

BRAKE SYSTEM

SECTION BR

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Primary line
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BR

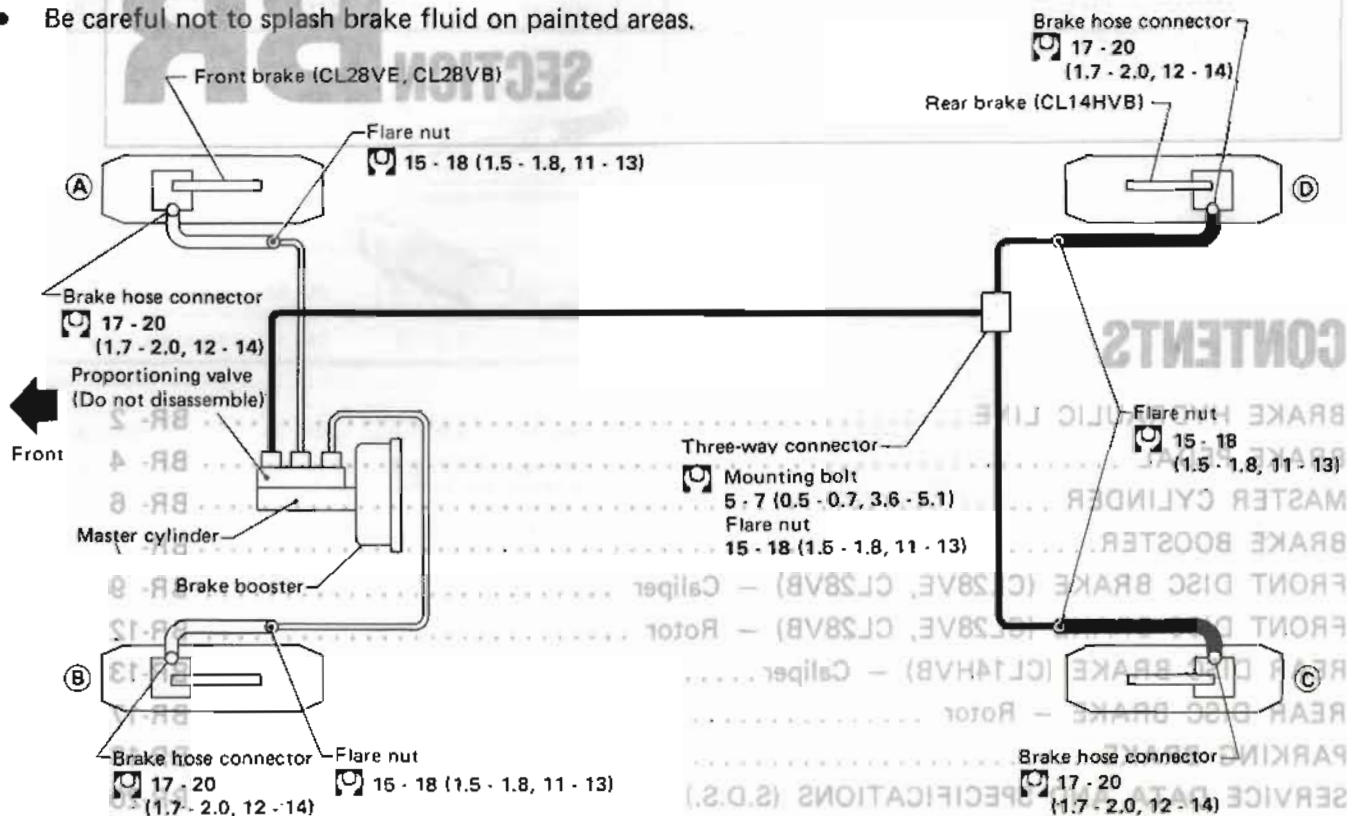
PRECAUTIONS

- Carefully monitor brake fluid level at master cylinder during bleeding operation.
- Bleed air according to the following procedure:
 - Left rear caliper (C) → Right rear caliper (D)
 - Right front caliper (A) → Left front caliper (B)
- Connect a transparent vinyl tube to air bleeder valve of caliper.

BRAKE HYDRAULIC LINE

Precautions

- Recommended fluid is brake fluid "DOT 3".
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas.



WARNING:

Clean pad and shoe dust using a dust collector after cleaning with waste cloth.

Primary line
Secondary line

N-m (kg-m, ft-lb)

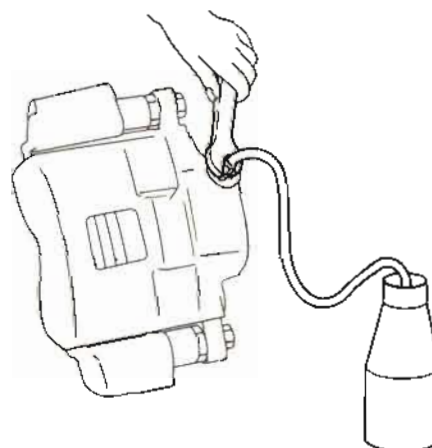
SBR821

Bleeding Procedure

PRECAUTIONS

Carefully monitor brake fluid level at master cylinder during bleeding operation.

- Bleed air according to the following procedure:
Left rear caliper ③ → Right rear caliper ④ → Right front caliper ① → Left front caliper ②
- Connect a transparent vinyl tube to air bleeder valve of caliper.



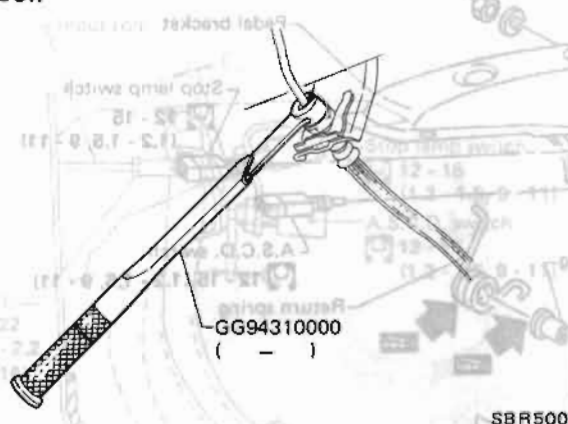
SBR606

BRAKE HYDRAULIC LINE

Removal and Installation

CAUTION :

- When removing and installing brake tube, use Tool.



- Cover openings to prevent entrance of dirt whenever disconnecting hydraulic line.

- To remove brake hose, first remove flare nut securing brake tube to hose, then withdraw lock spring. Next disconnect the other side.
- All hoses must be free from excessive bending, twisting and pulling.
- Whenever installing brake lines, be sure to check for oil leakage by fully depressing brake pedal.

Inspection

Check brake lines (tubes and hoses) for evidence of cracks, deterioration or other damage. Replace any damaged parts.

If leakage occurs around connectors re-tighten or, if necessary, replace damaged parts.



- Check pedal free play.
Make sure that stop lamp is off when pedal is released.

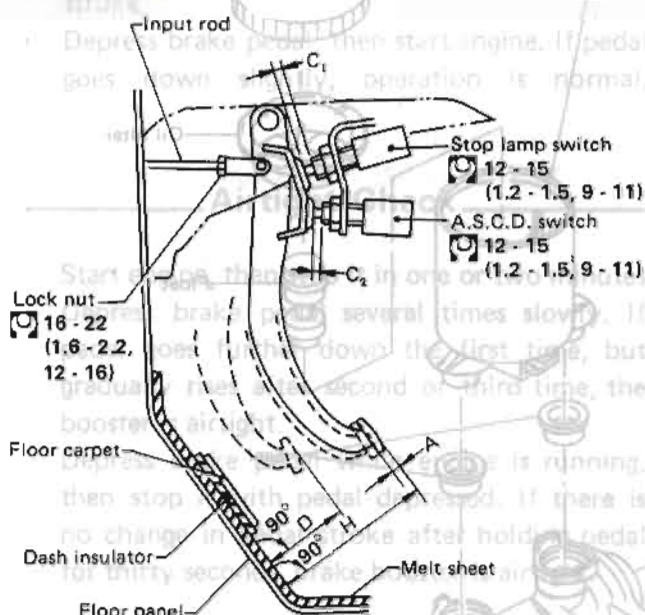
- Check brake pedal depressed height with engine running.

