POWER-TRANSMISSION COMPONENTS

CONTENTS

E9CAZAF

CLUTCH

E9CBAAE

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

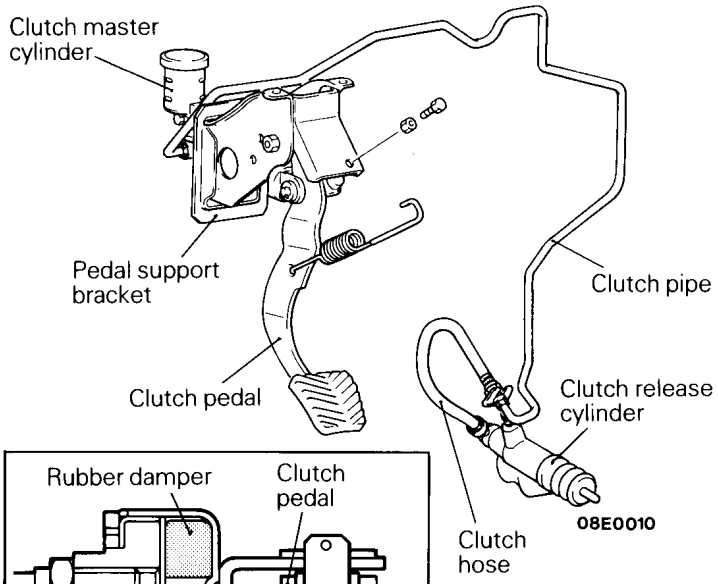
Engine	2600	2500D with turbocharger	2500D with turbocharger and inter-cooler	3000
Clutch control	Hydraulic type	Hydraulic type	Hydraulic type	Hydraulic type
Clutch disc type	Single dry disc type	Single dry disc type	Single dry disc type	Single dry disc type
Clutch disc size mm (in.)	225 x 150 (8.9 x 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)

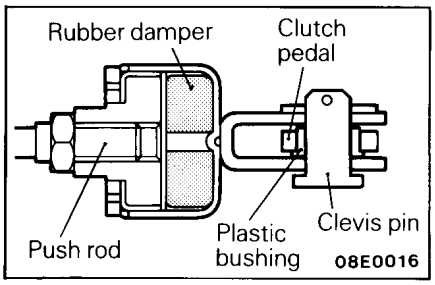
CLUTCH CONTROL

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.

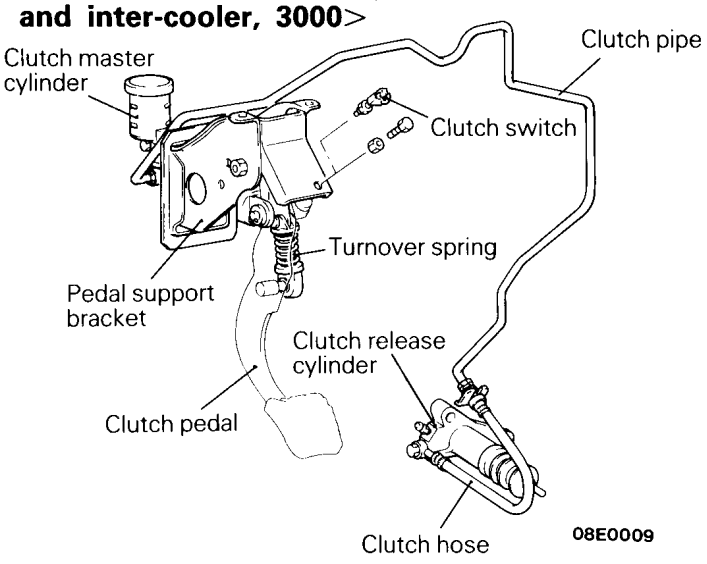
The clutch pedal of the 2500D with turbocharger, 2500D with turbocharger and inter-cooler, 3000 has a compression type turnover spring, which reduces the pressure required to operate the pedal.
The clutch switch for the auto-cruise control system has been equipped at the pedal support bracket.

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

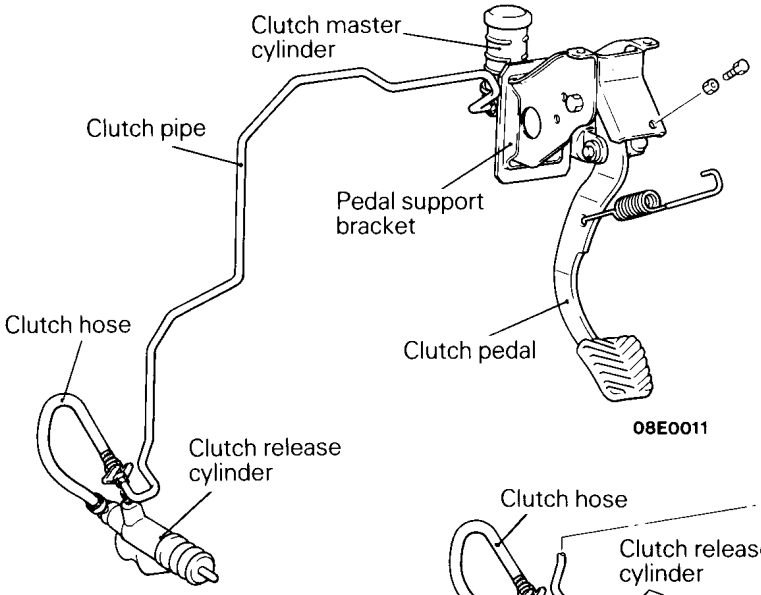




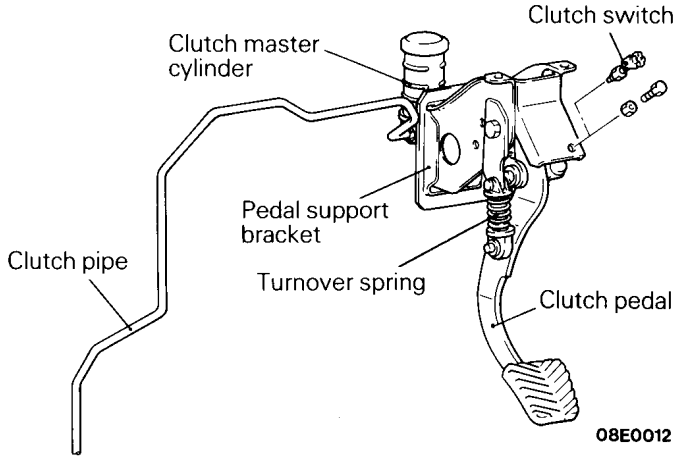
<2500D with turbocharger and inter-cooler, 3000>

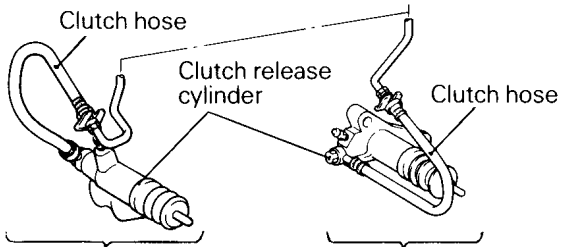


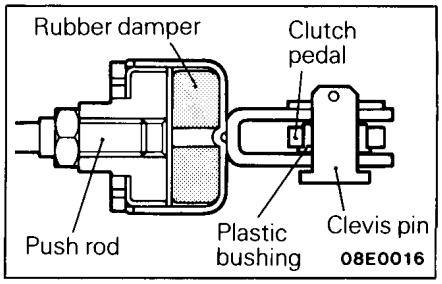
R.H. drive vehicles <2500D, 2600>



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

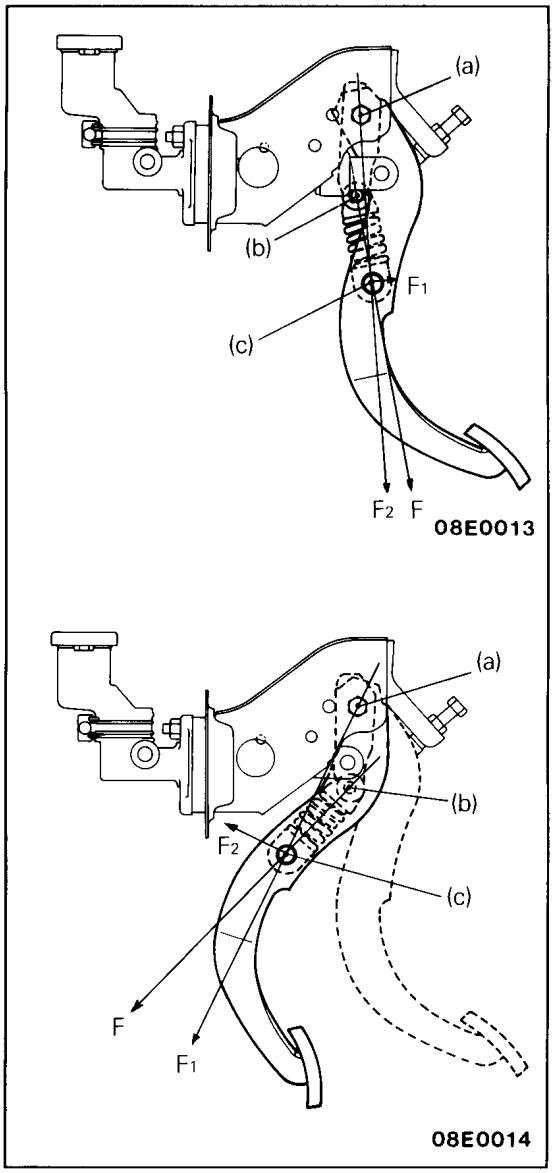






<2500D with turbocharger>

<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			

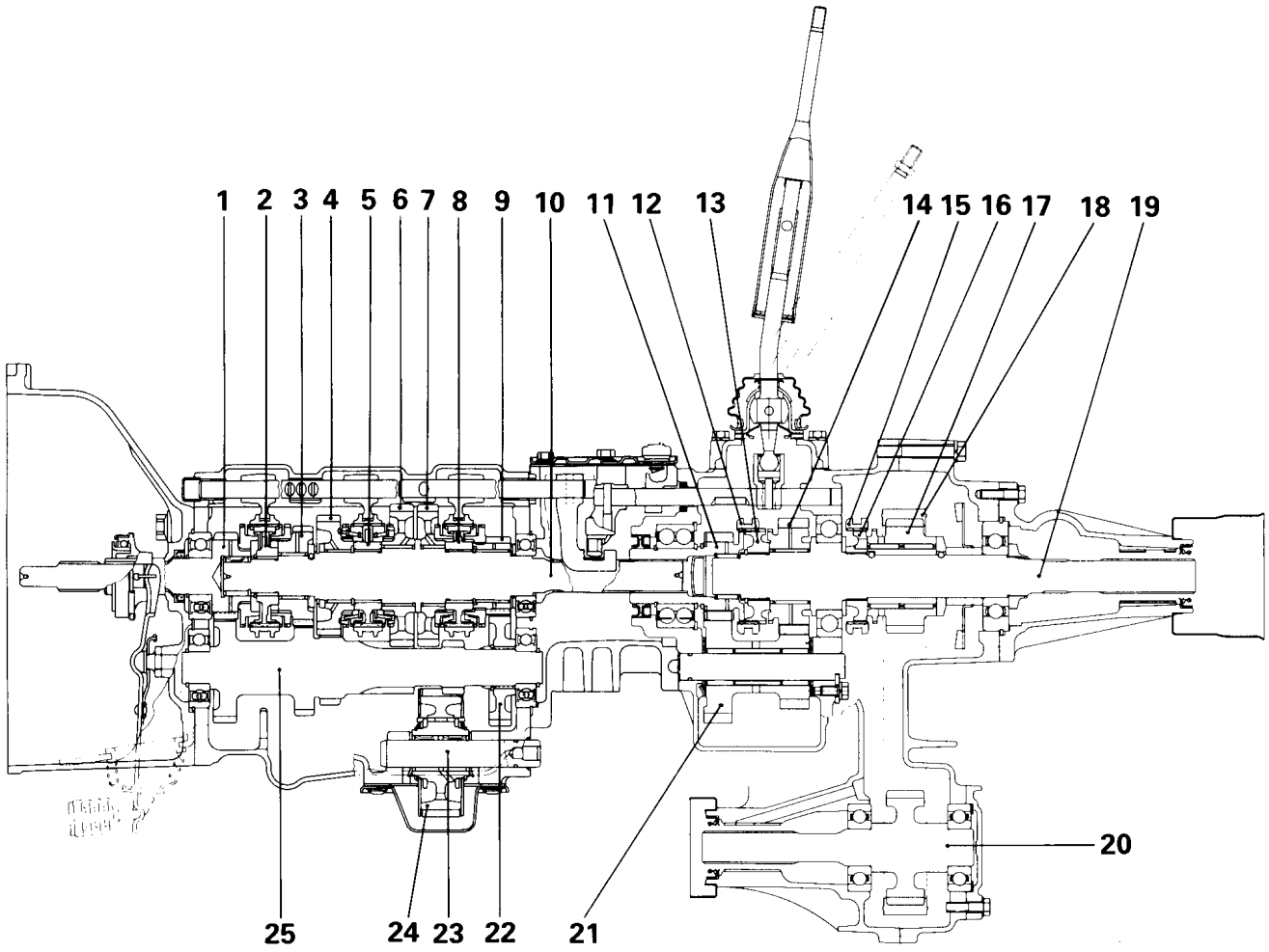
Vehicles for GCC

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		

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			

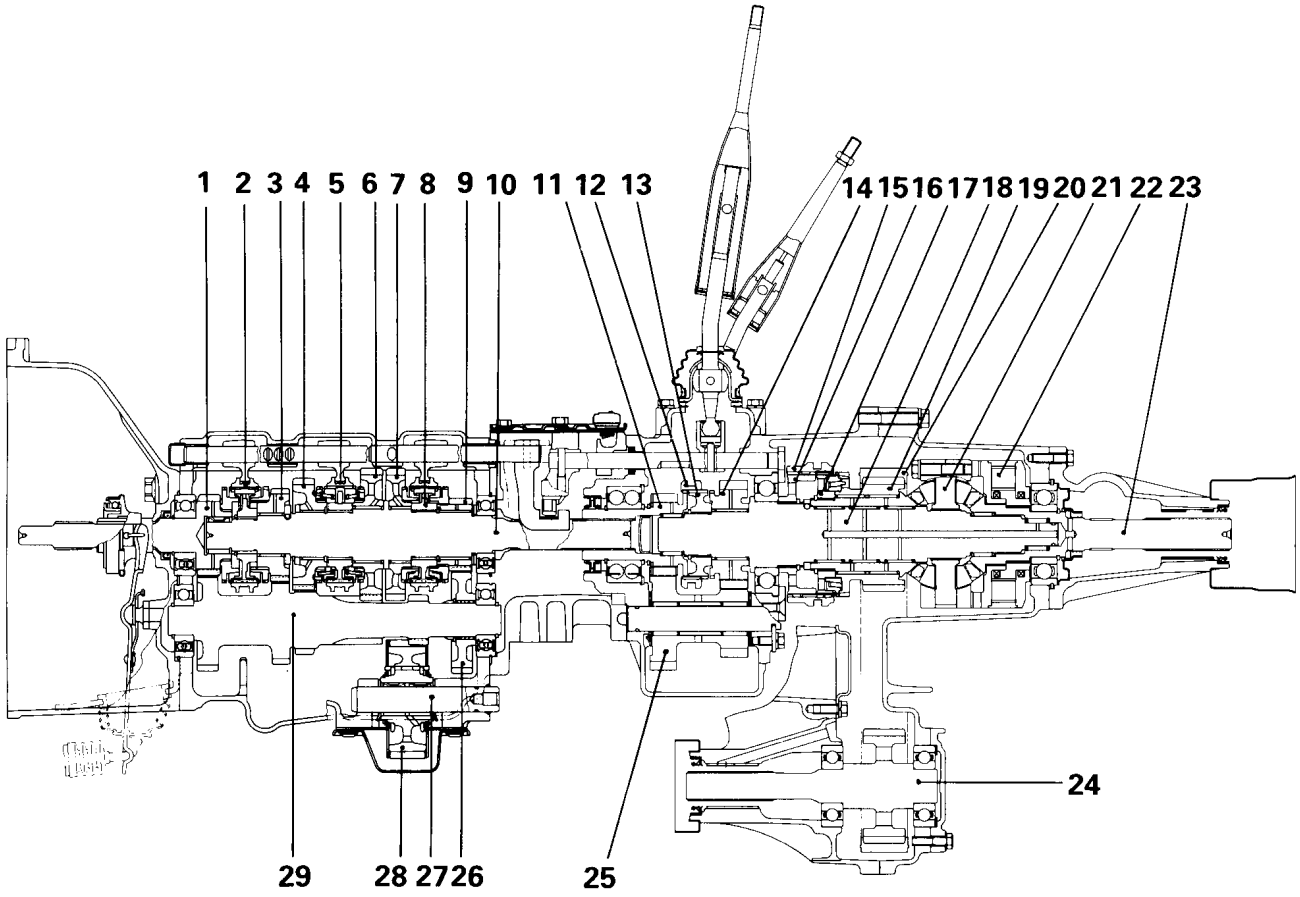
V5MT1 SECTIONAL VIEW (PART-TIME 4WD)



