

BRAKE

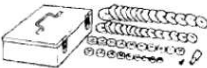
GENERAL DESCRIPTION	BR- 2
PREPARATION	BR- 2
TROUBLESHOOTING	BR- 4
CHECK AND ADJUSTMENT	BR- 4
MASTER CYLINDER.....	BR- 8
BRAKE BOOSTER	BR- 14
VACUUM PUMP	BR- 16
(3L)	BR- 16
VACUUM PUMP	BR- 20
(1KZ-T, 1KZ-TE)	BR- 20
FRONT BRAKE	BR- 25
REAR BRAKE	BR- 30
(Drum Brake)	BR- 30
REAR BRAKE	BR- 35
(Disc Brake)	BR- 35
REAR BRAKE	BR- 39
(Parking Brake).....	BR- 39
LOAD SENSING PROPORTIONING	
AND BY-PASS VALVE (LSP & BV)	BR- 44
ANTI-LOCK BRAKE SYSTEM (ABS)	BR- 47
ABS ACTUATOR	BR- 47
FRONT SPEED SENSOR	BR- 52
REAR SPEED SENSOR.....	BR- 53
TROUBLESHOOTING	BR- 55
SERVICE SPECIFICATIONS	BR- 103

GENERAL DESCRIPTION

1. Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.
2. It is very important to keep parts and the area clean when repairing the brake system.
3. If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

	09023-00100 Union Nut Wrench 10 mm	
	09608-04031 Front Hub Inner Bearing Cone Replacer	1KZ-T and 1KZ-TE E/G
	09703-30010 Brake Shoe Return Spring Tool	
	09709-29017 LSPV Gauge Set	
	09718-00010 Shoe Hold Down Spring Driver	
	09718-20010 Brake Shoe Return Spring Replacer	
	09737-00010 Brake Booster Push Rod Gauge	
	09843-18020 Diagnosis Check Wire	
	09950-60010 Replacer Set	3L E/G
	(09951-00400) Replacer 40	3L E/G

BRAKE — PREPARATION

BR-3

	09950-70010 Handle Set	3L E/G
	(09951-07150) Handle 150	3L E/G
	09990-00150 ABS Actuator Checker and Sub-harness	
	09990-00200 ABS Actuator Checker Sub-harness "C"	
	09990-00300 ABS Actuator Checker Sub-harness "I"	
	09990-00400 ABS Actuator Checker Sheet "M"	

RECOMMENDED TOOLS

BR07W-04

	09031-00040 Pin Punch .	
	09082-00040 TOYOTA Electrical Tester.	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

BR017-1A

Torque wrench	
Micrometer	Vacuum pump, Brake disc
Dial indicator	Brake disc
Vernier calipers	Brake disc, Brake drum

LUBRICANT

BR018-08

Item	Capacity	Classification
Brake fluid	—	SAE J1703 or FMVSS No.116 DOT 3

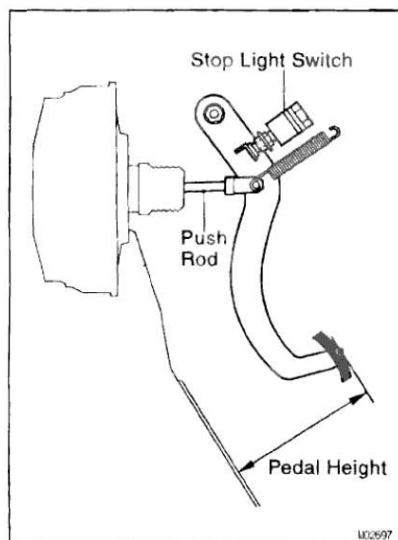
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TROUBLESHOOTING

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

See page	1									
Part Name	1									
Trouble	1									
Low pedal or spongy pedal	1	2	3	5	4	6	8	5	6	7
Brake drag				1	11	4	2	3	9	8
Brake pull									5	1
Hard pedal but brake inefficient	1	2	3		5		9	4	6	10
Noise from brakes							8	1		

W05570



CHECK AND ADJUSTMENT

BRAKE PEDAL CHECK AND ADJUSTMENT

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:

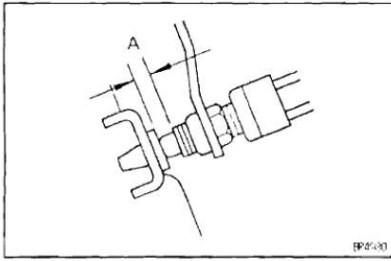
LHD: 194.8–204.8 mm (7.669–8.063 in.)

RHD: 197.0–207.0 mm (7.756–8.150 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

- Disconnect the connector from the stop light switch.
- Loosen the stop light switch lock nut and remove the stop light switch.
- Loosen the push rod lock nut.
- Adjust the pedal height by turning the pedal push rod.
- Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
- Install the stop light switch and turn it until it lightly contacts the pedal stopper.
- Turn the stop light switch back one turn.



- (h) Check the clearance (A) between stop light switch and pedal.

Clearance:

0.5–2.4 mm (0.020–0.094 in.)

- (i) Tighten the stop light switch lock nut.
(j) Connect the connector to the stop light switch.
(k) Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

- (l) After adjusting the pedal height, check that pedal freeplay.

HINT: If clearance (A) between the stop light switch and the brake pedal stopper has been adjusted correctly, the pedal freeplay will meet the specifications.

3. CHECK PEDAL FREEPLAY

- (a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

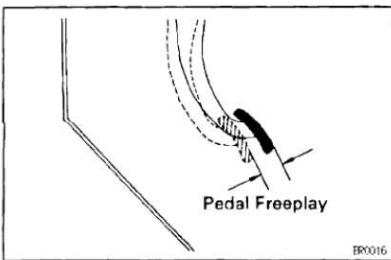
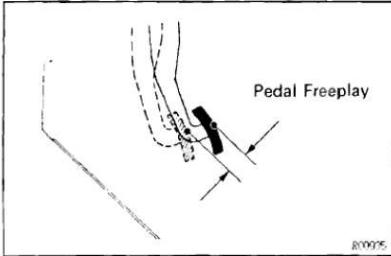
- (b) Push in the pedal by hand until the beginning of the resistance is felt, then measure the distance.

Pedal freeplay:

3–6 mm (0.12–0.24 in.)

HINT: The freeplay to the 1st point of resistance is due to the play between the clevis and pin. It is 1–3 mm (0.04–0.12 in.) on the pedal.

If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.



4. CHECK PEDAL RESERVE DISTANCE

Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf):

Europe: More than 80 mm (3.15 in.)

Others: More than 95 mm (3.74 in.)

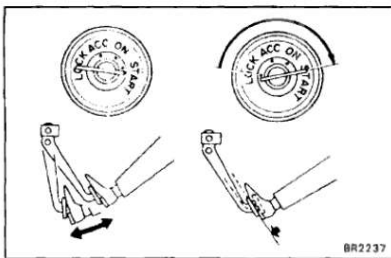
If the reserve distance is incorrect, troubleshoot the brake system.

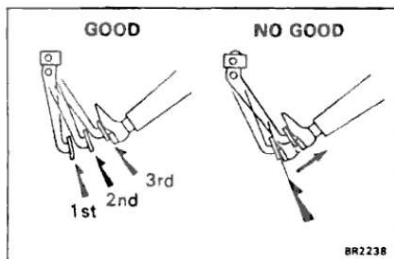
BRAKE BOOSTER OPERATIONAL TEST

1. OPERATING CHECK

- (a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.

- (b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.





2. AIR TIGHTNESS CHECK

- Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly. If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.
- Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air tight.

BRAKE SYSTEM BLEEDING

HINT: If any work is done on the brake system or if air in the brake lines is suspected, bleed the system of air.

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. FILL BRAKE RESERVOIR WITH BRAKE FLUID

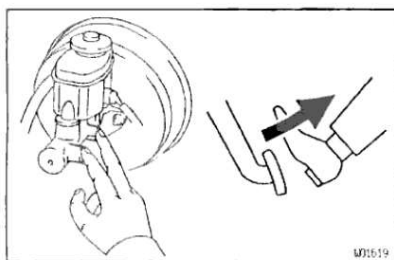
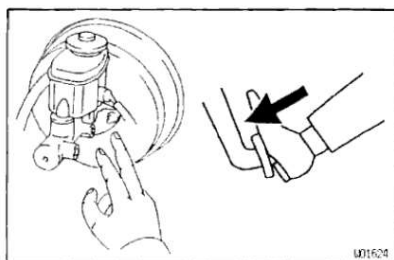
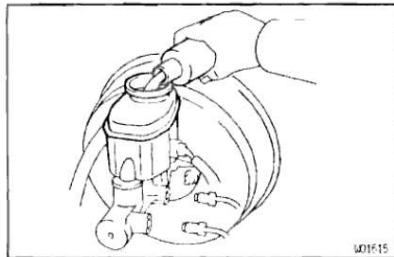
Check the fluid level in the reservoir after bleeding each wheel. Add fluid, if necessary.

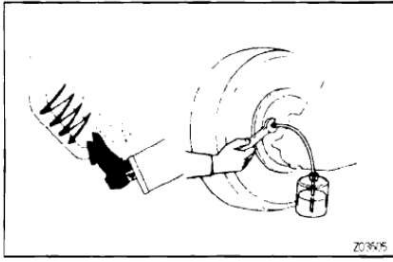
Fluid: SAE J1703 or FMVSS No.116 DOT3

2. BLEED MASTER CYLINDER

HINT: If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

- Disconnect the brake lines from the master cylinder.
- Slowly depress the brake pedal and hold it.
- Block off the outer holes with your fingers, and release the brake pedal.
- Repeat (b) and (c) 3 or 4 times.





3. CONNECT VINYL TUBE TO BRAKE CALIPER OR WHEEL CYLINDER BLEEDER PLUG

Insert other end of the tube in a half—full container of brake fluid.

HINT: Begin air bleeding from the wheel cylinder with the longest hydraulic line.

4. BLEED BRAKE LINE

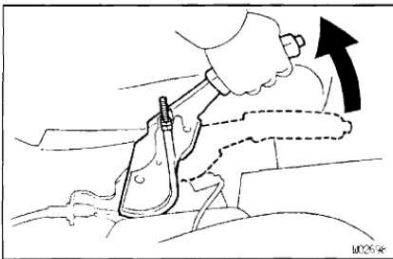
- Slowly depress the brake pedal several times.
- While an assistant depresses the pedal, loosen the bleeder plug until fluid starts to run out. Then tighten the bleeder plug.
- Repeat this procedure until there are no more air bubbles in the fluid.

Bleeder plug tightening torque:

11 N·m (110 kgf·cm, 8 ft·lbf)

5. REPEAT PROCEDURE FOR EACH WHEEL

6. BLEED LSP & BV



PARKING BRAKE CHECK AND ADJUSTMENT

1. CHECK PARKING BRAKE LEVER TRAVEL

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 196 N (20 kgf, 44 lbf):

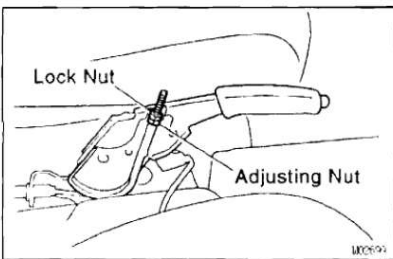
6—8 clicks

If incorrect, adjust the parking brake lever travel.

2. IF NECESSARY, ADJUST PARKING BRAKE LEVER TRAVEL

HINT: Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted. For shoe clearance adjustment, see step 3 on page BR—34 or see step 1 on page BR—42.

- Remove the rear console box.
- Loosen the lock nut and turn the adjusting nut until the lever travel is correct.
- Tighten the lock nut.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)
- Install the rear console box.

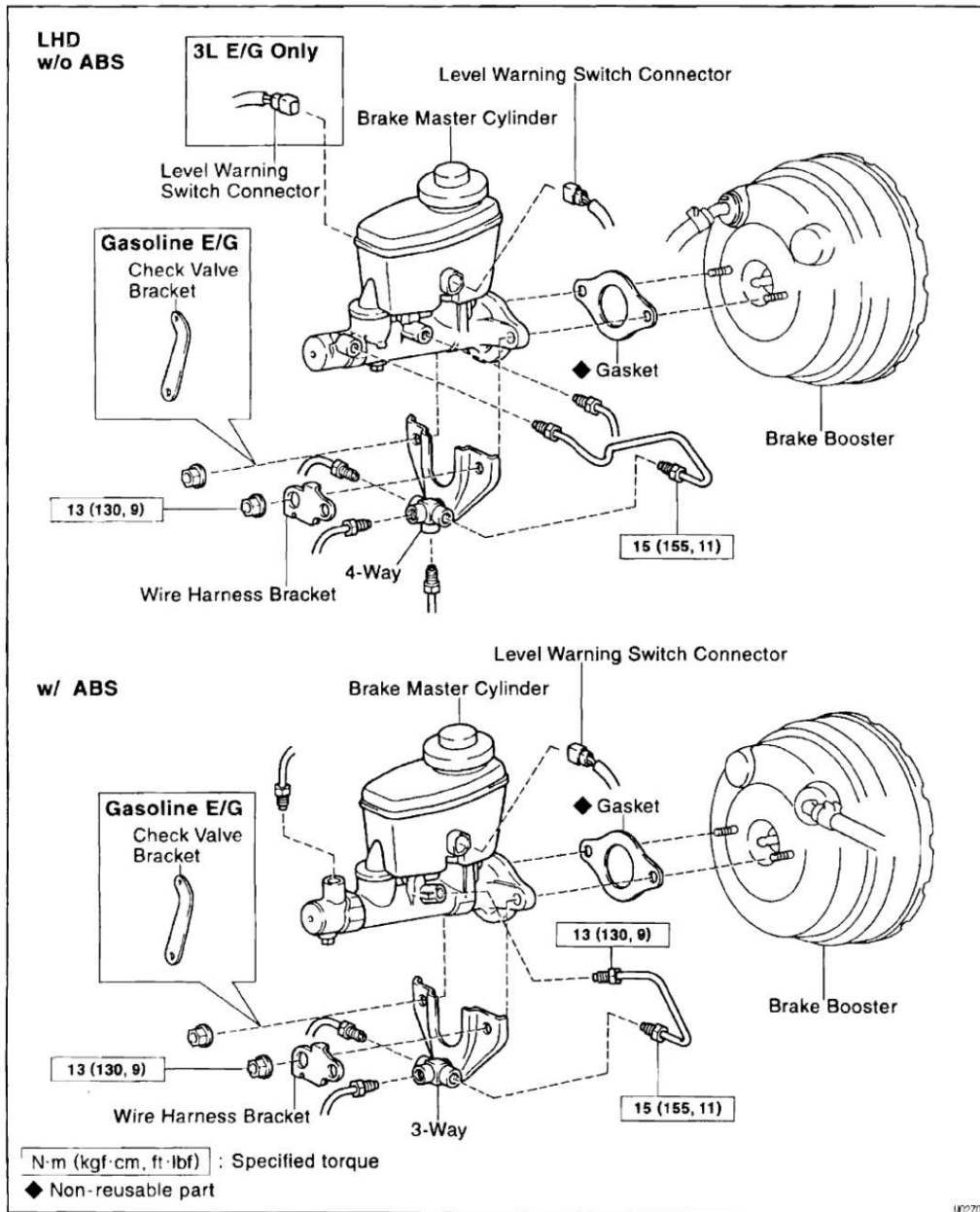


MTC10—SL

BR

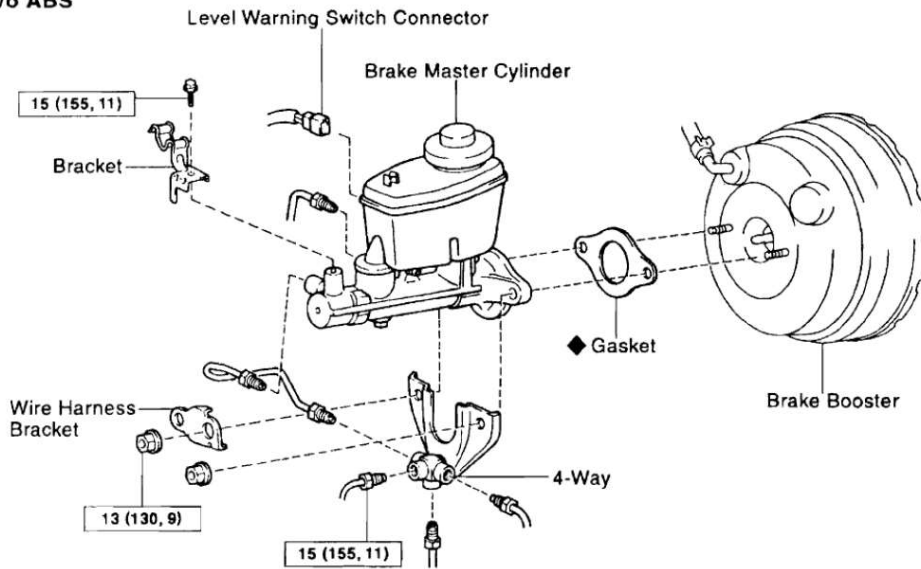
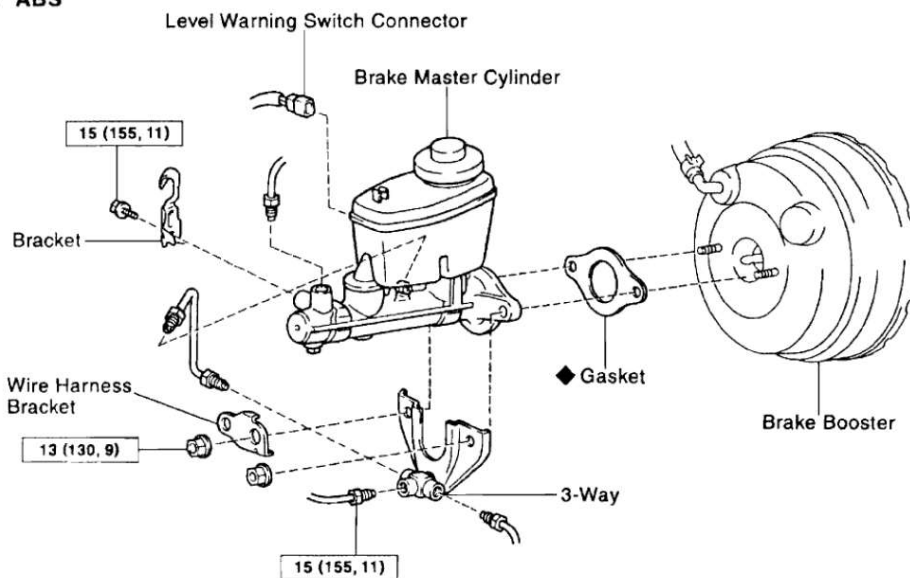
MASTER CYLINDER MASTER CYLINDER REMOVAL

MILE-01



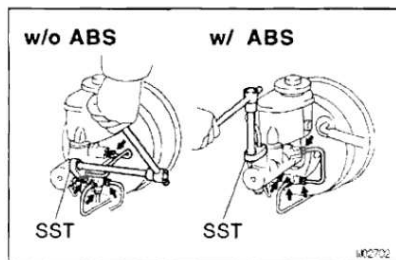
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U72700

**RHD
w/o ABS****w/ ABS**

N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part



1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

2. TAKE OUT FLUID WITH SYRINGE

NOTICE: Do not let brake fluid remain on a painted surface. Wash it off immediately.

3. DISCONNECT BRAKE LINES

w/o ABS:

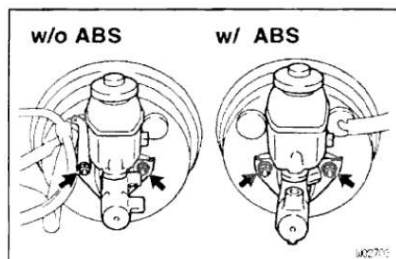
Using SST, disconnect the 6 brake lines from the master cylinder and 4-way.

w/ ABS:

Using SST, disconnect the 5 brake lines from the master cylinder and 3-way.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



4. REMOVE MASTER CYLINDER

LHD w/o ABS:

Remove the 2 nuts, 4-way, wire harness bracket, and check valve bracket (Gasoline E/G), and pull out the master cylinder and gasket.

LHD w/ ABS:

Remove the 2 nuts, 3-way, wire harness bracket, and check valve bracket (Gasoline E/G), and pull out the master cylinder and gasket.

RHD w/o ABS:

Remove the 2 nuts, 4-way, wire harness bracket, bolt, and bracket, and pull out the master cylinder and gasket.

RHD w/ ABS:

Remove the 2 nuts, 3-way, wire harness bracket, bolt, and bracket, and pull out the master cylinder and gasket.

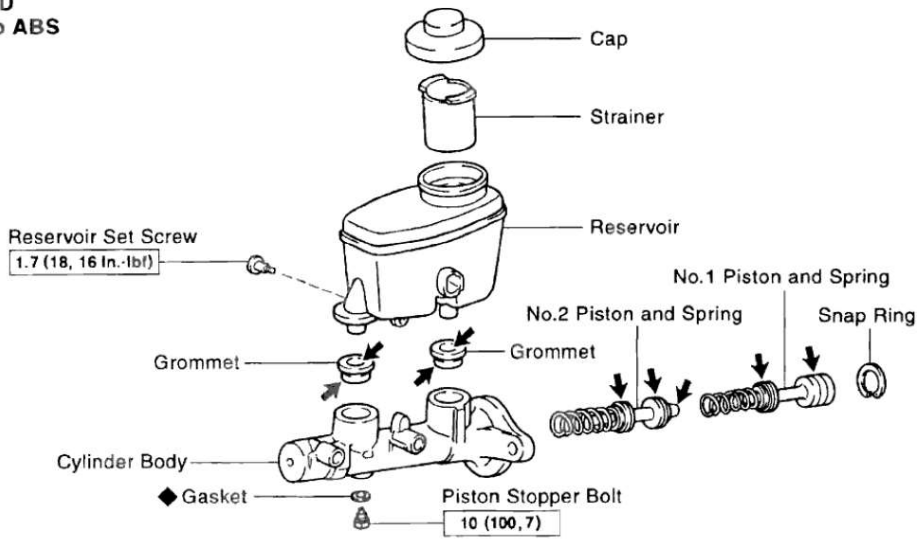
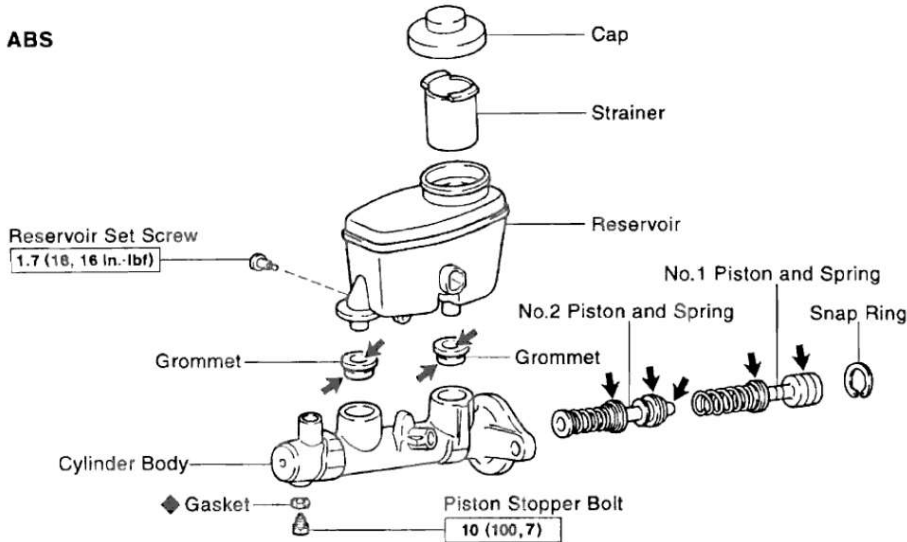
Torque:

Nut: 13 N·m (130 kgf·cm, 9 ft·lbf)

Bolt: 15 N·m (155 kgf·cm, 11 ft·lbf)

COMPONENTS

MILF-01

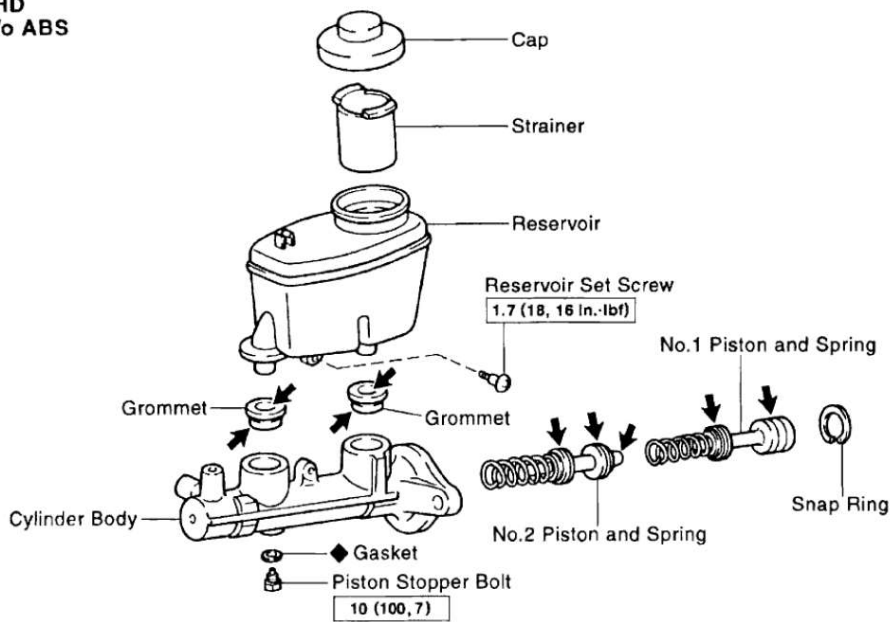
**LHD
w/o ABS****w/ ABS**

N·m (kgf·cm, ft·lbf) : Specified torque

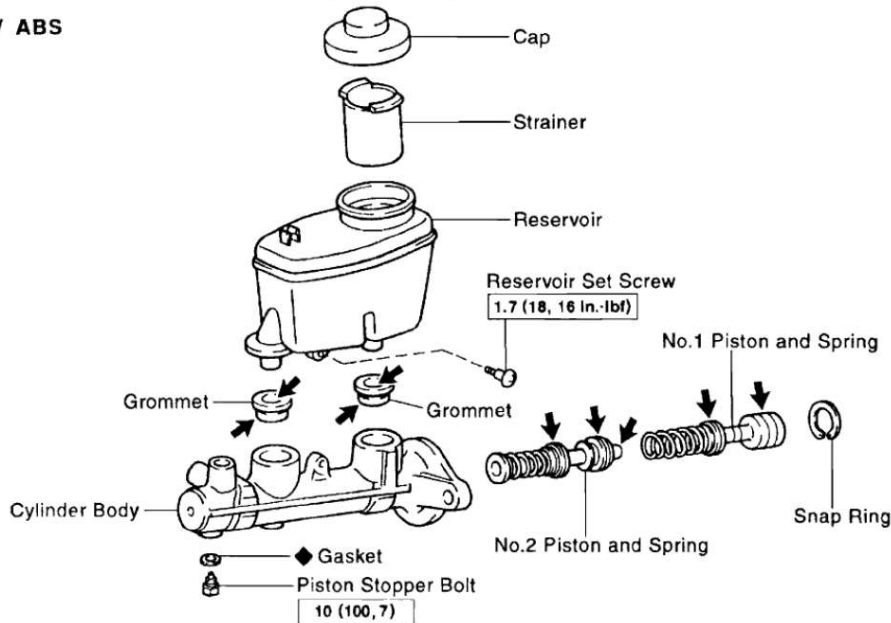
◆ Non-reusable part

◀ Lithium soap base glycol grease

U02754

RHD
w/o ABS

w/ ABS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

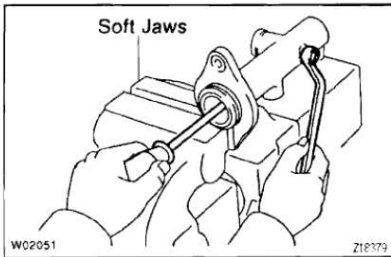
◀ Lithium soap base glycol grease

1402705

MASTER CYLINDER DISASSEMBLY

1. REMOVE RESERVOIR

- (a) Remove the set screw and pull out the reservoir.
Torque: 1.7 N·m (18 kgf·cm, 16 in·lbf)
- (b) Remove the cap and strainer from the reservoir.



