BRAKE SYSTEM

SECTION BR

CONTENTS

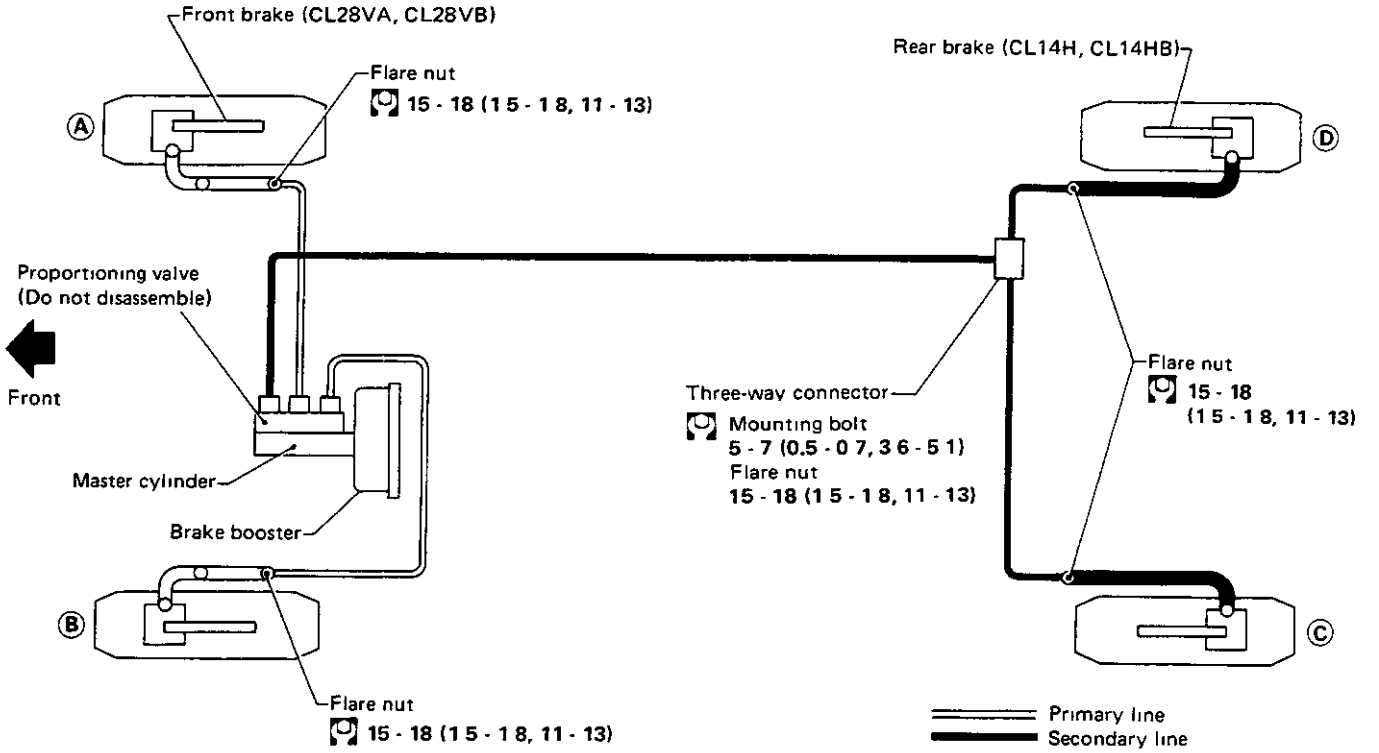
FIND

BR

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

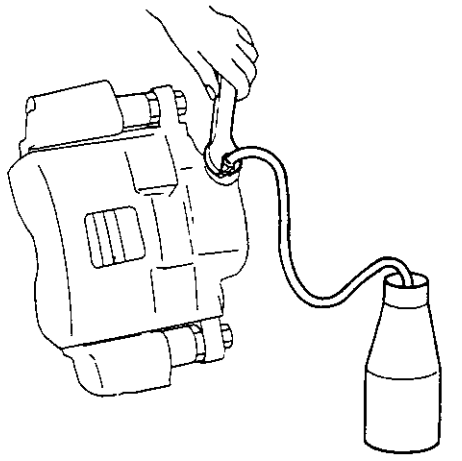
N·m (kg-m, ft-lb)

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 Ⓒ → Right rear caliper Ⓓ → Right front caliper Ⓐ → Left front caliper Ⓑ
- Connect a transparent vinyl tube to air bleeder valve of caliper.