If depressed height is below the specified value, check brake system for leaks, accumulation of air or any damage regarding components.

Check brake pedal for the following items and make the necessary repairs.

- Brake pedal bend
- Cracks in deformation
- Crack of any welded portion

Check brake pedal free height from melt sheet.
Adjust if necessary.



□ : N·m (kg-m, ft-lb)

H: Free height

M/T 182 - 192 mm (7.17 - 7.56 in)

A/T 184 - 194 mm (7.24 - 7.64 in)

D: Depressed height

M/T 80 mm (3.15 in) or more

A/T 80 mm (3.15 in) or more

Under force of 490 N (50 kg, 110 lb) with engine running.

C₁: Clearance between pedal stopper and threaded end of stop lamp switch.

0.3 - 1.0 mm (0.012 - 0.039 in)

C₂: Clearance between pedal stopper and threaded end of A.S.C.D. switch.

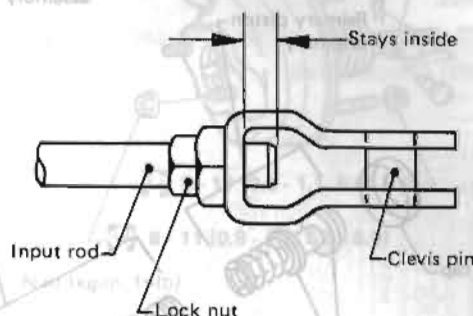
0.3 - 1.0 mm (0.012 - 0.039 in)

A: Pedal free play

1.0 - 3.0 mm (0.039 - 0.118 in)

(1) Adjust pedal free height with brake booster input rod. Then tighten lock nut.

Be sure that tip of input rod stays inside.



SBR930

(2) Adjust clearance "C₁" and "C₂" with stop lamp switch and A.S.C.D. switch respectively. Then tighten lock nuts.

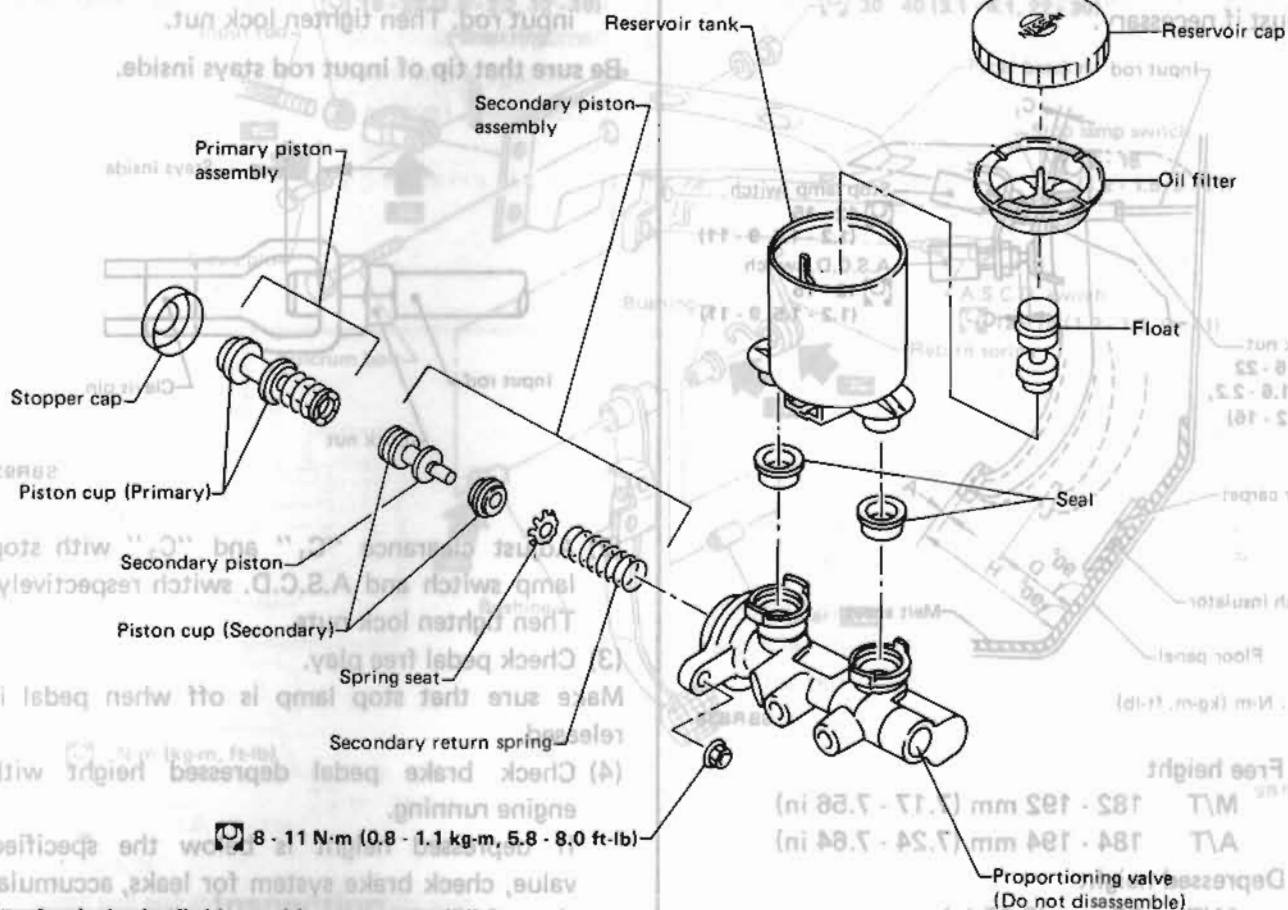
(3) Check pedal free play.

Make sure that stop lamp is off when pedal is released.

(4) Check brake pedal depressed height with engine running.

If depressed height is below the specified value, check brake system for leaks, accumulation of air or any damage regarding component parts (master cylinder, wheel cylinder, etc.), and make the necessary repairs.

MASTER CYLINDER



- Apply brake fluid or rubber grease to sliding contact surface when assembling master cylinder.
- Check parts for wear or damage. Replace if any of above conditions are observed.
- Replace piston assembly when disassembled.

SBP823

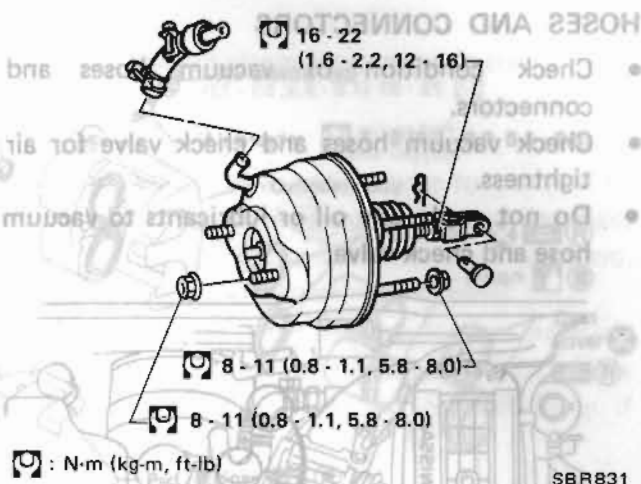
Operating Check

- Depress brake pedal several times with engine off, then check that there is no change in pedal stroke.
- Depress brake pedal, then start engine. If pedal goes down slightly, operation is normal.

