

AUTOMATIC TRANSMISSION

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

WARNING!

- (1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver (from rendering the SRS inoperative).
- (2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.
- (3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) and GROUP 00 – Maintenance Service, before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

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

SPECIFICATIONS

GENERAL SPECIFICATIONS

E23CA--

<Vehicles built up to May 1992>

Items	2WD	4WD
Model	F4A22	W4A32
Applicable engine	4G93	4G93
Type	Electronically controlled 4-speed full-automatic	Electronically controlled 4-speed full-automatic
Torque converter		
Type	3-element with damper clutch	3-element with damper clutch
Engine stall speed	1800–2800	1800–2800
Gear ratio		
1st	2.846	2.846
2nd	1.581	1.581
3rd	1.000	1.000
4th	0.685	0.685
Reverse	2.176	2.176
Final gear ratio	4.350	–
Reduction ratio		
Primary	–	1.288
Front differential	–	3.866
Transfer	–	1.090
Speedometer gear ratio (driven/drive)	29/36	29/36

< Vehicles built from June 1992 >

Items	2WD		4WD
	F4A22	F4A23	W4A32
Model	F4A22	F4A23	W4A32
Applicable engine	4G93•4G63	4G64	4G63
Type	Electronically controlled 4-speed full-automatic	Electronically controlled 4-speed full-automatic	Electronically controlled 4-speed full-automatic
Torque converter			
Type	3-element with damper clutch	3-element with damper clutch	3-element with damper clutch
Engine stall speed	1800–2800	1800–2800	1800–2800
Gear ratio			
1st	2.846	2.551	2.846
2nd	1.581	1.488	1.581
3rd	1.000	1.000	1.000
4th	0.685	0.685	0.685
Reverse	2.176	2.176	2.176
Final gear ratio	4.350	3.900	–
Reduction ratio			
Primary	–	–	1.288
Front differential	–	–	3.866
Transfer	–	–	1.090
Speedometer gear ratio (driven/drive)	29/36	29/36	29/36

SERVICE SPECIFICATIONS

E23CB--

Items	Specifications
Standard value	
Line pressure	kPa (kg/cm ² , psi) 870–890 (8.7–8.9, 124–126)
Oil pressure change for each turn of adjustment screw	kPa (kg/cm ² , psi) 38 (0.38, 4.6)
Accelerator pedal switch switching point	mm (in.) 2–6 (0.08–0.24)
Distance between sleeve and selector lever assembly	mm (in.) 18.0–19.0 (0.709–0.784)

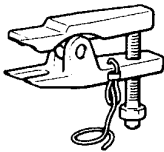
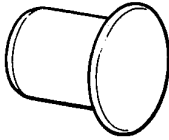
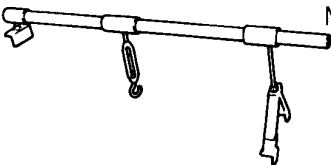
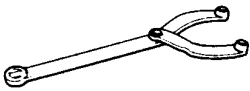
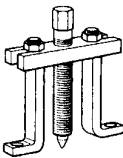
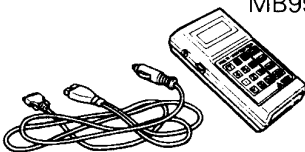

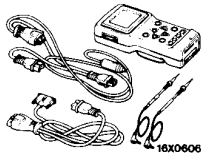

LUBRICANTS

E23CD--

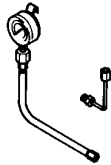
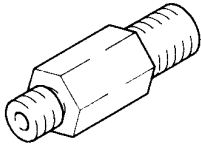
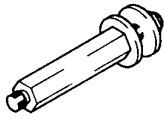
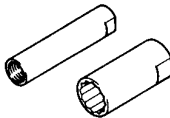
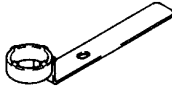
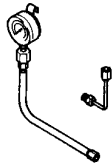
Items	Specified lubricant	Quantity dm ³ (U.S.qts., Imp.qts.)
Transmission fluid	Dia Queen ATF SP or equivalent	<F4A22, F4A23> 6.1 (6.4, 5.4) <W4A32> 6.5 (6.7, 5.7)
Transfer oil	Hypoid gear oil SAE 75W–90 or 75W–85W conforming to API GL-4 or higher	<W4A32> 0.6 (0.6, 0.5)

NOTES

SPECIAL TOOLS

Tool	Number	Name	Use
	MB991113	Steering linkage puller	Disconnection of the coupling of the knuckle and lower arm ball joint Disconnection of the coupling of the knuckle and tie-rod end ball joint
	MB991193	Plug	Preventing foreign substances from entering transfer <4WD>
	MB991191	Engine hanger	To support the engine assembly during removal and installation of the transmission
	MB990767	End yoke holder	Fixing the hub <4WD>
	MB990241	Axle shaft puller	Removal of the drive shaft <4WD>
	MB991341	Multi-use tester (MUT) sub assembly	Checking of the diagnosis code, actuator testing, and checking of the service data
		ROM pack (For the number, refer to GROUP 00 – Precautions Before Service.)	
	MB991502	MUT-II sub assembly	All models Up to 1993 models Checking of the diagnosis code, actuator testing, and checking of the service data
		ROM pack	

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Tool	Number	Name	Use
	MD998330	Oil pressure gauge 3000 kPa (30 kg/cm ² , 400 psi)	Measuring oil pressure
	MD998332	Adapter	Connection of the oil pressure gauge
	MD998915	Kickdown servo wrench adapter	Adjustment of kickdown servo
	MD998916	Kickdown servo adjust wrench set	Adjustment of kickdown servo
	MD998918	Kickdown servo wrench	Adjustment of kickdown servo
	MD999563	Oil pressure gauge 1000 kPa (10 kg/cm ² , 140 psi)	Measuring of pressure

Based upon use of the troubleshooting guide, the probable location of the problem should be estimated.



Checks should be made of fluid levels and the condition of the ATF, as well as the condition of the manual control cables; adjustments should then be made if found to be necessary.



If a presumption has been made that there is an abnormal condition somewhere in the electronic-control system, check the fault code, in order to determine the probable location of the problem, by using a multi-use tester or MUT-II.



When the abnormal system is discovered, check each element (sensors, etc.) one by one, and make repairs as necessary.



When the abnormal condition is presumed to be in the oil-pressure-control system, check by making an oil-pressure test.



When the result of the oil-pressure test does not satisfy the specified pressure, check each system at places related to the valve body, check the oil-pressure passages for leakage, etc.



If the problem is unusually dirty ATF, abnormal noises, oil leakage, or slippage of the clutch or brakes, or an abnormal condition of the transmission itself, disassemble and repair the transmission.

TROUBLESHOOTING

Functional malfunctions of the ELC-4A/T can lead to other problems, such as those described below:

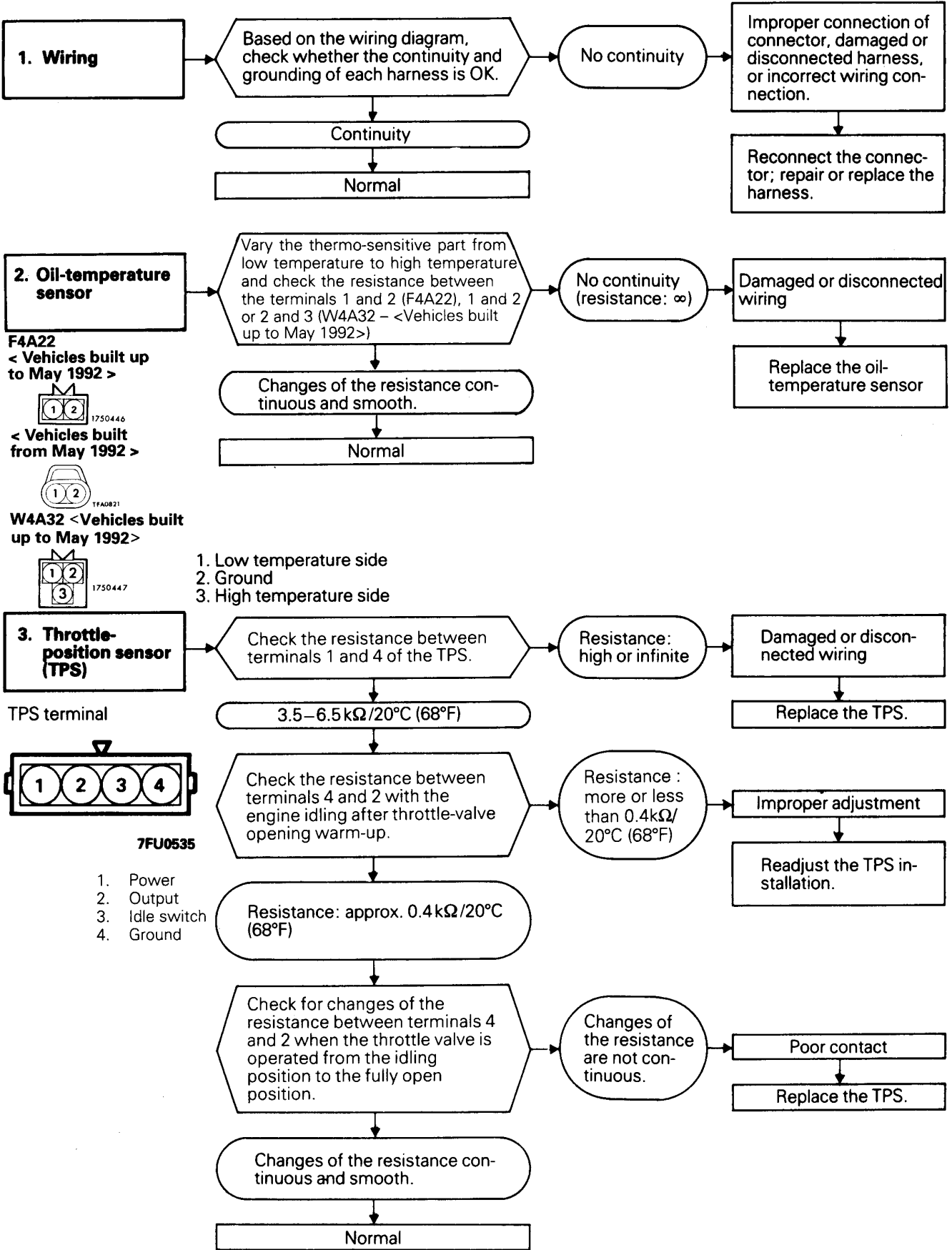
- (1) Improper maintenance and/or adjustments
- (2) Malfunctions of the electronic control functions
- (3) Malfunctions of mechanical functions
- (4) Malfunctions of hydraulic control functions
- (5) Malfunctions of engine performance etc.

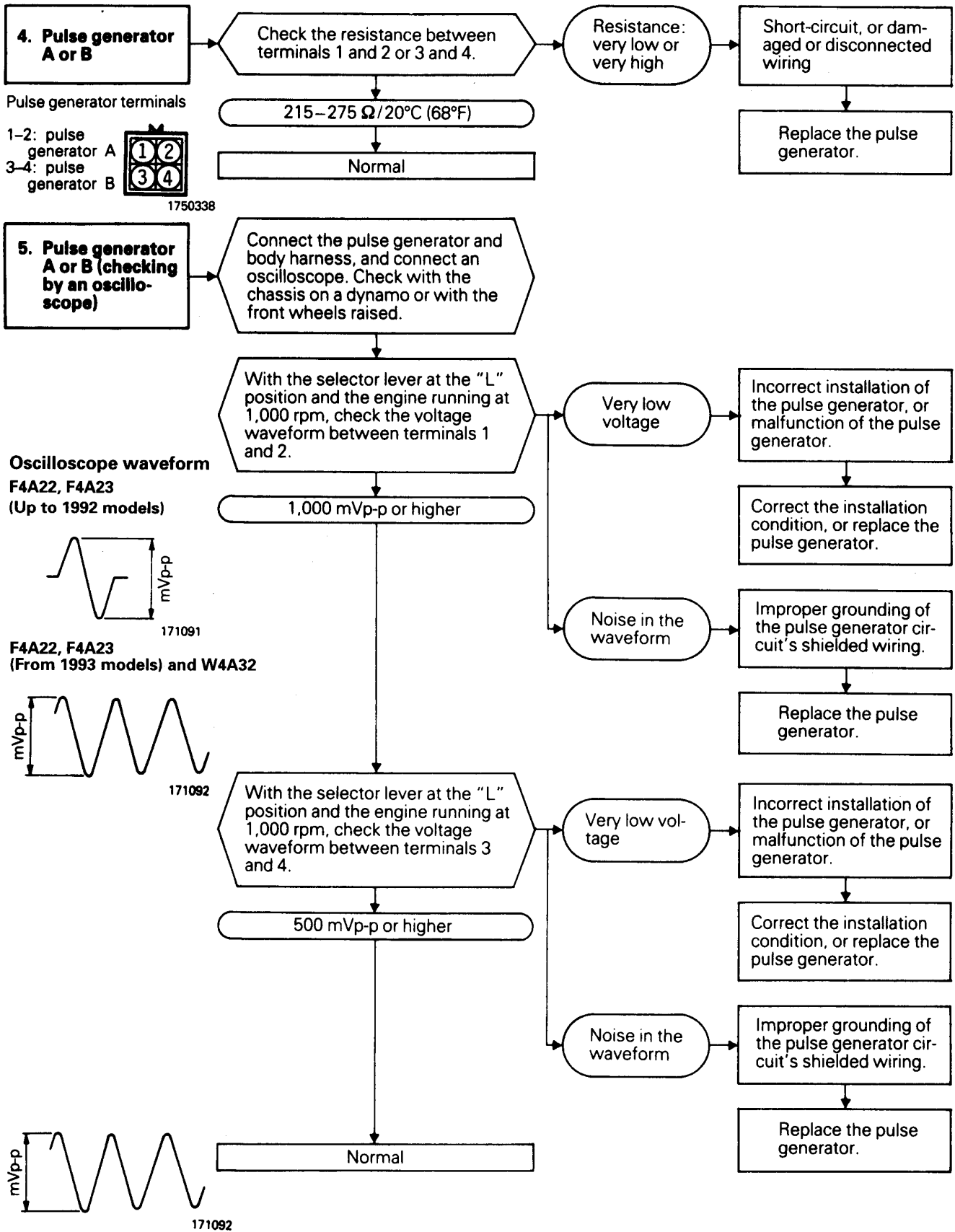
In order to properly determine (“Troubleshoot”) the source of these malfunctions, it is first essential to methodically question the user concerning the details of the problem, such as the condition of the problem, the situation at the time the problem occurred, and any other relevant information, all in as much detail as possible. The user should also be asked whether or not the problem has occurred more than once, and under what conditions. Subsequently, certain tests should be conducted in a certain order, as described at the left.

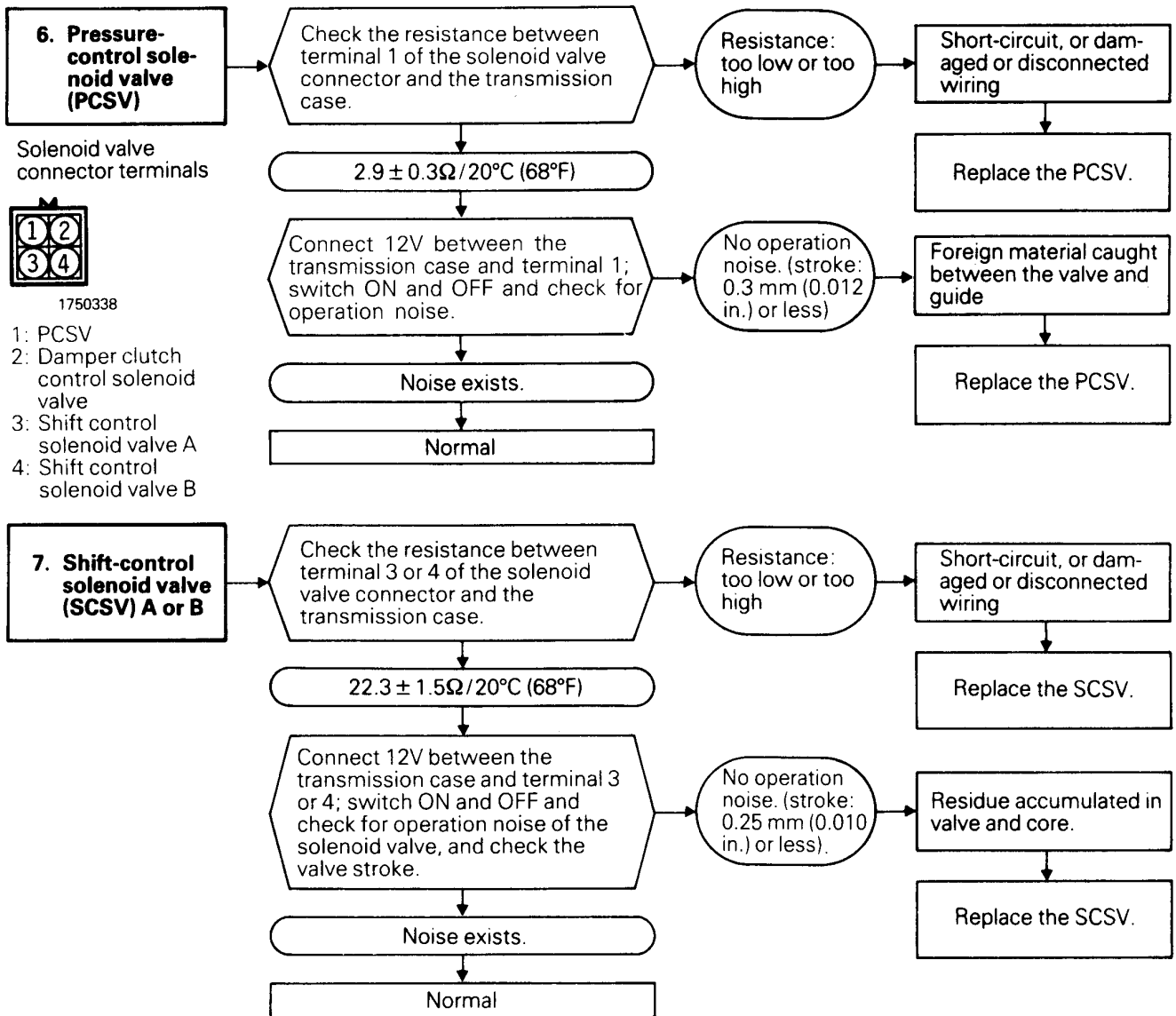
Transmission malfunction of shift-shock (after start-off)																	Abnormal noise, other			
	Won't shift from 2nd to 3rd	Won't shift to 4th	Overdrive control switch doesn't function	Doesn't shift according to shift pattern (shifting is possible)	Improper start-off (starts off from 2nd, etc.)	Excessive creeping or idling vibration	Excessive vibration-shock when shift 1-2 or 3-4	Excessive vibration-shock when shift 2,3 or 4-3	Excessive vibration-shock during upshift	Excessive vibration-shock during D-2 downshift	Sudden engine rpm increase during upshift	Sudden engine rpm increase during 3-2 shift, excessive vibration	Excessive vibration-shock only when cold	Excessive vibration-shock (other than already described)	Damper clutch won't function	Abnormal vibration in high-load region in low gear (approx. 1 Hz)	Abnormal noise from converter housing together with engine rpm	Mechanical noise (clatter noise) from converter housing	Abnormal noise inside transmission case	3rd gear is held
1						X														
2					X		X	X	X	X			X	X		X				
3		X			X															X
4					X										X	X				
5												X					X			
6																				
7																		X		
8																				
9																		X		
10	X	X									X	X								X
11												X								X
12											⊗	⊗	X							X
13	X			X	X		X	X	X	X	X	X	X	X	X	X				X
14	X							X	X		X									X
15																				X
16							X				X	X								X
17							X				X	X		X						X
18									X											X
19																				X
20		⊗					X				X									X
21		X			X															X
22				⊗			X	X	⊗	X	⊗	X		X	X	X				
23							X	X	X	X	X	X		X	X	X				X
24				X											X	X				X
25							X					X								X
26																				X
27							X	X	X	X	X			X	X					X
28																				X
29																				X
30	X	X									X	X								X
31															X					
32																X				X
33		X	X																	
34					X	X									X					
35														X	X	X				
36																				X
37				X																X
38	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X

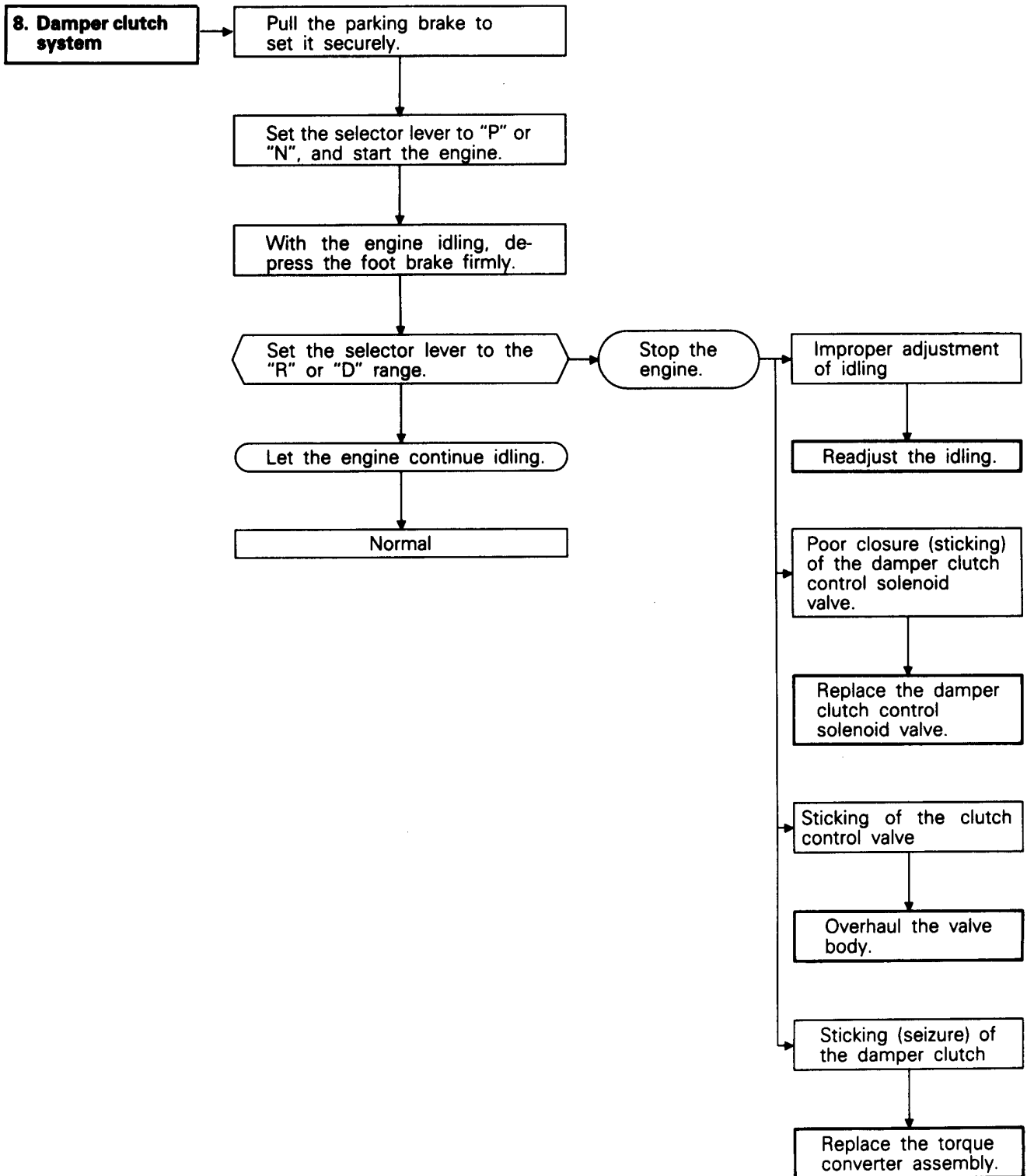
PSCV = Pressure control solenoid valve
 DCCSV = Damper clutch control solenoid valve