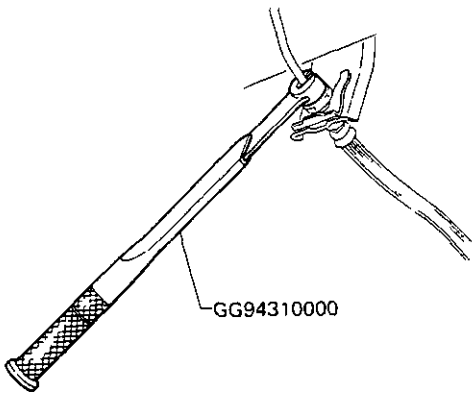
SBR606

BRAKE HYDRAULIC LINE

Removal and Installation

CAUTION

a. **When removing and installing brake tube, use Tool.**



SBR500

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

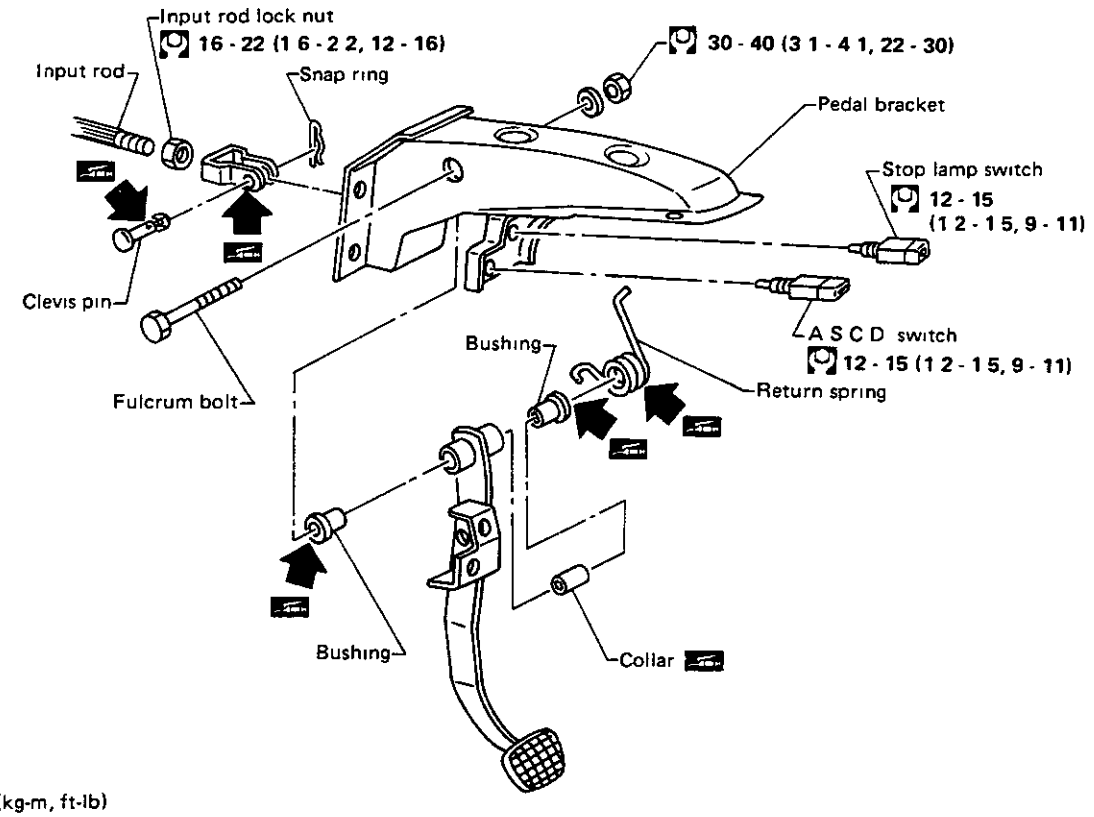
- To remove brake hose, first remove flare nut securing brake tube to hose, then withdraw lock spring. Next disconnect the other side
- All hoses must be free from excessive bending, twisting and pulling
- Whenever installing brake lines, be sure to check for oil leakage by fully depressing brake pedal

Inspection

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

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

BRAKE PEDAL



SBR822

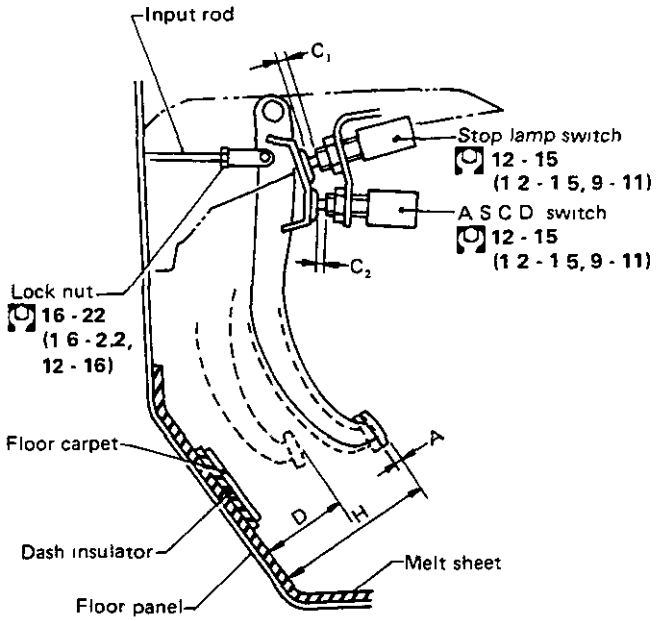
Inspection

Check brake pedal for the following items, servicing as necessary.

- Brake pedal bend
- Clevis pin deformation
- Crack for any welded portion

Adjustment

Check brake pedal free height from melt sheet Adjust if necessary



N·m (kg-m, ft-lb)

SBR838

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 More than 90 mm (3.54 in)

A/T More than 90 mm (3.54 in)

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

C_1: *Clearance between pedal stopper and threaded* end of stop lamp switch.

0.3 - 1.0 mm (0.012 - 0.039 in)

C_2: 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

0.3 - 3.8 mm (0.012 - 0.150 in)

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

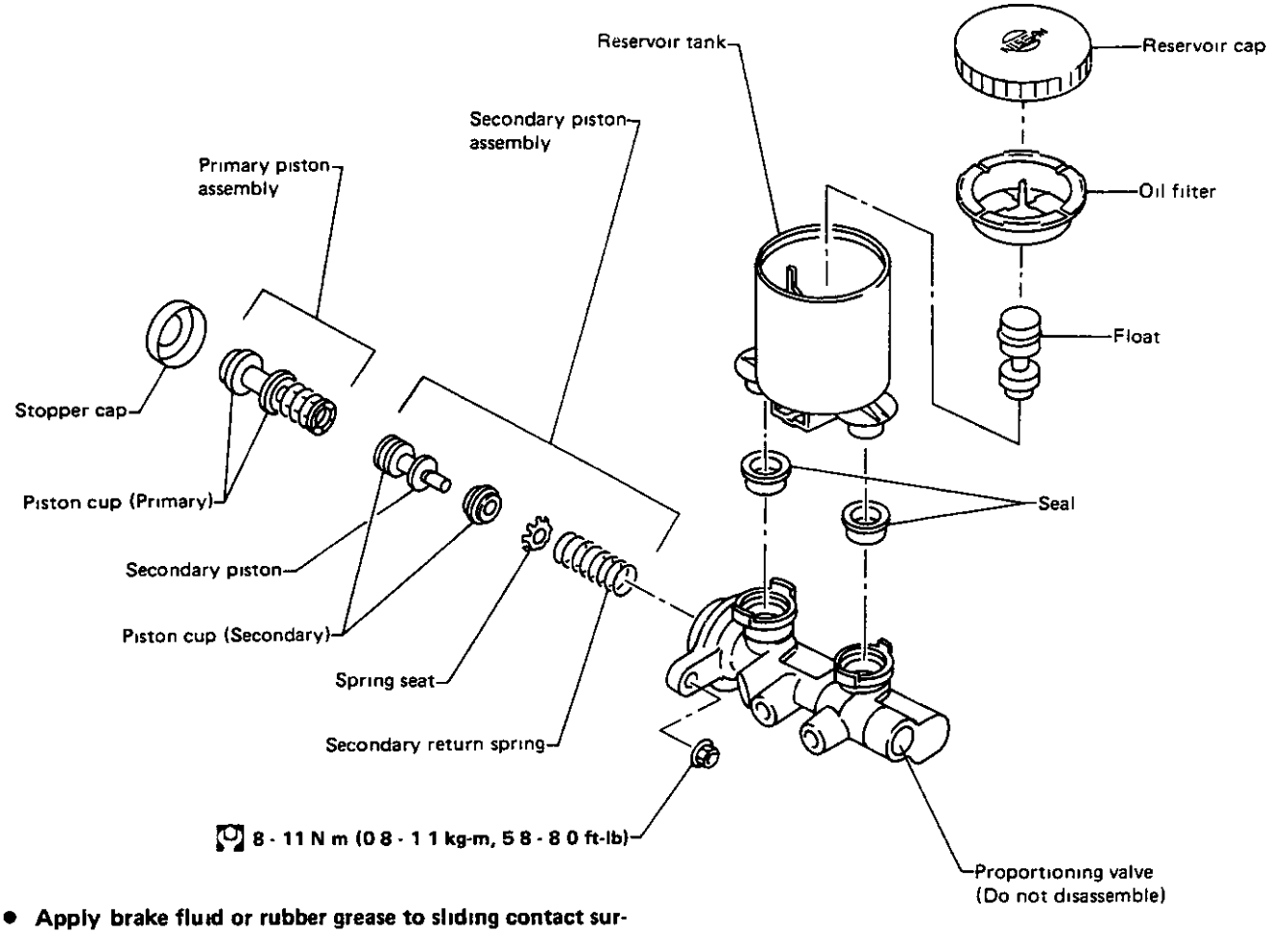
(2) Adjust clearance "C_1" and "C_2" with stop lamp switch and A.S.C.D. switch respectively. Then tighten lock nuts.