TRM0232

1. Main drive pinion
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. 2WD/4WD hub
17. Drive sprocket
18. Chain
19. Rear output shaft
20. Front output shaft
21. Transfer counter gear
22. 5th speed counter gear
23. Reverse idler gear shaft
24. Reverse idler gear
25. Counter gear

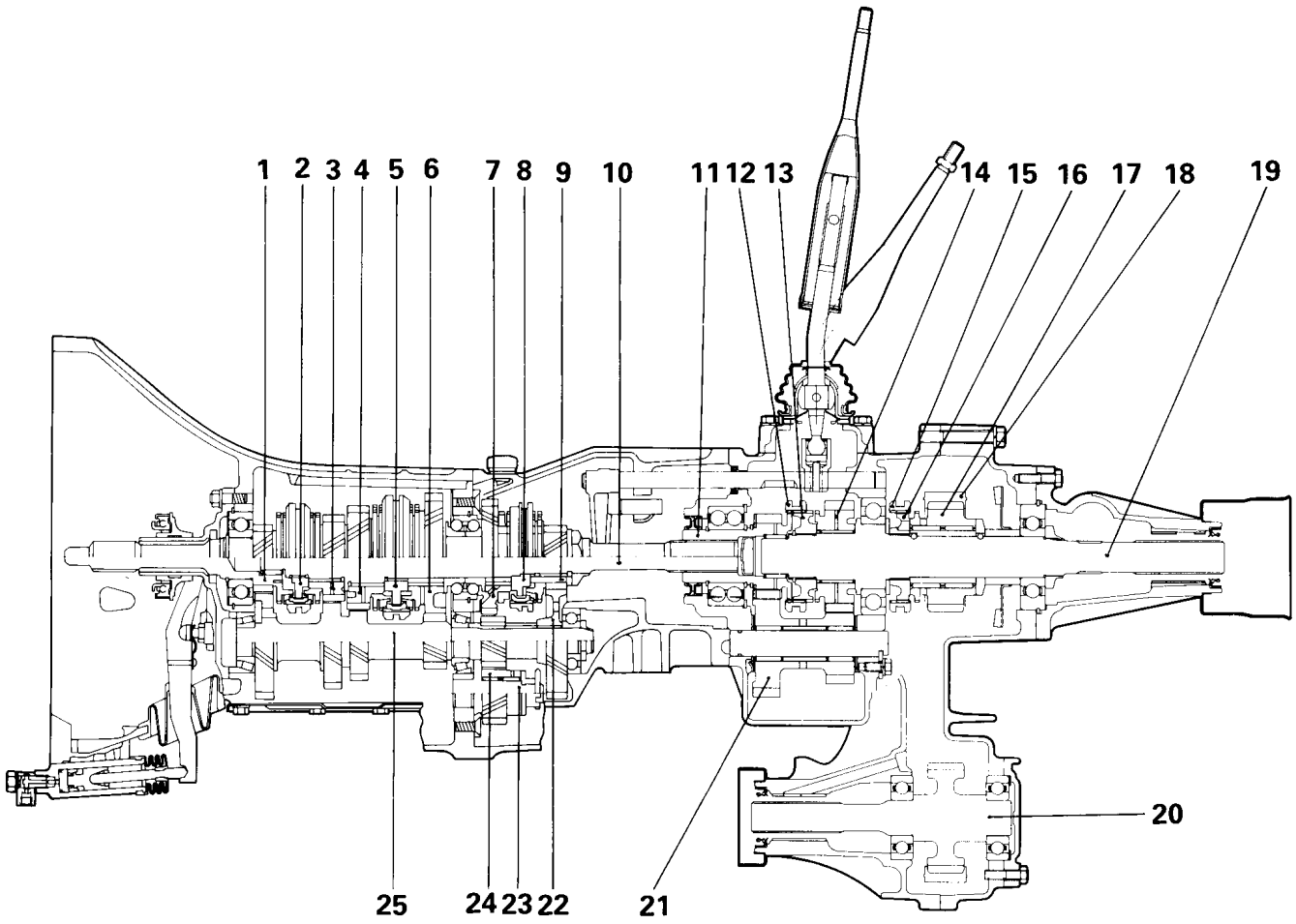
V5MT1 SECTIONAL VIEW (SUPER SELECT 4WD)



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
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. 2WD/4WD hub
17. Drive sprocket
18. Chain
19. Rear output shaft
20. Front output shaft
21. Transfer counter gear
22. 5th speed counter gear
23. Reverse idler gear shaft
24. Reverse idler gear
25. Counter gear

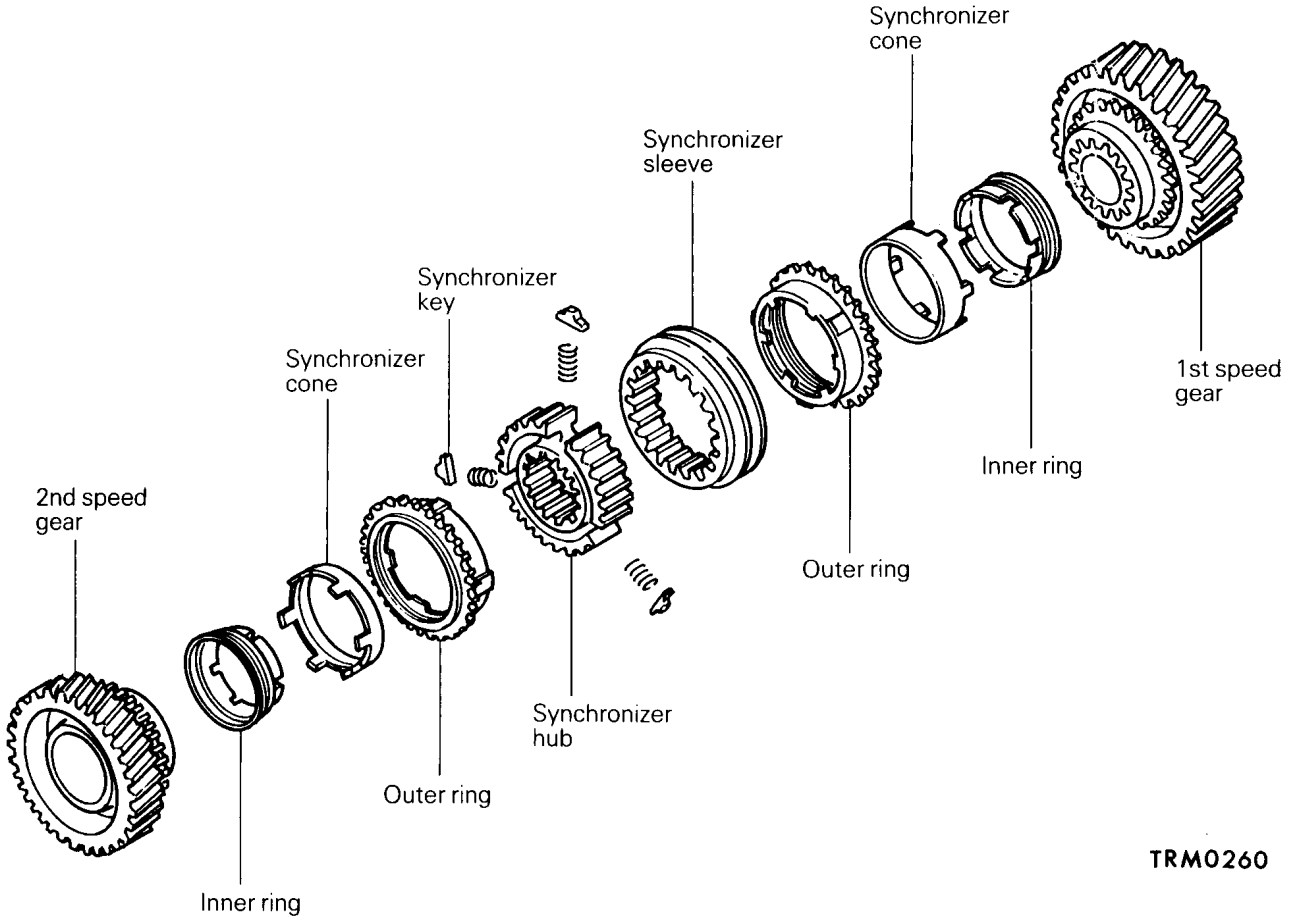
V5MT1 TRANSMISSION SECTION

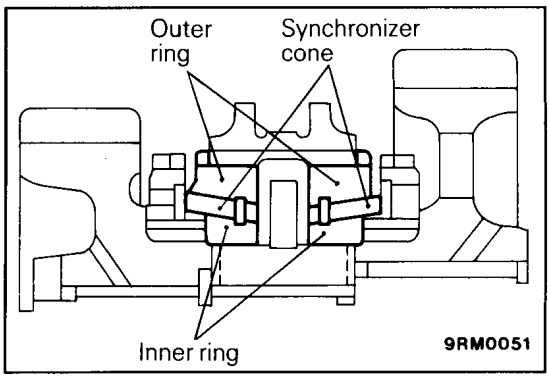
The transmission section of the V5MT1 model incorporates several improvements in: 1st – 2nd synchronizer; reverse synchronizer; reverse idler gear; etc.

1ST – 2ND SYNCHRONIZER

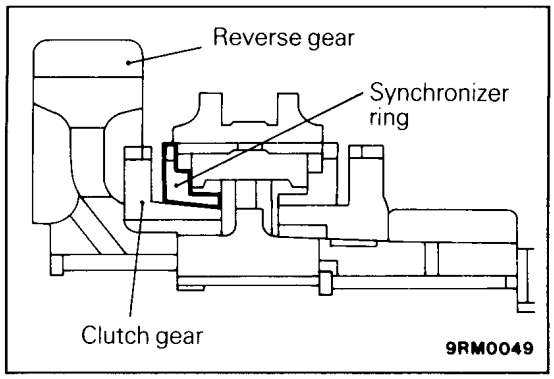
A double-cone type synchronizer has been employed for the 1st – 2nd synchronizer.
The double-cone synchronizer consists of: speed gears, clutch gears (integral with each speed gear), inner rings, synchronizer cones, outer rings, synchronizer hubs, a synchronizer sleeve, synchronizer keys, etc.

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.



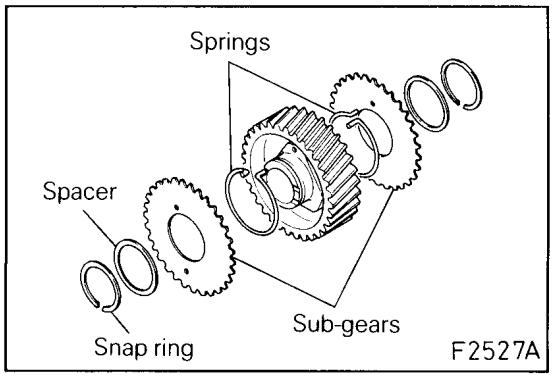


Therefore, the inner and outer rings rotate together with the synchronizer hub, and the synchronizer cone rotates together with the speed gear, all keeping contact with one another.
As mentioned above, the synchronizer cone has sliding surfaces on both inside and outside, and both surfaces are involved in synchronization.
This means that this synchronizer has a doubled synchronization capacity and, as a result, the gear shifting requires less force.



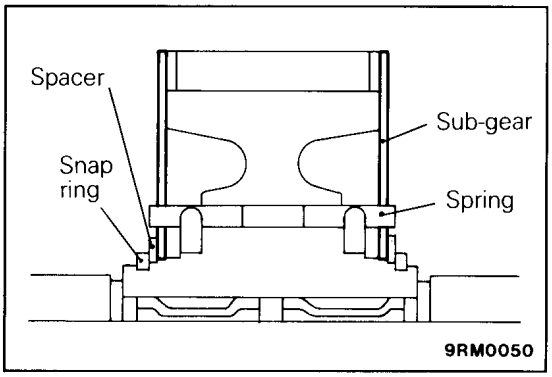
REVERSE SYNCHRONIZER

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.

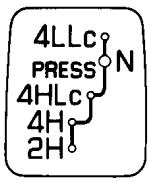


SUPER SELECT 4WD SYSTEM

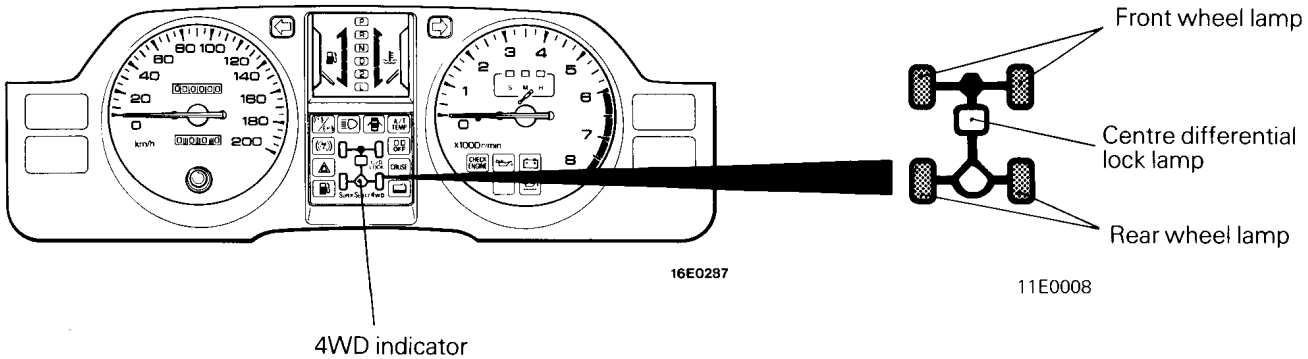
The Super Select 4WD system is the ultimate realization of 4WD design merits. It allows drivers to enjoy diverse modes of driving with both stable steering and greater driving capacity.
The Super Select 4WD system features:

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 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.

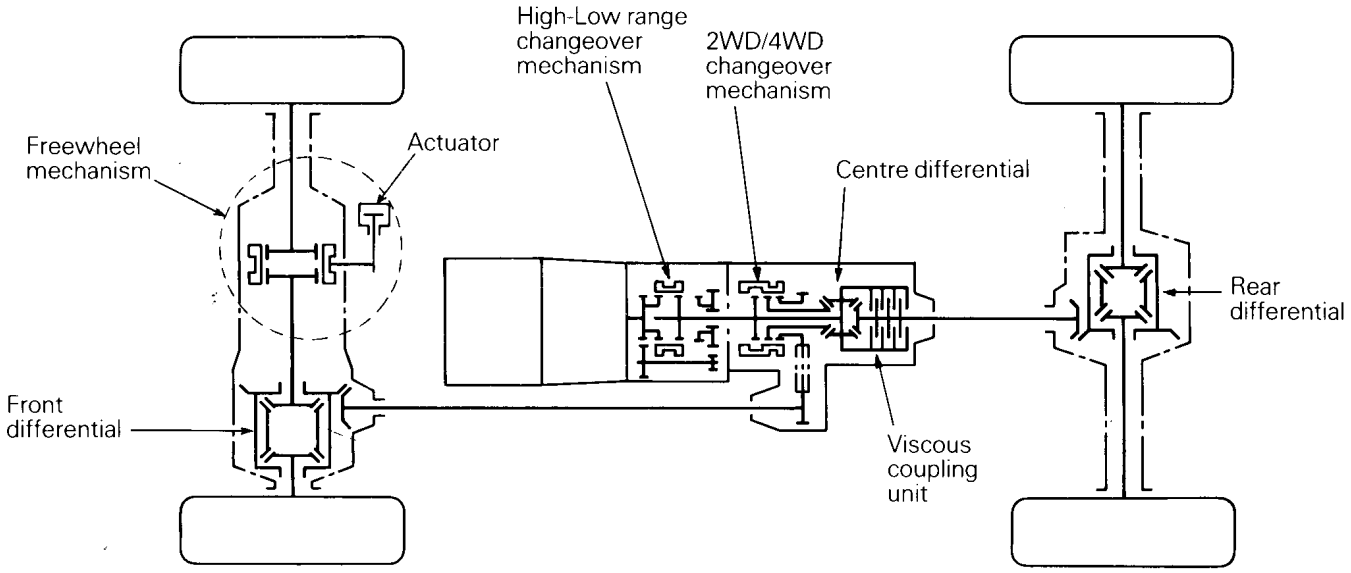
LIST OF DRIVETRAIN CHARACTERISTICS

Transfer shift pattern	Position	2WD/4WD	High/Low	Centre differential	Driving conditions
 11E0007	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.

