

STEERING SYSTEM

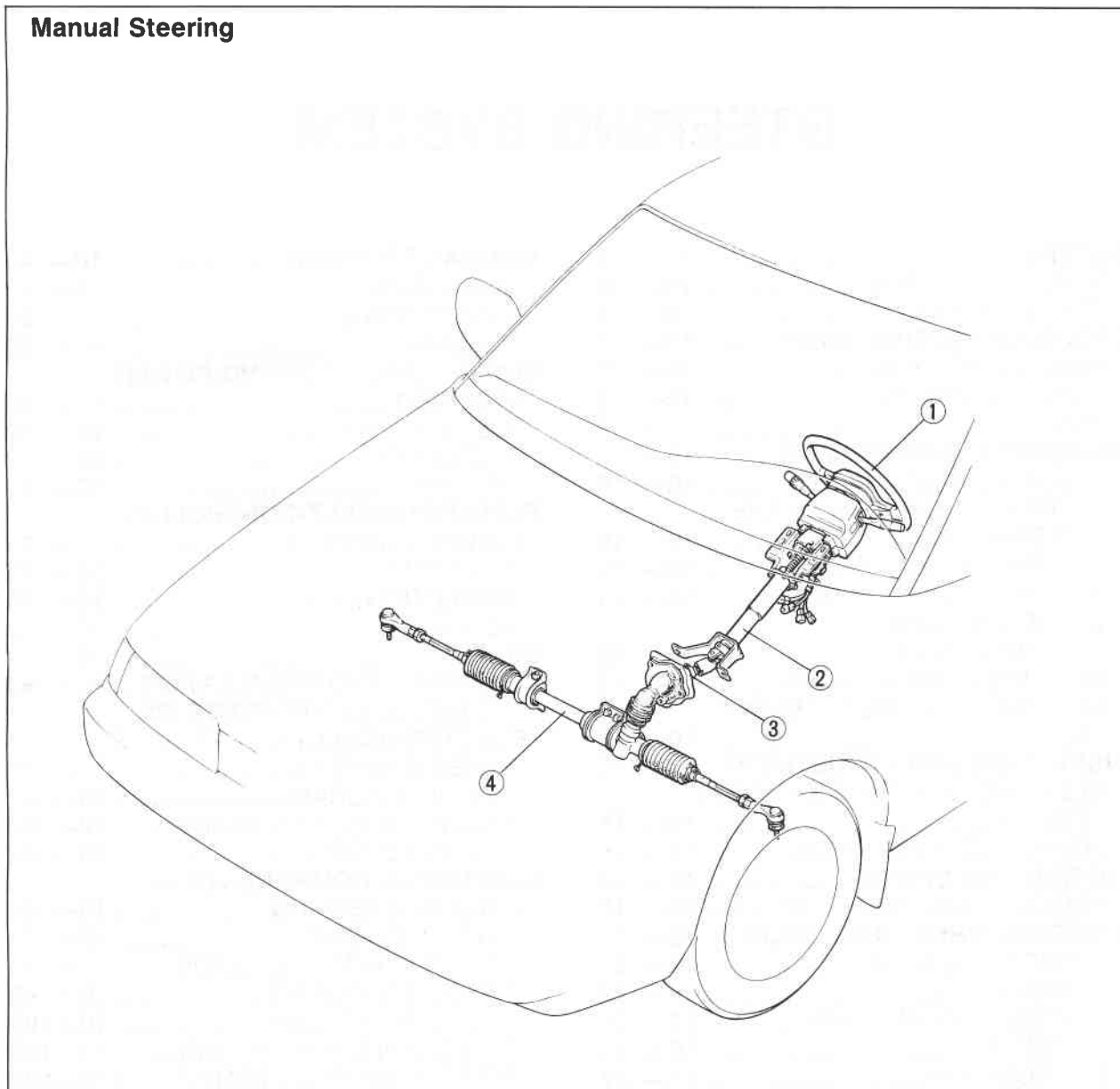
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10 OUTLINE

OUTLINE

STRUCTURAL VIEW

Manual Steering

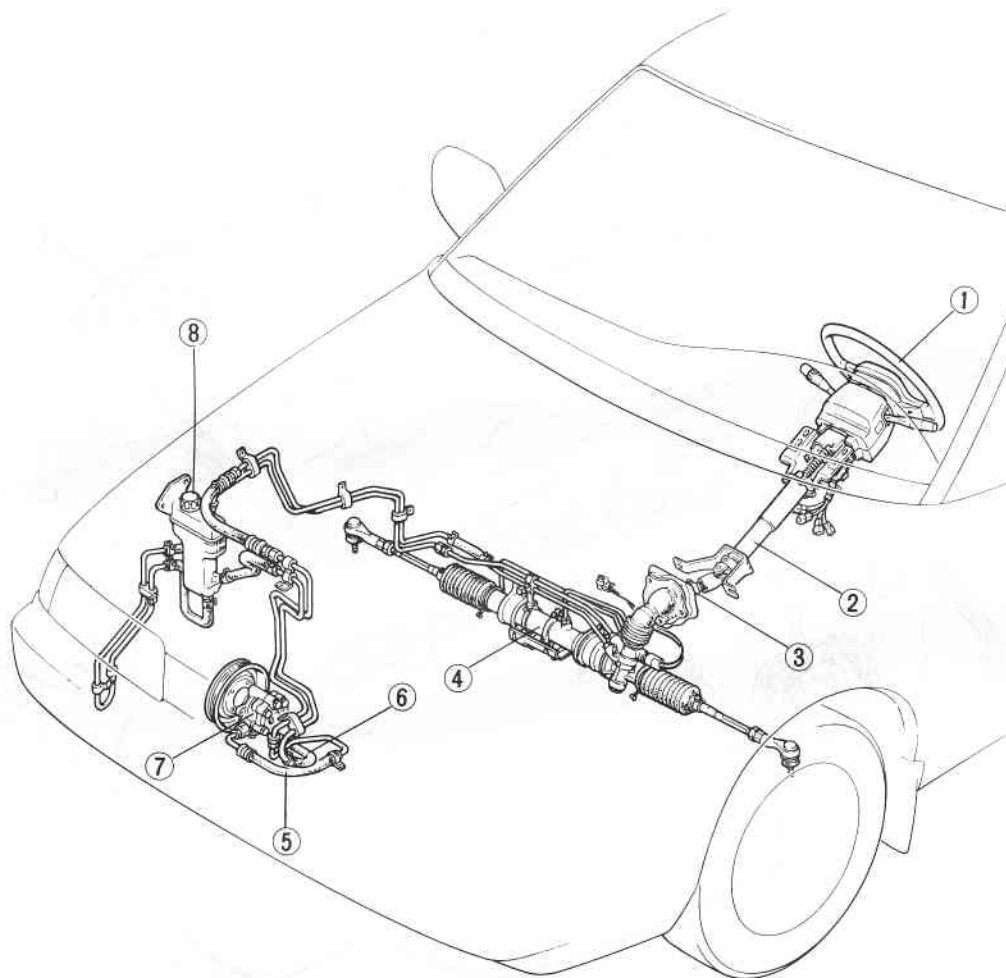


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- 1. Steering wheel
- 2. Steering shaft

- 3. Intermediate shaft
- 4. Steering gear assembly

Power Steering (ESPS)



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- 1. Steering wheel
- 2. Steering shaft
- 3. Intermediate shaft

- 4. Steering gear assembly
- 5. Pressure hose
- 6. Return hose

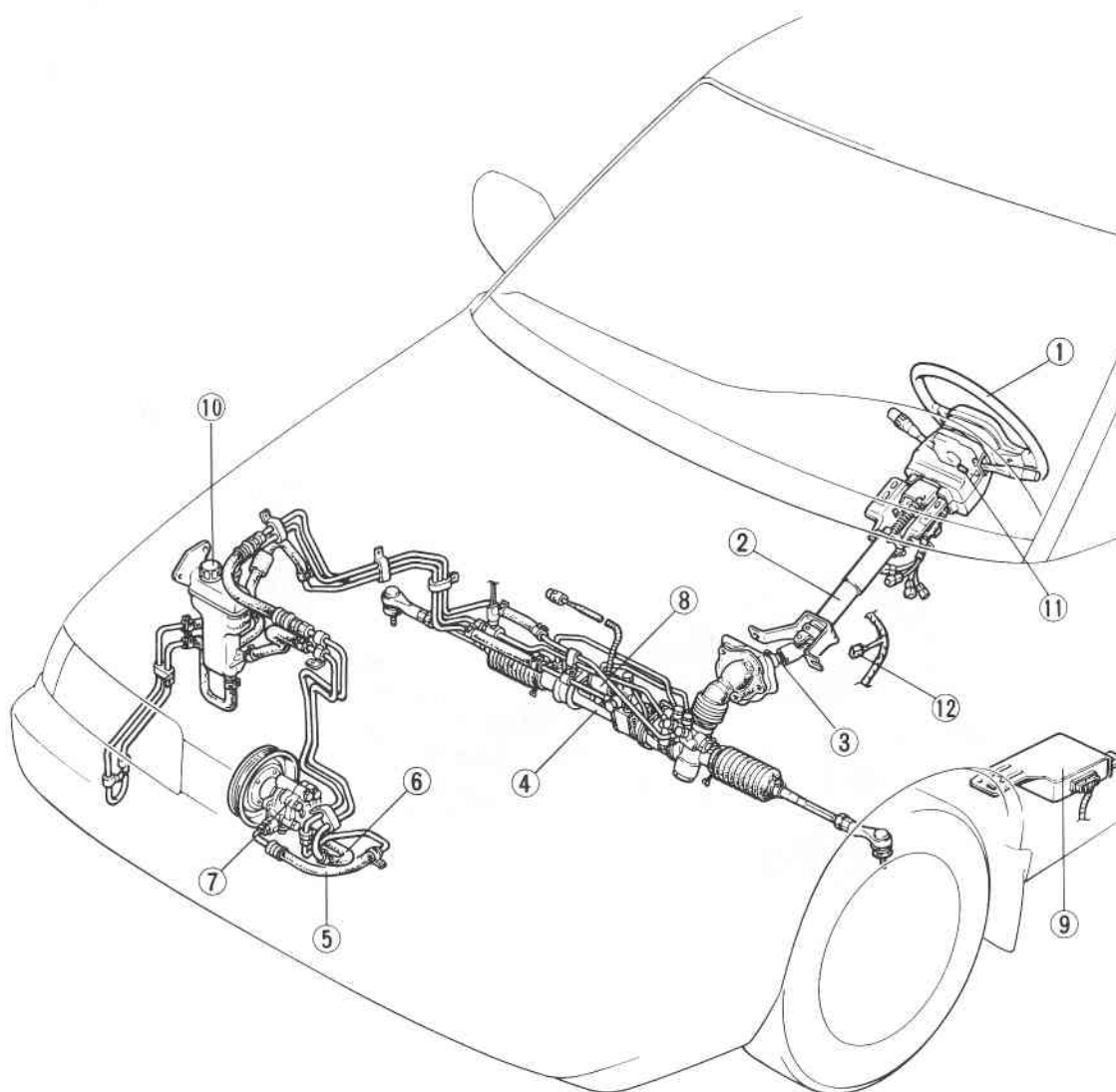
- 7. Oil pump
- 8. Reserve tank

Note

Engine speed sensing power steering is abbreviated ESPS.

10 OUTLINE

Power Steering (ECPS)



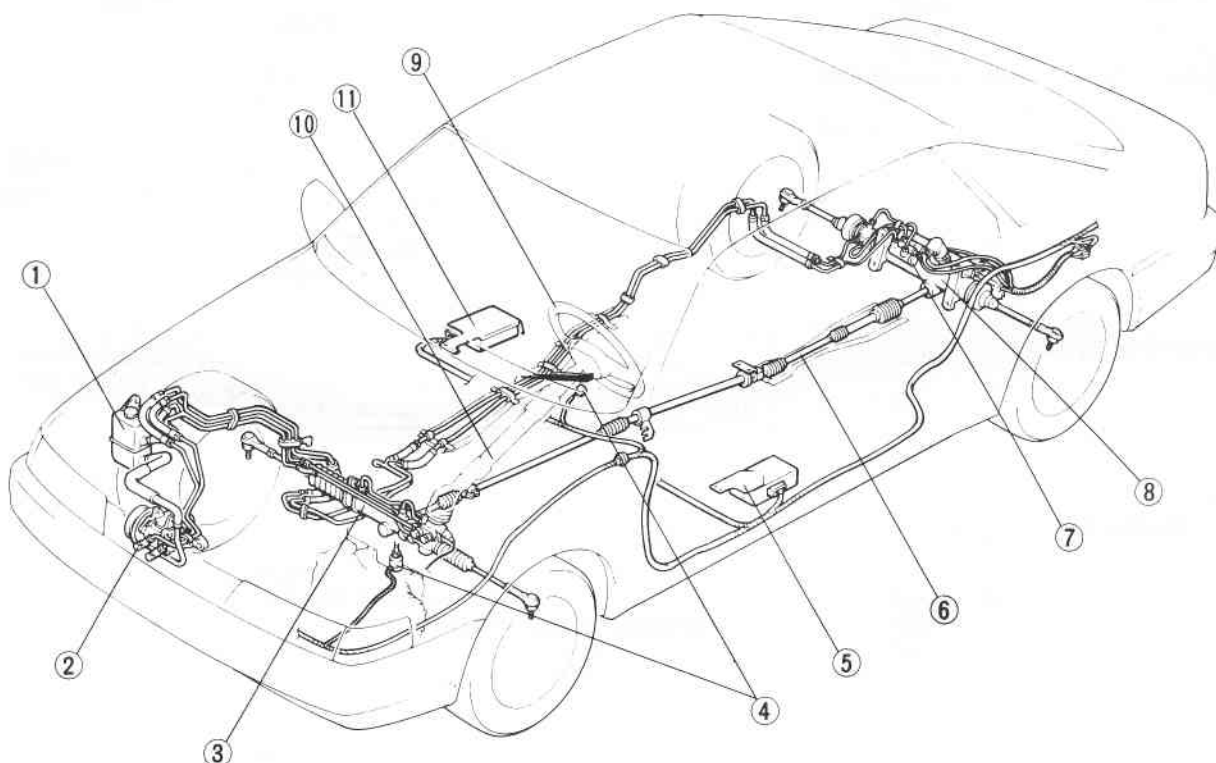
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- | | | |
|---------------------------|-------------------|---------------------------|
| 1. Steering wheel | 5. Pressure hose | 9. Control unit |
| 2. Steering shaft | 6. Return hose | 10. Reserve tank |
| 3. Intermediate shaft | 7. Oil pump | 11. Steering angle sensor |
| 4. Steering gear assembly | 8. Solenoid valve | 12. Check connector |

Note

Electronically - controlled power steering is abbreviated ECPS.

Power Steering (4WS)



86U10X-005

- | | |
|---------------------------------|----------------------------------|
| 1. Reserve tank | 6. Steering angle transfer shaft |
| 2. Oil pump | 7. Solenoid valves |
| 3. Front steering gear assembly | 8. Rear steering gear assembly |
| 4. Speed sensor | 9. Steering wheel |
| 5. Control unit | 10. Steering shaft |
| | 11. Relay and timer |

Note

4-wheel steering is abbreviated 4WS.

10 OUTLINE

SPECIFICATIONS

Item		Type	Manual steering	Power steering
Steering wheel	Outer diameter	mm (in)	380 (15.0)	
	Turns lock to lock		4.32	2.93
Steering shaft and joints	Shaft type		Collapsible	
	Joint type		Cross joints (2)	
	Tilt stroke	mm (in)	40 (1.6)	
Front steering gear	Type		Rack and pinion	
	Gear ratio		∞ (infinite)	
Power steering fluid	Capacity liter (US qt, Imp)	2WS	—	0.9 (0.95, 0.79)
		4WS	—	1.0 (1.06, 0.88)
	Type	2WS 4WS	—	Dexron II or M III

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Note

2-Wheel steering is abbreviated 2WS.

TROUBLESHOOTING GUIDE

MANUAL STEERING

Problem	Probable Cause	Remedy	Page
Steering "heavy" (vehicle jacked up, both wheels off ground)	Poor lubrication, foreign material, or abnormal wear of steering ball-joints	Refer to Section 13	—
	Stuck or damaged ball-joints	Replace	10—18
	Improperly adjusted steering pinion preload	Adjust	10—56
	Damaged steering gear	Replace	10—28
	Worn or damaged steering bushing	Replace	10—53
	Stuck lower-arm ball-joint	Refer to Section 13	—
	Malfunction of steering-shaft joint	Replace	10—21
Steering wheel pulls to one side	Incorrect tire pressure	Refer to Section 12	—
	Unevenly worn tires	Refer to Section 12	—
	Weakened front spring	Refer to Section 13	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Dragging brake	Refer to Section 11	—
	Loose lower arm	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
General instability while driving	Incorrect tire pressure	Refer to Section 12	—
	Damaged or unbalanced wheel	Refer to Section 13	—
	Worn or damaged steering joints	Replace	10—21
	Improperly adjusted steering pinion preload	Adjust	10—56
	Weakened front spring	Refer to Section 13	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Malfunctioning shock absorber	Refer to Section 13	—
Steering wheel vibrates	Improperly adjusted wheel alignment	Refer to Section 13	—
	Incorrect tire pressure	Refer to Section 12	—
	Unevenly worn tires	Refer to Section 12	—
	Worn wheel bearing, or incorrect adjustment	Refer to Section 13	—
	Worn or damaged steering joints	Replace	10—21
	Improperly adjusted steering pinion preload	Adjust	10—56
	Loose gear housing mounting bolts	Tighten	10—30
	Worn steering gear bearing	Replace	—
	Worn or damaged stabilizer and/or lower arm bushing	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Worn lower-arm ball-joint	Refer to Section 13	—
	Damaged unbalanced wheel	Refer to Section 13	—
	Malfunctioning or loose shock absorber	Refer to Section 13	—
Excessive steering wheel play	Improperly adjusted steering gear backlash	Adjust	10—56
	Worn rack and pinion gear	Replace	10—51
	Worn or damaged steering joints	Replace	10—21
	Worn or damaged lower-arm bushing	Refer to Section 13	—
Poor steering wheel return	Incorrect tire pressure	Refer to Section 12	—
	Stuck or damaged steering joints	Replace	10—21
	Improperly adjusted front wheel alignment	Refer to Section 13	—
	Improperly adjusted steering pinion preload	Adjust	10—56
Abnormal noise from steering system	Loose steering linkage	Tighten	10—28
	Worn steering joints	Replace	10—21
	Improperly adjusted steering gear backlash	Adjust	10—56

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10 TROUBLESHOOTING GUIDE

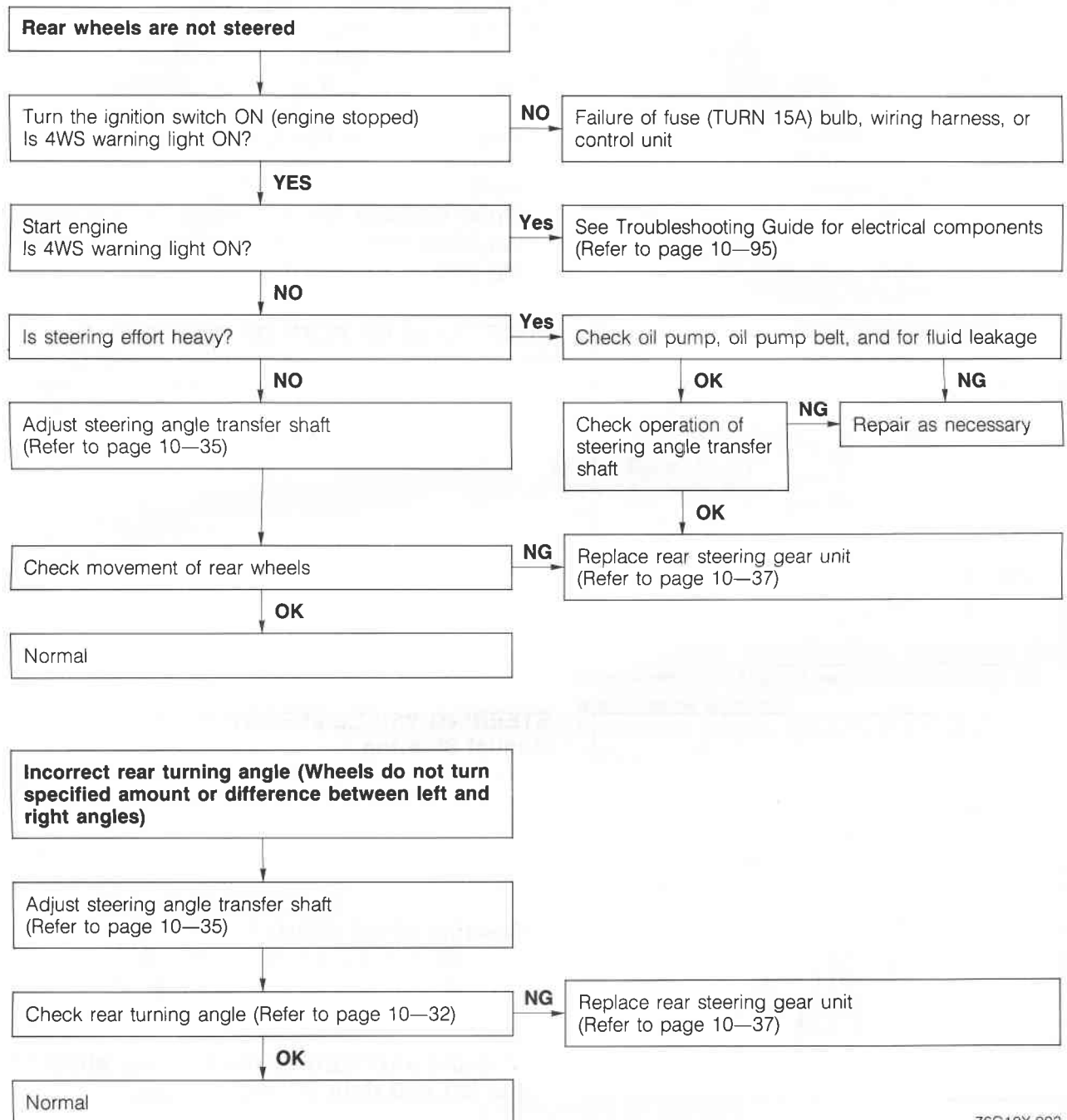
POWER STEERING

Problem	Possible cause	Remedy	Page
Hard steering	Loose or damaged belt	Adjust or replace	10—12
	Low fluid level, or air in fluid	Add fluid or bleed air	10—11
	Leakage of fluid	Repair or replace	10—13
	Malfunctioning electrical system*	Repair or replace	10—87
	Insufficient oil pump pressure	Repair or replace	10—16
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Malfunctioning steering gear	Repair or replace	10—28, 37
Poor return	Linkage ball joint not operating smoothly	Replace	10—18
	Insufficient tire pressure	Refer to Section 12	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Ball-joint not operating smoothly	Replace	10—20
Excessive play	Steering shaft contacting something	Repair	10—21
	Loose gear box housing mounting bolts	Tighten	10—30
	Worn linkage or tie-rod ball joint	Replace	10—18
	Worn lower ball joint	Refer to Section 13	—
	Worn or damaged steering joint	Replace	10—21
Steering wheel vibrates	Worn rack and pinion gear	Replace	10—58, 75
	Insufficient tire pressure	Refer to Section 12	—
	Damaged or unbalanced wheel	Refer to Section 13	—
	Improperly adjusted wheel alignment	Refer to Section 13	—
	Loose gear box housing mounting bolts	Tighten	10—30
	Incorrect pinion preload adjustment	Adjust	10—72, 81
	Worn ball joints	Replace	10—18
	Loose shock absorber mounting	Refer to Section 13	—
Steering wheel pulls	Malfunctioning shock absorber	Refer to Section 13	—
	Unevenly worn tires	Refer to Section 12	—
	Incorrect tire pressure	Refer to Section 12	—
	Dragging brake	Refer to Section 11	—
Excessively light steering at high speed*	Improperly adjusted wheel alignment	Refer to Section 13	—
	Malfunctioning electrical system	Repair or replace	10—87

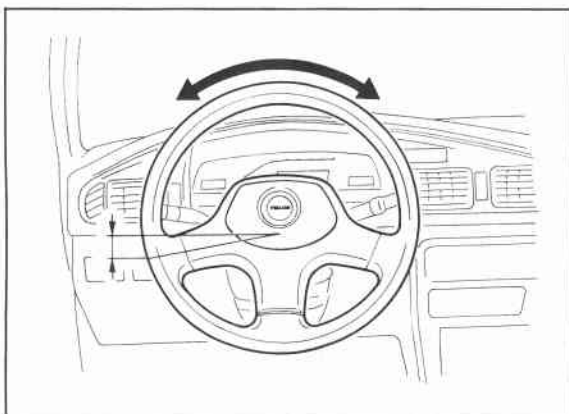
*... Only for electronically - controlled type

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4WS Rear Steering Gear



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ON-VEHICLE MAINTENANCE

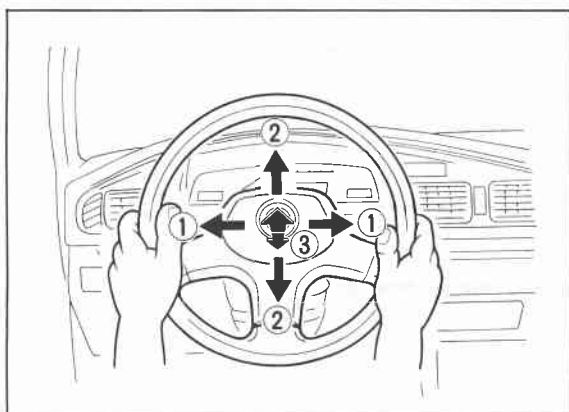
STEERING WHEEL PLAY

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: 0—30 mm (0—1.18 in)

Note

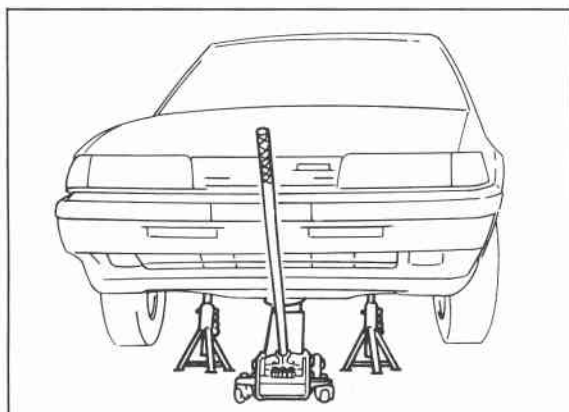
If play exceeds specification, either the steering joints are worn or backlash of the steering gear is excessive.



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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.



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STEERING WHEEL EFFORT

Manual Steering

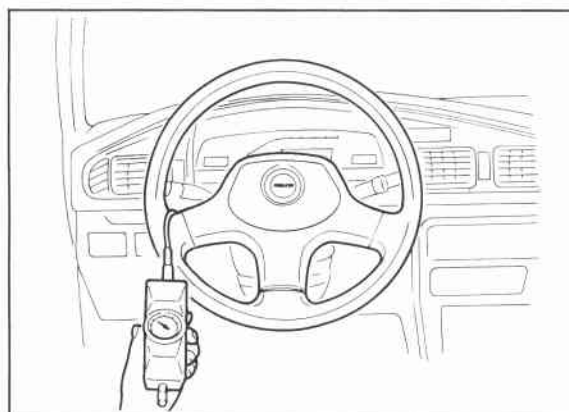
1. Jack up the vehicle. Move the steering wheel to put the wheels in the straight-ahead position.
2. Measure the steering wheel effort by connecting a pull scale to the outer circumference of the steering wheel.

Steering wheel effort:

**5—25 N (0.5—2.5 kg, 1—5.5 lb)
[during one turn of the steering wheel]**

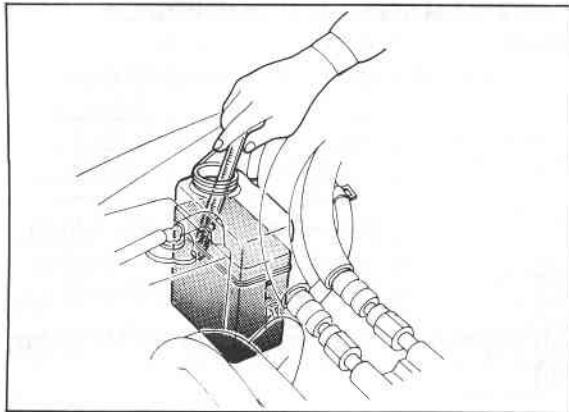
Note

Measure after turning the steering wheel to the left and right at least 5 times.

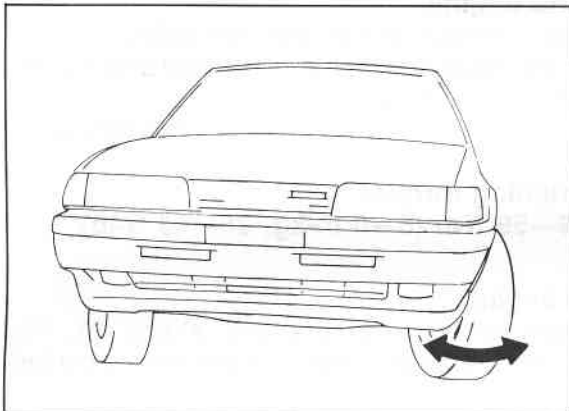


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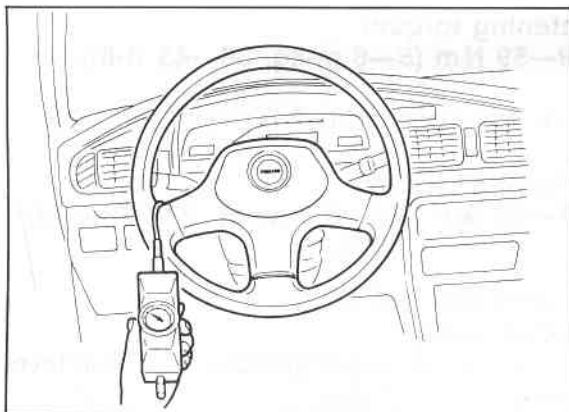
3. If the measured value exceeds specification, check the following: rotation-starting torque of pinion, rotation torque of each ball-joint, and joints.



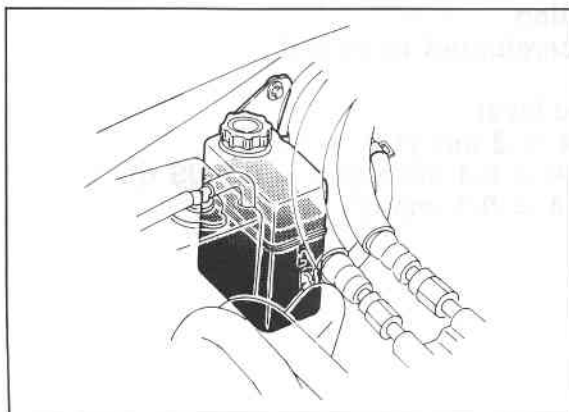
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86U10X-017

Power Steering

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)**, pull scale.
3. Attach a pull scale to the outer circumference of the steering wheel. 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.
4. If the measured value exceeds 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.

Steering wheel effort:

ESPS Type

25—31N (2.6—3.2 kg, 6—7 lb)

ECPS Type

15—23 N (1.7—2.3 kg, 3—5 lb)

4WS Type

25—35N (2.5—3.5 kg, 6—8 lb)

[during one turn of the steering wheel]

Note (4WS)

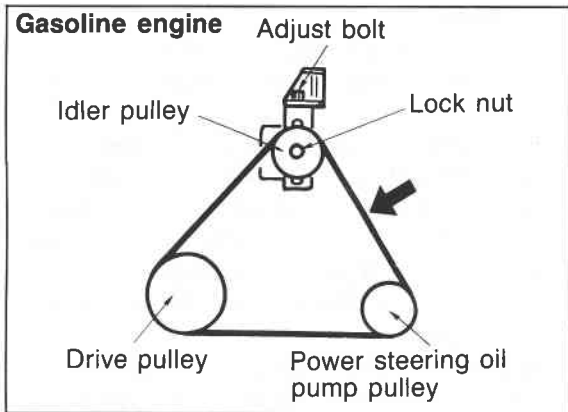
- 1) If not within specification, separate the transfer shaft from the front steering gear and check again.
- 2) If still not within specification, there is a malfunction of the front steering gear.
- 3) If the measured value is now within specification, check the transfer shaft and rear steering gear. (Refer to Page 10—45.)

POWER STEERING FLUID LEVEL

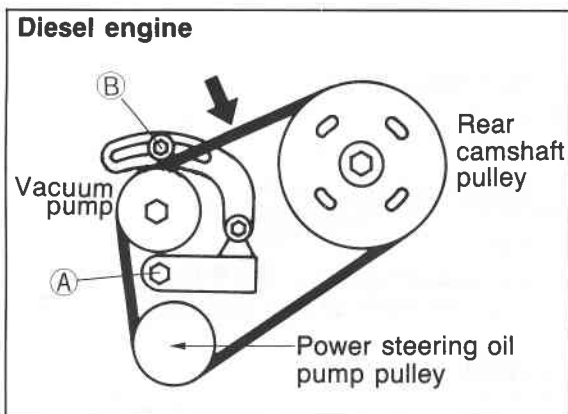
Check the power steering fluid level, and add fluid to the specified level if necessary.

Caution

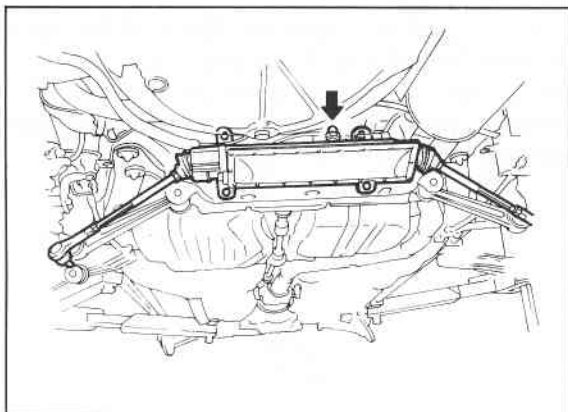
Use only the specified power steering fluid.



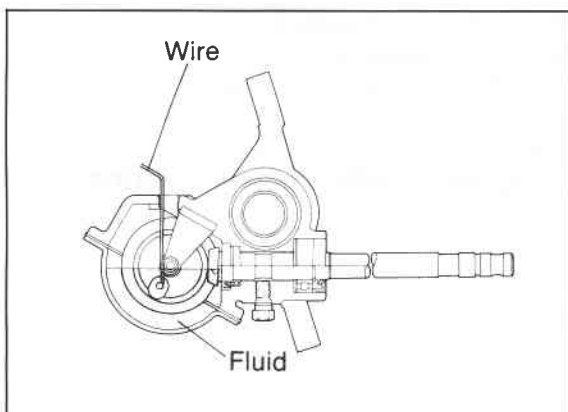
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86U10X-250

LOOSE OR DAMAGED OIL PUMP BELT Inspection

Inspect the oil pump belt for looseness or damage.

Power steering oil pump drive belt	Deflection	
	New	Used
Gasoline engine	8—10 mm (0.31—0.39 in)	9—11 mm (0.35—0.43 in)
Diesel engine	6.5—7.5 mm (0.26—0.30 in)	7—8 mm (0.28—0.31 in)

[When depressed with a force of 98 N (10 kg, 22 lb)]

Adjustment

Gasoline engine

1. Loosen the lock nut on the idler pulley.
2. Turn the adjust bolt on the idler pulley until the correct tension is obtained.
3. Tighten the lock nut and recheck the tension.

Tightening torque:

49—59 N·m (5—6 m·kg, 36—43 ft·lb)

Diesel engine

1. Loosen the vacuum pump bolt (A) and (B).
2. Lever the vacuum pump outward and apply tension to the belt.
3. Tighten the adjust bolt (B).

Tightening torque:

49—59 N·m (5—6 m·kg, 36—43 ft·lb)

4. Tighten the mounting bolt (A).

Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

REAR STEERING GEAR OIL

Fluid Level (4WS)

Remove the bleeder valve, and check the fluid level with a wire.

Caution

Be careful not to let dirt in.

Fluid level

44 ± 3 mm (1.7 ± 0.1 in)

0.9 ± 0.1 liters (1.0 ± 0.1 US qt,

0.8 ± 0.1 Imp qt)

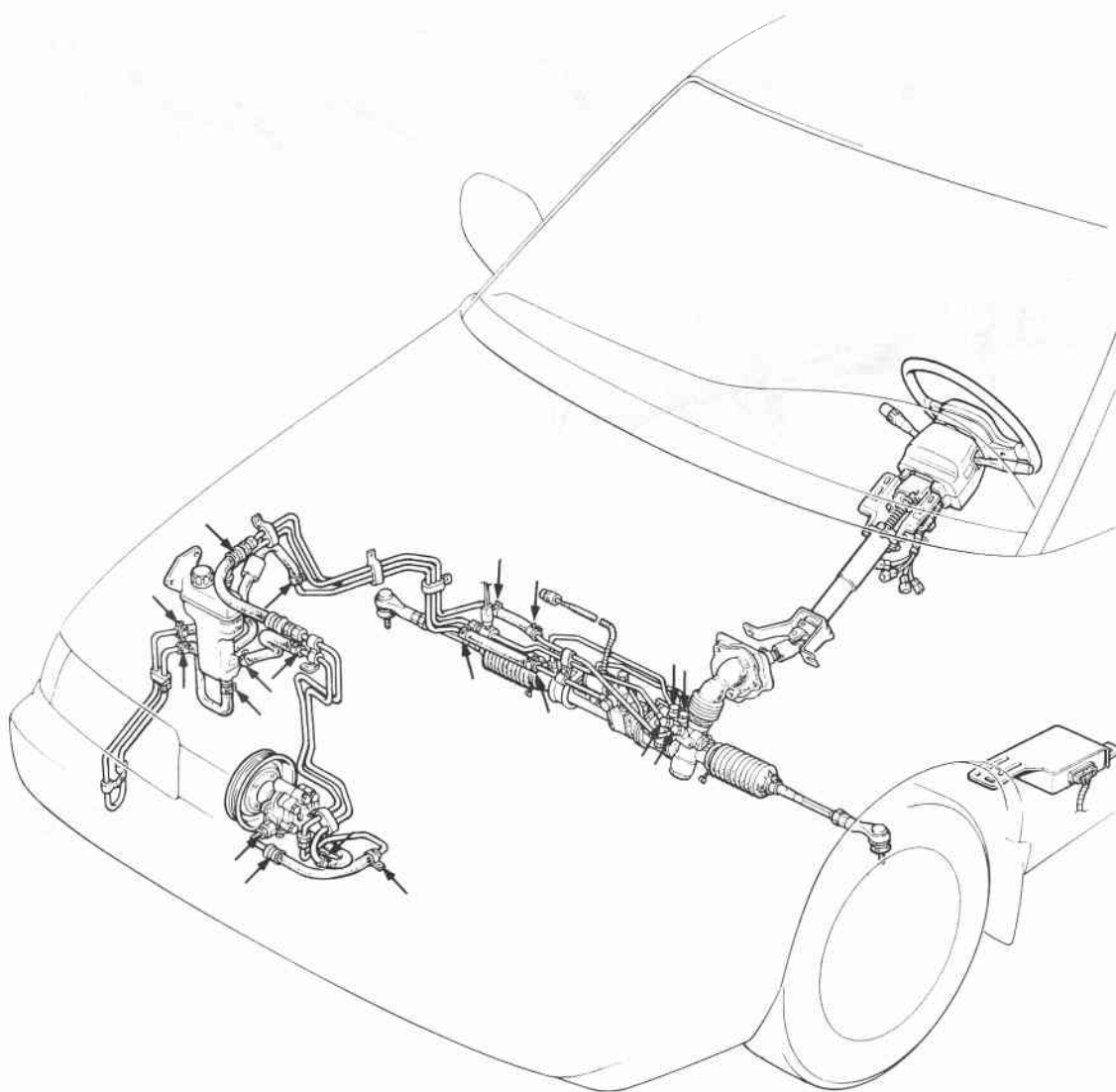
LEAKAGE OF POWER STEERING FLUID

Check the following points for fluid leakage:

1. Gear
2. Oil pump
3. All fluid pipes and connections
4. Solenoid valve (ECPS Type, 4WS Type)

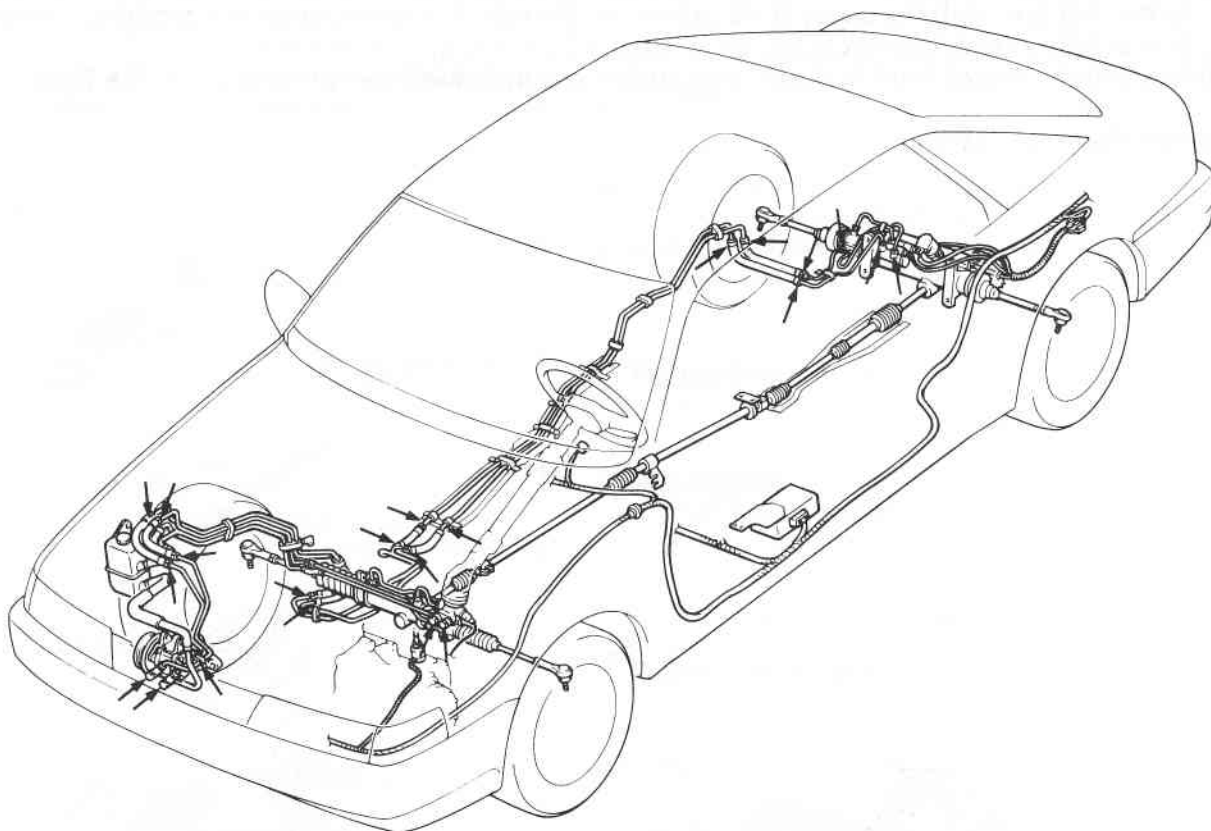
Note

- a) Start the engine, and check for fluid leakage after turning the steering wheel completely to the left and right to apply fluid pressure. Do not, however, keep the steering wheel in the fully turned position for more than 15 seconds.
- b) The points where fluid leakage may occur are indicated by the arrows in the figure.

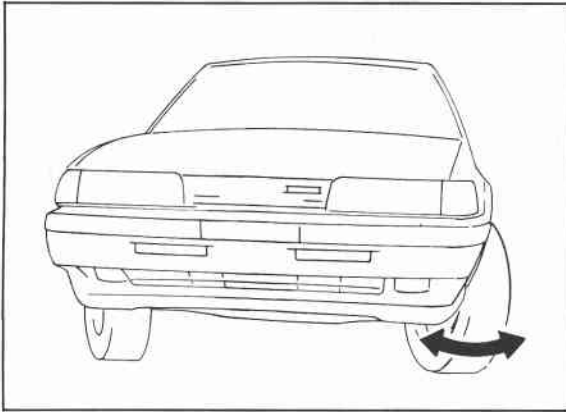
Power Steering (2WS)

10 ON-VEHICLE MAINTENANCE

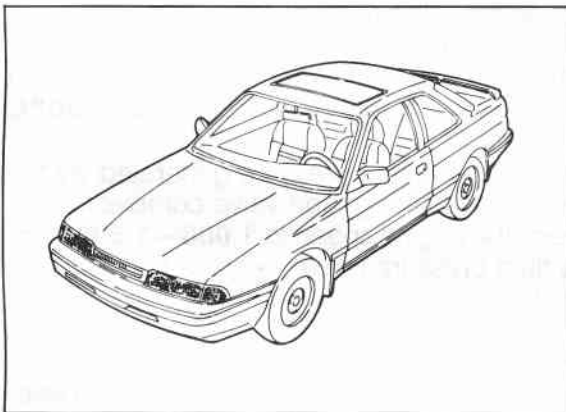
Power Steering (4WS)



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86U10X-021



86U10X-022

INSPECTION AND ADJUSTMENT

BLEEDING OF POWER STEERING SYSTEM

1. Check the fluid level, and add fluid if necessary.
2. Turn the steering wheel fully in both directions 5 times (engine not running).
3. Recheck the fluid level. If the level has lowered, add fluid, and repeat from step 1.

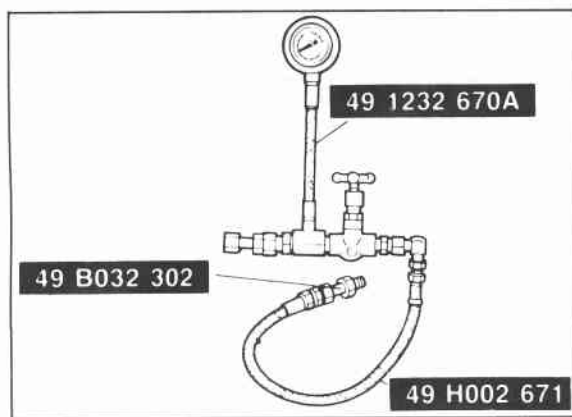
4. Start the engine, and run it at idle.
5. Turn the steering wheel fully in both directions 5 times to bleed air from the system.
6. Check that the fluid is not foamy and the fluid level has not lowered.
If a problem is found, add fluid as necessary and repeat from step 5.