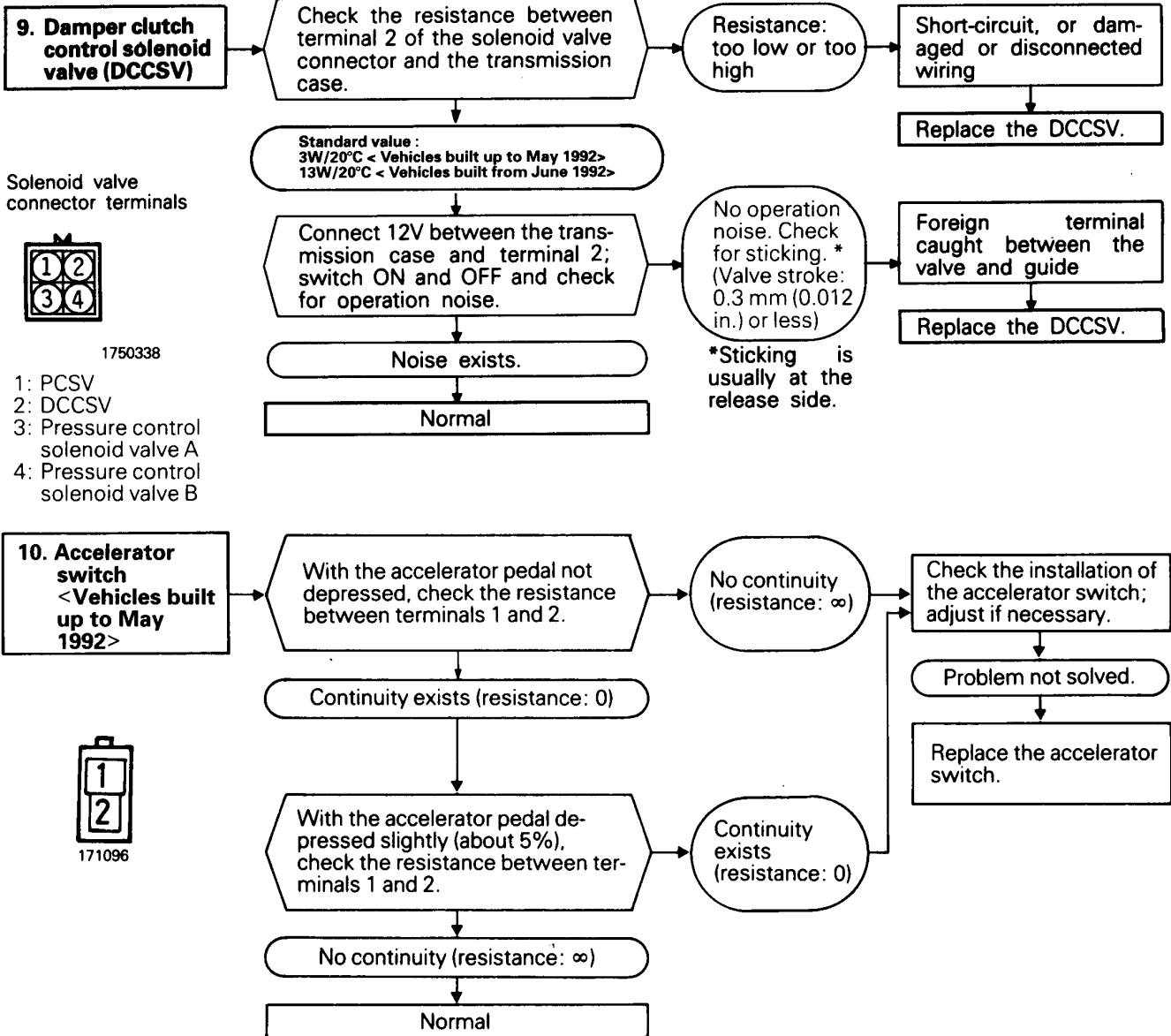
INSPECTION OF ELECTRONIC CONTROL SYSTEM COMPONENTS



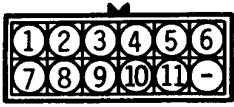




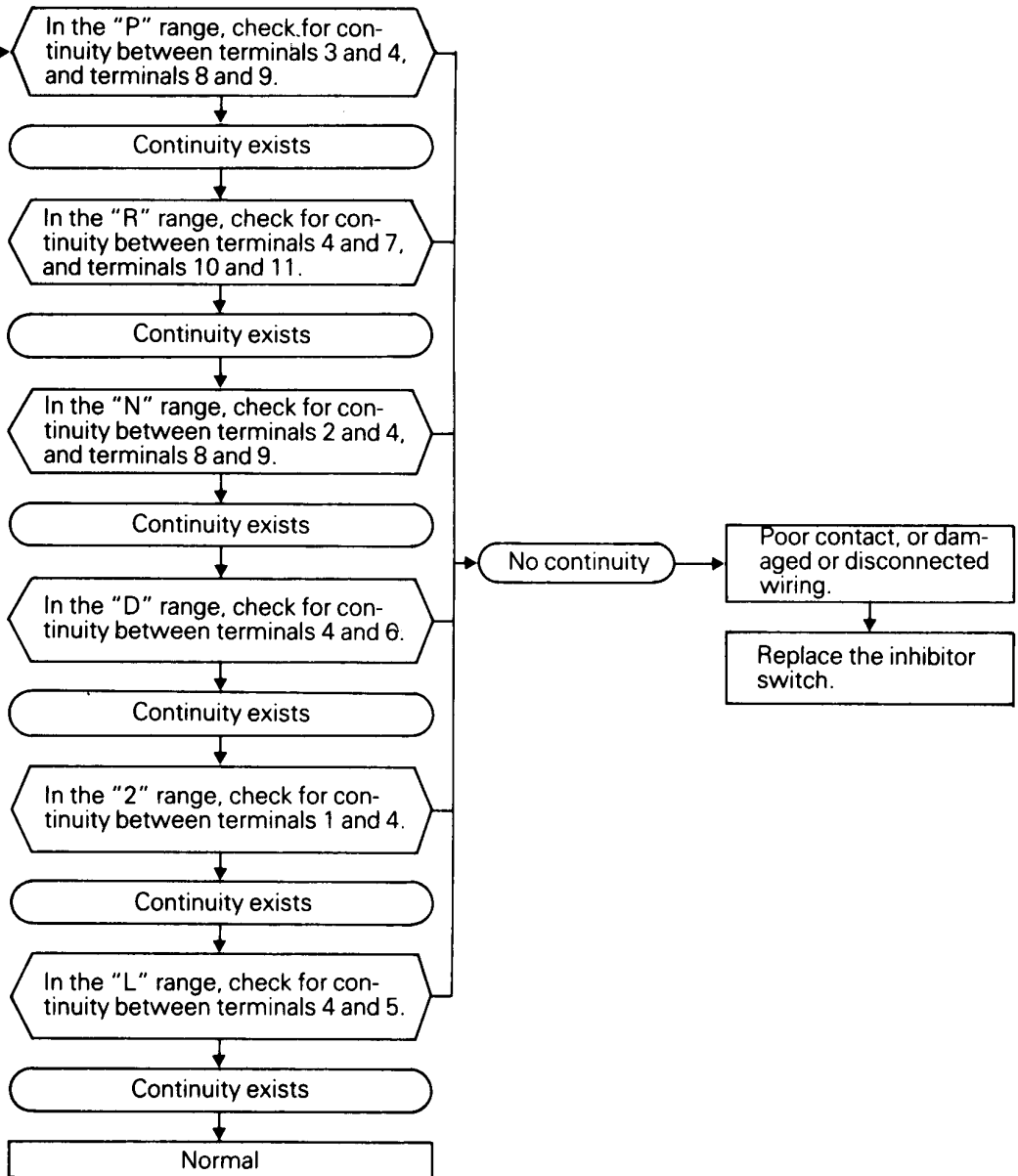




11. Inhibitor switch
 <Vehicles built up to May 1992>



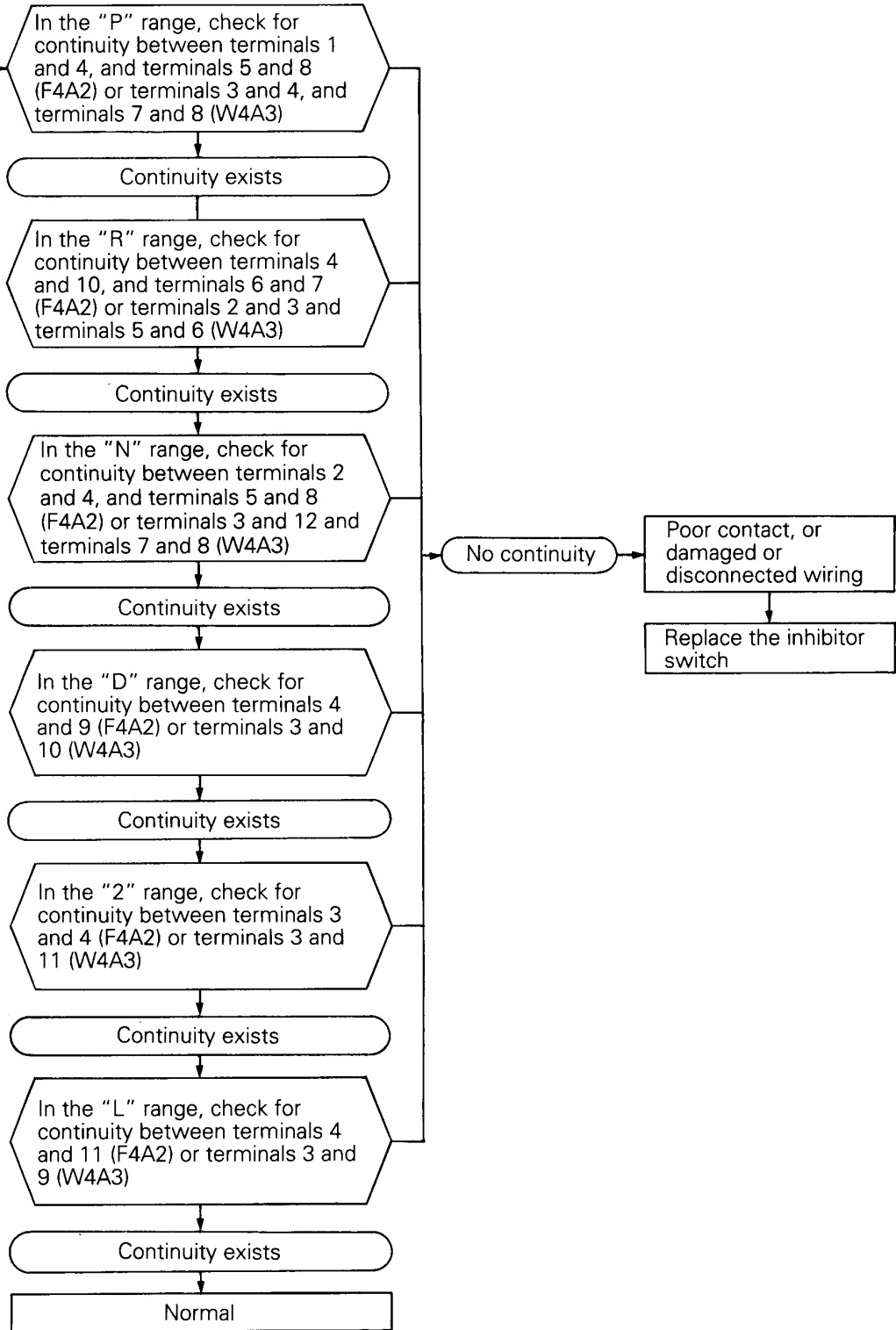
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12. Inhibitor switch
<Vehicles built
from June 1992>

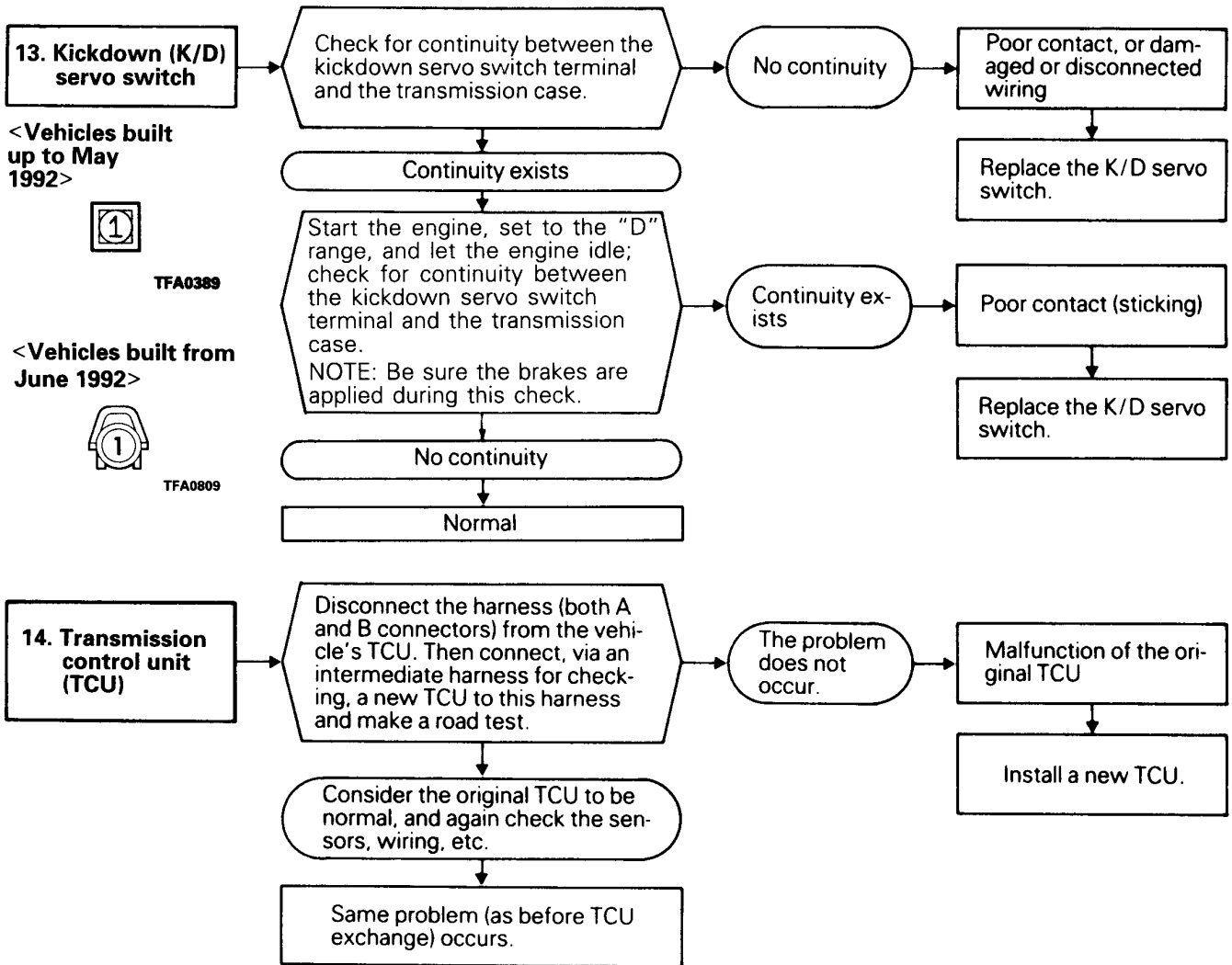


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NOTES



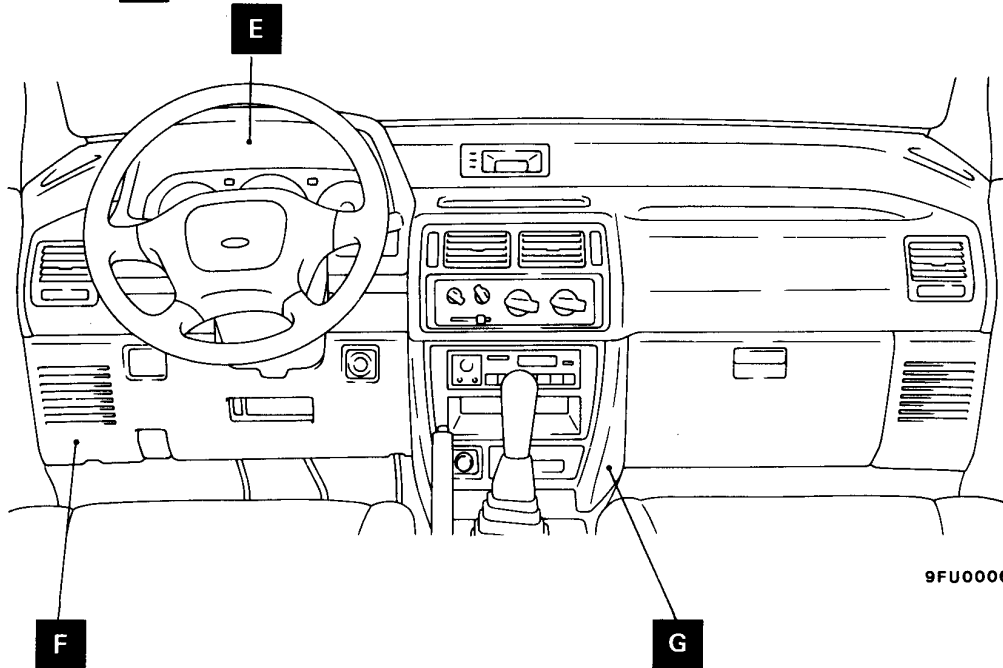
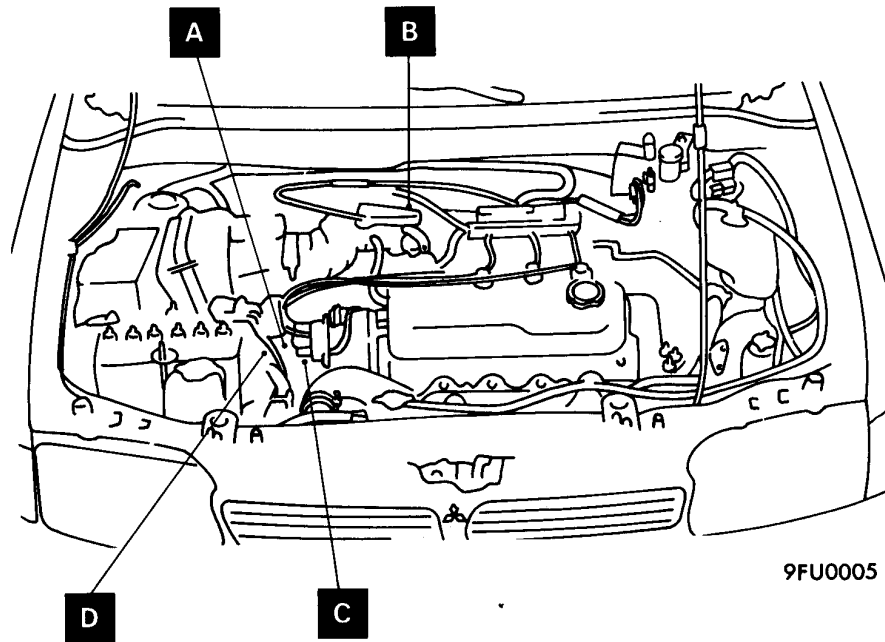
E.L.C. 4-SPEED AUTOMATIC TRANSMISSION CONTROL COMPONENTS LAYOUT

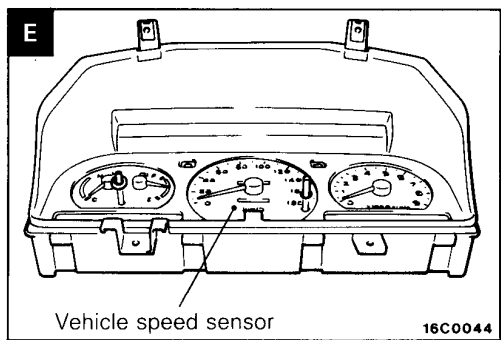
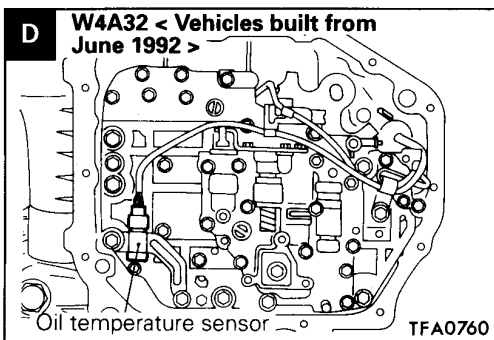
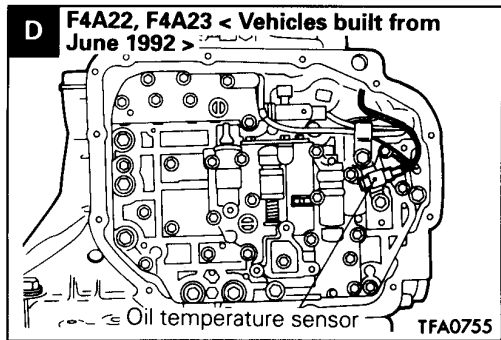
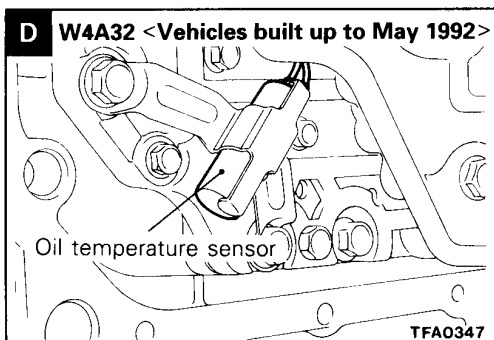
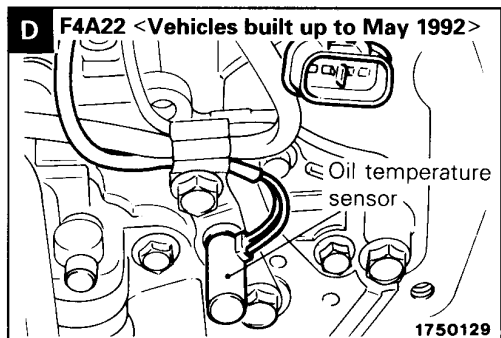
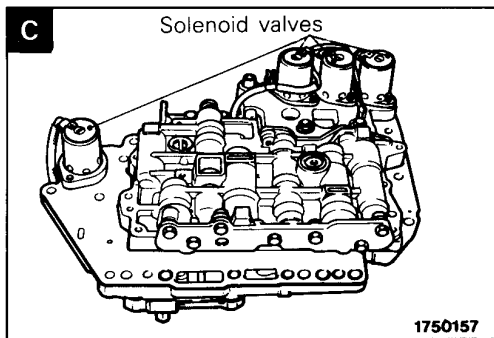
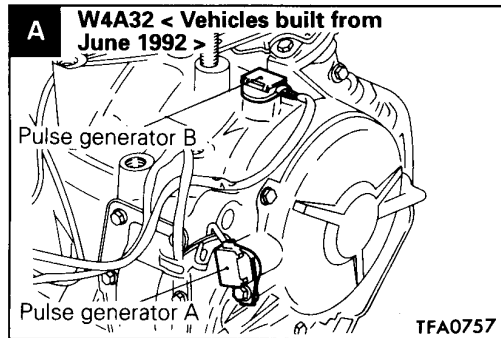
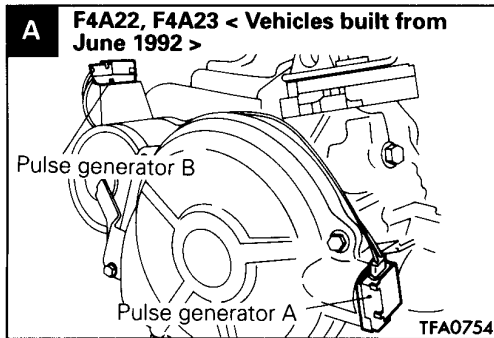
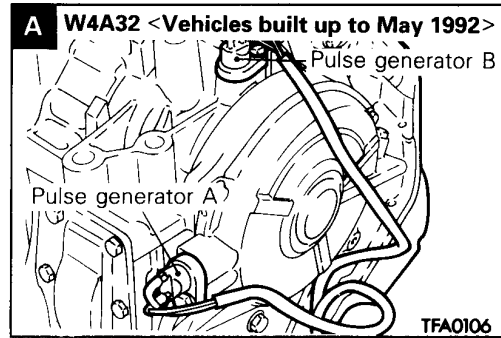
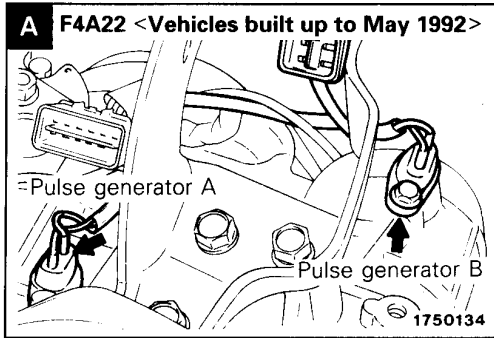
Name	Symbol	Name	Symbol
Oil temperature sensor	D	Solenoid valve	C
Pulse generator A	A	Throttle position sensor	B
Pulse generator B	A	Vehicle speed sensor	E
Self diagnosis check connector	F	4 A/T control unit	G

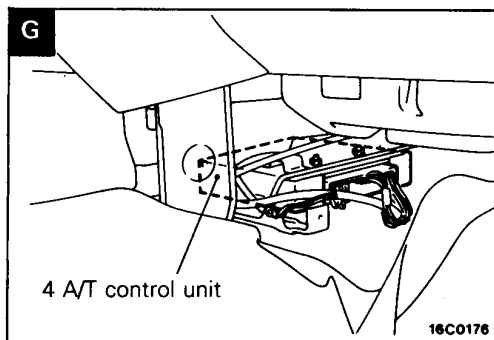
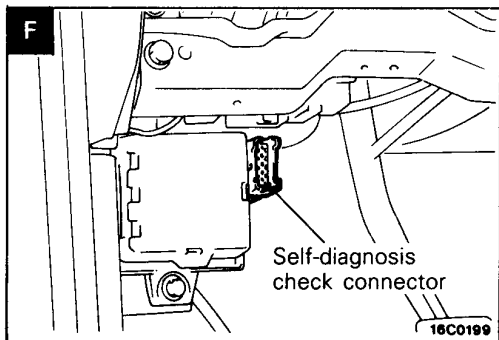
NOTE

C and D are built into the transmission.

