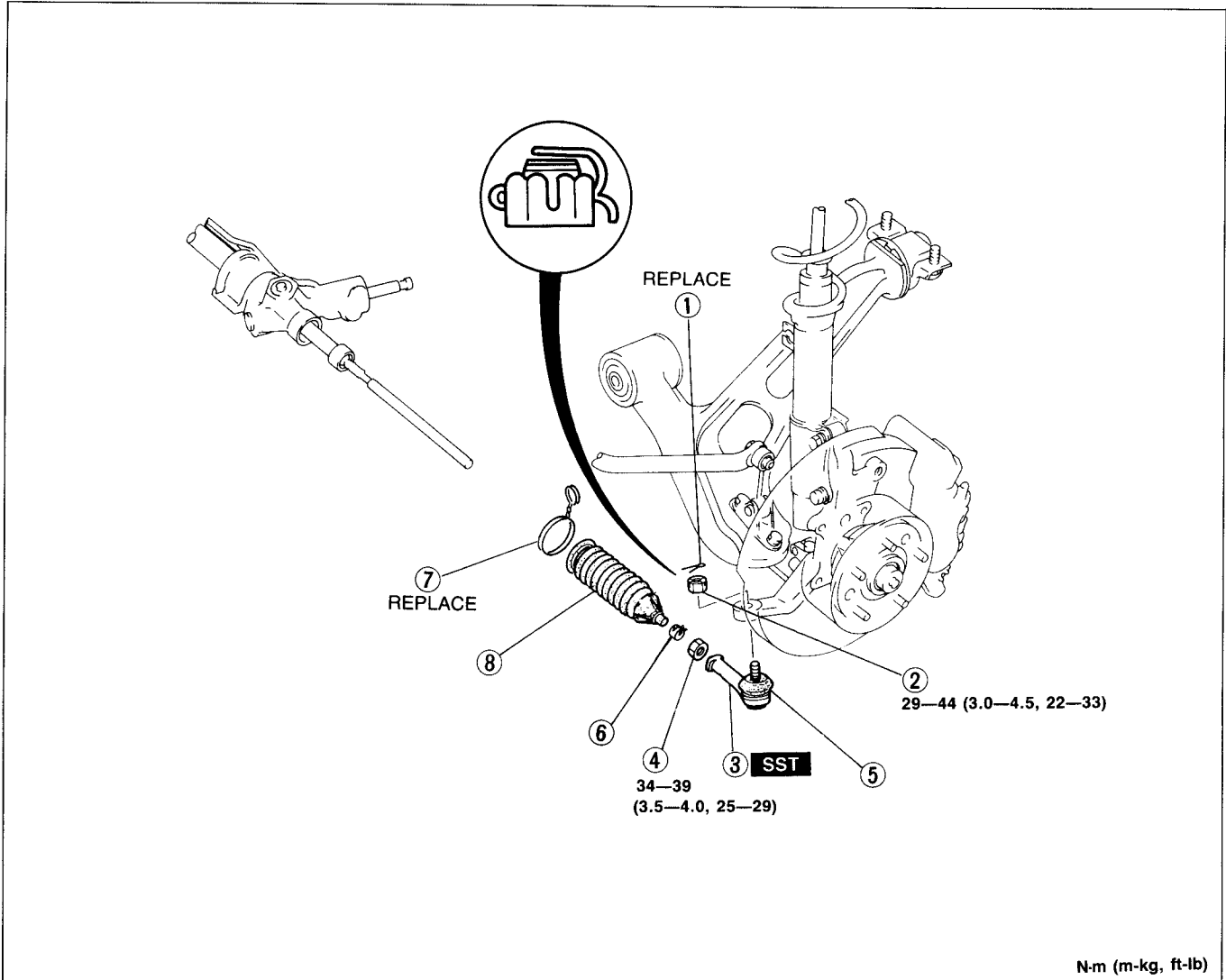
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N ENGINE SPEED SENSING POWER STEERING

BOOTS

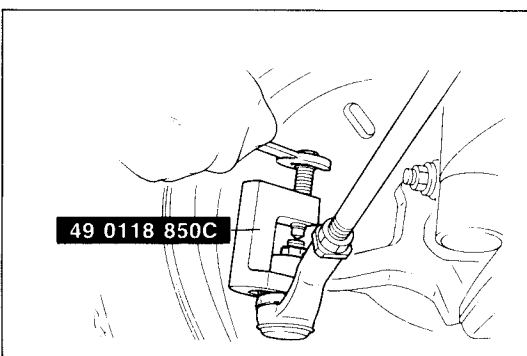
Removal

1. Loosen the wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheel.
4. Remove in the order shown in the figure, referring to **Removal Note**.



97U0NX-007

- | | | |
|-------------------|------------------------|----------|
| 1. Cotter pin | 5. Tie-rod end boot | |
| 2. Nut | Removal note..... | page N-7 |
| 3. Tie-rod end | Installation note..... | page N-7 |
| Removal note..... | 6. Boot clamp | |
| page N-6 | 7. Boot wire | |
| 4. Locknut | 8. Steering gear boot | |
| Removal note..... | | |
| page N-7 | | |

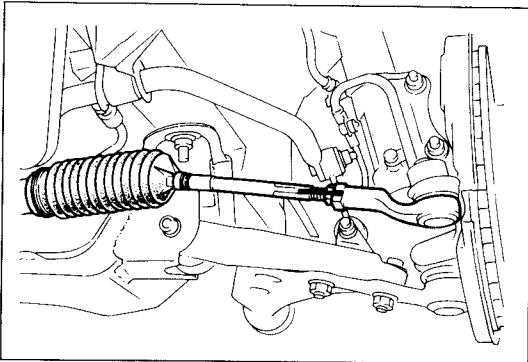


97U0NX-008

Removal note

Tie-rod end

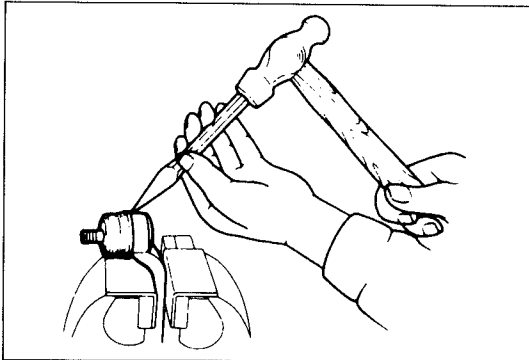
Separate the tie-rod end from the knuckle with the **SST**.



97U0NX-009

Locknut

Mark the tie-rod end locknut for reference during installation before loosening.



97U0NX-010

Tie-rod end boot

Secure the tie-rod end in a vise. Place a chisel against the boot and hold it at the angle shown. Remove the boot.

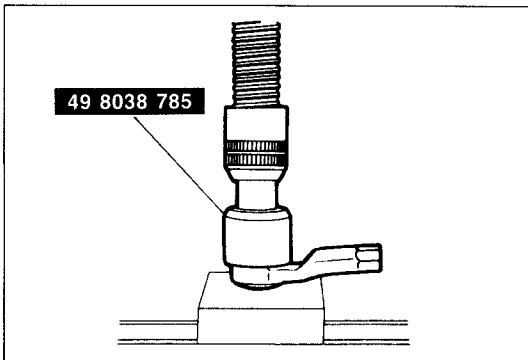
Caution

Do not scar the part where the boot attaches to the tie-rod end.

Installation

1. Install in the reverse order of removal, referring to **Installation Note**.
2. Tighten all necessary nuts to the specified torque.
3. After installation, check the steering angle and toe-in, and adjust if necessary. (Refer to Section R.)

97U0NX-011

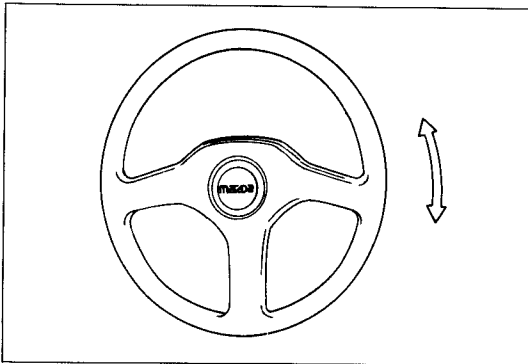


97U0NX-012

Installation note

Tie-rod end boot

Put a small amount of grease (lithium base) into the new boot and set it onto the tie-rod end. Install the boot onto the tie-rod end with the **SST** and a press.



97U0NX-013

STEERING WHEEL AND COLUMN

On-vehicle Inspection

Steering wheel play

With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and check that the play is within specification.

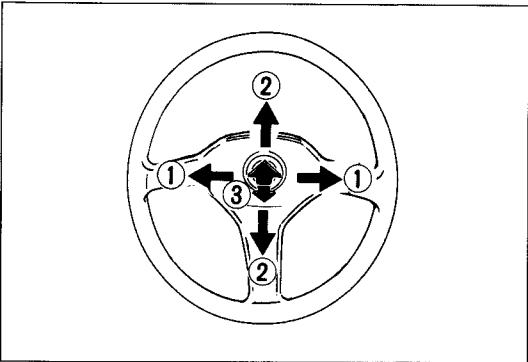
Play: 5—20mm (0.20—0.79 in)

Note

If the play exceeds specification, either the steering joints are worn or the backlash of the steering gear is excessive.

Looseness or play of steering wheel

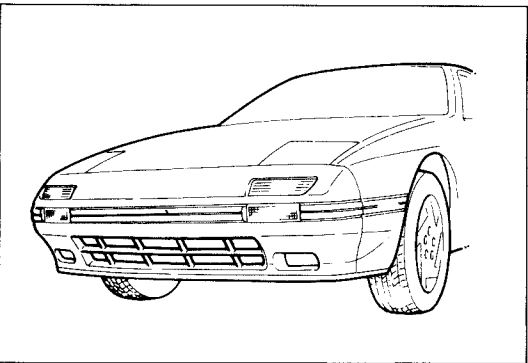
Move the steering wheel in the directions ①, ②, and ③ to check for column bearing wear, steering shaft joint play, steering wheel looseness, and column looseness.



