

This file is available for free download at <http://www.iluvmyrx7.com>

This file was not scanned to deprive Mazda of any money - it was scanned due to the rareness of the original manuals and the overwhelming need of the RX-7 owner to have this information so that they can accurately troubleshoot problems. Perhaps if Mazda's dealerships could support the Rotary Engine it wouldn't be so necessary for the owners to do so.



Many thanks to Lenny Terris for scanning this.

Before beginning any service procedure, refer to the 1994 RX-7 Body Electrical Troubleshooting Manual; see section S for air bag system service warnings and section J1 for audio antitheft system alarm conditions.

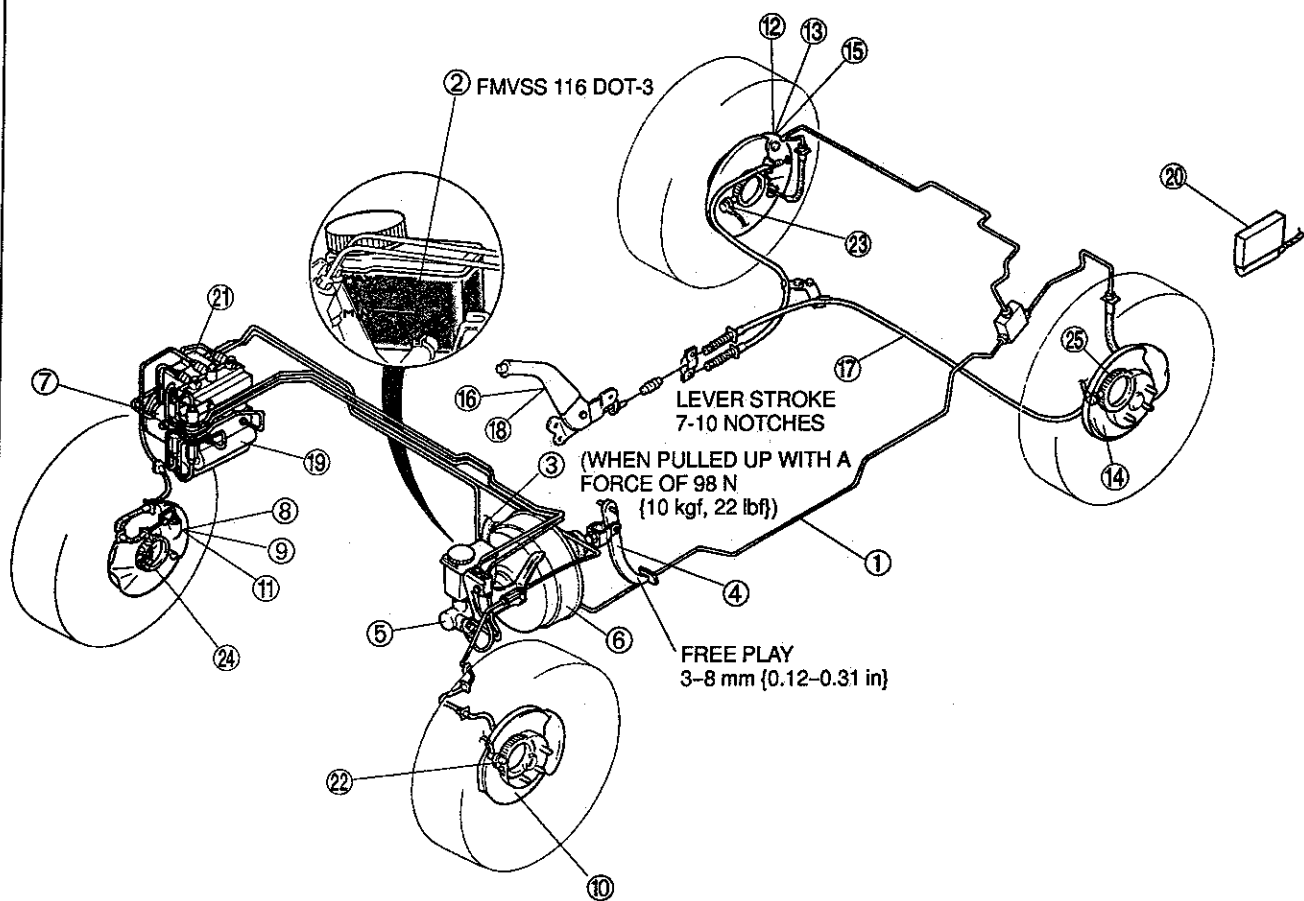
P

## BRAKING SYSTEM

INDEX .....	P - 2
OUTLINE .....	P - 4
SPECIFICATIONS .....	P - 4
CONVENTIONAL BRAKE SYSTEM .....	P - 5
PREPARATION .....	P - 5
TROUBLESHOOTING GUIDE .....	P - 6
AIR BLEEDING .....	P - 7
BRAKE LINE .....	P - 7
BRAKE FLUID .....	P - 8
VACUUM LINE .....	P - 8
BRAKE PEDAL .....	P - 9
MASTER CYLINDER .....	P -11
POWER BRAKE UNIT .....	P -16
PROPORTIONING BYPASS VALVE .....	P -19
FRONT BRAKE (DISC) .....	P -21
DISC PAD (FRONT) .....	P -24
DISC PLATE (FRONT) .....	P -24
CALIPER (FRONT) .....	P -26
REAR BRAKE (DISC) .....	P -27
DISC PAD (REAR) .....	P -29
DISC PLATE (REAR) .....	P -30
CALIPER (REAR) .....	P -31
PARKING BRAKE SYSTEM .....	P -33
TROUBLESHOOTING GUIDE .....	P -33
PARKING BRAKE (LEVER TYPE) .....	P -33
PARKING CABLE (LEVER TYPE) .....	P -34
PARKING BRAKE LEVER .....	P -35
ANTILOCK BRAKE SYSTEM (ABS) .....	P -37
PREPARATION .....	P -37
TROUBLESHOOTING GUIDE .....	P -38
SERVICE POINTS .....	P -53
HYDRAULIC UNIT .....	P -56
ABS CONTROL UNIT .....	P -59
WHEEL-SPEED SENSOR (FRONT) .....	P -60
SENSOR ROTOR (FRONT) .....	P -61
WHEEL-SPEED SENSOR (REAR) .....	P -62
SENSOR ROTOR (REAR) .....	P -63
RELAY .....	P -64

P

INDEX



1. Brake line  
Inspection ..... page P-7  
Removal / Installation  
..... page P-7
2. Brake fluid  
Inspection ..... page P-8  
Replacement ... page P-8
3. Vacuum line  
Inspection ..... page P-8
4. Brake pedal  
Inspection (on-vehicle)  
..... page P-9  
Removal / Inspection /  
Installation ... page P-10
5. Master cylinder  
Removal / Installation  
..... page P-11  
Disassembly / Inspection /  
Assembly .... page P-15
6. Power brake unit  
Inspection (on-vehicle)  
..... page P-16  
Removal /  
Installation ... page P-18
7. Proportioning bypass valve  
Inspection .... page P-19  
Replacement  
..... page P-20
8. Front brake (disc)  
Inspection (on vehicle)  
..... page P-21  
Removal / Inspection /  
Installation ... page P-22
9. Disc pad (front)  
Replacement  
..... page P-24
10. Disc plate (front)  
Inspection .... page P-24
11. Caliper (front)  
Disassembly / Inspection /  
Assembly .... page P-26
12. Rear brake (disc)  
Inspection (on-vehicle)  
..... page P-27  
Removal / Inspection /  
Installation ... page P-28
13. Disc pad (rear)  
Replacement .. page P-29
14. Disc plate (rear)  
Inspection .... page P-30
15. Caliper (rear)  
Disassembly / Inspection /  
Assembly .... page P-31
16. Parking brake (lever type)  
Inspection .... page P-33  
Adjustment ... page P-33
17. Parking cable (lever type)  
Removal / Inspection /  
Installation ... page P-34
18. Parking brake lever  
Removal / Inspection /  
Installation ... page P-35
19. Hydraulic unit  
Removal / Installation  
..... page P-56  
Disassembly / Inspection /  
Assembly .... page P-58
20. ABS control unit  
Removal / Installation  
..... page P-59
21. Relay  
Removal / Installation  
..... page P-64  
Inspection .... page P-64
22. Wheel-speed sensor (front)  
Removal / Installation  
..... page P-60  
Inspection .... page P-60
23. Wheel-speed sensor (rear)  
Removal / Installation  
..... page P-62  
Inspection .... page P-62
24. Sensor rotor (front)  
Removal / Installation  
..... page P-61
25. Sensor rotor (rear)  
Removal / Installation  
..... page P-63


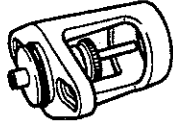
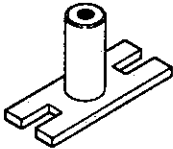
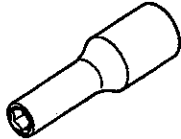
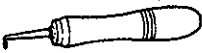

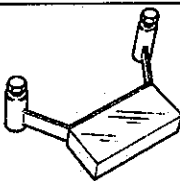
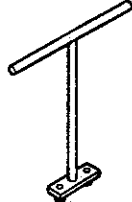
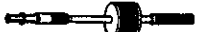
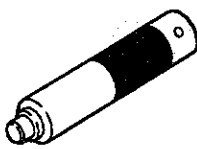

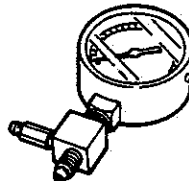
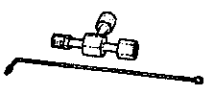
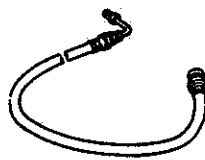
## OUTLINE

## SPECIFICATIONS

Item		Specifications	
Brake pedal			
Type		Suspended	
Lever ratio		4.1 : 1	
Maximum stroke		mm {in}	135 {5.31}
Master cylinder			
Type		Tandem (with level sensor)	
		Portless, recessed type	
Bore		mm {in}	23.8 {0.94}
Front brake			
Type		Disc (ventilated)	
Cylinder bore		mm {in}	36.1 {1.42}
Pad dimension (area × thickness)		mm <sup>2</sup> × mm {in <sup>2</sup> × in}	Outer
			Inner
			4,500 × 10.3 {6.97 × 0.41}
			4,500 × 9.3 {6.97 × 0.37}
Disc plate dimension (outer diameter × thickness)		mm × mm {in × in}	294.0 × 22.0 {11.57 × 0.87}
Rear brake			
Type		Disc (ventilated)	
Cylinder bore		mm {in}	34.9 {1.37}
Pad dimension (area × thickness)		mm <sup>2</sup> × mm {in <sup>2</sup> × in}	3,210 × 8.0 {4.98 × 0.31}
Disc plate dimension (outer diameter × thickness)		mm × mm {in × in}	294.0 × 20.0 {11.57 × 0.79}
Power brake unit			
Type		Vacuum multiplier	
Size		mm {in}	209.5 + 215.2 {8 + 8}
Rear wheel hydraulic control system			
Type		Proportioning bypass valve	
Switching point (master cylinder pressure)		kPa {kgf/cm <sup>2</sup> , psi}	3,920 {40.0, 570}
Parking brake			
Type		Mechanical two-rear-wheel control	
Operation system		Hand lever	
Brake fluid			
Type		FMVSS 116 DOT-3	

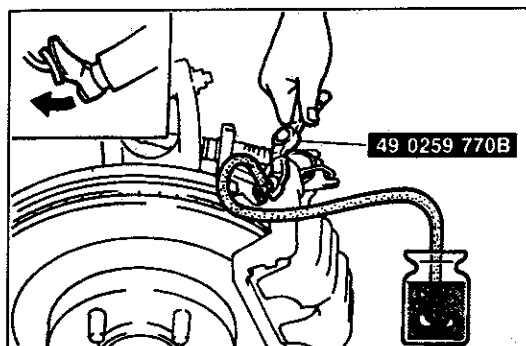
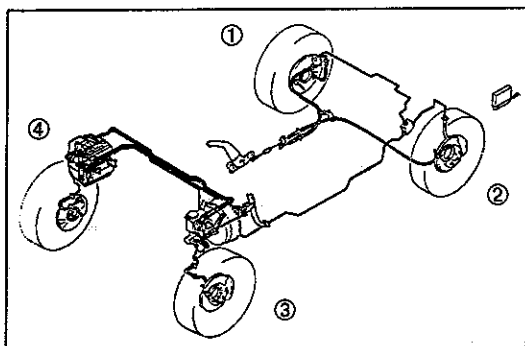
## CONVENTIONAL BRAKE SYSTEM

### PREPARATION SST

49 0259 770B Wrench, flare nut		For removal / installation of brake pipe	49 B043 001 Gauge, adjustment		For adjustment of push rod clearance
49 B043 003 lock tool, turning		For adjustment of push rod clearance	49 B043 004 Wrench, socket		For adjustment of push rod clearance
49 0208 701A Air-out tool, boot		For removal of piston seal	49 0221 600C Expansion tool, disc brake		For installation of disc pads
49 F033 001 Stopper, disc brake piston		For removal of disc brake piston	49 FA18 602 Wrench, disc brake piston		For removal of disc brake piston
49 1285 071 Puller, bearing		For removal of bearing	49 B043 002 Installer, bearing		For installation of bearing
49 U043 0A0 Gauge set, oil pressure		For measurement of fluid pressure	49 U043 004 Gauge, oil pressure (Part of 49 U043 0A0)		For measurement of fluid pressure
49 U043 005 Joint (Part of 49 U043 0A0)		For measurement of fluid pressure	49 U043 006 Hose (Part of 49 U043 0A0)		For measurement of fluid pressure

## TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
<b>Poor braking</b>	Leakage of brake fluid	Repair	—
	Air in system	Bleed air	P-7
	Worn disc pad	Replace	P-24, 29
	Brake fluid, grease, oil, or water on disc pad	Clean or replace	P-24, 29
	Hardening of disc pad surface, or poor contact	Grind or replace	P-24, 29
	Malfunction of caliper piston	Replace	P-26, 31
	Malfunction of master cylinder	Repair or replace	P-11, 15
	Malfunction of power brake unit	Replace	P-18
	Malfunction of check valve (vacuum hose)	Replace	P-8
	Damaged vacuum hose	Replace	P-8
	Deterioration of flexible hose	Replace	P-7
	Malfunction of proportioning bypass valve (PBV)	Replace	P-20
<b>Brakes pull to one side</b>	Worn disc pad	Replace	P-24, 29
	Brake fluid, grease, oil, or water on disc pad	Clean or replace	P-24, 29
	Hardening of disc pad surface, or poor contact	Grind or replace	P-24, 29
	Abnormal wear, distortion, or runout of disc plate	Repair or replace	P-24, 30
	Malfunction of automatic adjuster	Repair or replace	P-26, 31
	Loose or damaged dust cover mounting bolt	Tighten or replace	Section M
	Malfunction of caliper piston	Replace	P-26, 31
	Worn or improperly adjusted wheel bearing preload	Adjust or replace	Section M
	Improper adjustment of wheel alignment	Adjust	Section R
	Unequal tire air pressure	Adjust	Section Q
<b>Brakes do not release</b>	No brake pedal play	Adjust	P-9
	Improper adjustment of push rod clearance	Adjust	P-11
	Clogged master cylinder return port	Clean	—
	Brake pad not returning properly	Repair	—
	Improper return or malfunction of caliper piston	Repair or Replace	P-26, 31
	Excessive runout of disc plate	Replace	P-24, 30
	Improper adjustment of wheel bearing preload	Adjust or replace	Section M
<b>Pedal goes too far (excessive pedal stroke)</b>	Air in system, insufficient brake fluid	Add fluid and bleed air	P-7, 8
	Improper adjustment of pedal play	Adjust	P-9
	Worn disc pad	Replace	P-24, 29
<b>Abnormal noise or vibration during braking</b>	Worn disc pad	Replace	P-24, 29
	Damaged pad	Grind or replace	P-24, 29
	Brakes do not release	Repair	—
	Foreign material or scratches on disc plate contact surface	Clean	—
	Loose caliper mounting bolt	Tighten	P-22, 28
	Damaged disc plate contact surface	Replace	P-22, 28
	Poor contact of pad	Repair or replace	P-24, 29
	Insufficient grease on sliding parts	Apply grease	—



## AIR BLEEDING

The brakes should be bled whenever a brake line is disconnected. If a hydraulic line is disconnected at the master cylinder, start at the slave cylinder farthest from the brake master cylinder, and move to the next closest slave cylinder until all four cylinders have been bled. If the disconnection point is anywhere except the master cylinder, start at the point closest to the disconnection, and move to the next farthest slave cylinder until all four cylinders have been bled.

1. On level ground, jack up the vehicle and support it evenly on safety stands.

### Caution

- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

2. Remove the bleeder cap and attach a vinyl tube to the bleeder screw.
3. Place the other end of the vinyl tube in a clear, fluid-filled container.
4. Have a helper depress the brake pedal several times, and then hold it in the depressed position.
5. Loosen the bleeder screw, drain out the fluid, and close the screw by using the SST.
6. Repeat steps 4 and 5 until no air bubbles are seen.
7. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
8. Tighten the bleeder screw by using the SST.

### Tightening torque:

5.9–8.8 N·m {60–90 kgf·cm, 53–78 in·lbf}

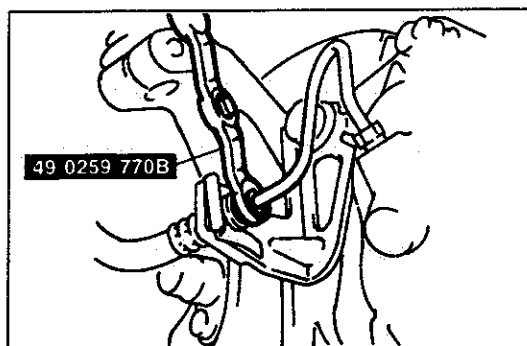
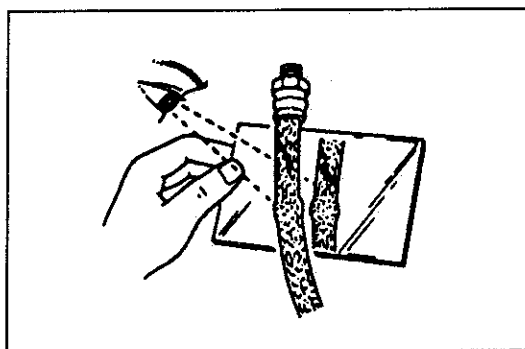
9. Perform the above steps for the remaining wheels.
10. Check for correct brake operation.
11. Check that there is no fluid leakage. Wipe off any spilled fluid immediately.
12. After bleeding the brakes, add brake fluid to MAX.

## BRAKE LINE

### Inspection

Check for the following and repair or replace parts as necessary.

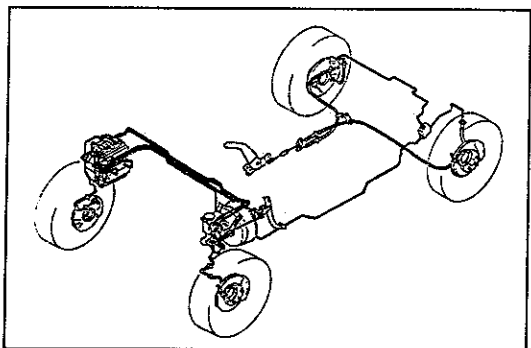
1. Cracks, damage, and corrosion of brake lines
2. Damage to brake hose threads
3. Scars, cracks, and swelling of flexible hoses
4. Fluid leakage from brake lines



### Removal / Installation

1. When disconnecting the flexible hose and brake line, loosen the nut by using the SST, then remove the holding clip.
2. When connecting the flexible hose, do not overtighten or twist it.
3. Install the holding clip and tighten the brake pipe nut by using the SST.
4. Verify that the hose does not contact other parts when the vehicle bounces or when the steering wheel is turned all the way to the left or right.
5. Bleed the air from the brake system. (Refer to above.)



**BRAKE FLUID****Inspection**

1. Depress the brake pedal several times, and check the brake system for leaks.

2. Verify that the fluid level in the reservoir is between MAX and MIN.

3. If the fluid level is extremely low, check the brake system for leaks.

**Fluid specification: FMVSS 116 DOT-3**

**Replacement****Caution**

- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

1. Remove the brake fluid from the reservoir by using a suction pump.
2. Fill the reservoir with clean brake fluid.
3. Attach a vinyl tube to the farthest bleeder screw and place the other end of the tube in a clear container.
4. Remove all old brake fluid from the brake lines by loosening the bleeder screw and pumping the brake pedal until only clean fluid is seen. The reservoir should be kept about 3/4 full during this procedure to prevent air from re-entering the lines.
5. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
6. Tighten the bleeder screw.

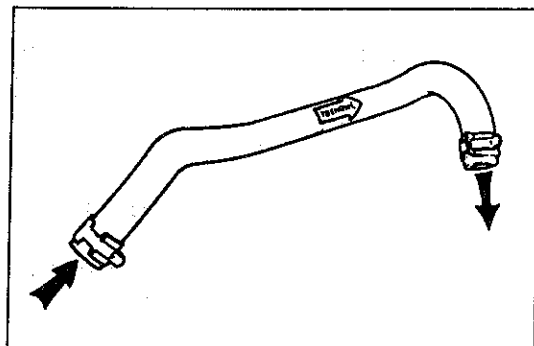
**Tightening torque:**

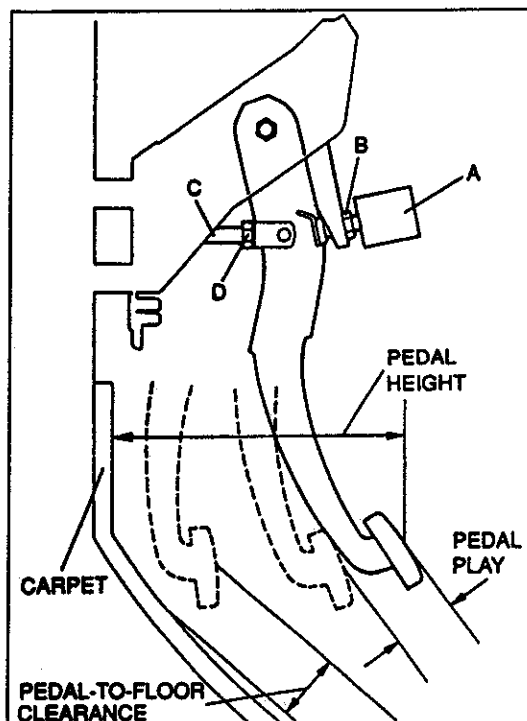
**5.9–9.8 N·m {60–100 kgf·cm, 53–86 in·lbf}**

7. Perform the above steps for the remaining wheels.
8. Fill the reservoir to MAX.

**VACUUM LINE****Inspection**

1. Remove the clamps and the hose.
2. Apply both suction and pressure to the engine side of the hose, and verify that air flows only toward that side. If air flows in both directions or not at all, replace the vacuum hose.





## BRAKE PEDAL

### Inspection (on-vehicle)

#### Pedal height inspection

Verify that the distance from the center of the upper surface of the pedal pad to the carpet is as specified.

**Pedal height: 164.5–176.0 mm {6.48–6.92 in}**  
(with carpet)

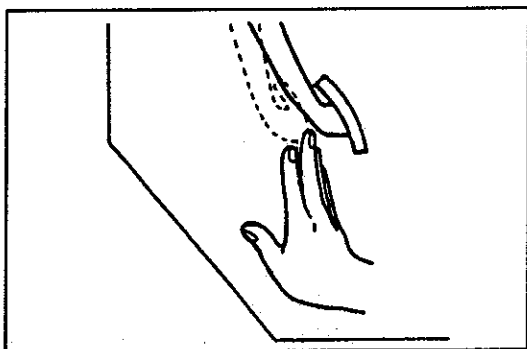
#### Pedal height adjustment

1. Disconnect the stoplight switch connector.
2. Loosen locknut B and turn switch A until it does not contact the pedal arm.
3. Loosen locknut D and turn rod C to adjust the height.
4. Adjust the pedal free play and tighten locknut D. (Refer to below.)
5. Turn switch A until it contacts the pedal arm; then turn the switch a half-turn more.
6. Tighten locknut B.

#### Tightening torque:

**13.8–17.6 N·m {140–180 kgf·cm, 122–156 in·lbf}**

7. Connect the stoplight switch connector.

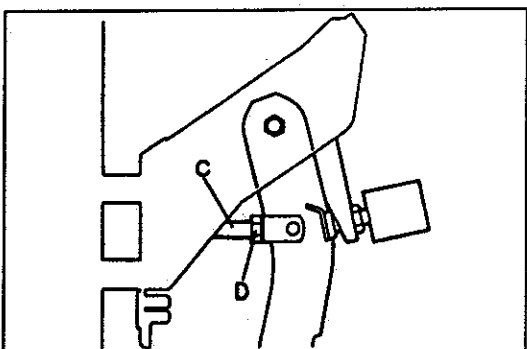


#### Pedal play inspection

1. Depress the pedal a few times to eliminate the vacuum in the system.
2. Lightly depress the pedal by hand until resistance is felt, and check the free play.

**Free play: 3–8 mm {0.12–0.31 in}**

P



#### Pedal play adjustment

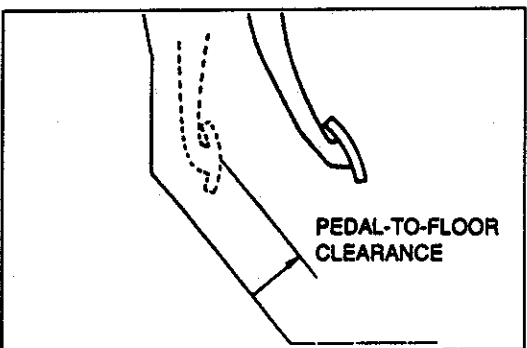
1. Loosen locknut D and turn rod C to adjust the free play.

**Free play: 3–8 mm {0.12–0.31 in}**

2. Tighten locknut D.

#### Tightening torque:

**24–34 N·m {2.4–3.5 kgf·m, 17–25 ft·lbf}**



#### Pedal-to-floor clearance

1. Check if the distance from the floor panel to the center of the upper surface of the pedal pad is as specified when the pedal is depressed with a force of 589 N {60 kgf, 132 lbf}.