(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.



- **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.**

SBR823

BRAKE BOOSTER

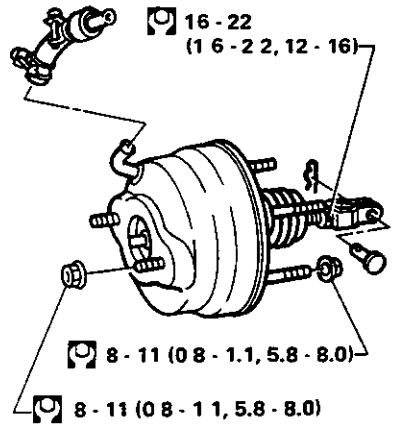
Operating Check

- Depress brake pedal several times with engine off, then check that there is not 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



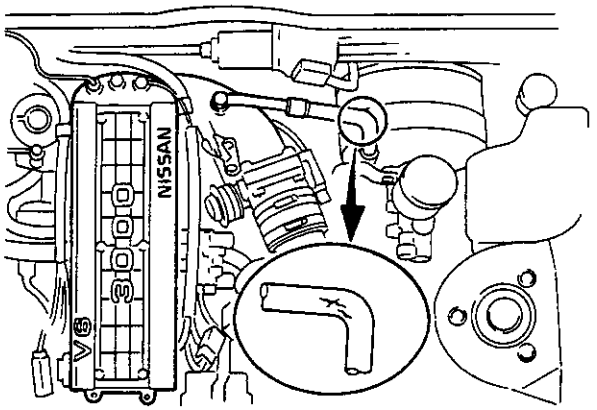
N·m (kg-m, ft-lb)

SBR831

Inspection

HOSES AND CONNECTORS

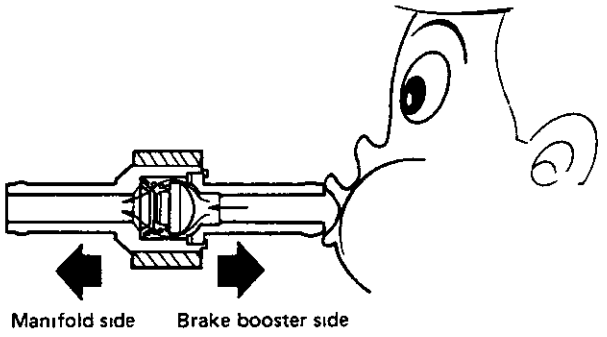
- Check condition of vacuum hoses and connections.
- Check vacuum hoses and check valve for air tightness



SBR832

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

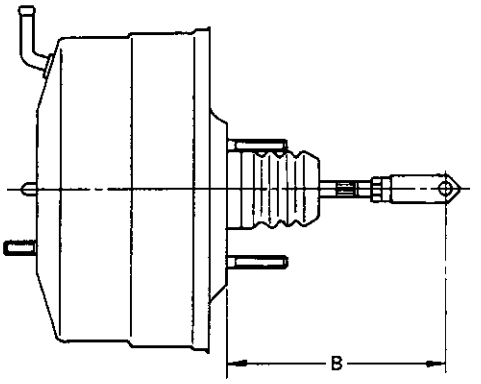
PV servo cannot be adjusted as output rod thread portion is secured by adhesive