97U0NX-014

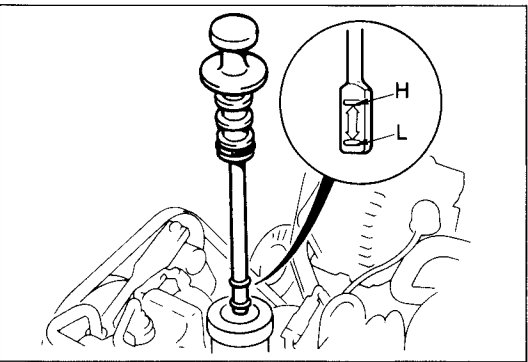
Steering wheel effort

1. With the vehicle on a hard, level surface, move the steering wheel to put the wheels in the straight-ahead position.



97U0NX-015

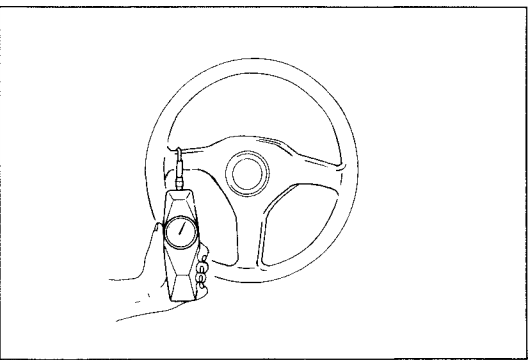
2. Start the engine and warm the power steering fluid to **50—60°C (122—140°F)**.



97U0NX-016

3. Attach a pull scale to the outer of the steering wheel, and then, starting with the wheels in the straight-ahead position, check the steering effort required to turn the steering wheel to the left and to the right.

Steering wheel effort: 36 N (3.7 kg, 8.1 lb) or less [during one turn of the steering wheel]

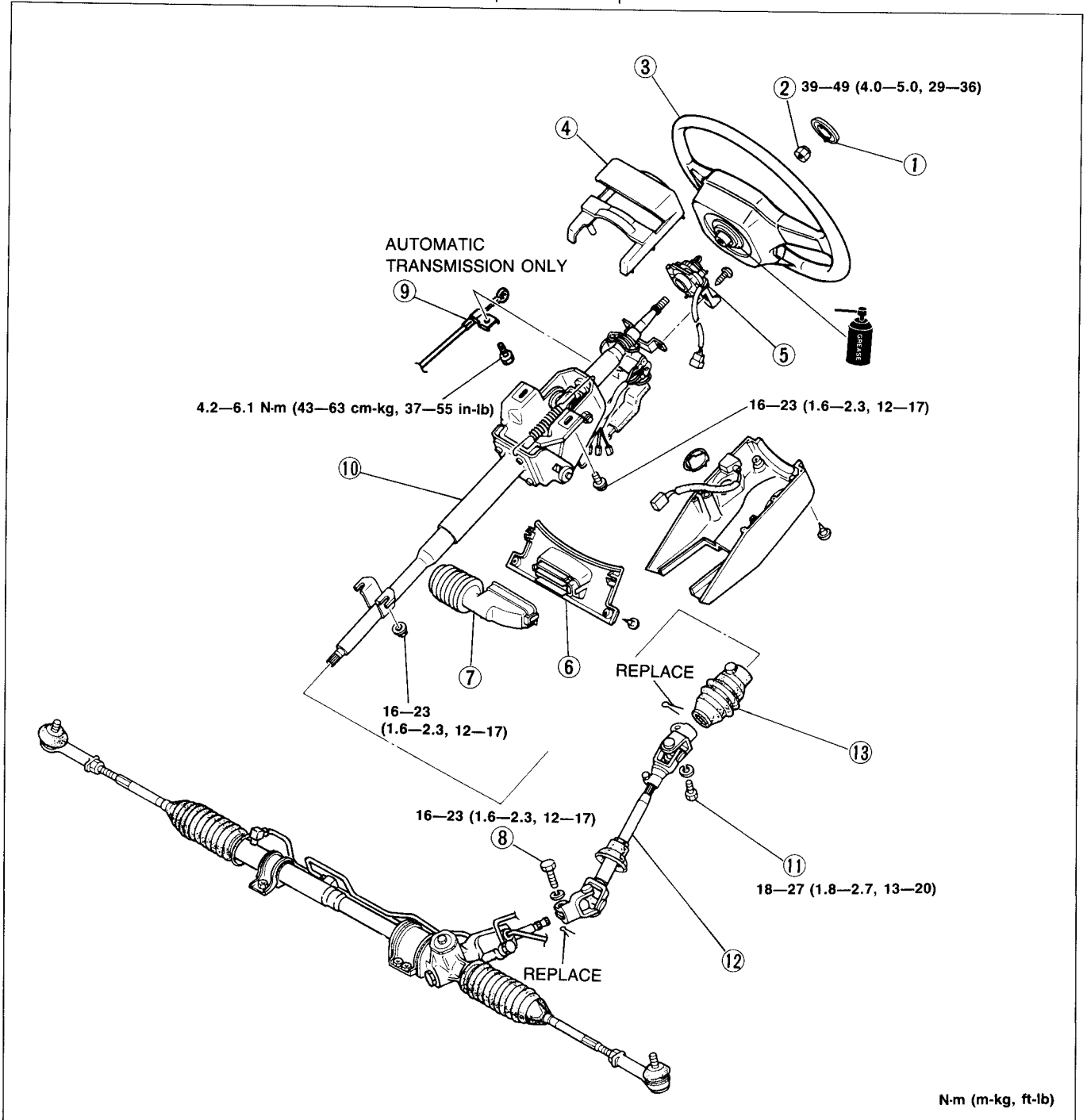


97U0NX-017

4. If not within specification, check the following: fluid level, air in system, fluid leakage at hose or connections, function of oil pump and gear box, and tire pressure.

Removal and Installation

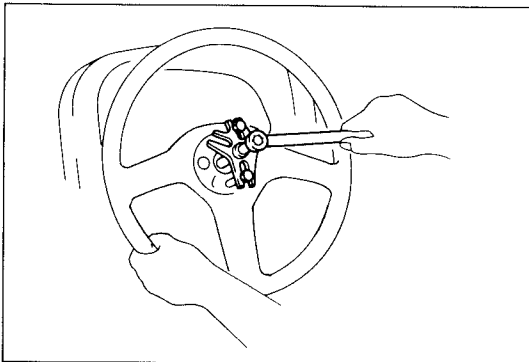
1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal.
3. Tighten all necessary nuts and bolts to the specified torque.



97UONX-018

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Horn cap 2. Locknut 3. Steering wheel
Removal note..... page N-10 4. Column cover 5. Combination switch
Removal and Installation Section S 6. Cover 7. Duct 8. Intermediate shaft bolt | <ol style="list-style-type: none"> 9. Inter lock cable 10. Steering shaft
Disassembly page N-10
Inspection page N-11
Assembly page N-11 11. Bolt 12. Intermediate shaft
Inspect universal joint for looseness, abnormal noise, or sticking. 13. Duct boot |
|--|--|

N ENGINE SPEED SENSING POWER STEERING



97U0NX-019

Removal note Steering wheel

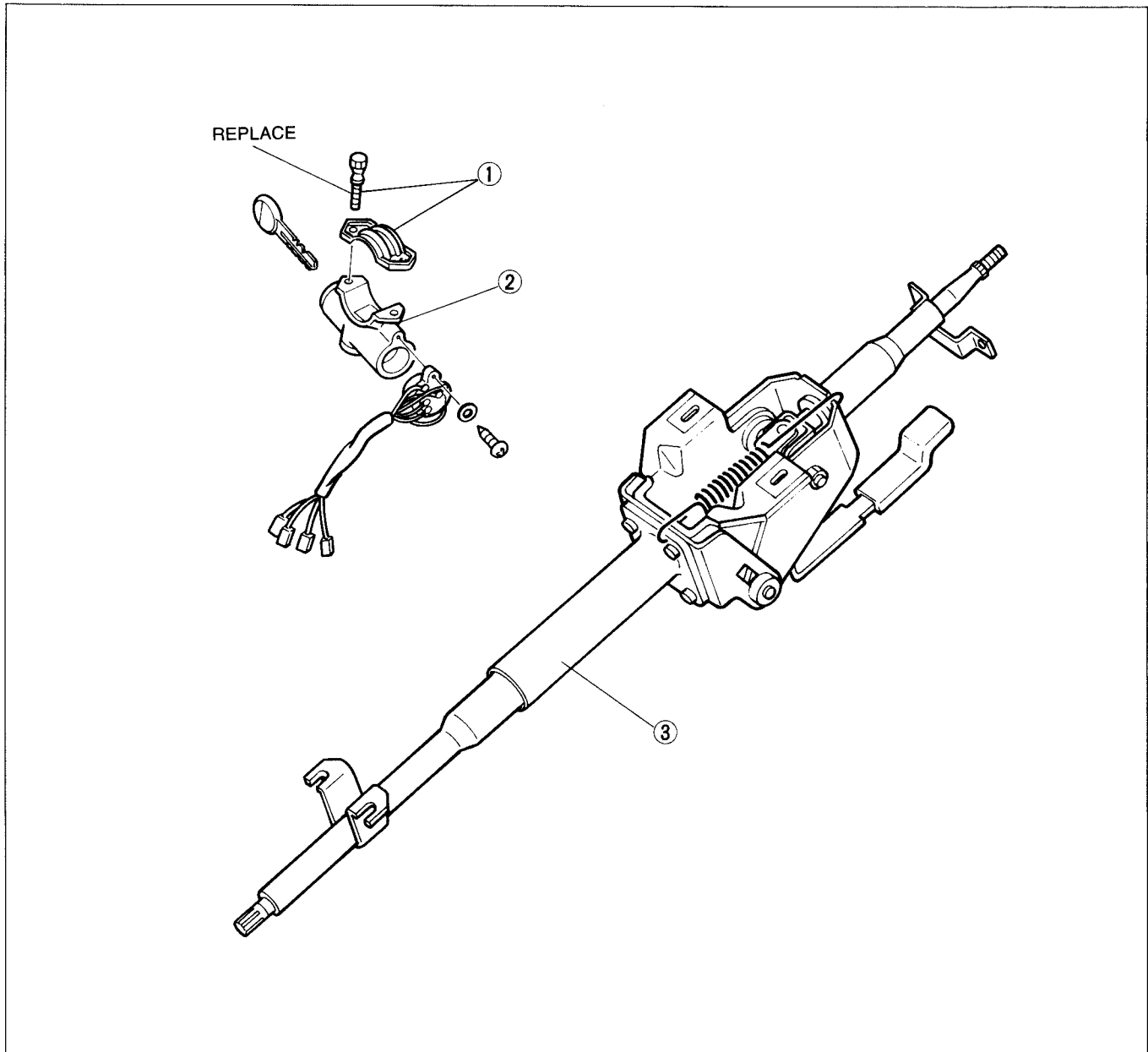
Caution

Do not try to remove the steering wheel by hitting the shaft with a hammer. The column will collapse.

Remove the steering wheel with a suitable puller.

