BRAKE SYSTEM

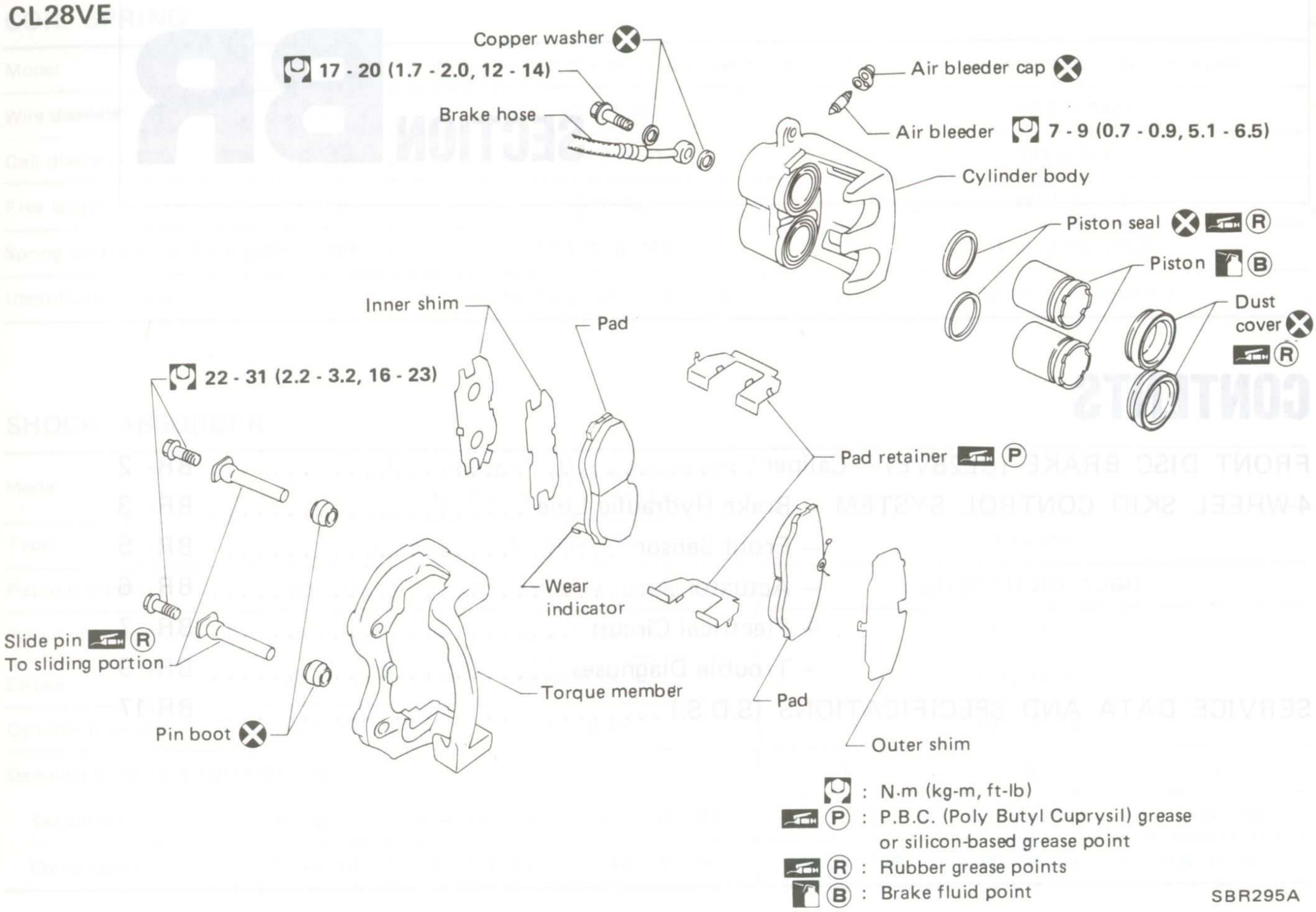
SECTION BR

CONTENTS

FRONT DISC BRAKE (CL28VE) – Caliper ..... BR- 2
4-WHEEL SKID CONTROL SYSTEM – Brake Hydraulic Line ..... BR- 3
– Front Sensor ..... BR- 5
– Actuator ..... BR- 6
– Electrical Circuit ..... BR- 7
– Trouble Diagnoses ..... BR- 9
SERVICE DATA AND SPECIFICATIONS (S.D.S.) BR-17

FRONT DISC BRAKE (CL28VE)—Caliper

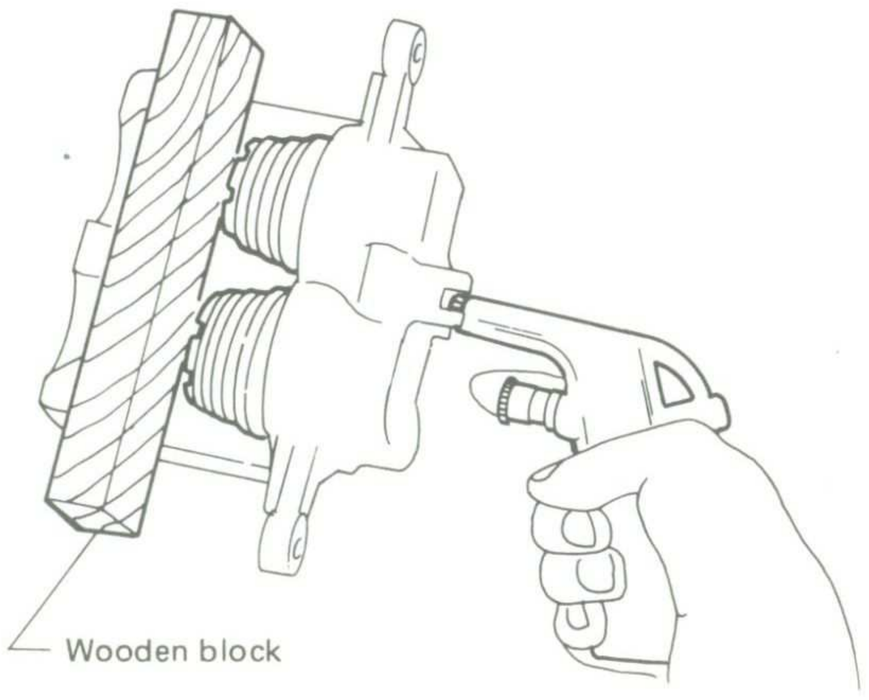
CL28VE



Disassembly

Push out piston and dust cover with compressed air.

