

# BRAKE SYSTEM

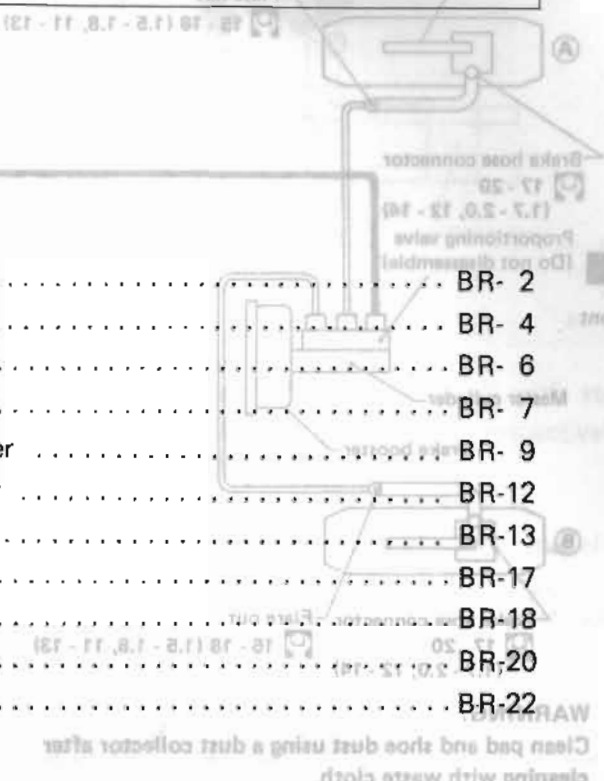
# SECTION BR

**CAUTION**

Be careful not to damage the brake tube when you are installing the universal joint.

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Primary line  
Secondary line

## Bleeding Procedure

**BR**



**PRECAUTIONS**

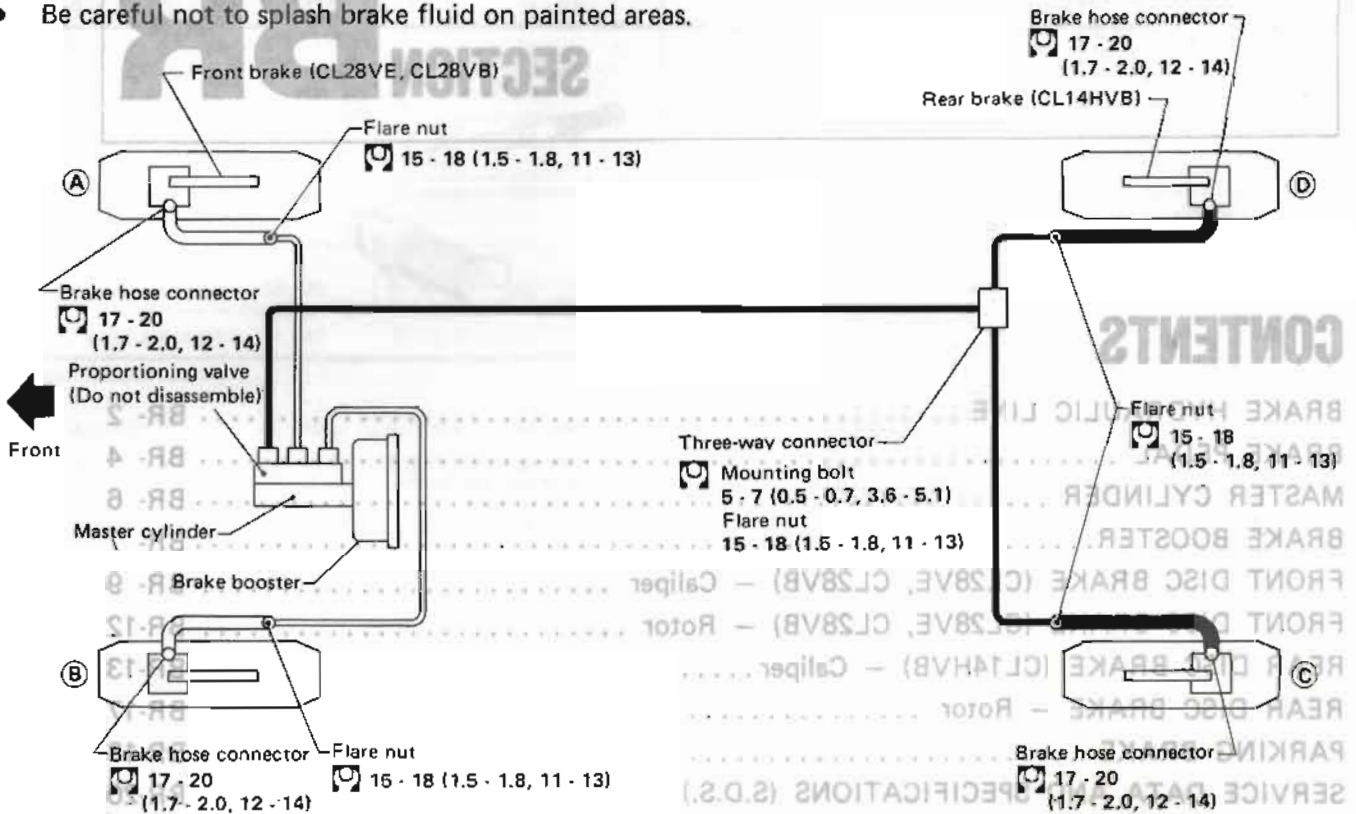
Carefully monitor brake fluid level at master cylinder during bleeding operation.

- 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)

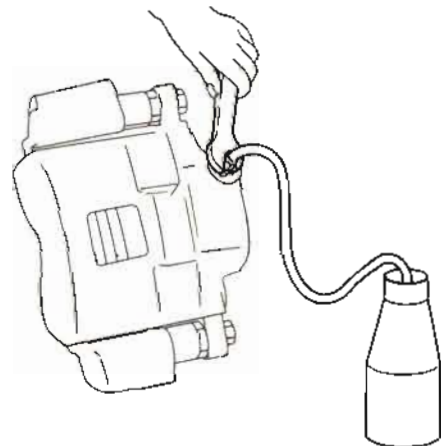
SBR821

## 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.



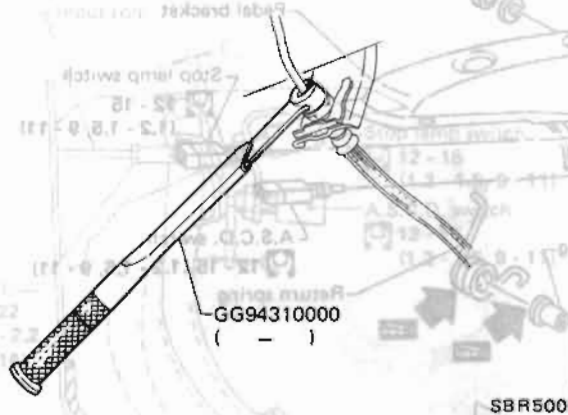
SBR606

# BRAKE HYDRAULIC LINE

## Removal and Installation

### CAUTION :

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



- 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 connectors re-tighten or, if necessary, replace damaged parts.