2. REMOVE 2 GROMMETS

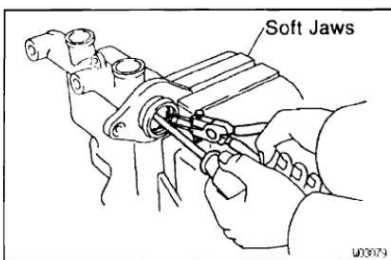
3. PLACE CYLINDER IN VISE

4. REMOVE PISTON STOPPER BOLT

Using soft jaws on the vise and a screwdriver, push the pistons in all the way and remove the piston stopper bolt and gasket.

HINT: Tape the screwdriver tip before use.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



5. REMOVE 2 PISTONS AND SPRINGS

- (a) Using soft jaws on the vise, push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

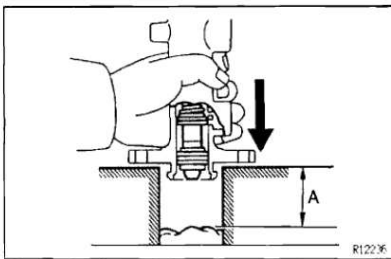
HINT: Tape the screwdriver tip before use.

- (b) Remove the No.1 piston and spring by hand, pulling straight out, not at an angle.

NOTICE: If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.

ASSEMBLY NOTICE: Be careful not to damage the rubber lips on the pistons.

- (c) Place a rag and 2 wooden blocks on the work table, and lightly tap the cylinder flange against the block edges until the No.2 piston drops out of the cylinder. DISASSEMBLY HINT: Make sure that the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).



MASTER CYLINDER INSPECTION

HINT: Clean the disassembled parts with compressed air.

1. INSPECT CYLINDER BORE FOR RUST OR SCORING
2. INSPECT CYLINDER FOR WEAR OR DAMAGE

If necessary, clean or replace the cylinder.

MASTER CYLINDER ASSEMBLY

BR1A8-02

Assembly is in the reverse order of disassembly.
NOTICE: Apply lithium soap base glycol grease to the rubber parts indicated by arrows (See page BR-11 or 12).

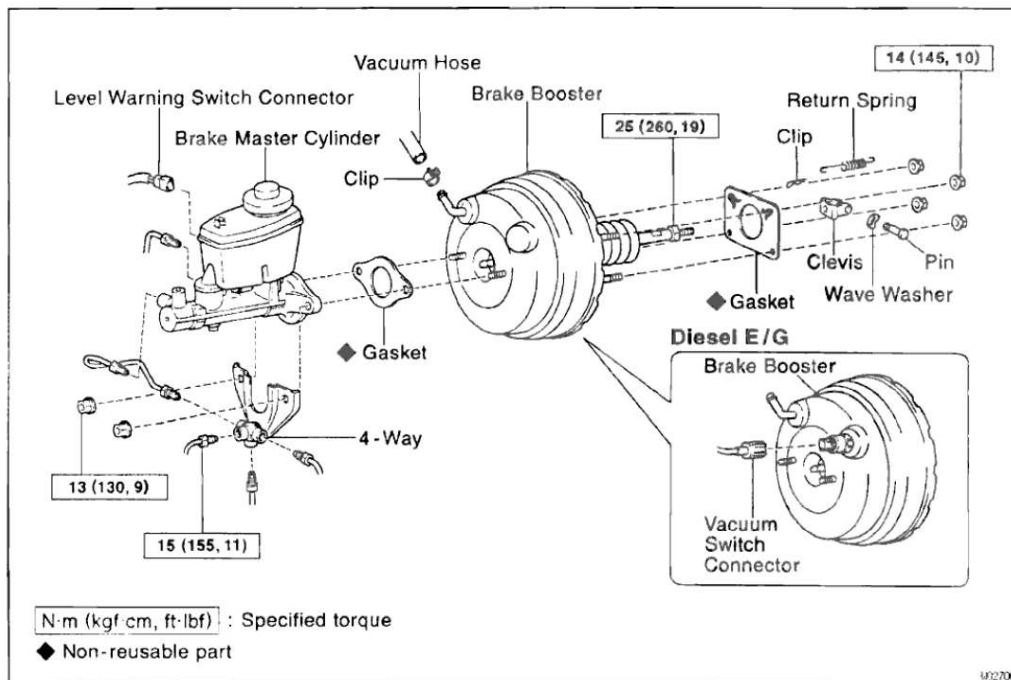
MASTER CYLINDER INSTALLATION

BR1A8-02

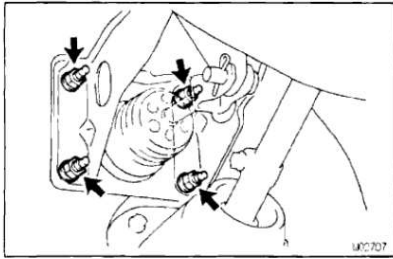
Installation is in the reverse order of removal.
BEFORE INSTALLATION, ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD (See page BR-15)
AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See page BR-6), CHECK FOR LEAKS, CHECK AND ADJUST BRAKE PEDAL (See page BR-4)

BRAKE BOOSTER
BRAKE BOOSTER REMOVAL

BR111-04



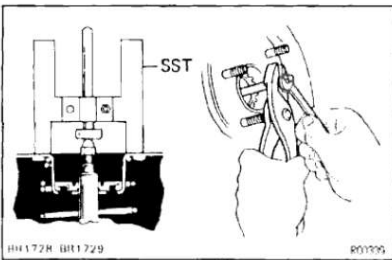
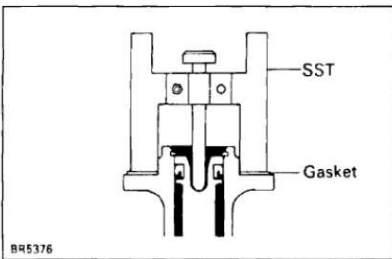
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1. **REMOVE MASTER CYLINDER**
(See page BR-10)
2. **REMOVE THESE PARTS:**
 - Return spring
 - Clip, clevis pin and wave washer
3. **REMOVE BRAKE BOOSTER**
 - (a) Using pliers, remove the clip, and disconnect the vacuum hose.
 - (b) Remove the 4 booster installation nuts and clevis.
 - (c) Remove the booster and gasket.

BRAKE BOOSTER INSTALLATION

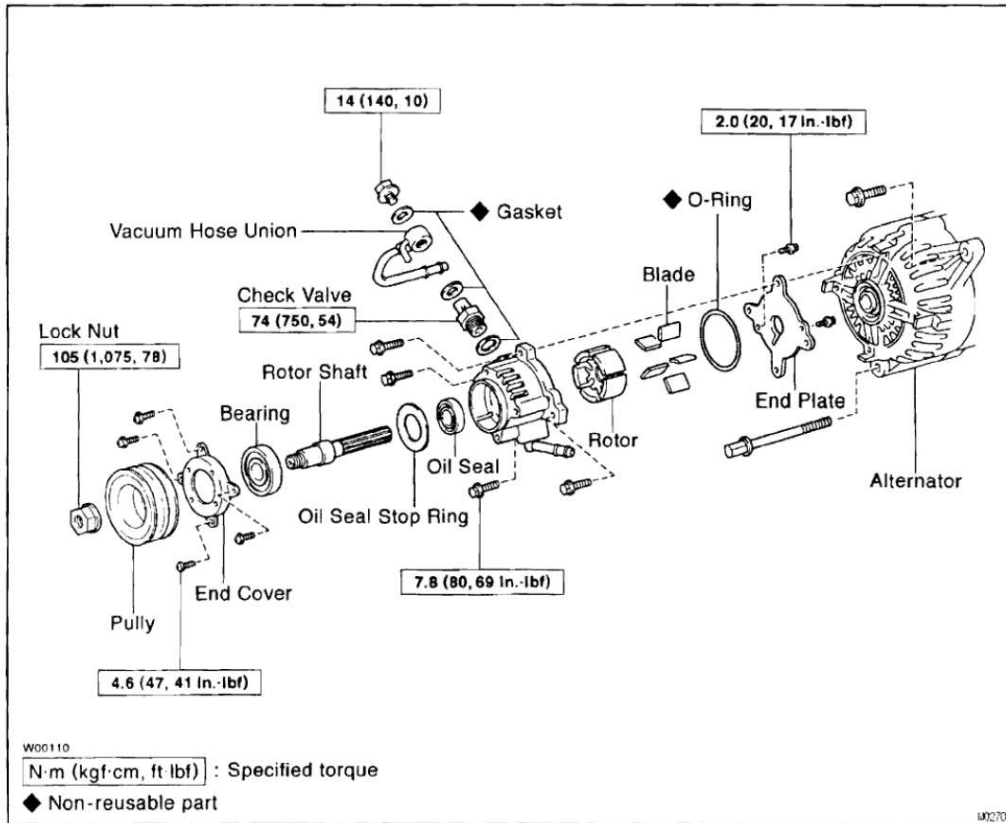
1. **INSTALL BRAKE BOOSTER**
 - (a) Install the clevis to the operating rod.
 - (b) Install the booster with a new gasket.
 - (c) Install and torque the 4 booster installation nuts.
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)
 - (d) Install the clevis pin into the wave washer, clevis and brake pedal, and install the clip to the clevis pin.
 - (e) Install the pedal return spring.
2. **ADJUST LENGTH OF BOOSTER PUSH ROD**
 - (a) Install the gasket on the master cylinder.
 - (b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737-00010



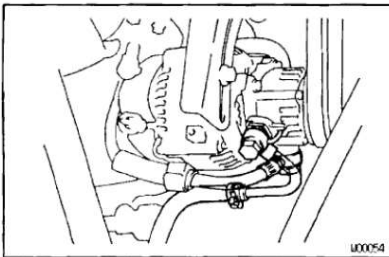
- (c) Turn the SST upside down, and set it on the booster.
SST 09737-00010
- (d) Measure the clearance between the booster push rod and pin head (SST).
Clearance:
0 mm (0 in.)
- (e) Adjust the booster push rod length until the push rod slightly touches the pin head.
HINT: When adjusting the push rod, depress the brake pedal enough so that the push rod sticks out.
3. **INSTALL MASTER CYLINDER** (See page BR-14)
4. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM**
(See page BR-6)
5. **CHECK FOR FLUID LEAKAGE**
6. **CHECK AND ADJUST BRAKE PEDAL**
(See page BR-4)
7. **DO OPERATIONAL CHECK**
(See page BR-5)

VACUUM PUMP (3L) COMPONENTS

BR04Y-06



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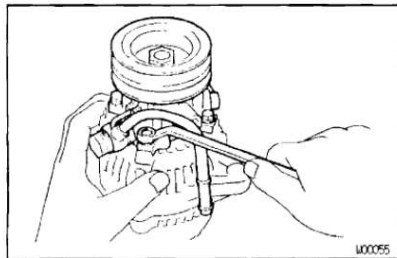


VACUUM PUMP REMOVAL

BR080-03

1. DISCONNECT CONNECTORS AND VACUUM HOSES

Disconnect the 2 connectors, 2 vacuum hoses and oil inlet union from the alternator and vacuum pump.
Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

**2. REMOVE ALTERNATOR WIRE**

Remove the cover, nut, alternator wire, bolt and wire harness bracket from the alternator.

3. REMOVE ALTERNATOR

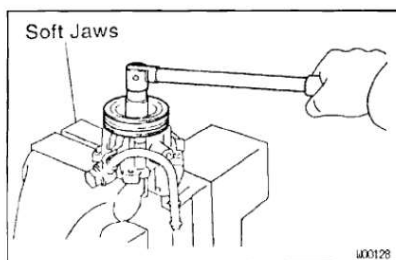
(a) Loosen the pivot and adjusting bolts, and remove the alternator drive belt.

(b) Remove the 2 bolts and alternator with vacuum pump.

4. REMOVE VACUUM PUMP FROM ALTERNATOR

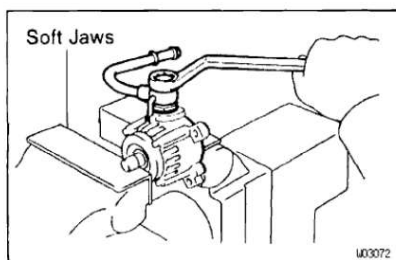
Remove the 4 bolts and vacuum pump from the alternator.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

**VACUUM PUMP DISASSEMBLY****1. REMOVE PULLEY**

Using soft jaws on the vise, remove the pulley lock nut and pulley.

Torque: 105 N·m (1,075 kgf·cm, 78 ft·lbf)

**2. REMOVE VACUUM HOSE UNION**

Using soft jaws on the vise, remove the union bolt, union and 2 gaskets.

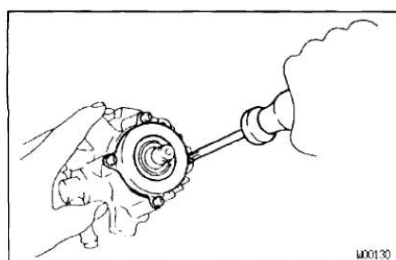
Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

ASSEMBLY HINT: Align and insert the union pin into the matching hole of the casing.

3. REMOVE CHECK VALVE

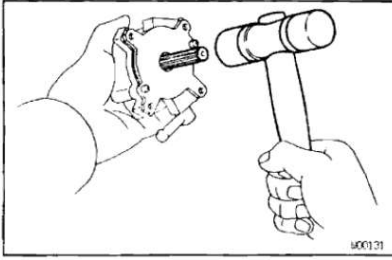
Remove the check valve and gasket.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

**4. REMOVE END COVER**

Remove the 4 screws and end cover.

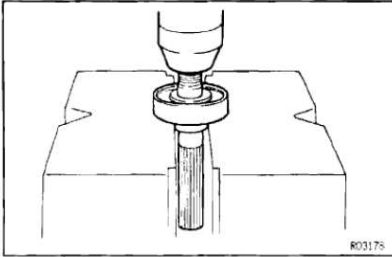
Torque: 4.6 N·m (47 kgf·cm, 41 in·lbf)

**5. REMOVE ROTOR SHAFT WITH BEARING**

Using a plastic hammer, tap out the rotor shaft with bearing.

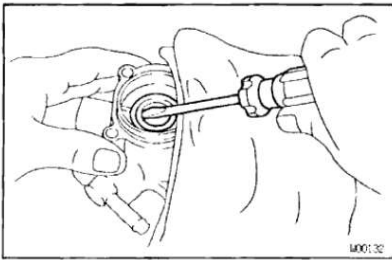
6. REMOVE OIL SEAL STOP RING**7. REMOVE END PLATE**

Remove the 2 screws and end plate.
Torque: 2.0 N·m (20 kgf·cm, 17 in.-lbf)

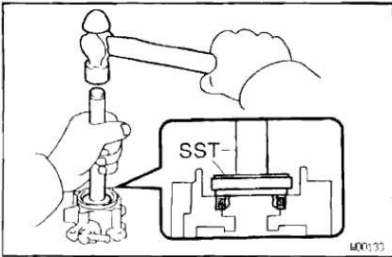
8. REMOVE O-RING**9. REMOVE ROTOR AND 5 BLADES****10. IF NECESSARY, REMOVE BEARING**

Using a press, remove the bearing from the rotor shaft.

BR

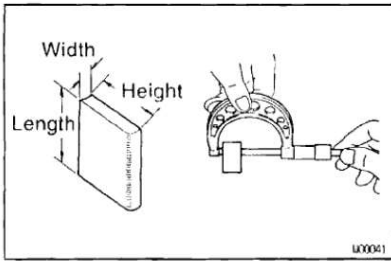
**11. REMOVE OIL SEAL**

Using a screwdriver, remove the oil seal.



ASSEMBLY HINT: Use SST and a hammer, tap in the oil seal.

SST 09950-60010 (09951-00400),
09950-70010 (09951-07150)



VACUUM PUMP INSPECTION

1. INSPECT BLADE

- (a) Check the blades for wear or damage.
- (b) Using a micrometer, measure the height, width and length of the blades.

Minimum height:

12.20 mm (0.4803 in.)

Minimum width:

4.95 mm (0.1949 in.)

Minimum length:

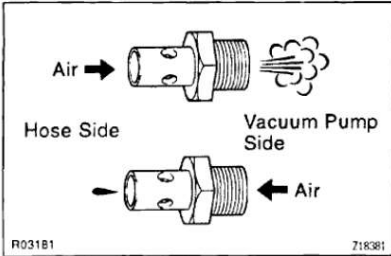
22.98 mm (0.4047 in.)

If necessary, replace the blade.

2. INSPECT CHECK VALVE OPERATION

- (a) Check that air flows from the hose side to the pump side.
- (b) Check that air does not flow from the pump side to the hose side.

If necessary, replace the check valve.



VACUUM PUMP ASSEMBLY

Assembly is in the reverse order of disassembly.

VACUUM PUMP INSTALLATION

Installation is in the reverse order of removal.

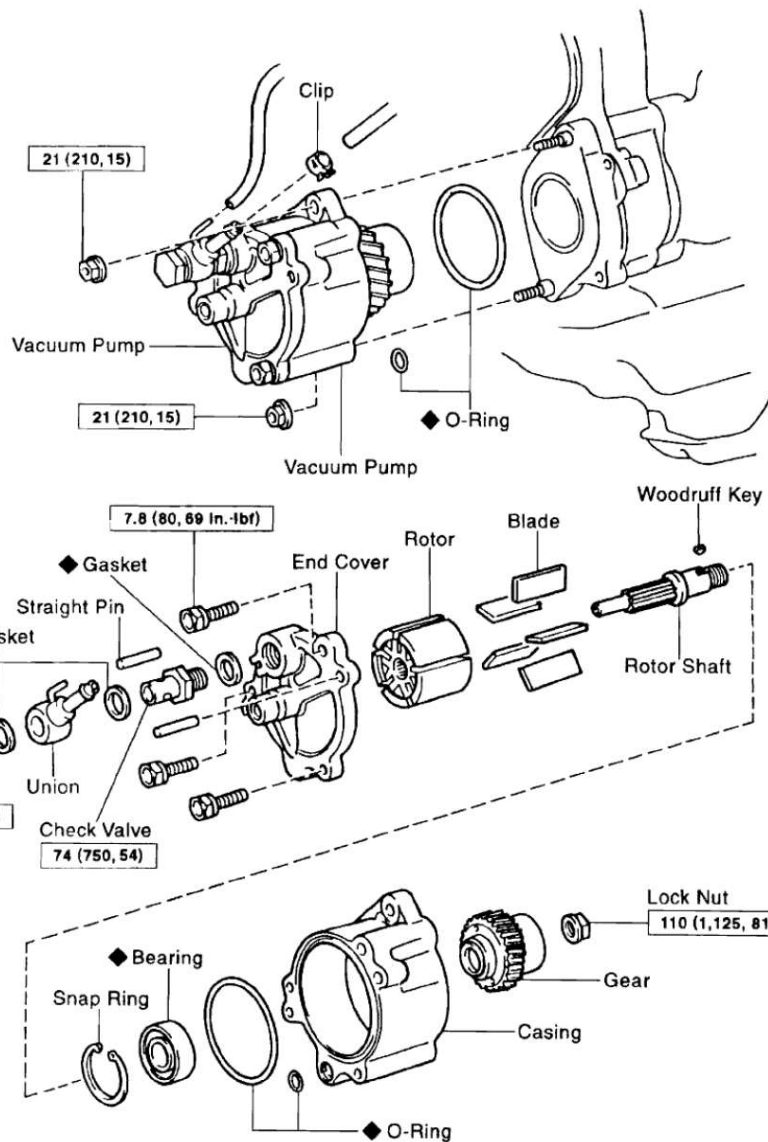
AFTER INSTALLATION, ADJUST BELT TENSION

BR

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VACUUM PUMP **(1KZ—T, 1KZ—TE)** **COMPONENTS**

MROU-04



N·m (kgf·cm, in.-lbf) : Specified torque

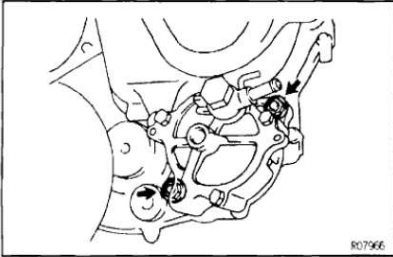
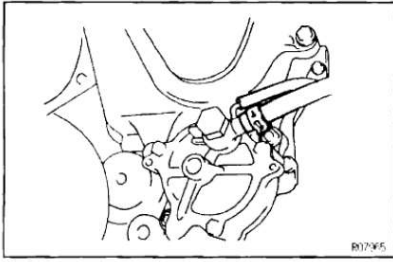
◆ Non-reusable part

W07709

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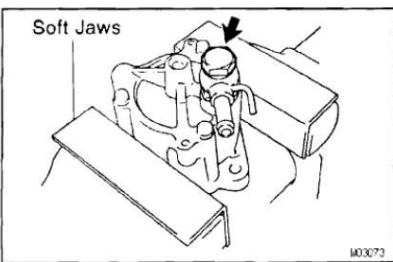
VACUUM PUMP REMOVAL**REMOVE VACUUM PUMP**

- (a) Disconnect the 2 hoses from the vacuum pump.
- (b) Remove the 2 nuts and pump from the engine.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
- (c) Remove the 2 O—rings.

**VACUUM PUMP DISASSEMBLY****1. REMOVE VACUUM HOSE UNION**

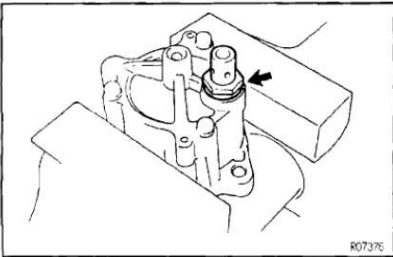
Using soft jaws on the vise, remove the union bolt, union and 2 gaskets.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

**2. REMOVE CHECK VALVE**

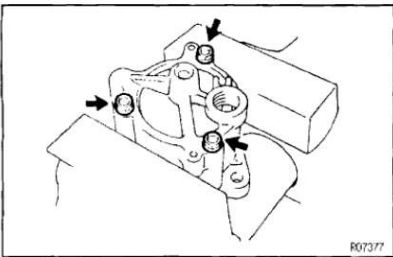
Remove the check valve and gasket.

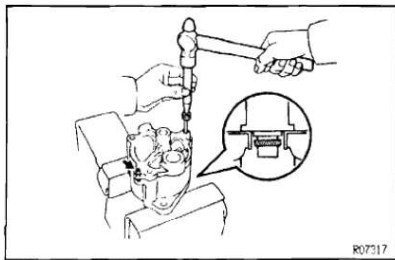
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

**3. REMOVE END COVER**

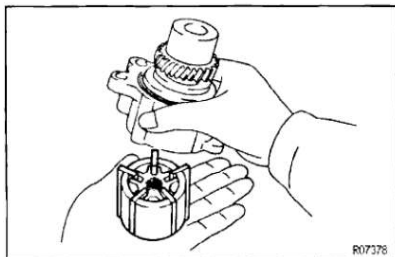
- (a) Remove the 3 bolts.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)



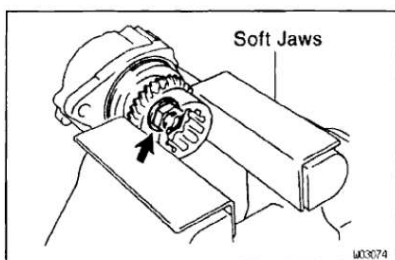


- (b) Place the vacuum pump on vise.
NOTICE: Do not tighten the vise.
- (c) Using a pin punch and hammer, drive out the 2 straight pins.
- (d) Remove the end cover and 2 O-rings.



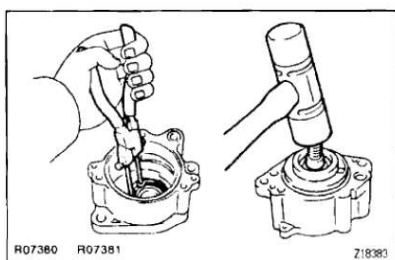
4. REMOVE ROTOR AND 5 BLADES

ASSEMBLY HINT: Before installation, apply engine oil to the rotor and blades.



5. REMOVE GEAR

- (a) Using soft jaws on the vise, clamp the gear in the vise.
- (b) Remove the lock nut.
Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)
- (c) Remove the gear and woodruff key.

