ACTIVE-ELECTRONIC CONTROL SUSPENSION

CONTENTS

E33AA--

CONTINUED ON NEXT PAGE

WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING!

(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).

(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.

(3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

The SRS includes the following components: impact sensors, SRS diagnosis unit, SRS warning lamp, air bag module, clock spring and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

 May 1994 PWGE9004-G REVISED

NOTES

SPECIFICATIONS

GENERAL SPECIFICATIONS

Items	Front Suspension		Rear Suspension
	L. H. drive vehicles	R. H. drive vehicles	
Suspension system	McPherson strut with coil spring and compression rod type		Multi link with coil spring type
Wheel alignment			
Camber	0° ± 30′		0° ± 30′
Caster	2°45′ ± 30′		
Toe-in mm (in.)	0 ± 3 (0 ± 0.12)		– 2 to 3 (–0.08 to 0.12)
Coil spring			
Wire dia x O.D. x free length mm (in.)	<M/T> L.H.: 14.4 x 194. 4 – 184.4 x 428 (0.57 x 7.65 – 7.26 x 16.9) R.H.: 14.4 x 194.4 – 184.4 x 428*1 (0.57 x 7.65 – 7.26 x 16.9), 14.2 x 194.2 – 184.2 x 428*2 (0.56 x 7.65 – 7.25 x 16.9) <A/T> 14.6 x 194.6 – 184.6 x 427 (0.57 x 7.66 – 7.27 x 16.8)	<M/T> 14.4 x 194.4 – 184.4 x 428 (0.57 x 7.65 – 7.26 x 16.9) <A/T> L.H.: 14.4 x 194.4 – 184.4 x 428 (0.57 x 7.65 – 7.26 x 16.9) R.H.: 14.6 x 194.6 – 184.6 x 427 (0.57 x 7.66 – 7.27 x 16.8)	11.0 x 127.0 x 377 (0.43 x 5.0 x 14.8)
Coil spring identification color	<M/T> L.H.: Green x 1 R.H.: Green x 1*1, Pink x 1*2 <A/T> Green x 2	<M/T> Green x 1 <A/T> L.H.: Green x 1 R.H.: Green x 2	Light blue x 1
Spring constant N/mm (kg/mm, lbs/in.)	<M/T> L.H.: 16.0 (1.60, 90) R.H.: 16.0 (1.60, 90)*1 15.2 (1.52, 85)*2 <A/T> 16.9 (1.69, 95)	<M/T> 16.0 (1.60, 90) <A/T> L.H.: 16.0 (1.60, 90) R.H.: 16.9 (1.69, 95)	18 (1.8, 101)
Shock absorber			
Type	Hydraulic, cylindrical double-acting type		Hydraulic, cylindrical double-acting type
Max. length mm (in.)	485 (19.1)		505.5 (19.9)
Min. length mm (in.)	341 (13.4)		364 (14.3)
Stroke mm (in.)	144 (5.7)		141.5 (5.6)
Damping/force [at 0.3 m/sec. (0.9 ft/sec.)]			
Expansion N (kg, lbs.)			
HARD	1,500 (150, 330)		1,400 (140, 308)
MEDIUM	1,100 (110, 242)		1,000 (100, 220)
SOFT	700 (70, 154)		600 (60, 132)
Contraction N (kg, lbs.)			
HARD	750 (75, 165)		800 (80, 176)
MEDIUM	550 (55, 121)		550 (55, 121)
SOFT	300 (30, 66)		300 (30, 66)

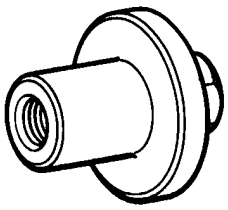
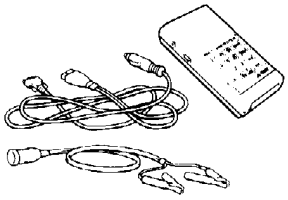
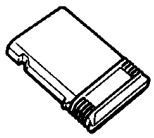
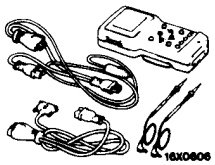
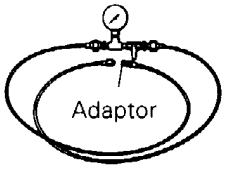
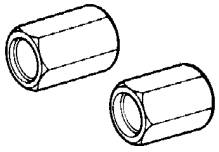
NOTE
*1: Vehicles built up to March, 1992
*2: Vehicles built from April, 1992

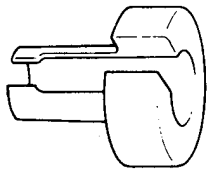
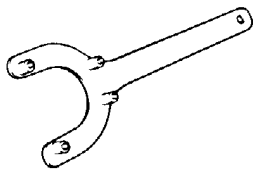
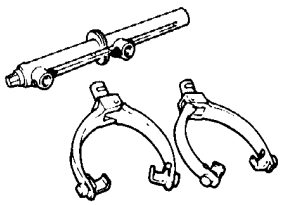
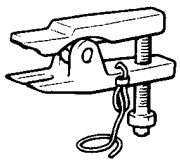
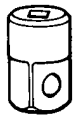
SERVICE SPECIFICATIONS

E33CB--

Items		Specifications
Standard value		
Toe-in		
At the centre of tyre tread	mm (in.)	0 ± 3 (0 ± 0.12)
Toe angle (per wheel)		0 ± 9′
Toe-out angle on turn (inner wheel when outer wheel at 20°C)		22°
Camber		0° ± 30′
Caster		2°45′ ± 30′
Kingpin inclination		13°15′
Side slip	mm (in.)	0 ± 3 (0 ± 0.12)
Wheel arch height to centre of wheel	mm (in.)	
Front		391–401 (15.4–15.8)
Rear		362–372 (14.3–14.6)
High-pressure switch		
Pressure switch shut of pressure	kPa (kg/cm², psi)	900 (9, 128) or more
Pressure switch operation pressure	kPa (kg/cm², psi)	710–810 (7.1–8.1, 101–115)
Low-pressure switch		
Return pump activation pressure	kPa (kg/cm², psi)	140 ± 30 (1.4 ± 0.3, 20 ± 4)
Return pump stop pressure	kPa (kg/cm², psi)	70 ± 30 (0.7 ± 0.3, 10 ± 4)
Lower arm ball joint starting torque	Nm (kgcm², in.lbs.)	10–22 (100–220, 87–191)
Air compressor relief pressure	kPa (kg/cm², psi)	1,000–1,300 (10–13, 142–185)
G sensor output voltage (when vehicle is level)	V	2.5 ± 0.6

SPECIAL TOOLS

Tool	Number	Name	Use
	MB991004	Wheel alignment gauge attachment	• Measurement of the wheel alignment for the aluminium type wheel
	MB991268 MB991341	Multi-use tester sub-assembly	Up to 1993 models • Checking of self-diagnosis codes • Read-out of service data • Testing of the actuator • ACTIVE-ECS – Service Adjustment Procedures
	(For the number, refer to GROUP 00 – Precautions Before Service.)	ROM pack	
	MB991502	MUT-II	All models • Checking of self-diagnosis codes • Read-out of service data • Testing of the actuator • ACTIVE ECS – Service Adjustment Procedures
 16X0607		ROM pack	
	MB991075 Adaptor A (M 10 female) B (M 10 male) C (M 12 male) D (M 10 female)	Air pressure gauge	• To check air pressure
	MB991226 E (M 12 female) F (M 14 female)	Adaptor set	

Tool	Number	Name	Use
	MB991229	Air tube releaser	• Removal/installation of the air tube
	MB991176	Spring seat holder	• Disassembly/reassembly of the strut assembly
	MB991237 MB991238, MB991239	Spring compressor body Arm set	• Compression of the front coil spring (MB991237, MB991238) • Compression of the rear coil spring (MB991237, MB991239)
	MB991113 or MB990635	Steering linkage puller	• Removal of the lower arm ball joint
	MB990326	Preload socket	• Measurement of the lower arm ball joint starting torque
	MB990968	Torque wrench	
	MB990799	Ball joint remover and installer	Installation of the dust cover

TROUBLESHOOTING

HOW TO USE THE TROUBLESHOOTING

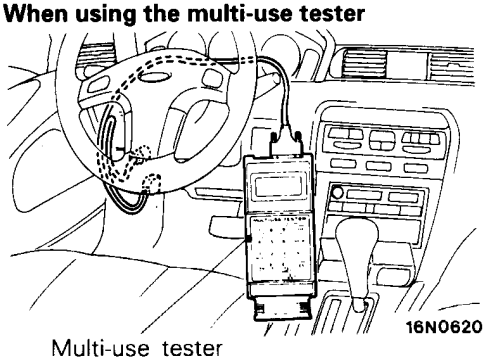
E33EAA-E

COMPOSITION OF THE TROUBLESHOOTING

In order to make the troubleshooting procedures for the ACTIVE-ELECTRONIC CONTROL SUSPENSION (ACTIVE-ECS) as accurate and as easy as possible, the troubleshooting is composed mainly of the following information.

<table>
<tr><th>No.</th><th colspan="3">Item</th><th colspan="3">Description (purpose)</th><th>Page</th></tr>
<tr><td>1</td><td colspan="3">How to use the troubleshooting</td><td colspan="3">To provide an overall understanding of information provided by the troubleshooting</td><td>P.33B-6</td></tr>
<tr><td>2</td><td colspan="3">Troubleshooting points</td><td colspan="3">To provide an understanding of certain important points and notes helpful for following troubleshooting procedures.</td><td>P.33B-7</td></tr>
<tr><td>3</td><td colspan="3">Selection of the troubleshooting chart</td><td colspan="3">To provide broad general classifications of problems and malfunctions.</td><td>P.33B-8</td></tr>
<tr><td rowspan="5">4</td><td rowspan="5">Troubleshooting quick-reference charts</td><td>Troubleshooting chart [I]</td><td rowspan="4">Diagnosis when the self-diagnosis indication is normal.</td><td colspan="2">Malfunctions related to the ACTIVE-ECS indicator.</td><td>P.33B-9</td></tr>
<tr><td>Troubleshooting chart [II]</td><td colspan="2">Malfunctions related to a change in the body attitude.</td><td>P.33B-10</td></tr>
<tr><td rowspan="3">Troubleshooting chart [III]</td><td rowspan="2">Other</td><td>Malfunctions that do not include the air-pressure system</td><td>P.33B-11</td></tr>
<tr><td>Malfunctions that include the air-pressure system.</td><td>P.33B-13</td></tr>
<tr><td>Troubleshooting chart [IV]</td><td colspan="3">Diagnosis of the self-diagnosis malfunction code output.</td><td>P.33B-14</td></tr>
<tr><td>5</td><td colspan="3">Checking according to charts classified by the malfunction symptom</td><td colspan="3">Steps according to the malfunction symptom are described by flow charts.</td><td>P.33B-21</td></tr>
<tr><td>6</td><td colspan="3">Troubleshooting hints classified according to circuits</td><td colspan="3">Informational hints for troubleshooting and circuit diagrams (for circuits to which the ultimate cause has been narrowed down by using the charts classified by the malfunction symptom) are provided for system circuits. Individual final checks and inspections are conducted by using this information for reference.</td><td>P.33B-23</td></tr>
</table>

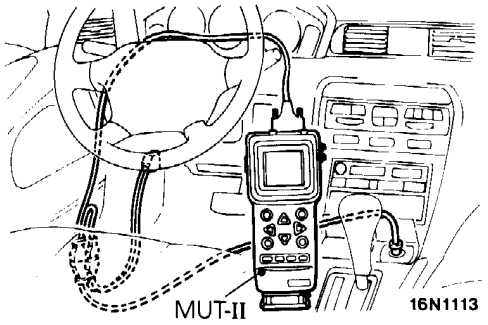
When using the multi-use tester



16N0620

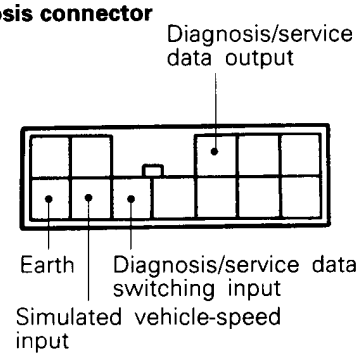
Multi-use tester

When using the MUT-II



16N1113

Diagnosis connector



16L0091

TROUBLESHOOTING POINTS E33EAA

REGARDING THE DIAGNOSIS FUNCTION

For the ACTIVE-Electronic Control Suspension (ACTIVE-ECS), the electronic control unit has been provided with the following functions in order to make checking of the electronic-control system easier.

(1) Output of self-diagnosis codes
(2) Output of service data
(3) Testing of the actuator

Note that all of the above can be checked by using the multi-use tester <Up to 1993 models> or MUT-II <All models>.

NOTE
Connect the multi-use tester or MUT-II to diagnosis connector 1 (white).

Caution
Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.

Checks to make when the alarm lamp illuminates

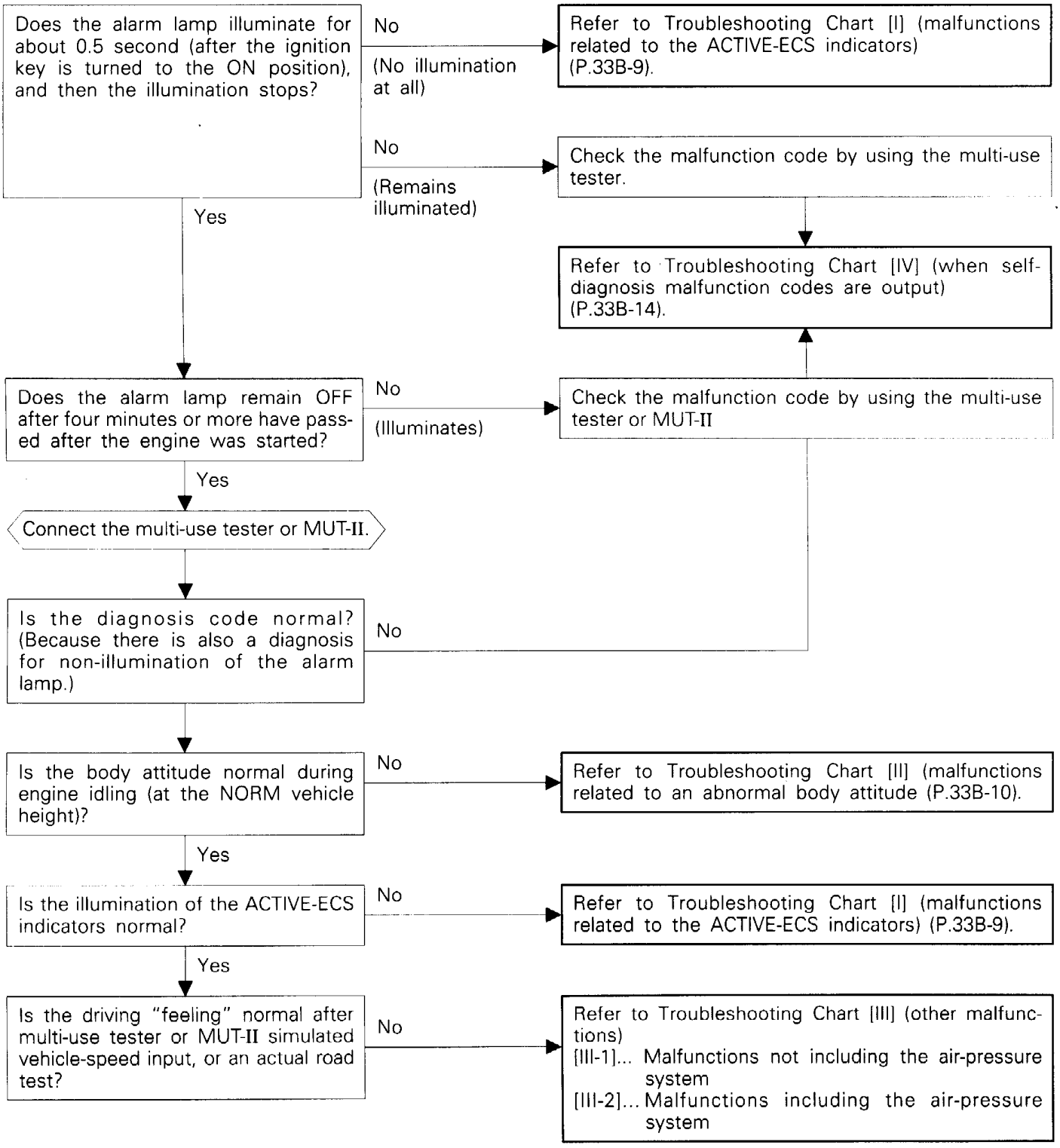
(1) The alarm lamp will illuminate under the conditions described below.
If it no longer illuminates after following the procedures described below, the system is normal.

Item	Procedure	Reasons for alarm lamp illumination
When the vehicle is overloaded	Stop the engine and lighten the load; then start the engine once again.	The vehicle height adjustment is not completed after three minutes or more have passed.
When the vehicle is stopped on a steep hill or slope with the engine running	Move the vehicle to a level surface and stop the engine; then start the engine once again.	The vehicle height adjustment is made due to the load movement on the steep slope, but the adjustment is not completed even though three minutes or more have passed.
When the vehicle-height adjustment is made frequently during hot summer weather, etc.	After stopping the engine, open the bonnet; then start the engine once again after the compressor within the engine compartment has become cool.	Either the compressor has operated continuously for four minutes or longer, or the compressor's thermo switch has been switched OFF, and, because the compressor is not operating, there is insufficient air pressure, with the result that vehicle height adjustment is not completed even though three minutes or more have passed.

(2) If the alarm lamp illuminates occasionally during driving, check for an improper contact within the sensor system (diagnosis No.22-25).(Refer to P.33B-15, 16.)

NOTES

SELECTION OF THE TROUBLESHOOTING CHART



TROUBLESHOOTING QUICK REFERENCE CHART

1. TROUBLESHOOTING CHART [I] (MALFUNCTIONS RELATED TO THE ACTIVE-ECS INDICATORS)

Problem	Check points									Troubleshooting hints classified by circuit
					ACTIVE-ECS					
					Manual Switches					
	Fuse	Power relay	Connector	Wiring harness	SPORT	HIGH	Indicator lamps	Tail lamp relay	ECU	
All indicators don't illuminate.	×	×	×	×						[7] (P. 33B-23)
No control mode switching.				×					×	
No indicator illumination when control mode switch is pressed				×			×		×	
The correct indicator does not illuminate				×	×	×	×		×	
An indicator that should not be illuminated remains illuminated.				×	×	×	×		×	
The indicators do not become dimmer when the headlamps are switched ON.				×				×		

NOTE
1. Malfunctions related to the ACTIVE-ECS indicators should be checked and corrected after first checking whether or not the replacement or repair of the ACTIVE-ECS indicator, wiring harness or ECU components is the cause of the malfunction.
2. ×: Indicates the applicable point.

For information concerning the procedures for checking each circuit individually, refer to troubleshooting hint [7] of the troubleshooting guide classified by circuits.

2. TROUBLESHOOTING CHART [II] (MALFUNCTIONS RELATED TO CHANGES OF THE BODY ATTITUDE)

No.	Check item (function)		Probable cause							Trouble-shooting hints classified by circuit
			The body remains tilted when the vehicle is stopped. (The alarm lamp illuminates about two minutes later.)		The vehicle height changes after the anti-rolling control action.		The vehicle height changes when left as is.			
			Tilts to the left.	Tilts to the right.	The vehicle height increases.	The vehicle height decreases.	The vehicle height at the front or rear increases.	The vehicle height decreases.		
								Front or rear only.	One wheel only.	
1	G sensor *1 (analogue detection of body lateral Gs)		× (Output Remains 5V.)	× (Output Remains 0V.)						[1]
2	Exhaust valves for Active (Switching of air spring exhaust to internal circulation or external discharge.)	Front			× (Stuck open)	× (Harness short-circuit, stuck closed)				[22]
		Rear			× (Stuck open)	× (Harness short-circuit, stuck closed)				[22]
3	Air-supply valves (These valves supply air to the air springs when the vehicle height is increased and during attitude control.)	Front				× (Harness short-circuit stuck closed)	× (Leakage at valve seat)	× (Air leakage to outside)		[23]
		Rear				× (Harness short-circuit, stuck closed)	× (Leakage at valve seat)	× (Air leakage to outside)		[24]
4	Control valves	Left front							× (Leakage at valve seat or air leakage to outside)	[25]
		Right front								
		Left rear								[26]
		Right rear								

NOTE
1. *1: When there is an abnormal condition of the output signals, including incorrect installation of the G sensor, the anti-rolling action is activated, and because there is no reset, the vehicle body remains tilted.
When this condition continues for one minute or more, the alarm lamp illuminates and a self-diagnosis code (No. 11) is output.
2. ×: Indicates the applicable point.

3. TROUBLESHOOTING CHART [III] (OTHER MALFUNCTIONS)

(1) [III-1] Malfunctions not including the air-pressure system

No.	Check points (functions)	Item No. or diagnosis code	Service data		Malfunction			
			Condition and indicated data	Indication (standard value)	Anti-rolling control action is activated frequently.	System operates with the ignition key ON (with the engine stopped).	No control when stopped.	No anti-squat control.
1	G sensor (detection of body lateral Gs)	11	Stop the vehicle at a horizontally level place.	(2.5)	× (Liquid leakage)			
2	Alternator "L" terminal (detection of engine rotation)	12	Engine rotation	HIGH		× (Harness wiring damaged or disconnected)	× (Harness short-circuit)	
			Engine stop	LOW				
3	Throttle-position sensor (detection of sudden acceleration or deceleration)	14	Throttle fully open	V (0.25)				× (Damaged or disconnected wiring) (Short circuit)
4	High-pressure switch (detection of high-pressure tank pressure)	15	760 kPa (7.6 kg/cm², 108 psi) or less	ON				
			950 kPa (9.5 kg/cm² 135 psi) or more	OFF				
5	Headlamp switch (detection of headlamp illumination)	18	Headlamp switch ON/OFF	ON				
				OFF				
6	Steering wheel sensor (detection of steering direction and angular velocity)	21	STR. 1 and STR. 2 each ON/OFF	ON				
				OFF				
7	Vehicle speed sensor (detection of vehicle speed)	24	Vehicle speed input to ECU	km/h				×*
8	Stop lamp switch (detection of braking)	26	Stop lamp switch ON/OFF	ON				
				OFF				
9	Accel switch*1 or Idle position switch*2	34	Accel switch*1 or idle position switch*2 ON/OFF	ON				
				OFF				
10	A/T inhibitor switch	31	R range ON All other ranges OFF	ON				
				OFF				
11	M/T back up lamp switch	32	Back up lamp switch ON/OFF	ON				
				OFF				
12	Door switch	33	Door switch ON/OFF	ON				
				OFF				
13	Damping force switching actuator	41	–	–				
14	Compressor relay	43	–					
15	Compressor	–	–	–				
16	Return pump relay	44	–	–				
17	Return pump	–	–	–				

NOTE
1. The * symbol indicates the period of time between the detection of the malfunction of the vehicle-speed sensor and the illumination of the alarm lamp.
2. ×: Indicates the applicable point.
3. *1 : <Vehicles built up to October, 1991>
   *2 : <Vehicles built from November, 1991>

Malfunction													
Compressor motor non-activation	Front does not become lower wheel an vehicle light is selected.	Front only becomes lower when Low vehicle hight is selected at night (with headlamps ON).	No anti-rolling control	No anti-drive control	Vehicle-speed-response function doesn't operate		No A/T shift squat control	Anti-squat control doesn't function during revers	Vehicle-height adjustment starts late when passengers get in or out.	Vehicle-height adjustment frequency increase when vehicle is stopped	Damping force switching doesn't function.	Non-operation of return pump	Troubleshooting hints classified by circuit
					Damping force automatic switching	Vehicle-height adjustment							
													[1]
													[2]
													[3]
× (Damaged or disconnected wiring)													[4]
	× (Harness wiring damaged or disconnected)	× (Harness short-circuit)											[5]
			× (Harness short-circuit)										[9]
			× *	× *	× *	× *							[12]
				× (Damaged or disconnected wiring)									[14]
							× (Damaged or disconnected wiring)						[14]
							× (Damaged or disconnected wiring) (Harness short-circuit)	× (Damaged or disconnected wiring)					[15]
								× (Damaged or disconnected wiring)					[15]
									× (Damaged or disconnected wiring circuit)	× (Short circuit)			[16]
											× (Damaged or disconnected wiring)(Short circuit)		[17]
× (Damaged or disconnected wiring)													[18]
× (Damaged or disconnected wiring)													[18]
												× (Damaged or disconnected wiring)	[19]
												× (Damaged or disconnected wiring)	[19]

(2) [III-2] Malfunctions including the air-pressure system

No.	Check points (functions)	Problem						Trouble-shooting hints classified by circuit
		Compressor is activated frequently.	Active attitude control doesn't function. (excessive rolling during driving)	Active attitude control effect is not sufficient. (a feeling of incompatibility during driving)	Vehicle height overshoots its target when adjusted.	Abnormal vehicle-height adjustment.		
						Diagnosis No. 54	Diagnosis No. 55	
1	Low-pressure switch (detection of low-pressure tank pressure)	× (Air leakage)					× (Air leakage)	[3]
2	High-pressure switch (detection of high-pressure tank pressure)	× (Air leakage) (Characteristic malfunction)	× (Air leakage)	× (Air leakage)			× (Air leakage) (Contacts fused)	[5]
3	Rear pressure sensor (detection of pressure within rear air springs)	× (Air leakage)		× (Air leakage)			× (Air leakage)	[13]
4	Exhaust valve for vehicle-height adjustment					× (Stuck)		[20]
5	Flow-rate switchover valve (flow-rate switchover during vehicle-height adjustment and attitude-control mode)	× (Air leakage)		× (Stuck closed)	× (Stuck open)		× (Air leakage)	[21]
6	Front or rear exhaust valve (switching of air spring exhaust to internal circulation or external discharge)		× (Stuck open)	× (Stuck open)		× (Stuck closed) (Harness short-circuit)		[23]
7	Front or rear air-supply valve (air supply to air springs during vehicle-height increase and attitude-control mode)	× (Air leakage)		× (Stuck closed) (Harness short-circuit)		× (Stuck closed) (Harness short-circuit)	× (Air leakage)	[23], [24]
8	Front (left and right) and rear (left and right) control valves	× (Air leakage)		× (Stuck closed) (Harness short-circuit)		× (Stuck closed) (Harness short-circuit)	× (Air leakage)	[25], [26]
9	Compressor	× (Air leakage)					× (Air leakage)	[18]
10	Air tube	× (Air leakage)	× (Air leakage) (Clogged)	× (Air leakage) (Clogged)		× (Clogged)	× (Air leakage)	–

NOTE
×: Indicates the applicable point.

4. TROUBLESHOOTING CHART [IV] (WHEN SELF-DIAGNOSIS MALFUNCTION CODES ARE OUTPUT)

NOTE

(1) The alarm lamp does not illuminate for an abnormal condition (code No. 12) of the alternator output voltage ("L terminal) or abnormal condition of the low pressure switch (code No. 13), abnormal condition of the rear pressure switch (code No. 25) for air leakage (code No. 56) within the front or rear valves.

(2) For malfunctions represented by a code number with the * symbol, if the malfunction is of a temporary nature (such as improper contact of a connector, etc.), the warning lamp's illumination will stop when the malfunction stops, and the function will return to normal.

(3) When the alarm lamp is illuminated (i.e., when a malfunction has been detected), the control mode cannot be switched (with the exception of a certain few malfunctions) when the control switch is pressed.

(4) If two or more malfunctions occur at the same time, the corresponding code numbers will be displayed in order from the lowest one.

Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
0	Normal	–	–	–
*11	Damaged or disconnected wiring or short-circuit of G sensor input circuit, or G sensor malfunction.	Alarm lamp illuminates; among attitude-control modes, only rolling control stops. (Others operate normally.)	• Improper installation of G sensor. • G sensor internal wiring damaged or disconnected. • Damaged or disconnected wiring or short-circuit of G sensor circuit. • Connector of G sensor circuit disconnected. • Malfunction of ECU.	Troubleshooting hints classified by circuit [1]
*12	With the ignition key at the ON position and the vehicle speed at 40 km/h (25 mph) or higher, the output voltage of the alternator "L" terminal is approximately 5V or lower.	The charging warning lamp illuminates, and, furthermore, the system does not function when the vehicle is stopped (vehicle speed of 3 km/h (2 mph) or lower). NOTE The alarm lamp does not illuminate, and, furthermore, there is no detection of harness damage or disconnection between the alternator "L" terminal and the ECU.	• Insufficient alternator "L" terminal output voltage (malfunction of the charging system). • Harness short-circuit between the alternator "L" terminal and the ECU. • ECU malfunction.	Troubleshooting hints classified by circuit [2]
*13	The low-pressure switch is not switched OFF even though the attitude-control function is performed 30 times. The return pump is activated frequently.	The alarm lamp illuminates, and only the attitude-control function stops. (Other functions are normal.)	• Low-pressure switch is fused. • Damaged or disconnected wiring, or short-circuit, of the low-pressure switch circuit harness. • The connector of the low-pressure switch circuit is disconnected. • ECU malfunction.	Troubleshooting hints classified by circuit [3]

Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
*21	Damaged or disconnected wiring of the steering wheel sensor input circuit, or a malfunction of the steering wheel sensor.	The alarm lamp illuminates, and the attitude-control function stops. The damping force is held to MEDIUM, and the vehicle height is held to NORMAL.	• Steering wheel sensor malfunction. • Damaged or disconnected wiring of the steering wheel sensor circuit harness. • Disconnection of the connector of the steering wheel sensor circuit. • ECU malfunction.	Thoubleshooting hints classified by circuit [9]
*22	An abnormal signal (a signal unlike any normal signal such as an error code, etc.) is input from the front height sensor; or, a malfunction of the vehicle-height discrimination circuit within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM. NOTE Note that 32 seconds are required to determine that there is a malfunction.	• Front height sensor malfunction. • Damaged or disconnected wiring, or a short-circuit, of the front height sensor circuit. • Disconnection of the connector of the front height sensor circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [10]
*23	An abnormal signal is input from the rear height sensor; or, a malfunction of the vehicle-height discrimination circuit within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM. NOTE Note that 32 seconds are required to determine that there is a malfunction.	• Rear height sensor malfunction. • Damaged or disconnected wiring, or a short-circuit, of the rear height sensor circuit. • Disconnection of the connector of the rear height sensor circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [11]
*24	There is damaged or disconnected wiring, or a short-circuit, of the vehicle-speed sensor input circuit. (The throttle is open 30% or more, and the output of the alternator "L" terminal is HIGH level, but even so the input of the vehicle-speed pulses is not 30 seconds or longer.)	The alarm lamp illuminates, and the attitude-control function stops. The damping force is held to MEDIUM, and the vehicle height is held to NORMAL.	• Malfunction of the vehicle-speed sensor (damaged or disconnected wiring, or a short-circuit). • Damaged or disconnected wiring, or a short-circuit, of the vehicle-speed sensor circuit. • The connector of the vehicle-speed sensor circuit is disconnected. • ECU malfunction.	Troubleshooting hints classified by circuit [12]

Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
*25	There is damaged or disconnected wiring of the rear pressure sensor input circuit. (The rear internal pressure is abnormally high.)	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM. NOTE This code is also output during driving in an overloaded condition.	• Rear pressure sensor malfunction. • Damaged or disconnected wiring, or a short-circuit, of the rear pressure sensor circuit. • Disconnection of the connector of the rear pressure sensor circuit. • ECU malfunction	Troubleshooting hints classified by circuit [13]
41	Damaged or disconnected wiring of the damping force switching actuator (step motor type) or of the actuator circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the damping-force control function are stopped. The vehicle height is held to NORMAL.	• All connectors of the damping-force switching actuator (step motor type) and the actuator circuit are disconnected. • Damaged or disconnected wiring, or a short-circuit, of the damping-force switching actuator (step motor type) and the harness of the ECU part of the actuator circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [17]
42	There is damaged or disconnected wiring, or a short-circuit, of the solenoid valve power source relay circuit.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• The solenoid valve power source relay contacts are fused. • Damaged or disconnected wiring of the solenoid valve power source relay coil. • Damaged or disconnected wiring, or a short-circuit, of the solenoid valve power source relay circuit. • Disconnection of the connector of the solenoid valve power source relay circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [7]

Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
43	Damaged or disconnected wiring, or a short-circuit, of the compressor relay circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring, or a short-circuit, of the compressor relay coil. • Damaged or disconnected wiring, or a short-circuit, of the compressor relay circuit harness. • Disconnection of the compressor relay circuit connector. • ECU malfunction.	Troubleshooting hints classified by circuit [18]
44	Damaged or disconnected wiring, or a short-circuit, of the return pump relay circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring, or a short-circuit, of the return pump relay coil. • Damaged or disconnected wiring, or a short-circuit, of the return pump relay circuit harness. • Disconnection of the return pump relay circuit connector. • ECU malfunction.	Troubleshooting hints classified by circuit [19]
45	Damaged or disconnected wiring, or a short-circuit, of the exhaust valve actuation circuit (for vehicle-height adjustment), or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring, or a shortcircuit, of the exhaust valve coil (for vehicleheight adjustment). • Damaged or disconnected wiring, or a shortcircuit, of the exhaust valve actuation circuit (for vehicle-height adjustment). • Disconnection of the connector of the exhaust valve actuation circuit (for vehicle-height adjustment). • ECU malfunction.	Troubleshooting hints classified by circuit [20]

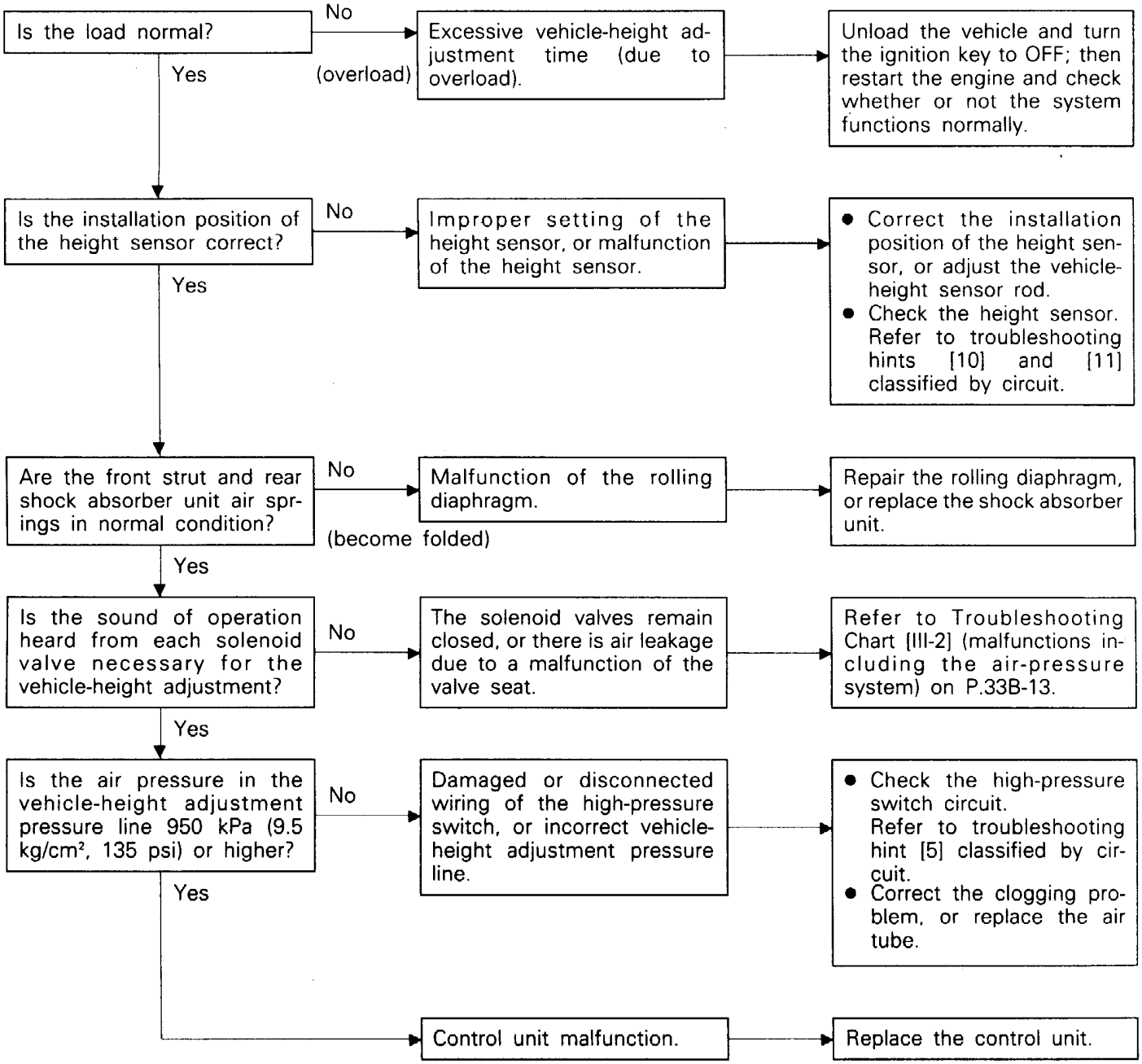
Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
46	Damaged or disconnected wiring, or a short-circuit, of the flow-rate switchover valve actuation circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring, or a short-circuit, of the flow-rate switchover valve coil. • Damaged or disconnected wiring, or a short-circuit, of the flow-rate switchover valve circuit harness. • Disconnection of the flow-rate switchover valve circuit connector. • ECU malfunction.	Troubleshooting hints classified by circuit [21]
47	Damaged or disconnected wiring of the front or rear exhaust valve actuation circuit (for active control), or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring of the front or rear exhaust valve coil (for active control). • Damaged or disconnected wiring of the front or rear exhaust valve circuit (for active control). • Disconnection of the connector of the front or rear exhaust valve circuit (for active control). • ECU malfunction.	Troubleshooting hints classified by circuit [22]
51	Damaged or disconnected wiring of the front or rear air-supply valve actuation circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring of the front or rear air-supply valve coil. • Damaged or disconnected wiring of the front or rear air-supply valve circuit harness. • Disconnection of the connector of the front or rear air-supply valve circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [23], [24]

Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
52	Damaged or disconnected wiring of the left front or right front valve actuation circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring of the left front or right front valve coil. • Damaged or disconnected wiring of the left front or right front valve circuit harness. • Disconnection of the connector of the left front or right front valve circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [25]
53	Damaged or disconnected wiring of the left rear or right rear valve actuation circuit, or a malfunction of an output transistor within the ECU.	The alarm lamp illuminates, and the attitude-control function and, the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Damaged or disconnected wiring of the left rear or right rear valve coil. • Damaged or disconnected wiring of the left rear or right rear valve circuit harness. • Disconnection of the connector of the left rear or right rear valve circuit. • ECU malfunction.	Troubleshooting hints classified by circuit [26]
54	Even though three minutes or more have passed for the vehicle-height adjustments of the front and the rear, and the pressure within the high-pressure tank is sufficient (the high-pressure switch is OFF), the vehicle-height adjustments are not completed.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Overloaded condition. • Improper adjustment of the front or rear vehicle-height sensor. • Air-pressure line is clogged. • Malfunction of the front strut unit or the rear shock absorber unit air spring. • ECU malfunction.	Refer to Malfunction Symptoms Chart [A] on P.33B-21.

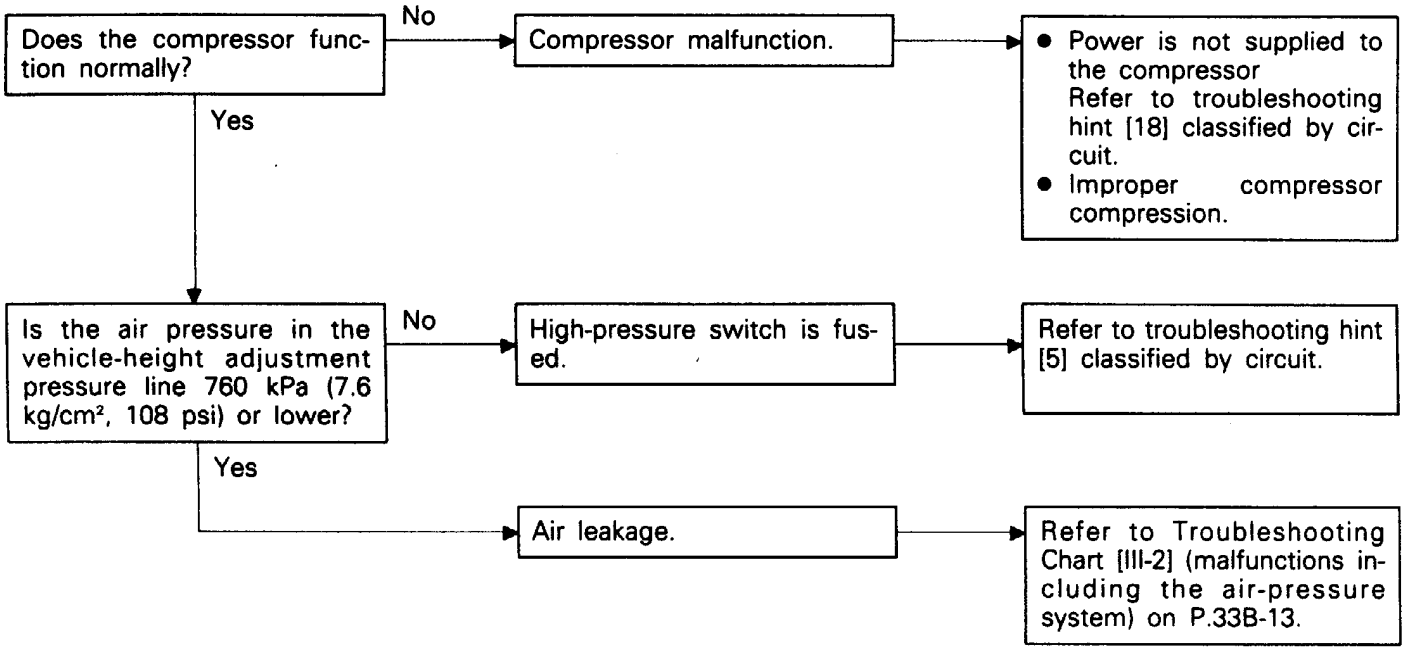
Diagnosis code No.	Malfunction	Vehicle condition	Probable cause	Action
55	Even though three minutes or more have passed for the vehicle-height adjustments of the front and the rear, and with insufficient pressure within the high-pressure tank (the high-pressure switch is ON), the vehicle-height adjustments are not completed, or the compressor has operated continuously for four minutes or longer.	The alarm lamp illuminates, and the attitude-control function and the vehicle-height control function are stopped. The damping force is held to MEDIUM.	• Compressor malfunction. Damaged or disconnected wiring of the harness between the compressor relay and the compressor. Malfunction of the air compression of the compressor. • Air leakage from the high-pressure tank (non-airtight connection with the low-pressure tank). • High-pressure switch is fused.	Refer to Malfunction Symptoms Chart [B] on P.33B-22.
56	The return pump is continuously activated (repeatedly starts and stops eight times), even though neither the attitude-control function nor the vehicle-height control function has been initiated.	Control functions are not stopped (alarm lamp does not illuminate).	Air leakage within the front (left or right) or rear (left or right) valve.	Replace the front or rear solenoid valve.

CHECKING ACCORDING TO CHARTS CLASSIFIED BY THE MALFUNCTION SYMPTOM

[A] DIAGNOSIS CODE NO. 54



[B] DIAGNOSIS CODE NO. 55

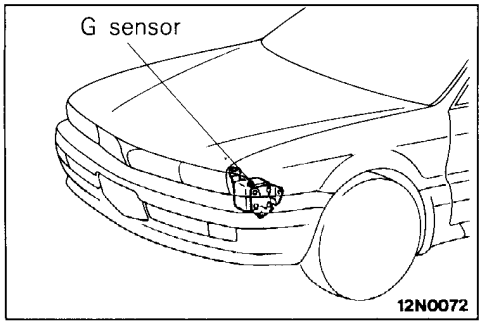


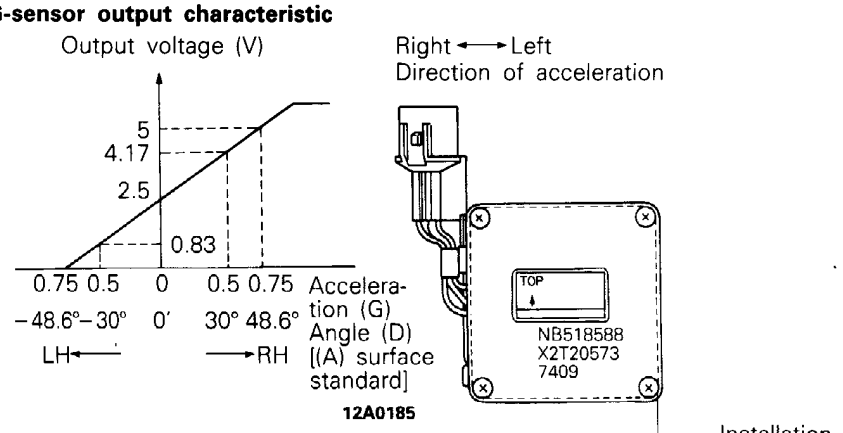
TROUBLESHOOTING HINTS CLASSIFIED ACCORDING TO CIRCUITS

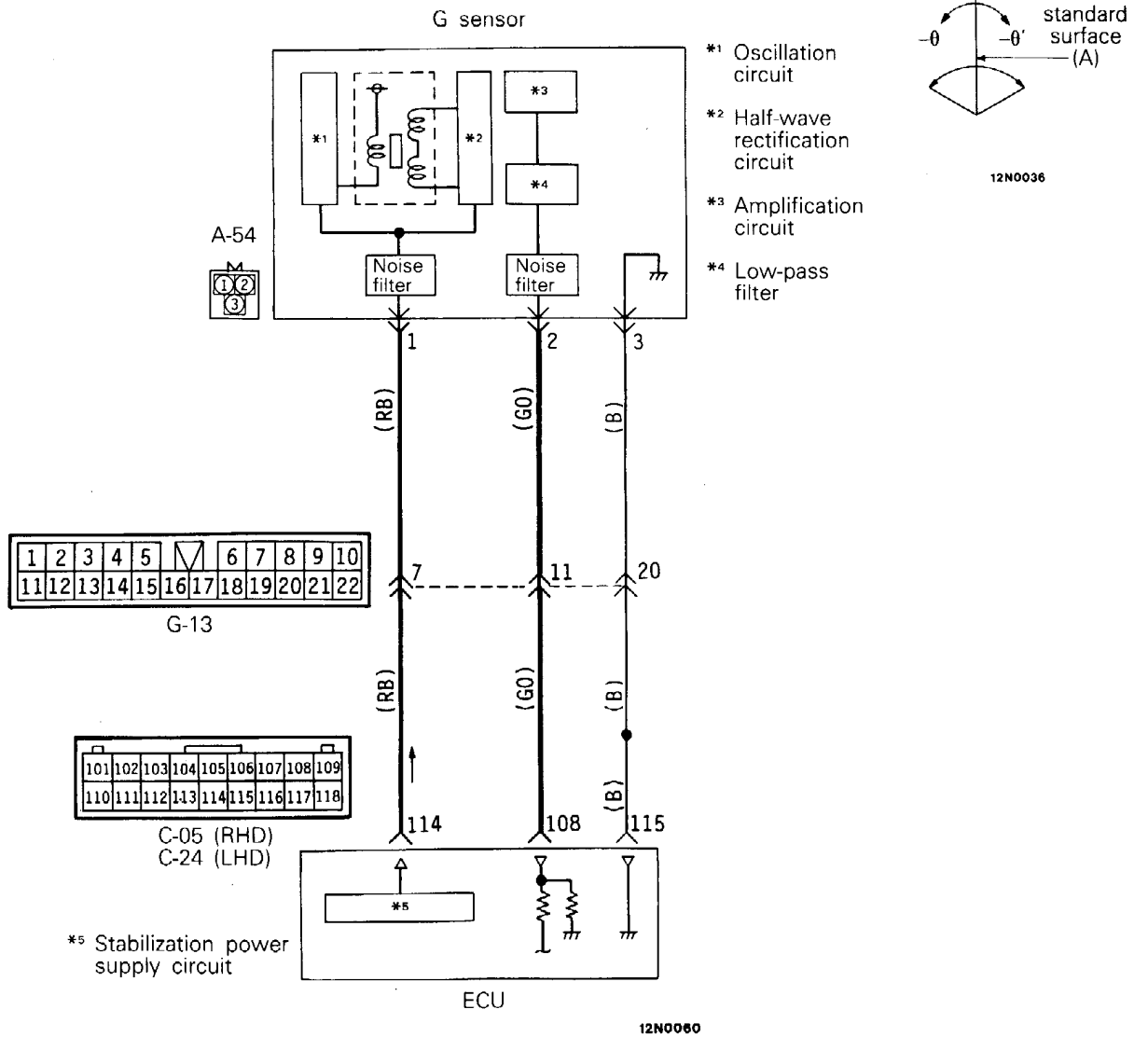
Contents

NOTE
*1 : <Vehicles built up to October, 1991>
*2 : <Vehicles built from November, 1991>

[1] G-SENSOR CIRCUIT







Operation

The G-sensor detects the amount of acceleration that is generated (to the left or right) when the vehicle body turns. Applying the principle of the differential transformer, the magnetic field changes when the movable iron core within the coil moves in response to acceleration, and these changes are taken out as changes of voltage. Within the coil, silicon oil is enclosed in order to suppress the vibration of the movable iron core. Note that the G-sensor is a special sensor for control of rolling.

