TOYOTA

REPAIR MANUAL SUPPLEMENT

FOR CHASSIS & BODY

LAND CRUISER

(Station Wagon)

FZJ80 series
HZJ80 series
HDJ80 series

May, 1996

Pub. No. RM534E

FOREWORD

This supplement has been prepared to provide information covering general service repairs for the chassis and body of the TOYOTA LAND CRUISER (Station Wagon) which underwent changes in May, 1996.

Applicable models: FZJ80 series
HZJ80 series
HDJ80 series

For the service specifications and repair procedures of the above model other than those listed in this supplement, refer to the following manuals.

Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop/Canvas Top/ Station Wagon) Chassis and Body Repair Manual Supplement Jan., 1992	RM290E
Aug., 1992	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E
• 1FZ-F, 1FZ-FE Engine Repair Manual	RM321E
• 1FZ-FE Engine Repair Manual Supplement	RM436E
• 1PZ, 1HZ, 1HD-T Engine Repair Manual	RM172E
• 1HD-FT Engine Repair Manual	RM437E
• 1HD-FT Engine Repair Manual Supplement	RM523E
• A442F Automatic Transmission Repair Manual	RM314E
• Land Cruiser (Station Wagon) Electrical Wiring Diagram	EWD169F
• Land Cruiser (Station Wagon) Electrical Wiring Diagram Supplement Jan., 1995	EWD232F
May, 1996	EWD272F

All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

CAUTION

This manual does not include all the necessary items about repair and service. this manual is made for the purpose of the use for the persons who have special techniques and certifications. In the cases that non–specialized or uncertified technicians perform repair or service only using this manual or without proper equipment or tool, that may cause severe injury to you or other people around and also cause damage to your customer's vehicle.

In order to prevent dangerous operation and damages to your customer's vehicle, be sure to follow the instruction shown below.

- Must read this manual thoroughly. It is especially important to have good understanding all the contents written in the PRECAUTION of "IN" section.
- The service method written in this manual is very effective to perform repair and service. When performing the operations following the procedures using this manual, be sure to use tools specified and recommended. If using non–specified or recommended tools and service method, be sure to confirm safety of the technicians and any possibility of causing personal injury or damage to the customer's vehicle before starting the operation.
- If part replacement is necessary, must replace the part with the same part number or equivalent part. Do not replace it with inferior quality.
- It is important to note that this manual contains various "Cautions" and "Notices" that must be carefully observed in order to reduce the risk of personal injury during service or repair, or the possibility that improper service or repair may damage the vehicle or render it unsafe. It is also important to understand that these "Cautions" and "Notices" are not exhaustive, because it is important to warn of all the possible hazardous consequences that might result from failure to follow these instructions.

NOTE: The following screen toning letters sections refer to the Land Cruiser (Station Wagon) Repair Manual for Chassis and Body (Pub. No. RM184E, RM290E, RM315E, RM434E).

INTRODUCTION

HOW TO USE THIS MANUAL

INDEX

IN02E–01

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

IN

GENERAL DESCRIPTION

IN02G–02

At the beginning of each section, a General Description is given that pertains to all repair operations contained in that section.
Read these precautions before starting any repair task.

PREPARATION

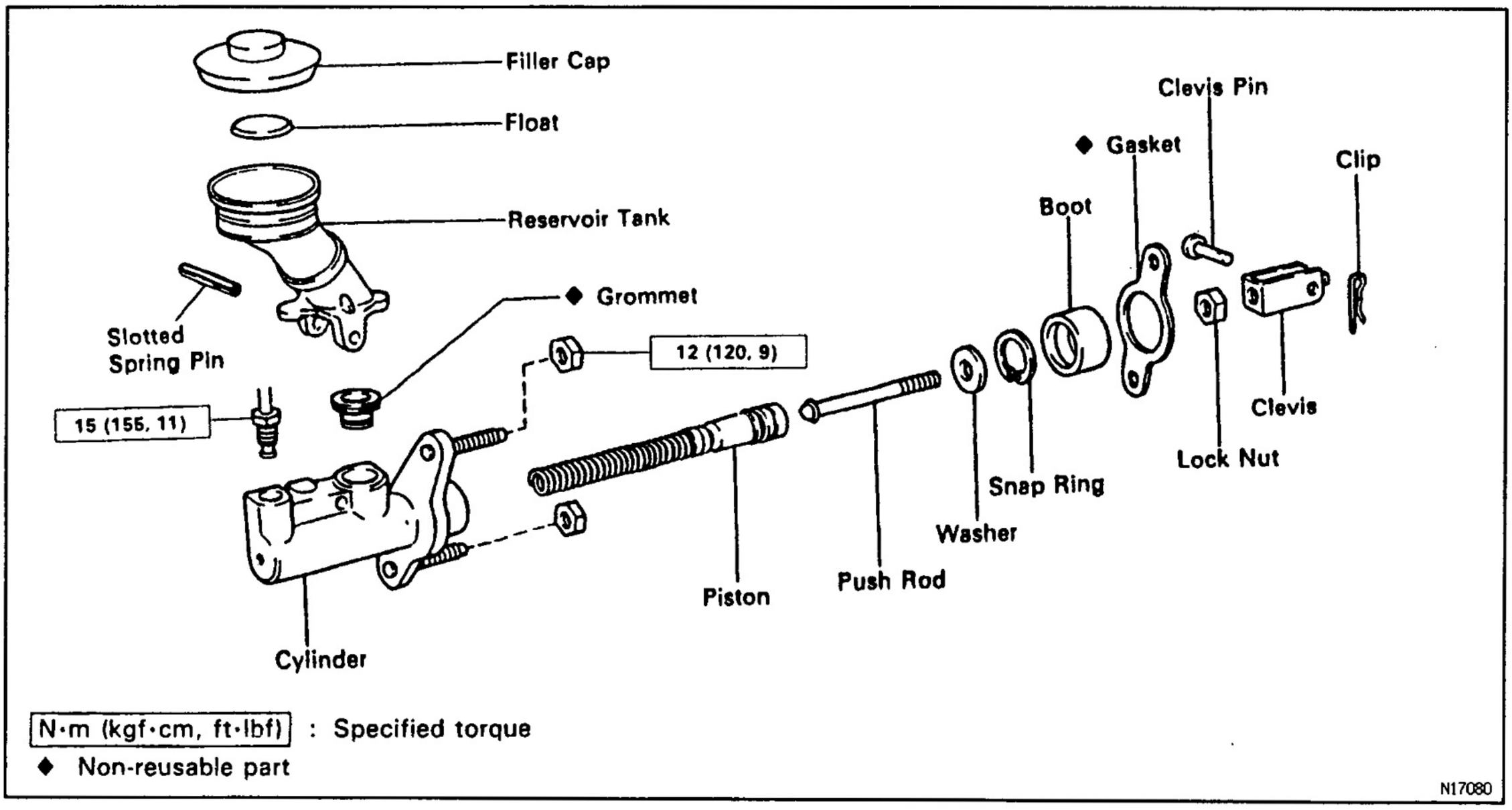
IN02J–01

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

IN02K–0H

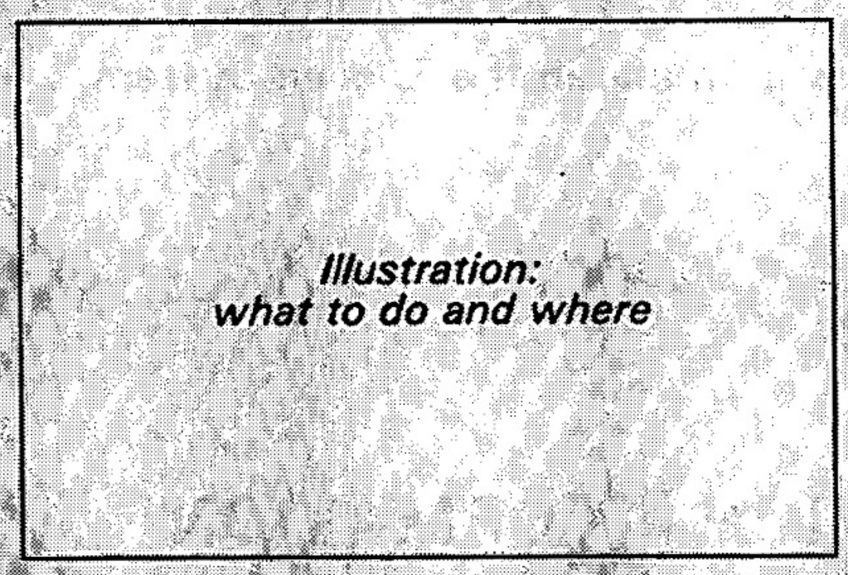
Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.
Example:



The procedures are presented in a step–by–step format:

- The illustration shows what to do and where to do it.
- The task heading tells what to do.
- The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

IN02L–01

REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

IN02M–01

SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found at the end of each section, for quick reference.

IN02N–01

CAUTIONS, NOTICES, HINTS:

- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

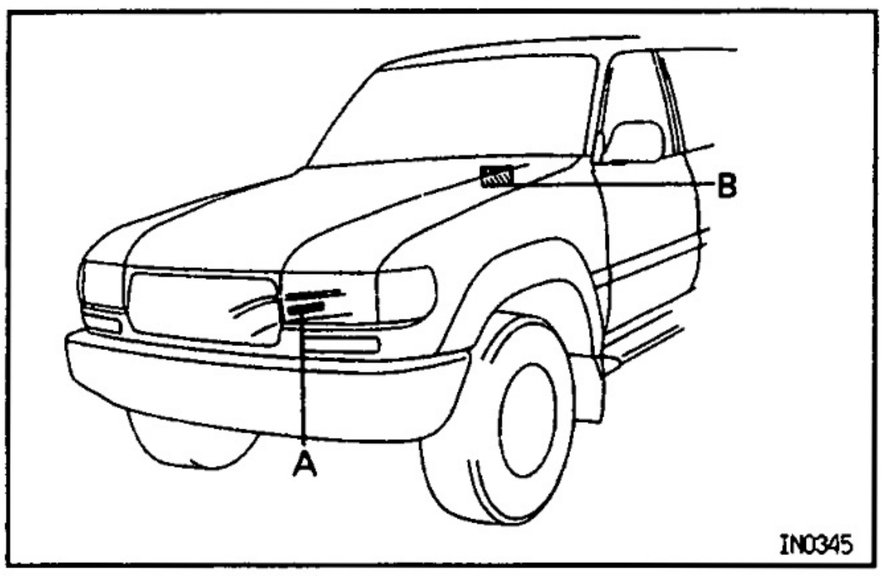
IN02P–02

SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)



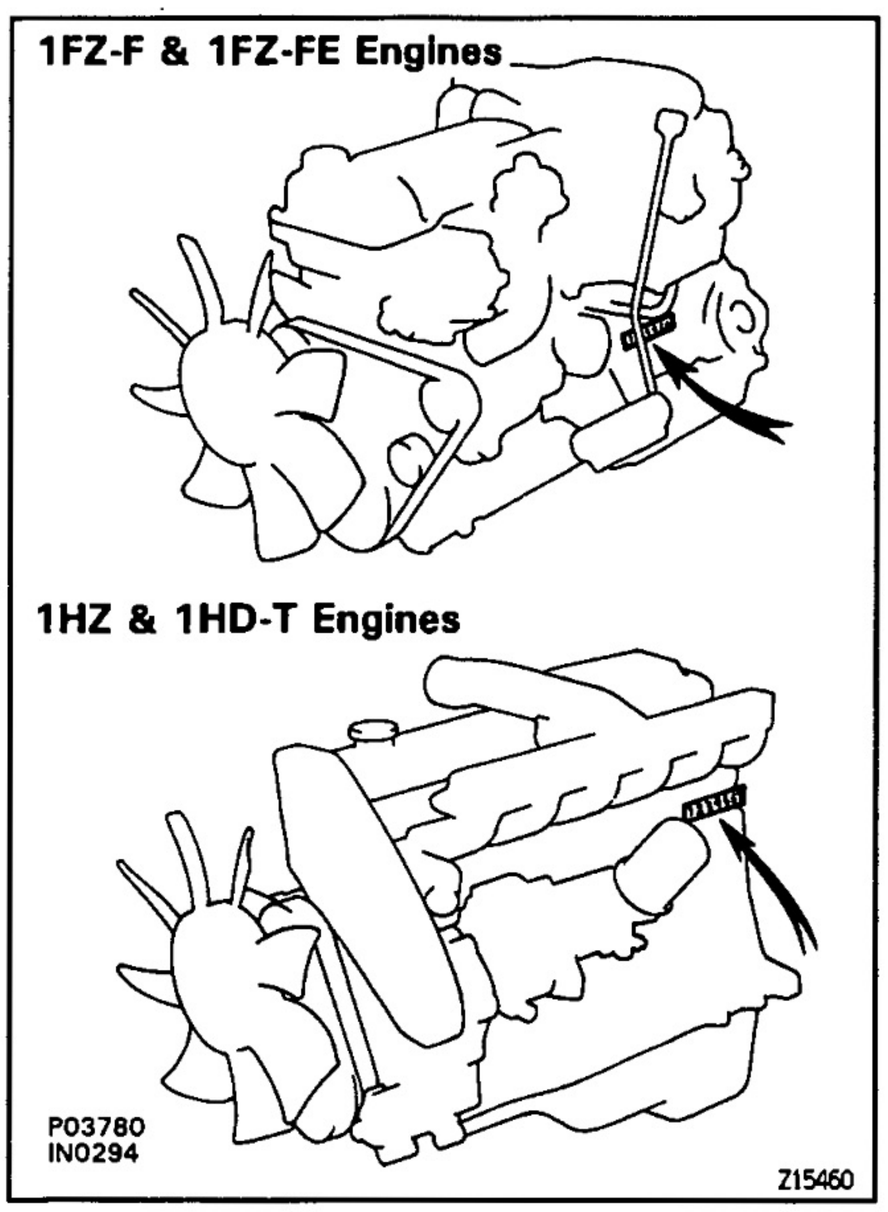
IDENTIFICATION INFORMATION

IN004–01

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the vehicle identification number, manufacture's plate.

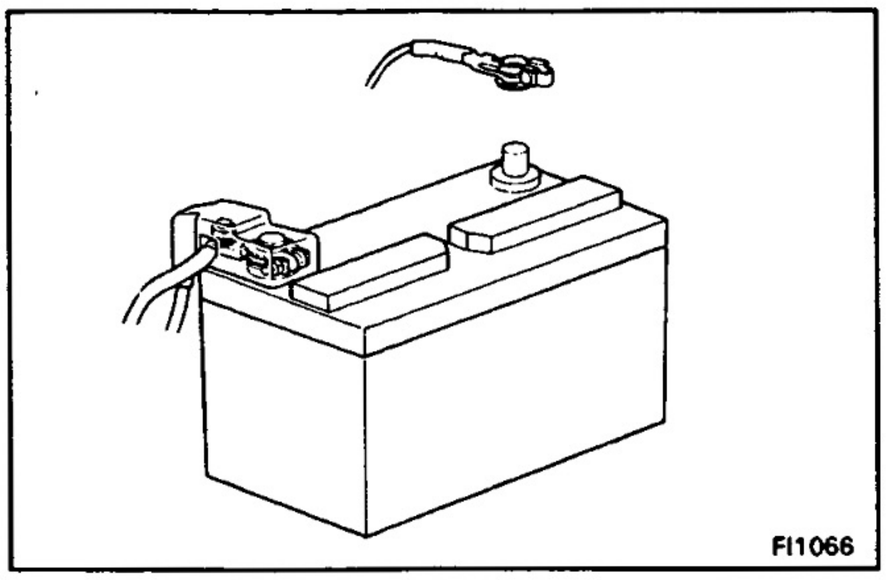
A. Vehicle Identification Number
B. Manufacture's Plate



IN04V–04

ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block as shown.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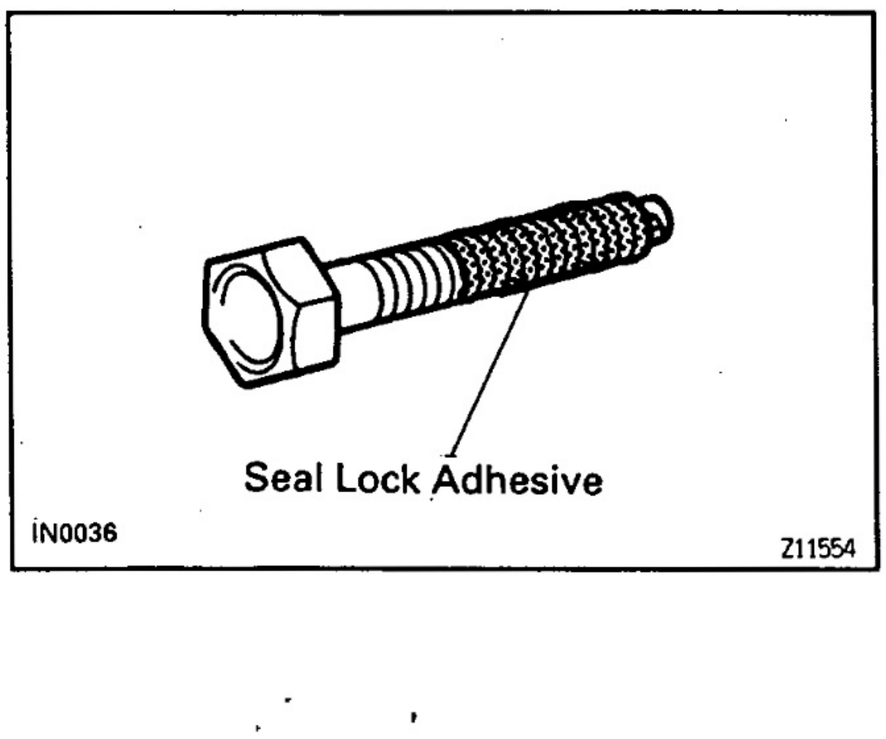
GENERAL REPAIR INSTRUCTIONS

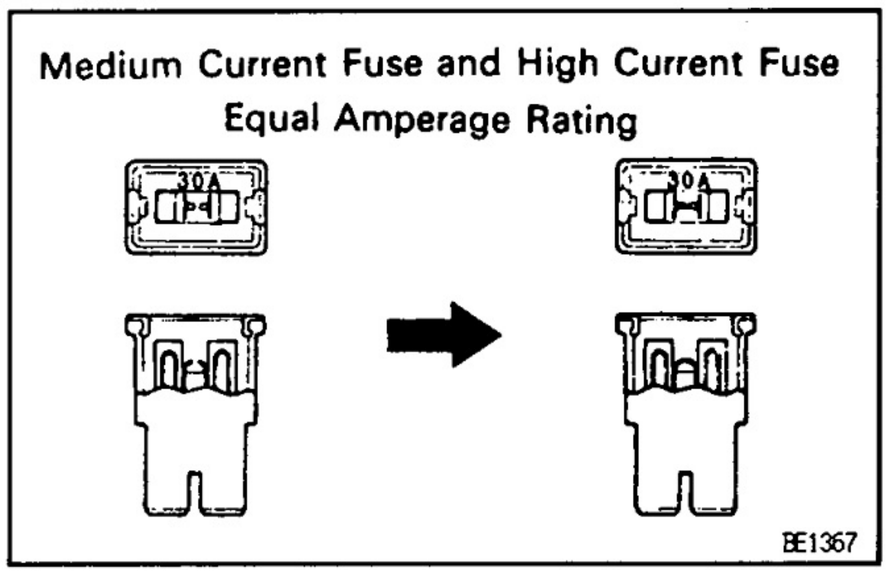
IN068–03

1. Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
2. During disassembly, keep parts in the appropriate order to facilitate reassembly.
3. Observe the following:
   (a) Before performing electrical work, disconnect the negative (−) terminal cable from the battery.
   (b) If it is necessary to disconnect the battery for inspection or repair, always disconnect the negative (−) terminal cable which is grounded to the vehicle body.
   (c) To prevent damage to the battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.
   (d) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.
   (e) Install the cable ends to the battery terminals with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.
   (f) Be sure the cover for the positive (+) terminal is properly in place.
4. Check hose and wiring connectors to make sure that they are secure and correct.
5. Non−reusable parts
   (a) Always replace cotter pins, gaskets, O−rings and oil seals etc. with new ones.
   (b) Non−reusable parts are indicated in the component illustrations by the "◆" symbol.
6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.
   (c) Precoated parts are indicated in the component illustrations by the "★" symbol.
7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

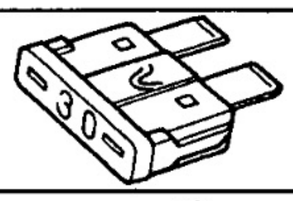
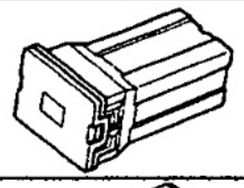
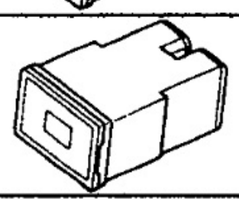
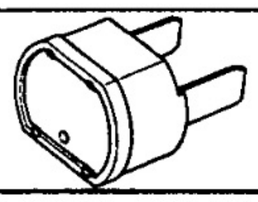
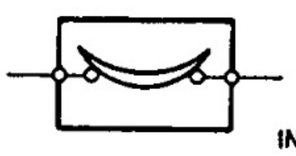


IN0036 Z11554

9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in the preparation part at the front of each section in this manual.



10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

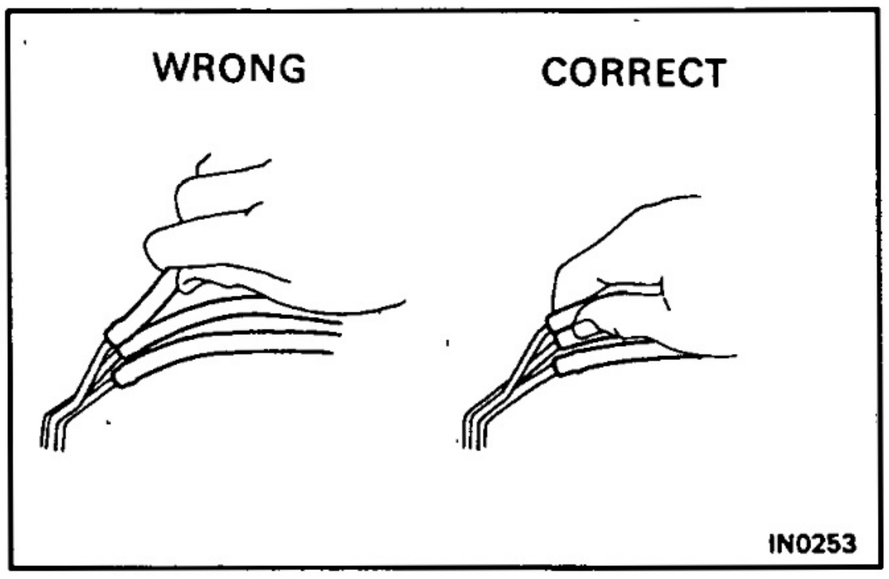
Illustration	Symbol	Part Name	Abbreviation
 BE5594	 IN0365	FUSE	FUSE
 BE5595	 IN0366	MEDIUM CURRENT FUSE	M-FUSE
 BE5596	 IN0367	HIGH CURRENT FUSE	H-FUSE
 BE5597	 IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

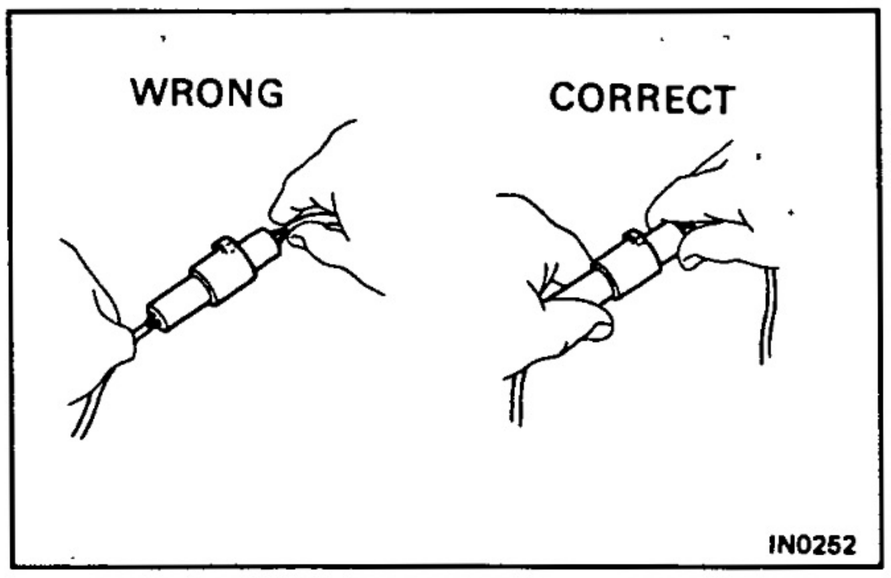
V00076

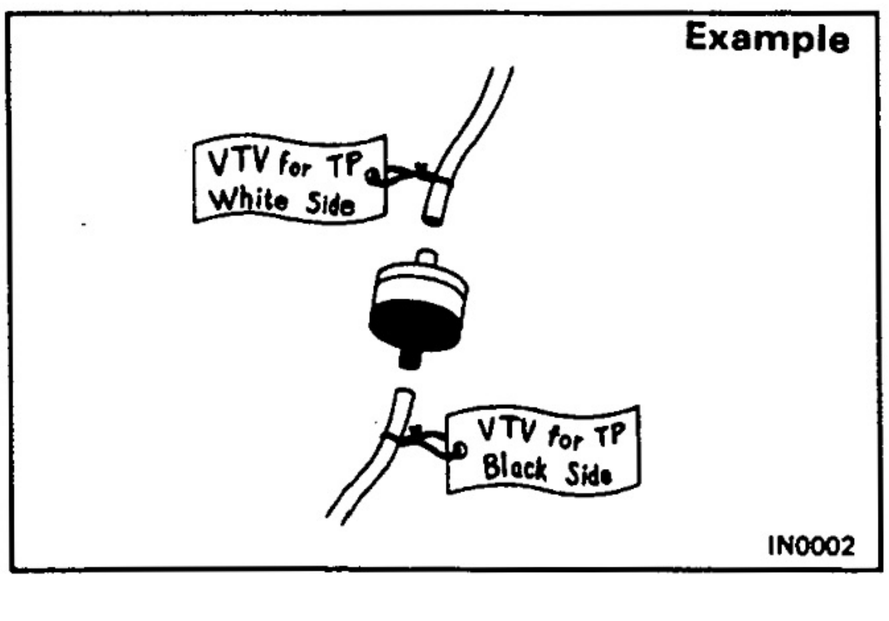
11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN−20).
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.

(b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

12. Observe the following precautions to avoid damage to the following parts:
    (a) Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
    (b) To disconnect vacuum hoses, pull on the end, not the middle of the hose.
    (c) To pull apart electrical connectors, pull on the connector itself, not the wires.
    (d) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
    (e) When steam cleaning an engine, protect the electronic components, air filter and emissions–related components from water.
    (f) Never use an impact wrench to remove or install temperature switches or temperature sensors.
    (g) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
    (h) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step–down adapter instead. Once the hose has been stretched, it may leak.







13. Tag hoses before disconnecting them:
    (a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
    (b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

14. Unless otherwise stated, all resistance is measured at an ambient temperature of 20°C (68°F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurements should be made when the engine has cooled down.

IN

PRECAUTION

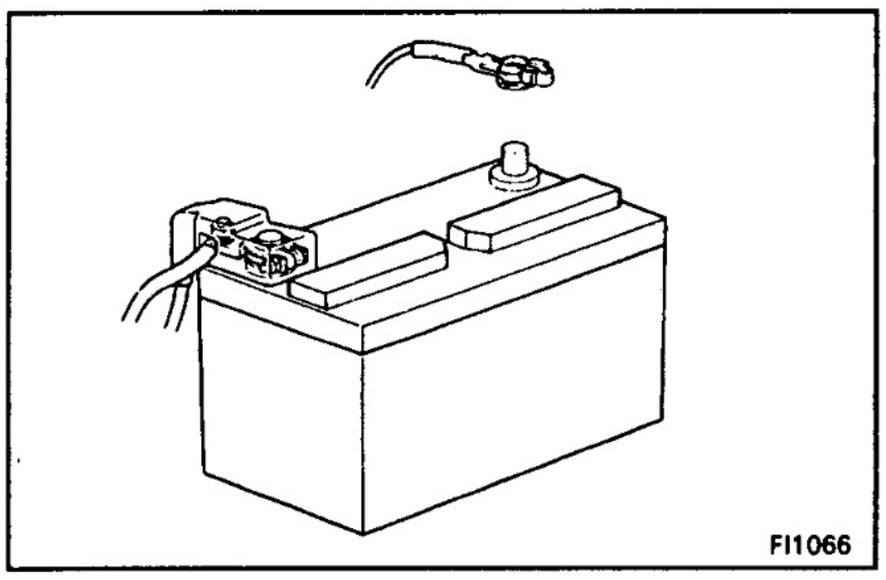
FOR VEHICLES EQUIPPED WITH SRS AIRBAG

IN07J-05

The LAND CRUISER STATION WAGON specifications is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag.

Failure to carry out service operations in the correct sequence could cause the airbag system to unexpectedly deploy during servicing, possibly leading to a serious accident.

Further, if a mistake is made in servicing the airbag system, it is possible the airbag may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.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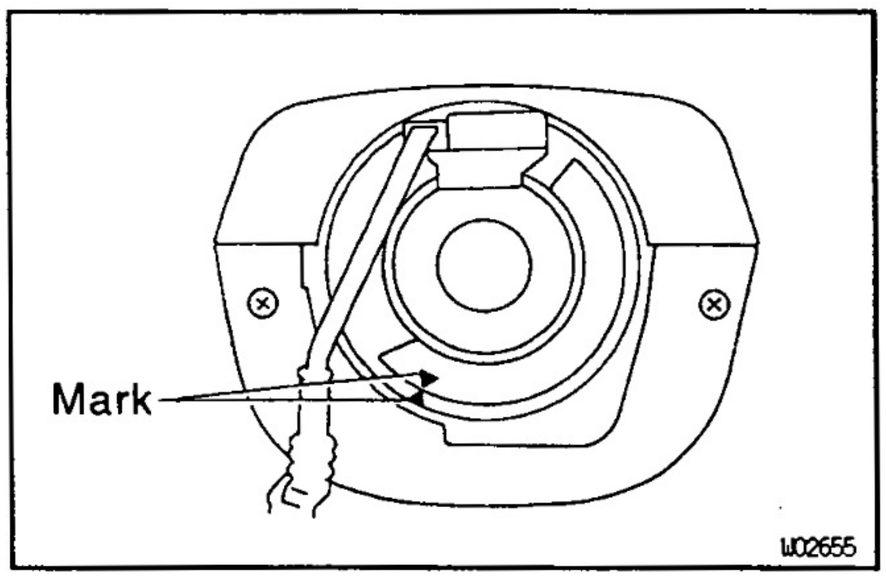
1. Malfunction symptoms of the airbag system are difficult to confirm, so the diagnostic codes become the most important source of information when troubleshooting. When troubleshooting the airbag system, always inspect the diagnostic codes before disconnecting the battery (See Pub. No. RM434E on page RS−38).
2. **Work must be started after approx 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (−) terminal cable is disconnected from the battery.**
   (The airbag system is equipped with a back−up power source so that if work is started within 90 seconds of disconnecting the negative (−) terminal cable from the battery, the airbag may deploy.)
   When the negative (−) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by each memory system. Then when work is finished, reset the clock and audio systems as before.
   To avoid erasing the memory of each memory system, never use a back−up power supply from outside the vehicle.
3. Even in cases of a minor collision where the airbag does not deploy, the airbag sensor assembly, front passenger airbag assembly and steering wheel pad should be inspected (See Pub. No. RM434E on pages RS−9, 19, 29).

4. Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.
5. Before repairs, remove the airbag sensors if shocks are likely to be applied to the sensors during repairs.
6. Never disassemble and repair the airbag sensor assembly, steering wheel pad or front passenger airbag assembly in order to reuse it.
7. If the airbag sensor assembly, steering wheel pad or front passenger airbag assembly have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
8. Do not expose the airbag sensor assembly, steering wheel pad or front passenger airbag assembly directly to hot air or flames.
9. Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.
10. Information labels are attached to the periphery of the airbag components. Follow the notices.
11. After work on the airbag system is completed, perform the airbag warning light check (See Pub. No. RM 434E on page RS–38).



Spiral Cable (in Combination Switch)

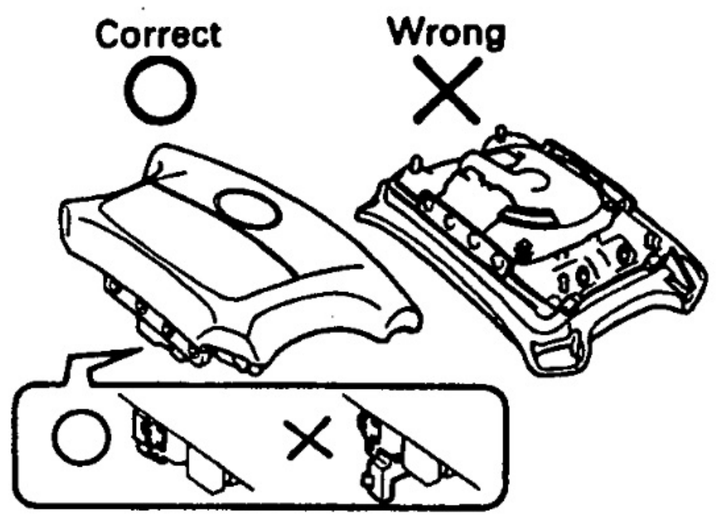
The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position; otherwise cable disconnection and other troubles may result. Refer to page See Pub. No. RM434 E on page SR–11 concerning correct steering wheel installation.

IN

Steering Wheel Pad (with Airbag)

1. **When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.**
   In this case, the twin—lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. Do not store a steering wheel pad on top of another one. (Storing the pad with its metallic surface up may lead to a serious accident if the airbag inflates for some reason.)
2. **Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)**
3. Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.
4. Store the steering wheel pad where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
5. When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.
6. **When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See Pub. No. RM434E on page RS—12). Carry out the operation in a place away from electrical noise.**

Example:



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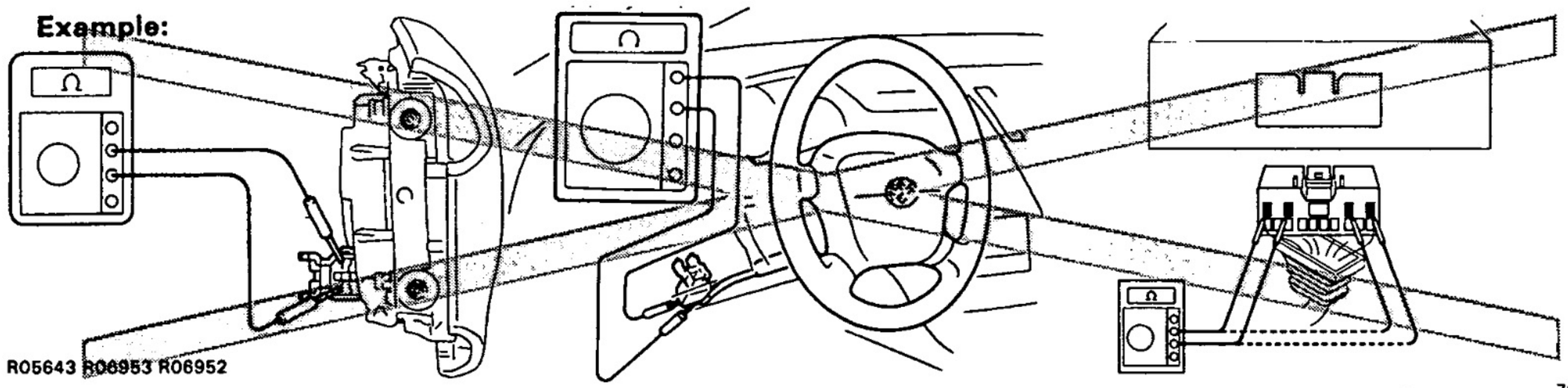
Example:



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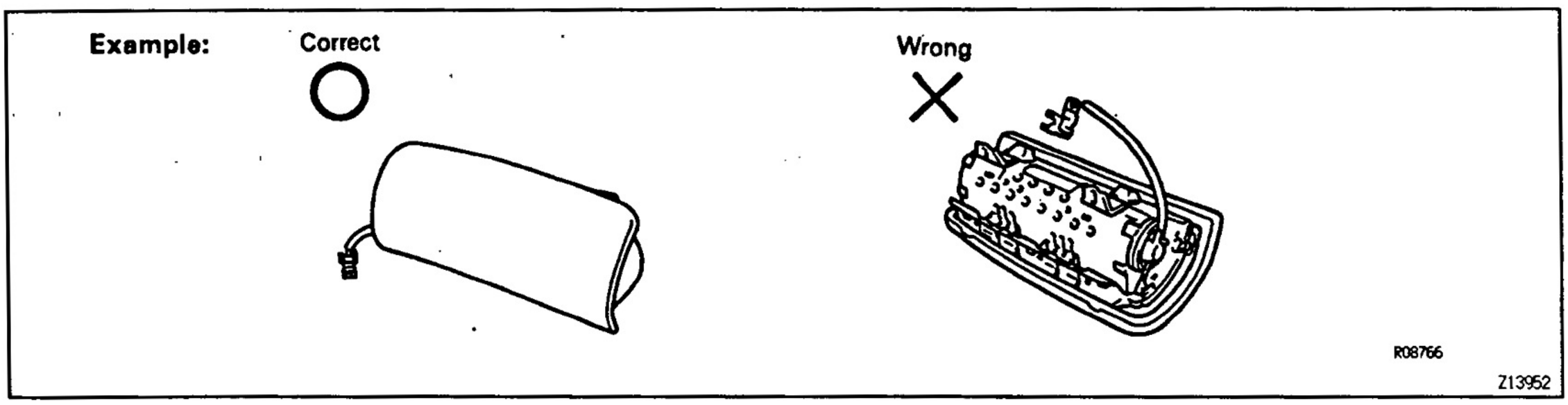
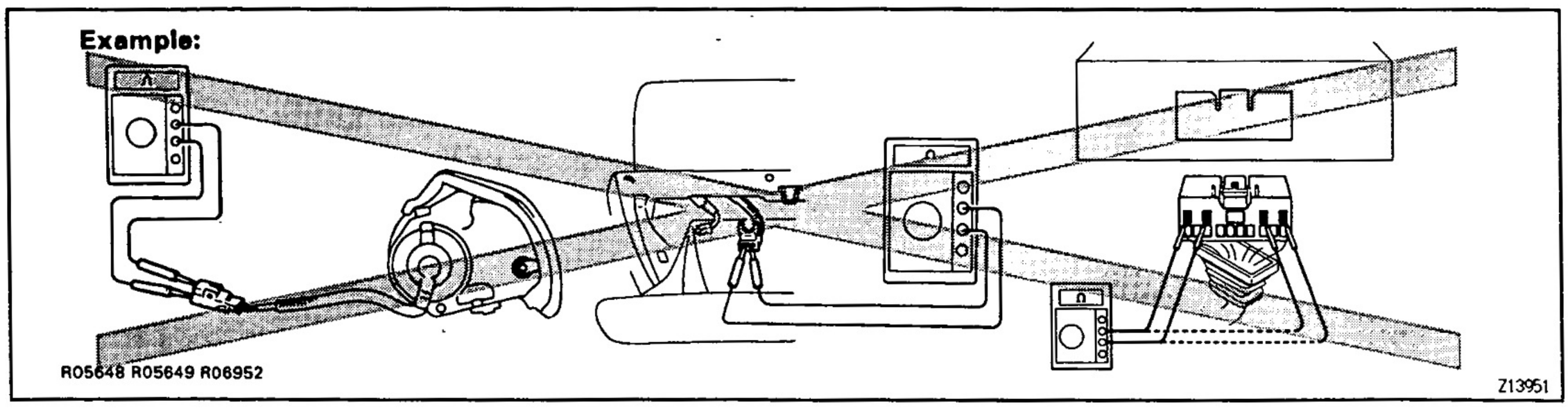
Z13950

Front Passenger Airbag Assembly

1. **Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.**
   Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag inflates.
2. **Never measure the resistance of the airbag squib. (This may cause the airbag deploy, which is very dangerous.)**
3. Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.
4. Store the airbag assembly where the ambient temperature remains below 93°C (200°F), without high humidity and away from electrical noise.
5. When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the glove compartment finish plate at the left side of the glove compartment before starting work.
6. **When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal (See Pub. No. RM434E on page RS–23). Carry out the operation in a safe place away from electrical noise.**





IN

Airbag Sensor Assembly

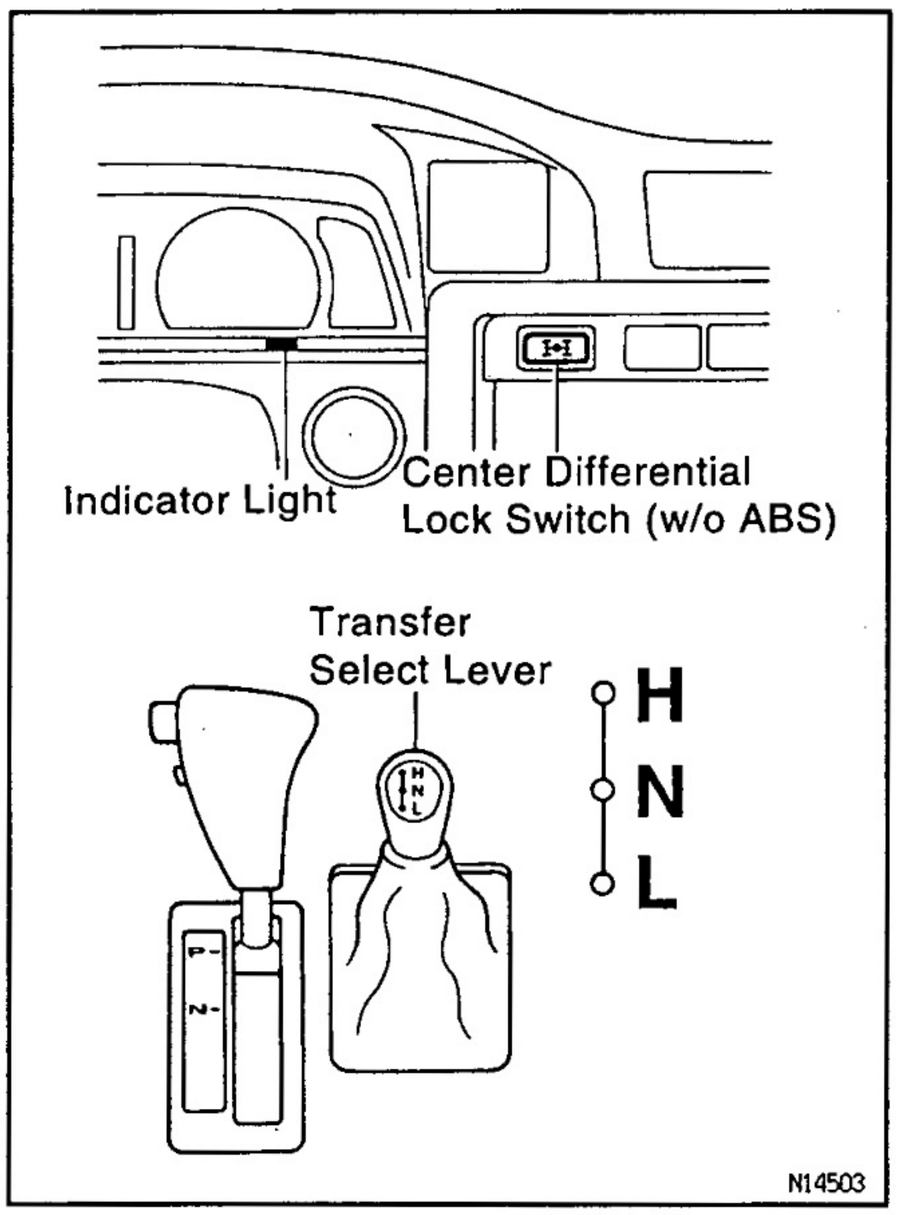
The connector to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connector is connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the airbag system.

Wire Harness and Connector

The airbag system's wire harness is integrated with the cowl wire harness assembly. The wires for the airbag wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the airbag system wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it.

IN092-01

WHEN SERVICING FULL-TIME 4WD VEHICLES



The full – time 4 WD LAND CRUISER STATION WAGON is equipped with the mechanical lock type center differential system. When carrying out any kind of servicing or testing on a full—time 4WD in which the front or rear wheels are made to rotate (braking test, speedometer test, on—vehicle wheel balancing, etc.), or when towing the vehicle, be sure to observe the precautions given below. If incorrect preparations or test procedures are used, the test cannot be successfully carried out, and may be dangerous as well. Therefore, before beginning any such servicing or test, be sure to check the following items:

(1) Center differential lock type
(2) w/o ABS:
Center differential mode position (FREE or LOCK)
(3) Whether wheels should be touching ground or jacked up
(4) Transmission gear position
(5) Transfer gear position (H or L)
(6) Maximum testing vehicle speed
(7) Maximum testing time

Also be sure to observe the following cautions:

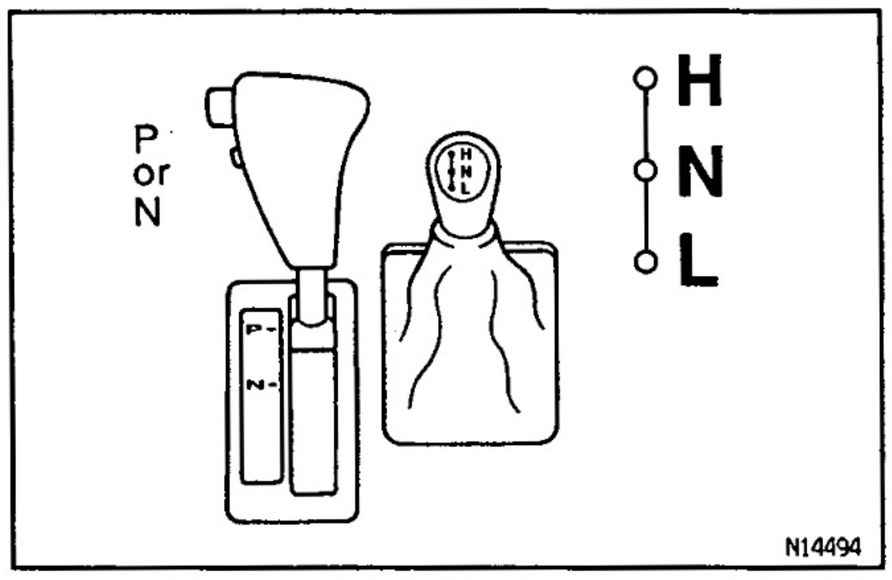
(1) Never accelerate or decelerate the vehicle suddenly.
(2) Observe the other cautions given for each individual test.

Before Beginning Test

During tests with a brake tester or chassis dynamometer, such as braking force tests or speedometer tests, if only the front or rear wheels are to be rotated, it is necessary to set the position of the center differential to the FREE position or to the LOCK position depending on the type of test being performed.

(1) w/o ABS:
Select the position of the center differential by pushing the center differential lock switch with the transfer select lever to "H" position.

(2) After selecting the position, confirm the operation of indicator light.



HINT:

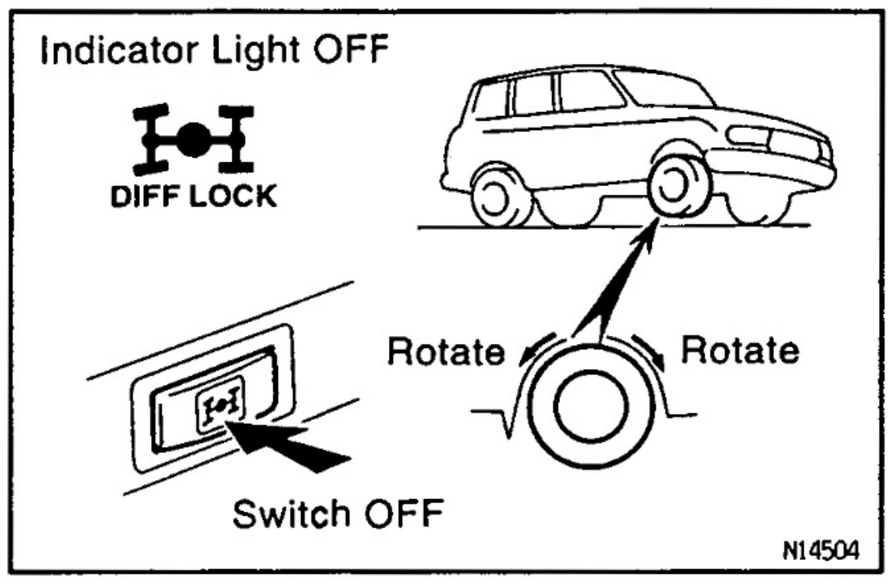
- w/o ABS:
  Move the vehicle backward or forward slightly if the indicator light does not operate correctly when the center differential lock switch is turned ON or OFF.
- When the transfer select lever is put in "L" position, the center differential is put in LOCK condition regardless of the position of the center differential lock switch.
- Transfer H ↔ L Gear Shifting Procedure:
  When shifting, always put the shift lever of the automatic transmission in P or N range. In other ranges, the gears of the transfer clash, and switching cannot occur.

w/o ABS:

CAUTIONS WHEN CENTER DIFFERENTIAL CONTROL SWITCH IS TURNED ON

- Operate the switch only when all 4 wheels are stopped or when driving with the wheels in a straight line.
- Never operate the switch under the following conditions.

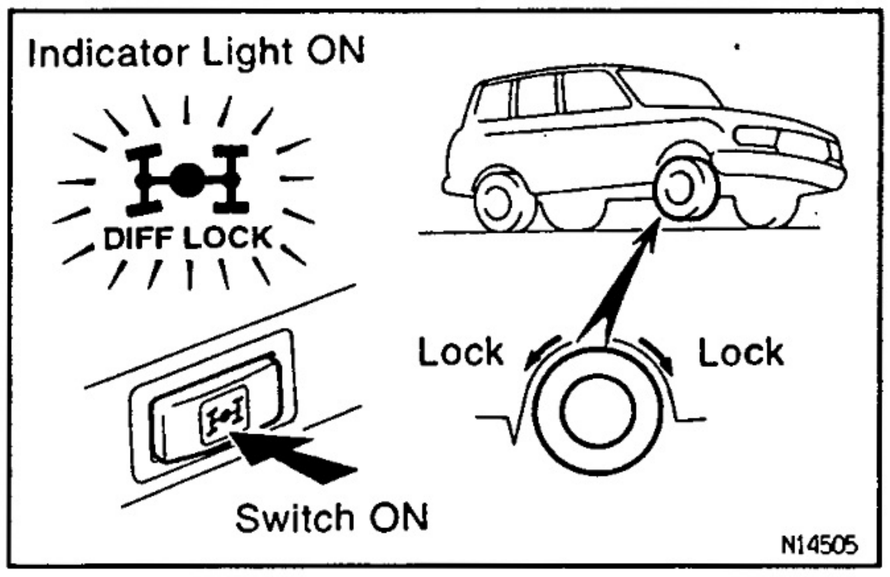
(1) When any tire is slipping.
(2) When any tire is spinning freely.
(3) When swerving or cornering.



FREE Position

Center Differential Lock		Transfer Select Lever	Wheel
Control Switch	Indicator Light		
OFF	OFF	H	A lifted wheel can be rotated even if only one wheel is lifted up, as long as transmission is in N range.

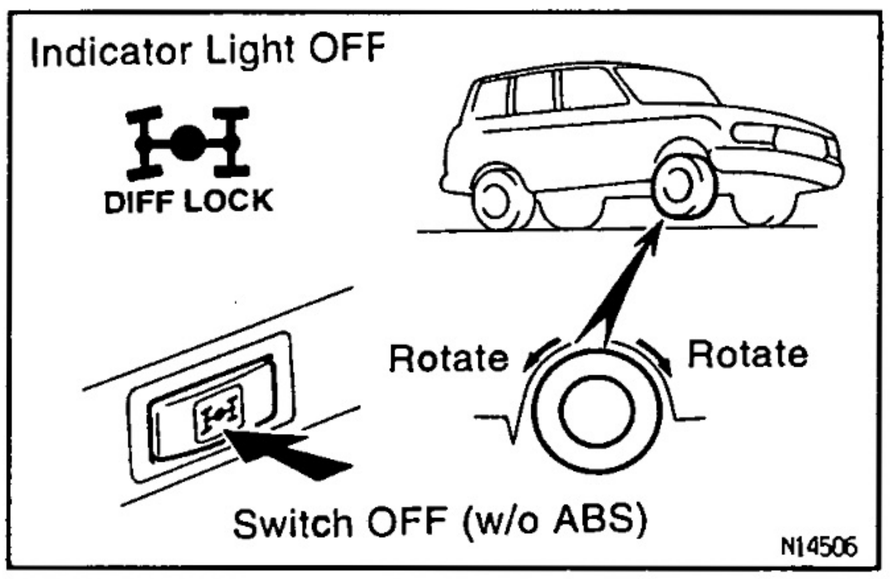
V06649

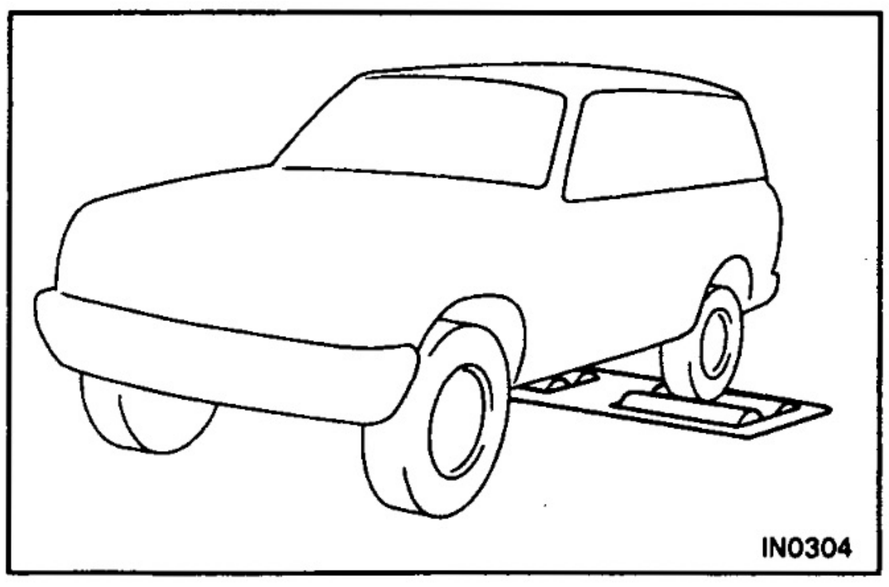


LOCK Position

Center Differential Lock		Transfer Select Lever	Wheel
Control Switch	Indicator Light		
ON	ON	H	A lifted wheel cannot be rotated if only one wheel is lifted up, even if transmission is in N range.
OFF	ON	L	

V06650





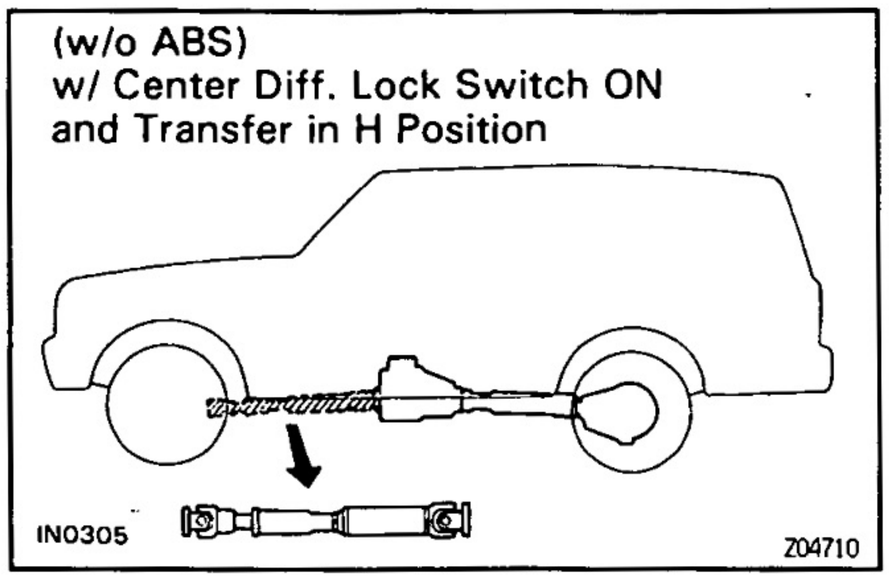
Braking Force Test (Vehicle Speed: Below 0.5 km/h or 0.3 mph)

When performing low—speed type brake tester measurements, observe the following instructions.

(1) Put the center differential in FREE position.
- Shift the transfer select lever to H position.
- (w/o ABS)
  Turn the center differential lock switch to OFF and check that the center differential lock indicator light goes off.

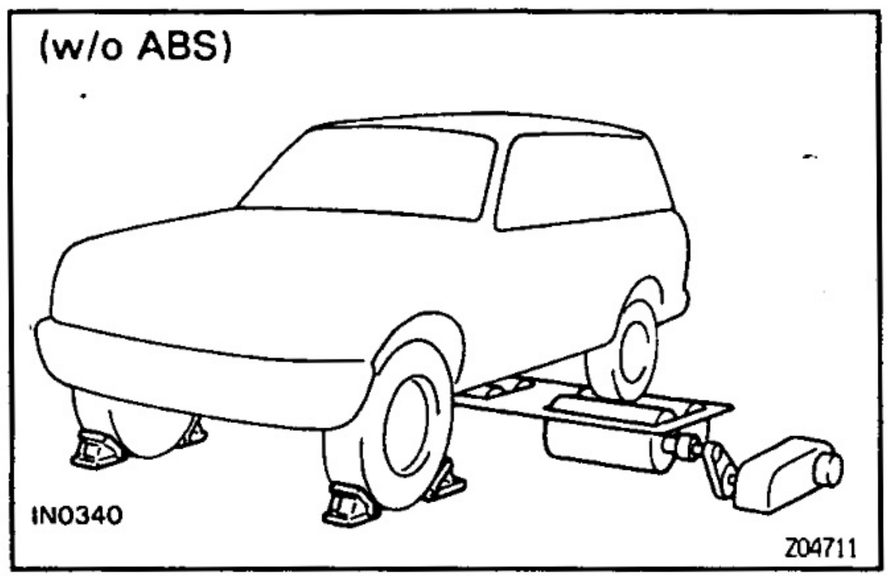
(2) Shift the transmission shift lever to N range.

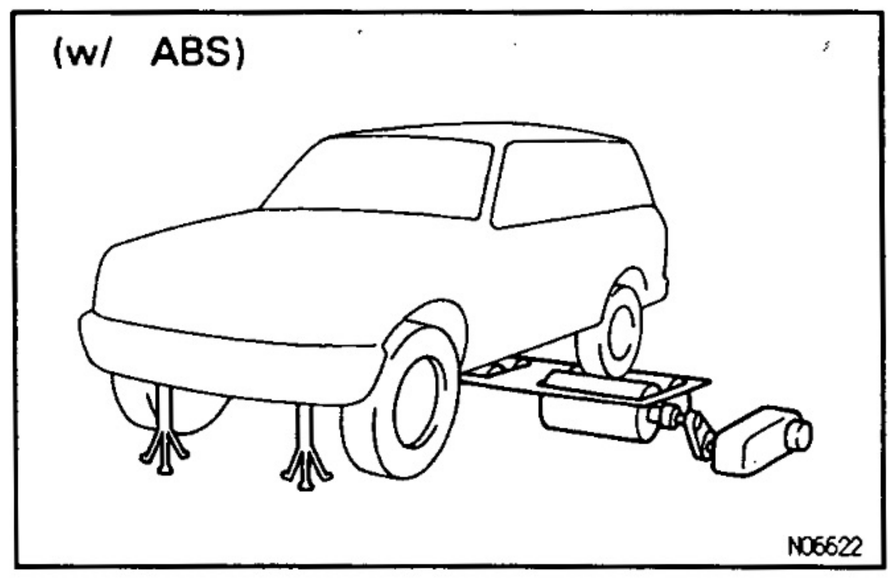
(3) Idle the engine, operate the brake booster and perform the test.



Speedometer Test or Other Tests (Using Speedometer Tester or Chassis Dynamometer)

(1) w/o ABS:
Remove the front propeller shaft, put the center differential in LOCK position, then put the rear wheels on the tester roller and perform the test.





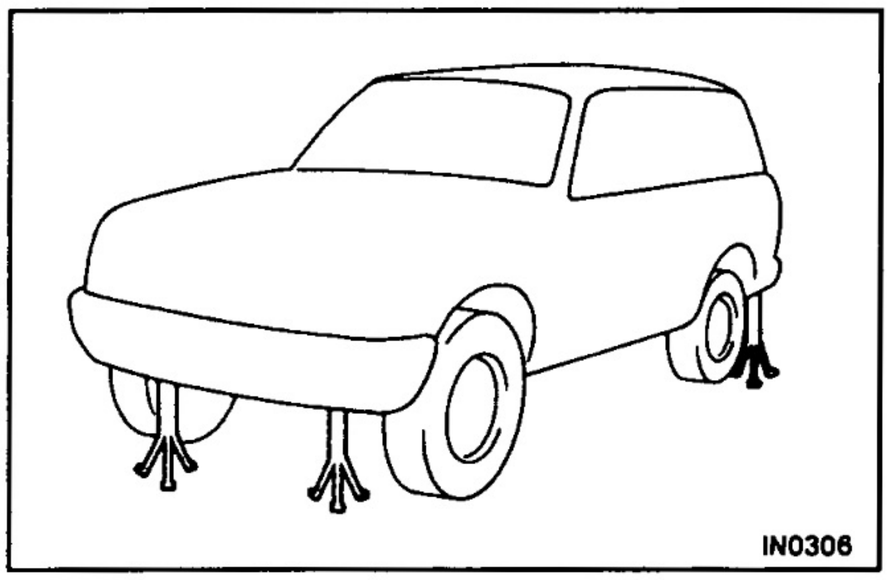
(2) w/ ABS:
Shift the transfer select lever to H position, jack up the front wheels, then put the rear wheels on the tester roller and perform the test.

(3) When performing tests, observe the following precautions.

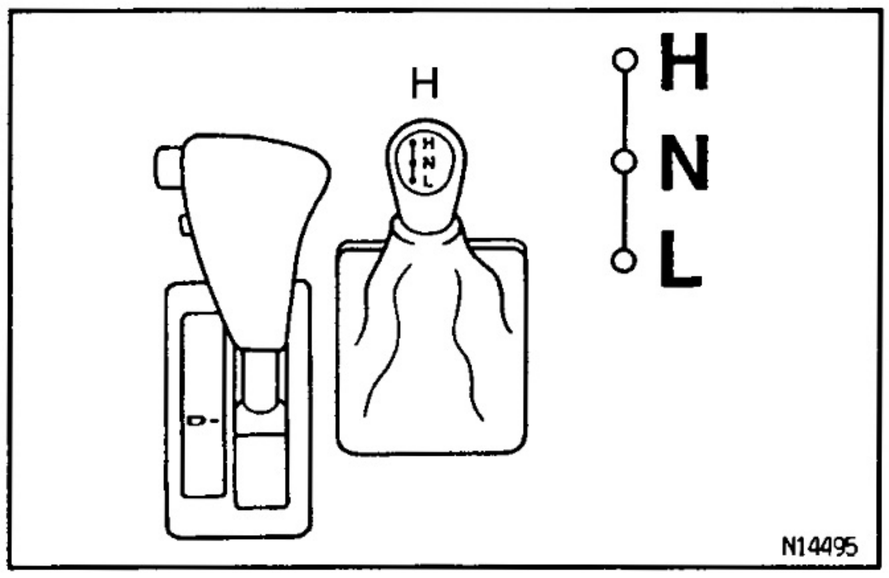
- w/o ABS:
  Check that the center differential is securely in LOCK condition.
- Confirm that the vehicle is securely immobilised.
- Never operate the brakes suddenly, suddenly drive the wheels, or suddenly decelerate.

On–Vehicle Wheel Balancing

When doing on–vehicle wheel balancing on a full–time 4WD vehicle, to prevent the wheels from rotating at different speeds or in different directions from each other (which could lead to damage to the center differential or transfer gears), always be sure to observe the following precautions:

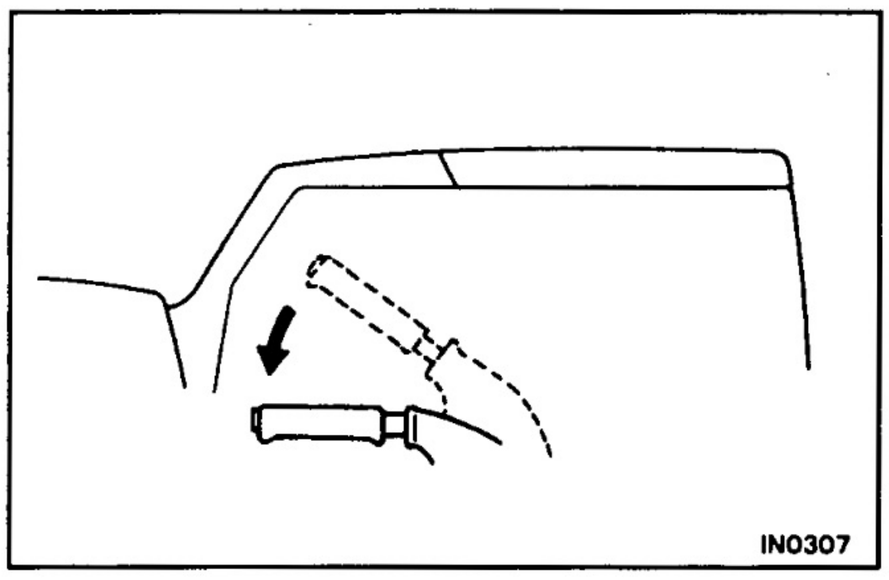


(1) All 4 wheels should be jacked up, clearing the ground completely.

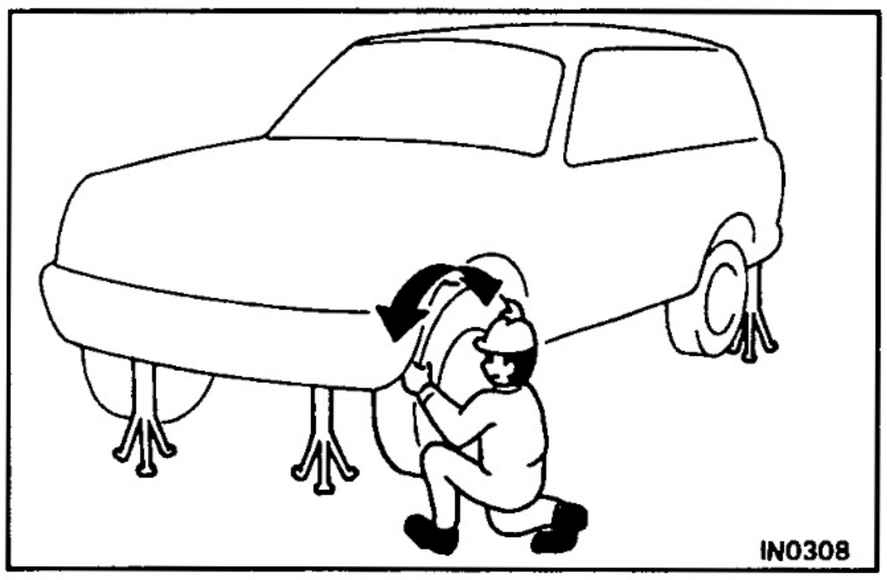


(2) w/o ABS:
The center differential should be in the LOCK position with the transfer gear in H position.

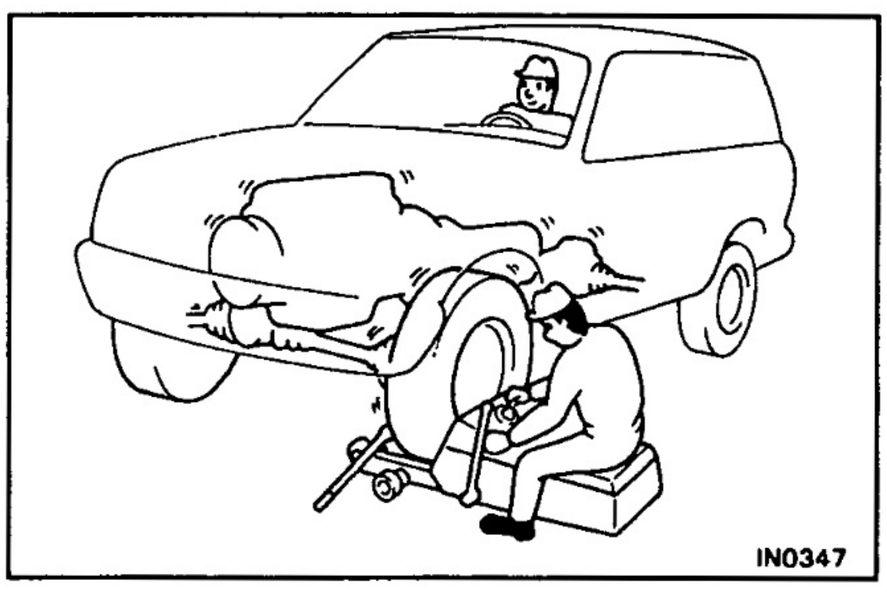
(3) w/ ABS:
Shift the transfer select lever to H position.



(4) The parking brake lever should be fully released.



(5) None of the brakes should be allowed to drag.



(6) The wheels should be driven with both the engine and the wheel balancer.
HINT: When doing this, be careful of the other wheels, which will rotate at the same time.

(7) Avoid sudden acceleration, deceleration and braking.

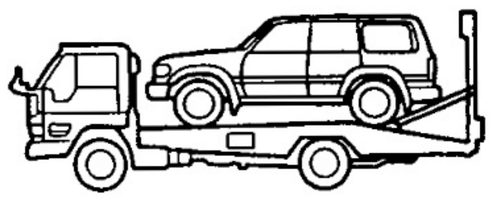
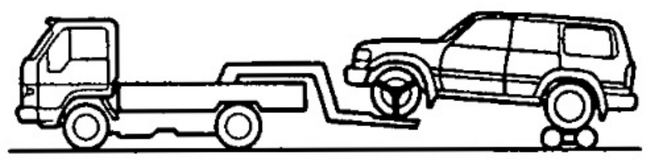
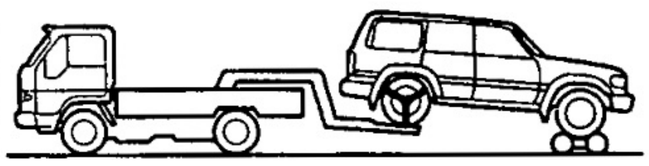
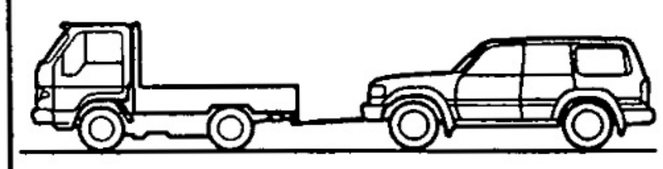
(8) Carry out the wheel balancing with the transmission in "D" or "3" range.

IN093-01

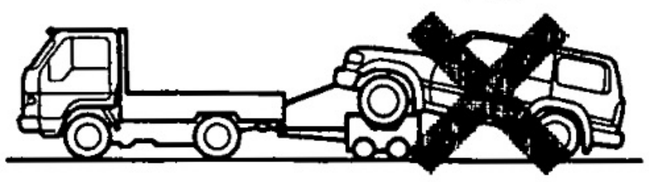
WHEN TOWING FULL–TIME 4WD VEHICLES

1. Only use one of the methods shown below to tow the vehicle.
2. When there is trouble with the chassis and drive train, use method ① (flat bed truck)

IN

Towing Method \ Condition	Parking Brake	Transmission Shift Lever Position	Transfer Shift Lever Position	(w/o ABS) Center Differential Lock Switch	Center Differential
① Flat Bed Truck  IN0309	Applied	"P" Range	"H" Position	OFF	FREE (Normal Driving)
② Wheel Lift Type Truck with Dollies  					
③ Towing with Rope  IN0312	Released	"N" Range	"N" Position	OFF	↑

HINT : Do not use any towing methods other than those shown above.
For example, the towing method shown below is dangerous, so do not use it.

NO  IN0313	During towing with this towing method, there is a danger of the drive train heating up and causing breakdown, or of the front wheels flying off the dolly.

V08127

FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

IN006-06

CAUTION: If large amounts of unburned gasoline flow into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

1. **Use only unleaded gasoline.**
2. **Avoid prolonged idling.**
   Avoid running the engine at idle speed for more than 20 minutes.
3. **Avoid spark jump test.**

(a) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
(b) While testing, never race the engine.

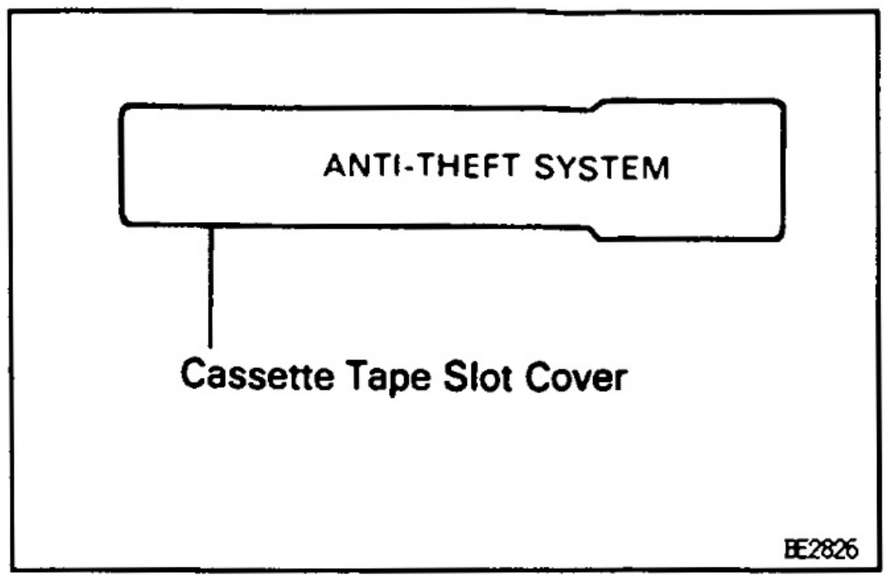
4. **Avoid prolonged engine compression measurement.**
   Engine compression tests must be done as rapidly as possible.
5. **Do not run engine when fuel tank is nearly empty.**
   This may cause the engine to misfire and create an extra load on the converter.
6. **Avoid coasting with ignition turned off and prolonged braking.**
7. **Do not dispose of used catalyst along with parts contaminated with gasoline or oil.**

IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

IN08A-02

For vehicles with mobile communication systems such as two—way radios and cellular telephones, observe the following precautions.

(1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.
(2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronics systems. For details about ECU and sensors locations, refer to the section on the applicable component.
(3) Do not wind the antenna feeder together with the other wiring. As much as possible, also avoid running the antenna feeder parallel with other wire harnesses.
(4) Confirm that the antenna and feeder are correctly adjusted.
(5) Do not install powerful mobile communications system.



FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT–IN ANTI–THEFT SYSTEM

IN00C–01

Audio System displaying the sign "ANTI – THEFT SYSTEM" shown on the left has a built–in anti–theft system which makes the audio system soundless if stolen.

If the power source for the audio system is cut even once, the anti–theft system operates so that even if the power source is reconnected, the audio system will not produce any sound unless the ID number selected by the customer is input again. Accordingly, when performing repairs on vehicles equipped with this system, before disconnecting the battery terminals or removing the audio system the customer should be asked for the ID number so that the technician can input the ID number afterwards, or else a request made to the customer to input the ID number. For the method to input the ID number or cancel the anti–theft system, refer to the Owner's Manual.

FOR USING HAND–HELD TEATER

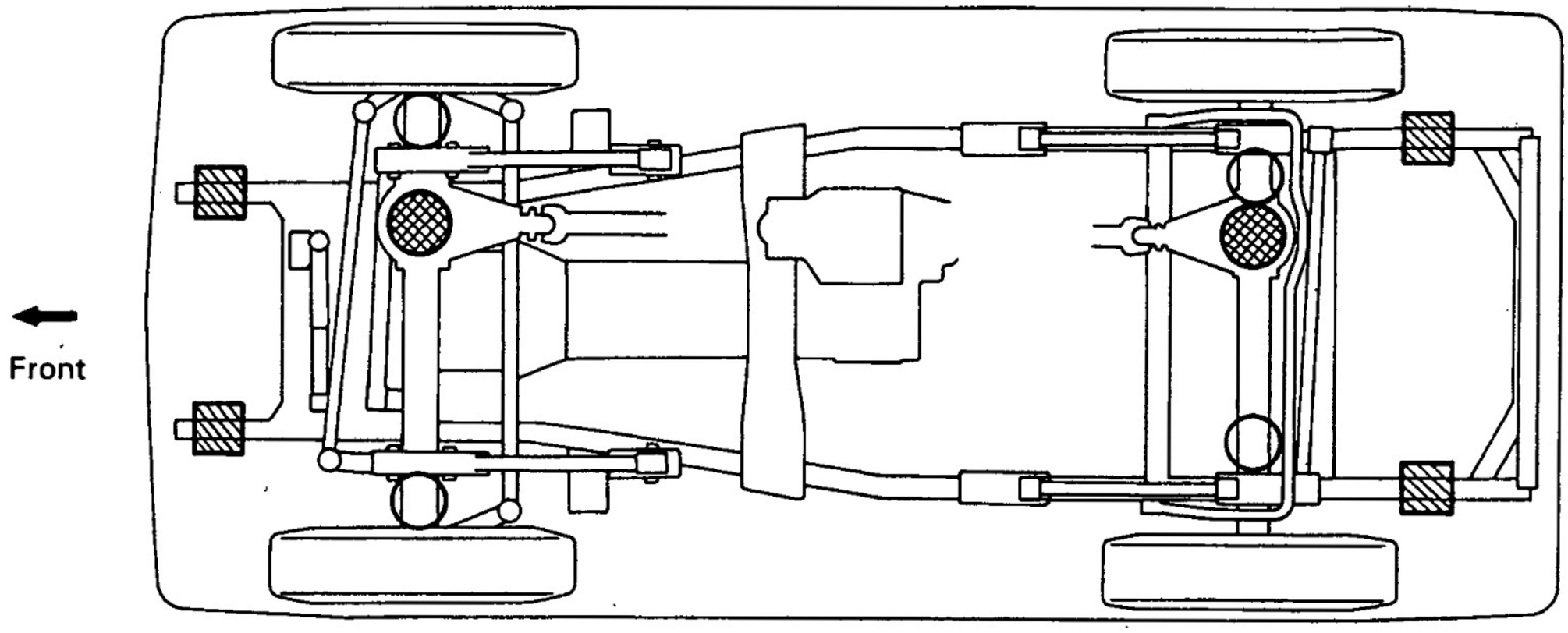
IN00X–03

CAUTION: Observe the following for safety reasons:

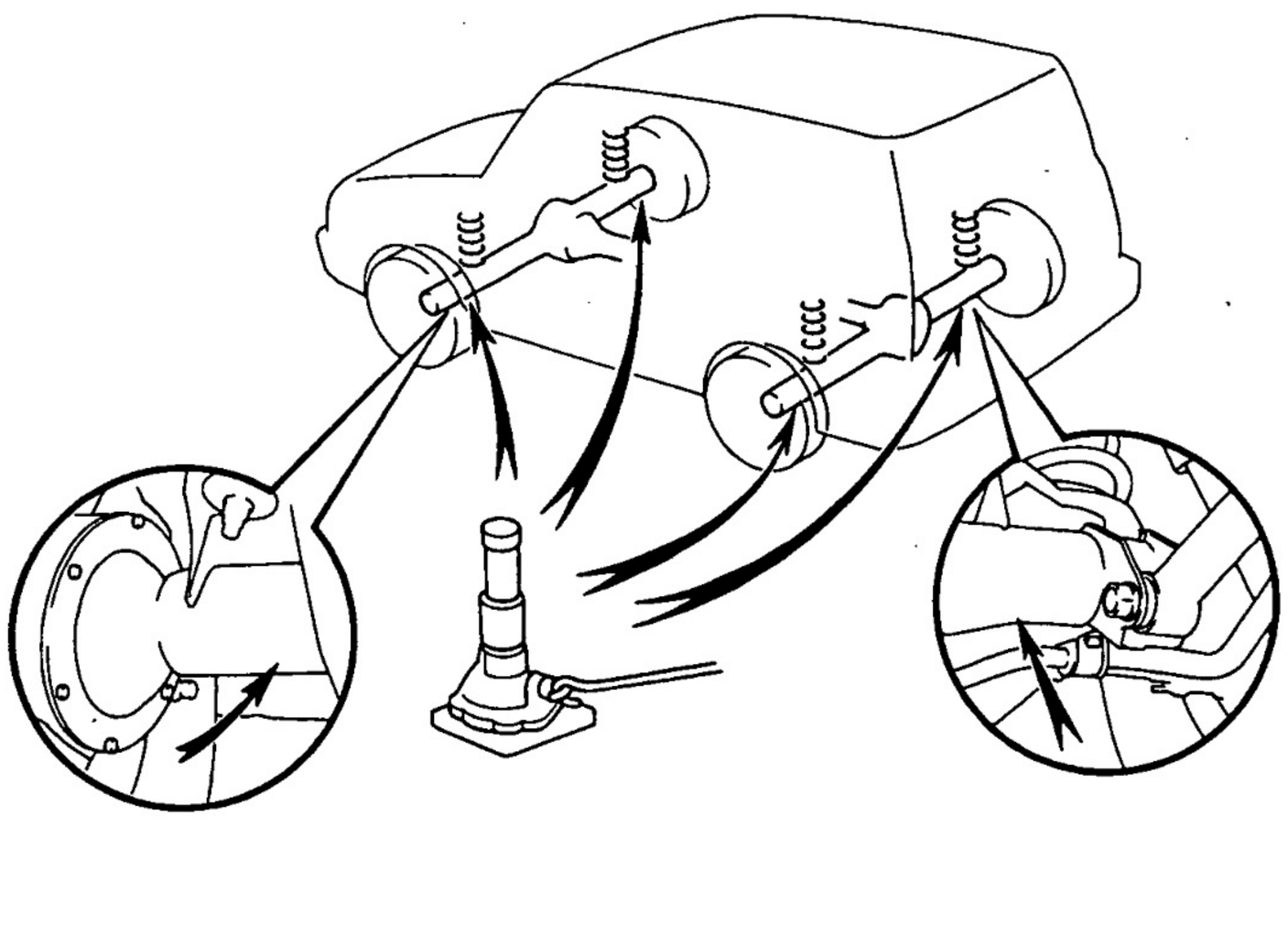
- Before using the hand–held tester, the hand–held tester's operator manual should be read thoroughly.
- Be sure to route all cables securely when driving with the hand–held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)
- Two persons are required when test driving with the hand–held tester, one person to drive the vehicle and one person to operate the hand–held tester.

VEHICLE LIFT AND SUPPORT LOCATIONS

IN007-GU



Front



JACK POSITION _____

Front ..... Under the front differential

Rear ..... Under the rear differential

SCREW TYPE JACK POSITION _____

SUPPORT POSITION

Safety stand .....