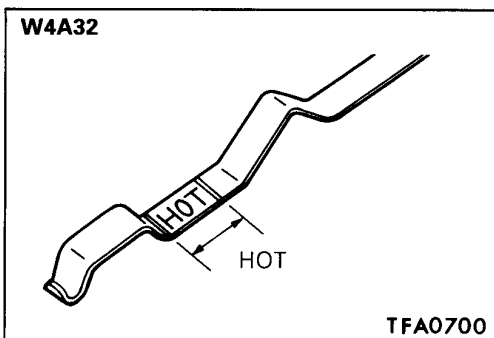
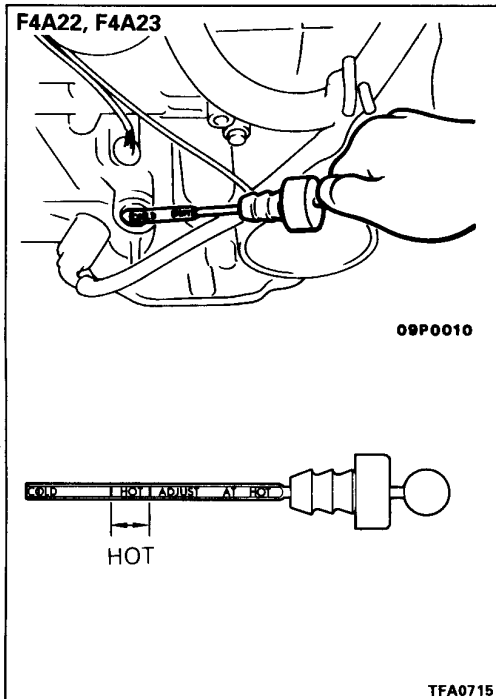
For details of the location of the throttle position sensor, refer to GROUP 13 – On-vehicle Inspection of MPI components.







NOTES



SERVICE ADJUSTMENT PROCEDURES

E23FLAK

TRANSMISSION FLUID LEVEL INSPECTION

1. Drive until the fluid temperature reaches the usual temperature [70 – 80°C (160 – 180°F)].
2. Place vehicle on level floor.
3. Move selector lever sequentially to every position to fill torque converter and hydraulic circuit with fluid, then place lever in "N" Neutral position.
4. Before removing dipstick, wipe all dirt from area around dipstick. Then take out the dipstick and check the condition of the fluid.
The transmission should be overhauled under the following conditions.
 - If there is a "burning" odor.
 - If the fluid color has become noticeably blacker.
 - If there is a noticeably great amount of metal particles in the fluid.
5. Check to see if fluid level is in "HOT" range on dipstick. If fluid level is low, add automatic transmission fluid until level reaches "HOT" range.

Transmission fluid: Dia Queen ATF SP or equivalent

Low fluid level can cause a variety of conditions because it allows pump to take in air along with fluid. Air trapped in hydraulic circuit forms bubbles which make fluid spongy. Therefore, pressures will be erratic, causing delayed shift, slippy clutch and brakes, etc.

Improper filling can also raise fluid level to high. When transmission has too much fluid, gears churn up foam and cause the same conditions which occur with low fluid level, resulting in accelerated deterioration of automatic transmission fluid.

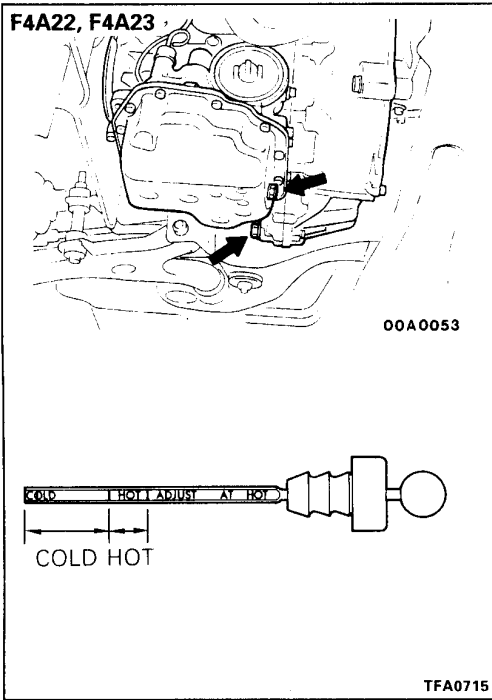
In either case, air bubbles can cause overheating, fluid oxidation, which can interfere with normal valve, clutch, and servo operation. Foaming can also result in fluid escaping from transmission vent where it may be mistaken for a leak.

6. Be sure to examine fluid on dipstick closely.

TRANSFER OIL LEVEL INSPECTION

Transfer oil level inspection is the same as for the manual transmission transfer.

Refer to GROUP 22 – Service Adjustment Procedures.



TRANSMISSION FLUID REPLACEMENT

E23FMAJ

Drain the fluid and check whether there is any evidence of contamination.

Replenish with new fluid after the cause of any contamination has been corrected.

- (1) Remove drain plugs to let fluid drain.
- (2) Remove the oil pan.
- (3) Check the oil filter for clogging and damage and replace if necessary.
- (4) Clean the inside of oil pan and magnets.
- (5) Attach the magnets to the concave part of the oil pan.
- (6) Clean both gasket surfaces of transmission case and oil pan.
- (7) Install oil pan with new gasket and tighten oil pan bolts.

Oil pan bolt: 11 Nm (1.1 kgm, 8.0 ft.lbs.)

- (8) Tighten drain plug with gasket.

Drain plug: 33 Nm (3.3 kgm, 24 ft.lbs.)

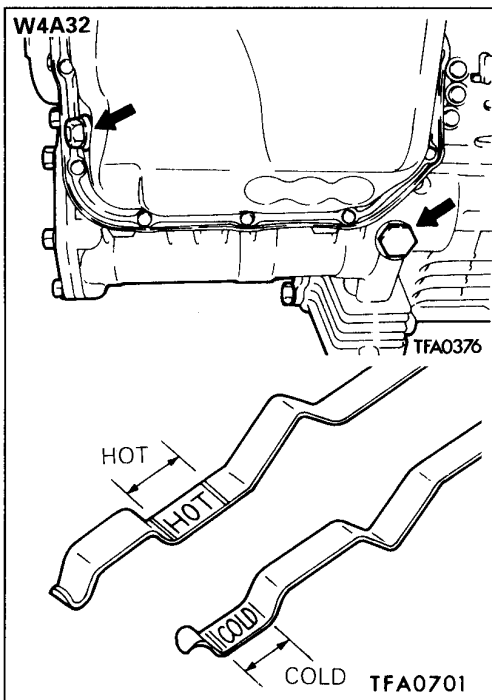
- (9) Replenish with new automatic transmission fluid as far as the COLD mark on the level gauge.

Transmission fluid:

Dia Queen ATF SP or equivalent

- (10) Start engine and allow to idle for at least two minutes. Then, with parking brake on, move selector lever momentarily to each position, ending in "N" Neutral position.

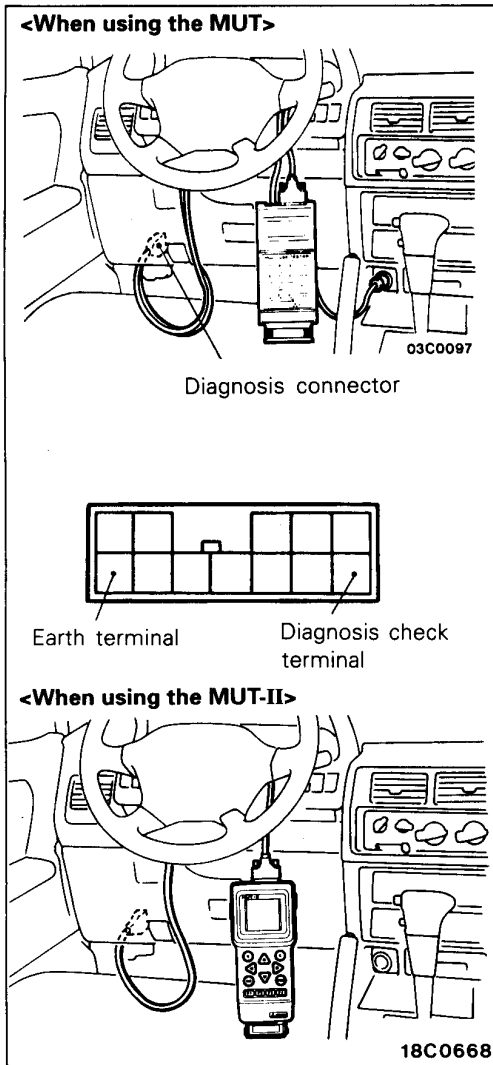
- (11) Check to be sure that the automatic transmission fluid is up to the HOT mark on the level gauge.



TRANSFER OIL REPLACEMENT

Transfer oil replacement is the same as for the manual transmission transfer.

Refer to GROUP 22 – Service Adjustment Procedures.



READ OUT OF MALFUNCTION CODE

E23FAAH

WHEN USING MULTI-USE TESTER (MUT) <Up to 1993 models> OR MUT-II <All models>

- (1) Connect the voltmeter, MUT or MUT-II to the diagnosis connector.

NOTE

When connecting the MUT-II to vehicles built before 1993, use the adaptor harness which is supplied as an accessory to the MUT-II sub-assembly.

- (2) Read out malfunction codes.
- (3) Check the cause according to the "DIAGNOSIS CHART" and "FAIL-SAFE CHART" and repair.
- (4) Use the MUT or MUT-II to erase the malfunction code. If you do not have a MUT or MUT-II, remove the (-) terminal of the battery to erase the malfunction code.

DIAGNOSIS CHART

Code No.	Description	Remedy
11	Excessively high throttle position sensor output	<ul style="list-style-type: none"> ● Check the throttle position sensor connector. ● Check the throttle position sensor itself. ● Adjust the throttle position sensor. ● Check the accelerator switch (No. 24: output or not).
12	Excessively low throttle position sensor output	
13	Throttle position sensor malfunction	
14	Improperly adjusted throttle position sensor system	
15	Open in the low-temperature side of the oil temperature sensor circuit.	<ul style="list-style-type: none"> ● Oil temperature sensor connector inspection ● Oil temperature sensor inspection
16	Short in the high-temperature side of the oil temperature sensor circuit.	
17	Open in the high-temperature side of the oil temperature sensor circuit or short in the low-temperature side circuit.	
21	Open kickdown servo switch circuit	<ul style="list-style-type: none"> ● Check the kickdown servo switch connector. ● Check the kickdown servo switch.
22	Shorted kickdown servo switch circuit	
23	Open ignition pulse pickup cable circuit	<ul style="list-style-type: none"> ● Check the ignition pulse signal line.
24	Open-circuited or improperly adjusted accelerator switch <Vehicles built up to May 1992>	<ul style="list-style-type: none"> ● Check the accelerator switch connector. ● Check the accelerator switch itself. ● Adjust the accelerator switch.
31	Open pulse generator A circuit	<ul style="list-style-type: none"> ● Check the pulse generator A and pulse generator B. ● Check the vehicle speed reed switch (for chattering).
32	Open pulse generator B circuit	

23-30 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

Code No.	Description	Remedy
33	Open-circuit or improperly adjusted wide open throttle switch	<ul style="list-style-type: none">● Check the wide open throttle switch connector.● Check the wide open throttle switch itself.● Adjust the wide open throttle switch.
34	Short-circuit or improperly adjusted wide open throttle switch	
41	Open shift control solenoid valve A circuit	<ul style="list-style-type: none">● Check the solenoid valve connector.● Check shift control solenoid valve A.
42	Shorted shift control solenoid valve A circuit	
43	Open shift control solenoid valve B circuit	<ul style="list-style-type: none">● Check the solenoid valve connector.● Check shift control solenoid valve B.
44	Shorted shift control solenoid valve B circuit	
45	Open pressure control solenoid valve circuit	<ul style="list-style-type: none">● Check the solenoid valve connector.● Check the pressure control solenoid valve.
46	Shorted pressure control solenoid valve circuit	
47	Broken wire in damper clutch control solenoid valve	<ul style="list-style-type: none">● Inspection of solenoid valve connector● Individual inspection of damper clutch control solenoid valve
48	Short circuit in damper clutch control solenoid valve	
49	Defect in the damper clutch system	<ul style="list-style-type: none">● Inspection of damper clutch hydraulic system● Individual inspection of damper clutch control solenoid valve● Replacement of control unit

Code No.	Description	Remedy
51	1st gear incorrect ratio	<ul style="list-style-type: none"> ● Check the pulse generator A and pulse generator B connector. ● Check pulse generator A and pulse generator B. ● Rear clutch slippage.
52	2nd gear incorrect ratio	<ul style="list-style-type: none"> ● Check the pulse generator A connector. ● Check pulse generator A. ● Kickdown brake slippage.
53	3rd gear incorrect ratio	<ul style="list-style-type: none"> ● Check the pulse generator A and pulse generator B connector. ● Check pulse generator A and pulse generator B. ● Front clutch slippage. ● Rear clutch slippage.
54	4th gear incorrect ratio	<ul style="list-style-type: none"> ● Check the pulse generator A and pulse generator B connector. ● Check pulse generator A and pulse generator B themselves. ● End clutch slippage. ● Kickdown brake slippage.
59	Abnormal vibration occurs	<ul style="list-style-type: none"> ● Check the pulse generator A connector. ● Check the pulse generator A. ● Replace the automatic transmission fluid.
–	Normal	–
–	Defective transmission control unit (TCU)	<ul style="list-style-type: none"> ● TCU power supply inspection ● TCU earth inspection ● TCU replacement

FAIL-SAFE CHART

Output code	Description	Fail-safe countermeasure	Note (relation to self-diagnosis)
Code No.			
81	Open-circuited pulse generator A	Locked in 3rd (D) or 2nd (2,L)	When code No. 31 is generated 4th time
82	Open-circuited pulse generator B	Locked in 3rd (D) or 2nd (2,L)	When code No. 32 is generated 4th time
83	Open-circuited or shorted shift control solenoid valve A	Locked in 3rd	When code No. 41 or 42 is generated 4th time
84	Open-circuited or shorted shift control solenoid valve B	Locked in 3rd	When code No. 43 or 44 is generated 4th time
85	Open-circuited or shorted pressure control solenoid valve	Locked in 3rd (D) or 2nd (2,L)	When code No. 45 or 46 is generated 4th time
86	Gear shifting does not match the engine speed	Locked in 3rd (D) or 2nd (2,L)	When code No. 51, 52, 53 or 54 is generated 4th time
–	Defective transmission control unit (TCU)	Locked in 3rd	–

23-32 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

CHECKING THE CONTROL SYSTEM (WHEN MUT OR MUT-II IS USED)

Using the MUT or the MUT-II, follow the checking procedures as described in the table below.

Check items	Check procedures		Probable cause (or remedy) if a malfunction is found
	Check conditions	Normal value	
Throttle position sensor (TPS) ● Data reading ● Item No. 11	Accelerator completely closed	0.4–1.0 V	<ul style="list-style-type: none"> ● TPS is incorrectly adjusted if voltage is high during fully closed or fully open ● TPS or circuit harness malfunction if there is no change ● TPS or accelerator wire malfunction if the change is not smooth
	Accelerator slowly depressed	Changes occur according to degree of opening	
	Accelerator completely open	4.5–5.5 V	
Oil temperature sensor ● Data reading ● Item No. 15	Engine cold (before starting)	Corresponding to outside air temperature	<ul style="list-style-type: none"> ● Oil temperature sensor or circuit harness malfunction
	Engine warming up (during driving)	Gradual increase	
	After engine warmed up	70–90°C (158–194°F)	
Kickdown servo switch ● Data reading ● Item No. 21	L range; idling	ON	<ul style="list-style-type: none"> ● Kickdown servo improperly adjusted ● Kickdown servo switch or circuit harness malfunction ● Kickdown servo malfunction
	D range; 1st or 3rd gear	ON	
	D range; 2nd or 4th gear	OFF	
Ignition signal line ● Data reading ● Item No. 23	N range; idling	650–900 r/min.	<ul style="list-style-type: none"> ● Ignition system malfunction ● Ignition signal pick-up circuit harness malfunction
	N range; 50 km/h (31 mph) (speedometer reading)	1800–2200 r/min.	
Accelerator switch <Vehicles built up to May 1992> ● Data reading ● Item No. 24	Accelerator fully closed	ON	<ul style="list-style-type: none"> ● Accelerator switch incorrectly adjusted ● Accelerator switch or circuit harness malfunction
	Accelerator slightly depressed	OFF	
Idle switch ● Data reading ● Item No. 25	Accelerator fully closed	ON	<ul style="list-style-type: none"> ● TPS is incorrectly adjusted ● TPS or circuit harness malfunction
	Accelerator slightly depressed	OFF	
Air conditioner relay signals ● Data reading ● Item No. 26	D range; air conditioner switch ON	ON	<ul style="list-style-type: none"> ● Air conditioner power relay ON signal-detection circuit harness malfunction
	D range; air conditioner switch OFF	OFF	

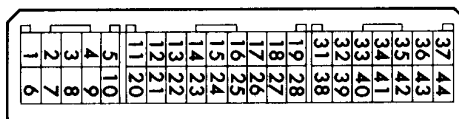
Check items	Check procedures		Probable cause (or remedy) if a malfunction is found
	Check conditions	Normal value	
Transmission gear position ● Data reading ● Item No. 27	D range; idling	C	<ul style="list-style-type: none"> ● TCU malfunction ● Accelerator switch system malfunction ● Inhibitor switch system malfunction ● TPS system malfunction
	L range; idling	1ST	
	2 range; 2nd gear	2ND	
	D range; overdrive-OFF, 3rd gear	3RD	
	D range; overdrive; 4th gear	4TH	
Pulse generator A ● Data reading ● Item No. 31	D range; stopped	0 r/min.	<ul style="list-style-type: none"> ● Pulse generator A or circuit harness malfunction ● Pulse generator A shielded line malfunction ● Kickdown brake slippage
	D range; driving at 50 km/h (31 mph) in 3rd gear	1800–2200 r/min.	
	D range; driving at 50 km/h (31 mph) in 4th gear	1200–1500 r/min.	
Pulse generator B ● Data reading ● Item No. 32	D range; stopped	0 r/min.	<ul style="list-style-type: none"> ● Pulse generator B or circuit harness malfunction ● Pulse generator B shielded line malfunction
	D range; driving at 50 km/h (31 mph) in 3rd gear	1800–2200 r/min.	
	D range; driving at 50 km/h (31 mph) in 4th gear	1800–2200 r/min.	
Overdrive switch ● Data reading ● Item No. 35	Overdrive switch ON	OD	<ul style="list-style-type: none"> ● Overdrive switch or circuit harness malfunction
	Overdrive switch OFF	OD-OFF	
Inhibitor switch ● Data reading ● Item No. 37	Shift to P range	P	<ul style="list-style-type: none"> ● Inhibitor switch improperly adjusted ● Inhibitor switch or circuit harness malfunction ● Manual control cable malfunction
	Shift to R range	R	
	Shift to N range	N	
	Shift to D range	D	
	Shift to 2 range	2	
	Shift to L range	L	

23-34 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

Check items	Check procedures		Probable cause (or remedy) if a malfunction is found
	Check conditions	Normal value	
Vehicle speed reed switch ● Data reading ● Item No. 38	Vehicle stopped	0 km/h (0 mph)	<ul style="list-style-type: none"> ● Vehicle speed reed switch malfunction if high-speed signals emitted while vehicle is stopped ● Otherwise, vehicle speed reed switch or circuit harness malfunction
	Driving at 30 km/h (19 mph)	30 km/h (19 mph)	
	Driving at 50 km/h (31 mph)	50 km/h (31 mph)	
PCSV duty ● Data reading ● Item No. 45	D range; idling	50–70%	<ul style="list-style-type: none"> ● Duty should become 100% when, while idling in D range, accelerator is pressed even slightly ● TCU malfunction ● TPS Malfunction ● Accelerator switch system malfunction
	D range; 1st gear	100%	
	D range; during shift	Changes occur according to conditions	
Amount of damper clutch slip ● Data reading ● Item No. 47	D range, 3rd gear 1,500 r/min. (reading on tachometer)	100–300 r/min.	<ul style="list-style-type: none"> ● Damper clutch is defective ● Ignition signal line or pulse generator system is defective. ● Transmission hydraulic pressure is inadequate. ● Damper clutch control solenoid valve (DCCSV) is defective.
	D range, 3rd gear 3,500 r/min. (reading on tachometer)	0 r/min.	
DCCSV duty ● Data reading ● Item No. 49	D range, 3rd gear 1,500 r/min. (reading on tachometer)	0%	<ul style="list-style-type: none"> ● Transmission control unit is defective. ● TPS system is defective. ● Pulse generator B system is defective.
	D range, 3rd gear 3,500 r/min. (reading on tachometer)	Change according to negative load	