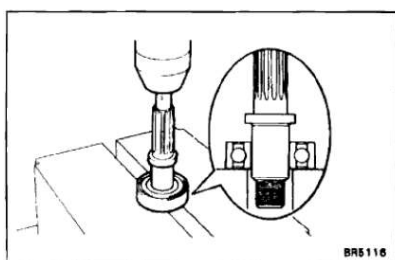


6. REMOVE SNAP RING

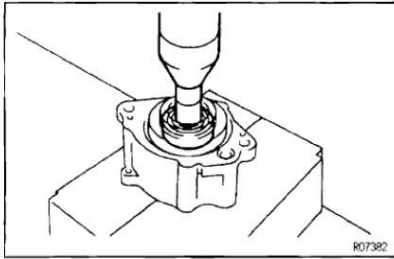
Using snap ring pliers, remove the snap ring.

7. REMOVE ROTOR SHAFT

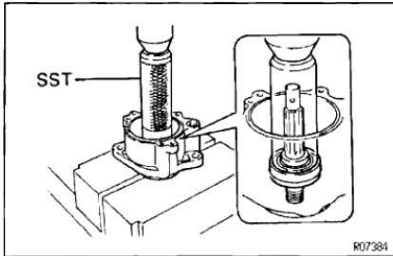
Using a plastic hammer, tap out the rotor shaft.



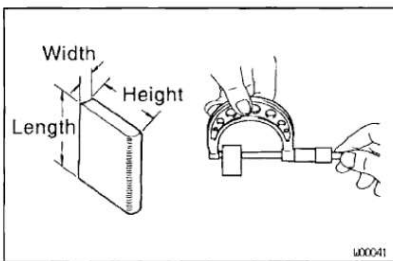
ASSEMBLY HINT: Use a press, install a new bearing to the rotor shaft.

**8. REMOVE BEARING**

Using a press and 17 mm socket, press out the bearing.



ASSEMBLY HINT: Use SST and a press, install the rotor shaft to the casing.
SST 09608–04031

**VACUUM PUMP INSPECTION****1. INSPECT BLADES**

- (a) Check the blades for wear or damage.
- (b) Using a micrometer, measure the height, width and length of the blades.

Minimum height:

16.50 mm (0.6496 in.)

Minimum width:

5.95 mm (0.2343 in.)

Minimum length:

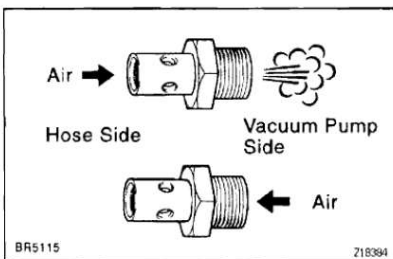
44.96 mm (1.7701 in.)

If necessary, replace the blades.

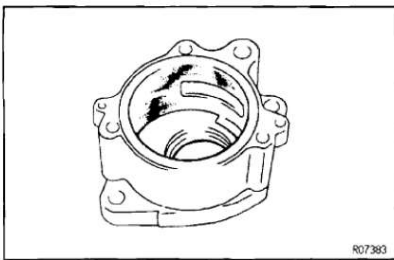
2. INSPECT CHECK VALVE OPERATION

- (a) Check that air flows from the hose side to the pump side.
- (b) Check that air does not flow from the pump side to the hose side.

If necessary, replace the check valve.

**3. INSPECT INSIDE SURFACE OF CASING**

Inspect the inside surface on the casing for scoring.
If necessary, replace the vacuum pump assembly.



VACUUM PUMP ASSEMBLY

BR100-03

Assembly is in the reverse order of disassembly.

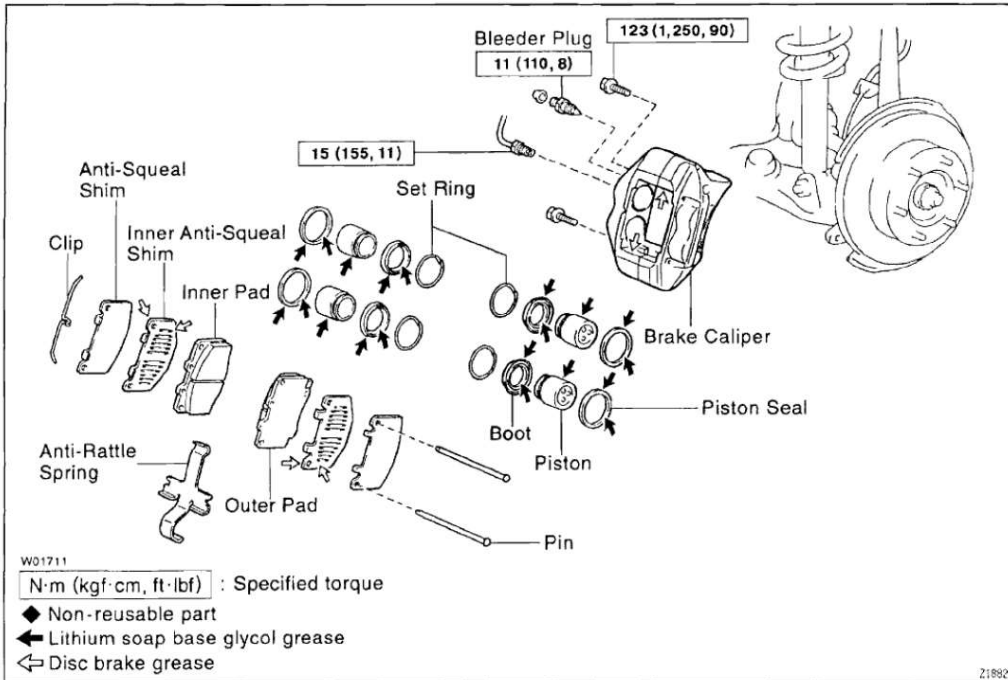
VACUUM PUMP INSTALLATION

BR100-03

Installation is in the reverse order of removal.

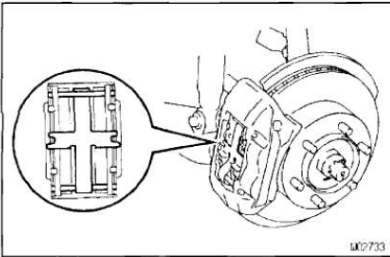
FRONT BRAKE COMPONENTS

BR1-23-02



BRAKE PADS REPLACEMENT

BR1-21-02



1. REMOVE FRONT WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness and replace pads if not within the specification.

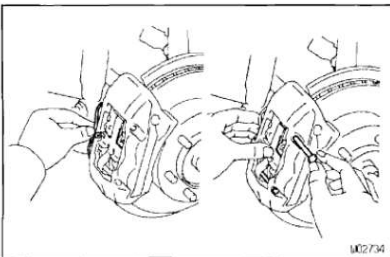
Minimum thickness:

1.0 mm (0.039 in.)

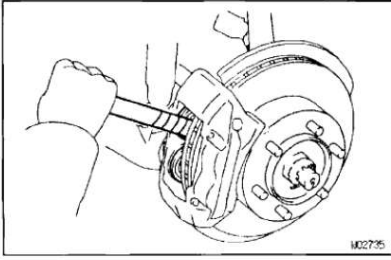
3. REMOVE THESE PARTS:

- Clip
- 2 pins
- Anti-rattle spring
- 2 pads
- 4 anti-squeal shims

NOTICE: The anti-rattle spring can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.



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4. CHECK DISC THICKNESS AND RUNOUT
(See page BR-28)

5. INSTALL NEW PADS

NOTICE: When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a monkey wrench handle or an equivalent.

HINT:

- Tape the monkey wrench handle before use.
- Always change the pad on one wheel at a time as there is a possibility of the opposite piston flying out.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (c) Install the anti-squeal shims to 2 new pads.

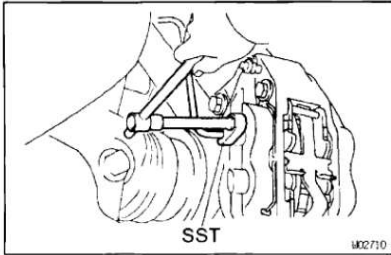
HINT: Apply disc brake grease to both sides of the inner anti-squeal shims (See page BR-25).

- (d) Install the 2 pads.

NOTICE: Do not allow oil or grease to get on the rubbing face.

6. INSTALL ANTI-RATTLE SPRING AND 2 PINS

7. INSTALL CLIP



CALIPER REMOVAL

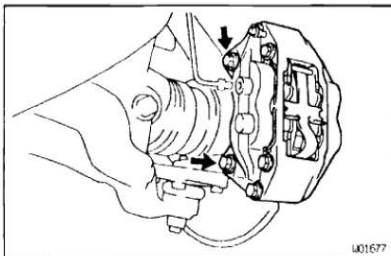
1. REMOVE FRONT WHEEL

2. DISCONNECT BRAKE LINE

Using SST, disconnect the brake line.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



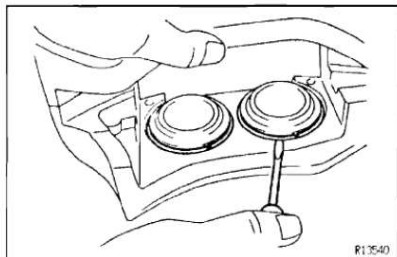
3. REMOVE CALIPER

Remove the 2 mounting bolts and caliper.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

4. REMOVE THESE PARTS:

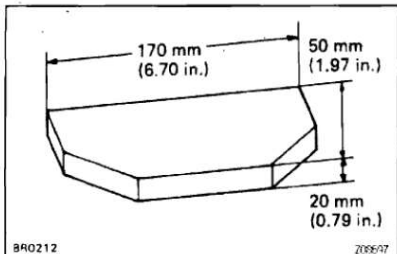
- Clip
- 2 pins
- Anti-rattle spring
- 2 pads
- 4 anti-squeal shims



CALIPER DISASSEMBLY

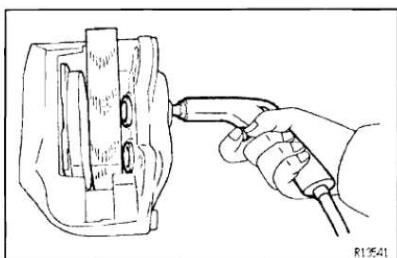
1. REMOVE CYLINDER BOOT SET RINGS AND BOOTS

Using a screwdriver, remove the 4 cylinder boot set rings and boots.



2. REMOVE PISTONS FROM CYLINDER

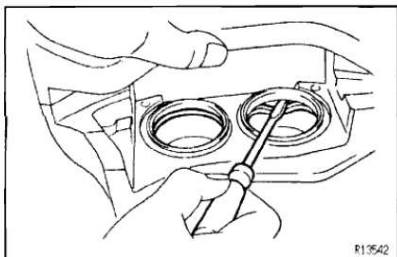
(a) Prepare the wooden plate to hold the pistons.



(b) Place the plate between the pistons and insert a pad at one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

DISASSEMBLY CAUTION: Do not place your fingers in front of the pistons when using compressed air.



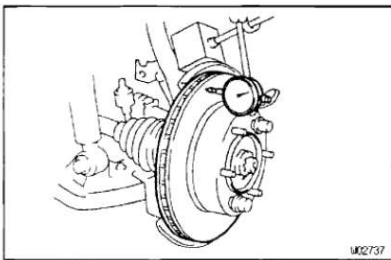
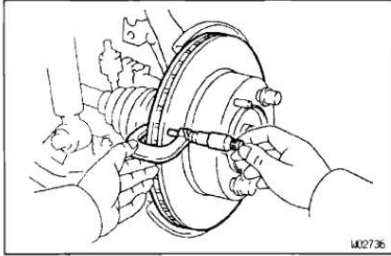
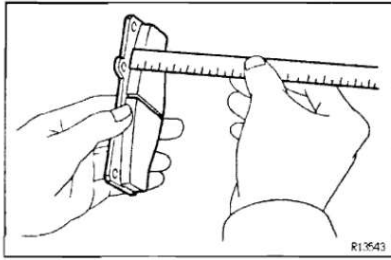
3. REMOVE PISTON SEALS

Using a screwdriver, remove the 4 piston seals from the cylinder.

CALIPER ASSEMBLY

Assembly is in the reverse order of disassembly.

NOTICE: Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR-25).



FRONT BRAKE COMPONENTS INSPECTION AND REPAIR

1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness:

11.5 mm (0.453 in.)

Minimum thickness:

1.0 mm (0.039 in.)

Replace the pad if the thickness is less than the minimum (the 1.0 mm slit is no longer visible), or if it shows signs of uneven wear.

2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness:

22.0 mm (0.866 in.)

Minimum thickness:

20.0 mm (0.787 in.)

If the disc is scored or worn, or if its thickness is less than the minimum, repair or replace the disc.

3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout:

0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the disc.

HINT: Before measuring the runout, confirm that the front hub bearing play is within the specification.

4. IF NECESSARY, ADJUST DISC RUNOUT

- (a) Remove the hub nuts and disc. Reinstall the disc 1/6 of a turn round from its original position on the hub. Install and torque the hub nuts.

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

- (b) Repeat (a) until the disc has been installed on the 4 remaining hub position.
- (c) If the minimum runout recorded in (a) and (b) is less than the maximum disc runout, install the disc in that position.
- (d) If the minimum runout recorded in (a) and (b) is greater than the maximum disc runout, replace the disc and repeat step 3.

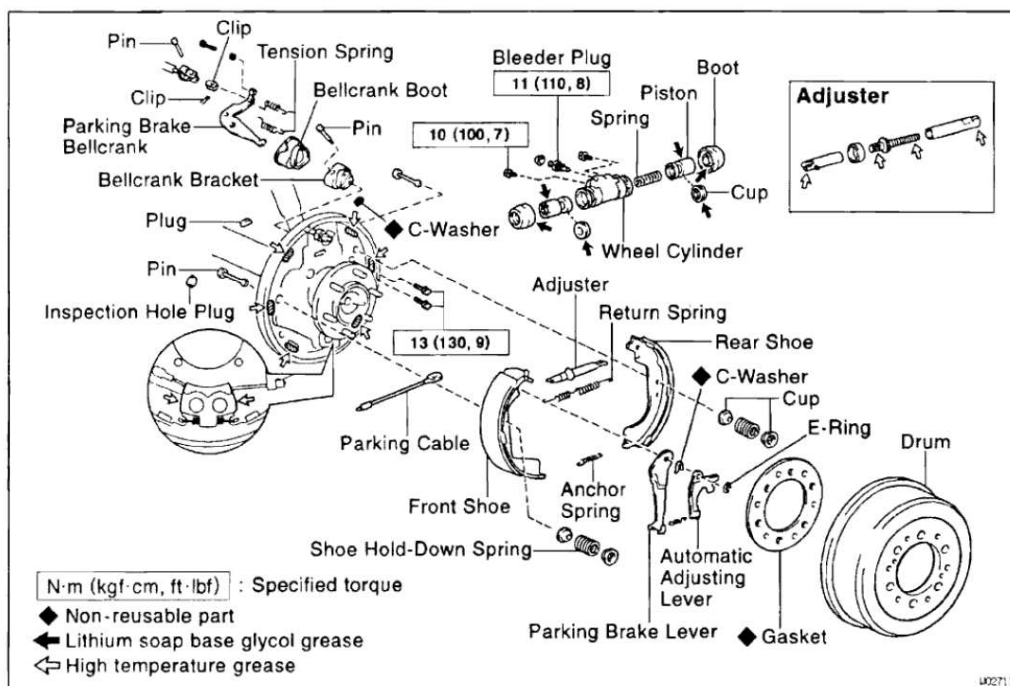
CALIPER INSTALLATION

Installation is in the reverse order of removal.

**AFTER INSTALLATION, FILL BRAKE RESERVOIR
WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See
page BR-6) AND CHECK FOR LEAKS**

REAR BRAKE (Drum Brake) COMPONENTS

BR1-J8-02



U02711

REAR BRAKE REMOVAL

BR1-J8-02

1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.

If less than the minimum, replace the shoes.

Minimum thickness:

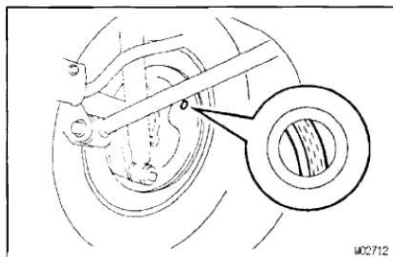
1.0 mm (0.039 in.)

2. REMOVE REAR WHEEL

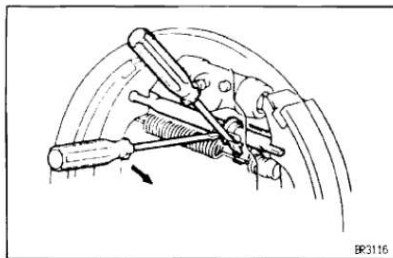
3. REMOVE BRAKE DRUM

HINT: If the brake drum cannot be removed easily, do the following steps.

- Remove the adjusting hole plug in the backing plate.
- Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.
- Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.

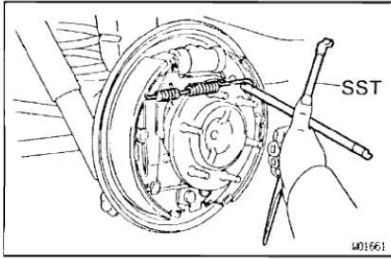


U02712

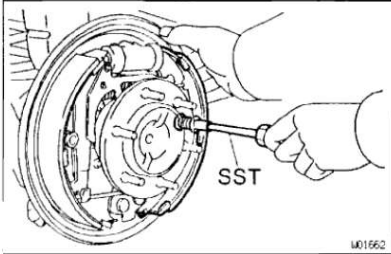


BR3116

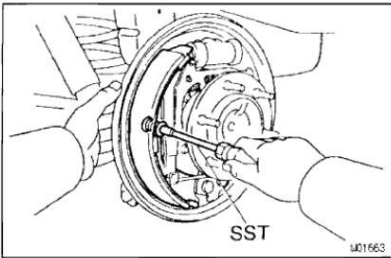
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**4. REMOVE REAR SHOE**

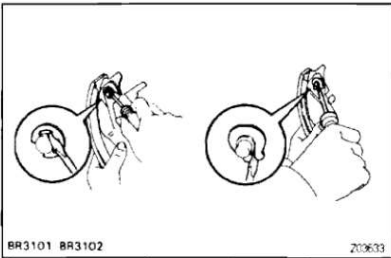
- (a) Using SST, disconnect the return spring.
SST 09703-30010



- (b) Using SST, remove the shoe hold-down spring, cups and pin.
SST 09718-00010
- (c) Disconnect the anchor spring from the rear shoe and remove the rear shoe.
- (d) Remove the anchor spring from the front shoe.

**5. REMOVE FRONT SHOE**

- (a) Using SST, remove the shoe hold-down spring, cups and pin.
SST 09718-00010
- (b) Remove the return spring from the front shoe.
- (c) Remove the front shoe with the adjuster.
- (d) Disconnect the parking brake cable from the front shoe.

**6. REMOVE ADJUSTER FROM FRONT SHOE**

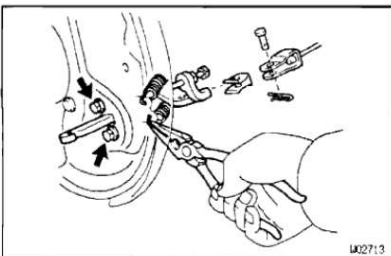
- (a) Remove the adjusting lever spring.
- (b) Remove the adjuster.

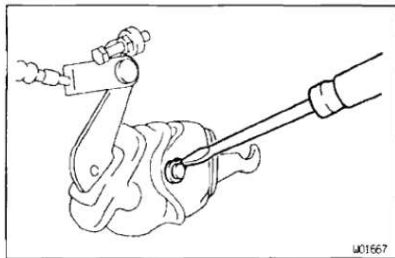
7. REMOVE AUTOMATIC ADJUSTING LEVER AND PARKING BRAKE LEVER

- (a) Using a screwdriver, remove the E-ring.
- (b) Remove the automatic adjusting lever.
- (c) Using a screwdriver, remove the C-washer.
- (d) Remove the parking brake lever.

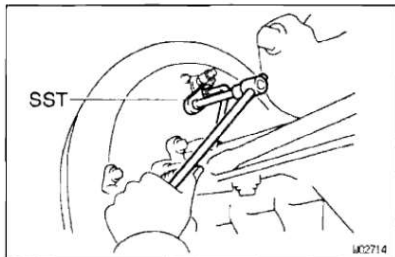
8. REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK

- (a) Using needle-nose pliers, remove the clip.
- (b) Remove the clip and pin, and disconnect the parking brake cable.
- (c) Using needle nose pliers, remove the 2 tension springs.
- (d) Remove the 2 bolts and bellcrank.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
- (e) Remove the bellcrank boot from the bellcrank bracket.





- (f) Using a screwdriver, remove the C—washer and pin.
- (g) Remove the parking brake bellcrank from the bellcrank bracket.



9. REMOVE WHEEL CYLINDER

- (a) Using SST, disconnect the brake line. Use a container to catch the brake fluid.

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

SST 09023—00100

- (b) Remove the 2 bolts and wheel cylinder.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

10. DISASSEMBLE WHEEL CYLINDER

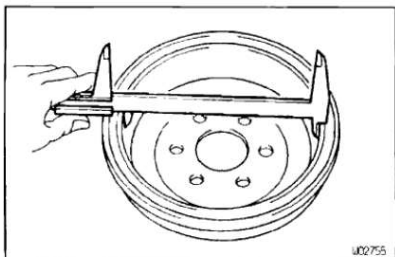
Remove the these parts from the wheel cylinder.

- 2 boots
- 2 pistons
- 2 piston cups
- Spring

REAR BRAKE COMPONENTS INSPECTION AND REPAIR

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



2. MEASURE BRAKE DRUM INSIDE DIAMETER

Using vernier calipers, measure the inside diameter of the drum.

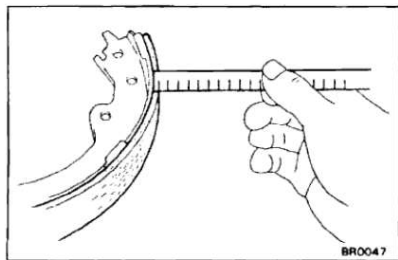
Standard inside diameter:

295.0 mm (11.614 in.)

Maximum inside diameter:

297.0 mm (11.693 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.



BR0047

3. MEASURE BRAKE SHOE LINING THICKNESS

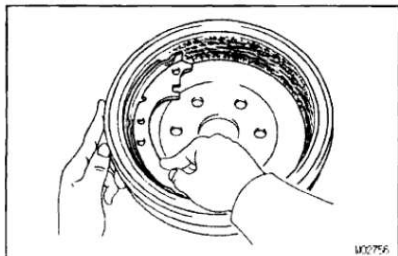
Using a ruler, measure the shoe lining thickness.

Standard thickness: 6.0 mm (0.236 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the shoe lining is less than the minimum, or shows signs of uneven wear, replace the brake shoes.

HINT: If any of the brake shoes have to be replaced, replace all of the rear brake shoes in order to maintain even braking.



W02756

4. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

REAR BRAKE INSTALLATION

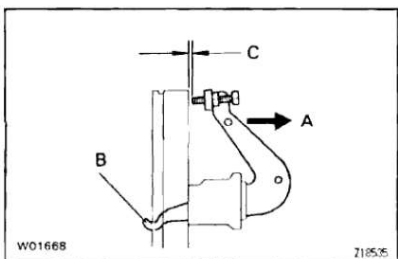
BR 1-28-02

BR

Installation is in the reverse order of removal.

AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See page BR-6) AND CHECK FOR LEAKS

NOTICE: Apply lithium soap base glycol grease and high temperature grease to the parts indicated by the arrows (See page BR-30).

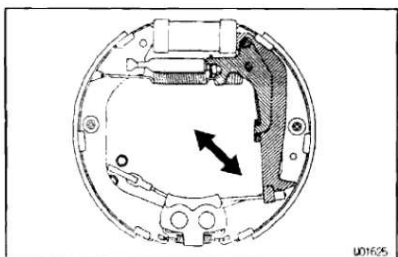


W01668

718535

1. ADJUST BELLCRANK

- Lightly pull the bellcrank in direction A until there is no slack at part B.
- In this condition, turn the adjusting bolt so that dimension C will be 0.4–0.8 mm (0.016–0.031 in.).
- Lock the adjusting bolt with the lock nut.
- Connect the parking brake cable to the parking brake bellcrank and install the clip.
- Install the tension spring.

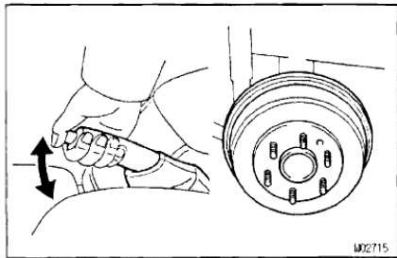


W01605

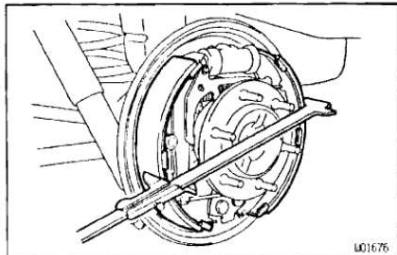
2. CHECK OPERATION OF AUTOMATIC ADJUSTING MECHANISM

- Move the parking brake lever of the rear shoe back and forth, as shown. Check that the adjusting bolt turns.

If it does not turn, check for incorrect installation of the rear brakes.



- (b) Adjust the adjuster length to the shortest possible amount.
- (c) Install the drum.
- (d) Pull the parking brake lever all the way up until a clicking sound can no longer be heard.