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

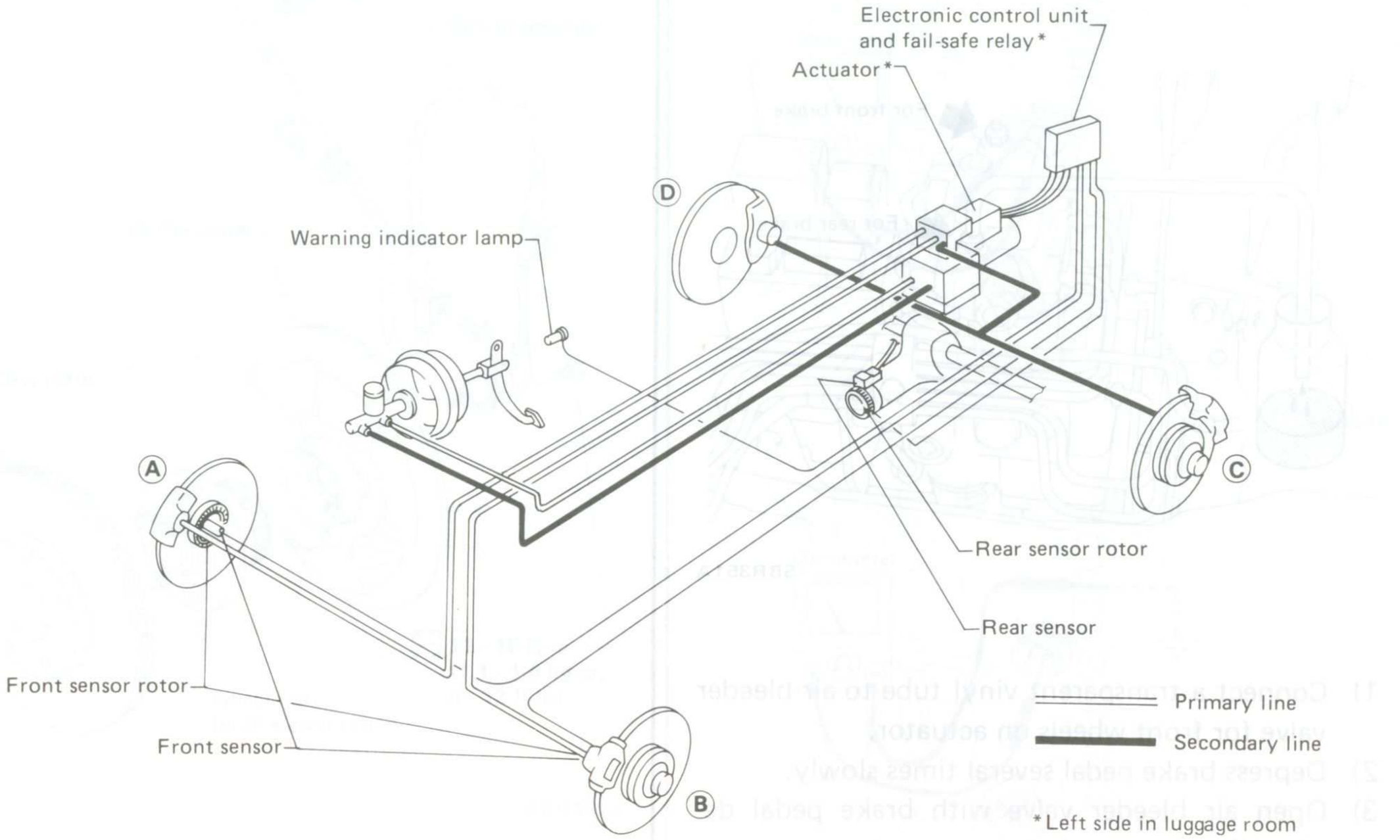


SBR085A

4-WHEEL SKID CONTROL SYSTEM — Brake Hydraulic Line

Precautions

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



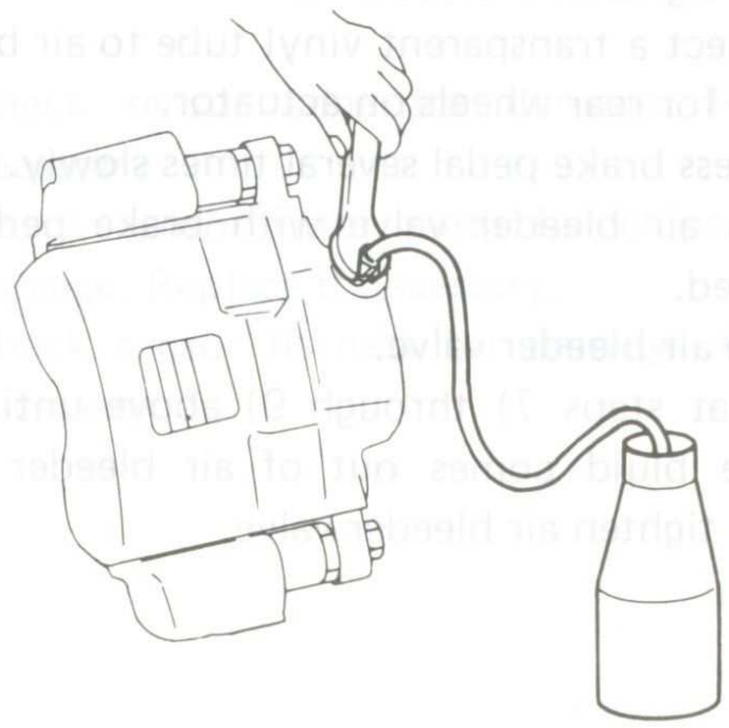
SBR933

Bleeding Procedure

Precautions:

Make sure that ignition switch is off and actuator connector is disconnected. Carefully monitor brake fluid level at master cylinder during bleeding operation.

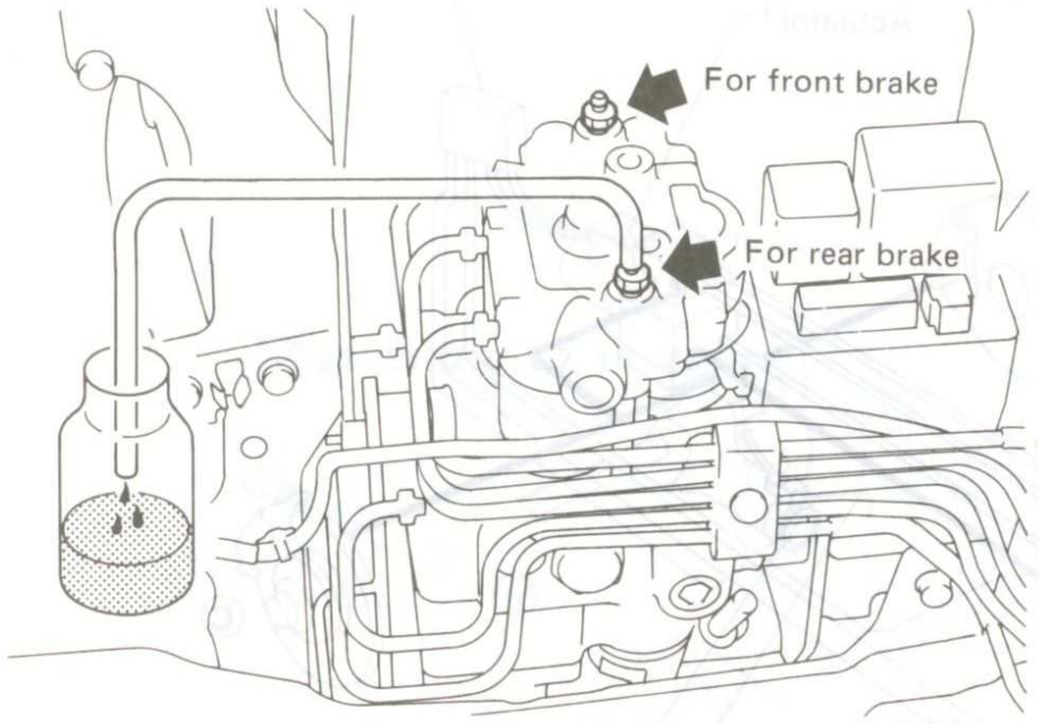
- Bleed air out of calipers according to the following procedure:
  Left front caliper Ⓑ → Right front caliper Ⓐ → Left rear caliper Ⓒ → Right rear caliper Ⓓ.
- Connect a transparent vinyl tube to air bleeder valve of caliper.



SBR606

Bleeding Procedure (Cont'd)

After bleeding air out of calipers, bleed air out of actuator according to the following procedure.

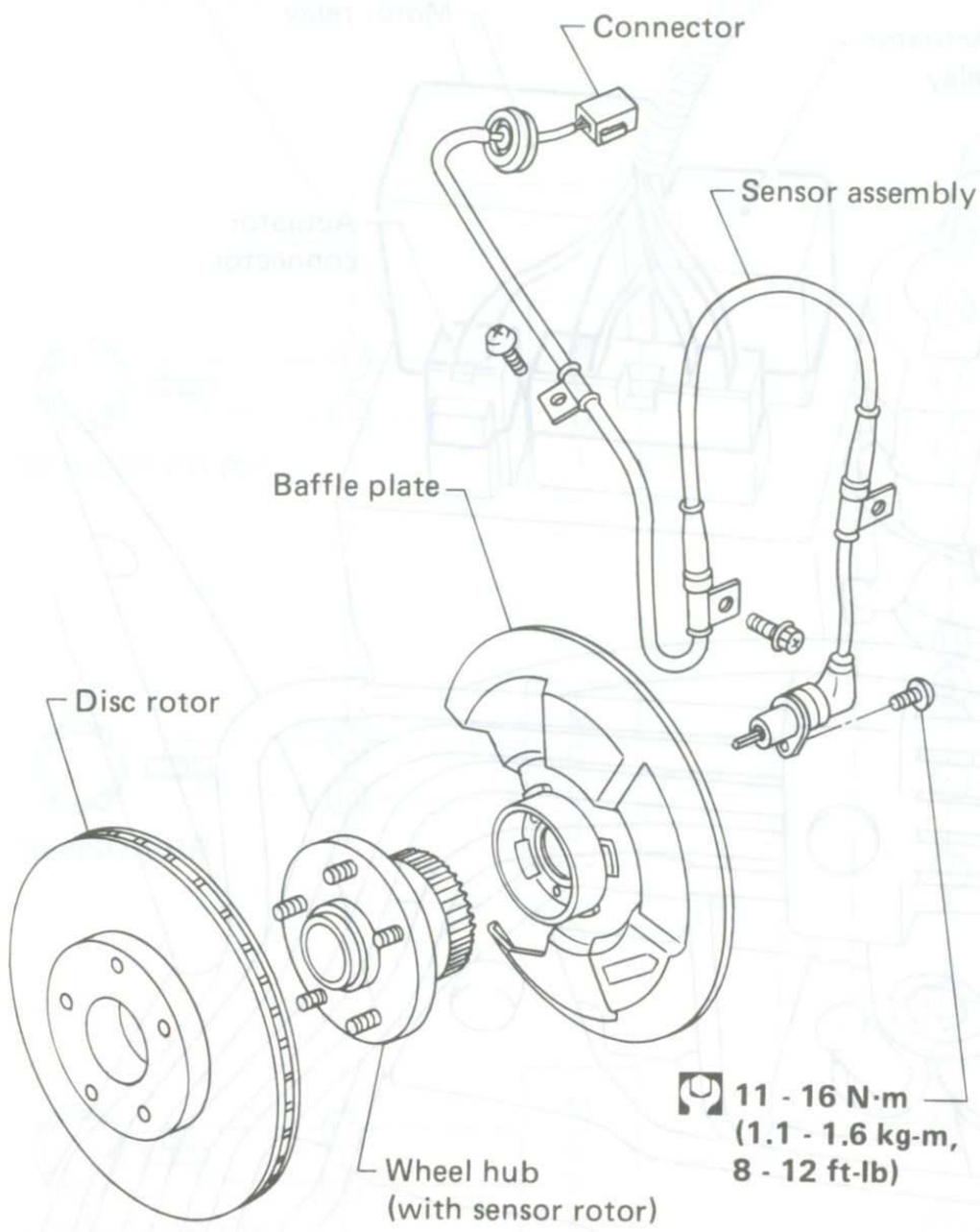


SBR351A

1) Connect a transparent vinyl tube to air bleeder valve for front wheels on actuator.
2) Depress brake pedal several times slowly.
3) Open air bleeder valve with brake pedal depressed.
4) Close air bleeder valve.
5) Repeat steps 2) through 4) above until clear brake fluid comes out of air bleeder valve. Then tighten air bleeder valve.
6) Connect a transparent vinyl tube to air bleeder valve for rear wheels on actuator.
7) Depress brake pedal several times slowly.
8) Open air bleeder valve with brake pedal depressed.
9) Close air bleeder valve.
10) Repeat steps 7) through 9) above until clear brake bluid comes out of air bleeder valve. Then tighten air bleeder valve.

