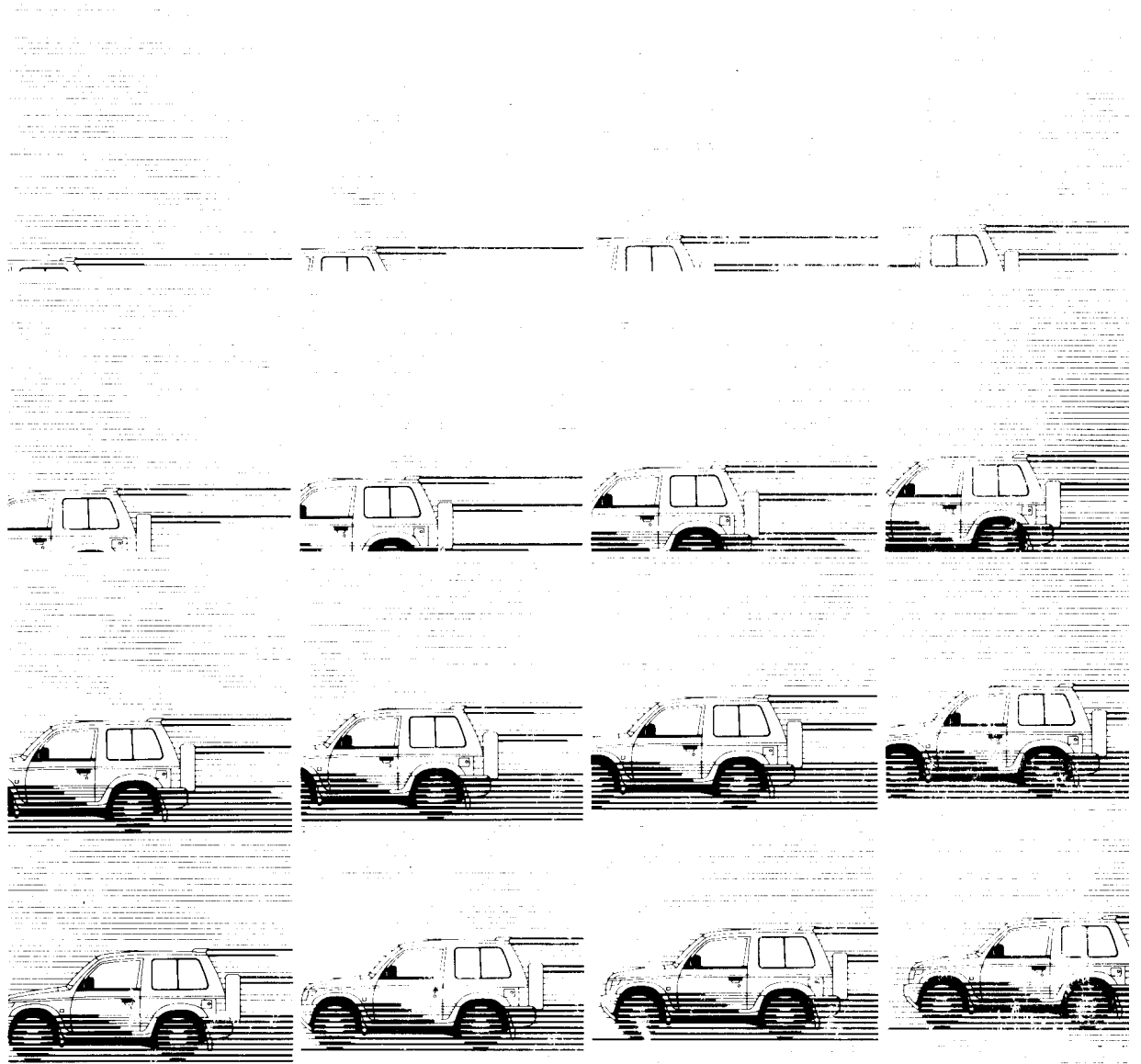




Technical Information Manual

PAJERO '91



MITSUBISHI PAJERO

TECHNICAL INFORMATION MANUAL

FOREWORD

This manual has been prepared as an introduction to the specifications, features, construction and function of the newly developed PAJERO. Use the following manuals in combination with this manual as required.

WORKSHOP MANUAL	
ENGINE GROUP	PWEE□□□□ (Looseleaf edition)
CHASSIS GROUP	PWJE9086 PWJE9085 PWJE9101
ELECTRICAL WIRING	PHJE9026 PHJE9025 PHJE9101
PARTS CATALOGUE	B6035601A1 B8035601A1 BFA35600A1

All information, illustrations and product descriptions contained in this manual are current as at the time of publication. We, however, reserve the right to make changes at any time without prior notice or obligation.

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DRIVE-CONTROL COMPONENTS	3
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GENERAL

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HOW TO USE THIS MANUAL

INDICATION OF DESTINATION

Europe, General Export, Australia, New Zealand and GCC used for convenience to indicate destination.

NOTE

1. "General Export" means territories other than Europe, GCC, Australia, New Zealand, the U.S.A. and Canada.
2. "GCC" indicates countries that are members of the (Persian) Gulf Cooperation Council of nations.
3. In some instances, vehicles with other specifications may be shipped to some countries.

MODEL INDICATIONS

The following abbreviations are used in this manual for classification of model types.

2400: Indicates models equipped with the 2,351 cm³ (143.5 cu.in.) <4G64> petrol engine.

2600: Indicates models equipped with the 2,555 cm³ (155.9 cu.in.) <4G54> petrol engine.

3000: Indicates models equipped with the 2,972 cm³ (181.3 cu.in.) <6G72> petrol engine.

2500D: Indicates models equipped with the 2,477 cm³ (151.2 cu.in.) <4D56> diesel engine.

MPI: Indicates the multi-point injection, or engines equipped with the multi-point injection.

M/T: Indicates the manual transmission, or models equipped with the manual transmission.

A/T: Indicates the automatic transmission, or models equipped with the automatic transmission.

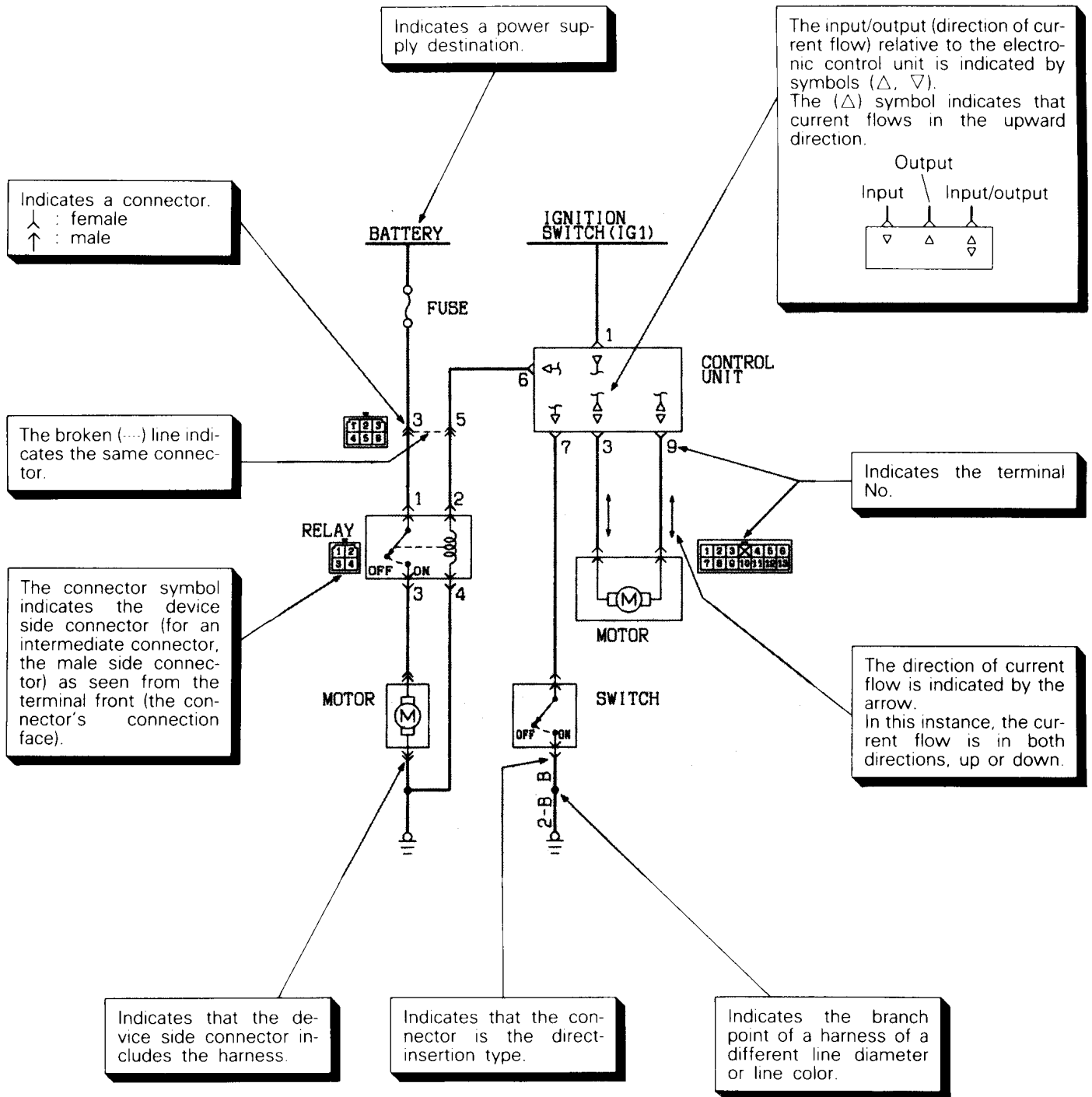
A/C: Indicates the air conditioner.

EXPLANATION OF CIRCUIT DIAGRAMS

The symbols used in circuit diagrams are used as described below.

NOTE

For detailed information concerning the reading of circuit diagrams, refer to the separate manual of "ELECTRICAL WIRING".



TARGET OF DEVELOPMENT

"Pajero" was conceived with Mitsubishi's original philosophy in automaking. It is a full scale 4WD vehicle that can be driven any part of the world, and has maintained the highest reputation in the world. Now, Pajero is reborn with new components, even more marked individuality in style, improved basic functions as an off-road 4WD vehicle, together with high speed capacity for on-road driving.

The new "Pajero" has evolved and made the debut as a highly complete off-road 4WD vehicle that represents the new era in the 90s, and it is warmly welcomed by the intellectuals who know how to enjoy themselves in any field of activities and by the sport lovers who are open to any challenges. It satisfies all the needs for driving pleasure.



PRODUCT CHARACTERISTICS

Updated design with good taste and sophistication yet with enhanced untamed air

- The exterior design expressing high quality and modernity
- The interior design expressing high class and authenticity

- Aerodynamic “Sand shaved form”
- Balance between a passenger car comfort and off-road traveling capacity – large bumper that blends with the body, combination lamps, and other garnish articles
- High quality interior
- Improved operability – audio system layout, automatic transmission select lever layout, seat belt layout and seats in new design

Excellent basic functions

- Engine with respected performance history
- Mechanism that suits on-road and off-road traveling

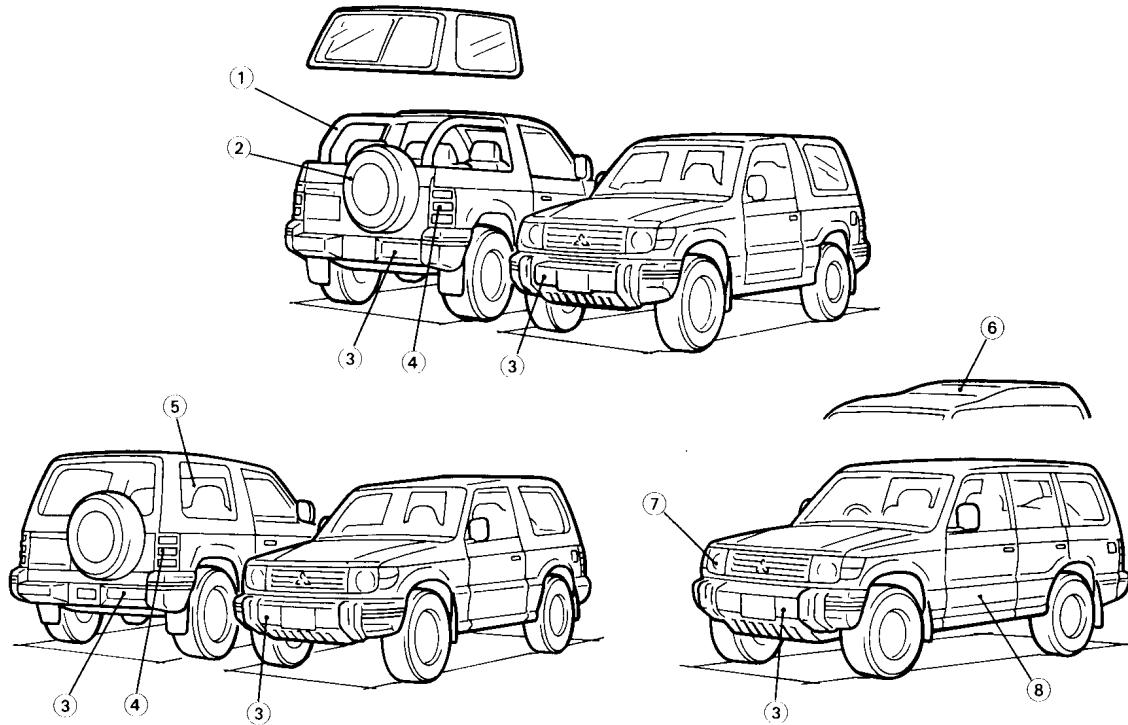
- Super select 4WD
- New front double wishbone suspension
- Wide tread
- World first multimode ABS
- 2 pod type 15” front ventilated disc brakes
- Rear differential lock that is most effective when driving on rough roads or when freeing the vehicle from being struck
- Ground clearance control

Ease and comfort

- Roomy interior
- Improved air-conditioning system
- Improved information devices
- Attention to the smallest details for comfort

- Roomy leg space and large width
- First dual automatic airconditioner for this class
- Multimeter with additional electronic compass
- Space for installation of CB radio
- Full flat seats
- Sunroof in 3 types (electric sliding sunroof, electric canvas sunroof and tilt-up sunroof)
- Cornering lamp
- Accessory socket (12 V electric outlet)
- Toolbox contained in the rear door trimming
- Inspection lamp

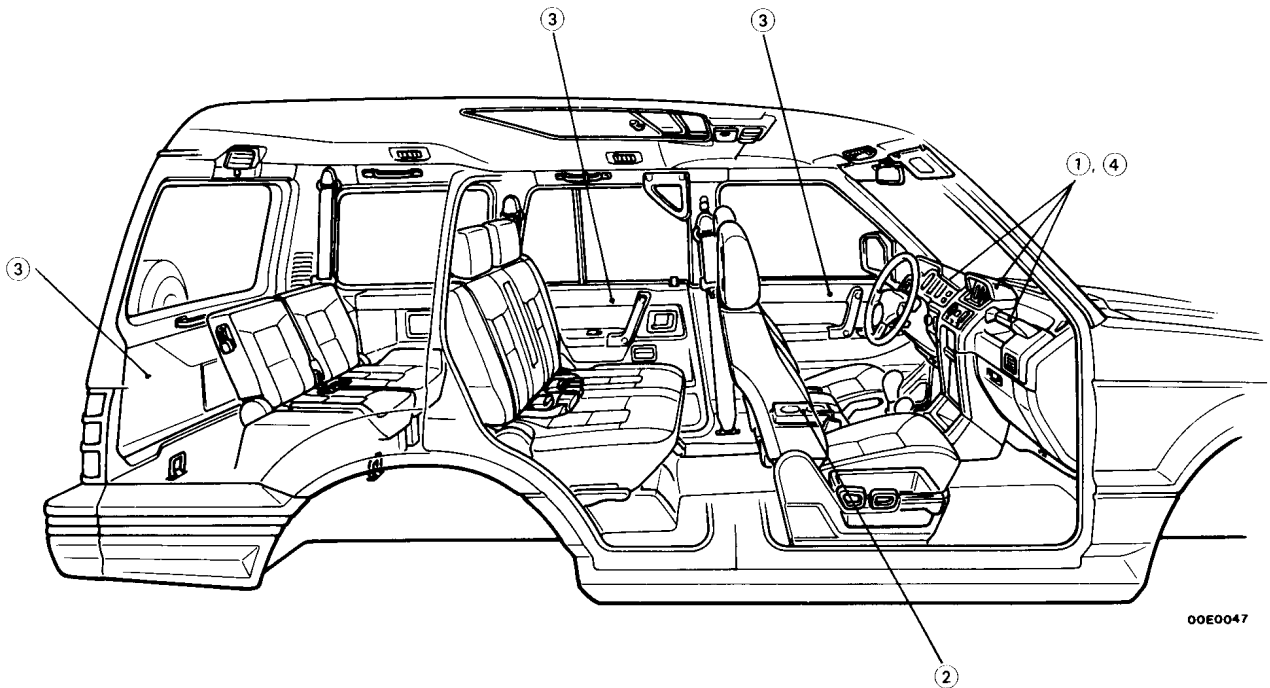
TECHNICAL CHARACTERISTICS
APPEARANCE



00E0020

No.	Characteristics
①, ②	18 inch wheels and tires, and a rear support bar (optional) that emphasized and enhanced cross-country air of a canvas top model <Canvas top model>
③	Front and rear bumpers to exhibit strength with consideration to approach and departure angles
④	Rear combination lamps where lenses are protected with a lamp bezel
⑤	Aerodynamically designed flush surface body and a cabin similar to a passenger car's
⑥	Unique and unassuming kick-up roof that is different from conventional high roofs
⑦	Nose area and uniquely shaped headlamp that inherit the existing image but improved aerodynamically
⑧	Lower body garnish with a heavy duty image through a low and wide body proportion

INTERIOR



No.	Characteristics
①	Instrument panel that creates gentle harmony and ease of use in the essential functions of a 4WD-RV* (recreational vehicle) (assist grip, multimeter, accessory socket, inspection lamp)
②	Comfortable seats <ul style="list-style-type: none"> ● Suspension seats ● Front seats with armrests to offer comfort during a long drive ● Rear seats with a centre armrest and full flat seats
③	Door trimming that contributes to safety in accommodation
④	Components that enhance the joy of RV* <ul style="list-style-type: none"> ● Full flat seats ● Various audio equipments ● Multimeter ● Cup holders

NOTE
*: RV – Recreational Vehicle

INCREASED ENGINE POWER

High output and high torque were made possible by adopting a new intake system (axial-flow air cleaner, pressure detection type Karman vortex air flow sensor) in 6G72-SOHC engine. Some models with 4D56 diesel engine are equipped with a turbocharger and improved intercooler to obtain higher power.

SPECIFICATIONS

For Europe

Engine	Total displacement cm ³ (cu.in.)	Max. output kW (PS) at r/min.	Max. torque Nm (kg/cm ²) at r/min.
4G64-SOHC (MPI)	2,351 (143.5)	82 (111) at 4,800	184 (18.4) at 3,500
6G72-SOHC (MPI)	2,972 (181.3)	110 (150) at 5,000	241 (24.1) at 4,000
4D56 with turbocharger and intercooler	2,477 (151.2)	73 (99) at 4,200	240 (24.0) at 2,000

For General Export and GCC

Engine	Total displacement cm ³ (cu.in.)	Max. output kW (PS) at r/min.	Max. torque Nm (kg/cm ²) at r/min.
4G54	2,355 (155.9)	78 (106) at 5,000	192 (19.2) at 3,000
6G72-SOHC (MPI)	2,972 (181.3)	109 (148) at 5,000	238 (23.8) at 4,000
4D56	2,477 (151.2)	53 (72) at 4,200	147 (14.7) at 2,000
4D56 with turbocharger and intercooler		73 (99) at 4,200	240 (24.0) at 2,000

For Australia

Engine	Total displacement cm ³ (cu.in.)	Max. output kW (PS) at r/min.	Max. torque Nm (kg/cm ²) at r/min.
4G54	2,355 (155.9)	79 (107) at 5,000	192 (19.2) at 3,000
6G72-SOHC (MPI)	2,972 (181.3)	109 (148) at 5,000	239 (23.9) at 4,000
4D56 with turbocharger	2,477 (151.2)	62 (84) at 4,200	201 (20.1) at 2,000
4D56 with turbo- charger and inter- cooler		73 (99) at 4,200	240 (24.0) at 2,000

CHASSIS**Steering**

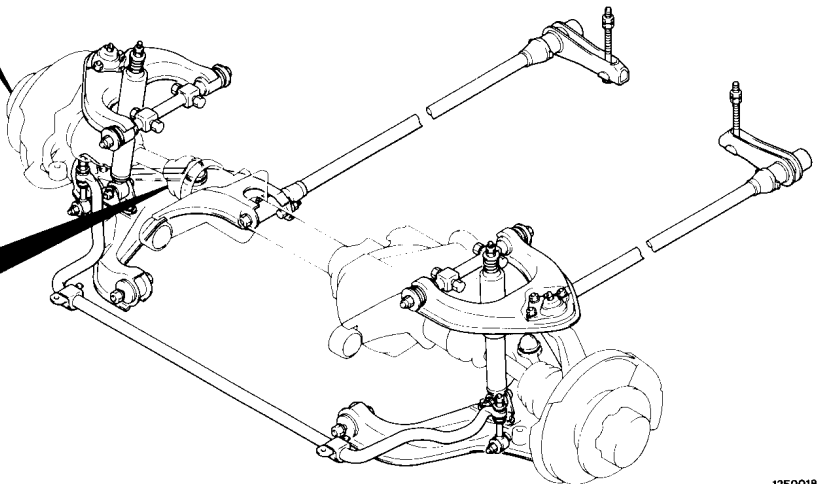
- Tilt steering function that offers the most comfortable driving position
- Collapsible column structure that is excellent in absorption of impact at crash
- Highly reliable ball and nut type gear box and engine speed responsive power steering that maintains steerability according to the speed

Front Suspension

- Increased wheel strokes with combination of reliable double wishbone independent suspension and torsion bar springs
- 3-mode variable shock absorber that can change its mode, H (hard), M (medium) and S (soft) during driving by the switch operation
- Optimal spring constant and shock absorber damping force
- King pin offset modified for mounting ABS

Front Axle

- Drive shaft in DOJ-BJ type with high transmission efficiency and low vibration and noise and in constant velocity ball joint type
- Synchronized differential to improve fuel efficiency and driving efficiency during two wheel driving
- Super-select 4WD to fully exert the merit of a 4WD and to offer driving pleasure at any driving mode



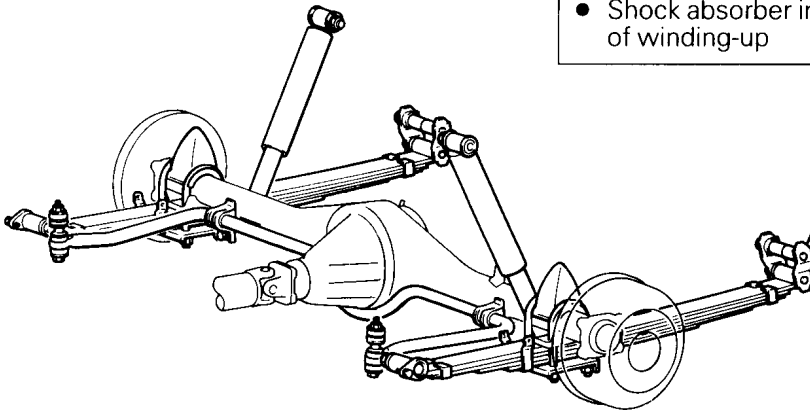
12E0018

Rear Axle

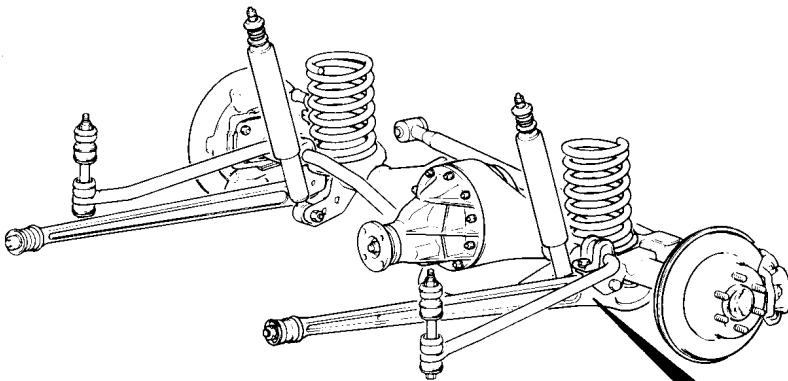
- Semi-floating axle shaft
- Highly reliable limited slip differential
- Rear differential lock that can change its Free/Lock state by a switch operation. This differential significantly improved the ability for driving on snow, mud, or sand-covered road and for freeing the vehicle from being stuck.

**Rear Suspension <Leaf spring type> –
Except vehicles for Europe**

- Rear suspension in asymmetric progressive leaf spring type that is excellent in offering driving comfort and rolling rigidity
- Shock absorber in bias arrangement that is effective in prevention of winding-up



12E0039



12E0009

Rear Suspension <Coil spring type>

- Rear suspension in 3-link coil spring type that is excellent in offering driving stability, comfort and steering stability
- Tapered coil springs where the spring constant changes according to the load to offer fine driving comfort regardless of the number of passengers
- Optimal shock absorber damping force

Brakes

- H piping that can maintain the braking balance even during malfunction of a hydraulic line, and a blend proportioning valve that controls the rear brakes
- 2 pod front disc brake that improved the braking feeling (standard equipment for some models)
- Rear drum-in disc brake that displays excellent parking brake effect (standard equipment for some models)
- Compact tandem brake booster that lightens the brake pedal force (for some models)
- Multimode anti-lock brake system (ABS) that for the first time offers the full scale 4WD vehicle a capacity to perform ABS operation while the centre differential lock is engaged

NEW TECHNOLOGY

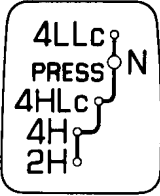
We made full application of the latest technology in creating the components, and adopted numerous other newly developed mechanisms for driving both on-road and off-road to obtain power, stability, comfort, bad road traveling capacity and fuel efficiency.

SUPER-SELECT 4WD

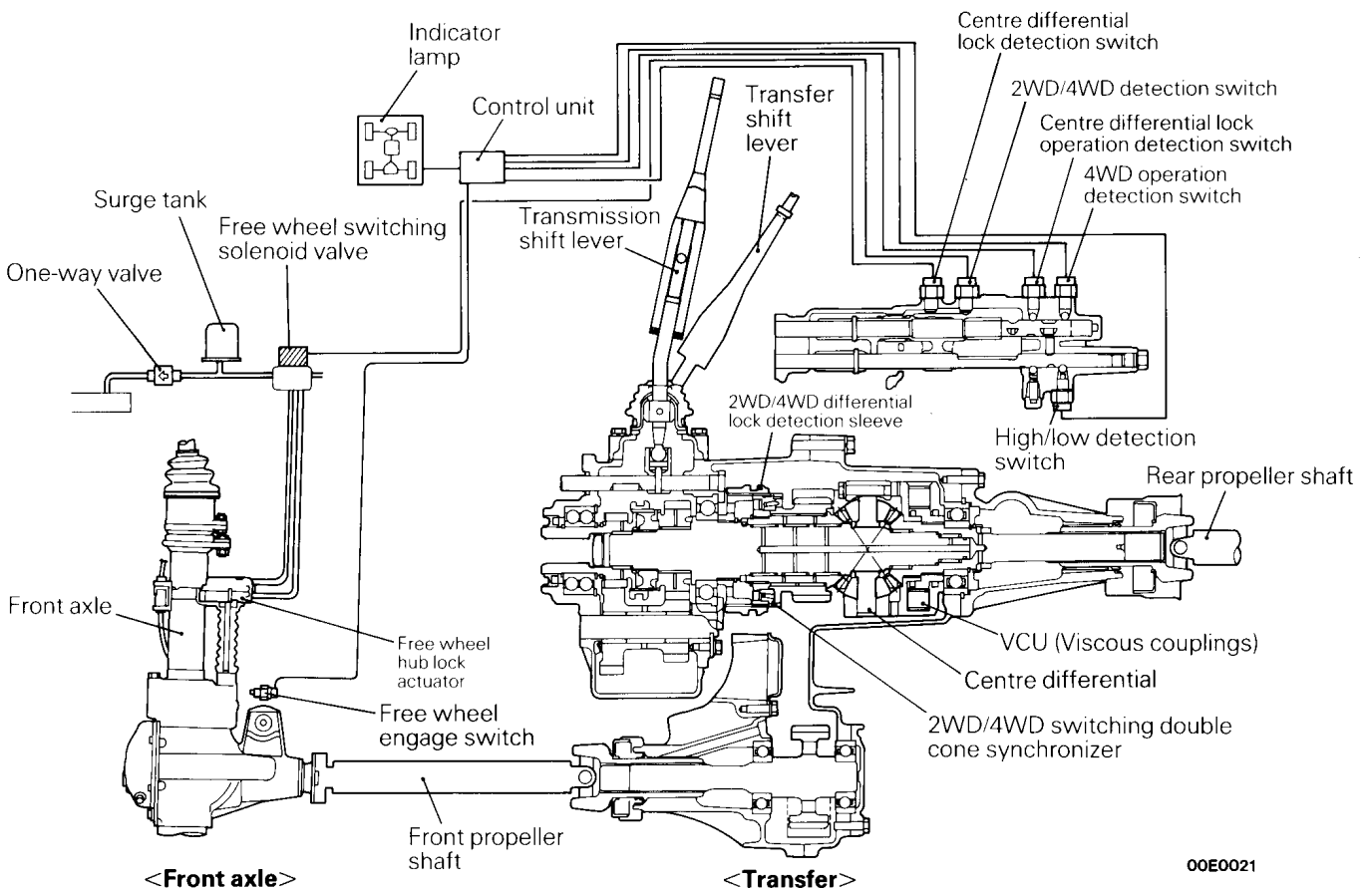
You can select from four driving modes with one lever according to the road surface conditions with this super-select 4WD mechanism. The synchronized differential structure enables front axle to shift between "free" and "lock" positions automatically by shifting the transfer lever to and from 2H and 4H. This shift can be done during driving when the speed is under 100 km/h (60 mph).

Driving Modes

*: with VCU differential limits

Shift pattern	Shift position	Conditions
	2H (2WD)	Normal driving
	4H (full-time 4WD)*	Normal driving and slippery surface (standard mode)
	4HLc (direct 4WD)	Bad road, sand, deep snow
	N (neutral)	When mechanical winch is used
	4LLc (direct low range 4WD)	When especially strong drive torque is needed

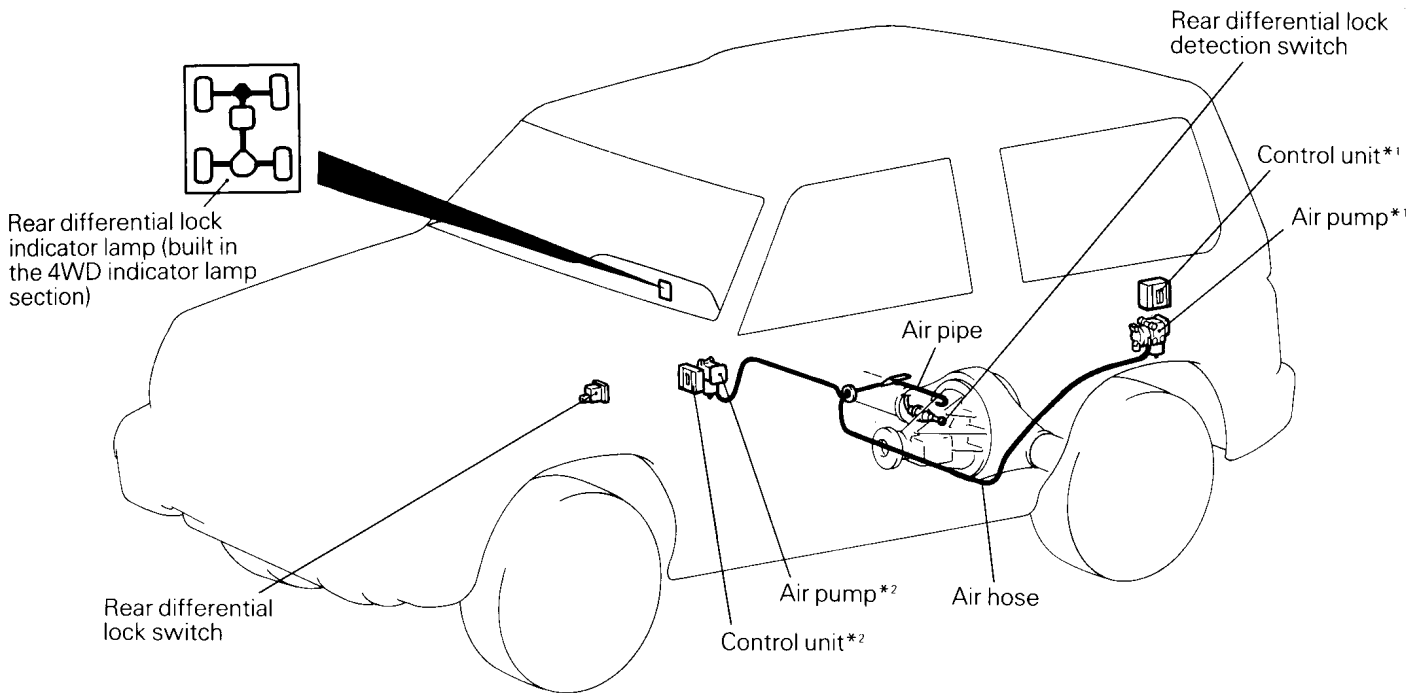
System Chart



REAR DIFFERENTIAL LOCK SYSTEM

The rear differential lock system completely locks the left and right rear wheels to facilitate escape from a gutter, gravel roads or heavy snow. It consists of the electronic control part, the air piping part and the differential lock part.

Shifting between “free” and “lock” can be done by a switch. An indicator lamp in the instrumental panel illuminates when the wheels are locked to alert the driver to ensure further safety.



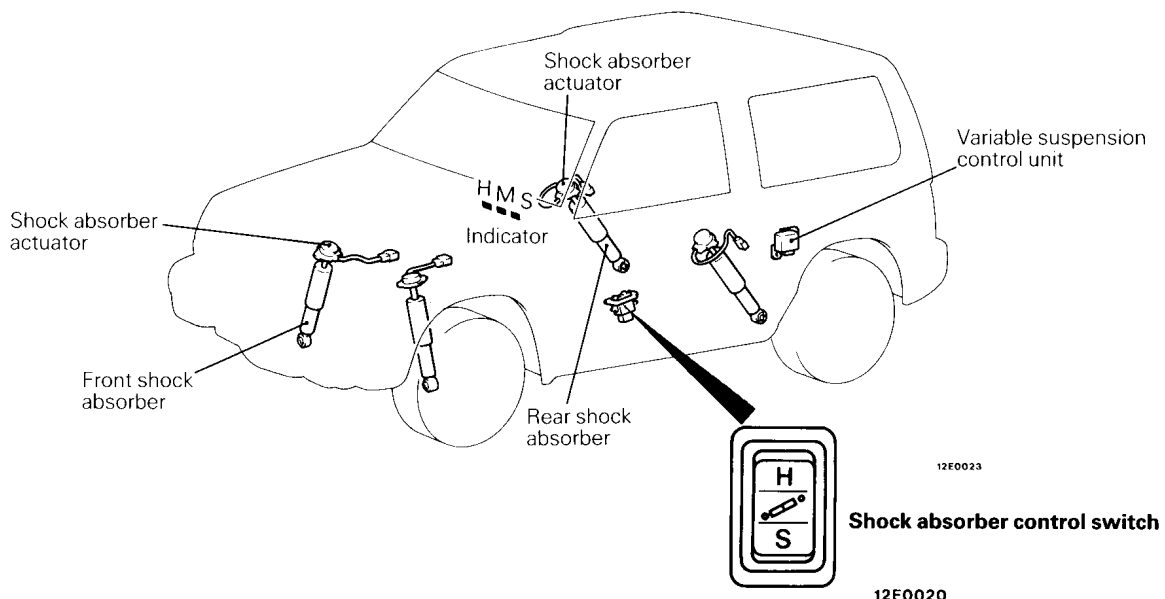
NOTE
 *¹: Standard wheelbase vehicles
 *²: Long wheelbase vehicles

11E0080

3-MODE VARIABLE SHOCK ABSORBER

The damping force of the shock absorber can be shifted in three modes, H (hard), M (medium) and S

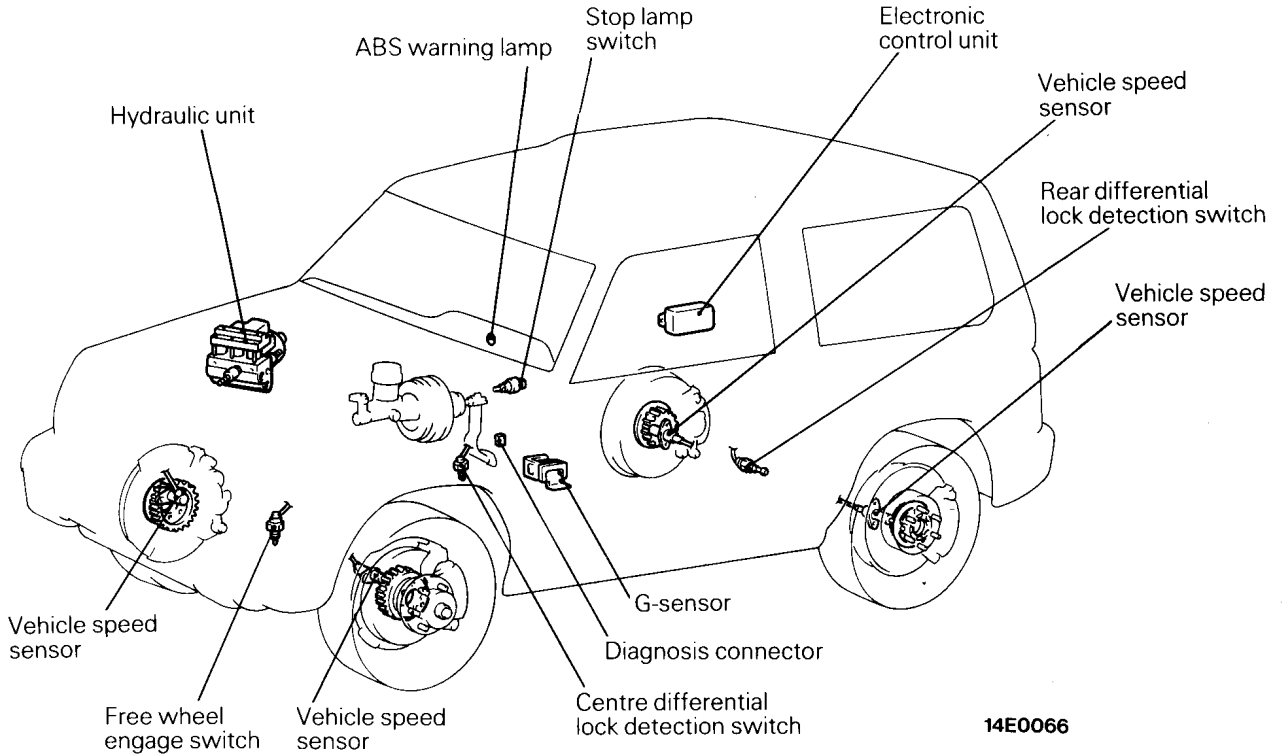
(soft) by a switch according to the traveling condition and the driver’s taste.



MULTI-MODE ANTI-LOCK BRAKE SYSTEM (ABS)

ABS is a system to detect the fluctuation in the revolution speed of each wheel with a wheel speed sensor, and automatically control the brake fluid pressure with the hydraulic unit in order to prevent

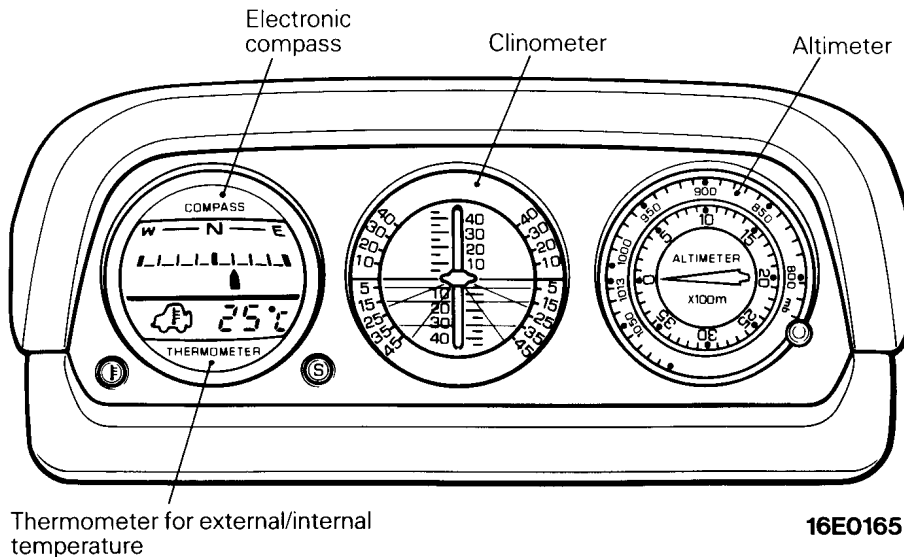
slipping that occurs when the wheels are locked by a sudden braking or on a slippery surface. A multi-mode system, independent front wheel mode and rear wheel select-low mode, is adopted.



ELECTRONIC COMPASS

The electronic compass detects the north to south elements and east to west elements on the traveling direction with a terrestrial magnetism sensor, amplifies the elements, processes the

signals in a microcomputer and indicates the heading direction of the vehicle in 16 points. This electronic compass is built in the multimeter.

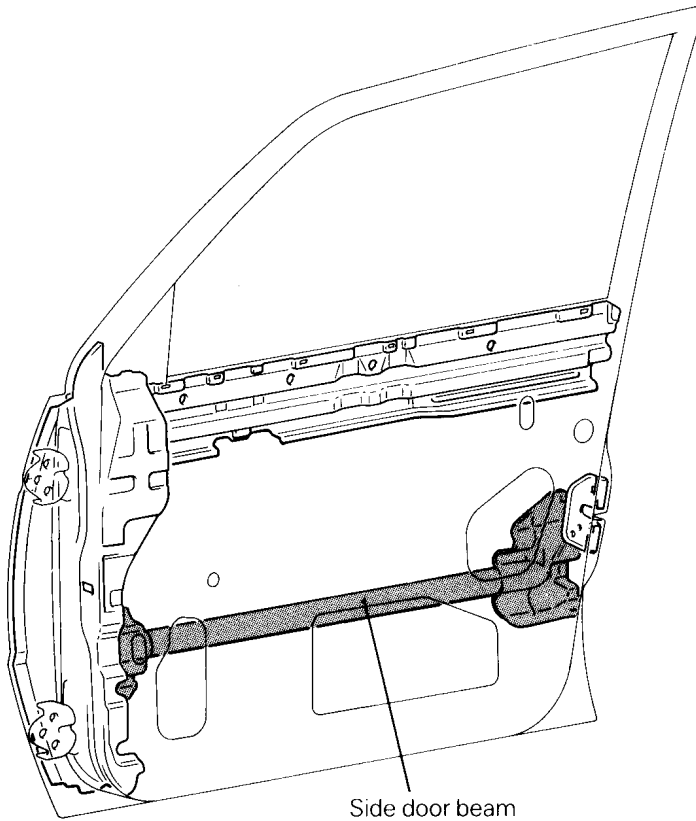


SAFETY AT CRASH <Vehicles for Europe>

Completely soldered ladder frame is adapted for excellent rigidity and durability. Side door beams are

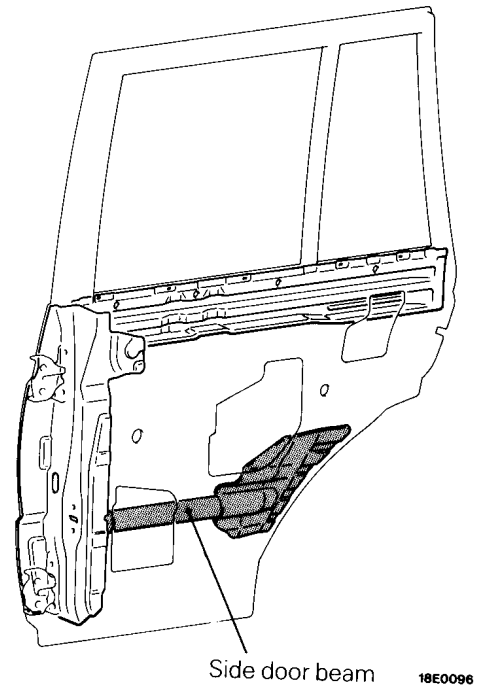
installed inside the doors to assure safety at crash from the side.

<Front door>



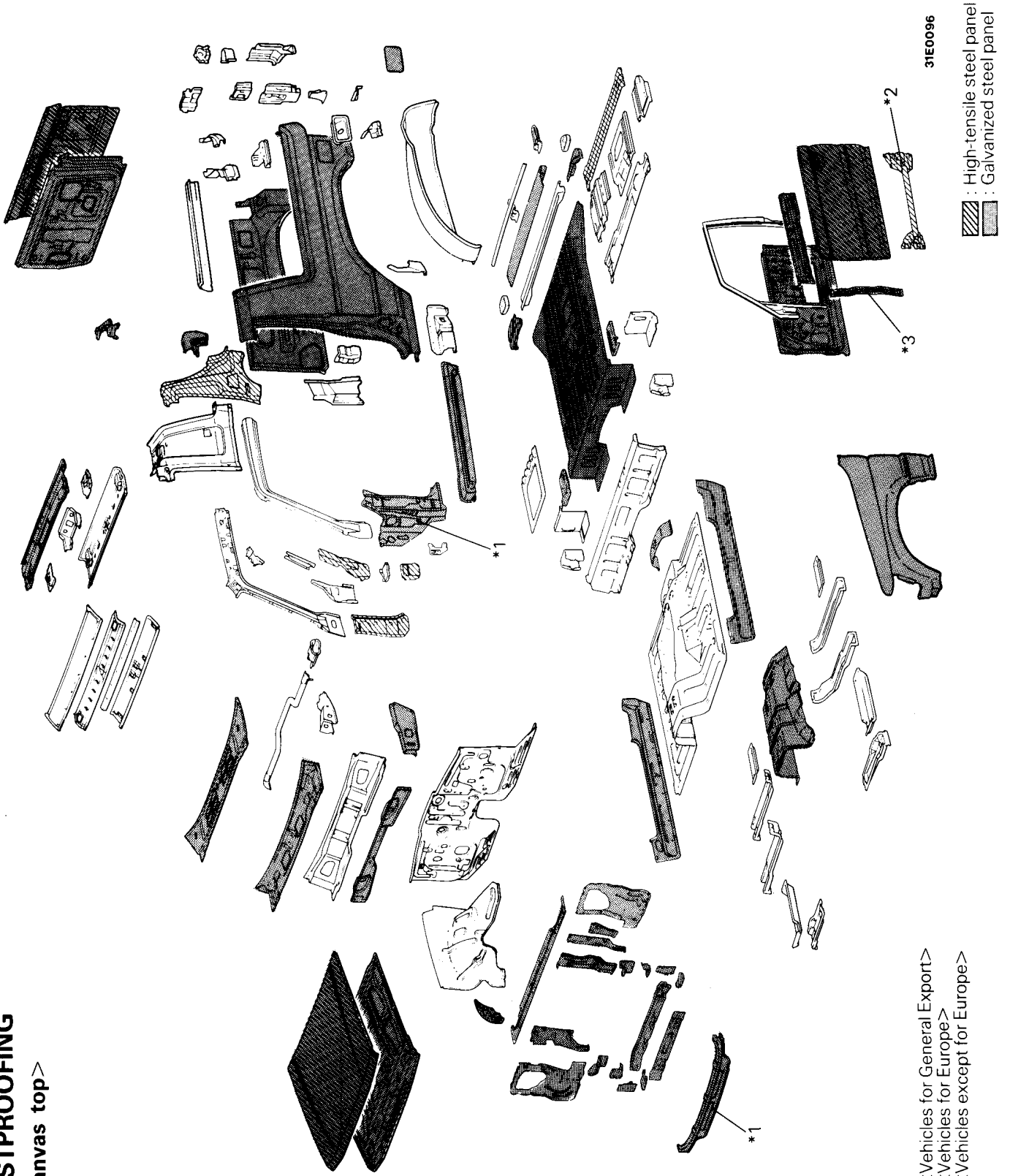
18E0079

<Rear door>



18E0096

RUSTPROOFING
<Canvas top>

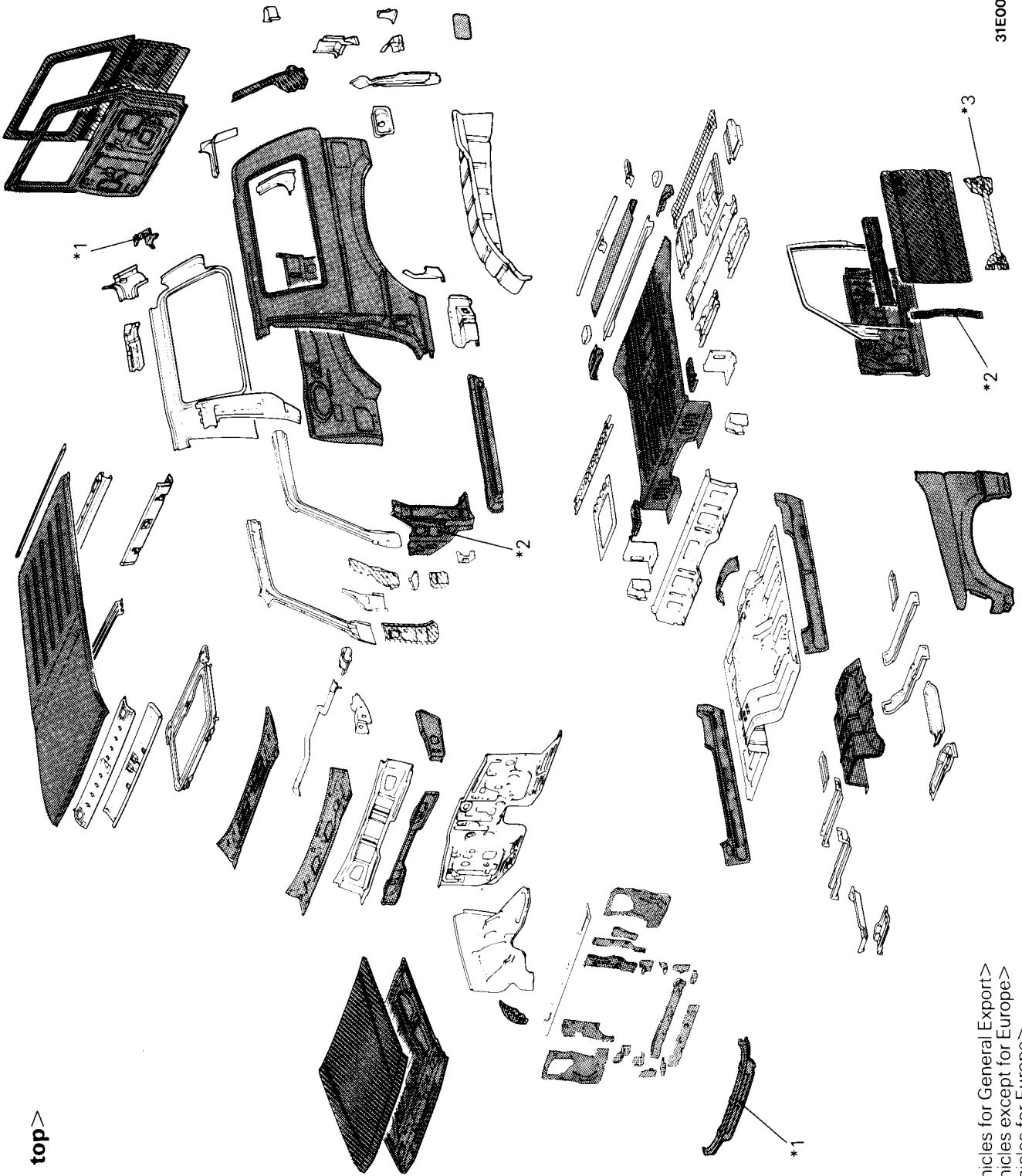


- *1: <Vehicles for General Export>
- *2: <Vehicles for Europe>
- *3: <Vehicles except for Europe>

31E0096

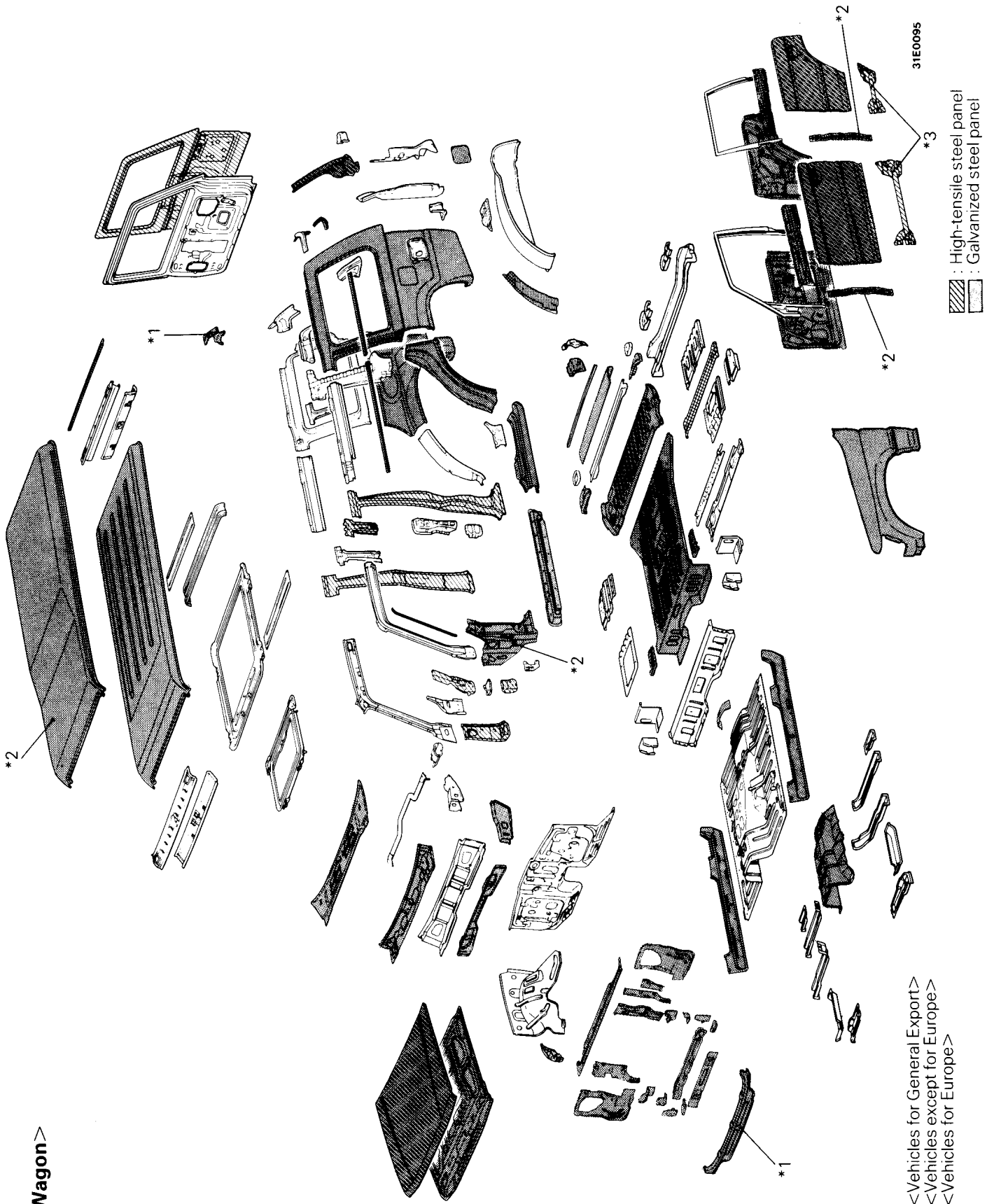
▨ : High-tensile steel panel
■ : Galvanized steel panel

<Metal top>



- *1: <Vehicles for General Export>
- *2: <Vehicles except for Europe>
- *3: <Vehicles for Europe>

31E0097
▨ : High-tensile steel panel
▤ : Galvanized steel panel



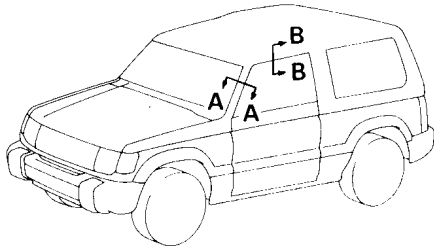
< Wagon >

- *1: <Vehicles for General Export>
- *2: <Vehicles except for Europe>
- *3: <Vehicles for Europe>

FLUSH SURFACE BODY

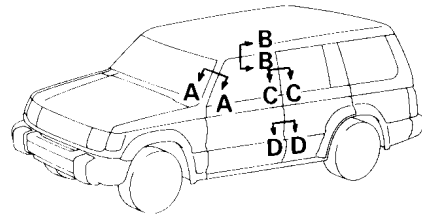
We aimed for better appearance and decrease in aerodynamic noise with the utmost effort to make each part completely flush surfaced.

<2-DOOR MODELS>



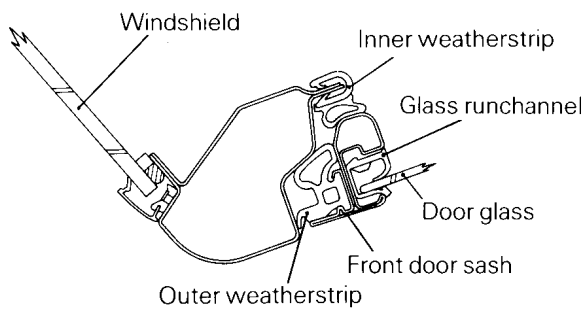
18E0001

<4-DOOR MODELS>



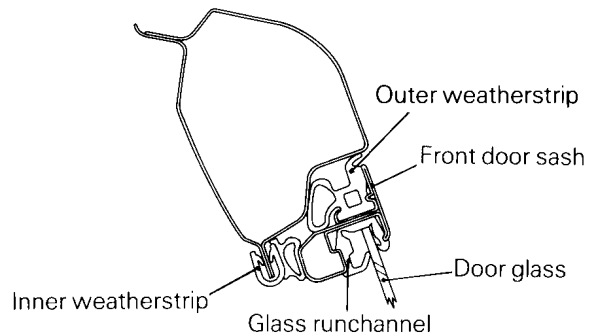
18E0003

Cross section A-A



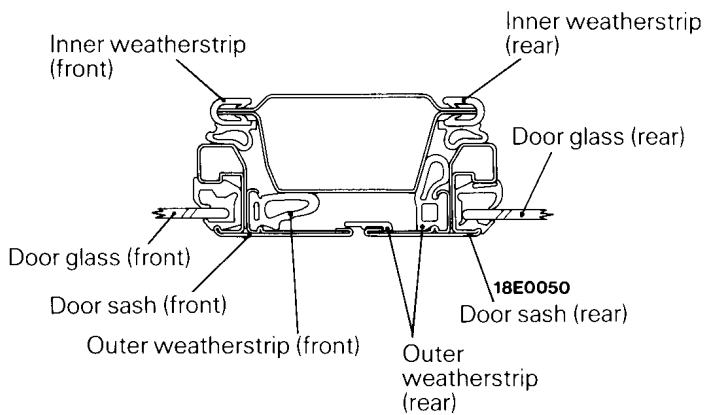
18E0048

Cross section B-B



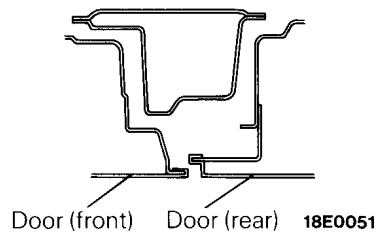
18E0049

Cross section C-C



18E0050

Cross section D-D



18E0051

VEHICLE IDENTIFICATION

VEHICLE INFORMATION CODE PLATE

Vehicle information code plate is riveted on the hood inner panel or cowl top outer panel. The plate shows model code, engine model, transmission model, and body colour code.

1. MODEL

V 4 3 W G R X E L 6

Model series
Vehicle model

2. ENGINE

6 G 7 2 Engine model

3. EXT

C A 6 Exterior code

4. TRANSAXLE

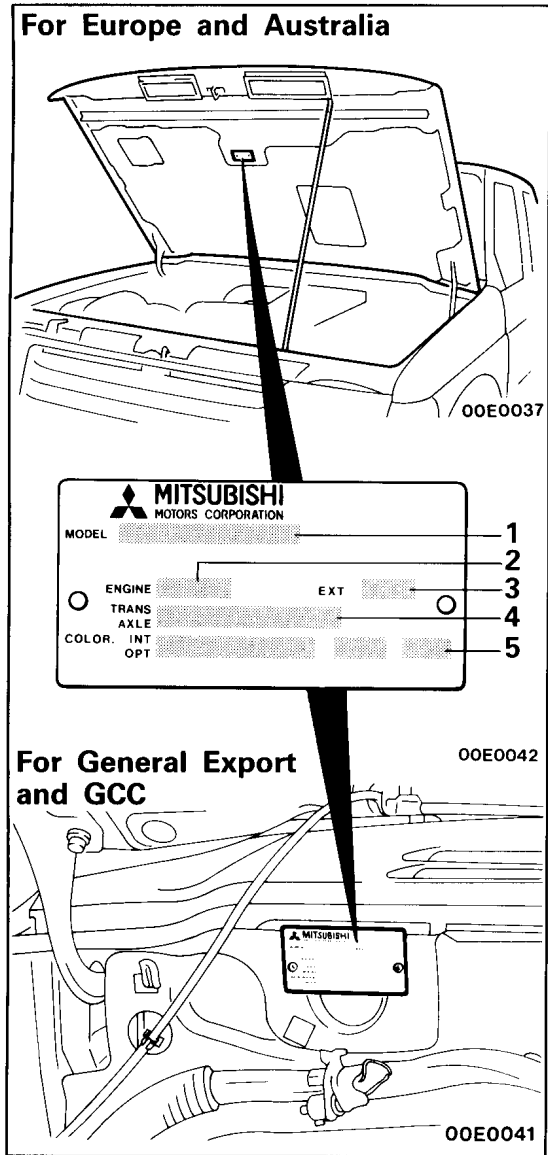
V 4 A W 2 4 8 7 5

Final gear ratio
Transmission model

5. COLOR, INT
OPT

R 2 5 8 7 V 0 3 V

Equipment code
Interior colour code
Body colour code



For monotone colour vehicles, the body colour code shall be indicated. For two-tone or three-way two-tone colour vehicles, each colour code only shall be indicated in series.

MODEL

For Europe

<2-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V21C	NSEL6	Canvas top	4G64 [2,351 cm ³ (143.5 cu.in.)]	V5M21 (5 M/T)	MPI
V24C	NSFL6		4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)	Injection
V23C	GRHEL6	Canvas top with wide fender	6G72 [2,972 cm ³ (181.3 cu.in.)]	V4AW2 (4 A/T)	MPI
V21W	NHEL6	Wagon	4G64 [2,351 cm ³ (143.5 cu.in.)]	V5M21 (5 M/T)	MPI
V24W	NDFL6	Wagon	4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)	Injection
	NHFL6/R6				
V24WG	NXFL6/R6	Wagon with wide fender	6G72 [2,972 cm ³ (181.3 cu.in.)]	V4AW2 (4 A/T)	MPI
V23W	GNXEL6/R6				
	GRXEL6/R6				

<4-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V41W	NHEL6	Wagon	4G64 [2,351 cm ³ (143.5 cu.in.)]	V5M21 (5 M/T)	MPI
V44W	NDFL6		Wagon without 3rd seat row	4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)
	NDFCL6				
	NHFL6/R6	Wagon	V4AW2 (4 A/T)		
	RHFL6/R6				
V44WG	NXFL6/R6	Wagon with wide fender	6G72 [2,972 cm ³ (181.3 cu.in.)]	V5MT1 (5 M/T)	MPI
	RXFL6/R6			V4AW2 (4 A/T)	
	NXFCL6	Wagon with wide fender, without 3rd seat row		V5MT1 (5 M/T)	
	RXFCL6			V4AW2 (4 A/T)	
V43W	NHECL6	Wagon without 3rd seat row	6G72 [2,972 cm ³ (181.3 cu.in.)]	V5MT1 (5 M/T)	MPI
	RHECL6			V4AW2 (4 A/T)	
	GNXEL6/R6	Wagon with wide fender		V5MT1 (5 M/T)	
	GRXEL6/R6			V4AW2 (4 A/T)	
	GNXECL6	Wagon with wide fender, without 3rd seat row		V5MT1 (5 M/T)	
	GRXECL6			V4AW2 (4 A/T)	

For General Export

<2-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V12C	NSL	Canvas top	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
V14C	NSL/R		4D56 [2,477 cm ³ (151.2 cu.in.)]		Injection
V12V	NDL/R	Van	4G54 [2,555 cm ³ (155.9 cu.in.)]		Conventional carburettor
V14V	NDL/R		4D56 [2,477 cm ³ (151.2 cu.in.)]		Injection
V23W	NXEL/R	Wagon	6G72 [2,972 cm ³ (181.3 cu.in.)]	V5MT1 (5 M/T)	MPI

<4-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V32V	NDL/R	Van	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
	HNDL/R	Van with kick-up roof			
V32W	NHL/R	Wagon			
	HNHL	Wagon with kick-up roof			
	RHL	Wagon		V4AW2 (4 A/T)	
V43V	HNDL/R	Van with kick-up roof		4D56 [2,477 cm ³ (151.2 cu.in.)]	
V44WG	NXFL/R	Wagon with wide fender	4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)	Injection
V43W	GNXEL/R		6G72 [2,972 cm ³ (181.3 cu.in.)]		

For GCC

<2-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V12W	NHLW	Wagon	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
V24WG	NXFLW	Wagon with wide fender	4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)	Injection
V23W	GNXELW		6G72 [2,972 cm ³ (181.3 cu.in.)]		MPI

<4-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V32V	NDLW	Van	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
	HNDLW	Van with kick-up roof			
V32W	NHLW	Wagon			
	RHLW		V4AW2 (4 A/T)		
V44WG	NXFLW	Wagon with wide fender	6G72 [2,972 cm ³ (181.3 cu.in.)]	V4AW2 (4 A/T)	MPI
V43W	GNXELW				
	GRXELW				

For Australia

<2-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V12W	NDR8	Wagon	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
V23W	GNXER8	Wagon with wide fender	6G72 [2,972 cm ³ (181.3 cu.in.)]	V5MT1 (5 M/T)	MPI

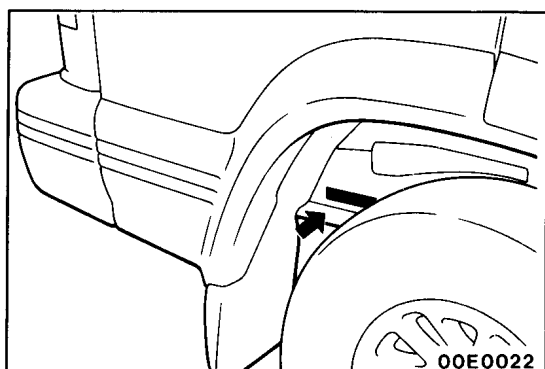
<4-DOOR MODELS>

Model code		Body style	Engine model	Transmission model	Fuel supply system
V32W	NSR8	Wagon	4G54 [2,555 cm ³ (155.9 cu.in.)]	V5M21 (5 M/T)	Conventional carburettor
V34W	NSTR8		4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger		Injection
V44W	NHFR8		Wagon with wide fender	4D56 [2,477 cm ³ (151.2 cu.in.)] with turbocharger and inter-cooler	V5MT1 (5 M/T)
V44WG	NXFR8				
V43W	NHER8	Wagon	6G72 [2,972 cm ³ (181.3 cu.in.)]	V4AW2 (4 A/T)	MPI
	RHER8	Wagon with wide fender		V5MT1 (5 M/T)	
	GNXER8			V4AW2 (4 A/T)	
	GRXER8				

MODEL CODE

V	4	3	W	G	H	N	X	E	C	L	6
1	2	3	4	5	6	7	8	9	10	11	12

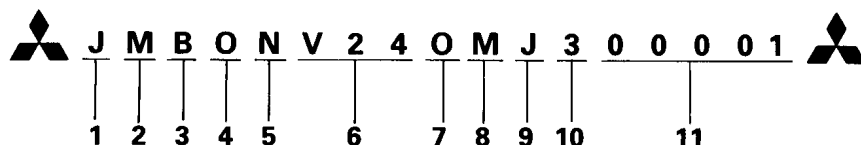
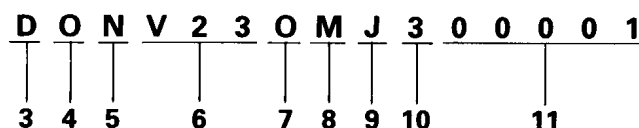
1. Sort
V: PAJERO
2. Chassis type
 - 1: Standard wheelbase with rear leaf suspension
 - 2: Standard wheelbase with rear coil suspension
 - 3: Long wheelbase with rear leaf suspension
 - 4: Long wheelbase with rear coil suspension
3. Development order
 - 1: 2,351 cm³ (143.5 cu.in.) petrol engine <4G64>
 - 2: 2,555 cm³ (155.9 cu.in.) petrol engine <4G54>
 - 3: 2,972 cm³ (181.3 cu.in.) petrol engine <6G72>
 - 4: 2,477 cm³ (151.2 cu.in.) diesel engine <4D56>
4. Body type
C: Canvas top
V: Van
W: Wagon
5. Fender specification
G: Wide fender
None: Standard fender
6. Roof type
H: Kick-up roof
None: Standard roof
7. Transmission type
N: 5 x 2-speed manual transmission
R: 4 x 2-speed automatic transmission
8. Trim code
9. Exhaust emission specification
E: MPI, SOHC
F: Turbocharger with inter-cooler
10. Interior specification
C: Without 3rd seat row
None: Standard interior
11. Steering wheel location
L: Left hand
R: Right hand
12. Destination
6: For Europe
8: For Australia
W: For GCC
None: For General Export

**CHASSIS NUMBER**

The chassis number is stamped on the side wall of the frame near the right rear wheel.

NOTE

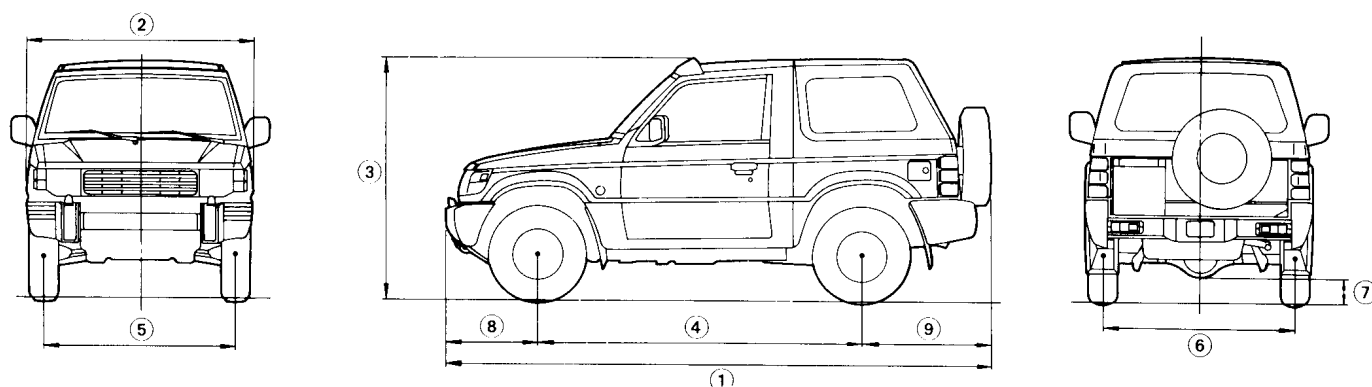
The Mitsubishi symbol at both ends of the chassis number is only on vehicles destined for Europe.

For Europe**For General Export, GCC and Australia**

1. Asia
2. Japan
3. MITSUBISHI
 - A: For Europe, right hand drive
 - B: For Europe, left hand drive
 - C: For General Export, right hand drive
 - D: For General Export, left hand drive
 - F: For Australia, right hand drive
4. Sort
 - O: 4 or 2-door with tailgate (backdoor)
 - A: 2-door semi-open (Canvas top)
5. Transmission type
 - N: 5 x 2-speed manual transmission
 - R: 4 x 2-speed automatic transmission
6. Development order
 - 2-door models
 - V12: 2,555 cm³ (155.9 cu.in.) petrol engine
 - V14: 2,477 cm³ (151.2 cu.in.) diesel engine
 - V21: 2,351 cm³ (143.5 cu.in.) petrol engine
 - V23: 2,972 cm³ (181.3 cu.in.) petrol engine
 - V24: 2,477 cm³ (151.2 cu.in.) diesel engine
 - 4-door models
 - V32: 2,555 cm³ (155.9 cu.in.) petrol engine
 - V34: 2,477 cm³ (151.2 cu.in.) diesel engine
 - V41: 2,351 cm³ (143.5 cu.in.) petrol engine
 - V43: 2,972 cm³ (181.3 cu.in.) petrol engine
 - V44: 2,477 cm³ (151.2 cu.in.) diesel engine
7. Body style
 - O: Frame
8. Model year
 - M: 1991
 - N: 1992
9. Plant
 - J: Oye Plant of Nagoya Motor Vehicle Works
10. Engine specification
 - 0: Without turbocharger, without catalyzer
 - 3: With turbocharger, without catalyzer
 - 5: Without turbocharger, with catalyzer
 - 8: With turbocharger, with catalyzer
11. Serial number
 - 00001 to XXXXX

MAJOR SPECIFICATIONS

FOR EUROPE CANVAS TOP



00E0038

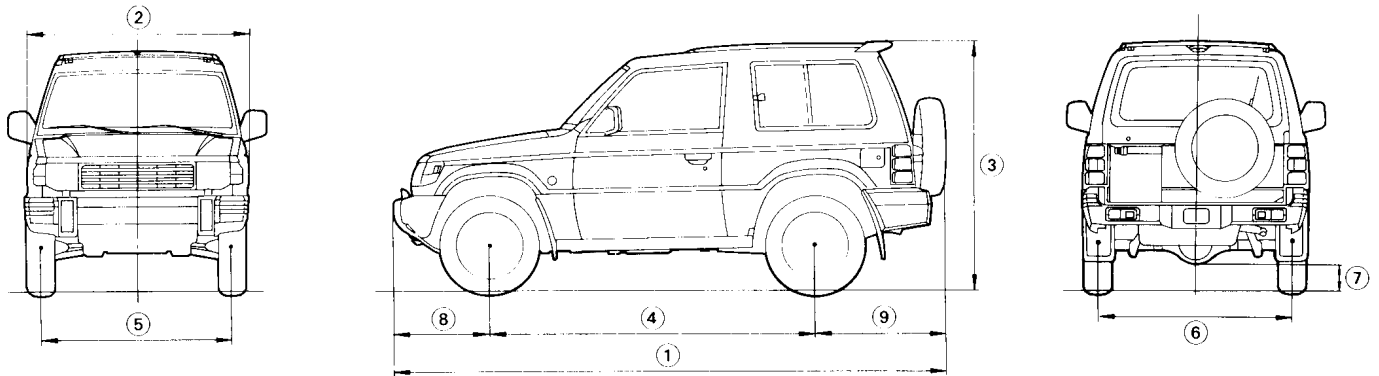
Items		V21CNSEL6	V24CNSFL6	V23CGRHEL6
Dimensions	mm (in.)			
Overall length	①	4,075 (160.4)		4,145 (163.2)
Overall width	②	1,695 (66.7)		1,785 (70.3)
Overall height (unladen)	③	1,815 (71.5)		1,815 (71.5)
Wheelbase	④	2,420 (95.3)		2,420 (95.3)
Track – front	⑤	1,420 (55.9)		1,465 (57.7)
Track – rear	⑥	1,435 (56.5)		1,480 (58.3)
Ground clearance (laden)	⑦	215 (8.5) or 205 (8.1)* ¹		215 (8.5)
Overhang – front	⑧	675 (26.6)		720 (28.3)
Overhang – rear	⑨	980 (38.6)		1,005 (39.6)
Weight	kg (lbs.)			
Kerb weight		1,530 – 1,655 (3,373 – 3,648)	1,655 – 1,800 (3,648 – 3,968)	1,705 – 1,835 (3,758 – 4,045)
Max. gross vehicle weight		2,200 (4,850) or 2,300 (5,070)* ²	2,300 (5,070)	2,350 (5,180)
Max. front axle load		1,100 (2,425)	1,100 (2,425)	1,200 (2,645)
Max. rear axle load		1,450 (3,196) or 1,500 (3,306)* ²	1,450 (3,196)	1,450 (3,196)
Seating capacity		4		
Engine				
Model		4G64	4D56	6G72
Total displacement	cm ³ (cu.in.)	2,351 (143.5)	2,477 (151.2)	2,972 (181.3)
Transmission				
Type		5-speed manual	5-speed manual	4-speed automatic
Model		V5M21	V5MT1	V4AW2

NOTE

*¹: With rear differential lock

*²: Vehicles for Sweden or Denmark

METAL TOP



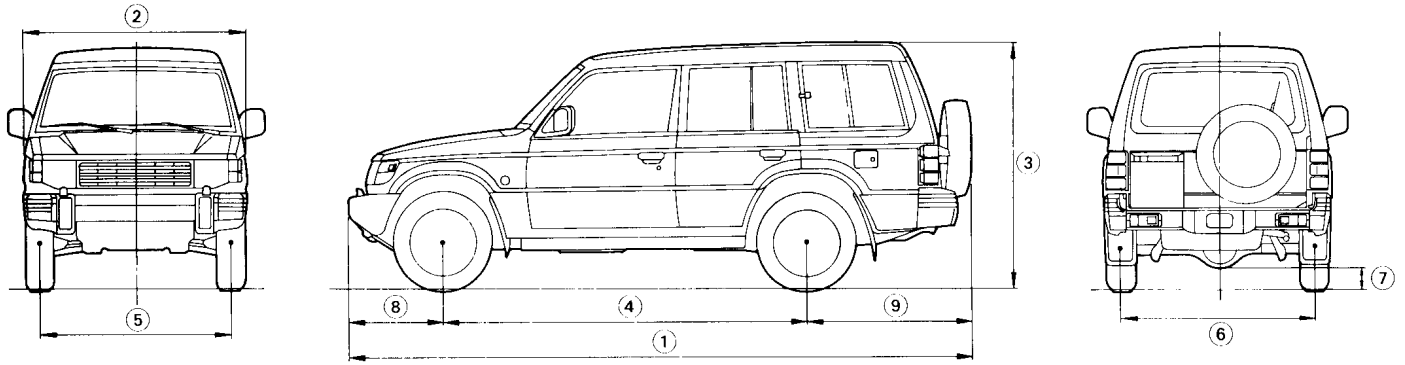
00E0039

Items		V21WNHEL6	V24WNDFL6 V24WNHFL6/R6	V24WGNXFL6/R6	V23WGNXEL6/R6 V23WGRXEL6/R6
Dimensions	mm (in.)				
Overall length	①	4,120 (162.2) or 4,075 (160.4)* ³		4,145 (163.2)	
Overall width	②	1,695 (66.7)		1,785 (70.3)	
Overall height (laden)	③	1,805 (71.1)		1,815 (71.5)	
Wheelbase	④	2,420 (95.3)		2,420 (95.3)	
Track – front	⑤	1,420 (55.9)		1,465 (57.7)	
Track – rear	⑥	1,435 (56.5)		1,480 (58.3)	
Ground clearance (laden)	⑦	215 (8.5) or 205 (8.1)* ¹		225 (8.8) or 215 (8.5)* ¹	
Overhang – front	⑧	720 (28.3) or 675 (26.6)* ³		720 (28.3)	
Overhang – rear	⑨	980 (38.6)		1,005 (39.6)	
Weight	kg (lbs.)				
Kerb weight		1,580 – 1,710 (3,483 – 3,769)	1,730 – 1,900 (3,813 – 4,188) or 1,680 – 1,820 (3,703 – 4,012)* ³	1,755 – 1,905 (3,869 – 4,199)	1,740 – 1,855 (3,836 – 4,089)
Max. gross vehicle weight		2,200 (4,850) or 2,350 (5,180)* ²	2,300 (5,070)	2,300 (5,070)	2,350 (5,180)
Max. front axle load		1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,200 (2,645)
Max. rear axle load		1,450 (3,196) or 1,500 (3,306)* ²	1,450 (3,196)	1,450 (3,196)	1,450 (3,196)
Seating capacity		5			
Engine					
Model		4G64		4D56	6G72
Total displacement	cm ³ (cu.in.)	2,351 (143.5)		2,477 (151.2)	2,972 (181.3)
Transmission					
Type		5-speed manual	5-speed manual or 4-speed automatic* ⁴		
Model		V5M21	V5MT1 or V4AW2* ⁴		

NOTE

*¹: With rear differential lock*²: Vehicles for Sweden or Denmark*³: V24WNDFL6*⁴: V23WGRXEL6/R6

WAGON



00E0040

<Vehicles with petrol engine>

Items		V41WNHEL6	V43WGNXEL6/R6 V43WGNXECL6 V43WNHECL6* ¹¹	V43WGRXEL6/R6 V43WGRXECL6 V43WRHECL6* ¹¹
Dimensions	mm (in.)			
Overall length	①	4,700 (185.0)	4,725 (186.0)	4,725 (186.0)
Overall width	②	1,695 (66.7)	1,785 (70.3)	1,785 (70.3)
Overall height (unladen)	③	1,855 (73.0)	1,865 (73.4)	1,865 (73.4)
Wheelbase	④	2,725 (107.3)	2,725 (107.3)	2,725 (107.3)
Track – front	⑤	1,420 (55.9)	1,465 (57.7)	1,465 (57.7)
Track – rear	⑥	1,435 (56.5)	1,480 (58.3)	1,480 (58.3)
Ground clearance (laden)	⑦	210 (8.3) or 200 (7.9)* ¹	210 (8.3)	210 (8.3)
Overhang – front	⑧	720 (28.3)	720 (28.3)	720 (28.3)
Overhang – rear	⑨	1,255 (49.4)	1,280 (50.4)	1,280 (50.4)
Weight	kg (lbs.)			
Kerb weight		1,790 – 1,945 (3,946 – 4,287)	1,915 – 2,070 (4,221 – 4,563) or 1,890 – 2,045 (4,166 – 4,508)* ⁵ or 1,824 – 1,844 (4,021 – 4,065)* ¹¹	1,910 – 2,065 (4,210 – 4,552) or 1,885 – 2,040 (4,155 – 4,497)* ⁶ or 1,824 – 1,844 (4,021 – 4,065)* ¹¹
Max. gross vehicle weight		2,560 (5,643)	2,650 (5,842) or 2,500 (5,511)* ¹¹	2,650 (5,842) or 2,500 (5,511)* ¹¹
Max. front axle load		1,100 (2,425)	1,200 (2,645)	1,200 (2,645) or 1,100 (2,425)* ¹¹
Max. rear axle load		1,650 (3,637)	1,650 (3,637)	1,650 (3,637)
Seating capacity		7	7 or 5* ⁵ . * ⁶	
Engine			6G72	
Model		4G64		
Total displacement	cm ³ (cu.in.)	2,351 (143.5)	2,972 (181.3)	
Transmission				
Type		5-speed manual	5-speed manual	4-speed automatic
Model		V5M21	V5MT1	V4AW2

NOTE

*¹: With rear differential lock

*⁵: V43WGNXECL6

*⁶: V43WGRXECL6

*¹¹: Vehicles for Sweden

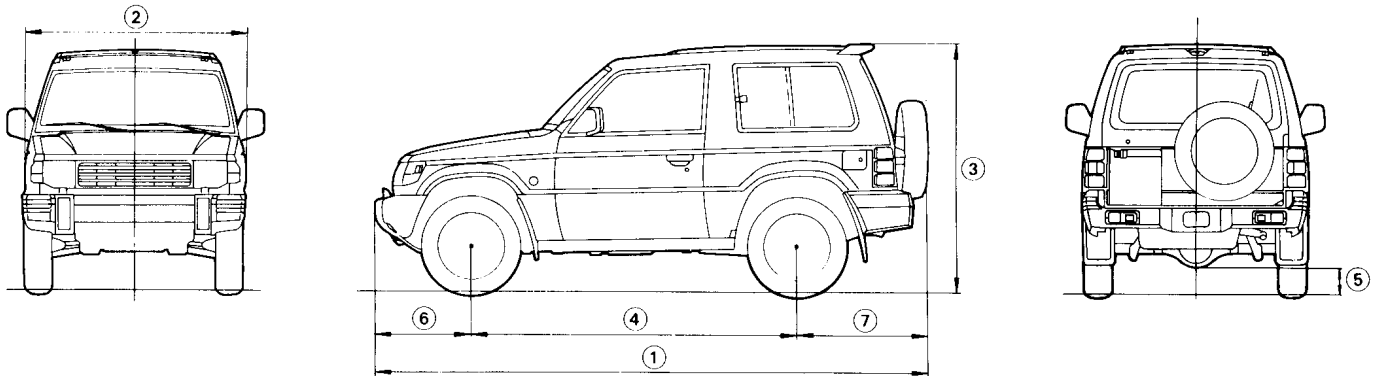
<Vehicles with diesel engine>

Items	V44WNDFL6 V44WNDFCL6 V44WNHFL6/R6	V44WRHFL6/R6	V44WGNXFCL6/R6 V44WGNXFCL6	V44WGRXFCL6/R6 V44WGRXFCL6
Dimensions	mm (in.)			
Overall length	① 4,055 (159.6) or 4,700 (185.0)* ⁷	4,700 (185.0)	4,725 (186.0)	
Overall width	② 1,695 (66.7)	1,695 (66.7)	1,785 (70.3)	
Overall height (unladen)	③ 1,855 (73.0)	1,855 (73.0)	1,865 (73.4)	
Wheelbase	④ 2,725 (107.3)	2,725 (107.3)	2,725 (107.3)	
Track – front	⑤ 1,420 (55.9)	1,420 (55.9)	1,465 (57.7)	
Track – rear	⑥ 1,435 (56.5)	1,430 (56.2)	1,480 (58.3)	
Ground clearance (laden)	⑦ 210 (8.3) or 200 (7.9)* ¹	210 (8.3) or 200 (7.9)* ¹	210 (8.3)	
Overhang – front	⑧ 675 (26.6) or 720 (28.3)* ⁷	720 (28.3)	720 (28.3)	
Overhang – rear	⑨ 1,255 (49.4)	1,255 (49.4)	1,280 (50.4)	
Weight	kg (lbs.)			
Kerb weight	1,865 – 2,000 (4,111 – 4,409) or 1,840 – 1,975 (4,056 – 4,354)* ⁸ or 1,915 – 2,110 (4,221 – 4,651)* ⁷	1,895 – 2,100 (4,177 – 4,629)	1,945 – 2,115 (4,287 – 4,662) or 1,920 – 2,090 (4,232 – 4,607)* ⁹	1,935 – 2,105 (4,265 – 4,640) or 1,910 – 2,080 (4,210 – 4,585)* ¹⁰
Max. gross vehicle weight	2,650 (5,643)	2,650 (5,643)	2,650 (5,643)	2,650 (5,643)
Max. front axle load	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)	1,100 (2,425)
Max. rear axle load	1,650 (3,637)	1,650 (3,637)	1,650 (3,637)	1,650 (3,637)
Seating capacity	7 or 5* ⁸	7	7 or 5* ⁹	7 or 5* ¹⁰
Engine	4D56			
Model				
Total displacement	cm ³ (cu.in.) 2,477 (151.2)			
Transmission				
Type	5-speed manual	4-speed automatic	5-speed manual	4-speed automatic
Model	V5MT1	V4AW2	V5MT1	V4AW2

NOTE

*¹: With rear differential lock*⁷: V44WNHFL6/R6*⁸: V44WNDFCL6*⁹: V44WGNXFCL6*¹⁰: V44WGRXFCL6

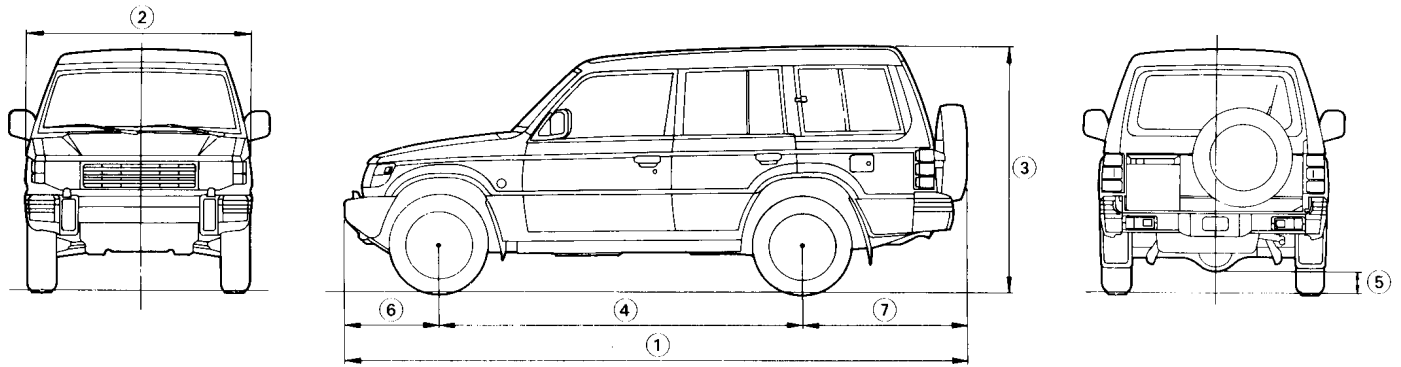
**FOR AUSTRALIA
METAL TOP**



00E0039

Items		V12WNDR8	V23WGNXER8
Dimensions	mm (in.)		
Overall length	①	4,065 (160.0)	4,145 (163.2)
Overall width	②	1,695 (66.7)	1,785 (70.3)
Overall height (unladen)	③	1,815 (71.5)	1,815 (71.5)
Wheelbase	④	2,420 (95.3)	2,420 (95.3)
Ground clearance (laden)	⑤	210 (8.3)	195 (7.7)
Overhang – front	⑥	680 (26.8)	720 (28.3)
Overhang – rear	⑦	965 (38.0)	1,005 (39.6)
Weight	kg (lbs.)		
Kerb weight		1,560 (3,439)	1,745 (3,847)
Max. gross vehicle weight		2,200 (4,850)	2,350 (5,180)
Seating capacity		5	
Engine			
Model		4G54	6G72
Total displacement	cm ³ (cu.in.)	2,555 (155.9)	2,972 (181.3)
Transmission			
Type		5-speed manual	5-speed manual
Model		V5M21	V5MT1

WAGON



00E0040

<Vehicles with petrol engine>

Items		V32WNSR8	V43WNHER8 V43WRHER8	V43WGNXER8 V43WGRXER8
Dimensions	mm (in.)			
Overall length	①	4,645 (182.9)	4,655 (183.3)	4,725 (186.0)
Overall width	②	1,695 (66.7)	1,695 (66.7)	1,785 (70.3)
Overall height (unladen)	③	1,870 (73.6)	1,860 (73.2)	1,865 (73.4)
Wheelbase	④	2,725 (107.3)	2,725 (107.3)	2,725 (107.3)
Ground clearance (laden)	⑤	195 (7.7)	190 (7.5)	195 (7.7)
Overhang – front	⑥	680 (26.8)	675 (26.6)	720 (28.3)
Overhang – rear	⑦	1,240 (48.8)	1,255 (49.4)	1,280 (50.4)
Weight	kg (lbs.)			
Kerb weight		1,740 (3,836)	1,895 (4,177) or 1,890 (4,166)*	1,915 (4,221) or 1,910 (4,210)*
Max. gross vehicle weight		2,400 (5,291)	2,600 (5,732)	2,600 (5,732)
Seating capacity		5	7	
Engine				
Model		4G54	6G72	
Total displacement	cm ³ (cu.in.)	2,555 (155.9)	2,972 (181.3)	
Transmission				
Type		5-speed manual	5-speed manual or 4-speed automatic*	
Model		V5M21	V5MT1 or V4AW2*	

NOTE

*: <A/T>

<Vehicles with diesel engine>

Items	V34WNSTR8	V44WNHFR8	V44WGNXFR8
Dimensions	mm (in.)		
Overall length	① 4,645 (182.9)	4,655 (183.3)	4,725 (186.0)
Overall width	② 1,695 (66.7)	1,695 (66.7)	1,785 (70.3)
Overall height (unladen)	③ 1,870 (73.6)	1,860 (73.2)	1,865 (73.4)
Wheelbase	④ 2,725 (107.3)	2,725 (107.3)	2,725 (107.3)
Ground clearance (laden)	⑤ 195 (7.7)	190 (7.5)	195 (7.7)
Overhang – front	⑥ 680 (26.8)	675 (26.6)	720 (28.3)
Overhang – rear	⑦ 1,240 (48.8)	1,255 (49.4)	1,280 (50.4)
Weight	kg (lbs.)		
Kerb weight	1,790 (3,946)	1,925 (4,243)	1,950 (4,299)
Max. gross vehicle weight	2,400 (5,291)	2,600 (5,732)	2,600 (5,732)
Seating capacity	5	7	
Engine			
Model	4D56		
Total displacement	cm ³ (cu.in.) 2,477 (151.2)		
Transmission			
Type	5-speed manual		
Model	V5M21	V5MT1	

ENGINE

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E9BZAG

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GENERAL INFORMATION

E9BLAAH

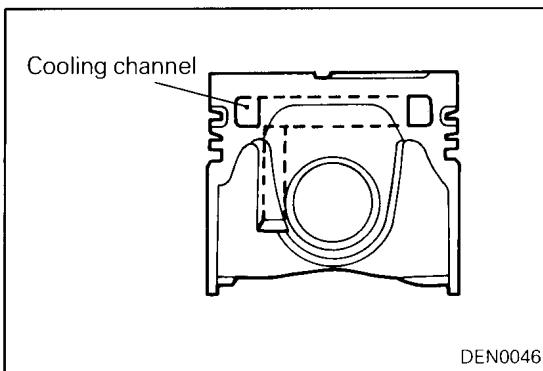
There are three versions of engine for the new PAJERO/MONTERO line-up.

The 4G64 petrol engine is the same as that used in the current L300 models. Similarly, the 4G54 and 6G72 petrol engines are the same as those for the current PAJERO/MONTERO models. Conversely the 4D56 turbocharged diesel engine with an inter-cooler has the following improvements:

- The pistons, piston rings and cylinder liners have been improved for higher abrasion resistance and durability.
- The oil pump and oil jets have been improved for better lubrication.
- The turbocharger has been improved for higher operational performance.

Item			4G64	4G54	6G72
Total displacement			cm ³ (cu.in.) 2,351 (143.5)	2,555 (155.9)	2,972 (181.4)
Number of cylinders and arrangement			4, in-line type	4, in-line type	6, V-type
Combustion chamber			Compact type	Compact type	Compact type
Number of intake/exhaust valves (per cylinder)			1 each	1 each	1 each
Valve mechanism			Single Overhead Camshaft (SOHC), belt driven	Single Overhead Camshaft (SOHC), chain driven	Single Overhead Camshaft (SOHC), belt driven
Bore x stroke			mm (in.) 86.5 x 100.0 (3.406 x 3.937)	91.1 x 98.0 (3.587 x 3.858)	91.1 x 76.0 (3.587 x 2.992)
Compression ratio			8.5	8.8	8.9
Valve timing	Intake valves	Open	20° BTDC	25° BTDC	19° BTDC
		Close	64° ABDC	59° ABDC	59° ABDC
	Exhaust valves	Open	64° BBDC	64° BBDC	59° BBDC
		Close	20° ATDC	20° ATDC	19° ATDC
Supercharging			–	–	–
Intercooler			–	–	–
Fuel system			Electronic control multi-point fuel injection	Carburetor	Electronic control multi-point fuel injection
Ignition system	Ignition distribution		By distributor	By distributor	By distributor
	Ignition timing control		Electronic control	Governor and vacuum control	Electronic control

Item			4D56	4D56 with turbocharger	4D56 with turbocharger and inter-cooler
Total displacement	cm ³ (cu.in.)		2,477 (151.2)	2,477 (151.2)	2,477 (151.2)
Number of cylinders and arrangement			4, in-line type	4, in-line type	4, in-line type
Combustion chamber			Swirl chamber type	Swirl chamber type	Swirl chamber type
Number of intake/exhaust valves (per cylinder)			1 each	1 each	1 each
Valve mechanism			Single Overhead Camshaft (SOHC), belt driven	Single Overhead Camshaft (SOHC), belt driven	Single Overhead Camshaft (SOHC), belt driven
Bore x stroke	mm (in.)		91.1 x 95.0 (3.587 x 3.740)	91.1 x 95.0 (3.587 x 3.740)	91.1 x 95.0 (3.587 x 3.740)
Compression ratio			21.0	21.0	21.0
Valve timing	Intake valves	Open	20° BTDC	20° BTDC	20° BTDC
		Close	48° ABDC	48° ABDC	48° ABDC
	Exhaust valves	Open	54° BBDC	54° BBDC	54° BBDC
		Close	22° ATDC	22° ATDC	22° ATDC
Supercharging			–	Turbocharger	Turbocharger
Intercooler			–	–	Air cooling
Fuel system			Distributor-type injection pump	Distributor-type injection pump	Distributor-type injection pump
Ignition system	Ignition distribution			–	–
	Ignition timing control			–	–



ENGINE PROPER

E9BBAAG

PISTONS <4D56 WITH TURBOCHARGER AND INTER-COOLER>

A cooling channel has been provided in the pistons for better cooling.

PISTON RINGS <4D56 WITH TURBOCHARGER AND INTER-COOLER>

The surface treatment has been improved for better durability.

CYLINDER BLOCK <4D56>

The cylinder liner material has been improved for greater abrasion resistance.

MOUNTS

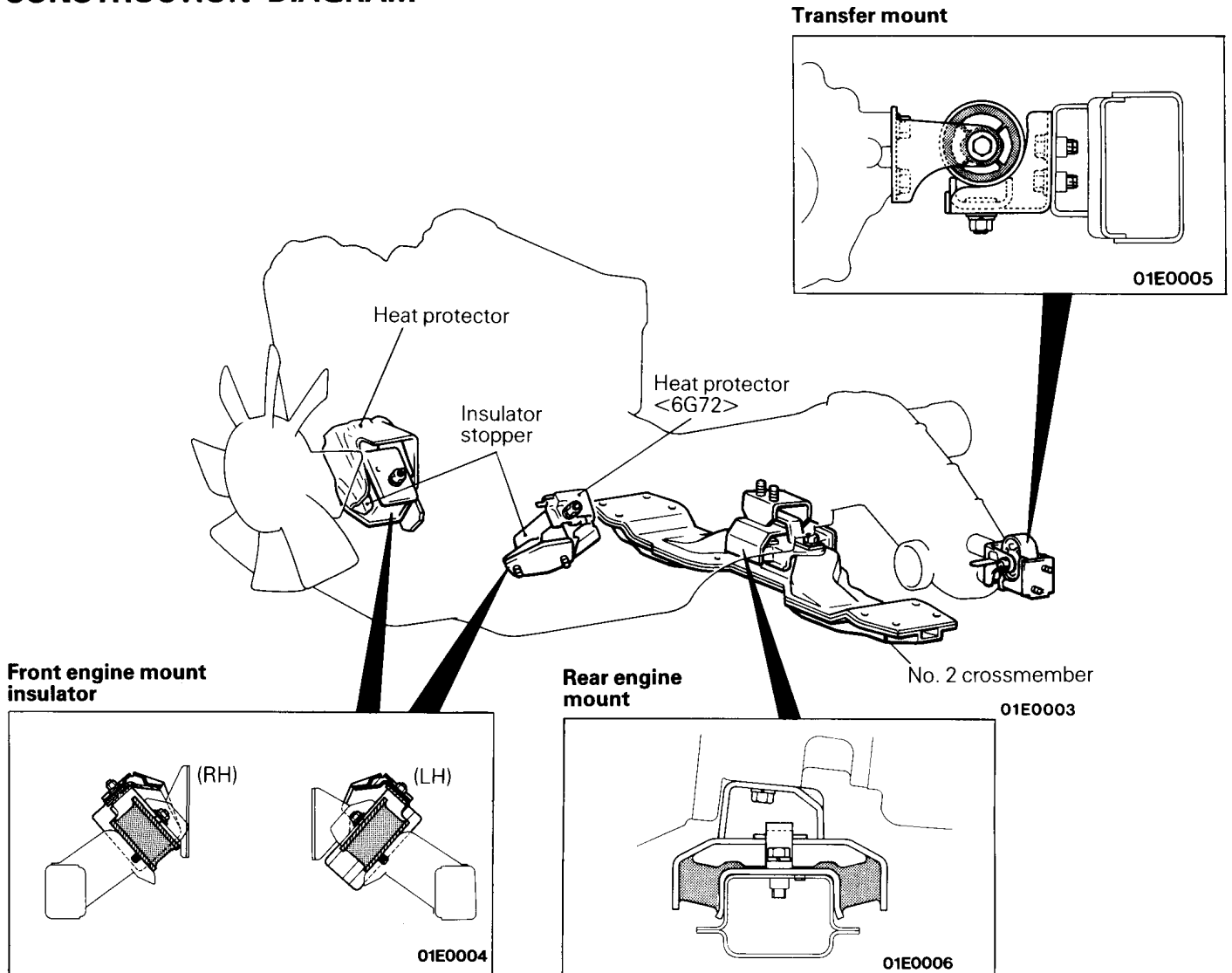
The engine and transmission block are supported at four points: at two points below the engine, one below the transmission, and one below the transfer section. This four-point mount configuration is ideal both to minimize engine roll and to reduce vibrations caused by engine rotation:

- The front engine mounts are of the same shear-compression type used in earlier models. A stopper encloses the insulator to ensure

greater rigidity.

- The rear engine mount has also adopted the shear-compression type to reduce engine vibration transmission to the vehicle body.
- The transfer mount is a non-contact type which reduces engine roll and effectively insulates the vehicle body from engine vibrations particularly when idling.

CONSTRUCTION DIAGRAM



LUBRICATION SYSTEM

OIL PUMP <4D56>

The delivery rate has been increased by the adoption of a multi-tooth trochoidal oil pump.

OIL JETS <4D56 WITH TURBOCHARGER AND INTER-COOLER>

The jet nozzle diameter has been enlarged to increase the oil injection rate.

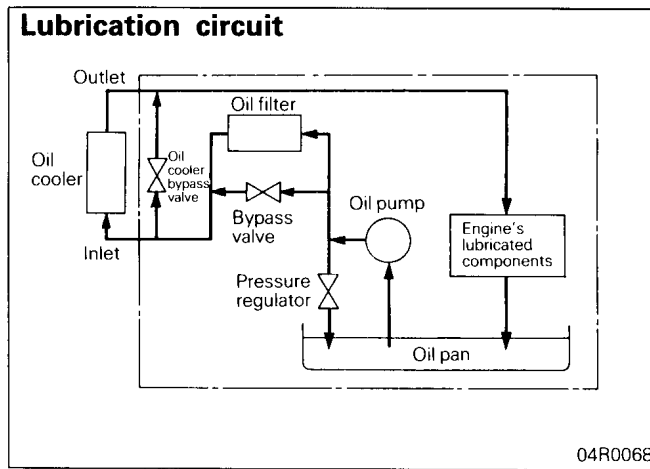
ENGINE OIL COOLER

The engine oil cooler is the corrugated-fin type, and is located at the front of the radiator. For the lubrication oil circuit, there is a bypass circuit (oil cooler bypass valve) which can lubricate the various parts of the engine even if there is a foreign object clogging the interior of the oil cooler; this

bypass circuit is located at the engine side. This valve detects the temperature of the engine oil, and regulates the circulation of engine oil to the oil cooler, thus improving the engine's warming up characteristics.

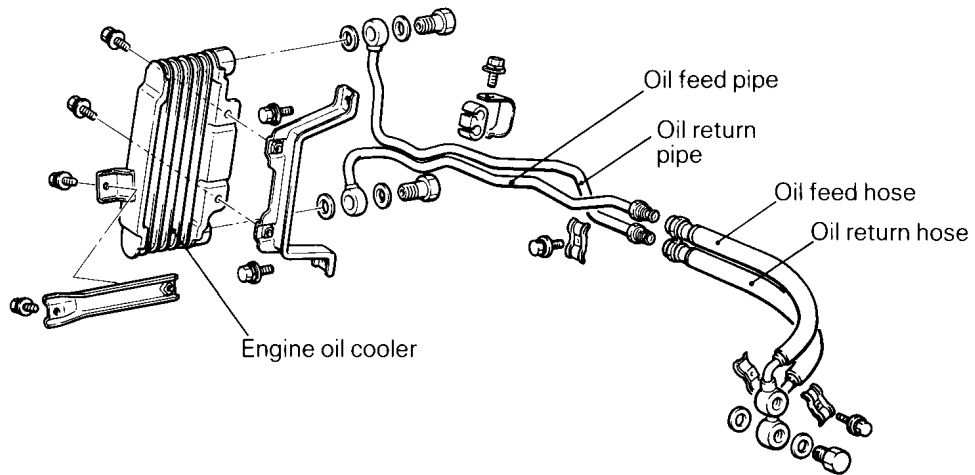
SPECIFICATIONS

Items		6G72	4D56
Engine oil cooler Performance	J/h (kcal/h, BTU/h)	12,976 X 10 ³ (3,100, 12,301)	26,790 x 10 ³ (6,400, 25,396)

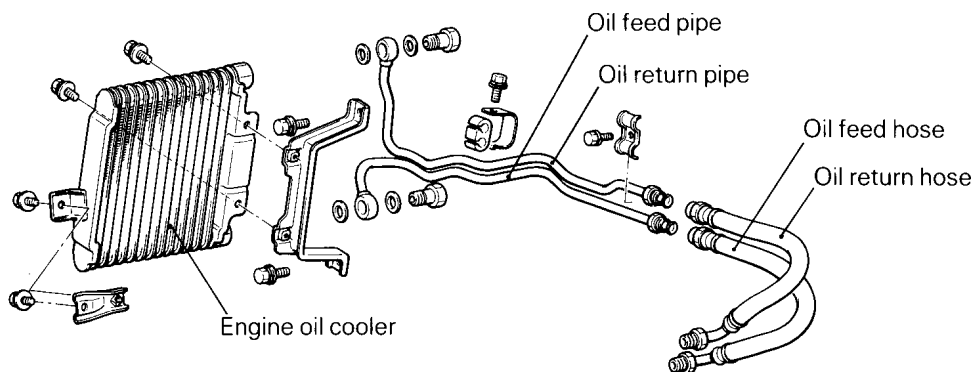


CONSTRUCTION DIAGRAM

<6G72>



<4D56>



COOLING SYSTEM

The cooling system is of the water-cooled forced circulation type with the following advantageous features:

- The temperature control type fan clutch has been adopted to reduce fan noises and engine output loss.

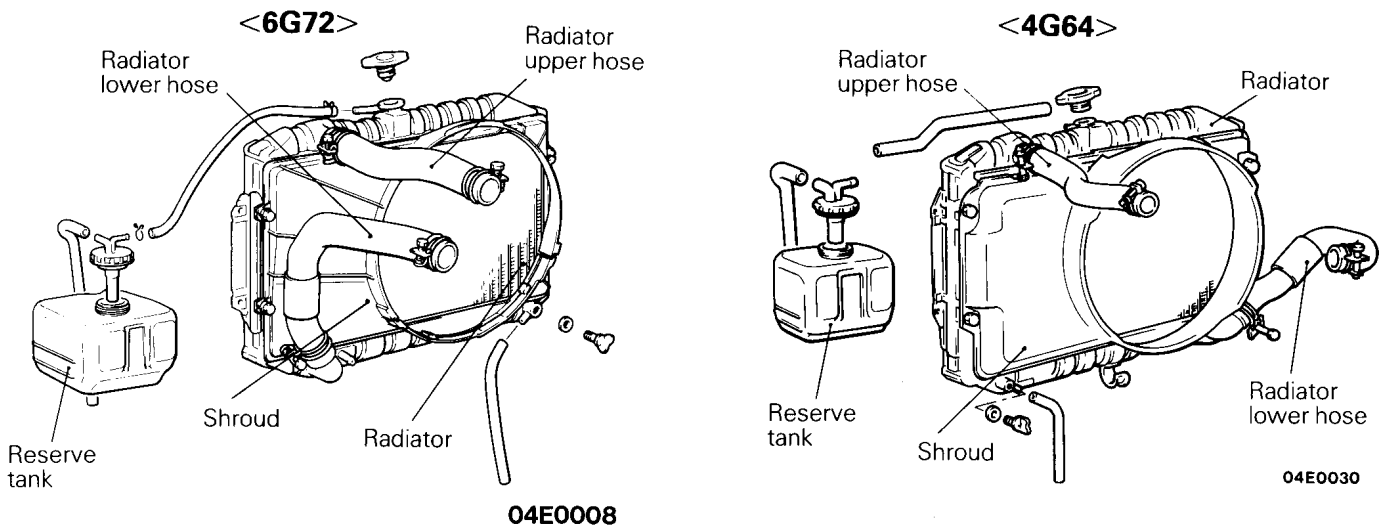
- The radiator shroud is of the full-shroud type which gives higher cooling performance.
- The automatic transmission oil cooler for vehicles with automatic transmission is of the "double cooling" type which means that both the air cooling system and radiator built-in water cooling system are integrated in the oil cooler.

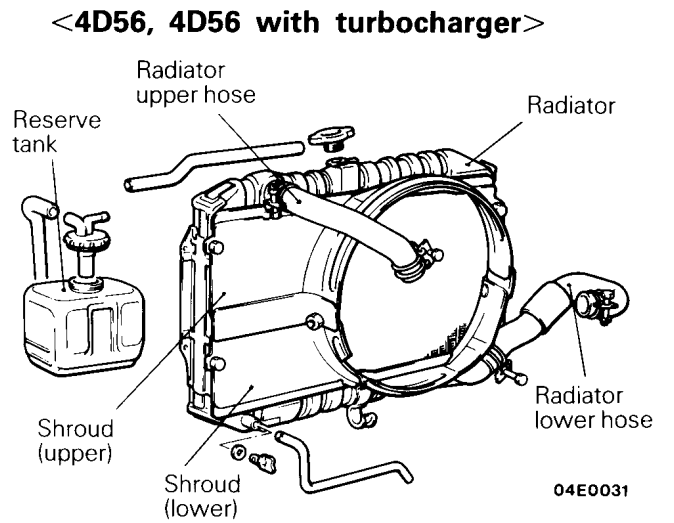
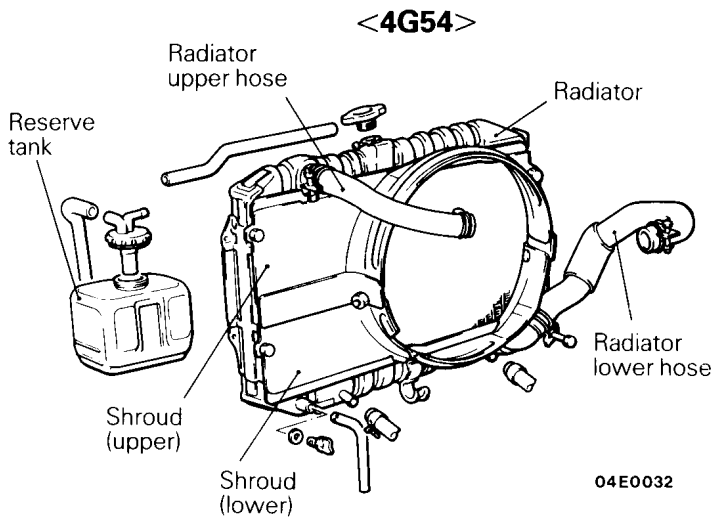
SPECIFICATIONS

Items	Specifications
Cooling method	Water-cooled pressurized, forced circulation
Radiator	
Type	Pressurized corrugated fin type
Performance	J/h (kcal/h, BTU/h)
<6G72 A/T, 4G64, 4G54, 4D56>	193,396 x 10 ³ (46,200, 183,333)
<6G72 M/T>	182,093 x 10 ³ (43,500, 172,619)
<4D56 T/C>	210,558 x 10 ³ (50,300, 199,603)
<4D56 I/C · T/C>	221,861 x 10 ³ (53,000, 210,317)
Radiator cap	
High pressure valve opening pressure	kPa (kg/cm ² , psi) 75–105 (0.75–1.05, 11–15)
Vacuum valve opening pressure	kPa (kg/cm ² , psi) –5 (–0.05, –0.7) or less
Automatic transmission oil cooler <Vehicles with A/T>	
Performance	J/h (kcal/h, BTU/h)
<6G72>	6,195 x 10 ³ (1,480, 5,873)
<4G54, 4D56>	4,814 x 10 ³ (1,150, 4,563)
Thermostat type	Wax pellet type with jiggle valve
Fan clutch type	Thermo type
Water pump type	Impeller of centrifugal type

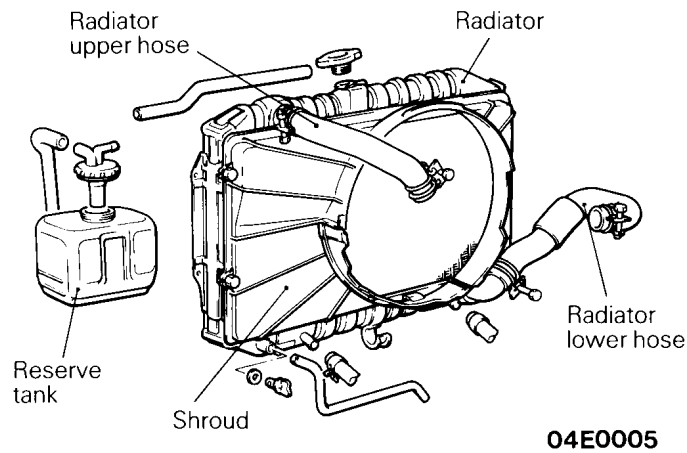
NOTE
 T/C: With turbocharger
 I/C · T/C: With turbocharger and inter-cooler

CONSTRUCTION DIAGRAM

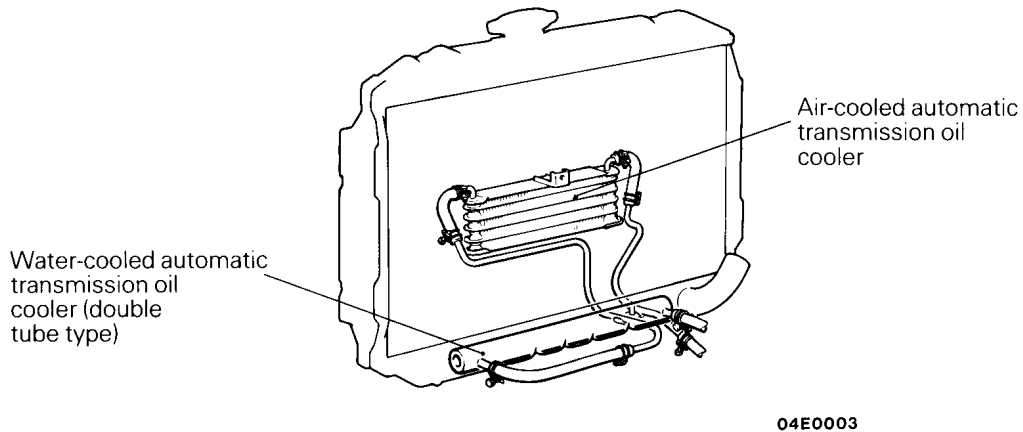




<4D56 with turbocharger and inter-cooler>



<Automatic transmission oil cooler>

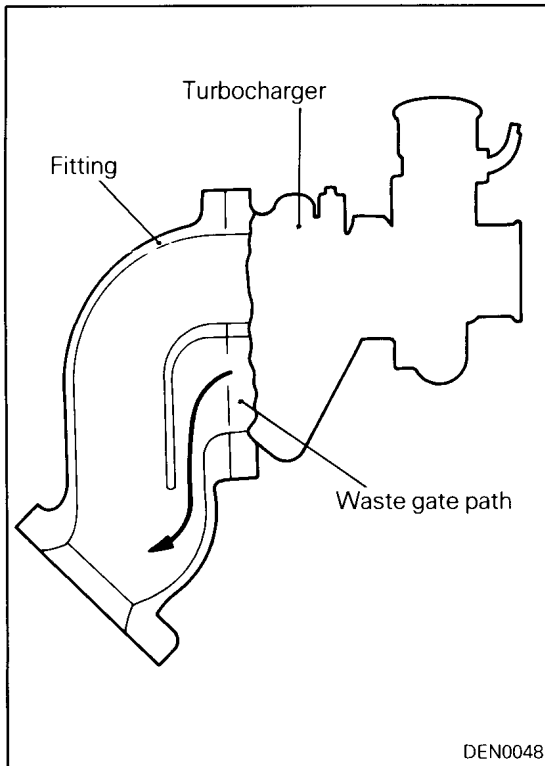


INTAKE AND EXHAUST SYSTEM

E9BHAAG

TURBOCHARGER <4D56 WITH TURBOCHARGER AND INTER-COOLER>

The shape of compressor wheel blades has been changed to increase the compressor capacity. The waste gate path has also been reshaped to decrease the exhaust resistance.



EXHAUST PIPE

The new exhaust system is designed to assure quiet equivalent to that of passenger vehicles and to make full use of high engine performance. The features are as outlined below:

- Installed to the vehicle body via rubber hangers and suspenders, it reduces vibration transmission from the exhaust system to the body.

- The large-capacity main muffler reduces exhaust noises and reduces power loss.
- The spring type flexible spherical joints reduces vibrations during idling and improves durability and reliability.
- The main muffler is positioned horizontally to provide greater off-road driving clearance.