Adjust clearance "C<sub>1</sub>" and "C<sub>2</sub>" 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 components.

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

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

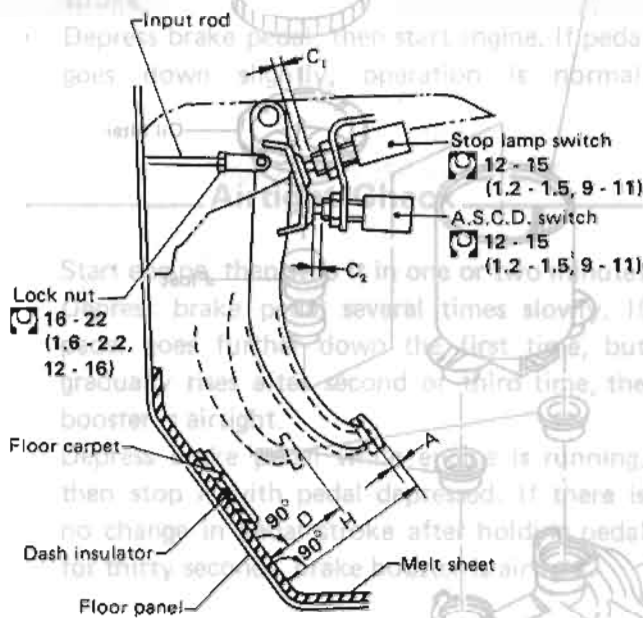





# BRAKE PEDAL

## Adjustment

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.

C<sub>1</sub>: Clearance between pedal stopper and threaded end of stop lamp switch.

0.3 - 1.0 mm (0.012 - 0.039 in)

C<sub>2</sub>: Clearance between pedal stopper and threaded end of A.S.C.D. switch.

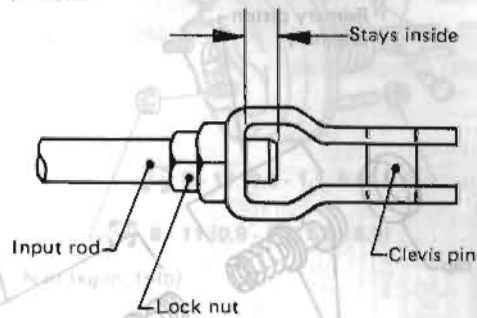
0.3 - 1.0 mm (0.012 - 0.039 in)

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.



(2) Adjust clearance "C<sub>1</sub>" and "C<sub>2</sub>" with stop lamp switch and A.S.C.D. switch respectively. Then tighten lock nuts.

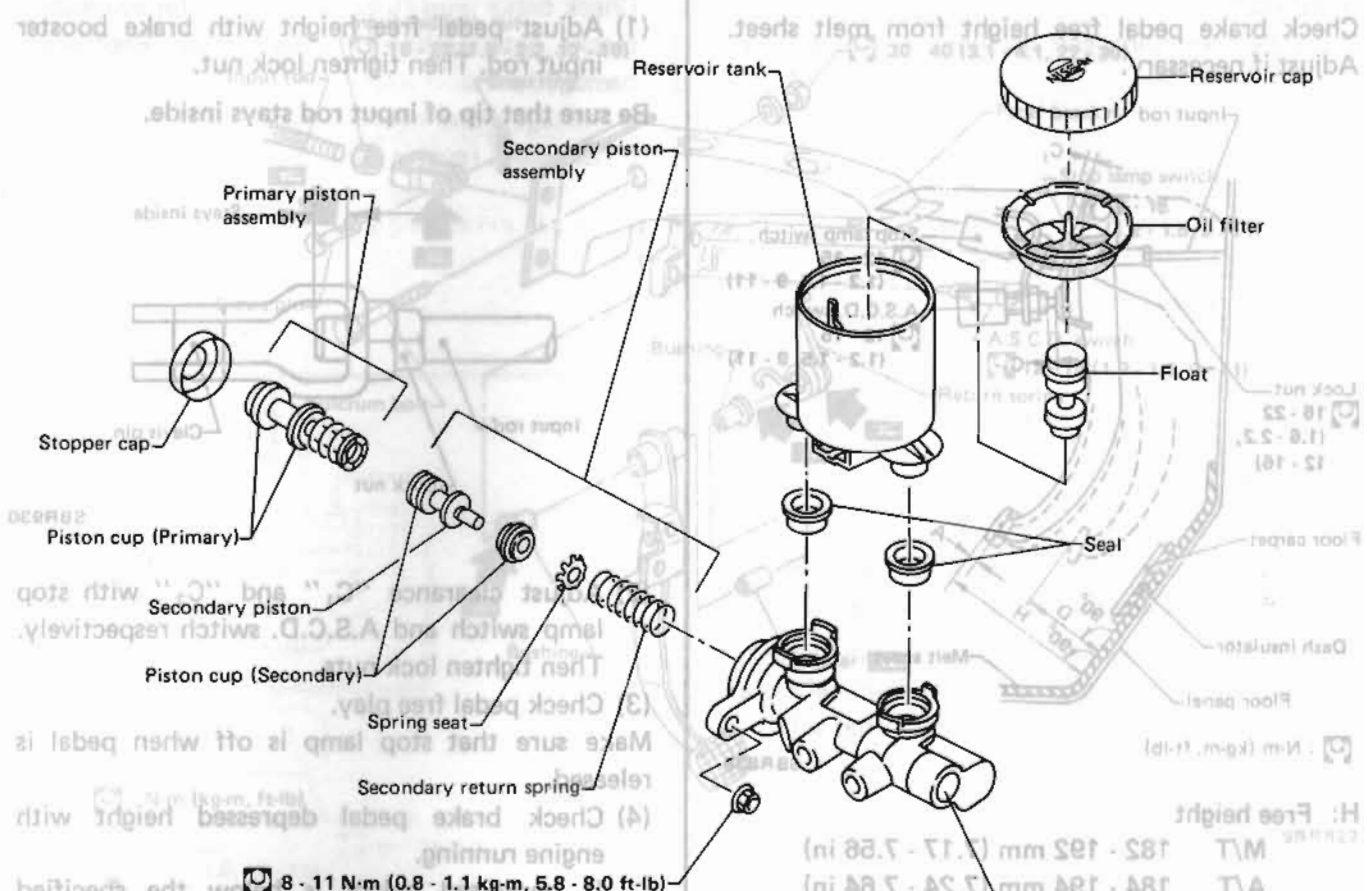
(3) Check pedal free play.

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



8 - 11 N·m (0.8 - 1.1 kg·m, 5.8 - 8.0 ft·lb)

- 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.

H: Free height  
 M/T 182 - 192 mm (7.17 - 7.56 in)  
 A/T 184 - 194 mm (7.24 - 7.64 in)

D: Depressure  
 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.