4WD INDICATOR



SYSTEM SCHEMATIC DIAGRAM

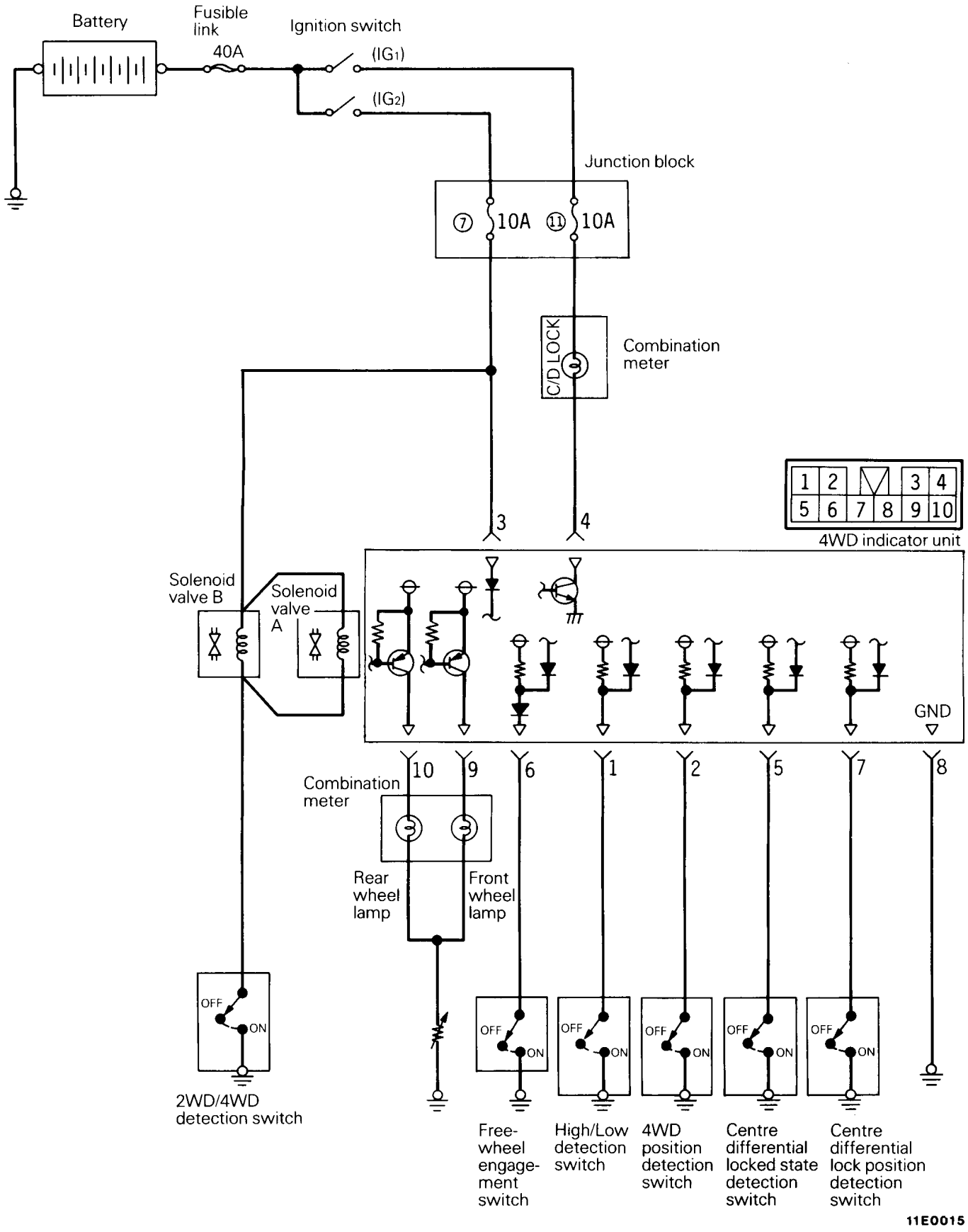


11E0004

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 engegement 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

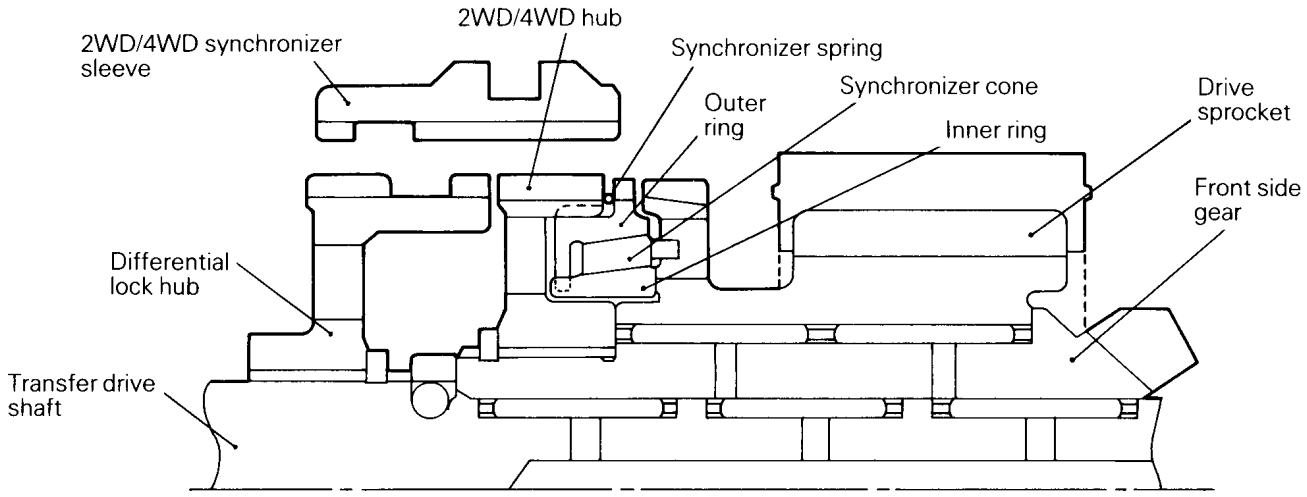


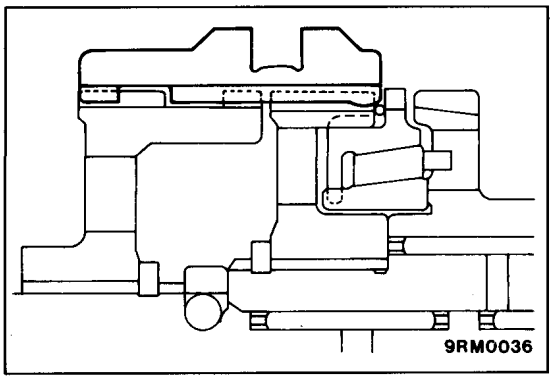
2WD–4WD Changeover Mechanism

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

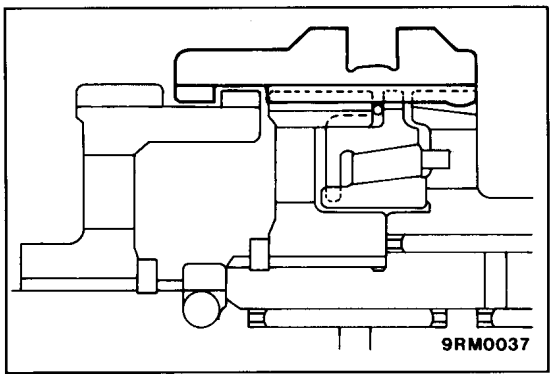
The 2WD–4WD changeover section consists of: a differential lock hub, a 2WD/4WD hub, a drive sprocket, a 2WD/4WD synchronizer sleeve, outer rings, inner rings, synchronizer cones, synchronizer springs, a front side gear, a transfer drive shaft, etc. (See illustration below.)
The differential lock hub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





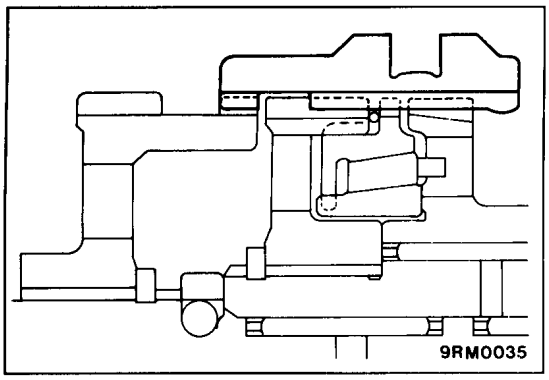
(1) 2WD (When the 2H Position is Selected)

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.

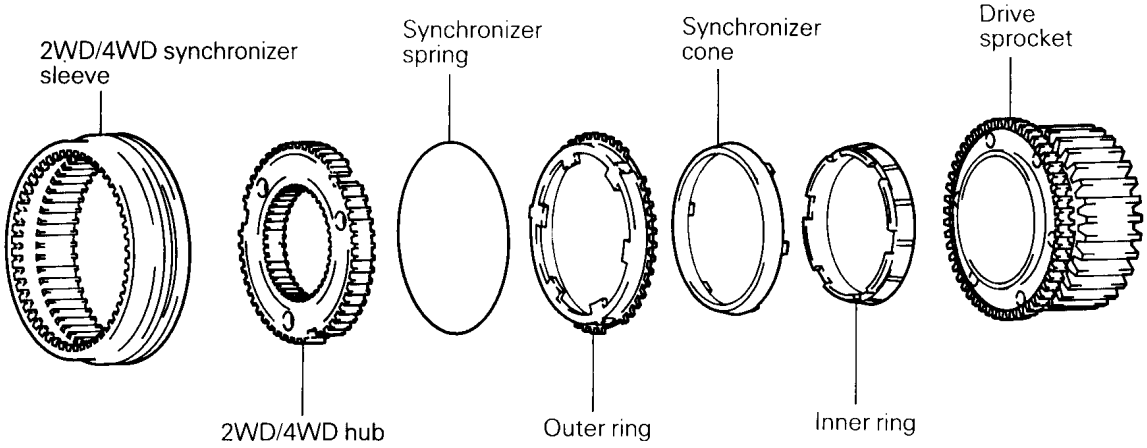


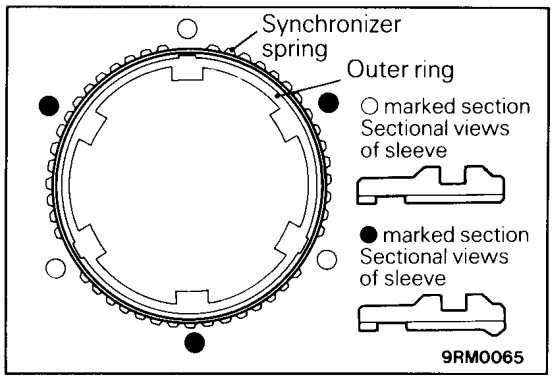
(3) Direct-coupled 4WD (When the 4HLc or 4LLc Position is Selected)

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.

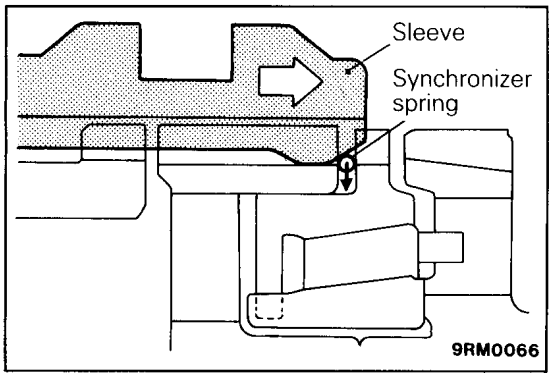
DOUBLE CONE SYNCHRONIZER

The synchronizer used in the 2WD–4WD change-over section is a "double cone synchronizer". This synchronizer constructed as illustrated below.

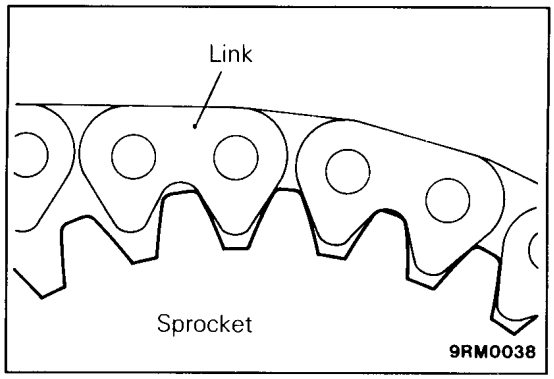




The synchronizer spring is an annulus spring.
Resting on the projections (indicated by circles ○ in the illustration) on the outer periphery of the outer ring, the spring is in contact with the outer ring.
The synchronizer, on the other hand, also has projections on some of its spline teeth at the end 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.



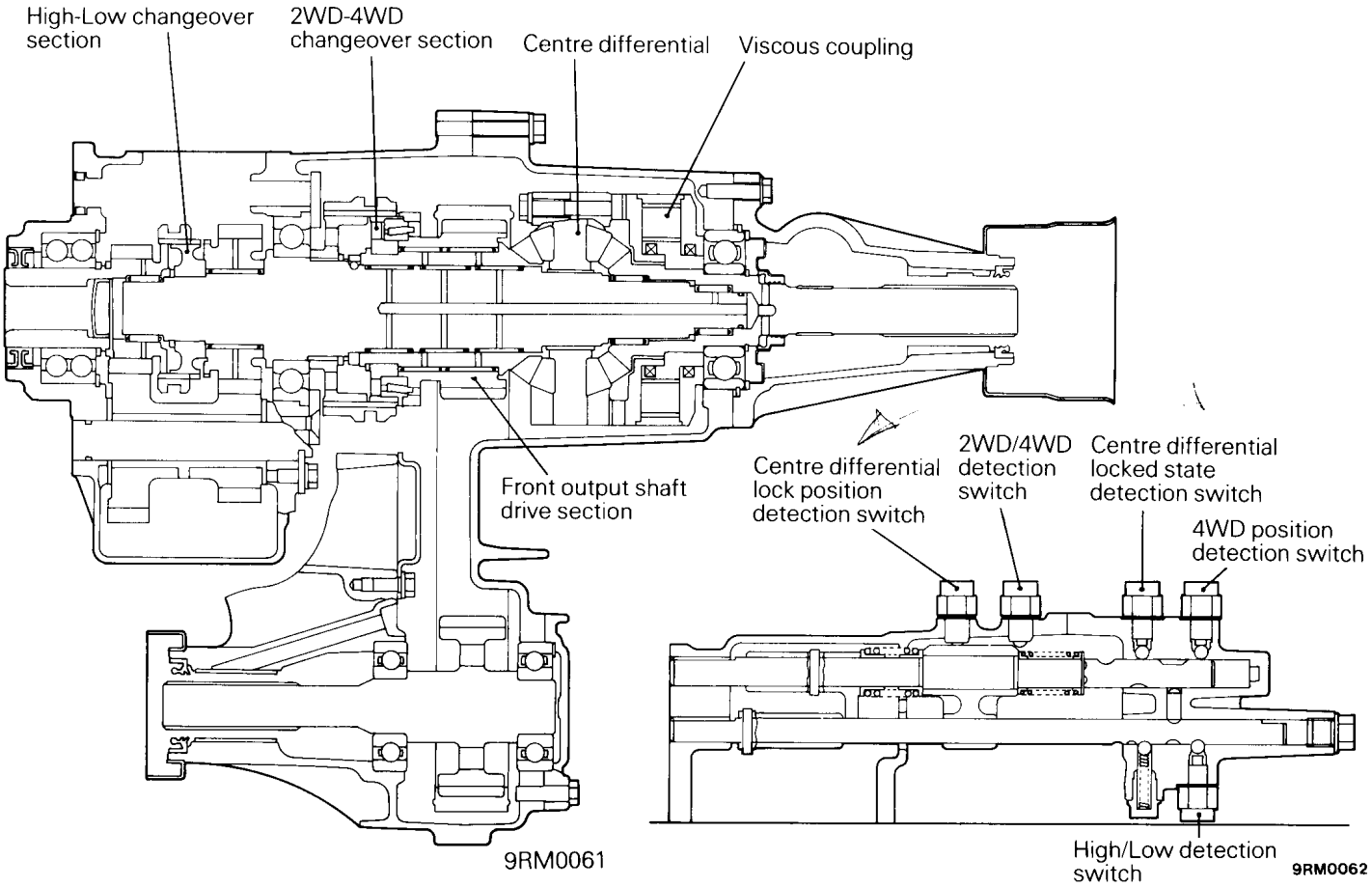
RANDOM CHAIN

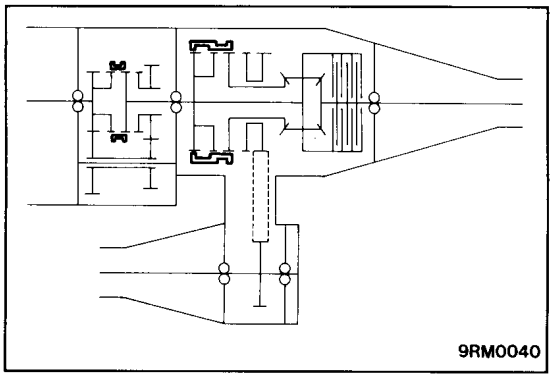
The random chain has two kinds of links randomly connected. These links are different in shape so that they contact the sprocket teeth in different ways. This design is effective to reduce the noise when driving the sprocket.