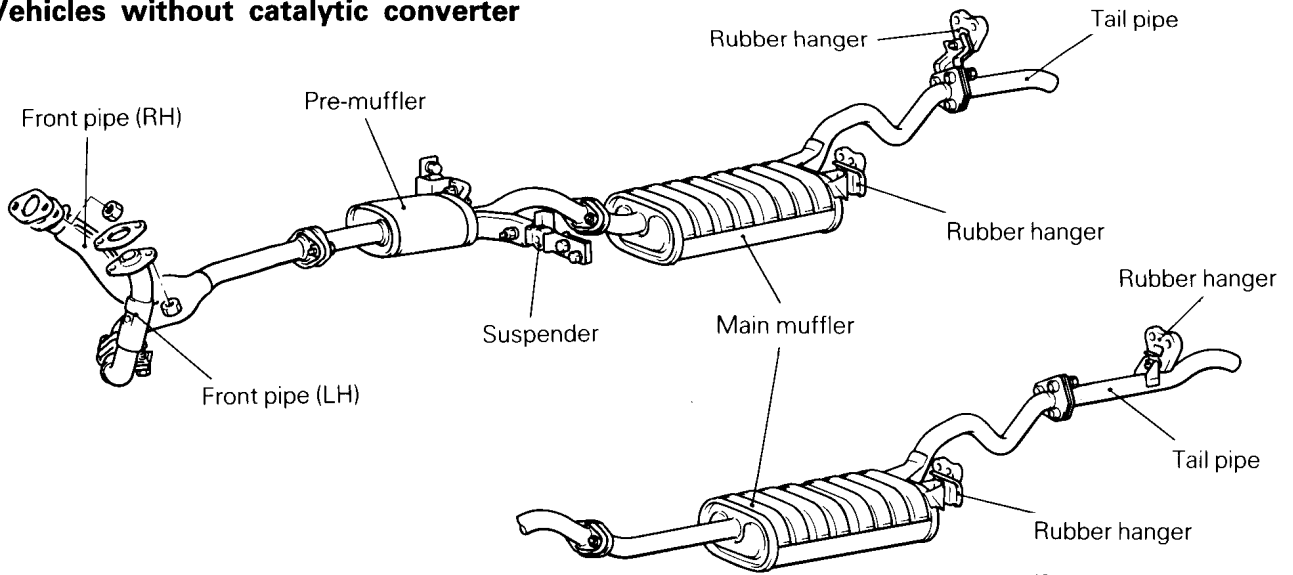
SPECIFICATIONS

Items	Specifications
Exhaust system Front exhaust pipe <6G72, 4G64, 4G54 – engine for Australia> <4D56, 4G54 – engine for General Export and GCC> Muffler Coupling Suspension system	Dual type Single type Expansion resonance type Flat coupling and Spherical coupling Rubber hangers and Rubber suspenders

CONSTRUCTION DIAGRAM

<6G72>

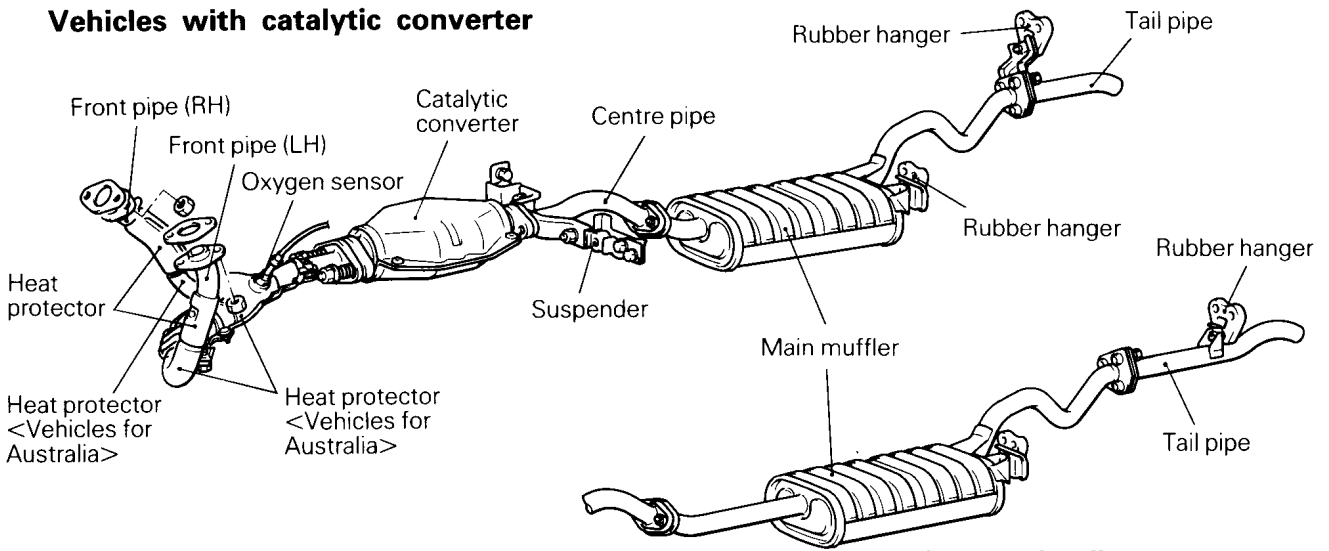
Vehicles without catalytic converter



<Long wheelbase>

05E0023

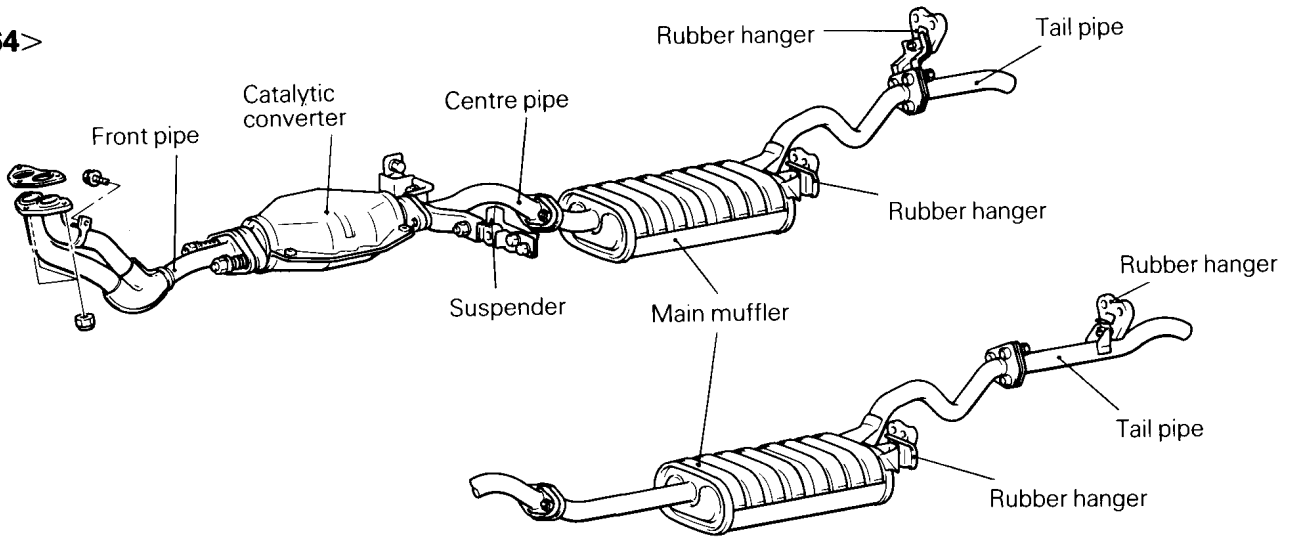
Vehicles with catalytic converter



<Long wheelbase>

05E0021

<4G64>

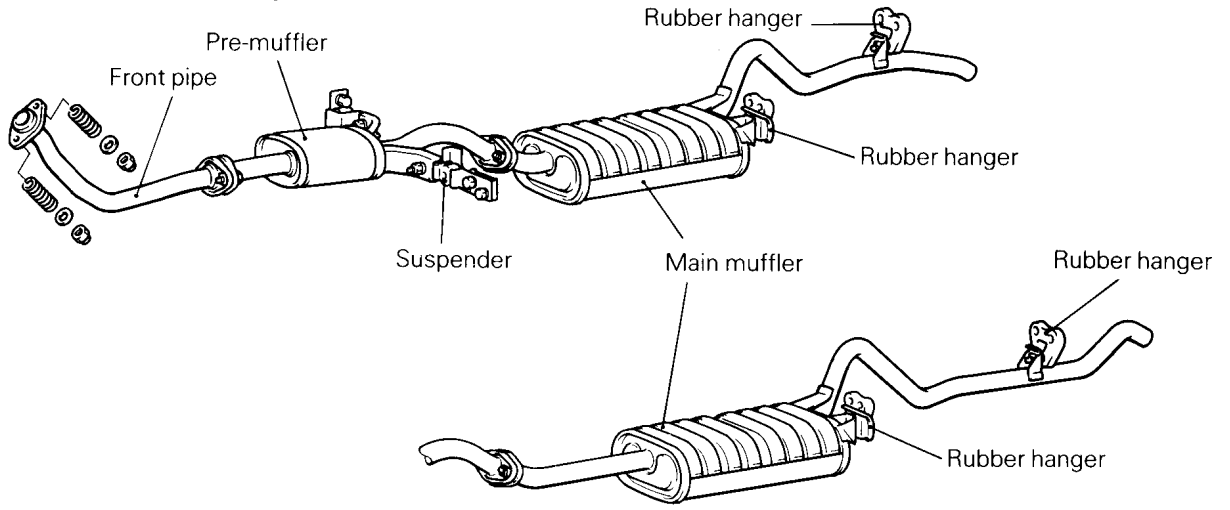


<Long wheelbase>

05E0024

<4G54>

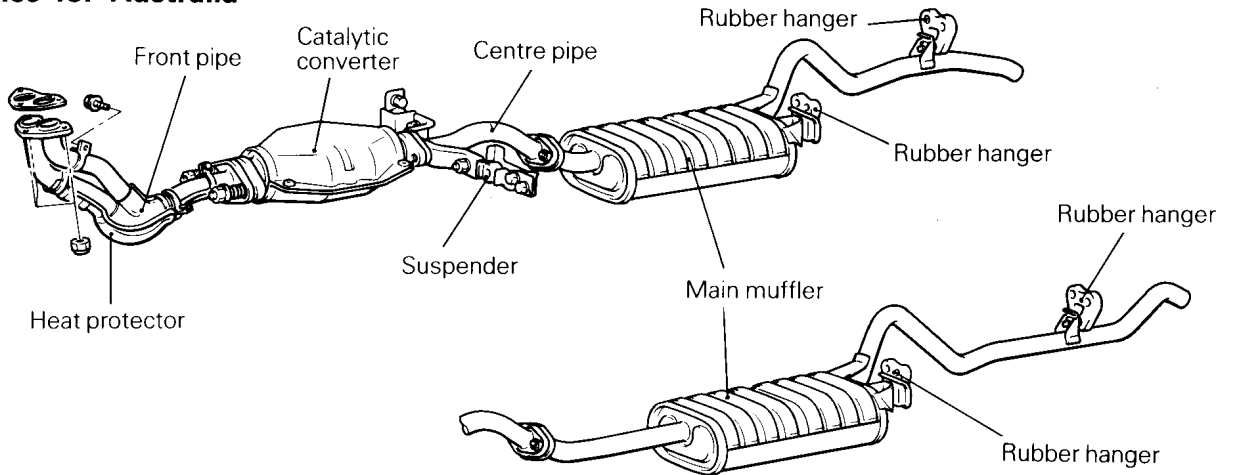
Vehicles for General Export and GCC



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05E0026

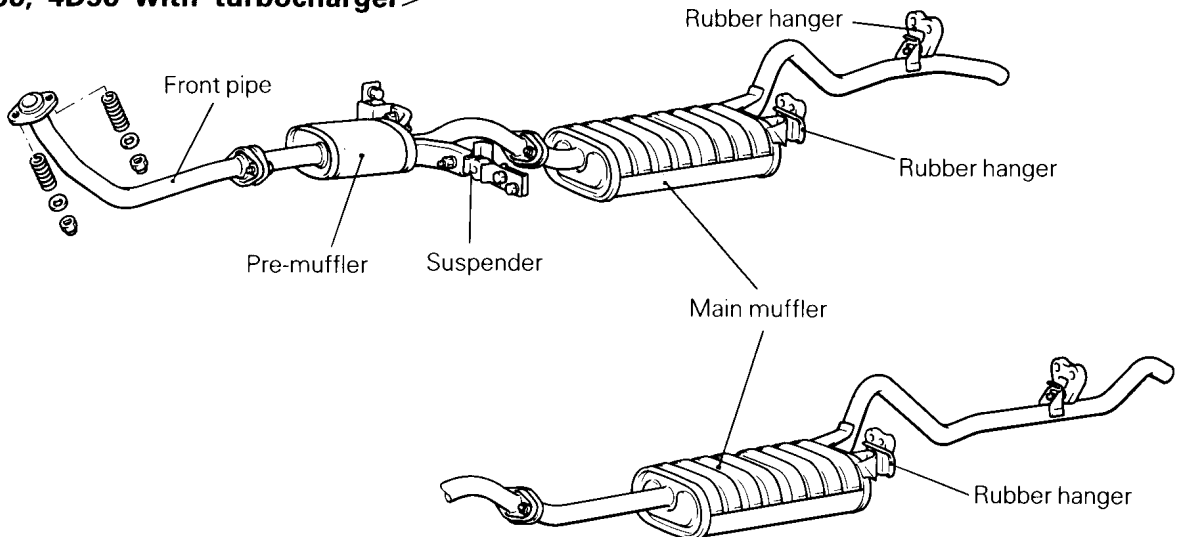
Vehicles for Australia



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05E0025

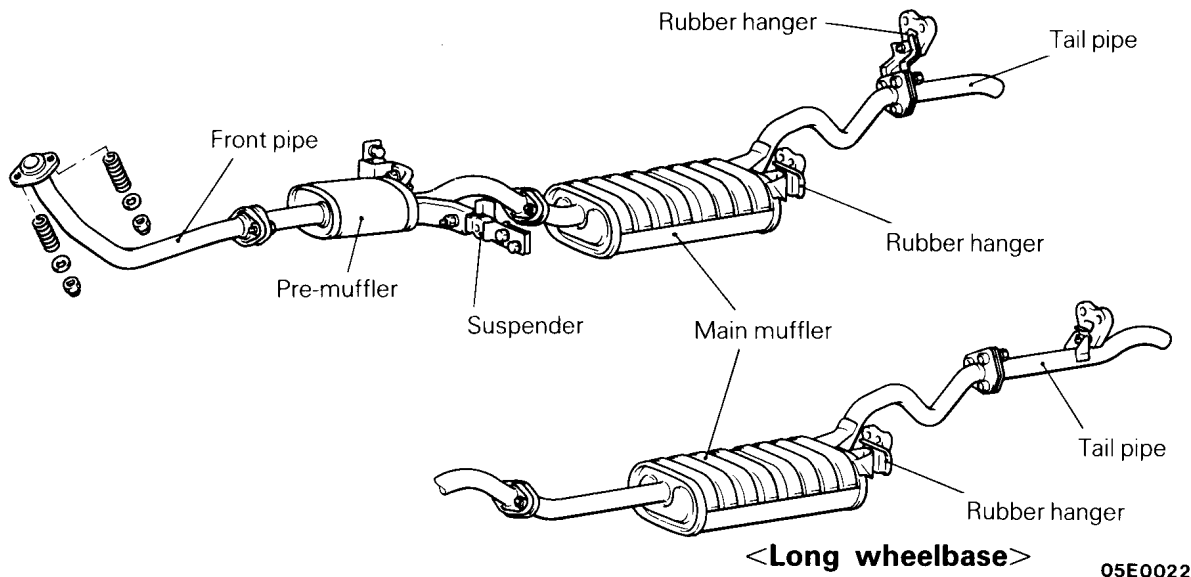
<4D56, 4D56 with turbocharger>



<Long wheelbase>

05E0020

<4D56 with turbocharger and inter-cooler>



FUEL SYSTEM

E9BDFAC

<6G72, 4G64>

The fuel system comprises: an electromagnetic fuel injector; a delivery pipe; a fuel pressure regulator [the control pressure setting is 335 kPa (3.35 kg/cm², 47.6 psi)]; an electric motor-driven fuel pump for high pressure fuel supply; an engine control unit to control the engine based on signals from sensors, etc. This system is basically the same as those both for 4G64 engines on current L300 models and for 6G72-SOHC engines on current PAJERO/MONTERO models. It has the following features:

- The fuel filters are located in the fuel tank and on the No. 3 crossmember.
- A check valve is provided to prevent fuel from

flowing out if the vehicle overturns. A resin-made screw-in type fuel filler cap is also provided.

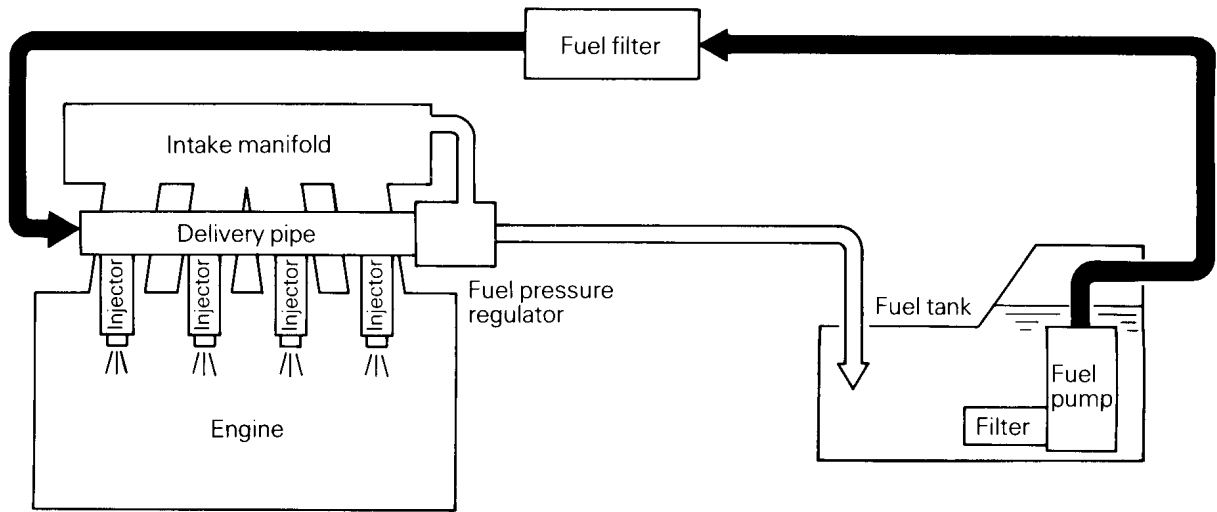
- To improve serviceability, a terminal for connecting a power supply to drive the fuel pump is provided in the engine compartment.
- The rear floor has an access hole which allows the fuel pump and fuel gauge unit to be removed without removal of the fuel tank.
- The electronic-controlled fuel injection has adopted the MPI system that injects fuel independently into each air intake port of cylinder. (For the MPI system, see P.1-21 <4G64> and P.1-38 <6G72>.)

SPECIFICATIONS

Items		Standard wheelbase	Long wheelbase
Fuel			
Tank capacity	dm ³ (U.S.gal., Imp.gal.)	75 (19.8, 16.5)	92 (24.3, 20.2)
Return system		Equipped	Equipped
Filter		High pressure type	High pressure type
Fuel pump			
Type		Electrical, in-tank type	Electrical, in-tank type
Driven by		Electric motor	Electric motor

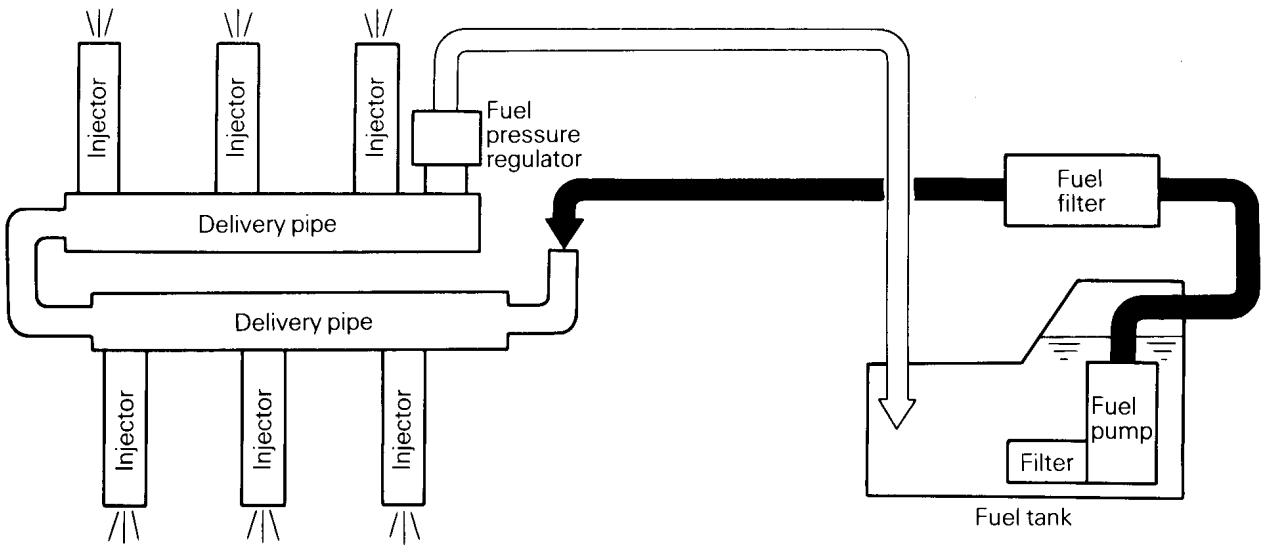
FUEL FLOW DIAGRAM

<4G64>



03A0009

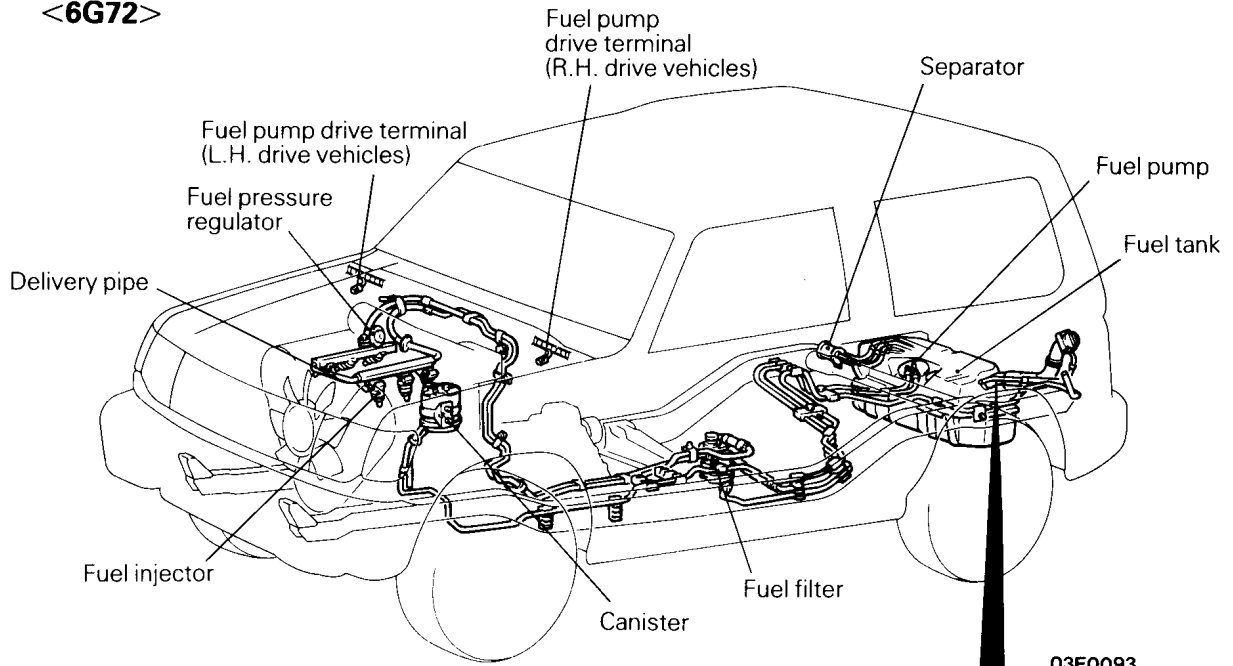
<6G72>



7FU0298

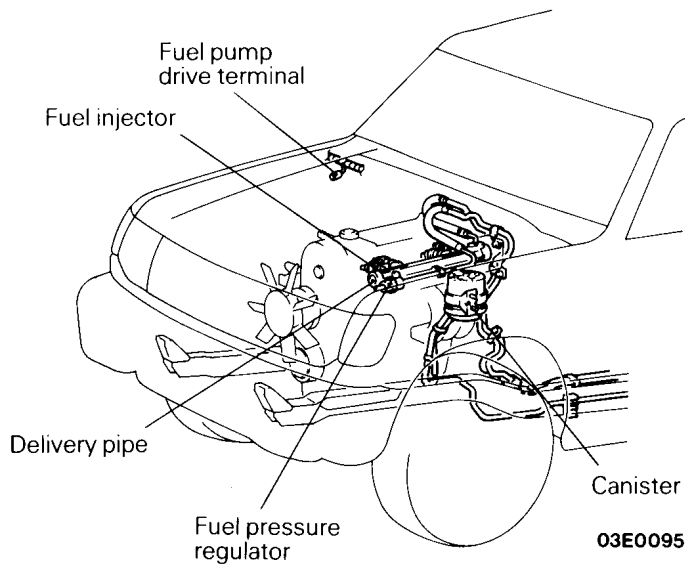
CONSTRUCTION DIAGRAM

<6G72>

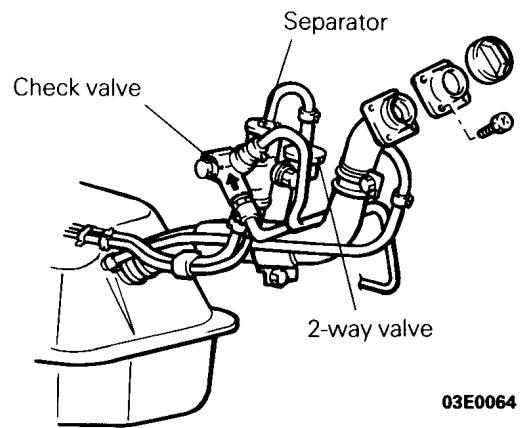


03E0093

<4G64>



03E0095



03E0064

<4G54>

The fuel system comprises a two-barrel down-draft type carburetor, a mechanical (diaphragm type) fuel pump, etc. This system is basically the same as that adopted for the 4G54 engines on current PAJERO/MONTERO models. It has the following features:

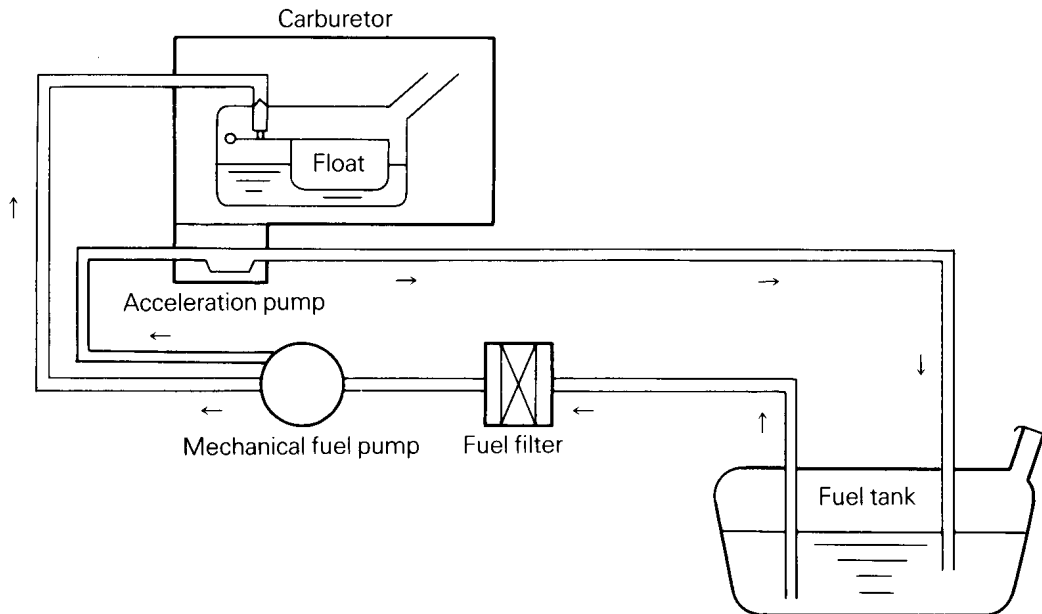
- The fuel filters are located in the fuel tank and in the engine compartment.

- A check valve is provided to prevent flow out of fuel if the vehicle turns over. A resin-made screw-in type fuel filler cap is also provided.
- The rear floor has an access hole to allow removal of the fuel gauge unit without need for removal of the fuel tank.

SPECIFICATIONS

Items		Standard wheelbase	Long wheelbase
Fuel			
Tank capacity	dm ³ (U.S.gal., Imp.gal.)	60 (15.9, 13.2)	92 (24.3, 20.2)
Return system		Equipped	Equipped
Filter		Cartridge type	Cartridge type
Fuel pump			
Type		Mechanical diaphragm	Mechanical diaphragm
Driven by		Camshaft	Camshaft
Carburetor			
Type		Down-draft, 2-barrel, conventional	Down-draft, 2-barrel, conventional

FUEL FLOW DIAGRAM



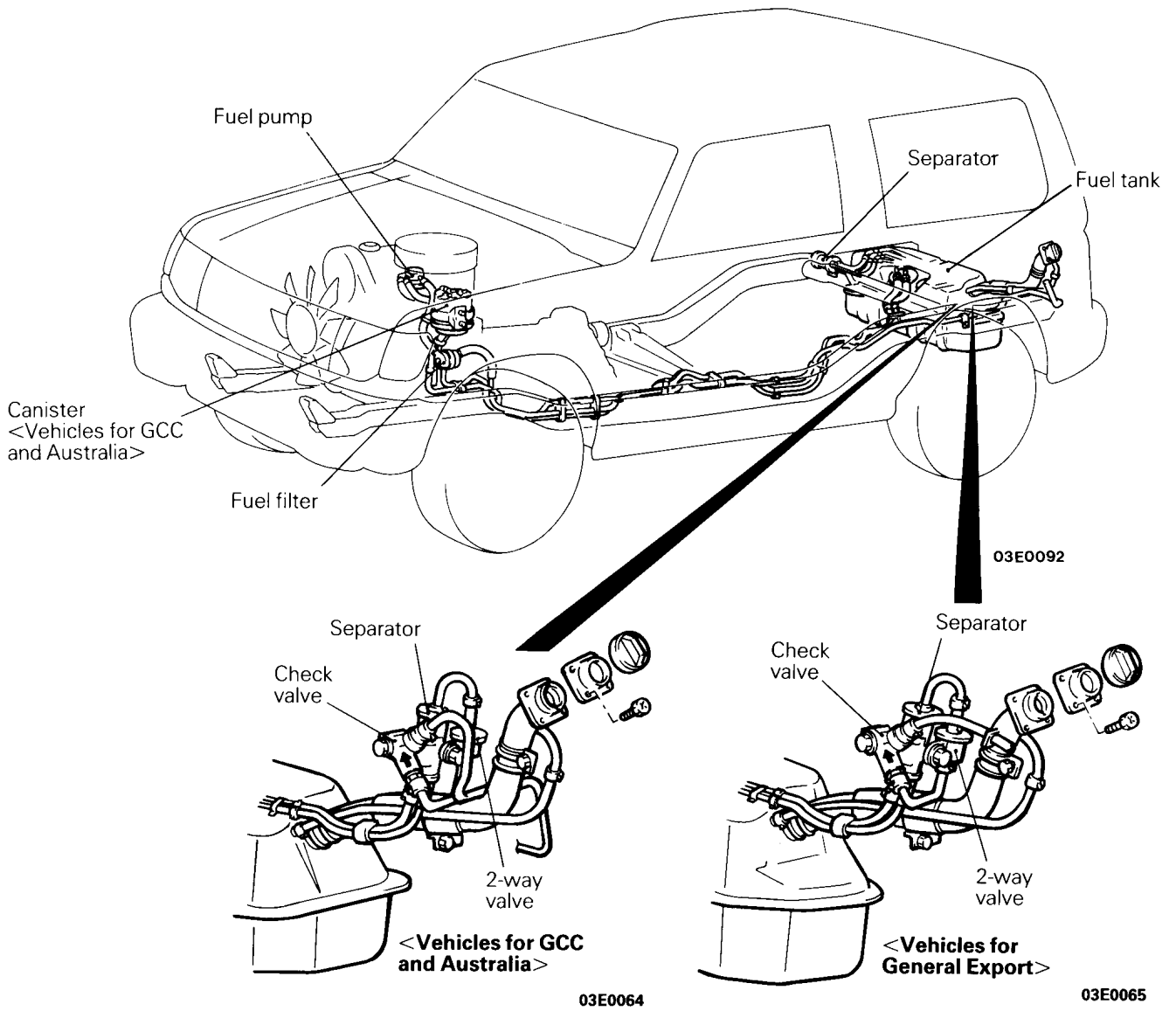
1FU0138

CARBURETOR SPECIFICATIONS

Destination		GCC		General Export		Australia	
Engine		4G54		4G54		4G54	
Transmission <4WD>		M/T	A/T	M/T	A/T	M/T	
Carburetor main body		Resin body		Resin body		Resin body	
Throttle bore diameter (primary/secondary) mm (in.)		32 (1.26)/35 (1.38)		32 (1.26)/35 (1.38)		32 (1.26)/35 (1.38)	
Venturi diameter (primary/secondary) mm (in.)		24 (0.94)/30 (1.18)		24 (0.94)/30 (1.18)		24 (0.94)/30 (1.18)	
Choke mechanism	Choke type	Manual		Manual		Automatic (wax type)	
	Choke breaker	Not provided		Not provided		Provided	
	Fast idle	Provided		Provided		Provided	
	Unloader	Not provided		Not provided		Provided	
Devices	Fuel cut solenoid valve	Provided		Provided		Provided	
	Dash pot	Not provided		Not provided		Not provided	
	Mixture control valve	Not provided		Not provided		Not provided	
	Auxiliary accelerator pump	Not provided		Not provided		Provided	
	Bowl vent valve	Not provided		Not provided		Provided	
	Secondary valve control	Not provided		Not provided		Not provided	
Carburetor gasket*		Metallic (rubber-coated)		Metallic (rubber-coated)		Metallic (rubber-coated)	

*: Set the carburetor gasket using a guide bar.

CONSTRUCTION DIAGRAM



<4D56>

E9BDEAE

The fuel system comprises: injection nozzles; fuel injection pipes; a fuel injection pump; fuel filters, fuel hoses and pipes; a fuel tank, etc. This system is basically the same as that used for the 4D56 engines in current PAJERO/MONTERO models. It has the following features:

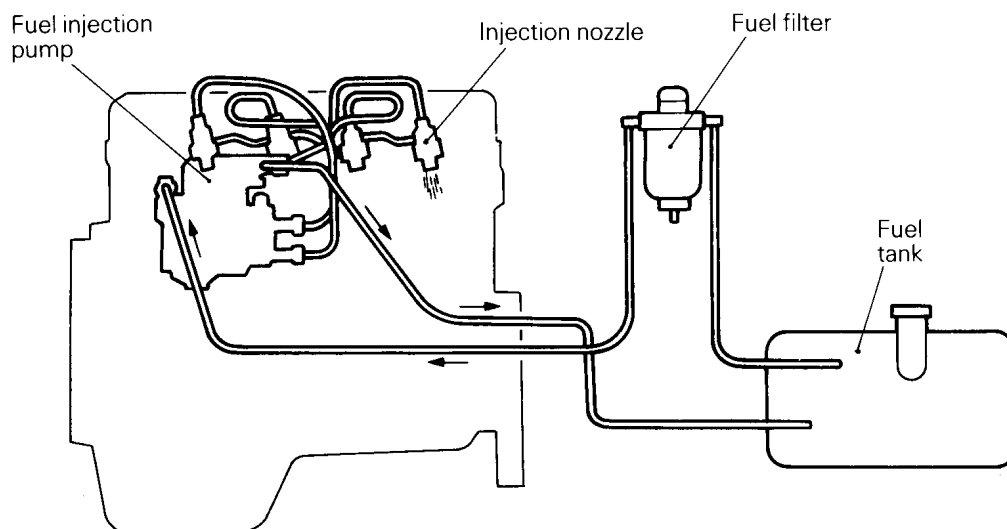
- The fuel filters are located in the fuel tank and in the engine compartment.

- A check valve is provided to prevent fuel from flowing out if the vehicle turns over. A resin-made screw-in type fuel filler cap is also provided.
- The rear floor has an access hole to allow removal of the gauge unit without need for removal of the fuel tank.

SPECIFICATIONS

Items	Standard wheelbase		Long wheelbase	
	Vehicles for General Export	Vehicles for Europe and GCC		
Fuel Tank capacity	dm ³ (U.S.gal., Imp.gal.)	60 (15.9, 13.2)	75 (19.8, 16.5)	92 (24.3, 20.2)
Return system		Equipped	Equipped	Equipped
Fuel injection pump				
Type		Distributor-type	Distributor-type	Distributor-type
Injection nozzle				
Nozzle type		Throttling type	Throttling type	Throttling type
Holder type		Screw-in type	Screw-in type	Screw-in type

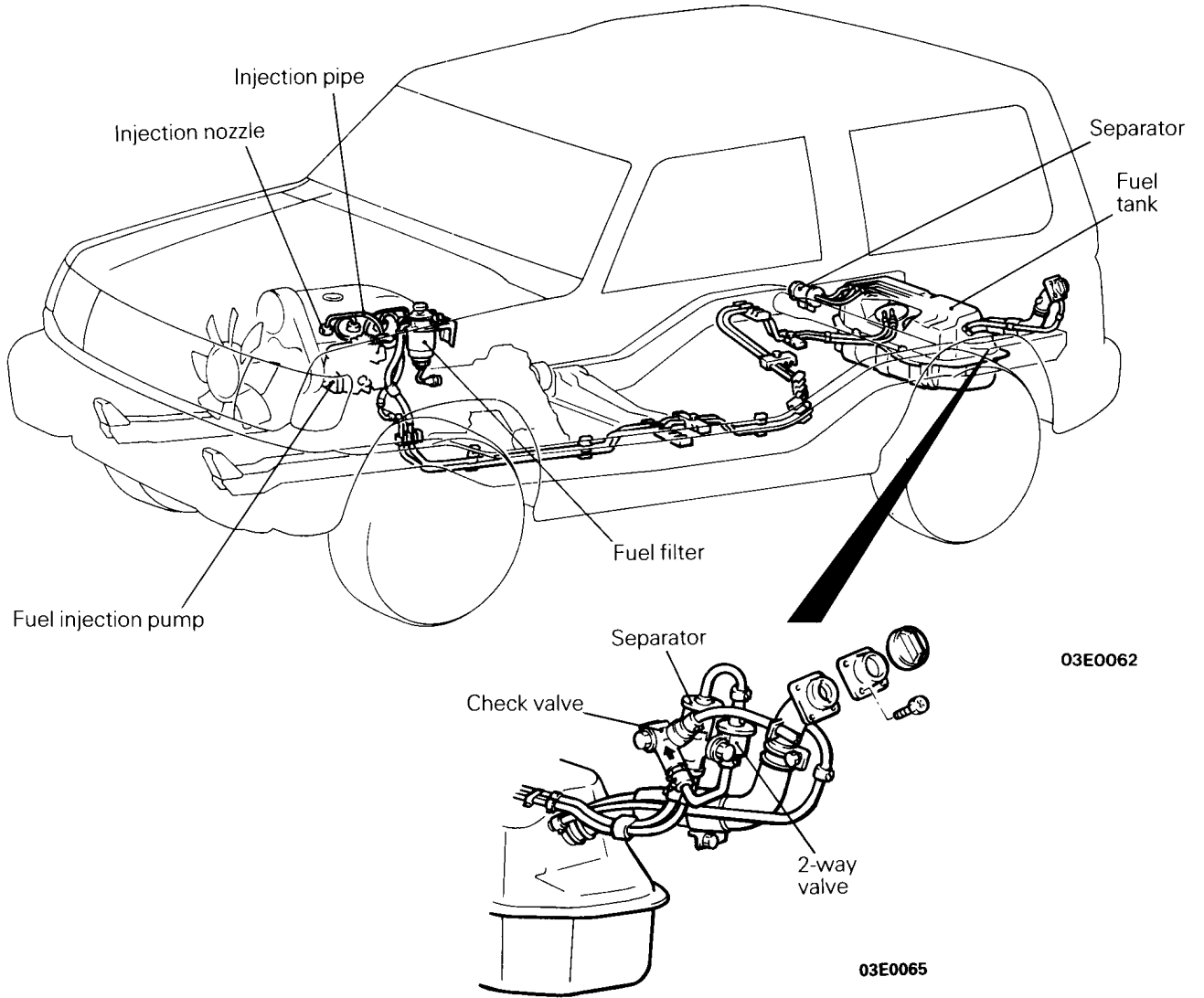
FUEL FLOW DIAGRAM



FUEL INJECTION PUMP SPECIFICATIONS

Destination		Europe	GCC	General Export	Australia
Engine: 4D56		Turbocharger with inter-cooler	Turbocharger with inter-cooler	Non-turbocharger, turbocharger with inter-cooler	Turbocharger with inter-cooler
Transmission		M/T, A/T	M/T	M/T	M/T
Injection timing		ATDC	7° [at plunger lift 1 mm (0.0394 in.) point]		
Idle speed		r/min	750		
Injection pump	Type	Distributor pump			
	Plunger diameter	mm (in.)	10 (0.39)		
	Injection order	1-3-4-2			
	Injection interval	90°±0.5°			
	Rotation direction	Clockwise as viewed from drive side			
Governor	Type	Centrifugal, half all-speed control			
	Boost compensator	Provided: Turbocharged model only			
Timer (injection timing control unit) type		Hydraulic			
Load timer		Provided			
Fuel feed pump		Vane type			
Fuel cut solenoid valve		Provided			
Accelerator opener		Provided: Vehicles with anti-skid brake system or air-conditioner only			

CONSTRUCTION DIAGRAM



FUEL TANK

Within the fuel tank, there is an electric motor-driven fuel pump <6G72, 4G64>, an in-tank filter and a fuel gauge unit.

The fuel tank has the following features:

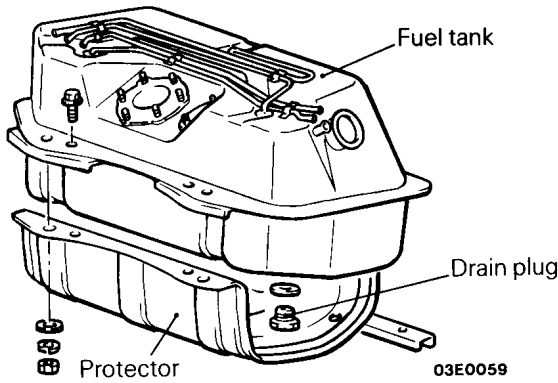
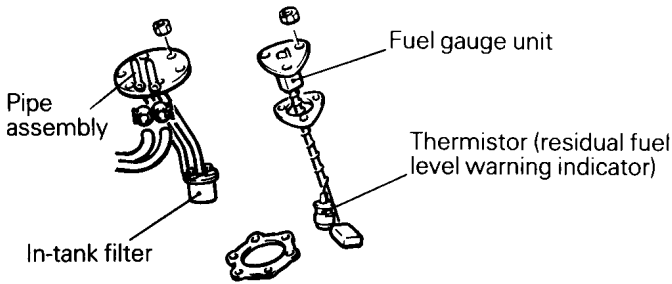
- A rigid crossmember protects the fuel tank from rear collision, improving safety.
- It has a protector that prevents damage to the fuel tank from flying stone chips, bricks, etc.

- A reservoir cup is provided in the fuel tank which secures a smooth fuel supply even a small amount of fuel remains in the tank.*
- The fuel tank drain plug is standard on all vehicles.

*: Excluding 4G54 and 4D56 engines for standard wheelbase models for General Export.

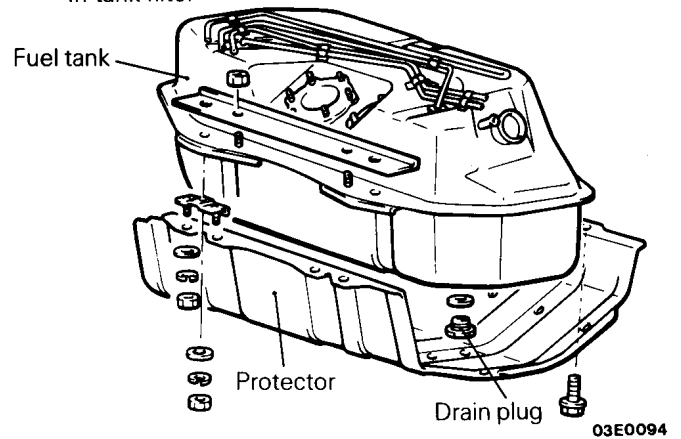
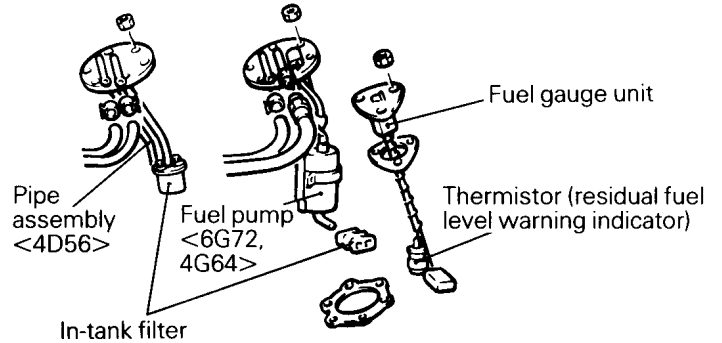
<Standard wheelbase>

(4G54, 4D56 engine for General Export)

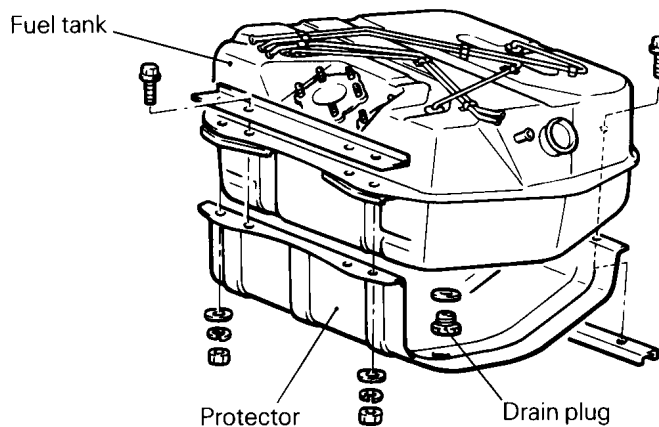
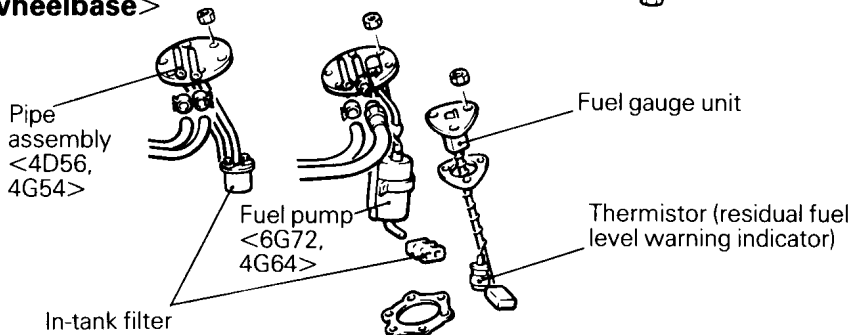


<Standard wheelbase>

(6G72, 4G64, 4D56 engine for Europe and GCC)



<Long wheelbase>



CONTROL SYSTEM <4G64>

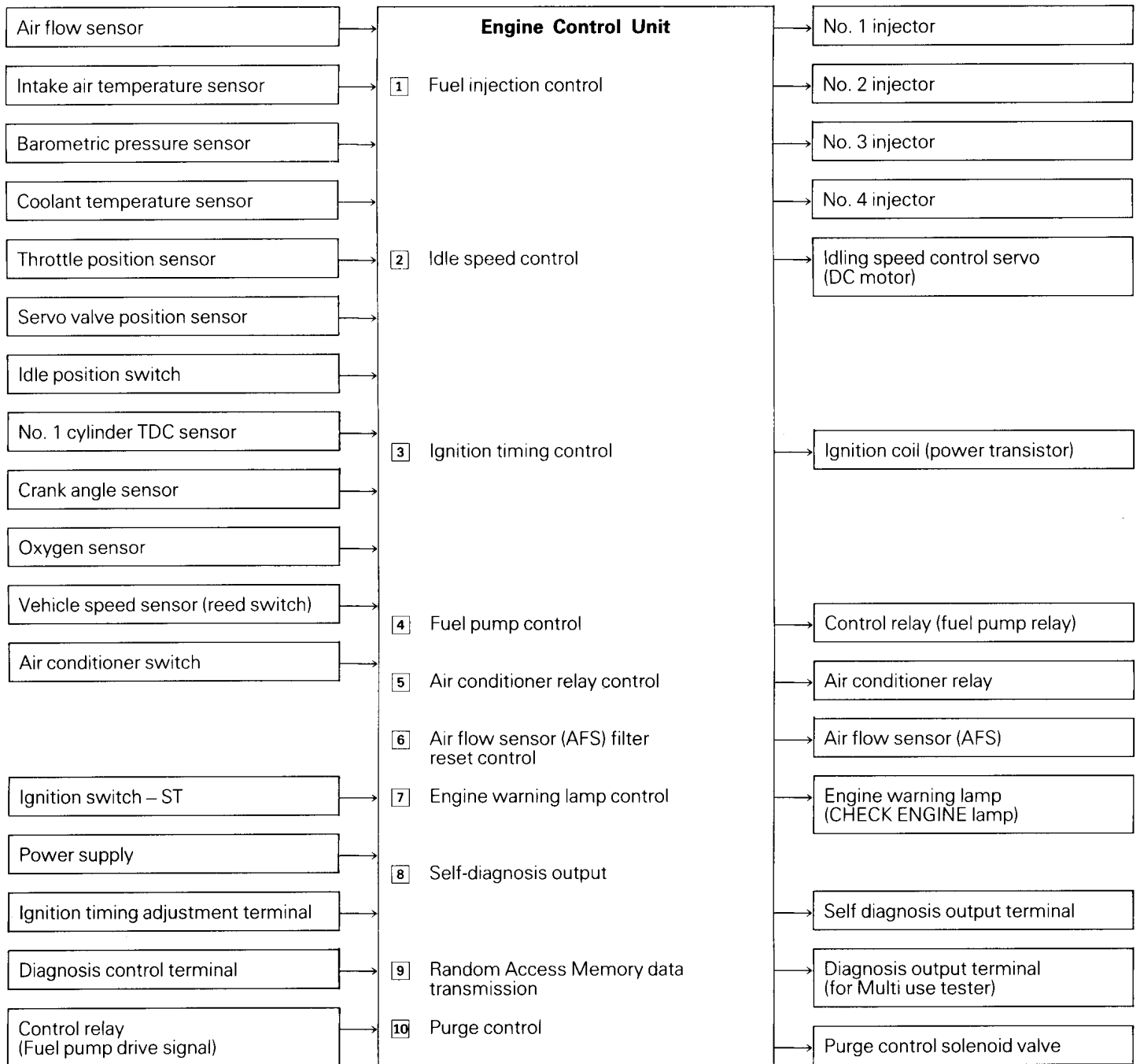
E9BMBAE

In addition to inheriting the control features of the 4G64 engine which powers the current L300 models, the new 4G64 engine's control system incorpo-

rates the following improvements for better driveability and higher engine performance:

Principal improvements/additions	Remarks
New idle speed control (ISC) system	<ul style="list-style-type: none"> • The new system regulates the throttle valve bypass air volume for idle speed control (same as the 6G7 engine) • A DC motor is used for driving the servo valve. (A stepper motor is used in 6G7 engine.)
Servo valve position sensor	A sensor compatible with the new idle speed control (ISC) system
Pressure sensitive type air flow sensor and smooth flow type air cleaner	<ul style="list-style-type: none"> • Conventional sensor is an ultrasonic sensitive type • Higher engine output
Air flow sensor filter reset control	<ul style="list-style-type: none"> • Corresponds to the adoption of the pressure sensitive type air flow sensor • Assures a highly reliable air flow sensor signal
Independent earth lead for oxygen sensor	<ul style="list-style-type: none"> • Improves oxygen sensor signal reliability • Same as the 4G1 engine
Smaller water temperature sensor temperature sensing section size	<ul style="list-style-type: none"> • For higher sensor response • Same as the 4G1 engine
Throttle position sensor (TPS) with built-in idle position switch	Same as the 6G7 engine
Oil level alarm system	To improve reliability

SYSTEM BLOCK DIAGRAM

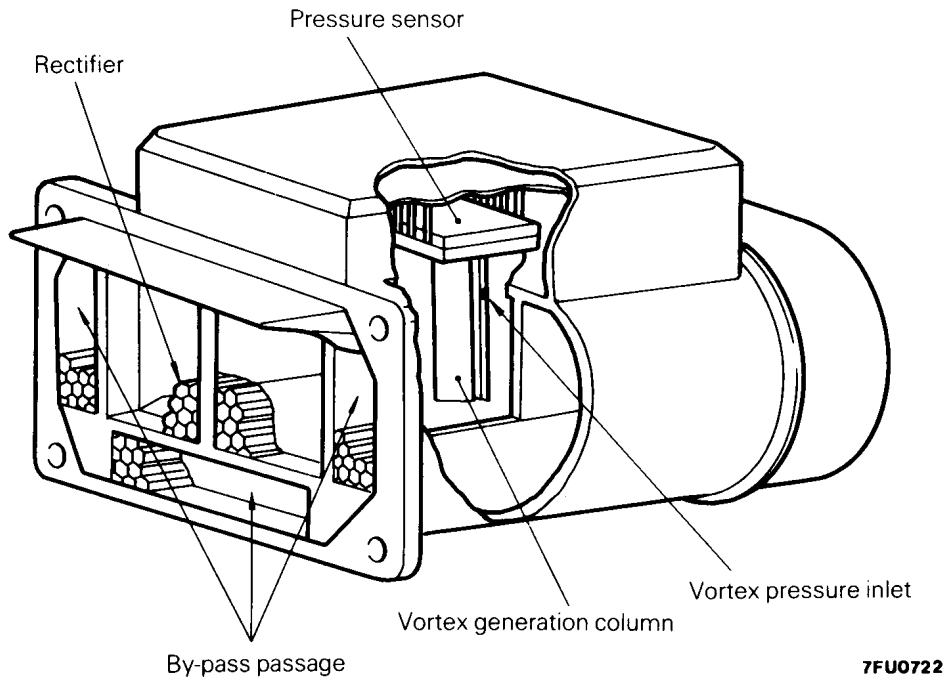


SENSORS

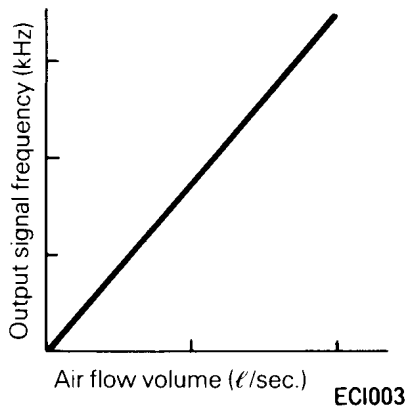
AIR FLOW SENSOR (AFS)

The air flow sensor (AFS) is the sensor that measures the amount of intake air and is mounted on the air cleaner. The AFS uses the Karman vortex phenomenon to detect the amount of intake air passing the air cleaner element and inputs it as a signal for the amount of intake air to the engine control unit.

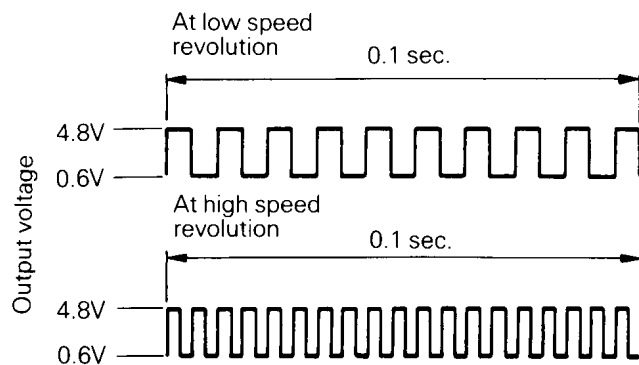
The engine control unit uses this signal for the amount of intake air and the engine speed (rpm) signal (crank angle sensor signal) to calculate and determine the basic injector drive time. An intake air temperature sensor and barometric pressure sensor are attached to the AFS.



7FU0722



ECI003

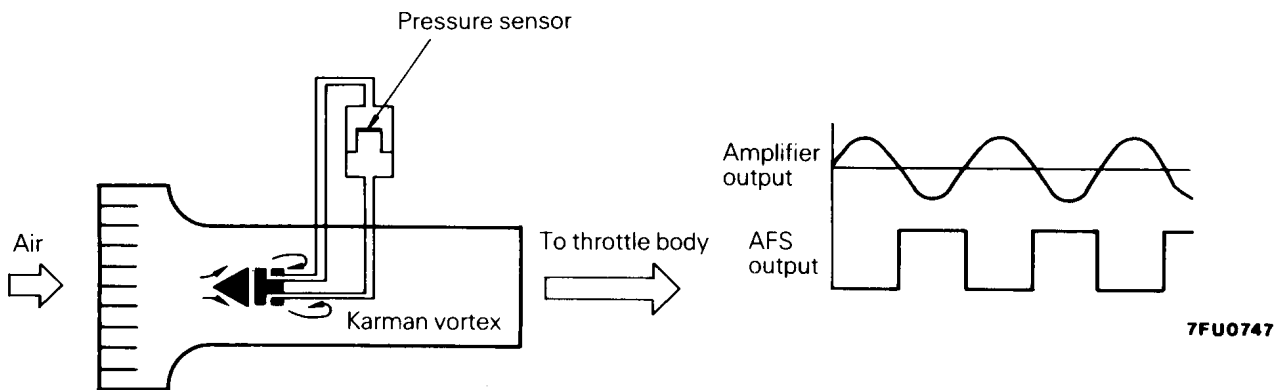


6FU0492

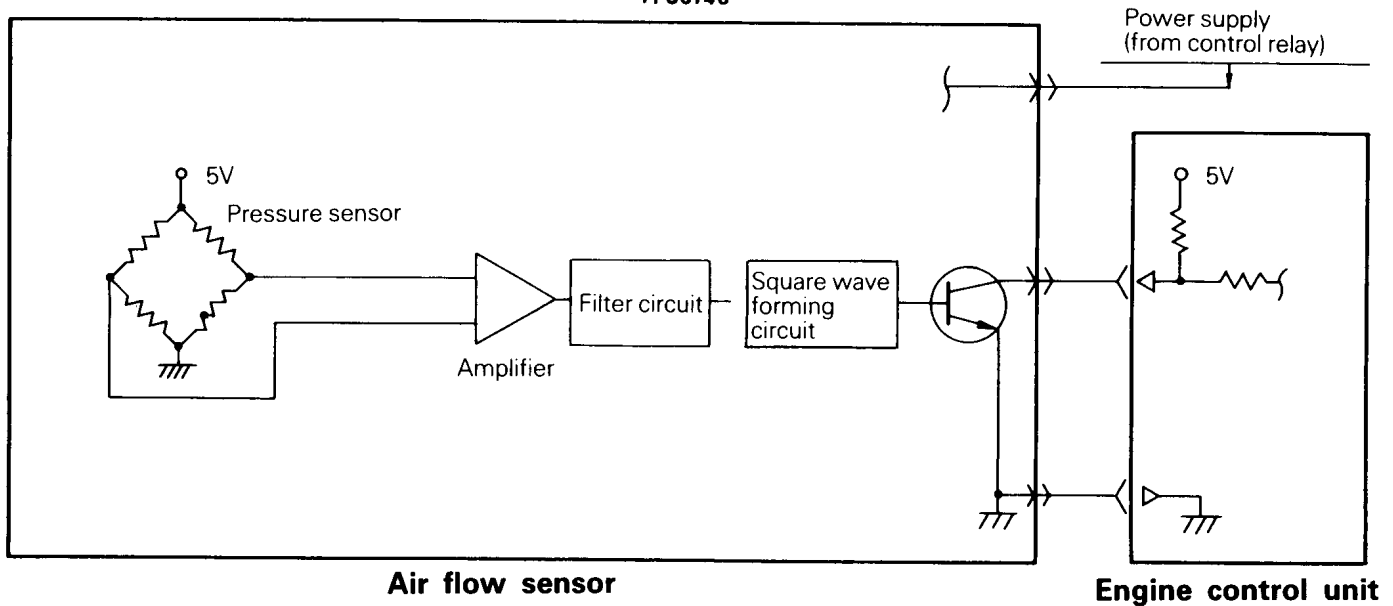
If a vortex generation column is placed in the path of the air flow, regular vortexes are generated downstream alternately. This is called the Karman vortex line and the number of vortexes generated is proportional to the air flow speed, in other words, the amount of air flow.

If a vortex pressure inlet is made downstream of the vortex generating column and the pressure detected, this pressure varies each time the vortex passes the inlet and when the number of vortexes increases, the number of pressure variations also

increases in proportion to this. In other words, the frequency of the pressure variations is proportional to the amount of air flow. The pressure detection type AFS is different from the conventional ultrasonic detection type AFS, and it detects the pressure variations due to the Karman vortex using a semiconductor type pressure sensor. The AFS changes the pressure variations to a square wave and inputs it as a pulse signal proportional to the amount of intake air flow to the engine control unit.



7FU0746



Air flow sensor

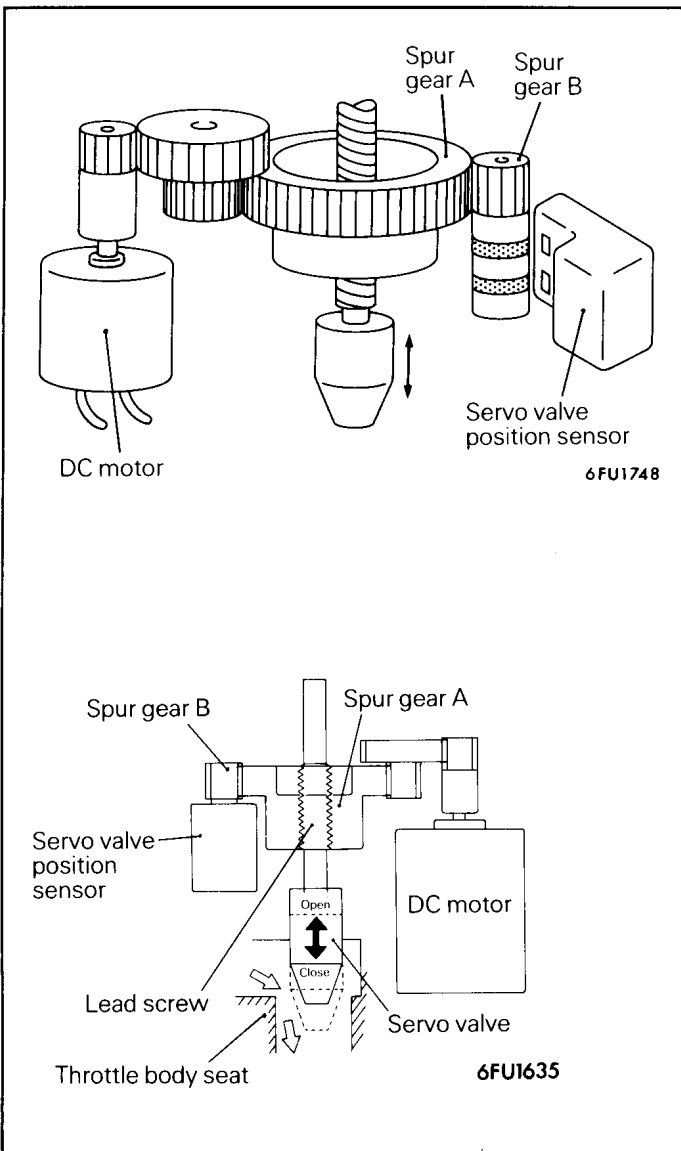
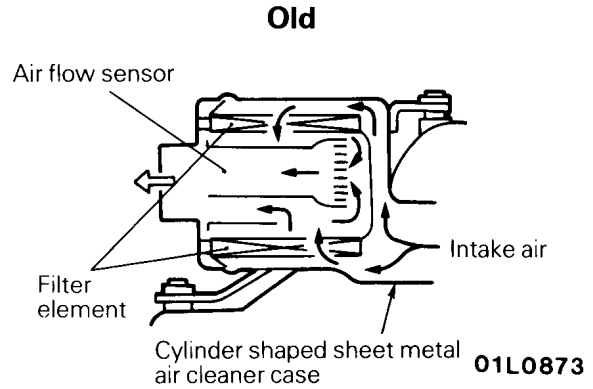
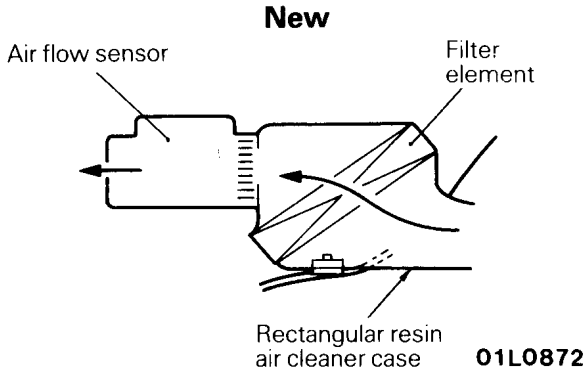
Engine control unit

7FU0748

SMOOTH FLOW TYPE AIR CLEANER

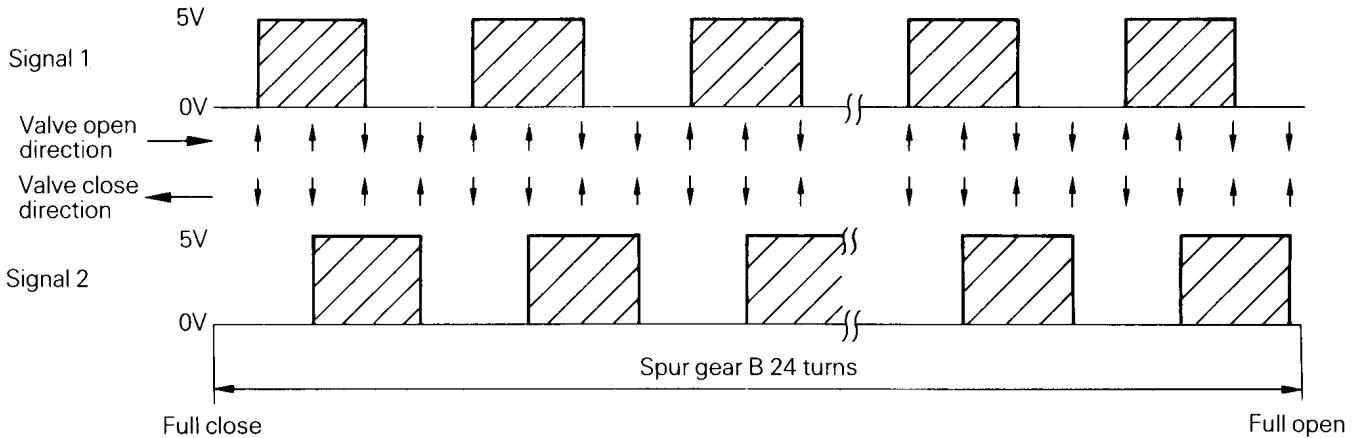
The air cleaner case is a resin made rectangular shape which is adapted to the new pressure sensitive type air flow sensor. It assures smooth

intake air flow and also features easy removal and installation of the filter element.



SERVO VALVE POSITION SENSOR

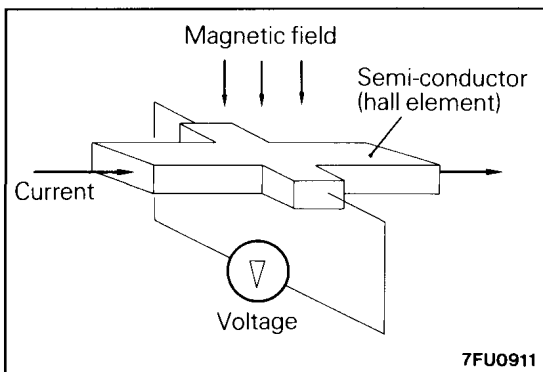
As spur gear A (see figure) is rotated by the DC motor, the servo valve extends or retracts according to the motor's rotating direction. The servo valve position sensor is built into the idle speed control (ISC) servo and it detects the rotation of spur gear A (change of the servo valve position) via the rotation of spur gear B (see figure) and converts it into a pulse signal, which is sent to the engine control unit. The servo valve position sensor outputs one pulse signal (Signal 1) each time spur gear B completes one rotation. To detect spur gear B's rotating direction (or to determine whether the servo valve is extending or retracting), it also outputs another pulse signal (Signal 2) which is same in waveform as Signal 1 but is 90° out of phase from Signal 1. When the ignition switch turned ON, the engine control unit causes the servo valve to move once to the fully closed position (where the valve contacts the stopper) for initializing and then it computes the servo valve position by detecting Signals 1 and 2. The valve position is calculated with the assumption that the servo valve fully closed position is step 0 and the fully open position is step 96.



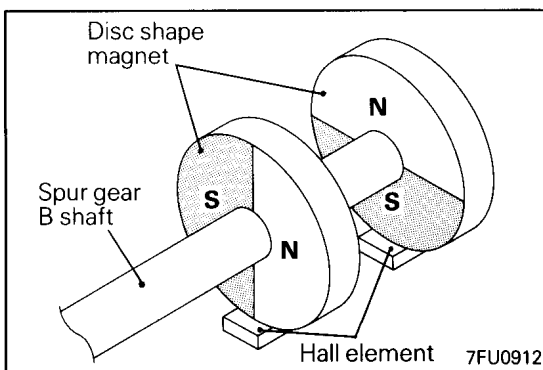
6FU1633

	Valve position increment step				Valve position decrement step			
Signal 1	L → H	H	H → L	L	L	L → H	H	H → L
Signal 2	L	L → H	H	H → L	L → H	H	H → L	L

NOTE H: High, L: Low



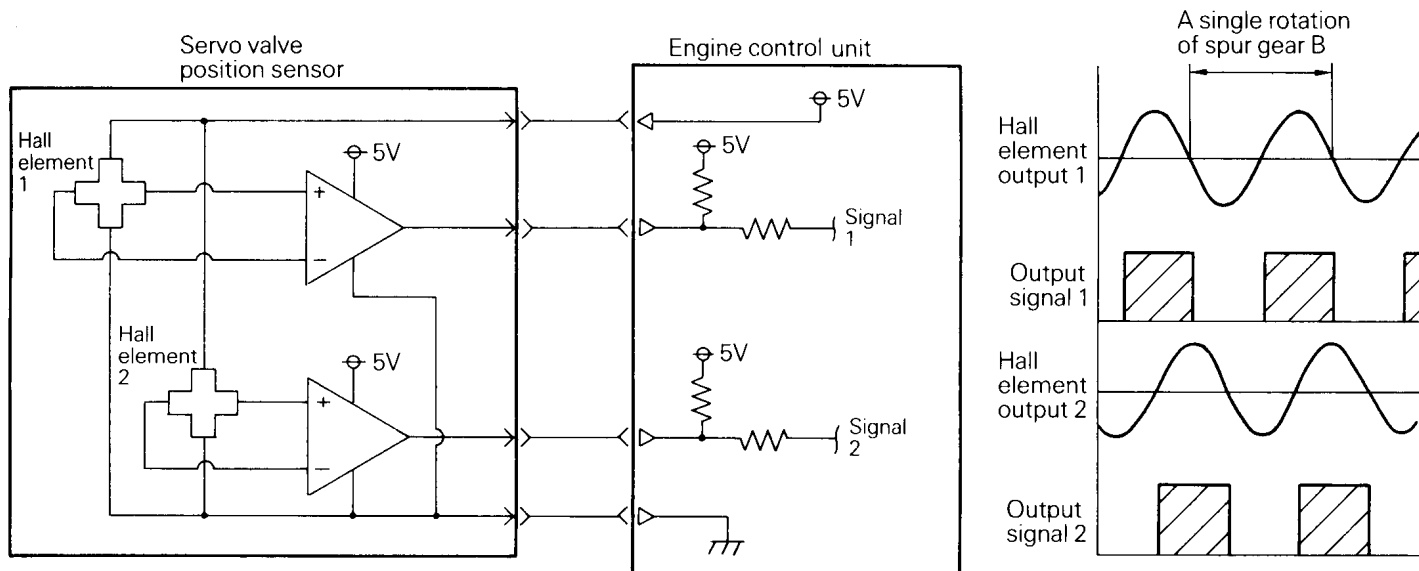
The servo valve position sensor detects the rotation signal of spur gear B as described below. When a semi-conductor is so positioned in a magnetic field that the current flow through the semi-conductor is perpendicular to the magnetic field, a voltage proportional to the current strength and magnetic flux density develops in a direction perpendicular to both the current flow and the magnetic field (Hall effect).



The servo valve position sensor employs this principle and is shown schematically to the left. The shaft carries two disc magnets with the polarity shifted about 90° to each other. Close to each of these magnets is fitted a Hall element.

As spur gear B rotates, the magnetic field applied to the Hall element changes. If a current is flowing through the Hall element, the voltage generated by the element changes with the gear rotation. When this voltage is applied to the comparator in the sensor, the comparator output voltage is 5 V

when the generated voltage is positive and is 0 V when the voltage is negative. Represented in this manner as a pulse signal, the rotation signal of spur gear B is transmitted from the position sensor to the engine control unit.



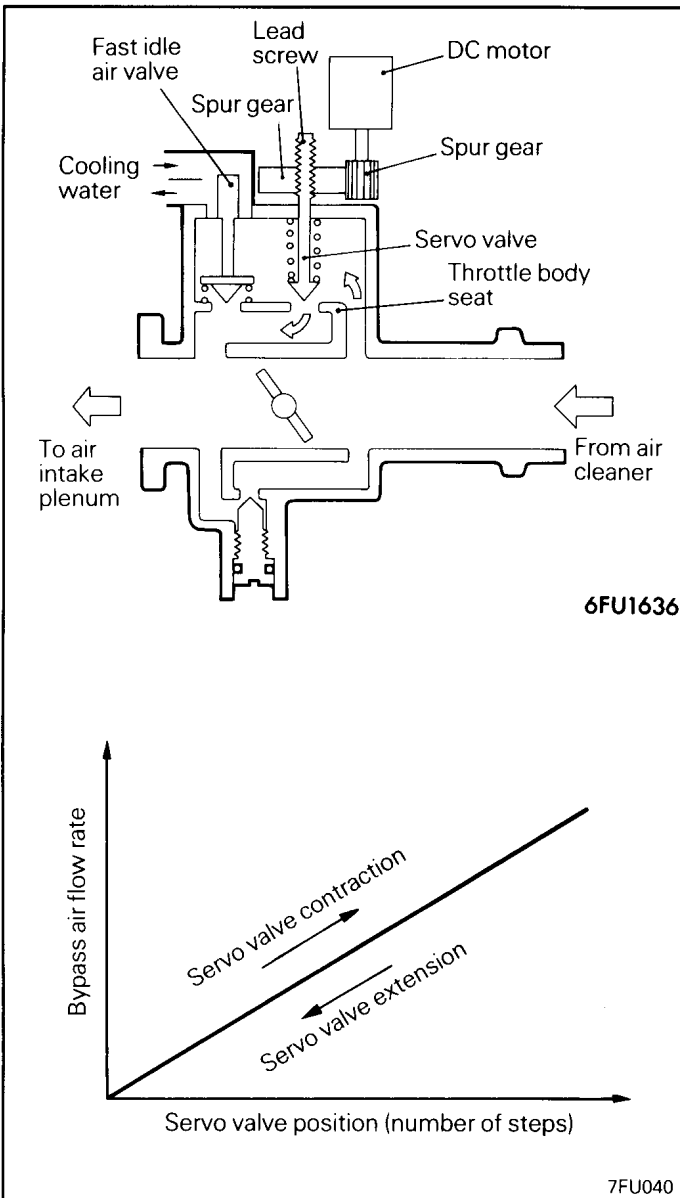
7FU0913

ACTUATOR**IDLE SPEED CONTROL (ISC) SERVO**

The ISC servo consists of a DC motor, spur gears and a servo valve, and is joined to the throttle body. The spur gear on the lead screw of the servo valve shaft turns when the DC motor is driven by the current from the engine control unit. Consequently, the valve extends or retracts according to the motor rotating direction.

The volume of bypass air that flows bypassing the throttle valve increases when the clearance between the servo valve and the throttle body seat becomes larger and it decreases when this clearance becomes smaller.

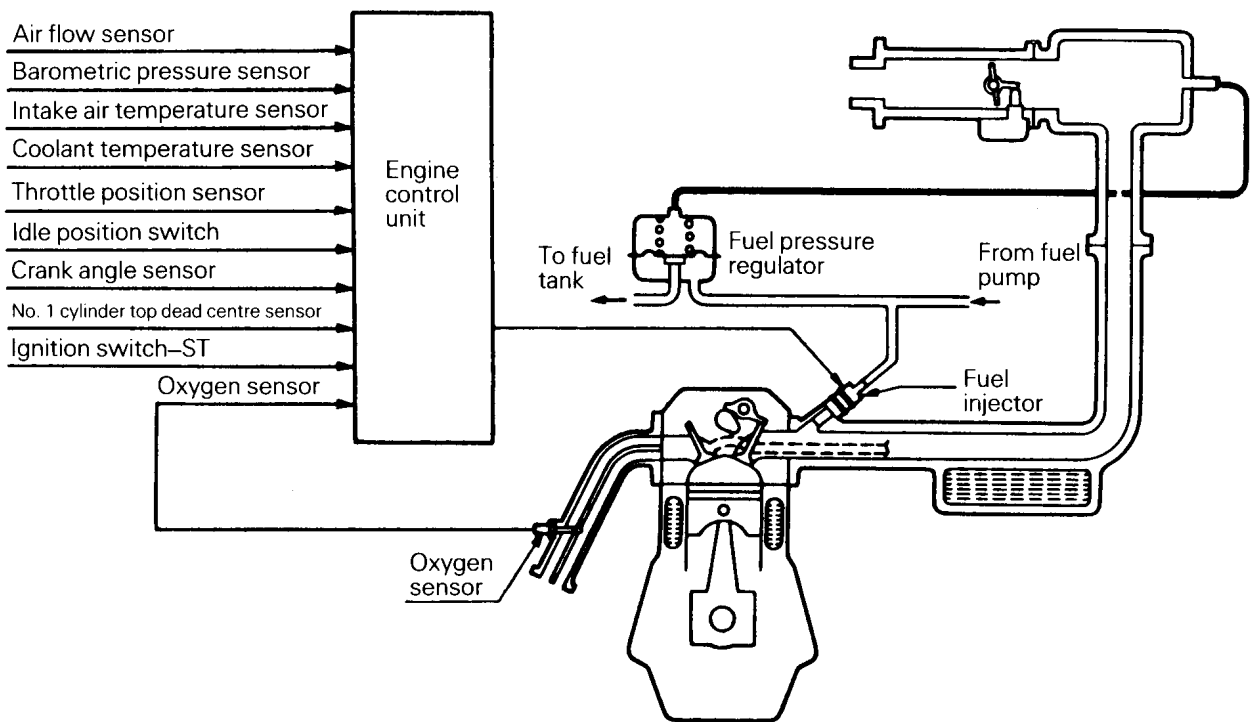
In other words, the bypass air volume changes with the servo valve position (i.e., the gap between the valve and its seat). The servo valve position changes either positively or negatively according to the direction of the DC motor's rotation and the amount of valve's positional change is continuously calculated by the engine control unit.



FUEL INJECTION CONTROL

The fuel injection control system is basically the same configuration as used in the current 4G64 engine.

System Configuration

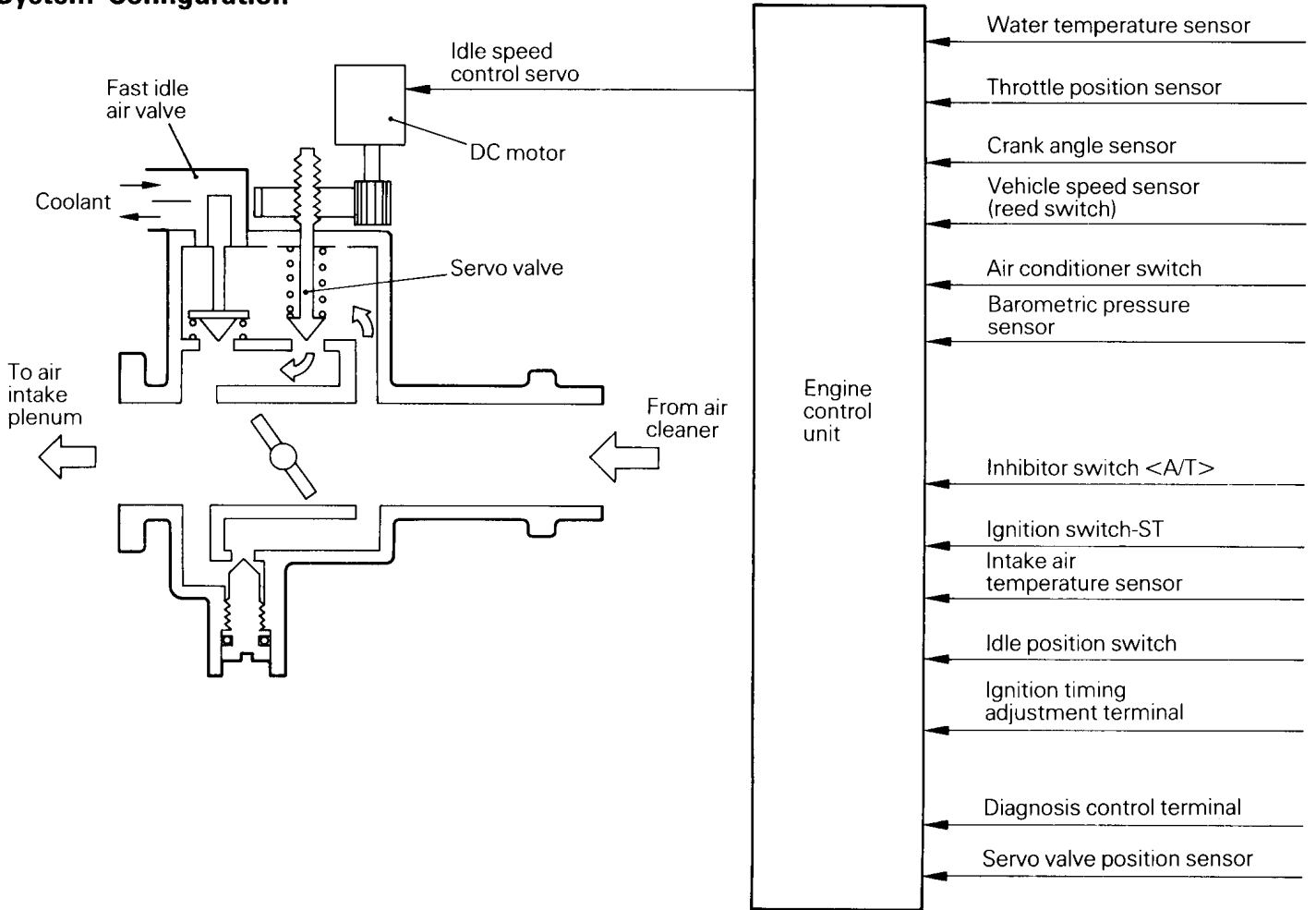


IDLE SPEED CONTROL (ISC)

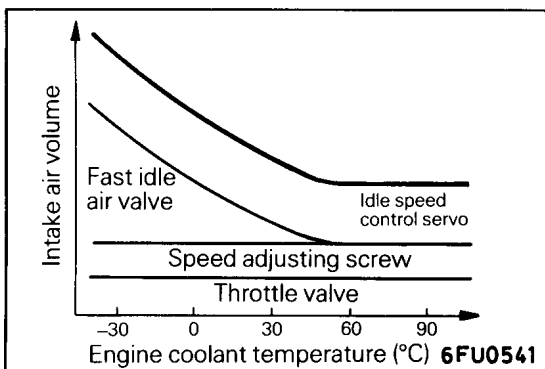
In the new 4G64 engine, the idle speed is controlled by regulating the throttle valve bypass air volume, the same as in the current 6G7 engines and 4G6-DOHC engines.

Therefore, the idle speed control system used in the new engine is basically the same as these engines.

System Configuration



6FU1630



INTAKE AIR VOLUME AT IDLING

The intake air volume at idling is measured at each of the four paths before being supplied to the intake manifold (See figure). This is the same as for an idle speed control which uses a stepper motor.

The status of the throttle body when adjusting the basic idle speed is also basically the same as that of the stepper motor type idle speed control as follows:

- Idle speed control servo: Opened to the ninth step (opened wider at high-altitude)
- Fast idle air valve: Completely closed [engine coolant temperature 80°C (176°F) or higher]
- Throttle valve: Lever touching the fixed SAS

DC MOTOR DRIVE CONTROL

When there is a difference between the target position and the actual position of the servo valve, the engine control unit drives the DC motor to either

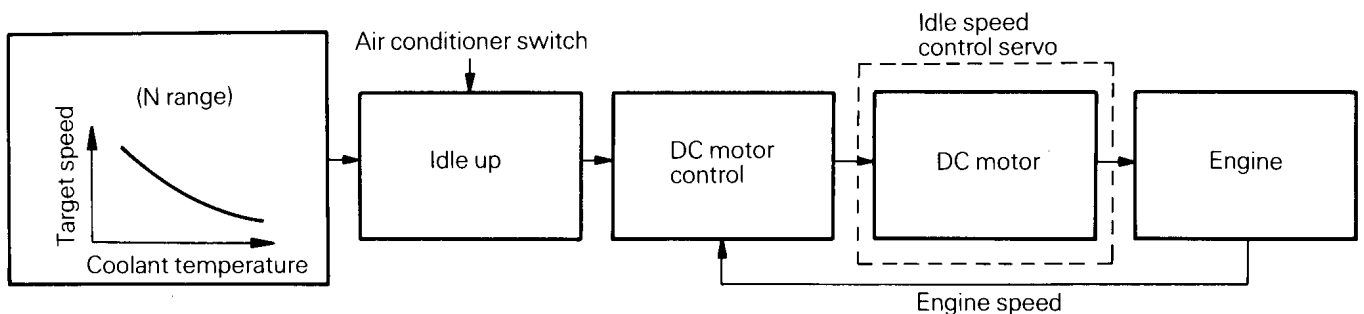
extend or contract the valve according to the actual difference. When the target is reached, the motor stops.

IDLE SPEED FEEDBACK CONTROL

In order to keep the engine speed at the preset idle target speed when idling, the DC motor is operated to control the bypass air volume.

The feedback control includes basically the same items as those of the stepper motor type idle speed control.

Idle Speed Feedback Control Block Diagram



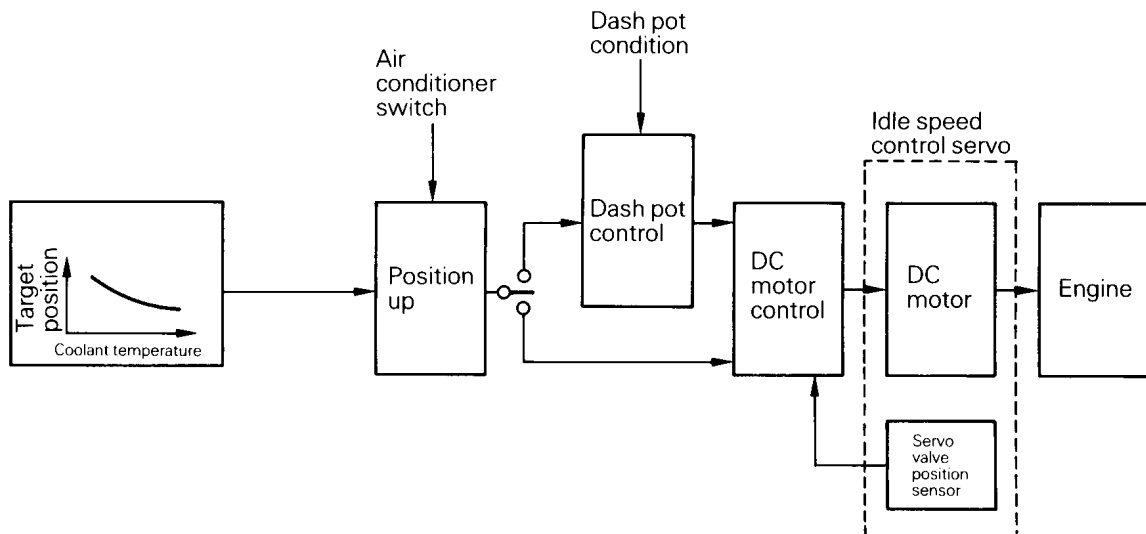
IDLE SPEED CONTROL (ISC) POSITION CONTROL

During idling, the engine speed changes sharply if the air conditioner switch is turned ON or OFF, or any other operation is made which can cause a change of engine load.

Immediately after detection of the load change signal, the engine control unit moves the servo valve to the target position according to the load status after such a change in order to adjust the bypass air volume, thereby limiting the engine speed change.

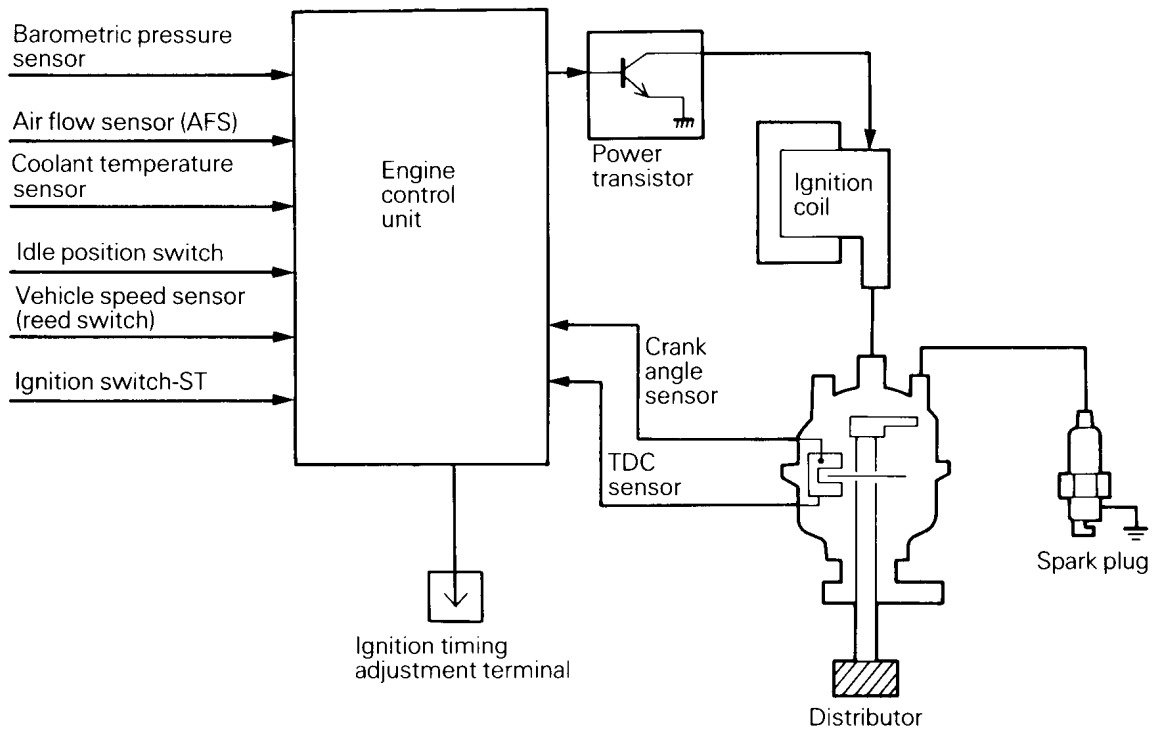
If the target position cannot be reached even after several DC motor operation attempts during position control, servo valve failure is assumed and the self diagnosis failure code (No. 55) is stored. Also the DC motor stops.

The position control items are basically the same as those of the stepper motor type idle speed control.

Position Control Block Diagram

IGNITION TIMING AND ENERGIZATION TIME CONTROL

The ignition timing and energization time control is basically the same as that of the current 4G64 engine.

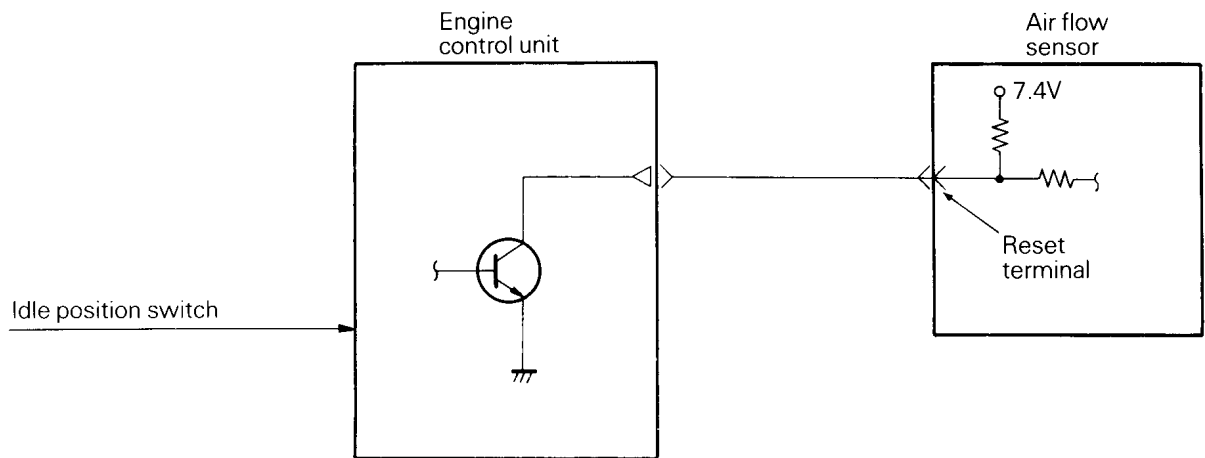


7FU0915

FUEL PUMP CONTROL, AIR CONDITIONER RELAY CONTROL, PURGE CONTROL

These controls are the same as those of the current 4G64 engine.

AIR FLOW SENSOR (AFS) FILTER RESET CONTROL



6FU0554

When the idle position switch is ON, the engine control unit turns on the power transistor, thereby sending the air flow sensor reset signal to the air flow sensor.

After receiving the reset signal, the air flow sensor resets the filter circuit, thereby improving the air volume detecting capacity of the air flow sensor in the operational region of low intake air volume.

SELF DIAGNOSIS SYSTEM

ENGINE WARNING LAMP (CHECK ENGINE LAMP) CONTROL

The components which may cause an engine warning lamp illumination are as listed below:

Oxygen sensor	No. 1 cylinder TDC sensor
Air flow sensor (AFS)	Barometric pressure sensor
Intake air temperature sensor	Ignition timing adjustment signal*
Throttle position sensor	Injector
Coolant temperature sensor	Fuel pump
Crank angle sensor	Engine control unit

*: The engine warning lamp also illuminates if the ignition timing adjustment terminal is shorted to earth when adjusting the ignition timing.

SELF DIAGNOSIS FUNCTION

The diagnosis items are as listed below:

Code No.	Diagnosis item	Major diagnosis points
11	Oxygen sensor	Malfunction of the air/fuel ratio control system Open or short circuit in the oxygen sensor circuit
12	Air flow sensor	Open or short circuit of sensor related circuit
13	Intake air temperature sensor	Open or short circuit of sensor related circuit
14	Throttle position sensor	Abnormal sensor output
21	Water temperature sensor	<ul style="list-style-type: none"> ● Open or short circuit of sensor related circuit ● Excessive connector contact resistance
22	Crank angle sensor	Abnormal sensor output
23	No. 1 cylinder TDC sensor	Abnormal sensor output
24	Vehicle speed sensor (reed switch)	Open or short circuit of sensor circuit
25	Barometric pressure sensor	Open or short circuit of sensor related circuit
36*	Ignition timing adjustment signal	Shorted ignition timing adjustment signal cable
41	Injector	Open circuit in injector related circuit
42	Fuel pump	<ul style="list-style-type: none"> ● Open circuit in fuel pump drive circuit ● Faulty control relay
55	Idle speed control servo valve position sensor	<ul style="list-style-type: none"> ● Open or short circuit of sensor related circuit ● Faulty idle speed control servo
–	Normal	–

*: Failure code No. 36 is not stored.

SERVICE DATA OUTPUT FUNCTIONS

The available service data output items are as listed below:

NOTE

Items added to those contained in the existing system are shown in bold characters.

Item No.	Service data item	Unit
11	Oxygen sensor output	mV
12	Air flow sensor output	Hz
13	Intake air temperature sensor output	°C
14	Throttle position sensor output	mV
16	Battery voltage	V
18	Cranking signal (ignition switch – ST)	ON – OFF
21	Coolant temperature sensor output	°C
22	Crank angle sensor output	RPM
25	Barometric pressure sensor output	mmHg

Item No.	Service data item	Unit
26	Idle position switch	ON – OFF
28	Airconditioner switch	ON – OFF
34	Air flow sensor reset signal	ON – OFF
36	Ignition timing adjustment mode	ON – OFF
37	Volumetric efficiency	%
38	Crank angle sensor output (readable at 2,000 r/min or less)	RPM
41	Injector drive time	mS
44	Ignition advance angle value	°BTDC, °ATDC
49	Airconditioner relay	ON – OFF
55	ISC servo position sensor	STEP

ACTUATOR TESTS

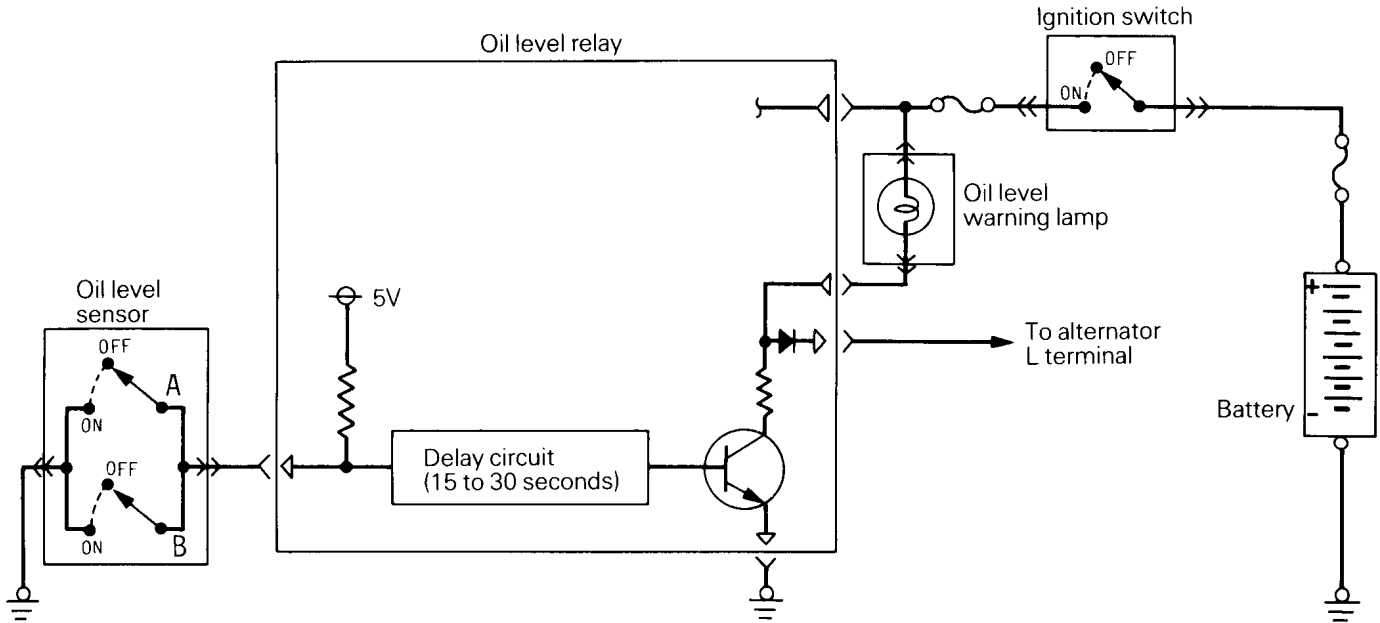
The actuator test items are as listed below:

Item No.	Actuator test item
01	No. 1 injector: OFF
02	No. 2 injector: OFF
03	No. 3 injector: OFF
04	No. 4 injector: OFF
07	Fuel pump: ON
08	Purge control solenoid valve: ON

OIL LEVEL WARNING SYSTEM

When a low engine oil level is detected during engine operation, this system illuminates the oil level warning lamp to warn the driver of low oil level.

If the normal oil level recovers either by replenishment or repair, the oil level warning lamp goes out.



7FU1146

The oil level warning lamp illuminates under either or both of the following conditions:

- (1) When the ignition switch is ON (engine stopped)
 - The current from the ignition switch flows through the oil level warning lamp and alternator L terminal to ground. This causes the oil level warning lamp to come on.
 - When the engine is started, the alternator L terminal potential goes high so that current stops flowing and the oil level warning lamp goes out.
- (2) When low oil level remains for more than about 20 seconds after the engine oil temperature has risen [about 55°C (131°F)].
 - If the engine oil temperature is low, oil level sensor switch A (oil temperature switch) is kept ON so that no voltage is applied to the delay circuit.

- If the engine oil temperature has risen and accordingly the oil temperature switch has been turned OFF, but the oil level is normal, oil level sensor switch B (level switch) remains ON so that no voltage is applied to the delay circuit.
- If the engine oil quantity decreases due to leaks or other reasons while the engine is running, the oil level switch is turned OFF and the voltage is applied to the delay circuit. If the level switch remains OFF for more than the predetermined delay time (approximately 20 seconds), the power transistor is turned ON and the oil level warning lamp comes on.
- The delay circuit is provided to prevent the oil level warning lamp from lighting when the level switch is turned OFF temporarily due to vehicle turns or similar causes.

CONTROL SYSTEM <6G72>

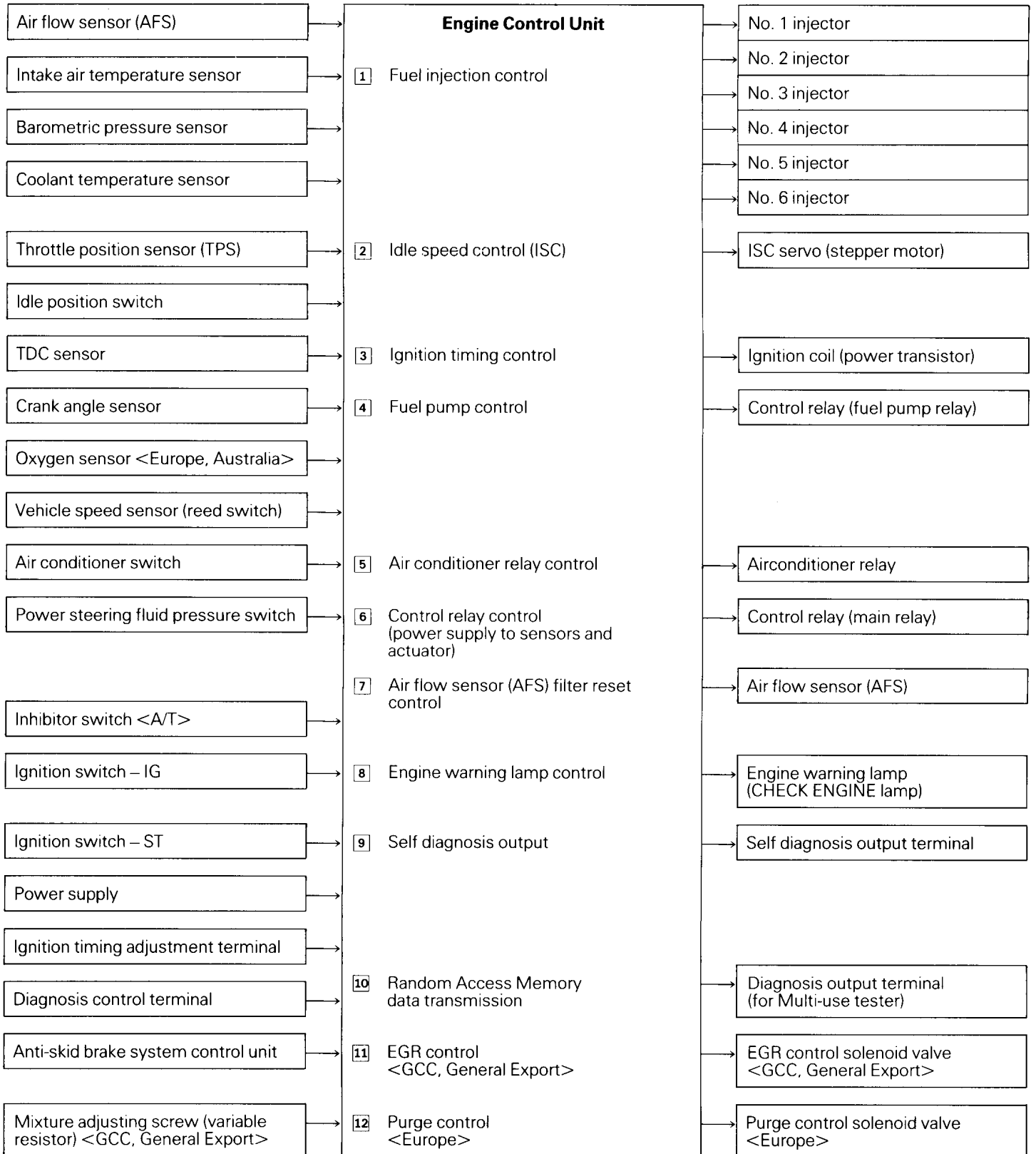
E9BMBAF

In addition to the control features derived from the current 6G72-SOHC engine, the new 6G72-SOHC engine's control system features the following

improvements for better driveability and higher engine performance:

Principal improvements/additions	Applicable destination			Remarks
	Europe	GCC General Export	Australia	
Pressure sensitive type air flow sensor and smooth flow type air cleaner	X	X	X	<ul style="list-style-type: none"> Conventional sensors are the ultrasonic sensitive type. Higher engine output
Air flow sensor filter reset control	X	X	X	<ul style="list-style-type: none"> Corresponds to the adoption of a pressure sensitive type air flow sensor. Assures a highly reliable air flow sensor signal.
Changed TDC sensor and crank angle sensor signals	X	X	X	For using the signal common to 6G72-DOHC engines.
Oxygen sensor with heater	X	–	X	Highly sensitive to oxygen density even when the exhaust temperature is low (already adopted for PAJERO/MONTERO models for Australia)
Independent earth lead for oxygen sensor	X	–	X	Improves of oxygen sensor signal reliability.
Smaller water temperature sensor temperature sensing section size	X	X	X	<ul style="list-style-type: none"> For higher sensor response Same as the 4G1 engine
Stepper motor control for when the anti-skid brake system is operating	X	X	X	<ul style="list-style-type: none"> For higher braking performance Same as the 4G6-DOHC engine
Oil level warning system	X	–	–	For better reliability

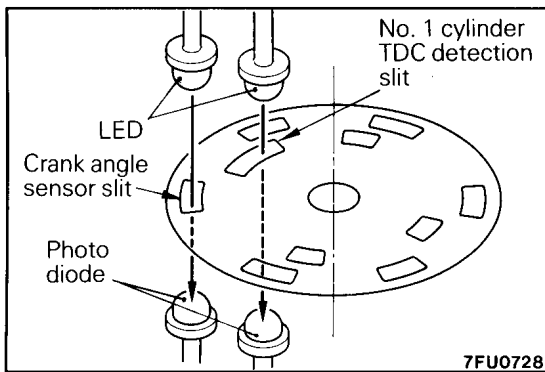
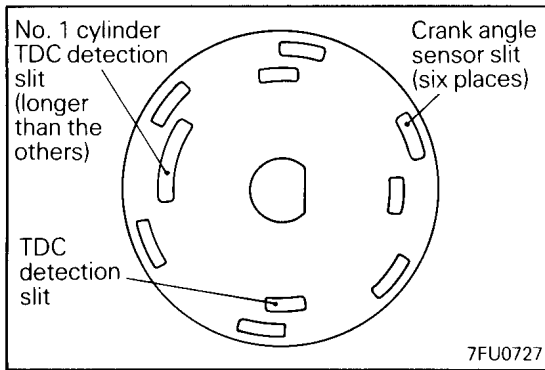
SYSTEM BLOCK DIAGRAM



SENSORS

AIR FLOW SENSOR

See the paragraph on 4G64 engine (P.1-23).

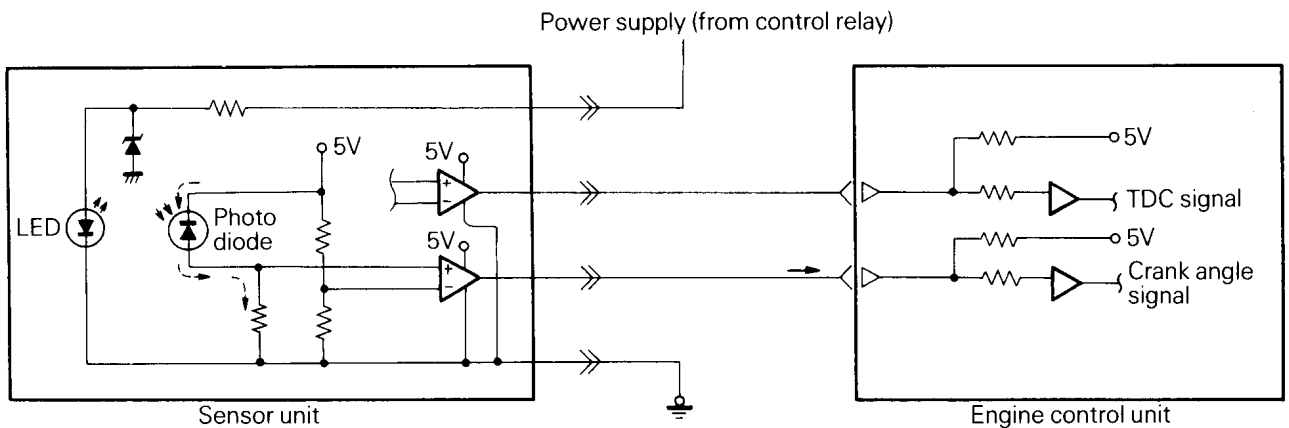


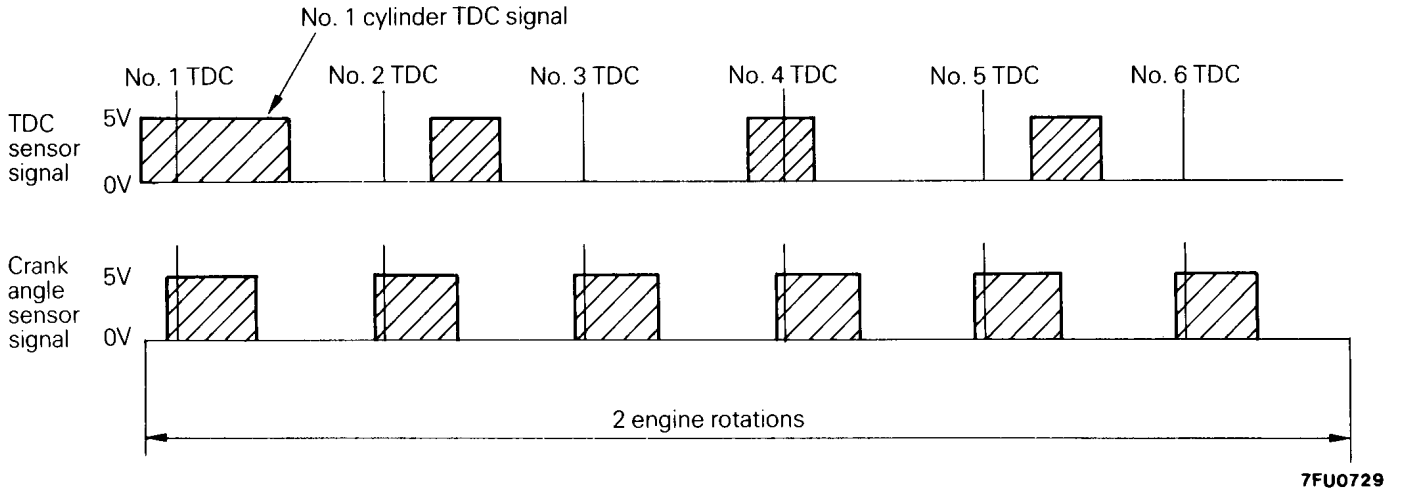
TDC SENSOR AND CRANK ANGLE SENSOR

The TDC sensor and crank angle sensor combination consists of a disc and a sensor unit which are built into the distributor. The disc is a metal disc with six outer slits and four inner slits. The outer slits are arranged at 60 degree intervals. The inner slits are for the TDC sensor and the outer ones are for the crank angle sensor. The disc is fixed to the sensor shaft so that when the intake valve side camshaft on the rear bank rotates, the disc also rotates. The light transmitted through the disc slits is read optically by the sensor unit. The sensor unit has two light emitting diode (LED) and photo diode pairs. One pair is for the outer slits and the other is for the inner slits. The disc rotates in a narrow space between the light emitting diodes and photo diodes.

Light from the LED reaches the photo diode each time a slit passes between them. The photo diode has a special characteristics meaning that when it receives light, it allows the current to flow in the opposite direction to that of an ordinary diode. Consequently, the current flows in the direction of dotted line shown below. This sends a voltage of about 5 V to the comparator of the sensor unit so

the engine control unit terminal voltage becomes 5 V. After a slit has passed the LED and photo diode pair, light cannot reach the photo diode so that the current indicated by the dotted line no longer flows. This means that the engine control unit terminal voltage becomes 0 V. Consequently, the output signal from the sensor unit is sent as a pulse signal to the engine control unit.





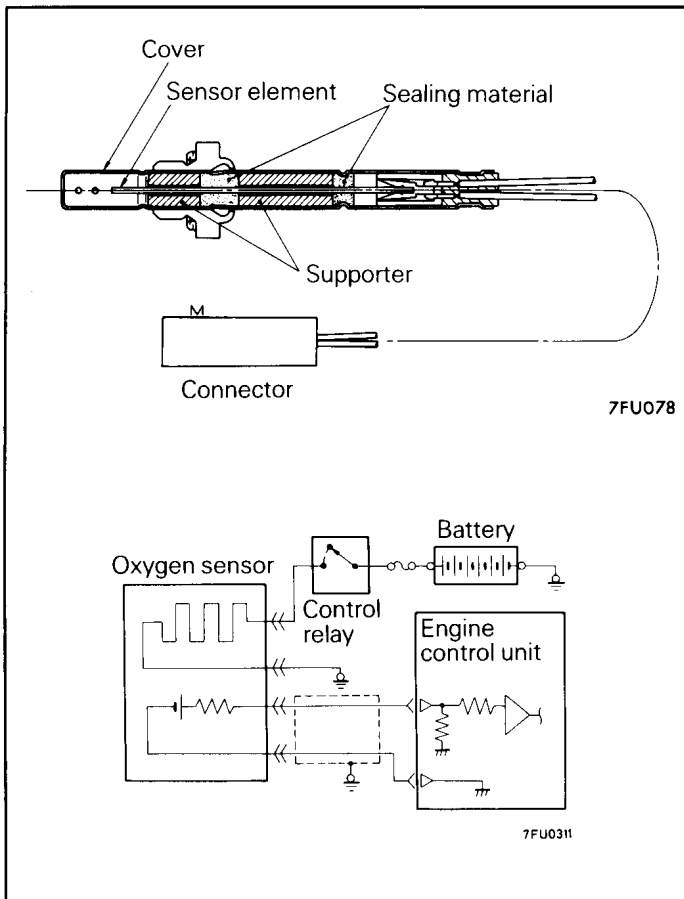
7FU0729

(1) TDC sensor signal

This signal obtained using the four inner slits of the disc is for detecting the top dead centre on compression stroke of each cylinder. Based on this signal, the engine control unit determines both the fuel injection order and which cylinder to ignite.

(2) Crank angle sensor signal

This signal obtained using the six outer slits of the disc is for detecting the crank angle corresponding to each cylinder. The engine control unit determines the engine speed and the intake air volume per stroke based on this signal. It also determines the ignition timing and sends the ignition coil primary current shut off signal to the power transistor unit.



7FU078

7FU0311

OXYGEN SENSOR

Similarly as the engine for Australia, the oxygen sensor has a platinum heater built in the sensor element.

This oxygen sensor with the built-in heater has good oxygen density response even when the exhaust gas temperature is low.

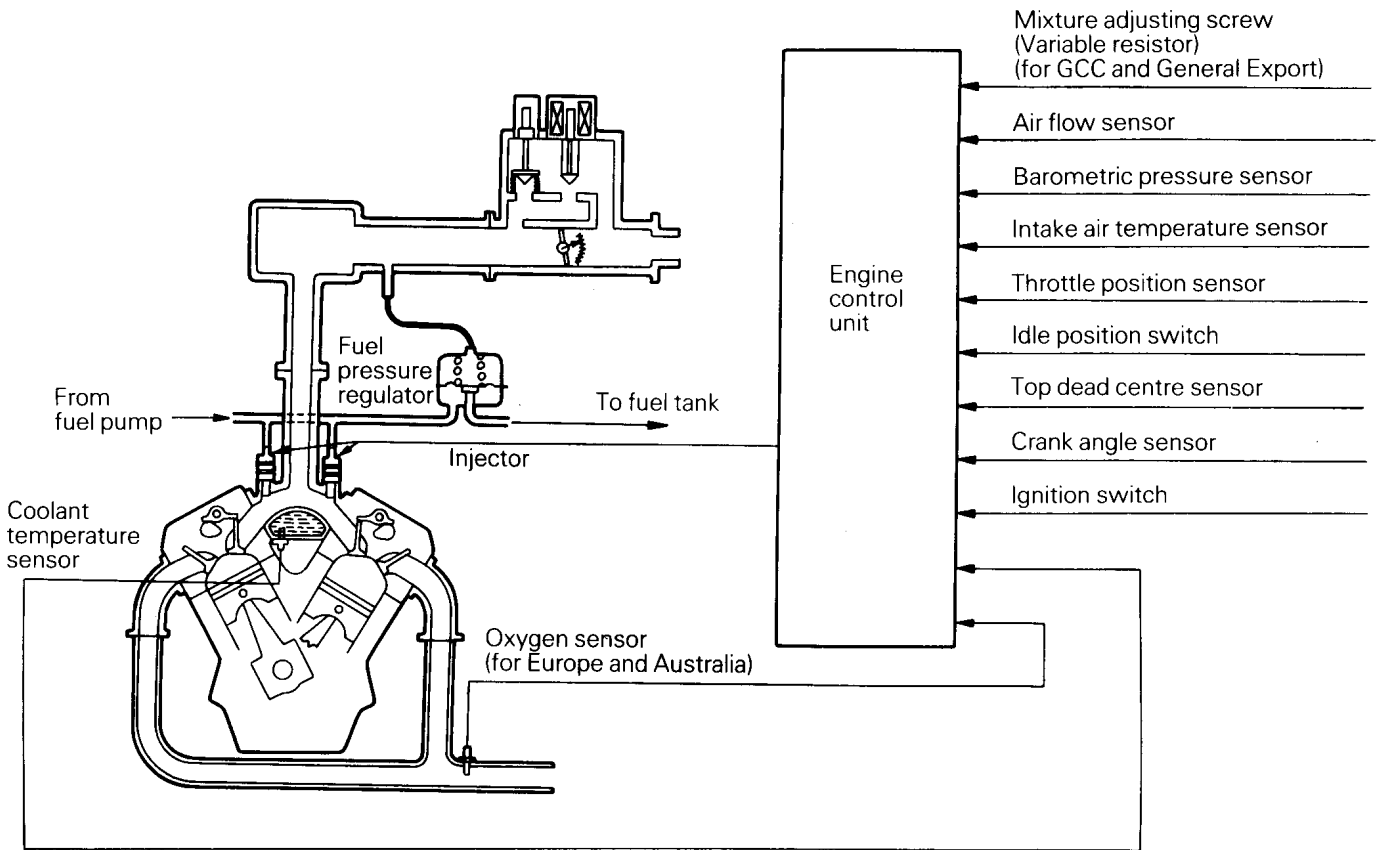
Therefore, quite quickly after engine start up, it can provide feedback control of the air-fuel ratio. This sensor has a dedicated earth lead and is connected directly to the earth within the engine control unit. This makes the oxygen sensor output signal highly reliable, because it is virtually free from the influence of earth level variations in other components.

FUEL INJECTION CONTROL

(1) Along with improvements in the TDC sensor and the crank angle sensor signal, the trigger signal for controlling the fuel injection timing (injector energization timing) has been changed from the TDC sensor signal to the crank angle sensor

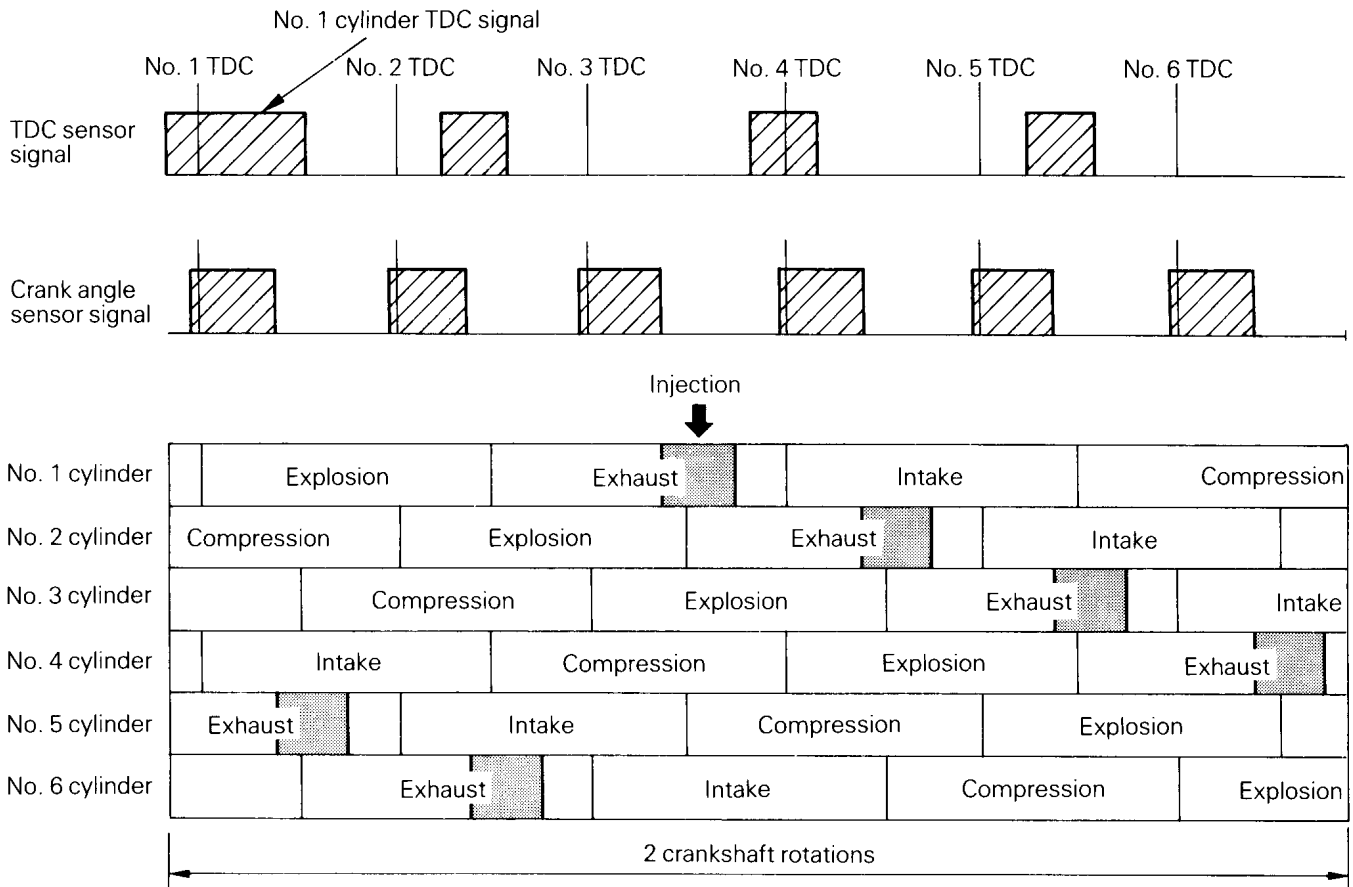
signal.
 (2) Other controls are basically the same as the control system used for the current 6G72-SOHC engines.

System Configuration Diagram



FUEL INJECTION (INJECTOR DRIVE) TIMING CONTROL

Sequential Injection Timing Diagram



7FU0736

The injector is energized on the exhaust stroke of each cylinder.

The No. 1 cylinder TDC signal is the reference signal of the sequential injection. Upon detection of the compression stroke of No. 1 cylinder from this

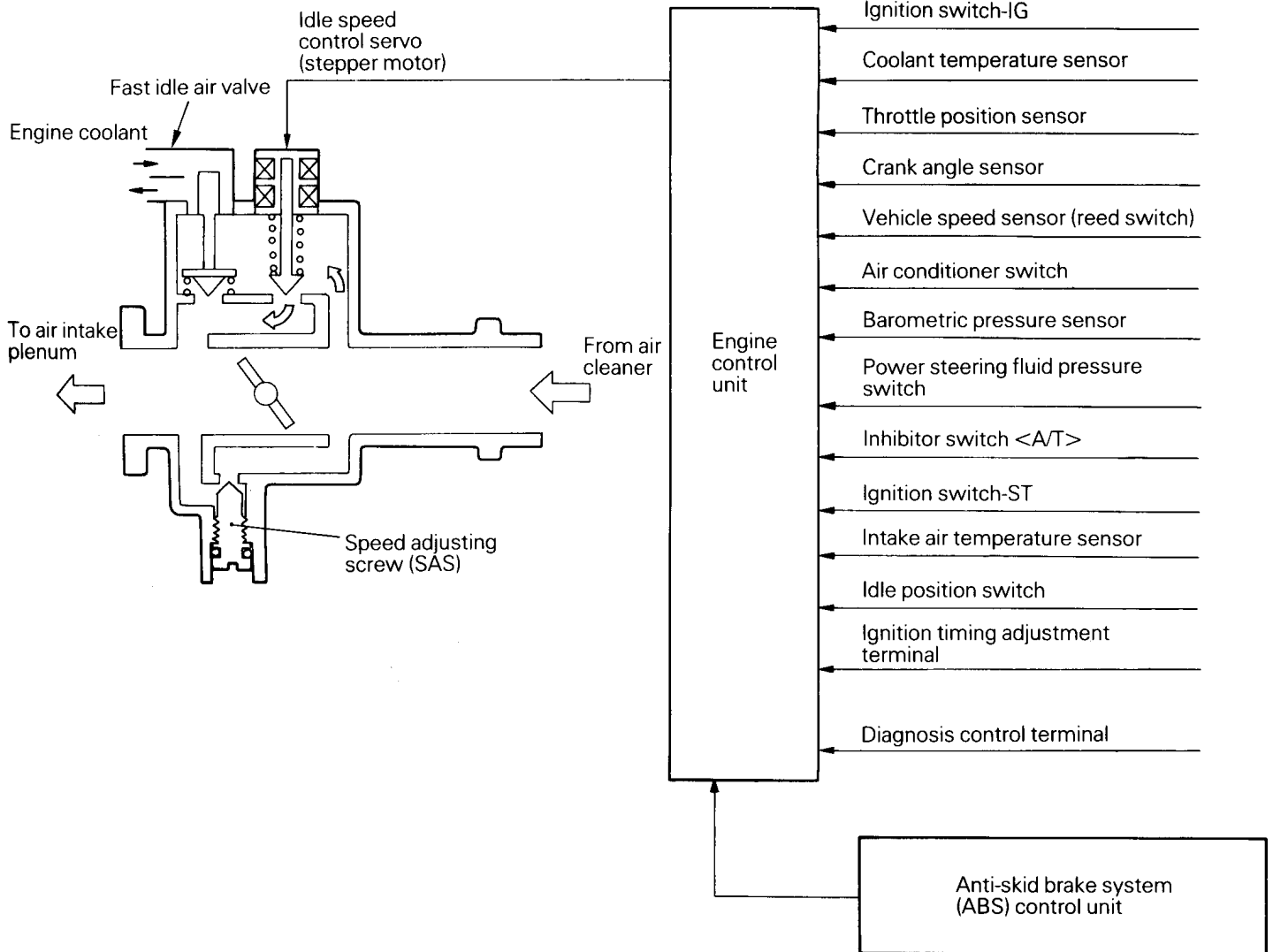
reference signal, the sequential injection to the cylinders starts in the order of 5-6-1-2-3-4. Injection into each cylinder occurs in sync with the crank angle signal every time the crankshaft rotates two times.

IDLE SPEED CONTROL (ISC)

(1) A stepper motor position control feature has been added for more precise idle speed control when the anti-skid brake system is in operation. This control is basically the same as that used in the current 4G63-DOHC engine.

(2) Other controls are basically the same as those for the current 6G72-SOHC engines.

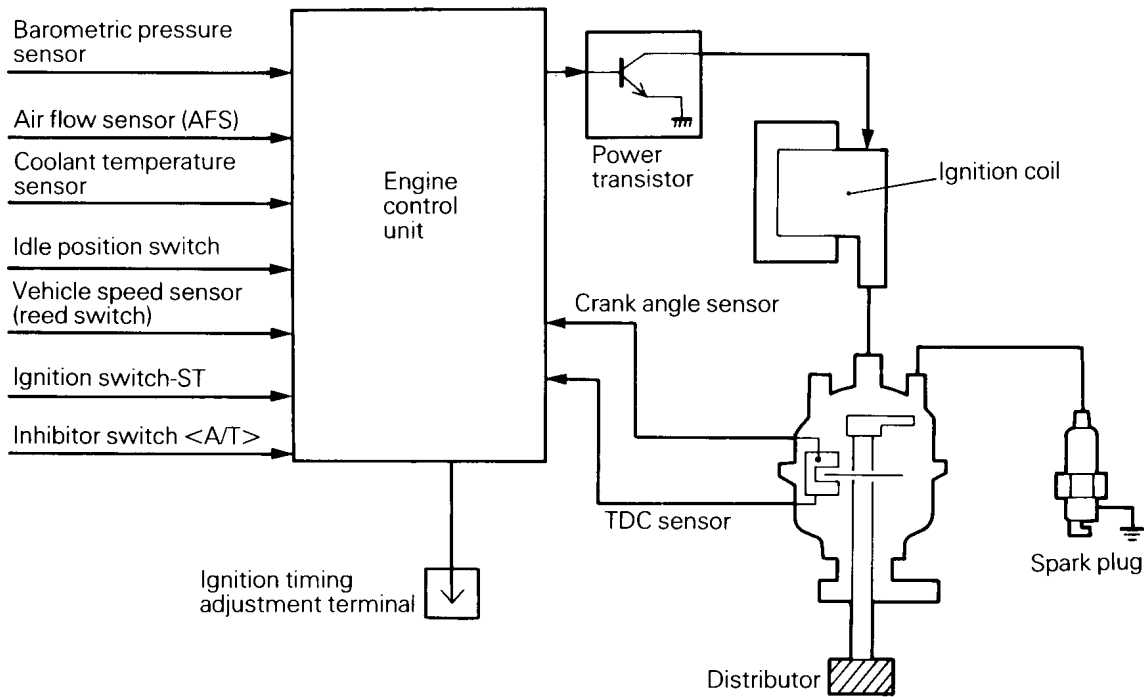
System Configuration Diagram



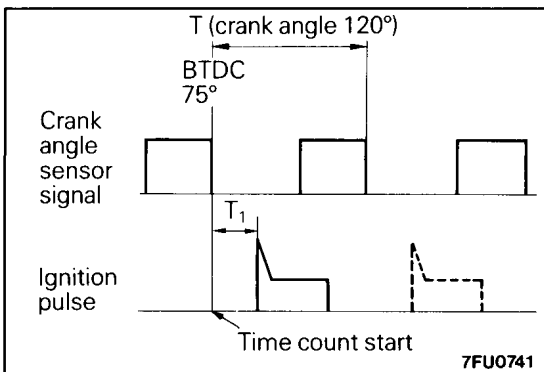
IGNITION TIMING AND ENERGIZATION TIME CONTROL

- (1) Along with the improvements of the TDC sensor and crank angle sensor signals, the ignition timing control has been changed to the same control system as the current 4G63 engine.
- (2) Other controls are basically the same as those used for the current 6G72-SOHC engine.