Diagnosis

When signals that are otherwise virtually inconceivable are input due to damaged or disconnected wiring or a short-circuit or similar problem of a heavy-line circuit, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance.	
				HIGH	AUTO
11	Rolling control only stops.	Normal operation	Normal operation	○	○

Service data indication

Code No.	Indication	Standard value
11	G-sensor output voltage	Approx. 2.5V when vehicle is horizontal

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
114	Power supply for sensor.	When the ECU is activated	7.0–7.6V
108	G-sensor output signal	When stopped	1.9–3.1V
		When wiring damaged or disconnected	Approx. 0V
115	Sensor circuit earth	Constantly	Approx. 0V

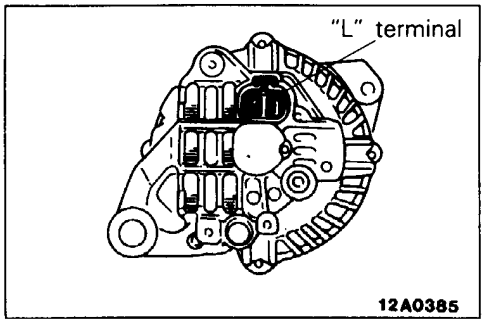
Checking the G-sensor circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
108	G-sensor output	Resistance	114–2	–	Continuity
114	G-sensor power source	Resistance	114–1	–	Continuity

Troubleshooting hints

Malfunction mode	Malfunction probable cause	Malfunction	Note
Silicon oil leakage	Because the silicon oil for suppression of vibrations of the G-sensor movable iron core is leaking due to a collision, the sensitivity is oversensitive.	• Rolling control occurs frequently.	–
Damaged or disconnected earth line.	The earth line is damaged or disconnected. Malfunction is not detected because the earth line is earthed to the G sensor's body itself, however, noise is easily picked up.	• There are times of a feeling of incompatibility of the rolling control. • Rolling control occurs suddenly; an error occurs.	–

[2] ALTERNATOR "L" TERMINAL CIRCUIT



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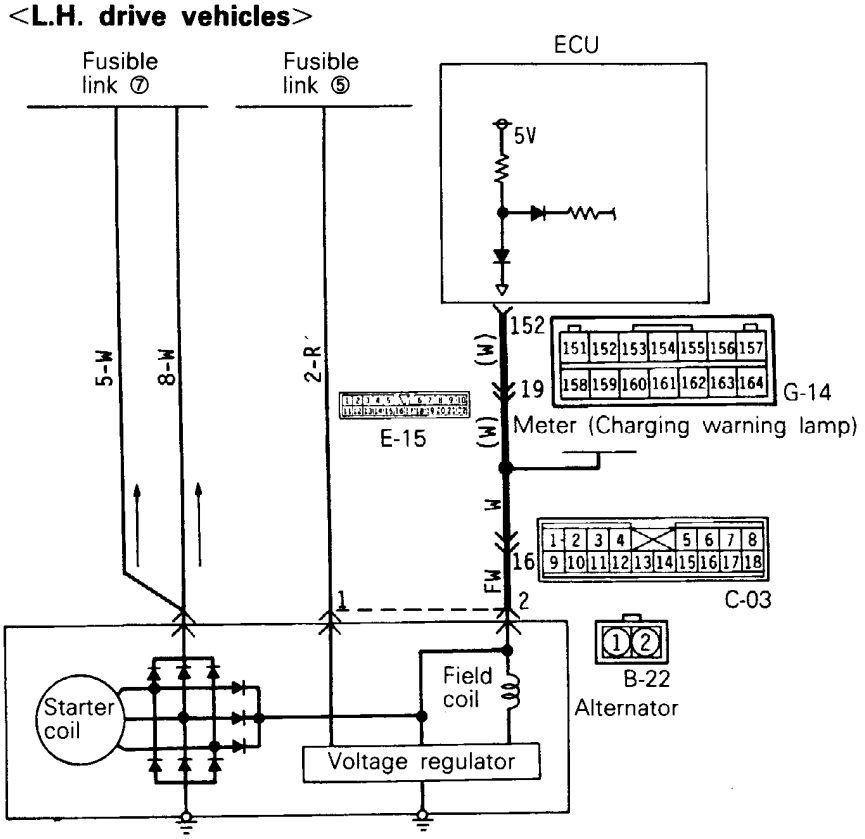

12N0176

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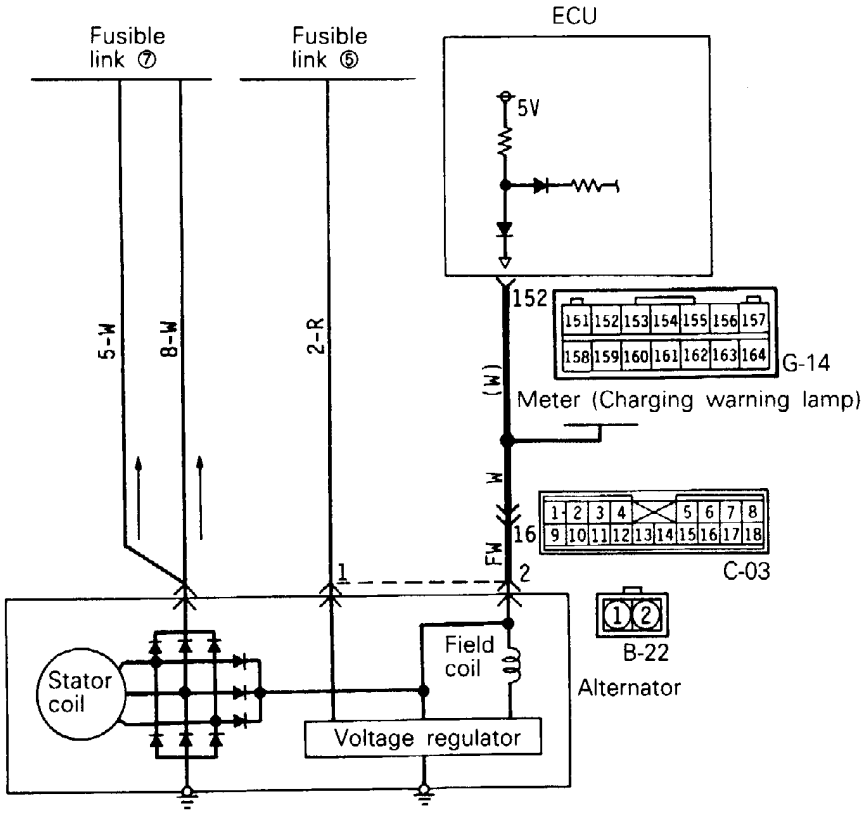


12N0063

Operation

The alternator "L" terminal signal is used to determine whether or not the engine is operating. This is in order to reduce the frequency of compressor operation, and is because activation of the system is possible while the engine is operating, or at a vehicle speed of 3 km/h (2 mph) or higher.

Diagnosis

When the alternator "L" terminal is LOW level (as a result of a short-circuit of the heavy-line circuit or due to an abnormal condition of the alternator) even though the vehicle speed is 40 km/h (25 mph), control is as described in the table below. Note, however, that there is no detection if there is damaged or disconnected wiring of the harness, and the alarm lamp does not illuminate.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
12	*"L" terminal "L" logic				

*"L" terminal "L" logic: As a result of system operation conditions, the system is not activated at a vehicle speed of less than 3 km/h (2 mph). When the vehicle speed becomes 3 km/h (2 mph) or higher all functions are normal. (Refer to the explanation of the operation.)

Service data indication

Code No.	Indication
12	The output voltage level of the alternator "L" terminal is indicated.

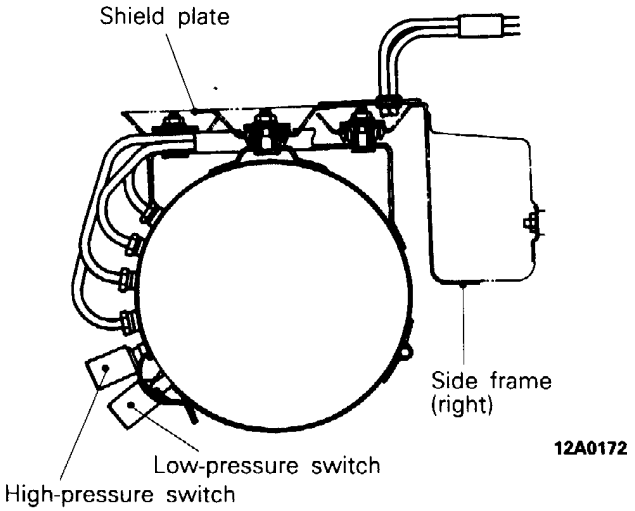
ECU terminal voltage (when connector is connected)

Terminal No.	Signal	Condition*	Terminal voltage
152	Alternator "L" terminal signal	When engine stalls	Approx. 0.5–3V
		When engine is operating	Approx. 13–15V
		Whe harness wiring is damaged or disconnected	4.5–5.5V

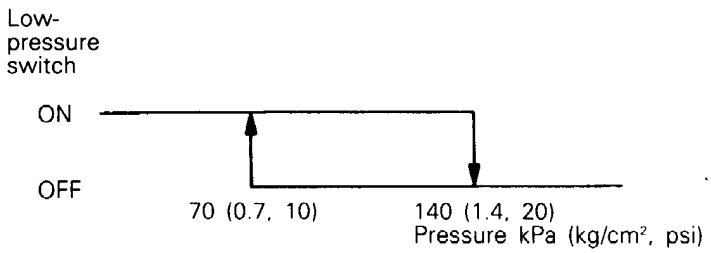
Checking the alternator "L" terminal circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
152	Alternator	Voltage	152-earth	Ignition switch ON.	Approx. 2–5V
				While engine is operating	System voltage

[3] LOW-PRESSURE SWITCH CIRCUIT



12A0172



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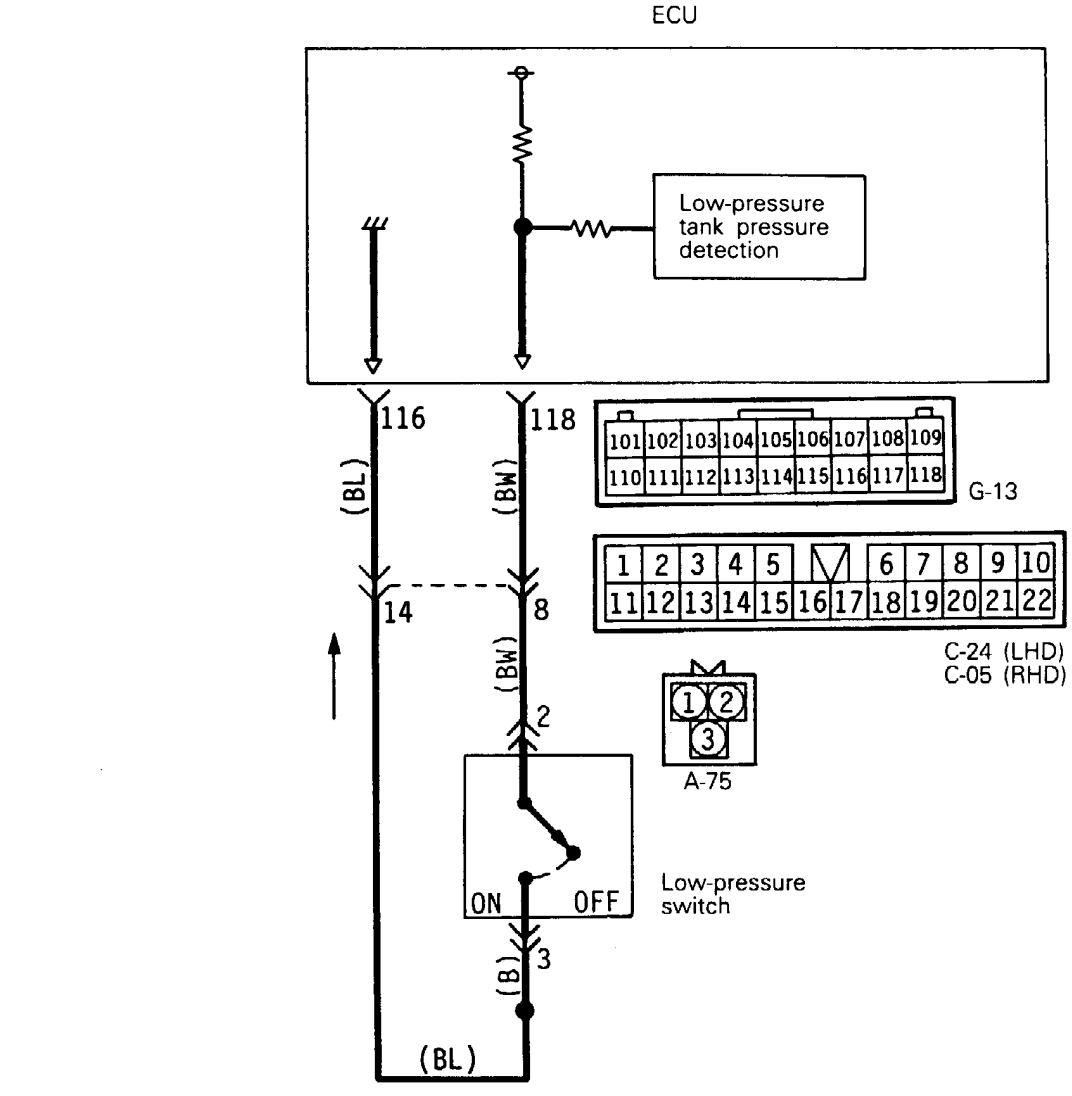


12N0061

Operation

The low-pressure switch is switched ON and OFF by the pressure in the low-pressure tank, and as a result the ECU functions to control the activation and stop of the return pump.
When the pressure in the low-pressure tank becomes 140 kPa (1.4 kg/cm², 20 psi) or higher, it is switched OFF, and as a result the ECU sends the drive signal to the return pump. It is switched ON at a pressure of 70 kPa (0.7 kg/cm², 10 psi) or lower and the return pump stops two seconds later.

Diagnosis

When there is a short-circuit, or damaged or disconnected wiring, of the heavy-line circuit, or if the contacts of the low-pressure switch become fused, the alarm lamp illuminates, and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
13	Control stop	Normal operation	Normal operation	Accept	

Service data indication

Code No.	Indication
13	Indicates ON or OFF condition of the low-pressure switch.

ECU terminal voltages (when connector is connected)

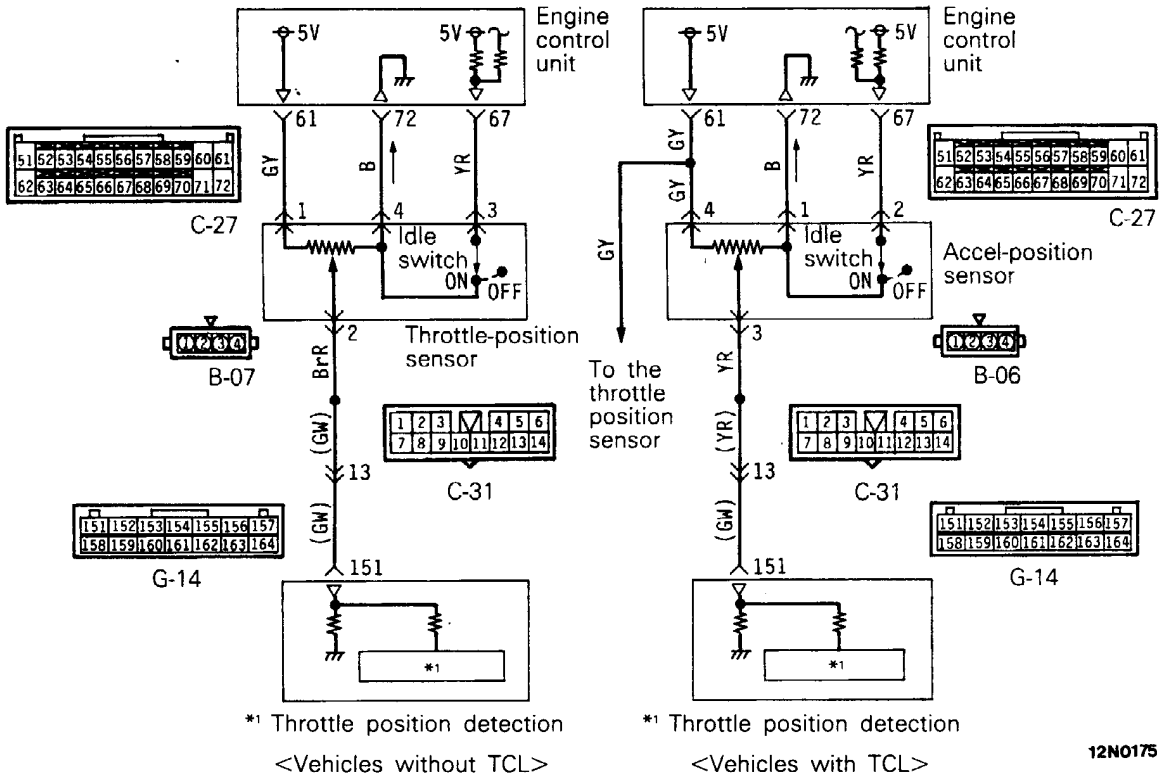
Terminal No.	Signal	Condition	Terminal voltage
118	Low-pressure tank pressure signal	When the low-pressure switch is ON	Approx. 0V
		When the low-pressure switch is OFF	4–8V

Checking the low-pressure switch circuit (with the connector disconnected).

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
118	Low-pressure switch	Resistance	118-earth	Drive the return pump by actuator test item no. 6 to lower the inside pressure of the low pressure tank; Inside pressure of low pressure tank is 70 kPa (0.7 kg/cm-2, 10 psi) or less.	Continuity

[4] THROTTLE-POSITION SENSOR CIRCUIT (ACCEL POSITION SENSOR CIRCUIT)

<L.H. drive vehicles>



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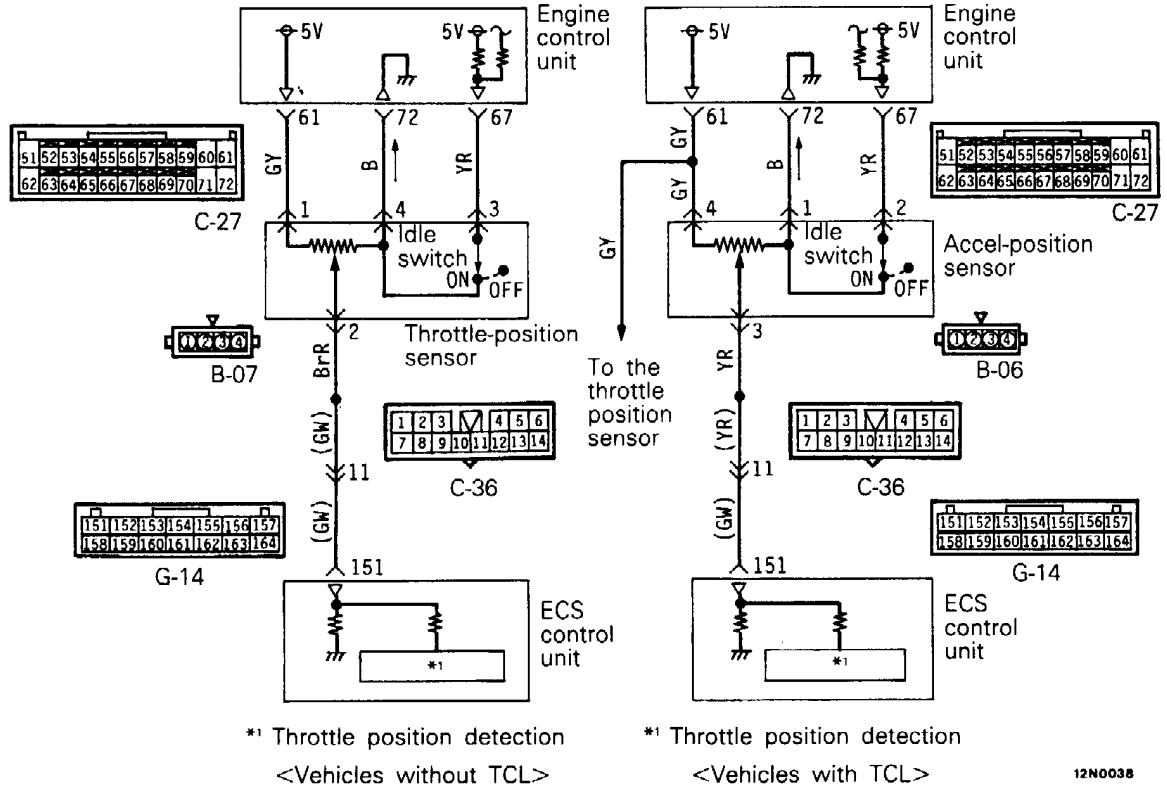


Operation

For accelerator position detection, the same throttle position sensor as the engine ECU uses is used in vehicles without TCL, and the same accelerator position sensor as the TCL ECU uses is used in vehicles with TCL.

Service data indication

Code No.	Indication
14	The output voltage of the throttle position sensor is indicated.

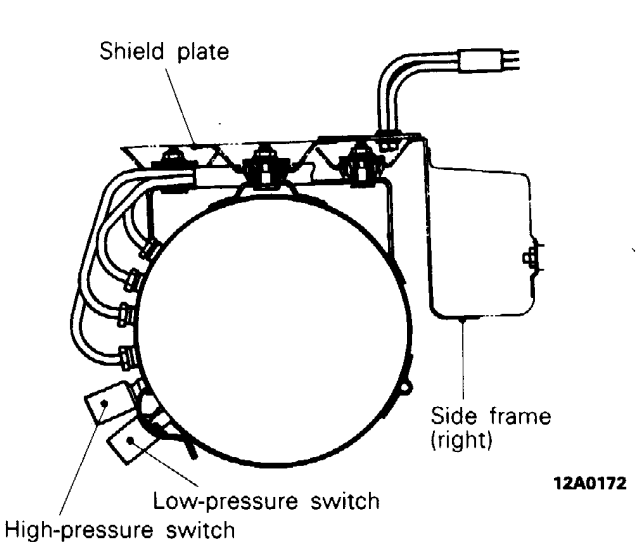
ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
151	Throttle-position sensor signal (Accel-position sensor signal)	During idle	Approx. 0–1V
		When fully open	Approx. 4–8V
		When there is damaged or disconnected wiring	Approx. 0V

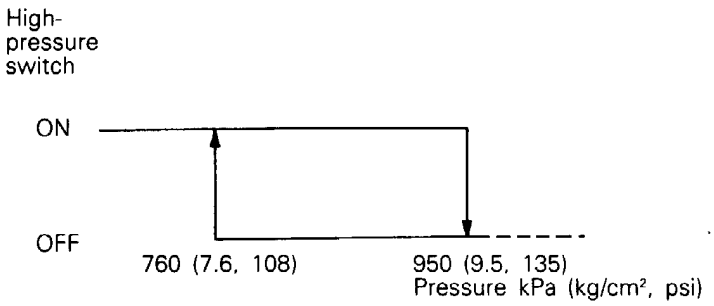
Checking the throttle-position sensor circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Standard
1	Throttle-position sensor (Accel-position sensor)	Resistance	1–4	3.5–6.5 kΩ
4				

[5] HIGH-PRESSURE SWITCH CIRCUIT



12A0172



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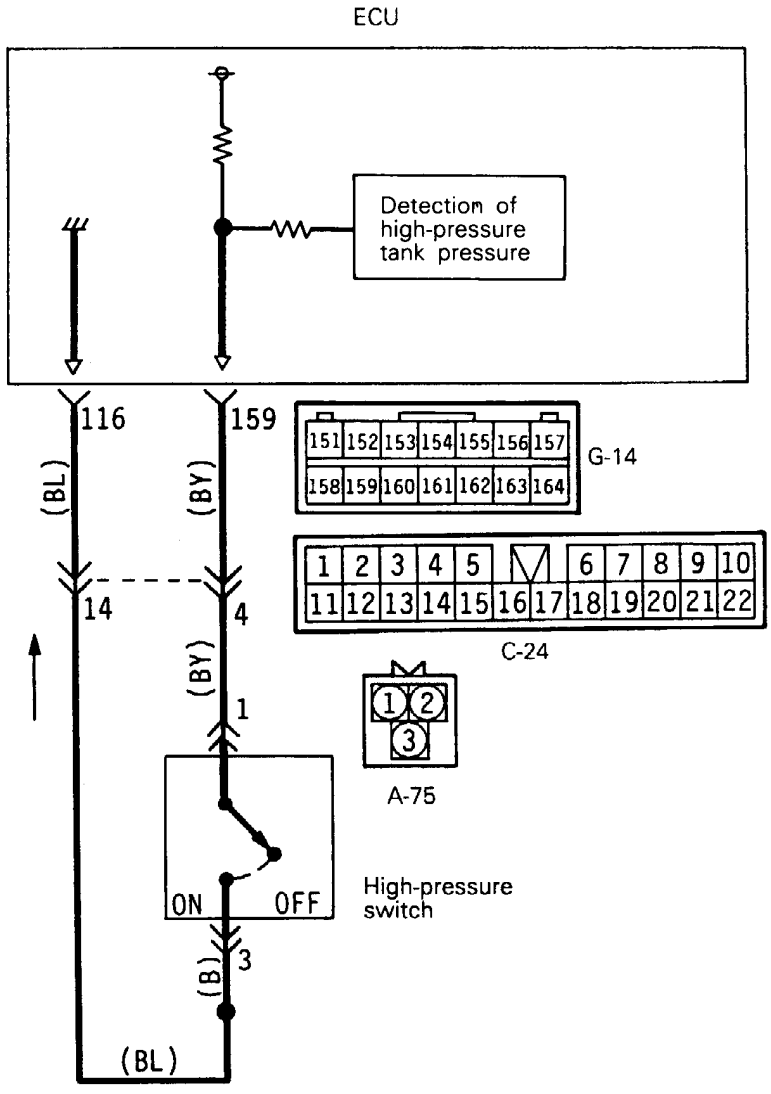


12N0062

Operation

The high-pressure switch is switched ON and OFF by the pressure in the high-pressure tank, and as a result the ECU functions to control the activation and stop of the compressor.
When the pressure in the high-pressure tank becomes 760 kPa (7.6 kg/cm², 108 psi) or lower, the high-pressure switch is switched ON, and as a result the ECU sends the drive signal to the compressor.
Conversely, when the pressure of the high-pressure tank becomes 950 kPa (9.5 kg/cm², 135 psi) or higher, the high-pressure switch is switched OFF, and the compressor is stopped two seconds thereafter.
Note, however, that the compressor is not activated, even if the high-pressure switch is switched ON, if the return pump is in operation. Note also that there is no diagnosis function for the high-pressure switch.

Service data indication

Code No.	Indication
15	Indicates the ON/OFF status of the high-pressure switch.

ECU terminal voltages (with connector connected)

Terminal No.	Signal	Condition	Terminal voltage
159	High-pressure tank pressure signal	When high-pressure switch is ON (low pressure)	Approx. 0V
		When high-pressure switch is OFF (high pressure)	4 – 8V

Checking the high-pressure switch circuit (with the connector disconnected)

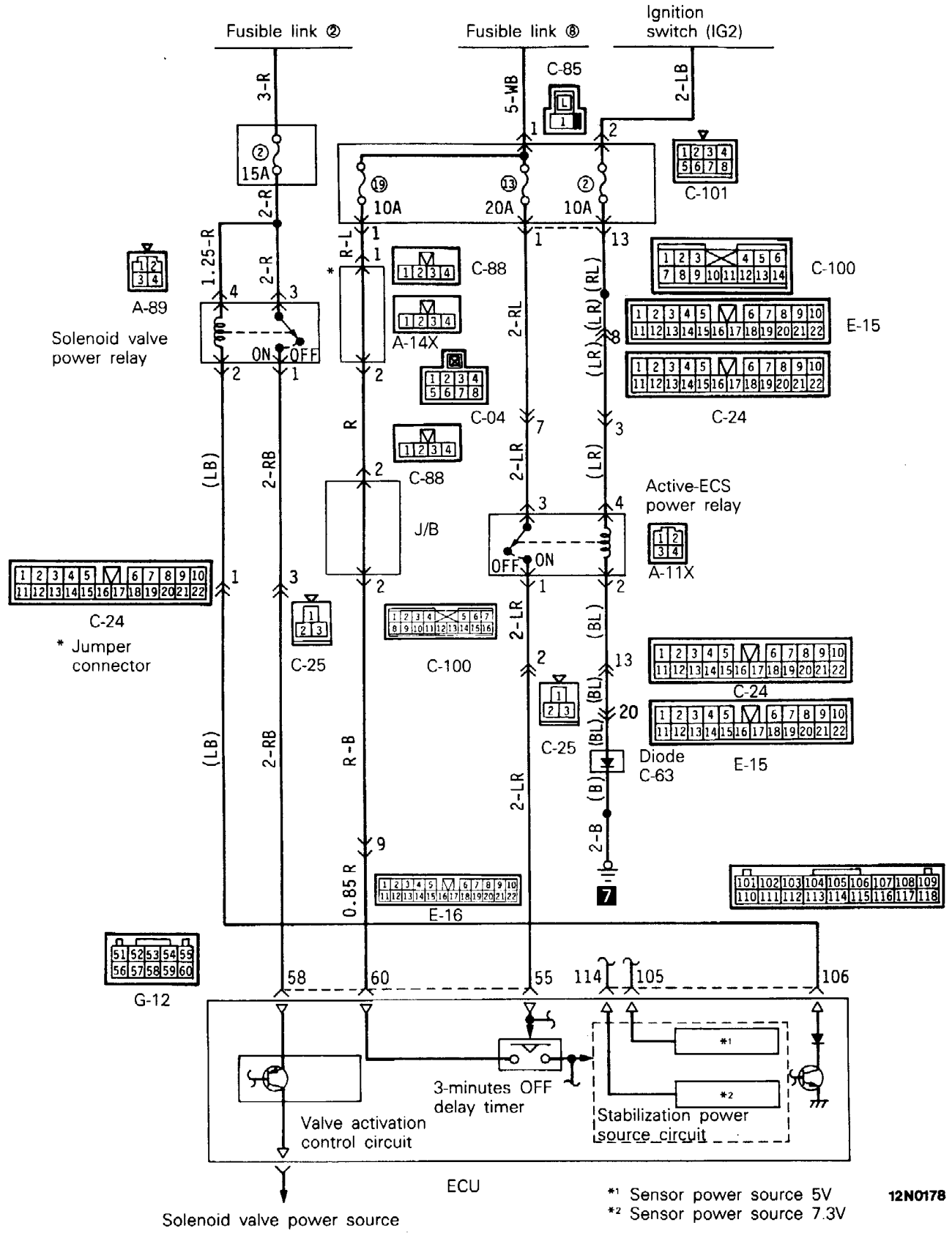
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
159	High-pressure switch	Resistance	159-Earth	Drive the return pump by actuator test item No. 6 to raise the inside pressure of the high pressure tank; Inside pressure of high pressure tank is 950 kPa (9.5 kg/cm², 135 psi) or more.	No continuity

Troubleshooting hints

Malfunction mode	Malfunction probable cause	Malfunction	Note
Harness wiring damage or disconnection.	Harness wiring damage or disconnection, or improper switch contact.	Compressor doesn't operate.	–
Harness short-circuit.	Harness short-circuit, or switch short-circuit.	Compressor operates without stopping.	Diagnosis No. 55 output.
Air leakage.	O-ring worn or damaged.	Rolling control feeling of incompatibility, very frequent operation of compressor.	–

[6] ACTIVE-ECS POWER SOURCE CIRCUIT

<L.H. drive vehicles>



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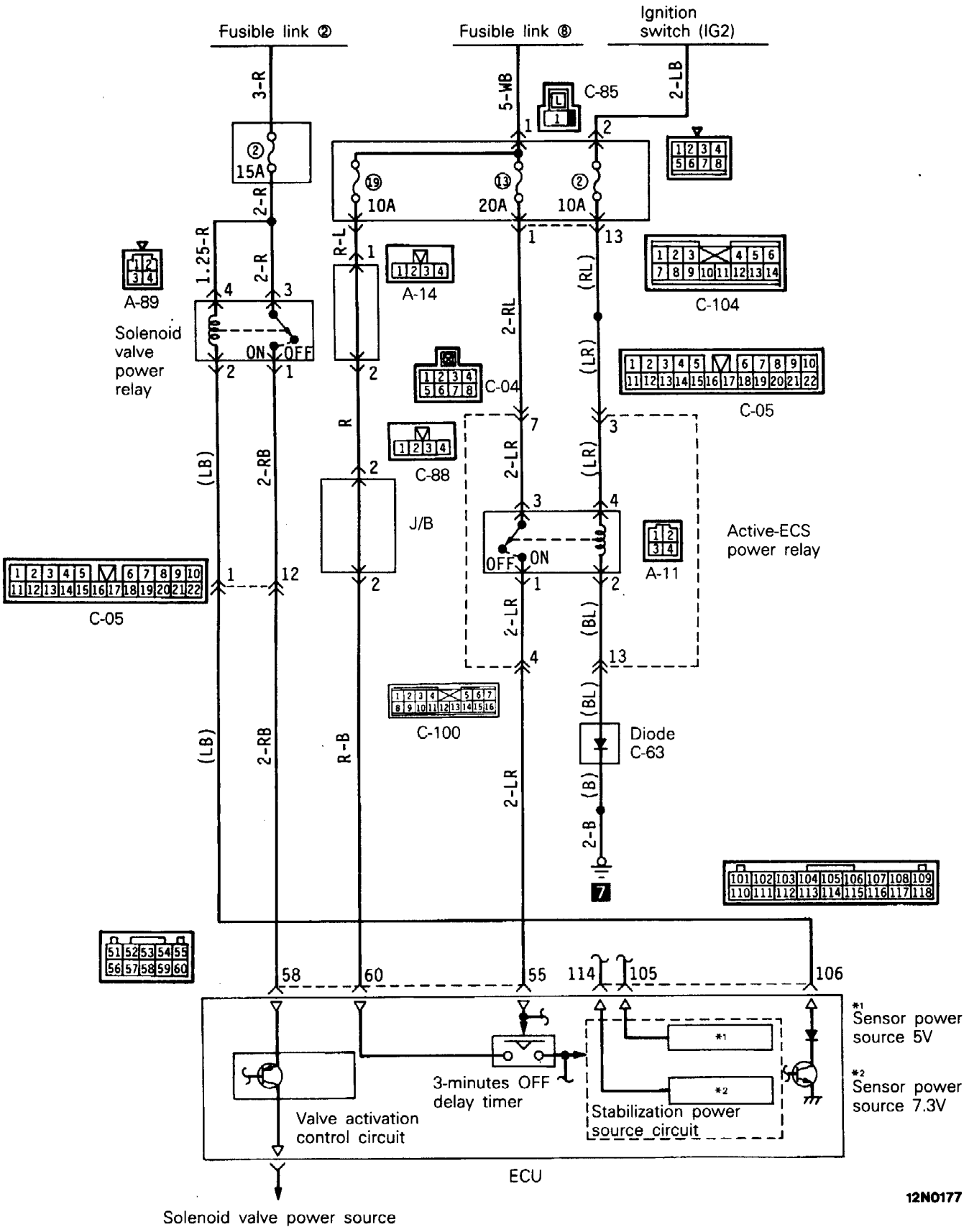
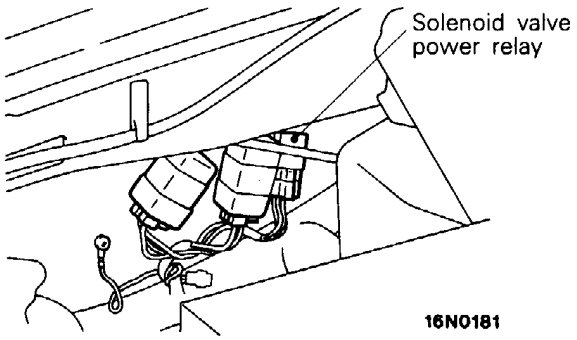
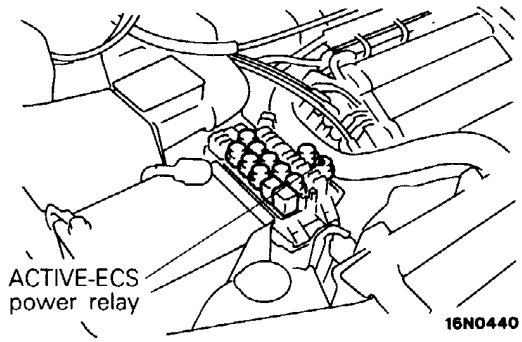






Operation

When the ignition is switched ON, the ECS power relay is also switched ON, and power is supplied to the system. At the same time, the ECU switches ON the solenoid valve power relay, and power is supplied to the solenoid valve activation circuit. As a result, system operation is possible.

When the ignition switch is switched OFF after driving, the three-minute OFF delay timer makes vehicle-height adjustment (down only) possible for a period of three minutes, thus preventing the vehicle height from increasing while passengers get out of the vehicle, etc.

Diagnosis

When problems such as damage or disconnection of the heavy-line circuit, or fusing of the contacts of the solenoid valve power relay, etc. occur, the alarm lamp illuminates, and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
42	Rolling control only stops.	Held at MEDIUM	Rolling control only stops	Not accept	

Service data indication

Code No.	Indication
16	Indicates ON/OFF status of the ignition switch.

ECU terminal voltage (when connector is connected)

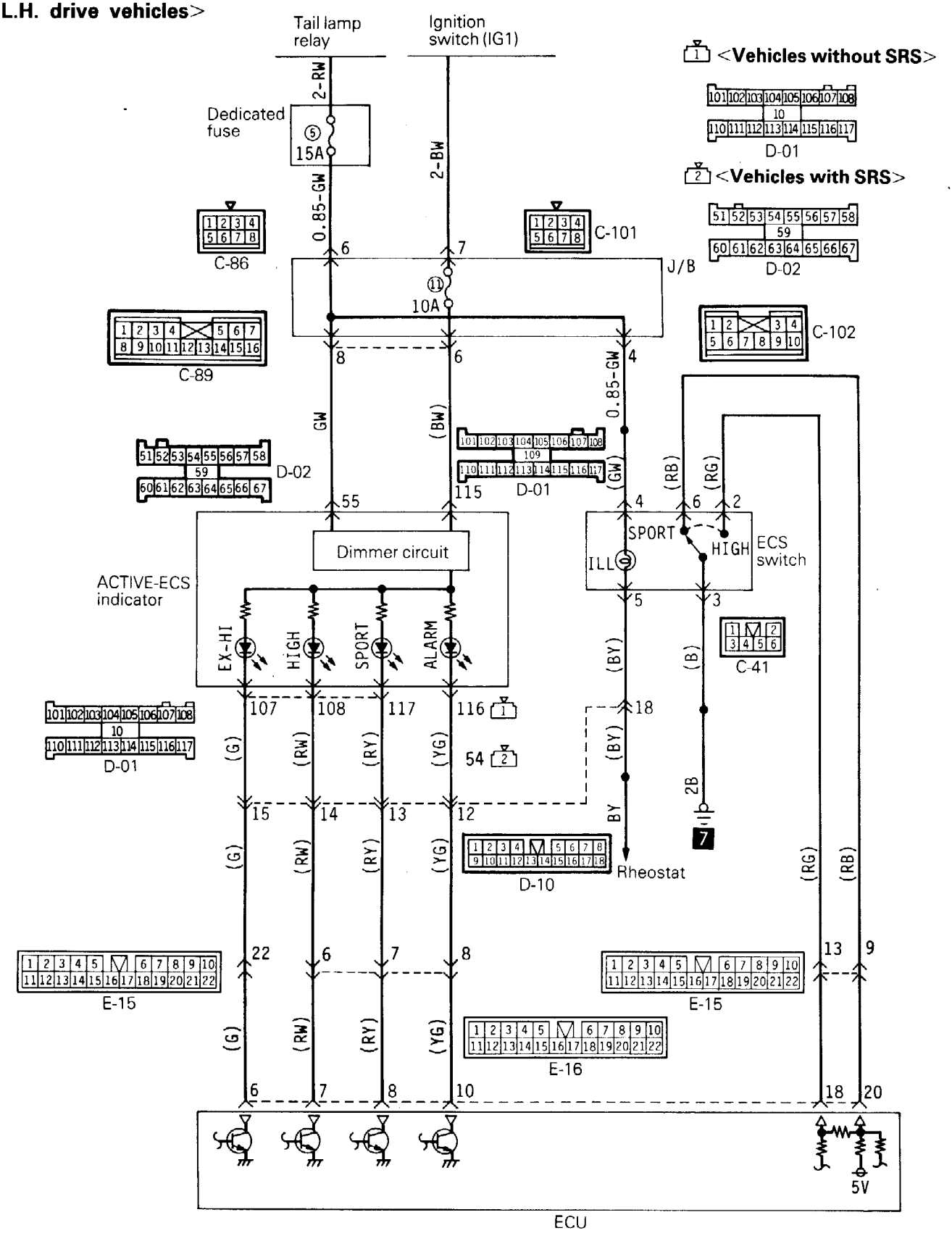
Terminal No.	Signal	Condition	Terminal voltage
55	Ignition (IG2) power source signal	When ignition switch is ON	System voltage
		When ignition switch is OFF	Approx. 0V
58	Solenoid valve power relay output signal	When system is normal	System voltage
		During fail-safe	Approx. 0V
60	Battery (+B) power source	Constantly	System voltage
114	Sensor power source (7.3V)	Constantly	6.3 – 8.3V
105	Sensor power source (5V)	Constantly	4.5 – 5.5V
106	Solenoid valve power relay drive signal	When solenoid valve power relay is ON	0–1.0V
		When solenoid valve power relay is OFF	System voltage

Checking the ACTIVE-ECS power source circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
55	Ignition switch	Voltage	55-earth	Ignition switch OFF	Approx. 0V
				Ignition switch OFF → ON	0V → System voltage
58	Solenoid valve power relay	Voltage	58-earth	Terminal 106 open.	Approx. 0V
				Terminal 106 earthed.	0V → System voltage
60	ECU back-up power source	Voltage	60-earth	–	System voltage

[7] ACTIVE-ECS INDICATORS CIRCUIT

<L.H. drive vehicles>



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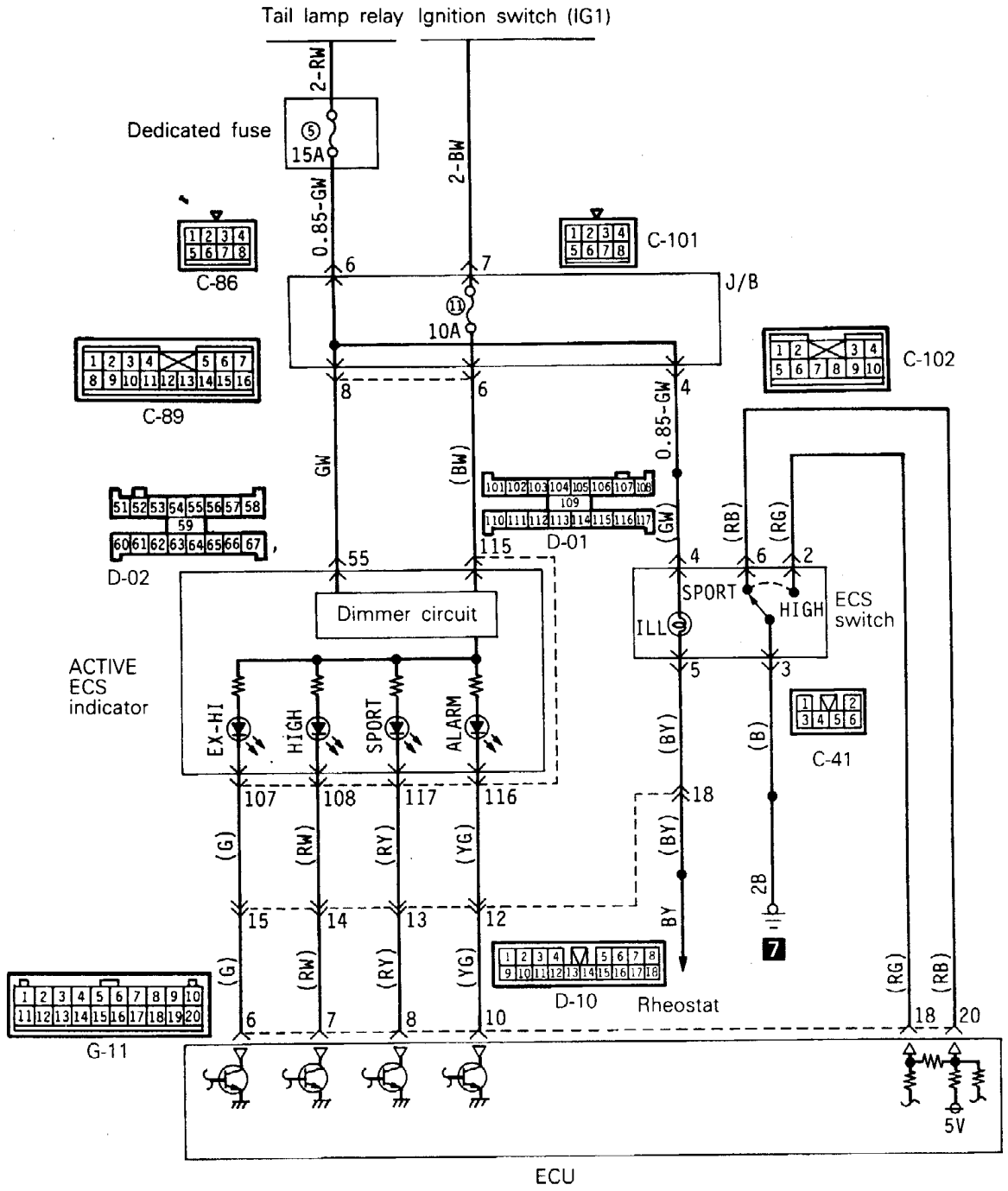

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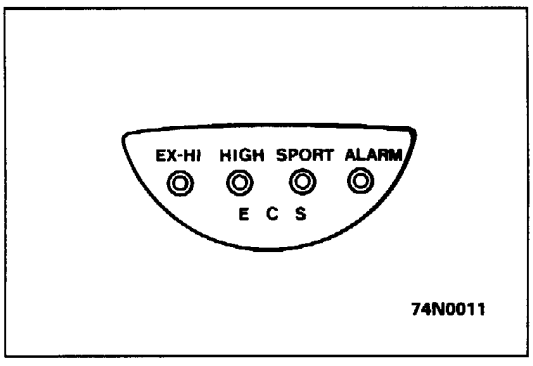

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ACTIVE-ECS INDICATOR INSPECTION CHART

After the ignition key has been turned to ON, check if the indicator lamps illuminate until approximately 0.5 second after the engine is started.

Service data indication

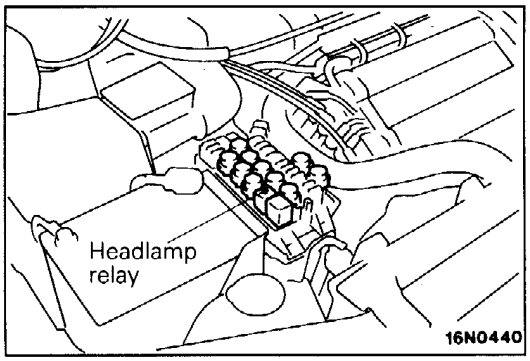
Code No.	Indication	Standard value	
17	ECU input voltage indications when SPORT, HIGH switches are pressed.	When switches are open	Approx. 5V
		When SPORT switch is ON	Approx. 0V
		When HIGH switch is ON	Approx. 2.5V

1. Inspection of each ACTIVE-ECS indicator

Disconnect the control unit connector and turn the ignition switch to ON.
Earth each terminal in the connector that has been disconnected from the control unit.