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.

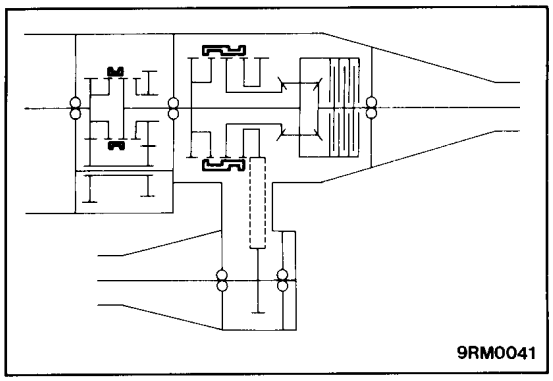




WHEN THE 2H POSITION IS SELECTED

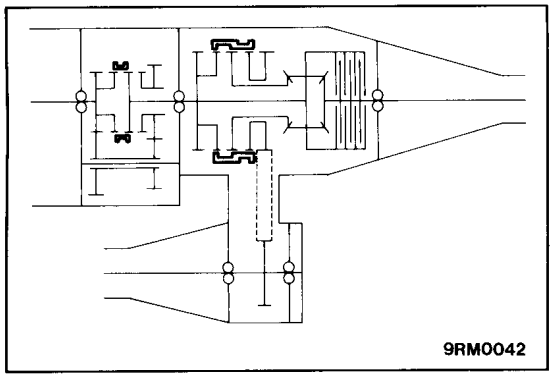
When the 2H position is selected, the High-Low changeover section setting is at "High" and the 2WD–4WD changeover section setting is at "2WD" (the drive sprocket is set free). The engine power arriving at the transfer input gear through the transmission section is directly transmitted to the transfer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



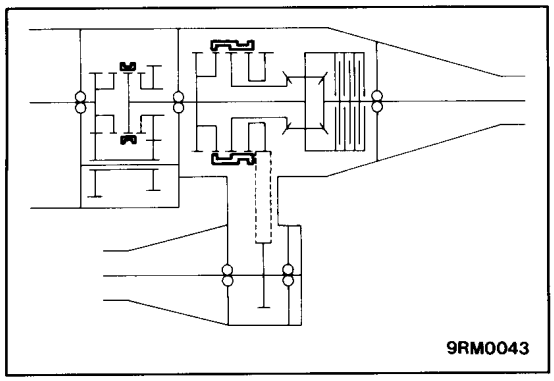
WHEN THE 4H POSITION IS SELECTED

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.



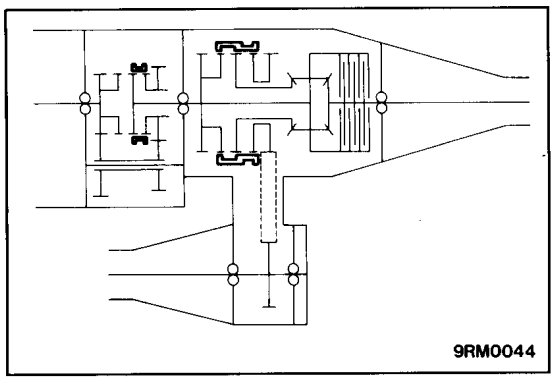
WHEN THE 4HLc POSITION IS SELECTED

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.



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.



WHEN THE 4LLc POSITION IS SELECTED

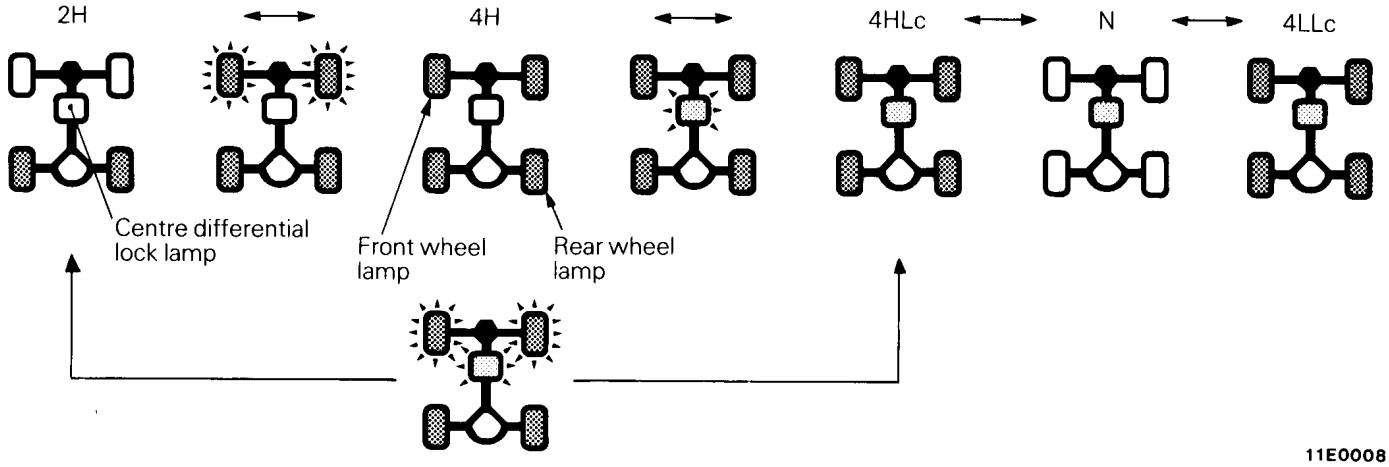
When the 4LLc position is selected, the High–Low changeover section setting is at "Low" and the 2WD–4WD changeover section setting is at "4WD" (the centre differential is locked).
The engine power arriving at the transfer input gear through the transmission section is transmitted to the transfer drive 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.

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.

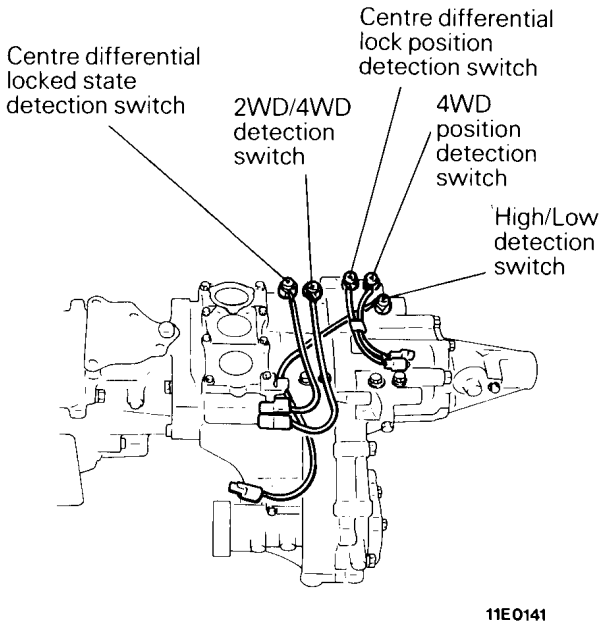


11E0008

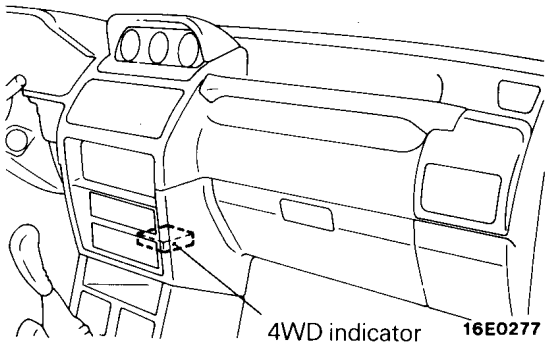
4WD INDICATOR CONTROL UNIT

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.

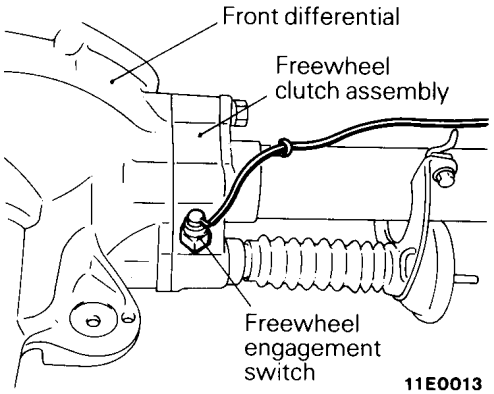
The locations of the switches and control unit are shown in the illustration below.
The relationship between the state of each switch and the illumination of each lamp is shown in the table on the next page.



11E0141



16E0277



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 OFF ON OFF ON Flash OFF Flash ON Flash OFF
	Rear wheel symbols	ON OFF ON OFF ON
	Centre differential lock symbol	OFF Flash ON Flash OFF Flash ON Flash 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

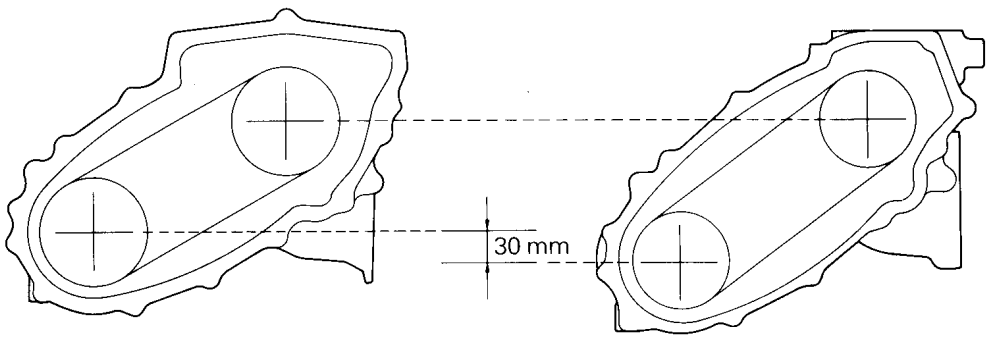
PART-TIME 4WD SYSTEM

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.



9RM0060

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

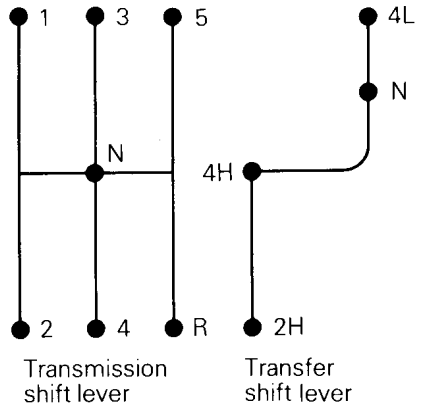
Transfer Gearshift Control

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

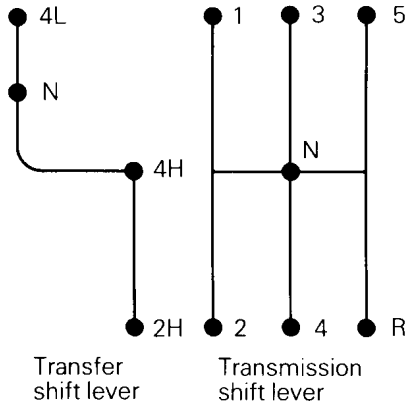
Also, the transfer gearshift pattern is arranged so that the more frequently used 2H and 4H positions are on the same line.

New

L.H. drive vehicles



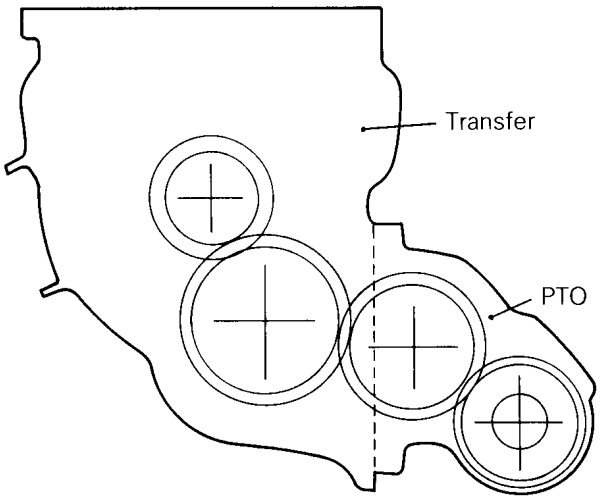
R.H. drive vehicles



9RM0058

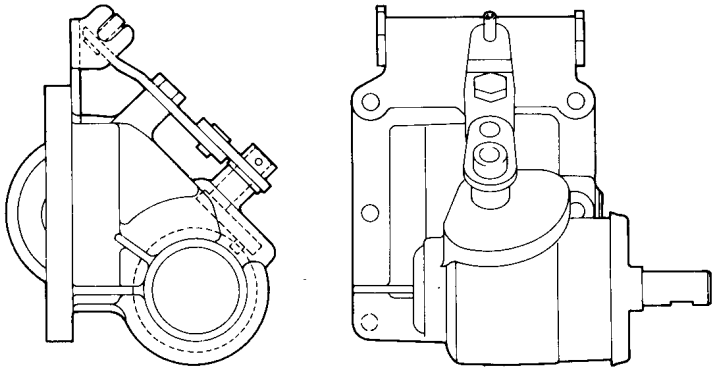
Power Take-off (PTO)

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

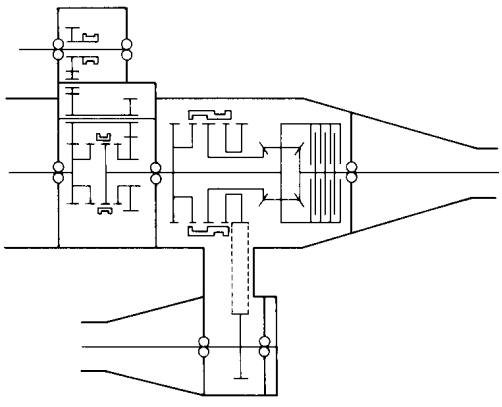
PTO external views



9RM0052

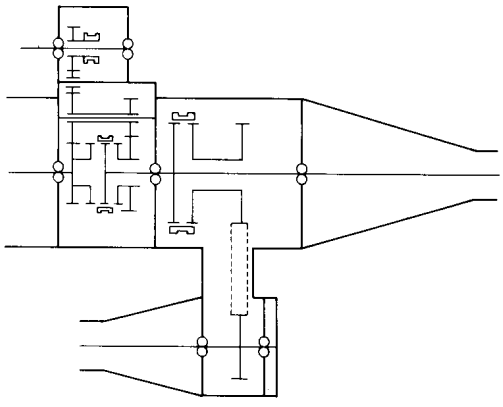
When the transfer shift gear is placed in the N position and the PTO shift lever in the ON position, the engine power from the transmission section arrives at the counter gear in the transfer High-Low changeover section. This power then flows through the PTO idler gear to the PTO output gear and is finally 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	