System Configuration Diagram



7FU0915



7FU0741

IGNITION TIMING CONTROL

Period T of the crank angle sensor signal is measured and based on this, the time (t) necessary for one degree (1°) of the crankshaft rotation is determined.

$$t = T/120$$

After determining "t", the ignition timing (T₁) is calculated in reference to the 75° BTDC signal. After T₁ time has lapsed following the 75° BTDC signal input, the ignition coil primary current cut off signal is sent to the power transistor.

$$T_1 = t \times (75 - \theta)$$

θ: an ignition advance angle as calculated by the engine control unit

FUEL PUMP CONTROL, AIR CONDITIONER RELAY CONTROL, CONTROL RELAY CONTROL, EGR CONTROL <GCC, GENERAL EXPORT>, PURGE CONTROL <EUROPE>

These controls are the same as the current 6G72-SOHC engine.

AIR FLOW SENSOR (AFS) FILTER RESET CONTROL

See the paragraph on the 4G64 engine (P.1-34).

SELF DIAGNOSIS SYSTEM**ENGINE WARNING LAMP (CHECK ENGINE LAMP) CONTROL**

The components which may cause an engine warning lamp illumination are as listed below.

Oxygen sensor	TDC sensor
Air flow sensor (AFS)	Barometric pressure sensor
Intake air temperature sensor	Ignition timing adjustment signal*
Throttle position sensor	Injector
Coolant temperature sensor	Engine control unit
Crank angle sensor	–

*: The engine warning lamp also illuminates if the ignition timing adjustment terminal is shorted to earth when adjusting the ignition timing.

SELF DIAGNOSIS FUNCTION

The diagnosis item are as listed below.

Code No.	Diagnosis item	Major diagnosis contents	DIAGNOSIS 2 Mode
11	Oxygen sensor	Malfunction of the air/fuel ratio control system Open or short circuit in the oxygen sensor circuit	–
12	Air flow sensor	Open or short circuit of sensor related circuit	–
13	Intake air temperature sensor	Open or short circuit of sensor related circuit	–
14	Throttle position sensor	Abnormal sensor output	–
21	Coolant temperature sensor	<ul style="list-style-type: none"> ● Open or short circuit of sensor related circuit ● Excessive connector contact resistance 	–
22	Crank angle sensor	Abnormal sensor output	–
23	TDC sensor	Abnormal sensor output	–
24	Vehicle speed sensor (reed switch)	Open or short circuit of sensor circuit	–
25	Barometric pressure sensor	Open or short circuit of sensor related circuit	–
36*	Ignition timing adjustment signal	Short circuit in ignition timing adjustment signal line	–
41	Injector	Open circuit in injector related circuit	–
–	Normal	–	–

*: Malfunction code No. 36 is not stored.

SERVICE DATA OUTPUT

The available service data output items are as listed below.

NOTE

Items added to those contained in the existing system are shown in bold characters.

Item No.	Service data item	Unit
11	Oxygen sensor output	mV
12	Air flow sensor output	Hz
13	Intake air temperature sensor output	°C
14	Throttle position sensor output	mV
16	Battery voltage	V
17	Mixture adjusting screw (variable resistor) <GCC, General Export>	mV
18	Cranking signal (ignition switch – ST)	ON – OFF
21	Coolant temperature sensor output	°C
22	Crank angle sensor output	RPM
25	Barometric pressure sensor output	mmHg
26	Idle position switch	ON – OFF
27	Power steering fluid pressure switch	ON – OFF
28	Airconditioner switch	ON – OFF
29	Inhibitor switch <A/T>	D2LR – NP
34	Air flow sensor reset signal	ON – OFF
36	Ignition timing adjustment mode	ON – OFF
37	Volumetric efficiency	%
38	Crank angle sensor output (readable at 2,000 r/min or less)	RPM
41	Injector drive time	mS
44	Ignition advance angle value	°BTDC, °ATDC
45	ISC stepper motor position	STEP
49	Airconditioner relay	ON – OFF

ACTUATOR TESTS

The actuator test items are as listed below.

Item No.	Actuator test item
01	No. 1 injector: OFF
02	No. 2 injector: OFF
03	No. 3 injector: OFF
04	No. 4 injector: OFF
05	No. 5 injector: OFF
06	No. 6 injector: OFF
07	Fuel pump: ON
08	Purge control solenoid valve: ON <Europe>
10	EGR control solenoid valve: ON <GCC, General Export>

OIL LEVEL WARNING SYSTEM <EUROPE>

See the paragraph on the 4G64 engine (P.1-37).

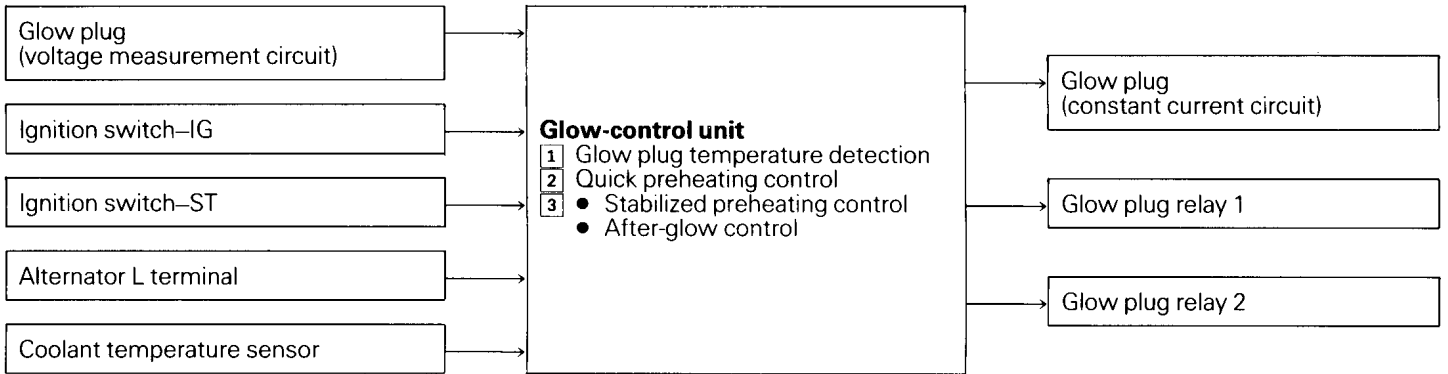
CONTROL SYSTEM <4D56>

E9BMDAC

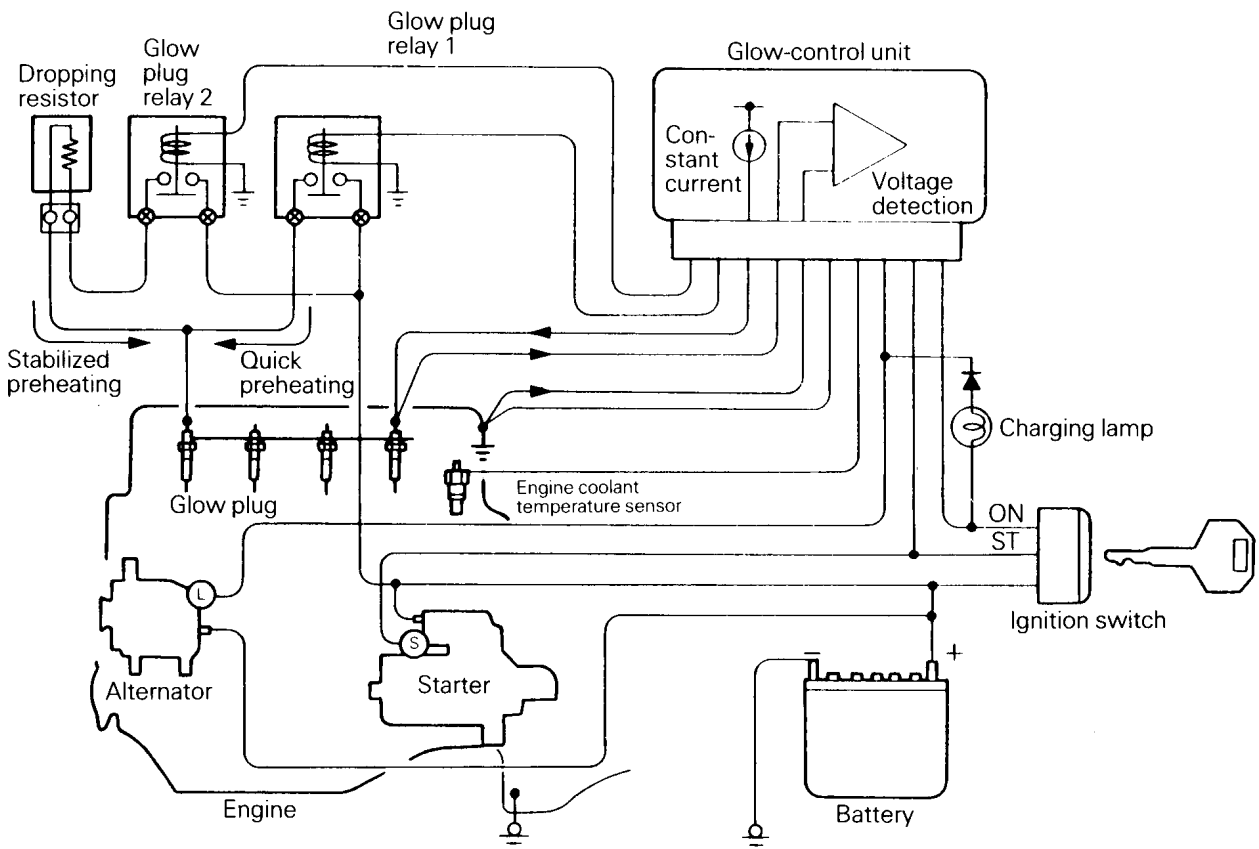
SUPER QUICK GLOW SYSTEM

The new 4D56 engine uses the same super quick glow system as that used in the current 4D56 engine.

SYSTEM BLOCK DIAGRAM



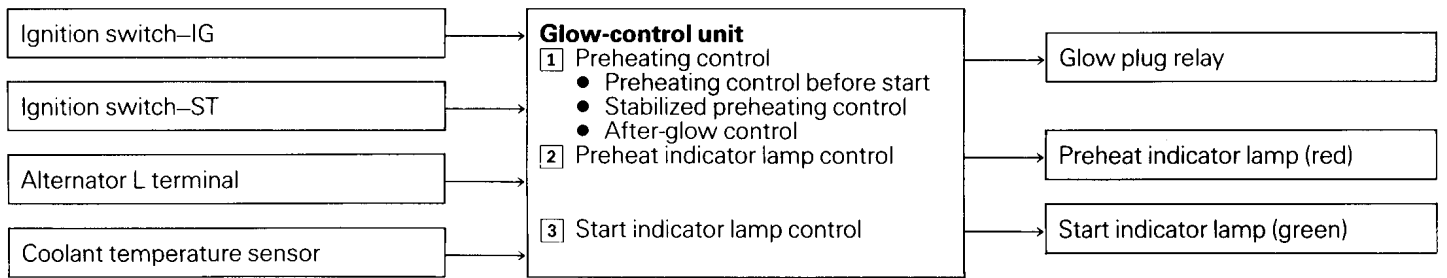
CONTROL SYSTEM DIAGRAM



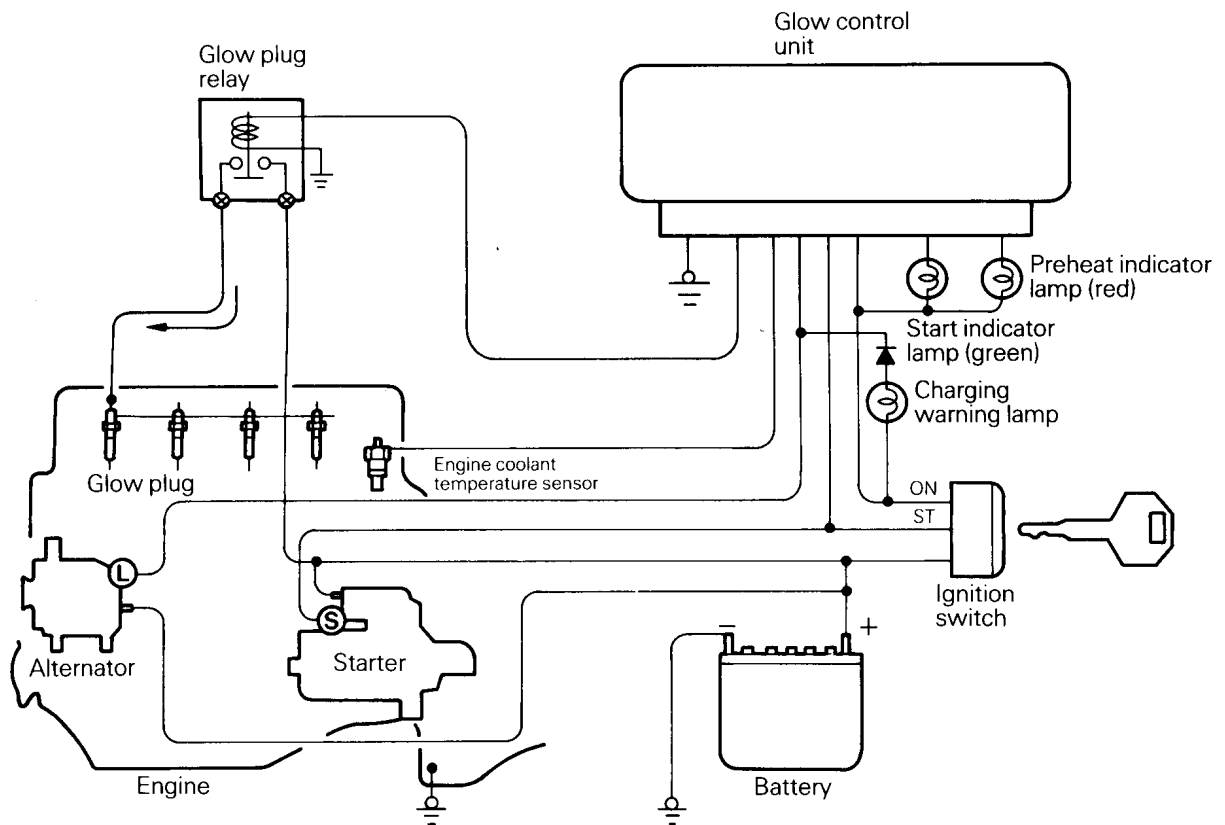
AUTO GLOW SYSTEM

The auto glow system is the same as that used in the current 4D56 engine.

SYSTEM BLOCK DIAGRAM



CONTROL SYSTEM DIAGRAM

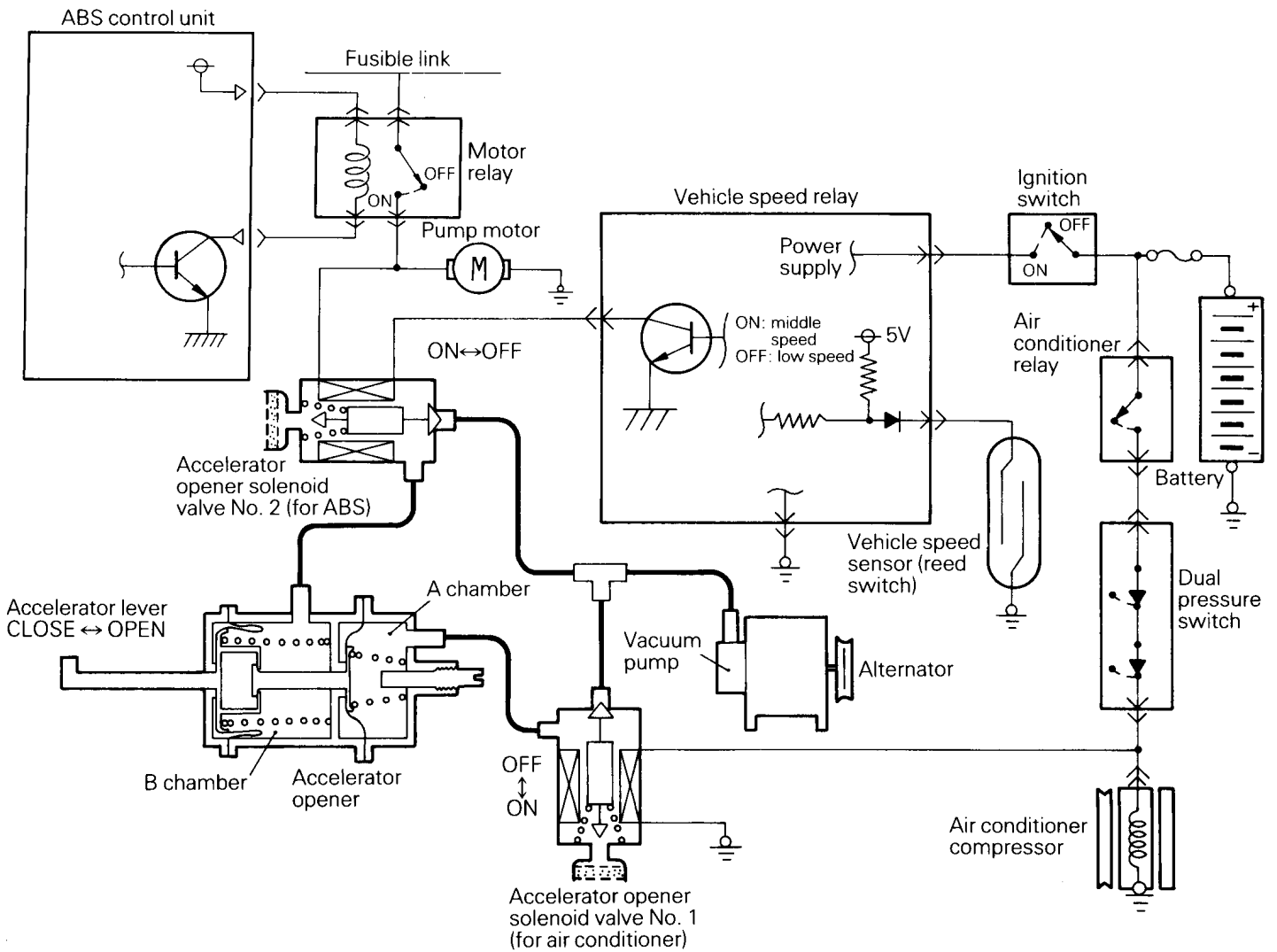


ACCELERATOR LEVER CONTROL WHEN ANTI-SKID BRAKE (ABS) IS IN OPERATION

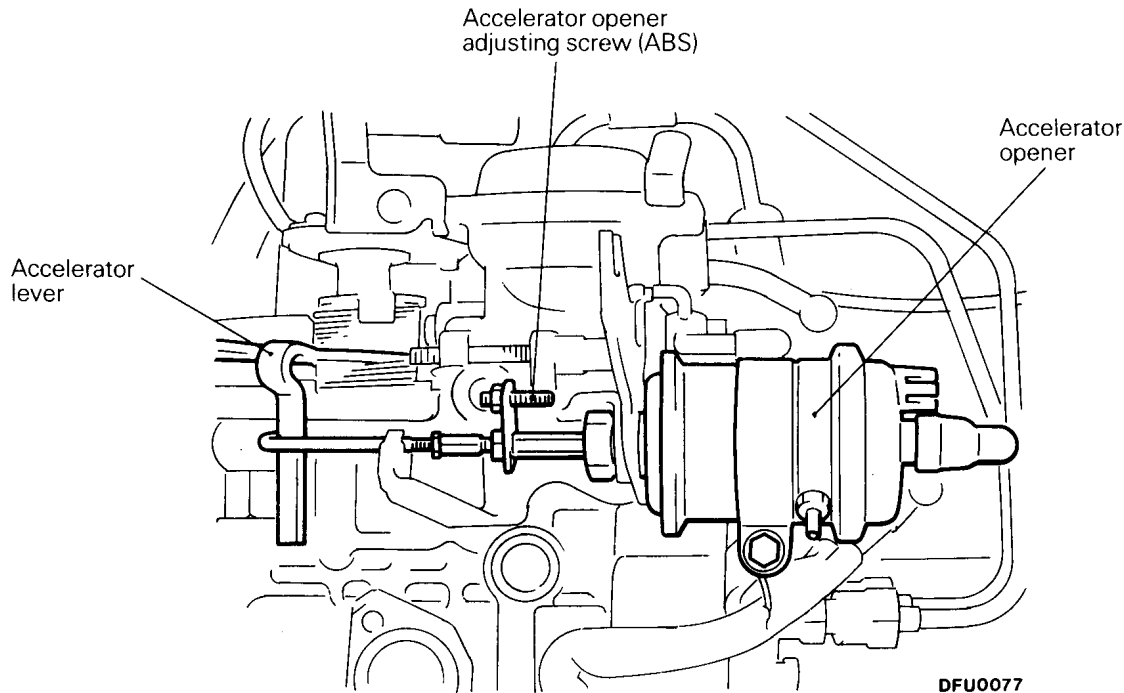
When ABS is operating, this new function controls the accelerator lever, opening it a little to increase the amount of fuel injected (equivalent to that amount injected when the engine runs at 1,900

r/min with no load). This limits wheel lock due to excessive engine braking effects and thereby improving the ABS performance.

CONTROL SYSTEM DIAGRAM



Accelerator Opener External View



The ABS control unit turns ON the motor relay to supply the motor drive power to the pump motor when the ABS is in operation. It also supplies the power to accelerator opener solenoid valve No. 2 (for ABS). The vehicle speed relay has its inside power transistor turned ON only when the vehicle speed as detected by the vehicle speed sensor (reed switch) is at either middle or high speed [approx. 24 km/h (15 mph) or more]. Therefore, when the vehicle is driven at middle or high speeds while the ABS is operating, accelerator opener solenoid valve No. 2 is turned ON to introduce the vacuum produced by the vacuum pump to chamber B of the accelerator opener.

This makes the accelerator lever open a little (to the position equivalent to when the engine is running at 1,900 r/min with no load), thereby preventing excessive engine braking effect. In other cases, this valve remains OFF, introducing atmosphere into chamber B of the accelerator opener. When the air conditioner compressor is operating, accelerator opener solenoid valve No. 1 (for air conditioner) is turned ON, introducing the vacuum into chamber A of the accelerator opener. This makes the accelerator lever open a little (to the position equivalent to when the engine is running at 900 r/min under the compressor load), thereby securing air conditioner performance.

OIL LEVEL WARNING SYSTEM <EUROPE>

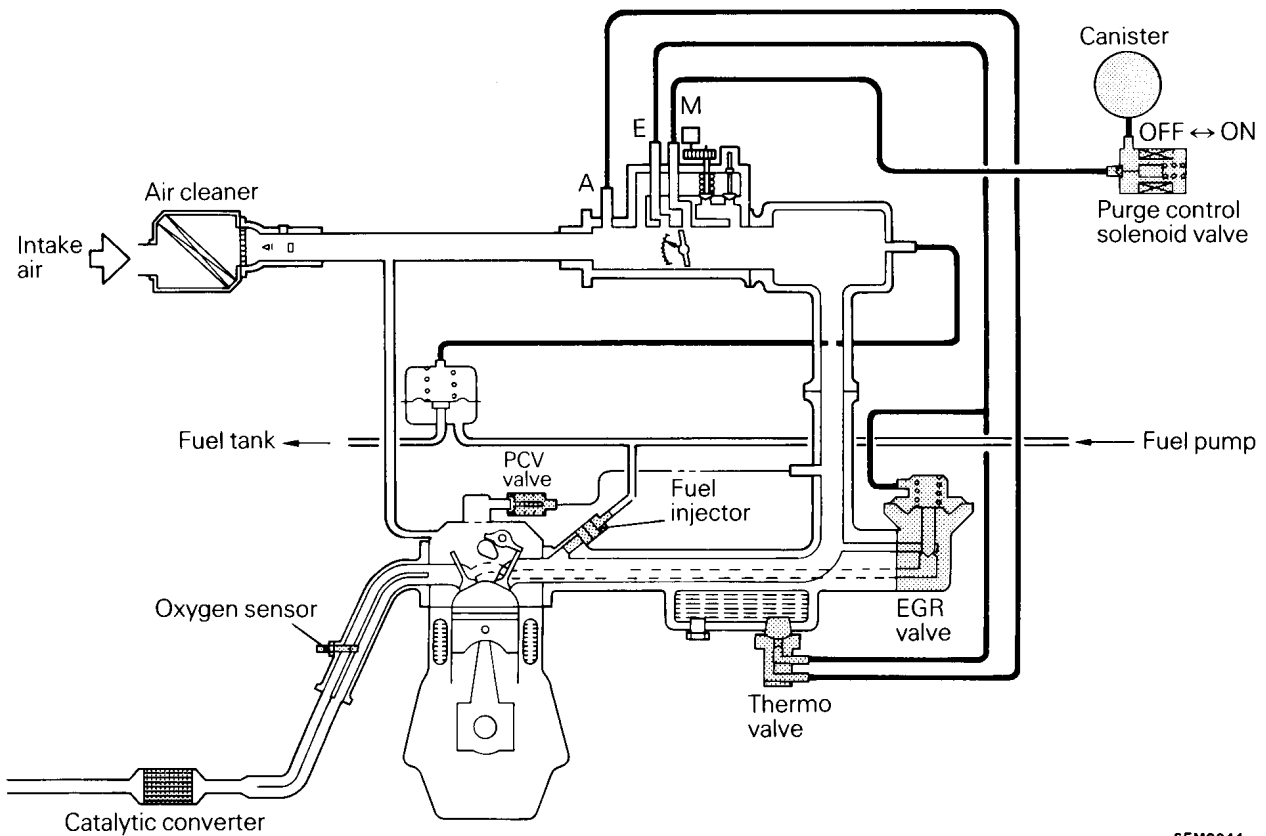
See the paragraph on the 4G64 engine (P.1-37).

EMISSION CONTROL SYSTEM <4G64>

E9BNAAE

The system used is basically the same as one used in the current 4G6 engine.

EMISSION CONTROL SYSTEM DIAGRAM



6EM0344

EMISSION CONTROL SYSTEM <6G72>

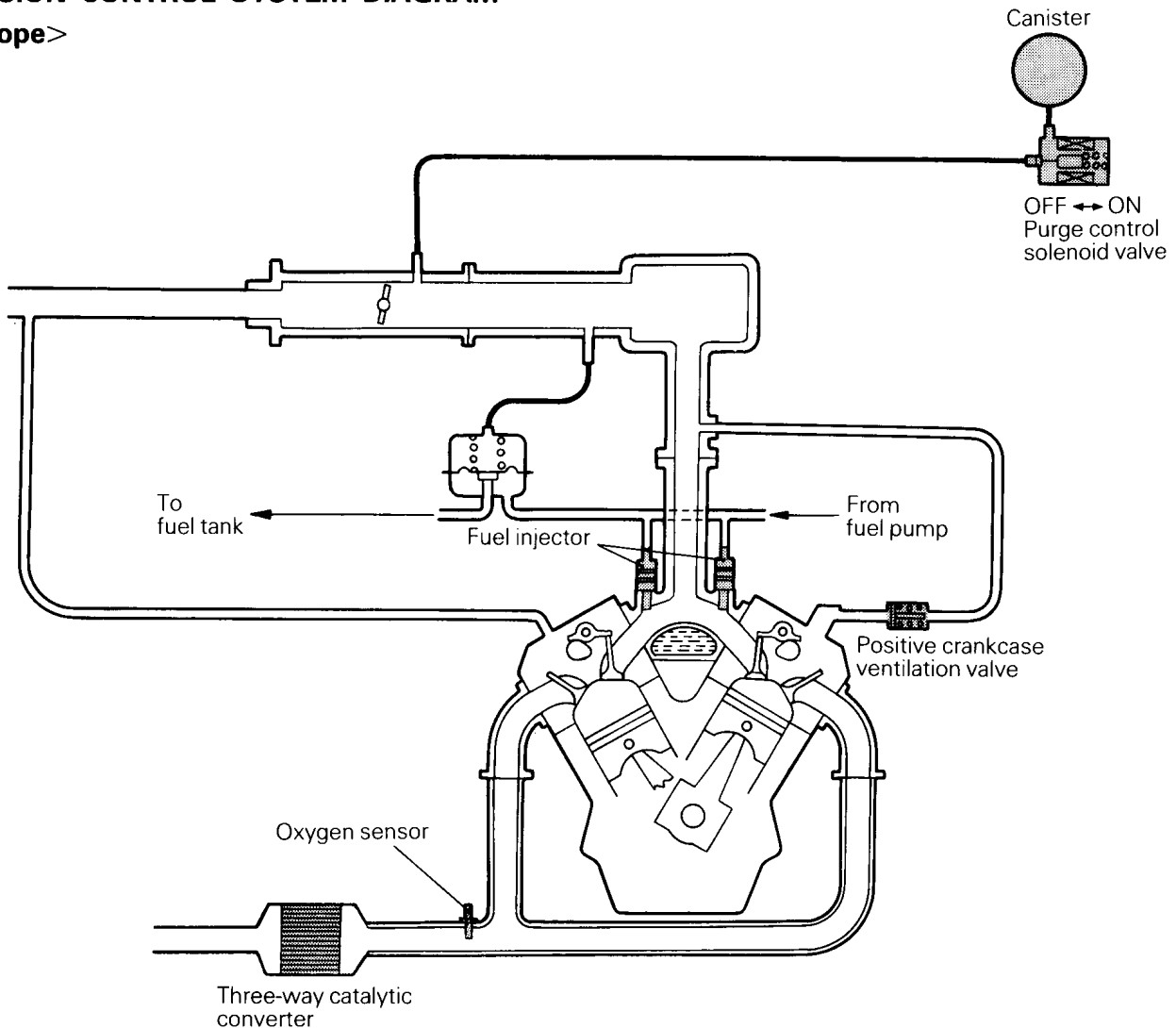
E9BNAAF

The system used is basically the same as one used in the 6G72-SOHC engines in the current PAJERO/ MONTERO models.

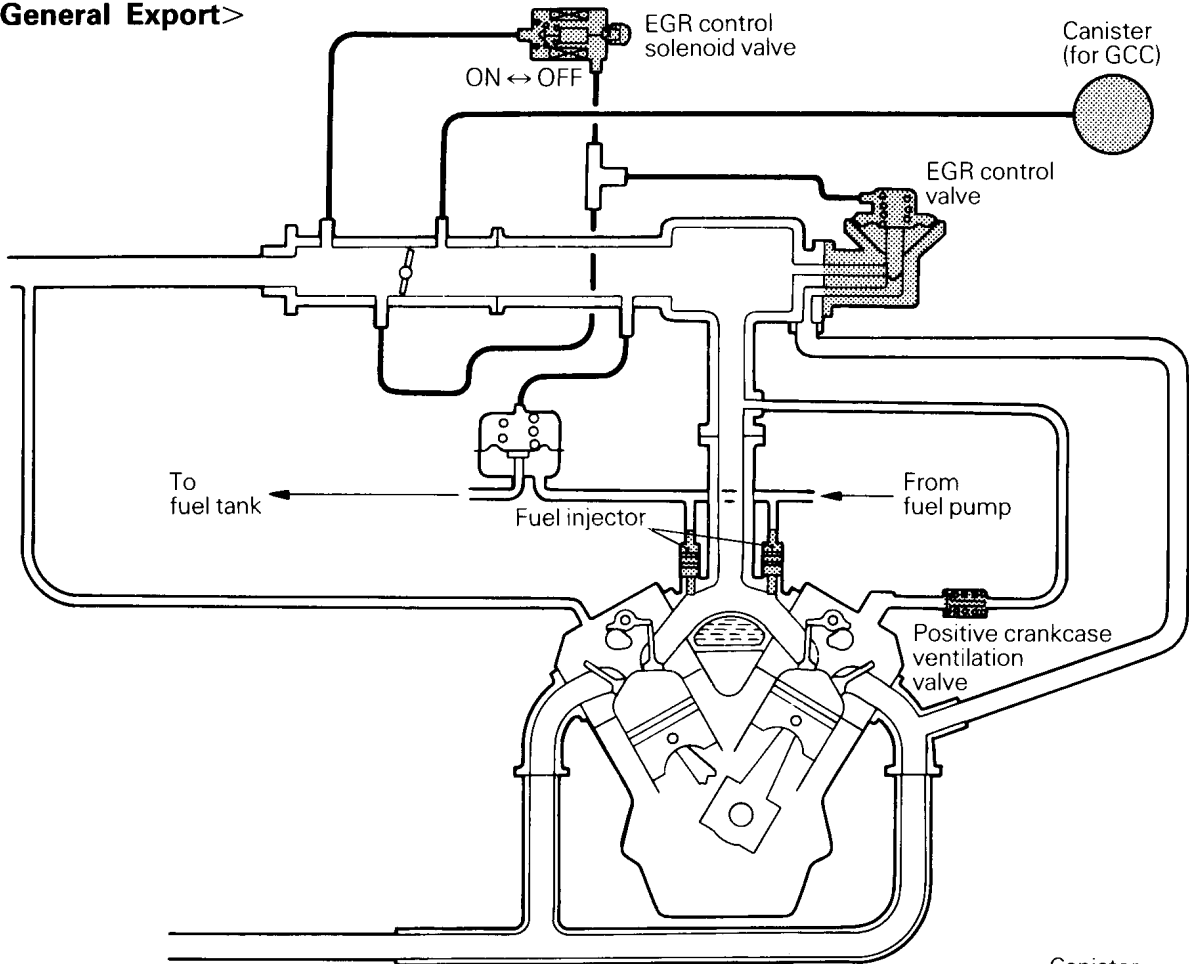
System	Applicable destination				Remarks
	Europe	GCC	General Export	Australia	
Crank case ventilation system	X	X	X	X	
Evaporating emission control system	X	X	–	X	Electronic control type <Europe> Vacuum control type <GCC, Australia>
Catalytic converter	X	–	–	X	Three-way catalyst
Air-fuel ratio closed loop control	X	–	–	X	Oxygen sensor signal used
Exhaust gas recirculation system	–	X	X	–	Electronic control type

EMISSION CONTROL SYSTEM DIAGRAM

<Europe>

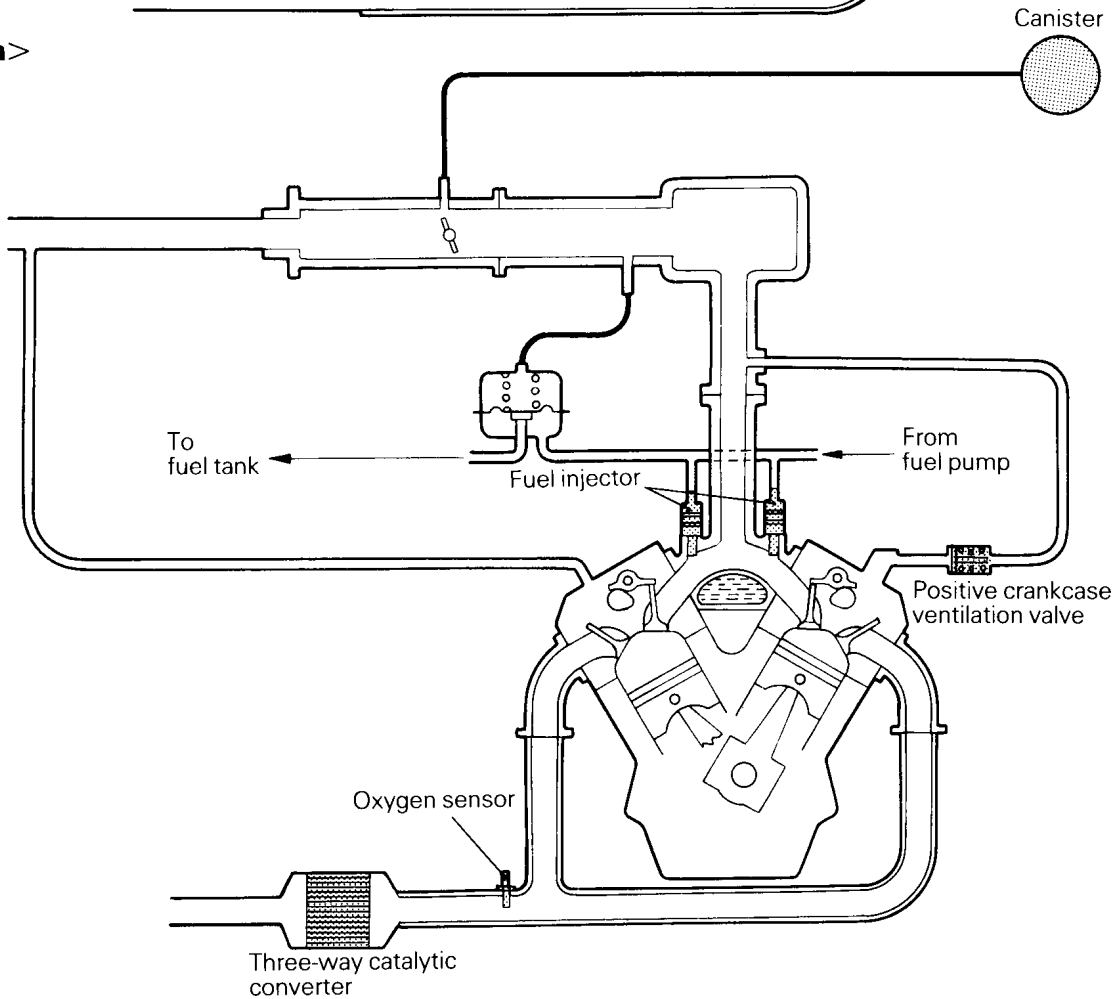


<GCC, General Export>



7EM0174

<Australia>



7EM0217

EMISSION CONTROL SYSTEM <4G54>

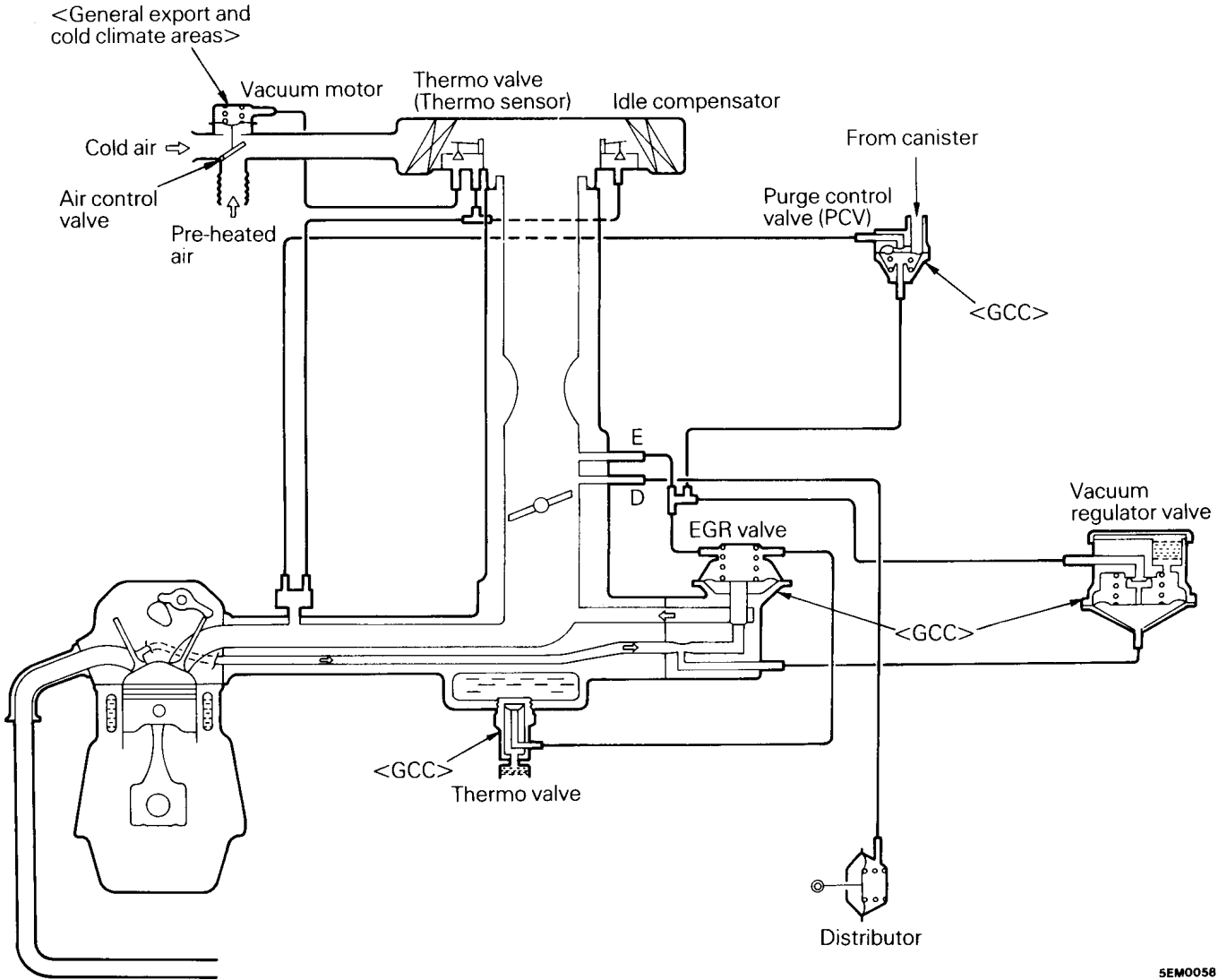
E9BNDAD

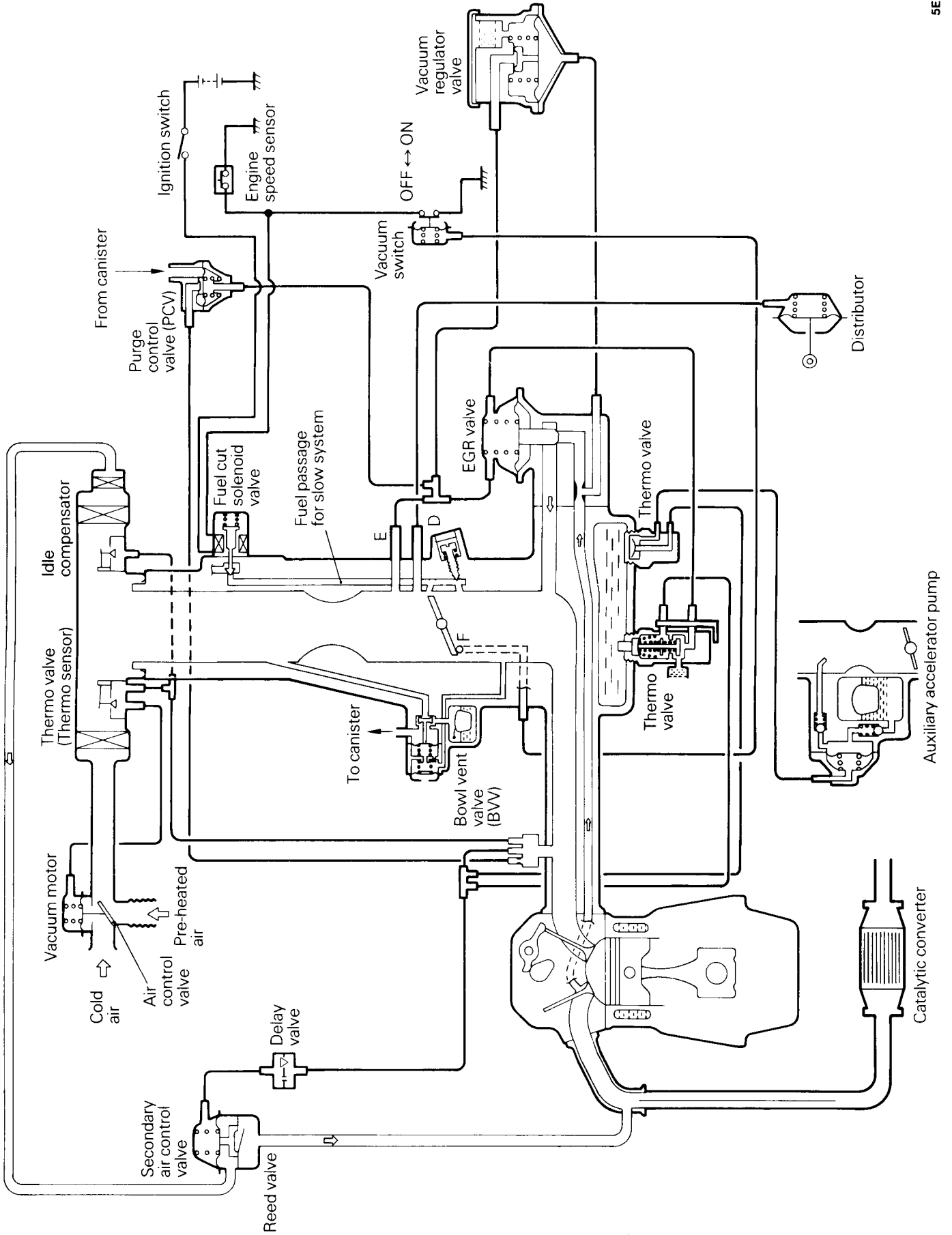
The system used is basically the same as one used in the current 4G54 engines.

System	Applicable destination			Remarks
	GCC	General Export	Australia	
Crankcase ventilation system	X	X	X	Closed system
Evaporative emission control system	X	–	X	Purge control valve E vacuum control type
Catalytic converter	–	–	X	Oxidizing catalyst
Secondary air supply system	–	–	X	Reed valve type with control valve
Exhaust gas recirculation (EGR) system	X	–	X	Vacuum regulate type
Fuel shut-off device at deceleration	–	–	X	Controlled by vacuum switch and engine speed sensor
Intake air temperature control system	–	X (Cold climate areas)	X	Vacuum control type
Idle compensator	X	X	X	Bimetal type

EMISSION CONTROL SYSTEM DIAGRAM

<GCC, General Export>





AUTO-CRUISE CONTROL SYSTEM

By using the auto-cruise control, the driver can drive at the speed he likes [in a range of approximately 40 – 200 km/h (25 – 124 mph)] without depressing the accelerator pedal.

Control system

The throttle position sensor (TPS) signal is used in addition to the conventional vehicle speed sensor as the input signal to bring about the following improvements in control.

(1) The amount of actuator control varies according to vehicle speed and throttle opening not only for an expansion of conformity to differences in engine output but also for better response.

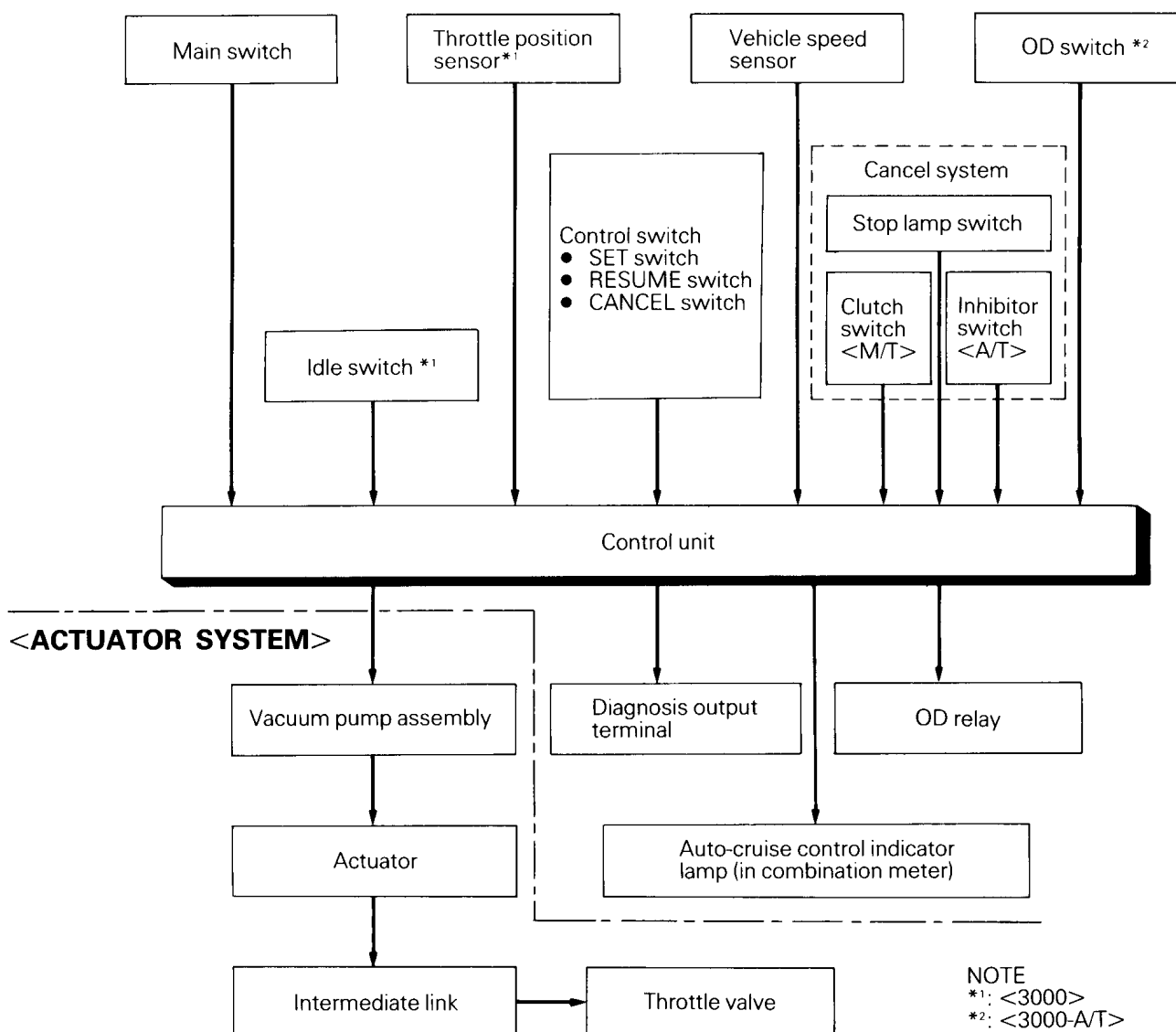
(2) On A/T models, overdrive is released (4-speed → 3-speed) when climbing inclines and the system judges the return time by vehicle speed and throttle opening to prevent hunting between 3-speed and 4-speed.

Actuator system

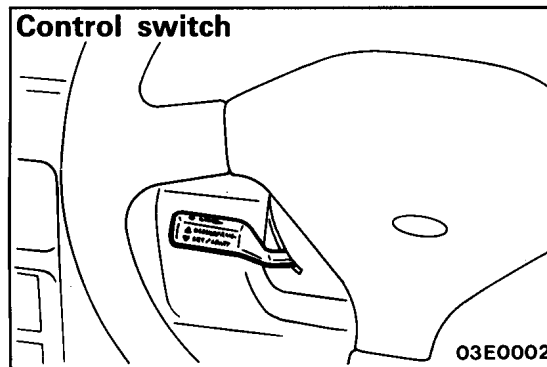
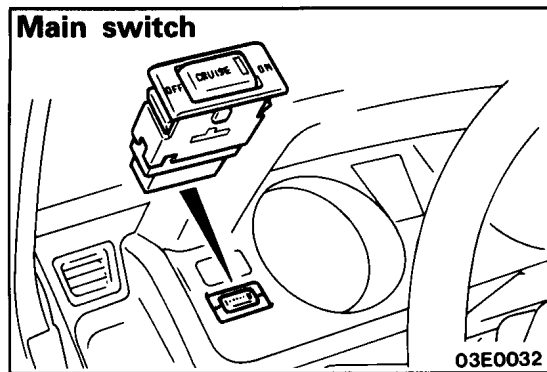
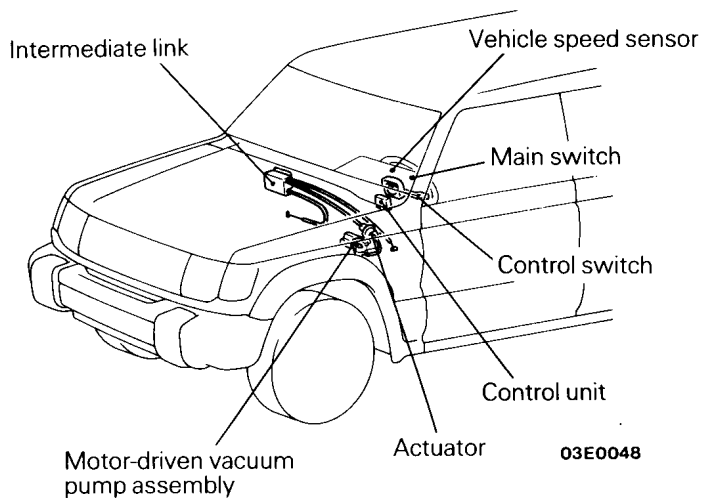
The actuator system consists of the motor-driven vacuum pump, actuator and intermediate link. The vacuum pump and actuator are in different locations.

SYSTEM BLOCK DIAGRAM

<CONTROL SYSTEM>



COMPONENTS AND FUNCTIONS



Components		Function
Vehicle speed sensor		It generates a pulse signal proportional to vehicle speed (revolving speed of the transaxle output gear).
Control unit		It receives signals from the vehicle speed sensor and each switch, and uses a micro-computer to control all functions of the auto-cruise control.
Actuator system		It drives the motor-driven vacuum pump according to signals from the control unit and adjusts the throttle valve via the intermediate link to the set opening.
Main switch		Switch for cruise control power.
Control switch	SET (COAST) switch	Vehicle speed is set with the SET (COAST) switch and RESUME (ACCEL) switch.
	RESUME (ACCEL) switch	
	CANCEL switch	It is used to cancel the setting pf the cruise speed.
Cancel system	Stop lamp switch	It outputs a signal to cancel cruise control.
	Clutch switch <M/T>	
	Inhibitor switch <A/T>	
Throttle position sensor (TPS)*		It generates an analog voltage proportional to throttle opening.
Idle switch*		Based on the value of TPS voltage when the idle switch goes from ON to OFF, it varies TPS voltage to compensate for fluctuations.
Diagnosis output terminal		If the multi-use tester or a voltmeter is connected, diagnosis and input check codes from the control unit can be read.
Auto-cruise control indicator lamp		It is in the combination meter and lights up when the auto-cruise control is functioning.

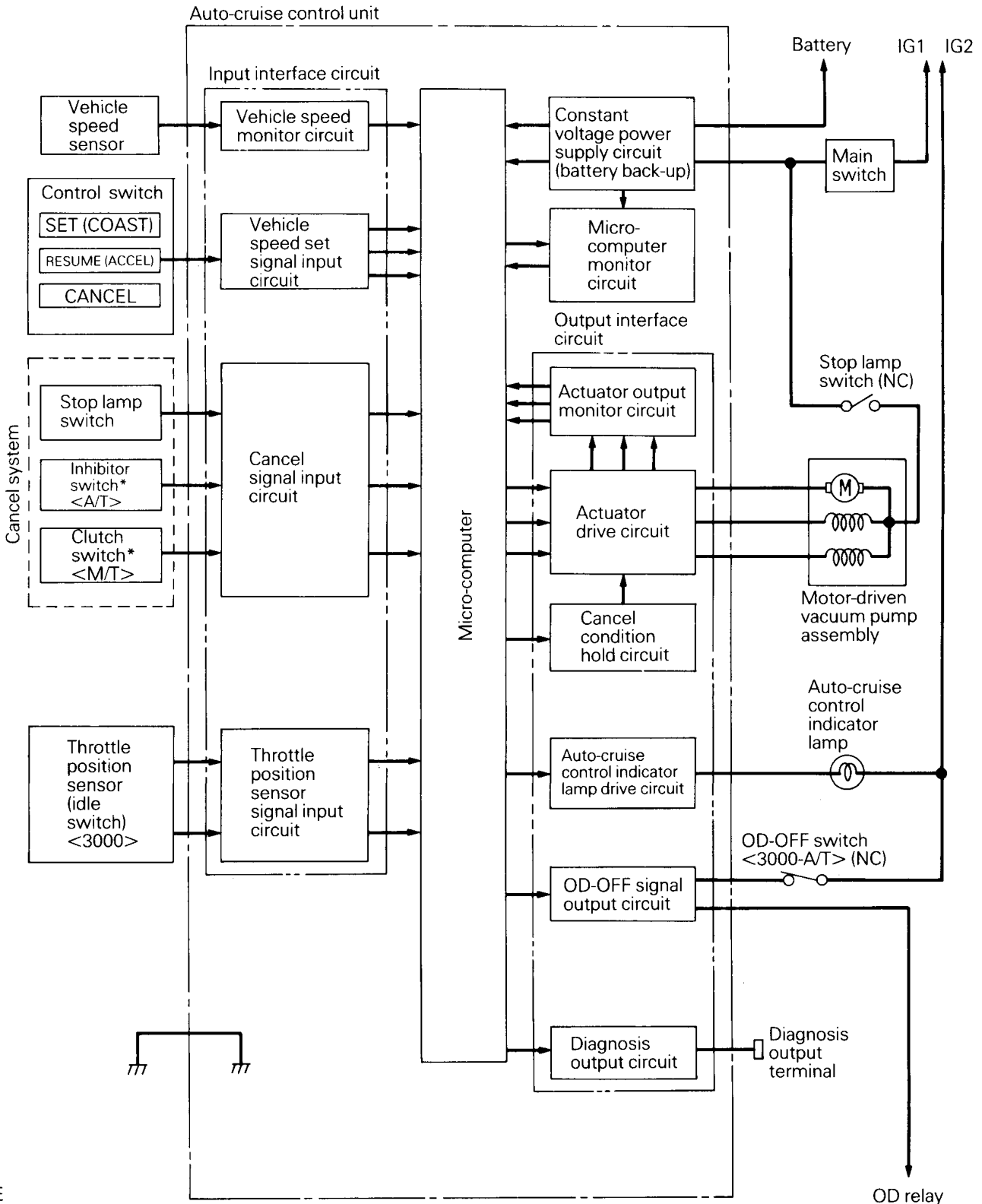
NOTE
*: <3000>

AUTO-CRUISE CONTROL UNIT

The control unit is made up of the input interface circuit, micro-computer, constant voltage power supply circuit, micro-computer monitor circuit and output interface circuit. Signals from the vehicle speed sensor, throttle position sensor <3000> and each switch are input into the control unit. It

processes them according to the program in the micro-computer memory and outputs control signals to the actuator. It also outputs system self-diagnosis results and conditions of input signals to the diagnosis output terminal.

CONTROL LOGIC AND BLOCK DIAGRAM



NOTE
 * mark indicates the conventional same structure used formerly.
 NC: Normally Closed.

SET (COAST) SWITCH FUNCTION

SET

When driving within the range of the limit vehicle speed [approximately 40 – 200 km/h (25 – 124 mph)], it makes vehicle speed set when the SET switch is turned from the on-position to the off. After that, it controls the actuator for cruise-

controlled driving at that speed. However, if the SET switch is turned from the on-position to the off in the range over the high speed limit speed [approximately 200 km/h (124 mph)], the high speed limit speed is taken as the set speed.

COAST

When the SET switch is turned to the on-position during auto-cruise control the throttle is fully closed while the SET switch is the on-position, the vehicle decelerates due to the engine brake and then the vehicle speed when the SET switch is turned to the off-position is taken as the new set speed for auto-cruise control. The COAST function can de-

celerate until the low speed limit speed [approximately 40 km/h (25 mph)] is reached but if vehicle speed falls below that, the COAST function is canceled. In such a case, the vehicle speed just before the beginning of COAST function is put into memory as the set speed.

RESUME (ACCEL) SWITCH FUNCTION

RESUME

If the cruise-controlled driving speed is canceled by the cancel system (refer to the item mentioned below) during auto-cruise control, the vehicle speed set before the cancellation resumes when the

RESUME switch is turned from the off-position to the on in the speed range over the low speed limit speed [approximately 40 km/h (25 mph)] to control the cruising speed.

ACCEL

When the RESUME switch is turned to the on-position during auto-cruise control, it continues acceleration while the switch is in the on-position, the vehicle speed when the switch is turned to the off-position is taken as the new set speed for auto-cruise control. Vehicle can be accelerated to

over the high speed limit speed [approximately 200 km/h (124 mph)] by the ACCEL function but after the RESUME switch is turned to the off-position, it decelerates to the high speed limit speed to control the cruising speed.

CANCEL FUNCTION

When the following signals are input, current to the motor-driven vacuum pump assembly is cut off and the auto-cruise control canceled.

- When CANCEL switch is in on-position.
- When the stop lamp switch is ON.
- When the clutch switch is ON <M/T>.
- When the inhibitor switch is in neutral <A/T>.
- When vehicle speed is below the low speed limit speed [approximately 40 km/h (25 mph)].

- When vehicle speed falls more than 15 km/h (9 mph) from the speed in memory.
- When, during RESUME functioning, vehicle speed again falls more than 15 km/h (9 mph) after resuming to the memorized vehicle speed minus 10 km/h (6 mph) and over.
- When vehicle speed changes suddenly (0.5G or more).
- When the stop lamp switch input wire is broken.

HIGH SPEED LIMIT FUNCTION

Cruise-controlled driving is not possible at vehicle speeds exceeding the high speed limit speed [approximately 200 km/h (124 mph)]. If the SET switch is turned to the on-position when vehicle speed exceeds the high speed limit speed, 200

km/h (124 mph) is put into memory. At this time, when the accelerator pedal is released to decelerate (under high speed limit speed), the cruise control functions to control cruising at 200 km/h (124 mph).

FAIL-SAFE FUNCTION

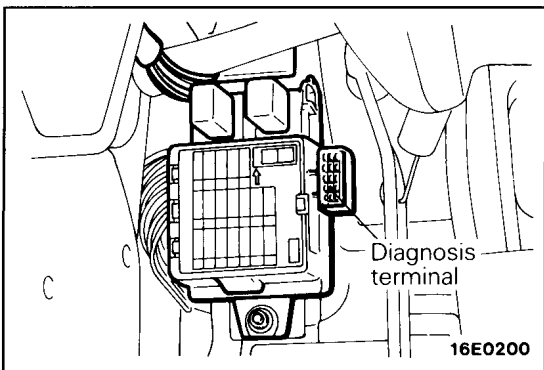
When the following conditions exist, current to the motor-driven vacuum pump assembly is cut off and the cruise control is canceled.

Condition	When only main switch is ON	Driving with auto-cruise control
When SET, RESUME or CANCEL switch is turned to the on-position continuously for 60 seconds or more.	X	X
When there is some abnormality in the hold circuit, system becomes cancel condition	X	X
When a disagreement between the motor-driven vacuum pump drive signal and valve drive signal occurs.	X	X
When there is a failure* in the TPS or idle switch <3000>	X	X
When vehicle speed signal is not input continuously for 0.1 second or more [when vehicle speed exceeds approximately 40 km/h (25 mph)]	–	X

NOTE
The * mark means that the condition in which the TPS output voltage is 1.5V or over with the idle switch ON or 0.2V or less with the idle switch OFF continues for 4 seconds or more.

OVERDRIVE RELEASE FUNCTION <3000-A/T>

When actual vehicle speed falls approximately 7 km/h (4 mph) or more below the set vehicle speed when in overdrive or during cruise driving, overdrive is released for a fixed amount of time to return to the set speed in a short time.



SELF-DIAGNOSIS AND INPUT CHECK FUNCTIONS

SELF-DIAGNOSIS

When the auto-cruise control is canceled without intervention by the driver, the cause can be found out in the following way.

- (1) Turn the ignition switch and main switch ON.

NOTE

Contents of diagnosis stay in memory until ie battery terminals are disconnected.

- (2) Connect the multi-use tester or a voltmeter to the diagnosis terminal and read the output codes.
- (3) By comparing the output codes that are read out with the chart below, it is possible to find the cause of the cancellation in each system.

Diagnosis Code NO.

Output code No.	Contents of trouble
11	Trouble related to actuator drive output
12	Trouble related to vehicle speed signal
15	Control switch trouble
16	Trouble in control unit, etc.
17	TPS or idle switch trouble <3000>

Cancellation of Diagnosis Codes

Diagnosis codes stay in memory until the battery terminals are disconnected but they can be canceled without disconnecting them by going through the following procedures;

- (1) Turn the ignition switch ON.
- (2) With the SET switch to the on-position, turn the main switch ON and then turn the RESUME switch on within one second. (This makes it

ready for input check.)

- (3) Turn the SET switch and stop lamp switch to the on-position at the same time and keep them the position for five seconds or more.
- (4) Use the multi-use tester or a voltmeter to confirm that the diagnosis codes have been canceled.

INPUT CHECK FUNCTION

The input check function can be used to check whether the input signal is normal when there is some trouble related to the auto-cruise control, such as the auto-cruise control cannot be set.

- (1) Connect the multi-use tester or a voltmeter to the diagnosis terminal.

- (2) Turn the ignition switch ON.
- (3) With the SET switch to the on-position, turn the main switch ON and then turn the RESUME switch on within one second to make input check possible. Perform each input operation and read the codes.

Output code	Input operation	Operation check judgement	Output code	Input operation	Operation check judgement
21	SET switch on	SET switch circuit normal	26	Turn the following switches ON ● Clutch switch <M/T> ● Inhibitor switch <A/T>	Switch circuit mentioned on left normal
22	RESUME switch on	RESUME switch circuit normal	27	CANCEL switch on	Cancel switch circuit normal
23	Stop lamp switch on	Stop lamp switch circuit mentioned	28	TPS voltage is over 1.5V (Depress accelerator pedal more than half) <3000>	TPS circuit normal
24	Driving at 40 km/h (25 mph) or more	If code No. 24 can be confirmed, vehicle speed sensor is normal.	29	Idle switch OFF (Depress accelerator pedal.) <3000>	Idle switch circuit normal
25	Driving at 40 km/h (25 mph) or lower.	If code No. 25 can be confirmed, vehicle speed sensor is normal.	–	–	–

NOTE

If more than two input operations are performed at the same time, the codes are output, starting with the smallest number.

MOTOR-DRIVEN VACUUM PUMP ASSEMBLY CONSTRUCTION

The motor-driven vacuum pump assembly consists of a diaphragm type vacuum pump driven by a DC motor and two solenoid valves (control valve and release valve), and the rotations of the DC motor are varied to the diaphragm back and forth action by the eccentric cam and rod.

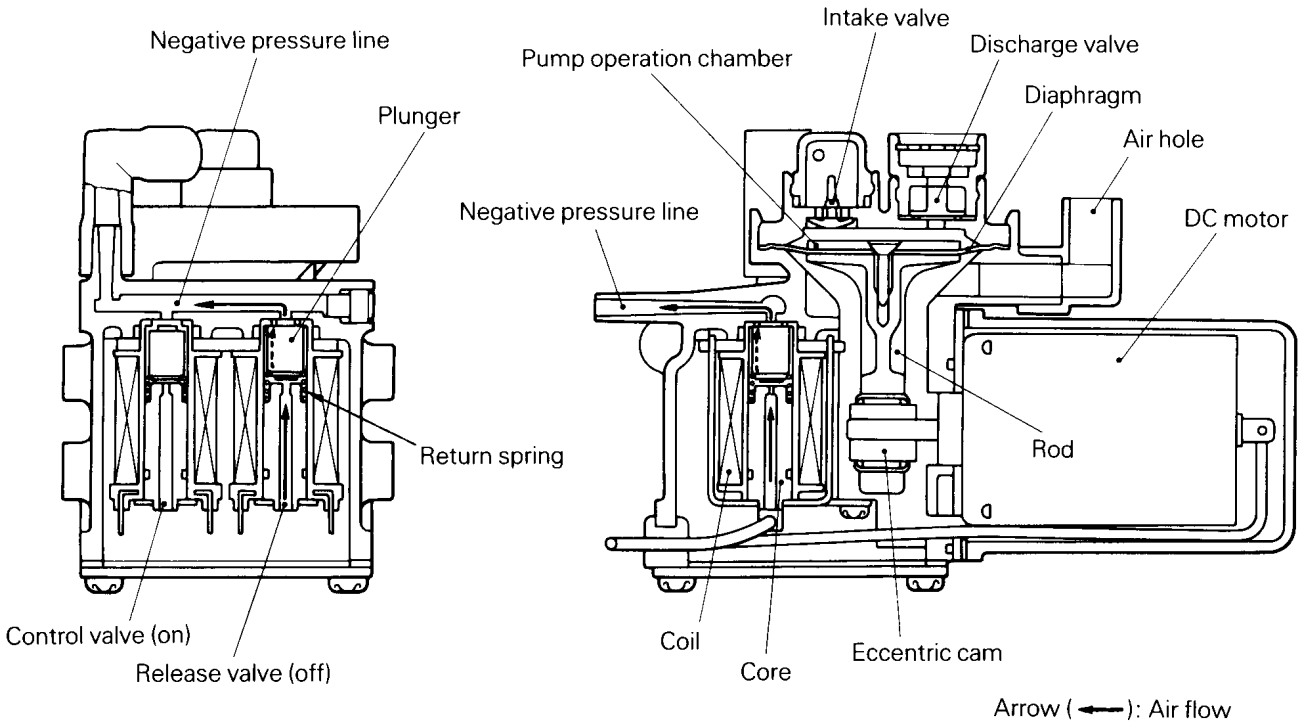
When the diaphragm moves in the direction (down in the figure below) to increase the capacity of the pump operating chamber, the intake valve is OPEN and the discharge valve is CLOSED so the air in the negative pressure line is sucked into the pump operating chamber.

Next, when the diaphragm moves in the direction (up in the figure below) to decrease the capacity of the pump operating chamber, the discharge valve is

OPEN and the intake valve is CLOSED, releasing the air in the pump operating chamber to the atmosphere. In this way, the negative pressure is generated by sucking the air in the negative pressure line into the pump operating chamber and releasing the air in the pump operating chamber to atmosphere.

When no current flows in the solenoid coil, the solenoid valve plunger set in the negative pressure line is returned by the return spring, the line hole in the core opens and the negative pressure line is opened to the atmosphere.

When current flows in the solenoid coil, the coil is energized to pull the plunger, the line hole in the core is closed and the negative pressure line is cut off from the atmosphere.

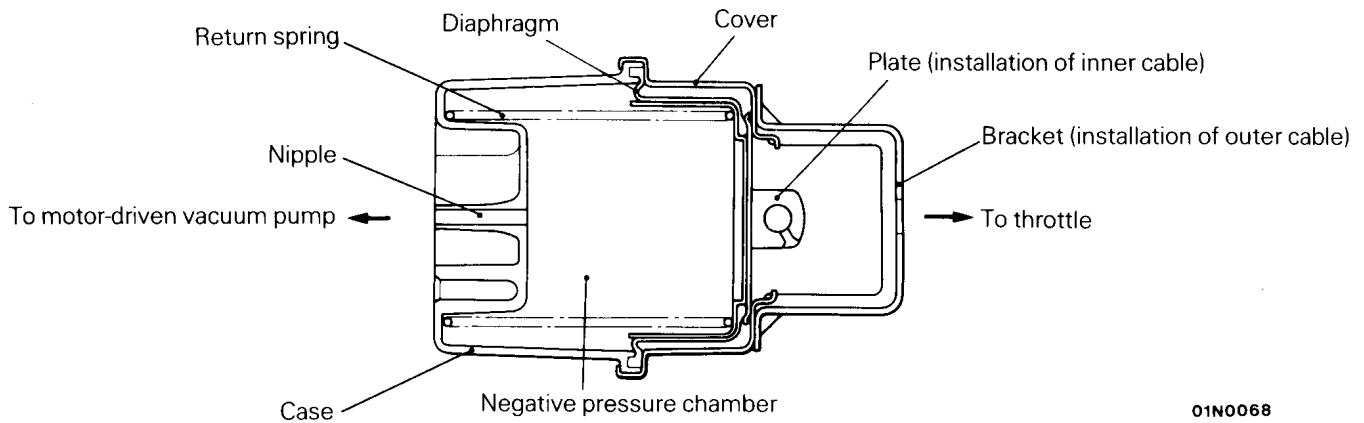


01N0067

ACTUATOR CONSTRUCTION

The actuator consists of the diaphragm, case, cover and return spring, etc. Negative pressure is used in the negative pressure chamber formed by the diaphragm and case, and the diaphragm moves in the direction to pull the auto-cruise control cable when negative pressure increases. Also, when

negative pressure decreases, the diaphragm is moved by the force of the return spring to loosen the auto-cruise control cable. In this way, the throttle valve is opened and closed by the increase and decrease in the negative pressure sent to the negative pressure chamber.



01N0068

MOTOR-DRIVEN VACUUM PUMP ASSEMBLY ACTUATOR OPERATION

The negative pressure line of the vacuum pump and negative pressure chamber of the actuator are connected by the vacuum hose. The DC motor, control valve and release valve in the motor-driven

vacuum pump assembly are turned on or off by the control signal from the control unit and have the following operation modes.

ACCELERATION MODE

Current flows to the DC motor, control valve and release valve. The vacuum pump is operated by the DC motor, the control valve and release valve are closed and the negative line is cut off from the atmosphere.

The negative pressure generated by the vacuum pump is used in the negative pressure chamber of the actuator and the diaphragm moved in the direction to pull the auto-cruise control cable to open the throttle valve and accelerate the vehicle.

HOLD MODE

No current flows to the DC motor but current flows to the control valve and release valve. Since the vacuum pump does not operate, no negative pressure is added; since both the control valve and release valve are closed and the negative pressure

line is cut off from the atmosphere, negative pressure is not reduced. Consequently, the diaphragm does not function and the throttle valve is held in a fixed position.

DECELERATION MODE

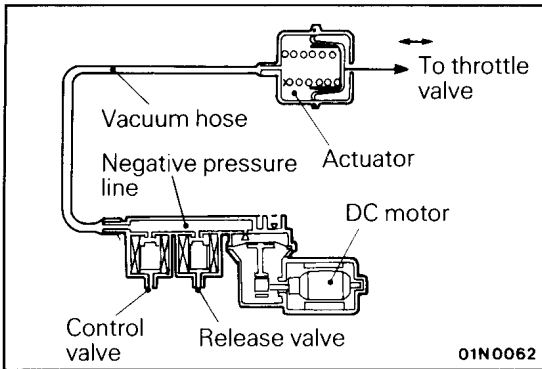
No current flows to the DC motor and control valve but current flows to the release valve. Since the control valve is off, the line hole in the control valve core is open, air flows to the actuator negative pressure chamber and negative pressure is re-

duced. The diaphragm is returned by the force of the return spring to loosen the auto-cruise control cable to close the throttle valve and decelerate the vehicle speed.

RELEASE MODE

No current flows in the DC motor, control valve and release valve. The line holes in the release valve core and control valve core are open and air flows into the negative pressure chamber of the actuator.

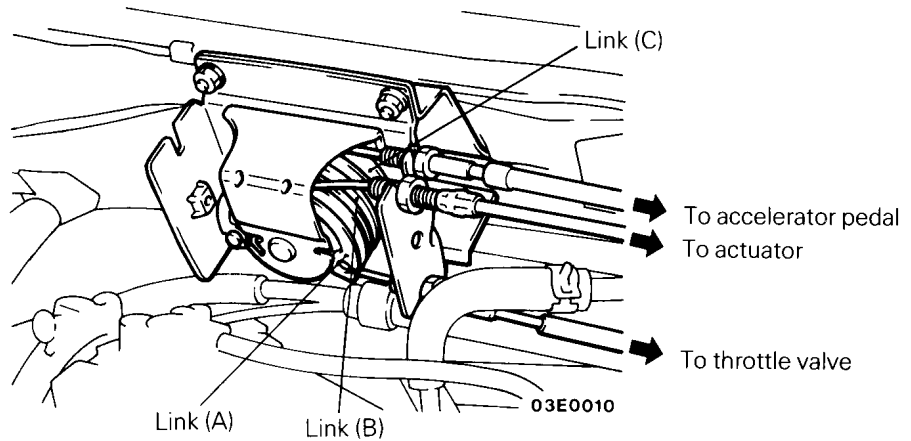
As a result, the diaphragm is returned quickly by the force of the return spring to the initial condition, the throttle valve moves in the closing direction and the auto-cruise control is canceled.



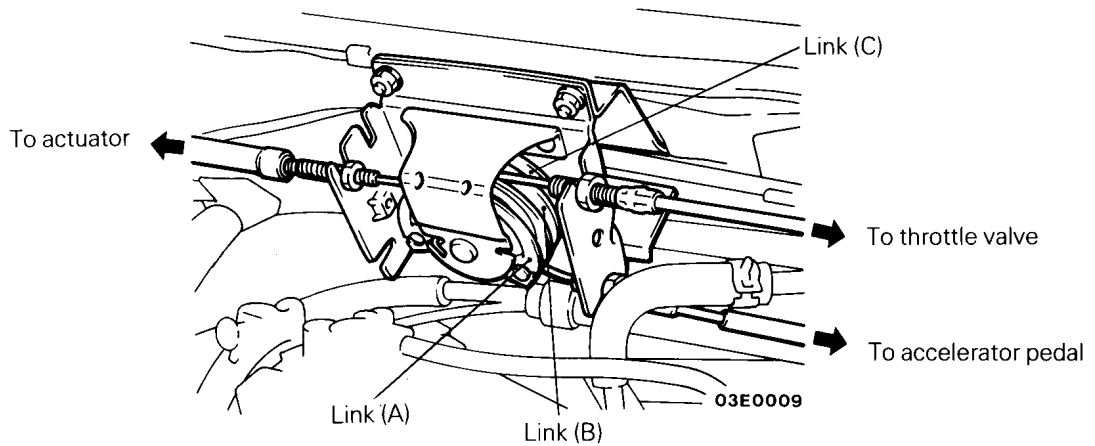
Operation modes	DC motor	Solenoid valve	
		Control valve	Release valve
Acceleration	Flow	Closed	Closed
Hold	Not flow	Closed	Closed
Deceleration	Not flow	Open	Closed
Cancel	Not flow	Open	Open

INTERMEDIATE LINK STRUCTURE

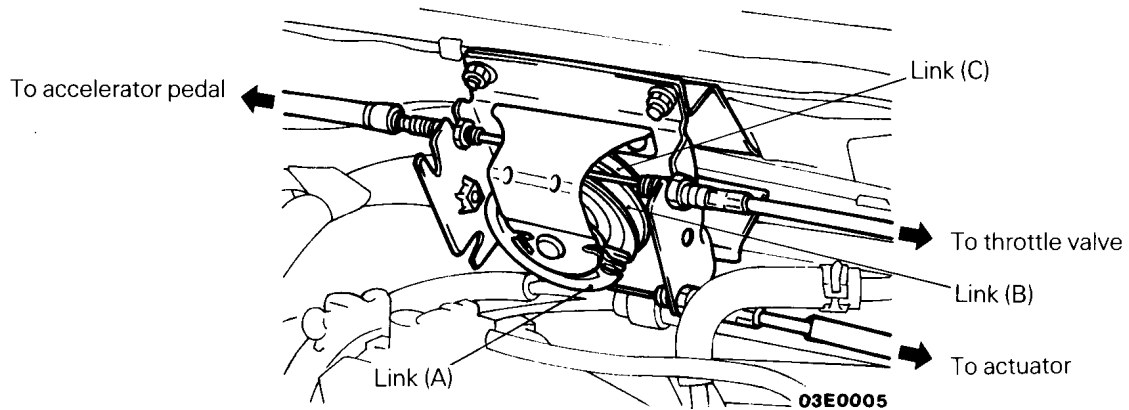
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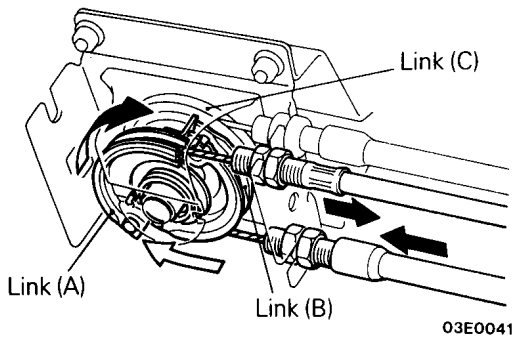
<LH drive vehicles with diesel engine>



<RH drive vehicles>

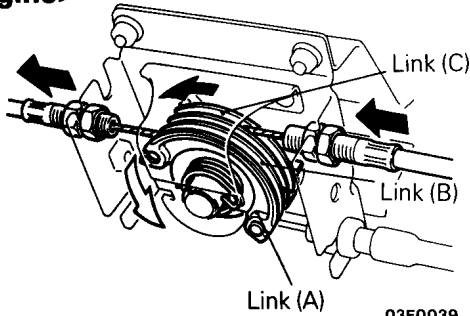


<LH drive vehicles with MPI>



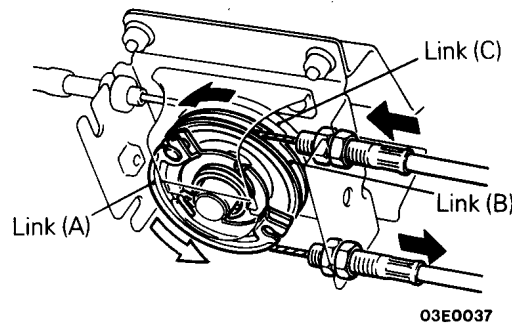
03E0041

<LH drive vehicles with diesel engine>



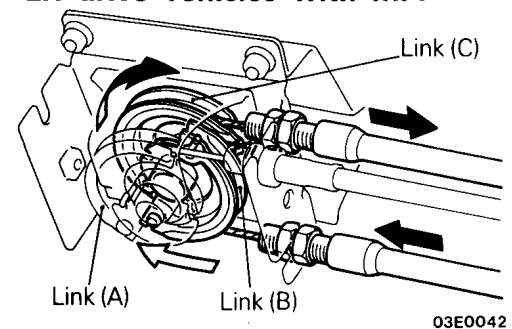
03E0039

<RH drive vehicles>



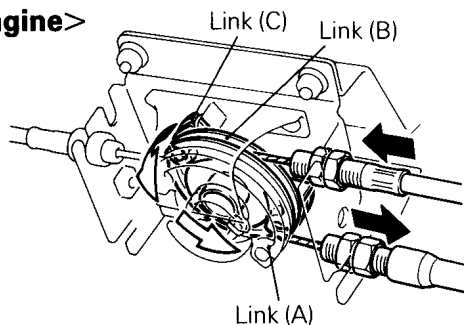
03E0037

<LH drive vehicles with MPI>



03E0042

<LH drive vehicles with diesel engine>



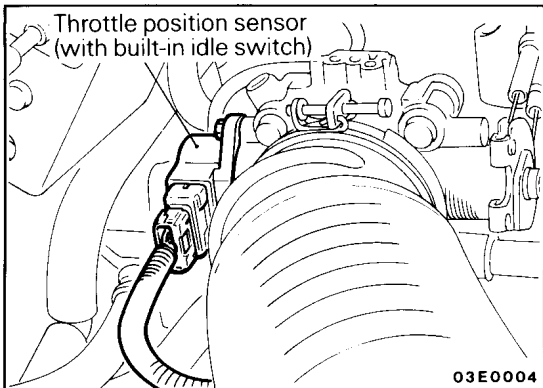
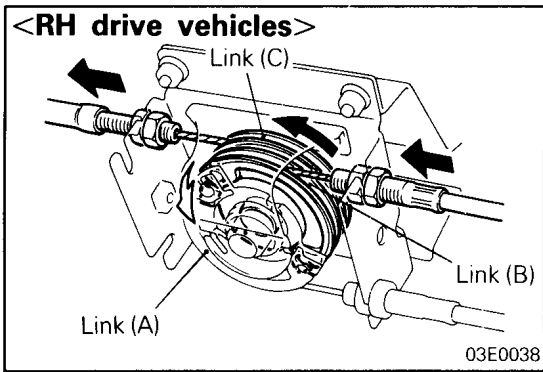
03E0040

AUTO-CRUISE CONTROL DRIVING

The actuator operates, link (B) on the throttle valve side rotates because of rotation of link (A) on the actuator side to open and close the throttle valve. At this time, link (C) on the accelerator pedal side does not rotate so the accelerator pedal does not move but remains in its usual position.

ORDINARY DRIVING

When the accelerator pedal is depressed, its cable is pulled to rotate the link (C). As a result, the link (B) on the throttle valve side rotates, opening/closing the throttle valve. At this time, the link (A) on the actuator side will not rotate.

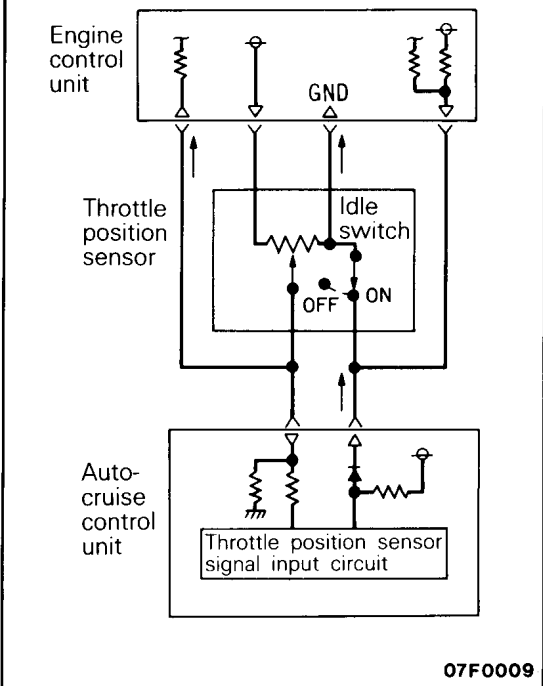


THROTTLE POSITION SENSOR (TPS) <3000>

The throttle position sensor is also used for engine control and it sends the degree of opening of the throttle valve to the control unit as an output voltage.

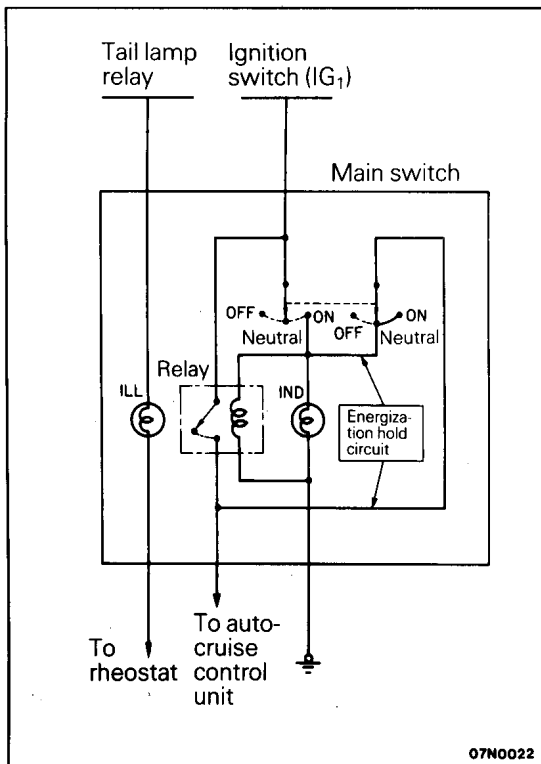
IDLE SWITCH <3000>

The idle switch is built into the throttle position sensor. Based on the value of the TPS voltage when the idle switch is turned from ON to OFF, the control unit compensates variation and fluctuations of the TPS voltage.



AUTO-CRUISE CONTROL SWITCH**MAIN SWITCH**

The main switch is the power switch for the control unit and it uses a system as shown in the figure so it automatically returns to the neutral position. If the ignition switch is turned OFF with the main switch ON (indicator lamp illuminates), the main switch also goes OFF at the same time. In this condition, even if the ignition switch is turned ON again, the main switch remains OFF.

**Operation of Main Switch**

WHEN THE MAIN SWITCH IS PRESSED TO THE ON SIDE (WHEN IGNITION SWITCH IS ON)

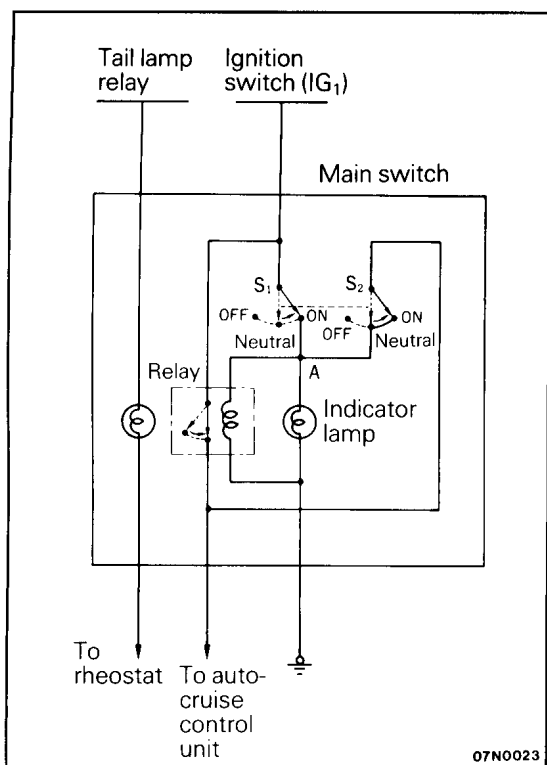
While the main switch is pressed to the ON side, switches S_1 and S_2 both go ON, current flows to ignition switch <IG1>, S_1 , relay (coil side), indicator lamp and earth, and the relay inside the main switch is not only turned ON but the indicator lamp also lights up. As a result, power is supplied to <IG1>, relay (contact side) and the control unit. When the main switch is released, the main switch returns to the neutral position and switch S_1 goes OFF but, since switch S_2 is ON, current flows to <IG1>, relay (contact side), switch S_2 , relay (coil side), the indicator lamp and earth, the ON condition of the relay is maintained and even if switch S_1 goes OFF, power continues to be fed to the control unit.

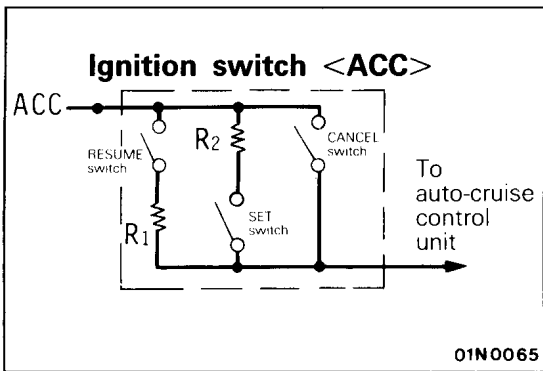
WHEN THE MAIN SWITCH IS PRESSED TO THE OFF SIDE (WHEN BOTH THE IGNITION SWITCH AND MAIN SWITCH ARE ON)

If the main switch is pressed to the OFF side, the power is not supplied to the relay coil in the main switch since both S_1 and S_2 switches are OFF, the relay in the main switch goes OFF, and the power supply to the control unit is not only cut off but the indicator lamp also goes out.

WHEN THE IGNITION SWITCH IS TURNED OFF (WHEN THE MAIN SWITCH IS ON)

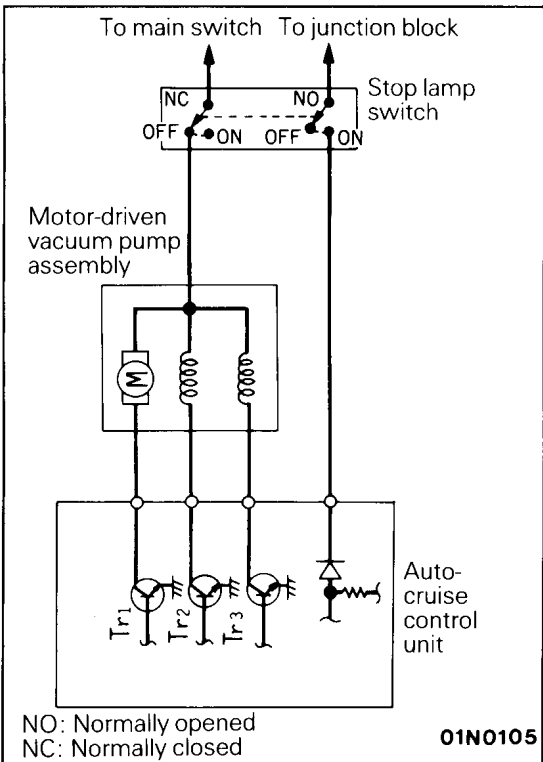
If the ignition switch is turned OFF when the main switch is ON, the relay inside the main switch goes OFF and the main switch does not go ON but remains OFF even if the ignition switch is turned ON again.





CONTROL SWITCH

The resistance value inside the switches is varied for each switch and the auto-cruise control is controlled by outputting the different signals to the auto-cruise control unit.



CANCEL SYSTEM

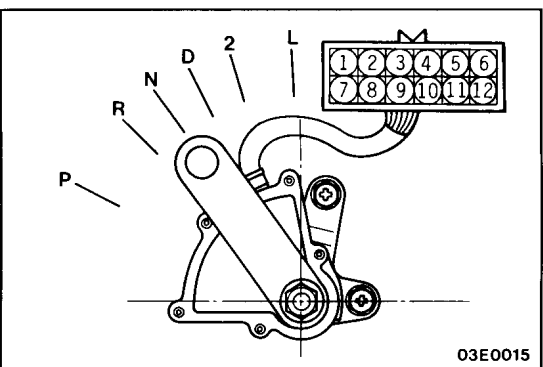
The switches constituting the cancel system are the stop lamp switch, clutch switch <M/T> and inhibitor switch <A/T>. If the contacts of any of these switches close, the auto-cruise control is canceled.

Stop Lamp Switch

A single unit 4-pole type stop lamp switch for the stop lamp (NO) and auto-cruise control (NC) is used for the stop lamp switch to improve the reliability of the cruise control cancel function. When the brake pedal is depressed, the auto-cruise control (NC) contact in the lamp switch is opened, power to the motor-driven vacuum pump assembly is cut off and cruise control driving is canceled. At the same time, the cancel signal stops the power supply to the motor-driven vacuum pump assembly in the control unit because the stop lamp (NO) contact closes and cruise control driving is canceled.

Clutch Switch <M/T>

The construction and operation of this switch are the same as that used in GALANT models.



Inhibitor Switch <A/T>

The starter switch also works as the inhibitor switch. When the selector lever is positioned at "N" during auto-cruise control driving, current flows from the control unit to the inhibitor switch to the starter to earth. As a result, the cancel signal is sent to the microcomputer, cancelling the auto-cruise control driving.

POWER- TRANSMISSION COMPONENTS

CONTENTS

E9CAZAF

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CLUTCH

The clutch adopted is of the dry single disc type with diaphragm spring.

The clutch is hydraulically controlled on all models.

SPECIFICATIONS**Vehicles for Europe**

Engine	2400	2500D	3000
Clutch control	Hydraulic type	Hydraulic type	Hydraulic type
Clutch disc type	Single dry disc type	Single dry disc type	Single dry disc type
Clutch disc size mm (in.)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	240 x 160 (9.4 x 6.3)
Clutch cover type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type
Clutch cover set load kg (lbs.)	460 (1,014)	550 (1,213)	550 (1,213)
Clutch master cylinder I.D. mm (in.)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)

Vehicles for General Export

Engine	2600	2500D without turbocharger	2500D with turbocharger and inter-cooler	3000
Clutch control	Hydraulic type	Hydraulic type	Hydraulic type	Hydraulic type
Clutch disc type	Single dry disc type	Single dry disc type	Single dry disc type	Single dry disc type
Clutch disc size mm (in.)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	240 x 160 (9.4 x 6.3)
Clutch cover type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type
Clutch cover set load kg (lbs.)	460 (1,014)	410 (904)	550 (1,213)	550 (1,213)
Clutch master cylinder I.D. mm (in.)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)

Vehicles for GCC

Engine	2600	2500D	3000
Clutch control	Hydraulic type	Hydraulic type	Hydraulic type
Clutch disc type	Single dry disc type	Single dry disc type	Single dry disc type
Clutch disc size mm (in.)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	240 x 160 (9.4 x 6.3)
Clutch cover type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type
Clutch cover set load kg (lbs.)	460 (1,014)	550 (1,213)	550 (1,213)
Clutch master cylinder I.D. mm (in.)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)

Vehicles for Australia

Engine	2600	2500D with turbocharger	2500D with turbocharger and inter-cooler	3000
Clutch control	Hydraulic type	Hydraulic type	Hydraulic type	Hydraulic type
Clutch disc type	Single dry disc type	Single dry disc type	Single dry disc type	Single dry disc type
Clutch disc size mm (in.)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	225 x 150 (8.9 x 5.9)	240 x 160 (9.4 x 6.3)
Clutch cover type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type	Diaphragm spring strap drive type
Clutch cover set load kg (lbs.)	460 (1,014)	500 (1,103)	550 (1,213)	550 (1,213)
Clutch master cylinder I.D. mm (in.)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)	15.87 (5/8)

CLUTCH CONTROL

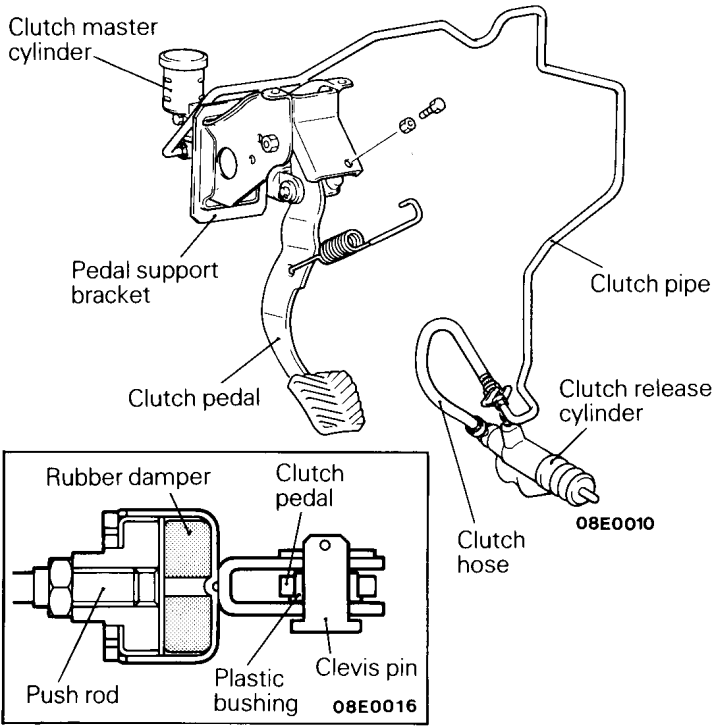
The clutch control is composed of the clutch pedal, the clutch master cylinder, the clutch pipe, the release cylinder, etc.

The push rod of the clutch master cylinder has a rubber damper which damps the vibration from the transmission and improves the feeling at pedal operation.

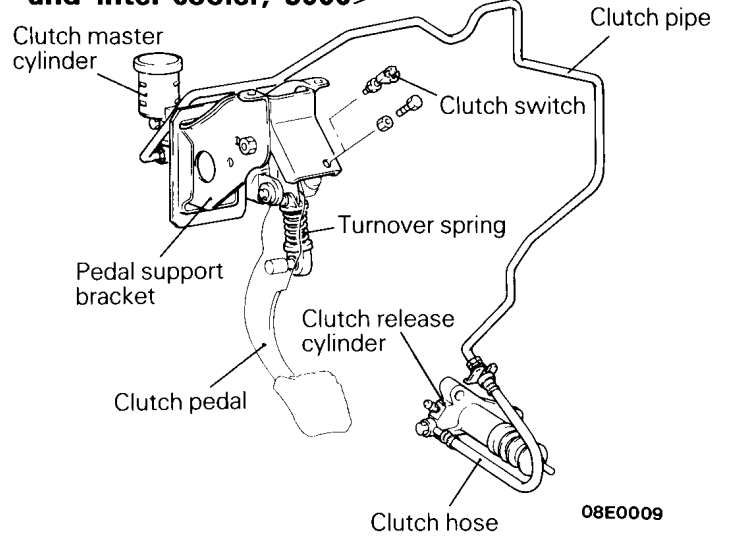
The clutch pedal of the 2500D with turbocharger, 2500D with turbocharger and inter-cooler, 3000 has a compression type turnover spring, which reduces the pressure required to operate the pedal.

The clutch switch for the auto-cruise control system has been equipped at the pedal support bracket.

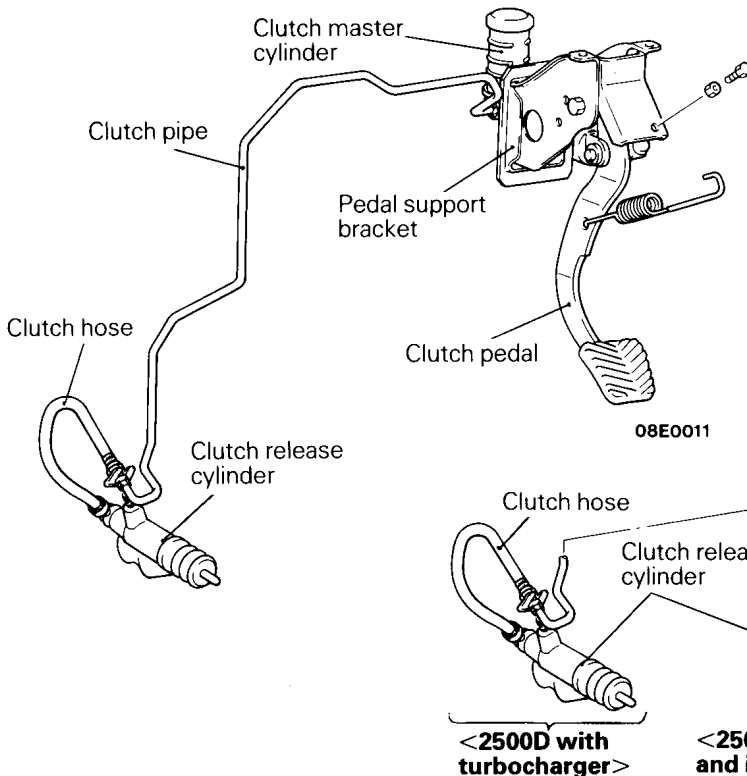
L.H. drive vehicles
<2400, 2500D, 2600>



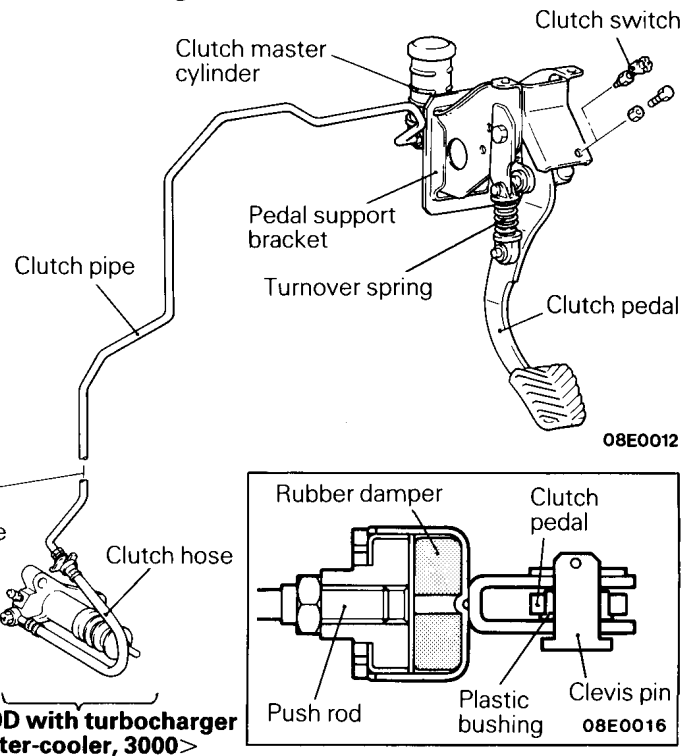
<2500D with turbocharger and inter-cooler, 3000>



R.H. drive vehicles
<2500D, 2600>



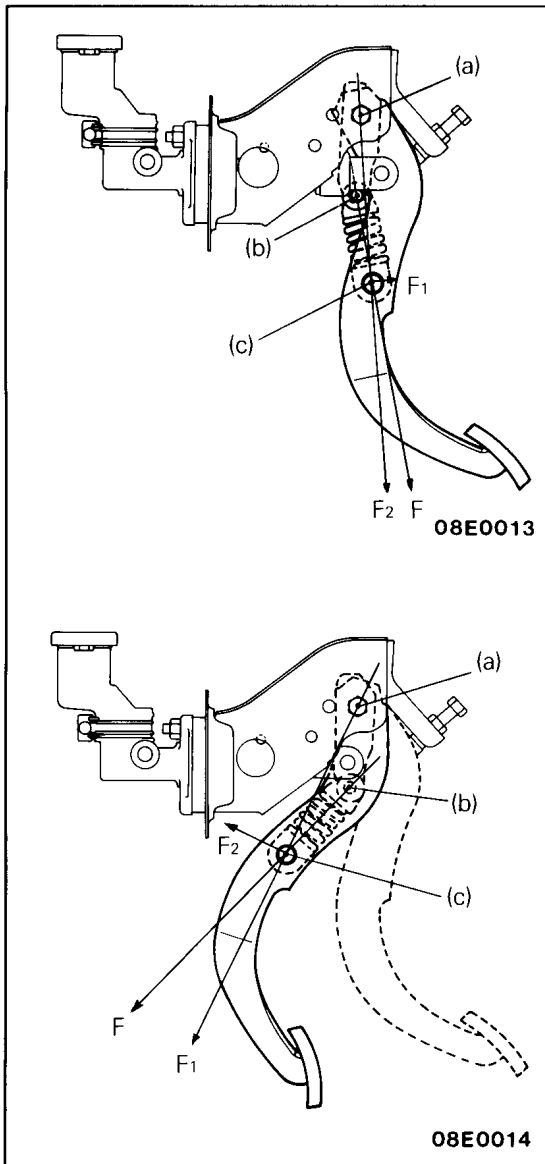
<2500D with turbocharger, 2500D with turbocharger and inter-cooler, 3000>



TURNOVER SPRING

The turnover spring works as an aid to pedal depression by its tension when the clutch pedal is depressed.

- (1) When the pedal is free, the spring force acts in the direction of F so that its component F_1 acts to force the pedal toe surface toward the driver.
- (2) As the pedal is depressed, it rotates clockwise with the fulcrum (c) about the fulcrum (a). When the moving fulcrum (c) moves beyond the line connecting the fixed fulcrums (a) and (b), component F_2 acts to force the pedal toe surface down, thereby reducing necessary depression effort.
- (3) When the pedal is released, the reaction force from the master cylinder pushrod is transmitted to the pedal, which overcomes F_2 so that the pedal moves back to the initial position.



MANUAL TRANSMISSION

There are two manual transmission versions used on the new PAJERO/MONTERO models: V5MT1 and V5M21. These transmissions inherit the superior characteristics of their predecessors and incorporate several improvements in their transmission and transfer sections for higher performance, greater reliability, easier control and a quieter ride.

The principal improvements include:

(1) Improvements have been added to a part of the drivetrain and the synchronizers of the V5MT1 transmission for greater reliability and easier control.

(2) Utilizing the newly-developed transfer with a built-in centre differential, the new V5MT1 transmission features the "Super Select 4WD" system which allows the driver to select any of four available driving modes and also to select either 2WD or 4WD when driving thanks to the front axle synchronization mechanism.

(3) The part-time 4WD transfer version also has several improvements in the gearshift control mechanism, transfer case, transfer powertrain, etc., which all contribute to higher reliability and a quieter ride.

SPECIFICATIONS

Vehicles for Europe

Engine	2400	2500D	3000
Transmission model	V5M21	V5MT1	
Drive system	Part time 4WD		Super select 4WD
Transmission type	5 forward speed, one reverse, constant mesh		
Gear ratio			
1st	3.967		3.918
2nd	2.136		2.261
3rd	1.360		1.395
4th	1.000		1.000
5th	0.856		0.829
Reverse	3.578		3.925
Transfer type	2 speeds, constant mesh		
Centre differential	Not provided		Provided
Gear ratio			
High		1.000	
Low		1.925	

Vehicles for General Export

Engine	2600	2500D without turbocharger	2500D with turbocharger and inter-cooler	3000
Transmission model	V5M21		V5MT1	
Drive system	Part time 4WD		Super select 4WD	
Transmission type	5 forward speed, one reverse, constant mesh			
Gear ratio				
1st	3.967		3.918	
2nd	2.136		2.261	
3rd	1.360		1.395	
4th	1.000		1.000	
5th	0.856		0.829	
Reverse	3.578		3.925	
Transfer type	2 speeds, constant mesh			
Centre differential	Not provided		Provided	
Gear ratio				
High			1.000	
Low			1.925	

Vehicles for GCC

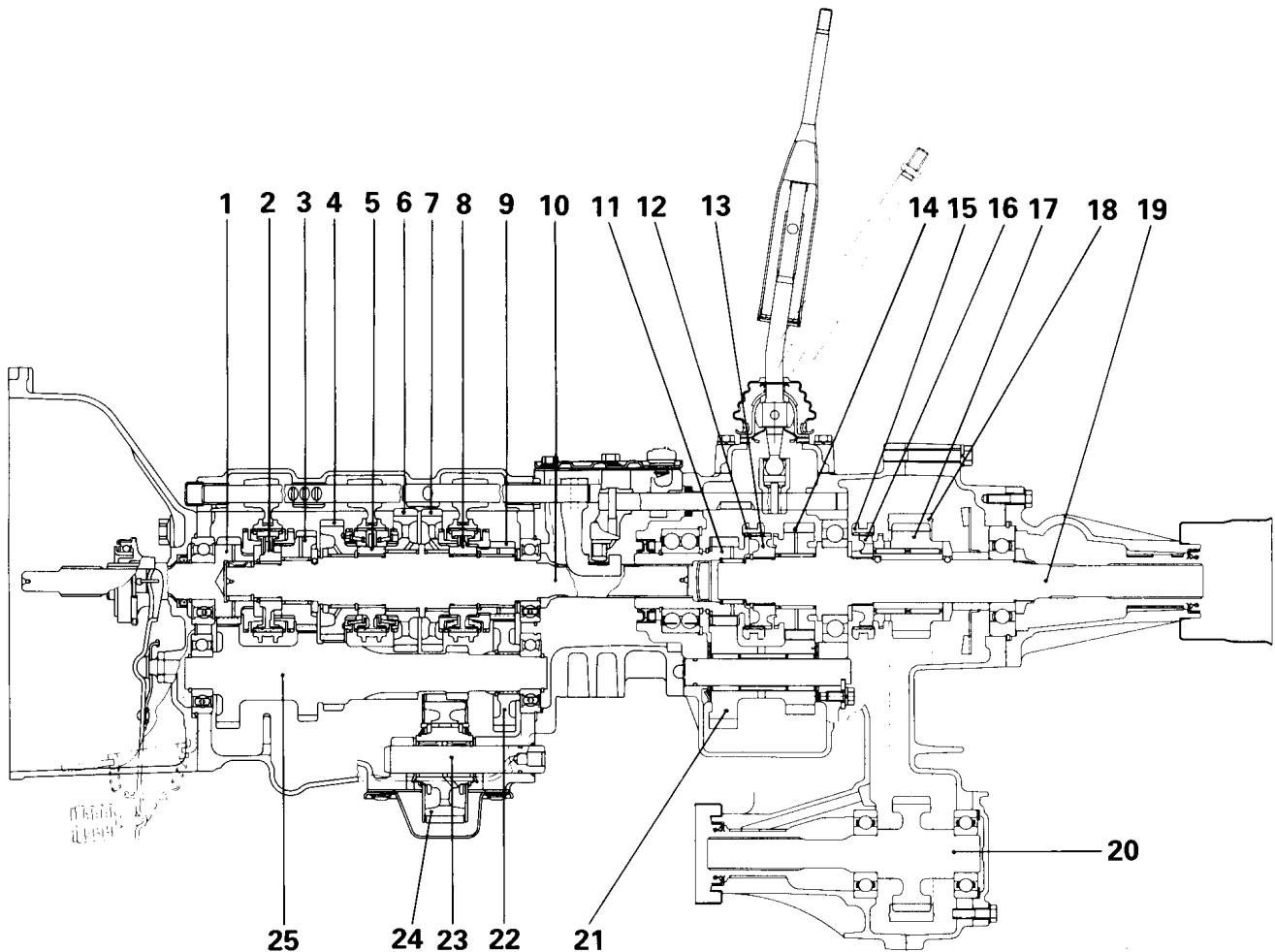
Engine	2600	2500D	3000
Transmission model	V5M21		V5MT1
Drive system	Part time 4WD		Super select 4WD
Transmission type	5 forward, one reverse, constant mesh		
Gear ratio			
1st	3.967		3.918
2nd	2.136		2.261
3rd	1.360		1.395
4th	1.000		1.000
5th	0.856		0.829
Reverse	3.578		3.925
Transfer type	2 speeds, constant mesh		
Centre differential	Not provided		Provided
Gear ratio			
High			1.000
Low			1.925

2-8 POWER-TRANSMISSION COMPONENTS – Manual Transmission

Vehicles for Australia

Engine	2600	2500D with turbocharger	2500D with turbocharger and inter-cooler	3000
Transmission model	V5M21		V5MT1	
Drive system	Part time 4WD		Super select 4WD	
Transmission type	5 forward speed, one reverse, constant mesh			
Gear ratio				
1st	3.967		3.918	
2nd	2.136		2.261	
3rd	1.360		1.395	
4th	1.000		1.000	
5th	0.856		0.829	
Reverse	3.578		3.925	
Transfer type	2 speeds, constant mesh			
Centre differential	Not provided		Provided	
Gear ratio				
High			1.000	
Low			1.925	

V5MT1 SECTIONAL VIEW (PART-TIME 4WD)

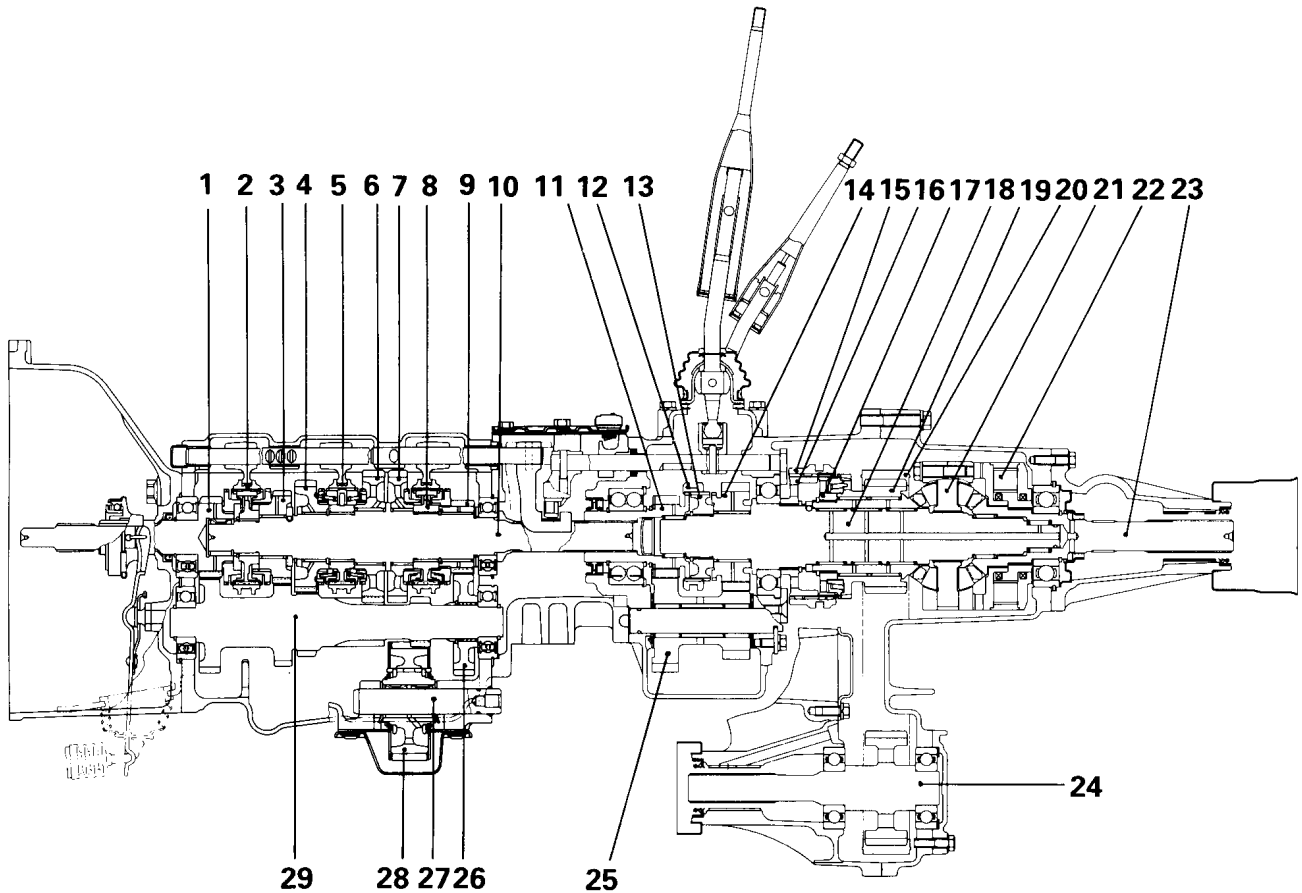


TRM0232

- | | |
|-------------------------------|------------------------------|
| 1. Main drive pinion | 14. Low speed gear |
| 2. 3rd – 4th synchronizer | 15. 2WD/4WD sleeve |
| 3. 3rd speed gear | 16. 2WD/4WD hub |
| 4. 2nd speed gear | 17. Drive sprocket |
| 5. 1st – 2nd synchronizer | 18. Chain |
| 6. 1st speed gear | 19. Rear output shaft |
| 7. Reverse gear | 20. Front output shaft |
| 8. 5th – Reverse synchronizer | 21. Transfer counter gear |
| 9. 5th speed gear | 22. 5th speed counter gear |
| 10. Main shaft | 23. Reverse idler gear shaft |
| 11. Transfer input gear | 24. Reverse idler gear |
| 12. High/Low sleeve | 25. Counter gear |
| 13. High/Low hub | |

2-10 POWER-TRANSMISSION COMPONENTS – Manual Transmission

V5MT1 SECTIONAL VIEW (SUPER SELECT 4WD)

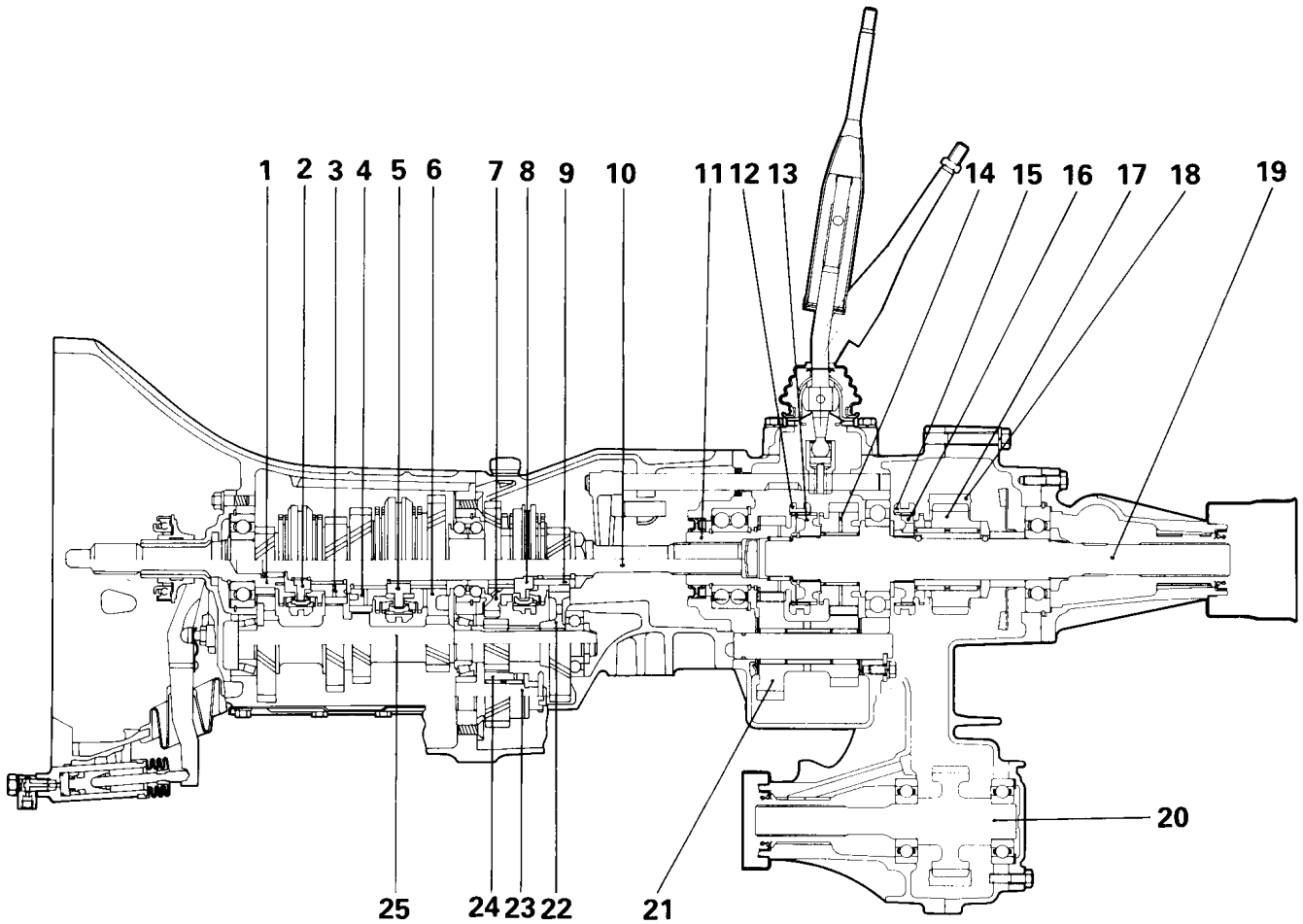


TRM0231

1. Main drive pinion
2. 3rd – 4th synchronizer
3. 3rd speed gear
4. 2nd speed gear
5. 1st – 2nd synchronizer
6. 1st speed gear
7. Reverse gear
8. 5th – Reverse synchronizer
9. 5th speed gear
10. Main shaft
11. Transfer input gear
12. High/Low sleeve
13. High/Low hub
14. Low speed gear
15. 2WD/4WD sleeve

16. Differential lock hub
17. 2WD/4WD hub
18. Transfer drive shaft
19. Drive sprocket
20. Chain
21. Centre differential
22. VCU (Viscous coupling)
23. Rear output shaft
24. Front output shaft
25. Transfer counter gear
26. 5th speed counter gear
27. Reverse idler gear shaft
28. Reverse idler gear
29. Counter gear

V5M21 SECTIONAL VIEW (PART-TIME 4WD)



TRM0241

- | | |
|-------------------------------|------------------------------|
| 1. Main drive pinion | 14. Low speed gear |
| 2. 3rd – 4th synchronizer | 15. 2WD/4WD sleeve |
| 3. 3rd speed gear | 16. 2WD/4WD hub |
| 4. 2nd speed gear | 17. Drive sprocket |
| 5. 1st – 2nd synchronizer | 18. Chain |
| 6. 1st speed gear | 19. Rear output shaft |
| 7. Reverse gear | 20. Front output shaft |
| 8. 5th – Reverse synchronizer | 21. Transfer counter gear |
| 9. 5th speed gear | 22. 5th speed counter gear |
| 10. Main shaft | 23. Reverse idler gear shaft |
| 11. Transfer input gear | 24. Reverse idler gear |
| 12. High/Low sleeve | 25. Counter gear |
| 13. High/Low hub | |

V5MT1 TRANSMISSION SECTION

The transmission section of the V5MT1 model incorporates several improvements in: 1st – 2nd synchronizer; reverse synchronizer; reverse idler gear; etc.