IN0314
IN0342

Z00796

ABBREVIATIONS USED IN THIS MANUAL

IN01D–2C

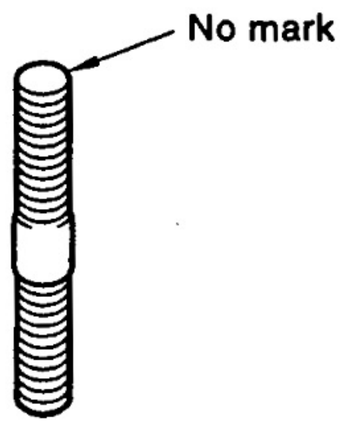
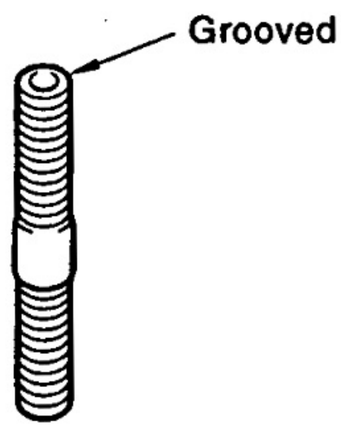
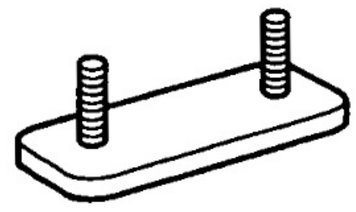
ABS	Anti–Lock Brake System
ADD	Automatic Disconnecting Differential
ALR	Automatic Locking Retractor
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
CB	Circuit Breaker
CRS	Child Restraint System
ECU	Electronic Control Unit
ELR	Emergency Locking Retractor
ESA	Electronic Spark Advance
FIPG	Formed in Place Gasket
FL	Fusible Link
Fr	Front
IG	Ignition
J/B	Junction Block
LH	Left–Hand
LSPV	Load Sensing Proportioning Valve
Max.	Maximum
Min.	Minimum
MP	Multipurpose
M/T	Manual Transmission
O/D, OD	Overdrive
O/S	Oversize
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PS	Power Steering
RH	Right–Hand
Rr	Rear
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
SW	Switch
TEMP.	Temperature
T/F	Transfer
T/M	Transmission
U/S	Undersize
w/	With
w/o	Without
4WD	Four Wheel Drive Vehicles (4x4)

STANDARD BOLT TORQUE SPECIFICATIONS

IN006–01

IN

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt		4T 5T 6T 7T 8T 9T 10T 11T	Hexagon flange bolt w/ washer hexagon bolt	 4 Protruding lines	9T
	 No mark	4T	Hexagon flange bolt w/ washer hexagon bolt	 5 Protruding lines	10T
Hexagon flange bolt w/ washer hexagon bolt	 No mark	4T	Hexagon flange bolt w/ washer hexagon bolt	 6 Protruding lines	11T
Hexagon head bolt	 2 Protruding lines	5T	Stud bolt		4T
Hexagon flange bolt w/ washer hexagon bolt	 2 Protruding lines	6T			6T
Hexagon head bolt	 3 Protruding lines	7T	Welded bolt		4T
Hexagon head bolt	 4 Protruding lines	8T			

V06821

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	—	—	—
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	—	—	—
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	—	—	—
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	—	—	—
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

CLUTCH

REFER TO FOLLOWING REPAIR MANUALS:

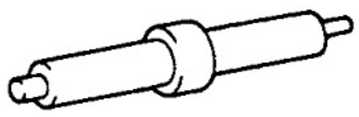
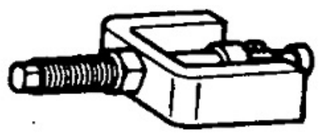
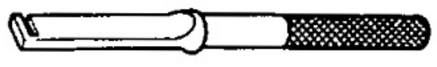
Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual Supplement Jan., 1992	RM290E
Aug., 1992	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

NOTE: The above pages contain only the points which differ from the above listed manuals.

PREPARATION

SST(SPECIAL SERVICE TOOLS)

CL003-10

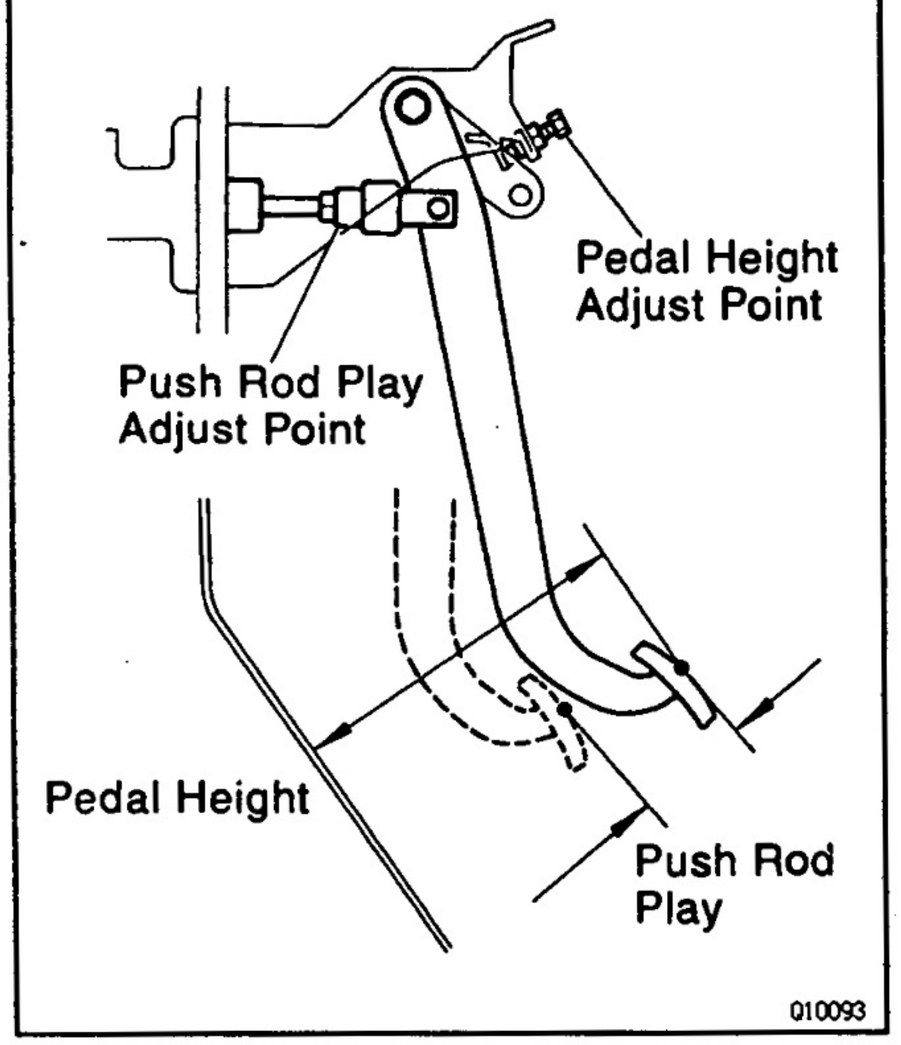
	09301–00110 Clutch Guide Tool	
	09303–35011 Input Shaft Front Bearing Puller	
	09304–12012 Input Shaft Front Bearing Replacer	
	09333–00013 Clutch Diaphragm Spring Aligner	

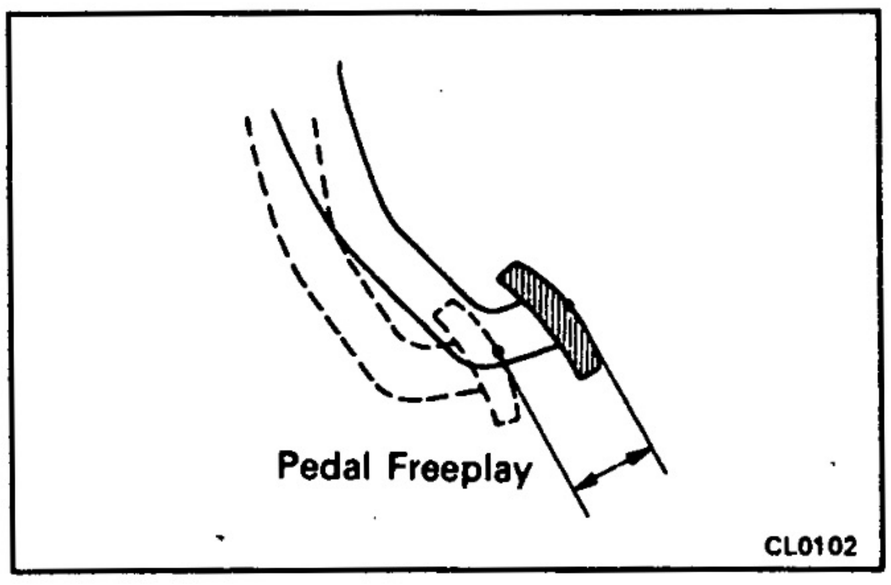
CL004-0N

EQUIPMENT

Calipers	
Dial indicator	
Torque wrench	

FZJ Series





CLUTCH PEDAL

CLUTCH PEDAL CHECK AND ADJUSTMENT

CL0AG-02

1. CHECK THAT PEDAL HEIGHT IS CORRECT

Pedal height from asphalt sheet:

168.0 – 178.0 mm (6.61 – 7.00 in.)

Pedal height from floor panel:

172.0 – 182.0 mm (6.77 – 7.17 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

Loosen the lock nut and turn the stopper bolt until the height is correct. Tighten the lock nut.

3. CHECK THAT PEDAL FREEPLAY AND PUSH ROD PLAY ARE CORRECT

Pedal freeplay:

Push in on the pedal until the beginning of clutch resistance is felt.

Pedal freeplay: 5.0 – 15.0 mm (0.197 – 0.591 in.)

Push rod play:

Gently push on the pedal until the resistance begins to increase a little.

Push rod play at pedal top:

1.0 – 5.0 mm (0.039 – 0.197 in.)

4. IF NECESSARY, ADJUST PEDAL FREEPLAY AND PUSH ROD PLAY

(a) Loosen the lock nut and turn the push rod until the freeplay and push rod play are correct.

(b) Tighten the lock nut.

(c) After adjusting the pedal freeplay, check the pedal height.

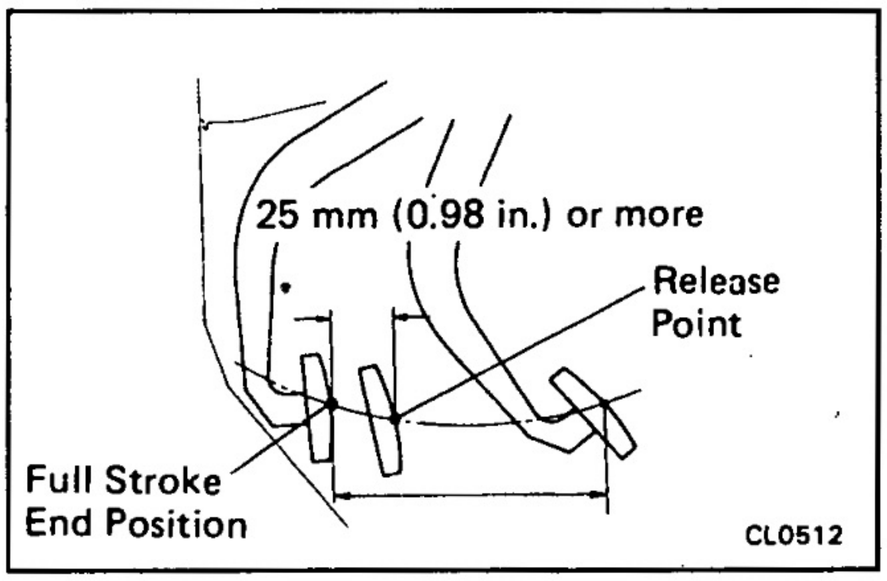
(d) Connect the air duct and install the lower finish panel.

5. CHECK CLUTCH RELEASE POINT

(a) Pull the parking brake lever and install wheel stopper.

(b) Start the engine and idle the engine.

(c) Without depressing the clutch pedal, slowly shift the shift lever into reverse position until the gears contact.



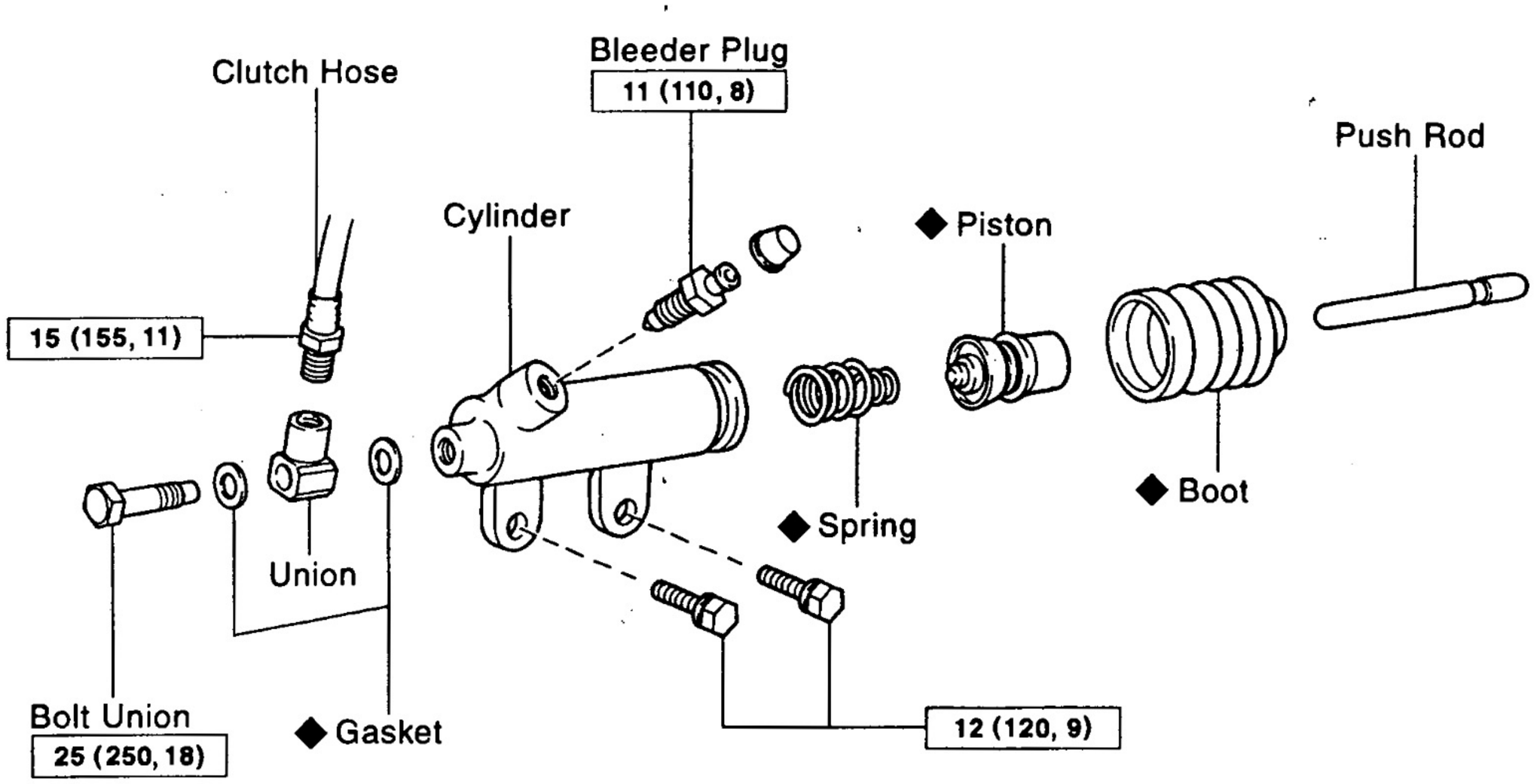
(d) Gradually depress the clutch pedal and measure the stroke distance from the point the gear noise stops (release point) up to the full stroke end position.
Standard distance:
25 mm (0.98 in.) or more
(From pedal stroke end position to release point)
If the distance not as specified, perform the following operation.

- Check pedal height.
- Check push rod play and pedal freeplay.
- Bleed the clutch line.
- Check the clutch cover and disc.

CLUTCH RELEASE CYLINDER
COMPONENTS

CL00E-17

FZJ Series



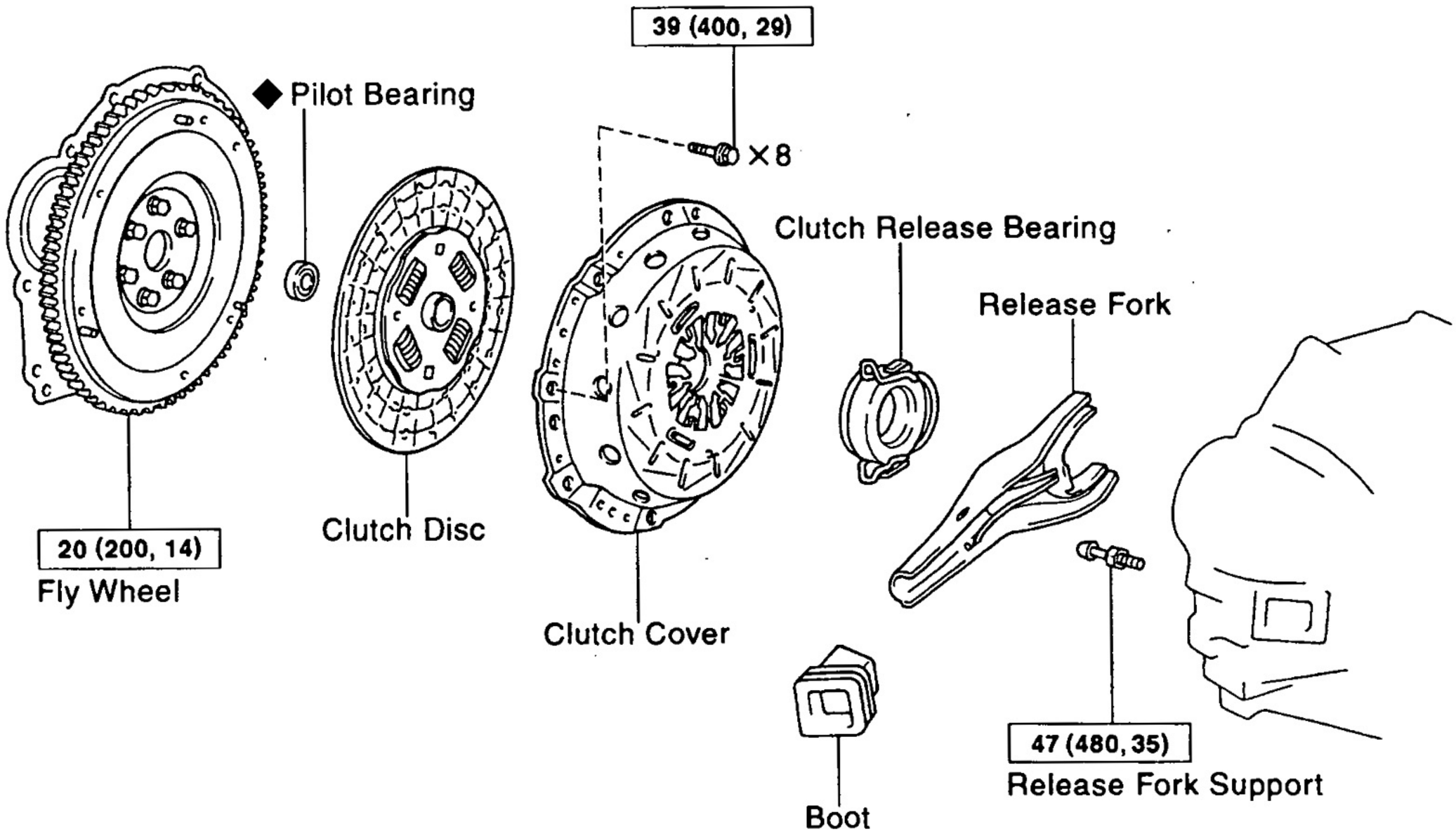
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Q10087

CLUTCH UNIT
COMPONENTS

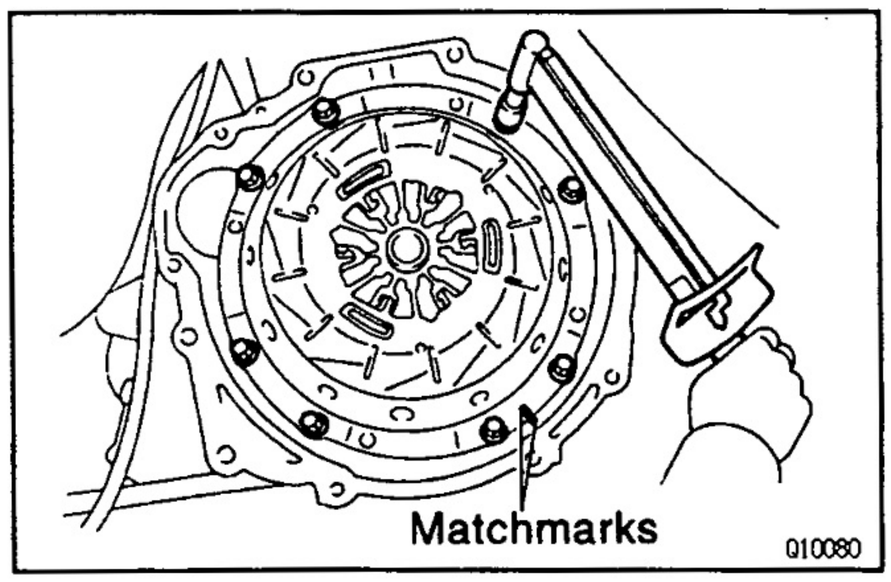
CL00K-14

FZJ Series



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Q10086



Q10080

CL0F1-01

CLUTCH UNIT REMOVAL

1. **REMOVE TRANSMISSION FROM ENGINE (See Pub.No. RM184E on page MT–5)**
2. **REMOVE CLUTCH COVER AND DISC**

(a) Place matchmarks on the flywheel and clutch cover.

(b) Loosen each set bolt one turn at a time until the spring tension is released.

(c) Remove the 8 set bolts, and pull off the clutch cover with the clutch disc.

INSTALLATION HINT: When replacing the clutch disc, also replace the clutch cover.

NOTICE:

- **When replacing the clutch disc, also replace the clutch cover.**
- **Do not drop the clutch disc.**

3. REMOVE RELEASE BEARING AND FORK FROM TRANSMISSION

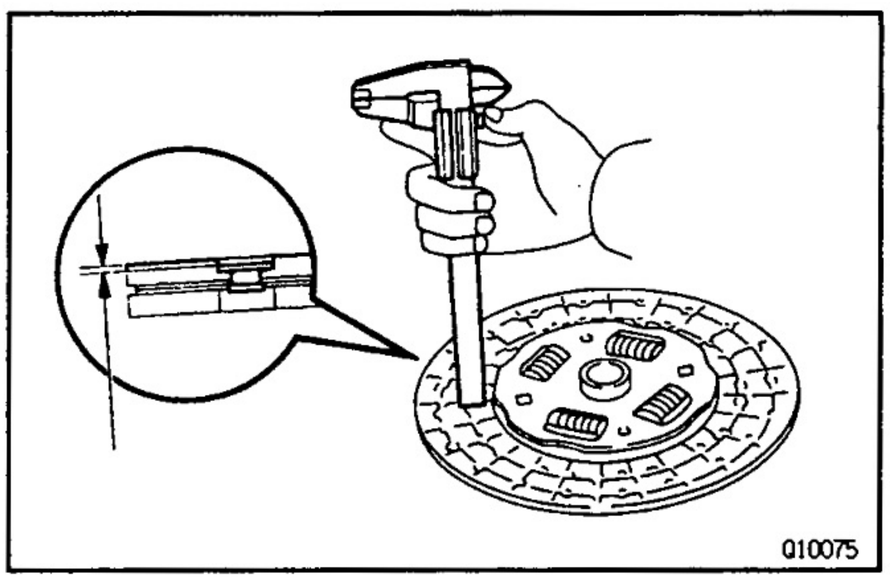
(a) Remove the release bearing together with the fork and separate them.

(b) Remove the boot.

CL

CL018-04

CLUTCH PARTS INSPECTION

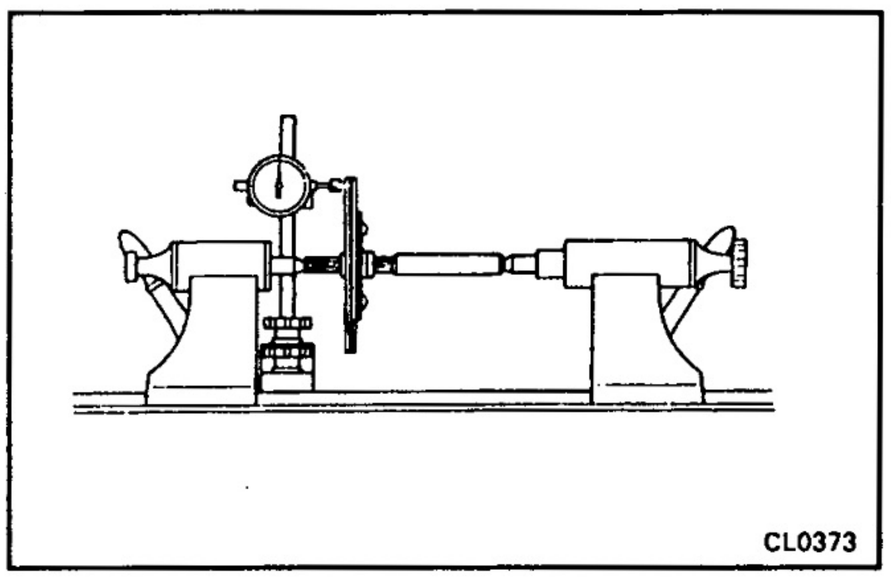


1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If the depth is less than the specification, replace the clutch disc and cover.

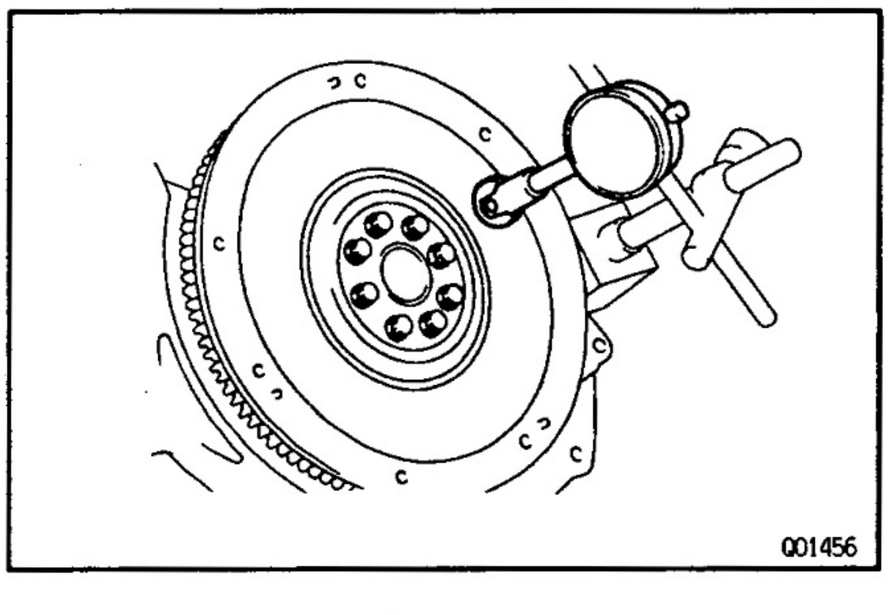


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, check the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If the runout is not within the specification, replace the clutch disc and cover.



3. INSPECT FLYWHEEL RUNOUT

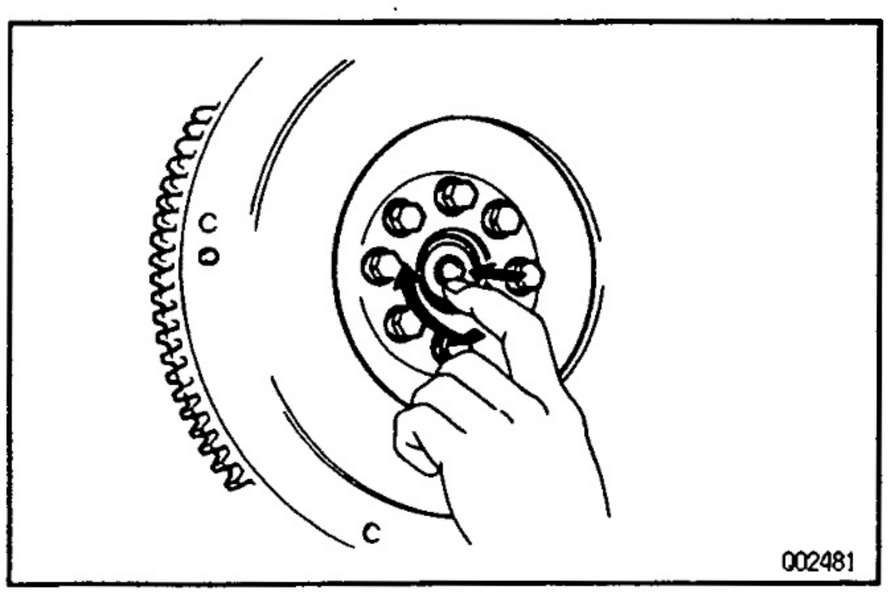
Using a dial indicator, check the flywheel runout.

Maximum runout: 0.1 mm (0.004 in.)

If the runout is not within the specification, replace the flywheel.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

HINT: Then tighten the bolts an additional 90°.

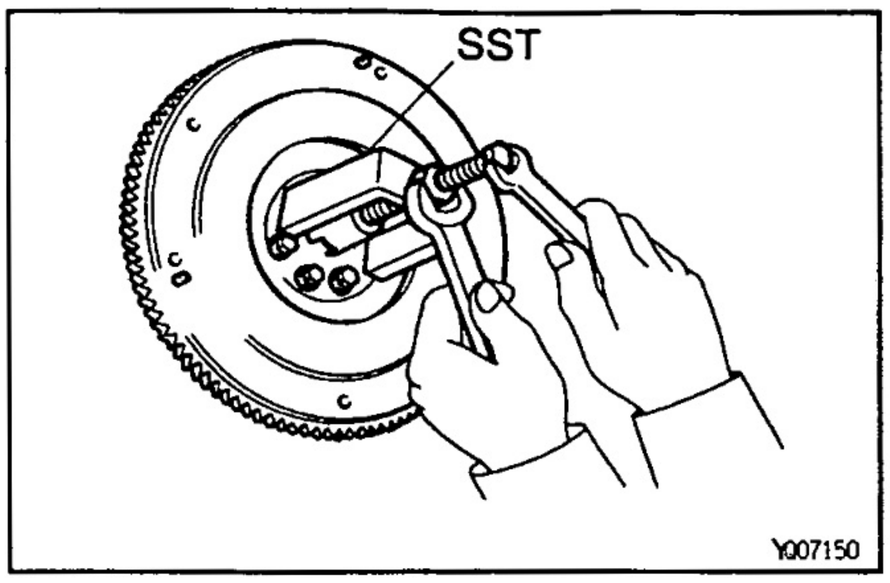


4. INSPECT PILOT BEARING

Turn the bearing by hand while applying force in the axial direction.

If the bearing sticks or has much resistance replace the pilot bearing.

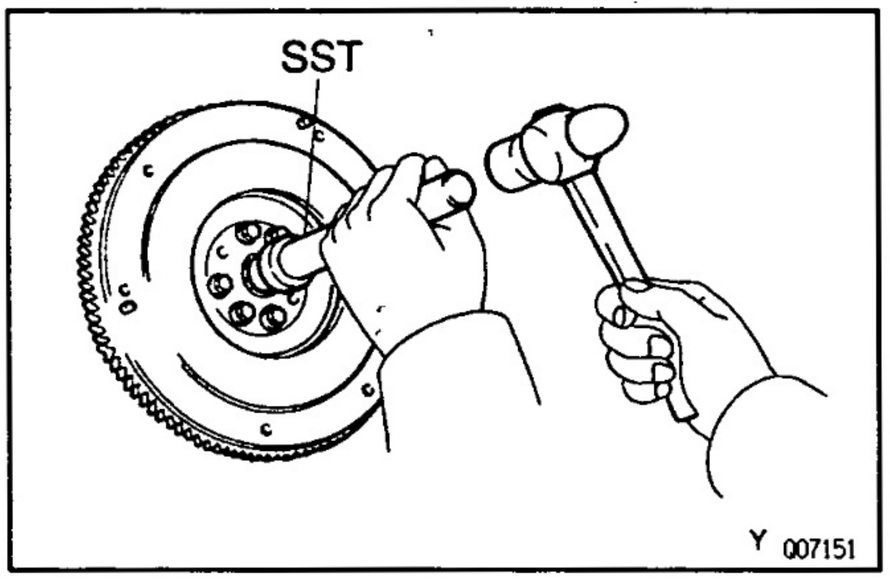
HINT: The bearing is permanently lubricated and requires no clearing or lubrication.



5. IF NECESSARY, REPLACE PILOT BEARING

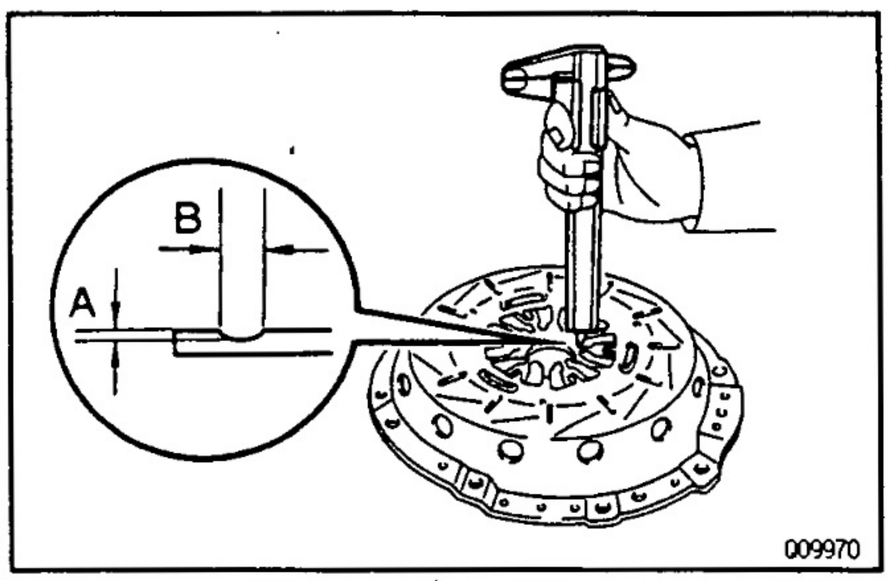
(a) Remove the 2 bolts at diametrically opposite points.

(b) Using SST, remove the pilot bearing.
SST 09303–35011



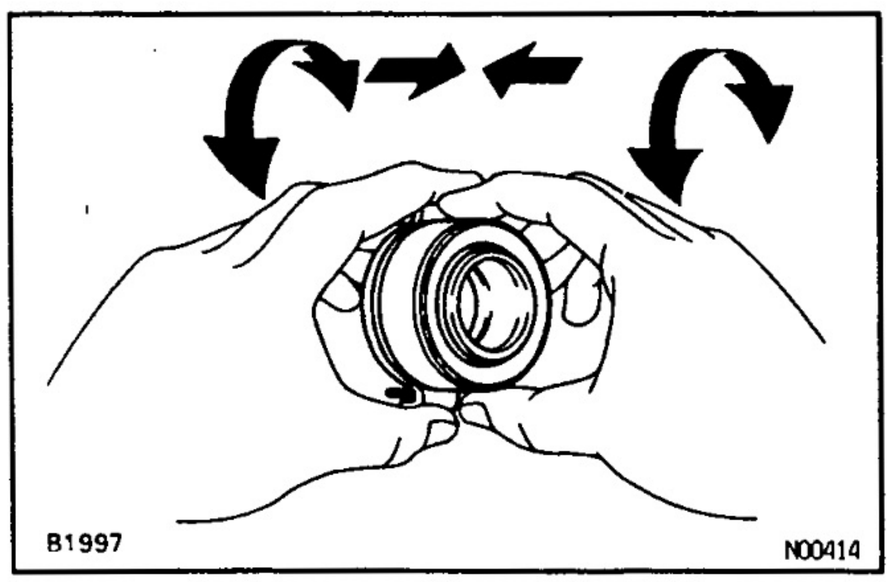
(c) Using SST, install a new pilot bearing.
SST 09304–12012

(d) Torque 2 new bolts.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)
HINT: Then tighten the 2 bolts an additional 90°.



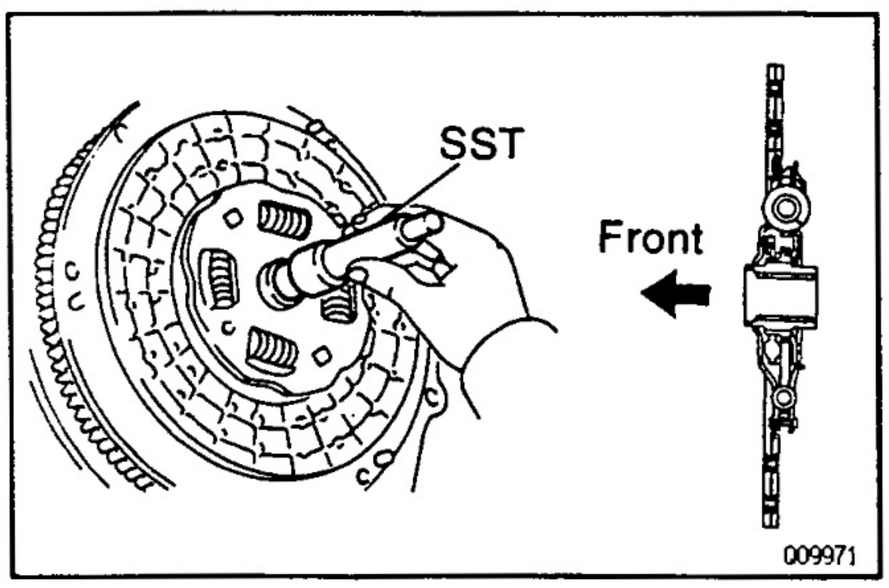
6. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.
Maximum:
A (Depth) 0.6 mm (0.024 in.)
B (Width) 5.0 mm (0.197 in.)
If the depth and/or width is not within the specification, replace the clutch cover.



7. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the axial direction.
HINT: The bearing is permanently lubricated and requires no cleaning or lubrication.
If a problem is found, replace the bearing.

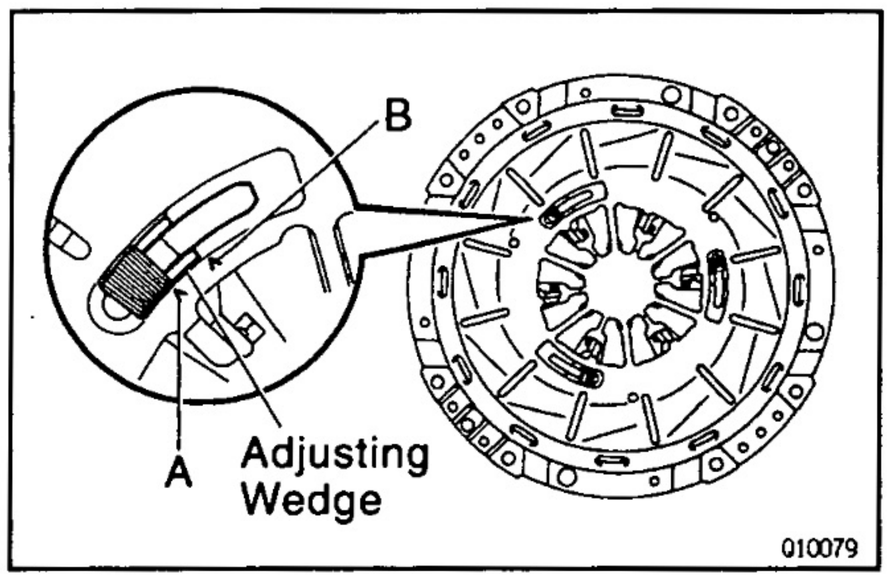


CLUTCH UNIT INSTALLATION

CL0F2-01

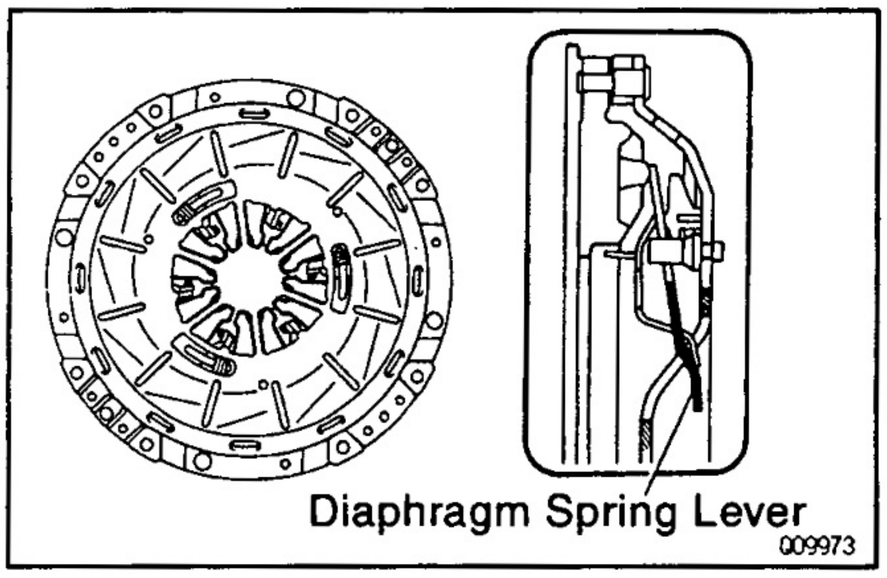
1. INSTALL CLUTCH DISC AND CLUTCH COVER ON FLYWHEEL

(a) Insert SST in the clutch disc, then set them and the clutch cover in position.
SST 09301–00110

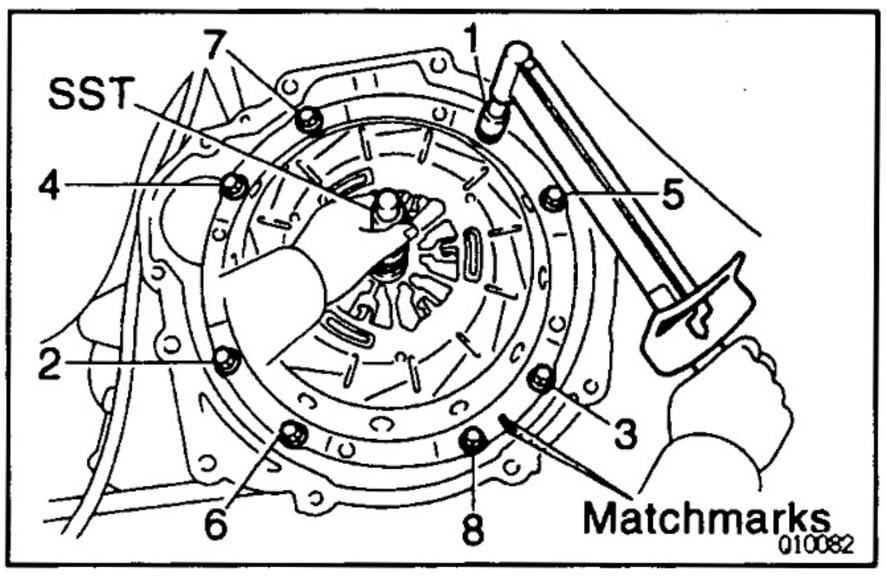


INSTALLATION HINT:

- When replacing the the clutch cover, make sure that the adjusting wedge is within the specific area.
- Make sure that the adjusting wedge is between A and B.



- Do not stroke the diaphragm spring lever.



(b) Align the matchmarks on the clutch cover and flywheel.
HINT: Temporarily tighten the No.1 and No.2 bolts.

(c) Torque the bolts on the clutch cover in the order shown.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

2. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

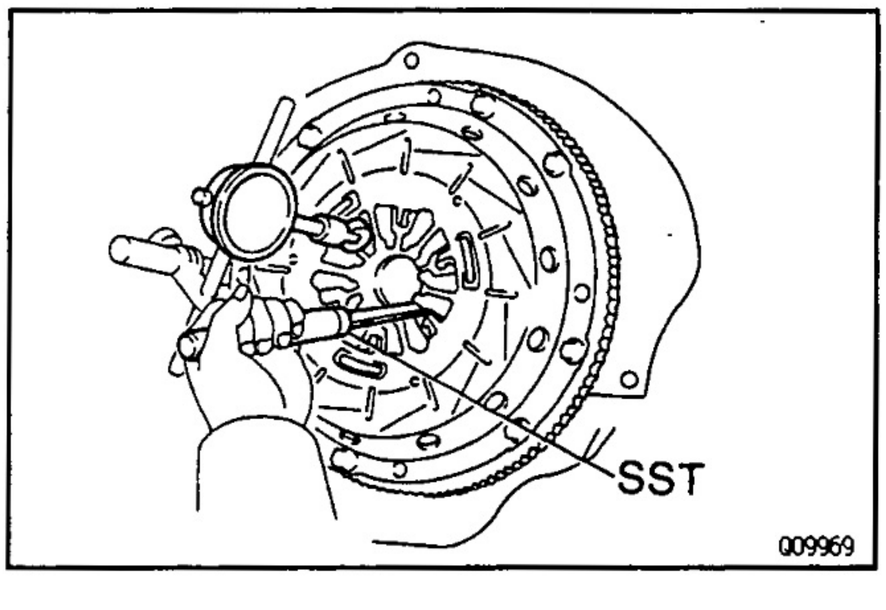
Using a dial indicator with roller instrument, check the diaphragm spring tip alignment.
Maximum non–alignment: 0.5 mm (0.020 in.)

If the alignment is not within the specification, using SST, adjust the diaphragm spring tip alignment.
SST 09333–00013

3. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2)

(a) Apply release hub grease to the following parts.

- Release fork and hub contact point
- Release fork and push rod contact point
- Release fork pivot point



(b) Apply clutch spline grease.

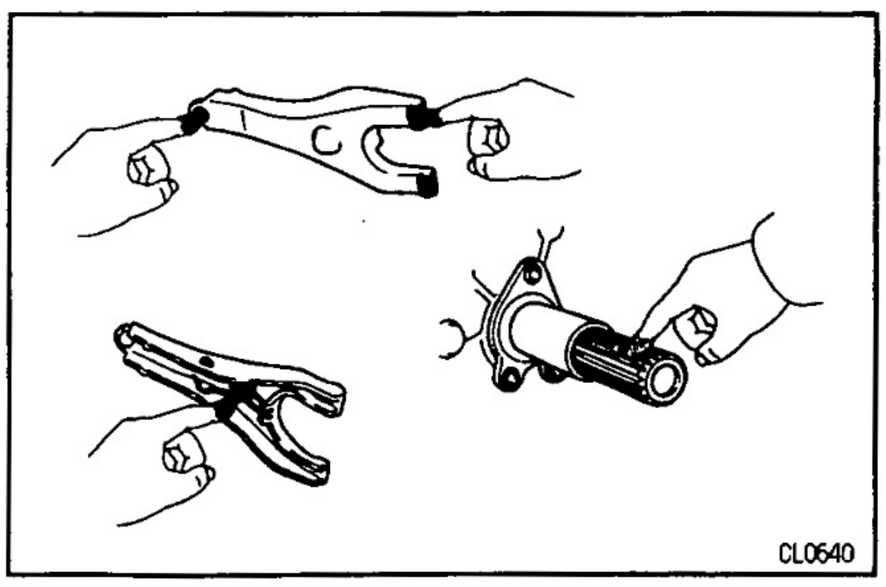
- Clutch disc spline

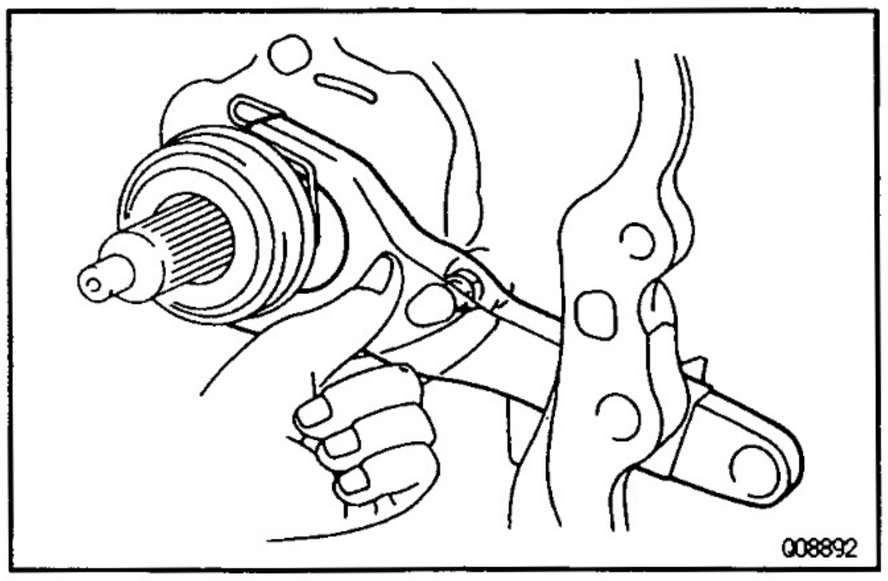
HINT: Recommended grease part number 08887–01706 (100 g).

4. INSTALL RELEASE BEARING AND FORK TO TRANSMISSION

(a) Install the bearing to the release fork, and install them to the transmission.

(b) Install the boot.





5. INSTALL TRANSMISSION TO ENGINE
(See Pub.No RM184E on page MT–5)
INSTALLATION HINT:

- When replaing the clutch disc, also replace the clutch cover.
- After replacing the clutch cover and clutch disc, operate the pedal 10 times with full stroke so that the diaphragm spring postune is reset at the initial setting.Right after the replacement pedal operation force may feel heavy, but this does not indicate abnormally. by repeating the pedal operation mentioned above, the specified operation force will be attained.

SERVICE SPECIFICATIONS

SERVICE DATA

CL0FS–01

Pedal height from asphalt sheet	168.0–178.0 mm (6.61–7.00 in.)
Pedal height from floor panel	172.0–182.0 mm (6.77–7.17 in.)
Push rod play at pedal top	1.0–5.0 mm (0.039–0.197 in.)
Pedal freeplay	5.0–15.0 mm (0.197–0.591 in.)
Clutch release point from pedal full stroke end position	25 mm (0.98 in.) or more

TORQUE SPECIFICATIONS

CL000–17

Part tightened	N·m	kgf·cm	ft·lbf
Clutch line union	15	155	11
Bolt union	25	250	18
Release cylinder x Body	12	120	9
Bleeder plug	11	110	8
Release fork support	47	480	35
Clutch cover x Flywheel	39	400	29

SUSPENSION AND AXLE

SA

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual	
Supplement Jan., 1992	RM290E
Aug., 1992	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

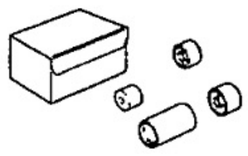
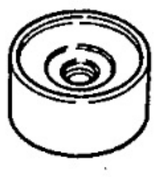
NOTE: The above pages contain only the points which differ from the above listed manuals.

FRONT SUSPENSION

PREPARATION

SST (SPECIAL SERVICE TOOLS)

SA2TC-01

	09710-22042 Rear Suspension Bushing Tool Set	
	(09710-02061) Replacer	Leading arm bushing (Rear side)
	09710-30050 Suspension Arm Bushing Replacer	Leading arm bushing (Front side)

SA

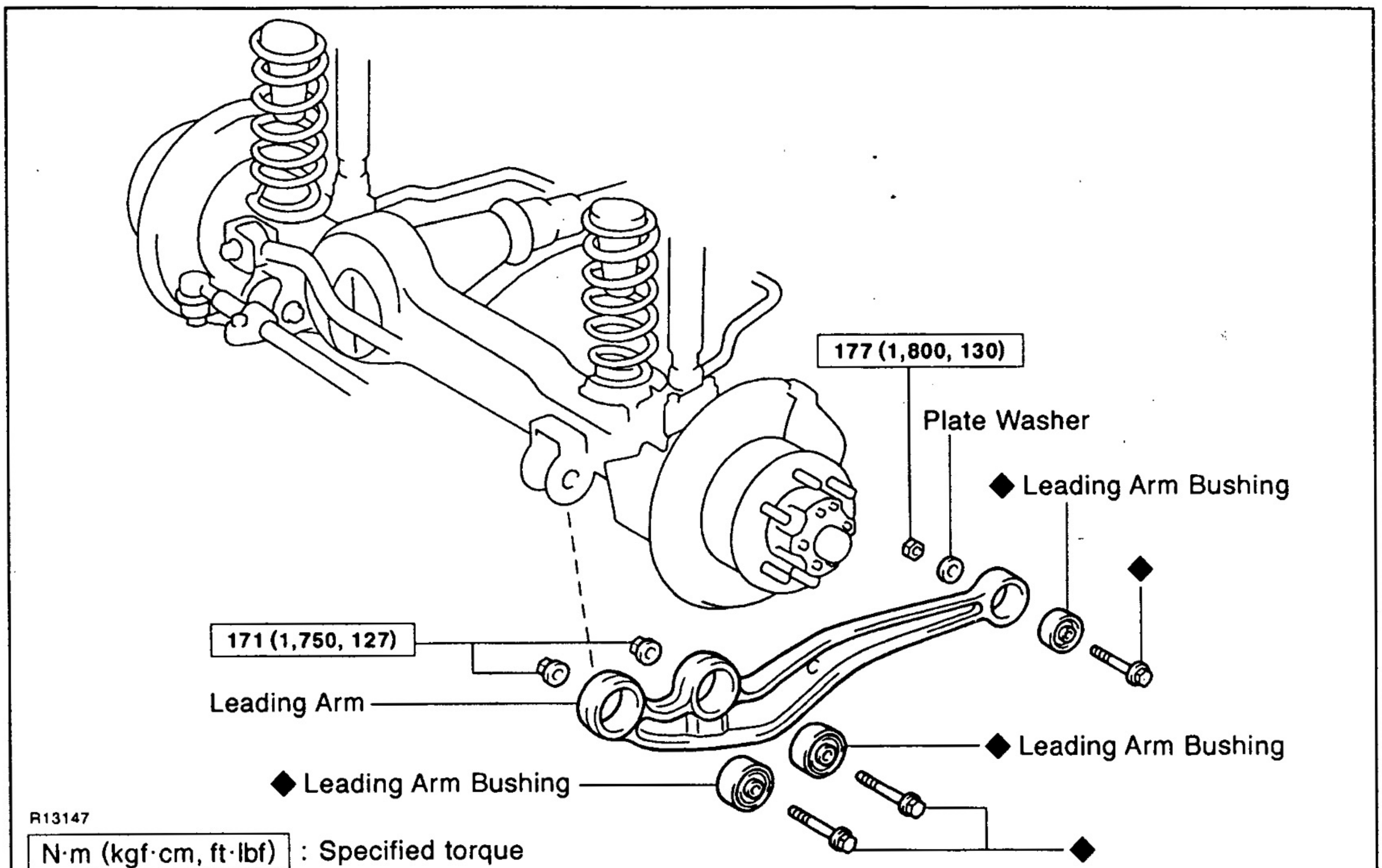
SA0ZD-02

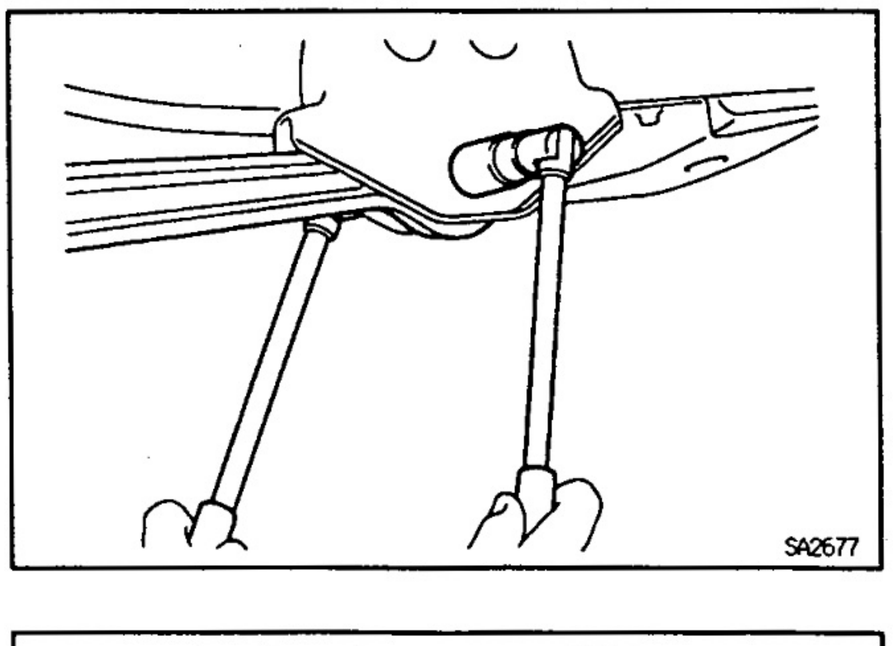
EQUIPMENT

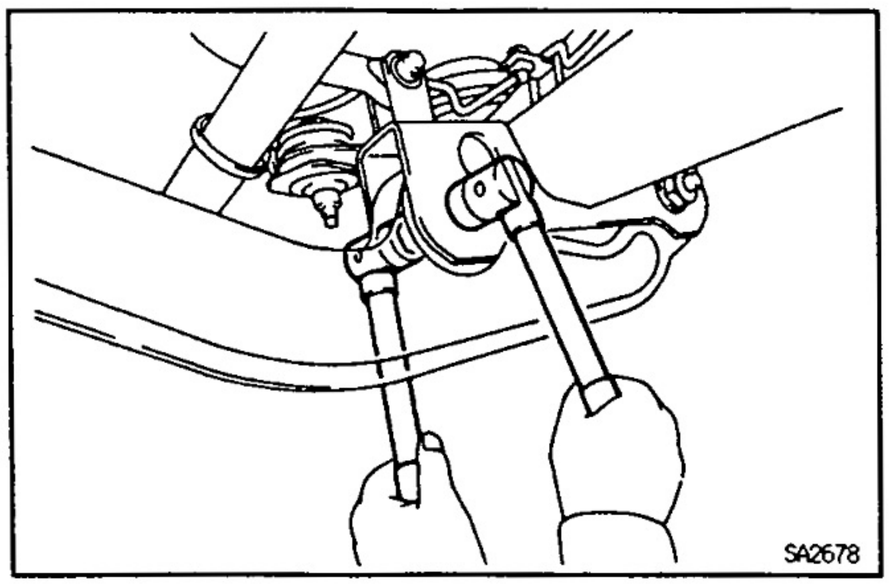
Torque wrench	

LEADING ARM
COMPONENTS

SA2RZ–01







SA2SJ–04

LEADING ARM REMOVAL

1. REMOVE FRONT WHEEL

Torque:

Steel wheel: 147 N·m (1,500 kgf·cm, 109 ft·lbf)

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

2. REMOVE LEADING ARM

(a) Remove the bolt, plate washer and nut from the leading arm to the frame side.

Torque: 177 N·m (1,800 kgf·cm, 130 ft·lbf)

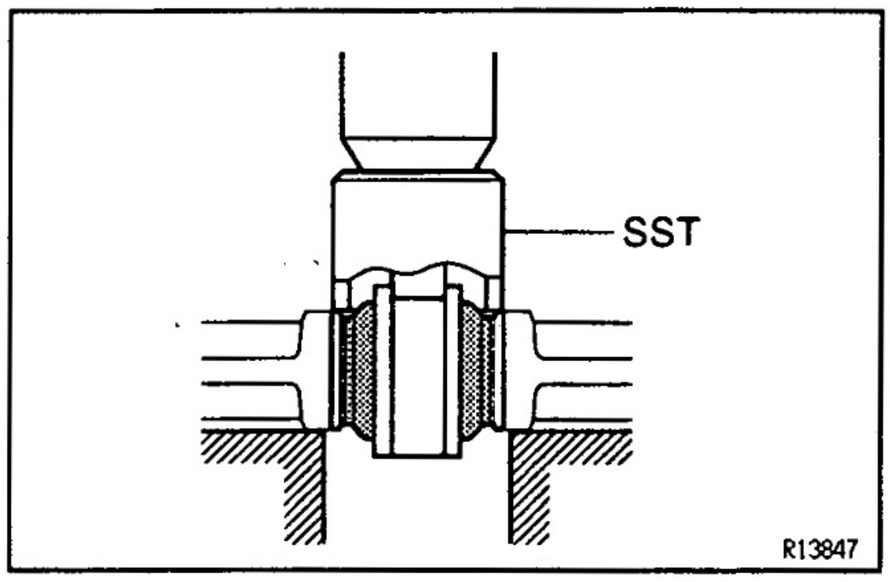
INSTALLATION HINT: After stabilizing the suspension, torque the bolt.

(b) Remove the 2 bolts and nuts from the leading arm to the axle housing side.

Torque: 171 N·m (1,750 kgf·cm, 127 ft·lbf)

INSTALLATION HINT: After stabilizing the suspension, torque the bolts.

(c) Remove the leading arm.



LEADING ARM BUSHING REPLACEMENT SA1V5-04

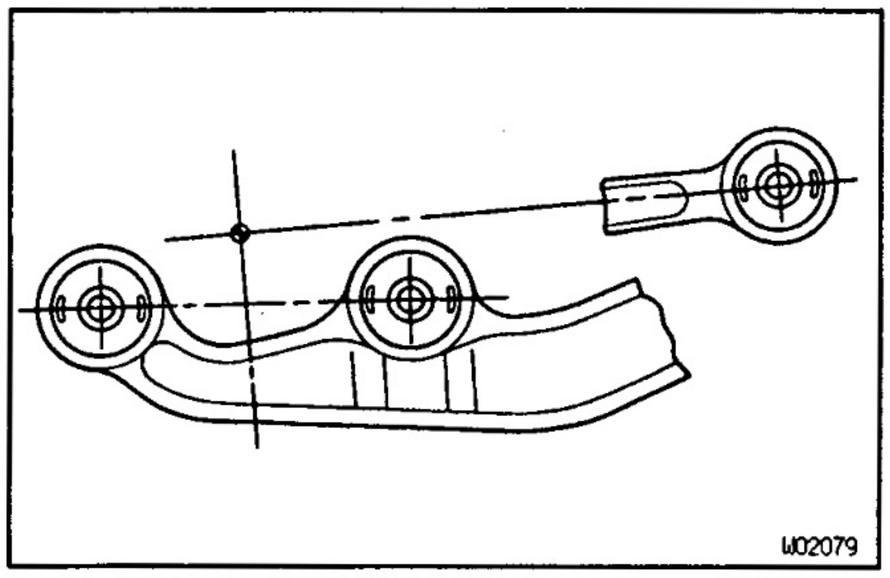
REPLACE BUSHINGS

Using SST and a press, replace the bushing from the leading arm.

SST

Front side: 09710–30050

Rear side: 09710–22042, (09710–02061)



HINT: When assembling a new bushing, as shown in the illustration.

SA

LEADING ARM BUSHING INSTALLATION SA25K-03

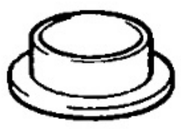
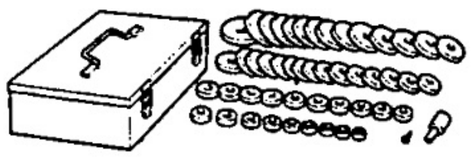
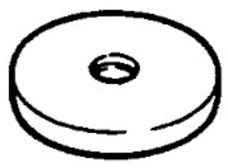
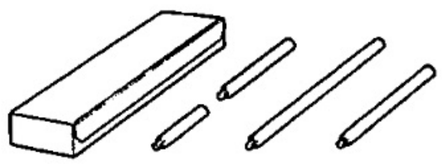
Installation is in the reverse order of removal.

REAR SUSPENSION

PREPARATION

SST (SPECIAL SERVICE TOOLS)

SA2TD-01

	09316–20011 Transfer Bearing Replacer	Lower control arm bushing
	09506–35010 Differential Drive Pinion Rear Bearing Replacer	Lower control arm bushing
	09710–22021 Front Suspension Bushing Tool Set	Lower control arm bushing
	(09710–01071) Lower Arm Bushing Remover	
	09950–60010 Replacer Set	Lower control arm bushing
	(09951–00540) Replacer 54	
	09950–70010 Handle Set	Lower control arm bushing
	(09951–07100) Handle 100	

SA

SA0YX-04

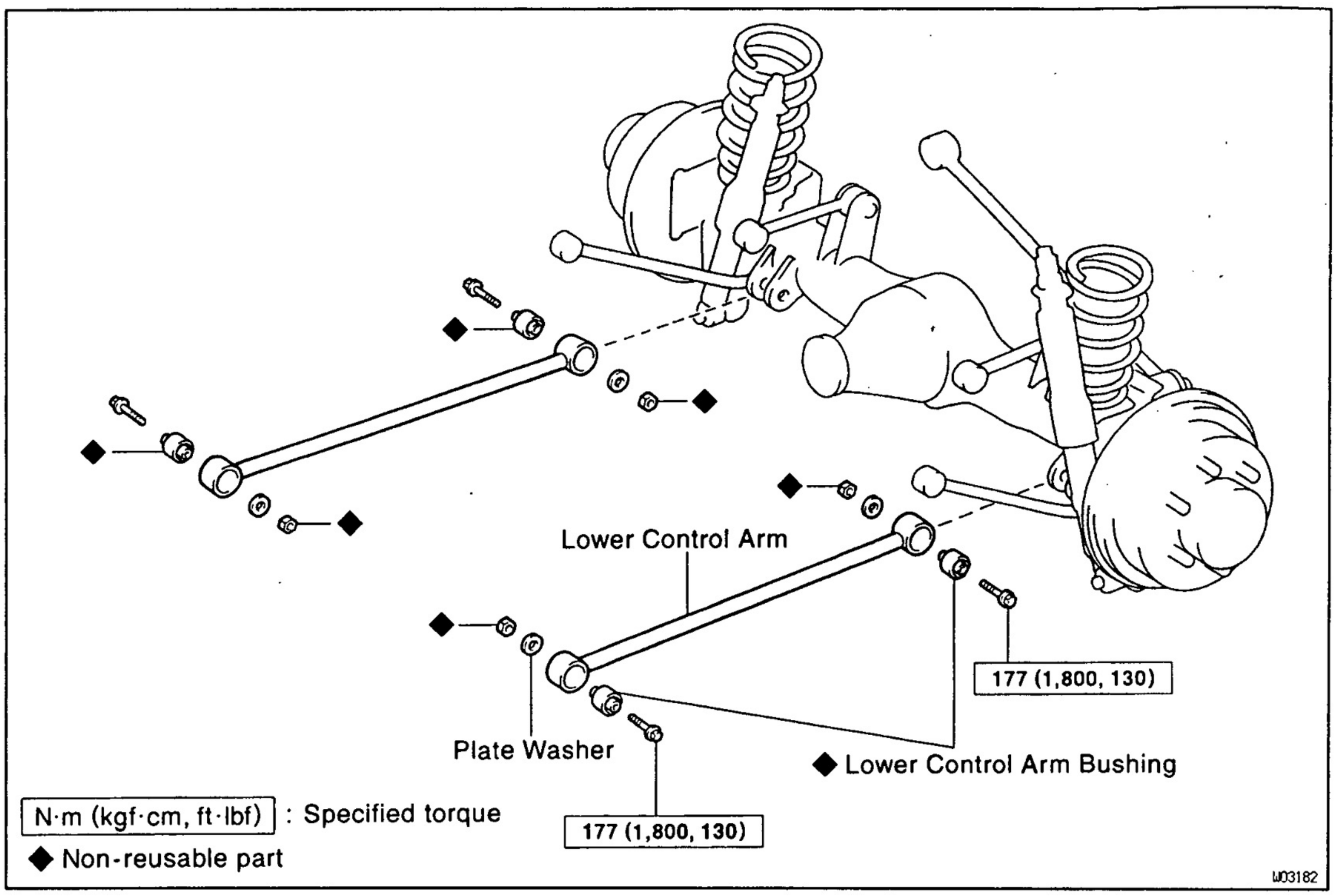
EQUIPMENT

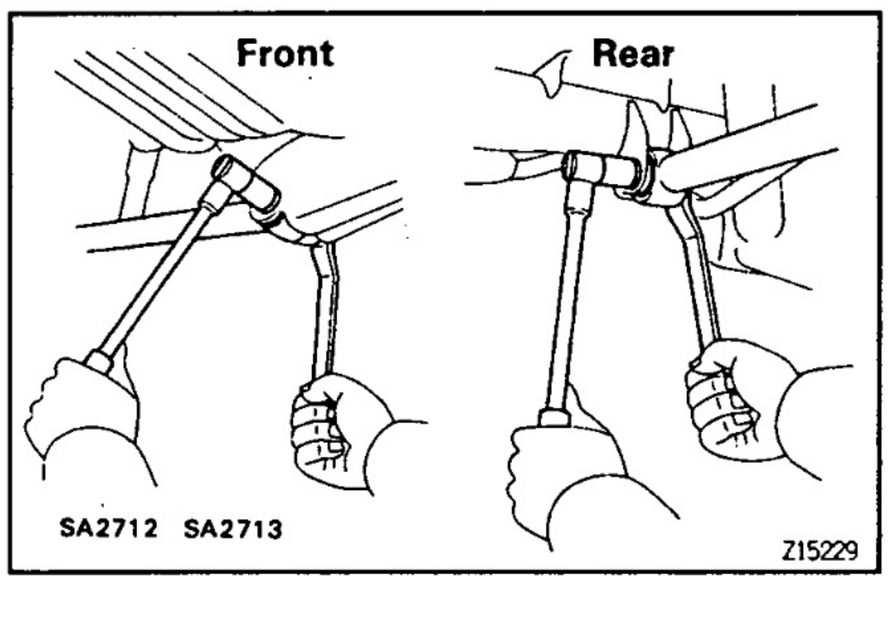
Torque wrench	

UPPER AND LOWER CONTROL ARM

SA250-01

COMPONENTS

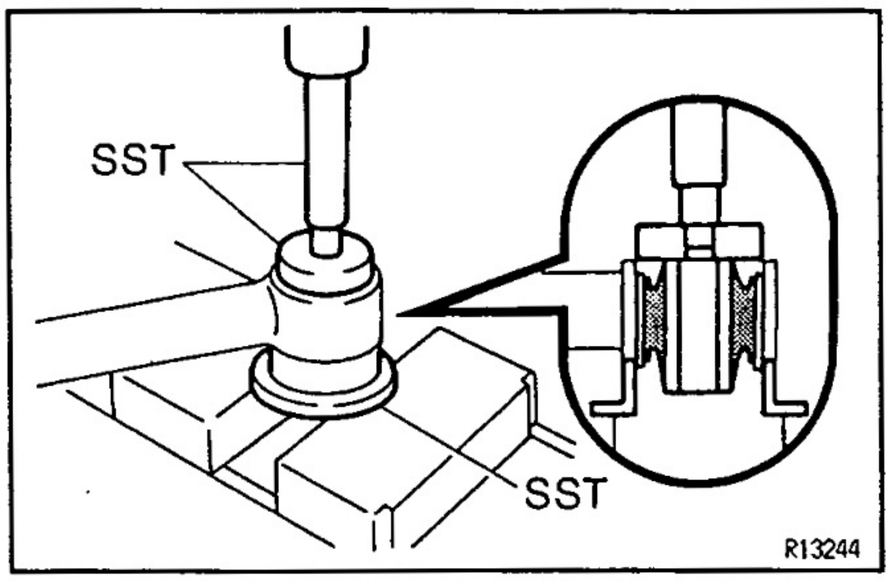


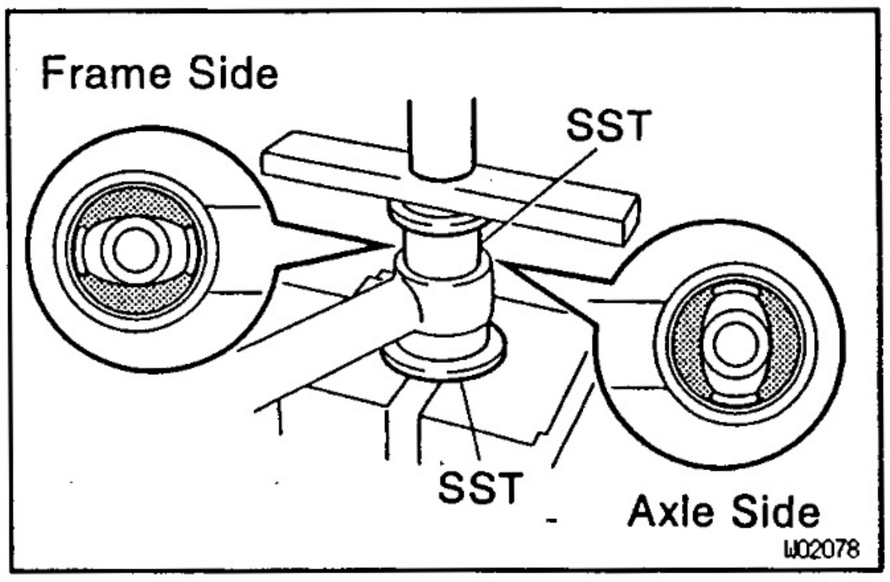


SA251-01

LOWER CONTROL ARM REMOVAL

1. **REMOVE REAR WHEEL**
   Torque:
   Steel wheel: 147 N·m (1,500 kgf·cm, 109 ft·lbf)
   Aluminum wheel: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE LOWER CONTROL ARM**
   Remove the bolts, plate washers, nuts and lower control arm.
   Torque: 177 N·m (1,800 kgf·cm, 130 ft·lbf)
   INSTALLATION HINT: After stabilizing the suspension, torque the bolt.





SA252-01

BUSHING REPLACEMENT

REPLACE LOWER CONTROL ARM BUSHING

(a) Using SST and a press, remove the bushing.
SST 09506–35010, 09950–60010 (09951–00540), 09950–70010 (09951–07100)

(b) Using SST and a press, install a new bushing, as shown.
SST 09316–20011, 09506–35010

SA

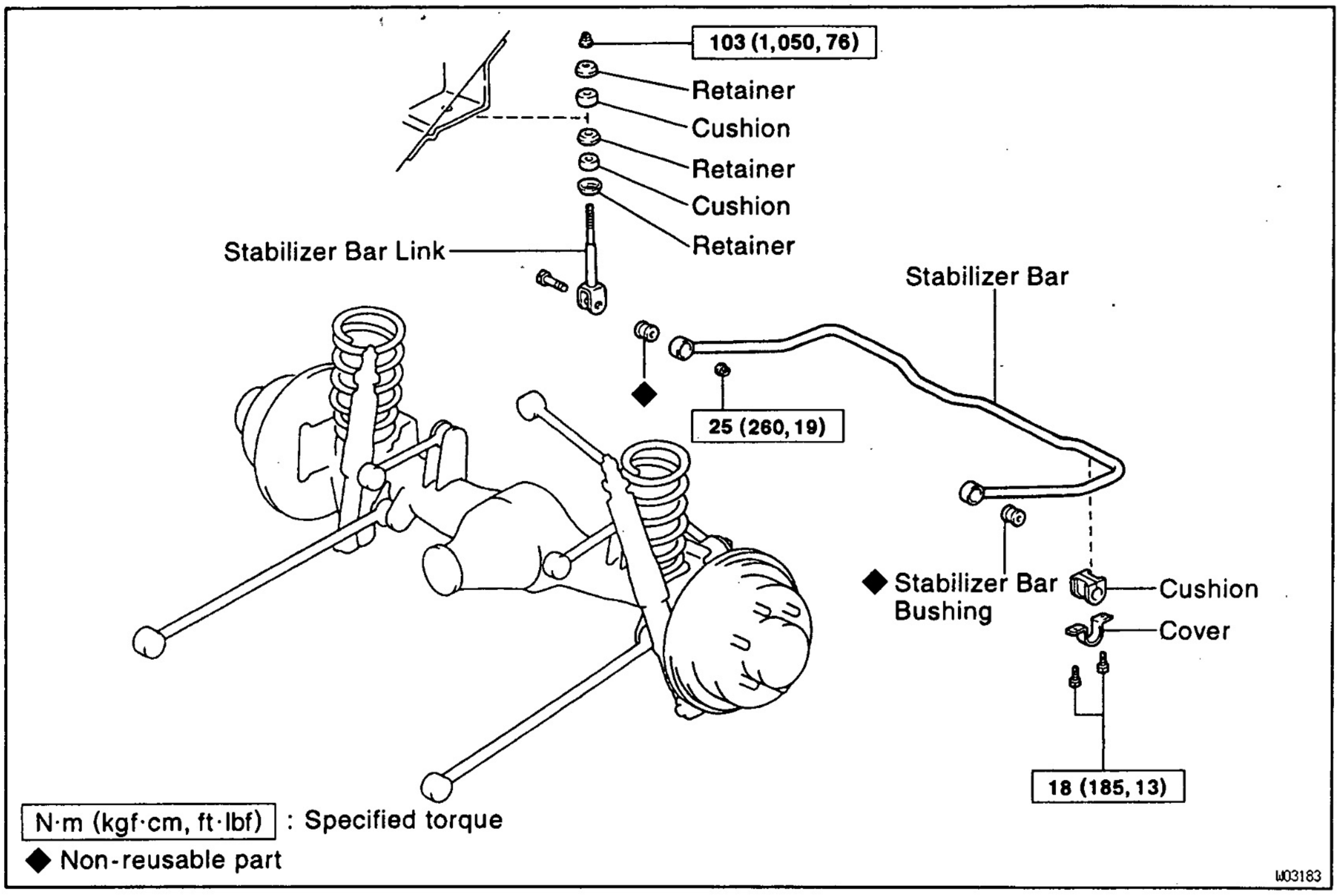
SA276-03

LOWER CONTROL ARM INSTALLATION

Installation is in the reverse order of removal.

STABILIZER BAR
COMPONENTS

SA283-01



SA278-02

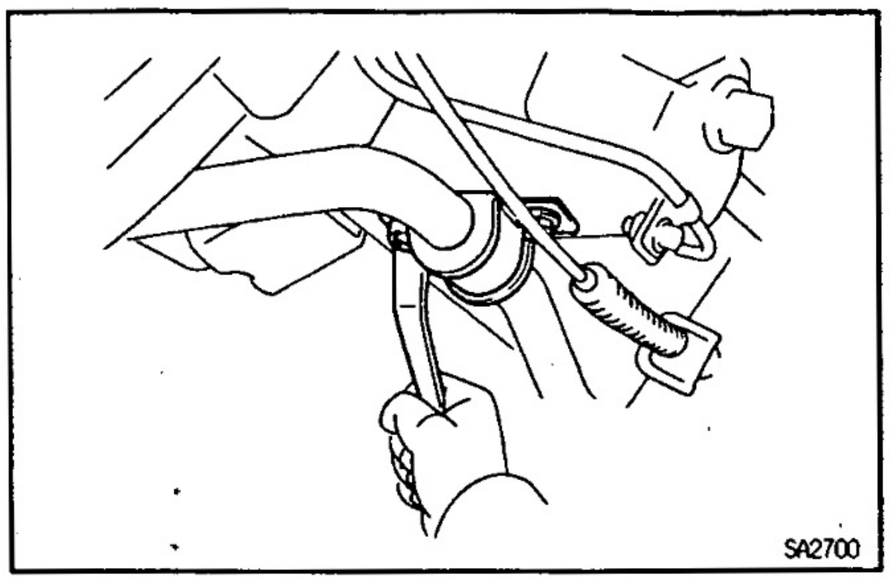
STABILIZER BAR REMOVAL

REMOVE STABILIZER BAR

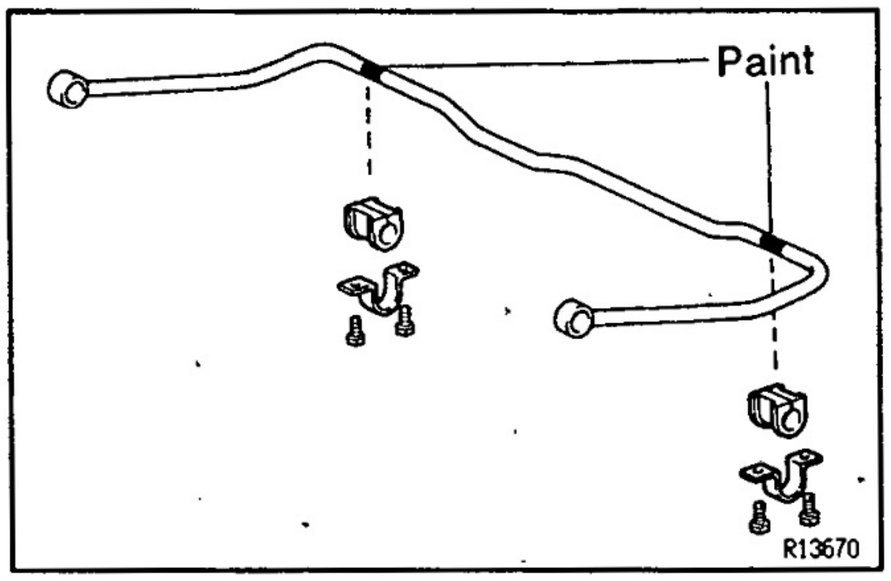
(a) Loosen the 2 bolts and nuts.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
INSTALLATION HINT: After stabilizing the suspension, torque the nut.

(b) Remove the 2 nuts and disconnect the stabilizer bar with the links from the bracket.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
INSTALLATION HINT: After stabilizing the suspension, torque the nut.

(c) Remove the bolts, nuts and links from the stabilizer bar.



(d) Remove the 2 bolts and stabilizer bar from the axle housing with the cover.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
INSTALLATION HINT: After stabilizing the suspension, torque the bolt.



(e) Remove the 2 brackets and cushions from the stabilizer bar.
INSTALLATION HINT: Install the cushions and brackets touching the line painted on the stabilizer bar.

SA

SA279-01

STABILIZER BAR INSTALLATION

Installation is in the reverse order of removal.