TRANSMISSION CONTROL UNIT (TCU)

<Vehicles built up to May 1992>



TFA0827

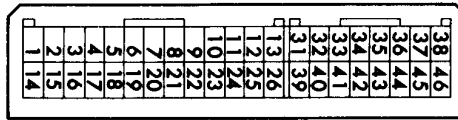
1. Damper clutch control solenoid valve
2. Shift control solenoid valve A
3. Oil temperature warning light < W4A32 >
4. Power source
5. Earth
6. Pressure control solenoid valve
7. Shift control solenoid valve B
8. –
9. Power source
10. Earth

11. Earth
12. Wide open throttle switch (L.H. drive vehicles only)
13. –
14. –
15. Diagnosis output terminal
16. Air conditioner relay signal
17. –
18. Diagnosis control terminal
19. –
20. Power source (Backup)
21. Kickdown servo switch
22. Idle switch
23. Throttle position sensor (Power source)
24. Oil temperature sensor (low temperature side)
25. Oil temperature sensor (high temperature side) < W4A32 >
26. Throttle position sensor (Output)
27. Sensor earth
28. Vehicle speed reed switch

31. Inhibitor switch (P)
32. Inhibitor switch (R)
33. Inhibitor switch (N)
34. Inhibitor switch (D)
35. Inhibitor switch (2)
36. Inhibitor switch (L)
37. Overdrive switch
38. Pulse generator (B)
39. Pulse generator (B)
40. Pulse generator (A)
41. Pulse generator (A)
42. Earth
43. Ignition pulse
44. –

23-35-1 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

<Vehicles built from June 1992>



TFA0828

1. Damper clutch control solenoid valve
2. Shift control solenoid valve A
3. Oil temperature warning light <W4A32>
4. –
5. –
6. –
7. Kickdown servo switch
8. Air conditioning relay signal
9. Diagnosis output terminal
10. –
11. Diagnosis control terminal
12. Power supply
13. Ground
14. Pressure control solenoid valve
15. Shift control solenoid valve B
16. K/D detent switch <Left hand drive>
17. –
18. –
19. –
20. Idle switch
21. Throttle position sensor
22. –
23. Oil temperature sensor
24. Sensor ground
25. Power supply (Backup)
26. Ground

31. Inhibitor switch (P)
32. Inhibitor switch (R)
33. Inhibitor switch (N)
34. Inhibitor switch (D)
35. Inhibitor switch (2)
36. Inhibitor switch (L)
37. Overdrive switch
38. –
39. Power supply
40. Vehicle speed reed switch
41. Pulse generator B
42. Pulse generator B
43. Pulse generator A
44. Pulse generator A
45. Ground
46. Ignition pulse

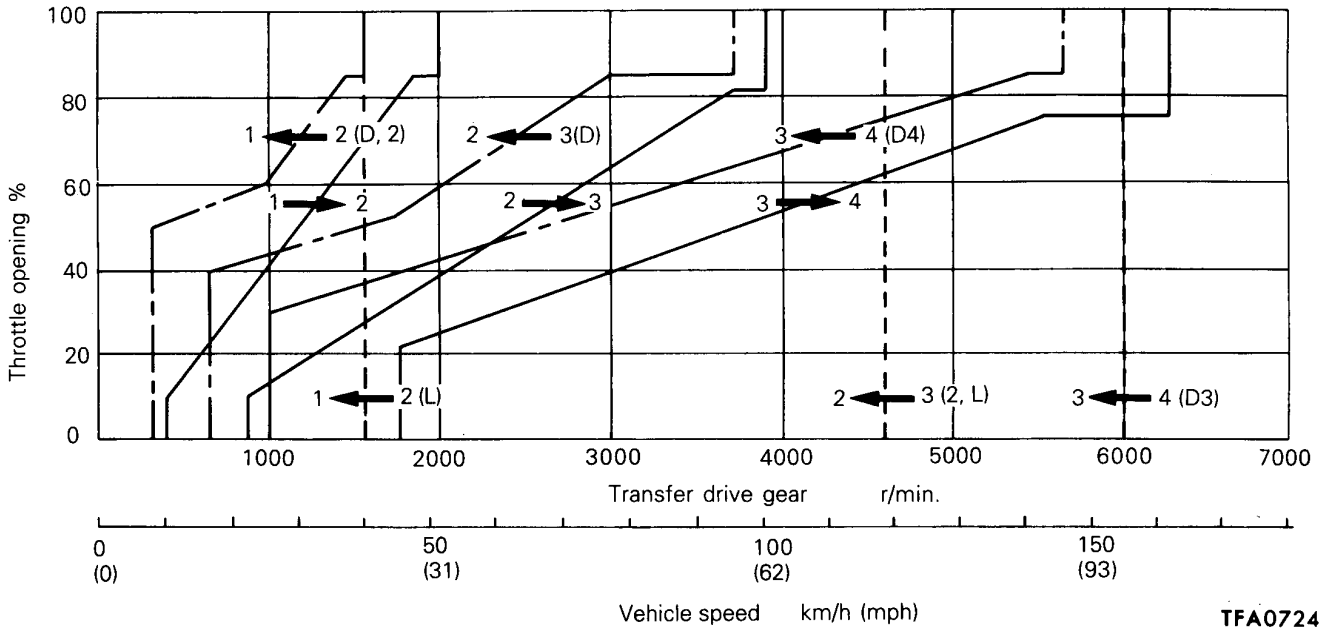
NOTES

SHIFT PATTERNS

<Vehicles built up to May 1992>

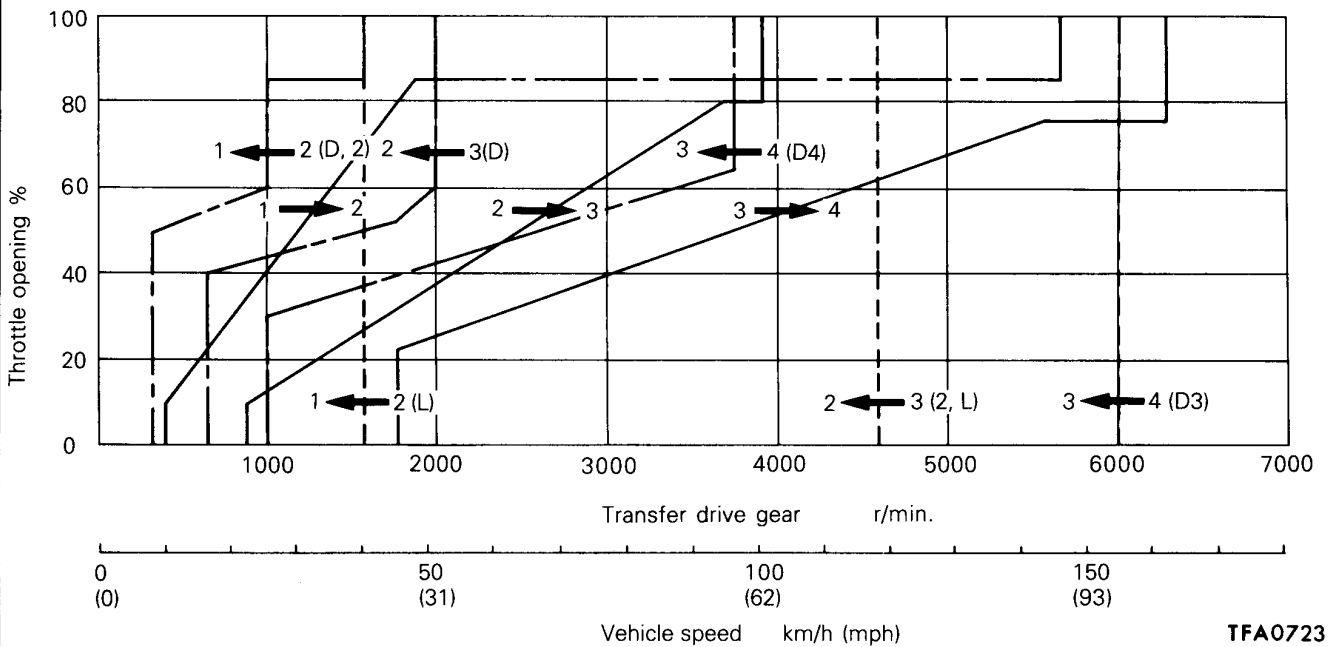
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LEFT HAND DRIVE



TFA0724

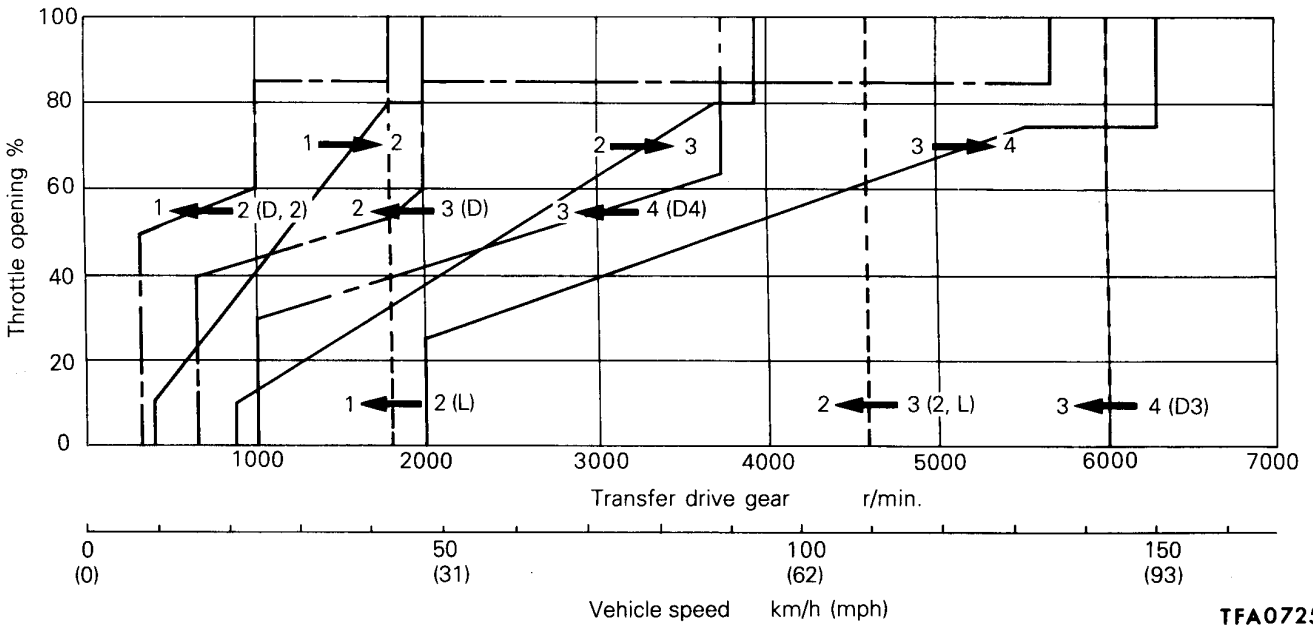
RIGHT HAND DRIVE



TFA0723

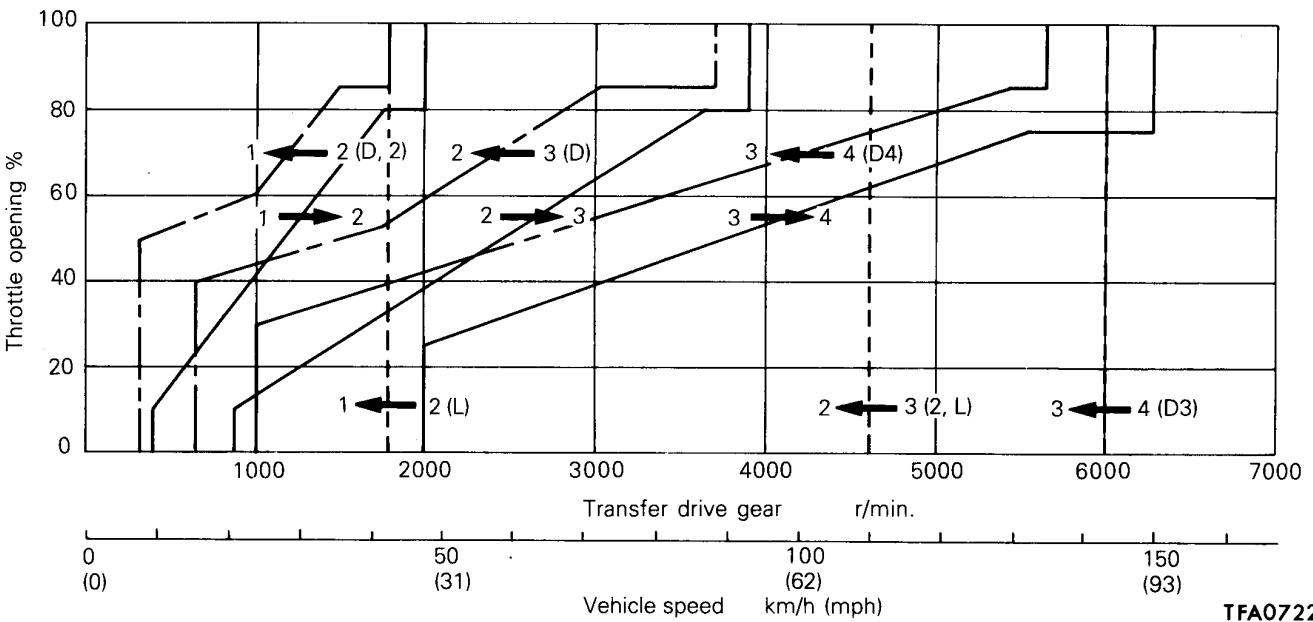
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LEFT HAND DRIVE



TFA0725

RIGHT HAND DRIVE



TFA0722

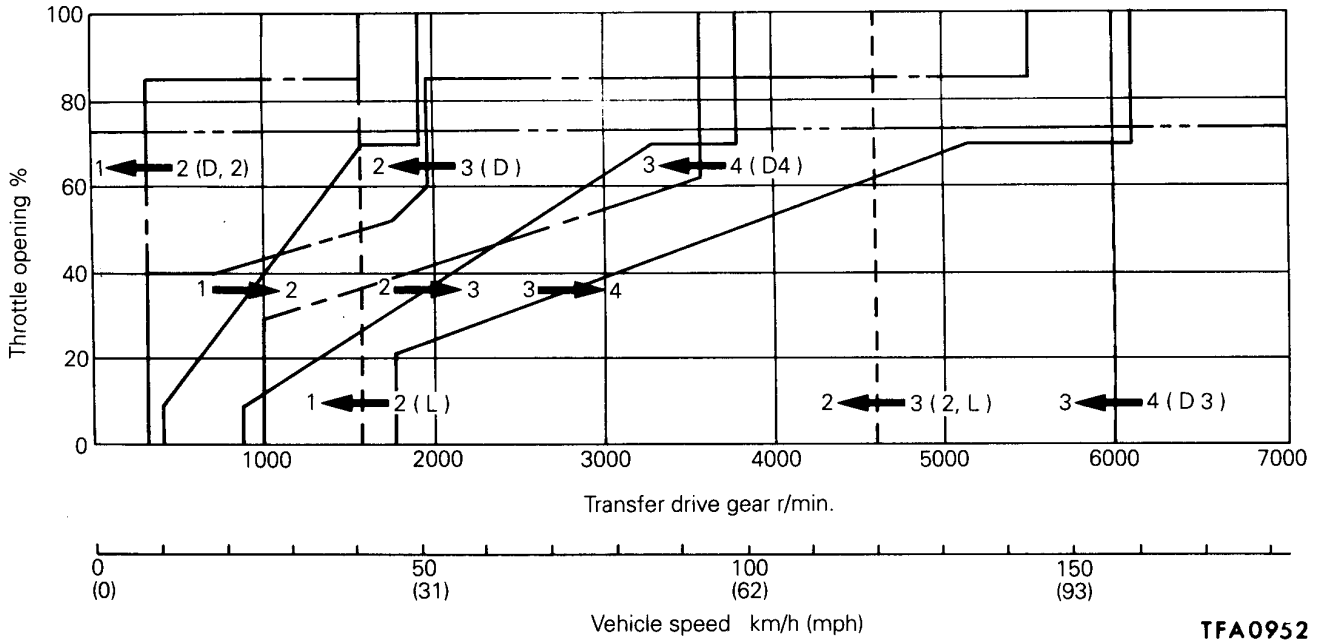
23-37-1 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

< Vehicles built from June 1992 >

< F4A22 – 4G93 engine >

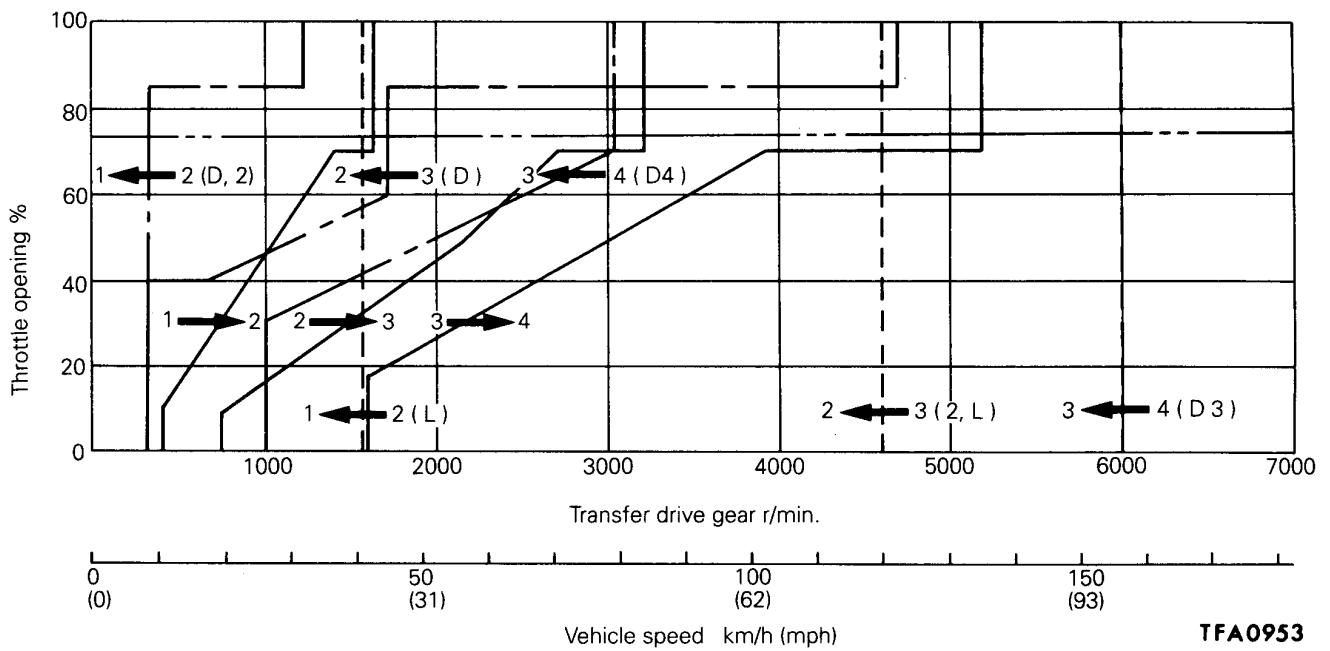
LEFT HAND DRIVE

Power (PWR) position



TFA0952

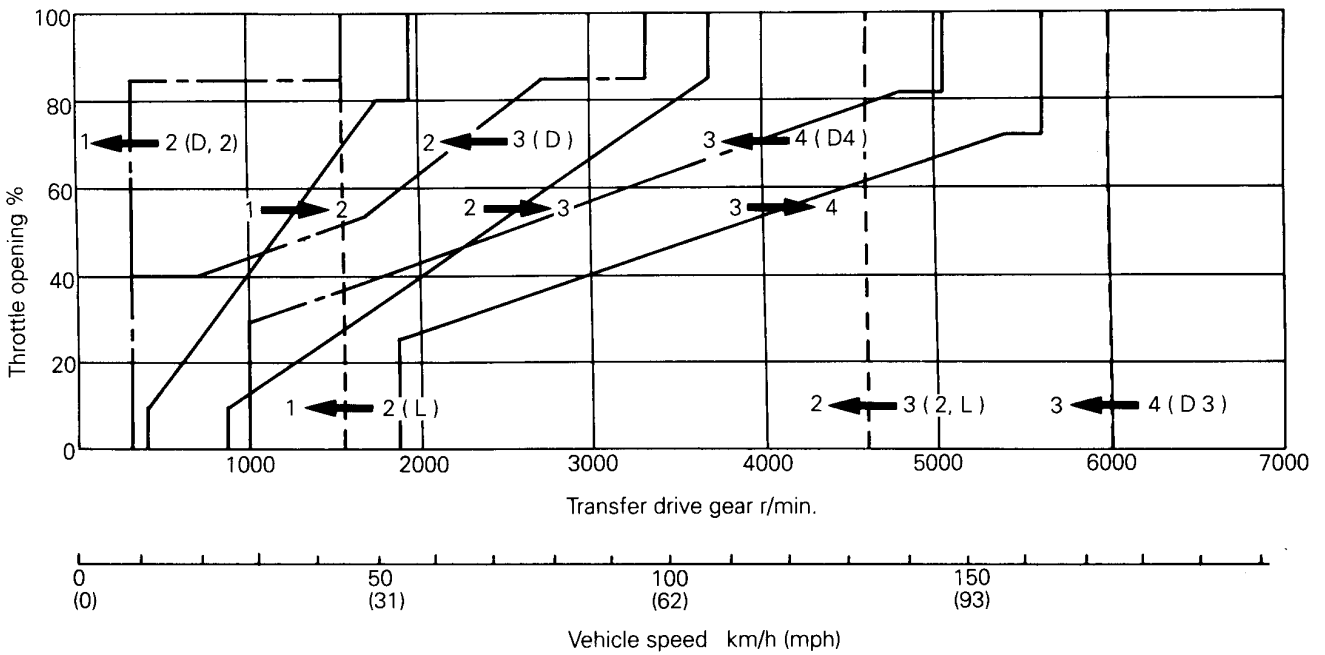
Economy (ECO) position



TFA0953

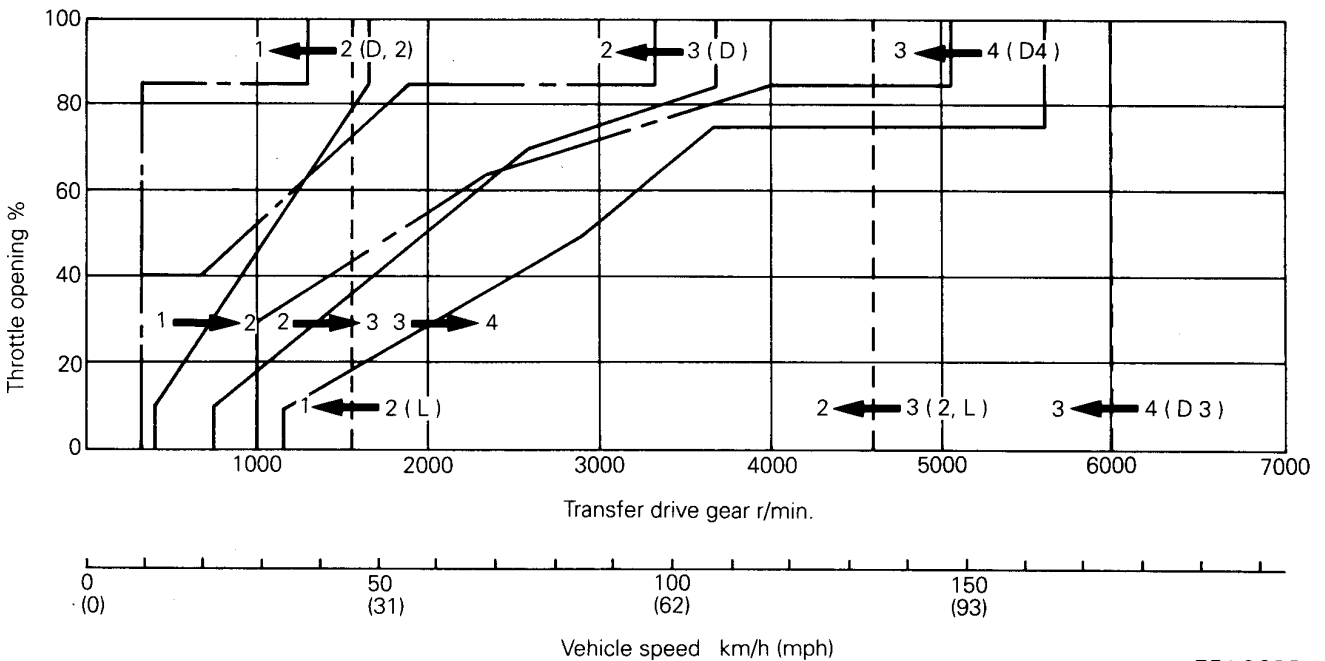
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Power (PWR) position