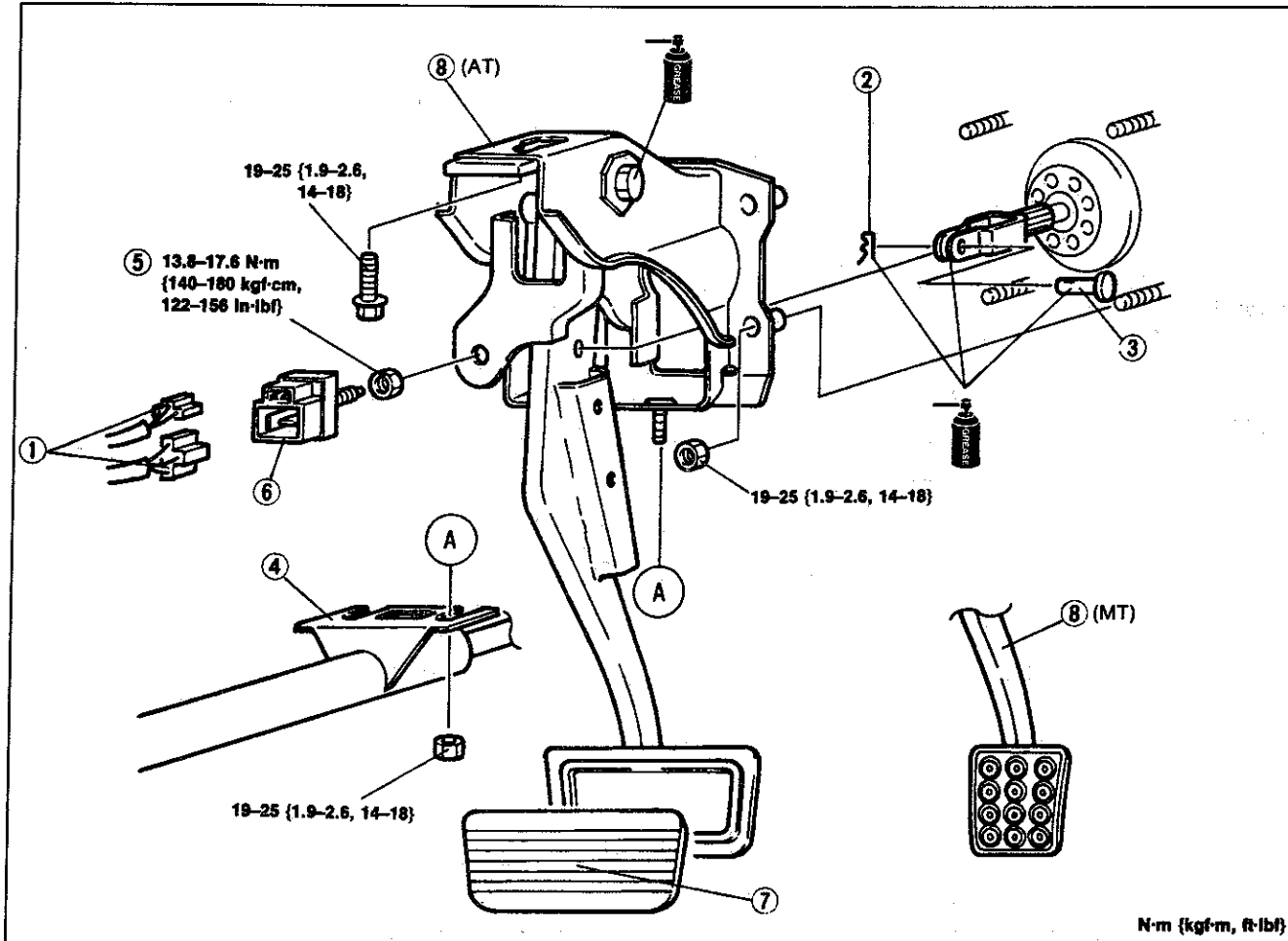
**Pedal-to-floor clearance: 100 mm {3.94 in} min.**  
(without carpet)

2. If the distance is less than specified, inspect for air in the brake system.

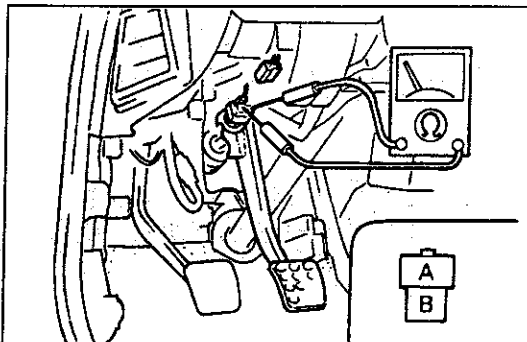
## CONVENTIONAL BRAKE SYSTEM

## Removal / Inspection / Installation

1. Remove the side wall. (Refer to section S.)
2. Remove the lower panel. (Refer to section S.)
3. Remove the column cover.
4. Remove in the order shown in the figure.
5. Inspect all parts and repair or replace as necessary.
6. Install in the reverse order of removal.
7. After installation, check and adjust the pedal height and free play.



- |  |                                |
|--|--------------------------------|
| 1. Stoplight switch connector          | 6. Stoplight switch            |
| 2. Spring clip                         | Inspection ..... below         |
| 3. Clevis pin                          | 7. Pedal pad                   |
| 4. Steering shaft bracket mounting nut | Inspect for wear and damage    |
| Service ..... Section N                | 8. Brake pedal                 |
| 5. Nut                                 | Inspect for bending and damage |

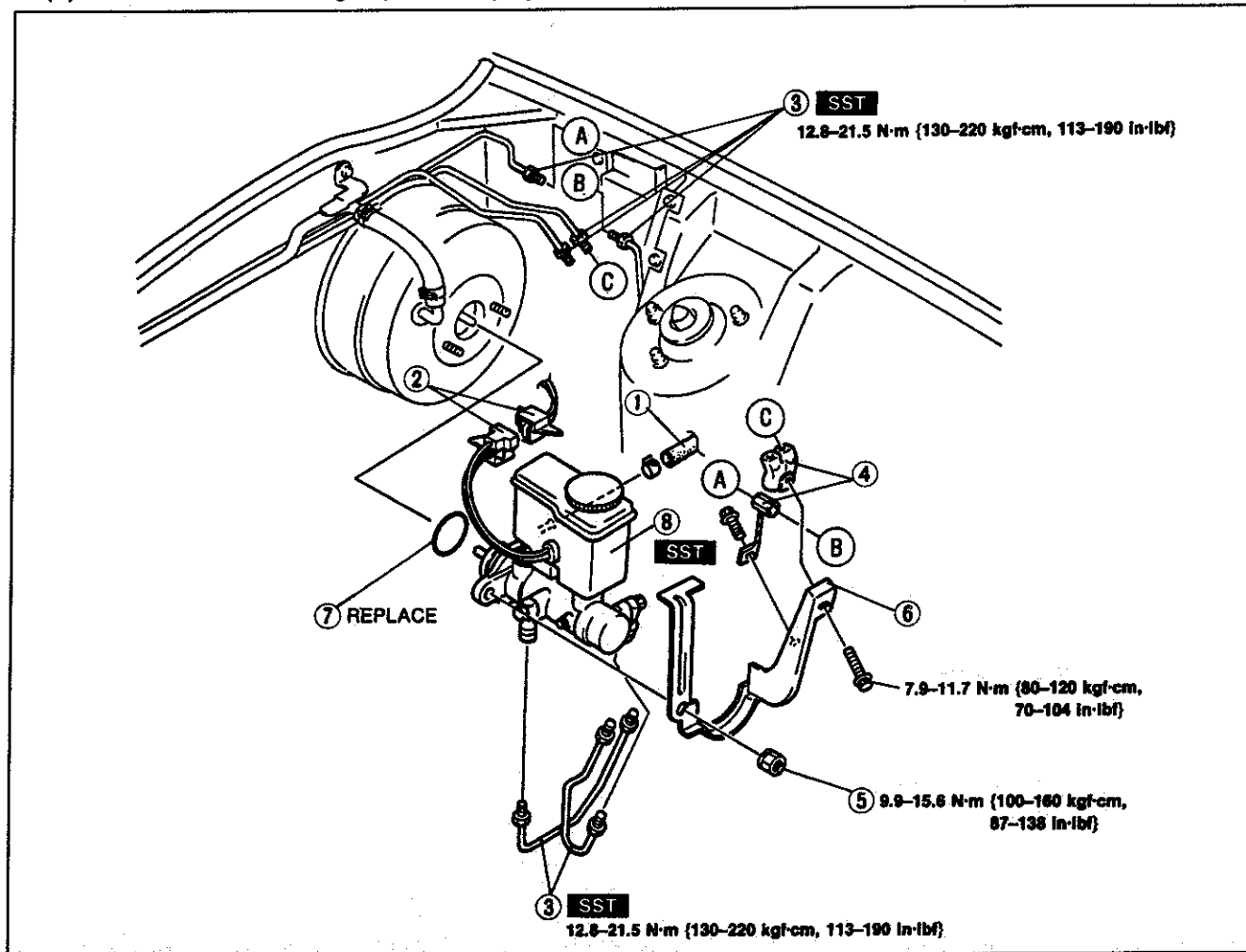


## Inspection Stoplight switch

1. Disconnect the stoplight switch connector.
2. Connect an ohmmeter to the terminals of the stop-light switch.
3. Verify continuity between the terminals when the brake pedal is depressed.

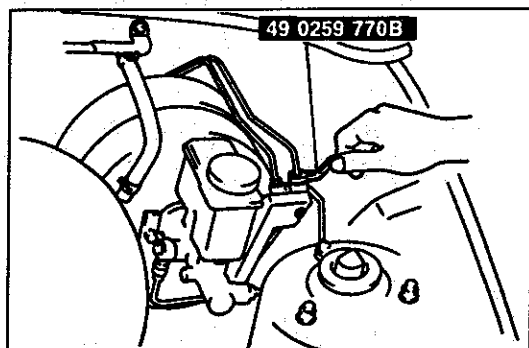
## MASTER CYLINDER Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.
3. After installation, perform the following.
  - (1) Add fluid and bleed the brakes. (Refer to page P-7.)
  - (2) Check for fluid leakage. (Refer to page P-8.)



1. Hose (MT)
2. Brake fluid level sensor connector
3. Brake pipe
  - Removal Note ..... below
  - Installation Note ..... page P-14
4. Pipe joint and bracket
5. Nut

6. Bracket
7. O-ring
8. Master cylinder
  - Disassembly / Inspection / Assembly ..... page P-15
  - Installation Note ..... page P-12

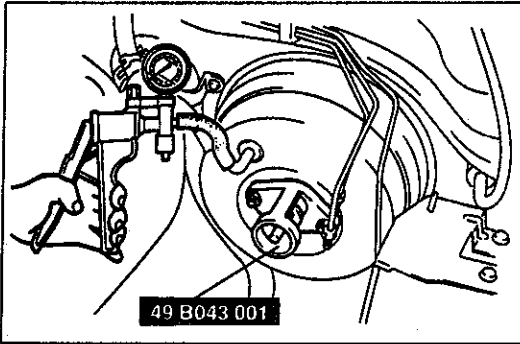


### Removal note Brake pipe

Loosen the brake pipe at the master cylinder by using the SST.

### Caution

- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

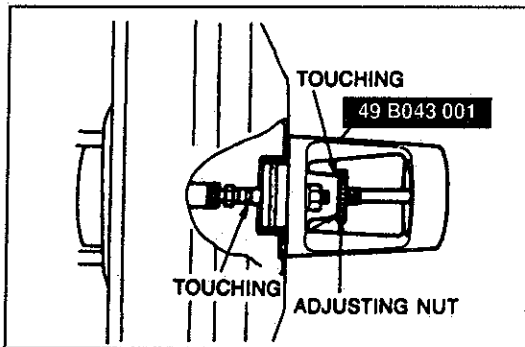
**Installation note****Master cylinder****Piston to push rod clearance**

1. Turn the nut of the SST clockwise to fully retract the gauge rod. Attach the SST to the power brake unit.

**Tightening torque:**

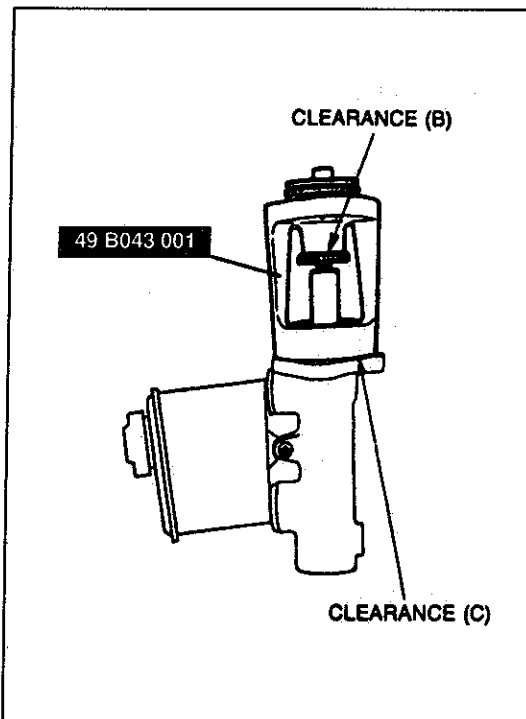
9.9–15.6 N·m {100–160 kgf·cm, 87–138 in·lbf}

2. Apply 66.7 kPa {500 mmHg, 19.7 inHg} vacuum by using a vacuum pump.



3. Turn the adjusting nut of the SST counterclockwise until the gauge rod just contacts the end of the master cylinder push rod.

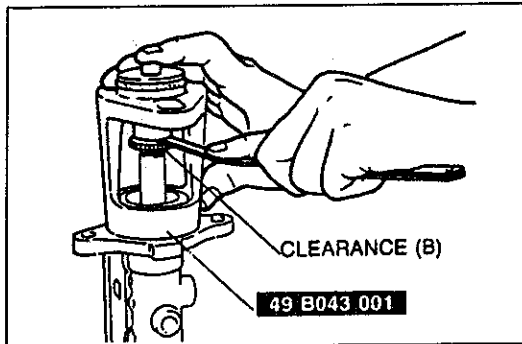
Push lightly on the end of the gauge rod to be sure it is seated. Verify that there is no gap between the adjusting nut and the SST body.



4. Remove the SST from the power brake unit without disturbing the adjusting nut. Set the SST onto the master cylinder as shown in the figure.

5. Push lightly on the end of the SST gauge rod to be sure it is bottomed in the master cylinder piston, but do not push so hard that the piston moves. Note any clearance between the SST body and the adjusting nut (clearance B) or between the body and the master cylinder (clearance C). Adjust the push rod as necessary, as outlined in "Adjustment" on the next page.

Measurement	Push rod
Clearance at (B)	Too short
Clearance at (C)	Too long
No clearance at (B) or (C)	OK

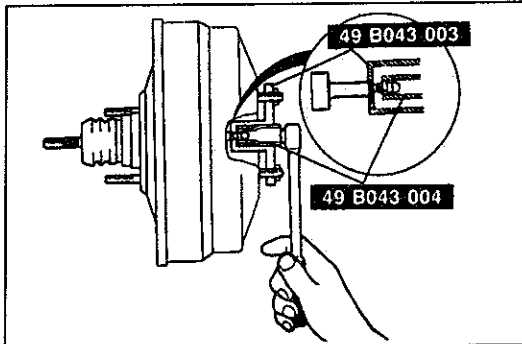


## Adjustment

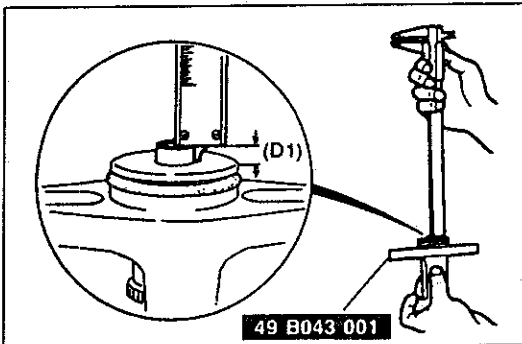
The threads of the push rod are specially designed so that the bolt becomes harder to turn past a certain point. This is to prevent the bolt from coming loose. Turn the bolt only within this range when adjusting.

## Clearance at B

1. Push lightly on the end of the **SST** gauge rod, and measure the clearance between the adjusting nut and the **SST** body.

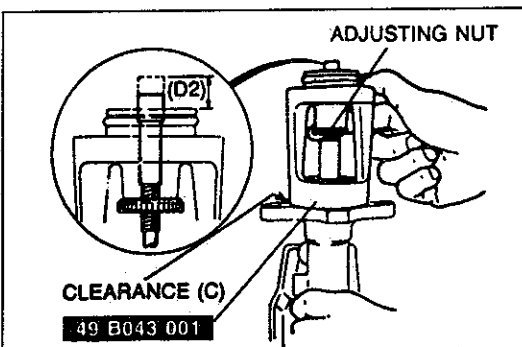


2. Using the **SSTs**, turn the nut to lengthen the master cylinder push rod an amount equal to the clearance measured at B.



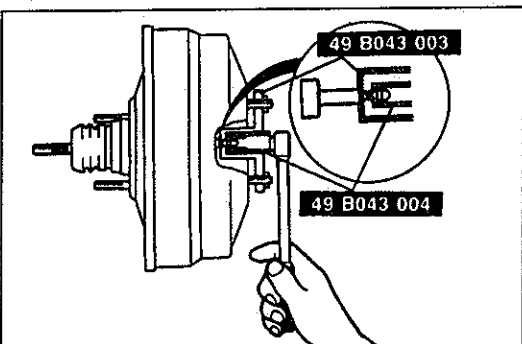
## Clearance at C

1. Measure and record height D1 of the gauge rod.

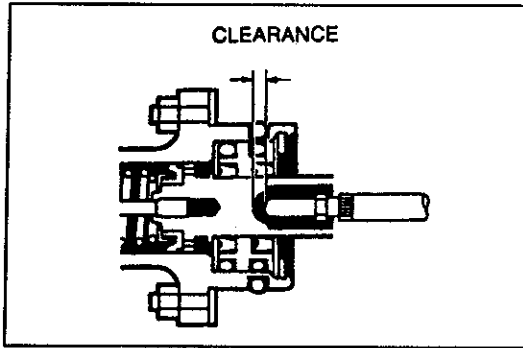


2. Turn the adjusting nut until the **SST** body sets squarely on the master cylinder. (Turn only enough for the body to touch.)

3. Measure and record height D2 of the gauge rod.



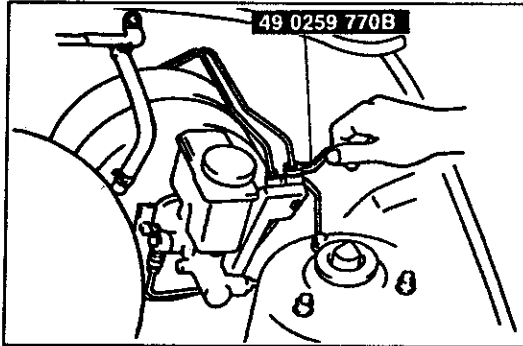
4. Subtract D1 from D2. Using the **SSTs**, turn the nut to shorten the master cylinder push rod an amount equal to the difference.



### Note

- The previous adjustment produces the following clearance.

Vacuum applied to unit	Push rod-to-piston clearance
Approx 66.7 kPa (500 mmHg, 19.7 inHg)	0.1–0.4 mm (0.004–0.016 in)



### Brake pipe

1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination.  
(Refer to section GI "Torque Formulas".)
2. Tighten the brake pipe flare nut by using the SST.

### Tightening torque:

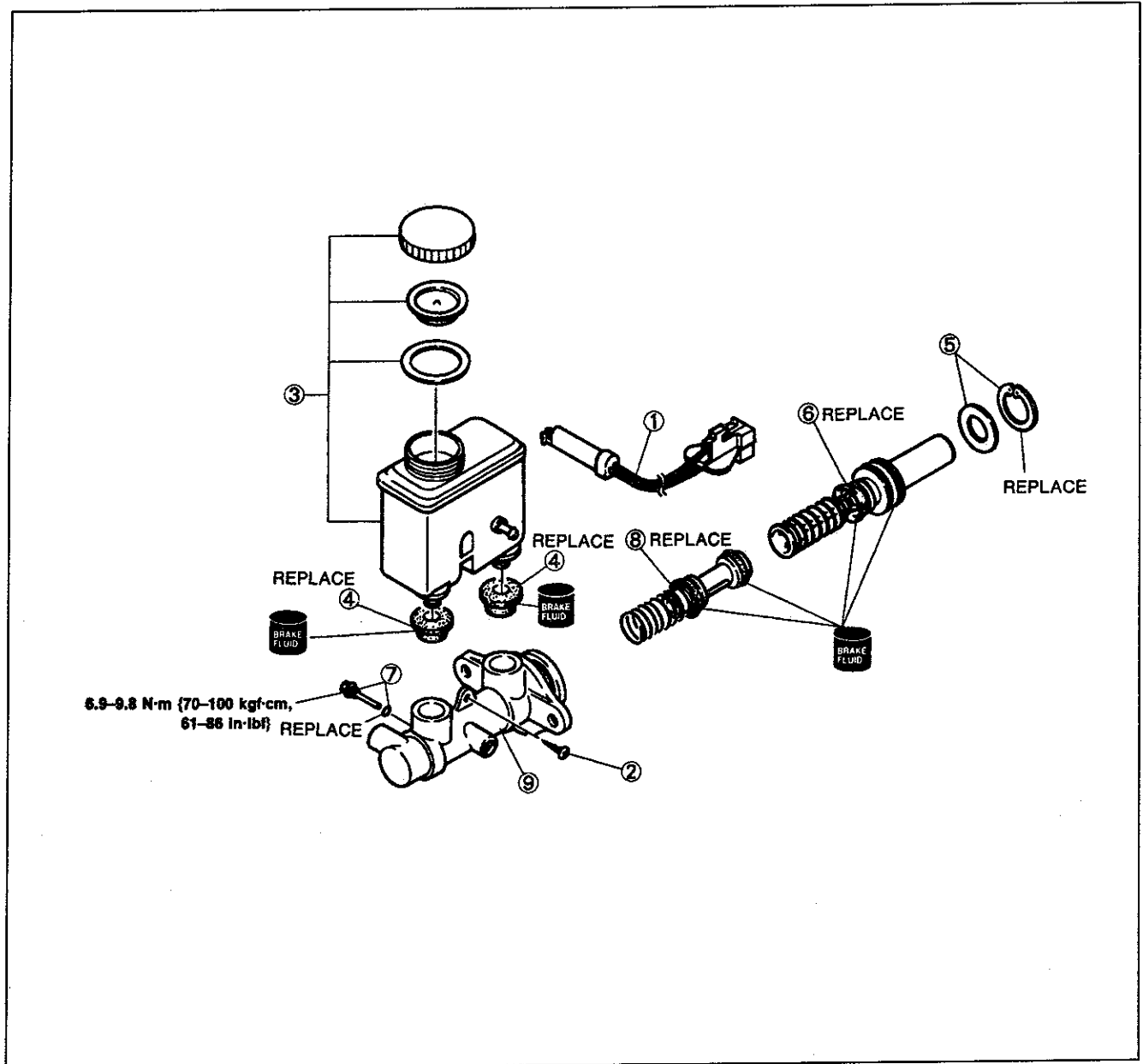
12.8–21.5 N·m{130–220 kgf·cm, 113–190 in·lbf}

## Disassembly / Inspection / Assembly

### Caution

- The brake master cylinder is made of aluminum, and can be easily damaged by tightening in a vise. When securing the master cylinder in a vise, tighten only the master cylinder flange.

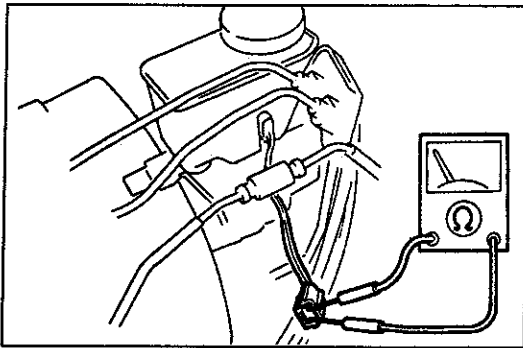
1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



1. Brake fluid level sensor  
Inspection ..... page P-16
2. Screw
3. Reservoir assembly  
Inspect for damage and deformation
4. Bushings
5. Snap ring and spacer
6. Primary piston assembly  
Inspect for abnormal wear, rust, and damage

7. Stop pin and O-ring  
Assembly Note ..... page P-16
8. Secondary piston assembly  
Inspect for abnormal wear, rust, and damage
9. Master cylinder body  
Inspect for damage and wear  
Inspect inside of body for corrosion





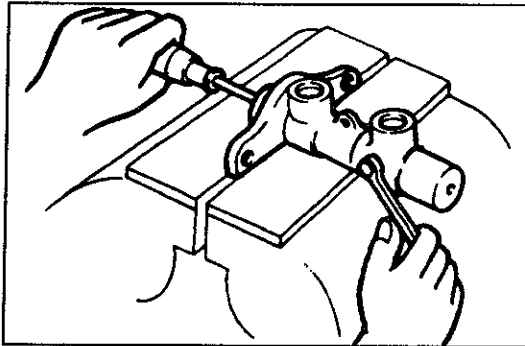
### Inspection

#### Brake fluid level sensor

1. Disconnect the brake fluid level sensor connector.
2. Check continuity of the brake fluid level sensor.

Fluid level	Continuity
Below MIN	Yes
Above MIN	No

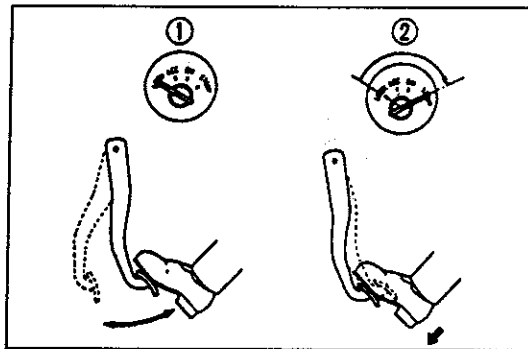
3. If not as specified, replace the brake fluid level sensor.



### Assembly note

#### Stop pin and O-ring

1. Install a new O-ring onto the stop pin.
2. Install the secondary piston assembly with the hole in the piston facing the stop pin.
3. Install and tighten the stop pin.
4. Push and release the piston to verify that it is held by the stop pin.



