1989 Mazda RX-7 Factory Service Manual

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STEERING SYSTEM

97U0NX-001

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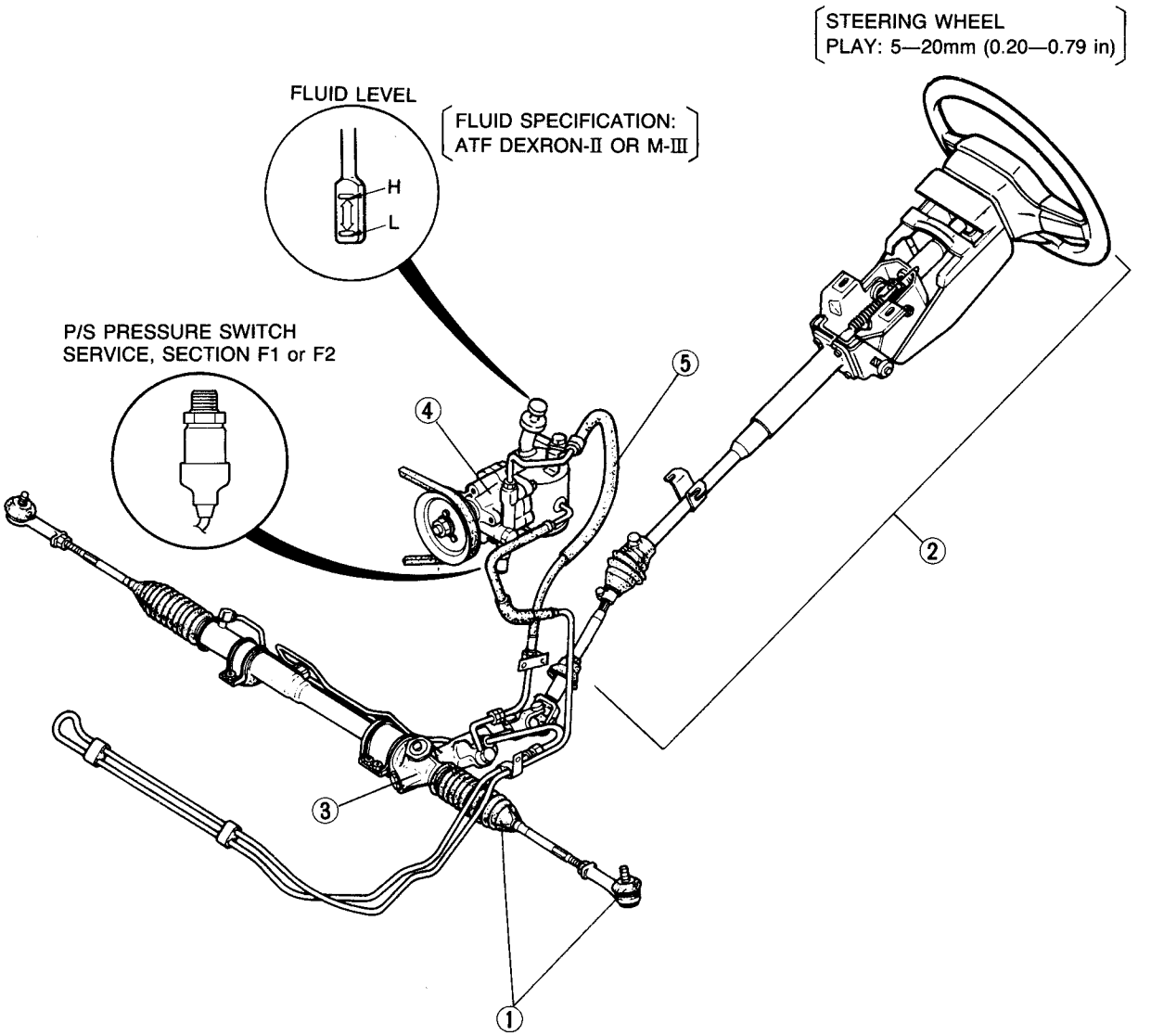
ENGINE SPEED SENSING POWER STEERING (ESPS)



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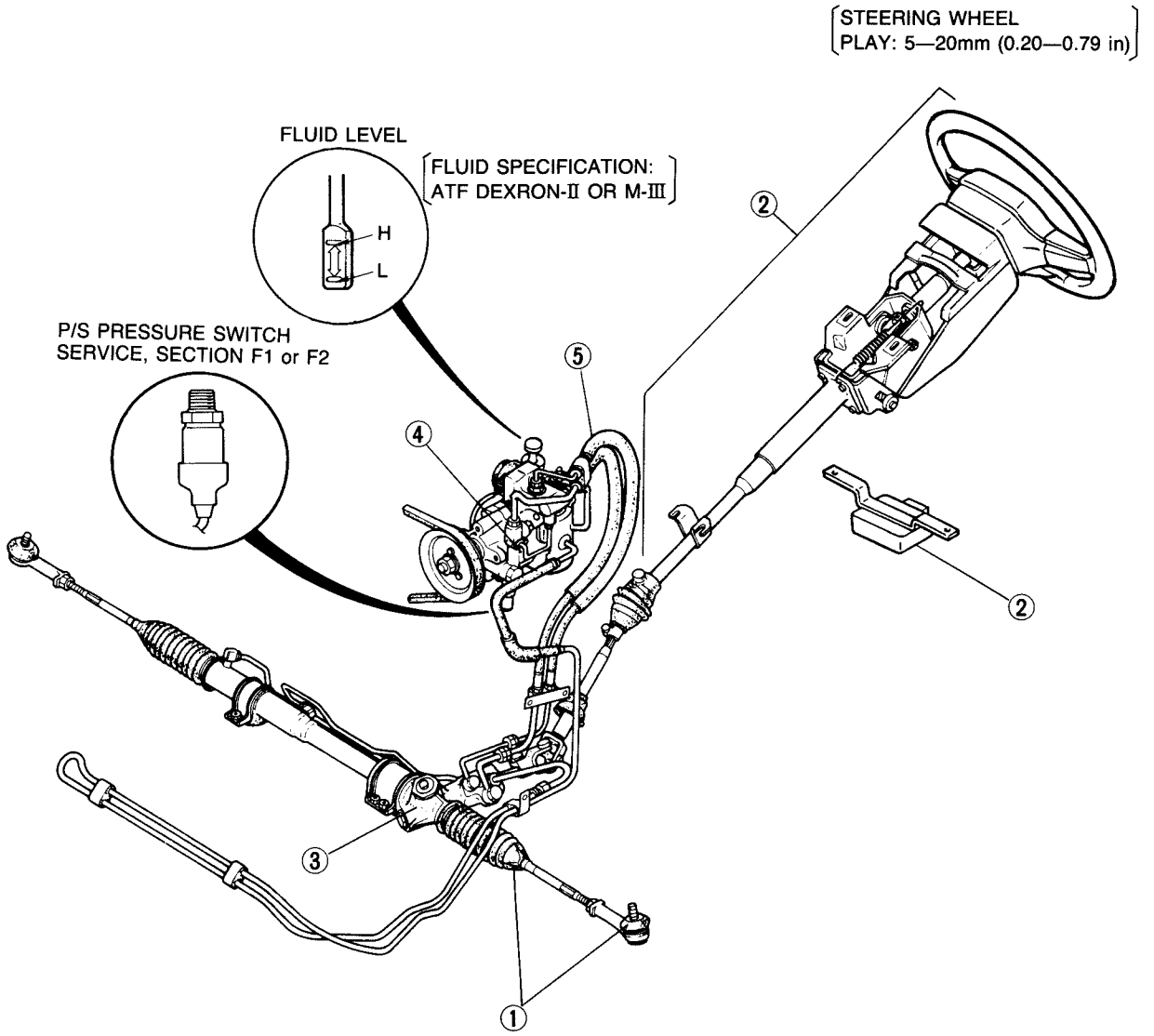
ELECTRONICALLY CONTROLLED POWER STEERING (ECPS)



97U0NX-003

OUTLINE

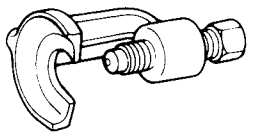
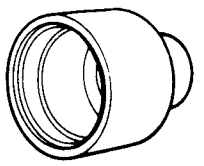
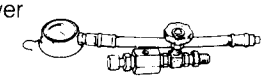
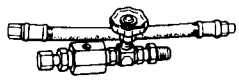
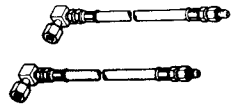
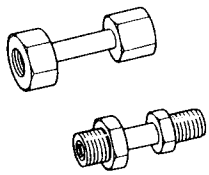
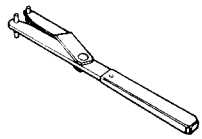
SPECIFICATIONS

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 	

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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)