Connector Side Earth Terminal No.	Normal Condition
10	"ALARM" illuminates
8	"SPORT" illuminates
7	"HIGH" illuminates
6	"EX-HI" illuminates

[8] HEADLAMP SWITCH CIRCUIT



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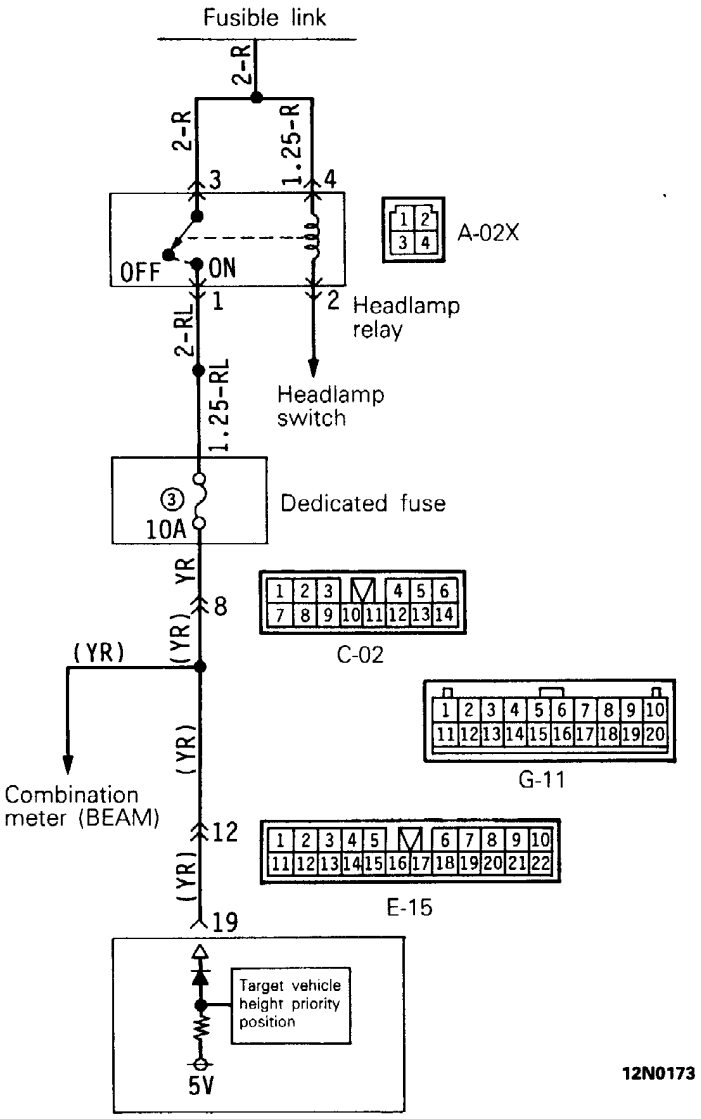

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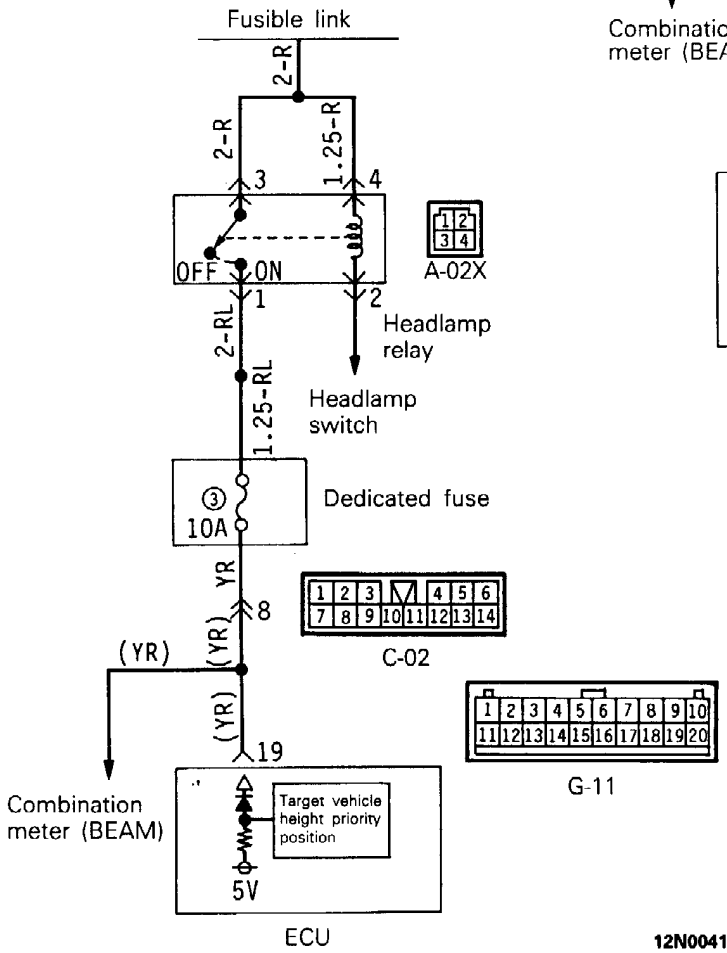


Operation

The ACTIVE-ECS system functions, in order to improve the "air drag" characteristic, to adjust the vehicle height to the LOW setting at the front end only during the daytime when the vehicle speed reaches 120 km/h (75 mph) or higher and continues at that speed for a period of ten seconds or longer.
During the nighttime, however, in order to prevent deviation of the headlamp beams from the required directional path, the vehicle height is adjusted to the LOW setting for both the front end and the rear end when signals from the headlamp relay are input.
Because the headlamps illuminate in the daytime for vehicles equipped with the daytime running lamps and for vehicles equipped with dim-dip lamps, the LOW vehicle height is always selected and maintained for both the front and rear of the vehicle when the vehicle is driven at a vehicle speed of 120 km/h (75 mph) or higher for ten seconds or longer continuously.

Service data indication

Code No.	Indication
18	Indicates the ON or OFF status of the headlamp switch.

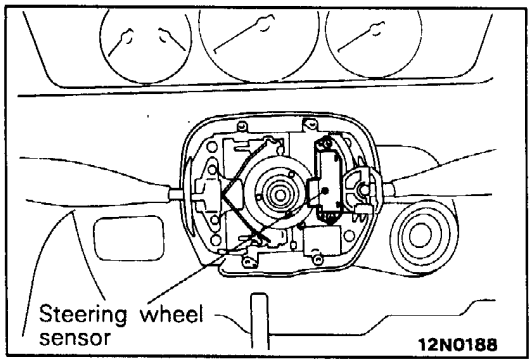
ECU terminal voltages (when connector is connected)

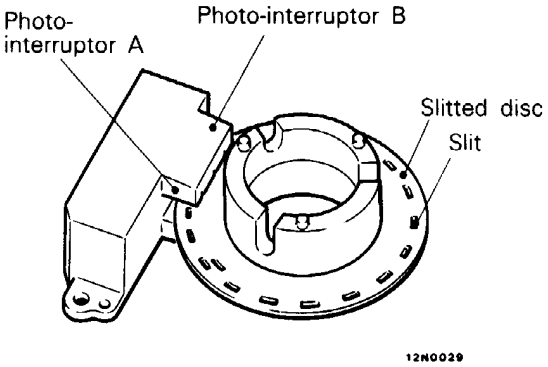
Terminal No.	Signal	Condition	Terminal voltage
19	Headlamp switch signal	When headlamp switch is ON	System voltage
		When headlamp switch is OFF	Approx. 0V
		When there is damaged or disconnected wiring	4 – 8V

Headlamp switch circuit (with the connector disconnected)

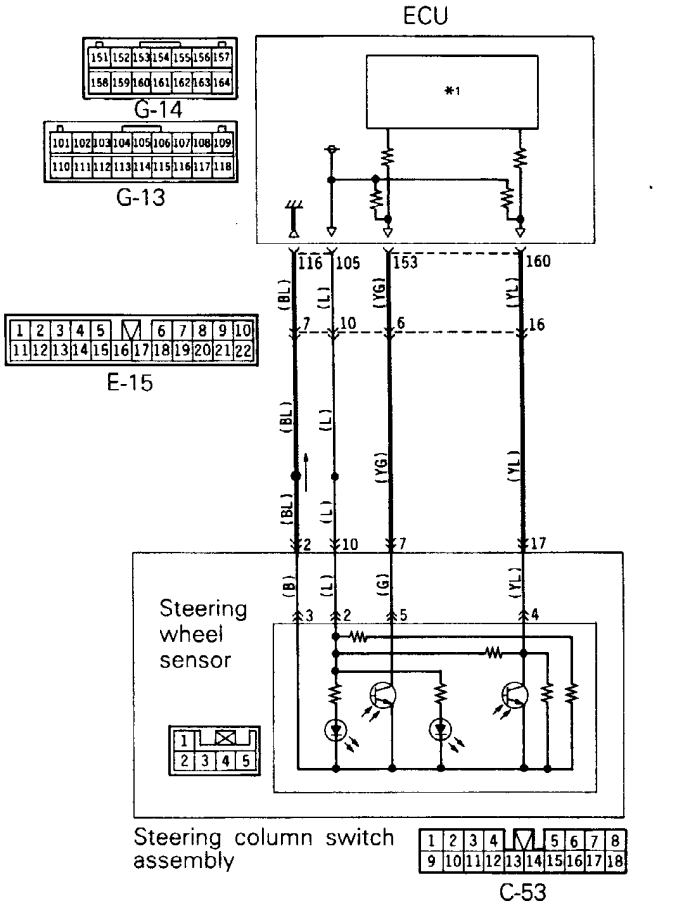
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
19	Headlamp relay	Voltage	19-earth	When the headlamp switch is OFF	Approx. 0V
				When the headlamp switch is ON	System voltage

[9] STEERING WHEEL SENSOR CIRCUIT





<L.H. drive vehicles> *1 Steering wheel angularvelocity calculation and sudden steering wheel movement detection circuit



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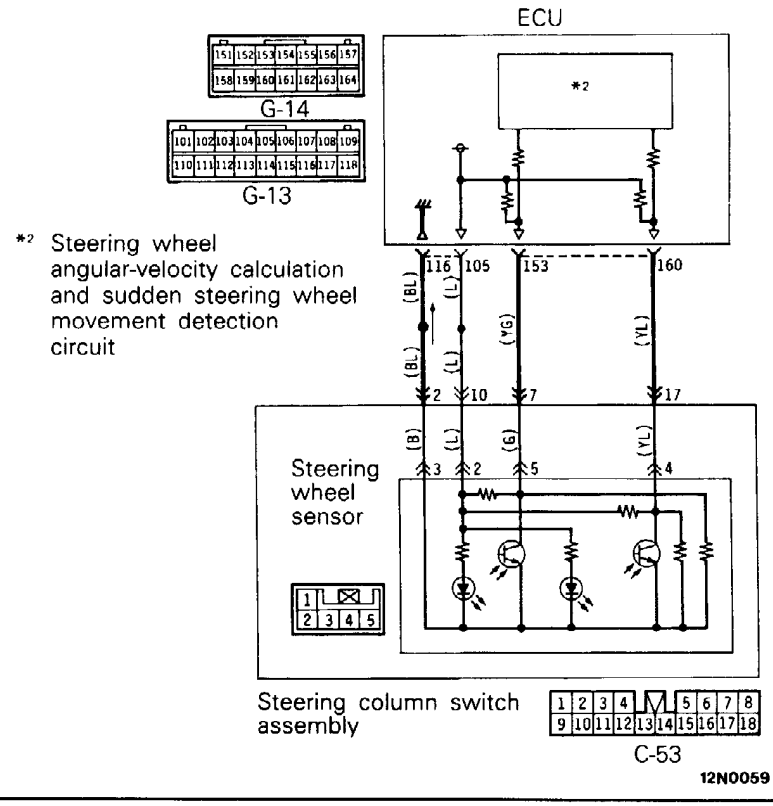


*2 Steering wheel angular-velocity calculation and sudden steering wheel movement detection circuit

Operation

The slitted disc installed to the steering shaft interrupts, or allows light to pass with the result that electric signals corresponding to the angular-velocity of the steering wheel movement are detected and passed to the ECU.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
21	Control stop	Held at MEDIUM	Held at NORM vehicle height.	Not accept	

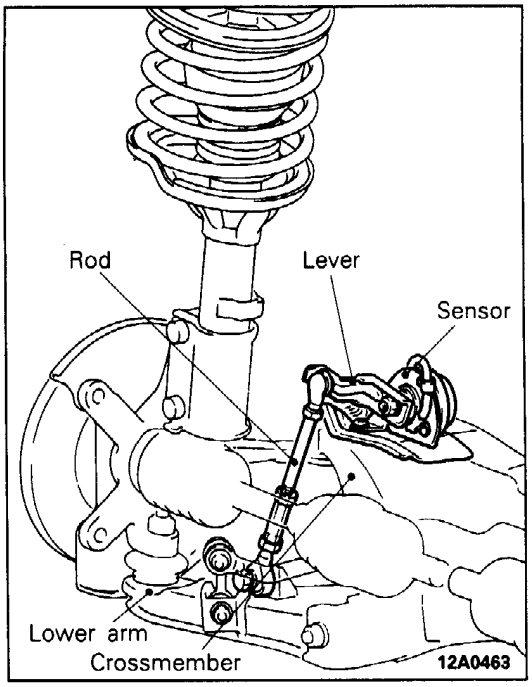
Service data indication

Code No.	Indication
21	Indicates the ON or OFF status individually for STR. 1 and STR. 2.

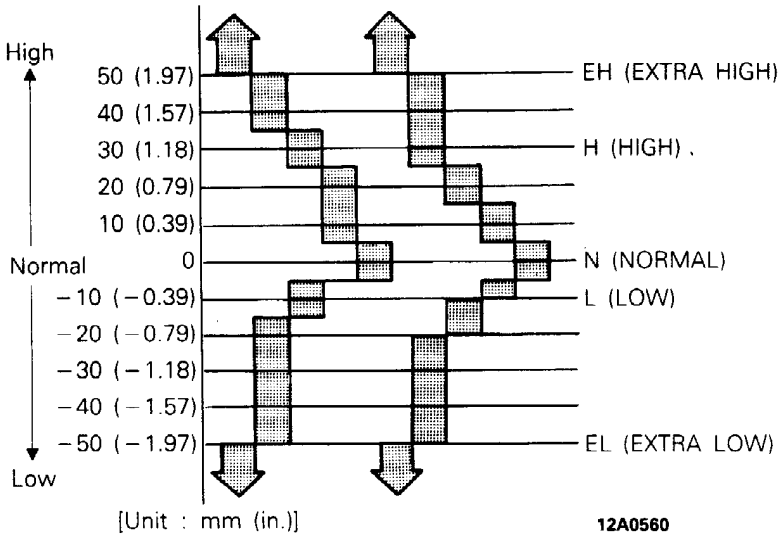
ECU terminal voltages (when connector is connected)

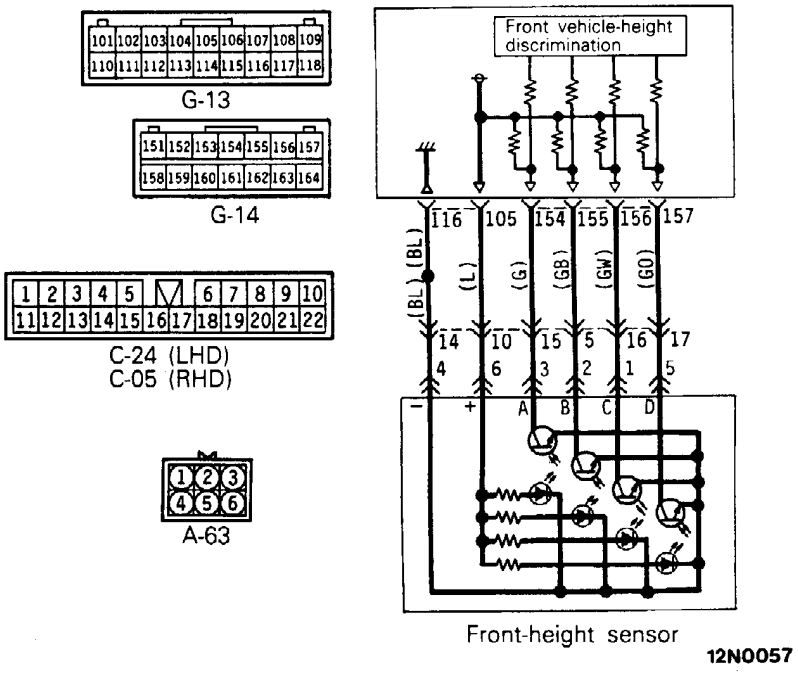
Terminal No.	Signal	Condition	Terminal voltage
105	Power source for sensor	When the ECU is activated	4 – 8V
153	Steering wheel sensor (A)	When the photo-interruptor is ON	Approx. 0V
	Steering wheel sensor (B)	When the photo-interruptor is OFF	3.0–4.0V
160		When there is damage or disconnection of the harness	4 – 8V
116	Sensor circuit earth	Constantly	Approx. 0V

[10] FRONT-HEIGHT SENSOR CIRCUIT



Relationship between N (normal vehicle height) and other vehicle-height levels





Operation

The front-height sensor detects (by detecting the relative position of the body and the front axle) the action movements (bouncing, nose diving, etc.), and the vehicle height, of the front of the vehicle.
The rotating disc plate rotates in the area between four pairs of light-emitting diodes and photo-transistors, and the slits in the disc thus interrupt, or let pass, the light beams between the light-emitting diodes and the photo-transistors.
By employing the data gathered in this way, the sensor can detect the vehicle height as any one of the nine level classifications.

Diagnosis

When a signal (error code) indicating an abnormal condition (resulting from damage or disconnection of the heavy-line circuit, or a malfunction of a photo-transistor, etc.) is input, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
22	Control stop	Held at MEDIUM	Control stop	Not accept	

Service data indication

Code No.	Indication
22	Current vehicle-height level (ERROR when there is a malfunction) Indicates the ON or OFF status of each photo-interruptor.

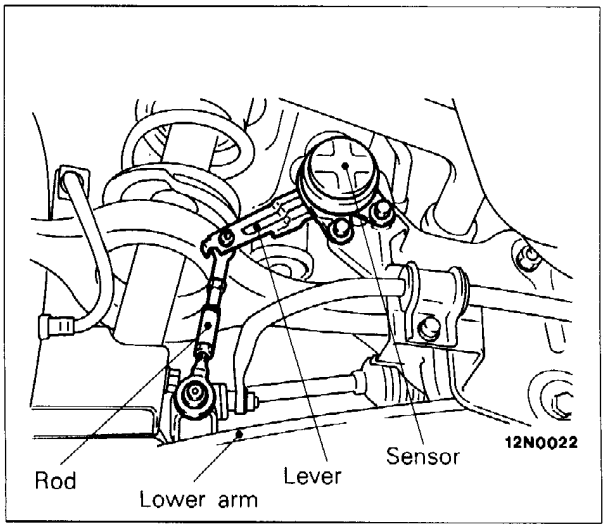
ECU terminal voltages (when connector is connected)

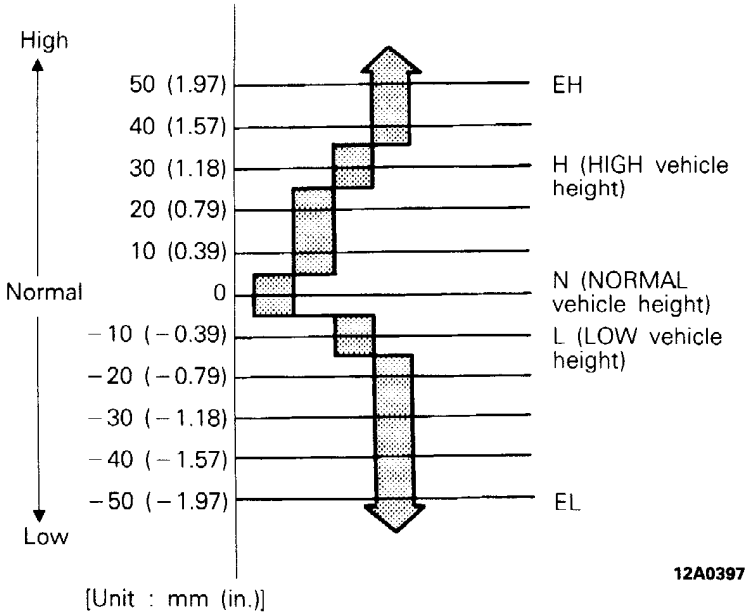
Terminal No.	Signal	Condition	Terminal voltage
105	Power source for sensor	When the ECU is activated	4 – 8V
154, 155 156, 157	Front vehicle-height signal	When the photo-interruptors are ON	Approx. 0V
		When the photo-interruptors are OFF	4 – 8V
116	Sensor circuit earth	Constantly	Approx. 0V

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Improper adjustment of the front-height sensor rod.	Because of the improper adjustment of the front-height sensor rod, a signal not corresponding to the actual vehicle height is being sent to the ECU.	• When the engine is stopped and left as it is, the height of only the front end decreases to lower than the NORMAL vehicle height. • With the engine running, the height of the front end is lower than the NORMAL vehicle height. • With the engine running (AUTO mode and NORMAL vehicle height), the height of the front end becomes higher than the NORMAL height).	–

[11] REAR-HEIGHT SENSOR CIRCUIT





[Unit : mm (in.)]

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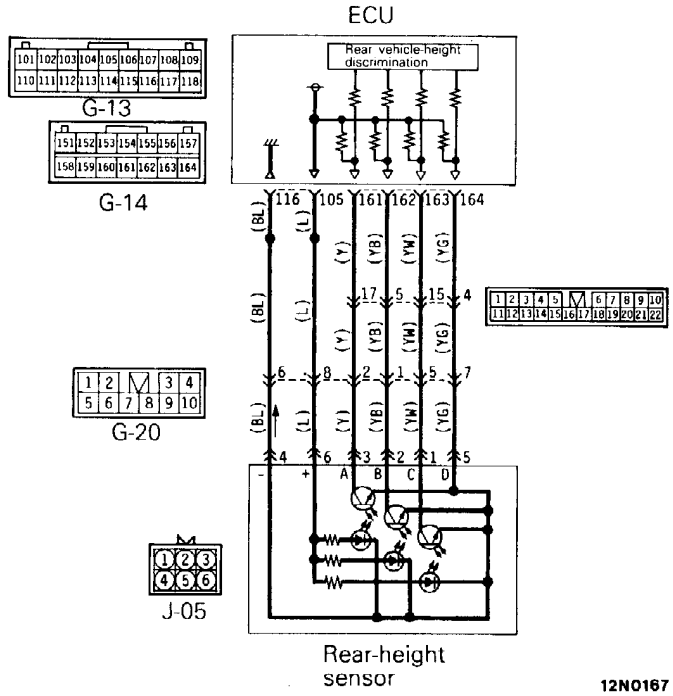

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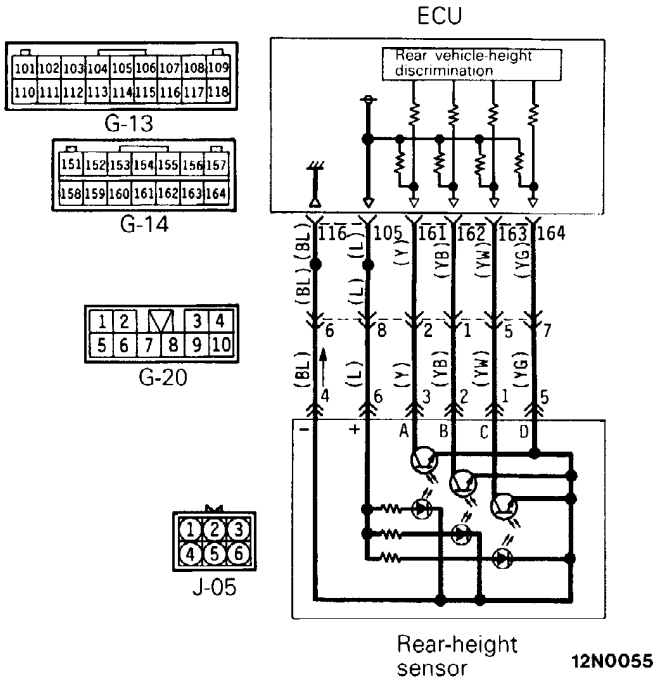


Operation

The rear-height sensor detects (by detecting the relative position of the body and the rear axle) the action movements (bouncing, pitching, etc.), and the vehicle height, of the rear of the vehicle. The rotating disc plate rotates in the area between three pairs of light-emitting diodes and photo-transistors, and the slits in the disc thus interrupt, or let pass, the light beams between the light-emitting diodes and the photo-transistors. By employing the data gathered in this way, the sensor can detect the vehicle height as any one of the seven level classifications.

Diagnosis

When a signal (error code) indicating an abnormal condition (resulting from damage or disconnection of the heavy-line circuit, or a malfunction of a photo-transistor, etc.) is input, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
23	Control stop	Held at MEDIUM	Control stop	Not accept	

Service data indication

Code No.	Indication
23	Current vehicle-height level (ERROR when there is a malfunction) Indicates the ON or OFF status of each photo-interruptor.

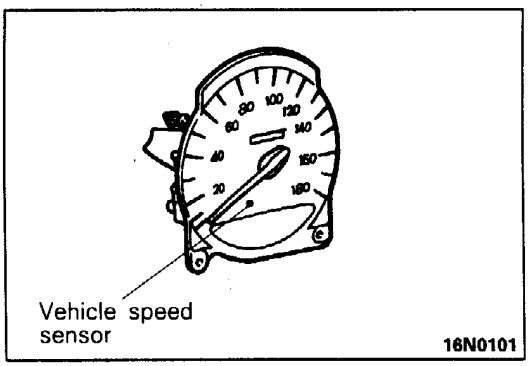
ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
105	Power source for sensor	When the ECU is activated	4-8 V
161,162 163	Rear vehicle-height signal	When the photo-interruptors are ON	Approx. 0V
		When the photo-interruptors are OFF	4-8 V
164	Rear vehicle-height signal	Constantly	Approx. 0V
116	Sensor circuit earth	Constantly	Approx. 0V

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Improper adjustment of the rear-height sensor rod.	Because of the improper adjustment of the rear-height sensor rod, a signal not corresponding to the actual vehicle height is being sent to the ECU.	• When the engine is stopped and left as it is, the height of only the rear end decreases to lower than the NORMAL vehicle height. • With the engine running, the height of the rear end is lower than the NORMAL vehicle height. • With the engine running (AUTO mode and NORMAL vehicle height), the height of the rear end becomes higher than the NORMAL height).	–

[12] VEHICLE-SPEED SENSOR CIRCUIT



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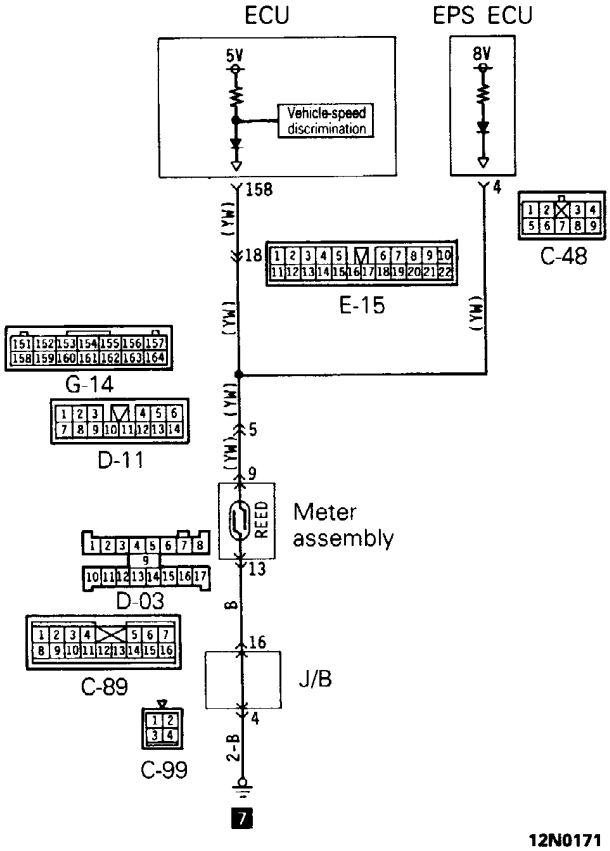

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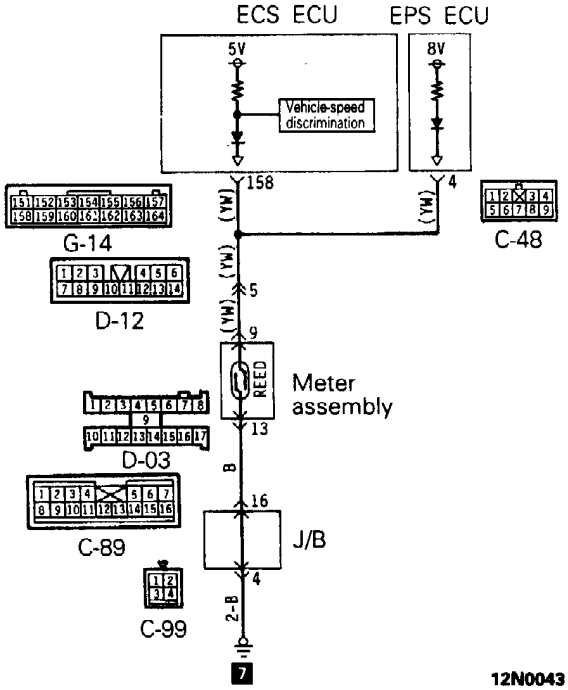


Operation

The vehicle-speed sensor is a reed switch type with pulse signals being sent four times for each rotation of the transmission's output gear.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of the vehicle-speed sensor, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
24	Control stop	Held at MEDIUM	Held at NORMAL	Not accept	

Service data indication

Code No.	Indication
24	Indicates the vehicle speed input to the ECU (including the simulated vehicle speed).

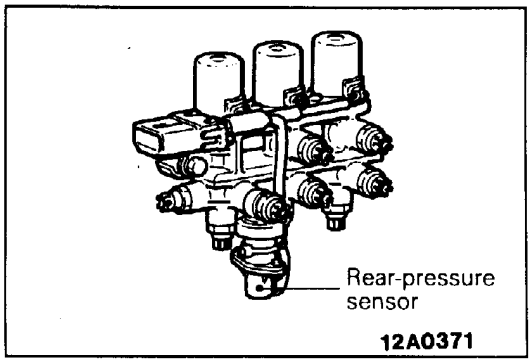
ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
158	Vehicle-speed signal	When the vehicle-speed sensor reed switch is ON	Approx. 0V
		When the vehicle-speed sensor reed switch is OFF	7.0 – 9.0V

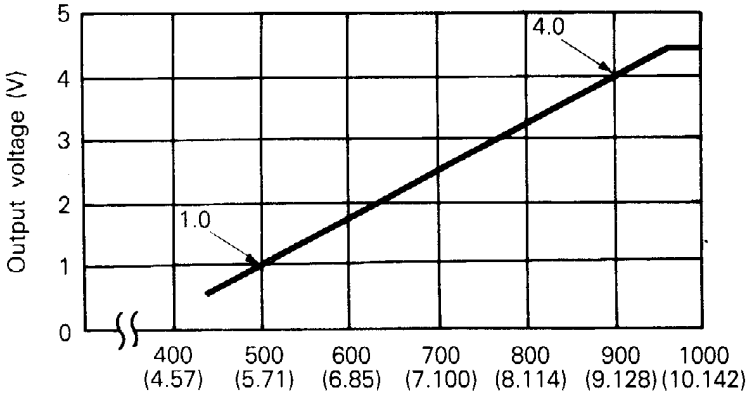
Checking the vehicle-speed sensor circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
158	Vehicle-speed sensor	Resistance	158-earth	With the battery's (–) terminal disconnected, move the vehicle back and forth.	Continuity ↕ No continuity

[13] REAR-PRESSURE SENSOR CIRCUIT



Rear-pressure sensor output voltage characteristic



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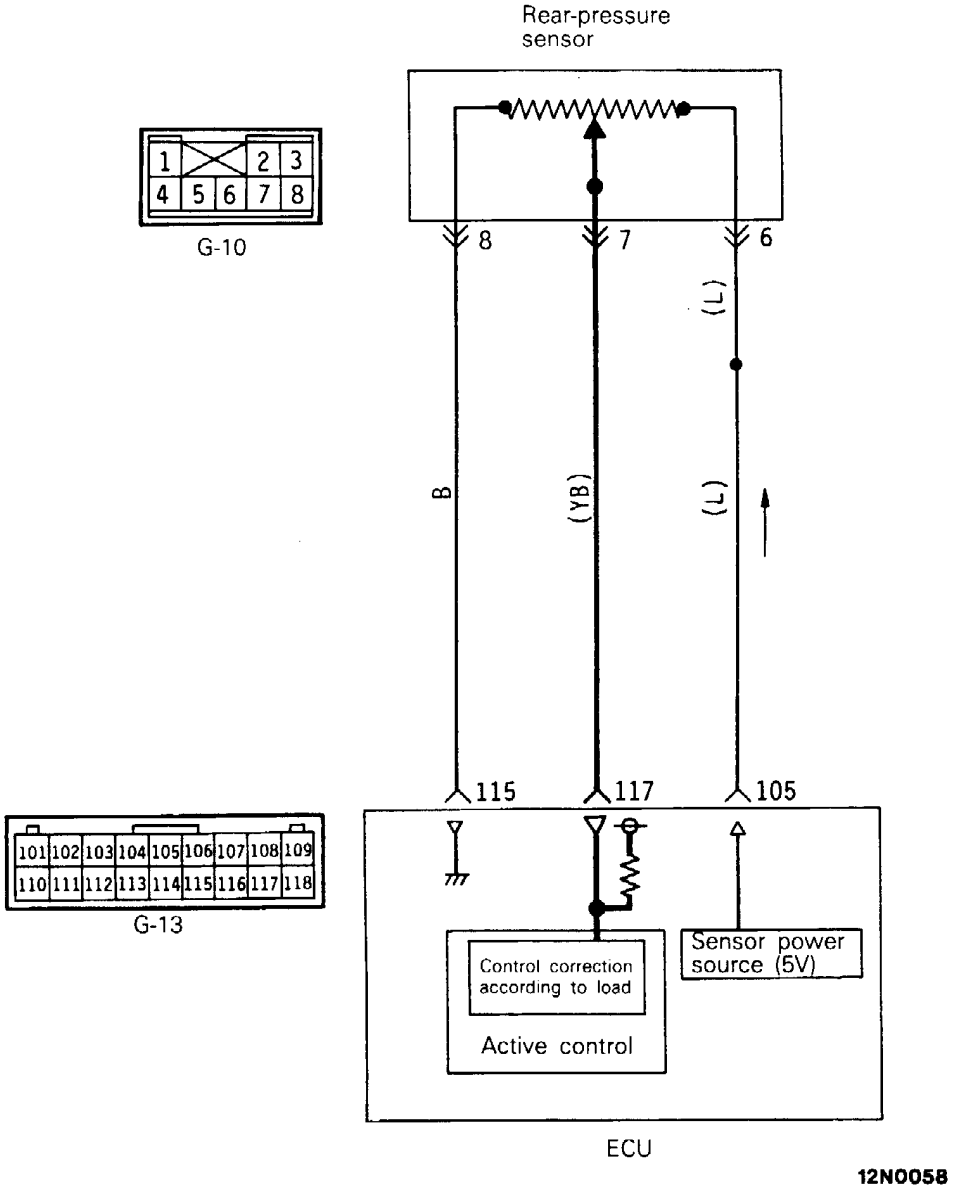

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Operation

The rear-pressure sensor detects the internal pressure of the rear air springs.
Although the timing of air supply and exhaust for control of the vehicle attitude is basically determined according to a predetermined "map", the supplying and exhaust times are corrected as necessary, according to data from this sensor, in order to cope with changes of the load carried by the vehicle and other factors.

Diagnosis

If, because of damage or disconnection of the heavy-line circuit, or a malfunction of the rear-pressure sensor, etc., a higher than normal value of the internal pressure of the air springs is indicated continuously, the alarm lamp illuminates, and control is as described in the table below. Note, however, this diagnosis signal is given if there is an overload.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
25	Control stop	Normal operation	Only the vehicle-height increase control function stops.	Not accept	Accept

Service data indication

Code No.	Indication	Standard value
25	Rear-pressure sensor output voltage	Fluctuates within a range of 0.5V to 4.5V when the body is shaken from side to side.

Condition		Reference value
Front seats: 2 persons	When EXTRA HIGH	Approx. 2.45V
	When HIGH vehicle height	Approx. 1.60V
	When NORMAL vehicle height	Approx. 0.90V
	When LOW vehicle height	Approx. 0.86V

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
105	Power supply for sensor	When the ECU is activated	4 – 8V
117	Rear air spring pressure signal	Low rear air spring pressure High rear air spring pressure	0.5V ↕ 4.5V
		When wiring is damaged or disconnected	4 – 8V
115	Sensor circuit earth	Constantly	0V

Checking the rear-pressure sensor (with the connector disconnected)

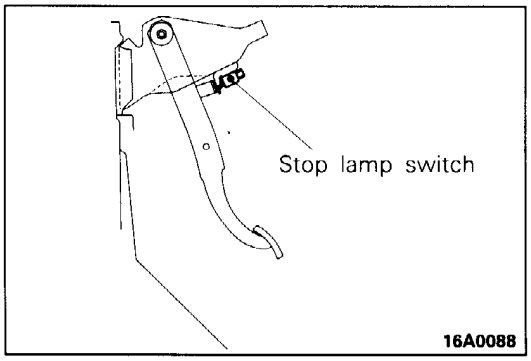
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
105 115	Rear-pressure sensor All resistances	Resistance	105–115	–	3.5–7.0 kΩ
105 117	Rear-pressure sensor output	Resistance	117–115	Change should be smooth (according to the air pressure applied to the rear-pressure sensor) within the standard value range shown at the right.	0–5 kΩ

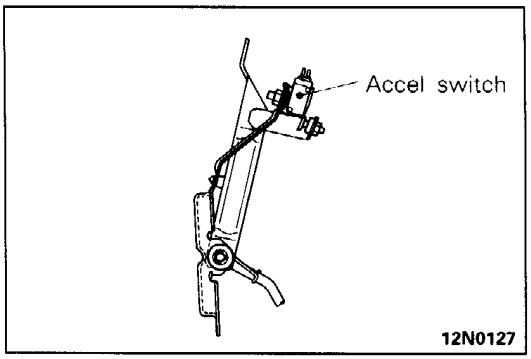
Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Harness short-circuit	Because of a short-circuit of the harness, etc., no correction of the air-supply and exhaust time can be made to compensate for a loaded condition of the vehicle.	Insufficient control of the attitude, resulting in a feeling of incompatibility.	–
Air leakage	Wear, damage, etc. of the O-ring	Vehicle height decreases if not corrected.	–

[14] STOP LAMP SWITCH CIRCUIT/ACCEL SWITCH CIRCUIT

<Vehicles built up to October, 1991>





<R.H. drive vehicles>

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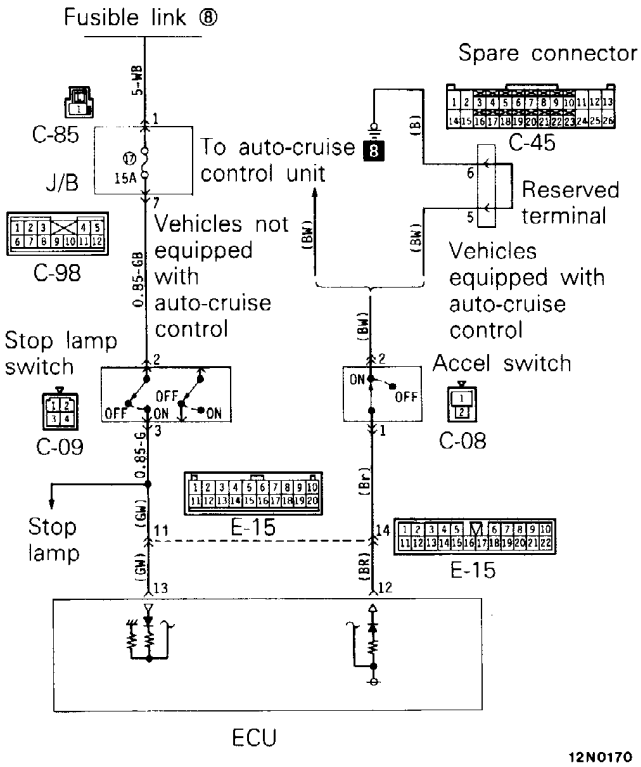
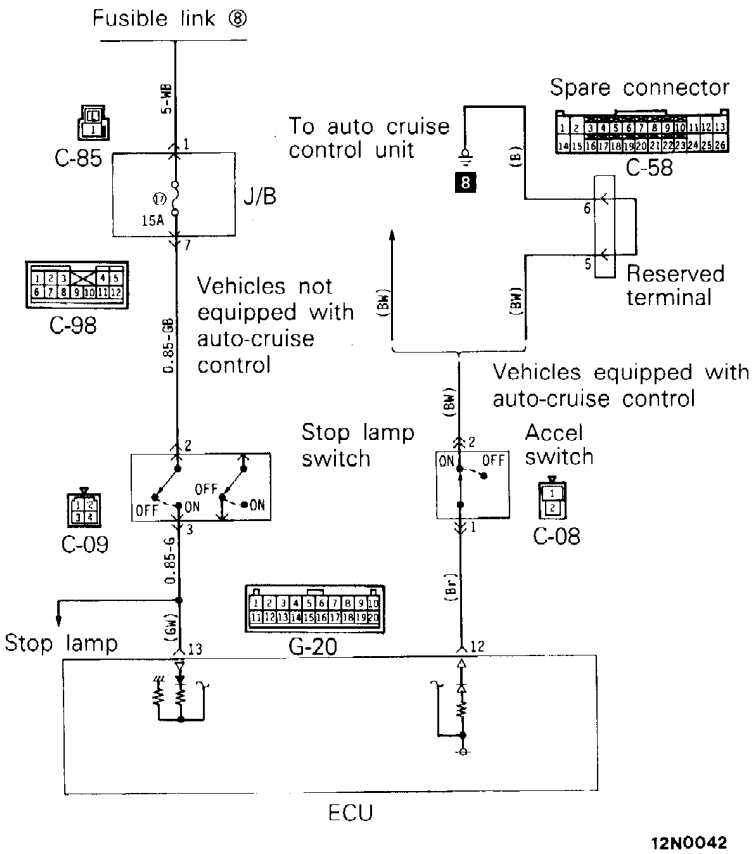




Operation

When the brake pedal is depressed, the stop lamp switch is switched ON and 12V is sent to the ECU, thus resulting is the detection that braking is in progress.

When the accel pedal is depressed, the accel switch is switched OFF and ECU power supply 5V is earthed, thus resulting is the detected that accel is in progress.

Service data indication

Code No.	Indication
26	Indicates the ON or OFF status of the stop lamp switch.
34	Indicates the ON or off status of the accel switch.

ECU terminal voltages (when connector is connected)

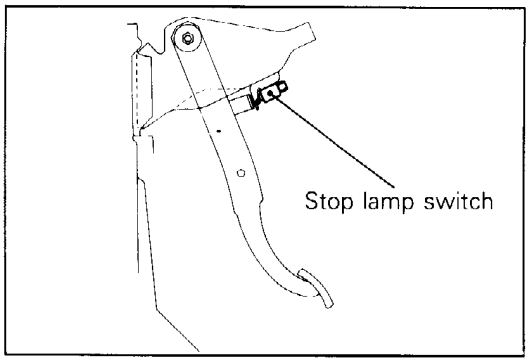
Terminal No.	Signal	Condition	Terminal voltage
13	Stop lamp switch signal	When the stop lamp switch is ON	0V
		When the stop lamp switch is OFF	System voltage
12	Accel switch signal	When the stop lamp switch is ON	0V
		When the stop lamp switch is OFF	System voltage

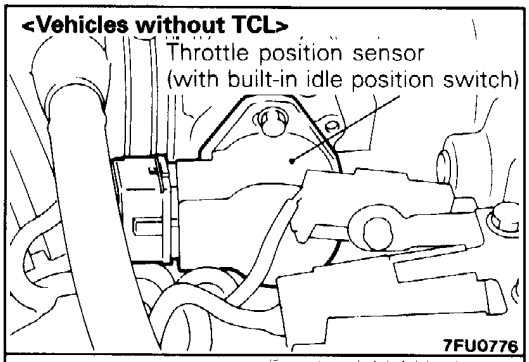
Checking the stop lamp switch circuit (with the connector disconnected)

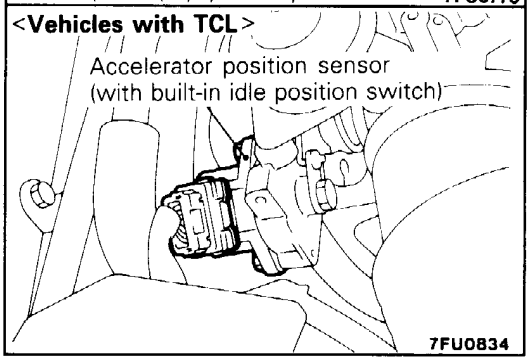
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition		Standard
13	Stop lamp switch	Voltage	13-earth	Ignition switch ON	Depress the brake pedal.	System voltage
					Do not depress the brake pedal.	0V
12	Accel switch	Voltage	12-earth	Ignition switch ON	Depress the accel pedal.	System voltage
					Do not depress the accel pedal.	0V

[14] STOP LAMP SWITCH CIRCUIT/IDLE POSITION SWITCH CIRCUIT

<Vehicles built from November, 1991>







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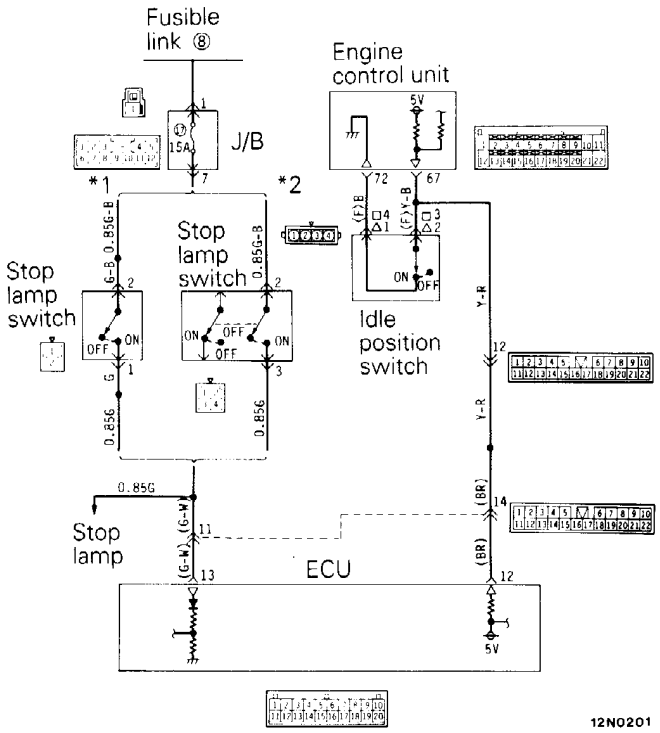

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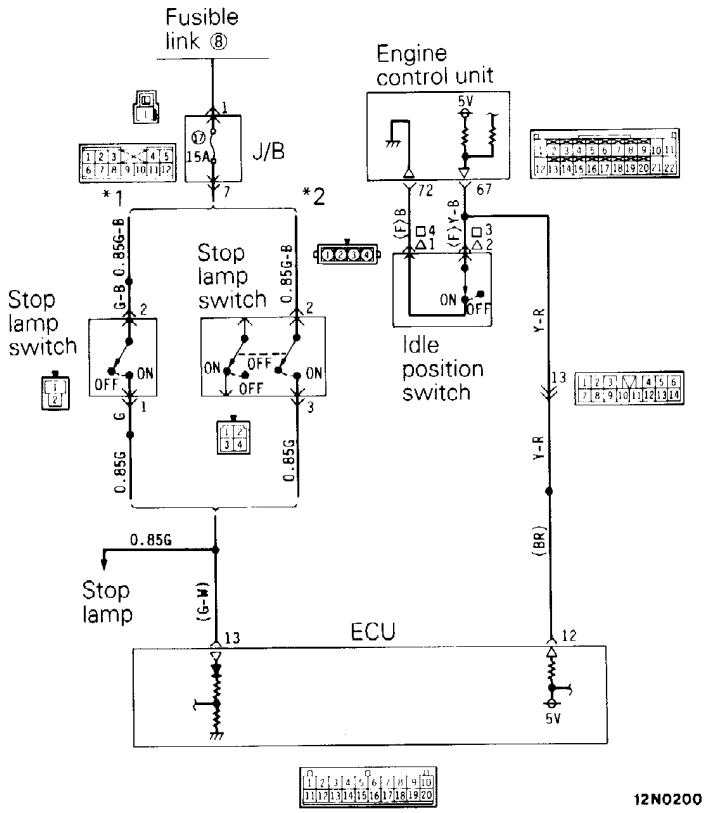


NOTE
*1 : Vehicles without auto–cruise control
*2 : Vehicles with auto–cruise control
□ : Vehicles without TCL
△ : Vehicles with TCL

Operation

When the brake pedal is depressed, the stop lamp switch is switched ON and the battery voltage is sent to the ECU, thus resulting is the detection that braking is in progress.
The idle position switch senses whether the accelerator pedal is depressed or not, converts it into high/low voltage and inputs the voltage to the ECU.