4-WHEEL SKID CONTROL SYSTEM — Front Sensor

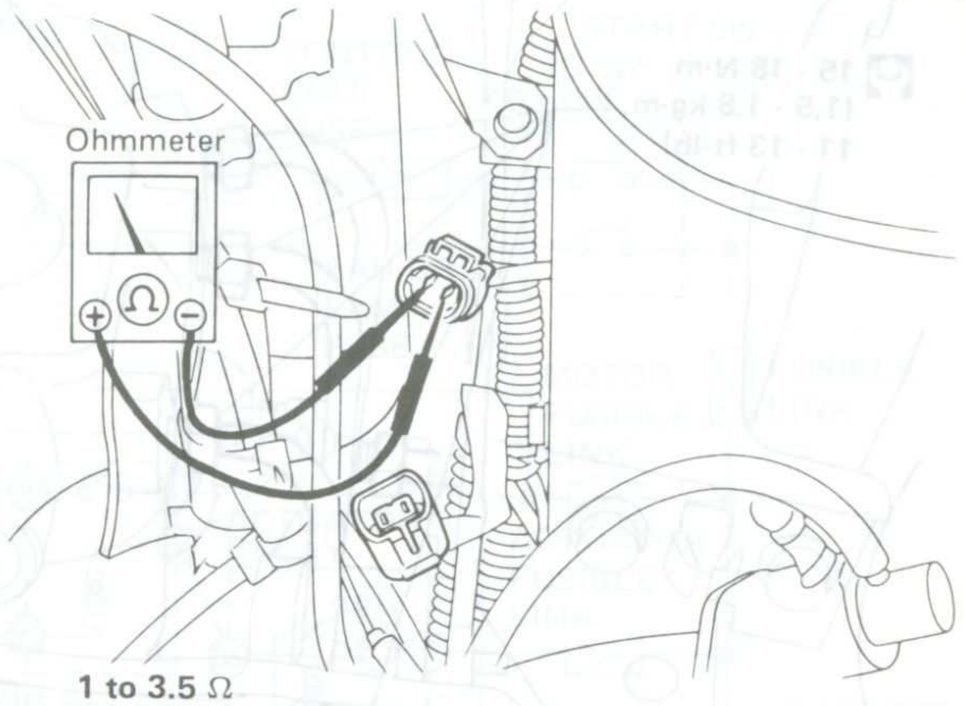
Removal



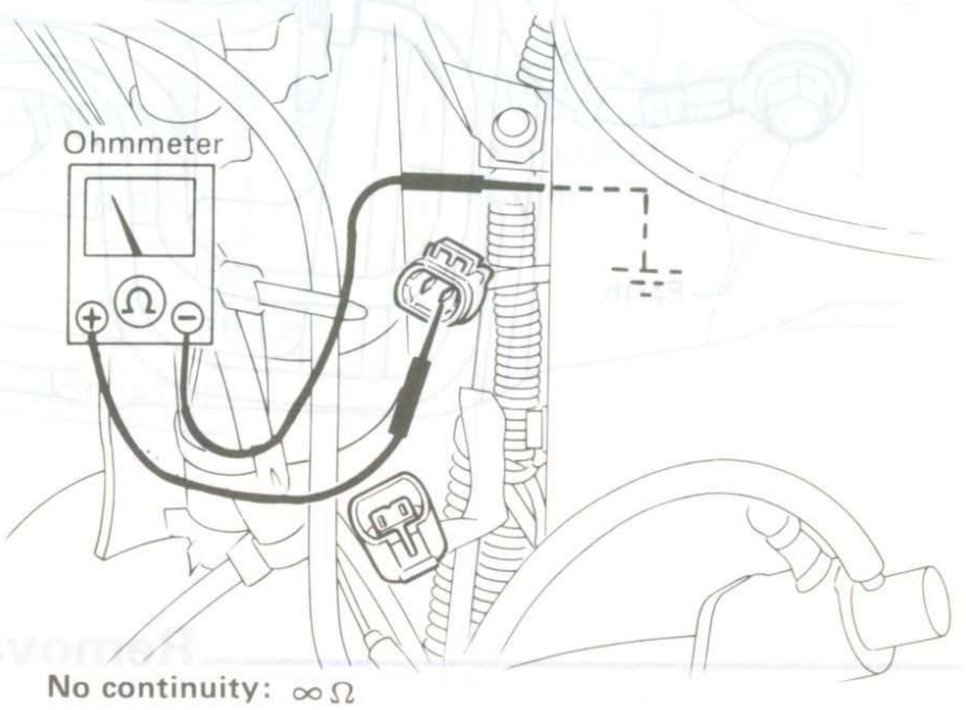
SBR352A

Inspection

- Check the sensor* resistance. Repair if necessary.



SBR944

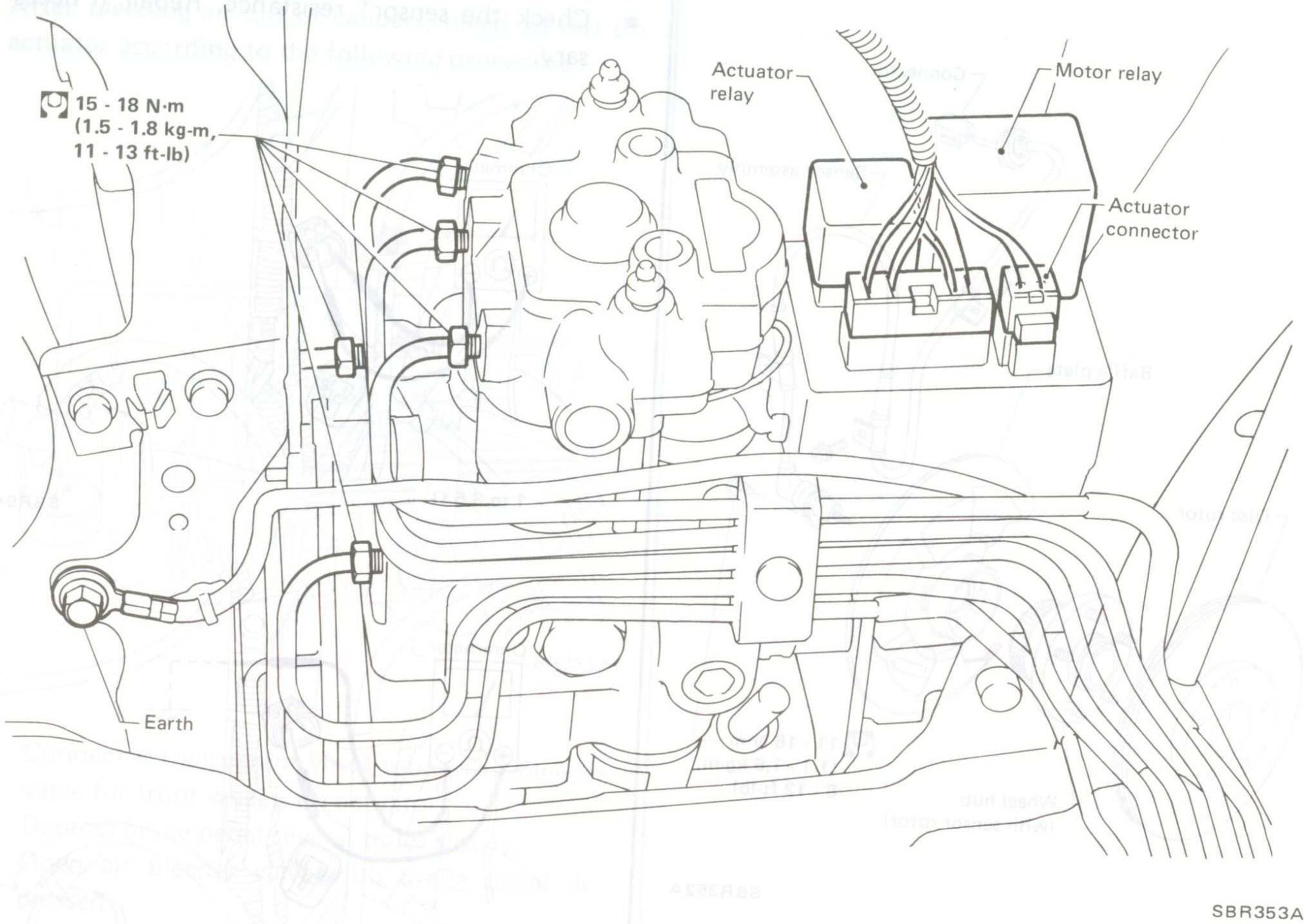


SBR945

*: In engine room

- Check sensor edge for damage. Replace if necessary.
- Check sensor rotor teeth for chips or other damage. Replace if necessary.
- Check sensor harness for damage. Replace if necessary.