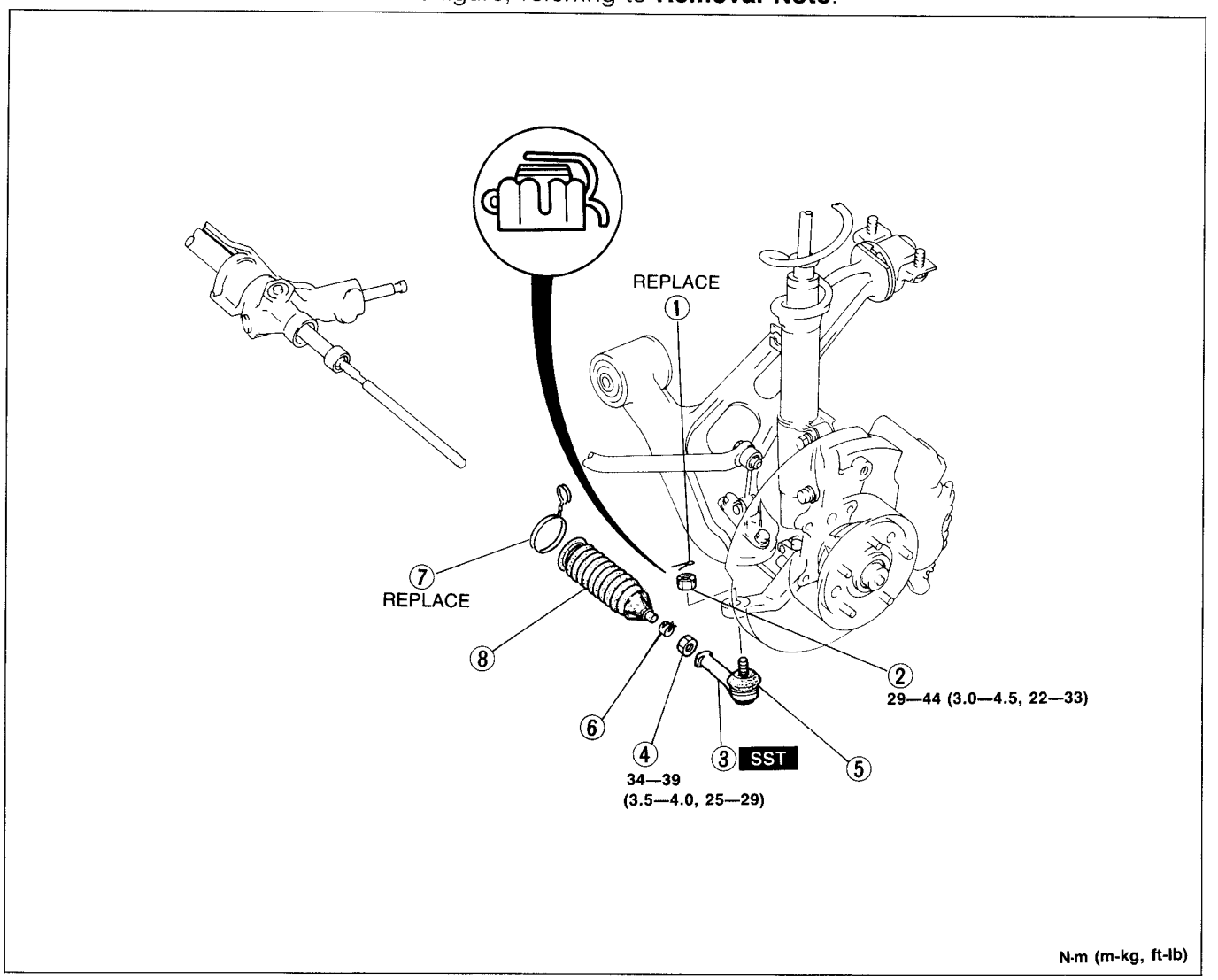
Problem	Possible Cause	Action	Page/Section
Steering wheel pulls to one side	Incorrect tire pressure	Adjust	Section Q
	Unevenly worn tires	Replace	Section Q
	Weak front spring	Replace	Section R
	Worn or damaged stabilizer and/or lower arm bushing	Replace	Section R
	Dragging brake	Repair	Section P
	Loose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

97U0NX-006

BOOTS

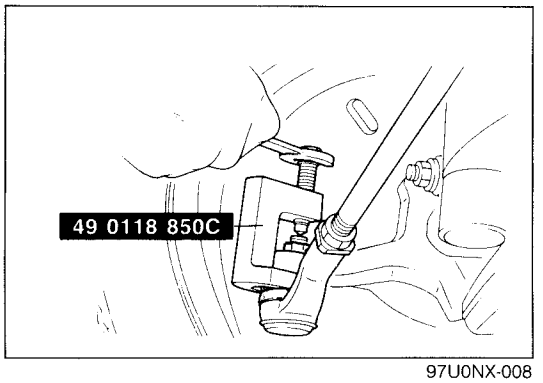
Removal

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



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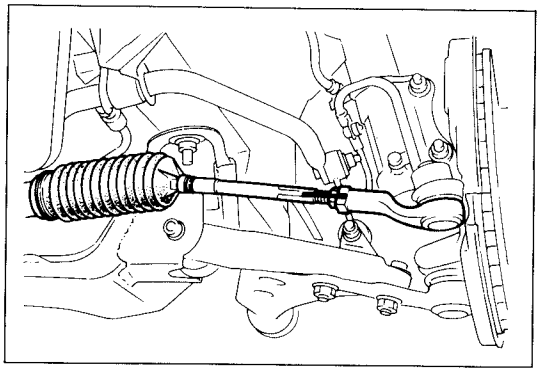
Removal note

Tie-rod end

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



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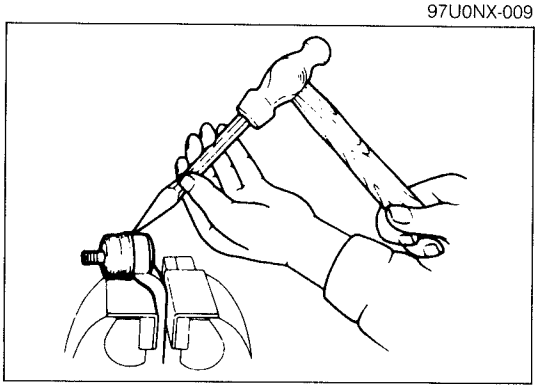
Locknut
Mark the tie-rod end locknut for reference during installation before loosening.



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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.)

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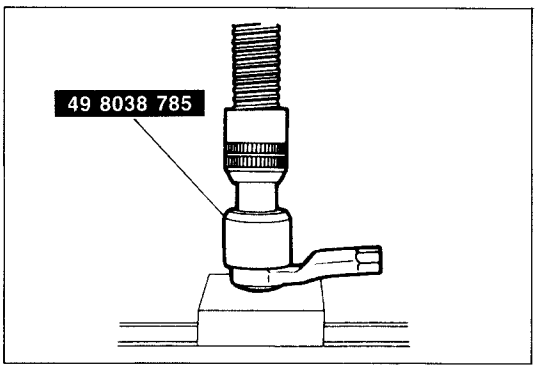

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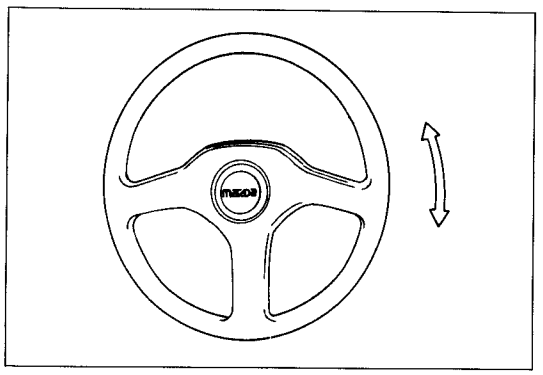
Installation note
Tie-rod end boot
Put a small amount of grease (lithium base) into the new boot and set it onto the tie-rod end. Install the boot onto the tie-rod end with the **SST** and a press.



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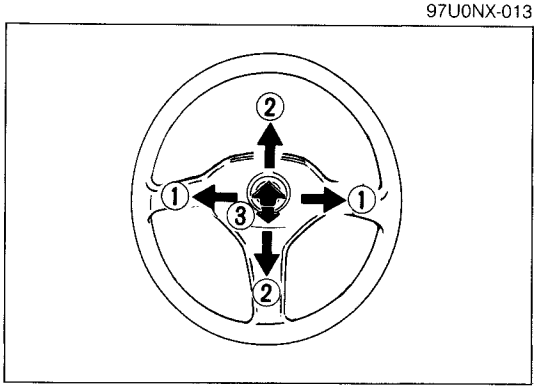

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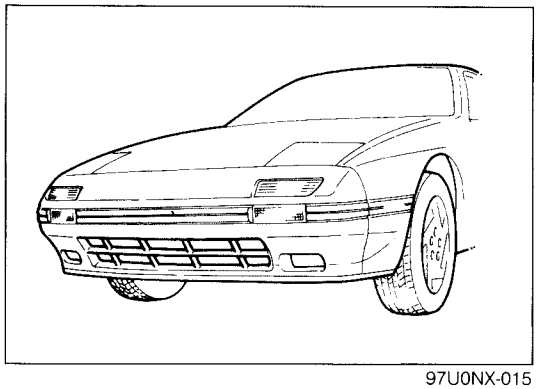

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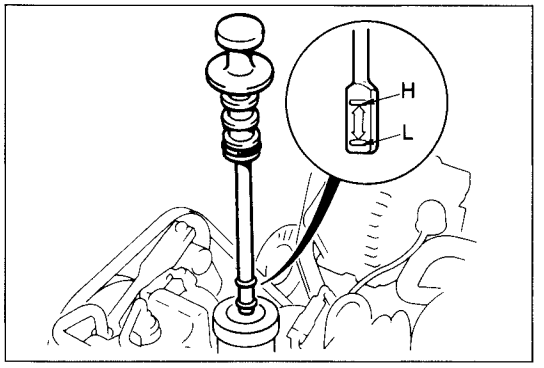

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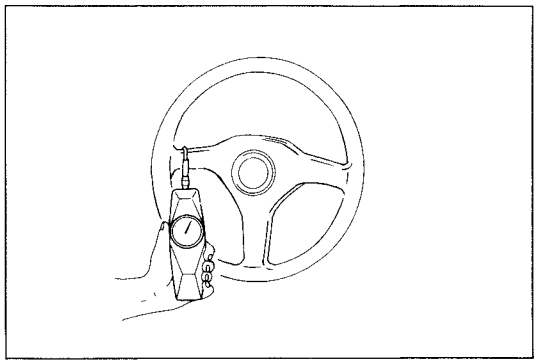

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STEERING WHEEL AND COLUMN

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.