SERVICE SPECIFICATIONS

TORQUE SPECIFICATIONS

SA2TE—01

FRONT

Part tightened		N·m	kgf·cm	ft·lbf
Hub nut	Steel wheel	147	1,500	109
	Aluminum wheel	103	1,050	76
Leading arm x Frame		177	1,800	130
Leading arm x Axle housing		171	1,750	127

REAR

Part tightened		N·m	kgf·cm	ft·lbf
Hub nut	Steel wheel	147	1,500	109
	Aluminum wheel	103	1,050	76
Lower control arm x Frame		177	1,800	130
Lower control arm x Axle housing		177	1,800	130
Stabilizer bar x Link		25	260	19
Stabilizer bar Link x Link bracket		103	1,050	76
Bracket x Axle housing		18	185	13

BRAKE

REFER TO FOLLOWING REPAIR MANUALS:

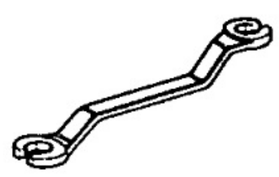
Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual Supplement (Aug., 1992)	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

NOTE: The above pages contain only the points which differ from the above listed manuals.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

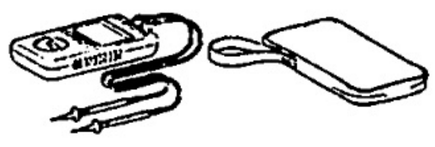
BR016–1H

	09709–29017	LSPV Gauge Set	
	09717–20010	Brake Shoe Return Spring Remover	
	09718–20010	Brake Shoe Return Spring Replacer	
	09751–36011	Brake Line Union Nut 10 x 12 mm Wrench	

BR

BR0FN–06

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	

BR017–1C

EQUIPMENT

Torque wrench	
Vernier calipers	Brake disc

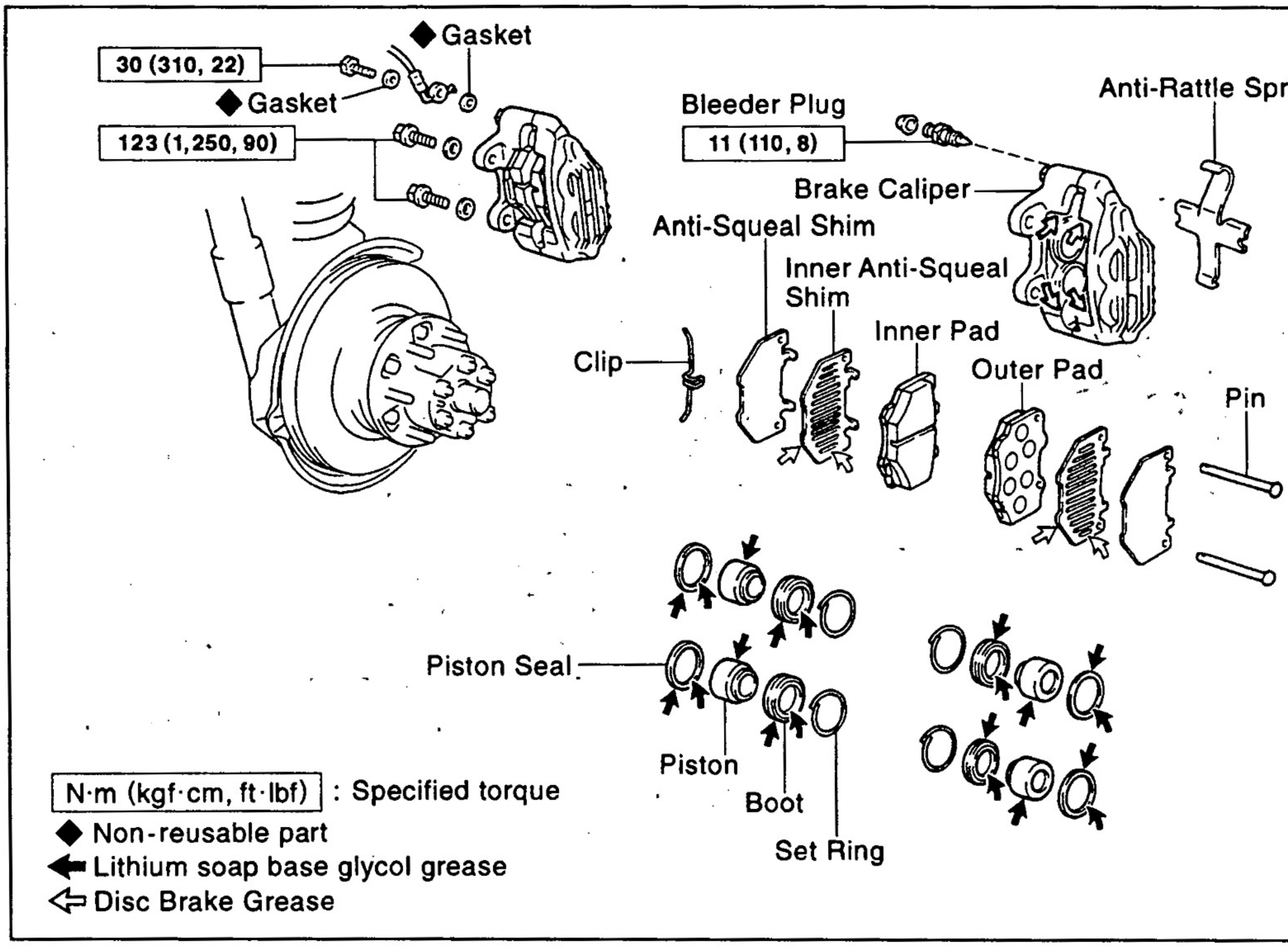
BR018–0D

LUBRICANT

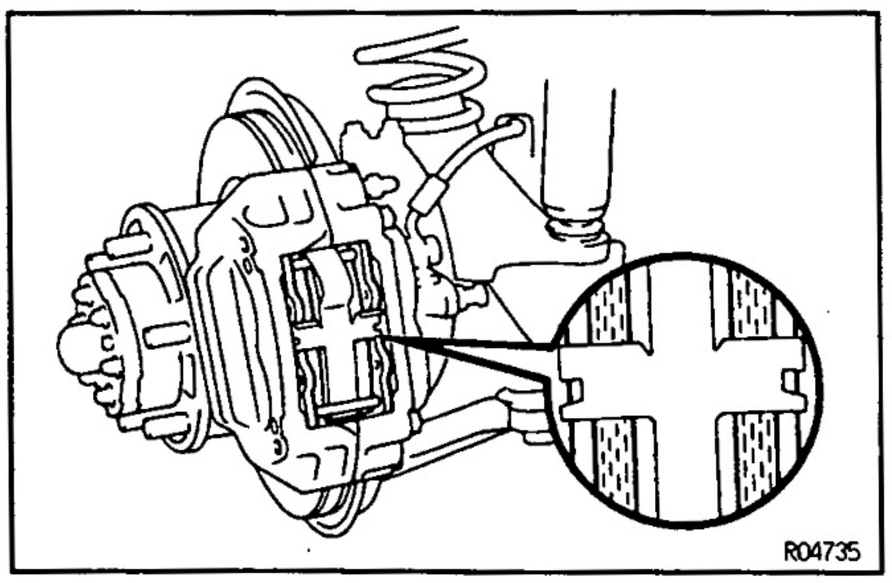
Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No.116 DOT 3

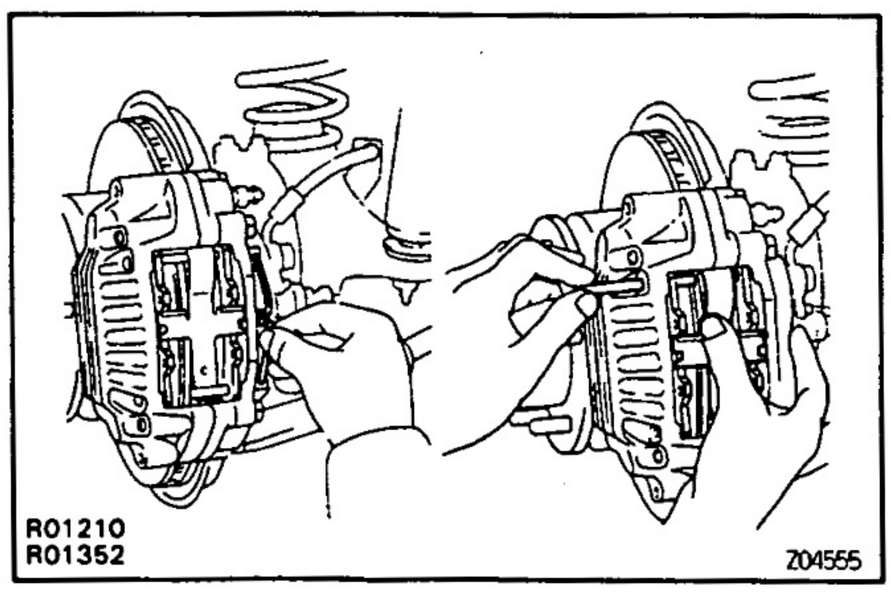
FRONT BRAKE
COMPONENTS

BR01P-07



W02175





BR112-03

BRAKE PADS REPLACEMENT

1. **REMOVE FRONT WHEEL**
2. **INSPECT PAD LINING THICKNESS**
   Check the pad thickness through the caliper inspection hole and replace the pads if it is not within the specification.
   Minimum thickness:
   1.0 mm (0.039 in.)
3. **REMOVE THESE PARTS:**

(a) Clip
(b) 2 pins
(c) Anti−rattle spring
(d) 2 pads
(e) 4 anti−squeal shims

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

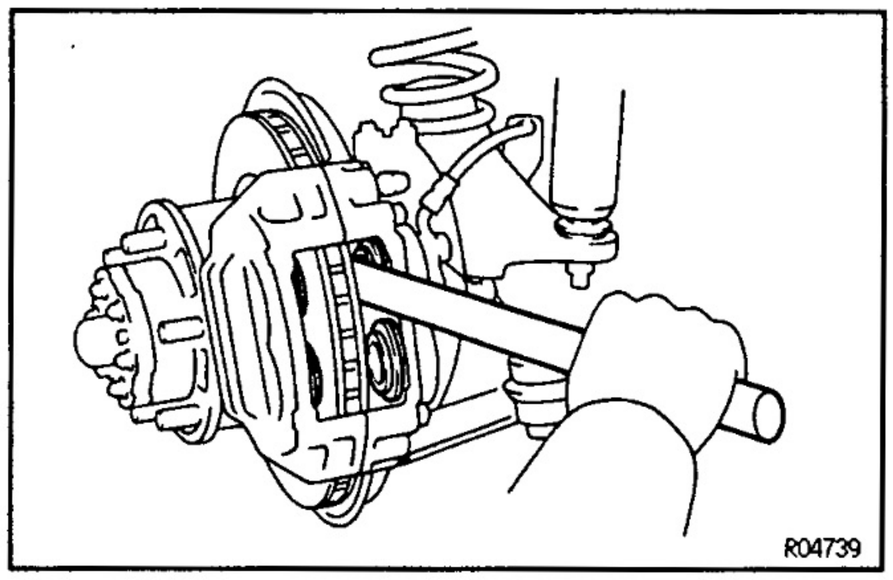
BR

4. CHECK DISC THICKNESS AND DISC RUNOUT
(See Pub.No.RM184E on page BR–38)

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 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 2 anti–squeal shims to each pad.
HINT: Apply disc brake grease to both sides of the inner anti–squeal shims (See page BR–3).

(d) Install the 2 pads.
HINT: Apply disc brake grease to the caliper indicated by the arrows (See page BR–3).
NOTICE: There should be no oil or grease adhering to the friction surfaces of the pads or the disc.

6. INSTALL ANTI–RATTLE SPRING AND 2 PINS

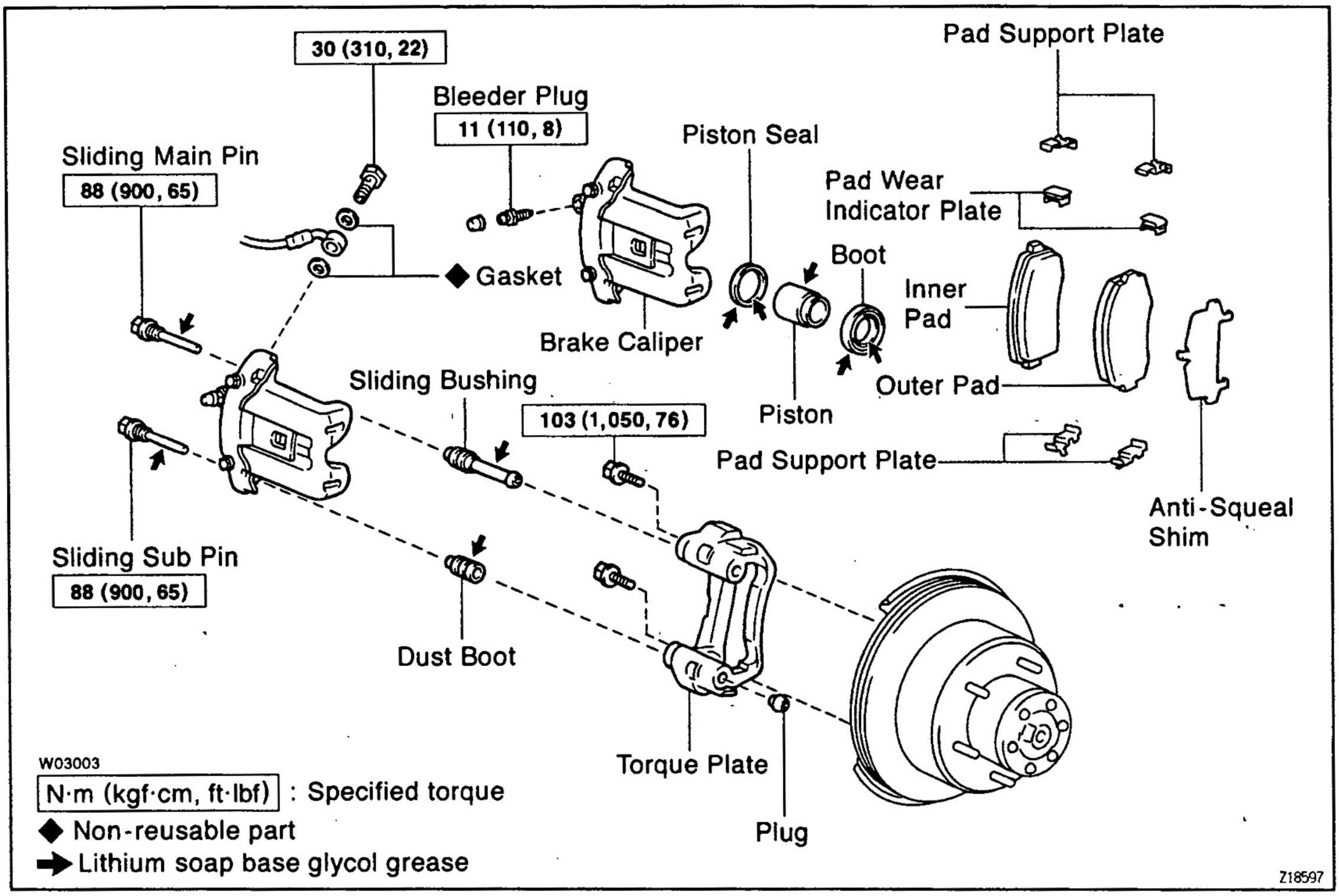
7. INSTALL CLIP

8. INSTALL FRONT WHEEL

9. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE (Disc Brake) COMPONENTS

BR020-01

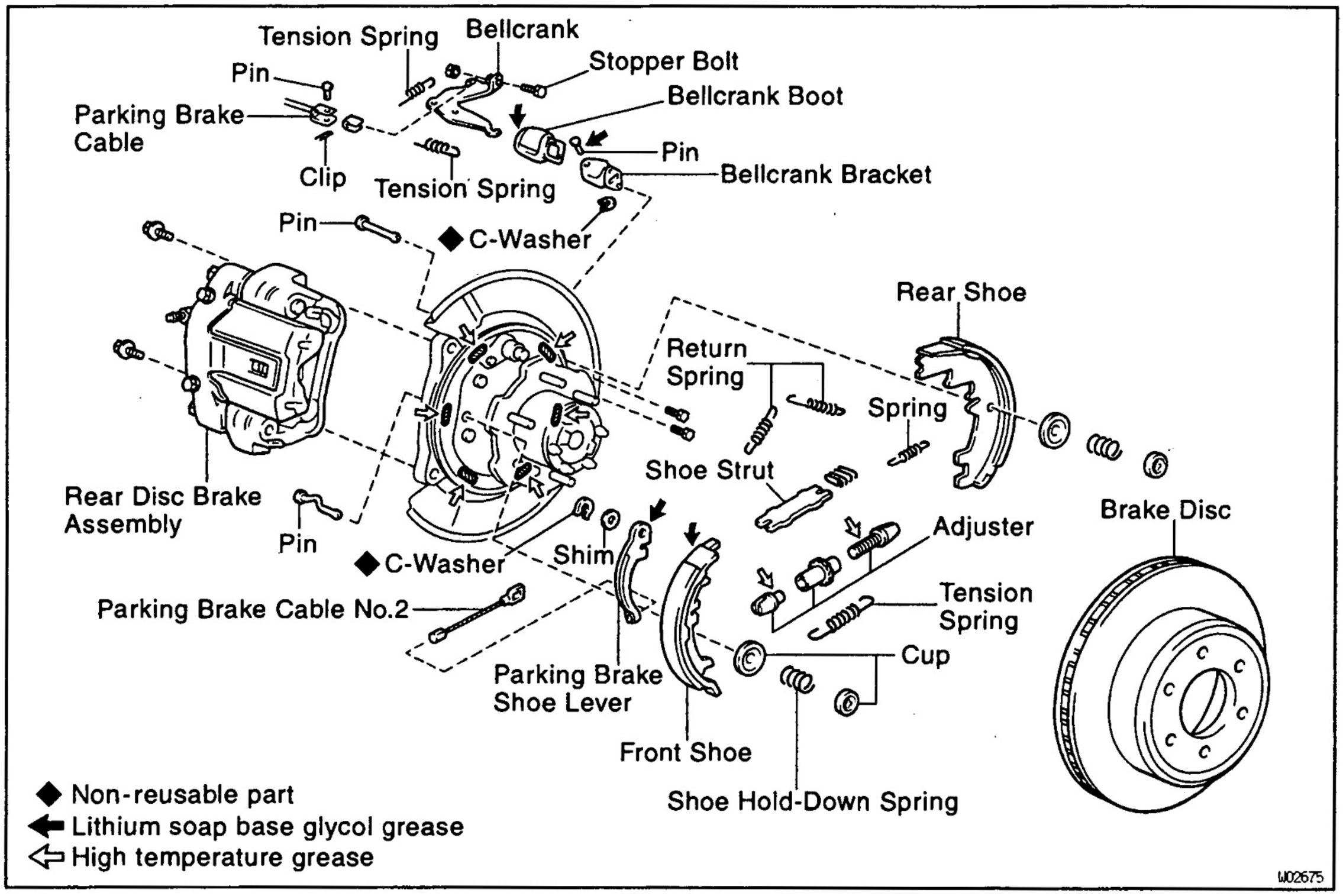


BR

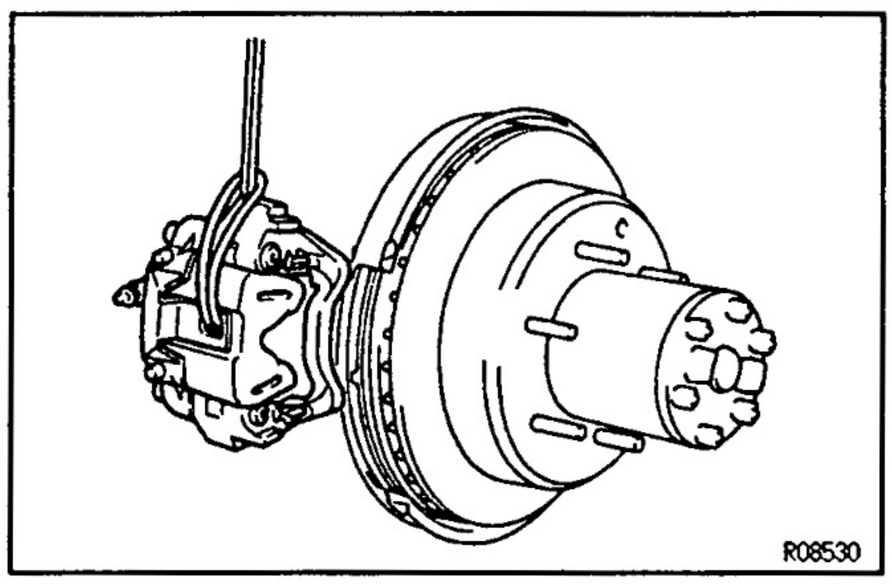
REAR BRAKE (Parking Brake)

COMPONENTS

BR027-04



W02675



R08530

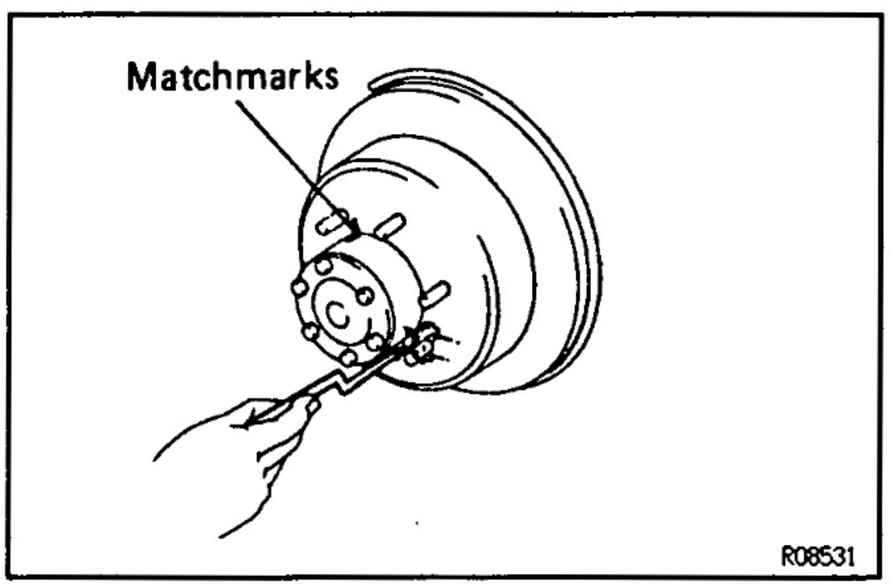
BR116-06

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.

(b) Suspend the disc brake assembly securely. Ensure that the hose is not stretched.

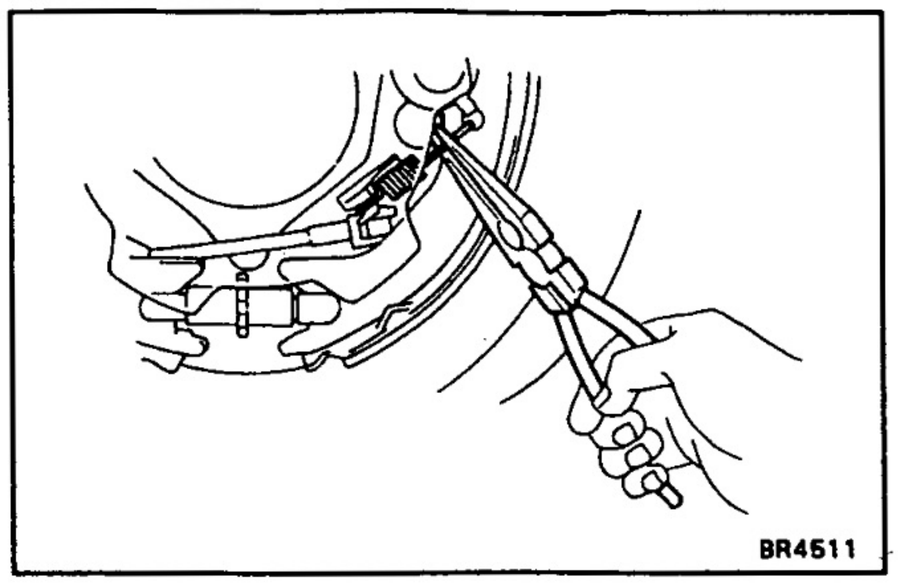


R08531

3. **REMOVE DISC**

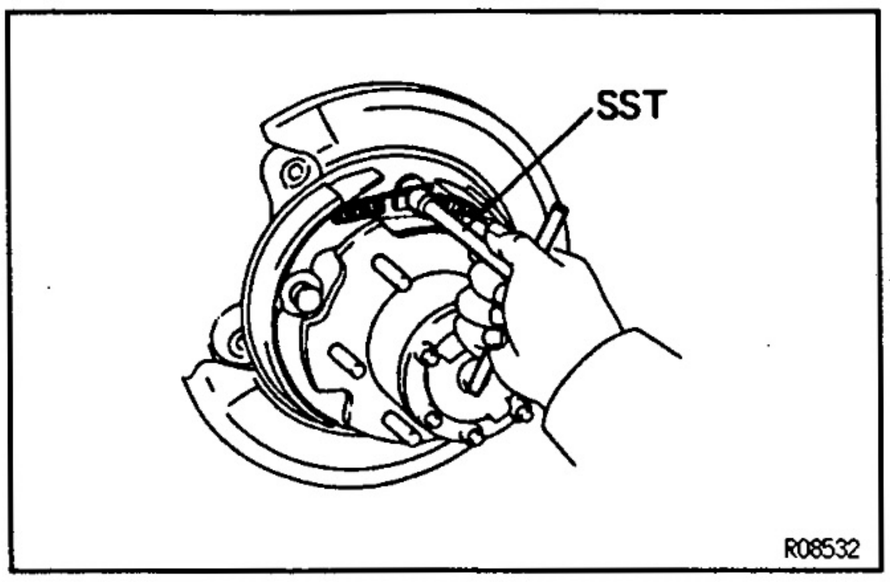
Place the matchmarks on the disc and rear hub, and remove the disc.

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



4. REMOVE TENSION SPRING

Using pliers, remove the tension spring.



5. REMOVE SHOE RETURN SPRINGS

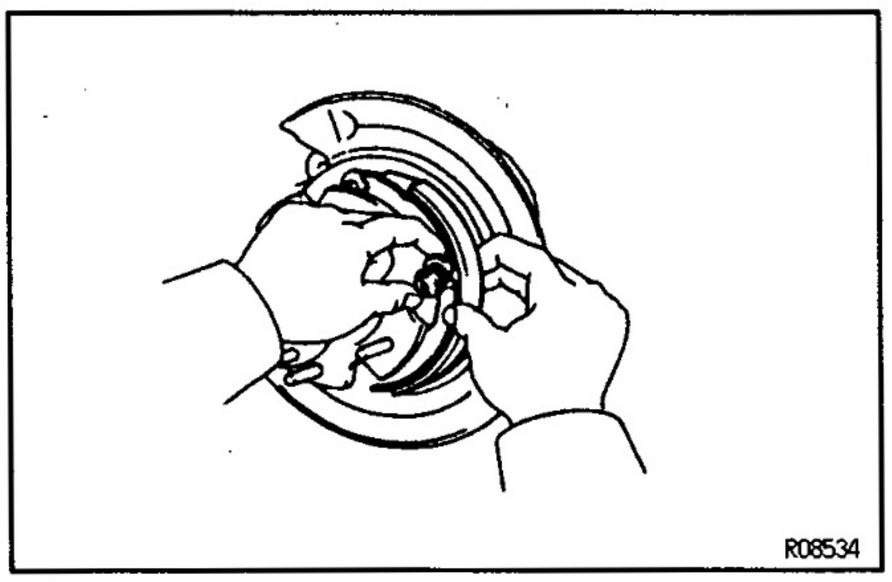
Using SST, remove the shoe return springs.

SST 09717–20010

INSTALLATION HINT: Using 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

(a) Slide out the rear shoe, and remove the rear shoe and adjuster.

(b) Remove the lower side tension spring.

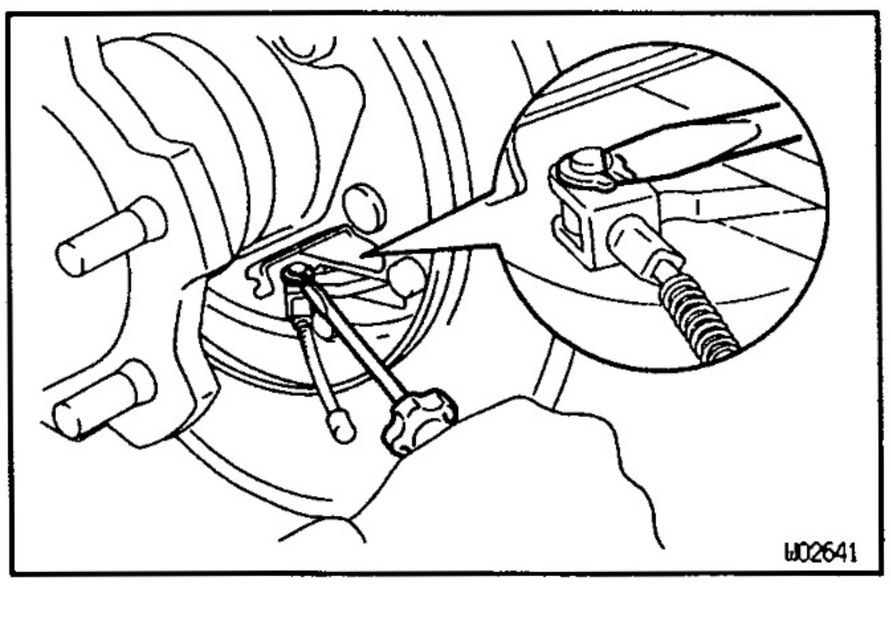
(c) Remove the shoe hold–down spring cups, spring and pin.

8. REMOVE FRONT SHOE

(a) Slide out the front shoe.

(b) Disconnect the parking brake cable from the parking brake shoe lever.

(c) Remove the shoe hold–down spring cups, springs and pin.

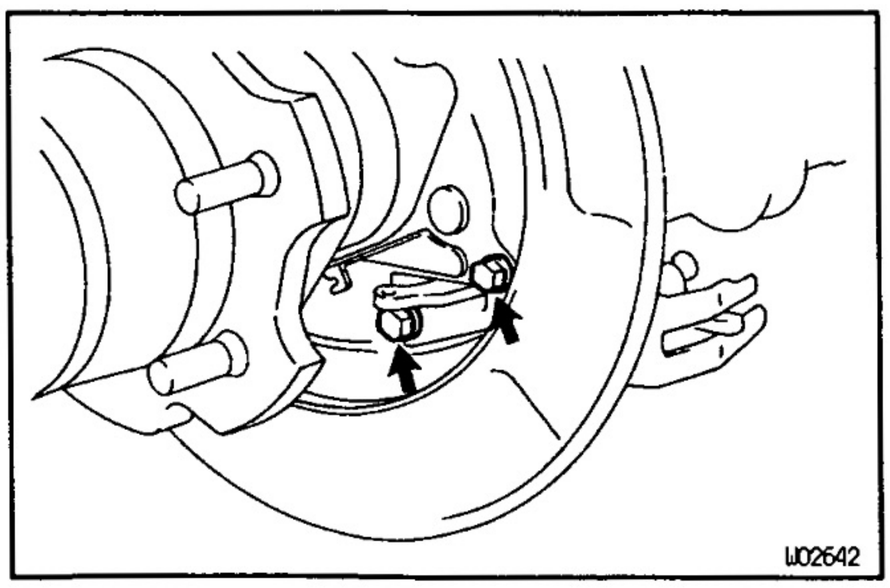


9. IF NECESSARY, REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK ASSEMBLY

(a) Using a screwdriver, remove the C–washer.

(b) Remove the pin and disconnect the parking brake cable No.2 from the bellcrank.

(c) Remove the clip.



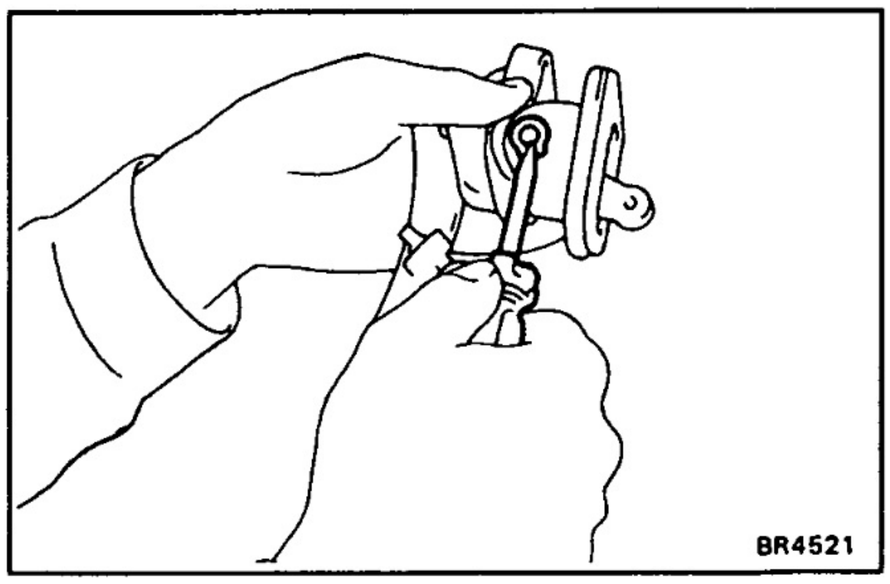
(d) Remove the pin and clip, then disconnect the parking brake cable.

(e) Remove the 2 tension springs.

(f) Remove the 2 bolts and parking brake bellcrank assembly.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(g) 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.

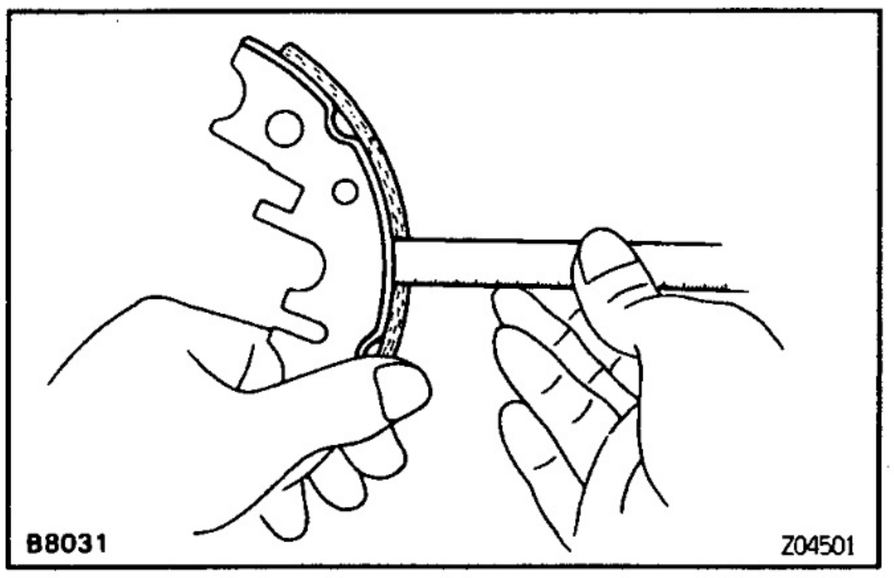
BR029–08

PARKING BRAKE COMPONENTS INSPECTION AND REPAIR

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.

BR



2. MEASURE BRAKE SHOE LINING THICKNESS

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

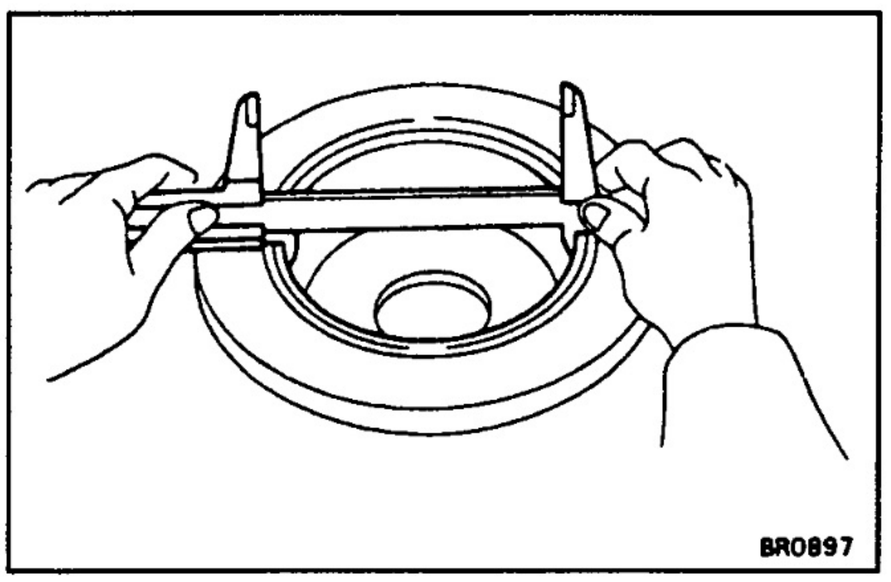
Standard thickness:

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.

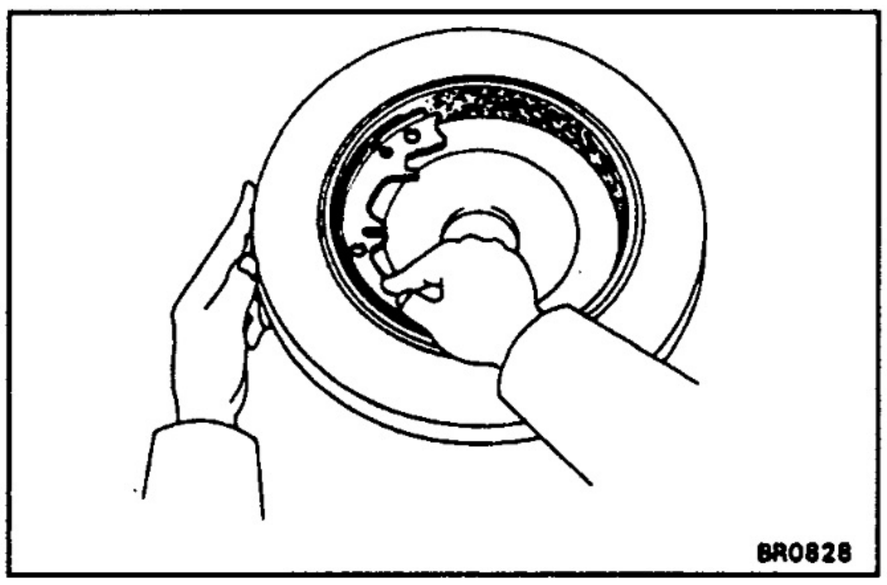
Standard inside diameter:

230 mm (9.06 in.)

Maximum inside diameter:

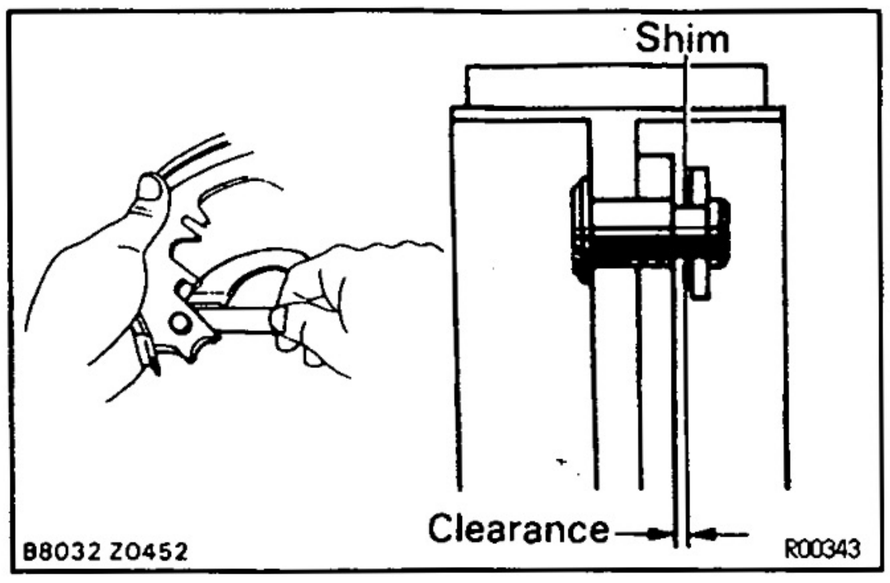
231 mm (9.09 in.)

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 the 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

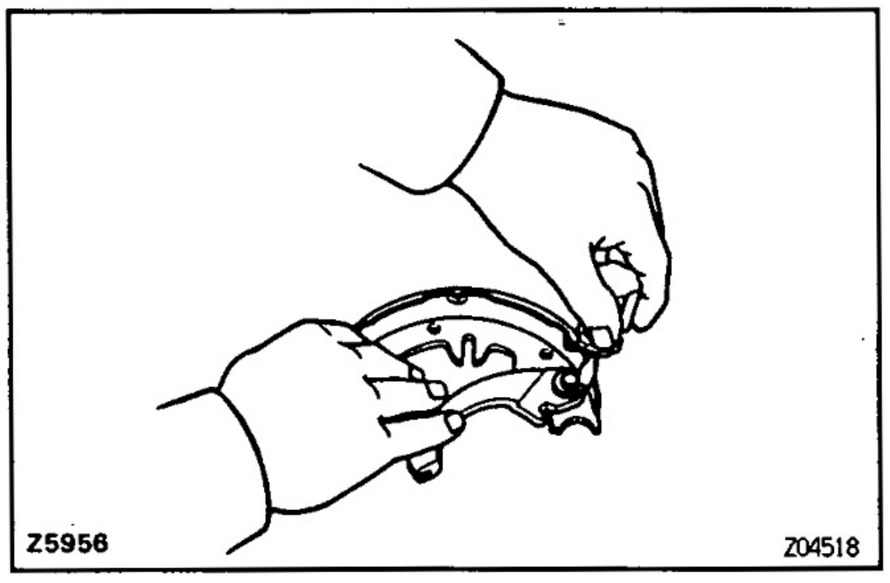
Using a feeler gauge, measure the clearance.

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.

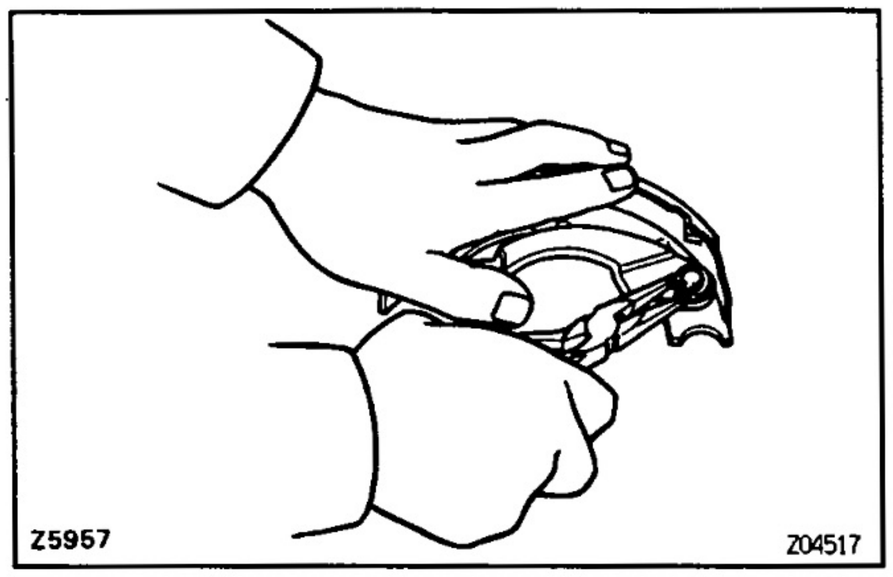
Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.9 mm (0.035 in.)
0.6 mm (0.024 in.)	



6. IF NECESSARY, REPLACE SHIM

(a) Using a screwdriver, remove the C–washer.

(b) Remove the parking brake shoe lever, and install the correct size shim.



(c) Install the parking brake shoe lever with a new C–washer.

(d) Remeasure the clearance.

PARKING BRAKE ASSEMBLY

BR1K0–01

Assembly is in the reverse order of disassembly.

NOTICE: Apply high temperature grease and lithium soap base glycol grease to the parts indicated by the arrows (See page BR–6).

1. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Disconnect the PKB cable from bellcrank and remove the 2 tension springs.

(b) Loosen the stopper bolt.

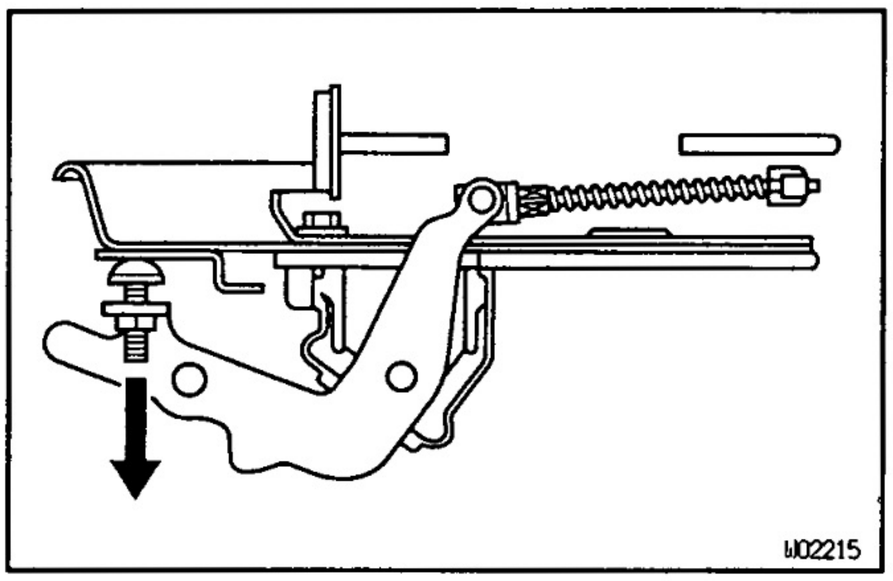
(c) Temporarily install the hub nuts.

(d) Remove the hole plug.

(e) Turn the adjuster and expand the shoes until the disc locks.

(f) Return the adjuster 8 notches.

(g) Install the hole plug.



2. 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.

(e) Connect the PKB cable to the bellcrank.

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.

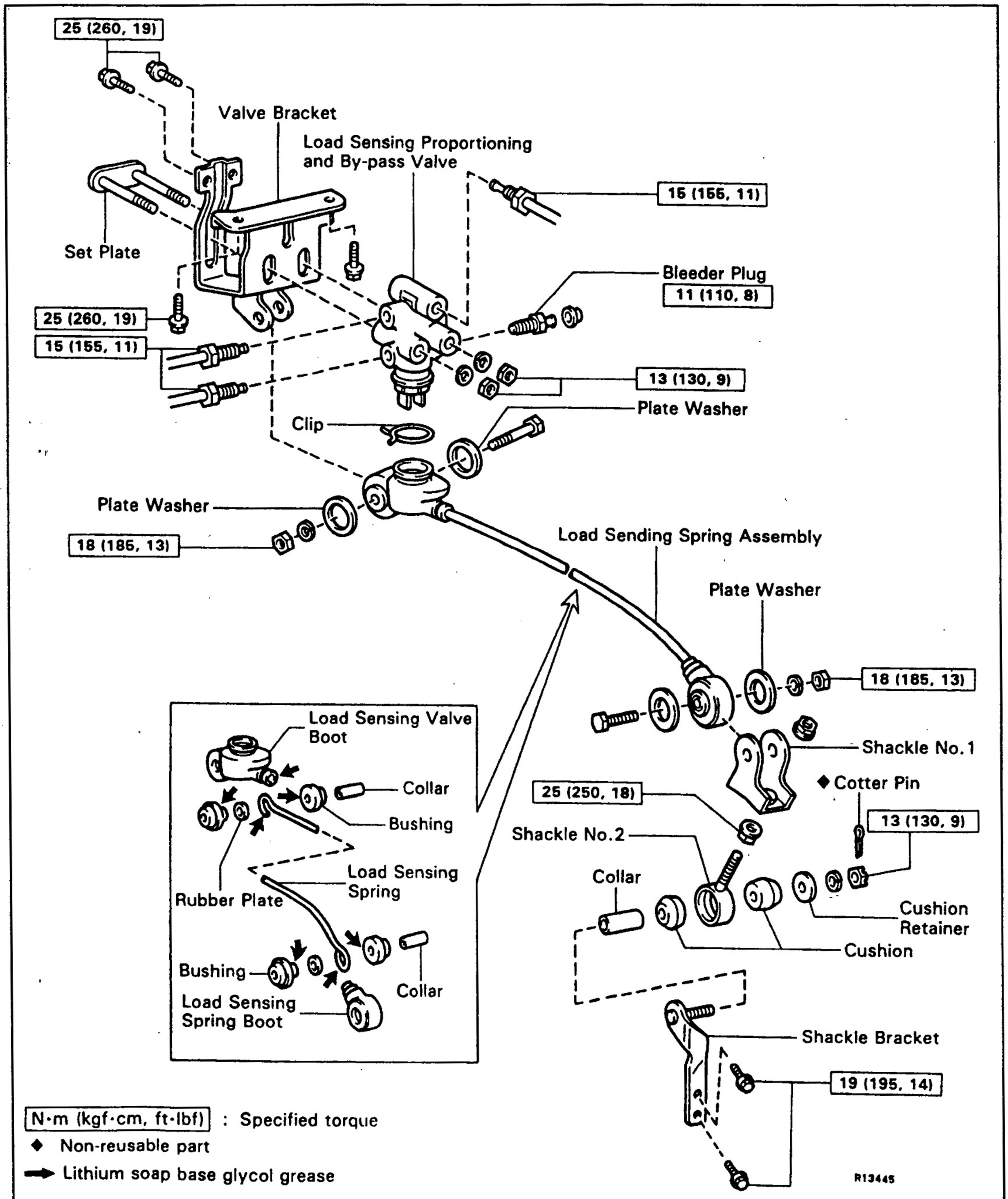
(d) Repeat this procedure 2 or 3 times.

4. RECHECK AND ADJUST PARKING BRAKE LEVER TRAVEL

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

COMPONENTS

BR0S3–06



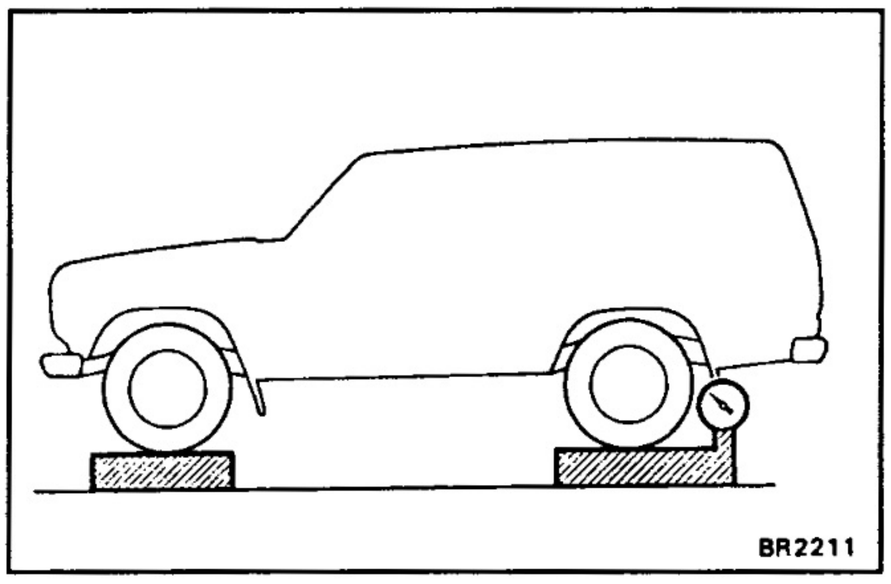
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

➡ Lithium soap base glycol grease

Z17910

BR0G6–06

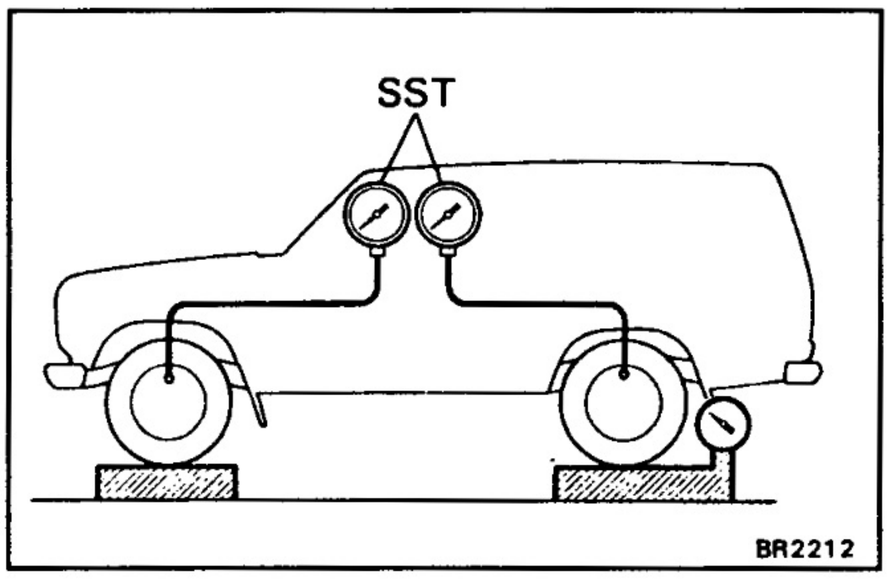


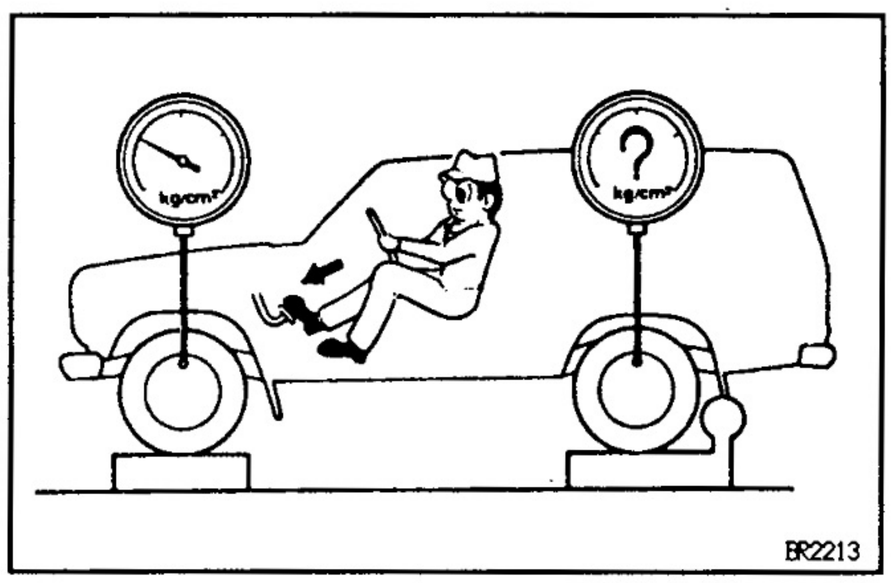
FLUID PRESSURE CHECK AND ADJUSTMENT

1. SET REAR AXLE LOAD

Rear axle load (include vehicle weight):

1,330 kg (2,932 lb)





2. INSTALL LSPV GAUGE (SST) AND BLEED AIR

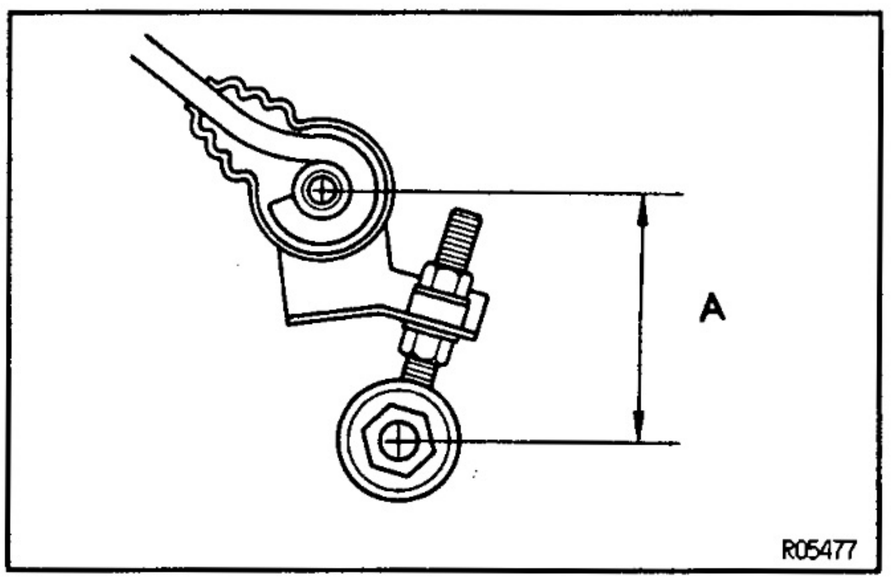
SST 09709–29017

3. RAISE FRONT BRAKE PRESSURE TO 7,845 kPa (80 kgf/cm², 1,138 psi) AND CHECK REAR BRAKE PRESSURE

Rear brake pressure:

5,984±589 kPa (61±6 kgf/cm², 869±86 psi)

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) Disconnect the No.2 shackle from the shackle bracket.

(b) Adjust the length of the No.2 shackle turning it.

Low pressure – Lengthen **A**.

High pressure – Shorten A

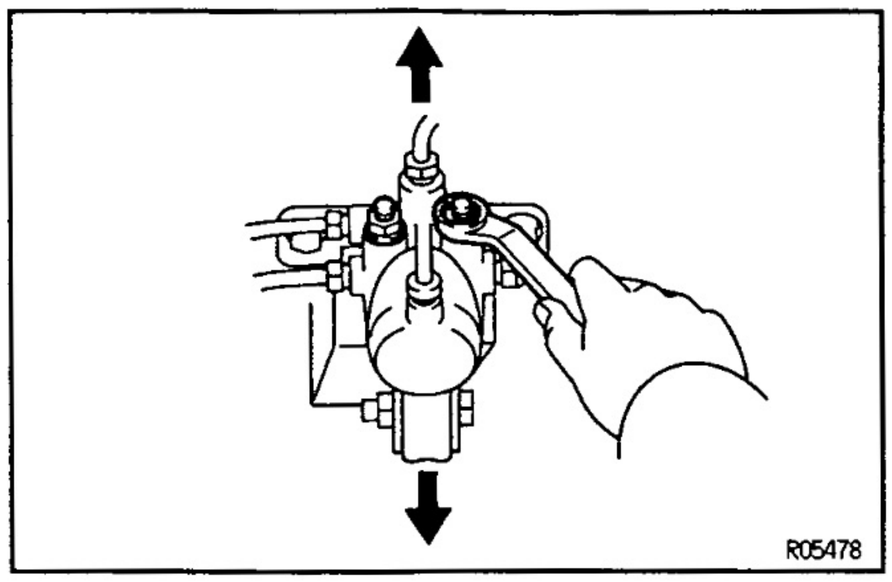
Initial set:

90 mm (3.54 in.)

Adjusting range:

84–96 mm (3.31–3.78 in.)

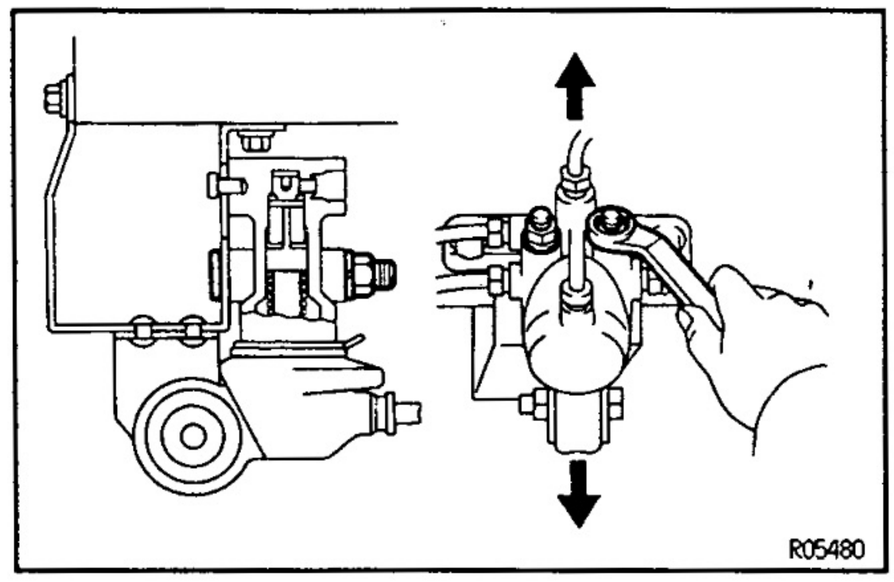
HINT: One turn of the No.2 shackle changes the fluid pressure by about 98.1 kPa (1.0 kgf/cm², 14.2 psi).



(c) In event the pressure cannot be adjusted by No.2 shackle, raise or lower the valve body.
Low pressure – Lower
High pressure – Raise

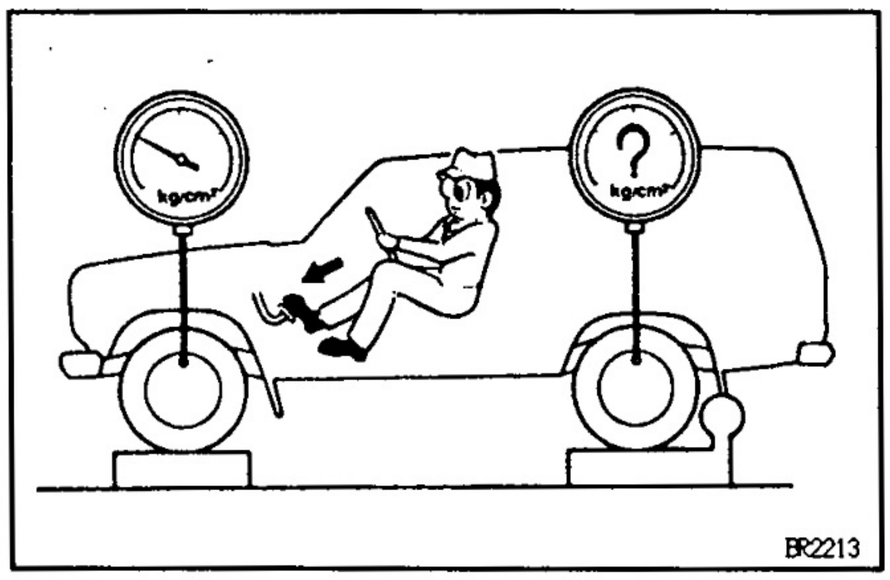
(d) Torque the nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(e) Adjust the length of the No.2 shackle again.
If it cannot be adjusted, inspect the valve housing.



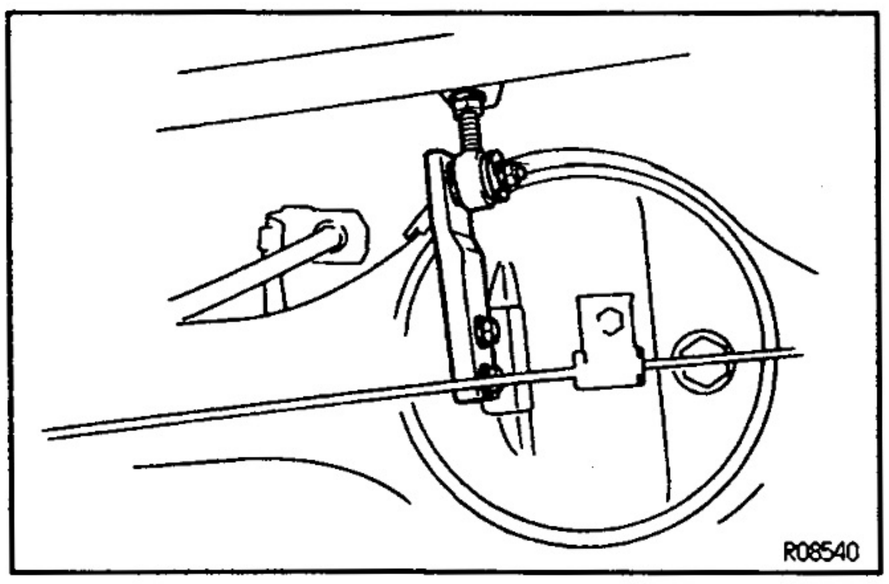
5. IF NECESSARY, CHECK VALVE BODY

(a) Assemble the valve body in the uppermost position.
HINT: When the brakes are applied, the piston will move down about 1 mm (0.039 in.). Even at this time, the piston should not make contact with or move the load sensing spring.



(b) In this position, check the rear brake pressure.

Front brake pressure kPa (kgf/cm², psi)	Rear brake pressure kPa (kgf/cm², psi)
3,434 (35, 498)	3,434 (35, 498)
5,396 (55, 783)	3,630 – 4,218 (37 – 43, 527 – 612)
9,810 (100, 1,424)	4,513 – 5,494 (46 – 56, 655 – 797)



BR0G7–06

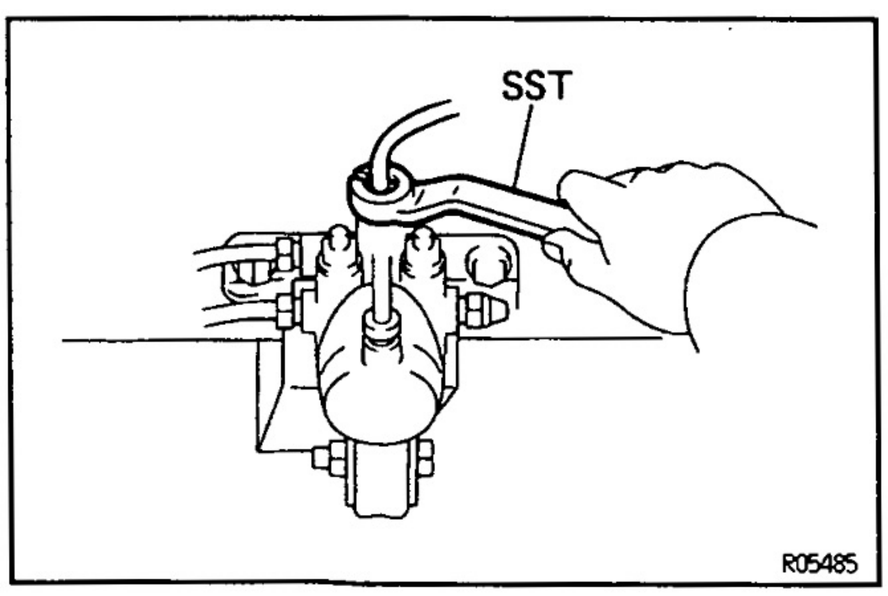
LSP & BV REMOVAL

1. DISCONNECT SHACKLE NO.2 FROM BRACKET

(a) Remove the cotter pin.

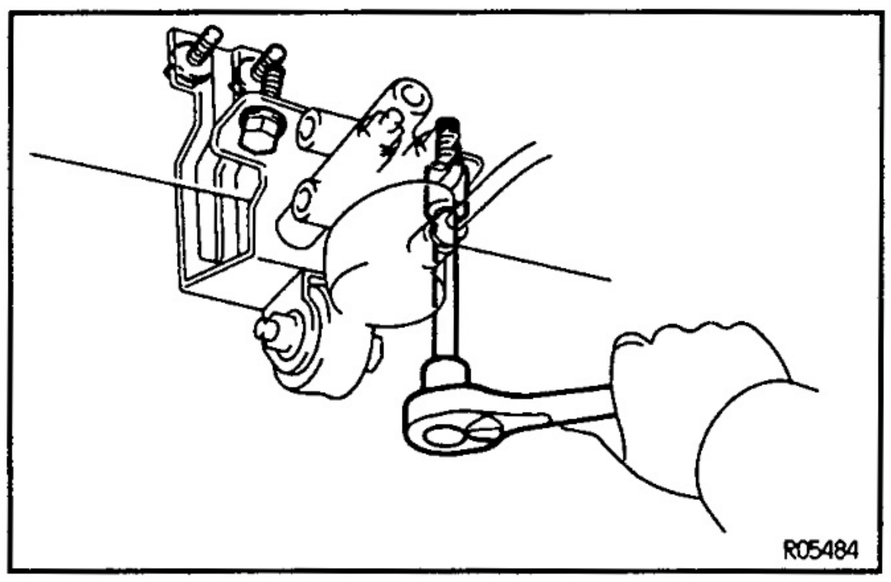
(b) Remove the nut and disconnect the shackle No.2 from the bracket.

(c) Remove the retainer, 2 cushions and collar.

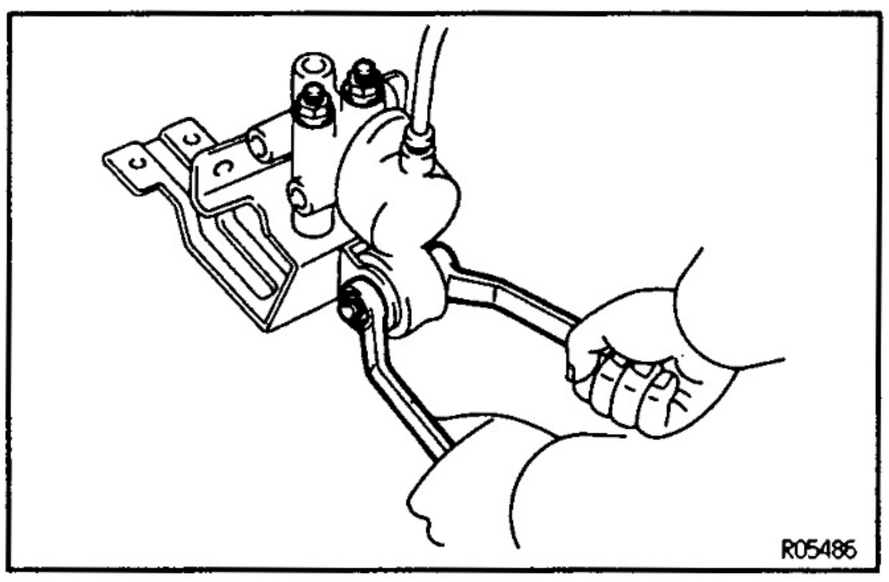


2. REMOVE LSP & BV ASSEMBLY

(a) Using SST, disconnect the brake lines from the valve body.
SST 09751–36011



(b) Remove the valve bracket and 4 mounting bolts, then remove the LSP & BV assembly.



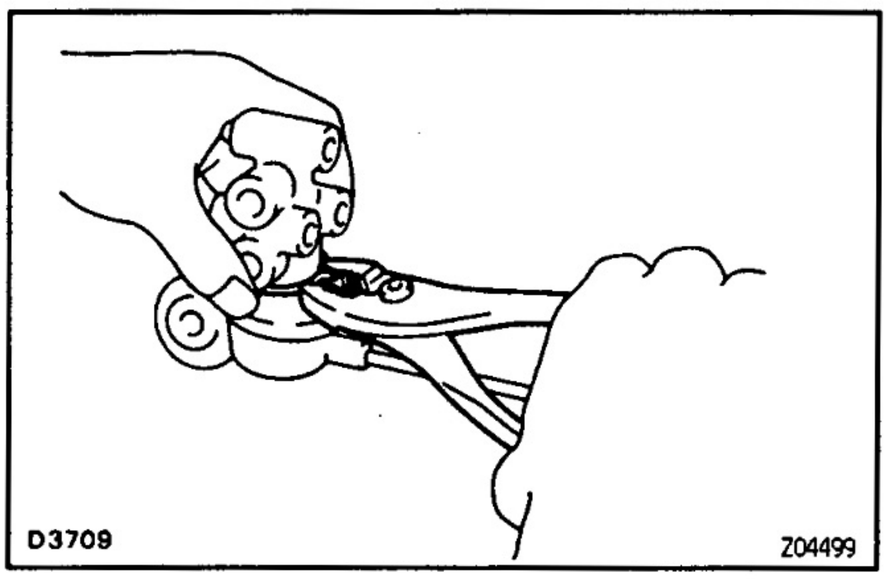
LSP & BV ASSEMBLE DISASSEMBLY

BR0BC–06

1. REMOVE VALVE BRACKET

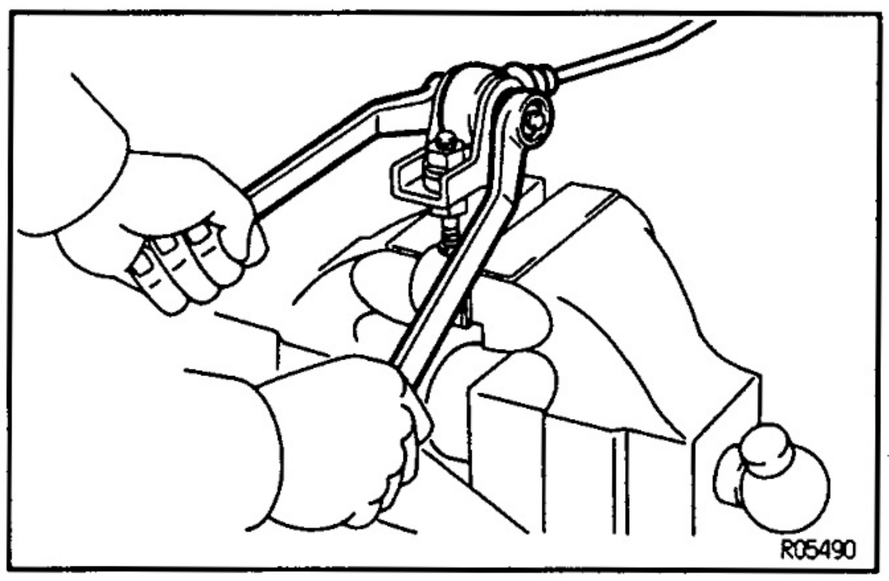
(a) Remove the nut, bolt and 2 plate washers.

(b) Remove the 2 nuts, bracket and set plate from the valve body.



2. DISCONNECT SPRING FROM VALVE

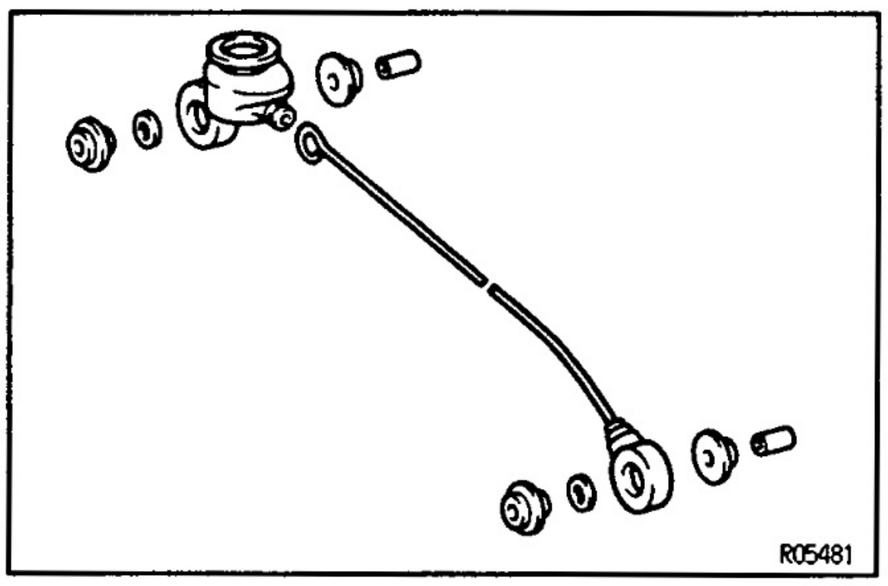
Using pliers, remove the clip, and remove the spring from the valve.



3. REMOVE SHACKLE NO.1 AND NO.2

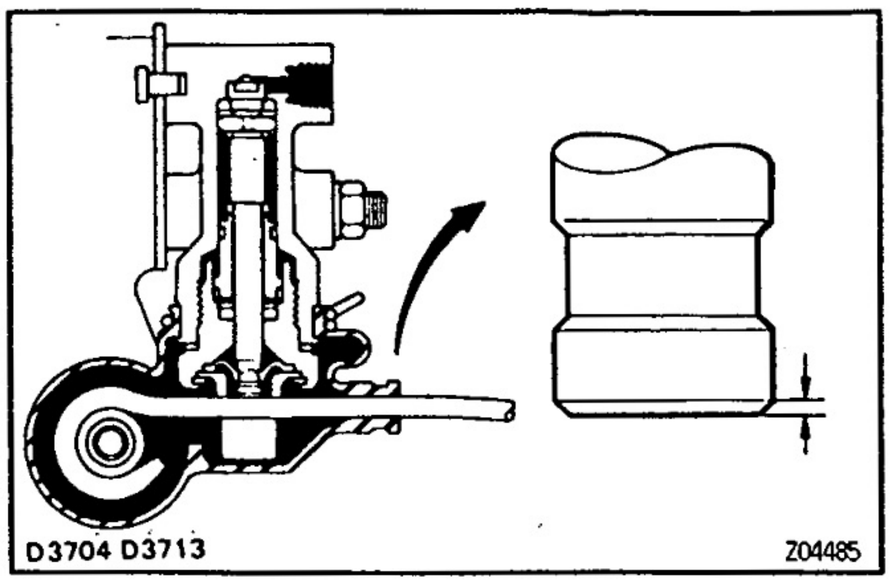
(a) Remove the bolt and nut, then remove the these parts:
- Load sensing spring
- 2 plate washers

(b) Loosen the 2 nuts, and remove the shackle No.1 from the shackle No.2.



4. DISASSEMBLE LOAD SENSING SPRING

Disassembly the these parts:
- Bushings
- Collars
- Rubber plates
- Load sensing valve boot
- Load sensing spring boot



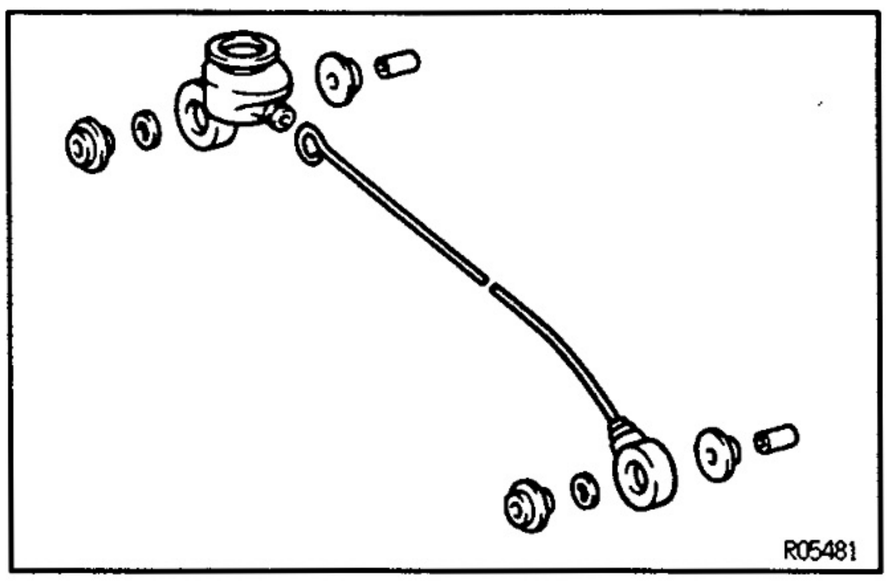
BR0BD–06

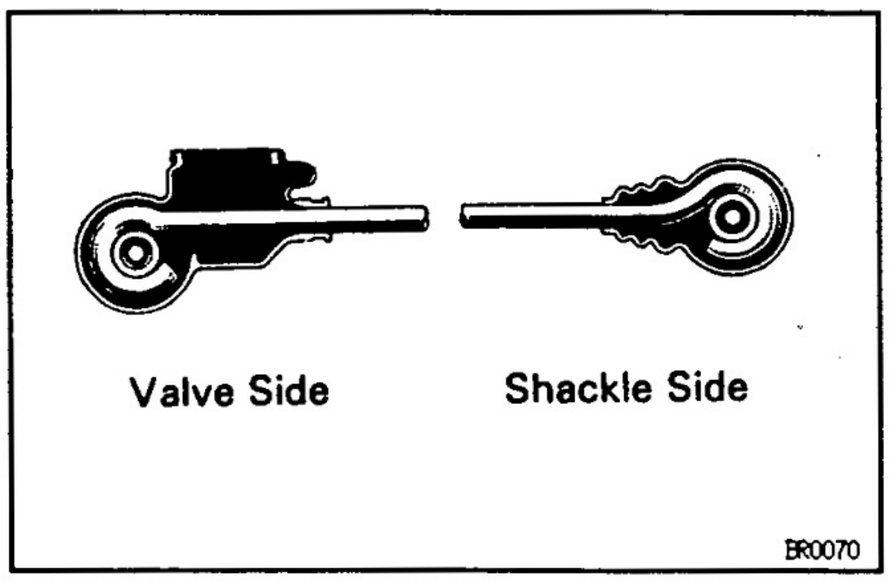
LSP & BV INSPECTION

INSPECT VALVE PISTON PIN AND LOAD SENSING SPRING CONTACT SURFACE FOR WEAR

Wear limit:

0.7 mm (0.028 in.)





BR1AE–03

LSP & BV ASSEMBLY

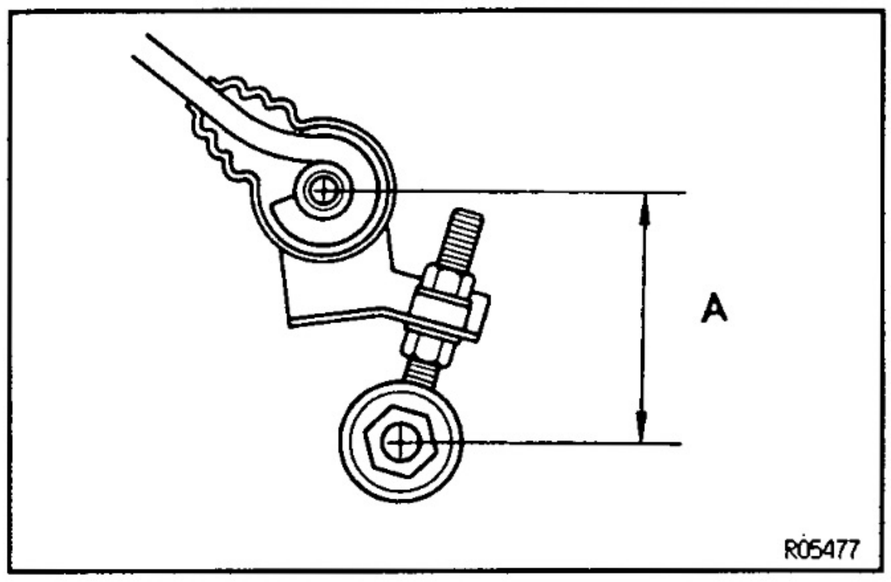
1. **ASSEMBLE THESE PARTS TO LOAD SENSING SPRING:**
   - Load sensing valve boot
   - Load sensing spring boot
   - Bushings
   - 2 rubber plates
   - 2 collars

   HINT: Apply lithium soap base glycol grease to the indicated by the arrows (See page BR–11).
   Do not mistake the valve side for the shackle side of the load sensing spring.
2. **INSTALL SHACKLE NO.1 AND NO.2 TO LOAD SENSING SPRING**
   (a) Install the lock nut and shackle No. 1 to the shackle No. 2.
   (b) Torque the bolt and nut through the 2 plate washers.
   Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
3. **INSTALL LOAD SENSING SPRING TO VALVE BODY**
   Install the load sensing spring assembly to the load sensing valve with the clip.
4. **INSTALL VALVE BRACKET**
   (a) Install the set plate to the valve assembly through the valve bracket and temporarily tighten the 2 valve body mounting nuts.
   (b) Torque the bolt and nut through the 2 plate washers.
   Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

BR1AF–02

LSP & BV INSTALLATION

1. **INSTALL LSP & BV ASSEMBLY**
   Install the LSP & BV assembly to the frame with the 4 bolts.
   Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)



2. CONNECT SHACKLE NO.2 TO BRACKET

(a) Set the dimension A by turning shackle No.2.
Initial set:
90 mm (3.54 in.)

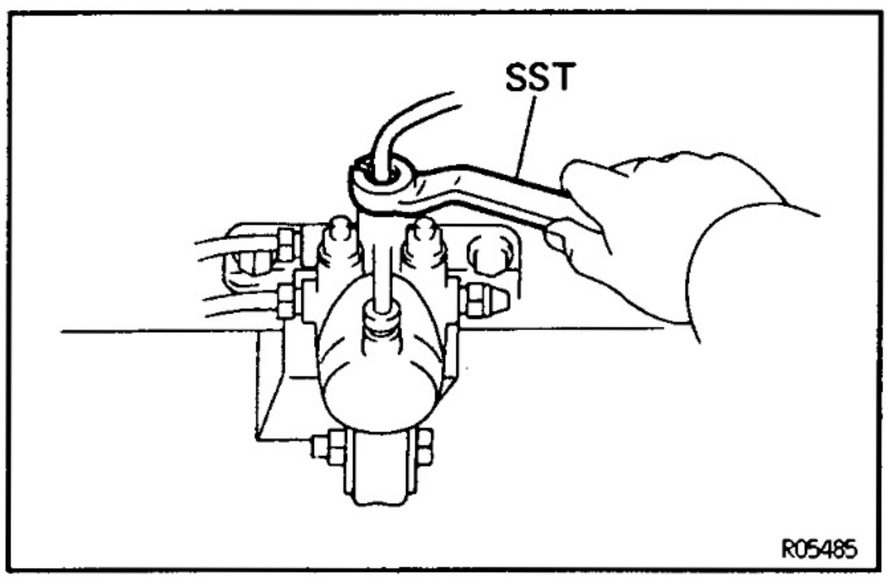
(b) Tighten the lock nut.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(c) Install the 2 bushings and collar to the load sensing spring shackle.

(d) Install the load sensing spring shackle to the shackle bracket with a retainer and nut.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(e) Install a new cotter pin.

BR



3. CONNECT BRAKE LINES
Using SST, connect the brake lines.
SST 09751–36011
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

4. SET REAR AXLE LOAD
(See page BR–12)

5. SET VALVE BODY

(a) When pulling down the load sensing spring, confirm that the valve piston moves down smoothly.

(b) Position the valve body so that the valve piston lightly contacts the load sensing spring.

(c) Tighten the valve body mounting nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

6. BLEED BRAKE SYSTEM
(See Pub.No.RM184E on page BR–7)

7. CHECK FLUID LEAKAGE

8. CHECK AND ADJUST LSP & BV FLUID PRESSURE
(See page BR–12)

SERVICE SPECIFICATIONS

SERVICE DATA

BR03A–2R

Front brake pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc inside diameter	STD	230 mm (9.06 in.)
Rear brake disc inside diameter	Maximum	231 mm (9.09 in.)
Parking brake lining thickness	STD	4.0 mm (0.157 in.)
Parking brake lining thickness	Minimum	1.0 mm (0.039 in.)
Parking brake lever travel at 196 N (20 kgf, 44.1 lbf)		7 – 9 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

BR03B–2R

Part tightened	N·m	kgf·cm	ft·lbf
Bleeder plug	11	110	8
Parking brake bellcrank x Backing plate	13	130	9
LSP & BV Bracket x Frame	25	260	19
LSP & BV x LSP & BV Bracket	13	130	9
LSP & BV Spring x LSP & BV Bracket	18	185	13
LSP & BV Spring x Shackle No. 1	18	185	13
LSP & BV Shackle lock nut	25	250	18
LSP & BV Shackle x Shackle bracket	13	130	9
LSP & BV Shackle bracket x Rear axle housing	19	195	14

STEERING

REFER TO FOLLOWING REPAIR MANUALS:

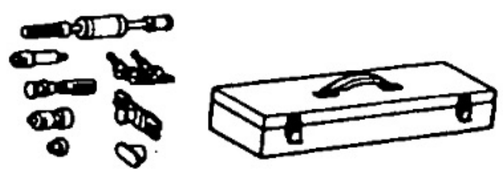
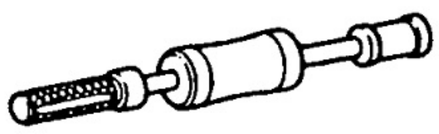
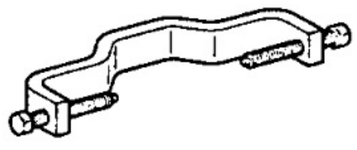
Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

NOTE: The above pages contain only the points which differ from the above listed manuals.