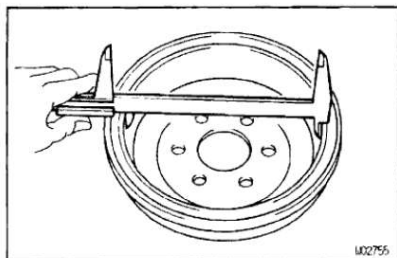
3. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

- (a) Remove the drum.
- (b) Using vernier calipers, measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

Shoe clearance:

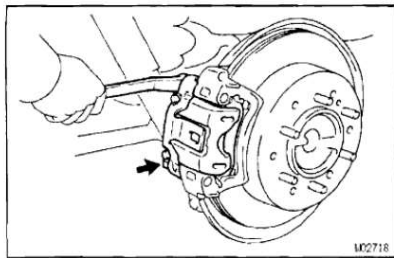
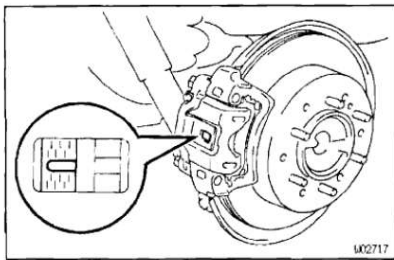
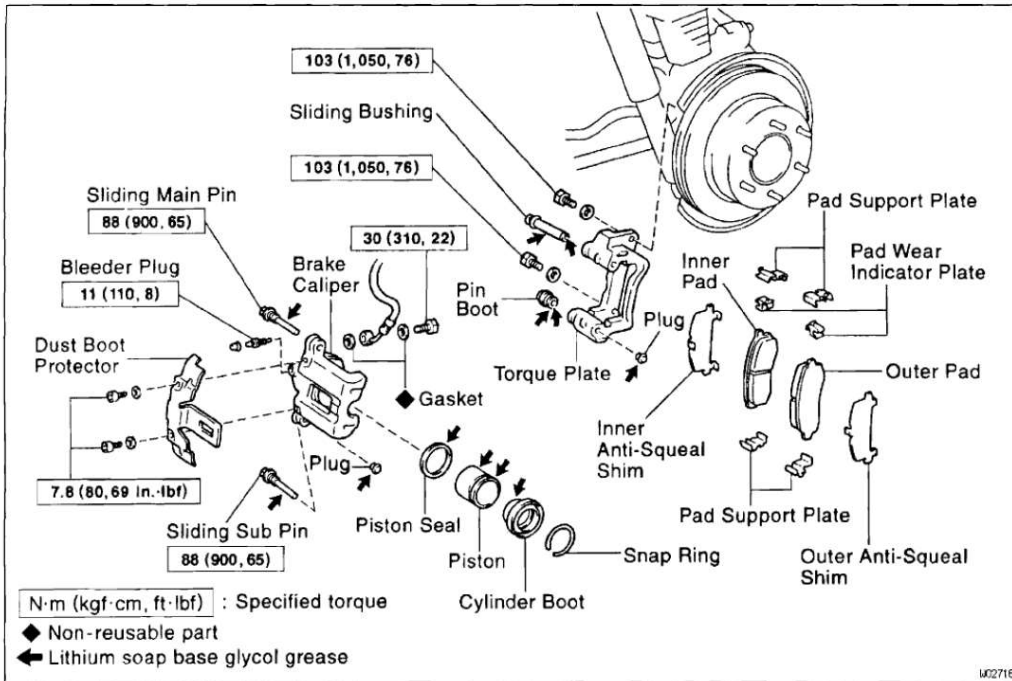
0.5 mm (0.020 in.)

If it is incorrect, check the parking brake system.



REAR BRAKE (Disc Brake) COMPONENTS

BR030-06



BRAKE PADS REPLACEMENT

BR114-04

1. REMOVE REAR WHEEL

Remove the wheel and temporarily fasten the disc with the hub nuts.

2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)

3. REMOVE BRAKE CALIPER

- Remove the sliding main pin and sliding sub pin.
- Remove the caliper and suspend it so the hose is not stretched.

HINT: Do not disconnect the flexible hose.

4. REMOVE THESE PARTS:

- 2 brake pads
- 2 anti-squeal shims
- 4 pad support plates
- 2 pad wear indicator plates

NOTICE: The pad support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

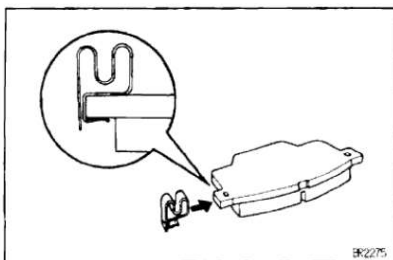
5. CHECK DISC THICKNESS AND RUNOUT

(See page BR-38)

6. INSTALL 4 PAD SUPPORT PLATES**7. INSTALL 2 NEW PADS**

NOTICE: When replacing worn pads, the anti-squeal shims and wear indicator plates must be replaced together with the pads.

BR

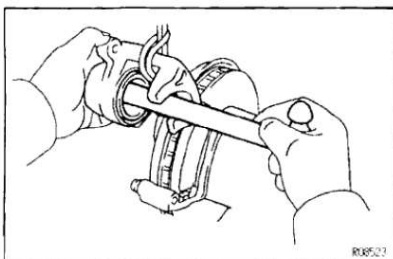


- (a) Install pad wear indicator plate to each pads.
- (b) Install the 2 anti-squeal shims to the pads.
- (c) Install the 2 pads so the wear indicator plate is facing upward.

NOTICE: Do not allow oil or grease to get on the rubbing face.

8. INSTALL CALIPER

- (a) Draw out a small amount of brake fluid from the reservoir.



- (b) Press in the piston with a hammer handle or an equivalent.
- HINT:** Always change the pads on one wheel at a time as there is a possibility of the opposite piston flying out.
- (c) Install the caliper carefully so the boot is not wedged.
- (d) Install and torque the sliding main pin and sub pin.

Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)

9. INSTALL REAR WHEEL**10. CHECK THAT FLUID LEVEL IS AT MAX LINE**

BM1A9-02

CALIPER REMOVAL**1. DISCONNECT FLEXIBLE HOSE**

- (a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.
- Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)
- (b) Use a container to catch the brake fluid as it drains out.

2. REMOVE CALIPER

Remove the 2 sliding pins and caliper.

Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)

3. REMOVE THESE PARTS:

- 2 pads with anti-squeal shims
- 4 pad support plates

4. REMOVE DUST BOOT PROTECTOR

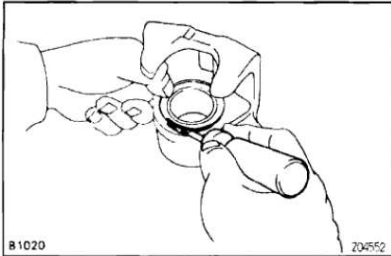
Using a 5 mm hexagon wrench, remove the 2 bolts and dust boot portector.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

BR1LJ-01

CALIPER DISASSEMBLY**1. REMOVE CYLINDER BOOT**

Using a screwdriver, remove the cylinder boot from the caliper.



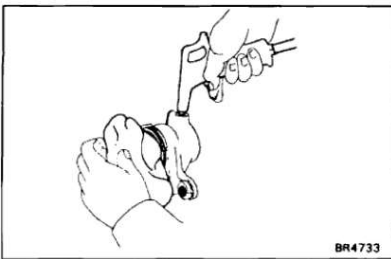
R1020

204552

2. REMOVE PISTON

- (a) Place a piece of cloth or a similar object between the piston and caliper.
- (b) Use compressed air to remove the piston from the cylinder.

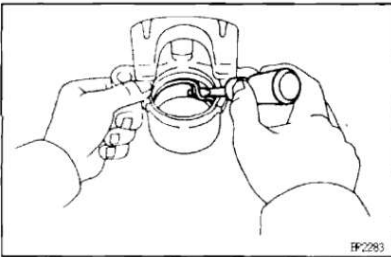
CAUTION: Do not place your fingers in front of the piston when using compressed air.



BR4733

3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.

4. REMOVE PIN BOOT AND SLIDING BUSHING

FP2283

CALIPER ASSEMBLY

BR1AA-02

Assembly is in the reverse order of disassembly.

NOTICE: Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR-35).

REAR DISC BRAKE COMPONENTS INSPECTION AND REPAIR

1. MEASURE PAD LINING THICKNESS

(See step 1. on page BR-28)

Standard thickness:

10.0 mm (0.394 in.)

Minimum thickness:

1.0 mm (0.039 in.)

2. MEASURE DISC THICKNESS

(See step 2. on page BR-28)

Standard thickness:

18.0 mm (0.709 in.)

Minimum thickness:

16.0 mm (0.630 in.)

3. MEASURE DISC RUNOUT

(See step 3. on page BR-28)

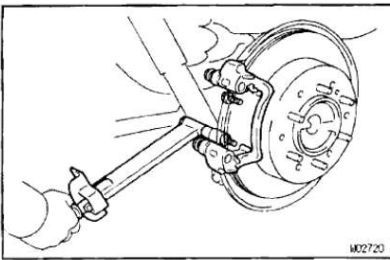
Maximum disc runout:

0.15 mm (0.0059 in.)

4. IF NECESSARY, REPLACE DISC

- (a) Remove the torque plate.
- (b) Remove the hub nuts of the temporarily installed disc and pull off the disc.
- (c) Install a new disc and loosely install the hub nuts.
- (d) Install the torque plate and tighten the mounting bolts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



CALIPER INSTALLATION

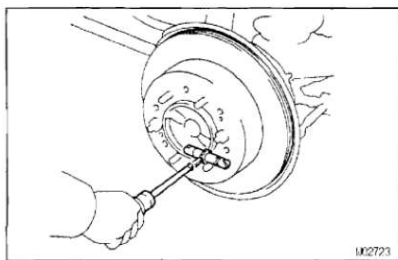
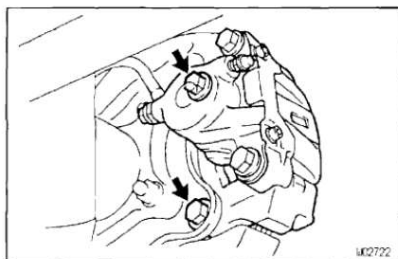
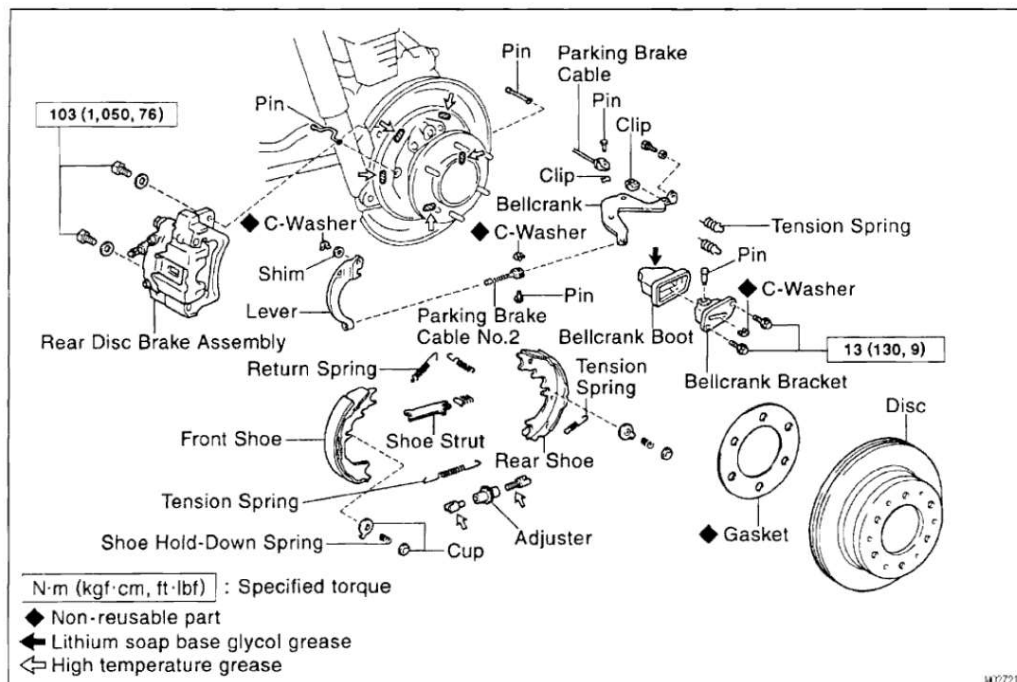
M11AC-02

Installation is in the reverse order of removal.

**AFTER INSTALLATION, FILL BRAKE RESERVOIR
WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See
page BR-6) AND CHECK FOR LEAKS**

REAR BRAKE (Parking Brake) COMPONENTS

•RC27-07



PARKING BRAKE DISASSEMBLY

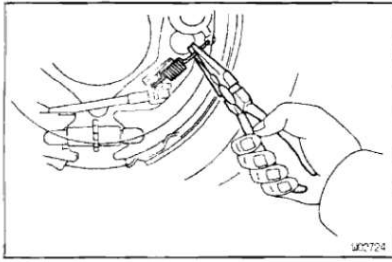
- 1. REMOVE REAR WHEEL**
- 2. REMOVE REAR DISC BRAKE ASSEMBLY**
 - (a) Remove the 2 mounting bolts and remove the disc brake assembly.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
 - (b) Suspend the disc brake securely. Ensure that the hose is not stretched.
- 3. REMOVE DISC**

Place a matchmarks on the disc and rear hub, and remove the disc.

HINT: If the disc cannot be removed easily, using a screwdriver, turn the shoe adjuster until the wheel turns freely.

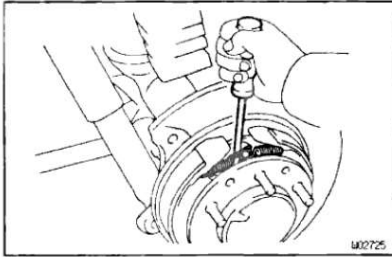
NP 14-04

BR



4. REMOVE TENSION SPRING

Using needle—nose pliers, remove the tension spring.



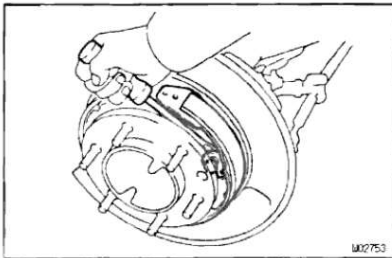
5. REMOVE SHOE RETURN SPRINGS

Using a screwdriver, remove the 2 shoe return springs.

INSTALLATION HINT: Use SST, install the front shoe return spring and then install the rear return spring.

SST 09718—20010

6. REMOVE SHOE STRUT WITH SPRING

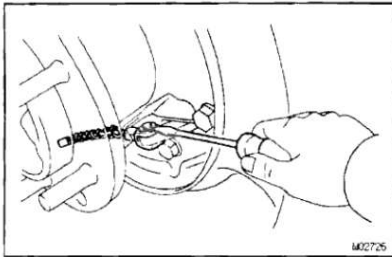


7. REMOVE REAR SHOE, ADJUSTER AND TENSION SPRING

- Using needle—nose pliers, remove the tension spring from the rear shoe.
- Using a screwdriver, slide out the rear shoe, and remove the rear shoe, adjuster, shoe strut and spring.
- Remove the lower side tension spring.
- Remove the shoe hold—down spring cups, spring and pin.

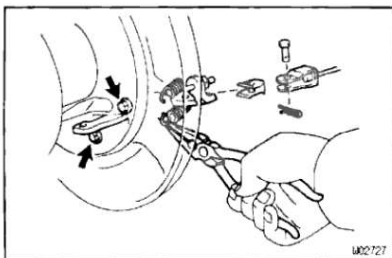
8. REMOVE FRONT SHOE

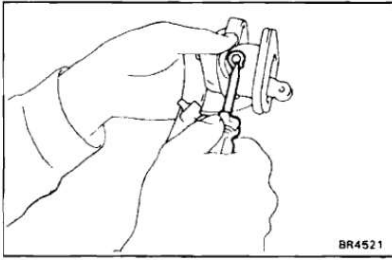
- Slide out the front shoe.
- Disconnect the parking brake cable from the parking brake shoe lever.
- Remove the shoe hold—down spring cups, spring and pin.



9. IF NECESSARY, REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK ASSEMBLY

- Using a screwdriver, remove the C—washer.
 - Remove the pin and disconnect the parking brake cable No.2 from the bellcrank.
 - Using needle nose pliers, remove the clip.
 - Remove the pin and clip, then disconnect the parking brake cable.
 - Using needle—nose pliers, remove the 2 tension springs.
 - Remove the 2 bolts and parking brake bellcrank assembly.
- Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
- Remove the boot from parking brake bellcrank bracket.





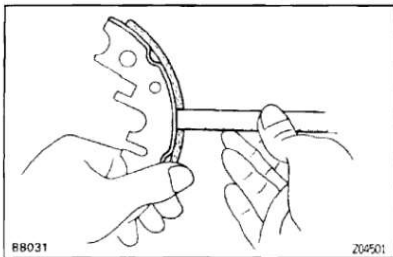
- (h) Using a screwdriver, remove the C-washer and pin.
- (i) Remove the parking brake bellcrank from the bell crank bracket.

PARKING BRAKE COMPONENTS INSPECTION AND REPAIR

MILL-01

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness:

4.0 mm (0.157 in.)

Minimum thickness:

1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is extremely uneven wear, replace the brake shoe.

3. MEASURE BRAKE DISC INSIDE DIAMETER

Using a vernier calipers, measure the inside diameter of the disc.

Standard inside diameter:

210 mm (8.27 in.)

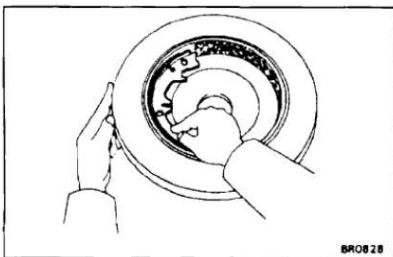
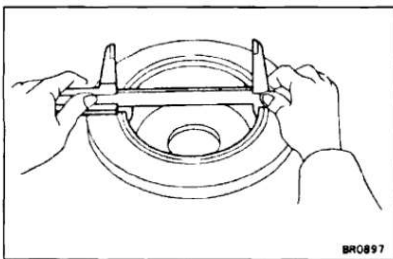
Maximum inside diameter:

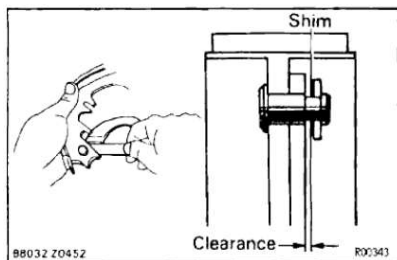
211 mm (8.31 in.)

Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or is worn unevenly.

4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.





5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

Standard clearance:

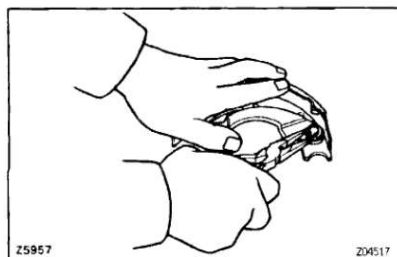
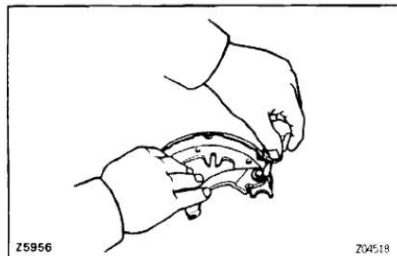
Less than 0.35 mm (0.0138 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.9 mm (0.035 in.)
0.6 mm (0.024 in.)	—

6. IF NECESSARY, REPLACE SHIM

- Using a screwdriver, remove the C-washer.
- Remove the parking brake shoe lever, and install the correct size shim.
- Using needle nose pliers, install the parking brake shoe lever with a new C-washer.
- Remeasure the clearance.



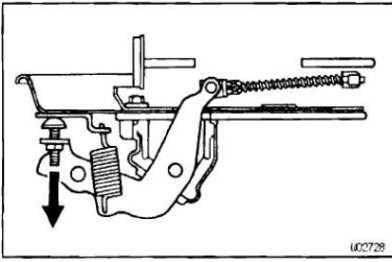
PARKING BRAKE ASSEMBLY

Assembly is in the reverse order of disassembly.

NOTICE: Apply lithium soap base glycol grease and high temperature grease to the parts indicated by the arrows (See page BR-39)

1. ADJUST PARKING BRAKE SHOE CLEARANCE

- Temporarily install the hub nuts.
- Remove the hole plug.
- Turn the adjuster and expand the shoes until the disc locks.
- Return the adjuster 8 notches.
- Install the hole plug.

**2. IF NECESSARY ADJUST BELLCRANK**

- (a) Pull the bellcrank until all play in the interior linkage is taken up.
- (b) Screw in the bellcrank adjusting bolt to where it contacts on the dust seal.
- (c) Loosen it one turn, and lock it at that position with the lock nut.
Torque: **5.4 N·m (55 kgf·cm, 48 in.-lbf)**
- (d) Install the bellcrank spring.

3. BEDDING DOWN PARKING BRAKE SHOES AND DISC

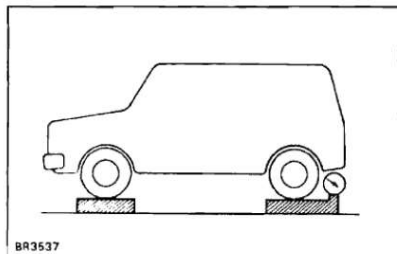
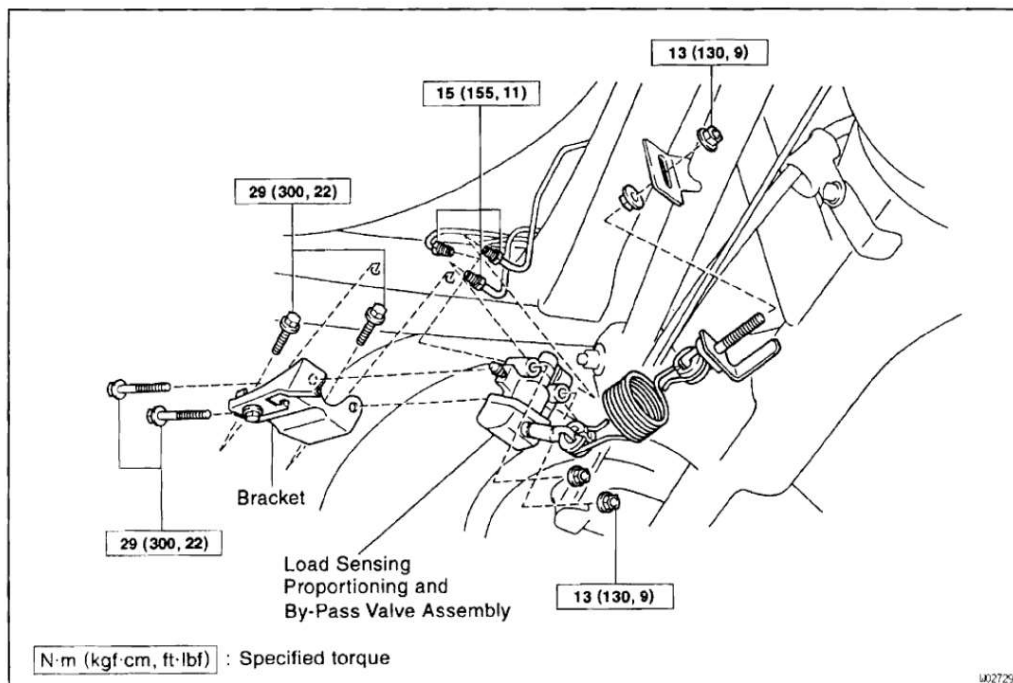
- (a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (b) With the parking brake release button pushed in, pull on the lever with 88 N (9 kgf, 19.8 lbf) of force.
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure 2 or 3 times.

4. RECHECK AND ADJUST PARKING BRAKE LEVER TRAVEL

LOAD SENSING PROPORTIONING AND BY-PASS VALVE (LSP & BV)

COMPONENTS

M11JC-02



FLUID PRESSURE CHECK AND ADJUSTMENT

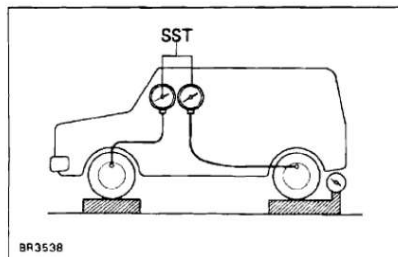
M11JD-02

1. SET REAR AXLE LOAD

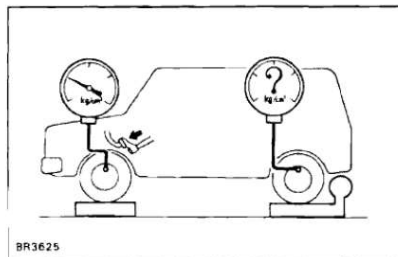
Rear axle load (includes vehicle weight):

Short model: 950 kg (2,094 lb)

Long model: 1,064 kg (2,346 lb)



2. INSTALL LSPV GAUGE (SST) AND BLEED AIR
09709-29017

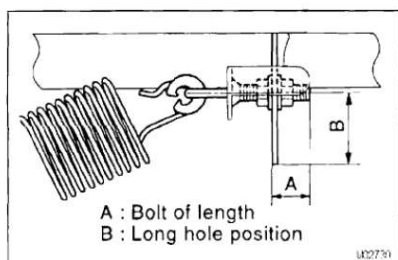


3. RAISE FRONT BRAKE FLUID PRESSURE TO FOLLOWING SPECIFICATION AND CHECK REAR BRAKE FLUID PRESSURE

Rear brake fluid pressure:

Model	Front brake fluid pressure kPa (kgf/cm ² , psi)	Rear brake fluid pressure kPa (kgf/cm ² , psi)
Short w/o ABS	8,826 (90, 1,280)	4,021 (41, 583)
Short w/ ABS	8,826 (90, 1,280)	5,296 (54, 768)
Long w/o ABS	8,826 (90, 1,280)	4,609 (47, 668)
Long w/ ABS	8,826 (90, 1,280)	6,963 (71, 1,010)

HINT: The brake pedal should not be depressed twice and/or returned while setting to the specified pressure. Read the value of rear pressure 2 seconds after adjusting the specified fluid pressure.



4. IF NECESSARY, ADJUST FLUID PRESSURE

- (a) Adjust the fluid pressure by changing the A or B length.

Low pressure — Lengthen A, B

High pressure — Shorten A, B

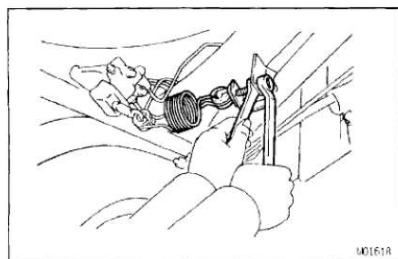
HINT: One turn of the adjusting nut and 1 mm (0.04 in.) sliding of the adjusting bolt changes the fluid pressure, as shown in the table below.

Model	A kPa (kgf/cm ² , psi)	B kPa (kgf/cm ² , psi)
Short w/o ABS	177 (1.8, 26)	59 (0.6, 9)
Short w/ ABS	216 (2.2, 31)	69 (0.7, 10)
Long w/o ABS	157 (1.6, 23)	49 (0.5, 7)
Long w/ ABS	255 (2.6, 37)	88 (0.9, 13)

- (b) Torque the lock nut.