SBR823  
 Clearance between pedal stopper and threaded end of stop lamp switch.  
 0.3 - 1.0 mm (0.012 - 0.039 in)

C: 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)

# BRAKE BOOSTER

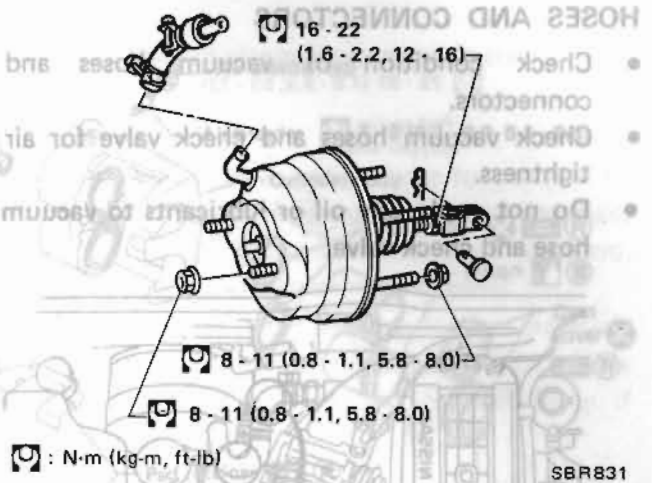
## Operating Check

- 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.

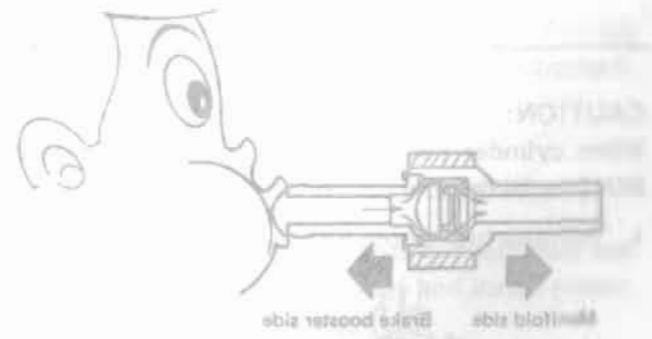
## Removal and Installation



**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.

8BR832



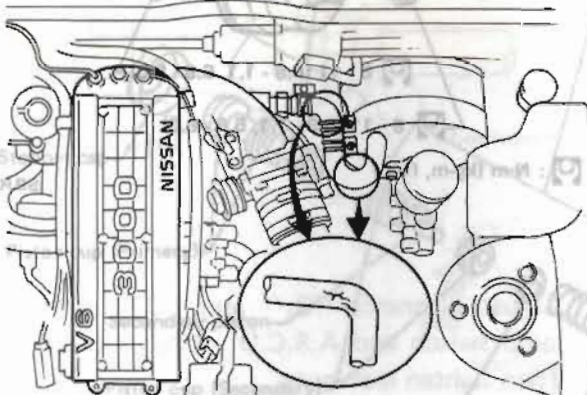


# BRAKE BOOSTER

## Inspection

### HOSES AND CONNECTORS

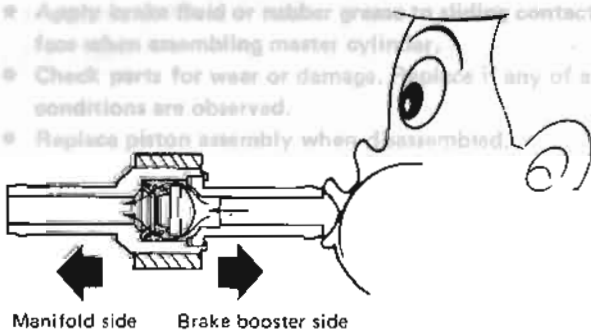
- Check condition of vacuum hoses and connectors.
- Check vacuum hoses and check valve for air tightness.
- Do not apply any oil or lubricants to vacuum hose and check valve.



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.



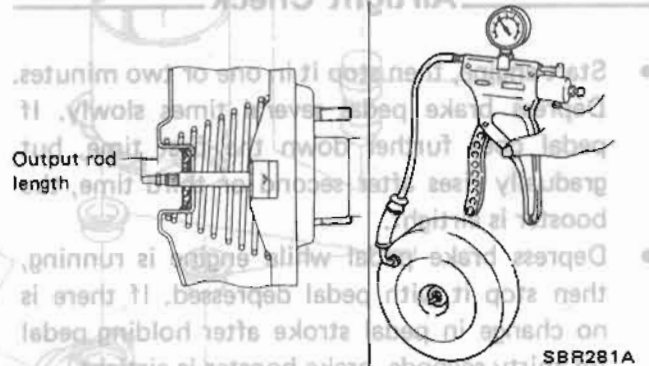
SBR846

### 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:

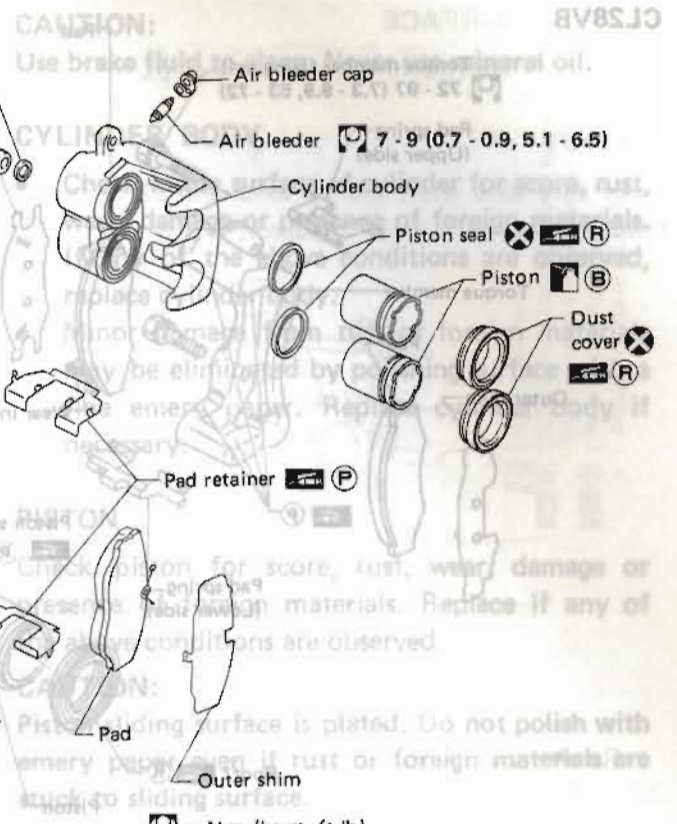
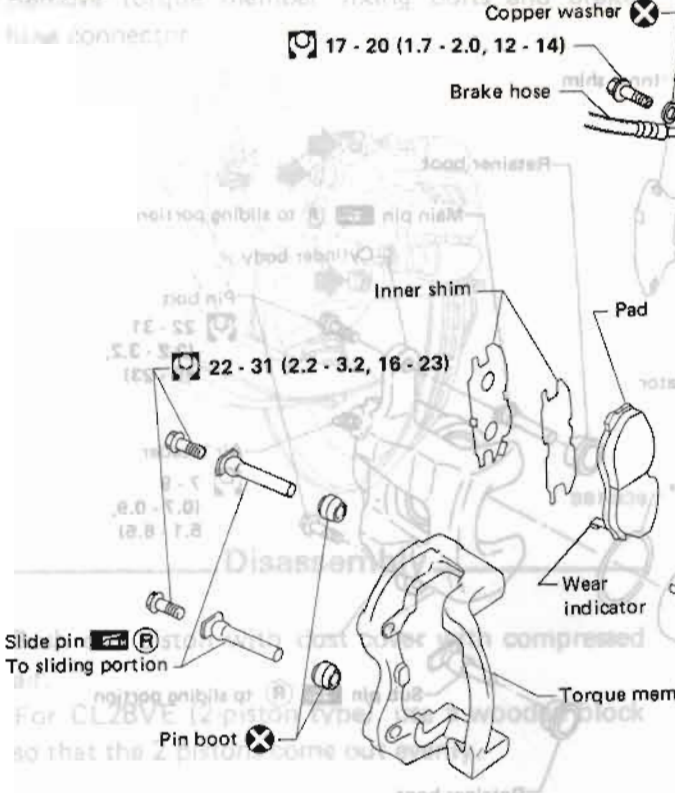
10.275 - 10.525 mm (0.4045 - 0.4144 in)