PREPARATION

SST (SPECIAL SERVICE TOOLS)

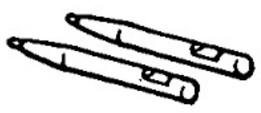
SR127-08

	09910-00015 Puller Set	
	(09911-00011) Puller Clamp	Tilt steering column
	(09912-00010) Puller Slide Hammer	Tilt steering column
	09950-40010 Puller B Set	
	(09957-04010) Attachment	Tilt steering column
	(09958-04010) Holder	Tilt steering column

SR

SR128-09

RECOMMENDED TOOLS

	09904-00010 Expander Set .	
	(09904-00050) No. 4 Claw	
	09905-00012 Snap Ring No.1 Expander .	

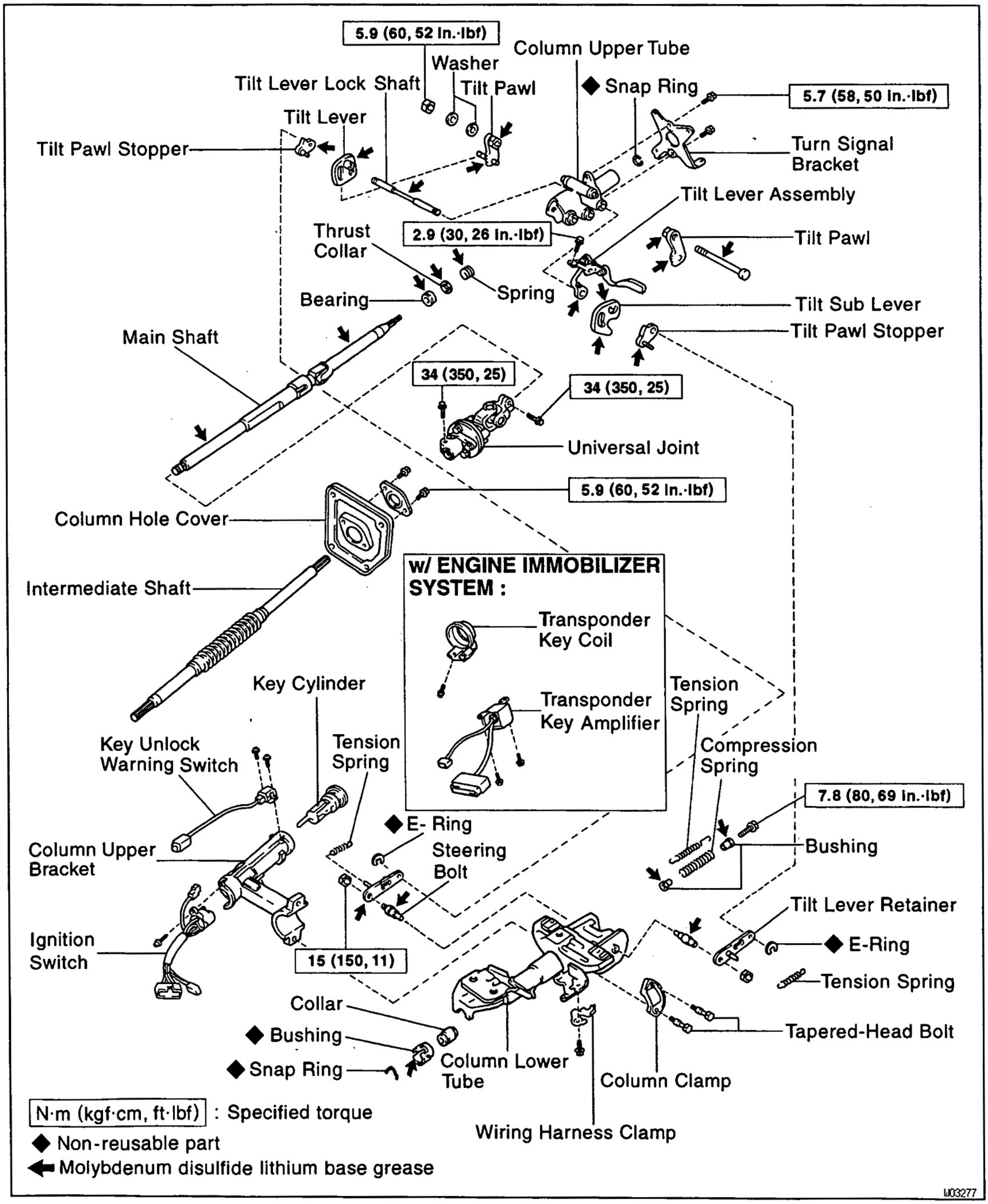
SR027-10

EQUIPMENT

Torque wrench	

TILT STEERING COLUMN
COMPONENTS

SR1YB-01



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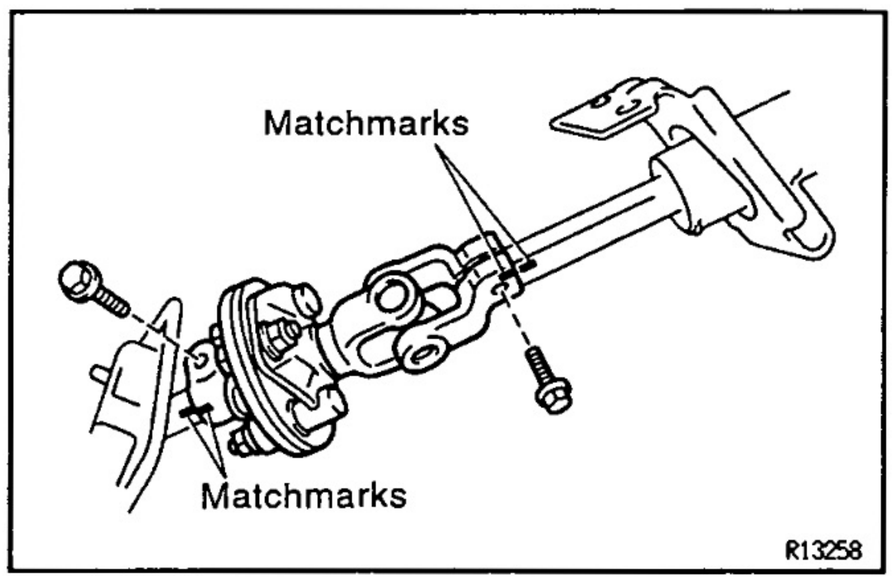
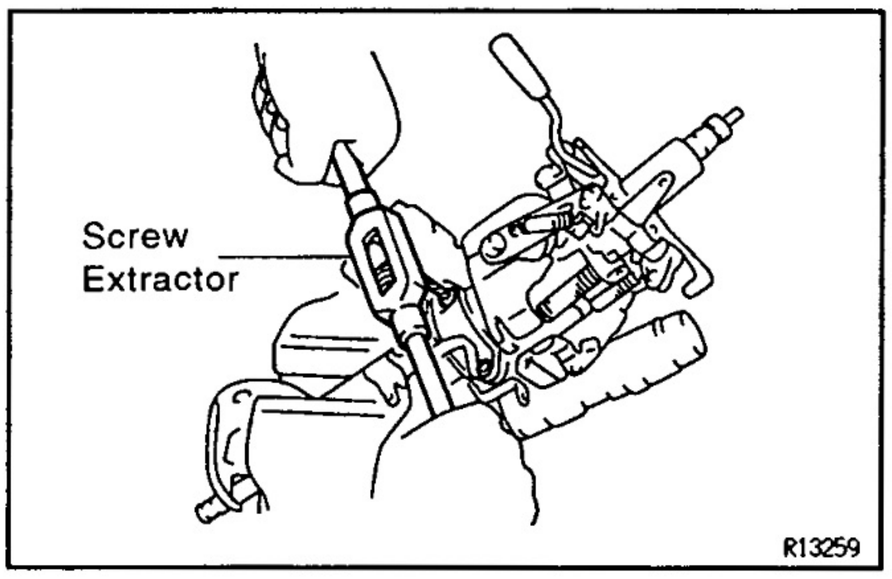
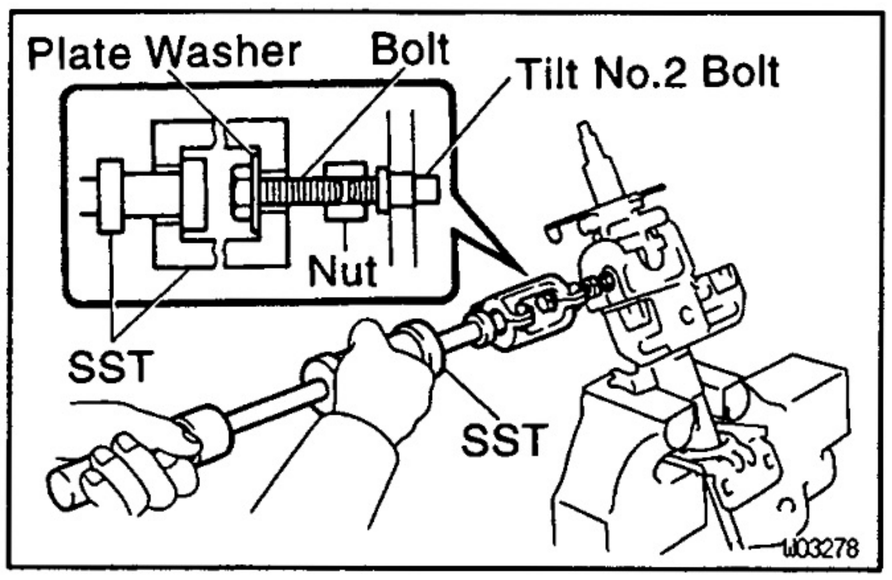






TILT STEERING COLUMN DISASSEMBLY SR1YC-01

NOTICE: When using a vise, do not overtighten it.

1. DISCONNECT UNIVERSAL JOINT

(a) Place matchmarks on the universal joint, intermediate shaft and main shaft.

(b) Remove the 2 bolts.

2. REMOVE DUST SEAL AND COLUMN HOLE COVER

Remove the 2 bolts from the dust seal.

3. REMOVE WIRING HARNESS CLAMP

Remove the bolt.

4. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Using a punch, mark the center of the 2 tapered–head bolts.

(b) Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the 2 bolts.

(c) Using a screw extractor, remove the 2 bolts.

5. REMOVE COMPRESSION SPRING

(a) Remove the bolt.

(b) Remove the 2 bushings from the spring.

6. REMOVE 3 TENSION SPRINGS

7. REMOVE 2 TILT LEVER RETAINERS

(a) Remove the E–ring from the tilt lever lock shaft.

(b) Remove the nut and retainer.

8. REMOVE 2 TILT PAWL STOPPERS

9. REMOVE 2 TILT PAWLS

(a) Remove the nut and 2 washers from the bolt.

(b) Pull out the bolt.

(c) Remove the tilt lever assembly set bolt.

10. REMOVE TILT LEVER, TILT SUB LEVER, TILT LEVER ASSEMBLY AND TILT LEVER LOCK SHAFT

11. REMOVE COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY

(a) Set SST, the nut (10 mm nominal diameter, 1.25 mm pitch), plate washer (36 mm outer diameter) and bolt (10 mm nominal diameter, 1.25 mm pitch, 50 mm length), as shown in the illustration.

SST 09910–00015 (09911–00011, 09912–00010)

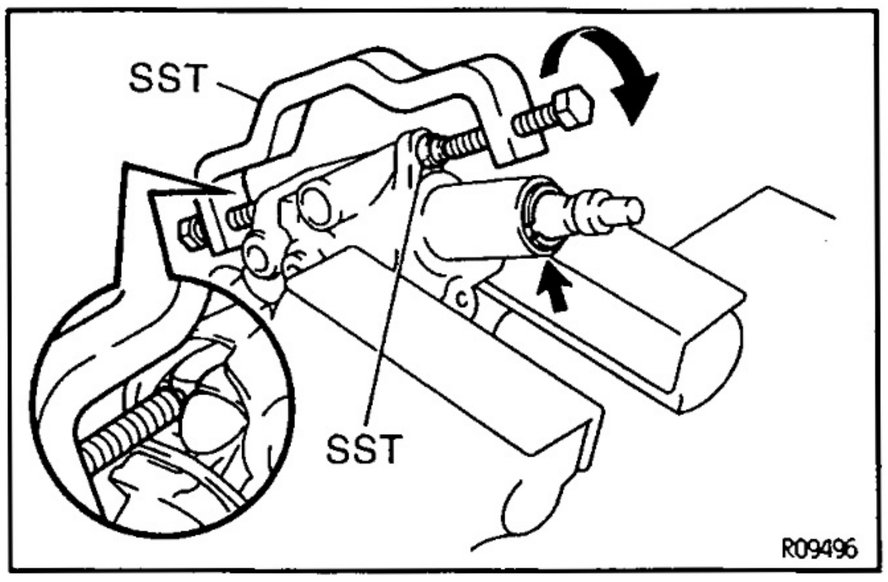
Reference

Nut:	90170–10004
Plate washer:	90201–10201
Bolt:	91111–51050

(b) Remove the 2 tilt No.2 bolts by using the sliding hammer on SST.

(c) Remove the upper tube with the shaft assembly from the column lower tube.

SR



12. REMOVE TURN SIGNAL BRACKET

Remove the 2 bolts.

13. REMOVE MAIN SHAFT ASSEMBLY

(a) Using SST, compress the compression spring.
SST 09950–40010 (09957–04010, 09958–04010)
NOTICE: Do not bend the sliding yoke of the main shaft assembly more than 20°.

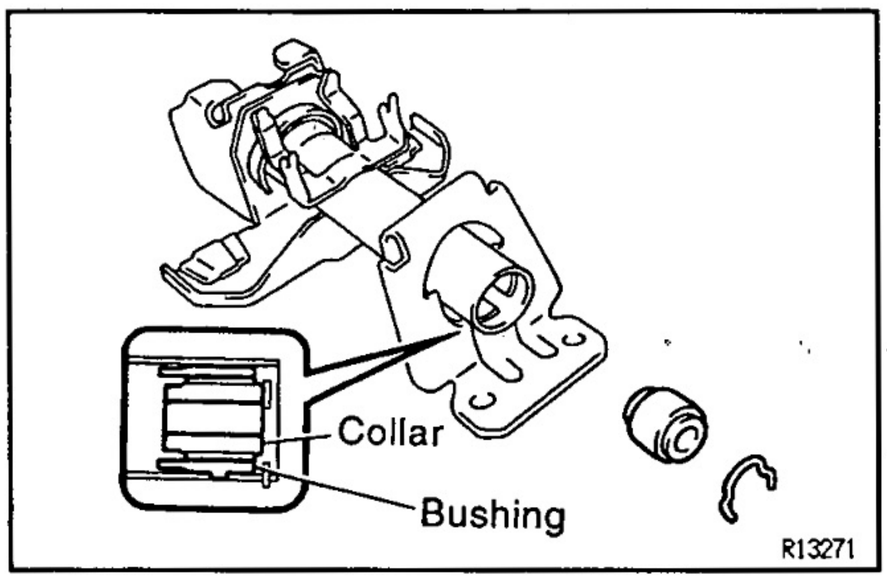
(b) Using a snap ring expander, remove the snap ring from the shaft assembly.

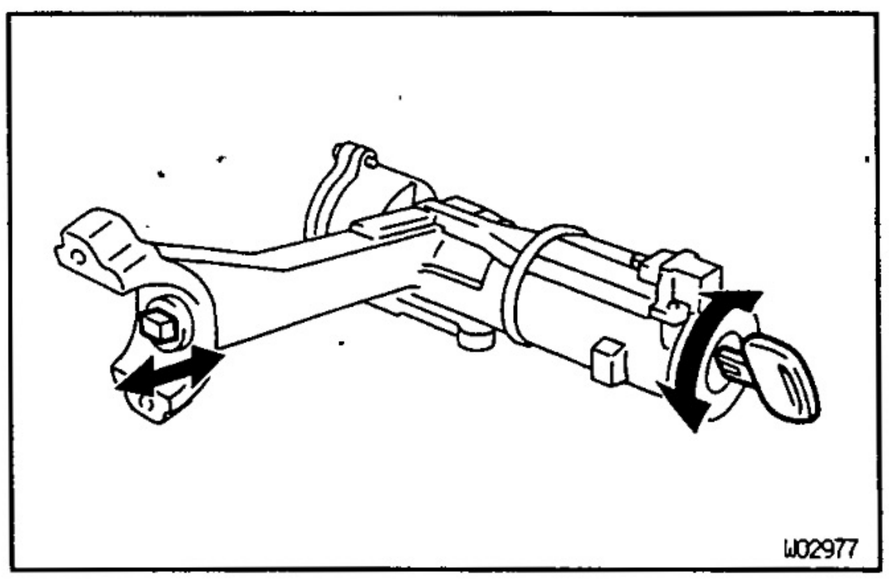
(c) Remove the shaft assembly from the column upper tube.

(d) Remove the compression spring, bearing thrust collar and bearing from the shaft assembly.

14. REMOVE COLLAR

Remove the snap ring and collar from the column lower tube.



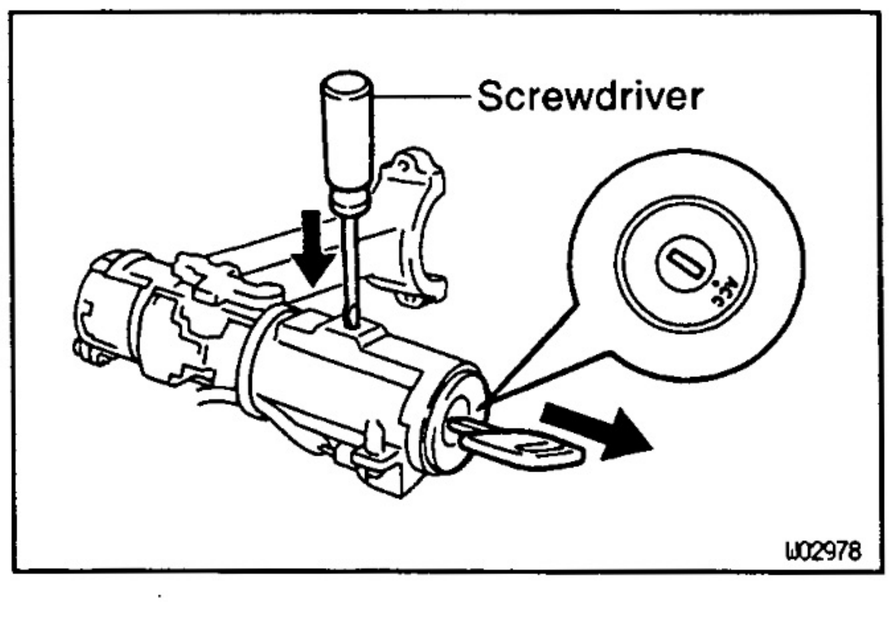


TILT STEERING COLUMN INSPECTION AND REPLACEMENT

SR1YD-01

1. INSPECT COLUMN UPPER BRACKET

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

(a) Place the ignition key at the ACC position.

(b) Push down the stop pin with a screwdriver and pull out the key cylinder.

(c) Install a new key cylinder.
HINT: Make sure the ignition key is at the ACC position.

3. INSPECT IGNITION SWITCH

(See Pub. No. RM434E on page BE–5)

4. IF NECESSARY, REPLACE IGNITION SWITCH

(a) Remove the 2 screws.

(b) Install new switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH

(See Pub. No. RM434E on page BE–5)

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

(a) Remove the 2 screws.

(b) Install a new switch with the 2 screws.

7. w/ ENGINE IMMOBILIZER SYSTEM: INSPECT TRANSPONDER KEY COIL
(See page BE–30)

8. w/ ENGINE IMMOBILIZER SYSTEM: IF NECESSARY, REPLACE TRANSPONDER KEY COIL

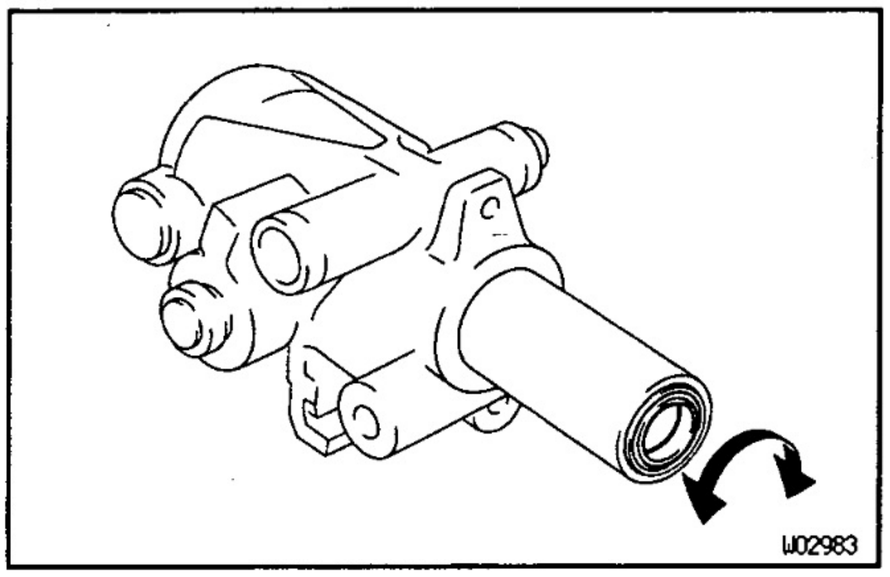
(a) Disconnect the connector.
(b) Remove the screw.
(c) Install a new key coil with the screw.

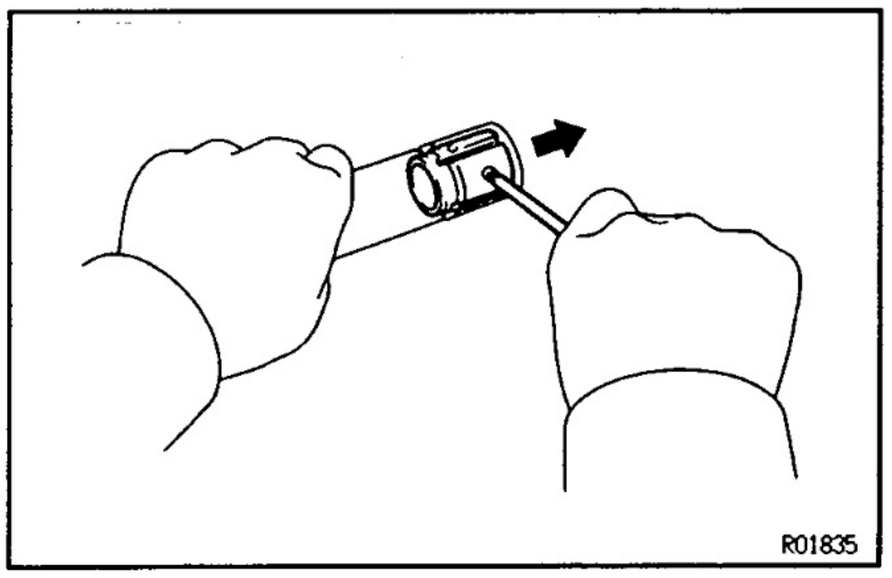
9. w/ ENGINE IMMOBILIZER SYSTEM: IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

(a) Remove the 2 screws.
(b) Install a new key amplifier with the 2 screws.

10. INSPECT BEARING

Check the bearing rotation condition and check for abnormal noise.
If the bearing is worn or damaged, replace the column upper tube.





11. IF NECESSARY, REPLACE BUSHING

(a) Using a screwdriver, depress the 3 projections on the busing and remove the bushing from the column lower tube.
(b) Align the projections on a new bushing with the holes in the lower tube. Install the bushing until the projections are firmly engaged in the holes in the lower tube.

TILT STEERING COLUMN ASSEMBLY

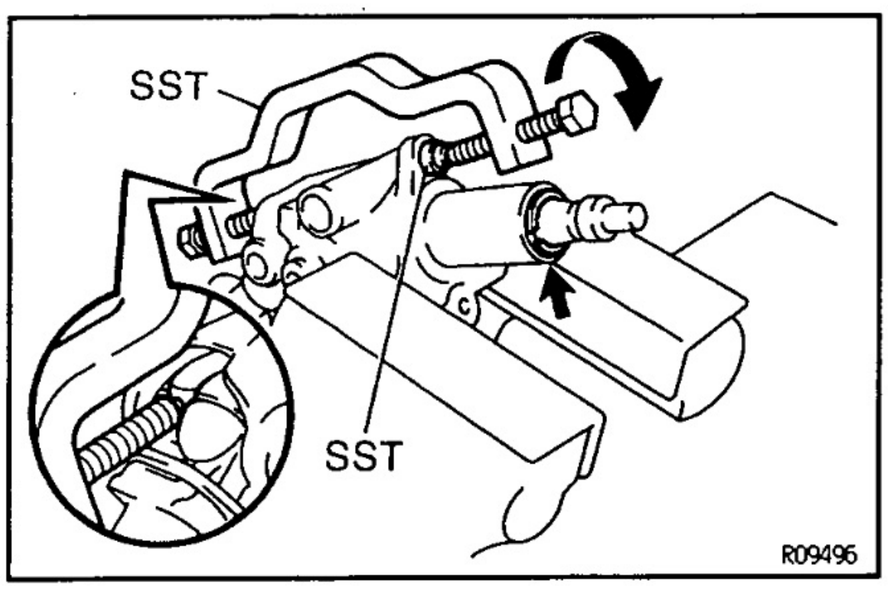
SR1YE-01

NOTICE: When using a vise, do not overtighten it.

1. COAT WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE
(See page SR–3)

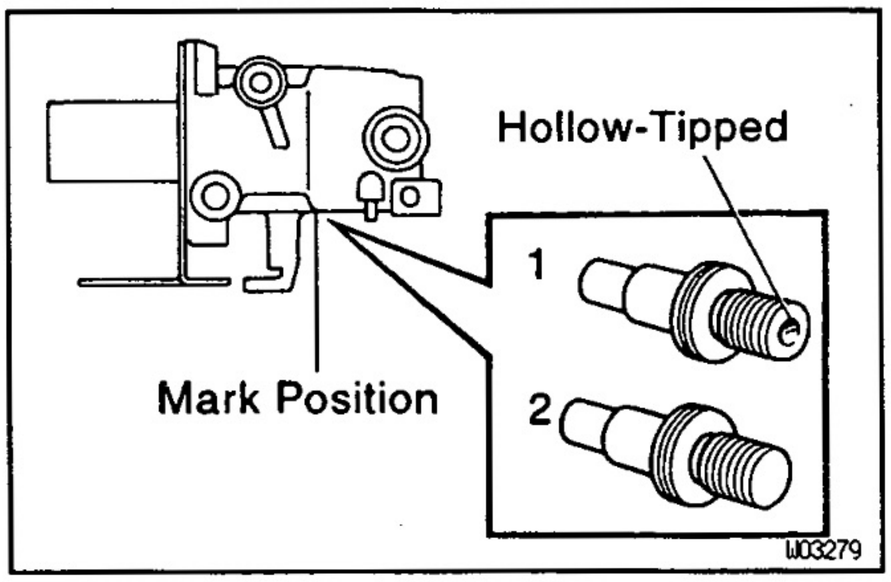
2. INSTALL MAIN SHAFT ASSEMBLY

(a) Install a new bearing, bearing thrust collar and compression spring to the shaft assembly.
(b) Install the shaft assembly into the column upper tube.
(c) Using SST, compress the compression spring.
SST 09950–40010 (09957–04010, 09958–04010)
NOTICE: Do not bend the universal joint of the main shaft more than 20°.
(d) Using snap ring pliers, install a new snap ring.



3. INSTALL TURN SIGNAL BRACKET

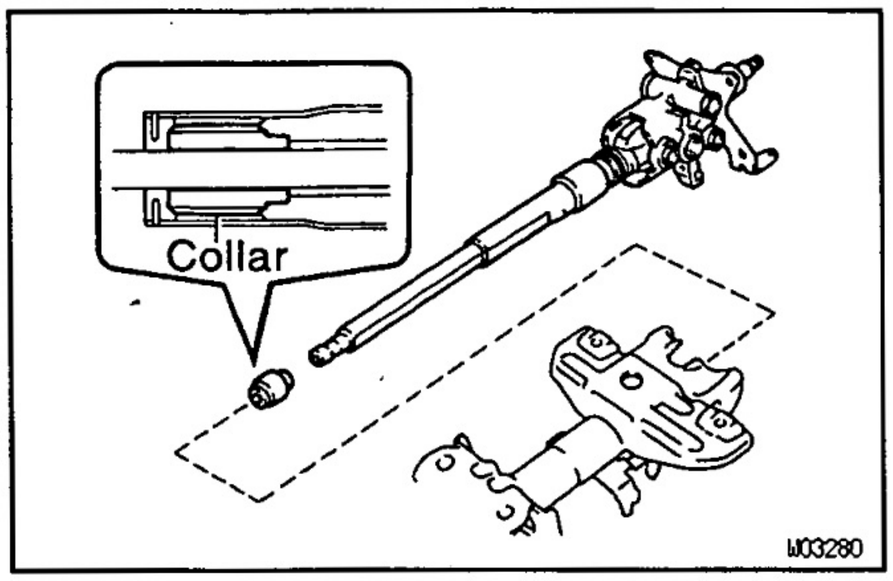
Torque the 2 bolts.
Torque: 5.7 N·m (58 kgf·cm, 50 in.·lbf)



4. SELECT TILT NO.2 BOLTS

Select the bolt with plain thread end when the column upper tube mark is 2, and the bolt with the hollow–tipped thread end when the mark is 1.

NOTICE: Select the bolt type to match each number marked in the squares on the upper tube.



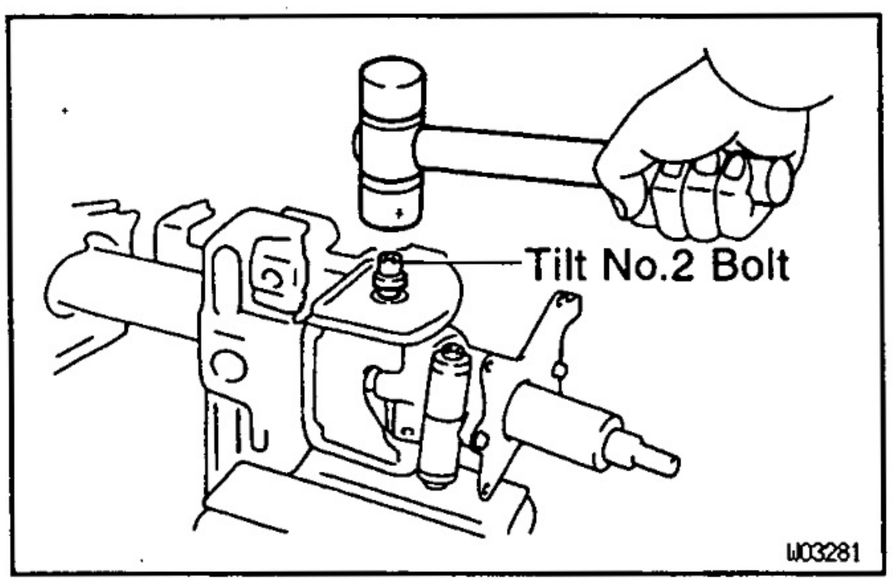
5. INSTALL COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY

(a) Install the collar to the shaft assembly.

(b) Install a new snap ring.

(c) Install the upper tube with the shaft assembly into the column lower tube.

SR



(d) Using a plastic hammer, drive in the 2 tilt No.2 bolts.

6. INSTALL TILT LEVER LOCK SHAFT, TILT LEVER ASSEMBLY, TILT SUB LEVER AND TILT LEVER

7. INSTALL 2 TILT PAWLS

(a) Install the pawl.

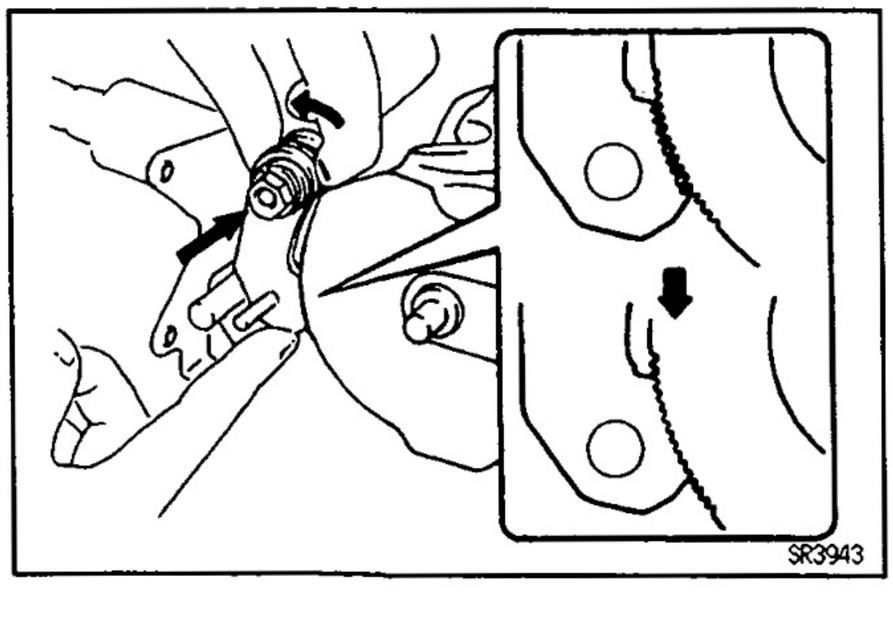
HINT: Install the pawl pin into the long hole of the tilt lever/ tilt sub lever.

(b) Install the bolt through the pawls and tilt lever assembly.

(c) Temporarily install the 2 washers and nut.

(d) Torque the tilt lever assembly set bolt.

Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)



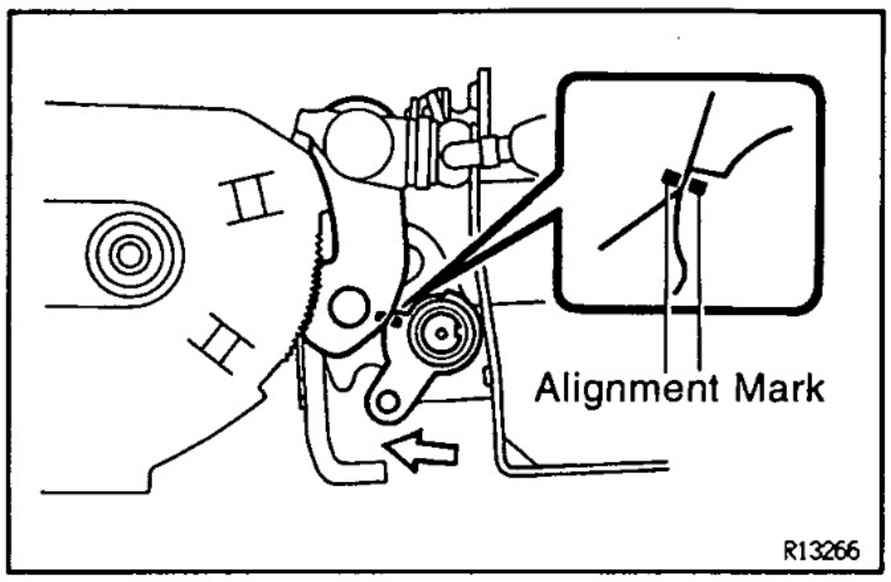
8. ENGAGE AND ADJUST 2 TILT PAWLS

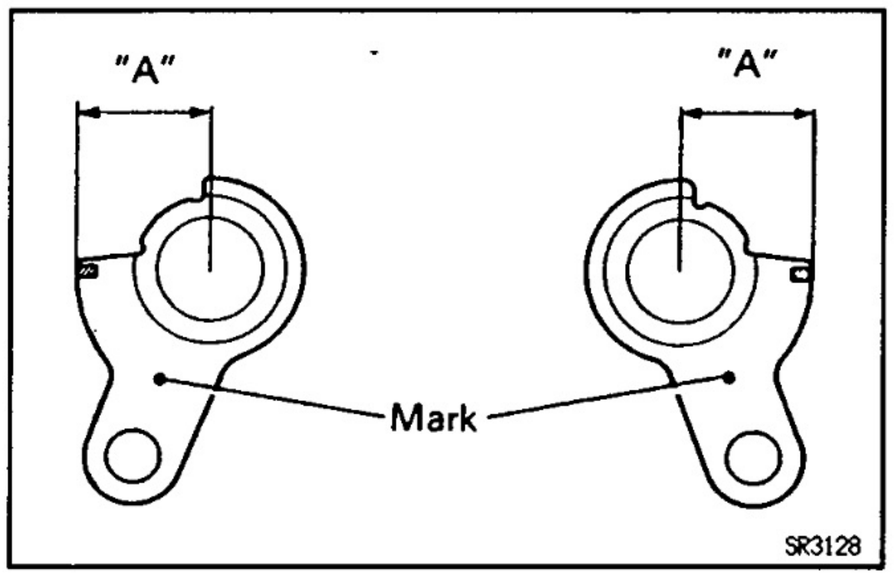
(a) Engage the tilt sub lever side pawl to the center of the ratchet.

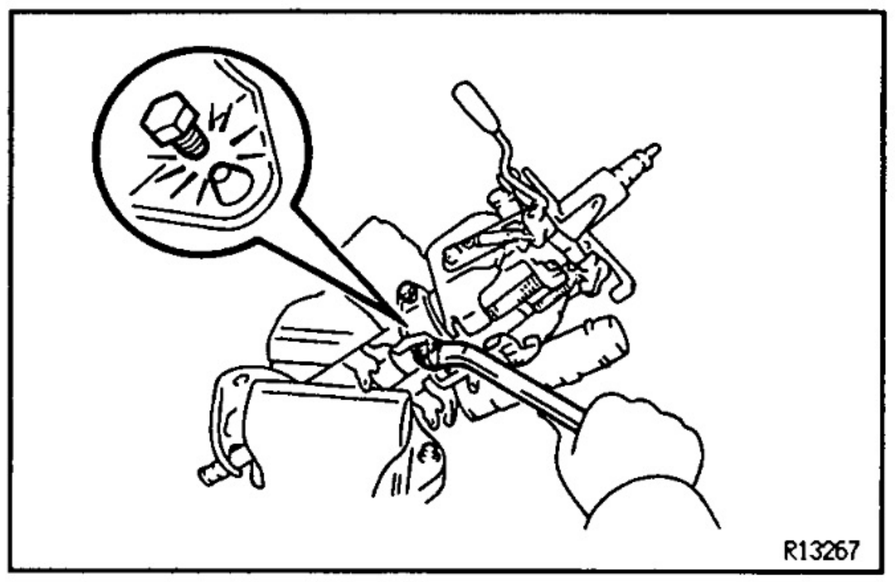
(b) While turning the tilt lever side tilt pawl collar, completely engage the tilt lever side pawl to the ratchet.

(c) Torque the nut.

Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)







9. SELECT AND INSTALL 2 TILT PAWL STOPPERS

(a) With the tilt pawl and ratchet engaged, install the stopper.

(b) Check that the alignment marks on the stopper and pawl align when the stopper is rotated to the pawl side.

(c) If the alignment marks do not align, select stopper according to the following table.

Tilt lever side	Tilt sub lever side	Dimension "A" mm (in.)
1	A	12.65 – 12.75 (0.4980 – 0.5020)
2	B	12.55 – 12.65 (0.4941 – 0.4980)
3	C	12.45 – 12.55 (0.4902 – 0.4941)
4	D	12.35 – 12.45 (0.4862 – 0.4902)
5	E	12.25 – 12.35 (0.4823 – 0.4862)

(d) After selecting the stoppers, check that on both sides the pawl and ratchet are fully engaged.

10. INSTALL 2 TILT LEVER RETAINERS

(a) Install a new E–ring.

(b) Torque the nut.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

11. INSTALL 3 TENSION SPRINGS

12. INSTALL COMPRESSION SPRING

(a) Install the 2 bushings to the spring.

(b) Torque the bolt.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

13. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

Tighten 2 new tapered–head bolts until the bolt head brakes off.

14. INSTALL WIRING HARNESS CLAMP

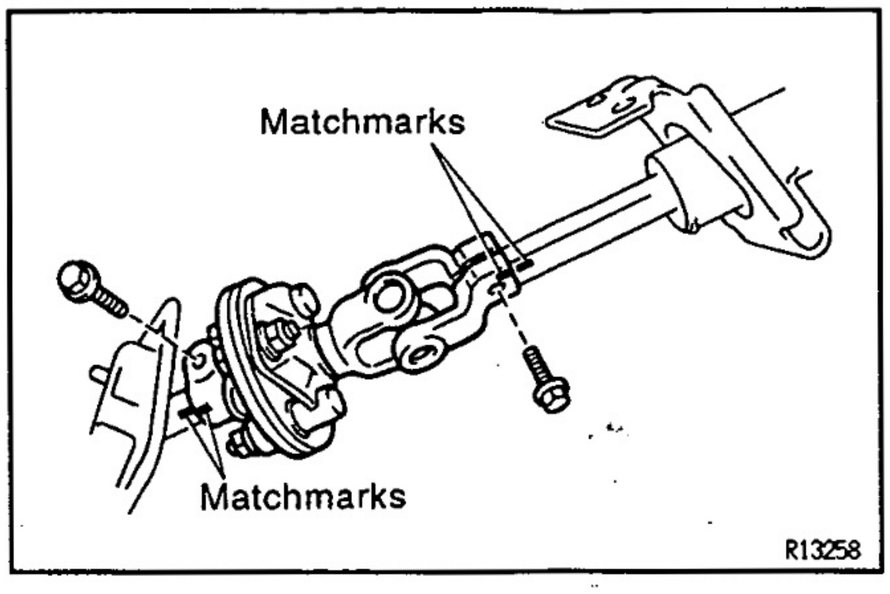
Tighten the bolt.

15. INSTALL COLUMN HOLE COVER AND DUST SEAL

(a) Install the dust seal to the hole cover.

(b) Torque 2 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

SR



16. CONNECT UNIVERSAL JOINT

(a) Align the matchmarks on the intermediate No.2 shaft and universal joint then torque the bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Align the matchmarks on the universal joint and the main shaft then torque the bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

17. CHECK TILT STEERING COLUMN OPERATION

(a) Check that there is no axial play at the end of the main shaft.

(b) With the main shaft in the neutral position, raise the tilt lever and check that the main shaft rises to the uppermost position.

(c) Lower the main shaft, and check that it locks in the lowermost position.

SERVICE SPECIFICATIONS

SERVICE DATA

SR0VC-0H

TILT STEERING COLUMN	
Pawl stopper alignment mark	
1 or A	12.65 – 12.75 mm (0.4980 – 0.5020 in.)
2 or B	12.55 – 12.65 mm (0.4941 – 0.4980 in.)
3 or C	12.45 – 12.55 mm (0.4902 – 0.4941 in.)
4 or D	12.35 – 12.45 mm (0.4862 – 0.4902 in.)
5 or E	12.25 – 12.35 mm (0.4823 – 0.4862 in.)

TORQUE SPECIFICATIONS

SR0VD-0J

Part tightened	N·m	kgf·cm	ft·lbf
TILT STEERING COLUMN			
Universal joint x Intermediate shaft	34	350	25
Main shaft assembly x Universal joint	34	350	25
Turn signal bracket set bolt	5.7	58	50 in.·lbf
Tilt sub lever side pawl set bolt x nut	5.9	60	52 in.·lbf
Tilt lever retainer set nut	15	150	11
Tilt lever assembly set bolt	2.9	30	26 in.·lbf
Compression spring set bolt	7.8	80	69 in.·lbf
Column hole cover x Lower dust seal	5.9	60	52 in.·lbf

BODY ELECTRICAL SYSTEM

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual	
Supplement Jan., 1992	RM290E
Aug., 1992	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

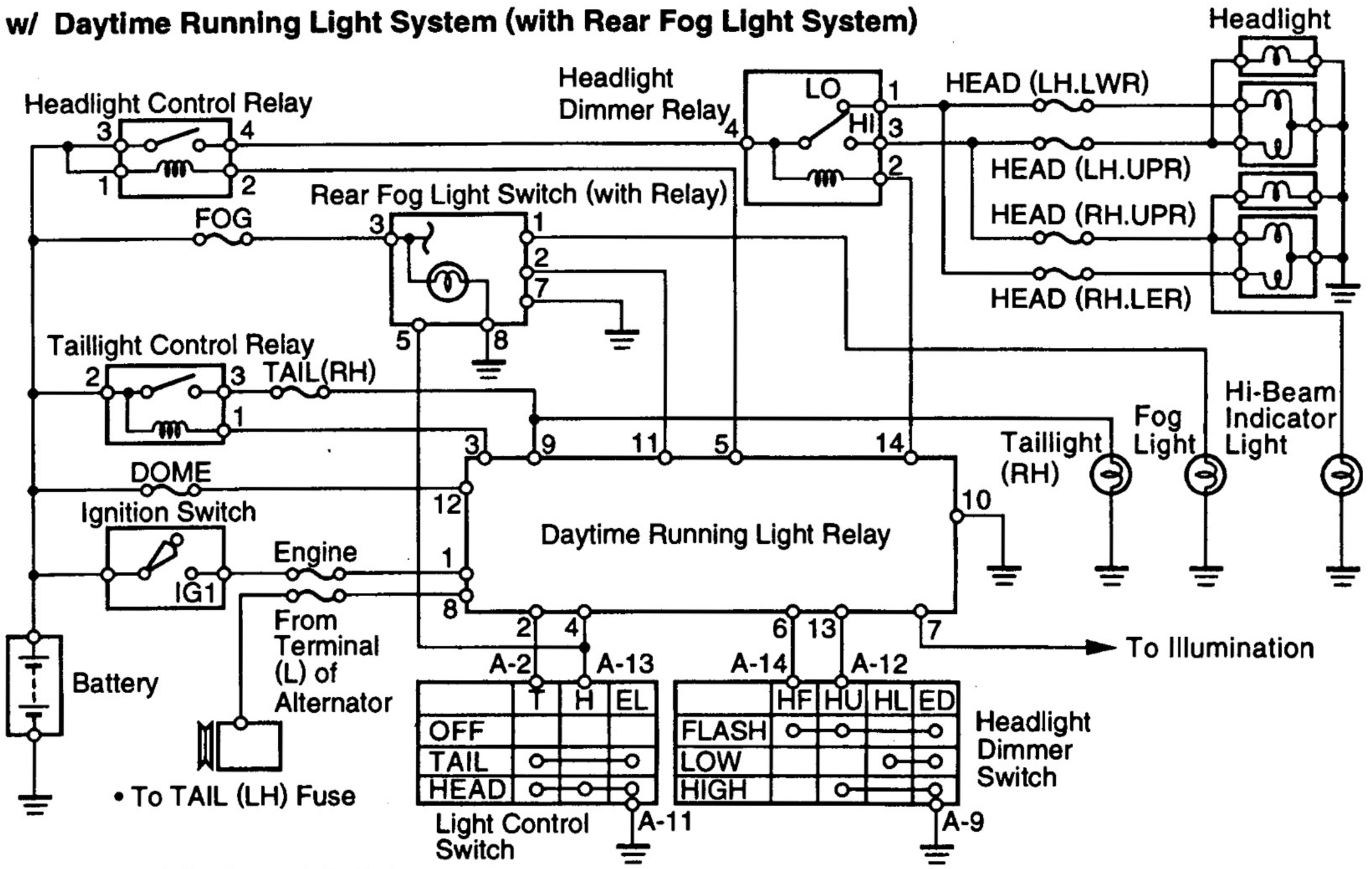
NOTE: The above pages contain only the points which differ from the above listed manuals.

HEADLIGHT AND TAILLIGHT SYSTEM

WIRING DIAGRAMS

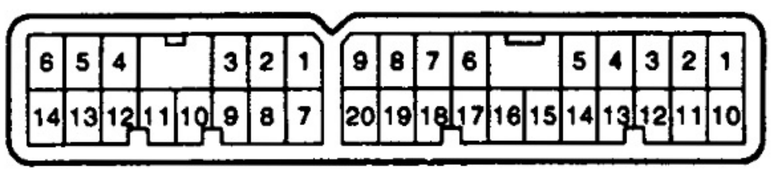
BE3A9-01

w/ Daytime Running Light System (with Rear Fog Light System)

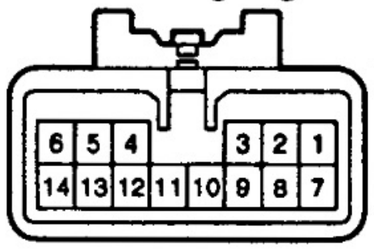


• Light Control Switch
• Dimmer Switch

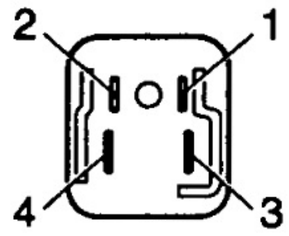
Connector "A" Connector "B"



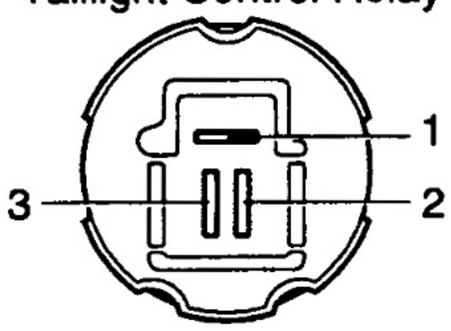
Daytime Running Light Relay



Headlight Control Relay

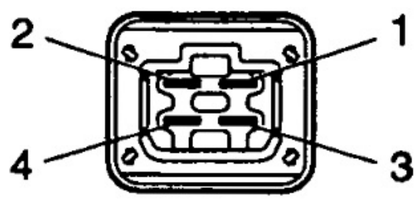


Taillight Control Relay



Rear Fog Light Switch

Headlight Dimmer Relay

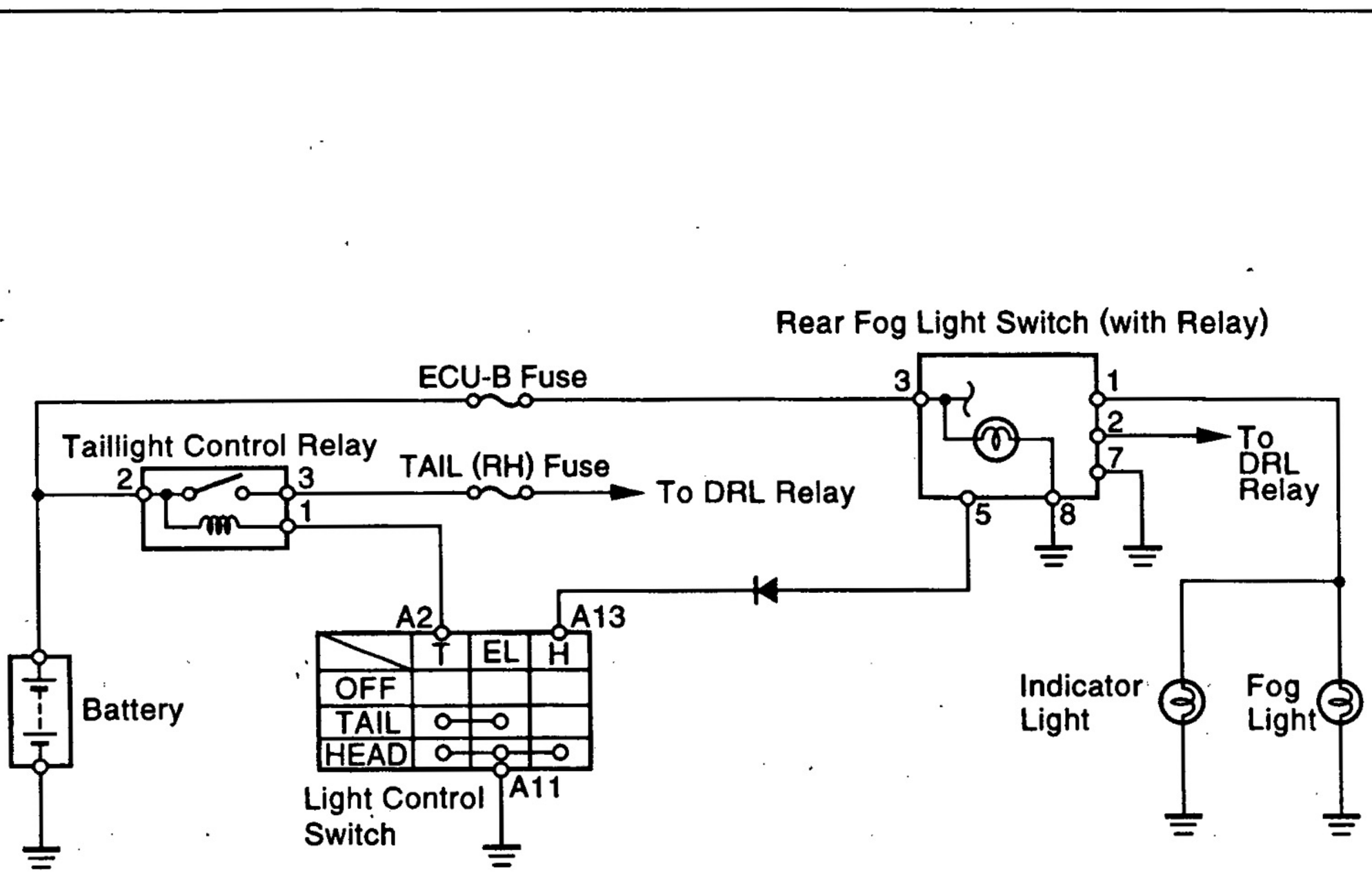


BE5023
V-34-2 e-14-2-A BE1838
BE2763 h-8-2-B BE1839

Z19136

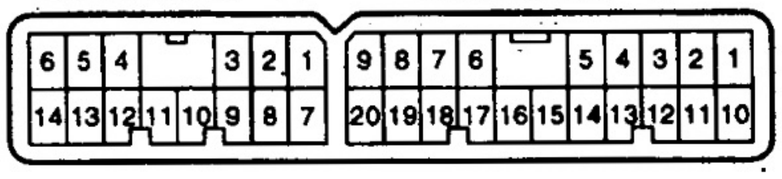
REAR FOG LIGHT SYSTEM
WIRING DIAGRAMS

BE3AA-01

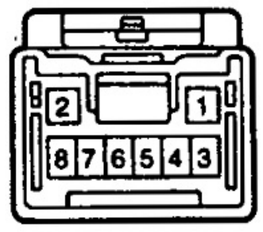


Light Control Switch

Connector "A" Connector "B"

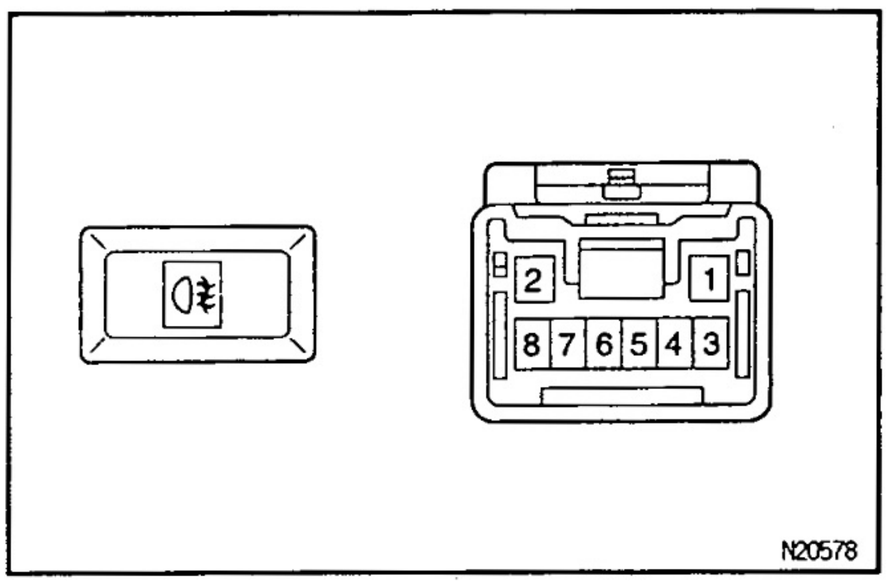


Rear Fog Light Switch



BE5024
V-34-2 h-8-2-B

Z19137

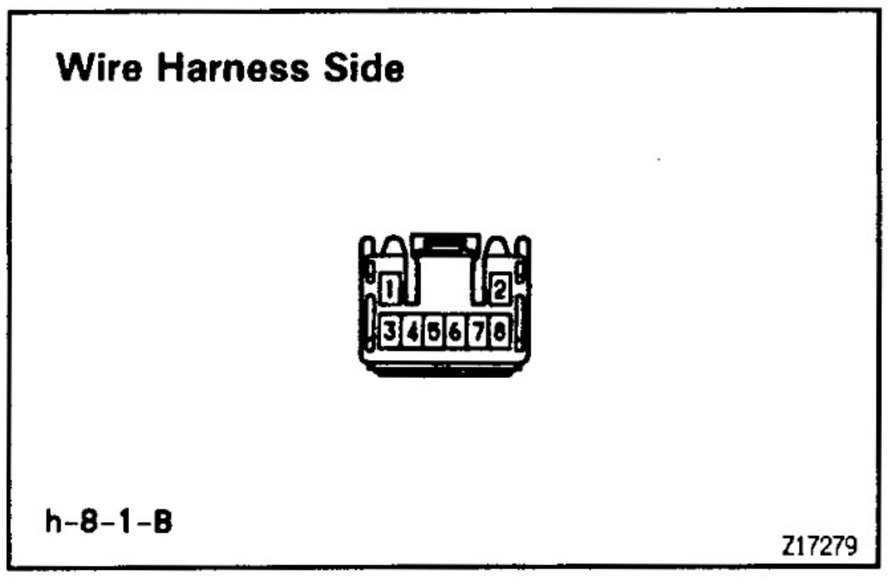


REAR FOG LIGHT SWITCH INSPECTION BE30W-03

1. INSPECT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	2 – 5	Continuity
Illumination circuit	2 – 8	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT SWITCH CIRCUIT

Disconnect the actuator connector from the switch, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	* Continuity
2 – Ground	Light control switch TAIL or HEAD	Continuity
4 – Ground	Constant	Continuity
5 – Ground	Light control switch HEAD	Continuity
7 – Ground	Constant	Continuity
8 – Ground	Constant	Continuity
3 – Ground	Constant	Battery voltage

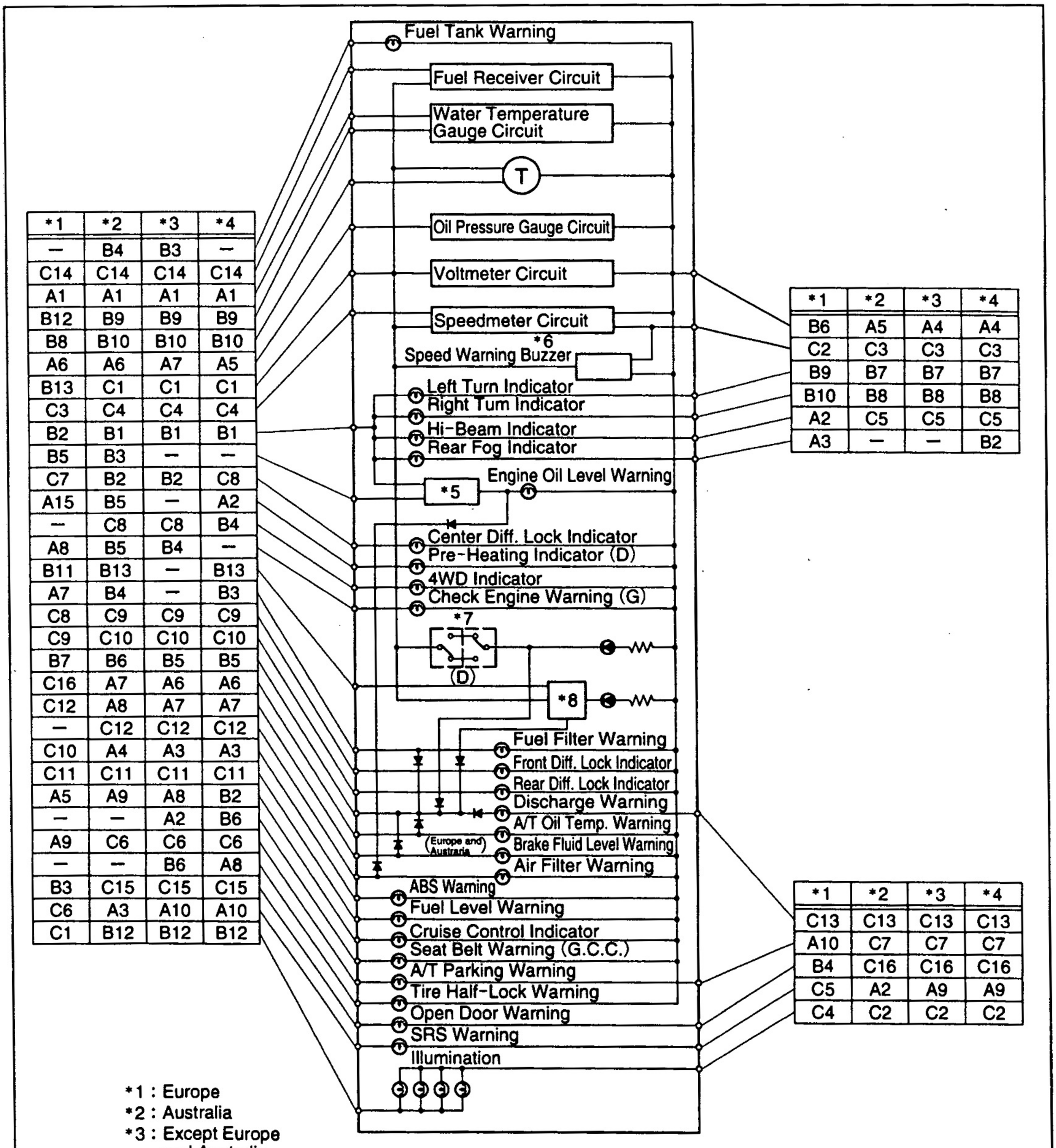
*: There is resistance because this circuit is grounded through the bulb.
If the circuit is not as specified, inspect the circuits connected to other pars.

BE

COMBINATION METER

METER CIRCUIT

BE3A9-01



*1	*2	*3	*4
—	B4	B3	—
C14	C14	C14	C14
A1	A1	A1	A1
B12	B9	B9	B9
B8	B10	B10	B10
A6	A6	A7	A5
B13	C1	C1	C1
C3	C4	C4	C4
B2	B1	B1	B1
B5	B3	—	—
C7	B2	B2	C8
A15	B5	—	A2
—	C8	C8	B4
A8	B5	B4	—
B11	B13	—	B13
A7	B4	—	B3
C8	C9	C9	C9
C9	C10	C10	C10
B7	B6	B5	B5
C16	A7	A6	A6
C12	A8	A7	A7
—	C12	C12	C12
C10	A4	A3	A3
C11	C11	C11	C11
A5	A9	A8	B2
—	—	A2	B6
A9	C6	C6	C6
—	—	B6	A8
B3	C15	C15	C15
C6	A3	A10	A10
C1	B12	B12	B12

*1	*2	*3	*4
B6	A5	A4	A4
C2	C3	C3	C3
B9	B7	B7	B7
B10	B8	B8	B8
A2	C5	C5	C5
A3	—	—	B2

*1	*2	*3	*4
C13	C13	C13	C13
A10	C7	C7	C7
B4	C16	C16	C16
C5	A2	A9	A9
C4	C2	C2	C2

*1 : Europe
*2 : Australia
*3 : Except Europe and Australia (Gasoline Engine)
*4 : Except Europe and Australia (Diesel Engine)
*5 : Engine Oil Level Circuit
*6 : G.C.C.Countries, Nigeria
*7 : Warning Cansel Switch
*8 : Turbo Circuit

Ⓣ : Tachometer
Diff. : Differential
Temp. : Tamperature
(D) : (Diesel Engine)
(G) : (Gasoline Engine)

T

N20622

BE

Hi-Grade

No.		Wiring Connector Side	
		Europe	Australia
A	1	Ground (TEMP)	Ground (TEMP)
	2	Headlight Hi-Beam	
	3	Rear Fog Light Switch	ABS ECU
	4	–	GAUGE Fuse
	5	Cruise Control ECU	Oil Pressure Sender Gauge
	6	Oil Pressure Sender Gauge	A/T Fluid Temperature Sensor
	7	Fuel Filter Warning Switch	Brake Fluid Level Warning Switch
	8	EFI ECU (Gasoline Engine)	Cruise Control ECU
	9	L4 Position Switch	DOME Fuse
	10	Neutral Start Switch	Airbag Sensor Assembly
	15	Glow Timer Relay (Diesel Engine)	
B	1	–	Ground
	2	Ground	Center Differential Lock Indicator Switch
	3	Door Courtesy Switch	Engine Oil Level Sensor
	4	DOME Fuse	Fuel Filter Warning Switch and Buzzar (Diesel Engine) or Fuel Tank ECU
	5	Engine Oil Level Sensor	EFI ECU (Gasoline Engine), Glow Timer Relay (Diesel Engine)
	6	GAUGE Fuse	Charge Light Relay
	7	Charge Light Relay	Light Control Switch (Left)
	8	Igniter (Gasoline Engine), Tacho Pick Sensor (Diesel Engine M/T), ECT ECUT (Diesel Engine A/T)	Light Control Switch (Right)
	9	Light Control Switch (Left)	Water Temperature Sender Gauge
	10	Light Control Switch (Right)	Igniter (Gasoline Engine), Tacho Pick Sensor (Diesel Engine M/T), ECT ECU (Diesel Engine A/T)
	11	Turbo Pressure Switch	–
	12	Water Temperature Sender Gauge	Light Control Rheostat, Illumination (–)
	13	Ground (Gauge)	Turbo Pressure Switch
C	1	Light Control Rheostat, Illumination (–)	Ground (Gauge)
	2	Speed Control Unit	TAIL Fuse
	3	Speed Sensor	Speed Control Unit
	4	TAIL Fuse	Speed Sensor
	5	DOME Fuse	Headlight Hi-Beam
	6	Airbag ECU	L4 Position Switch
	7	Center Differential Lock Indicator Switch	Neutral Start Switch
	8	Front Differential Lock Indicator Switch	4WD Indicator Switch
	9	Rear Differential Lock Indicator Switch	Front Differential Lock Indicator Switch
	10	ABS ECU	Rear Differential Lock Indicator Switch
	11	Fuel Level Warning Switch	Fuel Level Warning Switch
	12	Brake Fluid Level Warning Switch	Air Filter Warning Switch
	13	IGN Fuse	IGN Fuse
	14	Fuel Sender Gauge	Fuel Sender Gauge
	15	–	Door Courtesy Switch
	16	A/T Fluid Temperature Sensor	DOME Fuse

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N20623

BE

Hi-Grade

No.		Wiring Connector Side Except Europe and Australia Gasoline Engine	Wiring Connector Side Except Europe and Australia Diesel Engine
A	1	Ground (TEMP)	Ground (TEMP)
	2	Seat Belt Warning Relay	Glow Timer Relay
	3	ABS ECU	ABS ECU
	4	GAUGE Fuse	GAUGE Fuse
	5	Oil Pressure Sender Gauge	Oil Pressure Sender Gauge
	6	A/T Fluid Temperature Sensor	A/T Fluid Temperature Sensor
	7	Brake Fluid Level Warning Switch	Brake Fluid Level Warning Switch
	8	Cruise Control ECU	Tire Half-Lock Indicator Switch
	9	DOME Fuse	DOME Fuse
	10	Airbag Sensor Assembly	Airbag Sensor Assenbly
B	1	Ground	Ground
	2	Center Differential Lock Indicator Switch	Rear Fog Light Switch
	3	Fuel Tank ECU	Fuel Filter Warning Switch and Buzzar (Diesel Engine)
	4	EFI ECU	4WD Indicator Switch
	5	Charge Light Relay	Charge Light Relay
	6	Tire Half-Lock Indicator Switch	Seat Belt Warning Relay
	7	Light Control Switch (Left)	Light Control Switch (Left)
	8	Light Control Switch (Right)	Light Control Switch (Right)
	9	Water Temperature Sender Gauge	Water Temperature Sender Gauge
	10	Igniter	Tacho Pick Sensor (M/T), ECT ECU (A/T)
	11	–	–
	12	Light Control Rheostat, Illumination (–)	Light Control Rheostat, Illumination (–)
	13	–	Turbo Pressere Switch
C	1	Ground (Gauge)	Ground (Gauge)
	2	TAIL Fuse	TAIL Fuse
	3	Speed Control Unit	Speed Control Unit
	4	Speed Sensor	Speed Sensor
	5	Headlight Hi-Beam	Headlight Hi-Beam
	6	L4 Position Switch	L4 Position Switch
	7	Neutral Start Switch	Neutral Start Switch
	8	4WD Indicator Switch	Center Differential Lock Indicator Switch
	9	Front Differential Lock Indicator Switch	Front Differential Lock Indicator Switch
	10	Rear Differential Lock Indicator Switch	Rear Differential Lock Indicator Switch
	11	Fuel Level Warning Switch	Fuel Level Warning Switch
	12	Air Filter Warning Switch	Air Filter Warning Switch
	13	IGN Fuse	IGN Fuse
	14	Fuel Sender Gauge	Fuel Sender Gauge
	15	Door Courtesy Switch	Door Courtesy Switch
	16	DOME Fuse	DOME Fuse

BE

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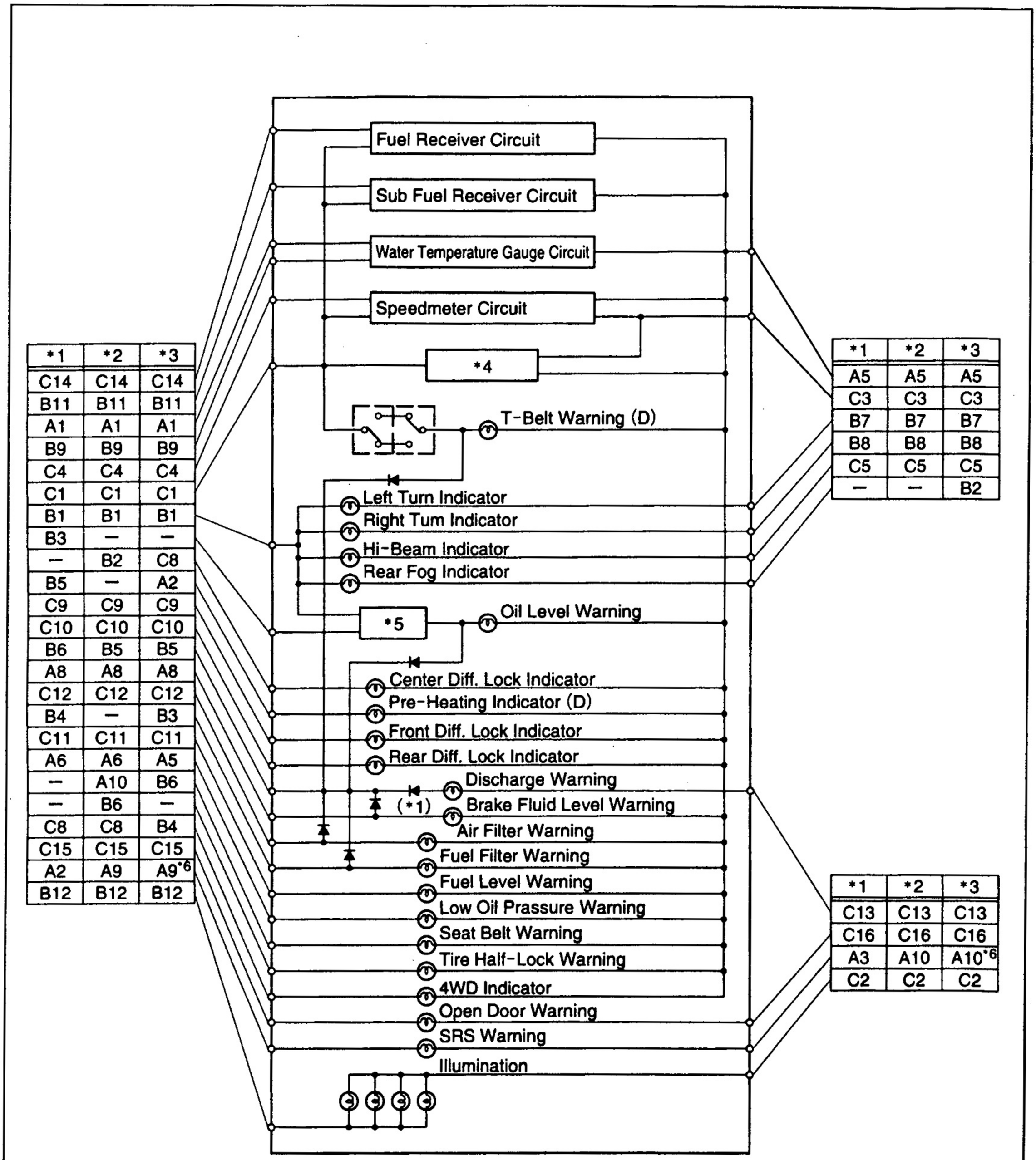
N20624



*1	*2	*3
C14	C14	C14
B11	B11	B11
A1	A1	A1
B9	B9	B9
C4	C4	C4
C1	C1	C1
B1	B1	B1
B3	–	–
–	B2	C8
B5	–	A2
C9	C9	C9
C10	C10	C10
B6	B5	B5
A8	A8	A8
C12	C12	C12
B4	–	B3
C11	C11	C11
A6	A6	A5
–	A10	B6
–	B6	–
C8	C8	B4
C15	C15	C15
A2	A9	A9*6
B12	B12	B12

*1	*2	*3
A5	A5	A5
C3	C3	C3
B7	B7	B7
B8	B8	B8
C5	C5	C5
–	–	B2

*1	*2	*3
C13	C13	C13
C16	C16	C16
A3	A10	A10*6
C2	C2	C2

*1 : Australia
*2 : Except Australia (Gasoline Engine)
*3 : Except Australia (Diesel Engine)
*4 : Speed Warning Buzzer (G.C.C.Countries Nigeria)
*5 : Engine Oil Level Circuit (Australia)
*6 : G.C.C.Countries

(D) : (Diesel Engine)
Diff. : Differential

N20628

Lo-Grade

No.		Wiring Connector Side Australia (Diesel Engine)
A	1	Ground (TEMP)
	2	DOME Fuse
	3	Airbag Sensor Assembly
	4	—
	5	GAUGE Fuse
	6	Low Oil Prassure Warning Switch
	7	—
	8	Brake Fluid Level Warning Switch
	9	—
	10	—
B	1	Ground
	2	—
	3	Engine Oil Level Sensor
	4	Fuel Filter Warning Switch and Buzzar (Diesel Engine)
	5	Glow Timer Relay
	6	Charge Light Relay
	7	Light Control Switch (Left)
	8	Light Control Switch (Right)
	9	Water Temperature Sender Gauge
	10	—
	11	Sub Fuel Sender Gauge
	12	Light Control Rheostat, Illumination (–)
	13	—
C	1	Ground (Gauge)
	2	TAIL Fuse
	3	Speed Control Unit
	4	Speed Sensor
	5	Headlight Hi-Beam
	6	—
	7	—
	8	4WD Indicator Switch
	9	Front Diff. Lock Indicator Switch
	10	Rear Diff. Lock Indicator Switch
	11	Fuel Level Warning Switch
	12	Air Filter Warning Switch
	13	IGN Fuse
	14	Fuel Sender Gauge
	15	Door Courtesy Switch
	16	DOME Fuse

Lo-Grade

No.		Wiring Connector Side Except Australia Gasoline Engine	Wiring Connector Side Except Australia Diesel Engine
A	1	Ground (TEMP)	Ground (TEMP)
	2	Seat Belt Warning Relay	Glow Timer Relay
	3	—	—
	4	—	GAUGE Fuse
	5	GAUGE Fuse	Low Oil Prassure Warning Switch
	6	Low Oil Prassure Warning Switch	—
	7	—	—
	8	Brake Fluid Level Warning Switch	Brake Fluid Level Warning Switch
	9	DOME Fuse	—
	10	Airbag Sensor Assembly	—
B	1	Ground	Ground
	2	Center Diff. Lock Indicator Switch	Rear Fog Light Switch
	3	—	Fuel Filter Warning Switch and Buzzar (Diesel Engine)
	4	—	4WD Indicator Switch
	5	Charge Light Relay	Charge Light Relay
	6	Tire Half-Lock Indicator Switch	Seat Belt Warning Relay
	7	Light Control Switch (Left)	Light Control Switch (Left)
	8	Light Control Switch (Right)	Light Control Switch (Right)
	9	Water Temperature Sender Gauge	Water Temperature Sender Gauge
	10	—	—
	11	Sub Fuel Sender Gauge	Sub Fuel Sender Gauge
	12	Light Control Rheostat, Illumination (–)	Light Control Rheostat, Illumination (–)
	13	—	—
C	1	Ground (Gauge)	Ground (Gauge)
	2	TAIL Fuse	TAIL Fuse
	3	Speed Control Unit	Speed Control Unit
	4	Speed Sensor	Speed Sensor
	5	Headlight Hi-Beam	Headlight Hi-Beam
	6	—	—
	7	—	—
	8	4WD Indicator Switch	Center Diff. Lock Indicator Switch
	9	Front Diff. Lock Indicator Switch	Front Diff. Lock Indicator Switch
	10	Rear Diff. Lock Indicator Switch	Rear Diff. Lock Indicator Switch
	11	Fuel Level Warning Switch	Fuel Level Warning Switch
	12	Air Filter Warning Switch	Air Filter Warning Switch
	13	IGN Fuse	IGN Fuse
	14	Fuel Sender Gauge	Fuel Sender Gauge
	15	Door Courtesy Switch	Door Courtesy Switch
	16	DOME Fuse	DOME Fuse

T

N20626

BE397-01

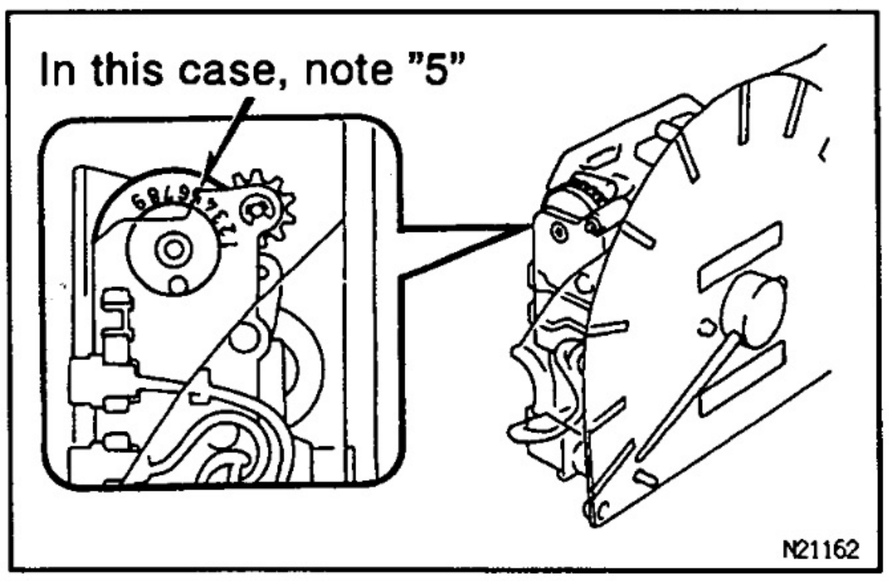
T–BELT WARNING INSPECTION

Replace speedometer

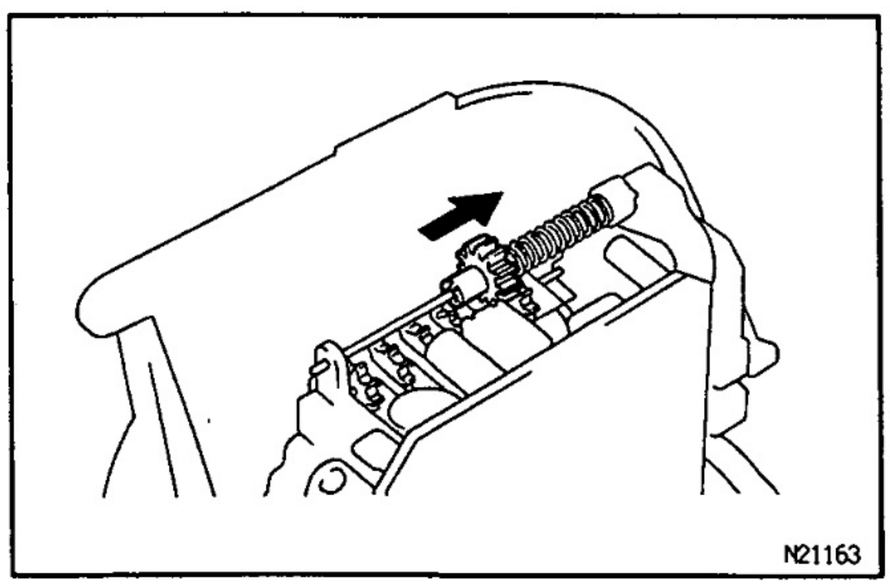
HINT: When replacing the speedometer for diesel engine vehicle, set the T–BELT warning cam position of the new speedometer for the running distance.

1. **REMOVE COMBINATION METER**
2. **REMOVE COMBINATION METER COVER**
3. **REMOVE SPEEDOMETER**
4. **ADJUSTING CAN FOR T–BELT WARNING**

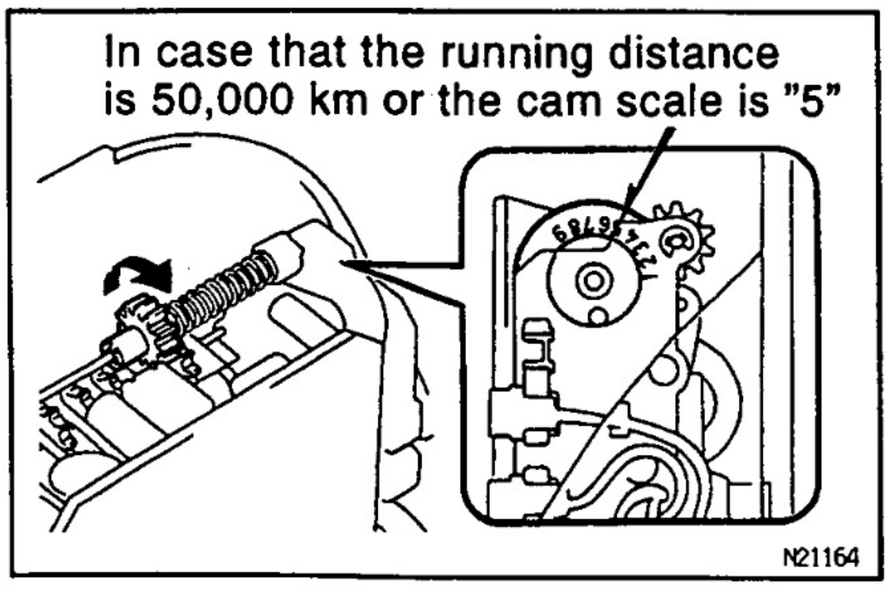
(a) Check the running distance of the removed speedometer and round off the 1,000 km digit to set the distance by 10,000 km.
For example:
43612 km → 40000 km
48963 km → 50000 km



HINT: If the speedometer shows the trace to have been replaced, (e.g. the running distance and the scale of the T – BELT warning cam are not the same.), record the value on the cam scale.