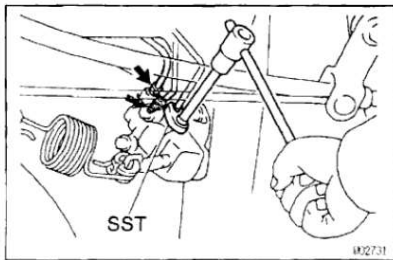
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

If it cannot be adjusted, replace the valve body.



BR

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**LSP & BV REMOVAL**

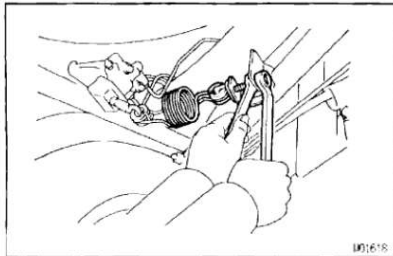
M11M-01

1. DISCONNECT BRAKE LINES

Using SST, disconnect the 3 brake lines from the valve body.

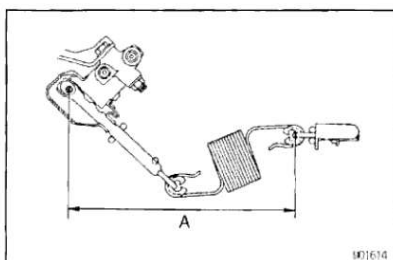
SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

**2. REMOVE LSP & BV ASSEMBLY**

- (a) Remove the lock nut and disconnect the adjusting bolt from the rear lateral control rod.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

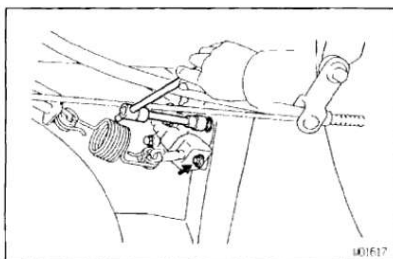


INSTALLATION NOTICE: Set spring length A to initial set length and temporarily tighten the lock nut.

Initial set length (Unladen):

Short model: 220 mm (8.66 in.)

Long model: 222 mm (8.74 in.)



- (b) Remove the 2 mounting bolts and nuts, and remove the LSP & BV assembly.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- (b) Remove the 2 bolts and bracket from the frame.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

LSPV & BV INSTALLATION

M11M-01

Installation is in the reverse order of removal.

AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See page BR-6), CHECK AND ADJUST FLUID PRESSURE (See page BR-44) AND CHECK FOR LEAKS

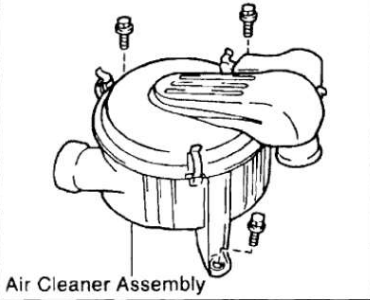
ANTI-LOCK BRAKE SYSTEM (ABS)

ABS ACTUATOR COMPONENTS

BR112-01

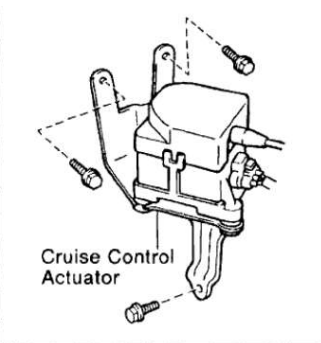
LHD

1KZ-T and 1KZ-TE E/G



19 (195, 14)

w/ Cruise Control



Holder

Cushion

ABS Actuator

5.4 (55, 48 in.-lbf)

ABS Actuator Bracket

15 (155, 11)

N·m (kgf·cm, in.-lbf) : Specified torque

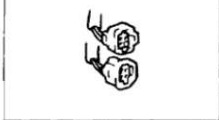
UJ2738

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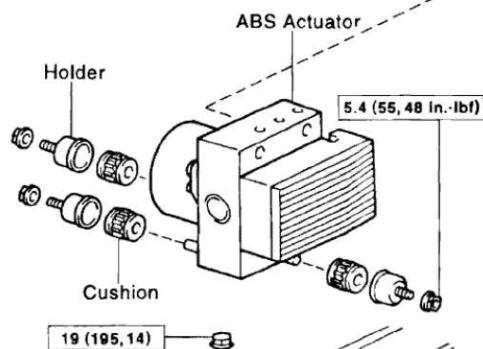
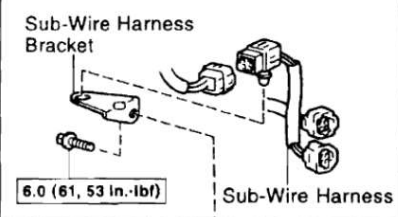
BR

RHD

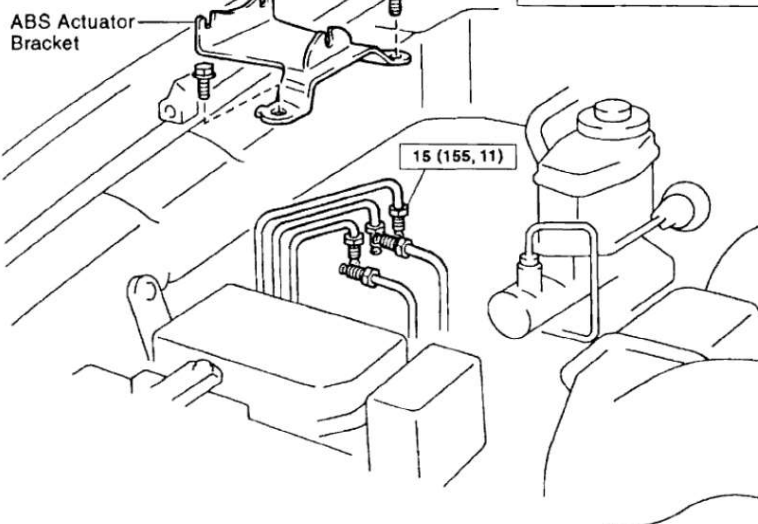
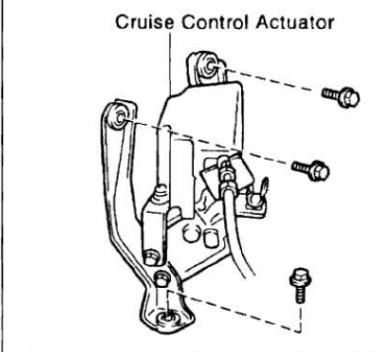
w/o Cruise Control



w/ Cruise Control



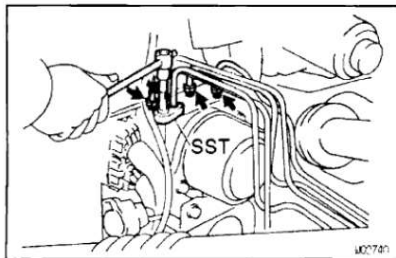
w/ Cruise Control



N·m (kgf·cm, in.-lbf) : Specified torque

1002799

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ABS ACTUATOR REMOVAL

BR1JH-02

1. **w/ CRUISE CONTROL:**
REMOVE CRUISE CONTROL ACTUATOR
2. **LHD 1KZ-T and 1KZ-TE E/G:**
REMOVE AIR CLEANER ASSEMBLY
3. **DISCONNECT BRAKE LINES**
Using SST, disconnect the 5 brake lines from the ABS actuator.
SST 09023-00100
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
4. **DISCONNECT CONNECTORS**
Disconnect the 2 connectors from the actuator.
5. **REMOVE ABS ACTUATOR**
 - (a) **RHD w/ Cruise control:**
Remove the bolt and sub-wire harness bracket.
Torque: 6.0 N·m (61 kgf·cm, 53 in·lbf)
 - (b) Remove the 3 bolts and ABS actuator assembly.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)
 - (c) Remove the 3 nuts and ABS actuator from the actuator bracket.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)
 - (d) Remove the 3 cushions and holders from the ABS actuator.

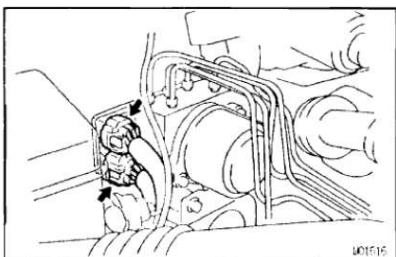
ABS ACTUATOR INSTALLATION

BR1JH-02

Installation is in the reverse order of removal.
AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID, BLEED BRAKE SYSTEM (See page BR-6) AND CHECK FOR LEAKS

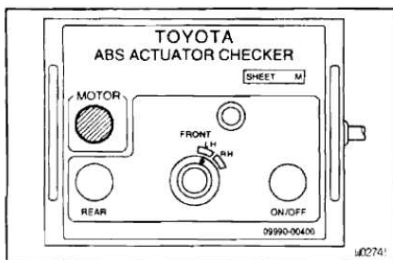
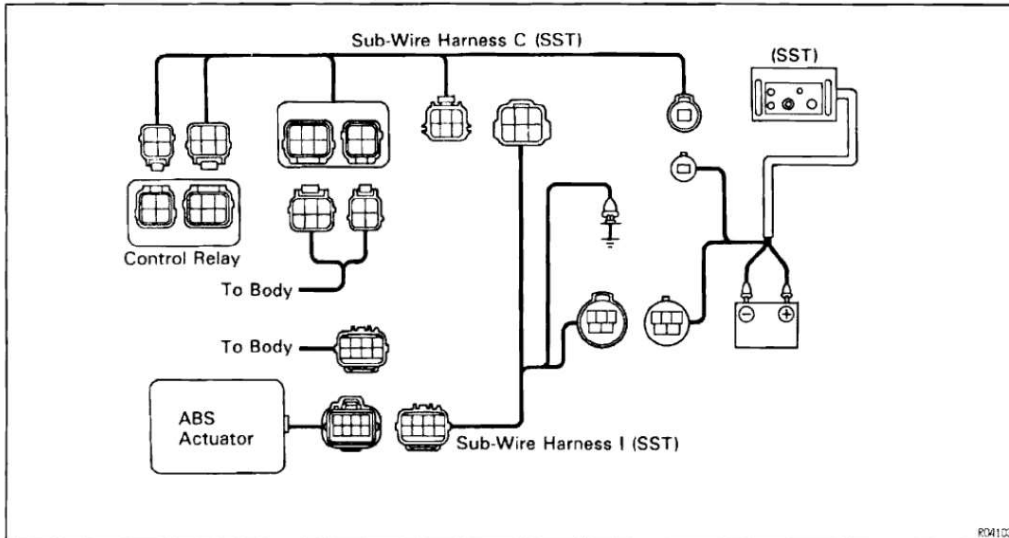
ABS ACTUATOR INSPECTION

BR1JU-02



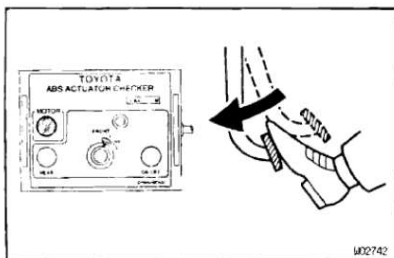
1. **INSPECT BATTERY VOLTAGE**
Battery voltage:
10-14 V
2. **DISCONNECT CONNECTORS**
 - (a) Disconnect the 2 connectors from the actuator.
 - (b) Disconnect the 2 connectors from the control relay.
3. **CONNECT ACTUATOR CHECKER (SST) TO ACTUATOR**
 - (a) Connect the actuator checker (SST) to the actuator, control relay and body side wire harness through the sub-wire harness C and I (SST) as shown.
SST 09990-00150, 09990-00200, 09990-00300

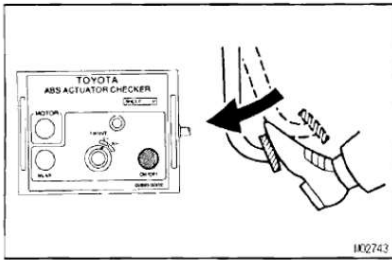
- (b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (-) terminal. Connect the black cable of the sub-wire harness to the battery negative (-) terminal or body ground.
- (c) Place the "SHEET M" (SST) on the actuator checker.



4. INSPECT BRAKE ACTUATOR OPERATION OF FRONT LH WHEEL

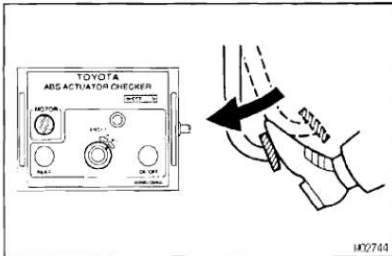
- (a) Start the engine, and run it at idle.
- (b) Turn the selector switch of the actuator checker to the "FRONT LH" position.
- (c) Push and hold in the MOTOR switch for a few seconds. Make sure that you can hear the motor run.
- (d) Depress the brake pedal and hold it for about 15 seconds, and check that the pedal does not go down.
- (e) With your foot still applied onto the brake pedal, push MOTOR switch and check that the brake pedal does not pulsate.





- (f) Depress the brake pedal and hold it. As you hold the pedal down, push and hold in the POWER switch for a few seconds. Check that the pedal does not go down. **NOTICE: Do not keep the POWER switch pushed down for more than 10 seconds.**

- (g) With your foot still applied onto the brake pedal, release the POWER switch and check that the pedal goes down.

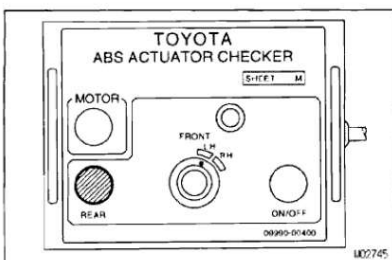


- (h) With your foot still applied onto the brake pedal, push the MOTOR switch and check that the brake pedal returns.

- (i) Release the brake pedal.

5. INSPECT FOR OTHER WHEELS

- (a) Turn the selector switch to the "FRONT RH" position.
(b) Repeating (c) to (i) in the step 4, check the actuator operation similarly.



- (c) Similarly, inspect rear wheel.

HINT: Push the REAR switch instead of the POWER switch, and inspect it in any selector switch position.

6. PUSH MOTOR SWITCH

- (a) Push and hold in the MOTOR switch for a few seconds.

- (b) Stop the engine.

7. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

Remove the "SHEET M" (SST) and disconnect the actuator checker (SST) and sub-wire harness (SST) from the actuator, control relay and body side wire harness.

SST 09990-00150, 09990-00200, 09990-00300,
09990-00400

8. CONNECT CONNECTORS

- (a) Connect the connector to the actuator.
(b) Connect the 2 connectors to the control relay.

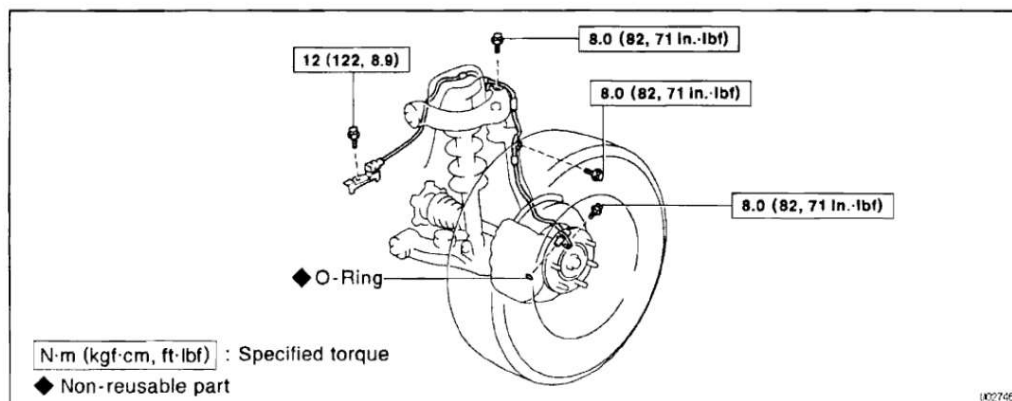
9. CLEAR DTC (See page BR-59)

BR

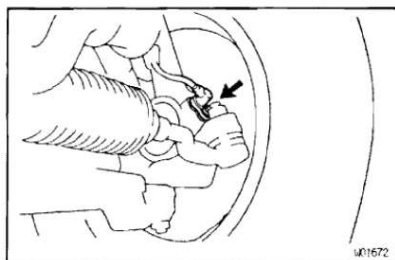
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FRONT SPEED SENSOR COMPONENTS

BM1A-02



BR



FRONT SPEED SENSOR REMOVAL

BM1A-02

REMOVE SPEED SENSOR

- Disconnect the speed sensor connector.
 - Remove the 4 resin clips and 4 clamp bolts holding the sensor harness from the steering knuckle, upper suspension arm and side rail.
- Torque:
- Side rail: 12 N·m (122 kgf·cm, 8.9 ft·lbf)
 - Others: 8.0 N·m (82 kgf·cm, 71 in.-lbf)
- Remove the mounting bolt and speed sensor.
 - Remove the O-ring.
- Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

REAR SPEED SENSOR INSTALLATION

BM1A-02

Installation is in the reverse order of removal.

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page BR-59)

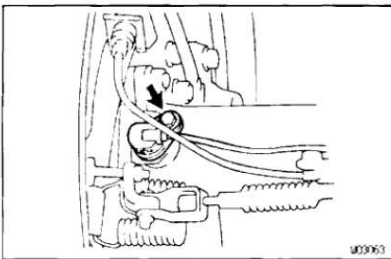
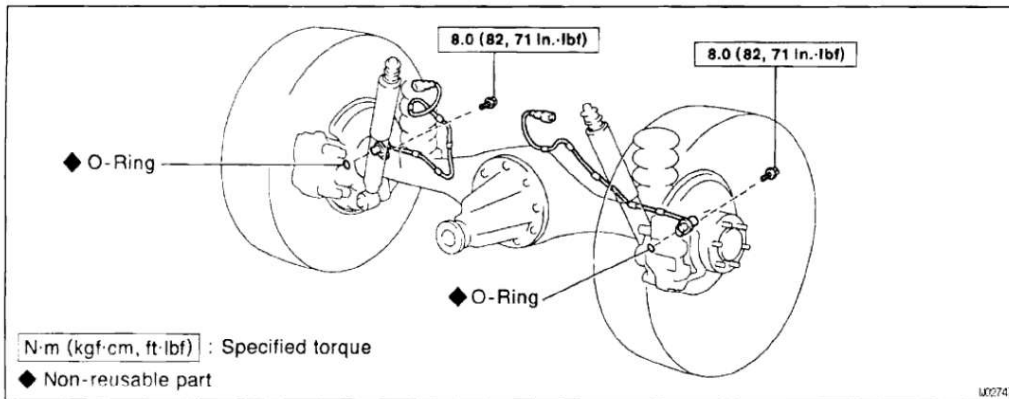
NOTICE: Make sure the followings:

- There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.
- The sensor is installed flat against the knuckle when you tighten the bolt.
- When installing the resin clips, use new ones.

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REAR SPEED SENSOR COMPONENTS

BR1.JP-02



REAR SPEED SENSOR REMOVAL

BR1.JT-02

REMOVE SPEED SENSOR

- Disconnect the speed sensor connector, and pull out the sensor wire harness with grommet.
- Remove the 5 resin clips, holding the sensor wire harness from the frame, upper control arm and axle housing.
- Remove the mounting bolt and speed sensor.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)
- Remove the O-ring.

REAR SPEED SENSOR INSTALLATION

BR1.JR-02

Installation is in the reverse order of removal.

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page BR-59)

NOTICE: Make sure followings:

- There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.
- The sensor is installed flat against the knuckle when you tighten the bolt.
- When installing the resin clips, use new ones.

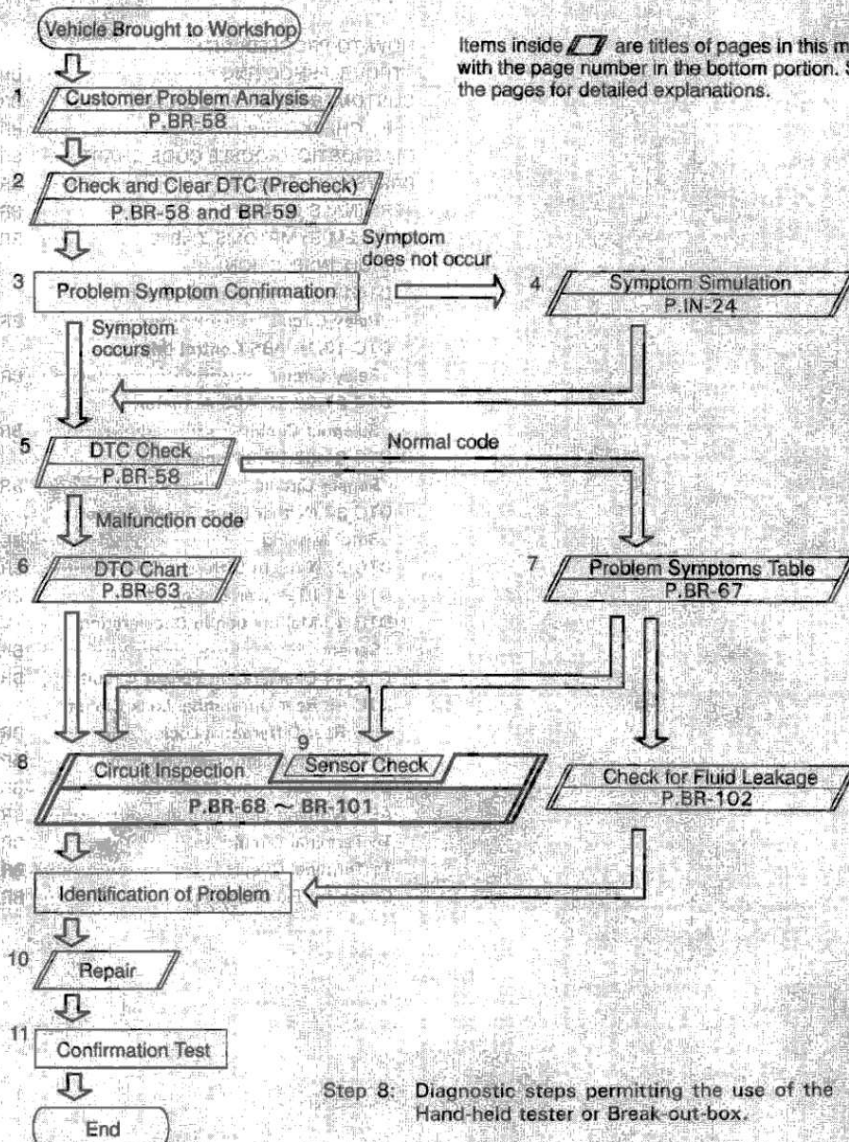
TROUBLESHOOTING

HOW TO PROCEED WITH	
TROUBLESHOOTING	BR – 56
CUSTOMER PROBLEM ANALYSIS CHECK ..	BR – 57
PRE – CHECK	BR – 58
DIAGNOSTIC TROUBLE CODE CHART	BR – 63
PARTS LOCATION	BR – 65
TERMINALS OF ECU	BR – 66
PROBLEM SYMPTOMS TABLE	BR – 67
CIRCUIT INSPECTION	
DTC11,12 ABS Control (Solenoid)	
Relay Circuit	BR – 68
DTC 13,14 ABS Control (Motor)	
Relay Circuit	BR – 71
DTC 21,22,23 ABS Actuator	
Solenoid Circuit	BR – 74
DTC 31,32,33,34 Speed	
Sensor Circuit	BR – 77
DTC 37 Neither Front Speed Sensor	
Rotor Missing	BR – 81
DTC 37 Tires of Different Size	
BR – 82	
DTC 41 IG Power Source Circuit	
BR – 83	
DTC 43 Malfunction in Deceleration	
Sensor	BR – 86
DTC 44 Deceleration Sensor Circuit	
BR – 87	
DTC 48 Rear Differential Lock Circuit	
(w/ Rear Differential Lock)	BR – 89
DTC 49 Stop Light Switch Circuit	
BR – 92	
DTC 51 ABS Pump Motor Lock	
BR – 94	
ABS Warning Light Circuit	
BR – 95	
Tc Terminal Circuit	
BR – 98	
Ts Terminal Circuit	
BR – 100	
Check for Fluid Leakage	
BR – 102	

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshooting in accordance with the procedure on the following pages.

Items inside **▮** are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.



CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's
Name _____

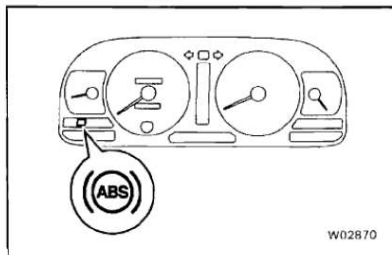
Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal ☐ Remains ON ☐ Does not Light Up	

DTC Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

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BR



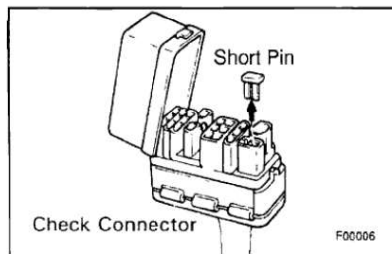
PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) INDICATOR CHECK

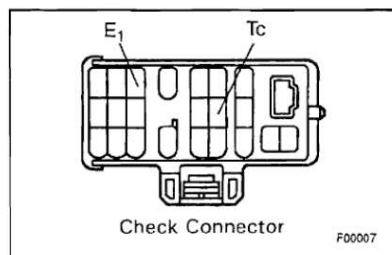
When the ignition switch is turned ON, check that the ABS warning light goes on for 3 seconds.

HINT: If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit (See page BR-95).



(b) DTC CHECK

- (1) Turn the ignition switch ON.
- (2) Disconnect the short pin from check connector.

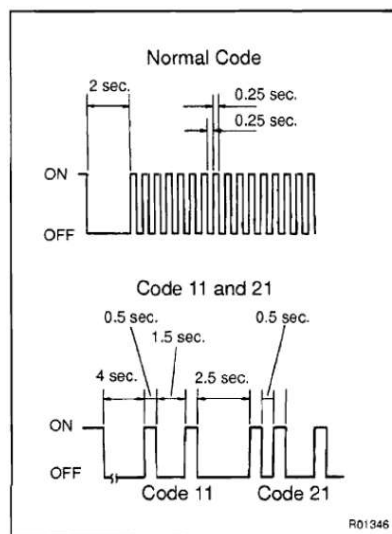


- (3) Using SST, connect terminals T_c and E₁ of check connector.