Disassembly

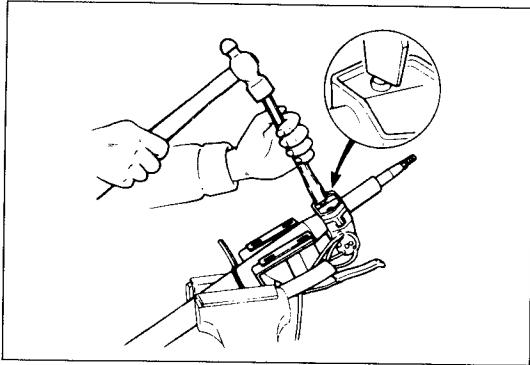
Disassemble in the order shown in the figure, referring to **Disassembly Note**.



97U0NX-020

1. Steering lock mounting bolts and bracket
Disassembly note..... page N-11
Assembly note page N-11

2. Steering lock assembly
Inspection..... page N-11
3. Steering shaft
Inspection..... page N-11

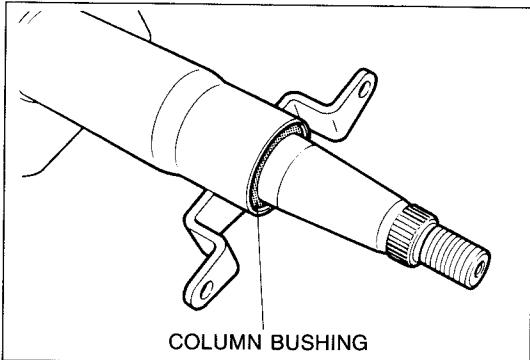


97U0NX-021

Disassembly note

Steering lock mounting bolts and bracket

Use a chisel to make a groove in the head of the steering lock mounting bolts. Remove the bolts with a screwdriver. Remove the steering lock assembly.



COLUMN BUSHING

97U0NX-022

Inspection

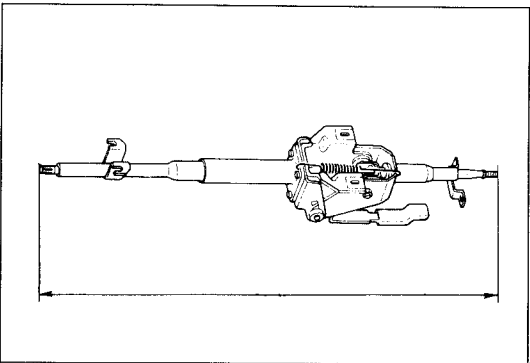
Check for the following and replace the column assembly if necessary.

Steering shaft

1. Column bushing wear.

2. Steering shaft length.

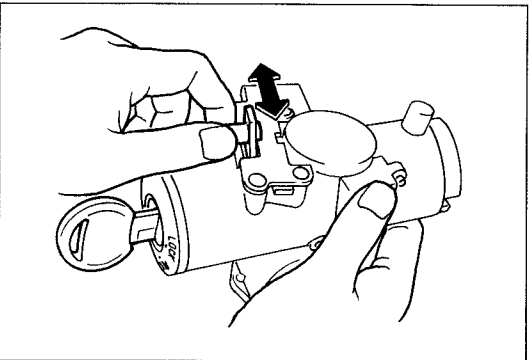
Length: 815.5 ± 1.5mm (32.11 ± 0.06 in)



97U0NX-023

Steering lock assembly (Automatic transmission only)

Verify that the cable connector does not move when the key is in the LOCK position and that it moves freely with the key in other positions.



97U0NX-024

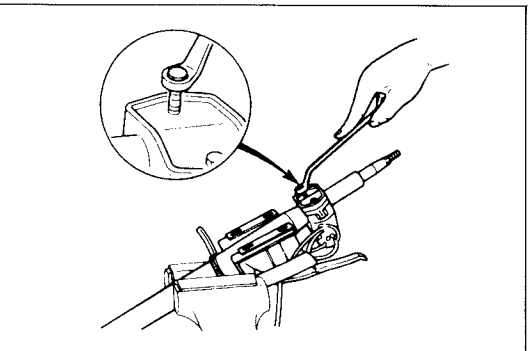
Assembly

Assemble in the reverse order of disassembly, referring to **Assembly Note**.

Assembly note

Steering lock mounting bolts and bracket

Install the steering lock assembly on the jacket. Install the new steering lock mounting bolts. Tighten the bolts until the heads break off.



97U0NX-025

N ENGINE SPEED SENSING POWER STEERING

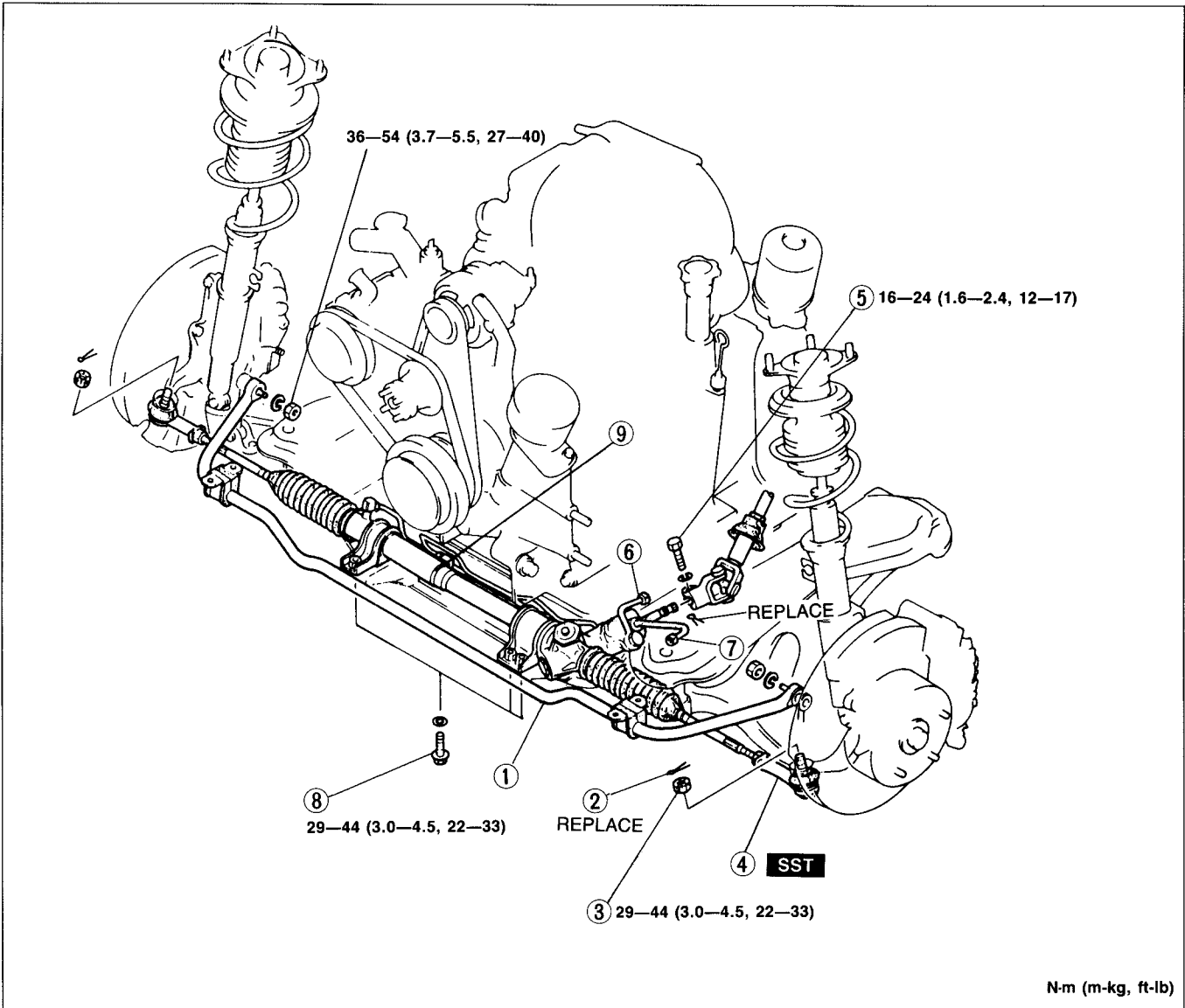
STEERING GEAR AND LINKAGE

Removal

1. Loosen the wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Remove the under cover.
5. Remove the battery and the radiator and cowl. (Refer to Section E.)
6. Remove in the order shown in the figure, referring to **Removal Note**.

Note

- a) Use a container or rags to collect the power steering fluid when disconnecting the pressure pipe and return hose.
- b) Lower the steering brackets, steering gear, and linkage as an assembly. Then separate the steering gear and linkage.



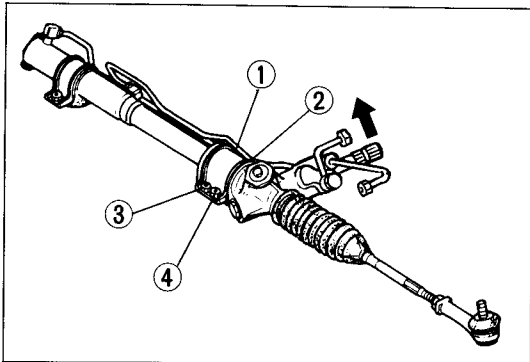
97U0NX-026

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Stabilizer
Removal and Installation Section R 2. Cotter pin 3. Nut 4. Tie-rod end
Removal note page N- 6 5. Intermediate shaft bolt
Installation note page N-13 | <ol style="list-style-type: none"> 6. Pressure pipe 7. Return pipe 8. Mounting bracket bolt
Installation note page N-13 9. Steering gear |
|--|--|

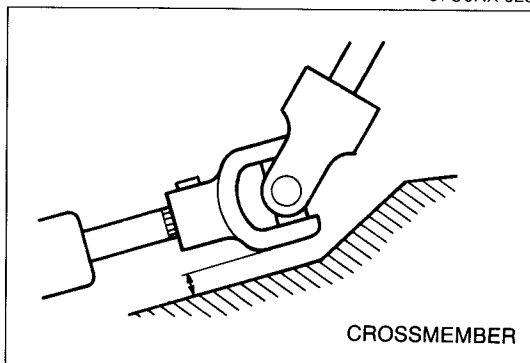
Installation

1. Install in the reverse order of removal, referring to **Installation Note**.
2. Tighten all necessary bolts and nuts to the specified torque.
3. After installation:
 - (1) Check for fluid leakage. (Refer to page N-16.)
 - (2) Bleed air from the system. (Refer to page N-17.)

97U0NX-027



97U0NX-028



97U0NX-029

Installation note

Mounting bracket bolt and intermediate shaft bolt

1. Tighten the mounting bracket bolts in the order shown while pushing the pinion shaft in the direction indicated.
2. Connect the intermediate shaft to the pinion shaft.

3. Make sure that the clearance between the universal joint and the crossmember is **6—15mm (0.24—0.59 in)**. If not within specification, disconnect the intermediate shaft and repeat Steps 1 and 2.
4. Tighten the intermediate shaft bolt.