Note

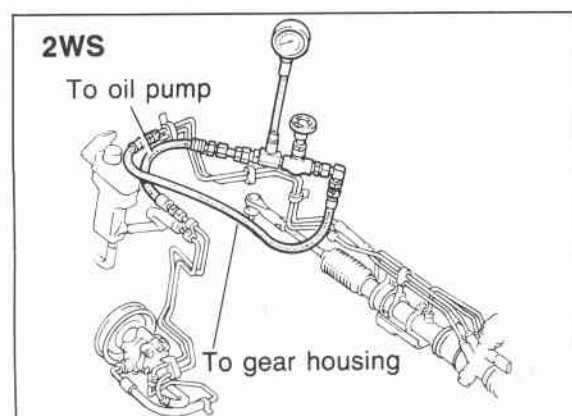
If bleeding is not done completely, the following problems may appear:

- Foamy fluid on level gauge.
- Noise from power steering oil pump.

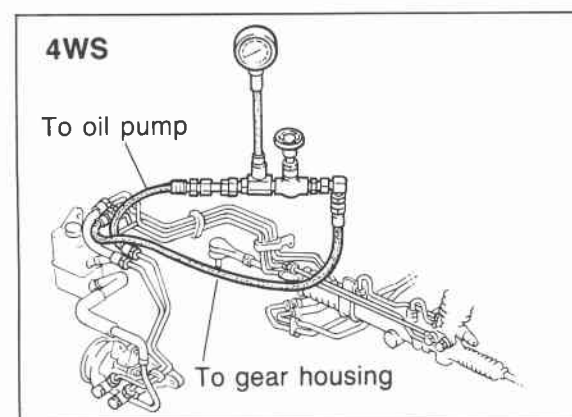
10 INSPECTION AND ADJUSTMENT



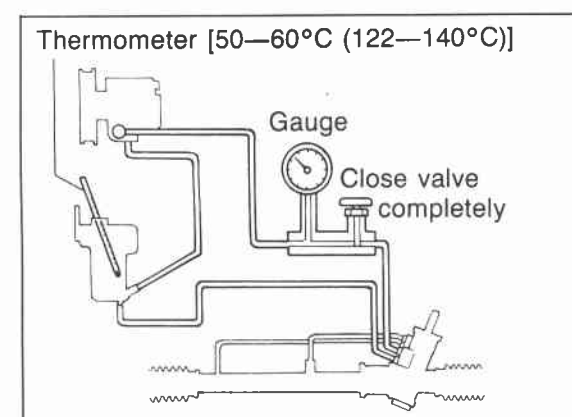
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86U10X-024



86U10X-025



86U10X-026

POWER STEERING PRESSURE

1. Disconnect the high-pressure hose of the gear housing side, and attach the **SST**.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

2. Bleed air from the system.
3. Open the gauge valve fully, then start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.
4. To measure the fluid pressure generated by the oil pump, close the gauge valve completely and increase the engine speed to **1,000—1,500 rpm**. If the fluid pressure is low, replace the oil pump assembly.

Warning

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

Oil pump fluid pressure

2WS

7,355—7,846 kPa
(75—80 kg/cm², 1,066—1,138 psi)

4WS

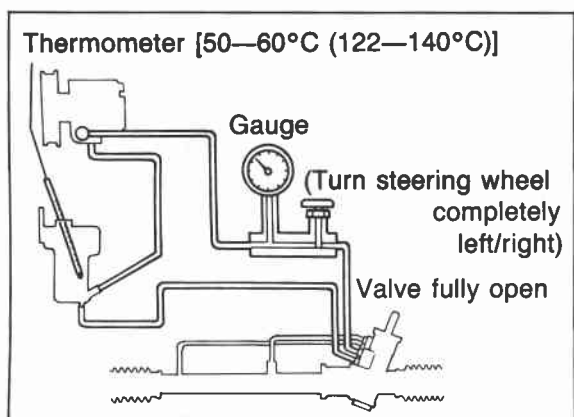
Front 8,093—8,829 kPa
(82.5—90.0 kg/cm², 1,173—1,280 psi)

Rear 7,112—7,848 kPa
(72.5—80.0 kg/cm², 1,031—1,138 psi)

5. To measure the fluid pressure generated at the gear housing, first open the gauge valve completely, increase the engine speed to **1,000—1,500 rpm**, and then turn the steering wheel fully to the left and right.

Warning

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



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Gear housing fluid pressure

2WS

7,355—7,846 kPa

(75—80 kg/cm², 1,066—1,138 psi)

4WS

Front 8,093—8,829 kPa

(82.5—90.0 kg/cm², 1,173—1,280 psi)

Rear More than 2,943 kPa

(More than 30 kg/cm², more than 427 psi)

If the fluid pressure is low, repair or replace the gear box.

6. Remove the gauge set, then tighten the high-pressure hose to the specified torque.

Tightening torque:

31—36 N·m (3.2—3.7 m·kg, 23—27 ft·lb)

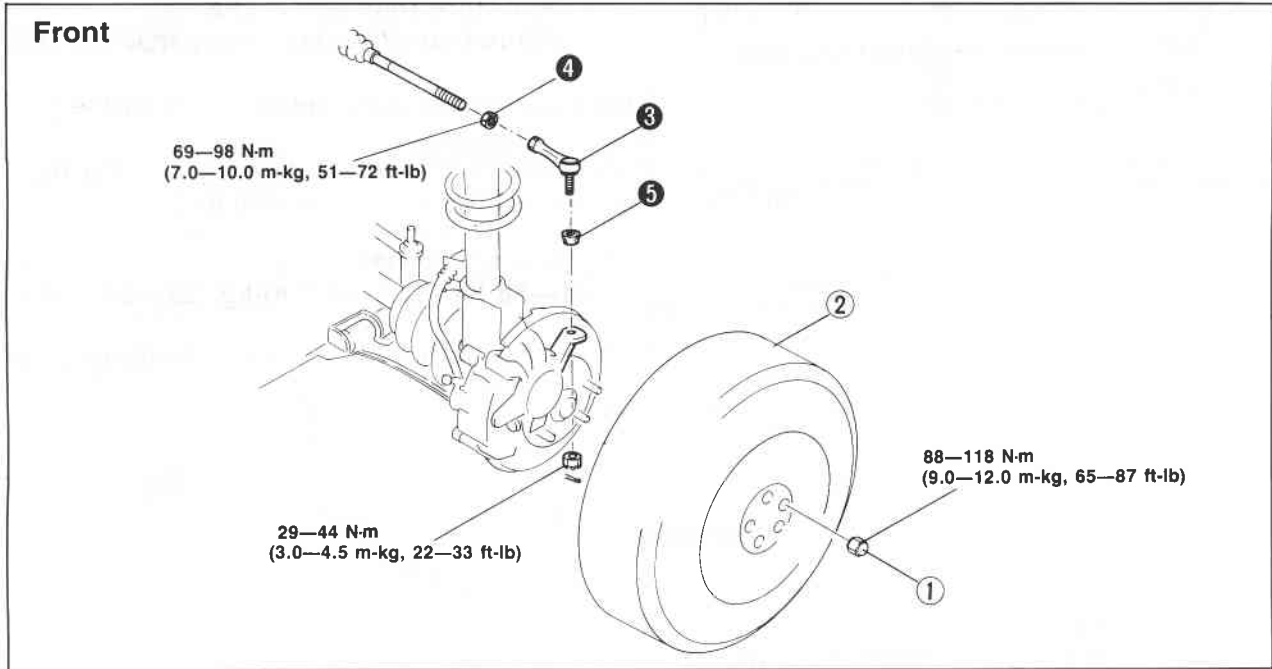
7. Bleed the air from the system. (Refer to page 10—15.)

10 TIE-ROD END BOOT

TIE-ROD END BOOT

REMOVAL AND INSTALLATION

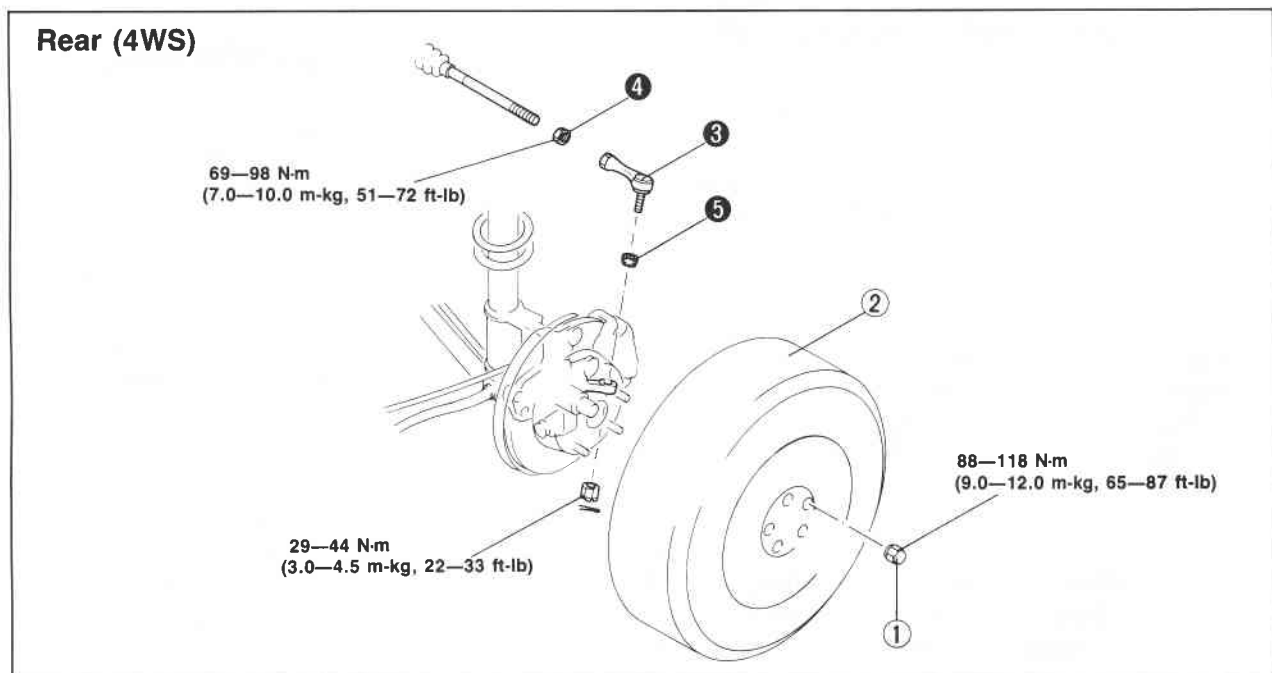
1. Jack up the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to the installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.



1. Lug nuts
2. Wheel

3. Tie-rod end
4. Nut

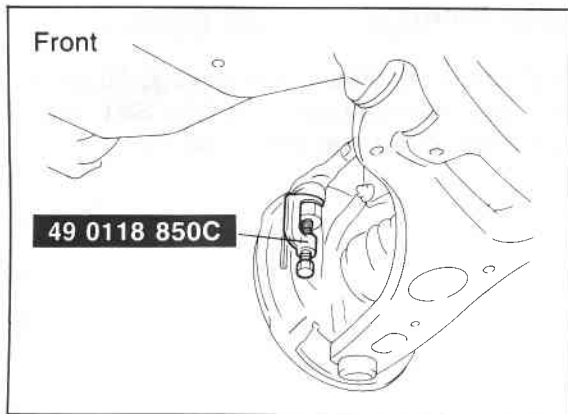
5. Boot



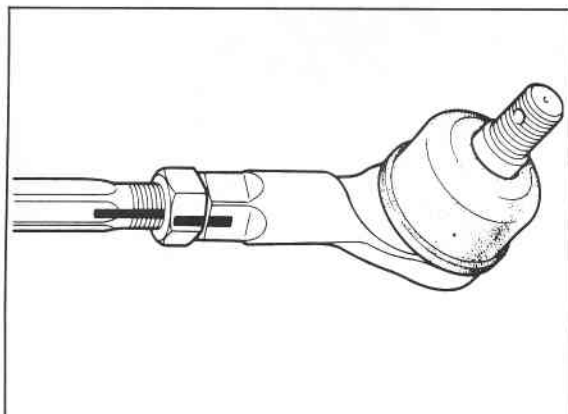
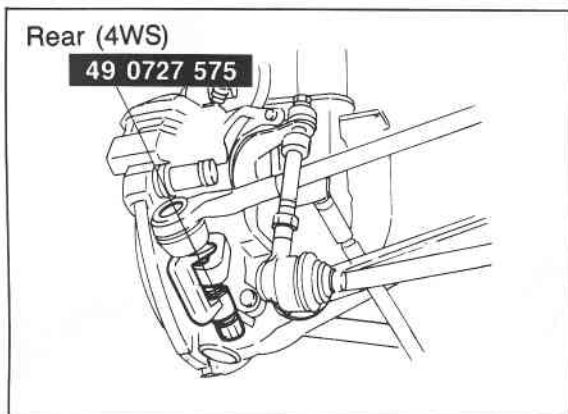
1. Lug nuts
2. Wheel

3. Tie-rod end
4. Nut

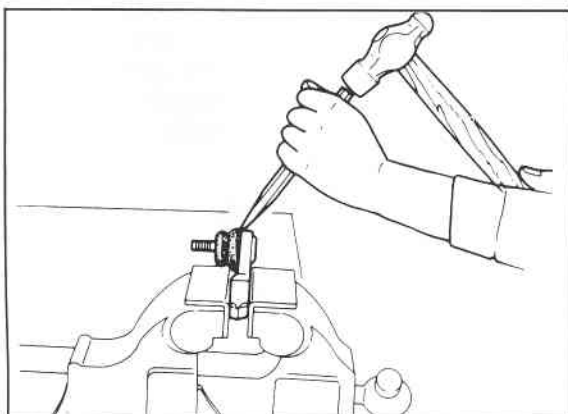
5. Boot



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86U10X-031

Removal Note

Tie-rod end

Separate the tie-rod end from the knuckle using the SST.

Nut

Before removing the nut from the tie-rod end, make a mark for reference during installation.

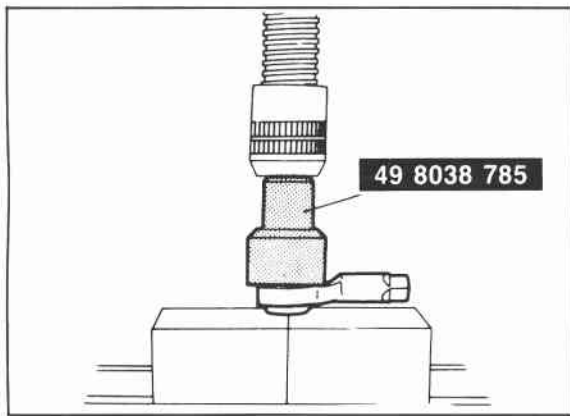
Boot

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

Caution

Be careful not to scar the part where the boot is attached to the tie-rod end.

10 TIE-ROD END BOOT



86U10X-032

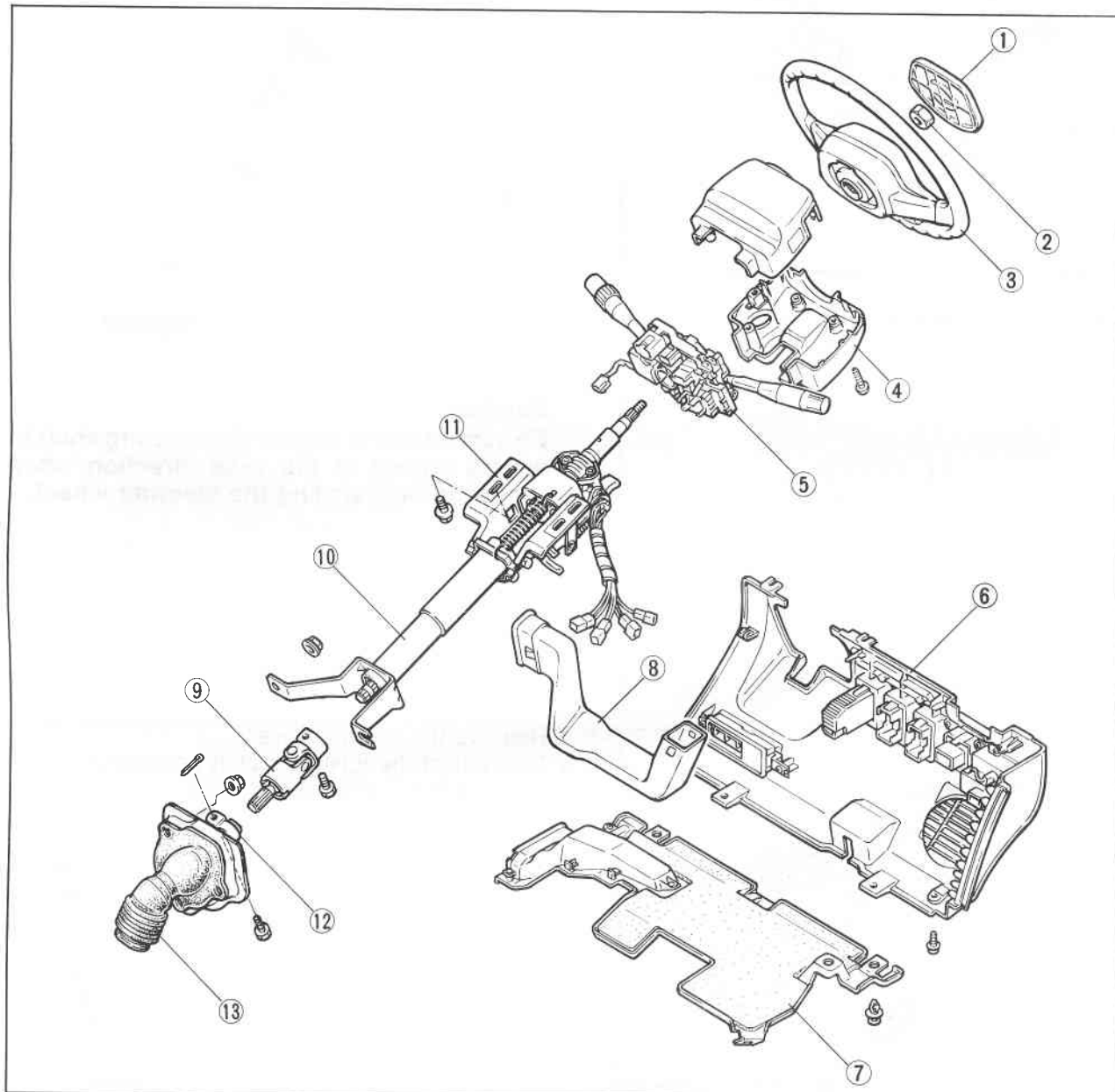
Installation Note

Boot

Put a small amount of grease (lithium base, NLGI No. 2) into the new boot and set it onto the **SST**. Install the boot to the tie-rod end with a press.

STEERING WHEEL AND COLUMN

STRUCTURAL VIEW



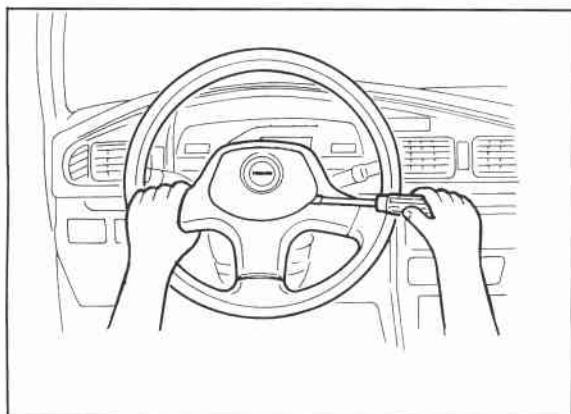
76G10X-006

1. Horn cap
2. Lock nut
3. Steering wheel
4. Column cover
5. Combination switch

6. Switch panel
7. Lower panel
8. Duct
9. Universal joint
10. Steering shaft

11. Steering shaft assembly
12. Intermediate shaft
13. Dust boot

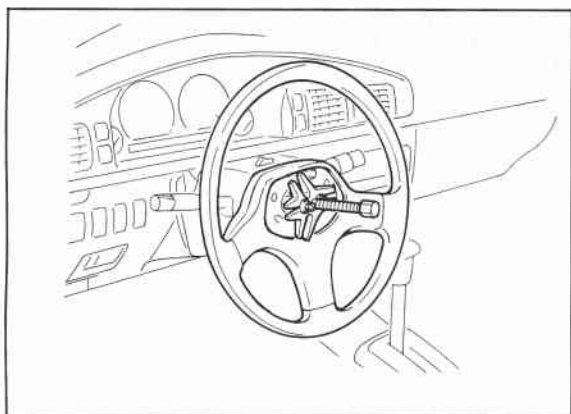
10 STEERING WHEEL AND COLUMN



76G10X-007

REMOVAL

1. Remove the horn cap.
2. Remove the locknut.

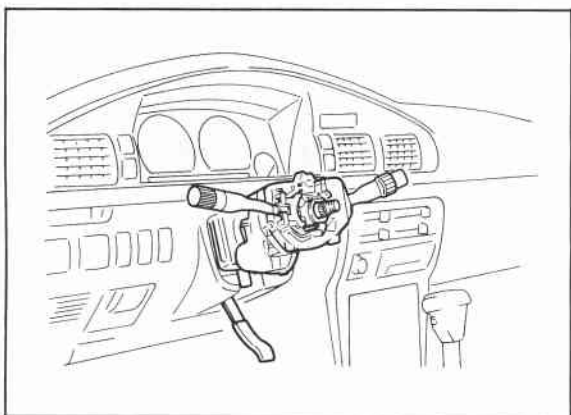


76G10X-008

3. The steering wheel must be removed with a suitable puller.

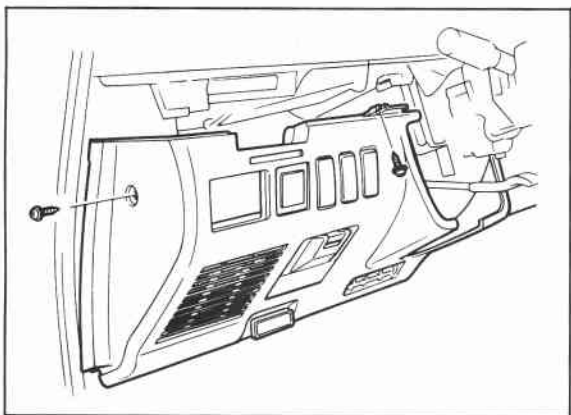
Caution

Be careful not to subject the steering shaft to severe impact in the axial direction when removing or installing the steering wheel.



76G10X-009

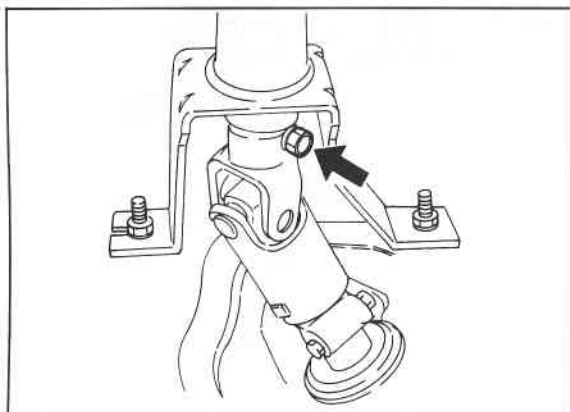
4. Remove the column cover.
5. Disconnect the ignition switch connector.
6. Remove the combination switch.



76G10X-010

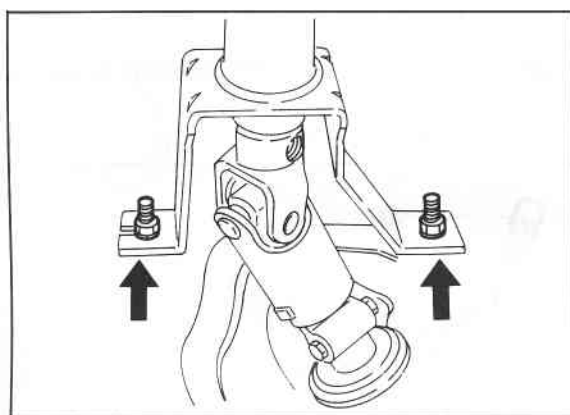
7. Remove the lower panel and switch panel.
8. Remove the duct.

STEERING WHEEL AND COLUMN 10



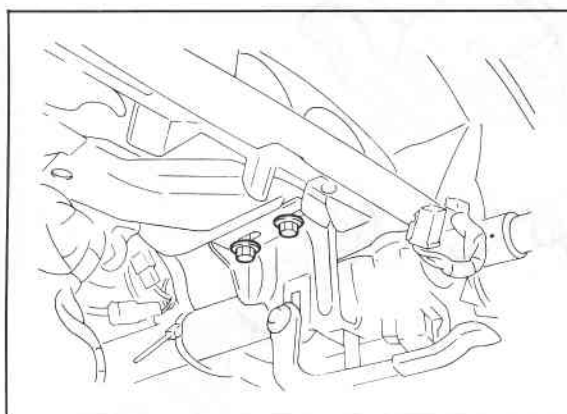
76G10X-011

9. Remove the bolt connecting the universal joint and steering shaft.



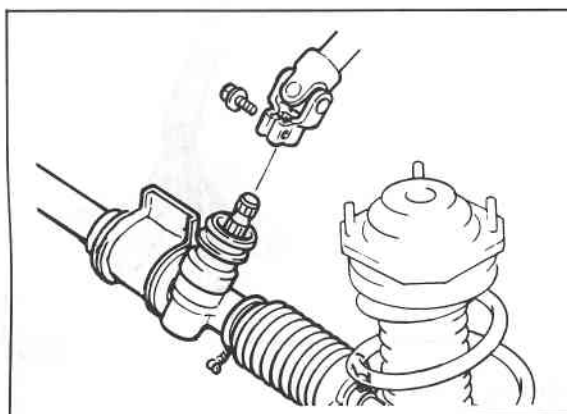
76G10X-012

10. Remove the nuts from the lower bracket of the steering shaft.



76G10X-013

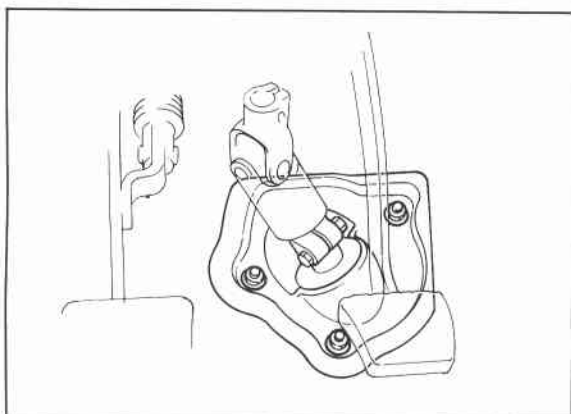
11. Remove the bolts from the upper bracket of the steering shaft.
12. Remove the steering shaft assembly.



76G10X-014

13. Remove the bolts from the intermediate shaft.

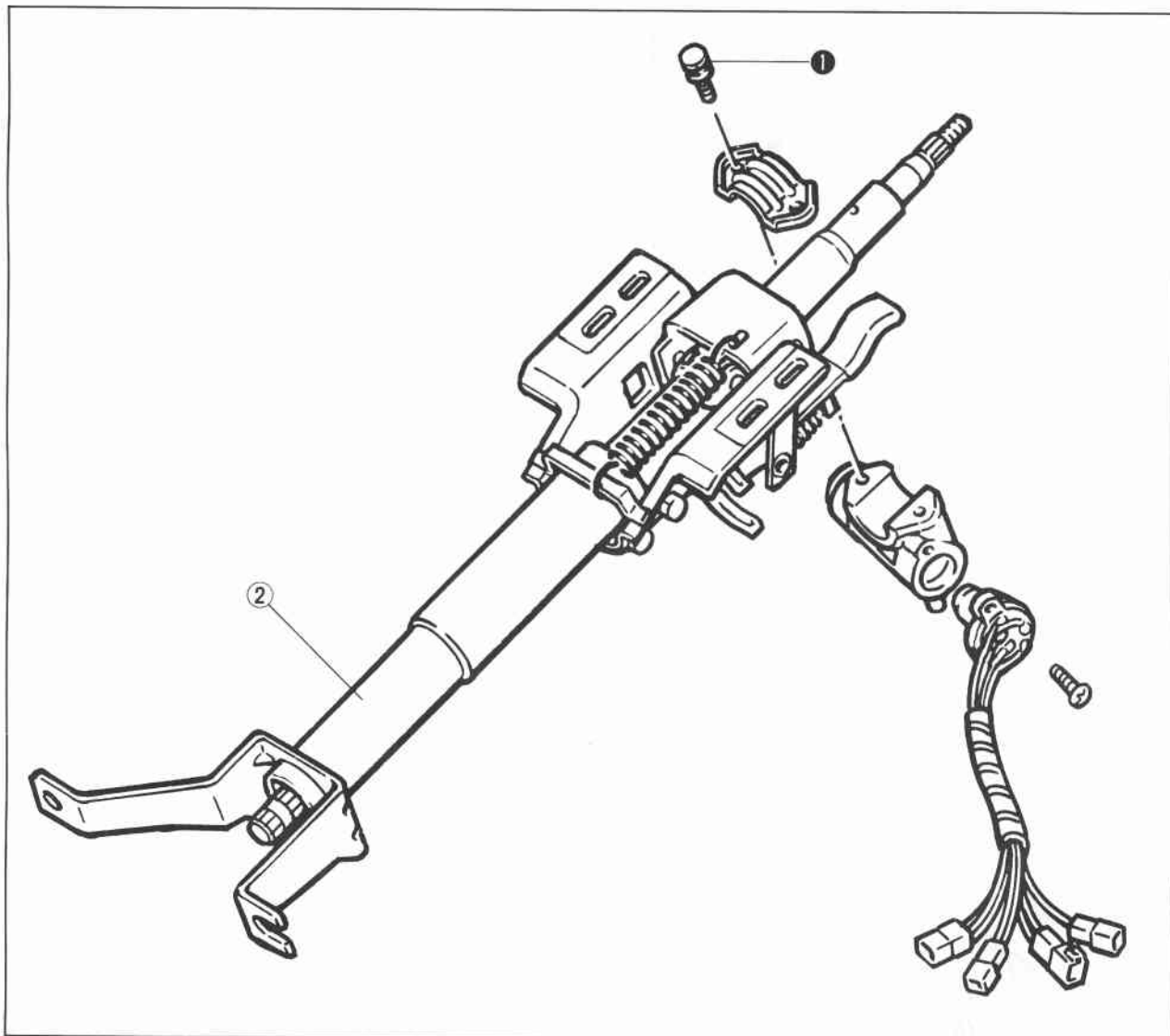
10 STEERING WHEEL AND COLUMN



14. Remove the dust cover assembly.
15. Remove the intermediate shaft.

DISASSEMBLY AND ASSEMBLY

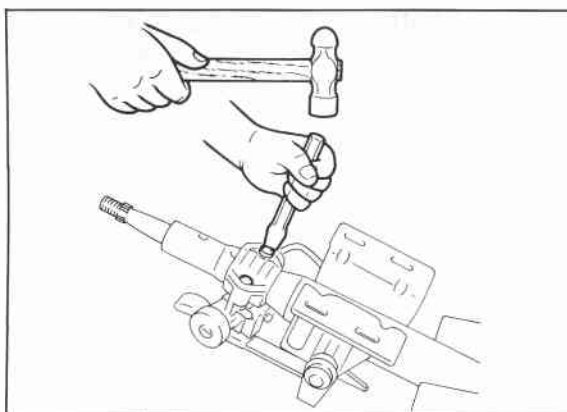
1. Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.
2. Assemble in the reverse order of removal, referring to the assembly note.



1. Steering lock bolt

2. Steering shaft

86U10X-043

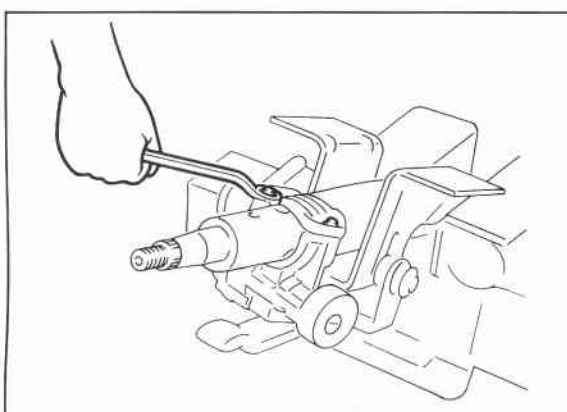


86U10X-44

Disassembly Note

Steering lock

Use a chisel to make a groove in the head of the steering lock installation screws. Remove the screws with a screwdriver; then remove the steering lock.



86U10X-045

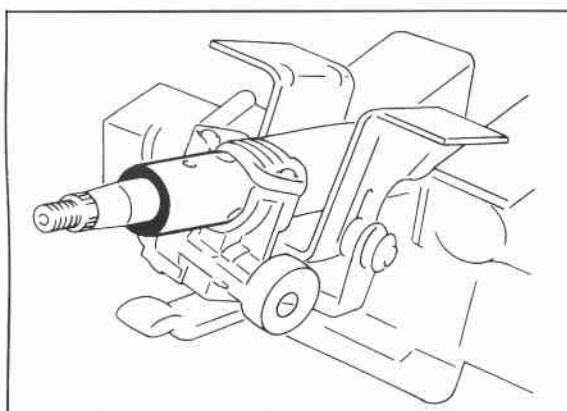
Assembly Note

Steering lock

Install the steering lock on the jacket; then use new steering lock mounting screws, and tighten them until the heads break off.

Caution

Check the operation of the lock while tightening the steering lock mounting screws.



86U10X-046

INSPECTION

Check the following and replace any faulty parts.

Shaft

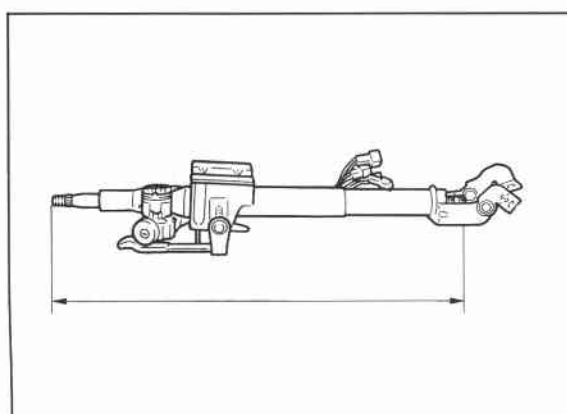
1. Wear of column bushing

2. Length of steering column

Length:

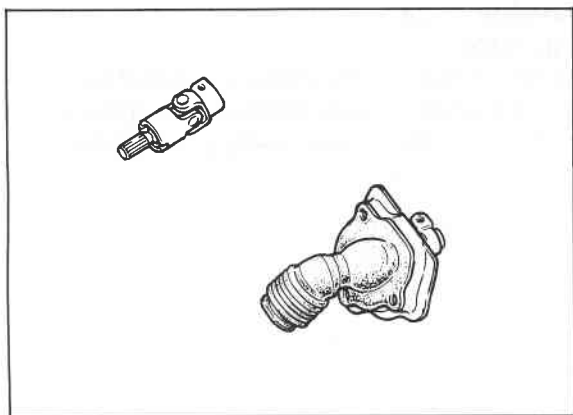
614—616 mm (24.2—24.3 in)

3. Damage of column



86U10X-047

10 STEERING WHEEL AND COLUMN



86U10X-048

Intermediate Shaft and Universal Joint

Looseness, abnormal noise, or sticking while rotating

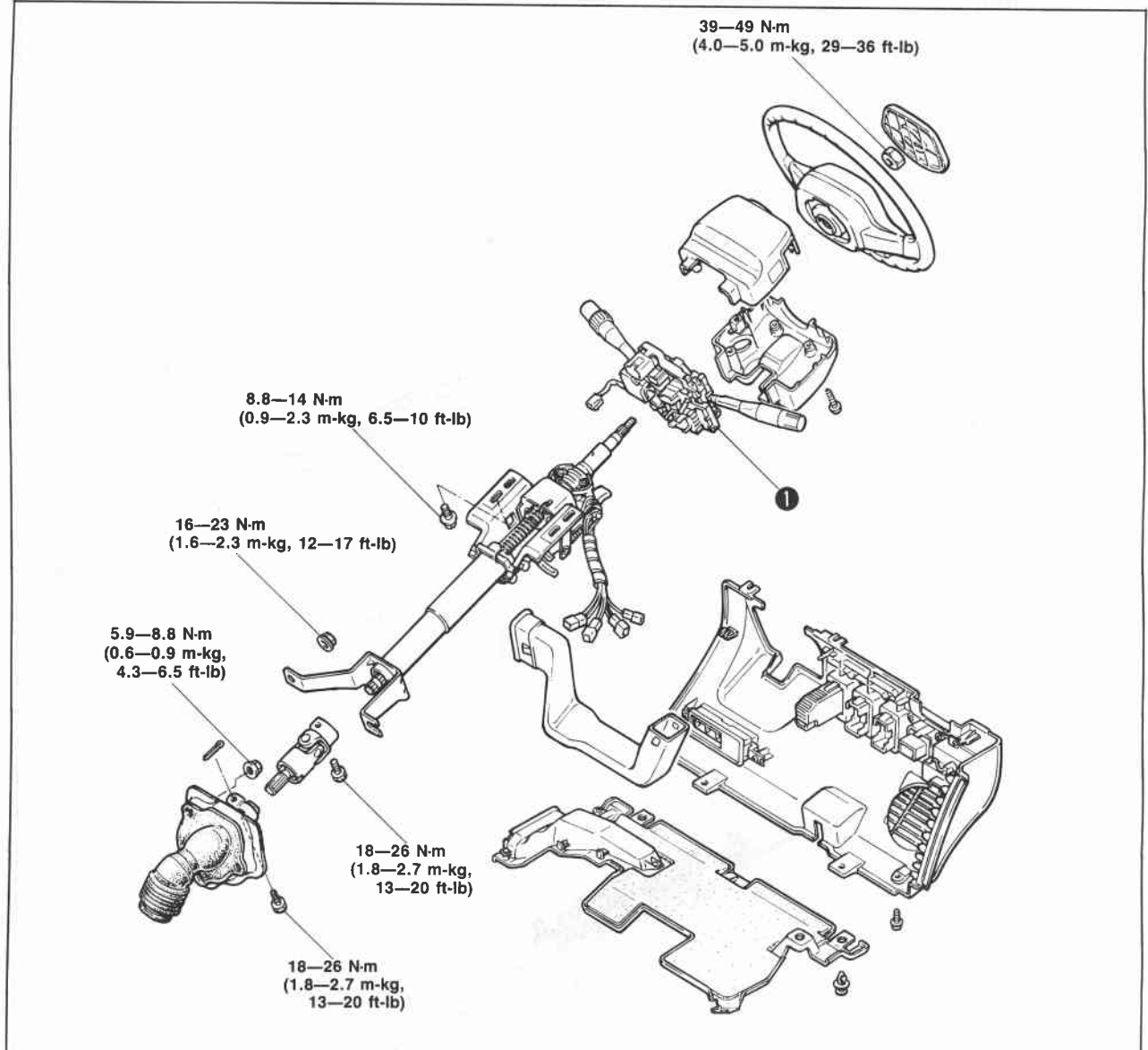
Dust Boot

Damage or deterioration

INSTALLATION

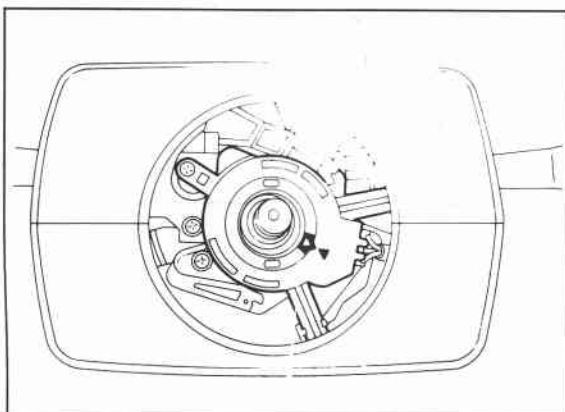
Install in the reverse order of removal, referring to the installation note for specially marked parts.

Torque specifications



86U10X-049

1. Combination switch



86U10X-050

Installation Note

Combination switch (angle sensor)

Position the angle sensor in the following order:

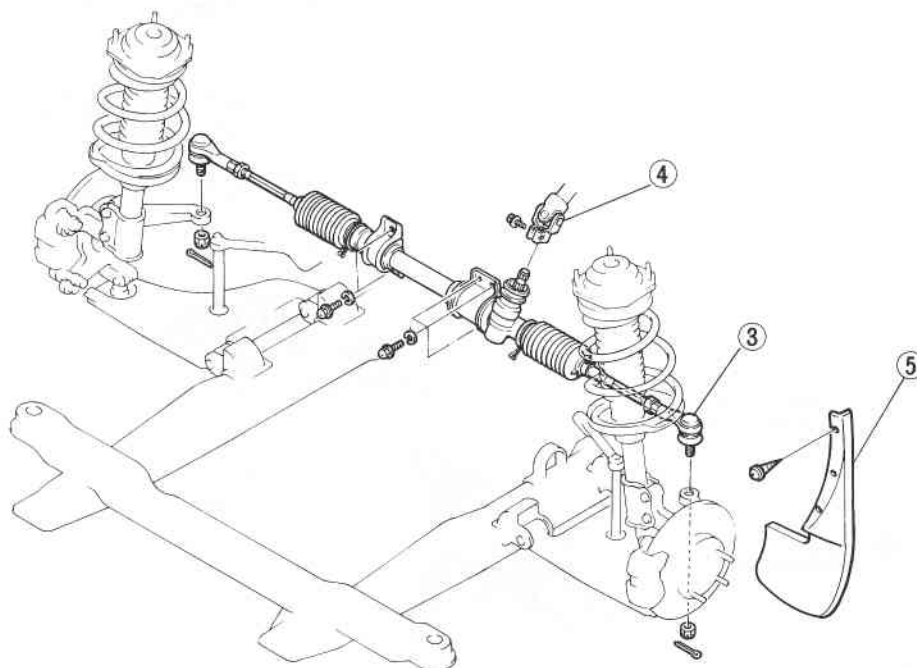
1. Set the wheels in the straight-ahead position.
2. Align the alignment marks (arrows).

10 STEERING GEAR AND LINKAGE

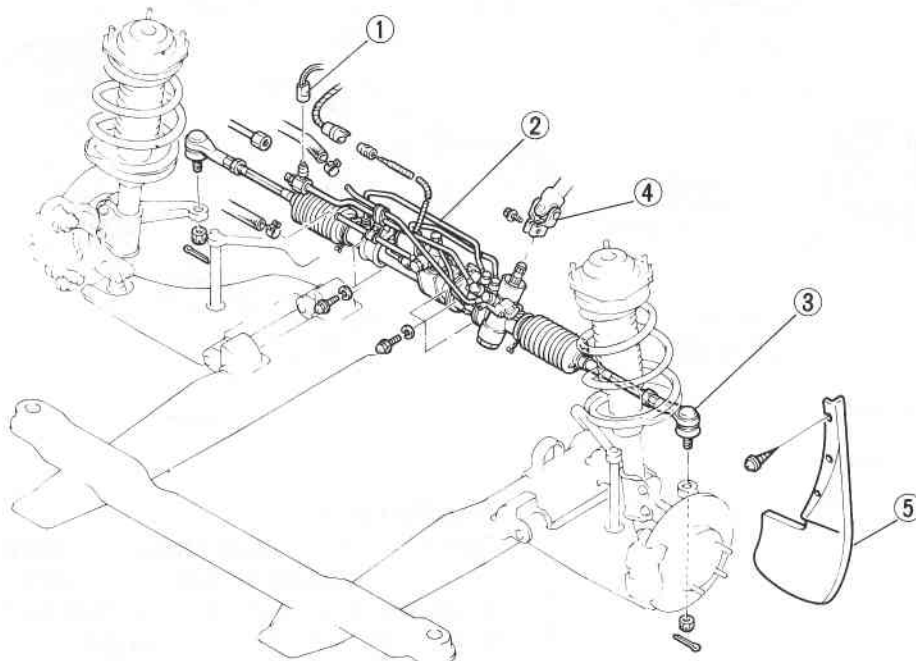
STEERING GEAR AND LINKAGE

STRUCTURAL VIEW

Manual steering



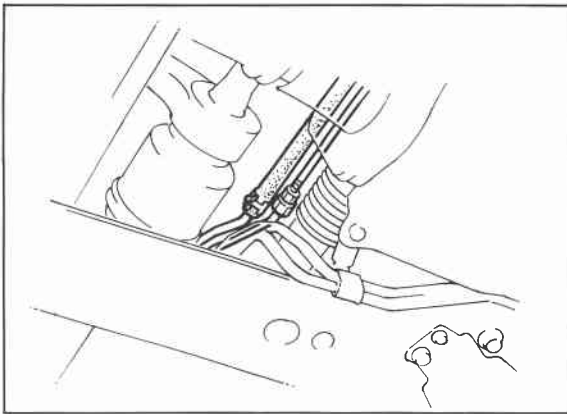
Power steering



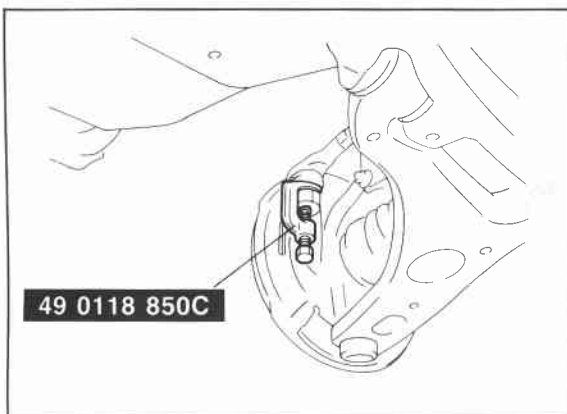
86U10X-051

- 1. Oil pressure switch connector
- 2. Pipes
- 3. Tie-rod end

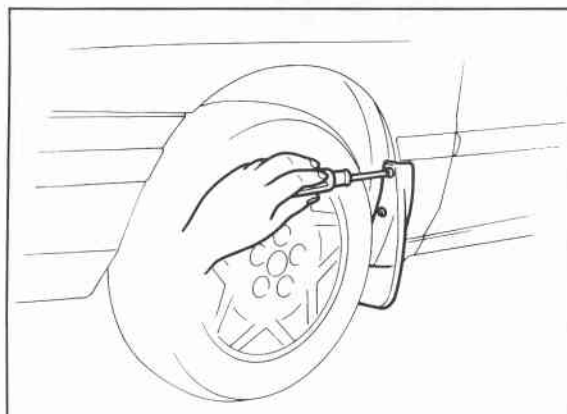
- 4. Steering shaft universal joint
- 5. Mud flap



86U10X-052



86U10X-053



86U10X-054

REMOVAL

Note

The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.