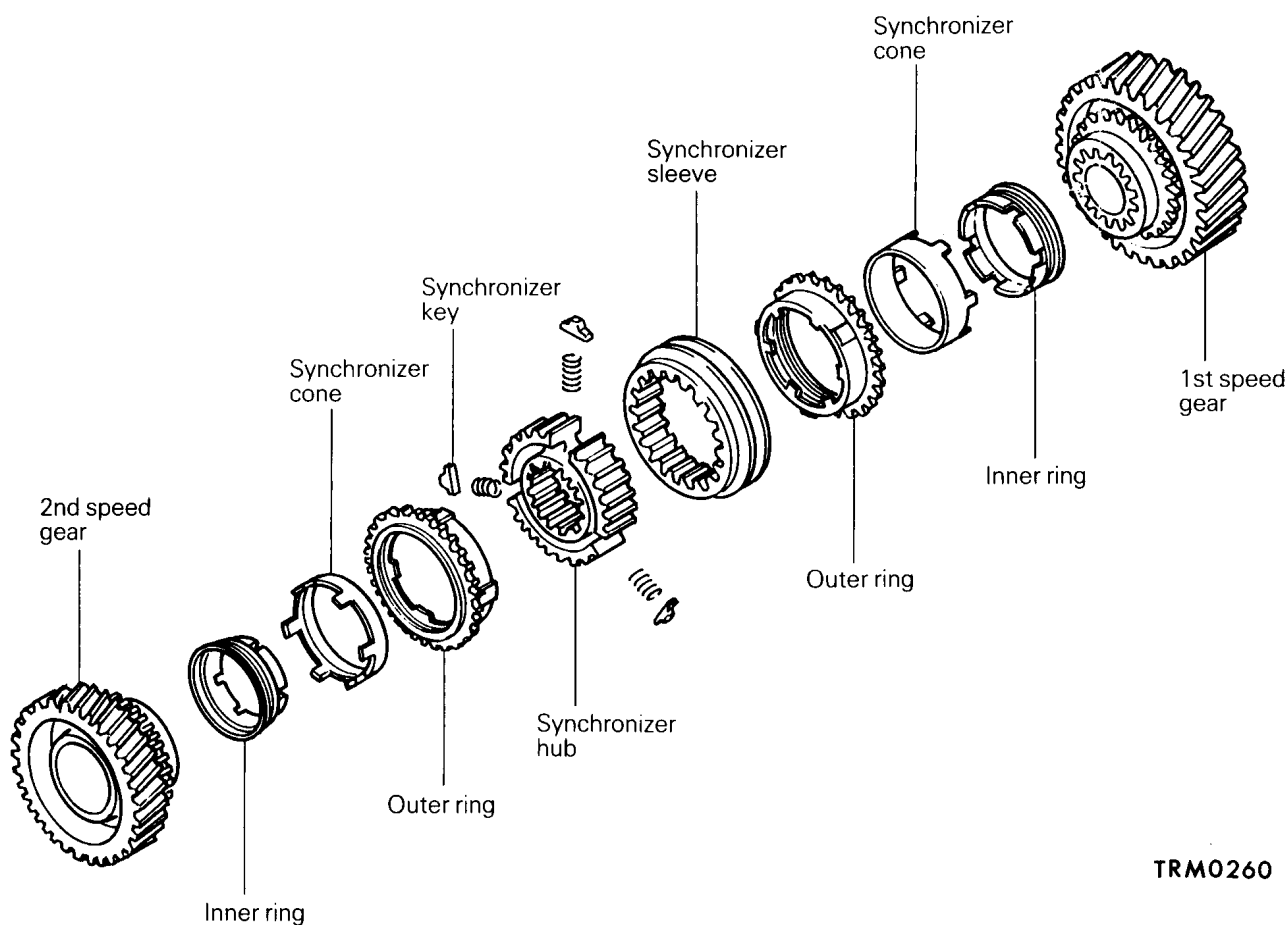
1ST – 2ND SYNCHRONIZER

A double-cone type synchronizer has been employed for the 1st – 2nd synchronizer. The double-cone synchronizer consists of: speed gears, clutch gears (integral with each speed gear), inner rings, synchronizer cones, outer rings, synchronizer hubs, a synchronizer sleeve, synchronizer keys, etc.

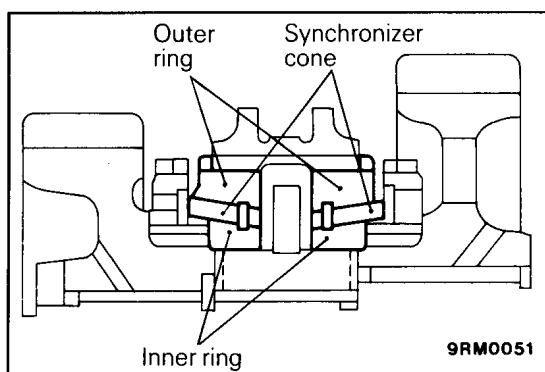
The inner ring is kept in contact with the synchronizer cone at the cone surfaces provided on their inside and outside, respectively. The other end of the inner ring is engaged with the outer ring using the slots in its synchronizer hub side fitted to the lugs on the outer ring.

The synchronizer cone is kept in contact with both the inner and outer rings at its inside and outside cone surfaces and also engages with the clutch gear using the lugs provided at its end near the speed gear.

The outer ring's inside cone surface is in contact with the synchronizer cone's outside cone surface, while its outside projections are fitted in the synchronizer hub.



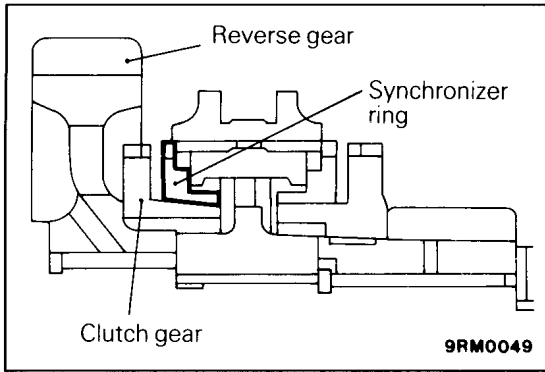
TRM0260



9RM0051

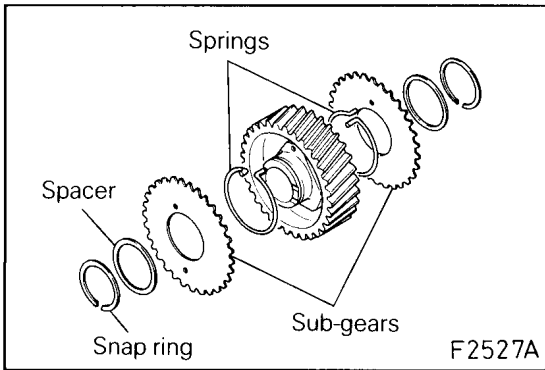
Therefore, the inner and outer rings rotate together with the synchronizer hub, and the synchronizer cone rotates together with the speed gear, all keeping contact with one another. As mentioned above, the synchronizer cone has sliding surfaces on both inside and outside, and both surfaces are involved in synchronization.

This means that this synchronizer has a doubled synchronization capacity and, as a result, the gear shifting requires less force.



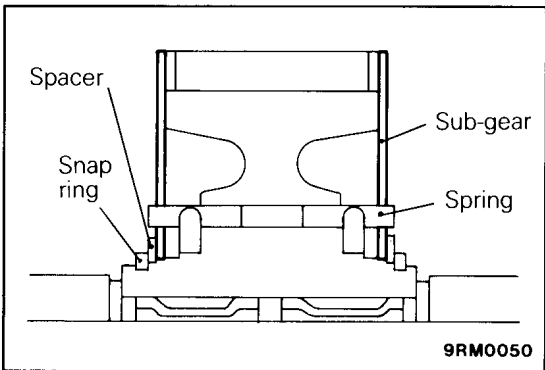
REVERSE SYNCHRONIZER

To prevent gearing noises during the shift to reverse, the reverse gear has a synchronizer added. The construction and operation of this synchronizer are the same as those used for the other speed gears.



REVERSE IDLER GEAR

As a measure to decrease noise during idling, sub-gears have been added to the gear. (Vehicles equipped with the 4D56 engine with intercooled turbocharger)
 The sub-gears are thin gears fixed to both sides of the main gear via springs in such a way that the teeth of the sub-gears are out of phase from those of the main gear. Using the sub-gears keeps the backlash between the main gear and its counterpart at zero, which decreases noise during idling.



SUPER SELECT 4WD SYSTEM

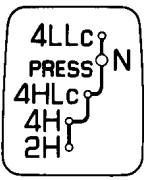
The Super Select 4WD system is the ultimate realization of 4WD design merits. It allows drivers to enjoy diverse modes of driving with both stable steering and greater driving capacity.

The Super Select 4WD system features:

1. Improved drive control. By using a freewheel mechanism with a vacuum-actuator-operated changeover device in the front axle and a 2WD/4WD change-over mechanism with double-cone synchronizer in the transfer, it is possible to select either 2WD or 4WD even while the vehicle is moving. (See Page 2-37 for details of the freewheel mechanism.)
2. Easy selection of the appropriate drivetrain mode for various conditions. A single lever

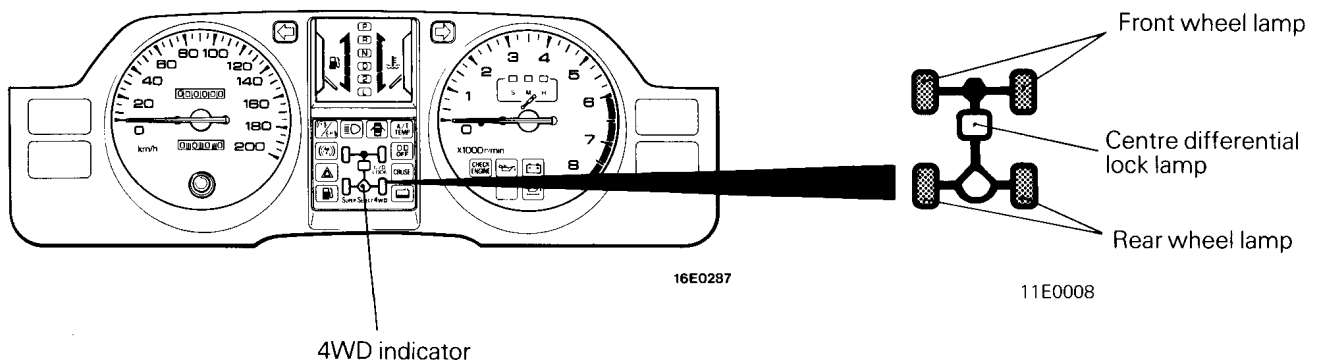
3. permits selection of 2WD (rear wheel drive), full-time 4WD, direct-coupled 4WD and direct-coupled low gear 4WD modes. This is thanks to the fact that the transfer incorporates a high/low range changeover mechanism and a viscous coupling type limited differential mechanism.
3. Visual recognition of system operation. The 4WD indicator on the combination meter panel allows the driver to know the current operational state of the system. The front and rear wheel symbol lamps illuminate when these wheels are powered wheels and the centre differential lock symbol lamp either illuminates when it is in the locked position or flashes while it is being switched over.

LIST OF DRIVETRAIN CHARACTERISTICS

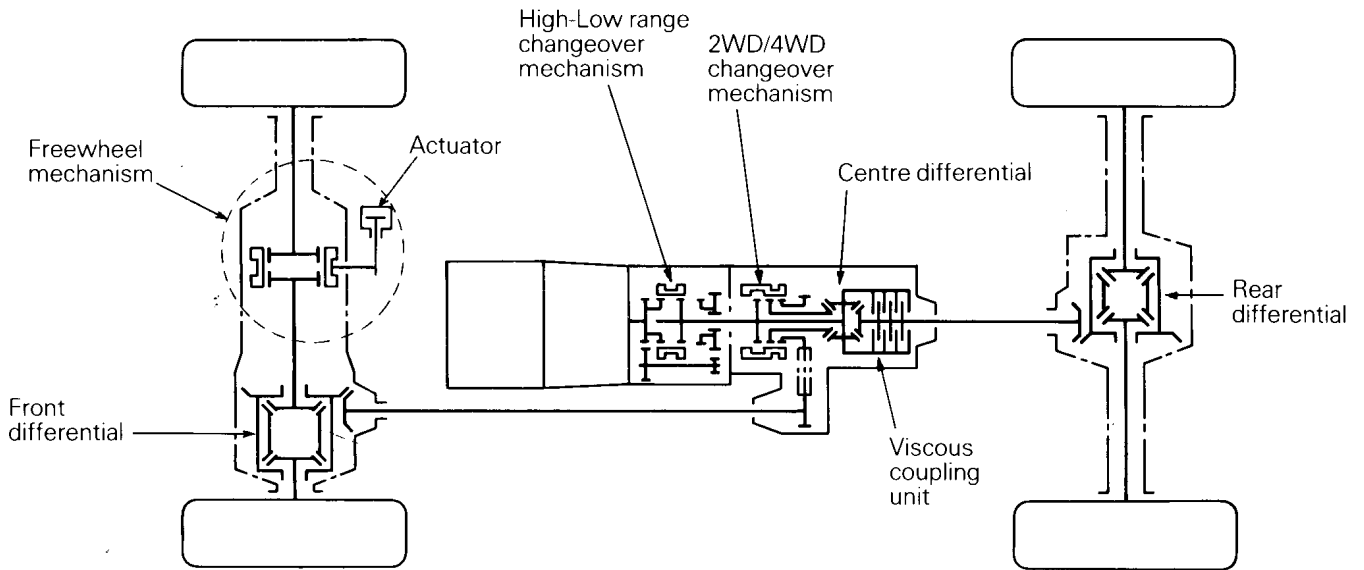
Transfer shift pattern	Position	2WD/4WD	High/Low	Centre differential	Driving conditions
	2H	2WD	High	–	For driving on a dry ordinary road or highway. (Economical driving position)
	4H	4WD	High	Operating	For ordinary and slippery road driving. (Viscous coupling functions to limit the differential operation.)
	4HLc	4WD	High	Locked	For driving on rough, sandy or snow-covered roads.
	N	–	–	–	For using the power take-off (PTO).
	4LLc	4WD	Low	Locked	For greater traction torque as when climbing steep inclines.

11E0007

4WD INDICATOR



SYSTEM SCHEMATIC DIAGRAM

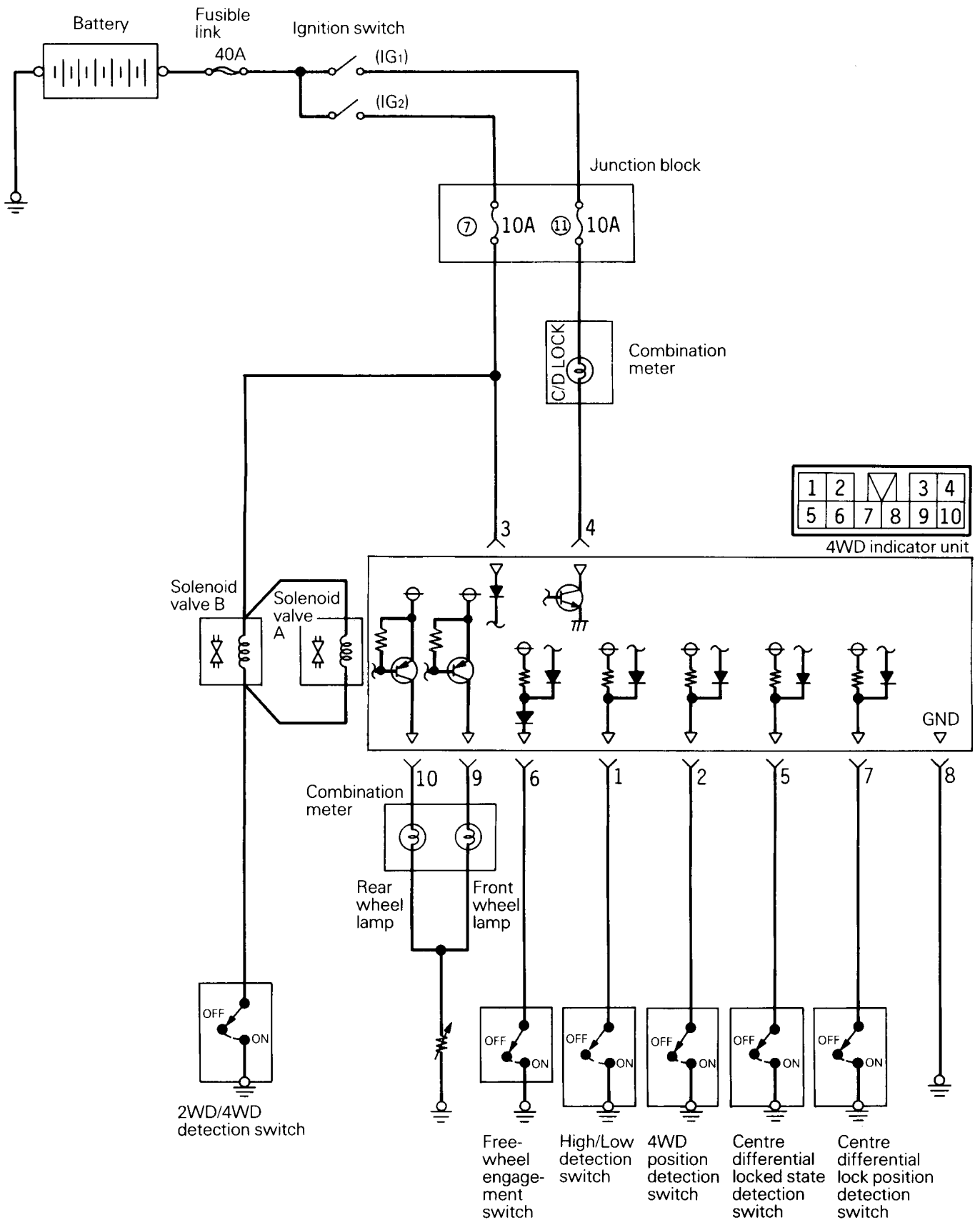


11E0004

PRINCIPAL COMPONENTS

Component		Function
Freewheel mechanism	Solenoid valves A and B	These valves operate in response to the ON/OFF signal from the transfer 2WD/4WD detection switch to change the passage of the vacuum which acts on the actuator.
	Actuator (2-way type)	This actuator moves the clutch in the freewheel mechanism by utilizing the vacuum built inside its chamber.
	Freewheel clutch assembly	A spline engagement type clutch provided on the right hand output shaft of the front differential. It functions to free (2WD state) or lock (4WD state) the freewheel mechanism of the differential.
	Freewheel engagement switch	This switch decides whether the freewheel mechanism is in free state or locked state by detecting the freewheel clutch shift fork position. (The switch turns ON in locked state.)
High-Low range changeover mechanism	High-Low range changeover device	According to the transfer shift lever position, this device changes the transfer gear to High, Neutral or Low.
	High/Low detection switch	This switch detects the High/Low shift rail position to determine whether the transfer gear is in High or Low range. (It turns ON when the gear is in either High or Low range and turns OFF when the gear is in Neutral.)
2WD-4WD changeover mechanism	2WD-4WD changeover device	This device with a synchronizer switches the drivetrain mode to 2WD, Full-time 4WD or Direct-coupled 4WD.
	2WD/4WD detection switch	When this switch detects the 4WD state of the transmission from the 2WD-4WD shift fork position, it sends a signal to solenoid valves A and B to activate them. (It turns ON when the drivetrain is in the 2WD state.)
	4WD position detection switch	By detecting the 2WD-4WD shift rail position, this switch determines whether the transfer shift lever is in the 4WD position or not. (It turns ON when the lever is in the 4WD position.)
	Centre differential locked state detection switch	By detecting the 2WD-4WD shift fork position, this switch determines whether the centre differential is in the locked or free state. (It turns ON when the centre differential is in the locked state.)
	Centre differential lock position detection switch	This switch determines whether the transfer shift lever is in the direct-coupled 4WD position or not from the 2WD-4WD shift rail position. (It turns ON when the shift lever is in the direct-coupled 4WD position.)

SUPER SELECT 4WD ELECTRIC CIRCUIT DIAGRAM



2WD-4WD Changeover Mechanism

This mechanism is a composite of the 2WD-4WD changeover mechanism and the centre differential locking mechanism. There are three positions: the 2WD-centre differential lock position, the 4WD-centre differential free position and the 4WD-centre differential lock position.

Moreover, to make it possible to change over between 2WD and 4WD while the vehicle is moving, a synchronizer is provided in the 2WD-4WD changeover section (between the 2WD/4WD hub and the drive sprocket).

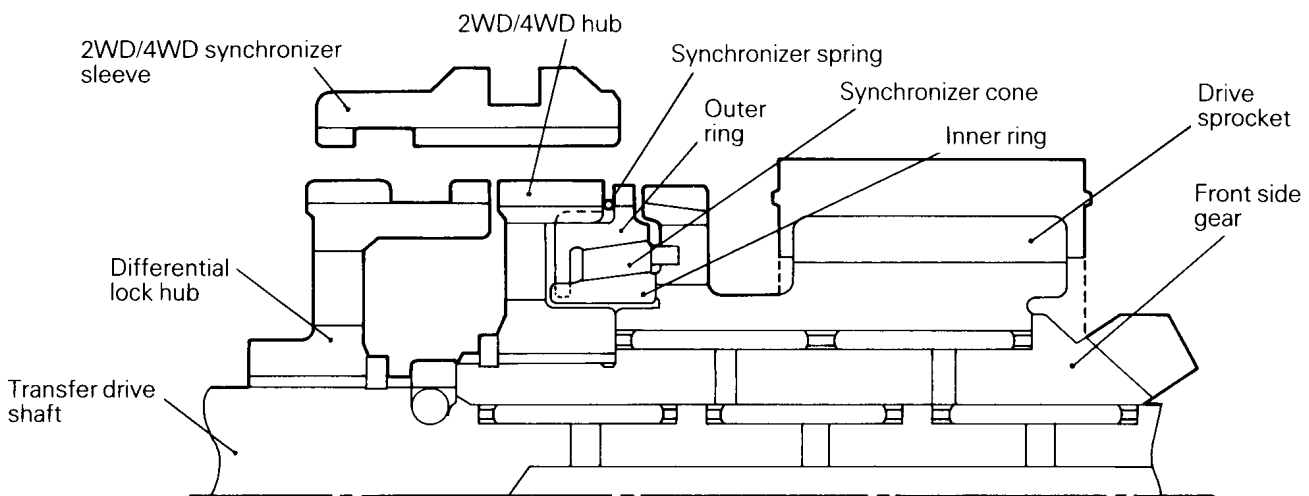
The front output shaft drive chain is a "random chain" which assures quieter operation.

2WD-4WD CHANGEOVER SECTION

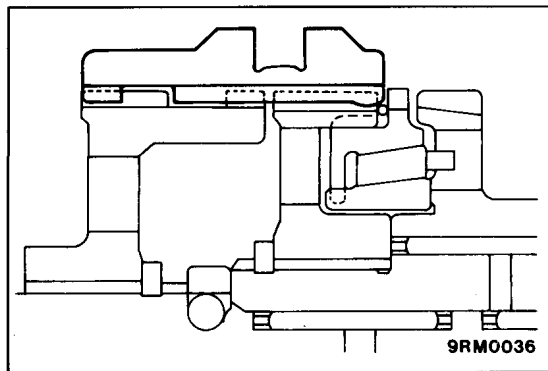
The 2WD-4WD changeover section consists of: a differential lock hub, a 2WD/4WD hub, a drive sprocket, a 2WD/4WD synchronizer sleeve, outer rings, inner rings, synchronizer cones, synchronizer springs, a front side gear, a transfer drive shaft, etc. (See illustration below.)

The differential lock hub is engaged with the transfer drive shaft; the 2WD/4WD hub is engaged with the front side gear, outer rings and inner rings; and the drive sprocket is engaged with the synchronizer cones. The parts included in each of these three engagement combinations move concurrently.

The 2WD/4WD synchronizer combines two or three of these combinations to accomplish a 2WD-4WD changeover.

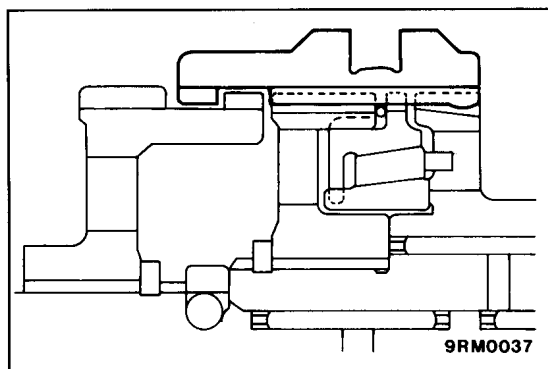


9RM0034



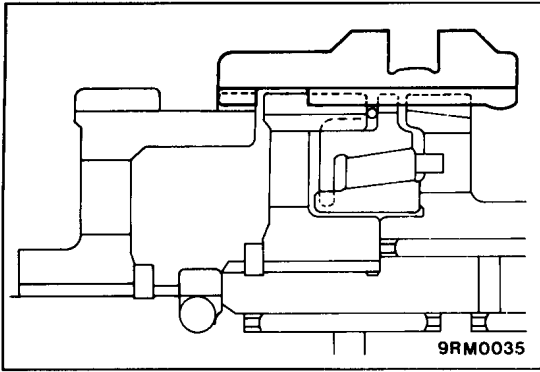
(1) 2WD (When the 2H Position is Selected)

When the 2H position is selected, the synchronizer sleeve is at the leftmost position (see illustration). The sleeve combines the differential lock hub and the 2WD/4WD hub but the drive sprocket remains free. In this condition, the transfer drive shaft and the front side gear rotate together and, therefore, the centre differential is in the locked state. Because the drive sprocket is free to turn, power is not transmitted to the front differential so that the drivetrain is in the rear wheel drive mode.



(2) Full-time 4WD (When the 4H Position is Selected)

When the 4H position is selected, the synchronizer sleeve is at the centre (see illustration) combining the 2WD/4WD hub and the drive sprocket together but leaving the differential lock hub free. Under this condition, power is distributed through the centre differential to both the front side gear and the rear output shaft. Because the differential lock hub is free to turn, the centre differential operates without restrictions and, therefore, it absorbs the difference in speed between the front and rear axle for smooth driving.



(3) Direct-coupled 4WD (When the 4HLc or 4LLc Position is Selected)

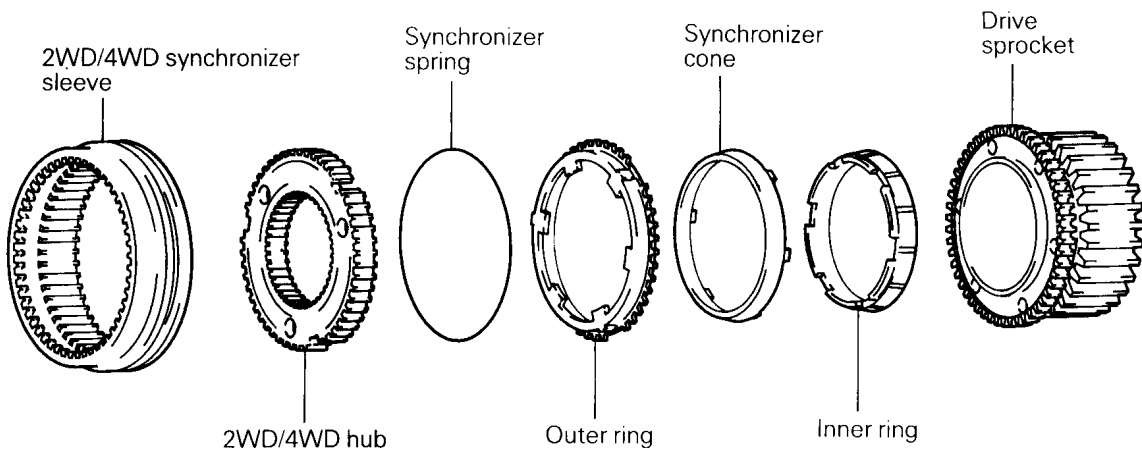
When the 4HLc or 4LLc position is selected, the synchronizer sleeve is in the rightmost position (see illustration) combining the drive sprocket, the 2WD/4WD hub and the differential lock hub.

Under this condition, the transfer drive shaft and the front side gear rotate together (i.e., the centre differential is locked) along with the drive sprocket. This means that both the front and rear drive axles rotate at the same speed.

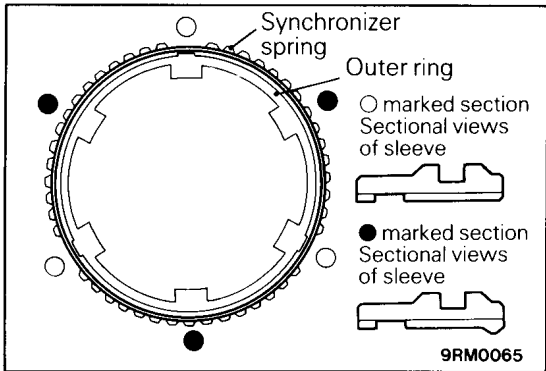
DOUBLE CONE SYNCHRONIZER

The synchronizer used in the 2WD–4WD change-over section is a “double cone synchronizer”.

This synchronizer constructed as illustrated below.

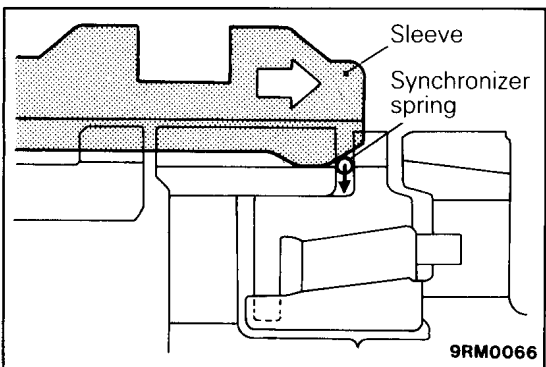


TRM0261



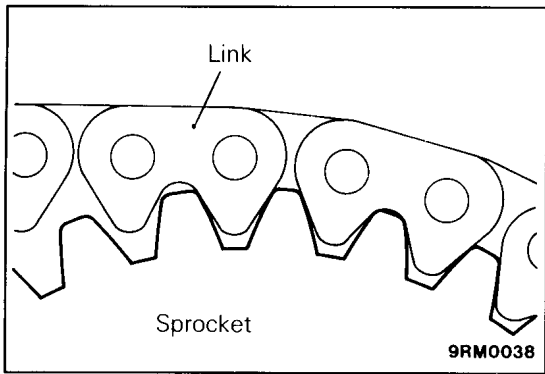
The synchronizer spring is an annulus spring. Resting on the projections (indicated by circles ○ in the illustration) on the outer periphery of the outer ring, the spring is in contact with the outer ring.

The synchronizer, on the other hand, also has projections on some of its spline teeth at the end facing the synchronizer spring. These teeth with projection are located at the places that correspond to the midpoints of each space between adjacent projections on the outer ring (these locations are indicated by dots ● in the illustration).



When the synchronizer sleeve moves toward the outer ring, the projections push the spring at the midpoints between outer ring projections. This causes the spring to push the outer ring and thrust pressure is applied to the synchronizer cone surface. When the synchronizer sleeve pushes the spring with a greater force, the projections forces the spring down and the sleeve comes into direct contact with the chamfered section of the outer ring.

In this synchronizer, therefore, the synchronizer spring plays the role of both synchronizer keys and springs in a conventional synchronizer.



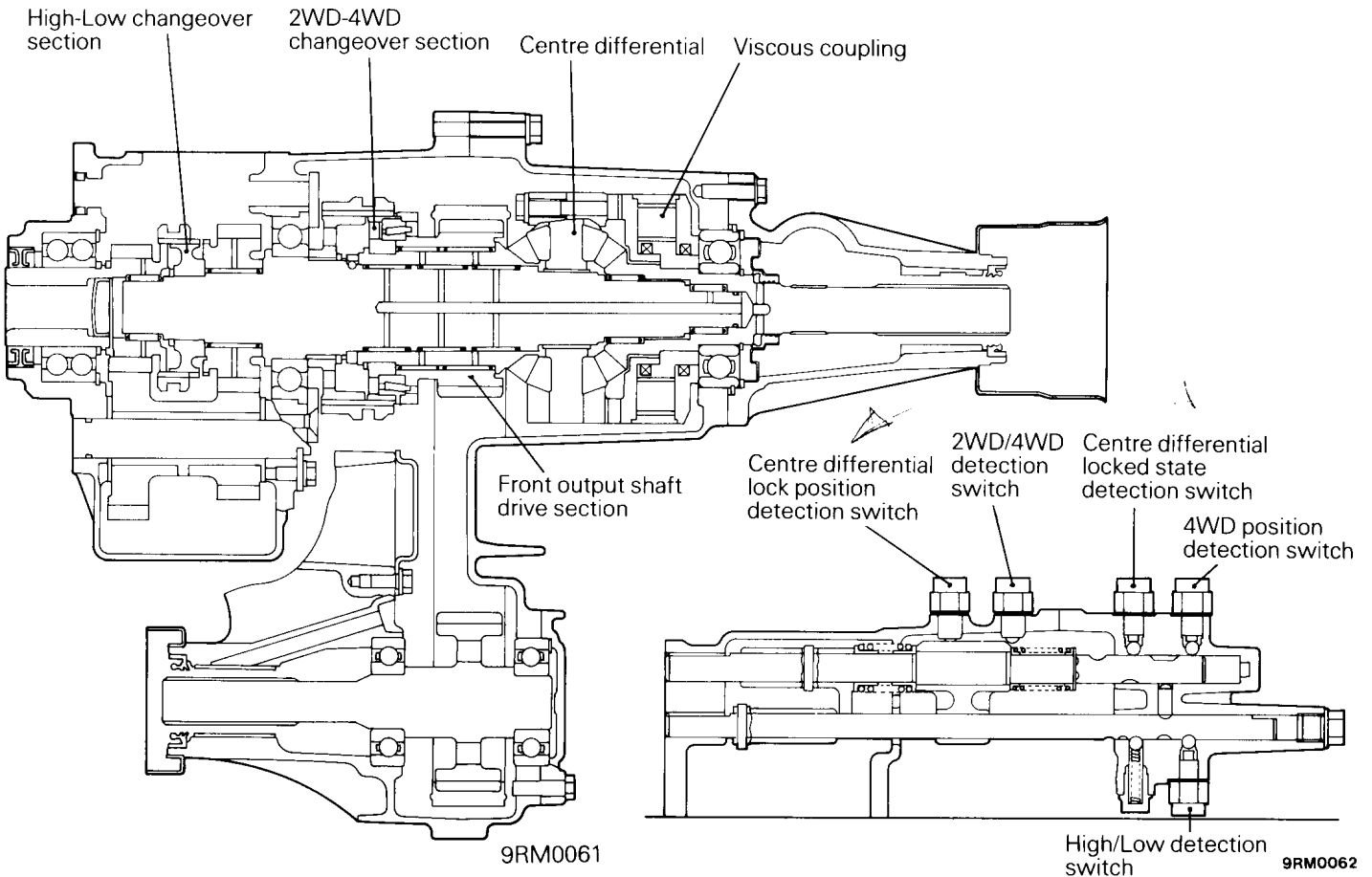
RANDOM CHAIN

The random chain has two kinds of links randomly connected. These links are different in shape so that they contact the sprocket teeth in different ways. This design is effective to reduce the noise when driving the sprocket.

Transfer Section

The transfer used in the Super Select 4WD system consists of a High-Low changeover section, a 2WD-4WD changeover section, a centre differential, a viscous coupling, front output shaft drive section, etc.

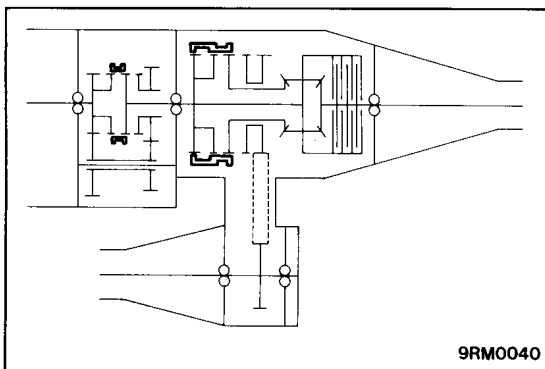
In the gearshift control section, there are detection switches for various controls.

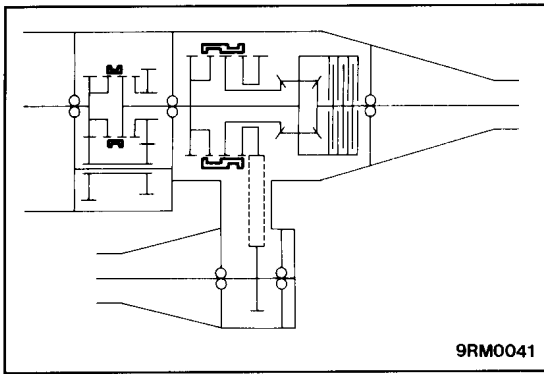


WHEN THE 2H POSITION IS SELECTED

When the 2H position is selected, the High-Low changeover section setting is at "High" and the 2WD-4WD changeover section setting is at "2WD" (the drive sprocket is set free). The engine power arriving at the transfer input gear through the transmission section is directly transmitted to the transfer drive shaft.

This power is then transmitted to the 2WD-4WD changeover section where the differential lock hub is coupled with the 2WD/4WD hub while the drive sprocket remains free. Since the centre differential does not perform its function under this condition, power is only transmitted to the rear output shaft.





9RM0041

WHEN THE 4H POSITION IS SELECTED

In the 4H position, the High–Low changeover section setting is at “High” and the 2WD–4WD changeover section setting is at “4WD” (the centre differential is not locked).

The engine power arriving at the transfer input gear through the transmission section is directly transmitted to the transfer drive shaft.

This power is then transmitted to the 2WD–4WD changeover section where the 2WD/4WD hub and the drive sprocket are coupled but the differential lock hub remains free. Power is consequently distributed to both the front and rear output shafts via the centre differential.

Since the centre differential does perform the differential function, it absorbs the speed difference between the front and rear output shafts to assure smooth driving.

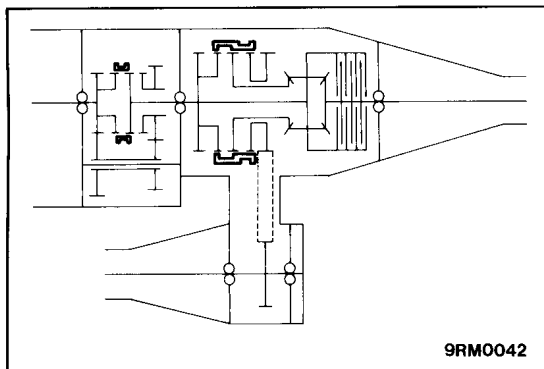
The viscous coupling in the centre differential functions as a differential limiter which, according to the speed difference, adjusts the torque transfer to both shafts for optimum power distribution.

WHEN THE 4HLc POSITION IS SELECTED

In the 4HLc position, the High–Low changeover section setting is at “High” and the 2WD–4WD changeover section setting is at “4WD” (the centre differential is locked).

The engine power arriving at the transfer input gear through the transmission section is directly transmitted to the transfer drive shaft.

This power is then transmitted to the 2WD–4WD changeover section where the 2WD/4WD hub, drive sprocket and differential lock hub are coupled together (i.e., the centre differential is locked). Consequently, the power is distributed evenly to both the front and rear output shafts.



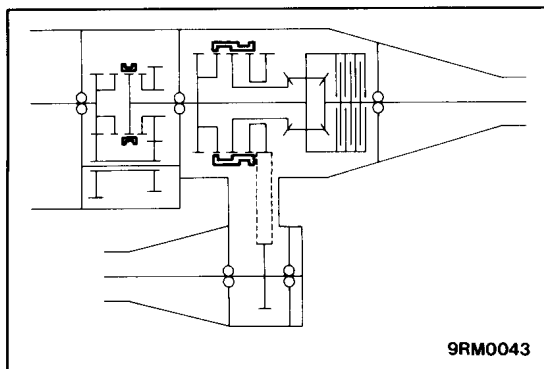
9RM0042

WHEN THE N POSITION IS SELECTED

When the N position is selected, neither the High nor Low gear engages in the High–Low changeover section (the gear is in neutral) and the 2WD–4WD changeover section setting is “4WD” (the centre differential is locked).

The engine power arriving at the transfer input gear through the transmission section is transmitted to the counter gear which runs idle but no further.

This position is used to transfer the power from the counter gear to external apparatus if the vehicle is equipped with a power take-off.



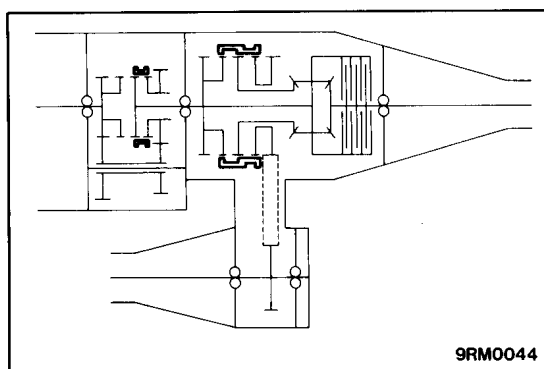
9RM0043

WHEN THE 4LLc POSITION IS SELECTED

When the 4LLc position is selected, the High–Low changeover section setting is at “Low” and the 2WD–4WD changeover section setting is at “4WD” (the centre differential is locked).

The engine power arriving at the transfer input gear through the transmission section is transmitted to the transfer drive shaft via the counter gear.

This power is then transmitted to the 2WD–4WD changeover section where the 2WD/4WD hub, drive sprocket and differential lock hub are coupled together (i.e., the centre differential is locked). As a result, the power is distributed evenly to both the front and rear output shafts.



9RM0044

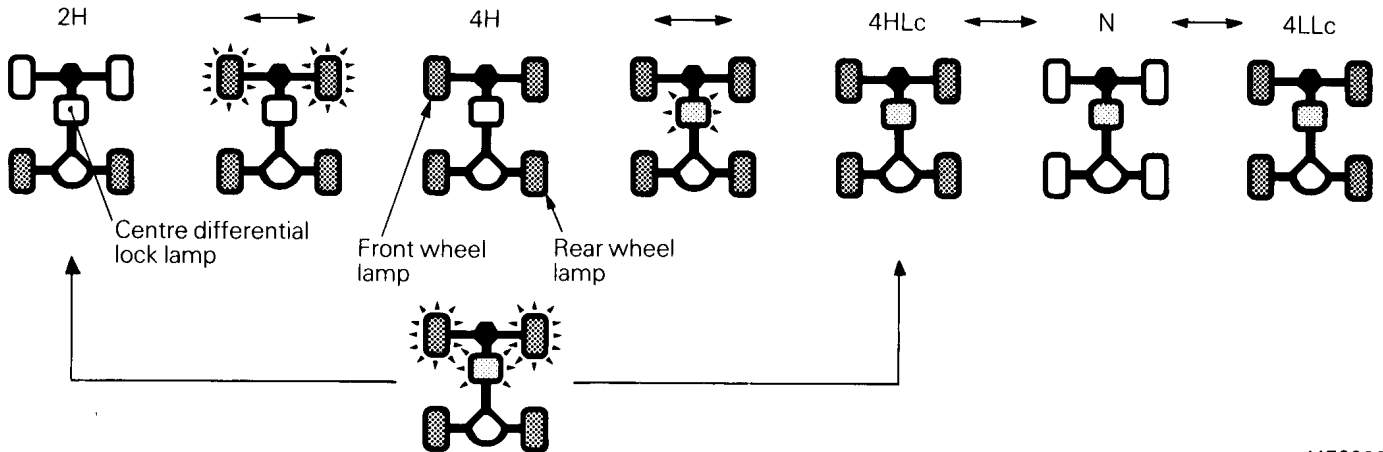
4WD Indicator Control

4WD INDICATOR

The driver can check the state of the drivetrain engagement on the 4WD indicator located in the combination meter panel.

The lamps inside the indicator illuminate to indicate the 2WD, 4WD and locked centre differential states. The lamps flash while selections take place.

The 2WD and 4WD states are respectively indicated by illuminating in green the two rear wheel symbols and all wheel symbols. When the centre differential is locked, the central symbol lamp lights or flashes in amber.



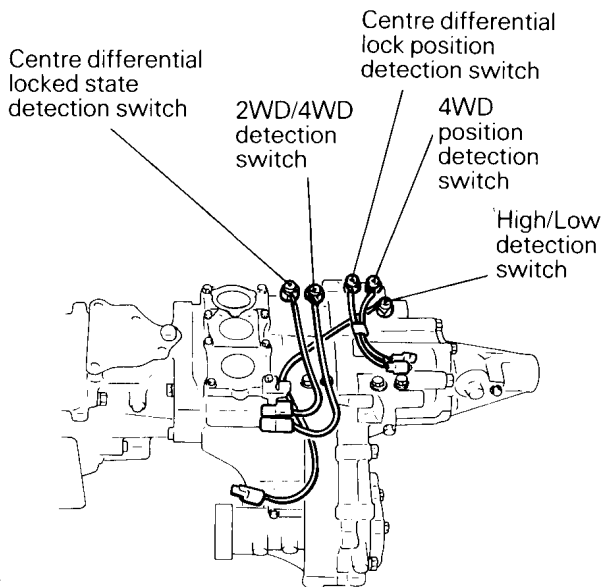
11E0008

4WD INDICATOR CONTROL UNIT

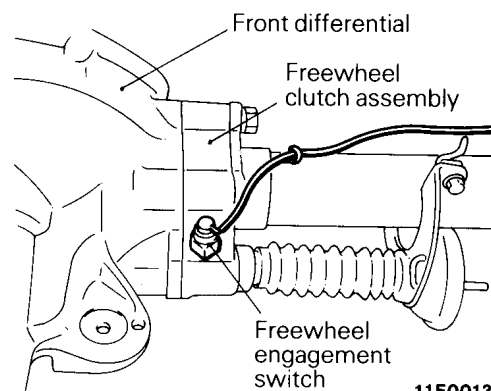
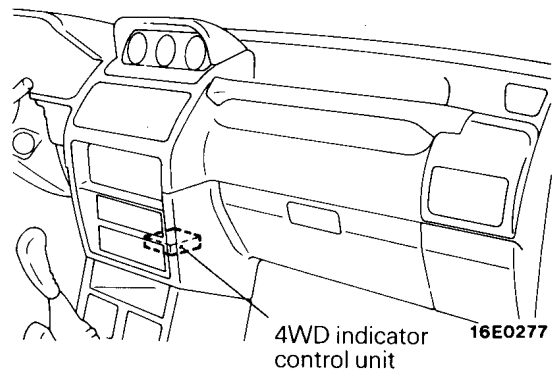
The 4WD indicator control unit controls the illumination of indicator lamps using the ON-OFF signals from the switches located in the transfer and freewheel clutch in order to display the current drivetrain engagement state.

The locations of the switches and control unit are shown in the illustration below.

The relationship between the state of each switch and the illumination of each lamp is shown in the table on the next page.



11E0141



11E0013

INDICATOR LAMP ILLUMINATION TABLE

Transfer shift position		2H	→	4H	→	4HLc	→	4LLc	→	4HLc	→	4H	→	2H	→	→	4HLc	→	→	2H	
4WD indicator	Front wheel symbols	OFF	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	OFF
	Rear wheel symbols	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	OFF
	Centre differential lock symbol	OFF	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	Flash	ON	OFF
Detection switches	4WD position detection switch	OFF	ON										OFF	ON		OFF					
	2WD/4WD detection switch	ON	OFF										ON	OFF		ON					
	Freewheel engagement switch	OFF	ON										OFF	ON		OFF					
	High/Low detection switch	ON		OFF	ON	OFF	ON														
	Centre differential lock position detection switch	OFF	ON										OFF	ON		OFF					
	Centre differential locked state detection switch	OFF	ON										OFF	ON		OFF					

PART-TIME 4WD SYSTEM

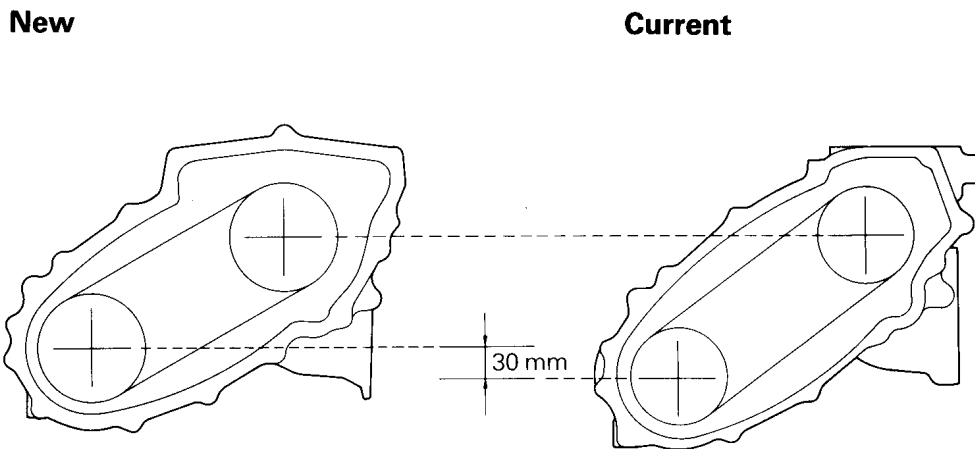
The new part-time 4WD transfer is the same in basic construction as that used in the current PAJERO/MONTERO models which consists of the High-Low changeover section, 2WD-4WD changeover section, etc.

The major improvements the new transfer incorporates are easier control of the transfer shift lever and quieter operation thanks to the employment of a new type drive chain.

Transfer Case

To increase the minimum ground clearance, the new transfer case has the configuration changed

with the front output shaft axis position raised by approximately 30 mm.



Transfer Powertrain

To reduce the chain drive noise, a random chain has been adopted.

In accordance with the adoption of the new type chain, the front and rear output shafts have been adapted to the chain.

Item	Current	New
Number of link type	1	2
Number of links	82	68
Number of sprocket teeth	33	28

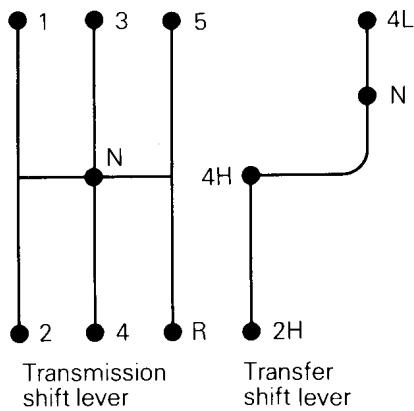
Transfer Gearshift Control

For easier gearshift control, the more frequently used transmission shift lever is positioned on the driver side.

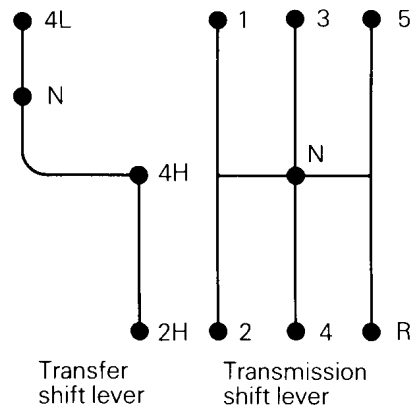
Also, the transfer gearshift pattern is arranged so that the more frequently used 2H and 4H positions are on the same line.

New

L.H. drive vehicles



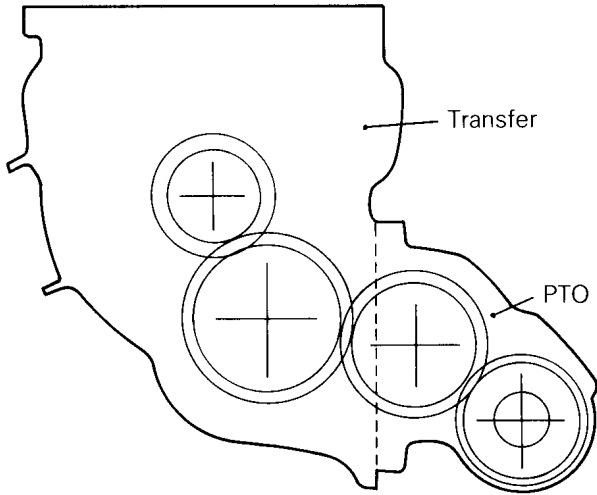
R.H. drive vehicles



Power Take-off (PTO)

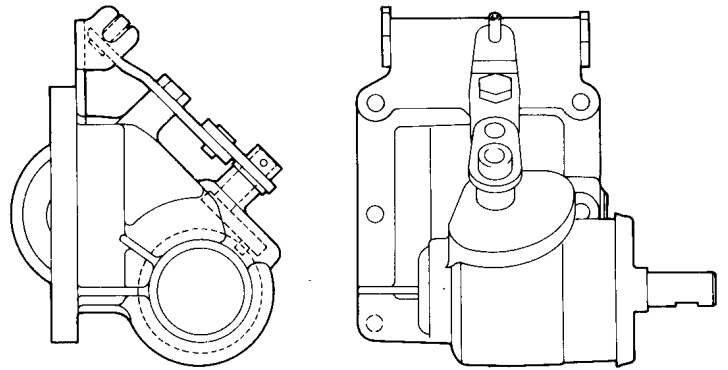
The power take-off, a mechanism used to deliver the engine power to an external apparatus, is located on the side of the transfer case. Similarly to the PTO mechanism used in current models, the end of the PTO shift lever engages with

the PTO output gear sleeve. This is so that the PTO output gear can slide on the PTO output shaft splines according to the shift lever movement to engage with the PTO idler gear.



9RM0053

PTO external views

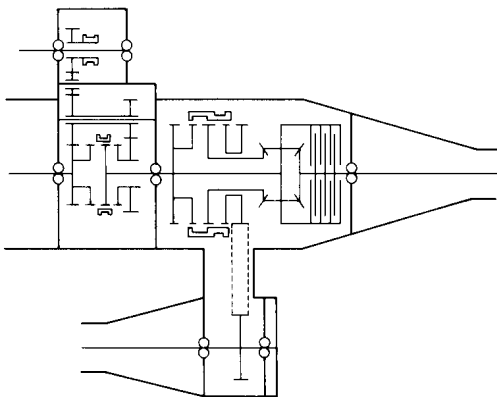


9RM0052

When the transfer shift gear is placed in the N position and the PTO shift lever in the ON position, the engine power from the transmission section arrives at the counter gear in the transfer High-Low

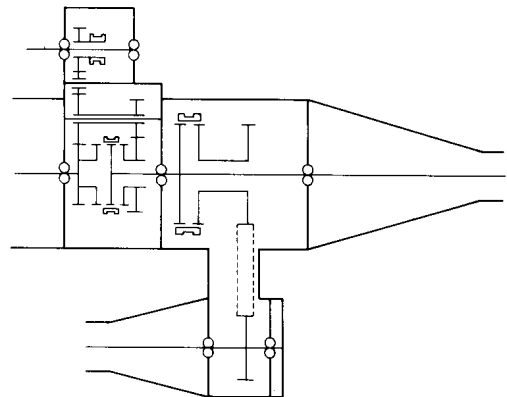
changeover section. This power then flows through the PTO idler gear to the PTO output gear and is finally output from the PTO output shaft.

Super Select 4WD



9RM0046

Part-time 4WD



9RM0045

AUTOMATIC TRANSMISSION

The new PAJERO/MONTERO's automatic transmission is the V4AW2 model with a cable type floor-shift control. Complete with the new type transfer which is basically the same as that in the manual transmission version, it proves to provide higher performance, greater reliability, easier control and a quieter run.

The transmission itself incorporates such changes as modifications to the torque converter and rearrangement of the shift pattern in order to make it perfectly adapted to the vehicle characteristics.

SPECIFICATIONS

Vehicles for Europe

Engine	2500D	3000
Transmission model	V4AW2-3	
Drive system	Super Select 4WD	
Torque converter type	3-element, single-stage, 2-phase type with damper clutch	
Nominal diameter	mm (in.) 254 (10.0)	
Stall torque ratio	2.20	2.02
Transmission type	4 forward speeds, one reverse, full-automatic	
Gear ratio		
1st	2.826	2.826
2nd	1.493	1.493
3rd	1.000	1.000
4th	0.688	0.730
Reverse	2.703	2.703
Shift positions	P-R-N-D-2-L (6 positions with overdrive)	
Shift pattern control	Hydraulic (electronic for overdrive control)	
Transfer type	2 speeds, constant mesh	
Centre differential	Provided	
Gear ratio		
High	1.000	
Low	1.925	

2-26 POWER-TRANSMISSION COMPONENTS – Automatic Transmission

Vehicles for General Export

Engine		2600
Transmission model		V4AW2-3
Drive system		Part-time 4WD
Torque converter type		3-element, single-stage, 2-phase type with damper clutch
Nominal diameter	mm (in.)	254 (10.0)
Stall torque ratio		2.20
Transmission type		4 forward speeds, one reverse, full-automatic
Gear ratio		
1st		2.826
2nd		1.493
3rd		1.000
4th		0.688
Reverse		2.703
Shift positions		P-R-N-D-2-L (6 positions with overdrive)
Shift pattern control		Hydraulic (electronic for overdrive control)
Transfer type		2 speeds, constant mesh
Centre differential		Not provided
Gear ratio		
High		1.000
Low		1.925

Vehicles for GCC

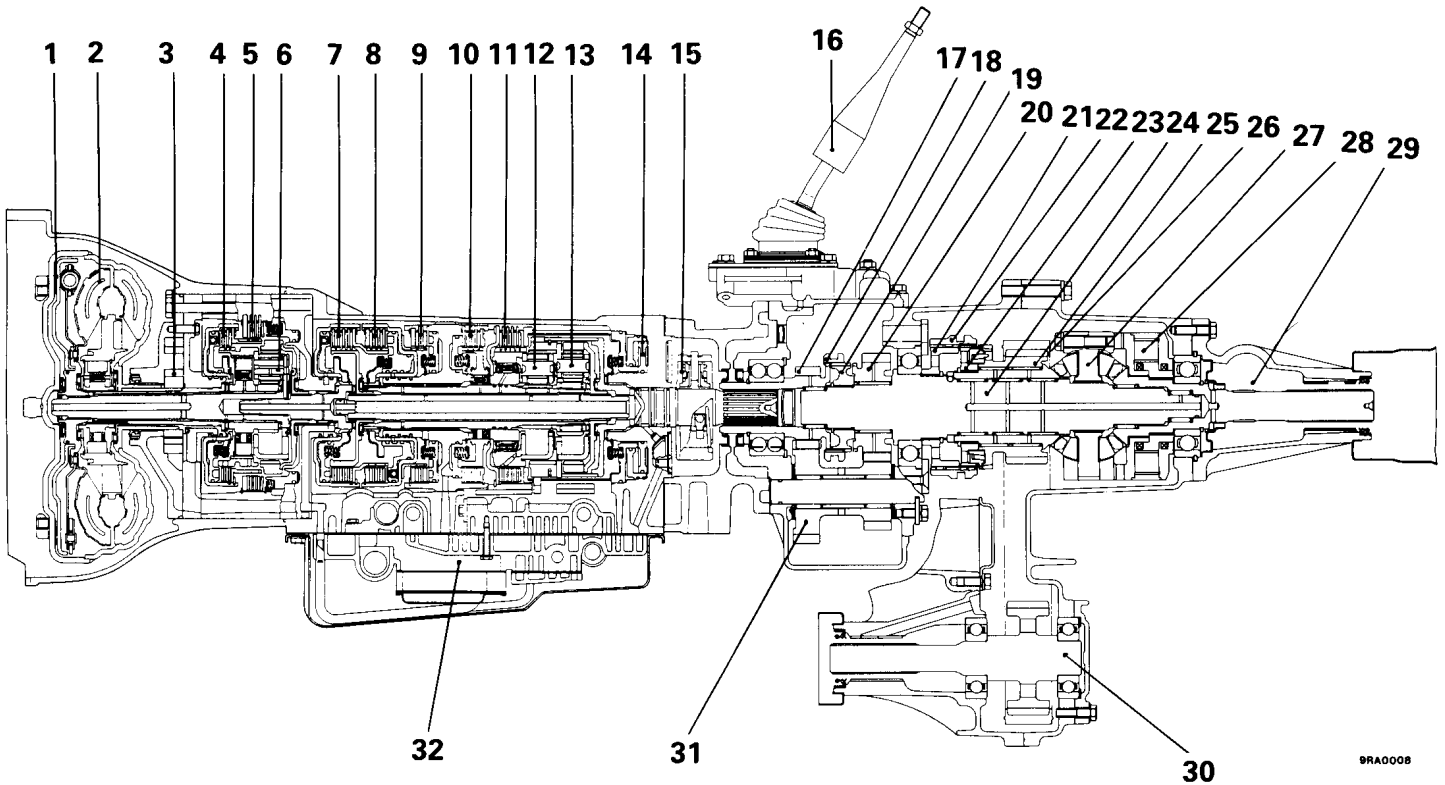
Engine		2600	3000
Transmission model		V4AW2-3	
Drive system		Part-time 4WD	Super Select 4WD
Torque converter type		3-element, single-stage, 2-phase type with damper clutch	
Nominal diameter	mm (in.)	254 (10.0)	
Stall torque ratio		2.20	2.02
Transmission type		4 forward speeds, one reverse, full-automatic	
Gear ratio			
1st		2.826	2.826
2nd		1.493	1.493
3rd		1.000	1.000
4th		0.688	0.730
Reverse		2.703	2.703
Shift positions		P-R-N-D-2-L (6 positions with overdrive)	
Shift pattern control		Hydraulic (electronic for overdrive control)	
Transfer type		2 speeds, constant mesh	
Centre differential		Not provided	Provided
Gear ratio			
High		1.000	
Low		1.925	

Vehicles for Australia

Engine	3000
Transmission model	V4AW2-3
Drive system	Super Select 4WD
Torque converter type	3-element, single-stage, 2-phase type with damper clutch
Nominal diameter	mm (in.)
	254 (10.0)
Stall torque ratio	2.02
Transmission type	4 forward speeds, one reverse, full-automatic
Gear ratio	
1st	2.826
2nd	1.493
3rd	1.000
4th	0.730
Reverse	2.703
Shift positions	P-R-N-D-2-L (6 positions with overdrive)
Shift pattern control	Hydraulic (electronic for overdrive control)
Transfer type	2 speeds, constant mesh
Centre differential	Provided
Gear ratio	
High	1.000
Low	1.925

2-28 POWER-TRANSMISSION COMPONENTS – Automatic Transmission

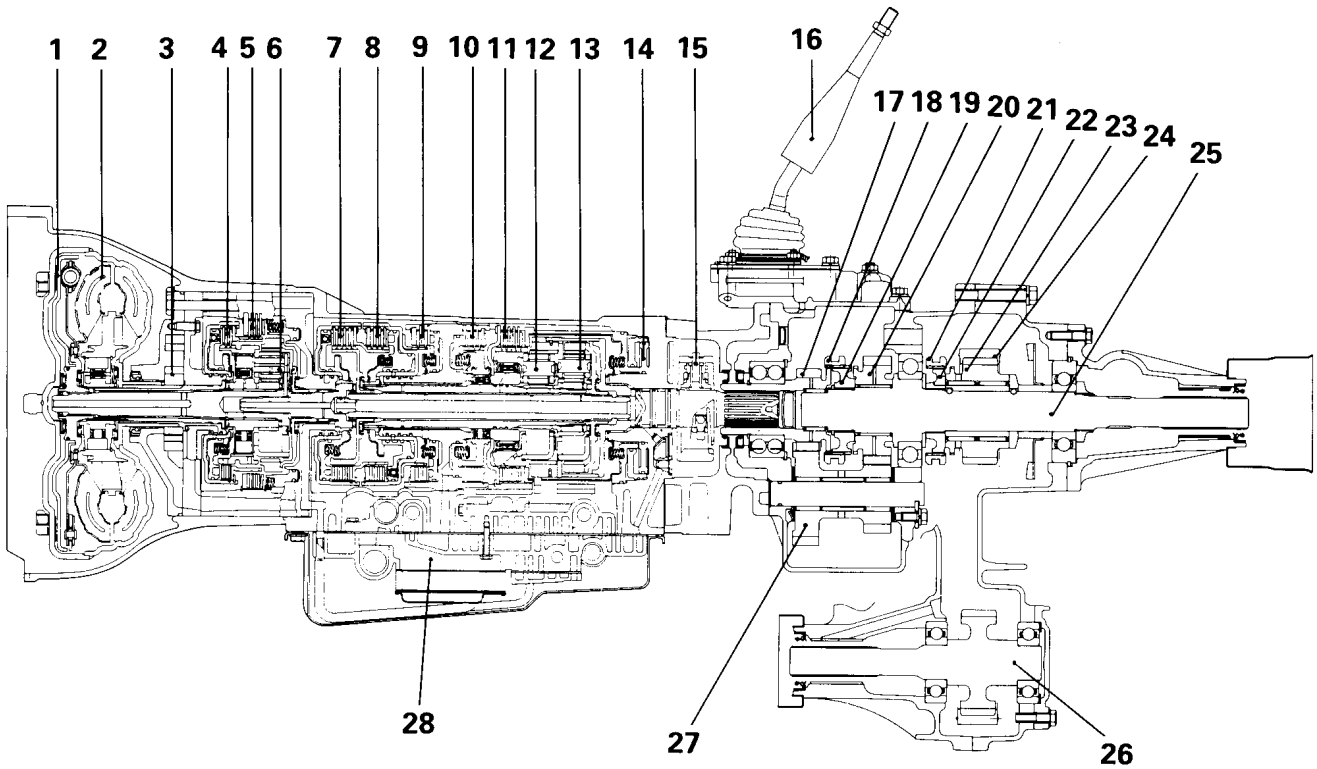
V4AW2 SECTIONAL VIEW (SUPER SELECT 4WD)



1. Lock-up clutch
2. Torque converter
3. Oil pump
4. Overdrive clutch
5. Overdrive brake
6. Overdrive planetary gear
7. Forward clutch
8. Direct clutch
9. Brake No. 1
10. Brake No. 2
11. Brake No. 3
12. Front planetary gear
13. Rear planetary gear
14. Brake No. 3 piston
15. Governor
16. Transfer control lever

17. Transfer input gear
18. High/Low sleeve
19. High/Low hub
20. Low speed gear
21. Differential lock hub
22. 2WD/4WD synchronizer sleeve
23. 2WD/4WD hub
24. Transfer drive shaft
25. Drive sprocket
26. Chain
27. Centre differential
28. VCU (Viscous coupling)
29. Rear output shaft
30. Front output shaft
31. Transfer counter gear
32. Valve body

V4AW2 SECTIONAL VIEW (PART-TIME 4WD)



9RA0007

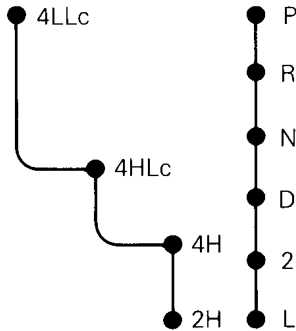
- | | |
|-----------------------------|----------------------------|
| 1. Lock-up clutch | 15. Governor |
| 2. Torque converter | 16. Transfer control lever |
| 3. Oil pump | 17. Transfer input gear |
| 4. Overdrive clutch | 18. High/Low sleeve |
| 5. Overdrive brake | 19. High/Low hub |
| 6. Overdrive planetary gear | 20. Low speed gear |
| 7. Forward clutch | 21. 2WD/4WD sleeve |
| 8. Direct clutch | 22. 2WD/4WD hub |
| 9. Brake No. 1 | 23. Drive sprocket |
| 10. Brake No. 2 | 24. Chain |
| 11. Brake No. 3 | 25. Rear output shaft |
| 12. Front planetary gear | 26. Front output shaft |
| 13. Rear planetary gear | 27. Transfer counter gear |
| 14. Brake No. 3 piston | 28. Valve body |

SUPER SELECT 4WD SYSTEM

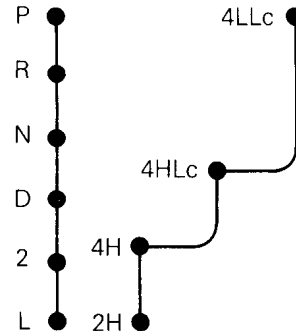
The automatic transmission version Super Select 4WD system is basically the same as the manual transmission version system except that the transfer shift lever position and the transfer shift pattern have both been rearranged.

Because the power take-off (PTO) is not provided in the automatic transmission version system, there is no neutral position in the transfer shift positions.

L.H. drive vehicles



R.H. drive vehicles



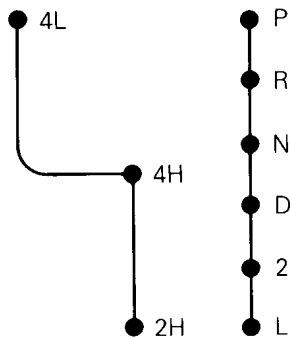
9RM0054

PART-TIME 4WD SYSTEM

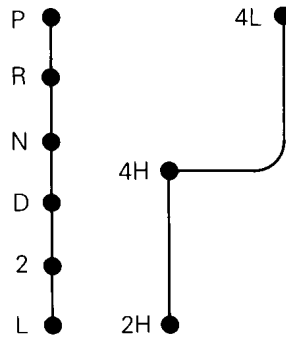
This system is basically the same as the manual transmission version system, but they do differ so that the transfer shift lever position and the transfer shift pattern.

Because the power take-off (PTO) is not provided in the automatic transmission version part-time 4WD system, there is no neutral position in the transfer shift positions.

L.H. drive vehicles



R.H. drive vehicles

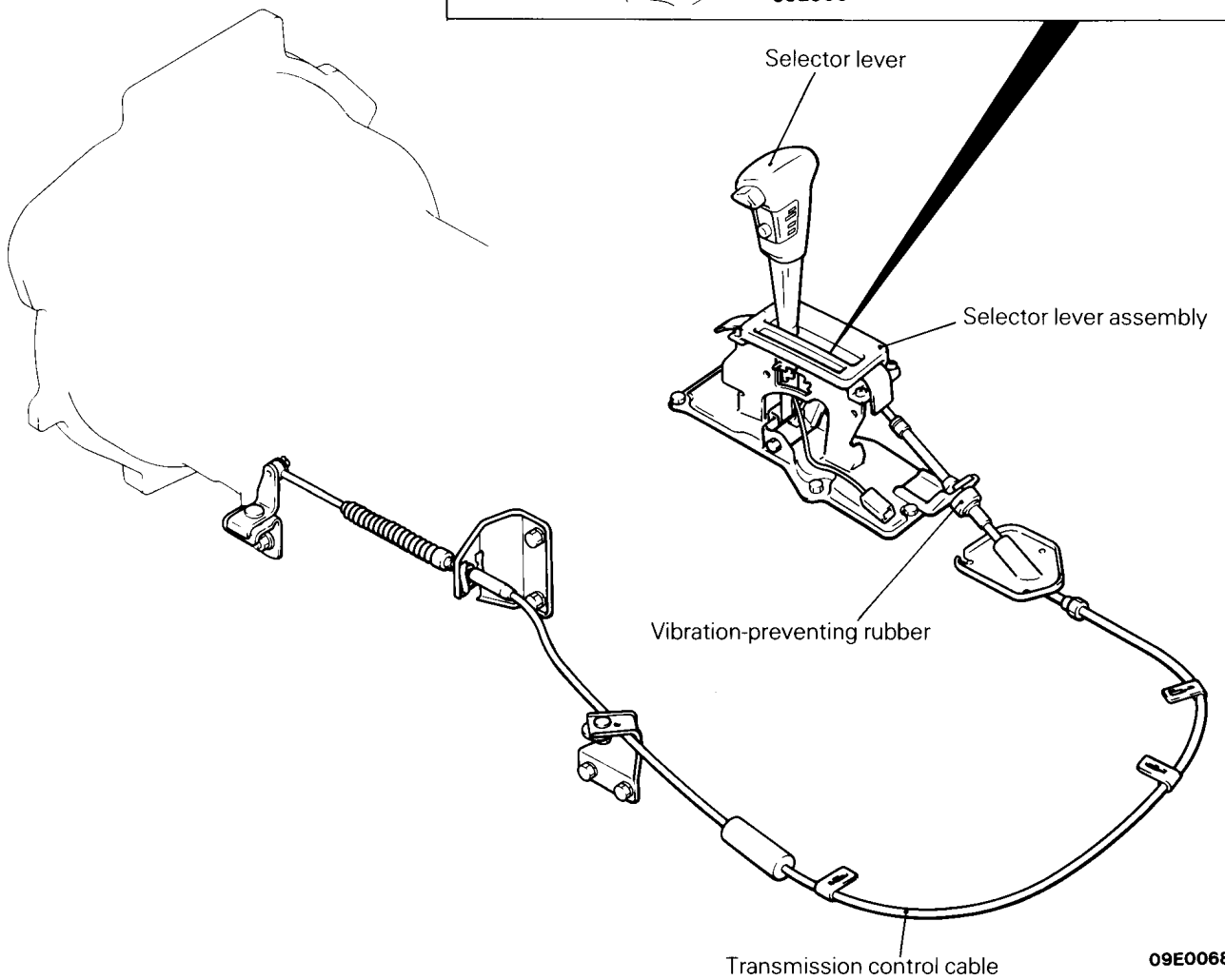
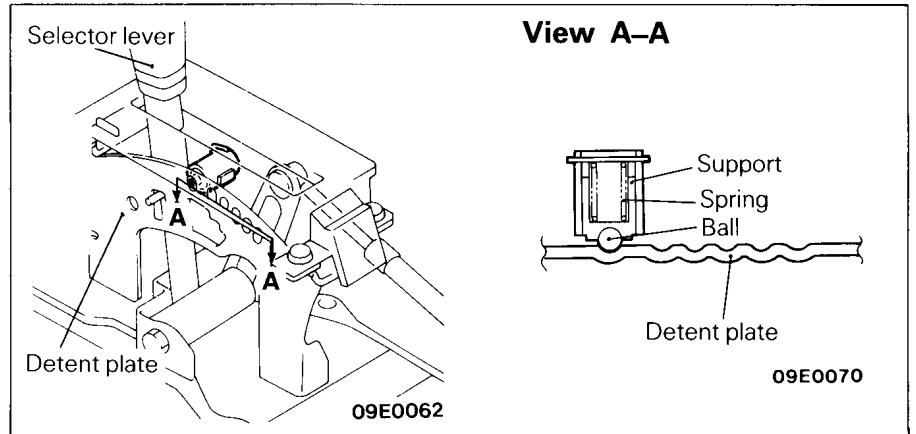


9RM0056

TRANSMISSION CONTROL

The detent plate in the selector lever assembly is partially corrugated and the selector lever has a mechanism that follows this corrugated surface of the detent plate when the lever is moved. Due to this design, the driver can more easily distinguish the lever's movement to each position.

Vibration preventing rubber at the selector lever assembly side fixing point of the transmission control cable effectively reduces the vibration transmitted to the selector lever.



PROPELLER SHAFT

E9CEAAB

SPECIFICATIONS

<Vehicles for Europe>

Items Models		Propeller shaft			Universal joint				
		Type	O.D. x Length		Type	Greasing method	Journal O.D.		
			mm (in.)	mm (in.)			mm (in.)	mm (in.)	
			Front	Rear			Front	Rear	
V21C	NSEL6	2-joint type	50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)	Cross type	Greasing nipple	14.689 (0.5783)	14.689 (0.5783)	
V24C	NSFL6			75 x 606 (2.95 x 23.9)				18.300 (0.7205)	
V23C	GRHEL6		50.8 x 752 (2.00 x 29.6)	75 x 441 (2.95 x 17.4)				18.300 (0.7205)	
V21W	NHEL6		50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)				14.689 (0.5783) 18.300 (0.7205)	
V24W	NDFL6			75 x 606 (2.95 x 23.9)					
	NHFL6		50.8 x 700 (2.00 x 27.6)	75 x 519 (2.95 x 20.4)					
	NHFR6			75 x 491 (2.95 x 19.3)					
	GNXFL6								
V23W	GNXEL6 GNXER6		50.8 x 665 (2.00 x 26.2)	75 x 491 (2.95 x 19.3)				18.300 (0.7205)	
	GRXEL6 GRXER6		50.8 x 752 (2.00 x 29.6)	75 x 441 (2.95 x 17.4)					
V41W	NHEL6		50.8 x 665 (2.00 x 26.2)	75 x 908 (2.95 x 35.7)					14.689 (0.5783) 18.300 (0.7205) 14.689 (0.5783) 18.300 (0.7205)
V44W	NDFL6								
	NDFCL6								
	NHFL6		50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)					
	NHFR6								
	GNXFL6								
	GNXFR6								
	GNXFCL6								
	RHFL6		50.8 x 771 (2.00 x 30.4)	75 x 748 (2.95 x 29.4)					
RHFR6			75 x 718 (29.5 x 28.3)						
			75 x 718 (2.95 x 28.3)						
V43W	GNXEL6	50.8 x 665 (2.00 x 26.2)	75 x 793 (2.95 x 31.2)	18.300 (0.7205)					
	GNXER6								
	GNXECL6								
	GRXEL6	50.8 x 752 (2.00 x 29.6)	75 x 740 (2.95 x 29.1)						
	GRXER6								
	GRXECL6								

NOTE

- (1) The propeller shaft length represents the distance between the centres of two joints.
(2) The dimensions in brackets [] apply to when the optional differential lock is used.

<Vehicles for General Export>

Models		Items		Propeller shaft		Universal joint			
		Type	O.D. x Length		Type	Greasing method	Journal O.D.		
			mm (in.)	mm (in.)			Front	Rear	
			Front	Rear			Front	Rear	
Except for GCC	V12C	NSL	2-joint type	50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)	Cross type	Greasing nipple	14.689 (0.5783)	14.689 (0.5783)
	V14C	NSL							
		NSR							
	V12V	NDL							
		NDR							
	V14V	NDL							
		NDR							
	V23W	GNXEL							
		GNXER							
	V32V	NDL							
		NDR							
		HNDL							
		HNDR							
	V32W	NHL							
		NHR							
		HNHL							
RHL									
V34V	HNDL								
	HNDR								
V44W	GNXFL								
	GNXFR								
V43W	GNXEL								
	GNXER								
GCC	V12W	NHLW	50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)	Cross type	Greasing nipple	14.689 (0.5783)	14.689 (0.5783)	
	V24W	GNXFLW	50.8 x 700 (2.00 x 27.6)	75 x 519 (2.95 x 20.4)				14.689 (0.5783)	
				75 x 491 (2.95 x 19.3)				18.300 (0.7205)	
	V23W	GNXELW	50.8 x 665 (2.00 x 26.2)	75 x 491 (2.95 x 19.3)				18.300 (0.7205)	
				75 x 908 (2.95 x 35.7)					
	V32W	NHLW	50.8 x 741 (2.00 x 29.2)	75 x 867 (2.95 x 34.1)				14.689 (0.5783)	
				75 x 793 (2.95 x 31.2)				18.300 (0.7205)	
	V44W	GNXFLW	50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)				18.300 (0.7205)	
50.8 x 665 (2.00 x 26.2)									
V43W	GNXELW	50.8 x 752 (2.00 x 29.6)	75 x 740 (2.95 x 29.1)						

NOTE
 (1) The propeller shaft length represents the distance between the centres of two joints.
 (2) The dimensions in brackets [] apply to when the optional differential lock is used.

<Vehicles for Australia>

Items Models		Propeller shaft				Universal joint			
		Type	O.D. x Length		mm (in.)	Type	Greasing method	Journal O.D.	
			Front	Rear				Front	Rear
V12W	NDR8	2-joint type	50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)	Cross type	Greasing nipple	14.689 (0.5783)	14.689 (0.5783)	
V23W	GNXER8			75 x 491 (2.95 x 19.3)				18.300 (0.7205)	
V32W	NSR8			75 x 908 (2.95 x 35.7)					
V34W	NSTR8		50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)					
V44W	NHFR8								
	GNXFR8		50.8 x 665 (2.00 x 26.2)	75 x 740 (2.95 x 29.1)					
V43W	NHER8								
	RHER8								
	GRXER8								

NOTE
The propeller shaft length represents the distance between the centres of two joints.

FRONT AXLE

E9CFAAF

The front axle features:

- High power transmission efficiency and less vibration and noise due to use of the drive shafts with D.O.J.-B.J. type constant velocity ball joints.
- Minimized risk of "torque steer" due to use of drive shafts equal in length on both sides.

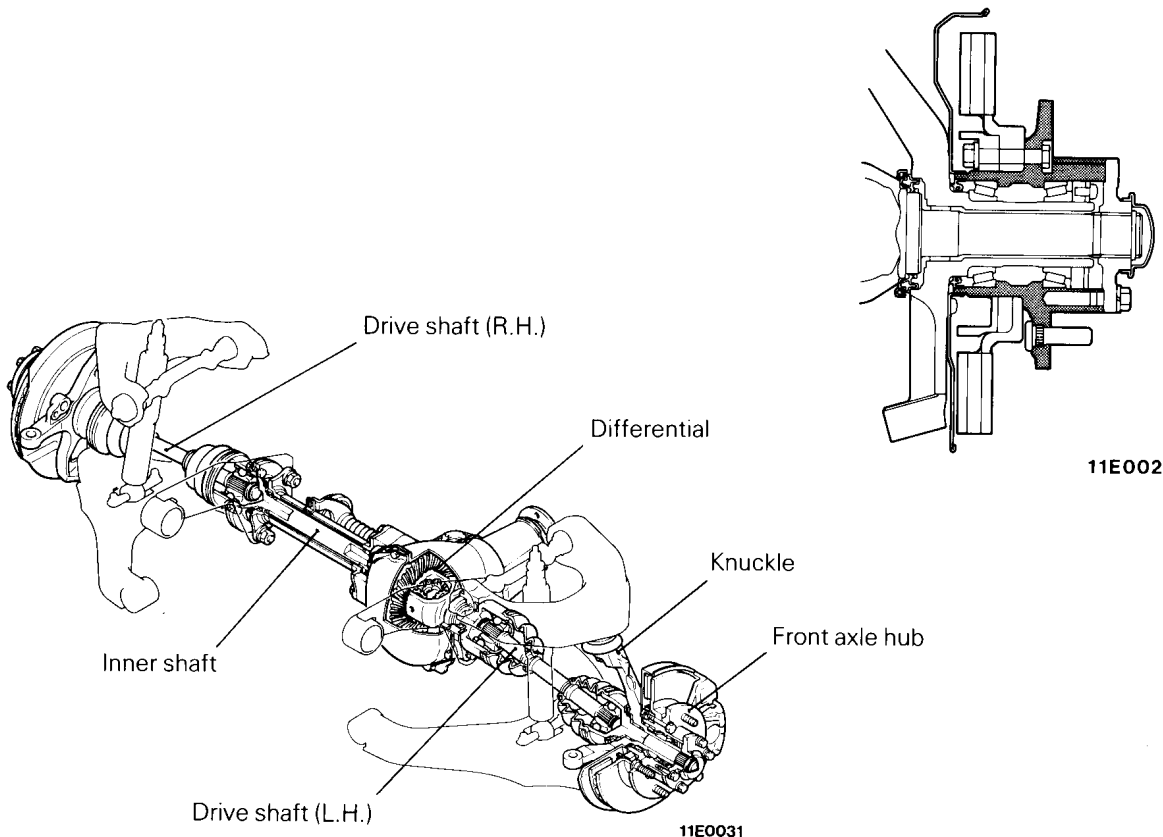
- Improved traction and fuel economy during 2WD mode due to the use of free-wheeling hubs.
- Synchronized freewheel differential which allows the selection of either 2WD or 4WD even while in motion.

NOTE

The free-wheeling hub is the same in both construction and operation as that used in current models.

SPECIFICATIONS

Items	Part time 4WD	Super select 4WD
Wheel bearing type	Tapered roller bearing	Tapered roller bearing
Drive shaft		
Joint type		
Outer	B.J. (Birfield Joint)	B.J. (Birfield Joint)
Inner	D.O.J. (Double Offset Joint)	D.O.J. (Double Offset Joint)
Length (Joint to joint)		
LH	291 (11.5)	291 (11.5)
RH	318 (12.5)	318 (12.5)
Inner shaft		
O.D. x Length	31.5 x 432 (1.24 x 17.0)	31.5 x 304.2 (1.24 x 12.0)
Bearing (O.D. x I.D.)	62 x 35 (2.44 x 1.38)	62 x 35 (2.44 x 1.38)



DRIVE SHAFT

The drive shaft has two different constant velocity joints: a D.O.J. type joint on the differential carrier side and a B.J. type joint on the axle hub side. Their advantageous features are outlined below.

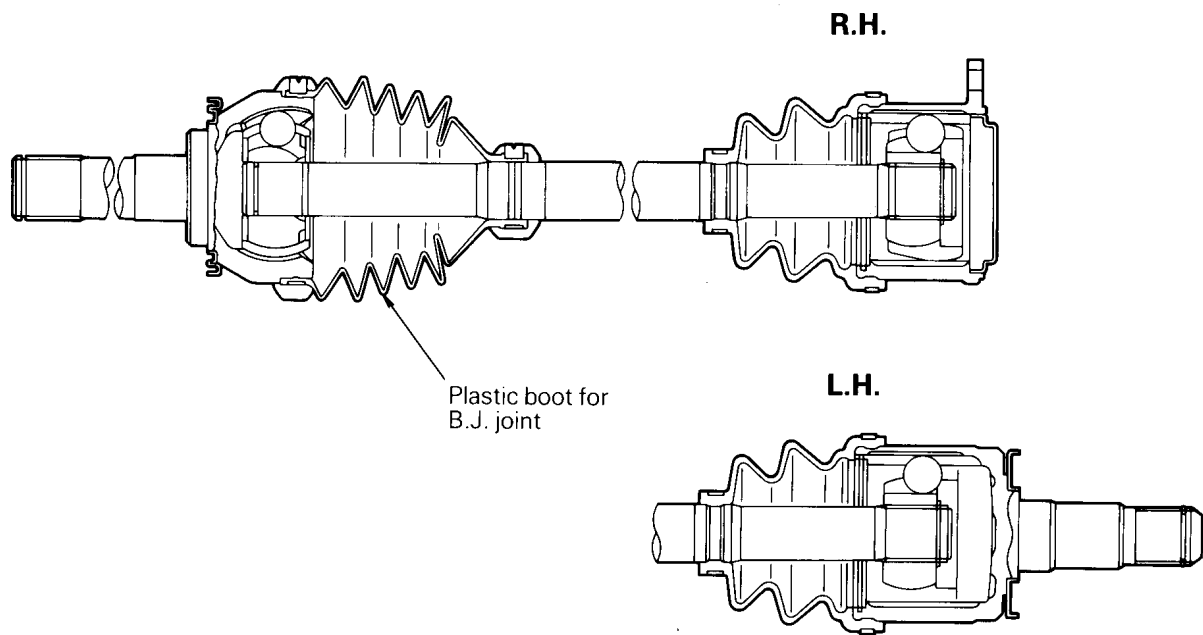
D.O.J. type

- Axially slidable
- Great resistance to both heavy and impact loads
- Compact in size and easy to handle
- Smaller sliding resistance

B.J. type

- Wider operation angle
- Great resistance to both heavy and impact loads
- Compact in size requiring smaller installation space

A highly durable plastic boot is used for the B.J. joint which is subjected to greater angular changes.



11E0025

FREEWHEEL MECHANISM

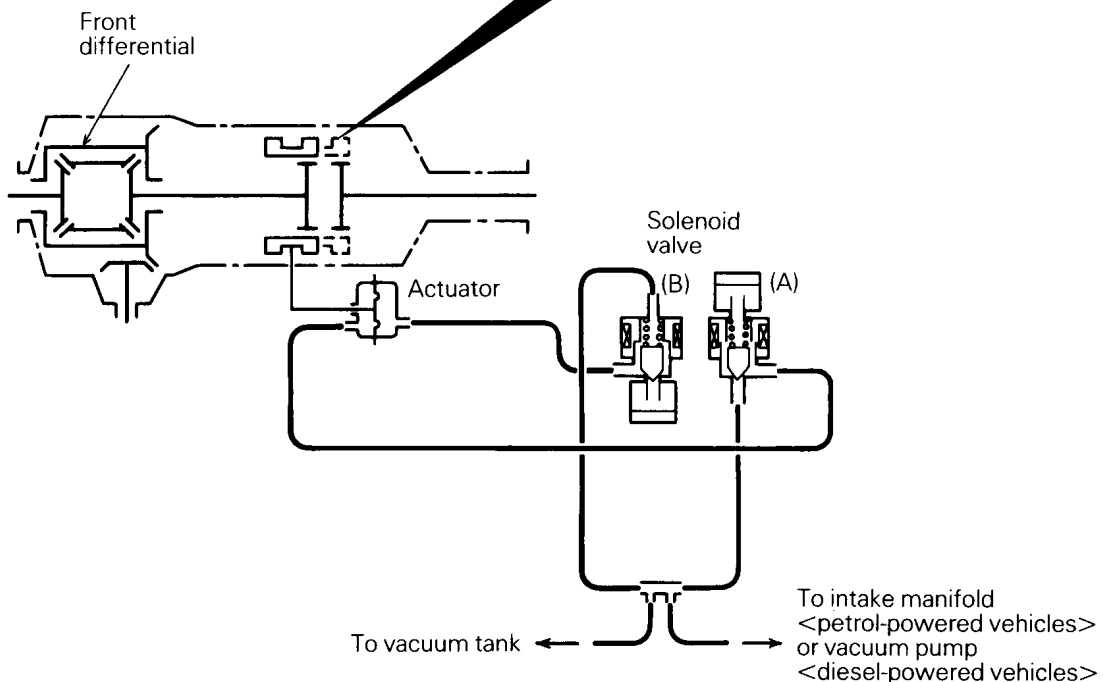
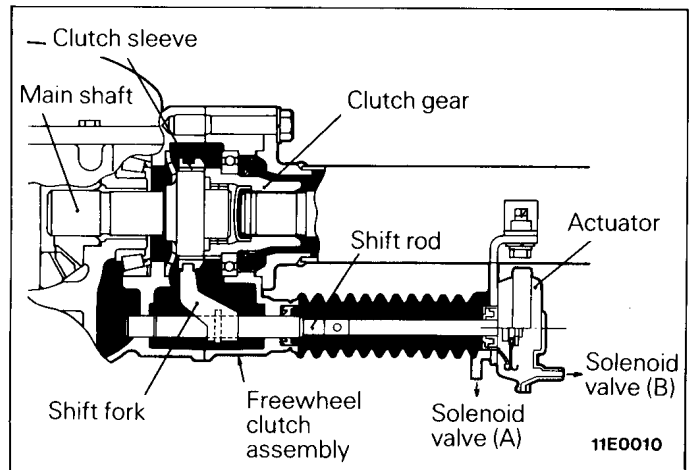
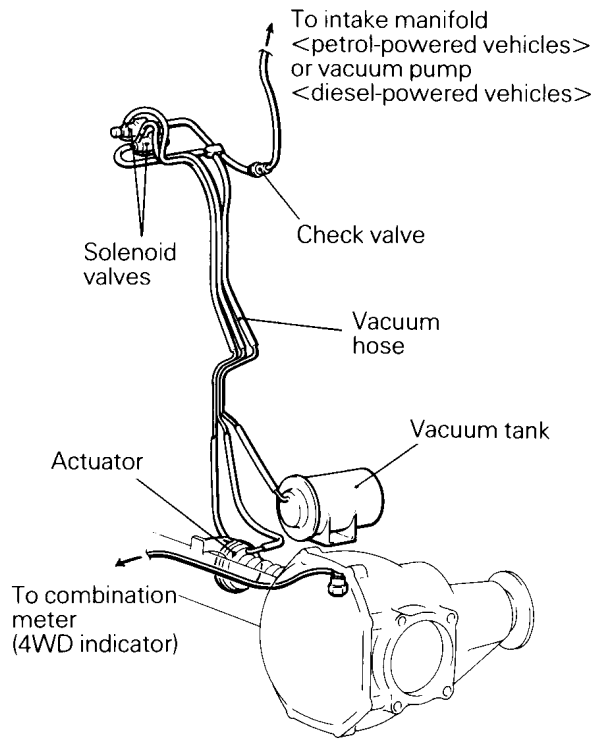
On vehicles with the Super Select 4WD system, a vacuum-actuated freewheel clutch has been adopted.

This device is composed of a main shaft, a clutch sleeve, a clutch gear, a shift rod, a shift fork, etc. It is located between the right-hand output shaft and the inner shaft of the front differential.

The freewheel clutch assembly is electrically and automatically controlled utilizing an ON/OFF signal from the 2WD/4WD detection switch which is located in the transfer.

According to the ON/OFF signal, the solenoid valves are either activated or deactivated to change the passage of the vacuum to the actuator. Operated by the actuator, via the shift rod and the shift fork, the clutch sleeve slides to either the free position (2WD) or the locked position (4WD) to select the drivetrain mode.

To provide a better freewheel clutch operational response, the vacuum circuit has a vacuum tank. (For the overall Super Select 4WD system operation description, see Pages 2-14 or 30.)



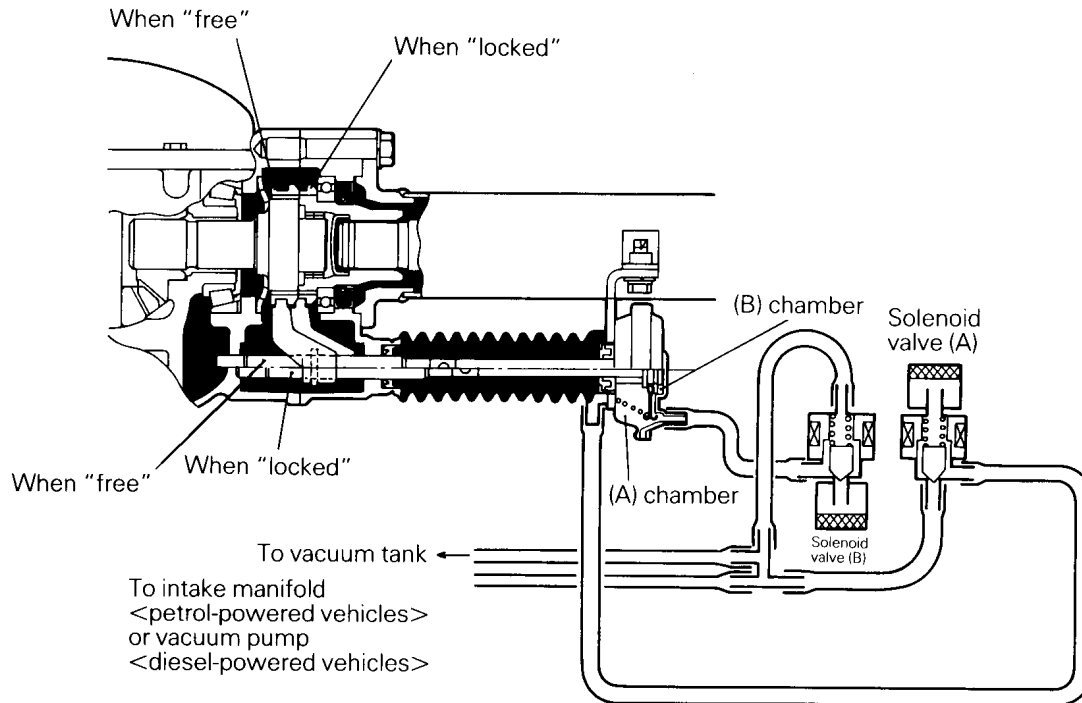
OPERATION OF THE FREEWHEEL CLUTCH**Free (2WD) State**

When the 2WD position is selected by the transfer shift lever, both solenoid valves (A) and (B) are energized.

The vacuum path opens through solenoid valve (A) and the vacuum acts on actuator's (A) chamber. This places the freewheel clutch in the "free" state (2WD).

Locked (4WD) State

When the transfer shift lever is placed in a position other than the 2WD position, neither solenoid valve (A) nor (B) are energized and actuator's (A) chamber opens to the atmosphere. At the same time, the vacuum acts on (B) chamber. This causes the freewheel clutch to engage and it attains the "locked" state (4WD).



11E0005

DIFFERENTIAL

FRONT DIFFERENTIAL

- Some models with a V6 petrol engine are equipped with the No. 6 differential while other models are equipped with the No. 5 differential.
- A 4-pinion type differential is employed on some models to accommodate the increased power output.

REAR DIFFERENTIAL

- The rear differential is either a No. 6 or No. 7 differential according to the model.
- An optionally available rear differential lock provides superior driveability in both muddy and sandy surface conditions and is particularly effective when moving out of the mud.
- All vehicles without rear differential lock are provided with a mechanical type limited slip differential which shows its usefulness when driving in mud or other low traction surfaces.

SPECIFICATIONS

<VEHICLES FOR EUROPE>

Items	2400	3000	2500D	
			Vehicles with standard fender	Vehicles with wide fender
Differential size				
Front	No. 5	No. 5 or No. 6* ¹	No. 5	No. 5
Rear				
2-door models	No. 6 or No. 7* ²	No. 7	No. 6 or No. 7* ²	No. 6 or No. 7* ²
4-door models	No. 7	No. 7	A/T: No. 6 or No. 7* ² M/T: No. 7	No. 7
Final drive gear type	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear
Reduction ratio				
2-door models	4.875	4.875	4.625	4.875
4-door models	4.875	4.625 or 4.875* ³	4.875	5.285
Pinion gear type				
Front				
2-door models	2-pinion	2-pinion	2-pinion	4-pinion
4-door models	4-pinion	2-pinion	A/T: 2-pinion M/T: 4-pinion	A/T: 2-pinion M/T: 4-pinion
Rear	2-pinion or 4-pinion* ²	2-pinion or 4-pinion* ²	2-pinion or 4-pinion* ²	2-pinion or 4-pinion* ²

NOTE

*¹: Manual transmission vehicles

*²: Vehicles with a rear differential lock or limited slip differential

*³: Vehicles with wide fender

<VEHICLES FOR GENERAL EXPORT AND GCC>

Items	2600	3000	2500D	
			Vehicles with standard fender	Vehicles with wide fender
Differential size				
Front	No. 5	M/T: No. 6 A/T: No. 5	No. 5	No. 5
Rear				
2-door models	No. 6	No. 7	No. 6	–
4-door models	M/T: No. 7 A/T: No. 6	No. 7	No. 7	No. 7
Final drive gear type	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear
Reduction ratio				
2-door models	4.875	4.875	4.625	–
4-door models	4.875	4.875	4.875	5.285
Pinion gear type				
Front				
2-door models	2-pinion	2-pinion	2-pinion	–
4-door models	M/T: 4-pinion A/T: 2-pinion	2-pinion	2-pinion	4-pinion
Rear	2-pinion or 4-pinion*	2-pinion or 4-pinion*	2-pinion or 4-pinion*	2-pinion or 4-pinion*

<VEHICLES FOR AUSTRALIA>

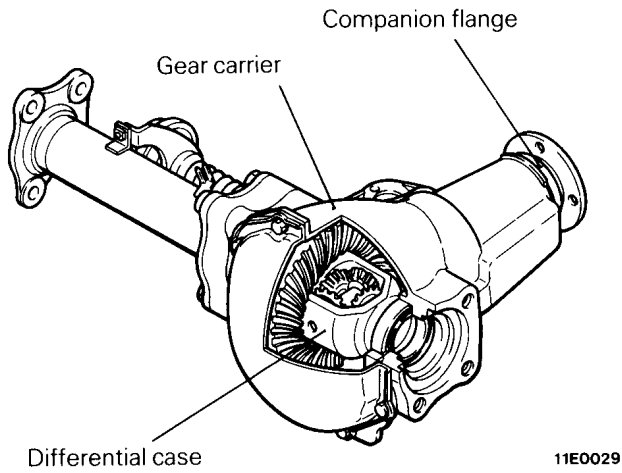
Items	2600	3000		2500D	
		Vehicles with standard fender	Vehicles with wide fender	Vehicles with standard fender	Vehicles with wide fender
Differential size					
Front	No. 5	M/T: No. 6 A/T: No. 5	M/T: No. 6 A/T: No. 5	No. 5	No. 5
Rear					
2-door models	No. 6	–	No. 7	–	–
4-door models	No. 7	No. 7	No. 7	No. 7	No. 7
Final drive gear type	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear	Hypoid gear
Reduction ratio					
2-door models	4.875	–	4.875	–	–
4-door models	4.875	4.625	4.875	4.875	5.285
Pinion gear type					
Front					
2-door models	2-pinion	–	2-pinion	–	–
4-door models	4-pinion	2-pinion	2-pinion	4-pinion	4-pinion
Rear	2-pinion or 4-pinion*	2-pinion or 4-pinion*	2-pinion or 4-pinion*	2-pinion or 4-pinion*	2-pinion or 4-pinion*

NOTE

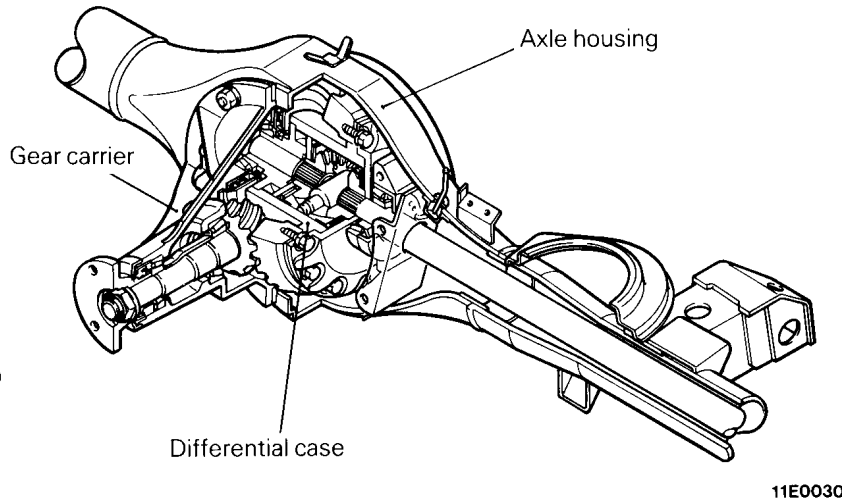
*: Vehicles with a rear differential lock or limited slip differential

CONSTRUCTION

Front differential



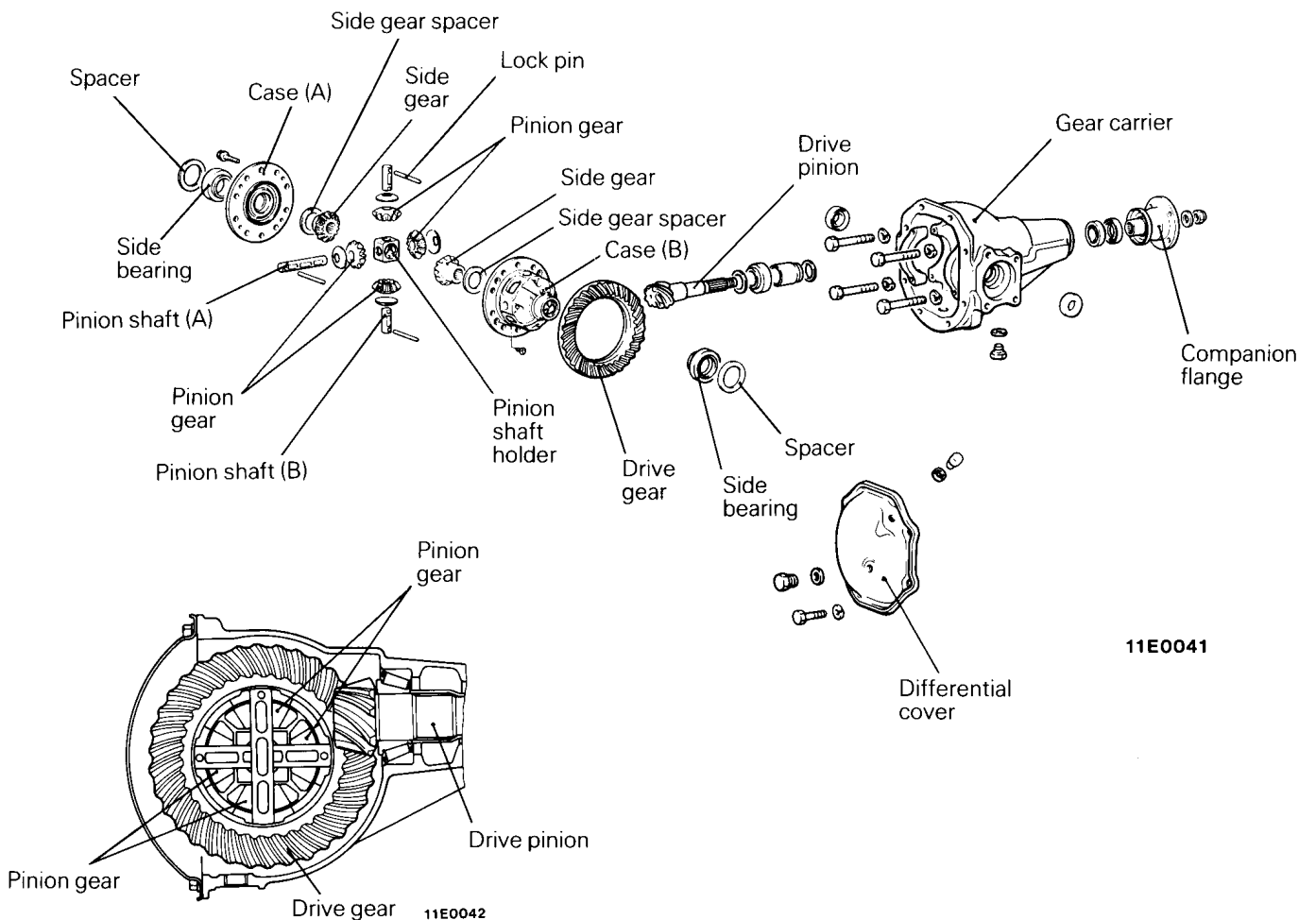
Rear differential



4-PINION TYPE FRONT DIFFERENTIAL

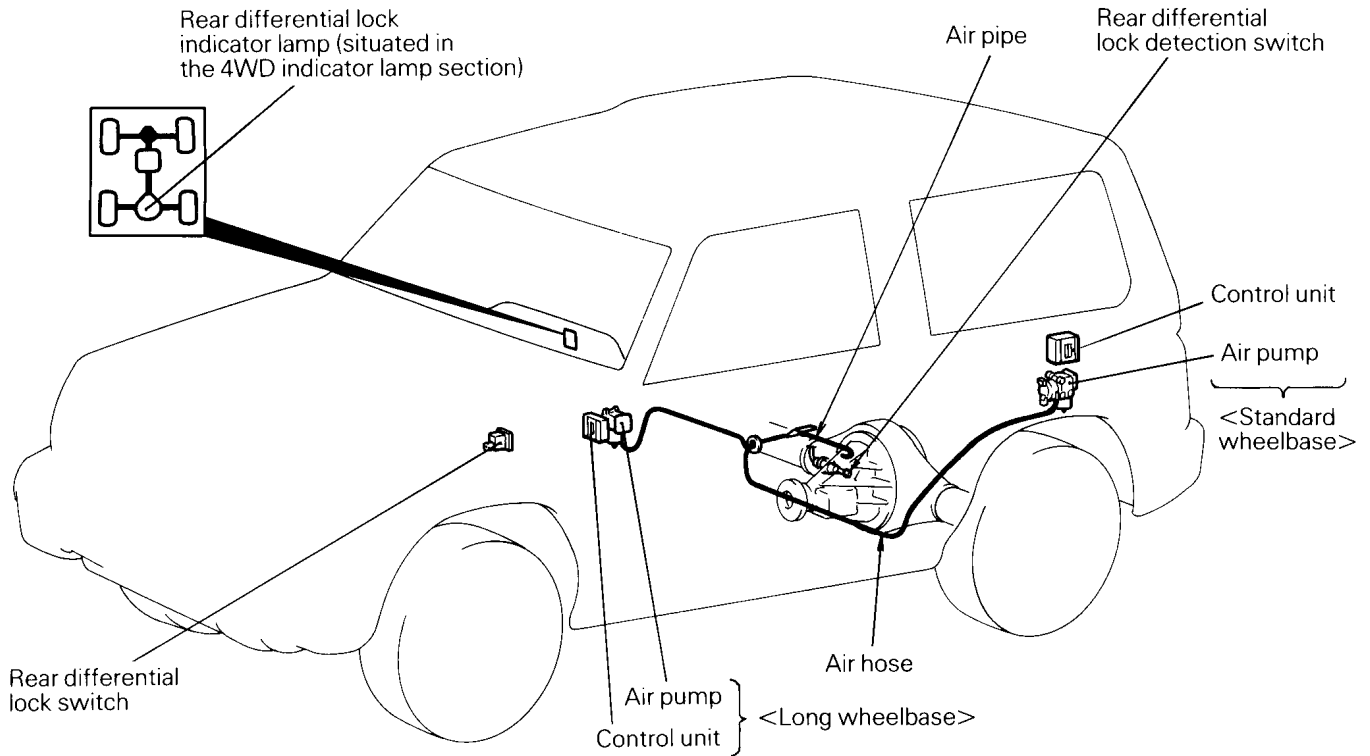
The 4-pinion front differential has four pinion gears engaged to the two side gears inside the differential case.

This design is more durable than the 2-pinion type because the load is distributed among four pinion gears so that each pinion gear bears a smaller load.



REAR DIFFERENTIAL LOCK SYSTEM

- Locks the right and left wheels completely, making it easier for the vehicle to get out of a trapped position or on a rocky or snowy road.
- Accommodated in a compact structure with a built-in diaphragm, giving high dependability against damage cold weather, etc.
- Easier to operate with a changeover switch
- Electronically controlled to allow locked condition changeover at a vehicle speed of 12 km/h (7 mph) or less for safety and to protect the lock mechanism.
- Consists of three sections; Electronic control section, Air piping section and Differential lock section.

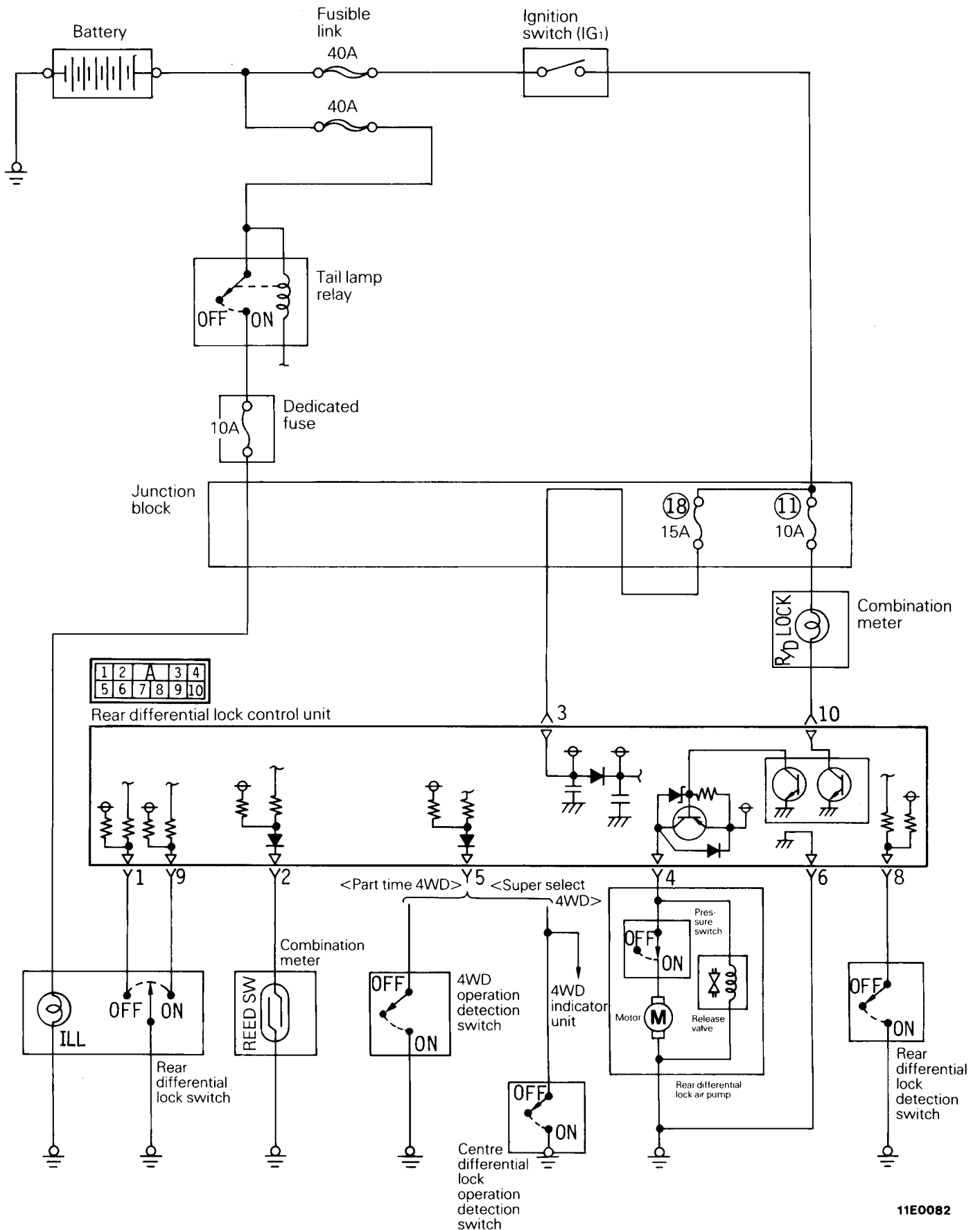


11E0080

Part Name		Summary of Function
Electronics control section	Rear differential lock switch	An automatic reset type switch which sends ON/OFF signal to the control unit.
	Rear differential lock indicator lamp	Situated in the 4WD indicator lamp section of the combination meter, the lamp lights when the system starts operation, and flashes* during changeover operation.
	Rear differential lock detection switch	A switch for detecting whether the rear differential is in the locked or free state. Switches between ON and OFF in combined operation with the movement of the drive cam in the differential case.
	Rear differential air pump	Interlocked with the rear differential lock switch, the pump can be operated only when the vehicle speed is less than 12 km/h (7 mph).
	Control unit	Controls the air pump, etc. on the basis of signals from the various switches.
Air piping section	Air hose, pipe	Establishes connection between the air pump and rear differential and forces the air from the air pump.
Differential lock section	Rear differential	Consists of an actuator, pressure plate, etc. accommodated in the rear differential. The rear differential lock detection switch is mounted.

NOTE
 *: The rear differential lock system employs a wait mechanism for protection of the lock mechanism. Even if the switch is operated, the system may not start changeover immediately. The wait state is indicated by a flashing lamp. The lamp also flashes when the interlocked state (where changeover is inhibited by the control unit) is created by operating the switch with the vehicle at a speed of 12 km/h (7 mph) or more.

REAR DIFFERENTIAL ELECTRICAL CIRCUIT DIAGRAM



REAR DIFFERENTIAL LOCK SYSTEM

- The indicator lamp flashes during changeover from the free to locked state and is illuminated when the changeover is completed. When changeover is made from the locked to free state, the indicator lamp similarly flashes during the changeover, and goes out when the changeover is completed.
- For safety and protection of the lock mechanism, the rear differential lock system does not

change over the differential to the locked state when the vehicle speed is in excess of 12 km/h (7 mph), but the indicator lamp in the combination meter flashes to alert the driver. When the vehicle speed decreases to 6 km/h (4 mph) or less, changeover can be made to the locked state. Changeover from the locked to free state can be made even when the vehicle speed is more than 12 km/h (7 mph).

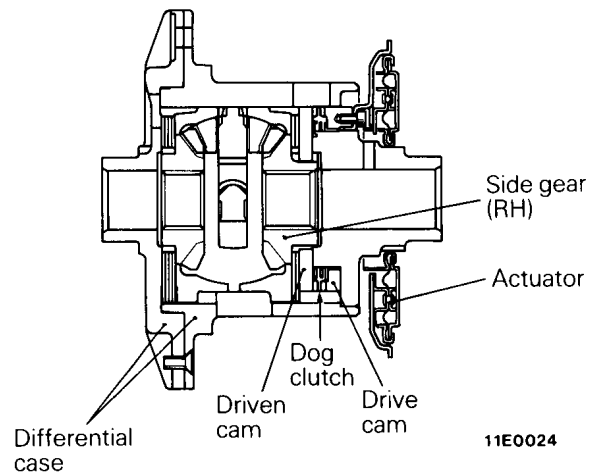
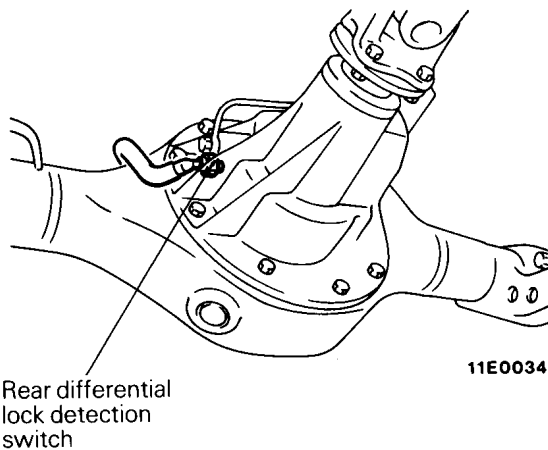
Rear differential lock switch	Vehicle speed	Rear differential lock air pump	Rear differential lock changeover	Rear differential lock indicator lamp
Neutral	Ignored	Not operated	Free	OFF
Neutral → ON signal	Lower than 12 km/h (7 mph)	Operated	Free → Locked	Flashing → ON
	12 km/h (7 mph) or higher	Not operated	Free	Flashing
Neutral → OFF signal	Ignored	Not operated	Locked → Free	Flashing → OFF

NOTE
The rear differential can be locked only when the centre differential is in the locked state. When the centre differential is reset, the rear differential is also automatically reset.

REAR DIFFERENTIAL

The rear differential lock system is a compact structure with a built-in diaphragm type actuator accommodated in the rear differential casing, assuring high dependability against damage, etc. The switch which detects the locked state is mounted

on the differential carrier. The air pressure generated by the air pump actuates the actuator to put the dog clutches of the drive and driven cams in mesh, thereby locking the motion of the differential case and side gear (RH).



REAR DIFFERENTIAL LOCK AIR PUMP ASSEMBLY

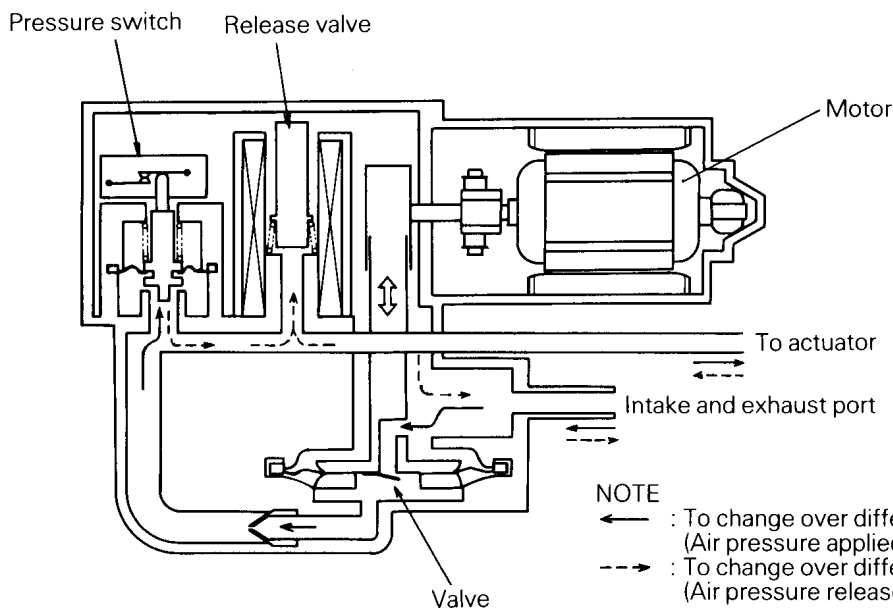
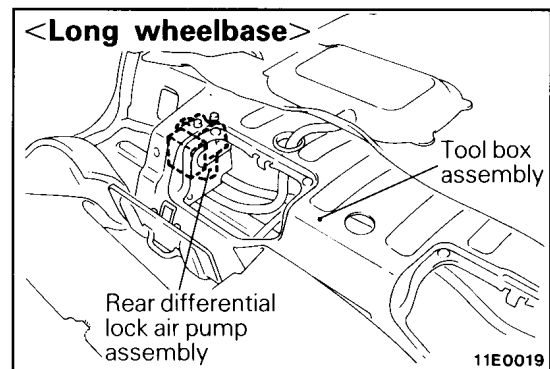
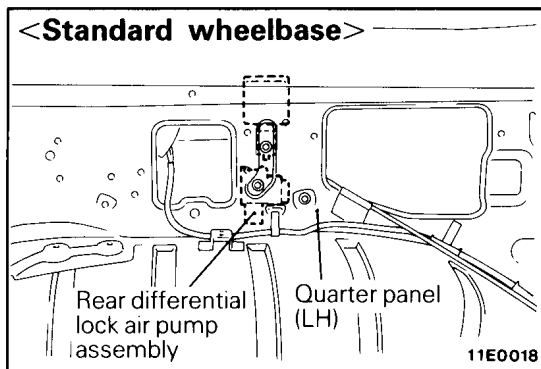
On the J top and metal top vehicles, the air pump assembly is mounted on the quarter panel (LH). On the long wheelbase vehicles, the air pump assembly is mounted in the tool box assembly under the rear seat with a bracket in between.

The air pump assembly consists of a motor, pressure switch and release valve. When the differential lock switch is turned ON, the motor operates the air pump to generate an air pressure which actuates the differential into the locked state. To retain the differential in the locked state, the air pressure is maintained constant by the function of the pressure switch.

When a predetermined pressure is exceeded, the pressure switch switches OFF to stop the motor. When the pressure falls below a predetermined value, the pressure switch is turned ON to start the motor. Basically, the motor operates intermittently, depending on the air pressure.

When OFF signal from the differential lock switch is detected, the control unit stops the motor. At the same time, the release valve opens to let the internal pressure escape and reset the locked state of the differential.

Rear differential changeover	Air pump	Pressure kPa (kg/cm ² , psi)	Pressure switch	Release valve
Free → Locked (air pressure applied)	Operated	0 → 25 to 40 (0.25 to 0.40, 4 to 6)	ON → OFF	Closed (current supplied)
Locked (air pressure retained)	Not operated	25 to 40 (0.25 to 0.40, 4 to 6)	OFF	Closed (Current supplied)
Locked → Free (air pressure released)	Not operated	25 to 40 (0.25 to 0.40, 4 to 6) → 0	OFF → ON	Opened (No current supplied)



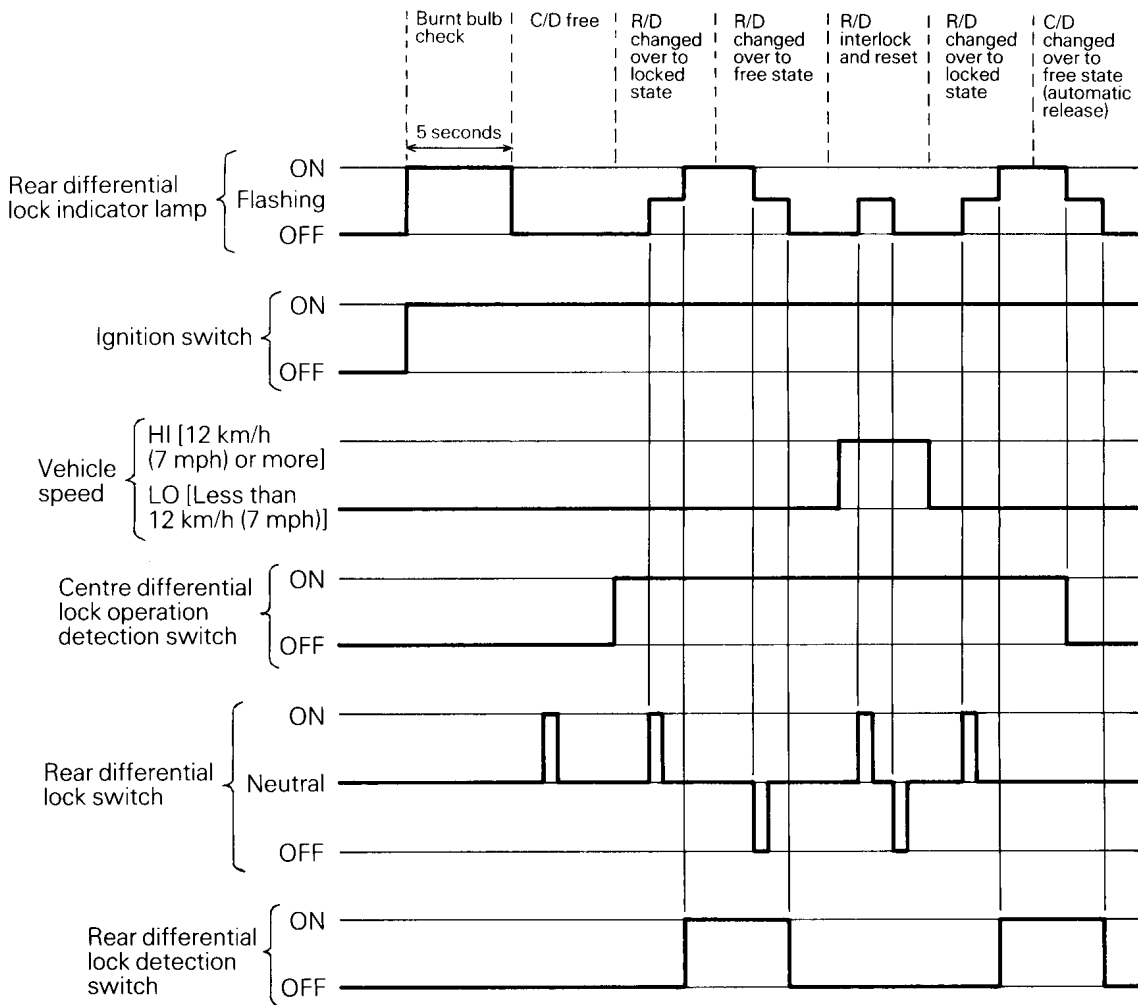
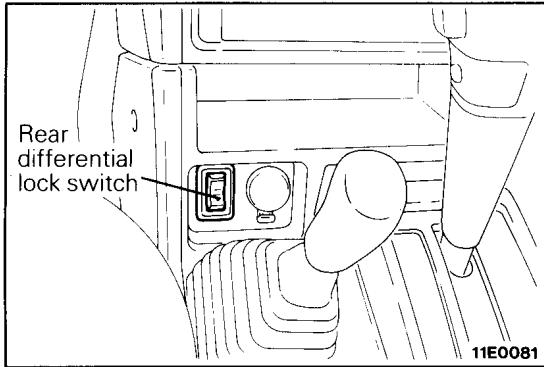
REAR DIFFERENTIAL LOCK INDICATOR LAMP

The rear differential portion of the 4WD indicator lamp in the combination meter either flashes or is illuminated, amber colour.