Airtight Check

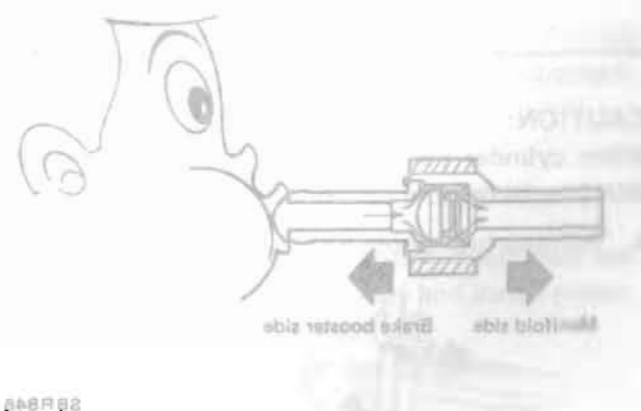
- Start engine, then stop it in one or two minutes. Depress brake pedal several times slowly. If pedal goes further down the first time, but gradually rises after second or third time, the booster is airtight.
- Depress brake pedal while engine is running, then stop it with pedal depressed. If there is no change in pedal stroke after holding pedal for thirty seconds, brake booster is airtight.

Removal and Installation



CHECK VALVE

- When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.

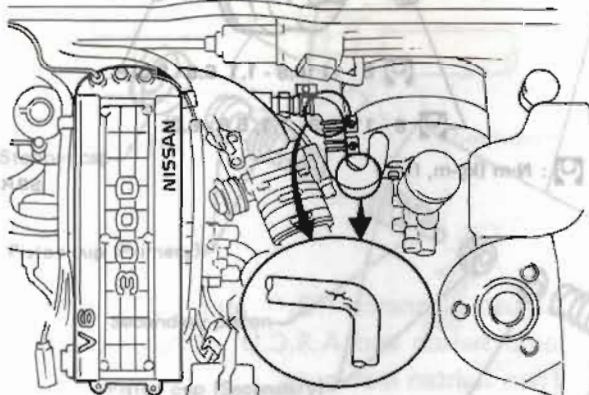


BRAKE BOOSTER

Inspection

HOSES AND CONNECTORS

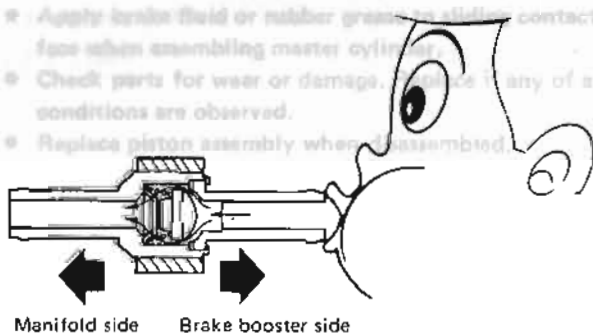
- Check condition of vacuum hoses and connectors.
- Check vacuum hoses and check valve for air tightness.
- Do not apply any oil or lubricants to vacuum hose and check valve.



SBR986

CHECK VALVE

- When pressure is applied to the brake booster side of check valve and valve does not open, replace check valve with a new one.



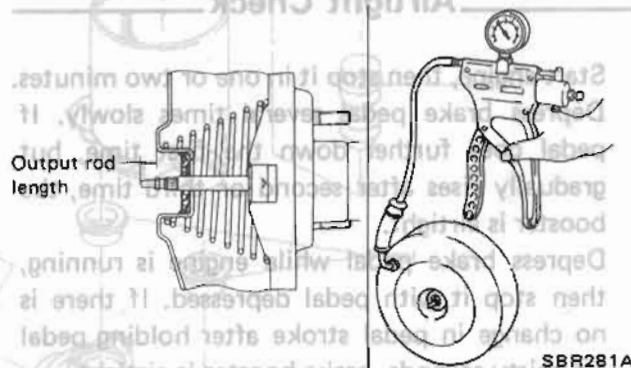
SBR846

OUTPUT ROD LENGTH CHECK

1. Supply brake booster with vacuum of -66.7 kPa (-500 mmHg, -19.69 inHg) using a handy vacuum pump.
2. Check output rod length.

Specified length:

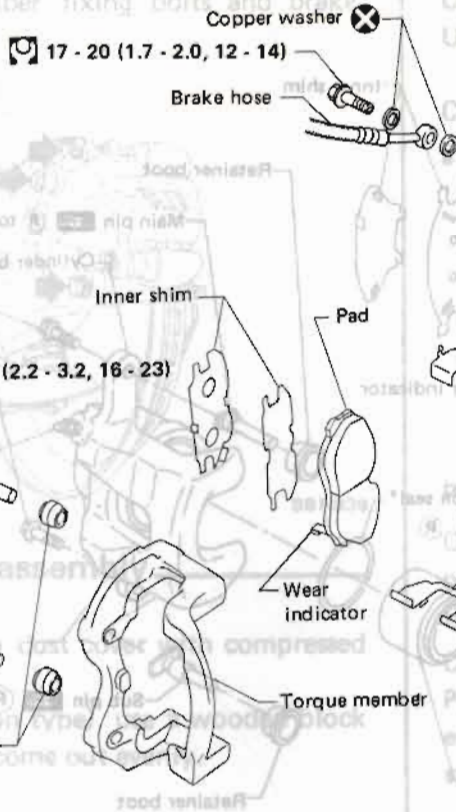
10.275 - 10.525 mm (0.4045 - 0.4144 in)



SBR281A

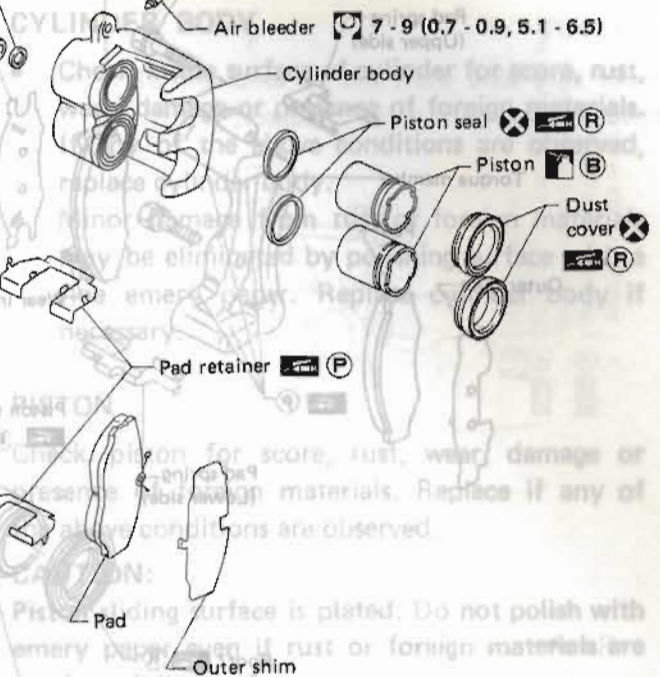
FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

CL28VE



CAUTION:

Use brake fluid only. Do not use mineral oil.