Adjustment

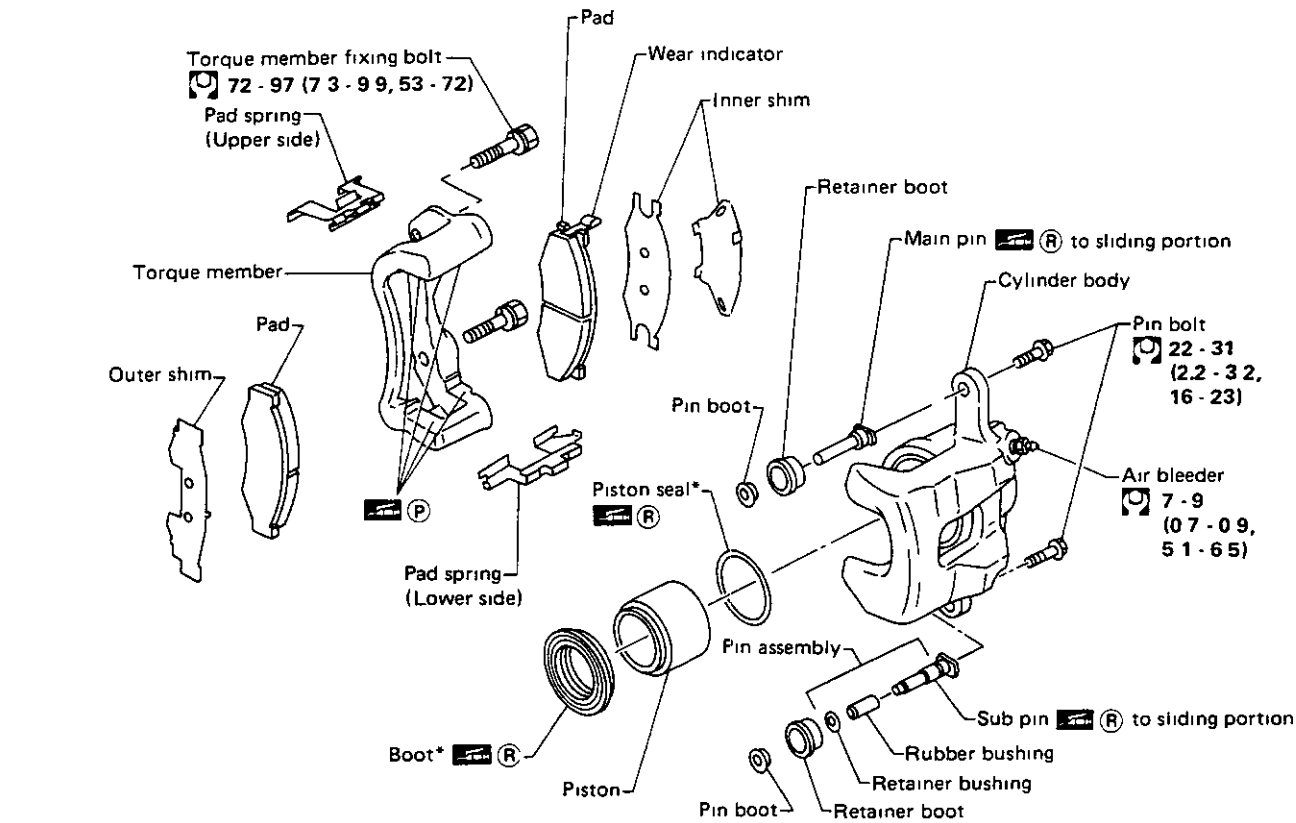
INPUT ROD LENGTH

Adjust length by turning clevis.

Length "B":
140 mm (5.51 in)



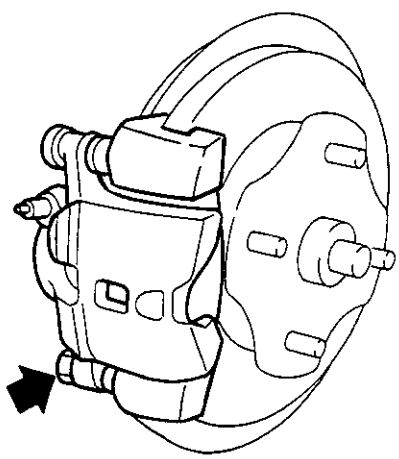
SBR833



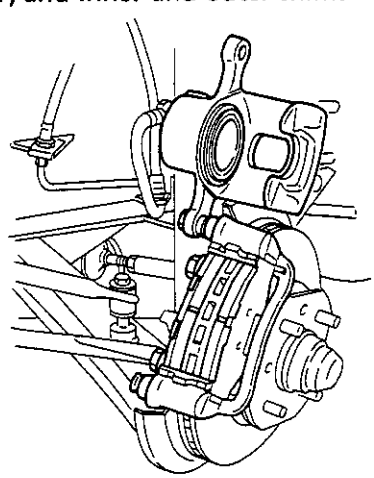
Pad Replacement

CAUTION:
When cylinder body is open, do not depress brake pedal, or piston will pop out.

1. Remove pin bolt.


SBR732

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

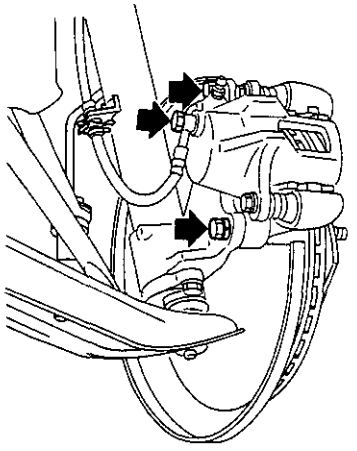

SBR825

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

FRONT DISC BRAKE (CL28VA, CL28VB) — Caliper

Removal and Installation

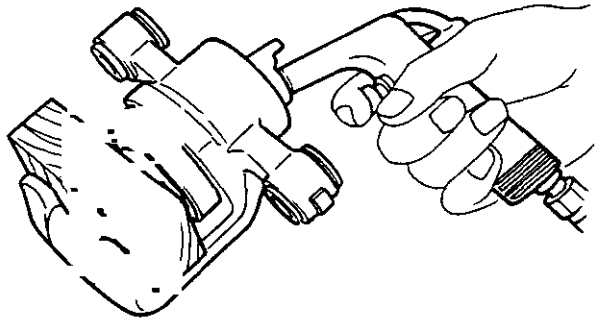
Remove torque member fixing bolts and brake hose connector



SBR839

Disassembly

Push out piston with dust seal using compressed air



SBR772

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 of 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.

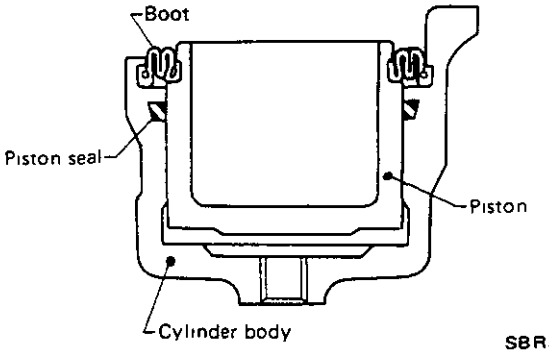
CAUTION:
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials is stuck to sliding surface.

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

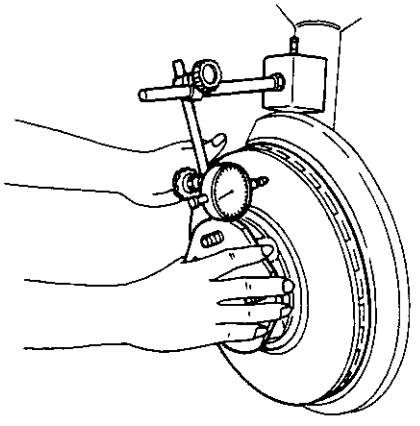
Inspection

RUBBING SURFACE

Check rotor for roughness, cracks or chips.

RUNOUT

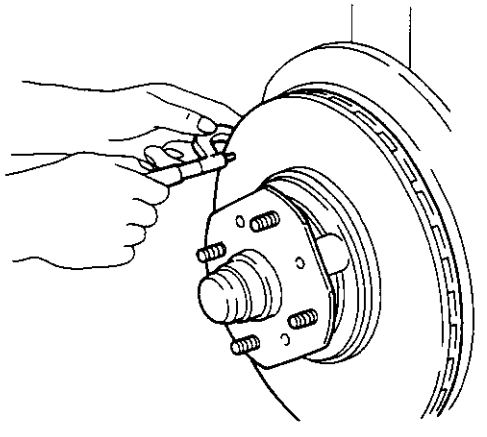
Make sure axle shaft has no axial end play Then check runout using a dial guage.