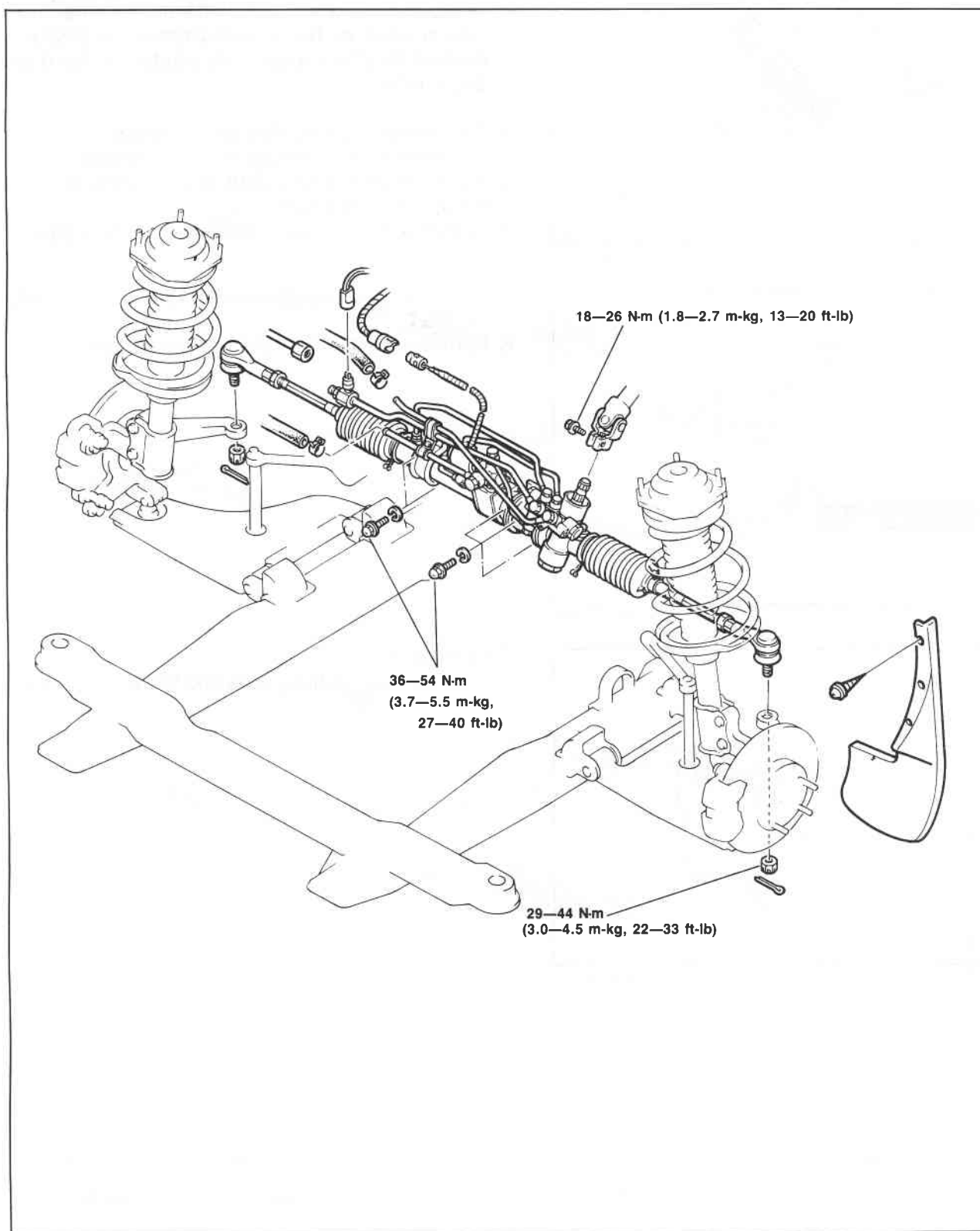
1. Disconnect the negative battery cable.
2. Disconnect the pressure switch connector.
3. Raise the vehicle on a lift or safety stands, and remove the front wheels.
4. Disconnect the power steering hose and pipe.
5. Disconnect the tie-rod ends from the knuckles with the **SST**.
6. Remove the steering shaft universal joint.
7. Remove the mud flap.
8. Remove the mounting bolts and the steering gear.

10 STEERING GEAR AND LINKAGE

INSTALLATION

Install in the reverse order of removal.

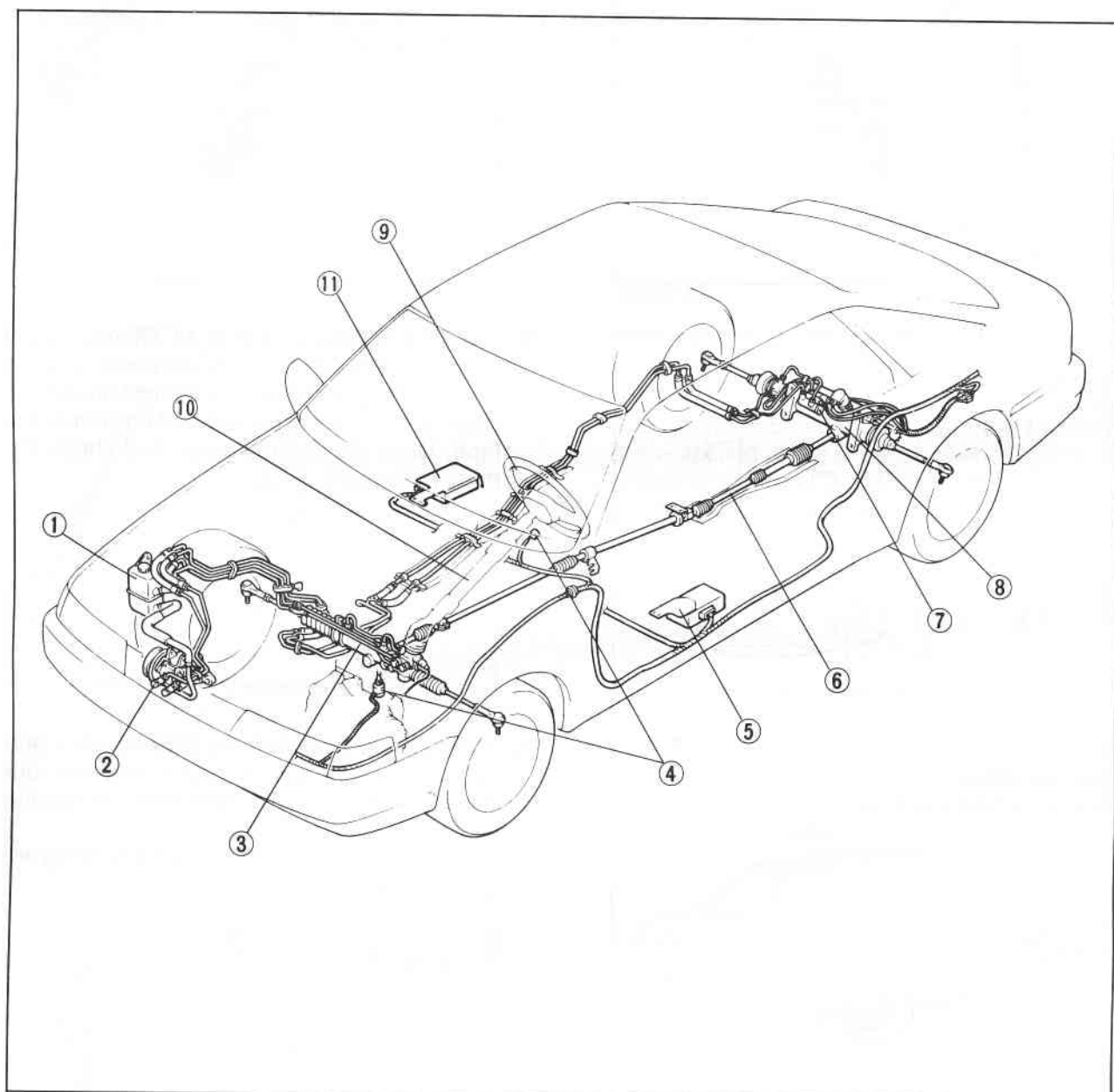
Torque Specifications



86U10X-055

4-WHEEL STEERING GEAR AND LINKAGE

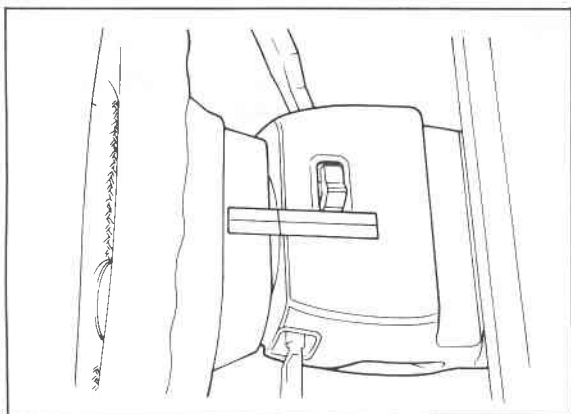
STRUCTURAL VIEW



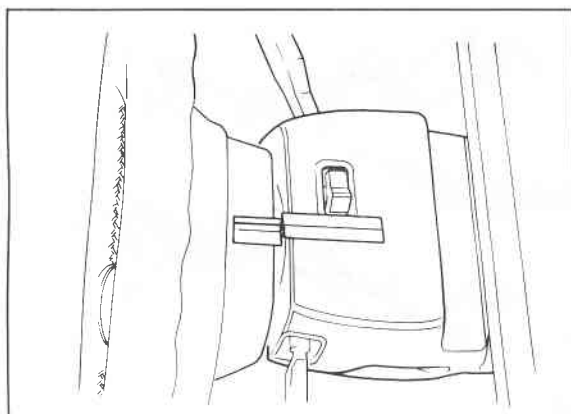
86U10X-056

- | | |
|---------------------------------|----------------------------------|
| 1. Reserve tank | 6. Steering angle transfer shaft |
| 2. Oil pump | 7. Solenoid valve |
| 3. Front steering gear assembly | 8. Rear steering gear assembly |
| 4. Speed sensor | 9. Steering wheel |
| 5. Control unit | 10. Steering shaft |
| | 11. Relay and timer |

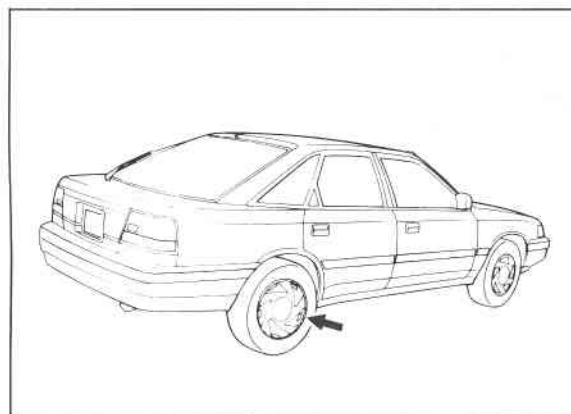
10 4-WHEEL STEERING GEAR AND LINKAGE



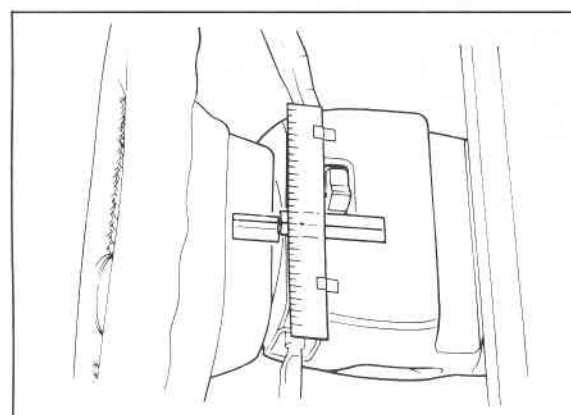
86U10X-301



86U10X-302



86U10X-303



86U10X-304

4WS PERFORMANCE INSPECTION

1. Steering Angle Transfer Shaft Alignment (Simple inspection)

- (1) Put masking tape on the steering wheel and column cover.

- (2) Drive the vehicle on a straight, flat road for at least 30 m (18.6 ft) and note the steering wheel position. Stop and mark the straight-ahead position on the steering wheel and column cover tape. Drive the vehicle again and check the marks.

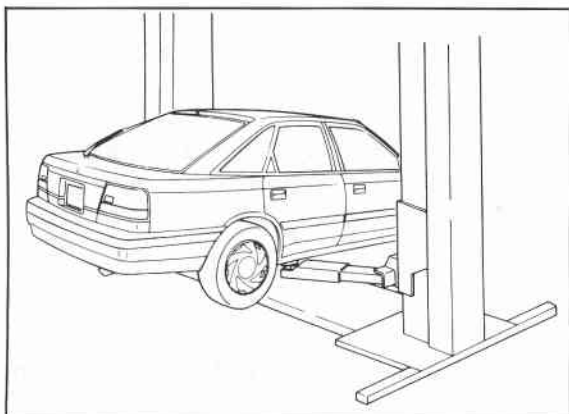
- (3) With the marks between the steering wheel and column cover aligned, check that the rear wheels do not turn off center when the engine is started.

- (4) If the rear wheels move, adjust the steering angle transfer shaft.

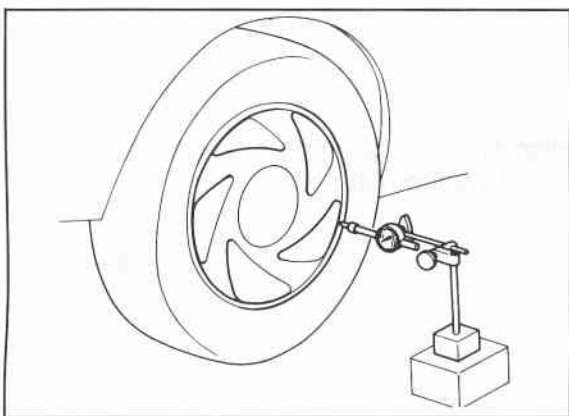
(Inspection by dial indicator)

- (1) Mark between the steering wheel and column cover as shown above.
- (2) Attach a scale on the column cover as shown in the illustration.

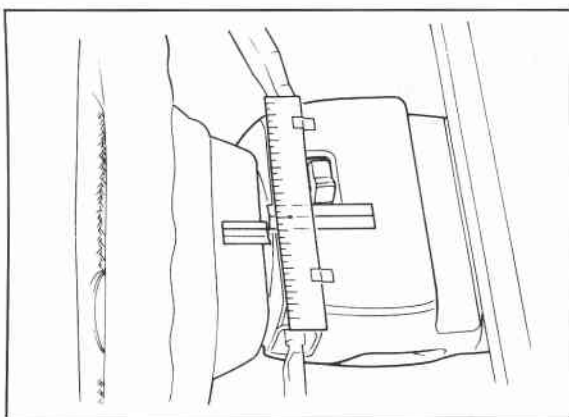
4-WHEEL STEERING GEAR AND LINKAGE 10



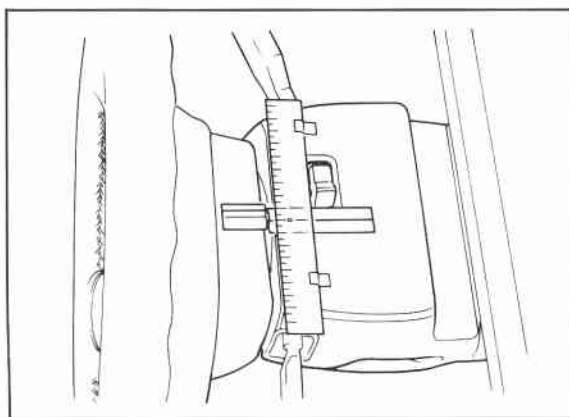
86U10X-305



86U10X-306



86U10X-307



86U10X-308

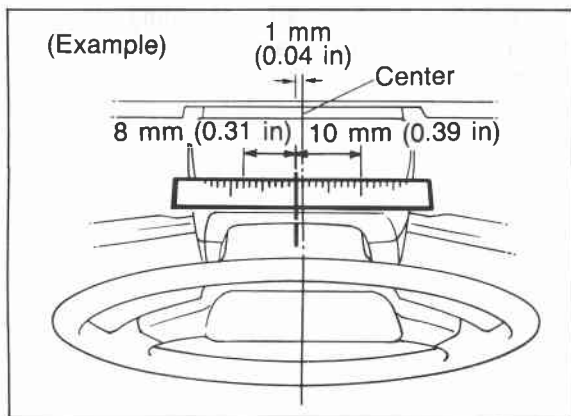
- (3) Raise the vehicle on a lift or safety stands.
- (4) Set a dial indicator against one rear tire. Set the pointer to 0.

- (5) With the marks on the steering wheel and column cover aligned, start the engine and turn the steering wheel slowly to the right. Using the scale on the column cover, note the rotation of the steering wheel at the point where the rear wheels begin to turn (dial indicator begins to move).

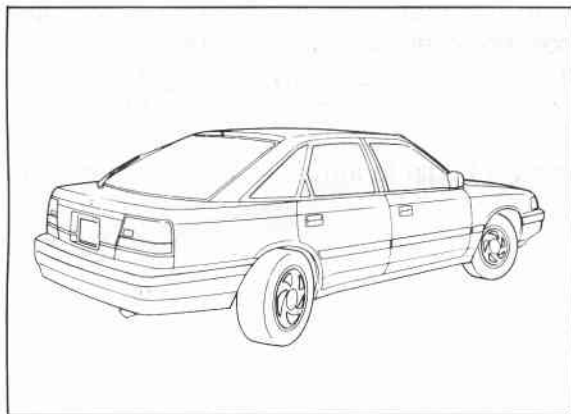
- (6) Turn the steering wheel left and right a few times to equalize the hydraulic pressure. Re-align the marks between the steering wheel and column cover.

- (7) Reset the dial indicator to 0 and turn the steering wheel slowly to the left. Using the scale on column cover, again note the rotation of the steering wheel at the point where the rear wheels begin to turn (dial indicator begins to move).

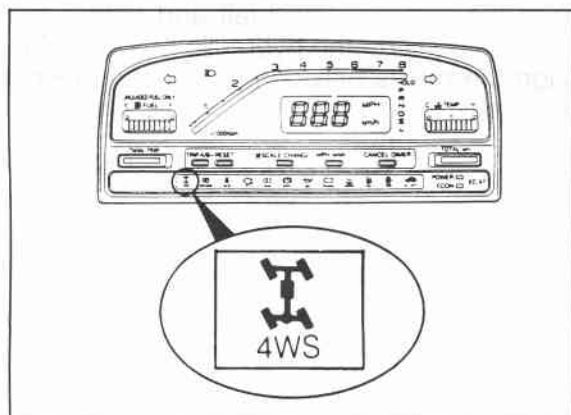
10 4-WHEEL STEERING GEAR AND LINKAGE



86U10X-309



86U10X-310



86U10X-311

- (8) The center position can be determined from the left/right measurements in (5) and (7) above.

Example:

Right rotation....10 mm (0.39 in)

Left rotation....8 mm (0.31 in)

Center = Right 1 mm (0.04 in)

- (9) Check that the center is within specification.

Specification

= R 5 mm (0.4 in) to L 5 mm (0.4 in)

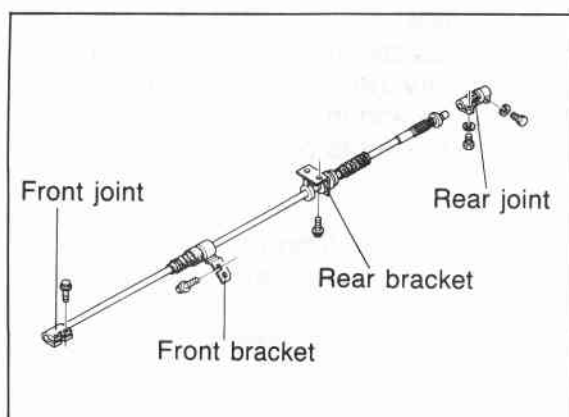
- (10) If not correct, adjust the steering angle transfer shaft.

2. Steering Inspection

With the vehicle stopped and the engine running, check that the rear wheels turn in the opposite direction when the steering wheel is turned and that there is no abnormal noise.

3. 4WS Electric System Inspection

Drive the vehicle and check that the 4WS warning light does not come on at over 40 km/h (25mph).



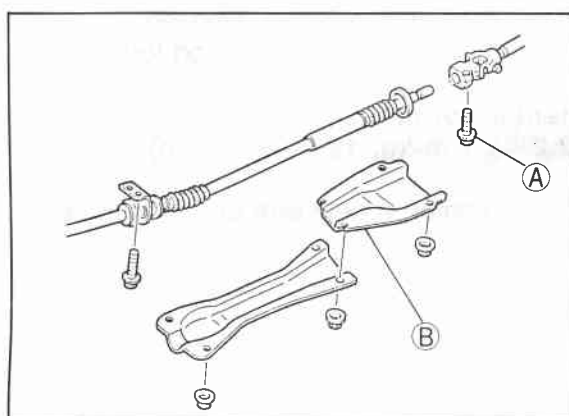
76G10X-033

ADJUSTMENT OF STEERING ANGLE TRANSFER SHAFT

If the steering angle transfer shaft is disconnected from the front or rear steering gear or after adjusting the wheel alignment, or if the rear steering angle is not correct, adjust the rear turning angle as described below.

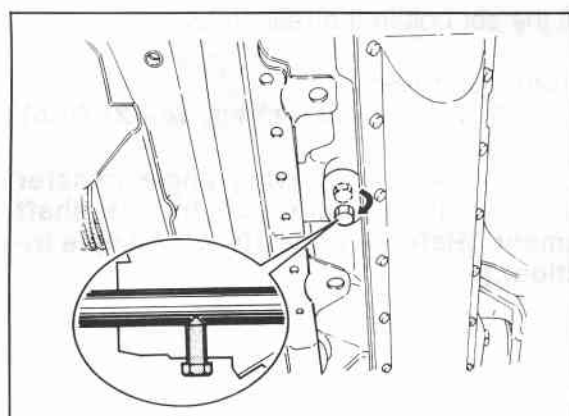
Warning

Improper installation of the 4WS steering transfer shaft may affect control of the vehicle and result in the risk of an accident or personal injury.



86U10X-313

1. Raise the vehicle on a lift or safety stands.
2. Remove cover B and joint bolt A.
3. Slide the shaft out of the joint.



86U10X-314

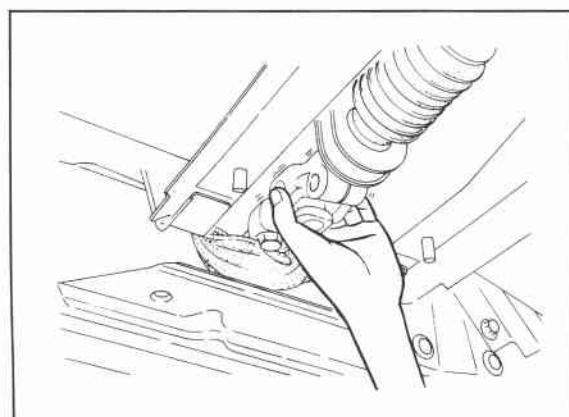
4. Remove the plug from the rear steering gear. Sight through the hole and turn the steering angle input shaft to align the notch in the input shaft with the center of hole.
5. Remove the set bolt attached to the rear steering gear, and install it in the steering gear to set the input shaft.

Tightening torque:

4.9—7.8 N·m (50—80 cm·kg, 43—69 in·lb)

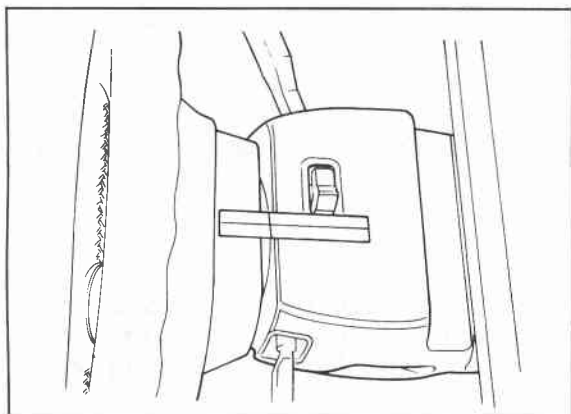
Note

After the input shaft is set, manually turn the rear joint and check that the shaft does not move.



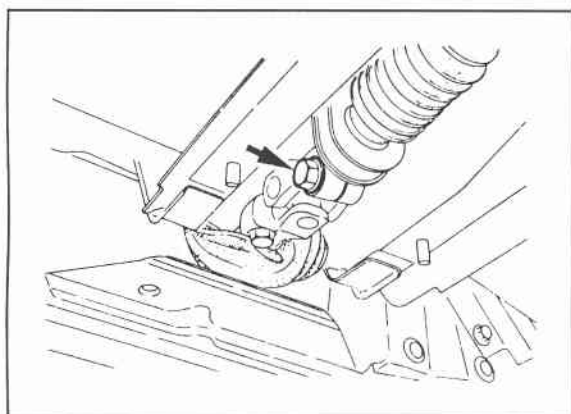
86U10X-315

10 4-WHEEL STEERING GEAR AND LINKAGE



86U10B-316

6. Lower the vehicle.
7. Check and adjust the front and rear wheel alignment if necessary. (Refer to Section 13.)
8. Drive the vehicle and mark the steering straight-ahead position. (Refer to page 10—32.)

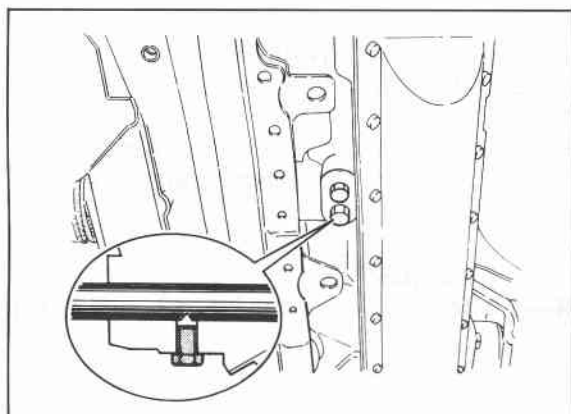


86U10X-317

9. Install the shaft and rear joint removed at step 2, and tighten the bolt to the specified torque.

**Tightening torque: 22—30 N·m
(2.2—3.1 m·kg, 191—269 in·lb)**

10. Install and tighten a new wire on the joint boot.



86U10X-318

11. Install the set bolt in the rear steering gear.

**Tightening torque:
20—28 N·m (2.0—2.9 m·kg, 14—21 ft·lb)**

After installing the steering angle transfer shaft, check the steering angle transfer shaft alignment. [Refer to page 10—32 (Simple inspection).]

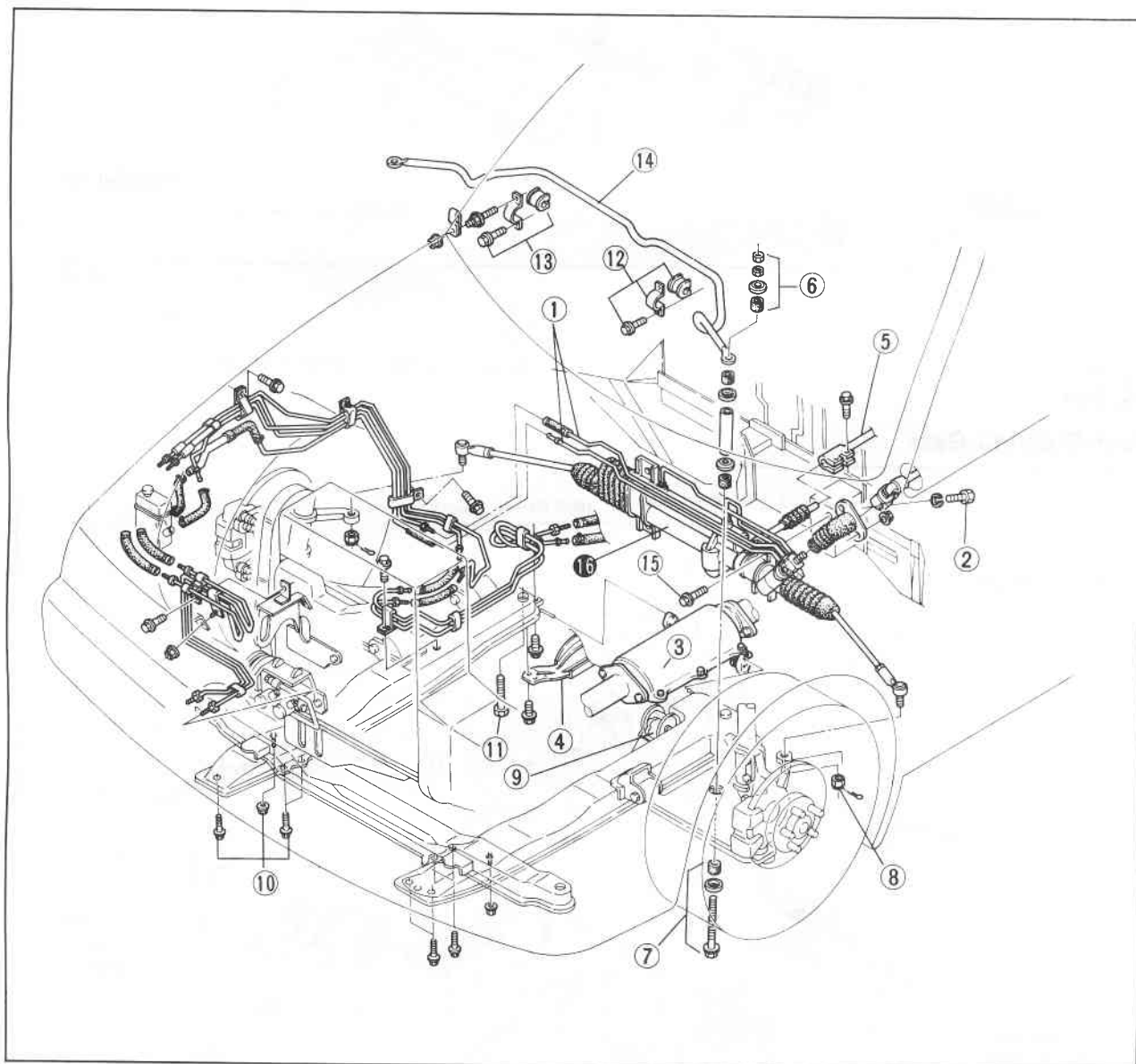
REMOVAL AND INSTALLATION

1. Jack up the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal, referring to installation note for specially marked parts.
4. Tighten all nuts and bolts to the specified torque, referring to page 10—39.

Note

The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.

Front Steering Gear

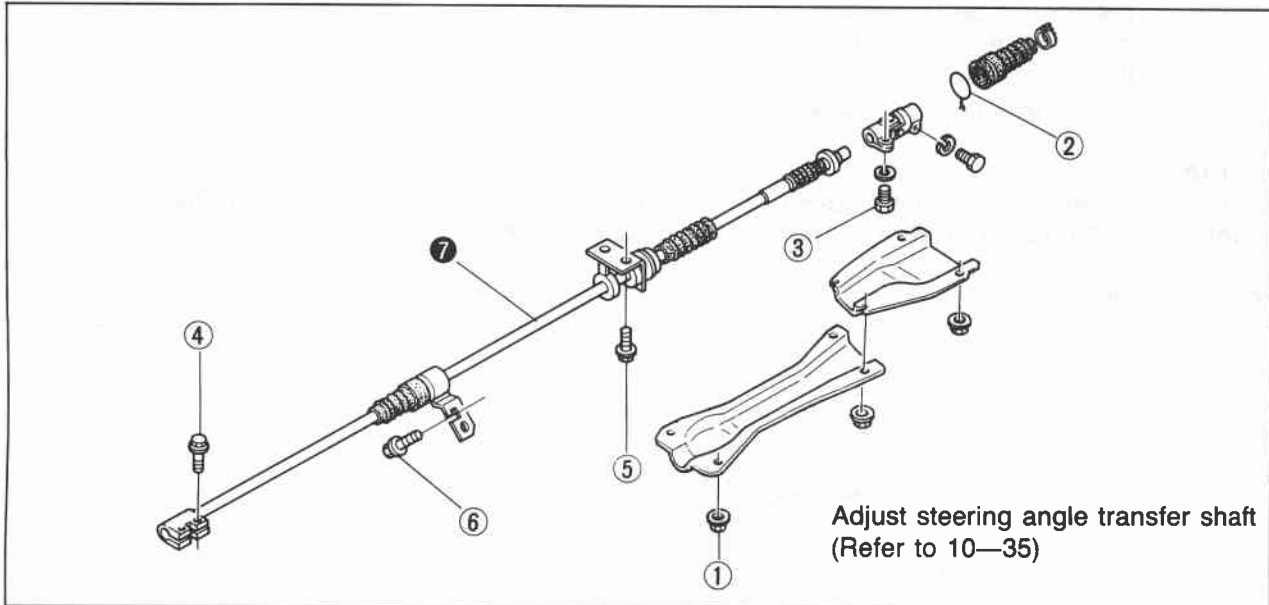


76G10X-034

- | | |
|-------------------------------|----------------------------------|
| 1. Pipes | 9. Engine mount |
| 2. Bolt | 10. Bolts and nut |
| 3. Exhaust pipe | 11. Bolt |
| 4. Under cover | 12. Bolt and mounting |
| 5. Shaft (Refer to next page) | 13. Bolts and mounting |
| 6. Nuts retainer and bushing | 14. Stabilizer |
| 7. Bolt, retainer and bushing | 15. Bolt |
| 8. Nuts | 16. Front steering gear assembly |

10 4-WHEEL STEERING GEAR AND LINKAGE

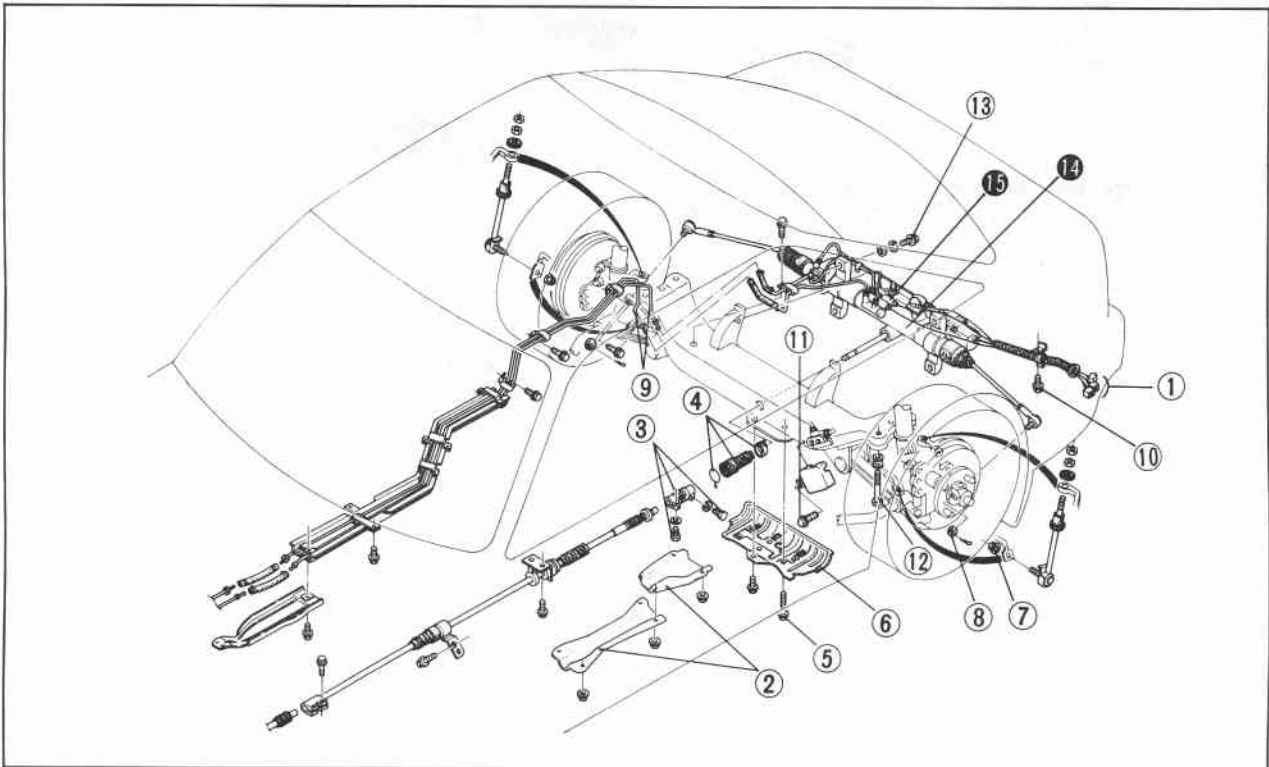
Steering Angle Transfer Shaft



86U10X-064

- | | |
|--------------|----------------------------------|
| 1. Nut | 5. Bolt |
| 2. Boot band | 6. Bolt |
| 3. Bolt | 7. Steering angle transfer shaft |
| 4. Bolt | |

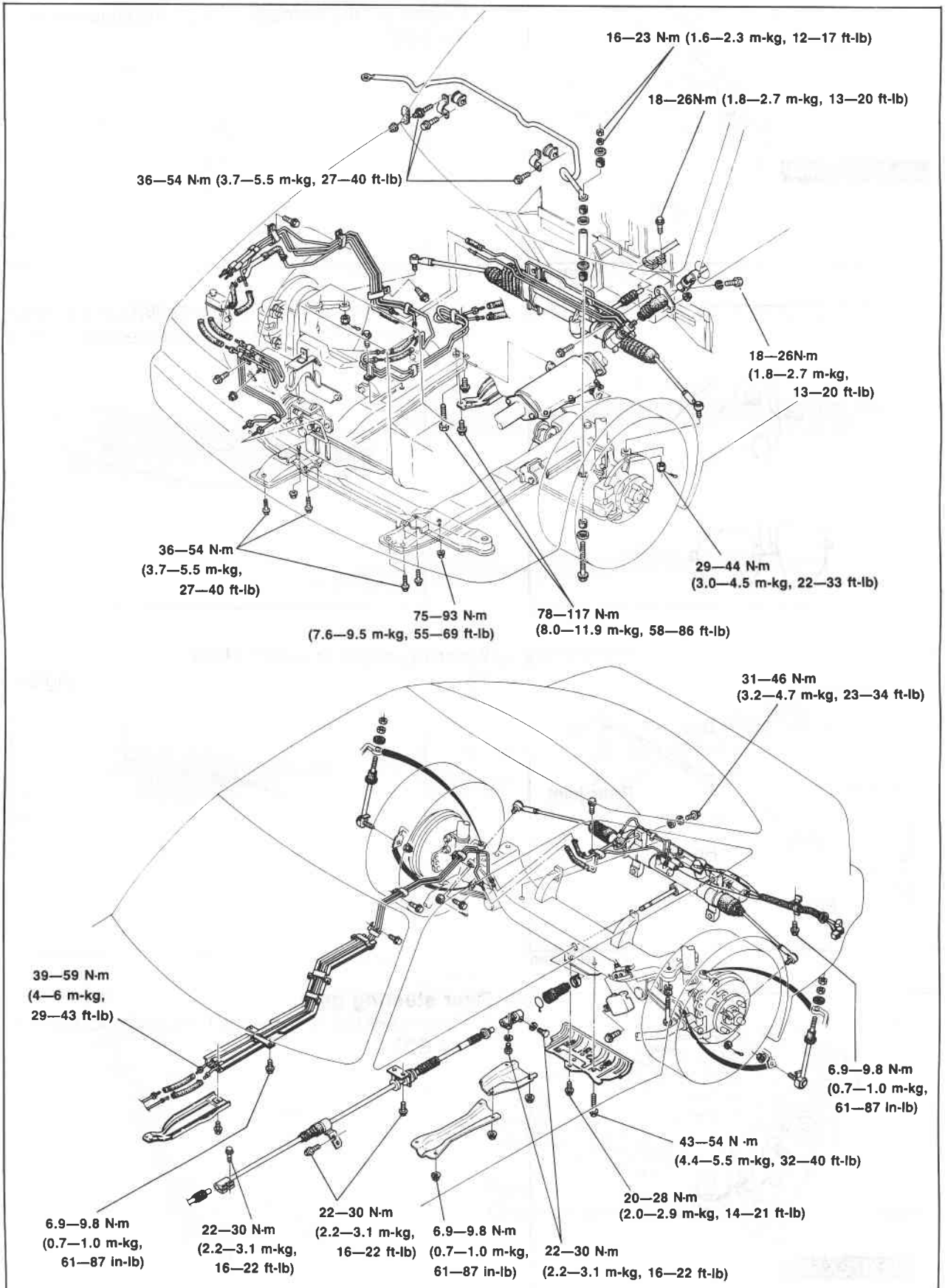
Rear Steering Gear



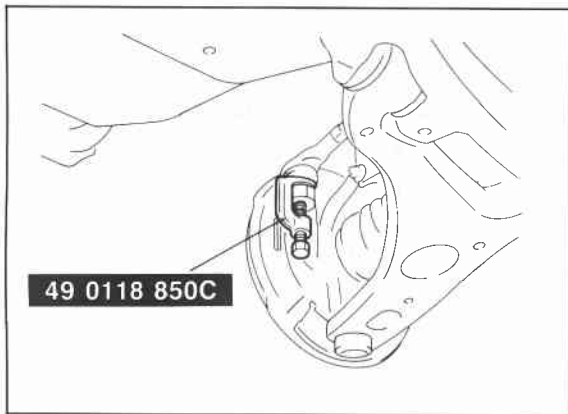
86U10X-065

- | | | |
|------------------------------|----------|---------------------------------|
| 1. Connector | 6. Cover | 11. Bolt |
| 2. Cover | 7. Nuts | 12. Bolt |
| 3. Universal joint and bolts | 8. Nuts | 13. Bolt |
| 4. Boot and boot band | 9. Pipes | 14. Rear steering gear assembly |
| 5. Bolts | 10. Bolt | 15. Solenoid valve |

Torque Specifications



10 4-WHEEL STEERING GEAR AND LINKAGE

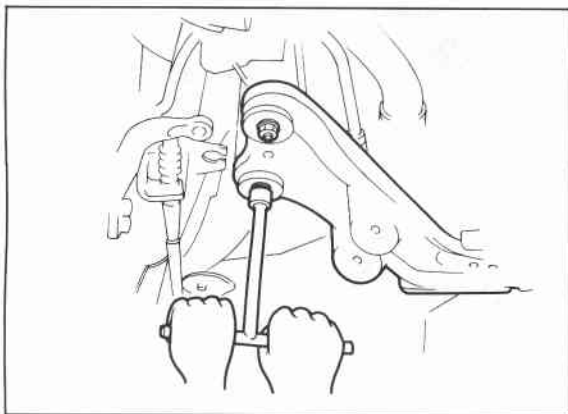


86U10X-067

Removal Note

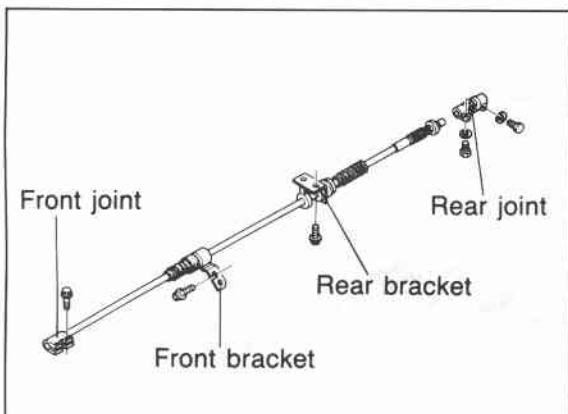
Front steering gear

1. Disconnect the tie-rod ends from the knuckles with the **SST**.



86U10X-068

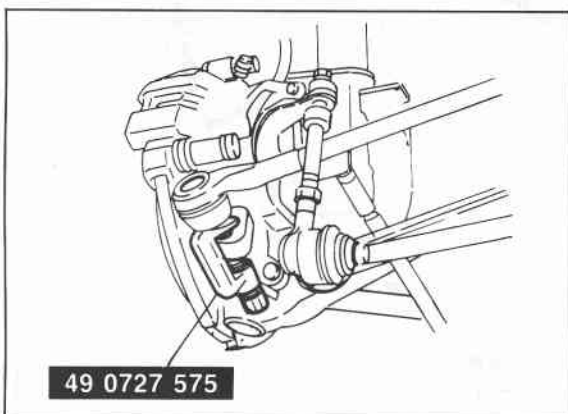
2. Remove the mounting bolts and nuts from the body and crossmember. Let the lower members hang down.



86U10X-069

Steering angle transfer shaft

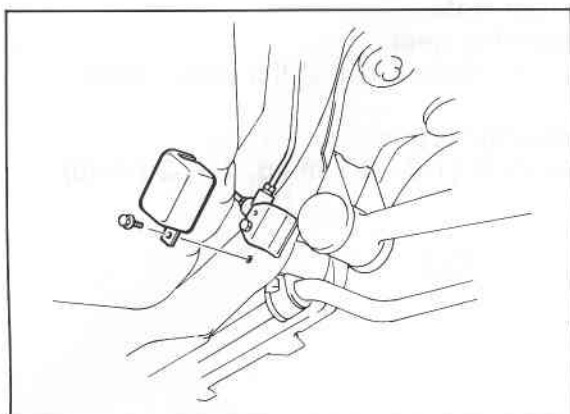
Be careful not to bend the joints to extreme angles.