### POWER BRAKE UNIT

#### Inspection (on-vehicle)

#### Power brake unit function check (Simple method)

##### Step 1

1. With the engine stopped, depress the brake pedal a few times.
2. With the pedal depressed, start the engine.
3. If immediately after the engine starts the pedal moves down slightly, the unit is operating.

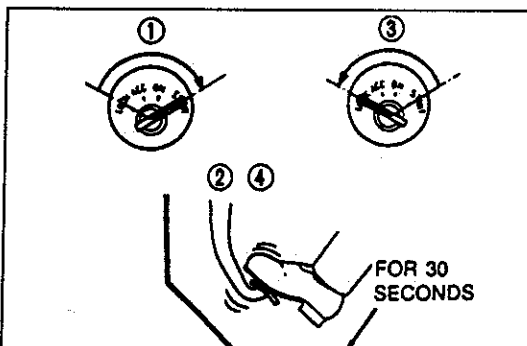
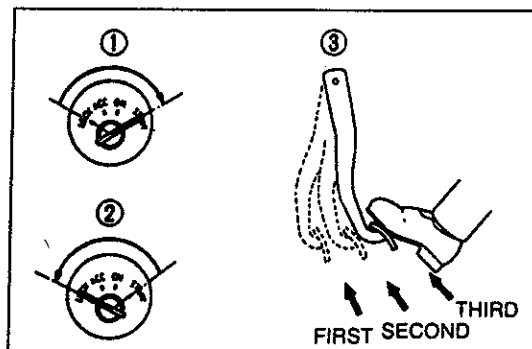
##### Step 2

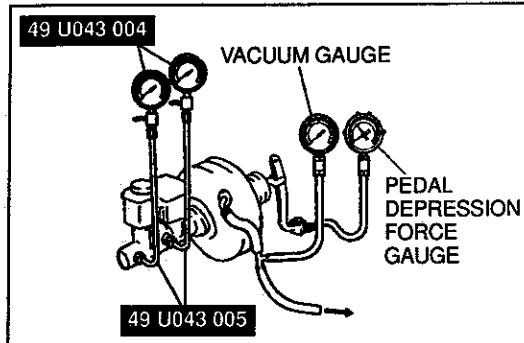
1. Start the engine.
2. Stop the engine after it has run for **1 or 2 minutes**.
3. Depress the pedal with the usual force.
4. If the first pedal stroke is long and becomes shorter with subsequent strokes, the unit is operating.
5. If a problem is found, inspect for damage of the check valve or vacuum hose and examine the installation. Repair if necessary, and inspect it once again.

##### Step 3

1. Start the engine.
2. Depress the pedal with the usual force.
3. Stop the engine with the pedal held depressed.
4. Hold the pedal down for **about 30 seconds**.
5. If the pedal height does not change, the unit is operating.
6. If there is a problem, inspect for damage to the check valve or vacuum hose, and inspect the hose connections. Repair if necessary, and inspect once again.

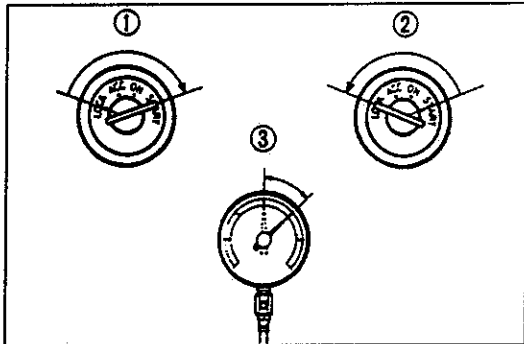
If the nature of the problem is still not clear after the three steps above, follow the more detailed check described in "Using the testers". (Refer to page P-17).





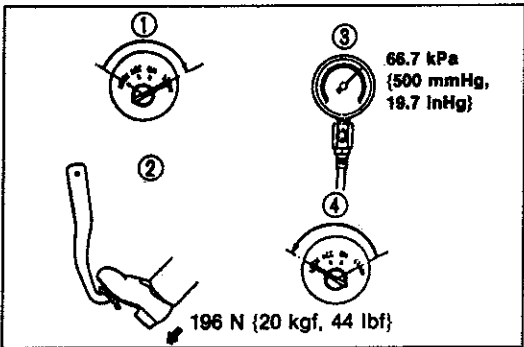
## (Using the testers)

1. Connect the SST or equivalent, vacuum gauge, and pedal depression force gauge as shown in the figure.
2. After bleeding the air from the SST, conduct the test as described in the steps below.



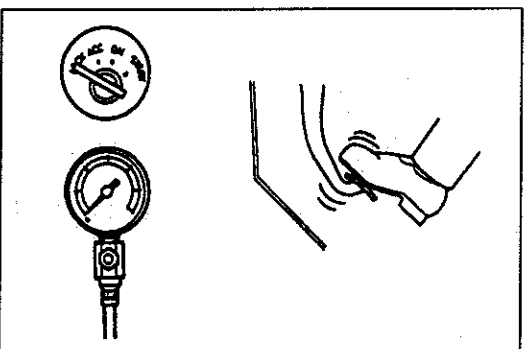
## a) Checking for vacuum loss Unloaded condition

1. Start the engine.
2. Stop the engine when the vacuum gauge reading reaches 66.7 kPa {500 mmHg, 19.7 inHg}.
3. Observe the vacuum gauge for 15 seconds. If the gauge shows 63.4–66.7 kPa {475–500 mmHg, 18.7–19.7 inHg}, the unit is operating.



## Loaded condition

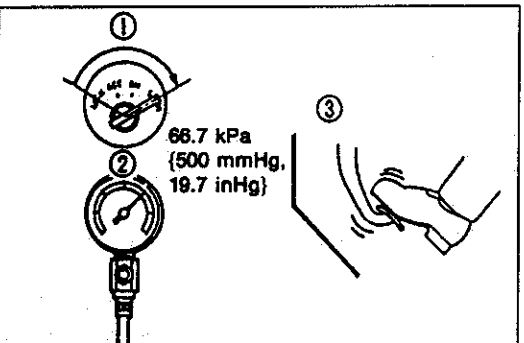
1. Start the engine.
2. Depress the brake pedal with a force of 196 N {20 kgf, 44 lbf}.
3. With the brake pedal depressed, stop the engine when the vacuum gauge reading reaches 66.7 kPa {500 mmHg, 19.7 inHg}.
4. Observe the vacuum gauge for 15 seconds. If the gauge shows 63.4–66.7 kPa {475–500 mmHg, 18.7–19.7 inHg}, the unit operating.



## b) Checking for hydraulic pressure

1. If, with the engine stopped (vacuum 0 kPa {0 mmHg, 0 inHg}), the fluid pressure is within specification, the unit is operating.

Pedal force	Fluid pressure kPa {kgf/cm <sup>2</sup> , psi}
196 N {20 kgf, 44 lbf}	590 {6, 85} min.

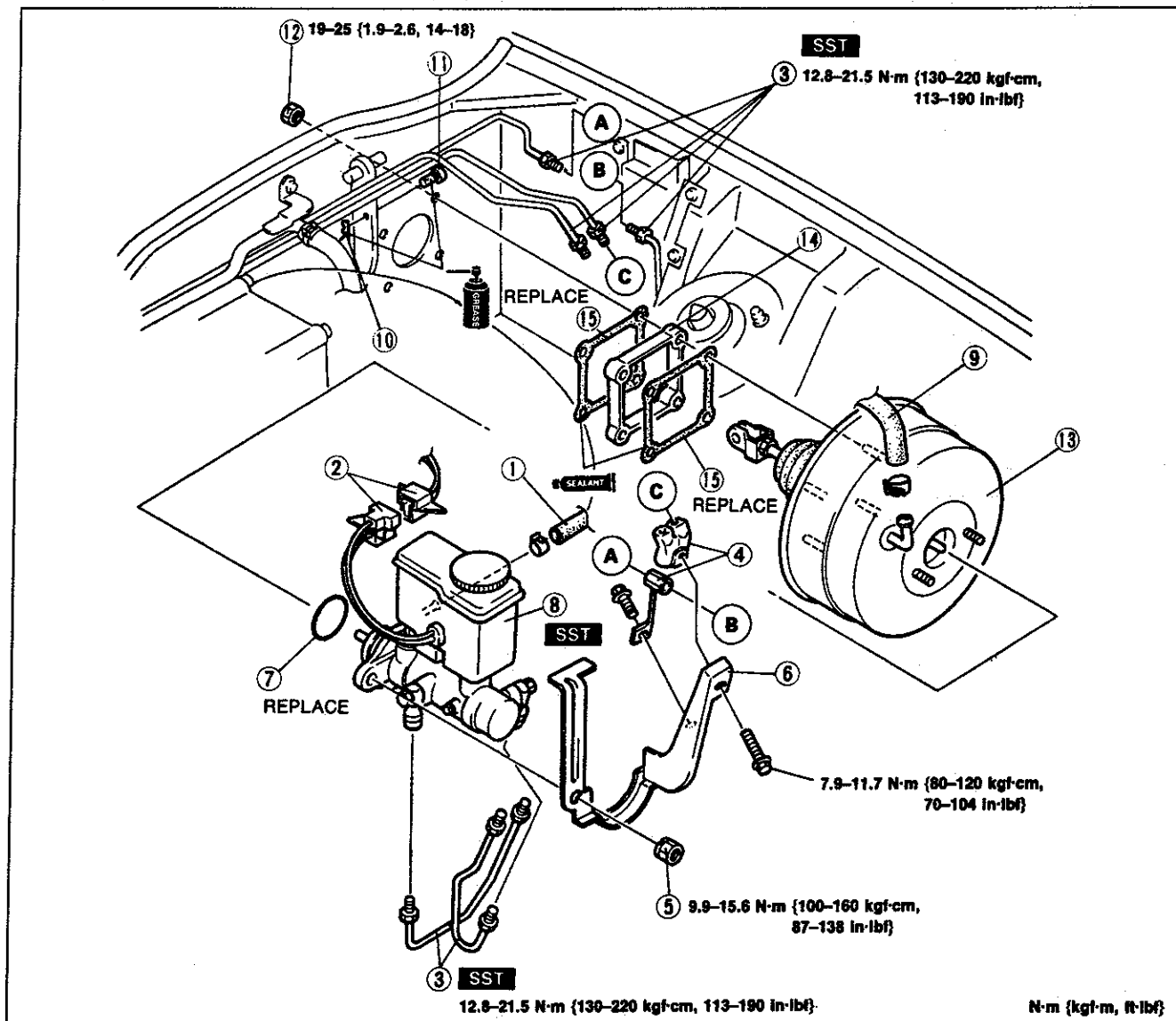


2. Start the engine. Depress the brake pedal when the vacuum reaches 66.7 kPa {500 mmHg, 19.7 inHg}. If the fluid pressure is within specification, the unit is operating.

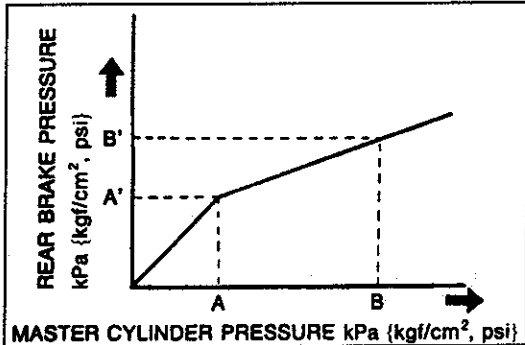
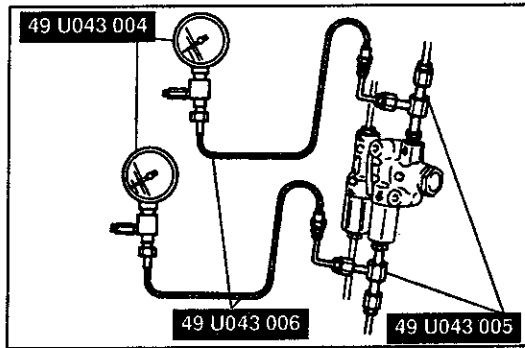
Pedal force	Fluid pressure kPa {kgf/cm <sup>2</sup> , psi}
196 N {20 kgf, 44 lbf}	7750 {79, 1120} min.

### Removal / Installation

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.
3. Add fluid and bleed the brakes. (Refer to page P-7.)
4. Check and adjust the brake pedal height. (Refer to page P-9.)
5. Check for fluid leakage. (Refer to page P-8.)



- |  |                            |
|--|----------------------------|
| 1. Hose (MT)                           | 9. Vacuum hose             |
| 2. Brake fluid level sensor connector  | Inspection ..... page P- 8 |
| 3. Brake pipe                          | 10. Spring clip            |
| Removal Note ..... page P-11           | 11. Clevis pin             |
| Installation Note ..... page P-14      | 12. Nut                    |
| 4. Pipe joint and bracket              | 13. Power brake unit       |
| 5. Nut                                 | Inspection ..... page P-16 |
| 6. Bracket                             | 14. Spacer                 |
| 7. O-ring                              | 15. Gasket                 |
| 8. Master cylinder                     |                            |
| Removal / Installation ..... page P-11 |                            |
| Disassembly / Inspection /             |                            |
| Assembly ..... page P-15               |                            |



## PROPORTIONING BYPASS VALVE

### Inspection

1. Connect the SST or equivalent to the inlet and outlet pipes to the rear brake system.
2. After bleeding the air from the SST, measure the fluid pressure from the master cylinder and to the rear brakes.

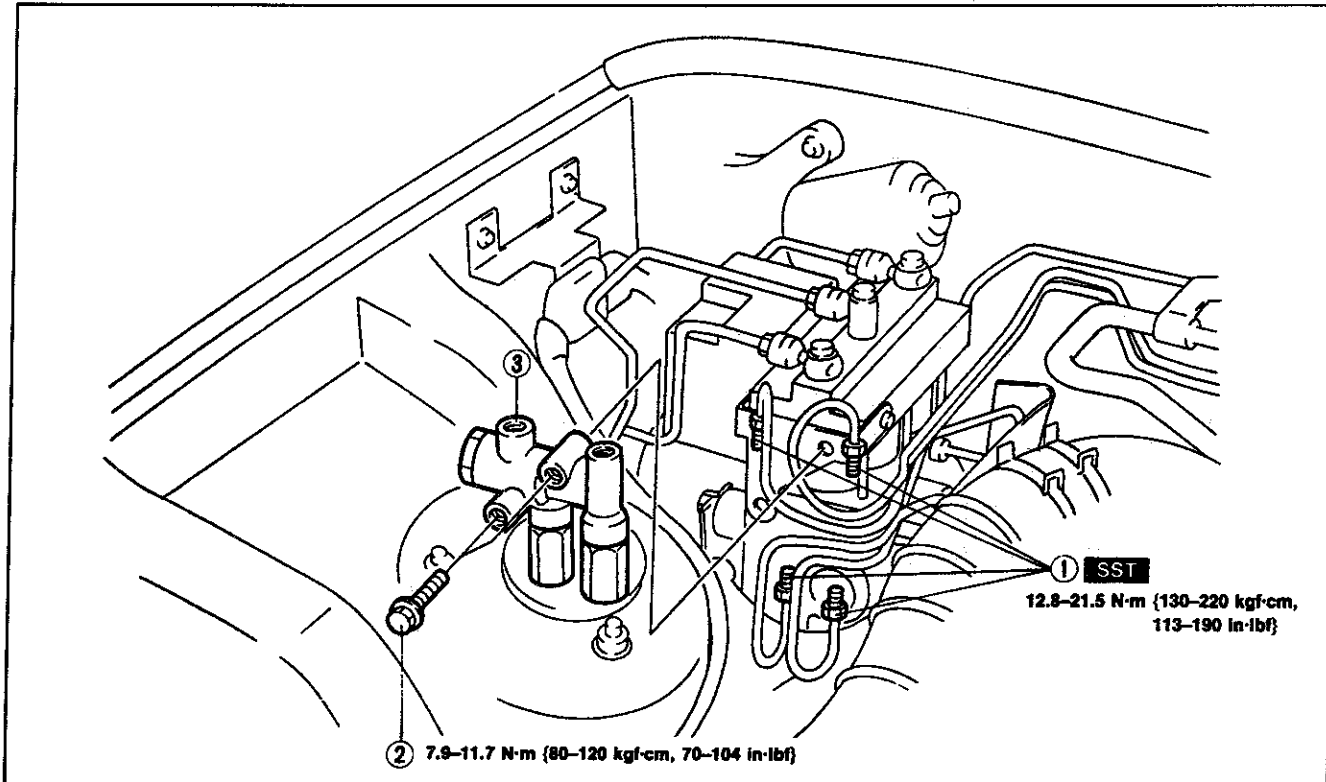
### Specification:

FLUID PRESSURE KPa {kgf/cm <sup>2</sup> , psi}		REAR BRAKE PRESSURE
MASTER CYLINDER PRESSURE	A = 3,920 {40,570}	A' = 3,630-4,210 {37-43, 530-610}
	B = 5,880 {60,850}	B' = 4,320-5,090 {44-52, 626-739}

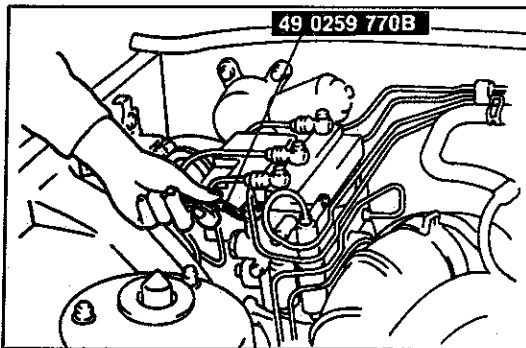
3. If not as specified, replace the proportioning bypass valve assembly.
4. Add fluid and bleed the air. (Refer to page P-7.)
5. Check for fluid leakage. (Refer to page P-8.)

### Replacement

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Install in the reverse order of removal, referring to **Installation Note**.
3. Add fluid and bleed the brakes. (Refer to page P-7.)
4. Check for fluid leakage. (Refer to page P-8.)



- |                               |                               |
|-------------------------------|-------------------------------|
| 1. Brake pipe                 | 2. Bolt                       |
| Removal Note ..... below      | 3. Proportioning bypass valve |
| Installation Note ..... below | Inspection ..... page P-19    |



### Removal note

#### Brake pipe

Loosen the brake pipes by using the SST.

### Caution

- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

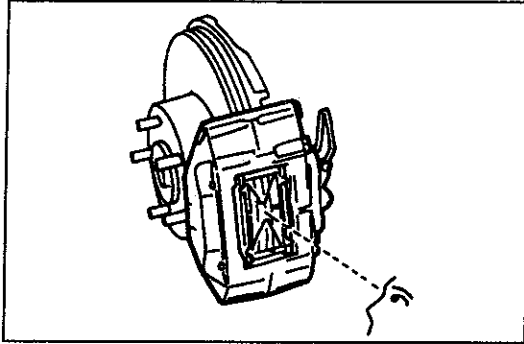
### Installation note

#### Brake pipe

1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
2. Tighten the brake pipes by using the SST.

### Tightening torque:

12.8-21.5 N·m{130-220 kgf·cm, 113-190 in·lbf}



### FRONT BRAKE (DISC)

#### Inspection (on-vehicle)

##### Disc pad

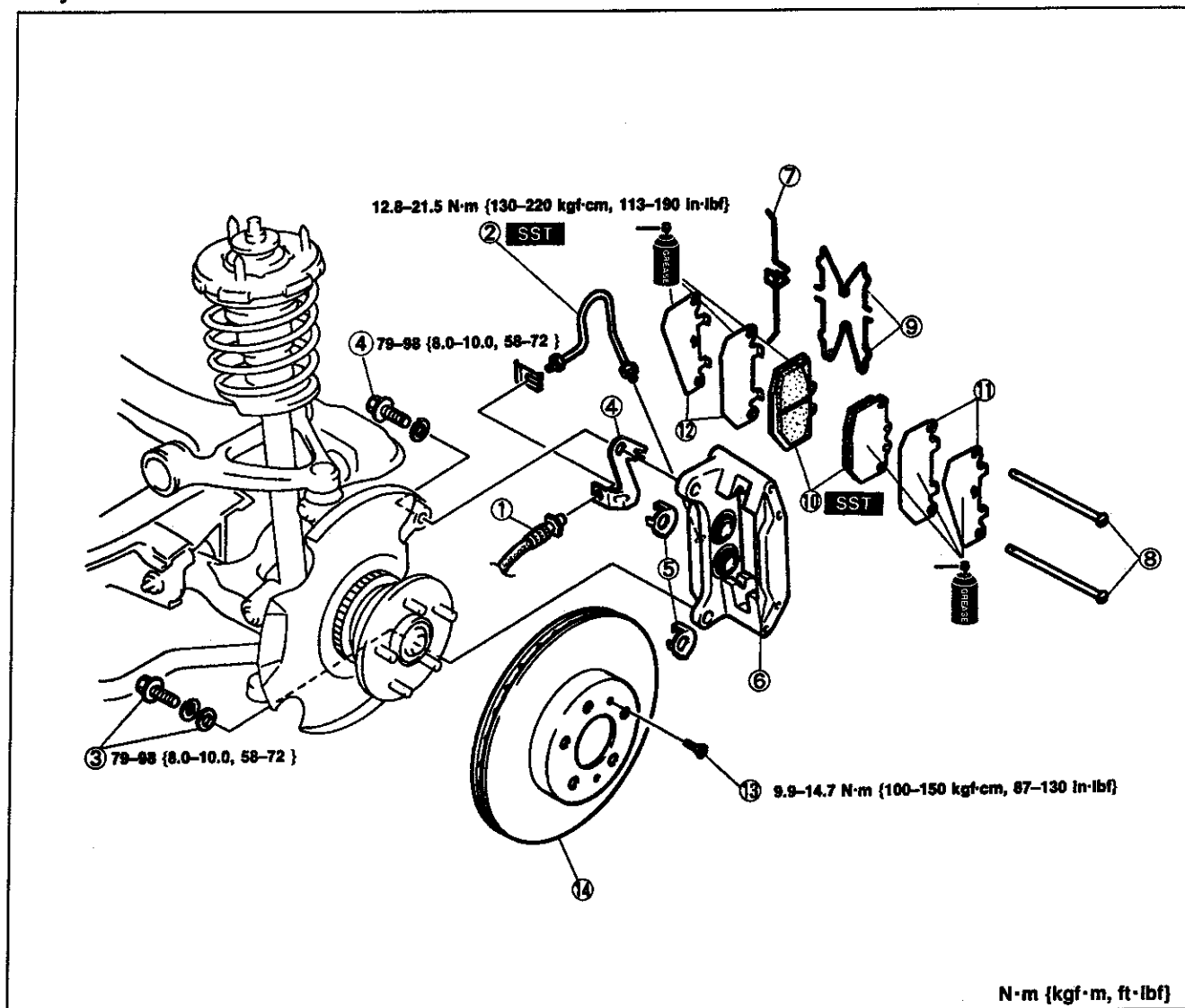
1. On level ground, jack up the front of the vehicle and support it on safety stands.
2. Remove the wheels.
3. Look through the caliper inspection hole and inspect the remaining thickness of the pads.

**Thickness: 1.0 mm {0.04 in} min.**

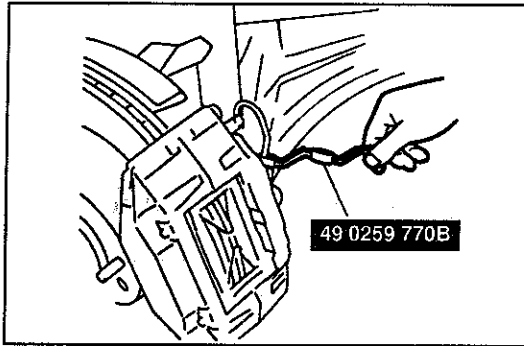
4. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.

**Removal / Inspection / Installation**

1. Remove in the order shown in the figure, referring to **Removal Note**.
2. Inspect all parts and repair or replace as necessary
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Add fluid and bleed the air. (Refer to page P-7.)
5. Check for fluid leakage. (Refer to page P-8.)
6. Depress the pedal a few times, then verify that the brakes do not drag while the wheels are being rotated by hand.



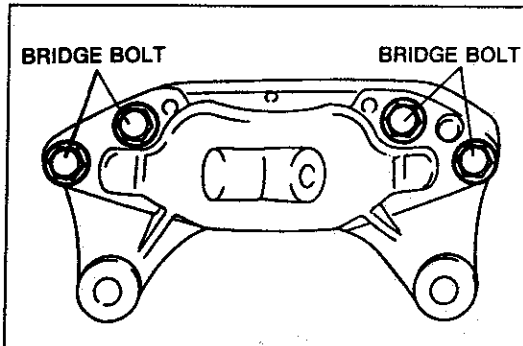
- |  |   |  |
|--|---|--|
| 1. Brake hose<br>Inspect for damage and cracks   | 6. Caliper<br>Removal Note<br>..... page P-23                                     | 11. Outer shim<br>Installation Note<br>..... page P-23 |
| 2. Brake pipe<br>Removal Note<br>..... page P-23<br>Installation Note<br>..... page P-23 | Disassembly / Inspection /<br>Assembly .... page P-26                             | 12. Inner shim<br>Installation Note<br>..... page P-23 |
| 3. Bolt, spacer  | 7. M-spring   | 13. Screw  |
| 4. Bolt, brake pipe bracket  | 8. Pad pin  | 14. Disc plate<br>Inspection .... page P-24            |
| 5. Guard plate   | 9. M-clip   |  |
|  | 10. Disc pad<br>Inspection .... page P-21<br>Installation Note<br>..... page P-23 |  |



## Removal note

### Brake pipe

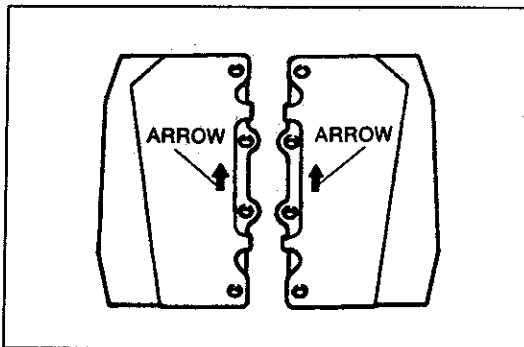
Remove the brake pipe by using the SST.