SBR826

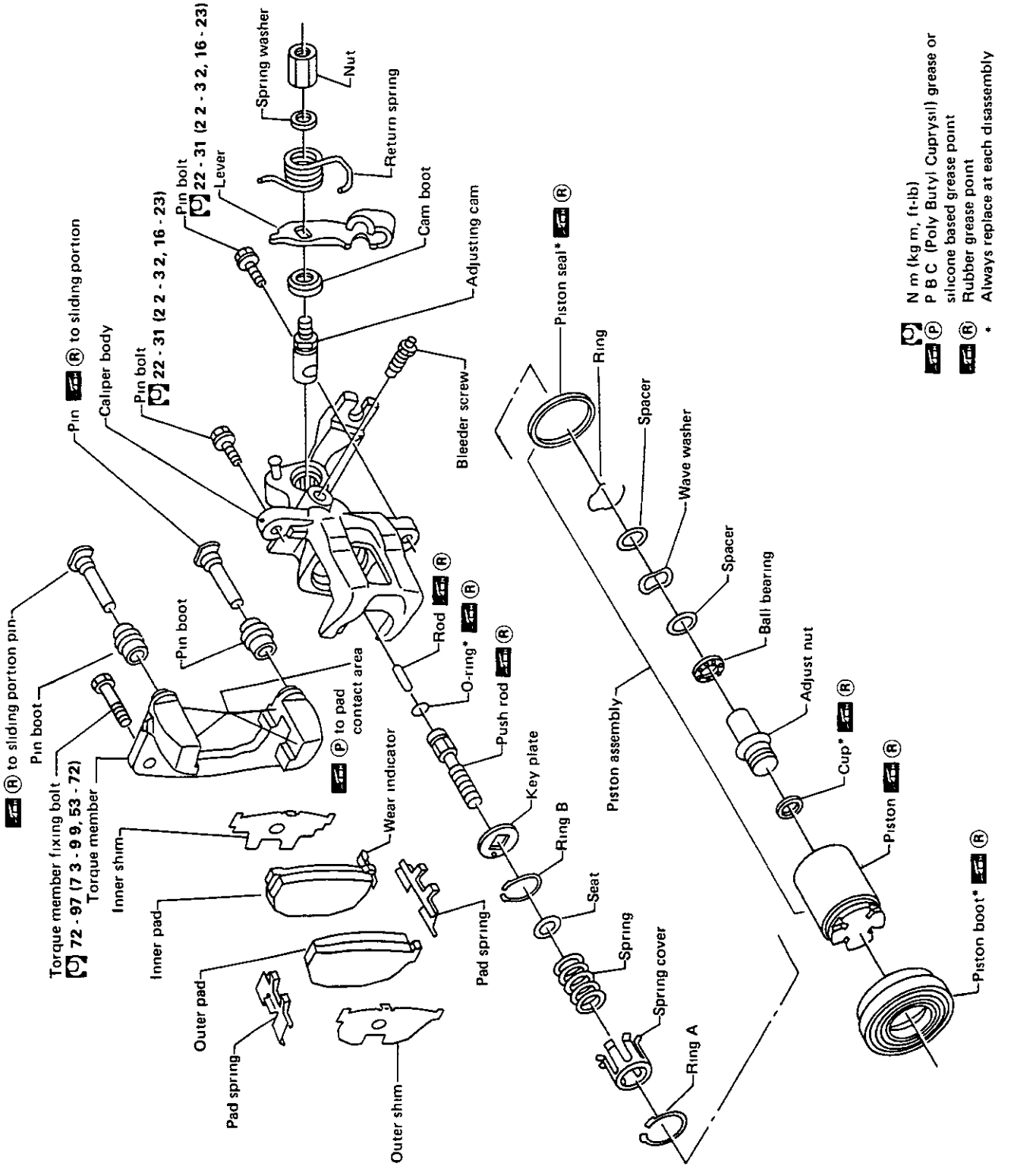
Rotor repair limit:
Maximum runout
(Total indicator reading at center of rotor pad contact surface)
Less than 0.07 mm (0 0028 in)

THICKNESS



SBR827

Rotor repair limit:
Minimum thickness
More than 20.0 mm (0.787 in)

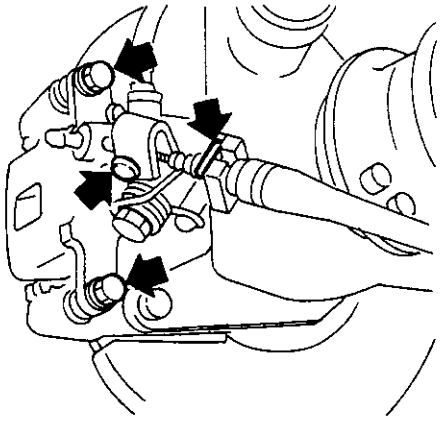

Spring washer
Nut
Return spring
Lever
Pin bolt
22 - 31 (2.2 - 3.2, 16 - 23)
Cam boot
Adjusting cam
Pin bolt
22 - 31 (2.2 - 3.2, 16 - 23)
Caliper body
Pin
(R) to sliding portion
Bleeder screw
Piston seal* (R)
Ring
Spacer
Wave washer
Spacer
Ball bearing
Adjust nut
Cup* (R)
Piston (R)
Piston boot* (R)
Piston assembly
Rod (R)
O-ring* (R)
Push rod (R)
Key plate
Ring B
Seat
Spring
Spring cover
Ring A
(R) to sliding portion pin
Pin boot
Torque member fixing bolt
72 - 97 (7.3 - 9.9, 53 - 72)
Torque member
Inner shim
Inner pad
Outer pad
Pad spring
Outer shim
Pad spring
Wear indicator
(P) to pad contact area
Pin boot
N·m (kg-m, ft-lb)
(P) (B) (C) (Poly Butyl Cuprysil) grease or silicone based grease point
(R) Rubber grease point
* Always replace at each disassembly

SBR828

Pad Replacement

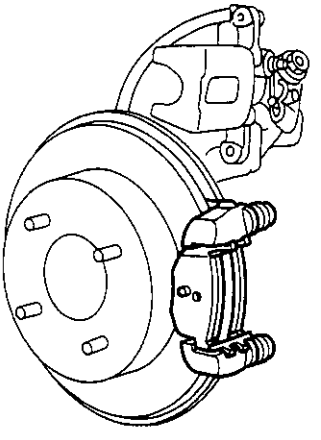
CAUTION:
When cylinder body is open, do not depress brake pedal, or piston will pop out.