Functions

- (1) When the rear differential is locked (the dog clutches in mesh), the indicator lamp is illuminated.
- (2) When the rear differential is in the state where the changeover is in progress [where any

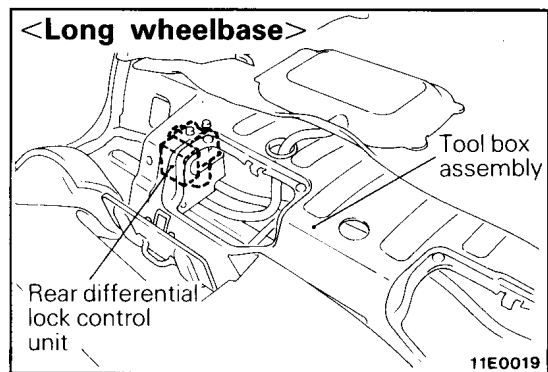
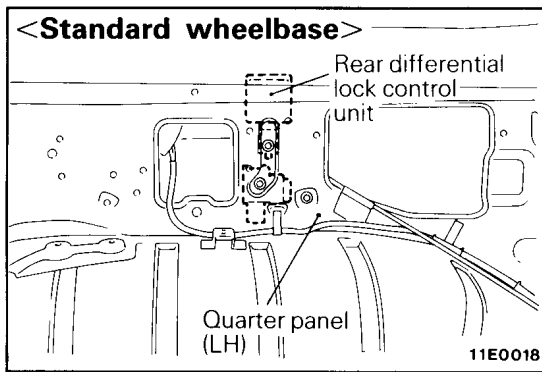
- attempt to change over the differential from the free to locked state with the vehicle at a speed of 12 km/h (7 mph) or more is inhibited by the control unit], the indicator lamp flashes.
- (3) To check for a burnt bulb, the indicator lamp is unconditionally lit for five seconds immediately after the ignition switch has been turned ON (the engine started).



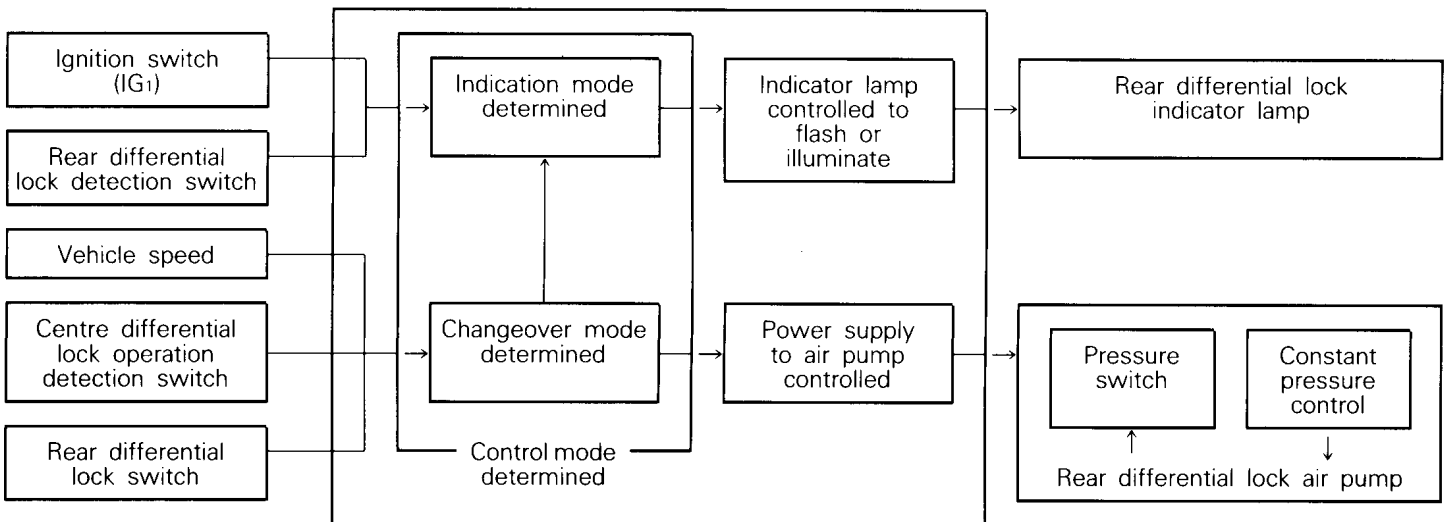
REAR DIFFERENTIAL CONTROL UNIT

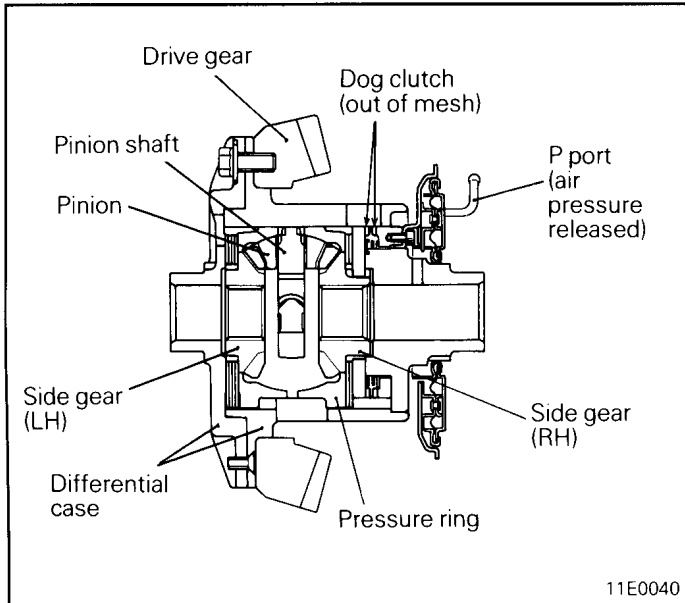
- On the J top and metal top vehicles, the control unit is mounted on the quarter panel (LH). On long wheelbase vehicles, the control unit is mounted in the tool box assembly under the rear seat with a bracket in between.
- Achieves ON/OFF control of power supply to the rear differential lock air pump in response to the ON/OFF signals from the rear differential lock switch and centre differential lock operation detection switch.
- When the vehicle speed is 12 km/h (7 mph) or more, the control unit inhibits changeover of the

- air pump from OFF to ON.
- Causes the rear differential lock indicator lamp to come on or go out in response to the ON/OFF signals from the rear differential lock detection switch. When changeover is in progress or when the interlocked state exists, the control unit causes the indicator lamp to flash.
- When the ignition switch is turned ON, the control unit causes the indicator lamp to light for approximately 5 seconds regardless of the ON/OFF states of all the switches.

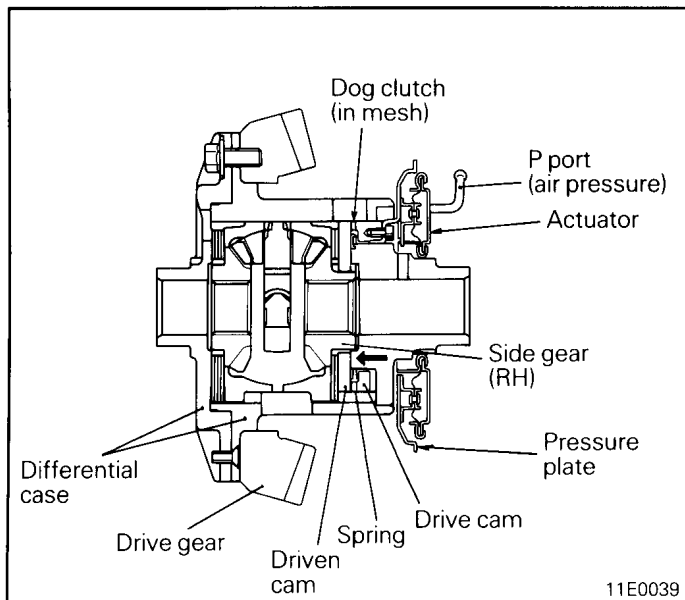


Block Diagram



**OPERATION OF SYSTEM****(1) Free state**

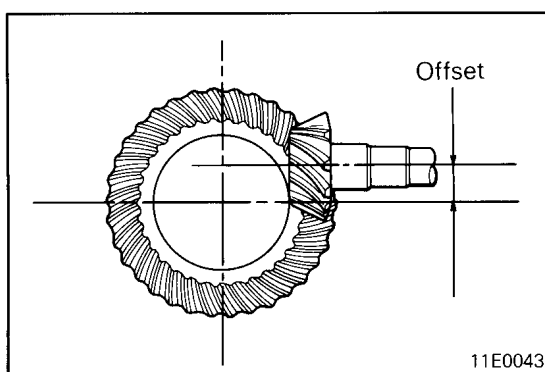
The torque input from the drive gear is transmitted through the differential case, pressure ring, pinion shaft, pinion gear and side gear to the right and left rear axle shafts. Even if the right and left shafts differ in rotating speed, the normal differential functions are accomplished, as there is no hindrance.

**(2) Locked state**

Application of an air pressure from the P port allows the actuator to operate, moving the pressure plate and drive cam in the direction of the arrow. As a result, the dog clutches of the drive and driven cams are brought into mesh to block the differential action of the differential case and side gear (RH) to create a locked state. In addition, the differential case and drive cam are meshed, as long as the torque is applied from the drive gear to the differential case, the drive cam is pressed against the driven cam and cannot be released.

(3) When locked state is released

When the air pressure applied to the P port is released, the actuator releases the pressure plate. When the torque applied to the differential case is removed, the drive cam is moved in the direction of the arrow by the spring, and is separated from the driven cam to restore the normal differential functions.

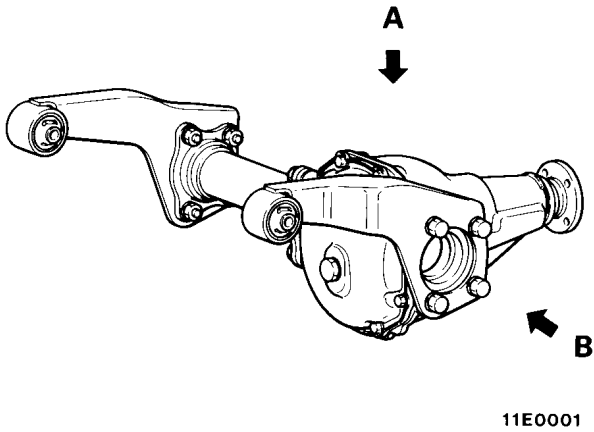
**FRONT DIFFERENTIAL**

The front differential is of a reverse offset configuration. In this configuration, the helix direction of both the drive gear and pinion gear is opposite to that of an ordinary differential. Consequently, the drive surfaces of the gear teeth are the leading surfaces contrary to the trailing surfaces in an ordinary 4WD vehicles' differential. This design is effective at reducing gearing noise.

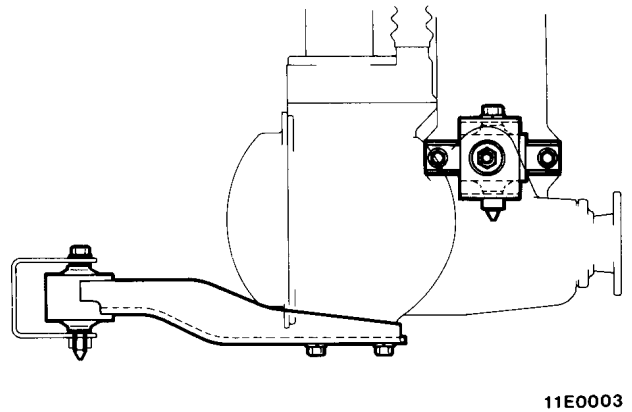
FRONT DIFFERENTIAL MOUNT

The front differential is elastically supported at two points at the front and one point at the rear to reduce vibrations via the brackets.

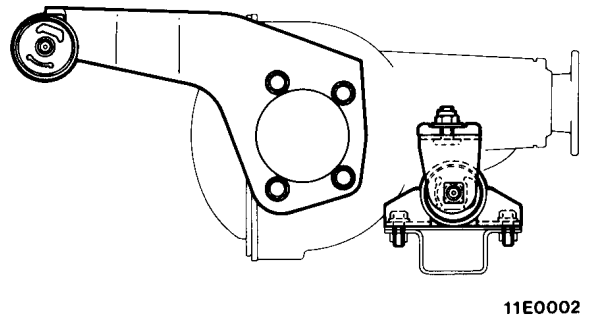
The insulators used at the front supporting points have internal voids at both top and bottom, while the insulator at the rear has them at both front and rear. The locations of these voids are determined according to the movement characteristics of each supporting point in order to absorb the vibrations most effectively.



View A



View B



REAR AXLE

E9CGAAB

The new PAJERO/MONTERO models use the rear axle of the semi-floating type with a “banjo” axle housing.

This rear axle features the following:

- Wider track (tread) for greater stability due to an extended axle housing and axle shaft

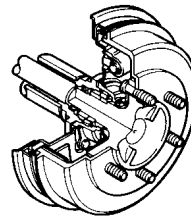
- Greatly durable wheel bearing support which uses a press-fitted retainer.
- A new differential air bleeder which opens to the atmosphere through a pipe connected to the differential housing.
- On ABS-equipped vehicles, the wheel speed sensing rotors are on the axle shafts.

SPECIFICATIONS

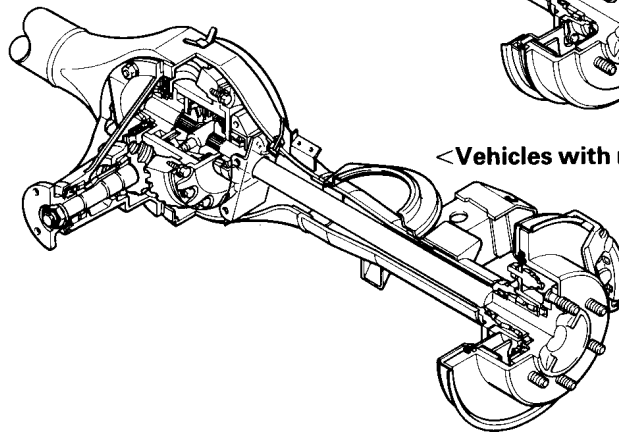
Items	Vehicles with rear disc brakes	Vehicles with rear differential lock	Vehicles with rear drum brakes
Axle housing type	Banjo type	Banjo type	Banjo type
Axle shaft			
Supporting type	Semi-floating type	Semi-floating type	Semi-floating type
Shaft O.D. (bearing part x centre x length) mm (in.)	40 x 34.5 x 744.5 (1.57 x 1.36 x 29.31)	LH: 40 x 34.5 x 723.5 (1.57 x 1.36 x 28.48) RH: 40 x 34.5 x 760.75 (1.57 x 1.36 x 29.95)	40 x 34.5 x 744.5 (1.57 x 1.36 x 29.31)
Bearing type	Double taper roller bearing	Double taper roller bearing	Taper roller bearing
Bearing (O.D. x I.D.) mm (in.)	80 x 40 (3.15 x 1.57)	80 x 40 (3.15 x 1.57)	80 x 40 (3.15 x 1.57)

CONSTRUCTION

<Vehicles with rear drum brake>

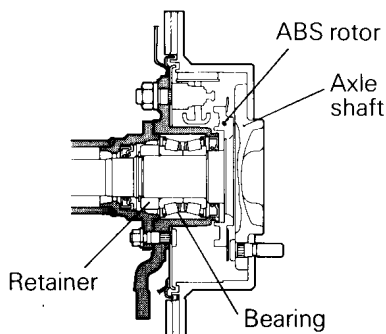


<Vehicles with rear disc brake>



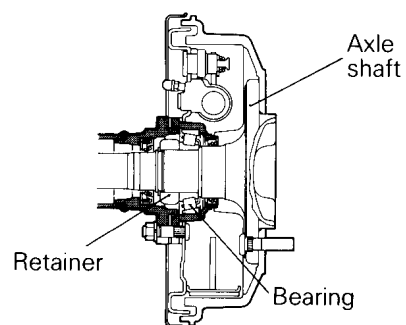
11E0032

<Vehicles with rear disc brake>



11E0026

<Vehicles with rear drum brake>



11E0027

DRIVE-CONTROL COMPONENTS

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E9DAZAE

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SUSPENSION

E9DLAAA

The front suspension is double wishbone, independent suspension which assures a comfortable ride and outstanding steering stability. The rear suspension is the 3-link coil spring type axle suspension, which assures comfortable ride and outstanding steering stability or the leaf spring type axle suspen-

sion, which features outstanding strength. In addition, remote controlled variable shock absorbers have been adopted which allow the shock absorber damping force to be changed in three stages of operation by a switch provided int.

SPECIFICATIONS

Items	V21, V23, V24, V41, V43, V44	V12, V14, V32, V34
Front suspension	Double wishbone type independent suspension	Double wishbone type independent suspension
Rear suspension	3-link coil spring type axle suspension	Leaf spring type axle suspension
Remote controlled variable shock absorber	Option	—

FEATURES

Ride comfort

1. Rubber bushing adopted for upper arm pivot <Front>
2. Larger size bushing adopted for lower arm <Front>
3. Taper coil springs adopted <Rear> (V21, V23, V24, V41, V43, V44)
4. Remote controlled variable shock absorbers adopted (Option)
5. Front wheel stroke increased

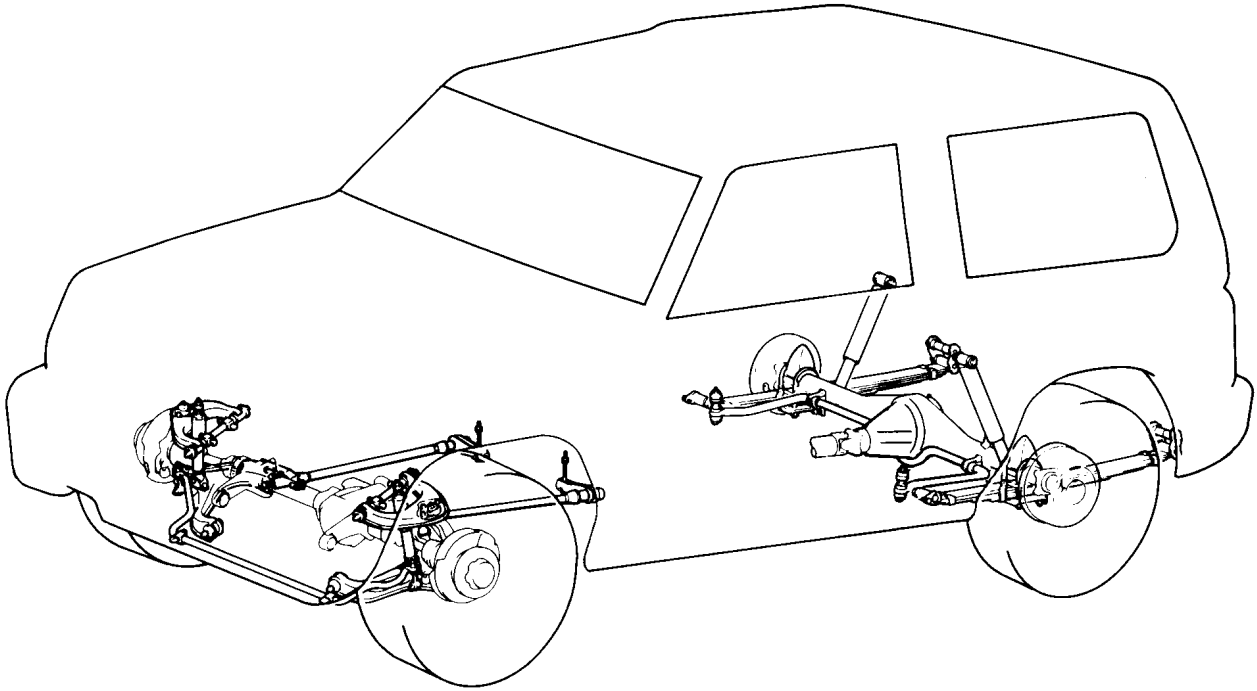
Better steering stability and rough road operation

1. Tread enlarged
2. Kingpin offset reduced
3. Straight type lateral rod adopted which offers higher lateral rigidity (V21, V23, V24, V41, V43, V44)
4. Higher roll rigidity stabilizer bar adopted
5. Shock absorber damping force optimized

Better durability and serviceability

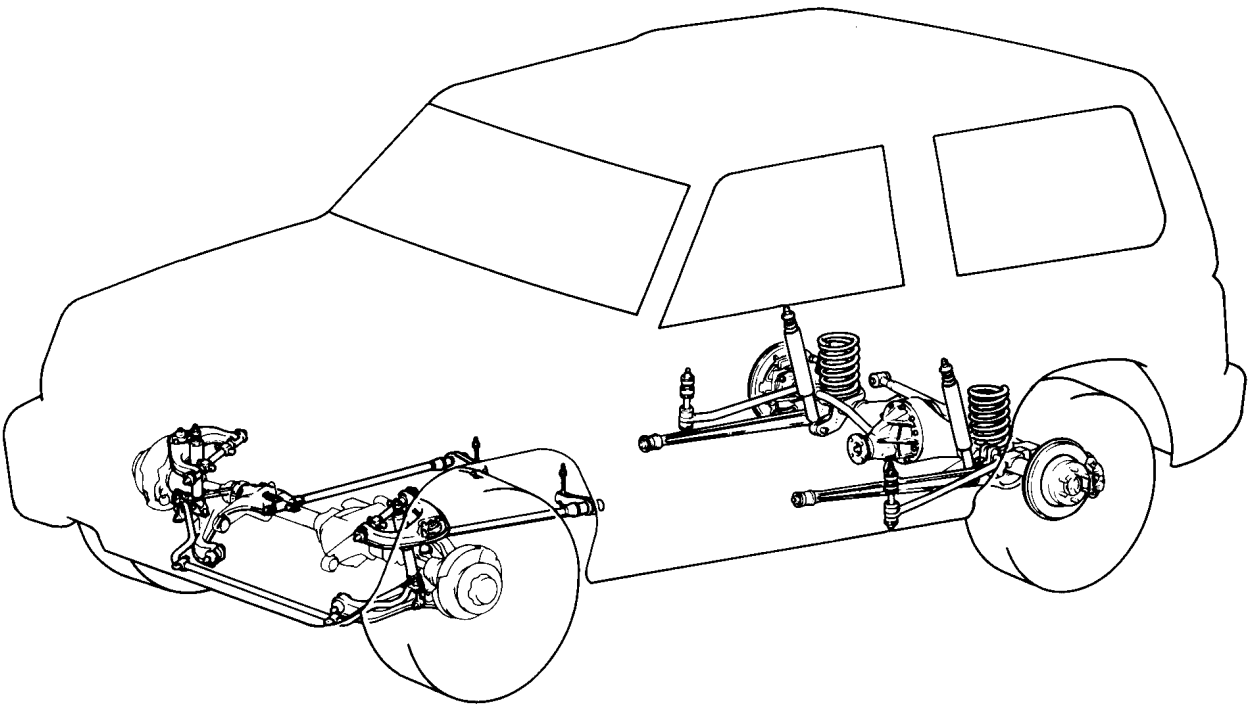
1. Forged lower arm adopted which offers higher strength and durability <Rear> (V21, V23, V24, V41, V43, V44)
2. Simpler link mechanism adopted which requires less parts <Rear> (V21, V23, V24, V41, V43, V44)

<REAR LEAF SPRING TYPE>



12E0041

<REAR 3-LINK COIL SPRING TYPE>

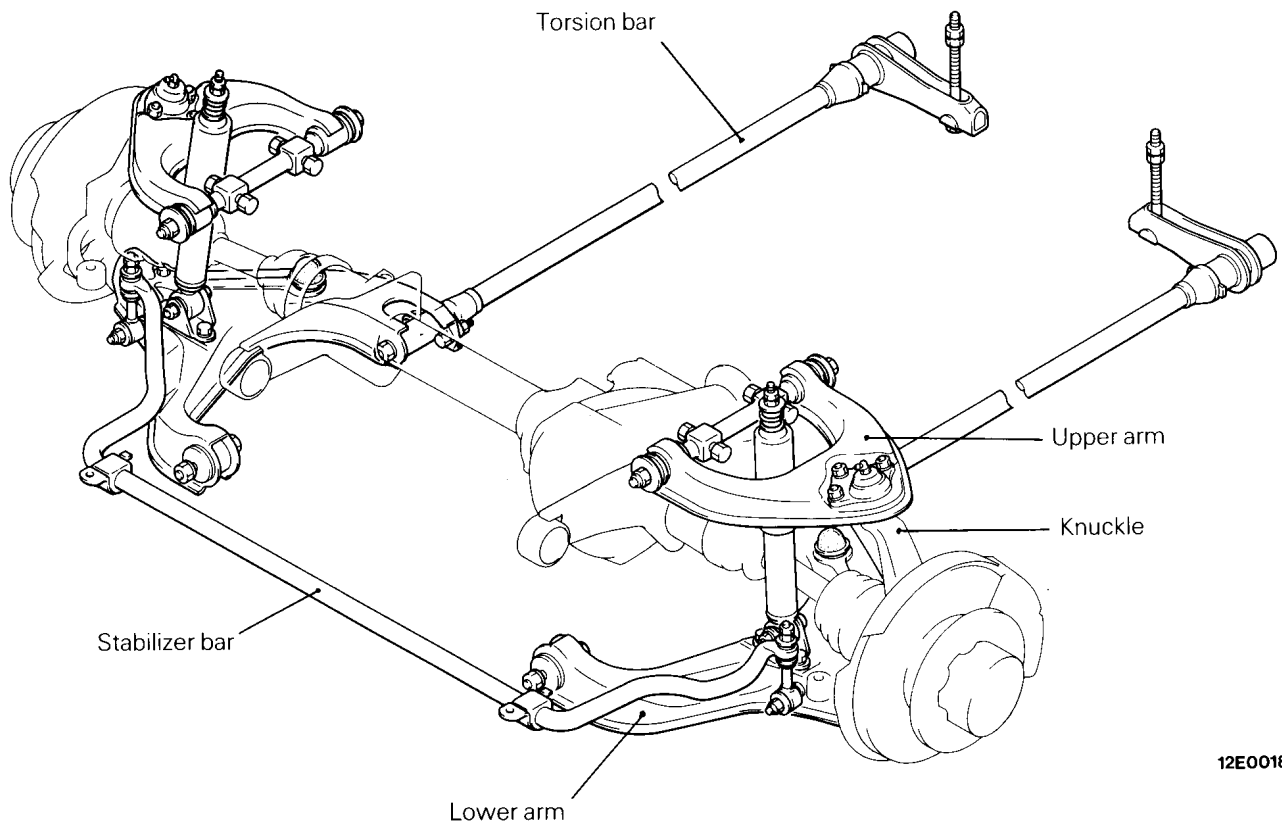


12E0040

FRONT SUSPENSION

FEATURES

- Adopts a highly rigid A-type upper arm and lower arm suitable for rough road operation.
- Sets optimum damping force characteristics for the shock absorbers.
- Adopts torsion bar springs which assure comfortable ride.



12E0018

NOTE

The construction and operation of the front suspension are essentially the same as those of the 1990

PAJERO. Only the differences from the conventional PAJERO are described here.

SPECIFICATIONS

Items	Standard specification	Optional specification
Suspension system	Independent, double wishbone with torsion bar and telescopic shock absorber	Independent, double wishbone with torsion bar and telescopic shock absorber
Camber	40' ± 30' (difference between right and left: 30' or less)	40' ± 30' (difference between right and left: 30' or less)
Caster	3° ± 1° (difference between right and left: 30' or less)	3° ± 1° (difference between right and left: 30' or less)
Kingpin inclination	14° 52'	14° 52'
Toe-in mm (in.)	3.5 ± 3.5 (0.14 ± 0.14)	3.5 ± 3.5 (0.14 ± 0.14)
Torsion bar Length x O.D. mm (in.)	1,277.5 x 26.2 (50.295 x 1.031) 1,277.5 x 27.0 (50.295 x 1.062)* ¹	1,277.5 x 27.0 (50.295 x 1.062)
Spring constant (wheel position) N/mm (kg/mm, lbs./in.)	25 (2.5, 140), 28 (2.8, 157)* ¹	28 (2.8, 157)
Shock absorber Type	Hydraulic cylinder type double acting	Low pressure nitrogen gas filled hydraulic cylinder type double acting
Max. length mm (in.)	345 (13.6)	345 (13.6)
Min. length mm (in.)	225 (8.9)	230 (9.1)
Stroke mm (in.)	120 (4.7)	115 (4.5)
Damping force [at 0.3 m/sec. (0.9 ft./sec.)]		
Expansion N (kg, lbs.)	2,450 (245, 540)	Hard: 3,150 (315, 694) Medium: 2,350 (235, 518) Soft: 1,700 (170, 375)
Contraction N (kg, lbs.)	1,500 (150, 331)	Hard: 1,600 (160, 353) Medium: 1,250 (125, 278) Soft: 850 (85, 187)
Stabilizer bar Outside diameter mm (in.)	23 (0.91)* ² , 25 (0.98)* ³ , 28 (1.10)* ⁴	23 (0.91)* ² , 25 (0.98)* ³ , 28 (1.10)* ⁴
Identification colour	Red* ² , White* ³ , Yellow* ⁴	Red* ² , White* ³ , Yellow* ⁴

NOTE

*¹: Australia version V32, V34

*²: V12, V14

*³: V21, V23, V24, V32, V34

*⁴: V41, V43, V44

DESCRIPTION OF CONSTRUCTION

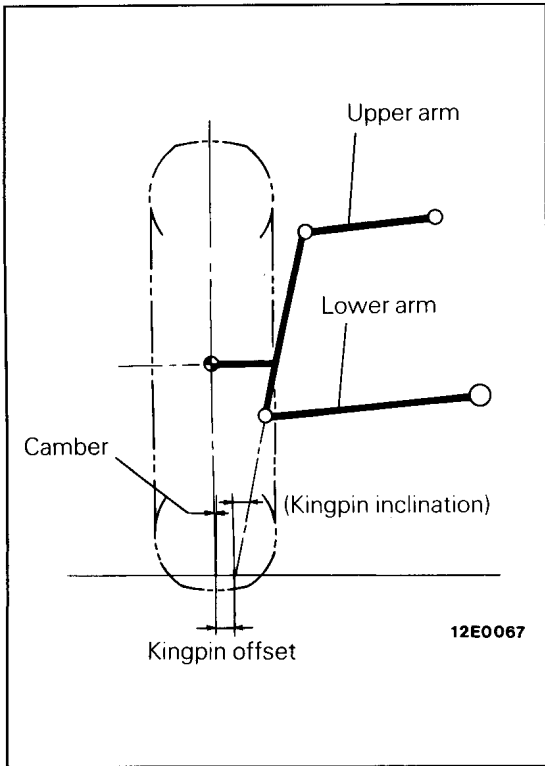
WHEEL ALIGNMENT

Camber, Toe-in

The camber has been reduced to improve the steerability.

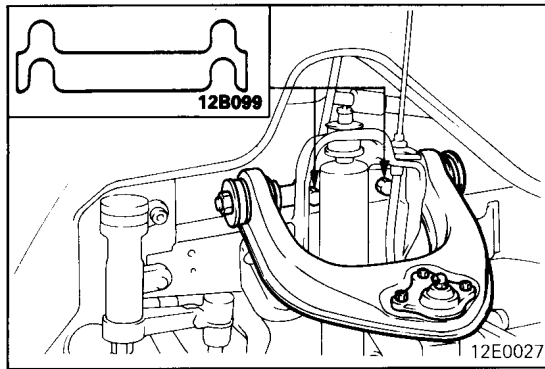
Kingpin Offset

The kingpin offset amount has been reduced for reduction of the moment around the kingpin shaft generated during braking or driving on a road where vehicles are exposed to various external forces to improve braking stability and straight ahead stability.



Wheel Alignment Adjustment

The camber can be adjusted by adding or removing shims set in the upper arm and cross member mounting portions. The caster is not possible to adjust.

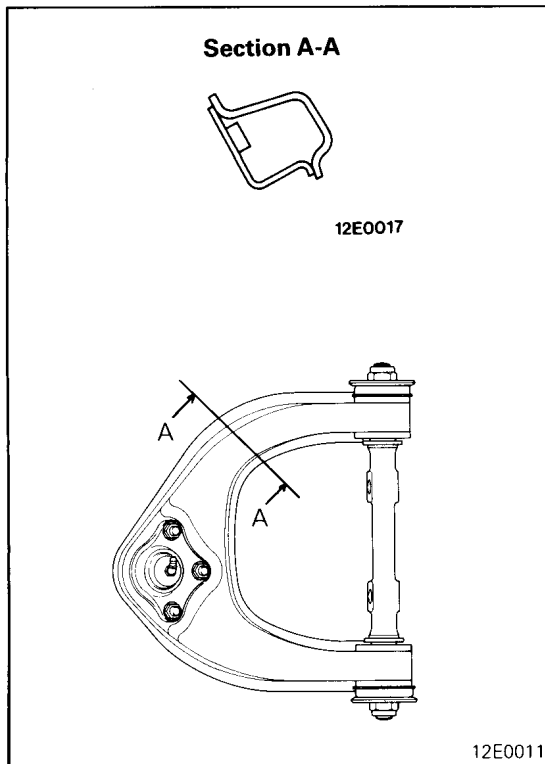


UPPER ARM

The upper arm is an A-type arm of box type closed cross-sectional construction which offers high strength.

A rubber bushing has been adopted for the pivot of the upper arm for improvement of riding comfort and prevention of vibration.

The ball joint is installed on the upper arm with bolts to assure easier servicing.



REAR SUSPENSION <LEAF SPRING TYPE>

E9DCAAE

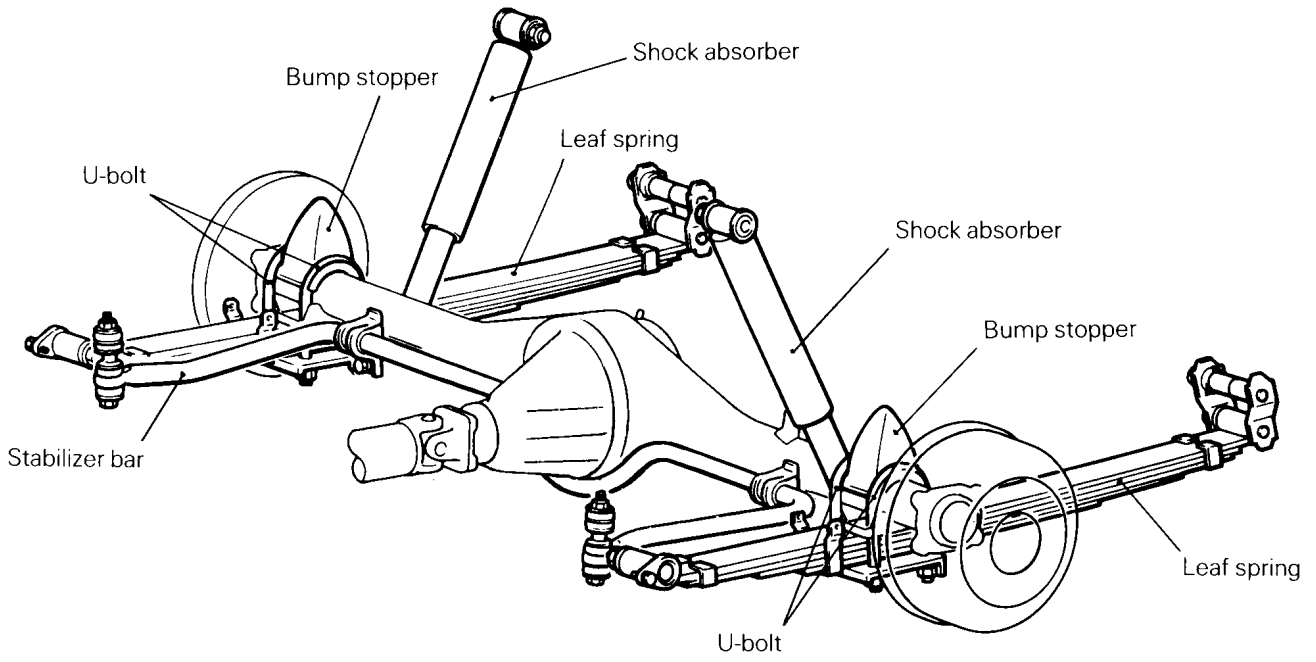
FEATURES

- Asymmetrical progressive leaf springs* have been adopted for improvement of riding comfort and roll rigidity and prevention of wind-up.
 - Bias arrangement shock absorbers have been adopted for effective prevention of wind-up.
- * Progressive leaf spring: Consists of large curvature leaves piled under an arc-shaped spring and provides a larger spring force for a larger load.

SPECIFICATIONS

Items	V12, V14	V32, V34
Suspension system	Asymmetrical semi-elliptic leaf spring type rigid axle suspension	Asymmetrical semi-elliptic leaf spring type rigid axle suspension
Leaf spring		
Number of leaf springs	4	5
Camber (unladen) mm (in.)	73 – 83 (2.87 – 3.27) [73.5 – 82.5 (2.89 – 3.25)]	Vehicles for General Export and Gulf countries 72.5 – 83.5 (2.854 – 3.287) [80.0 – 90.0 (3.15 – 3.54)] Vehicles for Australia 80.0 – 90.0 (3.15 – 3.54)
Spring constant as installed N/mm (kg/mm, lbs./in.)		
Light load	29.1 (2.91, 163) [35.0 (3.50, 196)]	Vehicles for General Export and Gulf countries 32.2 (3.22, 180) [42.4 (4.24, 237)] Vehicles for Australia 42.4 (4.24, 237)
Heavy load	73.1 (7.31, 409) [124.0 (12.40, 694)]	Vehicles for General Export and Gulf countries 61.5 (6.15, 344) [103.8 (10.38, 581)] Vehicles for Australia 103.8 (10.38, 581)
Shock absorber		
Max. length mm (in.)	548 (21.6)	558 (22.0)
Min. length mm (in.)	328 (12.9)	333 (13.1)
Stroke mm (in.)	220 (8.7)	225 (8.9)
Damping force [at 0.3 m/sec. (0.9 ft./sec.)]		
Expansion N (kg, lbs.)	1,200 (120, 265)	1,800 (180, 397)
Contraction N (kg, lbs.)	550 (55, 121)	800 (80, 176)

NOTE
Optional specifications shown in []



12E0039

NOTE

The construction and operation of the leaf spring type rear suspension are essentially the same as

those of the 1990 PAJERO.

REAR SUSPENSION <COIL SPRING TYPE>

E9DCAAF

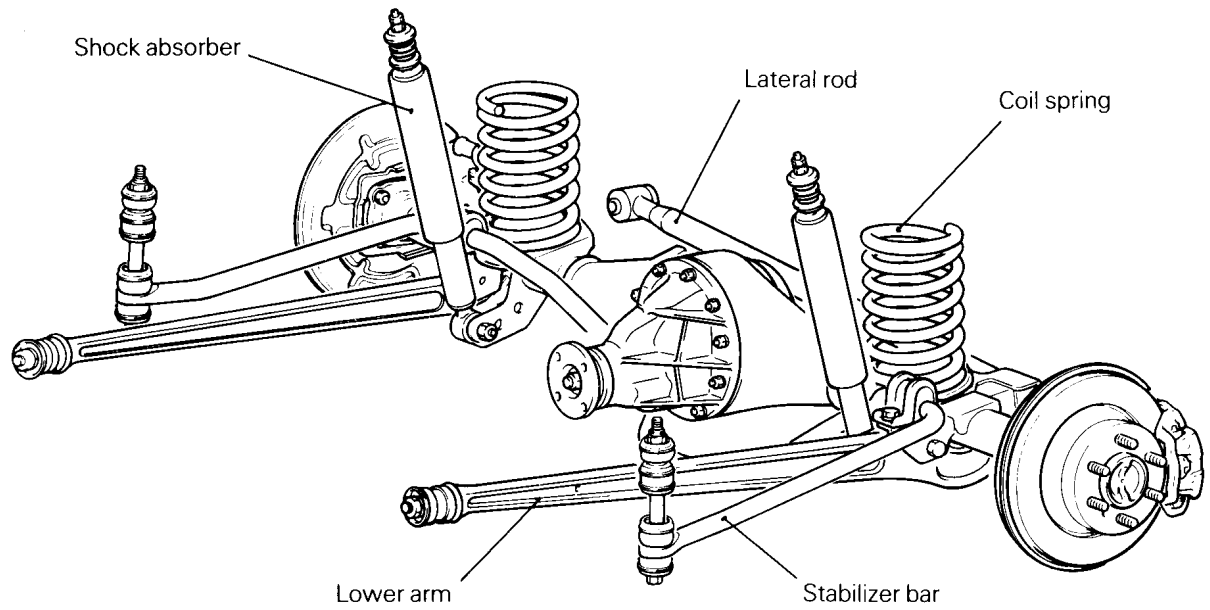
FEATURES

- Coil springs have been fitted to give passenger car ride comfort.
- A lateral rod has been adopted to assure better steering stability and rough road operation.

SPECIFICATIONS

Items	V21C, V24C	V21W, V23C, V23W, V24W	V41W, V43W, V44W
Suspension system	Coil spring type 3-link rigid axle suspension	Coil spring type 3-link rigid axle suspension	Coil spring type 3-link rigid axle suspension
Coil spring			
Wire dia. x O.D. x free length mm (in.)	13.4 to 14.5 x 159.4 to 160.5 x 422.5 (0.53 to 0.57 x 6.28 to 6.32 x 16.63) [13.4 to 15.0 x 159.4 to 161 x 391 (0.53 to 0.59 x 6.28 to 6.34 x 15.39)]	13.4 to 14.5 x 159.4 to 160.5 x 435.5 (0.53 to 0.57 x 6.28 to 6.32 x 17.15) [13.4 to 15.0 x 159.4 to 161 x 401.5 (0.53 to 0.59 x 6.28 to 6.34 x 15.81)]	14.2 to 15.8 x 160.2 to 161.8 x 404.5 (0.56 to 0.62 x 6.31 to 6.37 x 15.93) [11.8 to 16.0 x 157.8 to 162 x 396.5 (0.46 to 0.63 x 6.21 to 6.38 x 15.61)]
Coil spring identification colour	Orange x 1 [Pink x 1]	Orange x 2 [Pink x 2]	Green x 1 [Light blue x 1]
Spring constant N/mm (kg/mm, lbs./in.)	18 to 30 (1.8 to 3.0, 101 to 168) [22 to 40 (2.2 to 4.0, 123 to 224)]	18 to 30 (1.8 to 3.0, 101 to 168) [22 to 40 (2.2 to 4.0, 123 to 224)]	27 to 39 (2.7 to 3.9, 151 to 218) [27 to 45 (2.7 to 4.5, 151 to 252)]
Shock absorber			
Max. length mm (in.)	457 (18.0)	457 (18.0)	
Min. length mm (in.)	297 (11.7)	297 (11.7)	
Stroke mm (in.)	160 (6.3)	160 (6.3)	
Damping force [at 0.3 m/sec. (0.9 ft./sec.)]			
Expansion N (kg, lbs.)	2,450 (245, 540)	2,450 (245, 540) [Hard: 3,350 (335, 739) Medium: 2,450 (245, 540) Soft: 1,750 (175, 386)]	
Contraction N (kg, lbs.)	1,300 (130, 287)	1,300 (130, 287) [Hard: 1,650 (165, 364) Medium: 1,300 (130, 287) Soft: 900 (90, 198)]	

NOTE
Optional specifications shown in []



12 E0009

NOTE

The construction and operation of the coil spring type rear suspension are essentially the same as

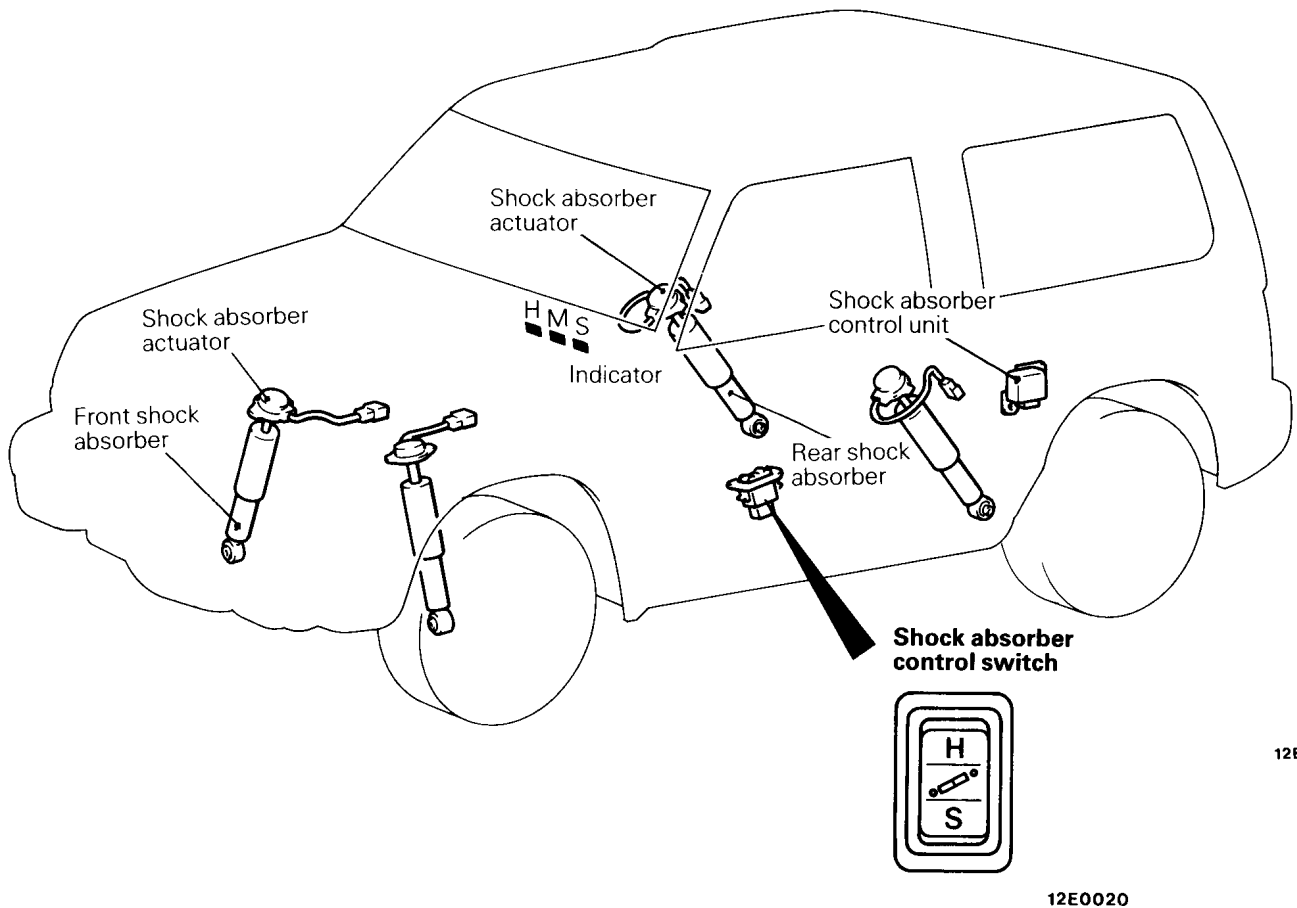
those of the 1990 PAJERO.

REMOTE CONTROLLED VARIABLE SHOCK ABSORBERS

E9DKAAA

The remote controlled variable shock absorbers allow the damping force to be changed in three stages by operating a three-stage switch fitted in the console. When the switch is operated, the

motor-driven actuators fitted on the top of the shock absorbers rotate the control rods in the shock absorbers to change the damping force.



12E0023

12E0020

Features of individual modes

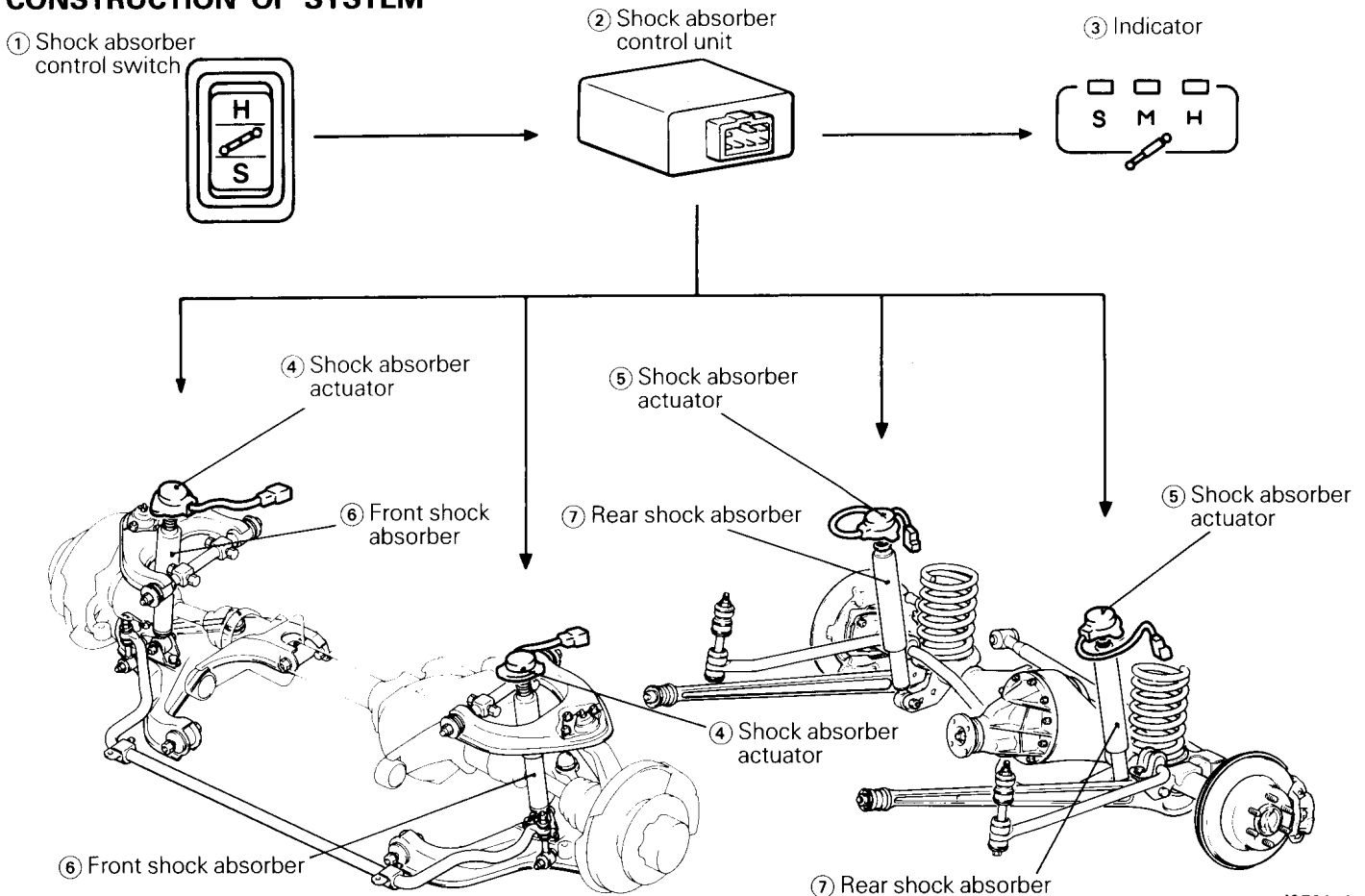
Mode	Items	Shock absorber damping force	Features
Hard		Hard setting	Outstanding steering stability and drivability on rough roads.
Medium		Standard setting	Proper suspension suitable for operation on general roads
Soft		Soft setting	Comfortable ride

SPECIFICATIONS

Items		Front suspension	Rear suspension
Type		Low pressure nitrogen gas filled hydraulic cylinder type double acting	Low pressure nitrogen gas filled hydraulic cylinder type double acting
Max. length	mm (in.)	345 (13.6)	457 (18.0)
Compressed length	mm (in.)	230 (9.1)	297 (11.7)
Stroke	mm (in.)	115 (4.5)	160 (6.3)
Damping force [at 0.3 m/sec. (0.9 ft./sec.)] N (kg, lbs.)	Expansion		
	Hard	3,150 (315, 694)	3,350 (335, 739)
	Medium	2,350 (235, 518)	2,450 (245, 540)
	Soft	1,700 (170, 375)	1,750 (175, 386)
	Contraction		
	Hard	1,600 (160, 353)	1,650 (165, 364)
	Medium	1,250 (125, 276)	1,300 (130, 287)
	Soft	850 (85, 187)	900 (90, 198)

DESCRIPTION OF CONSTRUCTION

CONSTRUCTION OF SYSTEM



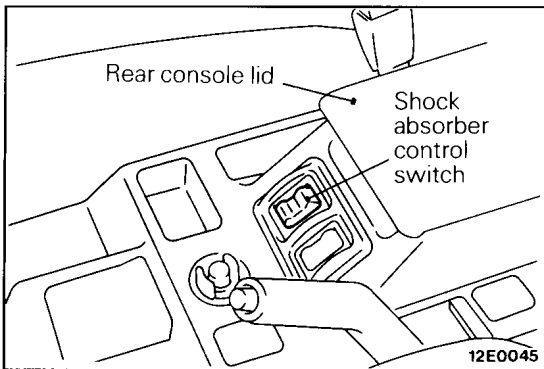
12E0042

When the shock absorber control switch (1) is operated, the shock absorber control unit (2) operates the shock absorber actuators (4), (5) to rotate the damping force changeover rotary valves built in the front shock absorbers (6) and rear shock

absorbers (7). Accordingly, the orifices which constitute the oil passages in the front and rear shock absorbers are opened or closed to alter the damping force.

Major components

Component	Function of component
Shock absorber control switch	Mode selection switch
Indicator	Indicates the current mode to the driver.
Shock absorber actuator	Actuates the rotary valve in the shock absorber.
Front shock absorbers, rear shock absorbers	Have a built-in rotary valve constructed to make the damping force variable.
Shock absorber control unit	Actuates all the actuators according to the mode selected by the shock absorber control switch.

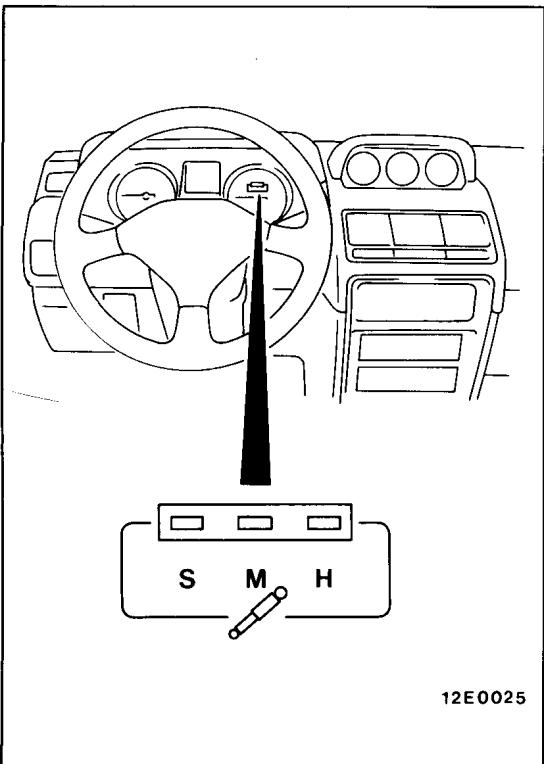


SHOCK ABSORBER CONTROL SWITCH

The shock absorber control switch is a rocker type 3-stage changeover switch fitted in the rear console assembly and is used to select the Hard, Medium or Soft mode.

INDICATOR

The indicator is arranged in the tachometer of the combination meter. The LED that is ON identifies the current mode.

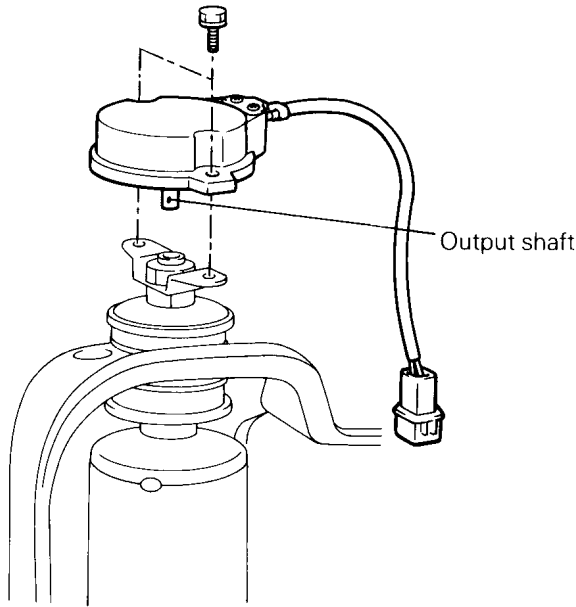


SHOCK ABSORBER ACTUATOR

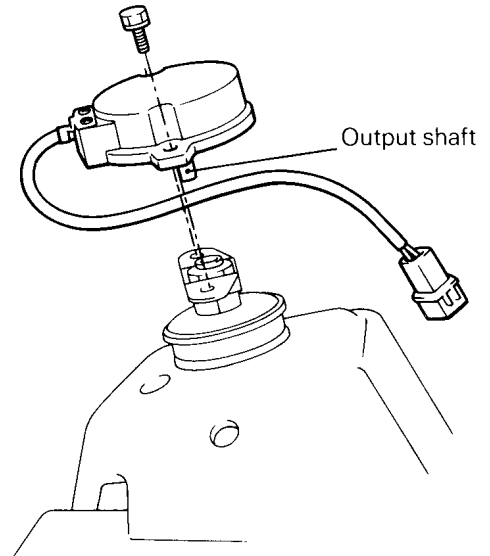
In response to a signal from the shock absorber control unit, the shock absorber actuators rotate the control rods in the shock absorbers to operate the respective rotary valves.

The actuator output shaft which rotates the control rod always rotates in a single direction for change-over of the Soft, Medium and Hard modes at intervals of 90°.

Front actuator

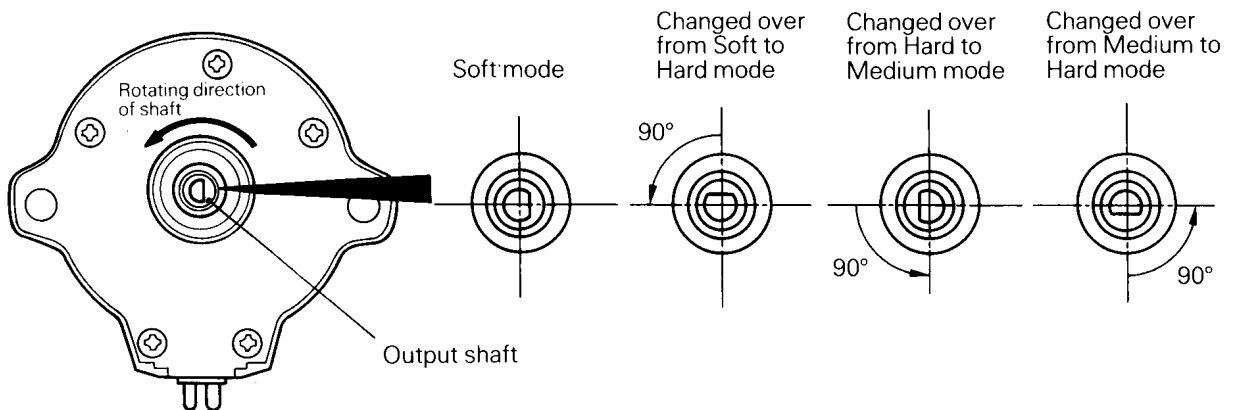


Rear actuator



12E0034

Back side of actuator

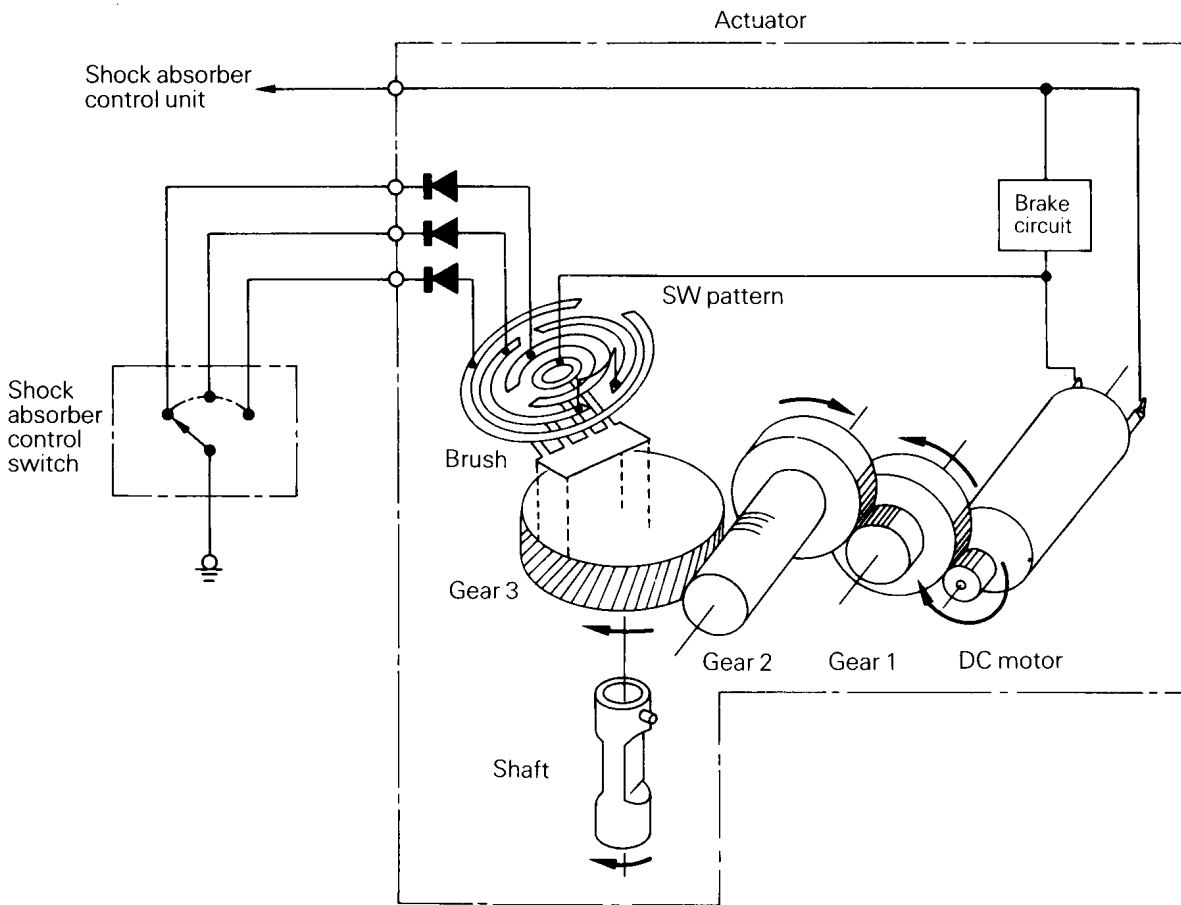


12E0006

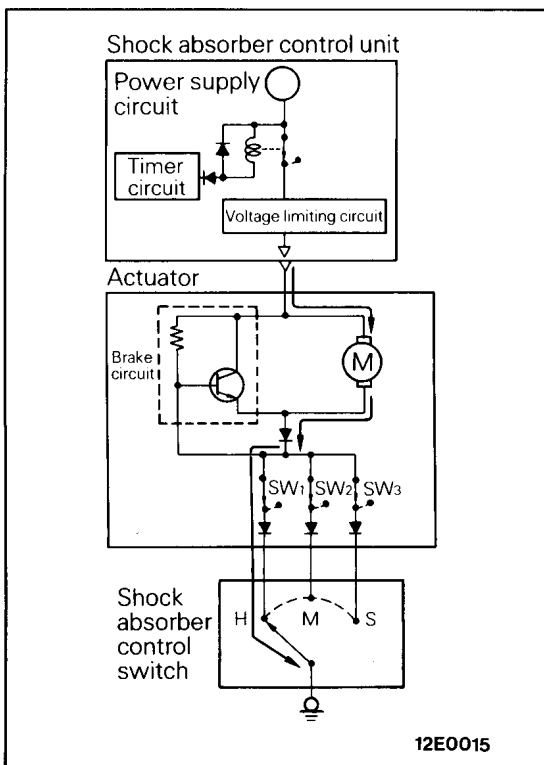
Construction of Actuator

The actuator consists of a rotary drive section composed of a DC motor and three gears, a position detector circuit composed of a brush rotating with the output shaft in a single body and a switch

pattern secured on the case, and a brake circuit which applies electric brake to the DC motor to assure locating accuracy.



12E0003



12E0015

Operation of Actuator

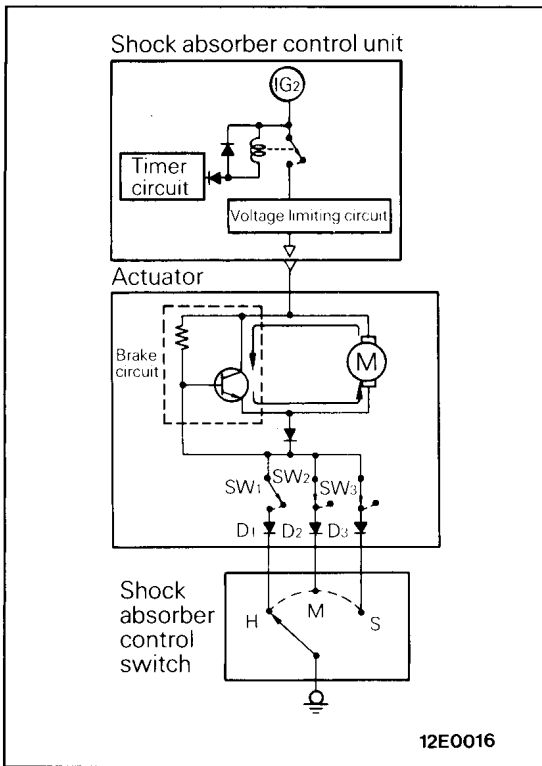
Briefly the system operates as follows when the Hard mode is selected. In the circuit diagram, the SW₁, SW₂ and SW₃ denote the contacts comprising the SW pattern and brush on the circuit board and have the following relationships with the actuator drive positions.

[Relationships between actuator drive positions and contacts SW₁, SW₂ and SW₃]

Contact	Hard	Medium	Soft
SW ₁	OFF	ON	ON
SW ₂	ON	OFF	ON
SW ₃	ON	ON	OFF

[Operation during rotation]

The electrical circuit in the actuator is configured as shown in the illustration at the left. When the Hard mode is selected, the power is fed to the motor as indicated by the arrow. When the output shaft rotates to the position H, the SW₁ is opened and the motor cut off.



12E0016

[Operation at the time of shutdown]

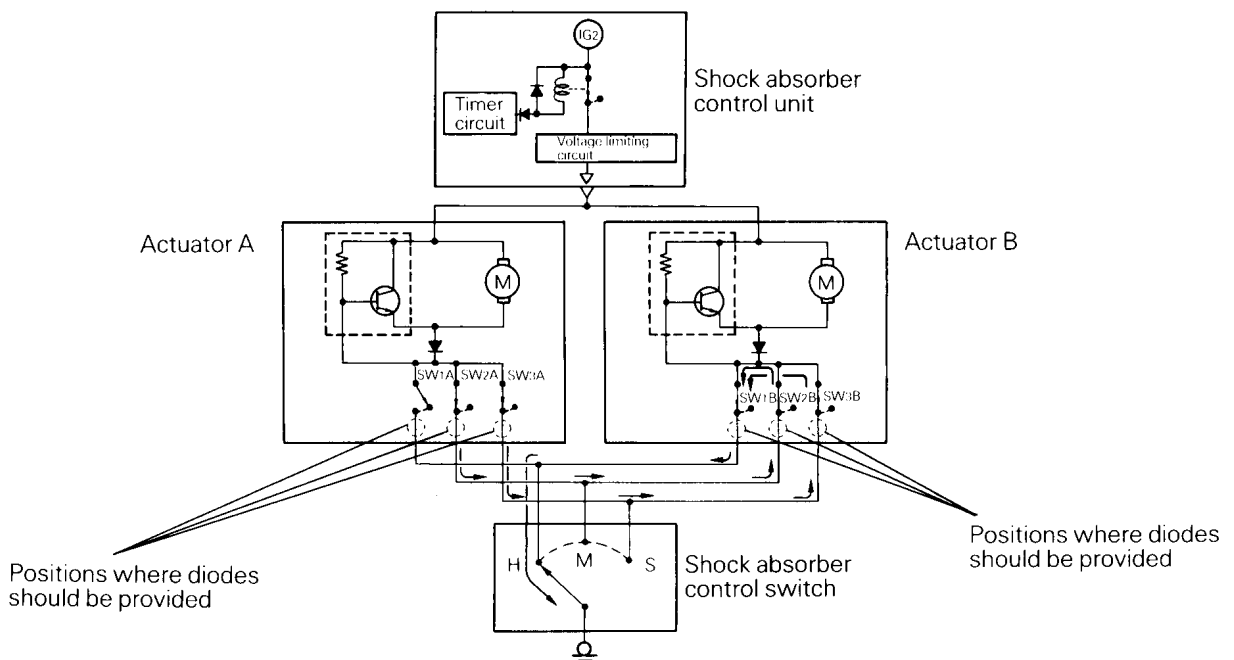
Even after the power supply to the motor has been stopped, the motor continues to rotate because of its inertial force, generating an e.m.f. (Electro motive force)

The e.m.f. is used to operate the brake circuit which provides a short circuit across the motor to apply abrupt brake to the motor.

[Roles of diodes D₁, D₂ and D₃]

Diodes D₁, D₂ and D₃ are provided between the actuator SW₁, SW₂ and SW₃ and the shock absorber control switch respectively. The diodes are provided for the purpose of preventing problems such as the one described below that occur when multiple actuators are wired in parallel. For example, when the Hard mode is selected the motors in both actuators A and B rotate to the Hard position. In this case, if the motor in actuator A reaches the Hard position earlier, the SW₁A is forced to OFF to stop

motor A. However, since the motor in actuator B does not reach the Hard position yet, the SW₁B remains ON. As a result, the ⊖ terminal of motor A is grounded via SW₂A, SW₃A → SW₂B, SW₃B → SW₁B → shock absorber control switch, and motor A cannot stop. In other words, it follows that if no diodes are provided, motors A and B cannot be stopped unless the SW₁A, SW₂B and SW₃B are simultaneously caused to be OFF.

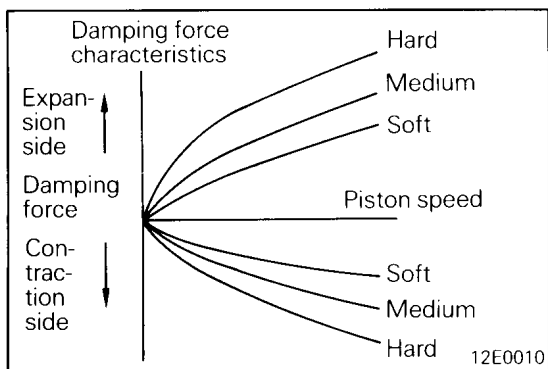
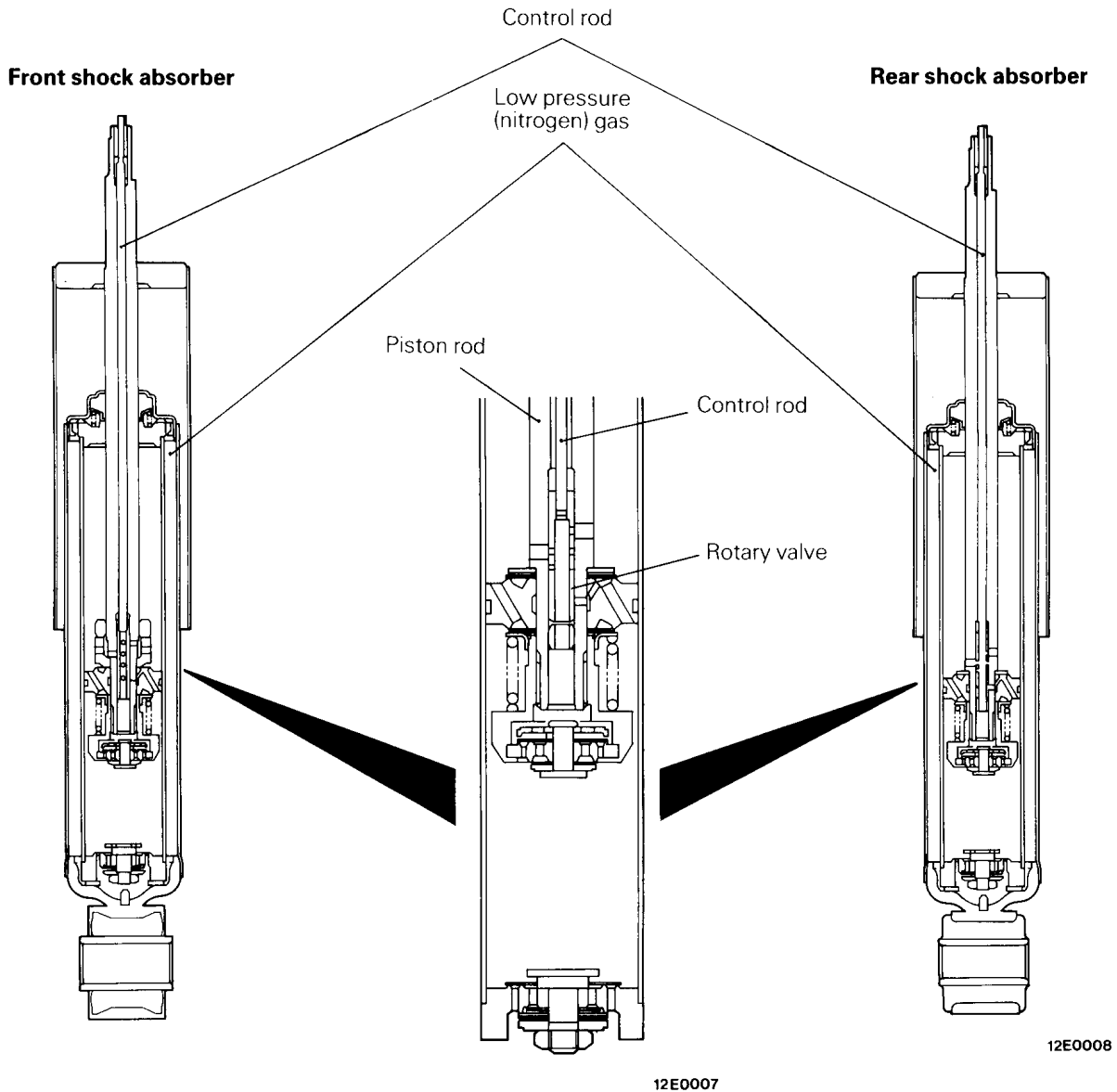


12E0014

FRONT AND REAR SHOCK ABSORBERS

The front and rear shock absorbers are essentially the same in construction and operation. Both have a rotary valve with an orifice which is made to rotate to open or close the oil passage, thereby changing

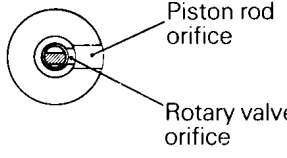


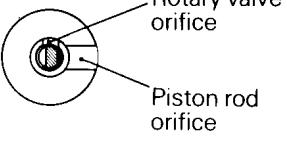
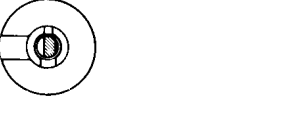

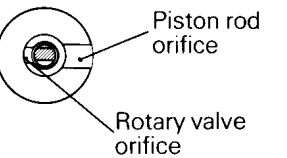
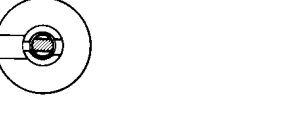

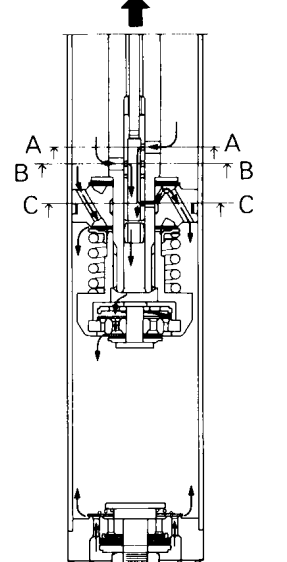
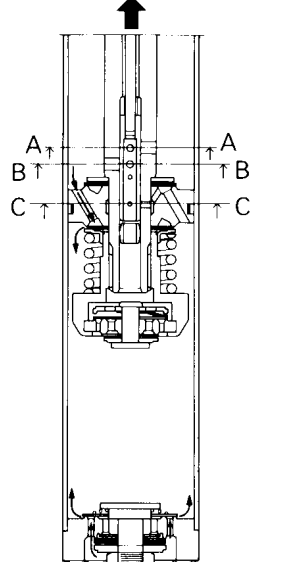
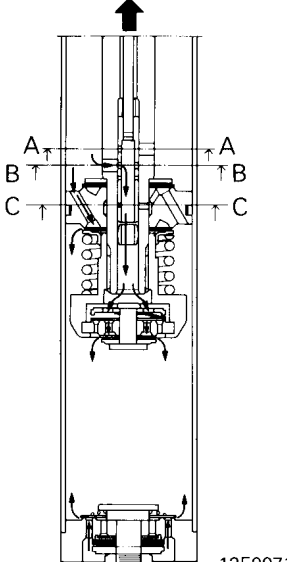
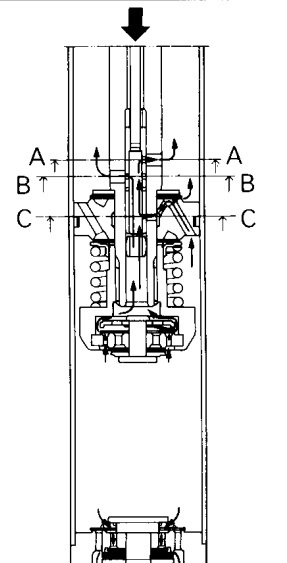
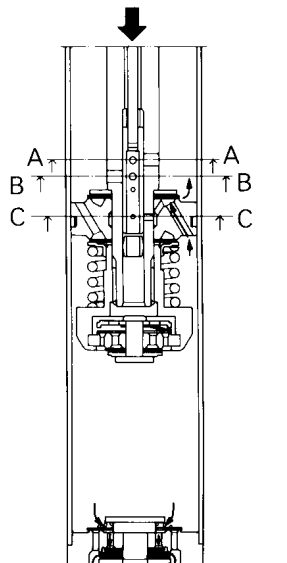
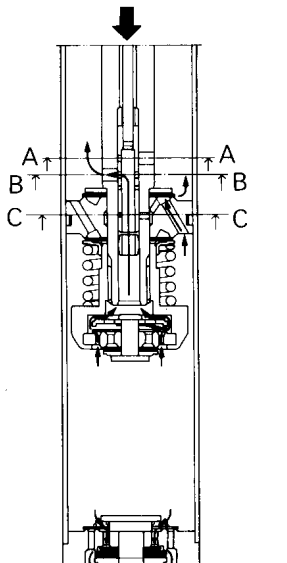
the damping force. The front and rear shock absorbers are filled with a low pressure nitrogen gas to assure stable damping force characteristics.



Damping Force Changing Mechanism

Both the rotary valve and the piston rod which accommodates the rotary valve have an orifice. The two orifices are placed in the opened or closed position by rotation of the rotary valve to increase or reduce the flow passage area in the shock absorber and change the damping force in three stages.

Flow of Shock Absorber Oil

Item	Mode	Soft mode	Hard mode	Medium mode
Positions of rotary valve orifice and piston rod orifice		<p>Section A-A</p>  <p>Piston rod orifice</p> <p>Rotary valve orifice</p> <p>Section B-B</p>  <p>Section C-C</p> 	<p>Section A-A</p>  <p>Rotary valve orifice</p> <p>Piston rod orifice</p> <p>Section B-B</p>  <p>Section C-C</p> 	<p>Section A-A</p>  <p>Piston rod orifice</p> <p>Rotary valve orifice</p> <p>Section B-B</p>  <p>Section C-C</p> 
Flow of oil in shock absorber	Expansion stroke			
	Contraction stroke			

12E0073

12E0071

12E0072

WHEEL AND TYRE

E9DMAAB

On the wide fender equipped vehicles, aluminum wheels are standard equipment. The offset amount of wheel, reduced for the wider

fender installation, have contributed to wider track and better cornering performance.

SPECIFICATIONS

<Vehicles for Europe>

Items	Vehicles with wide fender	Vehicles without wide fender
Wheel		
Type	Aluminum type	Steel type Aluminum type* ¹
Size	15 x 7JJ	15 x 6JJ
Offset	mm (in.) 10 (0.39)	33 (1.29)
Pitch circle diameter	mm (in.) 139.7 (5.5)	139.7 (5.5)
Tyre		
Size	265/70R15 110S	235/75R15 105S 215R15 100S* ¹
Tyre inflation pressure	kPa (kg/cm ² , psi)	
When 4 passengers		
Front	180 (1.8, 26)	180 (1.8, 26)
Rear	200 (2.0, 28)	200 (2.0, 28) 210 (2.1, 30)* ²
When 4 passengers to max. load or trailer towing		
Front	180 (1.8, 26)	180 (1.8, 26)
Rear	200 (2.0, 28)	220 (2.2, 31) 230 (2.3, 33)* ²

NOTE

*¹: Optional equipment

*²: Tire inflation pressure for optional tyres

<Vehicles for General Export>

Items	Canvas top and van		Wagon			
	GCC	Except for GCC	GCC		Except for GCC	
			With wide fender	Without wide fender	With wide fender	Without wide fender
Wheel Type	Steel type	Steel type	Aluminum type	Steel type	Aluminum type	Steel type
Size	16 x 5.50F 16 x 6JJ* ¹	16 x 5.50F 16 x 6JJ* ¹	15 x 7JJ	16 x 6JJ 16 x 5.50F* ¹	15 x 7JJ	16 x 6JJ 16 x 5.50F* ¹
Offset mm (in.)	33 (1.29)	33 (1.29)	10 (0.39)	33 (1.29)	10 (0.39)	33 (1.29)
Pitch circle diameter mm (in.)	139.7 (5.5)	139.7 (5.5)	139.7 (5.5)	139.7 (5.5)	139.7 (5.5)	139.7 (5.5)
Tyre Size	205/80R16 RF 104S 7.50-16 -6PRLT* ¹	205R16 RF 104Q 7.50-16 -6PRLT* ¹	31 x 10.50R15 6PRLT	205/80R16 RF 104S 7.50-16 -6PRLT* ¹	31 x 10.50R15 6PRLT	205R16 RF 104Q 7.50-16 -6PRLT* ¹
Tyre inflation pressure kPa (kg/cm ² , psi)						
Front	210 (2.1, 30) 200 (2.0, 29)* ²	210 (2.1, 30) 200 (2.0, 29)* ²	200 (2.0, 29)	210 (2.1, 30) 200 (2.0, 29)* ²	200 (2.0, 29)	210 (2.1, 30) 200 (2.0, 29)* ²
Rear	260 (2.6, 38) 240 (2.4, 35)* ²	260 (2.6, 38) 240 (2.4, 35)* ²	200 (2.0, 29)	260 (2.6, 38) 240 (2.4, 35)* ²	200 (2.0, 29)	260 (2.6, 38) 240 (2.4, 35)* ²

NOTE

*¹: Optional equipment*²: Tire inflation pressure for optional tyres

<Vehicles for Australia>

Items	Vehicles with wide fender	Vehicles without wide fender	
		With leaf spring rear suspension	With 3-link, coil spring rear suspension
Wheel Type	Aluminum type	Steel type	Steel type
Size	15 x 7JJ	16 x 5.50F 16 x 6JJ*	15 x 6JJ
Offset mm (in.)	10 (0.39)	33 (1.29)	33 (1.29)
Pitch circle diameter mm (in.)	139.7 (5.5)	139.7 (5.5)	139.7 (5.5)
Tyre Size	265/70R15 110S	205R16 RF 104Q	P235/75R15
Tyre inflation pressure kPa (kg/cm ² , psi)			
When not loaded			
Front	180 (1.8, 26)	210 (2.1, 29)	180 (1.8, 26)
Rear	200 (2.0, 28)	240 (2.4, 35)	200 (2.0, 28)
When loaded			
Front	180 (1.8, 26)	230 (2.3, 33)	180 (1.8, 26)
Rear	200 (2.0, 28)	260 (2.6, 38)	240 (2.4, 35)

NOTE

*: Optional equipment

STEERING

E9DEBAA

- The steering wheel is a three- or two-spoke type.
- The steering column employs an impact absorbing mechanism (Europe and GCC versions) and a tilt steering mechanism (Europe, General Export, Australia and GCC versions).
- The oil pump is a vane type oil pump with a fluid flow control system so the steering force varies according to engine speed.
- The manual steering gear box is a recirculating ball type with a variable gear ratio. (Except GCC version)
- The power steering gear box is a recirculating ball type with a rotary valve for smooth changeover of oil passages. In addition, a variable gear ratio has been adopted for less steering effort and better steering feeling.

- The steering linkage has steering angle stoppers at the pitman arm and idler arm to prevent noise when maximum steering is done. In addition, an idler arm which provides high support rigidity has been adopted for better steering feeling and reliability. On manual steering equipped vehicles, a damper has been provided for transmission of less vibration to the steering wheel.

NOTE

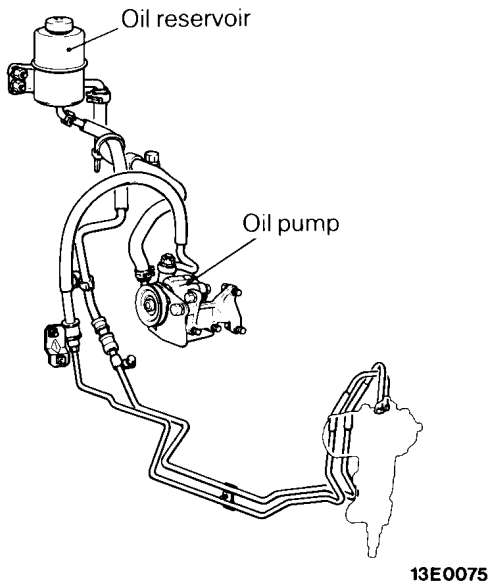
The construction and operation of the oil pump, manual steering gear box and power steering gear box are essentially the same as those of the PAJERO.

SPECIFICATIONS

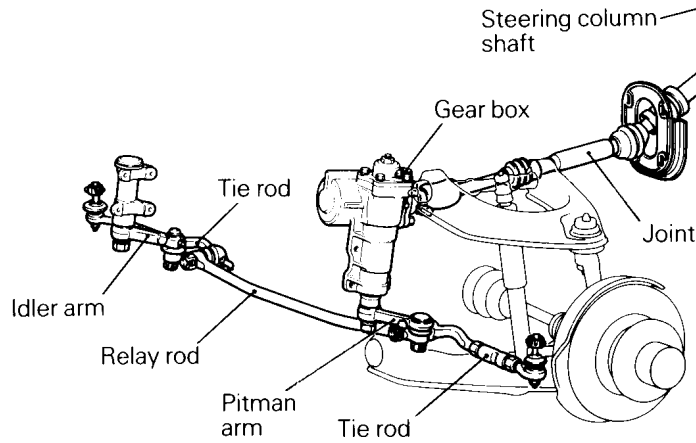
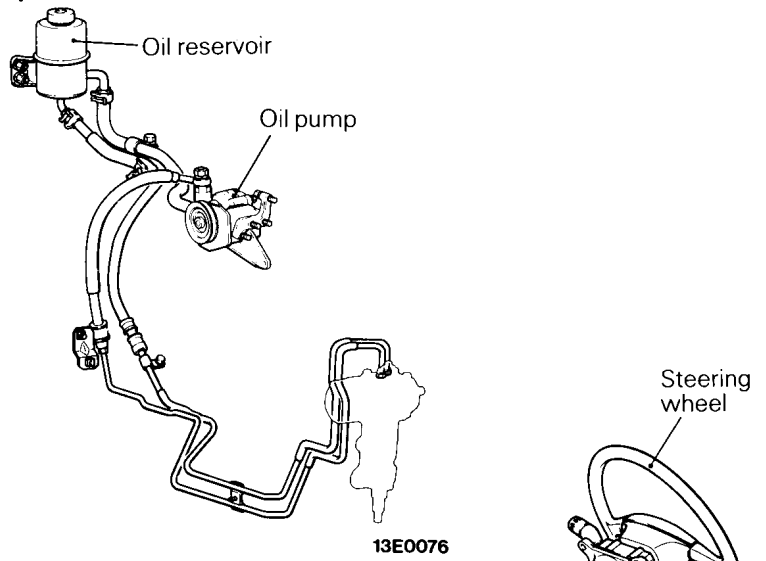
Items	Specifications
Steering wheel diameter	mm (in.) 390 (15.35)
Steering angle (vehicle in unladen)	
Inner wheel	32°40' +0°
Outer wheel	29°45' -3°
Manual steering gear box	
Steering gear type	Recirculating ball type with variable gear ratio
Steering gear ratio	20.5–24.5
Power steering gear box	
Steering gear type	Ball and nut, torsion bar type (integral type)
Steering gear ratio	16.4–18.0
Oil pump	
Oil pump type	Vane type
Displacement	cm ³ /rev. (cu.in/rev.) 9.6 (0.59)
Damper assembly	
Type	Hydraulic, cylindrical, double-acting type
Maximum length	mm (in.) 534 (21.0)
Compressed length	mm (in.) 361 (14.2)
Stroke	mm (in.) 173 (6.8)

CONSTRUCTION DIAGRAM

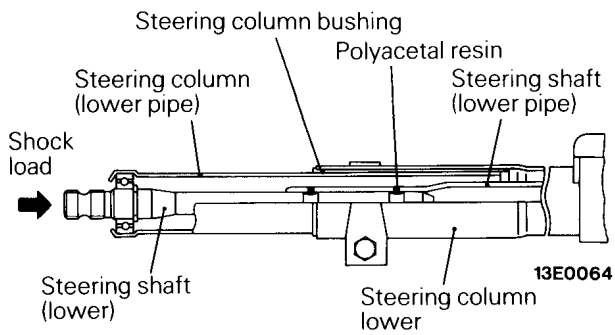
<Petrol-powered vehicles>



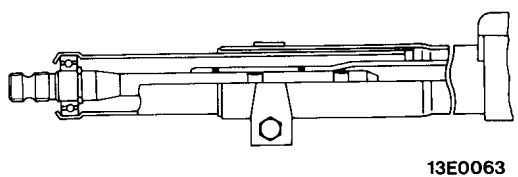
<Diesel-powered vehicles>



BEFORE SHOCK



AFTER SHOCK

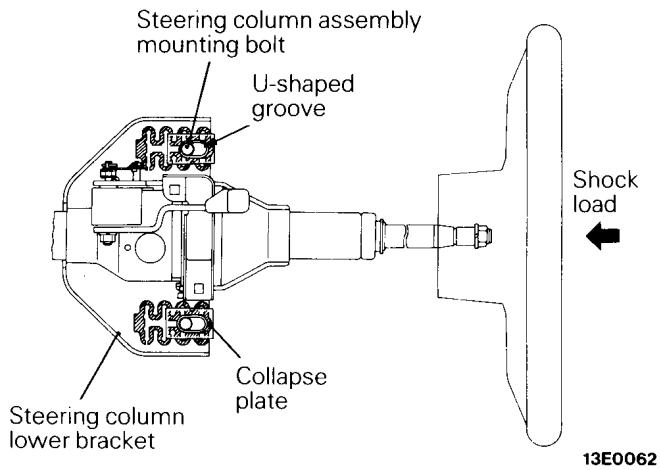


STEERING COLUMN

SHOCK ABSORBING STRUCTURE

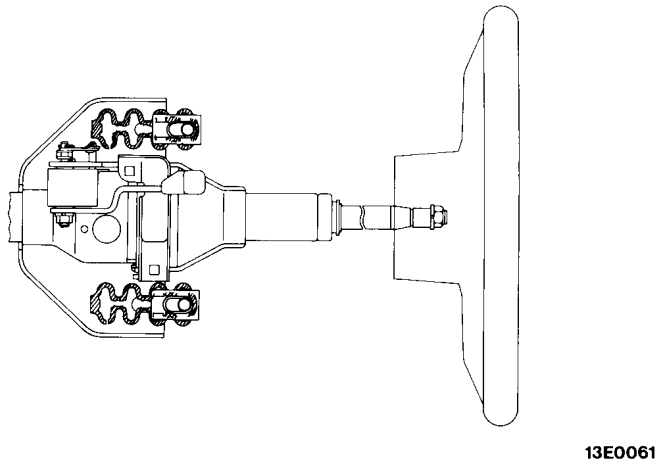
- (1) When the vehicle collides with something and there is a load added to the steering shaft from the gear box (primary shock), the steering shaft (lower) of the steering shaft assembly crushes the polyacetal resin, absorbing the shock load using the friction of the steering column (lower pipe) and steering column bushing as it slides into the steering shaft (lower pipe).

BEFORE SHOCK

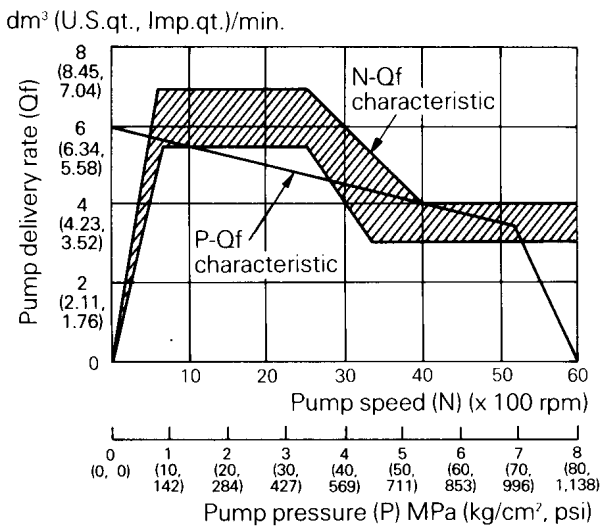


(2) If the driver's body is thrown against the steering wheel (secondary impact), the steering column assembly will be released forward and the collapse plate extended to absorb the impact load, as the mounting bolt hole of the steering column lower bracket is grooved in the form of character U.

AFTER SHOCK



OIL PUMP PERFORMANCE



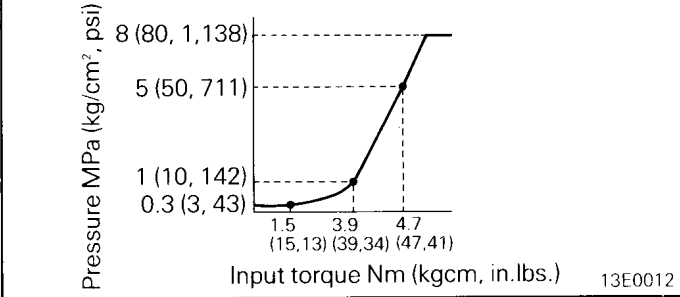
NOTE
 (1) P-Qf characteristic: Pump pressure and pump delivery rate
 (2) N-Qf characteristic: Pump speed and pump delivery rate

13E0011

OIL PUMP

The oil pump is a vane type with a fluid flow control system which reduces steering effort when the engine speed is low and properly increases it when the engine speed is high.

POWER STEERING GEAR BOX INPUT AND OUTPUT CHARACTERISTIC DIAGRAM

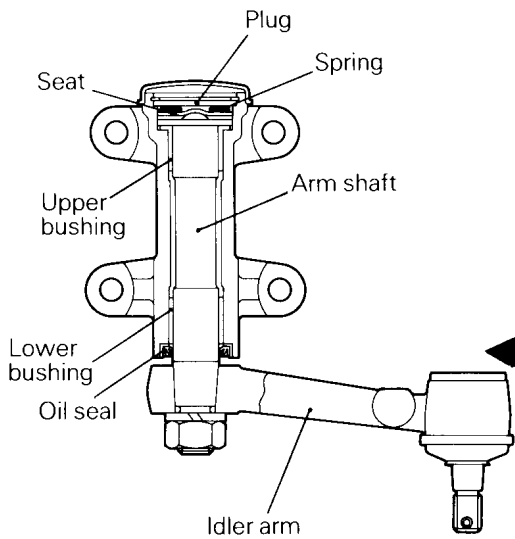


POWER STEERING GEAR BOX

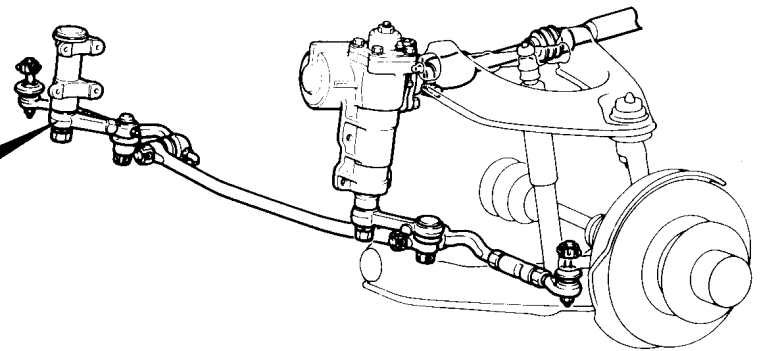
The power steering gear box uses a large diameter rack piston [$\phi 74$ mm (2.9 in.)] and variable gear ratio (16.4 to 18.0) to reduce steering effort and improve steering feeling.

STEERING LINKAGE

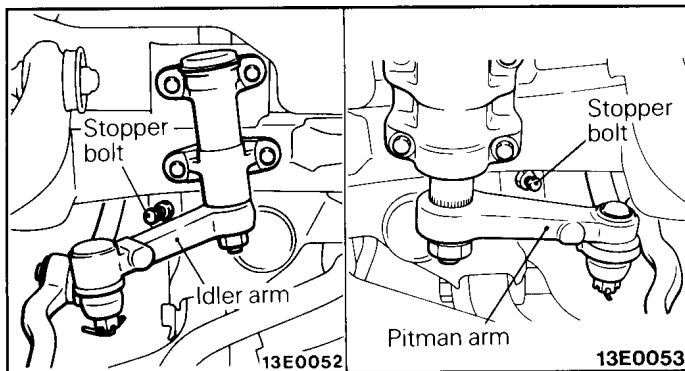
The idler arm support construction has been changed to improve steering feeling.



13E0013



13E0074



STEERING ANGLE

The side faces of the pitman arm and idler arm are blocked by a stopper bolt mounted on the frame to restrict the steering angle and prevent noise that may otherwise be generated when maximum steering is done.

BRAKES

E9DHAAG

The brake system offers outstanding reliability, dependability and braking performance, and gives the driver better braking feeling.

FEATURES

Improved braking performance

1. A multi mode type anti-lock brake system (ABS) has been adopted to prevent locked wheel slipping and assure proper braking.
2. Disc brakes have been adopted for the four wheels.
3. Two-piston type front ventilated disc brakes have been adopted to stabilize braking and improve braking feeling.
4. A tandem brake booster has been adopted which provides powerful braking by applying light foot pressure.
5. Parking brake accommodated drum in rear type disc brakes or 10" leading-trailing type drum brakes have been adopted which offer outstanding braking stability.

Improved serviceability

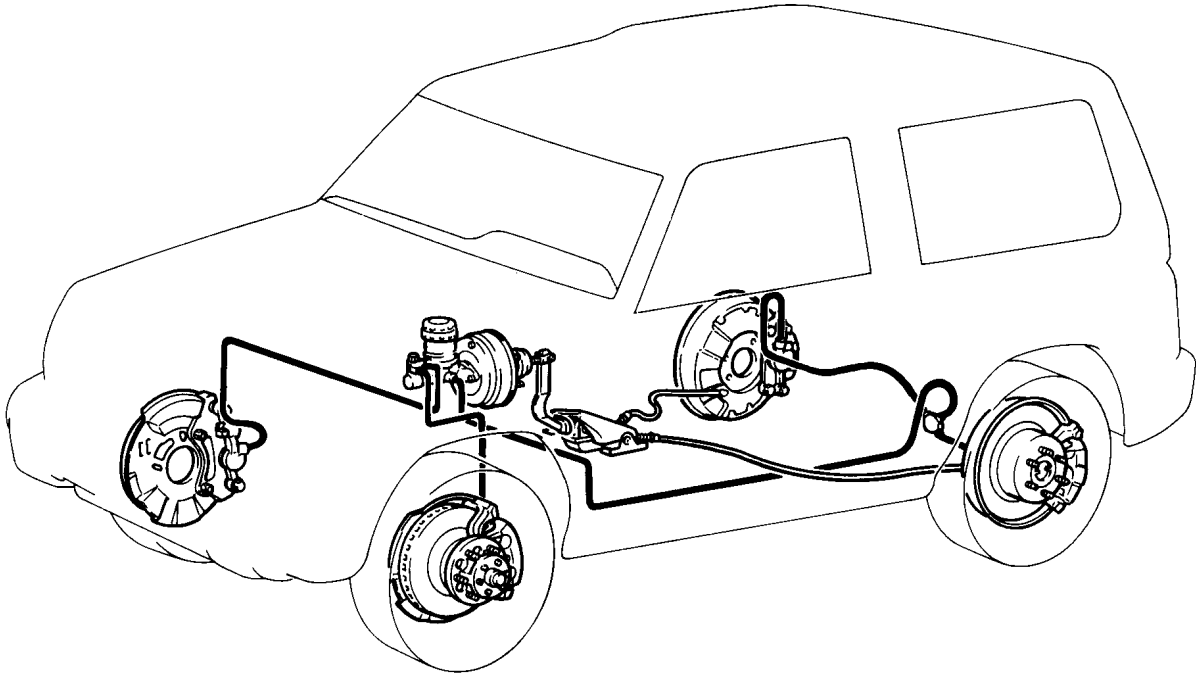
1. For ease of inspection, diagnosis functions have been adopted for the 4ABS.
2. For ease of removal and re-installation, the outer disc system has been adopted for the rear.
3. For ease of identification, the colour of the reserve tank cap of the master cylinder has been changed to white.

Higher safety

1. An audible type wear indicator has been adopted to alert the driver when the pad service limit is reached.
2. A blend proportioning valve has been adopted to prevent premature locking of the rear wheels.

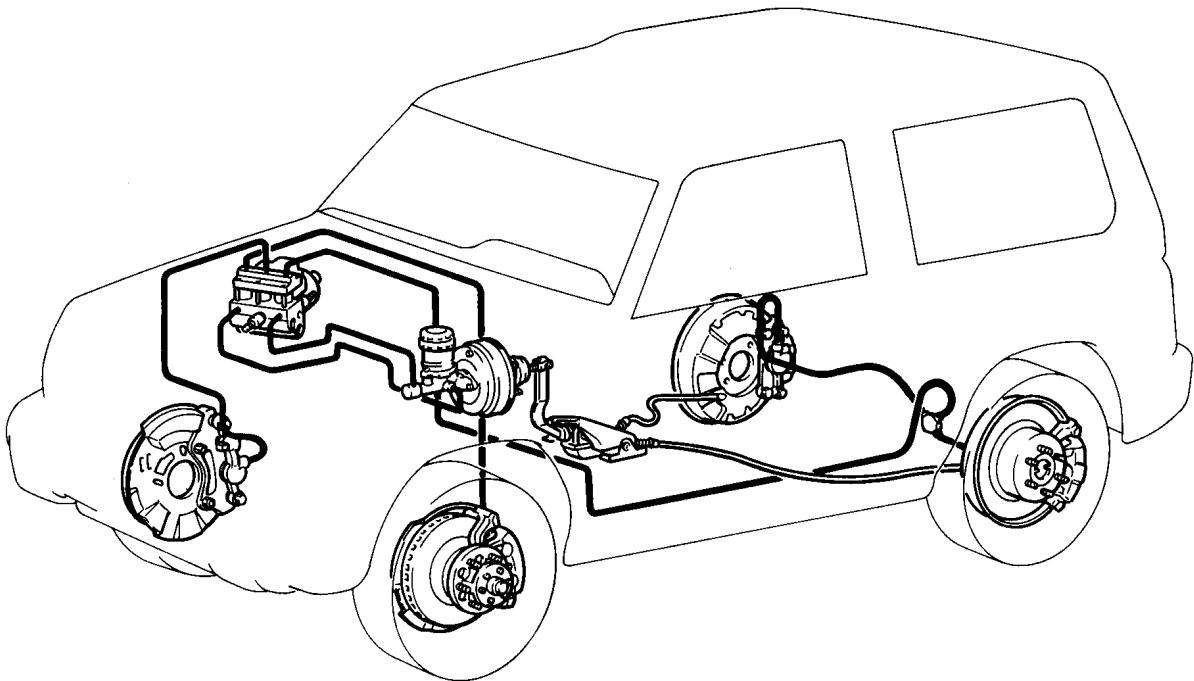
CONSTRUCTION DIAGRAM

<Vehicle without ABS>



14E0158

<Vehicle with ABS>



14E0067

SERVICE BRAKES**SPECIFICATIONS****Vehicles for Europe**

Items	2400, 3000	2500D
Master cylinder Type I.D. mm (in.)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, tandem 205 + 230 (8 + 9) 6.0	Vacuum type, tandem 180 + 205 (7 + 8) 6.0
Proportioning valve Type	Load sensing proportioning valve	Load sensing proportioning valve
Front brakes Type Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Floating caliper, dual pistons, ventilated disc (M-R57W) 228 x 24 (8.98 x 0.94) 42.8 (1 ¹¹ / ₁₆) x 2 10.0 (0.39) Automatic	Floating caliper, dual pistons, ventilated disc (M-R57W) 228 x 24 (8.98 x 0.94) 42.8 (1 ¹¹ / ₁₆) x 2 10.0 (0.39) Automatic
Rear brakes Type Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Floating caliper, single piston, solid disc (M-R59S) 272 x 18 (10.71 x 0.71) 42.8 (1 ¹¹ / ₁₆) 9 (0.354) Automatic	Floating caliper, single piston, solid disc (M-R59S) 272 x 18 (10.71 x 0.71) 42.8 (1 ¹¹ / ₁₆) 9 (0.354) Automatic
ABS Rotor teeth Front Rear Speed sensor type	110 110 Magnet coil type	110 110 Magnet coil type

Vehicles for General Export

Items	2600		2500D (except vehicles without wide fender)		Vehicles with wide fender
	2-door models	4-door models	2-door models	4-door models	
Master cylinder Type	Tandem type (without level sensor)	Tandem type (without level sensor)	Tandem type (without level sensor)	Tandem type (without level sensor)	Tandem type (without level sensor)
I.D. mm (in.)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)
Brake booster Type	Vacuum type, single	Vacuum type, tandem	Vacuum type, single	Vacuum type, single	Vacuum type, tandem
Effective dia. of power cylinder mm (in.)	230 (9)	205 + 230 (8 + 9)	205 (8)	230 (9)	180 + 205 (7 + 8)* ¹ or 205 + 230 (8 + 9)* ²
Boosting ratio	5.5	6.0	5.5	5.5	6.0
Proportioning valve Type	Blend proportioning valve	Blend proportioning valve	Blend proportioning valve	Blend proportioning valve	Blend proportioning valve
Front brakes Type	Floating caliper, single piston, ventilated disc (M-R56V)	Floating caliper, single piston, ventilated disc (M-R56V)	Floating caliper, single piston, ventilated disc (M-R56V)	Floating caliper, single piston, ventilated disc (M-R56V)	Floating caliper, single piston, ventilated disc (M-R56V)* ¹ or Floating caliper, dual pistons, ventilated disc (M-R57W)* ²
Disc effective dia. x thickness mm (in.)	227 x 22 (8.94 x 0.87)	227 x 22 (8.94 x 0.87)	227 x 22 (8.94 x 0.87)	227 x 22 (8.94 x 0.87)	227 x 22 (8.94 x 0.87)* ¹ or 228 x 24 (8.98 x 0.94)* ²
Wheel cylinder I.D. mm (in.)	60.3 (2 ³ / ₈)	60.3 (2 ³ / ₈)	60.3 (2 ³ / ₈)	60.3 (2 ³ / ₈)	60.3 (2 ³ / ₈)* ¹ or 42.8 (1 ¹¹ / ₁₆) x 2)* ²
Lining thickness mm (in.)	10.5 (0.41)	10.5 (0.41)	10.5 (0.41)	10.5 (0.41)	10.5 (0.41)* ¹ or 10.0 (0.39)* ²
Clearance adjustment	Automatic	Automatic	Automatic	Automatic	Automatic
Rear brakes Type	Leading trailing	Leading trailing	Leading trailing	Leading trailing	Floating caliper, single piston, solid disc (M-R59S)
Drum I.D. mm (in.)	254 (10)	254 (10)	254 (10)	254 (10)	—
Disc effective dia. x thickness mm (in.)	—	—	—	—	272 x 18 (10.71 x 0.71)
Wheel cylinder I.D. mm (in.)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	23.8 (1 ⁵ / ₁₆)	42.8 (1 ¹¹ / ₁₆)
Lining thickness mm (in.)	4.6 (0.181)	4.6 (0.181)	4.6 (0.181)	4.6 (0.181)	9 (0.354)
Clearance adjustment	Automatic	Automatic	Automatic	Automatic	Automatic
ABS* ² Rotor teeth					
Front	—	—	—	—	110
Rear	—	—	—	—	110
Speed sensor type	—	—	—	—	Magnet coil type

NOTE

*¹: Diesel powered vehicles*²: Petrol powered vehicles

Vehicles for GCC

Items	2600		3000	2500D
	2-door models	4-door models		
Master cylinder Type I.D. mm (in.)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 230 (9) 5.5	Vacuum type, tandem 205 + 230 (8 + 9) 6.0	Vacuum type, tandem 205 + 230 (8 + 9) 6.0	Vacuum type, tandem 180 + 205 (7 + 8) 6.0
Proportioning valve Type	Blend proportioning valve	Blend proportioning valve	Blend proportioning valve	Blend proportioning valve
Front brakes Type Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Floating caliper, single piston, ventilated disc (M-R56V) 227 x 22 (8.94 x 0.87) 60.3 (2 ³ / ₈) 10.5 (0.41) Automatic	Floating caliper, single piston, ventilated disc (M-R56V) 227 x 22 (8.94 x 0.87) 60.3 (2 ³ / ₈) 10.5 (0.41) Automatic	Floating caliper, dual pistons, ventilated disc (M-R57W) 228 x 24 (8.98 x 0.94) 42.8 (1 ¹¹ / ₁₆) x 2 10.0 (0.39) Automatic	Floating caliper, single piston, ventilated disc (M-R56V) 227 x 22 (8.94 x 0.87) 60.3 (2 ³ / ₈) 10.5 (0.41) Automatic
Rear brakes Type Drum I.D. mm (in.) Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Leading trailing 254 (10) — 23.8 (1 ⁵ / ₁₆) 4.6 (0.181) Automatic	Leading trailing 254 (10) — 23.8 (1 ⁵ / ₁₆) 4.6 (0.181) Automatic	Floating caliper, single piston, solid disc (M-R59S) — 272 x 18 (10.71 x 0.71) 42.8 (1 ¹¹ / ₁₆) 9 (0.354) Automatic	Floating caliper, single piston, solid disc (M-R59S) — 272 x 18 (10.71 x 0.71) 42.8 (1 ¹¹ / ₁₆) 9 (0.354) Automatic
ABS Rotor teeth Front Rear Speed sensor type	— — —	— — —	110 110 Magnet coil type	— — —

Vehicles for Australia

Items	2600, 2500D (vehicles with leaf spring)		3000	2500D (except vehicles with leaf spring)
	2-door models	4-door models		
Master cylinder Type I.D. mm (in.)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)	Tandem type (with level sensor) 23.8 (1 ⁵ / ₁₆)
Brake booster Type Effective dia. of power cylinder mm (in.) Boosting ratio	Vacuum type, single 230 (9) 5.5	Vacuum type, tandem 180 + 205 (7 + 8)* ¹ or 205 + 230 (8 + 9)* ² 6.0	Vacuum type, tandem 205 + 230 (8 + 9) 6.0	Vacuum type, tandem 180 + 205 (7 + 8) 6.0
Proportioning valve Type	Load sensing proportioning valve	Load sensing proportioning valve	Load sensing proportioning valve	Load sensing proportioning valve
Front brakes Type Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Floating caliper, single piston, ventilated disc (M-R56V) 227 x 22 (8.94 x 0.87) 60.3 (2 ³ / ₈) 10.5 (0.41) Automatic	Floating caliper, single piston, ventilated disc (M-R56V) 227 x 22 (8.94 x 0.87) 60.3 (2 ³ / ₈) 10.5 (0.41) Automatic	Floating caliper, dual pistons, ventilated disc (M-R57W) 228 x 24 (8.98 x 0.94) 42.8 (1 ¹ / ₁₆) x 2 10.0 (0.39) Automatic	Floating caliper, dual pistons, ventilated disc (M-R57W) 228 x 24 (8.98 x 0.94) 42.8 (1 ¹ / ₁₆) x 2 10.0 (0.39) Automatic
Rear brakes Type Drum I.D. mm (in.) Disc effective dia. x thickness mm (in.) Wheel cylinder I.D. mm (in.) Lining thickness mm (in.) Clearance adjustment	Leading trailing 254 (10) – 23.8 (1 ⁵ / ₁₆) 4.6 (0.181) Automatic	Leading trailing 254 (10) – 23.8 (1 ⁵ / ₁₆) 4.6 (0.181) Automatic	Floating caliper, single piston, solid disc (M-R59S) – 272 x 18 (10.71 x 0.71) 42.8 (1 ¹ / ₁₆) 9 (0.354) Automatic	Floating caliper, single piston, solid disc (M-R59S) – 272 x 18 (10.71 x 0.71) 42.8 (1 ¹ / ₁₆) 9 (0.354) Automatic
ABS Rotor teeth Front Rear Speed sensor type	– – –	– – –	110 110 Magnet coil type	– – –

NOTE

*1: Diesel powered vehicles

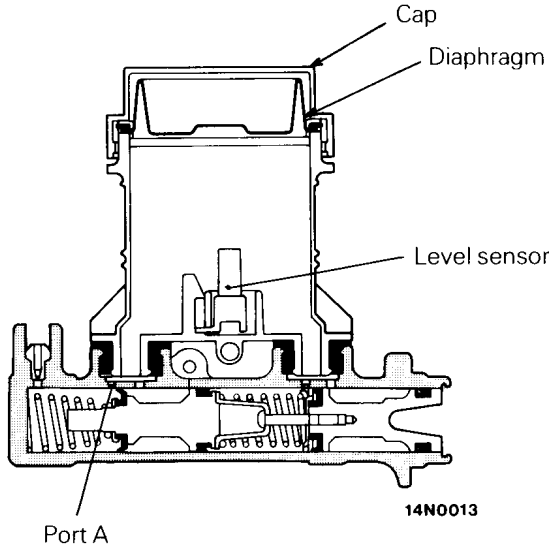
*2: Petrol powered vehicles

MASTER CYLINDER

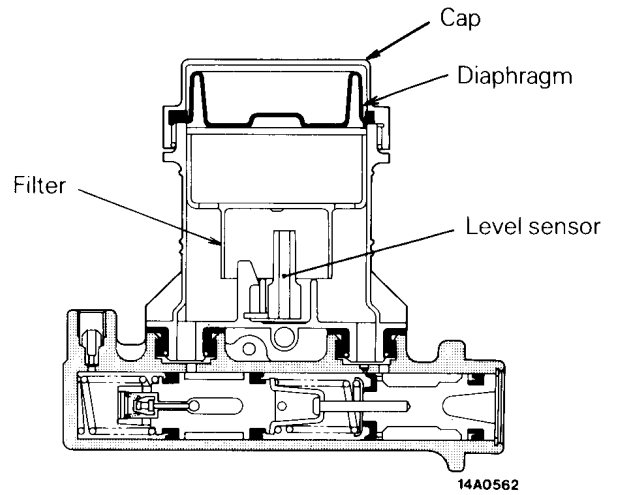
The master cylinder is constructed for a maximum measure of safety and offers the following features.

- A tandem type master cylinder has been adopted.
- On vehicles with ABS, a built-in filter has been provided in the reserve tank to prevent entry of foreign substances into the brake lines when brake fluid is added or replaced.

<Vehicles without ABS>



<Vehicles with ABS>



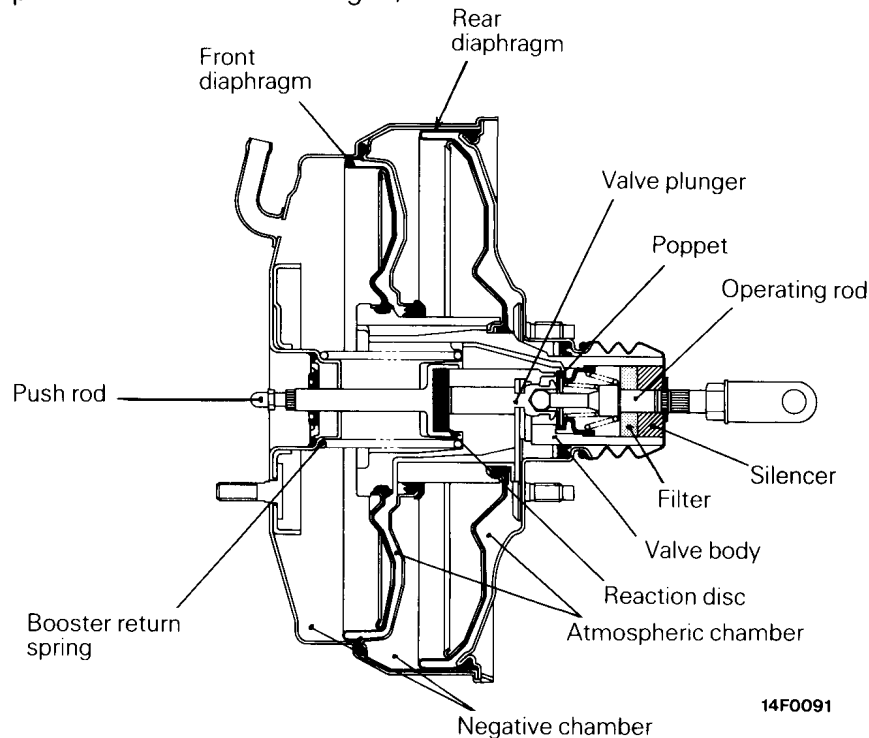
BRAKE BOOSTER

The brake booster is a tandem or single type. Either of the types is selected for the right type of vehicle.

- The tandem type has two diaphragms to cause the difference between the atmospheric pressure and negative pressure to act in two stages,

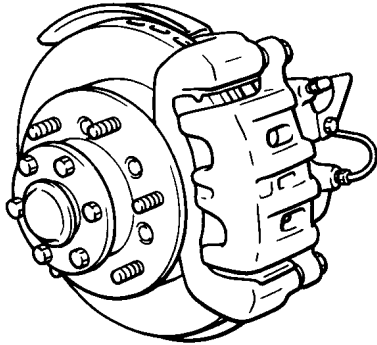
providing large boosting effects without increasing its outside diameter.

- A non-disassembly design has been adopted for size and weight reduction.

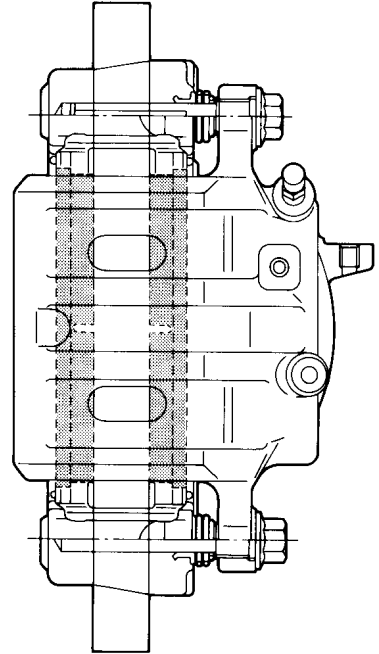


FRONT BRAKES

- The front brakes are 15" single piston (M-R56V type) or 15" dual pistons (M-R57W type) ventilated disc brakes.
- For the sake of safety, an audible type wear indicator has been provided on the pad inside the body.

M-R57W

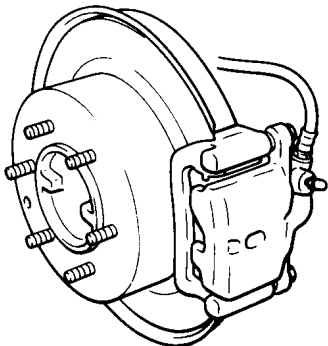
14E0009



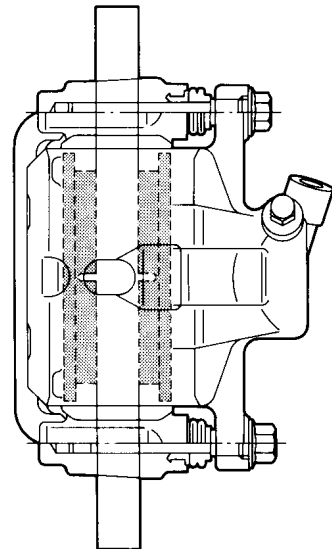
14E0008

REAR DISC BRAKES

- The rear disc brakes are 15" single piston (M-R59S type) drum in type disc brakes.
- For ease of servicing, the outer disc type has been adopted which tightens the wheel and disc jointly.
- For the sake of safety, an audible wear indicator has been provided on the pad inside the body.



14E0010

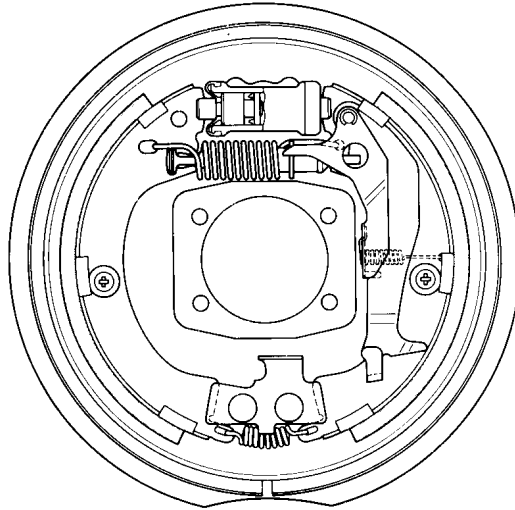


14E0007

REAR DRUM BRAKES

The rear drum brakes are 10" leading-trailing brakes with an auto adjuster mechanism which always

provides stable braking when traveling forward or backward.



14G0011

ANTI-LOCK BRAKE SYSTEM (ABS)

ESDIAAF

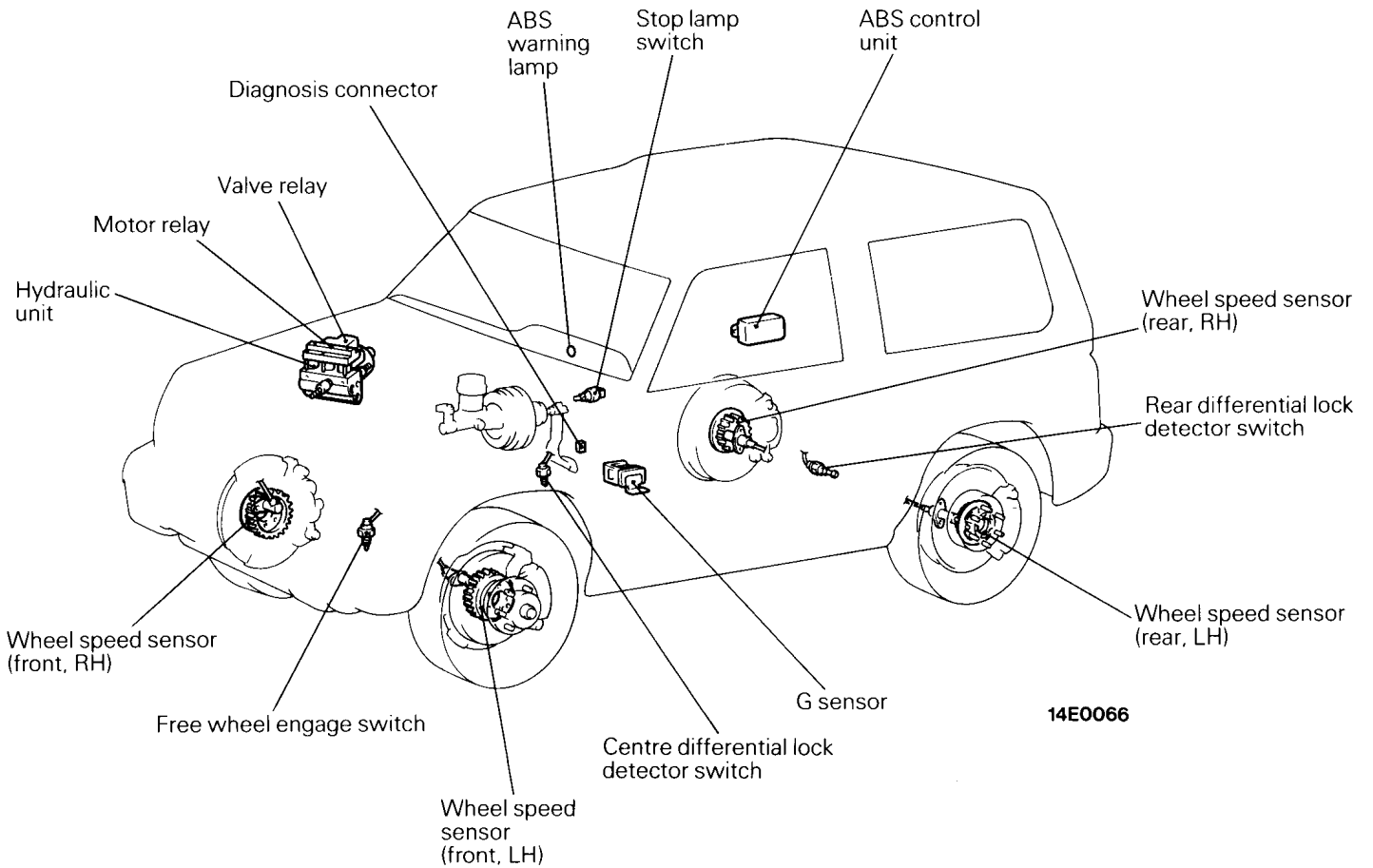
The anti-lock brake system (ABS), an improved version of the ABS now in use in the 2WD vehicles and the 4WD vehicles (VCU 4WD) such as the Galant, is compatible with the full drive mode of the Superselect 4WD. It is the world's first ABS applicable not only in the 2WD and VCU 4WD (centre differential free) modes but also in the directly coupled 4WD (centre differential locked) or rear differential locked mode.