86U10X-070

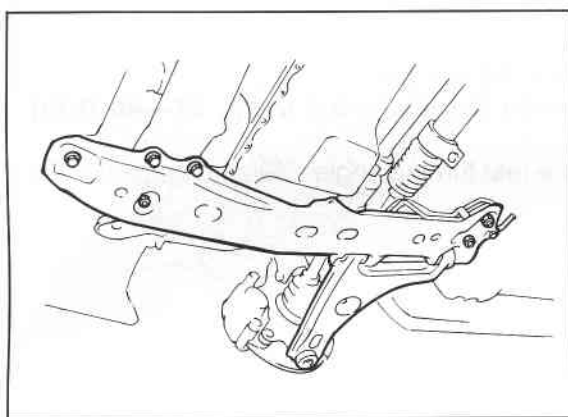
Rear steering gear

1. Disconnect the tie-rod ends from the knuckles with the **SST**.



86U10X-071

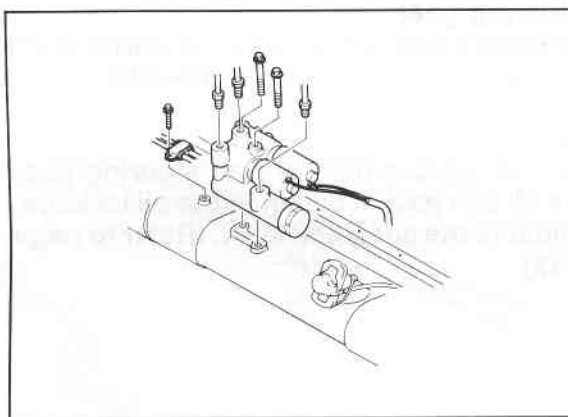
2. Remove the cover and the brake pipe joint block.



86U10X-072

3. Remove the mounting bolts and nuts from the left and right subframes.

4. Let the subframes hang down.



86U10X-073

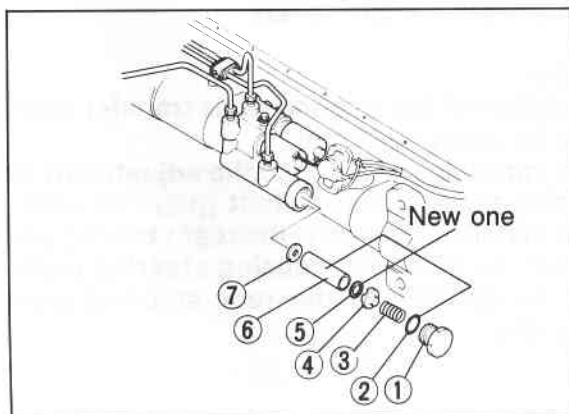
Solenoid valves

1. Remove the oil pipes.

2. Remove the bolts.

3. Disconnect the solenoid valve connectors.

4. Remove the solenoid valve assembly.



86U10X-074

Oil filter

Replace the oil filter in the sequence shown in the figure.

1. Filter cap

2. O-ring

3. Spring

4. Set plate

5. Rubber

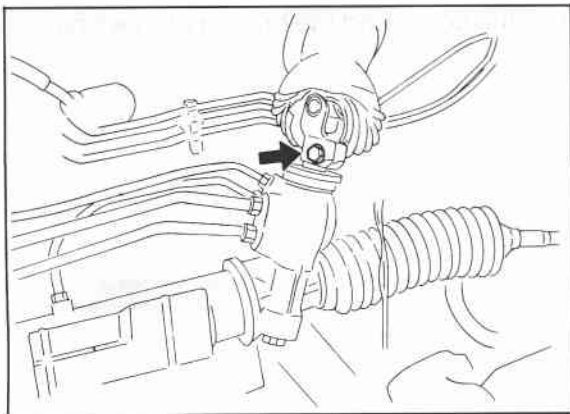
6. Oil filter

7. Magnet

Note

Clean up and install the magnet and set plate.

10 4-WHEEL STEERING GEAR AND LINKAGE



86U10X-075

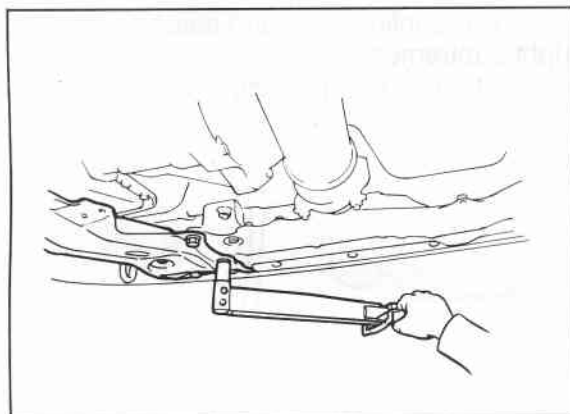
Installation Note

Front steering gear

Tighten the universal joint to the pinion shaft.

Tightening torque:

18—26 N (1.8—2.7 m-kg, 13—20 ft-lb)



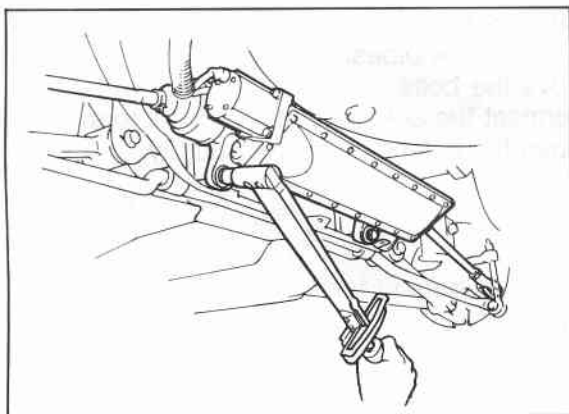
86U10X-076

Install the subframe.

Tightening torque:

36—54 N-m (3.7—5.5 m-kg, 27—40 ft-lb)

Adjust the rear turning angle. (Refer to page 10—35.)



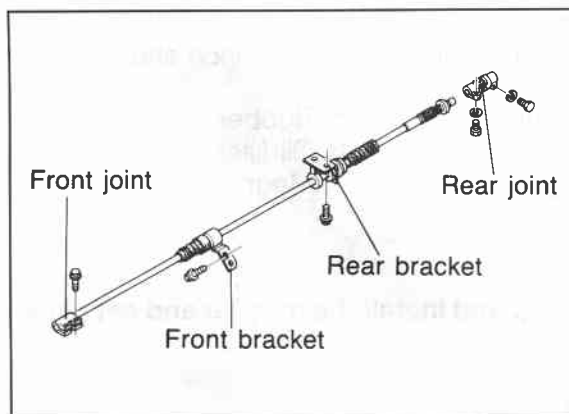
86U10X-077

Rear steering gear

Adjust the rear steering angle after installation of the rear steering gear. (Refer to page 10—35.)

Note

When the replacement of rear steering gear or the oil pan gasket owing to the oil leakage, add fluid to the specified level. (Refer to page 10—12)



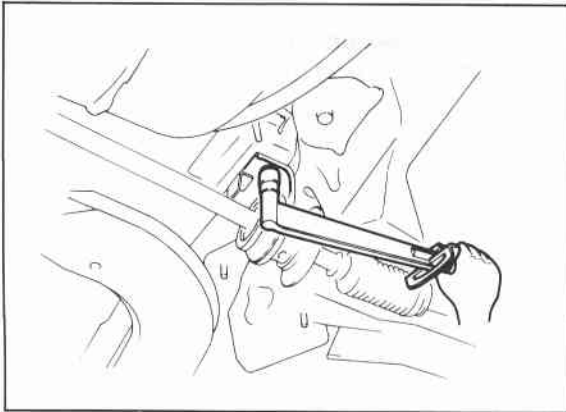
86U10X-078

Steering angle transfer shaft

Caution

Installation of the steering angle transfer shaft must be done correctly.

Work carefully, referring to the adjustment of steering angle transfer shaft (page 10—35). If not installed correctly, the rear steering angle may be incorrect, causing steering problems or damage to the rear steering gear assembly.



76G10X-035

1. Temporarily install the front bracket.
2. Install the rear bracket, and then tighten at the specified torque.

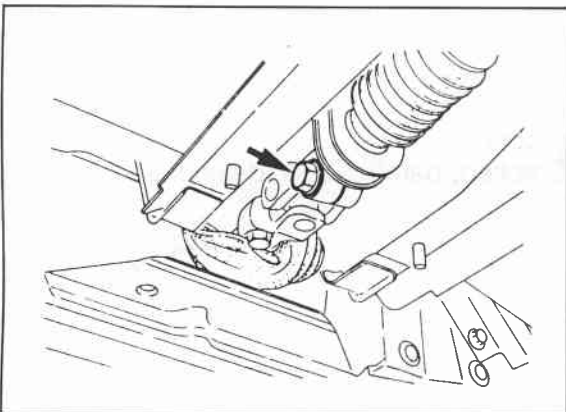
Tightening torque:

22—30 N·m (2.2—3.1 m·kg, 5.1—7.2 ft·lb)

3. Tighten the front bracket bolt.

Tightening torque:

22—30 N·m (2.2—3.1 m·kg, 5.1—7.2 ft·lb)

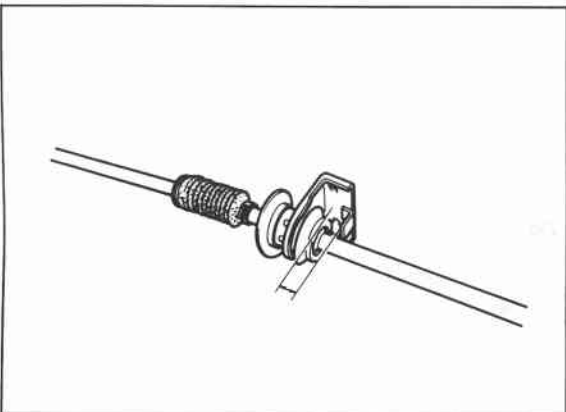


86U10X-320

Caution

The shaft should be installed by two or more persons, taking care not to bend the joint part.

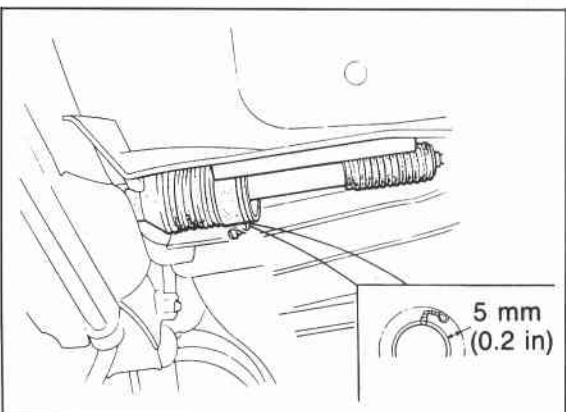
4. Connect the joint of the front steering gear side, and then tighten the bolt.
5. Connect the joint of the rear steering gear side, and then tighten the bolt.



86U10X-321

Caution

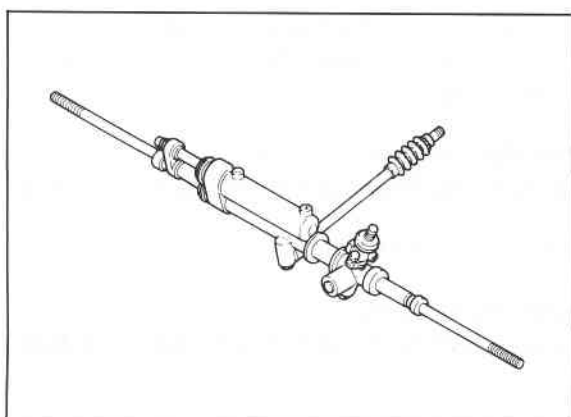
Check to be sure that the front and rear brackets do not contact the oil seal.



86U10X-322

6. Attach a new wire and clamp, and as shown in the illustration be sure that protrusion is within 5mm (0.2 in).
7. Install the cover.

10 4-WHEEL STEERING GEAR AND LINKAGE



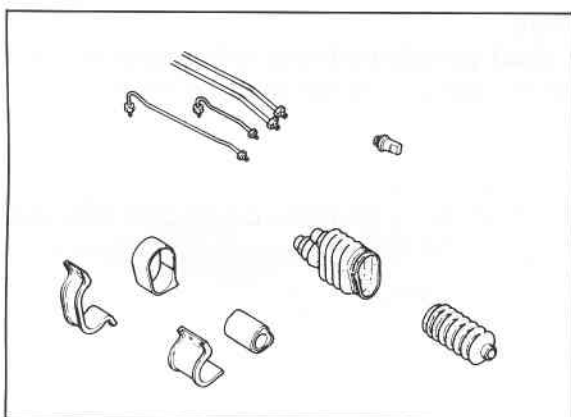
86U10X-079

INSPECTION

Front Steering Gear and Linkage

1. Check the following and replace the front steering gear assembly if necessary.

- (a) Damaged or cracked case
- (b) Bent linkage

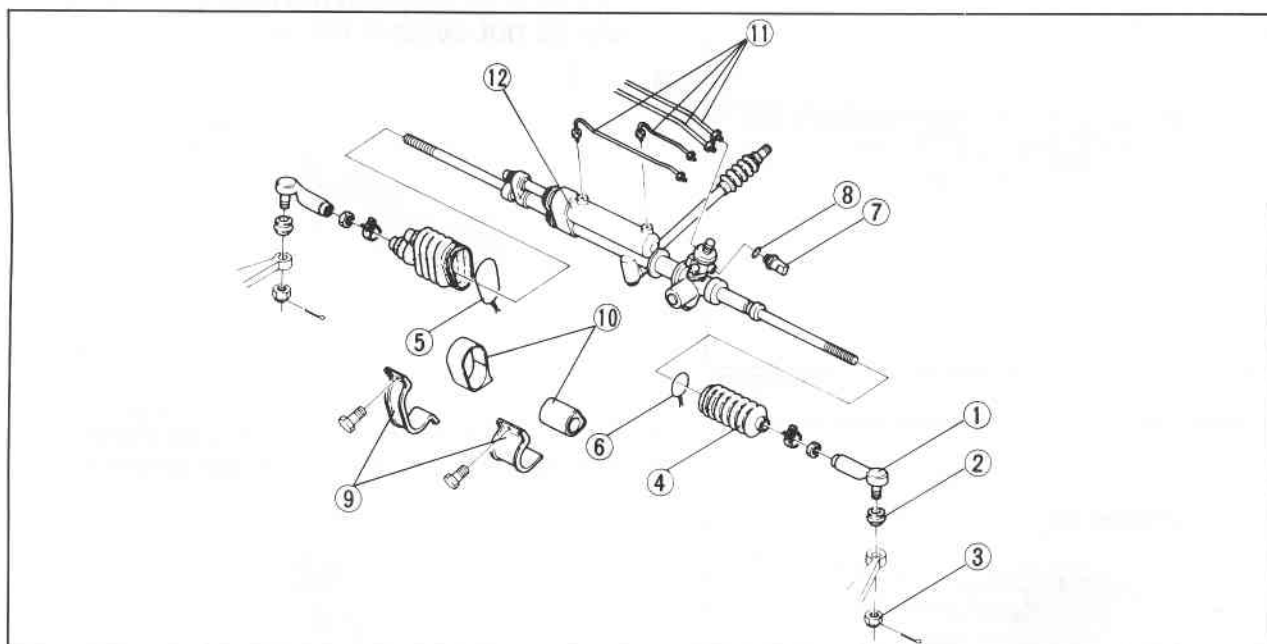


86U10X-080

2. Check the following and replace any faulty parts.

- (a) Clogged, bent, or pinched pipes
- (b) Faulty oil pressure switch
- (c) Damaged mounting bracket and mounting rubber
- (d) Cracked, damaged, or deteriorated boots

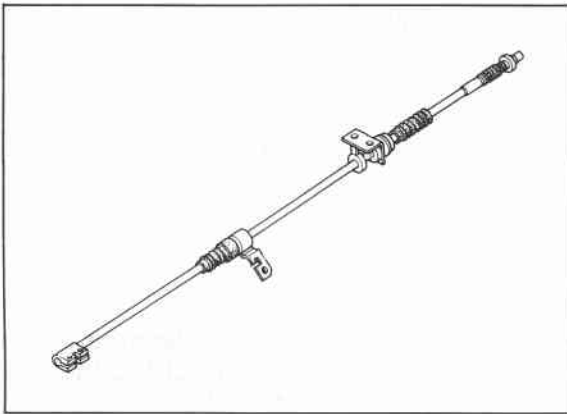
Available spare parts



86U10X-081

- | | |
|----------------------|----------------------------|
| 1. Tie-rod end | 7. Oil pressure switch |
| 2. Tie-rod end boot | 8. O-ring |
| 3. Nut | 9. Mounting bracket |
| 4. Boot | 10. Mounting rubber |
| 5. Boot band (large) | 11. Oil pipe |
| 6. Boot band (small) | 12. Steering gear assembly |

4-WHEEL STEERING GEAR AND LINKAGE 10



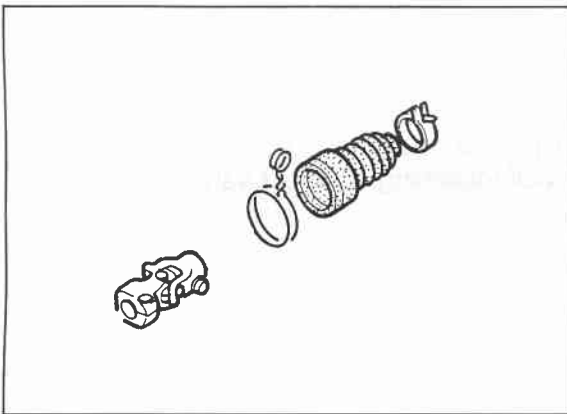
86U10X-082

Steering Angle Transfer Shaft

Check the following and replace the shaft assembly if necessary

1. Shaft

- (a) Cracked, damaged, or deteriorated boots
- (b) Stuck carrier bearing
- (c) Bending
- (d) Damaged mounting brackets



86U10X-083

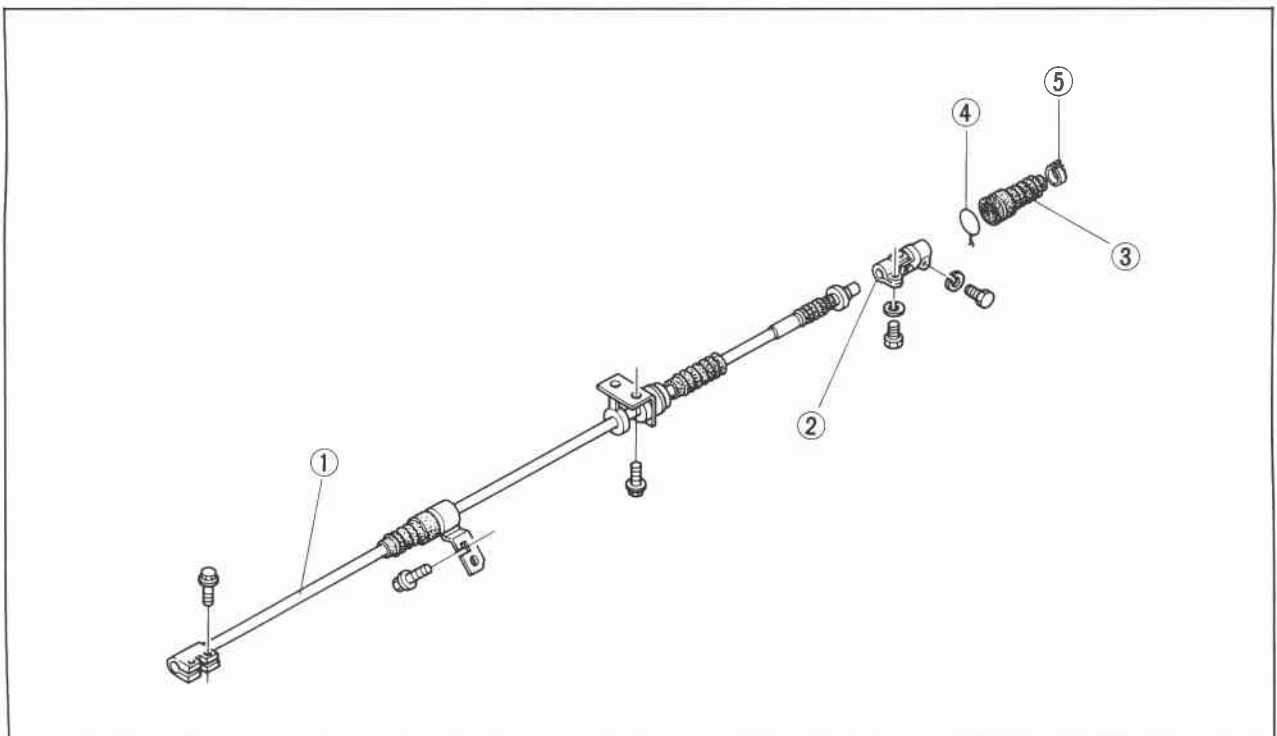
2. Universal joint

Looseness or damage

3. Rear boot

Crackes, damage, or deterioration

Available spare parts



86U10X-084

1. Shaft

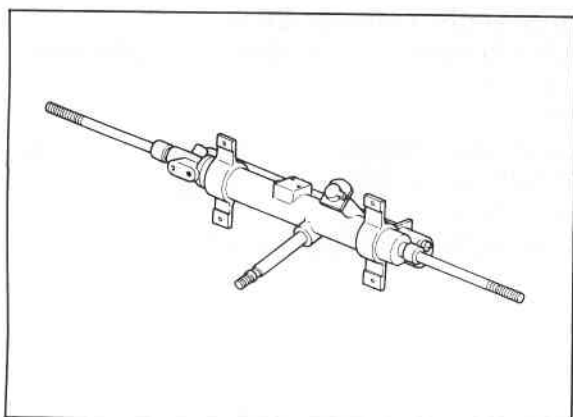
2. Universal joint

3. Rear boot

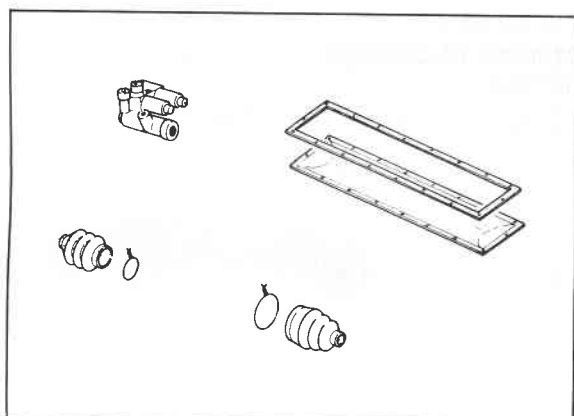
4. Wire

5. Clip

10 4-WHEEL STEERING GEAR AND LINKAGE



86U10X-085



86U10X-086

Rear Steering Gear and Linkage

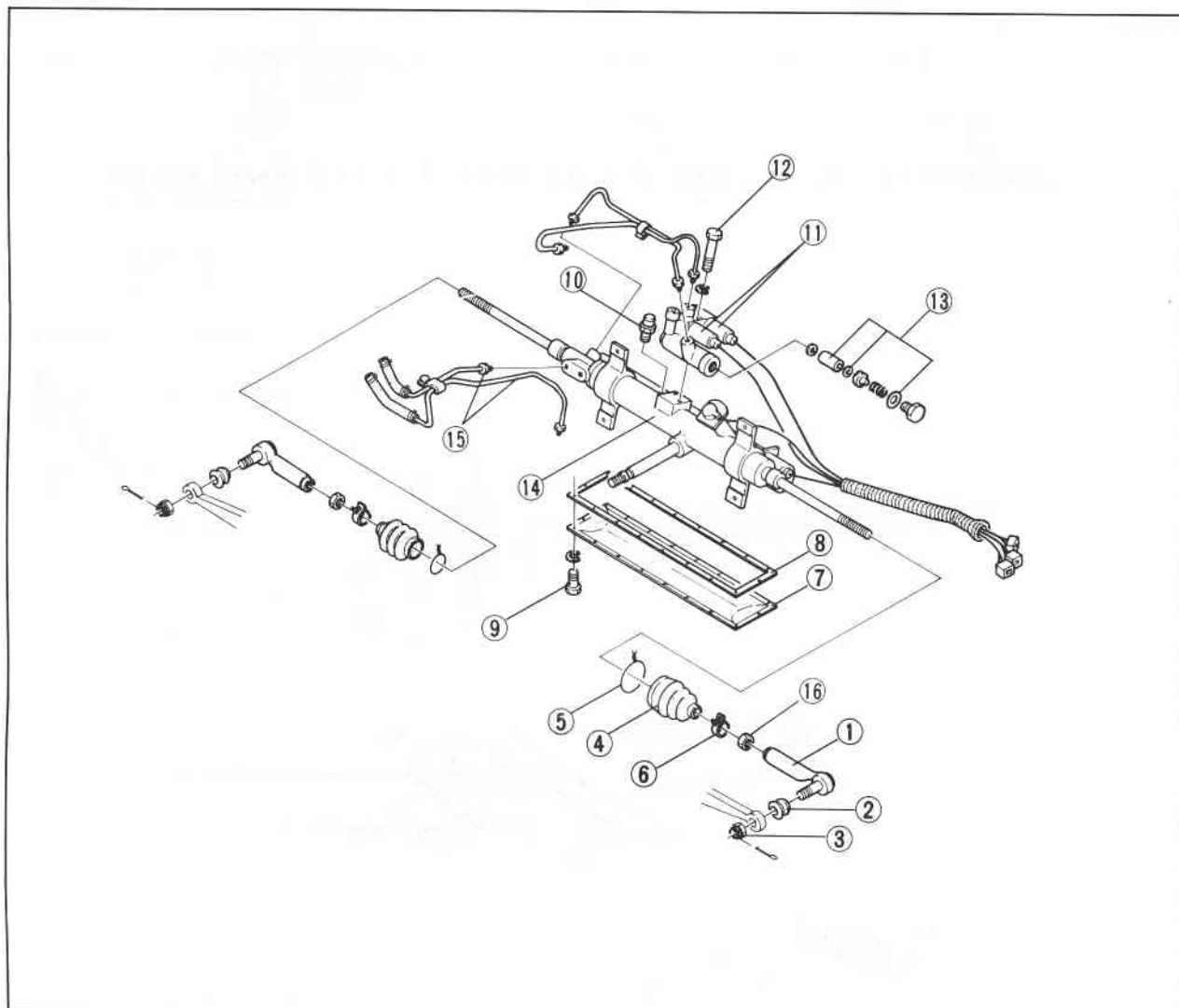
1. Check the following and replace the rear steering gear assembly if necessary.
 - (a) Damaged or cracked case
 - (b) Faulty stepper motor or rear-to-front steering ratio sensor
 - (c) Sticking bearings
 - (d) Oil leakage

Note

There is no fluid in a new replacement rear steering gear assembly, add fluid to the specified level. (Refer to 10—12.)

2. Check and tighten bolts and nuts, if necessary.
3. Check the following and replace any faulty parts.
 - (a) Cracked, damaged, or deteriorated rear steering gear boots and bands
 - (b) Cracked or damaged oil pan
 - (c) Malfunctioning solenoid valve

Available spare parts



86U10X-087

- | | |
|---------------------|-------------------------------------|
| 1. Tie-rod end | 9. Bolt |
| 2. Tie-rod end boot | 10. Oil filler bolt |
| 3. Nut | 11. Solenoid valve (Refer to 10—41) |
| 4. Boot | 12. Bolt |
| 5. Boot band (wire) | 13. Oil filter set (Refer to 10—41) |
| 6. Boot band (clip) | 14. Steering gear assembly |
| 7. Oil pan | 15. Pipe |
| 8. Oil pan gasket | 16. Nut |

10 MANUAL STEERING

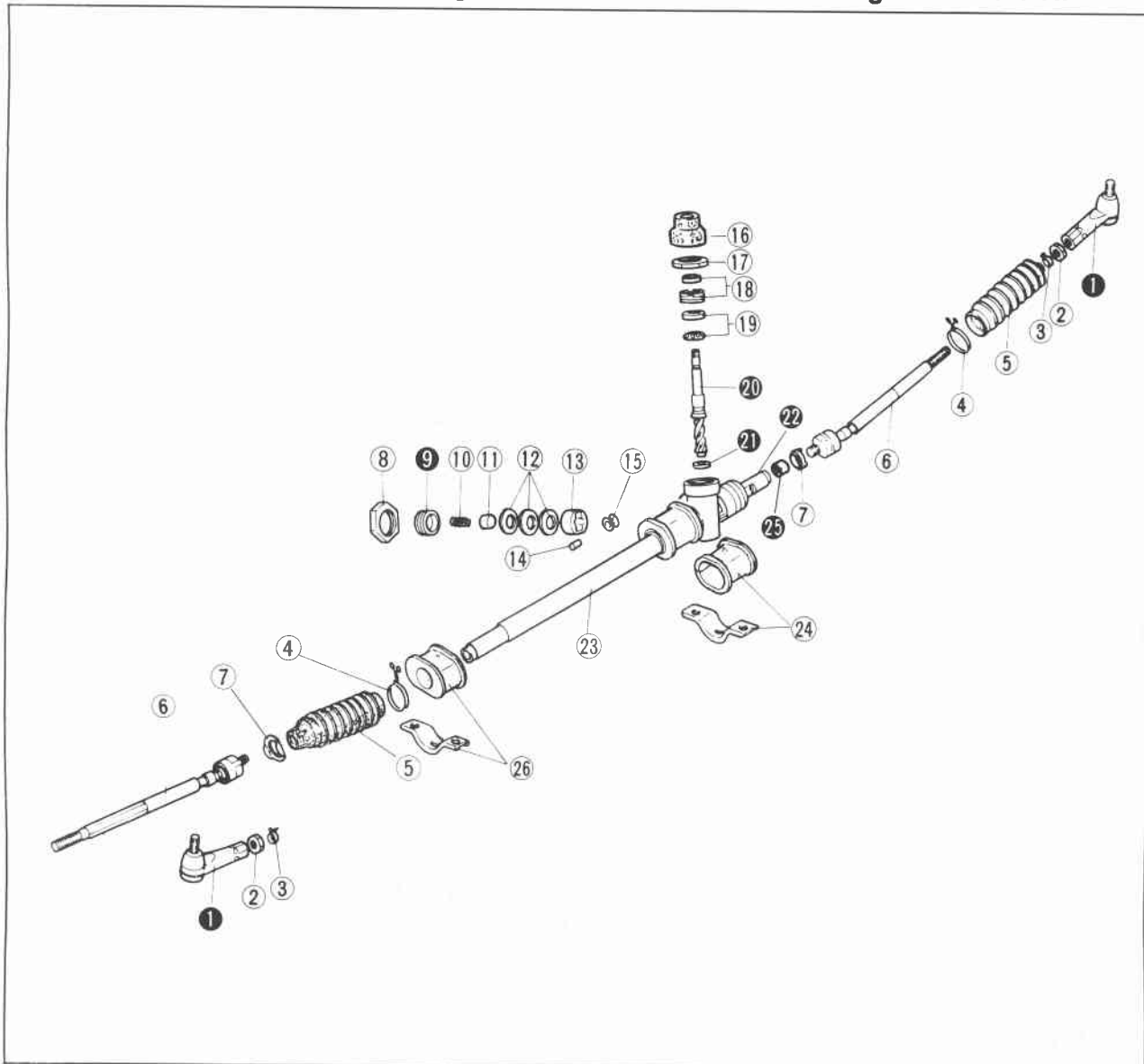
MANUAL STEERING

DISASSEMBLY

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

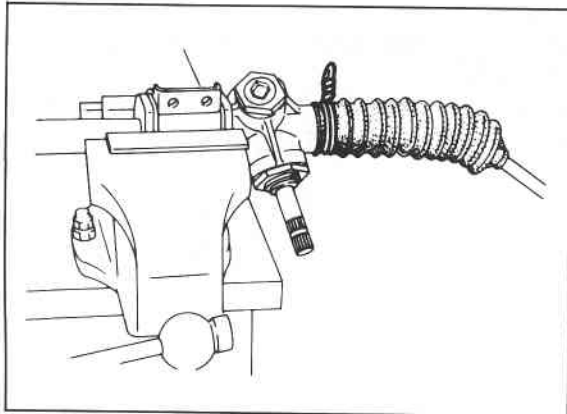
Note

Before disassembling, drain the gear oil and remove all external grease and dirt.



86U10X-088

- | | | |
|-------------------------|-----------------------------|---------------------------------|
| 1. Tie-rod end | 10. Spring | 19. Bearing |
| 2. Nut | 11. Friction block | 20. Pinion |
| 3. Clip | 12. Dish spring | 21. Bearing |
| 4. Boot wire | 13. Holder | 22. Rack |
| 5. Boot | 14. Needle roller | 23. Gear housing |
| 6. Tie-rod | 15. Roller assembly | 24. Mounting rubber and bracket |
| 7. Washer | 16. Boot support | 25. Bushing |
| 8. Adjust cover locknut | 17. Rear cover locknut | |
| 9. Adjust cover | 18. Rear cover and oil seal | |



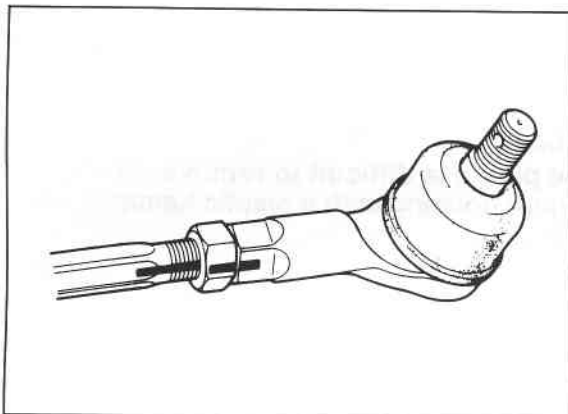
86U10X-089

Disassembly Note
Steering gear and linkage

Secure the gear and linkage in a vise.

Caution

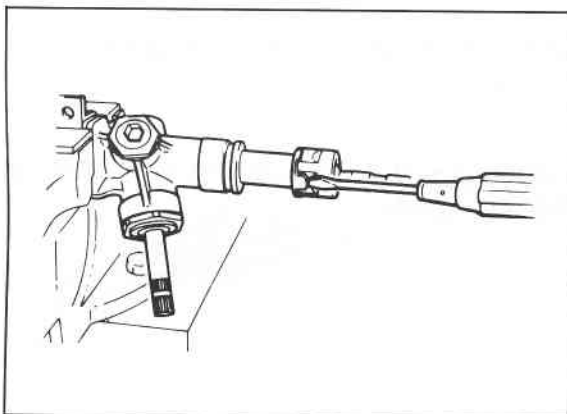
Insert protective material (such as copper plates) in the jaws of the vise.



86U10X-090

Tie-rod ends

Before removing the tie-rod ends, make a mark for proper installation.

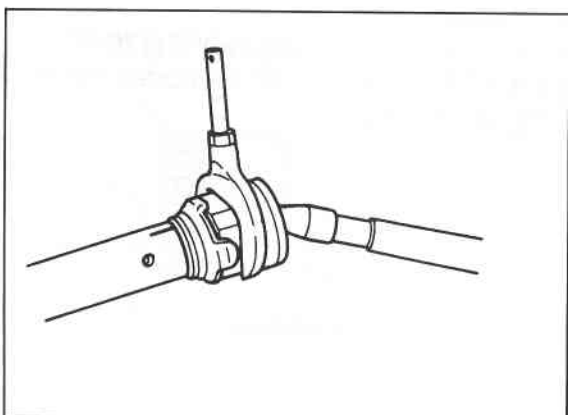


86U10X-091

Tie-rods

Remove the tie-rods.

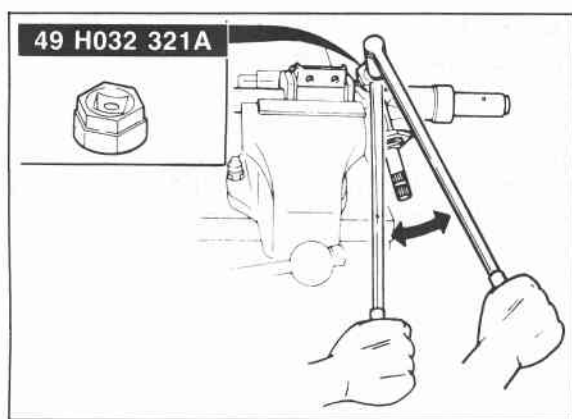
1. Uncrimp the washer as shown in the figure.



86U10X-092

2. Secure the rack in a vise and remove the tie-rod.

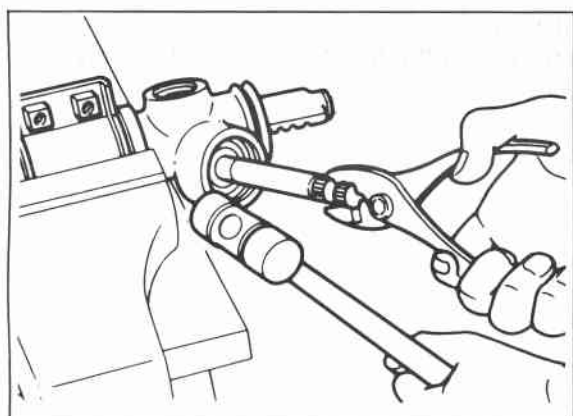
10 MANUAL STEERING



86U10X-093

Adjust cover

1. Loosen the locknut, and remove the adjust cover with the **SST**.
2. Remove the spring, friction block, dish springs holder, and needle roller assembly.



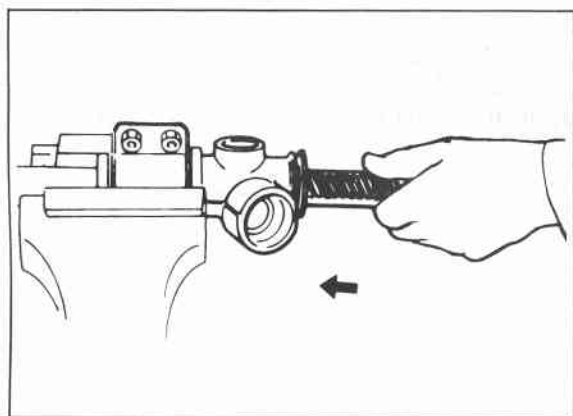
86U10X-094

Pinion

Gently grasp the serrated part of the pinion and pull it out of the gear housing.

Caution

If the pinion is difficult to remove, gently tap the gear housing with a plastic hammer while pulling.



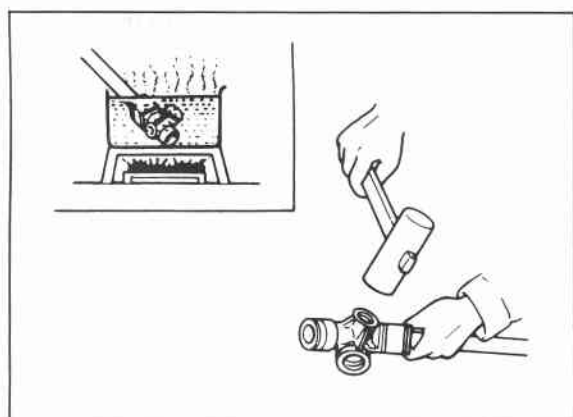
86U10X-095

Rack

Remove the rack by taking it out in the direction indicated by the arrow.

Caution

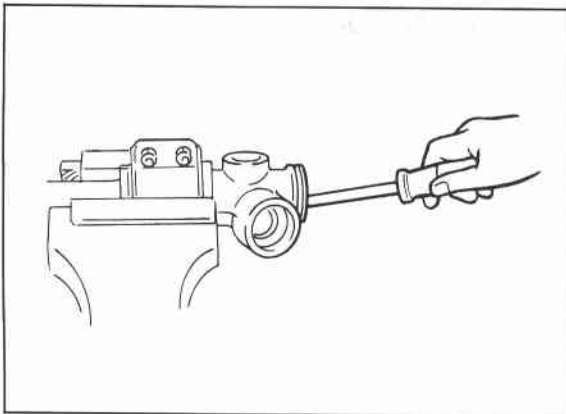
Do not damage the rack bushing with the edge of the rack gear.



86U10X-096

Bearing (lower)

Heat the housing in water to about 80°C (176°F); then tap the end of the housing with a wooden hammer to remove the bearing.



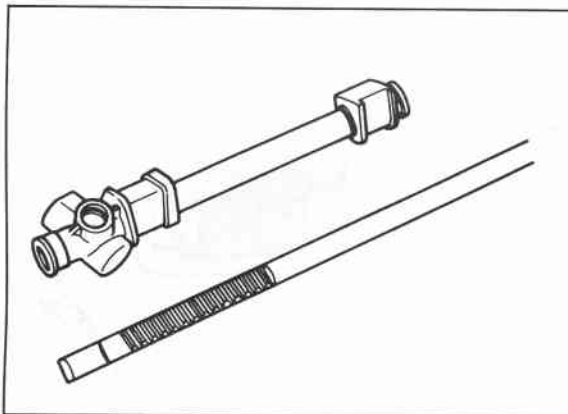
86U10X-097

Bushing

Break the bushing and remove it.

Caution

Be careful not to damage the gear housing.

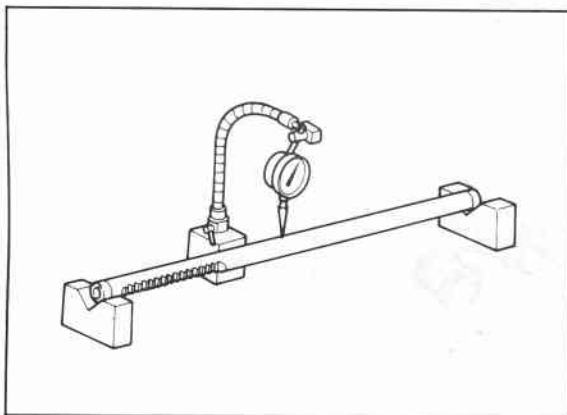


86U10X-098

INSPECTION

Check the following and replace any faulty parts.

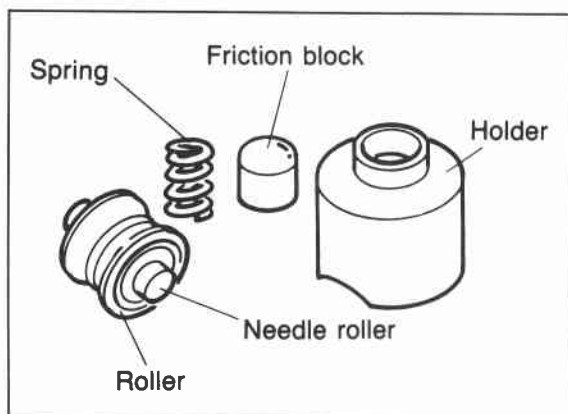
1. Damaged mounting rubber or bracket
2. Cracked, worn teeth, or damaged pinion
3. Loose, noisy, or sticking bearing in gear housing
4. Cracked or damaged gear housing
5. Worn rack and housing bushing
6. Tie-rod ball-joint operation and looseness
7. Bent tie-rods or tie-rod ends



86U10X-099

8. Cracked, worn teeth, or damaged rack
9. Runout of rack

Runout: 0.30 mm (0.012 in) max.



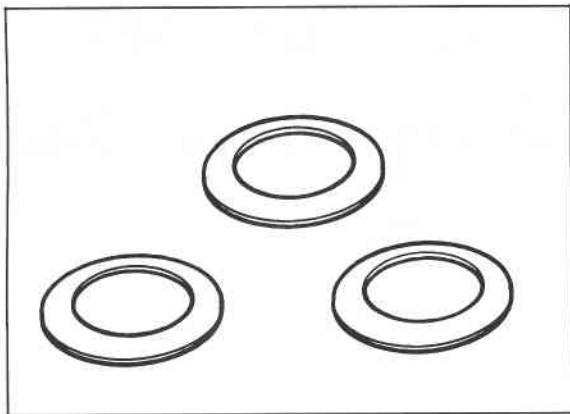
76G10X-036

10. Worn or damaged roller and friction block
11. Bearing operation
12. Cracked or damaged holder
13. Weak or damaged spring

Note

If the needle bearing must be replaced, replace the roller assembly.

10 MANUAL STEERING

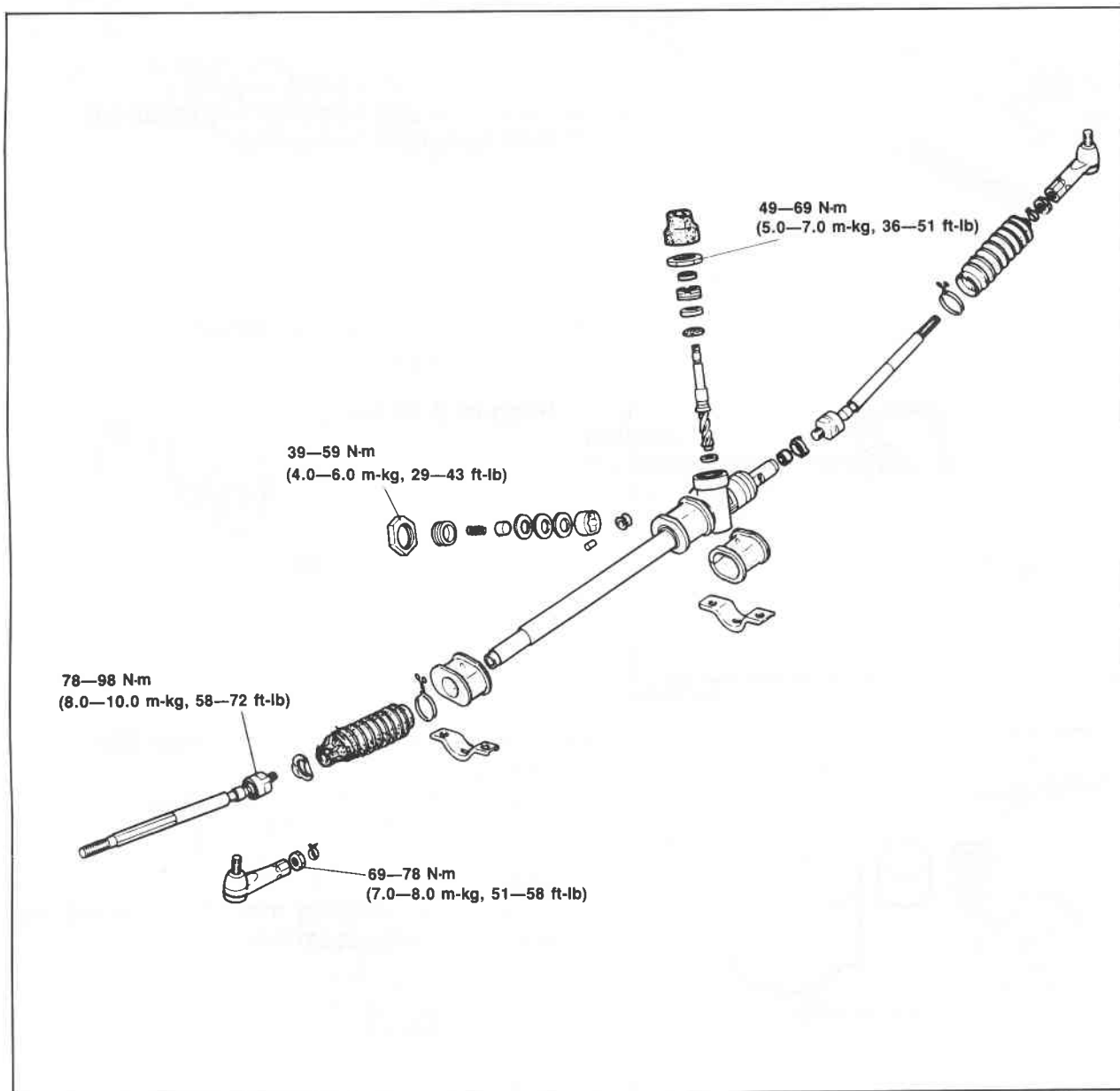


86U10X-101

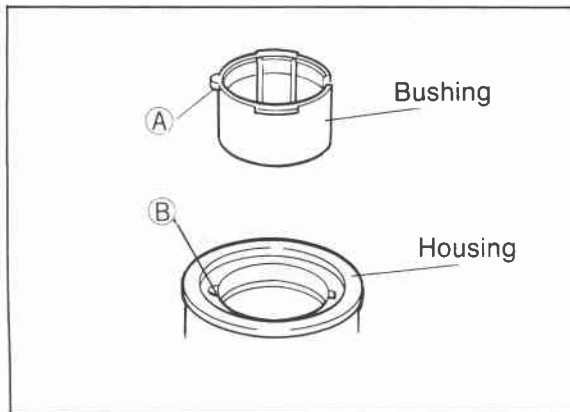
14. Damaged dish springs

ASSEMBLY

Torque Specifications

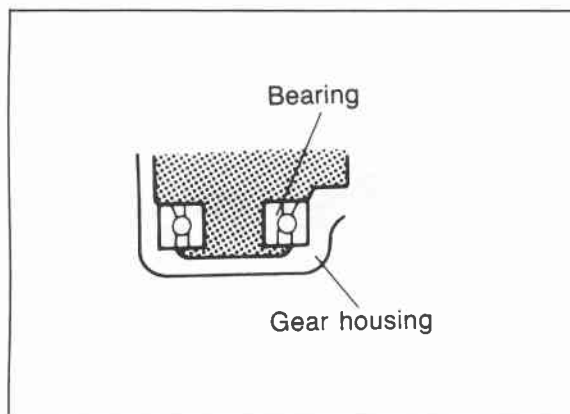


86U10X-102



86U10X-103

1. Install the mounting rubber and bracket.
2. Install the bushing.
Align A with B and press the bushing into the gear housing until it is fully seated.