## Caliper

### Caution

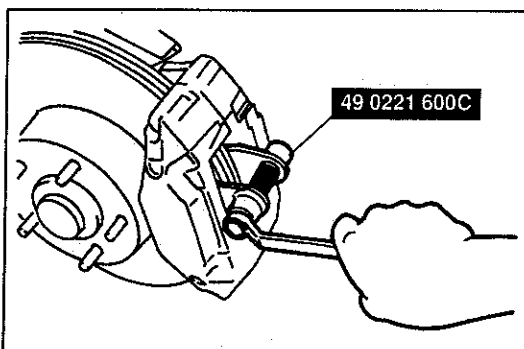
- Loosening the caliper bridge bolts will damage the brake caliper. Do not loosen or remove the caliper bridge bolts.



## Installation note

### Outer shim, inner shim

Align the arrow with the disc plate rotation and install the shims.



## Disc pad

- Clean the piston.
- Push the piston Inward by using the SST.
- Install the disc pads.

## Brake pipe

- Modify the brake pipe tightening torque to allow for a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
- Tighten the brake pipe by using the SST.

### Tightening torque:

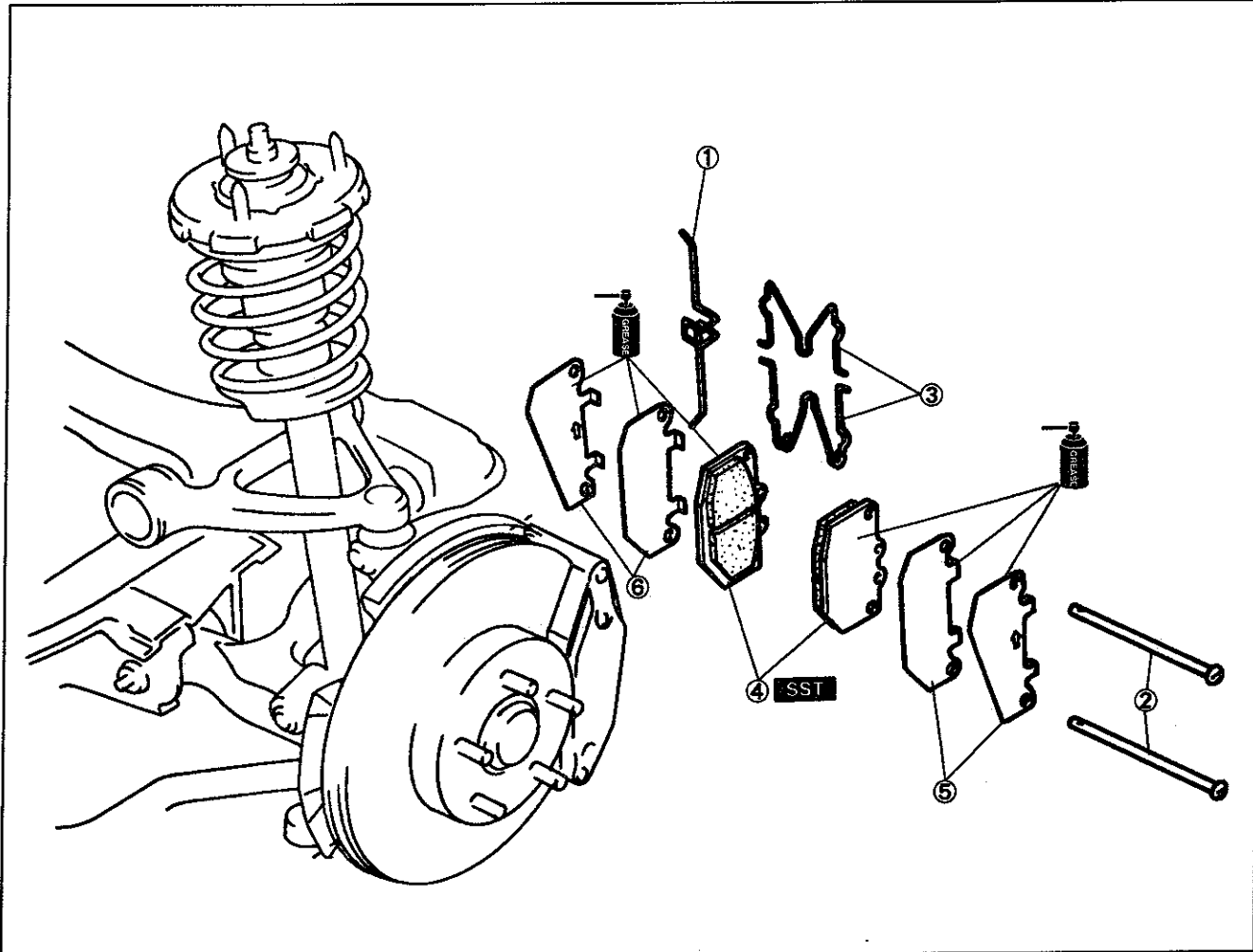
12.8–21.5 N·m{130–220 kgf·cm, 113–190 in·lbf}



**DISC PAD (FRONT)**

**Replacement**

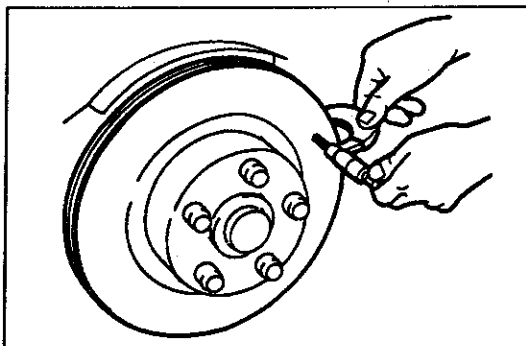
1. Remove in the order shown in the figure.
2. Install in the reverse order of removal, referring to **Installation Note**.



1. M-clip
2. Pad pin
3. M-spring

4. Disc pad  
Installation Note  
..... Page P-23
5. Outer shim  
Installation Note  
..... page P-23

6. Inner shim  
Installation Note  
..... page P-23



**DISC PLATE (FRONT)**

**Inspection**

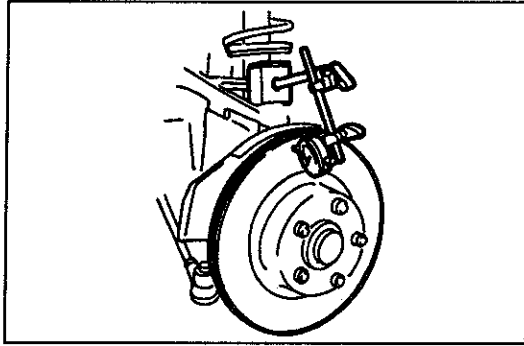
**Disc plate thickness**

1. Measure the thickness of the disc plate.

**Standard: 22.0 mm {0.87 in}**

**Minimum: 20.0 mm {0.79 in}**

2. If the thickness is less than minimum, replace the disc plate.



### Disc plate runout

1. Verify that there is no looseness in the wheel bearing.
2. Measure the runout at the outer edge of the contact surface.

**Runout: 0.1mm {0.004 in} max.**

3. If the runout exceeds specification, repair or replace the disc plate.

**CALIPER (FRONT)****Disassembly / Inspection / Assembly**

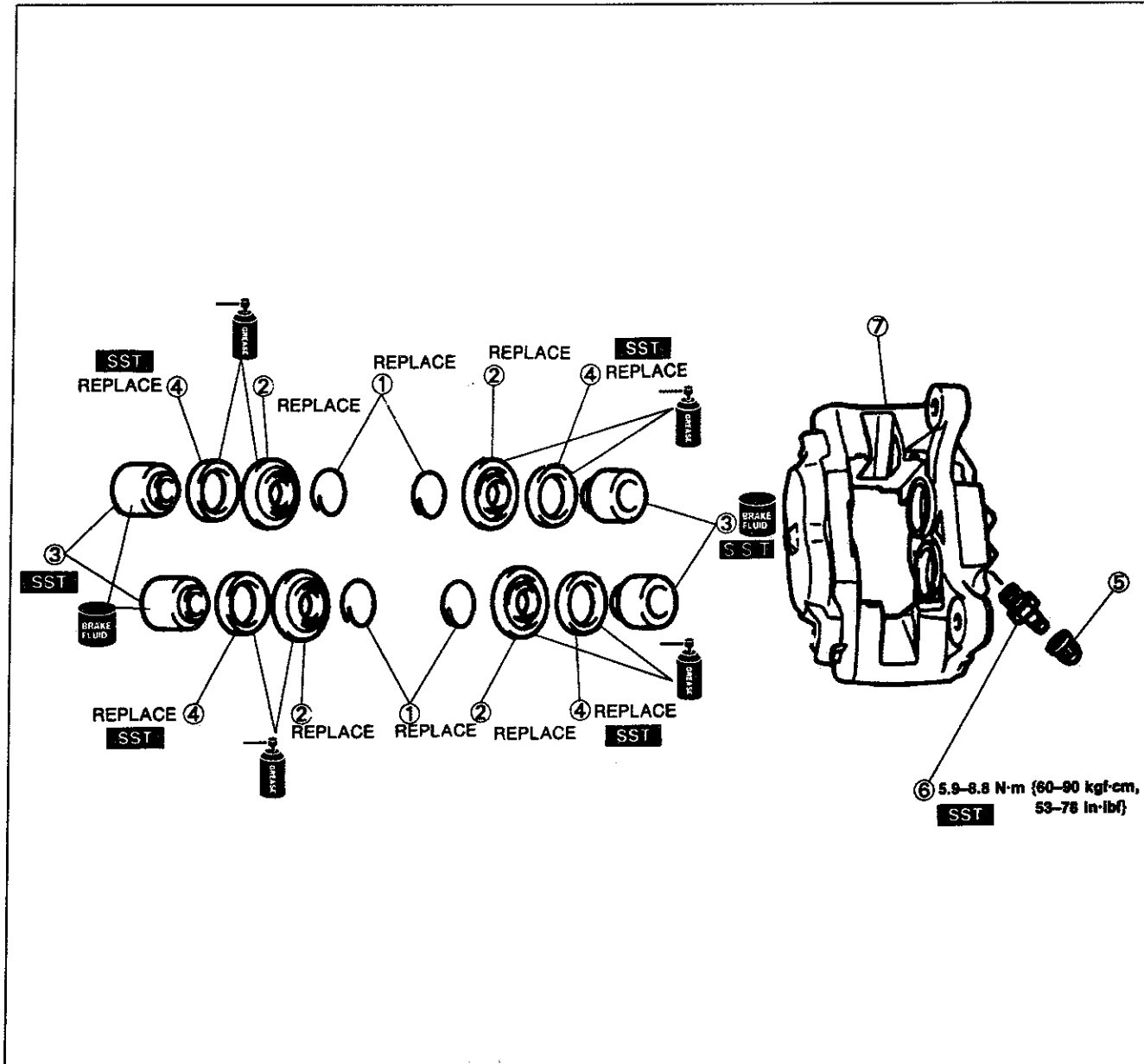
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.

**Caution**

- Loosening the caliper bridge bolts will damage the brake caliper. Do not loosen or remove the caliper bridge bolts.

2. Inspect all parts and repair or replace as necessary.

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



1. Piston ring

2. Dust boot

Inspect for wear and cracks

3. Piston

Disassembly Note

..... page P-27

Inspect for wear and cracks

4. Piston seal

Disassembly Note

..... page P-27

5. Bleeder cap

6. Bleeder screw

Disassembly Note

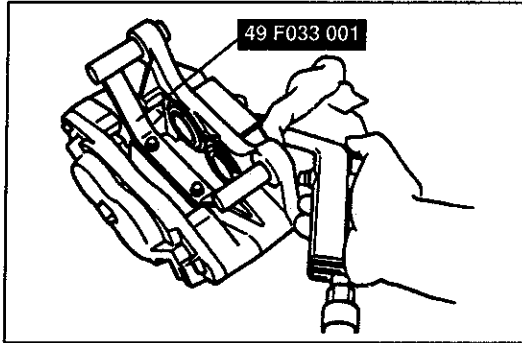
..... page P-27

Assembly Note

..... page P-27

7. Caliper body

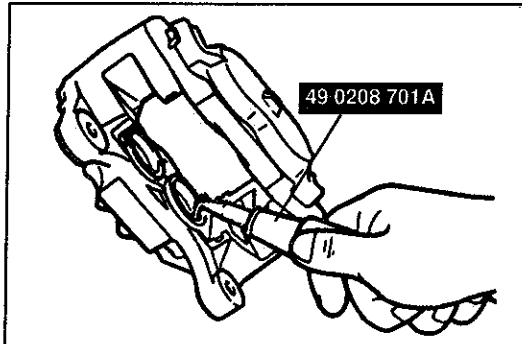
Inspect for damage and wear



## Disassembly note

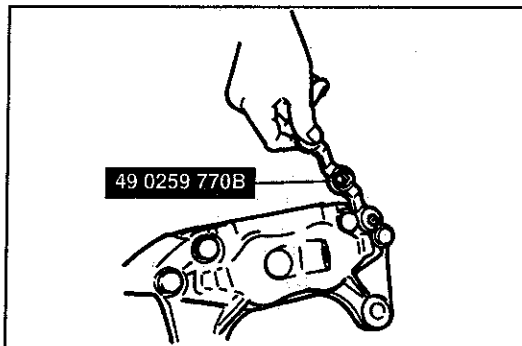
### Piston

1. Place the SST in the caliper.
2. Blow compressed air through the pipe hole to force the pistons out of the caliper.



### Piston seal

Remove the piston seal from the caliper by using the SST.



### Bleeder screw

Loosen the bleeder screw by using the SST.

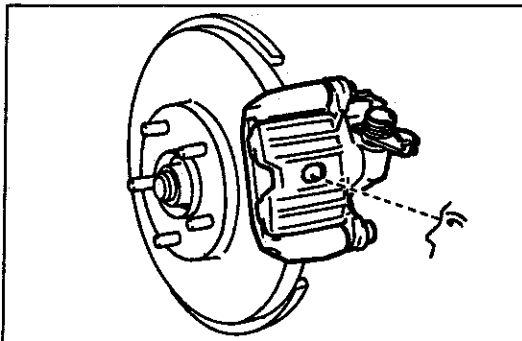
## Assembly note

### Bleeder screw

1. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination.  
(Refer to section GI "Torque Formulas".)
2. Tighten the bleeder screw by using the SST.

### Tightening torque:

5.9-9.8 N·m{60-100 kgf·cm, 53-86 in·lbf}



## REAR BRAKE (DISC)

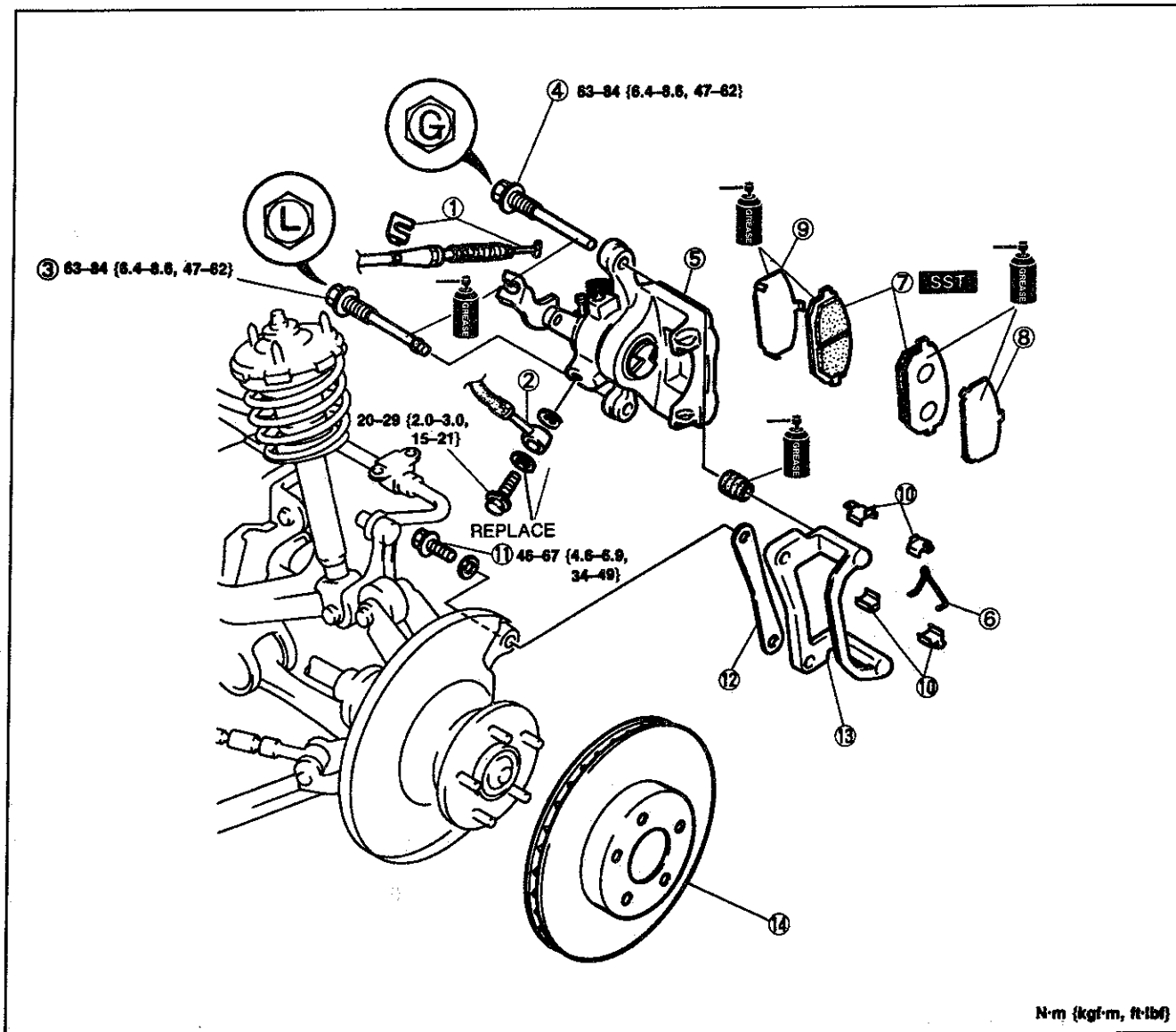
### Inspection (on-vehicle)

#### Disc pad

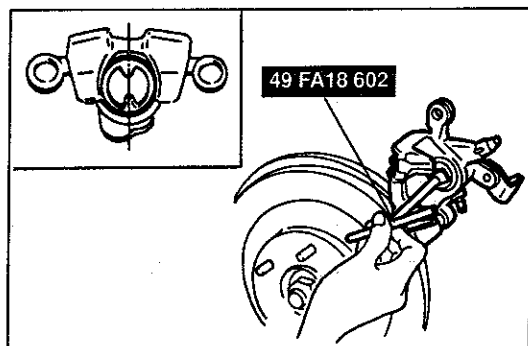
1. On level ground, jack up the rear of the vehicle and support it on safety stands.
2. Remove the wheel.
3. Look through the caliper inspection hole and inspect the remaining thickness of the pads.  
**Thickness: 1.0 mm {0.04 in} min.**
4. Replace the pads as a set (right and left wheels) if either is at or less than the minimum thickness.

**Removal / Inspection / Installation**

1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Add fluid and bleed the air. (Refer to page P-7.)
5. Check for fluid leakage. (Refer to page P-8.)
6. Depress the pedal a few times, then verify that the brakes do not drag while the wheels are rotated by hand.



- |   |  |   |
|---|--|---|
| 1. Clip and rear parking cable                                      | 6. V-spring  | 10. Pad clip                                |
| 2. Flexible brake hose<br>Inspect for damage and cracks             | 7. Disc pad<br>Inspection .... page P-27<br>Installation Note<br>..... page P-29 | 11. Bolt, washer                            |
| 3. Lock pin   | 8. Outer shim  | 12. Protector                               |
| 4. Guide pin  | 9. Inner shim  | 13. Mounting support                        |
| 5. Caliper<br>Disassembly / Inspection /<br>Assembly .... page P-31 |  | 14. Disc plate<br>Inspection .... page P-30 |



## Installation note

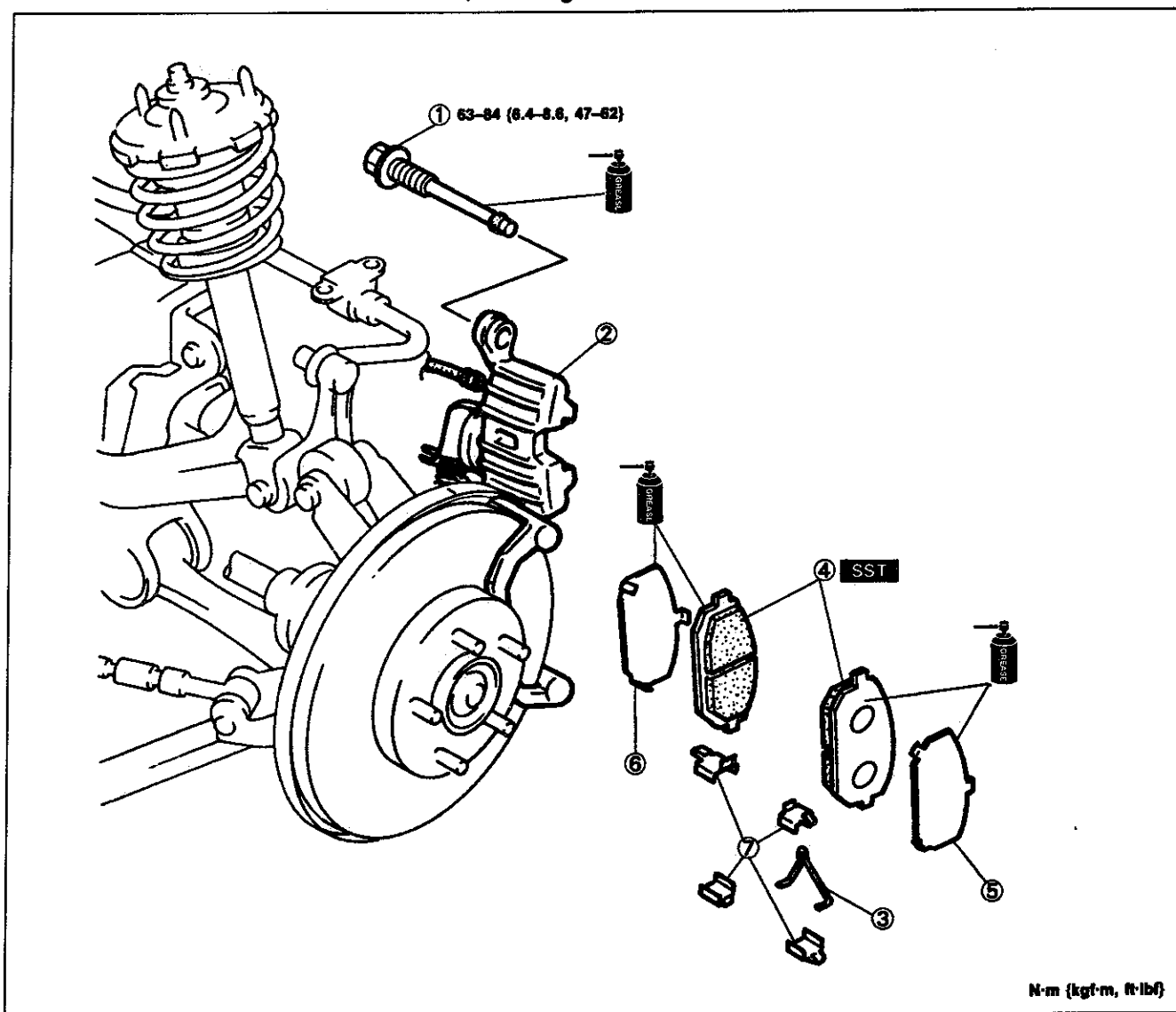
### Disc pad

1. Clean up the piston with clean brake fluid.
2. Rotate the piston clockwise by using the SST.
3. Align the piston grooves as shown in the illustration, and install the disc pads.

## DISC PAD (REAR)

### Replacement

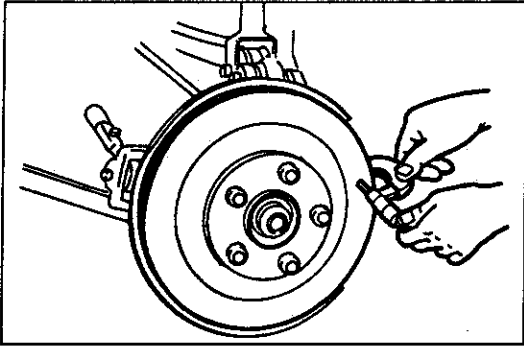
1. Disconnect the rear parking cable from the caliper.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal, referring to Installation Note.



1. Lock pin
2. Caliper
3. V-spring
4. Disc pad

5. Outer shim
6. Inner shim
7. Pad clip

Installation Note ..... above

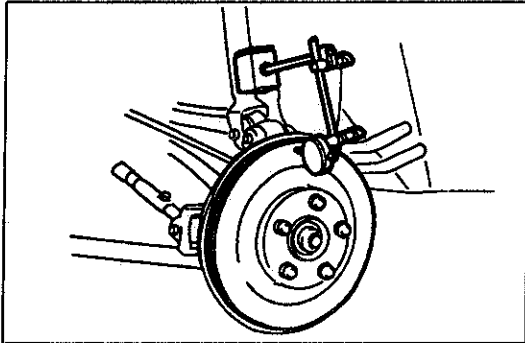
**DISC PLATE (REAR)****Inspection****Disc plate thickness**

1. Measure the thickness of the disc plate.

**Standard: 20.0 mm {0.79 in}**

**Minimum: 18.0 mm {0.71 in}**

2. If the thickness is less than minimum, replace the disc plate.

**Disc plate runout**

1. Verify that there is no looseness in the wheel bearing.
2. Measure the runout at the outer edge of the contact surface of the disc pad.