Q : N.m (kg-m, ft-lb)

P : P.B.C. (Poly Butyl Cuprysil) grease or silicon-based grease point

R : Rubber grease point

B : Brake fluid point

SBR295A

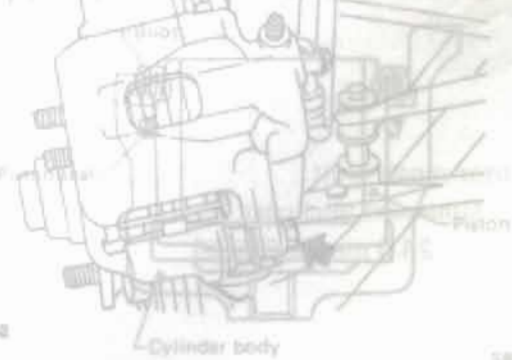
Pad Replacement

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

CAUTION:

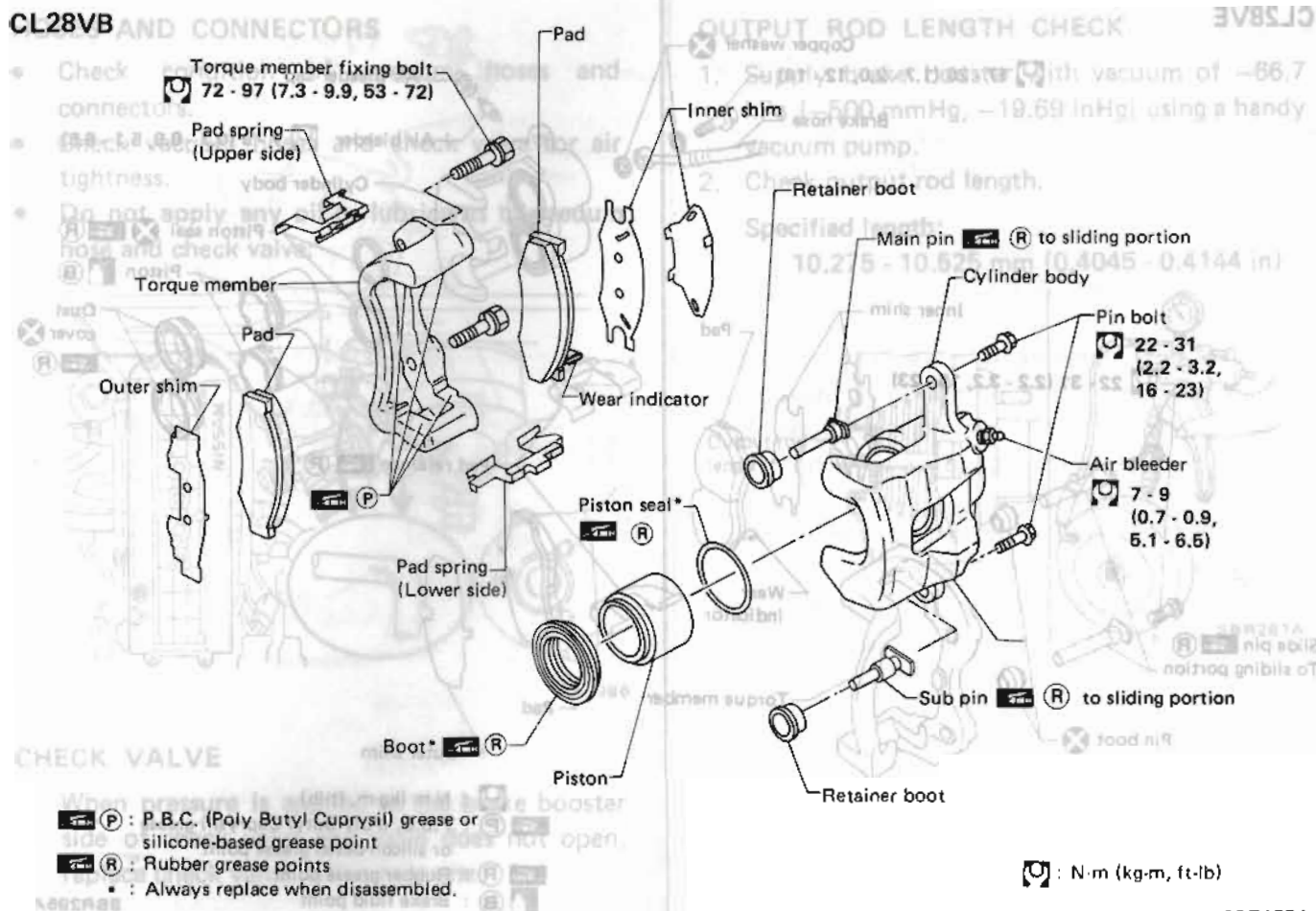
When cylinder body is swung up, do not depress brake pedal because piston will pop out.

- Remove brake hose lock spring and pin bolt.
- With dust seal fitted to piston, insert dust seal into groove on cylinder body and install piston.
- Properly secure dust seal.
- Pay attention to piston seal direction.



FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

CL28VB



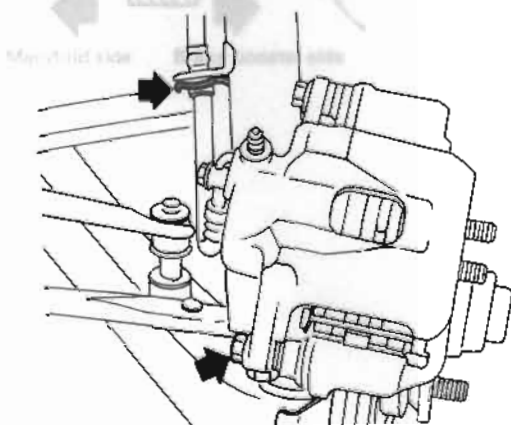
SBR157A

Pad Replacement

CAUTION:

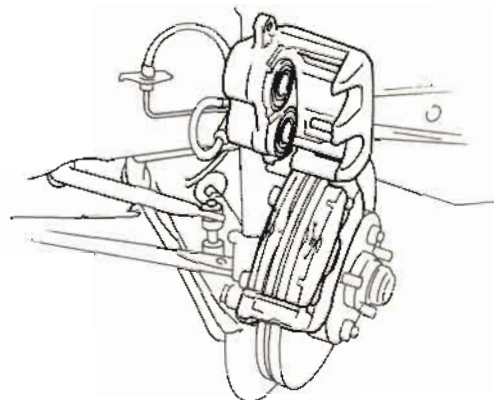
When cylinder body is swung up, do not depress brake pedal because piston will pop out.

1. Remove brake hose lock spring and pin bolt.



SBR988

2. Swing cylinder body upward. Then remove pad retainer and inner and outer shims.



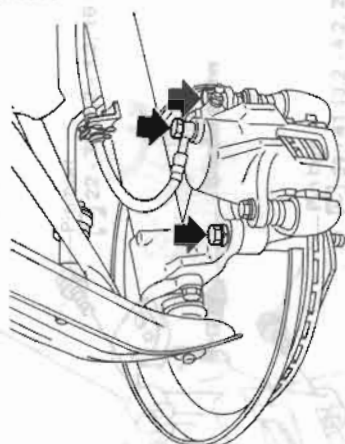
SBR296A

Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.

FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

Removal and Installation

Remove torque member fixing bolts and brake hose connector.

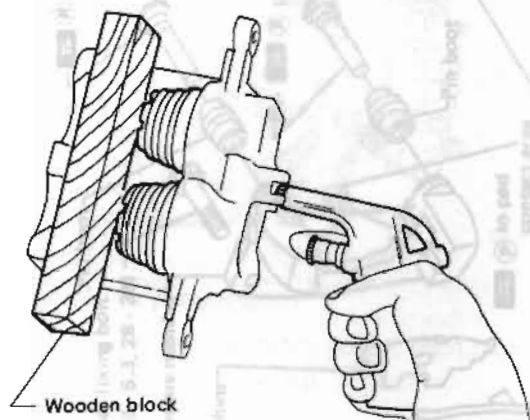


SBR839

Disassembly

Push out piston with dust cover with compressed air.

For CL28VE (2-piston type), use a wooden block so that the 2 pistons come out evenly.



SBR085A

Inspection

CAUTION:

Use brake fluid to clean. Never use mineral oil.

CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

PISTON

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any of the above conditions are observed.