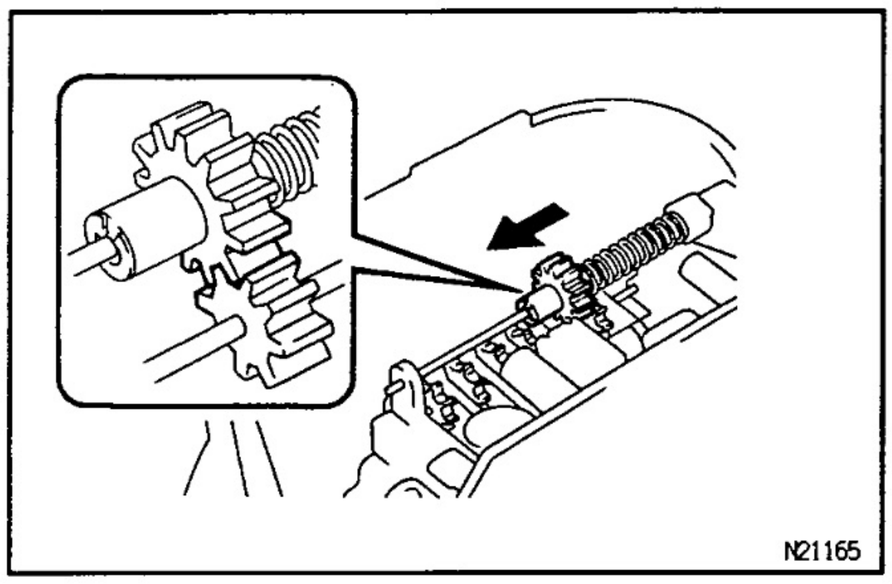


(b) Slide the gear for the T–BELT warning to release its fitting within the total pinion.



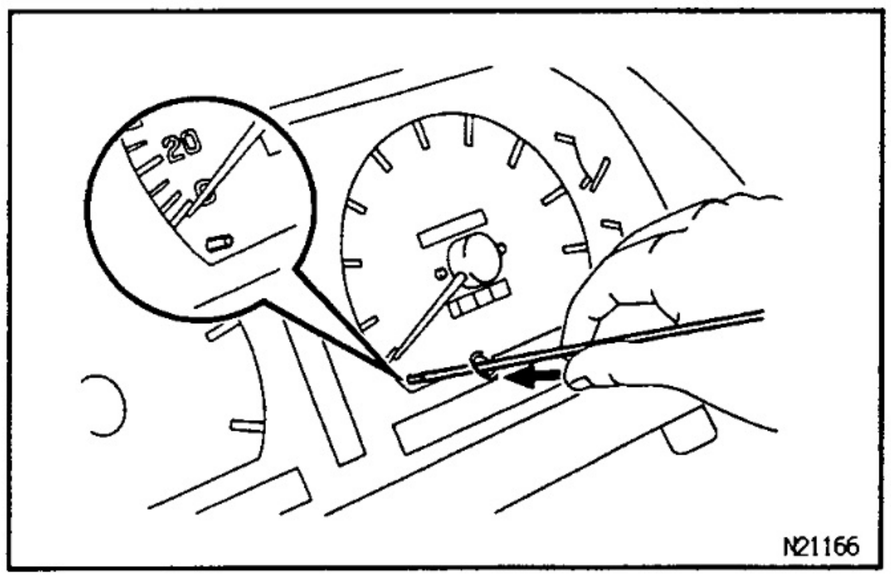
(c) Turn the slided gear so that the T–BELT warning cam shows the equipment figure either within the 10,000 km figure rounded previously or the cam scale.

- Align the cam scale to the lever part of the reset switch.
- Positioning the gear between the scales does not show 5,000 km.



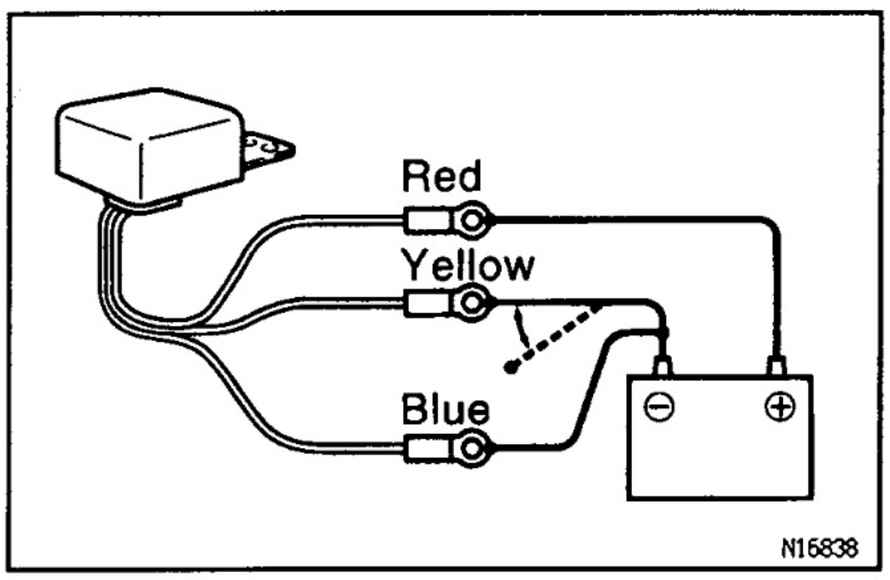
(d) Return the slided gear to the original
At this time, check that the lib of the slided gear is fitted with a small tooth of the total pinion.

5. **INSTALL SPEEDOMETER**
6. **INSTALL COMBINATION METER COVER**
7. **INSTALL COMBINATION METER**



8. **T–BELT WARNING RESET**

(a) Start the engine, and check that the T–BELT warning light is off.
(b) If the T–BELT warning light does not go off, remove the grommet of the combination meter and push the T–BELT reset switch with wire of similar to turn the light off.

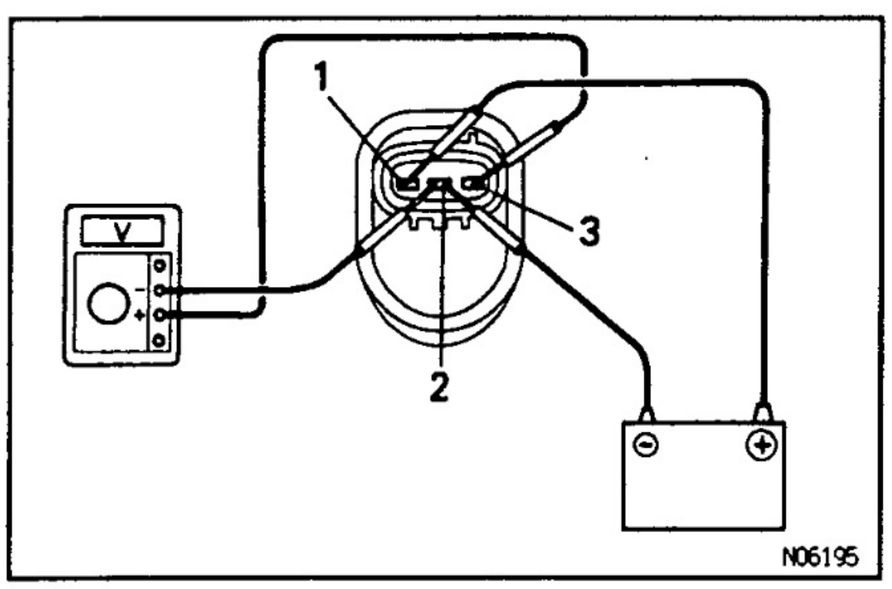


SPEED WARNING INSPECTION

BE3AC–01

INSPECT SPEED WARNING CHIME

(a) Connect the positive (+) lead from the battery to terminal Red and the negative (–) lead to terminal Blue.
(b) Connect the intermittently negative (–) lead to terminal Yellow, check that the chime sound.
HINT: The sound will be distorted if the chime is tilted.
If operation is not as specified, replace the chime.



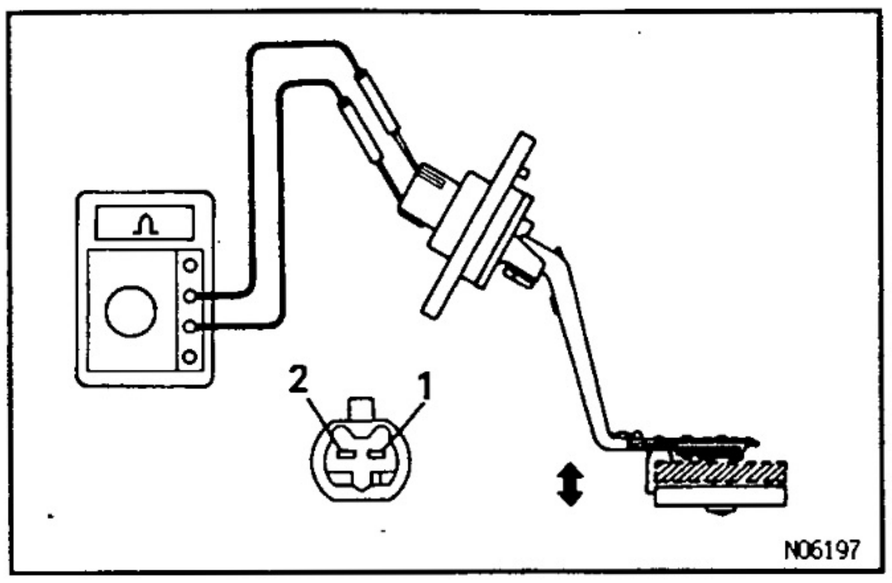
No.1 VEHICLE SPEED SENSOR INSPECTION

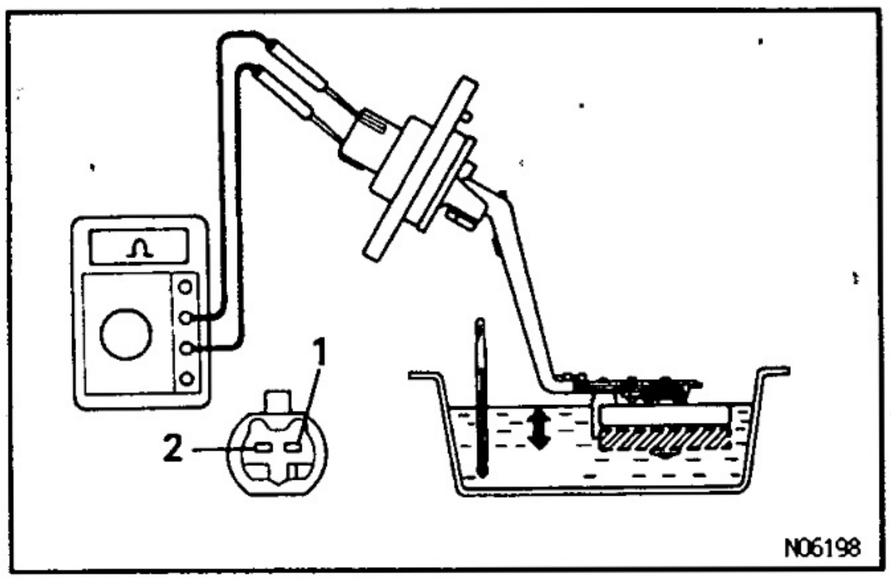
BE2KU–05

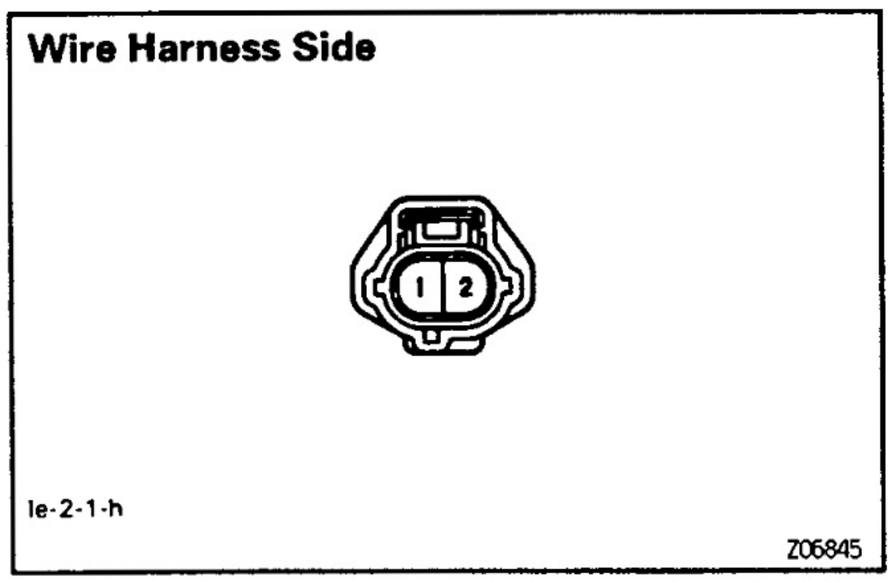
INSPECT SENSOR OPERATION

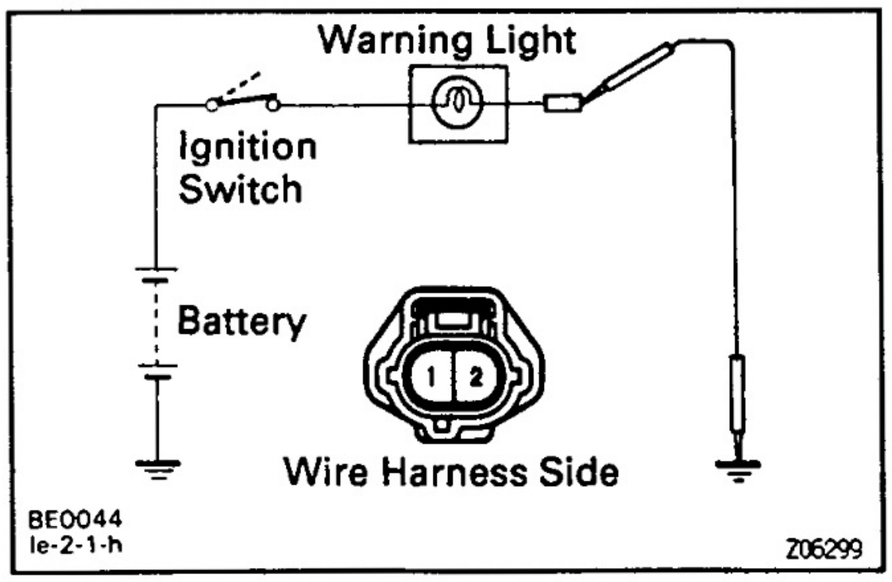
(a) Connect the positive (+) lead from battery to terminal 1 and negative (–) lead to terminal 2.
(b) Connect the positive (+) lead from tester to terminal 3 and negative (–) lead to terminal 2.
(c) Revolve shaft.
(d) Check that there is voltage changer from approx. 0 V to 11 V or more between terminals 3 and 2.
HINT: The voltage change should be 4 times per each revolution of the No.1 vehicle speed sensor shaft.
If operation is not as specified, replace the sensor.

BE









BE2L1-06

ENGINE OIL LEVEL WARNING INSPECTION

1. INSPECT WARNING SWITCH

(a) Check that there is continuity between terminal with the switch each position.

(b) Heat the switch to above 60°C (140°F) in an oil bath.

(c) Check that there is continuity between terminals with the switch ON (float up).

(d) Check that there is no continuity between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.

2. INSPECT WARNING CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.

3. INSPECT WARNING LIGHT

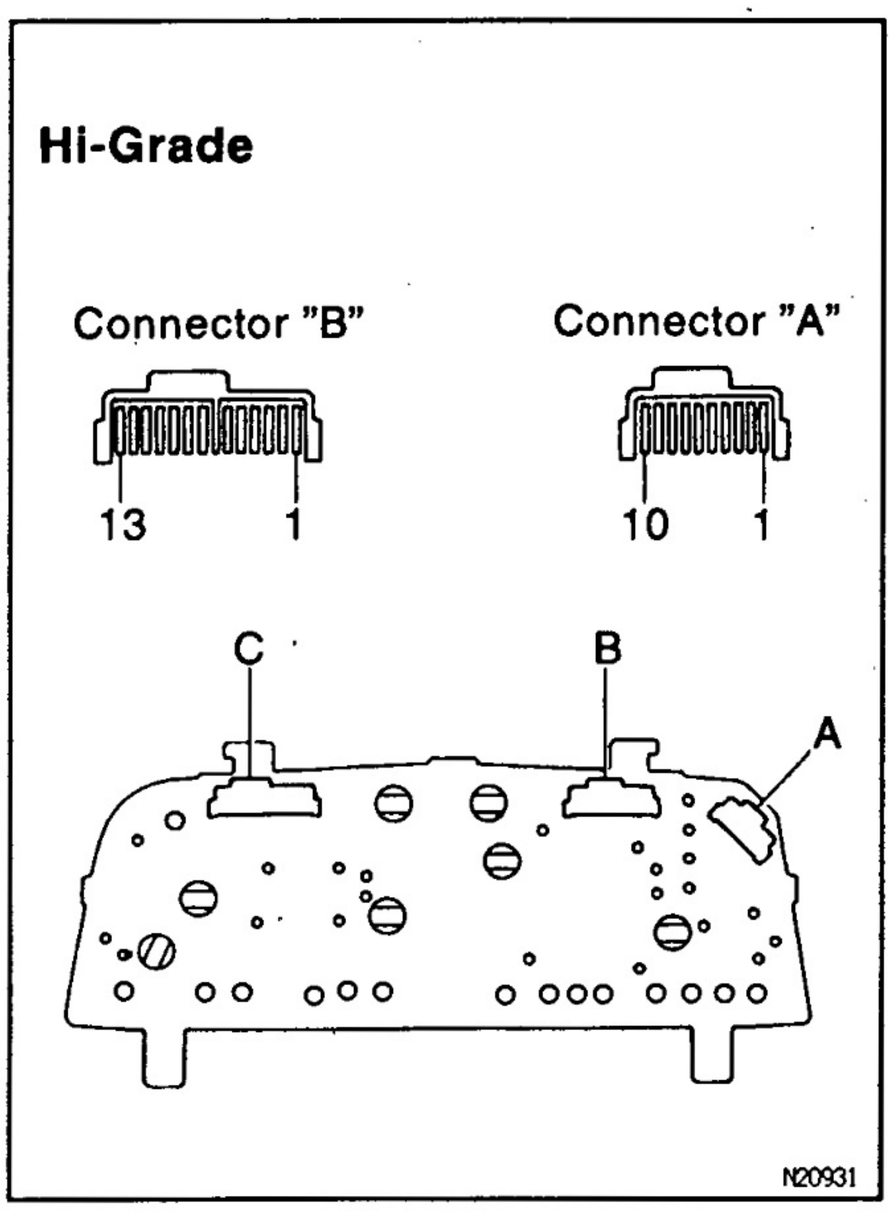
(a) Disconnect the connector from the switch.

(b) Ground terminal 1 on the wire harness connector.

(c) Turn the ignition switch ON, and check that the warning light lights up approximately 40 seconds later.

If the warning light does not light up, inspect bulb or wire harness.

BE



BE36K-02

TURBO WARNING INSPECTION

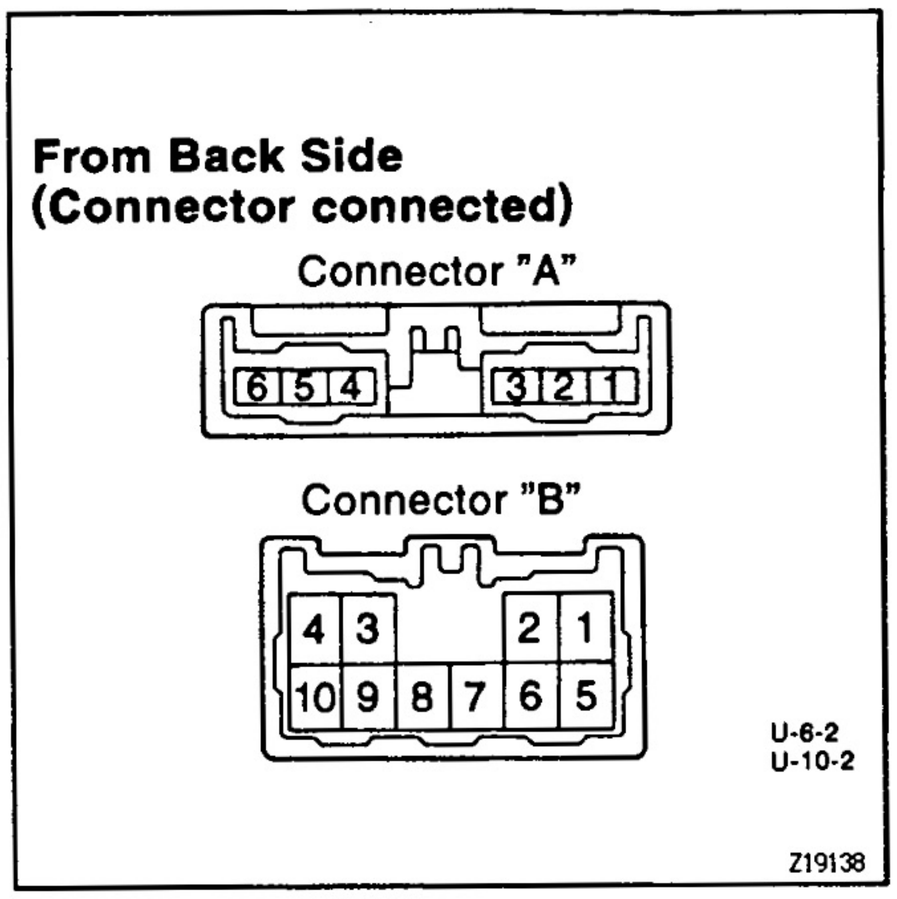
INSPECT TURBO INDICATOR AND WARNING LIGHT DRIVE CIRCUIT

Europe:

(a) Remove the combination meter.
(b) Connect the positive (+) lead to terminal B11, then check that the indicator light lights up.

Except Europe: **( ):Except Australia**

(a) Remove the combination meter.
(b) Connect the positive (+) lead from the battery to terminal A5 (A4) and the negative (−) lead to the terminal B6 (B5), then check that the indicator light lights up.
(c) Connect the battery negative (−) lead to the terminal B13 (B13).
(d) Check that the indicator light goes out.



BE3AD-01

COMPASS SYSTEM

1. INSPECT ACCESSORY METER CIRCUIT

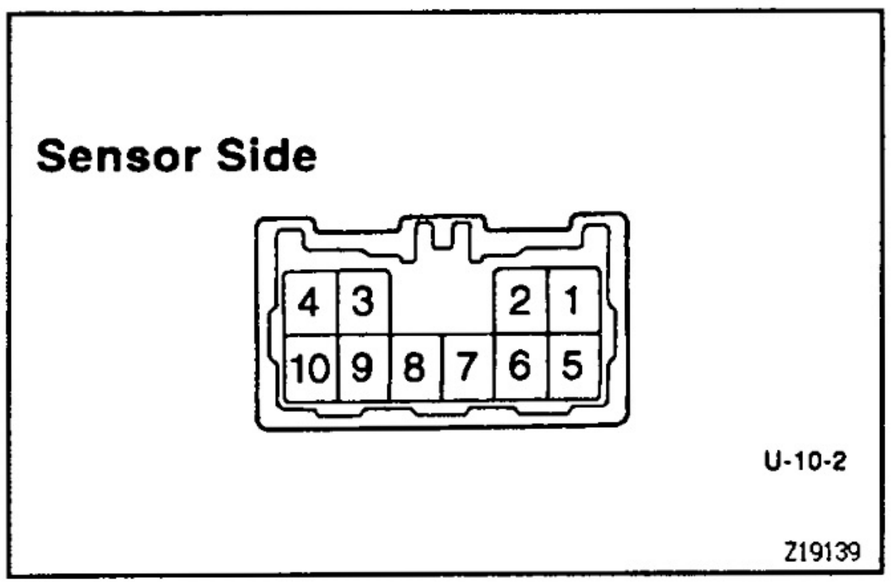
Connect connector "A" and "B" accessory meter and inspect connectors from the back side, as shown in the chart.

NOTICE: Perfrom the inspection in a place free from magnetic influence.

Terminal Name	Check for	Tester connection	Condition		Specified value
ACC	Voltage	A1 – A4	Ignition switch turned to ACC or ON		10 – 14 V
TAIL		A3 – A4	Light control switch turned to TAIL or HEAD		10 – 14 V
GROUND	Continuity	A4 – Ground	Constant		Continuity
GND		B4 – Ground	Constant		Continuity
ACC	Voltage	B6 – B4	Ignition switch turned to ACC or ON		10 – 14 V
HX1	Voltage	B5 – B4	Knob "N" position	Turned fully counter clockwise	1.2 – 1.8 V
				Neutral	3.7 – 4.3 V
				Turned full clockwise	6.2 – 6.8 V
			Knob "E" turned to clockwise and knob "N" turned to neutral position		3.7 – 4.3 V
HY2	Voltage	B8 – B4	Knob "E" position	Turned fully counter clockwise	3.3 – 3.5 V
				Neutral	3.9 – 4.1 V
				Turned full clockwise	4.5 – 4.7 V
			Knob "N" turned to clockwise and knob "E" turned to neutral position		3.9 – 4.1 V
HX2	Voltage	B9 – B4	Knob "N" position	Turned fully counter clockwise	3.3 – 3.5 V
				Neutral	3.9 – 4.1 V
				Turned full clockwise	4.5 – 4.7 V
			Knob "E" turned to clockwise and knob "N" turned to neutral position		3.9 – 4.1 V
HY1	Voltage	B10 – B4	Knob "E" position	Turned fully counter clockwise	1.2 – 1.8 V
				Neutral	3.7 – 4.3 V
				Turned full clockwise	6.2 – 6.8 V
			Knob "N" turned to clockwise and knob "E" turned to neutral position		3.7 – 4.3 V

V08320

If the circuit is not as specified, inspect the circuits connector to other parts or wire harness.



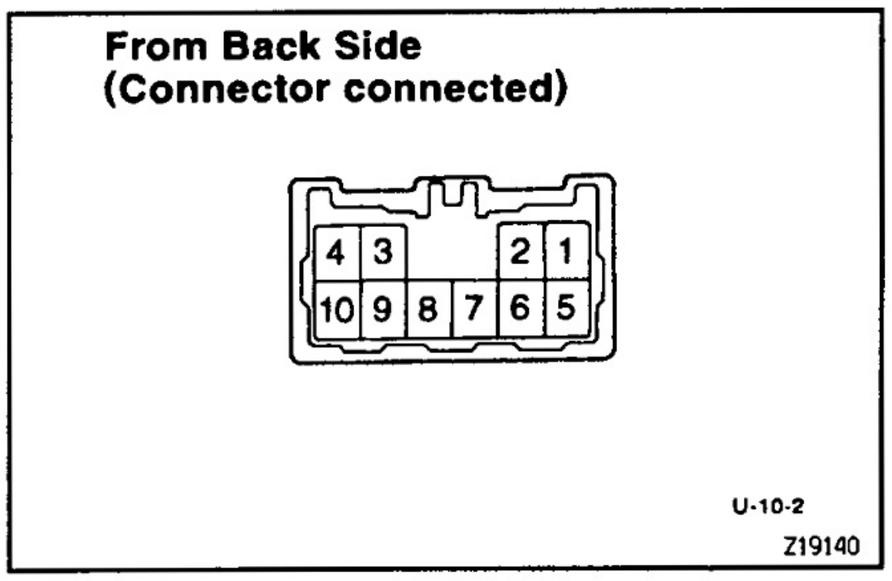
2. INSPECT MAGNET FIELD SENSOR RESISTANCE

Measure the resistance between terminals B5 and B9.

Resistance:

81 – 111 Ω

If resistance value is not as specified, replace the sender gauge.



3. INSPECT MAGNET FIELD SENSOR RESISTANCE

Connect connector to sensor and inspect connector from the back side, as shown in the chart.

BE

Terminal Name	Check for	Tester connection	Condition		Specified value
SX	Voltage	1 – 4	Face the car north, then turn the car in a circle.	Facing North	Approx. 4.0 V
				Facing East	Approx. 4.2 V
				Facing South	Approx. 4.0 V
				Facing West	Approx. 3.8 V
SY		2 – 4	Face the car north, then turn the car in a circle.	Facing North	Approx. 4.2 V
				Facing East	Approx. 4.0 V
				Facing South	Approx. 3.8 V
				Facing West	Approx. 4.0 V
VDD		3 – 4	Ignition switch turned to ACC		Approx. 8.0 V
ACC		6 – 4	Ignition switch turned to ACC		10 – 14 V
VSS		7 – 4	Ignition switch turned to ACC		Approx. 4.0 V
GND	Continuity	4 – Ground	Constant		Continuity

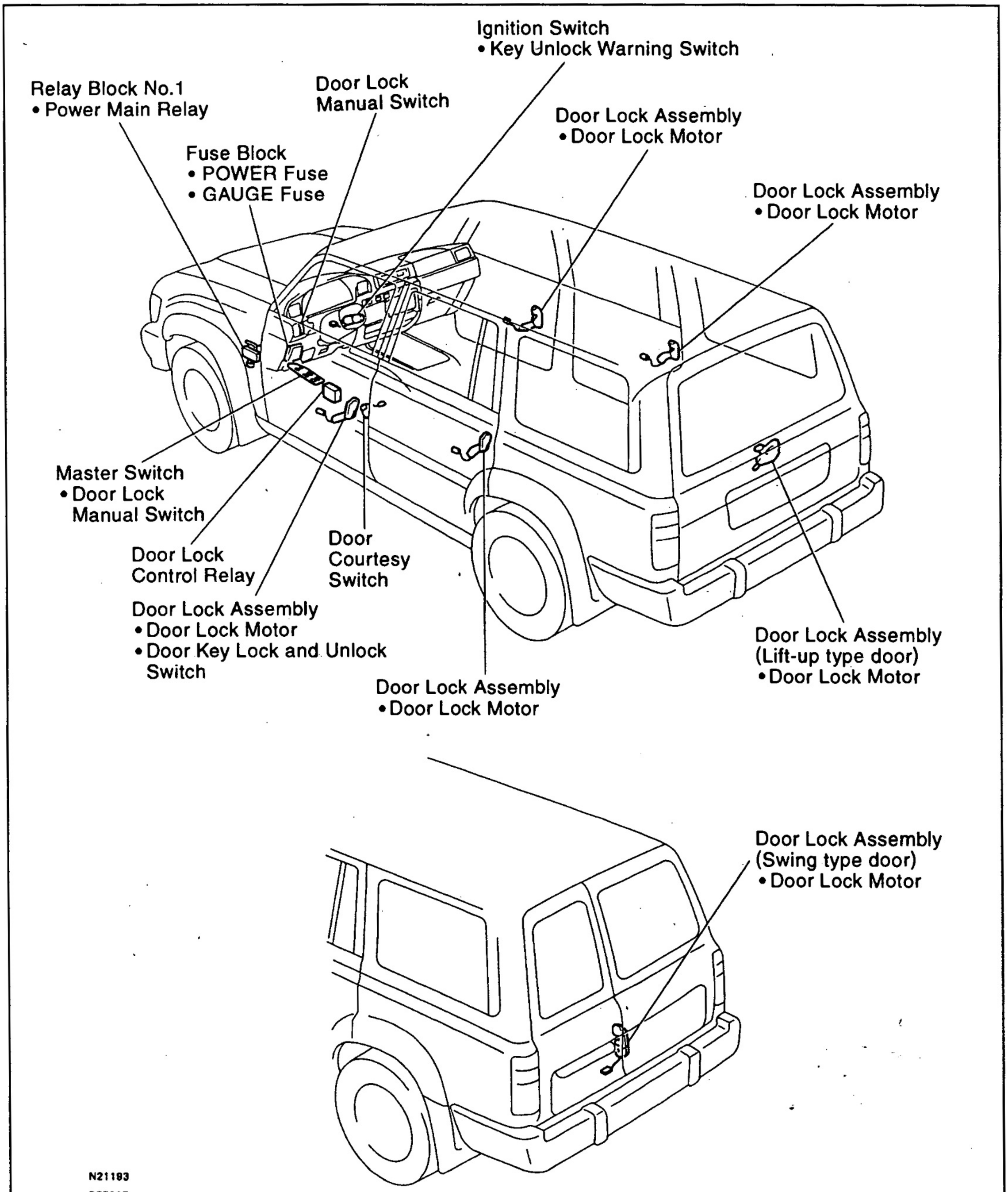
V08321

If resistance is not as specified, inspect the circuits connected to other parts or wire harness.

POWER DOOR LOCK CONTROL SYSTEM

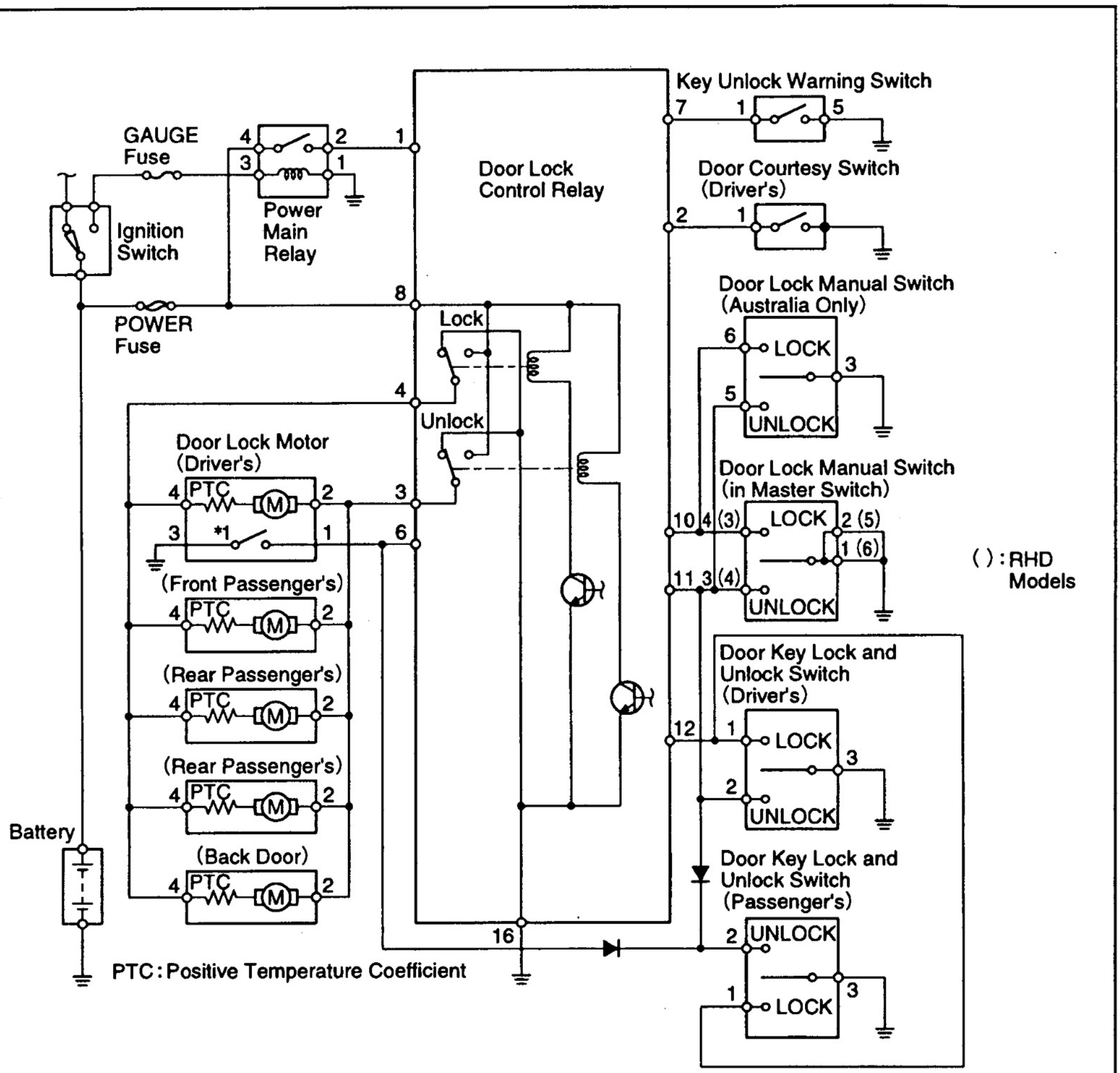
PARTS LOCATION

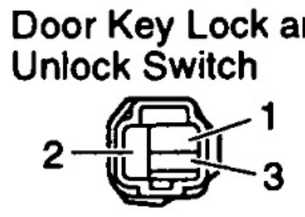
BE0JZ-0C

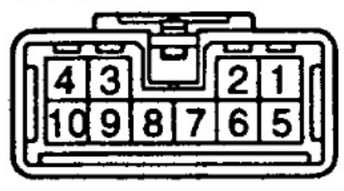


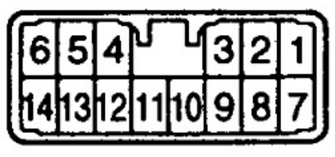
BE3AE-01

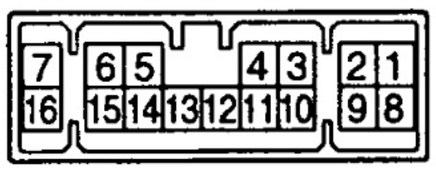
WIRING DIAGRAMS

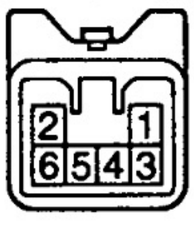








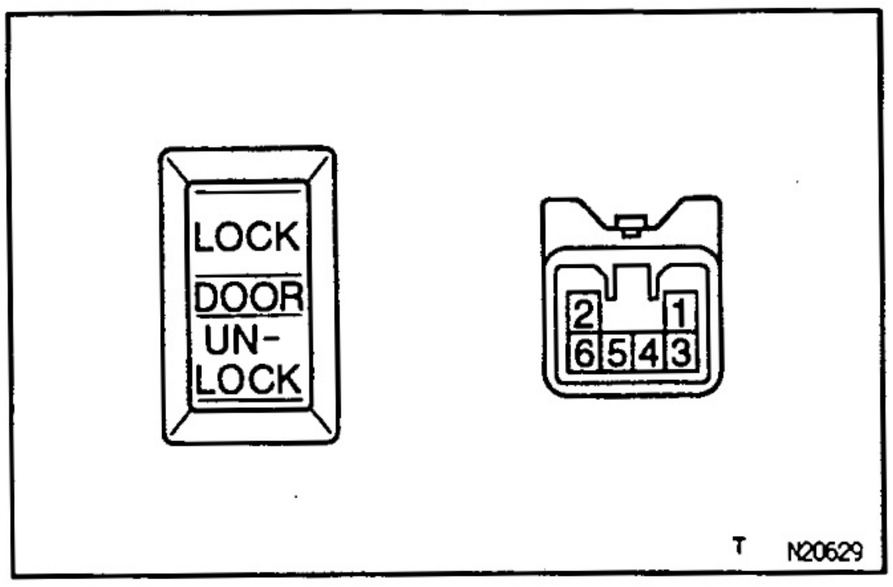




N20627
1U-3-2 e-10-2-B S-1-1-B S-14-2-B
S-16-2 GA-4-2 BE1647 1S-4-2-B

T

N20627



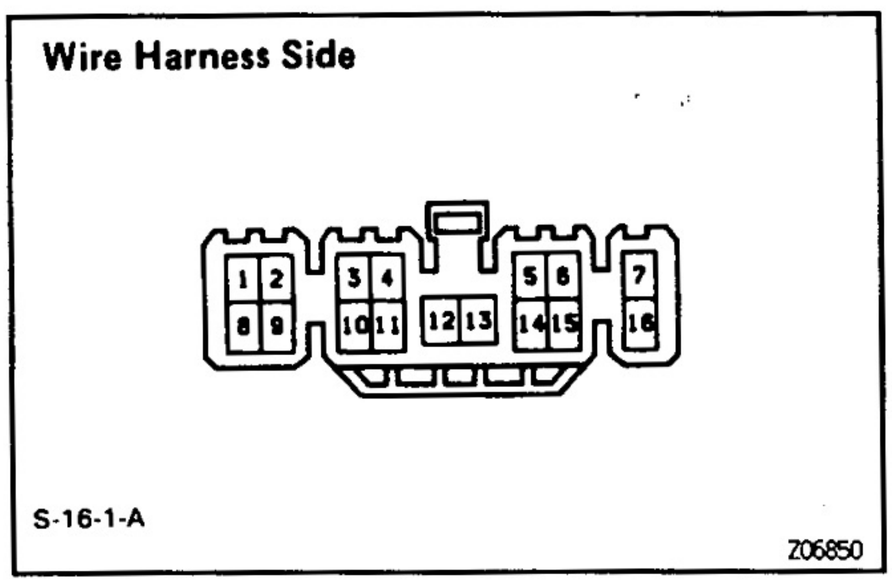
BE0K4-0B

DOOR LOCK MANUAL SWITCH INSPECTION (Less Power Window System: Australia Only)

INSPECT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UNLOCK	3 — 5	Continuity
OFF	—	No continuity
LOCK	3 — 6	Continuity

If continuity is not as specified, replace the switch.



BE3AF-01

DOOR LOCK CONTROL RELAY INSPECTION

INSPECT RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
2 — Ground	Driver's door courtesy switch position OFF (Door closed)	No continuity
2 — Ground	Driver's door courtesy switch position ON (Door opened)	Continuity
5 — Ground	Passenger's door lock switch position OFF (Door locked)	No continuity
5 — Ground	Passenger's door lock switch position ON (Door unlocked)	Continuity
6 — Ground	Driver's door lock switch position OFF (Door locked)	No continuity
6 — Ground	Driver's door lock switch position ON (Door unlocked)	Continuity
6 — Ground	Passenger's door key lock and unlock switch OFF (Door locked)	No continuity
6 — Ground	Passenger's door key lock and unlock switch ON (Door unlocked)	Continuity
7 — Ground	Key unlock warning switch position OFF (Ignition Key Removed)	No continuity

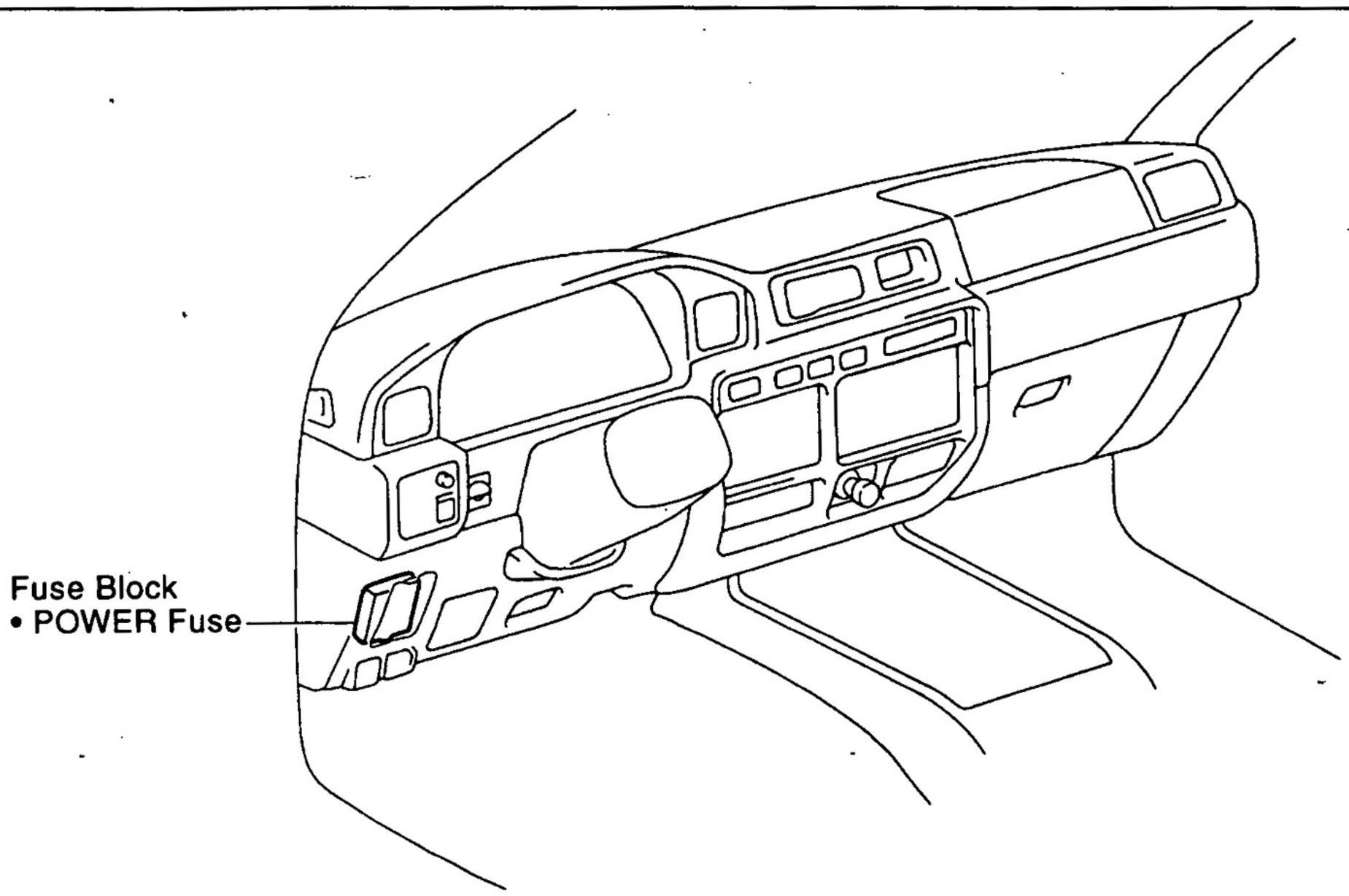
7 – Ground	Key unlock warning switch position ON (Ignition Key Set)	Continuity
9 – Ground	Driver's door key lock and unlock switch position OFF or LOCK (Door key free or turned to lock)	No continuity
9 – Ground	Driver's door key lock and unlock switch position UNLOCK (Door key turned to unlock)	Continuity
10 – Ground	Door lock manual switch position OFF or UNLOCK	No continuity
10 – Ground	Door lock manual switch position LOCK	Continuity
10 – Ground	Passenger's door key lock and unlock switch ON (Door unlocked)	No continuity
10 – Ground	Passenger's door key lock and unlock switch OFF (Door locked)	Continuity
11 – Ground	Door lock manual switch and passenger's door key lock and unlock switch position OFF or LOCK	No continuity
11 – Ground	Door lock manual switch or passenger's door key lock and unlock switch position UNLOCK	Continuity
12 – Ground	Driver's and passenger's door key lock and unlock switch position OFF or UNLOCK (Door key free or turned to unlock)	No continuity
12 – Ground	Driver's or passenger's door key lock and unlock switch position LOCK (Door key turned to lock)	Continuity
14 – Ground	Passenger's door courtesy switch position OFF (Door closed)	No continuity
14 – Ground	Passenger's door courtesy switch position ON (Door opened)	Continuity
16 – Ground	Constant	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON	Battery voltage
8 – Ground	Constant	Battery voltage

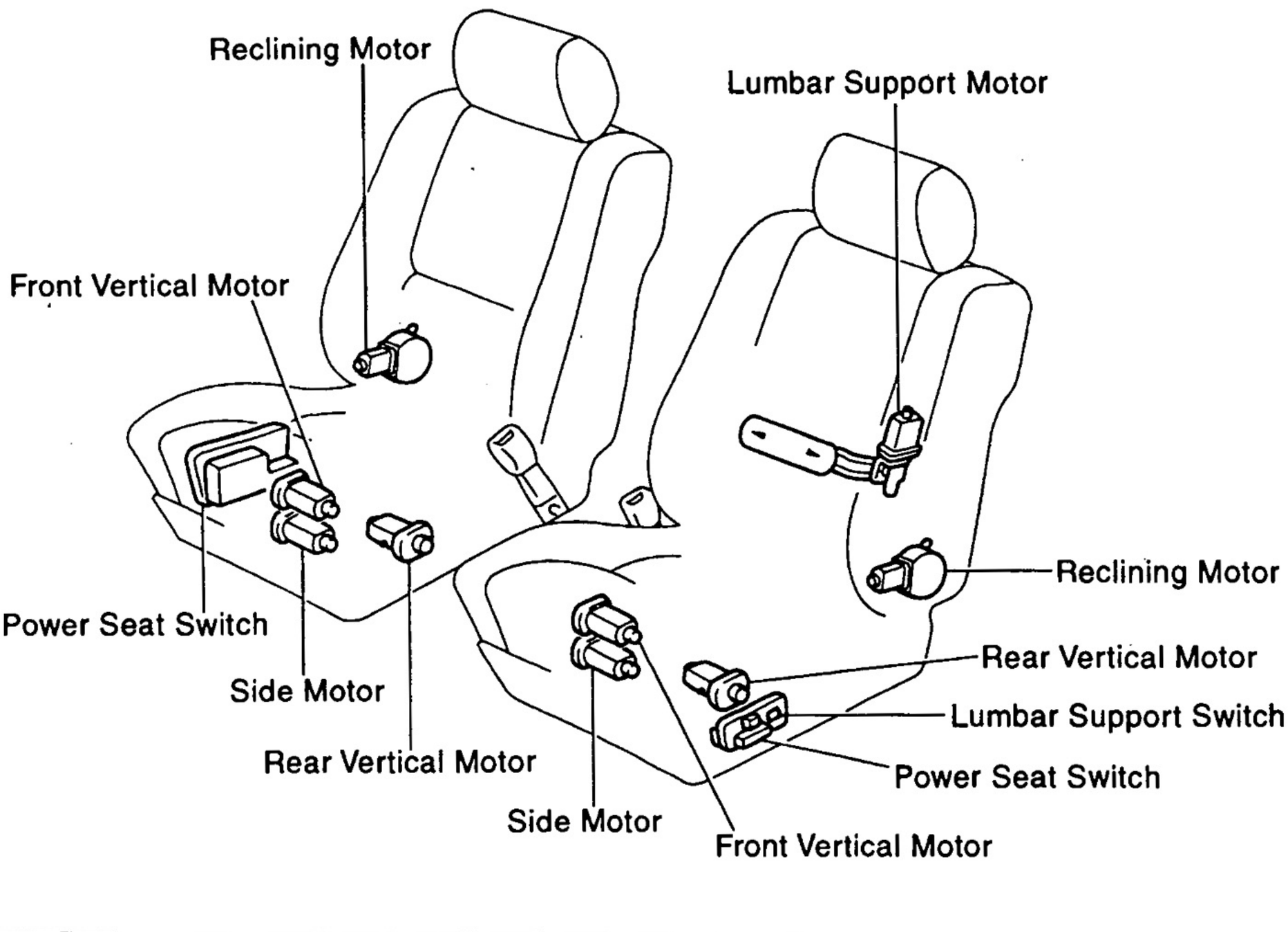
If circuit is as specified, inspect the door lock signal.
If the circuit is not as specified, inspect the circuits connected to other parts.

POWER SEAT CONTROL SYSTEM

PARTS LOCATION

BEOKR-04

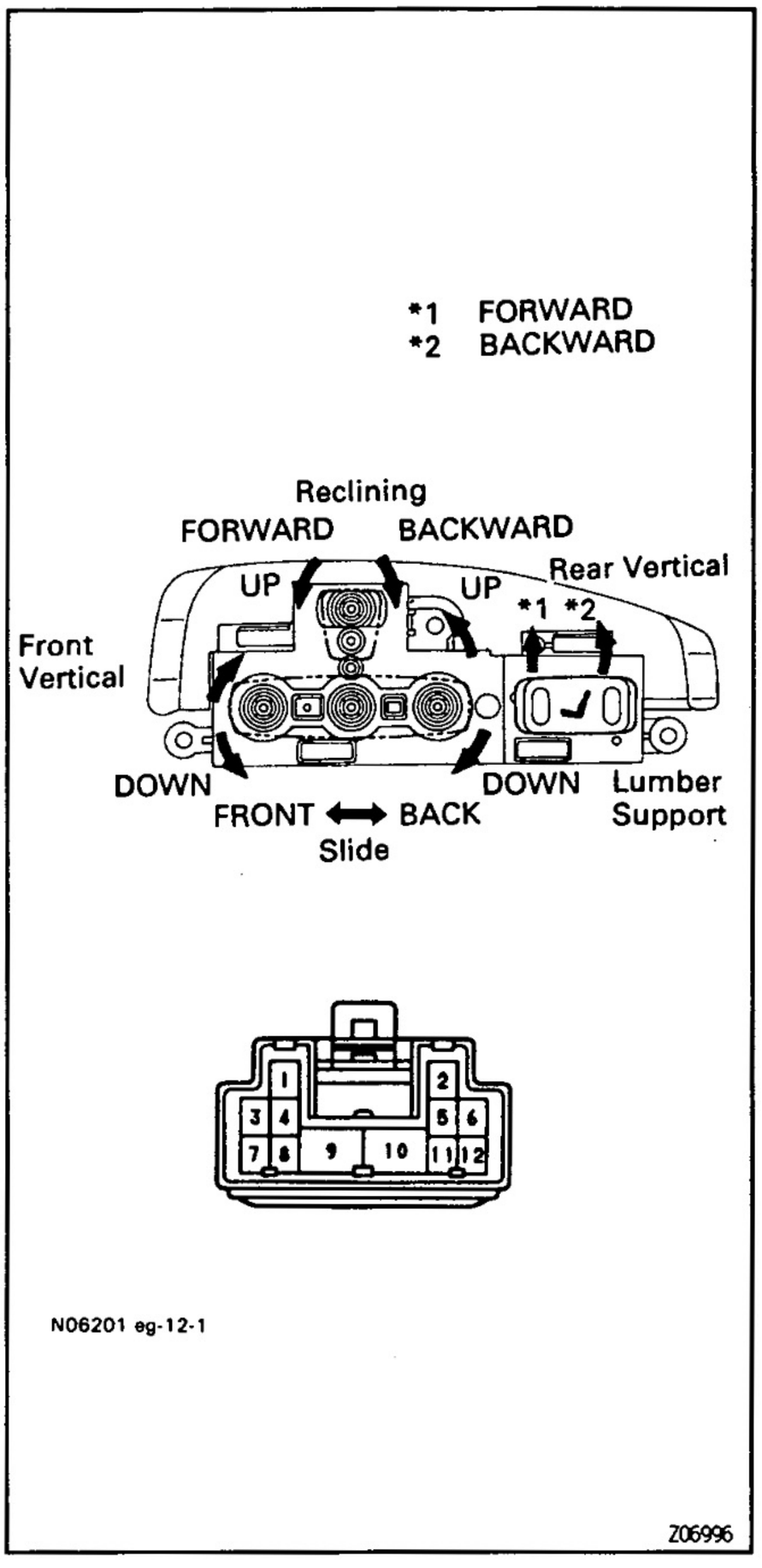




N14214
N20689

Z19279

BE



BE2KE-02

POWER SEAT SWITCH INSPECTION (DRIVER'S SIDE)

INSPECT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FORWARD	5 – 10, 8 – 9	Continuity
OFF	5 – 8 – 9	Continuity
BACKWARD	5 – 9, 8 – 10	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	4 – 11, 10 – 12	Continuity
OFF	4 – 11 – 12	Continuity
DOWN	4 – 12, 10 – 11	Continuity

Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 10, 6 – 7	Continuity
OFF	2 – 6 – 7	Continuity
DOWN	2 – 7, 6 – 10	Continuity

Reclining switch:

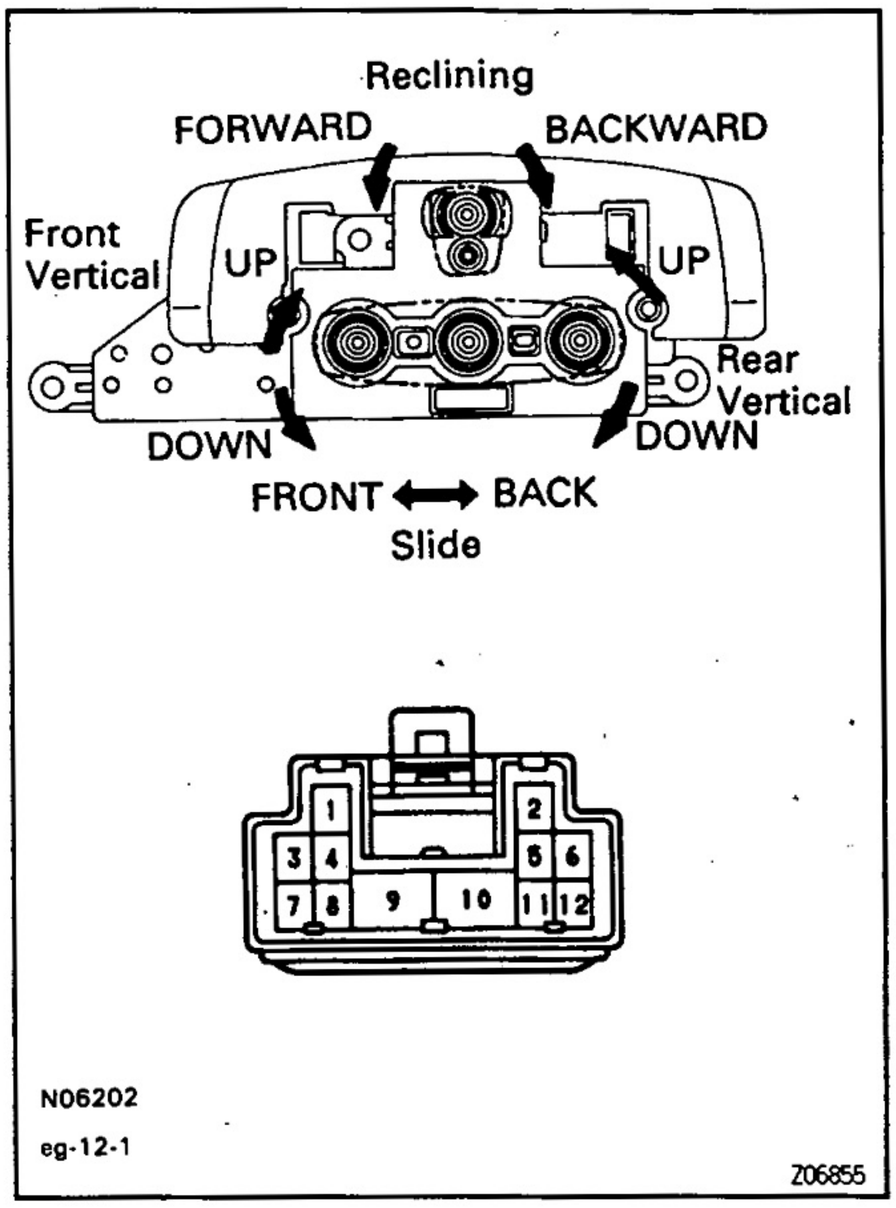
Switch position	Tester connection	Specified condition
FORWARD	4 – 10, 7 – 9	Continuity
OFF	4 – 7 – 9	Continuity
BACKWARD	4 – 9, 7 – 10	Continuity

Lumbar support switch:

Switch position	Tester connection	Specified condition
FORWARD	4 – 10, 7 – 9	Continuity
OFF	4 – 7 – 9	Continuity
BACKWARD	4 – 9, 7 – 10	Continuity

If continuity is not as specified, replace the switch.

BE



BE2KG-02

POWER SEAT SWITCH INSPECTION (PASSENGER'S SIDE)

INSPECT SWITCH CONTINUITY

Inspect the switch continuity between terminals.

Slide switch:

Switch position	Tester connection	Specified condition
FORWARD	5 – 10, 8 – 9	Continuity
OFF	5 – 8 – 9	Continuity
BACKWARD	5 – 9, 8 – 10	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	4 – 11, 10 – 12	Continuity
OFF	4 – 11 – 12	Continuity
DOWN	4 – 12, 10 – 11	Continuity

Rear vertical switch:

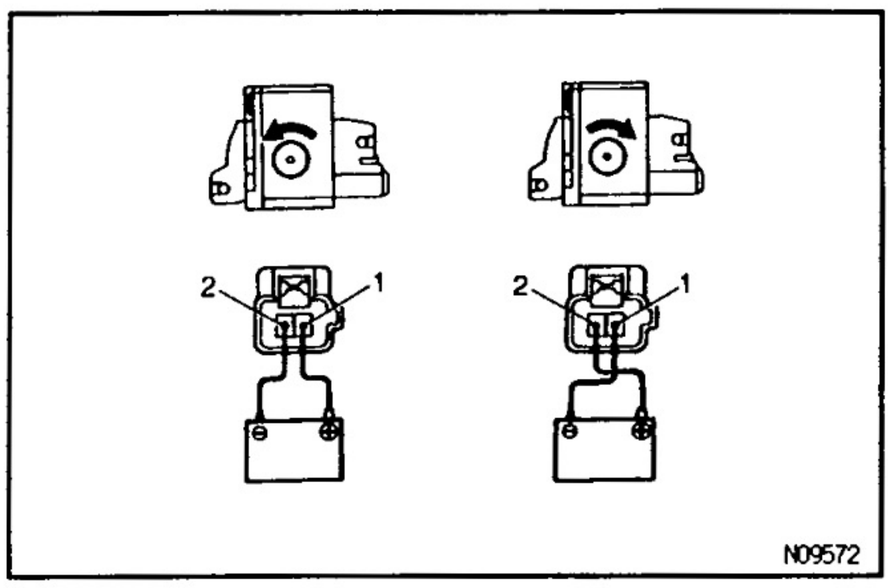
Switch position	Tester connection	Specified condition
UP	2 – 10, 6 – 7	Continuity
OFF	2 – 6 – 7	Continuity
DOWN	2 – 7, 6 – 10	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	4 – 10, 7 – 9	Continuity
OFF	4 – 7 – 9	Continuity
BACKWARD	4 – 9, 7 – 10	Continuity

If continuity is not as specified, replace the switch.

BE



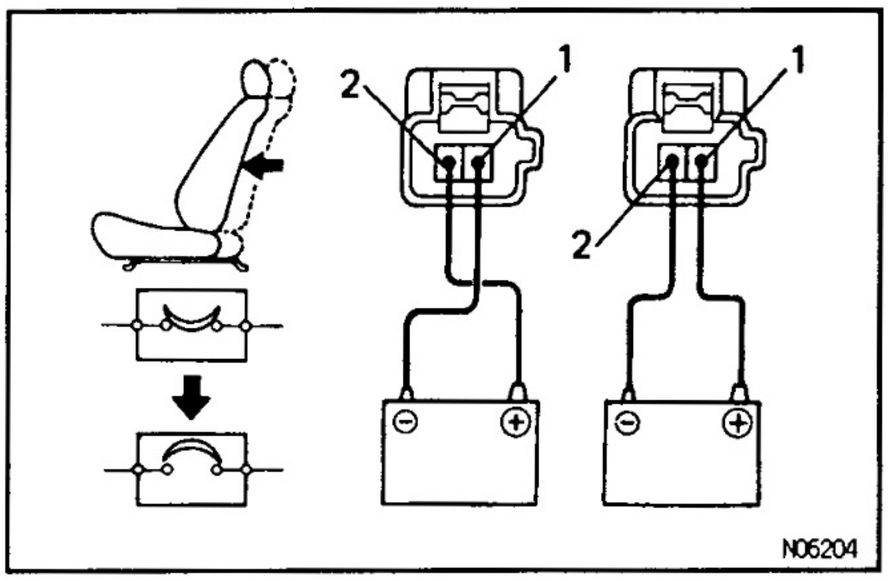
SLIDE MOTOR INSPECTION

BE3KJ-02

1. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (−) lead to terminal 2, and check that the motor turns counterclockwise.

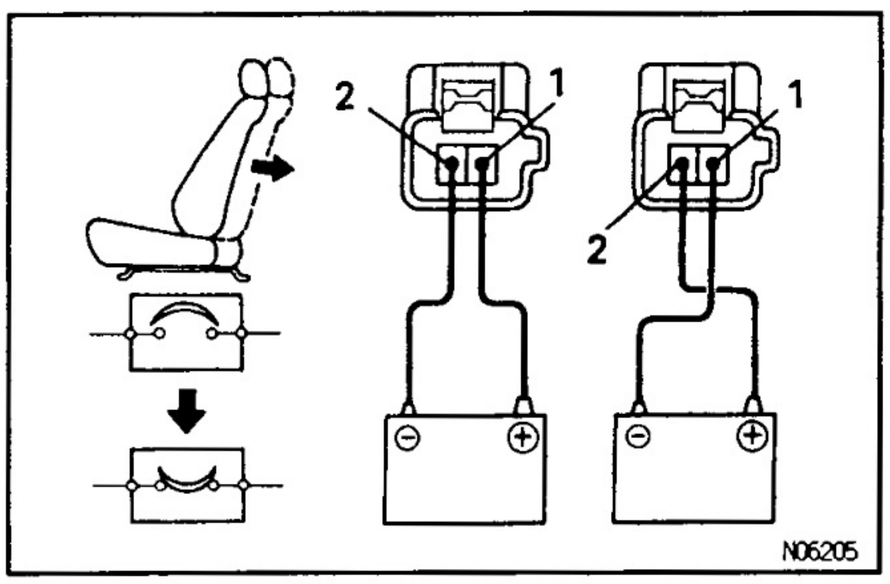
(b) Reverse the polarity, and check that the motor turns clockwise.
If operation is not as specified, replace the motor.



2. INSPECT CIRCUIT BREAKER OPERATION

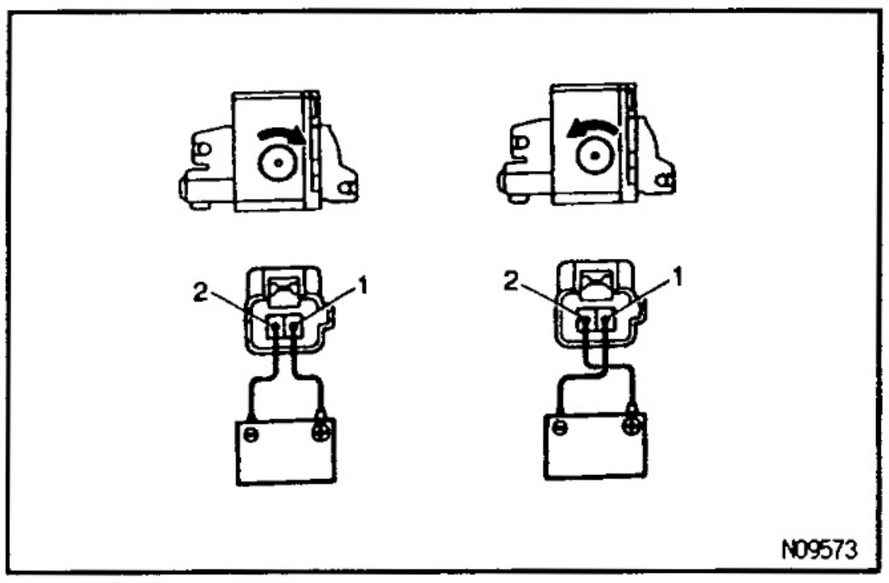
(a) Connect the positive (+) lead and the negative (−) lead from the battery to slide motor connector (illustrated terminals), and slide the seat to front end position.

(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.



(c) Reverse the polarity, and check that the seat begins to move backwards within approximately 60 seconds.
If operation is not as specified, replace the motor.

BE



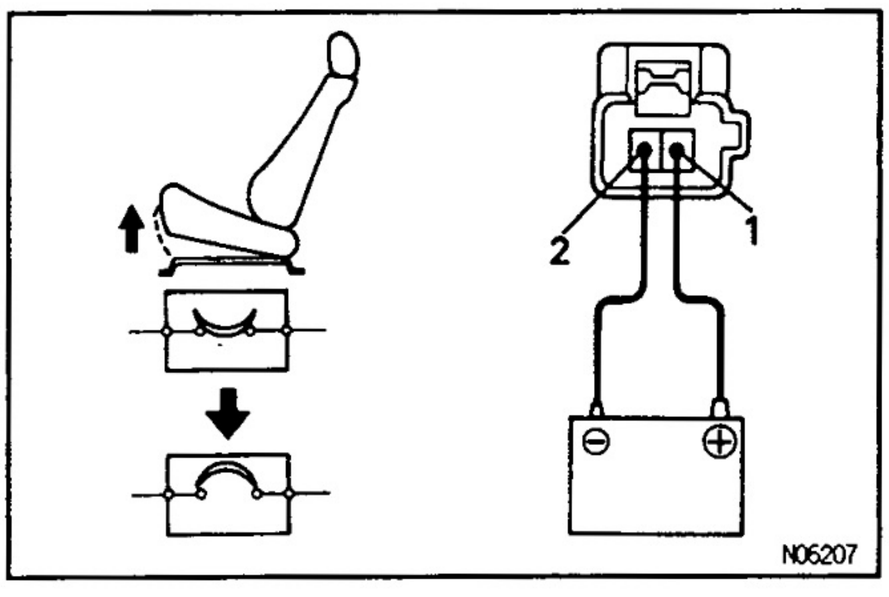
FRONT VERTICAL MOTOR INSPECTION

BE3KL-02

1. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (−) lead to terminal 2, and check that the motor turns clockwise.

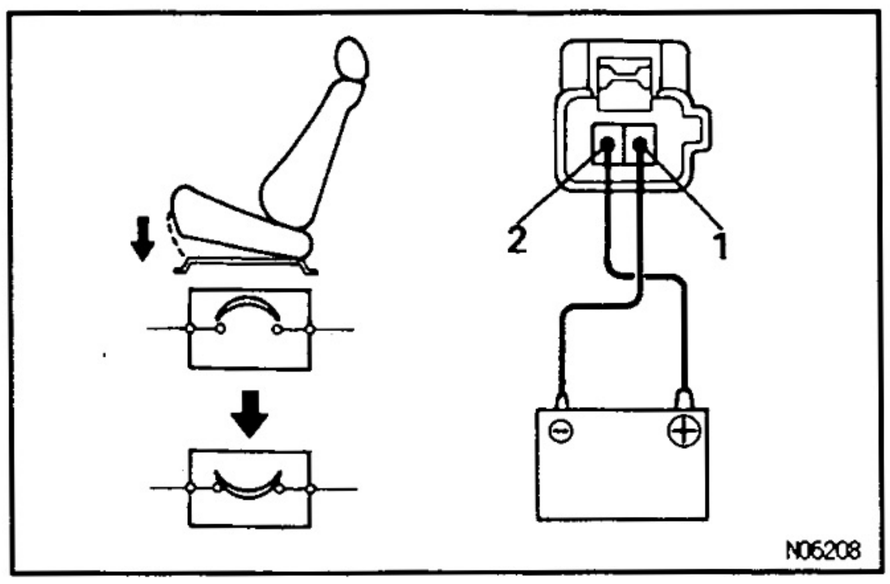
(b) Reverse the polarity, check that the motor turns counterclockwise.
If operation is not as specified, replace the motor.



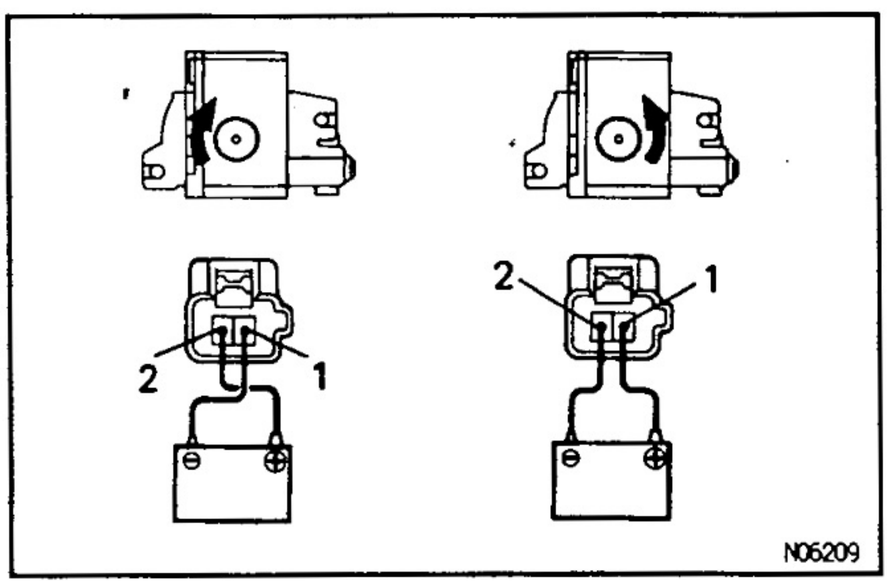
2. INSPECT CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead and the negative (−) lead from the battery to the front vertical motor connector (illustrated terminals), and move the front edge of seat cushion to the highest position.

(b) Continue to apply voltage, and check that there is a circuit breaker operation noise within 4 to 60 seconds.



(c) Reverse the polarity, and check that the seat cushion begins to descend within approximately 60 seconds. If operation is not as specified, replace the motor.



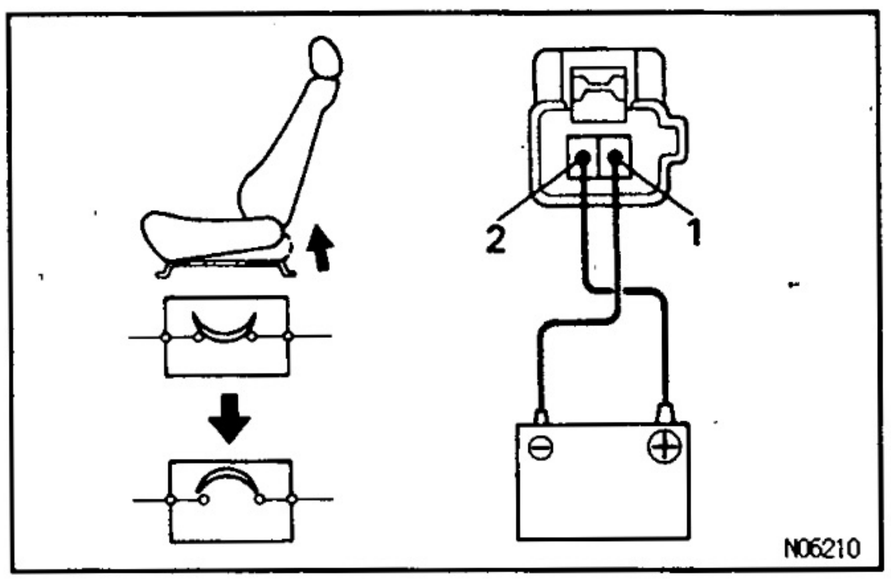
REAR VERTICAL MOTOR INSPECTION

BE2KN-02

1. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (−) lead to terminal 1, and check that the motor turns clockwise.

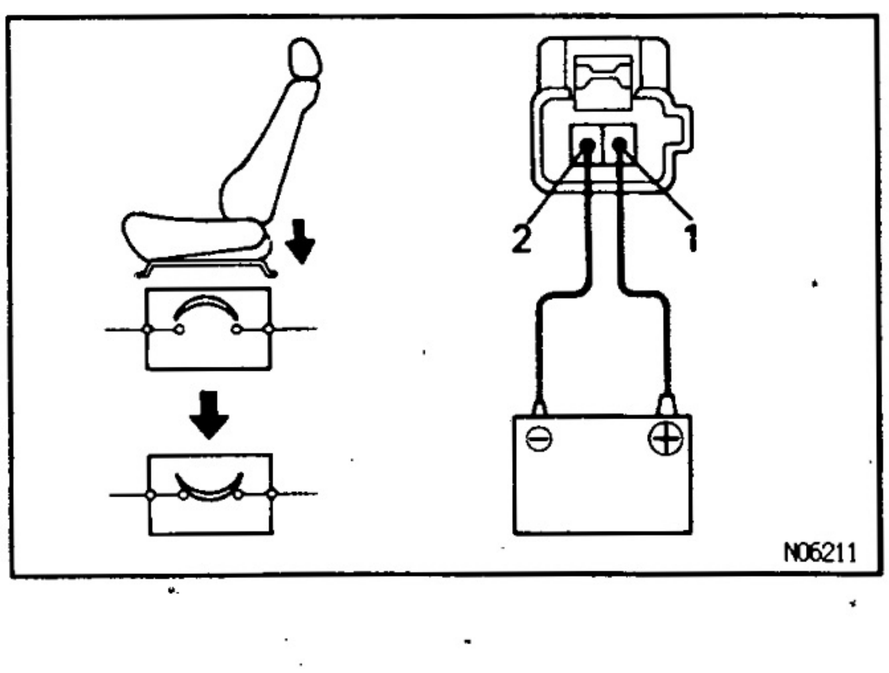
(b) Reverse the polarity, and check that the motor turns counterclockwise.
If operation is not as specified, replace the motor.



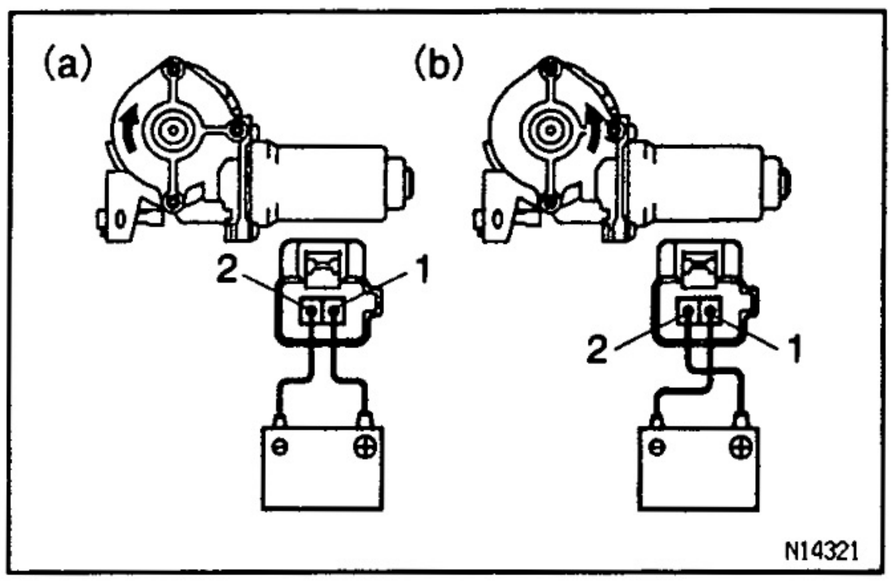
2. INSPECT CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead and the negative (−) lead from the battery to the rear vertical motor connector (illustrated terminals), and move the front edge of seat cushion to the highest position.

(b) Continue to apply voltage, and check that there is a circuit breaker operation noise within 4 to 60 seconds.



(c) Reverse the polarity, check that the seat cushion begins to descend within approximately 60 seconds. If operation is not as specified, replace the motor.



BE2KP-02

RECLINING MOTOR INSPECTION (DRIVER'S SIDE)

1. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (−) lead to terminal 2, and check that the motor turns clockwise.

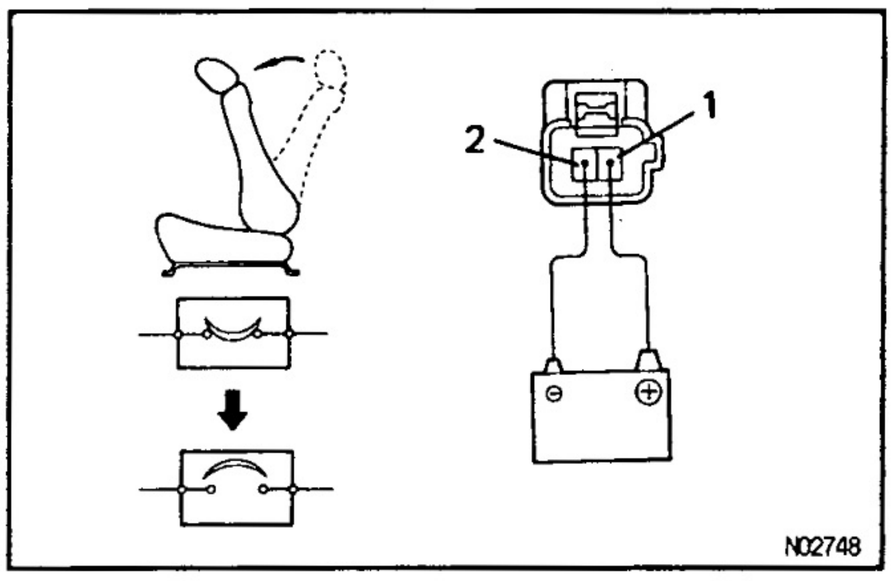
(b) Reverse the polarity, and check that the motor turns counterclockwise.

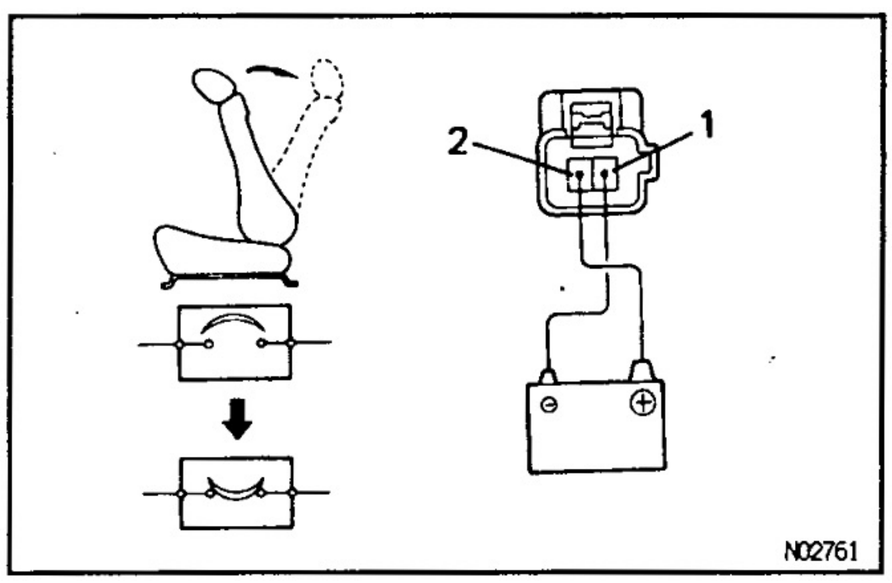
If operation is not as specified, replace the motor.

2. INSPECT CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead from terminal 1 and negative (−) lead to terminal 2.

Check that the seat back reclines to the most forward position.

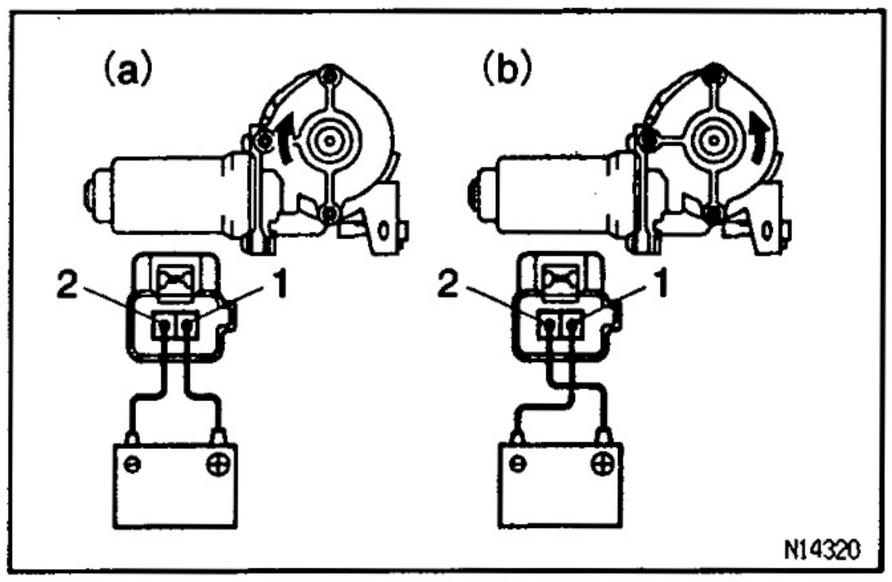




(b) Continue to apply voltage, and check that there is a circuit breaker operation noise within 4 to 40 seconds.

(c) Reverse the polarity, and check that the seat back starts to fall backwards within approximately 60 seconds.

If operation is not as specified, replace the motor.



BE2KQ-02

RECLINING MOTOR INSPECTION (PASSENGER'S SIDE)

1. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (−) lead to terminal 2, and check that the motor turns counterclockwise.