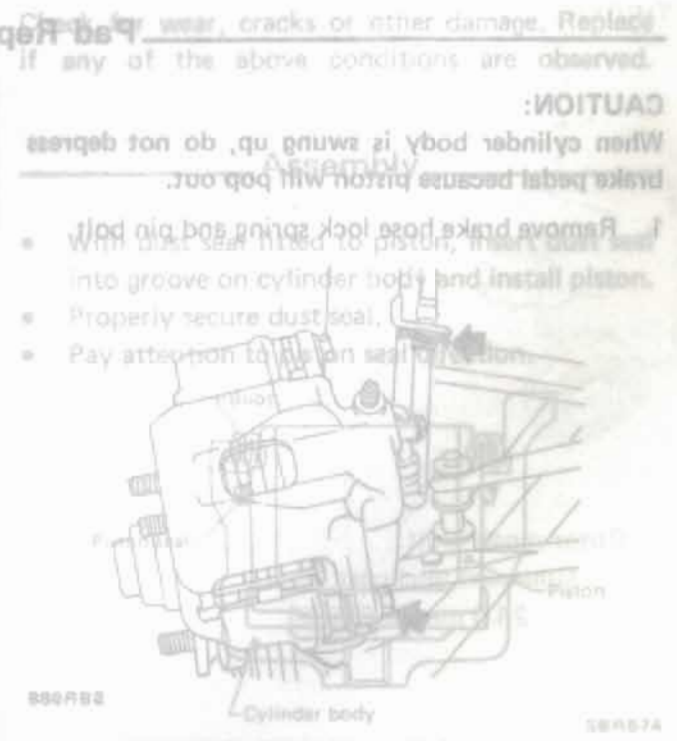


# FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

## CL28VE

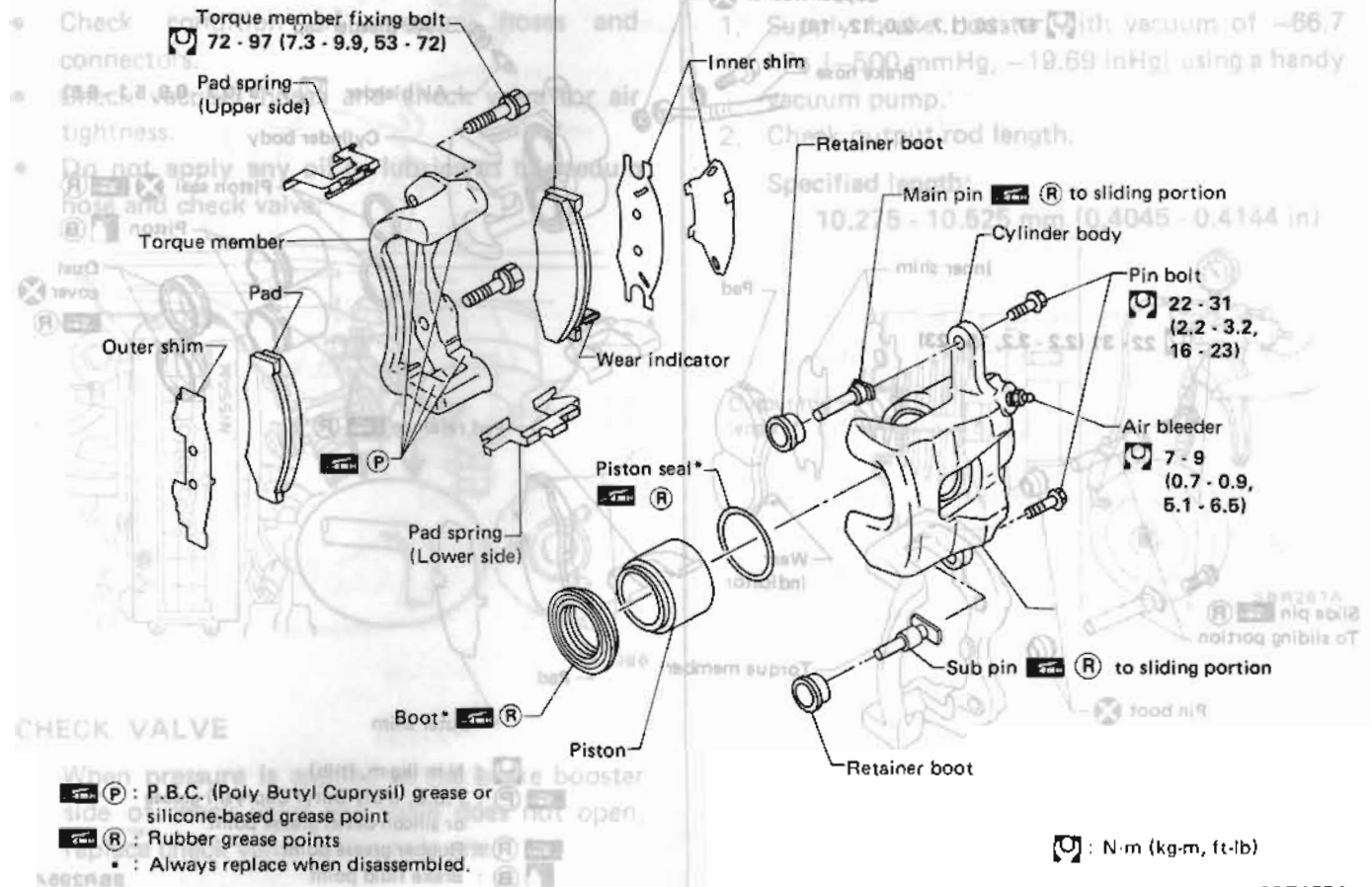


- N** : N.m (kg-m, ft-lb)
  - P** : P.B.C. (Poly Butyl Cuprysil) grease or silicon-based grease point
  - R** : Rubber grease point
  - B** : Brake fluid point
- SBR295A



# FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

## CL28VB



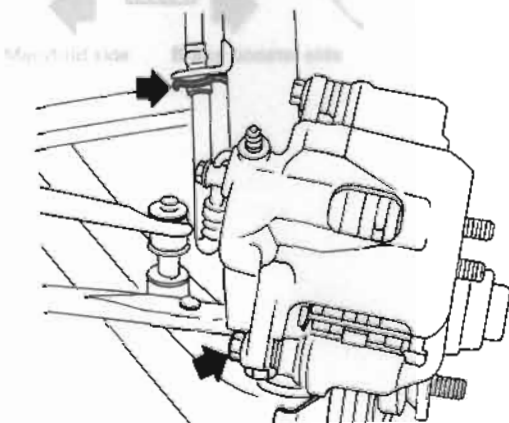
SBR157A

## Pad Replacement

### CAUTION:

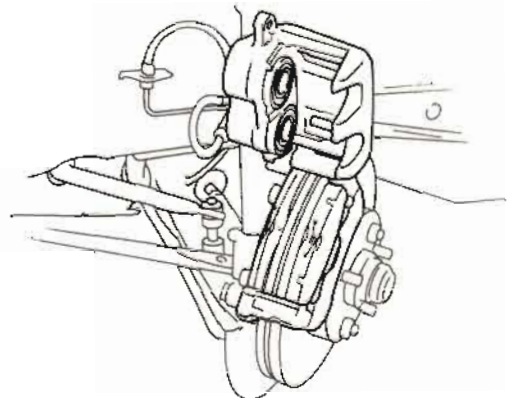
When cylinder body is swung up, do not depress brake pedal because piston will pop out.