1 Disconnect parking brake cable, then remove pin bolts



SBR840

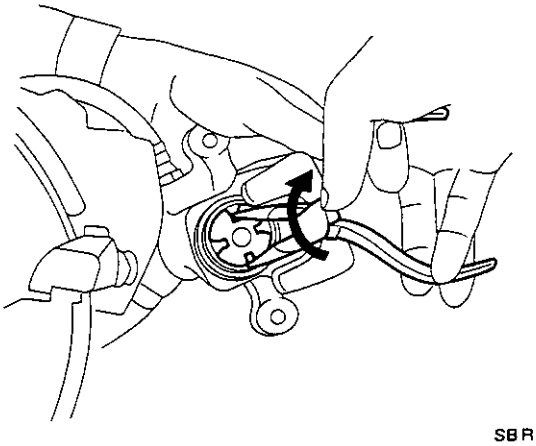
2 Remove pad retainer, pads and shims.



SBR640

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

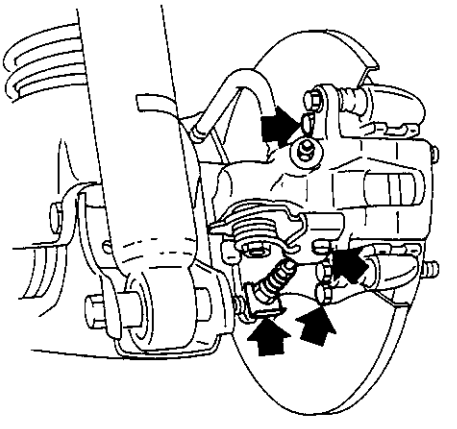
Be careful not to damage piston boot or get oil on rotor.
Always replace shims when replacing pads.



SBR641

Removal and Installation

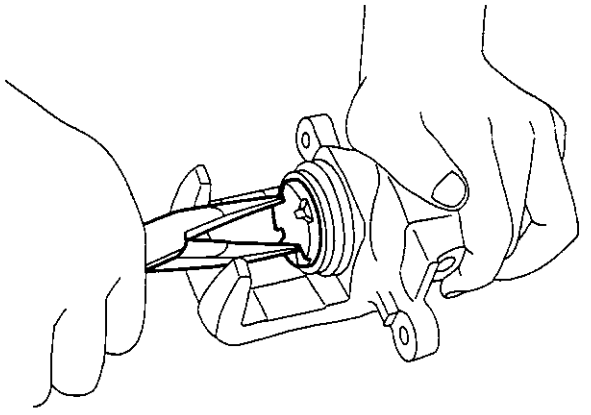
Disconnect parking brake cable and brake hose, then remove caliper assembly



SBR841

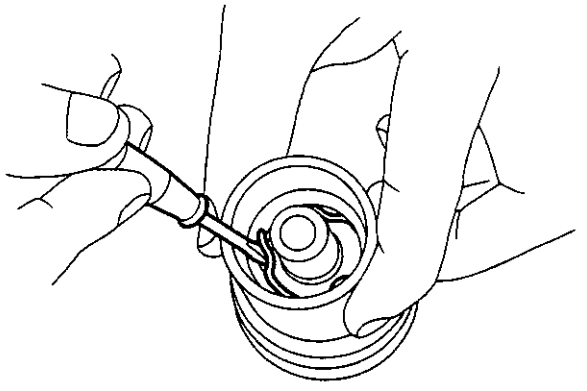
Disassembly

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



SBR646

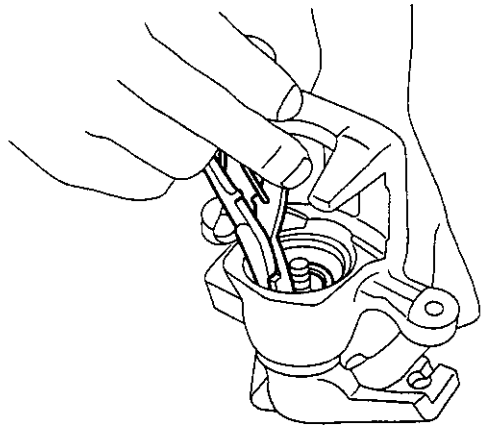
2 Pry off ring from piston and remove adjusting nut



SBR648

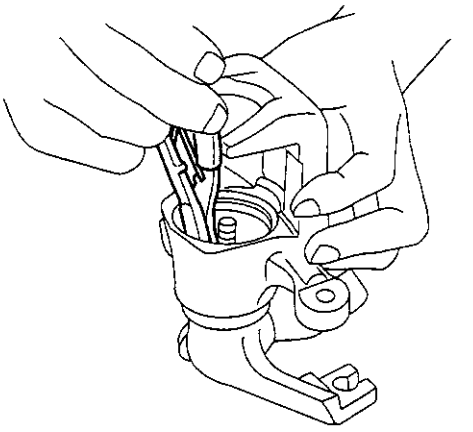
3 Disassembly cylinder body

(1) Pry off ring A with suitable pliers, then remove spring cover, spring and seat



SBR651

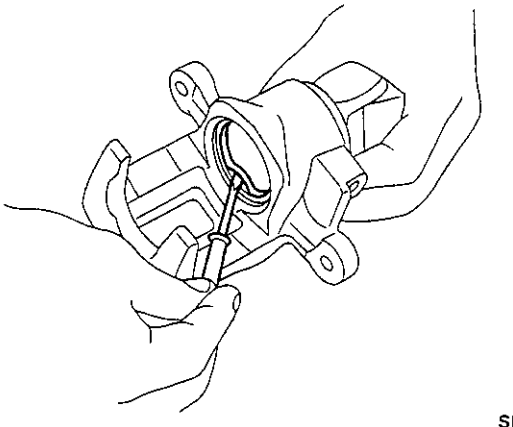
(2) Pry off ring B, then remove key plate, push rod and rod



SBR653

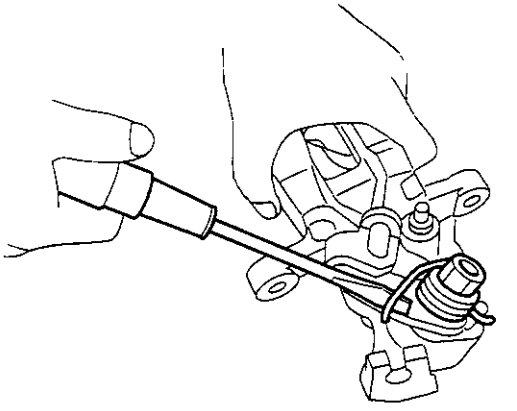
(3) Remove piston seal

Be careful not to damage cylinder body



SBR656

4. Remove return spring and lever



SBR657

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 of 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 of the above conditions are observed