The ABS dramatically improves the "traveling" as well as "braking" performance of the Superselect 4WD. Under any traveling conditions such as a slippery road surface, the ABS assures well-balanced implementation of all phases of traveling performance at an incredibly upgraded level.

NOTE

VCU: Viscous Coupling Unit

CONSTRUCTION DIAGRAM



LIST OF MAJOR COMPONENTS

Part name		Function
Sensors	Wheel speed sensor	Sends wheel speed signal of each wheel to the ECU.
	G sensor	Sends an output voltage corresponding to the body acceleration to the ECU.
	Stop lamp switch	Sends the signal indicating whether the brake pedal is depressed or not to the ECU.
	Free wheel engage switch	Sends ON or OFF signal corresponding to the status of the drive system to the ECU.
	Centre differential lock detector switch	
	Rear differential lock detector switch	
Actuators	Hydraulic unit (HU)	Controls the brake fluid pressure of each wheel in response to the signal from the ECU.
	Motor relay	Enters the ON state in response to the signal from the ECU and drives the pump motor in the HU.
	Valve relay	Enters the ON state in response to the signal from the ECU and supplies power to the solenoid valve in the HU.
	ABS warning lamp	Located in the combination meter, the lamp lights when the ABS fails.
	Diagnosis connector	Outputs a diagnosis code.
Electronic control unit (ECU)		Drives the hydraulic unit, etc. in response to the signals from the individual sensors.

FEATURES

1. Operates in all of the 2WD, VCU 4WD and directly coupled 4WD drive modes. (The world's first of its kind)

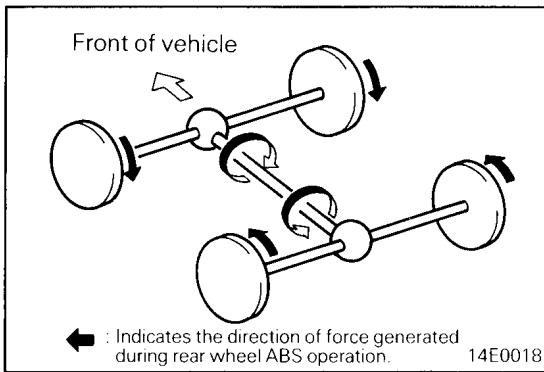
The basic concept is a 4-sensor, 3-channel control system for independent control of the front RH and LH wheels and integrated control of the rear wheels. It provides proper controls suitable for different drive modes.

2. Prevents vibration of the directly coupled 4WD.

Provides controls to prevent vibration (judder) which often occurs in the directly coupled 4WD mode where the front and rear wheels interfere with each other.

[Controls for different drive modes]

Drive Mode	ABS controls	
	Normal condition (Condition other than described at right)	Rear wheels showing signs of locking a little earlier than front wheels
2WD or VCU 4WD mode	<p>3-channel control for independent control of front RH and LH wheels and Select Low control of rear wheels</p> <p>Independent Independent Simultaneous </p> <p>14E0014</p>	<p>3-channel control for independent control of front RH and LH wheels and Select Low control of rear wheels</p> <p>Independent Independent Simultaneous </p> <p>14E0014</p>
Directly coupled 4WD mode	<p>3-channel control for independent control of front RH and LH wheels and Select Low control of rear wheels</p> <p>Independent Independent Simultaneous </p> <p>14E0014</p>	<p>"Reduce the pressure" instruction generated at rear wheels is simultaneously sent to the low side front wheel to reduce the torsional torque and prevent vibration.</p> <p><When rear RH wheel begins to be locked></p> <p>Independent Low side Simultaneous "Reduce the pressure" instruction</p> <p>14E0012</p> <p><When rear LH wheel begins to be locked></p> <p>Low side Independent Simultaneous "Reduce the pressure" instruction</p> <p>14E0013</p>



[Reference: about vibration that occurs during ABS operation of directly-coupled 4WD]

On 4WD vehicles, the front and rear wheels are coupled by the drive shaft. Therefore, when the rear wheels under control by brakes begin to be locked, operation of the ABS reduces braking on both of the rear wheels so that the wheels regain a rotating speed, but retains sufficient braking on both of the front wheels. As a result, torsional torque acts on the drive shaft that couples the front and rear wheels as shown. If operation of the ABS is terminated in this condition and all of the wheels return to the same state, the torsional torque goes out so that the drive shaft starts going back to the original state, inducing wheel vibration. This phenomenon causes practically no problem in the VCU equipped full time 4WD vehicles like the Galant. On the directly coupled 4WD vehicles, however, the front and rear wheels are held together with a stronger force so that the phenomenon becomes more obvious. To prevent it, control is necessary.

3. VCU 4WD or directly coupled 4WD vehicle velocity estimated

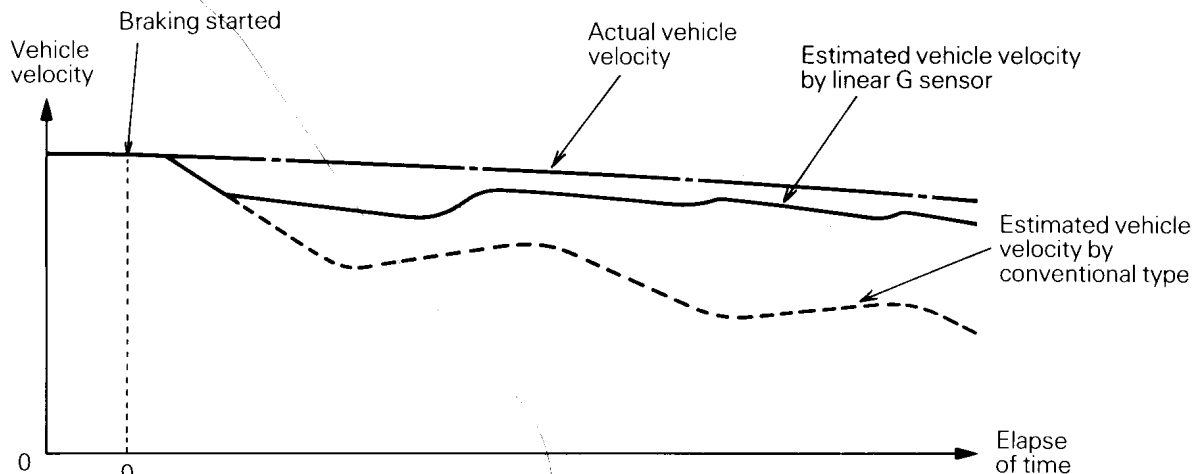
Precise vehicle velocity obtained from linear G sensor to provide highly efficient control

[Reference: estimated vehicle velocity of 4WD vehicle]

In the case of a 4WD vehicle, the front and rear wheels are coupled by the drive shaft. Therefore, application of braking to one of the wheels affects the other three wheels and causes all the wheels to reduce their rotating speed, making it impossible to precisely estimate the vehicle velocity. For this reason, the ABS for the full time 4WD vehicles like the Galant has a G sensor added for the purpose. Such 4WD vehicles are equipped with a VCU, and the front and rear wheels are not held together so tight as those of the directly coupled

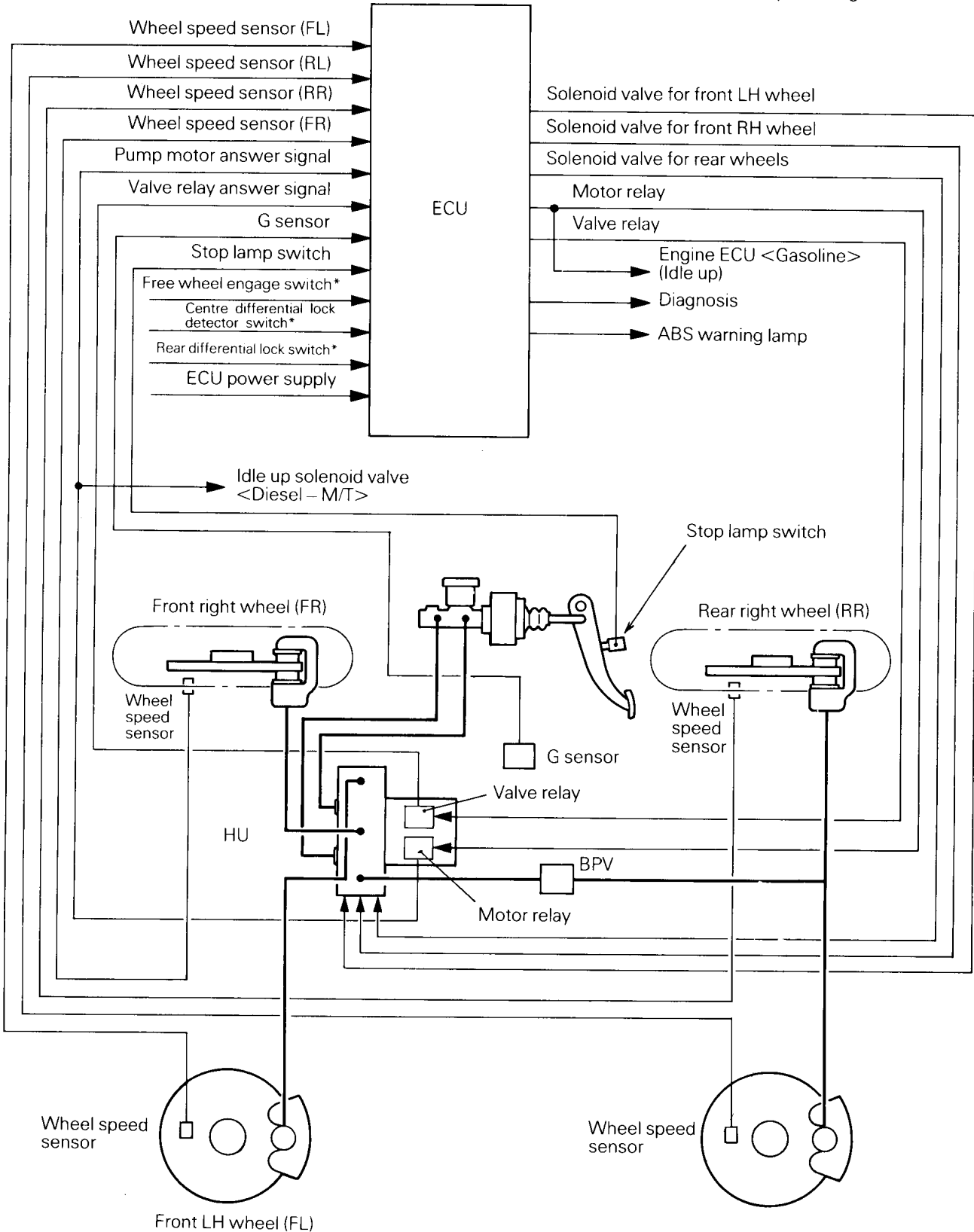
4WD vehicles. The G sensor used for such vehicles, therefore, is one that is caused to be ON when the vehicle velocity is smaller than a given value, and OFF when it is larger. In the case of the Pajero, additional capability is required for compatibility with the directly coupled 4WD (centre differential locked) mode. For this reason, the Pajero uses a displacement-sensitive type G sensor which generates an output voltage corresponding to the reduced degree of vehicle velocity.

[Comparison of estimated vehicle velocities by use of linear G sensor and ON/OFF type sensor for directly coupled 4WD vehicle]



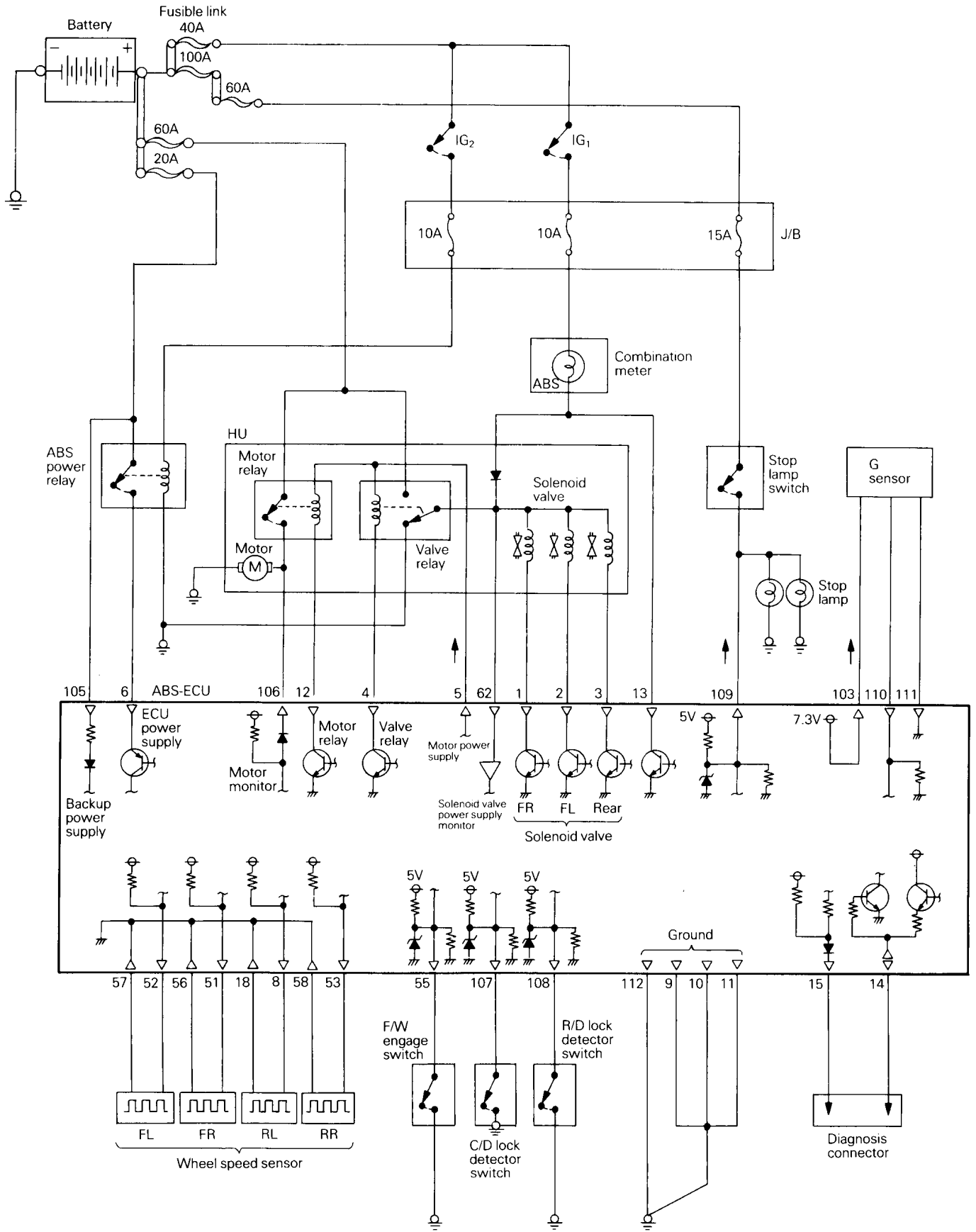
ROUGH SKETCH OF THE SYSTEM

HU: Hydraulic Unit
BPV: Blend Proportioning Valve



Remarks
The switches marked * are shared by the drive system.

ABS ELECTRICAL CIRCUIT DIAGRAM



ABS-ECU connector pin configuration

1	2	3	4	A	5	6	7	8	51	52	53	A	54	55	101	102	A	103	104	105			
9	10	11	12	13	14	15	16	17	18	56	57	58	59	60	61	62	106	107	108	109	110	111	112

C/D: Centre Differential
 R/D: Rear Differential
 F/W: Free Wheel

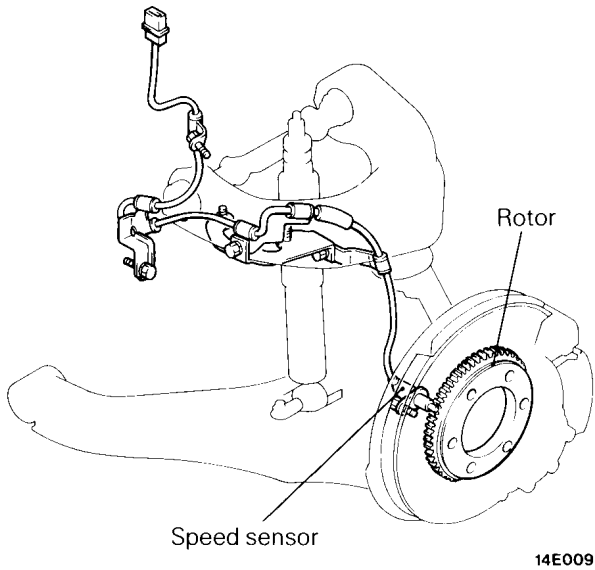
**DESCRIPTION OF CONSTRUCTION
SENSOR**

WHEEL SPEED SENSOR

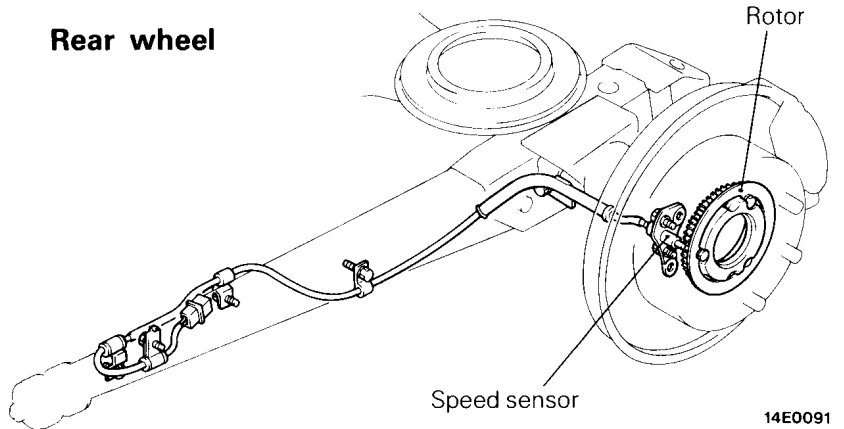
The wheel speed sensor for a front wheel consists of a rotor (110 teeth) mounted to the front hub and a speed sensor mounted to the knuckle arm. The wheel speed sensor for a rear wheel consists of a rotor (110 teeth) mounted to the rear axle shaft

and a speed sensor mounted to the rear wheel bearing case. The sensor gap for a front wheel is not adjustable, whereas the one for a rear wheel is adjustable.

Front wheel



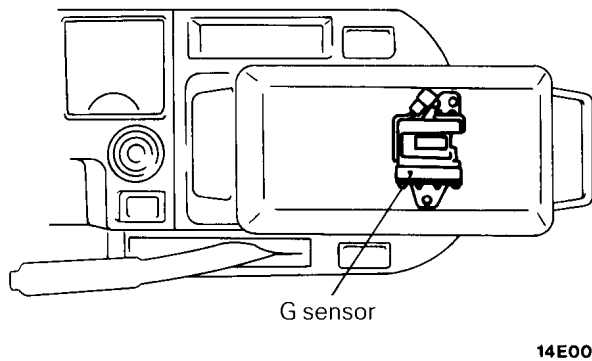
Rear wheel



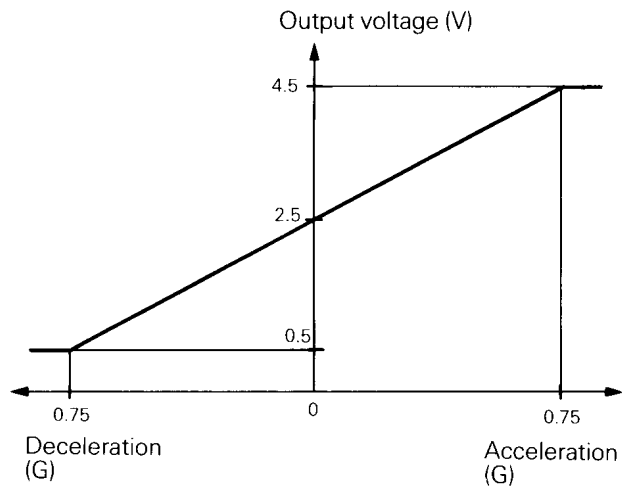
G SENSOR

The G sensor is located on the back bone behind the parking brake lever and outputs a voltage corresponding to the forward and backward vehicle acceleration and deceleration (body G).

ponding to the forward and backward vehicle acceleration and deceleration (body G).



G sensor output characteristics



Construction and Operation of G Sensor

The G sensor is a differential transformer type displacement-sensitive sensor and has built-in control circuits such as an oscillator circuit for supplying AC power to the exciting coil, a rectifier circuit at the detecting coil side, etc.

To suppress vibration of the moving part (core) of the differential transformer, the G sensor is filled with silicone oil.

[Theory of operation for measurement of displacement (acceleration) of differential transformer]

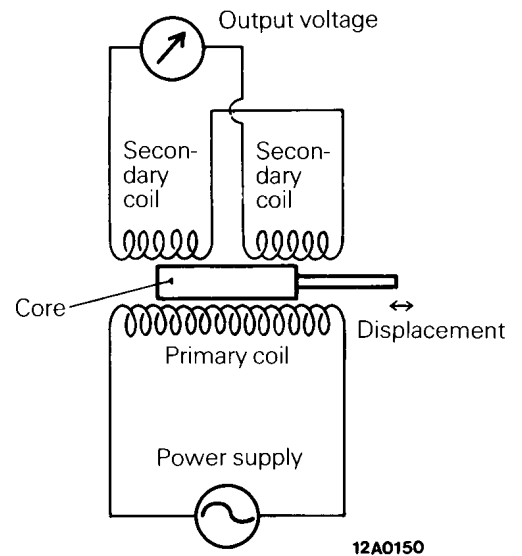
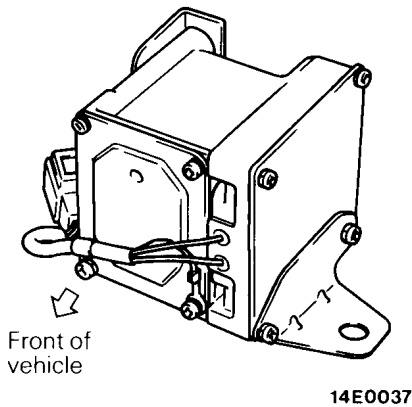
(1) When transformers that output the same voltages opposite to each other in polarity are connected in series, and the core positioned at the centre, the AC voltages induced in the

secondary coils become equal to each other. Since the voltage waveforms from both of the coils are opposite in phase, no output voltage is produced.

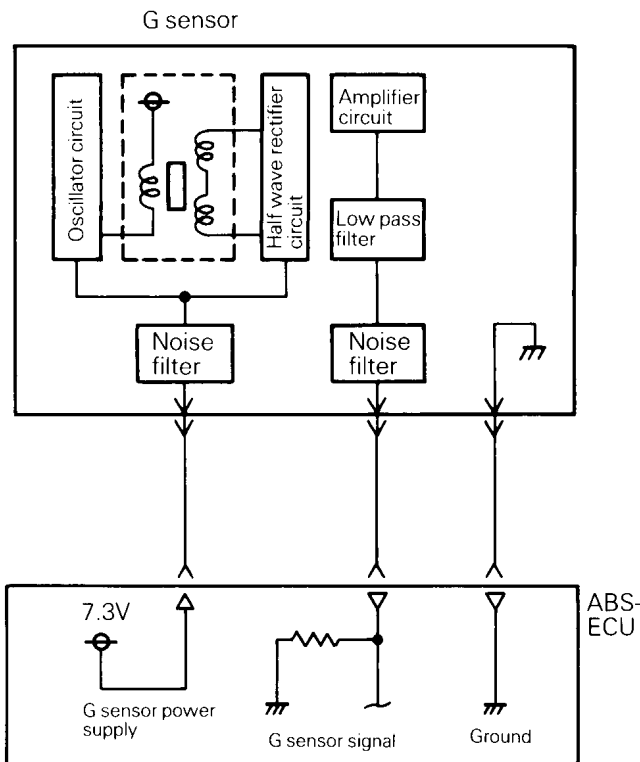
(2) If the core leaves the centre position, a difference is created between the induced voltages of both coils. As a result, an AC voltage proportional to the difference is produced at the output of the amplifier.

The polarity of the AC voltage is reversed, depending on whether the core is positioned at the right or left.

(3) The displacement of the core (acceleration) can be determined by converting the magnitude of the displacement of the core into the magnitude of a positive or negative voltage by use of this phenomenon.



Circuit diagram



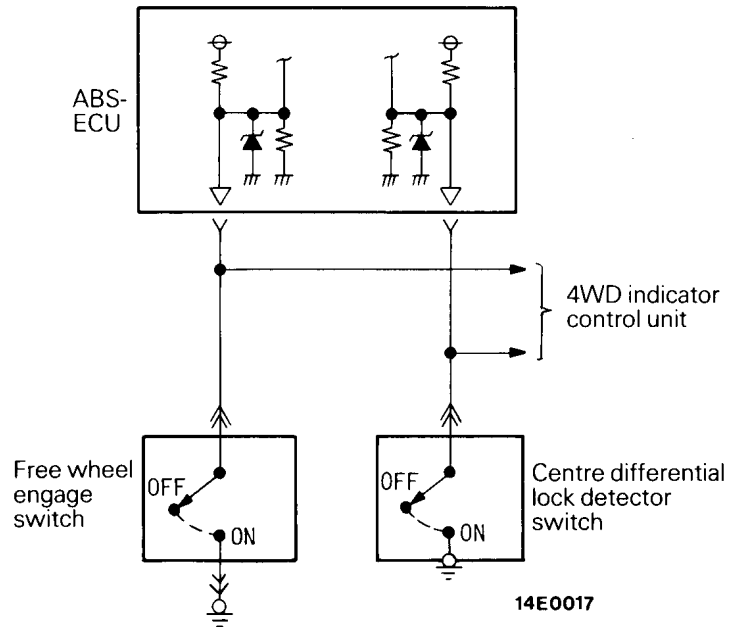
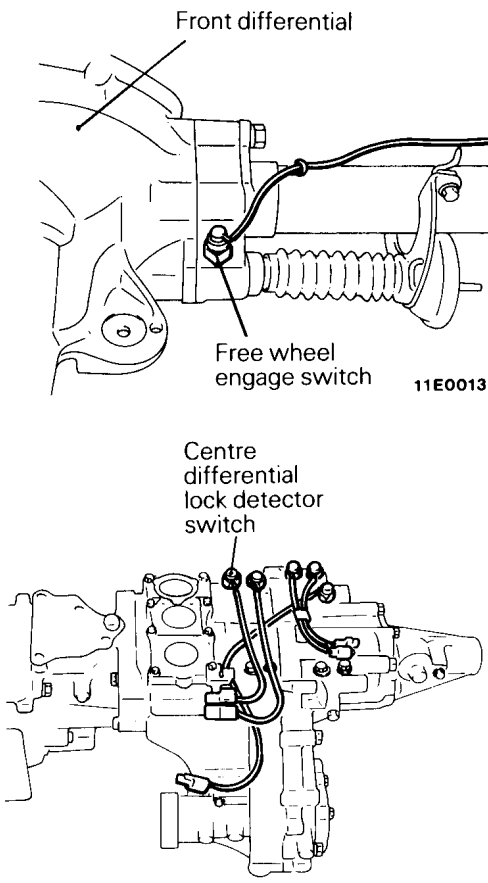
FREE WHEEL ENGAGE SWITCH AND CENTRE DIFFERENTIAL LOCK DETECTOR SWITCH

The two switches are shared by the Superselect 4WD system and send a signal on the status of the drive system to the ABS-ECU. In response to this

signal, the ABS-ECU selects a proper control mode suitable for the status of the drive system. (Refer to P. 3-48.)

Status of Each Switch and Drive System

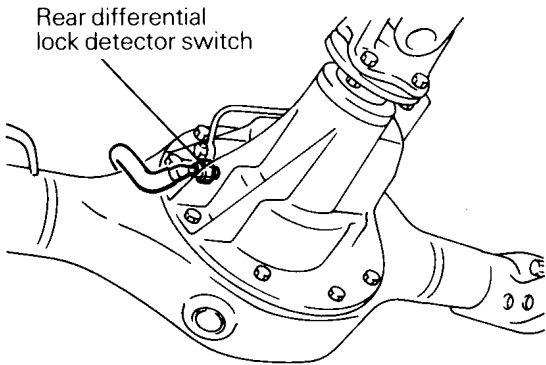
	2WD	4WD	
		Centre differential free	Centre differential lock
Free wheel engage switch	OFF	ON	ON
Centre differential lock detector switch	OFF	OFF	ON



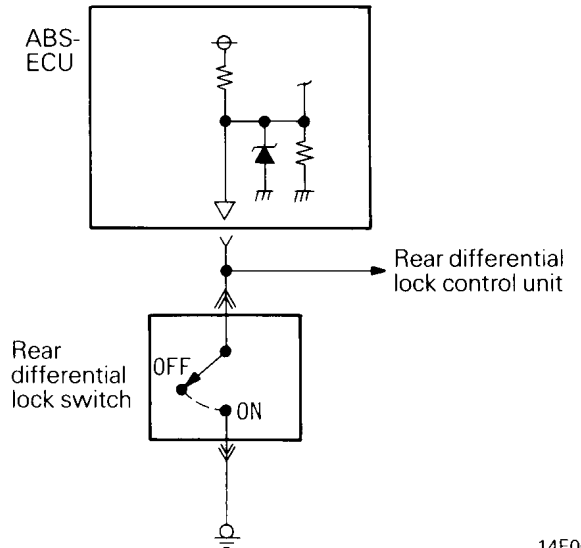
REAR DIFFERENTIAL LOCK DETECTOR SWITCH

The rear differential lock detector switch is shared by the rear differential lock system and outputs an ON signal to the ABS-ECU when the rear differential is in the locked state. When it is in the free state, the

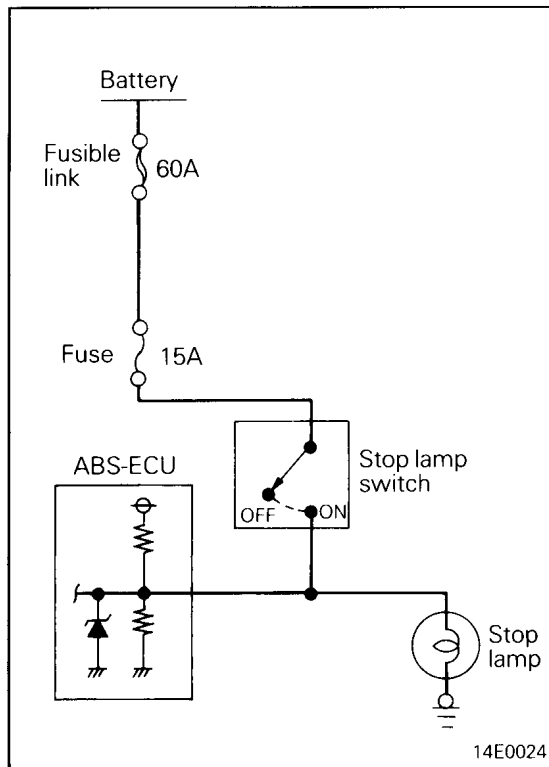
switch outputs an OFF signal. In response to this signal, the ABS-ECU corrects the ABS control to prevent premature locking of the rear wheels.



11E0034



14E0016



14E0024

STOP LAMP SWITCH

When the brake pedal is depressed, the stop lamp switch enters the ON state. When the brake pedal is released, the switch is forced to the OFF state. The output rises to the battery voltage (HIGH) when the switch enters the ON state, and falls to about 0V (LOW) when the switch is caused to be OFF.

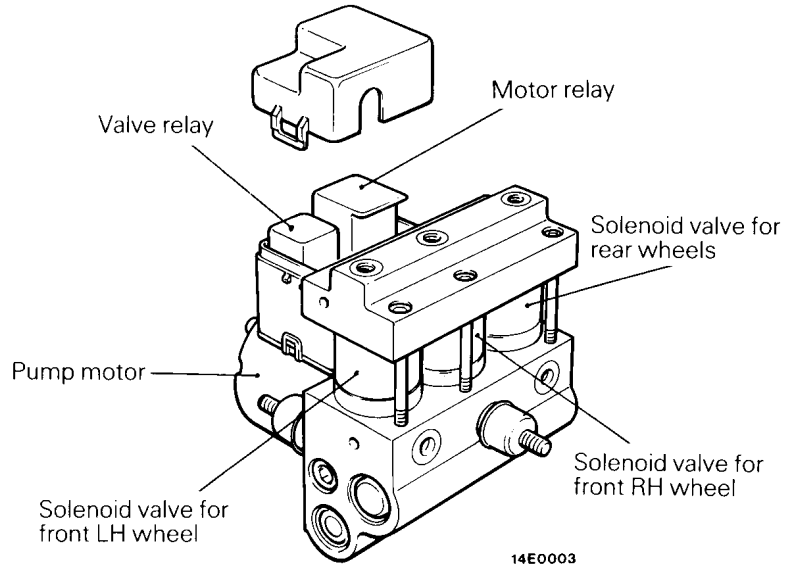
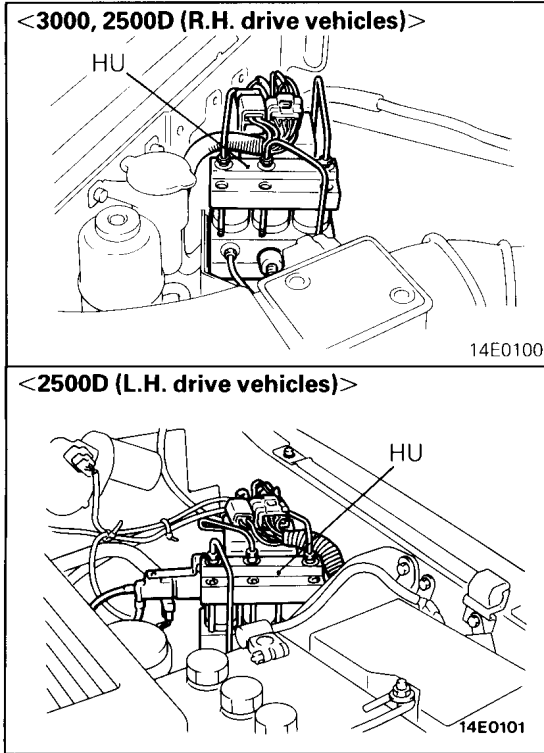
This voltage is monitored by the ECU to determine whether the brake pedal is depressed or not. The ECU uses the information to aid in ABS control.

ACTUATOR

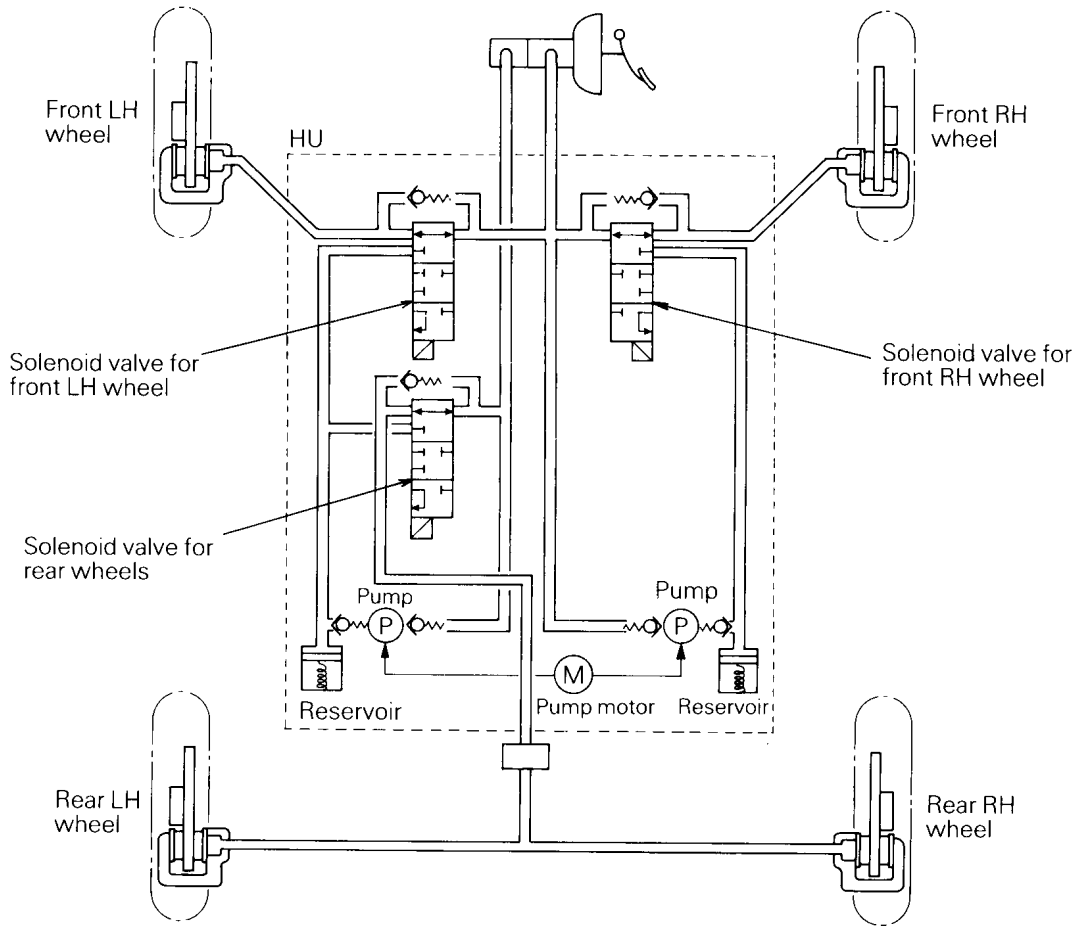
HYDRAULIC UNIT (HU)

The HU is elastically supported by the fender shield with a bracket in between. The HU consists of a pump motor, plunger pump, solenoid valve, etc. A relay box comprising a motor relay and valve relay is externally mounted.

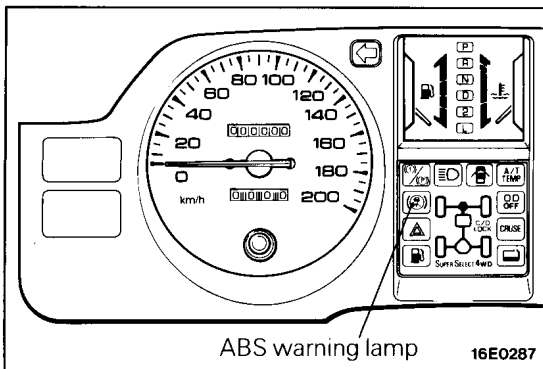
The fluid passages in the HU are in two separate systems; one for the front wheels and one for the rear wheels. Three solenoid valves are provided; one for the front LH wheel, one for the front RH wheel, and one for the rear wheels.



Function Diagram



14E0006



ABS WARNING LAMP

The ABS warning lamp continues to light:

- (1) During an initial check performed when the ignition key is placed in the ON position or when the engine is started (The lamp is defective if it does not light during the initial check.)
- (2) When the ABS fails (the lamp stays ON until the IG is OFF) The ABS warning lamp also lights when the ECU power voltage is abnormally low or high. In this case, it goes out when the power voltage re-enters the specified voltage range.

ELECTRONIC CONTROL UNIT (ECU)

The ECU calculates the wheel slipping conditions (slip ratio, deceleration) according to a predetermined theory on the basis of the wheel speeds detected by the wheel sensors and the signals from the wheel speed sensors and G sensor, and

controls the solenoid valves in the HU to make sure that the wheels are not locked. As a piece of data for determination of the end of control, signals on the stop lamp switch are input to the ECU.

[Major control actions]

(1) The Pajero ABS must be compatible with all of the 2WD, VCU 4WD (centre differential free) and directly coupled 4WD (centre differential lock) modes. Therefore, the signals from all of the 2WD/4WD, centre differential lock and rear differential lock detector switches are input to the ECU. In response to these switch signals, the ECU determines the status of the drive system, select a proper logic suitable for the status, and switches to the selected logic. (Refer to P. 3-48.)

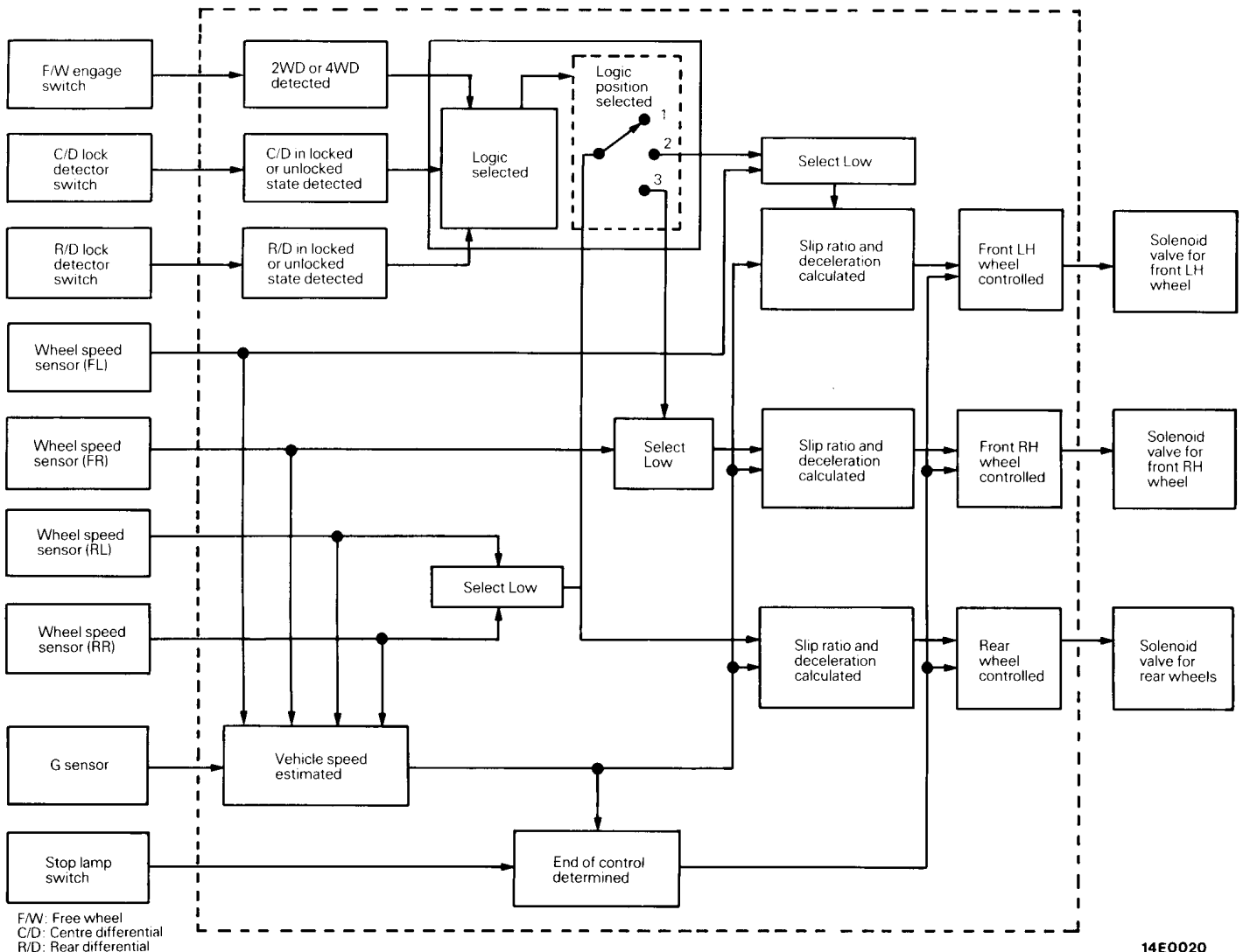
Position 1, the logic selecting position shown below, is associated with the 2WD and VCU 4WD modes, whereas positions 2 and 3 are associated with the directly coupled 4WD mode. When the ECU is in the directly coupled 4WD

mode, if it finds that the rear wheel rotating at a lower speed is the LH one, it selects position 2. If it finds that the rear wheel rotating at a lower speed is the RH one, it selects position 3.

(2) In the rear differential lock mode, the ECU corrects the slipping amount of the rear wheels to a somewhat smaller value to prevent premature locking of the rear wheels when the vehicle gets out of a slippery road surface to a dry paved surface, thereby ensuring the stability of the vehicle.

(3) In addition to the functions mentioned above, the ECU has a self diagnosis function. If a fault is detected by the diagnosis function, the ECU activates the fail safe function and also lights the ABS warning lamp.

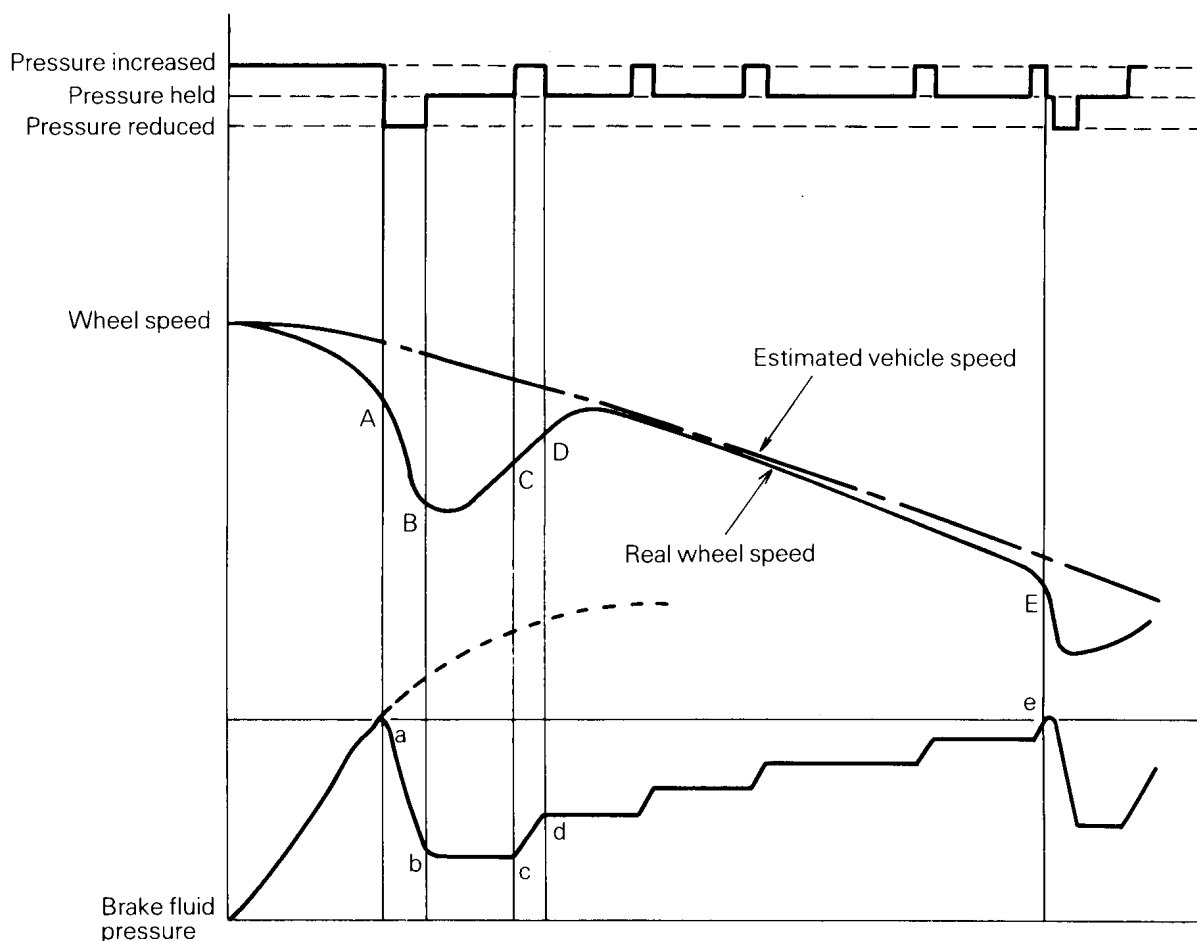
Block Diagram



F/W: Free wheel
C/D: Centre differential
R/D: Rear differential

BRAKE FLUID PRESSURE CONTROL**ABS Control Cycle**

- (1) In response to the signals from the wheel speed sensors of the four wheels, the ECU calculates the respective wheel speeds and wheel decelerations and estimates the vehicle speed at the moment.
- (2) Application of brakes increases the fluid pressure that acts on the wheel cylinder, thereby reducing the wheel speed. If the difference between the wheel speed and vehicle speed increases to the extent that the wheel decelerating condition reaches a predetermined value (point A), the ECU determines that the wheel is getting locked and sends a "reduce the pressure" signal to the solenoid valve to reduce the brake fluid pressure. (Between a-b)
- (3) Accordingly, the wheel deceleration starts recovery. When the wheel speed reaches point B, the ECU sends a "hold the pressure" signal to cause the wheel cylinder to retain the brake fluid pressure, and waits and sees for a while. (Between b-c)
- (4) If the wheel deceleration continues further recovery and goes past point C, the ECU determines that the danger of locking has been averted and issues an "increase the pressure" signal to increase the brake fluid pressure again. (Between c-d)
- (5) The brake fluid pressure is controlled by repeated fluid pressure increasing and holding operations. (Between d-e)
- (6) If the wheel decelerating condition exceeds the preset value, the cycle of operations described above in (2) through (5) is repeated to control the brake fluid pressure.



Remarks
When the brake fluid pressure changes, the wheel speed changes a little later. This is because the inertial force acts on the wheel.

14N0069

Vehicle Speed for Control

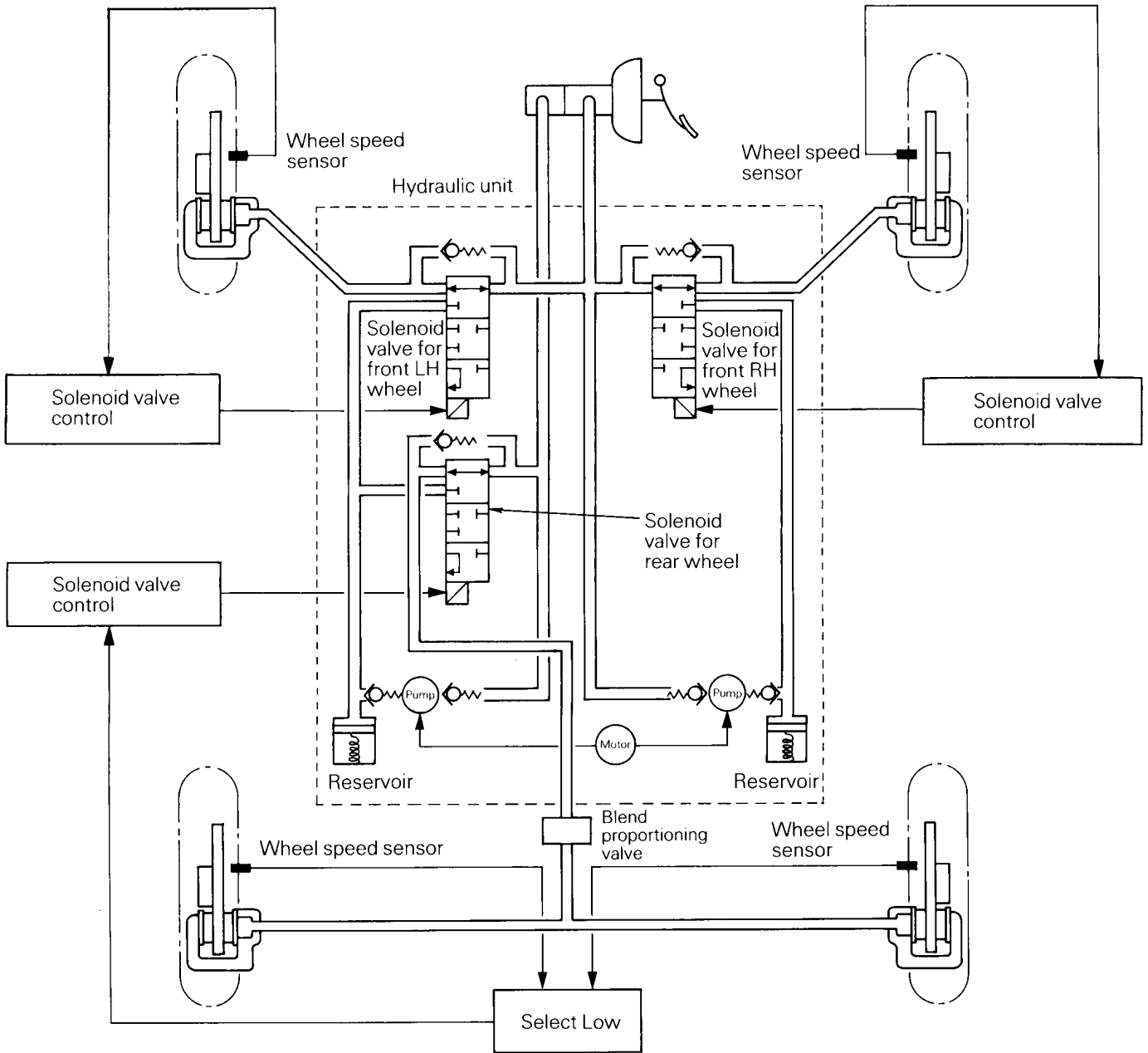
When the vehicle speed exceeds 9 km/h (6 mph), the ABS is ready for operation. When the vehicle speed decreases to about 2 km/h (1 mph) or less, the ABS stops control operations.

Control of 4 Wheels

The ABS control mode is essentially the 3-channel control mode. Based on this control mode, the ABS provides controls that differ between the 2WD and VCU 4WD modes and directly coupled 4WD mode.

1. VCU 4WD or 2WD Mode

In the VCU 4WD or 2WD mode, the ABS controls the front RH and LH wheels independently, while achieving Select Low integrated control of both rear wheels.

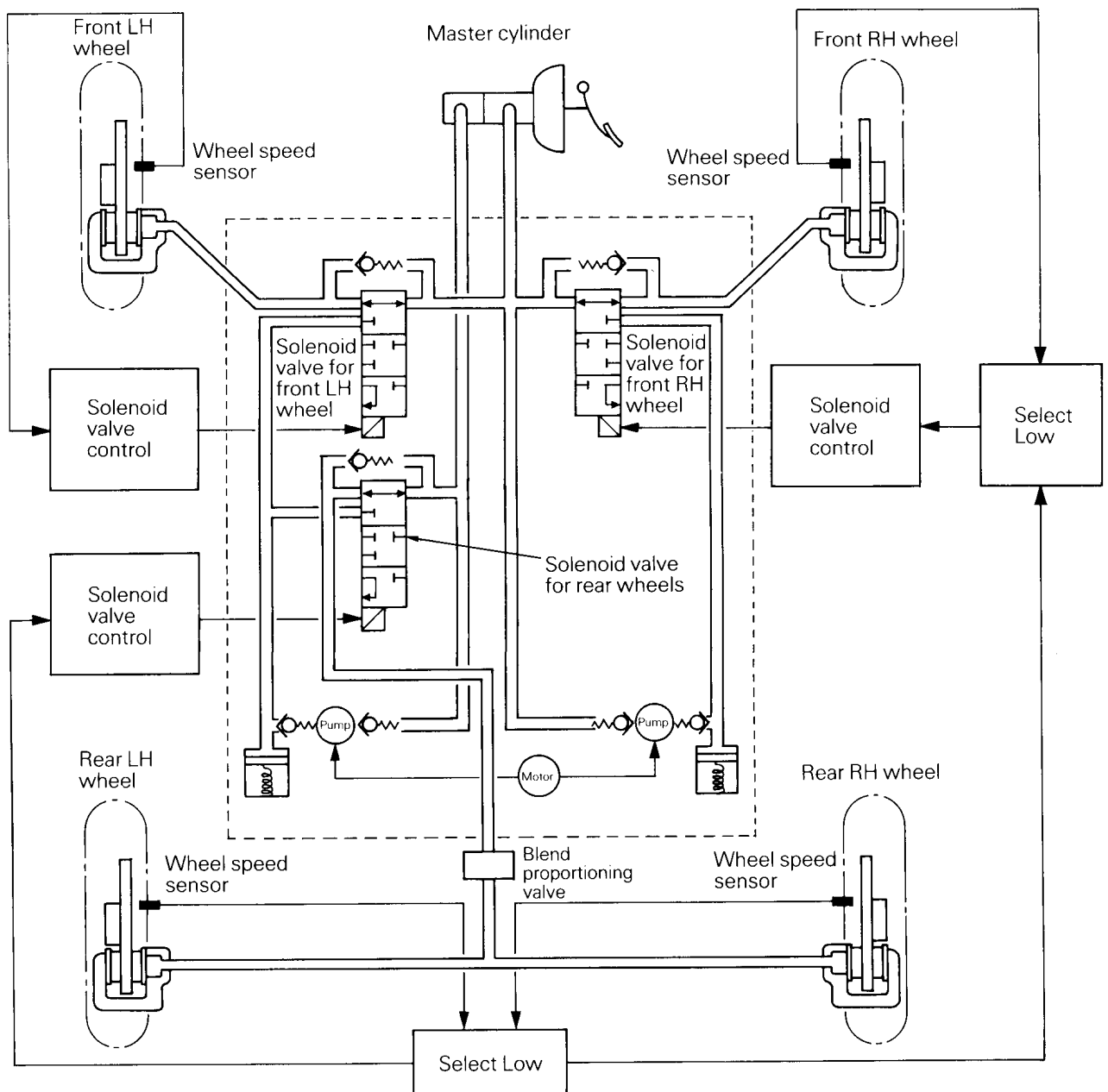


2. Directly Coupled 4WD

In the directly coupled 4WD mode, the ABS provides controls based on the controls in the VCU 4WD (centre differential free) and 2WD modes. If one of the rear wheels is about to be locked during ABS operation with the vehicle speed at approximately 15 km/h (9 mph) or more, the ABS achieves Select Low control of the front wheel located on the same side as the rear wheel rotating at a lower speed. In other words, the wheel speed of the rear wheel rotating at the lower speed is compared with the wheel speed of the front wheel located on the same side, and the solenoid valve for the

front wheel is controlled to match the lower speed. The fluid pressures that act on both rear wheels and the front wheel located on the same side as the rear wheel rotating at the lower speed, three wheels in total, are simultaneously controlled. (The illustration shown below applies when the rear RH wheel is getting locked.) Namely, when a rear wheel is about to be locked, the ABS provides controls that reproduce a simulated diagonal 2-channel control mode*.

*: Diagonal 2-channel control mode: Control mode adopted for Galant and other 4WD vehicles

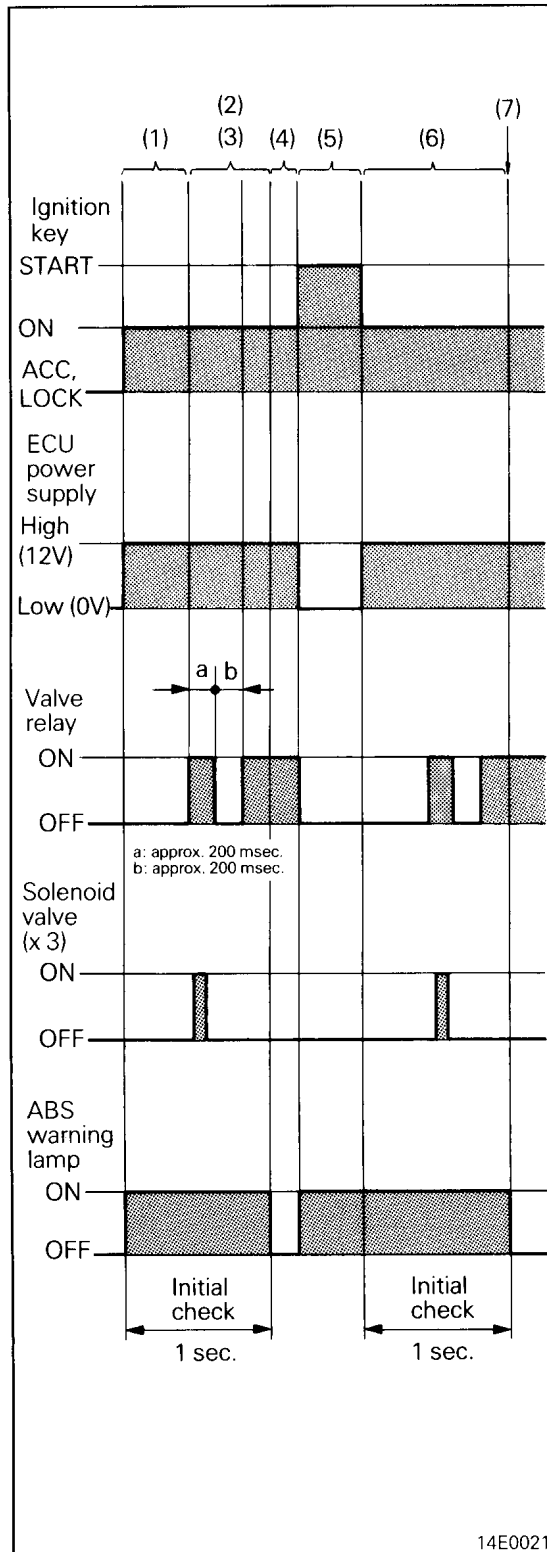


FAIL SAFE FUNCTION

Should the ABS system fail, the ECU isolates the system and allows the brakes to operate normally, assuring a high level of safety.

If the ECU determines on the basis of the result of self diagnosis that the ABS is out of order, the ECU

lights the ABS warning lamp. At the same time, it causes the valve relay to deactivate the solenoid valve controls in the HU and restore normal brake operations.

**INITIAL CHECK FUNCTION**

The ECU activates the self diagnosis function to perform an initial check when starting the ABS system in operation. When a fault is detected, the ECU lights the warning lamp and stops the ABS system from functioning.

Initial Check Operations

- (1) When the ignition key is placed in the "ON" position, the power is supplied to the ECU, and self diagnosis of the internal circuits of the ECU executed first. During the period the ABS valve relay stays in the "OFF" state.
- (2) Then the ECU drives the ABS valve relay to the "ON" to "OFF" to "ON" state for self diagnosis of the ABS valve relay. When the ABS valve relay is in the first "ON" state, current is supplied to all the solenoids for a very short interval to execute self diagnosis of the solenoids and solenoid drive circuits.
- (3) During the diagnosis period in (2), the two microcomputers in the ECU check all of the input signals, including switch signals, against one another.
- (4) When the initial check operations described above are completed, the warning lamp goes out.
- (5) When the ignition key is placed in the "START" position, the power supply to the ECU is cut off. However, since the ABS valve is caused to be "OFF", the warning lamp is lit by the ground side contact circuit of the ABS valve.
- (6) If the engine is successfully started and the ignition key brought back to the "ON" position, the power supply to the ECU is restored. As a result, the initial check operations described in (1) through (3) are re-executed.
- (7) When the initial check operations are completed without any error, the warning lamp goes out and the ABS is ready for operation.

INITIAL MOTION CHECK FUNCTION

When the vehicle started in motion reaches a vehicle speed of approximately 8 km/h (5 mph), the ECU performs the following checks.

- (1) Motor check (only the first time the vehicle is started in motion*)
The ECU rotates the motor for an interval of approximately 0.5 second to check that the motor relay and motor are driven.
- (2) Solenoid valve check
The ECU supplies current to all the valves simultaneously for a very short interval and sends "reduce the pressure" and "hold the

pressure" signals to check that the valves are driven.

- (3) Wheel speed sensor check
The ECU checks whether wheel speed signals are input from all of the wheel speed sensors, beginning at the time when the vehicle is started in motion.

NOTE

* The first time the vehicle is started in motion refers to the first time it is started in motion after the system has started.

CONSTANT CHECKS

In addition to the initial check and initial motion check functions, the ECU has a function that constantly checks the following items.

1. Mutual Calculation Result Check

The ECU contains two microcomputers which mutually check the respective results of calculations.

2. Power Supply System Check

The ECU checks whether the IG power voltage and valve relay voltage are within the operating voltage limits.

3. Valve Relay Check

The ECU checks whether the valve relay is always in the ON state.

4. Solenoid Valve Check

The ECU constantly outputs a signal to each of the solenoid valves to check whether the signal is in agreement with the status of the solenoid valve.

5. Input Switch System Check

The ECU checks the free wheel engage switch and centre differential lock detector switch separately for open circuit, and also checks for illegal input combinations other than the specified ones to be input from the two switches. (The ECU determines the status of the drive system on the basis of the combinations of inputs from the two switches. If it detects any illegal combination, it determines that the switches are defective.)

- Rear differential lock detector switch
Checks the switch for open circuit.
- Stop lamp switch
Checks the switch for open circuit and ON failure.

6. G Sensor Check

- Checks to ensure that the G sensor power voltage is not out of the specified limits (7.0 to 7.6V).
- Checks for an abnormal output voltage (open circuit or short circuit) from the G sensor.
- Checks for an abnormal output voltage that may be output from the G sensor for a long time.

7. Motor System Check

Checks that the output voltage from the ECU itself is in agreement with the drive status of the motor.

8. Wheel Speed Sensor System Check

- When the wheel speed input from any of the wheels is approximately 8 km/h (5 mph) or more, the ECU checks whether the wheel speeds input from the other wheels are correct.
- When the vehicle speed is approximately 20 km/h (12 mph) or more, the ECU compares the wheel speeds to check for an abnormally high or low wheel speed that might have been input.
- Monitors the voltages on the (+) wires of the wheel speed sensors to check for a sensor that might have been open-circuited or short-circuited to the body.

DIAGNOSIS FUNCTION

To facilitate ABS system checks, the ECU has the following functions.

- Diagnosis code output
- Service data output
- Actuator test

All of the functions can be checked by use of a multi-use tester (MUT).

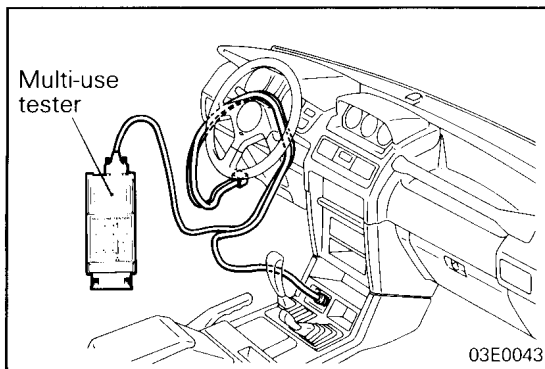
A diagnosis code can be checked in terms of the deflection of the pointer of a voltmeter.

Procedure for Entry into Diagnosis Function by Use of MUT and Subsequent Controls

With the vehicle stationary, connect an MUT to the diagnosis check connector. The MUT functions can then be used. After communicating with the MUT to determine that the MUT has been fixed to the ABS system, the ECU enters the MUT mode.

NOTE

1. Make sure that the ignition switch is in the OFF position when the MUT is connected. If the MUT is connected with the ignition switch at ON, the ECU does not enter the MUT mode.
2. In the MUT mode, the ABS warning lamp is lit and the anti-lock controls inhibited during an actuator test only in order to prevent a mode where the brakes temporarily fail to function.



Conditions for entry into MUT mode	<ol style="list-style-type: none"> ① When wheel speeds of all four wheels are 0 km/h (0 mph) (vehicle stationary), the ignition switch is OFF. ② The MUT's check harness is connected to the diagnosis check connector of the vehicle (the SELF DIAGNOSIS/DATA TRANSFER changeover terminal is connected to the ground), and the ignition switch is then placed in the ON position. ③ The ABS system is selected by the MUT control switch. (The specified serial data is received.)
MUT mode	<p>When the ABS warning lamp is OFF, the ECU communicates with the MUT and provides normal anti-lock controls.</p> <p>During an actuator test, however, the ECU lights the ABS warning lamp and inhibits the anti-lock controls.</p>

Self Diagnosis Codes

A total of 24 items are diagnosed, and the results of diagnosis stored until the battery terminals are disconnected.

If a MUT is connected, the ECU communicates with the MUT. When no MUT is used, a voltmeter may be used as in the past to get visible indications.

1. SELF DIAGNOSIS ITEMS

Code No.	Description	
11	Wheel speed sensor (FR) open circuit	
12	Wheel speed sensor (FL) open circuit	
13	Wheel speed sensor (RR) open circuit	
14	Wheel speed sensor (RL) open circuit	
15	Abnormal wheel speed sensor signal associated with any of four wheels	
16	Abnormally high or low battery voltage	
21	Wheel speed sensor (FR) short circuit or excessive gap	
22	Wheel speed sensor (FL) short circuit or excessive gap	
23	Wheel speed sensor (RR) short circuit or excessive gap	
24	Wheel speed sensor (RL) short circuit or excessive gap	
25	Free wheel engage switch open circuit	
26	Centre differential lock detector switch open circuit	
27	Rear differential lock detector switch open circuit	
31	Abnormal G sensor power voltage (including power cable short circuit)	
32	G sensor signal wire open circuit, short circuit or abnormal signal	
33	Stop lamp switch open circuit or ON failure	
41	Solenoid valve for front RH wheel	No answers to drive signals for solenoid valves associated with individual items
43	Solenoid valve for front LH wheel	
45	Solenoid valve for rear wheels	
51	Valve relay out of order	
52	Motor relay or pump motor out of order	
63	ECU out of order	
64		

2. DIAGNOSIS CODE INDICATION METHOD

All of the failure codes in store are indicated when either an MUT or voltmeter is used.

NOTE

1. In the case of a fault concerning diagnosis code No. 16 "Abnormally high or low power voltage", it is indicated only when the fault still exists. (None of the faults of its kind that occurred in the past is indicated.)
2. Even if faults associated with a code No. successively occur, the code that is indicated is only the first code stored in memory.

3. FAULT CODE MEMORY CLEARING PROCEDURE

The fault codes in store can be cleared by disconnecting the negative battery cable for more than 10 seconds or by using an MUT.

NOTE

1. When the ABS-ECU was made to stop functioning by the fail safe function, the diagnosis codes in store cannot be cleared.
2. To check whether the diagnosis codes have been cleared, repeat the procedure to check diagnosis codes.
3. After the memory has been erased, no instruction from an MUT will be accepted. To check diagnosis codes, temporarily stop the engine, re-start it, and repeat the MUT procedure.

Service Data Outputs

Of the data items input to the ECU, the following items can be read out by an MUT.

SERVICE DATA OUTPUT ITEMS

Service data item		Displayed unit
Code No.	Items	
11	Front RH wheel speed	km/H
12	Front LH wheel speed	km/H
13	Rear RH wheel speed	km/H
14	Rear LH wheel speed	km/H
16	ECU power voltage	V
25	Free wheel engage switch in ON or OFF state	ON/OFF
26	Centre differential lock detector switch in ON or OFF state	ON/OFF
27	Rear differential lock detector switch in ON or OFF state	ON/OFF
32	G sensor output voltage	V
33	Stop lamp switch at ON or OFF position	ON/OFF

Actuator Test Function

Using an MUT, you can easily check operation of the following actuators by forced actuator drive.

NOTE

1. When the ECU is in the stopped state, no actuator test can be executed.
2. To perform an actuator test, the vehicle must be stationary.

3. When the maximum wheel speed reaches 10 km/h (6 mph) during a forced actuator drive, the forced actuator drive is interrupted.
4. While an actuator test is in progress, the ECU lights the ABS warning lamp and inhibits the anti-lock controls.

ACTUATOR SPECIFICATIONS

No.	Components to be driven		Drive pattern
01	Solenoid valve and pump motor of associated channel of HU (Simplified inspection mode)	Solenoid valve for front LH wheel	
02		Solenoid valve for front RH wheel	
03		Solenoid valve for rear wheels	

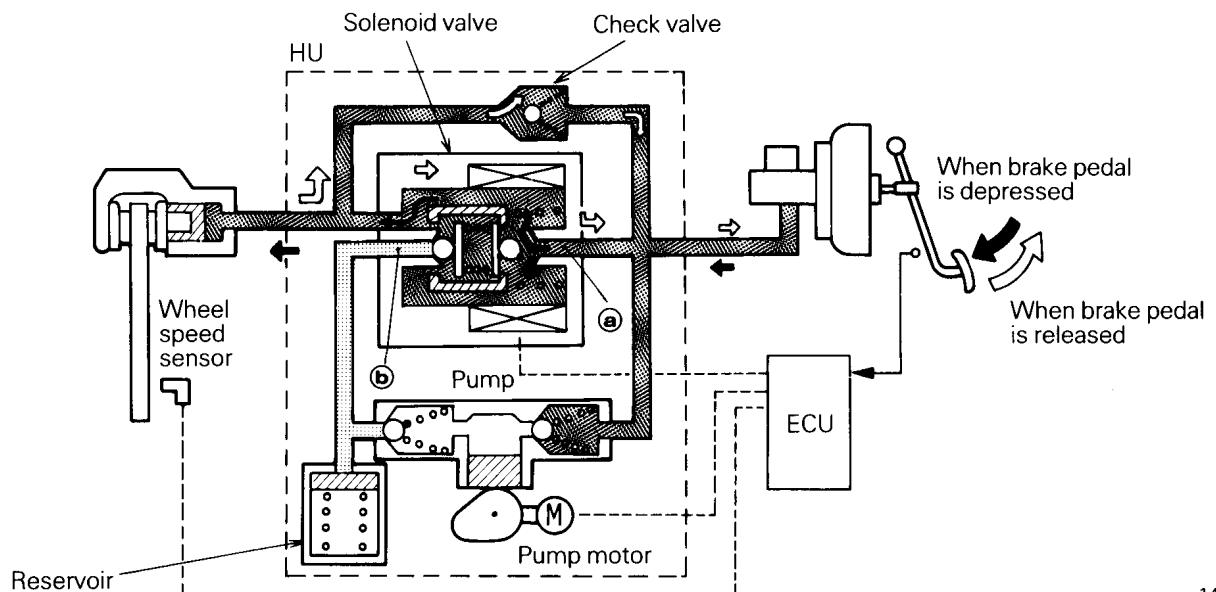
14E0048

OPERATION OF THE SYSTEM WHEN ABS IS NOT IN OPERATION

When the brake pedal is depressed, the brake fluid is routed to the solenoid valve. At this point, the ECU does not supply current to the solenoid valve, the inlet port (a) of the solenoid valve is in the opened position, and the outlet port (b) is in the closed position. Therefore, the brake fluid from the master cylinder is forced through the solenoid valve

to the wheel cylinder and causes the brakes to apply.

When the brake pedal is released, the brake fluid pressure in the master cylinder falls, and the brake fluid returns through both the check valve and solenoid valve to the master cylinder.



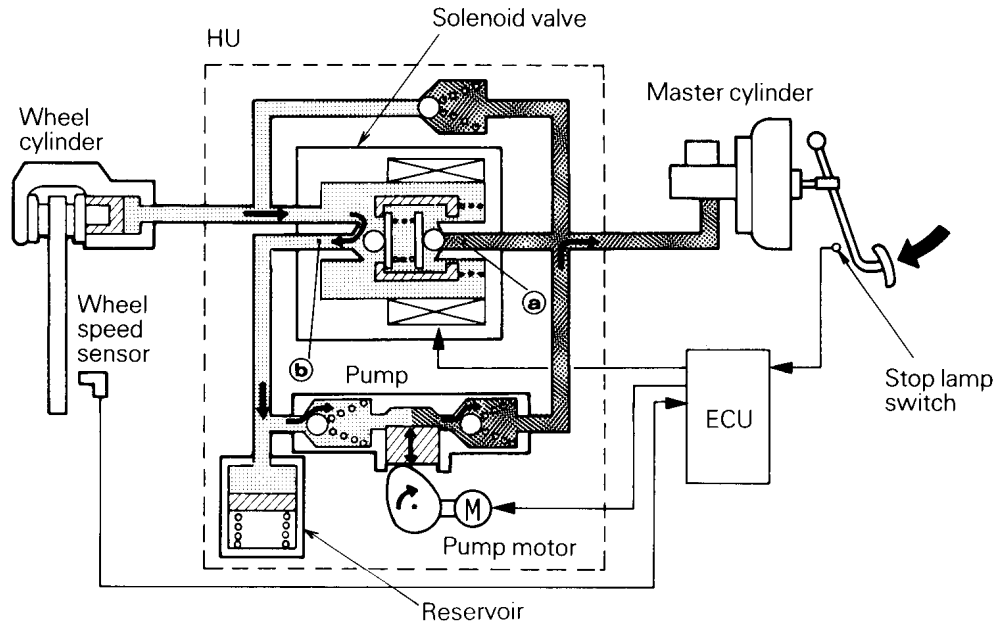
14F0053

WHEN ABS IS IN OPERATION

Operation to Reduce Fluid Pressure

When a wheel is about to be locked by brake application, the ECU supplies “reduce the pressure” current to the solenoid valve to close the inlet port (a) of the solenoid valve and open the outlet port (b). As a result, the brake fluid from the master cylinder is routed through the outlet port (b) to the reservoir to reduce the fluid pressure in the wheel

cylinder. As soon as the ECU supplies the current to the solenoid valve, it drives the pump motor to return the brake fluid collected in the reservoir to the master cylinder. In this case, pedal kickback is generated which forces the brake pedal back to some extent.

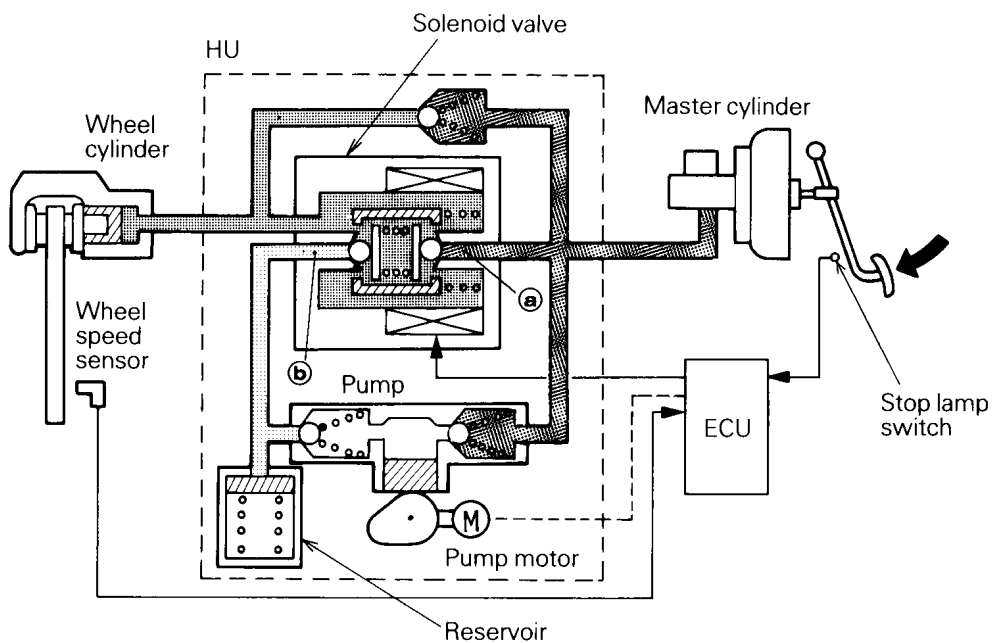


14F0054

Operation to Hold Fluid Pressure

If the fluid pressure in the wheel cylinder is reduced (or increased) to an optimum value, the ECU supplies “hold the fluid pressure” current to the

solenoid valve to close both inlet port (a) and outlet port (b). As a result, the fluid pressure in the wheel cylinder is maintained at the value.



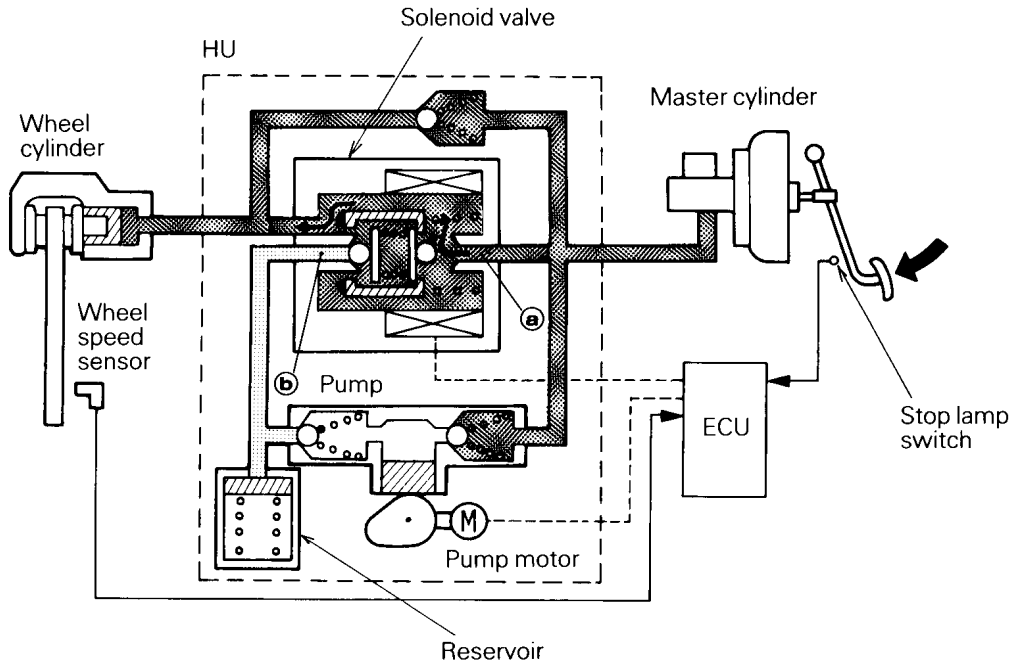
14F0055

Operation to Increase Fluid Pressure

When the fluid pressure in the wheel cylinder has to be increased, the ECU stops supplying current to the solenoid valve. Accordingly, the inlet port (a) is opened and the outlet port (b) closed just like when the ABS is not in operation, and the fluid pressure in

the wheel cylinder is increased. In this case, since the brake pedal is slightly pulled, pedal kickback is generated.

The fluid pressure increasing speed is controlled by repeating the fluid pressure increasing operation.



PARKING BRAKES

E9DJAAD

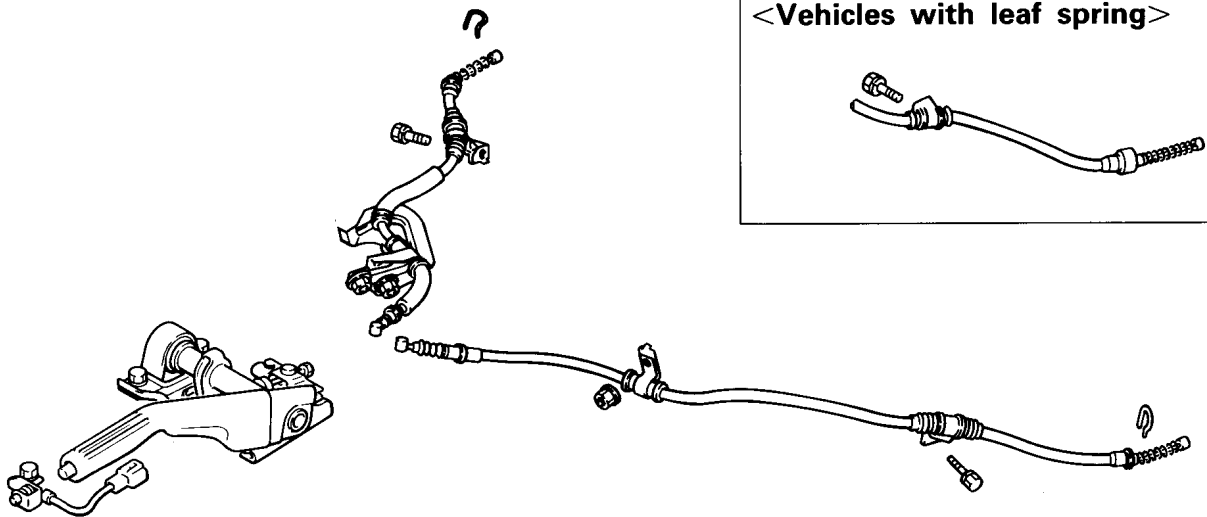
The parking brakes come in two types; the drum in disc type equipped with dedicated parking brake lining shoe, and the drum brake type which serves as combined parking and service brakes. Either of

the two types is properly selected for the right type of vehicle. For ease of operation, the lever is offset toward the driver's seat from the floor backbone centre.

SPECIFICATIONS

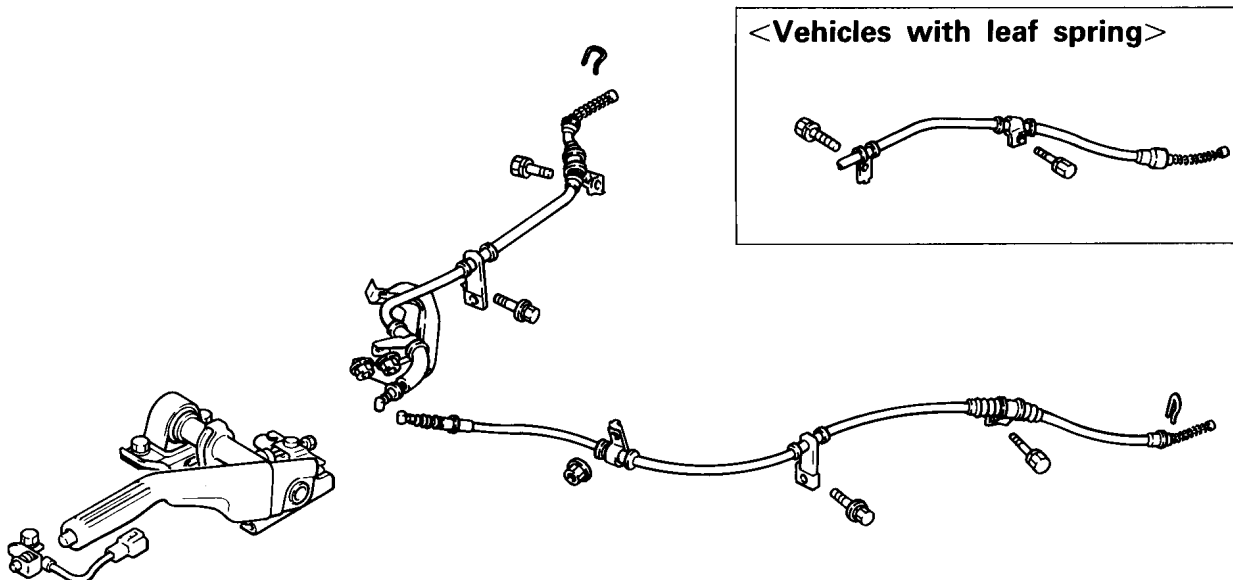
Items	Vehicles with rear drum brake	Vehicles with rear disc brake
Brake operation type	Lever type	Lever type
Cabling	V-shaped cabling	V-shaped cabling
Brake system	Serving also as service brakes (Drum brake type)	Dedicated parking brakes (Drum in disc type)

2-door models <vehicles with coil spring>



14E0157

4-door models <vehicles with coil spring>



14E0156

BODY

CONTENTS

E9EAZAF

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GENERAL DESCRIPTION

Further weight reduction and higher endurance reliability of the body have been achieved by

simplifying the body construction through use of highly rigid larger panels.

FEATURES

Weight reduction and rigidity increase

1. Ample use of high-tensile steel sheet
2. Improvement of door outer panel rigidity through effective use of reinforcement
3. Ladder type frame incorporating box type closed section side members as well as pipe type and welded channel type crossmembers

Rust prevention

1. Ample use of corrosion-resistant steel sheet
2. Flash plating of outer panel surface to provide excellent paint finish
3. Rocker panel primer is applied on the side sill

Reduction of vibration and noises including aerodynamic noise

1. Use of rubber body mount at connections between frame and body
2. Adoption of flush surfaces
3. Windshield installation using adhesive

Improvement of operability and safety

1. Use of two-stage door check to ensure stop at midpoint
2. Installation of central door lock
3. Adoption of power window switch and power window lock switch provided with one-touch-down mechanism
4. Adoption of laminated glass for windshield
5. Adoption of motor-driven canvas at front
6. Use of folding canvas at rear
7. Optional roll bars made available for canvas top
8. Use of reinforcement (side door beam) in door to ensure occupant's safety in side collision <vehicles for Europe>

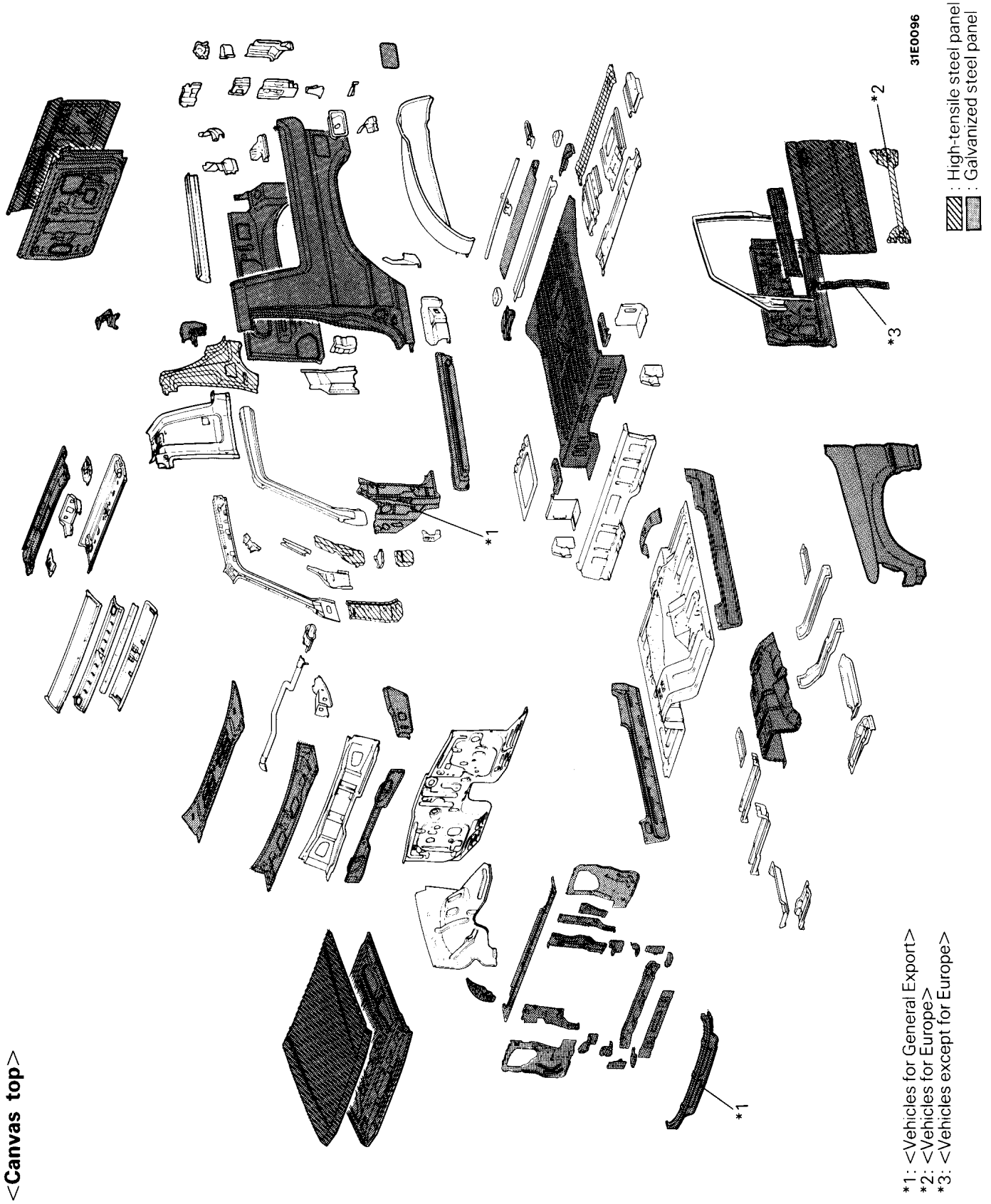
Improvement of reliability

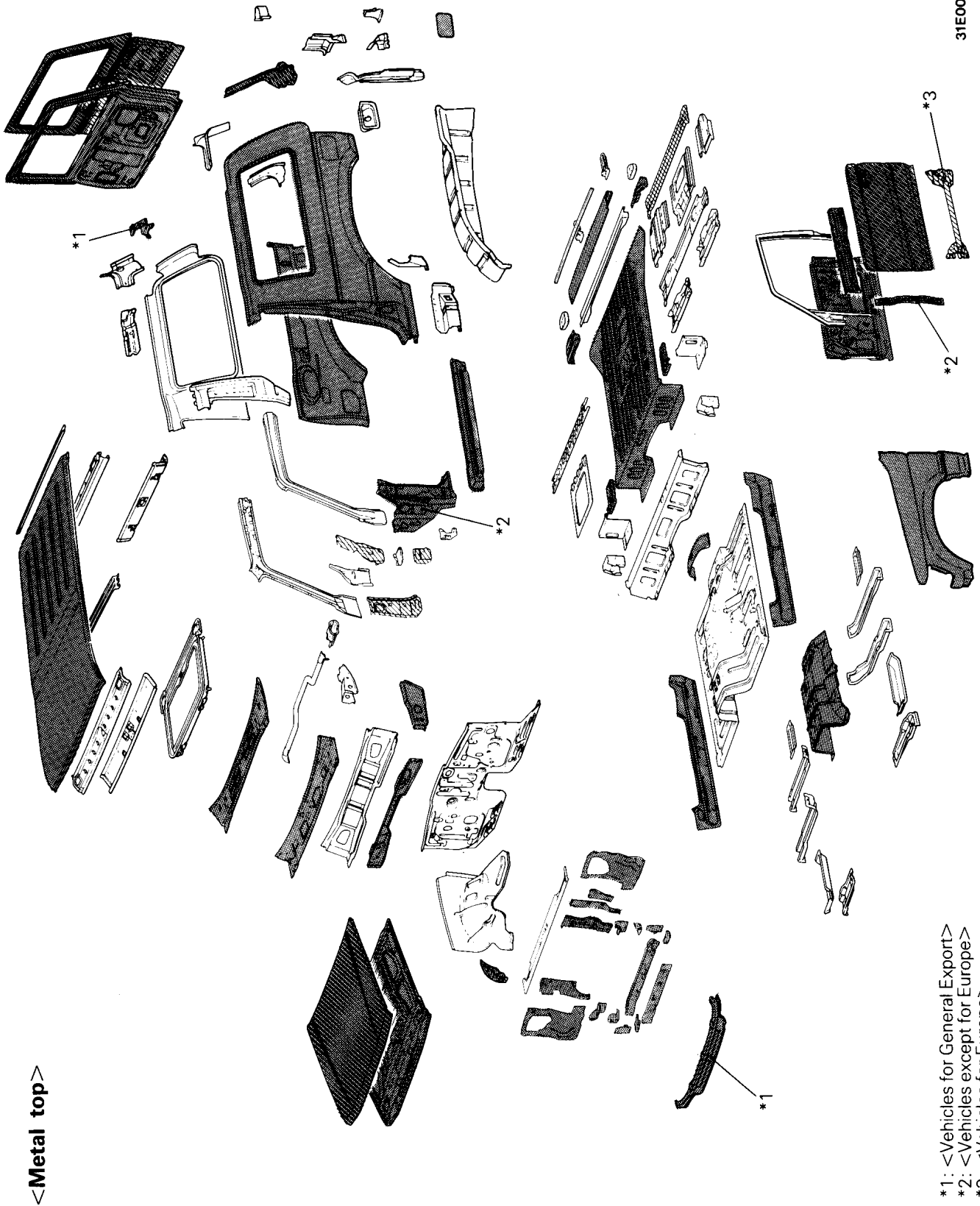
Use of Torx screws for installation of door latch

Enhancement of merchantability

1. Adoption of detachable tilt-up sunroof (option)
2. Adoption of motor-driven sliding sunroof (option)

MAIN BODY



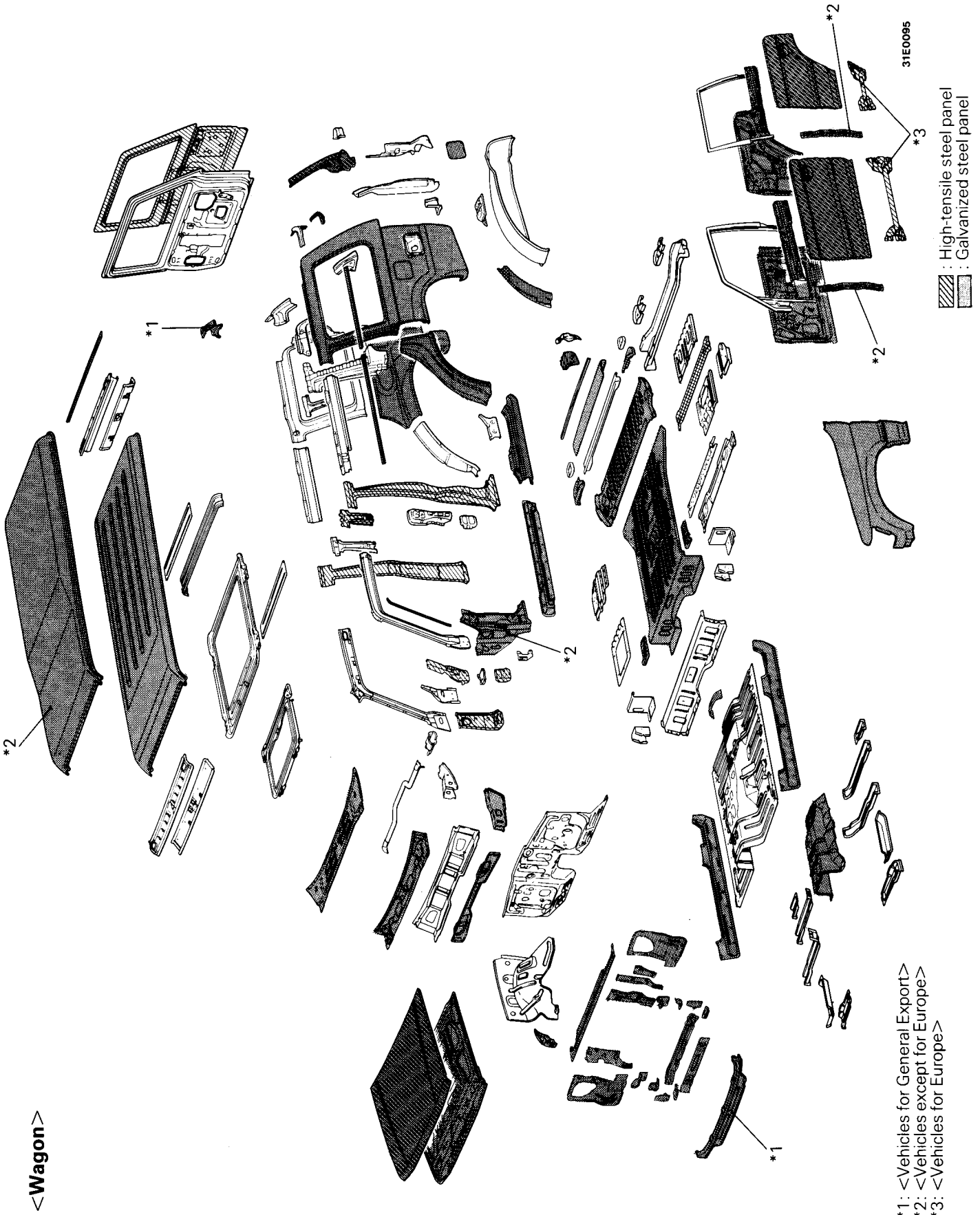


<Metal top>

- *1: <Vehicles for General Export>
- *2: <Vehicles except for Europe>
- *3: <Vehicles for Europe>

31E0097

▨ : High-tensile steel panel
 ■ : Galvanized steel panel



PAINT

BODY COLOUR

(M): Metallic paint
(P): Pearl tone paint

	Body colour	Body colour code		Colour number	Body colour name	Engine compartment and luggage compartment colour	
						Colour number	Colour name
	WHITE	W09		AC10809	Sophia White	AC10739	WHITE
	SILVER	H84		AC10884	Grace Silver (M)	AC10595	GRAY
	BLACK	X56		AC10756	Majorca Black (M)	AC10539	DARK GRAY
	LAMP BLACK	X94		AC10894	Lamp Black	AC10539	DARK GRAY
	RED	R57		AC10957	Venus Red	AC10795	RED
		R25		AC10925	Kutani Red (P)	AC10632	MAROON
	BEIGE	S46		AC10946	European Beige	AC10845	BEIGE
	LIGHT BEIGE	S22		AC10922	Wheat Beige (M)	AC10845	BEIGE
	BROWN	C41		AC10941	Sanjose Brown (M)	AC10828	DARK BROWN
	YELLOW	Y59		AC10659	San Marino Yellow	AC10575	YELLOW
	GREEN	G31		AC10931	Hannover Green (M)	AC10832	DARK GREEN
	BLUE	B42		AC10942	Normandie Blue (M)	AC10857	DARK BLUE
Paint used by manufacturer	WHITE	W09A51* ¹	W09	AC10809	Sophia White	AC10739	WHITE
	MEDIUM GRAY		A51	AC10951	Saimaa Gray (M)		
	WHITE	W09A24* ¹	W09	AC10809	Sophia White	AC10739	WHITE
	DARK GRAY		A24	AC10724	Dark Gray		
	BLACK	X56S22* ¹	X56	AC10756	Majorca Black (M)	AC10539	DARK GRAY
	LIGHT BEIGE		S22	AC10922	Wheat Beige (M)		
	LAMP BLACK	X94S22* ¹	X94	AC10894	Lamp Black	AC10539	DARK GRAY
	LIGHT BEIGE		S22	AC10922	Wheat Beige (M)		
	BLACK	X56A24* ¹	X56	AC10756	Majorca Black (M)	AC10539	DARK GRAY
	DARK GRAY		A24	AC10724	Dark Gray		
	RED	R57H84* ¹	R57	AC10957	Venus Red	AC10795	RED
	SILVER		H84	AC10884	Grace Silver (M)		
	RED	R25H84* ¹	R25	AC10925	Kutani Red (P)	AC10632	MAROON
	SILVER		H84	AC10884	Grace Silver (M)		
	RED	R57A24* ¹	R57	AC10957	Venus Red	AC10795	RED
	DARK GRAY		A24	AC10724	Dark Gray		

*¹: Two-tone body colour

(M): Metallic paint
(P): Pearl tone paint

	Body colour	Body colour code		Colour number	Body colour name	Engine compartment and luggage compartment colour	
						Colour number	Colour name
Paint used by manufacturer	RED	R25A24* ¹	R25	AC10925	Kutani Red (P)	AC10632	MAROON
	DARK GRAY		A24	AC10724	Dark Gray		
	BEIGE	S46X56* ¹	S46	AC10946	European Beige	AC10845	BEIGE
	BLACK		X56	AC10756	Majorca Black (M)		
	GREEN	G31S22* ¹	G31	AC10931	Hannover Green (M)	AC10832	DARK GREEN
	LIGHT BEIGE		S22	AC10922	Wheat Beige (M)		
	BLUE	B42H84* ¹	B42	AC10942	Normandie Blue (M)	AC10857	DARK BLUE
	SILVER		H84	AC10884	Grace Silver (M)		
	SILVER	H84B42* ²	H84	AC10884	Grace Silver (M)	AC10595	GRAY
	BLUE		B42	AC10942	Normandie Blue (M)		
	SILVER		H84	AC10884	Grace Silver (M)		
	LIGHT BEIGE		S22	AC10922	Wheat Beige (M)		
	BROWN	S22C41* ²	C41	AC10941	Sanjose Brown (M)	AC10845	BEIGE
	LIGHT BEIGE		S22	AC10922	Wheat Beige (M)		
	LIGHT BEIGE	S22G31* ²	S22	AC10922	Wheat Beige (M)	AC10845	BEIGE
	GREEN		G31	AC10931	Hannover Green (M)		
LIGHT BEIGE	S22		AC10922	Wheat Beige (M)			

*1: Two-tone body colour

*2: Three-way two-tone body colour

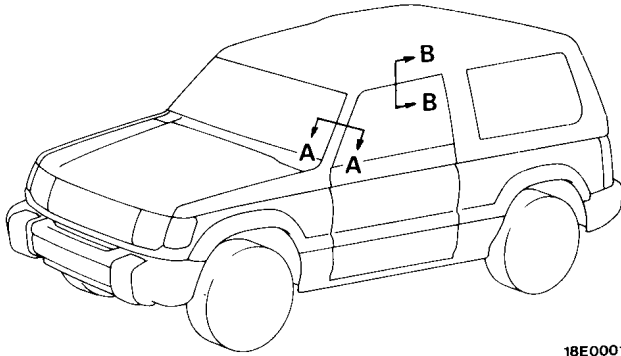
REDUCTION OF AERODYNAMIC NOISE

FLUSH SURFACE

Use of flush surface at each part of the body reduces wind noise and noise of escaping air and

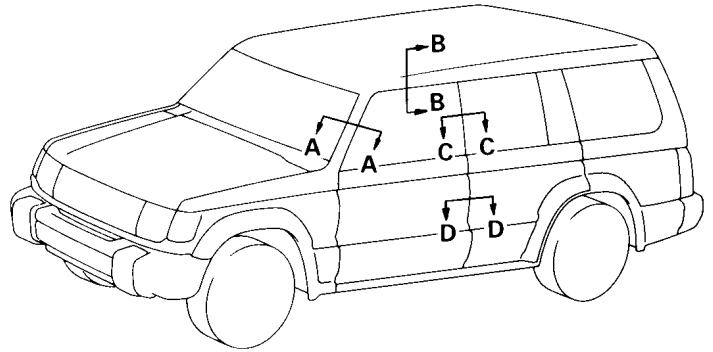
improves the appearance of the body.

<2-door model>



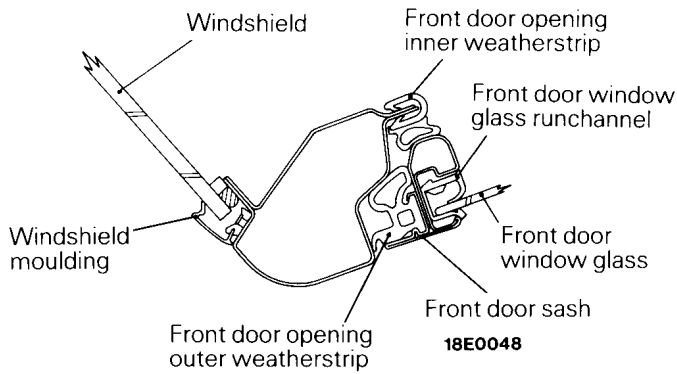
18E0001

<4-door model>



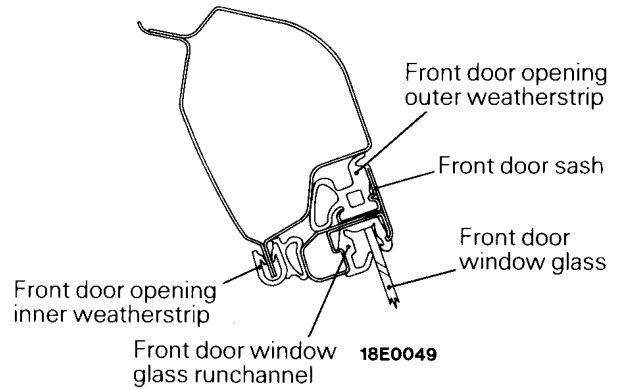
18E0003

Section A-A



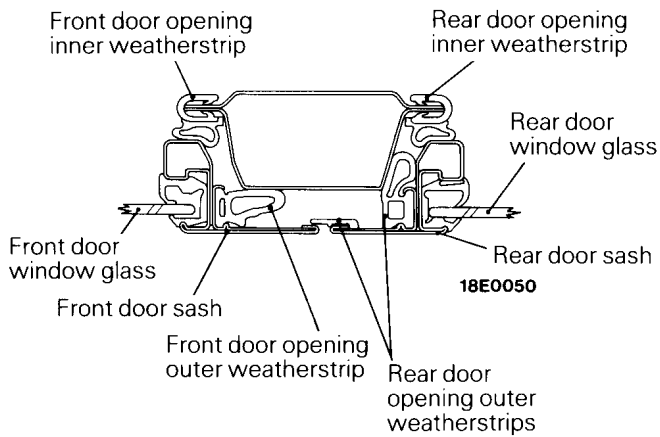
18E0048

Section B-B



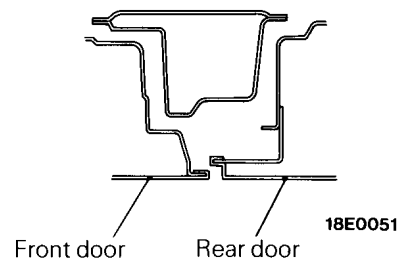
18E0049

Section C-C



18E0050

Section D-D



18E0051

DOORS

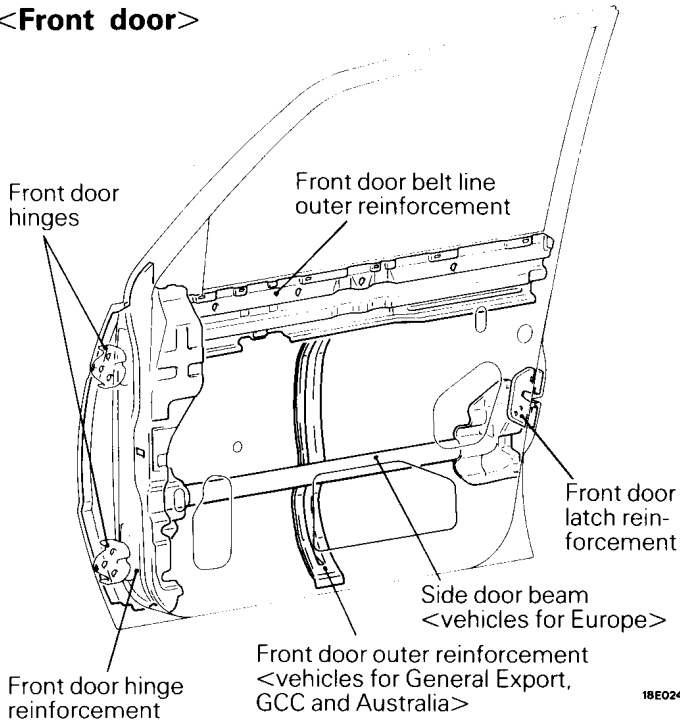
E9ECAAD

DOOR PANEL

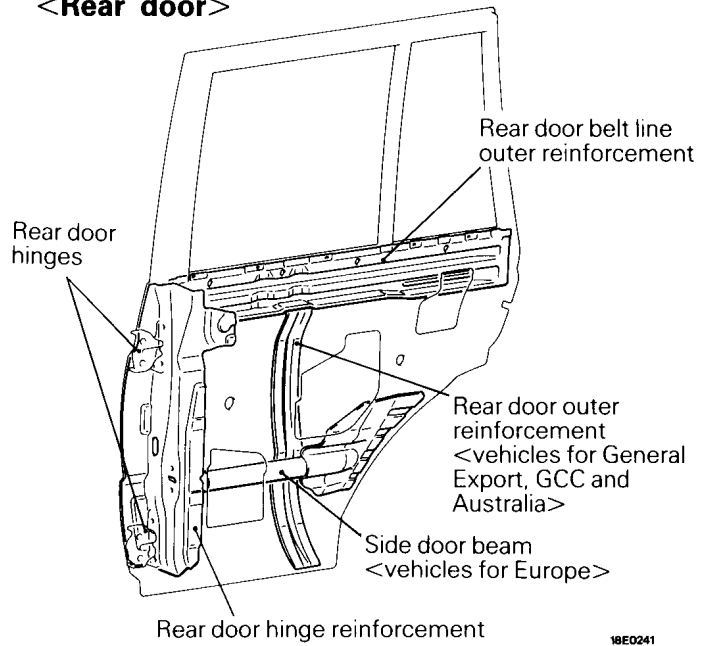
The front and rear doors are sash doors. The front door sash delta uses the welded construction to improve sash rigidity and reduce wind noise and the noise of escaping air. The back door is a door integral with the inner door

panel and has the door thickness increased to improve door rigidity. In addition, reinforcements at various points effectively improve outer panel rigidity.

<Front door>

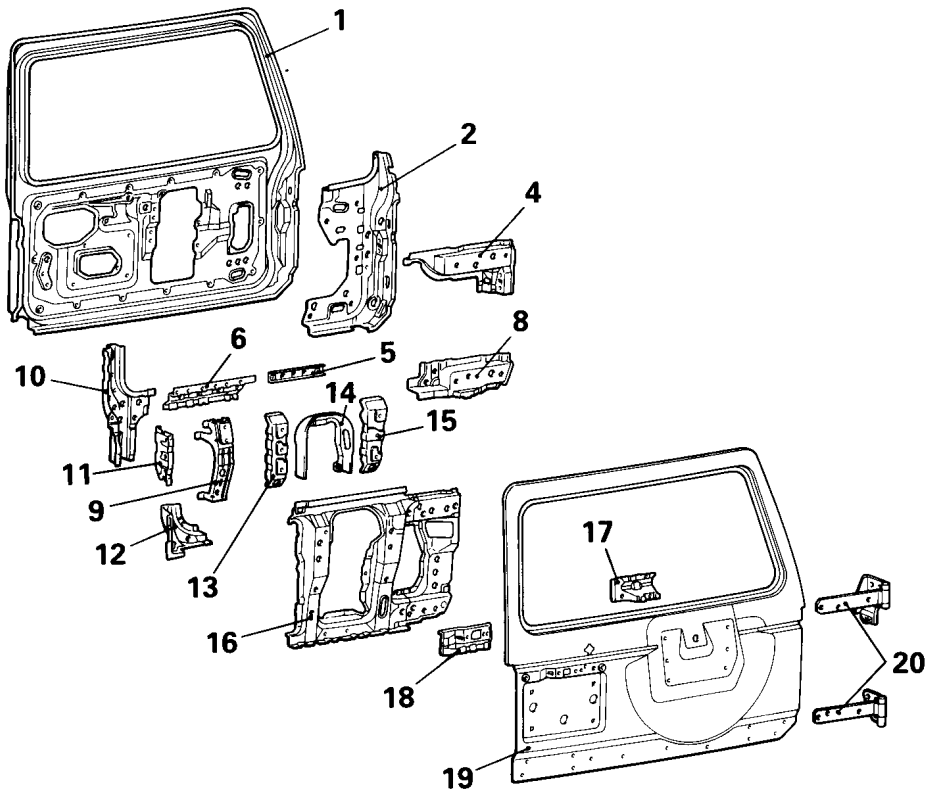


<Rear door>

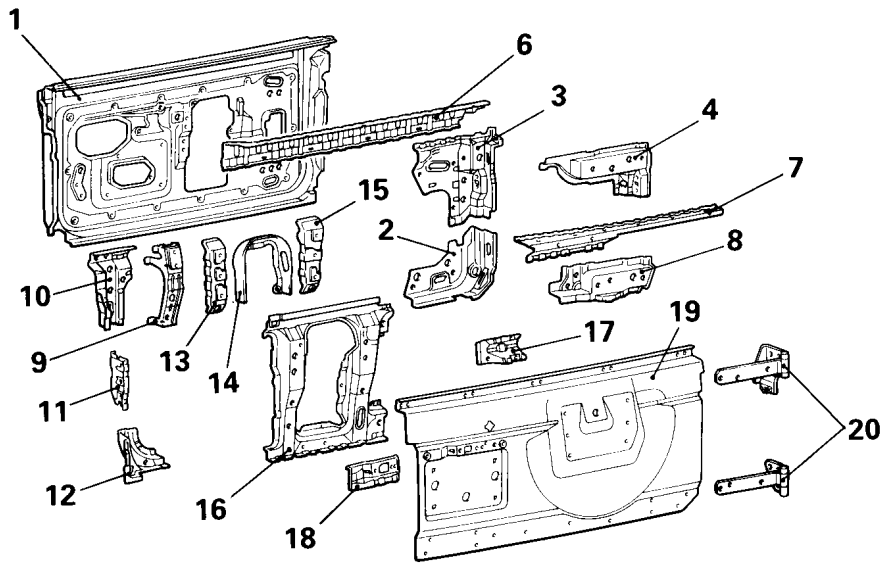


<Back door>

Metal top, long body



Canvas top



18E0139

No.	Part name	No.	Part name
1	Back door inner panel	11	Bumper rubber reinforcement
2	Back door corner reinforcement	12	Back door bumper lower reinforcement
3	Back door upper corner reinforcement	13	Reinforcement A for spare tire carriage
4	Back door hinge upper reinforcement	14	Back door spare tire extension
5	Pull handle reinforcement	15	Reinforcement B for spare tire carriage
6	Back door inner panel upper inner reinforcement	16	Back door spare tire reinforcement
7	Back door inner panel upper outer reinforcement	17	Back door outer panel reinforcement
8	Back door hinge lower reinforcement	18	Back door outside handle reinforcement
9	Tank carrier reinforcement	19	Back door outer panel
10	Back door latch reinforcement	20	Back door hinge

DOOR LOCK

Some models are equipped with the central door lock which allows all doors to be locked or unlocked by operating the inside lock knob on the driver's door or using the front door key.

The front and rear door checks are of the two-stage type to ensure stop at the midpoint.

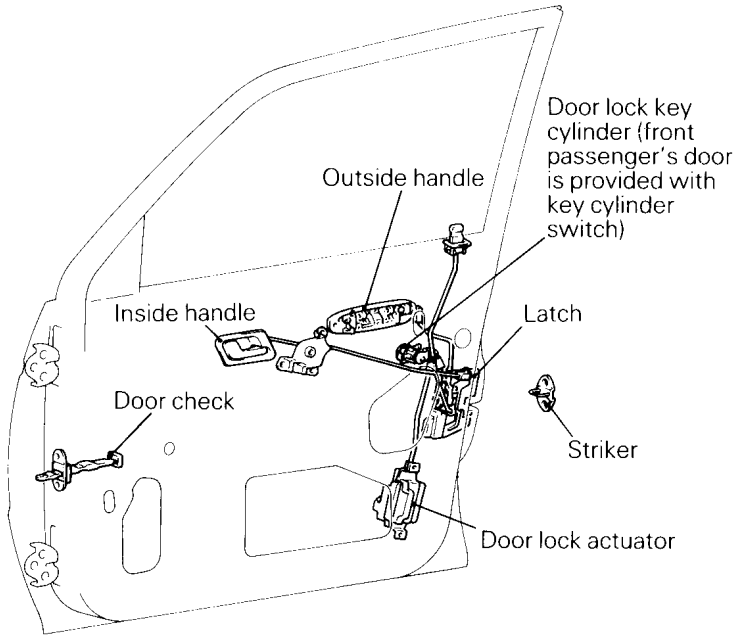
The back door is provided with a back door stopper

to prevent the door in the full open position from closing of itself on a slope or the like. In addition, the door latch is fastened with Torx screws to enhance the reliability.

NOTE

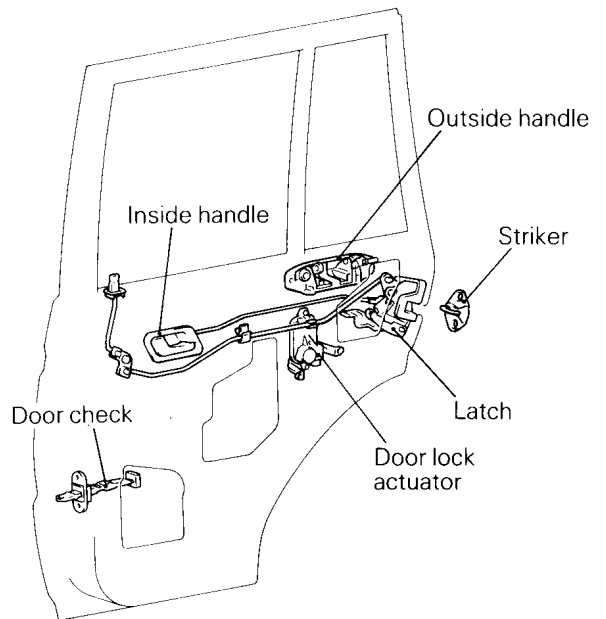
Operation of the door check is essentially the same as Lancer.

<Front door>



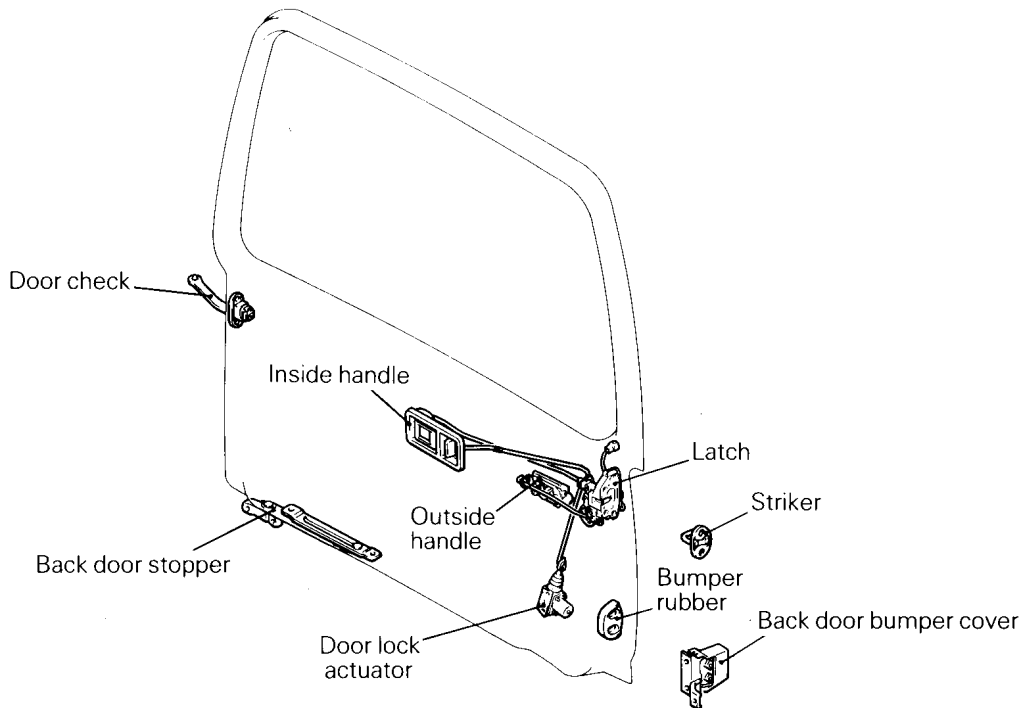
18E0095

<Rear door>



18E0092

<Back door>



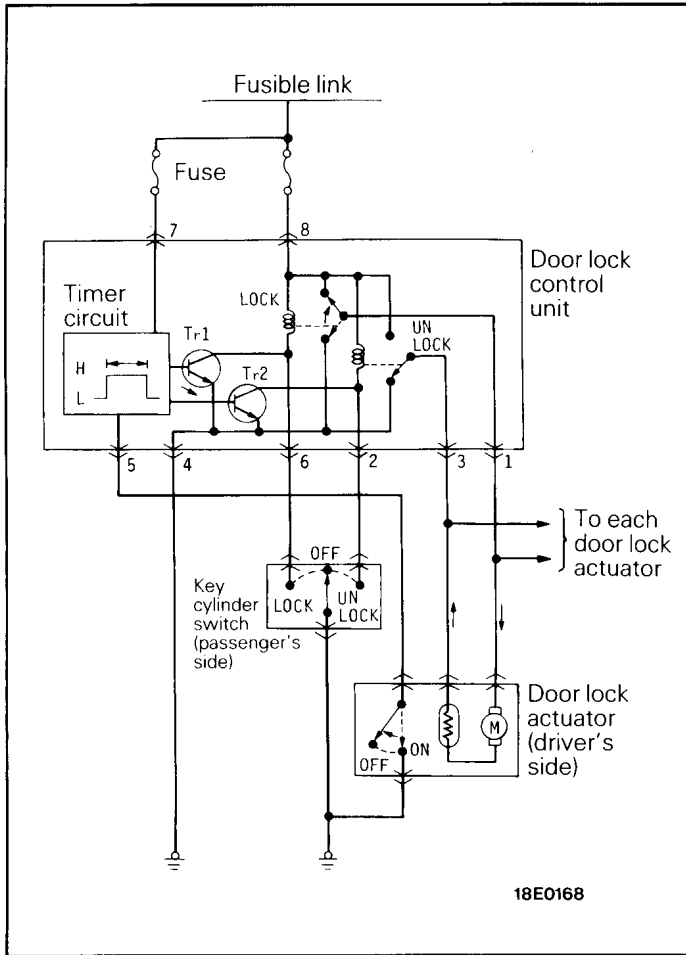
18E0099

CENTRAL DOOR LOCK OPERATION

Door Locking Operation

Setting the inside lock knob or key of the driver's door to the locking position causes the door lock switch incorporated in the door lock actuator to be turned off and terminal voltage ⑤ of the door lock control unit to change from L to H, flowing base current from the timer circuit to transistor Tr_1 for approx. 0.5 second. This will energize the lock side coil of the power relay inside the door lock control unit, operating the door lock actuators to lock the doors.