Steering wheel effort

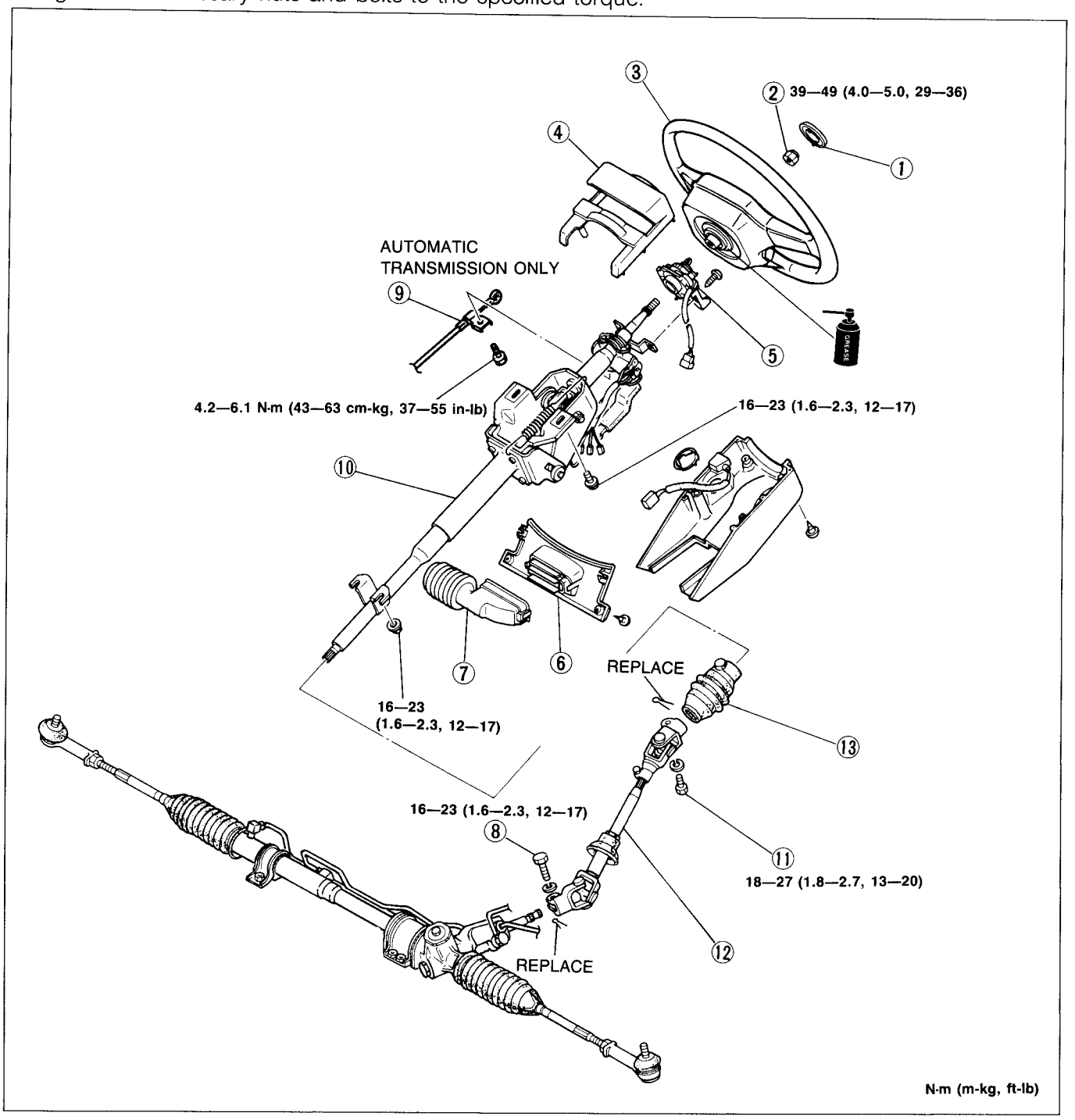
1. With the vehicle on a hard, level surface, move the steering wheel to put the wheels in the straight-ahead position.
2. Start the engine and warm the power steering fluid to **50—60°C (122—140°F)**.
3. Attach a pull scale to the outer of the steering wheel, and then, starting with the wheels in the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

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

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.

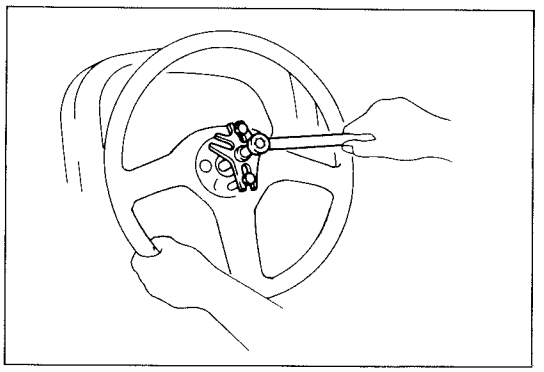
Removal and Installation

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.



97U0NX-018

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
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



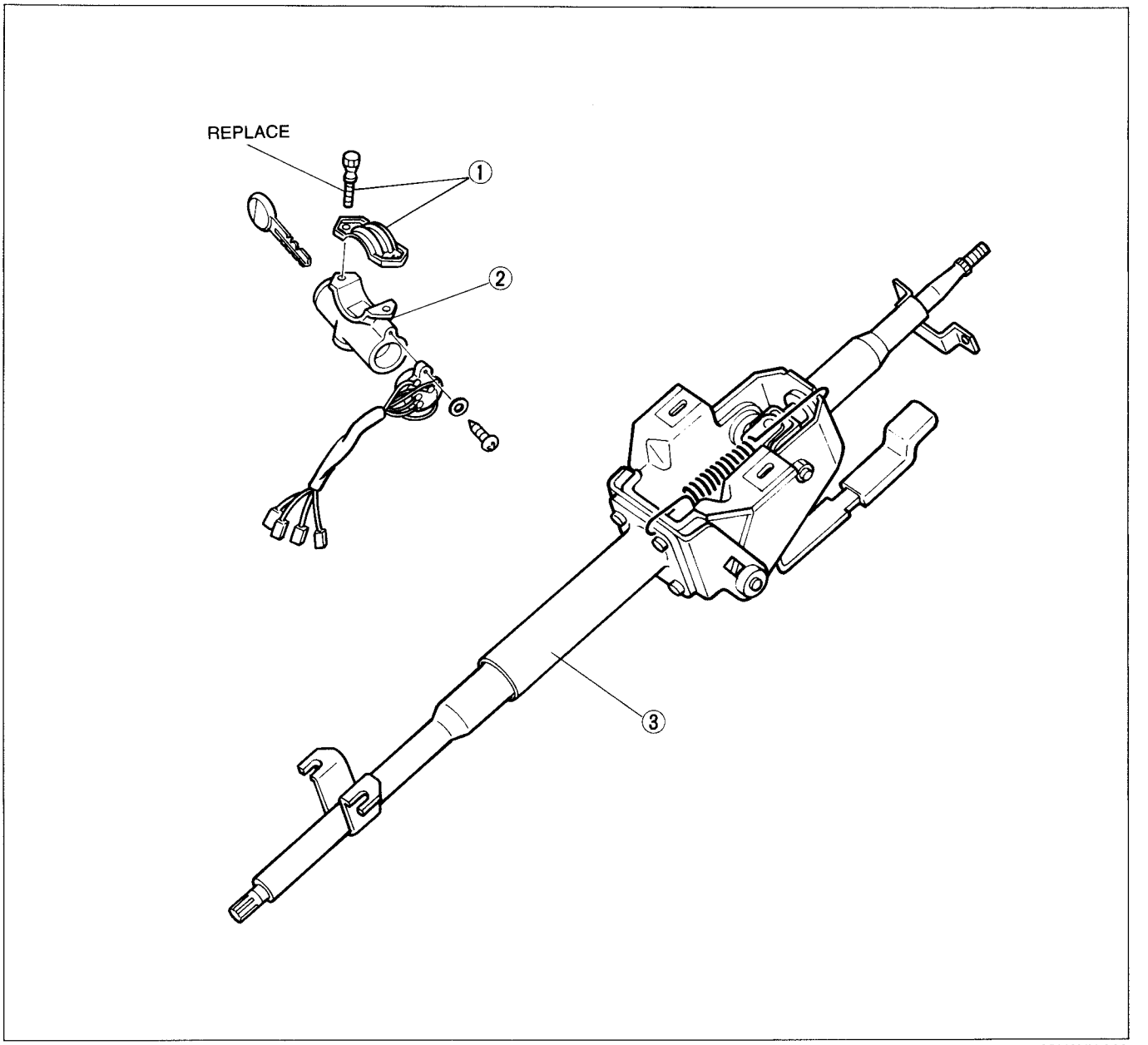
97U0NX-019

Removal note
Steering wheel

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

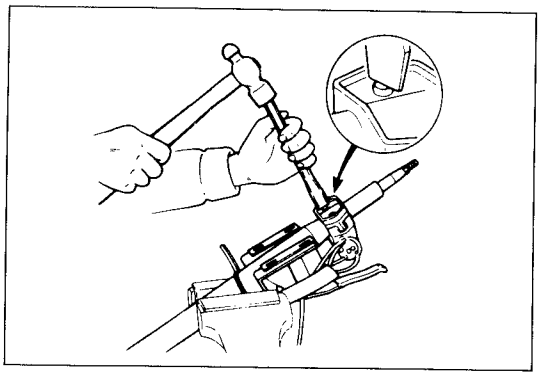
Remove the steering wheel with a suitable puller.

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



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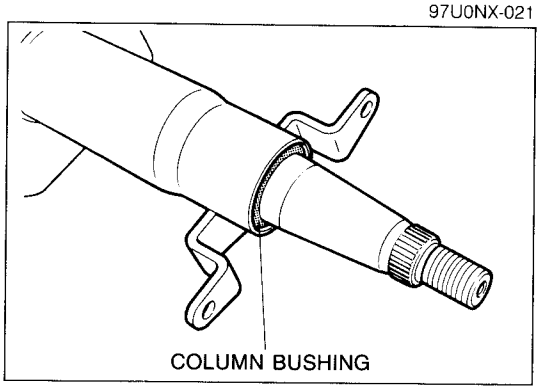
Disassembly note
Steering lock mounting bolts and bracket
Use a chisel to make a groove in the head of the steering lock mounting bolts. Remove the bolts with a screwdriver. Remove the steering lock assembly.



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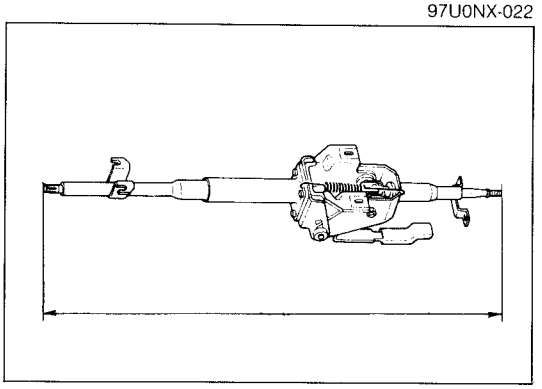
Inspection
Check for the following and replace the column assembly if necessary.

Steering shaft
1. Column bushing wear.