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

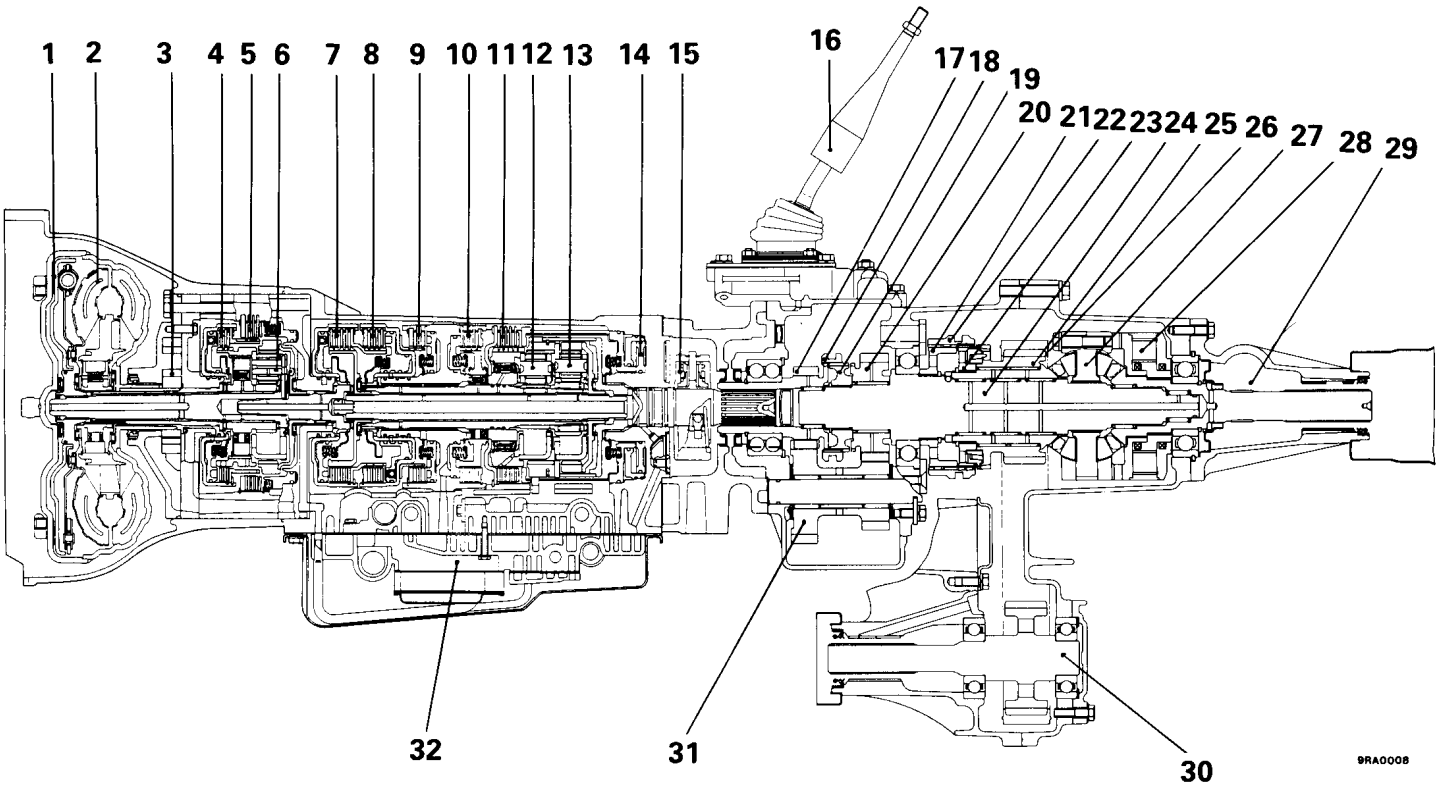
Vehicles for GCC

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

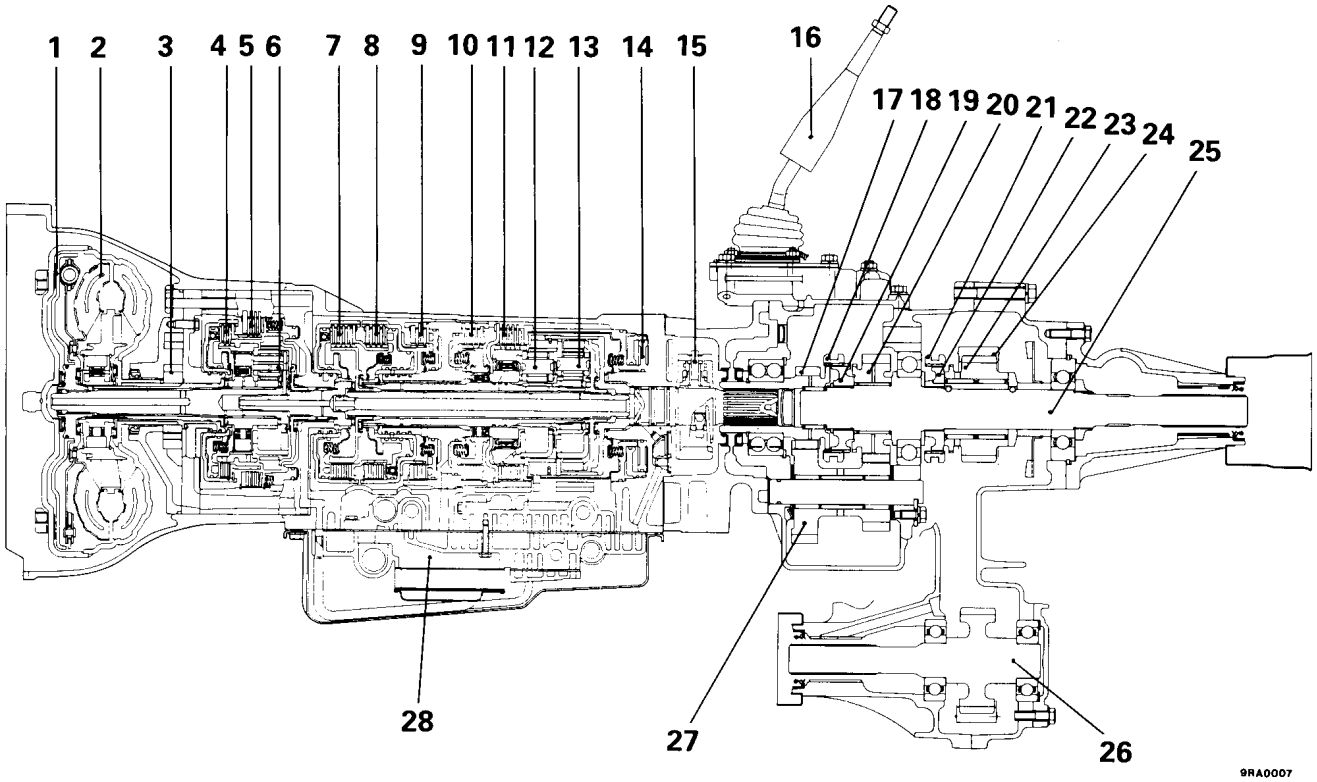
Engine	3000
Transmission model	V4AW2-3
Drive system	Super Select 4WD
Torque converter type	3-element, single-stage, 2-phase type with damper clutch
Nominal diameter mm (in.)	254 (10.0)
Stall torque ratio	2.02
Transmission type	4 forward speeds, one reverse, full-automatic
Gear ratio	
1st	2.826
2nd	1.493
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

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)



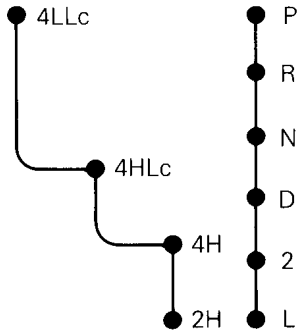
1. Lock-up clutch
2. Torque converter
3. Oil pump
4. Overdrive clutch
5. Overdrive brake
6. Overdrive planetary gear
7. Forward clutch
8. Direct clutch
9. Brake No. 1
10. Brake No. 2
11. Brake No. 3
12. Front planetary gear
13. Rear planetary gear
14. Brake No. 3 piston
15. Governor
16. Transfer control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

SUPER SELECT 4WD SYSTEM

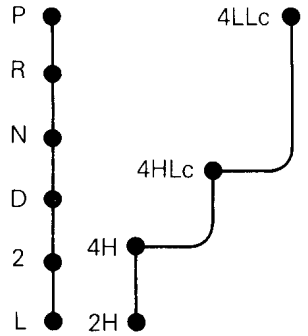
The automatic transmission version Super Select 4WD system is basically the same as the manual transmission version system except that the transfer shift lever position and the transfer shift pattern have both been rearranged.

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



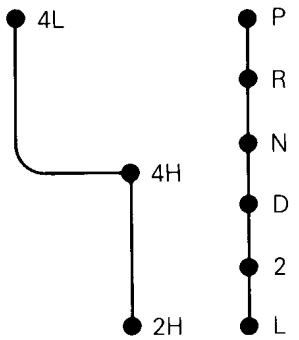
9RM0054

PART-TIME 4WD SYSTEM

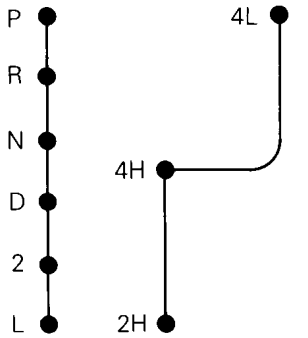
This system is basically the same as the manual transmission version system, but they do differ so that the transfer shift lever position and the transfer shift pattern.

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

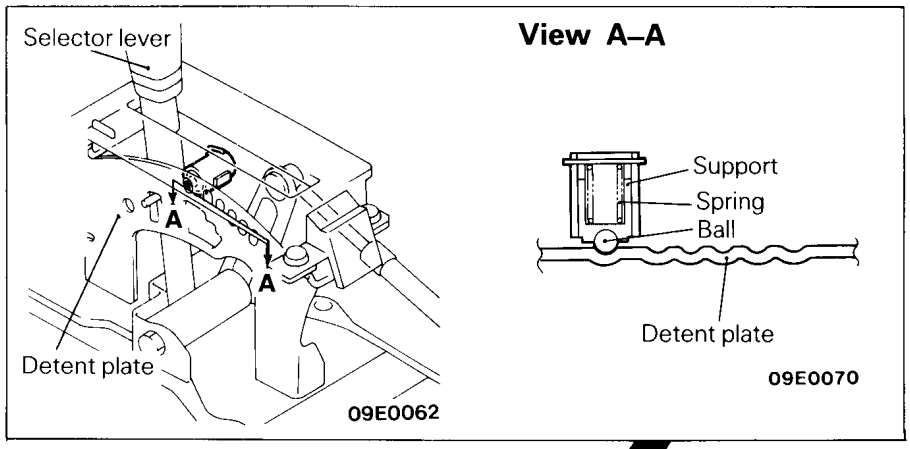


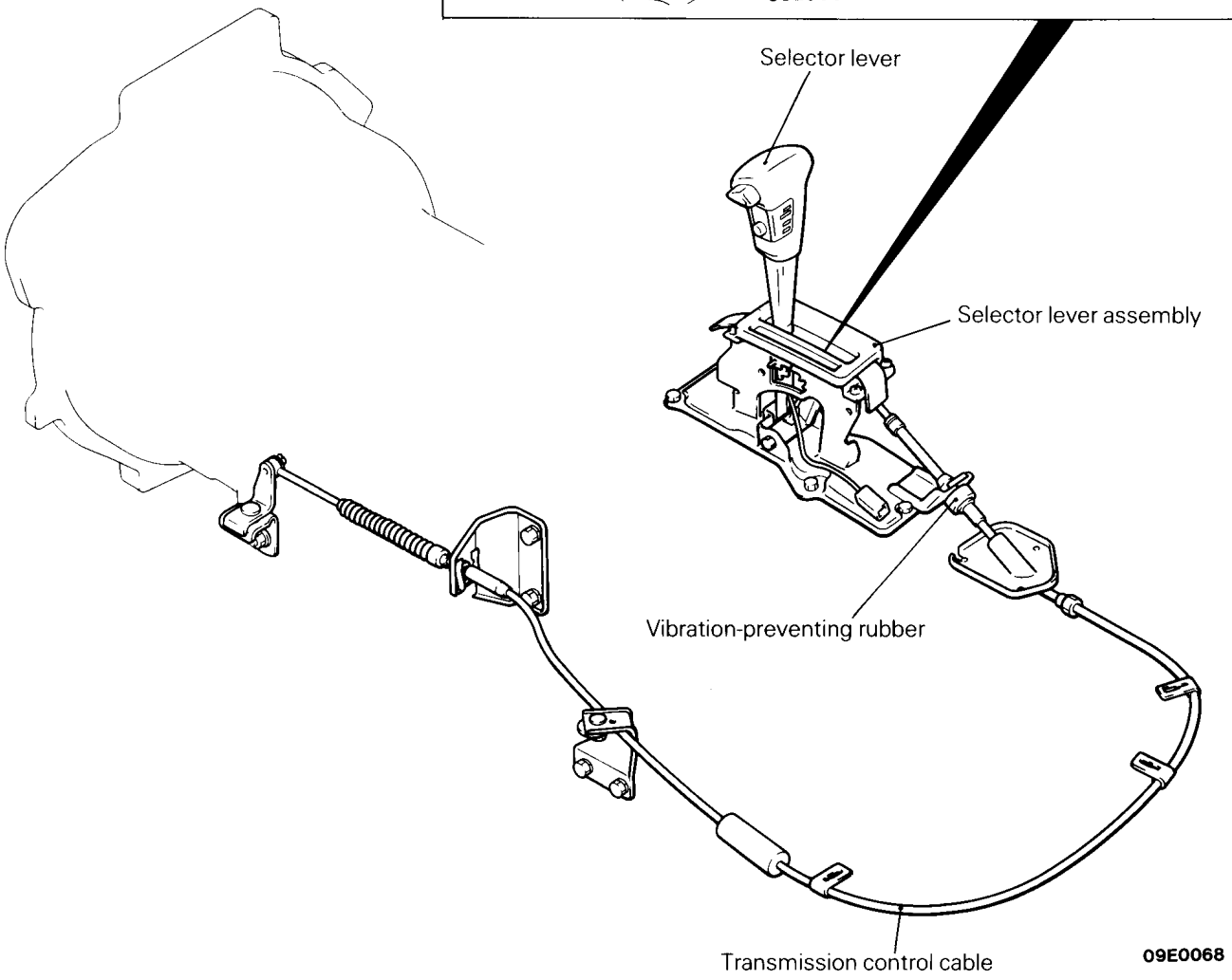
9RM0056

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 mm (in.)		Type	Greasing method	Journal O.D. 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) [75 x 606 (2.95 x 23.9)]	Cross type	Greasing nipple	14.689 (0.5783)	14.689 (0.5783) [18.300 (0.7205)]
V24C	NSFL6							
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) [75 x 606 (2.95 x 23.9)]				14.689 (0.5783) [18.300 (0.7205)]
V24W	NDFL6							
	NHFL6		50.8 x 700 (2.00 x 27.6)	75 x 519 (2.95 x 20.4) [75 x 491 (2.95 x 19.3)]				
	NHFR6							
	GNXFL6							
	GNXFR6							
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)				
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) [75 x 718 (29.5 x 28.3)]				14.689 (0.5783) [18.300 (0.7205)]
	RHFR6							
	GRXFL6			75 x 718 (2.95 x 28.3)				
	GRXFR6							
	GRXFCL6							
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 mm (in.)		Type	Greasing method	Journal O.D. mm (in.)	
				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			75 x 491 (2.95 x 19.3)				18.300 (0.7205)
		GNXER							
	V32V	NDL			75 x 908 (2.95 x 35.7)				
		NDR							
		HNDL							
		HNDR							
	V32W	NHL							
		NHR							
		HNHL							
		RHL		50.8 x 741 (2.00 x 29.2)	75 x 867 (2.95 x 34.1)				14.689 (0.5783)
	V34V	HNDL		50.8 x 665 (2.00 x 26.2)	75 x 943 (2.95 x 37.1)				
		HNDR							
	V44W	GNXFL		50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)				18.300 (0.7205)
		GNXFR							
	V43W	GNXEL		50.8 x 665 (2.00 x 26.2)	75 x 793 (2.95 x 31.2)				
		GNXER							
GCC	V12W	NHLW		50.8 x 665 (2.00 x 26.2)	75 x 630 (2.95 x 24.8)				14.689 (0.5783)
	V24W	GNXFLW		50.8 x 700 (2.00 x 27.6)	75 x 519 (2.95 x 20.4) [75 x 491 (2.95 x 19.3)]				14.689 (0.5783) [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)
	V32V	NDLW			75 x 908 (2.95 x 35.7)				
		HNDLW							
	V32W	NHLW							
		RHLW		50.8 x 741 (2.00 x 29.2)	75 x 867 (2.95 x 34.1)				14.689 (0.5783)
	V44W	GNXFLW		50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)				18.300 (0.7205)
	V43W	GNXELW		50.8 x 665 (2.00 x 26.2)					
		GRXELW		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. mm (in.)	
			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							
V44W	NHFR8		50.8 x 700 (2.00 x 27.6)	75 x 793 (2.95 x 31.2)				
	GNXFR8							
V43W	NHER8		50.8 x 665 (2.00 x 26.2)					
	RHER8							
	GNXER8		50.8 x 752 (2.00 x 29.6)	75 x 740 (2.95 x 29.1)				
	GRXER8							