Power supply of 5V inside the ECU is applied to the idle position sensor. When the accelerator pedal is released, the idle position switch is turned on to conduct the voltage (5V) to earth. This causes the idle position switch terminal voltage to go low from high.

Service data indication

Code No.	Indication
26	Indicates the ON or OFF status of the stop lamp switch.
34	Indicates the ON or OFF status of the idle position switch.

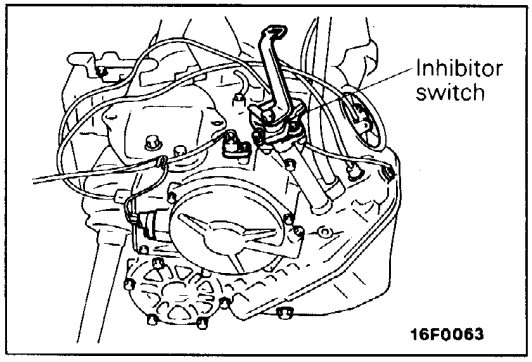
ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
13	Stop lamp switch signal	When the stop lamp switch is ON	0V
		When the stop lamp switch is OFF	System voltage
12	Idle position switch signal	When accelerator pedal is depressed	0V
		When accelerator pedal is not depressed	4 – 8 V

Checking the stop lamp switch and idle position switch circuit (with the connector disconnected)

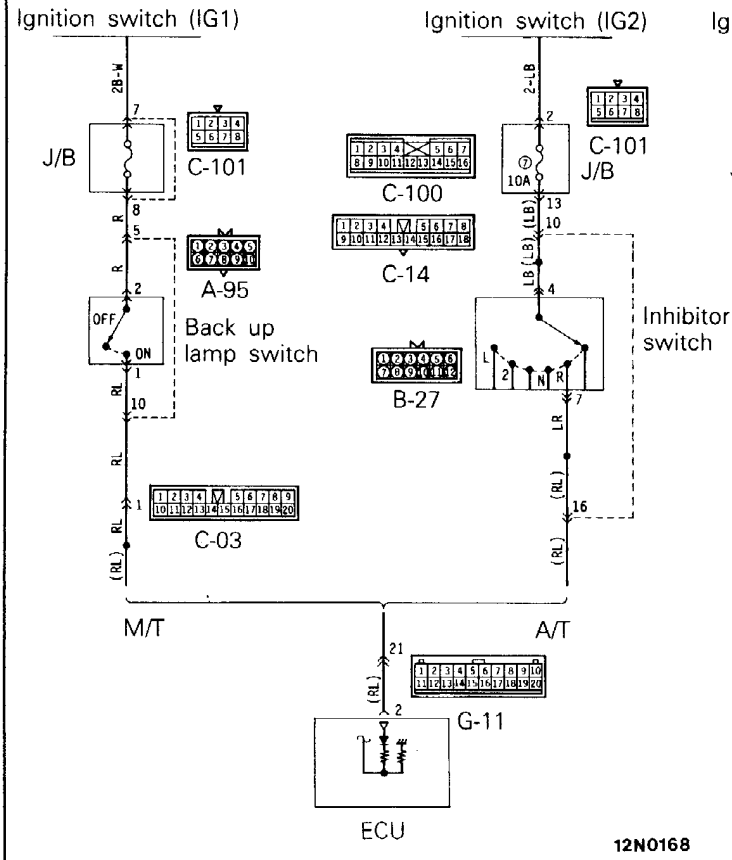
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition		Standard
13	Stop lamp switch	Voltage	13-earth	Ignition switch ON	Depress the brake pedal.	System voltage
					Do not depress the brake pedal.	0V
12	Idle position switch	Voltage	12-earth	Ignition switch ON	Depress the accel pedal.	4 – 8 V
					Do not depress the accel pedal.	0V

[15] INHIBITOR OR SWITCH CIRCUIT/BACK UP LAMP SWITCH CIRCUIT

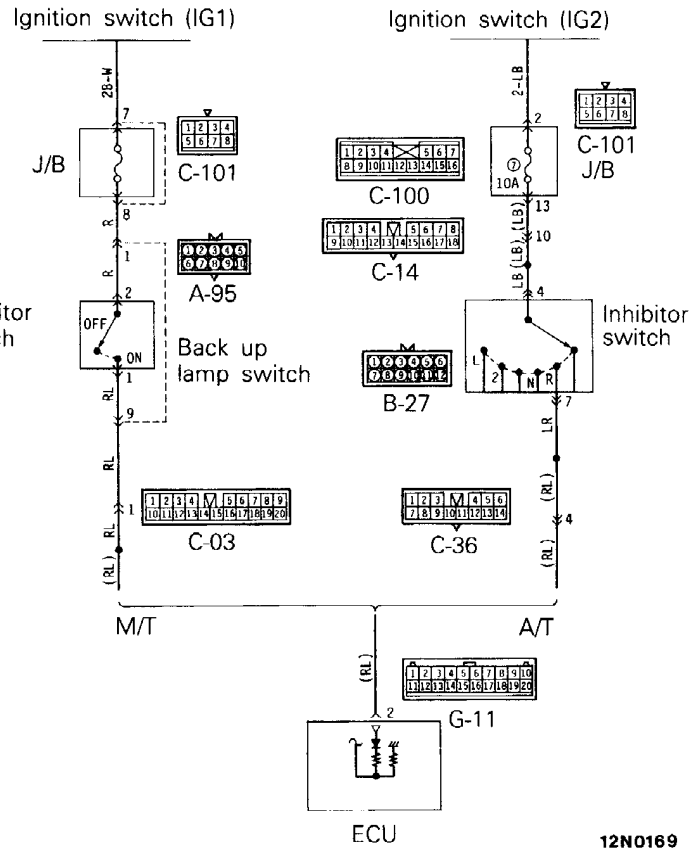


<Vehicles built up to October, 1992>

L.H. drive vehicles



R.H. drive vehicles



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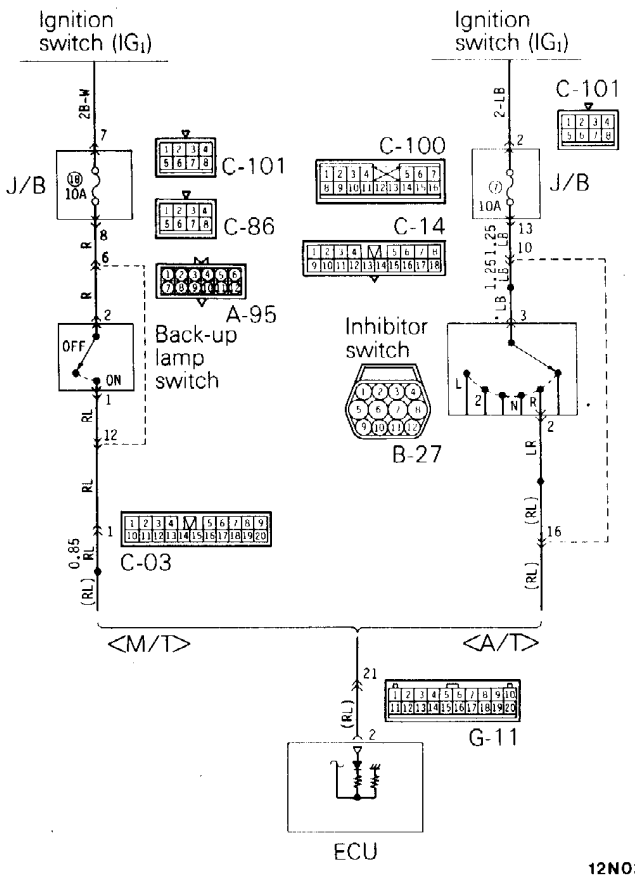
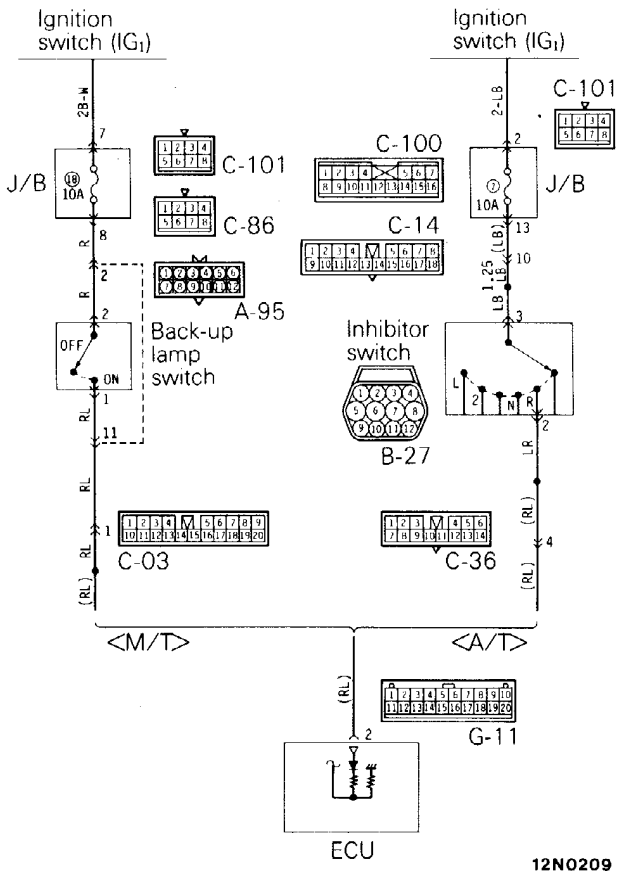
L.H. drive vehicles



R.H. drive vehicles



Service data indication

Code No.	Indication
31	When the inhibitor switch is in the REVERSE position, ON is displayed, and OFF is displayed in any other position
32	Indicates the ON or OFF status of the back-up lamp switch.

ECU terminal voltage (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
2	A/T shift signal R	When the inhibitor switch is in the REVERSE position	System voltage
72	Manual transmission back-up signal	When the back-up lamp switch is ON	System voltage

Checking the circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition		Standard
2	Inhibitor switch "R"	Voltage	2-earth	With the selector lever shifted to the REVERSE position	Ignition switch OFF	0V
					Ignition switch ON	System voltage
72	Back-up lamp	Voltage	72-earth	With the shift lever shifted to the REVERSE position	Ignition switch OFF	Approx. 0V
					Ignition switch ON	System voltage

NOTES

[16] DOOR SWITCH CIRCUIT

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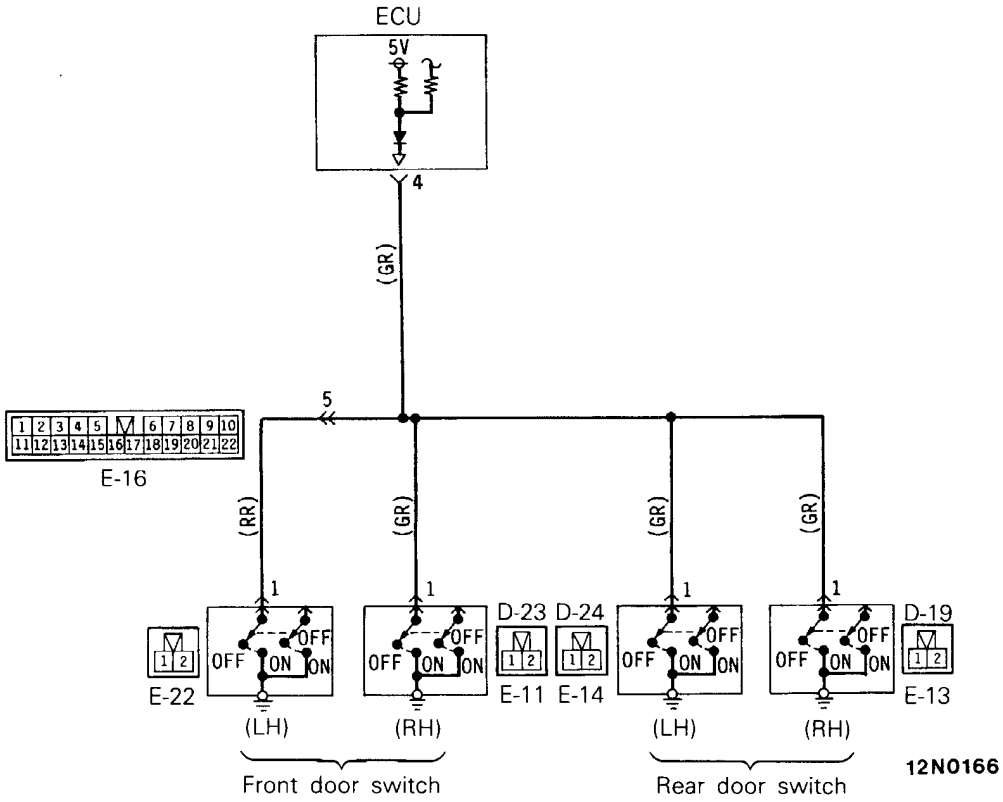

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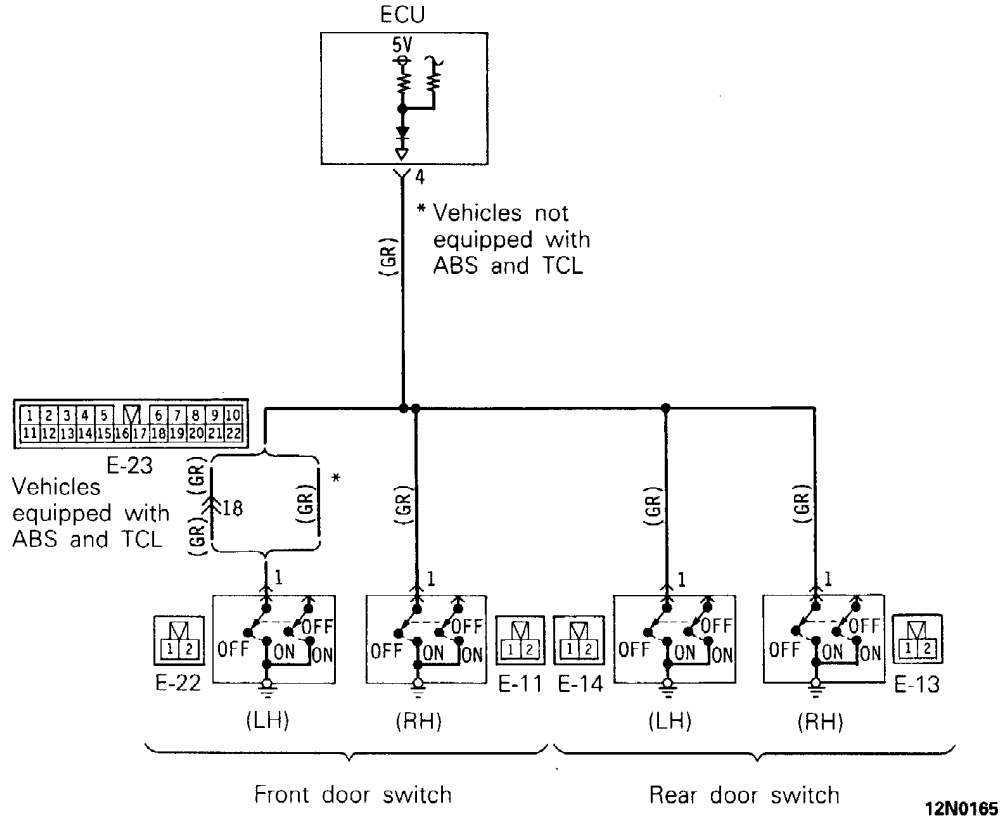


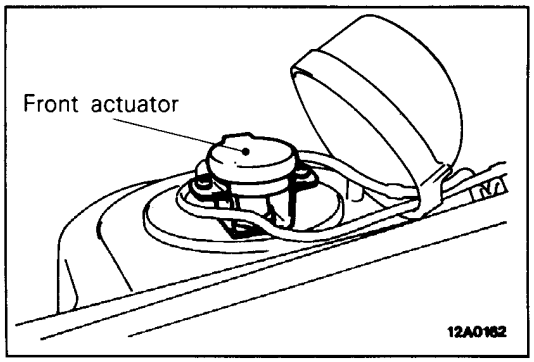
Service data indication

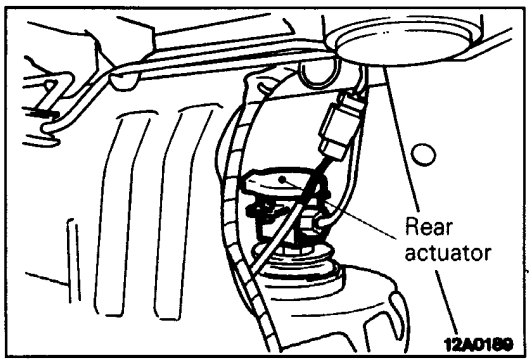
Code No.	Indication
33	Indicates the ON or OFF status of the door switch (indicates ON if at least one door is opened)

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
4	Door switch signal	When a door (at least one) opened	0V
		When the door is closed	System voltage

[17] DAMPING FORCE SWITCHING ACTUATOR DRIVE CIRCUIT





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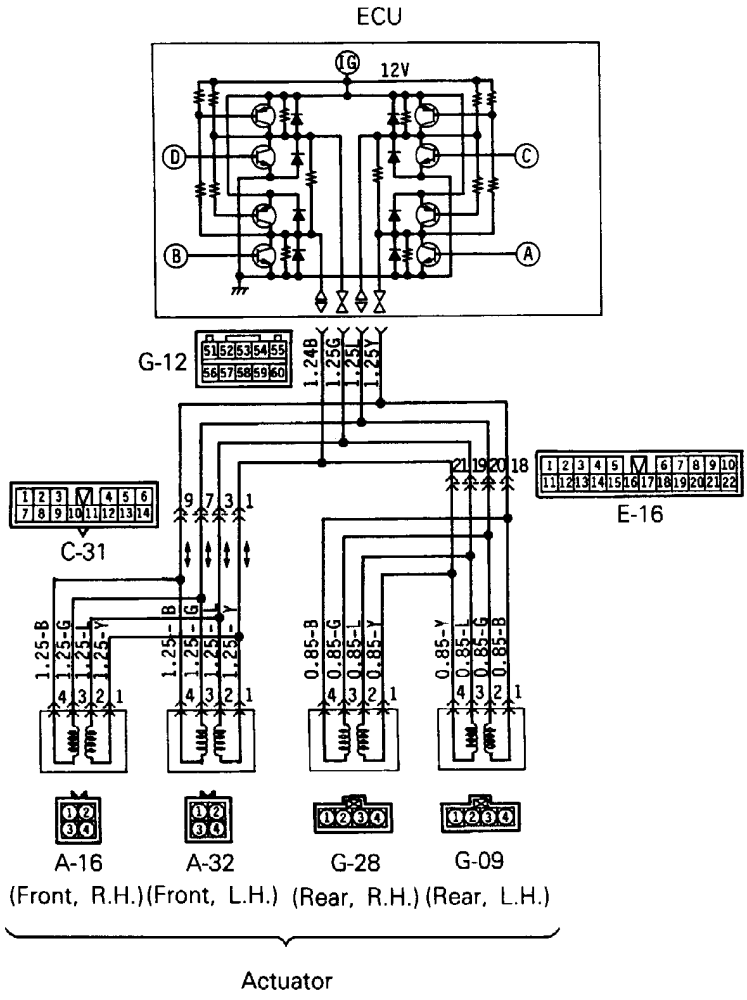

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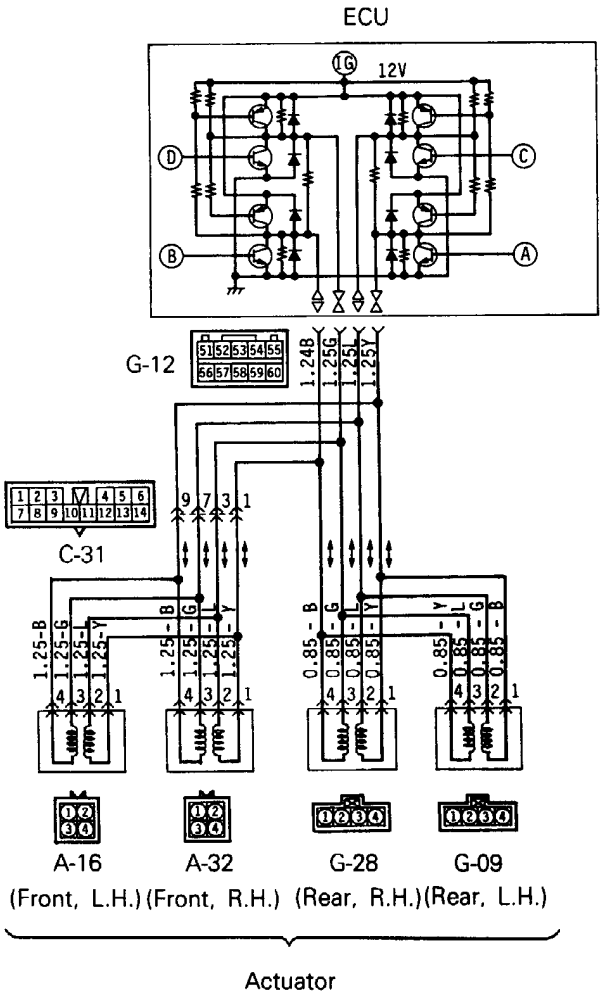


12N0164

Operation

The damping force switching actuator is the step motor. The allows the control rod of each shock absorber to rotate, thus selecting the damping force at one of four levels (HARD, MEDIUM, SOFT' or SOFT).

Diagnosis

If there is damage or disconnection of the heavy-line circuit, the alarm lamp illuminates, and control is as described in the table below. (Because the actuators are connected in parallel, there can be no detection if wiring damage or disconnection occurs at the final circuit.)

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
41	Control stop	Control stop	Held at NORMAL	Not accept	

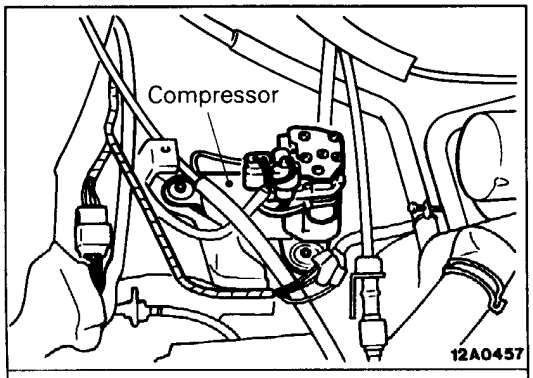
Actuator compulsory activation

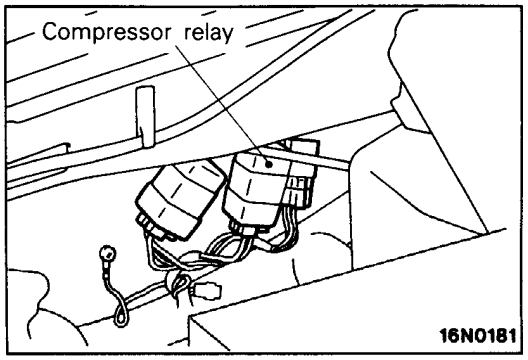
Code No.	Applicable operation	Description of activation
01	SOFT damping force	The damping force is compulsorily switched to SOFT; there is a return to the original damping force three seconds thereafter.
02	SOFT' damping force	The damping force is compulsorily switched to SOFT'; there is a return to the original damping force three seconds thereafter.
03	MEDIUM damping force	The damping force is compulsorily switched to MEDIUM; there is a return to the original damping force three seconds thereafter.
04	HARD damping force	The damping force is compulsorily switched to HARD; there is a return to the original damping force three seconds thereafter.

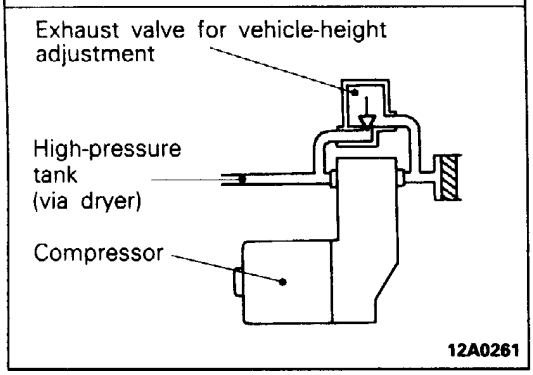
Checking the damping force switching actuator drive circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
51 56	Damping force switching actuator (step motor)	Resistance	51–56	Four coils that have a constant resistance of 6.4±0.3 ohms are connected in parallel (front and rear).	Approx. 1.6 Ω
52 57	Damping force switching actuator (step motor)	Resistance	52–57	Four coils that have a constant resistance of 6.4±0.3 ohms are connected in parallel (front and rear).	Approx. 1.6 Ω

[18] COMPRESSOR DRIVE CIRCUIT







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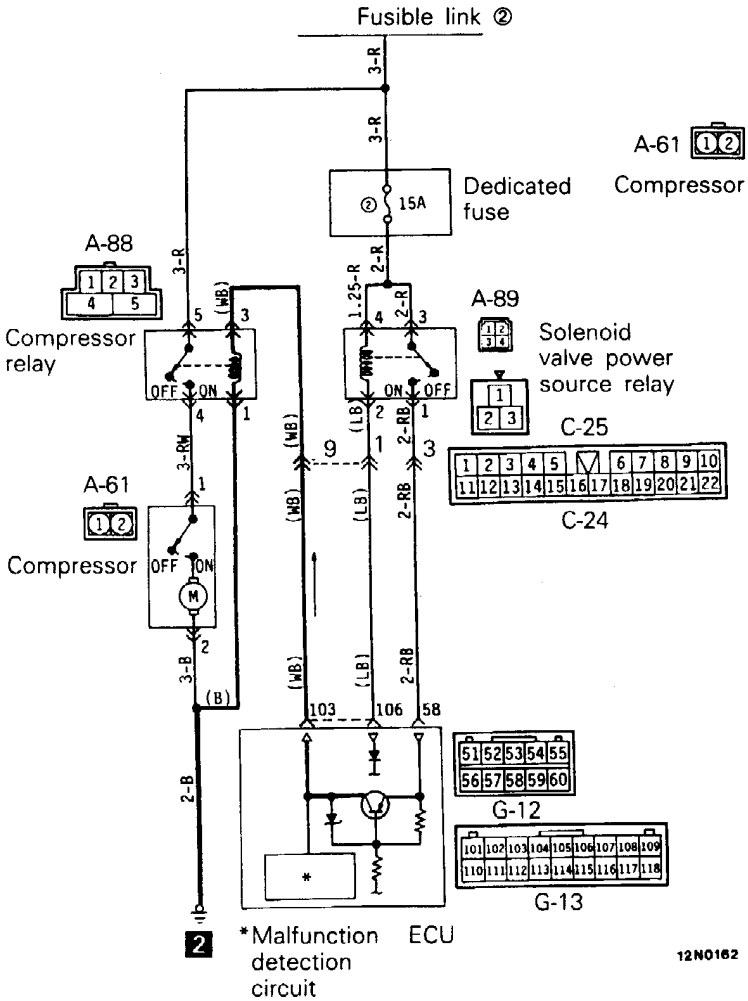

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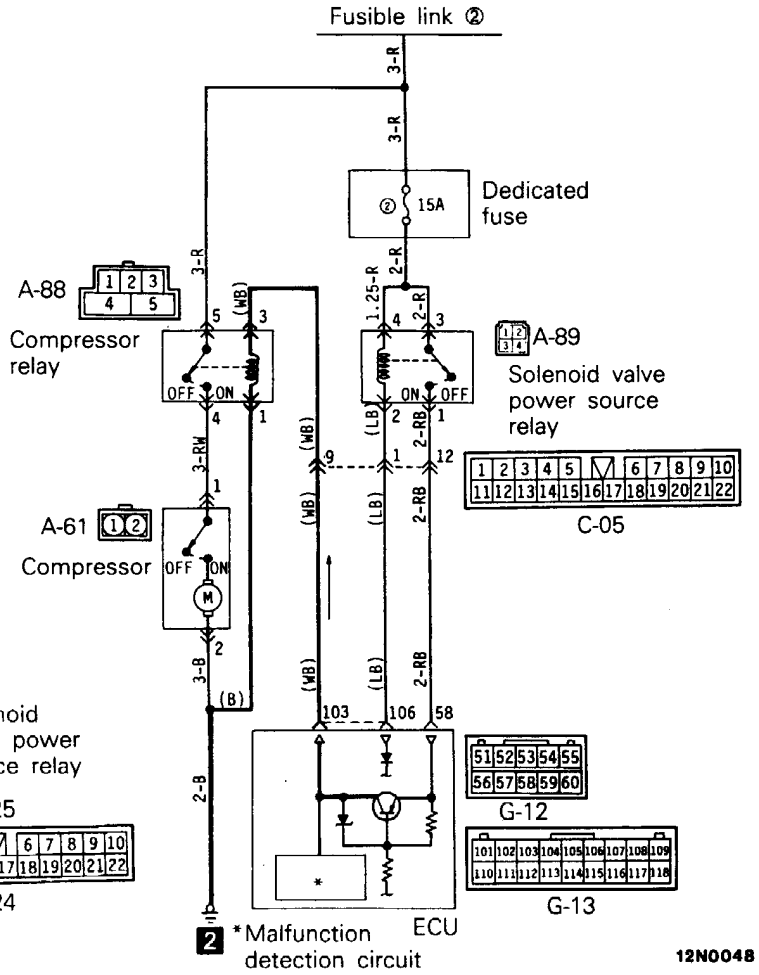


Operation

The compressor is activated when the pressure within the high-pressure tank decreases to 760 kPa (7.6 kg/cm², 108 psi) or lower, and then stops two seconds after the pressure reaches 950 kPa (9.5 kg/cm², 135 psi). Note, however, the compressor is not activated while the return pump is operating. A thermal switch is provided at the motor circuit. This thermal switch functions to interrupt the power to the motor (in order to protect the compressor) if the temperature within the compressor becomes high.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a short-circuit, or a malfunction of the output transistor within the ECU, the alarm lamp illuminates and control is as described in the table below.
(Note that the diagnosis is only applicable up to the compressor relay.)

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
43	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

Code No.	Applicable operation	Description of activation
05	Compressor relay ON	The compressor relay is compulsorily switched ON for a period of three seconds.

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
103	Compressor relay activation signal	When the compressor relay is ON	System voltage
		When the compressor relay is OFF	System voltage
		During fail-safe (solenoid valve power-source relay switch OFF)	0V

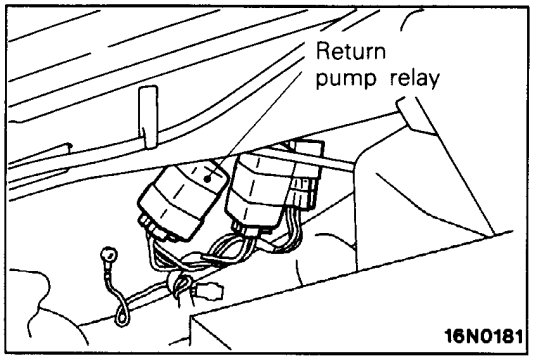
Checking the compressor drive circuit (with the connector disconnected)

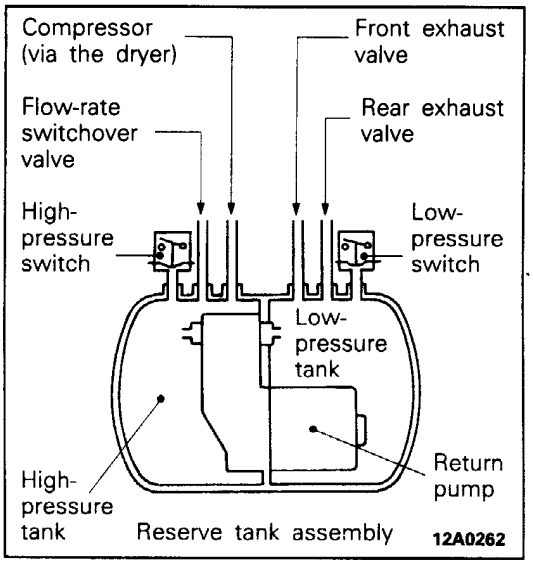
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
103	Compressor relay	Resistance	103-earth	–	Approx. 75Ω
				Next apply battery voltage to terminal 103.	Compressor operation

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
The compressor relay is fused.	The compressor relay contacts are fused.	The compressor won't stop, causing the battery to become flat.	–
The compressor is stuck.	The compressor won't operate due to fusing, etc.	The vehicle height can't be increased.	–

[19] RETURN PUMP DRIVE CIRCUIT





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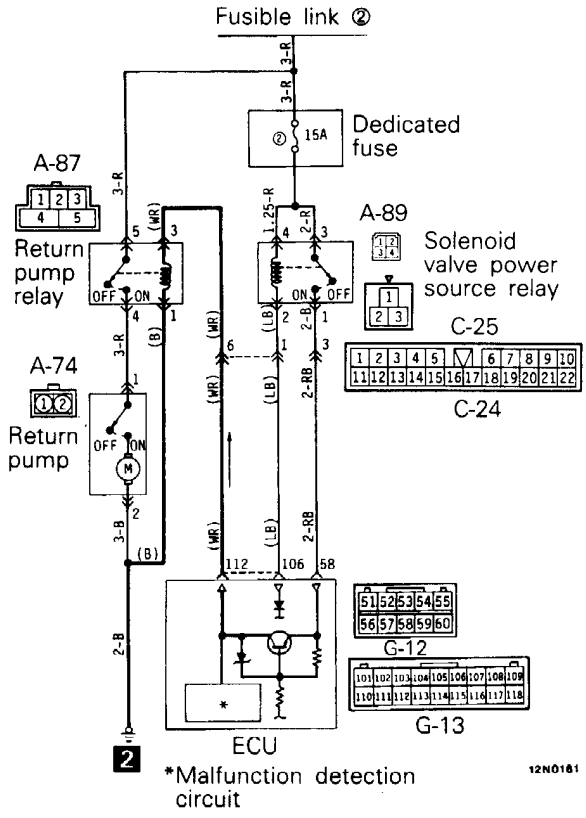

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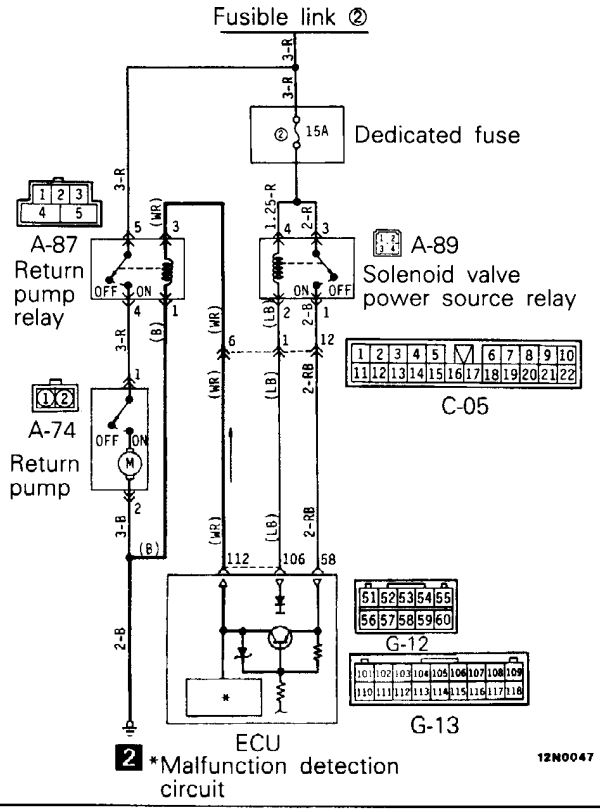


Operation

The return pump is activated when the pressure within the low-pressure pressure tank increases to 140 kPa (1.4 kg/cm², 20 psi) or higher, and then stops two seconds after the pressure is reduced to 70 kPa (0.7 kg/cm², 10 psi) or lower.

A thermal switch is provided at the motor circuit. This thermal switch functions to interrupt the power to the motor (in order to protect the return pump) if the temperature within the return pump becomes high.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a short-circuit, or a malfunction of the output transistor within the ECU, the alarm lamp illuminates and control is as described in the table below. (Note that the diagnosis is only applicable up to the return pump relay.)

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
44	Rolling control only stops.	Held at MEDIUM	Rolling control only stops.	Not accept	

Actuator compulsory activation

Code No.	Applicable operation	Description of activation
06	Return pump relay ON	The return pump relay is compulsorily switched ON for a period of three seconds.

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
112	Return pump relay activation signal	When the return pump relay is ON	System voltage
		When the return pump relay is OFF	0V
		During fail-safe (solenoid valve power source relay switch OFF)	0V

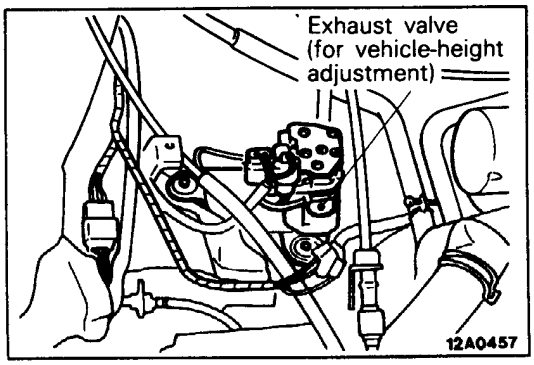
Checking the return pump drive circuit (with the connector disconnected)

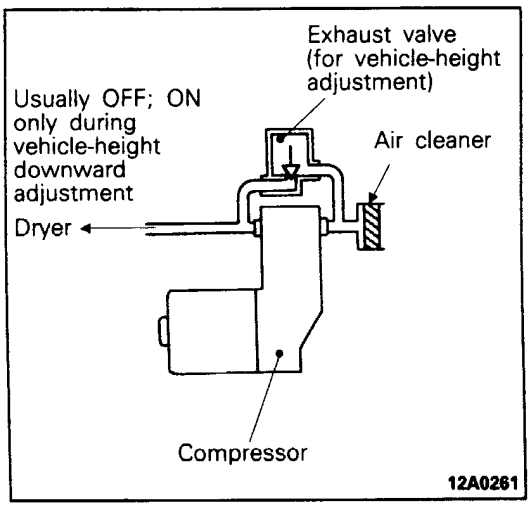
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
112	Return pump relay	Resistance	112-earth	–	Approx. 75Ω
				Next apply battery voltage to terminal 112.	Return pump operation

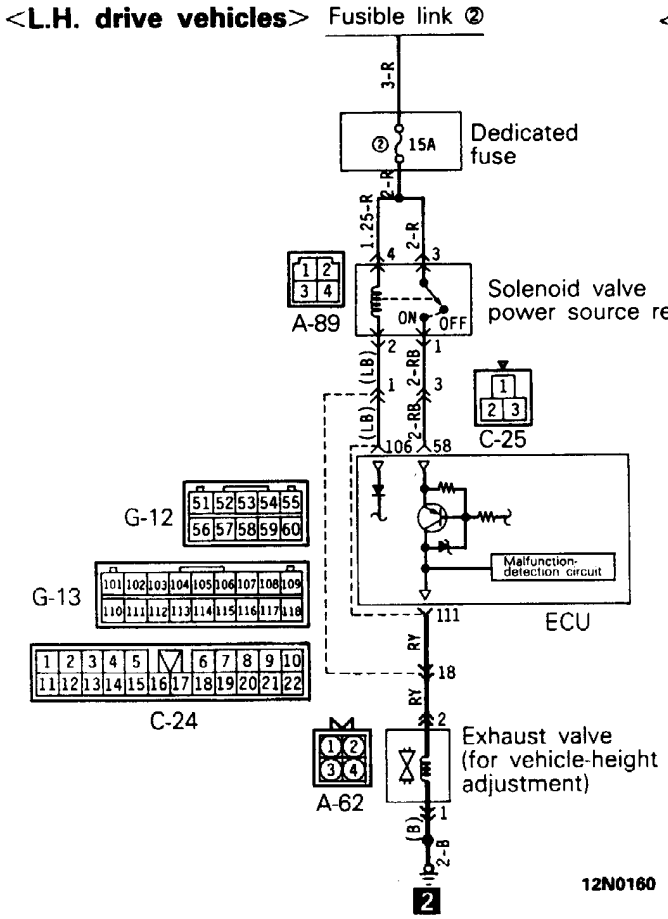
Troubleshooting hints (mechanical malfunctions)

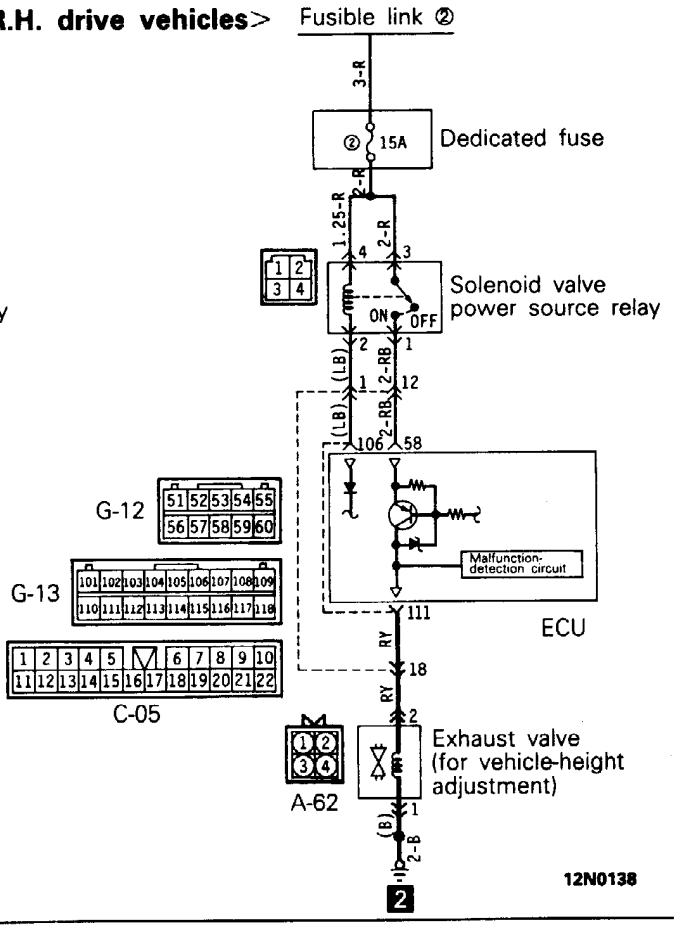
Malfunction mode	Malfunction probable cause	Malfunction	Note
The return pump relay is fused.	The return pump relay contacts are fused.	The return pump won't stop, causing the battery to become flat.	–
The return pump is stuck.	The return pump won't operate due to fusing, etc.	• Insufficient attitude-control effect. • Vehicle height increases after rolling control.	–

[20] EXHAUST VALVE ACTIVATION CIRCUIT (FOR VEHICLE-HEIGHT ADJUSTMENT)









Operation

The exhaust valve for adjustment of the vehicle height is installed at the compressor assembly. This valve is switched ON only when a downward adjustment of the vehicle height is being made; it functions to discharge air (from the air springs) into the atmosphere.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a short-circuit, or a malfunction of the output transistor within the ECU, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
45	Rolling control only stops.	Held at MEDIUM	Rolling control only stops.	Not accept	

Actuator compulsory activation

The exhaust valve for vehicle-height adjustment is activated by the following.