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

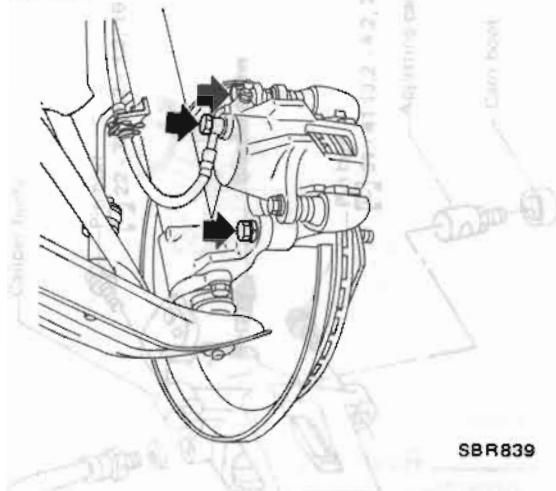
Be careful not to damage piston boot or get oil on rotor. Always replace shims when replacing pads.



# FRONT DISC BRAKE (CL28VE, CL28VB)—Caliper

## Removal and Installation

Remove torque member fixing bolts and brake hose connector.

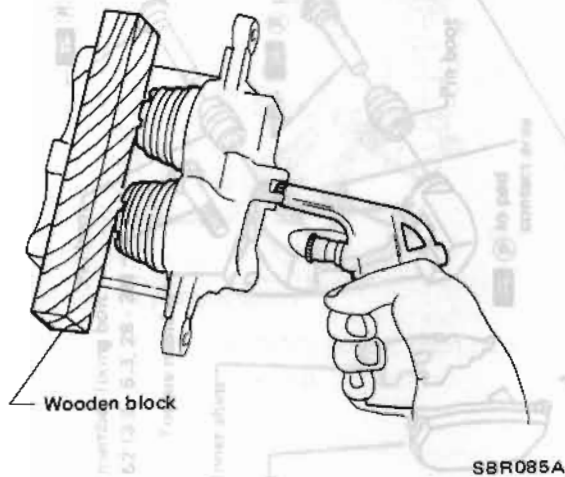


SBR839

## 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:

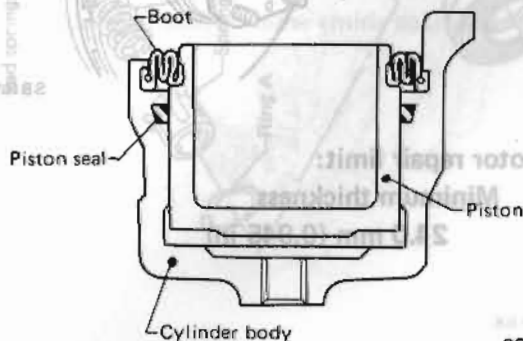
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign materials are stuck to sliding surface.

### 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

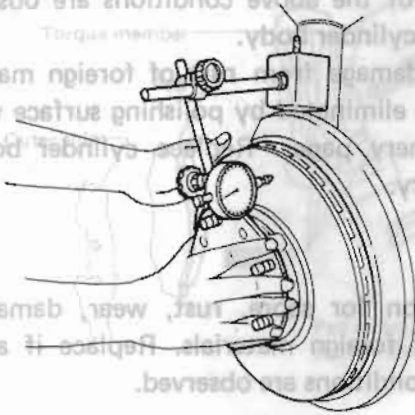
## Inspection

### 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:

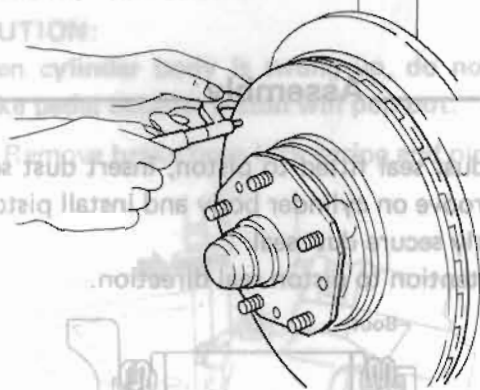
Maximum runout

(Total indicator reading at

center of rotor pad contact surface)

0.07 mm (0.0028 in)

### THICKNESS



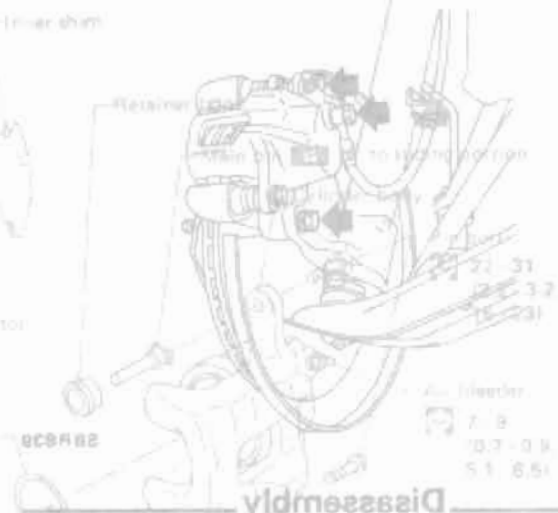
SBR169A

### Rotor repair limit:

Minimum thickness

24.0 mm (0.945 in)

Remove torque member fixing bolts and brake hose connector.