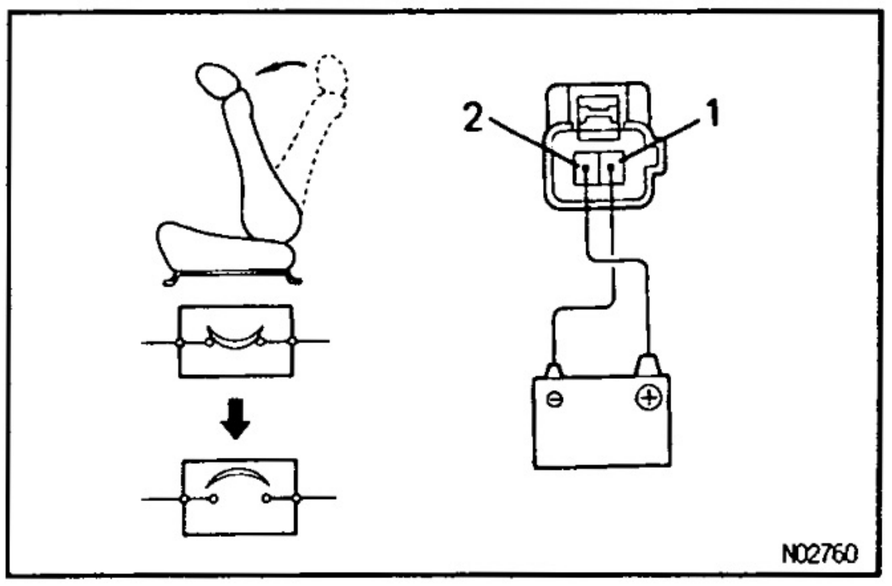
(b) Reverse the polarity, and check that the motor turns clockwise.

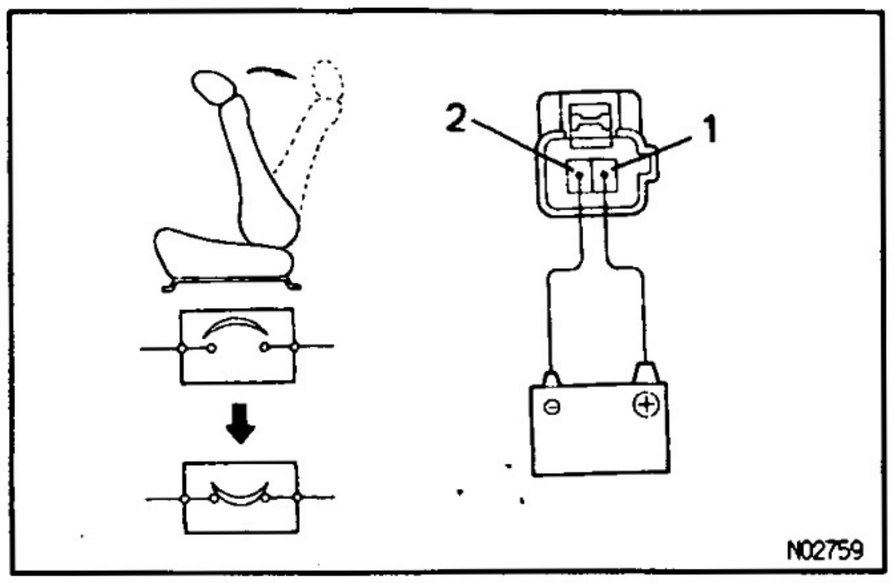
If operation is not as specified, replace the motor.

2. INSPECT CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (−) lead to terminal 1 on the seat wire harness side connector, and recline the seat back to the most forward position.

(b) Continue to apply voltage, and check that there is a circuit breaker operation noise within 4 to 40 seconds.



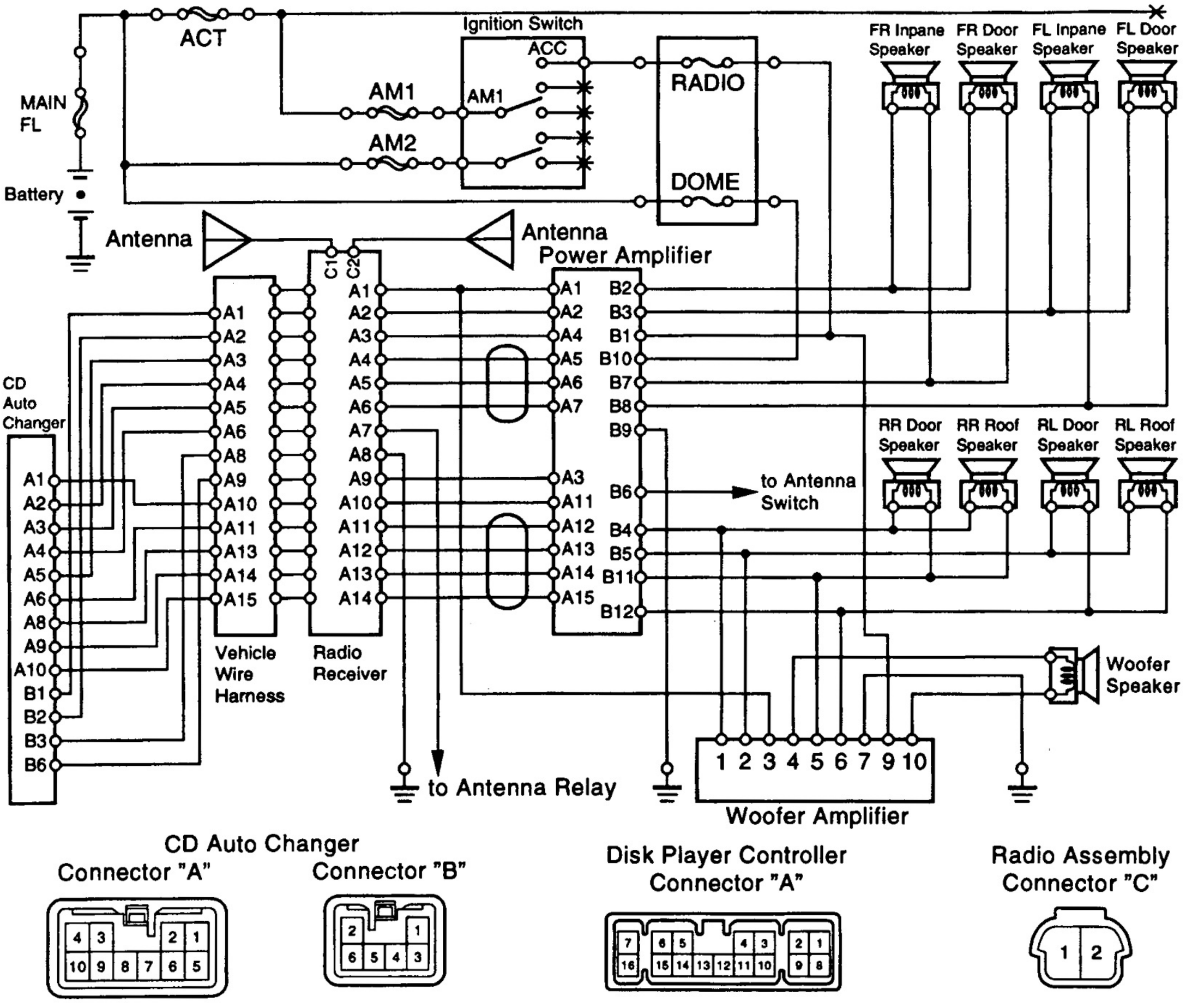


(c) Reverse the polarity, and check that the seat back starts to fall backwards within approximately 60 seconds.
If operation is not as specified, replace the motor.

AUDIO SYSTEM
WIRING DIAGRAMS

BE3AG-01

Radio-Tape Player, 9 Speaker + CD Auto Changer : Symbol [A]



CD Auto Changer

Connector "A"

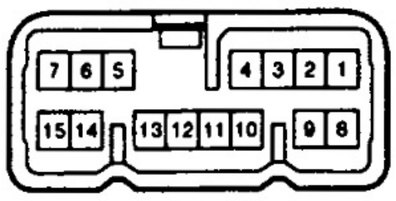
Connector "B"

Disk Player Controller Connector "A"

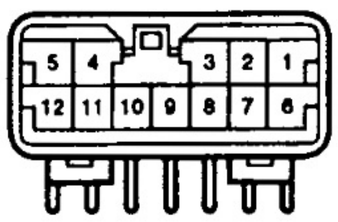
Radio Assembly Connector "C"

Power Amplifier

Connector "A"

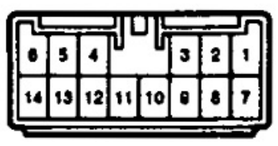


Connector "B"

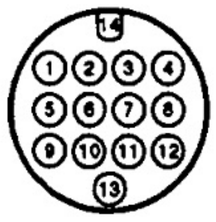


Radio Assembly

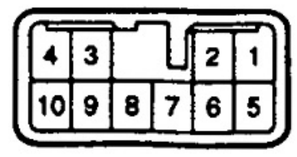
Connector "A"



Connector "B"



Woofer Amplifier



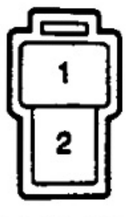
Front Speaker

Front Door Speaker

Rear Door Speaker

Rear Roof Speaker

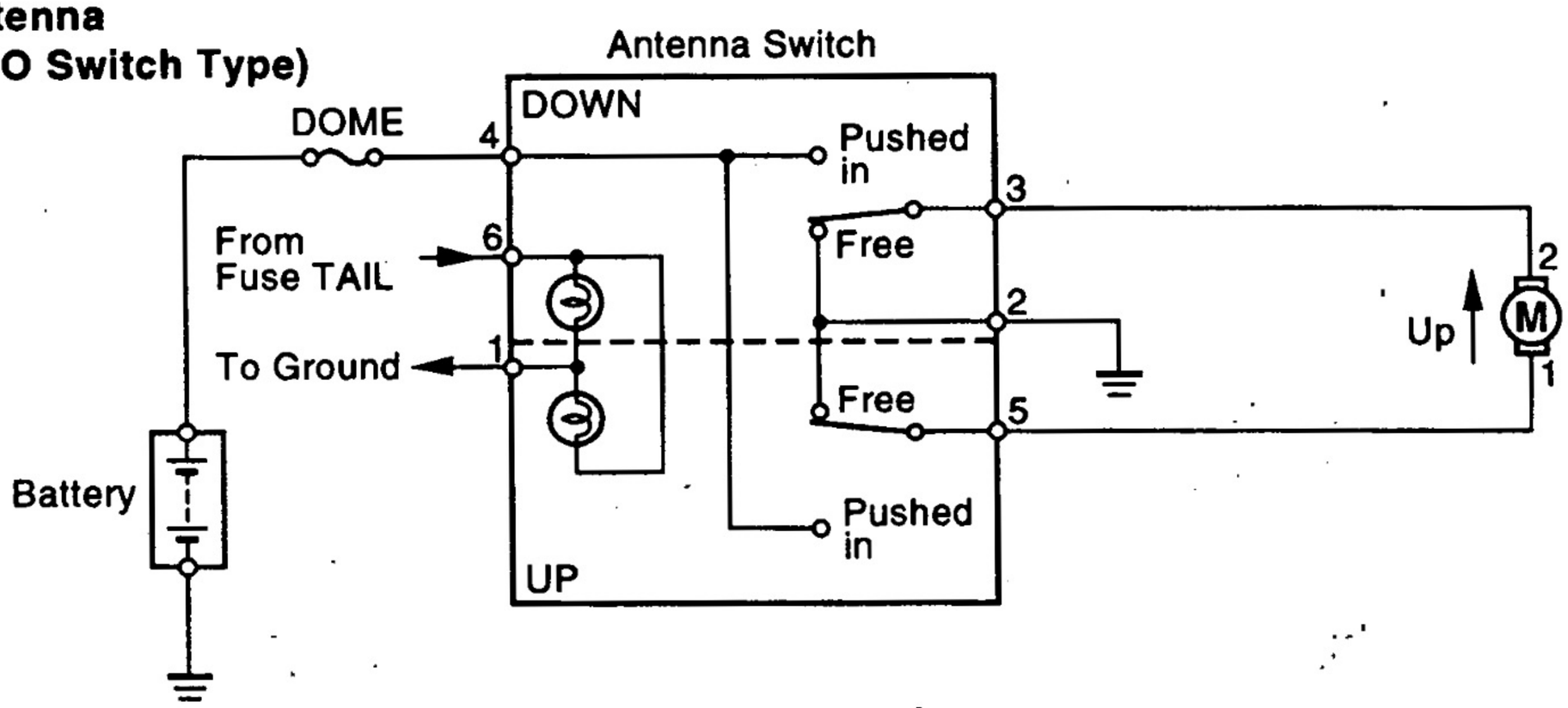
Woofer



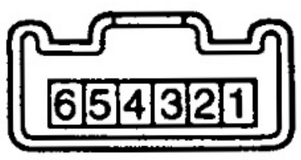
Ie-10-2 Ie-5-2-A S-16-2-A GA-2-2-C N20690
h-15-2-A e-12-2-A Y-14-2 BE3309 S-10-2-A
T-2-2 IS-2-2-B IS-2-2-B GA-2-2-C H-2-2

Z19144

Motor Antenna
(w/o AUTO Switch Type)



Antenna Switch



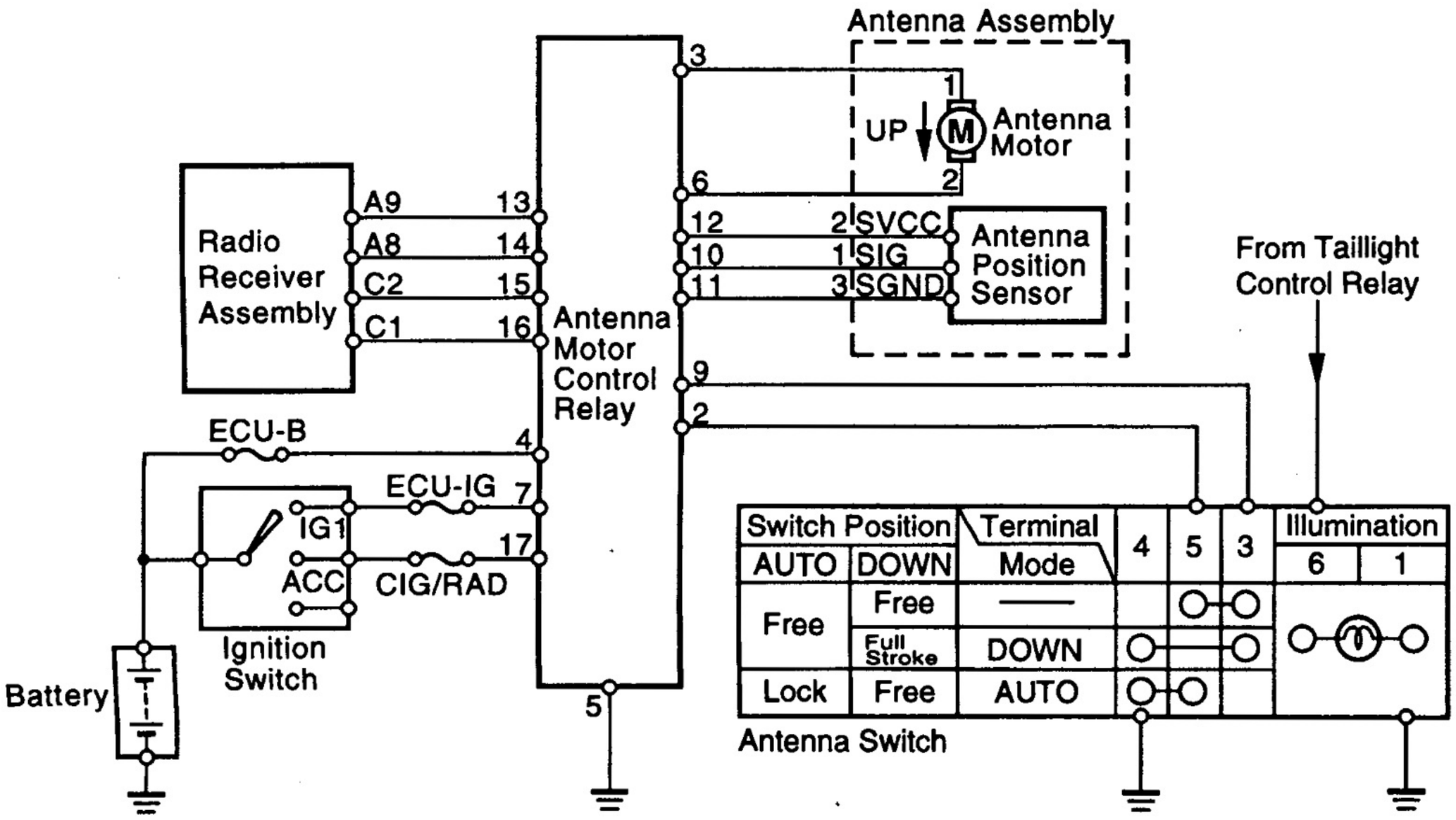
Antenna Motor

BE5074
e-6-2-c H-2-2

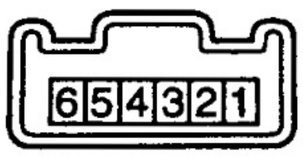
Z19142

BE

Motor Antenna (w/ Auto Switch Type)

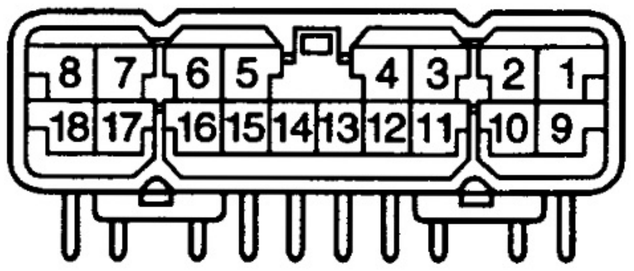


Antenna Switch

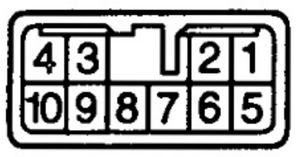


Antenna Motor

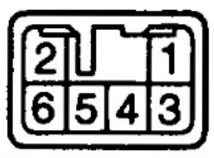
Antenna Motor Control Relay



Radio Assembly Connector "A"



Connector "B"



Connector "C"

Antenna Position Sensor

N14586

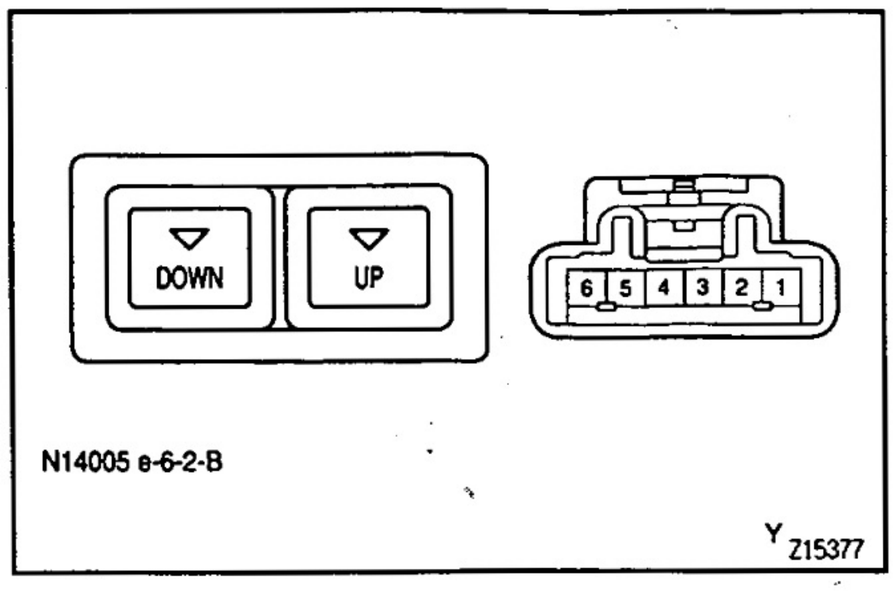
e-6-2-c H-2-2 e-18-2-A
S-10-2-A S-6-2-E GA-2-2-C H-4-2

Z19143

BE

BE3AH-01

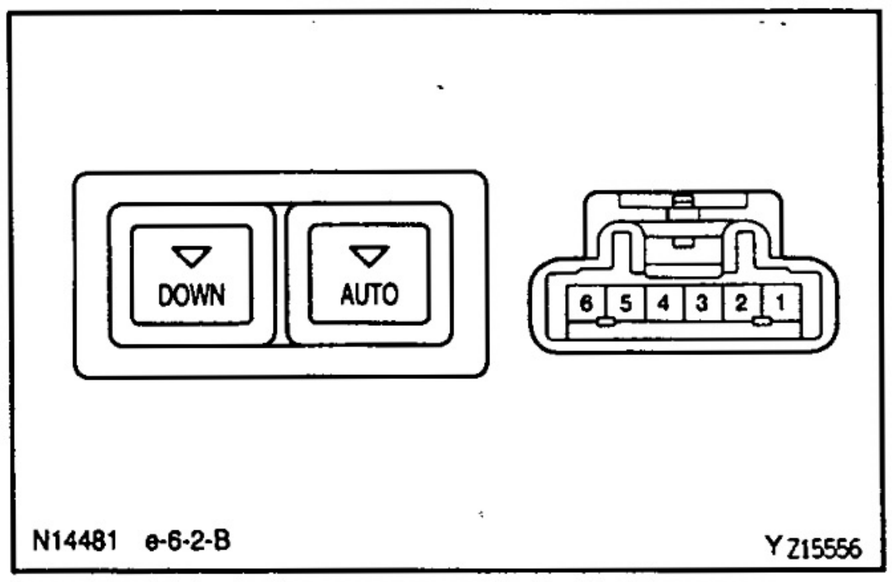
ANTENNA SWITCH INSPECTION



1. w/ Motor Antenna:
INSPECT SWITCH CONTINUITY
w/o AUTO Switch Type:

Condition	Tester connection	Specified condition
UP Button Position Free	2 — 5	Continuity
UP Button Position Pushed in	4 — 5	Continuity
DOWN Button Position Free	2 — 3	Continuity
DOWN Button Position in	3 — 4	Continuity
Illumination circuit	1 — 6	Continuity

If continuity is not as specified, replace the switch.



2. w/ AUTO Switch Type:

Condition	Tester connection	Specified condition
AUTO and DOWN Switch Free	2 — 3 — 5	Continuity
AUTO Free and DOWN Pushed in	3 — 4	Continuity
AUTO Pushed in and DOWN Switch Free	4 — 5	Continuity
Illumination circuit	1 — 6	Continuity

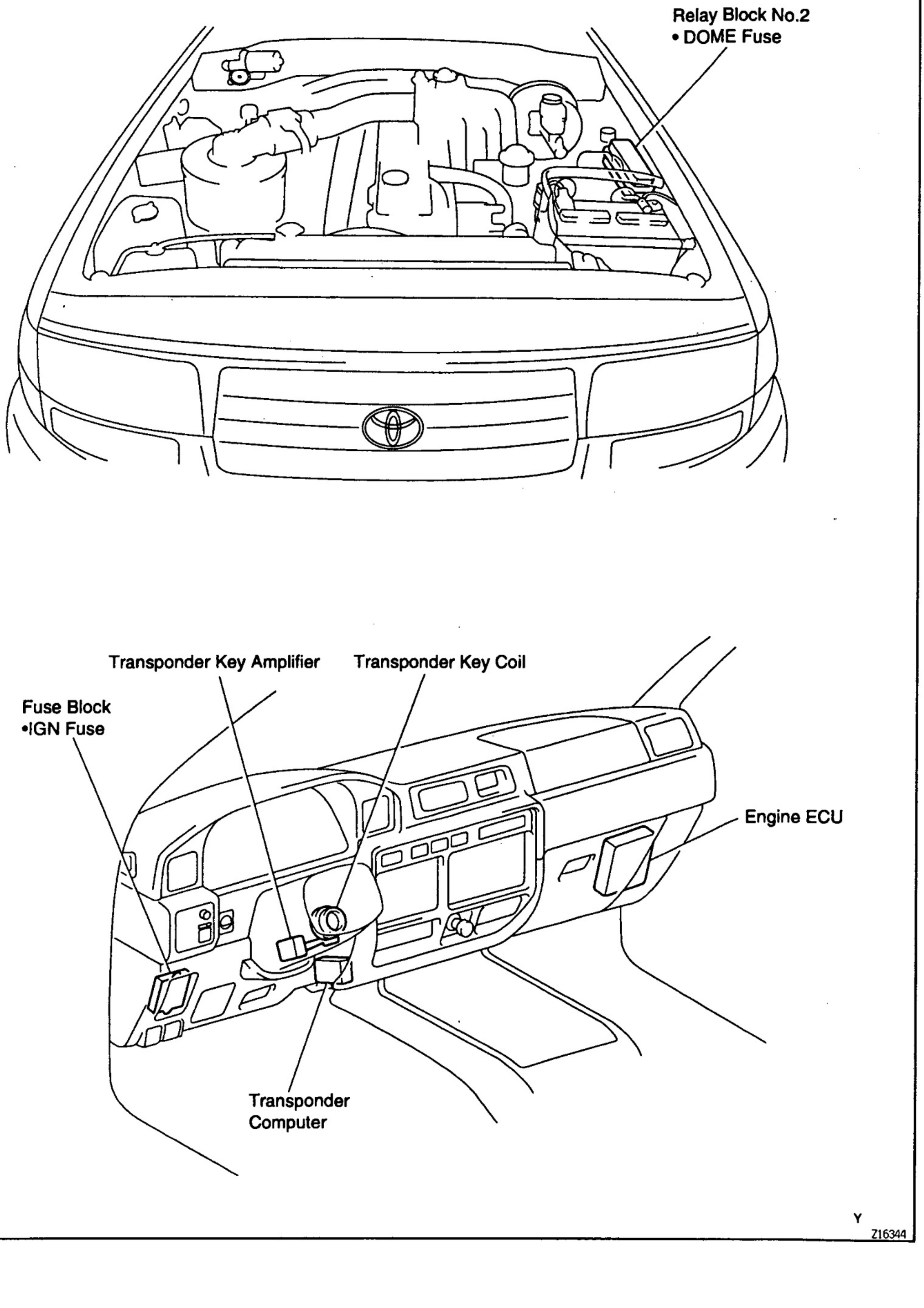
If continuity is not as specified, replace the switch.

BE

ENGINE IMMOBILISER SYSTEM

PARTS LOCATION

BE2HH-03



BE2NJ-01

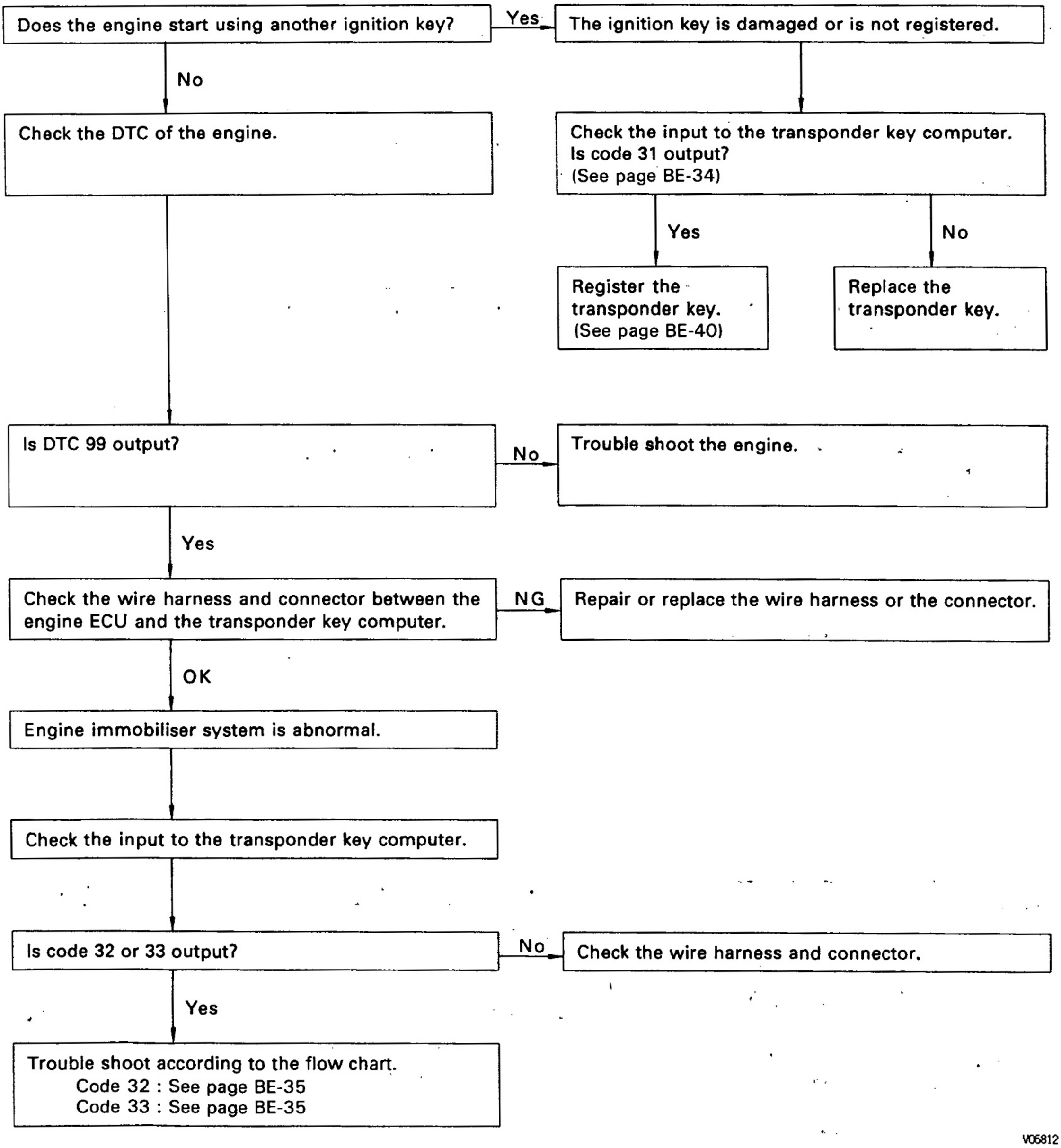
TROUBLESHOOTING

If a malfunction occurs in the engine immobiliser system, either of the following symptoms occurs:

1. Cranking occurs, but the engine does not start.
2. The engine starts, but stops after 5 seconds.

If either of these symptoms occurs, do troubleshooting to the following flow chart.

1. CRANKING OCCURS, BUT THE ENGINE DOES NOT START



V06812

2. ENGINE STARTS, BUT STOPS AFTER 5 SECONDS

Does the engine still stop after 5 secs, even when the engine is started using another transponder key?
- No → Key is damaged. → Exchange key.
- Yes ↓

Is DOME fuse blown?
- NG → Exchange DOME fuse.
- OK ↓

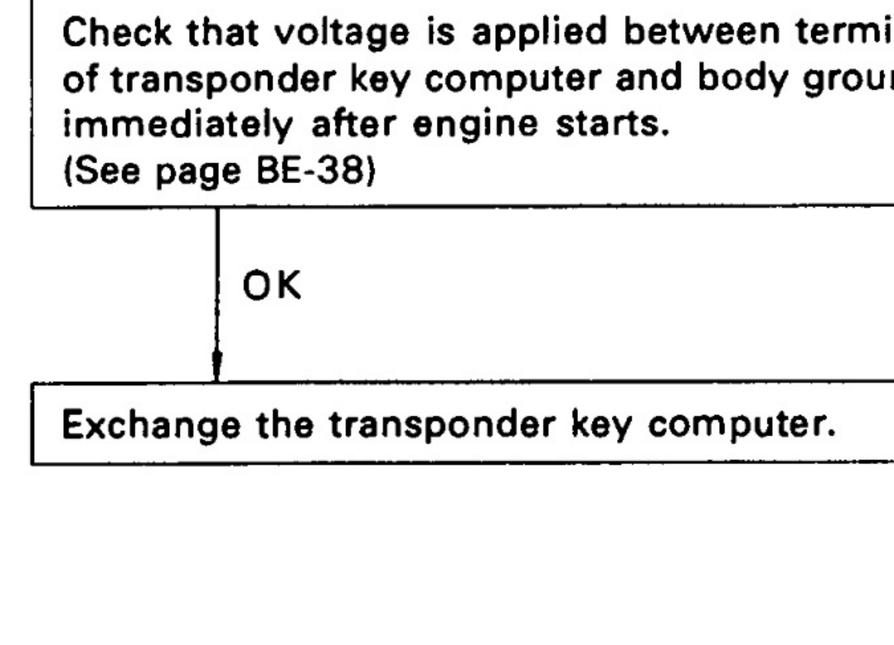
Is connector of transponder key computer properly locked?
- NG → Insert connector until it locks securely.
- OK ↓

Check the continuity between the transponder key computer and engine ECU.
- NG → Repair or replace the wire harness or connector.
- OK ↓

Check that voltage is applied between terminal 10 of transponder key computer and body ground immediately after engine starts.
(See page BE-38)
- NG → Exchange the engine ECU.
- OK ↓

Exchange the transponder key computer.

V06839

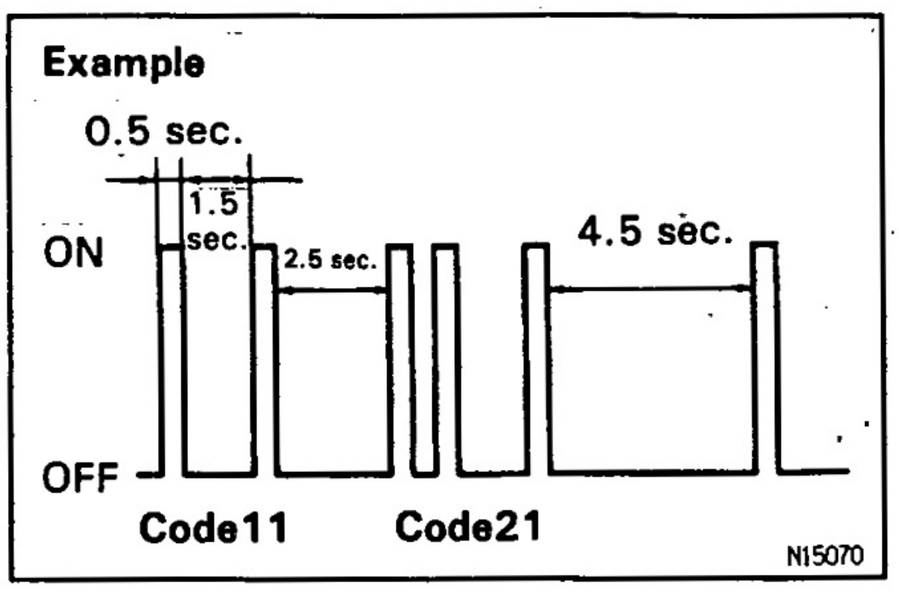


TRANSPONDER KEY COMPUTER INPUT CONDITION DISPLAY

DE2WK-02

1. READ THE CODE

(a) Connect the positive (+) lead from the volt meter (Analog Type) to OP3 of the check connector and the negative (–) lead to E1 of the check connector.



(b) Insert the ignition key in the key cylinder.

(c) Read the code from the movement of the tester needle.
If no code is output, turn the ignition switch on. If a code is now output, check if the DOME fuse is blown.

HINT:

- The code can be read using a luminous diode (Recommend activation current 10 ~ 20 mA) instead of a tester.
- A digital tester can also be used.

Display condition:

- When therecodes are multiple, they are output in order to start from the lowest code.
- After all the codes are output, Lo is displayed for 4.5 sec., then all the code are output again starting from the lowest code.
- If the situation changes during code output, Lo is output for 4.5 seconds after output of the current code ceases, then the codes are output again starting from the lowest code.
  E.g. While 11 (out of 11 and 21) is being output, conditions change and 12 is added. So after 11 is output, Lo is output for 4.5 sec., then 11, 12 and 21 are output.

BE

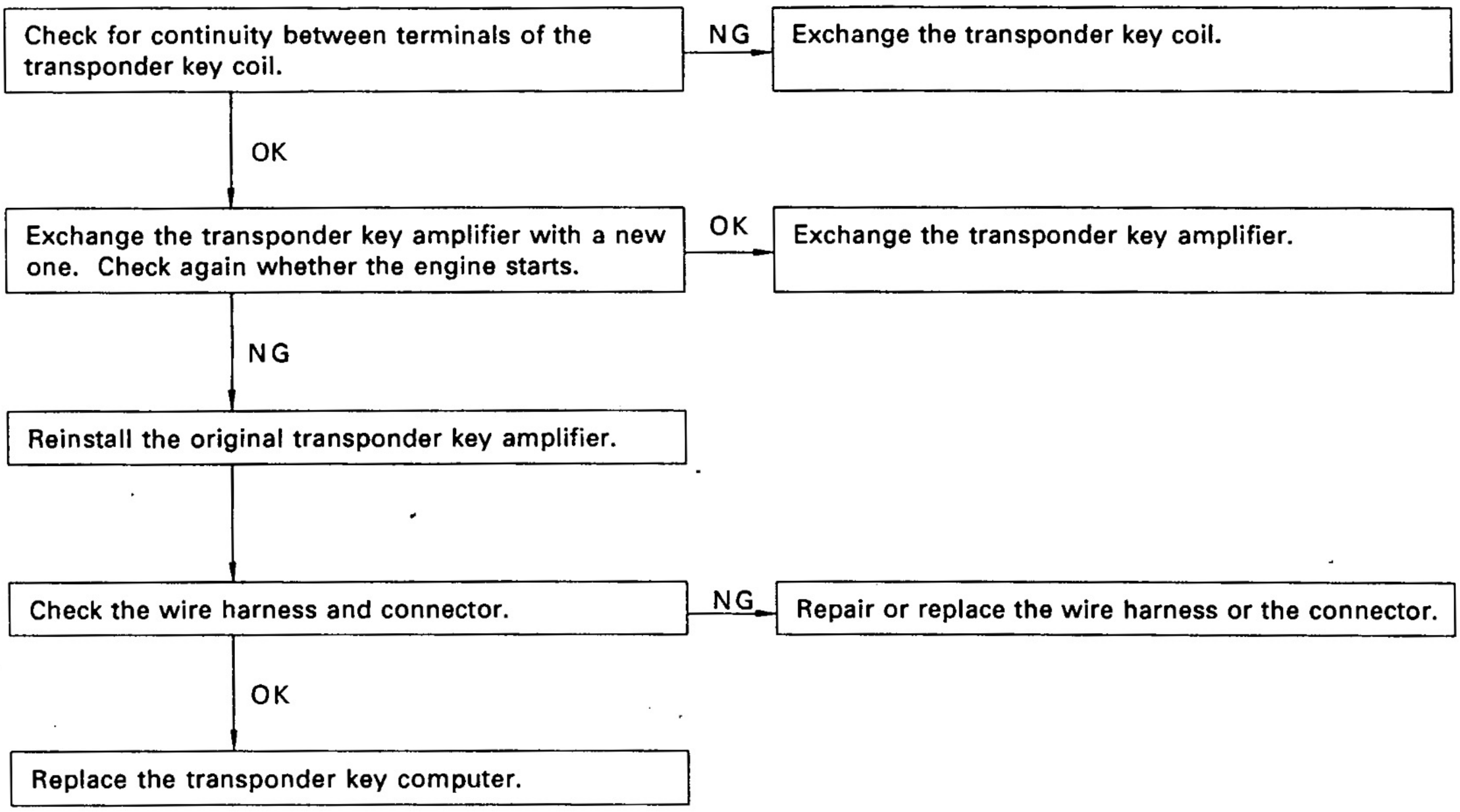
2. Code list

Code	Output condition
11	Key unlock warning switch ON (Ignition key inserted)
12	Any door is open. (Door courtesy switch ON)
13	Ignition switch at ON position
21	Master key is inserted in key and the immobiliser system is OFF.
22	Sub key is inserted in key cylinder and immobiliser system is OFF.
31	Key code recorded in transponder key computer differs from code of key inserted in key cylinder.
32	Transponder key code cannot be read.
33	Key code cannot be read because format of chip inside key is wrong.
34	Transponder key computer has no memory space to registered key code.

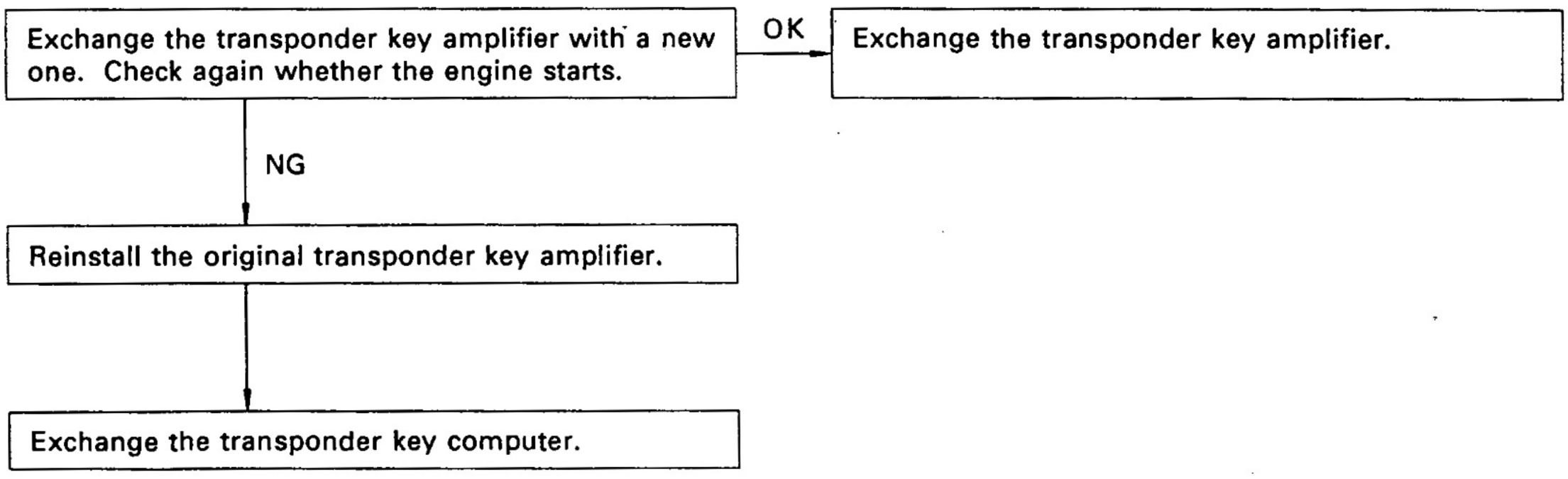
3. Malfunction list

Symptom	Cause
No code is output.	1. DOME Fuse 2. Wire harness or connector 3. Transponder key computer
Even when key is inserted in key cylinder, Code 11 is not output.	1. Key unlock warning switch 2. Wire harness or connector 3. Transponder key computer
Code 12 is not output when the door is open.	1. Door courtesy switch 2. Wire harness or connector 3. Transponder key computer
Code 13 is not output when ignition switch ON.	1. IGN Fuse 2. Wire harness or connector 3. Transponder key computer
Code 31 is output when key is inserted in key cylinder.	Key code is not registered.
Code 32 is output.	1. Transponder key coil 2. Transponder key amplifier 3. Wire harness or connector 4. Transponder key computer
Code 33 is output	1. Transponder key amplifier 2. Transponder key computer
Code 34 is output	Transponder key computer has no memory space to registered key code.

If code 32 is output, troubleshoot according to this flow chart.

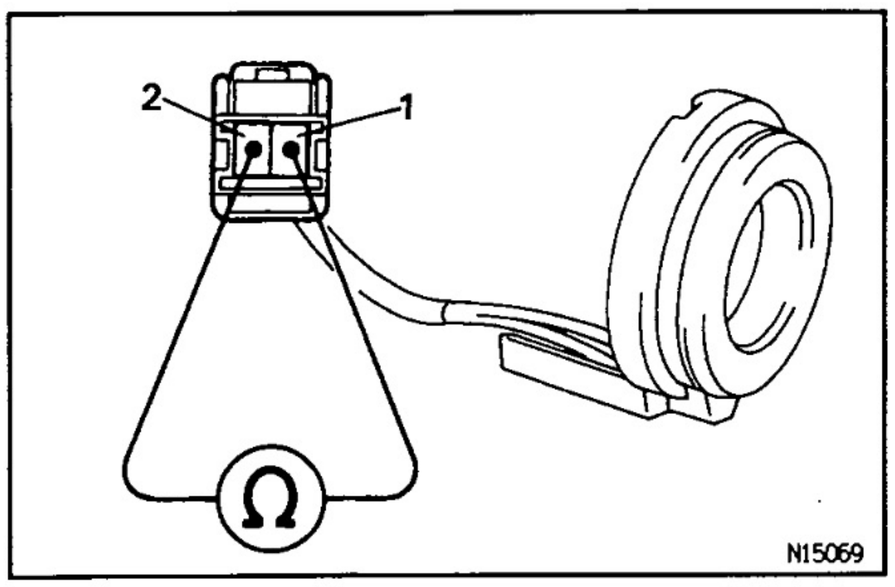


If code 33 is output, troubleshoot according to this flow chart.



V06813

BE

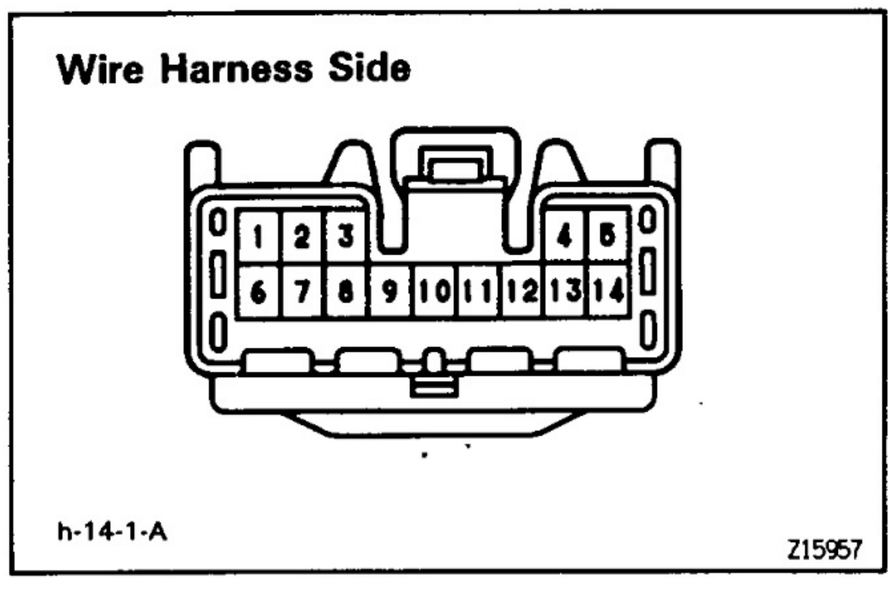


TRANSPONDER KEY COIL INSPECTION BE2NL-03

INSPECT TRANSPONDER KEY COIL CONTINUITY

Check that there is continuity between terminals 1 and 2.

If continuity is not as specified, replace the coil.



TRANSPONDER KEY COMPUTER INSPECTION BE3NU-02

1. INSPECT COMPUTER CIRCUIT

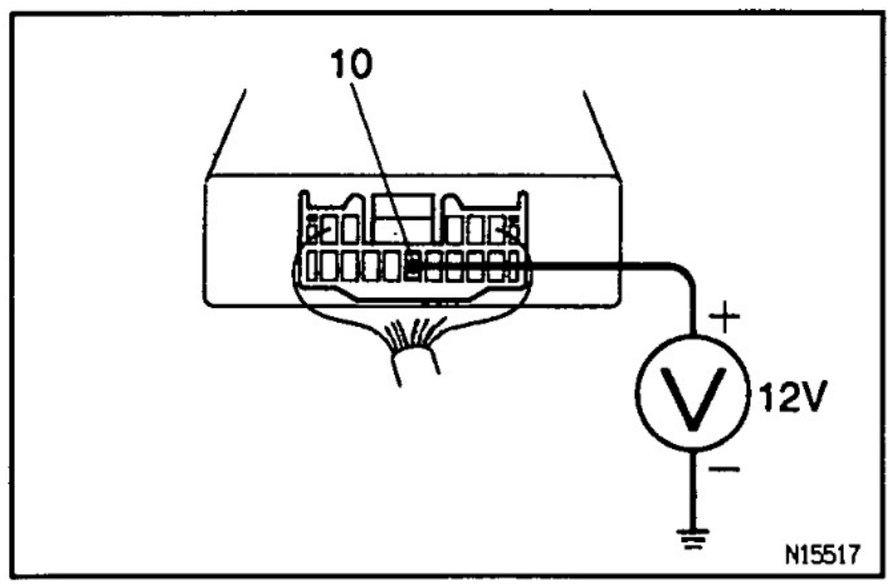
Disconnect the connector from the computer and inspect the connector on the wire harness side, as shown in the table below.

If the circuit is not as specified, try replacing the computer with a new one.

If the circuit is not as specified, inspect the circuits connected to other parts.

BE

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery voltage
2 – Ground	Ignition switch ON	Battery voltage
8 – Ground	All doors closed	No continuity
8 – Ground	Any door open.	Continuity
9 – Ground	Key unlock warning switch ON (key inserted)	Continuity
9 – Ground	Key unlock warning switch OFF (key removed)	No continuity
14 – Ground	Constant	Continuity



2. INSPECT COMPUTER

(a) With the connector connected, connect the positive (+) lead from the analog type tester to terminal 10 and the negative (–) lead to the body ground.

(b) Check that there is battery voltage when the ignition switch is turned ON.

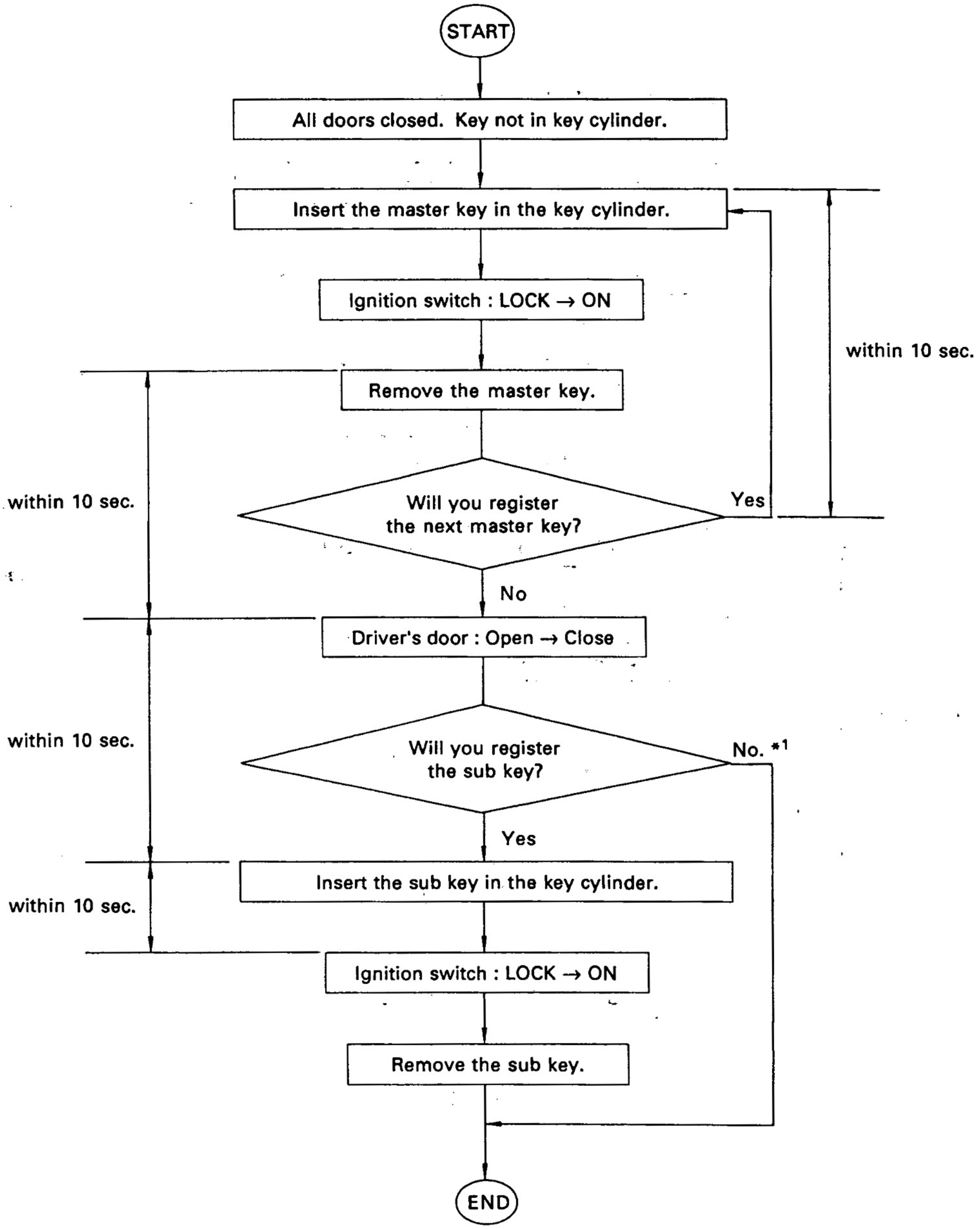
(c) Check that the tester needle swings strongly for approx. 1 sec. when the engine is started using the ignition key.

BE2NN-02

RESISTING PROCEDURE

1. RESISTING A NEW TRANSPONDER KEY CODE

This must be done when you have installed a new transponder key computer.



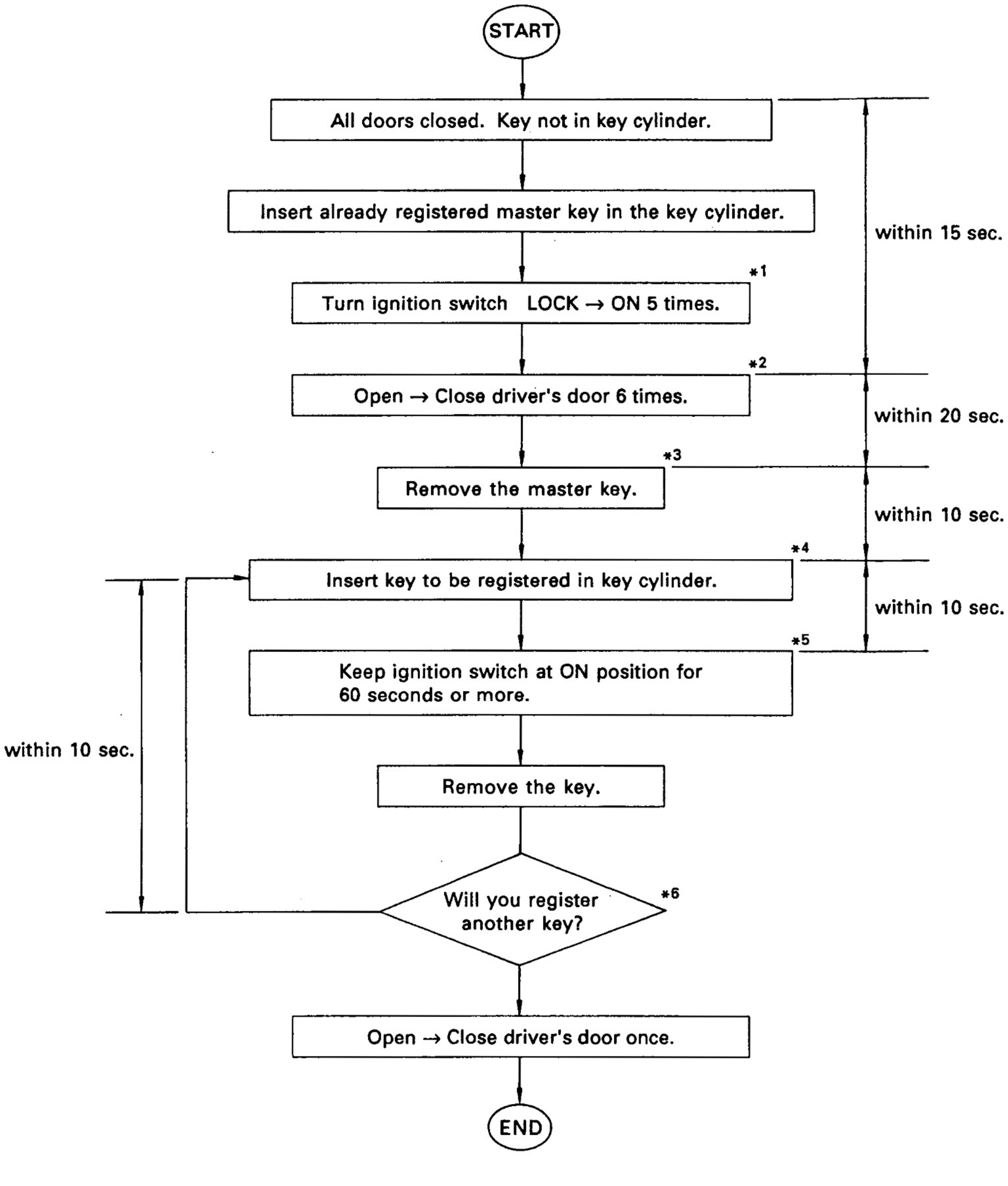
*1: When not resistering the sub key, resister the master key within 10 sec. of Driver's Door : Open → Close.

V06814

BE

2. REGISTRATION OF ADDITIONAL MASTER KEY

Do this operation to register an additional master key.



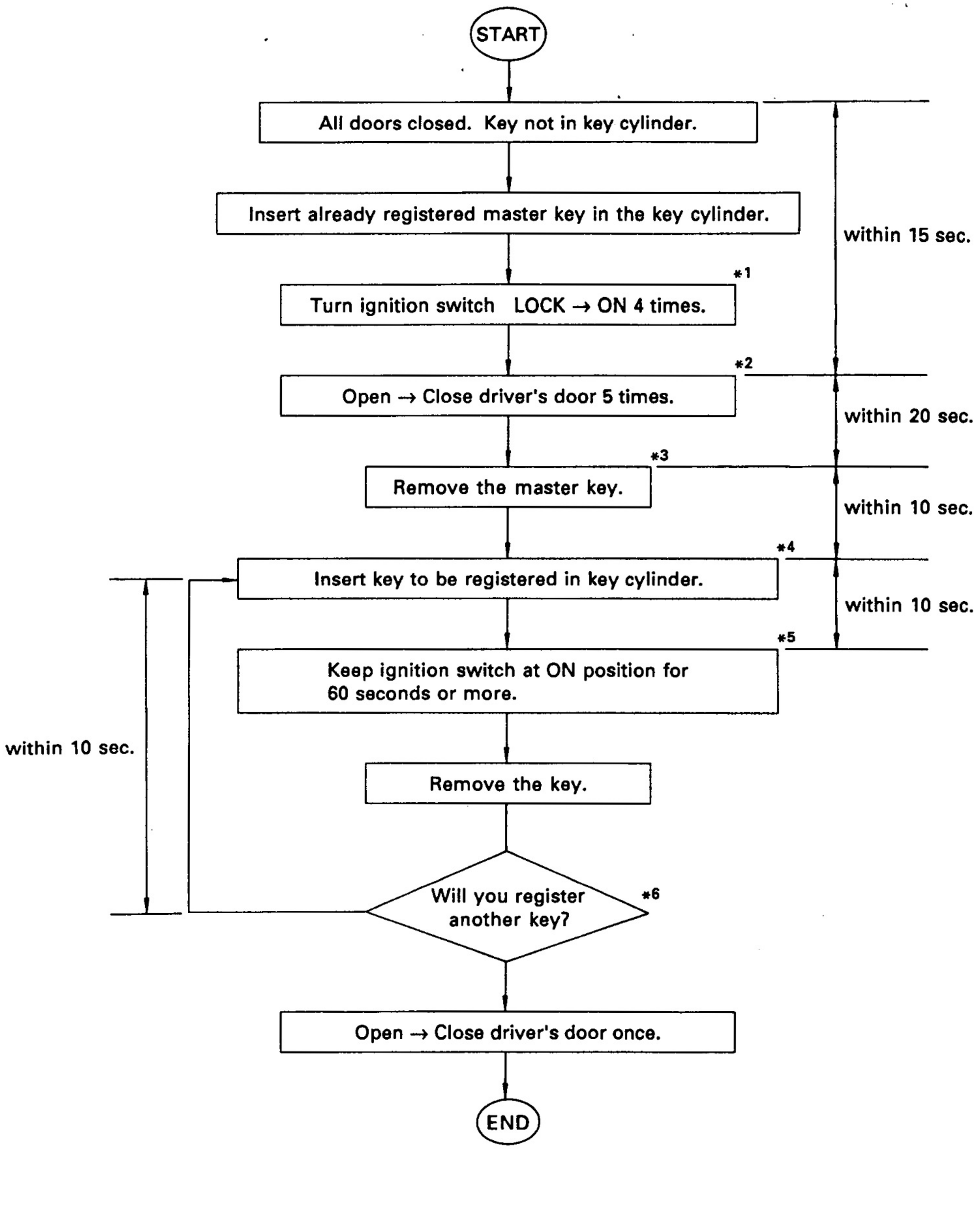
V06815

BE

*1: Turn the ignition switch LOCK → ON 5 times within 15 sec. of inserting the master key in the key cylinder. The ignition switch must finally remain in position ON, or the registration will not be carried out, then go on to the next operation.
*2: Firstly open and close the driver's door within 15 sec. of inserting the master key in the key cylinder. Then open and close the driver's door another 6 times within 20 sec. of closing the driver's door.
*3: Remove the master key from the ignition switch within 20 sec. of closing the driver's door.
*4: Insert the key to be registered in the key cylinder within 10 sec. of removing the master key.
*5: Turn the ignition switch LOCK → ON within 10 sec. of inserting the key.
*6: If you are to register another key, insert the next key within 10 sec. of removing the previous key.

3. ADDITIONAL REGISTRATION OF SUB KEY

Do this operation to register an additional sub key.

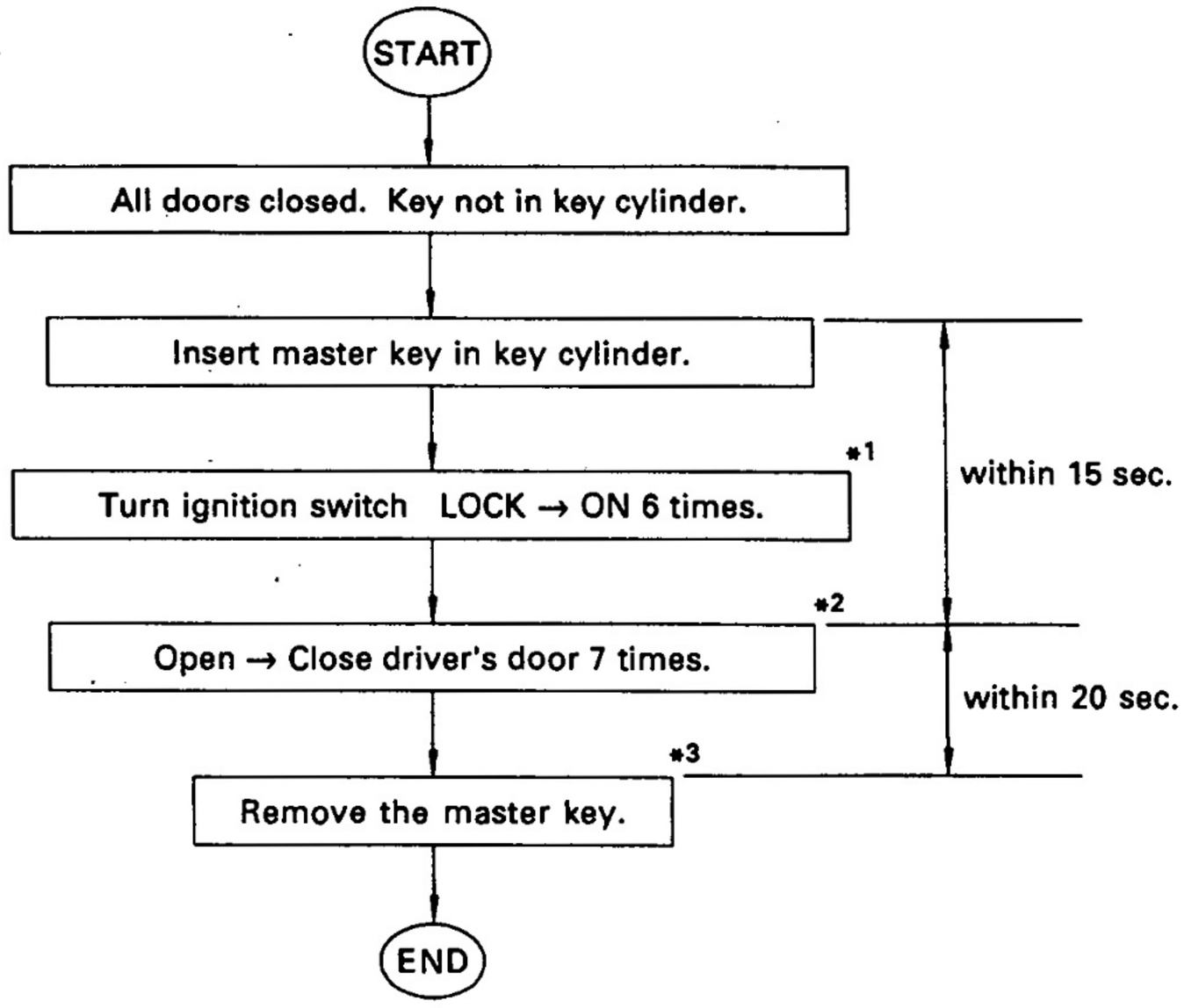


V06816

*1: Turn the ignition switch LOCK → ON 4 times within 15 sec. of inserting the master key in the key cylinder. The ignition switch must finally remain in position ON, or the registration will not be carried out, then go on to the next operation.
*2: Firstly open and close the driver's door within 15 sec. of inserting the master key in the key cylinder. Then open and close the driver's door another 4 times within 20 sec. of closing the driver's door.
*3: Remove the master key from the ignition switch within 20 sec. of closing the driver's door.
*4: Insert the key to be registered in the key cylinder within 10 sec. of removing the master key.
*5: Turn the ignition switch LOCK → ON within 10 sec. of inserting the key.
*6: If you are to register another key, insert the next key within 10 sec. of removing the previous key.

4. ERASURE OF TRANSPONDER KEY CODE

Do this operation to erase transponder key registration from the transponder key computer.



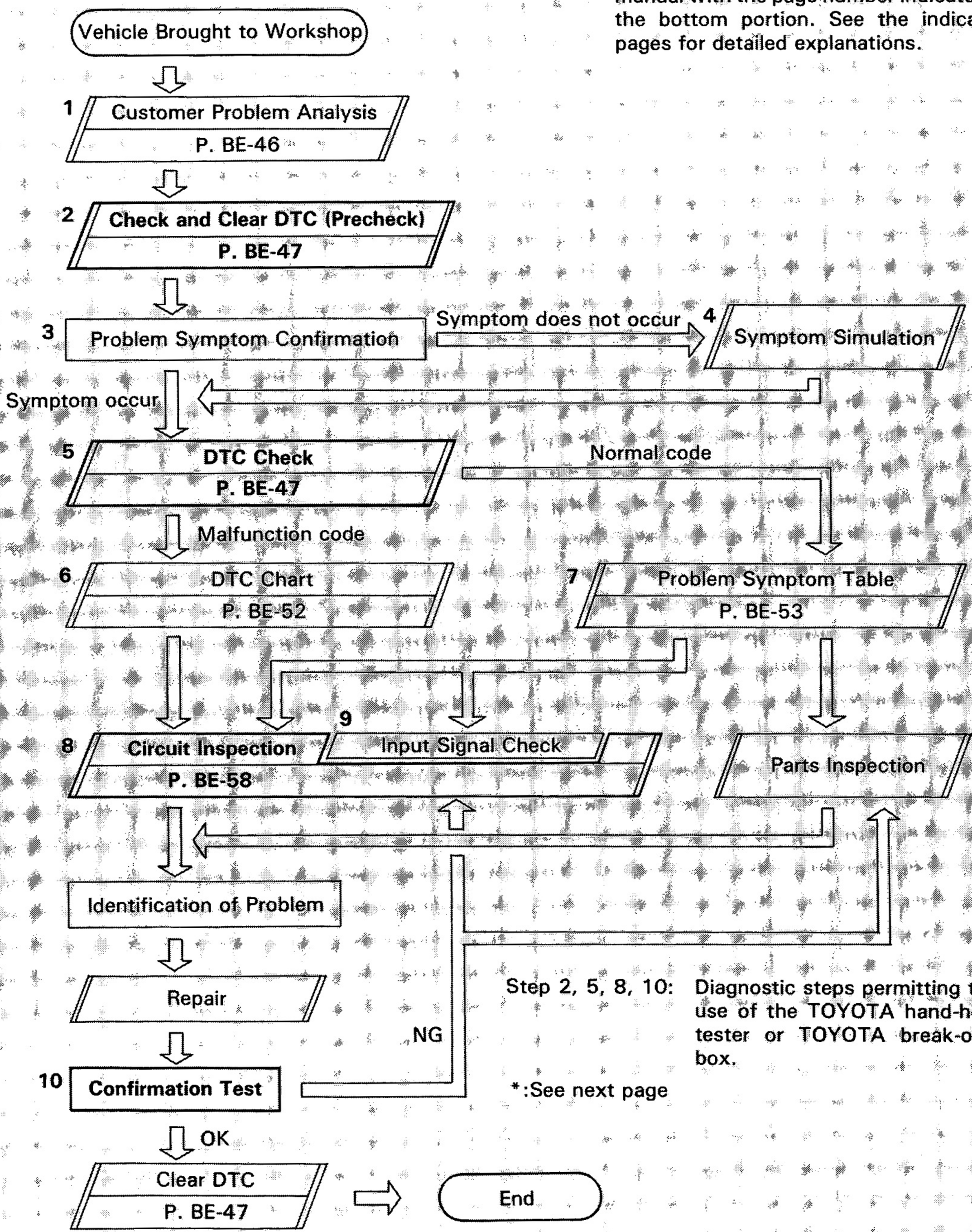
*1: Turn the ignition switch LOCK → ON 6 times within 15 sec. of inserting the master key in the key cylinder.
*2: Firstly open and close the driver's door within 15 sec. of inserting the master key in the key cylinder. Then open and close the driver's door another 6 times within 20 sec. of closing the driver's door.
*3: Remove the master key from the ignition switch within 20 sec. of closing the driver's door.

HINT: The registered code used in the operation is not erased.

CRUISE CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

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



Step 2, 5, 8, 10: Diagnostic steps permitting the use of the TOYOTA hand-held tester or TOYOTA break-out-box.

*: See next page

BE

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's Name: _____

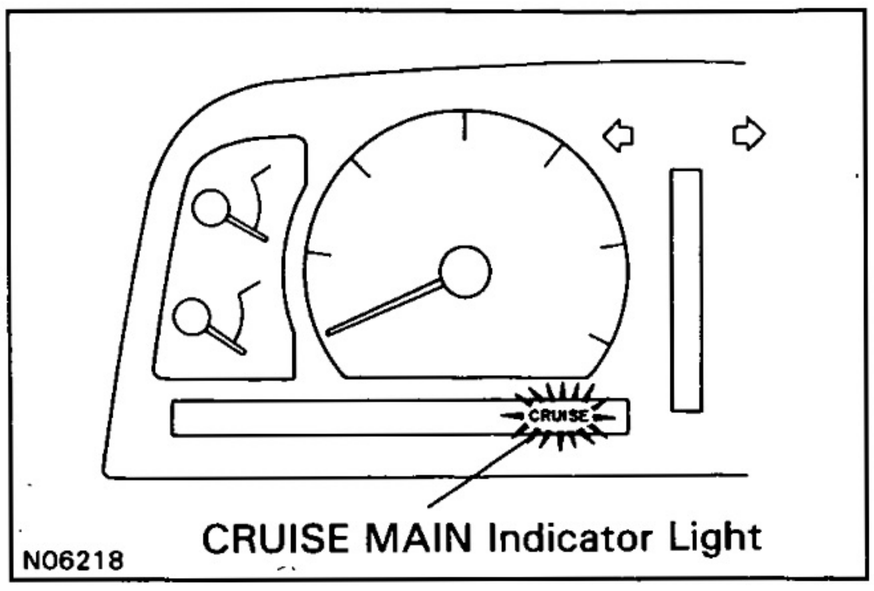
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km** **Mile**

Condition of Problem Occurrence	**Date of Problem Occurrence**	/ /
	How Often does Problem Occur?	☐ Continuous ☐ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	**km** **Mile**

Symptoms	☐ Auto cancel occurs	• Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill • After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D range shift ☐ At 40 km/h (25 mph) or less ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACCEL ☐ COAST ☐ RESUME ☐ CANCEL
	☐	☐ Remains ON ☐ Does not light up ☐ Blinking

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

BE



PRE-CHECK

1. DIAGNOSIS SYSTEM

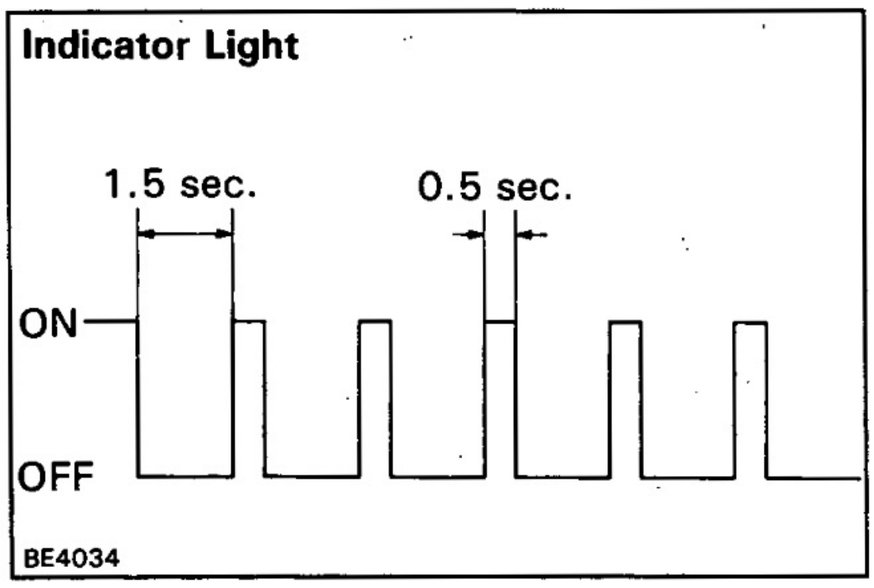
(a) INDICATOR CHECK

(1) Turn the ignition switch to ON.

(2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

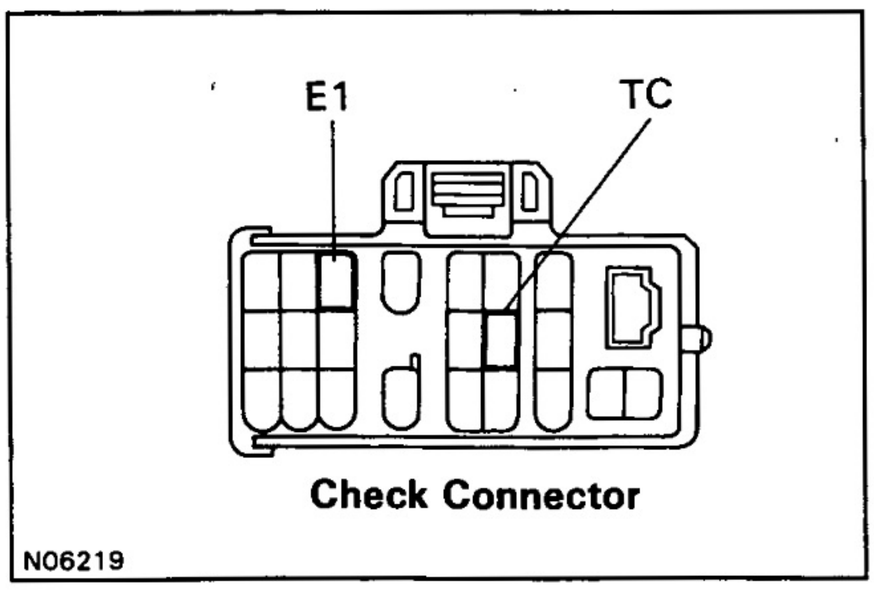
If the indicator check result is not normal, proceed to troubleshooting (See pub. No. RM434E on page BE-15) for the combination meter section.



(b) DTC CHECK

HINT:

If a malfunction occurs in the No.1 vehicle speed sensors or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns on and off the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stopped in memory as a diagnostic trouble code.



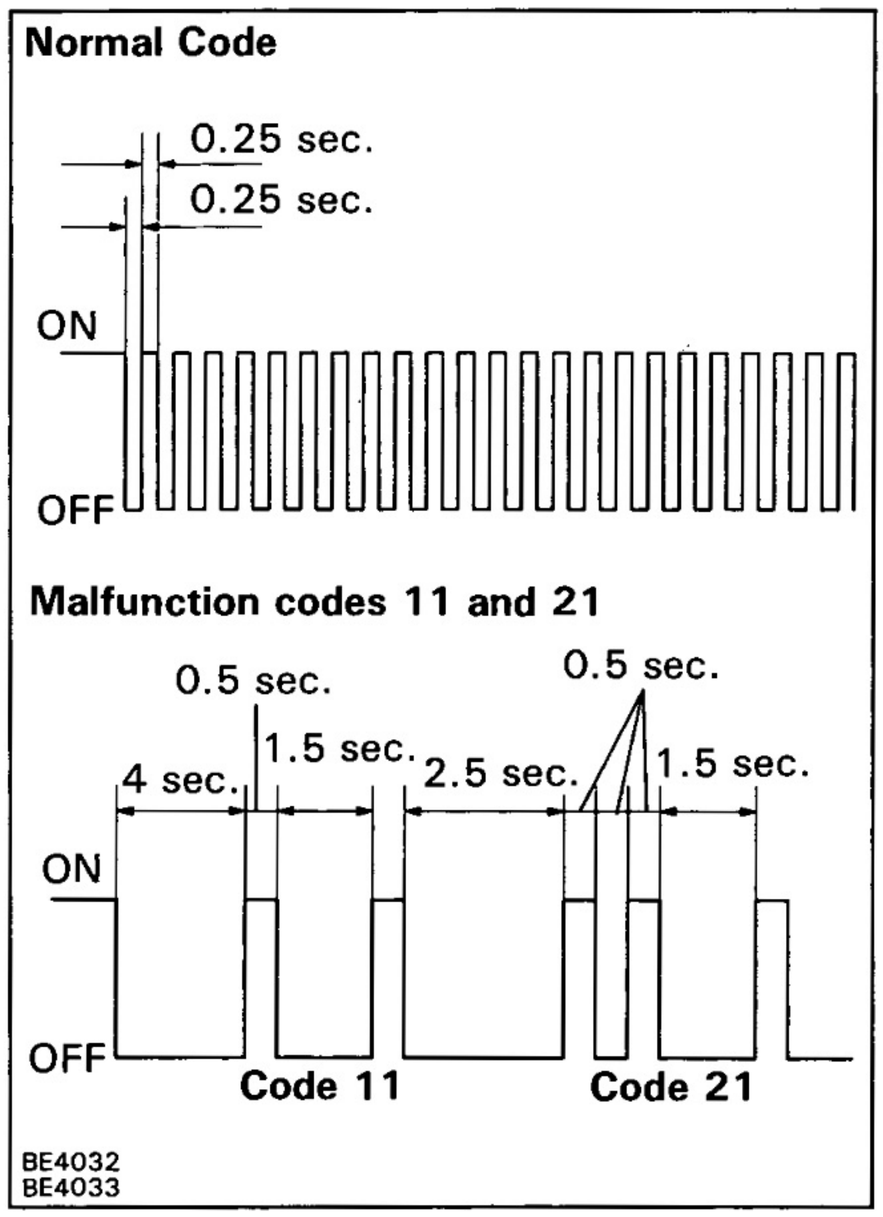
(c) OUTPUT OF DTC USING DIAGNOSIS CHECK WIRE

(1) Turn the ignition switch ON.

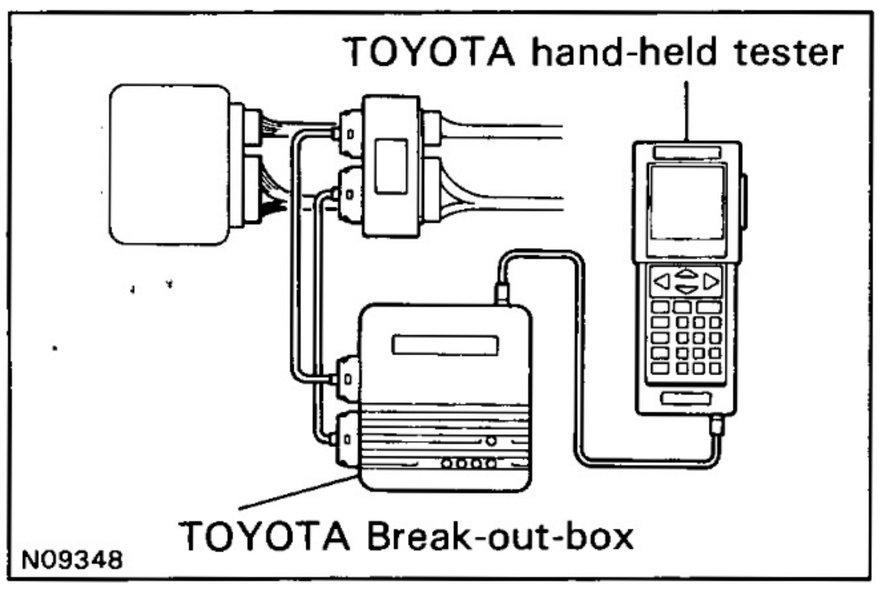
(2) Using SST, connect terminals Tc and E1 of check connector.

SST 09843–18020

(3) Read the DTC on the CRUISE MAIN indicator light.



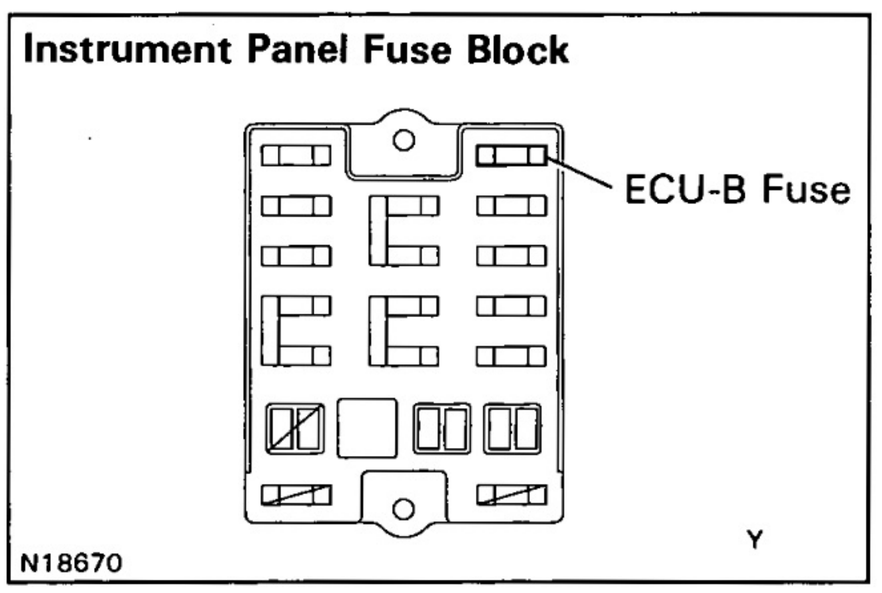
HINT:
If the DTC is not output, inspect the diagnosis circuit (See page BE-98).
As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.



BE

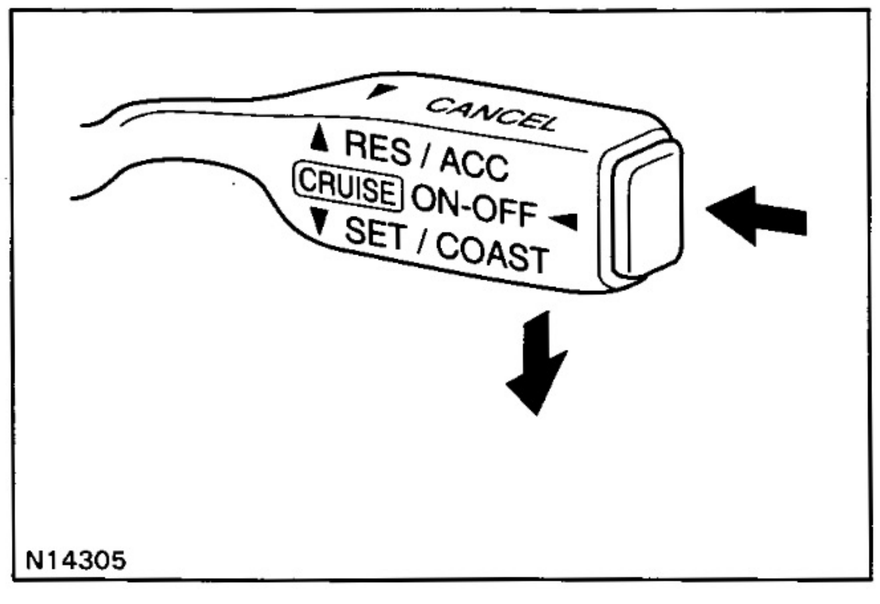
2. ECU TERMINAL VALUES MEASUREMENT BY USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

(a) Hook up the TOYOTA break-out-box and TOYOTA hand-held tester to the vehicle.
(b) Read the ECU input/output values by following the prompts on the tester screen.
(c) Please refer to the TOYOTA hand-held tester has a ''Snapshot'' function. This records the measured data and is effective in the diagnosis of intermittent problems.