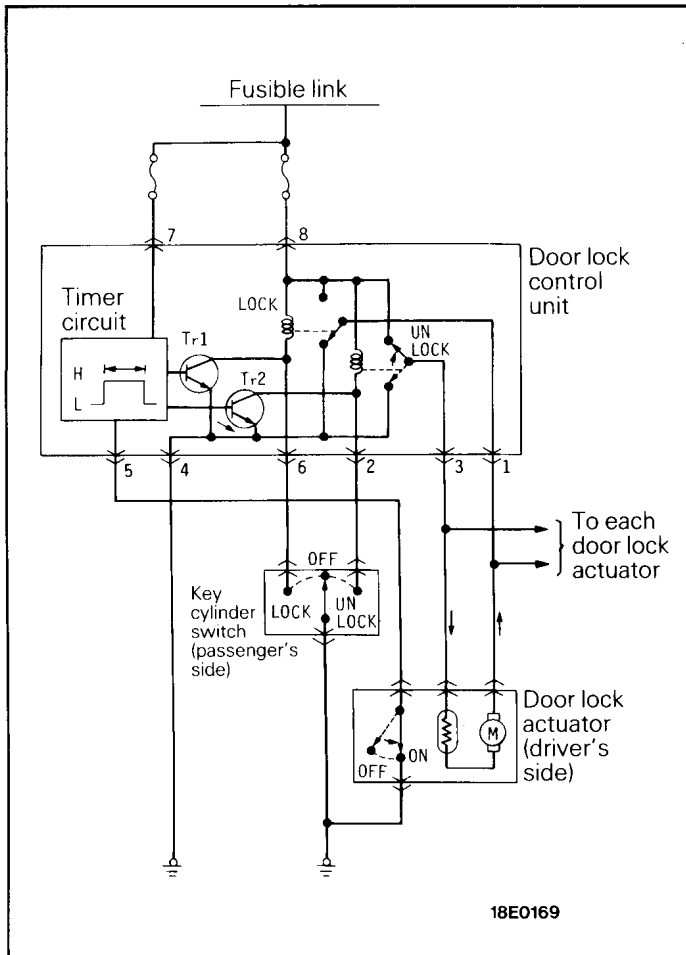
Turning the front passenger's door key to the locking position turns on the lock side of the key cylinder switch, directly energizing the lock side coil of the power relay inside the door lock control unit. This will operate the door lock actuators to lock the doors.



Door Unlocking Operation

Setting the inside lock knob or key of the driver's door to the unlocking position causes the door lock switch incorporated in the door lock actuator to be turned on and terminal voltage ⑤ of the door lock control unit to change from H to L, flowing base current to transistor Tr_2 for approx. 0.5 second by the inverting action of the timer circuit. This will energize the unlock side coil of the power relay inside the door control unit, operating the door lock actuators to unlock the doors.

Turning the front passenger's door key to the unlocking position turns on the unlock side of the key cylinder switch, directly energizing the unlock side coil of the power relay inside the door lock control unit. This will operate the door lock actuators to unlock the doors.

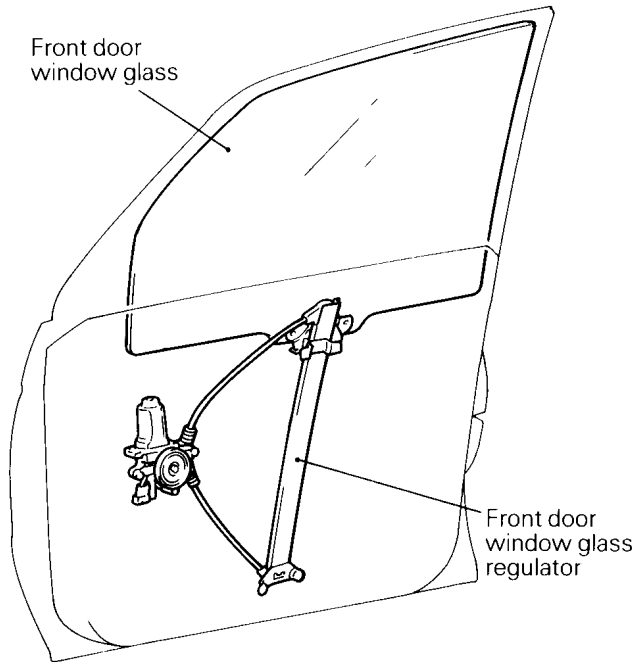


WINDOW GLASS REGULATOR

The window glass regulator is of the lightweight and compact wire winding type. On some models, the power windows with one-touch-down mechanism are used.

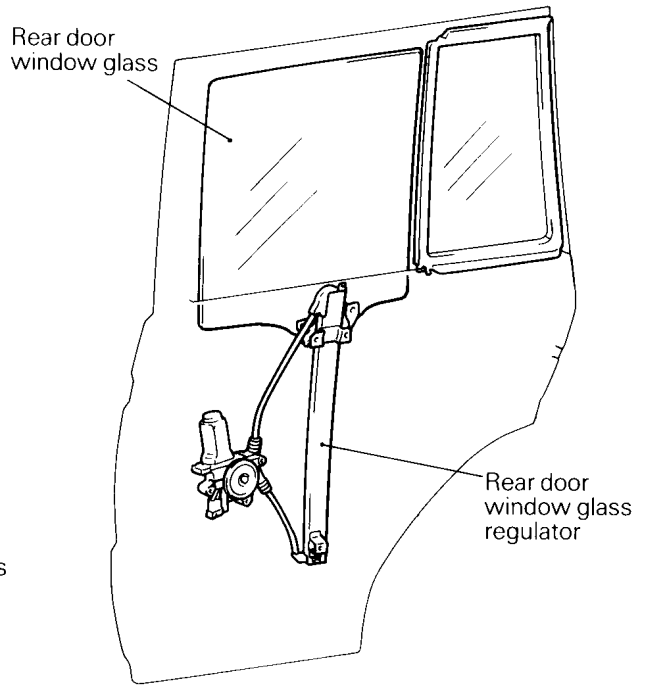
NOTE
Operation of the power window is essentially the same as Lancer.

<Front door>

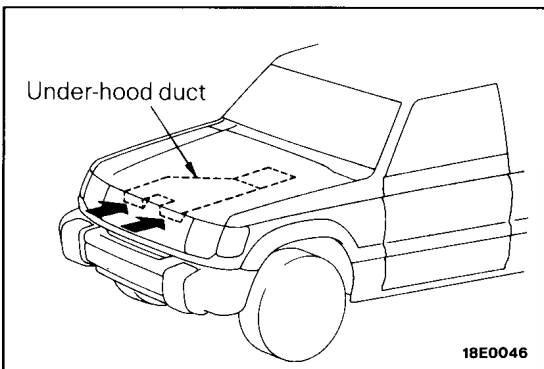


18E0086

<Rear door>



18E0090

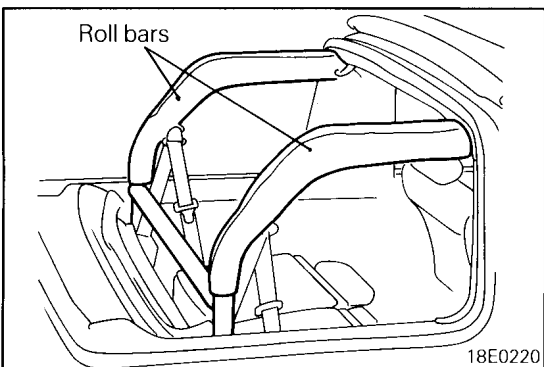


HOOD

E9E1AAB

<Vehicles with intercooler>

The engine hood has air ducts for cooling the intercooler installed on its back to improve the cooling efficiency and simplify the construction.



ROLL BARS <VEHICLES FOR EUROPE>

E9EKAAA

The roll bars made of steel pipe are available as option for the canvas top vehicles. These are designed to emphasize their cross country performance and enhance body strength.

WINDOW GLASS

E9EJAAB

- For added safety, the windshield is laminated glass and the door window glass and quarter window glass are tempered glass. On some models, coloured glass is used to improve matching with the interior colour.
- Windshield and back door window glass are installed in place with adhesive.
- The quarter window glass is either sliding type or stationary type.

Name	Thickness mm (in.)
Windshield glass	5.3 (0.21)
Front door window glass Rear door window glass Back door window glass	3.5 (0.14)
Quarter window glass	3.5 (0.14)* ¹ 4.0 (0.16)* ²
Sunroof glass	5.0 (0.20)

NOTE

*¹: Sliding glass*²: Stationary glass

SUNROOF

E9EGAAG

Optionally available motor-driven sliding type and detachable tilt-up type sunroofs, both made of

tempered glass, offer ample lighting and openness to enhance comfortableness.

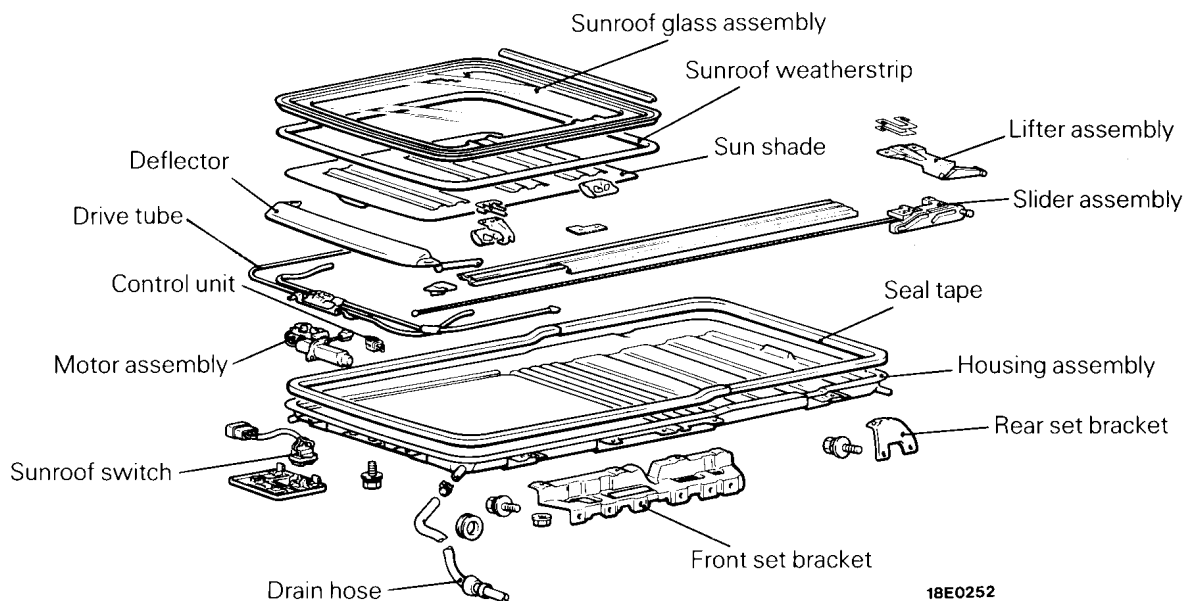
MOTOR-DRIVEN SLIDING SUNROOF

This sliding sunroof is opened and closed by the motors. In the fully opened state, it refreshes the occupants very much and also provides good ventilation. Even when it is fully closed, it does not offer poor lighting and visibility.

NOTE

The operation and construction of the sliding sunroof are the same as conventional Pajero except the following.

- Cam mechanism of sun shade
- Cam mechanism of slider assembly



18E0252

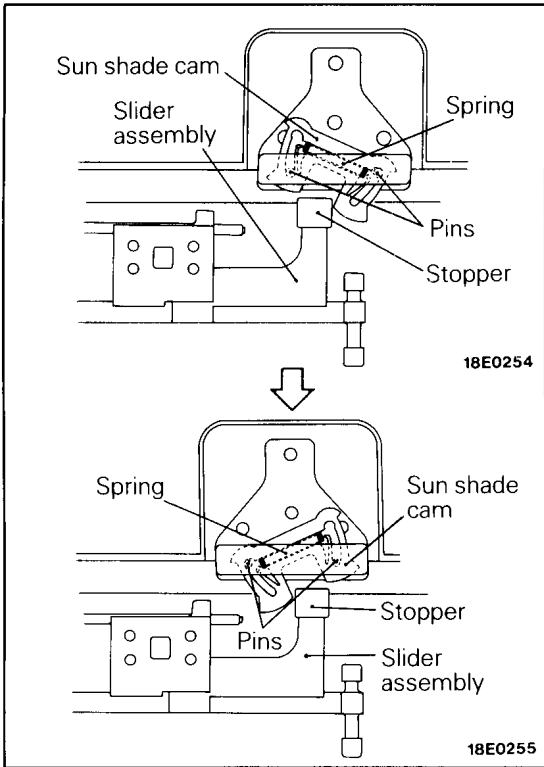
SUN SHADE CAM MECHANISM

Sliding the sunroof rearward brings the stopper into contact with the cam. The cam spring force prevents the cam from turning. The sun shade moves with the slider assembly until it is full open.

Although the sun shade stops at the full open position, the slider assembly slides further rearward. Therefore, the cam turns along the groove overcoming the cam spring force. When the sunroof slides forward, the same operation takes place.

NOTE

If the sunroof is closed before it is full open, the stopper does not contact the cam. Therefore, the sun shade is not interlocked with the sunroof.



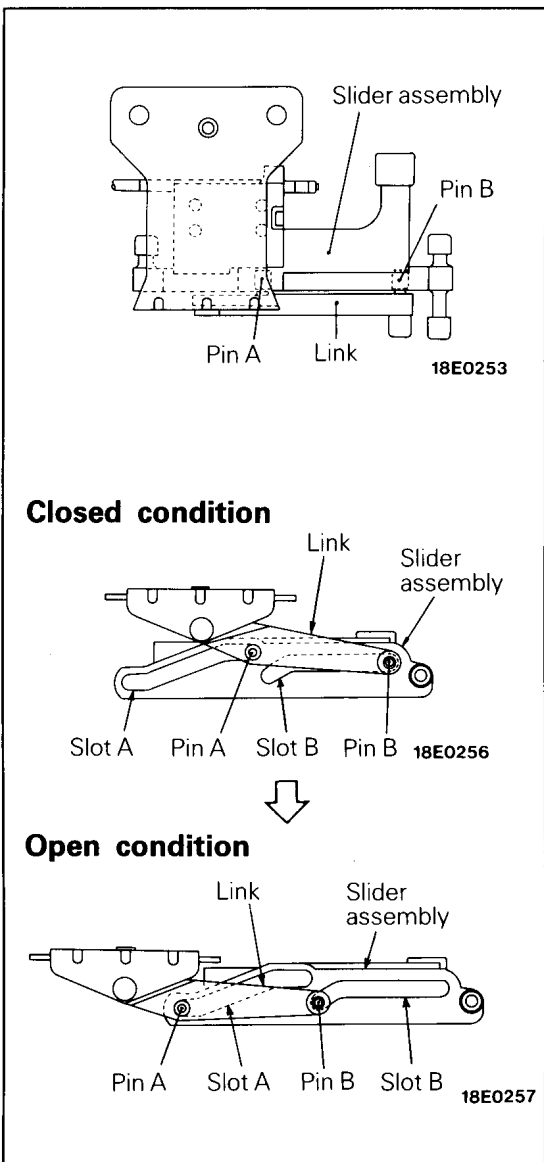
SLIDER ASSEMBLY CAM MECHANISM

In the full closed condition, pins A and B coupling the link with the slider assembly are located at the rear section of the slots, and the sunroof glass is flush with the roof panel.

Press the open side of the sunroof switch, and the motor will run, sliding the slider assembly rearward.

Sliding the slider assembly rearward moves pins A and B forward along the slots. Therefore, the link turns about pin B (fulcrum), bringing the front end of the link downward and lowering the sunroof glass. When pin B moves to the front section of the slot, it goes down along slot B. Therefore, the rear end of the link goes down.

Sliding the slider assembly further rearward moves the sunroof glass with the slider assembly rearward. Press the close side of the sunroof switch, and the motor will run in the direction opposite to that in which it runs when the open side of the switch is pressed. This will pull the slider assembly forward, bringing the full closed condition by reversing the operation made in opening the sunroof.



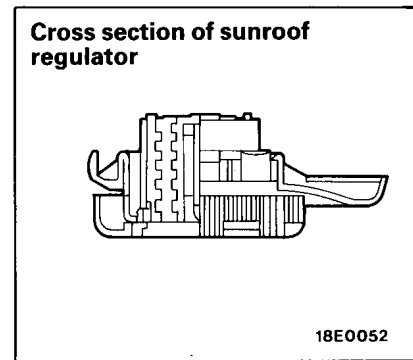
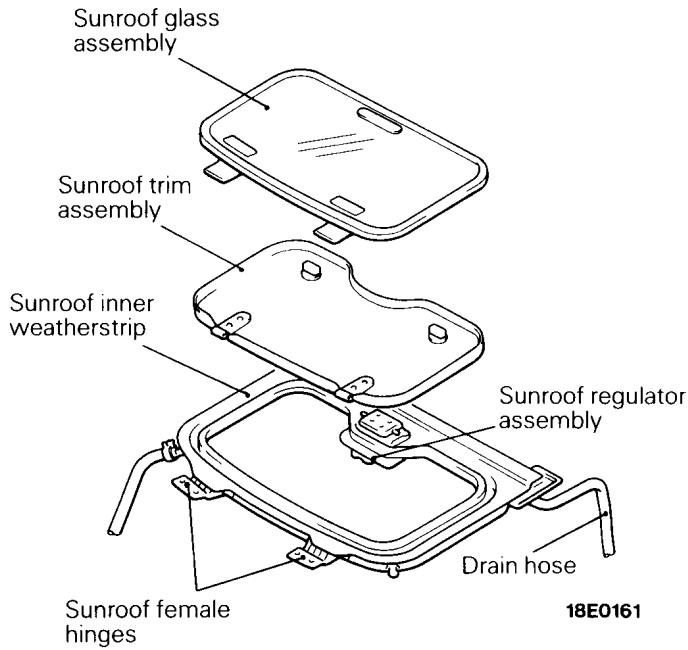
DETACHABLE TILT-UP SUNROOF

The detachable tilt-up sunroof made of tempered glass also improves lighting and ventilation. This sunroof has the following features.

- Provided with the sunroof regulator which can

adjust the rear end of the sunroof up to 50 mm (1.97 in.) freely at any angle.

- Equipped with detachable sunroof trim to prevent the glaring sunlight.



CANVAS TOP

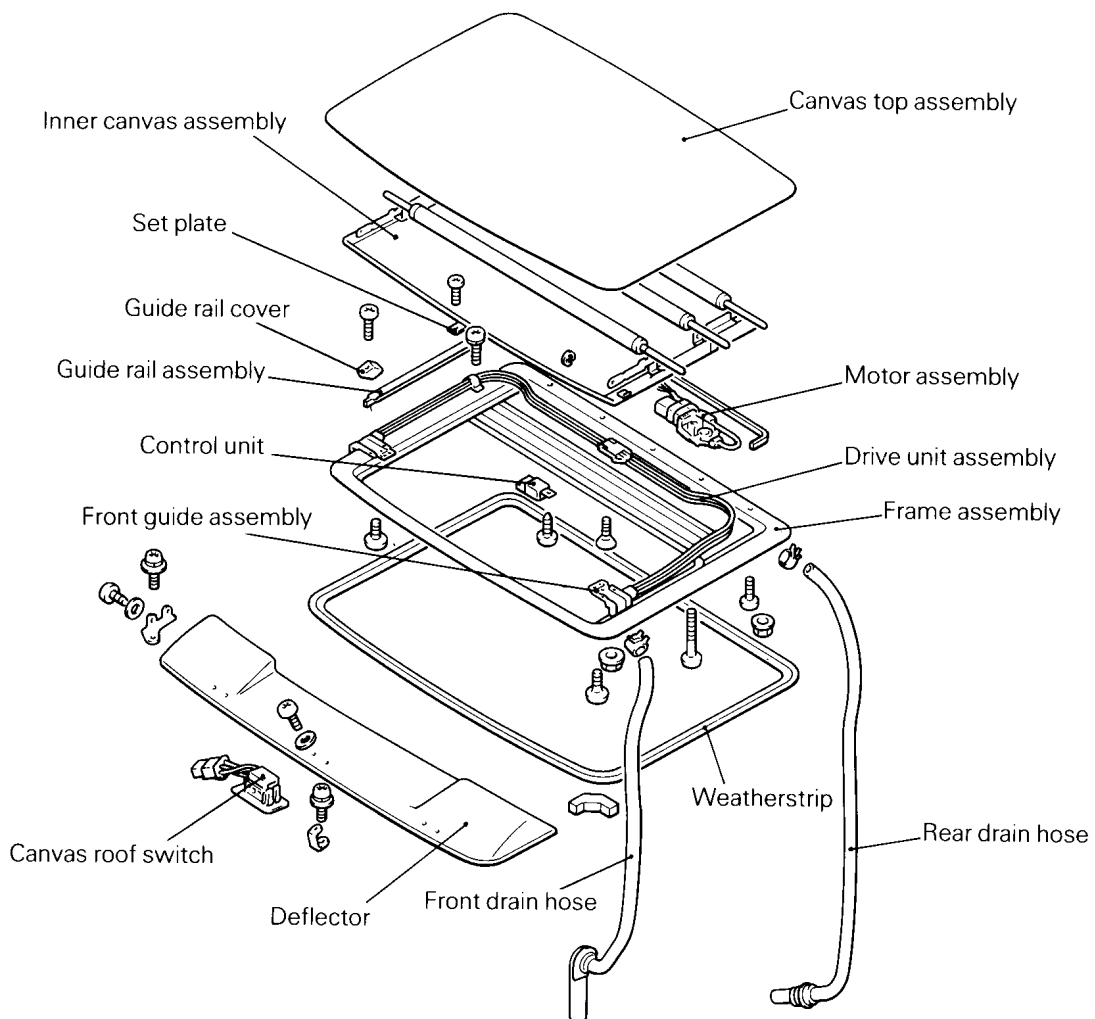
E9ELAAA

The canvas top is a water-proof polyester canvas which offers outstanding protection against rain and cold weather. The front canvas top is a motor-driven canvas (an option for Europe), whereas the rear is a folding type, and is easy to operate.

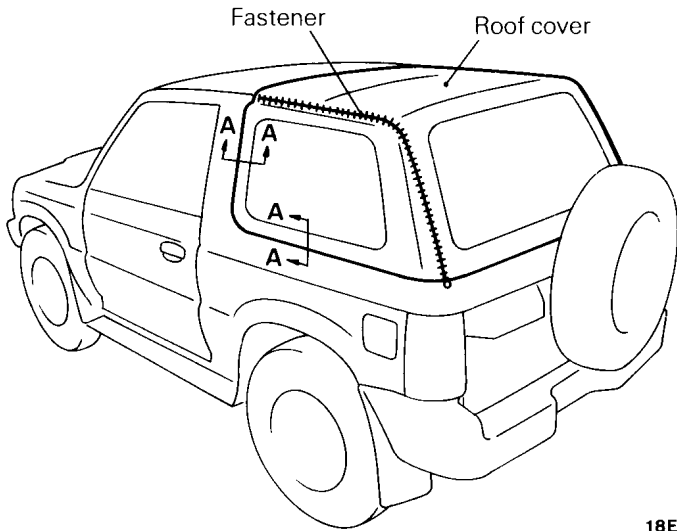
The canvas top offers the following features.

- The front canvas top uses a motor-driven canvas which can be opened and closed by operation of a switch.
- The rear canvas top uses a simplified folding canvas which can be easily opened and closed simply by removing the side canvas.
- A deflector is provided at the front of the canvas top to assure smoother air flow and less air noise during high speed operation.
- To eliminate the accident of part of your body being caught by the motor-driven canvas, a safety mechanism has been adopted which temporarily stops the front canvas at a position of 180 mm (7.1 in.) before it is totally closed.
- A storage cover has been provided to assure better appearance with the rear canvas folded.

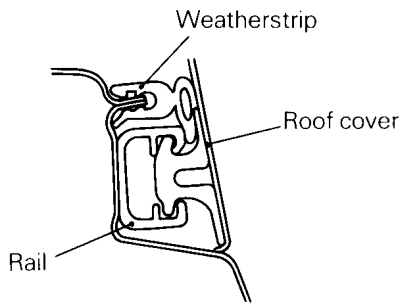
<Front Motor-driven Canvas>



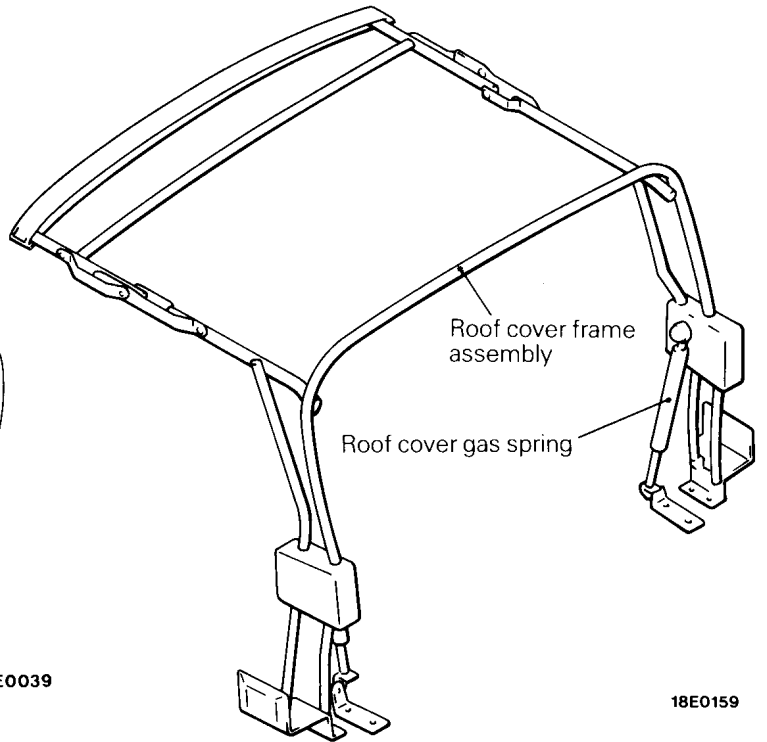
<Rear Folding Canvas>



Section A-A

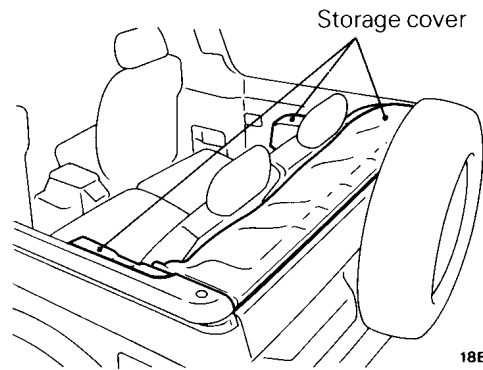


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18E0039

18E0159

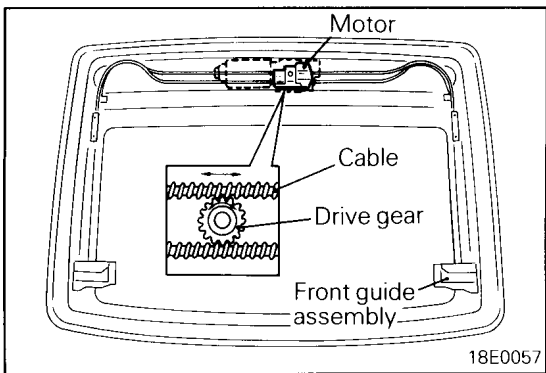


18E0040

CONSTRUCTION AND OPERATION <FRONT MOTOR-DRIVEN CANVAS>

SLIDING MECHANISM

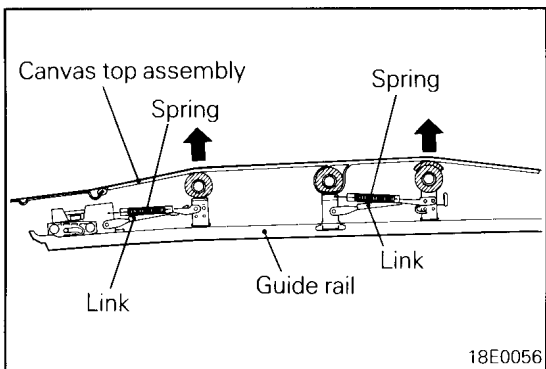
The canvas is moved by the drive gear and cables to allow it to slide forwards or backwards, thereby moving the front guide assembly coupled with the cables forward or backward.



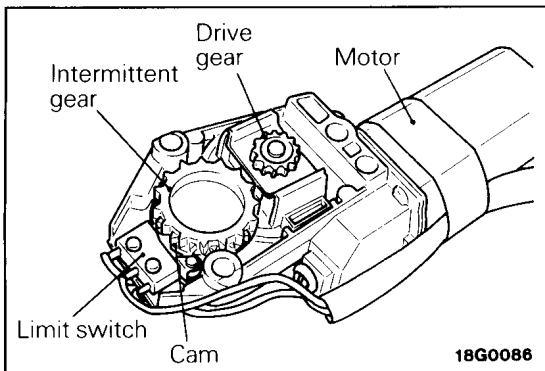
18E0057

FOLDING MECHANISM

When the canvas is moved to the rear, open. The two links each provided at the right and left are operated by the reactionary force of the springs mounted to the links and force the top frame located behind the links up to fold the canvas top assembly.



18E0056

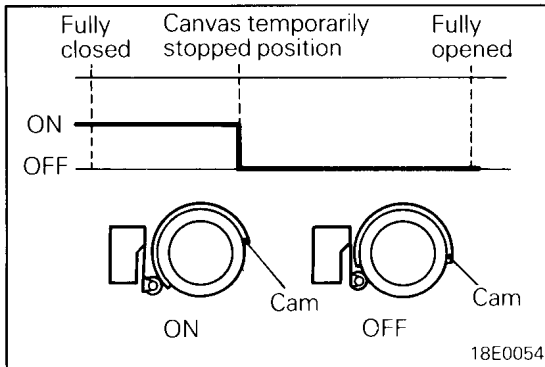


MOTOR ASSEMBLY

The motor assembly consists of a motor, drive gear assembly, cam and limit switch.

Limit Switch

The limit switch is a microswitch mounted with the motor in a single assembly and is turned ON or OFF by the cam under the intermittent gear to detect the opening position of the canvas.



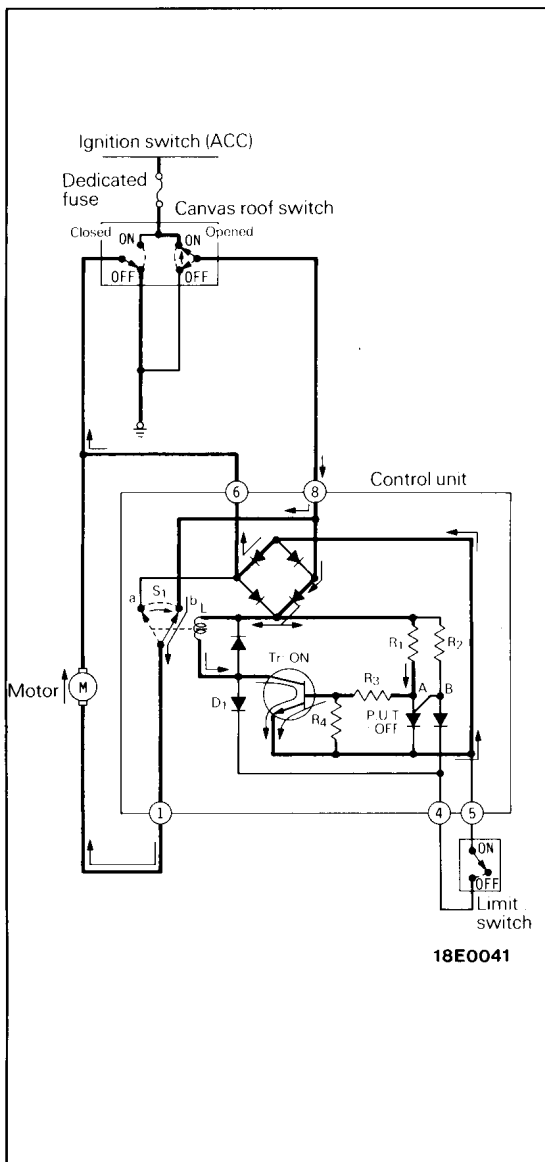
Operation of Limit Switch

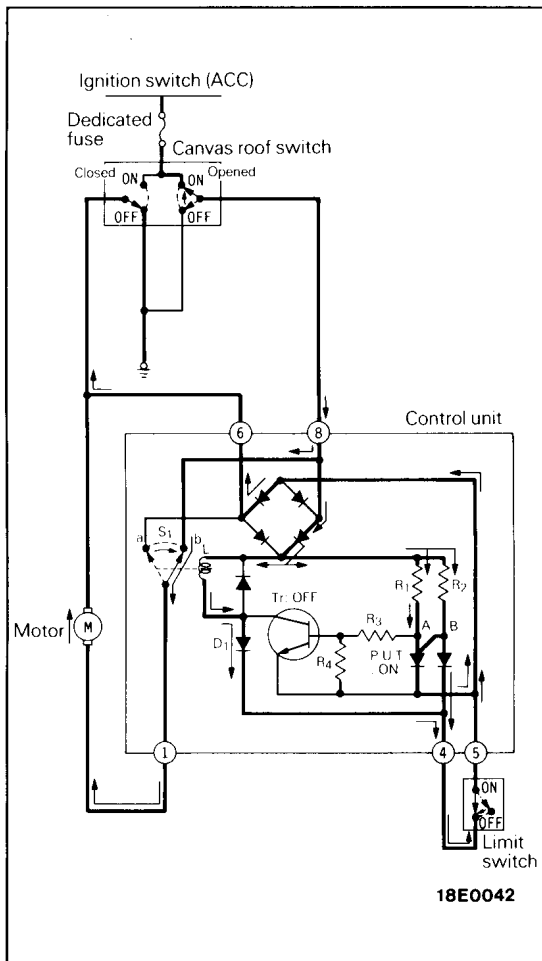
When the canvas reaches a position about 180 mm (7.1 in.) away from the fully closed position, the limit switch is turned ON to OFF when the canvas is in the opening direction, and from OFF to ON when the canvas is in the closing direction.

OPERATION OF FRONT MOTOR-DRIVEN CANVAS

To Open the Canvas [up to a Position about 180 mm (7.1 in.) from the Fully Closed Position]:

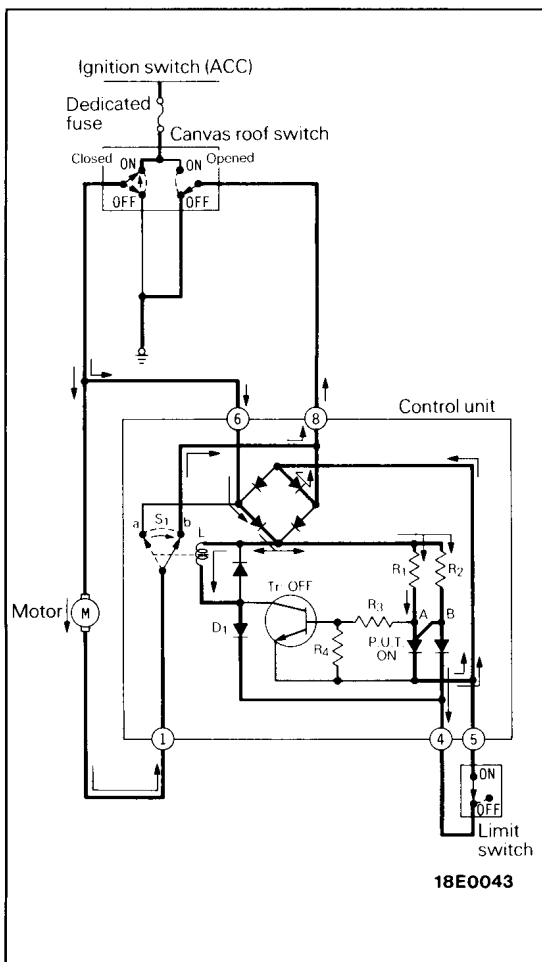
1. Continue to press the "OPEN" side of the canvas roof switch. Current will then flow from the roof switch to pin ⑧ of the control unit.
2. In this case, since the limit switch is ON, the voltage at point B in the control unit is larger than the voltage at point A, and the P.U.T. enters the OFF state.
3. The current that has flowed to pin ⑧ passes through resistors R₁ and R₃ and causes transistor Tr to be ON.
4. When transistor Tr is caused to be ON, the current that has flowed in from pin ⑧ flows to coil L as well, changing over the contact of switch S₁ from a to b.
5. Consequently, as described above, the canvas roof switch "opened" → control unit pins ⑧ and ① → motor → canvas roof switch "closed" → ground circuit is completed to rotate the motor and open the canvas.





To Open the Canvas [from a Position about 180 mm (7.1 in.) Away from the Fully Closed Position to the Fully Opened Position]:

1. When the canvas reaches a position about 180 mm (7.1 in.) away from the fully closed position, the limit switch changes from ON to OFF.
2. When the limit switch is placed in the OFF state, the voltage at point A becomes larger than the voltage at point B and causes the P.U.T. to be ON.
3. Since the P.U.T. is ON, transistor Tr is forced to the OFF state. Since the limit switch is OFF, however, the current having passed through coil L flows through diode D₁ and the limit switch to pin ⑥ of the control unit.
4. Accordingly, as mentioned above, the contact of switch S₁ is retained at b. So the canvas is opened until the fully opened position is reached.

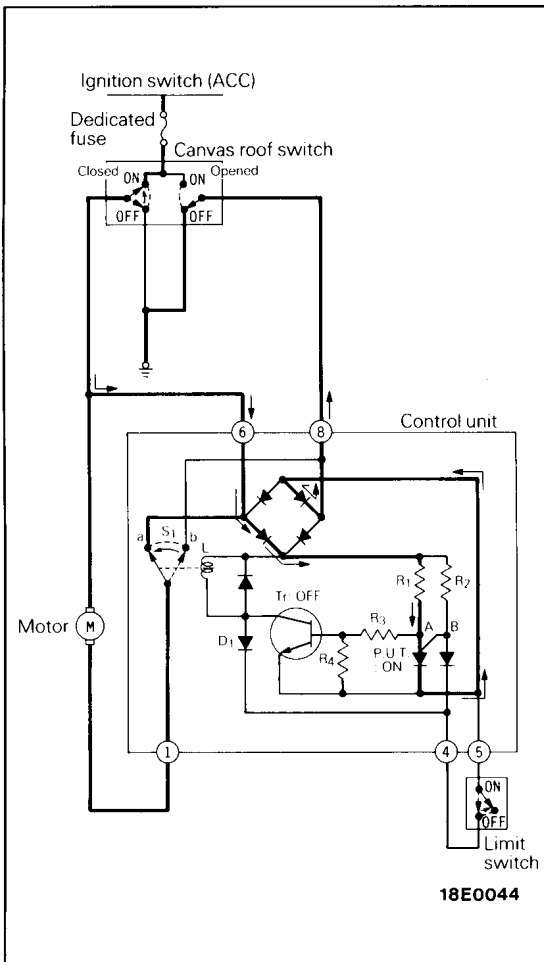


To Close the Canvas [from the Fully Opened Position to a Position about 180 mm (7.1 in.) Away from the Fully Closed Position]:

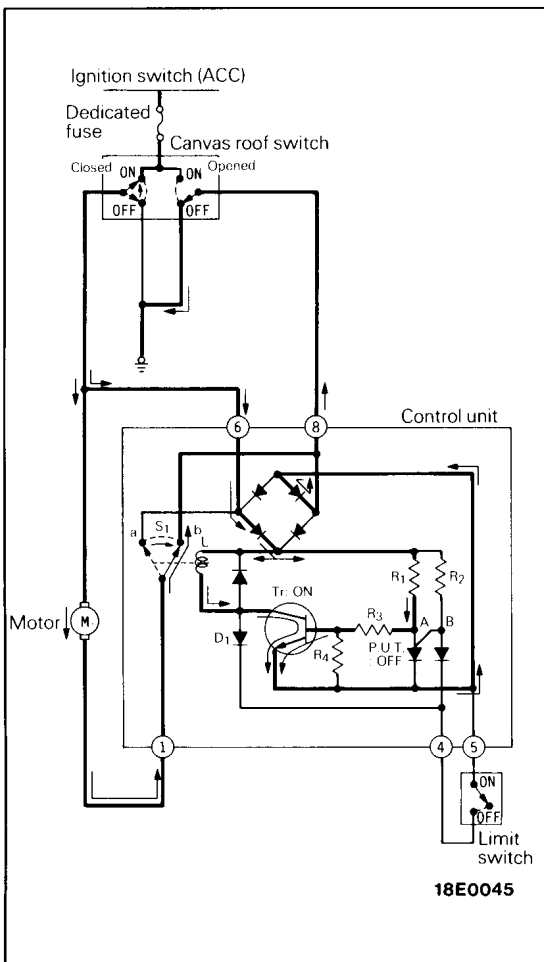
1. Continue to press the "CLOSE" switch. Current will then flow from the canvas roof switch to pin ⑥ of the control unit.
2. In this case, since the limit switch is OFF, the voltage at point A in the control unit is larger than the voltage at point B, and the P.U.T. enters the ON state.
3. Since the P.U.T. is ON, transistor Tr is caused to be OFF. Since the limit switch is OFF, however, the current having passed through coil L flows through diode D₁ and the limit switch to pin ⑧ of the control unit, changing over the contact of switch S₁ from a to b.
4. Consequently, as mentioned above, the canvas roof switch "closed" → motor → control unit pins ①, ⑧ → canvas roof switch "opened" → ground circuit is completed to rotate the motor and close the canvas.

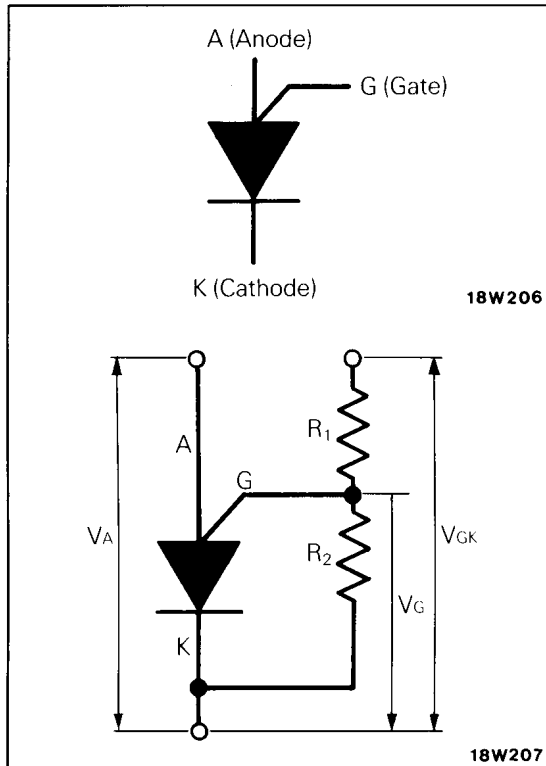
To Close the Canvas [from a Position about 180 mm (7.1 in.) Away from the Fully Closed Position to the Fully Closed Position]:

1. When the canvas reaches a position about 180 mm (7.1 in.) away from the fully closed position, the limit switch is changed from OFF to ON to block the flow of current through coil L and diode D₁.
2. As a result, the contact of switch S₁ is changed over from b to a to interrupt the current that has been flowing through the motor. The canvas is placed in the temporarily stopped state.
3. To reset the temporarily stopped state and re-rotate the motor, release the "CLOSE" side of the canvas roof switch.
4. Then the voltage applied to the control unit is removed and the voltages at both points A and B fall to 0V. Accordingly the P.U.T. is forced to the OFF state, and the circuit re-enters the state that had existed when the canvas roof switch was pressed first.



5. In this condition, press the "CLOSE" switch again. Current then flows from the canvas roof switch to pin ⑥ of the control unit.
6. Since the limit switch is ON, the voltage at point B is larger than the voltage at point A, and the P.U.T. enters the OFF state.
7. The current delivered from pin ⑥ passes through resistors R₁ and R₃ and causes transistor Tr to be ON.
8. When transistor Tr is switched ON, the current that has flowed in from pin ⑥ flows through coil L as well, changing over the contact of switch S₁ from a to b.
9. As a result, the canvas roof switch "closed" → motor → control unit pins ①, ⑧ → canvas roof switch "opened" → ground circuit is completed to rotate the motor and move the canvas until the fully closed position is reached.



**NOTE**

Programmable Unijunction Transistor (P.U.T.)

The P.U.T. consists of a PNP and NPN transistors combined together like a high sensitivity n gate type thyristor.

The P.U.T. switches ON and OFF, depending on the anode voltage V_A and gate voltage V_G .

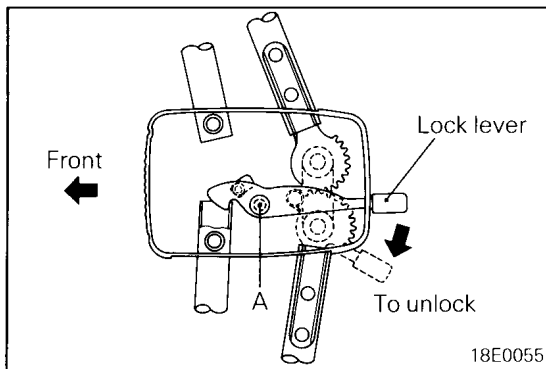
When V_A is smaller than V_G ($V_A < V_G$), it enters the OFF state.

When V_A is larger than V_G ($V_A > V_G$), it enters the ON state.

When V_A is equal to V_G ($V_A = V_G$), it retains the ON state.

Since the gate voltage V_G which constitutes an essential factor is a voltage divided by resistors R_1 and R_2 , the P.U.T. offers the advantage of allowing its characteristics to be freely programmable by changing resistors R_1 and R_2 .

The P.U.T. features high sensitivity and low leak current.

**CONSTRUCTION AND OPERATION <REAR FOLDING CANVAS>****ROOF COVER FRAME LOCK MECHANISM**

When the lock lever is placed in the unlocked position, it rotates clockwise with the A as the fulcrum, releasing the sub lower frame to set the gear assembly free.

When the gear assembly is pressed forward, the gears are rotated to fold the frame with the right and left in linked operation.

The roof cover frame is provided with gas springs so that the canvas can be opened and closed with less operating force.

EXTERIOR

CONTENTS

E9GAZAF

BUMPERS	2	DOOR MIRRORS	4
WINCH	3	EXTERIOR PARTS	5
Specifications	3		
Construction Diagram	3		



BUMPERS

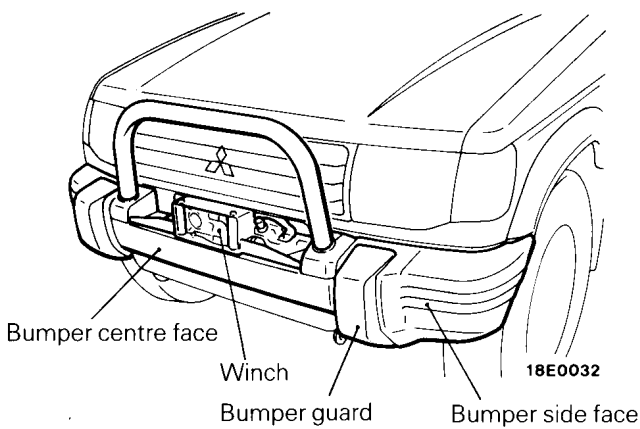
E9GBAAF

The sheet metal bumper is used with its corners fitted with a large-size polypropylene bumper side face to provide a sense of depth and strength. It offers the following features.

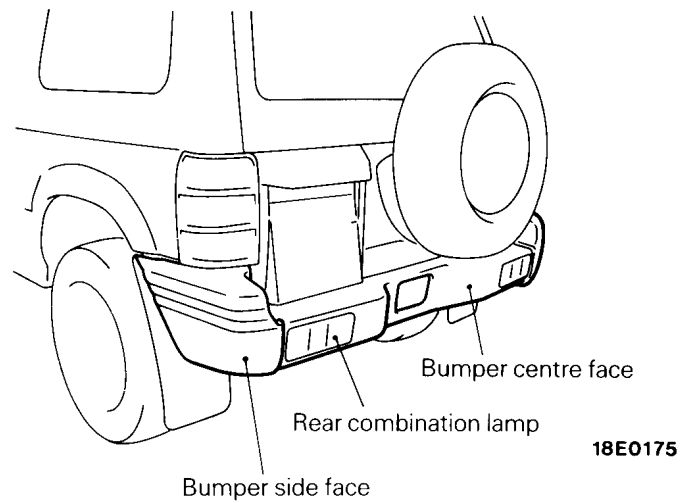
- The side surface of the bumper is wrapped around up to the wheel housing to emphasize a sense of wideness and made flush with the fender or wide fender to give a sense of continuity.

- On some models, bumper guards are mounted on the front bumper to ensure the greater safety.
- On vehicles for Europe and for Australia, the rear bumper incorporates the rear combination lamps.
- On vehicles with winch, the winch is built in the front bumper.

Front Bumper



Rear Bumper



WINCH

E9GHAAA

The winch is a mechanical winch driven by the engine power through the power take-off (P.T.O.) and drive shaft from the transfer counter gear. It is built in the front bumper to minimize its protrusion from the body.

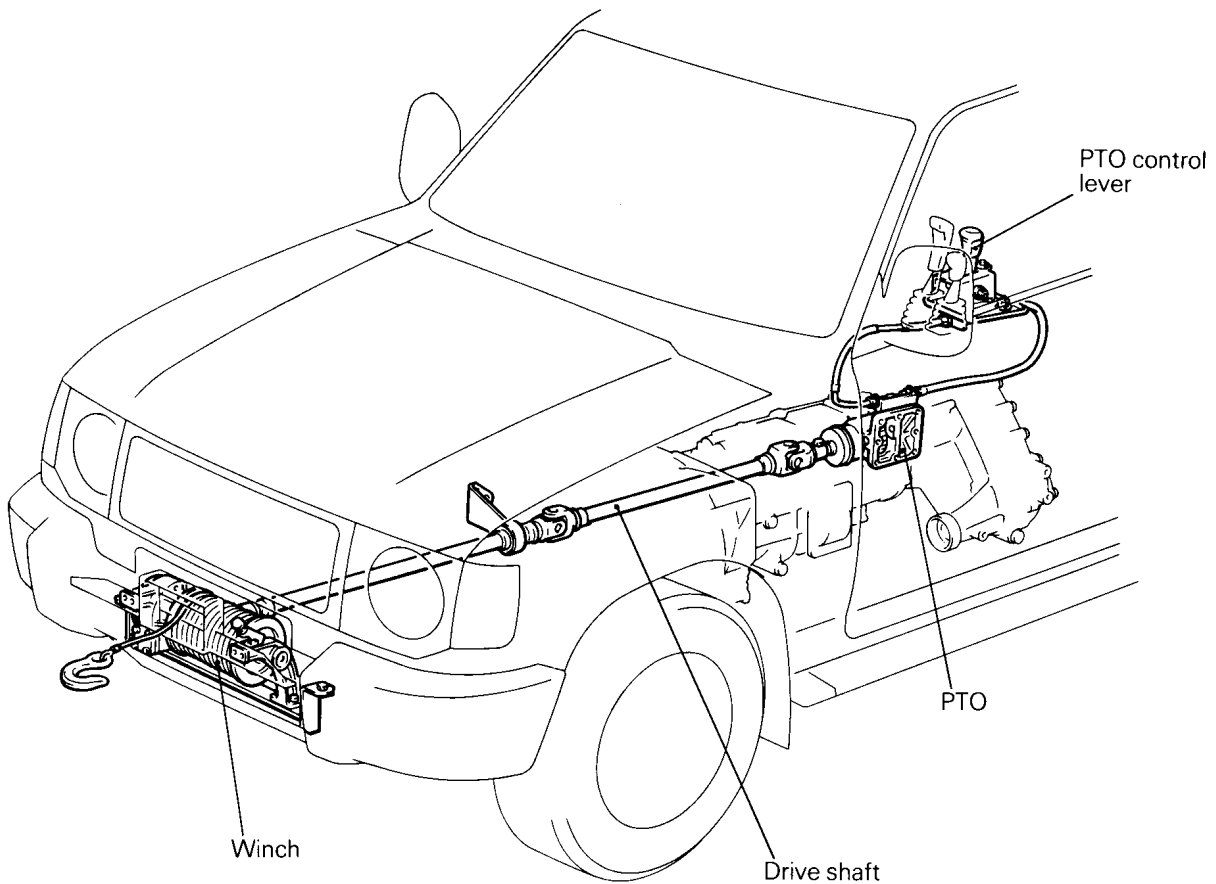
NOTE

The fundamental construction of the winch is the same as the current PAJERO.

SPECIFICATIONS

Items		Specifications	
Winch	Normal traction (continuous)		N (kg, lbs.) 7,000 (700, 1,543)
	Maximum instantaneous traction (wire rope wound a stage around drum)		N (kg, lbs.) 20,000 (2,000, 4,409)
	Worm gear	Reduction ratio	35 : 1
	Winch drum	O.D. x I.D. x inside width mm (in.)	200 x 78 x 188 (7.87 x 3.07 x 7.40)
Wire rope	Diameter x length mm x m (in. x ft.)		8 x 45 (0.31 x 147.64)
	Breaking load		N (kg, lbs.) 36,000 (3,600, 7,937)
Drive shaft	Universal joint	Type	Cross type
		Bearing	Needle roller bearing
P.T.O.	Reduction ratio		0.692

CONSTRUCTION DIAGRAM

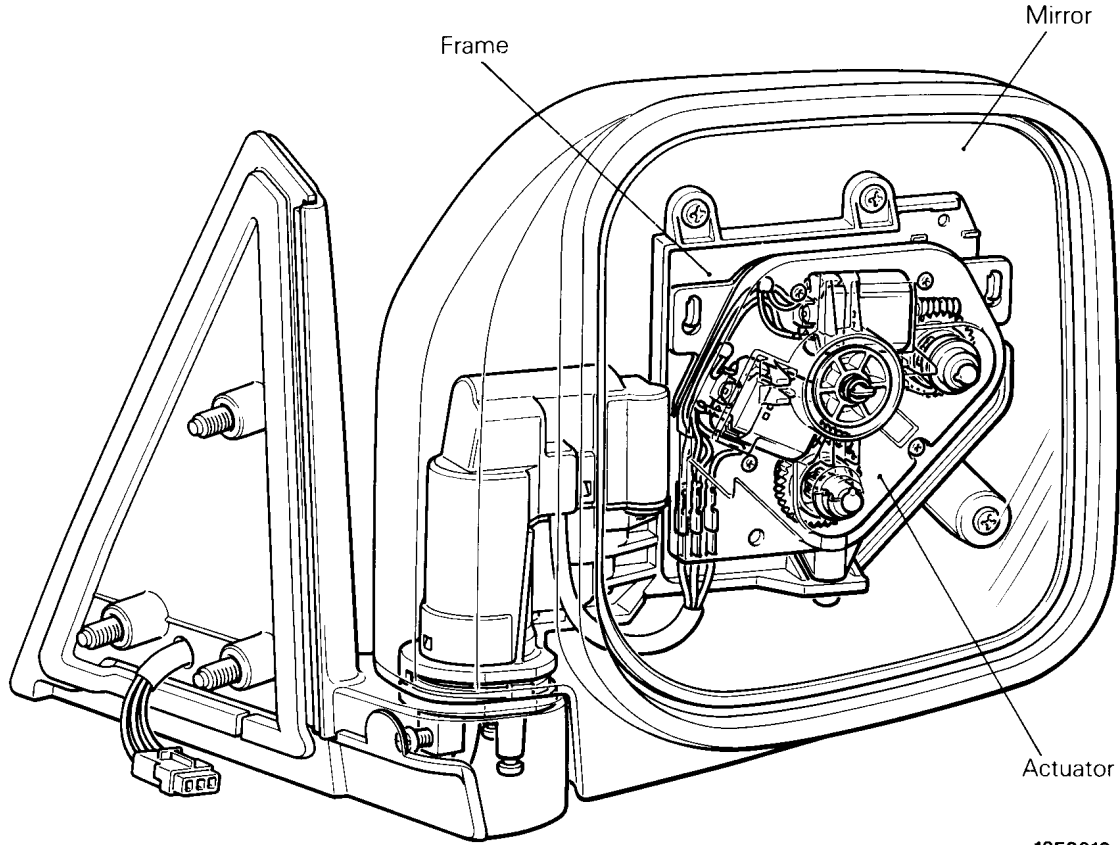


DOOR MIRRORS

E9GCAAF

The retractable door mirrors are adopted on all models, and on some models, the remote-control function is also equipped.

NOTE
The fundamental construction and operation of the remotely controlled mirror are the same as that of GALANT.

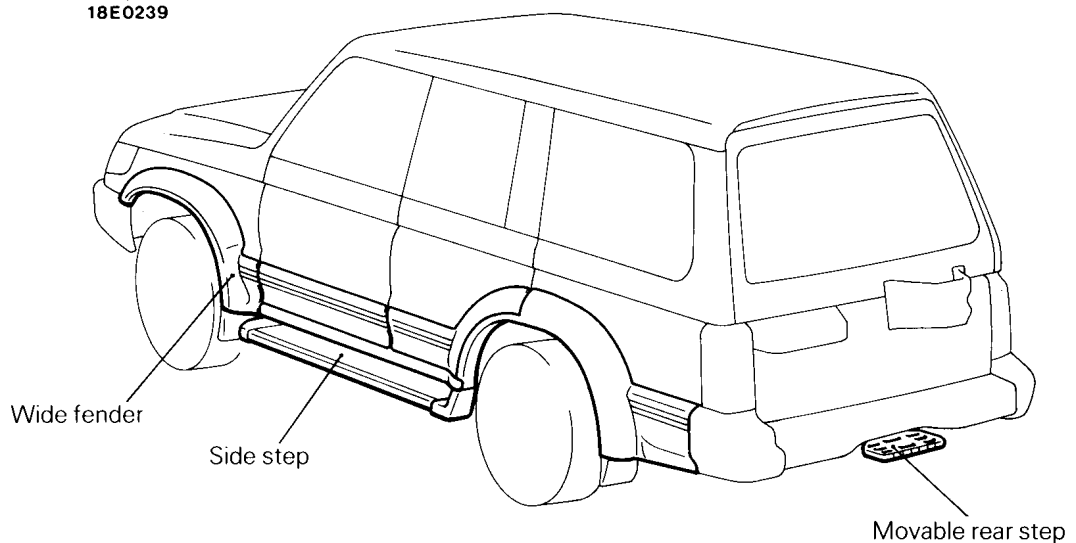
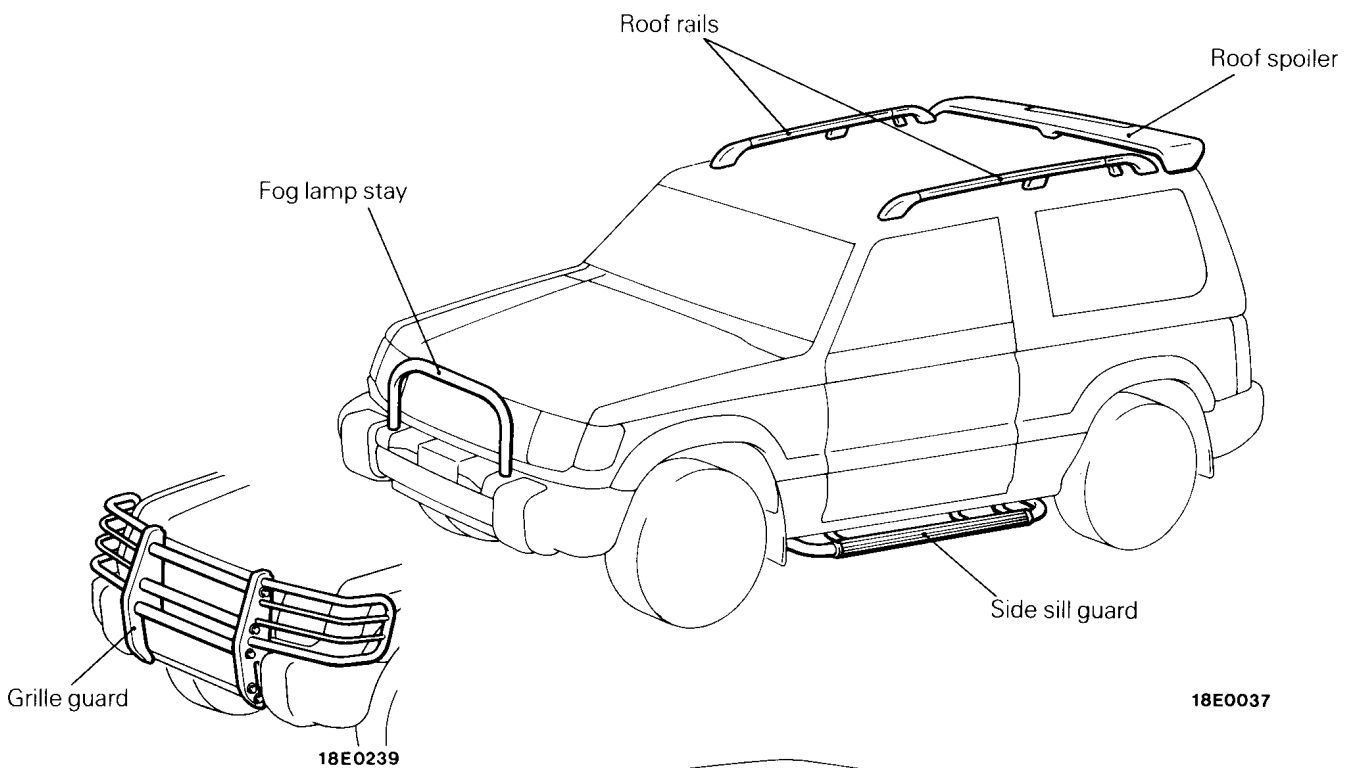


18E0010

EXTERIOR PARTS

E9GGAAA

- To improve the aerodynamic characteristics of the rear body, the roof spoiler is adopted on some models of metal-top vehicles.
- To enhance the appearance and merchantability, the roof rails are installed on the roof sides of some metal top models.
- On some models, the side steps are provided for more ease of getting on and off the vehicle. In addition, some models are provided with the side sill guards to enhance the appearance and merchantability.
- Vehicles for General Export and GCC are equipped with the grille guard to guard the front body. In addition, the grille guard is installed directly to the body frame to improve its strength.
- On some models of long-body vehicles and metal top vehicles, the vehicle width is increased by adoption of the wide fenders to enhance the appearance and merchantability.
- Some models for General Export and GCC are provided with the fog lamp stay to improve the appearance.
- On some models for General Export and GCC, the movable rear step is installed for ease of climbing into or out of the cargo space and also for better protection of the body from the obstacles while driving the vehicle.



INTERIOR

CONTENTS

E9HAZAE

SUMMARY OF INTERIOR PARTS	2	SEAT BELTS	13
Features	2	Construction and Operation of the Buckle	15
INSTRUMENT PANEL AND CONSOLE	4	REAR SHELF TRIM	15
SEATS	5		
Construction and Operation	8		
Seat armrest (vertical adjustment type)	8		
Suspension seat	9		
Heated seat <Vehicles for Europe>	10		
Walk-in mechanism with neutral memory	11		
Reclining adjustment mechanism with memory	11		

SUMMARY OF INTERIOR PARTS

E9HJAAA

The interior parts are designed to be easy to use and create high quality interior with a new sense while meeting the fundamental needs for the reliability

and security emphasized for the genuine multipurpose 4WD vehicle.

FEATURES

Enhancing a sense of quality

1. Use of full trim for interior
2. Headlining consisting of simultaneously formed felt base and skin
3. Formed resin trim
4. Door trim formed integrally with armrest
5. High grade cut pile carpet
6. Genuine leather seat <mid-roof model (with wide fenders) for Europe>

Promotion of convenience

1. Seat belt storage pocket
2. Split seat
3. Head restraint storage stay
4. Buckle assembled to seat
5. Suspension seat
6. Reclining adjusting mechanism with memory
7. Walk-in mechanism with neutral memory
8. Front passenger seat under tray
9. Seatback pocket
10. Water-repellent seat
11. Heated seat <vehicles for Europe>
12. Walk-in mechanism
13. Tilting head restraint with hole
14. Tool box built in back door trim
15. Adjustable angle type armrest
16. Side armrest tray
17. Front-rear seat full flatening
18. Front-second seat full flatening
19. Second-third seat full flatening
20. Sliding and reclining levers collected and arranged on side of seat (front seat)

Convenient storage of small articles

1. Glove box
2. Accessory boxes (instrument panel bottom centre, floor console front and side)
3. Front passenger seat under tray
4. Seatback pocket
5. Tray (instrument panel top centre)
6. Cup holders (inside of floor console, rear or second seat side armrests)
7. Door pocket
8. Quarter trim pocket

Improvement of safety

1. Slush formed instrument panel pad (from front of front passenger seat to panel centre)
2. Front passenger seat assist grip
3. Buckle assembled to seat
4. 3-point seat belt with ELR

Considerations for optimum riding position

1. Adjustable shoulder anchor
2. Seat armrest
3. Suspension seat
4. Lumbar support
5. Side support

INSTRUMENT PANEL AND CONSOLE

Various items of equipment required of the genuine multipurpose 4WD vehicle are functionally arranged on the instrument panel. In addition, a portion of the instrument panel extending from the front of the front passenger seat to the panel centre is covered by a large flush-formed pad with due consideration for the safety, resulting in the structure consisting of a resin (PPF) frame and a partial pad.

- The instrument panel has a large, easy-to-see combination meter located in front of the driver seat and principal switches arranged around it to ensure positive transmission of various information and provide easy, reliable operation.
- The centre of the panel top is provided with the multi-meter to facilitate the grasping of existing conditions inside and outside the vehicle for safe, pleasant driving. Provided halfway down

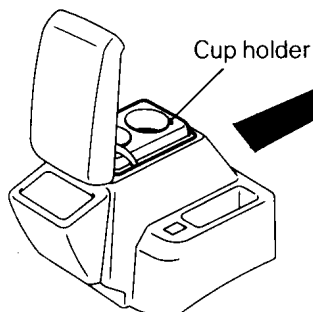
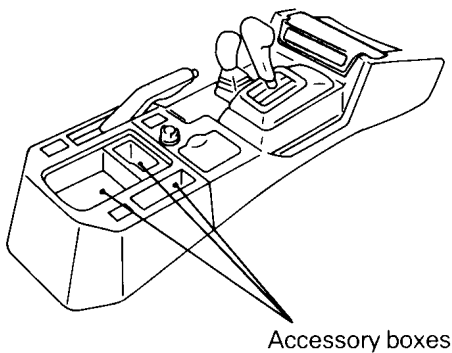
from the top of the panel are the air vents of the air conditioner and the air conditioner controls not only to enhance the controllability and but also to improve the safety and comfortableness through guarantee of good visibility. The bottom of the instrument panel is provided with a space for installation of radio, cassette tape player, etc. and also for selective installation of accessories.

- The assist grip installed in front of the front passenger seat offers a sense of integration with the instrument panel.

The floor console is available as either the tray type or the lid-fitted type.

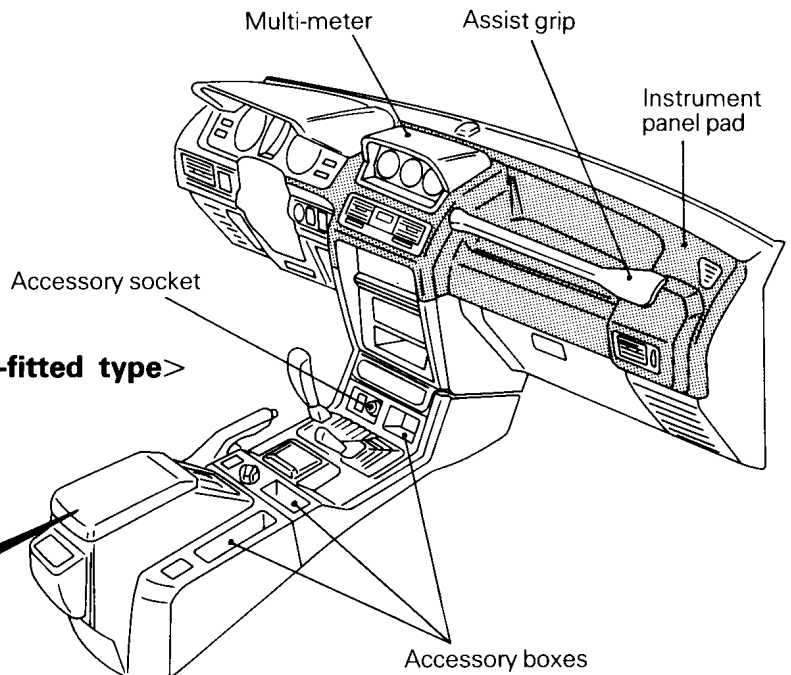
- The console has the accessory socket provided at the front to keep accessories or the like.
- Accessory boxes provide ample capacity to enhance convenience.

<Tray type>



19E0046

<Lid-fitted type>



19E0045

NOTE

■ : Flush-formed pad area

SEATS

E9HDAAE

The seats are provided with various adjusting mechanisms and devices to maintain optimum

riding position for the number of passengers, location of load or passenger, type of cargo, etc.

FRONT SEAT

Two types of seat are available for the front seat, and various adjusting mechanisms are provided to enhance the comfortableness and convenience.

- Lumbar support adjusting mechanism
- Side support adjusting mechanism
- Walk-in mechanism
- Reclining adjusting mechanism
- Reclining adjusting mechanism with memory
- Slide adjusting mechanism
- Walk-in mechanism with neutral memory

- Slide and reclining levers collected and arranged on side of seat
- Longitudinally tilting or vertically adjustable head restraint
- Armrest
- Heated seat
- Suspension seat
- Water-repellent seat
- Inner seat belt incorporated

REAR SEAT AND SECOND SEAT

The rear and second seats are available in two types, namely, split, forward folding type for various seat arrangement and one-piece, forward folding type.

- Seat cushion, back split seat
- Side armrest (with cup holder and tray)
- Centre armrest

- Reclining adjusting mechanism
- Walk-in mechanism
- Seat belt storage pocket
- Vertically adjustable head restraint
- Head restraint storage stay
- Inner seat belt incorporated

THIRD SEAT

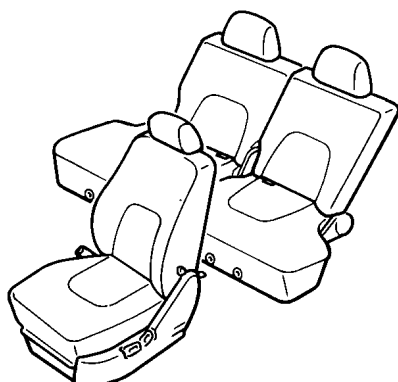
The third seat is of the lifting type to enhance the convenience of the cargo space.

- Front faced type
- Face to face type
- <Canvas top and metal top models (without

- wide fenders) and long body van for General Export>
- Seat belt storage pocket <Front faced type>
- Reclining adjusting mechanism <Front faced type>
- Inner seat belt incorporated

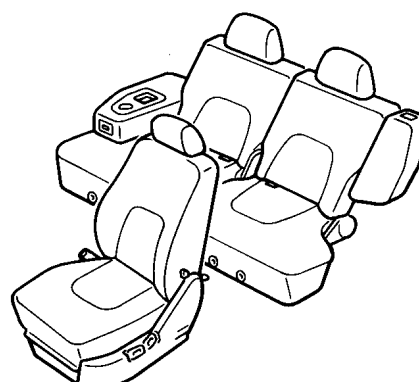
Vehicles for Europe and Australia

Canvas top



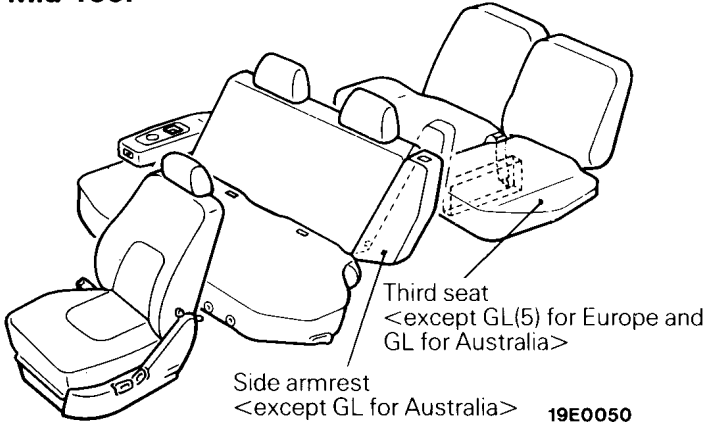
19E0017

Metal top



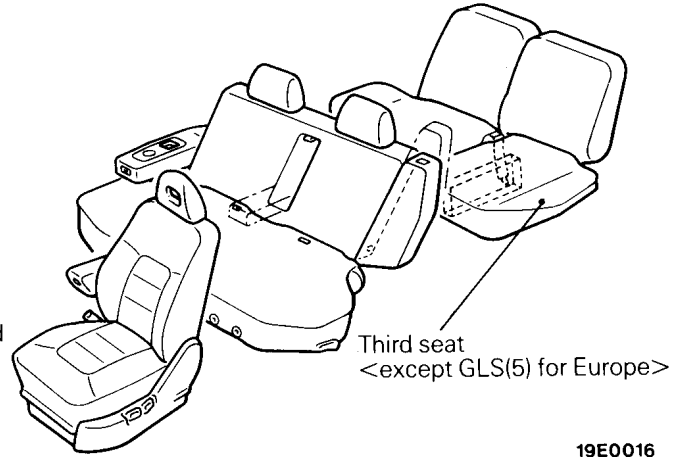
19E0018

Mid roof



19E0050

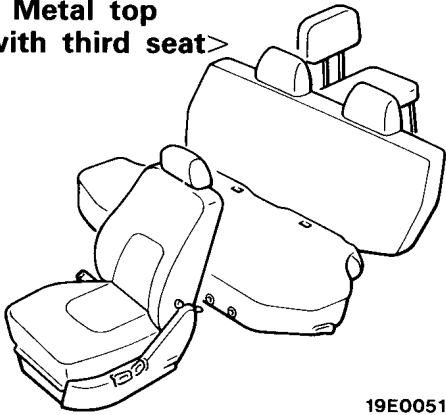
Mid roof <vehicles with wide fenders>



19E0016

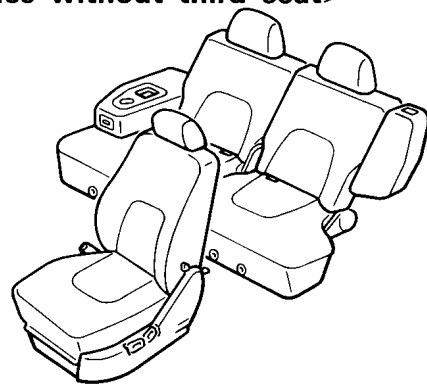
Vehicles for General Export

Canvas top, Metal top
<Vehicles with third seat>



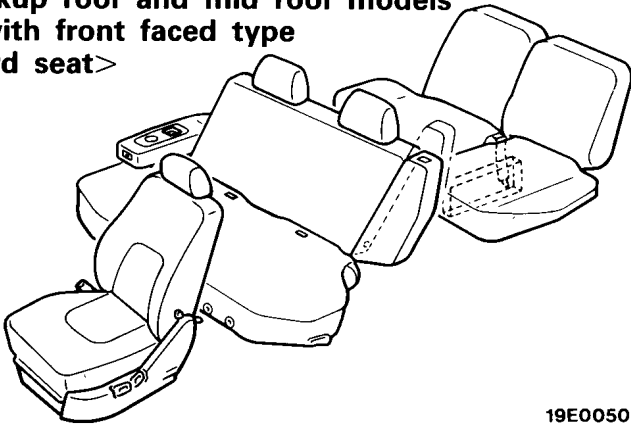
19E0051

Metal top
<Vehicles without third seat>



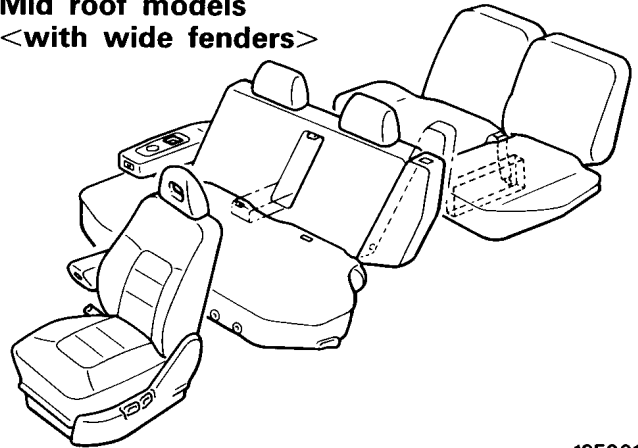
19E0018

Kickup roof and mid roof models
<with front faced type
third seat>



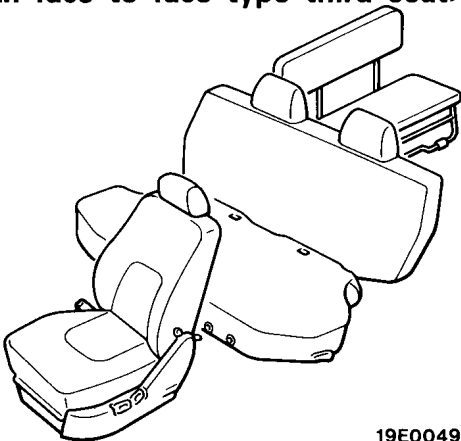
19E0050

Mid roof models
<with wide fenders>



19E0016

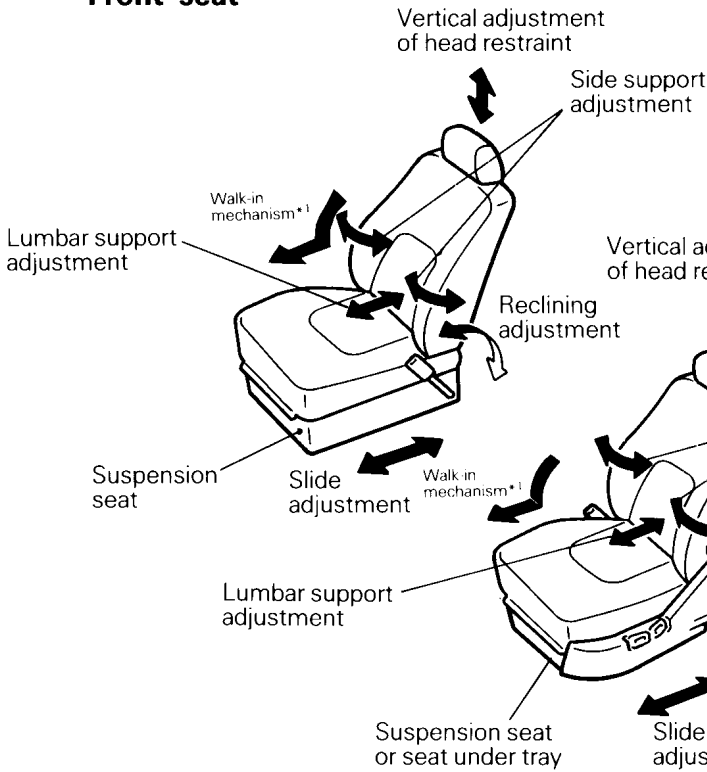
Kickup roof and mid roof models
<with face to face type
third seat>



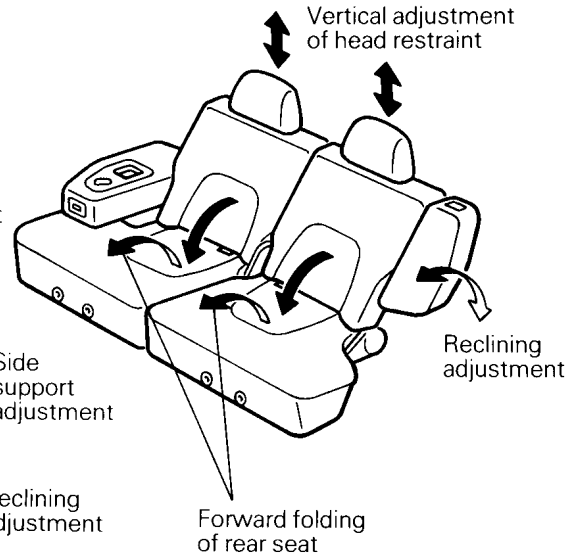
19E0049

EXPLANATION OF MECHANISM

Front seat



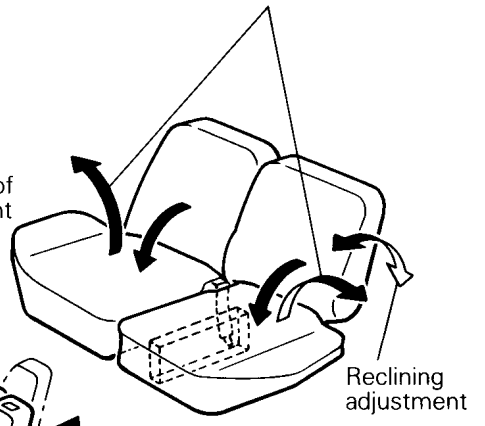
Split, forward folding rear seat



19E0019

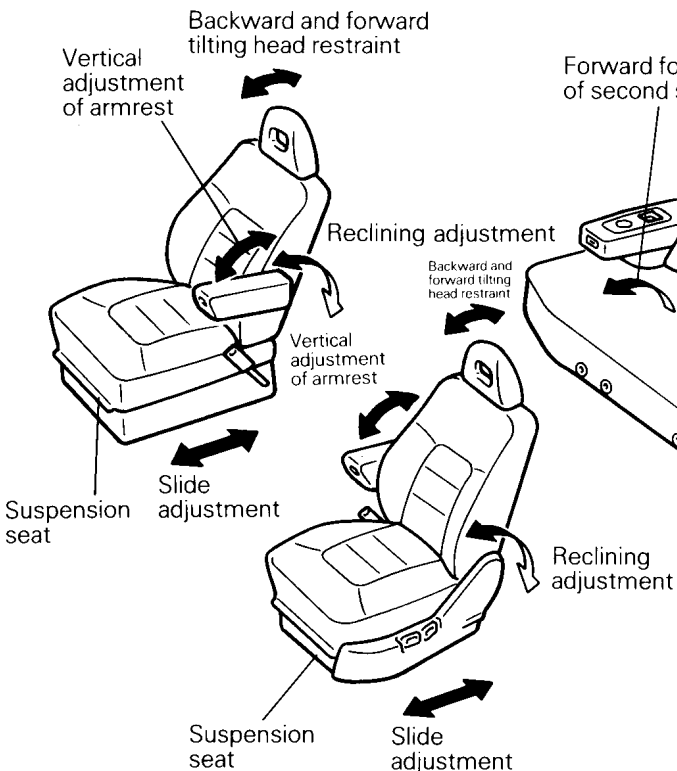
Lifting third seat*3

Lifting of third seat

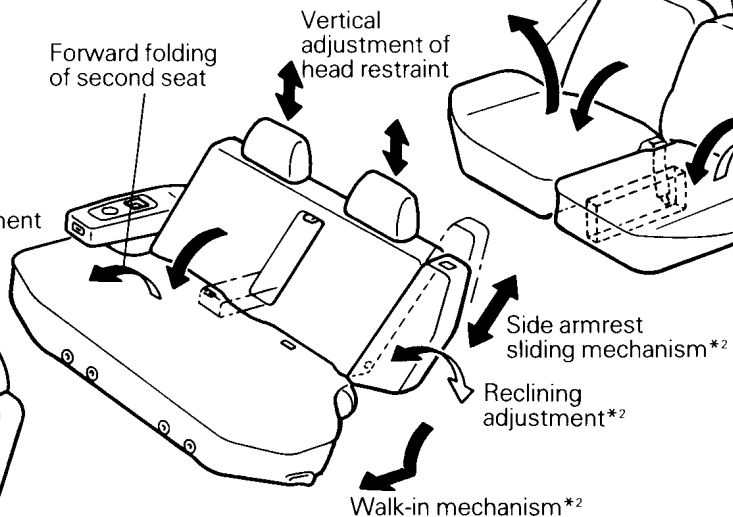


19E0020

Front seat with armrest



Unsplit forward tilting second seats



NOTE

- *1: J-top and metal top only (except RH seat of vehicles for Australia)
- *2: Except long body GL for Australia and van for General Export
- *3: Front faced type

CONSTRUCTION AND OPERATION

SEAT ARMREST (VERTICAL ADJUSTMENT TYPE)

The armrest with vertical adjustment in five stages to suit the taste of the occupant has been made available. When not in use, the armrest is raised and secured to the side of the seatback. To use the armrest, tilt it forward and all the way down and adjust to the desirable height (angle).

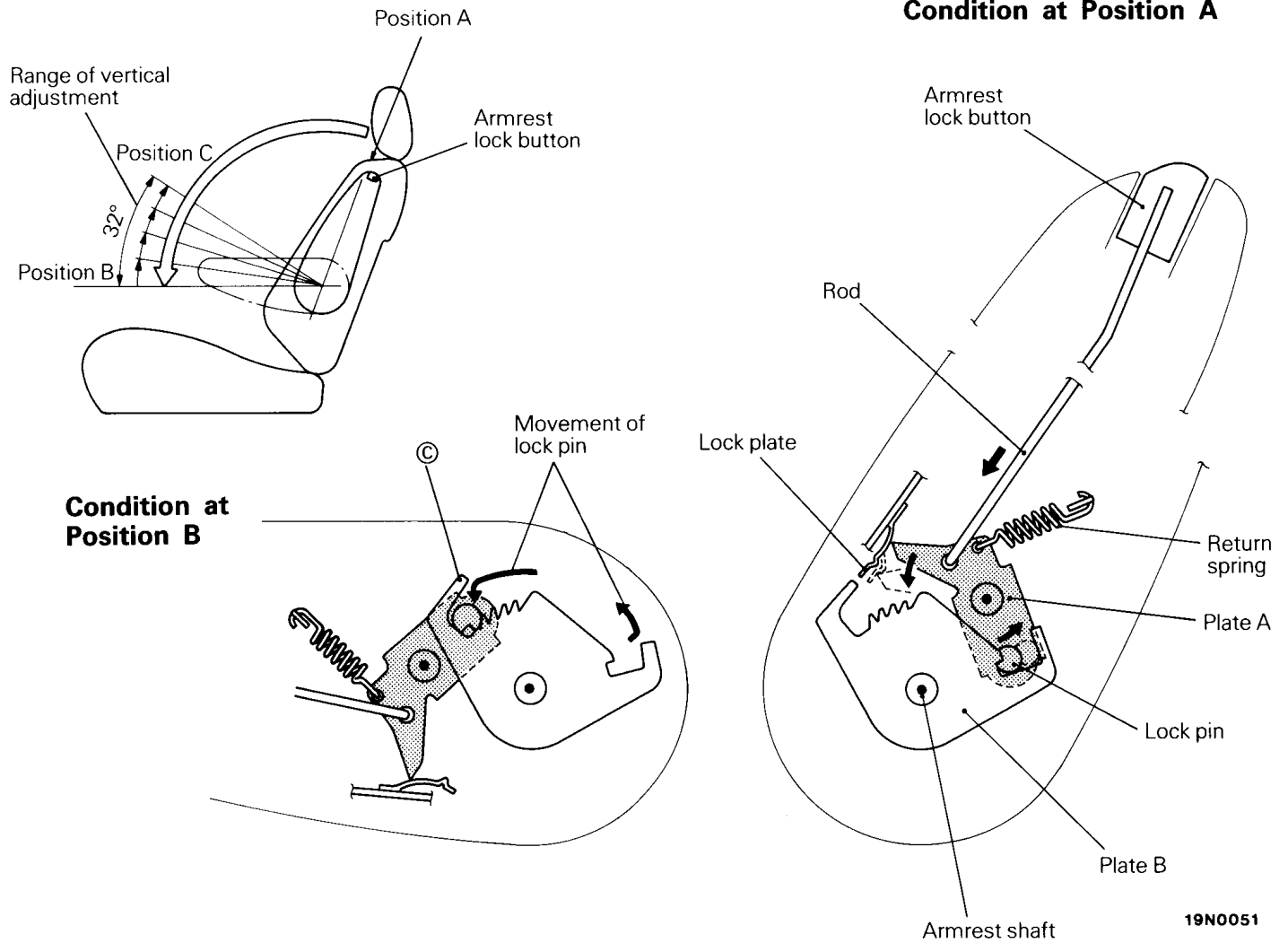
Vertical Adjusting Mechanism

When the armrest is at position A (when not in use), the lock pin integral with plate A engages plate B integral with the seatback frame, locking the armrest. Pushing the armrest lock button causes

the rod to turn plate A in the direction of the arrow and disengage the lock pin from plate B, tilting the armrest forward. On that occasion, plate A is locked by the lock plate. Therefore, the armrest tilts all the way down to position B without engagement of the lock pin on the way.

At position B, the lock pin comes into contact with portion C, plate A disengages the lock plate, and lock pin is pushed against plate B.

The four teeth of plate B and the lock pin are so shaped that at the location between positions B and C, the armrest can move upward but it cannot move downward because of its locking.

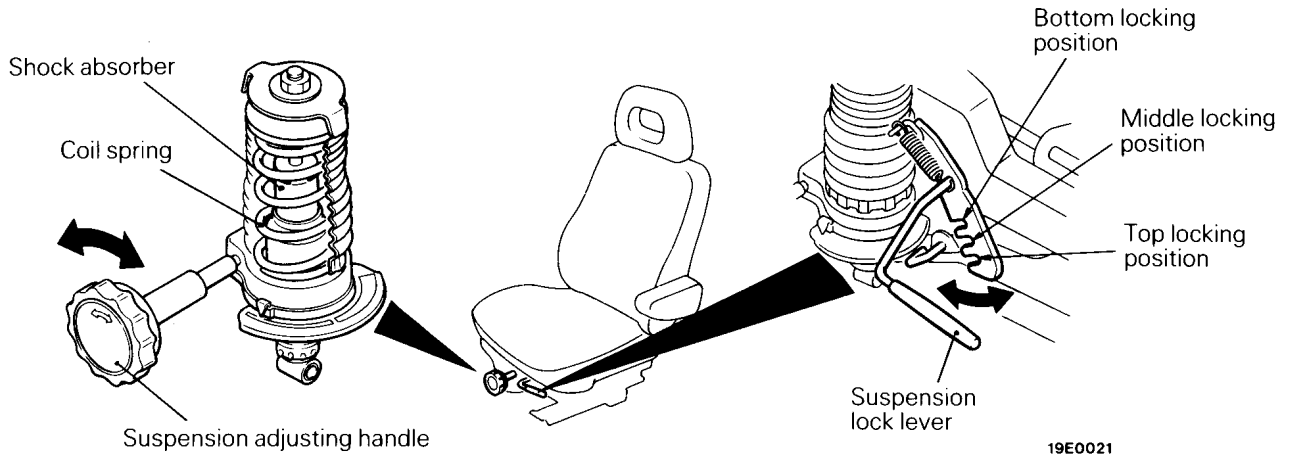


19N0051

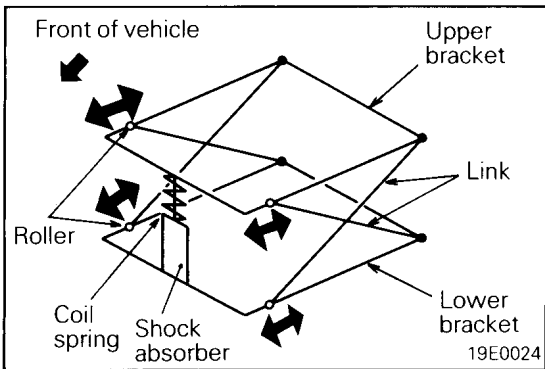
SUSPENSION SEAT

The suspension seat consisting of a linkage, coil spring and shock absorber is designed to absorb

body vibration in off-road driving, relieve the occupant's fatigue and offer comfortable ride.



NOTE
LH side seat is shown.



Suspension Mechanism

Except for coil spring and shock absorber installation methods, the mechanism is the same as conventional models of PAJERO.

Suspension Locking Mechanism

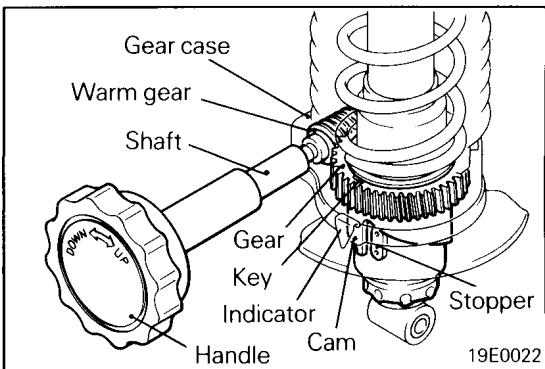
The mechanism is the same as the conventional models of PAJERO.

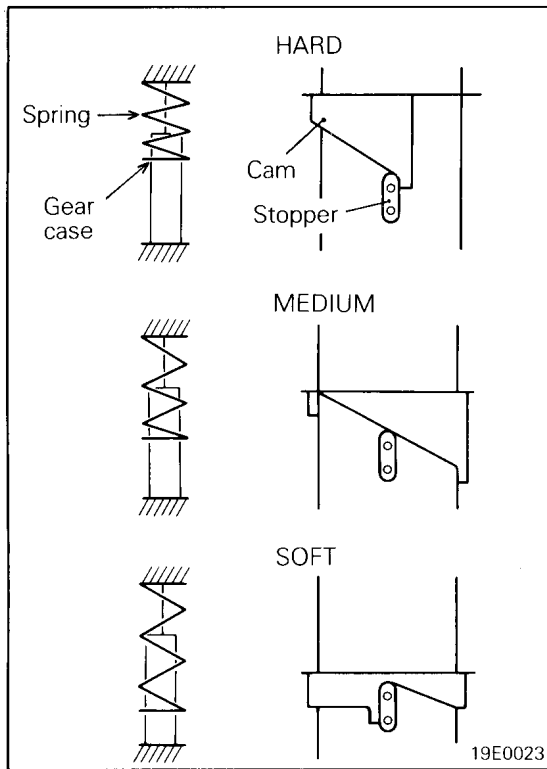
Suspension Adjusting Mechanism

The handle, shaft and worm gear rotate as a unit. The worm gear engages the gear.

The gear and cam turn as a unit by means of a key installed to the cam.

As it turns, the cam also moves up and down along the stopper installed to the cylinder.

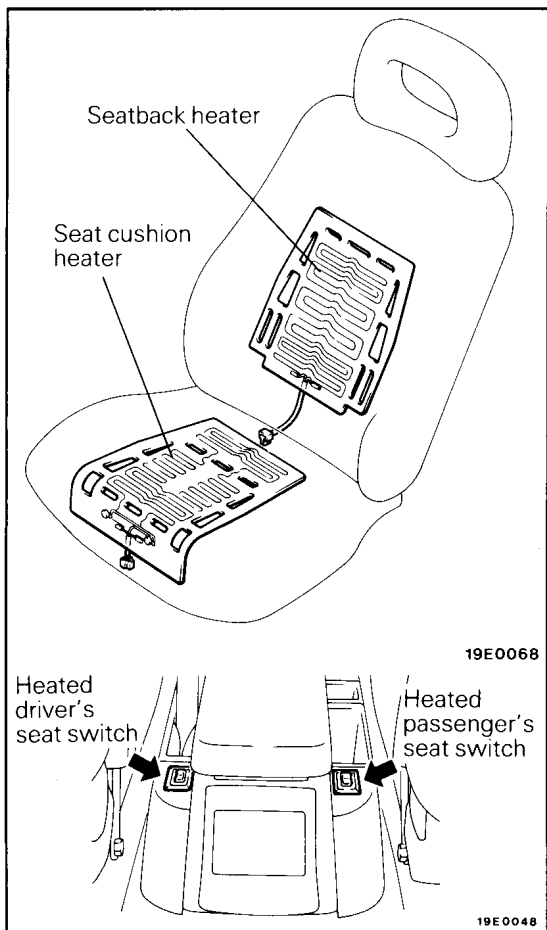




In addition, the gear case containing the worm gear, gear and indicator fits in the groove of the cylinder and moves vertically without rotating. The gear case, whose vertical movement is interlocked with that of the cam, also functions as a spring seat. The vertical movement of this gear case changes spring force to adjust suspension.

HEATED SEAT <VEHICLES FOR EUROPE>

Except for addition of the indicator and illumination to the switch, the heated seat is the same as that installed on the conventional models of PAJERO.



WALK-IN MECHANISM WITH NEUTRAL MEMORY

Raising the seatback of the seat moved to the foremost position by the walk-in mechanism and pushing it back will move the seat to the neutral position of the seat slide and lock it at that position.

NOTE

For the construction and operation of the mechanism, refer to 1989 COLT/LANCER Technical Information Manual.

RECLINING ADJUSTMENT MECHANISM WITH MEMORY

If the seatback is raised after being inclined to the front, it can be returned to the original angle set in memory by previously setting the seatback angle in memory.

Furthermore, even after it is reclined at any angle, if the seatback is raised after being inclined to the front, it can be returned to the original angle set in memory.

Fig. 1: This is outside the memorized position. The bracket on which the seatback is mounted and sector gear move as one unit. The lock gear and sector gear, and lock and memory plate teeth are meshed. The memory arm hits the memory plate and stops.

Fig. 2: To memorize the position shown in Fig. 1, the meshing of the lock and memory plate is disengaged when the memory lever is pulled, the memory arm pushes the memory plate with the force of spring A and turns it until it hits the lock gear. As a result, the memory arm moves in range "a" on the sector gear teeth. This amount is the memorized amount and the reclining angle is memorized.

Fig. 3: When the reclining lever is pulled up, the meshing of the lock gear and sector gear is disengaged, the seatback inclines to the front and the sector gear and memory plate turn but the memory arm does not turn since it is against the lock gear.

Fig. 4: When the seatback is inclined as far as possible to the front, bracket projection (A)

hits the lock gear pin and pushes the lock gear down. The unsupported memory arm is turned by the force of spring A until it hits the memory plate. As a result, the memorized range "a" on the sector gear teeth is covered.

Fig. 5: If the seatback is reclined to the rear, the coverage of the memory arm disappears when the sector gear, memory plate and memory arm rotate and the memorized position is reached; the lock gear and sector gear mesh and the seatback is fixed in the memorized position.

The memory range is between A – B as shown in Fig. 6. Since the memory plate and sector gear hit (b in Fig. 2 is 0) between B – C, position B is memorized even if the memory lever is pulled between B – C.

If the seat is at an angle outside the memorized position, the seatback angle can be changed in the front/back direction since the lock gear and sector gear meshing is disengaged when the reclining lever is pulled up.

Fig. 1

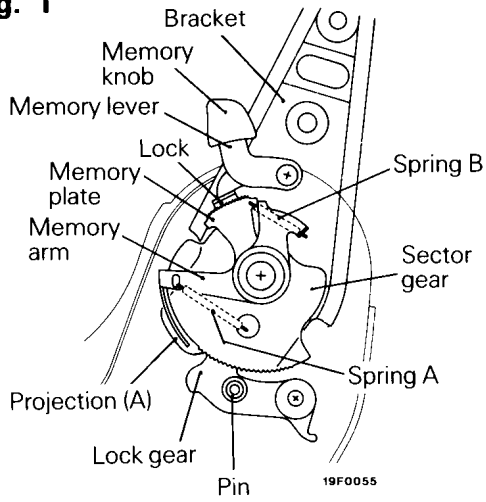


Fig. 2

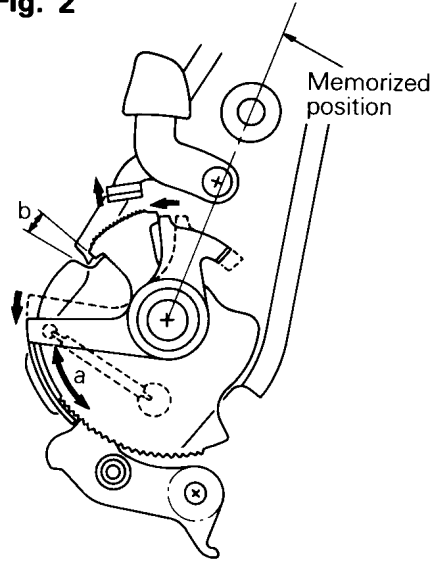


Fig. 3

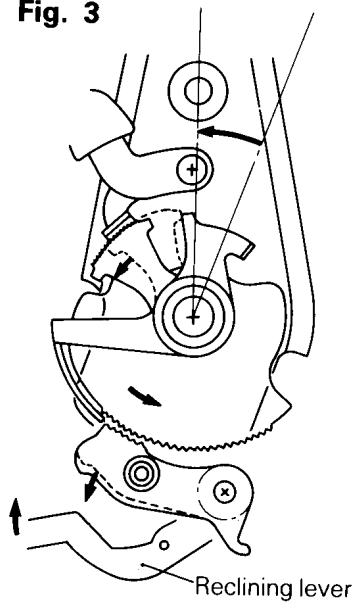


Fig. 4

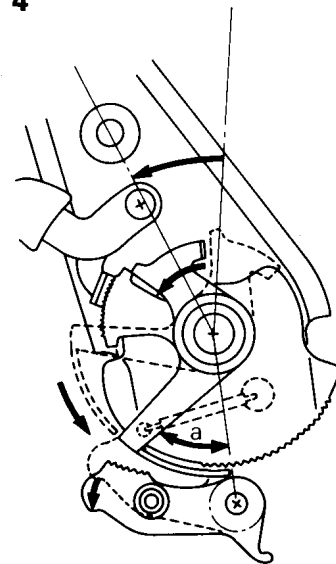


Fig. 5

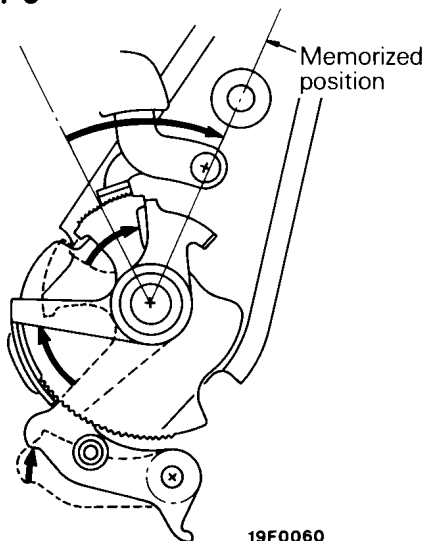
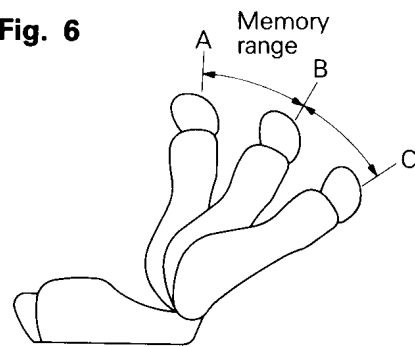


Fig. 6



SEAT BELTS

The seat belt has the following mechanisms.

VEHICLES FOR EUROPE AND AUSTRALIA

Front seat belt

- 3-point seat belt with ELR
- Buckle built in seat
- Adjustable seat belt anchor <Vehicles with full trim>

Rear or second seat belt

- 2-point lap belt <Canvas top>
- 3-point seat belt with ELR <Except for canvas top although option is available for canvas top>
- Inner seat belt built in seat

Third seat belt <Long body model (except GL(5) and GLS(5) for Europe and GL for Australia)>

- 3-point seat belt with ELR
- Inner seat belt built in seat

VEHICLES FOR GENERAL EXPORT

Front seat belt

- 3-point seat belt with ELR
- Buckle built in seat
- Adjustable seat belt anchor <Vehicles with full trim>

Rear or second seat belt

- 2-point lap belt <Except long body model for GCC>
- 3-point seat belt with ELR <Standard equipment on long body for GCC and option on metal top for GCC>
- Inner seat belt built in seat <Except metal top model (without wide fenders) for GCC and van>

Third seat belt <Long body model (except van)>

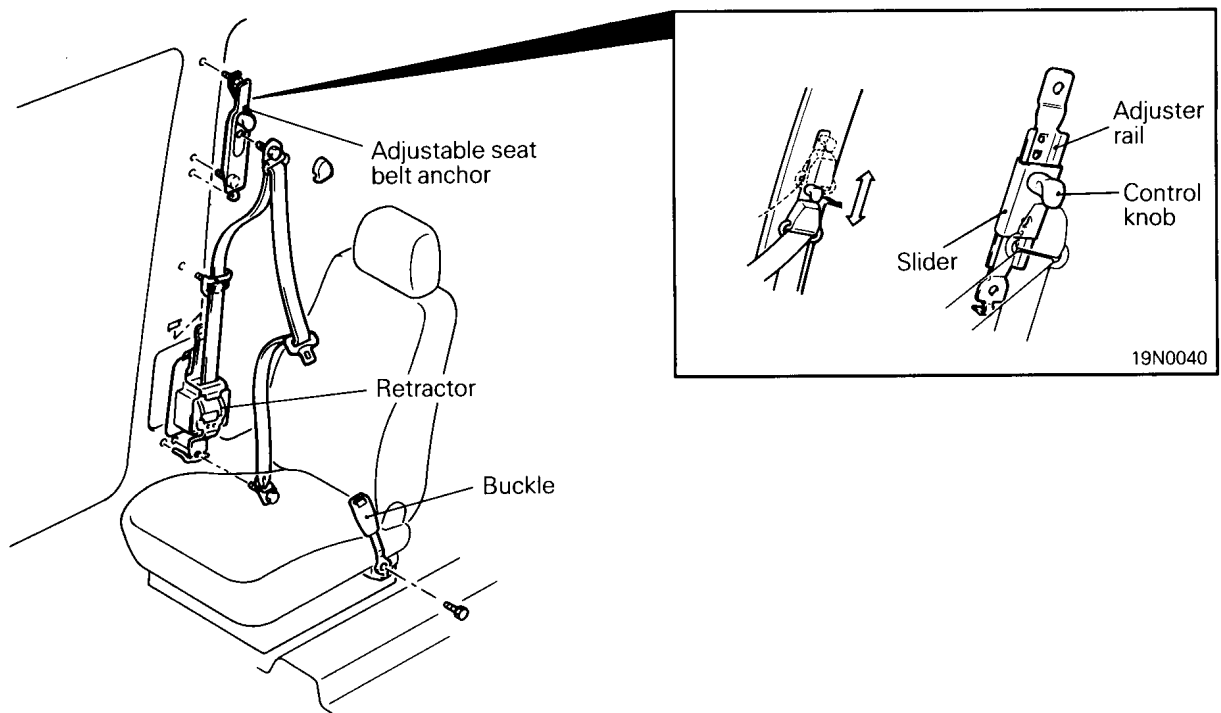
- 2-point lap belt <Except vehicles for GCC>
- 3-point seat belt with ELR <Vehicles for GCC>
- Inner seat belt built in seat

NOTE

For the construction and operation of the retractor and adjustable seat belt anchor, refer to the 1988

GALANT Technical Information Manual.

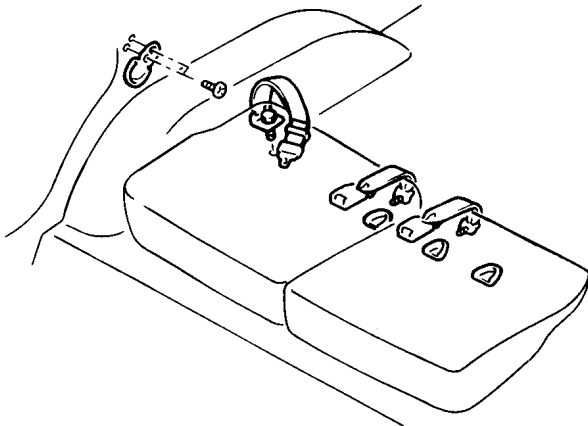
Front seat belt



19E0038

Rear or second seat belt

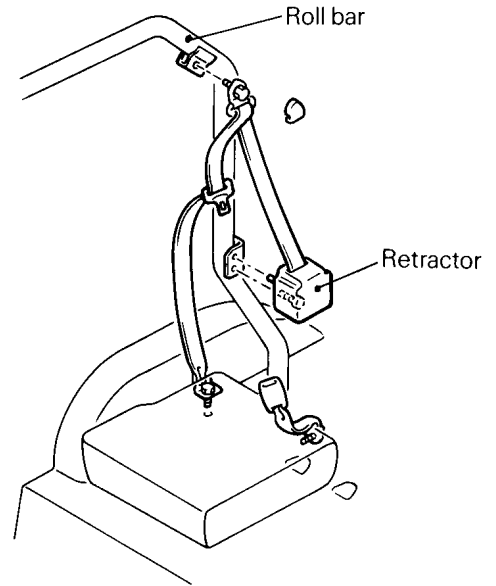
<2-point lap belt on canvas top>



NOTE
The inner seat belt on vehicles for General Export is of the floor anchor type.

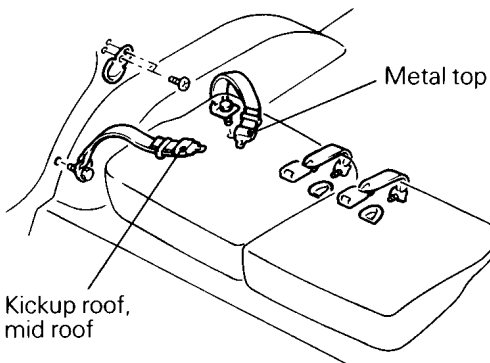
19E0060

<3-point belt with ELR on canvas top>
<Vehicles for Europe>



19E0039

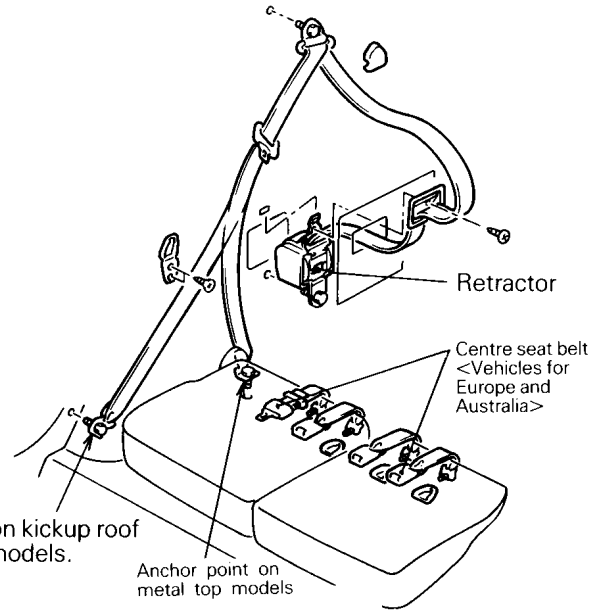
<2-point lap belt on metal top, kickup roof and mid roof>
<Vehicles for General Export>



NOTE
The inner seat belt on van is of the floor anchor type.

19E0067

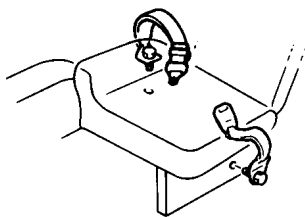
<3-point belt with ELR on metal top, kickup roof and mid roof model>



19E0041

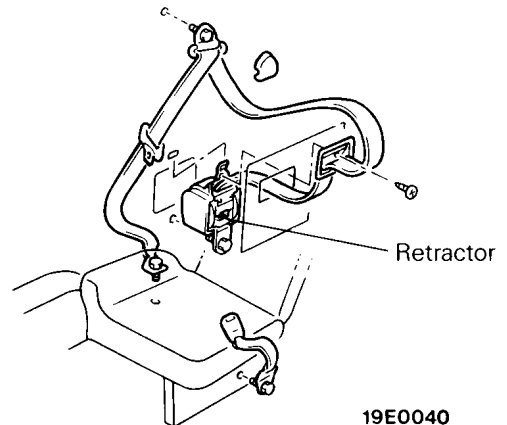
NOTE
The inner seat belts on metal top model (without wide fenders) and van for GCC are of the floor anchor type.

Third seat belt
<2-point lap belt>



19E0066

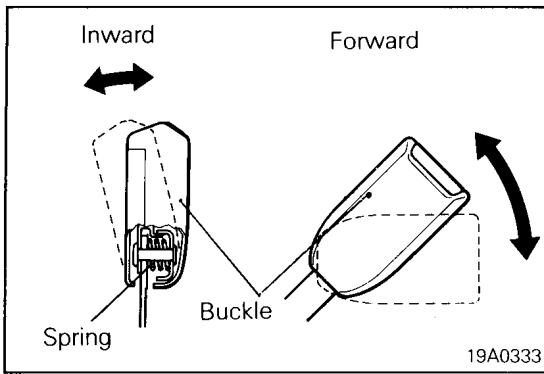
<3-point belt with ELR>



19E0040

CONSTRUCTION AND OPERATION OF THE BUCKLE

There is a spring installed in the portion connecting the buckle to the arm, allowing the buckle to tilt forward and inward so that the belts can be tight enough around the body.



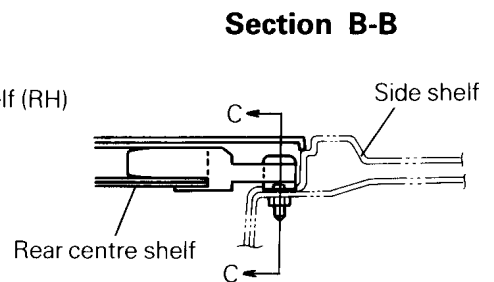
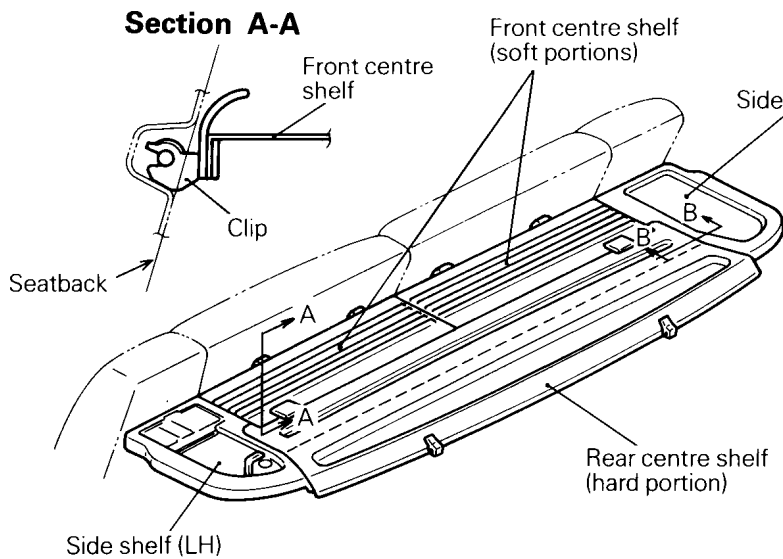
REAR SHELF TRIM

E9HHAAA

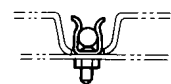
The rear shelf trim has been made available in order to make the cargo space invisible from outside the vehicle. It consists of the centre shelf and side shelves, and the centre shelf is further divided into the soft and hard portions. The soft portion is split in two to follow the rear split seat and reclining adjusting mechanism.

- The centre shelf is installed to the seatback of the rear seat by means of clips so that cargo may be taken out from the rear seat.
- The centre shelf may be taken out by folding it into three and stored at the rear end of the cargo space.

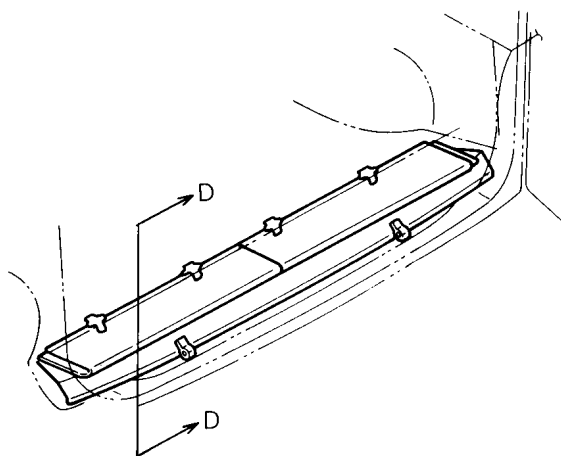
CONSTRUCTION



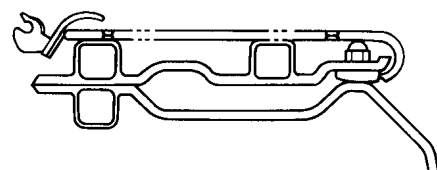
Section C-C



19E00G2



Section D-D



19E0003

EQUIPMENT

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E9FAZAE

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GENERAL INFORMATION

Newly developed devices and functions are incorporated for enriching the equipment arrangement.

FEATURES

Improvement in reliability

1. Gold plated on terminals of electronic control circuits
2. MWP (multipole water proof) type connectors adopted

Betterment in visibility and safety

1. Large-type combination meter
2. High-mount stop lamp having light-emitting diodes
3. Double-action ignition switch employed
4. Rear check back-up lamp for allowing the driver to check a backward distance behind the automobile when moving it back
5. Headlamp washer for cleaning the surface of headlamp lens

Enhancement in usability and convenience

1. Plug-in-type accessory sockets equipped at the front and rear seats

Improvement in serviceability

1. Diagnosis connector adopted
2. Ignition timing adjust terminal employed
3. Check terminal for fuel pump operation
4. Inspection lamp to allow checkup/maintenance at nighttime

Enrichment in product quality

1. Multi-meter combination including the oil temperature gauge, voltmeter, altimeter, inclinometer, inside/outside thermometer, electronic compass, etc.

WIRING HARNESS

E9FLAAA

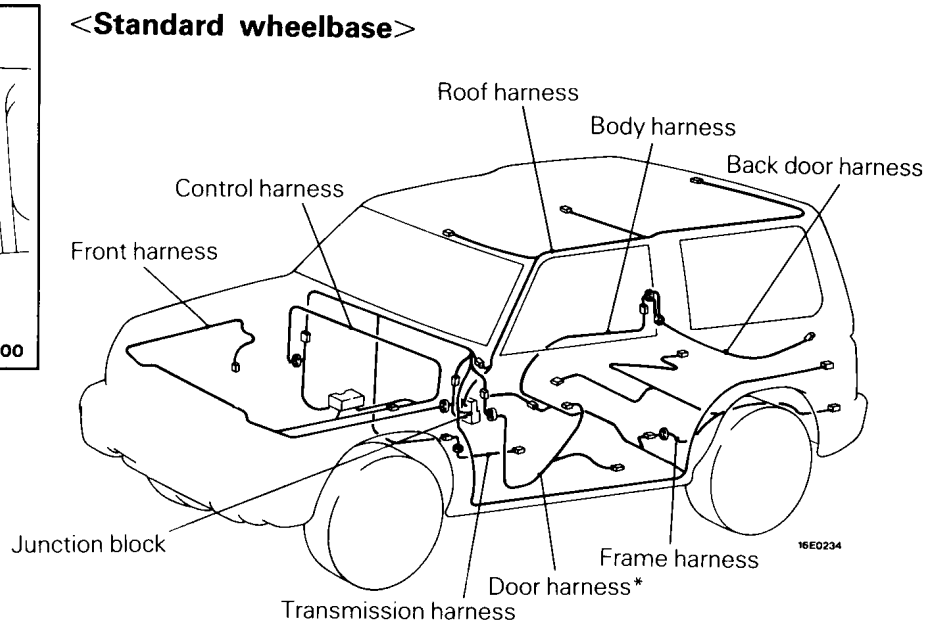
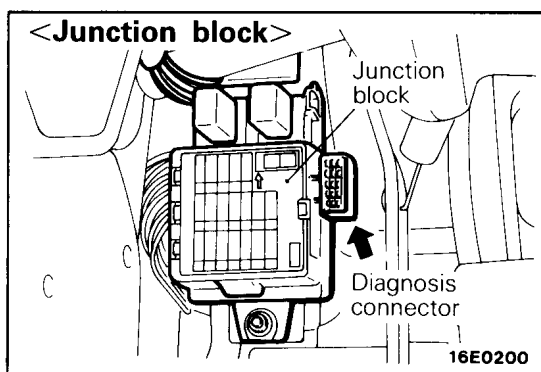
The wiring harness comprises the main harness wires (front harness, body harness, control harness) and the sub-harness wires (front door harness, back door harness, transmission harness, roof harness, frame harness). The advantageous features of wiring harness are as follows:

- To improve reliability, the junction block is employed in which the intermediate harness connectors, fuse box and relay box are incorporated.
- The CAVS (compact-stranded thin-core low-

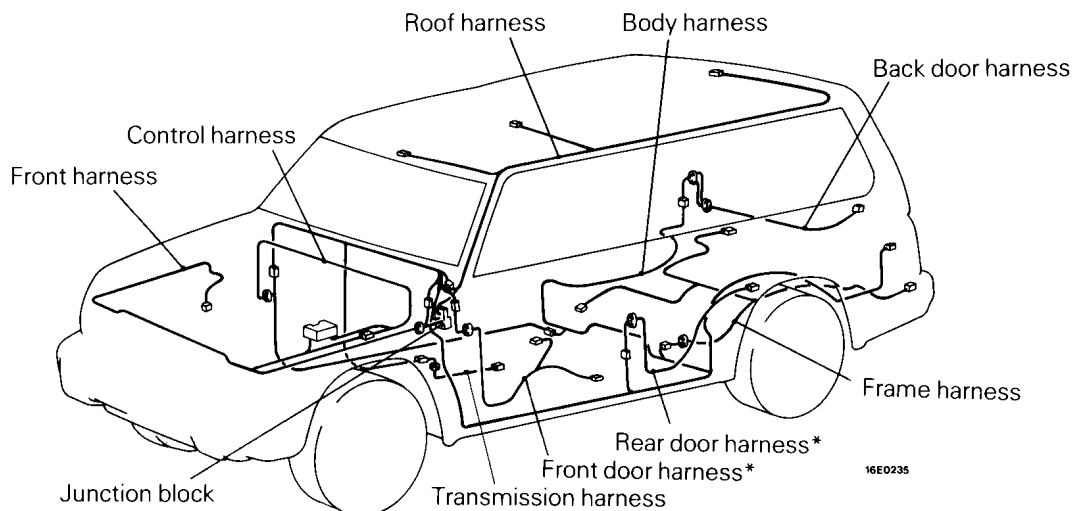
voltage) wires are adopted for harness, contributing to reduction in weight.

- For improvement in serviceability, the diagnosis connector is equipped to enable centralized diagnostic checkup of each electronic control circuit.
- The gold-plated connector terminals are used in the control unit, sensors and other engine control circuits where minuscule current is applied. This ensures higher reliability of electric conduction.

STRUCTURAL DIAGRAM



<Long wheelbase>



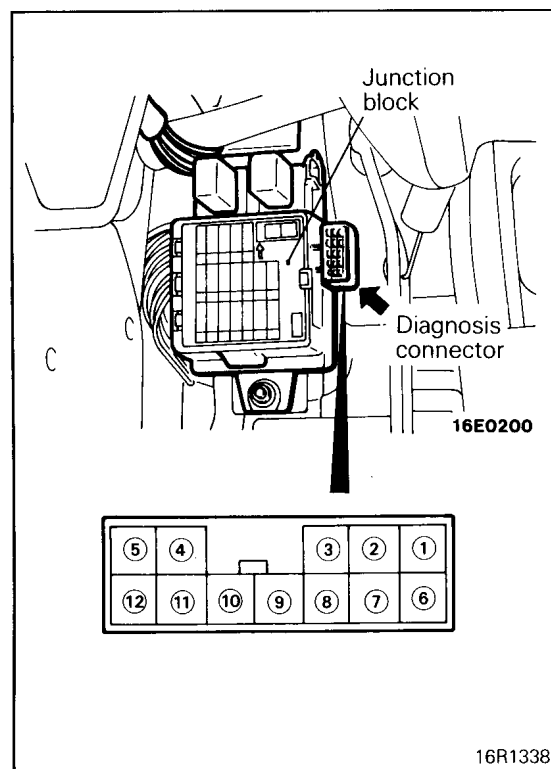
Remarks

Only the major harness connections are indicated above.
The asterisk mark (*) means that the same harness is provided on the right side also.