SST 09843 - 18020

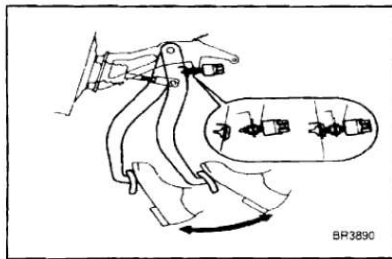
- (4) Read the DTC from the ABS warning light on the combination meter.

HINT: If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page BR-98 or BR-95).



As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

- (5) Code are explained in the code table on page BR-63.
- (6) After completing the check, disconnect terminals T_c and E₁, and turn off the display.
If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.



(c) DTC CLEARANCE

- (1) Using SST, connect terminals Tc and E₁ of check connector and remove the short pin from check connector.

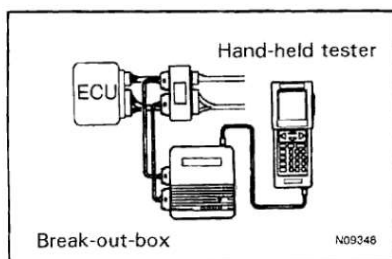
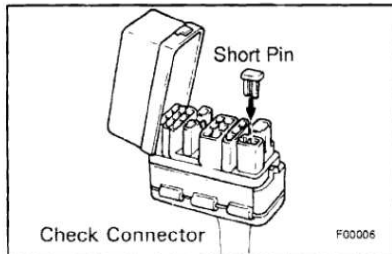
SST 09843 – 18020

- (2) IG switch ON.
- (3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 3 seconds.
- (4) Check that the warning light shows the normal code.
- (5) Remove the SST from the terminals of check connector.

SST 09843 – 18020

- (6) Connect the short pin to check connector.

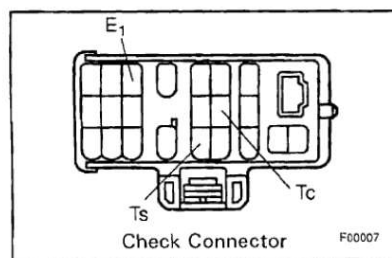
HINT: Cancellation can also be done by removing the ECU-B fuse, but in this case, other memory systems will also be cancelled out.



(d) ECU TERMINAL VALUES MEASUREMENT USING BREAK-OUT-BOX AND HAND-HELD TESTER

- (1) Hook up the hand-held tester and break-out-box to the vehicle.
- (2) Read the ECU input/output values by following the prompts on the tester screen.

HINT: Hand-held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems. Please refer to the hand-held tester/break-out-box operator's manual for further details.



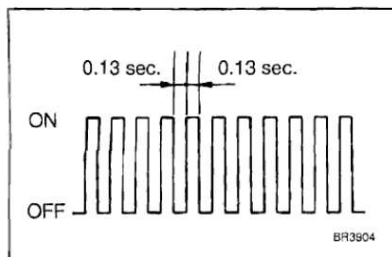
2. SPEED SENSOR SIGNAL AND DECELERATION SENSOR CHECK

(a) SPEED SENSOR SIGNAL CHECK

- (1) Turn the ignition switch OFF.
- (2) Using SST, connect terminals Ts and E₁ of check connector.

SST 09843 – 18020

- (3) Start the engine.



(4) Check that the ABS warning light blinks.

HINT: If the ABS warning light does not blink, inspect the ABS warning light circuit (See page BR-95).

(5) Drive vehicle straight forward.

HINT: Drive vehicle faster than 45 km/h (28 mph) for several seconds.

(6) Stop the vehicle.

(7) Using SST, connect terminals Tc and E₁ of check connector.

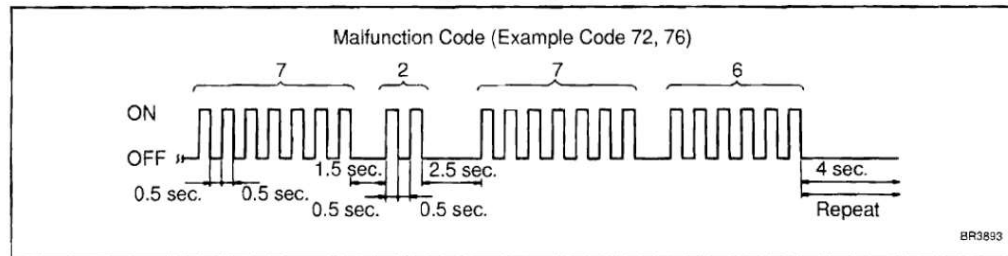
SST 09843 — 18020

(8) Read the number of blinks of the ABS warning light.

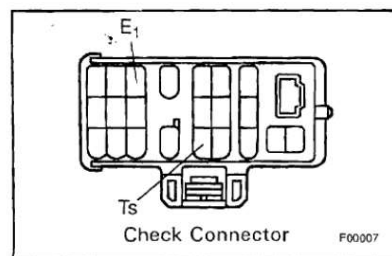
HINT: See the list of DTC on page BR-62.

If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).

If 2 or more malfunction are indicated at the same time, the lowest numbered code will be displayed 1st.



(9) After doing the check, disconnect terminals Ts and E₁, Tc and E₁ of check connector, and ignition switch turned OFF.



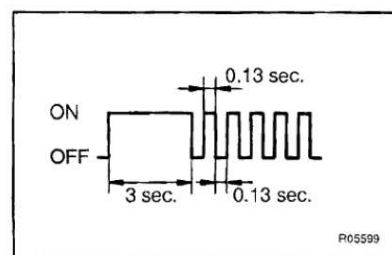
(b) DECELERATION SENSOR DETECTION POINT CHECK

(1) Turn the ignition switch OFF.

(2) Using SST, connect terminals Ts and E₁ of check connector.

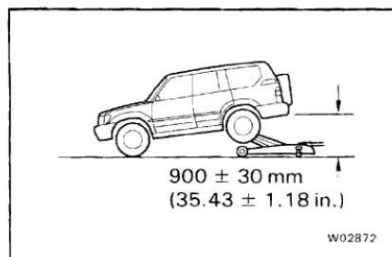
SST 09843 — 18020

(3) Start the engine.



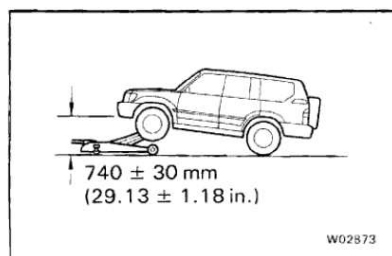
(4) Check that the ABS warning light blinks.

HINT: If the ABS warning light does not blink, inspect the ABS warning light circuit (See page BR-95).



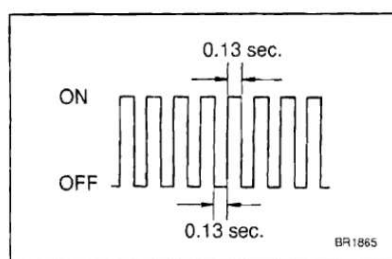
(5) Jack up the rear side of the vehicle slowly.
HINT: When measuring the height, measure at the center of the lower body of the vehicle.

- (6) Check that the warning light blinks.
If the warning light turns on, inspect the deceleration sensor installation. If the sensor installation is OK, replace the deceleration sensor.
- (7) Jack down the vehicle slowly.



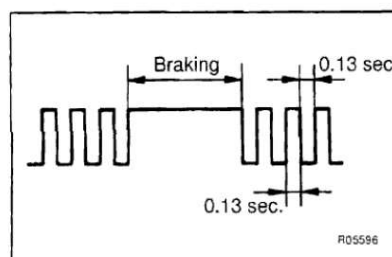
(8) Jack up the front side of the vehicle slowly, as shown.
HINT: When measuring the height, measure at the center of the lower body of the vehicle.

- (9) Check that the warning light blinks.
If the warning light turns on, inspect the deceleration sensor installation. If the sensor installation is OK, replace the deceleration sensor.
- (10) Jack down the vehicle slowly.

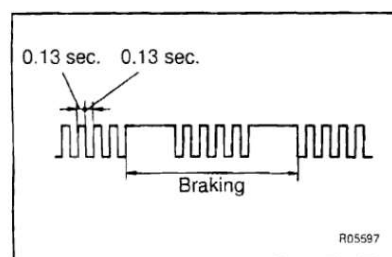


(c) DECELERATION SENSOR OPERATION CHECK

- (1) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, lightly depress the brake pedal.
- (2) Check that there is no change in the warning light pattern.



- (3) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, and depress the brake pedal moderately.
- (4) Check that the warning light turns on while braking.



- (5) Drive the vehicle straight ahead at about 20 km/h (12.4 mph) or more, and depress the brake pedal strongly.
- (6) Check that the warning light pattern changes while braking, as shown.
If the operation is not as specified, inspect the deceleration sensor installation. If the sensor installation is OK, replace the deceleration sensor.
- (7) Stop the vehicle and turn the ignition switch OFF.

- (8) Remove SST from the terminals Ts and E₁ of the check connector.

SST 09843 — 18020

(d) DTC OF SPEED SENSOR CHECK FUNCTION

Code No.	Diagnosis	Trouble Area
71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation
72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation
73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation
74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation
75	Abnormal change in output voltage of right front speed sensor	• Right front speed sensor rotor
76	Abnormal change in output voltage of left front speed sensor	• Left front speed sensor rotor
77	Abnormal change in output voltage of right rear speed sensor	• Right rear speed sensor rotor
78	Abnormal change in output voltage of left rear speed sensor	• Left rear speed sensor rotor
79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation

DIAGNOSTIC TROUBLE CODE CHART

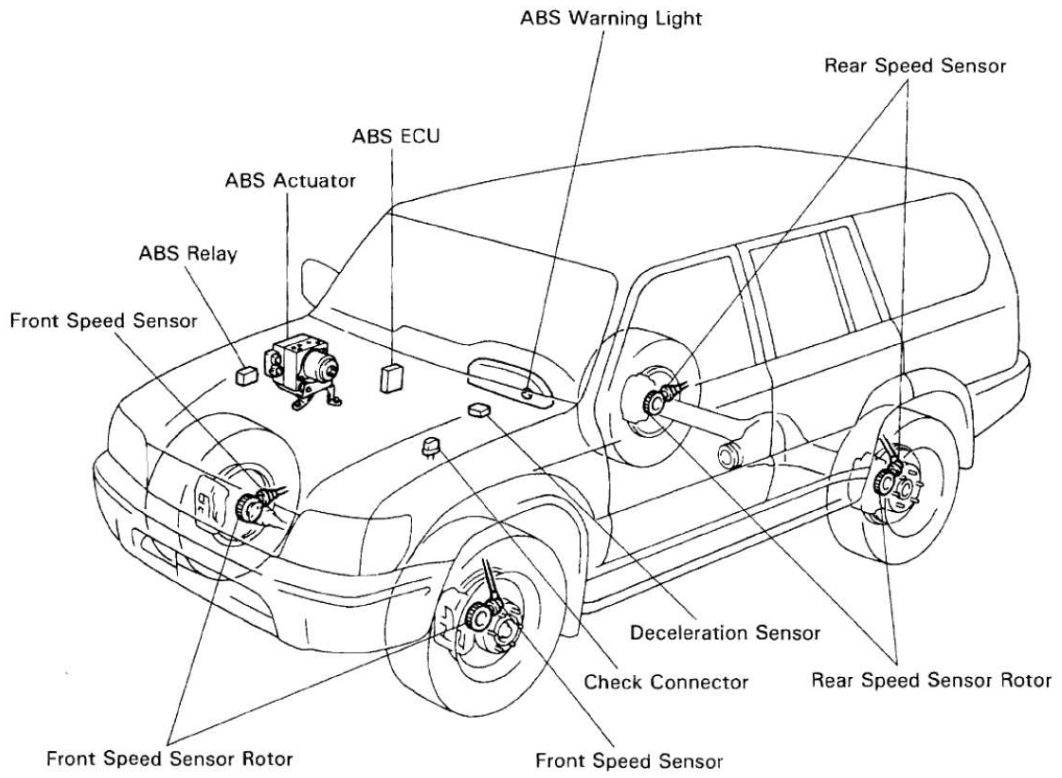
HINT: Using SST 09843 –18020, connect the terminals Tc and E₁, and remove the short pin.

If a malfunction code is displayed during the DTC check, check the circuit listed that the code. For details of each code, turn to the page referred to under the "See page" for respective "DTC No." in the DTC chart.

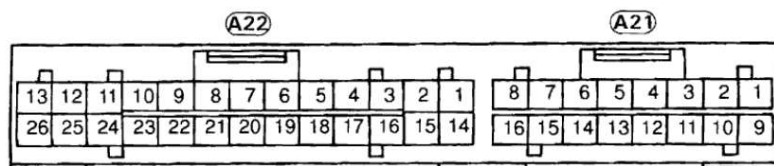
DTC No. (See Page)	Detection Item	Trouble Area
11 (BR-68)	Open circuit in ABS control (solenoid) relay circuit	• ABS control (solenoid) relay • Open or short in ABS control (solenoid) relay circuit • ECU
12 (BR-68)	Short circuit in ABS control (solenoid) relay circuit	• ABS control (solenoid) relay • B+ short in ABS control (solenoid) relay circuit • ECU
13 (BR-71)	Open circuit in ABS control (motor) relay circuit	• ABS control (motor) relay • Open or short in ABS control (motor) relay circuit • ECU
14 (BR-71)	Short circuit in ABS control (motor) relay circuit	• ABS control (motor) relay • B+ short in ABS control (motor) relay circuit • ECU
21 (BR-74)	Open or short circuit in 2-position solenoid circuit for right front wheel	• ABS actuator • Open or short in SFRR or SFRH circuit • ECU
22 (BR-74)	Open or short circuit in 2-position solenoid circuit for left front wheel	• ABS actuator • Open or short in SFLR or SFLH circuit • ECU
23 (BR-74)	Open or short circuit in 2-position solenoid circuit for rear wheel	• ABS actuator • Open or short in SRR or SRH circuit • ECU
31 (BR-77)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear and left rear speed sensor • Open or short in each speed sensor circuit • ECU
32 (BR-77)	Left front wheel speed sensor signal malfunction	
33 (BR-77)	Right rear wheel speed sensor signal malfunction	
34 (BR-77)	Left rear wheel speed sensor signal malfunction	
37 (BR-81)	Neither front speed sensor rotor missing	• Front axle hub • Right front, left front speed sensor • Wire harness for sensor system • ECU
37 (BR-82)	Some tires is different in size from the other tires	• Tire size • ECU
41 (BR-83)	Low battery voltage or abnormally high battery voltage	• Battery • IC regulator • Open or short in power source circuit • ECU
43 (BR-86)	Malfunction in deceleration sensor	• Deceleration sensor • Wire harness for deceleration sensor circuit • ECU
44 (BR-87)	Open or short in deceleration sensor circuit	• Deceleration sensor • Open or short in deceleration sensor circuit • ECU

48* (BR-89)	Open or short circuit in rear differential lock circuit Rear differential is locking	• Rear differential lock • ECU
49 (BR-92)	Open circuit in stop light switch	• Stop light switch • Open in stop light circuit
51 (BR-94)	Pump motor is locked Open in pump motor ground	• ABS pump motor
Always ON	Malfunction in ECU	• ECU

*: w/ Rear differential lock



TERMINALS OF ECU



R00463

Symbols (Terminals No.)	STD Voltage (V)	Condition
BAT (A22-22) - GND (A22-11, 24)	10 - 14	Always
IG1 (A22-10) - GND (A22-11, 24)	10 - 14	IG switch ON
SR (A21-5) - R+ (A21-3)	9 - 14	IG switch ON, ABS warning light OFF
MR (A21-4) - R+ (A21-3)	Below 1.0	IG switch ON
SFRH (A21-8) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
SFRR (A21-16) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
SFLH (A21-1) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
SFLR (A21-2) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
SRR (A22-10) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
SRH (A22-9) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
AST (A21-11) - GND (A22-11, 24)	10 - 14	IG switch ON, ABS warning light OFF
WA (A22-25) - GND (A22-11, 24)	Below 2.0	IG switch ON, ABS warning light ON
	10 - 14	IG switch ON, ABS warning light OFF
STP (A22-21) - GND (A22-11, 24)	Below 1.5	Stop light switch OFF
	8 - 14	Stop light switch ON
Tc (A22-20) - GND (A22-11, 24)	10 - 14	IG switch ON
Ts (A22-6) - GND (A22-11, 24)	10 - 14	IG switch ON
FR+ (A21-6) - FR- (A21-7)	AC generation	IG switch ON
		Slowly turn right front wheel
FL+ (A21-13) - FL- (A21-14)	AC generation	IG switch ON
		Slowly turn left front wheel
RR+ (A22-15) - RR- (A22-16)	AC generation	IG switch ON
		Slowly turn right rear wheel
RL+ (A22-1) - RL- (A22-2)	AC generation	IG switch ON
		Slowly turn left rear wheel
GS1 (A22-19) - GND (A22-11, 24)	About 2 or 4	IG switch ON
GS2 (A22-7) - GND (A22-11, 24)	2	IG switch ON
EX1 (A22-8) - GND (A22-11, 24)	Below 2.0	IG switch ON, center differential is locked
	10 - 14	IG switch ON, center differential is free
EX12 (A22-4) - GND (A22-11, 24)	Below 2.0	IG switch ON, rear differential is locked (4WD)
	12 - 14	IG switch ON, rear differential is free (4WD)
	Below 2.0	Always (2WD)
EX13 (A22-9) - GND (A22-11, 24)	Below 2.0	IG switch ON, transfer is in L4 position
	10 - 14	IG switch ON, transfer is in a position other than L4

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptoms	Inspection Circuit	See page
ABS does not operate.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit. 3. Speed sensor circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page BR-102).	BR-58 BR-83 BR-77 BR-49
ABS does not operate efficiently.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit. 3. Stop light switch circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page BR-102).	BR-58 BR-77 BR-92 BR-49
ABS warning light abnormal.	1. ABS warning light circuit. 2. ABS ECU.	BR-95
DTC check cannot be done.	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS ECU. 1. ABS warning light circuit. 2. Tc terminal circuit.	BR-95 BR-98
Speed sensor signal check cannot be done.	1. Ts terminal circuit. 2. ABS ECU.	BR-100

CIRCUIT INSPECTION

DTC	11, 12	ABS Control (Solenoid) Relay Circuit
-----	--------	--------------------------------------

CIRCUIT DESCRIPTION

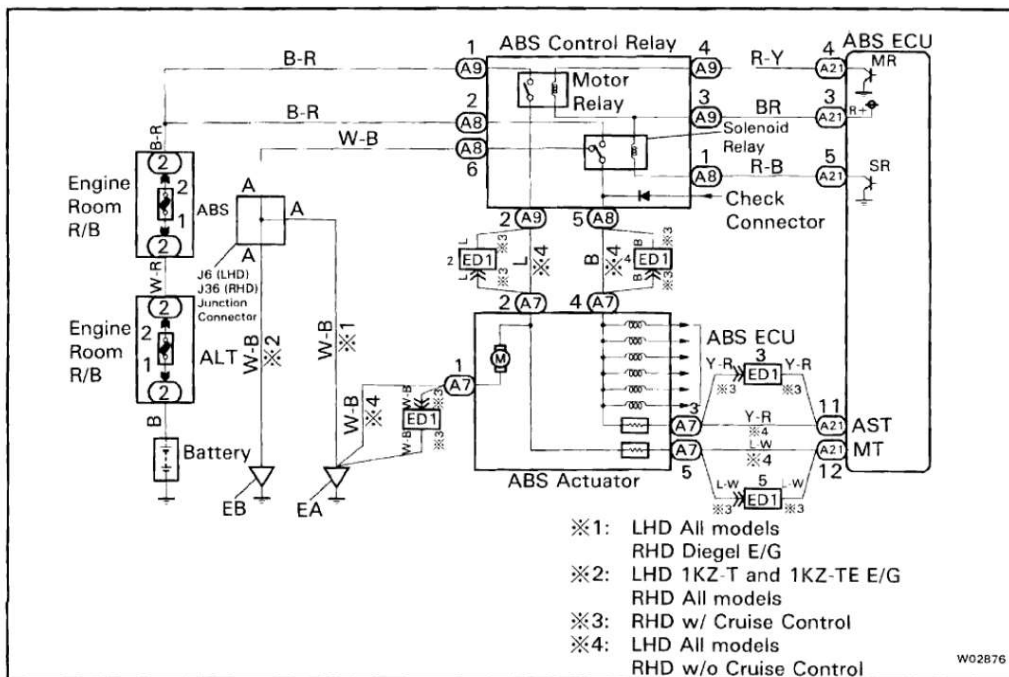
This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
11	Conditions (1) and (2) continue for 0.2 sec. or more: (1) ABS control (solenoid) relay terminal (SR) voltage: Battery voltage (2) ABS control (solenoid) relay monitor terminal (AST) voltage: 0 V	• ABS control (solenoid) relay • Open or short in ABS control (solenoid) relay circuit • ECU
12	Conditions (1) and (2) continue for 0.2 sec. or more: (1) ABS control (solenoid) relay terminal (SR) voltage: 0 V (2) ABS control (solenoid) relay monitor terminal (AST) voltage: Battery voltage	• ABS control (solenoid) relay • B+ short in ABS control (solenoid) relay circuit • ECU

BR

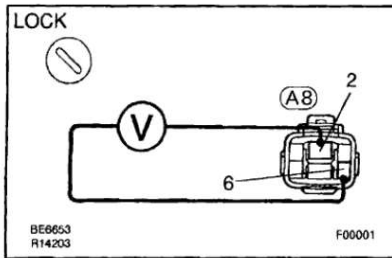
Fail safe function: If trouble in the ABS control (solenoid) relay circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals A8-2 and A8-6 of ABS control relay connector.

**PREPARATION:**

Disconnect the ABS control relay connector.

CHECK:

Measure the voltage between terminals A8-2 and A8-6 of ABS control relay harness side connector.

OK:

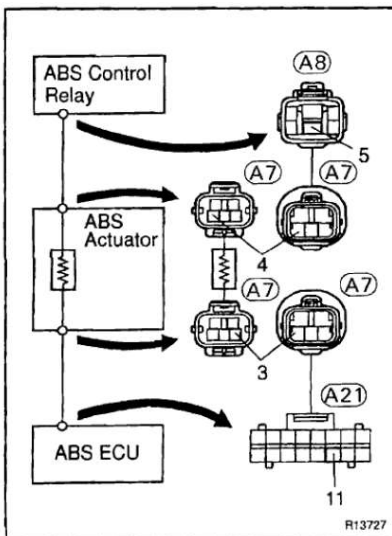
Voltage: 10 – 14 V

NG

Check and repair harness or connector.

OK

- 2 Check continuity between terminals A8-5 and A7-4, A7-4 and A7-3, A7-3 and A21-11.

**PREPARATION:**

Disconnect the 2 connectors from ABS actuator.

CHECK:

Check continuity between terminals A8-5 and A7-4, A7-4 and A7-3, A7-2 and A21-11.

OK:**Continuity**

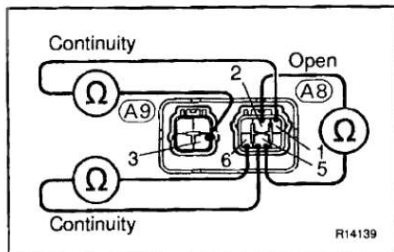
HINT: There is a resistance of 26 ~ 40 Ω between terminals A7-4 and A7-3.

NG

Repair or replace harness or ABS actuator.

OK

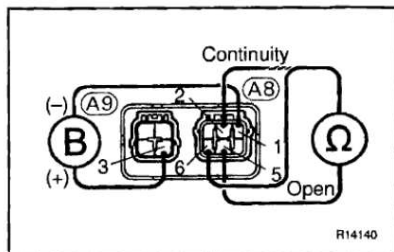
3 Check ABS control (solenoid) relay.

**CHECK:**

Check continuity between each terminal of ABS control (solenoid) relay.

OK:

Terminals A8-1 and A9-3	Continuity (Reference value 80 Ω)
Terminals A8-5 and A8-6	Continuity
Terminals A8-2 and A8-5	Open

**CHECK:**

- Apply battery voltage between terminals A8-1 and A9-3.
- Check continuity between each terminal of ABS control (solenoid) relay.

OK:

Terminals A8-5 and A8-6	Open
Terminals A8-2 and A8-5	Continuity

NG

Replace ABS control relay.

OK

4 Check for open and short in harness and connector between ABS control relay and ABS ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connector are normal, the ECU may be defective.

DTC	13, 14	ABS Control (Motor) Relay Circuit
-----	--------	-----------------------------------

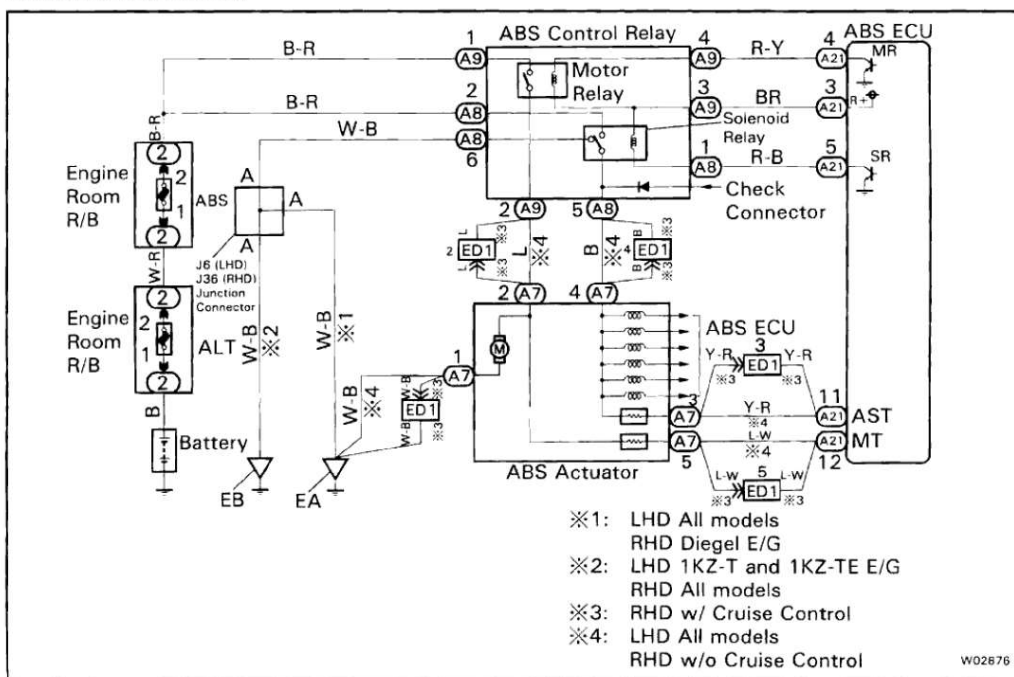
CIRCUIT DESCRIPTION

The ABS control (motor) relay supplies power to the ABS pump motor. While the ABS is activated, the ECU switches the ABS control (motor) relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
13	Conditions (1) and (2) continued for 0.2 sec. or more: (1) ABS control (motor) relay terminal (MR) voltage: Battery voltage (2) ABS control (motor) relay monitor terminal (MT) voltage: 0 V	• ABS control (motor) relay • Open or short in ABS control (motor) relay circuit • ECU
14	Conditions (1) and (2) continued for 2.5 sec. or more: (1) ABS control (motor) relay terminal (MR) voltage: 0 V (2) ABS control (motor) relay monitor terminal (MT) voltage: Battery voltage	• ABS control (motor) relay • B+ short in ABS control (motor) relay circuit • ECU

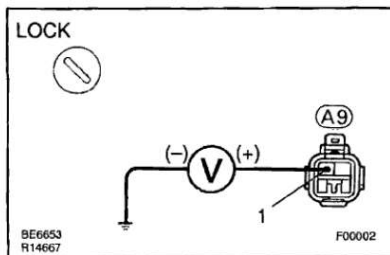
Fail safe function: If trouble occurs in the ABS control (motor) relay circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminal A9-1 of ABS control relay and body ground.