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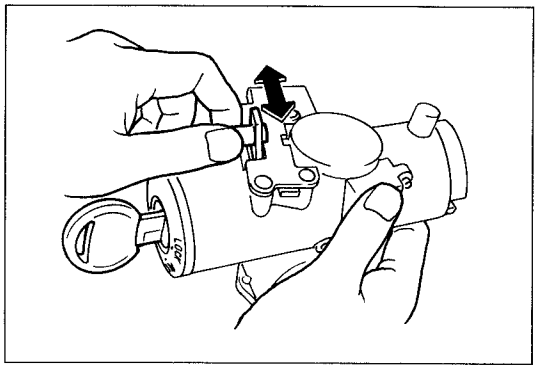
2. Steering shaft length.

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



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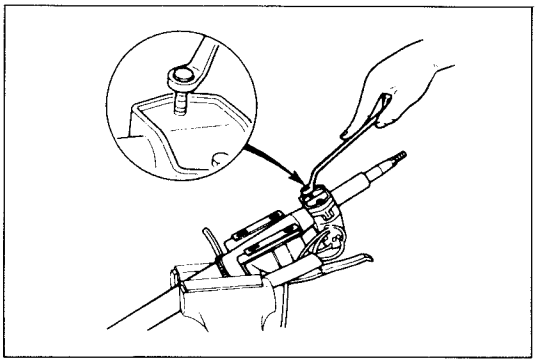
Steering lock assembly (Automatic transmission only)
Verify that the cable connector does not move when the key is in the LOCK position and that it moves freely with the key in other positions.



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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.

STEERING GEAR AND LINKAGE

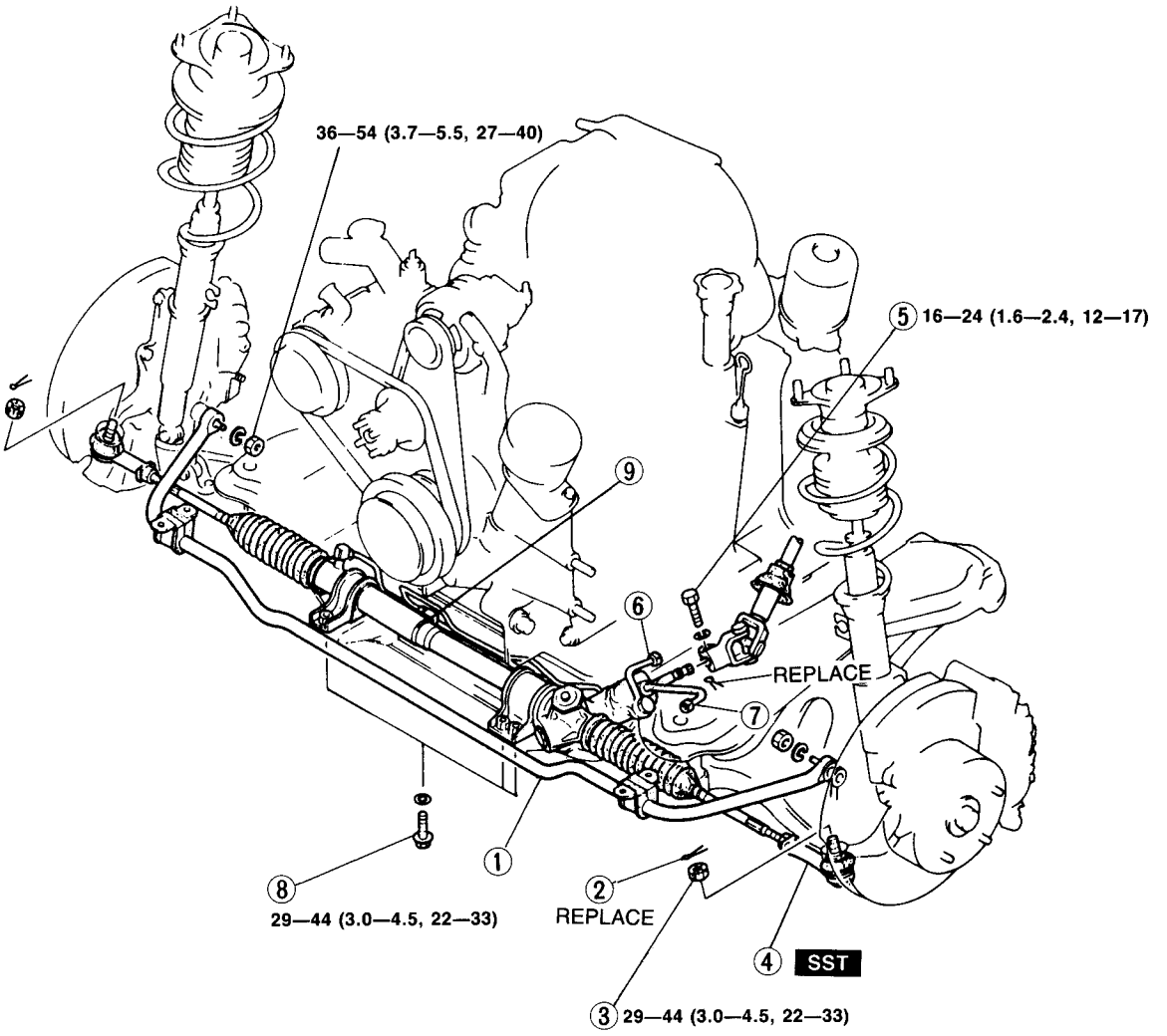
Removal

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

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
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.)

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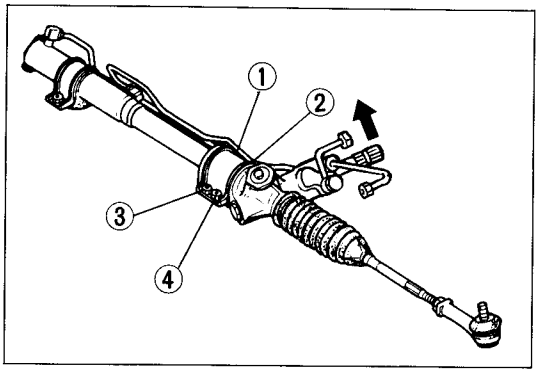

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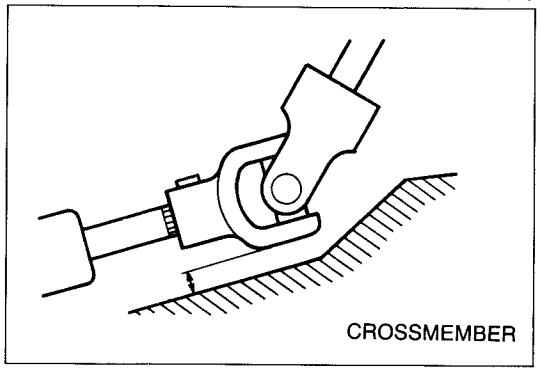


97U0NX-029

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)

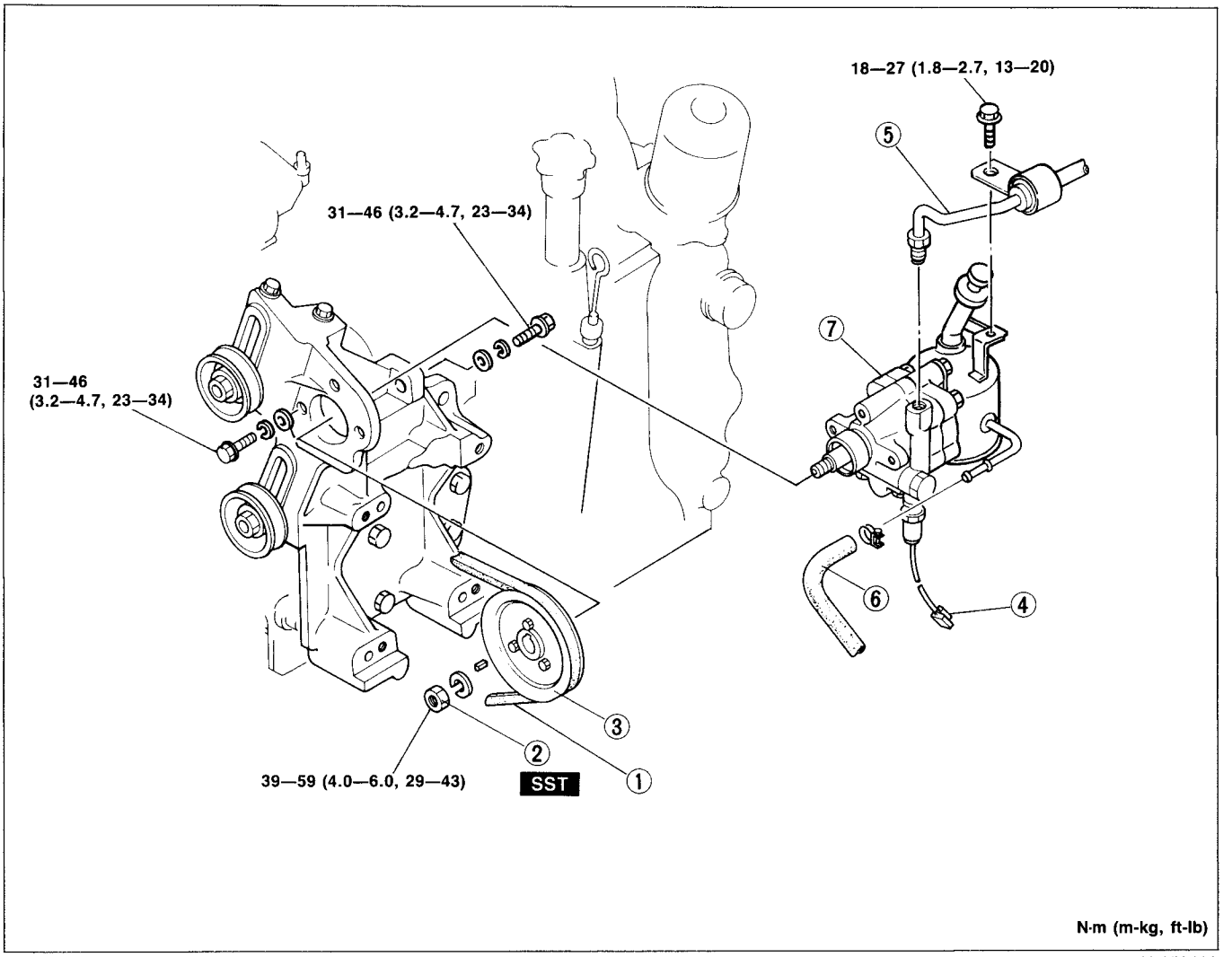
OIL PUMP

Removal

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

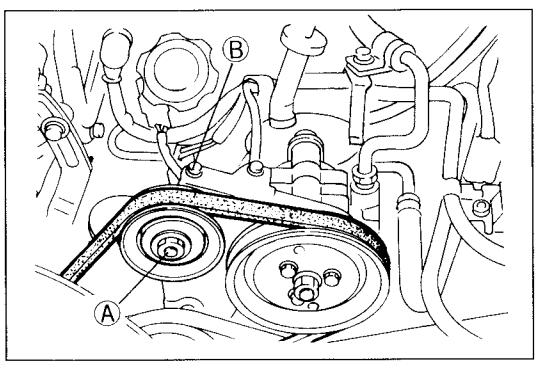
Note

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
2. Locknut
   - Removal note ..... page N–15
3. Oil pump pulley
4. Power steering pressure switch connector
5. Pressure pipe
   - Removal note ..... page N–15
6. Return hose
7. Oil pump assembly