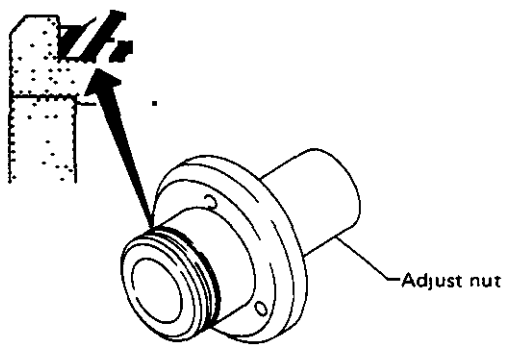
CAUTION.
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

PIN AND PIN BOOT

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

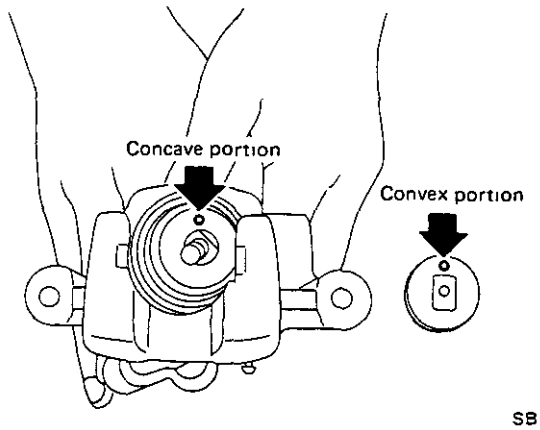
Assembly

- Install cup securely in the specified direction



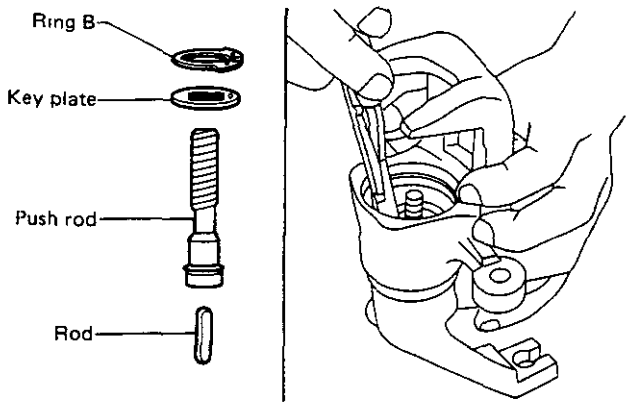
SBR849

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



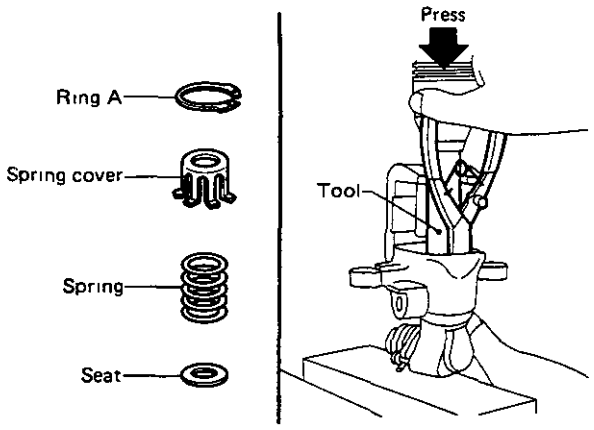
SBR842

- Install ring B with suitable tool



SBR843

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



SBR844

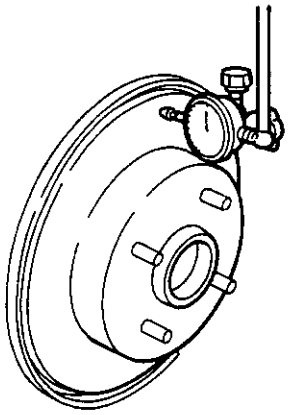
Inspection

RUBBING SURFACE

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

RUNOUT

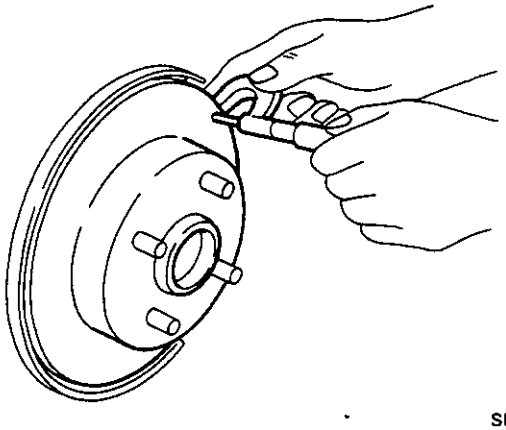
Make sure that axial end play is within the specifications before measuring Refer to section RA
Then check runout using a dial guage.



SBR845

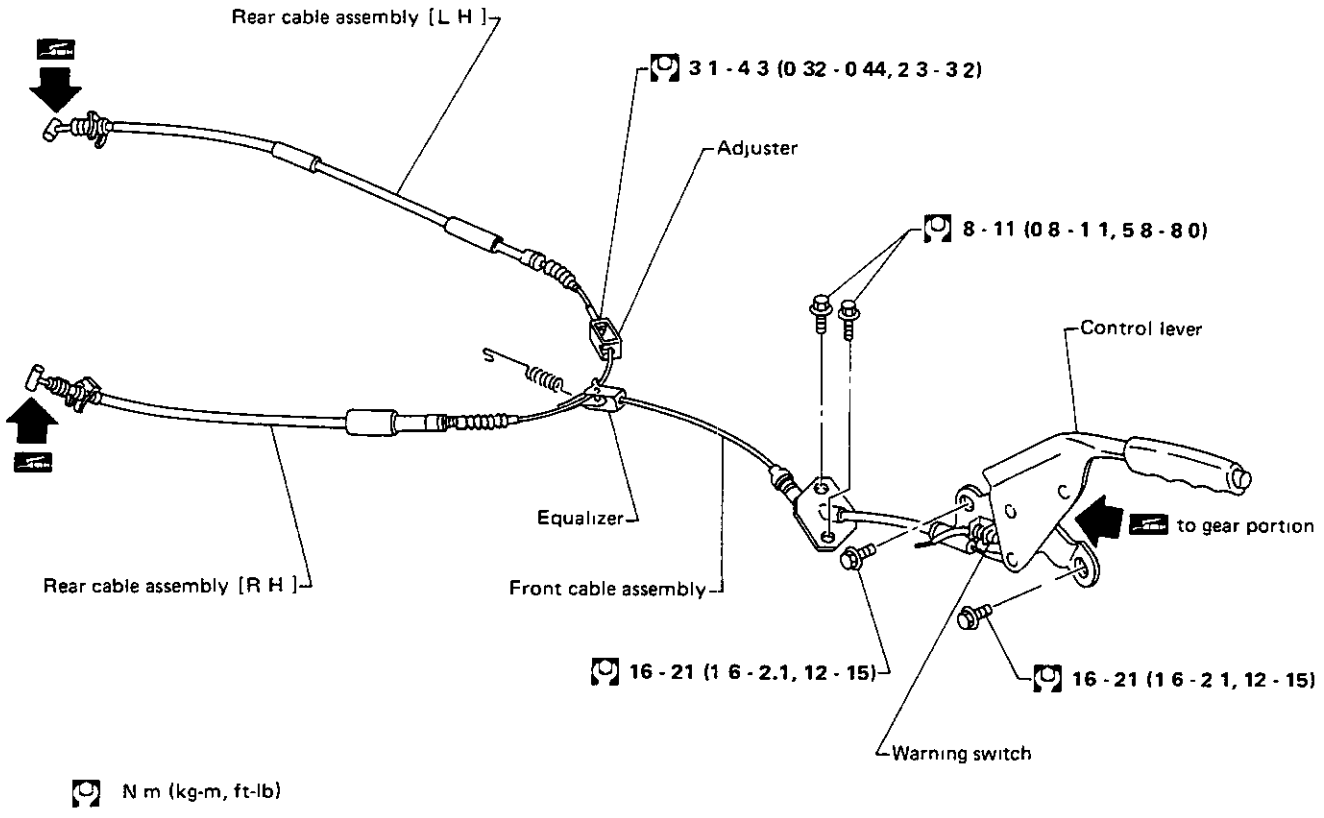
Rotor repair limit:
Maximum runout
(Total indicator reading at
center of rotor pad contact surface)
Less than 0.07 mm (0.0028 in)