CAUTION:

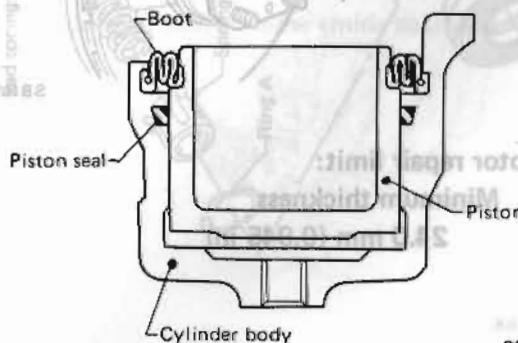
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

PIN, PIN BOLT, RETAINER BOOT, RUBBER BUSHING, RETAINER BUSHING, AND PIN BOOT

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

Assembly

- With dust seal fitted to piston, insert dust seal into groove on cylinder body and install piston.
- Properly secure dust seal.
- Pay attention to piston seal direction.



SBR574

FRONT DISC BRAKE (CL28VE, CL28VB)—Rotor

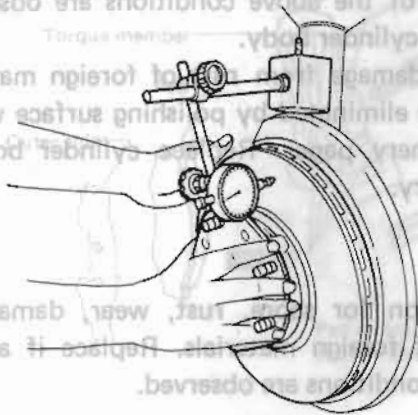
Inspection

RUBBING SURFACE

Check rotor for roughness, cracks or chips.

RUNOUT

Make sure axle shaft has no axial end play. Then check runout with a dial indicator.



SBR158A

Rotor repair limit:

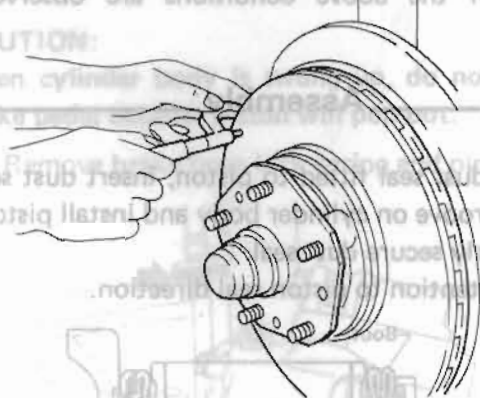
Maximum runout

(Total indicator reading at

center of rotor pad contact surface)

0.07 mm (0.0028 in)

THICKNESS



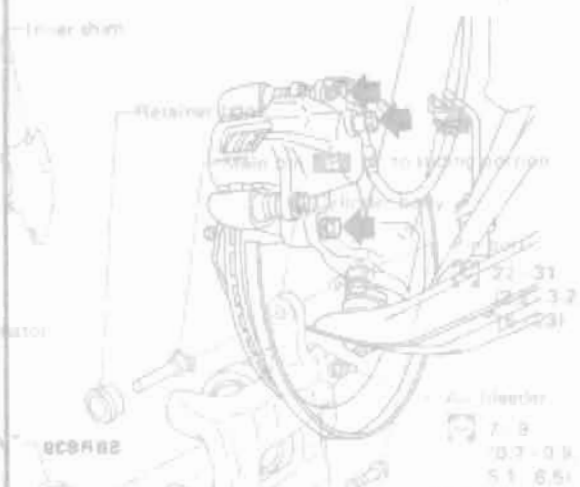
SBR159A

Rotor repair limit:

Minimum thickness

24.0 mm (0.945 in)

Remove torque member fixing bolts and brake hose connector.



Disassembly

Push out piston with dust cover with compressed air. For CL28VE (2-piston type), use a wooden block so that the 2 pistons come out evenly.

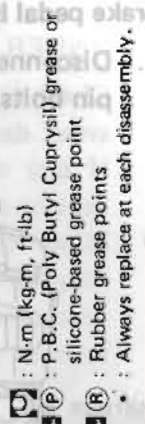


SBR158A

2 Swing caliper body upward. Then remove pad retainer and inner and outer pads.

Be careful not to damage piston boot or get oil on rotor. Always replace shim when replacing pads.

Disassembly



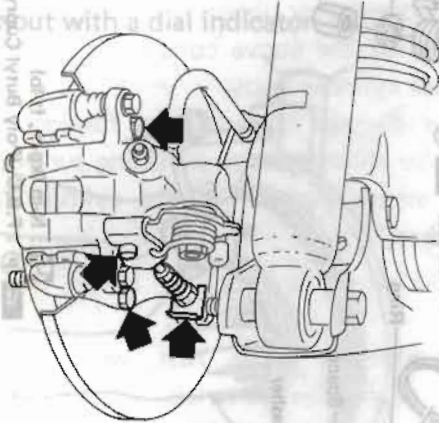
REAR DISC BRAKE (CL14HVB)—Caliper

Pad Replacement

CAUTION:

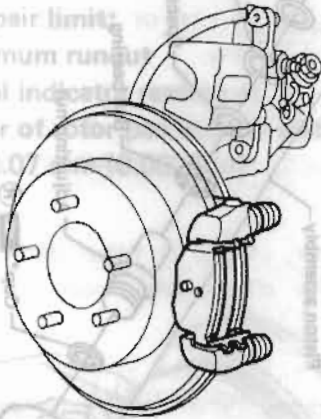
When cylinder body is swung up, do not depress brake pedal because piston will pop out.

1. Disconnect parking brake cable, then remove pin bolts.



SBR166A

2. Remove pad retainer, pads and shims.

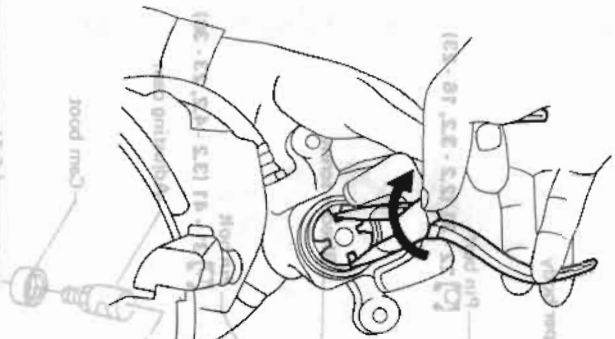


SBR160A

3. When installing pads, retract piston into cylinder body by turning it clockwise.

Be careful not to damage piston boot or get oil on rotor.

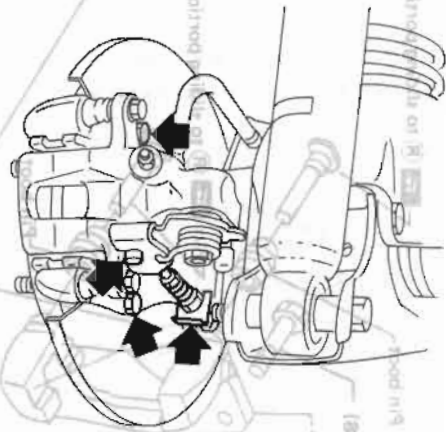
Always replace shims when replacing pads.



SBR641

Removal and Installation

Disconnect parking brake cable and brake hose, then remove caliper assembly.