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

FRONT AXLE

E9CFAAF

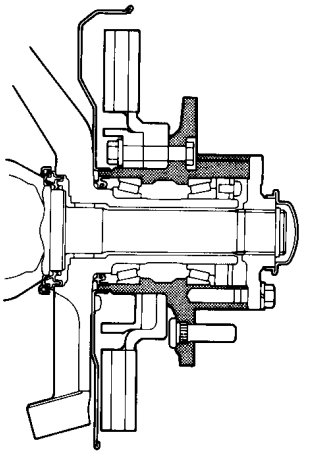
The front axle features:

- 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)	mm (in.)		
LH		291 (11.5)	291 (11.5)
RH		318 (12.5)	318 (12.5)
Inner shaft			
O.D. x Length	mm (in.)	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.)	mm (in.)	62 x 35 (2.44 x 1.38)	62 x 35 (2.44 x 1.38)



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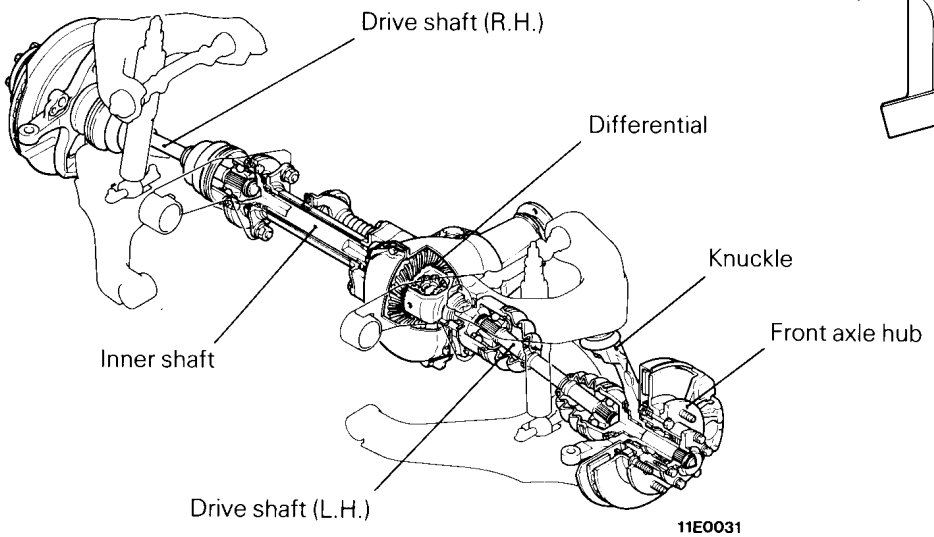

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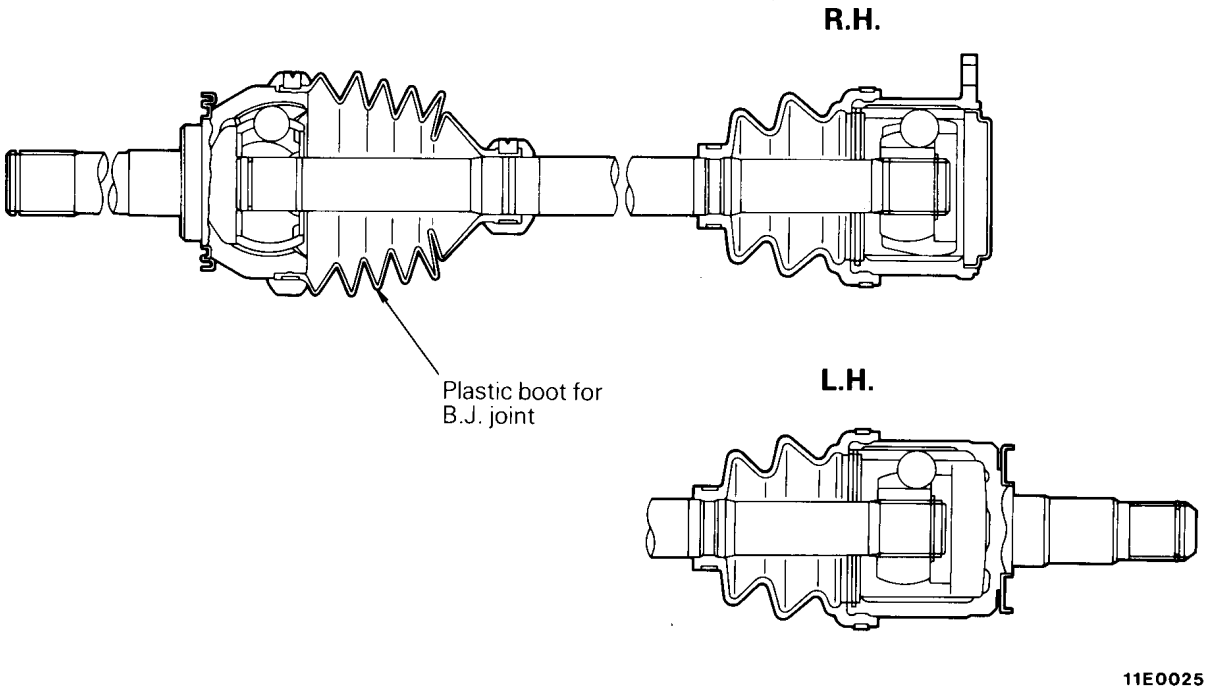
DRIVE SHAFT

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.



FREEWHEEL MECHANISM

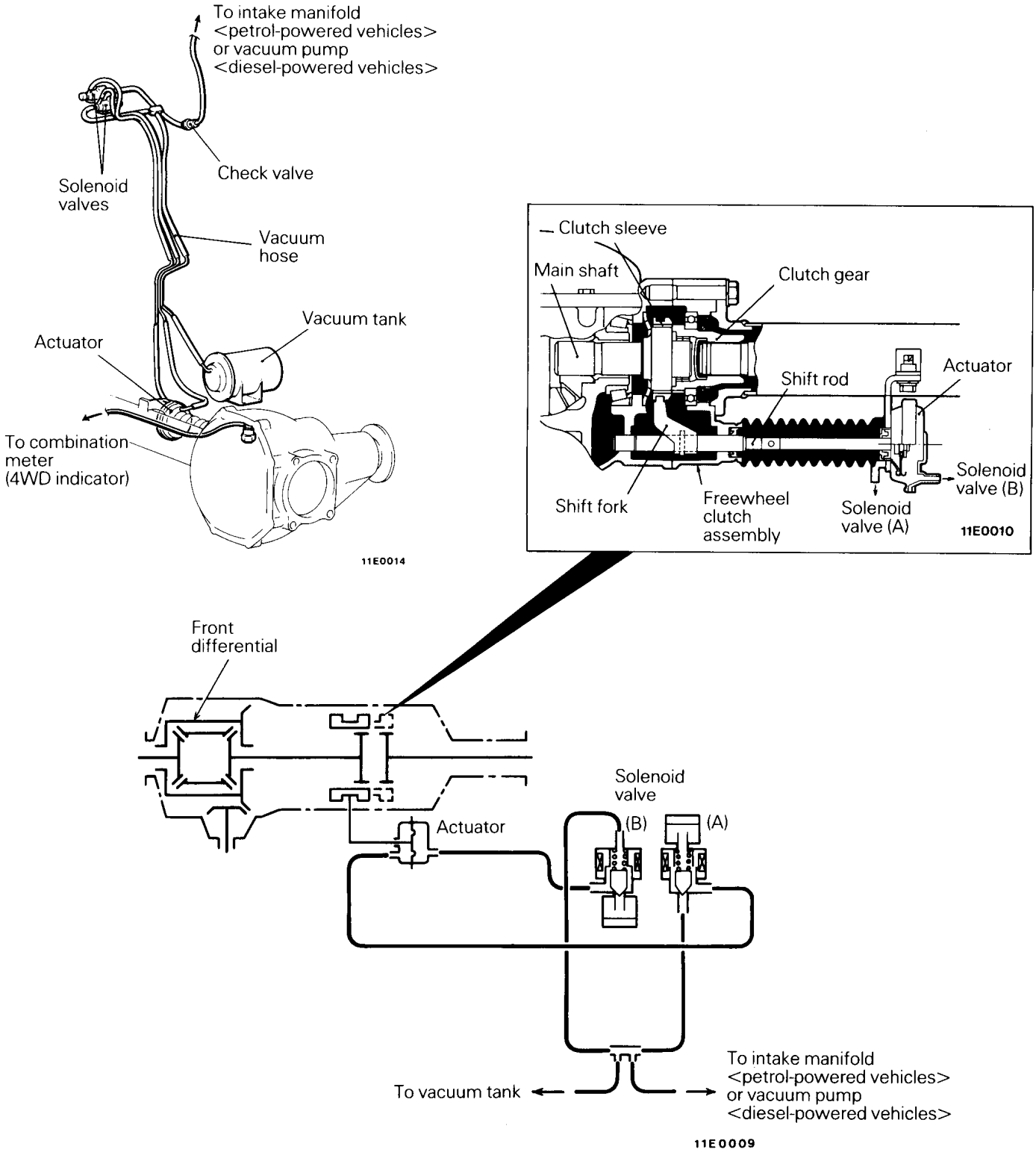
On vehicles with the Super Select 4WD system, a vacuum-actuated freewheel clutch has been adopted.

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.)



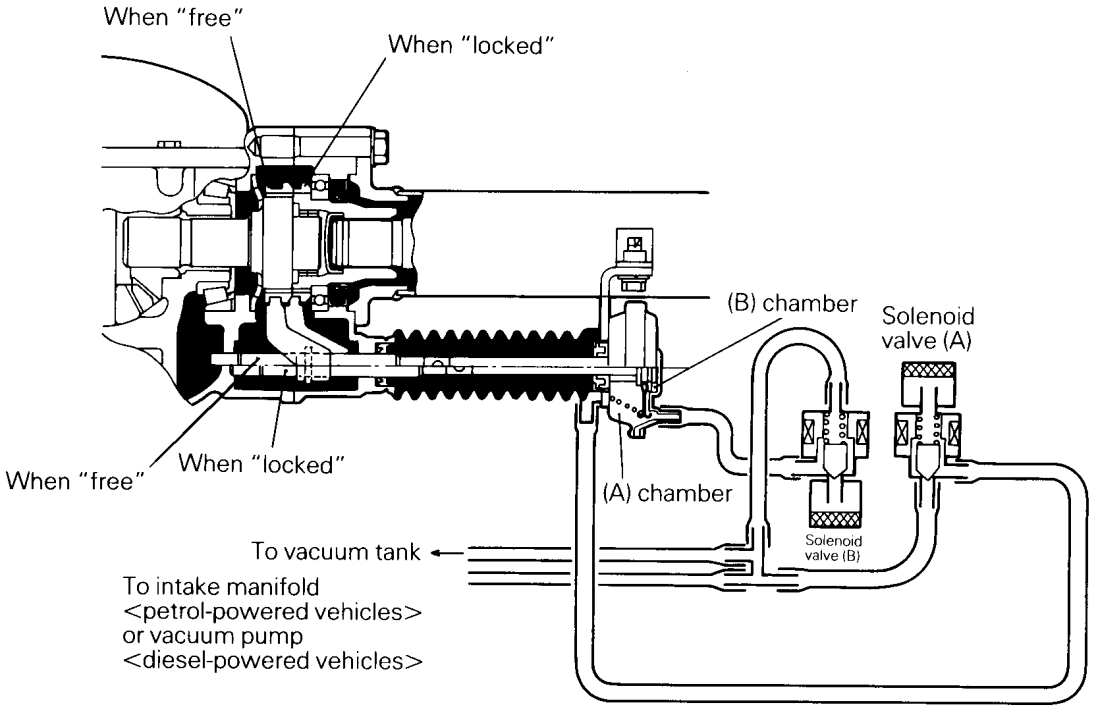
OPERATION OF THE FREEWHEEL CLUTCH

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).



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DIFFERENTIAL

E9CHAAA

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*

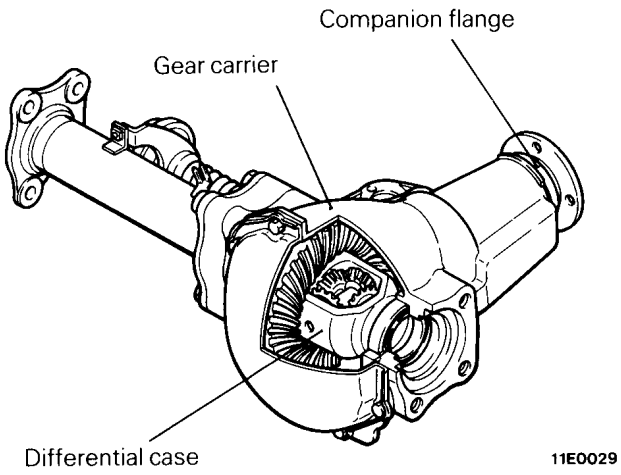
<VEHICLES FOR AUSTRALIA>

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*

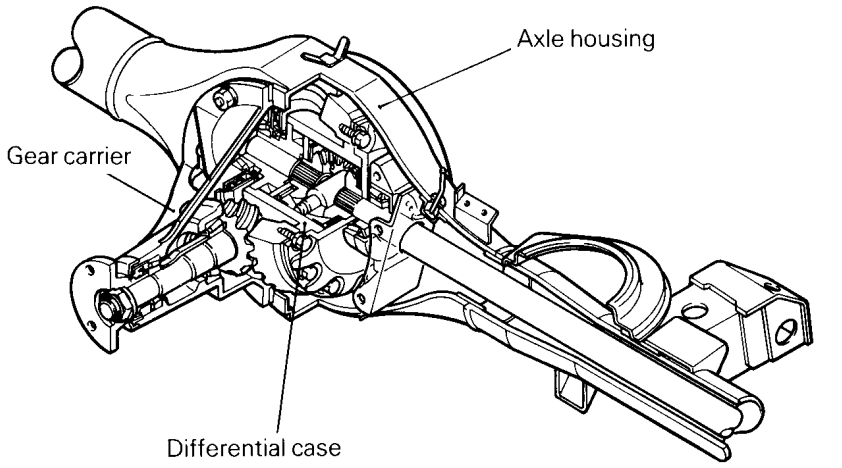
NOTE
*: Vehicles with a rear differential lock or limited slip differential