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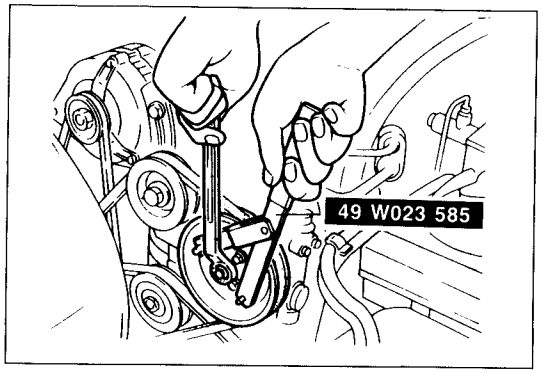
Removal note

Drive belt

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



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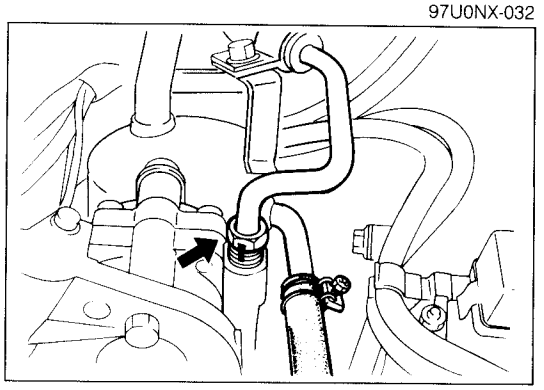
Locknut
Remove the locknut while holding the pulley with the **SST**.

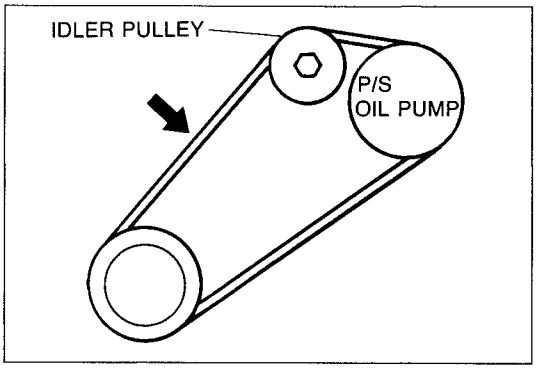


97U0NX-033

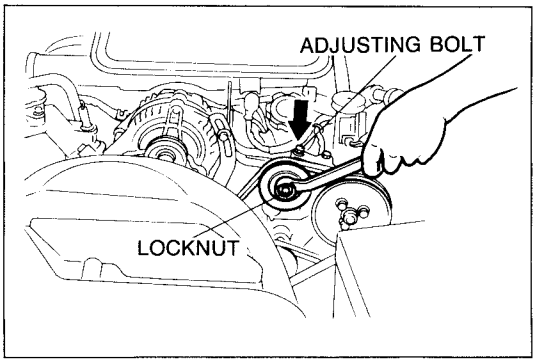
Pressure pipe
Mark the pressure pipe for reference during installation before loosening.

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



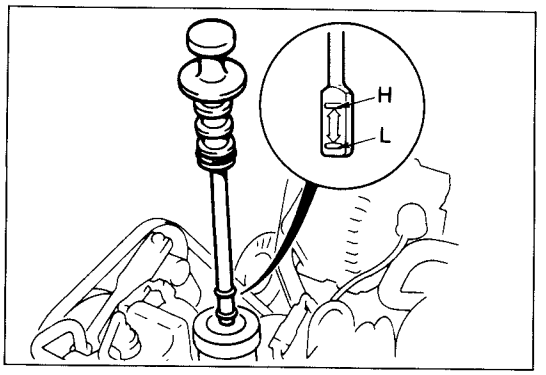
97U0NX-036

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-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.

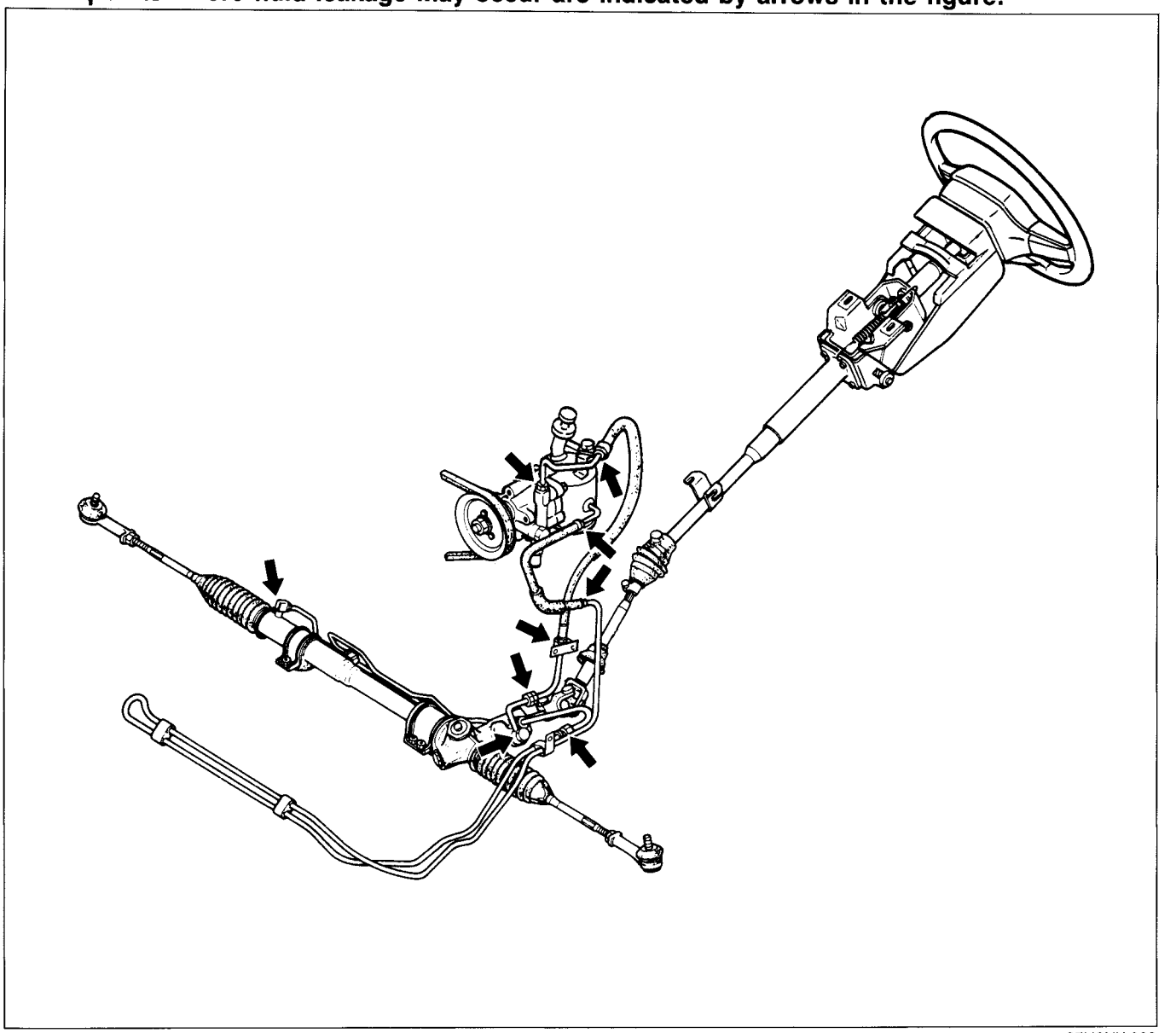
Fluid specification:
ATF DEXRON-II or M-III

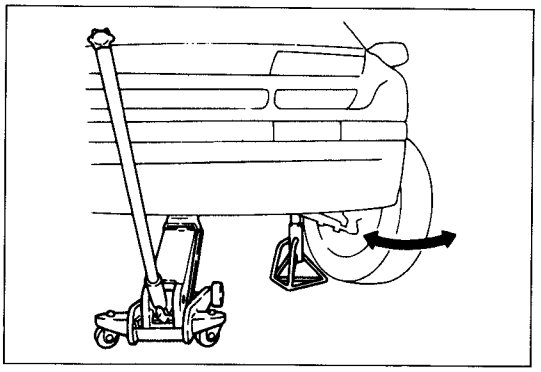
Inspection of fluid leakage

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.

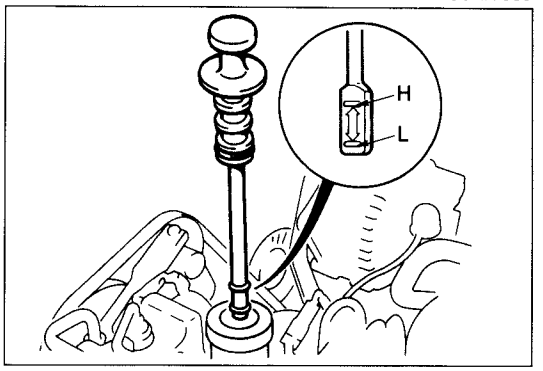
Note
The points where fluid leakage may occur are indicated by arrows in the figure.