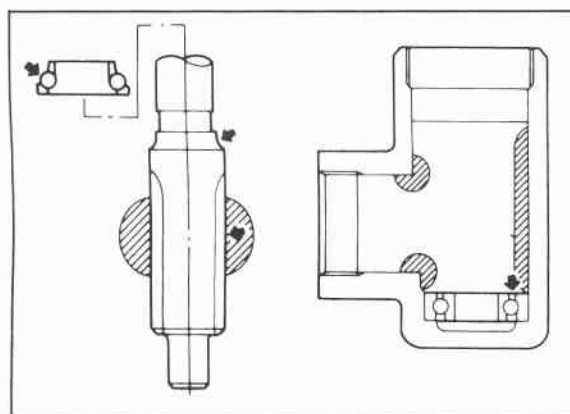


86U10X-104

3. Press in the lower bearing.

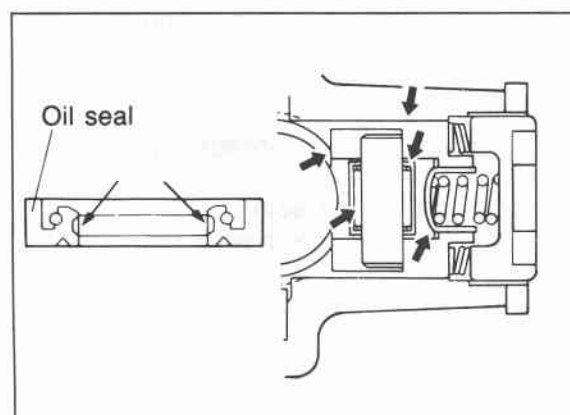
Caution

- a) Before pressing in, put grease (lithium base, NLGI No. 2) in the bearing and bearing bore.
- b) Install the bearing in the proper direction.
- c) Use the pinion to press the bearing in.



86U10X-105

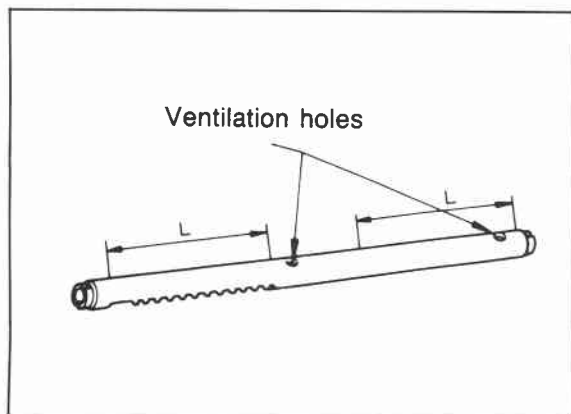
4. Fill or coat the following points with grease (lithium base, NLGI No. 2) before assembly.
 - a) Pinion bearing and teeth
 - b) Inside gear housing



69G10X-106

- c) Oil seal lip
- d) Roller surface
- e) Holder
- f) Friction block surface

10 MANUAL STEERING

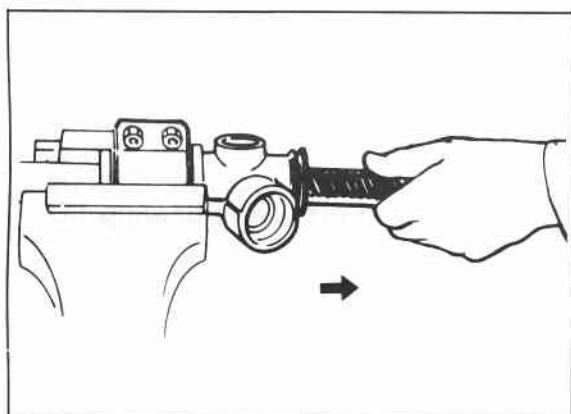


86U10X-107

- g) Inner surface of housing rack bushing
- h) Rack gear and outer circumference of rack shaft
L = 180 mm (7.09 in)
- i) Tie-rod ball-joint
- j) Inside left and right boots

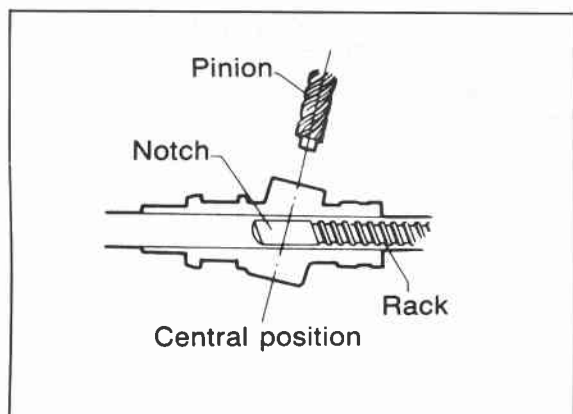
Caution

Be careful not to fill the ventilation holes in the rack shaft with grease.



86U10X-108

5. Carefully install the rack in the direction of the arrow.

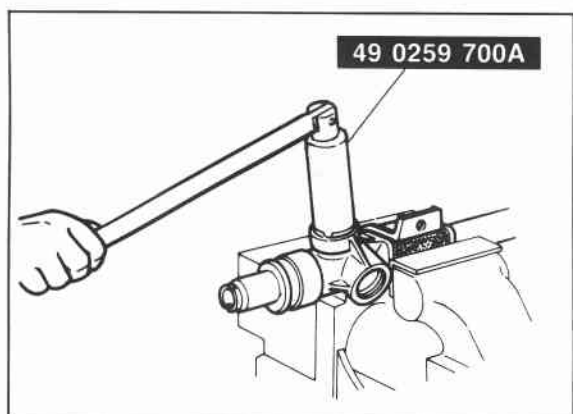


86U10X-109

6. Set the notch of the teeth of the rack at the pinion position, then insert the pinion.

Caution

This notch is used for adjustment of the pinion bearing preload without the pinion engaged with the rack.

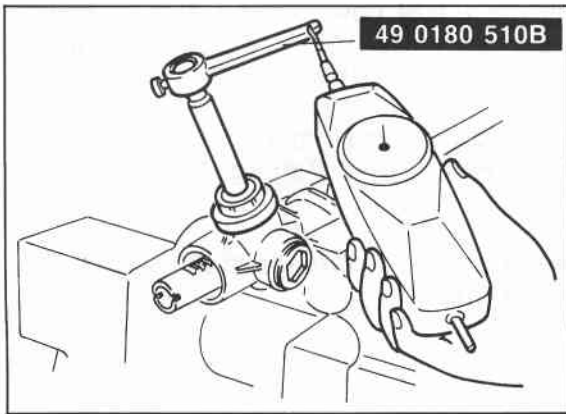


86U10X-110

7. Install the upper bearing, and then screw on the rear cover.

Caution

- a) Apply sealant to the threads of the rear cover.
- b) Do not install the oil seal.
- c) Screw on the rear cover with the SST.

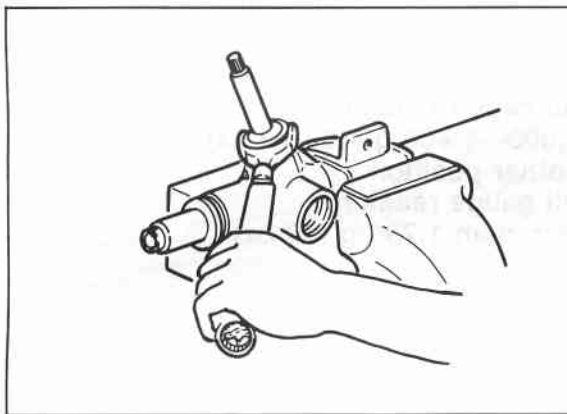


86U10X-111

8. Tighten the rear cover so that the torque of the pinion is approx **400 g (14.1 oz)**. Check with the **SST** and a pull gauge.

Caution

Before measuring the torque, rotate the pinion to the left and right a few times to seat the bearing.



86U10X-112

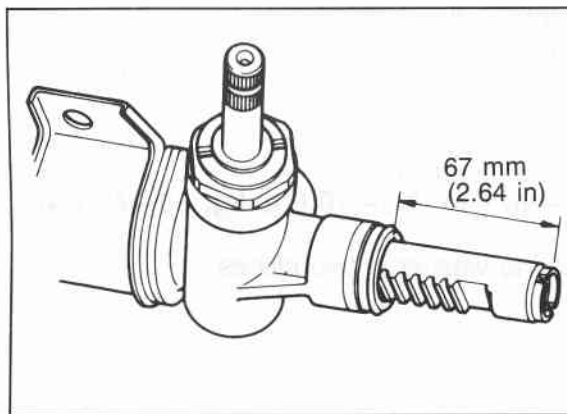
9. Loosen the rear cover and readjust the pinion torque to **300 g (10.6 oz)**. Tighten the locknut.

Tightening torque:

49—69 N·m (5,0—7,0 m·kg, 36—51 ft·lb)

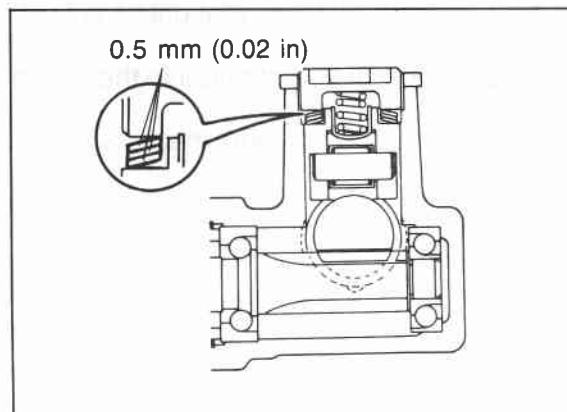
Caution

Recheck the pinion torque after tightening the locknut. If it is not within 200—350 g (7—12.3 oz), loosen the locknut and adjust once again.



86U10X-113

10. Carefully move the rack so that the pinion is set to the center (neutral position) of the rack gear.



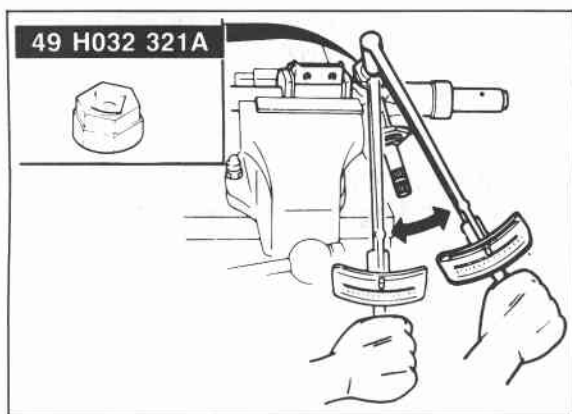
86U10X-114

11. Install the roller assembly, needle roller, holder, dish springs, friction block, and spring.

Caution

Install the roller bearing so that it correctly contacts the rack.

10 MANUAL STEERING



86U10X-115

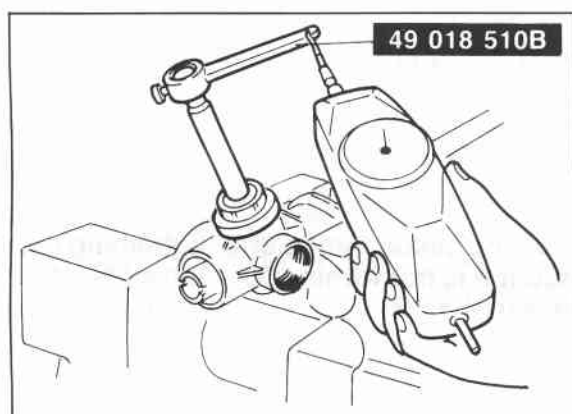
12. Torque the adjust cover to **9.8 N·m (1 m·kg, 7.2 ft·lb)**, then loosen it 25°—45°. Secure the adjust cover with the locknut and the **SST**.

Locknut tightening torque:

39—59 N·m (4.0—6.0 m·kg, 29—43 ft·lb)

Note

Apply sealant to the threads of the adjust cover before installing.



86U10X-116

13. Measure the pinion torque with the **SST**.

Center position $\pm 90^\circ$

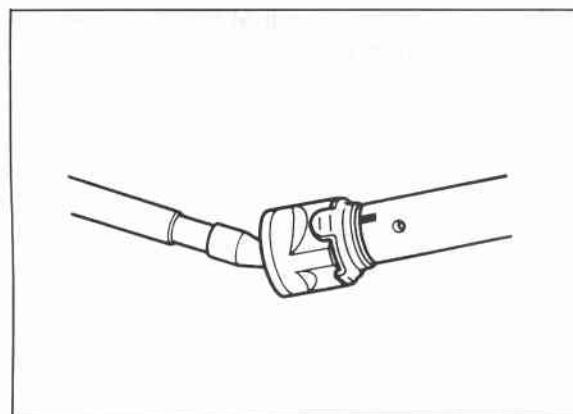
Pull gauge reading:

1,000—1,400 g (35—50 oz)

Any other position

Pull gauge reading:

less than 1,700 g (60 oz)



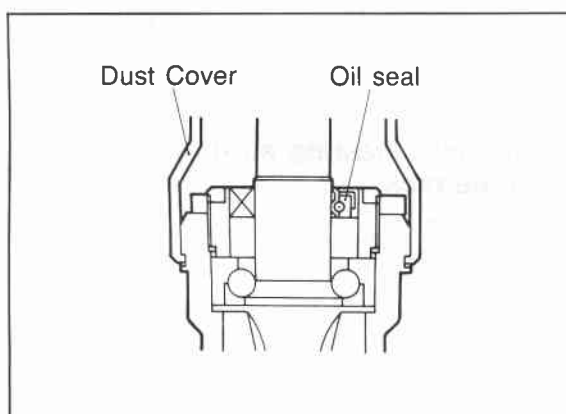
86U10X-117

14. Mark the positions of the rack grooves of the left tie-rod for staking.
15. Install the new washer on the left tie-rod, and install the tie-rod.

Tightening torque:

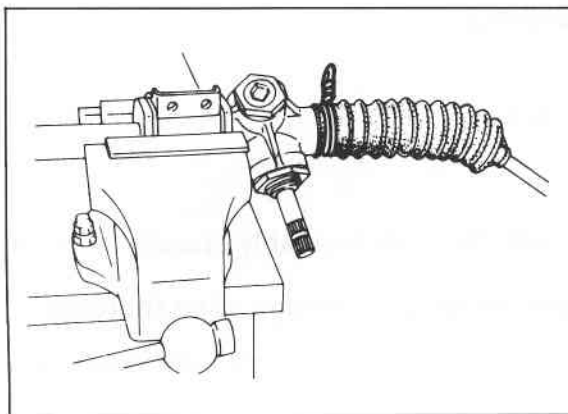
78—98 N·m (8.0—10.0 m·kg, 58—72 ft·lb)

16. Stake the washer in two places.



86U10X-118

17. Use a pipe to press in the oil seal until it is flush with the end of the rear cover.
18. Slide on the dust cover so that it fits into the pinion groove.
19. Press in the boot support. Be sure that it fits tightly.

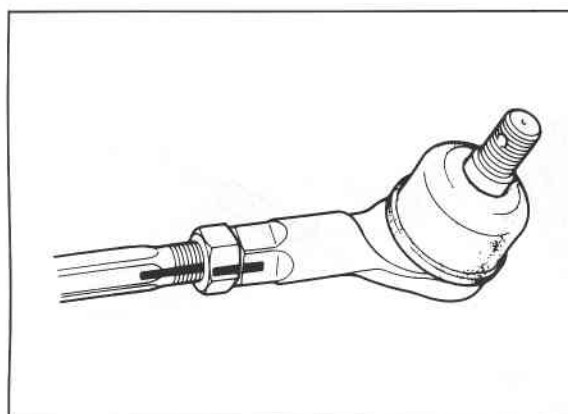


86U10X-119

20. Install the boot, then wrap a new wire around it two times and twist 4 to 4.5 times. Install the clip.

Caution

Check that the boot is not twisted or dented.



86U10X-120

21. Install the tie-rod ends, aligning them with the marks made before disassembly.

10 ENGINE SPEED SENSING POWER STEERING

ENGINE SPEED SENSING POWER STEERING

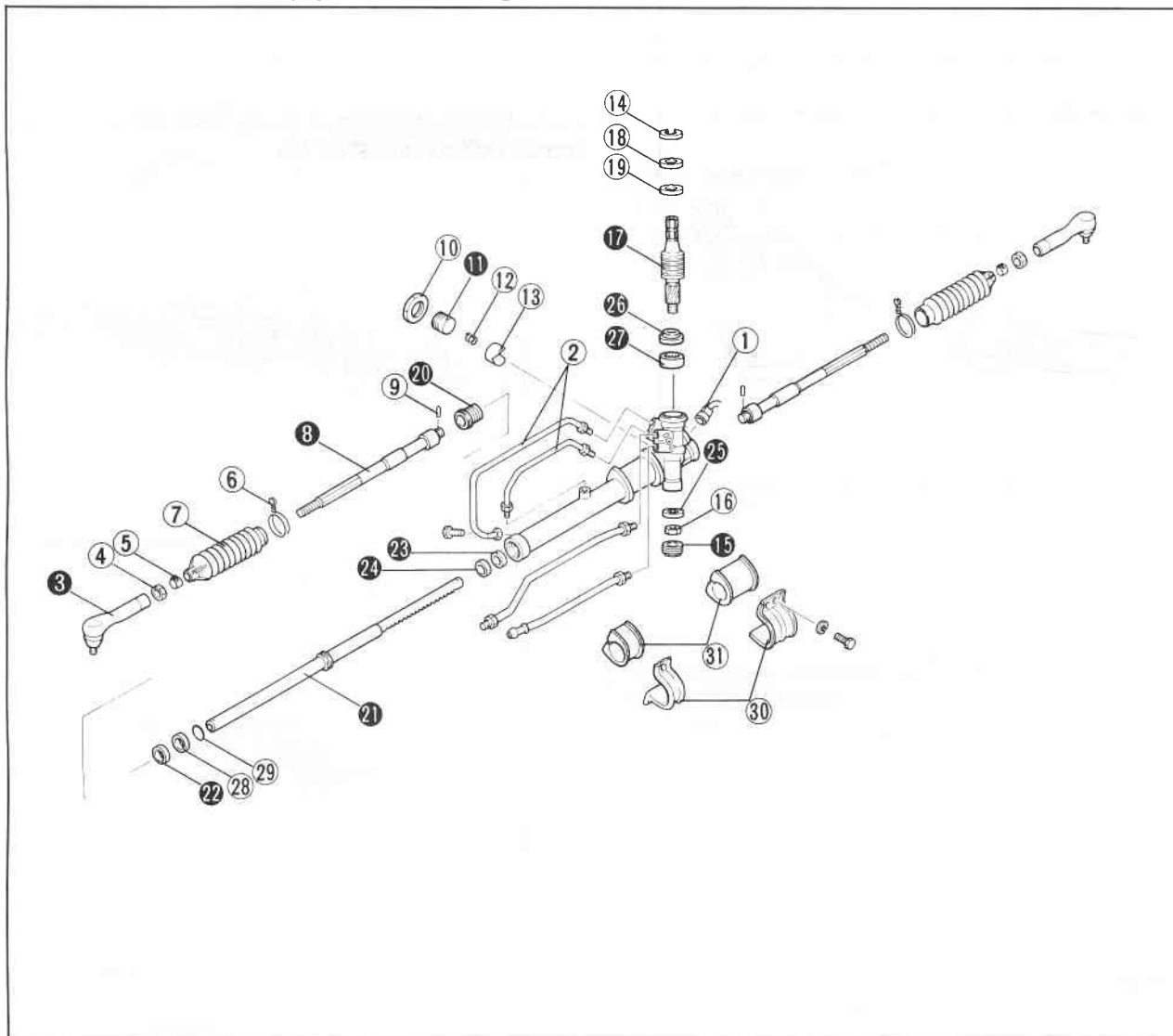
DISASSEMBLY

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

Caution

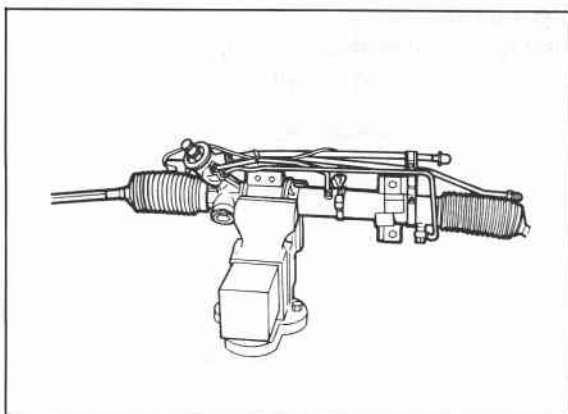
a) In order to prevent the entrance of dirt, all disassembly and assembly should be done in a clean area.

b) Before disassembly, plug the openings of all pipe installation fittings, then thoroughly clean the steering gear and linkage.



86U10X-121

- | | | |
|--------------------------|---|---------------------------|
| 1. Oil pressure switch | 11. Adjust cover | 21. Rack |
| 2. Oil pipe | 12. Spring | 22. Oil seal |
| 3. Tie-rod end | 13. Pressure pad | 23. Spacer |
| 4. Tie-rod end locknut | 14. Snap ring | 24. Oil seal |
| 5. Spring clip | 15. Housing cover | 25. Lower bearing |
| 6. Boot wire | 16. Lower bearing locknut | 26. Oil seal |
| 7. Boot | 17. Pinion shaft and control valve assembly | 27. Needle bearing |
| 8. Tie-rod | 18. Oil seal | 28. Seal ring |
| 9. Lock pin | 19. Upper bearing | 29. O-ring |
| 10. Adjust cover locknut | 20. Rack bushing assembly | 30. Mounting bracket |
| | | 31. Mounting rubber mount |



86U10X-122

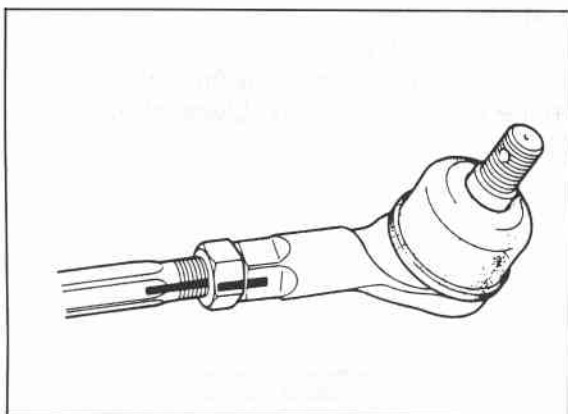
Disassembly Note

Steering gear and linkage

Secure the gear and linkage in a vise.

Caution

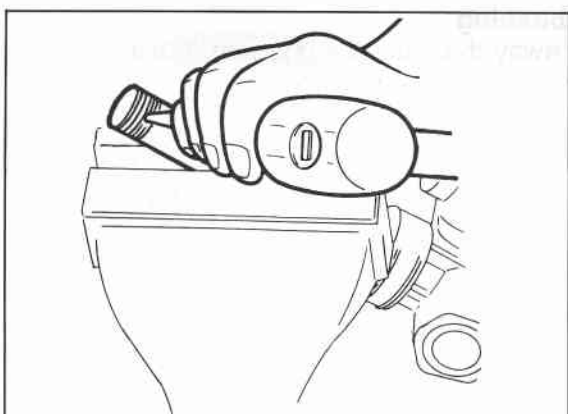
Insert protective material (such as copper plates) in the jaws of the vise.



86U10X-123

Tie-rod ends

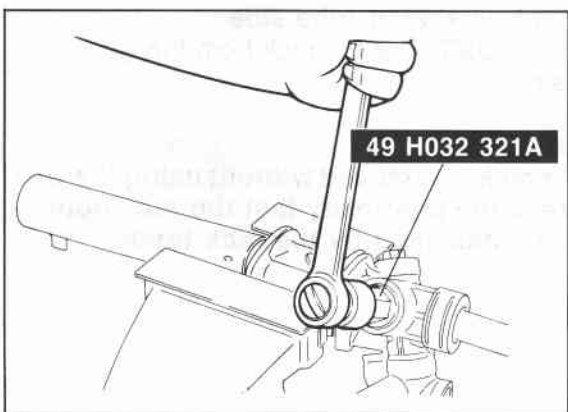
Before removing the tie-rod ends, make a mark for proper installation.



86U10X-124

Tie-rod

1. Remove the tie-rod from rack.
2. Remove the roll pin with a pin-punch and hammer.

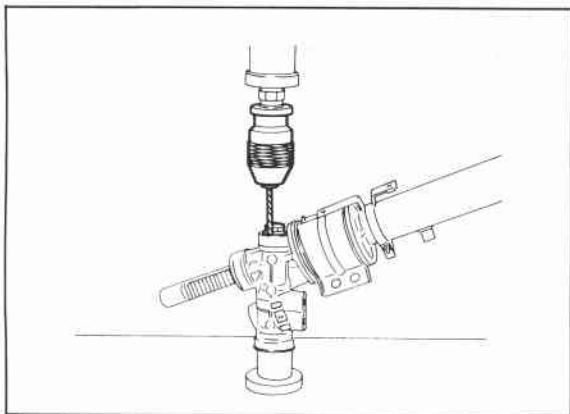


86U10X-125

Adjust cover

1. Remove the locknut from the adjust cover.
2. Remove the adjust cover with the **SST**.
3. Remove the spring and pressure pad.

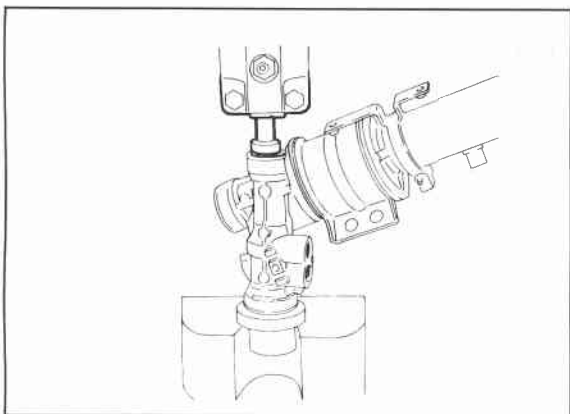
10 ENGINE SPEED SENSING POWER STEERING



86U10X-126

Housing cover

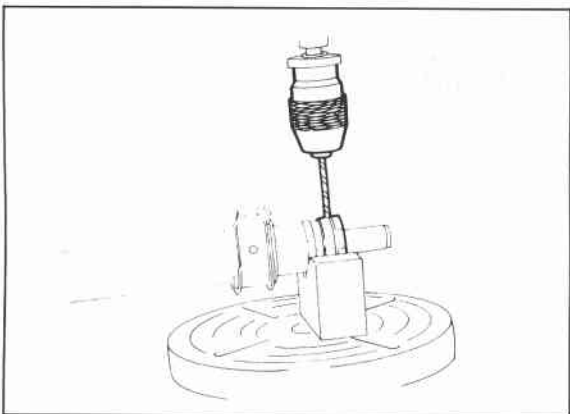
1. Cut away the staked areas with a drill.
2. Remove the housing cover.



86U10X-127

Pinion shaft

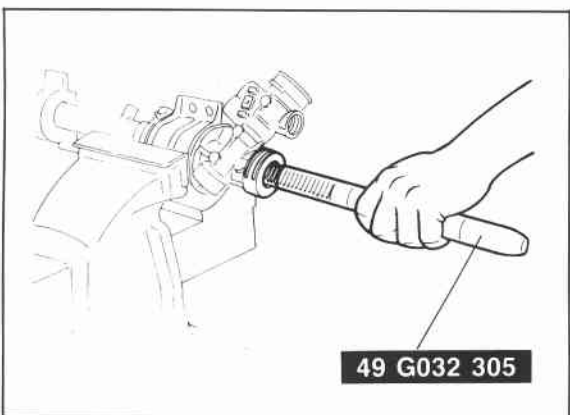
1. Remove the locknut.
2. Set the gear housing assembly on a press and remove the pinion shaft assembly as shown in the figure.



86U10X-128

Rack bushing

1. Cut away the staked areas with a drill.
2. Remove the rack bushing.



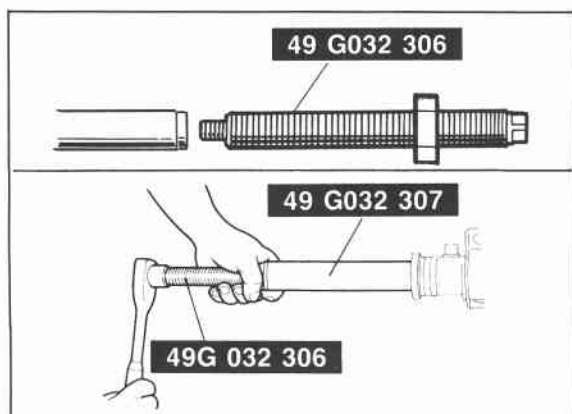
86U10X-129

Rack and oil seal at tube side

1. Slide the **SST** over the rack from the gear housing side.

Note

If the rack is removed without using the SST, there is the possibility that the rack housing may be damaged by the rack teeth.



86U10X-130

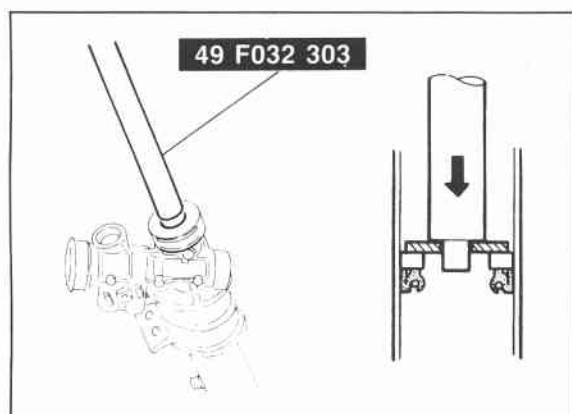
2. Install the **SST** to the threaded part of the rack at the tube side.
3. Remove the oil seal at the tube side which pulling out the rack.



86U10X-131

Spacer and oil seal at housing side

1. Insert the **SST** from the pinion housing side so that it contacts the spacer.



86U10X-132

2. Set the **SST** against the **SST** inserted in step 1.
3. Secure the gear housing in a vise.
4. Drive the spacer and oil seal out of the housing.

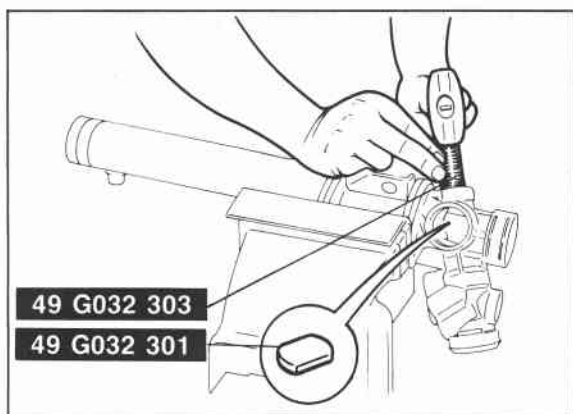


86U10X-133

Lower bearing

Drive the lower bearing out of the housing with the **SST**.

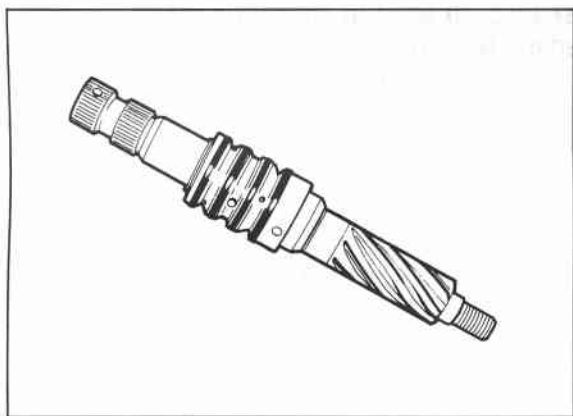
10 ENGINE SPEED SENSING POWER STEERING



86U10X-134

Oil seal and needle bearing

1. Insert the **SST** so that it contacts the needle bearing.
2. Drive the oil seal and needle bearing out with the **SST** bar.



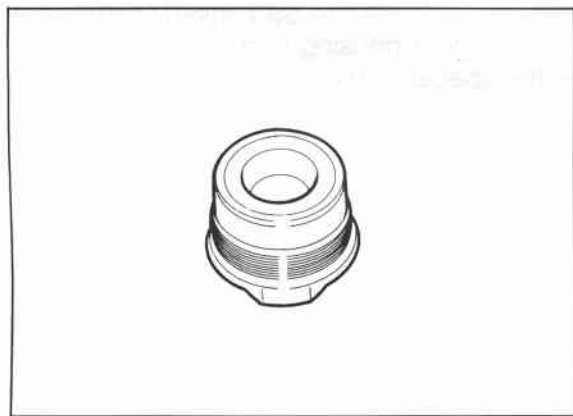
86U10X-135

INSPECTION

Check the following and replace any faulty parts.

Pinion shaft assembly

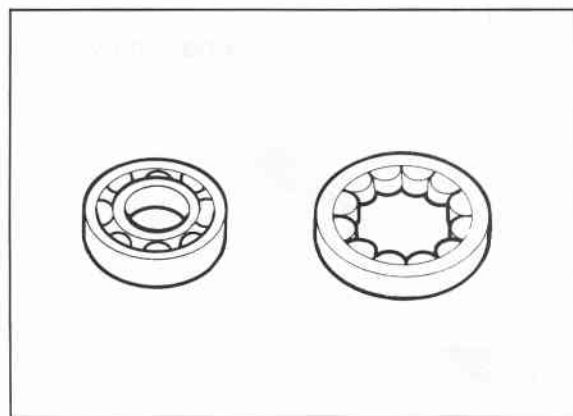
1. Pinion shaft teeth wear or damage
2. Control valve damage, clogging, and wear



86U10X-136

Rack bushing

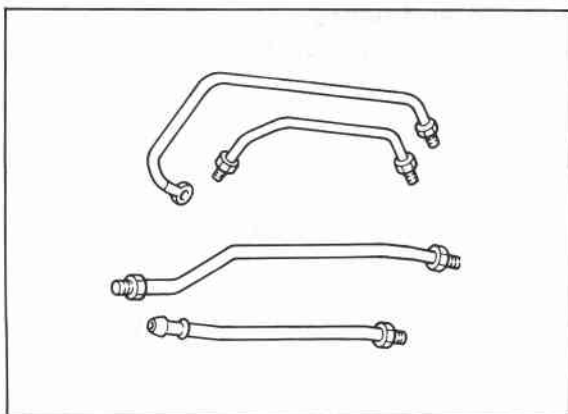
Wear or damage



86U10X-137

Bearing

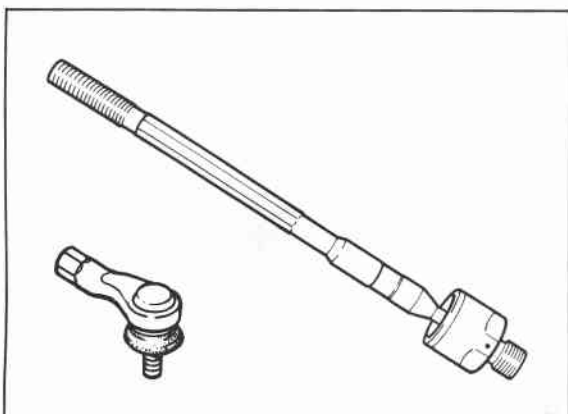
Wear, damage, and operation



86U10X-138

Oil pipe

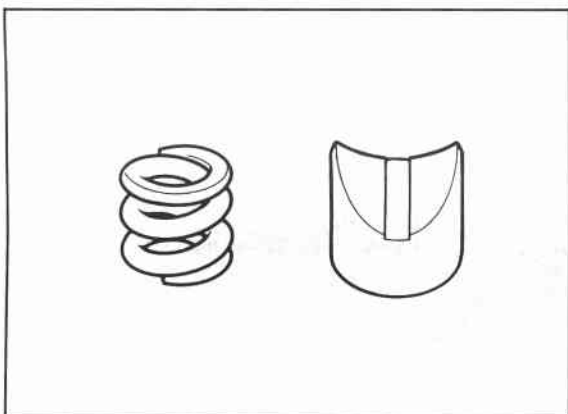
Clogging or damage



86U10X-139

Tie-rod and tie-rod end

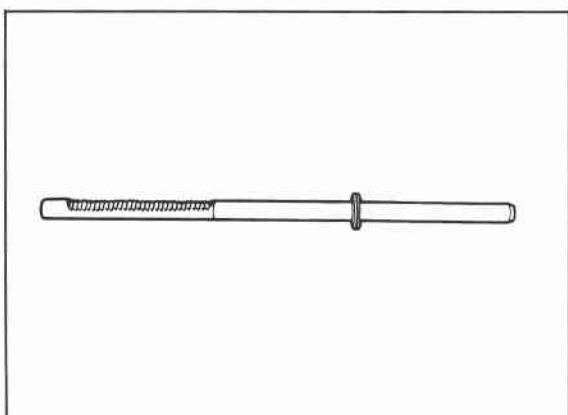
1. Tie-rod damage
2. Tie-rod ball joint damage and operation
3. Tie-rod end damage and operation



86U10X-140

Pressure pad and spring

1. Pressure pad damage
2. Spring damage

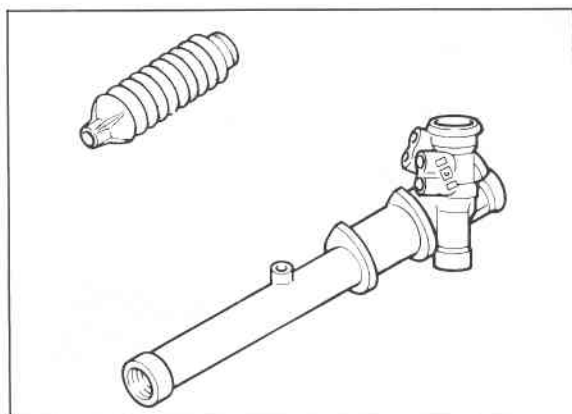


86U10X-141

Rack

1. Rack cracking, damage, or wear of teeth
2. Seal ring holder wear or damage
3. Rack piston side corrosion

10 ENGINE SPEED SENSING POWER STEERING

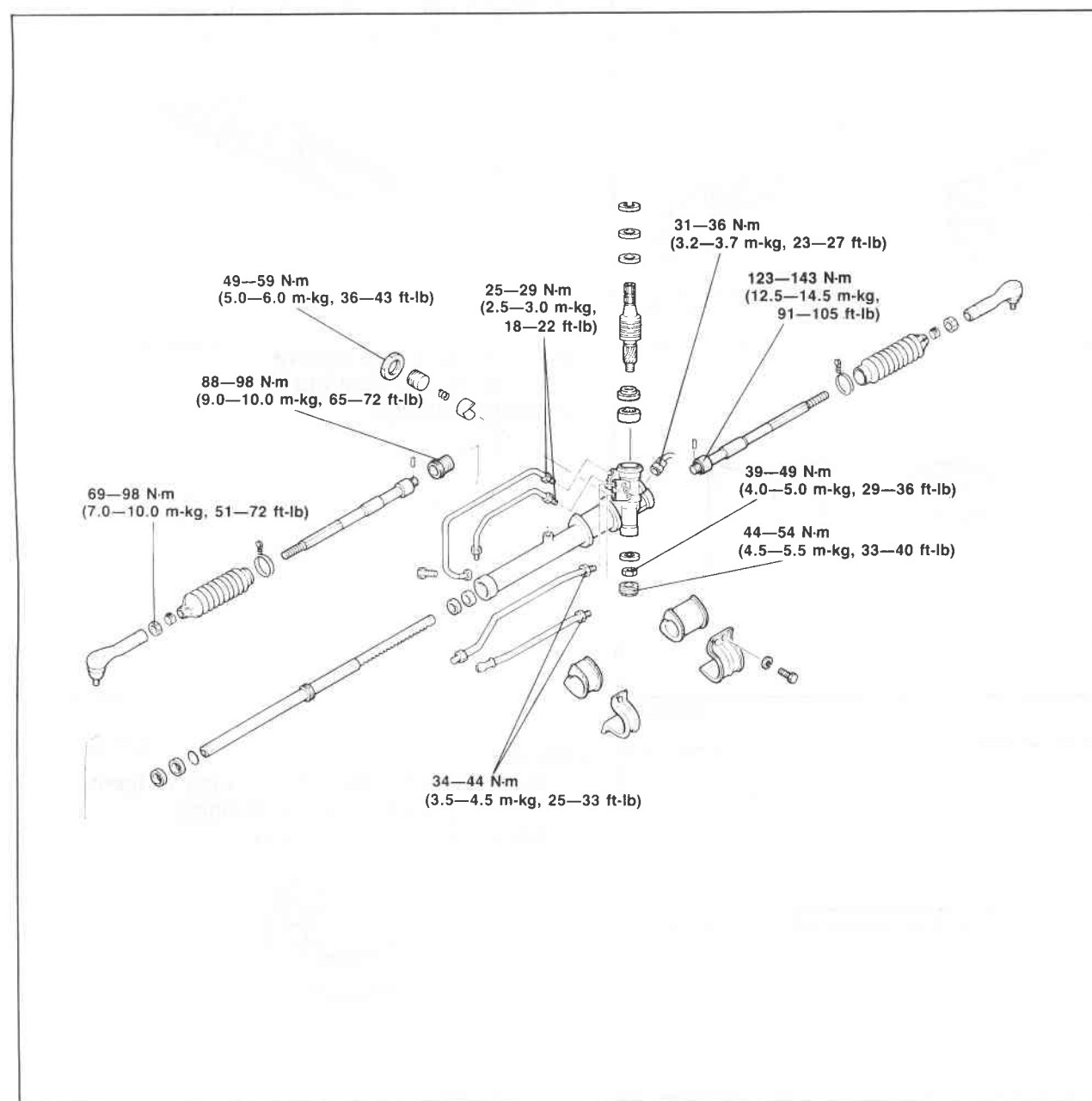


86U10X-142

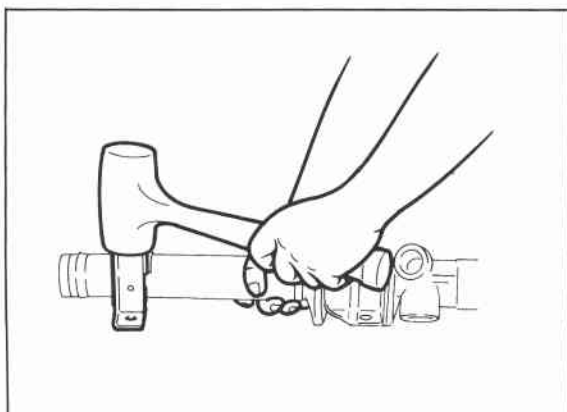
Gear housing and boots

1. Gear housing cracking or damage
2. Boot cracking or tearing

ASSEMBLY Torque Specifications



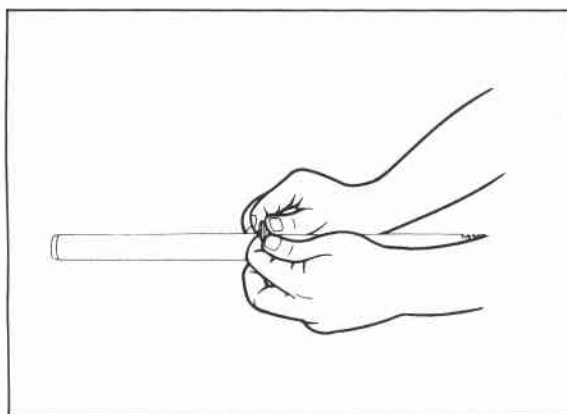
86U10X-251



86U10X-143

Mounting bracket and rubber

1. Install the mounting rubber.
2. Tap the mounting bracket on with a plastic hammer.



86U10X-144

O-ring and seal ring

1. Apply AFT to the O-ring and seal ring.
2. Install the O-ring in the ring groove of the rack.
3. Install the seal ring in the groove of the rack.

Note

Be careful not to cut or otherwise damage the edge of the seal ring.