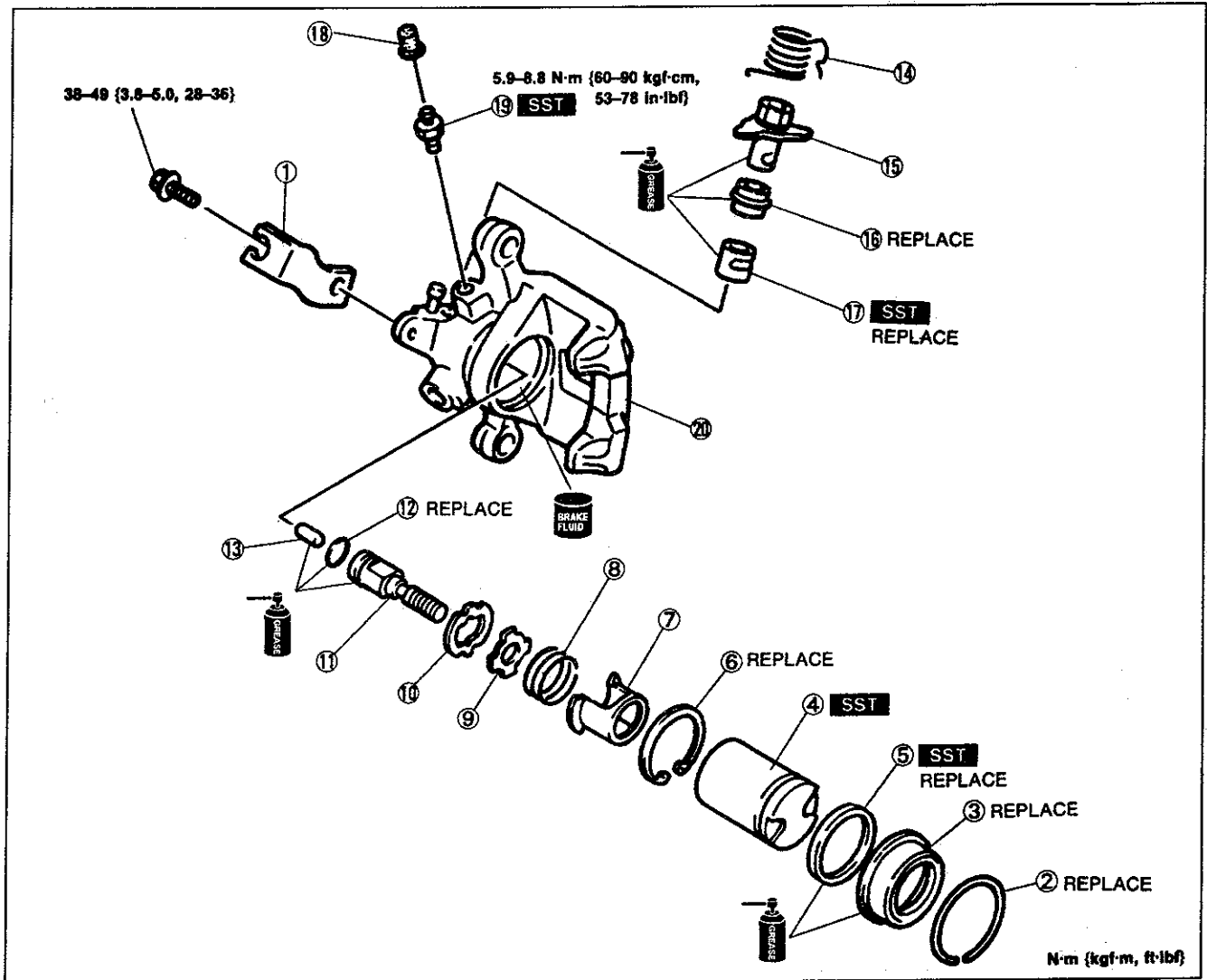
**Runout: 0.1mm {0.004 in} max.**

3. If the runout exceeds specification, repair or replace the disc plate.

## CALIPER (REAR)

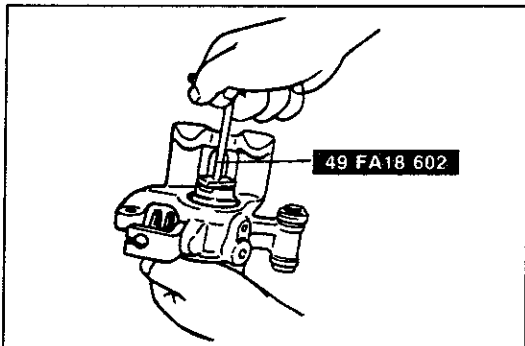
### Disassembly / Inspection / Assembly

1. Disassembly in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



- |                             |                             |                             |
|-----------------------------|-----------------------------|-----------------------------|
| 1. Cable bracket            | 7. Case cover               | 17. Bearing                 |
| 2. Retaining ring           | 8. Spring                   | Disassembly Note            |
| 3. Dust boot                | 9. Spring washer            | ..... page P-32             |
| 4. Piston                   | 10. Stopper                 | Assembly Note               |
| Disassembly Note            | 11. Adjuster spindle        | ..... page P-33             |
| ..... page P-32             | Inspect for wear and damage |                             |
| Inspect for wear and damage | 12. O-ring                  |                             |
| Assembly Note               | 13. Connecting link         |                             |
| ..... page P-33             | Inspect for wear and damage |                             |
| 5. Piston seal              | 14. Lever spring            |                             |
| Disassembly Note            | 15. Operating lever         |                             |
| ..... page P-32             | 16. Lever boot              |                             |
| 6. Snap ring                |                             |                             |
|                             |                             | 18. Bleeder cap             |
|                             |                             | 19. Bleeder screw           |
|                             |                             | Disassembly Note            |
|                             |                             | ..... page P-32             |
|                             |                             | Assembly Note               |
|                             |                             | ..... page P-32             |
|                             |                             | 20. Caliper body            |
|                             |                             | Inspect for wear and damage |

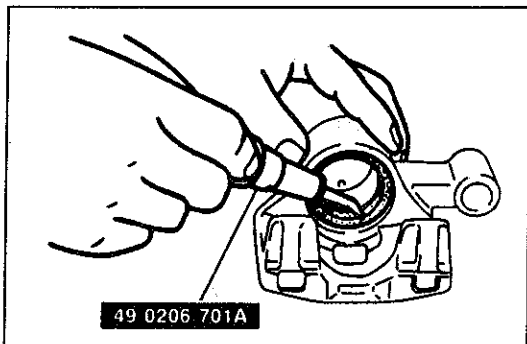




**Disassembly note**

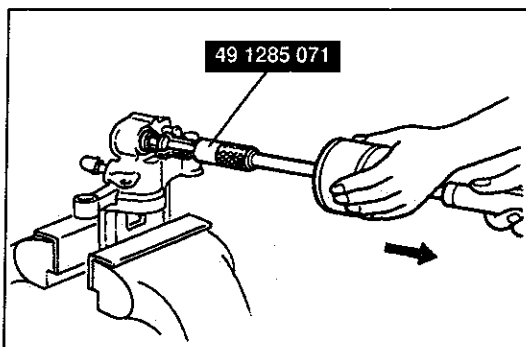
**Piston**

Remove the piston by turning the **SST** counterclockwise.



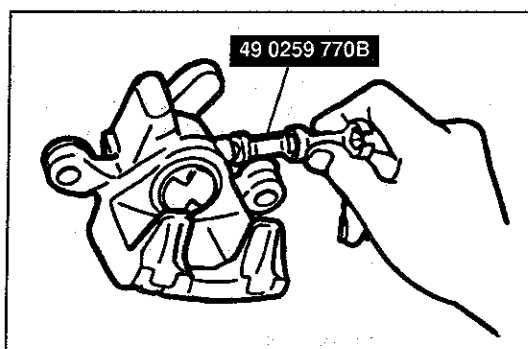
**Piston seal**

Remove the piston seal by using the **SST**.



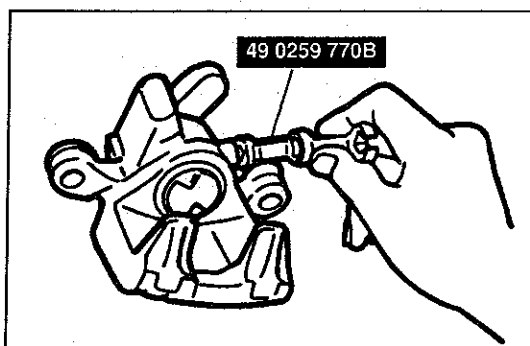
**Bearing**

1. Secure the caliper in a vise.
2. Remove the bearing from the caliper by using the **SST**.



**Bleeder screw**

Loosen the bleeder screw by using the **SST**.



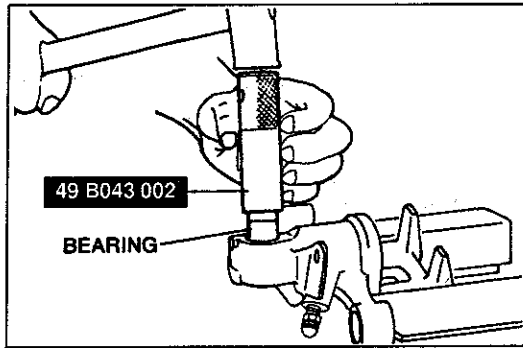
**Assembly note**

**Bleeder screw**

1. Modify the bleeder screw tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
2. Tighten the bleeder screw by using the **SST**.

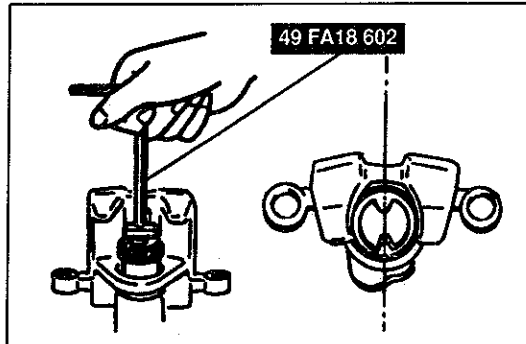
**Tightening torque:**

5.9–9.8 N·m {60–100 kgf·cm, 53–86 in·lbf}



## Bearing

Press the new bearing into the caliper with the **SST** until the **SST** bottoms against the caliper.



## Piston

1. Clean the piston with clean brake fluid.
2. Install the new dust boot in the piston groove.
3. Install the piston into the caliper body by turning the **SST** clockwise, and align the piston grooves, as shown in the illustration.
4. Fit the dust boot into the caliper body.

## PARKING BRAKE SYSTEM

### TROUBLESHOOTING GUIDE

Problem	Possible cause	Action	Page
Brakes do not release	Improper return of parking cable or improper adjustment	Repair or adjust	P-34
Parking brake does not hold well	Excessive parking brake lever stroke Parking cable stuck or damaged Brake fluid or oil on pads Hardening of pad surfaces, or poor contact	Adjust Repair or replace Clean or replace Grind or replace	P-33 P-34 P-29 P-29

## PARKING BRAKE (LEVER TYPE)

### Inspection

#### Parking brake lever stroke

1. Depress the brake pedal several times.
2. Pull and release the parking brake lever several times.
3. Verify that the stroke is within specification when the parking brake lever is pulled up with a force of **98 N {10 kgf, 22 lbf}**.

#### Stroke: 7-10 notches

4. If not within specification, adjust the parking brake lever stroke. (Refer to below.)

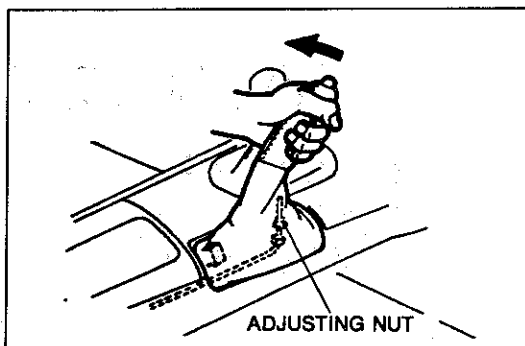
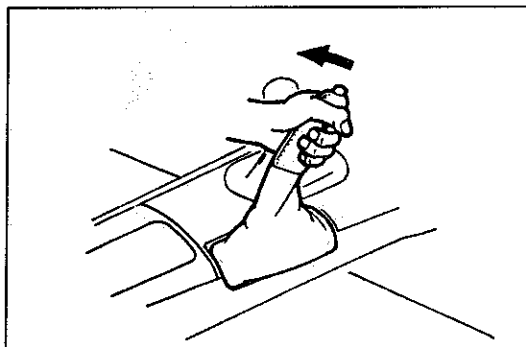
### Adjustment

#### Parking brake lever stroke

1. Depress the brake pedal several times.
2. Pull and release the parking brake lever several times.
3. Remove the console panel. (Refer to section S.)
4. Adjust the parking brake lever stroke by turning the adjusting nut.

#### Stroke: 7-10 notches

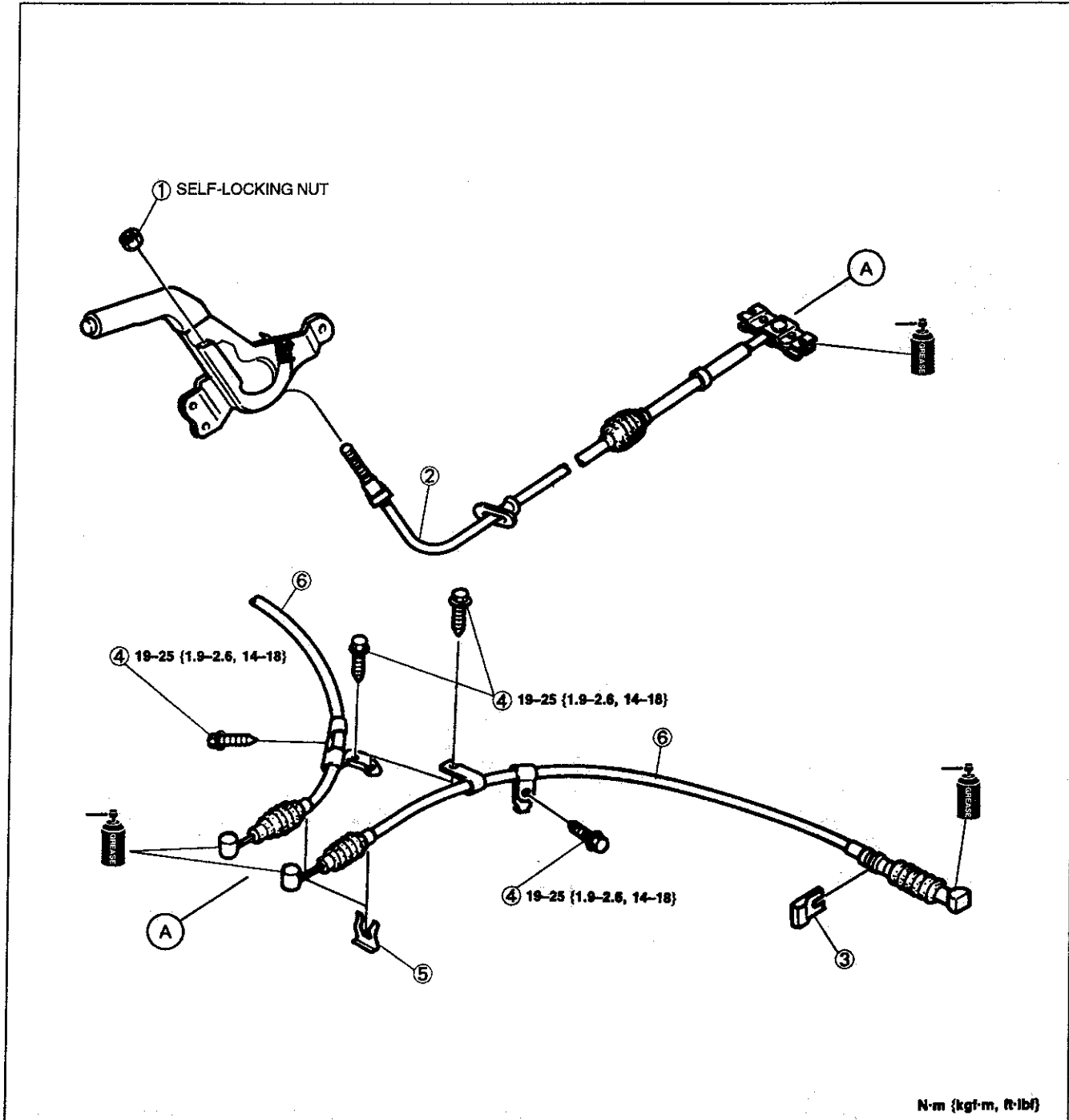
5. Pull the parking brake lever up one notch, and verify that the parking brake warning light comes on. Release the parking brake.
6. Turn the wheels by hand, and verify that the brakes do not drag.



## PARKING CABLE (LEVER TYPE)

## Removal/Inspection / Installation

1. Remove in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Install in the reverse order of removal.
4. After installation, check the parking brake lever stroke. (Refer to page P-33.)



1. Adjusting nut
2. Front parking cable  
Inspect for damage and wear

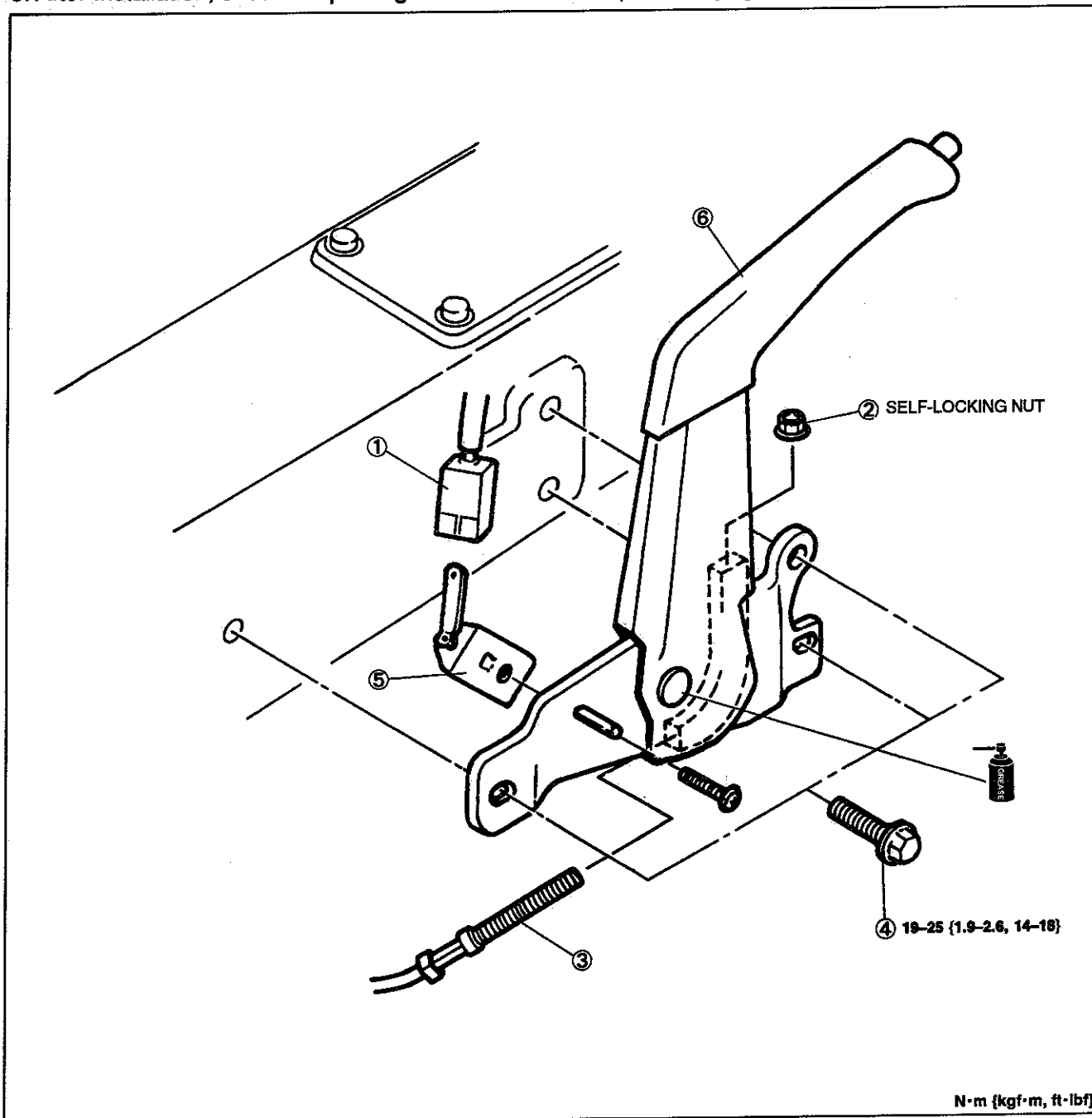
3. Clip
4. Bolt

5. Clip
6. Rear parking cable  
Inspect for damage and wear

## PARKING BRAKE LEVER

### Removal / Inspection / Installation

1. Remove the console panel. (Refer to section S.)
2. Remove the rear console. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Inspect all parts and repair or replace as necessary.
5. Install in the reverse order of removal, referring to **Installation Note**.
6. After Installation, check the parking brake lever stroke. (Refer to page P-33.)

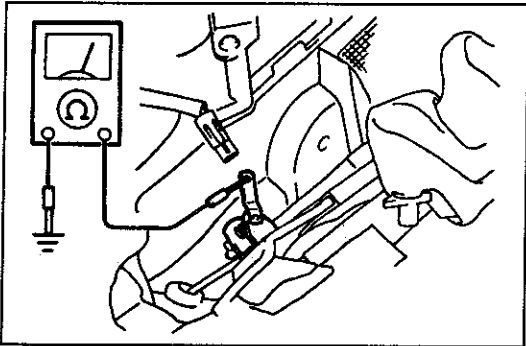


N·m {kgf·m, ft·lbf}

1. Parking brake switch connector
2. Adjusting nut
3. Front parking cable

4. Bolt
5. Parking brake switch  
Inspection .... page P-36  
Installation Note ..... page P-36

6. Parking brake lever  
Inspect for damage and bending

**Inspection****Parking brake switch**

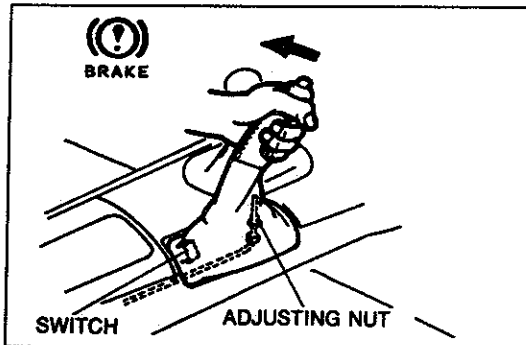
1. Remove the console panel. (Refer to section S.)
2. Disconnect the connector from the parking brake switch.
3. Pull the parking brake lever and check continuity between the terminal of the switch and a ground.

Parking brake lever	continuity
Released	No
Pulled	Yes

4. If not as specified, replace the parking brake switch.



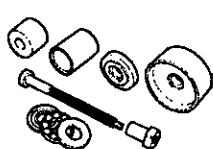
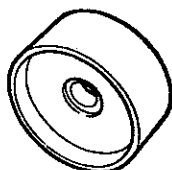
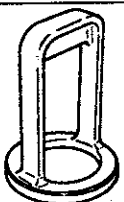
**Installation note****Parking brake switch**

1. Install the parking brake switch so that it contacts the parking brake lever when the lever is fully released.
2. Turn the ignition switch ON, and check that the parking brake warning lamp illuminates with the lever is pulled up one notch.



## ANTILOCK BRAKE SYSTEM (ABS)

### PREPARATION SST

<p>49 H066 003</p> <p>Harness, adapter</p> 	<p>For connecting ABS tester</p>	<p>49 0259 770B</p> <p>Wrench, flare nut</p> 	<p>For removal / installation of brake pipe</p>
<p>49 H028 2A0</p> <p>Set, rubber bushing replacer</p> 	<p>For installation of sensor rotor (front)</p>	<p>49 H028 204</p> <p>Attachment (Part of 49 H028 2A0)</p> 	<p>For installation of sensor rotor (front)</p>
<p>49 F026 104</p> <p>Installer, sensor rotor</p> 	<p>For installation of sensor rotor (rear)</p>		

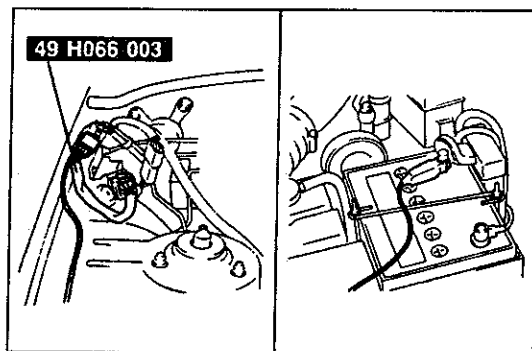
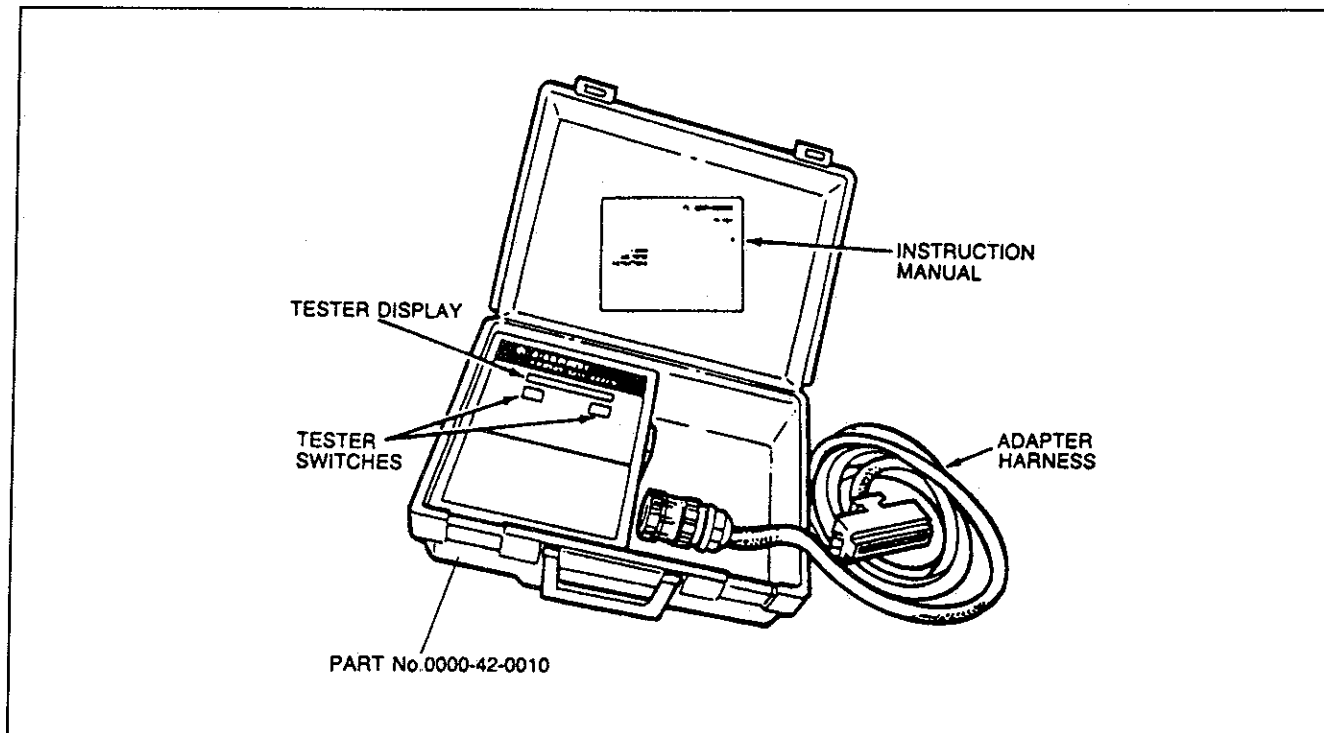
## TROUBLESHOOTING GUIDE

### Outline

The ABS tester is used to locate the cause of a problem within the antilock brake system by retaining and reducing the hydraulic fluid pressure in the hydraulic unit.