97U0NX-038


97U0NX-039

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.



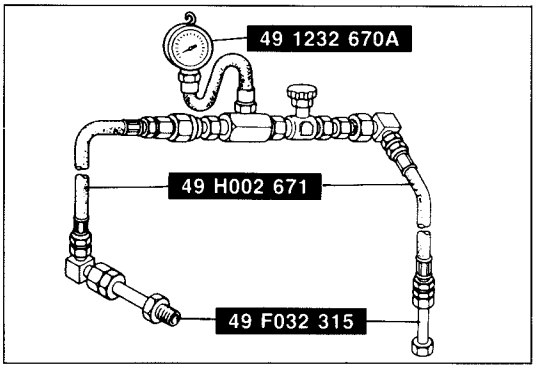
97U0NX-040

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

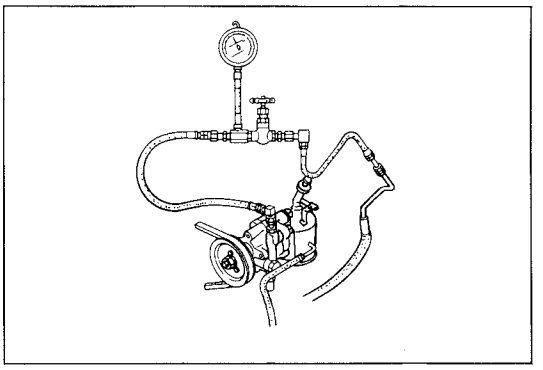
1. Assemble the **SST** as shown in the figure.

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

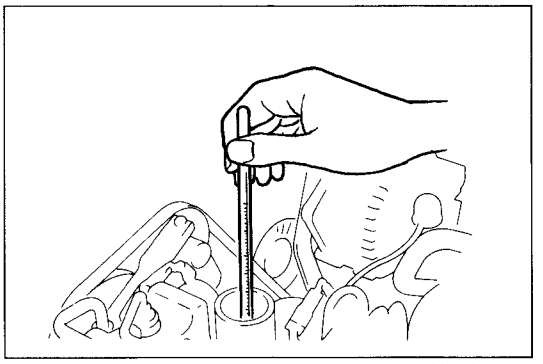


9MU0NX-008

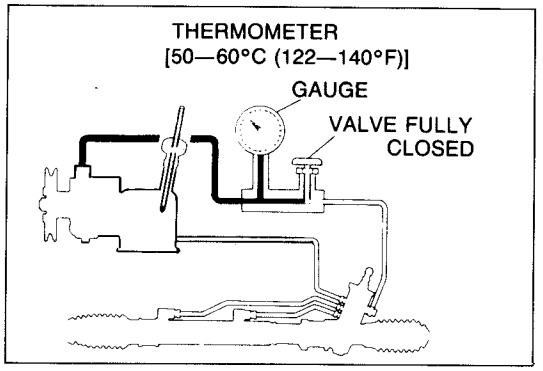
Note
Before disconnecting the hose, make marks at the connections for proper reinstallation.


97U0NX-041

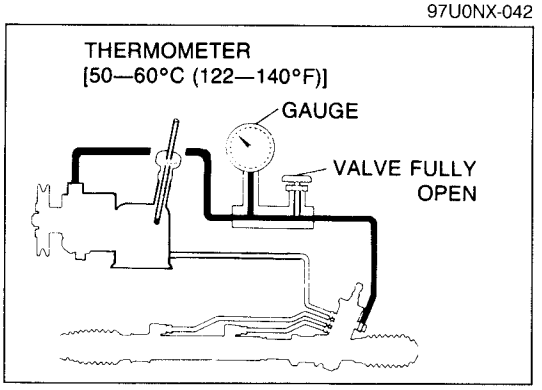
2. Disconnect the high-pressure hose from the oil pump. Attach the **SST**.
3. Bleed the air from the system. (Refer to page N–17.)


9MU0NX-010

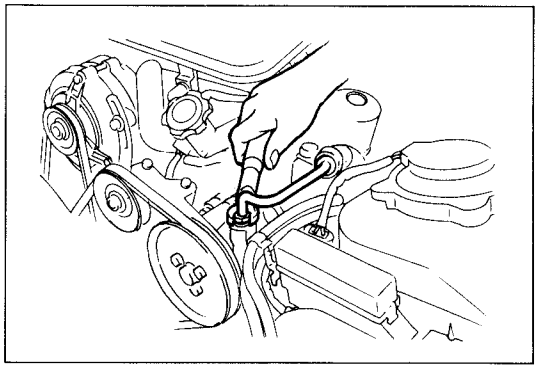
4. Open the gauge valve fully. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.



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/cm^2, 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/cm^2, 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.

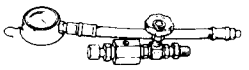
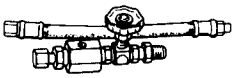
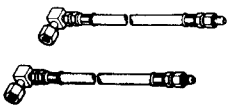
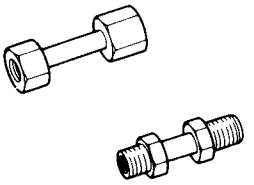
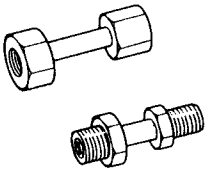
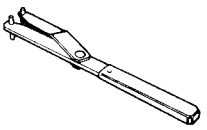
8. Remove the gauge set. Install and tighten the high-pressure hose to the specified torque.

   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

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 314 Adapter, power steering gauge 	49 F032 315 Adapter, power steering gauge 
49 W023 585A Adjust wrench 		

97U0NX-045

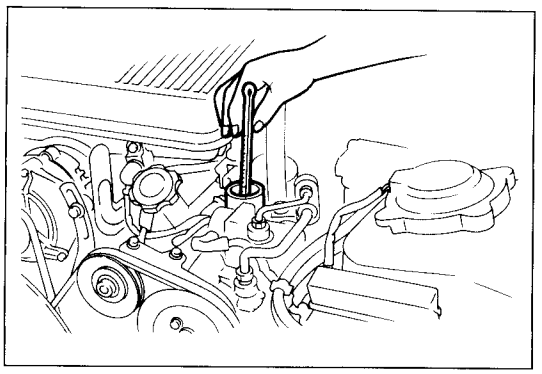
TROUBLESHOOTING GUIDE

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–22
Steering wheel pulls to one side	Incorrect tire pressure	Adjust	Section Q
	Unevenly worn tires	Replace	Section Q
	Weak front spring	Replace	Section R
	Worn or damaged stabilizer and/or lower arm bushing	Replace	Section R
	Dragging brake	Repair	Section P
	Loose lower arm	Tighten or replace	Section R
	Improperly adjusted wheel alignment	Adjust	Section R
General instability while driving	Incorrect tire pressure	Adjust	Section Q
	Damaged or unbalanced wheel	Adjust or replace	Section Q
	Worn or damaged steering joints	Replace	N– 9
	Improper steering pinion preload	Replace gear	N–12
	Weak front coil spring	Replace	Section R
	Worn or damaged stabilizer and/or lower arm bushing	Replace	Section R
	Malfunctioning shock absorber	Replace	Section R
	Improperly adjusted wheel alignment	Adjust	Section R
Shake (Steering wheel vibrates up/down)	Excessive tire or wheel runout	Replace	Section Q
	Loose lug nuts	Tighten	Section Q
	Unbalanced wheel(s)	Adjust or replace	Section Q
	Cracked or worn engine mount rubber	Replace	Section C
	Cracked or worn transmission mount rubber	Replace	Sections J1,J2,K

TROUBLESHOOTING GUIDE (Cont'd)

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

97U0NX-046



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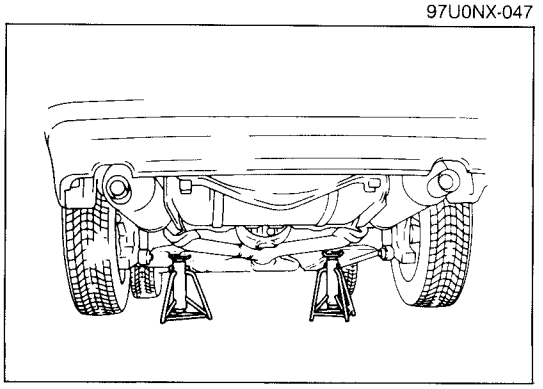

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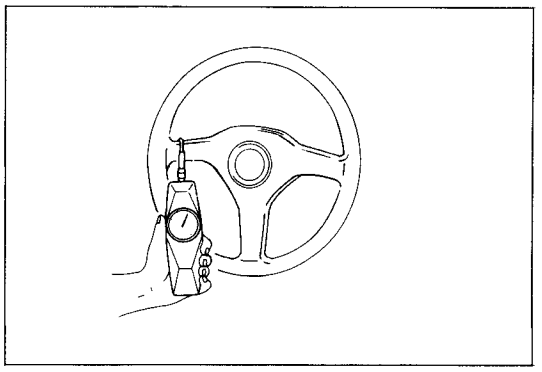


97U0NX-049

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]