TFA0954

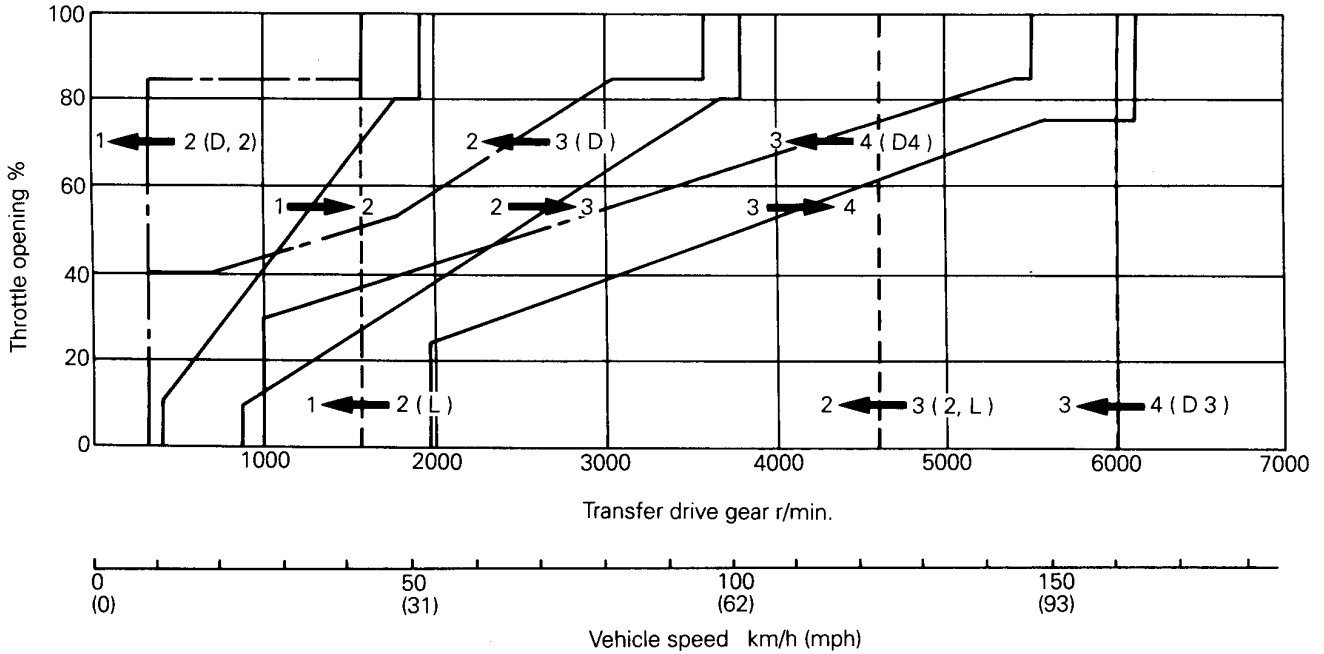
Economy (ECO) position



TFA0955

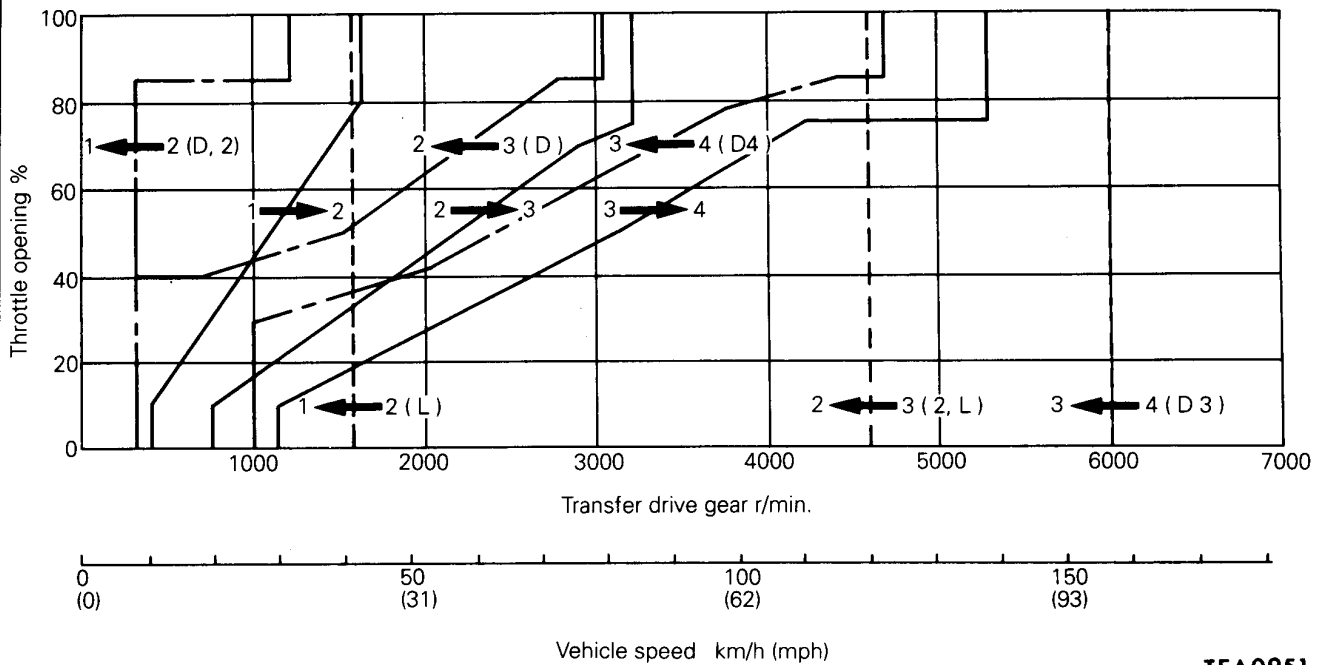
23-37-3 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

<F4A22 – 4G93> RIGHT HAND DRIVE – Power (PWR) position
 <F4A22 – 4G63> RIGHT HAND DRIVE



TFA0950

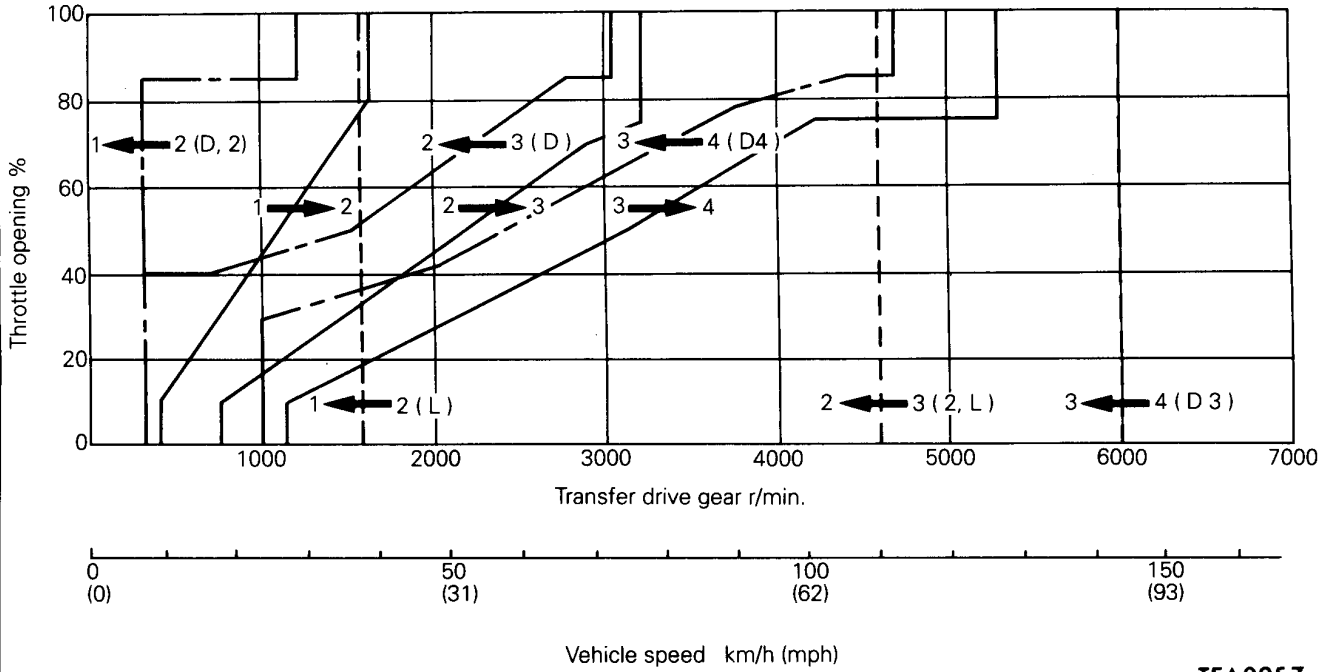
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 <F4A22 – 4G63> LEFT HAND DRIVE



TFA0951

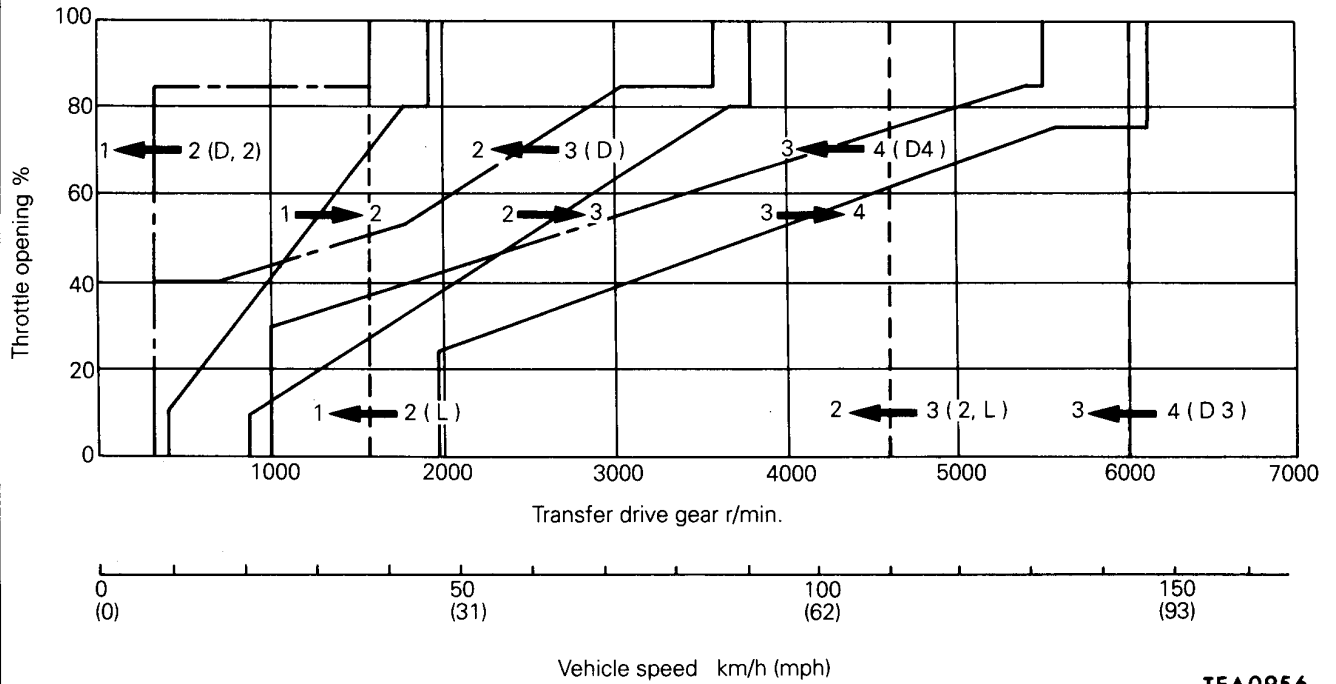
<W4A32>

LEFT HAND DRIVE



TFA0957

RIGHT HAND DRIVE



TFA0956

CONVERTER STALL TEST

E23FEAC

Stall test consist of determining maximum engine speed obtained at full throttle in "D" and "R" positions. This test checks torque converter stator overrunning clutch operation, and holding ability of transmission clutches and low-reverse brake.

Caution

During this test, make sure that no one stand in front of or behind vehicle.

1. Check transmission fluid level. Fluid should be at normal operating temperature [70–80°C (160–180°F)]. Engine coolant should also be at normal operating temperature [80–90°C (180–190°F)].
2. Apply chocks to both rear wheels.
3. Attach engine tachometer.
4. Apply parking and service brakes fully.
5. Start engine.
6. With selector lever in "D" position, depress accelerator pedal fully to read engine maximum rpm. Do not hold throttle wide open any longer than is necessary to obtain maximum engine rpm reading, and never longer than 5 seconds at a time. If more than one stall test is required, operate engine at approximately 1,000 r/min in neutral for 2 minutes to cool transmission fluid between tests.

Standard value: 1,800–2,800 r/min

7. Place selector lever to "R" position and perform stall test by the same procedure as in foregoing item.

Stall Speed Above Specification in "D"

If stall speed is higher than specification, rear clutch or overrunning clutch of transmission is slipping. In this case, perform hydraulic test to locate cause of slippage.

Stall Speed Above Specification in "R"

If stall speed is higher than specification, front clutch of transmission or low-reverse brake is slipping. In this case, perform hydraulic test to locate cause of slippage.

Stall Speed Above Specification in "D" and "R"

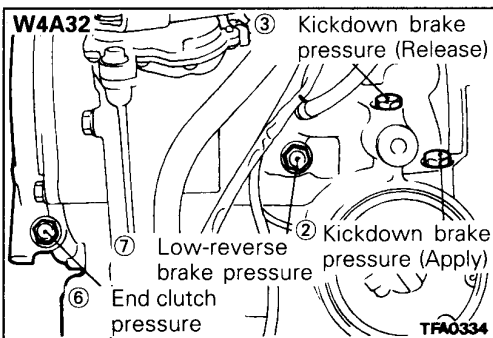
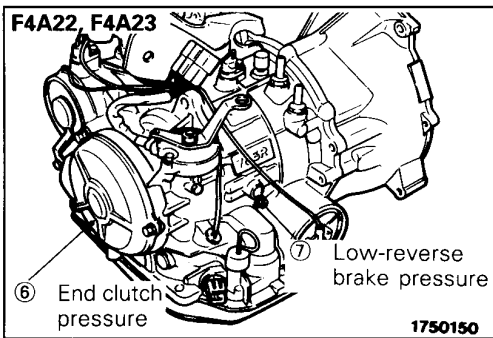
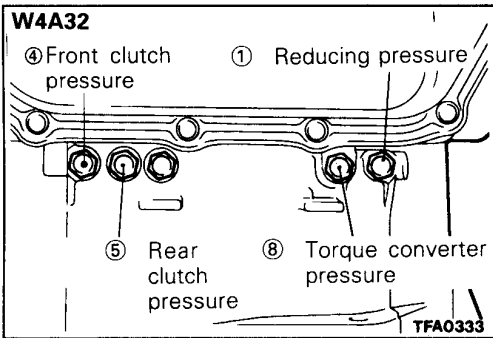
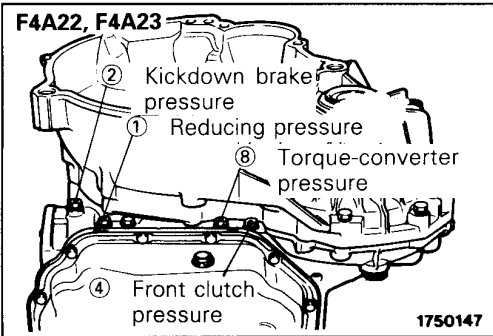
If stall speed is lower than specification, insufficient engine output or faulty torque converter is suspected. Check for engine misfiring, ignition timing, valve clearance etc. If these are good, torque converter is faulty.

E23FBAJ

OIL PRESSURE TEST

1. Completely warm up the transmission.
2. Raise the vehicle by using a jack so that the drive wheels can be rotated.
3. Connect an engine tachometer and place it in a position where it's easy to see.
4. Attach the special oil-pressure gauge (MD998330, MD999563) and the adapter (MD998332) to each oil-pressure outlet port.

When the reverse position pressure is to be tested, the 3,000 kPa (400 psi) type of gauge should be used.



5. Measure the oil pressure under various conditions, and check to be sure that the measured results are within the standard value range shown in the "Standard oil pressure table" below.

If the oil pressure is not within the specified range, check and repair as described in the section "Remedial steps if oil pressure is not normal".

23-40 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

Standard Oil Pressure Table

No.	Conditions			Standard oil pressure kPa (kg/cm ² , psi)							
	Select lever position	Engine speed rpm	Shift position	① Reducing pressure	② Kickdown brake pressure (Apply)	③ Kickdown brake pressure (Release)	④ Front clutch pressure	⑤ Rear clutch pressure	⑥ End clutch pressure	⑦ Low-reverse brake pressure	⑧ Torque-converter pressure
1	N	Idling	Neutral	360–480 (3.6–4.8, 51–68)	–	–	–	–	–	–	☆
2	D	Idling	2nd gear	360–480 (3.6–4.8, 51–68)	100–210 (1.0–2.1, 14–30)	–	–	730–830 (7.3–8.3, 104–118)	–	–	☆
3	D (SW-ON)	Approx. 2,500	4th gear	360–480 (3.6–4.8, 51–68)	830–900 (8.3–9.0, 118–128)	–	–	–	830–900 (8.3–9.0, 118–128)	–	450–650 (4.5–6.5, 64–92)
4	D (SW-OFF)	Approx. 2,500	3rd gear	360–480 (3.6–4.8, 51–68)	830–900 (8.3–9.0, 118–128)	830–900 (8.3–9.0, 118–128)	830–900 (8.3–9.0, 118–128)	830–900 (8.3–9.0, 118–128)	830–900 (8.3–9.0, 118–128)	–	450–650 (4.5–6.5, 64–92)
5	2	Approx. 2,500	2nd gear	360–480 (3.6–4.8, 51–68)	830–900 (8.3–9.0, 118–128)	–	–	830–900 (8.3–9.0, 118–128)	–	–	450–650 (4.5–6.5, 64–92)
6	L	Approx. 1,000	1st gear	360–480 (3.6–4.8, 51–68)	–	–	–	830–900 (8.3–9.0, 118–128)	–	300–450 (3.0–4.5, 43–64)	☆
7	R	Approx. 2,500	Reverse	360–480 (3.6–4.8, 51–68)	–	1,640–2,240 (16.4–22.4, 233–319)	1,640–2,240 (16.4–22.4, 233–319)	–	–	1,640–2,240 (16.4–22.4, 233–319)	450–650 (4.5–6.5, 64–92)
		Approx. 1,000				1,000 (10, 142) or more	1,000 (10, 142) or more			1,000 (10, 142) or more	

NOTE

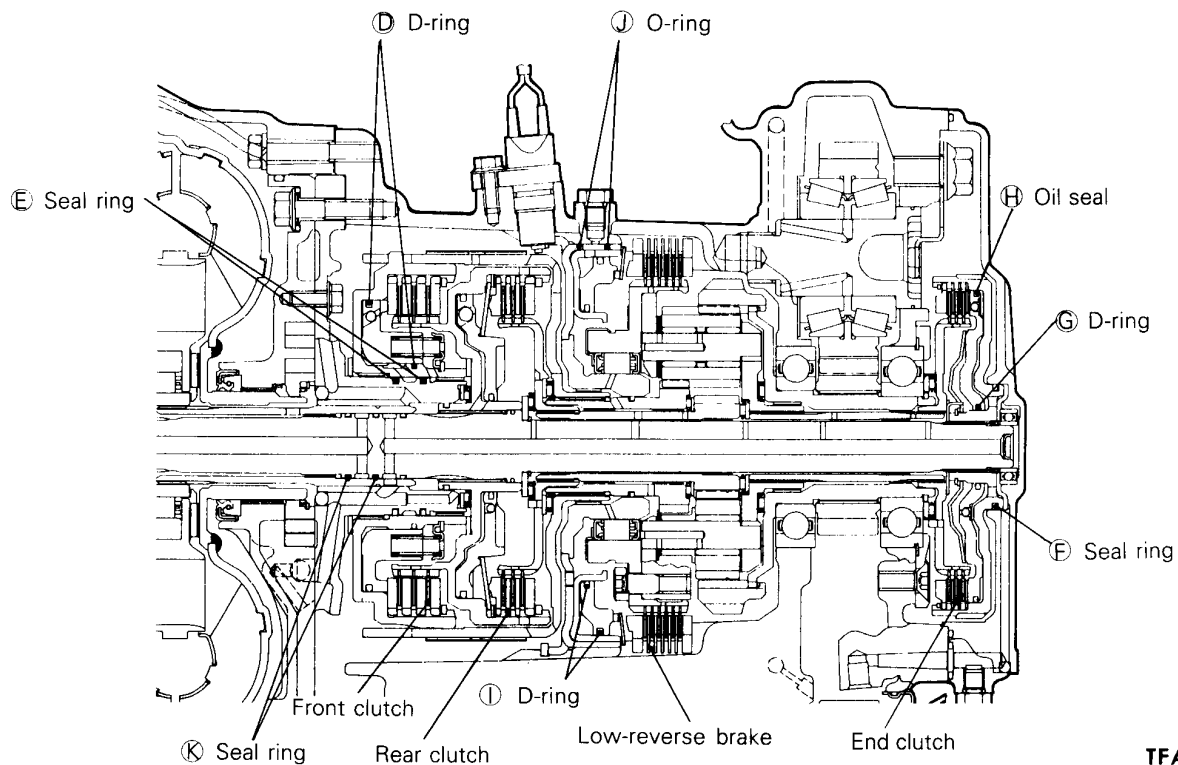
- must be 10 kPa (0.1 kg/cm², 1.4 psi) or less.
- SW-ON: Switch ON the overdrive control switch
- SW-OFF: Switch OFF the overdrive control switch
- ☆: Hydraulic pressure is generated, but not the standard value.