CONSTRUCTION

Front differential



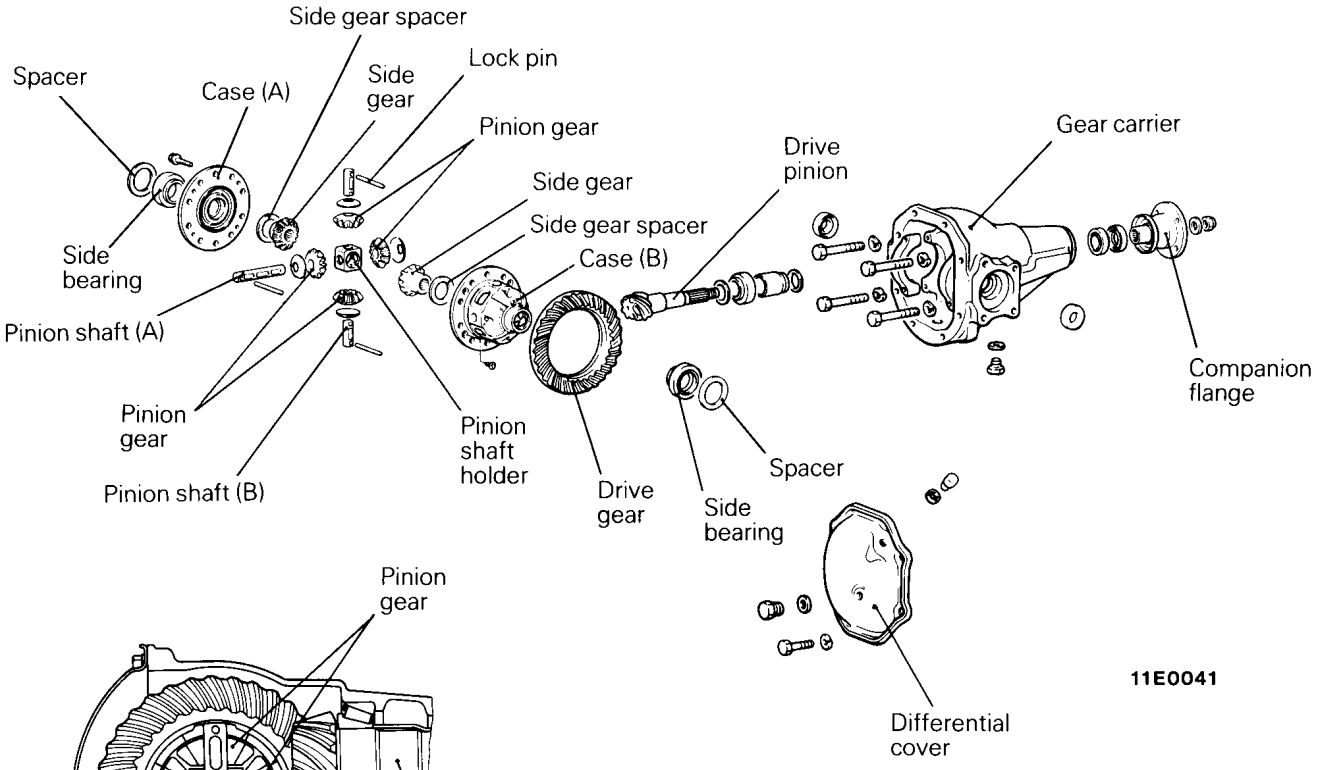
Rear differential

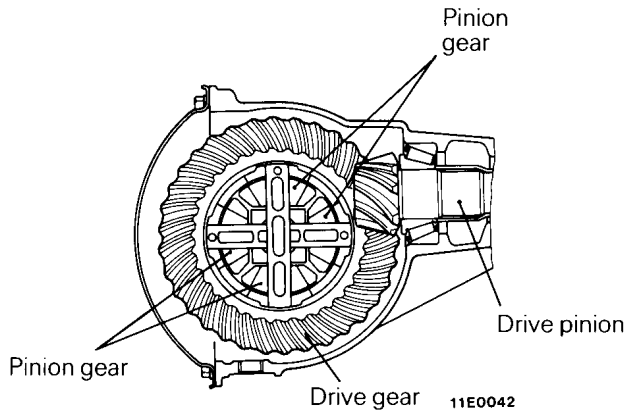


4-PINION TYPE FRONT DIFFERENTIAL

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

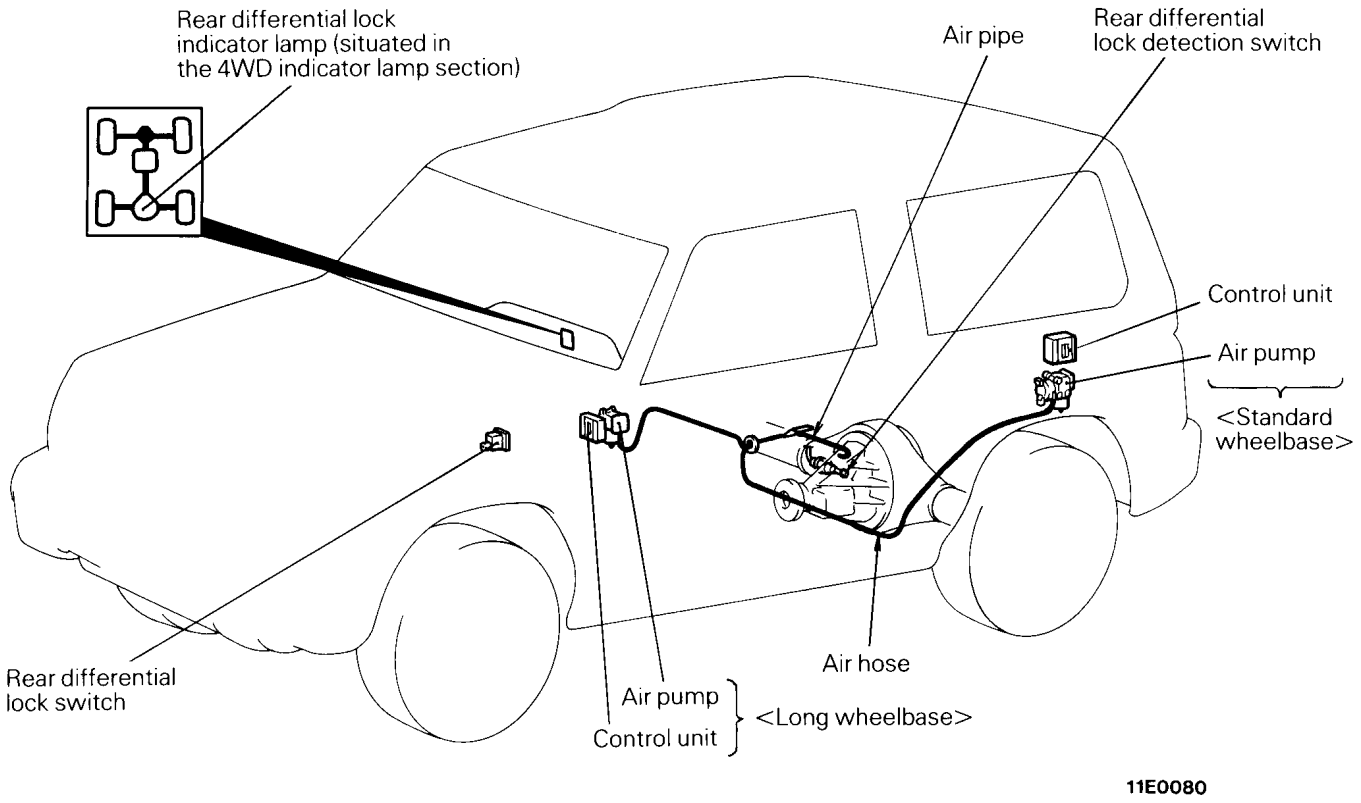
This design is more durable than the 2-pinion type because the load is distributed among four pinion gears so that each pinion gear bears a smaller load.





REAR DIFFERENTIAL LOCK SYSTEM

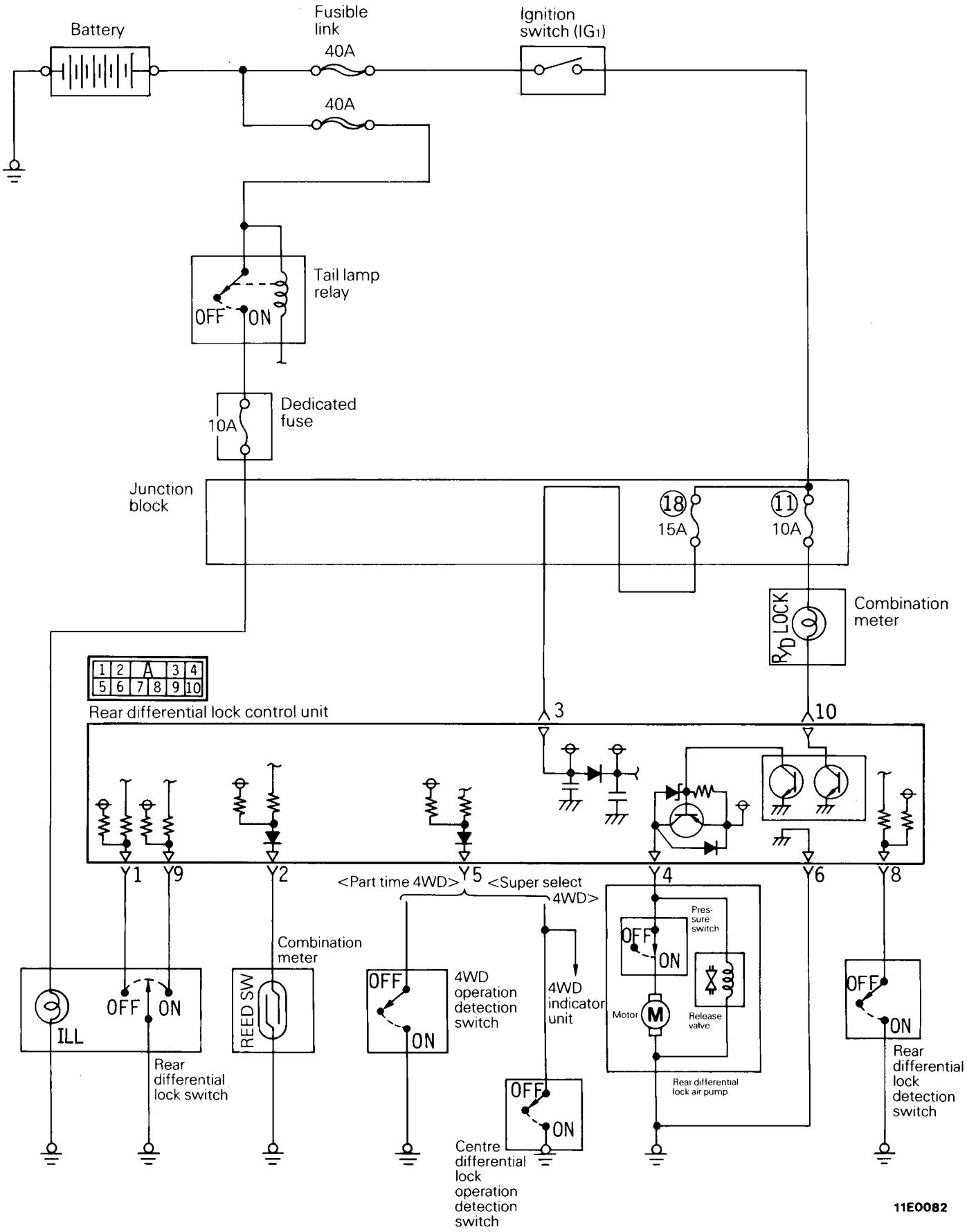
- Locks the right and left wheels completely, making it easier for the vehicle to get out of a trapped position or on a rocky or snowy road.
- Accommodated in a compact structure with a built-in diaphragm, giving high dependability against damage cold weather, etc.
- Easier to operate with a changeover 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.



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

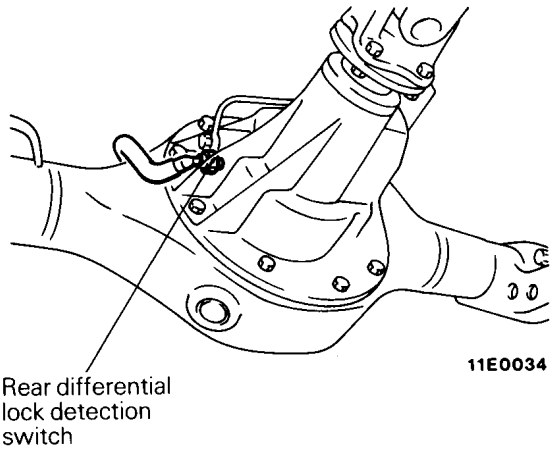
- The indicator lamp flashes during changeover from the free to locked state and is illuminated when the changeover is completed. When changeover is made from the locked to free state, the indicator lamp similarly flashes during the changeover, and goes out when the changeover is completed.
- For safety 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).

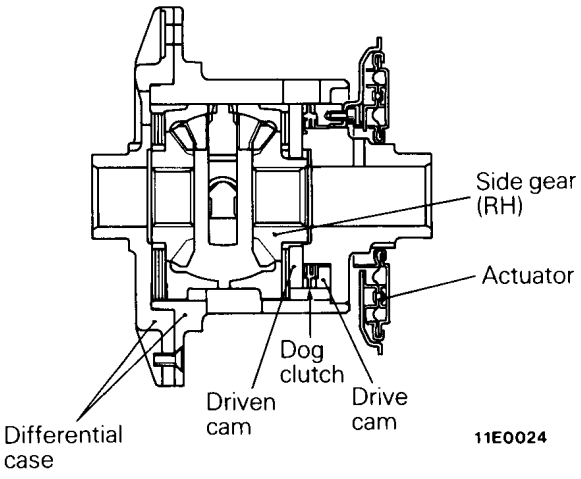
Rear differential lock switch	Vehicle speed	Rear differential lock air pump	Rear differential lock changeover	Rear differential lock indicator lamp
Neutral	Ignored	Not operated	Free	OFF
Neutral → ON signal	Lower than 12 km/h (7 mph)	Operated	Free → Locked	Flashing → ON
	12 km/h (7 mph) or higher	Not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

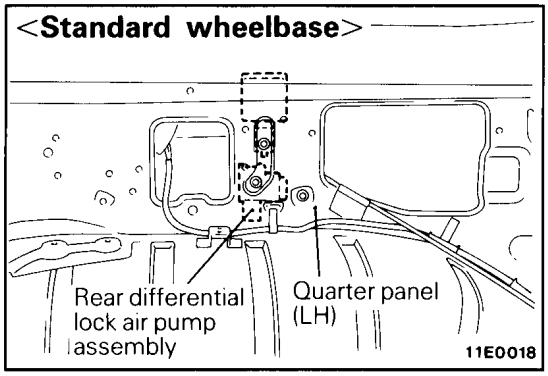


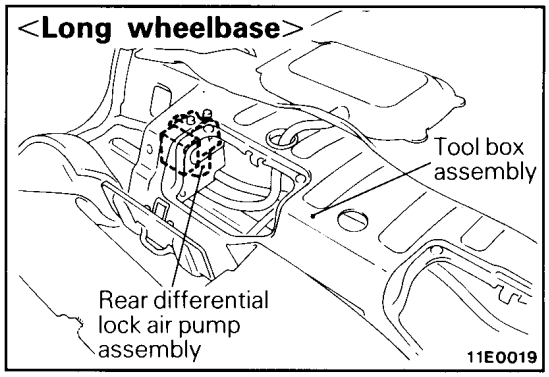


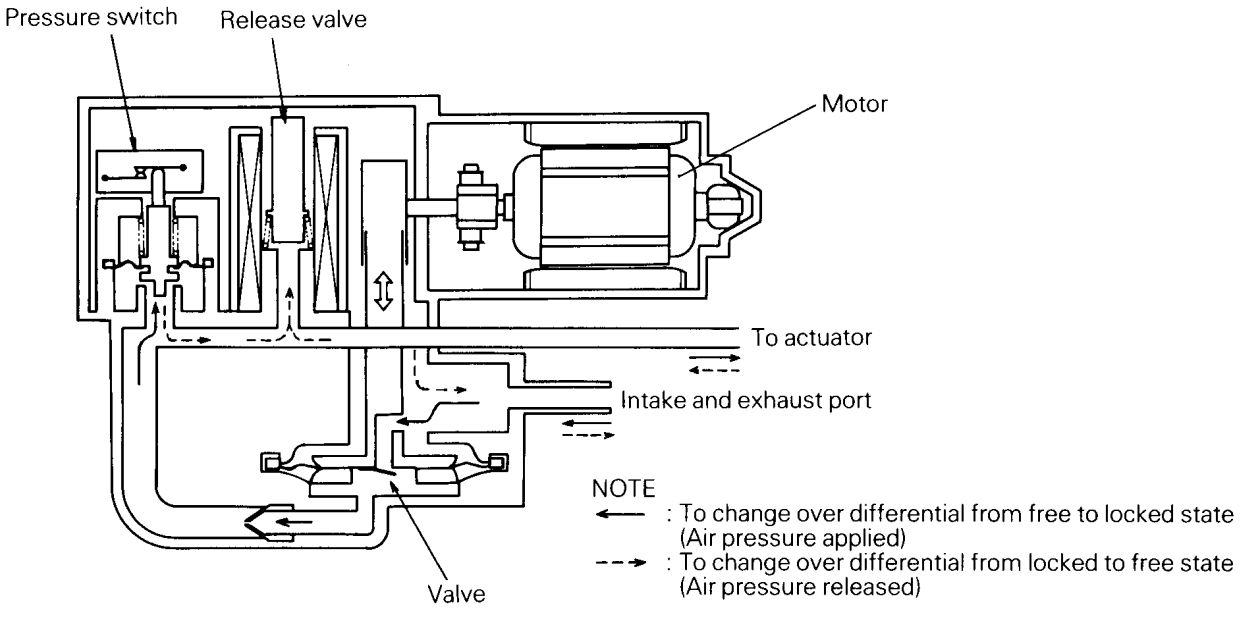
REAR DIFFERENTIAL LOCK AIR PUMP ASSEMBLY