4. Compress the seal ring by hand to fit it to the groove.



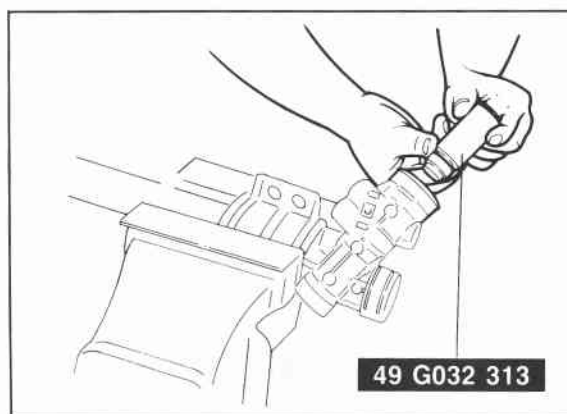
86U10X-145

Needle bearing

1. Apply grease to the end of the **SST**.
2. Apply ATF to the needle bearing.
3. Set the needle bearing on the **SST**.

Note

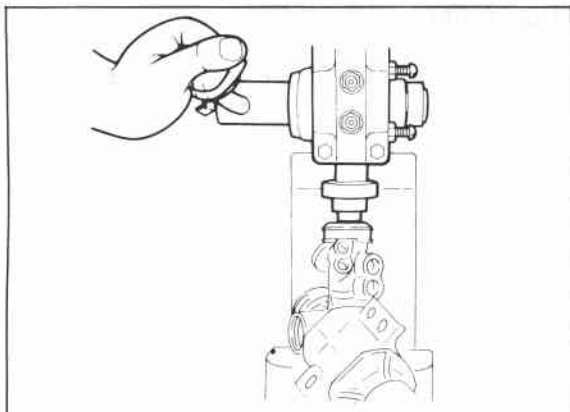
When installing the needle bearing to the SST, install the embossed side first.



86U10X-146

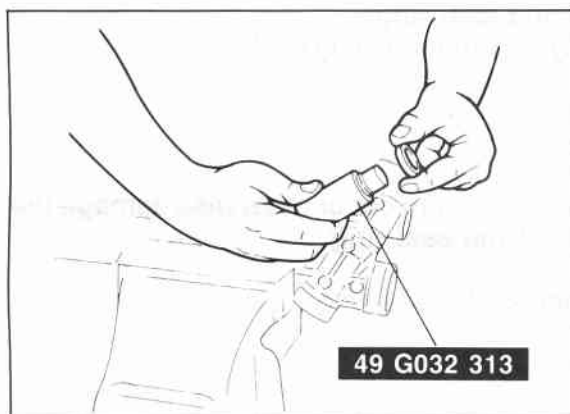
4. Insert the needle bearing and the **SST** into the housing.

10 ENGINE SPEED SENSING POWER STEERING



86U10X-147

5. Set the housing on a press and press in the bearing.



86U10X-148

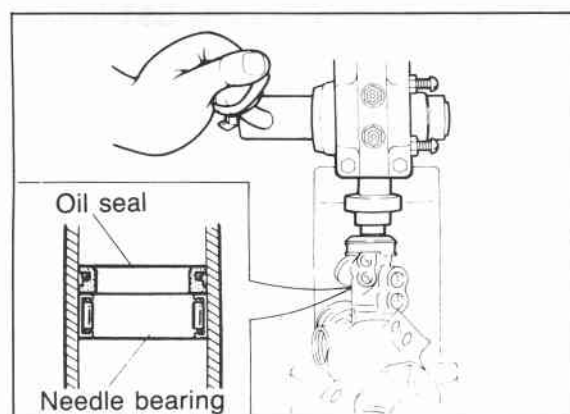
Oil seal

1. Apply grease to the end of the **SST**.
2. Apply ATF to the oil seal.
3. Set the oil seal on the **SST**.



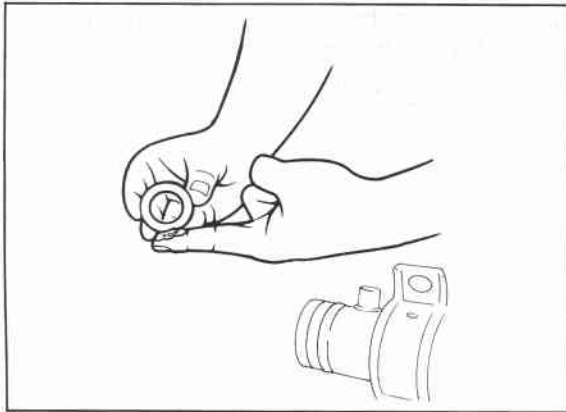
86U10X-149

4. Insert the oil seal and the **SST** into the housing.



86U10X-150

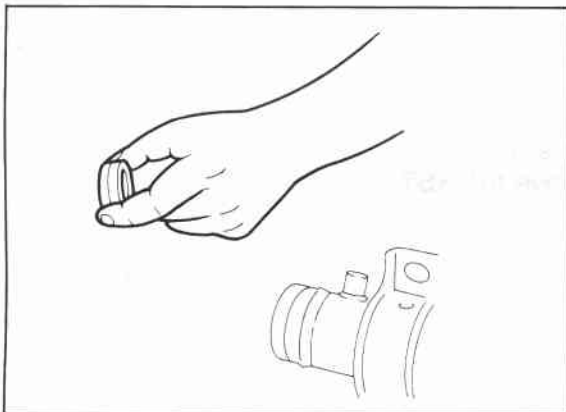
5. Set the housing on a press and press in the seal.



86U10X-151

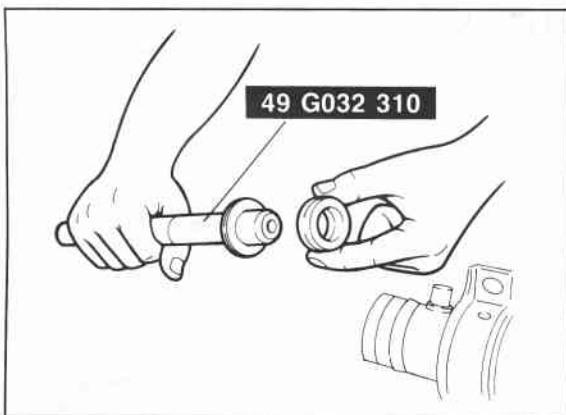
Spacer and pinion housing side oil seal

1. Apply grease to flat surface of the spacer.



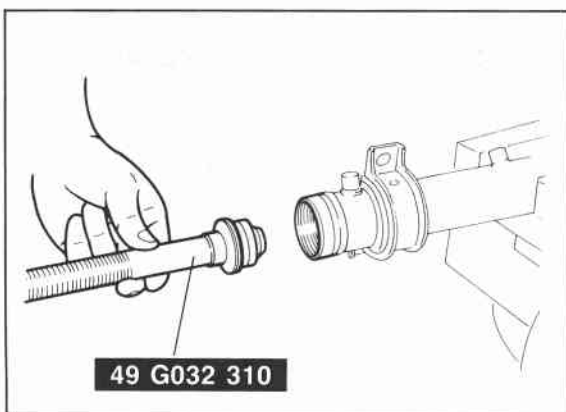
86U10X-152

2. Connect the oil seal to the grease coated surface of the spacer.
3. Apply ATF to the inside and outside of the spacer and oil seal.



86U10X-153

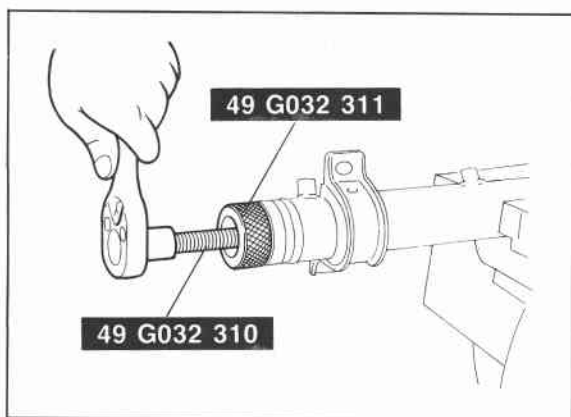
4. Set the spacer and oil seal on the **SST**.



86U10X-154

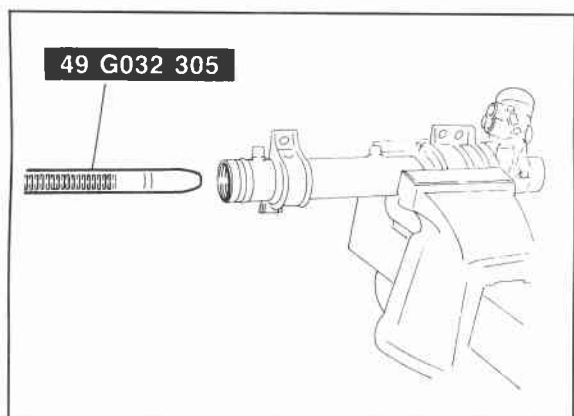
5. Insert the **SST** from the tube side.

10 ENGINE SPEED SENSING POWER STEERING



86U10X-155

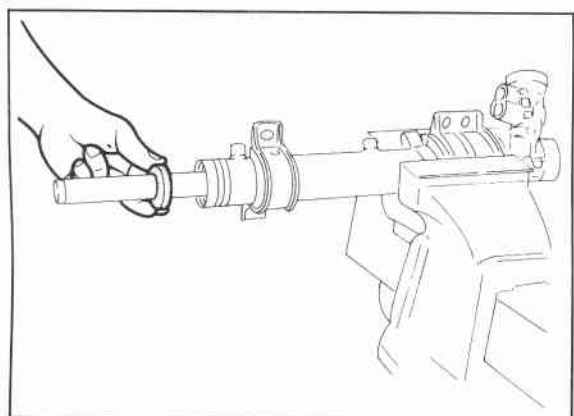
6. Install and tighten the **SST** nut against the tube.
7. Turn the **SST** shaft in as far as it will go to push in the seal and spacer.
8. Remove the **SST**.



86U10X-156

Rack

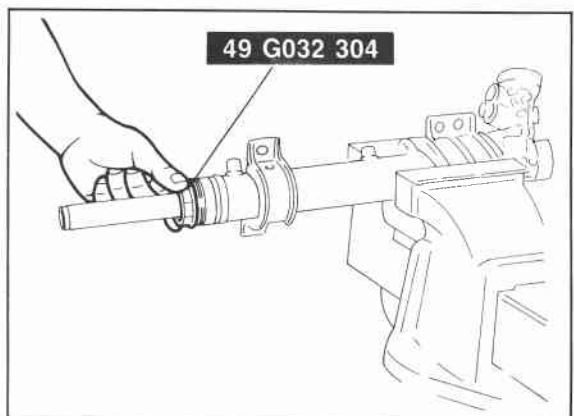
1. Apply grease (lithium base, NLGI No.2) to the friction surface and teeth of the rack.
2. Slide the **SST** over the rack and slide it in from the tube side.
3. Remove the **SST**.



76G10X-037

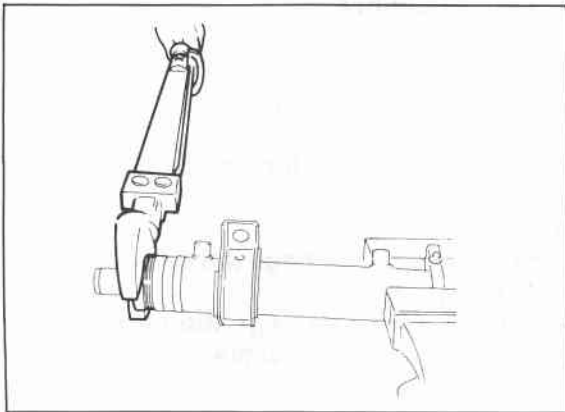
Oil seal (Rack)

1. Apply ATF to the oil seal and slide it onto the rack.



86U10X-158

2. Set the **SST** on the rack.
3. Turn the **SST** as far as it will go, and push the oil seal into the tube.
4. Remove the **SST**.



86U10X-159

Rack bushing

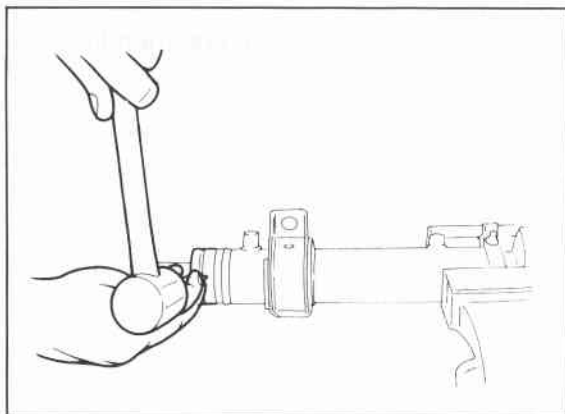
1. Install the rack bushing assembly in the rack housing.

Tightening torque:

88—98 N·m (9—10 m·kg, 65—72 ft·lb)

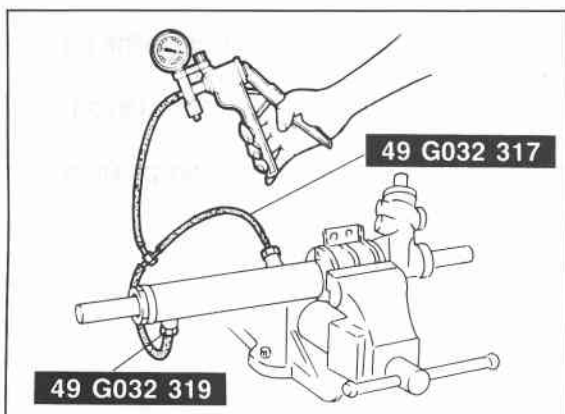
Note

The oil seal is pushed to the correct position in the rack housing by the tightening of the rack bushing.



86U10X-160

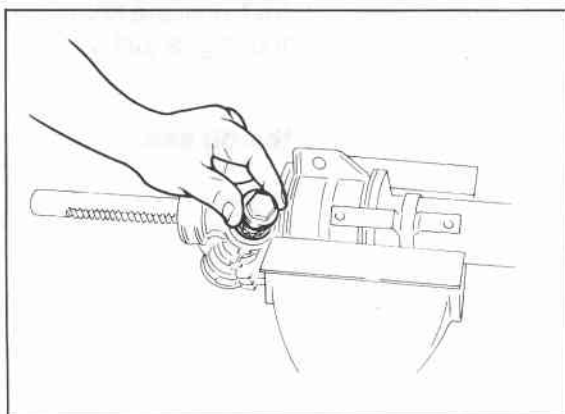
2. Stake the rack housing at two points **approx 1.5 mm (0.06 in)** from the end with a hammer and center punch.



86U10X-161

Hermetic inspection

1. Connect the **SST** to the cylinder housing.
2. Connect a vacuum pump to the **SST**.
3. Apply **400 mmHg (15.7 inHg)** vacuum.
4. Verify that vacuum is held for at least **30 sec.** If not, check the seal and assembly.

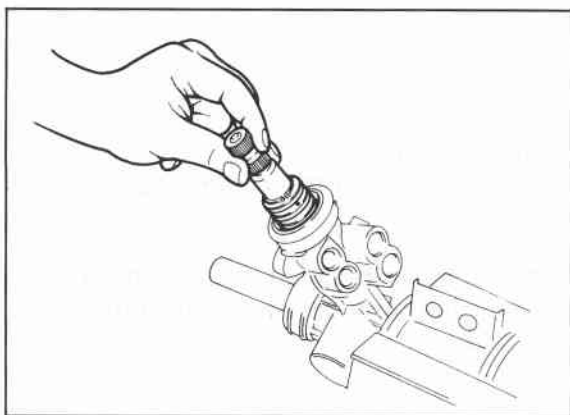


86U10X-162

Lower bearing

1. Secure the gear housing in a vise so that the lower bearing bore faces upward.
2. Apply ATF to the lower bearing, then install it in the housing.
3. Press the bearing into the gear housing with the housing cover. Tighten the cover until the tightening force suddenly increases.

10 ENGINE SPEED SENSING POWER STEERING



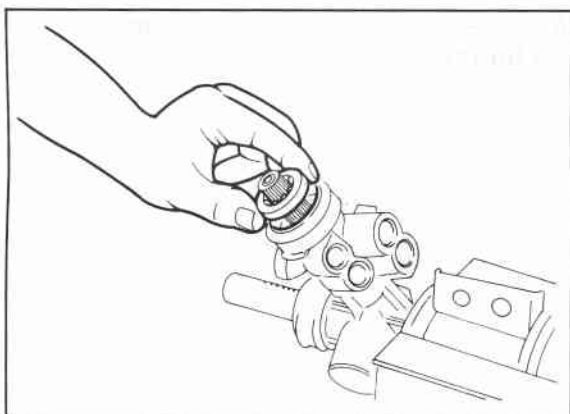
76G10X-038

Pinion shaft assembly

1. Apply grease (lithium base, NLGI No. 2) to the teeth of the pinion shaft.
2. Apply ATF to the seal ring and the friction surface of the control valve.
3. Install the pinion shaft in the housing.

Note

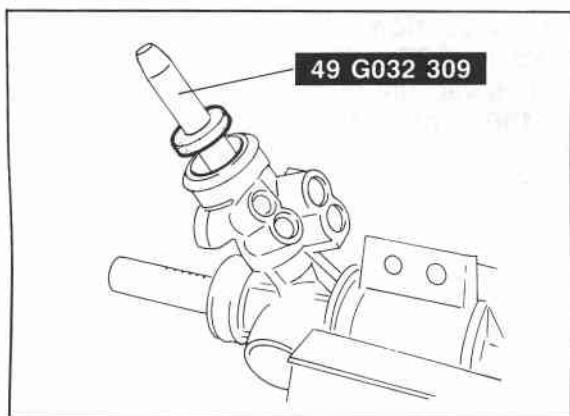
- a) Be careful not to damage the oil seal by the teeth of the pinion.
- b) Be careful not to damage the edge of the seal ring and control valve.



76G10X-039

Upper bearing

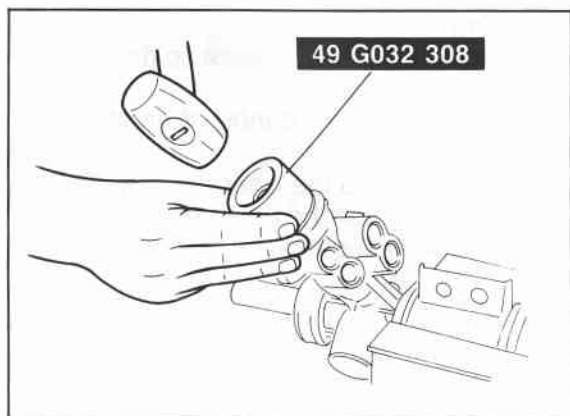
Apply ATF to the upper bearing, and then install it.



86U10X-165

Oil seal

1. Apply ATF to the oil seal, and fill inside the lip with grease (lithium base, NLGI No. 2).
2. Slide the **SST** over the serrations of the pinion shaft assembly.
3. Slide the oil seal over the **SST** and position it in the housing.

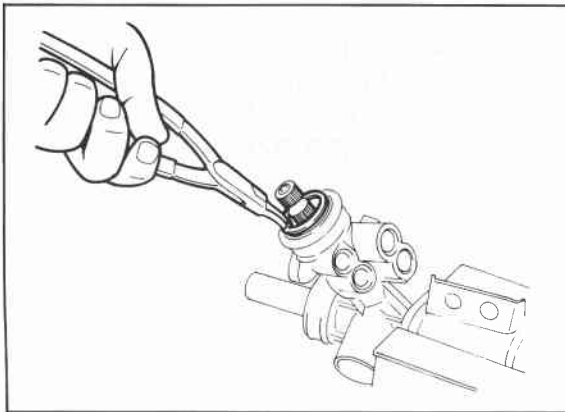


86U10X-166

4. Tap the oil seal in with the **SST** until the snap ring installation groove in the housing is just visible.

Note

Apply uniform force to the oil seal when installing.



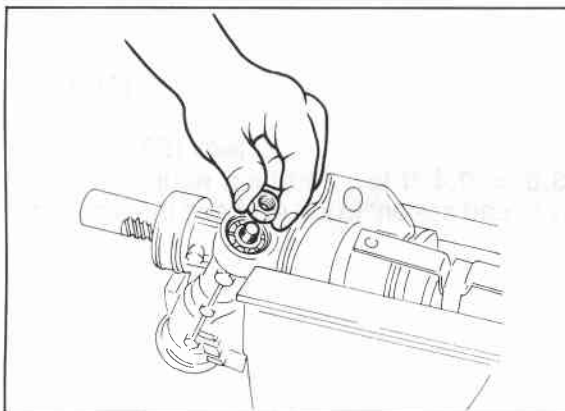
86U10X-167

Snap ring

Install the snap ring.

Note

Verify that the snap ring is correctly seated in the ring groove of the housing.



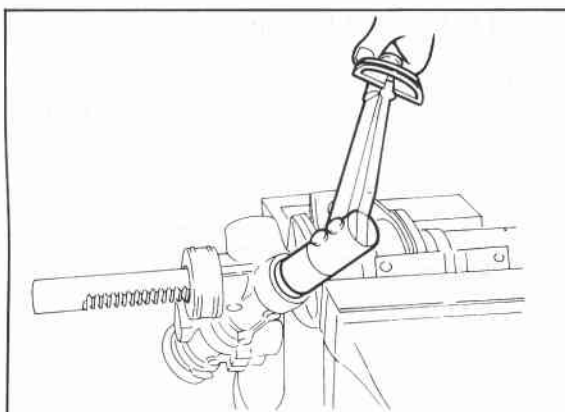
86U10X-168

Locknut

1. Temporarily install the tie-rod on the tube side of the rack.
2. Install the locknut and turn it until the tie-rod contacts the tube.
3. Tighten the locknut.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)



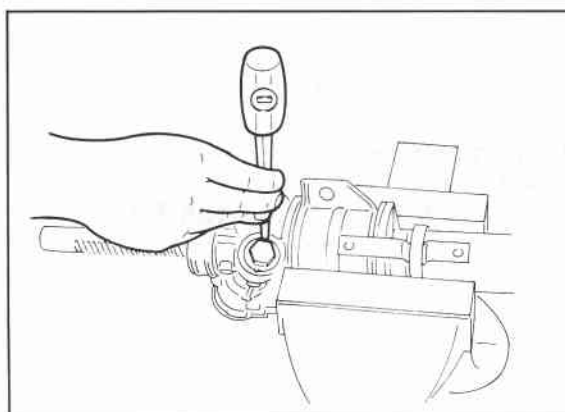
86U10X-169

Housing cover

1. Apply thread sealant to the housing cover threads.
2. Install the housing cover.

Tightening torque:

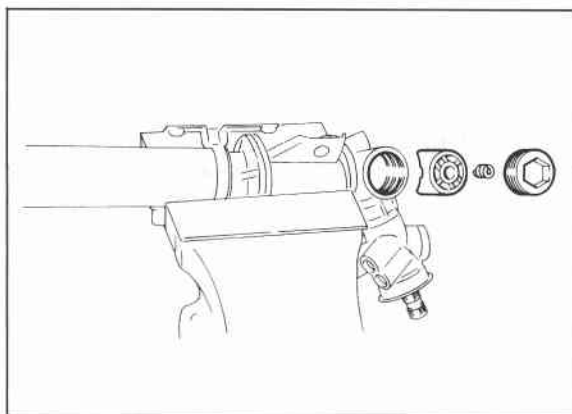
44—54 N·m (4.5—5.5 m·kg, 33—40 ft·lb)



86U10X-170

3. Stake between the rack housing and housing cover at two points with a center punch.

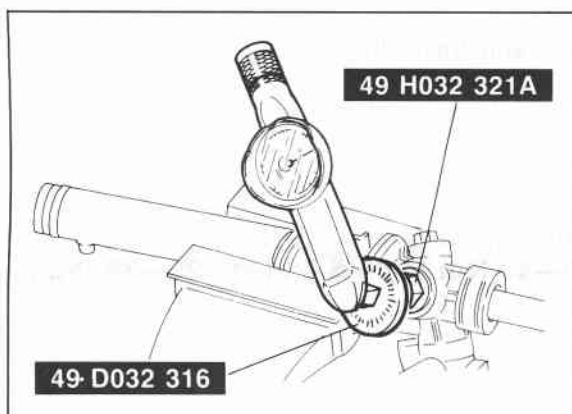
10 ENGINE SPEED SENSING POWER STEERING



86U10X-171

Pressure pad

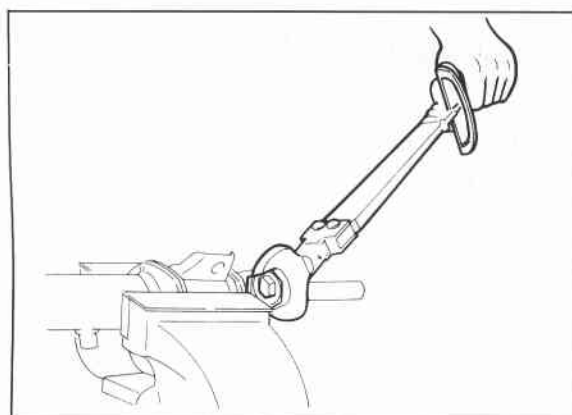
1. Secure the gear housing in a vise so that the pressure pad position faces upward.
2. Apply grease (lithium base NLGI No. 2) to the rack sliding surface of the pressure pad; then install it in the housing.
3. Install the pressure pad.



86U10X-172

Adjust cover

1. Set the rack in the center position.
2. Tighten the adjust cover to **9.8 N·m (100 cm·kg, 7.2 ft·lb)** then loosen it.
3. Tighten again to **4.9 ± 0.5 N·m (50 ± 5 cm·kg, 3.6 ± 0.4 ft·lb)**, and then return it 45°.
4. Apply thread sealant to the exposed threads of adjust cover.

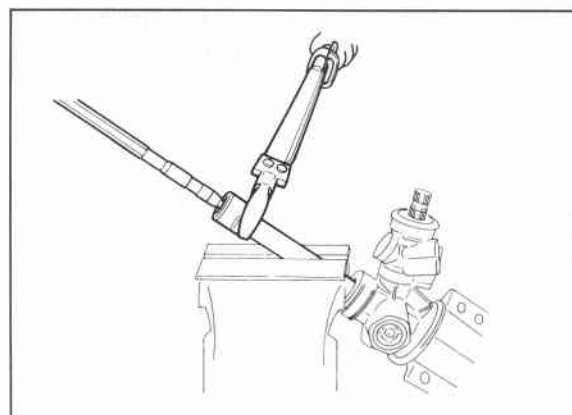


86U10X-173

5. Install and tighten the locknut.

Tightening torque:

49—59 N·m (5.0—6.0 m·kg, 36—43 ft·lb)



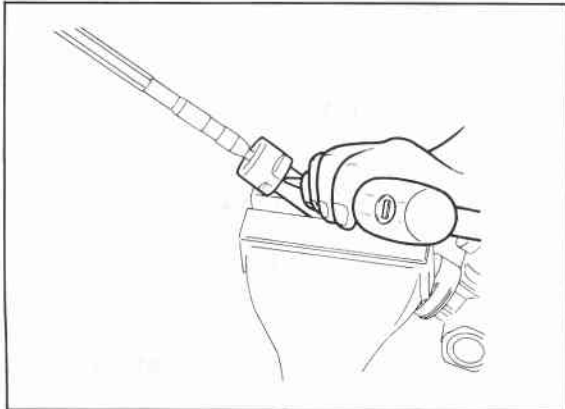
86U10X-174

Tie-rod

1. Secure the rack in a vise.
2. Install the tie rod on the rack.

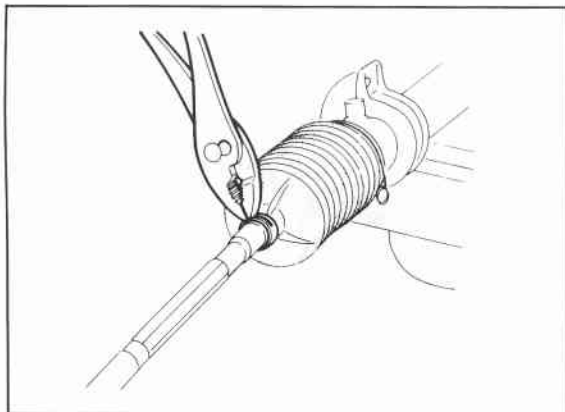
Tightening torque:

**123—143 N·m
(12.5—14.5 m·kg, 90.6—105 ft·lb)**



86U10X-175

3. Tap in a new roll pin.



86U10X-176

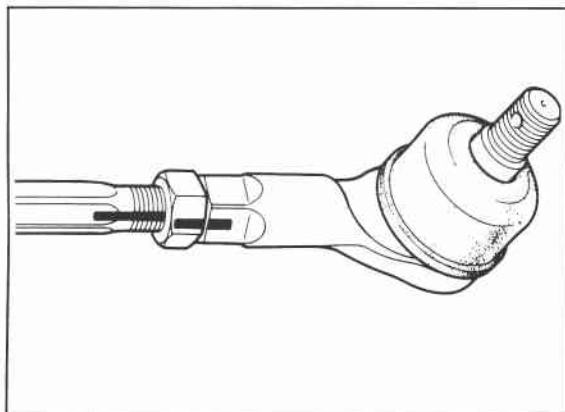
Boot

1. Apply grease to the inner surface of the small end of the boot.
2. Install the boot. Wrap a new wire around the large end of the boot two times and then twist it 4 to 4.5 times. Bend the twisted part toward the mounting bracket.

Note

Be careful not to break the boot wire.

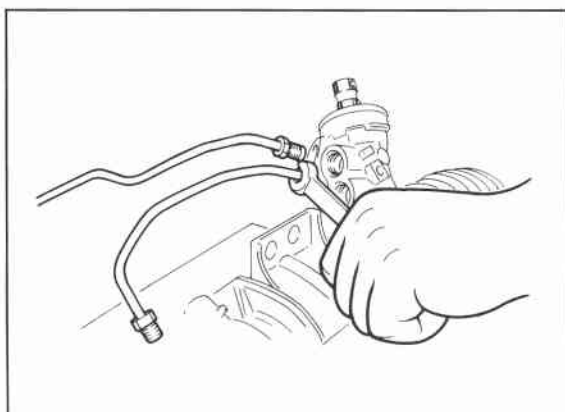
3. Install the spring clip on the small end of the boot.



86U10X-177

Tie-rod end

Align with the mark made before disassembly, and then tighten the nut.

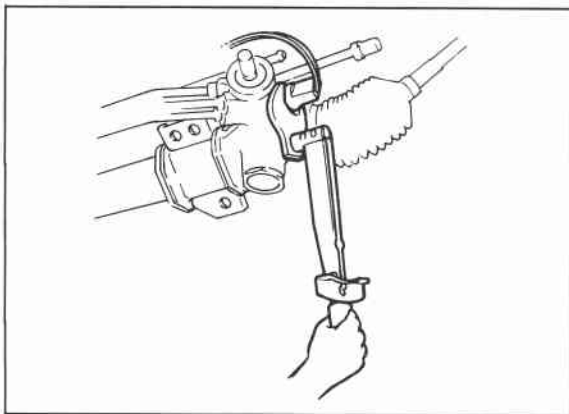


86U10X-178

Oil pipe

Secure the mounting bracket in a vise so that the oil pipe connections face upward.

10 ENGINE SPEED SENSING POWER STEERING



86U10X-179

Oil pressure switch

1. Install the pressure switch O-ring in the gear housing.
2. Install the oil pressure switch.

Tightening torque:

31—36 N·m (3.2—3.7 m·kg, 23—27 ft·lb)

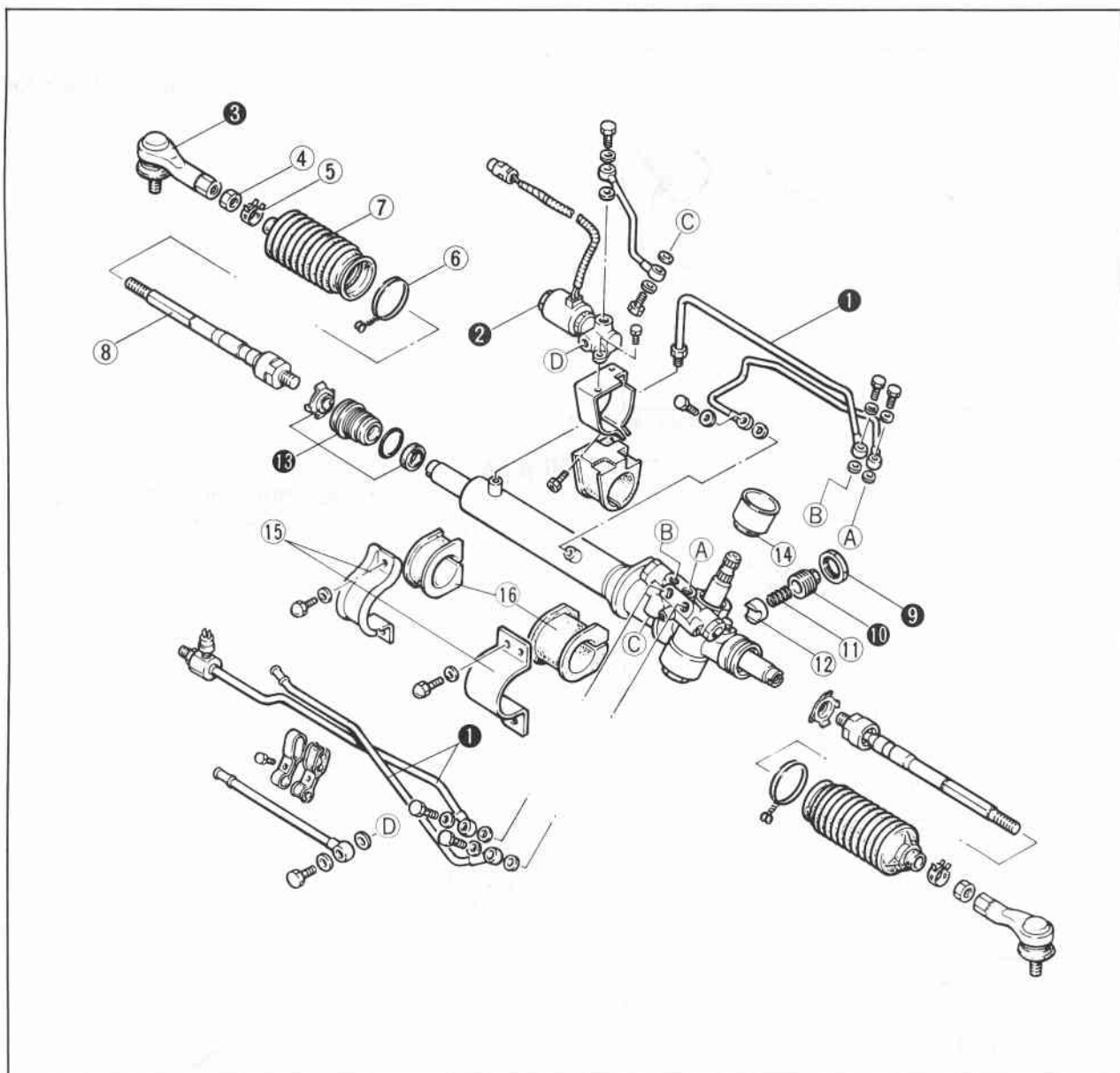
ELECTRONICALLY-CONTROLLED POWER STEERING

DISASSEMBLY

Disassemble in the sequence shown in the figure, referring to the disassembly note for specially marked parts.

Caution

- a) Because adjustment of the spool valve is not possible, do not disassemble the gear box for spool valve repairs. If repairs are necessary, replace the gear box assembly.
- b) In order to prevent the entrance of dirt, all disassembly and assembly should be done in a clean area.
- c) Before disassembly, plug the openings of all pipe installation fittings; then thoroughly clean the steering gear and linkage.



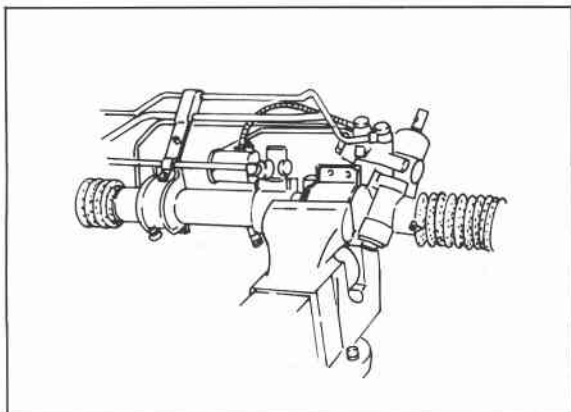
86U10X-180

- 1. Pipe
- 2. Solenoid valve
- 3. Tie-rod end
- 4. Tie-rod end locknut
- 5. Spring clip

- 6. Boot wire
- 7. Boot
- 8. Tie-rod
- 9. Adjust cover locknut
- 10. Adjust cover

- 11. Spring
- 12. Pressure pad
- 13. Outer box assembly
- 14. Oil seal
- 15. Mounting bracket
- 16. Mounting rubber

10 ELECTRONICALLY-CONTROLLED POWER STEERING



86U10X-181

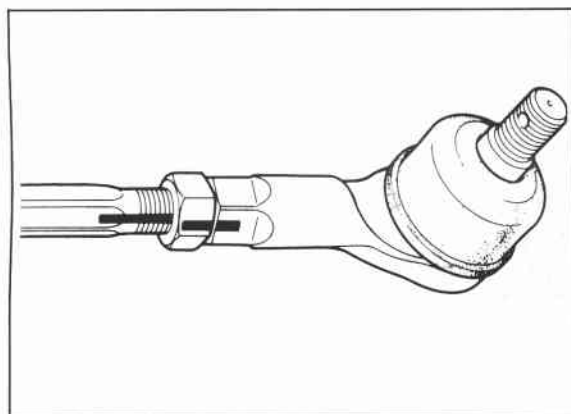
Disassembly Note

Steering gear and linkage

Secure the mount part of the removed gear and linkage in a vise.

Caution

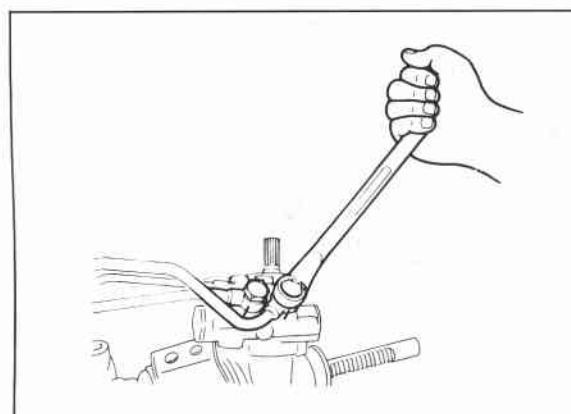
Insert protective material (such as copper plates) in the jaws of the vise.



86U10X-182

Tie-rod ends

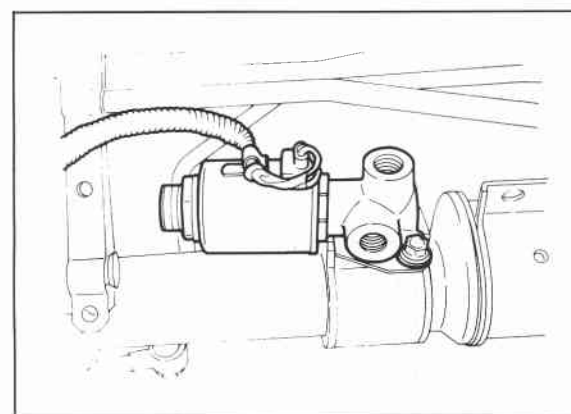
Before removing the tie-rod ends, make a mark for proper installation.



86U10X-183

Oil pipe

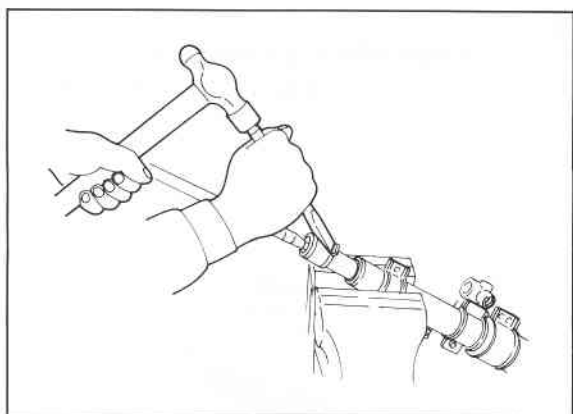
Mark the pressure and return pipes and the valve case for proper installation. Remove the pipes.



86U10X-184

Solenoid valve

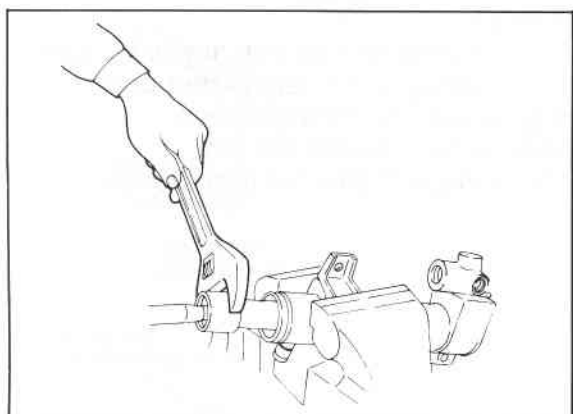
Remove the solenoid valve.



86U10X-185

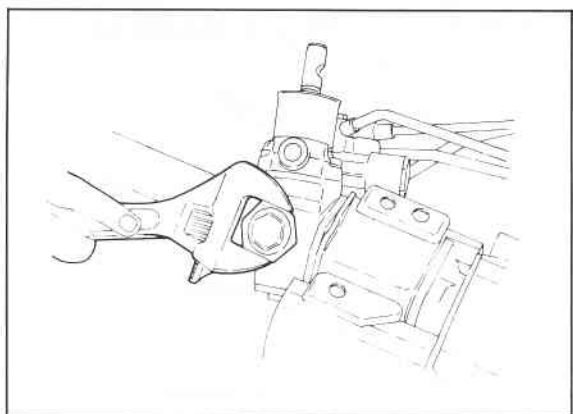
Tie-rods

1. Uncrimp the washer as shown in the figure.



63U10X-127

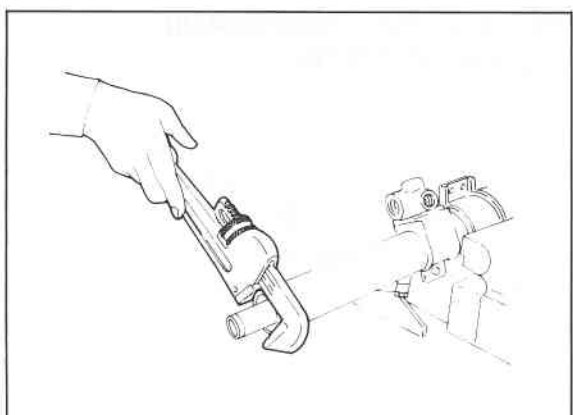
2. Remove the tie-rod from the rack.



86U10X-186

Locknut and adjust cover

Loosen the locknut and remove the adjust cover, spring, and pressure pad.

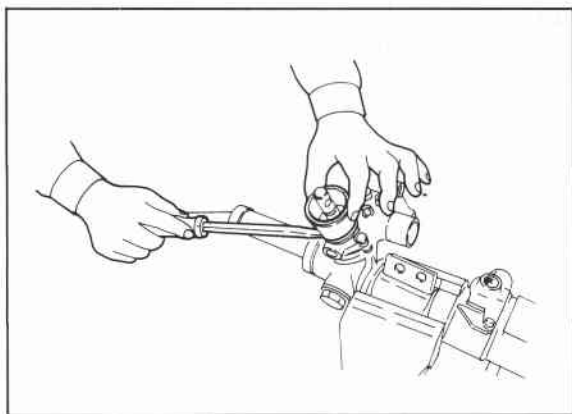


86U10X-187

Outer box

Protect the outer box with cloth and remove it with a pipe wrench.

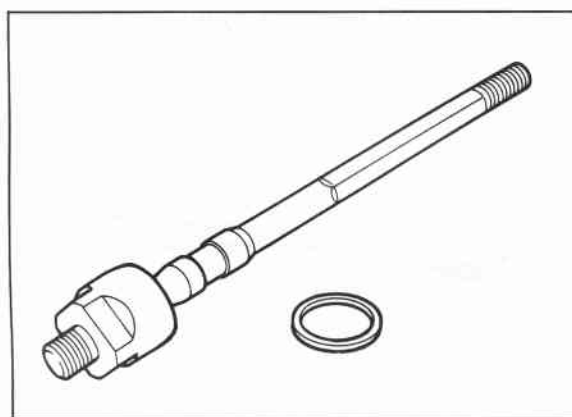
10 ELECTRONICALLY-CONTROLLED POWER STEERING



86U10X-188

Oil seal

Remove the oil seal with a screwdriver.



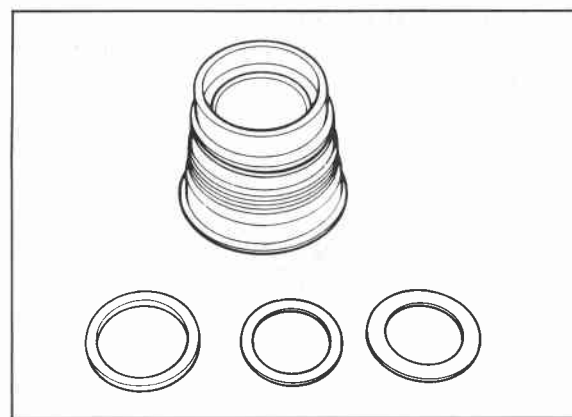
86U10X-189

INSPECTION

Check the following and replace any faulty parts.