**REMEDIAL STEPS IF OIL PRESSURE IS NOT NORMAL
(F4A22, F4A23)**

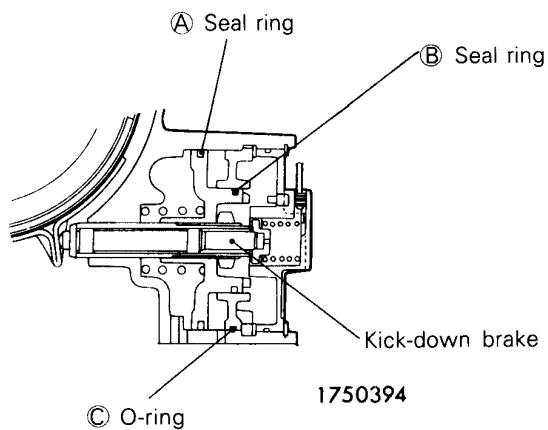
Problem	Probable cause(s)	Remedy
<p>1. All line pressures are low (or high). NOTE Line pressures are oil pressures ②, ④, ⑥ and ⑦ in the standard oil pressure table on the preceding page.</p>	<p>a. Clogged oil filter. b. Improper adjustment of the oil pressure (line pressure) of the regulator valve. c. Malfunction of the valve body assembly. d. Looseness of the valve body bolts. e. Improper discharge pressure of the oil pump.</p>	<p>a. Visually check the oil filter; replace it if it is clogged. b. Measure line pressure ② (kick-down brake pressure); readjust the line pressure if there is a deviation from the standard value, or replace the valve body assembly. c. Replace the valve body assembly. d. Tighten the valve body bolts to the specified torque. e. Check the side clearance of the oil pump gear; replace the oil pump assembly if necessary.</p>
<p>2. Inappropriate reducing pressure. Reducing pressure is oil pressure ① in the standard pressure table on the preceding page.</p>	<p>a. Reducing pressure circuit filter (L shaped) is clogged. b. Reducing pressure is improperly adjusted. c. Malfunction of the valve body assembly.</p>	<p>a. Disassemble the valve body assembly and check the filter; replace the filter if it is clogged. b. ① Measure the reducing pressure; readjust if there is a deviation from the standard value, or replace the valve body assembly. c. Replace the valve body assembly.</p>
<p>3. Inappropriate kickdown brake pressure (apply).</p>	<p>a. Malfunction of the kick-down servo piston's ① seal ring, ② D-ring and/or the sleeve's ③ seal ring. b. Malfunction of the valve body assembly.</p>	<p>a. Disassemble the kick-down servo and check the seal rings and D-ring for damage. Replace the seal rings or d-ring if they are cut, scarred or scratched. b. Replace the valve body assembly.</p>
<p>4. Inappropriate front clutch pressure.</p>	<p>a. Malfunction of the kick-down servo piston's ① seal ring, ② D-ring and/or the sleeve's ③ seal ring. b. Malfunction of the valve body assembly. c. Unusual wear or abrasion of the front clutch piston and/or the retainer, or malfunction of the ④ D-ring and/or the ⑤ seal ring.</p>	<p>a. Disassemble the kick-down servo and check the sealrings and D-ring for damage. Replace the seal rings or D-ring if they are cut, scarred or scratched. b. Replace the valve body assembly. c. Disassemble the transmission itself and check for unusual wear or abrasion of the front clutch piston and/or retainer inner circumference, or for damage of the D-ring and/or seal ring. If unusual wear or abrasion, or damage, is discovered, replace the piston, retainer, D-ring or seal ring.</p>

23-42 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

Problem	Probable cause(s)	Remedy
5. Inappropriate end clutch pressure.	<ul style="list-style-type: none"> a. Malfunction of the end clutch's (F) seal ring, (G) D-ring and/or (H) oil seal. b. Malfunction of the valve body assembly. 	<ul style="list-style-type: none"> a. Disassemble the end clutch and check the piston's oil seal and D-ring, and the retainer's seal ring, etc.; replace any part that is cut, scarred or scratched. b. Replace the valve body assembly.
6. Inappropriate low-reverse brake pressure.	<ul style="list-style-type: none"> a. Damage of the O-ring located between the valve body and the transmission. b. Malfunction of the valve body assembly. c. Malfunction of the low-reverse brake piston's (I) D-ring and/or the center support's (J) O-ring. 	<ul style="list-style-type: none"> a. Remove the valve body assembly and check whether or not there is an O-ring at the upper surface of the upper valve body, and if so whether it is damaged or not; replace it if it is cut, scarred or scratched. b. Replace the valve body assembly. c. Disassemble the transmission itself and check for damage to the O-ring; replace it if it is cut, scarred or scratched.
7. Inappropriate torque converter pressure.	<ul style="list-style-type: none"> a. The damper clutch control solenoid valve (DCCSV) or the damper clutch control valve is stuck. b. Clogging or leakage from the oil cooler or piping. c. Damage to the input shaft's (K) seal ring. d. Malfunction of the torque converter. 	<ul style="list-style-type: none"> a. Check the functioning of the damper clutch system and the DCCSV. b. Repair, or replace, the oil coller or the piping. c. Disassemble the transmission itself and check for damage to the seal ring; replace the seal ring if it is damaged. d. Replace the torque converter.



TFA0638



1750394

23-44 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

(W4A32)

Trouble symptom	Probable cause	Remedy
1. Line pressures are all low (or high). NOTE * "Line pressures" refers to oil pressure ②, ③, ④, ⑤, ⑥ and ⑦, in the "Standard oil pressure table" on the previous page.	<ul style="list-style-type: none"> a. Clogging of oil filter b. Improper adjustment of oil pressure (line pressure of regulator valve) c. Functional malfunction of valve body assembly d. Looseness of valve body tightening part e. Improper oil pump discharge pressure 	<ul style="list-style-type: none"> a. Visually inspect the oil filter; replace the oil filter if it is clogged. b. Measure line pressure ② (kickdown brake pressure); if the pressure is not the standard value, readjust the line pressure, or, if necessary, replace the valve body assembly. c. Replace the valve body assembly. d. Tighten the valve body tightening bolt and installation bolt. e. Check the side clearance of the oil pump gear; replace the oil pump assembly if necessary.
2. Improper reducing pressure	<ul style="list-style-type: none"> a. Clogging of the filter (L-shaped type) of the reducing-pressure circuit b. Improper adjustment of oil pressure c. Functional malfunction of valve body assembly 	<ul style="list-style-type: none"> a. Disassemble the valve body assembly and check the filter; replace the filter if it is clogged. b. Measure the ① reducing pressure; if it is not the standard value, readjust, or replace the valve body assembly. c. Replace the valve body assembly.
3. Improper kickdown brake pressure (Apply)	<ul style="list-style-type: none"> a. Malfunction of the seal ring ①, D-ring ② or seal ring ③ of the sleeve of the kickdown servo piston. b. Functional malfunction of the valve body assembly 	<ul style="list-style-type: none"> a. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring. b. Replace the valve body assembly.
4. Improper kickdown brake pressure (Release)	<ul style="list-style-type: none"> a. Malfunction of the seal ring ①, D-ring ② or seal ring ③ of the sleeve of the kickdown servo piston. b. Functional malfunction of the valve body assembly 	<ul style="list-style-type: none"> a. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring. b. Replace the valve body assembly.
5. Improper front clutch pressure	<ul style="list-style-type: none"> a. Malfunction of the seal ring ①, D-ring ② or seal ring ③ of the sleeve of the kickdown servo piston. b. Functional malfunction of the valve body assembly c. Wear of the front clutch piston or retainer, or malfunction of the D-ring ④ or seal ring ⑤. 	<ul style="list-style-type: none"> a. Disassemble the kickdown servo and check whether the seal ring or D-ring is damaged. If it is cut or has scratches, replace the seal ring or D-ring. b. Replace the valve body assembly. c. Disassemble the transmission itself and check whether or not there is wear of the front clutch piston and retainer inner circumference, or damage of the D-ring and/or seal ring. If there is any wear or damage, replace the piston, retainer, D-ring and/or seal ring.

Trouble symptom	Probable cause	Remedy
6. Improper rear clutch pressure	a. Malfunction of D-ring ⑥ of rear clutch piston, retainer seal ring ③ and seal rings ④ and ① of input shaft. b. Functional malfunction of the valve body assembly	a. Disassemble the rear clutch, check input shaft seal ring, retainer seal ring, piston D-ring, etc. and replace broken or damaged parts. b. Replace the valve body assembly.
7. Improper end clutch pressure	a. Malfunction of the seal ring ① or the D-ring ② and/or oil seal ③ of end clutch. b. Functional malfunction of the valve body assembly	a. Disassemble the end clutch and check the oil seal or D-ring of the piston, seal ring of the retainer, etc.; replace if there are cuts, scars, scratches or damage. b. Replace the valve body assembly.
8. Improper low-reverse brake pressure	a. O-ring between valve body and transmission damaged or missing b. Functional malfunction of the valve body assembly c. Malfunction of the D-ring ④ of the low-reverse brake piston or the O-ring ⑤ of the retainer.	a. Remove the valve body assembly and check to be sure that the O-ring at the upper surface of the upper valve body is not missing or damaged; install or replace the O-ring if necessary. b. Replace the valve body assembly. c. Disassemble the transmission itself and check the D-ring and O-ring for damage; replace if there are cuts, scars, scratches or damage.
9. Improper torque converter pressure	a. Sticking of the damper clutch control solenoid valve (DCCSV) or the damper clutch control valve. b. Clogging or leaking of the oil cooler and or piping. c. Damage to the input shaft ③ seal ring. d. Malfunction of the torque converter.	a. Check the operation of the damper clutch system and the DCCSV. b. Repair or replace, as necessary, the cooler and or piping. c. Disassemble the transmission itself and check for damage of the seal ring, replace the seal ring if there is damage. d. Replace the torque converter.

ACTUATOR TEST

E23FVAB

Using the multi-use tester, force the actuator to activate, and then check the kickdown brake apply pressure of the pressure-control solenoid valve (PCSV) during 50% duty.

NOTE

Conditions making forced activation possible

- ① Vehicle speed: 0 km/h (0 mph)
- ② Select lever position: D
- ③ Accelerator switch: ON
- ④ Throttle opening: 10% or less

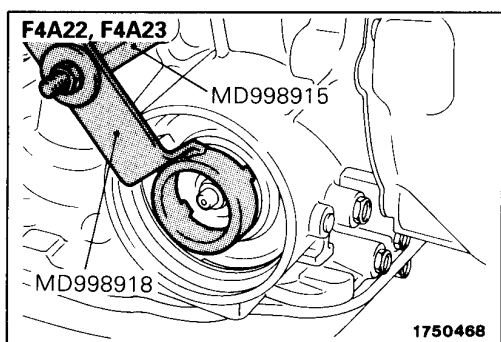
There will be a change to the 50% duty condition when there is forced activation for five seconds, if all of the above conditions are met.

Standard value: 250–300 kPa (2.5–3.0 kg/cm², 36–43 psi)
<when warm>

KICKDOWN SERVO ADJUSTMENT

E23FHBC

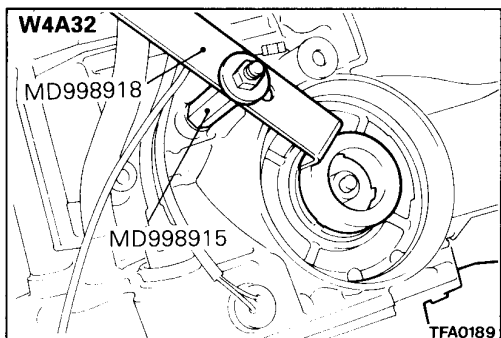
1. Completely remove all dirt and other materials adhered around the kickdown servo switch.
2. Remove the snap ring.
3. Remove the kickdown servo switch.



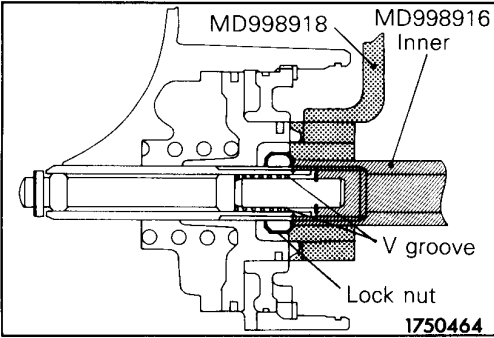
4. To prevent rotation of the piston, engage the pawl of the special tool into the notch of the piston, and using the adapter, fix the piston as shown in the left.

Caution

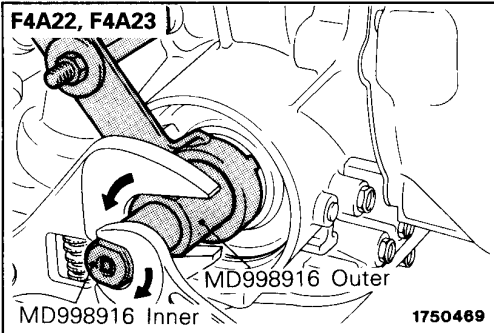
1. Don't press in the piston with the special tool.
2. When mounting the adapter on the transmission case, tighten it by hand. Don't apply much torque.



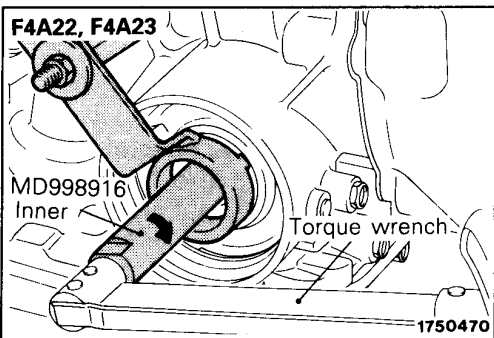
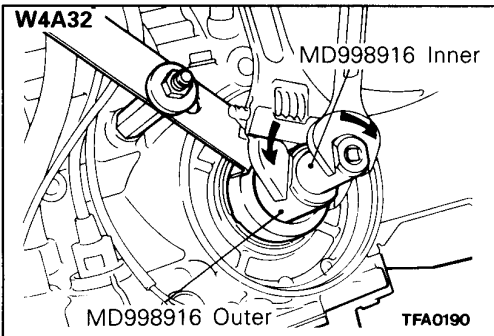
23-48 AUTOMATIC TRANSMISSION – Service Adjustment Procedures



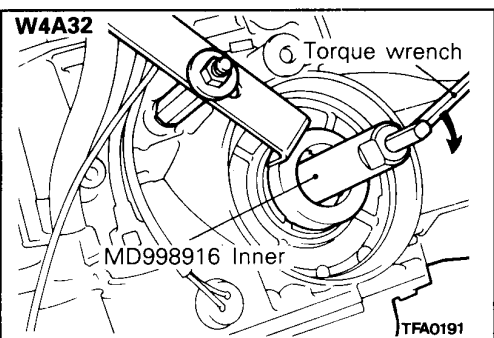
5. Loosen the lock nut to before the V groove of the adjusting rod, and tighten the special tool (inner) until it contacts the lock nut.

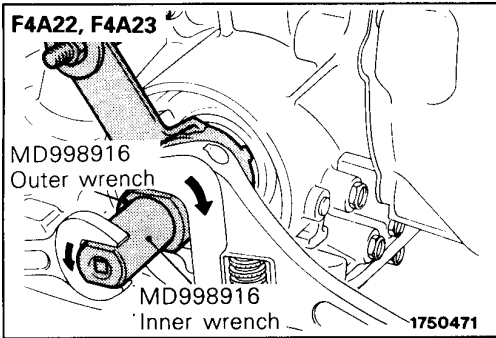


6. Engage the special tool (outer) on the lock nut. Rotating the outer cylinder counterclockwise and the inner cylinder clockwise, lock the lock nut and special tool (inner).



7. Attach a torque wrench to the special tool (inner) and tighten to a torque of 5 Nm (0.5 kgm, 3.6 ft.lbs.) after using 10 Nm (1 kgm, 7.2 ft.lbs.) and repeating "Tighten" and "Loosen" two times. After that, back off the special tool (inner) 2 to 2-1/4 turns (F4A22, W4A32) or 2-1/2 to 2-3/4 turns (F4A23).

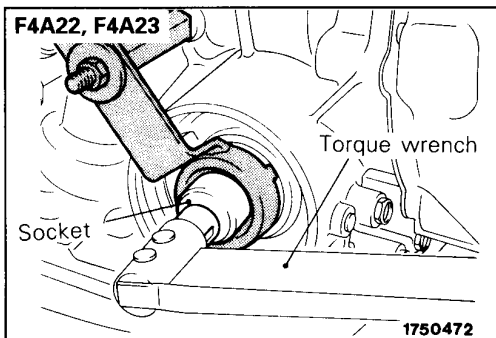
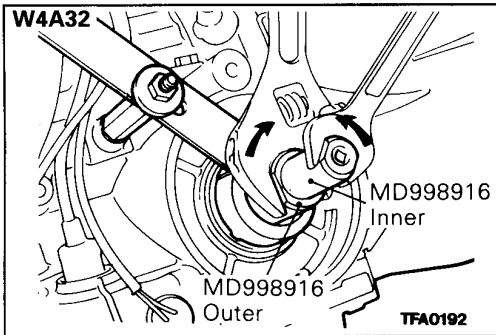




- Engage the special tool (outer) on the lock nut. Rotating the outer cylinder clockwise and the inner cylinder counterclockwise, unlock the lock nut and special tool (inner).

Caution

When unlocking the lock, apply equal force to both tools.



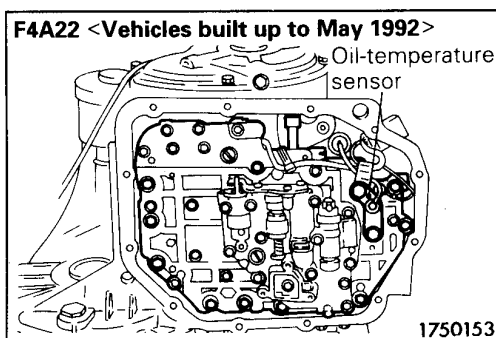
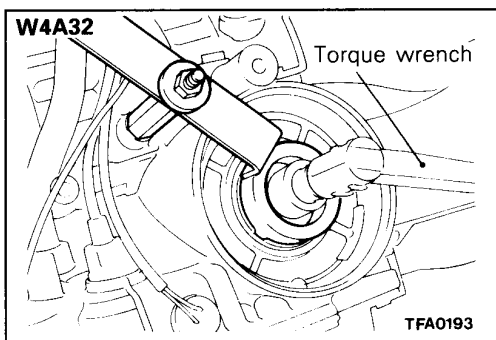
- Tighten the lock nut by hand until the lock nut contacts the piston. Then using the torque wrench, tighten to the specified torque.

Lock nut: 29 Nm (2.9 kgm, 21 ft.lbs.)

Caution

If it is rapidly tightened with the socket wrench or torque wrench, the lock nut and adjusting rod may rotate together.

- Remove the special tool which fastens the piston. Attach the plug tp the outlet of the low-reverse pressure.

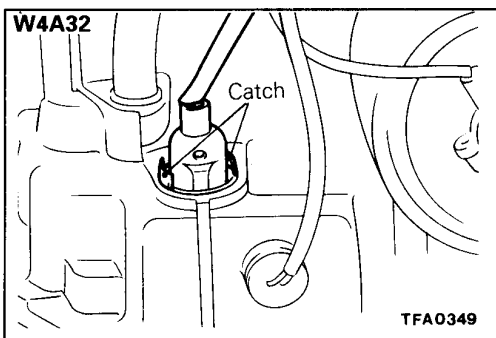
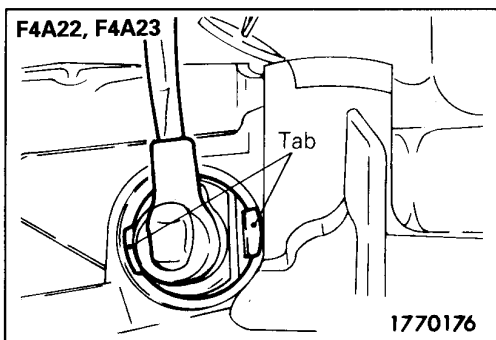
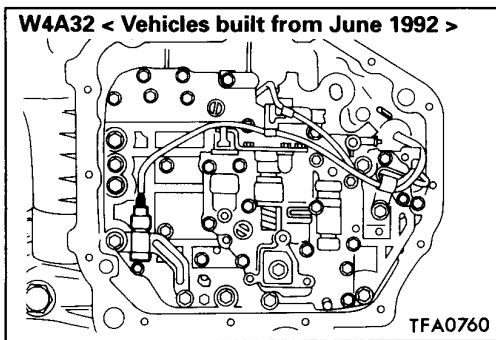
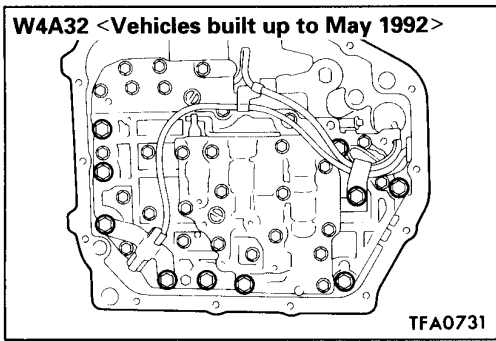
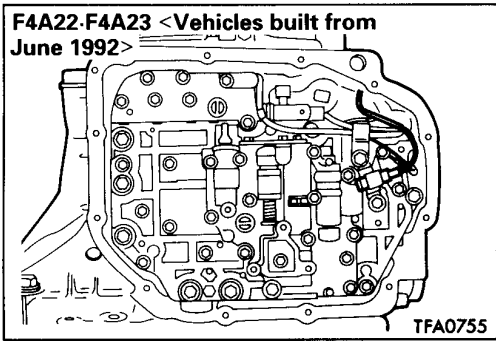


LINE PRESSURE ADJUSTMENT

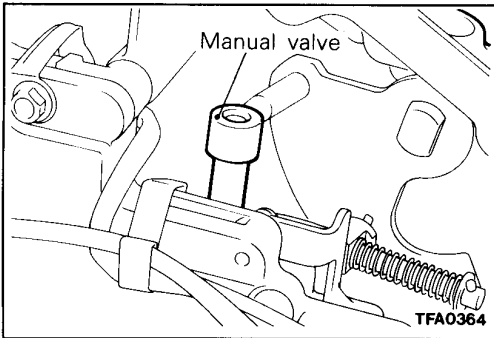
E23FNAG

- Drain out the automatic transmission fluid.
- Remove the oil pan.
- Remove the oil filter.
- Remove the oil-temperature sensor.
- Press the solenoid valve harness grommet and connector into the transmission case.

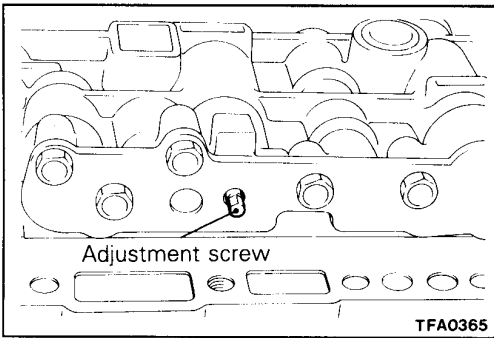
23-50 AUTOMATIC TRANSMISSION – Service Adjustment Procedures



6. Press the catches of the solenoid valve harness grommets and pass the connector through the case hole.



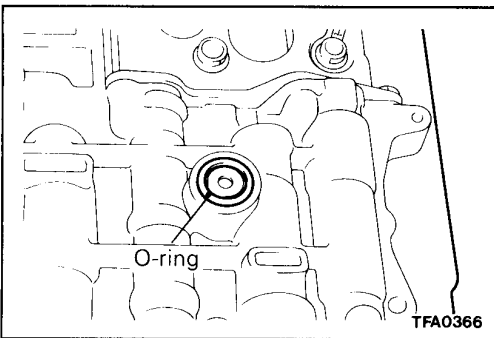
7. Remove the valve body assembly. The manual valve can come out, so be careful not to drop it.