Disassembly

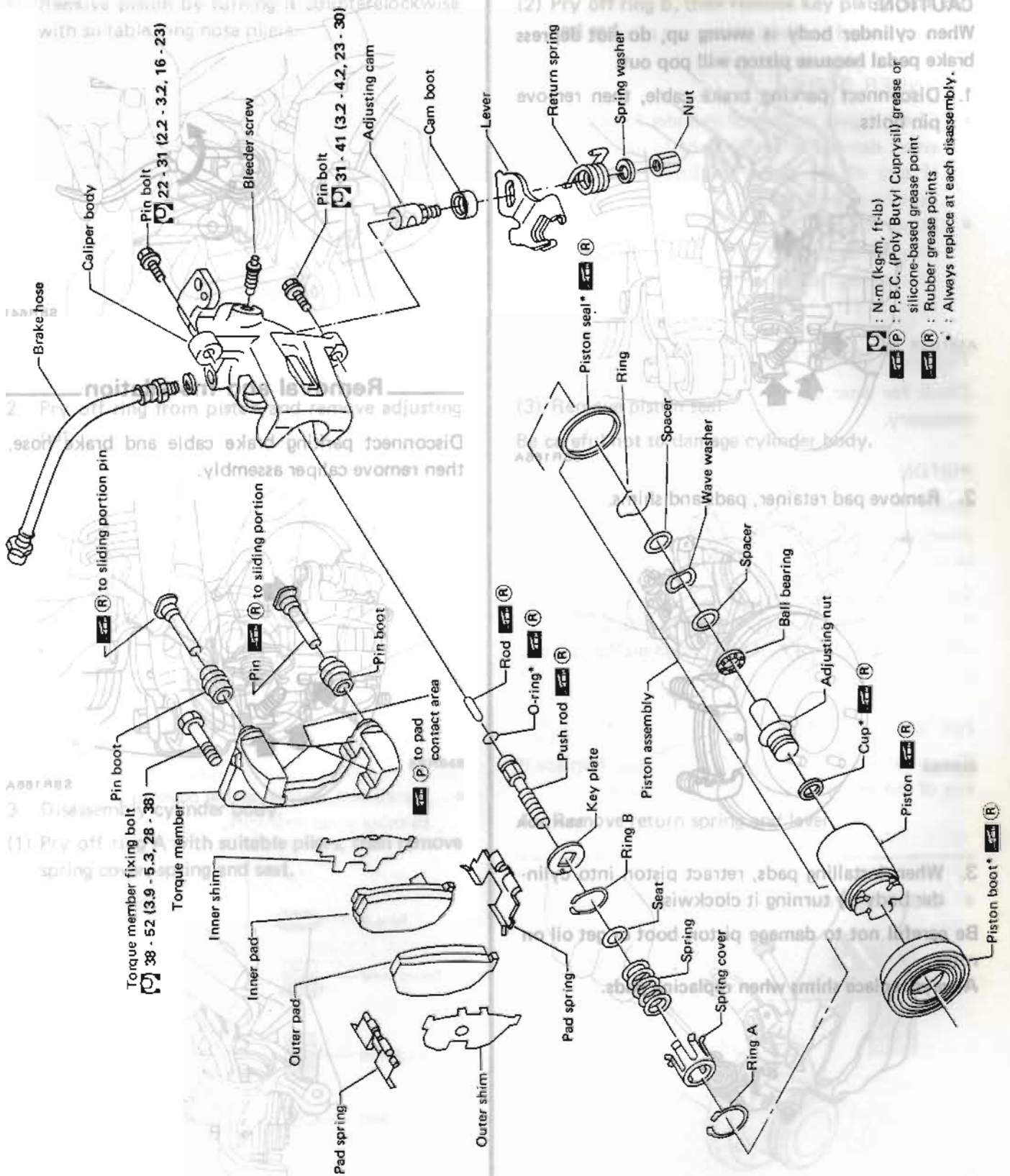
Push out piston with dust cover with compressed air. For CL28VE (2-piston type), use a wooden block so that the 2 pistons come out evenly.



SBR082A

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

# REAR DISC BRAKE (CL14HVB)—Caliper





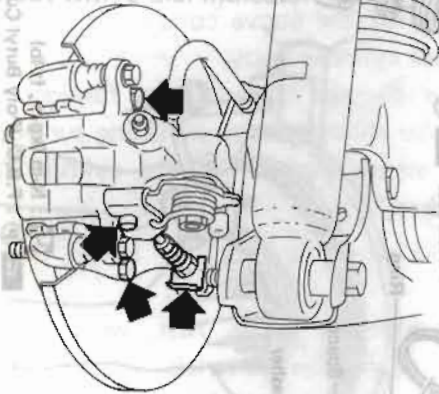
# REAR DISC BRAKE (CL14HVB)—Caliper

## Pad Replacement

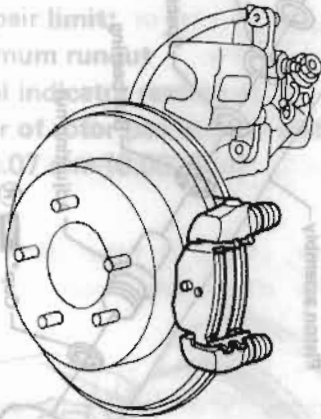
### CAUTION:

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.



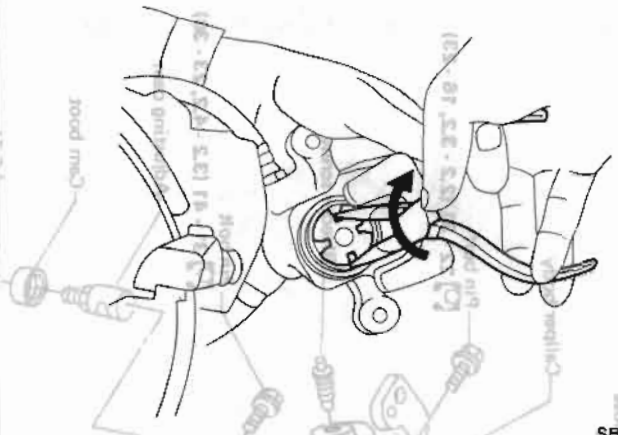
2. Remove pad retainer, pads and shims.



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

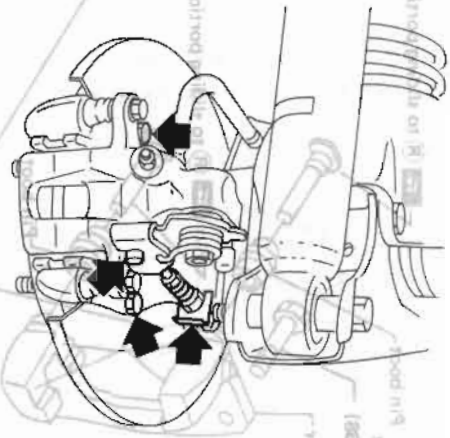
Be careful not to damage piston boot or get oil on rotor.

Always replace shims when replacing pads.