Code No.	Applicable operation
07	Vehicle height downward adjustment

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
111	Exhaust valve (for vehicle-height adjustment) activation signal	When the exhaust valve (for vehicle-height adjustment) is ON (open)	System voltage
		When the exhaust valve (for vehicle-height adjustment) is OFF (closed)	0V
		During fail-safe (for solenoid valve power source relay switch OFF)	0V

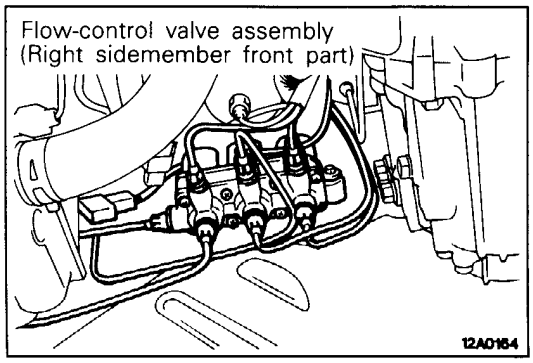
Checking the exhaust valve (for vehicle-height adjustment) activation circuit (with the connector disconnected)

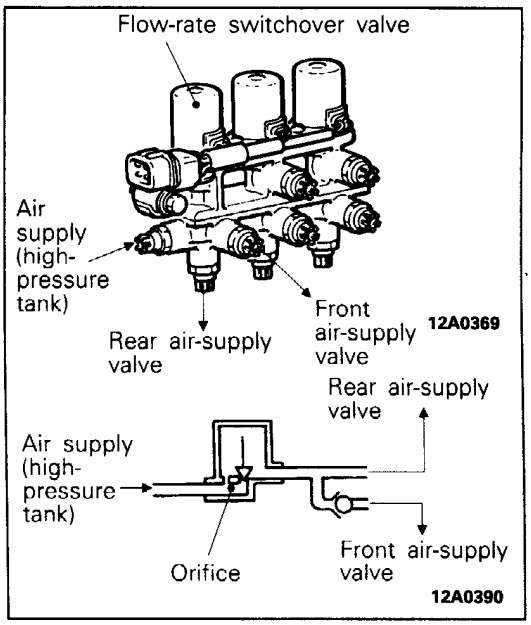
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
111	Exhaust valve (for vehicle-height adjustment)	Resistance	111-earth	–	Approx. 15 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	Air cannot be discharged because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	Vehicle height doesn't decrease.	Diagnosis code No. 54 is output.
Stuck in the ON (open) position	Air discharge cannot be stopped because the valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	• Vehicle height doesn't increase. • Compressor doesn't stop.	Diagnosis code No. 55 is output.
Air leakage at valve seat	Valve seat is worn.	• Vehicle height doesn't increase. • Compressor doesn't stop.	Diagnosis code No. 55 is output

[21] FLOW-RATE SWITCHOVER VALVE ACTIVATION CIRCUIT





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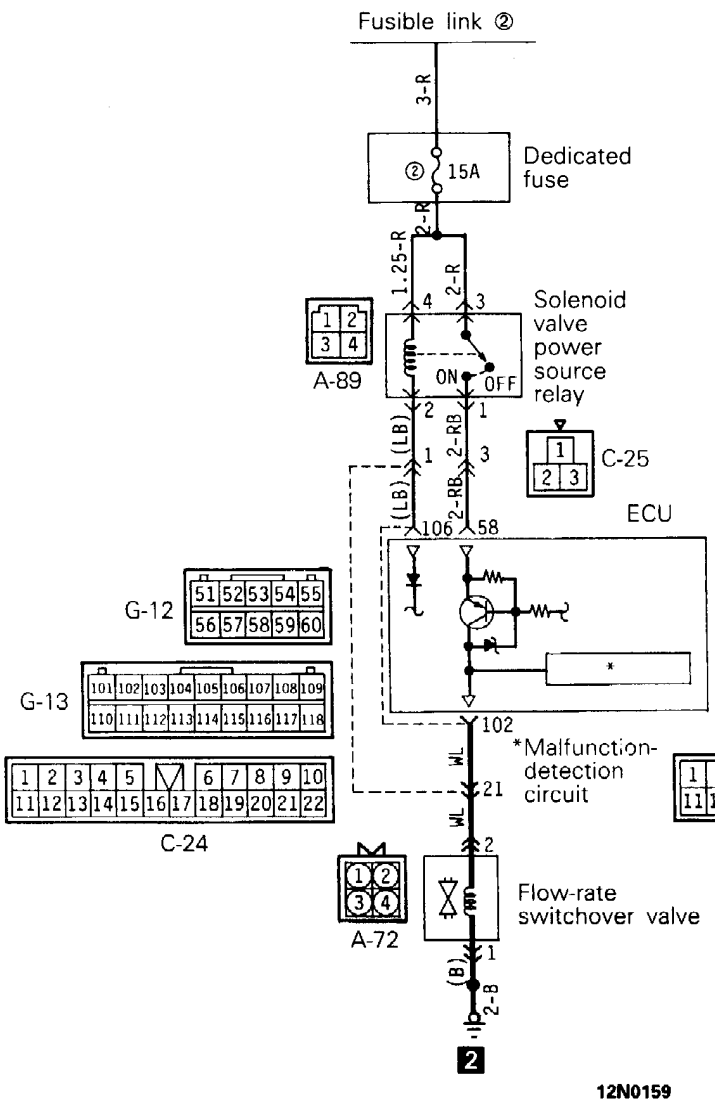

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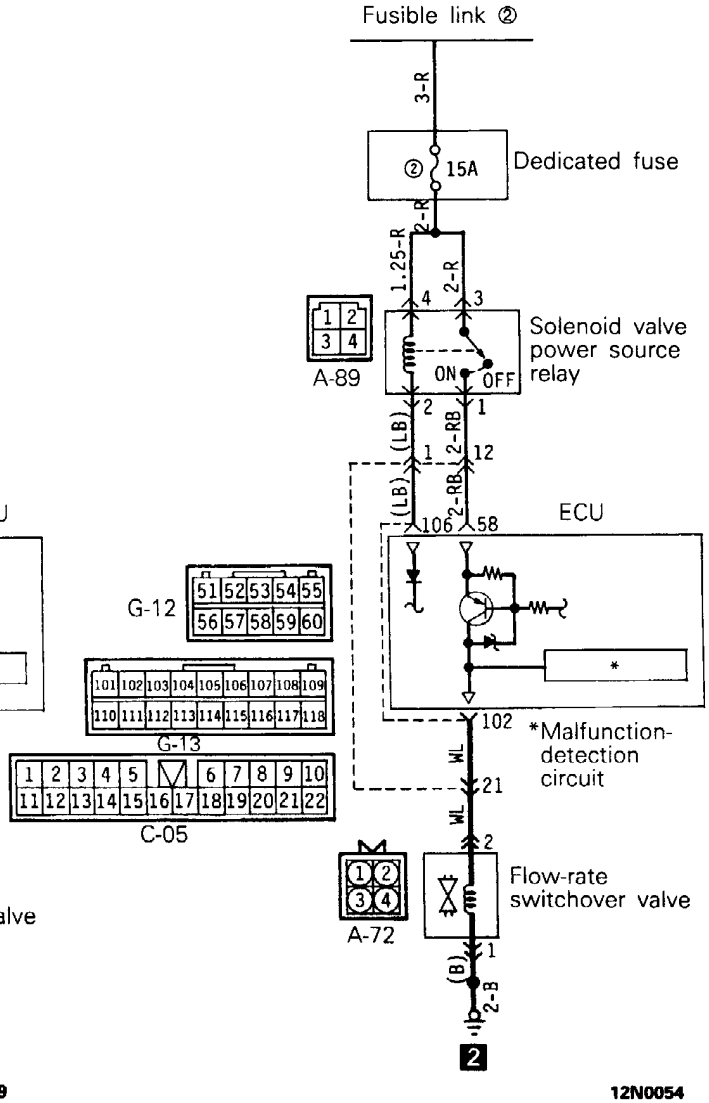


Operation

The flow-rate switchover valve switches, in two stages, the intake air flow volume supplied to each of the air springs.
Usually, during ordinary adjustments of the vehicle height, the flow-rate switchover valve is OFF (closed) in order to suppress the speed of the change of vehicle height to the appropriate speed, and the air is supplied to each of the air springs with the flow volume restricted by the orifice.
This valve is switched ON (opened) for rapid adjustment of the vehicle height, or during control of rolling etc., when the vehicle is traveling on a bad road surface, thus permitting a greater amount of air to be supplied to the air springs.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a short-circuit, or a malfunction of the output transistor within the ECU, the alarm lamp illuminates and control is as described in the table below.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
46	Rolling control only stops.	Held at MEDIUM	Rolling control only stops	Not accept	

Actuator compulsory activation

The flow-rate switchover valve is activated by the following.

Code No.	Applicable operation
09	Rolling control (left turn)
10	Rolling control (right turn)

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
102	Flow-rate switchover valve activation signal	When the flow-rate switchover valve is ON (open)	System voltage
		When the flow-rate switchover valve is OFF (closed)	0V
		During fail-safe (solenoid valve power source relay switch OFF)	0V

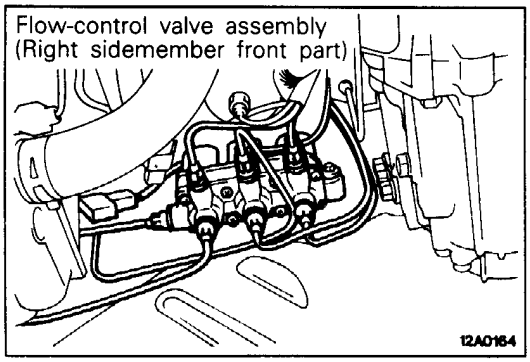
Checking the flow-rate switchover valve activation circuit (with the connector disconnected)

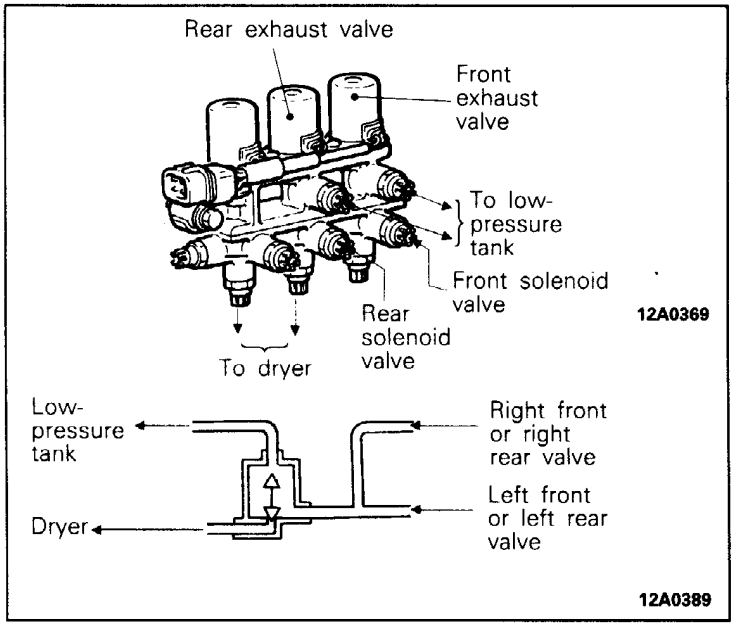
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
102	Flow-rate switchover valve activation signal	Resistance	102-earth	–	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	The valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• Insufficient rolling control effect. A feeling of incompatibility. • The vehicle height decreases after rolling control. • The vehicle height upward adjustment is slow when a poor road surface is detected.	–
Stuck in the ON (open) position	The valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	• The upward adjustment of the vehicle height is excessive. • There is a feeling of incompatibility during rolling control (excessive control).	–
Air leakage to atmosphere	Wear, etc. of the O-ring, etc.	• The compressor is activated too frequently. • There is a feeling of incompatibility during rolling control	Very slight leakages cannot be detected. Such leakage is detected a long time afterward by a decrease of the vehicle height.

[22] FRONT/REAR EXHAUST VALVE ACTIVATION CIRCUIT





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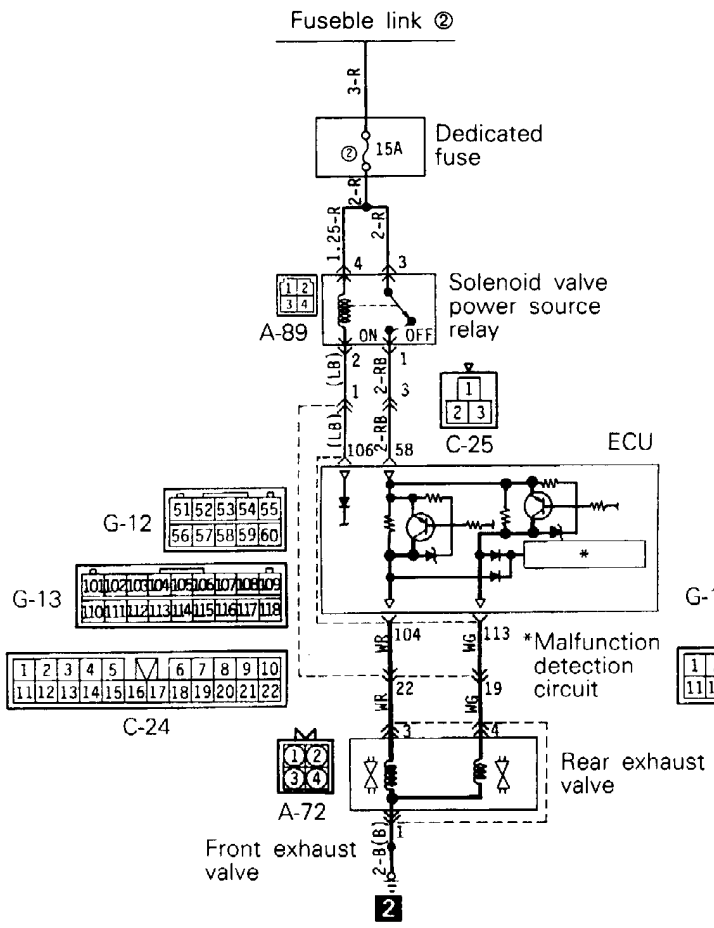

12N0158

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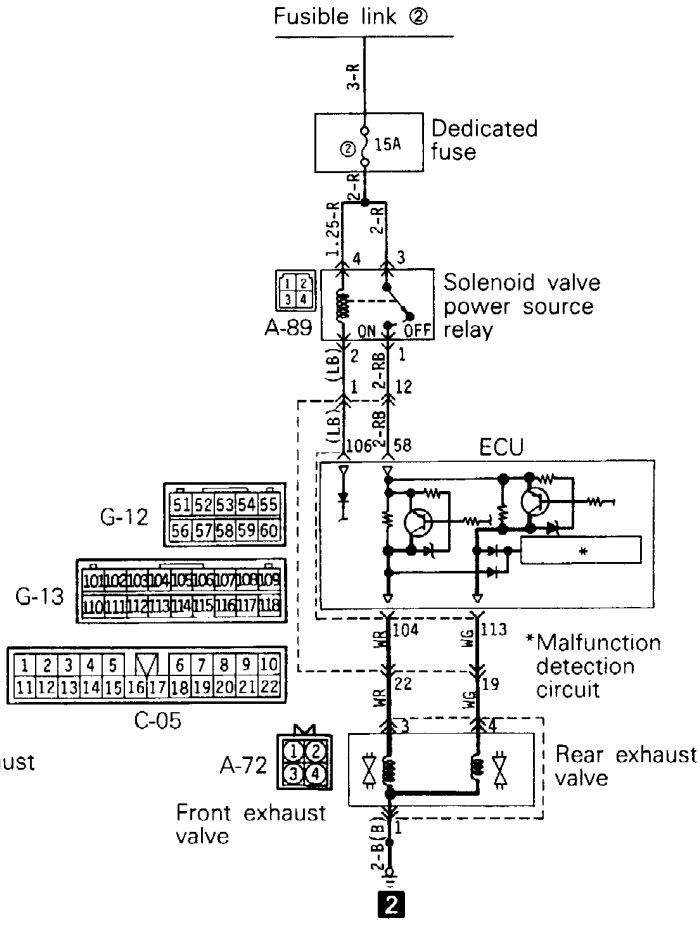


12N0051

Operation

These valves switch the air exhausted (from the front and rear left and right strut air springs) to either internal recirculation or discharge to the atmosphere. These valves are OFF (closed) during the attitude-control air-exhaust mode, and the exhaust air is led to the low-pressure tank and is once again circulated within the system. The valves are ON (open) during downward adjustment of the vehicle height, and the exhaust air, after passing through the dryer, is discharged (from the exhaust valves for vehicle-height adjustment) into the atmosphere. These valves are switched ON (opened), in order to maintain the differential pressure of the strut air springs, when the rolling control is being maintained.
(At this time, because the exhaust valves for vehicle-height adjustment are OFF (closed), air is not discharged to the atmosphere.)

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of an output transistor within the ECU, the alarm lamp illuminates, and control is as described in the table below.
Note that the malfunction-detection circuit is the same for the front and the rear exhaust valves.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
47	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

The front or the rear exhaust valves are activated by the following.

Code No.	Applicable operation
07	Vehicle height downward adjustment
09	Rolling control (left turn)
10	Rolling control (right turn)

ECU terminal voltage (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
104	Front exhaust valve activation signal	When the front/rear exhaust valves are ON (open)	System voltage
113	Rear exhaust valve activation signal	When the front/rear exhaust valves are OFF (closed)	0V
		During fail-safe (for solenoid valve power source relay switch OFF)	0V

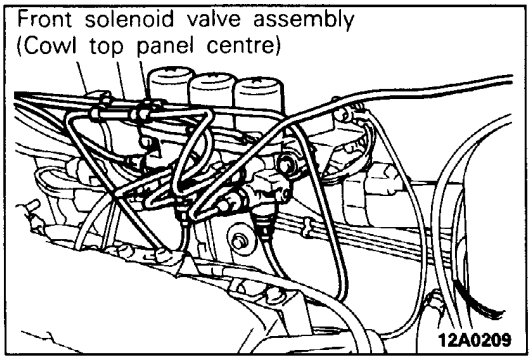
Checking the front/rear exhaust valves activation circuit (with the connector disconnected)

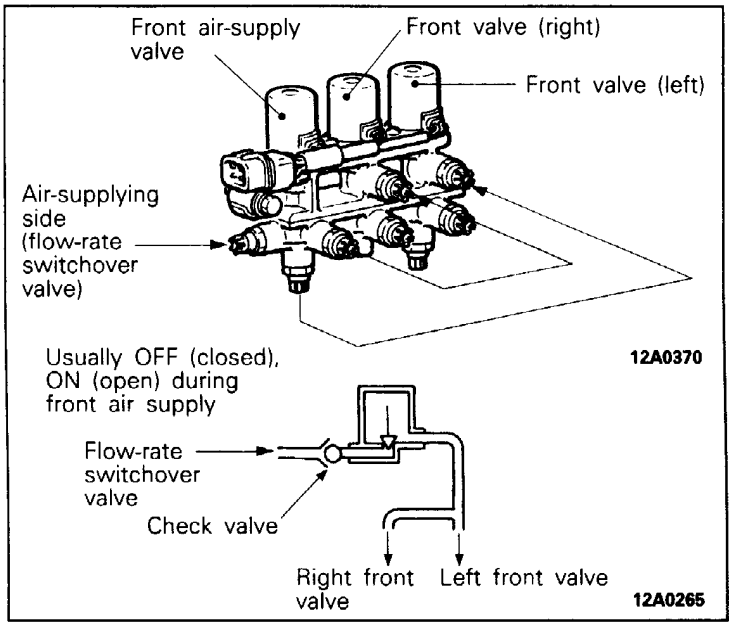
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
104	Front exhaust valve	Resistance	104-earth	–	8.5–13.5 Ω
113	Rear exhaust valve	Resistance	113-earth	–	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	The exhaust air cannot be switched to the outside-discharge mode because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• The vehicle-height adjustment (downward) cannot be made at the front or rear. • The vehicle height decreases at the front or rear during rolling control hold. • The vehicle-height adjustment (downward) is too fast and is excessive. • The return pump is activated during the vehicle-height adjustment (downward).	–
Stuck in the ON (open) position	The exhaust air cannot be switched to the internal-circulation mode because the valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	• Insufficient attitude control effect (air cannot be discharged). • The front or rear vehicle height increases after the rolling control.	–

[23] FRONT AIR-SUPPLY VALVE ACTIVATION CIRCUIT





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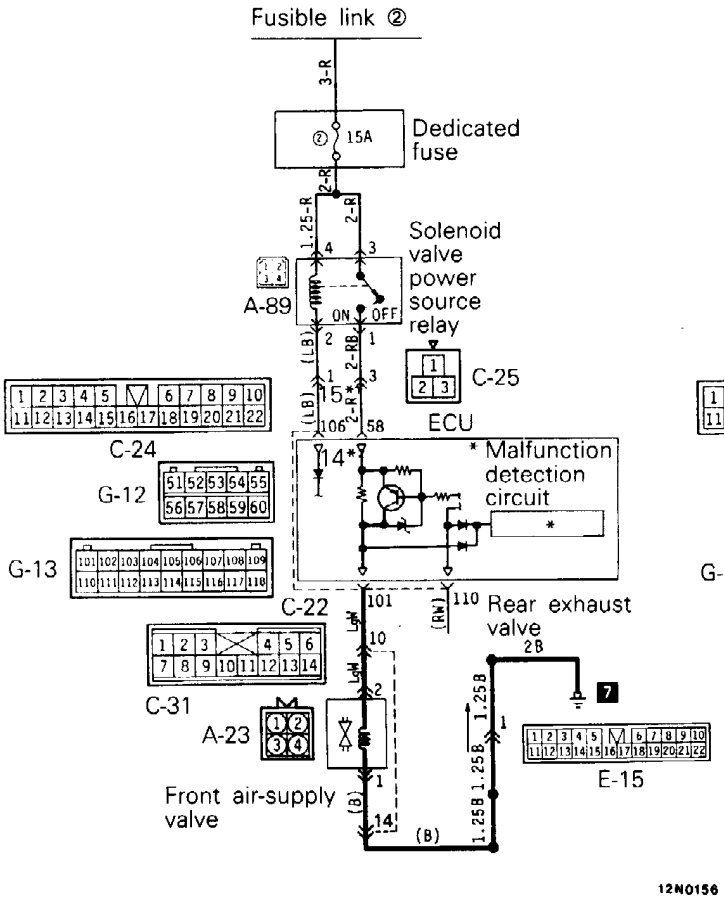

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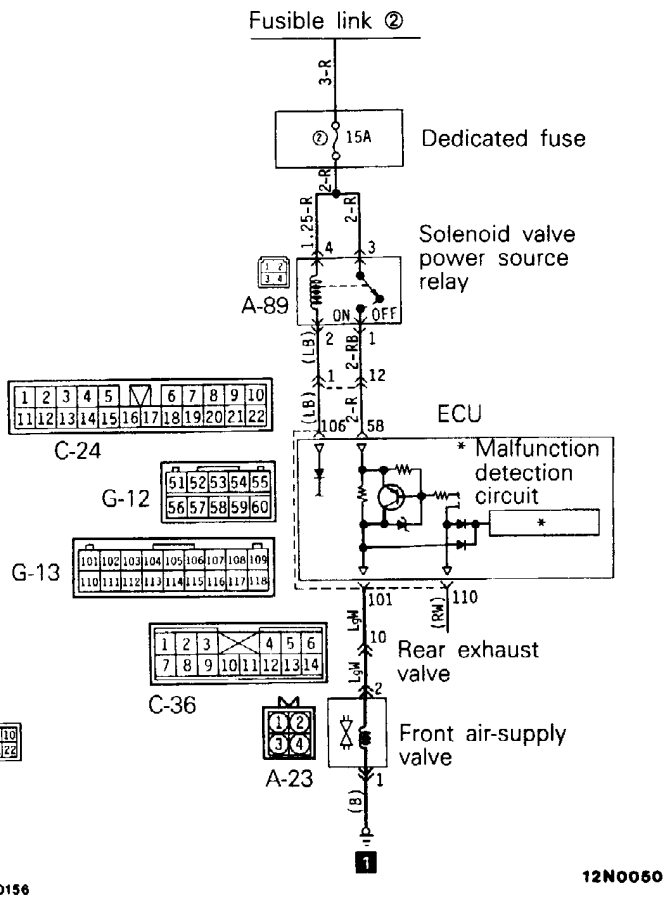


Operation

The front air-supply valves are switched ON (opened) for air supply to the left and right strut air springs during attitude control and during vehicle-height adjustment upward.

Usually, and during air exhaust, these valves are OFF (closed).
Note that a check valve is provided in these valves in order to prevent reverse flow of the air.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of an output transistor within the ECU, the alarm lamp illuminates, and control is as described in the table below.
Note that the malfunction-detection circuit is the same for the rear air-supply valves.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
51	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

The front air-supply valves are activated by the following.

Code No.	Applicable operation
08	Vehicle height upward adjustment
09	Rolling control (left turn)
10	Rolling control (right turn)

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
101	Front air-supply valve activation signal	When the front air-supply valves are ON (open)	System voltage
		When the front air-supply valves are OFF (closed)	0V
		During fail-safe (for solenoid valve power source relay switch OFF)	0V

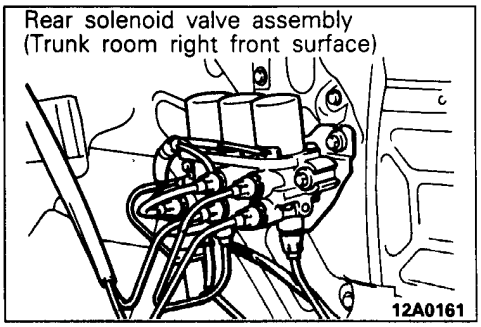
Checking the front air-supply valve activation circuit (with the connector disconnected)

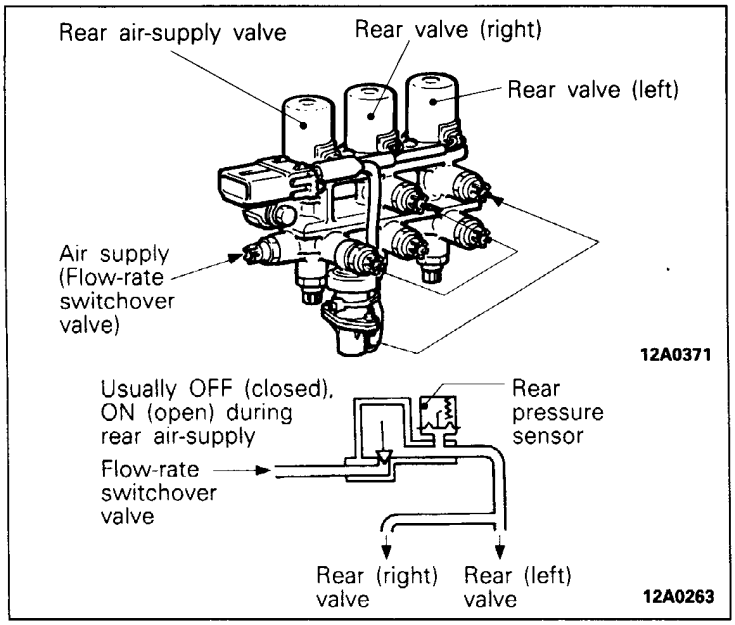
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
101	Front air-supply valve	Resistance	101-earth	–	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	Air cannot be supplied in because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• The front vehicle-height will not increase. • Insufficient control of rolling and braking dive. • The front vehicle-height decreases after rolling control.	–
Stuck in the ON (open) position	Air supply cannot be stopped because the valve is stuck in the ON (open) due to corrosion, freezing, etc, caused by moisture penetration.	The front vehicle-height increases and the body tilts to one side.	–
Air leakage at the valve seat	Valve seat is worn.	• When left as is, the front vehicle-height increases. • The front vehicle-height downward adjustment frequency increases.	Diagnosis No. 56 output
Air leakage to atmosphere	Wear, etc. of the O-ring etc.	• When left as is, the front vehicle-height decreases. • Air is not accumulated in the high-pressure tank. • The compressor is activated too frequently.	Very slight leakages cannot be detected. Such leakage is detected a long time afterward by a decrease of the vehicle height.

[24] REAR AIR-SUPPLY VALVE ACTIVATION CIRCUIT





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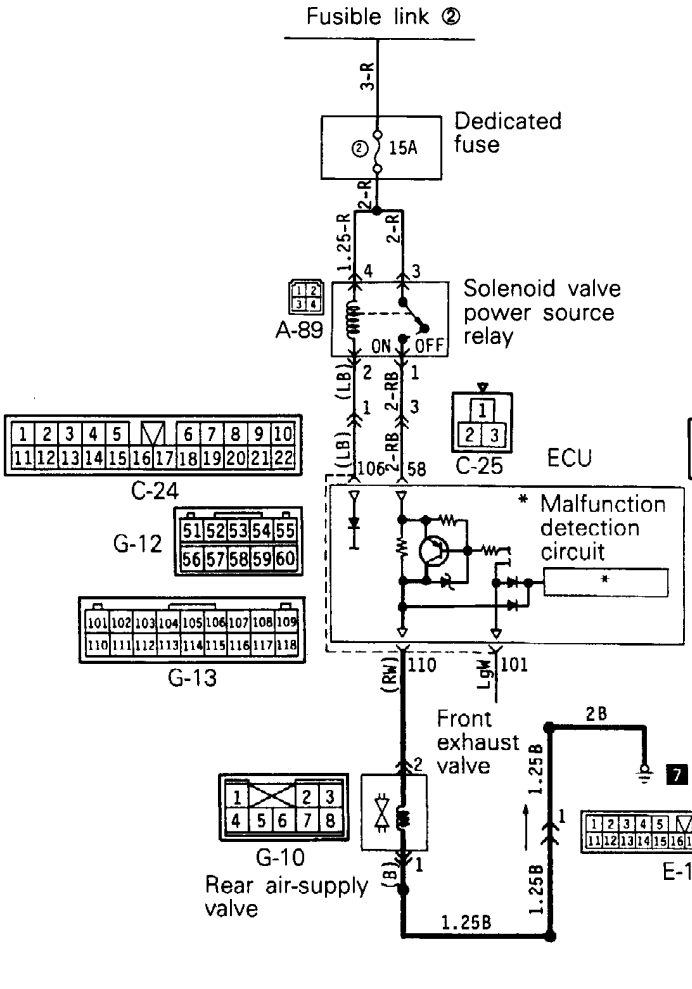

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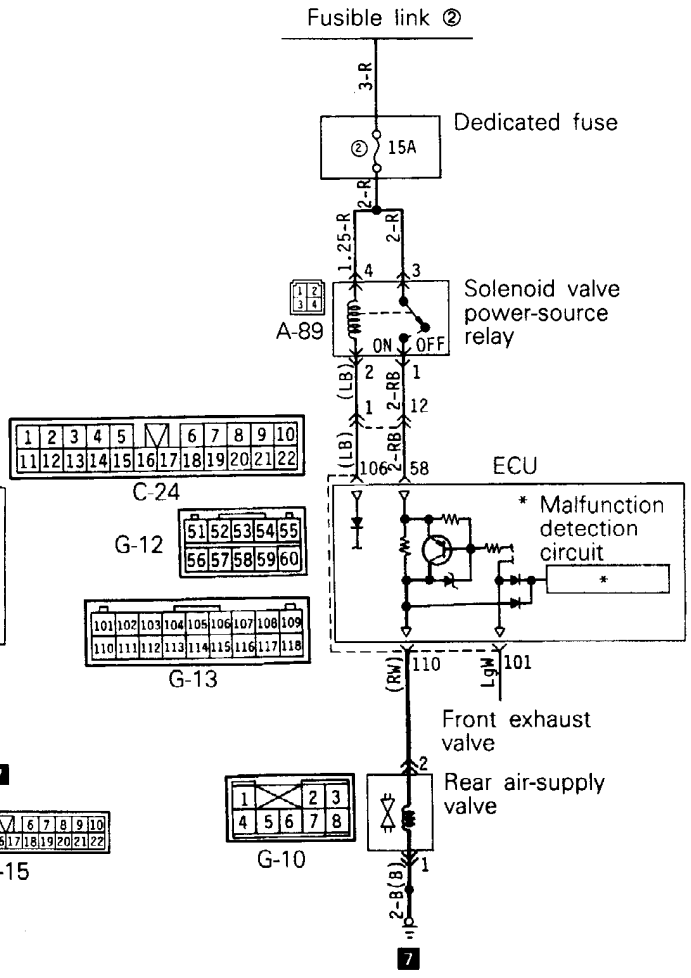


12N0049

Operation

The rear air-supply valves are switched ON (opened) for air supply to the left and right air springs during attitude control and during vehicle-height adjustment upward.

Usually, and during air exhaust, these valves are OFF (closed). Note that the rear-pressure sensors, for detection of the internal pressure of the rear shock absorbers, are installed in these valves.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of an output transistor within the ECU, the alarm lamp illuminates, and control is as described in the table below. Note that the malfunction-detection circuit is the same for the front air-supply valves.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
51	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

The rear air-supply valves are activated by the following.

Code No.	Applicable operation
08	Vehicle height downward adjustment
09	Rolling control (left turn)
10	Rolling control (right turn)

ECU terminal voltage (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
110	Rear air-supply valve activation signal	When the rear air-supply valves are ON (open)	System voltage
		When the rear air-supply valves are OFF (closed)	0V
		During fail-safe (for solenoid valve power source relay switch OFF)	0V

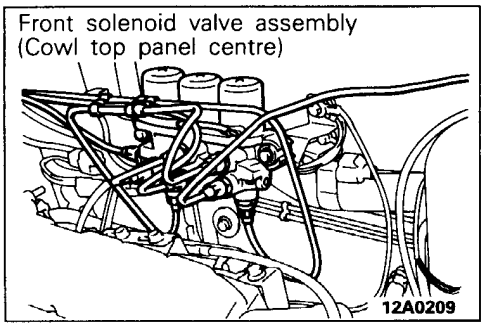
Checking the rear air-supply valve activation circuit (with the connector disconnected)

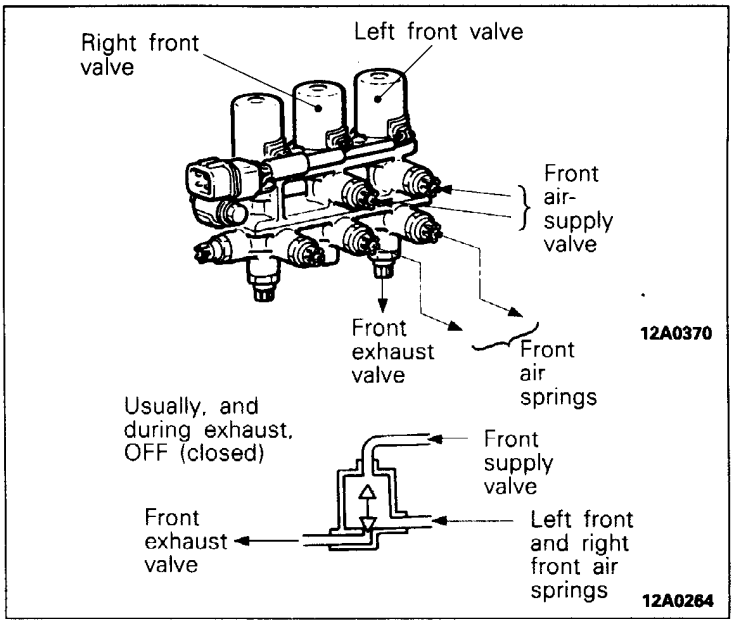
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
110	Rear air-supply valve	Resistance	110-earth	–	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	Air cannot be supplied in because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• The rear vehicle-height will not increase. • Insufficient control of rolling and squat. • The rear vehicle-height decreases after rolling control.	–
Stuck in the ON (open) position	Air supply cannot be stopped because the valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	The rear vehicle-height increases and the body tilts to one side.	–
Air leakage at the valve seat	Valve seat is worn.	• When left as is, the rear vehicle-height increases. • The rear vehicle-height downward adjustment frequency increases.	Diagnosis No. 56 output
Air leakage to atmosphere	Wear, etc. of the O-ring, etc.	• When left as is, the rear vehicle-height decreases. • Air is not accumulated in the high-pressure tank. • The compressor is activated too frequently.	Very slight leakages cannot be detected. Such leakage is detected a long time afterward by a decrease of the vehicle height

[25] LEFT FRONT/RIGHT FRONT VALVE ACTIVATION CIRCUIT





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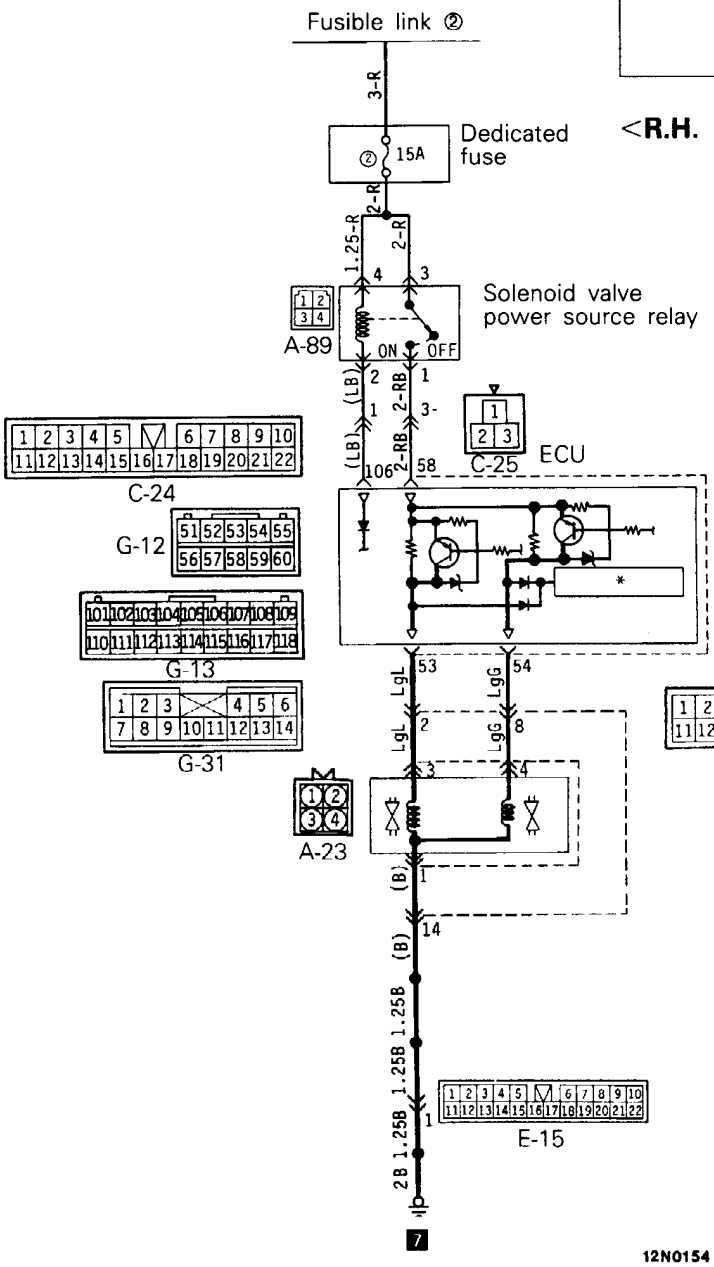

12N0154

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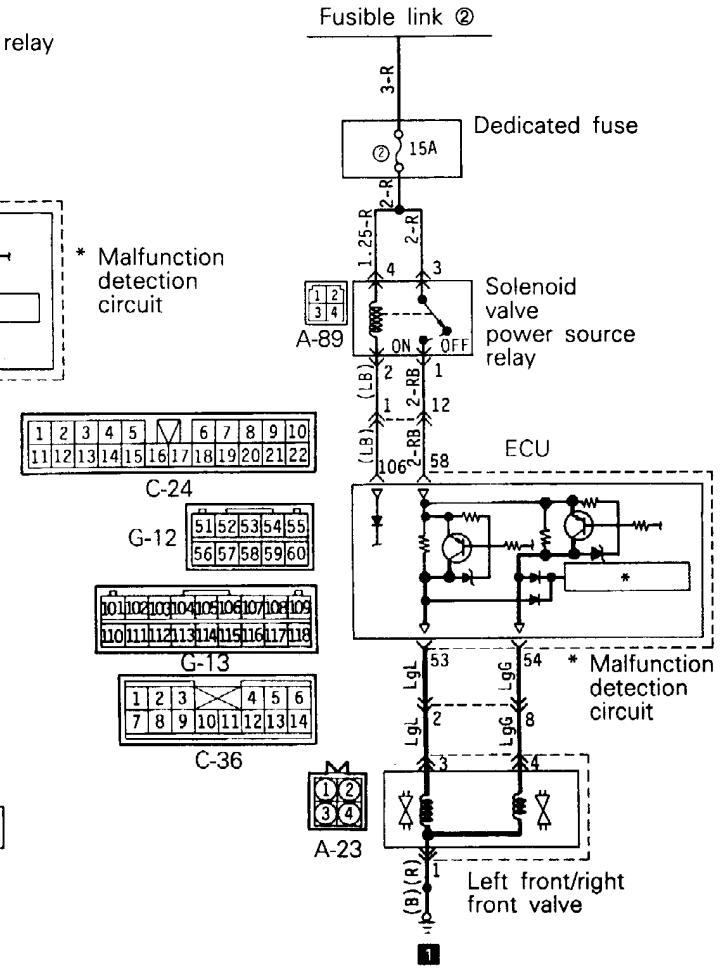


12N0052

Operation

The left front and right front valves are for switching the air intake and exhaust for the left front and right front strut air springs.

These valves are usually, and during air intake, OFF (closed), and are ON (open) during exhaust.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of an output transistor within the ECU, the alarm lamp illuminates, and control is as described in the table below.
Note that the malfunction-detection circuit is the same for the left front and right front valves.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
52	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

The left front and right front valves are activated by the following.

Code No.	Applicable operation
07	Vehicle height downward adjustment
09, 10	Rolling control (left turning: left valve)/ rolling control (right turning: right valve)

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
53	Left front valve activation signal	When the left/right front valves are ON	System voltage
		When the left/right front valves are OFF	0V
54	Right front valve activation signal	During fail-safe (for solenoid valve power source relay switch OFF)	0V

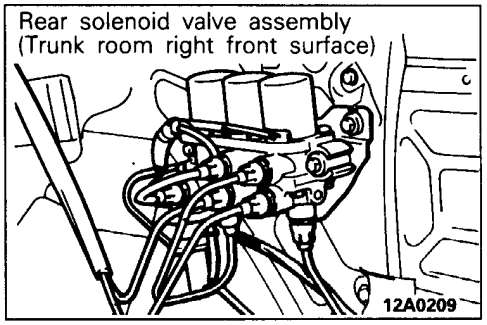
Checking the left front/right front valves activation circuit (with the connector disconnected)

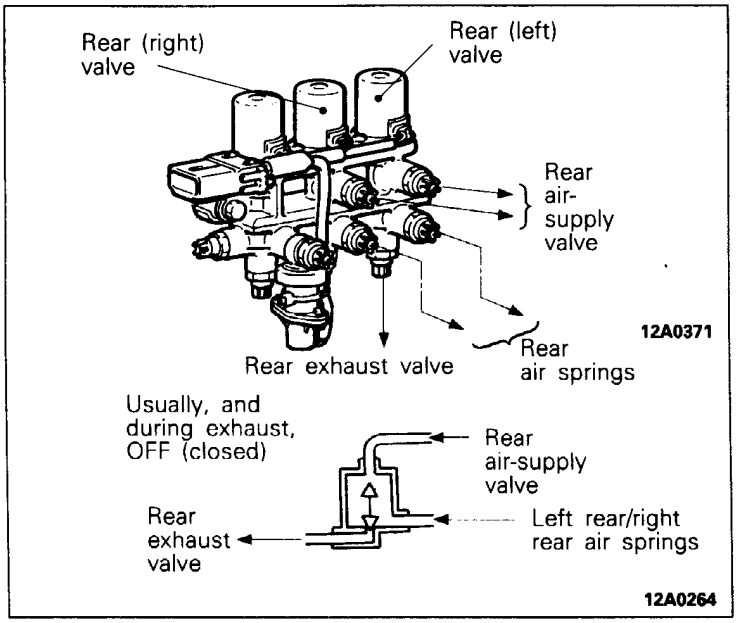
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
53	Left front valve	Resistance	53-earth	Constanty	8.5–13.5 Ω
54	Right front valve	Resistance	54-earth	Constanty	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	Air cannot be discharged because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• The left front and right front vehicle-height increases after rolling control. • Insufficient active control effect.	–
Stuck in the ON (open) position	Air cannot be taken in because the valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	• The left front and right front vehicle height decreases, and the body tilts to one side. • The return pump is activated too frequently.	Diagnosis code No. 56 is output.
Air leakage at valve seat	Valve seat is worn.	When left as is, the front vehicle-height will decrease.	Diagnosis code No. 56 is output.
Air leakage to atmosphere	Wear, etc. of the O-ring, etc.	When left as is, the front vehicle-height will decrease.	Very slight leakages cannot be detected. Such leakage is detected a long time afterward by a decrease of the vehicle height.

[26] LEFT REAR/RIGHT REAR VALVE ACTIVATION CIRCUIT





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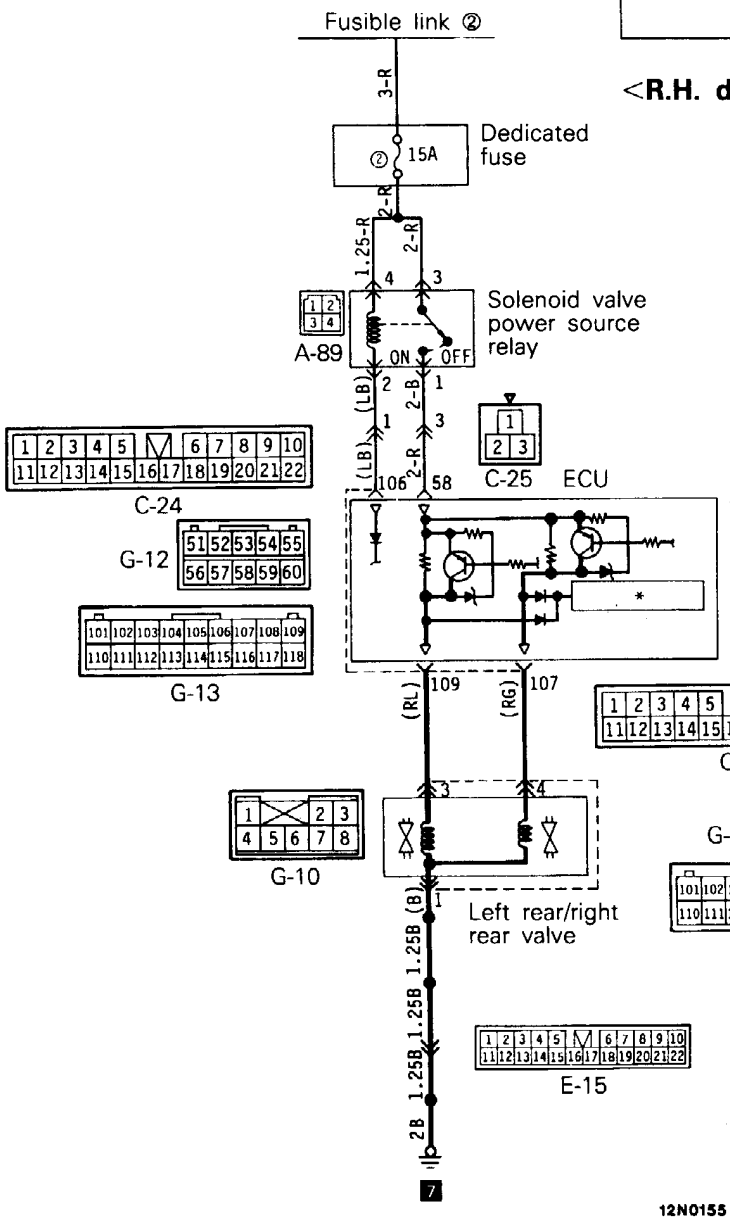

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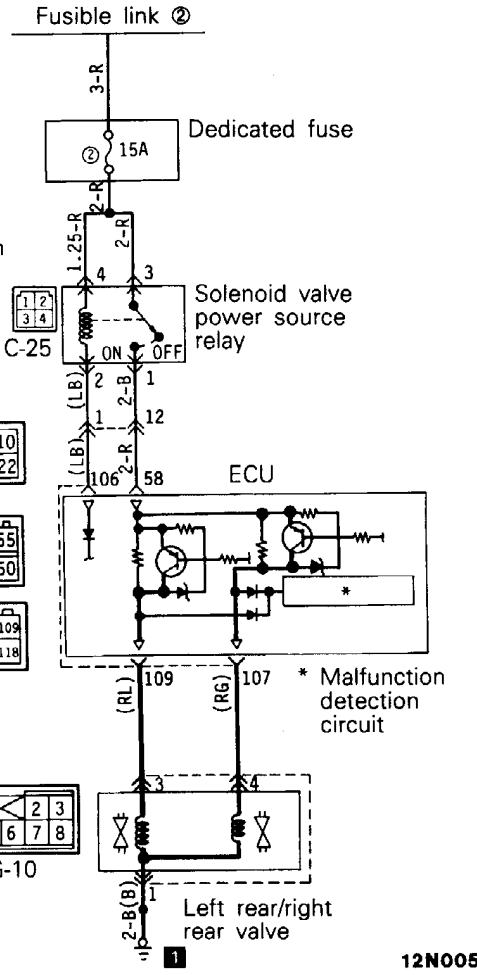

Operation

The left rear and right rear valves are for switching the air supply and exhaust for the left rear and right rear shock absorber air springs.

These valves are usually, and during air supply, OFF (closed), and are ON (open) during exhaust.

Diagnosis

If there is damage or disconnection of the heavy-line circuit, or a malfunction of an output transistor within the ECU, the alarm lamp illuminates, and control is as described in the table below.
Note that the malfunction-detection circuit is the same for the left rear and right rear valves.

Diagnosis No.	Attitude control	Damping force control	Vehicle-height control	Switch acceptance	
				HIGH	AUTO
53	Control stop	Held at MEDIUM	Control stop	Not accept	

Actuator compulsory activation

The left rear and right rear valves are activated by the following.

Code No.	Applicable operation
07	Vehicle height downward adjustment
09, 10	Rolling control (left turning: left valve)/ rolling control (right turning: right valve)

ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
109	Left rear valve activation signal	When the left/right rear valves are ON	System voltage
		When the left/right rear valves are OFF	0V
107	Right rear valve activation signal	During fail-safe (for solenoid valve power source relay switch OFF)	0V

Checking the left rear/right rear valves activation circuit (with the connector disconnected)

Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
109	Left rear valve	Resistance	109-earth	–	8.5–13.5 Ω
107	Right rear valve	Resistance	107-earth	–	8.5–13.5 Ω

Troubleshooting hints (mechanical malfunctions)

Malfunction mode	Malfunction probable cause	Malfunction	Note
Stuck in the OFF (closed) position	Air cannot be discharged because the valve is stuck in the OFF (closed) due to corrosion, freezing, etc. caused by moisture penetration.	• The left rear and right rear vehicle-height increases after rolling control. • Insufficient active control effect.	–
Stuck in the ON (open) position	Air cannot be taken in because the valve is stuck in the ON (open) due to corrosion, freezing, etc. caused by moisture penetration.	• The left rear and right rear vehicle height decreases, and the body tilts to one side. • The return pump is activated too frequently.	Diagnosis code No. 56 is output.
Air leakage at valve seat	Valve seat is worn.	When left as is, the rear vehicle-height will decrease.	Diagnosis code No. 56 is output.
Air leakage to atmosphere	Wear, etc. of the O-ring, etc.	When left as is, the rear vehicle-height will decrease.	Very slight leakages cannot be detected. Such leakage is detected a long time afterward by a decrease of the vehicle height.