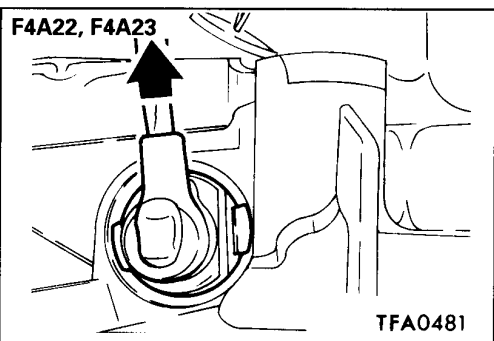
8. Turn the adjustment screw of the regulator valve and adjust so that the line pressure (kickdown brake pressure) becomes the standard value.
When the adjustment screw is turned to the clockwise, the line pressure becomes lower; when it is turned to counter-clockwise, it becomes higher.

Standard value: 870–890 kPa (8.7–8.9 kg/cm², 124–126 psi)

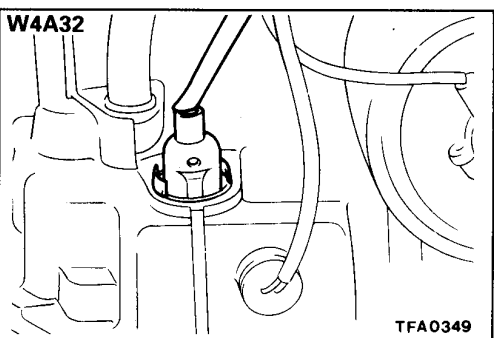
Oil pressure change for each turn of adjustment screw: 38 kPa (0.38 kg/cm², 5.4 psi)



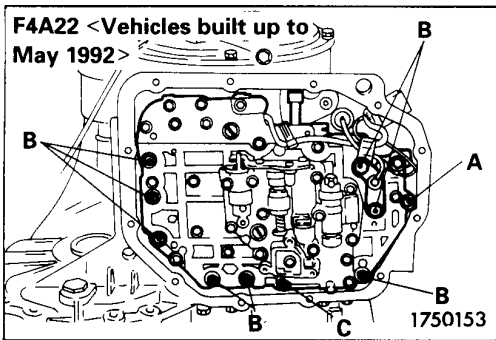
9. Check to be sure that the O-ring is installed on the upper surface of the valve body at the place shown in the figure.
10. Replace the O-ring of the solenoid valve harness grommet with a new one.



11. Pass the solenoid valve connector through the inside of the hole in the case.



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12. Temporarily install the valve body while inserting the detent plate pin in the manual valve groove. Then install the oil temperature sensor and holder and tighten the bolts with the specified torque.

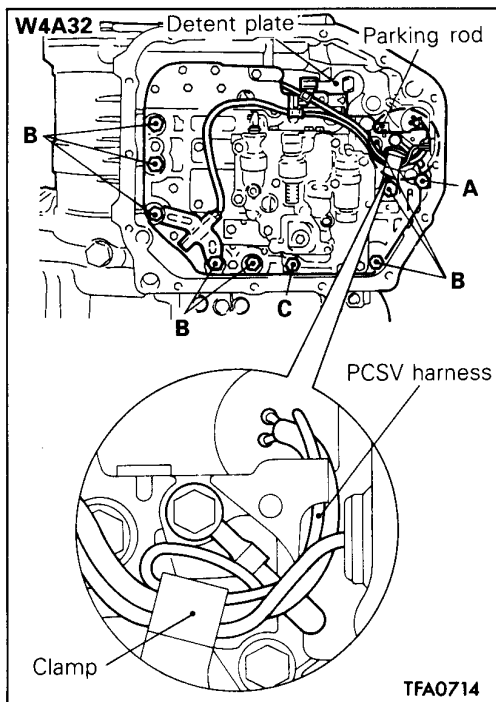
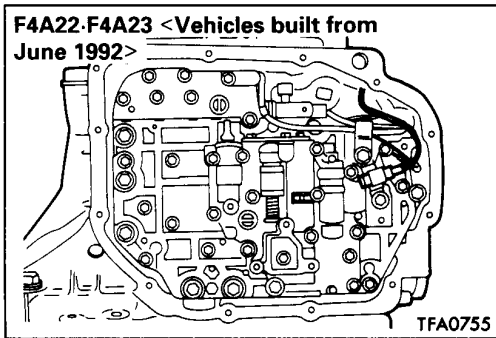
A bolt: 18 mm (0.709 in.) long

B bolt: 25 mm (0.984 in.) long

C bolt: 40 mm (1.575 in.) long

Valve body assembly mounting bolts:

11 Nm (1.1 kgm, 8.0 ft.lbs.)



Caution (W4A32)

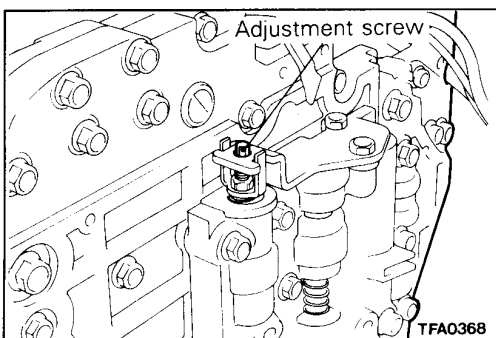
Fix the solenoid valve and oil temperature sensor harness securely in the position shown. In particular, the pressure control solenoid valve (PCSV) harness is different from other harnesses, so be sure to connect as shown in the illustration and to secure with clamps. If the harness is not secured, it will touch the detent plate and parking rod.

13. Install the oil filter.

14. Install a new oil pan gasket and oil pan.

15. Pour in the specified amount of ATF.

16. Make the oil pressure test. Readjust if necessary.



REDUCING PRESSURE ADJUSTMENT WHEN A MULTI-USE TESTER IS NOT USED

E23FNBD

1. Remove parts up to the oil filter in the same way as for adjustment of the line pressure. The valve body need not be removed.
2. Tune the adjustment screw of the lower valve body and adjust so that the reducing pressure is the standard value. When the adjustment screw is turned to the right, the reducing pressure becomes lower; when it is turned to the left, it becomes higher.

NOTE

When adjusting the reducing pressure, aim for the center value (425 kPa, 4.25 kg/cm², 60 psi) of the standard value allowance.

Standard value: 425 ± 10 kPa

(4.25 ± 0.1 kg/cm², 60 ± 1 psi)

Oil pressure change for each turn of adjustment screw: 45 kPa (0.45 kg/cm², 6.4 psi)

3. Install the oil filter and oil pan in the same way as for adjustment of the line pressure.
4. Make the oil pressure test. Readjust if necessary.

WHEN USING THE MULTI-USE TESTER (MUT) <Up to 1993 models> OR THE MUT-II <All models>

1. Use the MUT or MUT-II to force-actuate the pressure control solenoid valve to 50% duty, and measure the kickdown brake apply pressure at that time. If the kickdown brake applied pressure is not within the standard value, adjust using the reducing pressure adjustment screw.

Standard value: 275 ± 25 kPa

(2.75 ± 0.25 kg/cm², 39 ± 4 psi)

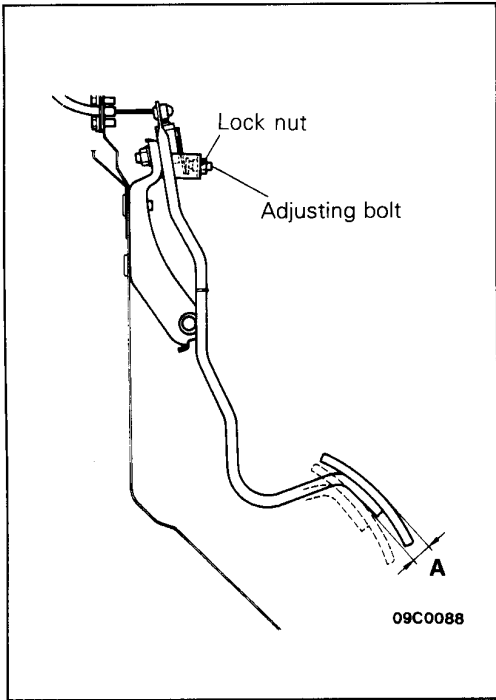
Oil pressure change for each turn of adjustment screw: 22 kPa (0.22 kg/cm², 3 psi)

2. Check to be sure, after completing this adjustment, that the reducing pressure is within the range of 360–480 kPa (3.6–4.8 kg/cm², 51–68 psi)

Caution

The adjustment should be made at an oil temperature of 70–80°C (158–176°F).

If the adjustment is made at an oil temperature that is too high, the line pressure will decrease during idling, with the result that a correct adjustment cannot be made.



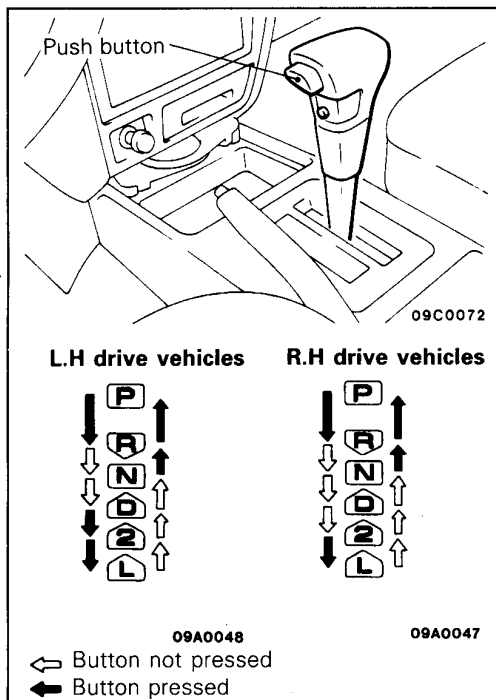
ACCELERATOR PEDAL SWITCH INSPECTION AND ADJUSTMENT < Vehicles built up to May 1992 >

E23FUAD

When the accelerator pedal is not depressed, there is continuity between the accelerator pedal switch terminals. Check that there is no continuity between the switch terminals when the pedal is depressed and indication stroke A reaches the standard value.

Standard value (A): 2-6 mm (0.08-0.24 in.)

When the stroke shown in the figure deviates from the standard value, adjust with the adjusting bolt.



SELECTOR LEVER OPERATION CHECK

E23FQAB

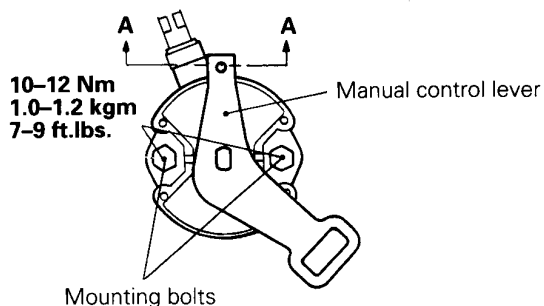
1. Shift selector lever to each range and check that lever moves smoothly and is controlled. Check that position indicator is correct.
2. Check to be sure the selector lever can be shifted to each position (by button operation as shown in the illustration).
3. Start the engine and check if the vehicle moves forward when the selector lever is shifted from N to D, and moves backward when shifted to R.
4. When the shift lever malfunctions, adjust control cable and selector lever sleeve. Check for worn shift lever assembly sliding parts.

INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT

1. Place selector lever in "N" (Neutral) position.
2. Loosen transmission control cable to manual control lever coupling adjusting nut to set cable and lever free.
3. Place manual control lever in "N" (neutral) position.
4. Rotate and adjust the inhibitor switch body so the hole in the end of the manual control lever
- and the hole (cross section A-A in the lower figure in the flange of the inhibitor switch body are aligned.
5. Tighten the mounting bolts of the inhibitor switch body to the specified torque. Be careful at this time that the position of the switch body is not changed.

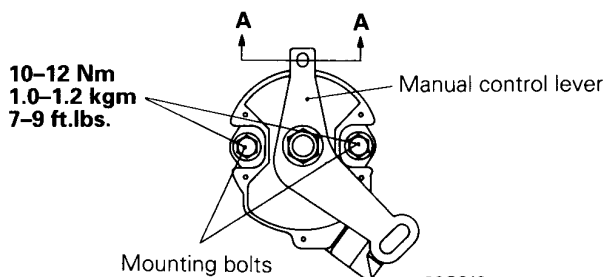
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Vehicles built up to May 1992



09A0111

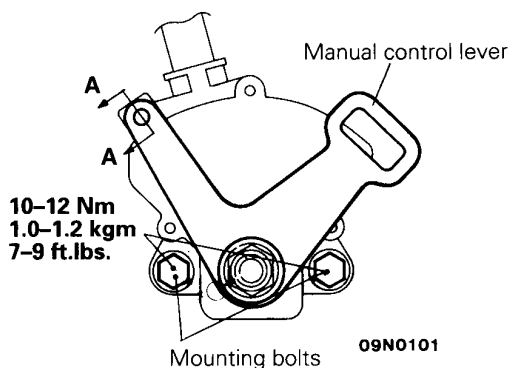
Vehicles built from June 1992



09C0104

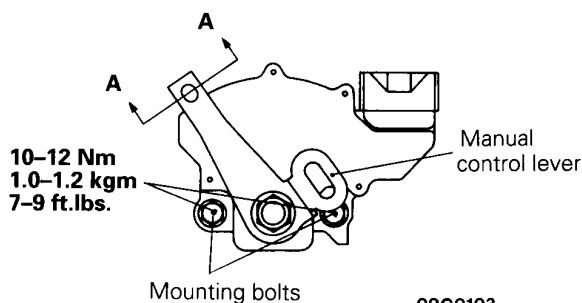
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Vehicles built up to May 1992



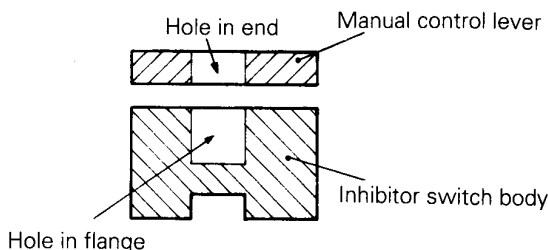
09N0101

Vehicles built from June 1992



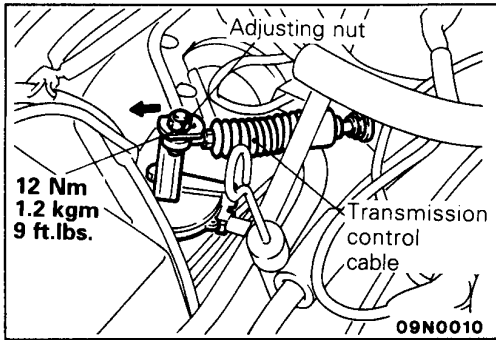
09C0103

Cross section A-A



09C0089

23-55-1 AUTOMATIC TRANSMISSION – Service Adjustment Procedures



6. Loosen the adjusting nut shown in the figure and gently pull the end of the transmission control cable in the direction of the arrow.
7. Tighten the adjusting nut to the specified torque.
8. Check that the selector lever is in the "N" position.
9. Check that each range on the transmission side operates and functions correctly for each position of the selector lever.

SPEEDOMETER CABLE REPLACEMENT

E23FPAE

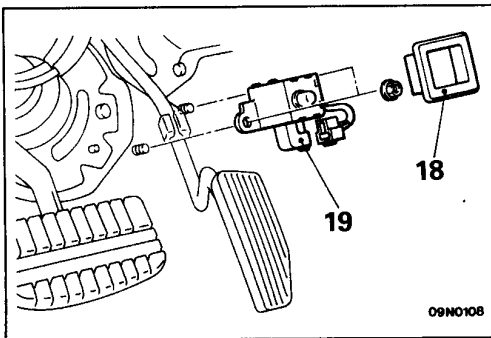
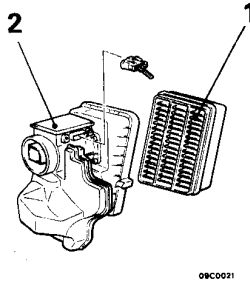
Refer to GROUP 22 – Service Adjustment Procedures.

NOTES

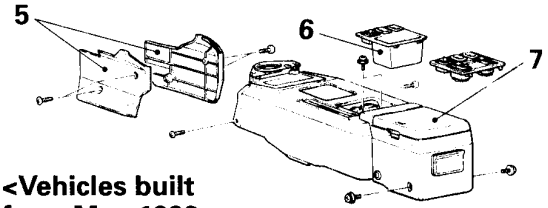
TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

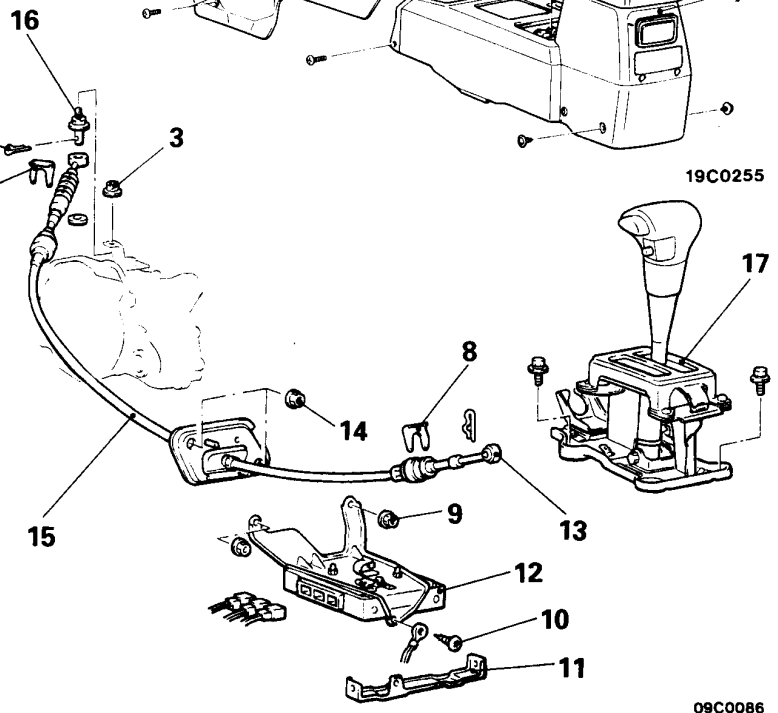
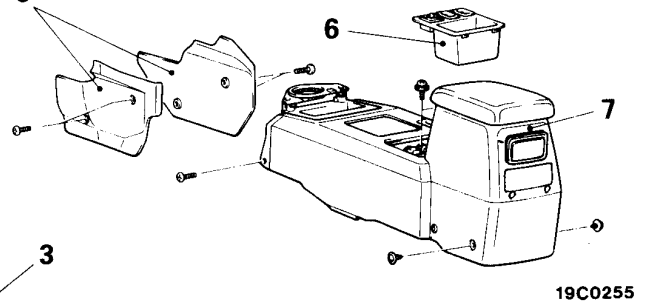
Caution: SRS
Be careful not to subject the SRS diagnosis unit to any shocks during removal and installation of the floor console, transmission control cable and shift lever assembly.



<Vehicles built up to April 1993>



<Vehicles built from May 1993>



Transmission control cable assembly removal steps

1. Air cleaner element
2. Air cleaner cover
- ◆◆ 3. Nut
4. Clip
5. Side cover
6. Floor console switch panel
7. Floor console assembly
8. Clip
9. Nuts
10. Screw
11. Bracket
12. A/T control unit
13. Connection for the transmission control cable assembly (selector lever assembly side)
14. Nut
15. Transmission control cable assembly
16. Adjuster

Selector lever assembly removal steps

5. Side cover
6. Floor console switch panel
7. Floor console assembly
13. Connection for the transmission control cable assembly (selector lever assembly side)
17. Selector lever assembly

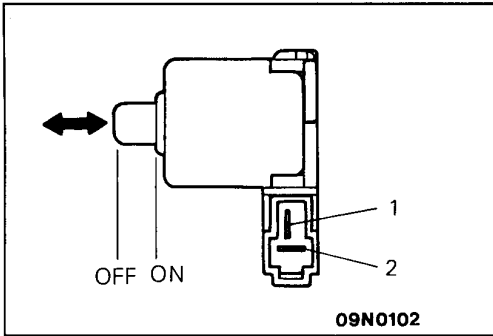
Removal of wide open throttle switch <L.H. drive vehicles>

18. Cover
19. Wide open throttle switch

INSPECTION

E231CAI

- Check the transmission control cable assembly for function and for damage.

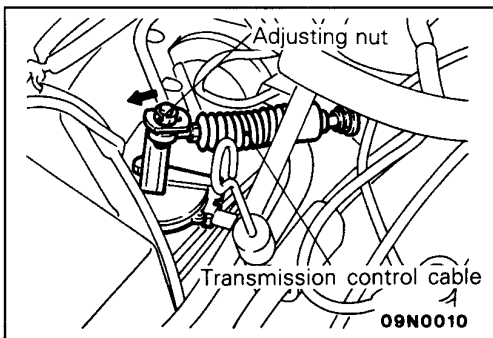


**WIDE OPEN THROTTLE SWITCH
<L.H. DRIVE VEHICLES>**

Check for continuity between terminals when the switch is OFF and when ON.

	1	2
ON	○—————○	
OFF		

NOTE
indicates that there is continuity between the terminals.



SERVICE POINTS OF INSTALLATION

E231DAL

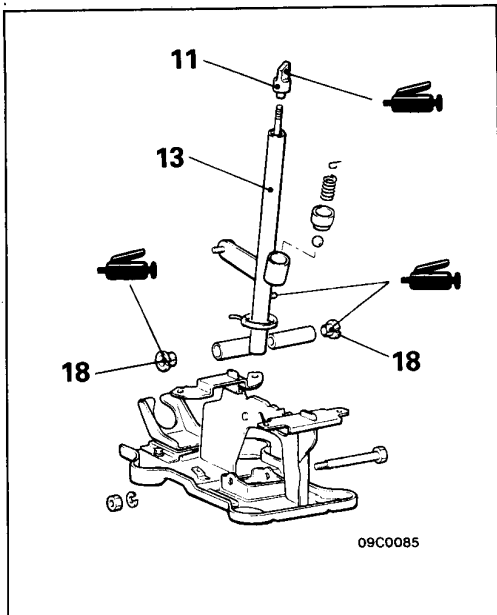
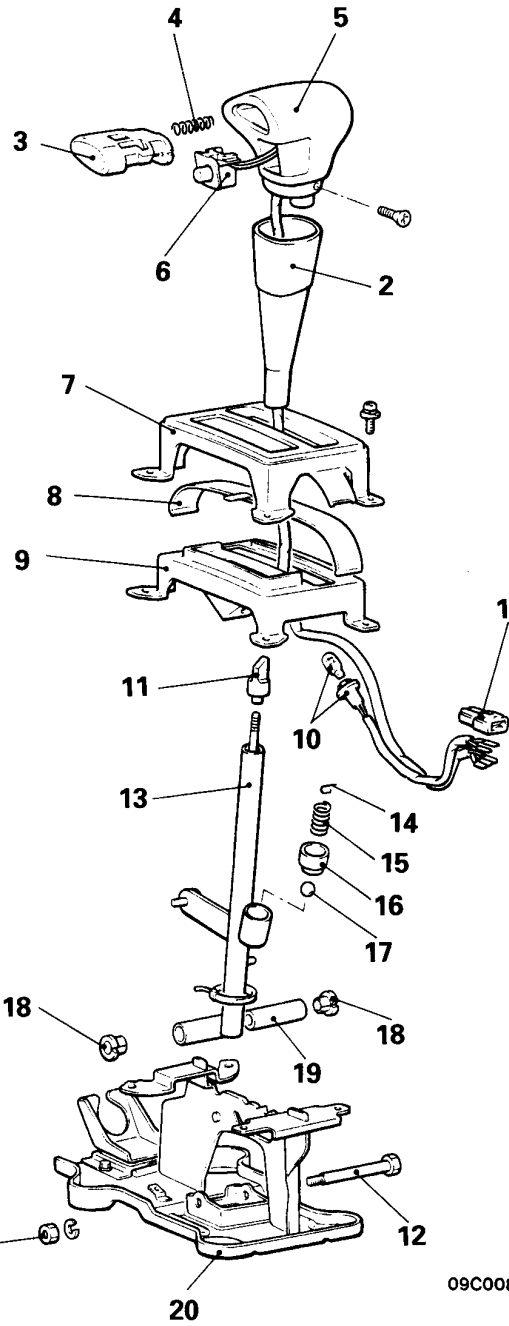
3. INSTALLATION OF NUT

- (1) Put the selector lever in the "N" position.
- (2) Loosen the adjusting nut, gently pull the transmission control cable in the direction of the arrow and tighten the nut.