**PREPARATION:**

Disconnect the ABS control relay connector.

CHECK:

Measure voltage between terminal A9-1 of ABS control relay harness side connector and body ground.

OK:

Voltage: 10 – 14 V

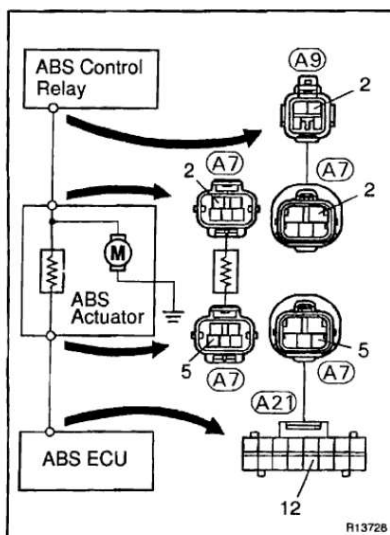
NG

Check and repair harness or connector.

OK

BR

- 2 Check continuity between terminals A9-2 and A7-2, A7-2 and A7-5, A7-5 and A21-12.

**PREPARATION:**

Disconnect the 2 connectors from ABS actuator.

CHECK:

Check continuity between terminals A9-2 and A7-2, A7-2 and A7-5, A7-5 and A21-12.

OK:

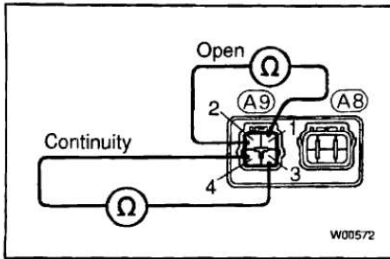
Continuity

HINT: There is a resistance of 26 ~ 40 Ω between terminals A7-2 and A7-5.

NG

Repair or replace harness or ABS actuator.

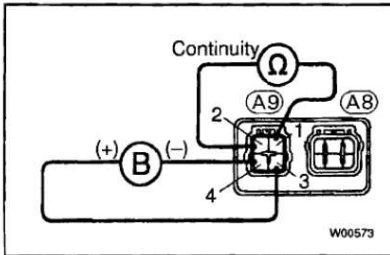
OK

3 Check ABS control (motor) relay.**CHECK:**

Check continuity between each terminal of ABS control (motor) relay.

OK:

Terminals A9-3 and A9-4	Continuity (Reference value 62 Ω)
Terminals A9-1 and A9-2	Open

**CHECK:**

- Apply battery voltage between terminals A9-3 and A9-4.
- Check continuity between terminals of ABS control (motor) relay.

OK:

Terminals A9-1 and A9-2	Continuity
-------------------------	------------

NG**Replace ABS control relay.****OK****4 Check for open and short in harness and connector between ABS control relay and ABS ECU (See page IN-30).****NG****Repair or replace harness or connector.****OK**

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, the ECU may be defective.

DTC	21, 22, 23	ABS Actuator Solenoid Circuit
-----	------------	-------------------------------

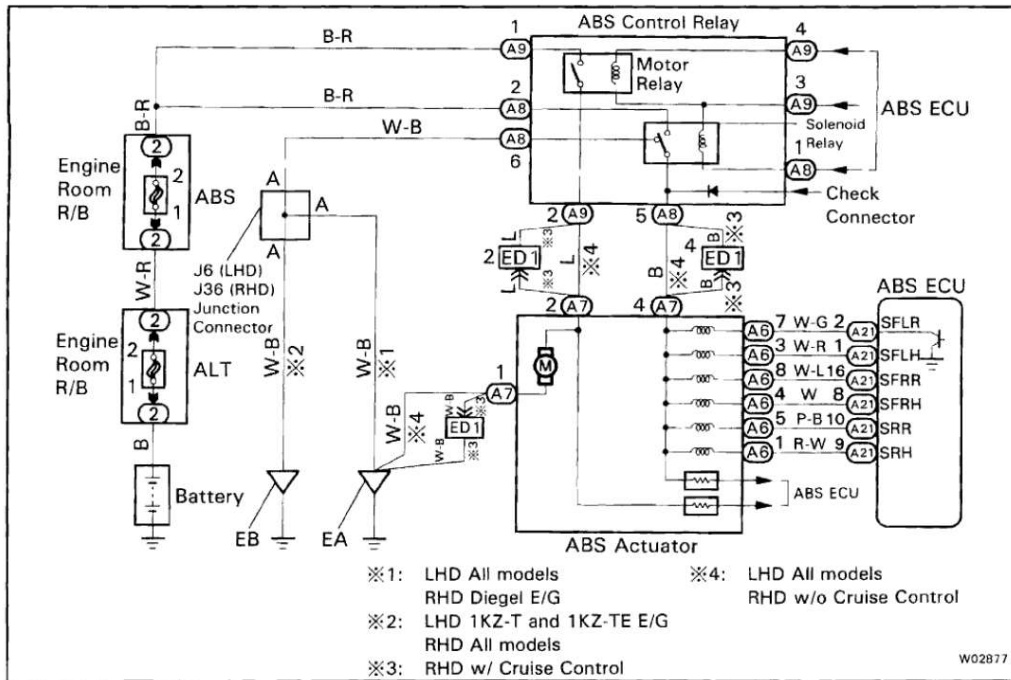
CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
21	Conditions (1) through (3) continue for 0.02 sec. or more: (1) ABS control (solenoid) relay terminal (SR) voltage: Battery voltage (2) Voltage of ABS ECU terminal AST: Battery voltage (3) When power transistor of ECU is ON, voltage of terminal SFRF or SFRH is 0 V or battery voltage.	•ABS actuator •Open or short in SFRF or SFRH circuit •ECU
22	Conditions (1) through (3) continue for 0.02 sec. or more: (1) ABS control (solenoid) relay terminal (SR) voltage: Battery voltage (2) Voltage of ABS ECU terminal AST: Battery voltage (3) When power transistor of ECU is ON, voltage of terminal SFLR or SFLH is 0 V or battery voltage.	•ABS actuator •Open or short in SFLR or SFLH circuit •ECU
23	Conditions (1) through (3) continue for 0.02 sec. or more: (1) ABS control (solenoid) relay terminal (SR) voltage: Battery voltage (2) Voltage of ABS ECU terminal AST: Battery voltage (3) When power transistor of ECU is ON, voltage of terminal SRR or SRH is 0 V or battery voltage.	•ABS actuator •Open or short in SRR or SRH circuit •ECU

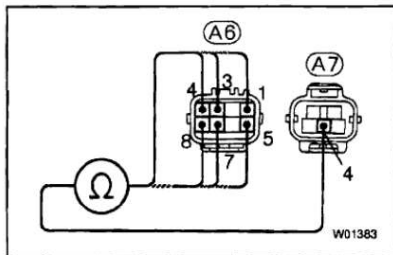
Fail safe function: If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check ABS actuator solenoid.

**PREPARATION:**

Disconnect the 2 connectors from ABS actuator.

CHECK:

Check continuity between terminals A7-4 and A6-1, 3, 4, 5, 7, 8 of ABS actuator connector.

OK:**Continuity**

HINT: Resistance of each solenoid coil

SFRH, SFLH, SRH: 5.0 Ω

SFRR, SFLR, SRR: 2.2 Ω

NG

Replace ABS actuator.

OK

- | | |
|---|--|
| 2 | Check for open and short in harness and connector between ABS ECU and actuator (See page IN-30). |
|---|--|

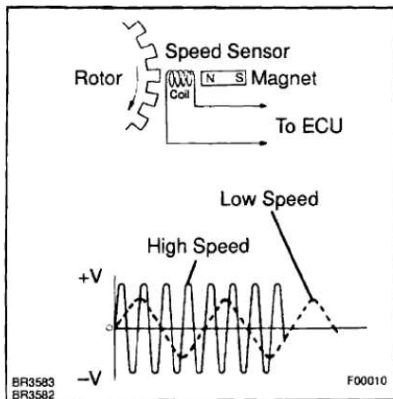
NG

Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connector are normal, the ECU may be defective.

DTC	31, 32, 33, 34	Speed Sensor Circuit
-----	----------------	----------------------

CIRCUIT DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS system. The front and rear rotors each have 48 serrations.

When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
31, 32, 33, 34	Detection of any of conditions (1) through (3): (1) At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. (2) Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. (3) Abnormal fluctuation of speed sensor signals with the vehicle speed 20 km/h (12 mph) or more. (4) An open is detected in the speed sensor circuit for 0.6 sec.	• Right front, left front, right rear, left rear speed sensor • Open or short in each speed sensor circuit • ECU

HINT:

DTC No. 31 is for the right front speed sensor.

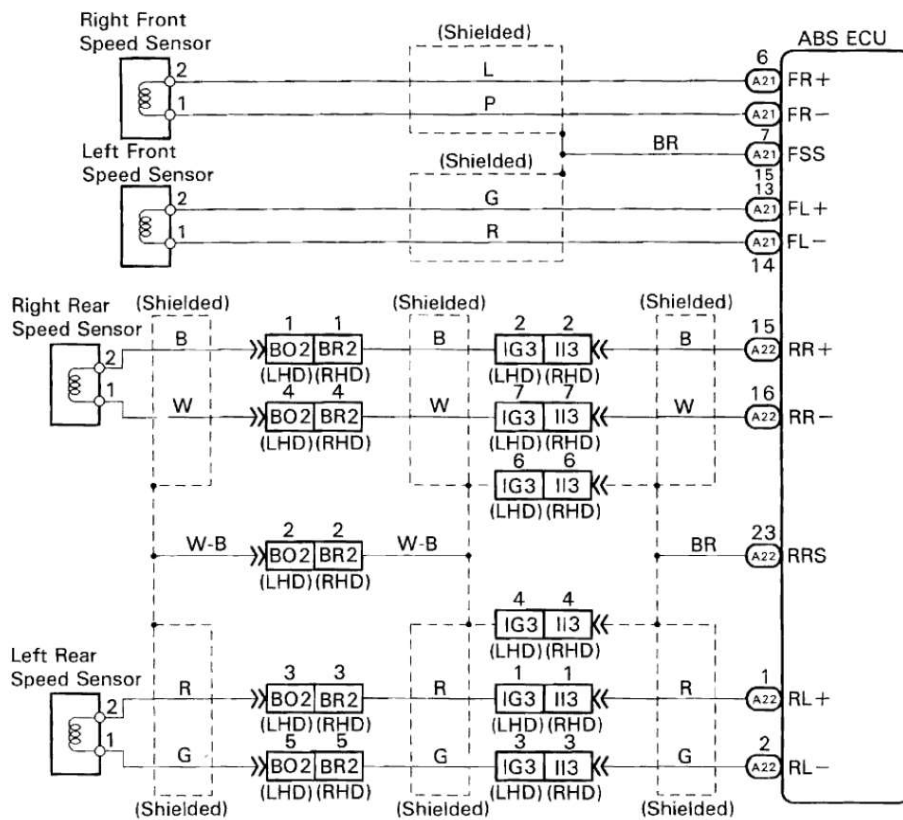
DTC No. 32 is for the left front speed sensor.

DTC No. 33 is for the right rear speed sensor.

DTC No. 34 is for the left rear speed sensor.

Fail safe function: If trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

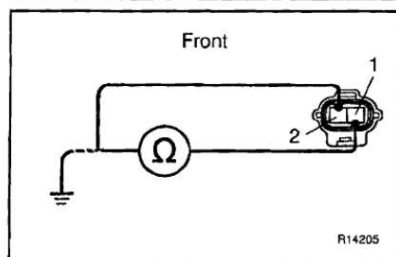
WIRING DIAGRAM



W02874

INSPECTION PROCEDURE

1 Check speed sensor.

**Front****PREPARATION:**

Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:**Resistance: 1.4 – 1.8 kΩ****CHECK:**

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:**Resistance: 1 MΩ or higher****Rear****PREPARATION:**

Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:**Resistance: 1.0 – 1.4 kΩ****CHECK:**

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:**Resistance: 1 MΩ or higher**

NG

Replace speed sensor.

NOTICE: Check the speed sensor signal last
(See page BR-59).

OK

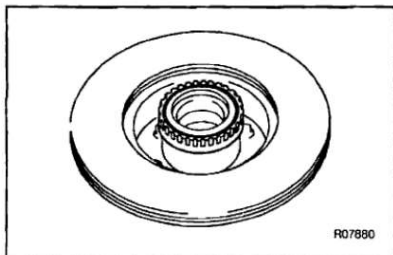
2 Check for open and short in harness and connector between each speed sensor and ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

3 Check sensor rotor and sensor installation.



Front

PREPARATION:

Remove axle hub (See SA section).

CHECK:

Check sensor rotor serrations.

OK:

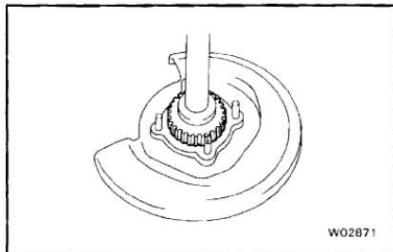
No scratches or missing teeth.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



Rear

PREPARATION:

Remove the axle shaft (See SA section).

CHECK:

Check the sensor rotor serrations.

OK:

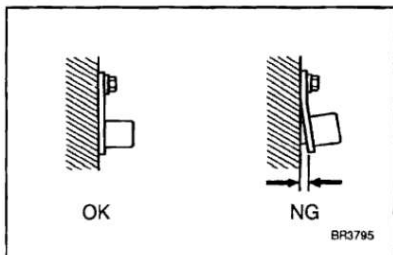
No scratches or missing teeth.

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and steering knuckle or rear axle carrier.

NG

Replace speed sensor or rotor.

NOTICE: Check the speed sensor signal last (See page BR-59).

OK

Check and replace ABS ECU.

DTC	37	Neither Front Speed Sensor Rotor Missing
------------	-----------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
37	With the rear wheels stationary and front wheels rotating at 20+ km/h (12+ mph) for 10+ secs, turn ignition switch ON then OFF 8 times, in succession.	• Front axle hub • Right front, left front speed sensor • Wire harness for sensor system • ECU

INSPECTION PROCEDURE

1	Check front axle hub (See page SA-12).
----------	---

NG

Replace front axle hub.

OK

2	Check front speed sensor (See page BR-79).
----------	---

NG

Replace front speed sensor.

OK

3	Check for open or short in harness and connector between speed sensor and ECU (See page IN-30).
----------	--

NG

Repair or replace harness and connector.

OK

Check and replace ABS ECU.

DTC	37	Tires of Different Size
------------	-----------	--------------------------------

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
37	Driving at more than 30 km/h (19 mph) for more than 60 seconds with 1 or 2 tires of different size.	• Tire size • ECU

INSPECTION PROCEDURE

1	Check tire size.
---	------------------

NG

Replace tires so that all 4 tires are of the same size.

OK

BR

Check and replace ABS ECU.

DTC	41	IG Power Source Circuit
-----	----	-------------------------

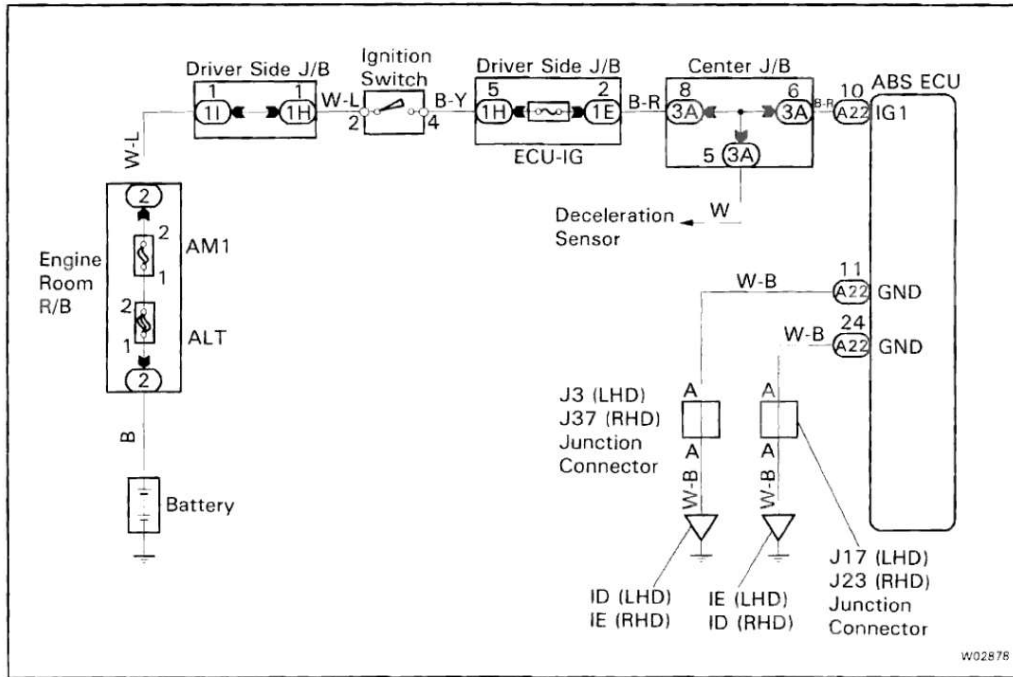
CIRCUIT DESCRIPTION

This is the power source for the ECU, hence the actuators.

DTC No.	DTC Detecting Condition	Trouble Area
41	Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG1 remains at more than 17 V or below 9.5 V for more than 10 sec.	• Battery • IC regulator • Open or short in power source circuit • ECU

Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check battery voltage.

OK:

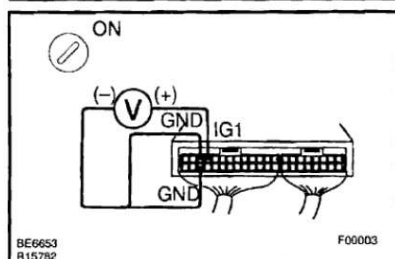
Voltage: 10 – 14 V

NG

Check and repair the charging system.

OK

2 Check voltage between terminals IG1 and GND of ABS ECU connector.



PREPARATION:

Remove ABS ECU with connectors still connected.

CHECK:

- Turn the ignition switch ON.
- Measure voltage between terminals IG1 and GND of ABS ECU connector.

OK:

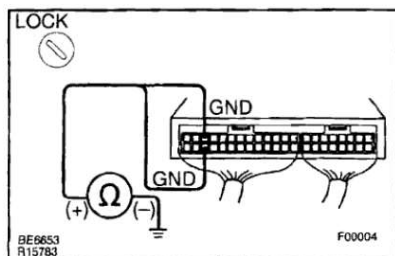
Voltage: 10 – 14 V

OK

Check and replace ABS ECU.

NG

3 Check continuity between terminals GND of ABS ECU connector and body ground.



CHECK:

Measure resistance between terminals GND of ABS ECU connector and body ground.

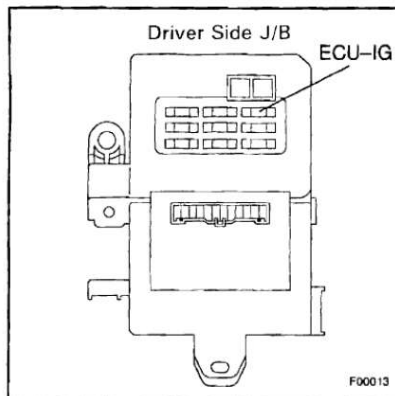
OK:

Resistance: 1 Ω or less

NG

Repair or replace harness or connector.

OK

4 Check ECU-IG fuse.**PREPARATION:**

Remove ECU-IG fuse from Driver side J/B.

CHECK:

Check continuity of ECU-IG fuse.

OK:

Continuity

NG

Check for short in all the harness and components connected to ECU-IG fuse (See attached wiring diagram).

OK

Check for open in harness and connector between ABS ECU and battery (See page IN-30).

BR

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DTC	43	Malfunction in Deceleration Sensor
------------	-----------	---

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
43	Either of the following (1) or (2) is detected: (1) After the battery terminal is connected, input from the deceleration sensor does not change at one cycle (0 km/h → more than 30 km/h → 0 km/h) for 16 times continuously. (2) When the brake pedal is not depressed at vehicle speed of 5 km/h or more, forward and backward G (more than 0.4 G) is detected for 30 seconds or more.	• Deceleration sensor • Wire harness for deceleration sensor system • ECU

INSPECTION PROCEDURE

1	Check deceleration sensor (See page BR-59).
----------	--

BR

NG

Replace deceleration sensor.

OK

2	Check for open or short in harness and connector between sensor and ECU (See page IN-30).
----------	--

NG

Repair or replace harness and connector.

OK

Check and replace ABS ECU.

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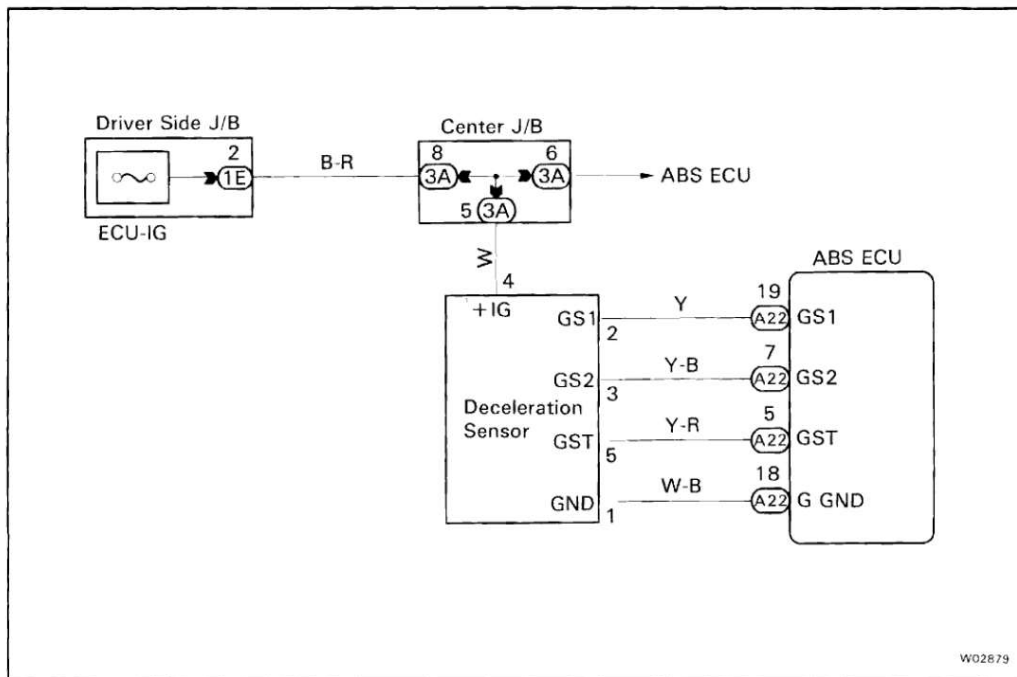
DTC	44	Deceleration Sensor Circuit
-----	----	-----------------------------

CIRCUIT DESCRIPTION

This sensor detects deceleration on the vehicle. The sensor signal is used in ABS control. If the sensor functions abnormally, the ABS warning light comes on but the ABS still operates.

DTC No.	DTC Detecting Condition	Trouble Area
44	Either of the following (1) or (2) is detected: (1) An open or short is detected in circuit GS1 or GS2 for 1sec. (2) After the ignition is turned ON, the test signal is output by GST. During this time, a trouble signal is detected for 0.5 sec.	• Deceleration sensor • Open or short in deceleration sensor circuit • ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

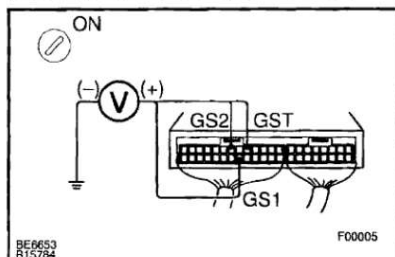
- 1 Check for open and short in harness and connector between Deceleration sensor and ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

- 2 Check voltage between terminals GS1, GS2, GST of ABS ECU and body ground.

**PREPARATION:**

- (a) Remove ABS ECU with connectors still connected.
 (b) Disconnect deceleration sensor connector.
 (c) Turn the ignition switch ON.

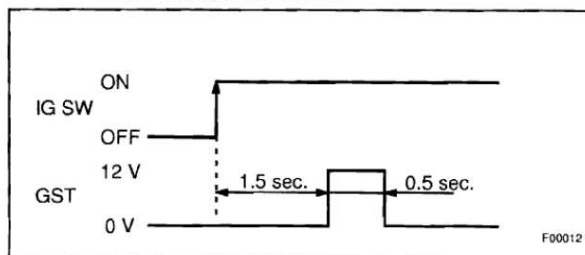
CHECK:

Measure voltage between terminals GS1, GS2, GST of ECU and Body ground.

OK:**Voltage:**

GS1, GS2: About 5 V

GST: As shown below



NG

Check and replace ABS ECU.