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/cm², 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)





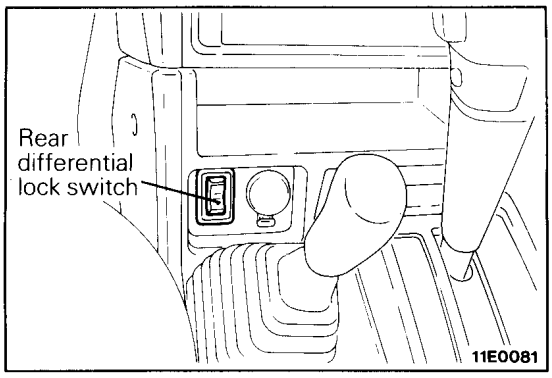


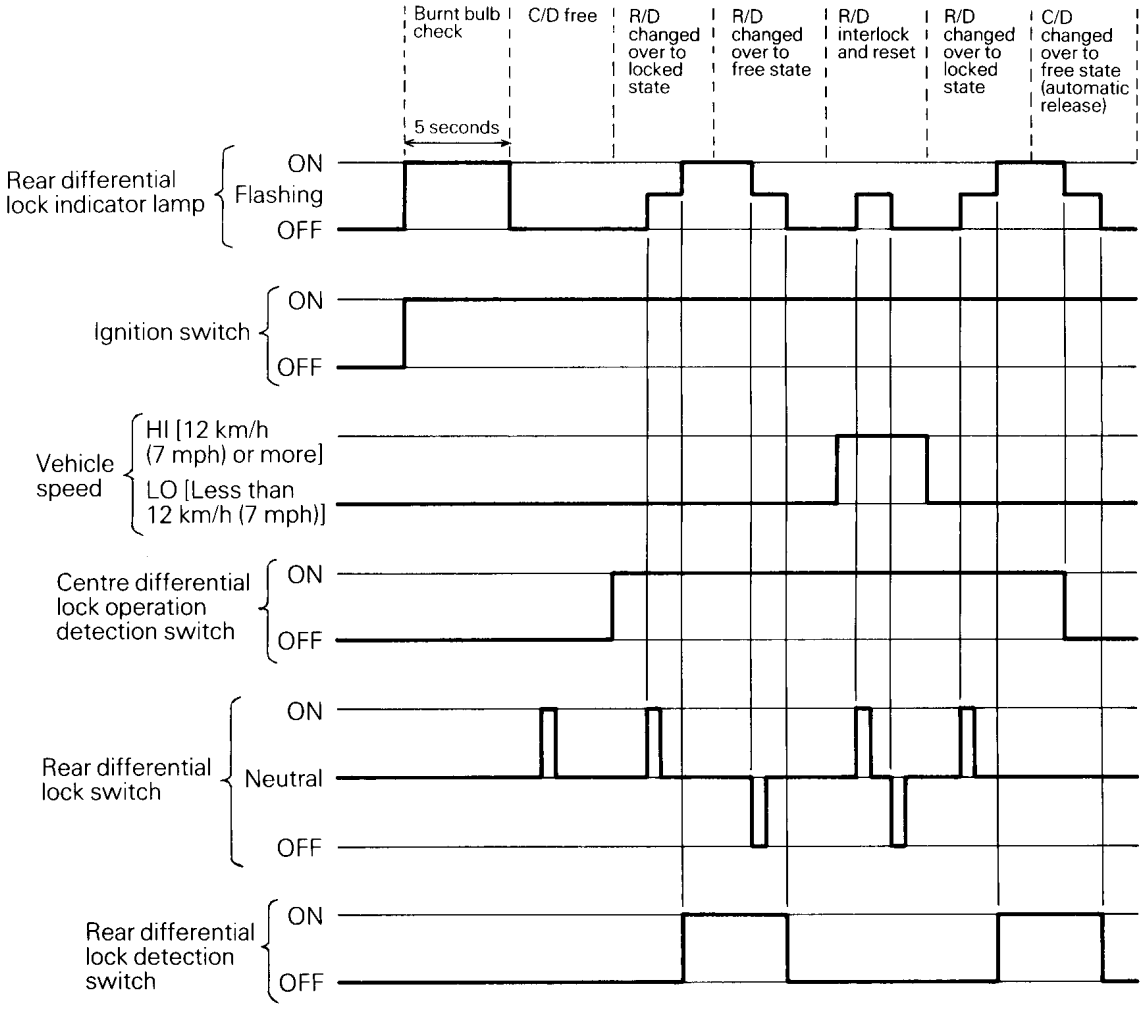
REAR DIFFERENTIAL LOCK INDICATOR LAMP

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).





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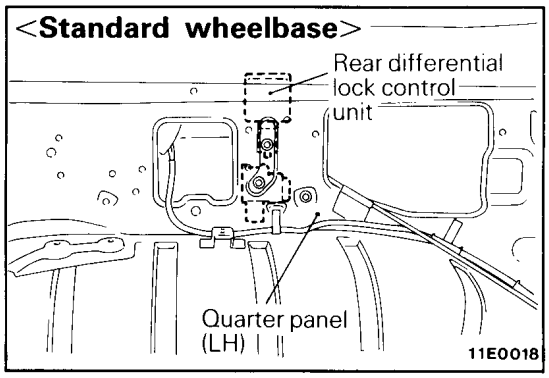
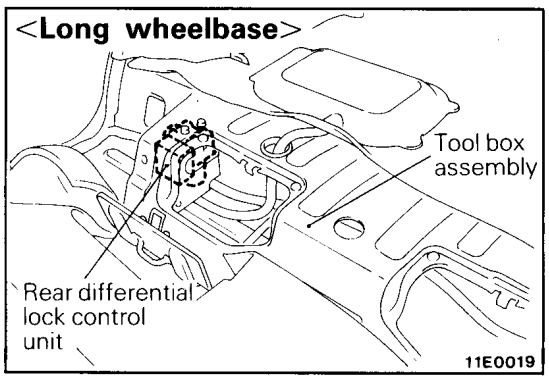
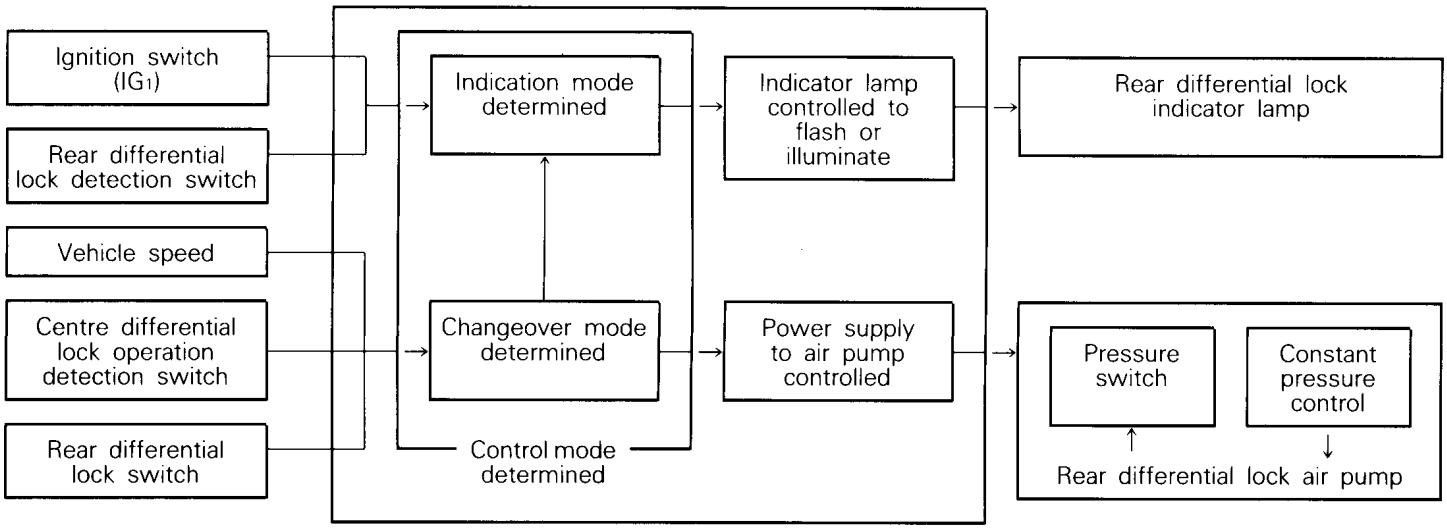
REAR DIFFERENTIAL CONTROL UNIT

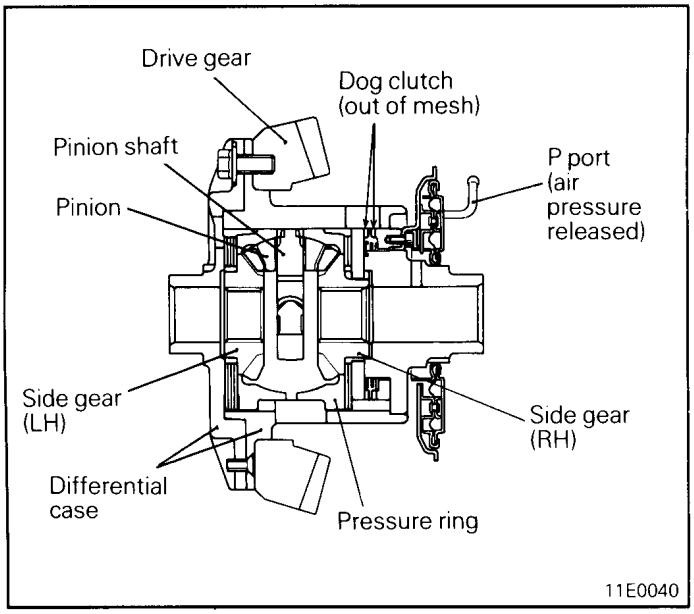
- On the J top and metal top vehicles, the control unit is mounted on the quarter panel (LH). On long wheelbase vehicles, the control unit is mounted in the tool box assembly under the rear seat with a bracket in between.
- Achieves ON/OFF control of power supply to the rear differential lock air pump 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.





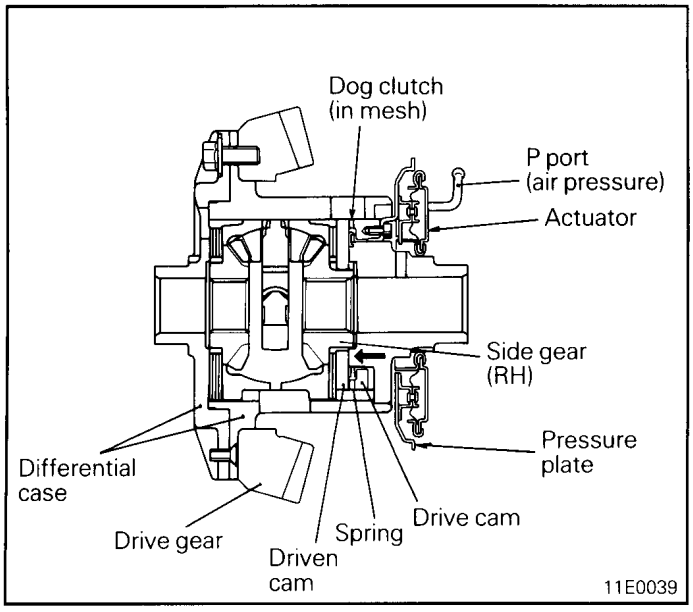
Block Diagram





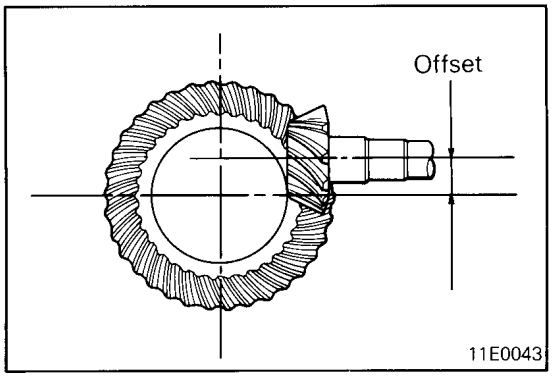
OPERATION OF SYSTEM

(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.



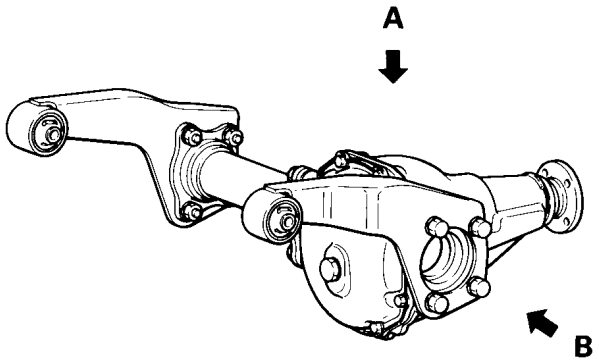
FRONT DIFFERENTIAL

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.



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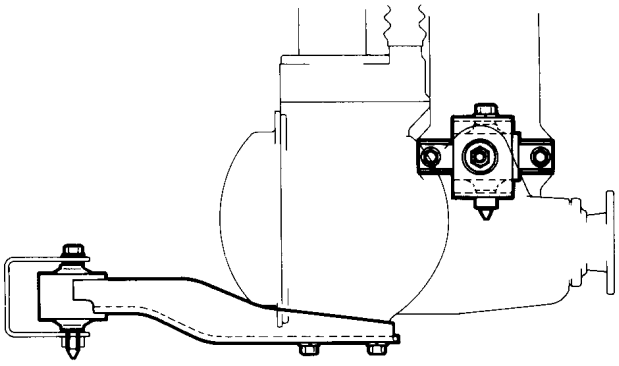
View A



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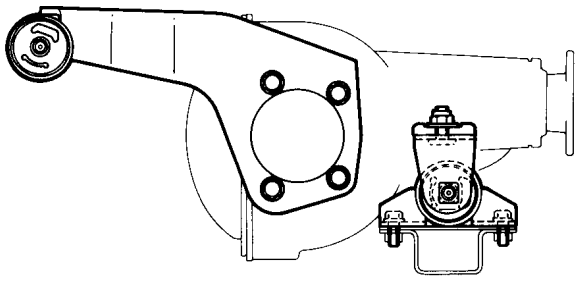
View B



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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:

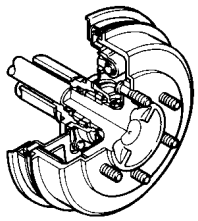
- Wider track (tread) for greater stability due to an extended axle housing and axle shaft
- Greately durable wheel bearing support which uses a press-fitted retainer.
- A new differential air bleeder which opens to the atmosphere through a pipe connected to the differential housing.
- On ABS-equipped 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>



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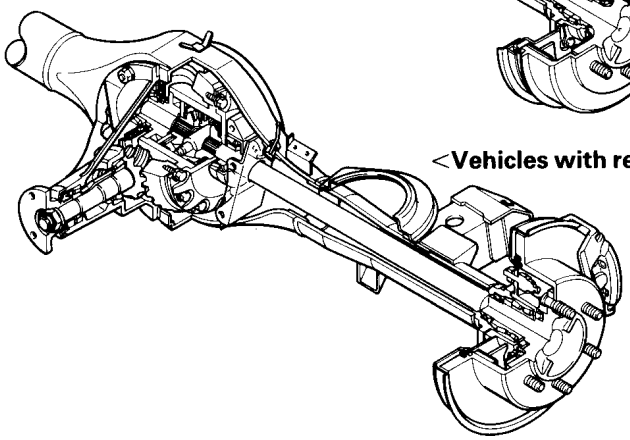

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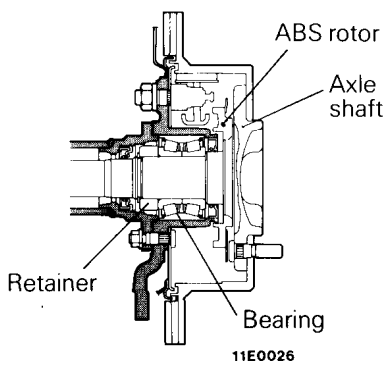

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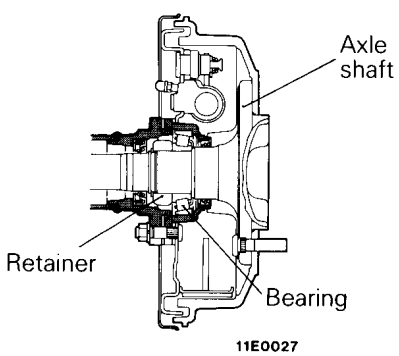

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