[27] ACTIVE-ECS RELATED DIAGNOSIS/SERVICE DATA OUTPUT CIRCUIT

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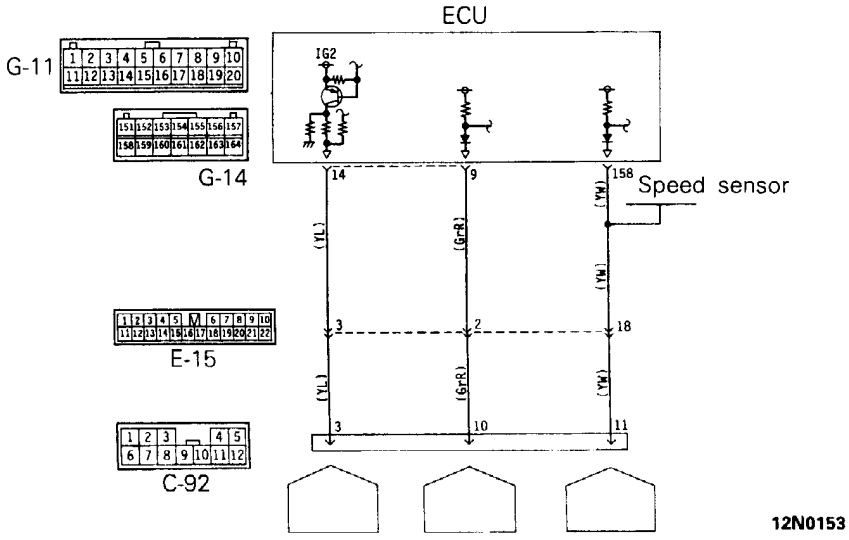

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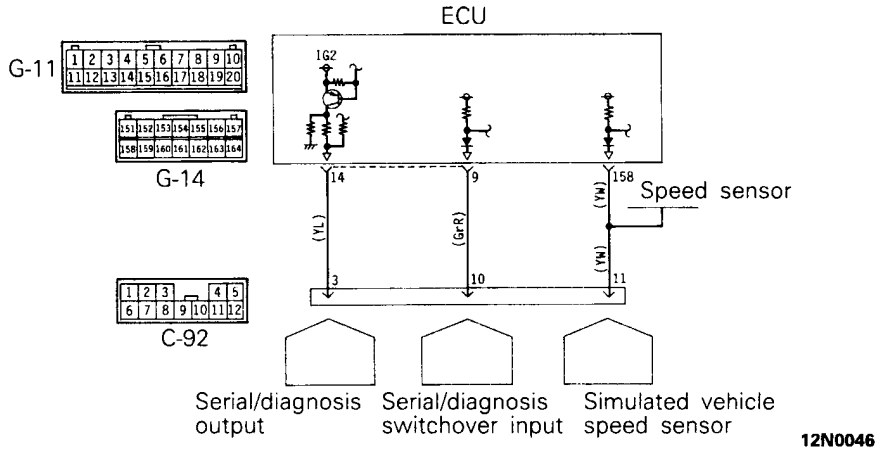
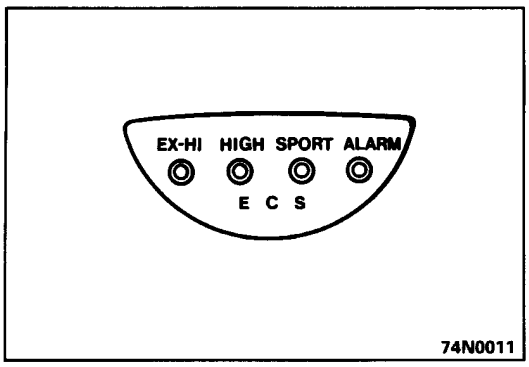


ECU terminal voltages (when connector is connected)

Terminal No.	Signal	Condition	Terminal voltage
9	Diagnosis/service data switching signal	When multi-use tester is connected	0V
		Usual	3.0–5.0V
14	Diagnosis/service data switching signal	Constantly	0V ↕ System voltage

ACTIVE-ECS related diagnosis/service data output circuit (with the connector disconnected)

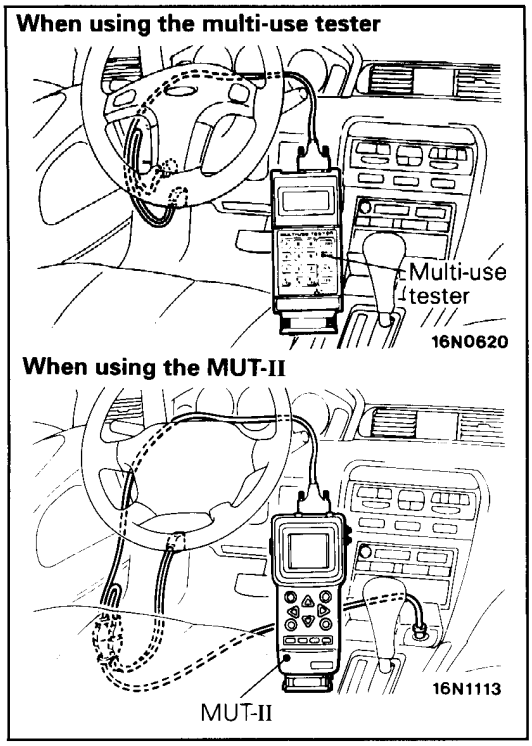
Terminal No.	Connection destination or measured part	Measurement	Tester connection	Check condition	Standard
9	Diagnosis/service data switching signal	Resistance	9 Diagnosis concentrated connector	–	Continuity
14	Harness for diagnosis/service data output	Resistance	14 Diagnosis concentrated connector	–	Continuity



SERVICE ADJUSTMENT PROCEDURES

ALARM LAMP CHECK

Check if the alarm lamp illuminates for approximately 0.5 second when the ignition key is turned to ON and the engine has been started.



SYSTEM CHECKING BY USING ALARM LAMP

1. After checking the alarm lamp bulb to be sure it has not failed, let the engine idle for approximately 4 minutes or more to check to be sure that the alarm lamp does not illuminate.
2. While the alarm lamp is on, connect the multi-use tester <Up to 1993 models> or MUT-II <All models> to the diagnosis check terminal of the wiring harness and check the diagnosis output code.

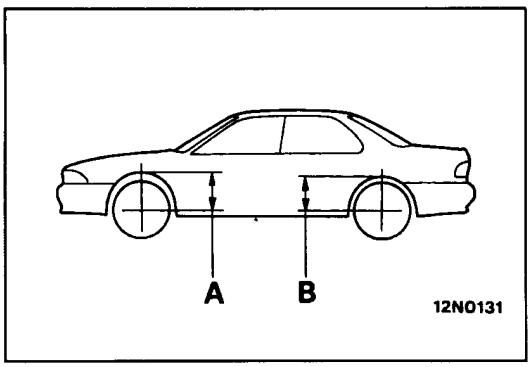
Caution
Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.

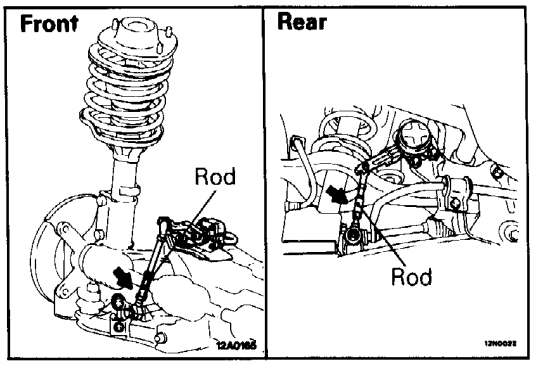
NOTE
Although the alarm lamp illuminates under the following circumstances, there is no actual malfunction if, after the following procedures have been followed and then the alarm lamp does not illuminate after waiting about four minutes or more.

1. When there is an overload
   Stop the engine, unload the cargo, and then restart the engine.
2. When the vehicle is stopped (with the engine running) on a steep hill or slope.
   Move the vehicle to a horizontal place and stop; then stop the engine and restart it.
3. When vehicle-height adjustments are made frequently. After stopping the engine, open the hood and allow the compressor to cool; then restart the engine.
4. When the vehicle is driven on winding roads in the mountains continuously for 18 minutes or longer. To protect the return pump from damage, stop the engine and then restart it.

CHECKING BY SELF-DIAGNOSIS

(1) Inspect the self-diagnosis codes.
(2) After completion of repairs to the malfunctions erase the self-diagnosis codes.
(3) Carry out a repeat self-diagnosis output inspection and check if the self-diagnosis codes are normal.





NORMAL VEHICLE HEIGHT CHECK AND ADJUSTMENT

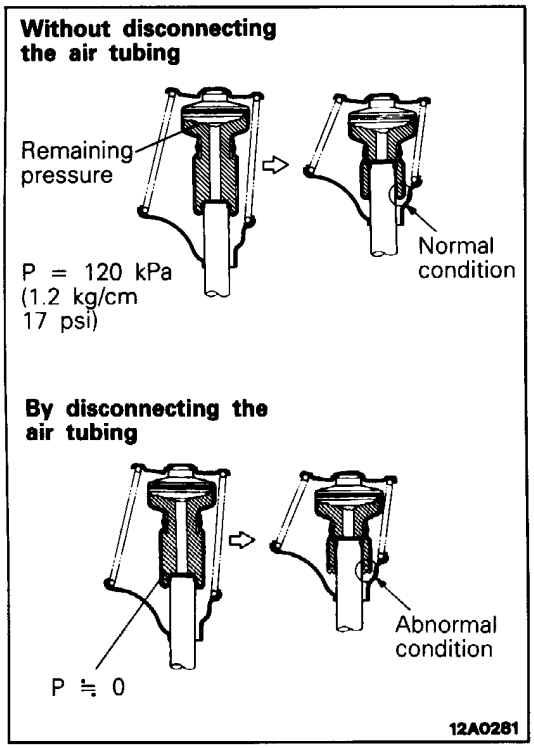
1. Park the vehicle on a flat surface.
2. With the vehicle unladen, start the engine, and after vehicle height adjustment is completed, check if the vehicle height is at NORMAL.
3. Measure the distance between the wheel arch and the center of the axle for both the right front and left rear.
   Standard value:

A (Front)	**391–401 mm (15.4–15.8 in.)**
B (Rear)	**362–372 mm (14.3–14.6 in.)**

4. If the vehicle height is not within the standard value, loosen the turnbuckles of the front and rear height sensor rods, and then make the adjustment by changing the length of the rods. (One turn of the nut will raise or lower the front vehicle height by approximately 6 mm [0.24 in.], and the rear vehicle height by approximately 3 mm [0.12 in.].) The vehicle height becomes higher when the rods are lengthened.

Caution

1. **Both the front and rear heights must be checked, because, even though only the front or the rear is adjusted, the other height (rear or front) is also changed.**
2. **The adjustments of the vehicle height must be made while the engine is idling (vehicle stopped).**



ROLLING DIAPHRAGM CHECKING

Under normal conditions, the rolling diaphragm is as shown in the "normal condition" half of the figure. If, however, the vehicle is jacked up while there is no air in the air springs and then let down suddenly, the diaphragm may become double folded, as shown in the "abnormal condition" half of the illustration.
If the vehicle is driven in abnormal condition, the diaphragm will soon be damaged, so the procedure below should be followed to prevent this.

Checking method

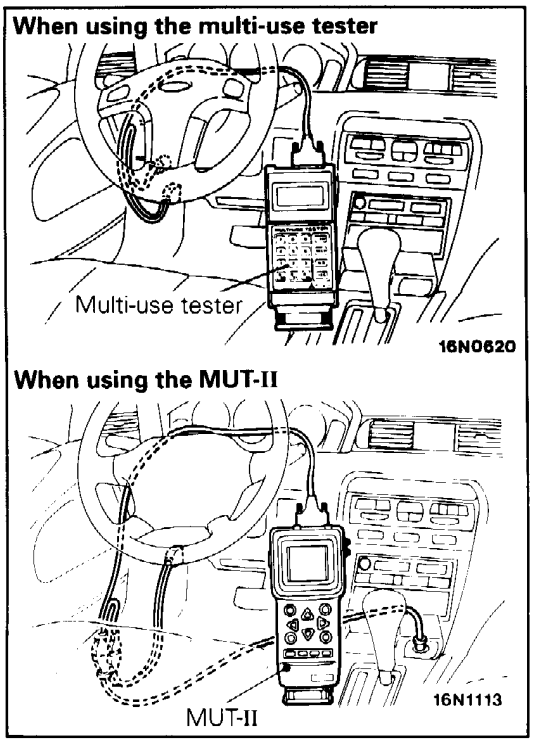
Front: Jack the front end up and check visually or feel the diaphragm.
Rear: Check to be sure that movement is smooth when the rear part of the body is bounced up and down.

Repair method

1. Jack up the vehicle and start the engine.
2. Press the HIGH vehicle-height switch for two seconds or longer so as to set to the EXTRA HIGH vehicle-height.
3. Supply air to each air spring so as to return the diaphragm to the normal form.

   NOTE
   The diaphragm will return easily if a solution of soap and water is applied to the diaphragm.

   Caution
   In order to prevent double-folding of the diaphragm, be sure, if the air tubing is disconnected in the course of servicing, to follow step 2 above after connecting the tubing in order to introduce air into the air springs.

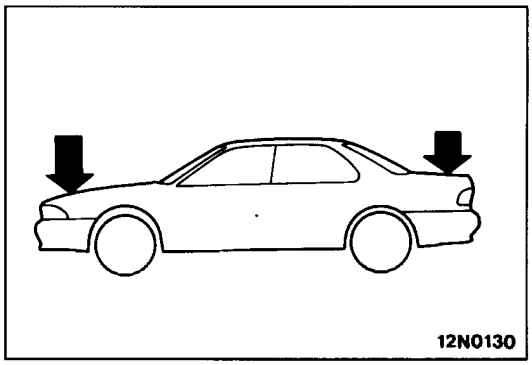


SYSTEM OPERATION CHECK

The checking procedures described below are for the purpose of actually activating the system so as to verify whether or not the system's function is normal.

Caution

1. **Fot checks conducted by an actual road test, do so in a safe place and observe the speed limit.**
   For tests that require high-speed driving, such tests can be conducted while the vehicle is stopped by using the multi-use tester <Up to 1993 models> or MUT-II <All models> to input simulated vehicle-speed signals.
   Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.
2. **Never drive the vehicle while the simulated vehicle-speed signals are still being used.**



CHECKING THE DAMPING FORCE

1. Move the wheel to the straight-ahead position.
2. Start the engine.
3. Set to the AUTO mode (normal vehicle height).
4. Press the control mode switch and check to be sure that there is a difference of the damping force for each control mode when the vehicle is moved up and down at a rate of twice per second.

Control mode	Damping force
AUTO	SOFT
SPORT	MEDIUM

CHECKING THE ANTI-ROLLING FUNCTION

1. Move the wheels to the straight-ahead position.
2. Turn the ignition key to ON.
3. When simulated vehicle-speed signals of 35 km/h (22 mph) or higher are input and the steering wheel is turned 45° or more, check that the damping force changes to MEDIUM or HARD, depending on the speed at which the steering wheel is turned.
   Check to be sure that this sensitivity increases (for each control mode) as the vehicle speed increases.

CHECKING THE ANTI-DIVE FUNCTION

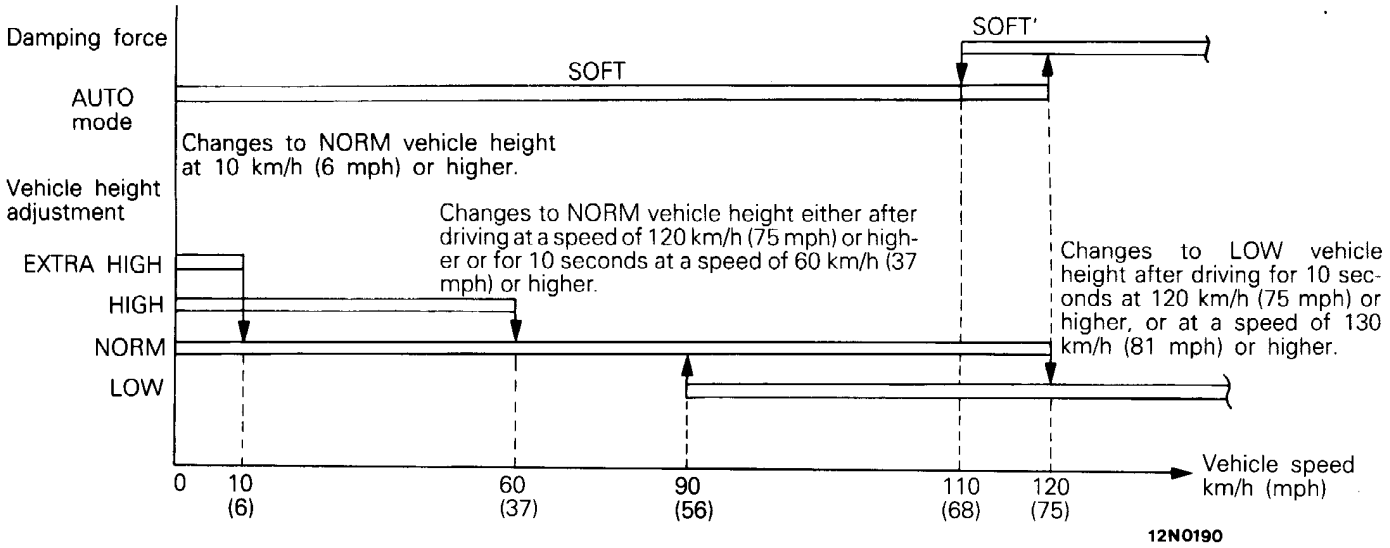
1. Turn the ignition key to ON.
2. Input a simulated vehicle-speed signal of 3 km/h (2 mph) or more.
3. With the brake pedal depressed (the stop lamp is ON), check that the damping force changes to HARD when the simulated vehicle-speed input signal is suddenly decreased from 100 km/h (62 mph) or higher, and that there is air supply at the front and exhaust at the rear.

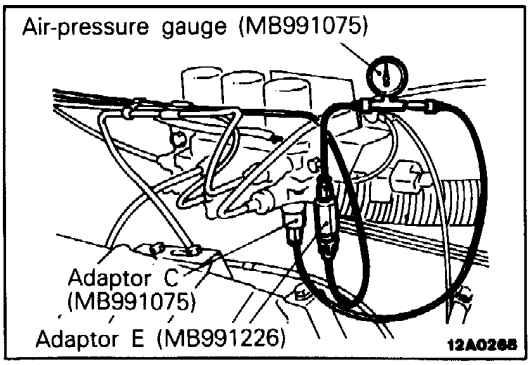
CHECKING THE ANTI-SQUAT FUNCTION

1. Turn the ignition key to ON.
2. Input a simulated vehicle-speed signal that is 3 km/h (2 mph) or higher and is less than 100 km/h (62 mph).
3. Check if the damping force changes to HARD when the accelerator pedal is suddenly depressed, and that there is air exhaust at the front and supply at the rear.

CHECKING THE VEHICLE-SPEED RESPONSE FUNCTION

1. Start the engine.
2. Input simulated vehicle-speed signals and check whether or not there are changes of the damping force and of the vehicle height (as shown in the diagram below) according to changes in the vehicle speed.

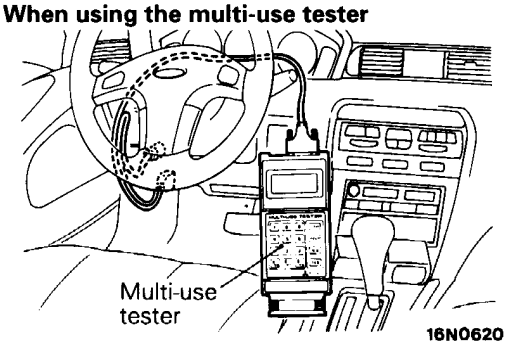




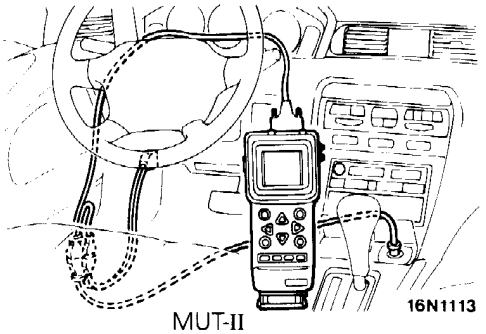
LOW-PRESSURE SWITCH (LOW-PRESSURE TANK SIDE) ACTUATION PRESSURE CHECK

1. Remove joint H of the blue-marked air tube (for the left front valve) of the front solenoid valve assembly.
2. Connect the special too (air-pressure gauge) between the disconnected air tube and the front solenoid valve assembly by using the special tools (adaptors E and C).

When using the multi-use tester



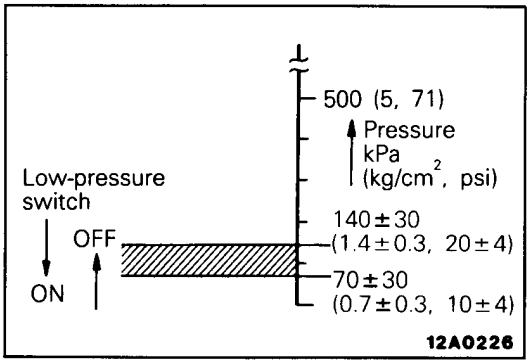
When using the MUT-II



3. Connect the multi-use tester <Up to 1993 models> or MUT-II <All models>, start the engine, and wait until the compressor stops (the high-pressure switch is OFF).

   Caution
   Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.

4. Input simulated vehicle-speed signals [3 km/h (2 mph) or higher].
5. With the simulated vehicle-speed signals still being input, conduct actuator test No. 09 (left turn) or No. 10 (right turn) so as to increase the pressure within the low-pressure tank chamber.

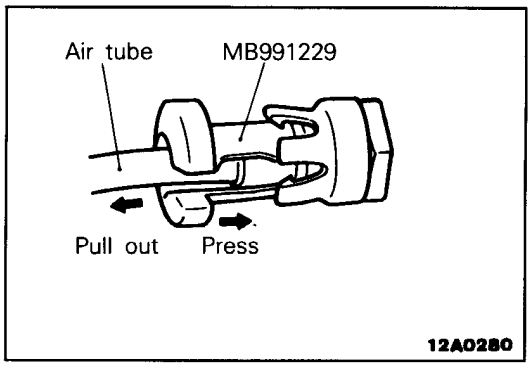


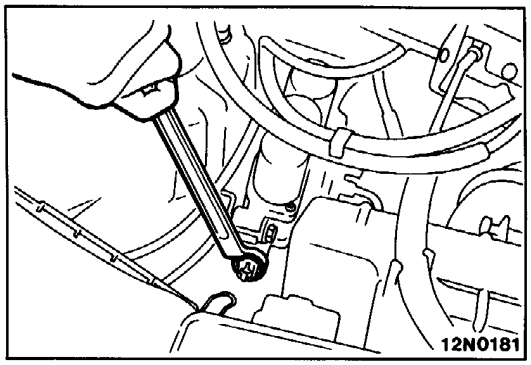
6. During the actuator test, monitor the pressure gauge indication and check whether or not the pressure when the return pump activation starts (i.e., the maximum gauge reading) and the pressure when the return pump stops are both within the standard value.

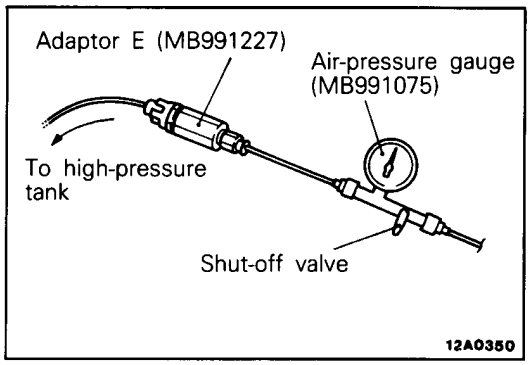
   Standard value:
   Return pump actuation pressure
   140 ± 30 kPa (1.4 ± 0.3 kg/cm², 20 ± 4 psi)
   Return pump stop pressure
   70 ± 30 kPa (0.7 ± 0.3 kg/cm², 10 ± 4 psi)

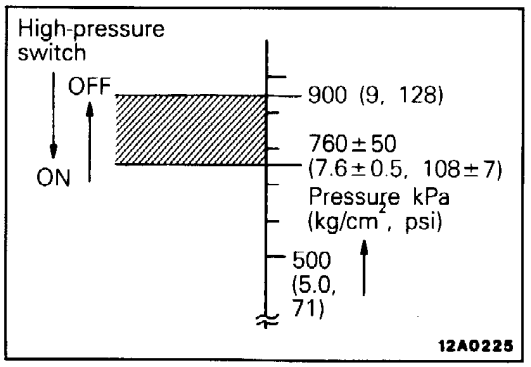
7. If the internal pressure of the low-pressure tank is not within the standard values when the return pump operation is actuated (i.e., the low-pressure switch is OFF) or when the operation of the return pump is stopped (low-pressure switch ON), remove the reserve tank assembly and replace the low-pressure switch.

NOTES









HIGH-PRESSURE SWITCH (HIGH-PRESSURE TANK SIDE) ACTUATION PRESSURE CHECK

1. Remove joint A of the yellow-marked air tube (for the front air-supply valves) of the front solenoid valve assembly.

   NOTE
   Removal is easier if the special tool is used to pull the air tube out, and then a socked wrench is used for removal.

2. Connect the gauge side air tubes of the special tool (air-pressure gauge) to the disconnected air tube and joint, connecting them via the special tube (adaptor E).

   NOTE
   The shut-off valve of the air-pressure gauge should be closed.

3. Start the engine and activate the compressor.

   NOTE
   If the system is in normal condition, the compressor will be activated after the engine is started, because the pressure within the high-pressure tank has decreased.

4. After activation of the compressor, the pressure within the high-pressure tank will increase; check whether or not the pressure is the standard value when the compressor is stopped.

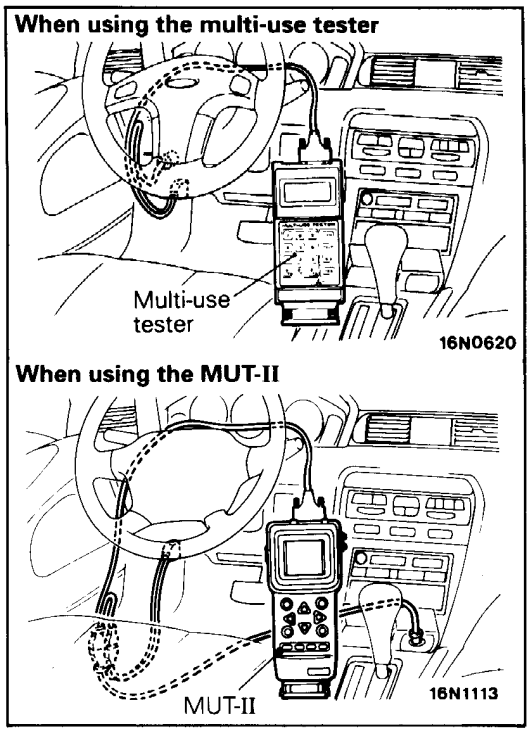
   Standard value: 900 kPa (9 kg/cm², 128 psi) or higher

5. Gradually open the shut-off valve of the air-pressure gauge while watching the indicator of the air-pressure gauge; check whether or not the pressure that actuates the compressor's operation (when the pressure within the high-pressure tank has dropped) is within the standard value range.

   Standard value: 760±50 kPa (7.6±0.5 kg/cm², 108±7 psi)

   NOTE
   The ON/OFF status of the high-pressure switch at this time can be checked by the multi-use tester <Up to 1993 models> or MUT-II <All models> (Refer to P.33B-4.)

6. If the pressure within the high-pressure tank is not within the standard value range when the compressor is stopped (high-pressure switch OFF) or the compressor is activated (high-pressure switch ON), remove the reserve tank assembly and replace the high-pressure switch.



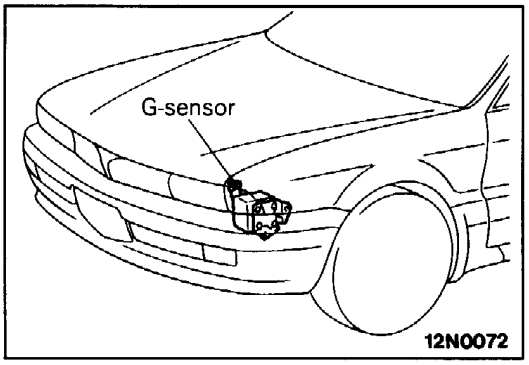
G-SENSOR OUTPUT VOLTAGE CHECK

1. Unload the vehicle and move it to a horizontal surface.
2. Connect the multi-use tester <Up to 1993 models> or MUT-II <All models> and start the engine.

   Caution
   Connection and disconnection of the multi-use tester or MUT-II should always be made with the ignition switch in the OFF position.

3. Check whether the G-sensor output voltage is within the standard value range when the vehicle-height is the NORMAL vehicle-height.

   Standard value: 2.5 ± 0.6V

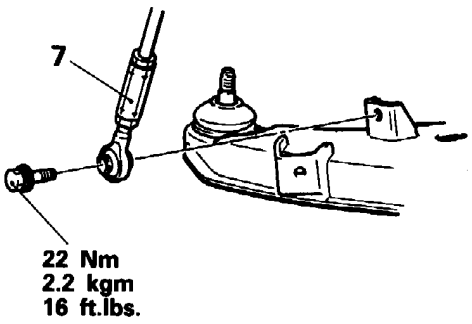


4. If the G-sensor output voltage is not within the standard value range, check the installation condition of the G sensor; if there is bolt loose, deformation of the body, etc., repair it. If the problem is not repairable, replace the G sensor.

   NOTE
   If the G-sensor installation surface is at an angle (tilted) due to body deformation or some other cause, a washer(s) or shim(s) may be used to make an adjustment so that the output voltage is within the standard value range.

STRUT ASSEMBLY

REMOVAL AND INSTALLATION



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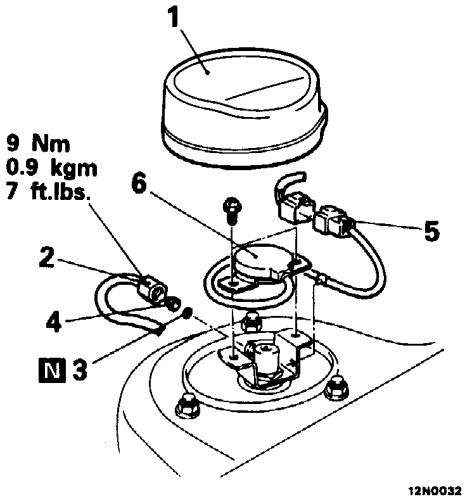

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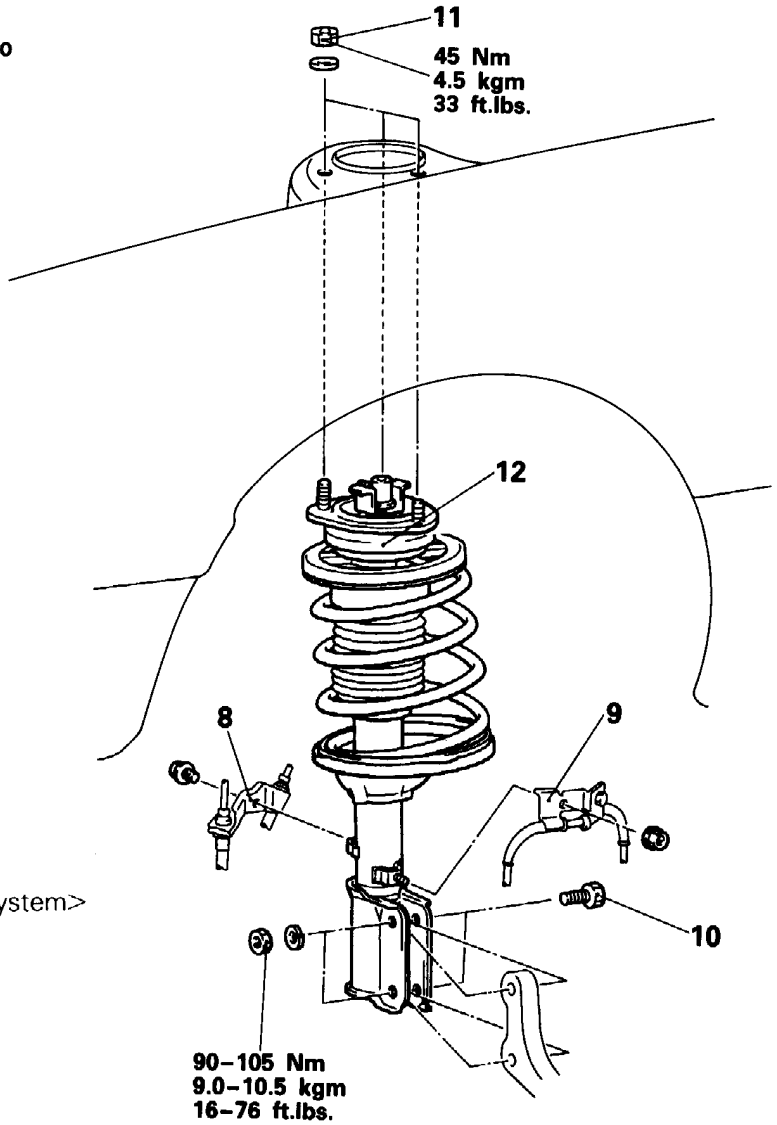
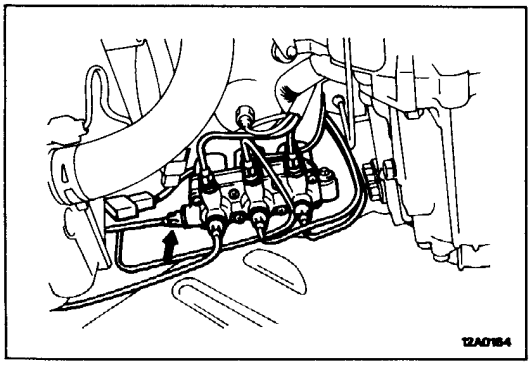


12N0033

Removal steps

1. Dust cover
2. Air tube
3. O-ring
4. Bush
5. Actuator connector
6. Actuator
7. Front height sensor rod
8. Brake hose and tube clamp
9. Front speed sensor clamp
   <Vehicles with anti-skid brake system>
10. Front strut lower mounting bolts
11. Front strut upper mounting nuts
12. Strut assembly

Post-installation Operation
- Operation Check of ECS System (Refer to P.33B-89.)
- Front Wheel Alignment Adjustment



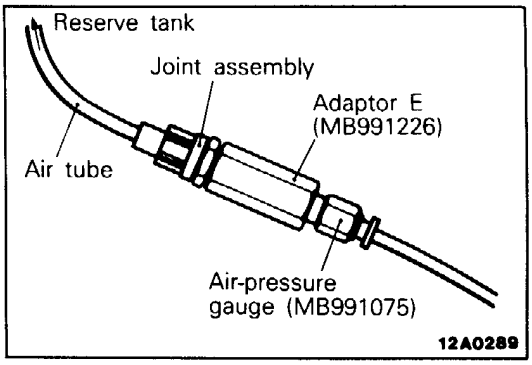
INSPECTION

E33LCAE

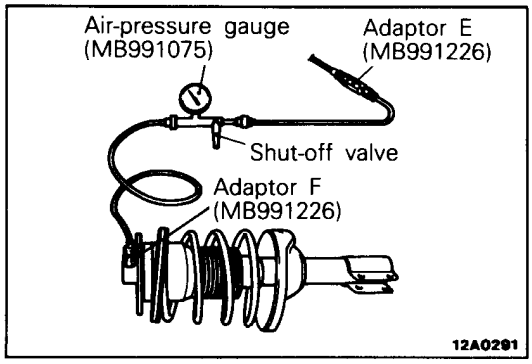
CHECKING FOR STRUT ASSEMBLY AIR LEAKAGE

(1) Disconnect the flow-control solenoid valve's air tube (connected to the high-pressure side of the reservoir tank) shown in the illustration, and then take off the joint assembly.

NOTE
This air tube is connected, via the reservoir tank and the dryer, to the compressor assembly.



(2) Install the removed joint assembly to the special tool (adaptor set) and then connect to the disconnected air tube.

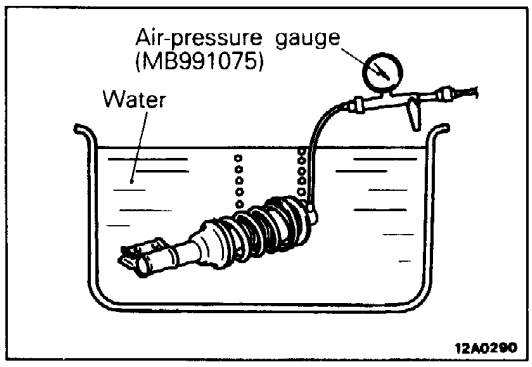


(3) Connect the air tube at the shut-off valve side of the special tool (air-pressure gauge) to the air tube side, and the other one to the strut assembly.
The installation at the strut side is done by using the special tool (adaptor set).

Caution
To prevent the entry of moisture during the strut assembly air leak check, utilize air from the dryer.

(4) Remove the compressor connector, then operate it by connecting it directly to the battery.

NOTE
Refer to P.33B-108 for compressor connector array.



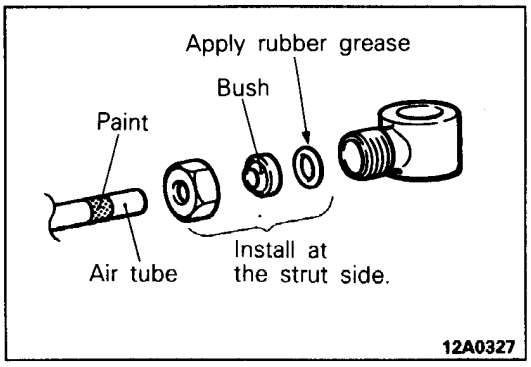
(5) Insert the strut assembly into a water tank and check for air leakage at a pressure of about 500 kPa (5 kg/cm^2, 71 psi).

Caution
1. **Don't mistake the rise of bubbles attached to the outside of the strut for air leakage.**
2. **Dry the strut with an air blower after the check has been completed.**

(6) When air leakage is found, check the strut assembly and replace it as necessary.

CHECKING THE ACTUATOR

For detailed information concerning the checking of the actuator, refer to the troubleshooting guide and to the service adjustment procedures section.



SERVICE POINTS OF INSTALLATION E33LDA-J

2. INSTALLATION OF AIR TUBE

(1) After coating the O-ring with rubber grease, install the O-ring, bush and flare nut to the strut assembly.

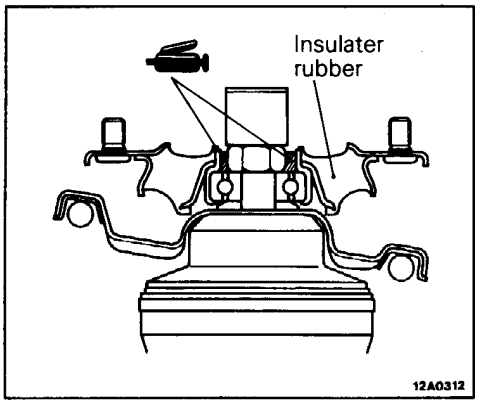
Caution
1. **The O-ring may be damaged if it is installed at the air tube side when the connection is made.**
2. **The bush must be installed so that the projection part is facing in the direction indicated in the illustration.**

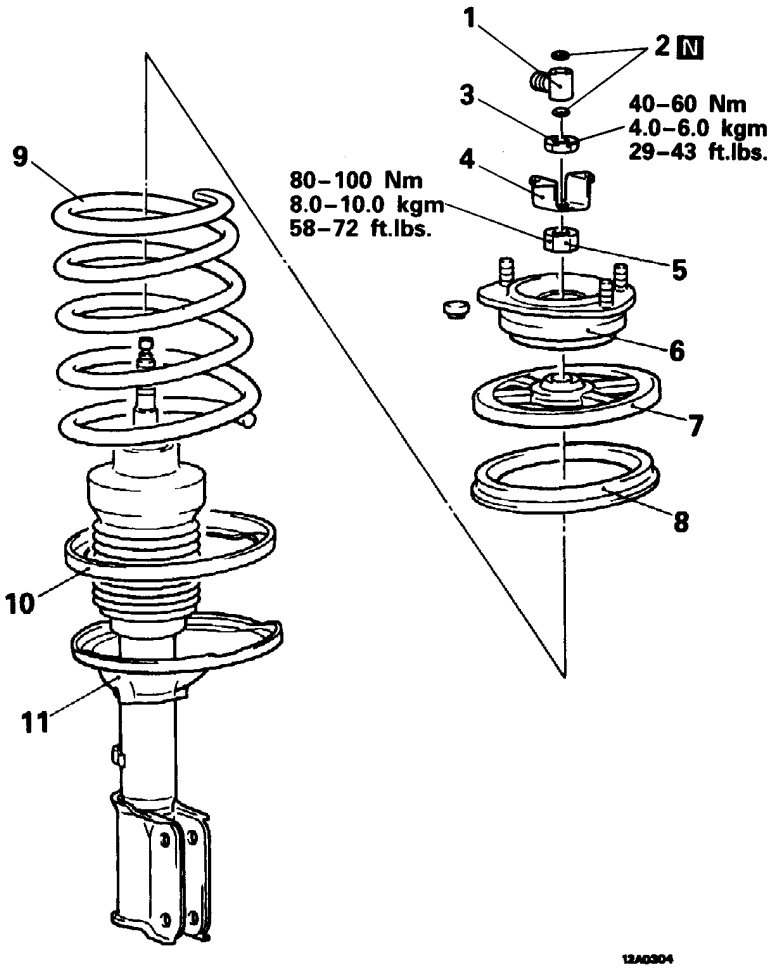
(2) First insert the air tube until resistance is felt, and then push the tube in until the painted place on the air tube.

Caution
Air leakage may occur if the air tube connection is not complete and secure.

(3) After connecting the air tube, in order to prevent double-folding of the diaphragm, while still in the lifted condition, press the vehicle-height switch (HIGH switch) for two seconds or longer to select the EXTRA HIGH mode so that air will be supplied to the air springs.

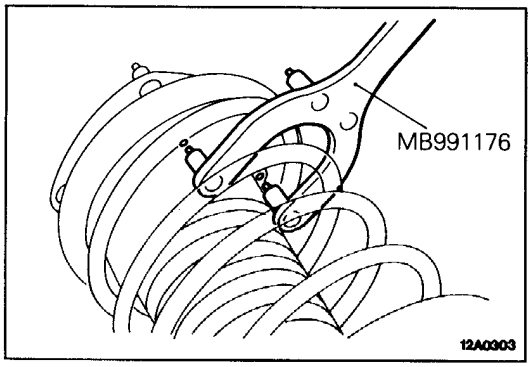
DISASSEMBLY AND REASSEMBLY E33LE–





Disassembly steps

1. Joint
2. O-ring
3. Actuator bracket mounting nut
4. Actuator bracket
5. Strut insulator mounting nut
6. Strut insulator
7. Upper spring seat
8. Upper spring pad
9. Coil spring
10. Lower spring pad
11. Strut assembly

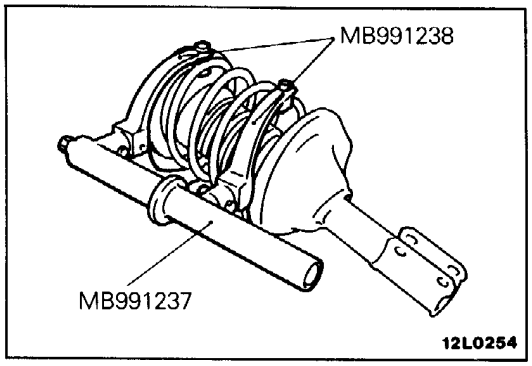


SERVICE POINTS OF DISASSEMBLY E33LFA-L

5. REMOVAL OF STRUT INSULATOR MOUNTING NUT

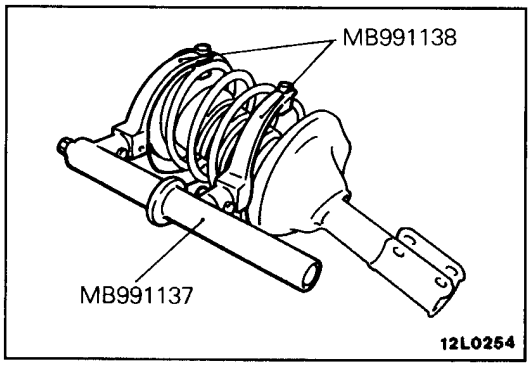
(1) Using the special tool, loosen the strut insulator mounting nut while holding the spring seat (upper).

Caution
(1) The strut insulator mounting nut should be loosened only, not removed.
(2) Do not use an air tool.



(2) Using the special tools, compress the coil spring and then remove the strut insulator mounting nut.

Caution
(1) Install the special tools evenly, and so that the maximum length will be attained within the installation range.
(2) Do not use an air tool to tighten the bolt of the special tool and to remove the strut insulator mounting nut.

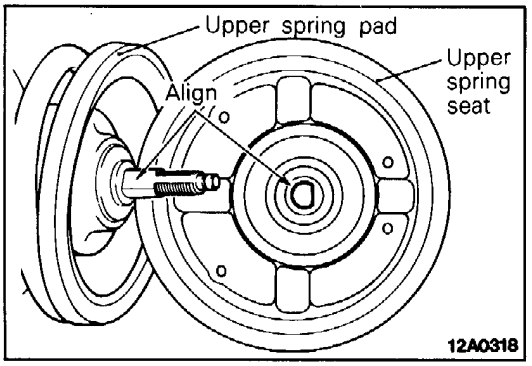


SERVICE POINTS OF REASSEMBLY E33UHAL

9. INSTALLATION OF COIL SPRING

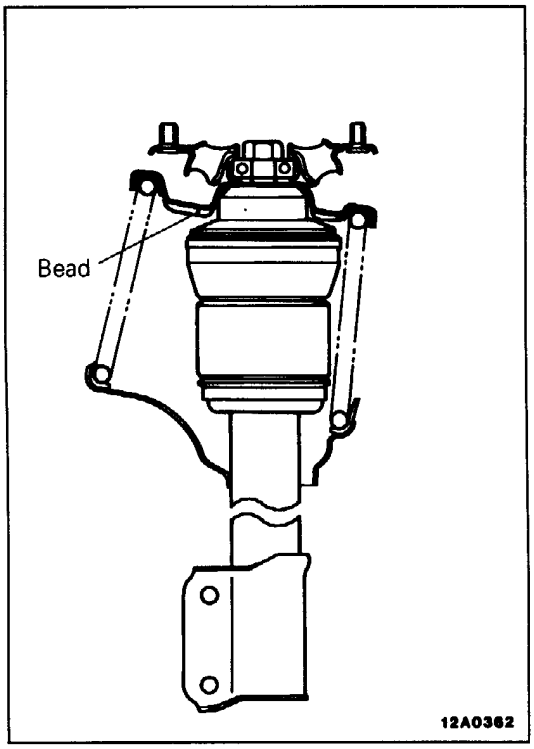
Attach the special tools to the coil spring and compress the spring, and then install to the strut.

Caution
Do not use an air tool to tighten the bolt of the special tool.

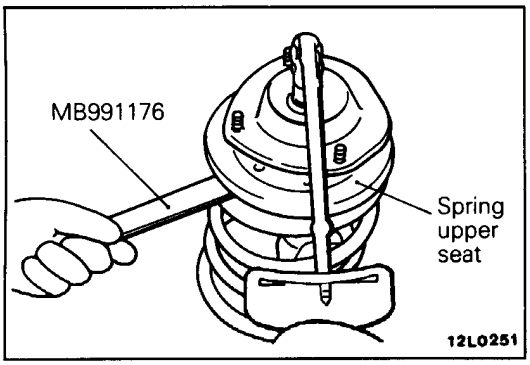


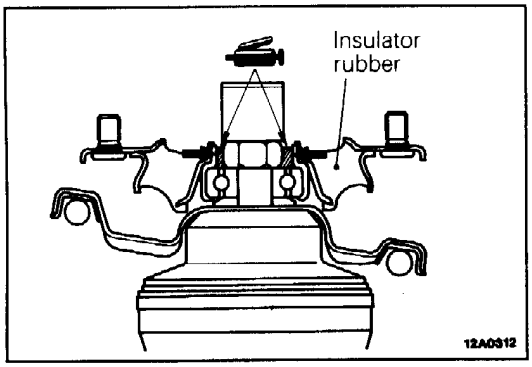
7. INSTALLATION OF UPPER SPRING SEAT

(1) Install the spring upper seat to the piston rod, and align the notched part of the piston rod and the hole in the spring seat.



(2) Align the bead of the spring upper seat and the facing direction of the knuckle bracket.





5. INSTALLATION OF STRUT INSULATOR MOUNTING NUT

(1) Loosely attach the strut insulator installation nut to the strut assembly.
(2) Correctly align both ends of the coil spring with the groove in the spring seat, and then loosen the special tools (MB991237 and MB991238).
(3) Using the special tool, hold the spring upper seat in place and tighten the strut insulator installation nut.

Caution
Do not use an air tool.