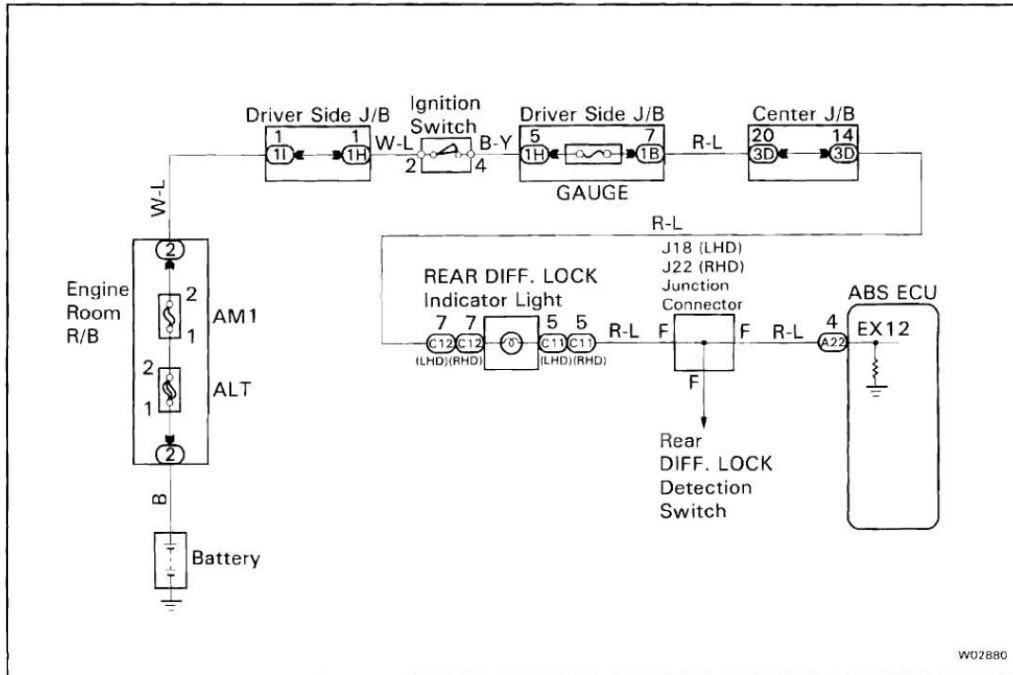
OK

Check and replace deceleration sensor.

DTC	48	Rear Differential Lock Circuit (w/Rear Differential Lock)
------------	-----------	--

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
48	Open or short circuit in rear differential lock circuit. Rear differential is locking.	• Rear differential lock • ECU

WIRING DIAGRAM**INSPECTION PROCEDURE**

HINT: Rear differential lock switch is OFF.

1	Check the rear differential lock is free (See page SA-105).
----------	--

NG

Repair the rear differential lock system.

OK

2 Is DTC output?

Check DTC on page BR-58.

NO

Normal.

YES

3 Check that REAR DIFF. LOCK indicator light does not go off.

NO

Go to step 6.

YES

BR

4 Check that bulb for REAR DIFF. LOCK indicator light is not burnt out.

YES

Replace indicator light.

NO

5 Check for open in harness and connector between battery and REAR DIFF. LOCK indicator light, REAR DIFF. LOCK indicator light and ABS ECU (See page IN-30).

NG

Repair or replace harness or connector.

OK

- | | |
|---|--|
| 6 | Check for short in harness and connector between REAR DIFF. LOCK indicator light and ABS ECU (See page IN-30). |
|---|--|

NG

Repair or replace harness or connector.

OK

Check and replace ABS ECU.

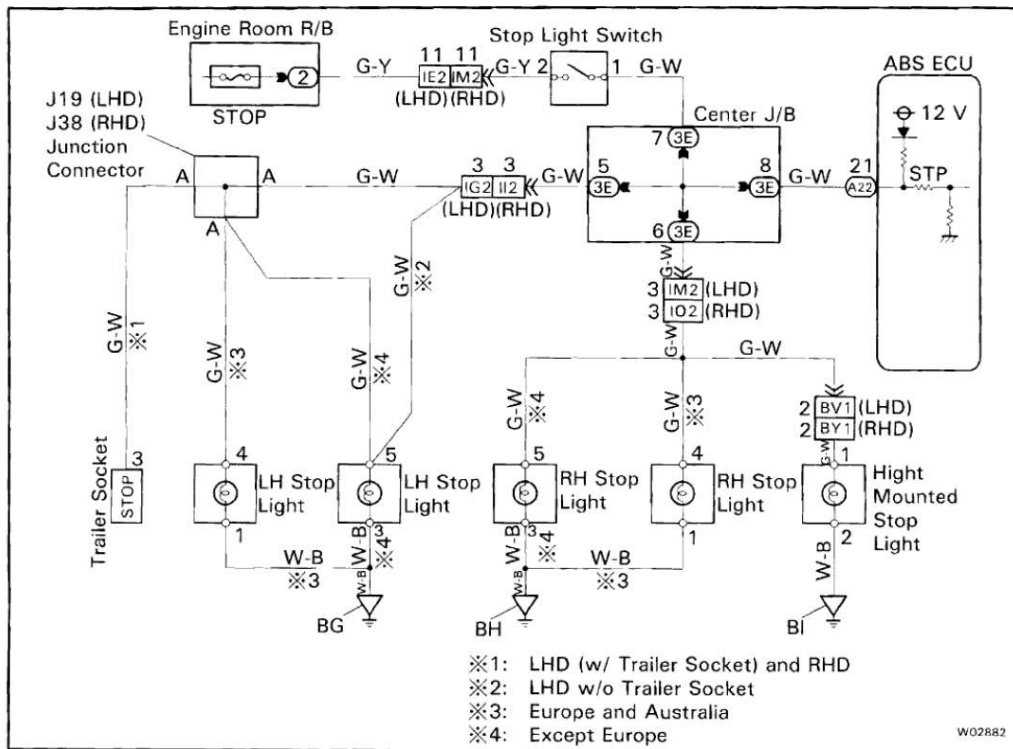
DTC	49	Stop Light Switch Circuit
-----	----	---------------------------

CIRCUIT DESCRIPTION

This stop light switch senses whether the brake pedal is depressed or released, and sends the signal to the ECU.

DTC No.	DTC Detecting Condition	Trouble Area
49	1.2 V – 1.7 V of STP voltage is continued for 0.3 seconds or more.	- Stop light switch - Open in stop light circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check operation of stop light.

CHECK:

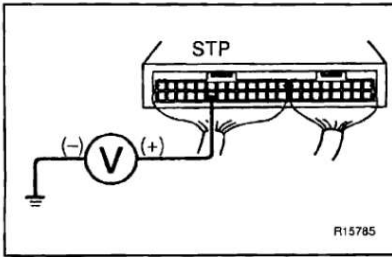
Check that stop light lights up when brake pedal is depressed and turns off when brake pedal is released.

NG

Repair stop light circuit (See page BE-33).

OK

2 Check voltage between terminal STP of ABS ECU and body ground.

**PREPARATION:**

Remove ABS ECU with connectors still connected.

CHECK:

Measure voltage between terminal STP of ABS ECU and body ground when brake pedal is depressed.

OK:

Voltage: 8 – 14 V

OK

Proceed to next circuit inspection shown on problem symptoms table (See page BR-67).

NG

3 Check for open in harness and connector between ABS ECU and stop light switch (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS ECU.

DTC

51

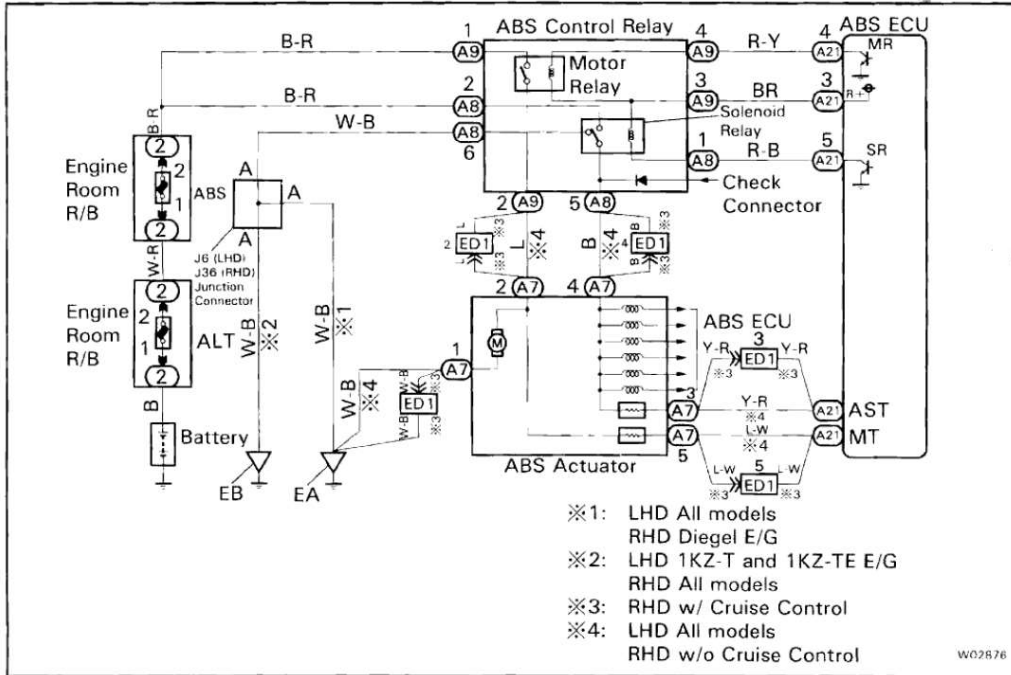
ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
51	Pump motor is not operating normally during initial check.	• ABS pump motor

Fail safe function: If trouble occurs in the ABS pump motor, the ECU cuts off current to the ABS control (solenoid) relay and prohibits ABS control.

WIRING DIAGRAM



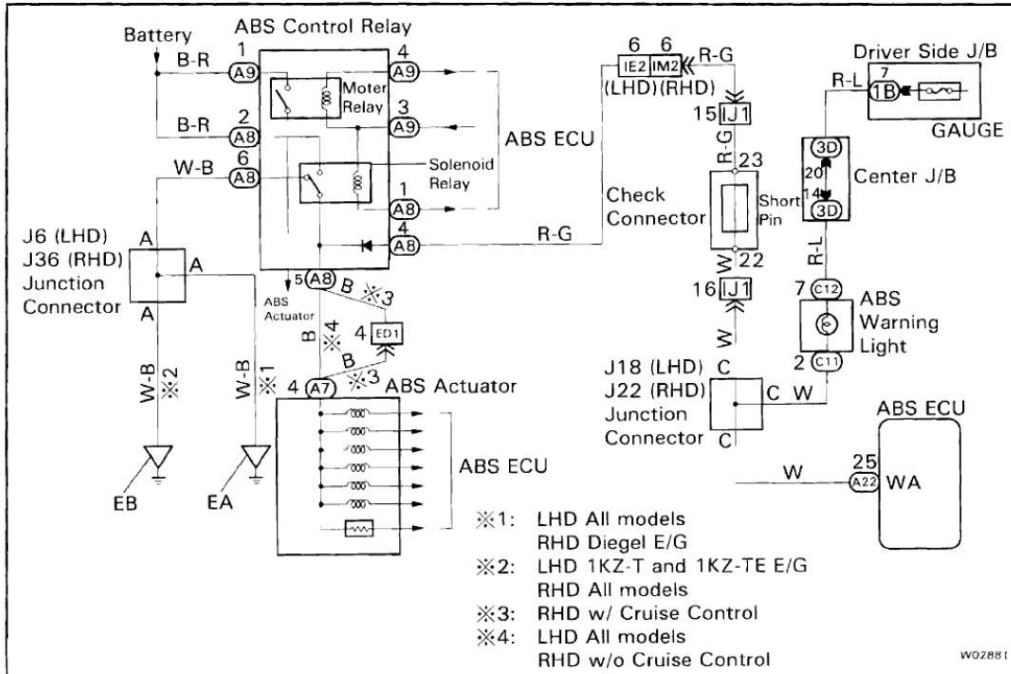
ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.

After removing the short pin of the check connector, connect terminals Tc and E₁ of the check connector to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	Go to step 1
ABS warning light remains on	Go to step 3

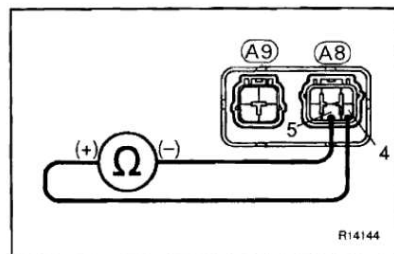
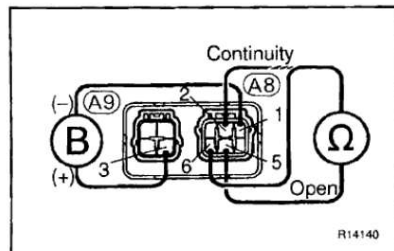
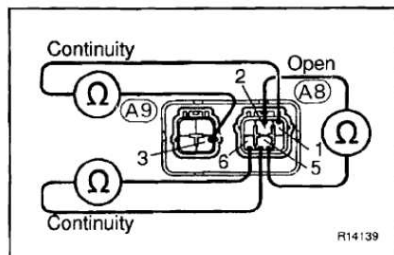
1	Check ABS warning light.
---	--------------------------

See Combination Meter Troubleshooting on page BE-50.

NG Repair bulb or combination meter assembly.

OK

2 Check ABS control relay.



PREPARATION:

Disconnect the connectors from control relay.

CHECK:

Check continuity between each terminal of ABS control relay.

OK:

Terminals A8-1 and A9-3	Continuity (Reference value 80 Ω)
Terminals A8-5 and A8-6	Continuity
Terminals A8-2 and A8-5	Open

CHECK:

- Apply battery voltage between terminals A8-1 and A9-3.
- Check continuity between each terminal of ABS control relay.

OK:

Terminals A8-5 and A8-6	Open
Terminals A8-2 and A8-5	Continuity

CHECK:

Connect the ⊕ test lead to terminal 4 of A8 and the ⊖ test lead to terminal 5 of A8. Check continuity between the terminals.

OK:

Continuity

If there is no continuity, connect the ⊖ test lead to terminal 4 of A8 and the ⊕ lead to terminal 5 of A8. Recheck continuity between terminals.

NG

Replace ABS control relay.

OK

Check for open in harness and connector between check connector and ABS control relay and body ground (See page IN-30).

3 Is DTC output?

Check DTC on page BR-58.

YES

Repair circuit indicated by the code output.

NO**4 Does ABS warning light go off if short pin is removed?****NO**

Check for short in harness and connector between warning light and check connector and ECU (See page IN-30).

YES**5 Check ABS control relay (See step 2).****NG**

Replace ABS control relay.

OK

Check for short in harness and connector between check connector and ABS control relay (See page IN-30).

BR

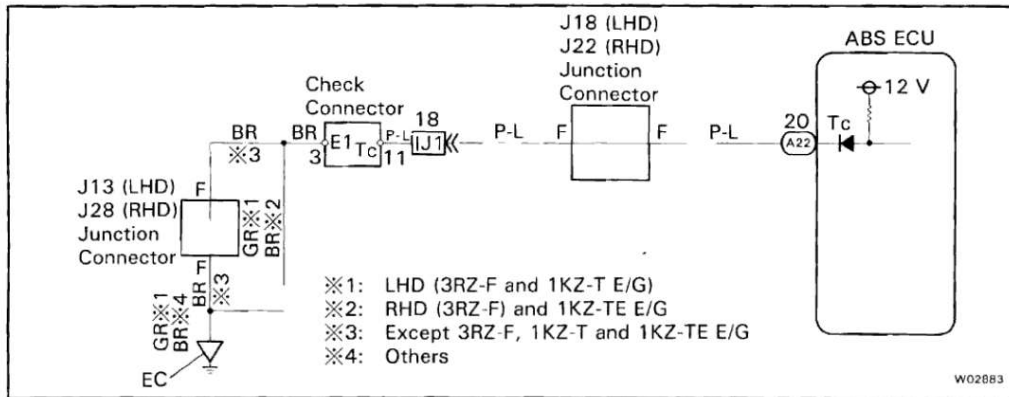
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Tc Terminal Circuit

CIRCUIT DESCRIPTION

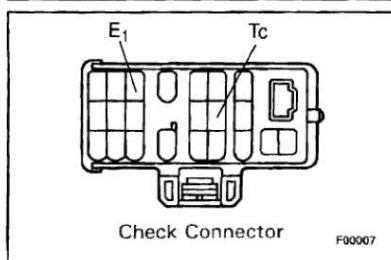
Connecting terminals Tc and E₁ of the check connector causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Tc and E₁ of check connector.



CHECK:

- Turn the ignition switch ON.
- Measure voltage between terminals Tc and E₁ of check connector.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Tc and E₁ are connected, the ECU may be defective.

NG

2

Check for open and short in harness and connector between ABS ECU and check connector, check connector and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

Check and replace ABS ECU.

BR

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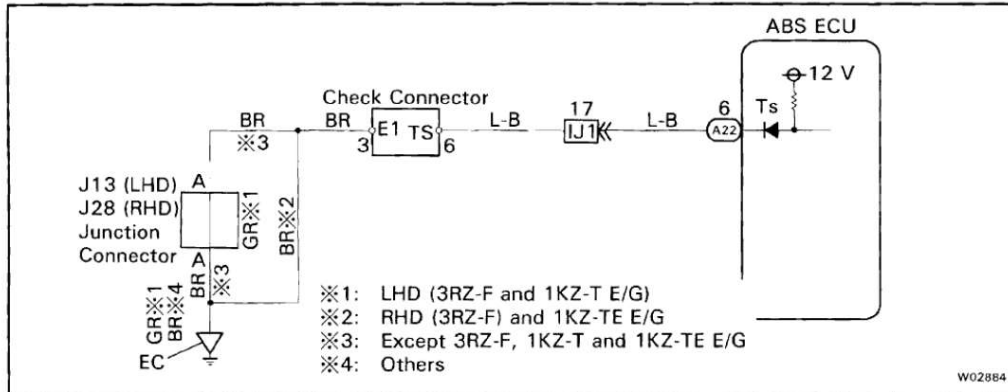
Ts Terminal Circuit

CIRCUIT DESCRIPTION

The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check.

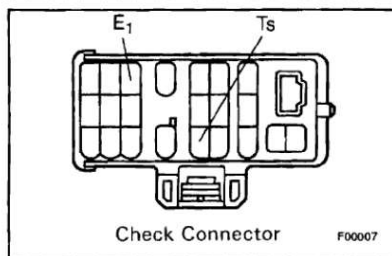
Connecting terminals Ts and E₁ of the check connector in the engine compartment starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

- 1 Check voltage between terminals Ts and E₁ of check connector.



CHECK:

- Turn the ignition switch ON.
- Measure voltage between terminals Ts and E₁ of check connector.

OK:

Voltage: 10 – 14 V

OK

If ABS warning light does not blink even after Ts and E₁ are connected, the ECU may be defective.

NG

2

Check for open and short in harness and connector between ABS ECU and check connector, check connector and body ground (See page IN-30).

NG

Repair or replace harness or connector.

OK

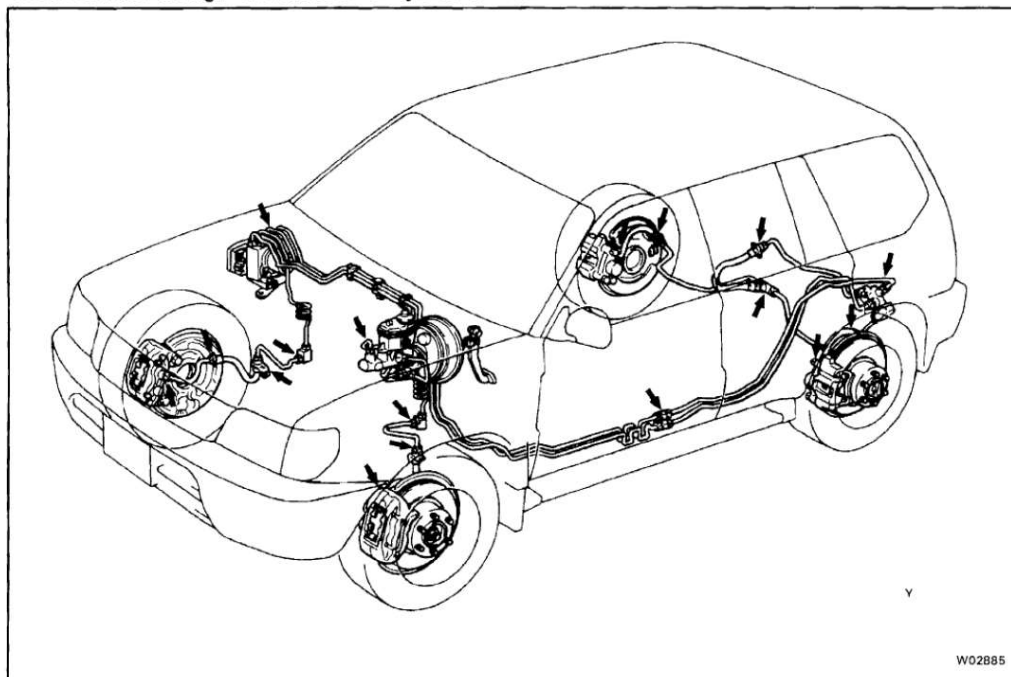
Check and replace ABS ECU.

BR

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Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



BR

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SERVICE SPECIFICATIONS

SERVICE DATA

BR-103 - 01

Brake pedal height (from asphalt sheet)	(LHD)	194.8 – 204.8 (7.669 – 8.063 in.)
	(RHD)	197.0 – 207.0 (7.756 – 8.150 in.)
Brake pedal freeplay		3 – 6 mm (0.12 – 0.24 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)	(Europe)	More than 80 mm (3.15 in.)
	(Others)	More than 95 mm (3.74 in.)
Brake booster push rod to piston clearance (w/ SST)		0 mm (0 in.)
Vacuum pump blade height	(3L E/G) Minimum	12.20 mm (0.4803 in.)
	(1KZ–T and 1KZ–TE E/G) Minimum	16.50 mm (0.6496 in.)
Vacuum pump blade width	(3L E/G) Minimum	4.95 mm (0.1949 in.)
	(1KZ–T and 1KZ–TE E/G) Minimum	5.95 mm (0.2343 in.)
Vacuum pump blade length	(3L E/G) Minimum	22.98 mm (0.9047 in.)
	(1KZ–T and 1KZ–TE E/G) Minimum	44.96 mm (1.7701 in.)
Front brake pad thickness	STD	11.5 mm (0.453 in.)
	Minimum	1.0 mm (0.039 in.)
Front brake thickness	STD	22.0 mm (0.866 in.)
	Minimum	20.0 mm (0.787 in.)
Front brake runout	Maximum	0.07 mm (0.0028 in.)
Rear brake drum inside diameter	STD	295.0 mm (11.614 in.)
	Maximum	297.0 mm (11.693 in.)
Rear brake shoe lining thickness	STD	6.0 mm (0.236 in.)
	Minimum	1.0 mm (0.039 in.)
Rear brake drum to shoe clearance		0.5 mm (0.020 in.)
Rear disc brake pad thickness	STD	10.0 mm (0.394 in.)
	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	18.0 mm (0.709 in.)
	Minimum	16.0 mm (0.630 in.)
Rear brake disc runout	Maximum	0.15 mm (0.0059 in.)
Rear brake disc inside diameter	STD	210 mm (8.27 in.)
	Maximum	211 mm (8.31 in.)
Parking brake shoe lining thickness	STD	4.0 mm (0.157 in.)
	Minimum	1.0 mm (0.039 in.)
Parking brake lever travel at 196 N (20 kgf, 44 lbf)		6 – 8 clicks
Parking brake clearance between rear shoe and lever		Less than 0.35 mm (0.0138 in.)
Parking brake adjusting shim thickness		0.3 mm (0.012 in.)
		0.6 mm (0.024 in.)
		0.9 mm (0.035 in.)

TORQUE SPECIFICATIONS

Part tightened	N-m	kgf-cm	ft-lbf
Master cylinder x Piston stopper bolt	10	100	7
Master cylinder x Reservoir	1.7	18	16 in.-lbf
Master cylinder x Brake booster	13	130	9
Brake line union nut	15	155	11
Brake booster clevis lock nut	25	260	19
Brake booster x Pedal bracket	14	145	10
Vacuum pump x Vacuum hose union bolt (3L E/G)	14	140	10
Vacuum pump x Oil inlet union bolt (3L E/G)	14	140	10
Vacuum pump x Alternator (3L E/G)	7.8	80	69 in.-lbf
Vacuum pump x Check valve (3L E/G)	74	750	54
Vacuum pump pulley lock nut (3L E/G)	105	1,075	78
Vacuum pump x Engine (1KZ-T and 1KZ-TE E/G)	21	210	15
Vacuum pump x Vacuum hose union bolt (1KZ-T and 1KZ-TE E/G)	14	140	10
Vacuum pump x Check valve (1KZ-T and 1KZ-TE E/G)	74	750	54
Vacuum pump casing x End cover (1KZ-T and 1KZ-TE E/G)	7.8	80	69 in.-lbf
Vacuum pump gear lock nut (1KZ-T and 1KZ-TE E/G)	110	1,125	81
Bleeder plug	11	110	8
Front disc brake caliper x Steering knuckle	123	1,250	90
Front disc brake caliper x Brake line union nut	15	155	11
Rear drum brake wheel cylinder x Backing plate	10	100	7
Parking brake bellcrank bracket x Backing plate	13	130	9
Rear disc brake caliper x Sliding pin	88	900	65
Rear disc brake caliper x Flexible hose	30	310	22
Rear disc brake torque plate x knuckle	103	1,050	76
Rear disc brake caliper x Dust boot protector	7.8	80	69 in.-lbf
Parking brake bellcrank bracket x Backing plate	13	130	9
LSP & BV x LSP & BV bracket	13	130	9
LSP & BV bracket x Frame	29	300	22
ABS actuator x ABS actuator bracket	5.4	55	48 in.-lbf
ABS actuator bracket x Body	19	195	14
ABS actuator x Sub-wire harness bracket (RHD w/ cruise control)	6.0	61	53 in.-lbf
ABS speed sensor installation bolt	8.0	82	71 in.-lbf
ABS speed sensor clamp bolt (Side rail)	12	122	8.9
(Others)	8.0	82	71 in.-lbf

BR

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