## Removal and Installation

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

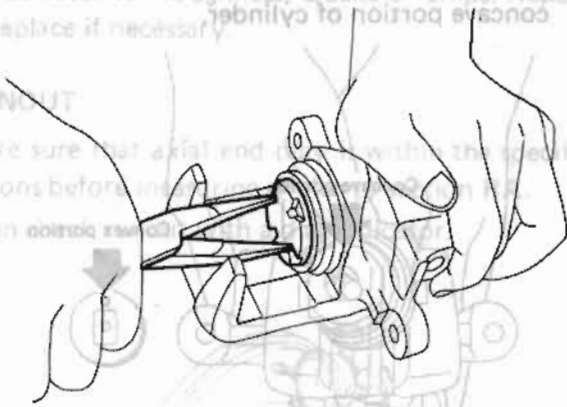




# REAR DISC BRAKE (CL14HVB)—Caliper

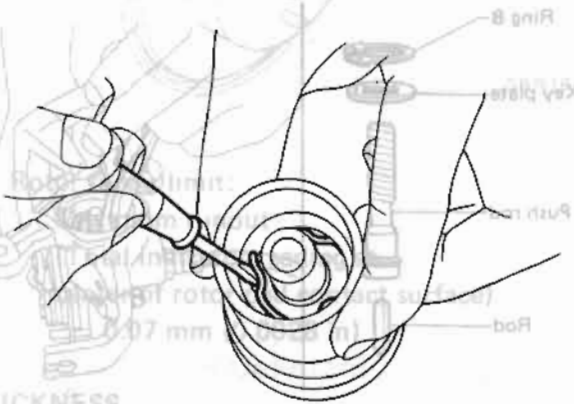
## Disassembly

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



SBR646

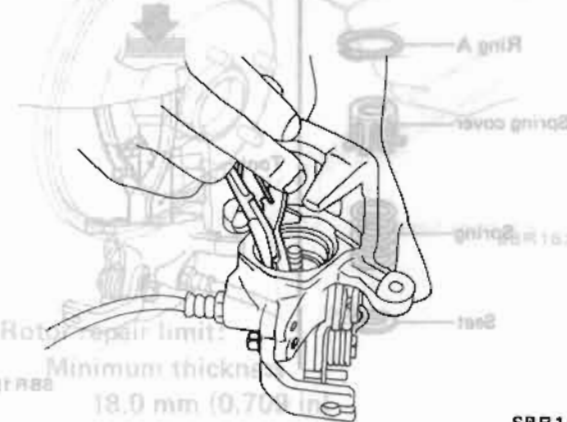
2. Pry off ring from piston and remove adjusting nut.



SBR648

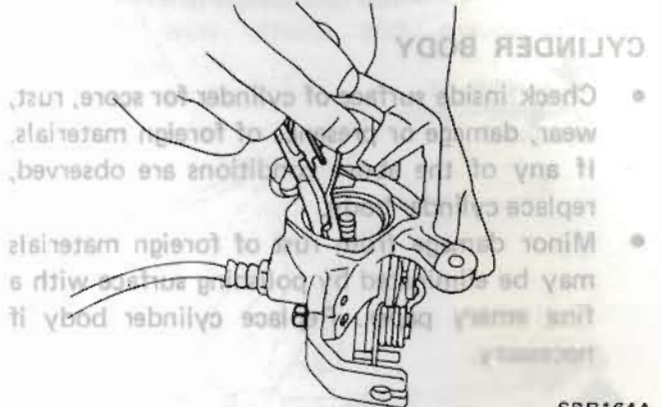
3. Disassembly cylinder body.

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



SBR148A

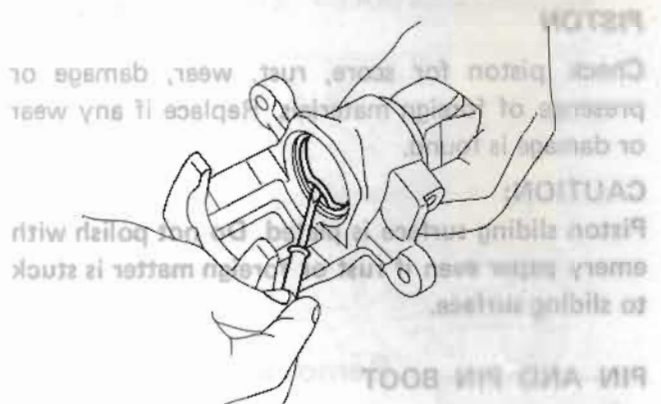
- (2) Pry off ring B, then remove key plate, push rod and rod.



SBR164A

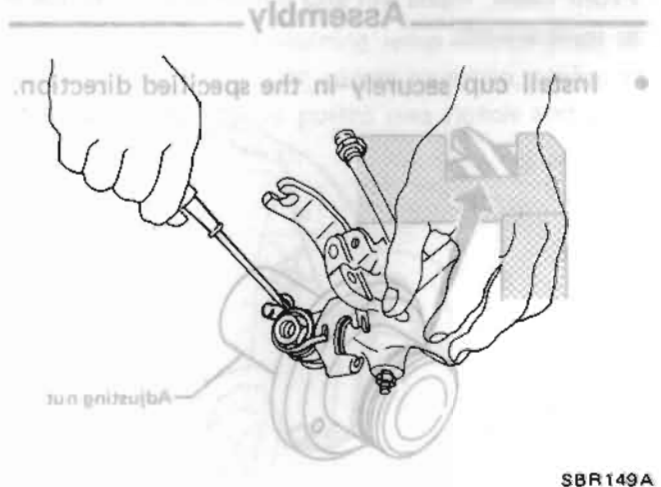
- (3) Remove piston seal.

Be careful not to damage cylinder body.



SBR656

4. Remove return spring and lever.



SBR149A

# 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:

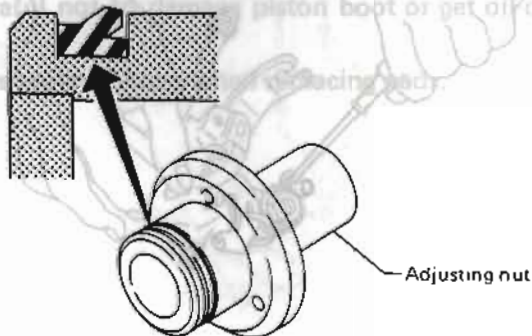
Piston sliding surface is plated. Do not polish with emery paper even if rust or foreign matter is stuck to sliding surface.

### PIN AND PIN BOOT

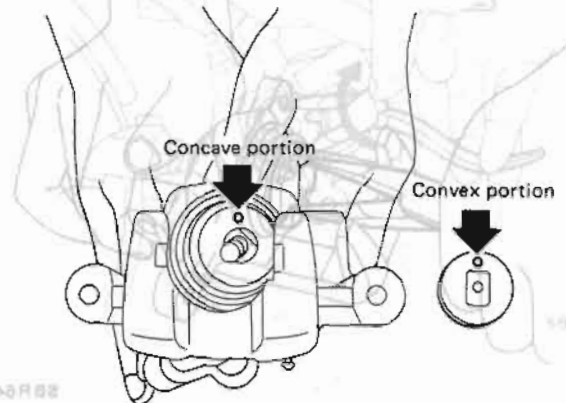
Check for wear, cracks or other damage. Replace if any of the above conditions are observed.

## Assembly

- Install cup securely in the specified direction.

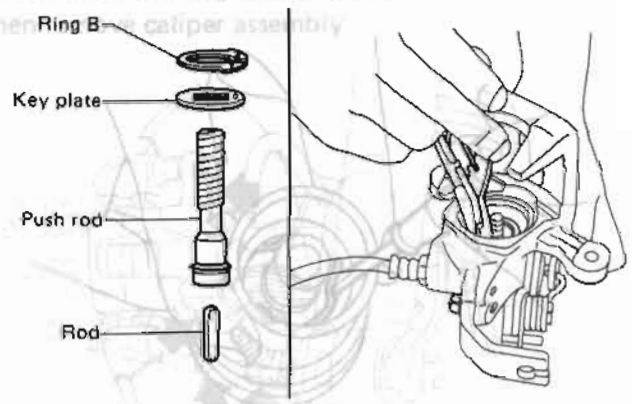


- Fit push rod into square hole in key plate. Also match convex portion of key plate with concave portion of cylinder.