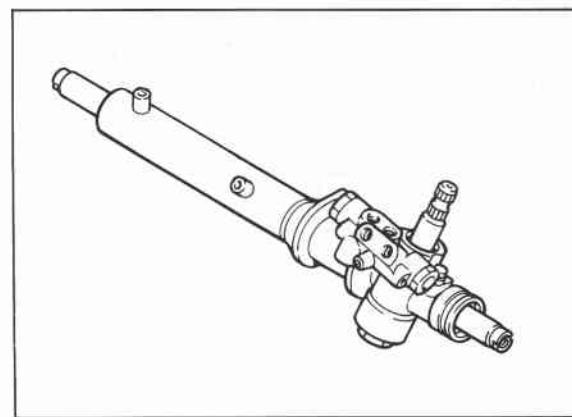
1. Cracked, damaged, or deteriorated boots
2. Worn pressure pad friction surface
3. Loose or sticking tie-rod ball joint
4. Bent or damaged tie-rod or tie-rod end

5. Worn outer box bushing



86U10X-190

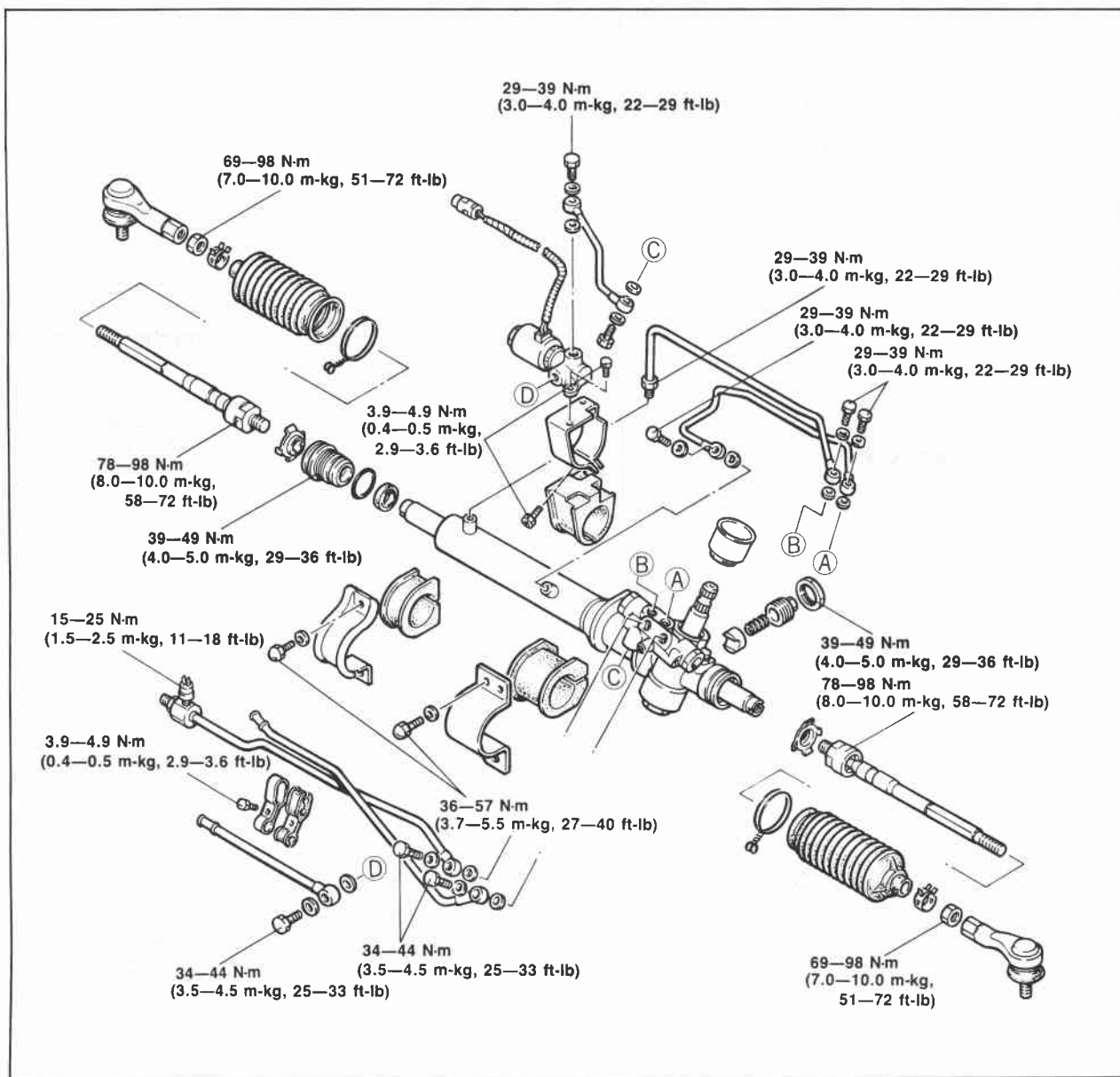
6. Cracked or damaged gear housing
7. Steering gear oil leakage



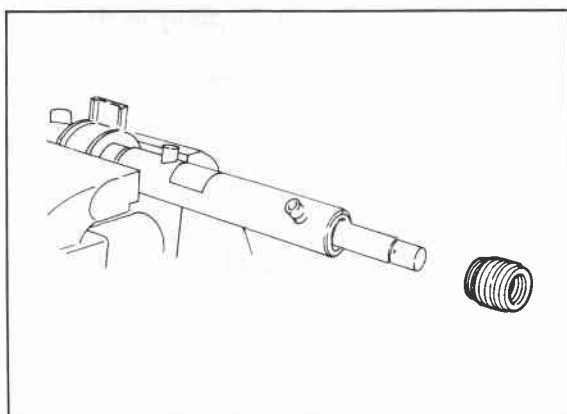
86U10X-191

ASSEMBLY

Torque Specifications



86U10X-252



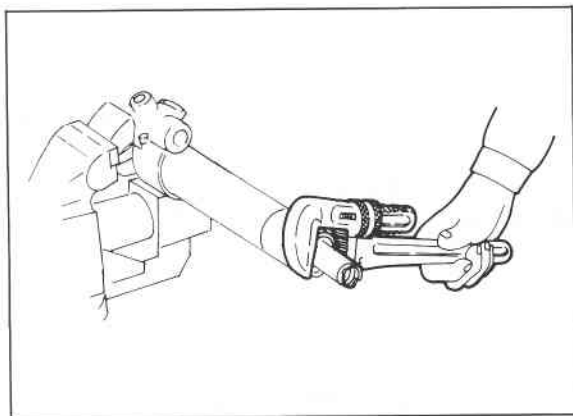
86U10X-192

1. Install the outer box in the rack housing.

Note

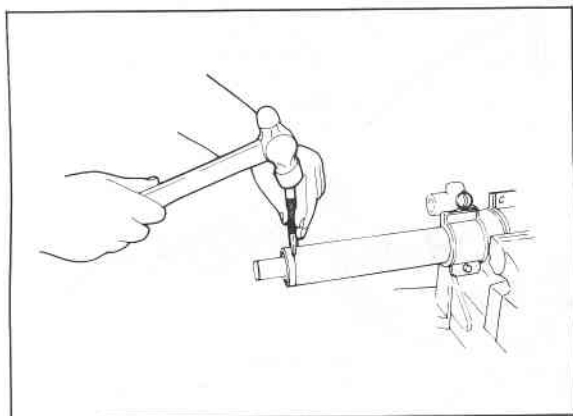
Coat the seals and O-rings with ATF.

10 ELECTRONICALLY-CONTROLLED POWER STEERING



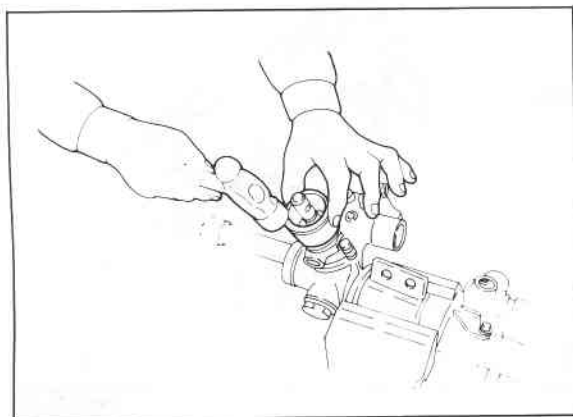
86U10X-193

2. Protect the outer box with cloth and tighten it with a pipe wrench.



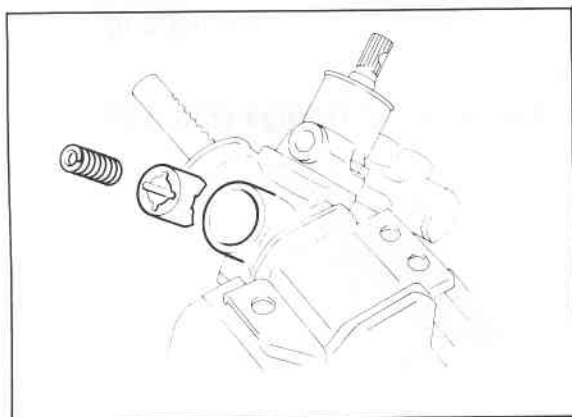
86U10X-194

3. Stake between the outer box and the rack housing with a center punch.



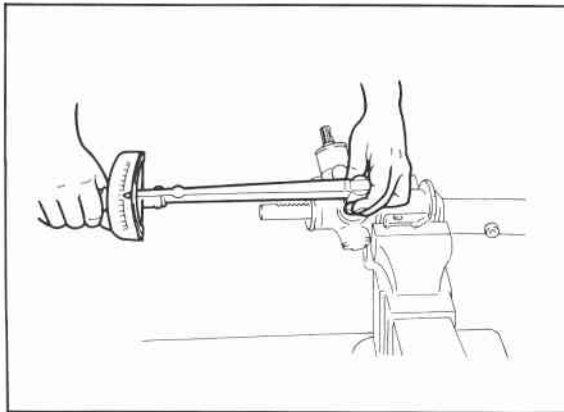
86U10X-195

4. Install the oil seal with a suitable pipe.



86U10X-196

5. Install the pressure pad and spring in the gear housing.



86U10X-197

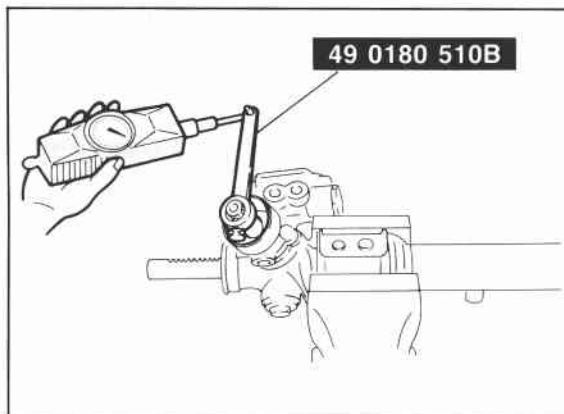
6. Apply thread sealant to the threads of the adjust cover.

7. Install the adjust cover to the gear housing and tighten it as specified; then loosen it 35°.

Tightening torque:

4.5—5.5 N·m

(45—55 cm·kg, 39—48 in·lb)

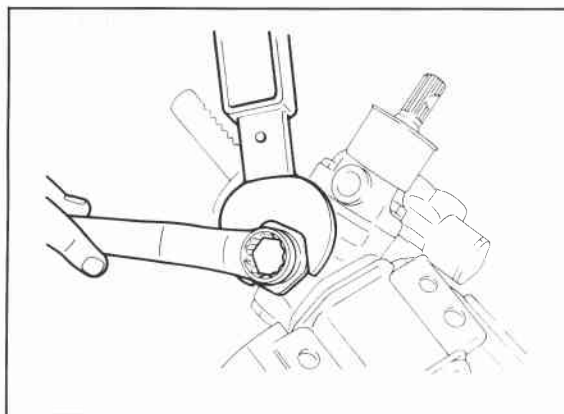


86U10X-198

8. Measure the pinion torque with the **SST**.

Pull scale: 1,000—1,400 g (35.3—49.4 oz)

9. If the pinion torque is not within specification, readjust the adjust cover.



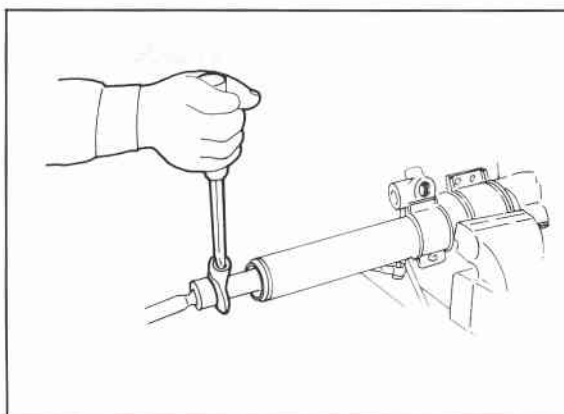
86U10X-199

10. Lock the adjust cover with the locknut.

Tightening torque:

40—50 N·m

(4—5 m·kg, 29—36 ft·lb)



76G10X-040

11. Set the rack in a vise and install the washer. Tighten the tie-rod.

Tightening torque:

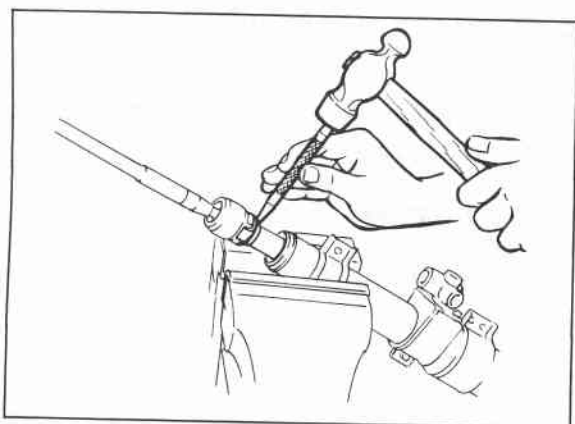
60—80 N·m

(6—8 m·kg, 43—58 ft·lb)

Caution

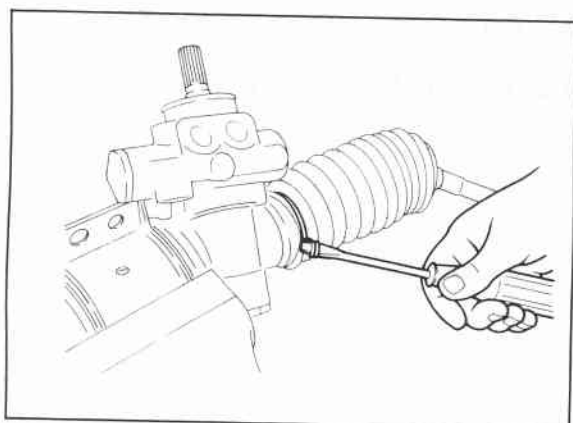
Insert protective material (such as copper plates) in the jaws of the vise.

10 ELECTRONICALLY-CONTROLLED POWER STEERING



86U10X-201

12. Stake the washer in two places with a punch.

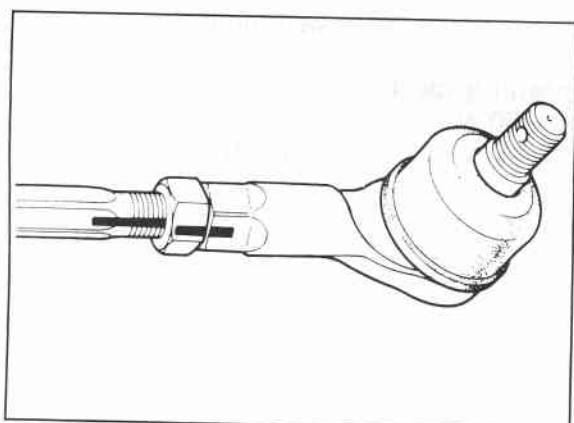


86U10X-202

13. Install the boot. Wrap a new wire around it two times and twist it 4 to 4.5 times.

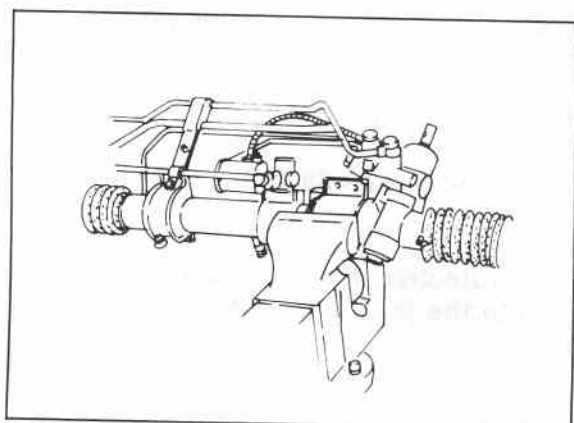
Caution

Be sure that the boot is not twisted or dented.



86U10X-203

14. Install the tie-rod ends, aligning them with the marks made before disassembly.



86U10X-204

15. Install the solenoid valve and pressure switch.
16. Align the oil pipes with the marks made before disassembly, then tighten them.

OIL PUMP

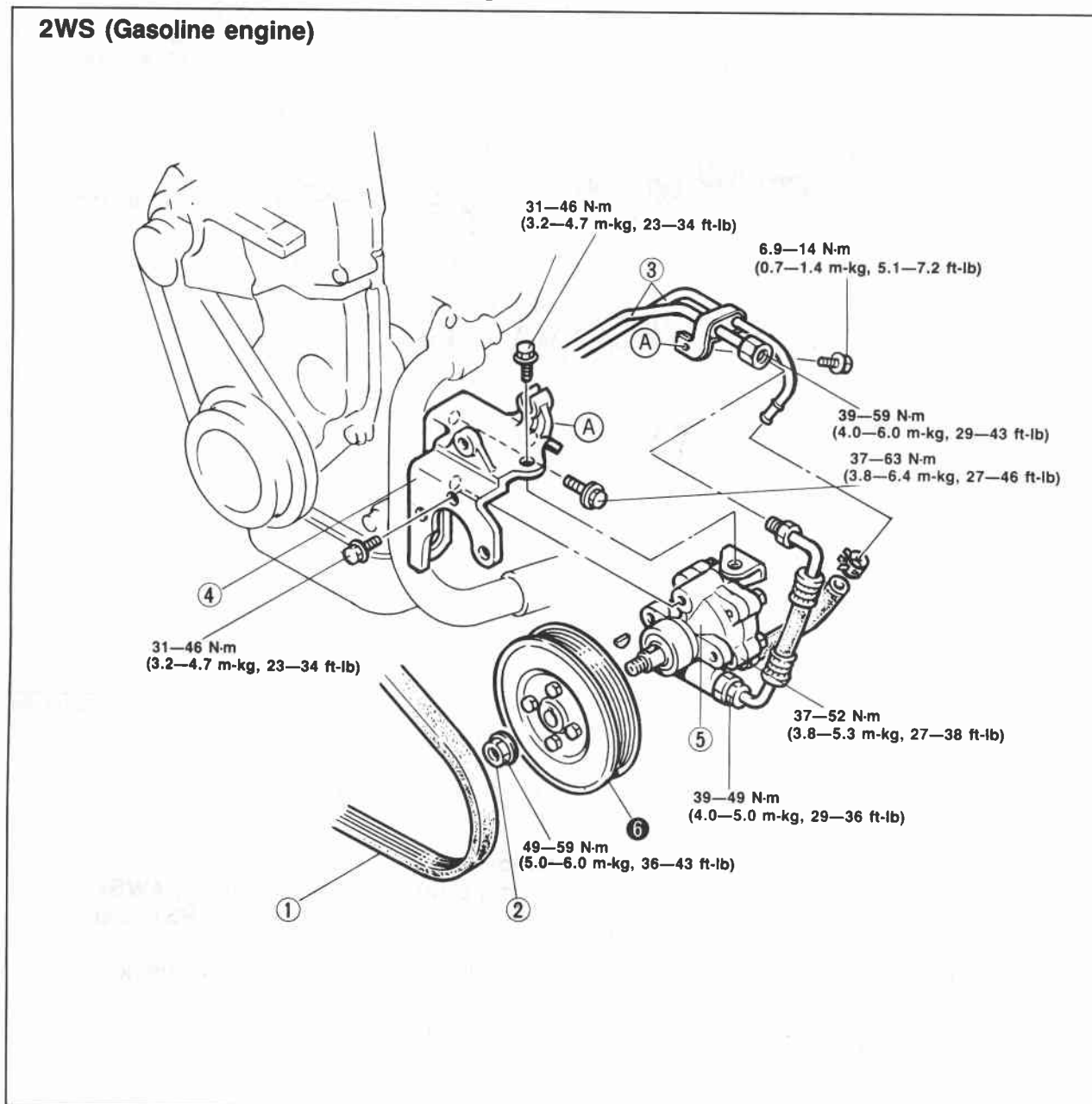
REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle, and support it with safety stands.
2. Remove in the order shown in the figure, referring to the removal note for specially marked parts.
3. Install in the reverse order of removal.
4. Tighten all nuts and bolts to the specified torque, referring to the figure.

Note

- a) The power steering fluid will leak out when the return hose or the pressure hose is disconnected. Prepare a suitable container for it to drain into.
- b) After installation, inspect the deflection of the oil pump belt and bleed the air from the system, then check for fluid leakage.

2WS (Gasoline engine)



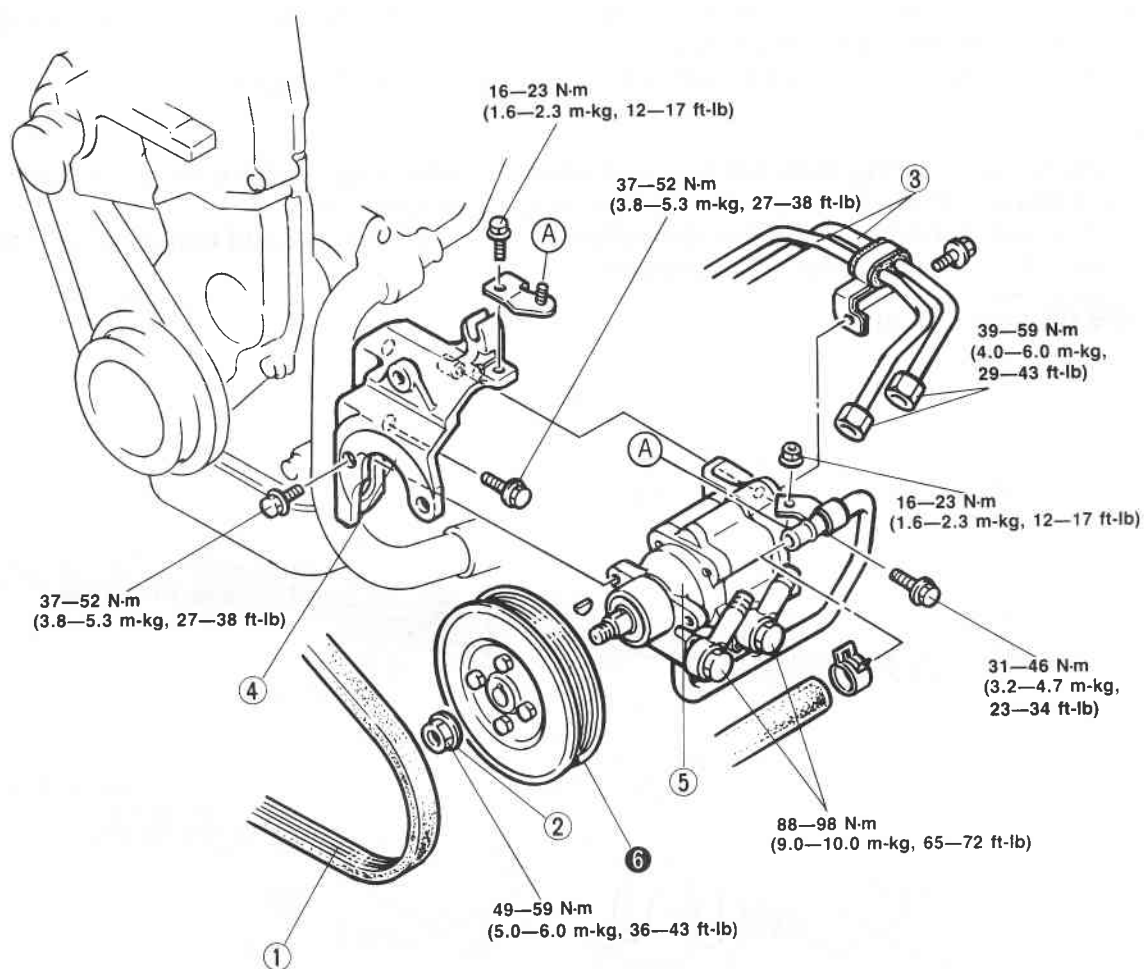
76G10X-041

1. Belt
2. Nut
3. Pipes

4. Bracket
5. Oil pump
6. Oil pump pulley

10 OIL PUMP

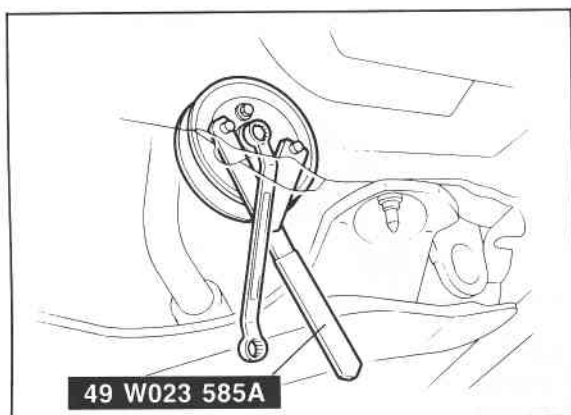
4WS



86U10X-206

1. Belt
2. Nut
3. Pipes

4. Bracket
5. Oil pump
6. Oil pump pulley



76G10X-016

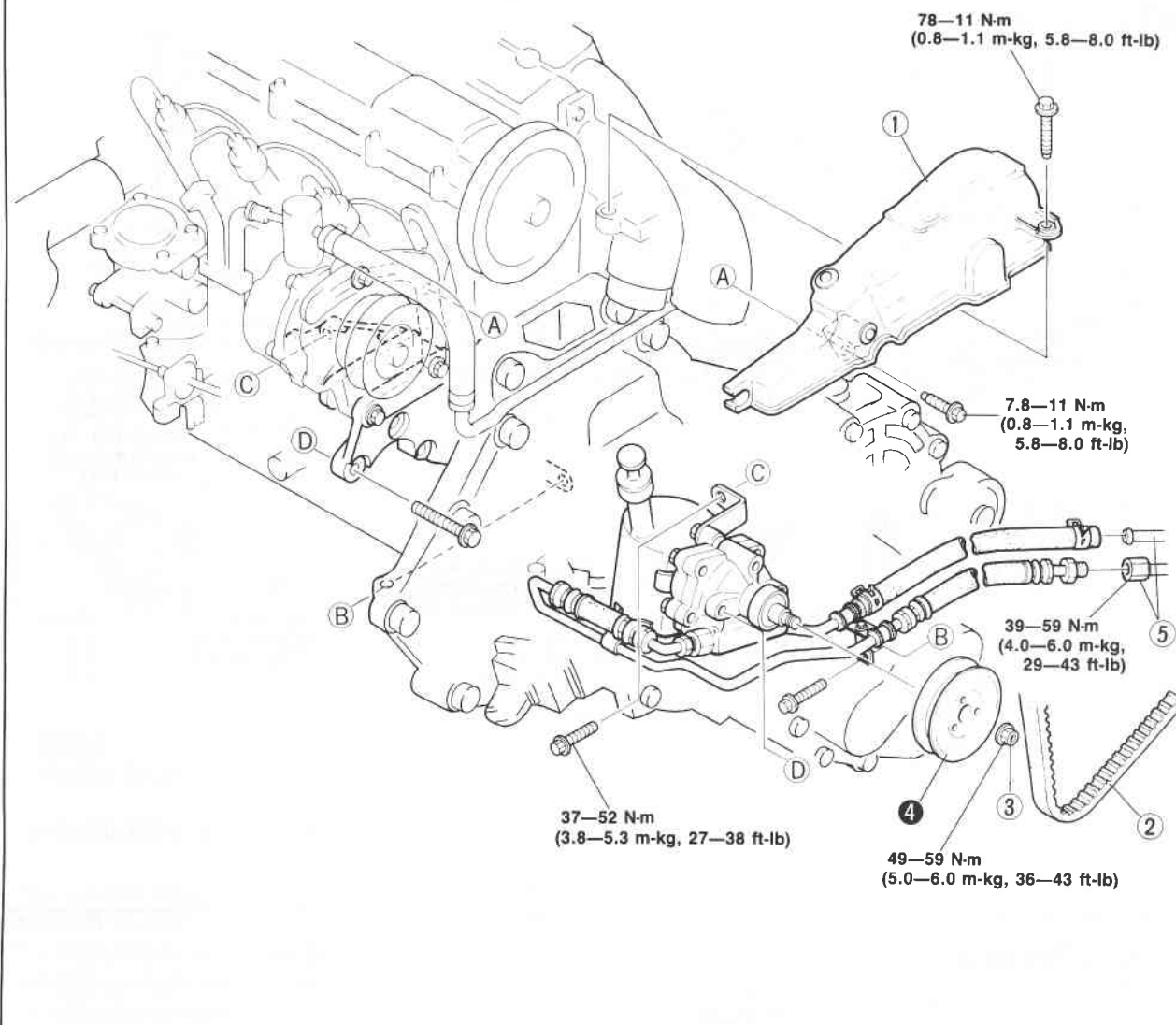
Removal Note

Oil pump (2WS Gasoline engine, 4WS)

1. Hold the oil pump pulley with the SST, and remove the pulley nut.
2. Slide the pulley forward. Remove the hose, pipes, and the pump.
3. Remove the pulley.

10 OIL PUMP

2WS (Diesel engine, without CX)



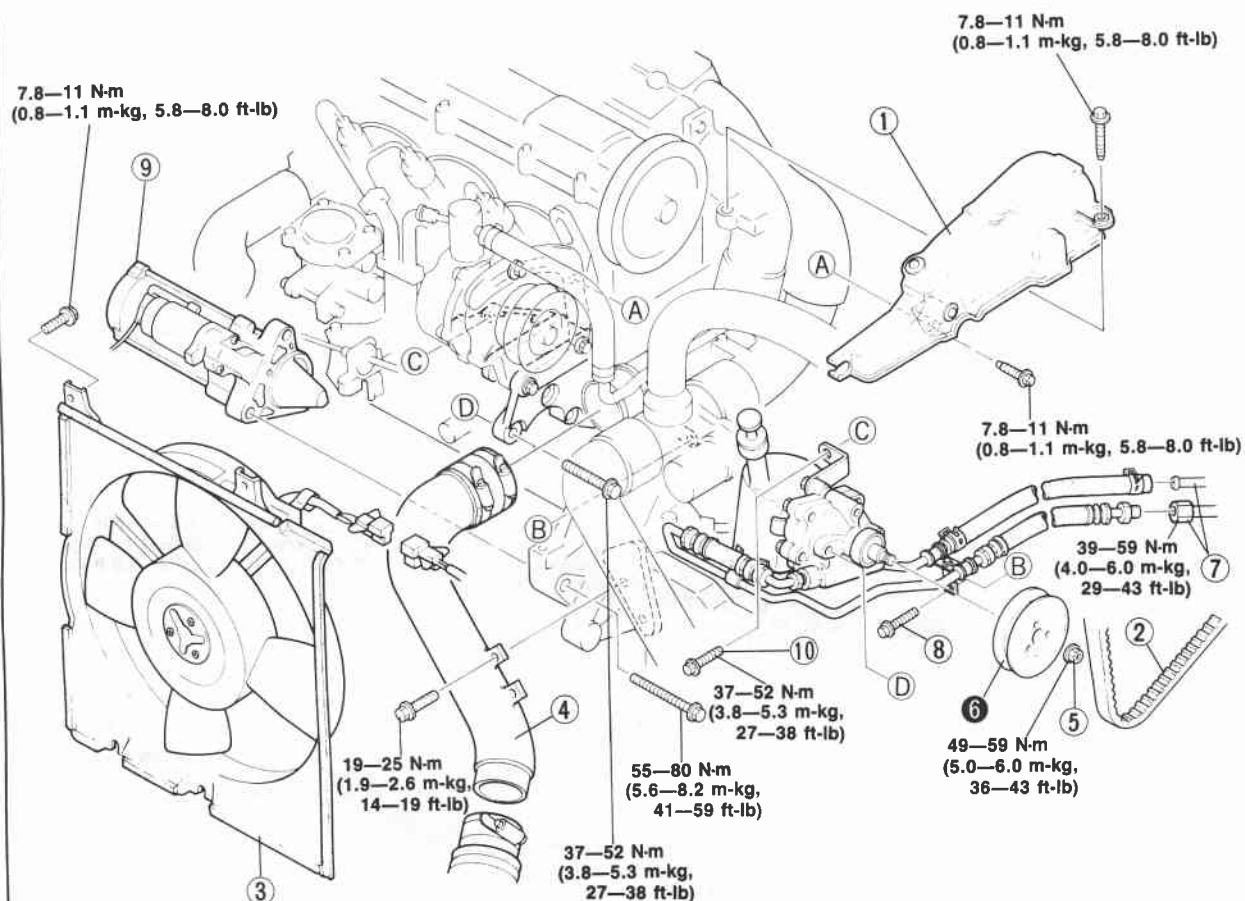
76G10X-042

- 1. Drive belt cover
- 2. Belt
- 3. Nut
- 4. Oil pump pulley

- 5. Pipes
- 6. Bolt
- 7. Bolt

10 OIL PUMP

2WS (Diesel engine, with CX)

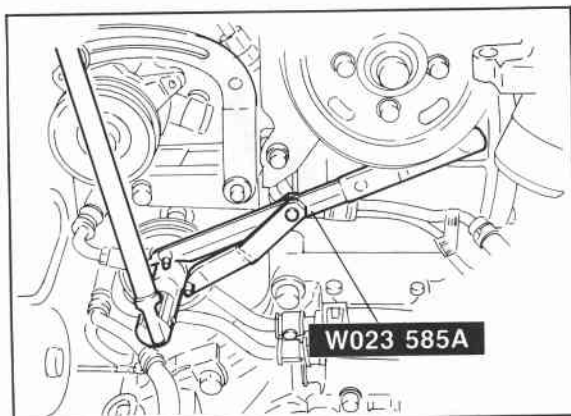


76G10X-017

- 1. Drive belt cover
- 2. Belt
- 3. Cooling fan
- 4. Intake air pipe

- 5. Nut
- 6. Oil pump pulley
- 7. Pipes
- 8. Bolt

- 9. Starter
- 10. Bolt



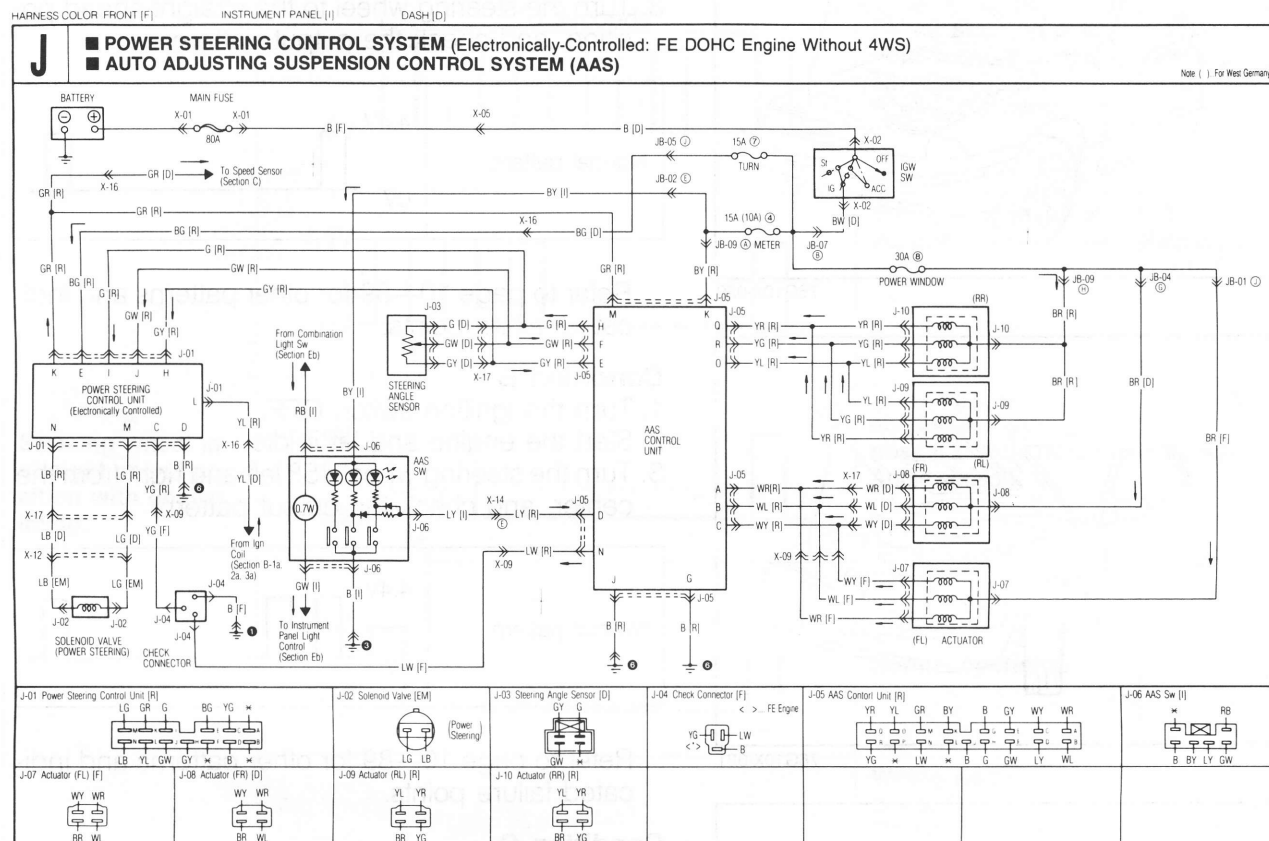
76G10X-018

Removal Note Oil pump (2WS Diesel engine)

1. Hold the oil pump pulley with the **SST**, and remove the pulley nut.
2. Slide the pulley forward. Remove the hose, pipes, and the pump.
3. Remove the pulley.

ELECTRICAL COMPONENTS OF ELECTRONICALLY-CONTROLLED POWER STEERING (ECPS)

CIRCUIT DIAGRAM



86U10X-208

Note

Refer to page 10—4 for the component location.

TROUBLESHOOTING GUIDE

The power steering control unit contains a self-diagnosis function to detect malfunctions within itself, the ECPS electrical components and circuits.

If a malfunction is detected, the control unit indicates where the problem is located by outputting specific voltage pulsations at terminal wire (YB) of the check connector.

Troubleshooting of the ECPS system, then, is easily performed by comparing the output pattern with those of the Diagnosis Table on pages 10—89 and 90.

76G10X-019



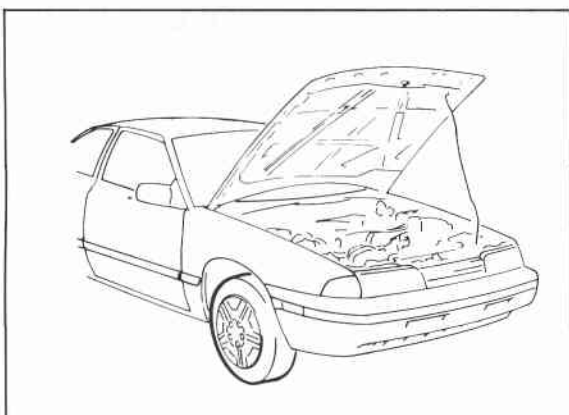
86U10X-209

TROUBLESHOOTING**How To Use Self-Diagnosis System**

By using the control unit's self-diagnosis function and a voltmeter, malfunctions of the system are easily determined. When diagnosing malfunctions, follow the steps below.

1. Connect a voltmeter to terminal wire (YB) of the check connector in the engine compartment.
2. Check the output patterns as described on the following page.

10 ELECTRICAL COMPONENTS OF ELECTRONICALLY-CONTROLLED POWER STEERING (ECPS)

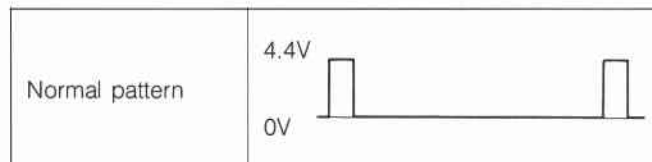


76G10X-020

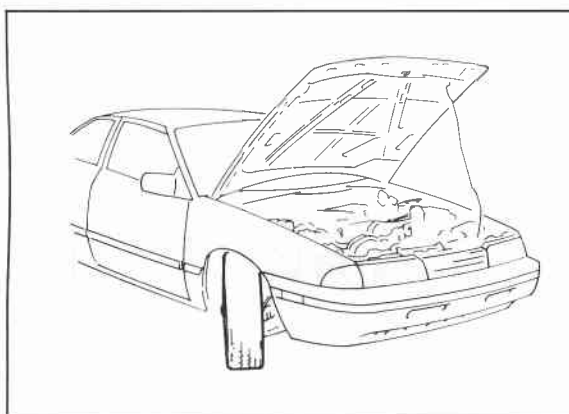
Checking Condition

Condition A

1. Turn the ignition switch OFF.
2. Start the engine and let it idle.
3. Turn the steering wheel to the straight-ahead position, and check the output pattern.



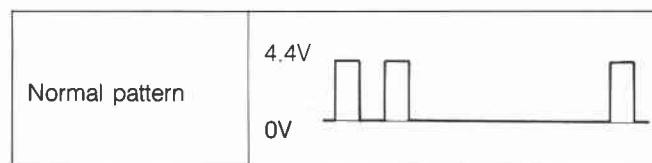
Refer to page 10—89 for other patterns and indicated failure points.



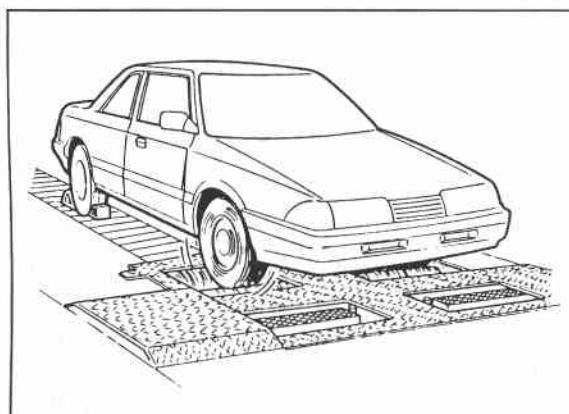
76G10X-021

Condition B

1. Turn the ignition switch OFF.
2. Start the engine and let it idle.
3. Turn the steering wheel 45° left and right from the center, and check the output pattern.



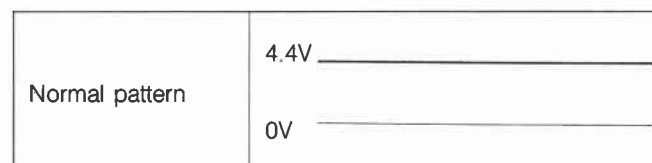
Refer to page 10—89 for other patterns and indicated failure points.



76G10X-022

Condition C

1. Turn the ignition switch OFF.
2. Place the vehicle on a chassis roller tester. Block the rear wheels, and secure it with chains.
3. Start the engine. Put the transmission in gear and operate the vehicle at more than 10 km/h (6.2 mph).
4. Check the output pattern.



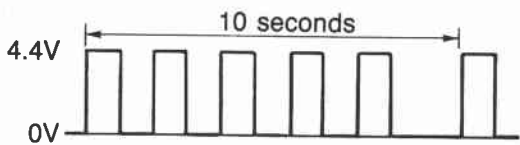
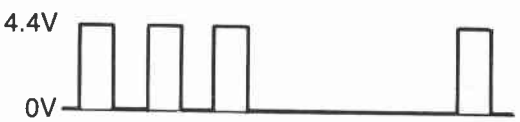



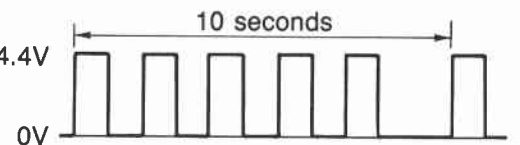



Refer to page 10—90 for other patterns and indicated failure points.

Note


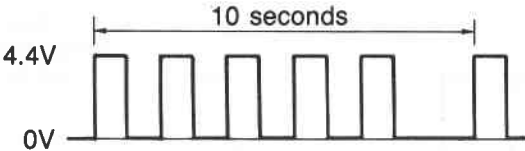
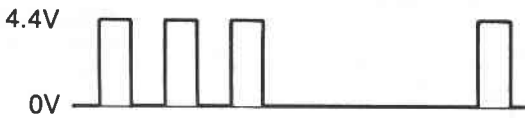




For vehicles equipped with ABS, the ABS warning light may come on. This is not a failure. The light will go off when turning the ignition switch OFF and back ON.