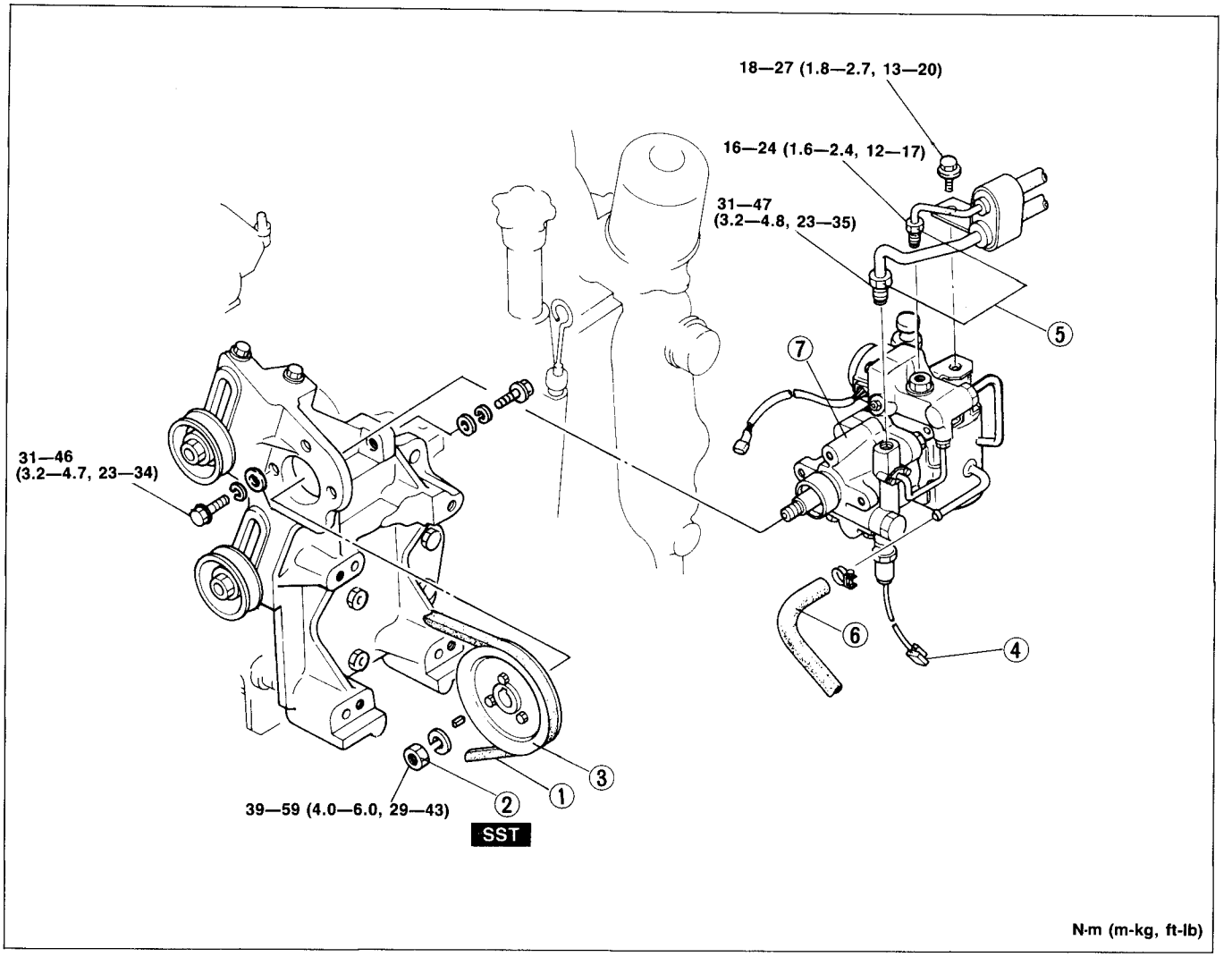
7. If not within specification check the following points: fluid level, air in system, fluid leakage at hose or connections, function of oil pump and gearbox, power steering pressure, and tire pressure.

OIL PUMP

Removal

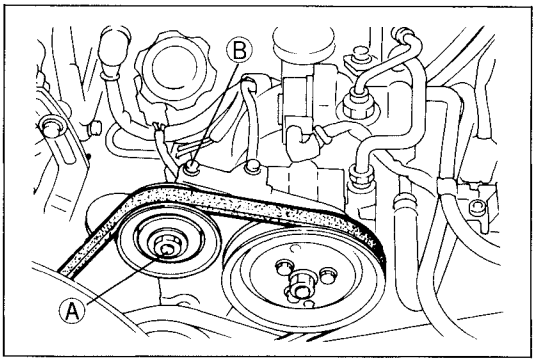
Remove in the order shown in the figure, referring to **Removal Note**.

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



97U0NX-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
5. Pressure pipe
   Removal note ..... page N–23
6. Return hose
7. Oil pump assembly

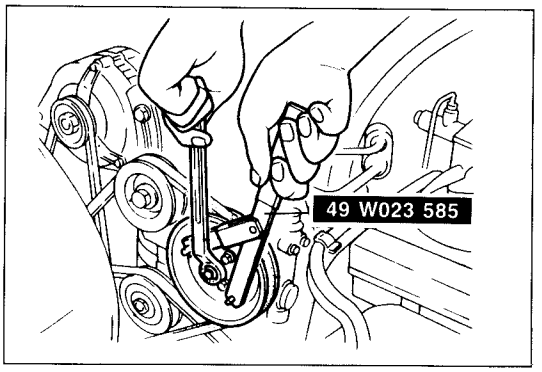


97U0NX-031

Removal note

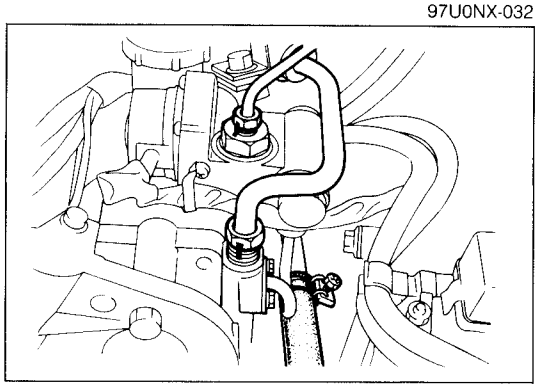
Drive belt

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



97U0NX-032

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

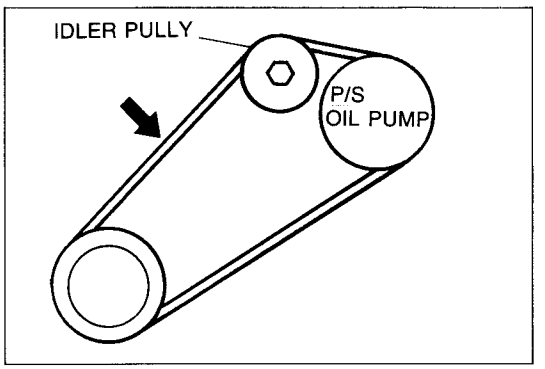


97U0NX-033

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



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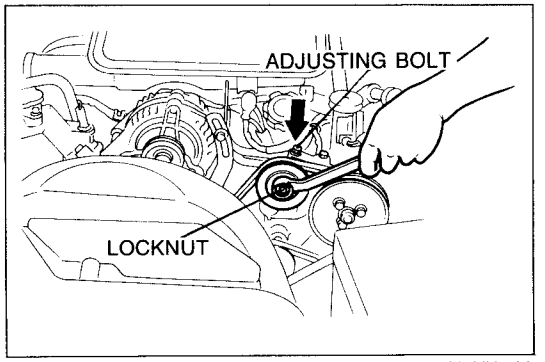


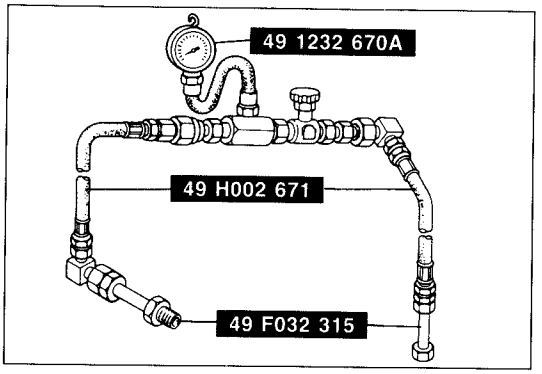
97U0NX-036

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)



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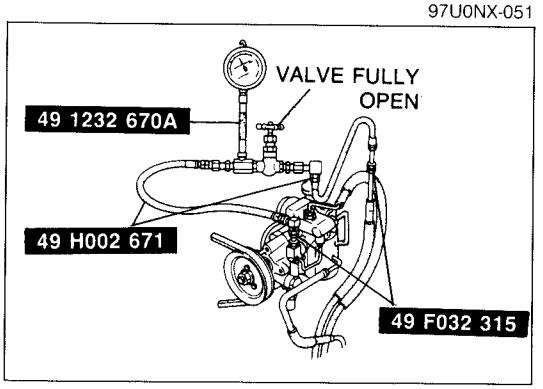

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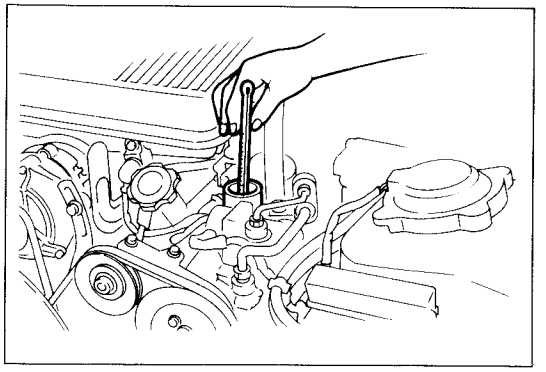
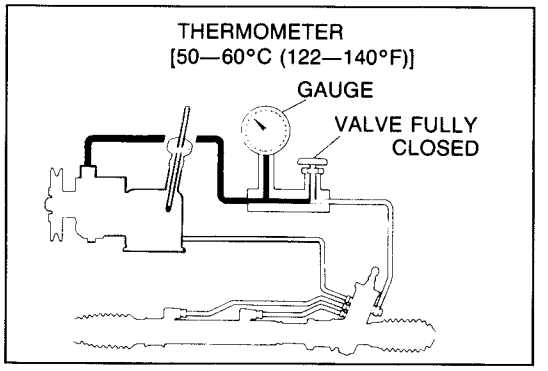

9MU0NX-010



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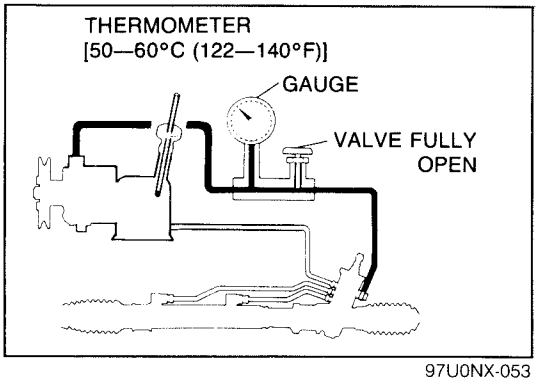


97U0NX-053

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.