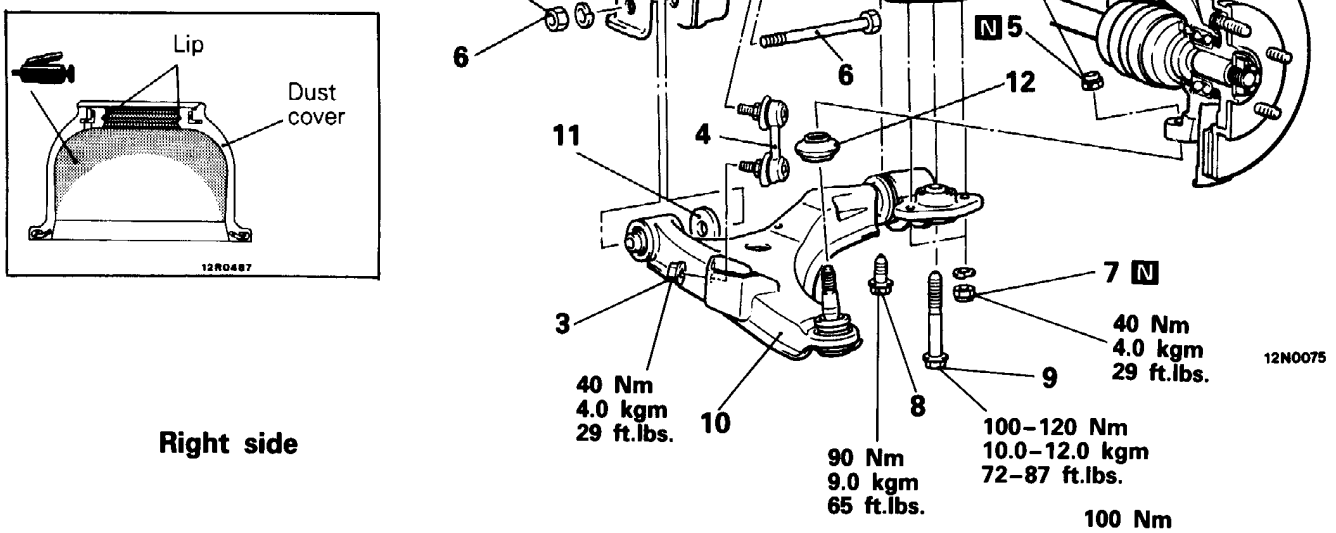
(4) Apply a coating of multipurpose grease to the insulator bearing channel.

Caution
When coating with grease, take care that the grease does not adhere to the insulator rubber part.

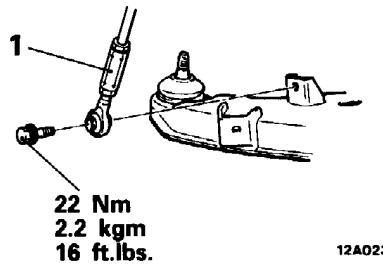
LOWER ARM

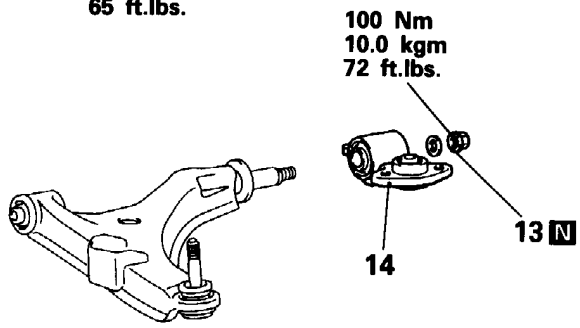
E33OA–

REMOVAL AND INSTALLATION



Right side



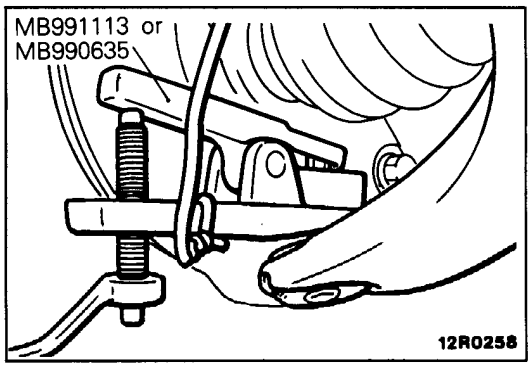


Removal steps

1. Front height sensor rod
2. Stabilizer link mounting nut (Stabilizer bar side)
3. Stabilizer link mounting nut (Lower arm side)
4. Stabilizer link
◆◆ 5. Lower arm ball-joint and knuckle coupling self-locking nut
6. Lower arm mounting bolt and nut
7. Clamp mounting self locking nut
8. Clamp mainting bolt (small)
9. Clamp mounting bolt (large)
10. Lower arm assembly
11. Stopper
12. Dust cover
◆◆ 13. Lower arm clamp mounting self locking nuts
14. Lower arm clamp

Post-installation Operation
- Operation Check of ECS System (Refer to P.33B-89.)
- Front Wheel Alignment Adjustment

Caution
***: Indicates parts which should be temporarily tightened, and then fully tightened with the vehicle on the ground in the unladen condition.**



SERVICE POINTS OF REMOVAL E33OBA-L

5. REMOVAL OF LOWER ARM BALL JOINT

Using the special tool, disconnect the lower arm ball joint from the knuckle.

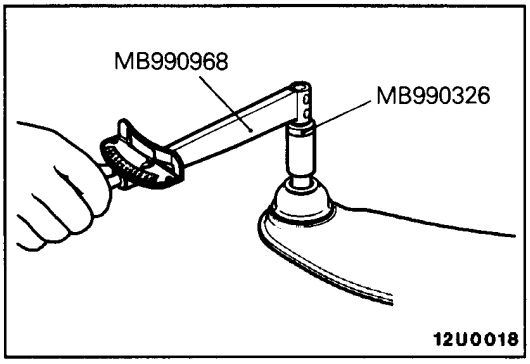
NOTE

(1) Always tie the cord of the special tool to the nearby part.

(2) Loosen the nut but do not remove it.

INSPECTION E33OCAE

- Check the lower arm for bend or breakage.
- Check the lower arm shaft for cracks and damage.
- Check the clamp for deterioration or damage.
- Check the bushing for wear and deterioration.
- Check the ball joint dust cover for cracks.



BALL JOINT CHECKING FOR STARTING TORQUE

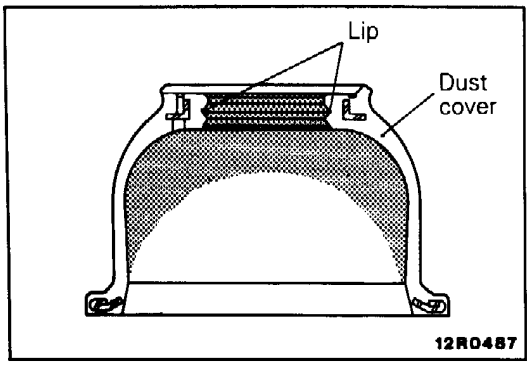
(1) If a crack is noted in the dust cover, replace it, adding grease.

(2) Shake the ball joint stud several times.

(3) Mount two nuts on the ball joint, and then measure the ball joint starting torque.

Standard value: 10–22 Nm
(100–220 kgcm, 87–191 in.lbs.)

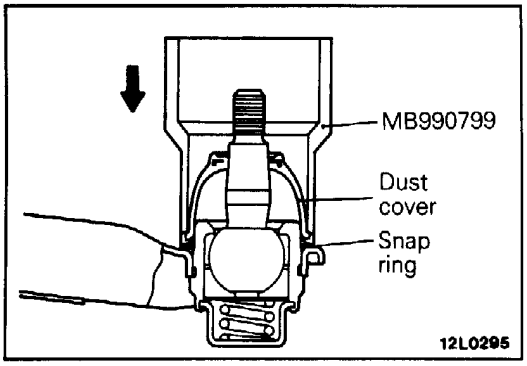
(4) If the starting torque exceeds the upper limit of standard value, replace the lower arm assembly. Even if the starting torque is below the lower limit of the standard value, the ball joint may be reused unless it has drag and excessive play.



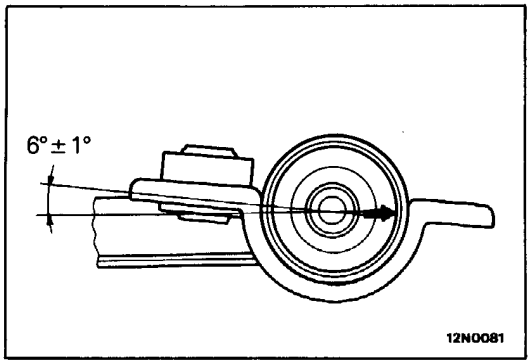
BALL JOINT DUST COVER REPLACEMENT E33ODAD

(1) Remove the dust cover.

(2) Apply multipurpose grease to the lip and inside of the dust cover.



(3) Drive in the dust cover with special tool until it is fully seated.



SERVICE POINTS OF INSTALLATION

13. INSTALLATION OF LOWER ARM CLAMP MOUNTING SELF-LOCKING NUT

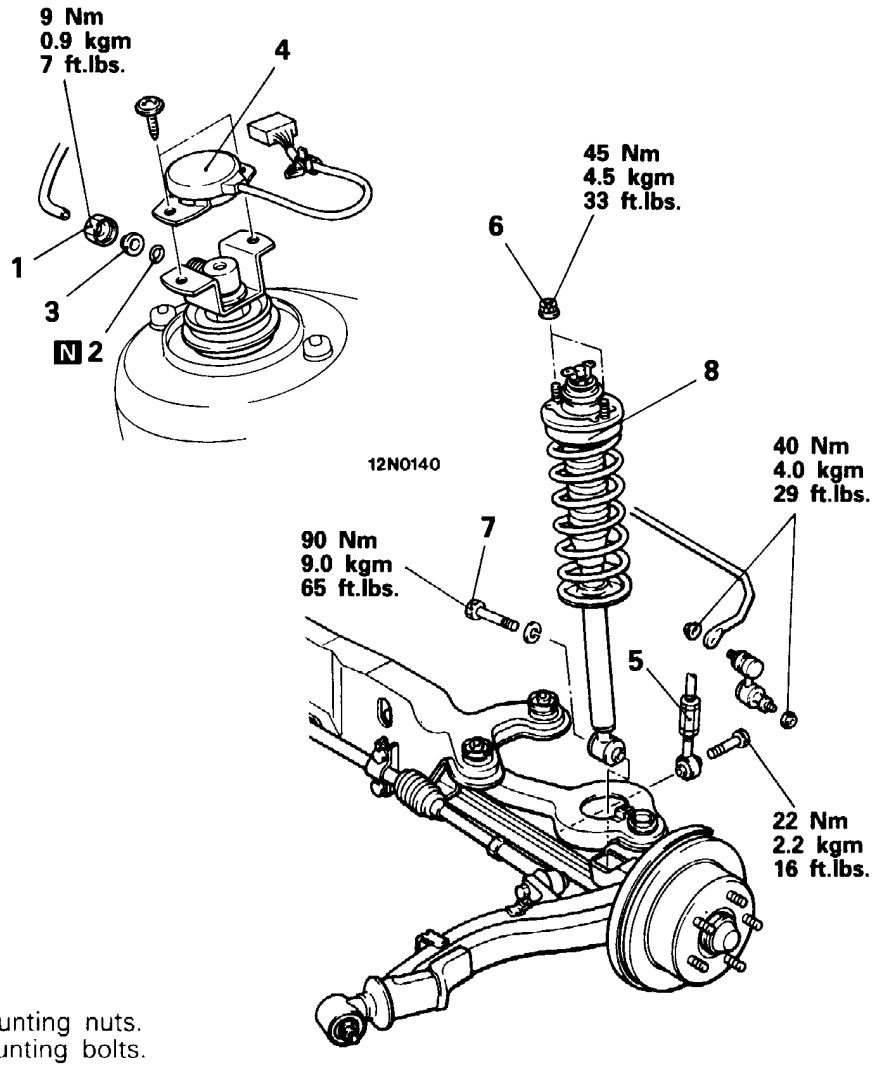
Tilt the mounting surface of the lower arm clamp 6°±1° to the lower arm lower surface, set the lower arm clamp, and install the self-locking nut.

SHOCK ABSORBER ASSEMBLY

REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of Trunk Room Side Trim (Refer to GROUP 52 – Trims.)

Post-installation Operation
- Installation of Trunk Room Side Trim (Refer to GROUP 52 – Trims.)
- Operation Check of ECS System (Refer to P.33B-89.)
- Rear Wheel Alignment Adjustment



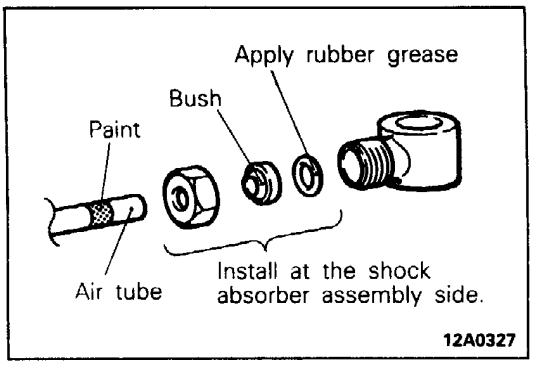
Removal steps

◆◆ 1. Air tube
2. O-ring
3. Bush
4. Actuator
5. Rear height sensor rod
6. Shock absorber upper mounting nuts.
7. Shock absorber lower mounting bolts.
8. Shock absorber

INSPECTION E33YAB-B

CHECKING FOR SHOCK ABSORBER ASSEMBLY AIR LEAKAGE

For information concerning checking for air leakage of the shock absorber assembly, refer to the section concerning the strut assembly (P.33B-99).



SERVICE POINTS OF INSTALLATION E33YACA

1. CONNECTION OF AIR TUBE

(1) After applying a coating of rubber grease to the O-ring, install the O-ring, bush and joint at the shock absorber assembly side.

Caution
1. The O-ring might be damaged if it is installed at the air tube side and then the insertion is made.
2. The bush must be installed so that the projection part is facing in the direction indicated in the illustration.

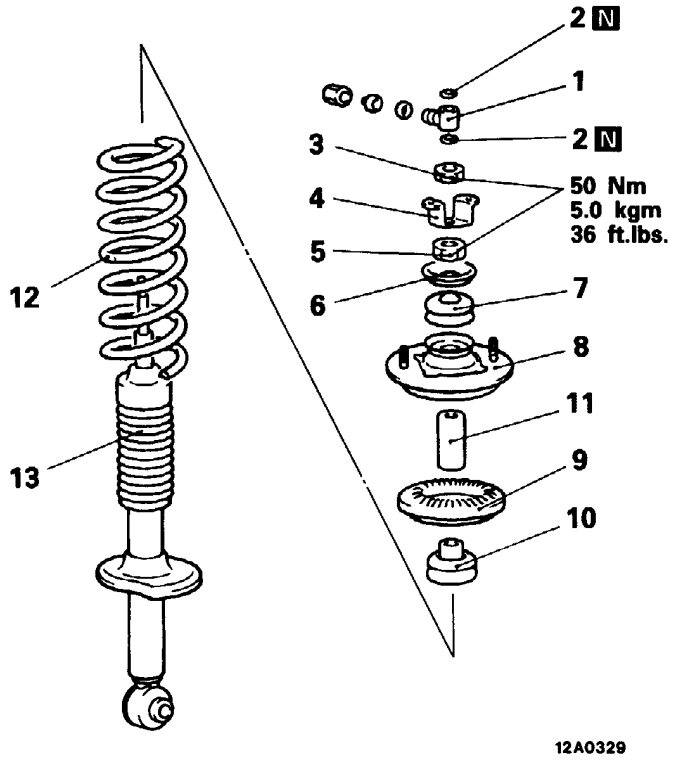
(2) First insert the air tube until resistance is felt, and then push in the tube until the painted place on the air tube.

Caution
Air leakage may occur if the air tube connection is not complete and secure.

(3) After connecting the air tube, in order to prevent double-folding of the diaphragm, while still in the lifted condition, press the vehicle-height switch (HIGH switch) for two seconds or longer to select the EXTRA HIGH mode so that air will be supplied to the air springs.

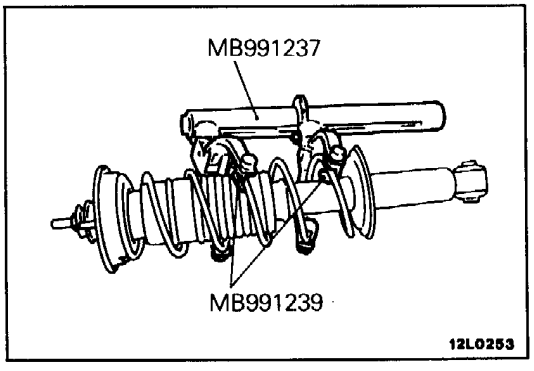
DISASSEMBLY AND REASSEMBLY

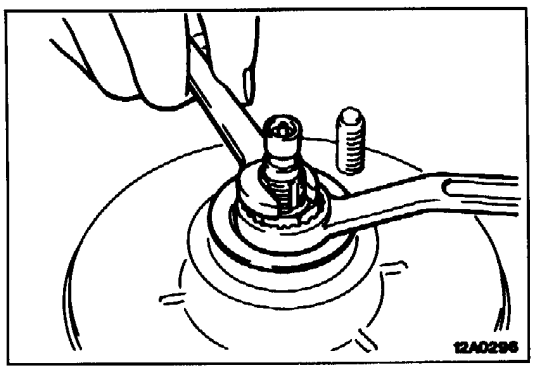
E33YAD-



Disassembly steps

- ◆◆ 1. Joint
- ◆◆ 2. O-ring
- 3. Actuator bracket mounting nut
- 4. Actuator bracket
- ◆◆ ◆◆ 5. Piston rod tightening nut
- 6. Washer
- 7. Upper bushing (A)
- ◆◆ 8. Bracket assembly
- 9. Spring pad
- 10. Upper bushing (B)
- 11. Collar
- ◆◆ 12. Coil spring
- 13. Shock absorber





SERVICE POINTS OF DISASSEMBLY

E33YAEA

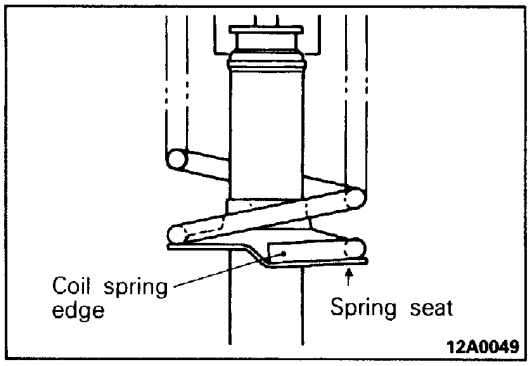
5. REMOVAL OF PISTON ROD TIGHTENING NUT

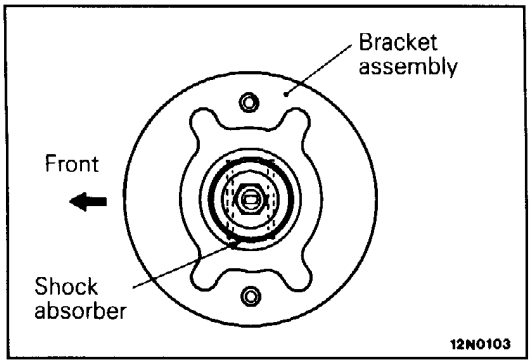
(1) Compress the coil spring using the special tools.

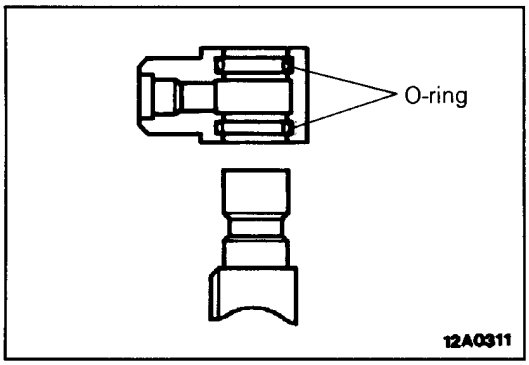
Caution
(1) Install the special tools evenly, and so that the maximum length will be attained within the installation range.
(2) Do not use an air tool to tighten the bolt of the special tool.

(2) While holding the piston rod, remove the piston rod tightening nut.

Caution
Do not use an air tool.







SERVICE POINTS OF REASSEMBLY E33YAGA

12. INSTALLATION OF COIL SPRING

(1) Use the special tools (MB991237 and MB991239) to compress the coil spring and insert it in the shock absorber.

Caution
Do not use an air tool to tighten the bolt of the special tool.

(2) Align the edge of the coil spring to the position of the shock absorber spring seat as shown.

8. INSTALLATION OF BRACKET ASSEMBLY/5. PISTON ROD TIGHTENING NUT

(1) With the position of the bracket assembly as shown in the figure, tighten the tightening nut to the specified torque.

Caution
Do not use an air tool.

(2) Install the coil spring so that the lower edge fits into the spring seat groove and the upper edge fits into the spring pad groove, then remove the special tools (MB991237 and MB991239).

2. INSTALLATION OF O-RING/1. JOINT

Apply a coating of rubber grease to the O-ring, install it to the joint, and then install to the piston rod.

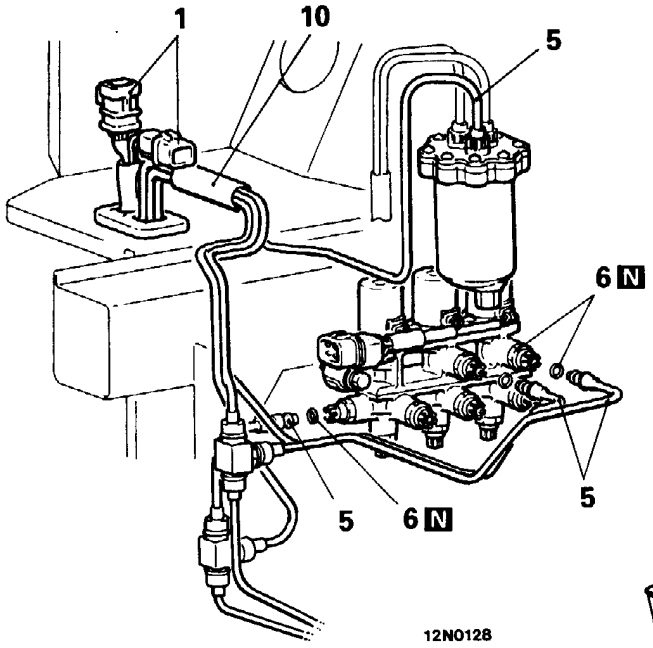
REAR SUSPENSION ASSEMBLY/UPPER ARM/LOWER ARM/TRAILING ARM

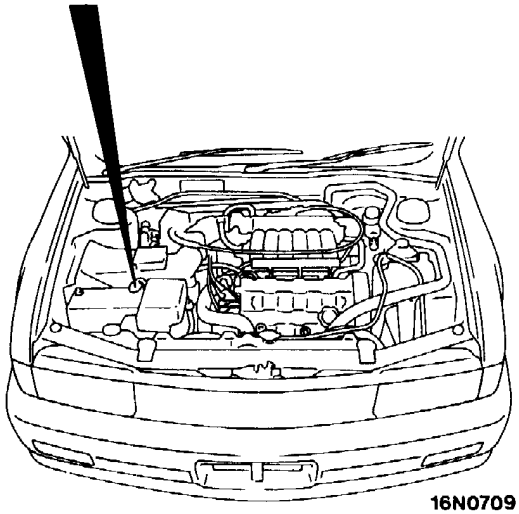
Refer to GROUP 34 – Rear Suspension.

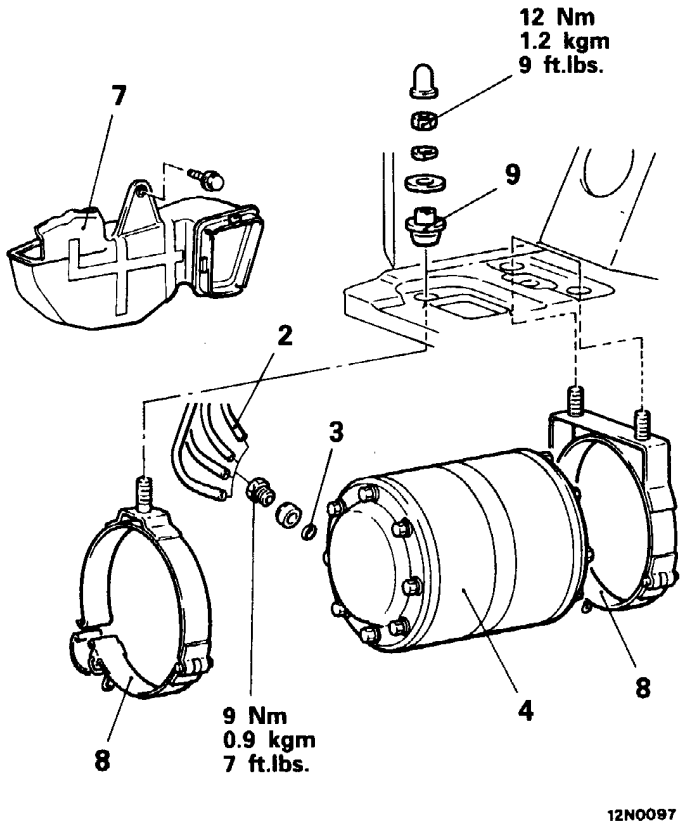
RESERVE TANK ASSEMBLY (FRONT)

E33ED---

REMOVAL AND INSTALLATION





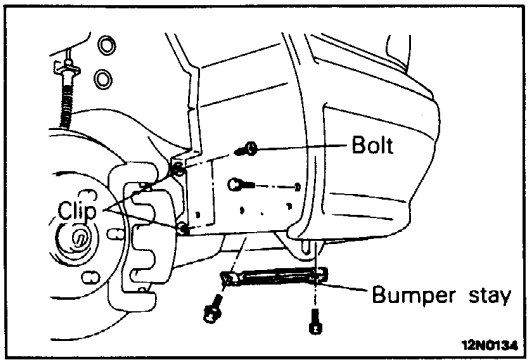


Removal steps

1. Reserve tank connector
2. Air tube
3. O-ring
4. Reserve tank (Front)
5. Air tube
6. O-ring
7. Air intake tube
8. Tank holder
9. Bush
10. Air tube

Pre-removal Operation
- Removal of Battery and Battery Tray
- Removal of Underguard

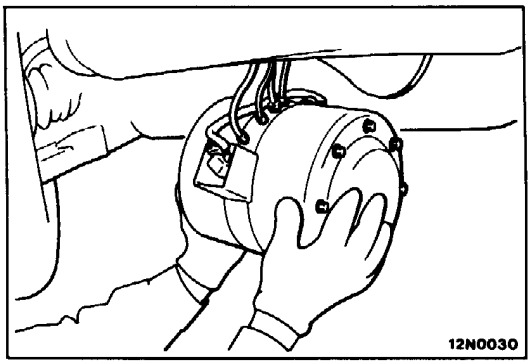
Post-installation Operation
- Installation of Underguard
- Installation of Battery and Battery Tray
- Operation Check of ECS System (Refer to P.33B-89.)



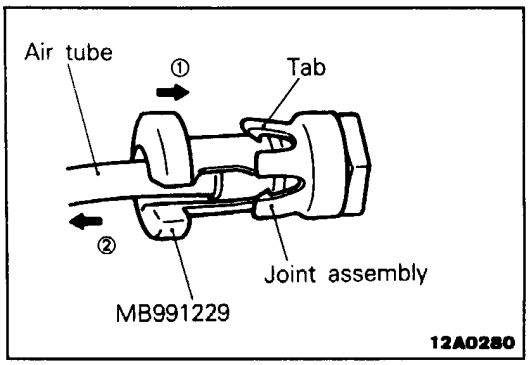
SERVICE POINTS OF REMOVAL E33ZDA-D

2. REMOVAL OF AIR TUBE

(1) Remove the splash shield clip and bolt, as shown in the diagram.
(2) Remove the bumper stay.



(3) Remove the reserve tank from the tank holder, and after pulling it downwards, being careful not to damage the air tubes, remove the air tube and reserve tank connections.



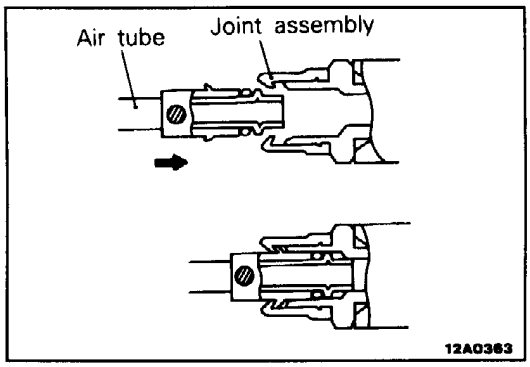
10. REMOVAL OF AIR TUBES

(1) Push the special tool inward, in direction ① shown in the figure, in order to expand the tabs of the joint.
(2) Pull out the air tube, together with the special tool, in direction ②.

Caution
To prevent dust, dirt and other foreign material from getting into the air tubes, dryer or solenoid valve openings, use vinyl tape or similar material to cover these openings.

INSPECTION E33ZDBC

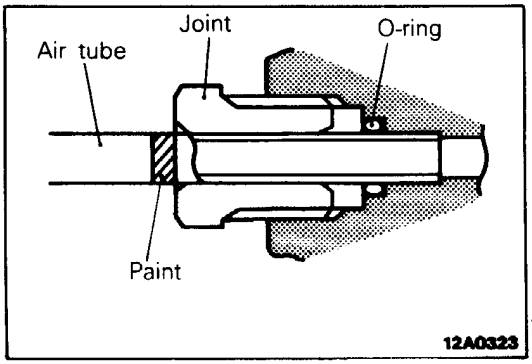
For detailed information concerning the checking of the return pump, the high-pressure switch and the low-pressure switch, refer to the troubleshooting guide and service adjustment procedures section.



SERVICE POINTS OF INSTALLATION E33ZDC-D

10. INSTALLATION OF AIR TUBES

Push the air tube inward to the joint assembly at the device side until a "click" is heard, and then check to be sure that the tabs of the joint assembly are securely affixed to the air tube.



2. CONNECTION OF AIR TUBE

Connect the air tube securely, all the way to the painted mark.

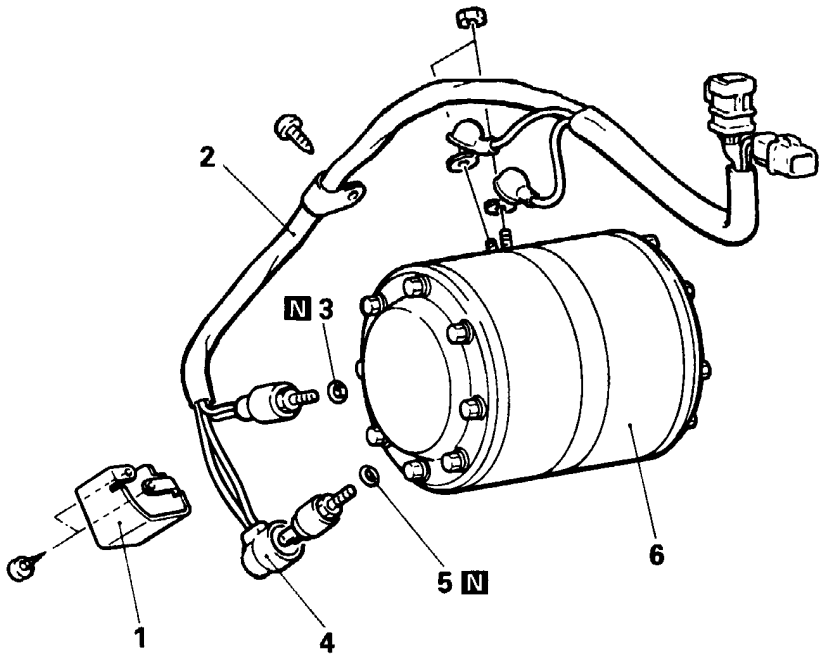
Caution
Be sure that the connection is secure; if it is not, an air leak may result.

DISASSEMBLY AND REASSEMBLY

E33ZDD–

Disassembly steps

1. Cover
2. Wiring harness (incorporated with high pressure switch)
3. O-ring
4. Low pressure switch
5. O-ring
6. Reserve tank



RESERVE TANK ASSEMBLY (REAR)

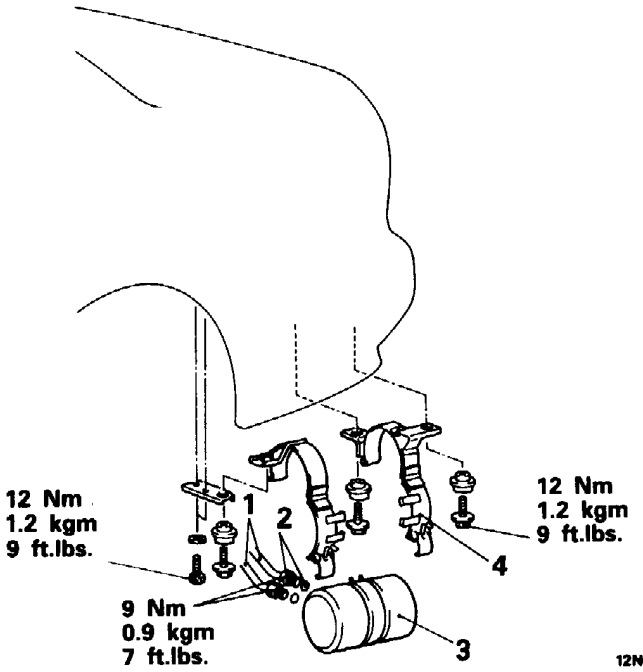
REMOVAL AND INSTALLATION

E33ZD–

Removal steps

◆◆ 1. Air tube
2. O-ring
3. Reserve tank (Rear)
4. Tank holder

Post-installation Operation
- Operation Check of ECS System (Refer to P.33B-89.)



SERVICE POINTS OF REASSEMBLY E33ZDC-E

1. INSTALLATION OF AIR TUBE

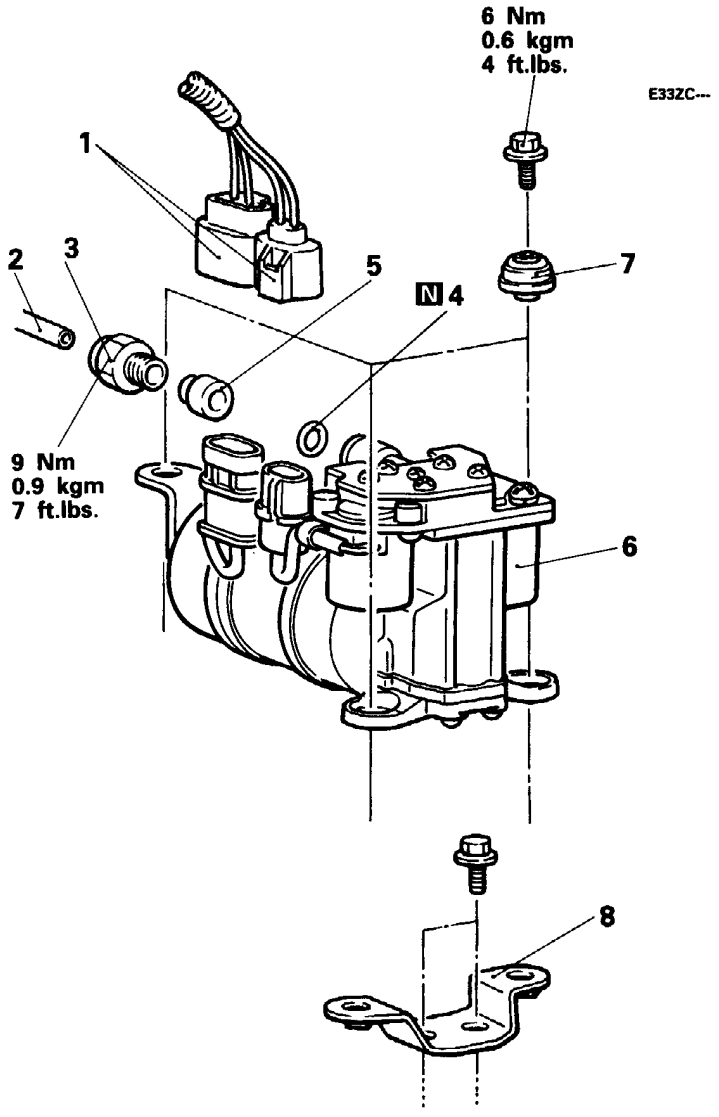
Refer to Reserve tank (Front) (Refer to P.33B-105.)

AIR COMPRESSOR ASSEMBLY

REMOVAL AND INSTALLATION

Pre-removal Operation
- Removal of Air Cleaner (Refer to GROUP 15 – Air Cleaner.)

Post-Installation Operation
- Installation of Air Cleaner (Refer to GROUP 15 – Air Cleaner.)
- Operation Check of ECS System (Refer to P.33B-89.)



Removal steps

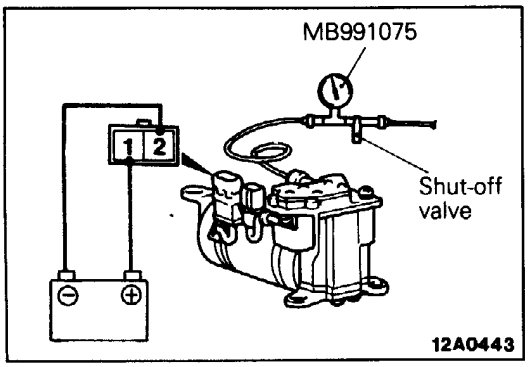
1. Front wiring harness connector
2. ◆◆ ◆◆ Air tube
3. Joint
4. O-ring
5. Connector
6. Air compressor assembly
7. Compressor mounting rubbers
8. Compressor mount bracket

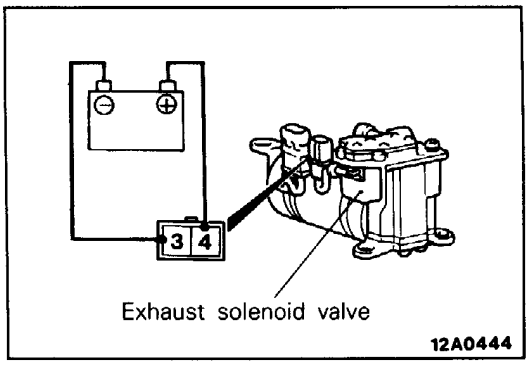
SERVICE POINTS OF REMOVAL E33ZCAC

2. REMOVAL OF AIR TUBE

Caution

1. In order to prevent dust, dirt and other foreign material from getting into the air tube and air compressor openings, cover these opening with vinyl tape or similar material.
2. Be careful not to bend the air tubes.





INSPECTION E33ZCBA

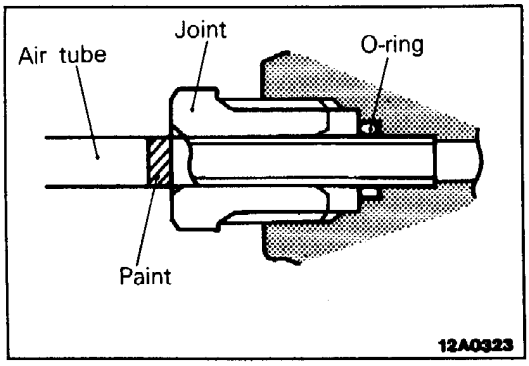
(1) Using special tool (adaptor C), connect the air tube on the gauge side of the special tool to the air compressor.
(2) Apply battery voltage (12V) between terminals (1) and (2) compressor.
(3) Check whether the relief pressure of the air compressor is the standard value.

Standard value: 1,000–1,300 kPa (10–13 kg/cm², 142–185 psi)

NOTE
Because of pulsation caused by the opening and closing of the exhaust solenoid valve combined with the relief valve, the gauge's indicator will show a reading which fluctuates within a range of 200–300 kPa (2–3 kg/cm², 29–43 psi). Use the mid-point of this fluctuation to make the gauge reading.

(4) Stop the air compressor and, with the pressure held, apply battery voltage (12V) between air compressor terminals (3) and (4). At this time, check to be sure that the exhaust solenoid valve makes a "click" sound and the pressure is gradually decreasing.
(5) If air compressor relief pressure is not within the standard value, or if there is a malfunction of the exhaust solenoid valve, replace the air compressor.

Caution
When the air compressor is replaced, first check to be sure that there is no air leakage at air tube joints, no poor contacts of wiring, and that the thermo switch is not in operation.



SERVICE POINTS OF INSTALLATION E33ZCCC

2. INSTALLATION OF AIR TUBE

(1) First insert the air tube at the lower part of the dryer until resistance is felt, and then press the tube further inward to the paint mark on the air tube.

Caution
Air leakage may occur if the air tube connection is not complete and secure.

(2) Connect air tubes correctly to the air compressor. Apply a soap-and-water solution to the air tube connections to check to be sure that there is no air leakage.

SOLENOID VALVE AND DRYER

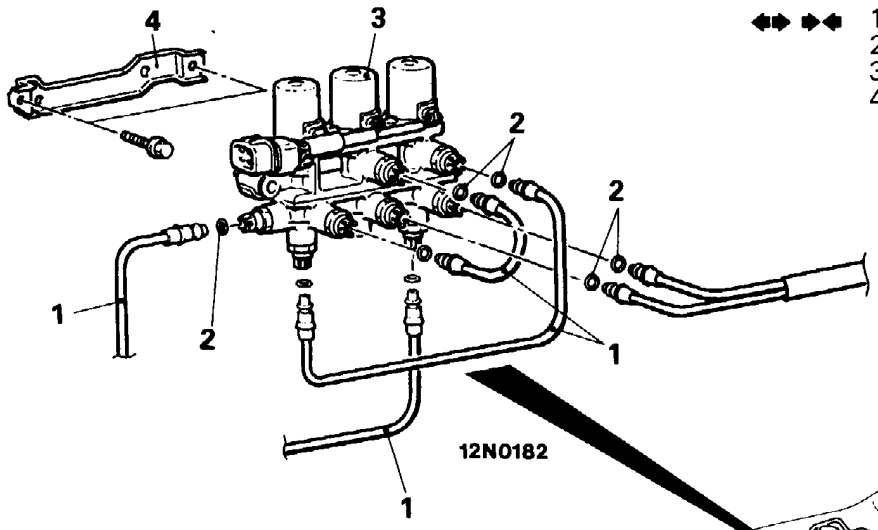
E33ZA---

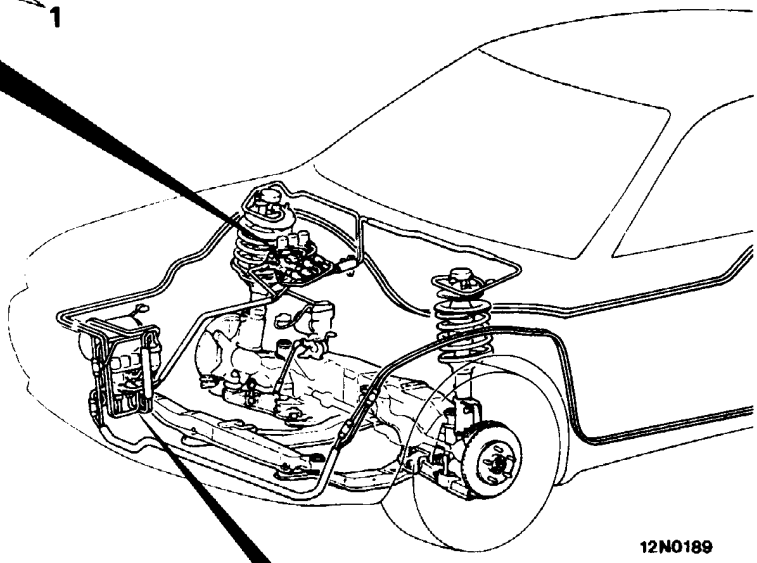
REMOVAL AND INSTALLATION

Front solenoid valve removal steps

- Removal of Air intake hose

◆◆ ▶◀ 1. Air tubes
2. O-ring
3. Front solenoid valve assembly
4. Front solenoid valve bracket





Dryer removal steps

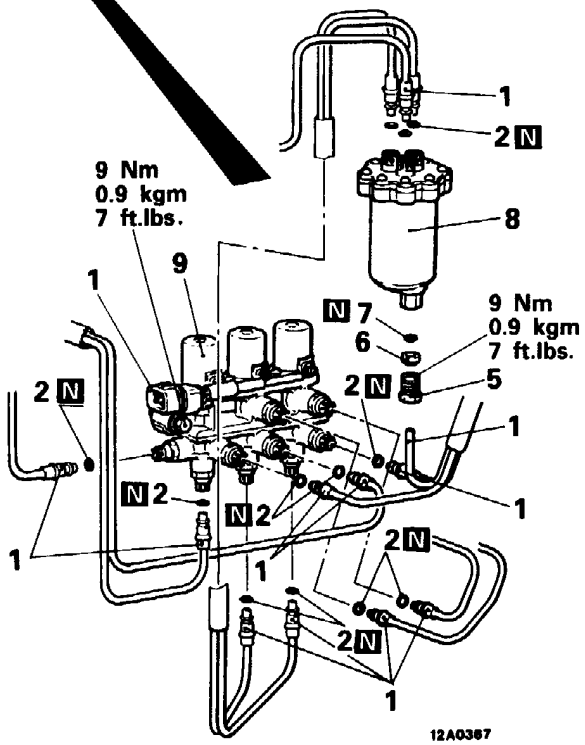
◆◆ ▶◀ 1. Air tubes
2. O-rings
5. Joint assembly
6. Bush
7. O-ring
8. Dryer

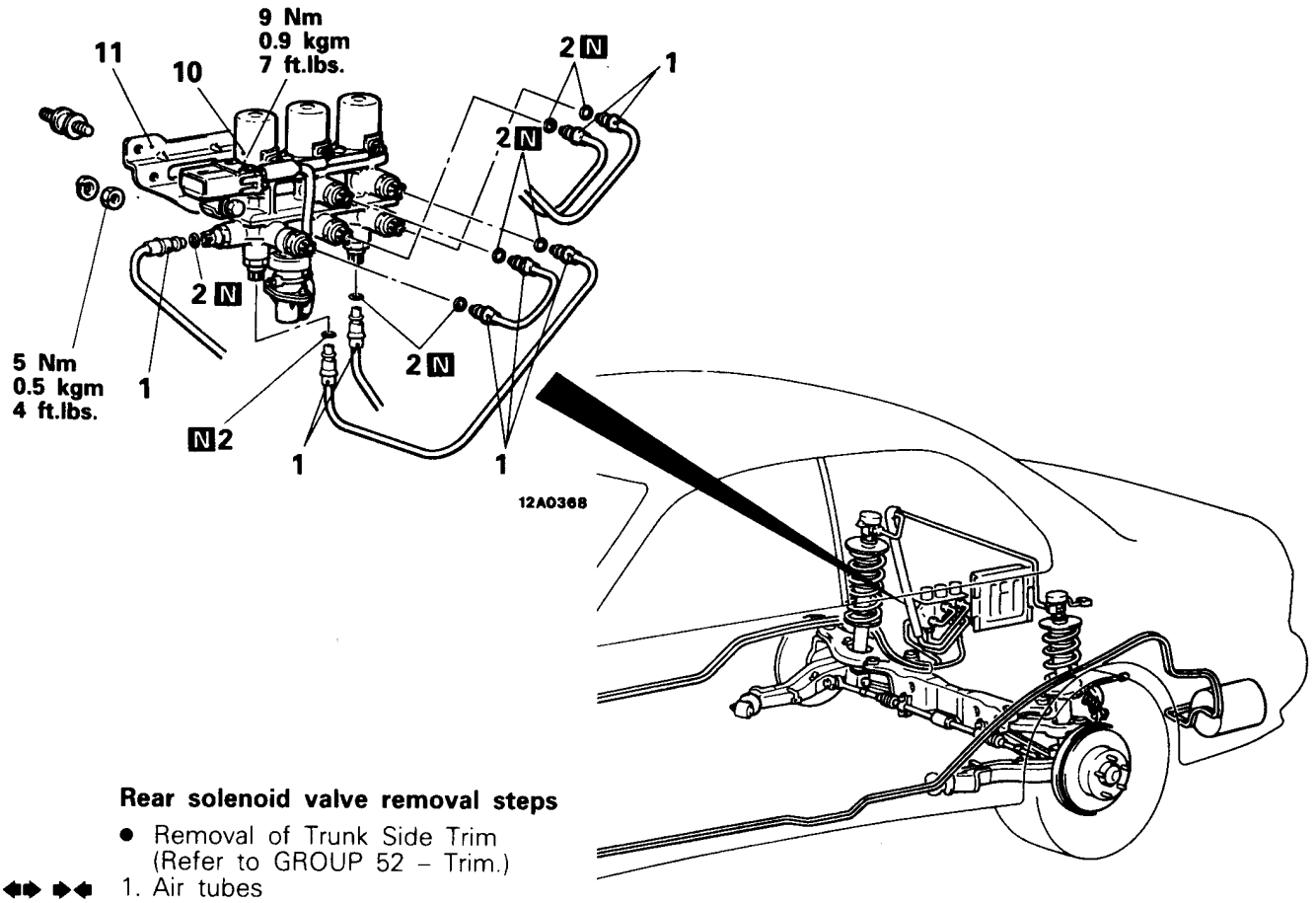
Flow control solenoid valve assembly removal steps

- Battery & Battery tray
- Washer tank assembly

◆◆ ▶◀ 1. Air tubes
2. O-rings
9. Flow control solenoid valve assembly

Post-Installation Operation
- Operation Check of ECS System (Refer to P.33B-89.)