Tightening torque:

16—24 N·m (1.6—2.4 m·kg, 12—17 ft·lb)

N ENGINE SPEED SENSING POWER STEERING

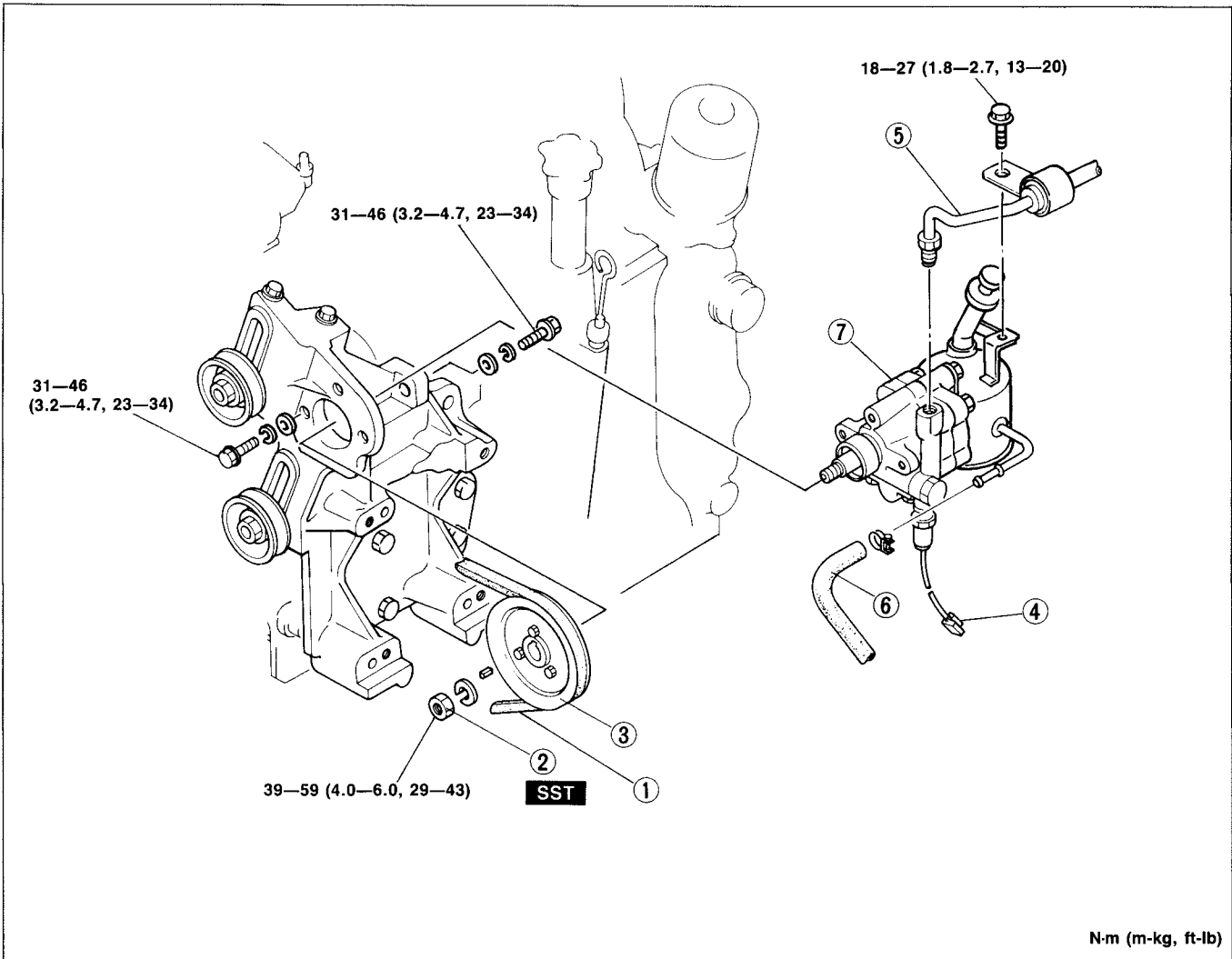
OIL PUMP

Removal

Remove in the order shown in the figure, referring to **Removal Note**.

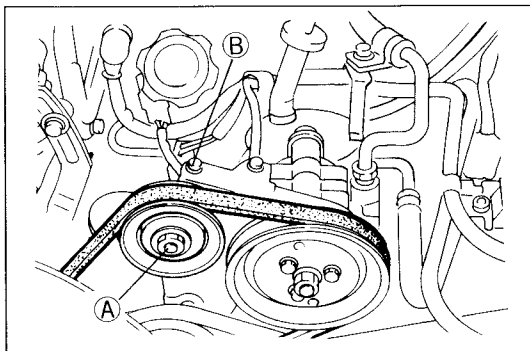
Note

Use a container or rags to collect the power steering fluid when disconnecting the pressure pipe and return hose.



97U0NX-030

- | | |
|---|---|
| 1. Drive belt
Removal note..... page N-14
Installation note page N-15 | 4. Power steering pressure switch connector |
| 2. Locknut
Removal note..... page N-15 | 5. Pressure pipe
Removal note..... page N-15 |
| 3. Oil pump pulley | 6. Return hose |
| | 7. Oil pump assembly |

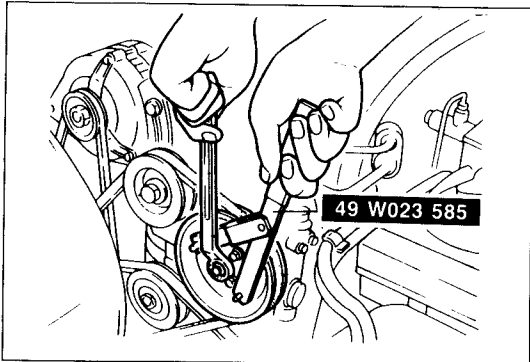


97U0NX-031

Removal note

Drive belt

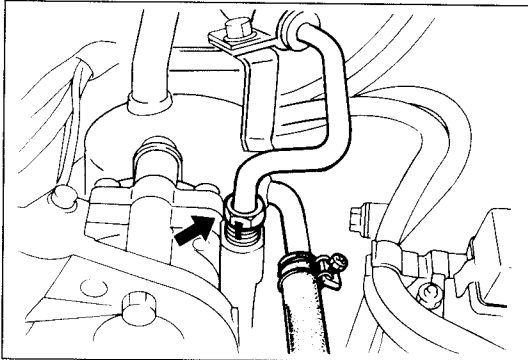
Loosen idler pulley locknut (A). Loosen adjusting bolt (B) and remove the drive belt.



97U0NX-032

Locknut

Remove the locknut while holding the pulley with the **SST**.



97U0NX-033

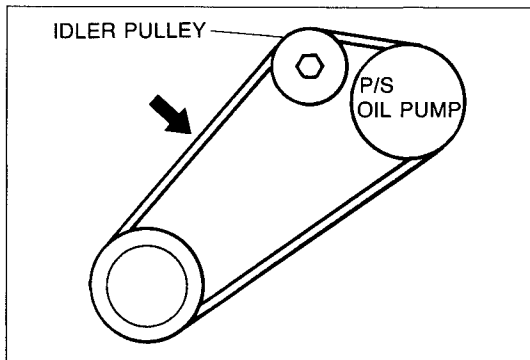
Pressure pipe

Mark the pressure pipe for reference during installation before loosening.

Installation

1. Install in the reverse order of removal, referring to **Installation Note**.
2. Tighten all necessary bolts and nuts to the specified torque.
3. After installation:
 - (1) Check connections for fluid leakage.
(Refer to page N-16.)
 - (2) Bleed air from system. (Refer to page N-17.)

97U0NX-034



97U0NX-035

Installation note

Drive belt

Adjust the deflection and tension of the drive belt as follows:

- (1) Loosen the idler pulley locknut.
- (2) Adjust the deflection (tension) by turning the adjusting bolt.
- (3) Tighten the locknut to the specified torque.

Tightening torque:

36—54 N·m (3.7—5.5 m·kg, 27—40 ft·lb)

Deflection (Depressed at 98N [10 kg, 22 lb])

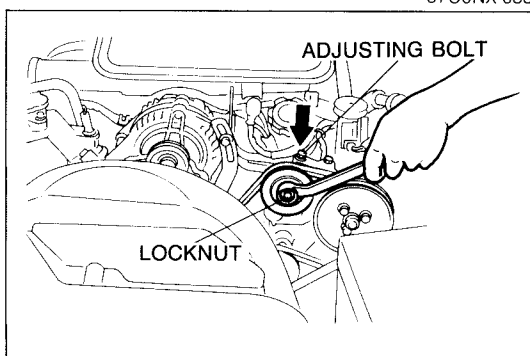
New : 11—13mm (0.43—0.51 in)

Used: 14—16mm (0.55—0.63 in)

Tension

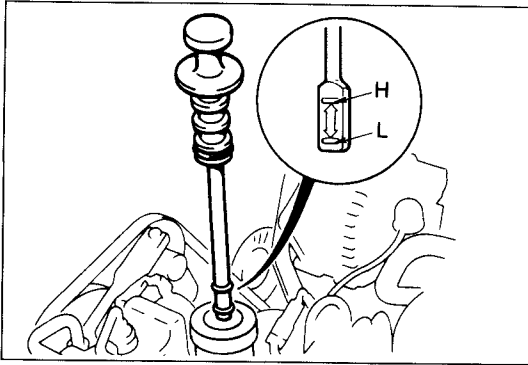
New : 392—491 N (40—50 kg, 88.0—110.0 lb)

Used: 284—353 N (29—36 kg, 63.8—79.2 lb)



97U0NX-036

N ENGINE SPEED SENSING POWER STEERING



97U0NX-037

POWER STEERING HYDRAULIC SYSTEM

On-vehicle Inspection and Service

Power steering fluid level

Check the power steering fluid level. Add fluid to the specified level if necessary.

Caution

Use only the specified power steering fluid.