4-WHEEL SKID CONTROL SYSTEM — Actuator



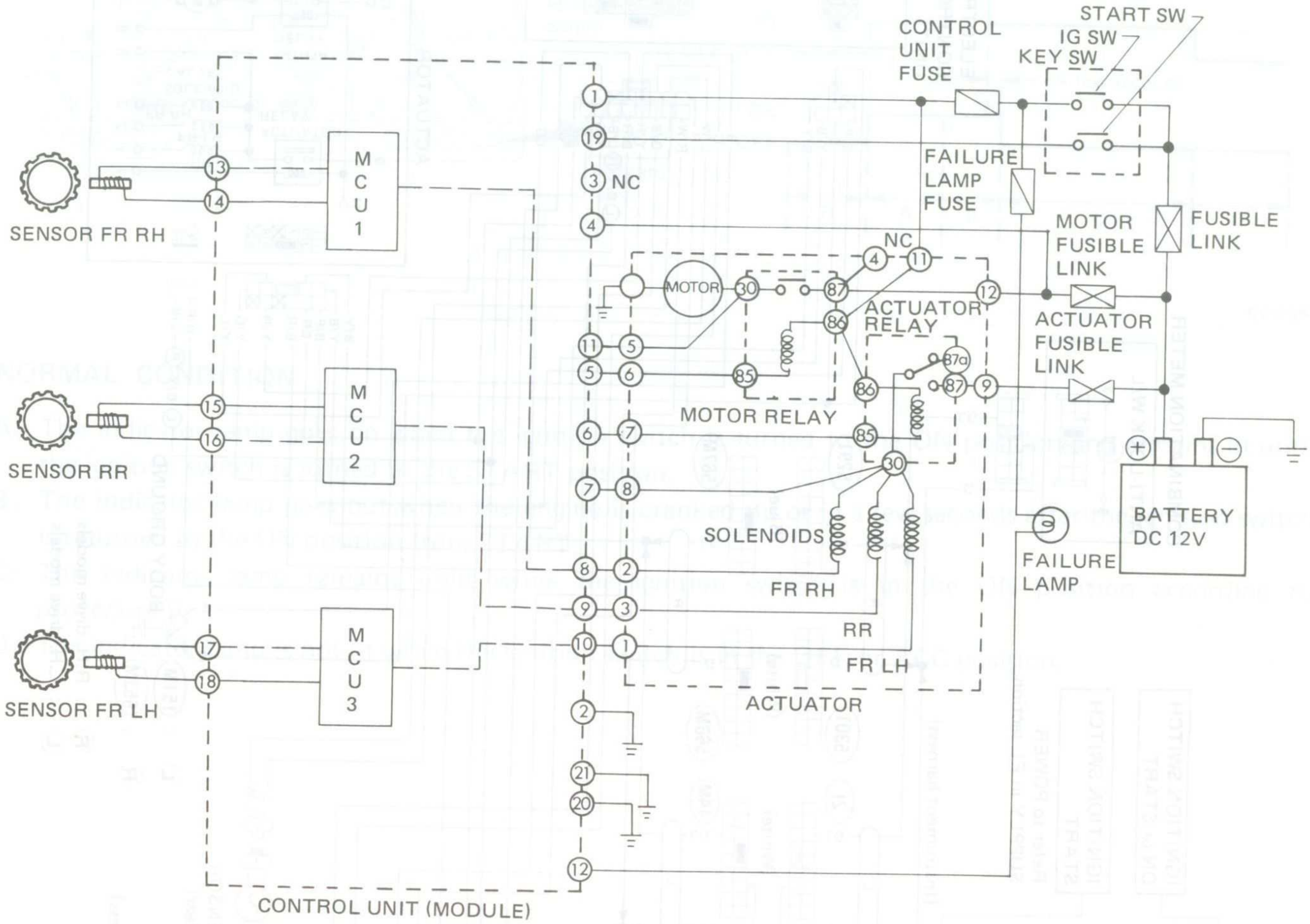
SBR353A

Removal and Installation

- Disconnect actuator connector.
- Remove earth, brake tubes and actuator fixing nuts.
- **Be sure that brake tubes are installed properly.**
- **Bleed air after installing actuator.**
  Refer to Bleeding Procedure.
- **When removing and installing brake tube, use Tool GG94310000.**

4-WHEEL SKID CONTROL SYSTEM —Electrical Circuit

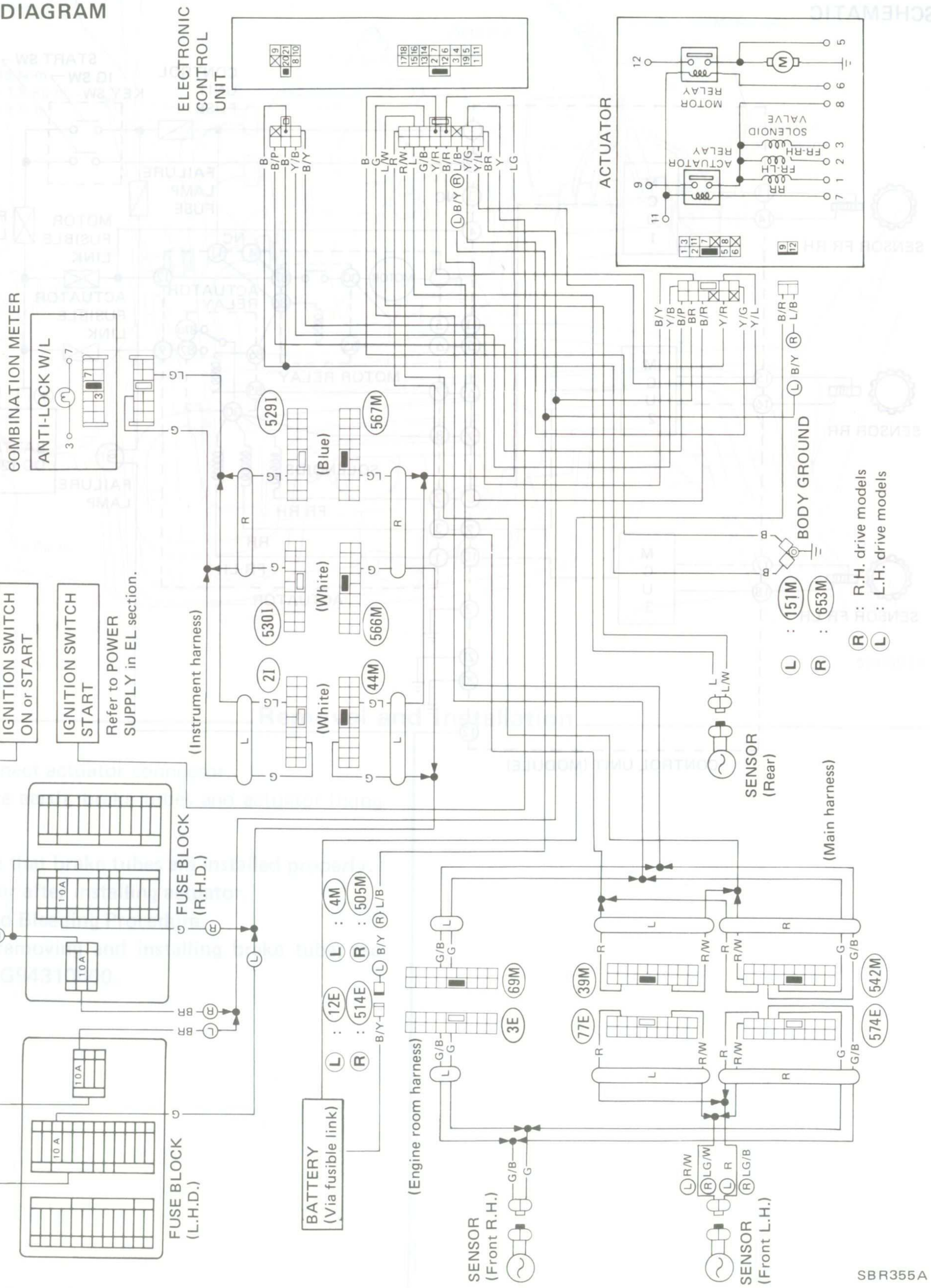
SCHEMATIC

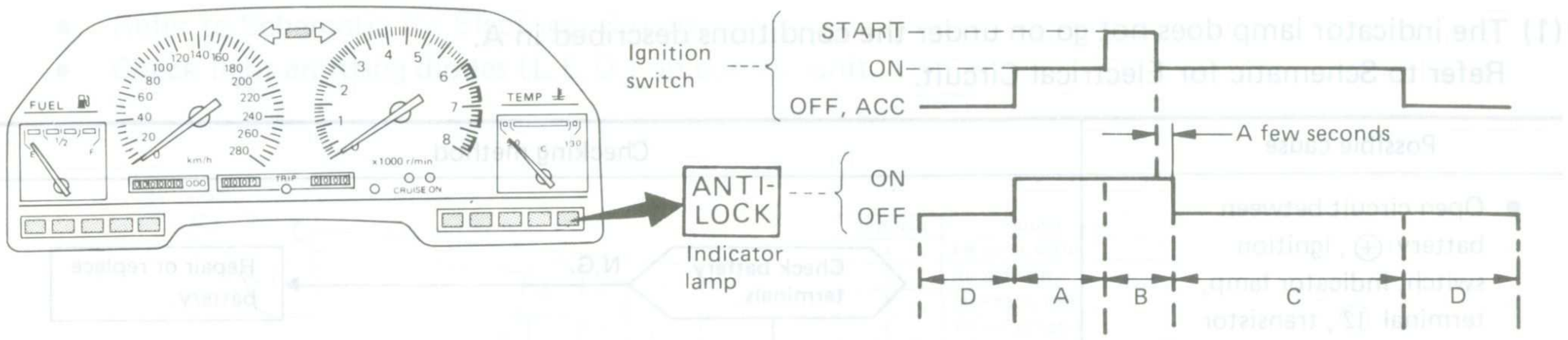


SBR354A

4-WHEEL SKID CONTROL SYSTEM — Electrical Circuit

WIRING DIAGRAM





SBR951

NORMAL CONDITION

A: The indicator lamp goes on when the ignition switch is turned to the ON position and remains lit until the ignition switch is turned to the START position.

B: The indicator lamp goes out when the engine is cranked up or in a few seconds after the ignition switch is returned to the ON position from START.

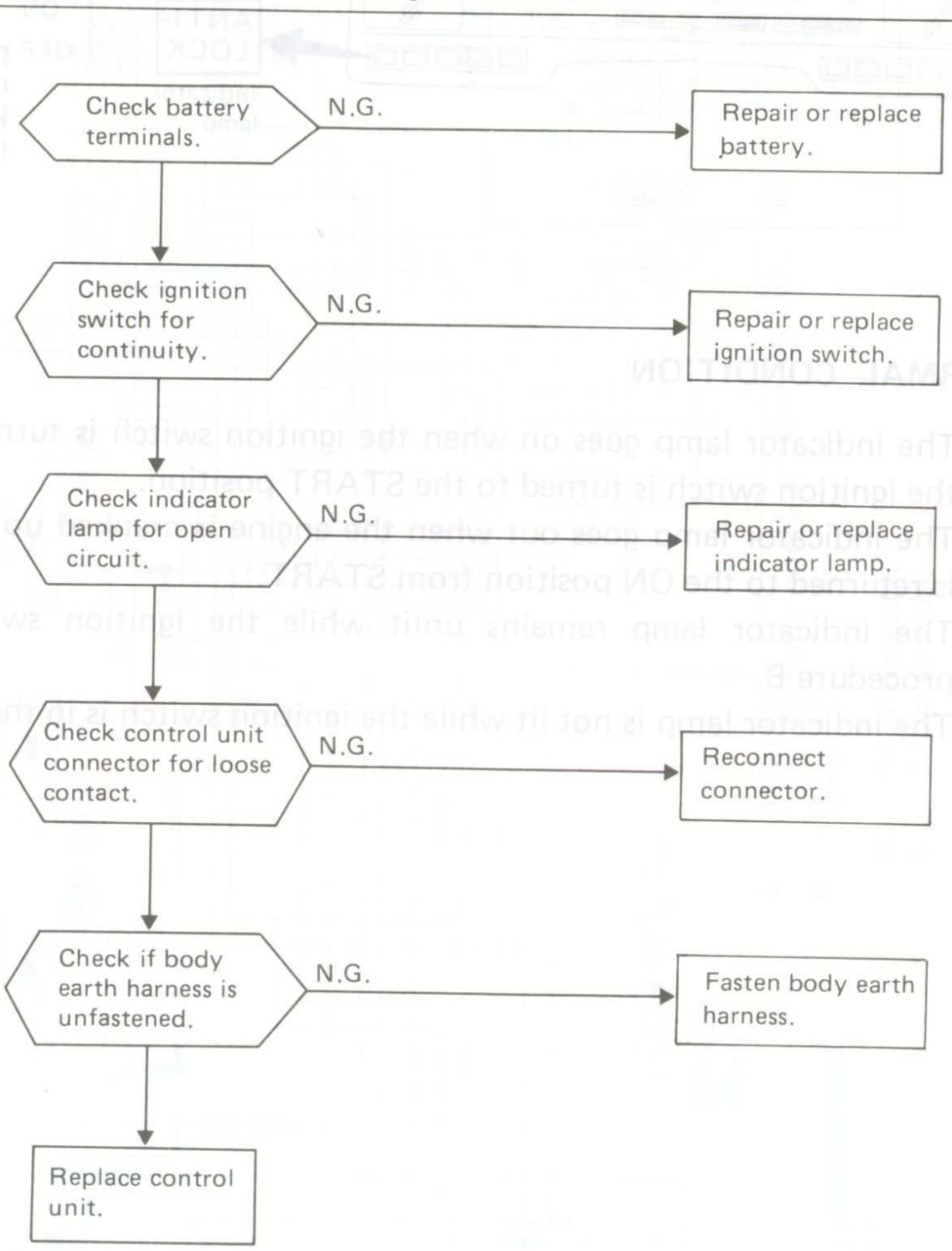
C: The indicator lamp remains unlit while the ignition switch is in the ON position according to procedure B.