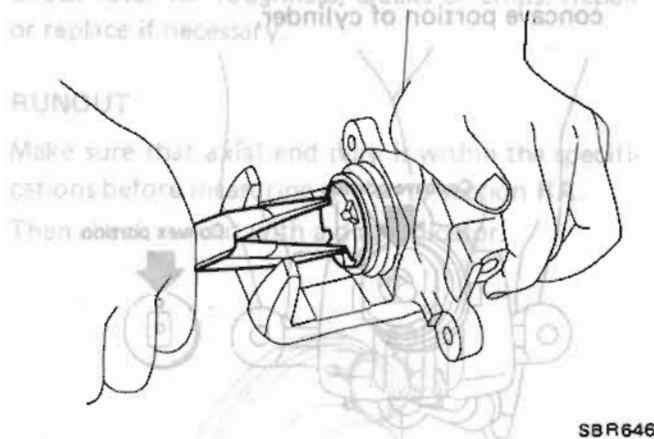


SBR166A

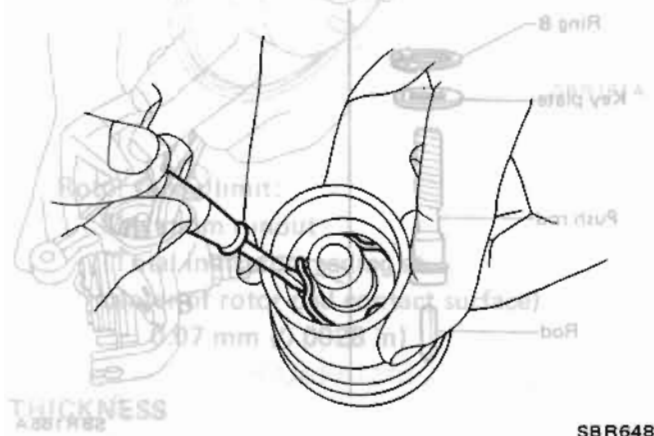
REAR DISC BRAKE (CL14HVB)—Caliper

Disassembly

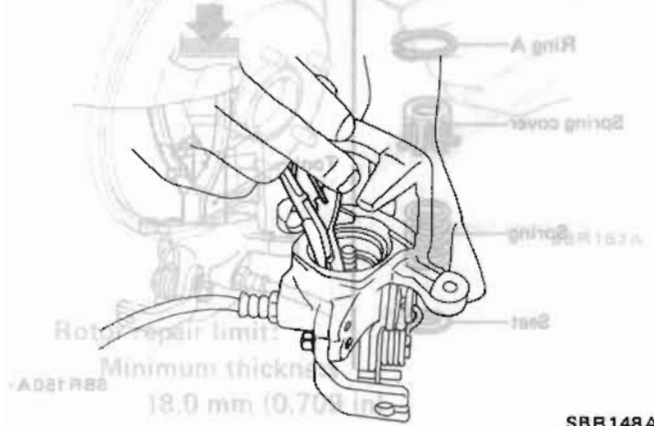
1. Remove piston by turning it counterclockwise with suitable long nose pliers.



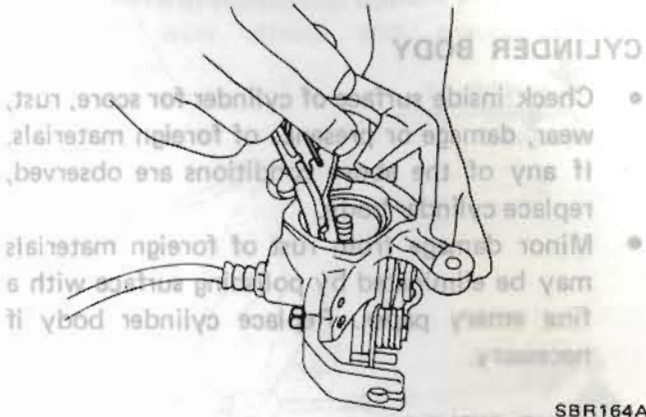
2. Pry off ring from piston and remove adjusting nut.



3. Disassembly cylinder body.
 - (1) Pry off ring A with suitable pliers, then remove spring cover, spring and seat.

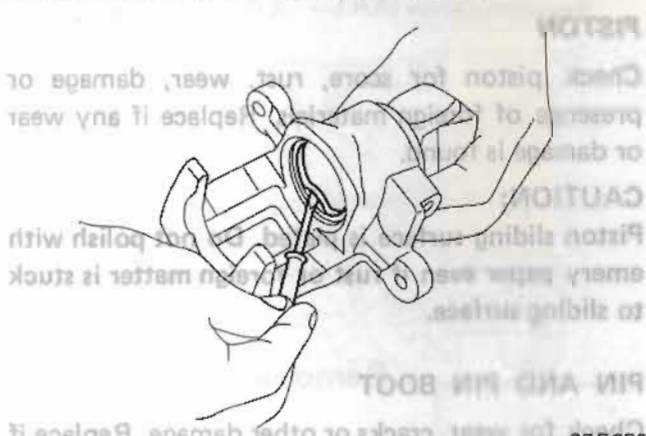


- (2) Pry off ring B, then remove key plate, push rod and rod.

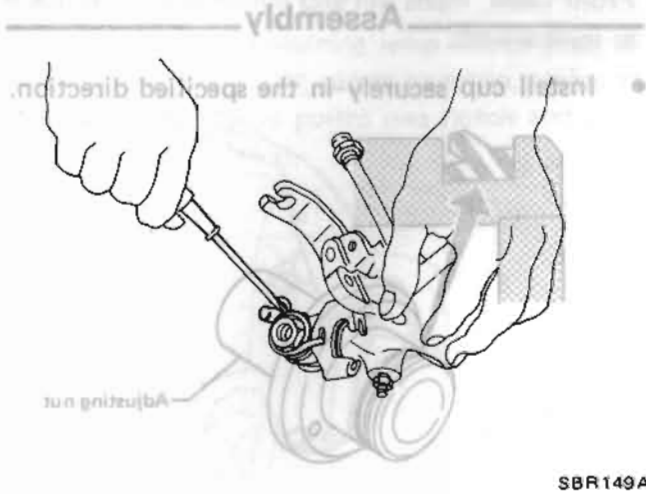


- (3) Remove piston seal.

Be careful not to damage cylinder body.



4. Remove return spring and lever.



REAR DISC BRAKE (CL14HVB)—Caliper

Inspection

CAUTION: Use brake fluid to clean. Never use mineral oil.

CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

TORQUE MEMBER

Check for wear, cracks or other damage. Replace if necessary.

PISTON

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any wear or damage is found.

CAUTION:

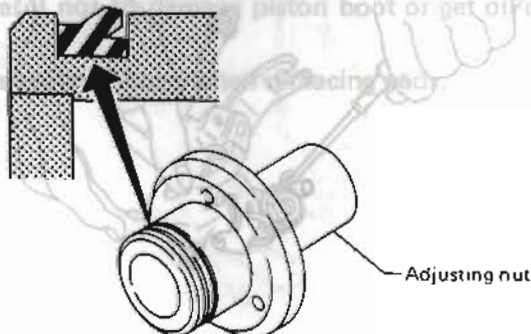
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

PIN AND PIN BOOT

Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

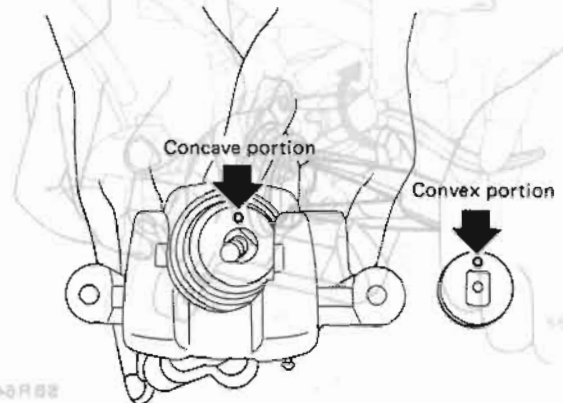
Assembly

- Install cup securely in the specified direction.