Fluid specification:

ATF DEXRON-II or M-III

Inspection of fluid leakage

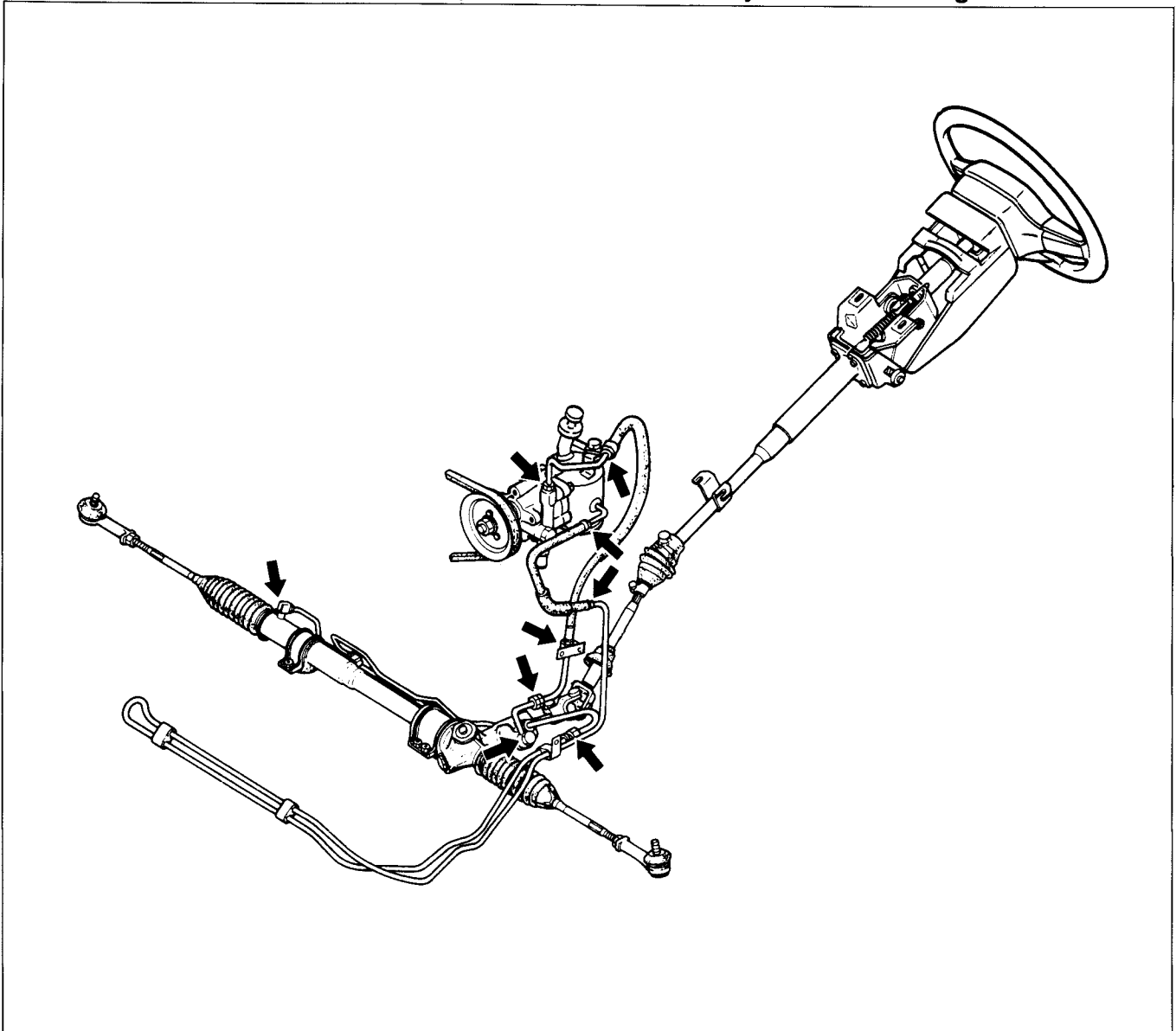
Start the engine. Turn the steering wheel fully to the left and right to apply fluid pressure. Check for fluid leakage.

Caution

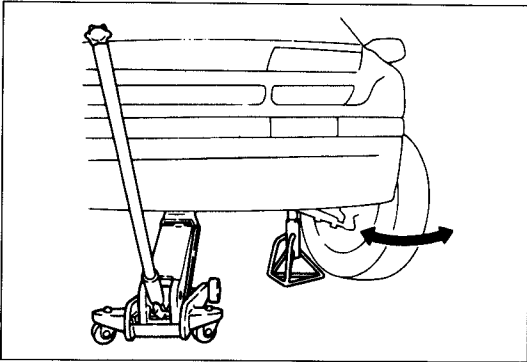
To prevent damage to the steering system, do not keep the steering wheel in the fully turned position for more than 15 seconds.

Note

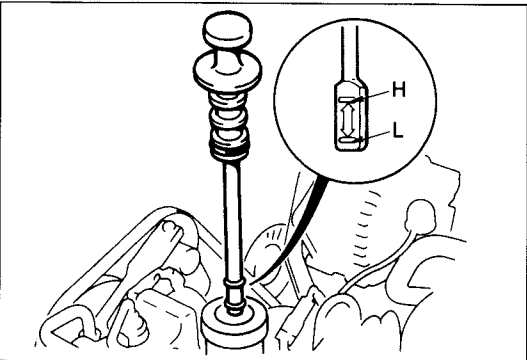
The points where fluid leakage may occur are indicated by arrows in the figure.



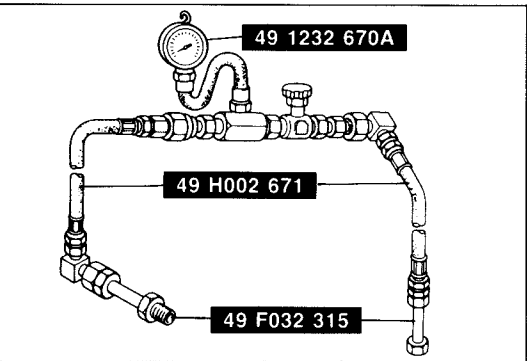
97U0NX-038



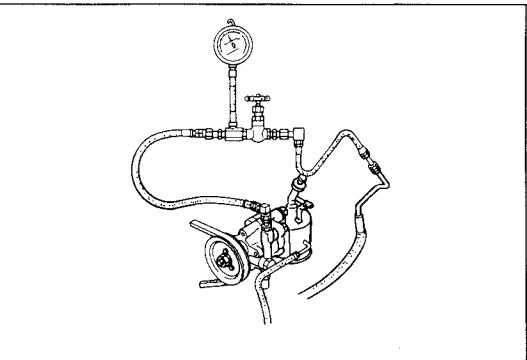
97U0NX-039



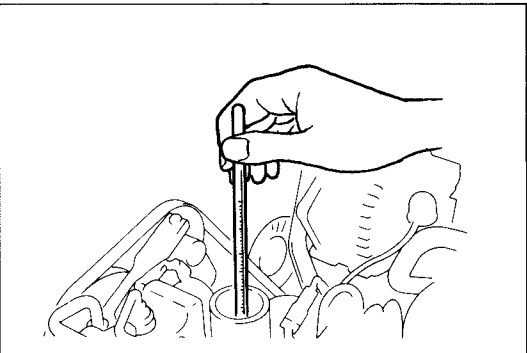
97U0NX-040



9MU0NX-008



97U0NX-041



9MU0NX-010

Bleeding of power steering system

1. Check the fluid level. (Refer to page N-16.)
2. Turn the steering wheel fully to the left and right several times with the engine not running.
3. Recheck the fluid level. If the level has dropped, add fluid.
4. Repeat Steps 2 and 3 until the fluid level stabilizes.
5. Start the engine and let it idle.
6. Turn the steering wheel fully to the left and right several times.
7. Verify that the fluid is not foamy and that the fluid level has not dropped.
8. Add fluid if necessary and repeat Steps 6 and 7.

Inspection of fluid pressure

1. Assemble the **SST** as shown in the figure.

Tightening torque:

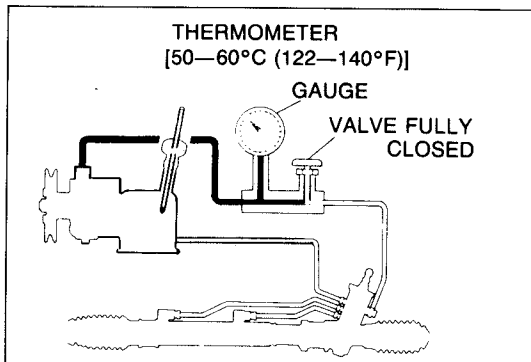
39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

Note

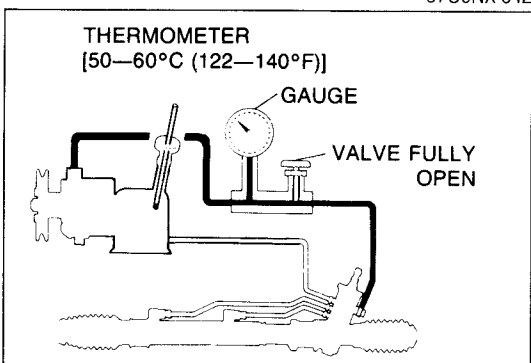
Before disconnecting the hose, make marks at the connections for proper reinstallation.

2. Disconnect the high-pressure hose from the oil pump. Attach the **SST**.
3. Bleed the air from the system. (Refer to page N-17.)
4. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.

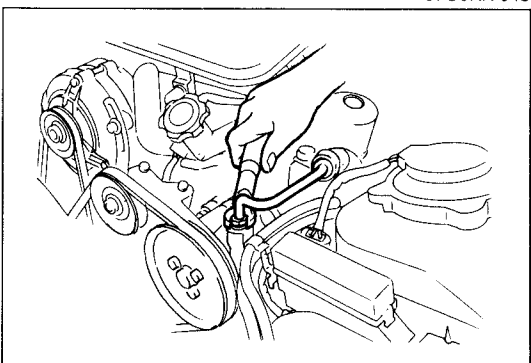
N ENGINE SPEED SENSING POWER STEERING



97U0NX-042



97U0NX-043



97U0NX-044

5. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump. If the pressure is below specification, replace the oil pump assembly.

**Oil pump fluid pressure: 7,848—8,339 kPa
(80—85 kg/cm², 1,137—1,209 psi)**

Caution

If the valve is left closed for more than 15 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.

6. Open the gauge valve fully again and increase the engine speed to **1,000—1,500 rpm**.
7. Turn the steering wheel fully to the left and right and measure the fluid pressure generated by the gear housing. If the pressure is below specification, replace the gear housing assembly.

**Gear housing fluid pressure: 7,848—8,339 kPa
(80—85 kg/cm², 1,137—1,209 psi)**

Caution

If the steering wheel is kept in the fully turned position for more than 15 seconds, the fluid temperature will rise excessively.