D: The indicator lamp is not lit while the ignition switch is in the OFF or ACC position.

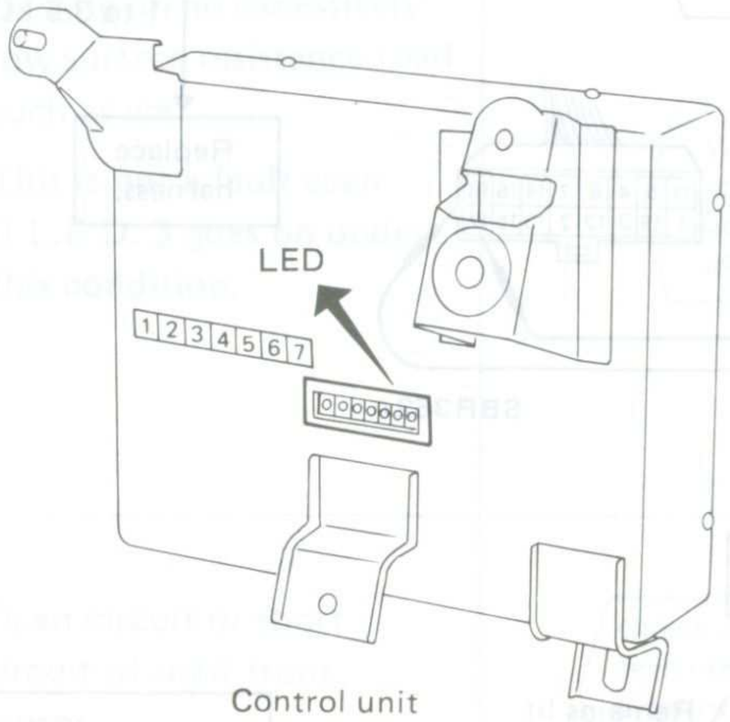
4-WHEEL SKID CONTROL SYSTEM — Trouble Diagnoses

POSSIBLE PROBLEMS

(1) The indicator lamp does not go on under the conditions described in A.
Refer to Schematic for Electrical Circuit.

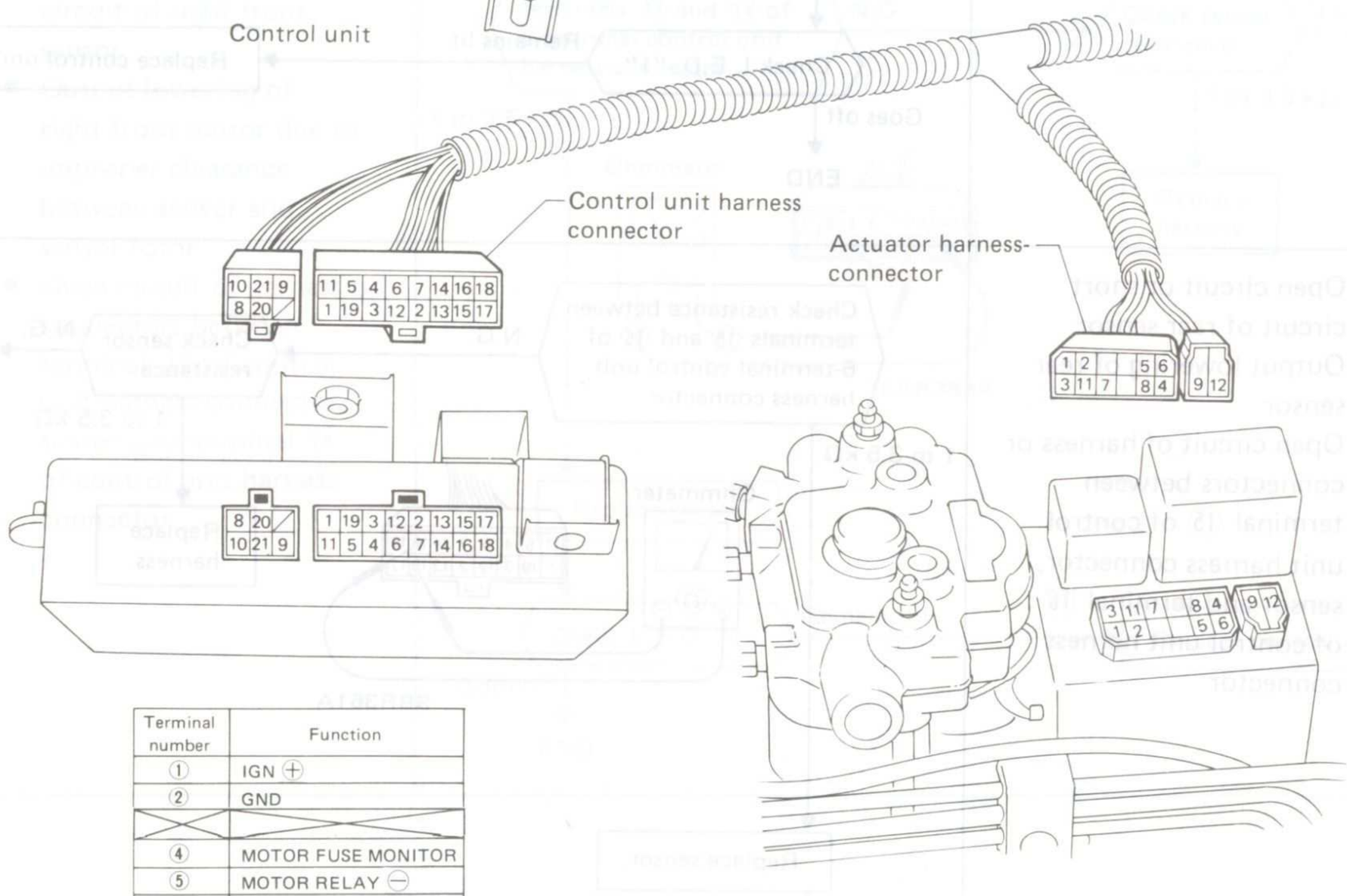
Possible cause	Checking method
• Open circuit between battery ⊕, ignition switch, indicator lamp, terminal ⑫, transistor in control unit, terminal ②, body earth and battery ⊖	

(2) The indicator lamp remains lit or goes on again under the conditions described in B and C respectively.
- Refer to Schematic for Electrical Circuit.
- Check light emitting diodes (L.E.D.) on control unit.