THICKNESS



SBR847

Rotor repair limit:
Minimum thickness
More than 9.0 mm (0.354 in)

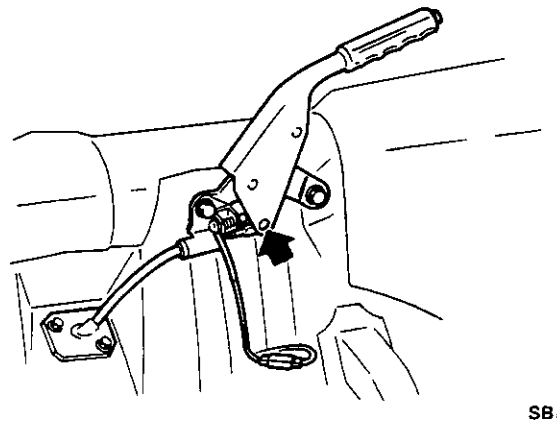


SBR834

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.



SBR835

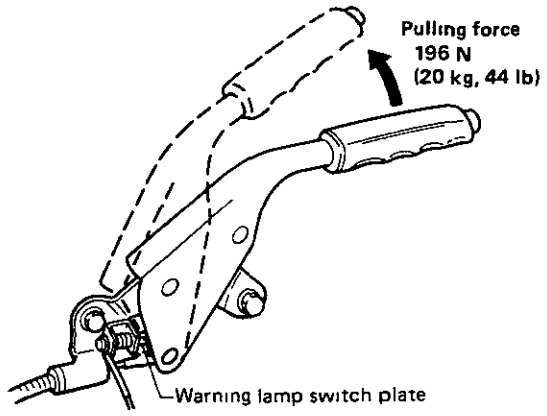
Inspection

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

Adjustment

STROKE

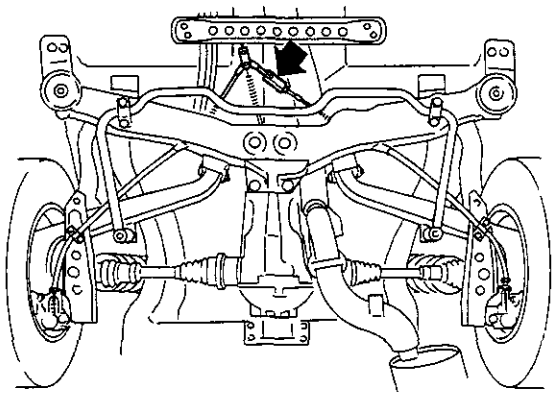
- Pull lever with specified amount of force
  Check lever stroke and smooth operation



Number of notches 8 - 9

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.

General Specifications

Item \ Engine	VG30E		VG30ET
Grade	SF	GL, GL-L	GL, GL-L
Front brake Brake model	CL28VA	CL28VB	
Pad Width x thickness x length mm (in)	Inner 43 x 11 x 126 5 (1 69 x 0 43 x 4 98) Outer 43 x 11 x 129 0 (1 69 x 0 43 x 5 08)		
Rotor outer diameter mm (in)	250 (9 84)	274 (10 79)	
Caliper inner diameter mm (in)	60 6 (2 386)		
Rear brake Brake model	CL14H	CL14HB	
Pad Width x thickness x length mm (in)	40 x 8 0 x 75 (1 57 x 0 315 x 2 95)		
Rotor outer diameter mm (in)	258 (10 16)	290 (11 42)	
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)		
Sprit point kPa (kg/cm², psi)	3,923 (40, 569)		3,432 (35, 498)
Reducing ratio	0 4		
Recommended brake fluid	DOT 3		

Inspection and Adjustment

BRAKE PEDAL

Pedal ratio		3 8
Maximum stroke	mm (in)	More than 134 (5 28)
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)	More than 90 (3 54)
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)	0 3 - 3 8 (0 012 0 150)

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 - 9

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)

BRAKE BOOSTER

Maximum vacuum leakage (15 seconds after engine is stopped) kPa (mmHg, inHg)		3 3 (25, 0 98)
Input rod length	mm (in)	140 (5 51)

Inspection and Adjustment (Cont'd)

DISC BRAKE

	Front brake		Rear brake	
Brake model	CL28VA	CL28VB	CL14H	CL14HB
Pad repair limit Minimum thickness mm (in)	2 (0 08)		2 (0 08)	
Rotor repair limit Maximum runout mm (in)	Less than 0 07 (0 0028)		Less than 0 07 (0 0028)	
Minimum thickness mm (in)	More than 20 0 (0 787)		More than 9 0 (0 354)	

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	22 - 31	2 2 - 3 2	16 - 23
Disc rotor to wheel hub	49 69	5 0 7 0	36 - 51
Rear disc brake			
Baffle plate	8 - 11	0 8 - 1 1	5 8 8 0
Torque member fixing bolt	72 - 97	7 3 - 9 9	53 72
Torque member to cylinder body	22 - 31	2 2 - 3 2	16 - 23
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

SPEIAL SERVICE TOOL

* Special tool or a commercial equivalent

Tool number (Kent-Moore No)	Tool name	
GG94310000* (–)	Flare nut torque wrench