8. Remove the gauge set. Install and tighten the high-pressure hose to the specified torque.

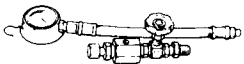


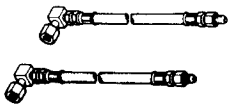
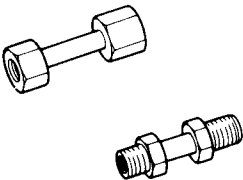
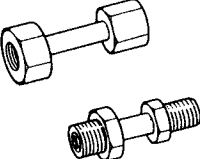
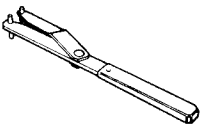
Tightening torque:

31—47 N·m (3.2—4.8 m·kg, 23—35 ft·lb)

9. Bleed the air from the system. (Refer to page N-17.)

ELECTRONICALLY CONTROLLED POWER STEERING

**PREPARATION
SST**

<p>49 1232 670A</p> <p>Gauge set, power steering</p> 	<p>49 1232 672</p> <p>Gauge (Part of 49 1232 670A)</p> 	<p>49 1232 673</p> <p>Valve body (Part of 49 1232 670A)</p> 
<p>49 H002 671</p> <p>Adapter, power steering gauge</p> 	<p>49 F032 314</p> <p>Adapter, power steering gauge</p> 	<p>49 F032 315</p> <p>Adapter, power steering gauge</p> 
<p>49 W023 585A</p> <p>Adjust wrench</p> 	<p>97U0NX-045</p>	

TROUBLESHOOTING GUIDE

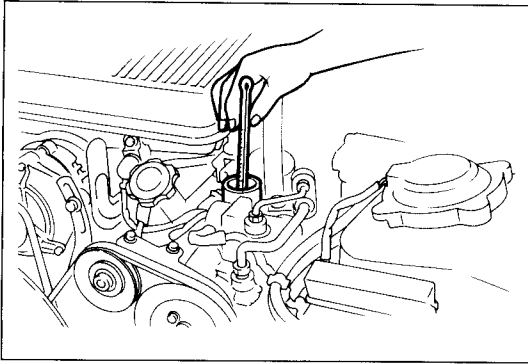
Problem	Possible Cause	Action	Page/Section
Steering feels heavy	Poor lubrication, foreign material, or abnormal wear of steering ball joint Stuck or damaged lower arm ball joints Improper steering pinion preload Damaged steering gear Malfunctioning steering shaft joint Improperly adjusted wheel alignment Malfunctioning steering gear Incorrect tire pressure Loose or damaged oil pump drive belt Low fluid level or air in fluid Leakage of fluid Insufficient oil pump pressure	Lubricate or replace Replace Replace gear Replace Replace Adjust Replace Adjust Adjust or replace Add fluid or bleed air Repair or replace Replace	N- 6 Section R N-12 N-12 N- 9 Section R N-12 Section Q Section C N-16,17 - N-22
Steering wheel pulls to one side	Incorrect tire pressure Unevenly worn tires Weak front spring Worn or damaged stabilizer and/or lower arm bushing Dragging brake Loose lower arm Improperly adjusted wheel alignment	Adjust Replace Replace Replace Repair Tighten or replace Adjust	Section Q Section Q Section R Section R Section P Section R Section R
General instability while driving	Incorrect tire pressure Damaged or unbalanced wheel Worn or damaged steering joints Improper steering pinion preload Weak front coil spring Worn or damaged stabilizer and/or lower arm bushing Malfunctioning shock absorber Improperly adjusted wheel alignment	Adjust Adjust or replace Replace Replace gear Replace Replace Replace Replace Adjust	Section Q Section Q N- 9 N-12 Section R Section R Section R Section R
Shake (Steering wheel vibrates up/down)	Excessive tire or wheel runout Loose lug nuts Unbalanced wheel(s) Cracked or worn engine mount rubber Cracked or worn transmission mount rubber	Replace Tighten Adjust or replace Replace Replace	Section Q Section Q Section Q Section C Sections J1,J2,K

N ELECTRONICALLY CONTROLLED POWER STEERING

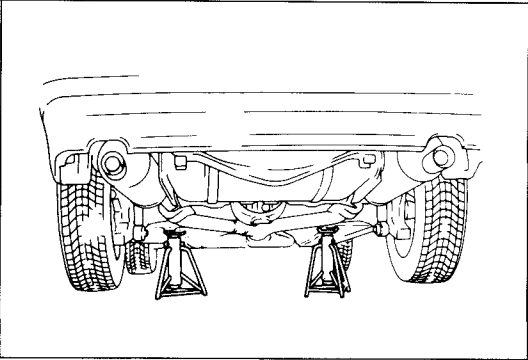
TROUBLESHOOTING GUIDE (Cont'd)

Problem	Possible Cause	Action	Page/Section
Shimmy (Steering wheel vibrates left/right)	Cracked or worn steering gear mount rubber Loose steering gear mounting bolts Stuck or damaged steering ball joint Excessive tire or wheel runout Loose lug nuts Unbalanced wheel(s) Incorrect tire pressure Unevenly worn tires Malfunctioning shock absorber Loose shock absorber mounting bolts Stuck or damaged lower arm ball joint Cracked or worn suspension bushings Damaged or worn front wheel bearing Improperly adjusted front wheel alignment	Replace Tighten Replace Replace Tighten Adjust or replace Adjust Replace Replace Tighten Replace Replace Replace Adjust	N-12 N-12 N- 6 Section Q Section Q Section Q Section Q Section Q Section R Section R Section R Section R Section M Section R
Excessive steering wheel play	Worn steering gear Worn or damaged steering joints Worn or damaged lower arm bushing Loose steering gear mounting bolts Worn linkage or tie-rod ball joint	Replace Replace Replace Tighten Replace	N-12 N- 9 Section R N-12 N- 6
Poor steering wheel return	Incorrect tire pressure Stuck or damaged steering joints Improperly adjusted front wheel alignment Improper steering pinion preload Ball joint not operating smoothly Steering shaft contacting something	Adjust Replace Adjust Replace gear Replace Repair	Section Q N-10 Section R N-12 N- 6 N- 9
Abnormal noise from steering system	Loose oil pump Loose steering gear Loose oil pump bracket Loose oil pump pulley Belt loose/tight Air in system Malfunctioning steering gear Malfunctioning oil pump Obstruction near steering column or pressure hose Loose steering linkage Worn steering joints	Tighten Tighten Tighten Tighten or replace Adjust Bleed air Replace Replace Repair or replace Tighten or replace Replace	N-22 N-12 Section C N-12 Section C N-17 N-12 N-22 N- 9 N- 6 N- 9
Excessively light steering at high speed	Malfunctioning electrical system	Repair or replace	N-26

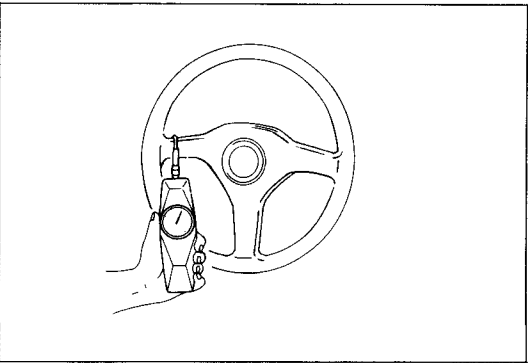
97UONX-046



97U0NX-047



97U0NX-048



97U0NX-049

STEERING WHEEL AND COLUMN

On-vehicle Inspection

Steering effort

1. With the vehicle on a hard level surface, move the steering wheel to put the wheels in the straight-ahead position.
2. Start the engine and warm the power steering fluid to **50—60°C (122—140°F)**.
3. Attach a pull scale to the outer of the steering wheel, and then, starting with the wheels in the straight-ahead position, check the steering effort required to turn the steering wheel to the left and to the right.

Steering wheel effort:

13.7—20.6 N (1.4—2.1 kg, 3.1—4.6 lb)

[during one turn of the steering wheel]

4. Jack up the rear of the vehicle and support it with safety stands.
5. Run the vehicle at 45 km/h (30 mph).
6. Measure the steering wheel effort.

Steering wheel effort:

22 N (2.2 kg, 4.8 lb) min.

[during one turn of the steering wheel]

7. If not within specification check the following points: fluid level, air in system, fluid leakage at hose or connections, function of oil pump and gearbox, power steering pressure, and tire pressure.

N ELECTRONICALLY CONTROLLED POWER STEERING

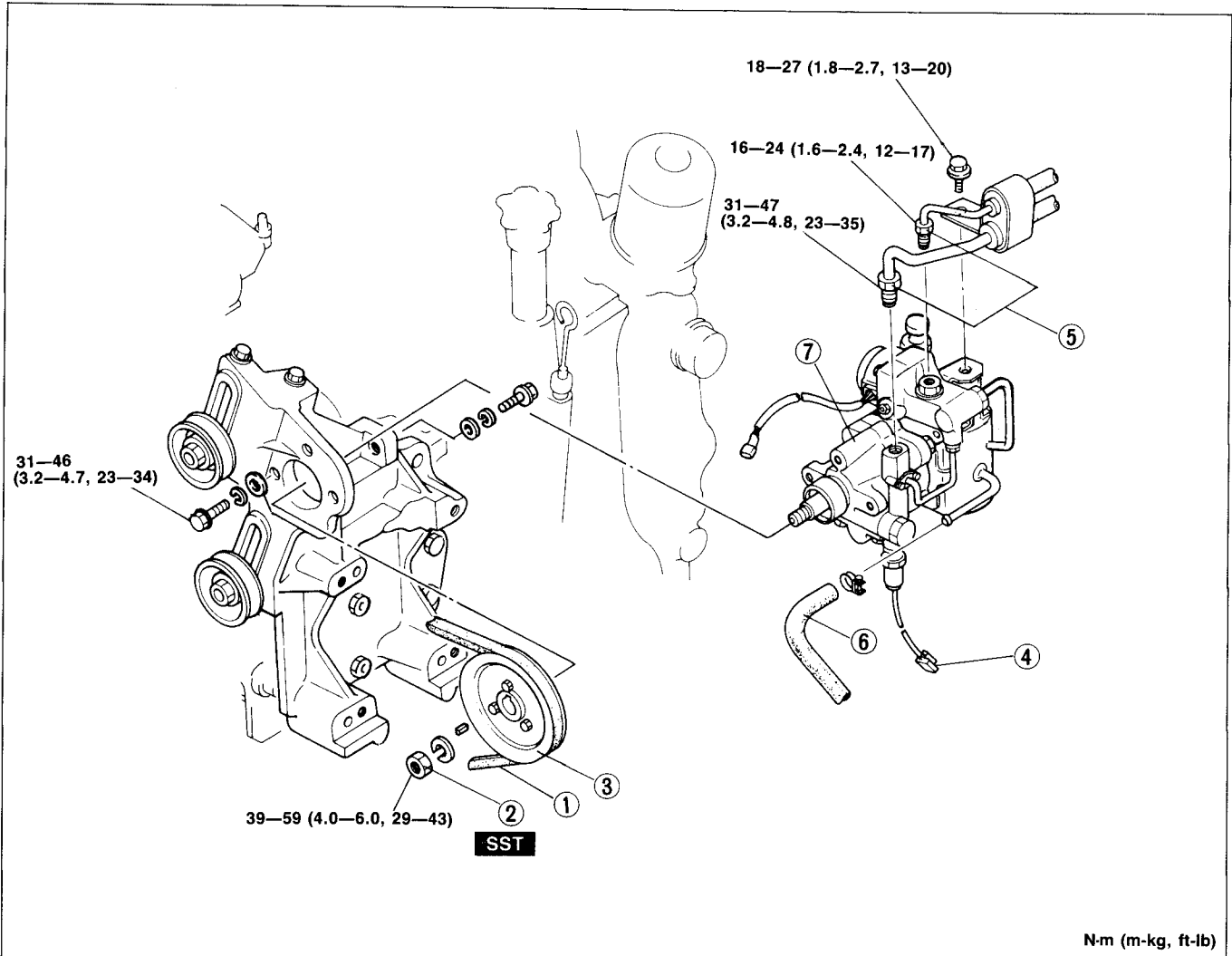
OIL PUMP

Removal

Remove in the order shown in the figure, referring to **Removal Note**.