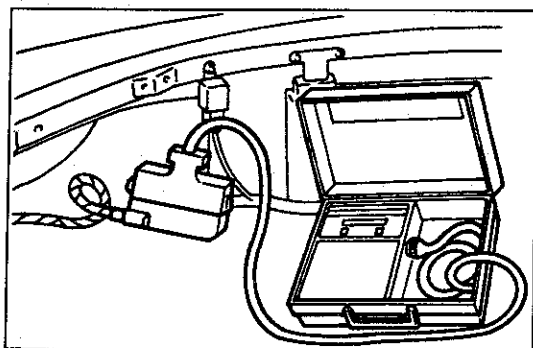
Because there is no way to check the ABS control unit itself, replace the control unit assembly only after first confirming that the other electrical parts are not malfunctioning.

### ABS tester



### Connecting the ABS tester

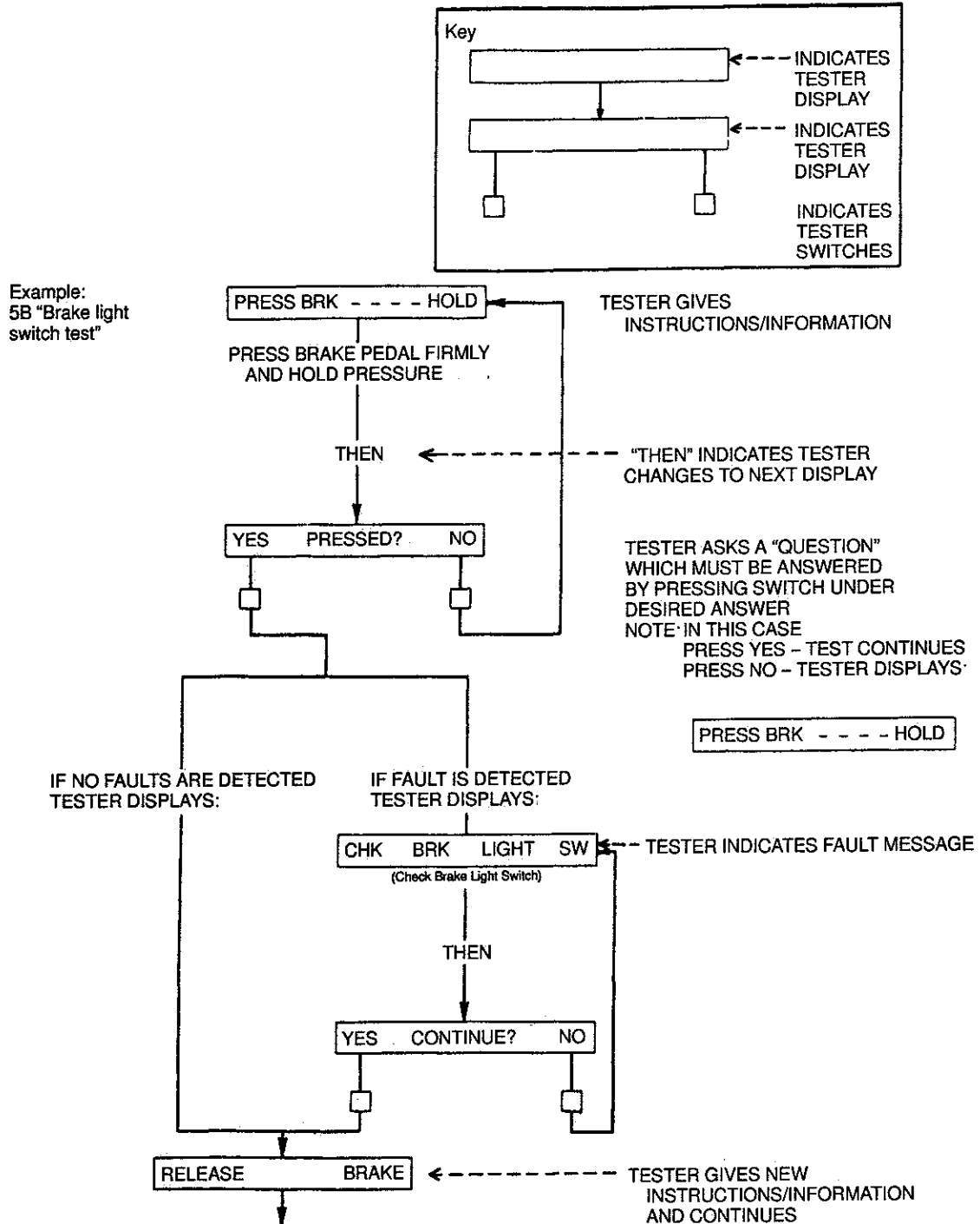
1. Turn the ignition switch OFF.
2. Connect the SST between the hydraulic unit wiring harness connectors, and to the positive battery terminal.



3. Remove the trunk side trim.
4. Remove the ABS control unit.
5. Disconnect the control unit connector and connect the ABS tester to the control unit connector at the harness side.

## Explanation of instruction procedure

### EXPLANATION OF INSTRUCTION PROCEDURE



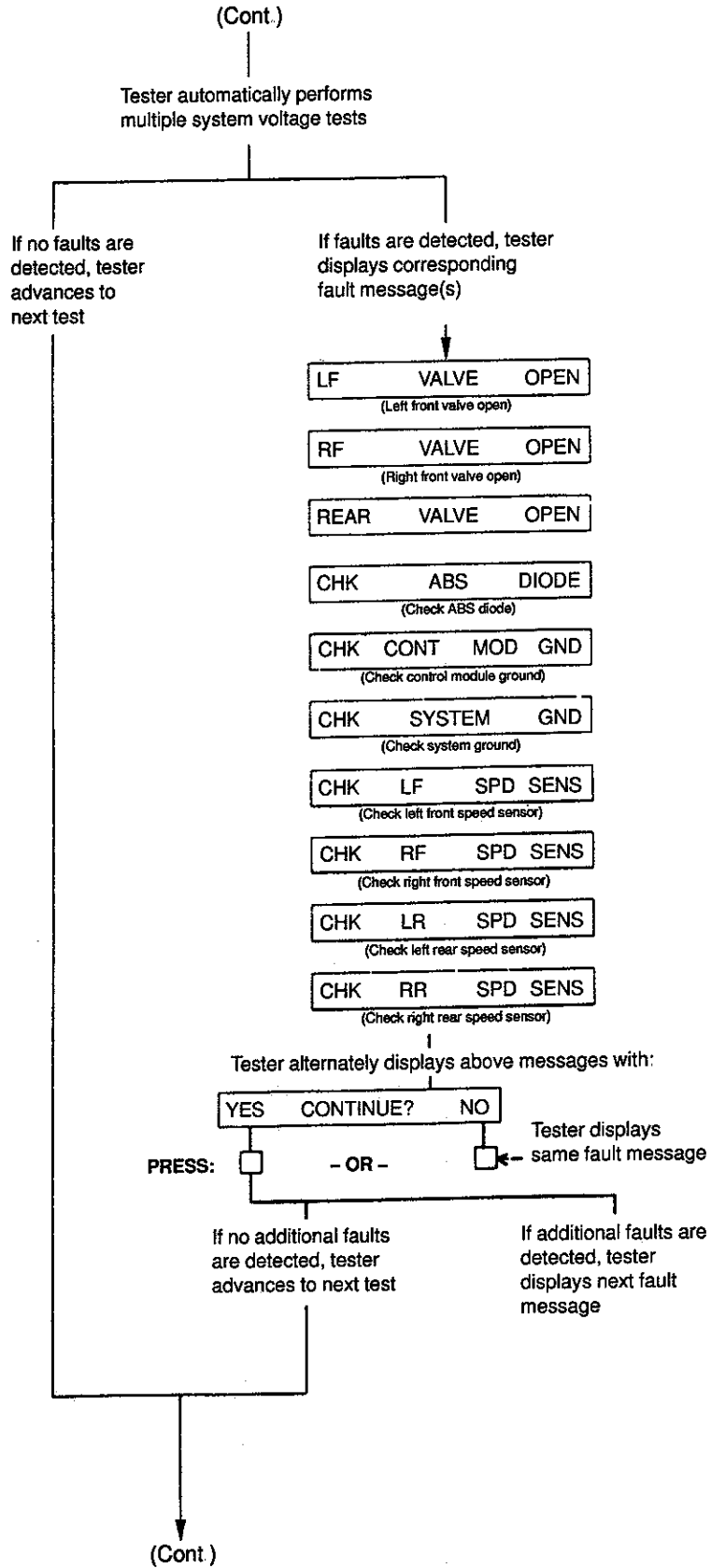


### Troubleshooting procedure

ITEM	
<b>1. CONNECTION / POWER ON</b>	<ol style="list-style-type: none"> <li>1. Locate ABS control unit.</li> <li>2. Disconnect control unit harness connector from control unit.</li> <li>3. Connect ABS tester harness to control unit harness connector</li> <li>4. Turn ignition key to ON position</li> </ol>
<b>2. ALTERNATOR TEST</b> • Start engine	<p>Tester rapidly displays several messages during initial segment check.</p> <pre>           graph TD             THEN --&gt; MAZDA_ABS2_TEST[MAZDA ABS 2 TEST]             MAZDA_ABS2_TEST --&gt; YES_ENG_RUN{YES ENG RUN? NO}             YES_ENG_RUN -- YES --&gt; MAZDA_ALT_TEST[MAZDA ALT TEST]             YES_ENG_RUN -- NO --&gt; NO_FAULT[No fault detected]             MAZDA_ALT_TEST --&gt; CHK_ALTERNATOR[CHK ALTERNATOR]             CHK_ALTERNATOR --&gt; YES_CONTINUE{YES CONTINUE? NO}             YES_CONTINUE -- YES --&gt; TURN_OFF_ENGINE[TURN OFF ENGINE]             YES_CONTINUE -- NO --&gt; NO_FAULT             NO_FAULT --&gt; TURN_OFF_ENGINE           </pre>
<b>3. ABS SYSTEM TEST</b> • Turn ignition key ON (Do not run engine)	<p>Tester rapidly displays several messages during initial segment check.</p> <pre>           graph TD             THEN --&gt; YES_ENG_RUN{YES ENG RUN? NO}             YES_ENG_RUN -- YES --&gt; MAZDA_ABS2_TEST[MAZDA ABS 2 TEST]             YES_ENG_RUN -- NO --&gt; CONT[Cont.]             MAZDA_ABS2_TEST --&gt; CONT           </pre>

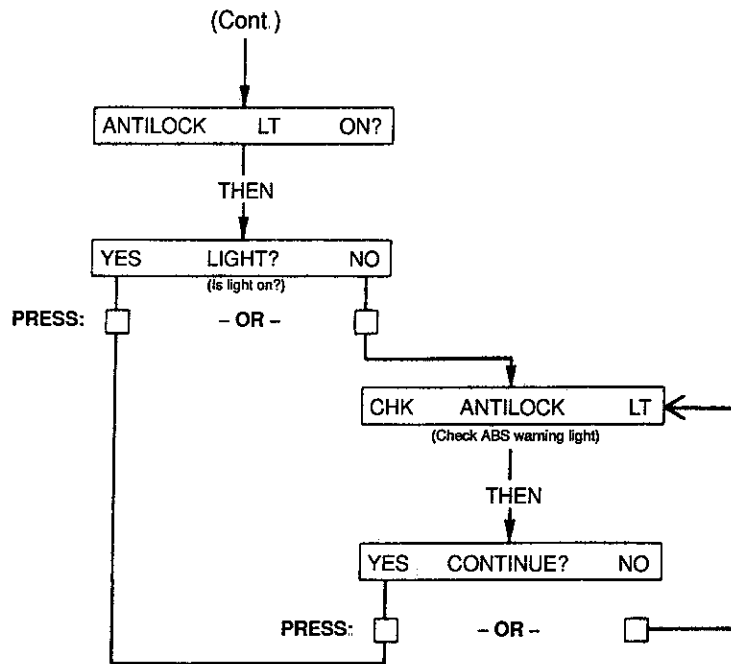
## 4. SYSTEM VOLTAGE CHECKS

- If tester displays a fault message, check and repair or replace parts as necessary.

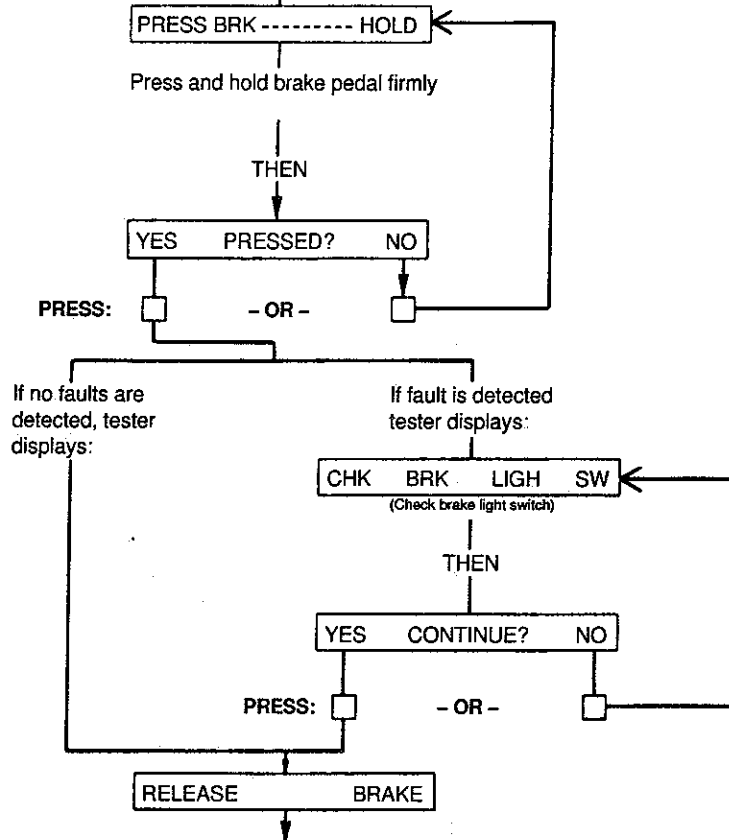


# ANTILOCK BRAKE SYSTEM (ABS)

## 5. STATIC TESTS 5A ABS WARNING LIGHT TEST



## 5B. BRAKE LIGHT SWITCH TEST





## 6. DYNAMIC TESTS

### 6A WHEEL SELECTION OR EXIT

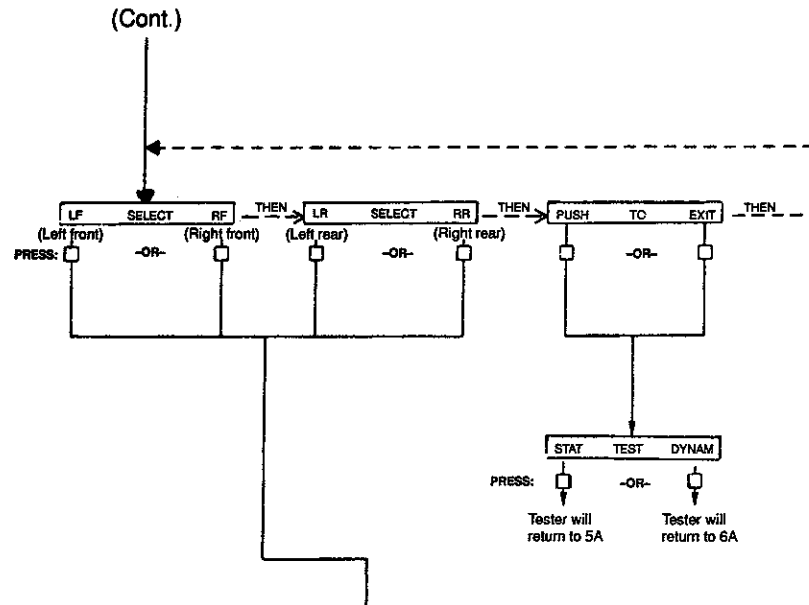
Each messages will displayed  
3-1/2 seconds  
Select one  
wheel to begin dynamic test  
sequence

**OR**

Press either switch under "PUSH  
TO EXIT" to return to "STAT  
TEST DYNAM" selection

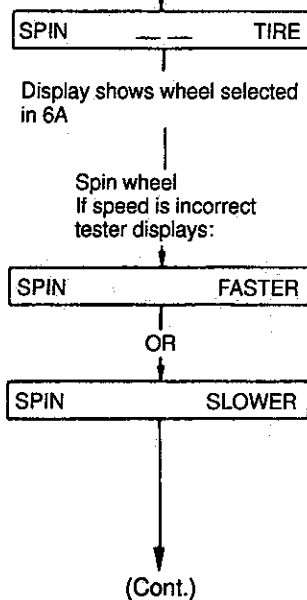
**IMPORTANT:**

After completing testing of selected wheel return to 6A "WHEEL SELECTION," to select another wheel  
Complete test procedures for all four wheels



On level ground, jack up the vehicle and support it evenly on safety stands.  
An extra person will be needed to spin wheels during the test.

## 6B WHEEL SENSOR TEST

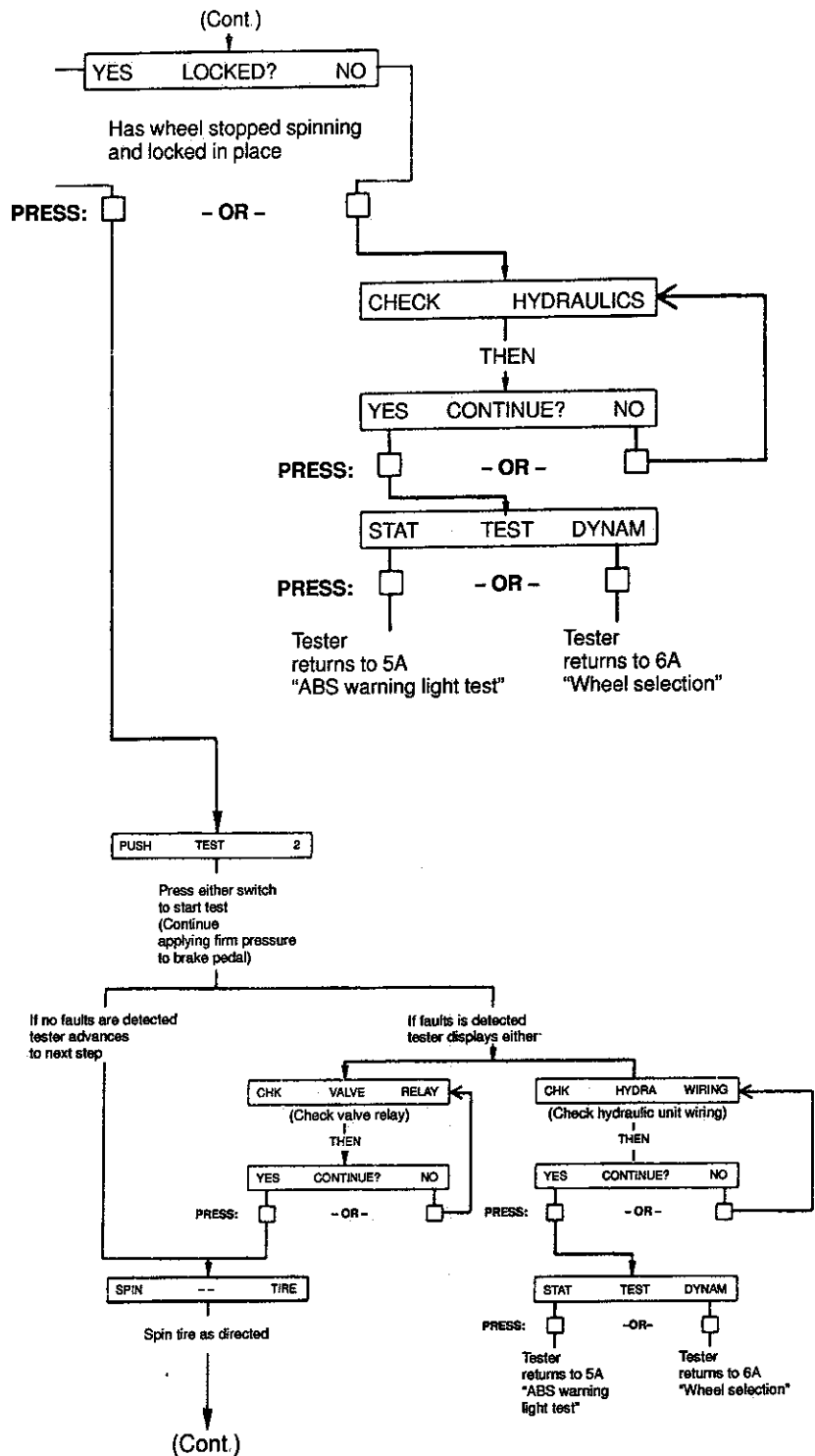




```

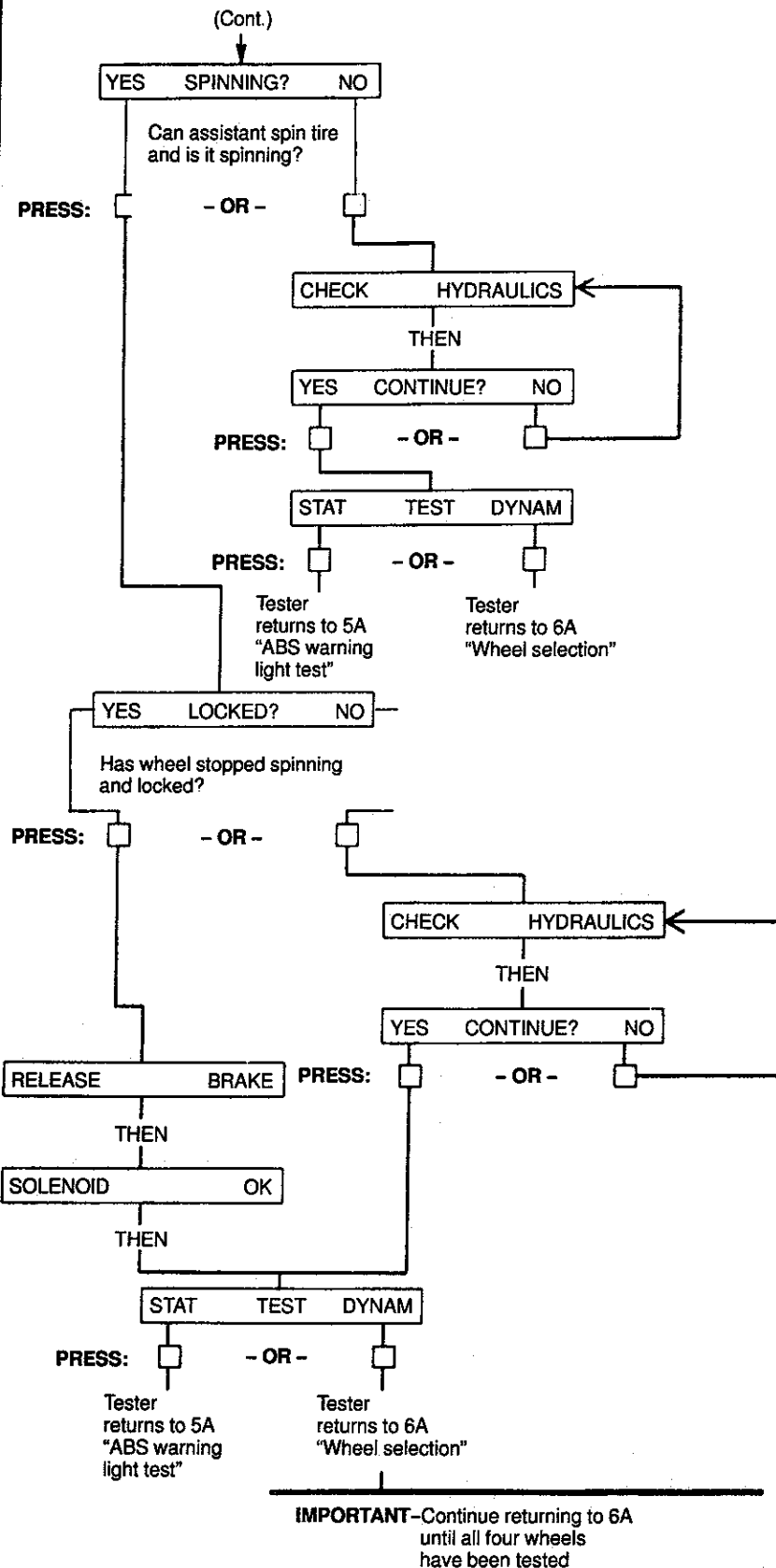
graph TD
    Start(( )) --> NoFaults[If no faults are detected  
tester advances  
to next step.]
    Start --> FaultDetected[If fault is detected  
tester displays either:]
    
    FaultDetected --> ValveRelay[CHK VALVE RELAY  
(Check valve relay)]
    FaultDetected --> HydraWiring[CHK HYDRA WIRING  
(Check hydraulic unit wiring)]
    
    ValveRelay --> ValveContinue{YES CONTINUE? NO}
    ValveContinue -- YES --> ValvePress[PRESS: ]
    ValveContinue -- NO --> ValvePress
    
    HydraWiring --> HydraContinue{YES CONTINUE? NO}
    HydraContinue -- YES --> HydraPress[PRESS: ]
    HydraContinue -- NO --> HydraPress
    
    ValvePress --> Pressed{YES PRESSED? NO}
    Pressed -- YES --> Spin[SPIN]
    Pressed -- NO --> Pressed
    
    HydraPress --> HydraStat[STAT TEST DYNAM]
    HydraStat --> HydraPress
    
    Spin --> SpinDir[Spin tire as directed]
    SpinDir --> Spinning{YES SPINNING? NO}
    
    Spinning -- YES --> CanSpin[Can assistant spin tire and  
is it spinning?]
    CanSpin --> CanSpinPress[PRESS: ]
    CanSpinPress --> CanSpinPress
    
    Spinning -- NO --> CanSpinPress
    
    CanSpinPress --> CheckHydraulics[CHECK HYDRAULICS]
    CheckHydraulics --> CheckContinue{YES CONTINUE? NO}
    CheckContinue -- YES --> CheckPress[PRESS: ]
    CheckContinue -- NO --> CheckPress
    
    CheckPress --> CheckStat[STAT TEST DYNAM]
    CheckStat --> CheckPress
    
    CheckStat --> Return5A[Tester returns to 5A  
"ABS warning light test"]
    CheckStat --> Return6A[Tester returns to 6A  
"Wheel selection"]
    
    CanSpinPress --> End(( ))
    Return5A --> End
    Return6A --> End
  
```

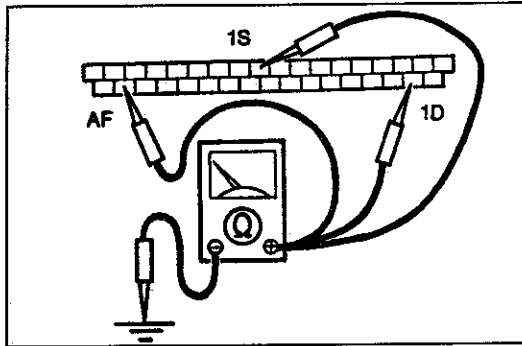
## 6C SOLENOID TEST





## 6C SOLENOID TEST





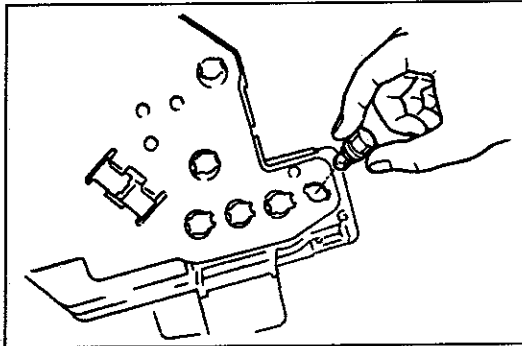
## Inspection of ABS system

### Check system ground

Check for an open circuit in (B) wire from terminals 1D, 1S, and AF of the ABS control unit O-01 connector and ground.