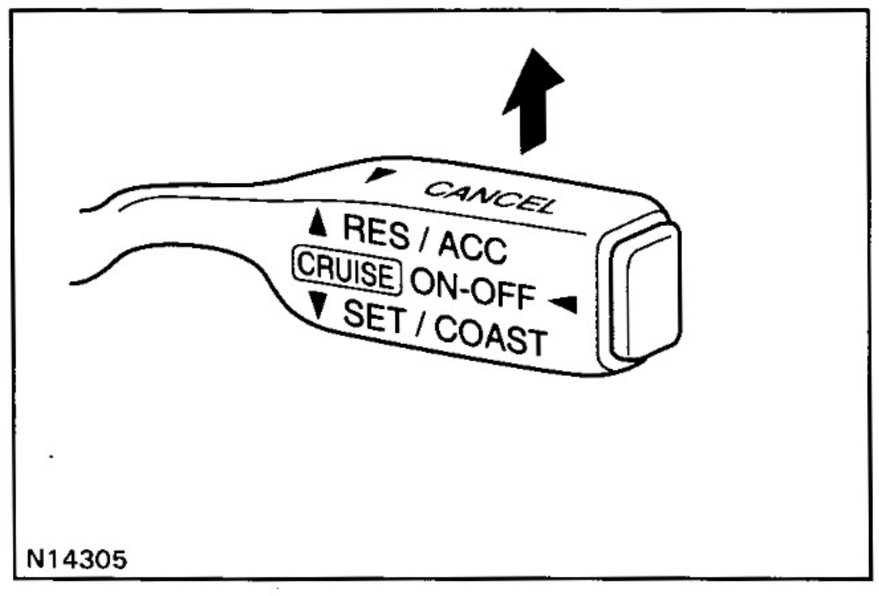
3. DTC CLEARANCE

(a) After completing repairs, the diagnostic trouble code retained in memory can be cleared by removing the ECU-B fuse for 10 seconds or more, with the ignition switch off.
(b) Check that the normal code is displayed after connecting the fuse.

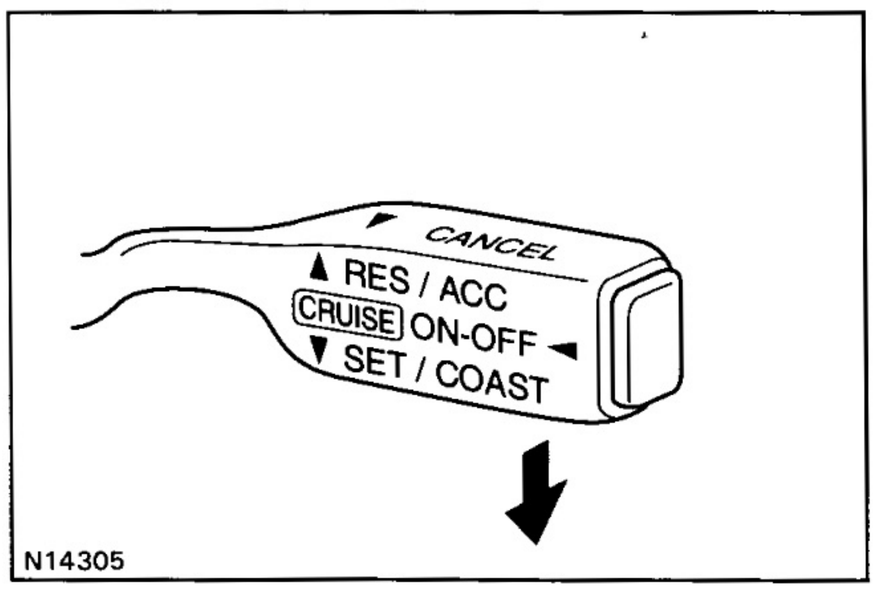


4. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

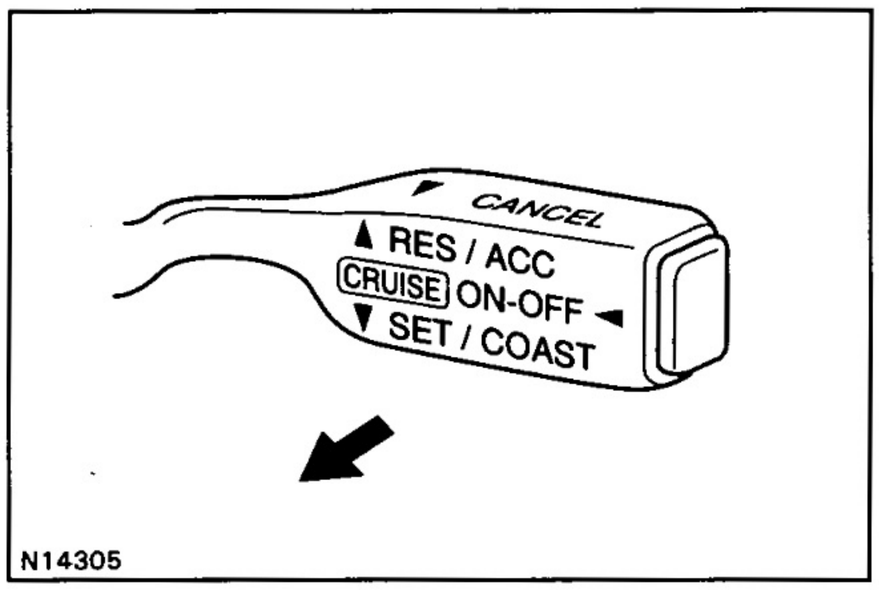
(a) SET INSPECTION
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Press the control switch to the SET/COAST.
  (4) After releasing the switch, check that the vehicle cruises at the desired speed.



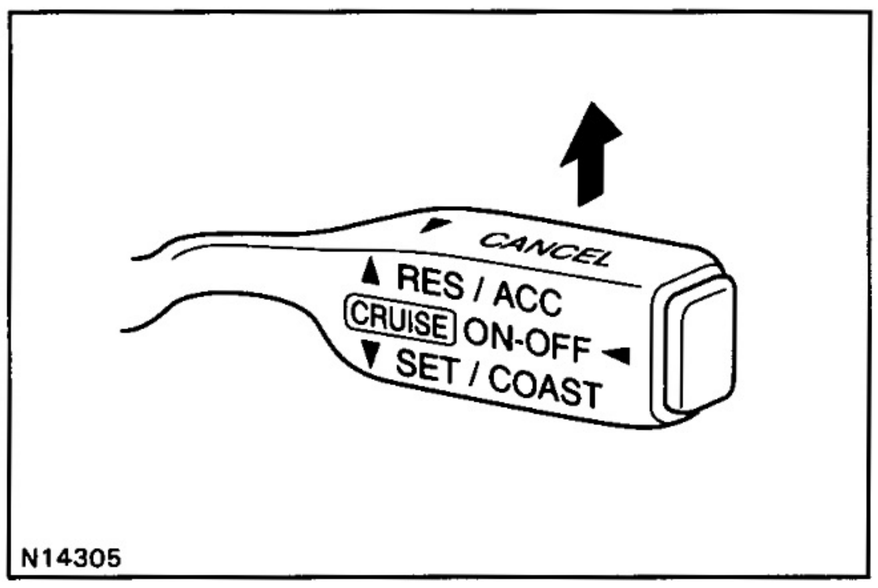
(b) ACCEL INSPECTION
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed is increased while the control switch turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
  (4) Momentarily press the control switch upward in the RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap-up function).



(c) COAST INSPECTION
  (1) Push the main switch ON.
  (2) Drive at a desired speed (40 km/h (25 mph) or higher).
  (3) Check that the vehicle speed is decreased while the control switch is turned to SET/COAST, and the vehicle cruise at the set speed when the switch is released.
  (4) Momentarily press the control switch is turned to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap-down function).

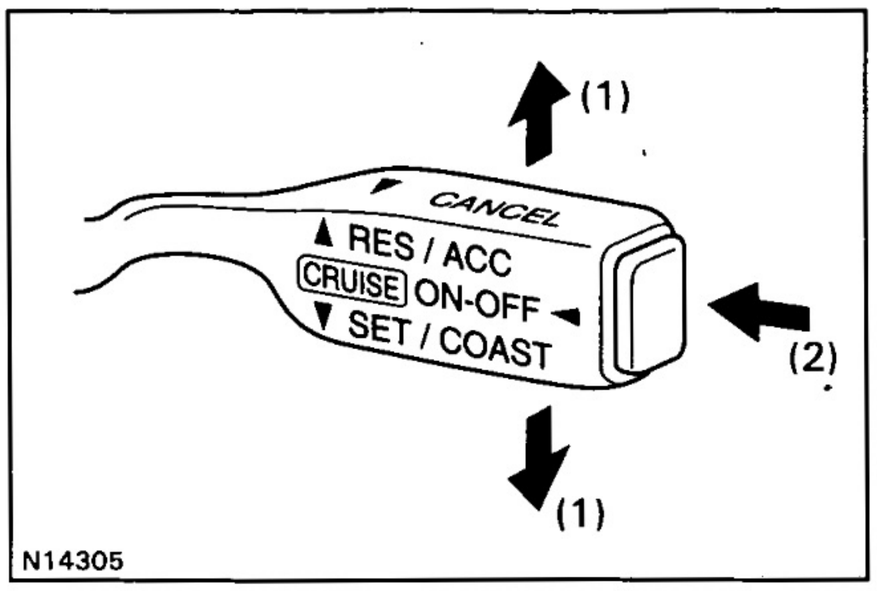


(d) CANCEL INSPECTION
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depress the brake pedal
- Depress the clutch pedal (M/T)
- Shift to except D range (A/T)
- Push the main switch OFF
- Pull the cruise control switch to CANCEL



(e) RESUME INSPECTION
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depress the brake pedal
- Depress the clutch pedal (M/T)
- Shift to except D range (A/T)
- Pull the cruise control switch to CANCEL

(4) After the control switch is turned to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



5. INPUT SIGNAL CHECK

HINT:

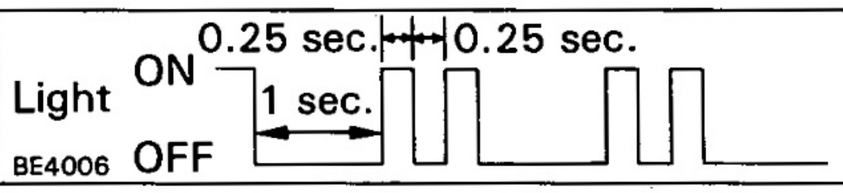
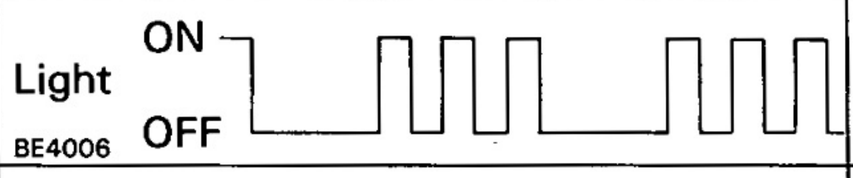
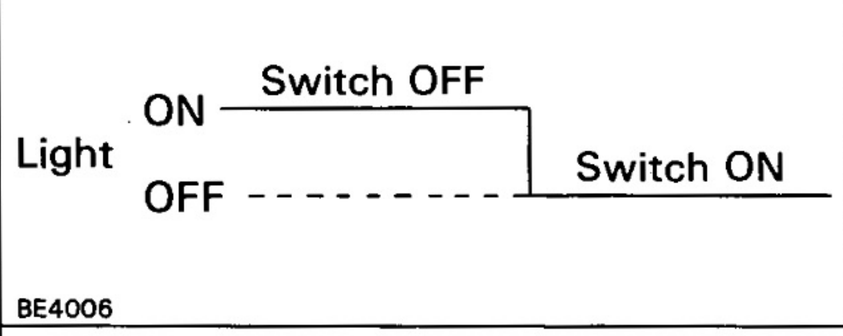
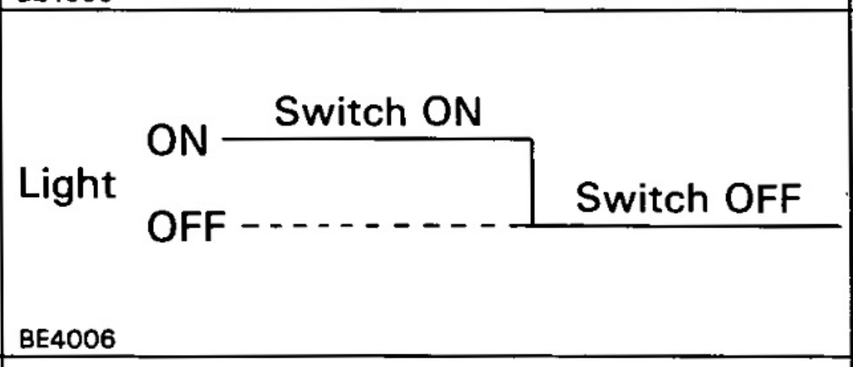
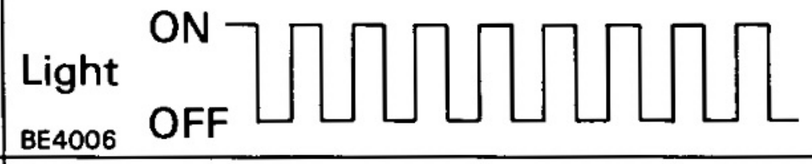
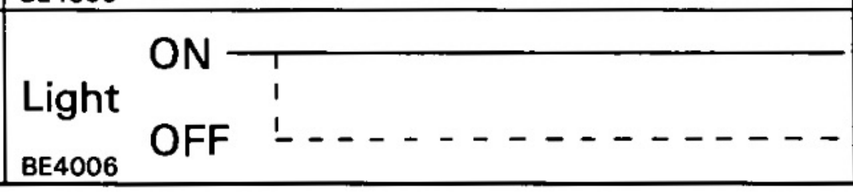
(1) For check No.1 ~ No.3
- Turn ignition switch ON

(2) For check No.4
- Jack up the vehicle
- Start the engine
- Shift to D range

(a) Press the control switch to SET/COAST or RES/ACC position and hold it down or hold it up "1".
(b) Push the main switch ON "2".
(c) Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
(d) Turn the SET/COAST or RES/ACC switch OFF.
(e) Operate each switch as listed in the table below.
(f) Read the blinking pattern of the CRUISE MAIN indicator light.
(g) After performing the check, turn the main switch OFF.

HINT:

When 2 or more signals are input to the ECU, the lowest numbered code will be displayed first.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON		SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON		RES/ACC switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		Stop light switch circuit is normal
	Turn neutral start switch OFF (Shift to except D range)		Neutral start switch circuit is normal
	Turn clutch switch OFF (Depress clutch pedal)		Clutch switch circuit is normal
4	Drive at about 40 km/h (25 mph) or higher		Vehicle Speed Sensor is normal
	Drive at about 40 km/h (25 mph) or below		

BE

DTC CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

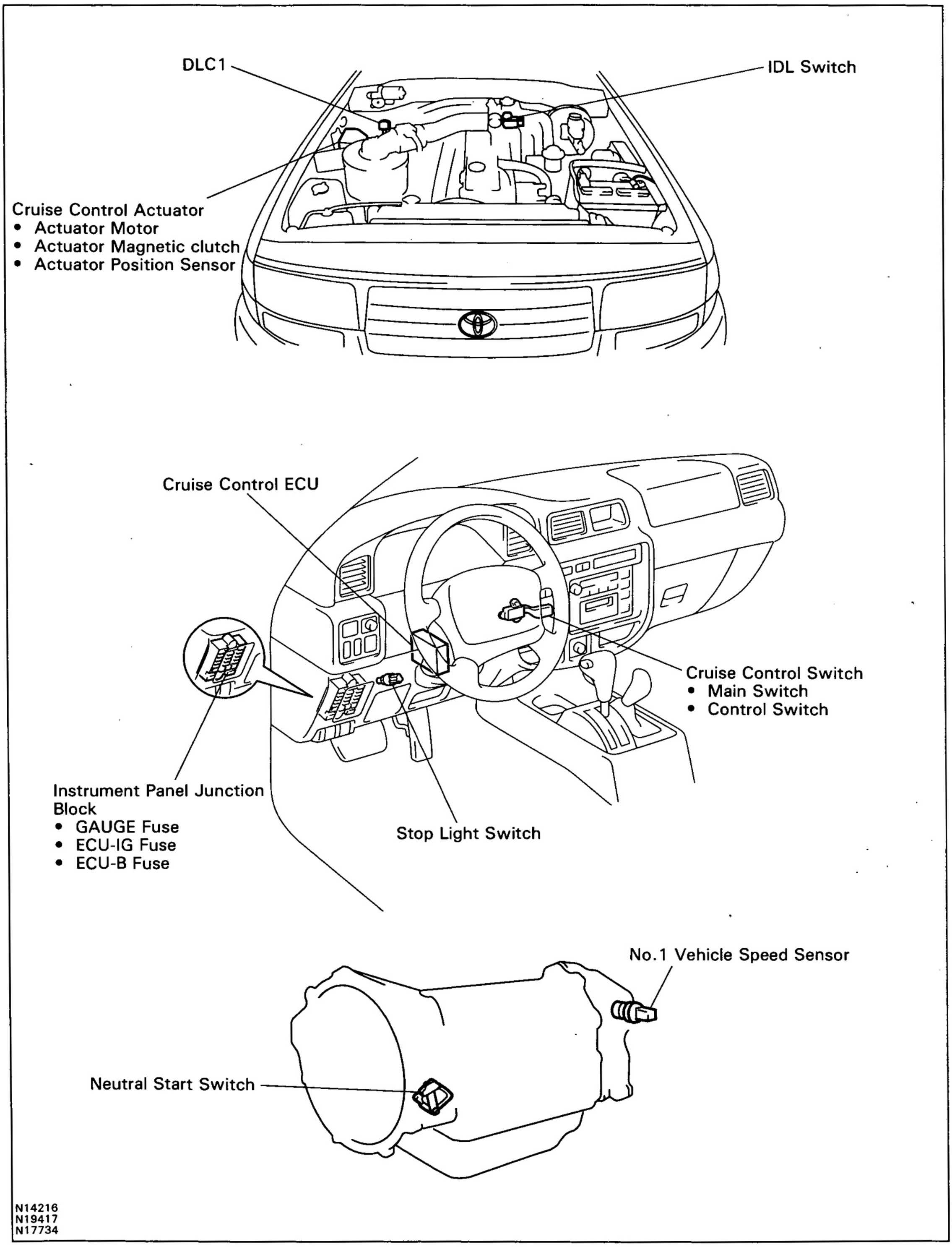
DTC No. (See Page)	Detection Item	Trouble Area
11 (BE-58)	• Actuator Motor Circuit	• Actuator motor • Harness or connector between cruise control ECU and actuator motor • Cruise control ECU
12 (BE-60)	• Actuator Magnetic Clutch Circuit	• STOP Fuse • Stop light switch • Actuator magnetic clutch • Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground • Cruise control ECU
13 (BE-63)	• Actuator Position Sensor Circuit	• Actuator position sensor • Harness or connector between cruise control ECU and actuator position sensor • Cruise control ECU
14 (BE-66)	• Actuator Mechanical Malfunction	• Actuator motor (actuator lock: motor, arm) • Harness or connector between cruise control ECU and actuator motor • Cruise control ECU
21 (BE-68)	• Open in Vehicle Speed Sensor Circuit	• Combination meter • Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor • Vehicle speed sensor • Cruise control ECU
23 (BE-71)	• Vehicle Speed Signal Abnormal	• Vehicle speed sensor • Cruise control ECU
32 (BE-72)	• Control Switch Circuit	• Cruise control switch • Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground • Cruise control ECU

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occourring or CANCEL occurring. (DTC is Normal)	1. Main Switch Circuit (Cruise control switch) 2. Vehicle Speed Sensor 3. Control Switch Circuit (Cruise control switch) 4. Stop Light Switch Circuit 5. Neutral Start Switch/Clutch Switch Circuit 6. Actuator Motor Circuit 7. Cruise Control Cable 8. Cruise Control ECU	 BE-94 BE-68 BE-72 BE-78 BE-84, 87 BE-57 BE-100
SET not occurring or CANCEL occurring. (DTC dose not output)	1. ECU Power Source Circuit 2. Cruise Control ECU	BE-89
Actual vehicle speed deviates above or below the set speed.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Electronically Controlled Transmission Communication Circuit 4. Actuator Motor Circuit 5. Cruise Control ECU	BE-100 BE-71 BE-81 BE-58
Gear shifting frequent between 3rd O/D when driving on uphill road. (Hurting)	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	BE-81
Cruise control not cancelled, even when brake pedal is depressed.	1. Cruise Control Cable 2. Stop Light Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-78 BE-58
Cruise control not cancelled, even when transmission is shifted to "N" position.	1. Cruise Control Cable 2. Neutral Start Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-84 BE-58
Cruise control not cancelled, even when clutch pedal is depressed.	1. Cruise Control Cable 2. Clutch Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-87 BE-58
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Cable 2. Control Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-72 BE-58
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-71 BE-58
Poor response is ACCEL and RESUME modes.	1. Cruise Control Cable 2. Electronically Controlled Transmission Communication Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	BE-100 BE-81 BE-58
O/D does not RESUME, even though the road is not uphill.	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	BE-81
DTC memory is erased.	1. Back-up Power Source Circuit 2. Cruise Control ECU	BE-92

DTC is not output, or is output when is should not be.	1. Diagnosis Circuit 2. Cruise Control ECU	BE-98
Cruise MAIN indicator light remains ON or fall to light up.	1. Cruise MAIN Indicator Light Switch Circuit	BE-96

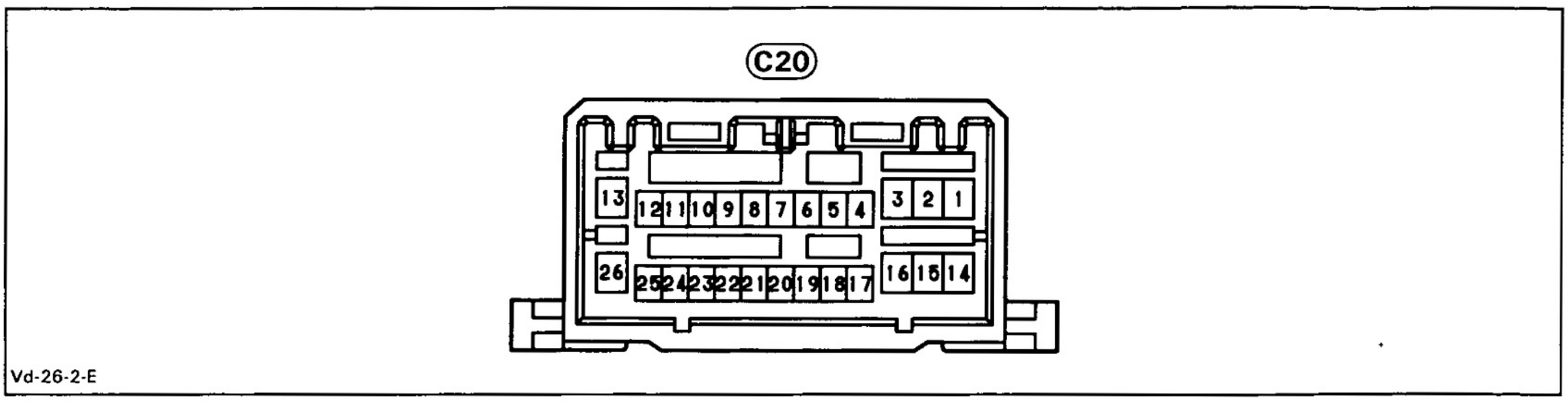
PARTS LOCATION



N14216
N19417
N17734

BE

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
D ↔ GND (C20-2 ↔ C20-13)	B-W ↔ BR	Shift to except D range	Below 1 V
		Shift to D range	10 – 16 V
PI ↔ GND (C20-7 ↔ C20-13)	G-Y ↔ BR	Ignition switch ON Cruise control main switch ON	Below 1.2 V
		Ignition switch ON Cruise control main switch OFF	10 – 16 V
TC ↔ GND (C20-8 ↔ C20-13)	B-Y ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON Connect terminals TC and E1 of diagnostic check connector	Below 1 V
OD ↔ GND (C20-9 ↔ C20-13)	G-O ↔ BR	During cruise control driving OD switch ON	10 – 16 V
		During cruise control driving OD switch OFF (3rd driving)	Below 1 V
L ↔ GND (C20-10 ↔ C20-13)	R ↔ BR	During cruise control driving	9 – 15 V
		Except during cruise control driving	Below 1 V
MC ↔ GND (C20-11 ↔ C20-13)	L-R ↔ BR	During cruise control driving COAST switch hold ON	9 – 15 V
		During cruise control driving ACC switch hold ON	Below 1 V
MO ↔ GND (C20-12 ↔ C20-13)	L ↔ BR	During cruise control driving ACC switch hold ON	9 – 15 V
		During cruise control driving COAST switch hold ON	Below 1 V
GND ↔ Body Ground (C20-13 ↔ Body Ground)	BR ↔ Body Ground	Constant	Below 1 V
B ↔ GND (C20-14 ↔ C20-13)	B-W ↔ BR	Ignition switch ON	10 – 16 V
BATT ↔ GND (C20-15 ↔ C20-13)	B-R ↔ BR	Constant	10 – 16 V
STP – ↔ GND (C20-16 ↔ C20-13)	G-W ↔ BR	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CCS ↔ GND (C20-18 ↔ C20-13)	B-G ↔ BR	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	5.1 – 8.3 V
		Ignition switch ON SET/COAST switch hold ON	2.4 – 4.0 V
		Ignition switch ON RES/ACC switch hold ON	0.8 – 1.4 V
CMS ↔ GND (C20-19 ↔ C20-13)	Y-R ↔ BR	Ignition switch ON Main switch ON	Below 1 V
		Ignition switch ON Main switch OFF	10 – 16 V
SPD ↔ GND (C20-20 ↔ C20-13)	L-W ↔ BR	Ignition switch ON	4.7 – 5.2 V
		During driving	3 – 7 V
IDL ↔ GND (C20-23 ↔ C20-13)	G-W ↔ BR	Ignition switch ON Throttle valve fully closed	Below 1 V
		Ignition switch ON Throttle valve fully opened	10 – 16 V
ECT ↔ GND (C20-22 ↔ C20-13)	G-R ↔ BR	During driving Gear position O/D	Below 1 V
		During driving Gear position 3rd	10 – 16 V
VR1 ↔ GND (C20-23 ↔ C20-13)	Y ↔ BR	Ignition switch ON	4.7 – 5.2 V
VR2 ↔ VR3 (C20-24 ↔ C20-25)	Y-G ↔ Y-L	During cruise control driving	1.0 – 4.7 V
		Ignition switch ON Actuator control plate fully opened	4.2 – 4.7 V
		Ignition switch ON Actuator control plate fully closed	1.0 – 1.2 V
VR3 ↔ GND (C20-25 ↔ C20-13)	Y-L ↔ BR	Constant	Below 1 V
L– ↔ GND (C20-26 ↔ C20-13)	W-B ↔ BR	Constant	Below 1 V

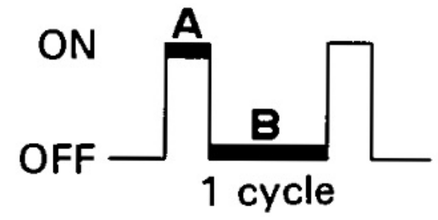
CIRCUIT INSPECTION

DTC	11	Actuator Motor Circuit

CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted by changes in the Duty Ratio (See note below).
Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then.

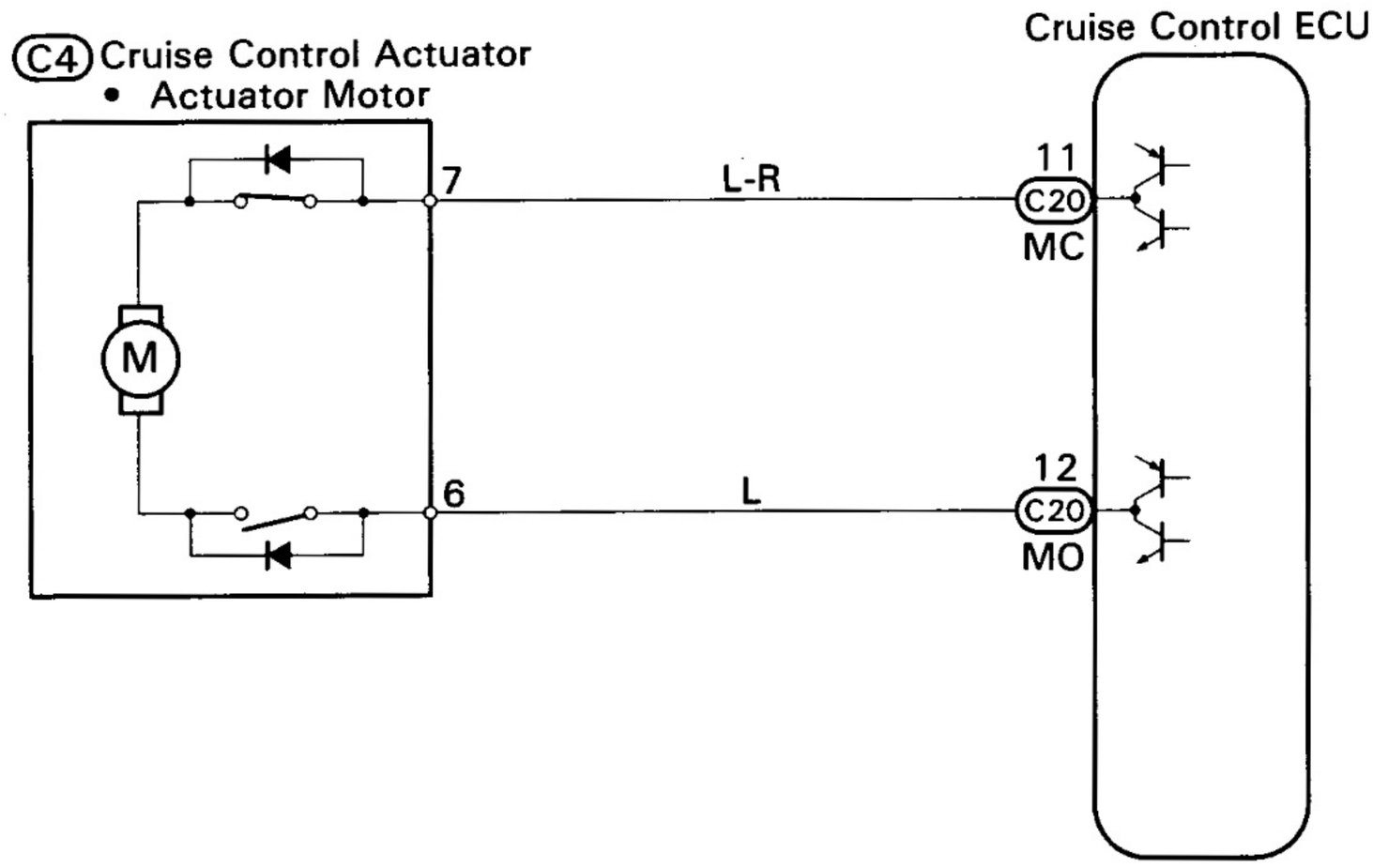
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$



BE4056

DTC No.	Detection Item	Trouble Area
11	• Short in actuator motor circuit.	• Actuator motor • Harness or connector between cruise control ECU and actuator motor • Cruise control ECU

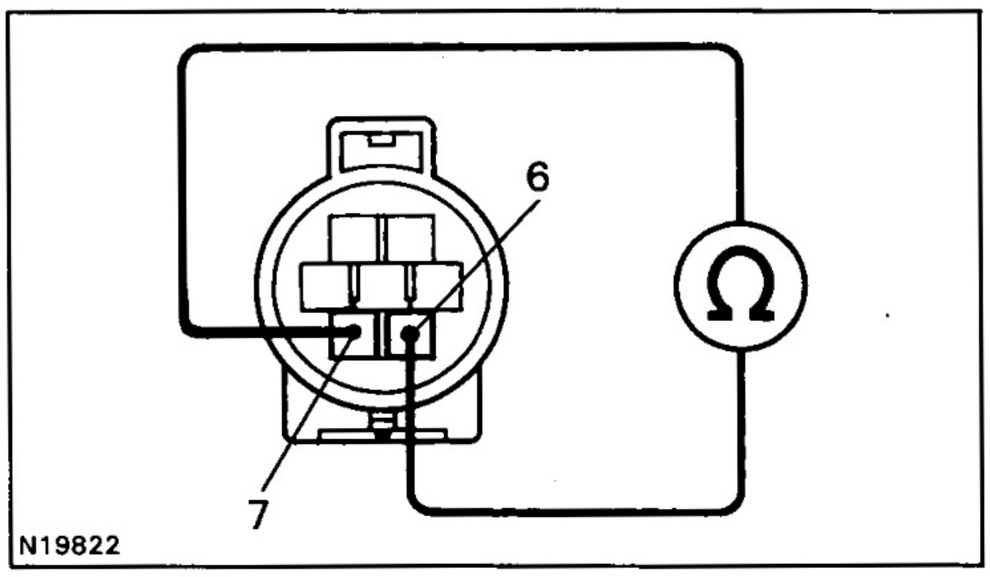
WIRING DIAGRAM



N20693

INSPECTION PROCEDURE

1	Check resistance between terminals MO and MC of actuator motor.



PREPARATION:

(a) Turn ignition switch OFF.
(b) Disconnect the actuator connector.

CHECK:

Measure resistance between terminals 6 and 7.

HINT:
If control plate position is fully opened or fully closed, resistance can not measure.

OK:

Resistance: more than 4.2 Ω

NG → **Replace cruise control actuator.**

OK

2	Check for open and short in harness and connectors between cruise control ECU and actuator motor.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

BE

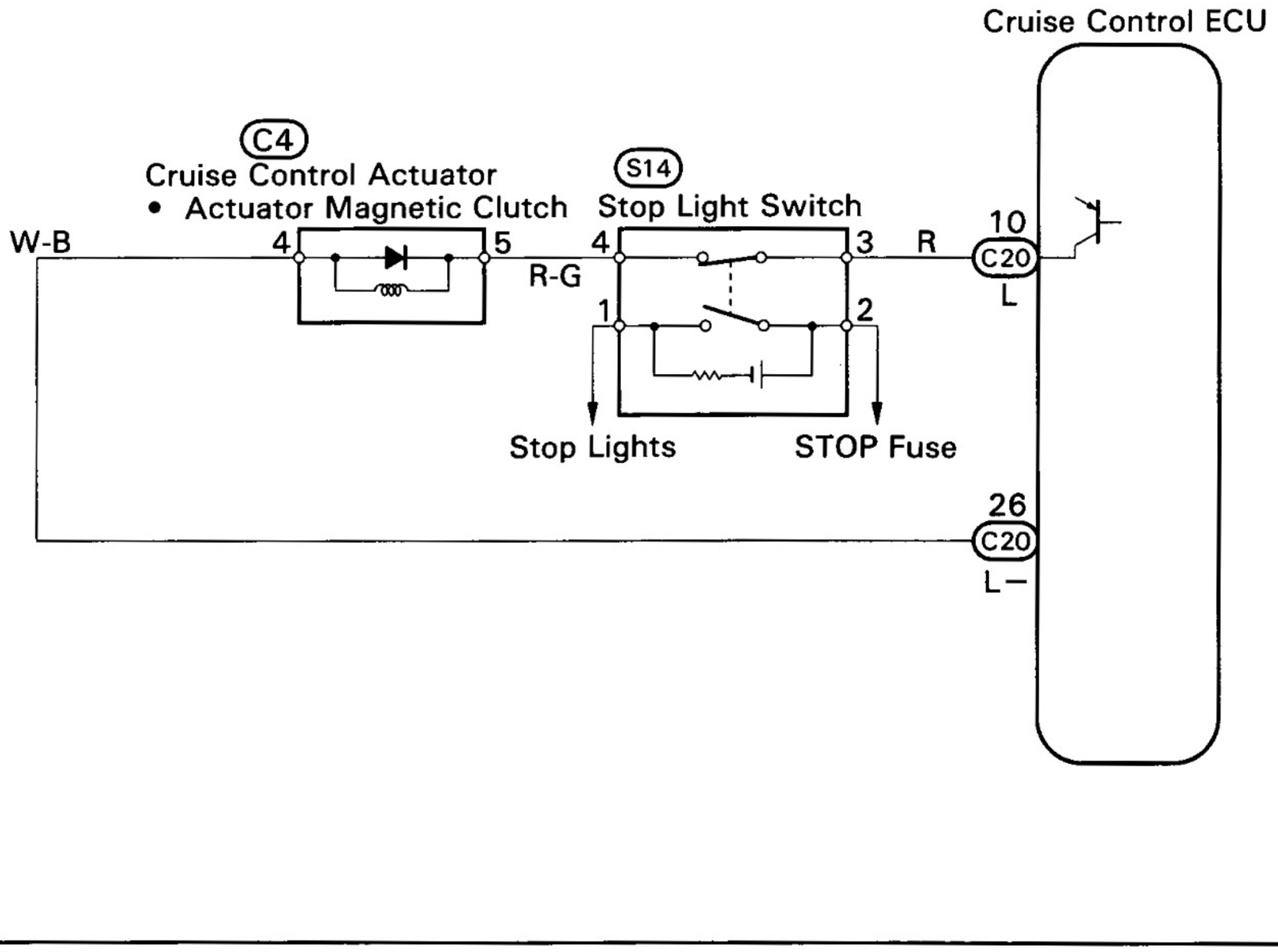
DTC	12	Actuator Magnetic Clutch Circuit

CIRCUIT DESCRIPTION

This circuit turns on the magnetic clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control operation, the rotor shaft between the motor and control plate is released.
When the brake pedal is depressed, the stop light switch turns on, supplying electrical power to the stop light. Power supply to the magnetic clutch is mechanically cut and the magnetic clutch is turned OFF.
When driving downhill, if the vehicle speed exceeds the set speed by 15 km/h (9 mph), the ECU turns the safety magnet clutch OFF. If the vehicle speed later drops to within 10 km/h (6 mph) above the set speed, then cruise control at the set speed is resumed.

DTC No.	Detection Item	Trouble Area
12	• Short in actuator magnetic clutch circuit. • Open (0.8 sec.) in actuator magnetic clutch circuit.	• STOP Fuse • Stop light switch • Actuator magnetic clutch • Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground • Cruise control ECU

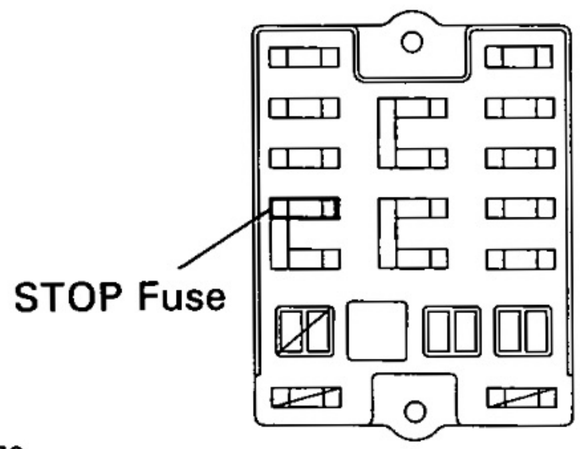
WIRING DIAGRAM



INSPECTION PROCEDURE

1 Check STOP fuse.

Instrument Panel Fuse Block



PREPARATION:

(a) Turn ignition switch OFF.
(b) Remove the STOP fuse from instrument panel fuse block.

CHECK:

Check fuse continuity.

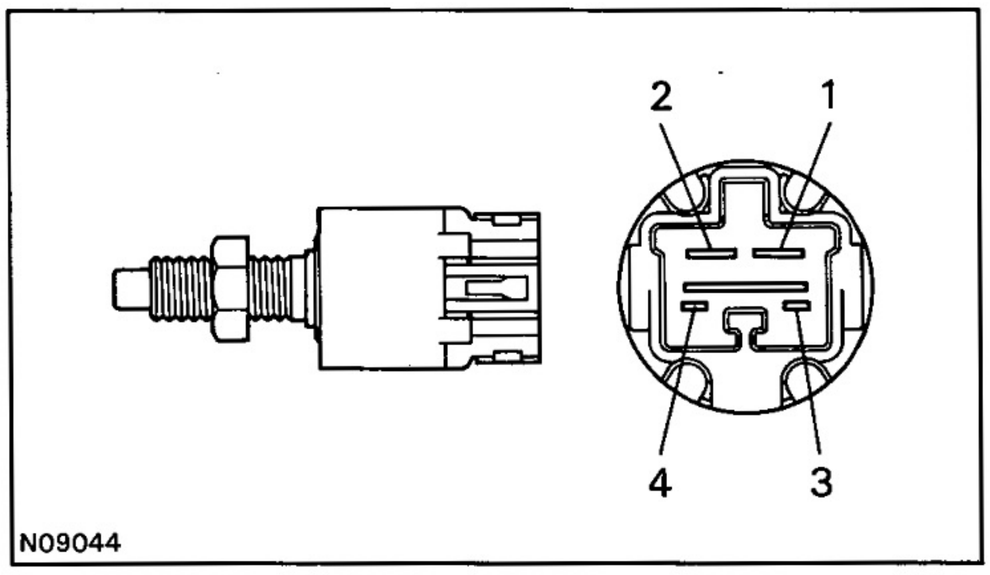
OK:

There is continuity.

NG → **Replace STOP fuse.**

OK

2 Check stop light switch.



PREPARATION:

Disconnect the stop light switch connector.

CHECK:

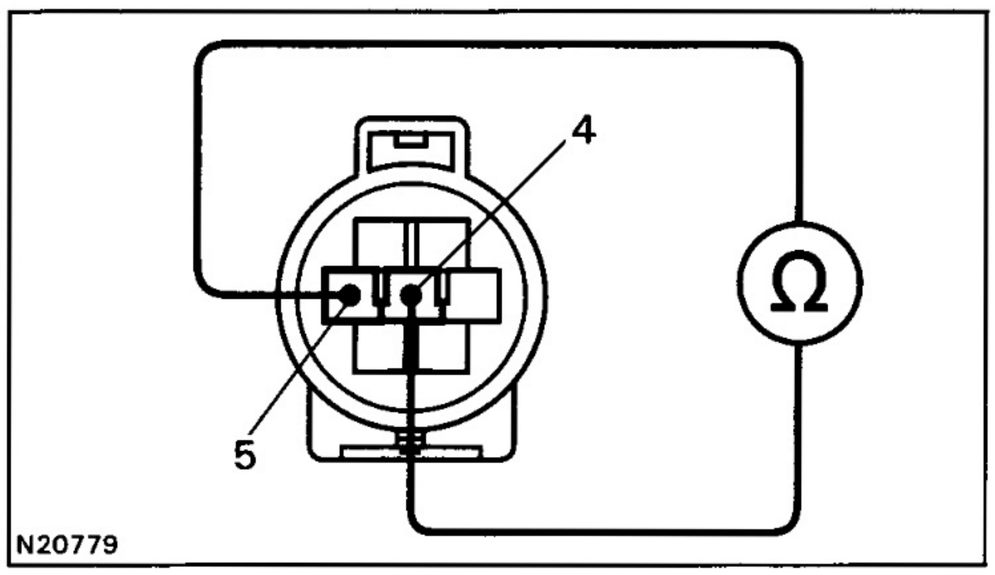
Check continuity between terminals.

Switch position	Continuity
Switch pin free (Brake pedal depressed)	1-2
Switch pin pushed in (Brake pedal released)	3-4

NG → **Replace stop light switch.**

OK

3	Check resistance between terminals L and GND of actuator magnetic clutch.



PREPARATION:

(a) Turn ignition switch OFF.
(b) Disconnect the actuator connector.

CHECK:

Measure resistance between terminals 4 and 5.

OK:

Resistance: 34.65 ~ 42.35 Ω

NG → **Replace cruise control actuator.**

OK

4	Check for open and short in harness and connectors between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

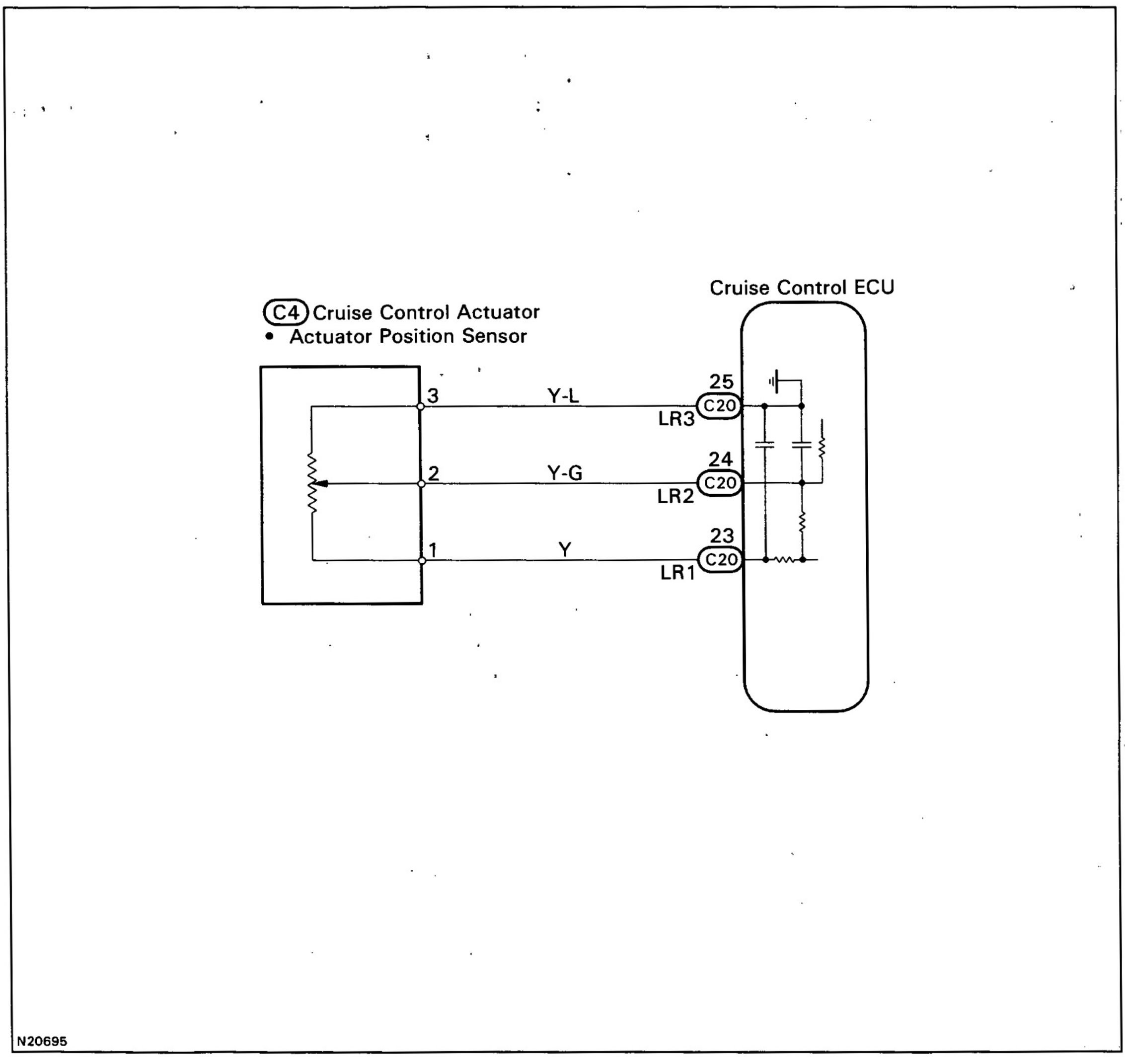
DTC	13	Actuator Position Sensor Circuit

CIRCUIT DESCRIPTION

The circuit detects the rotation position of the actuator control plate and sends a signal to the ECU.

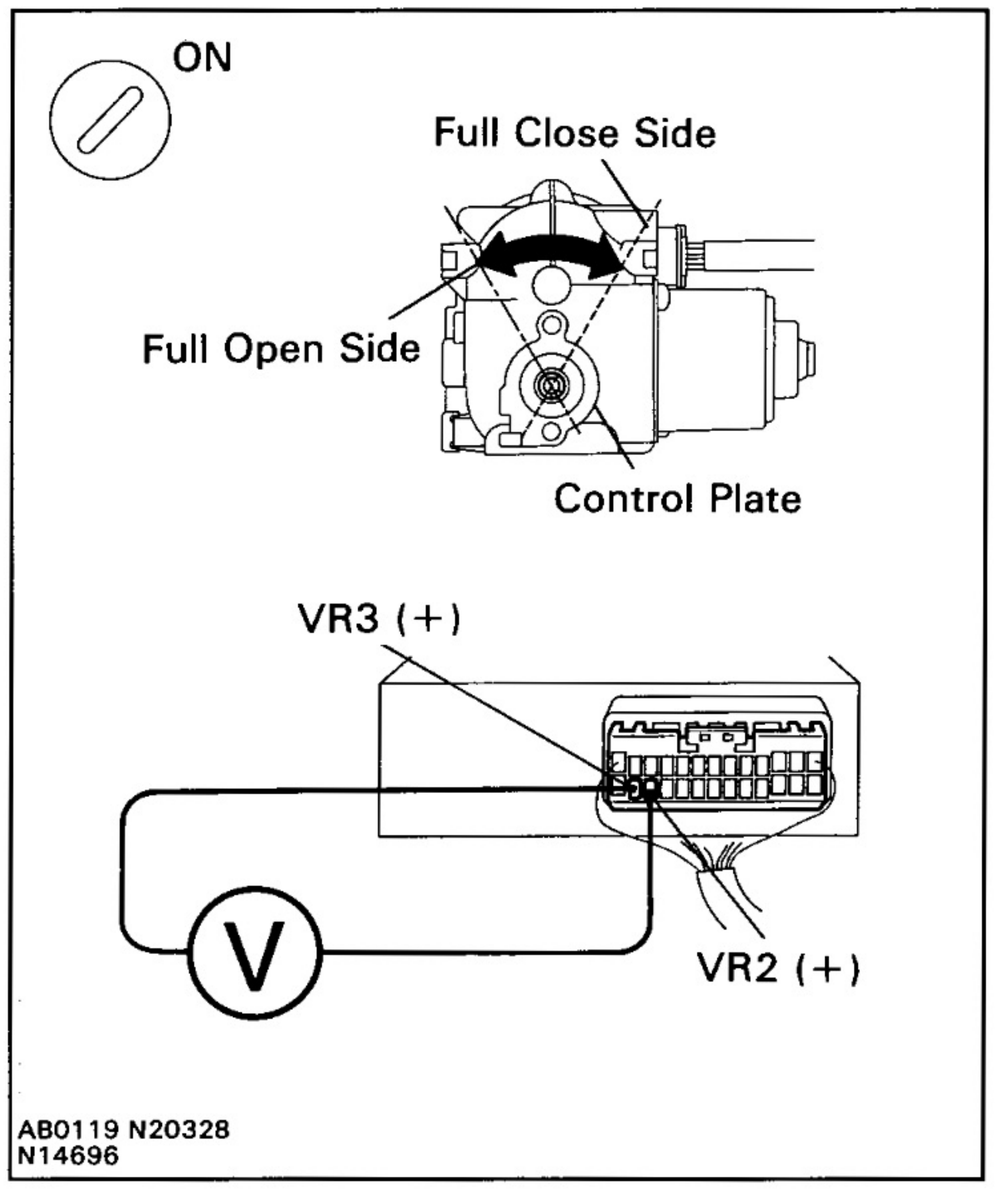
DTC No.	Detection Item	Trouble Area
13	• Position sensor detects abnormal voltage.	• Actuator position sensor • Harness or connector between cruise control ECU and actuator position sensor • Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check resistance between terminals VR2 and VR3 of cruise control ECU connector.**



AB0119 N20328
N14696

PREPARATION:

(a) Remove the ECU with connectors still connected.
(b) Turn ignition switch OFF.

CHECK:

Measure voltage between terminals 24 and 25 of ECU connector while turning control plate slowly by hand from the deceleration side to the acceleration side.

OK:

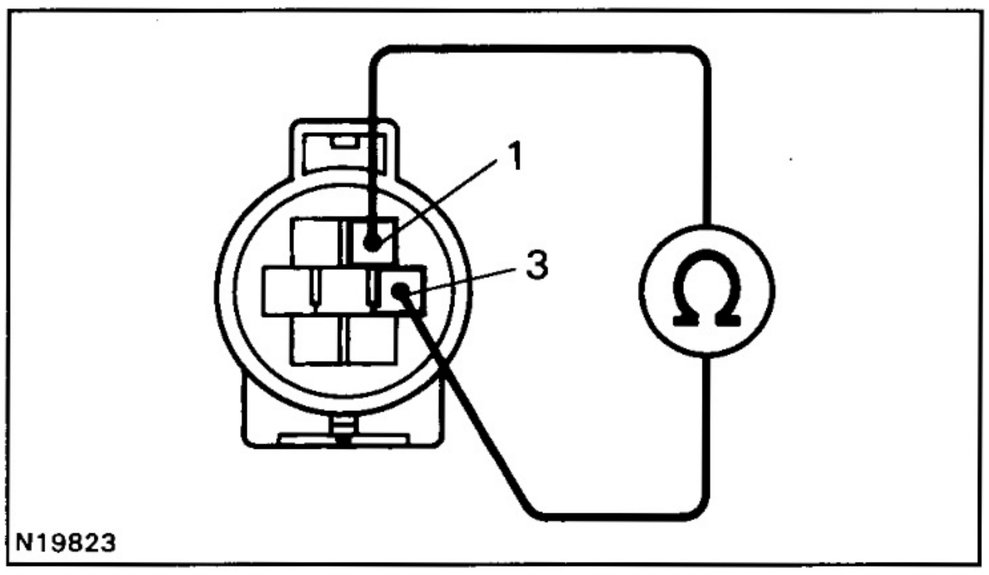
Voltage:
Fully closed: Approx. 1.3 V
Fully opened: Approx. 4.1 V
In addition, as the control plate is turned, the voltage should increase gradually without interruption.

BE

NG → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

OK

2	**Check resistance between terminals VR1 and VR3 of actuator position sensor.**



N19823

PREPARATION:

(a) Turn ignition switch OFF.
(b) Disconnect the actuator connector.

CHECK:

Measure resistance between actuator terminal 1 and 3 of actuator connector.

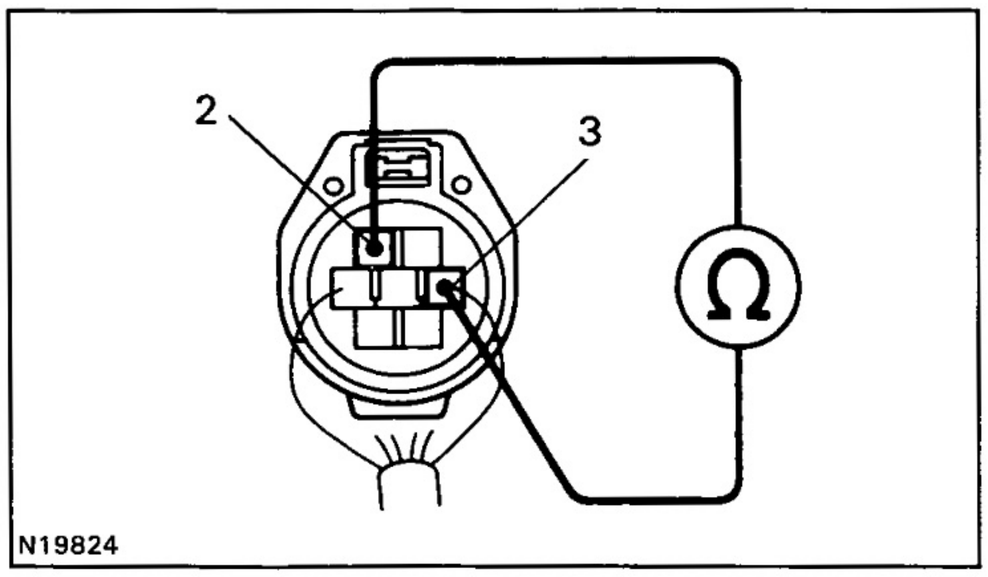
OK:

Resistance: 1.8 ~ 2.2 kΩ (25°C)

NG → **Replace cruise control actuator.**

OK

3	Check voltage between terminals VR2 and VR3 of actuator position sensor.



PREPARATION:

(a) Turn ignition switch ON.
(b) Connect the actuator connector.

CHECK:

Measure voltage between terminals 2 and 3 of actuator connector while turning control plate slowly by hand from the deceleration side to the acceleration side.

OK:

Voltage: 1.3 ~ 4.0 V

HINT:
As the control plate is turned, the voltage should increase gradually without interruption.

NG → **Replace cruise control actuator.**

OK

4	Check for open and short in harness and connector between cruise control ECU and actuator position sensor.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

BE

DTC	14	Actuator Mechanical Malfunction

CIRCUIT DESCRIPTION

The circuit detects the rotation position of the actuator control plate and sends a signal to the ECU.

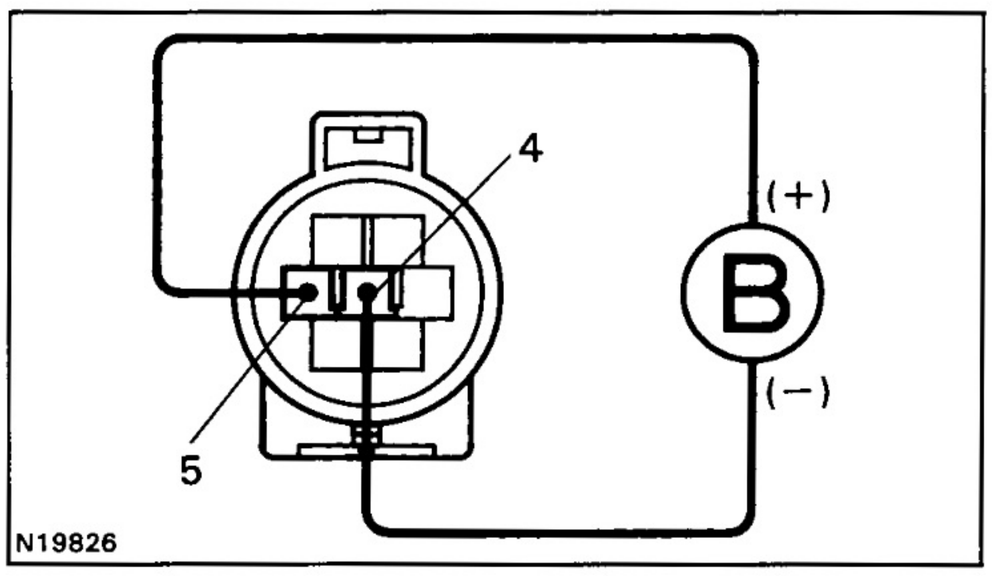
DTC No.	Detection Item	Trouble Area
14	• Open in actuator motor circuit. • Position sensor signal valve does not change when the motor operates.	• Actuator lock: (motor, arm) • Actuator motor • Harness or connector between cruise control ECU and actuator motor • Cruise control ECU

WIRING DIAGRAM

See page BE-63.

INSPECTION PROCEDURE

1 **Check cruise control actuator arm locking operation.**



PREPARATION:

(a) Turn ignition switch OFF.
(b) Disconnect the actuator connector.

CHECK:

(a) Connect the positive (+) lead from the battery to the terminal 5 of actuator and the negative (−) lead to terminal 4.

NOTICE:
Do not connect the high tension cables to the wrong battery terminal. You will damage the cruise control actuator.

(b) Move the control plate by hand.

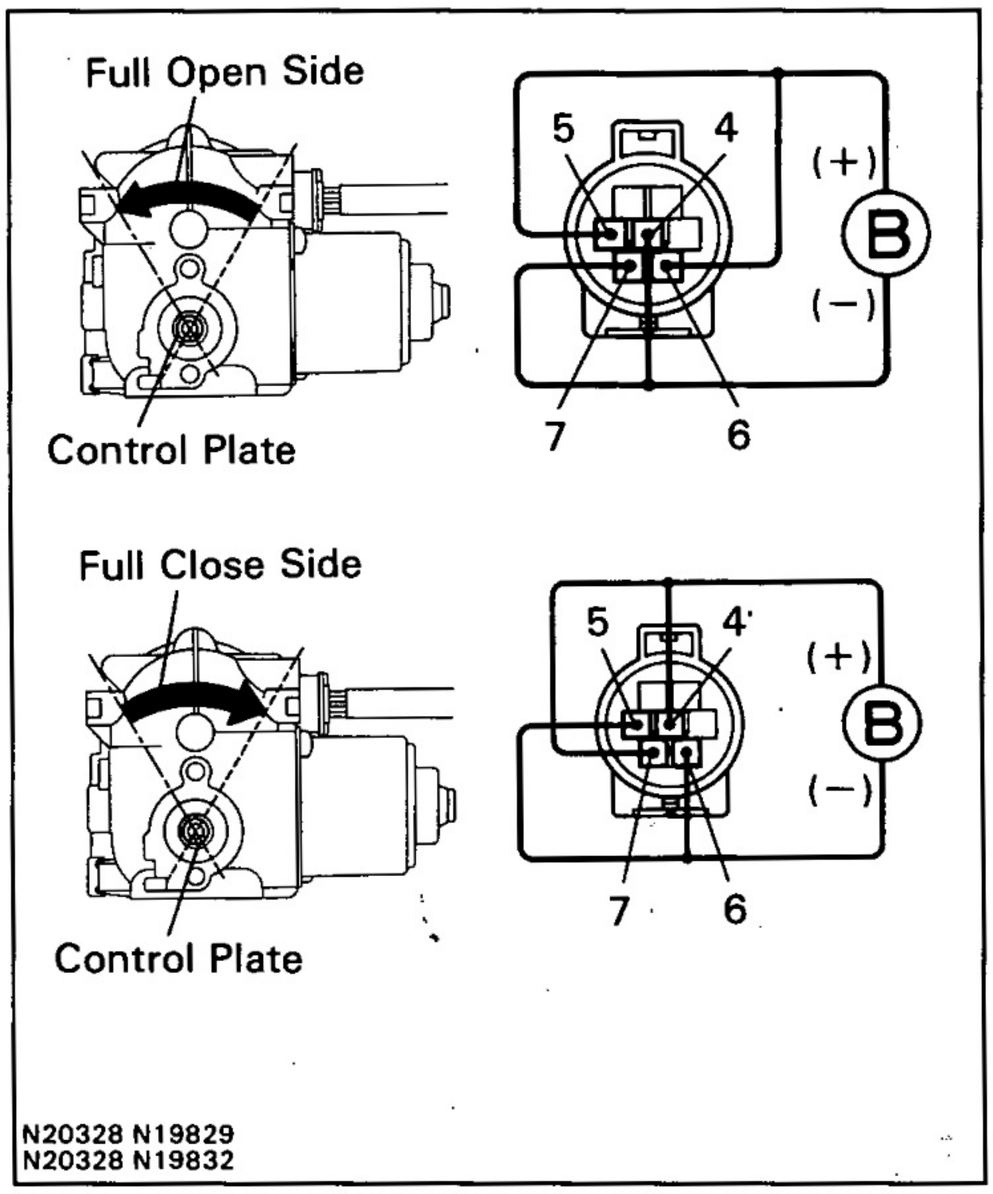
OK:

Control plate does not move.

NG → **Replace cruise control actuator.**

OK

2 Check cruise control actuator operation.



N20328 N19829
N20328 N19832

PREPARATION:

(a) Turn ignition switch OFF.
(b) Disconnect the actuator connector.

CHECK:

Connect the positive (+) lead from the battery to terminals 5 and 6 of actuator, connect the negative (−) lead to terminals 4 and 7 of actuator.

OK:

Control arm moves to full open side

CHECK:

Connect the positive (+) lead from the battery to terminals 4 and 7 of actuator, connect the negative (−) lead to terminals 5 and 6 of actuator.

OK:

Control arm moves to full close side

BE

NG → **Replace cruise control actuator.**

OK

3 Check harness and connector between cruise control ECU and cruise control actuator.

NG → **Repair or replace harness or connector.**

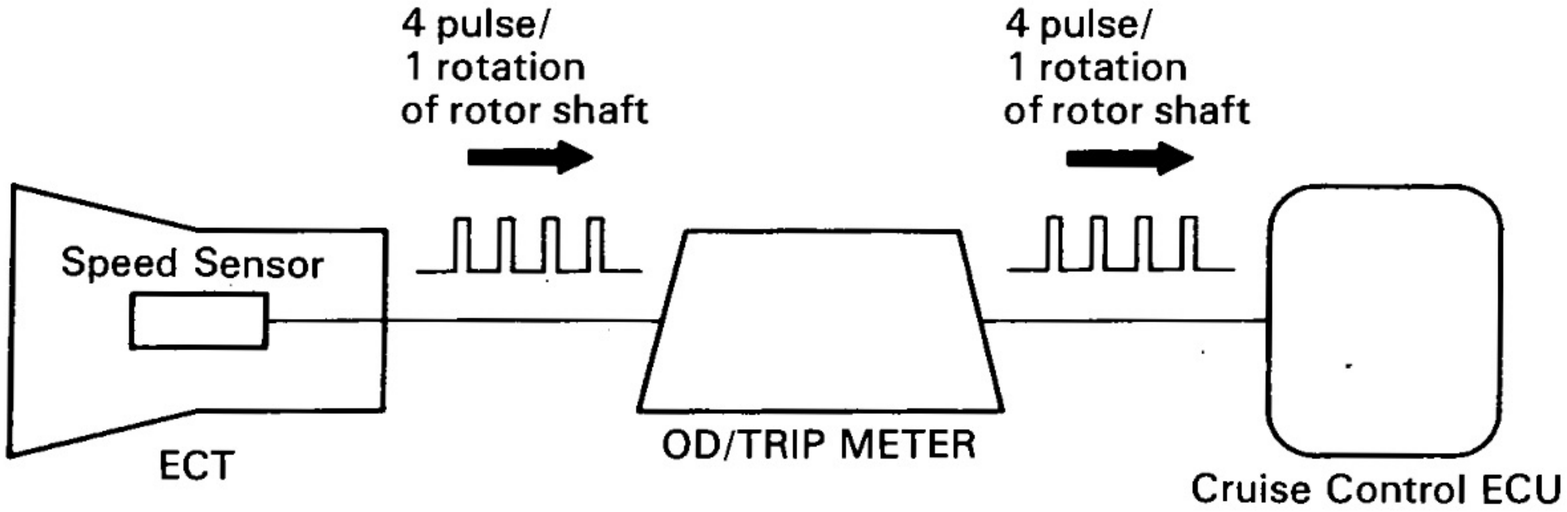
OK

Check and replace cruise control ECU.

DTC	21	Open in Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

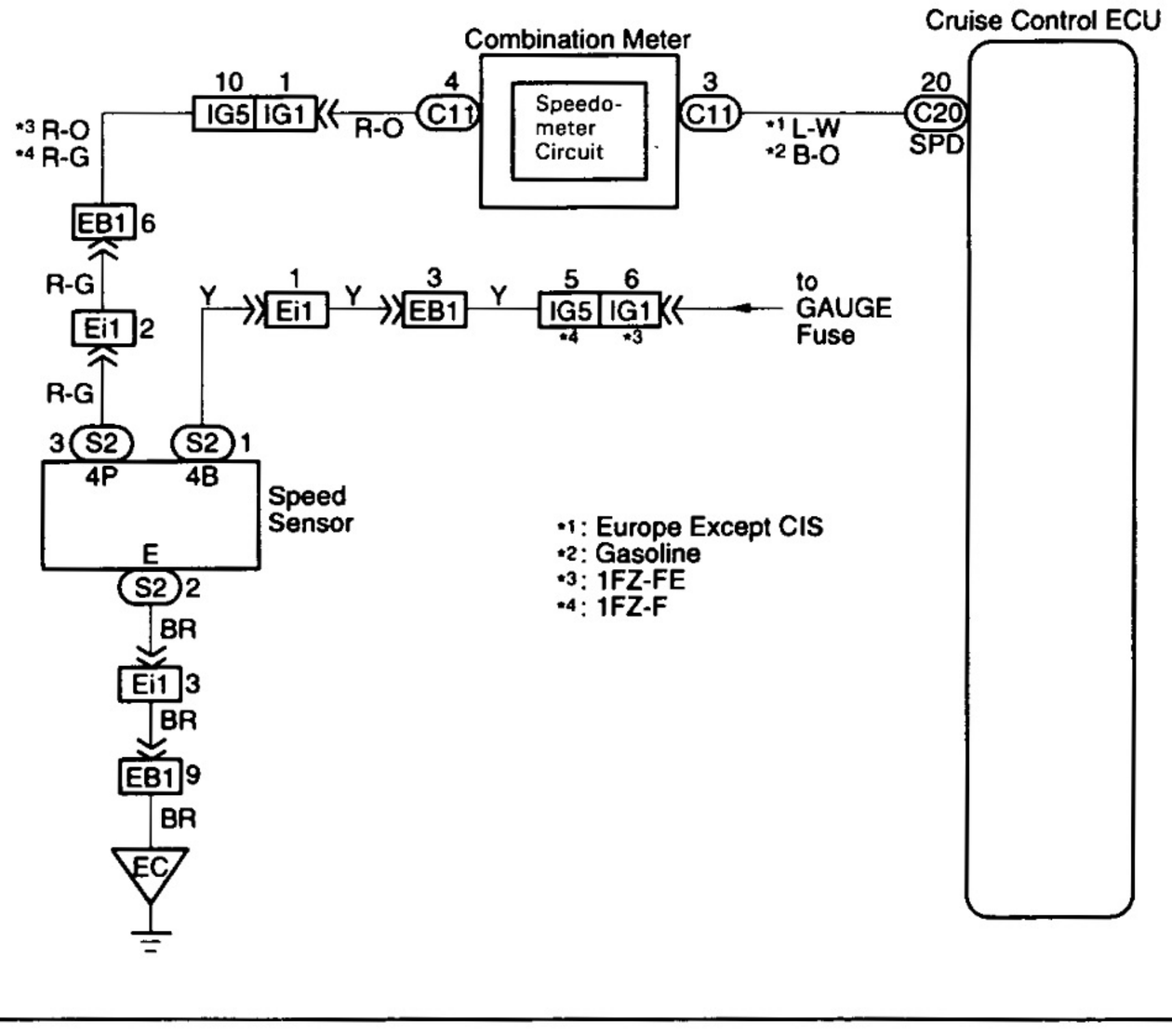
The vehicle speed sensor circuit is sent to cruise control ECU as vehicle speed signal.
The rotor shaft is driven by the gear of the transmission.
For each rotation of the shaft, the vehicle speed sensor sends a 4 pulse signal through the combination meter to the cruise control ECU (See the following).
This signal is converted inside the combination meter and sent as a 4-pulse signal to the cruise control ECU.
The ECU calculates the vehicle speed from this pulse frequency.



N10528

DTC No.	Detection Item	Trouble Area
21	• Speed signal is not input to the cruise control ECU while cruise control is set.	• Combination meter • Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor • Vehicle speed sensor • Cruise control ECU

WIRING DIAGRAM



N20696

INSPECTION PROCEDURE

1 **Input signal check.**

Input Signal	Indicator Light Blinking Pattern
Drive at about 40 km/h (25 mph) or below	Light: ON — OFF
Drive at about 40 km/h (25 mph) or higher	Light: ON / OFF (blinking)

CHECK:

(a) See input signal check on page BE-51.
(b) Check indicator light operation when driving with vehicle speed above 40 km/h (25 mph), and with vehicle speed below 40 km/h (25 mph).

OK:

Vehicle speed above 40 km/h (25 mph):
Indicator light blinks
Vehicle speed below 40 km/h(25 mph):
Indicator light stays on

OK → **Check and replace cruise control ECU.**

NG

2 **Check speedometer circuit (See Combination meter troubleshooting on page BE-5, 8).**

NG → **Repair or replace harness, connector or combination meter assembly.**

OK

3 **Check harness and connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor.**

NG → **Repair or replace harness or connector.**

OK

BE

4	Check vehicle speed sensor (See page BE-12).

NG → Replace vehicle speed sensor.

OK →

Check and replace cruise control ECU.

DTC	23	Vehicle Speed Signal Abnormal

CIRCUIT DESCRIPTION

See page BE-68.

DTC No.	Detection Item	Trouble Area
23	• Actual vehicle speed has dropped either by 16 km/h (10 mph) or more below the set speed, or by 20% or more of the set speed.	• Vehicle speed sensor • Cruise control ECU

WIRING DIAGRAM

See page BE-68.

INSPECTION PROCEDURE

1 Check vehicle speed sensor (See page BE-12).

NG → Replace vehicle speed sensor.

OK →

Check and replace cruise control ECU.

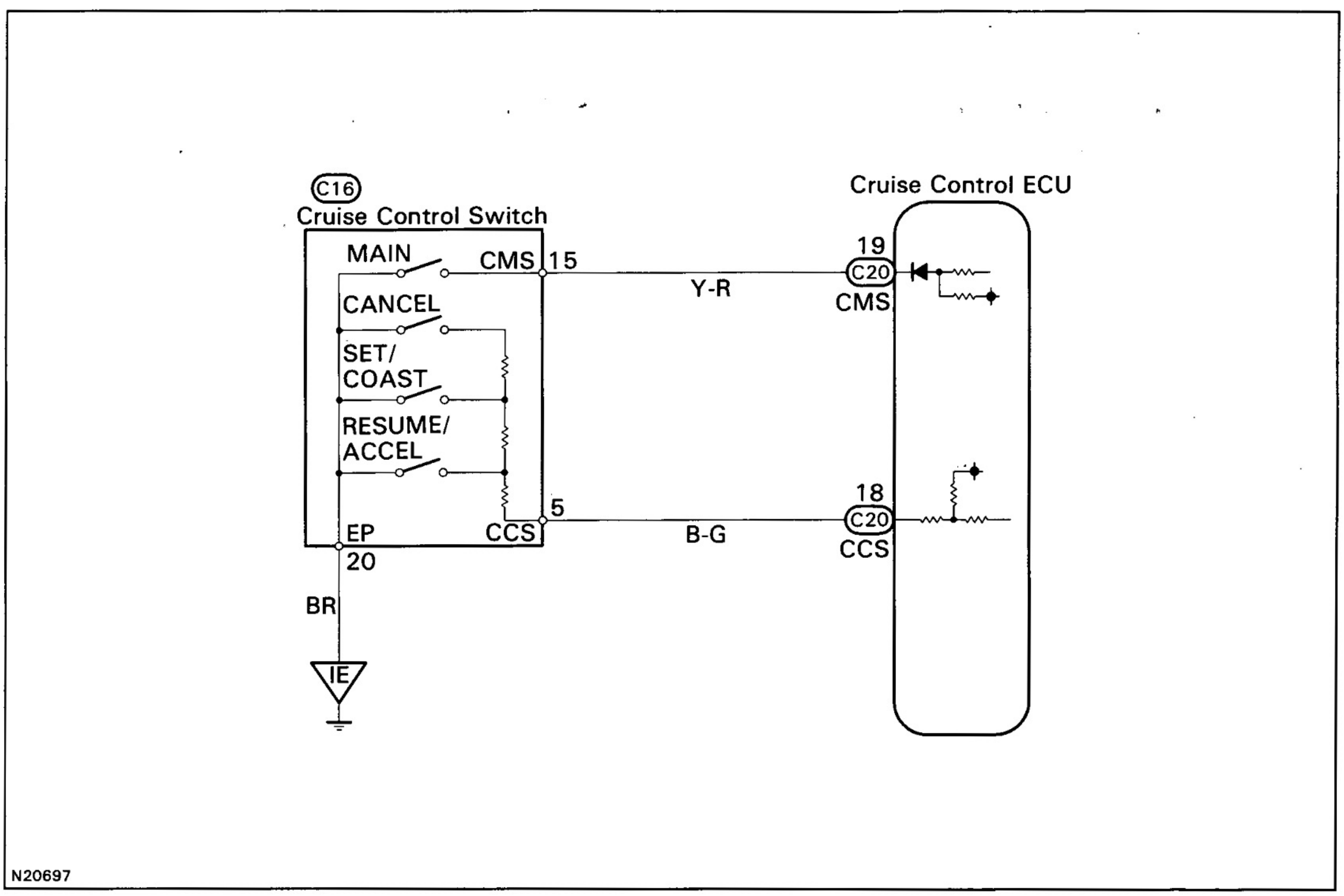
DTC	32	Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU.

DTC No.	Detection Item	Trouble Area
32	• Short in control switch circuit.	• Cruise control switch • Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground • Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1 Input signal check.

Input Signal	Indicator Light Blinking Pattern
SET/COAST switch	ON / OFF — 2 Pulses
RESUME/ACCEL switch	ON / OFF — 3 Pulses
CANCEL switch	ON / OFF — SW OFF, SW ON

PREPARATION:

See input signal check on page BE-51.

CHECK:

Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned on.

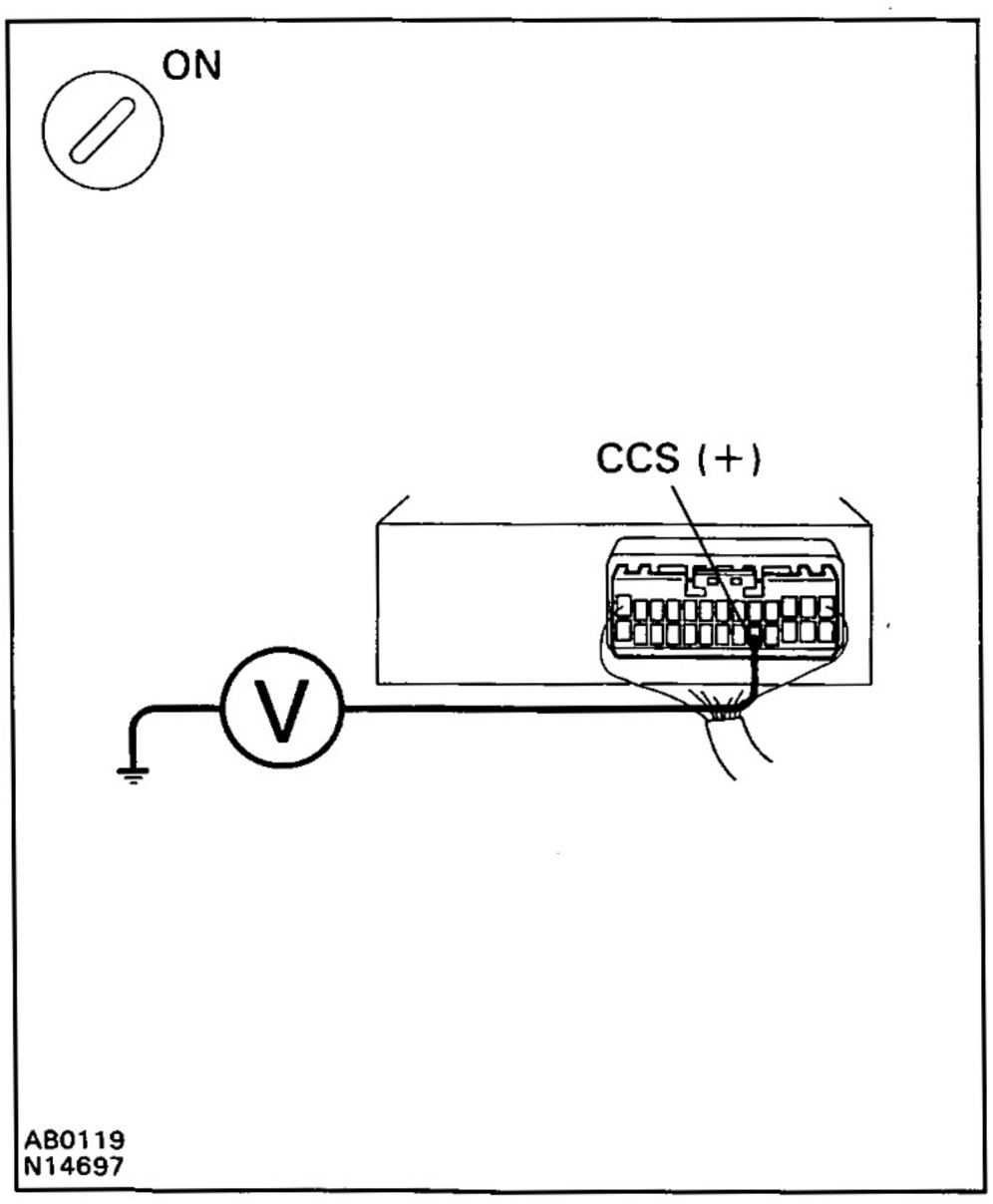
OK:

SET/COAST, RESUME/ACCEL switch
The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.
CANCEL switch
The indicator light goes off when the cancel switch is turned ON.

OK → **Wait and see.**

NG

2 Check voltage between terminals CCS of cruise control ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals 18 of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

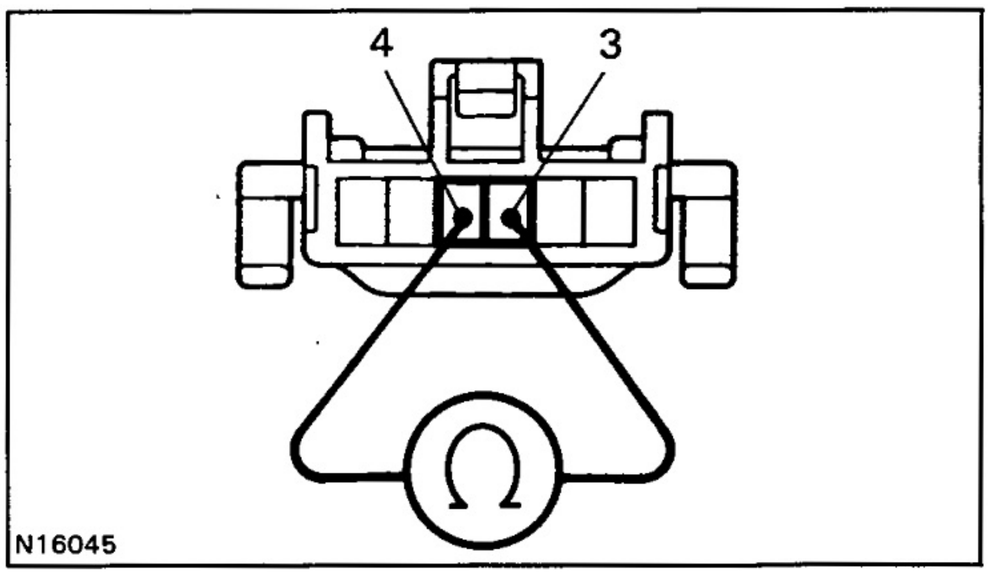
Switch position	Voltage
Neutral	10 – 14 V
RES/ACC	0.7 – 2.5 V
SET/COAST	2.3 – 4.6 V
CANCEL	4.1 – 7.2 V

NG → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

OK

BE

3 **Check control switch.**



PREPARATION:

(a) Remove steering wheel center pad.
(b) Disconnect the control switch connector.