Note

Use a container or rags to collect the power steering fluid when disconnecting the pressure pipe and return hose.



97UONX-050

1. Drive belt

Removal note page N-22
 Installation note page N-23

2. Locknut

Removal note page N-23

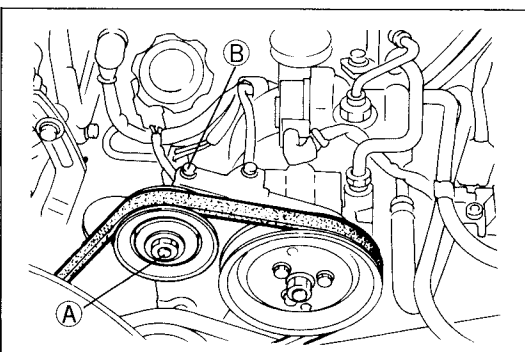
3. Oil pump pulley

4. Power steering pressure switch connector

Removal note page N-23

6. Return hose

7. Oil pump assembly

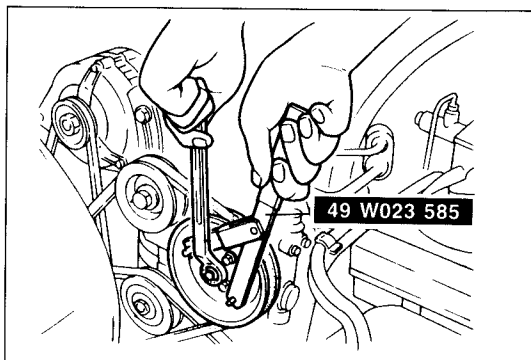


97UONX-031

Removal note

Drive belt

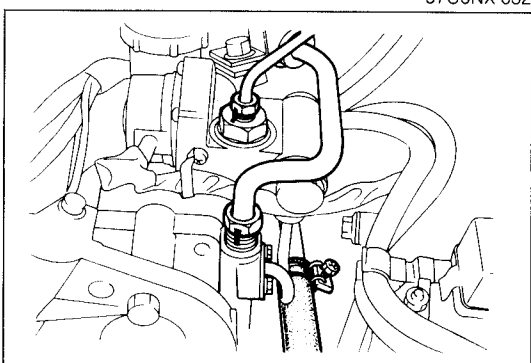
Loosen idler pulley locknut (A). Loosen adjusting bolt (B) and remove the drive belt.



97U0NX-032

Locknut

Remove the locknut while holding the pulley with the **SST**.



97U0NX-033

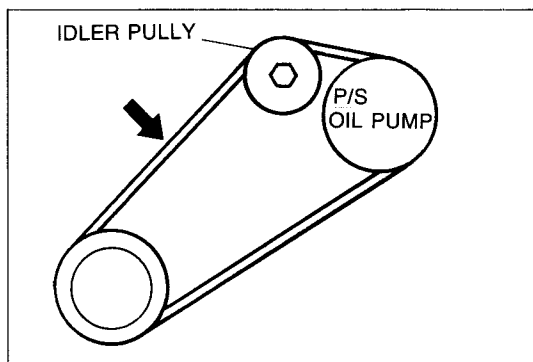
Pressure pipe

Mark the pressure pipe for reference during installation before loosening.

Installation

1. Install in the reverse order of removal, referring to **Installation Note**.
2. Tighten all necessary bolts and nuts to the specified torque.
3. After installation:
 - (1) Check connections for fluid leakage. (Refer to page N-16.)
 - (2) Bleed air from system. (Refer to page N-17.)

97U0NX-034



97U0NX-035

Installation note

Drive belt

Adjust the deflection and tension of the drive belt as follows:

- (1) Loosen the idler pulley locknut.
- (2) Adjust the deflection (tension) by turning the adjusting bolt.
- (3) Tighten the locknut to the specified torque.

Tightening torque:

36—54 N·m (3.7—5.5 m·kg, 27—40 ft·lb)

Deflection (Depressed at 98N [10 kg, 22 lb])

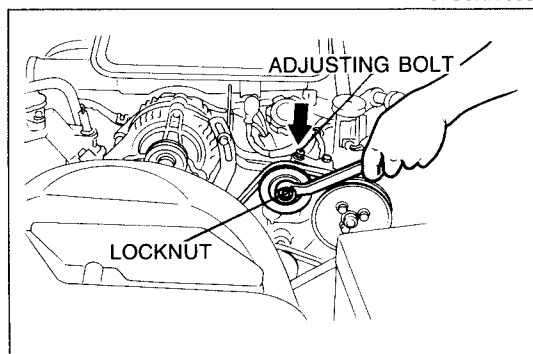
New : 11—13mm (0.43—0.51 in)

Used: 14—16mm (0.55—0.63 in)

Tension

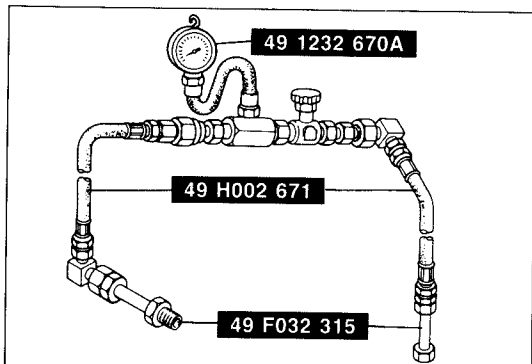
New : 392—491 N (40—50 kg, 88.0—110.0 lb)

Used: 284—353 N (29—36 kg, 63.8—79.2 lb)

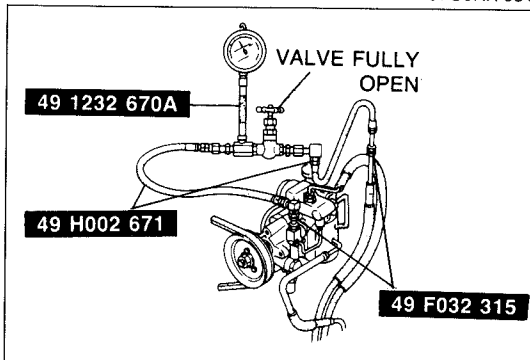


97U0NX-036

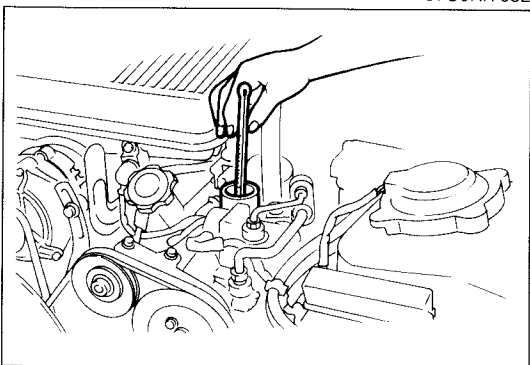
N ELECTRONICALLY CONTROLLED POWER STEERING



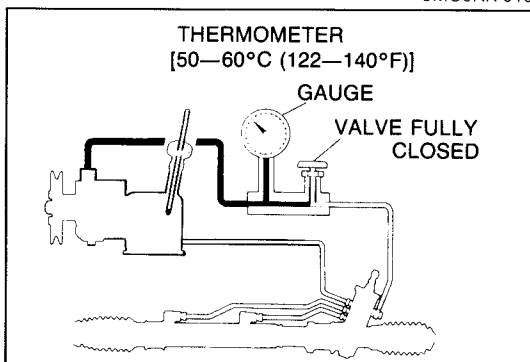
97U0NX-051



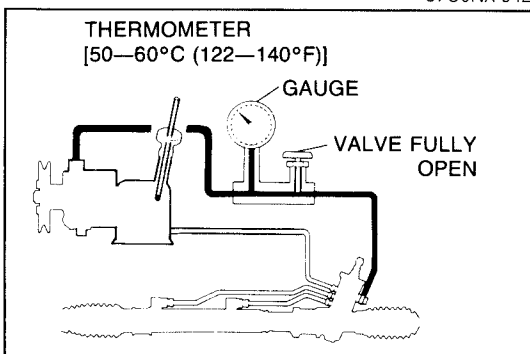
97U0NX-052



9MU0NX-010



97U0NX-042



97U0NX-053

POWER STEERING HYDRAULIC SYSTEM

On-vehicle Inspection and Service

Inspection of fluid pressure

Main pressure

1. Assemble the **SST** as shown in the figure.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

2. Disconnect the main-pressure hose from the oil pump. Attach the **SST**.

Note

Before disconnecting the hose, make marks at the connections for proper reinstallation.

3. Bleed the air from the system. (Refer to page N-17.)

4. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.

5. Close the gauge valve completely. Increase the engine speed to **1,000—1,500 rpm** and measure the fluid pressure generated by the oil pump. If the pressure is not within specification, replace the oil pump assembly.

Oil pump fluid pressure: 7,848—8,339 kPa (80—85 kg/cm², 1,137—1,209 psi)

Caution

If the valve is left closed for more than 15 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.

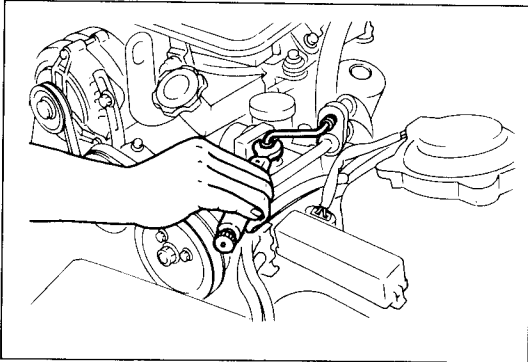
6. Open the gauge valve fully again and increase the engine speed to **1,000—1,500 rpm**.

7. Turn the steering wheel fully to the left and right and measure the fluid pressure generated by the gear housing. If the pressure is below specification, replace the gear housing assembly.

Gear housing fluid pressure: 7,848—8,339 kPa (80—85 kg/cm², 1,137—1,209 psi)

Caution

If the steering wheel is kept in the fully turned position for more than 15 seconds, the fluid temperature will rise excessively.