DIAGNOSIS SYSTEM

The diagnosis system is designed for improvement in serviceability. The following functions are provided in this system.

Functions	Electronic system	MPI	ABS-4WD	Auto-cruise control
Self-diagnosis code output (low-speed signal)		○	○	○
Self-diagnosis code output (high-speed signal)		○	○	
Service data output (high-speed signal)		○	○	
Actuator test (high-speed signal)		○	○	
Simplified check code output (same indication pattern as self-diagnosis code)				○
Diagnosis data storing		○ Effective until battery goes off		
Diagnosis data deletion with multi-use tester		○	○	



DIAGNOSIS CONNECTOR

The diagnosis connector box for checking each of the following electronic systems is equipped at the right side of the junction block.

- ① MPI
- ② —
- ③ —
- ④ ABS
- ⑤ Auto-cruise control
- ⑥ —
- ⑦ —
- ⑧ —
- ⑨ —
- ⑩ Diagnosis control
- ⑪ —
- ⑫ Earth

BATTERY

E9FMAAA

Shown below are the specification of battery.

SPECIFICATIONS**Vehicles for Europe**

Items	Models	Petrol-Powered Vehicles		Diesel-Powered Vehicles
Type		65D23R [75D26R]		95D31R [95D31R x 2*]
Capacity (5HR)	Ah	52 [52]		64 [64]
Reserve capacity	min.	111 [123]		159 [159]
Cold cranking current	A	420 [490]		622 [622]

NOTE

*: <LH drive vehicles>

[]: Optional equipment

Vehicles for General Export and GCC

Items	Models	Petrol-Powered Vehicles		Diesel-Powered Vehicles
		2600	3000	
Type		48D26R [75D26R]	55D23R [95D31R* ¹ , 75D26R* ²]	95D31R
Capacity (5HR)	Ah	40 [52]	48 [64, 52]	64
Reserve capacity	min.	81 [123]	99 [159, 123]	159
Cold cranking current	A	278 [490]	356 [622, 490]	622

NOTE

*¹: Vehicles for General Export*²: Vehicles for GCC

[]: Optional equipment

Vehicles for Australia

Items	Models	Petrol-Powered Vehicles		Diesel-Powered Vehicles
		2600	3000	
Type		48D26R	55D23R	95D31R
Capacity (5HR)	Ah	40	48	64
Reserve capacity	min.	81	99	159
Cold cranking current	A	278	356	622

LIGHTING

The flush-surfaced square two-headlamp is employed in the vehicles for Europe, Australia and GCC. The round two-headlamp is employed in the vehicles for General Export. In the vehicles for Europe, the headlamp leveling system is also adopted for adjusting the main beam of headlamp to a proper illumination angle according to the vehicle's posture that varies with the person or cargo loading condition.

The rear combination lamp is equipped on the quarter panel and rear bumper. The separate lamp arrangement is designed in the vehicles for Europe and Australia, and the self-contained lamp arrangement on the quarter panel is made in the vehicles for General Export and GCC. Further, in the vehicles for General Export and GCC, the rear check back-up lamp is provided so that the driver can recognize a backward distance when reversing.

SPECIFICATIONS

Vehicles for Europe

Items	Body types Models	Standard wheelbase			Long wheelbase		
		Vehicles with canvas top	Vehicles without wide fender	Vehicles with wide fender	Vehicles without wide fender		Vehicles with wide fender
					GL	GLX	
Exterior lamps	W						
Headlamp							
Semi-shielded beam (halogen lamp type)		60/55	60/55	60/55	60/55	60/55	60/55
Front combination lamp							
Turn-signal lamp		21	21	21	21	21	21
Clearance lamp		5	5	5	5	5	5
Side turn-signal lamp		5	5	5	5	5	5
Rear combination lamp							
Stop and tail lamp		21/5*1	21/5*1	21/5*1	21/5*1	21/5*1	21/5*1
Turn-signal lamp		21*1	21*1	21*1	21*1	21*1	21*1
Back-up lamp		21*2	21*2	21*2	21*2	21*2	21*2
Rear fog lamp		21*2	21*2	21*2	21*2	21*2	21*2
License plate lamp		10	10	10	10	10	10
Interior lamps	W						
Room lamp		10	8 x 2	8 x 2	8 x 2	8 x 2	8 x 2
Map lamp				8 x 2*3	8 x 2*4	8 x 2	8 x 2
Spot lamp			8 x 2*4	8 x 2*4			
Cargo space lamp			10*4	10*4	10	10*4	10

NOTE

- *1: Rear combination lamp mounted on the rear bumper
- *2: Rear combination lamp mounted on the quarter panel
- *3: Vehicles without sun-roof
- *4: Vehicles with sun-roof

Vehicles for General Export

Items	Body types Models	Standard wheelbase			Long wheelbase		
		Vehicles with canvas top	Vehicles without wide fender	Vehicles with wide fender	Vehicles without wide fender		Vehicles with wide fender
					L	H	
Exterior lamps	W						
Headlamp							
Shielded beam							
Incandescent lamp type		60/50	60/50		60/50	60/50	
Halogen lamp type		60/50* ¹	60/50* ¹	60/50* ³	60/50* ¹	60/50* ¹	60/50* ³
Semi-shielded beam							
Halogen lamp type		60/55* ²	60/55* ²	60/55* ⁴	60/55* ²	60/55* ²	60/55* ⁴
Front combination lamp							
Turn-signal lamp		21	21	21	21	21	21
Clearance lamp		5	5	5	5	5	5
Side turn-signal lamp				5			5
Rear combination lamp							
Stop and tail lamp		21/5 x 2	21/5 x 2	21/5 x 2	21/5 x 2	21/5 x 2	21/5 x 2
Turn-signal lamp		21	21	21	21	21	21
Back-up lamp		21	21	21	21	21	21
License plate lamp		10	10	10	10	10	10
High mounted stop lamp							
Back-door-window-equipped type				5 x 4		5 x 4	5 x 4
Roof-spoiler-equipped type				LED			
Interior lamps	W						
Room lamp		10	8 x 2	8 x 2	8 x 2	8 x 2	8 x 2
Map lamp				8 x 2* ⁵		8 x 2* ⁶	8 x 2
Spot lamp				8 x 2* ⁶			
Cargo space lamp					10	10	10

NOTE

*¹: Optional equipment for LH drive vehicles*²: Optional equipment for RH drive vehicles*³: LH drive vehicles*⁴: RH drive vehicles*⁵: Vehicles without sun-roof*⁶: Vehicles with sun-roof

LED: Light Emitting Diode

Vehicles for GCC

Items	Body types Models	Standard wheelbase		Long wheelbase		
		Vehicles without wide fender	Vehicles with wide fender	Vehicles without wide fender		Vehicles with wide fender
				L	H	
Exterior lamps	W					
Headlamp						
Semi-shielded beam						
Incandescent lamp type		45/40		45/40	45/40	
Halogen lamp type		60/55* ¹	60/55	60/55* ¹	60/55* ¹	60/55
Front combination lamp						
Turn-signal lamp		21	21	21	21	21
Clearance lamp		5	5	5	5	5
Side turn-signal lamp			5			5
Rear combination lamp						
Stop and tail lamp		21/5 x 2	21/5 x 2	21/5 x 2	21/5 x 2	21/5 x 2
Turn-signal lamp		21	21	21	21	21
Back-up lamp		21	21	21	21	21
License plate lamp		10	10	10	10	10
High mounted stop lamp						
Back-door-window-equipped type		5 x 4	5 x 4		5 x 4	5 x 4
Roof-spoiler-equipped type			LED			
Interior lamps	W					
Room lamp		8 x 2	8 x 2	8 x 2	8 x 2	8 x 2
Map lamp			8 x 2* ²		8 x 2* ³	8 x 2
Spot lamp		8 x 2* ³	8 x 2* ³			
Cargo space lamp		10* ³	10* ³	10	10	10

NOTE

*¹: Optional equipment*²: Vehicles without sun-roof*³: Vehicles with sun-roof

LED: Light Emitting Diode

Vehicles for Australia

Items	Body types Models	Standard wheelbase		Long wheelbase		
		Vehicles without wide fender	Vehicles with wide fender	Vehicles without wide fender		Vehicles with wide fender
				GL	GLX	
Exterior lamps	W					
Headlamp						
Semi-shielded beam (halogen lamp type)		60/55	60/55	60/55	60/55	60/55
Front combination lamp						
Turn-signal lamp		21	21	21	21	21
Clearance lamp		5	5	5	5	5
Side turn-signal lamp		5	5	5	5	5
Rear combination lamp						
Stop and tail lamp		21/5*1	21/5*1	21/5*1	21/5*1	21/5*1
Turn-signal lamp		21*1	21*1	21*1	21*1	21*1
Back-up lamp		21*2	21*2	21*2	21*2	21*2
Rear fog lamp		21*2	21*2	21*2	21*2	21*2
License plate lamp		10	10	10	10	10
High mounted stop lamp						
Back-door-window-equipped type			5 x 4			5 x 4
Roof-spoiler-equipped type			LED			
Interior lamps	W					
Room lamp		8 x 2	8 x 2	8 x 2	8 x 2	8 x 2
Map lamp			8 x 2*3	8 x 2*4	8 x 2	8 x 2
Spot lamp		8 x 2*4	8 x 2*4			
Cargo space lamp		10*4	10*4	10	10	10

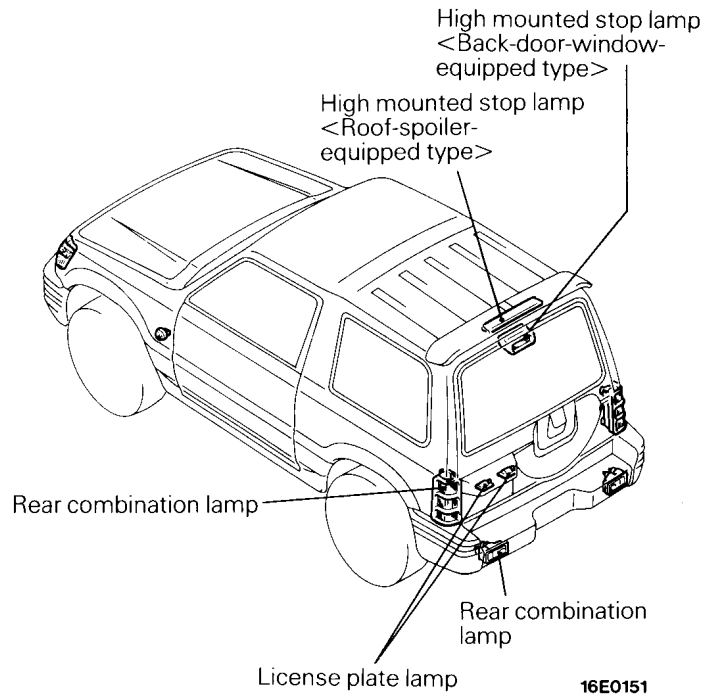
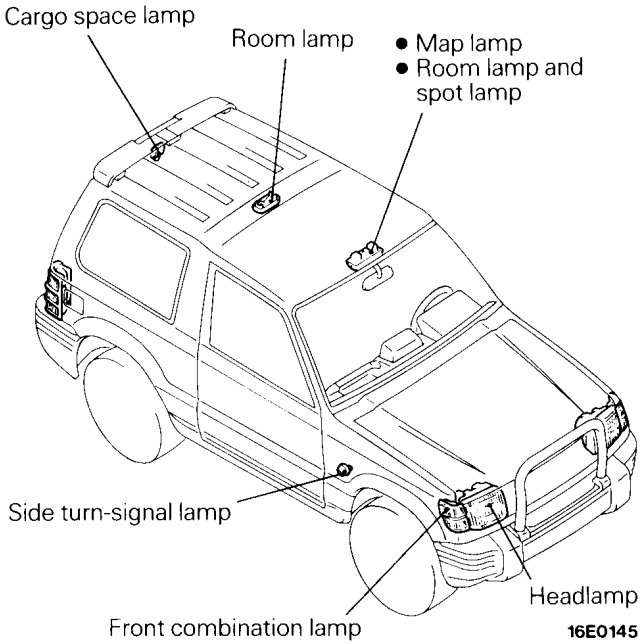
NOTE

- *1: Rear combination lamp mounted on the rear bumper
- *2: Rear combination lamp mounted on the quarter panel
- *3: Vehicles without sun-roof
- *4: Vehicles with sun-roof

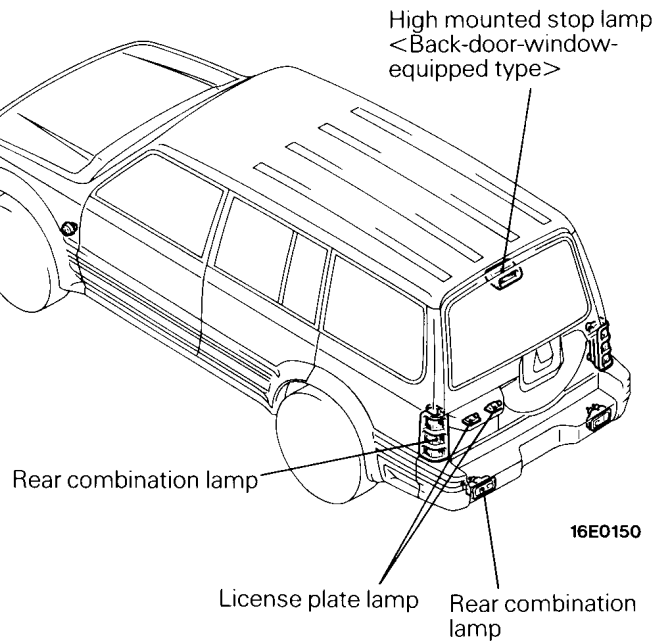
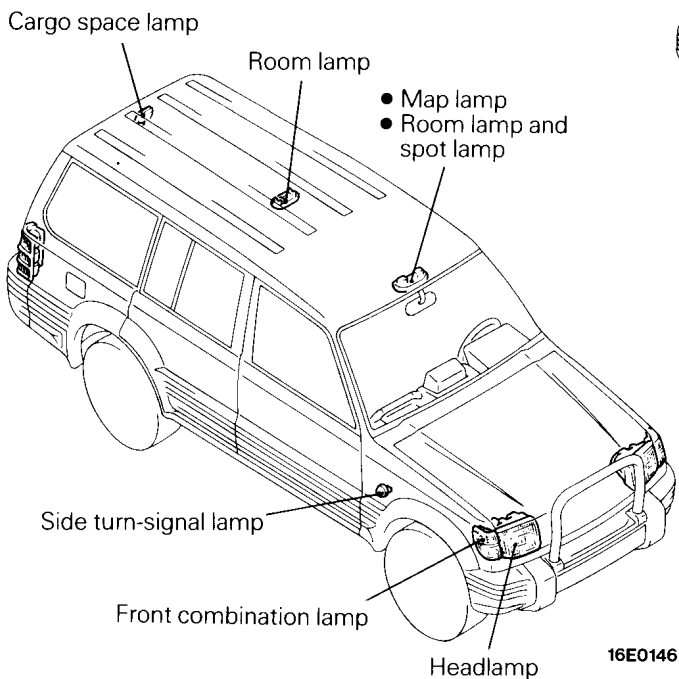
STRUCTURAL DIAGRAM

Vehicles for Europe, Australia and GCC

<Standard Wheelbase>

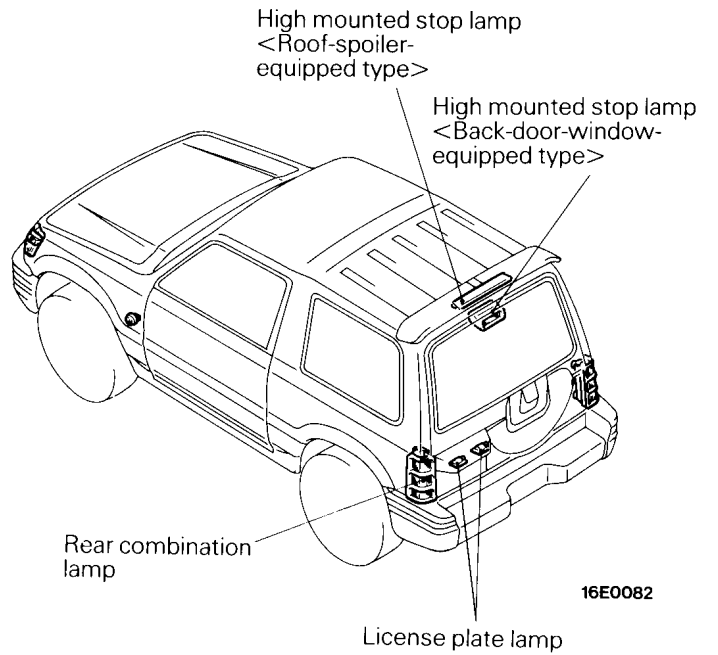
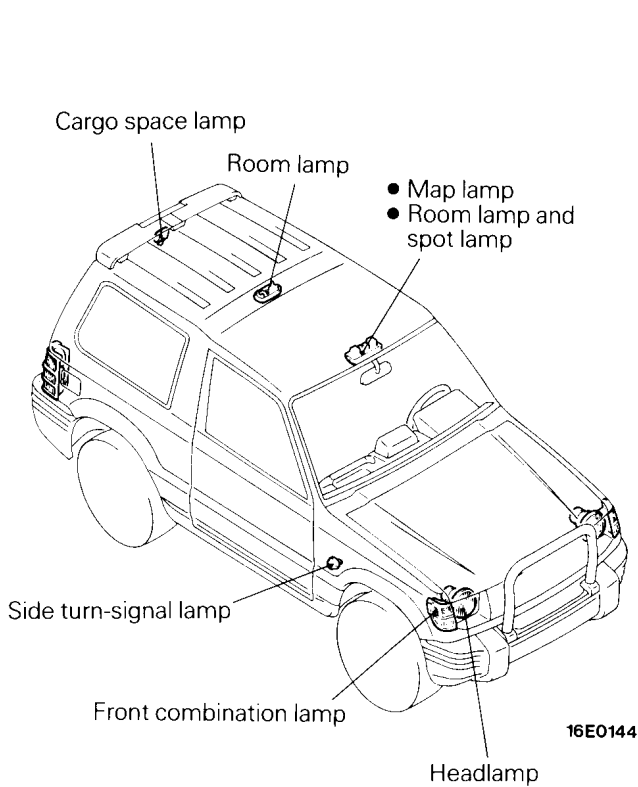


<Long Wheelbase>

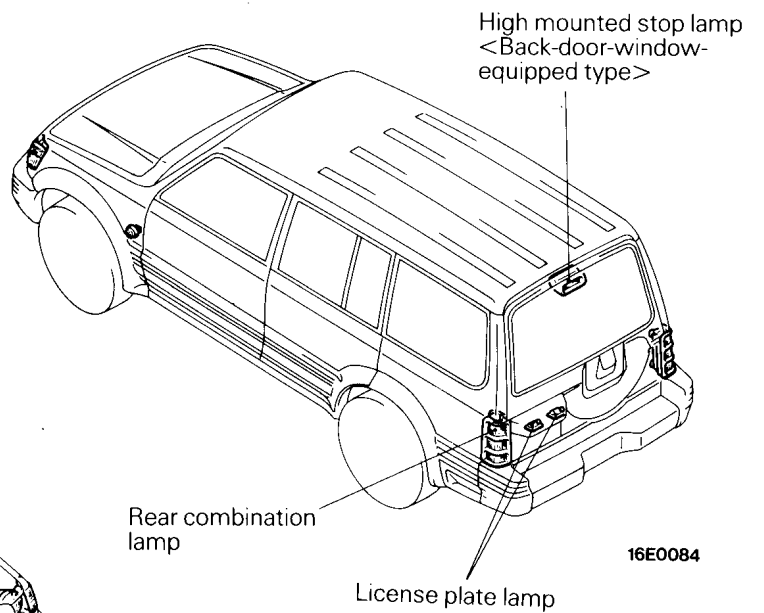
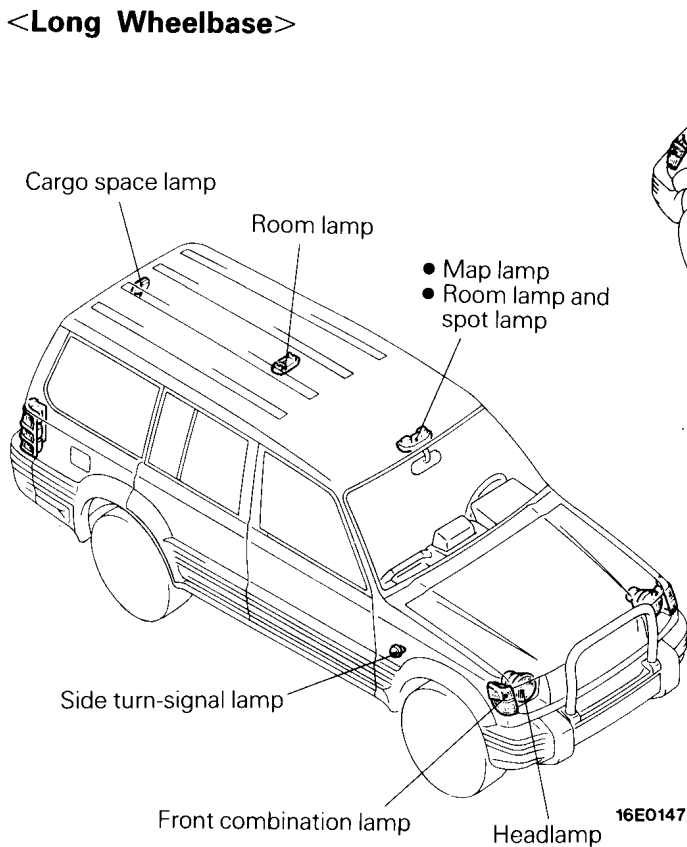


Vehicles for General Export

<Standard Wheelbase>



<Long Wheelbase>



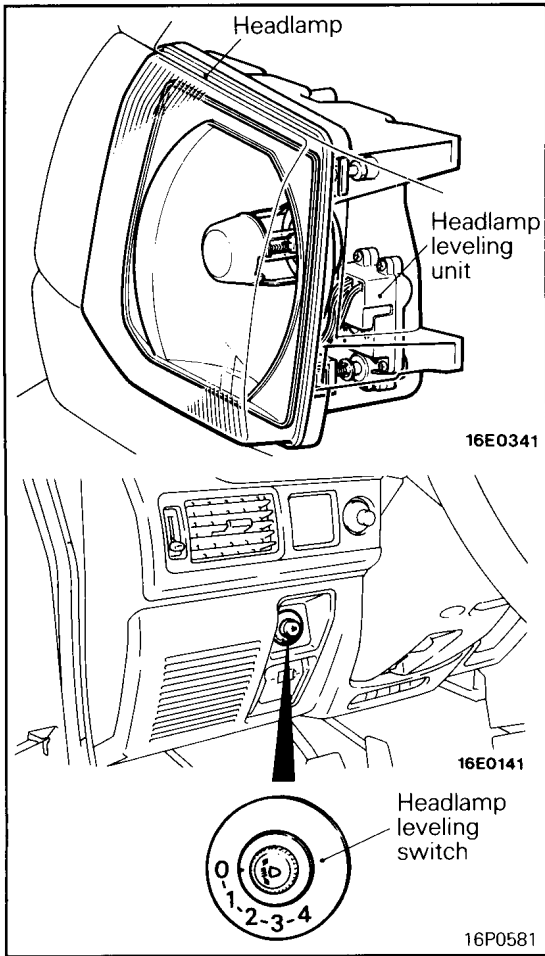
HEADLAMP LEVELING SYSTEM

The headlamps leveling system is a system that the driver can, if desired, use to change the headlamps illumination angle in the vertical direction so as to prevent approaching vehicles from being subjected to excessive brightness due to a change in the attitude of this vehicle because of the number of people or the amount of load carried. This system is composed of the headlamp leveling unit (installed to the rear of the headlamps) and the headlamp leveling switch (located at the lower left part of the instrument panel).

When the headlamps are illuminated, the illumination angle in the vertical direction (lower beam only) can be set to any one of four steps by using the headlamp leveling switch.

NOTE

The basic structure and operating principle are the same as those in the current version of PAJERO.

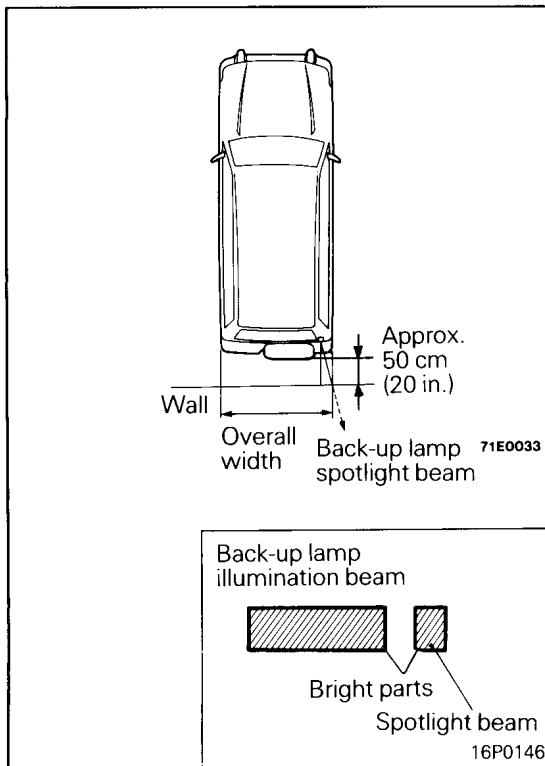


REAR CHECK BACK-UP LAMPS

The rear check back-up lamps are back-up lamps that can be used to check distances behind the vehicle according to the position where the spotlights provided on the back-up lamps are shining.

As shown in the illustration, the spot beams of light from the back-up lamps intersect the (imaginary) lines drawn backward as an extension of the side lines of the vehicle. This intersection by the beam of light is a point approximately 50 cm (20 in.) from the rear end of the spare tyre.

This means that, when the vehicle is being backed at night toward a wall or other object behind the vehicle, the driver will know that the wall or other object is only about 50 cm (20 in.) from the rear end of the spare tyre when the point at which the beams from the spotlights cross the imaginary lines extending back from the sides of the vehicle.



INSPECTION LAMP

E9FNAAA

The small-type inspection lamp is available for convenience in checkup or maintenance at night-time. Its power can be supplied from the accessory socket located at the front seat or rear seat. This widens the workable range of inspection lamp to enhance serviceability. The features of inspection lamp are as follows:

- The housing with slide cover is provided at the bottom of lamp case. The plug-ended cord approx. 3 m (9.84 ft.) long can be contained in this housing.

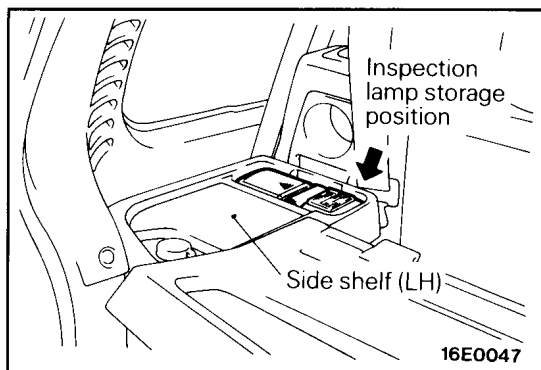
- The magnet is provided at the rear of lamp case so that the lamp can be snapped on/off its metal storage position in the vehicle. (Magnet snap-on/off type)
- The head swinging design of this lamp allows changing its illuminating direction through 11 steps.

NOTE

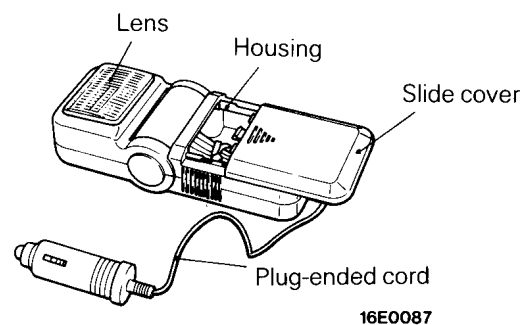
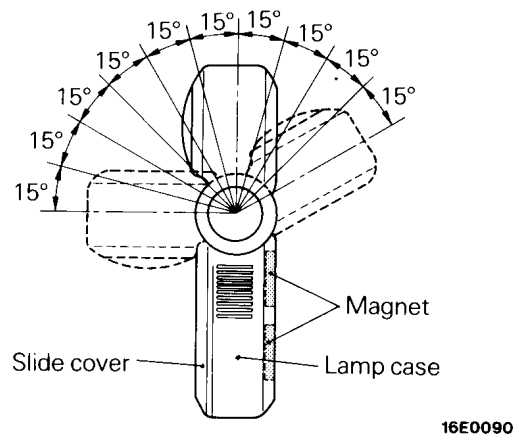
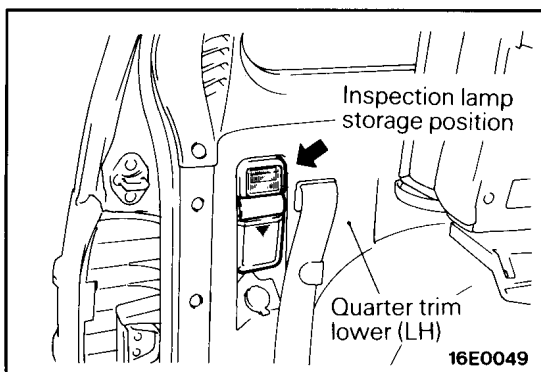
For the accessory socket, see P.7-27.

STRUCTURAL DIAGRAM

<Standard Wheelbase>



<Long Wheelbase>



METERS AND GAUGES

E9FOAAA

COMBINATION METERS

The combination meter board has easy-to-read large meters of needle type, indicator lamps, and warning lamps. Two kinds of combination meter panels are

designed for the diesel-powered vehicles and petrol-powered vehicles.

SPECIFICATIONS

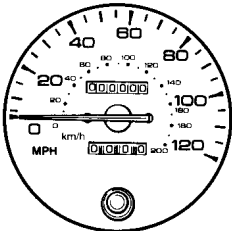
Items	Specifications
Speedometer	Reed switch type (cross-coil design)
Tachometer	Pulse type (cross-coil design)
Fuel gauge	Fixed needle type (cross-coil design)
Fuel gauge unit	Variable resistor type
Engine coolant temperature gauge	Mid-temperature stabilized type (cross-coil design)
Engine coolant temperature gauge unit	Thermistor type

STRUCTURAL DIAGRAM

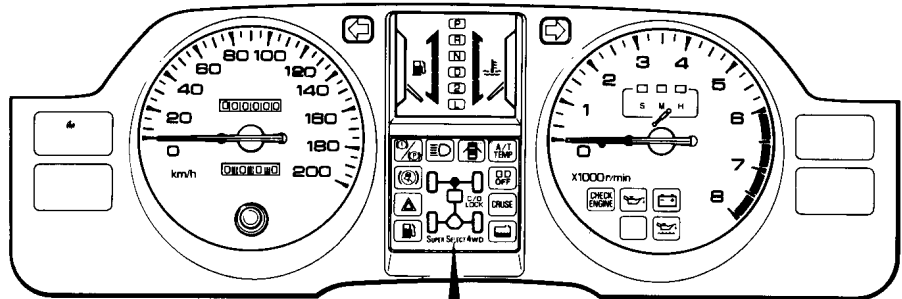
Vehicles for Europe

<Petrol-Powered Vehicles>

MPH indication speedometer, with Km/h scaling



16E0297

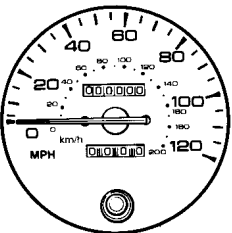


16E0287

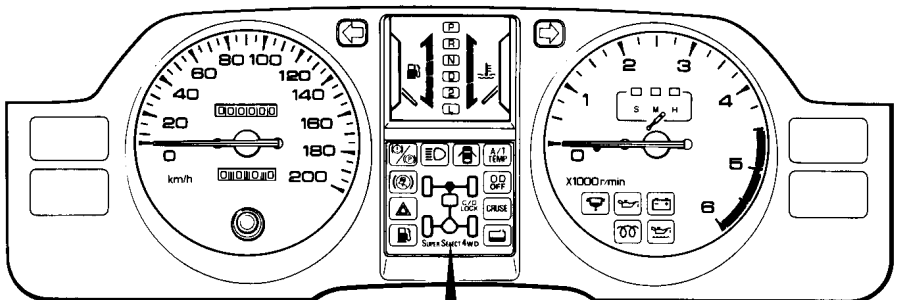


<Diesel-Powered Vehicles>

MPH indication speedometer, with Km/h scaling



16E0297



16E0288

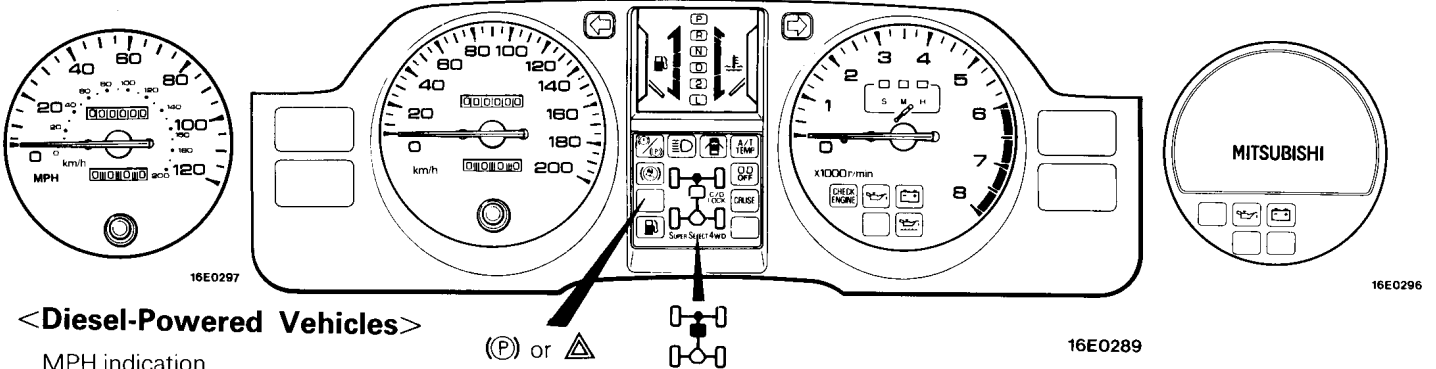


Vehicles for General Export

<Petrol-Powered Vehicles>

MPH indication speedometer, with Km/h scaling

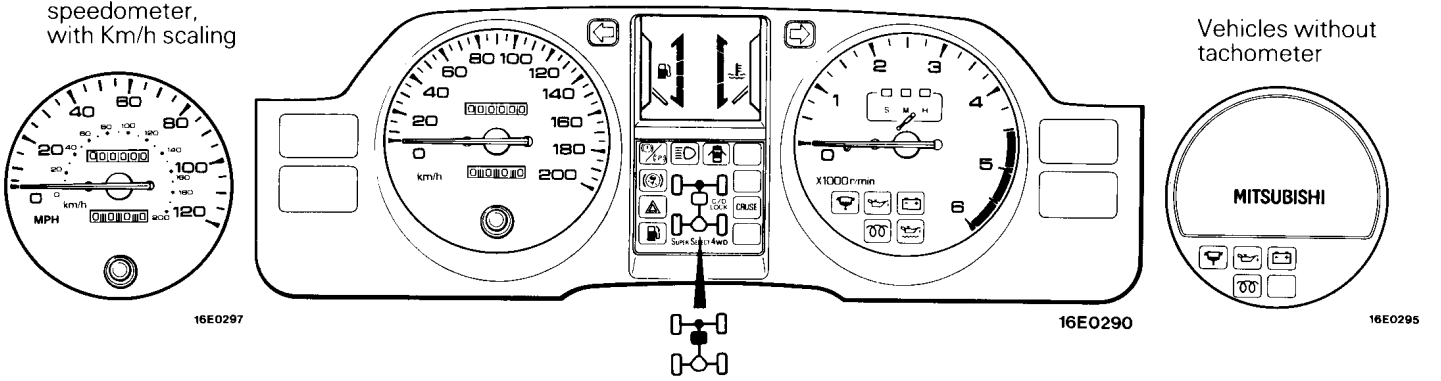
Vehicles without tachometer



<Diesel-Powered Vehicles>

MPH indication speedometer, with Km/h scaling

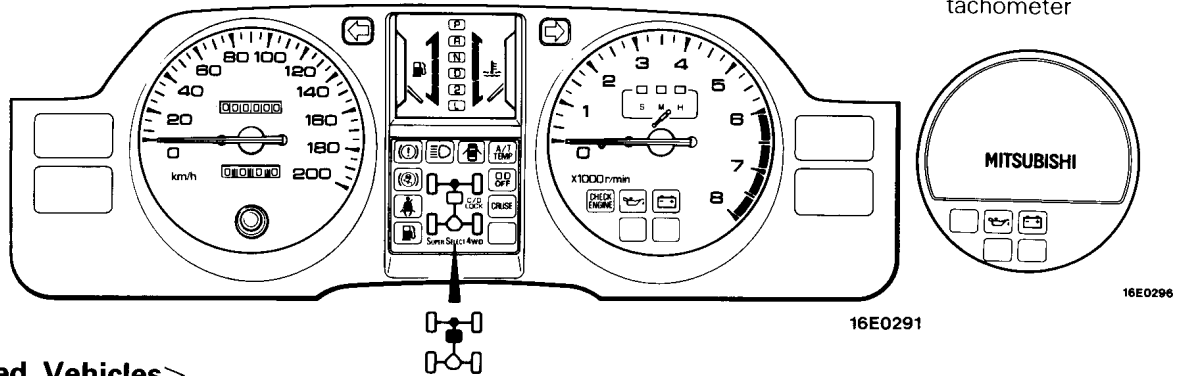
Vehicles without tachometer



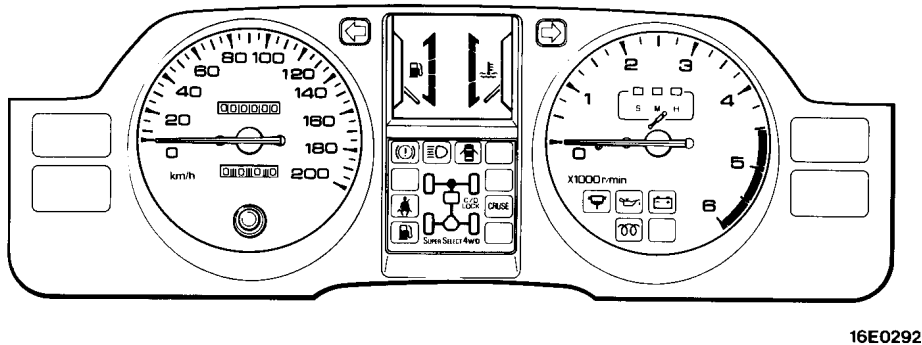
Vehicles for GCC

<Petrol-Powered Vehicles>

Vehicles without tachometer

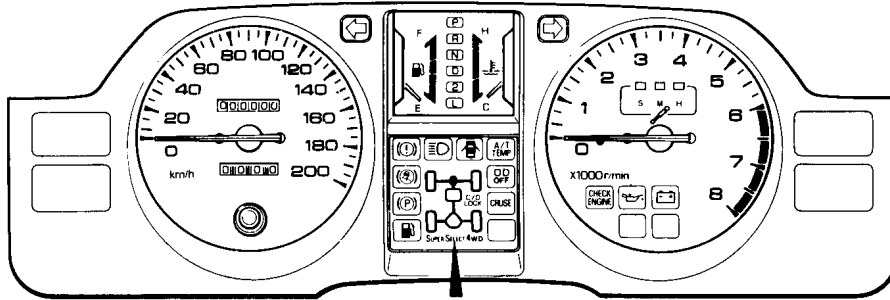


<Diesel-Powered Vehicles>



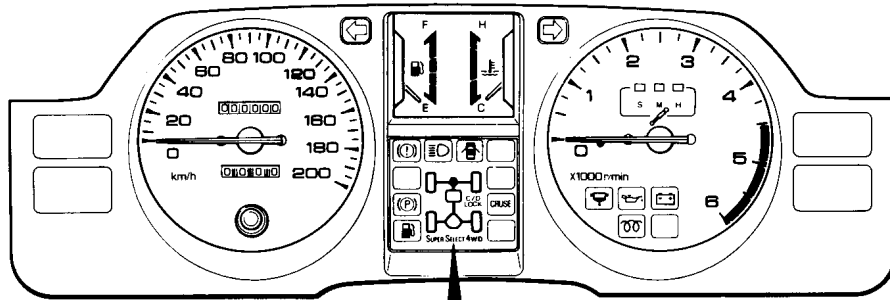
Vehicles for Australia

<Petrol-Powered Vehicles>



16E0293

<Diesel-Powered Vehicles>



16E0294

MULTI-METERS

The multi-meter board located at the top centre of instrument panel is designed for a combination of the electronic compass, inside/outside thermometer, altimeter, inclinometer, oil pressure gauge, and voltmeter. These meters and gauges are arranged as follows.

In vehicles for Europe, General Export and GCC:

- Electronic compass, inside/outside thermometer, inclinometer, altimeter

In vehicles for Australia:

- Oil pressure gauge, inclinometer, voltmeter

NOTE

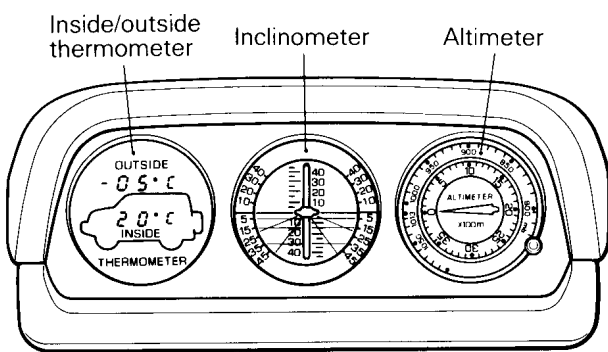
The basic structure and operating principle of the altimeter, inclinometer, oil pressure gauge and inside/outside thermometer are the same as those in the current version of PAJERO.

SPECIFICATIONS

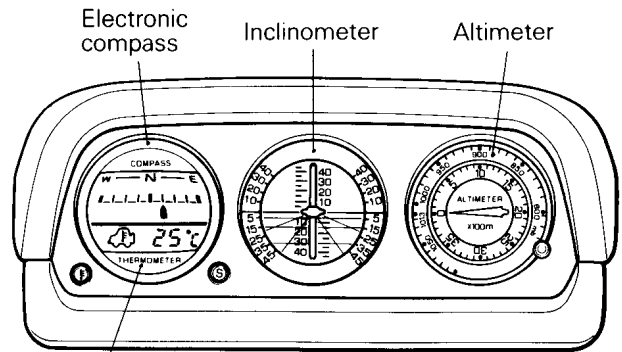
Items	Specifications
Altimeter	Aneroid type
Inclinometer	Gravity sensing type
Inside/outside thermometer	Temperature sensing type
Electronic compass	Terrestrial magnetism sensing type
Oil pressure gauge	Bimetal type
Oil pressure gauge unit	Bimetal type
Voltmeter	Bimetal type

STRUCTURAL DIAGRAM

<Vehicles for Europe, General Export and GCC>



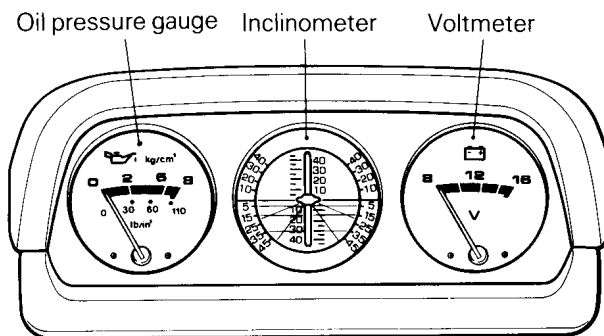
16E0164



Inside/outside thermometer

16E0165

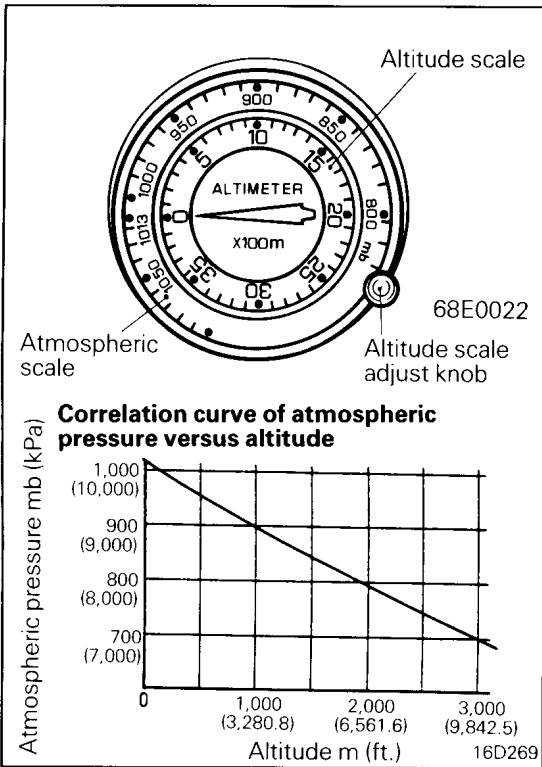
<Vehicles for Australia>



16E0166

ALTIMETER

The altimeter can indicate an atmospheric pressure at the current location on a principle of proportional relationship between altitude above ground level (above sea level) and atmospheric pressure. The atmospheric pressure scale is provided around the altitude scale for ease of reading.



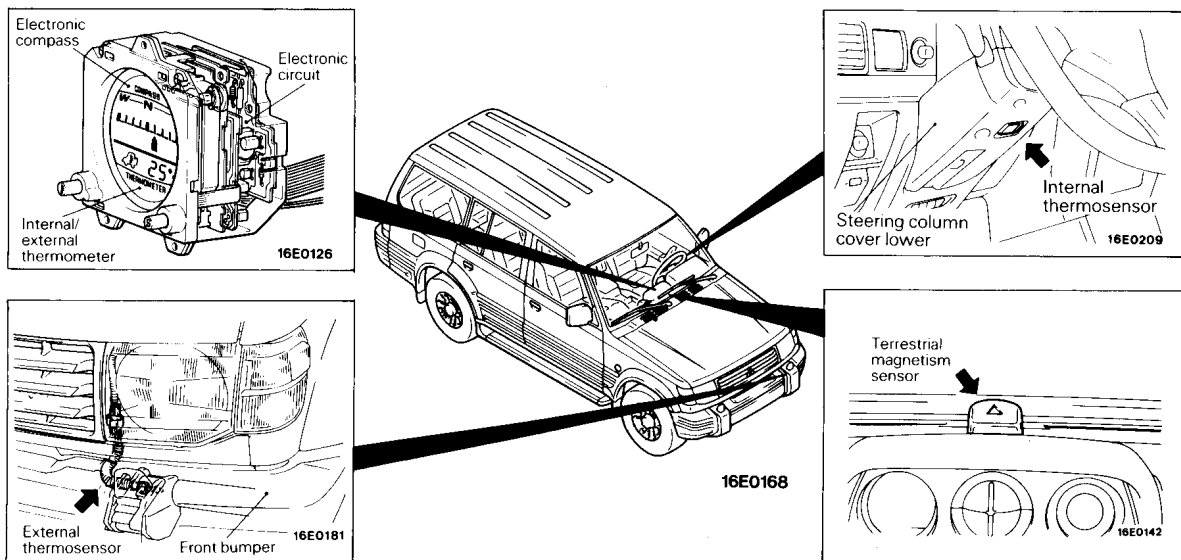
ELECTRONIC COMPASS AND INTERNAL/EXTERNAL THERMOMETER

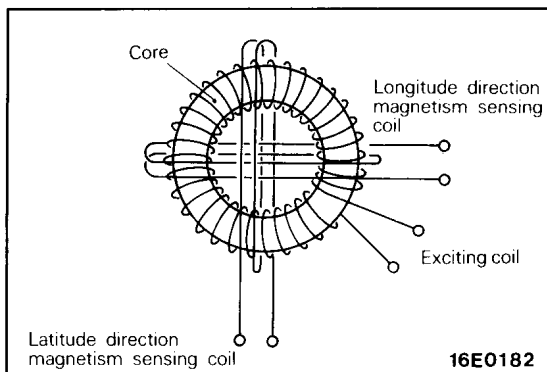
The electronic compass detects terrestrial magnetism components in the longitude and latitude directions of the vehicle, using the terrestrial magnetism sensor. The detected magnetism components are computed through the electronic circuit, and the current azimuth is indicated on the LCD in increments of 1/16 bearing angles. The major features of the electronic compass are as follows.

- Azimuth changeover indication (north-south switching) for ease of recognizing the driving direction of vehicle.
- Excellent response characteristic, and high accuracy of indication.
- Body magnetization correcting function to readily offset for an error due to magnetization on the body of vehicle.
- Declination correcting function for ready adjustment against deviation in the electronic compass with respect to the azimuth on map.

The internal/external thermometer receives temperature data from the internal or external thermosensor and carries out computation on temperature data. The internal/external temperature is thus indicated on the LCD. With the internal/external temperature select switch, the driver can read the internal or external thermometer indication.

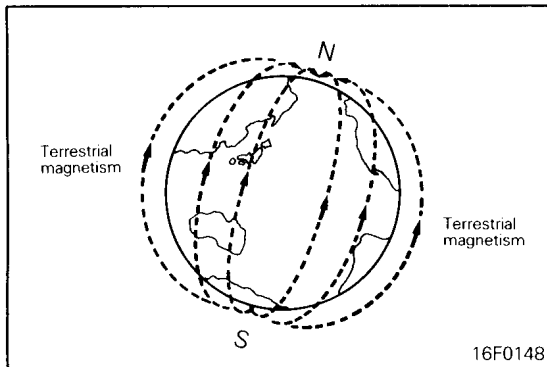
System Structural Diagram





TERRESTRIAL MAGNETISM SENSOR

The terrestrial magnetism sensor is of a flux gate type in which the exciting coil, longitudinal direction magnetism sensing coil, and latitudinal direction magnetism sensing coil are wound around the strong magnetic core ring.

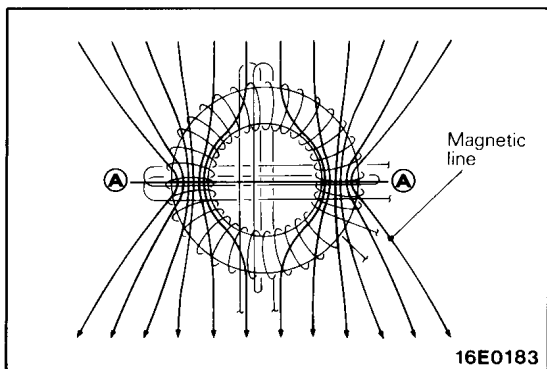


Terrestrial Magnetism

The earth can be regarded as an enormous magnet, and the magnetic field produced around it is known as terrestrial magnetism. In principle, the terrestrial magnetic lines are oriented from south to north, but the intensity of terrestrial magnetism is far weaker than an ordinary magnet. At some locations, the direction and intensity of terrestrial magnetism vary significantly.

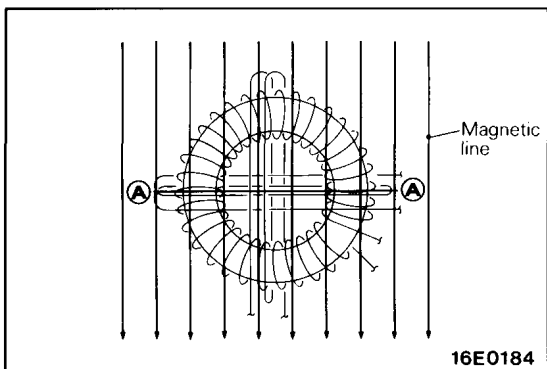
NOTE

The terrestrial magnetism tends to be disturbed particularly at such places as tunnel, railway crossing, area along railway, elevated road, urban area crowded with high-storied buildings, area above subway, etc.



Operating Principle

(1) When current is not applied to the exciting coil, the magnetic lines across the surrounding space having high magnetic resistance are bent toward the strong magnetic core. In this state, the density of magnetism passing through the A - A sensing coil is increased.

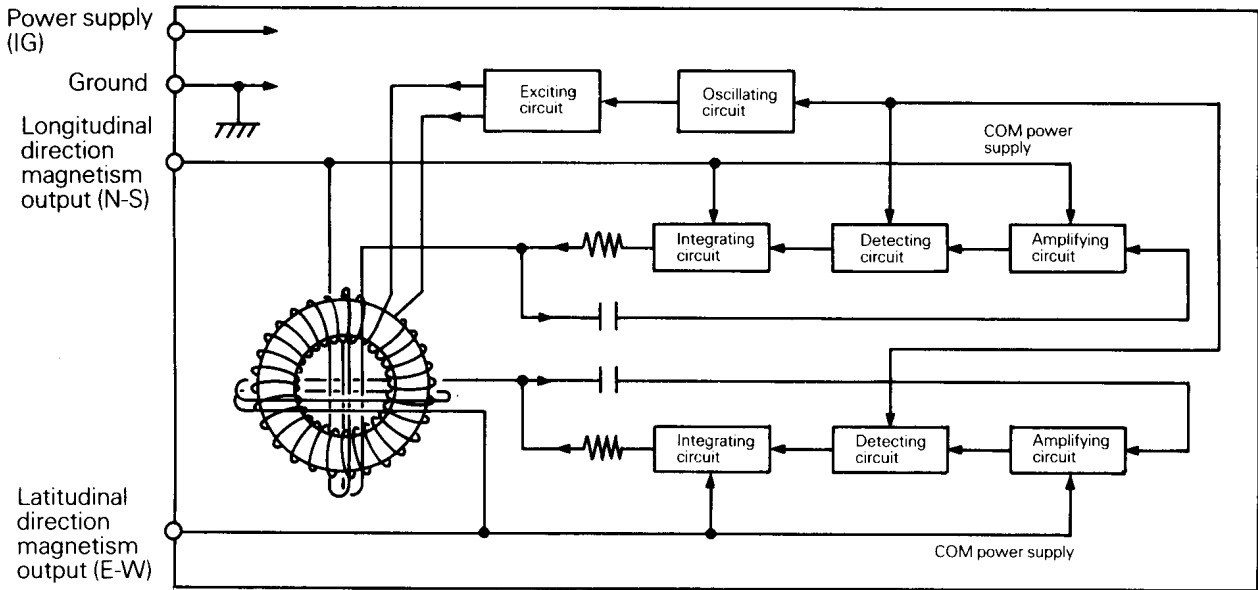


(2) When current is applied to the exciting coil, the magnetism in the strong magnetic core is increased to its saturation level. In this state, the magnetic resistance of the strong magnetic core is almost equal to that of the surrounding space (with respect to the external condition). The surrounding magnetic lines can hence go straight without being bent toward the strong magnetic core. This reduces the density of magnetism passing through the A - A sensing coil.

(3) The magnetism passing through the A - A sensing coil changes its state repetitively, i.e. the above steps (1) and (2) are repeated cyclically. Thus, the density of magnetism is altered continuously for converting minuscule terrestrial magnetism (DC characteristic) into AC form.

(4) The minuscule magnetism converted to have AC characteristic is detected as AC signal through the $\text{A} - \text{A}$ sensing coil. Then, the AC signal is subjected to the amplifying and detect-

ing circuits, and the DC signal output is delivered through the integrating circuit for distinctive indication of terrestrial magnetism.



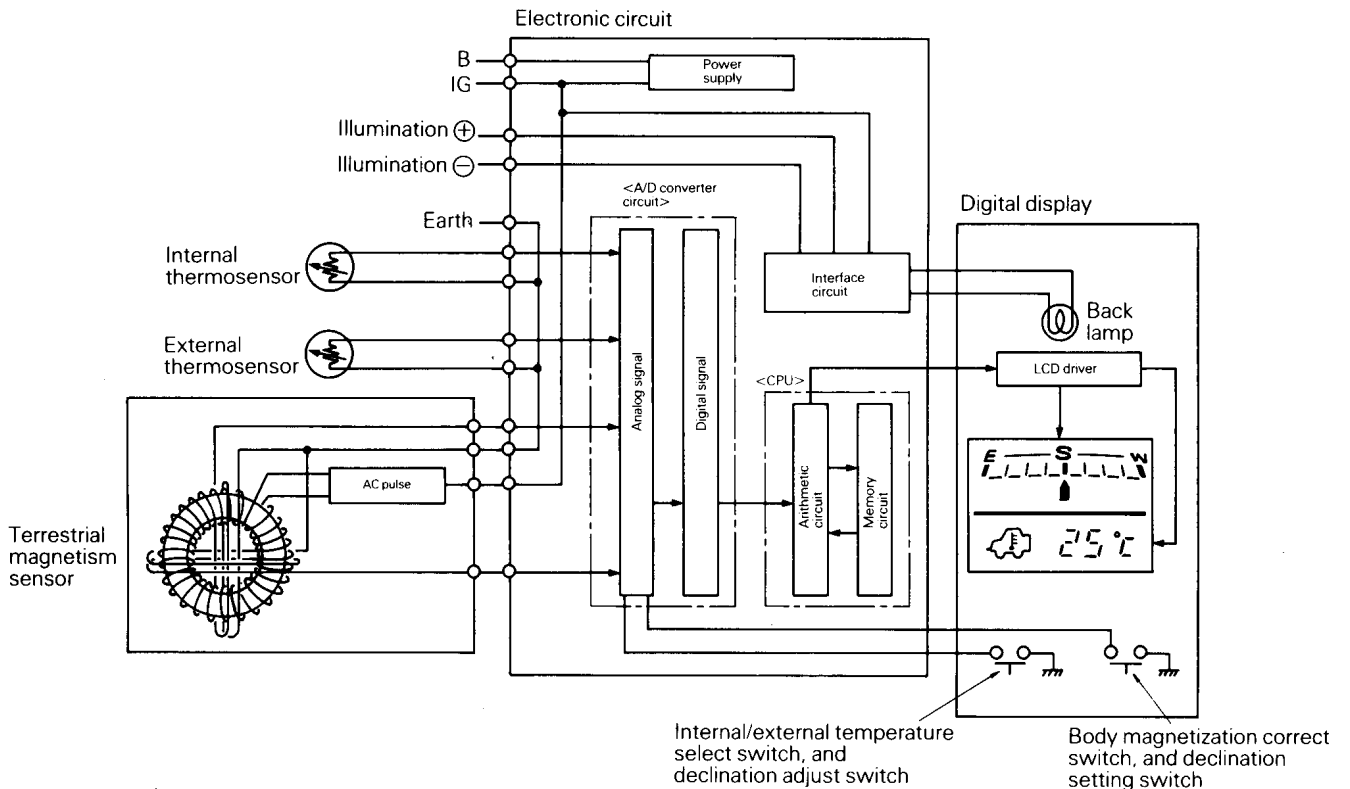
16E0187

ELECTRONIC CIRCUIT

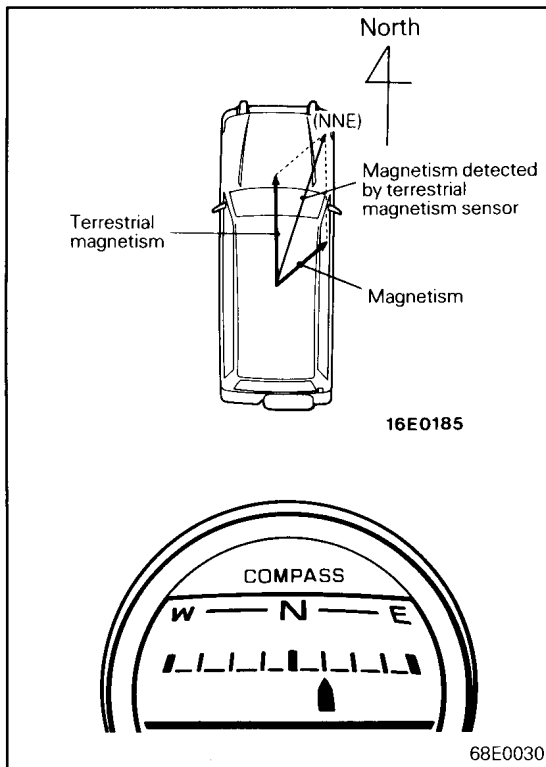
Operating Principle

Receiving the temperature data from the internal/external thermosensors or the DC signal output from the terrestrial magnetism sensor (longitudinal/latitudinal direction magnetism output), the electronic circuit carries out analog-to-digital conversion

(A/D converter circuit). The digital signal thus attained is subjected to the arithmetic circuit of CPU, and the result of computation is indicated on the LCD. Further, the interface function for reducing LCD illumination is provided for improvement in visibility at nighttime.



16E0186

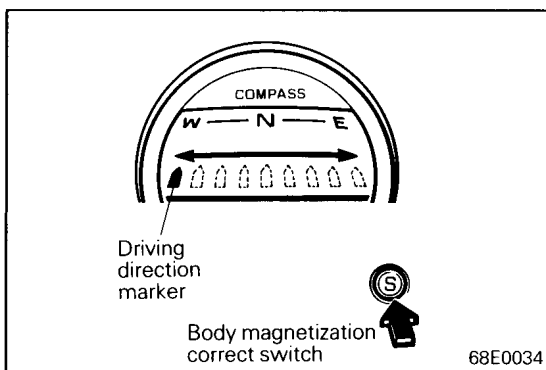


BODY MAGNETIZATION CORRECTING FUNCTION

The magnetism of the vehicle body mainly consisting of steel, which is likely to bear strong magnetism, varies depending on the driving condition. This may cause deviation from the exact azimuth of magnetism. For instance, if the body of vehicle is magnetized, the terrestrial magnetism sensor detects a vector consisting of magnetism of body and terrestrial magnetism, causing deviation from the exact azimuth. The body magnetism correcting function is provided to compensate for an effect due to magnetism of vehicle body.

Procedural instruction for correcting magnetism of vehicle body

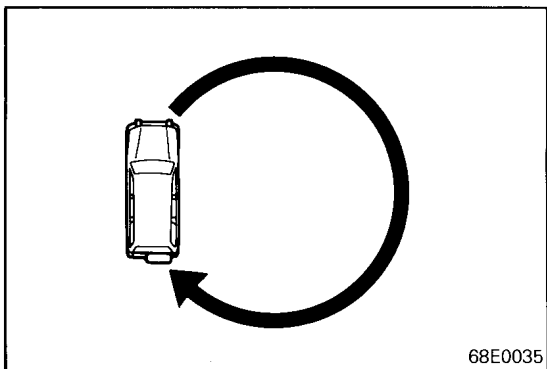
- (1) Press the body magnetism correct switch for more than 0.5 sec. The driving direction marker disappears from the current position, and it shifts left/right on an increment-by-increment basis.



- (2) Turn the vehicle through 360° slowly. This completes magnetism correction automatically.

NOTE

For magnetism correction, the vehicle may be turned clockwise or counterclockwise.

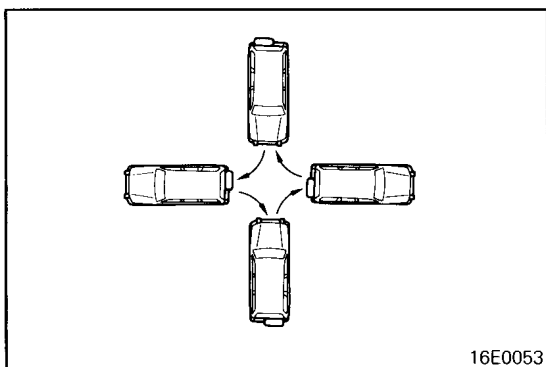


- (3) If the place is too small to turn the vehicle through 360°, give a full turn by repetition of changing its direction at right angle with forward/backward movement.

NOTE

For magnetism correction, the vehicle may be angled clockwise or counterclockwise.

- (4) On completion of magnetism correction, the driving direction marker appears at the exact position.



DECLINATION CORRECTING FUNCTION

The north on map deviated from that on compass (magnetic north) due to axial tilt of the earth. The declination correcting function is provided to compensate for this error over a range from 20° west to 20° east in increments of 5°.

Procedural instruction for correcting declination

<Example>

In case that the north on compass (magnetic north) has deviation of 5° toward west from the north on map:

- (1) Press the declination adjust switch and the declination setting switch at the same time for 1 to 2 seconds. The north direction indication (W-N-E), scale and driving direction marker come on, and 22.5° graduation on scale is changed to 5° graduation.

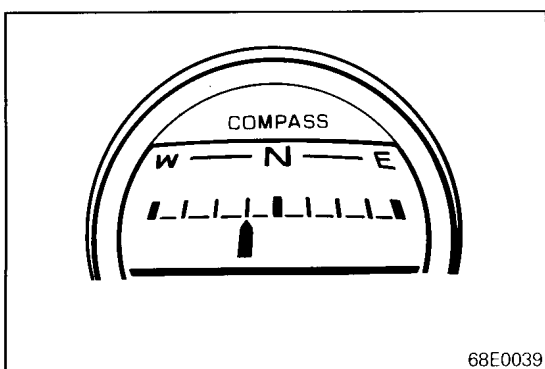
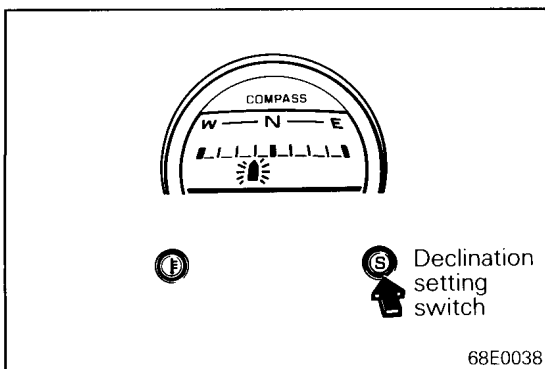
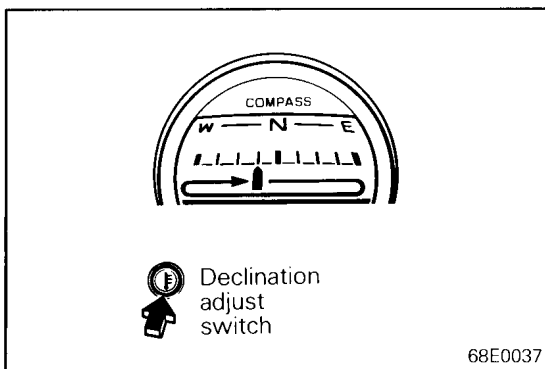
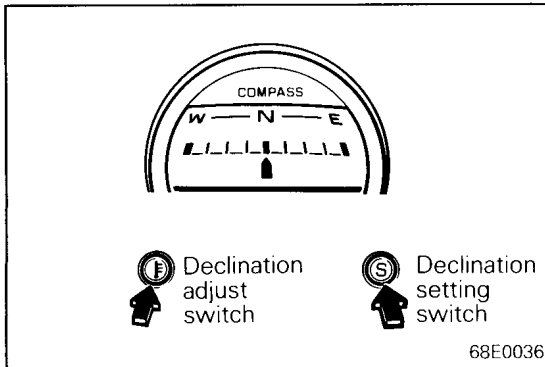
- (2) Each press of the declination adjust switch causes the driving direction marker to shift from left to right in increment of each graduation. Hold down this switch until the driving direction marker reaches the 5° west position.

NOTE

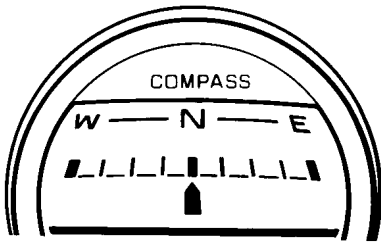
By holding down the declination adjust switch, the driving direction marker shifts continuously. It stops immediately when releasing the declination adjust switch.

- (3) Press the declination setting switch for 1 to 2 seconds. Then, the driving direction marker blinks at the currently stopped position.

- (4) The driving direction marker becomes lit steadily from blinking. This completes correction of declination.

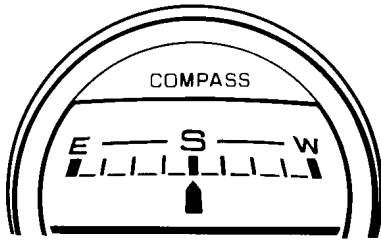


The vehicle is oriented to north.



68E0036

The vehicle is oriented to south.



68E0033

AZIMUTH CHANGEOVER INDICATION (NORTH-SOUTH SWITCHING)

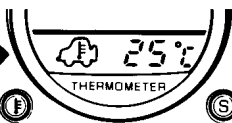
The vehicle driving azimuth indication is automatically toggled between the north azimuth indication (driving toward north) and the south azimuth indication (driving toward south) as the driving direction of vehicle is changed.

External temperature indication



68E0030

Internal temperature indication



Internal/external temperature select switch

68E0031

INTERNAL/EXTERNAL TEMPERATURE SELECT SWITCH

The internal/external temperature indication can be chosen by the internal/external temperature select switch.

WIPERS AND WASHERS

The windshield wiper/washer is available in two types; time-fixed intermittent wiper, and time-variable intermittent wiper. The features of windshield wiper/washer are as follows.

- The mist wiper function is provided to increase usability.
- The washer of 2-nozzle 4-jet type is employed, and the washer tank is mounted between the fender and its shield at the front left position.
- The wiper/washer switch is incorporated in the column switch, and it can be made active with the ignition switch turned at "ACC" or "ON".

The rear wiper/washer of time-fixed intermittent type is adopted. This leads to improvement in rearviewing during driving in rain.

The features of rear wiper/washer are as follows.

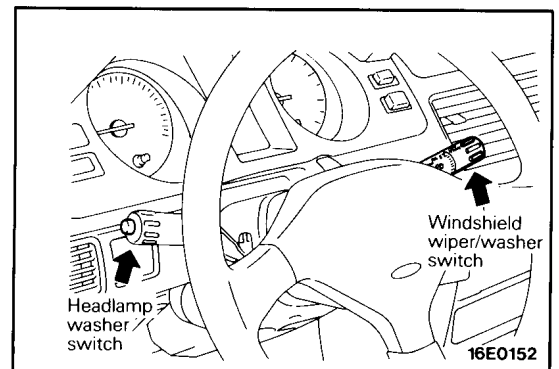
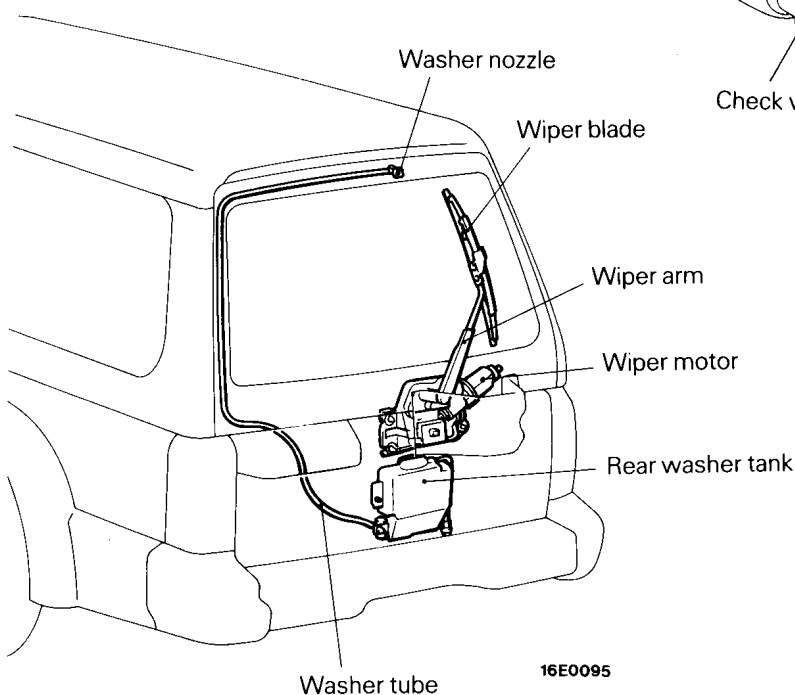
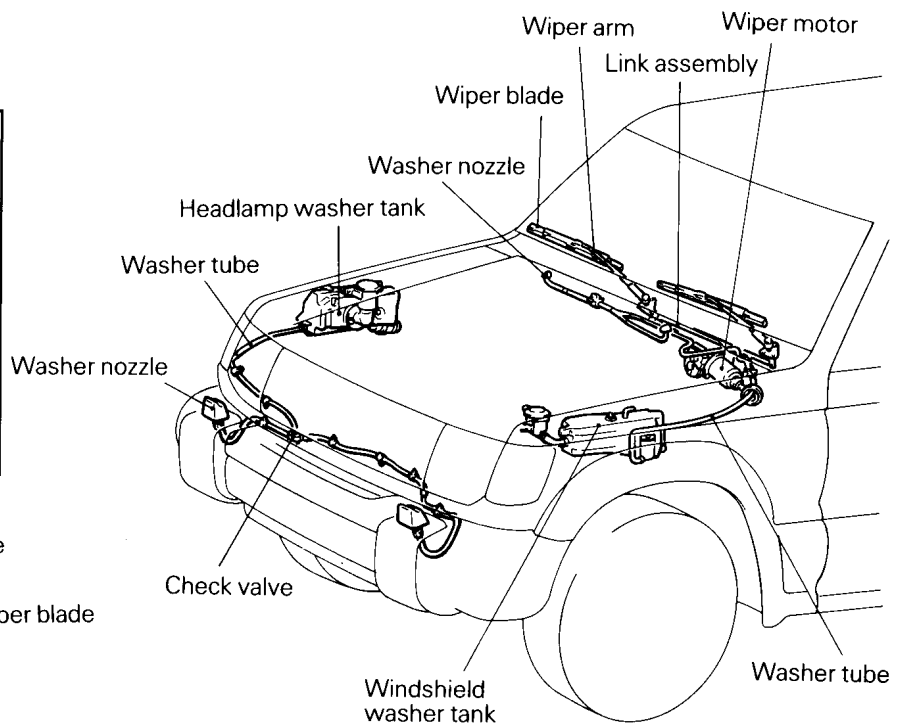
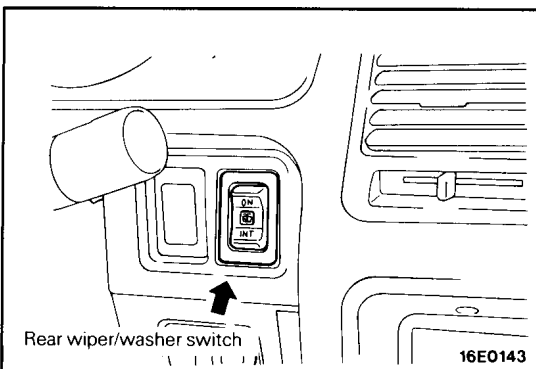
- The washer of 1-nozzle 2-jet type is employed, and the washer tank is mounted at the centre of back door.

- The wiper/washer switch can be made active with the ignition switch turned at "ACC" or "ON".

The headlamp washer is equipped to remove dirt or dust from the surface of headlamp lens. This leads to improvement in safety during driving at night-time. The features of headlamp washer are as follows.

- The washer of 2-nozzle 4-jet type is employed. High-pressure washing solution is jetted through the left and right nozzles (connected with the tube and check valve). The washer tank is mounted between the fender and its shield at the right front position.
- The headlamp washer switch is incorporated in the column switch, and it can be made active with the ignition switch turned at "ON" and the lighting switch turned at "TAIL" or "HEAD".

STRUCTURAL DIAGRAM



AUDIO SYSTEM

The radio, cassette player, speaker and antenna are equipped as indicated below.

Radio and cassette player

Vehicles for Europe

- LW/MW/FM electronic tuning radio with cassette player integrated type
- AM/FM electronic tuning radio with cassette player integrated type
- AM/FM electronic tuning radio (type 1)

Vehicles for General Export and GCC

- AM/FM electronic tuning radio with cassette player integrated type
- AM/FM electronic tuning radio (type 1 or type 2)
- AM electronic tuning radio
- AM/FM electronic tuning radio (type 2) with cassette player separated type <Except GCC>

Vehicles for Australia

- AM/FM electronic tuning radio with cassette player integrated type
- AM/FM electronic tuning radio (type 1)
- AM electronic tuning radio

Speaker

Vehicles for Europe

- 2-speaker (Front speaker: 10 cm (3.9 in.) double corn)
- 4-speaker (Front speaker: 10 cm (3.9 in.) double corn, rear speaker: 16 cm (6.2 in.) double corn)

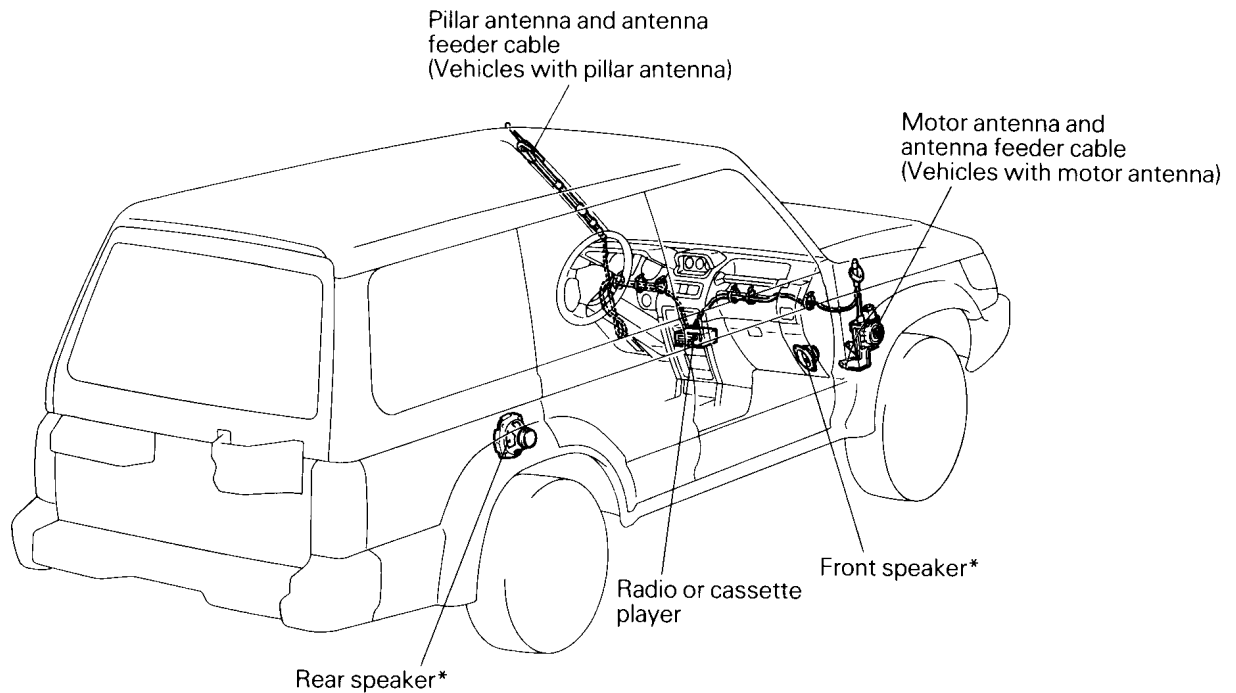
Vehicles for General Export, GCC and Australia

- 1-speaker (Front speaker – driver's side: 10 cm (3.9 in.) single corn)
- 2-speaker (Front speaker: 10 cm (3.9 in.) double corn)
- 4-speaker (Front speaker: 10 cm (3.9 in.) double corn, rear speaker: 16 cm (6.2 in.) double corn)

Antenna

- Pillar antenna [Entire length: 700 mm (27.5 in.)]
- Motor antenna [Entire length: 900 mm (35.4 in.)]

STRUCTURAL DIAGRAM



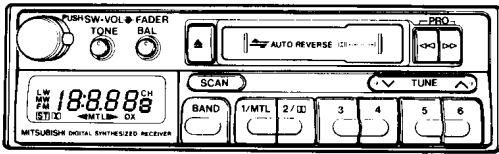
16E0136

NOTE

The broken line indicates the feeder cabling for pole antenna.

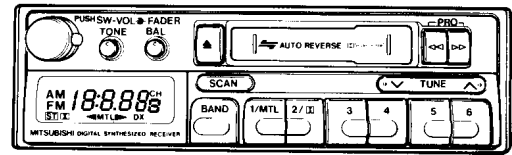
The asterisk mark (*) means that the same item is provided on the left side also.

LW/MW/FM electronic tuning radio with cassette player integrated type



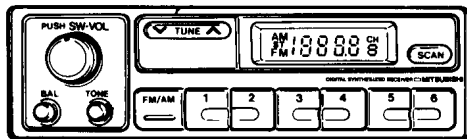
16N0598

AM/FM electronic tuning radio with cassette player integrated type



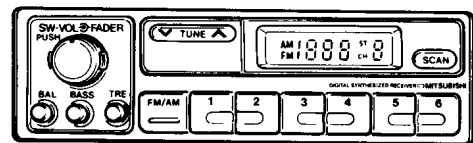
16N0597

AM/FM electronic tuning radio (type 1)



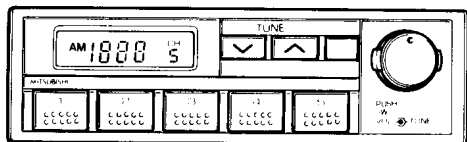
16E0162

AM/FM electronic tuning radio (type 2)



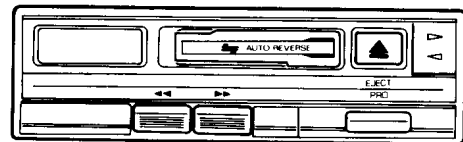
70P0068

AM electronic tuning radio



16E0161

Cassette player separated type



16E0163

ACCESSORY SOCKET

E9FPAAA

The accessory socket is equipped at each of the front and rear seats. Having a maximum load rating of 120 W, this plug-in type socket is usable for supplying power to an accessory device or inspection lamp.

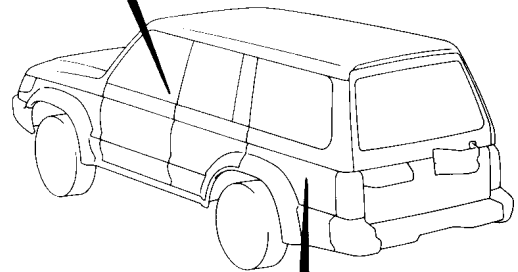
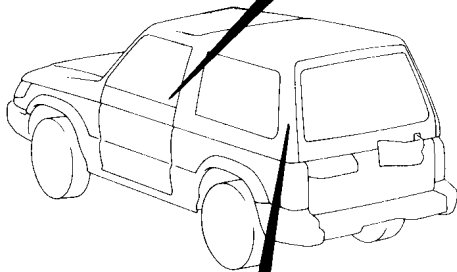
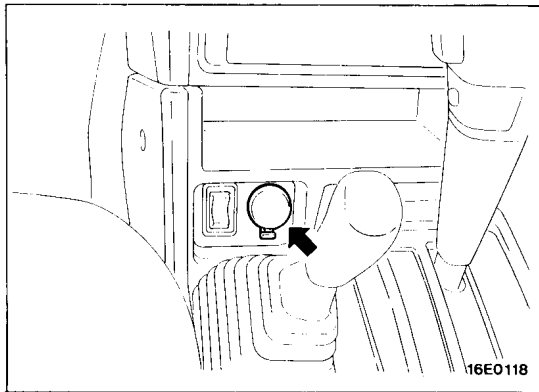
tion lamp.

NOTE

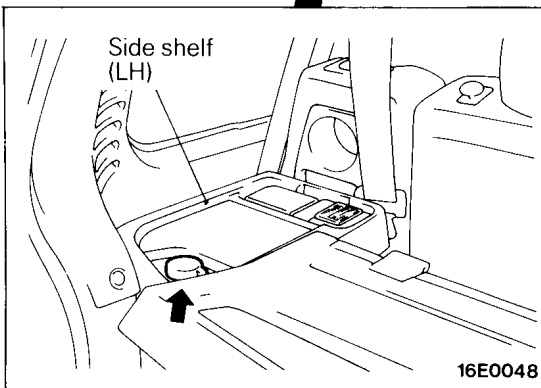
For the inspection lamp, see P.7-13.

STRUCTURAL DIAGRAM

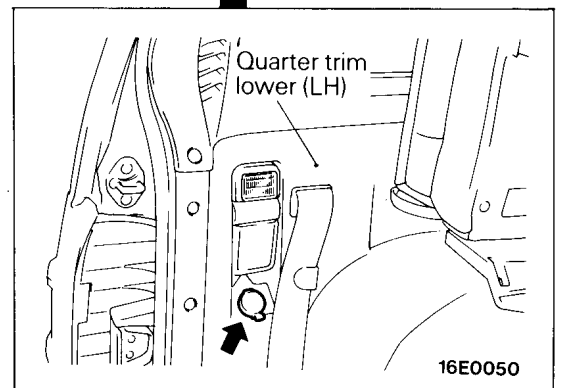
<Front seat>



<Rear seat – Standard wheelbase>



<Rear seat – Long wheelbase>



HEATERS AND AIR CONDITIONING

E9FICAA

GENERAL INFORMATION

The front heater is of a three-way-flow full-air-mix type that is excellent in temperature control response characteristic. With this heater, the cool air bypassing function is available for preventing a rush of blood to the person's face in the FOOT, FOOT/DEF., or DEF. mode.

The rear heater of air-mix type is employed which enables control of blowing air temperature. The air conditioner of refrigerant-saving type is used to meet the freon restriction regulations on ozone layer preservation.

FEATURES

More comfortable environment

1. Three-way-flow full-air-mix heater employed <Front heater>
2. Air distribution system with shower foot duct arrangement
3. Cool air bypassing function incorporated in heater unit <Front heater>
4. Full-air-mix rear heater employed

Safety regarding visual field

1. Side defroster independent distribution system employed
2. Constant blowing from side ventilator

Improvement of reliability and serviceability

1. Refrigerant-saving system adopted
2. Water valve eliminated

SPECIFICATIONS

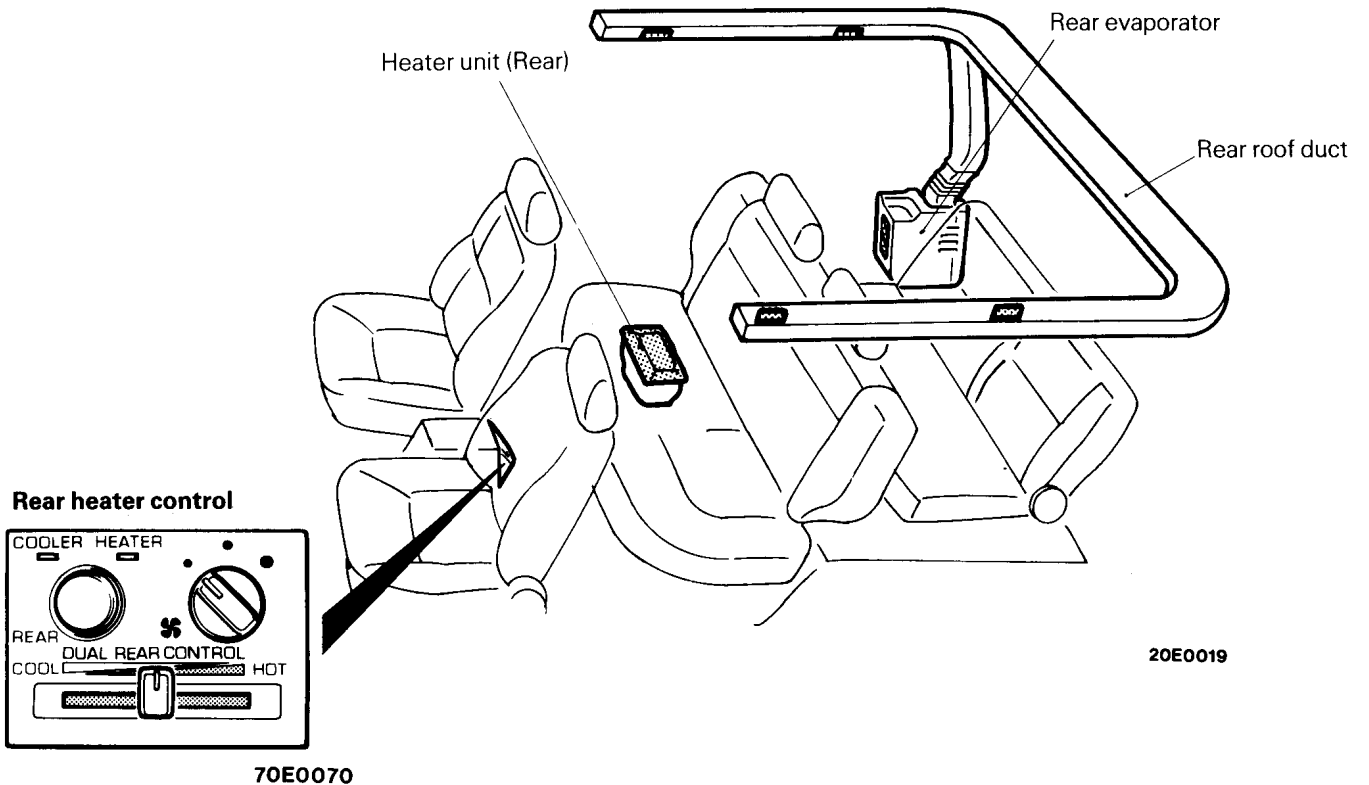
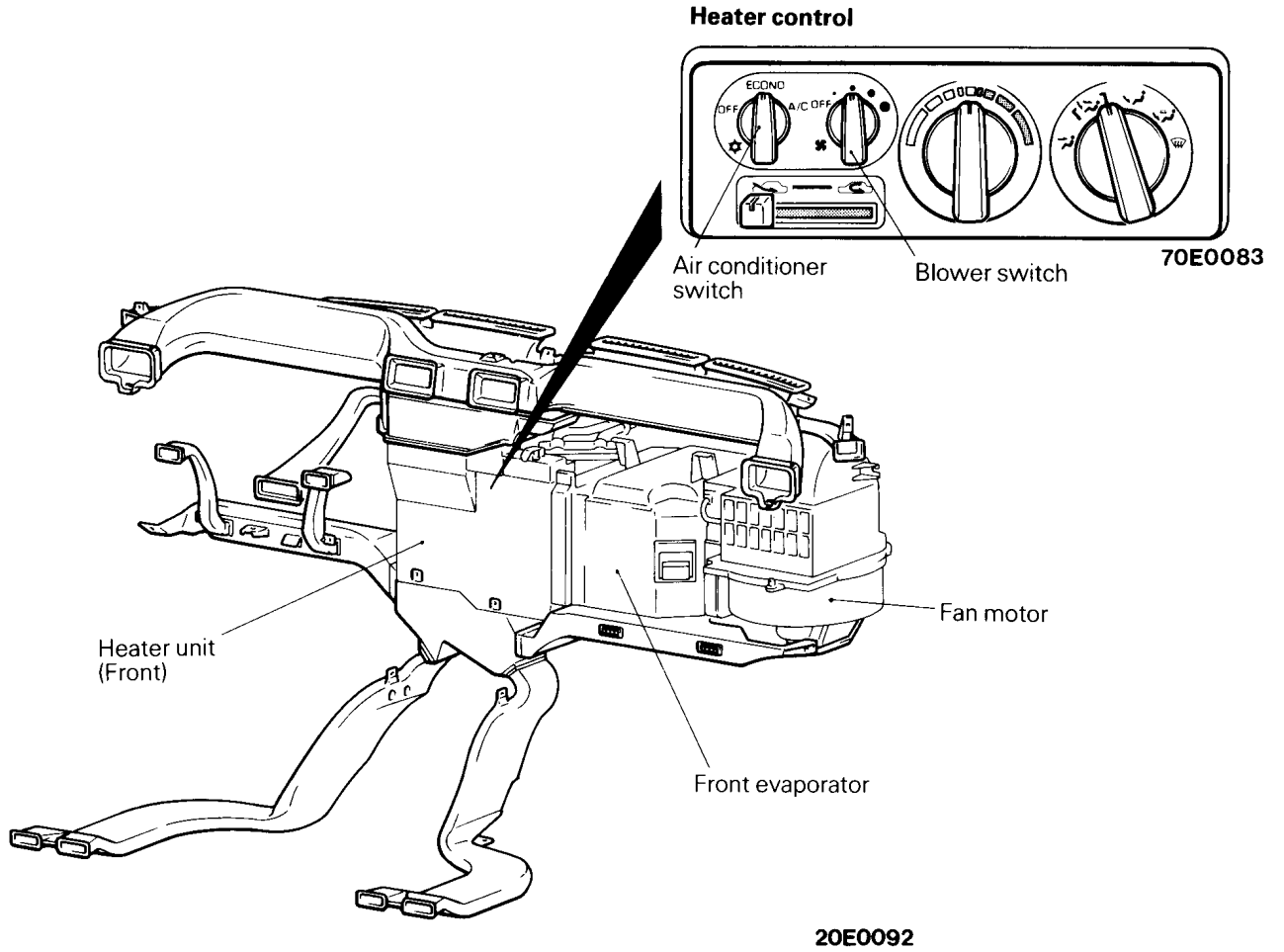
Items	Specifications
Heater unit	
Type	<Front> Three-way-flow full-air-mix system <Rear> Air-mix system
Heater control switch	Dial type
Compressor	
Model	10PA15 Inclined-plate type, 10PA17 Inclined-plate type* ¹
No. of cylinders and displacement	cm ³ (cu.in.) 10 cylinders 155.3 (9.5), 10 cylinders 177.7 (10.8)* ¹
Compressor oil	cm ³ (cu.in.) DENSO oil 6 80 ± 20 (4.88 ± 1.22) 150 ± 20 (9.1 ± 1.22)* ²
V-belt size	mm (in.) <6G72, 4D56> 920 (36.2) <4G64> 980 (38.6) <4G54> 1,390 (54.7)
Condenser	
Type	Aluminum film type
Dual-pressure switch	
High pressure switch	kPa (kg/cm ² , psi) OFF: 2,700 (27, 384) ON: 2,100 (21, 299)
Low pressure switch	kPa (kg/cm ² , psi) OFF: 200 (2.0, 28) ON: 210 (2.1, 30)
Freezer prevention (Temperature of blowing air from evaporator)	°C (°F) OFF: 3 (37) ON: 4 (39)
Refrigerant and quantity	g (oz) R-12 <Single Air Conditioner> MAX. 800 (28.22) <Dual Air Conditioner> MAX. 1,300 (45.86)

NOTE

(1) The *¹ symbol indicates vehicles for GCC with air conditioner.

(2) The *² symbol indicates vehicles with dual air conditioner.

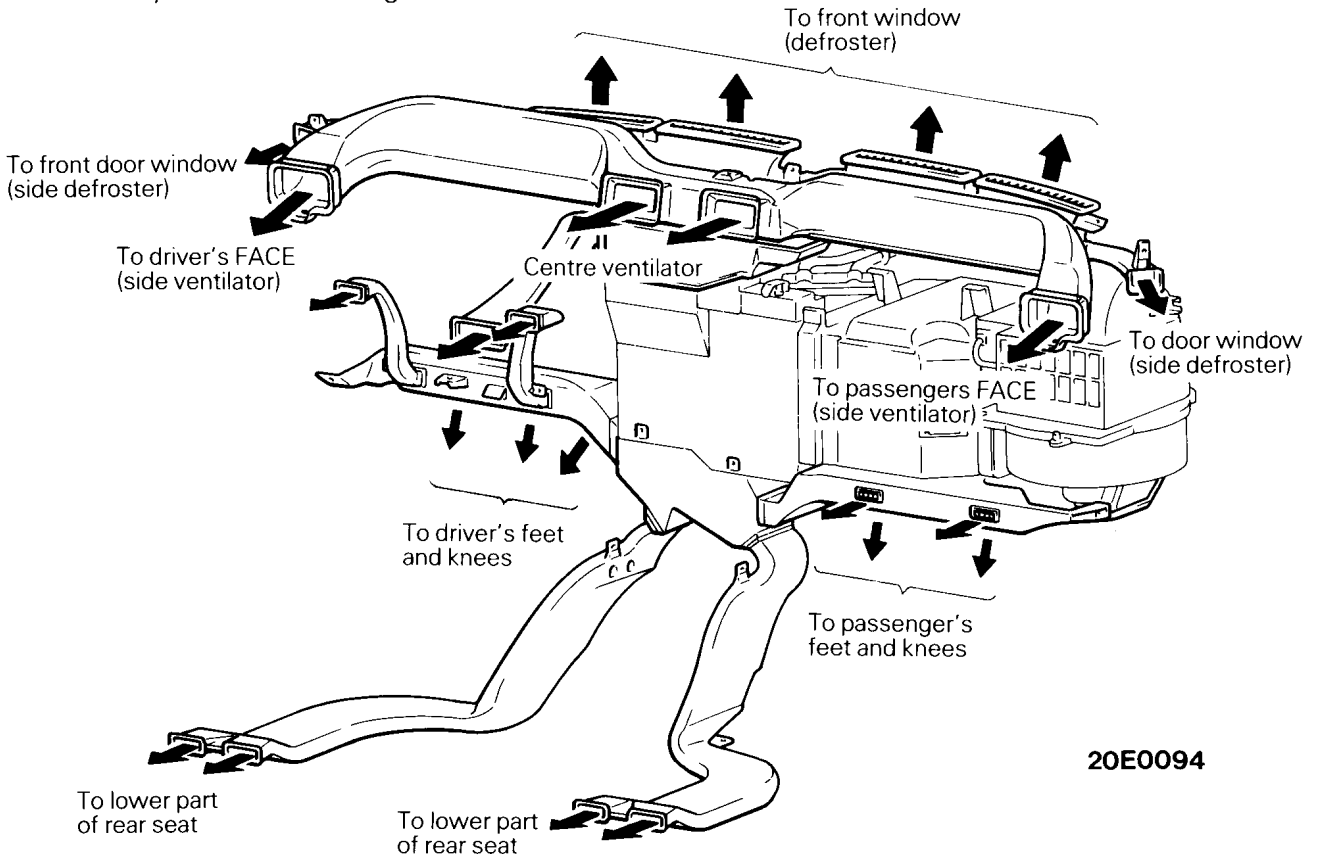
COMPONENTS



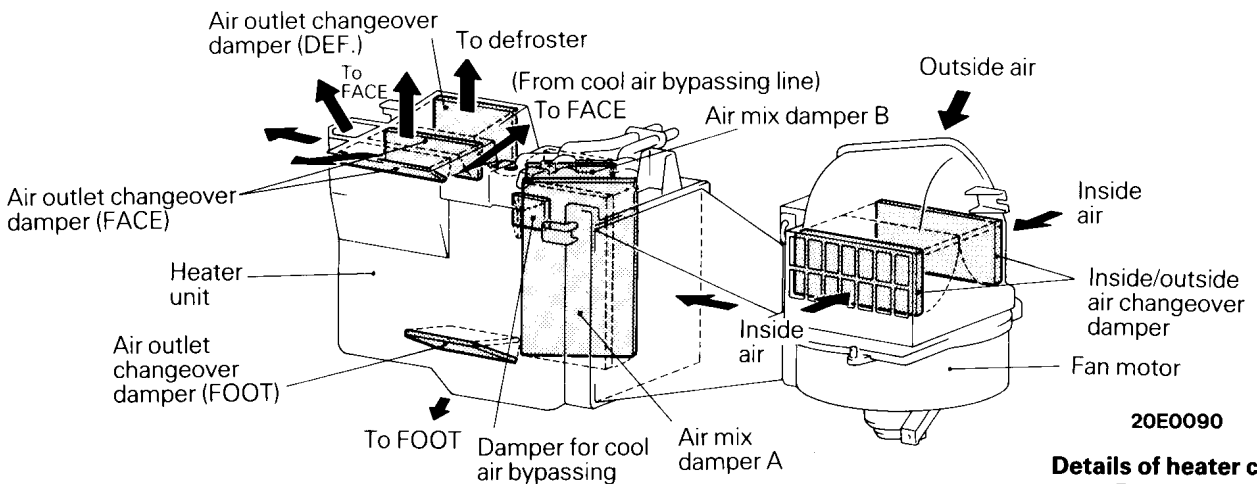
FRONT HEATER

The three-way-flow full-air-mix heater is employed which has excellent response characteristic of temperature control. Also, the prolate dimple (convex) is provided on the heater core tubing to increase efficiency of heat exchange. The cool air

bypassing system is adopted to prevent a rush of blood to the person's face in the FOOT, FOOT/DEF., or DEF. mode. To ensure safety regarding visual field, air is constantly blown from the side ventilator.

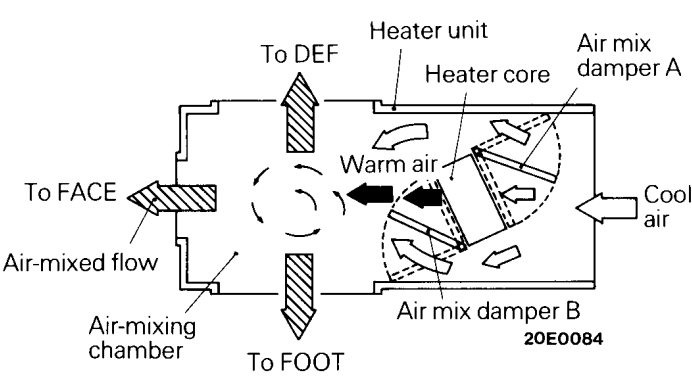


20E0094

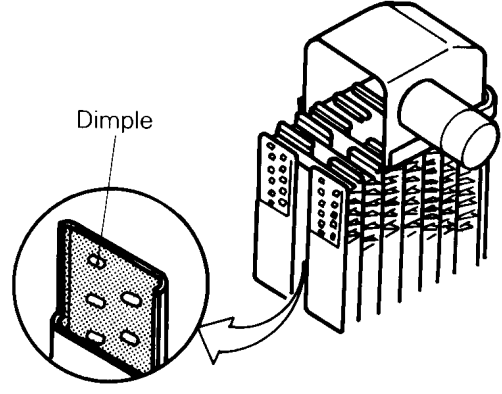


20E0090

Details of heater core



20E0084

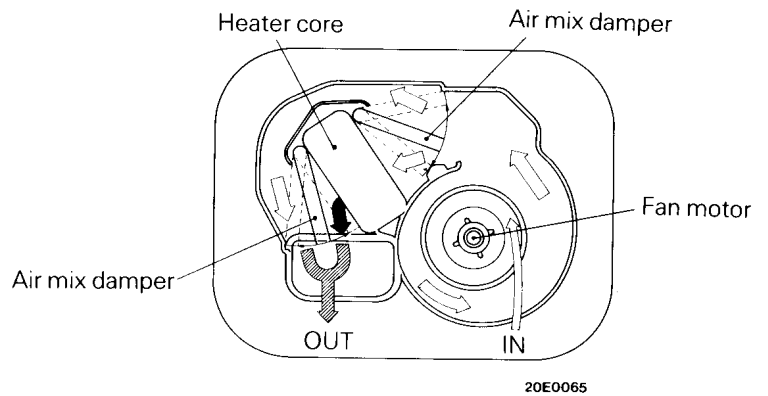
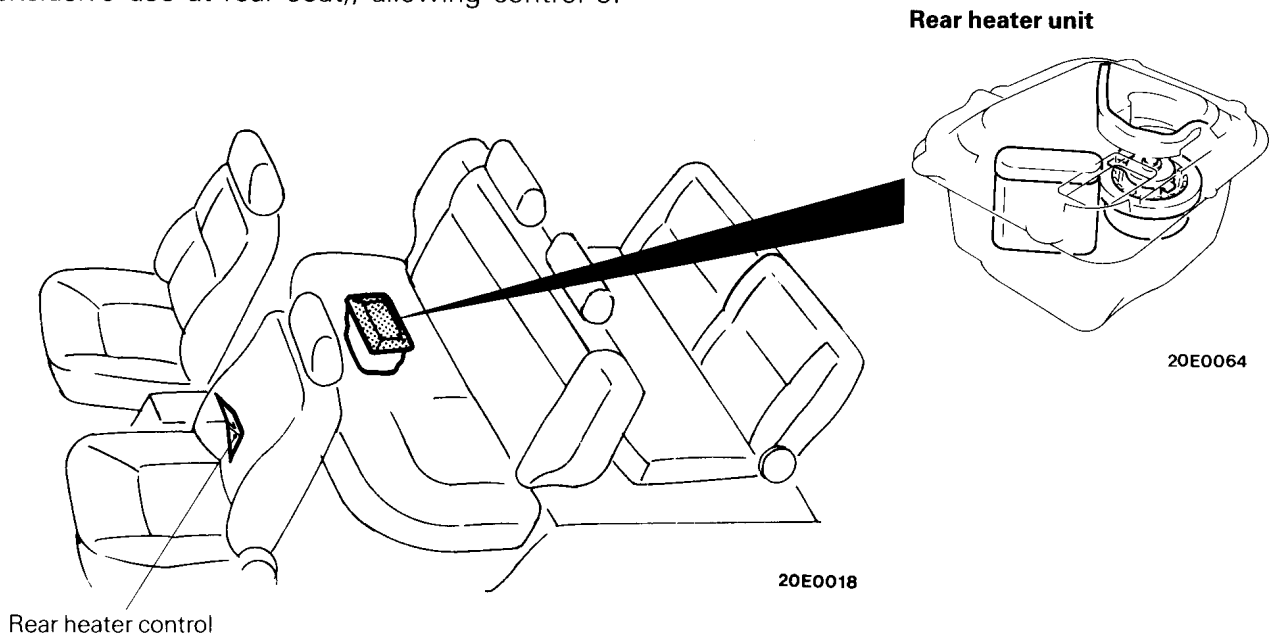


20A0137

REAR HEATER

The full-air-mix heater is built on the rear seat floor (for exclusive use at rear seat), allowing control of

the temperature of blowing air.

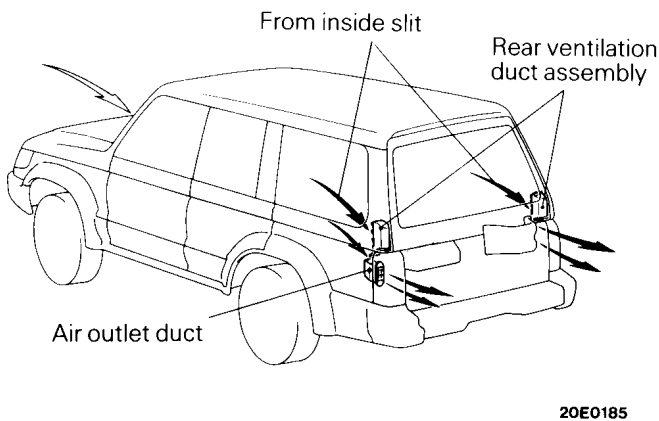


VENTILATION <AIR INLET AND AIR OUTLET>

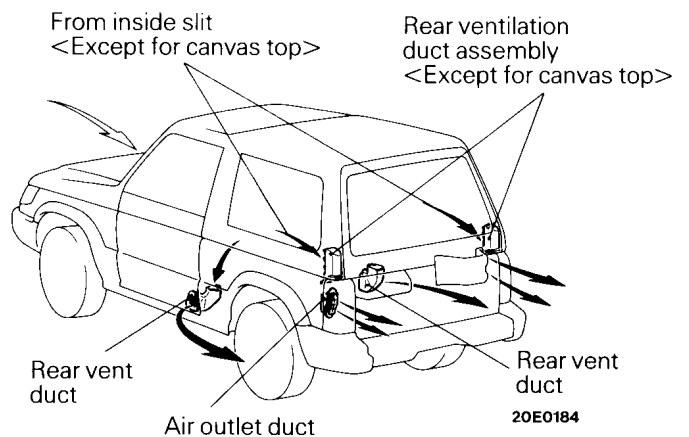
The outside air is introduced through the front deck section, and the inside air comes out through the rear combination lamp slit section and the rear door

opening <long wheelbase>. The check valve is equipped at the rear ventilation duct to prevent intrusion of wind, rain, dust, etc. from the outside.

<Long Wheelbase>

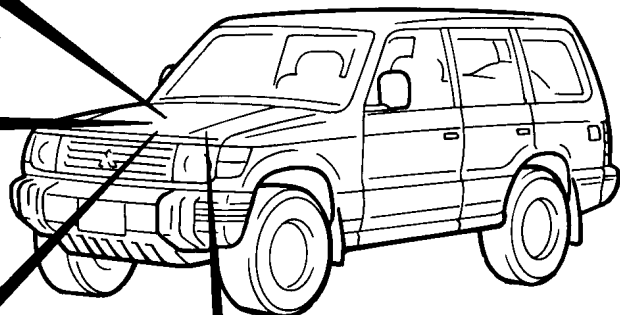
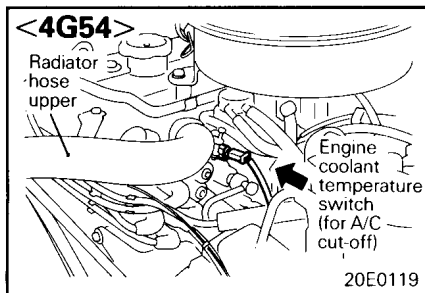
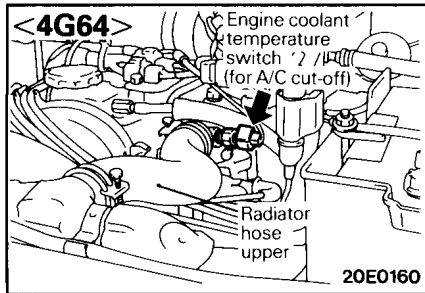
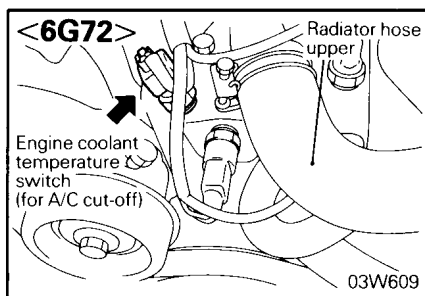
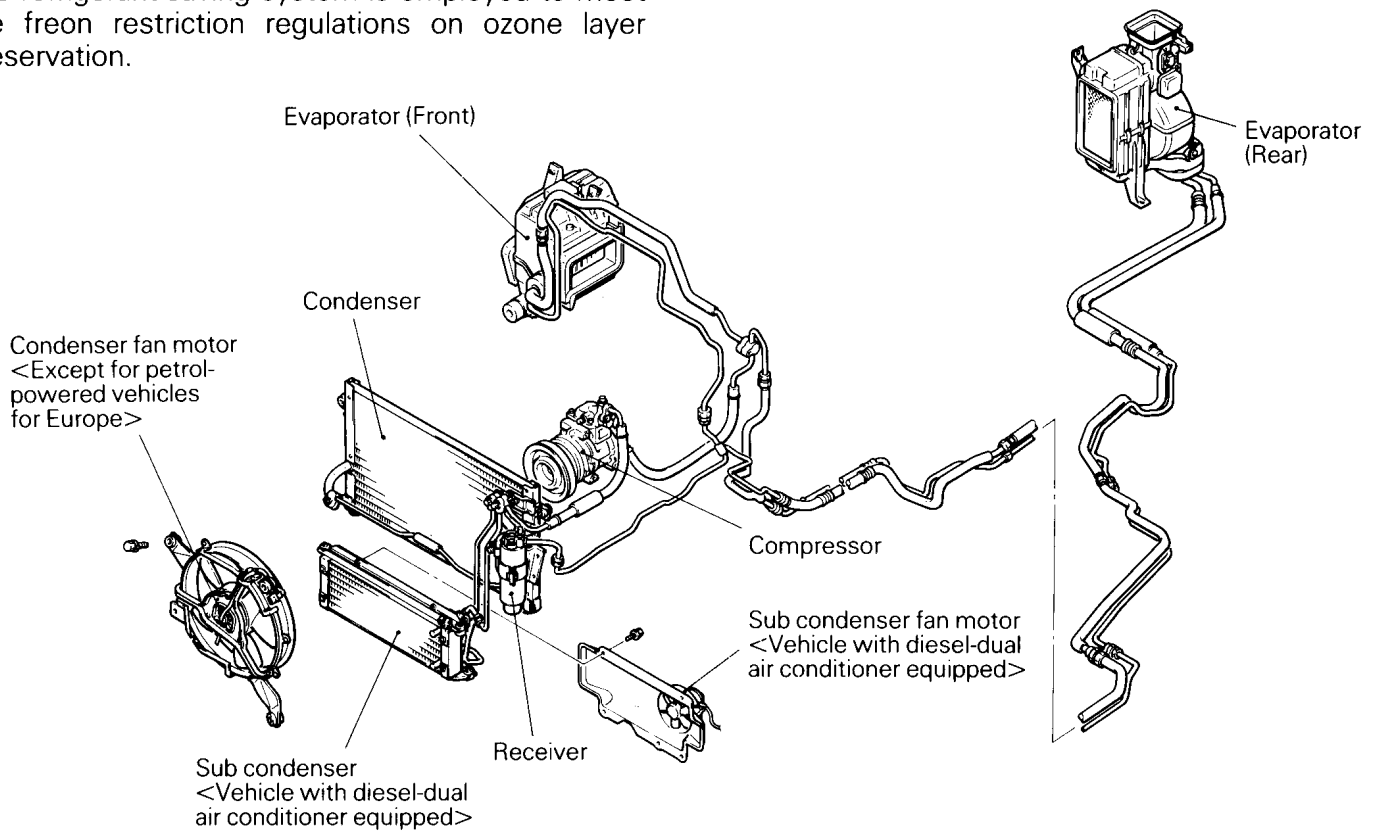


<Except for Long Wheelbase>

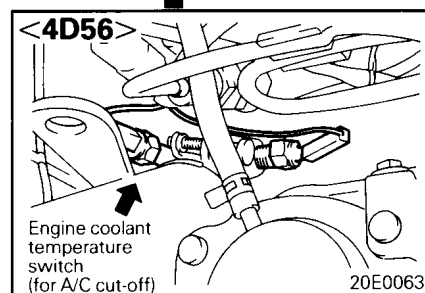


AIR CONDITIONER

The refrigerant-saving system is employed to meet the freon restriction regulations on ozone layer preservation.



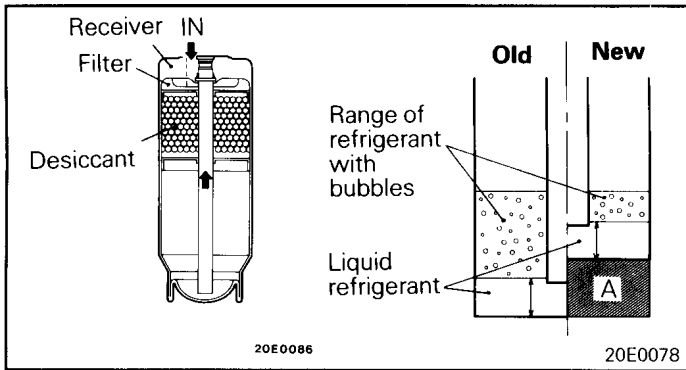
00E0020



REFRIGERANT-SAVING SYSTEM

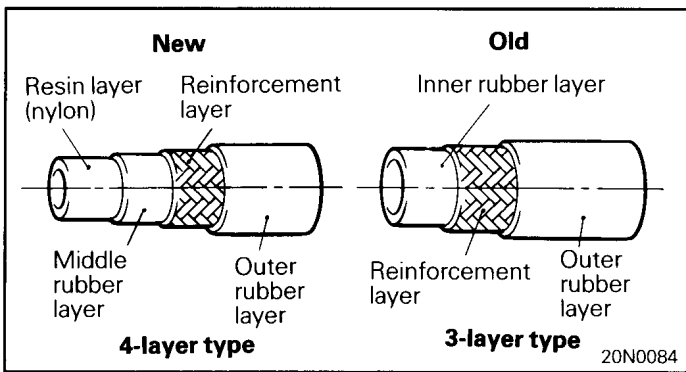
From July 1989, the consumption and production of specially designated chloro-fluoro carbon have been regulated world-wide to protect the ozone layer. Chloro-fluoro carbon R-12, used as the refrigerant in automobile air conditioners, is the object of those regulations and there is a need to control the

amount of chloro-fluoro carbon used as much as possible. To meet these regulations, the components of air conditioner are designed for realizing refrigerant-saving.



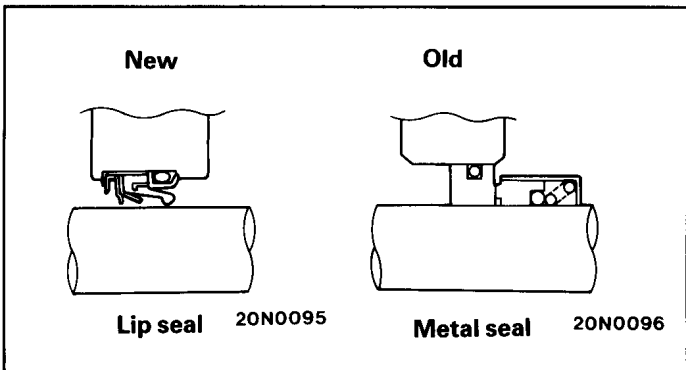
Receiver

The desiccant in the receiver is located at a position closer to the refrigerant inlet. Thereby, bubbling in the receiver can be suppressed significantly. Consequently, as shown in the figure, the range of liquid refrigerant mixed in the bubbles can be reduced. As a result, the amount of refrigerant can be reduced (Figure on the left A).



Refrigerant Line

The 3-layer type hose that was used up to now was replaced by a 4-layer type hose in order to reduce the amount of refrigerant permeated into the refrigerant line rubber hose.

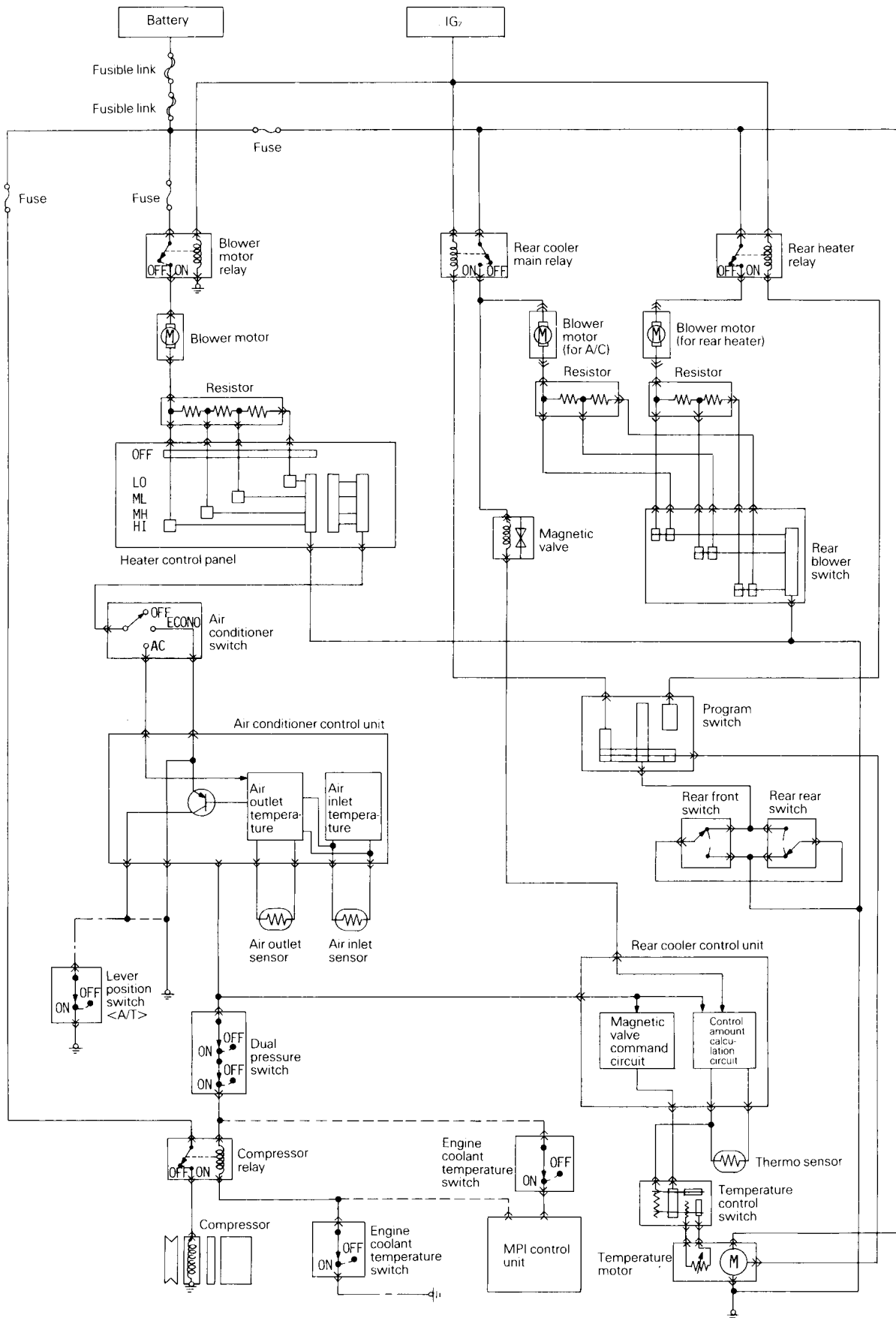


Compressor

Leakage of refrigerant from bearings has been reduced by changing the compressor bearings from metal seal to lip seal type.

COMPRESSOR CONTROL

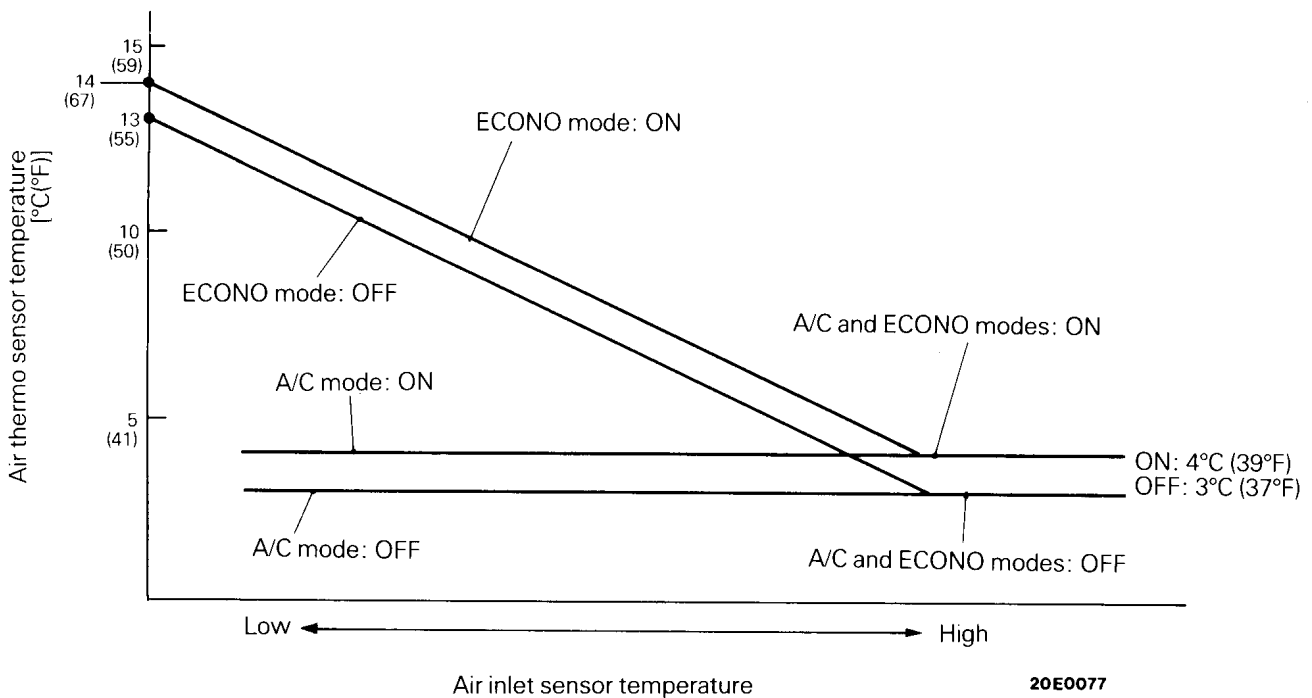
Circuit Diagram



If any one of the following switches and sensors is turned off, the magnet clutch of the compressor is turned off.

Switch and sensor	Operating condition of compressor
Blower switch	} Manual ON, OFF
Air conditioner switch	
Dual-pressure switch	} OFF at 200 (2.0, 28.4) or less, ON at 210 (2.1, 29.9) or more OFF at 2,700 (27, 384) or more, ON at 2,000 (20, 284) or less
High pressure switch	
Low pressure switch	
Engine coolant temperature switch (For air conditioner cut-off)	} OFF at 115 (239) or more, ON at 108 (226) or less OFF at 116 (241) or more, ON at 109 (228) or less
Petrol-powered vehicles	
Diesel-powered vehicles	
Air inlet sensor	} See the characteristic diagram
Air thermo sensor	

Compressor Magnet Clutch Control Characteristic Diagram



20E0077