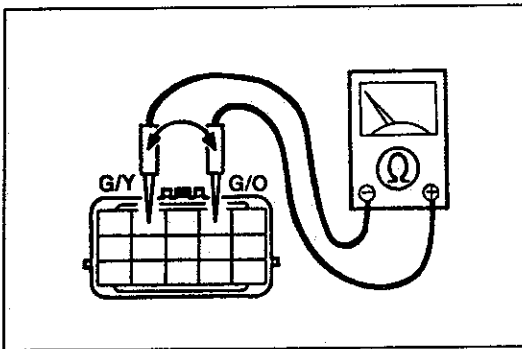
### Caution

- To prevent damage to the terminals, create a probe by wrapping a thin wire around the tester lead before inserting.



## Check antilock warning light

1. Remove the switch assembly. (Refer to 1994 RX-7 body electrical troubleshooting manual section Z4.)
2. Remove and check the ABS warning light bulb.
3. If a problem is found, replace the bulb.
4. If OK repair or replace the wiring harness. (Battery-ABS control unit-ABS warning light)



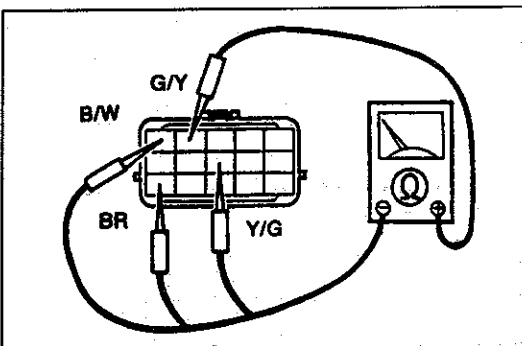
## Check ABS diode

1. Check the wiring harness between the warning light and the control unit and hydraulic unit. Repair if necessary.
2. Disconnect the hydraulic unit O-02 connector.
3. Using an ohmmeter, check for continuity between the terminals of the connector (hydraulic unit side).

Terminal	
(G/O)	(G/Y)
○	○

○-○ Continuity

4. If continuity is not specified, replace the hydraulic unit.

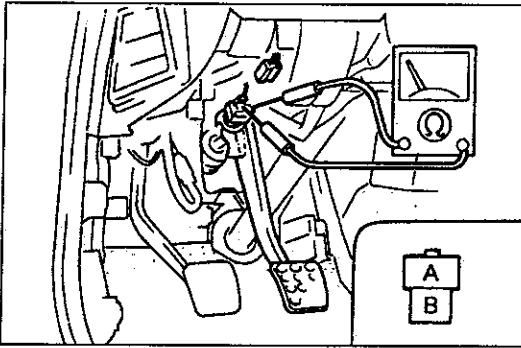


## Check front and rear valves

1. Disconnect the negative battery cable.
2. Disconnect the hydraulic unit O-02 connector.
3. Check for continuity between terminals of the connector (hydraulic unit side).

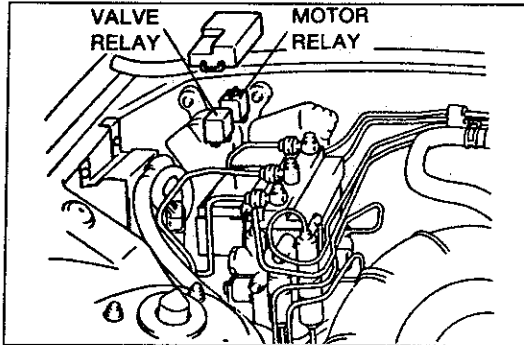
Wire		Continuity
(G/Y)	(Y/G)	Yes
	(BR)	Yes
	(B/W)	Yes

4. If not as specified, replace the hydraulic unit.



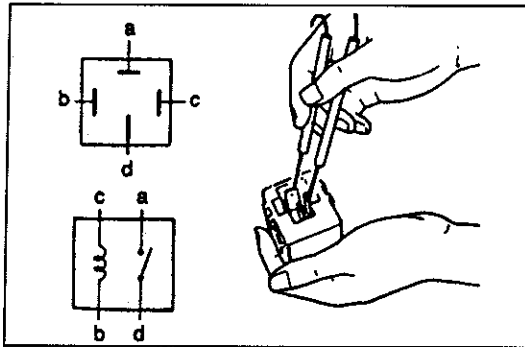
### Check stoplight switch

1. Disconnect the stoplight switch connector.
2. Connect an ohmmeter between terminals of the switch.
3. Verify that there is continuity between the terminals when the brake pedal is depressed.
4. If there is no continuity, replace or adjust the stoplight switch.



### Check motor relay

1. Disconnect the negative battery cable.
2. Remove the motor relay.



3. Using an ohmmeter, check continuity between terminals of the relay.

Connect to		a	b	c	d
12V	Ground				
—	—		○	○	
c	b	○			○

○—○: Continuity

4. If continuity is not as specified, replace the motor relay.

### Check pump motor

1. Disconnect the hydraulic unit O-03 connector.
2. Measure the voltage between wire (B/L) and a ground.

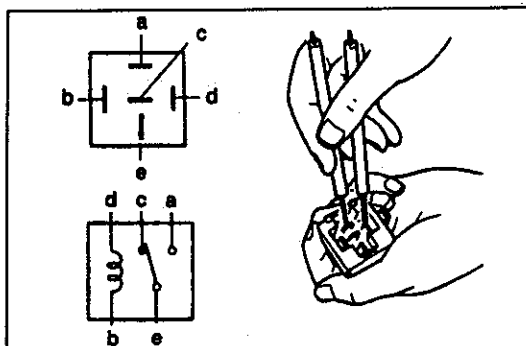
Wire	Voltage
(B/L)	Battery positive voltage

3. If not as specified, check the fuse (MAIN and ABS 60A) and repair or replace the wiring harness (battery-hydraulic unit).

4. If as specified, check for continuity between wire (G) of O-03 connector and a ground (hydraulic unit side).

Wire	Continuity
(R/Y)	Yes

5. If there is no continuity, replace the hydraulic unit.



## Check valve relay

1. Disconnect the negative battery cable.
2. Remove the valve relay.
3. Using an ohmmeter, check for continuity between terminals of the relay.

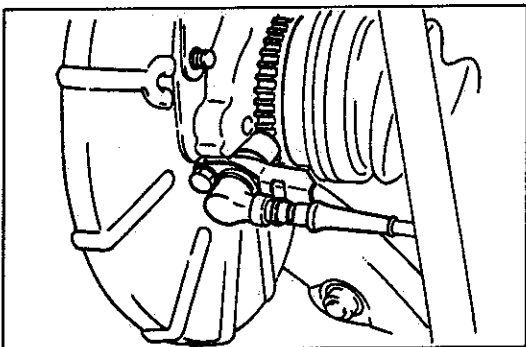
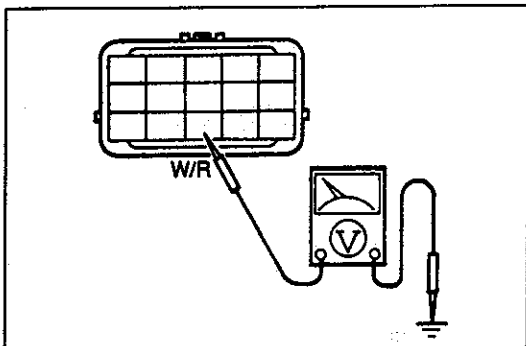
Connect to		a	b	c	d	e
12V	Ground					
—	—		○	○	○	○
b	d	○				○

○—○: Continuity

4. If continuity is not as specified, replace the valve relay.
5. If as specified, connect the negative battery cable.
6. Disconnect the hydraulic unit O-02 connector.
7. Measure voltage between wire (W/R) of O-02 connector and ground.

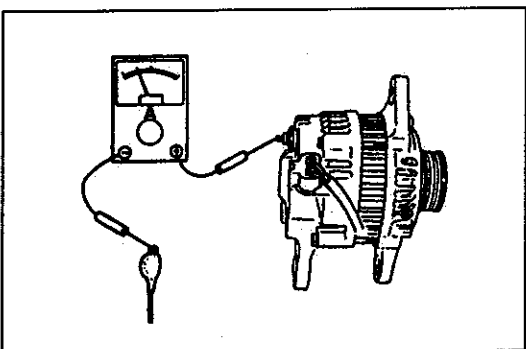
Wire	Voltage
(W/R)	Battery positive voltage

8. If not as specified, check the fuse (MAIN and ABS 15A) and repair or replace the wiring harness (battery-hydraulic unit).



## Check rotor

1. Check the rotor for looseness and missing or damaged teeth.
2. Replace if necessary.



## Check alternator

Refer to section G.

### Check wheel-speed sensor

1. Disconnect the O-01 connector.
2. Using an ohmmeter, check for continuity between the ABS control unit O-01 connector terminals.

Sensor \ Terminal	1K	1G	1O	1Q	1U	1F	1L	1P
Left front	○	○						
Right front					○	○		
Left rear			○	○				
Right rear							○	○

○-○ Continuity

2. If the continuity is not as specified, repair the wiring harness (wheel-speed sensor-ABS control unit).
3. If continuity is as specified, check voltage between the following terminals while rotating the wheel one rotation per second by hand.

Sensor	Terminal	Voltage
Left front	1K and 1G	50-60 mV*
Right front	1U and 1F	50-60 mV*
Left rear	1O and 1Q	50-60 mV*
Right rear	1L and 1P	50-60 mV*

\*Alternating current voltage

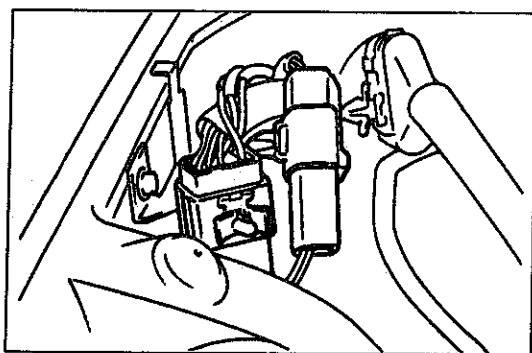
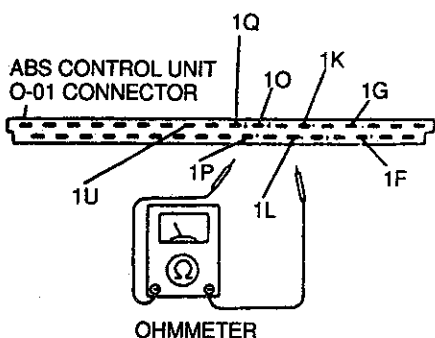
4. If voltage is not as specified, replace the wheel-speed sensor.
5. If voltage is as specified, replace the ABS control unit.

### Check hydraulics

Verify that all brake fluid line connections are tight and that no fluid is leaking.

### Check hydraulic unit wiring

1. Verify that the hydraulic unit connectors are properly secured.
2. Verify that the valve relay and motor relay are properly secured.





### Electrical diagnosis support Hydraulic Unit (HU)

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Valve relay, motor relay and solenoid valve-ABS CU	System shut down ↓ Normal braking	System shut down ↓ Normal braking	NA
HU-Fuse-Battery	System shut down ↓ Normal braking	System shut down ↓ Normal braking Fuse (ABS) burns out	NA
Motor-Ground	System shut down ↓ Normal braking	No symptom	System shut down ↓ Normal braking
O-02 connector (B) -Ground	ABS warning light does not illuminate when ABS CU disconnected	No symptom	ABS warning light does not illuminate when ABS CU disconnected
HU-ABS warning light	ABS warning light does not illuminate when ABS CU disconnected	ABS warning light illuminates continuously	NA

### Wheel-speed sensor

Circuit	Condition		
	Open circuit	Short circuit	Poor ground
Wheel speed sensor-ABS CU	Partial control	Partial control	NA

Partial control: If failure occurs during ABS operation, system is controlled by remaining sensors until ABS cycle is completed, then system is shut down.

NA: Not applicable

## ABS Control Unit (ABS CU)

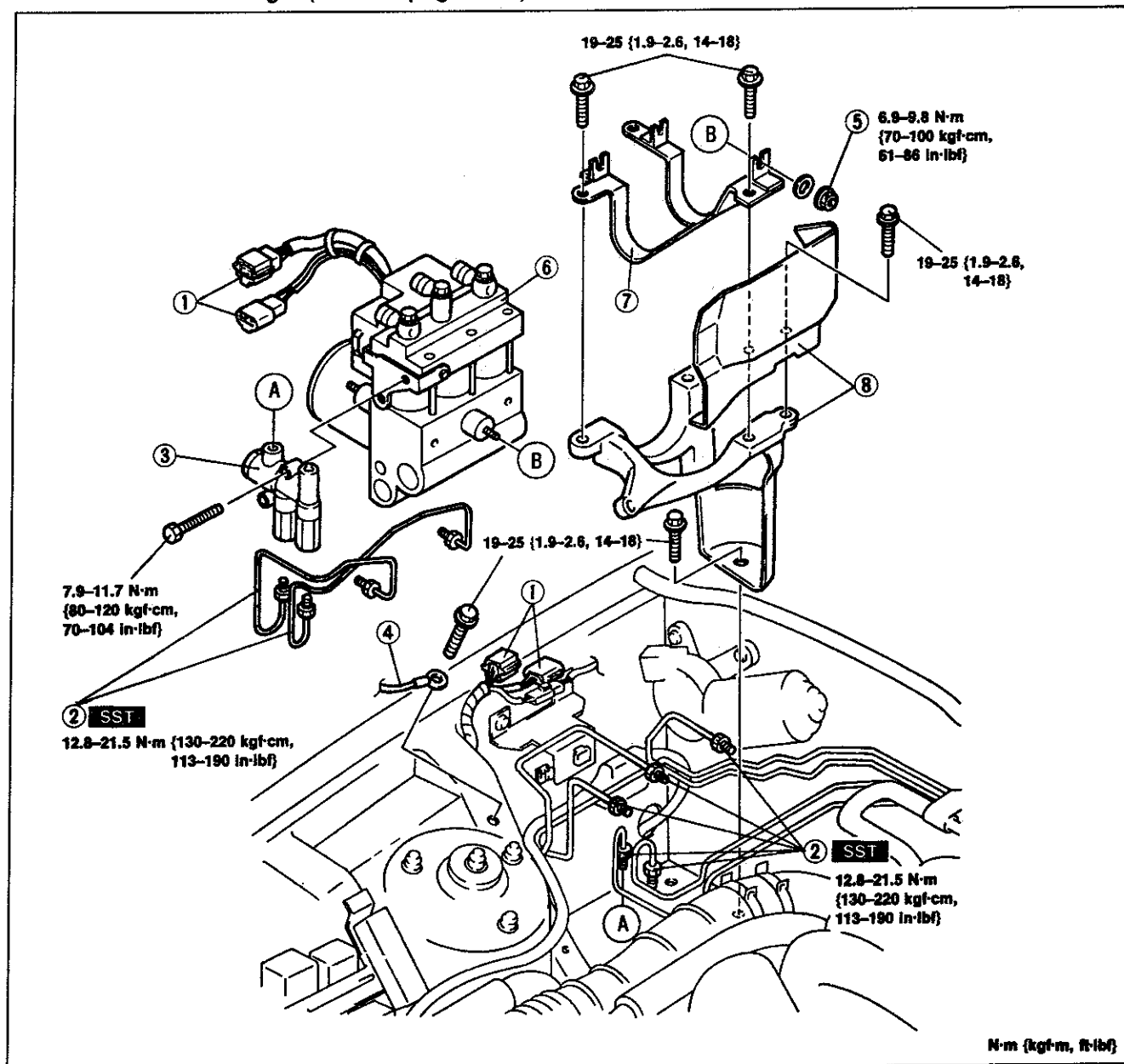
Circuit	Condition		
	Open circuit	Short circuit	Poor ground
ABS CU-Ignition switch-Battery	System shut down ↓ Normal braking	System shut down ↓ Normal braking Fuse (AIR CON 15A) burns out	NA
ABS CU-Stoplight switch-Battery	ABS controllability slightly down on low coefficient road, but no other effects	ABS controllability slightly down on low coefficient road, but no other effects Fuse (STOP 20A) burns out	NA
ABS CU-Alternator	ABS warning light remains illuminated after engine started ABS control normal	ABS warning light remains illuminated after engine started ABS control normal	NA
ABS CU-Ground	If all ground harnesses are open, system shut down	No symptom	If all ground harnesses are open, system shut down
ABS CU-ABS warning light	ABS warning light does not illuminate when ABS CU disconnected ABS warning light does not illuminate when ignition switch is ON and system has been shut down	ABS warning light illuminates continuously	NA

NA: Not applicable



**HYDRAULIC UNIT****Removal / Installation**

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. The only serviceable parts of the hydraulic unit are the valve relay and the motor relay, if there is a failure of any other part, replace the hydraulic unit assembly.
4. Install in the reverse order of removal, referring to **Installation Note**.
5. Add fluid and bleed the air. (Refer to page P-7.)
6. Check for fluid leakage. (Refer to page P-8.)



1. Connector

2. Brake pipe

Removal Note

..... page P-57

Installation Note

..... page P-57

3. Proportioning bypass valve

4. Ground wire

5. Nut

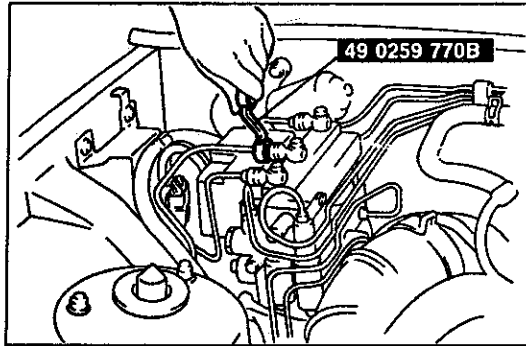
6. Hydraulic unit

Disassembly / Inspection /

Assembly .... page P-58

7. ABS bracket

8. Insulator and bracket



## Removal / note Brake pipe

### Caution

- Brake fluid will damage painted surfaces. If brake fluid does get on a painted surface, wipe it off immediately.

Loosen the brake pipe by using the SST.

## Installation note Brake pipe

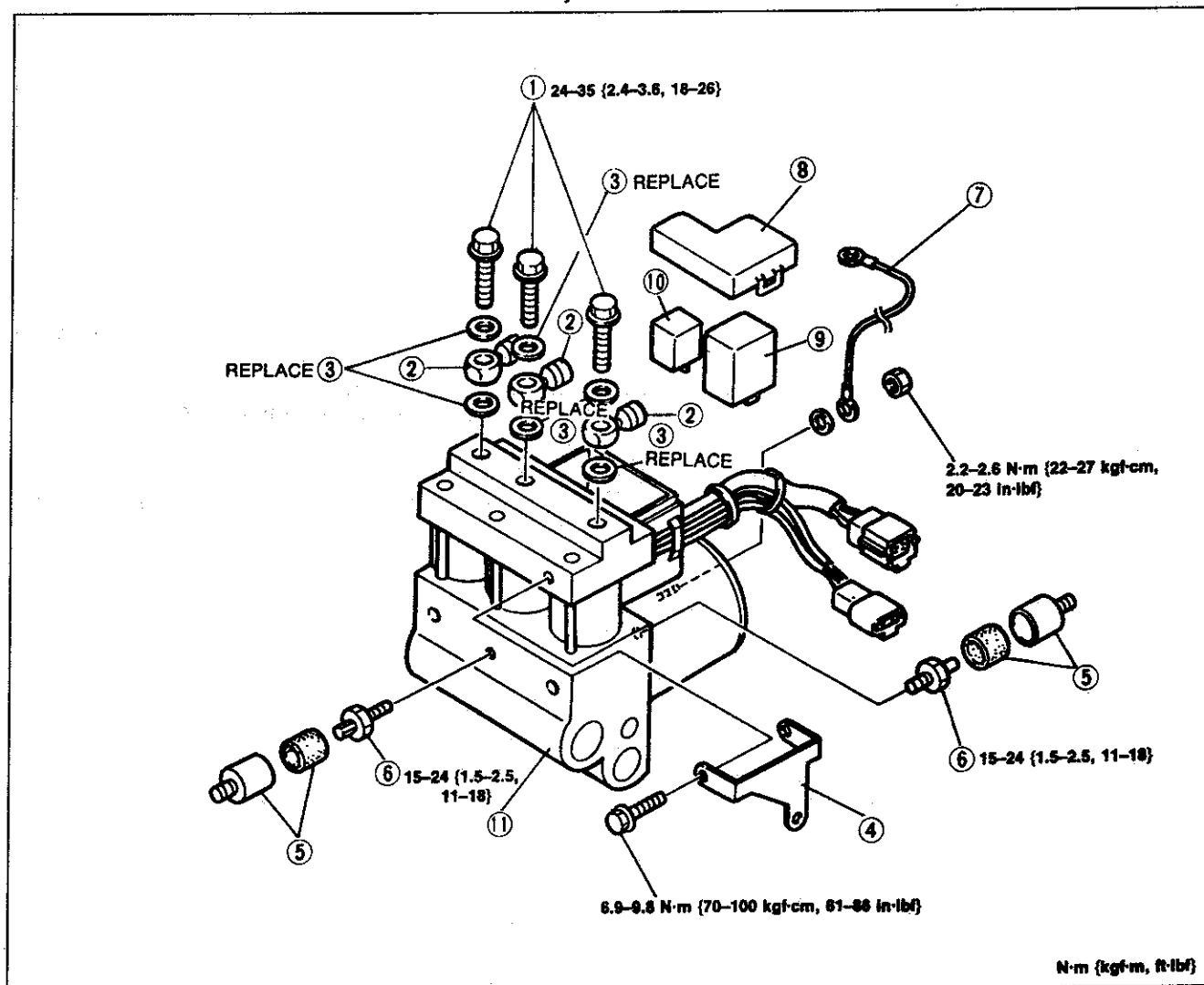
1. Modify the brake pipe flare nut tightening torque to allow for use of a torque wrench-SST combination. (Refer to section GI "Torque Formulas".)
2. Tighten the brake pipes by using the SST.