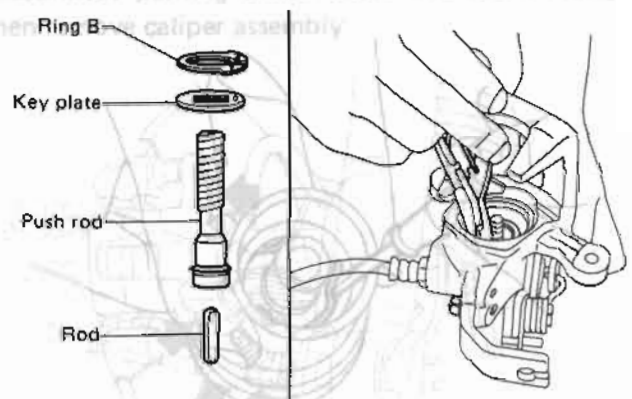
SBR849

- Fit push rod into square hole in key plate. Also match convex portion of key plate with concave portion of cylinder.



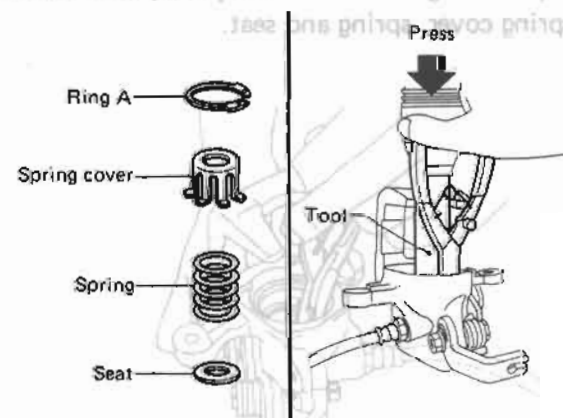
SBR812

- Install ring B with suitable tool.



SBR165A

- Install seat, spring, spring cover and ring A with suitable press and drift.



SBR150A

REAR DISC BRAKE — Rotor

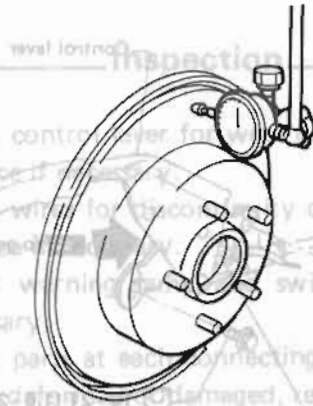
Inspection

RUBBING SURFACE

Check rotor for roughness, cracks or chips. Repair or replace if necessary.

RUNOUT

Make sure that axial end play is within the specifications before measuring. Refer to section RA. Then check runout with a dial indicator.



SBR161A

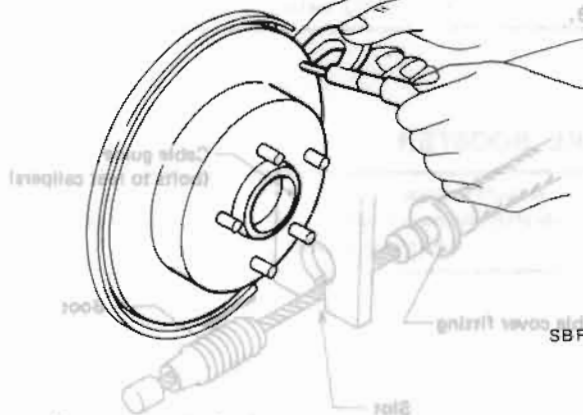
Rotor repair limit:

Maximum runout

(Total indicator reading at center of rotor pad contact surface)
0.07 mm (0.0028 in)

THICKNESS

When installing parking brake cable at rear caliper, make sure to pull back rubber boot to expose cable.



SBR162A

Rotor repair limit:

Minimum thickness

18.0 mm (0.709 in)

STROKE

- Pull lever with full amount of force. Check lever stroke and ensure both operation.



- Adjust lever stroke.



Front cable, clasp pin and control pin are available separately, separate front cable from parking brake lever by pressing pin.

Front cable, clasp pin and control pin are available separately. Front cable, clasp pin and control pin are available separately. Front cable, clasp pin and control pin are available separately.



REAR DISC PARKING BRAKE

Inspection

CAUTION:

Use brake fluid to clean. Never use mineral oil.

CYLINDER BODY

- Check inside surface of cylinder for score, rust, wear, damage or presence of foreign materials. If any of the above conditions are observed, replace cylinder body.
- Minor damage from rust or foreign materials may be eliminated by polishing surface with a fine emery paper. Replace cylinder body if necessary.

TOQUE MEMBER

Check for wear, cracks or other damage. Replace if necessary.

PISTON

Check piston for score, rust, wear, damage or presence of foreign materials. Replace if any wear or damage is found.

CAUTION: $\text{N}\cdot\text{m}$ (kg-m, ft-lb)

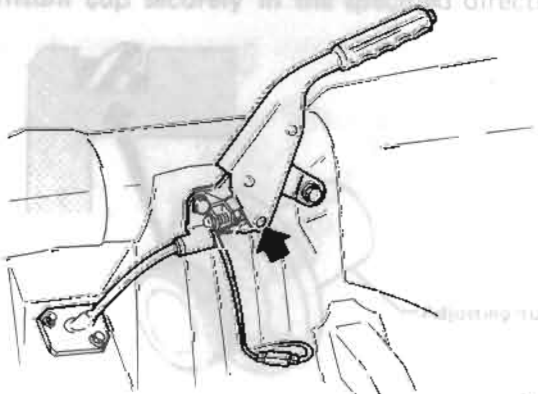
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

Removal

If necessary, separate front cable from parking brake lever by breaking pin.

Front cable, clevis pin and cotter pin are available as service parts.

- Install cup securely in the specified direction.



SBR835

- Fit push rod into square RUBBING SURFACE match convex portion of key plate with Check rotor for roughness, cracks or chips. Repair or replace if necessary.

3.1 - 4.3 (0.32 - 0.44, 2.3 - 3.2)

Adjuster

8 - 11 (0.8 - 1.1, 5.8 - 8.0)

Control lever

to gear portion

Equalizer

Front cable assembly

18 - 21 (1.6 - 2.1, 12 - 15)

16 - 21 (1.6 - 2.1, 12 - 15)

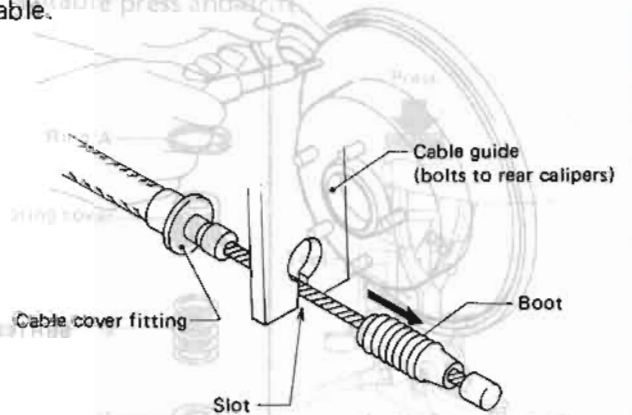
Warning switch

Push rod

Red

Installation

When installing parking brake cable at rear caliper, make sure to pull back rubber boot to expose cable.



SBR290A

Installation (Cont'd)

After cable cover fitting is installed in cable guide, reattach boot to fitting.

CAUTION:

It is important not to damage boot as it prevents water from entering cable. Water in cable may freeze during winter or cause corrosion.

Inspection

1. Check control lever for wear or other damage. Replace if necessary.
2. Check wires for discontinuity or deterioration. Replace if necessary.
3. Check warning lamp and switch. Replace if necessary.
4. Check parts at each connecting portion and, if found deformed or damaged, replace.