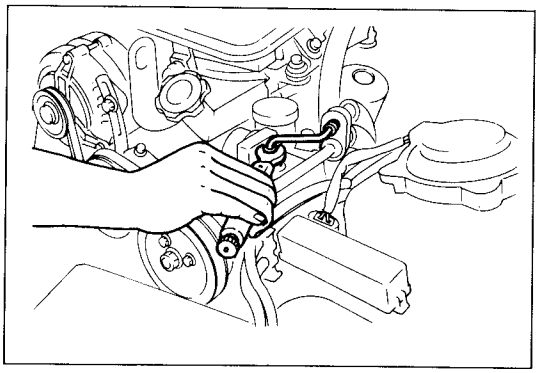
   Oil pump fluid pressure: 7,848—8,339 kPa (80—85 kg/cm^2, 1,137—1,209 psi)

   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/cm^2, 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.

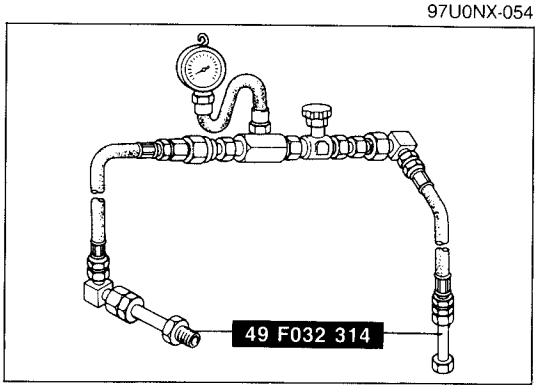


97U0NX-054

8. 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)

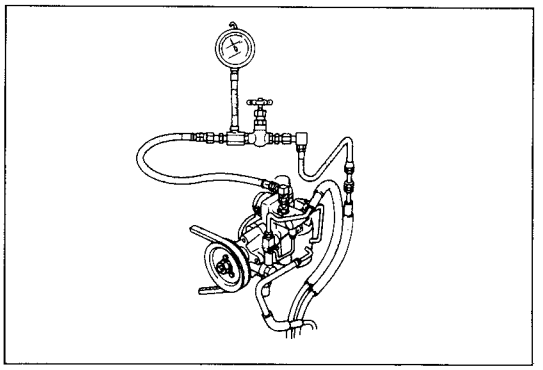
9. Bleed the air from the system. (Refer to page N—17.)



97U0NX-055

Sub fluid pressure (Reaction force chamber side)
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)



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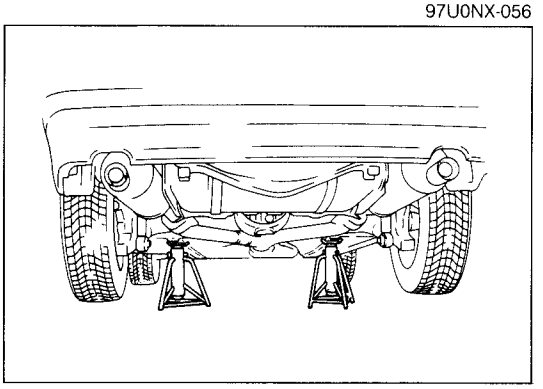
Note
Before disconnecting the hose, mark the connections for proper reinstallation.

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



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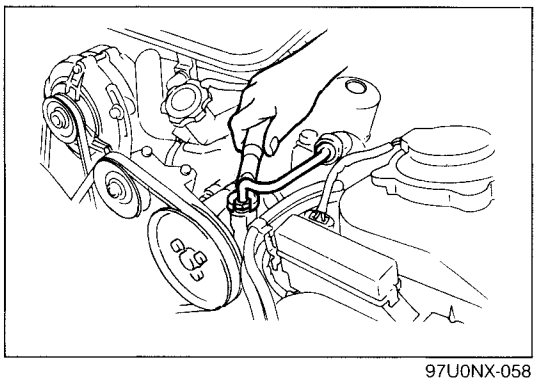
4. Jack up the rear of the vehicle and support it with safety stands.
5. Open the gauge valve completely. Start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.
6. Run the vehicle at **65 km/h (40.3 mph)**.
7. Measure the fluid pressure.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

Oil pump pressure:
294—490 kPa (3—5 kg/cm^2, 43—71 psi)



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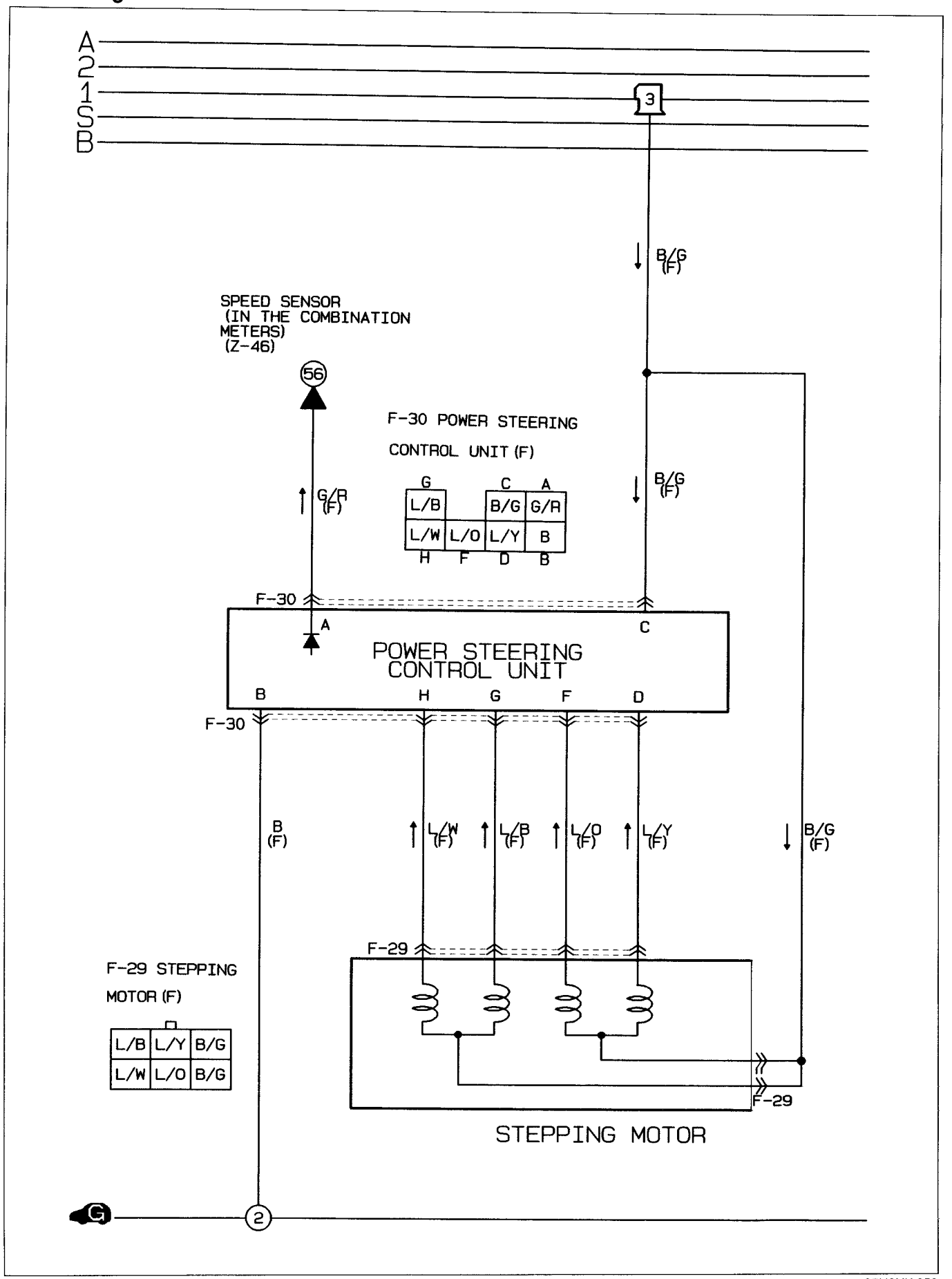
8. Remove the gauge set. Install and tighten the pressure hose to the specified torque.

Tightening torque:
16—24 N·m (1.6—2.4 m-kg, 12—17 ft-lb)

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

ECPS CONTROL UNIT
Circuit Diagram



97U0NX-059

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
Droppring of power sourse voltage	Power sourse voltage dropping to 8V or below	Steering effort maintained as at vehicle speed when failure occurred

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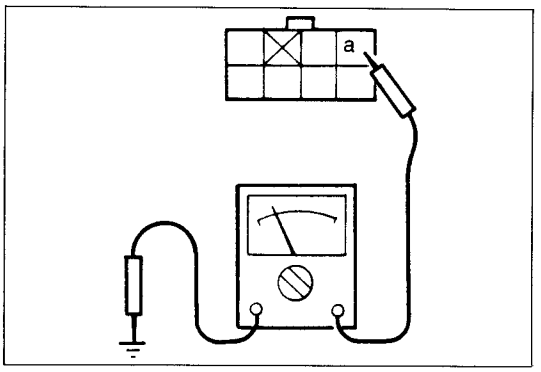

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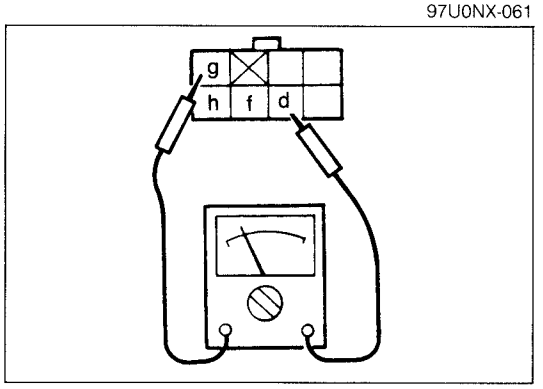

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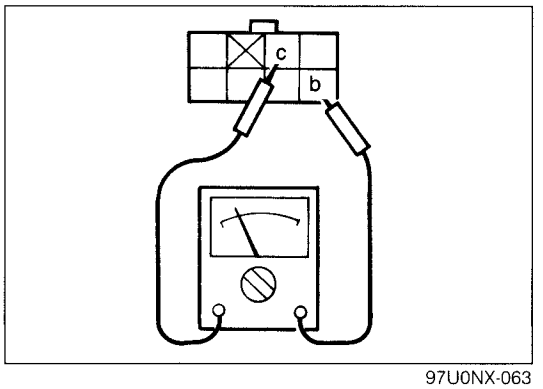

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Inspection
Speed sensor

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.