### Tightening torque:

12.8–21.5 N·m{130–220 kgf·cm, 113–190 in·lbf}

**Disassembly / Inspection / Assembly**

1. Disassemble in the order shown in the figure.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly.



1. Connector bolt
2. Pipe joint
3. Gasket
4. Proportioning bypass valve holder

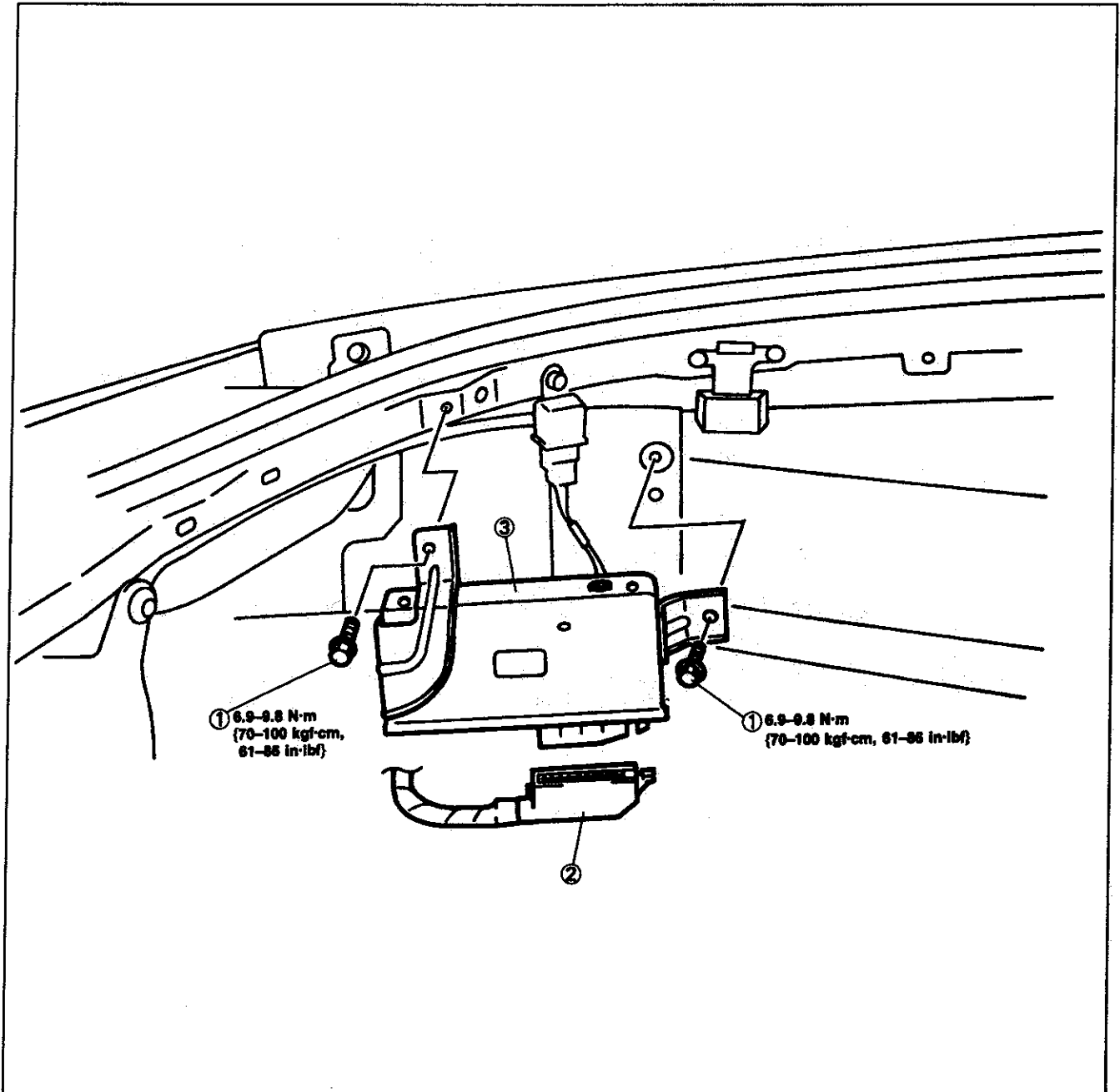
5. Casing and mount rubber
6. Hex stud
7. Ground wire
8. Cover

9. Motor relay  
Inspection .... page P-64
10. Valve relay  
Inspection .... page P-64
11. Hydraulic unit

## ABS CONTROL UNIT

### Removal / Installation

1. Disconnect the negative battery cable.
2. Remove the luggage compartment side trim. (Refer to section S.)
3. Remove in the order shown in the figure.
4. Install in the reverse order of removal.



1. Bolt

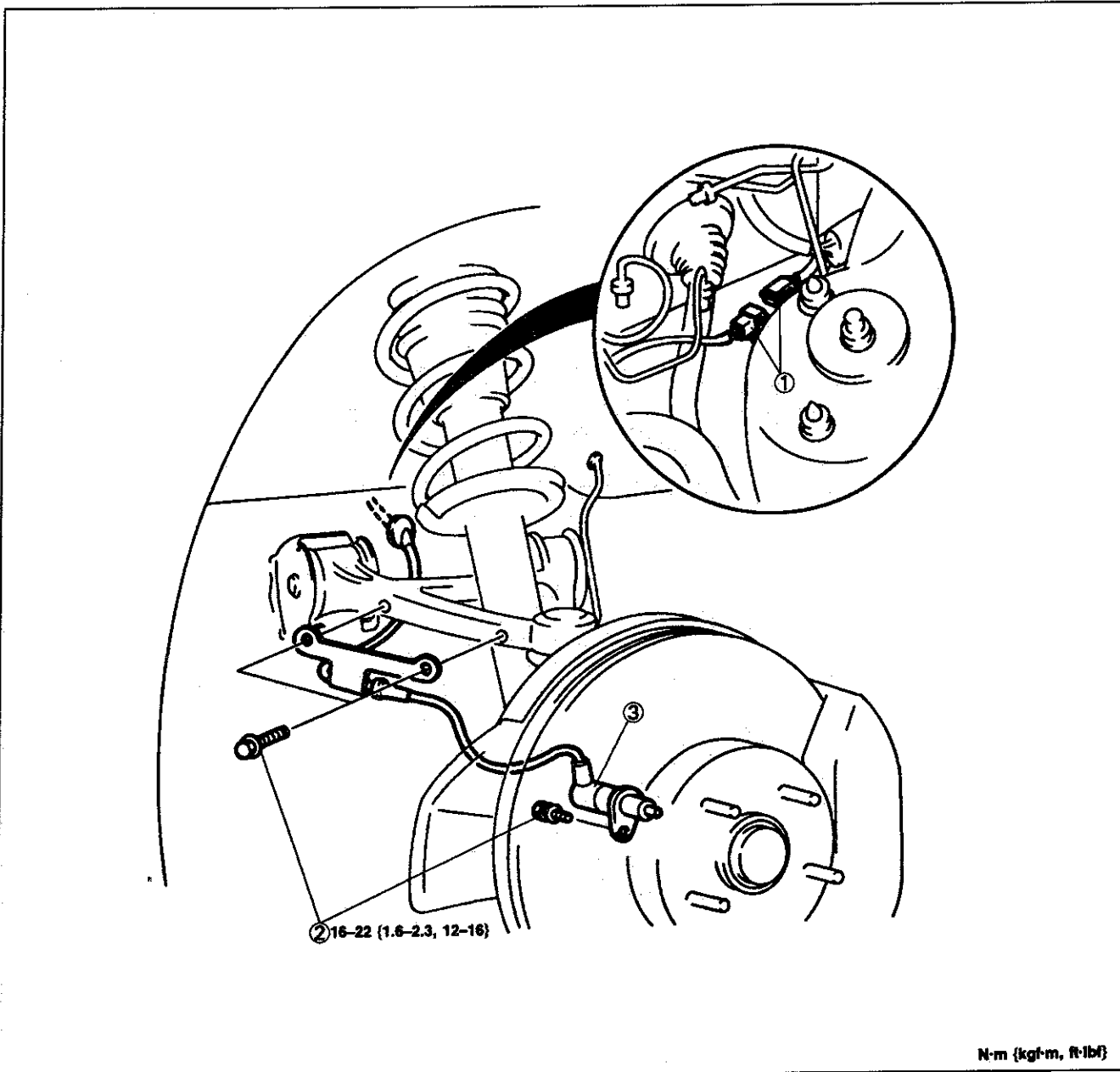
2. Connector

3. ABS control unit

**WHEEL-SPEED SENSOR (FRONT)**

**Removal / Installation**

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



1. Connector
2. Bolt

3. Wheel-speed sensor (front)  
Inspection ..... below

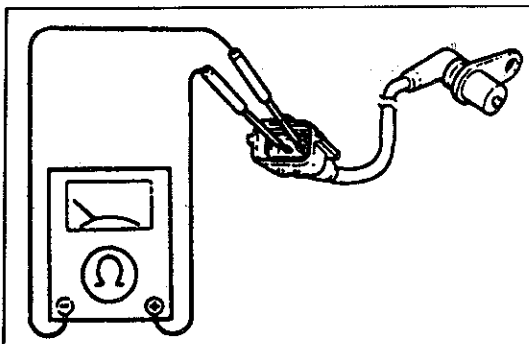
**Inspection**

**Wheel speed sensor (front)**

1. Measure resistance between terminals of the wheel-speed sensor.

**Resistance: 0.8–1.2 kΩ**

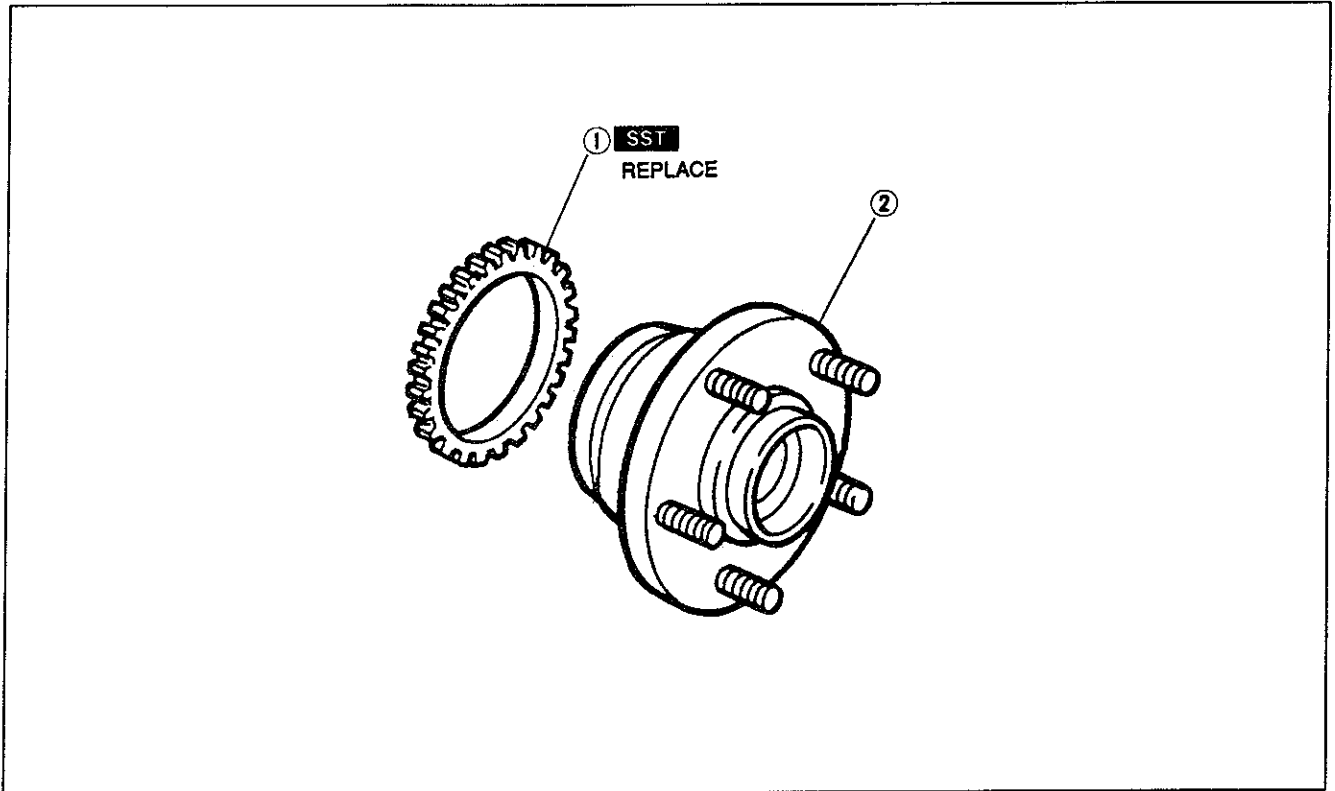
2. If resistance is not as specified, replace the wheel-speed sensor.



## SENSOR ROTOR (FRONT)

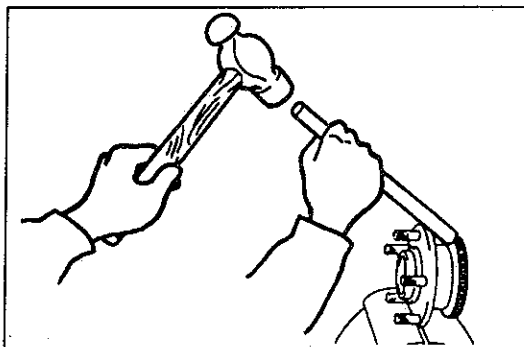
### Removal / Installation

1. Remove the wheel hub assembly from the vehicle. (Refer to section M.)
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Install the wheel hub assembly to the vehicle. (Refer to section M.)



1. Sensor rotor (front)  
Removal Note ..... below  
Installation Note ..... below

2. Front wheel hub assembly

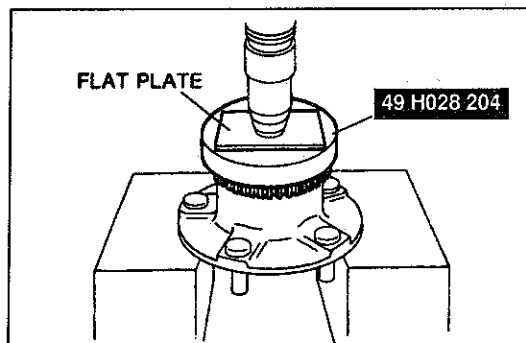


### Removal note Sensor rotor (front)

#### Note

- The sensor rotor does not need to be removed unless you are replacing it.

Remove the sensor rotor by using a brass bar and a hammer.

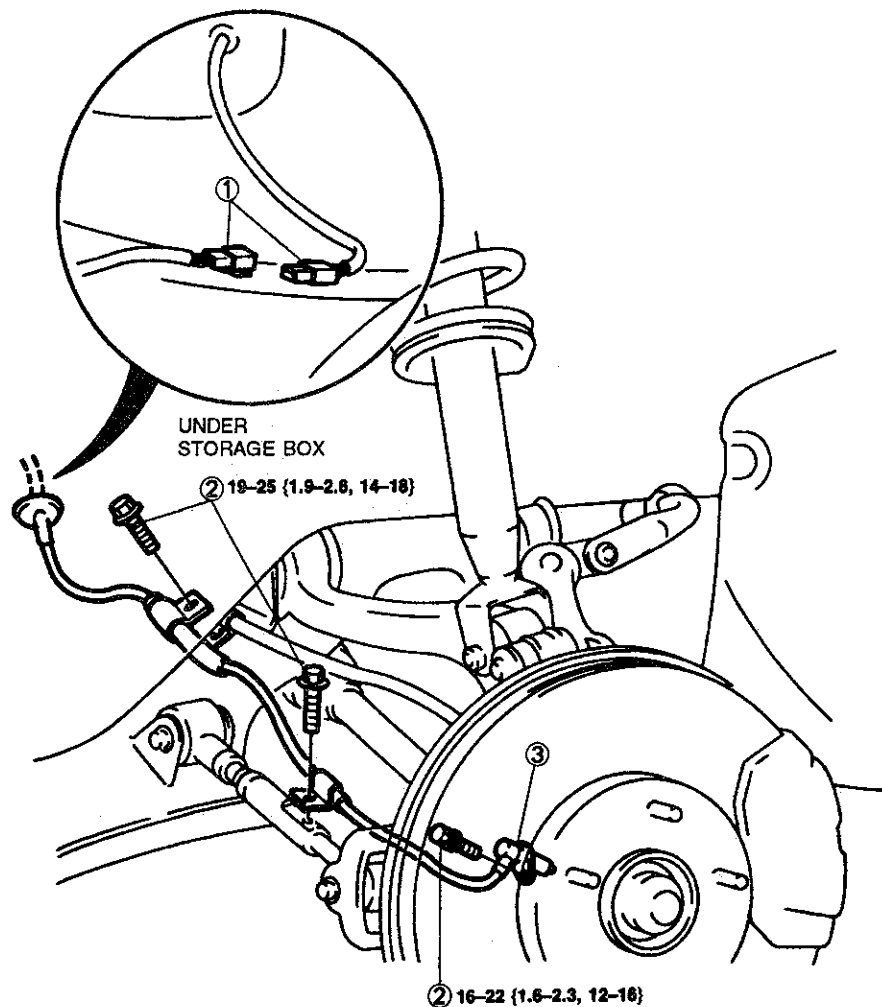


### Installation note Sensor rotor (front)

Press on the new sensor rotor by using the SST.

**WHEEL-SPEED SENSOR (REAR)****Removal / Installation**

1. Remove in the order shown in the figure.
2. Install in the reverse order of removal.



N·m (kgf·m, ft·lbf)

1. Connector
2. Bolt

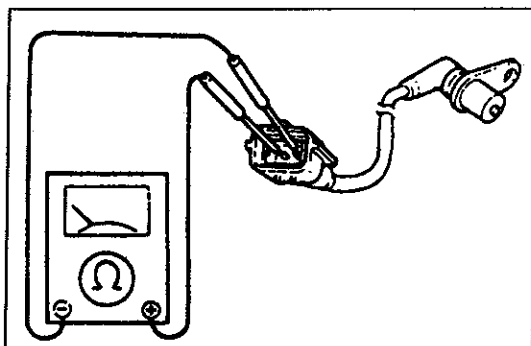
3. Wheel-speed sensor (rear)  
Inspection ..... below

**Inspection****Wheel-speed sensor (rear)**

1. Measure resistance between terminals of the wheel-speed sensor.

**Resistance: 0.8–1.2 kΩ**

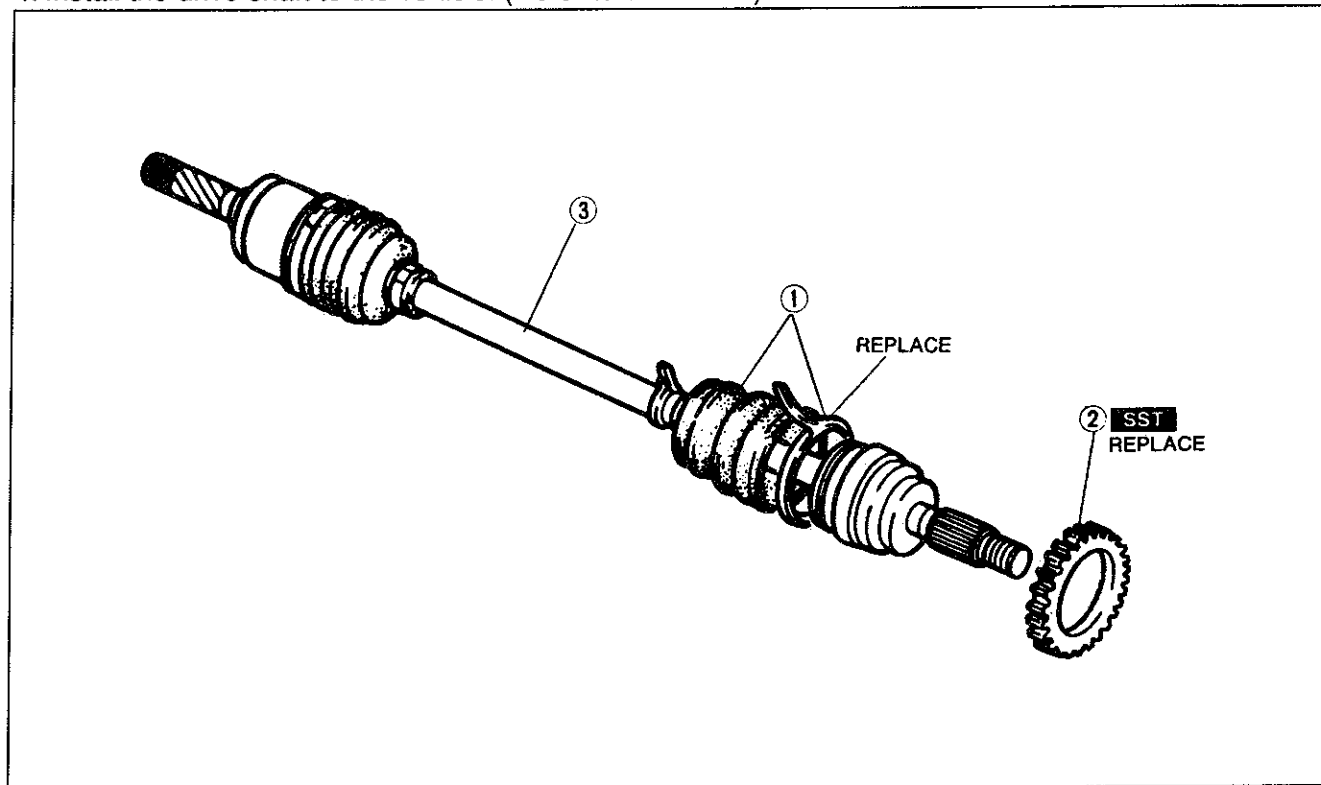
2. If resistance is not as specified, replace the wheel-speed sensor.



## SENSOR ROTOR (REAR)

### Removal / Installation

1. Remove the drive shaft from the vehicle. (Refer to section M.)
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Install the drive shaft to the vehicle. (Refer to section M.)



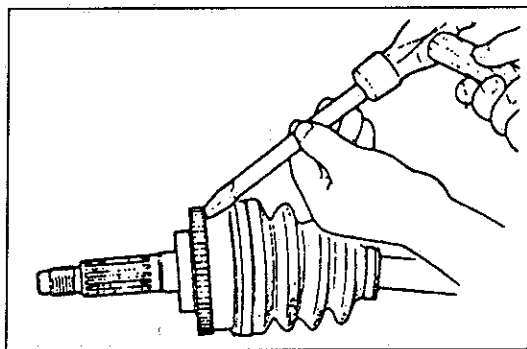
1. Boot band and boot

3. Drive shaft

2. Sensor rotor (rear)

Removal Note ..... below

Installation Note ..... below



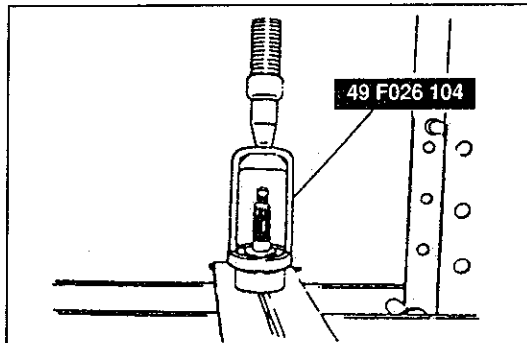
### Removal note

#### Sensor rotor (rear)

#### Note

- The sensor rotor does not need to be removed unless you are replacing it.

Tap the sensor rotor off the drive shaft by using a chisel and a hammer.



### Installation note

#### Sensor rotor (rear)

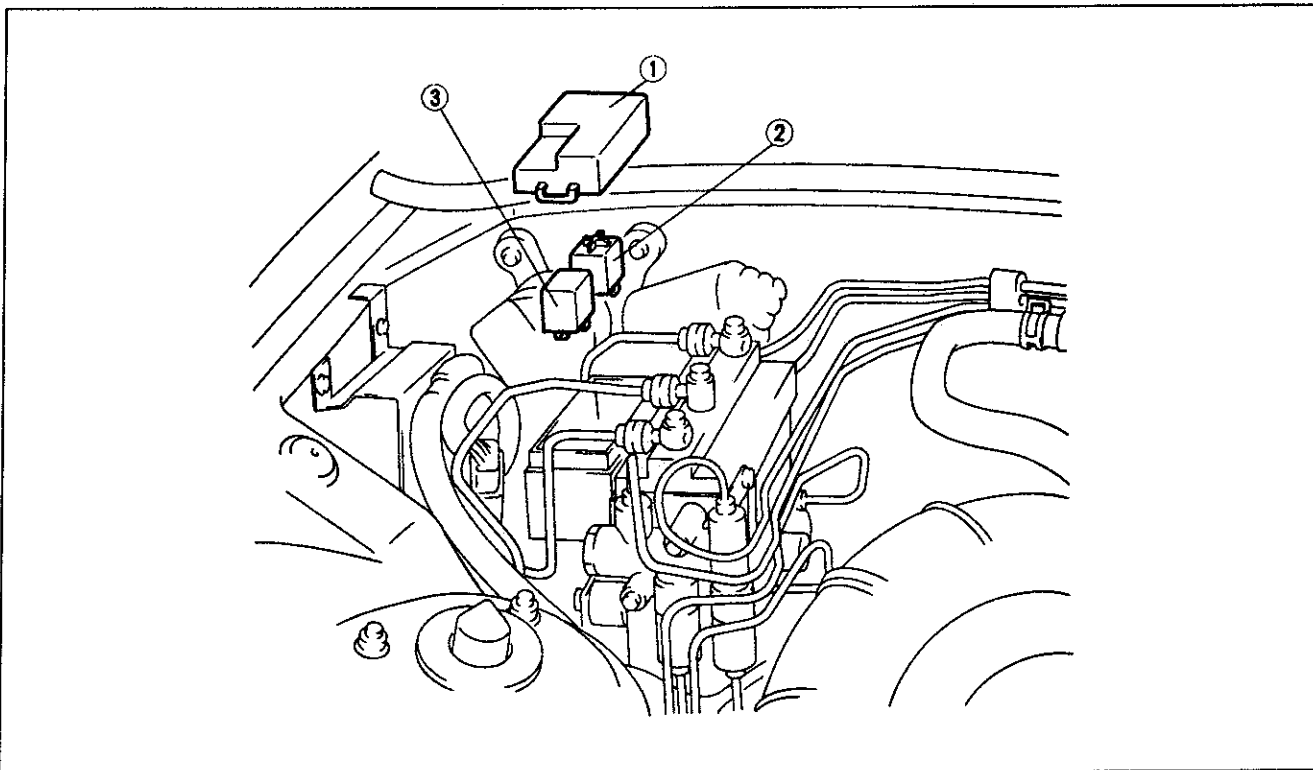
Set a new sensor rotor on the drive shaft and press it on by using the SST.



# RELAY

## Removal / Installation

1. Disconnect the negative battery cable.
2. Remove in the order shown in the figure.
3. Install in the reverse order of removal.



1. Cover

2. Motor relay

Inspection ..... below

3. Valve relay

Inspection ..... below

## Inspection

### Motor relay

1. Using an ohmmeter, check for continuity between the relay terminals.

Connect to		a	b	c	d
12V	Ground				
—	—		○	○	
c	b	○			○

○-○ Continuity

2. If continuity is not as specified, replace the motor relay.

### Valve relay

1. Using an ohmmeter, check for continuity between the relay terminals.

Connect to		a	b	c	d	e
12V	Ground					
—	—		○	○		○
b	d	○			○	○

○-○ Continuity

2. If continuity is not as specified, replace the valve relay.