CHECK VALVE

Maximum vacuum leakage
(15 seconds after 58.7 kPa (500 mmHg)
19.69 inHg) is applied.)
kPa (mmHg, inHg)
1.3 (10, 0.38)

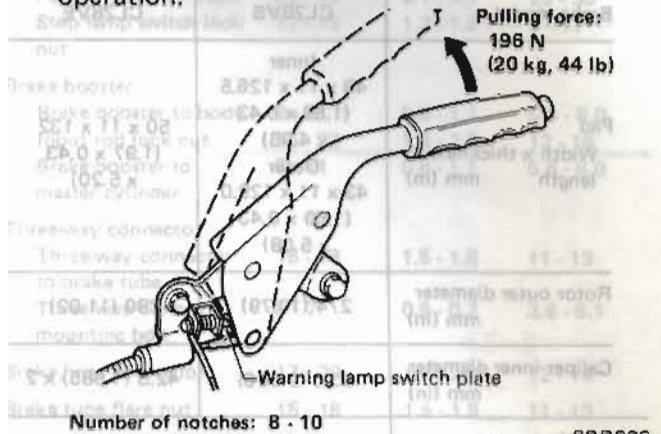
BRAKE BOOSTER

Maximum vacuum leakage
(15 seconds after engine is stopped)
kPa (mmHg, inHg)
2.3 (18, 0.88)

Adjustment

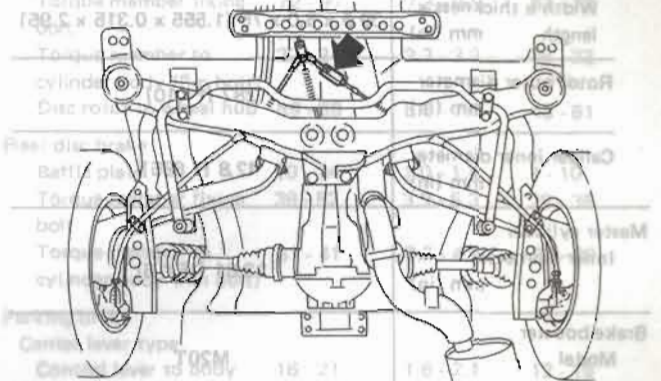
STROKE

- Pull lever with specified amount of force. Check lever stroke and ensure smooth operation.



SBR836

- Adjust lever stroke.



SBR837

WARNING LAMP SWITCH

Bend parking brake warning lamp switch plate so that brake warning light comes on when ratchet at parking brake lever is pulled one notch and goes out when fully released.

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

Item	Engine	VG30E	VG30ET
Front brake			
Brake model		CL28VB	CL28VE
Pad		Inner 43 x 11 x 126.5 (1.69 x 0.43 x 4.98)	50 x 11 x 132 (1.97 x 0.43 x 5.20)
Width x thickness x length mm (in)		Outer 43 x 11 x 129.0 (1.69 x 0.43 x 5.08)	
Rotor outer diameter mm (in)		274 (10.79)	280 (11.02)
Caliper inner diameter mm (in)		60.6 (2.386)	42.8 (1.685) x 2
Rear brake			
Brake model		CL14HVB	
Pad			
Width x thickness x length mm (in)		39.5 x 8.0 x 75 (1.555 x 0.315 x 2.95)	
Rotor outer diameter mm (in)		282 (11.10)	
Caliper inner diameter mm (in)		42.8 (1.685)	
Master cylinder			
Inner diameter mm (in)		23.81 (15/16)	
Brake booster			
Model		M20T	
Diaphragm diameter mm (in)		Primary 205 (8.07) Secondary 201 (7.91)	
Control valve			
Model		Proportioning valve (within master cylinder)	
Sprint point kPa (kg/cm ² , psi)		2,942 (30, 427)	
Reducing ratio		0.4	
Recommended brake fluid		DOT 3	

Inspection and Adjustment

BRAKE PEDAL

Pedal ratio	3.8
Free height mm (in)	M/T 182 - 192 (7.17 - 7.56) A/T 184 - 194 (7.24 - 7.64)
Depressed height [Under force of 490 N (50 kg, 110 lb) with engine running] mm (in)	80 (3.15) or more
Clearance between pedal stopper and threaded end of stop lamp switch mm (in)	0.3 - 1.0 (0.012 - 0.039)
Clearance between pedal stopper and threaded end of A.S.C.D. switch mm (in)	
Pedal free play mm (in)	1.0 - 3.0 (0.039 - 0.118)

PARKING BRAKE

Type	Center lever type
Number of notches when warning lamp switch comes on	1
Number of notches [When pulled under force of 196 N (20 kg, 44 lb)]	8 - 10

CHECK VALVE

Maximum vacuum leakage [15 seconds after 66.7 kPa (500 mmHg, 19.69 inHg) is applied.] kPa (mmHg, inHg)	1.3 (10, 0.39)
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BRAKE BOOSTER

Maximum vacuum leakage (15 seconds after engine is stopped) kPa (mmHg, inHg)	3.3 (25, 0.98)
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SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Inspection and Adjustment (Cont'd)

DISC BRAKE

	Front brake		Rear brake
Brake model	CL28VE	CL28VB	CL14HVB
Pad wear limit			
Minimum thickness mm (in)	2.0 (0.079)		
Rotor repair limit			
Maximum runout mm (in)	0.07 (0.0028)		
Minimum thickness mm (in)	24.0 (0.945)	20.0 (0.787)	18.0 (0.709)

STEERING SYSTEM

STEERING COLUMN

POWER STEERING SYSTEM - Checking

POWER STEERING GEAR AND LINKAGE

POWER STEERING OIL PUMP

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

SPECIAL SERVICE TOOLS

Refer to section MA for:

CHECKING WHEEL ALIGNMENT

- Toe-in
- Front wheel turning angle

BASIC MECHANICAL SYSTEM

- Checking drive belts

Tightening Torque

Item	N·m	kg·m	ft·lb
Brake pedal			
Pedal bracket to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Pedal bracket to pedal	30 - 40	3.1 - 4.1	22 - 30
Stop lamp switch lock nut	12 - 15	1.2 - 1.5	9 - 11
Brake booster			
Brake booster to body	8 - 11	0.8 - 1.1	5.8 - 8.0
Input rod lock nut	16 - 22	1.6 - 2.2	12 - 16
Brake booster to master cylinder	8 - 11	0.8 - 1.1	5.8 - 8.0
Three-way connector			
Three-way connector to brake tube	15 - 18	1.5 - 1.8	11 - 13
Three-way connector mounting bolt	5 - 7	0.5 - 0.7	3.6 - 5.1
Brake hose connector	17 - 20	1.7 - 2.0	12 - 14
Brake tube flare nut	15 - 18	1.5 - 1.8	11 - 13
Wheel cylinder air bleeder	7 - 9	0.7 - 0.9	5.1 - 6.5
Front disc brake			
Baffle plate	3.2 - 4.3	0.33 - 0.44	2.4 - 3.2
Torque member fixing bolt	72 - 97	7.3 - 9.9	53 - 72
Torque member to cylinder body (Pin bolt)	22 - 31	2.2 - 3.2	16 - 23
Disc rotor to wheel hub	59 - 69	6.0 - 7.0	43 - 51
Rear disc brake			
Baffle plate	10 - 14	1.0 - 1.4	7 - 10
Torque member fixing bolt	38 - 52	3.9 - 5.3	28 - 38
Torque member to cylinder body (Pin bolt)	31 - 41	3.2 - 4.2	23 - 30
Parking brake			
Center lever type			
Control lever to body	16 - 21	1.6 - 2.1	12 - 15
Adjuster lock nut	3.1 - 4.3	0.32 - 0.44	2.3 - 3.2
Front cable clamp to body	8 - 11	0.8 - 1.1	5.8 - 8.0

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Immanuel Kant's Religion

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