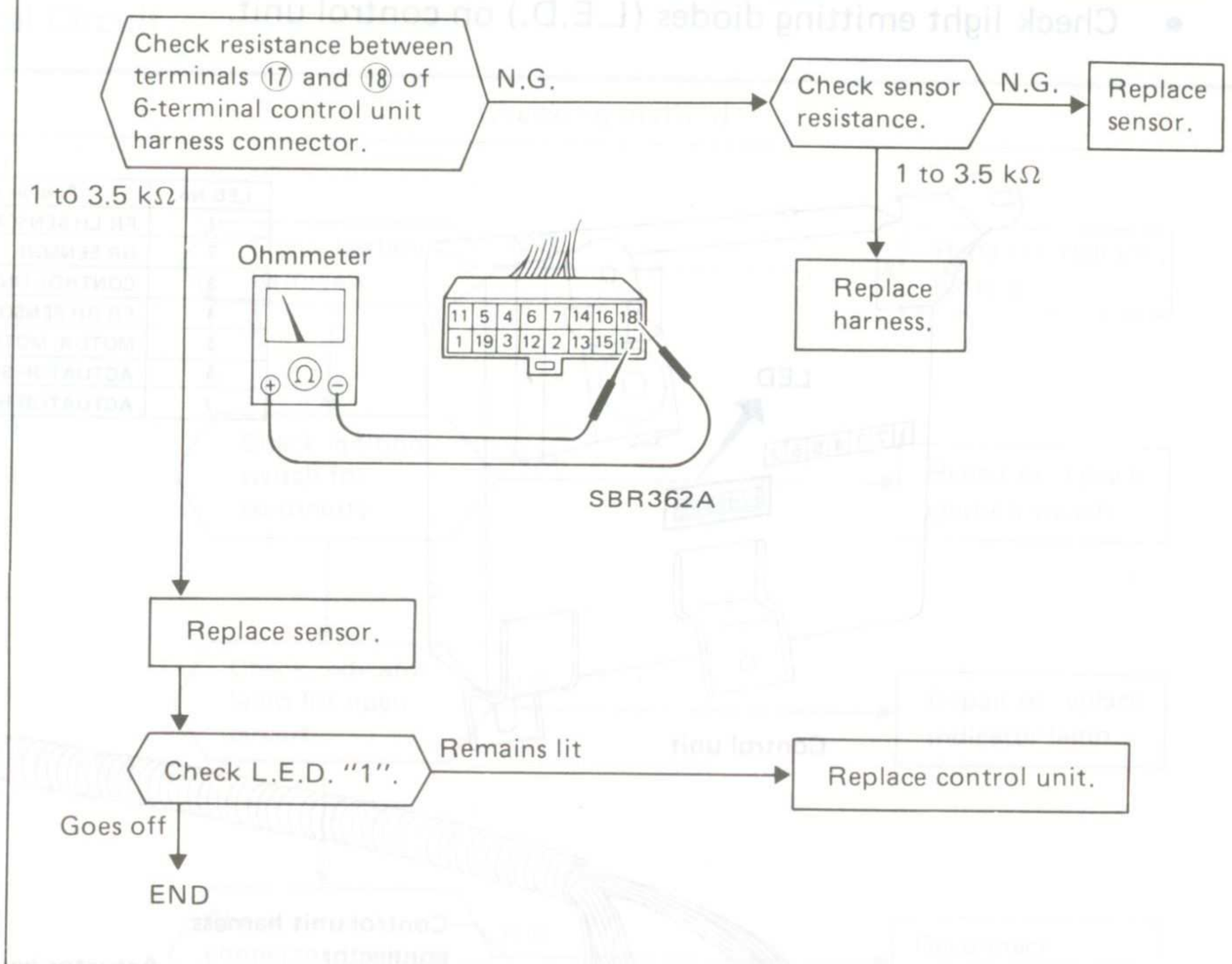
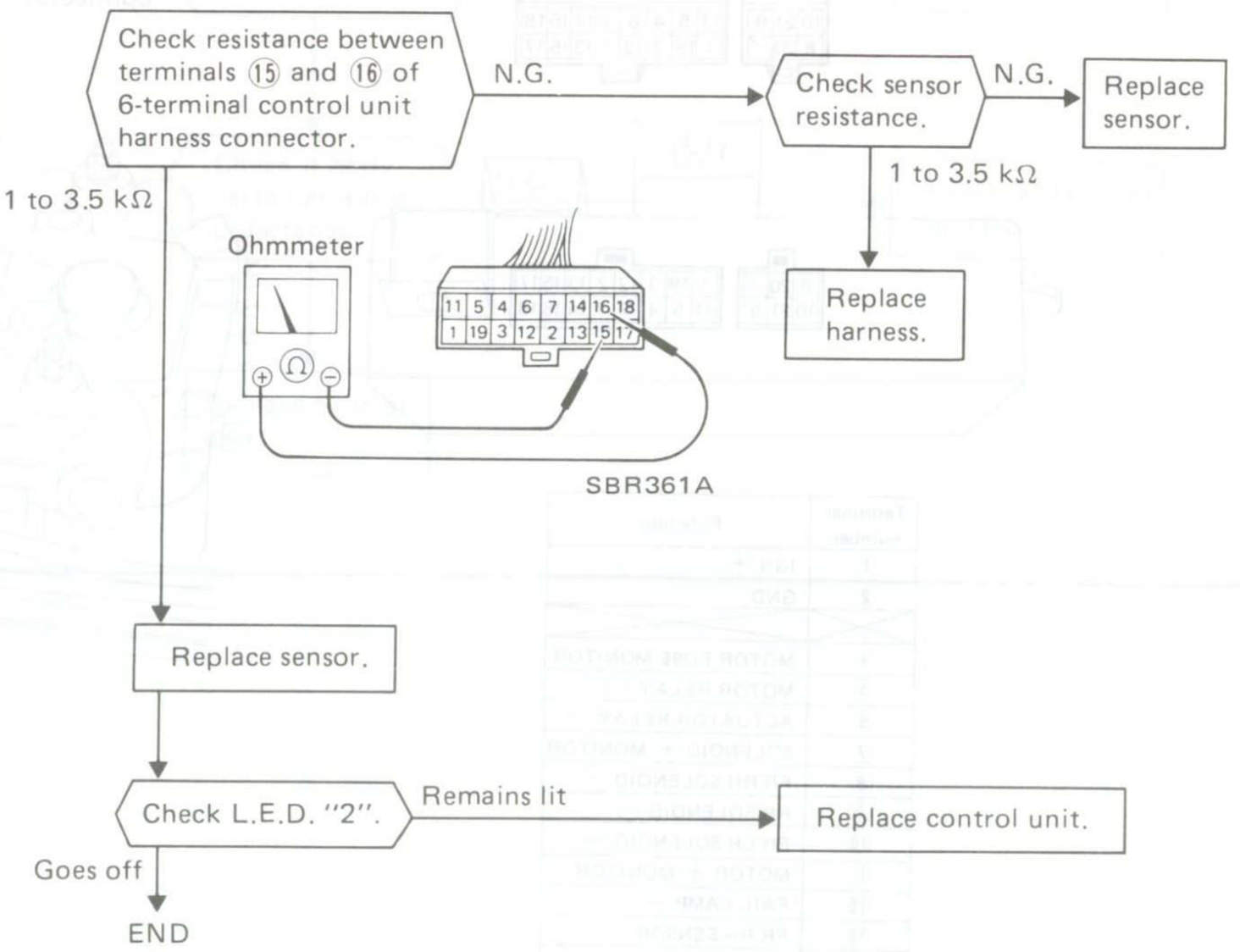
Control unit

LED No.	Possible cause
①	FR LH SENSOR
②	RR SENSOR
③	CONTROL UNIT
④	FR RH SENSOR
⑤	MOTOR, MOTOR RELAY
⑥	ACTUATOR SOLENOID
⑦	ACTUATOR RELAY

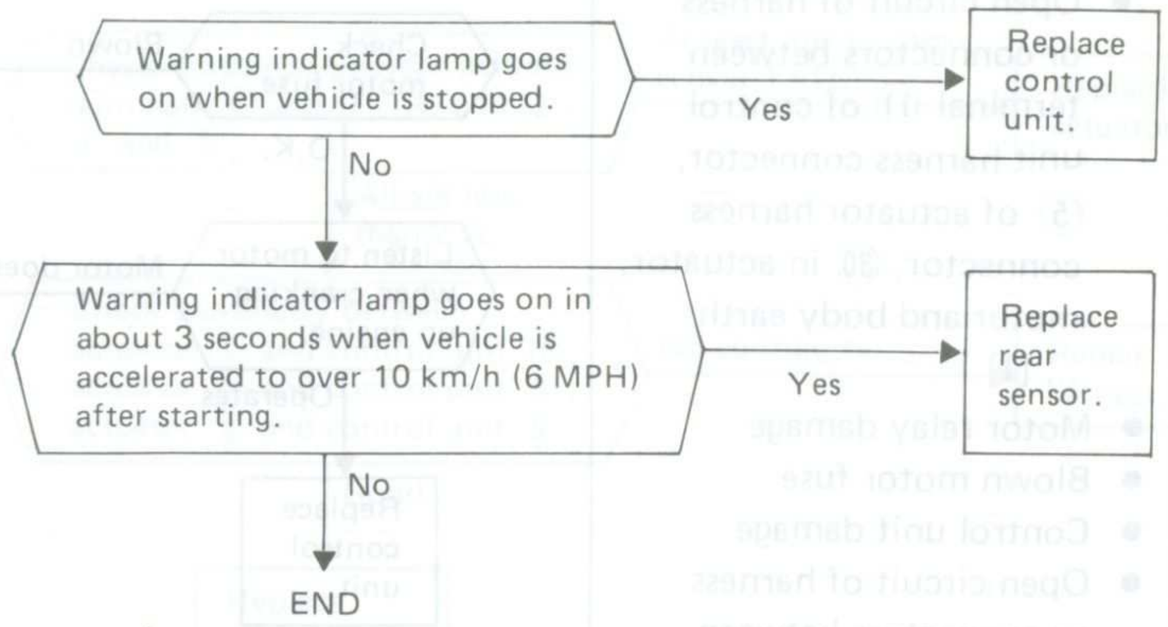
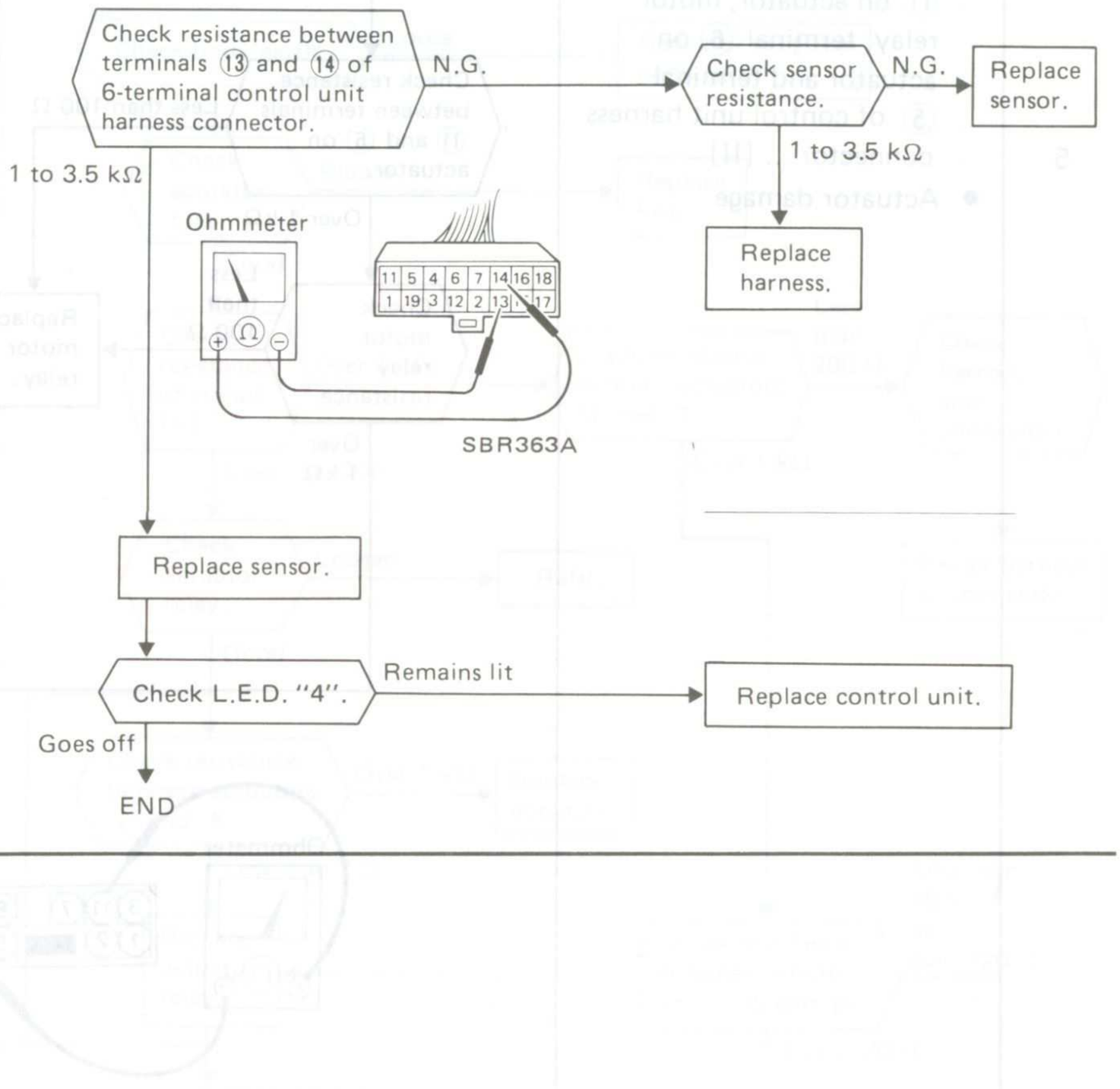