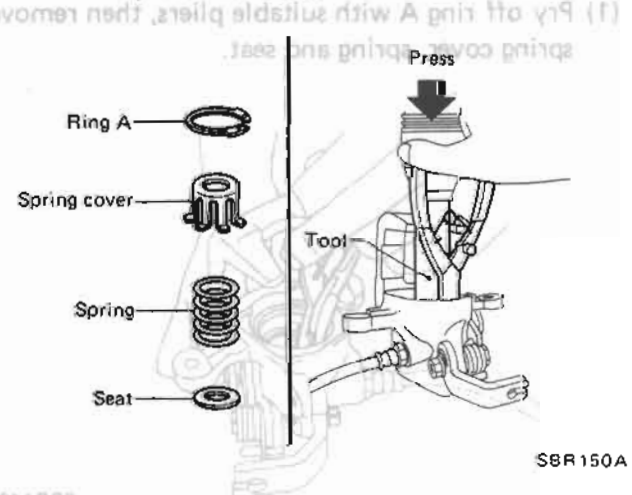
## Removal and Installation

- Install ring B with suitable tool.



## Removal and Installation

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





# REAR DISC BRAKE — Rotor

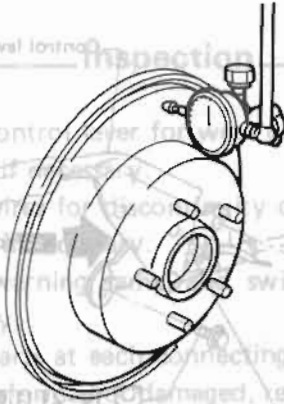
## Inspection

### 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

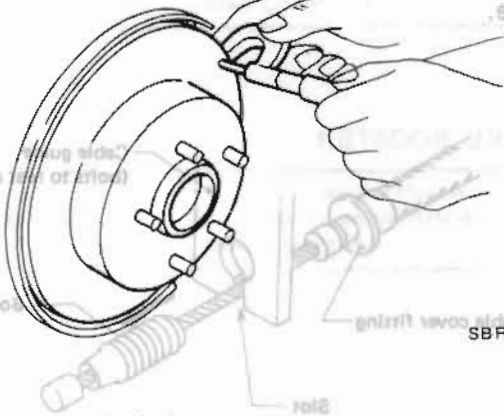
### Rotor repair limit:

#### 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.



Front cable, cable pin and control pin are available as separate items. Remove front cable from parking brake lever by pressing pin.

WARNING: Front cable, cable pin and control pin are available as separate items. Remove front cable from parking brake lever by pressing pin. That pin is not to be used when the parking brake is pulled and goes out when fully released.



SBR163



# REAR DISC PARKING BRAKE CALIPER

Inspection

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 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:  $\text{N}\cdot\text{m}$  (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.

Rear cable assembly [L.H.]

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

Equalizer

Front cable assembly

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

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

Warning switch

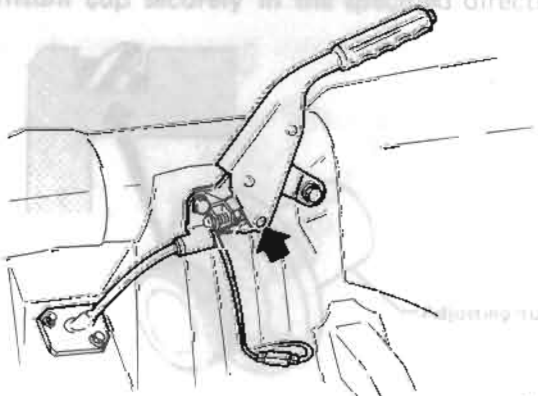
SBR163A

## 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.

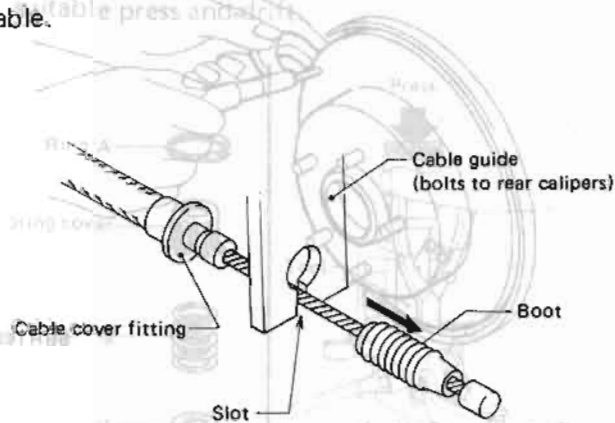
Install cup securely in the specified direction.



SBR835

## 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)  
 (19.59 inHg) is applied.)  
 kPa (mmHg, inHg)  
 1.3 (10, 0.38)

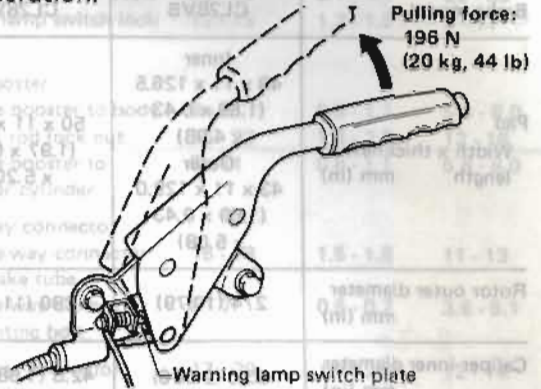
### BRAKE BOOSTER

Maximum vacuum leakage  
 (15 seconds after engine is stopped)  
 kPa (mmHg, inHg)  
 2.3 (18, 0.98)

## Adjustment

### STROKE

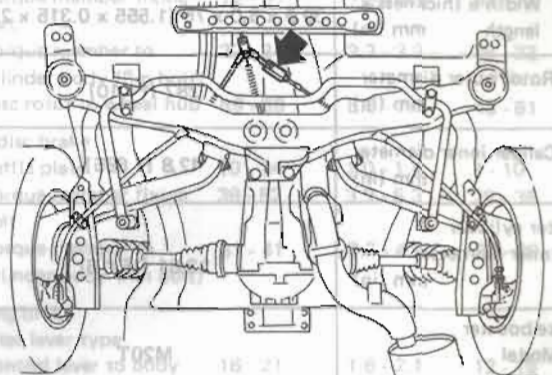
- Pull lever with specified amount of force. Check lever stroke and ensure smooth operation.



Number of notches: 8 - 10

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

## Inspection and Adjustment

### BRAKE PEDAL

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

### 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 Installation

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

### BRAKE BOOSTER

Maximum vacuum leakage [15 seconds after engine is stopped]	3.3 (25, 0.98)
kPa (mmHg, inHg)	



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

## Inspection and Adjustment (Cont'd)

### DISC BRAKE

Brake model	Front brake		Rear brake
		CL28VE	CL28VB
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
<b>Brake pedal</b>			
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
<b>Brake booster</b>			
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
<b>Three-way connector</b>			
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
<b>Front disc brake</b>			
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
<b>Rear disc brake</b>			
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
<b>Parking brake</b>			
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