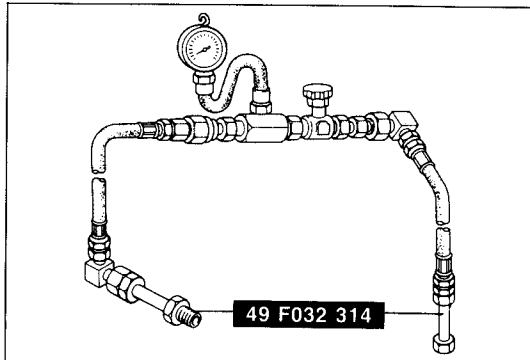
97U0NX-054

- Remove the gauge set. Install and tighten the main-pressure hose to the specified torque.

Tightening torque:

31—47 N·m (3.2—4.8 m·kg, 23—35 ft·lb)

- Bleed the air from the system. (Refer to page N—17.)



97U0NX-055

Sub fluid pressure (Reaction force chamber side)

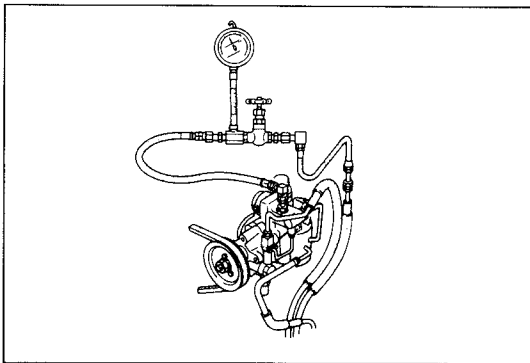
- Assemble the **SST** as shown in the figure.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

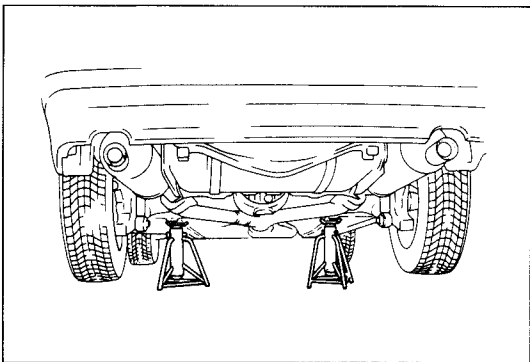
Note

Before disconnecting the hose, mark the connections for proper reinstallation.



97U0NX-056

- Disconnect the sub-pressure hose from the oil pump side. Attach the **SST**.
- Bleed the air from the system. (Refer to page N—17.)



97U0NX-057

- Jack up the rear of the vehicle and support it with safety stands.
- Open the gauge valve completely. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.
- Run the vehicle at **65 km/h (40.3 mph)**.
- Measure the fluid pressure. If the pressure is not within specification, replace oil pump assembly.

Oil pump pressure:

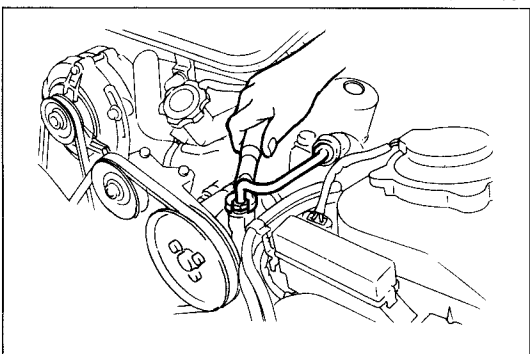
294—490 kPa (3—5 kg/cm², 43—71 psi)

- Remove the gauge set. Install and tighten the pressure hose to the specified torque.

Tightening torque:

16—24 N·m (1.6—2.4 m·kg, 12—17 ft·lb)

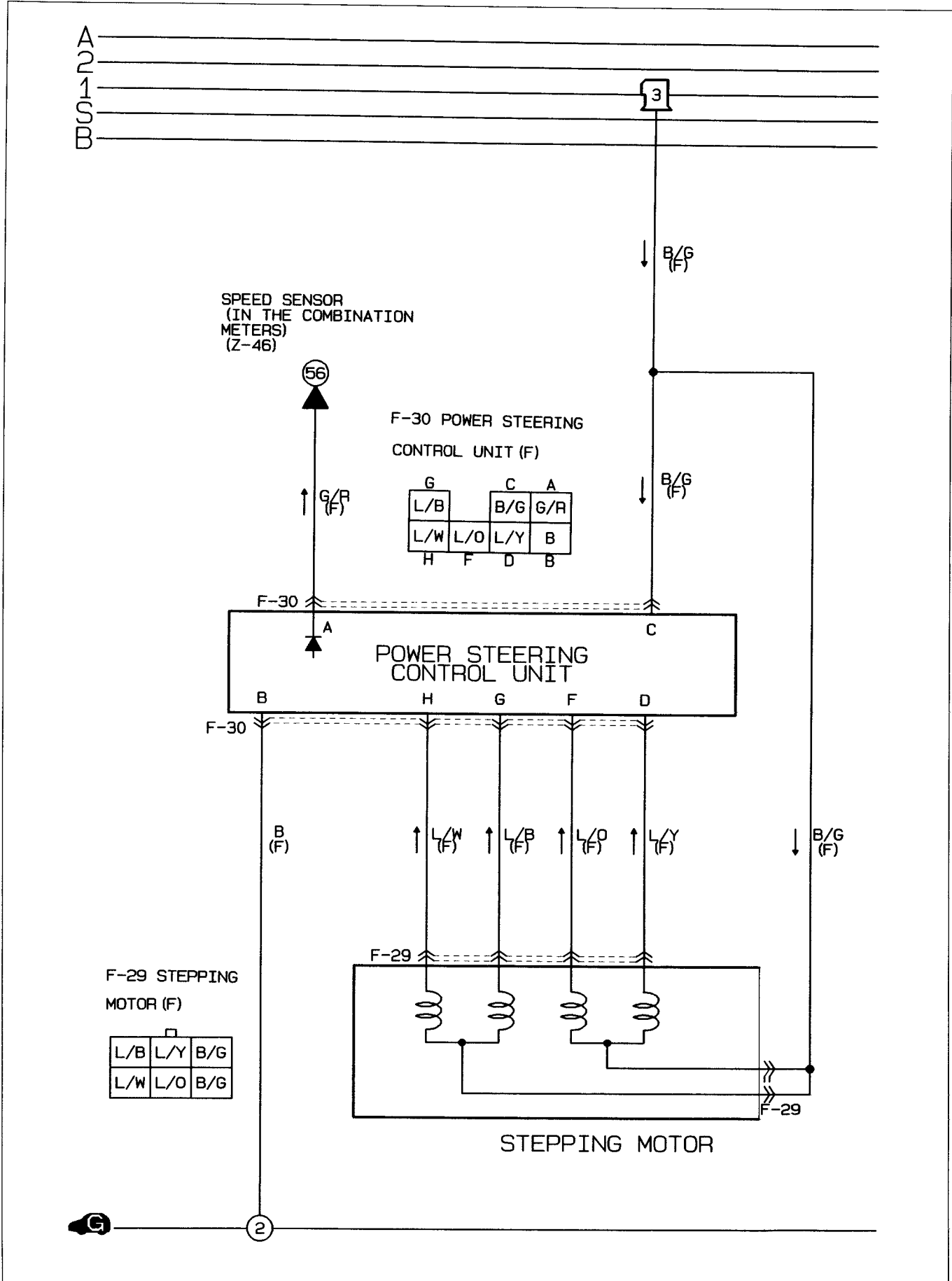
- Bleed the air from the system. (Refer to page N—17.)



97U0NX-058

N ELECTRONICALLY CONTROLLED POWER STEERING

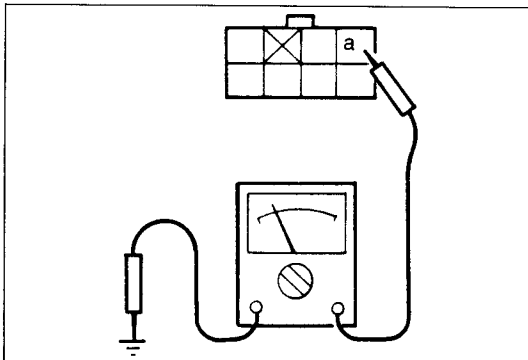
ECPS CONTROL UNIT Circuit Diagram



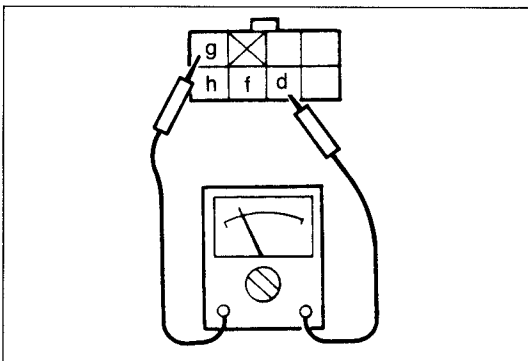
Fail Safe Function

Failure	Description	Power steering effect
Malfunction of vehicle speed sensor	No vehicle speed signal, for over 0.2 seconds at vehicle speed 30 km/h (18.6 mph) or over	Steering effort maintained as at vehicle speed when failure occurred
Dropring of power source voltage	Power source voltage dropping to 8V or below	Steering effort maintained as at vehicle speed when failure occurred

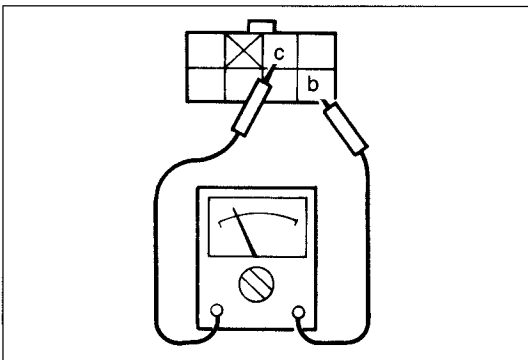
97U0NX-060



97U0NX-061



97U0NX-062



97U0NX-063

Inspection Speed sensor

1. Jack up the rear of the vehicle.
2. Put the transmission in neutral.
3. Turn a rear wheel by hand and check for continuity pulses between terminal a and a ground with an ohmmeter.
4. If there are no pulses, replace the speed sensor or repair the wiring harness. (Refer to Section T.)

Power steering motor

1. Check for continuity between terminals d and g, and between terminals f and h.
2. If there is no continuity, replace the oil pump or repair the wiring harness. (Refer to page N-22.)

Checking circuit

1. Disconnect the connector from the P/S control unit.
2. Turn the ignition switch ON.
3. Measure the voltage between b terminal and c terminal.

Specification: 12V

4. If there is no voltage, replace the fuse or repair the wiring harness.