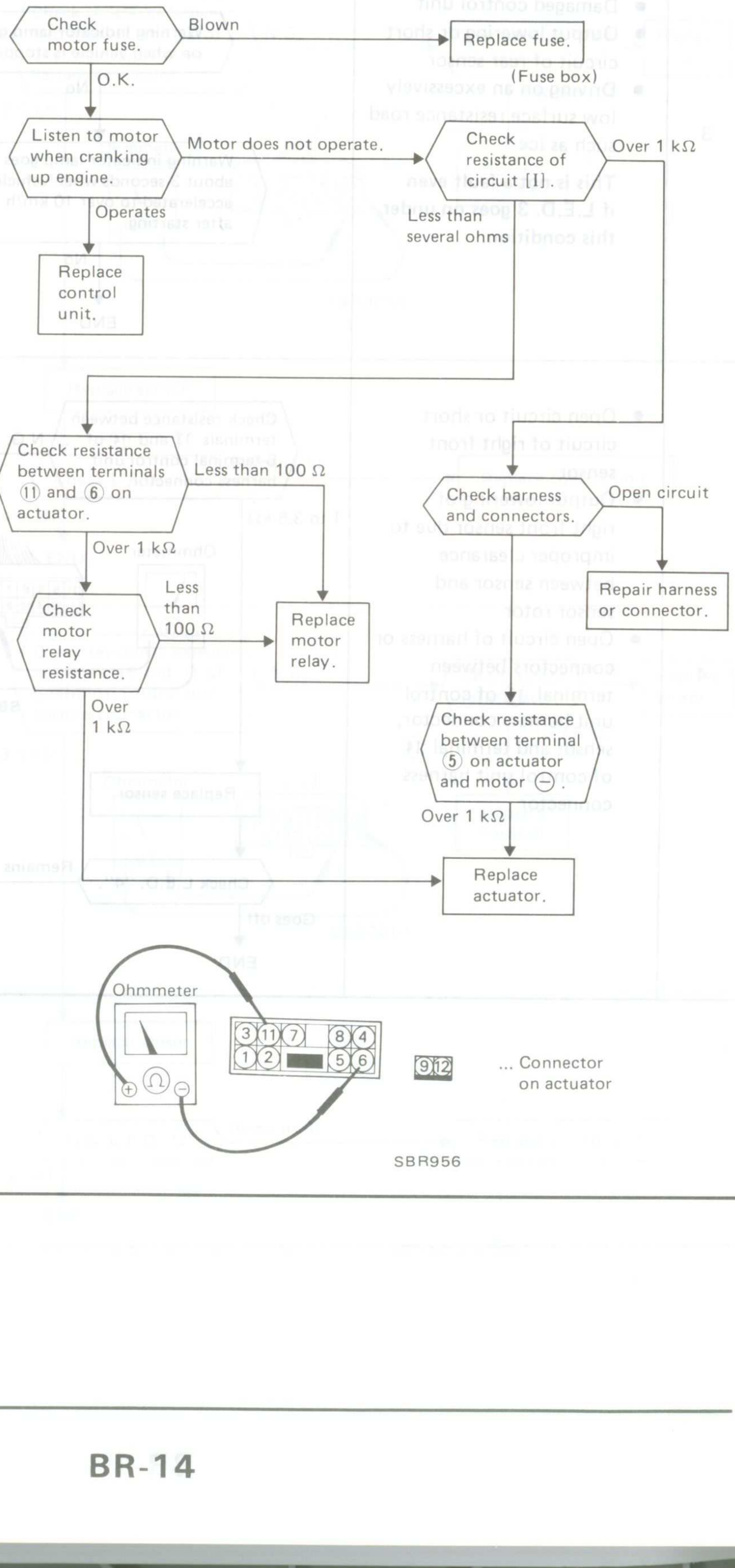
Terminal number	Function
①	IGN ⊕
②	GND
④	MOTOR FUSE MONITOR
⑤	MOTOR RELAY ⊖
⑥	ACTUATOR RELAY ⊖
⑦	SOLENOID ⊕ MONITOR
⑧	FR RH SOLENOID ⊖
⑨	RR SOLENOID ⊖
⑩	FR LH SOLENOID ⊖
⑪	MOTOR ⊕ MONITOR
⑫	FAIL LAMP ⊖
⑬	FR RH SENSOR
⑭	SENSOR GND
⑮	RR SENSOR
⑯	SENSOR GND
⑰	FR LH SENSOR
⑱	SENSOR GND
⑲	START ⊕
⑳	GND
㉑	GND

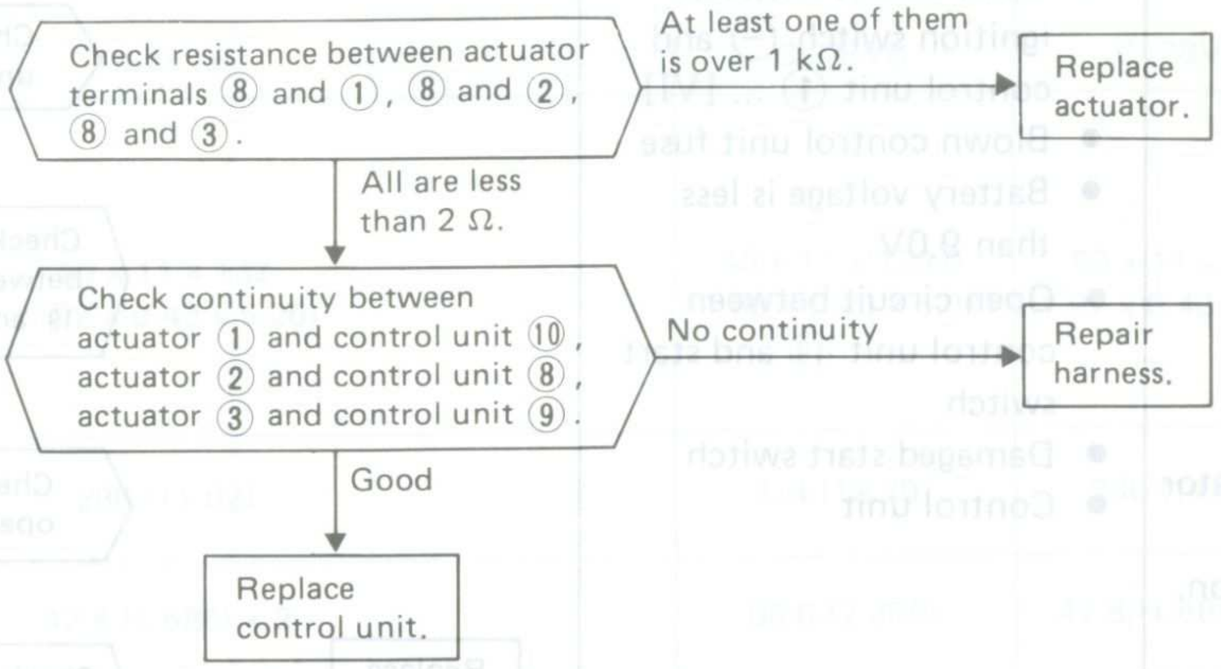
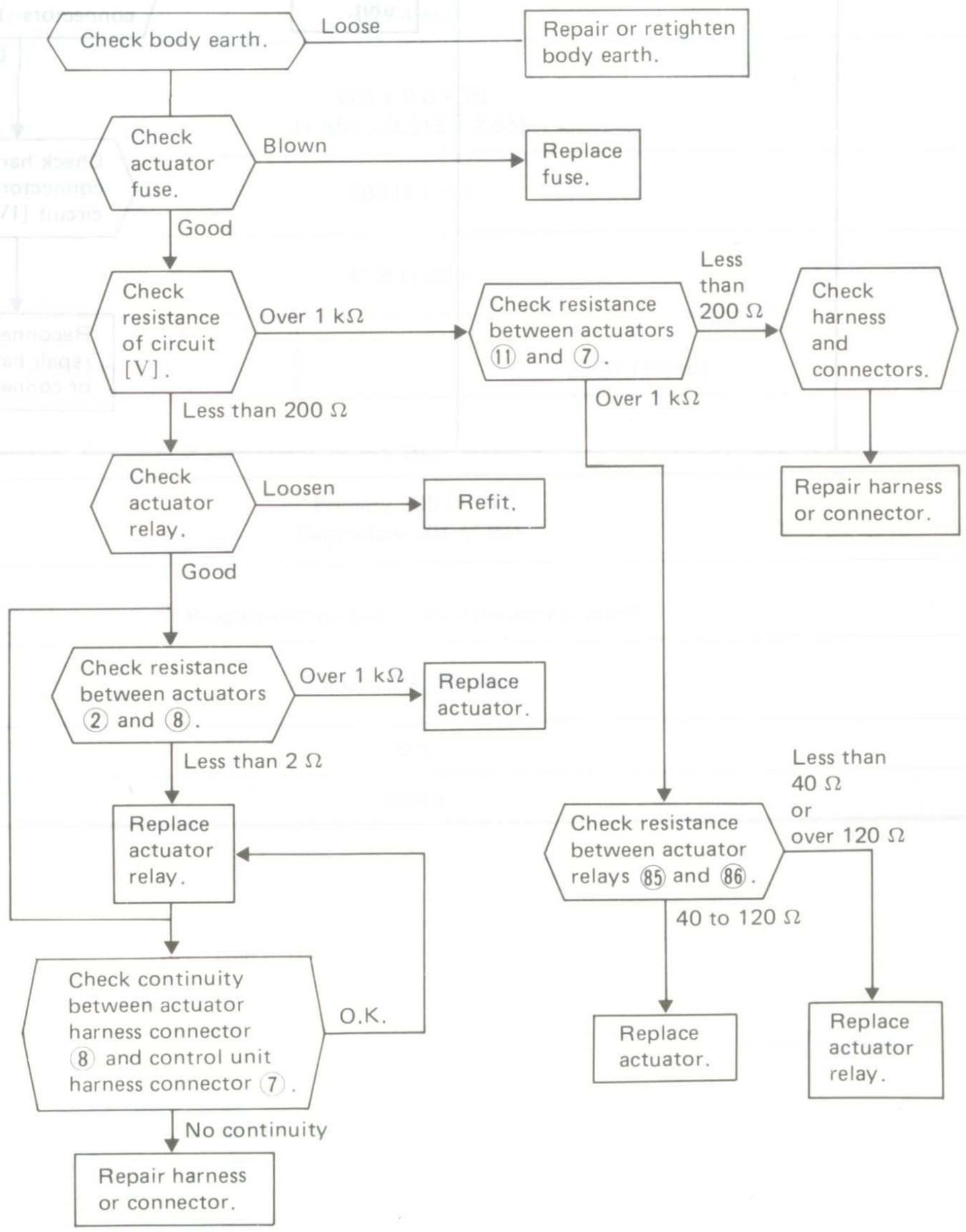
SBR356A