CHECK:

Measure resistance between terminals 3 and 4 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	50 – 80
SET/COAST	180 – 220
CANCEL	400 – 440

NG → **Replace control switch.**

OK

4 **Check harness and connector between cruise control ECU and cruise control switch, cruise control switch and body ground.**

NG → **Repair or replace harness or connector.**

OK

5 **Input signal check (See step 1).**

OK → **Wait and see.**

NG

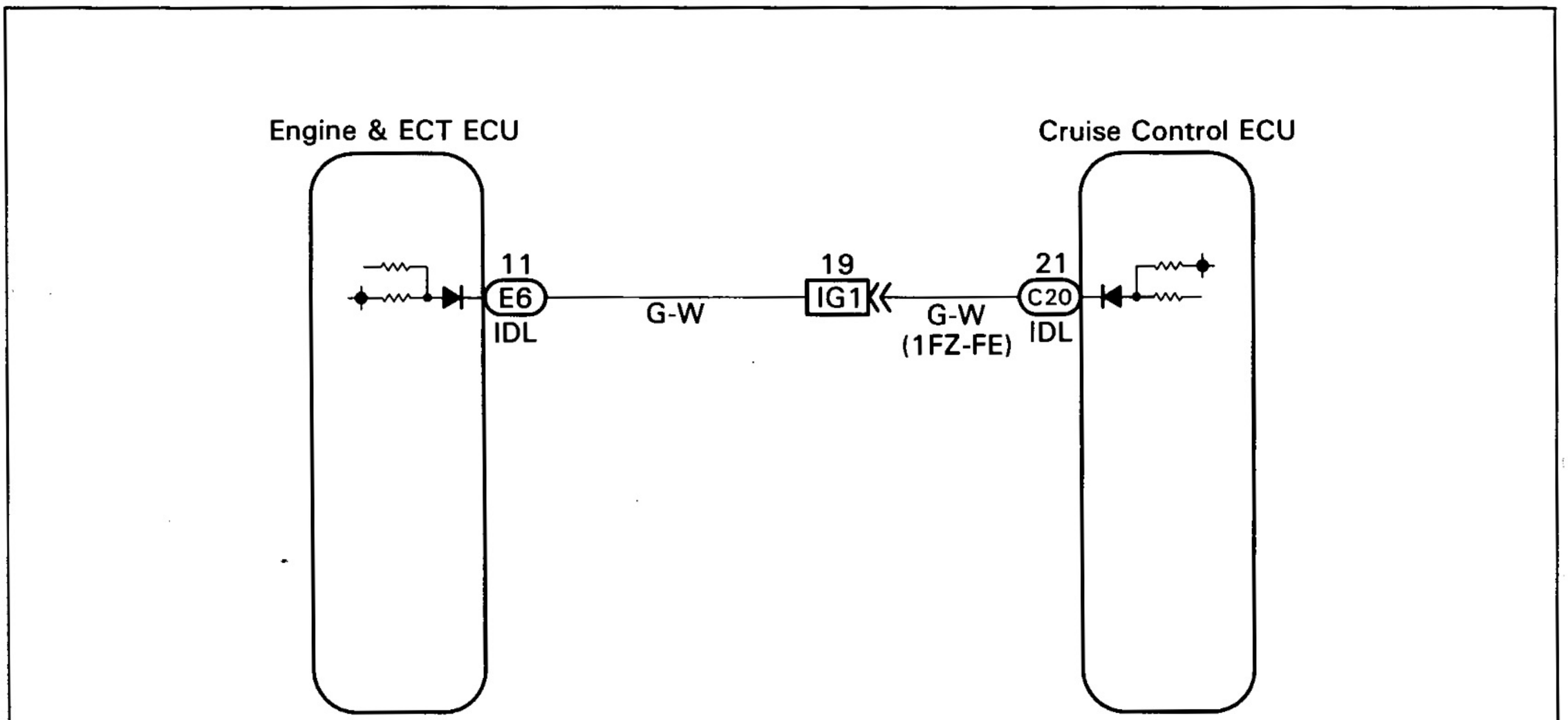
Check and replace cruise control ECU.

Idle Switch Circuit

CIRCUIT DESCRIPTION

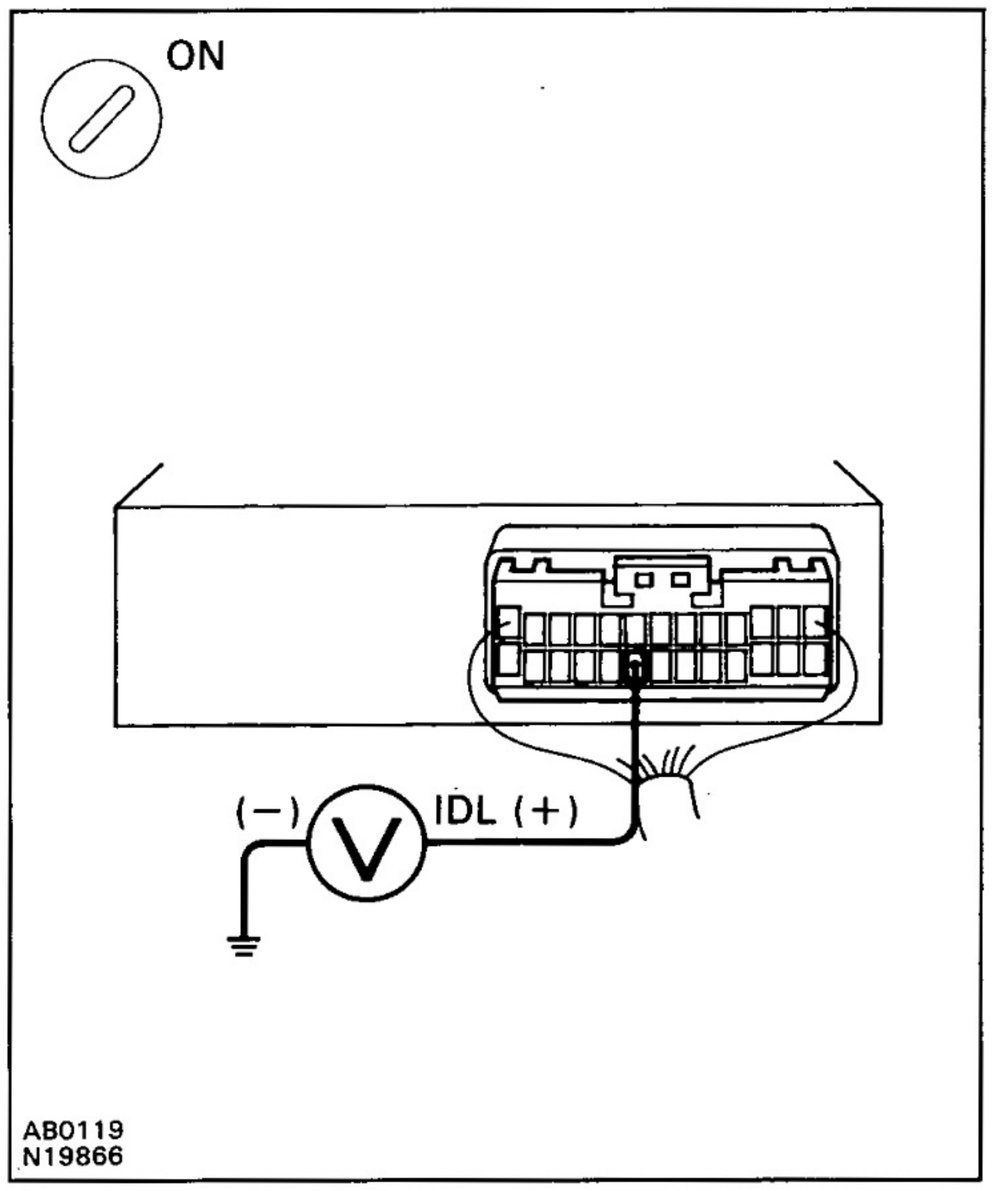
When the idle switch in turned ON, a signal is sent to the ECU. The ECU uses this signal to correct the discrepancy between the throttle valve position and the actuator position sensor value to enable accurate cruise control at the set speed. If the idle switch is malfunctioning, problem symptoms also occur in the engine, so also inspect the engine.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal IDL of cruise control ECU connector and body ground.



PREPARATION:

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

CHECK:

Measure voltage between terminal IDL of ECU connector and body ground when the throttle valve is fully closed and fully opened.

OK:

Throttle valve position	Voltage
Fully opened	10 – 14 V
Fully closed	Below 2 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

2	Check harness and connector between engine and ECT ECU and throttle position sensor.

NG → **Repair or replace harness or connector.**

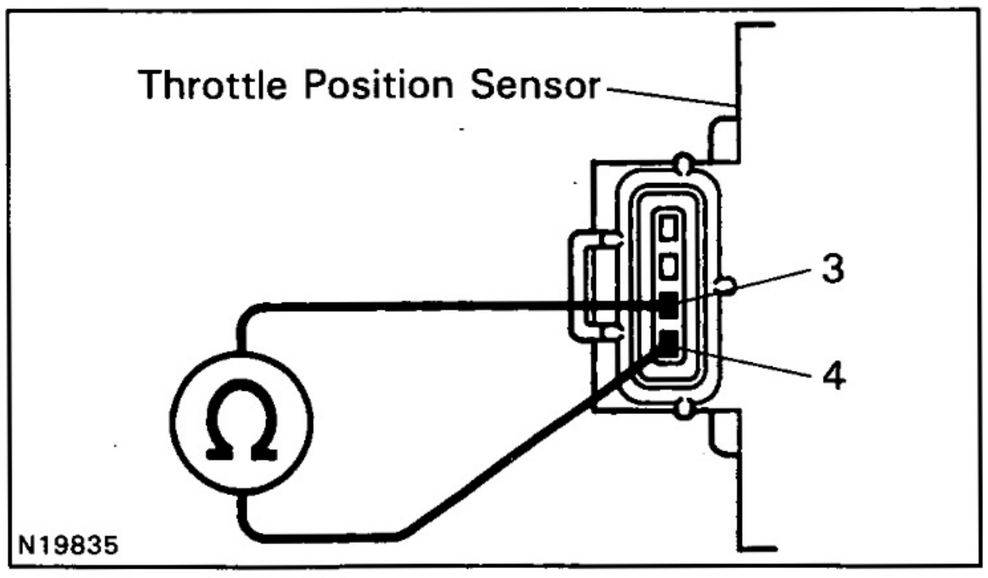
OK

3	Check throttle position sensor circuit.

NG → **Replace throttle position sensor.**

OK

4 Check throttle position sensor.



PREPARATION:

Disconnect the throttle position sensor connector.

CHECK:

Measure resistance between terminals 3 and 4 of throttle position sensor connector when the throttle valve is fully closed and fully opened.

OK:

Throttle valve position	Resistance
Fully opened	1 MΩ or higher
Fully closed	Below 2.3 kΩ

NG → **Replace throttle position sensor.**

OK

5 Check for open and short in harness and connector between cruise control ECU and throttle position sensor, throttle position sensor and body ground.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECU. When the ECU receives this signal, it cancels the cruise control.
A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel conditions are:

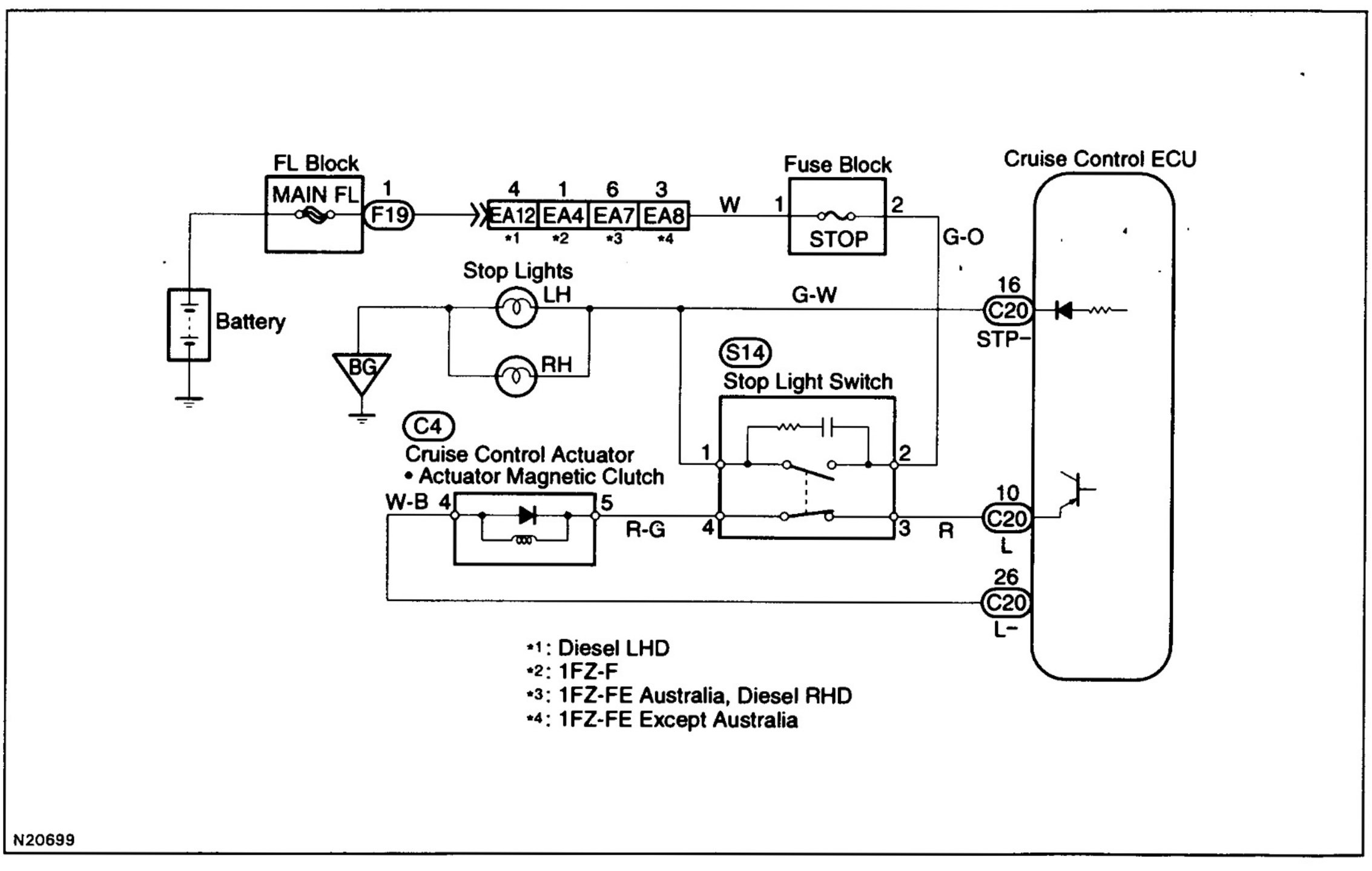
- Battery voltage at terminal STP−

When the brake is on, battery voltage normally applies through the STOP fuse and stop light switch to terminal STP− of the ECU, and the ECU turns the cruise control off.

If the harness connected to terminal STP− has an open circuit, terminal STP− will have battery voltage and the cruise control will be turned off.

Also, when the brake is on, the magnetic clutch circuit is cut mechanically by the stop light switch, turning the cruise control off. (See page BE-60 for operation of the actuator magnetic clutch)

WIRING DIAGRAM



N20699

INSPECTION PROCEDURE

1	Check operation of stop light.

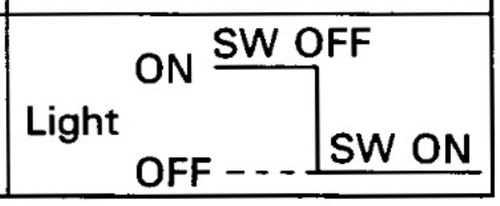
CHECK:

Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

NG → **Check stop light system.**

OK

2	Input signal check.

Input Signal	Indicator Light Blinking Pattern
Stop Light switch ON	

CHECK:

(a) See input signal check on BE-51.
(b) Check the indicator light when the brake pedal is depressed.

OK:

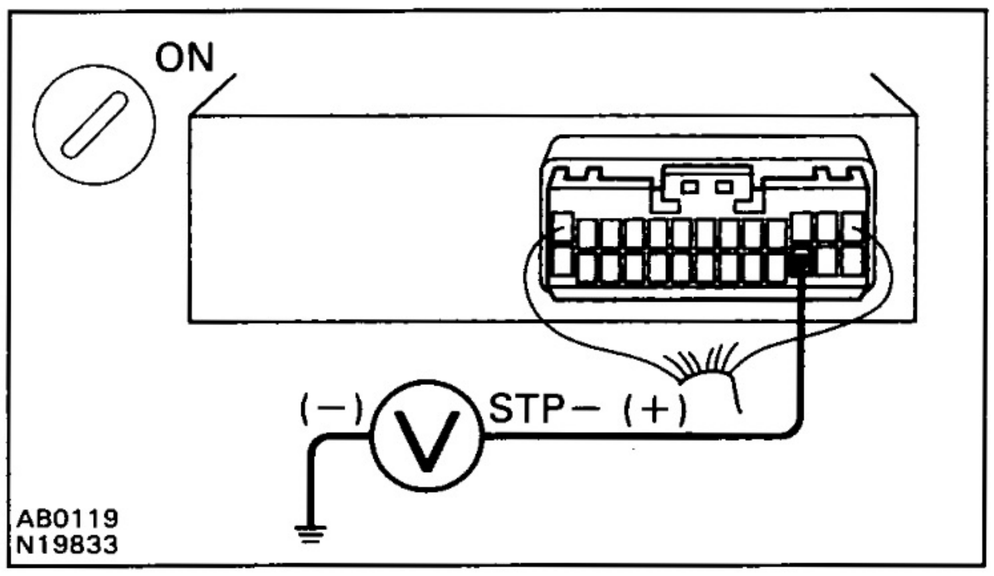
The indicator light goes off when the brake pedal is depressed.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

BE

3	Check voltage between terminal STP– of cruise control ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connectors still connected.
(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP– of cruise control ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	10 – 14 V
Released	Below 1 V

OK → Proceed to next circuit inspection shown on problem symptom table (See page BE-53).

NG

BE

4	Check for open in harness and connectors between terminal STP– of cruise control ECU and stop light switch.

NG → Repair or replace harness or connector.

OK

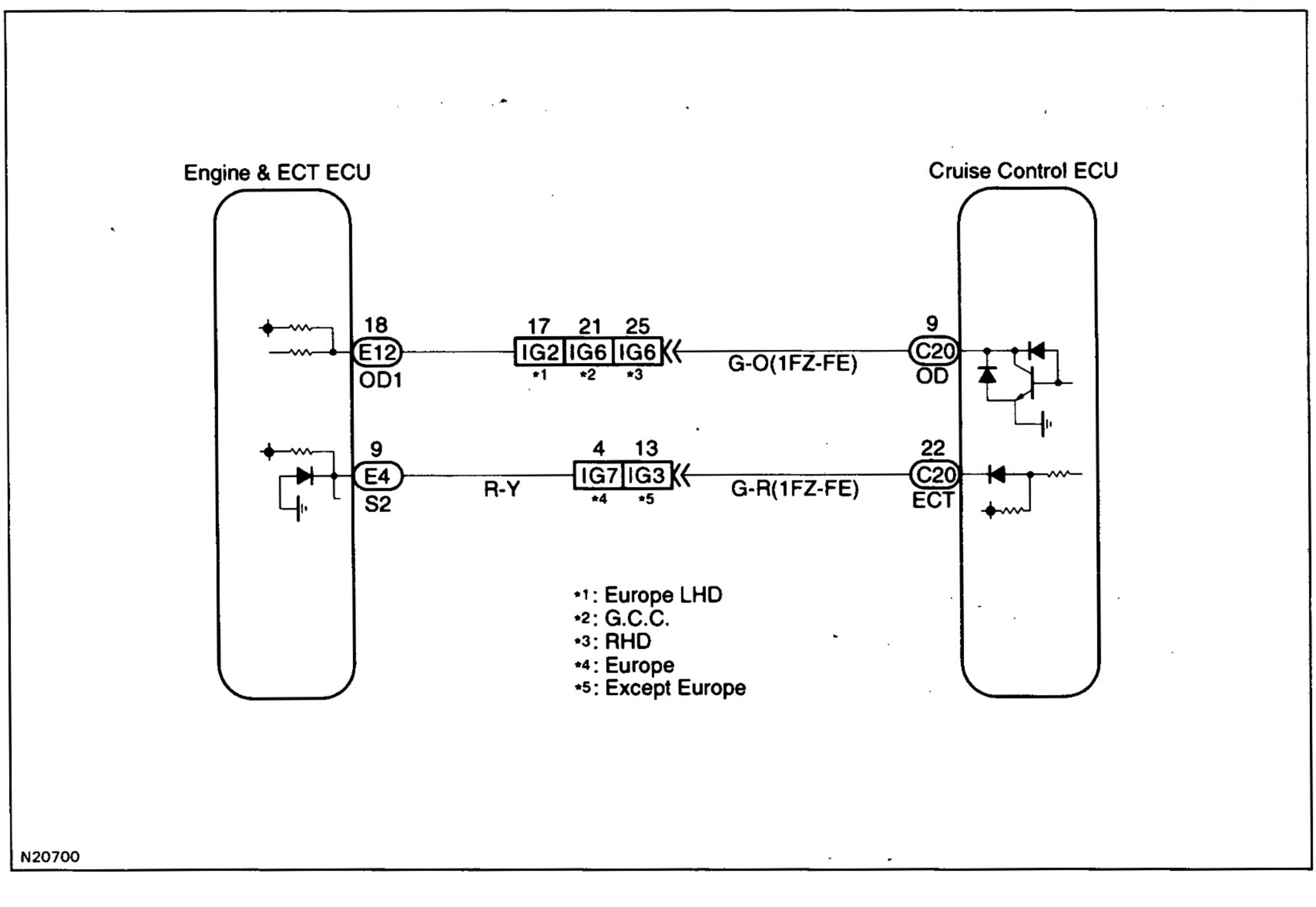
Check and replace cruise control ECU.

Electronically Controlled Transmission Communication Circuit

CIRCUIT DESCRIPTION

When driving uphill under cruise control, in order to reduce shifting due to ON-OFF overdrive operation and to provide smooth driving, when down shifting in the electronically controlled transmission occurs, a signal to prevent upshift until the end of the uphill slope is sent from the cruise control ECU to the electronically controlled transmission.
Terminal ECT of the cruise control ECU detects the shift change signal (output to electronically controlled transmission No.2 solenoid) from the engine & ECT ECU.
If vehicle speed down, also when terminal ECT of the cruise control ECU receives down shifting signal, it sends a signal from terminal OD to engine & ECT ECU to cut overdrive until the end of the uphill slope, and the gear shifts are reduced and gear shift points in the electronically controlled transmission are changed.

WIRING DIAGRAM



BE

INSPECTION PROCEDURE

1	Check operation of overdrive.

PREPARATION:

Test drive after engine warms up.

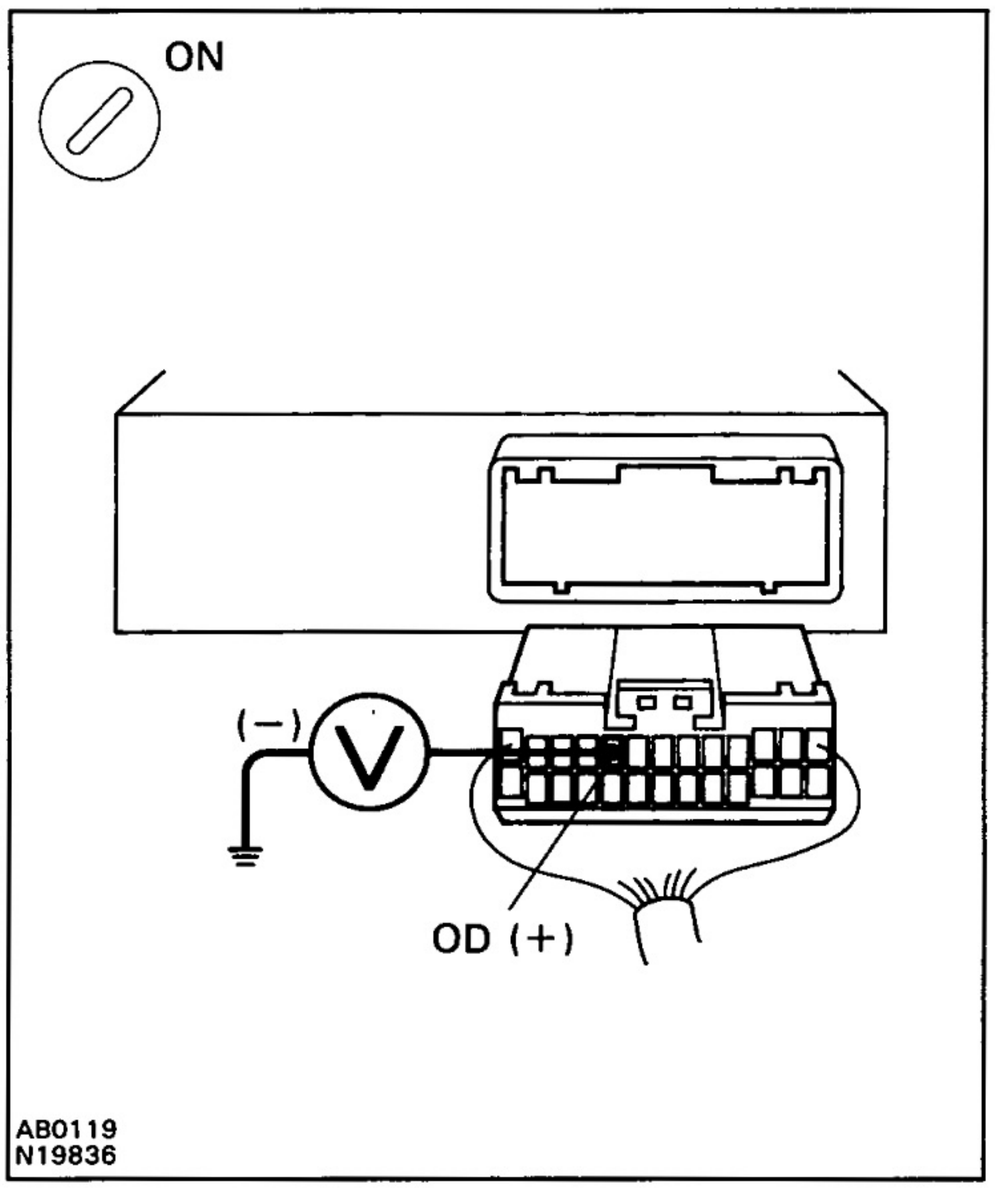
CHECK:

Check that overdrive ON ↔ OFF occurs with operation of OD switch ON-OFF.

NG → **Check and repair electronically controlled transmission (See AT section).**

OK

2	Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.
(c) Disconnect the ECU connector.

CHECK:

Measure voltage between terminal OD of harness side connector of ECU and body ground.

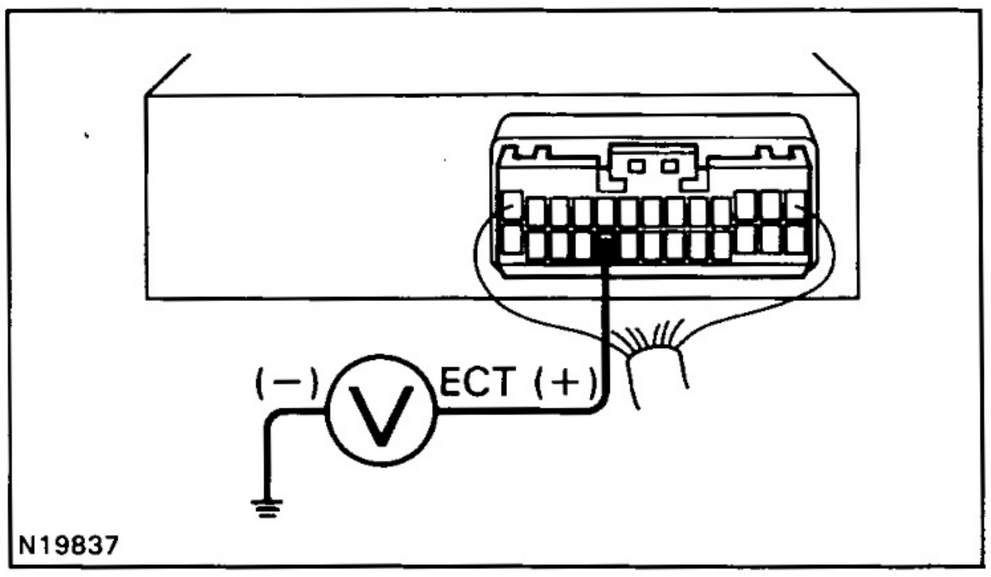
OK:

Voltage: 10 — 14 V

NG → **Go to step 5.**

OK

3 **Check voltage between terminal ECT of cruise control ECU connector and body ground (On test drive).**



N19837

PREPARATION:

(a) Connect the ECU connector.
(b) Test drive after engine warms up.

CHECK:

Check voltage between terminal ECT of ECU connector and body ground when OD switch is ON and OFF.

OK:

OD switch position	Voltage
ON	8 – 14 V
OFF	Below 0.5 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

4 **Check harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid.**

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

5 **Check harness and connector between terminal OD of cruise control ECU and terminal OD1 of engine & ECT ECU.**

NG → **Repair or replace harness or connector.**

OK

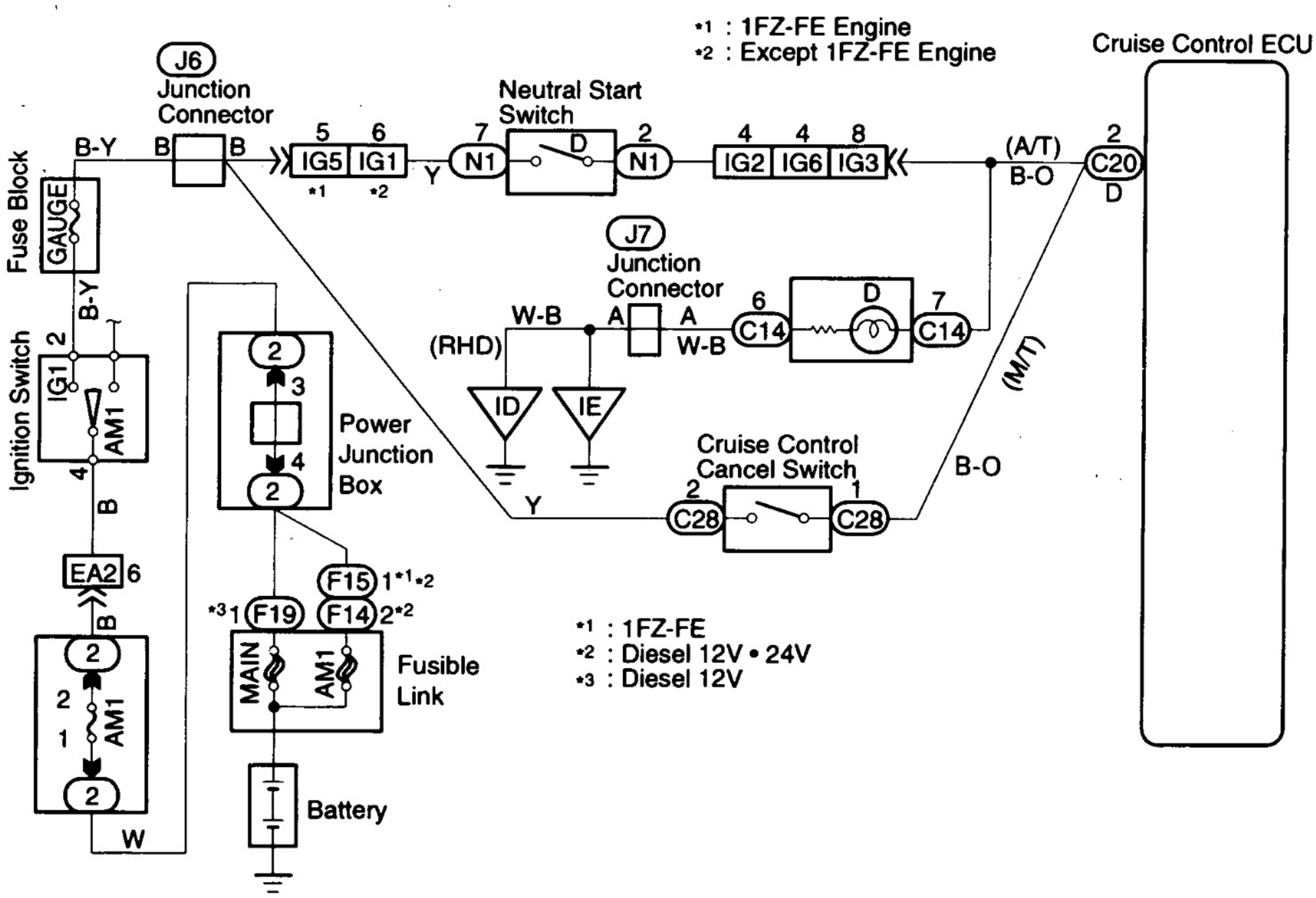
Check and replace cruise control ECU.

Neutral Start Switch Circuit

CIRCUIT DESCRIPTION

When the shift position is put in except D range, a signal is sent from the neutral start switch to the ECU. When this signal is input during cruise control driving, the ECU cancels the cruise control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check starter operation.

CHECK:

Check that the starter operates normally and that the engine starts.

NG → **Proceed to engine troubleshooting. (See ST section).**

OK

2	Input signal check.

Input Signal	Indicator Light Blinking Pattern
Turn neutral start OFF (Shift to except D range)	Light: ON (SW ON) / OFF (SW OFF)

PREPARATION:

See input signal check on page BE-51.

CHECK:

Check the indicator light when shifting into except D range.

OK:

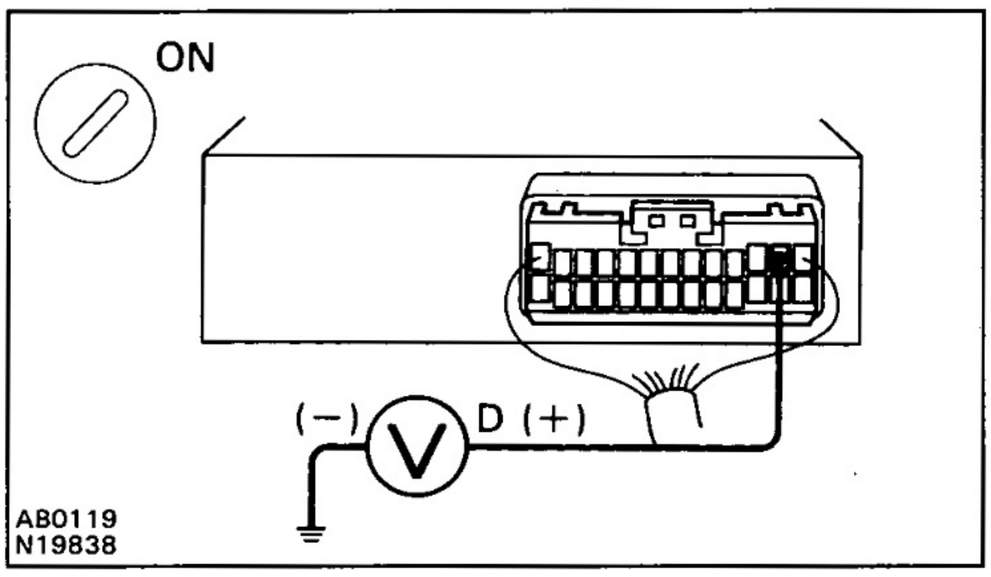
The indicator light goes off when shifting into except D range.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

BE

3	Check voltage between terminal D of cruise control ECU connector and body ground.



PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminal D of ECU connector and body ground when shifting into D range and other renges.

OK:

Shift Position	Voltage
D range	10 – 14 V
Other ranges	Below 1 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

BE

4	Check harness and connector between cruise control ECU and neutral start switch.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

Clutch Switch Circuit

CIRCUIT DESCRIPTION

When the clutch pedal is depressed, the clutch switch sends a signal to the cruise control ECU. When the signal is input to the cruise control ECU during cruise control driving, the cruise control ECU cancels cruise control.

WIRING DIAGRAM

Refer to neutral start switch circuit on page BE-84.

INSPECTION PROCEDURE

1 **Check starter operation.**

CHECK:

Check that the starter operates normally and that the engine starts.

NG → **Proceed to engine troubleshooting (See ST section).**

OK

2 **Input signal check.**

Input Signal	Indicator Light Blinking Pattern
Clutch switch OFF (Depress clutch pedal)	Light: ON, SW ON; OFF, SW OFF

PREPARATION:

See input signal check on page BE-51.

CHECK:

Check the indicator light when clutch pedal depressed.

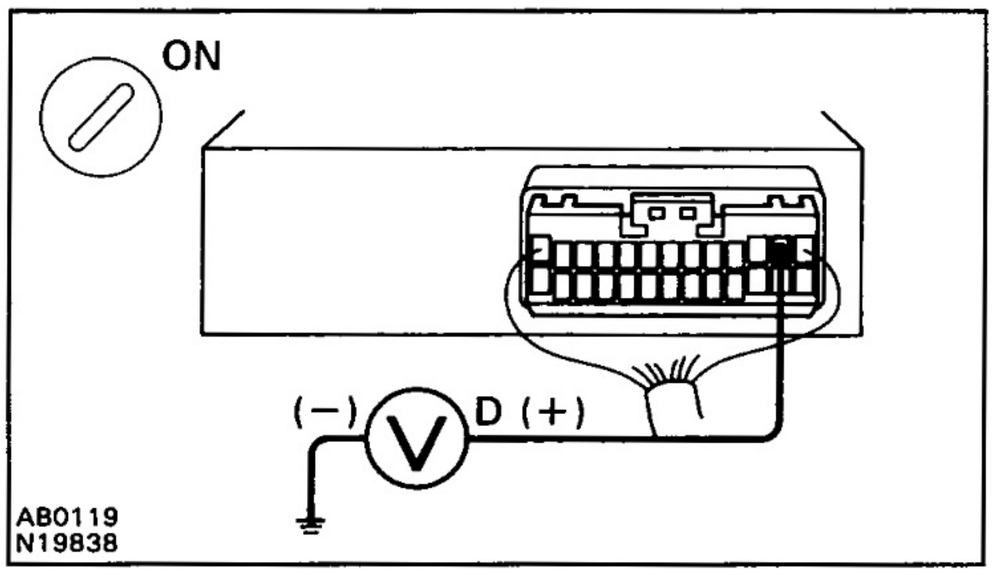
OK:

The indicator light goes off when clutch pedal depressed.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

3 Check voltage between terminal D of cruise control ECU and body ground.



PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminal D of cruise control ECU connector and body ground when clutch pedal depressed and pushed in.

OK:

Shift Position	Voltage
Clutch pedal depressed	10 – 14 V
Clutch pedal pushed in	Below 1 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

BE

4 Check for open in harness and connector between ECU and GAUGE fuse.

NG → **Repair or replace harness or connector.**

OK

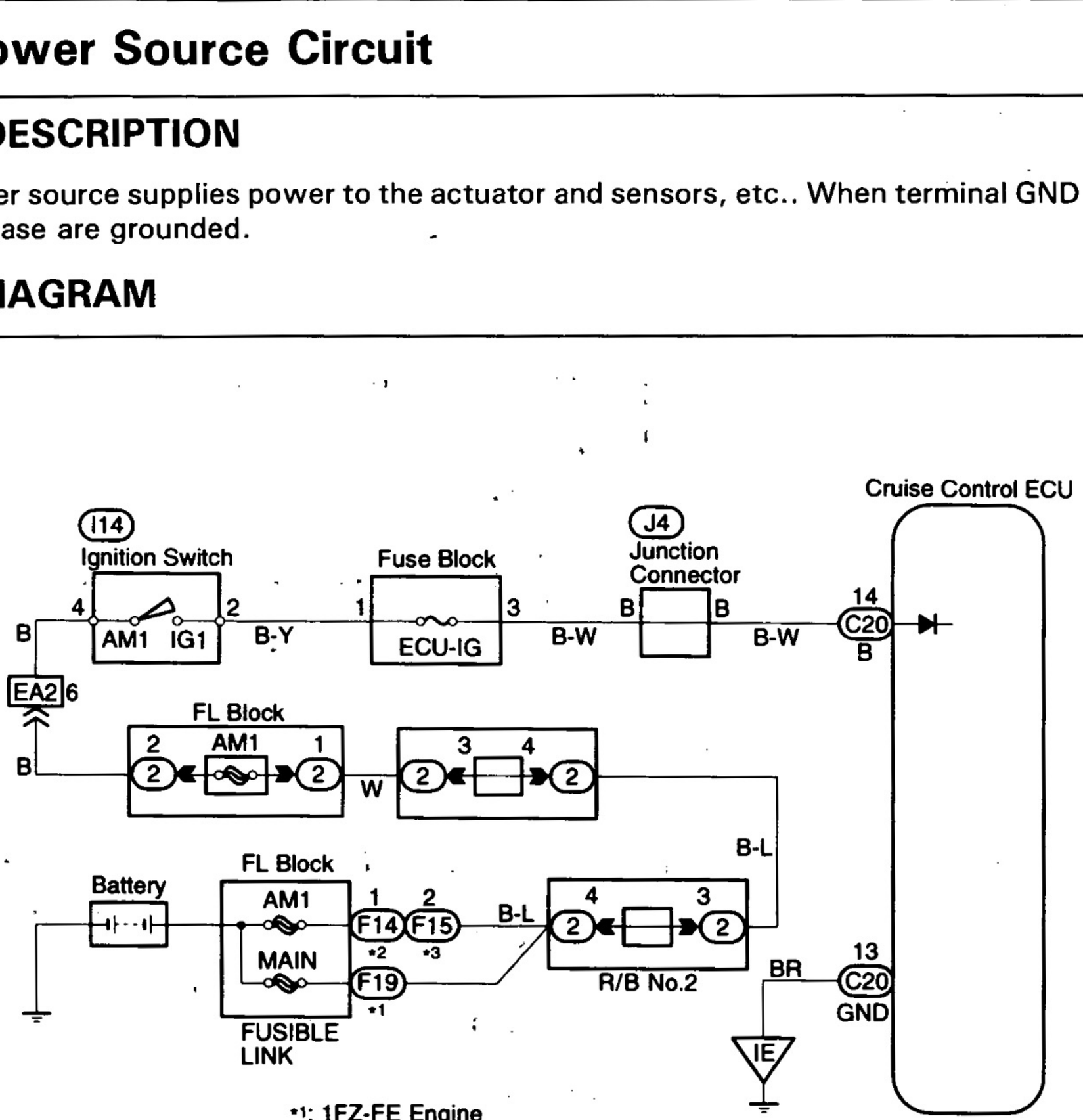
Check and replace cruise control ECU.

ECU Power Source Circuit

CIRCUIT DESCRIPTION

The ECU power source supplies power to the actuator and sensors, etc.. When terminal GND and the cruise control ECU case are grounded.

WIRING DIAGRAM

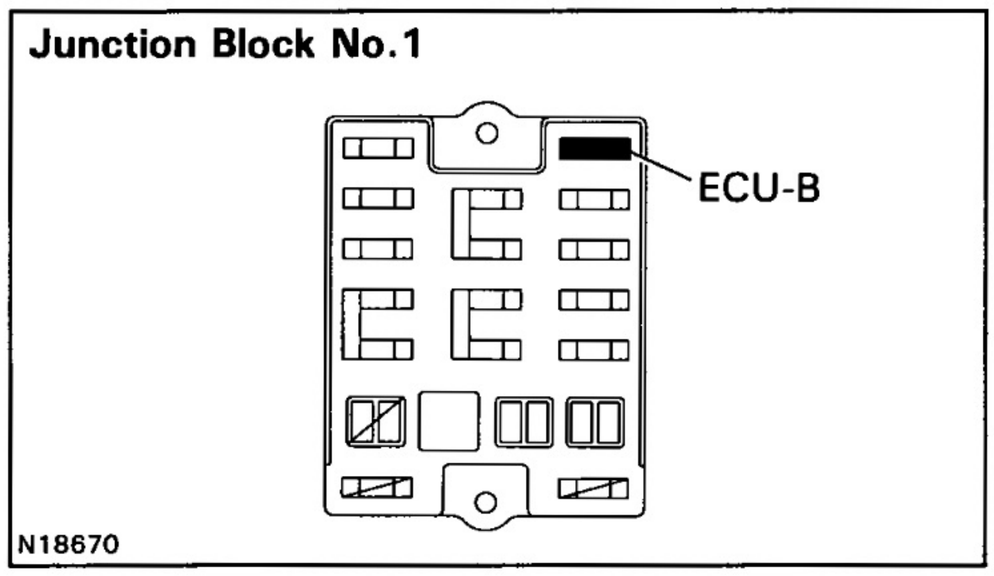


N20702

BE

INSPECTION PROCEDURE

1 Check ECU-B fuse.



PREPARATION:

Remove the ECU-B fuse from instrument panel fuse block.

CHECK:

Check continuity of ECU-B fuse.

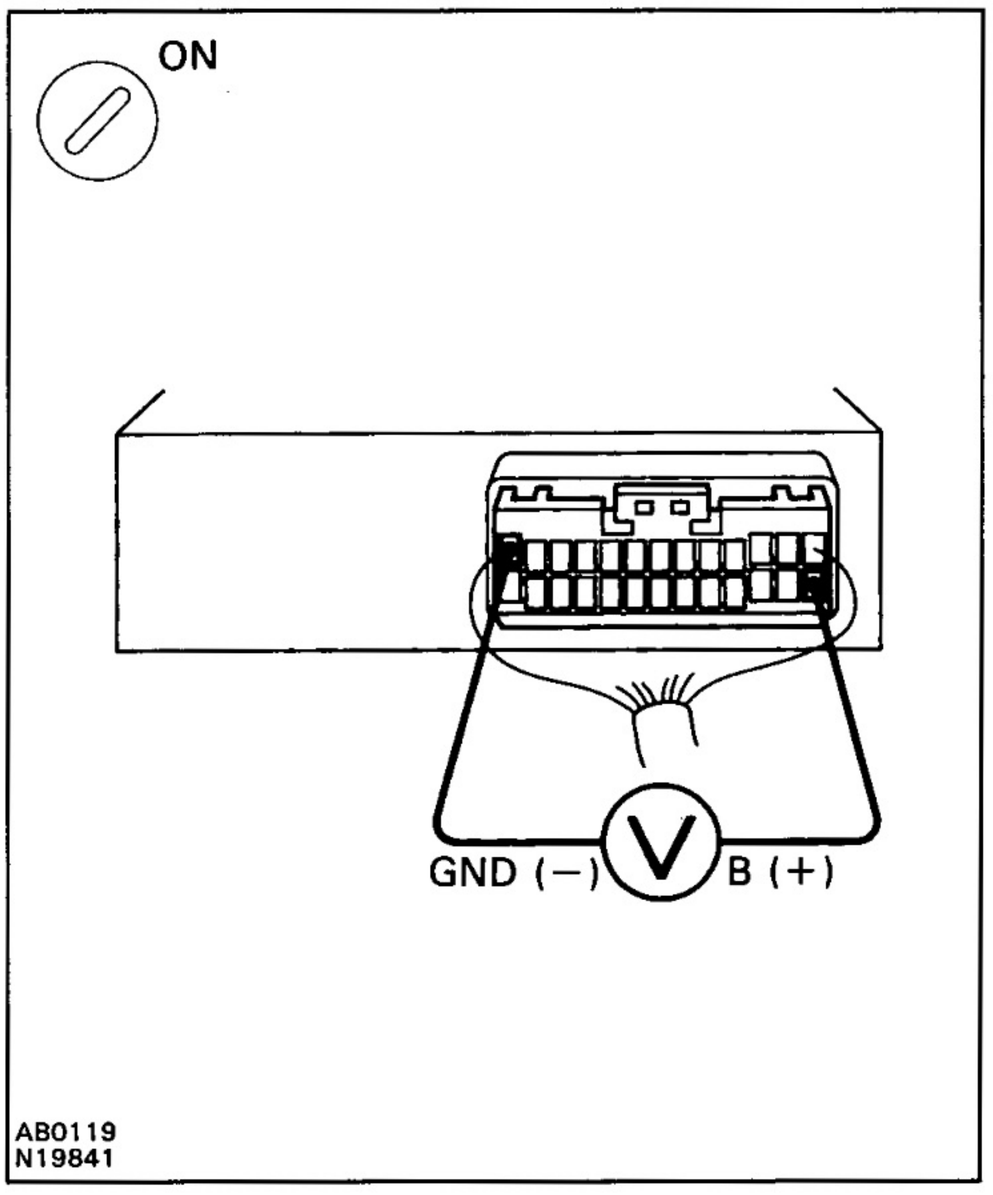
OK:

Continuity

NG → **Check for short in all the harness and components connected to ECU-B fuse.**

OK

2 Check voltage between terminals B and GND of cruise control ECU connector.



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals B and GND of ECU connector.

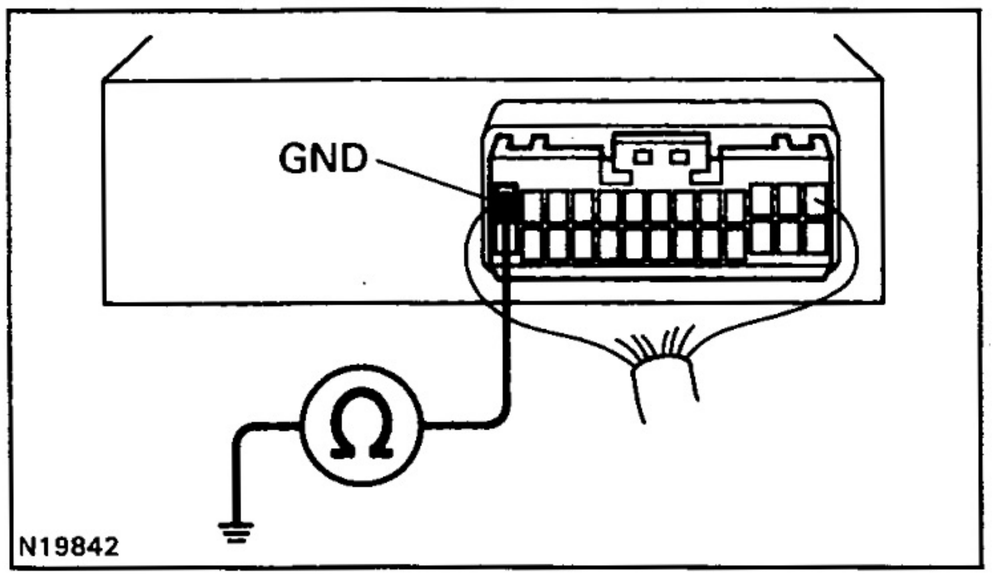
OK:

10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

3	**Check resistance between terminal GND of cruise control ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ECU connector and body ground.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector.**

OK

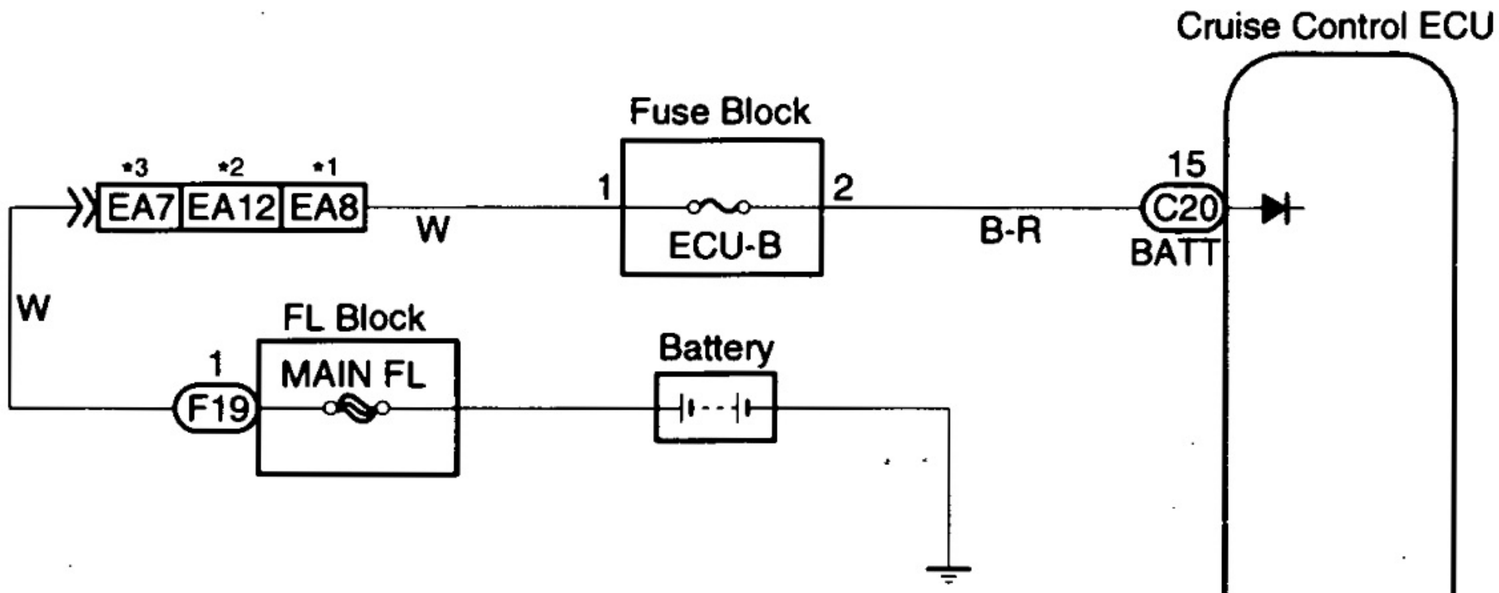
Check and repair harness and connector between cruise control ECU and battery.

Back-up Power Source Circuit

CIRCUIT DESCRIPTION

The ECU back-up power source provides power even when the ignition is off and is used for DTC memory, etc..

WIRING DIAGRAM



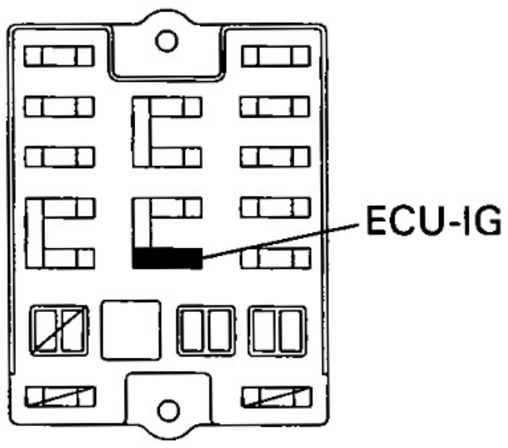
*1: 1FZ-FE Except Australia
*2: LHD Diesel
*3: 1FZ-FE Australia, RHD Diesel

N20703

INSPECTION PROCEDURE

1	Check ECU-IG fuse.

Junction Block No.1



N18670

PREPARATION:

Remove the ECU-IG fuse from instrument panel fuse block.

CHECK:

Check continuity of ECU-IG fuse.

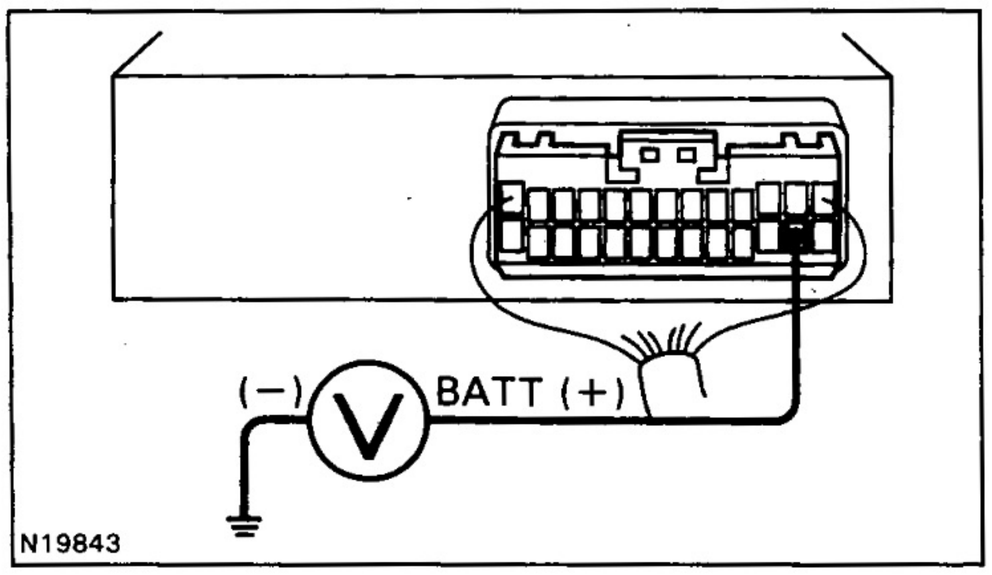
OK:

Continuity

NG → **Check for short in all the harness and components connected to ECU-IG fuse.**

OK

2	Check voltage between terminal BATT of cruise control ECU connector and body ground.



N19843

PREPARATION:

Remove the ECU with connector still connected.

CHECK:

Measure voltage between terminal BATT of ECU connector and body ground.

OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

Check and repair harness and connector between battery and cruise control ECU.

Main Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

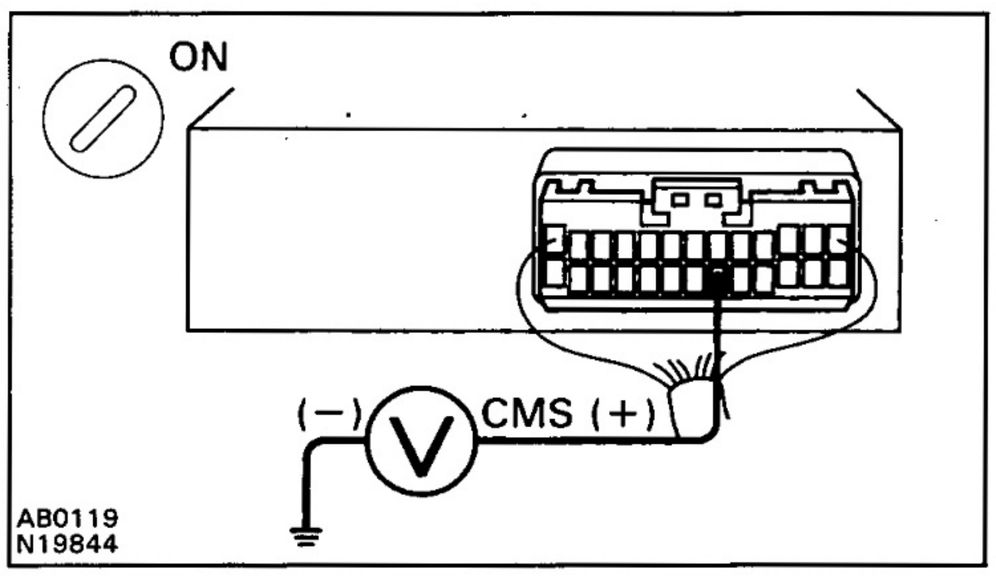
When the cruise control main switch is turned off, the cruise control does not operate.

WIRING DIAGRAM

See page BE-72.

INSPECTION PROCEDURE

1 Check voltage between terminal CMS of cruise control ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal CMS of cruise control ECU connector when main switch is held on and off.

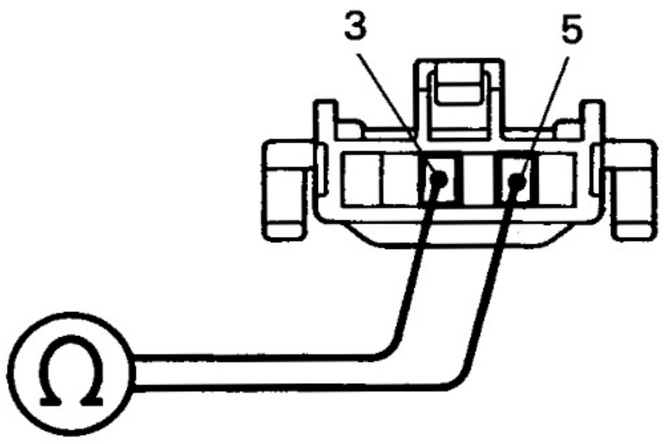
OK:

Main switch	Voltage
OFF	10 – 14 V
ON	Below 2 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

2 **Check main switch continuity.**



N15969

PREPARATION:

(a) Remove steering wheel center pad. (See SR section)
(b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 3 and 5 of control switch connector when main switch is held on and off.

OK:

Switch position	Tester connection	Specified condition
OFF	3 – 5	No continuity
Hold ON	3 – 5	Continuity

NG → **Replace control switch.**

OK

3 **Check harness and connector between cruise control ECU and main switch.**

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

BE

CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM

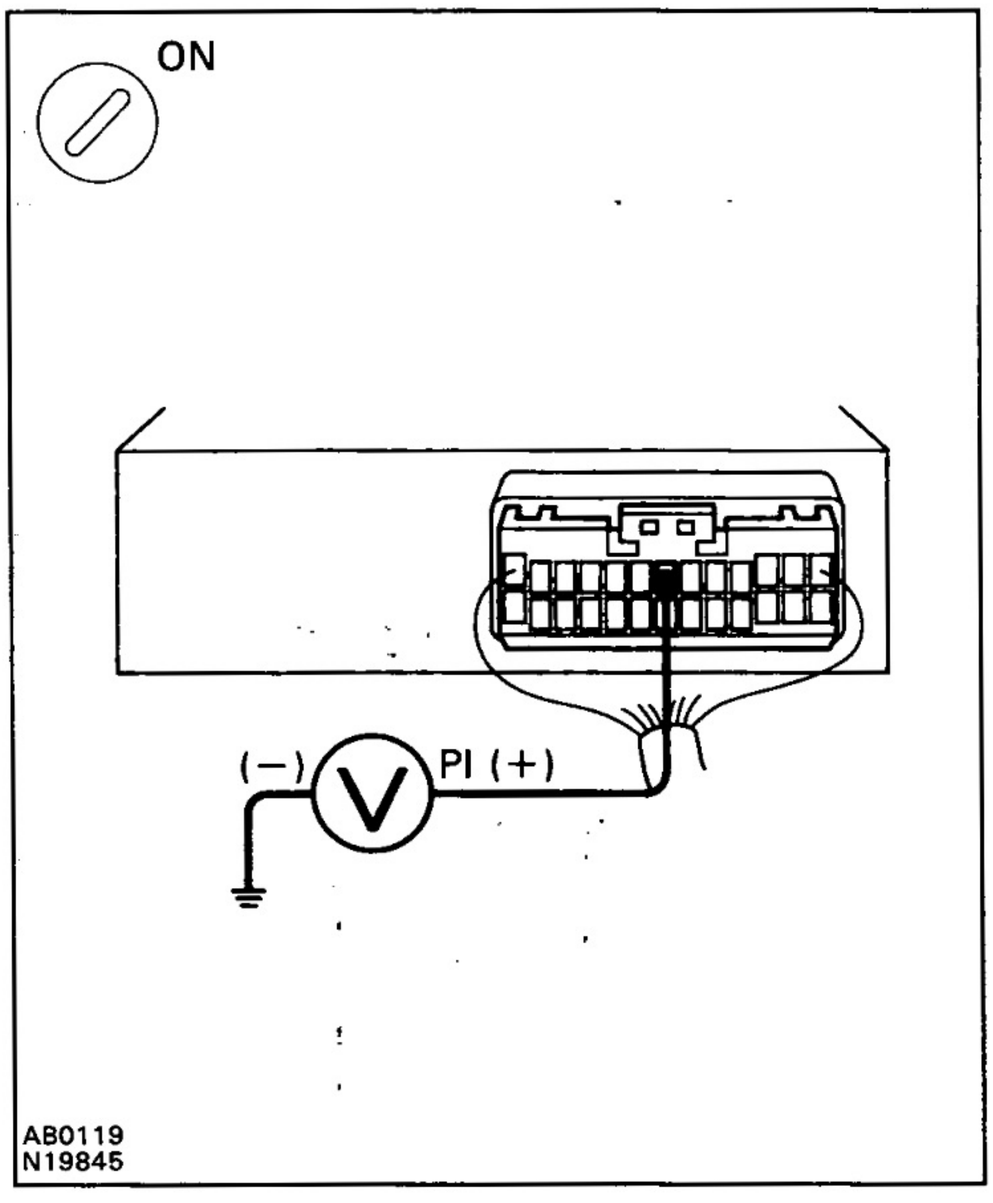
*1: 1FZ-FE Engine
*2: Diesel Engine
*3: Europe except CIS
*4: Australia
*5: General Countries 1HD-T Engine
*6: G.C.C. 1FZ-FE Engine

N20704

BE

INSPECTION PROCEDURE

1	Check voltage between terminals PI and GND of cruise control ECU connector.



AB0119
N19845

PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminals PI and GND of ECU connector when main switch on and off.

OK:

Switch position	Voltage
OFF	10 — 16 V
ON	Below 1.2 V

BE

OK → Proceed to next circuit inspection shown on problem symptom table (See page BE-53).

NG

2	Check combination meter. (See page BE-5)

NG → Replace combination meter.

OK

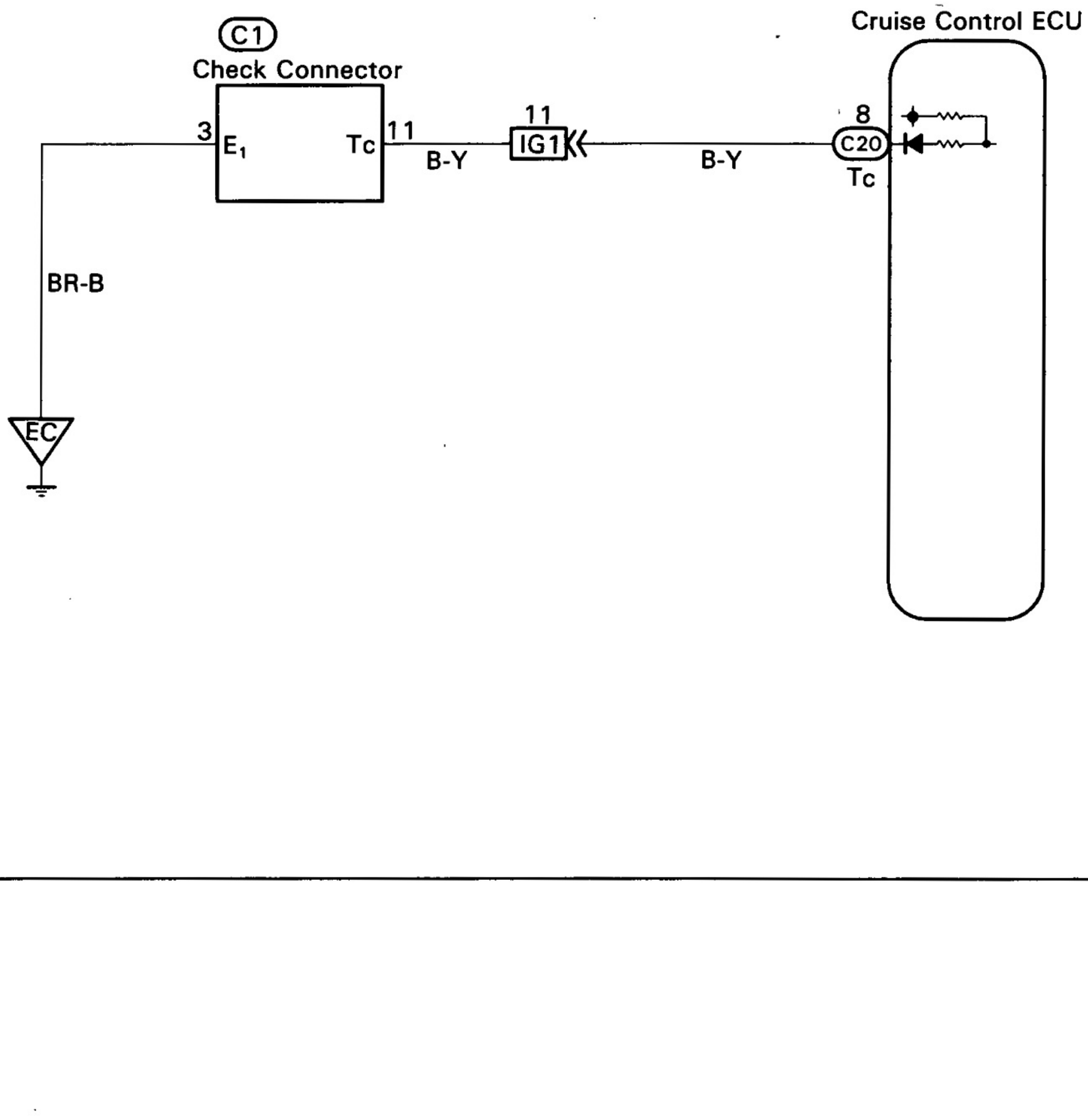
Check and replace cruise control ECU.

Diagnosis Circuit

CIRCUIT DESCRIPTION

This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM

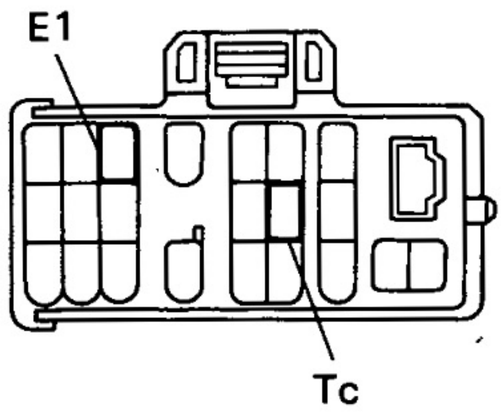


N20705

INSPECTION PROCEDURE

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

Check Connector



N06219

PREPARATION:

Turn ignition switch ON.

CHECK:

Measure voltage between terminals Tc and E1 of check connector.

OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page BE-53).**

NG

2	Check harness and connector between cruise control ECU and check connector, check connector and body ground.

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

Actuator Control Cable

INSPECTION PROCEDURE

1	Actuator control cable inspection.

CHECK:

(a) Check that the actuator, control cable throttle link are properly installed and that the cable and link are connected correctly.
(b) Check that the actuator and bell crank are operating smoothly.
(c) Check that the cable is not loose or too tight.

OK:

Freeplay: less than 10 mm

HINT:

- If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
- If the control cable is too tight, the idle RPM will become high.

AIR CONDITIONING

REFER TO FOLLOWING REPAIR MANUALS:

Manual Name	Pub. No.
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual	RM184E
• Land Cruiser (Hardtop, Canvas Top and Station Wagon) Chassis and Body Repair Manual Supplement (Aug., 1992)	RM315E
• Land Cruiser (Station Wagon) Chassis and Body Repair Manual Supplement (Jan., 1995)	RM434E

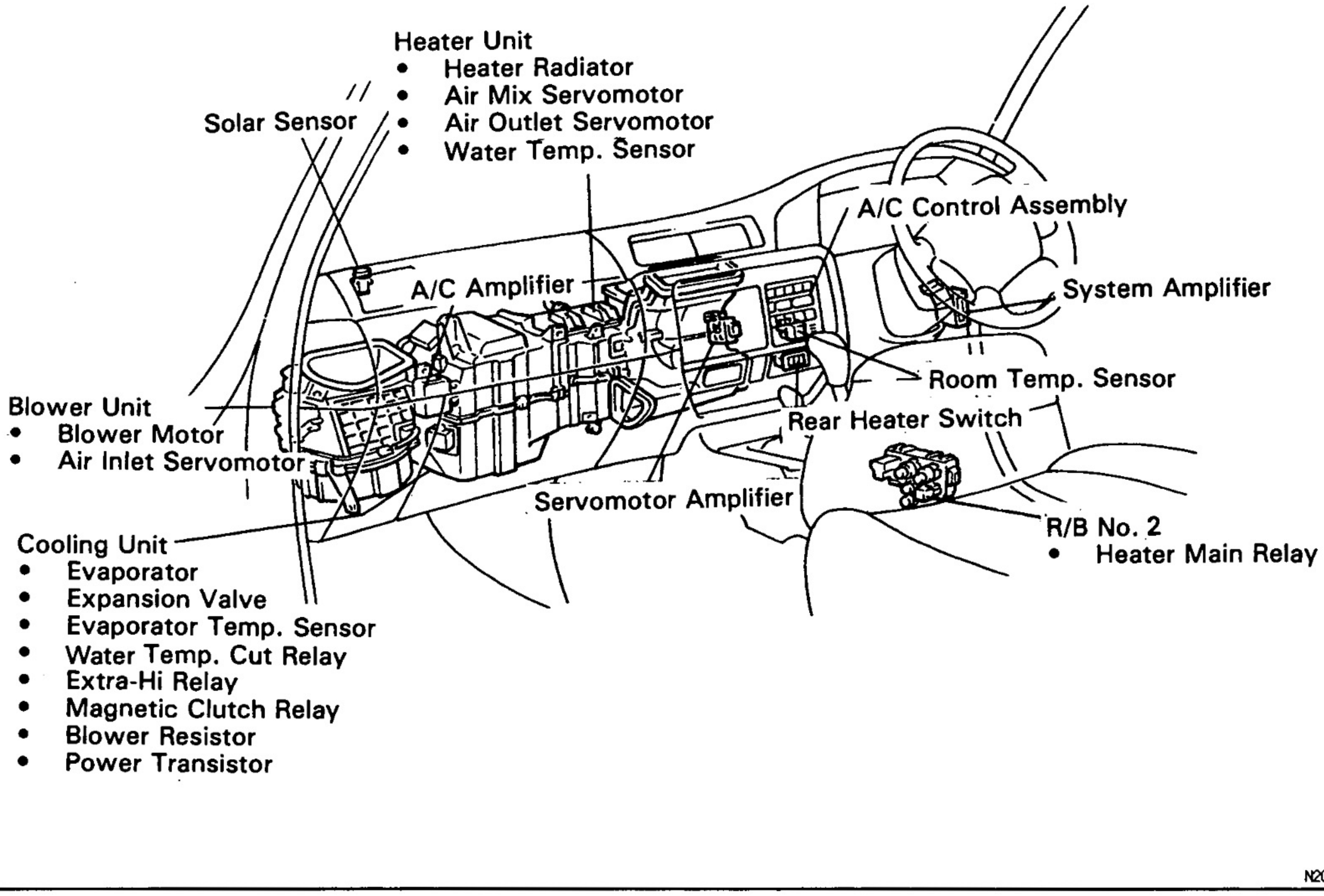
NOTE: The above pages contain only the points which differ from the above listed manuals.

DESCRIPTION

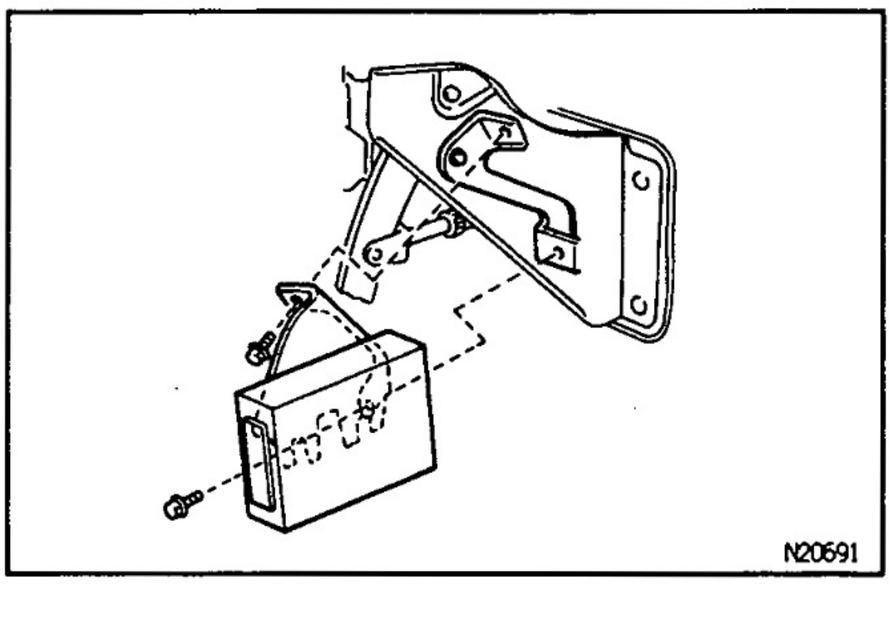
PARTS LOCATION

(AUTO A/C RHD Models)

AC2WQ-01



N20097



N20691

SYSTEM AMPLIFIER

SYSTEM AMPLIFIER REMOVAL

(AUTO A/C RHD Models)

AC2WR-01

1. **REMOVE LOEWER FINISH PANEL**
   (See Pub. No. RM434E on page BO–34)
2. **REMOVE AMPLIFIER**

(a) Disconnect the connector.

(b) Remove the 2 bolts and amplifier.

AC2WS-01

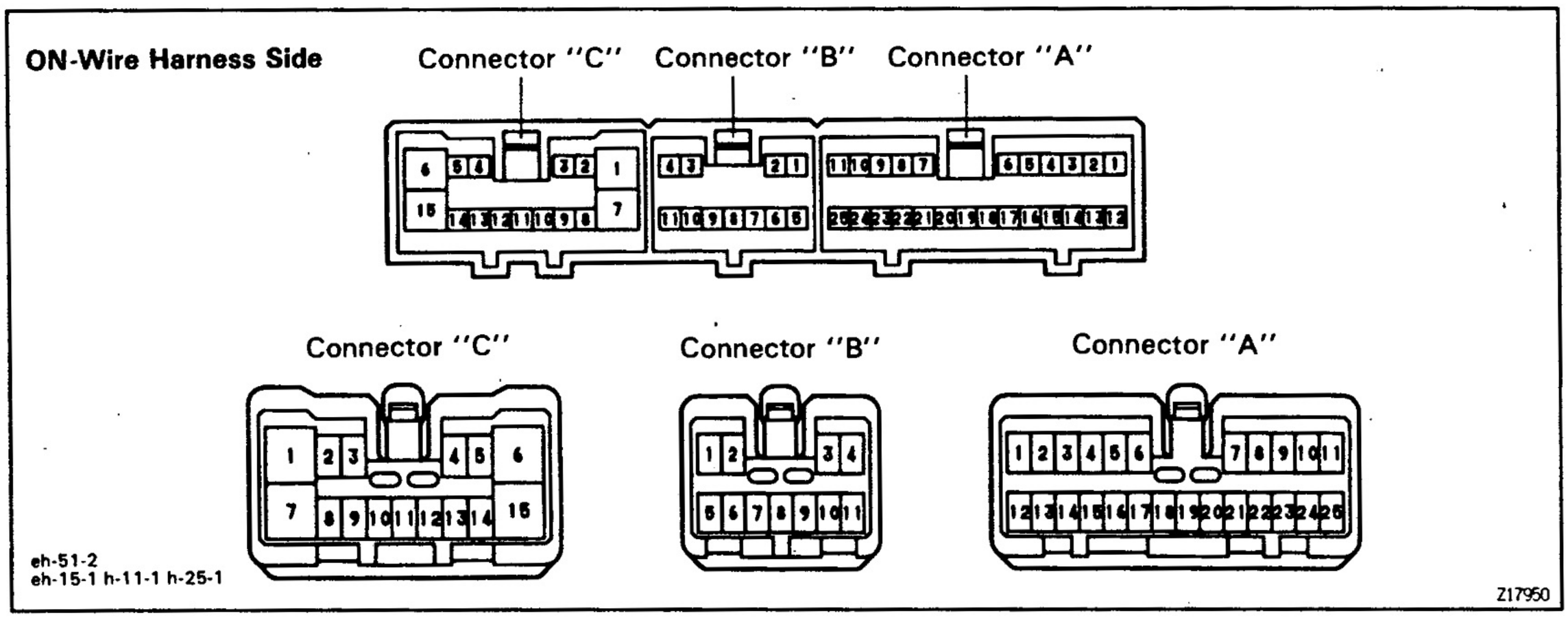
SYSTEM AMPLIFIER INSPECTION

INSPECT AMPLIFIER CIRCUIT

(a) Disconnect the connector from amplifier and inspect the connector on the wire harness side, as shown in the chart below.

Test condition:

- Ignition switch ON



Tester connection	Condition	Specified condition
A1 – Ground	Constant	Battery voltage
A5 – A15	Constant	Approx. 1.7 kΩ at 25 °C (77 °F)
A6 – A15	Constant	Approx. 1.7 kΩ at 25 °C (77 °F)
A10 – Ground	Constant	Battery voltage
A10 – Ground	Ignition switch OFF	No voltage
A11 – Ground	Ignition switch ON	Battery voltage
A11 – Ground	Ignition switch OFF	No voltage
A12 – Ground	Ignition switch ACC	Battery voltage
A12 – Ground	Ignition switch OFF, ON, START	No voltage
A16 – A4	Solar sensor subject to electrical light	Continuity
A16 – A4	Cover solar sensor by a cloth	No continuity
A19 – A15	Constant	Approx. 1.5 kΩ at 25 °C (77 °F)
A23 – Ground	Push in LO, M1, M2, HI button	Continuity
A24 – Ground	Push in AUTO button	Continuity
A20 – A15	Constant	Approx. 5.0 kΩ at 25 °C (77 °F)
B1 – Ground	Push in A/C button	Continuity
B2 – Ground	Constant	Battery voltage
B4 – Ground	Push in OFF button	Continuity
B6 – Ground	Constant	Battery voltage
B7 – Ground	Constant	Battery voltage
B8 – Ground	Constant	Battery voltage
B9 – Ground	Constant	Battery voltage
B10 – Ground	Push in AUTO button	Continuity

C2 — Ground	Push in FOOT button	Continuity
C3 — Ground	Push in FACE button	Continuity
C4 — Ground	Push in M2 button	Continuity
C5 — Ground	Push in LO button	Continuity
C6 — Ground	Ignition switch ON	Battery voltage
C6 — Ground	Ignition switch OFF	No voltage
C8 — Ground	Push in F/D button	Continuity
C9 — Ground	Push in DEF. button	Continuity
C10 — Ground	Push in Bi—Level button	Continuity
C11 — Ground	Push in HI button	Continuity
C12 — Ground	Push in M1 button	Continuity
C13 — Servomotor amplifier terminal 4	Constant	Continuity
C14 — Servomotor amplifier terminal 3	Constant	Continuity
C15 — Ground	Constant	Continuity

If circuit is as specified, try replacing the amplifier with a new one. If the circuit is not as specified, inspect the circuits connected to other parts.

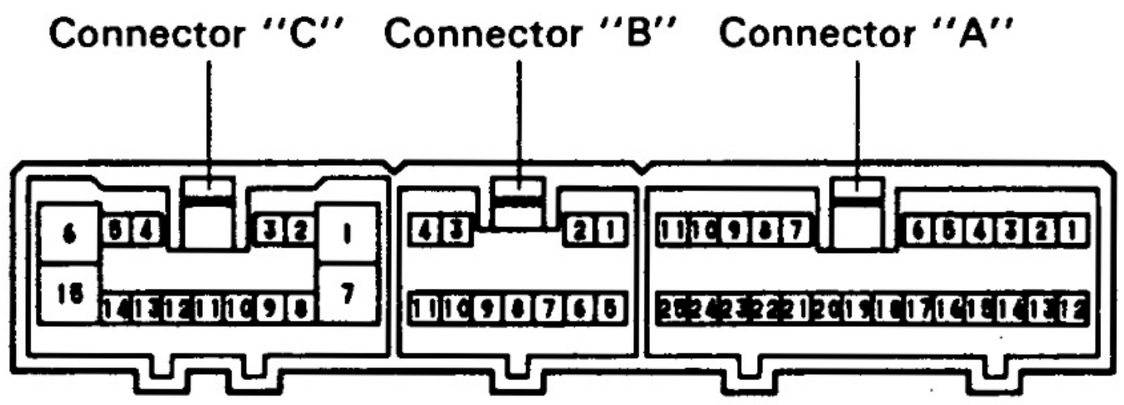
(b) Connect the connector to amplifier and inspect the wire harness side connector from the back side, as shown in the chart below.

Test condition:

- Ignition switch ON
- A/C switch ON

AC

From Back Side



eh-51-2

Z17951

Tester connection	Condition	Specified condition
A8 — Ground	Air inlet switch FRESH	Battery voltage
A9 — Ground	Air inlet switch RECIRC.	Battery voltage
A17 — A4	Temperature control lever MAX. COOL	Approx. 4 V

A17 — A4	Temperature control lever MAX. HOT	Below 1 V
A18 — A4	Set temperature control lever 20 °C (68 °F)	Approx. 4.1 V
A18 — A4	Set temperature control lever 25 °C (77 °F)	Approx. 2.5 V
A18 — A4	Set temperature control lever 30 °C (86 °F)	Approx. 0.9 V
C1 — Ground	Blower speed control switch LO (Manual Mode)	Approx. 9.6 V
C1 — Ground	Blower speed control switch LO (AUTO Mode)	Approx. 9.0 V
C1 — Ground	Blower speed control switch M1 (Manual Mode)	Approx. 7.1 V
C1 — Ground	Blower speed control switch M2 (Manual Mode)	Approx. 4.0 V
C1 — Ground	Blower speed control switch HI (AUTO Mode)	Approx. 1.5 V
C1 — Ground	Blower speed control switch HI (Manual Mode)	No voltage
C7 — Ground	Operate blower motor	Below 1.5 V

If circuit is as specified, try replacing the amplifier with a new one. If the circuit is not as specified, inspect the circuits connected to other parts.

AC

AC2WT—01

SYSTEM AMPLIFIER INSTALLATION

Installation is in the reverse order of removal.