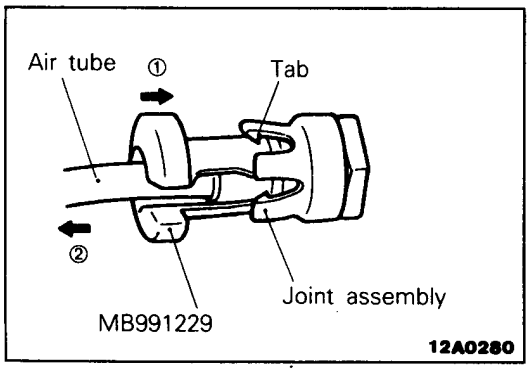


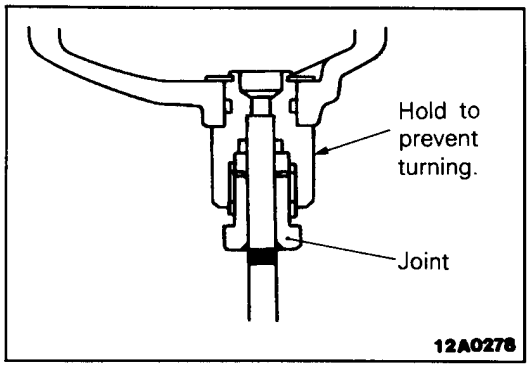


Rear solenoid valve removal steps

- Removal of Trunk Side Trim (Refer to GROUP 52 – Trim.)

◆◆ ◆◆ 1. Air tubes
2. O-rings
10. Rear solenoid valve assembly
11. Rear solenoid valve bracket





SERVICE POINTS OF REMOVAL E33ZAAC

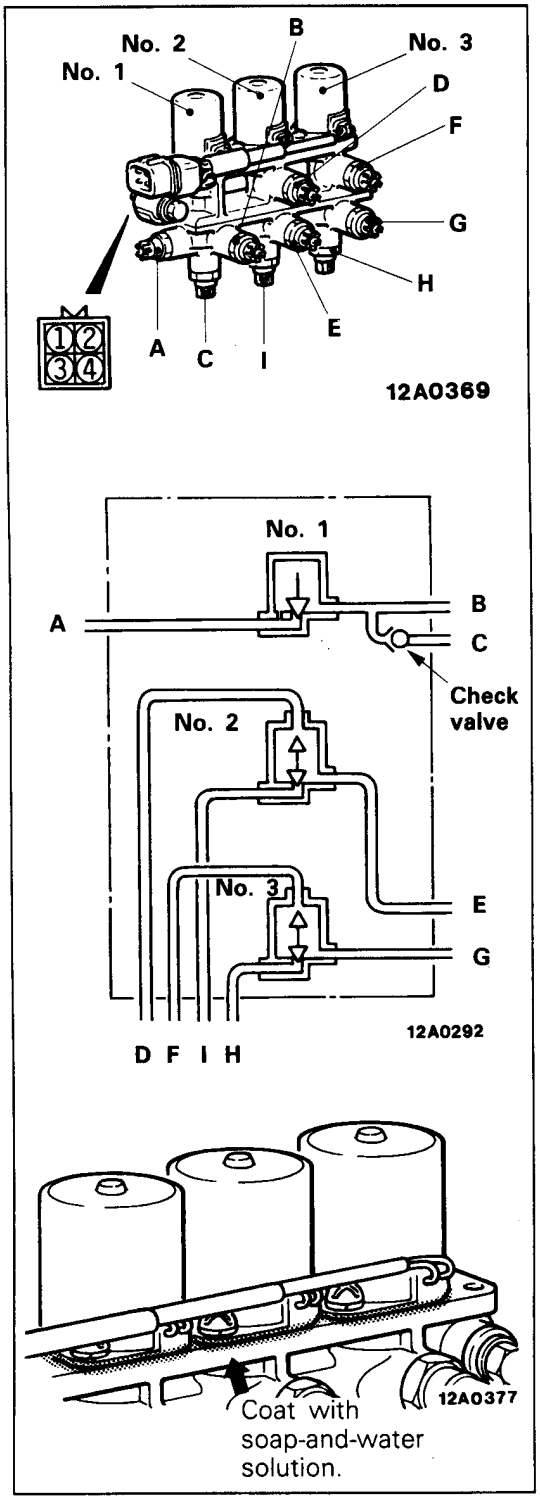
1. REMOVAL OF AIR TUBES

(1) Push the special tool inward, in direction ① shown in the figure, in order to expand the tabs of the joint.
(2) Pull out the air tube, together with the special tool, in direction ②.

Caution
In order to prevent dust, dirt and other foreign material from getting into the air tube, solenoid valve and dryer openings. Cover these openings with vinyl tape or similar material.

(3) For the air tube at the lower part of the dryer, loosen the joint, and then pull off.

NOTE
When loosening the joint, use a spanner at the hexagonal part of the joint installation part so as to prevent it from turning.



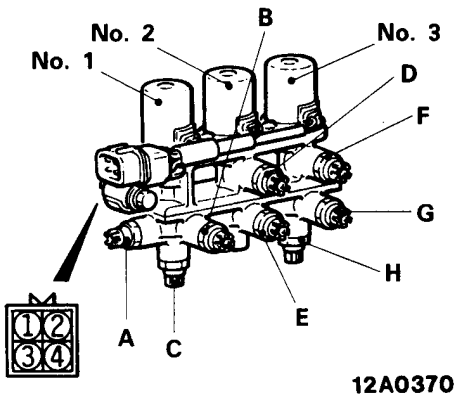
INSPECTION

E33ZABC

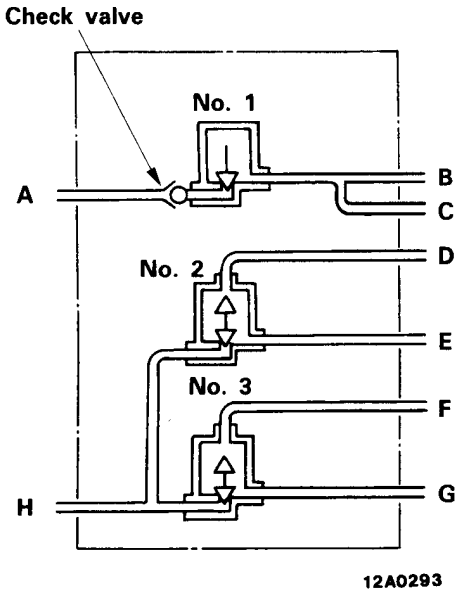
1. FLOW CONTROL SOLENOID VALVE

Check the No. 1–3 solenoid valves shown in the figure for correct operation and air leakage.

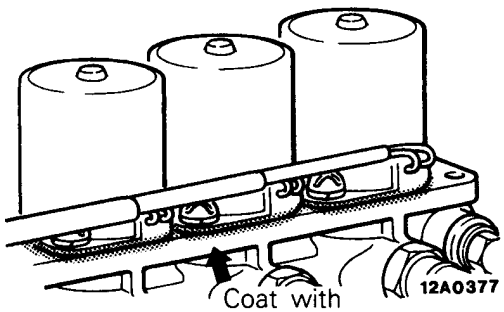
Check item	Condition	Result
Inject air from Part A and apply battery voltage to terminal ② and then earth terminal ①.	A "click" noise will be heard, and the volume of air blown out from joints B and C will become greater.	Good
	Other than as described above.	Malfunction of No. 1 solenoid valve
Blow air in at joint E, apply battery voltage (12V) to terminal ③, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint D to joint I.	Good
	Other than as described above	Malfunction of No. 2 solenoid valve
Inject air from part G and apply battery voltage (12V) to terminal ④, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint F to joint H.	Good
	Other than as described above.	Malfunction of No. 3 solenoid valve
Inject air from part C.	Air is not blown out.	Good
	Air is blown out from joint B.	Malfunction of check valve
With an air pressure of 1,000 kPa (10 kg/cm², 142 psi) from parts B, H and I, apply a soap-and-water solution where shown in the illustration.	No air leakage.	Good
	Air leakage	Malfunction of solenoid valve seal



12A0370



12A0293



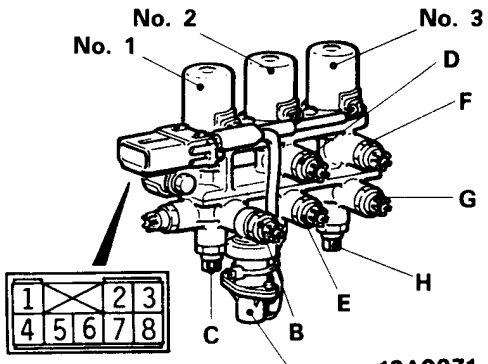
12A0377

Coat with soap-and-water solution.

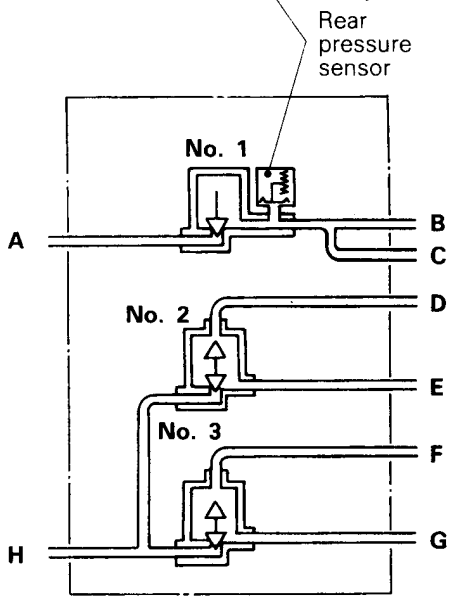
2. FRONT SOLENOID VALVE

Check the No. 1–3 solenoid valves shown in the figure for correct operation and air leakage.

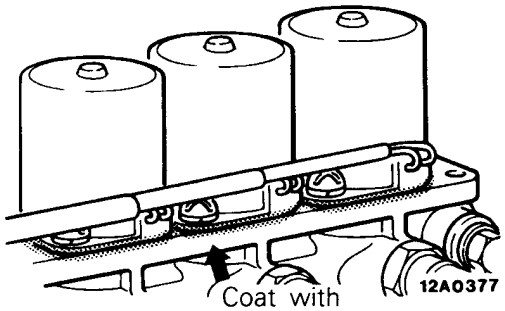
Check item	Condition	Result
Inject air from Part A and apply battery voltage to terminal ② and then earth terminal ①.	A "click" noise will be heard, and the volume of air blown out from joints B and C will become greater.	Good
	Other than as described above.	Malfunction of No. 1 solenoid valve
Blow air in at joint E, apply battery voltage (12V) to terminal ③, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint D to joint H.	Good
	Other than as described above	Malfunction of No. 2 solenoid valve
Inject air from part G and apply battery voltage (12V) to terminal ④, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint F to joint H.	Good
	Other than as described above.	Malfunction of No. 3 solenoid valve
Apply battery voltage (12V) to terminal ② and, with terminal ① earthed, blow air in at joint B or C.	Air is not blown out from joint A.	Good
	Air is blown out from joint A.	Malfunction of check valve
With an air pressure of 1,000 kPa (10 kg/cm², 142 psi) from parts B, H and I, apply a soap-and-water solution where shown in the illustration.	No air leakage.	Good
	Air leakage	Malfunction of solenoid valve seal



12A0371



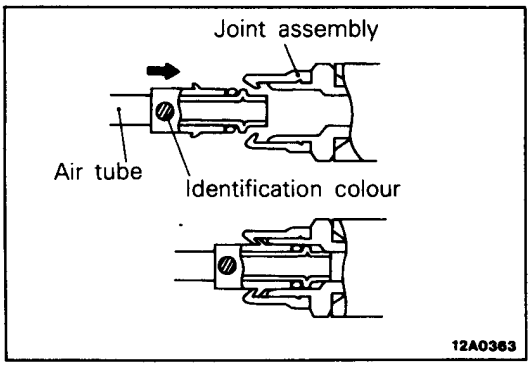
12A0294

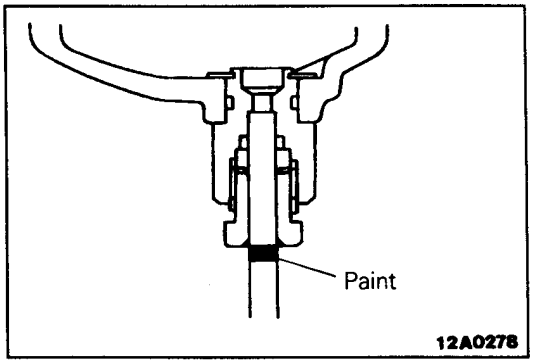


3. REAR SOLENOID VALVE

Check the No. 1–3 solenoid valves shown in the figure for correct operation and air leakage.

Check item	Condition	Result
Inject air from Part A and apply battery voltage (12V) to terminal ② and then earth terminal ①.	A "click" noise will be heard, and the air will be blown out from joints B and C.	Good
	Other than as described above.	Malfunction of No. 1 solenoid valve
Blow air in at joint E, apply battery voltage (12V) to terminal ③, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint D to joint H.	Good
	Other than as described above	Malfunction of No. 2 solenoid valve
Inject air from part G and apply battery voltage (12V) to terminal ④, and then earth terminal ①.	A "click" noise will be heard, and the air being blown out will change from joint F to joint H.	Good
	Other than as described above.	Malfunction of No. 3 solenoid valve
With an air pressure of 1,000 kPa (10 kg/cm², 142 psi) from parts A and H, apply a soap-and-water solution where shown in the illustration.	No air leakage.	Good
	Air leakage	Malfunction of solenoid valve seal





SERVICE POINTS OF INSTALLATION E33ZACC

1. INSTALLATION OF AIR TUBES

(1) For the one-touch type of air tube, press in to the joint assembly at the device side until a "click" is heard, and then check that the tabs of the joint assembly are securely affixed to the air tube.

Caution
Before connecting the air tube, check that the identification colour of the tube and the colour at the joint agree.

(2) First insert the air tube at the lower part of the dryer until resistance is felt, and then press the tube further inward to the paint mark on the air tube.

Caution
Air leakage may occur if the air tube connection is not complete and secure.

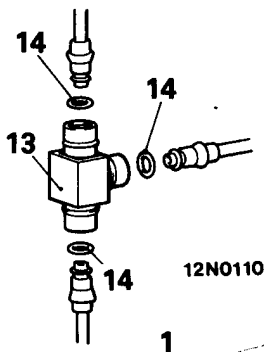
(3) After connection of the air tube, check for double-folding of the rolling diaphragm. (Refer to P.33B-89.)

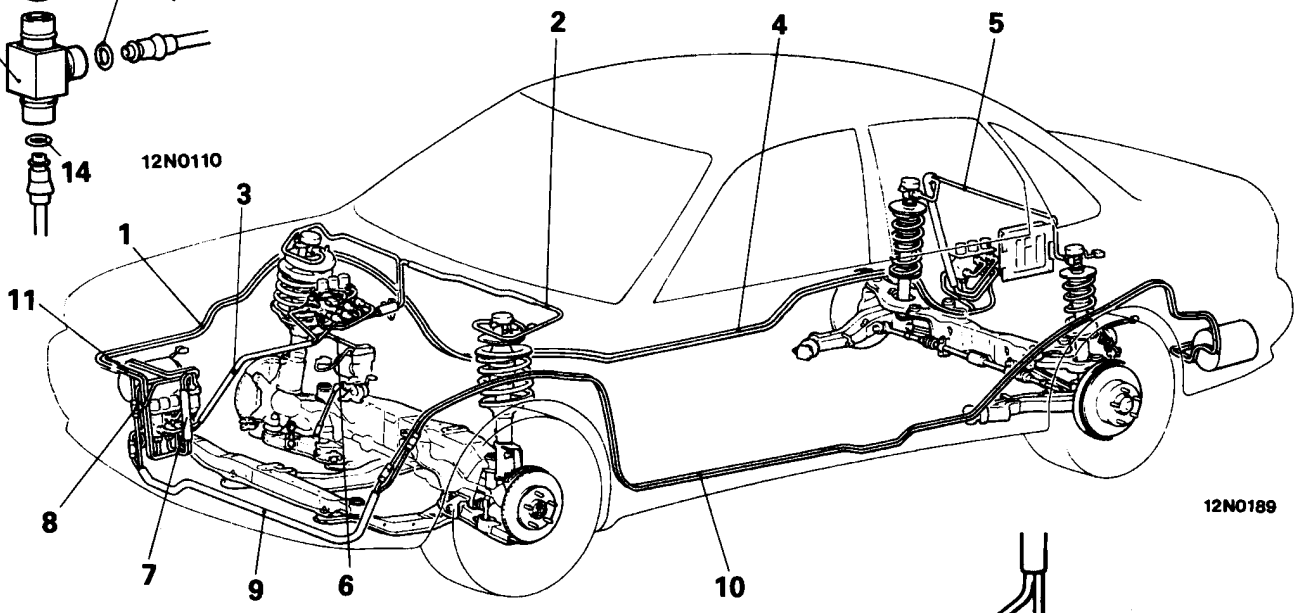
AIR TUBE

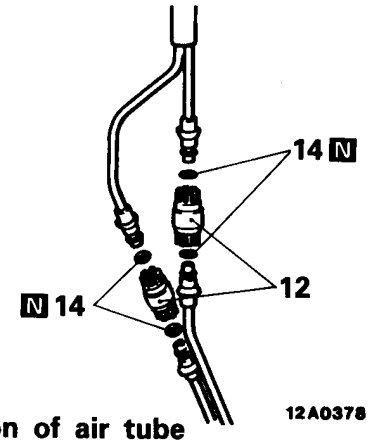
REMOVAL AND INSTALLATION

E33ZB---

Post-installation Operation
- Operation Check of ECS System (Refer to P.33B-89.)



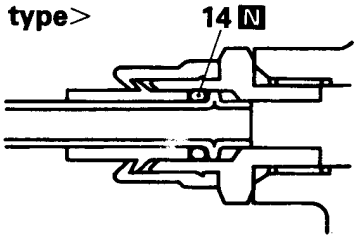




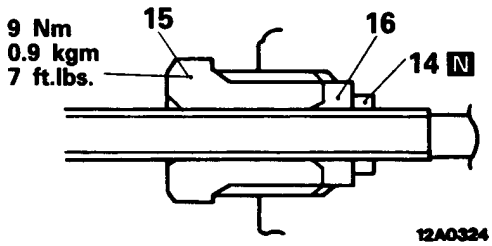
1. *Air tubes (flow control solenoid valve to joint assembly)
2. Air tubes (front solenoid valve to actuator)
3. Air tubes (flow control solenoid valve to front solenoid valve)
4. *Air tubes (joint assembly to rear solenoid valve)
5. Air tube (rear solenoid valve to actuator)
6. Air tubes (flow control solenoid valve to air compressor)
7. Air tubes (dryer to flow control solenoid valve)
8. Air tube (flow control solenoid valve to joint assembly B)
9. Air tube (joint assembly B to joint assembly A)
10. *Air tube (joint assembly A to reserve tank rear)
11. Air tubes (to reserve tank)
12. Joint assembly A
13. Joint assembly B
14. O-ring
15. Joint
16. Bush

Cross-section of air tube joint

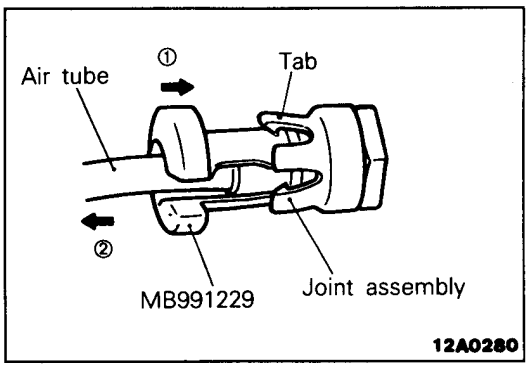
<One-touch type>

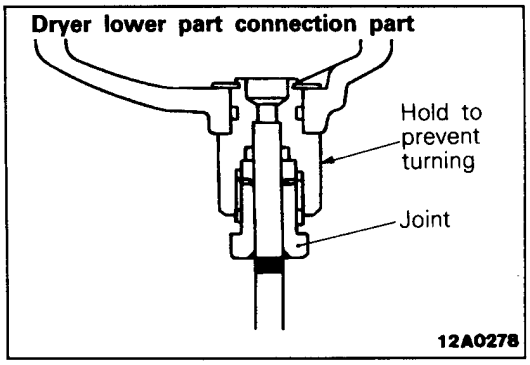


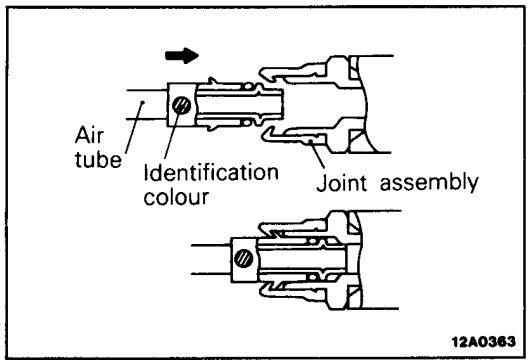
<Flare-nut type>

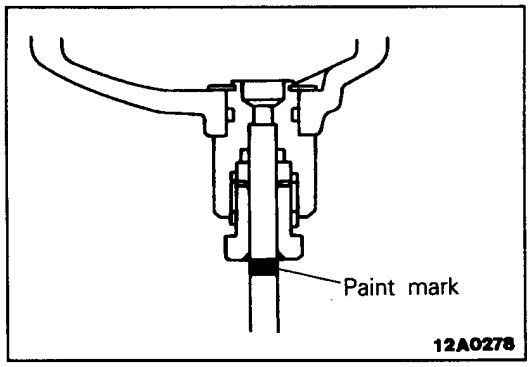


NOTE
(1) Connections within ( ) are air tube connections.
(2) Air tubes indicated by the * symbol are interwound with the harness.









SERVICE POINTS OF REMOVAL E33ZBAA

REMOVAL OF AIR TUBES

One-touch type

(1) Push the special tool inward, in direction ① shown in the figure, in order to expand the tabs of the joint.
(2) Pull out the air tube, together with the special tool, in direction ②.

Flare-nut type

Loosen the joint and pull out the air tube.

NOTE
When loosening the joint at the lower part of the dryer, use a spanner to hold the hexagonal part of the joint installation part to prevent it from turning.

Caution
In order to prevent the entry of dust, foreign material, etc., use vinyl tape or similar material to close the end of the air tube and the opening at the device side.

SERVICE POINTS OF INSTALLATION E33ZBCB

INSTALLATION OF AIR TUBES

One-touch type

Push the air tube in the joint assembly at the device side until a "click" is heard, and then check to be sure that the tabs of the joint assembly are securely affixed to the air tube.

Caution
Before connecting the air tube, check to be sure that the identification colour of the tube and the colour at the joint agree.

Flare-nut type

First insert the air tube until resistance is felt, and then press the tube further inward to the paint mark on the air tube.

Caution
Air leakage may occur if the air tube connection is not complete and secure.

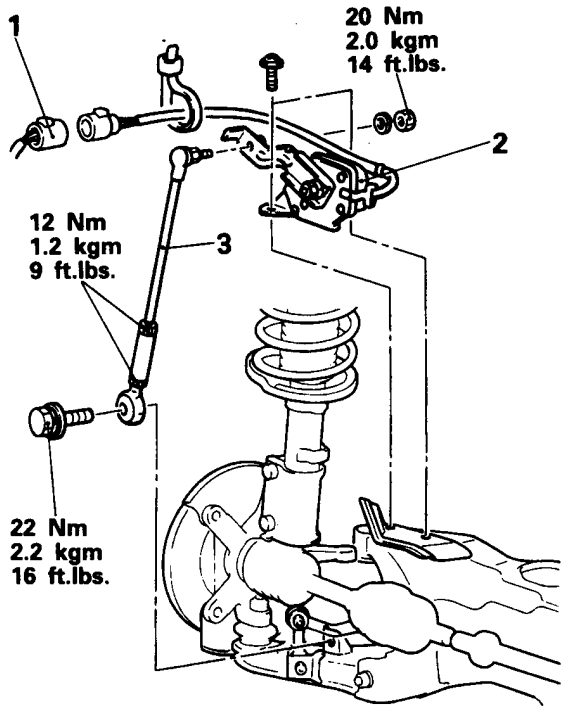
INSPECTION AFTER AIR TUBE INSTALLATION

(1) Check for double-folding at the rolling diaphragm. (Refer to P.33B-89.)
(2) Apply a soap-and-water solution to the joint part to check for air leakage; also visually check the air tube for breakage, crushing, pinching, etc.

HEIGHT SENSOR

E33ZE---

REMOVAL AND INSTALLATION



12A0357

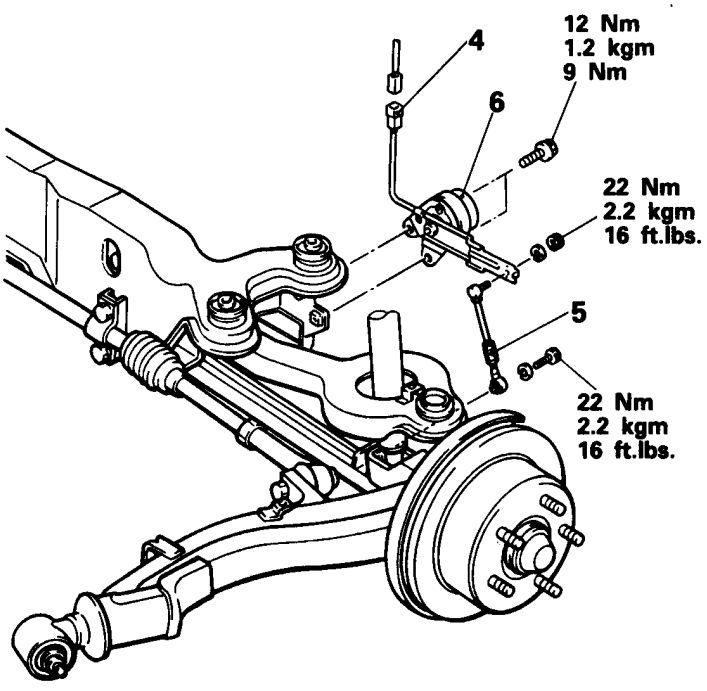
Front height sensor removal steps

- Removal of compressor assembly (Refer to P.33B-108.)

1. Front wiring harness connector
2. Front height sensor
3. Front rod assembly ◆◆

Rear height sensor removal steps

4. Body wiring harness connector
5. Rear rod assembly ◆◆
6. Rear height sensor

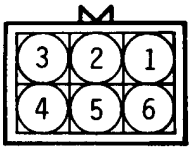


12N0124

Post-installation Operation

- Checking and Adjustment of The NORMAL Vehicle-height (Refer to P.33B-88.)
- Operation Check of ECS System (Refer to P.33B-89.)

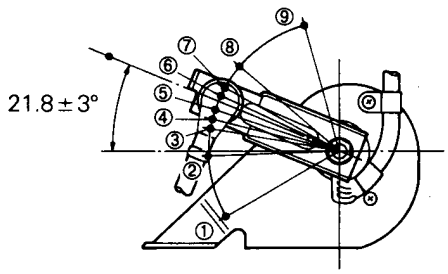
Front height sensor connector terminal array



12N0065

No. 1 Sensor A
No. 2 Sensor B
No. 3 Sensor C
No. 4 Earth
No. 5 Sensor D
No. 6 Sensor power supply (+5V)

Front height sensor position



12N0035

INSPECTION

E33ZEBA

- Check the rod and link plate for bending or damage.
- Check the rod adjustment lock nut for looseness.

CHECKING THE SENSOR TERMINAL VOLTAGE

Connect the height sensor to the body harness and then check that each terminal voltage changes as shown in the table below when, with the ignition key at the ON position, the sensor's link plate is turned.

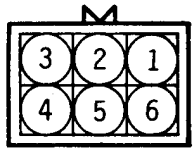
NOTE
To check the sensor terminal voltage, one method which can be used is to move the rod up and down while the sensor is installed to the chassis.

Front Height Sensor Terminal Voltage

[V]

Vehicle height level	Sensor link position	Terminal No.			
		1	2	3	5
Maximum level	①	0–0.5	4.5–5	0–0.5	4.5–5
Higher than HIGH	②				0–0.5
HIGH (target height)	③			4.5–5	
Higher than NORMAL	④		0–0.5		
NORMAL (target height)	⑤	4.5–5		0–0.5	
Lower than NORMAL	⑥				
LOW (target height)	⑦		4.5–5		
Lower than LOW	⑧			4.5–5	
Minimum level	⑨				4.5–5

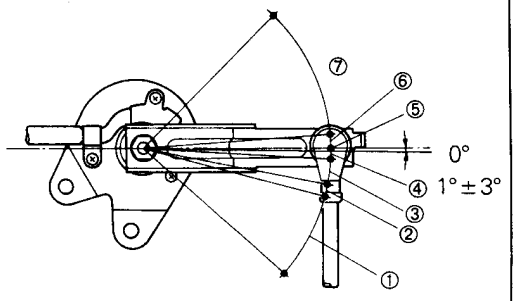
Rear height sensor connector terminal array



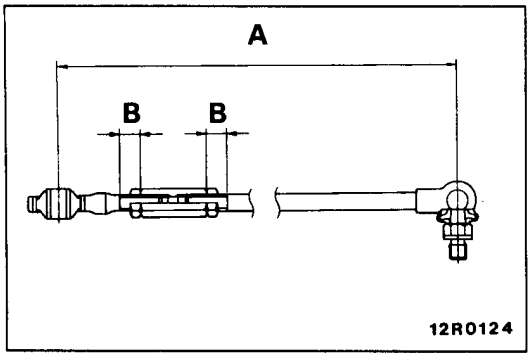
12N0065

1 Sensor A
2 Sensor B
3 Sensor C
4 Earth
5 Power supply
6 –

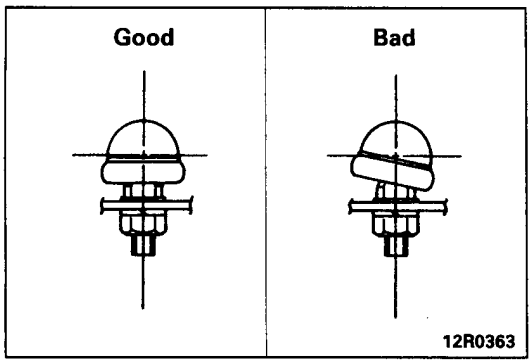
Rear height sensor position



12N0034



12R0124



12R0363

Rear Height Sensor Terminal Voltages

[V]

Vehicle height level	Sensor link position	Terminal No. 1	Terminal No. 2	Terminal No. 3
Higher than HIGH	①	0–0.5	4.5–5	0–0.5
HIGH (target height)	②			4.5–5
Higher than NORMAL	③		0–0.5	
NORMAL (target height)	④			0–0.5
Lower than NORMAL	⑤	4.5–5		
LOW (target height)	⑥		4.5–5	
Lower than LOW	⑦			4.5–5

SERVICE POINTS OF INSTALLATION E33ZEC-C

5. INSTALLATION OF REAR ROD ASSEMBLY/3. FRONT ROD ASSEMBLY

(1) Adjust the front and rear height sensors so that dimension A of the rod in the illustration is within specification.

Rod assembly length (A)

Front	**269–270 mm (10.5–10.6 in.)**
Rear	**135–136 mm (5.3–5.4 in.)**

Caution

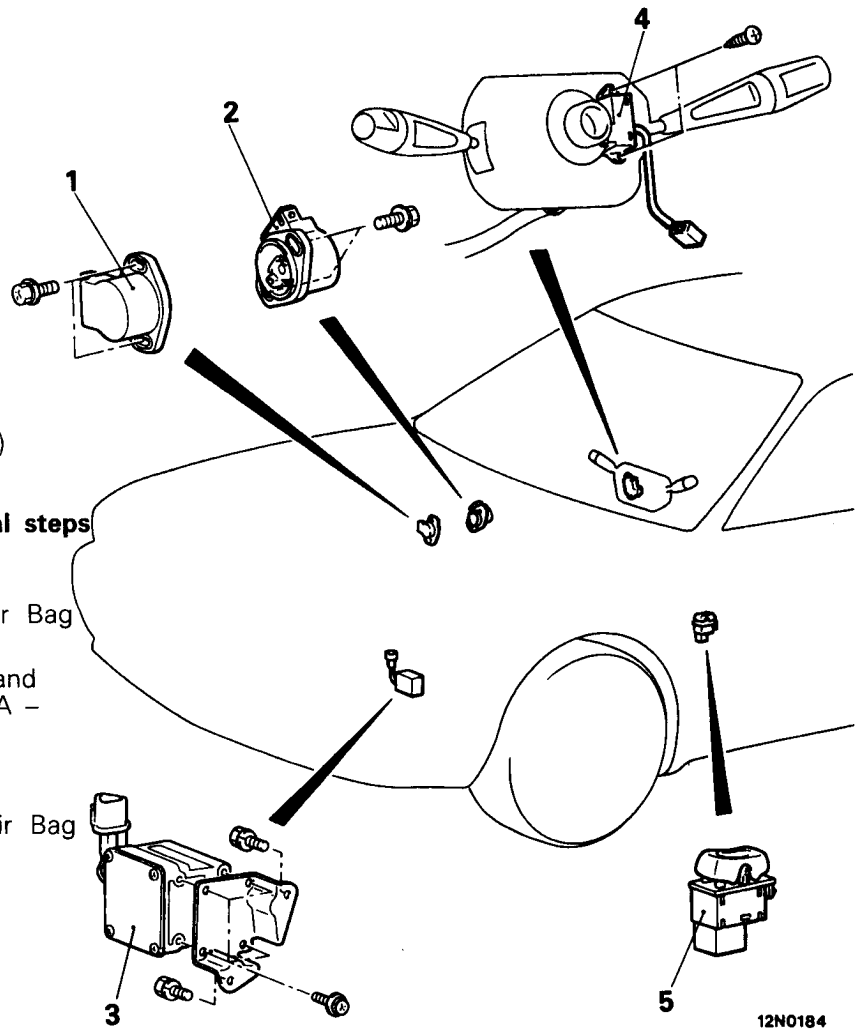
1. **When adjusting the length of the rod, adjust so that dimension B is uniform.**
2. **Height sensors must be installed so that the ball joint at the rod end is at rocking centre.**

ACTIVE-ECS SENSOR AND SWITCH

E33ZK---

REMOVAL AND INSTALLATION

CAUTION: SRS
For vehicles with SRS, before removal of air bag module, refer to GROUP 52B – SRS Service Precautions and Air Bag Module and Clock Spring.

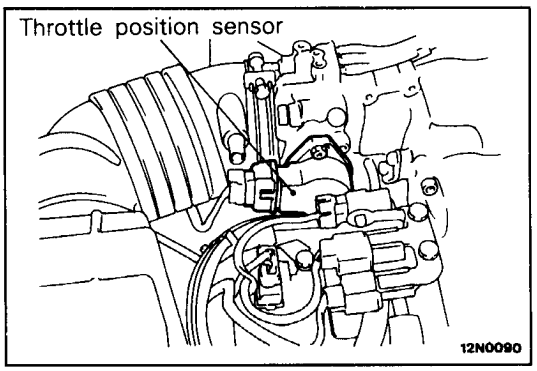


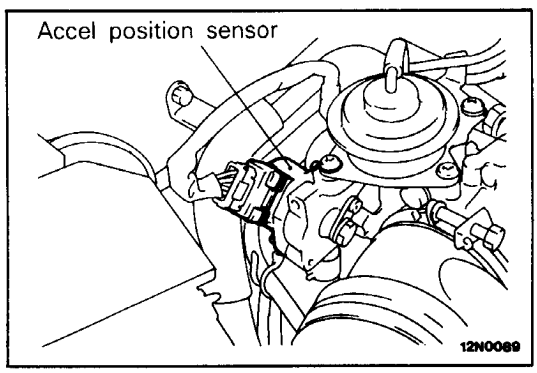
1. Throttle position sensor
2. Accel position sensor (Vehicles equipped with TCL)
3. G sensor

Steering wheel sensor removal steps

- Removal of air bag module. <Vehicles with SRS> (Refer to GROUP 52B – Air Bag Module and Clock Spring.)
- Removal of steering wheel and column cover (Refer to G37A – Steering Column Shaft.)
- Removal of clock spring. <Vehicles with SRS> (Refer to GROUP 52B – Air Bag Module and Clock Spring)
- Column switch (Refer to GROUP 54 – Column Switch.)

4. Steering wheel sensor
5. ACTIVE-ECS switch





SERVICE POINTS OF REMOVAL

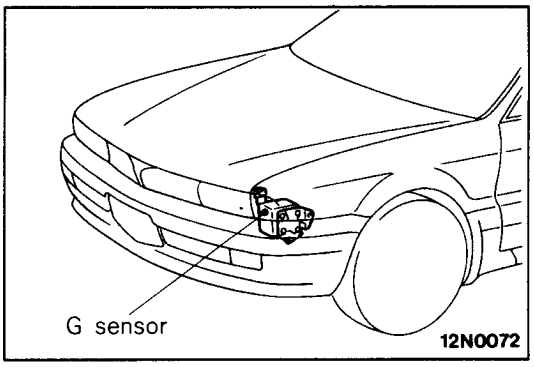
E33ZKA-B

1. REMOVAL OF THROTTLE POSITION SENSOR

Disconnect the harness connector, then remove the throttle position sensor from the throttle body.

2. REMOVAL OF ACCEL POSITION SENSOR

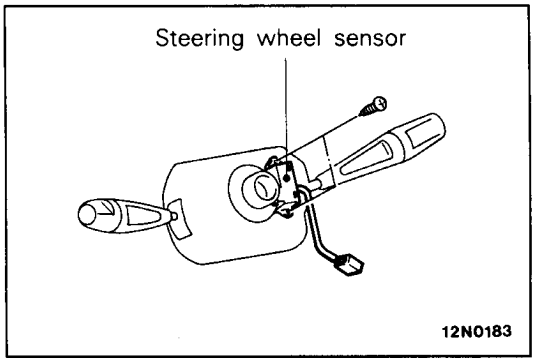
Disconnect the harness connector, then remove the accel position sensor from the throttle body.



3. REMOVAL OF G SENSOR

Disconnect the connection of the harness connector, and then remove the G sensor.

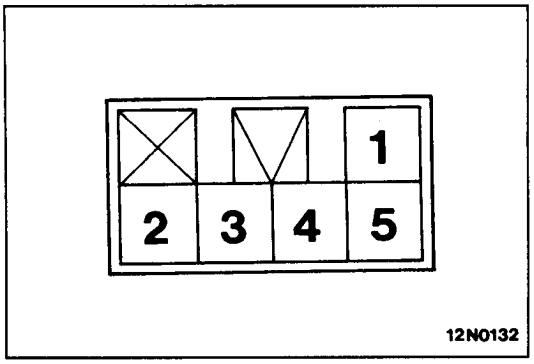
Caution
When removing the G sensor, take care not to drop it or subject it to severe impact.



4. REMOVAL OF STEERING WHEEL SENSOR

Remove the pin terminal from the column switch connector, then remove the steering wheel sensor from the column switch.

Caution
1. **The steering wheel sensor utilizes a photo coupler and care should be paid to ensure that no dust or grease are allowed to come into contact with it.**
2. **Be careful and ensure that the column switch side slit panel is not bent nor oil allowed to come into contact with it.**



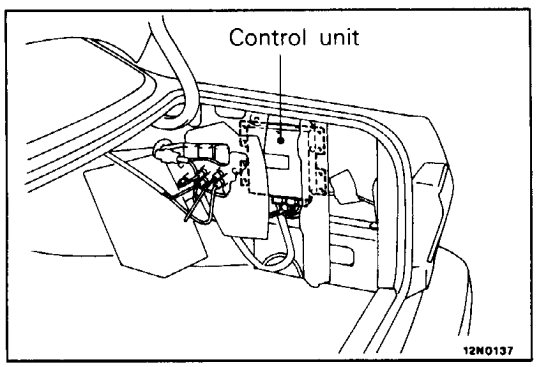
INSPECTION E33ZKB-B

INSPECTION OF ACTIVE-ECS SWITCH

Activate the switch, and check for continuity between the terminals.

Terminal \ Operation	No operation	Switched to HI	Switched to SP
1		○	
2		○	○
3	○	○	○
4	○	○	○
5			○

NOTE
○—○ indicates that there is continuity between the terminals.
Refer to the Troubleshooting heading for inspection of each sensor.



CONTROL UNIT E33ZHAA

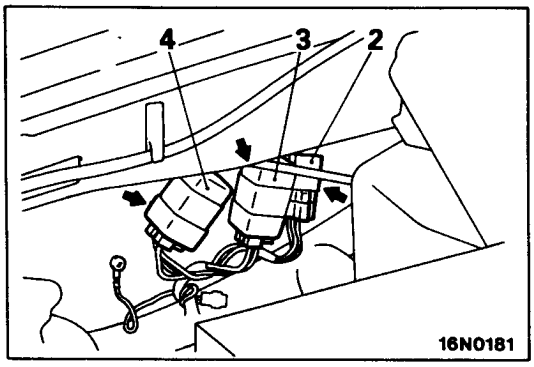
SERVICE POINTS OF REMOVAL

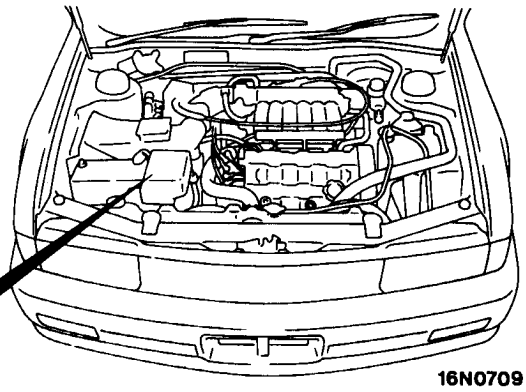
(1) Remove the trunk side trim.
(Refer to GROUP 52 – "Trims".)
(2) Remove the installation bolts and connectors, and then remove the control unit.

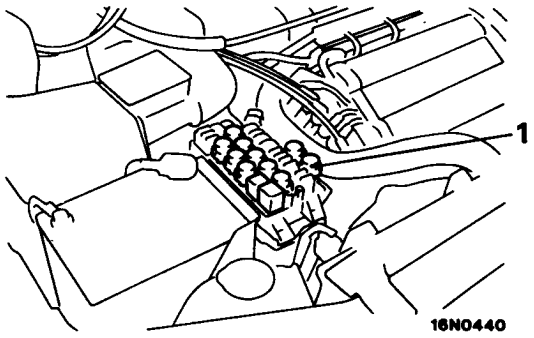
ACTIVE-ECS RELAY

E33ZL—

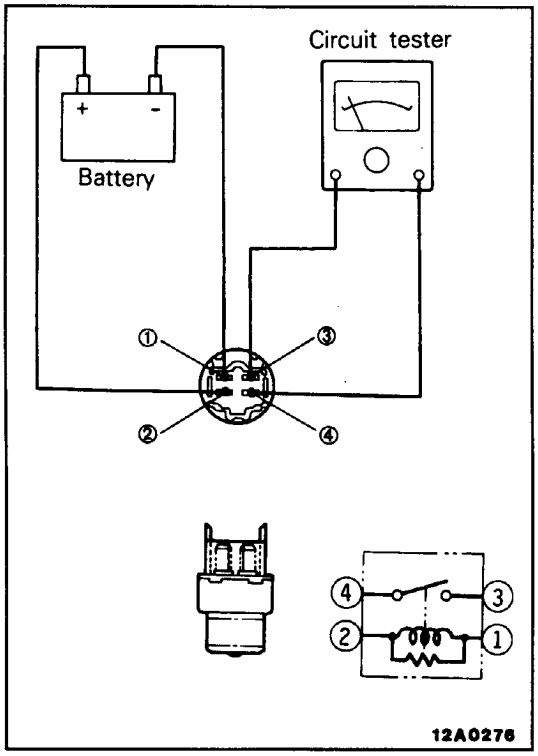
REMOVAL AND INSTALLATION







1. Power relay
2. Solenoid valve power relay
3. Compressor relay
4. Return pump relay



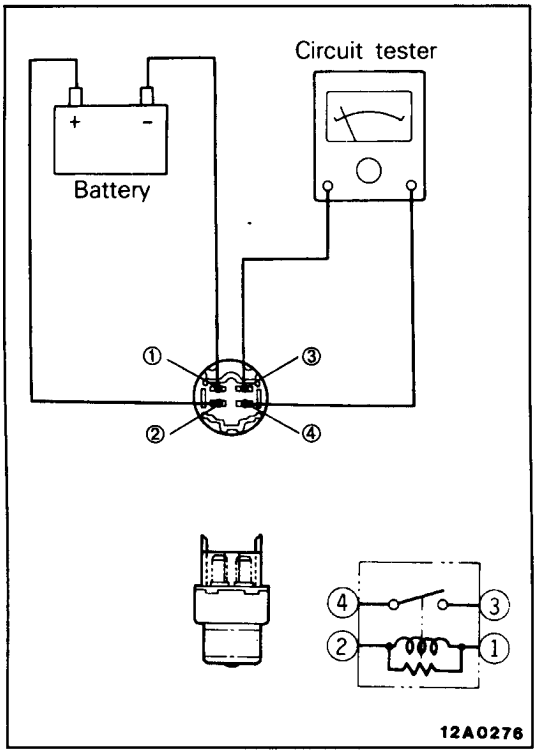
INSPECTION

E33ZLB-8

1. POWER RELAY

Connect battery power source to terminal 1. Check circuit between terminals with terminal 2 earthed.

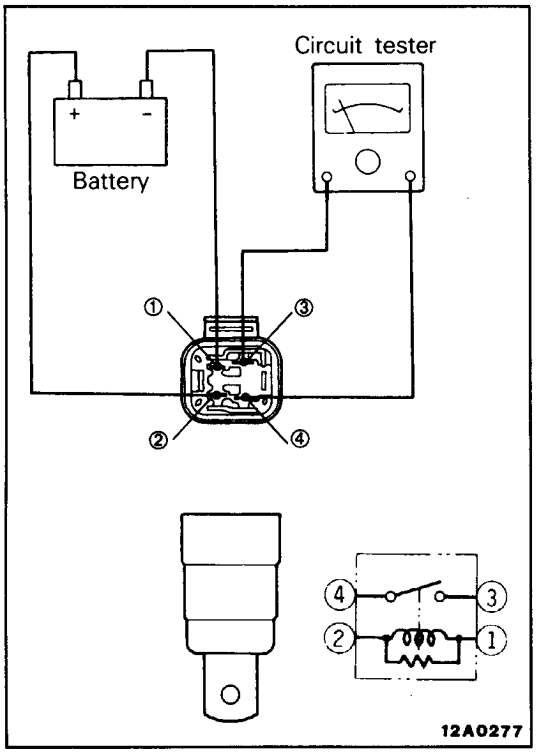
Power is supplied	Between 3–4 terminals	Continuity
Power is not supplied	Between 1–2 terminals	Continuity
	Between 3–4 terminals	No continuity



2. SOLENOID VALVE POWER RELAY

Connect battery power source to terminal 1. Check circuit between terminals with terminal 2 earthed.

Power is supplied	Between 3–4 terminals	Continuity
Power is not supplied	Between 1–2 terminals	Continuity
	Between 3–4 terminals	No continuity



3. COMPRESSOR RELAY/4. RETURN PUMP RELAY

Connect battery power source to terminal 1. Check circuit between terminals with terminal 2 earthed.

Power is supplied	Between 3–4 terminals	Continuity
Power is not supplied	Between 1–2 terminals	Continuity
	Between 3–4 terminals	No continuity