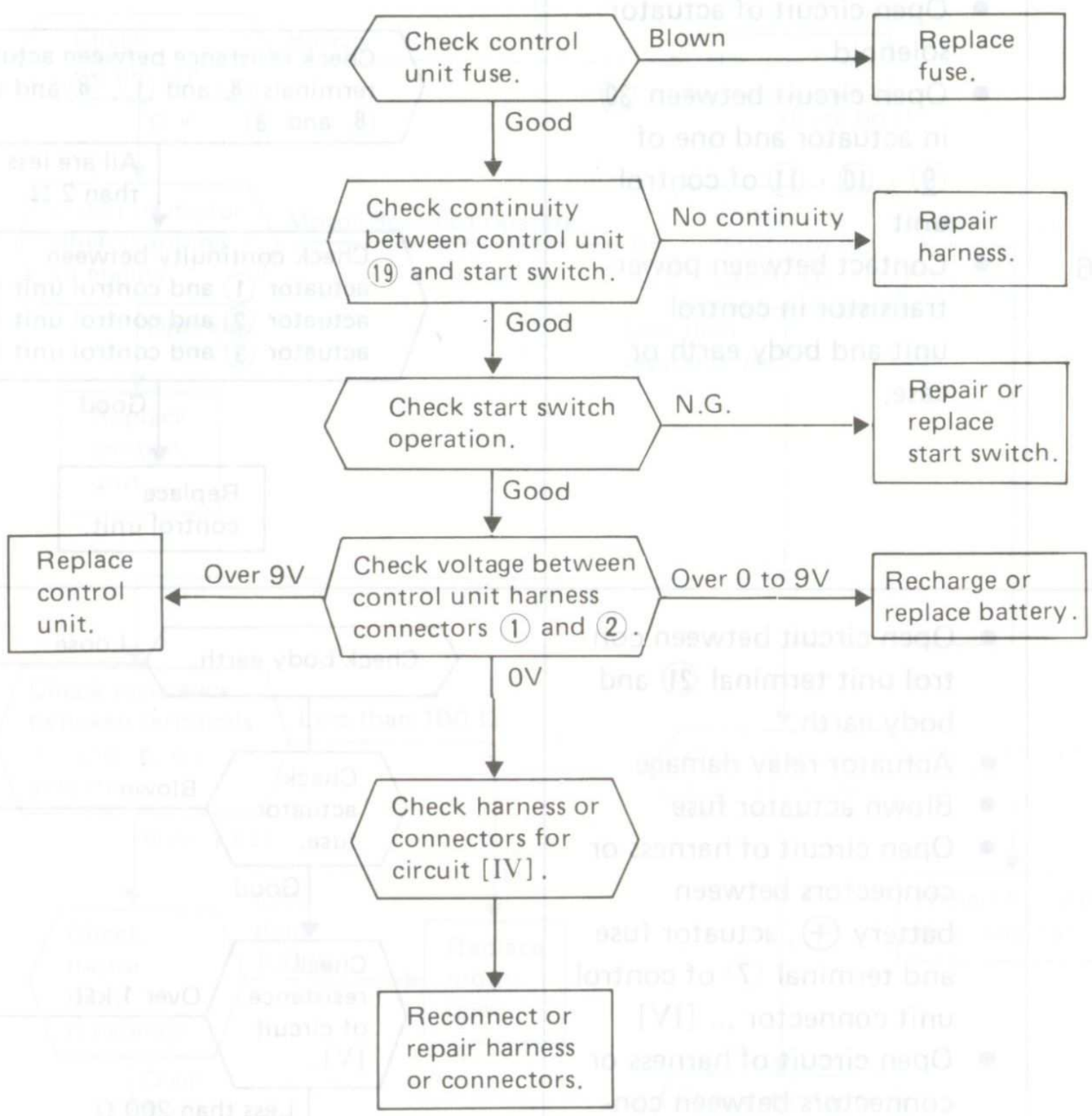
L.E.D. No.	Possible cause	Checking method
1	• Open circuit or short circuit of left front sensor • Output lowering of left front sensor due to improper clearance between sensor and sensor rotor • Open circuit of harness or connectors between terminal ⑰ of control unit harness connector, sensor and terminal ⑱ of control unit harness	
2	• Open circuit or short circuit of rear sensor • Output lowering of rear sensor • Open circuit of harness or connectors between terminal ⑮ of control unit harness connector, sensor and terminal ⑯ of control unit harness connector	

4-WHEEL SKID CONTROL SYSTEM — Trouble Diagnoses

L.E.D. No.	Possible cause	Checking method
3	• Damaged control unit • Output lowering or short circuit of rear sensor • Driving on an excessively low surface resistance road such as ice **This is not a fault even if L.E.D. 3 goes on under this condition.**	
4	• Open circuit or short circuit of right front sensor • Output lowering of right front sensor due to improper clearance between sensor and sensor rotor • Open circuit of harness or connectors between terminal ⑬ of control unit harness connector, sensor and terminal ⑭ of control unit harness connector	

L.E.D. No.	Possible cause	Checking method
5	• Open circuit of harness or connectors between terminal ⑪ of control unit harness connector, ⑤ of actuator harness connector, ㉚ in actuator, motor and body earth ... [I] • Motor relay damage • Blown motor fuse • Control unit damage • Open circuit of harness or connectors between motor fuse, terminal ⑪ on actuator, motor relay, terminal ⑥ on actuator and terminal ⑤ of control unit harness connector ... [II] • Actuator damage	

L.E.D. No.	Possible cause	Checking method
6	• Open circuit of actuator solenoid • Open circuit between ㉚ in actuator and one of ⑨ · ⑩ · ⑪ of control unit • Contact between power transistor in control unit and body earth or case.	
7	• Open circuit between control unit terminal ㉑ and body earth. • Actuator relay damage • Blown actuator fuse • Open circuit of harness or connectors between battery ⊕, actuator fuse and terminal ⑦ of control unit connector ... [IV] • Open circuit of harness or connectors between control unit fuse, actuator connector ⑪, actuator relay, actuator ⑦ and control unit connector ⑥ ... [V]	

L.E.D. No.	Possible cause	Checking method
No indicator lamp goes on.	• Open circuit between ignition switch ⊖ and control unit ① ... [VI] • Blown control unit fuse • Battery voltage is less than 9.0V. • Open circuit between control unit ⑲ and start switch • Damaged start switch • Control unit	

SERVICE DATA AND SPECIFICATIONS (S.D.S)

General Specifications

Item \ Destination	Europe		Australia	Except Europe and Australia	
Engine	VG30E	VG30ET	VG30ET	VG30E	VG30ET
Front brake Brake model	CL28VE			CL28VB	CL28VE
Pad Width x thickness x length mm (in)	50 x 11 x 132 (1.97 x 0.43 x 5.20)			43 x 11 x 129.0 (1.69 x 0.43 x 5.08)	50 x 11 x 132 (1.97 x 0.43 x 5.20)
Rotor outer diameter mm (in)	280 (11.02)			274 (10.79)	280 (11.02)
Caliper inner diameter mm (in)	42.8 (1.685) x 2			60.6 (2.386)	42.8 (1.685) x 2
Rear brake Brake model	CL14HVB				
Pad Width x thickness x length mm (in)	39.5 x 8.0 x 75 (1.555 x 0.315 x 2.95)				
Rotor outer diameter mm (in)	282 (11.10)				
Caliper inner diameter mm (in)	42.8 (1.685)				
Master cylinder Inner diameter mm (in)	25.40 (1)		23.81 (15/16)		
Brake booster Model	M20T				
Diaphragm diameter mm (in)	Primary 205 (8.07) Secondary 201 (7.91)				
Control valve Model	Proportioning valve (within master cylinder)				
Split point kPa (bar, kg/cm^2, psi)	2,942 (29.4, 30, 427)				
Reducing ratio	0.4				
Recommended brake fluid	DOT3				

SERVICE DATA AND SPECIFICATIONS (S.D.S)

Inspection and Adjustment

BRAKE PEDAL

Free height "H" mm (in)	M/T 182 - 192 (7.17 - 7.56) A/T 184 - 194 (7.24 - 7.64)
Depressed height "D" [Under force of 490 N (50 kg, 110 lb) with engine running] mm (in)	80 (3.15) or more
Clearance "C_1" between pedal stopper and threaded end of stop lamp switch mm (in)	0.3 - 1.0 (0.012 - 0.039)
Clearance "C_2" between pedal stopper and threaded end of A.S.C.D. switch mm (in)	
Pedal free play "A" mm (in)	1 - 3 (0.04 - 0.12)

PARKING BRAKE

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

DISC BRAKE

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