86U10X-213

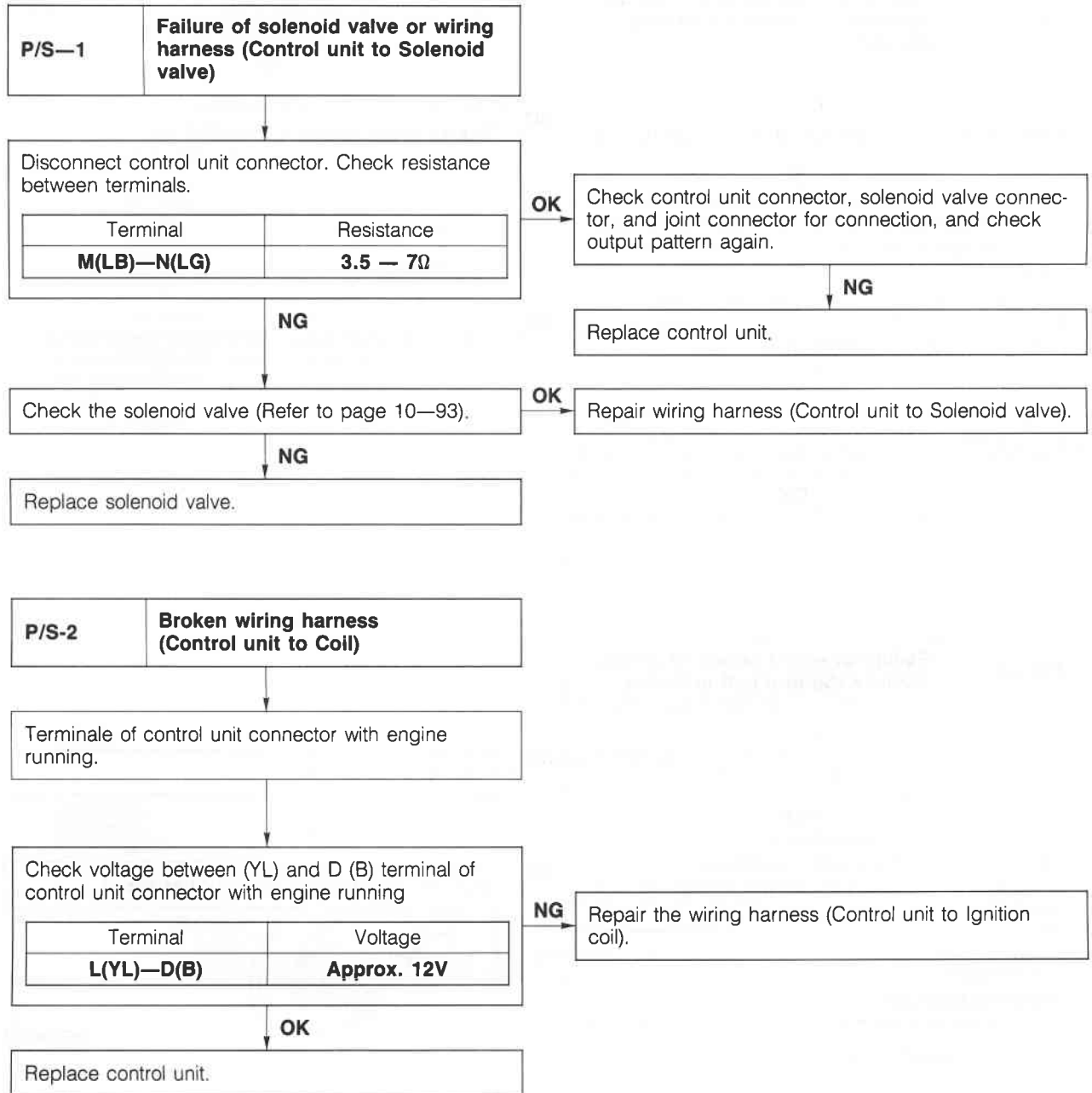
Diagnosis Table

Condition	Output pattern	Malfunction	Flow chart No.
A Steering wheel in straight-ahead position with engine idling.		Power steering solenoid valve or wiring harness (Control unit to Solenoid valve)	P/S—1 Refer to page 10—91
		Wiring harness (Control unit to Ignition coil)	P/S—2 Refer to page 10—91
		Steering wheel angle sensor or wiring harness (Control unit to Angle sensor)	P/S—3 Refer to page 10—92
		Normal operation	—
		Wiring harness (Fuse box to Control unit or Control unit to Body ground)	P/S—5 Refer to page 10—93
B Steering wheel turned 45° left and right from center with engine idling		Power steering solenoid valve or wiring harness (Control unit to Solenoid valve)	P/S—1 Refer to page 10—91
		Wiring harness (Control unit to Ignition coil)	P/S—2 Refer to page 10—91
		Normal operation	—
		Steering wheel angle sensor or wiring harness (Control unit to Angle sensor)	P/S—3 Refer to page 10—92

10 ELECTRICAL COMPONENTS OF ELECTRONICALLY-CONTROLLED POWER STEERING (ECPS)

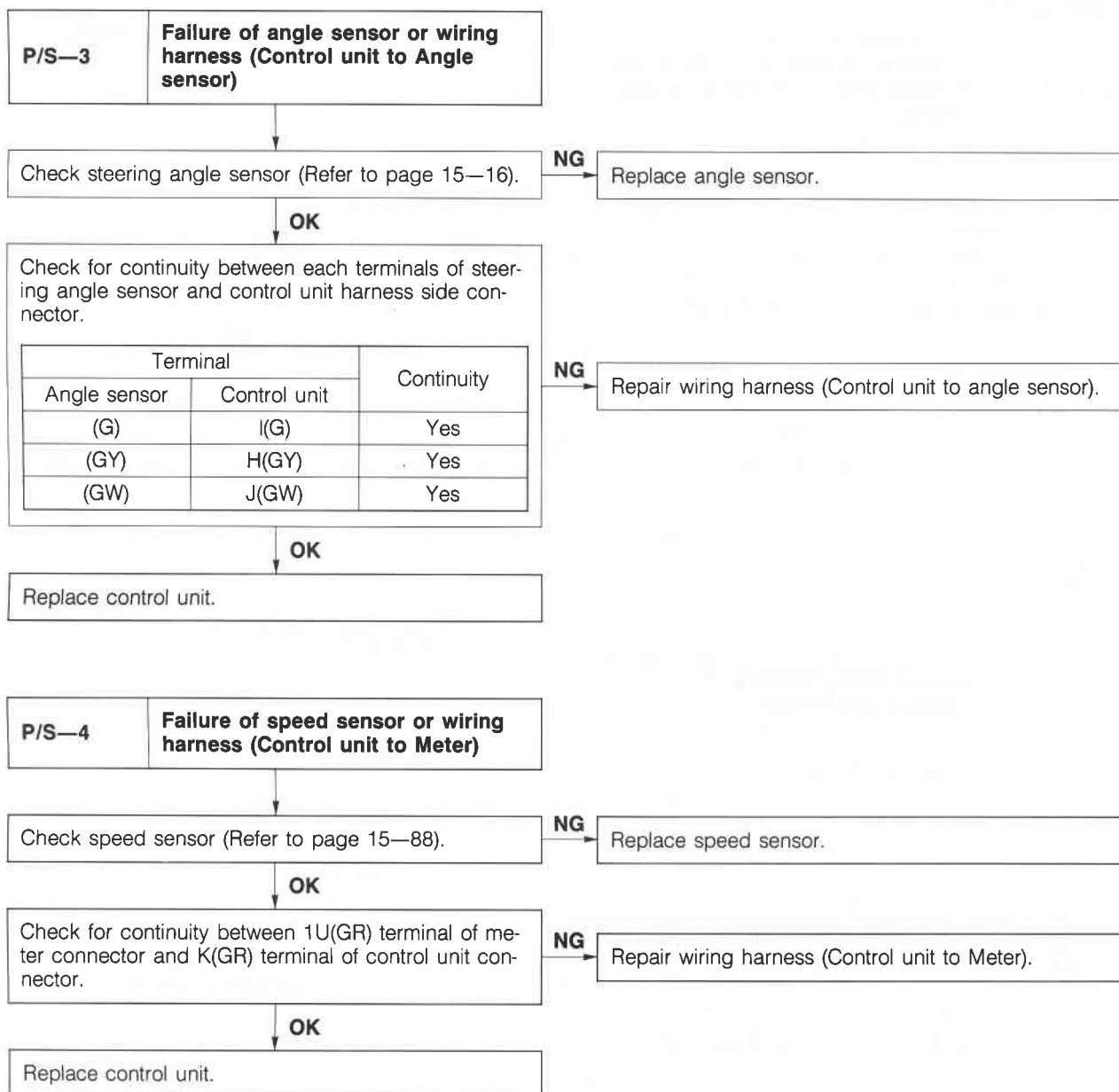
Condition	Output pattern	Malfunction	Flow chart No.
B Cont'd		Wiring harness (Fuse box to Control unit or Control unit to Body ground)	P/S—5 Refer to page 10—93
C Front wheels driven at more than 10 km/h (6.2 mph)		Power steering solenoid valve or wiring harness (Control unit to Solenoid valve)	P/S—1 Refer to page 10—91
		Wiring harness (Control unit to Ignition coil)	P/S—2 Refer to page 10—91
		Steering wheel angle sensor or wiring harness (Control unit to Angle sensor)	P/S—3 Refer to page 10—92
		Vehicle speed sensor or wiring harness (Control unit to Meter)	P/S—4 Refer to page 10—92
		Normal operation	—
		Wiring harness (Fuse box to Control unit or Control unit to Body ground)	P/S—5 Refer to page 10—93

76G10X-024

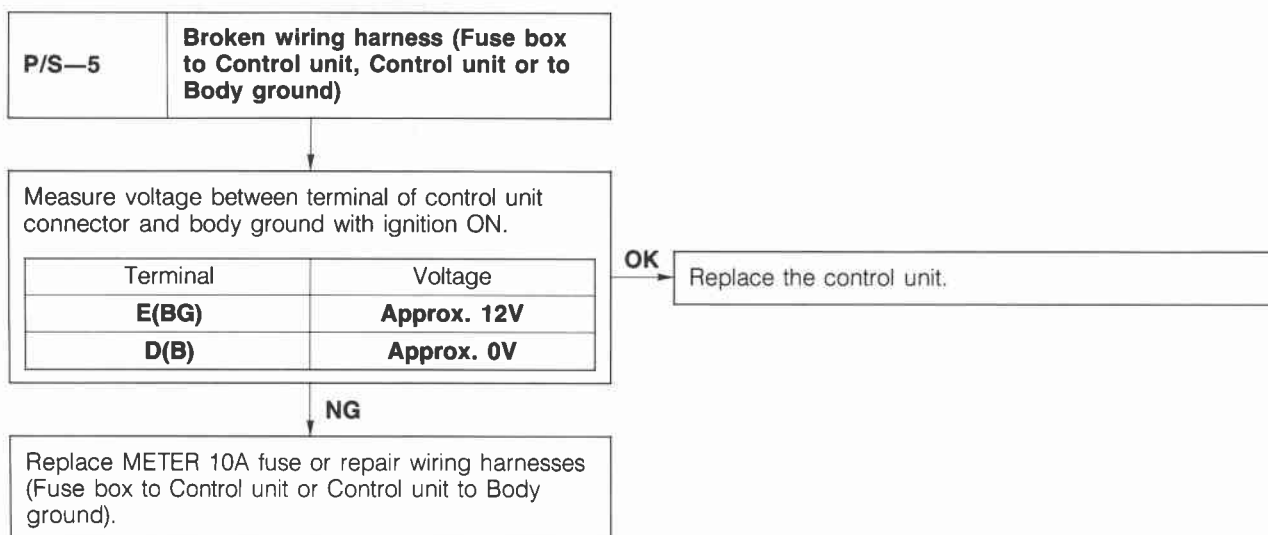
Flow Chart

76G10X-025

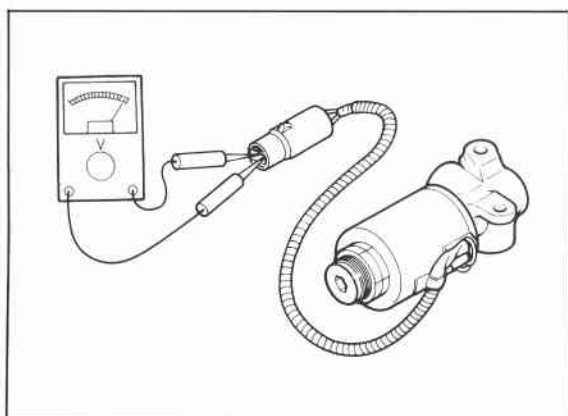
10 ELECTRICAL COMPONENTS OF ELECTRONICALLY-CONTROLLED POWER STEERING (ECPS)



76G10X-043



86U10X-218



86U10X-219

Power Steering Solenoid Valve Inspection

1. Listen for actuation sound of the solenoid valve when applying 12V between A and B terminals.
2. If no sound is heard, check the resistance of the solenoid valve with an ohmmeter.

Terminals	Resistance
A — B	3.4—6.9 Ω

3. If there is no continuity, replace the solenoid valve.

Steering Angle Sensor Inspection

Refer to page 15—16.

Vehicle Speed Sensor Inspection

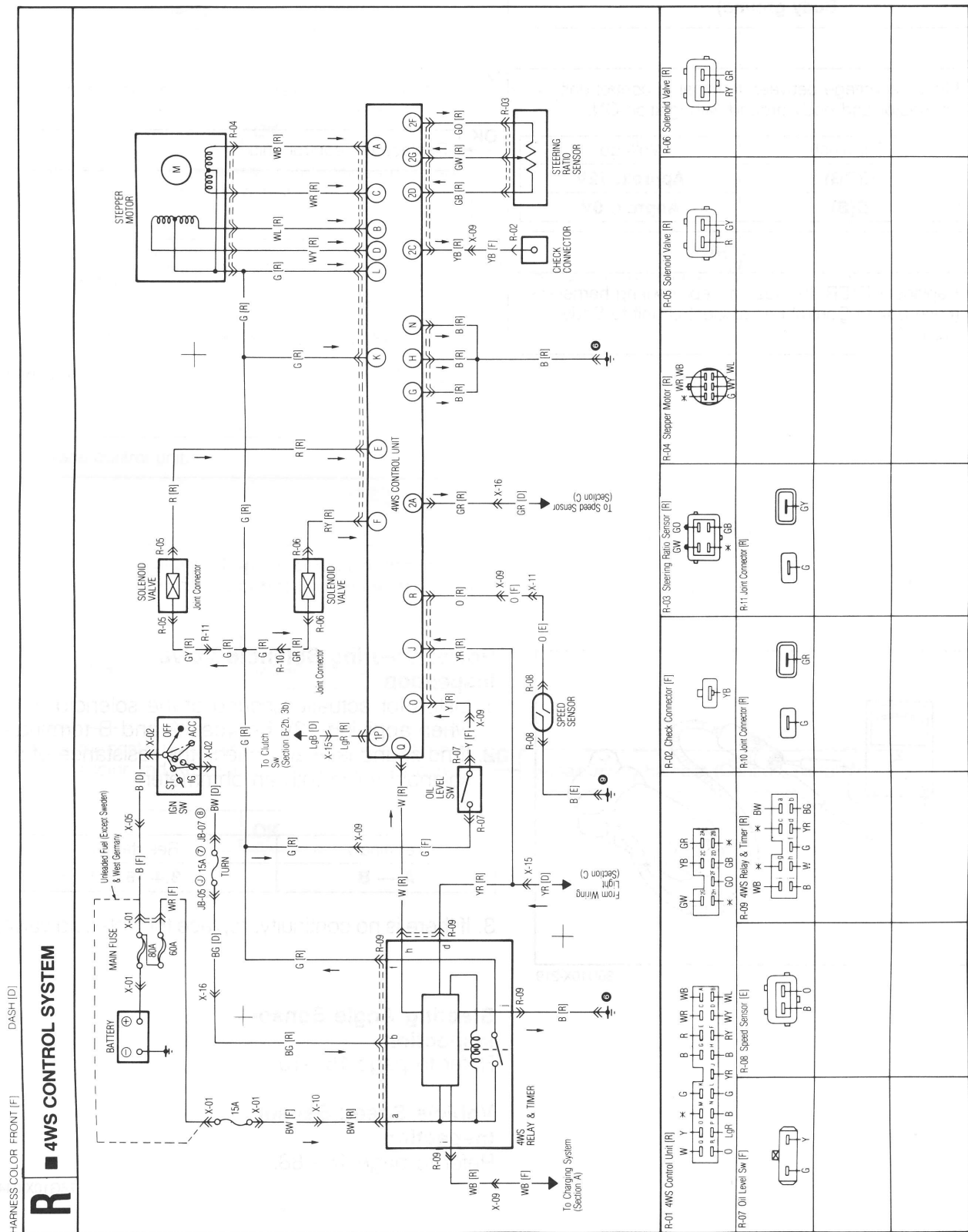
Refer to page 15—88.

76G10X-044

10

ELECTRICAL COMPONENTS OF 4-WHEEL STEERING (4WS)

CIRCUIT DIAGRAM



86U10X-221

Note
Refer to page 10—31 for component location.

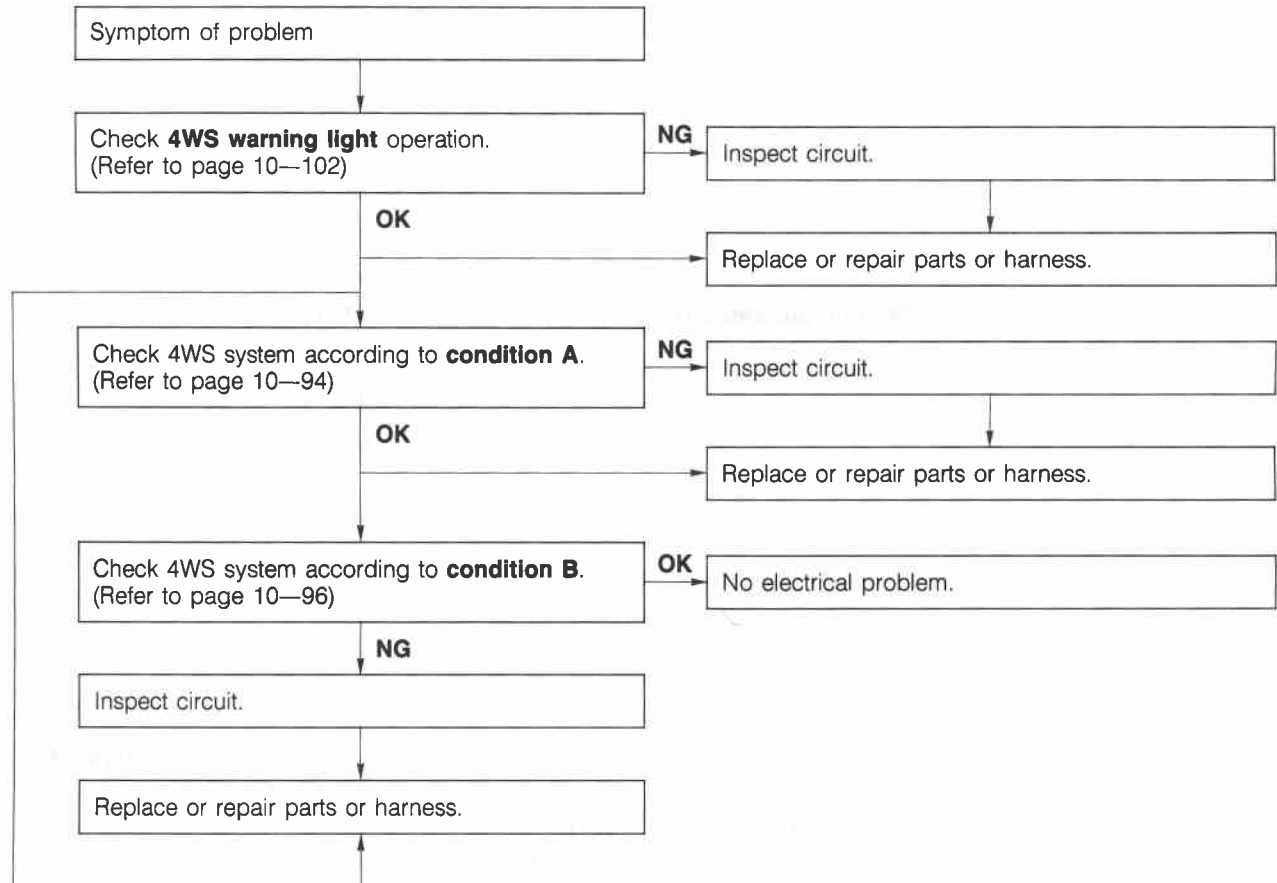
TROUBLESHOOTING GUIDE

Self-Diagnosis Function

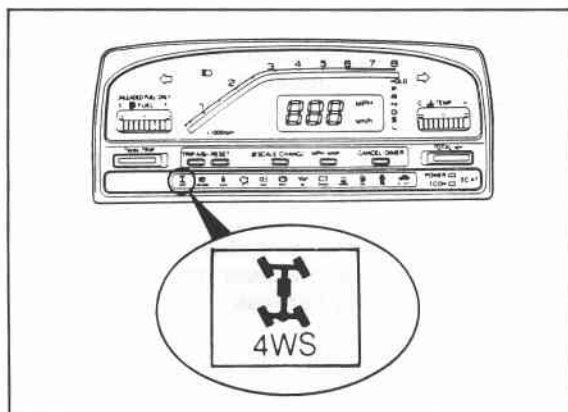
The four-wheel steering (4WS) control unit contains a self-diagnosis function to detect malfunctions within itself, the 4WS electrical components and circuits.

If a malfunction is detected, the control unit indicates where the problem is located and the 4WS warning light in the instrument cluster will flash for one minute with a specific pattern.

Troubleshoot the 4WS system according to the following flow chart.



76G10X-026



76G10X-027

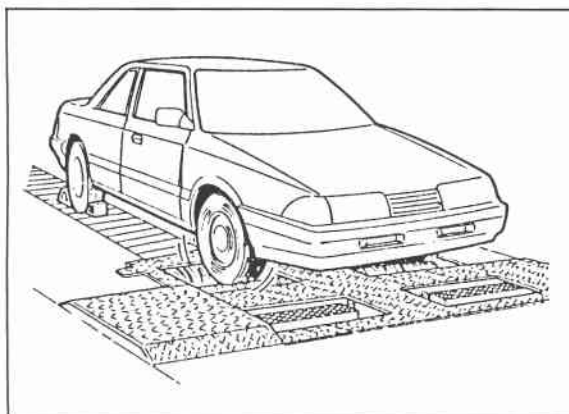
TROUBLESHOOTING

Checking Condition

Condition A

1. Turn the ignition switch OFF.
2. Start the engine after the ignition switch has been OFF for at least 10 seconds, and check if the 4WS warning light flashes or illuminates within 60 seconds.
3. If flashing or illumination occurs, inspect the circuit. (Refer to page 10—95.)

10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING



76G10X-045

Condition B

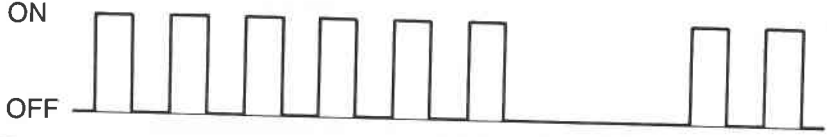
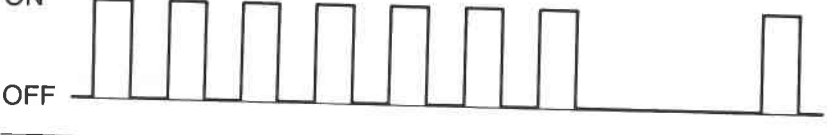

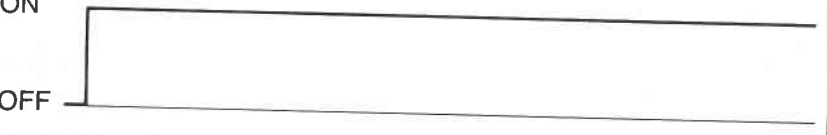
1. Place the vehicle on a chassis roller tester. Block the rear wheels, and secure it with chains.
2. Turn the ignition switch OFF.
3. Start the engine after the ignition switch has been OFF for at least 10 seconds. Put the transmission in gear and operate the vehicle at more than 40 km/h (25 mph).
4. Check if the 4WS warning light flashes or illuminates within 60 seconds.
5. If flashing or illumination occurs, inspect the circuit by referring to the table below.

Diagnosis Output Pattern

Warning light output pattern	Malfunction	Flow chart No.
	Normal operation, control unit or wiring harness	4WS—0
	Speed sensors or wiring harness	4WS—1
	Rear steering gear assembly	4WS—2
	Solenoid valve or wiring harness	4WS—3
	Stepper motor or wiring harness	4WS—4
	Rear-to-front steering ratio sensor or wiring harness	4WS—5

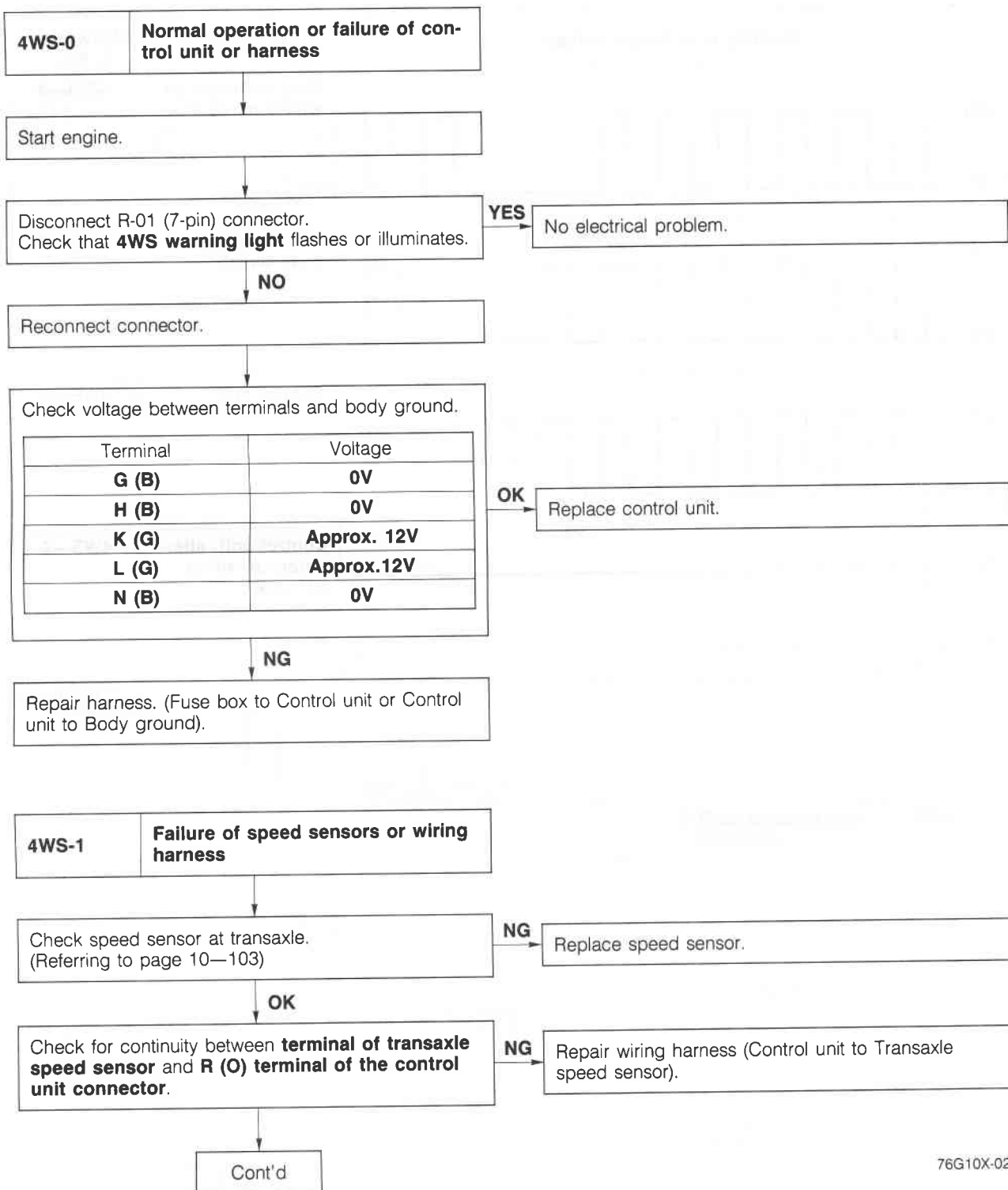
86U10X-225

ELECTRICAL COMPONENTS OF 4-WHEEL STEERING 10

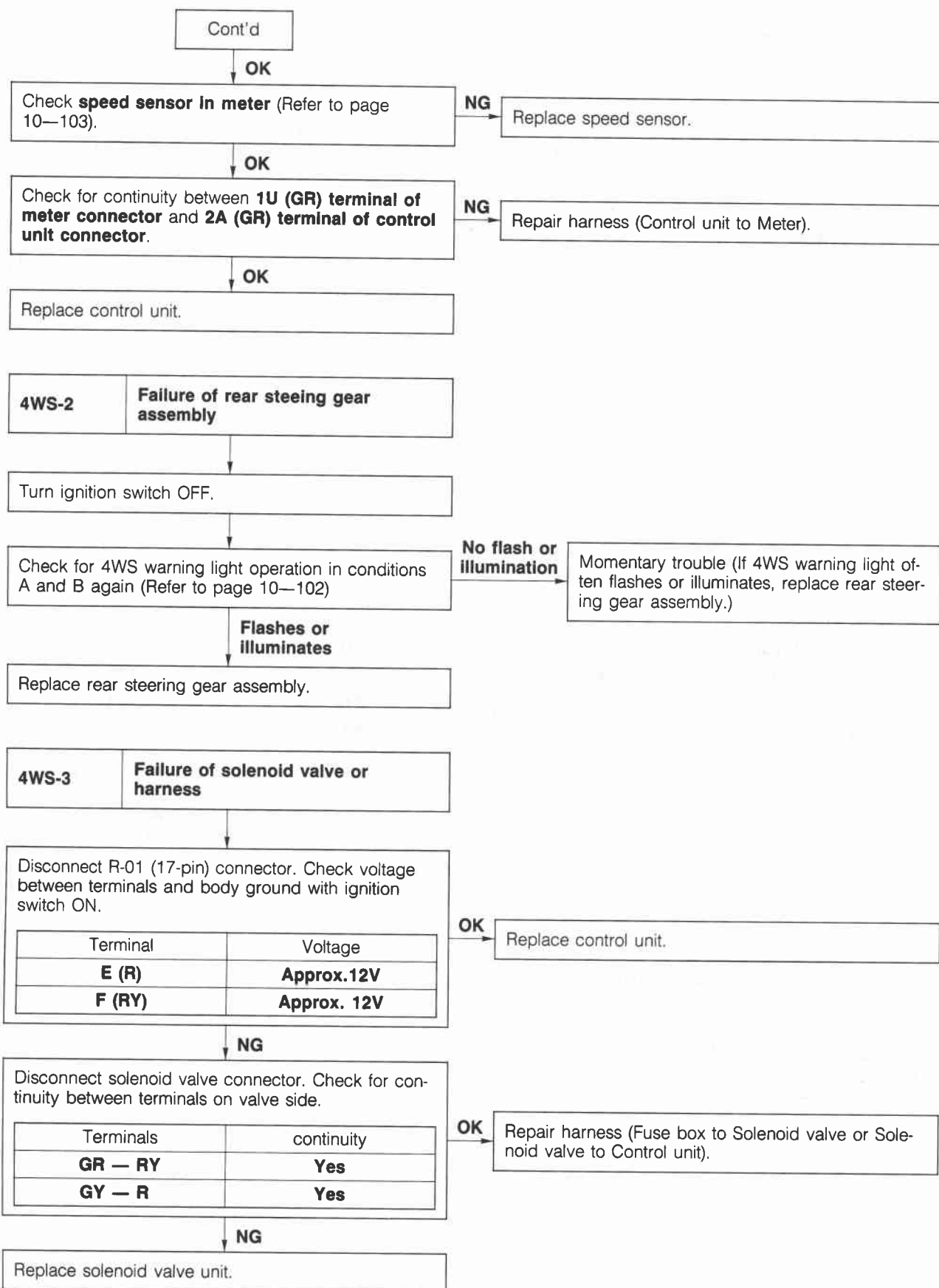
Warning light output pattern	Malfunction	Flow chart No.
 <p>ON</p> <p>OFF</p>	Stepper motor or wiring harness	4WS—6
 <p>ON</p> <p>OFF</p>	Oil leakage or oil level switch	4WS—7
 <p>ON</p> <p>OFF</p>	Control unit	4WS—8
 <p>ON</p> <p>OFF</p>	Control unit, alternator, or wiring harness	4WS—9

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10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING



ELECTRICAL COMPONENTS OF 4-WHEEL STEERING 10



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10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING

4WS-4 Failure of stepper motor or harness

Disconnect R-01 (17-pin) connector. Check for no continuity between each terminal of harness side connector and body ground.

Terminal	Continuity
A (WB)	No
B (WL)	No
C (WR)	No
D (WY)	No
L (G)	No

NG

Disconnect stepper motor connector. Check for no continuity between each terminal and body ground.

Terminal	Continuity
WB	No
WL	No
WR	No
WY	No
G	No

OK

NG

Repair harness (Stepper motor to Control unit).

Replace rear steering gear assembly.

Check for continuity between terminals of R-01 (17-pin) harness side connector.

Terminal	Continuity
A (WB) — L (G)	Yes
B (WL) — L (G)	Yes
C (WR) — L (G)	Yes
D (WY) — L (G)	Yes

NG

OK

Replace control unit.

Disconnect stepper motor connector. Check for continuity between terminals of motor side connector.

Terminals	Continuity
WB — G	Yes
WL — G	Yes
WR — G	Yes
WY — G	Yes

OK

NG

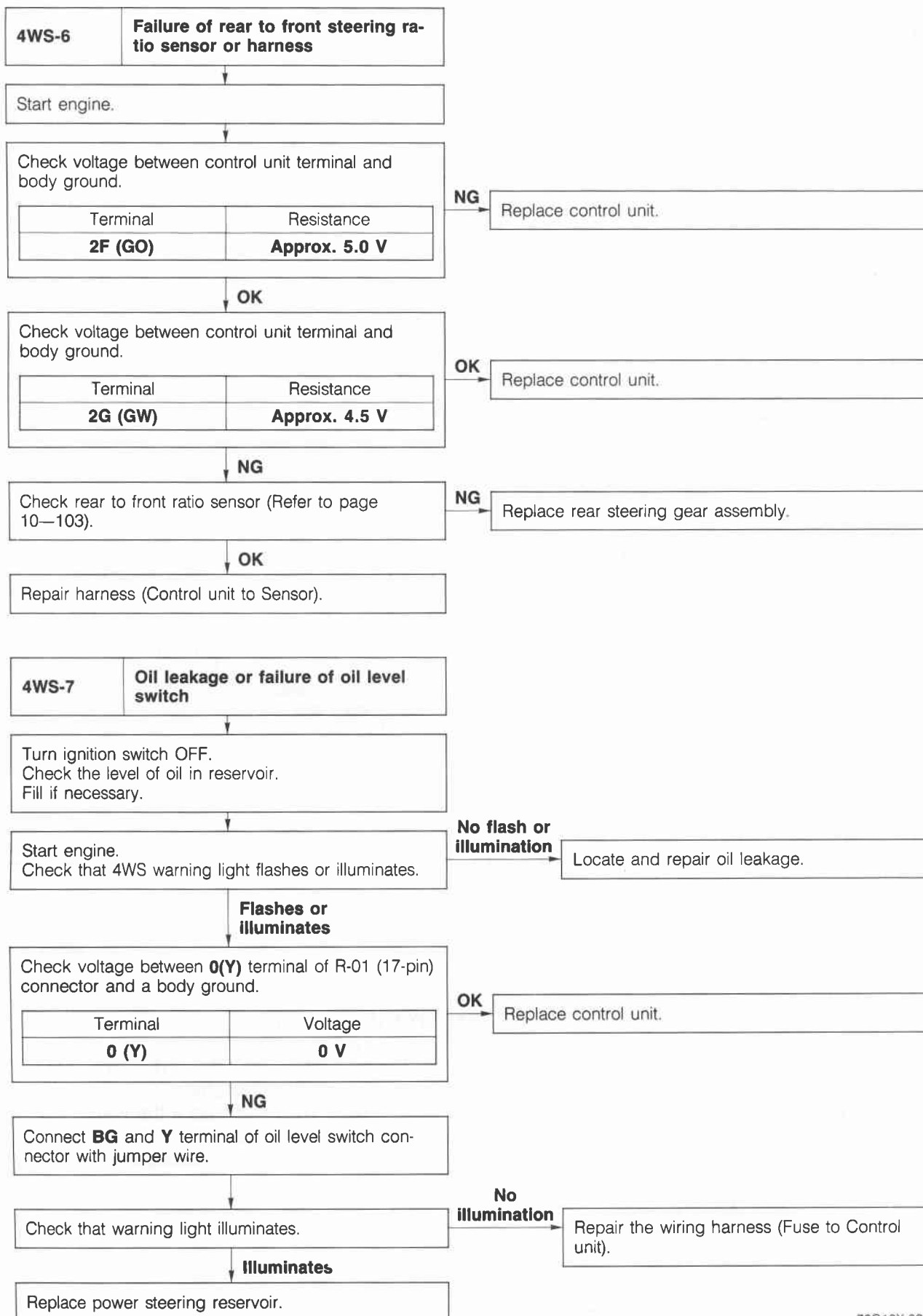
Repair wiring harness (Stepper motor to Control unit).

Replace rear steering gear assembly.

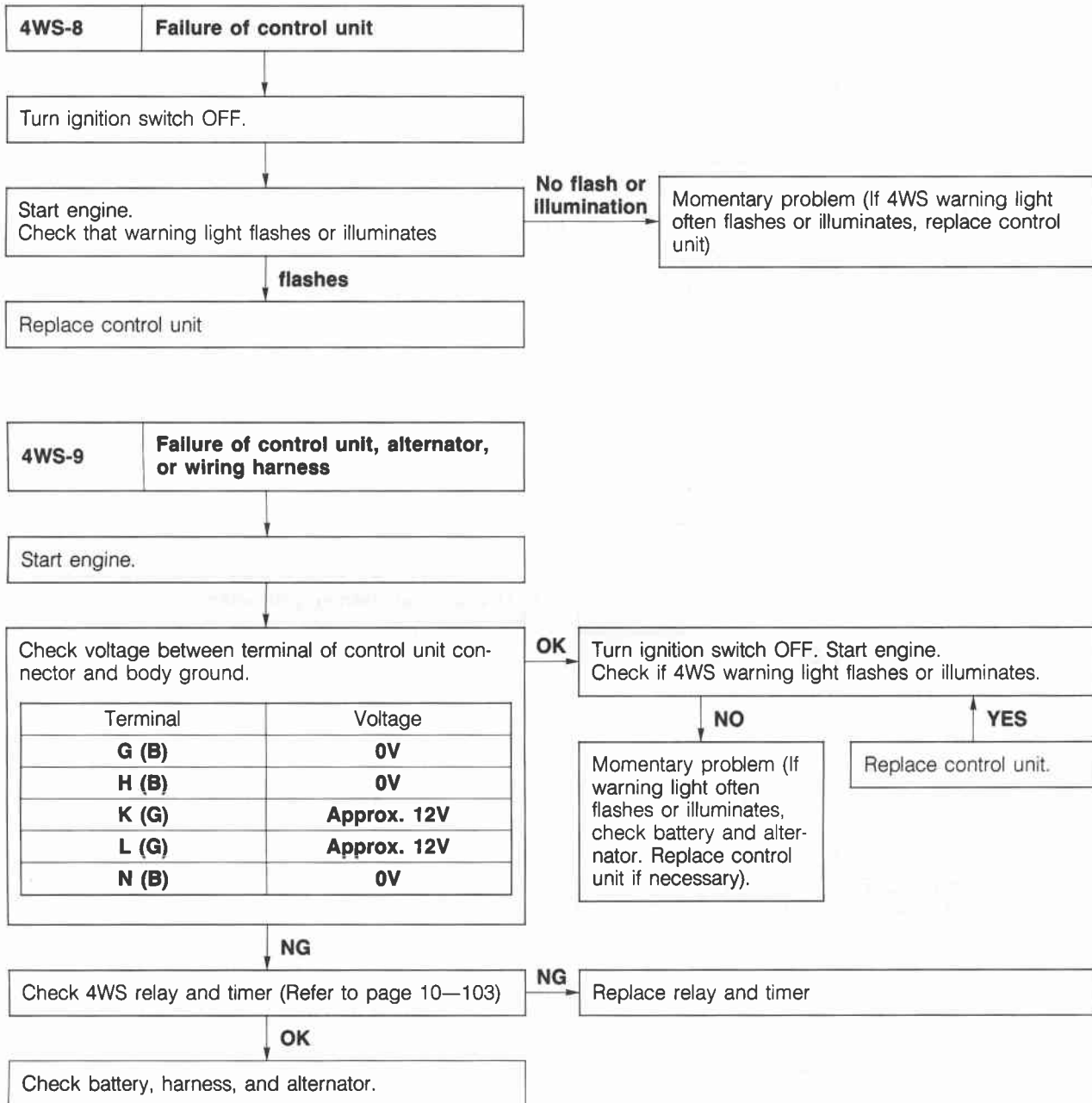
4WS-5 Failure of rear to front steering ratio sensor

Go to 4WS-2

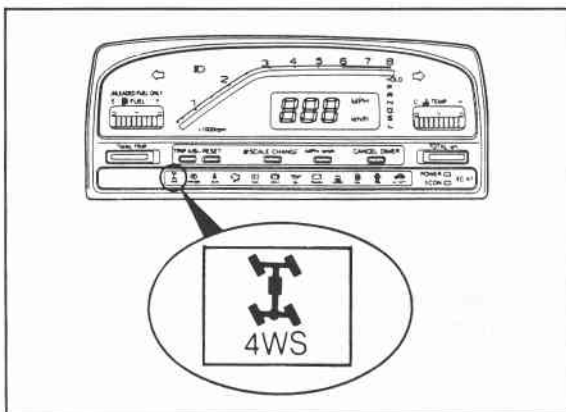
76G10X-046



10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING



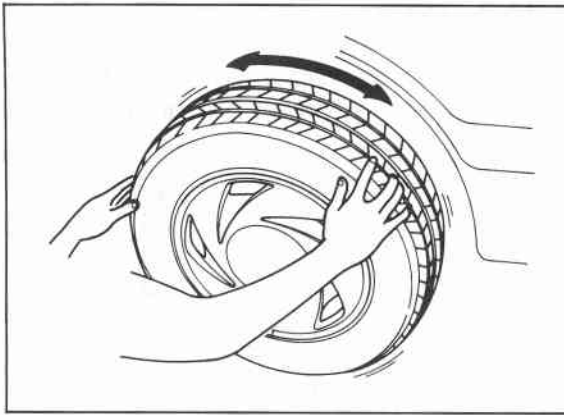
76G10X-031



86U10X-232

4WS WARNING LIGHT

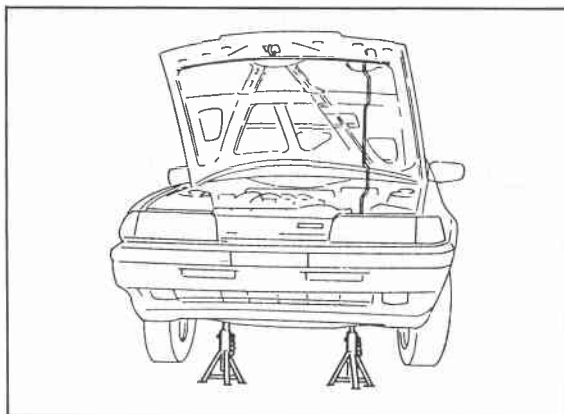
1. Turn the ignition switch OFF.
2. Turn the ignition switch ON, and check that the 4WS warning light illuminates.
3. If there is no illumination, check the warning light bulb and wiring harness. Replace the control unit if necessary.



86U10X-233

SPEED SENSOR (IN METER)

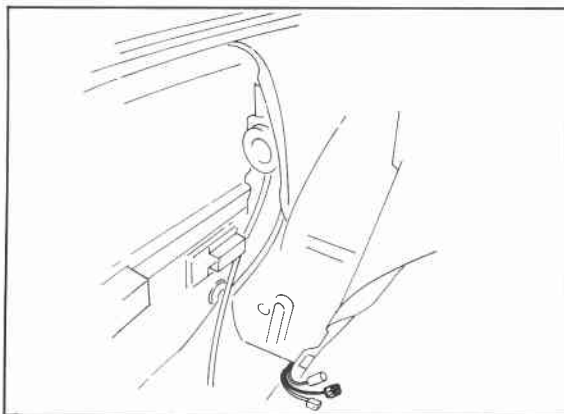
1. Jack up the front of the vehicle.
2. Connect a voltmeter between **2A (GR)** terminal of the control unit connector and a body ground.
3. Start the engine. Check that periodic voltage is detected when turning the front wheels slowly.
4. If periodic voltage is not detected, check the wiring harness. Replace the speed sensor if necessary.



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SPEED SENSOR (AT TRANSAXLE)

1. Jack up the front of the vehicle.
2. Connect a voltmeter between **R (O)** terminal of the control unit connector and a body ground.
3. Start the engine. Check that periodic voltage is detected when turning the front wheels slowly.
4. If periodic voltage is not detected, check the wiring harness. Replace the speed sensor if necessary.



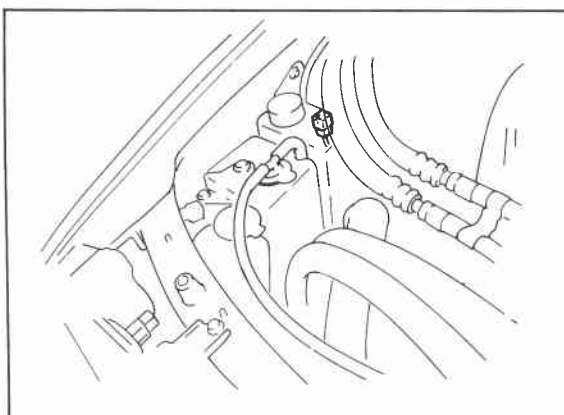
86U10X-235

REAR-TO-FRONT STEERING RATIO SENSOR

Check the resistance between the terminals with an ohmmeter.

Terminal	Resistance
GB—GO	3.5—6.5 kΩ
GB—GW	3.2—5.9 kΩ

If the resistance is not within specification, replace the rear steering gear assembly.



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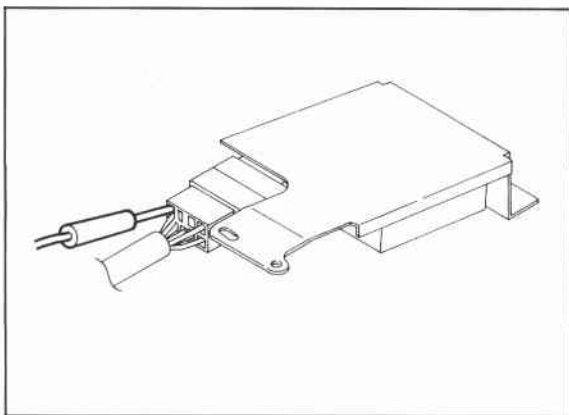
OIL LEVEL SWITCH (IN P/S RESERVOIR)

Check for continuity of the switch with an ohmmeter.

Fluid level	Continuity
More than L	No
Less than L	Yes

If the continuity is not within specification, replace the P/S reservoir.

10 ELECTRICAL COMPONENTS OF 4-WHEEL STEERING



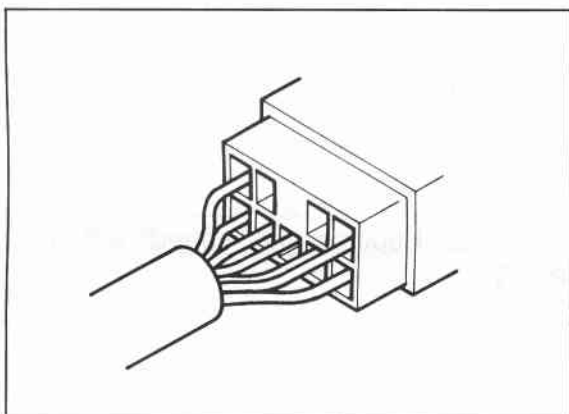
86U10X-237

RELAY AND TIMER

1. Start the engine.
2. Check voltage between each terminal of the relay and timer connector and a body ground.

Terminal	Voltage
a	12V
b	12V
d	12V
i	12V
j	0V

If the voltage is not as specified, replace the fuse or repair the harness.



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3. Check voltage between each terminal and a body ground with the engine running.

Terminal	Voltage
f	12V
h	12V

4. Check that the voltage of f and h terminal is 12V for approximately 7 to 10 seconds after the ignition switch is turned OFF.
If not, replace the relay and timer.