**SELECTOR LEVER ASSEMBLY
DISASSEMBLY AND REASSEMBLY**

Disassembly steps

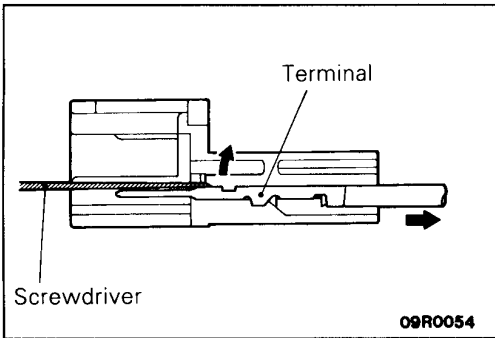
- ↔ 1. Overdrive switch/position lamp connector case
- 2. Cover
- 3. Push button
- 4. Spring
- 5. Selector knob
- 6. Overdrive switch
- 7. Upper panel
- 8. Slider
- 9. Lower panel
- ↔ 10. Position indicator lamp assembly
- ↔ 11. Sleeve
- 12. Bolt
- 13. Selector lever assembly
- 14. Pin
- 15. Spring
- 16. Support
- 17. Steel ball
- 18. Bushing
- 19. Pipe
- 20. Bracket assembly



12 Nm
1.2 kgm
9 ft.lbs.

09C0083

09C0085



SERVICE POINTS OF DISASSEMBLY

E23NBAC

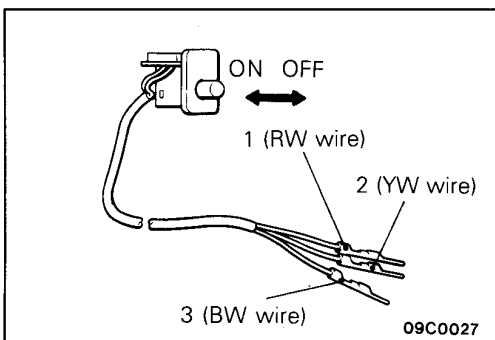
1. REMOVAL OF THE OVERDRIVE SWITCH/POSITION LAMP CONNECTOR CASE

Use a flat-tip screwdriver or similar tool and pull out the terminal from the overdrive switch/position lamp connector case.

INSPECTION

E23NCAC

- Check the detent plate for wear.
- Check the bushing for wear or damage.
- Check the spring for damage or deterioration.



OVERDRIVE SWITCH

Check for continuity between terminals when the switch is OFF and when ON.

Terminal	1 (RW)	2 (YW)	3 (BW)
Switch position			
Overdrive operating (ON)	○—○	○—○	
Overdrive not operating (OFF)	○—○	○—○	○—○

NOTE

○—○ indicates that there is continuity between the terminals.

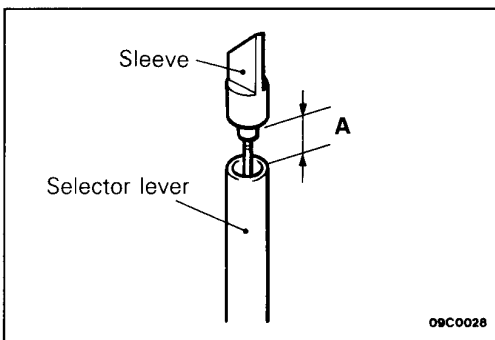
SERVICE POINTS OF REASSEMBLY

E23NDAC

11. INSTALLATION OF SLEEVE

Put the selector lever in the "N" position, turn the sleeve and adjust dimension A between the sleeve and the end of the lever so it reaches the standard value.

Standard value (A): 18.0–19.0 mm (0.709–0.748 in.)

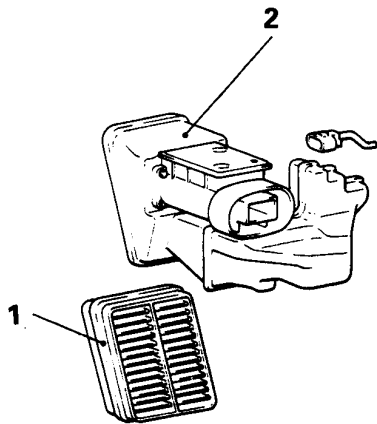


TRANSMISSION OIL COOLER HOSES

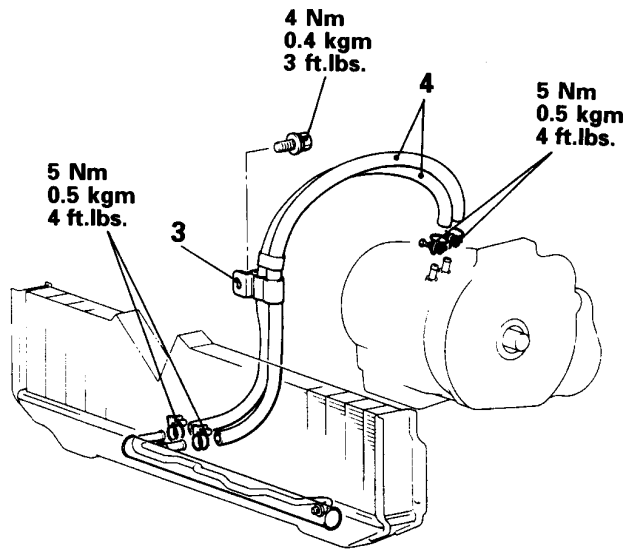
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Draining and Filling with Transmission Fluid (Refer to P.23-27.)

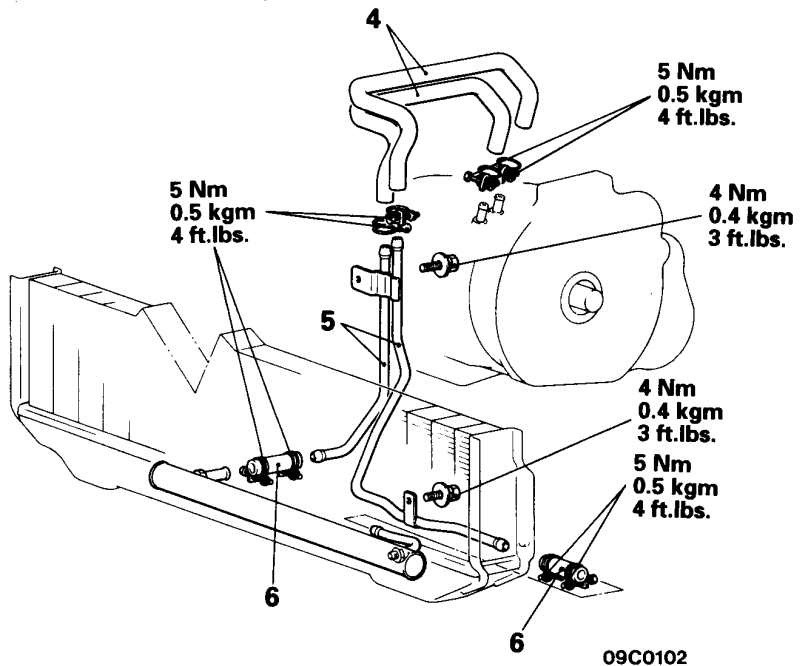


< Vehicles built up to April 1992 >



08C0004 < Vehicles built from May 1992 >

09C0032



Removal steps

1. Air cleaner element
2. Air cleaner cover
3. Clamp
4. Hose assembly
5. Tube assembly
6. Hose

09C0102

INSPECTION

- Check the hose and pipe for crack, damage or clog.

TRANSMISSION ASSEMBLY <2WD>

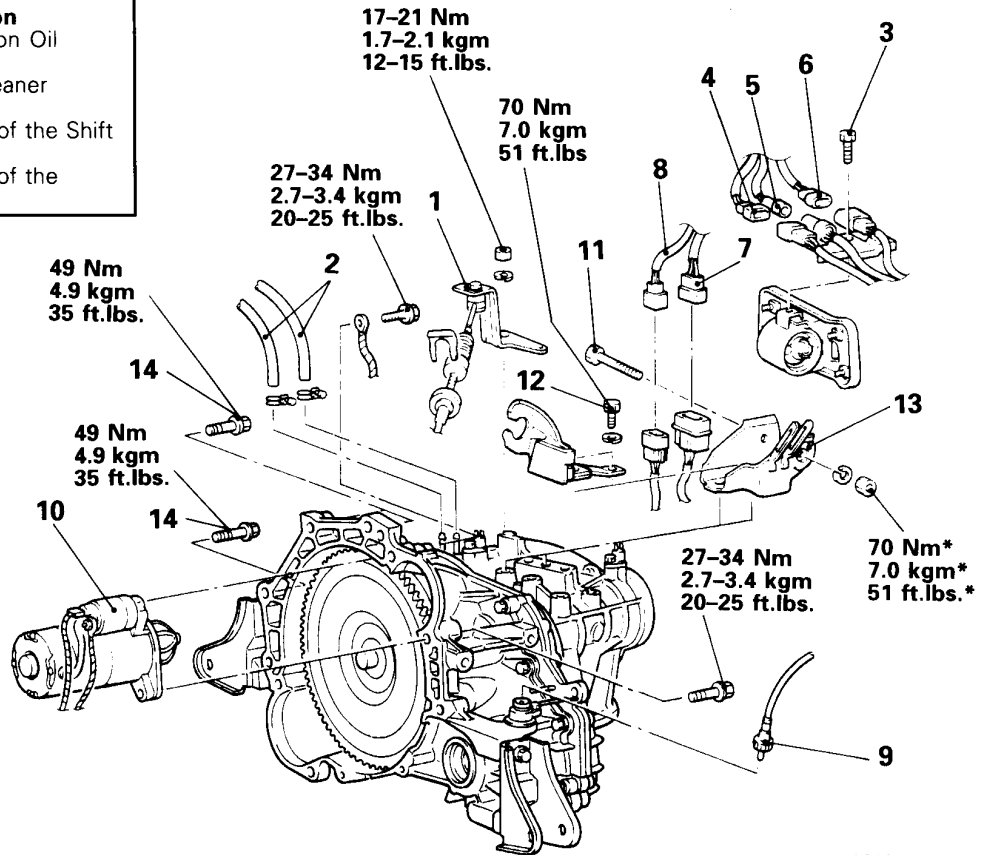
REMOVAL AND INSTALLATION

Pre-removal Operation

- Removal of the Air Cleaner Assembly

Post-installation Operation

- Supplying of Transmission Oil (Refer to P.23-27.)
- Installation of the Air Cleaner Assembly
- Checking the Operation of the Shift Lever
- Checking the Operation of the Meters and Gauges



09C0074

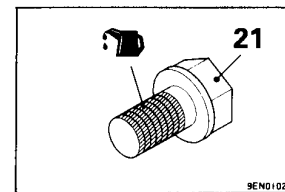
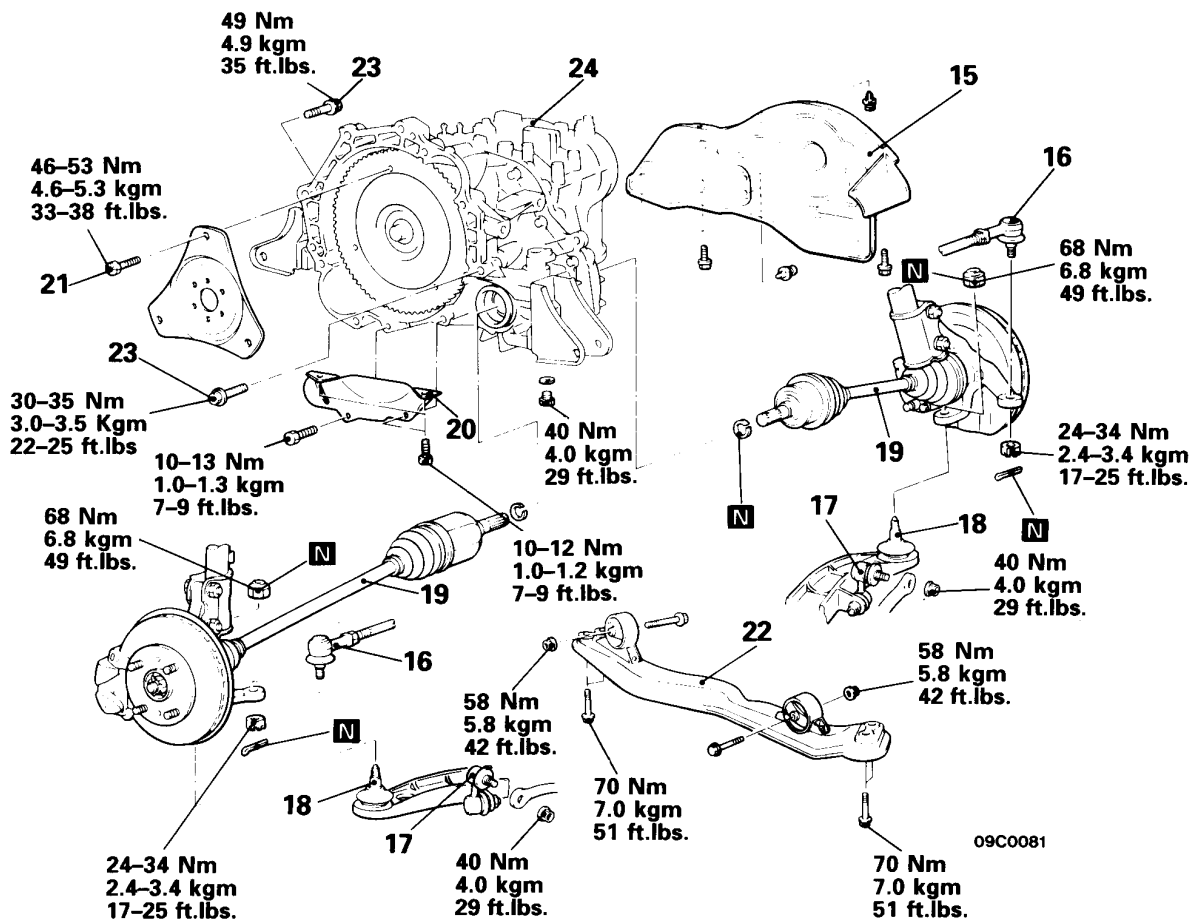
Removal steps

1. Connection for manual control lever
2. Transmission oil cooler hoses
3. Bolt
4. Pulse generator connector
5. Oil temperature connector
6. Kickdown servo switch connector
7. Inhibitor switch connector
8. Solenoid valve connector
9. Speedometer cable connection
10. Starter motor
11. Transmission mount bolt
12. Bolt
13. Transmission mount bracket
14. Transmission assembly upper part coupling bolts



NOTE

For tightening locations indicated by the * symbol, first tighten temporarily, and then make the final tightening with the entire weight of the engine applied to the vehicle body.



- Lifting up of the vehicle
- ◆◆ 15. Under cover (R.H.)
- ◆◆ 16. Connection for tie rod end
- ◆◆ 17. Connection for stabilizer bar
- ◆◆ 18. Connection for lower arm ball joint
- ◆◆ ◆◆ • Draining of the transmission fluid
- ◆◆ ◆◆ 19. Connection for the drive shaft
- ◆◆ 20. Bell housing cover
- ◆◆ 21. Drive plate connecting bolts
- ◆◆ 22. Center member
- ◆◆ 23. Transmission assembly lower part coupling bolts
- ◆◆ ◆◆ 24. Transmission assembly

SERVICE POINTS OF REMOVAL

E23LBAL

10. REMOVAL OF STARTER MOTOR

Remove the starter motor with the starter motor harness still connected, and secure it inside the engine compartment.

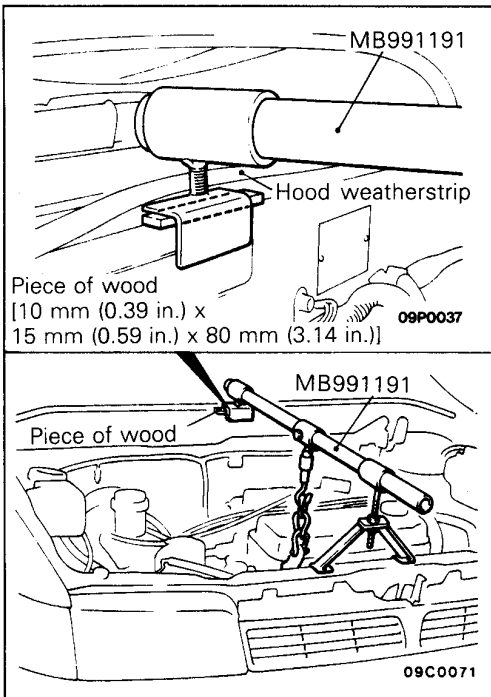
11. REMOVAL OF TRANSMISSION MOUNT BOLT

Set the special tool to the vehicle and support the engine assembly.

Caution

Be sure to insert a piece of wood between engine hanger assembly support and front deck.

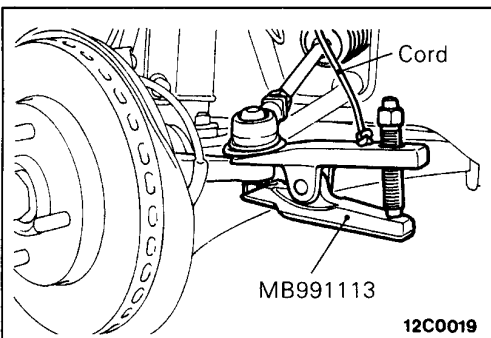
Make sure that the hood weatherstrip is not caught between the front deck and the piece of wood.



16. REMOVAL OF TIE ROD END

Caution

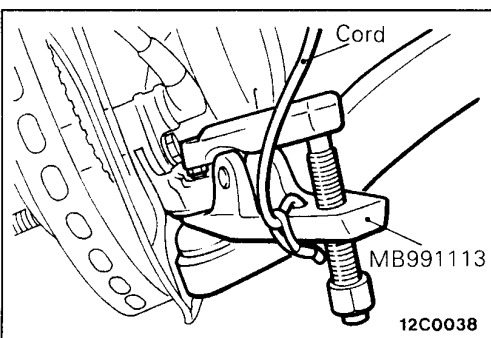
1. Loosen the nut only, don't remove it from the tie rod end.
2. Fix the special tool at the strut, etc by a cord in order to avoid dropping it.

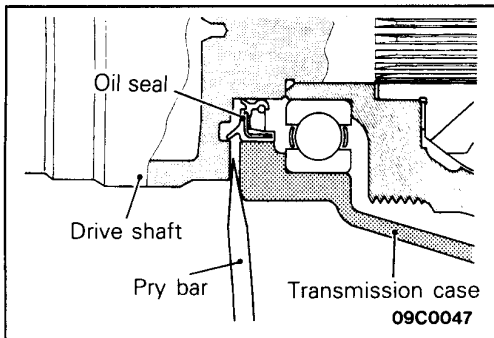


18. REMOVAL OF LOWER ARM BALL JOINT

Caution

1. Loosen the nut only, don't remove it from the knuckle.
2. Fix the special tool at the strut, etc by a cord in order to avoid dropping it.





19. DISCONNECTION OF DRIVE SHAFT

- (1) Insert a pry bar between the transmission case and the drive shaft, and then pry the drive shaft from the transmission.

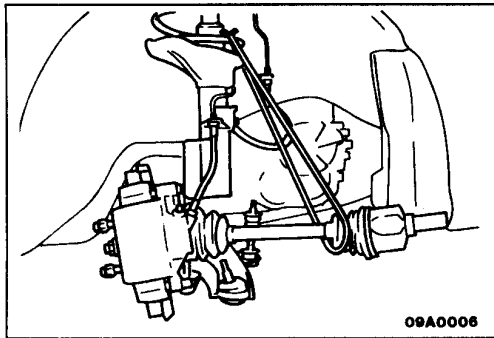
NOTE

Take out the drive shaft with the hub and knuckle, etc., still attached.

Caution

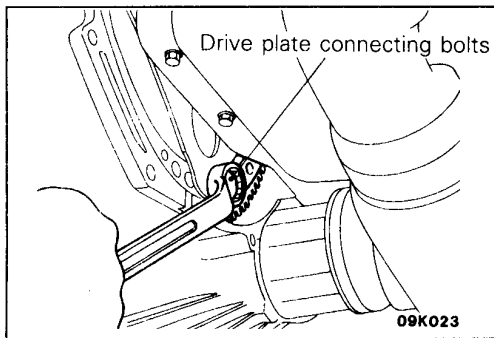
1. Do not pull on the drive shaft; doing so will damage the inboard joint; be sure to use the pry bar.
2. Do not insert the pry bar so deep as to damaged the oil seal.

- (2) Suspend the removed drive shaft with wire so that there are no sharp bends in any of the joints.
- (3) Turn the right hand drive shaft 90° toward the front of the vehicle so that it will not be a hindrance.



21. REMOVAL OF DRIVE PLATE CONNECTING BOLT

Remove the connection bolts while turning the crank shaft.



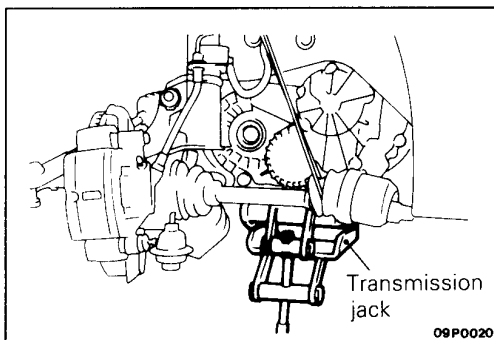
23. REMOVAL OF TRANSMISSION ASSEMBLY LOWER PART CONNECTING BOLTS/24. TRANSMISSION ASSEMBLY

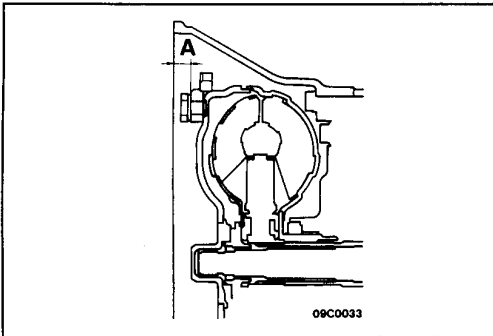
- (1) Support the transmission assembly by using a transmission jack.

Caution

The transmission jack should be used to support the transmission case side, not the oil pan.

- (2) Press in the torque converter to the transmission side so the torque converter does not remain on the engine side.
- (3) Remove the transmission assembly lower connection bolt and lower the transmission assembly.



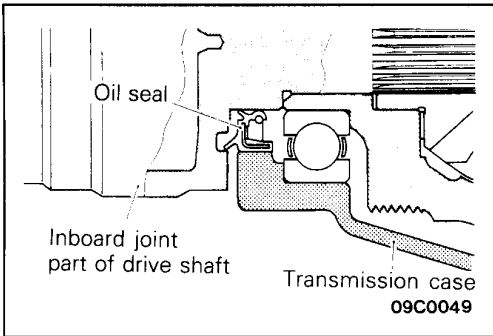
**SERVICE POINTS OF INSTALLATION**

E23LDAL

24. INSTALLATION OF TRANSMISSION ASSEMBLY

After securely inserting the torque converter into the transmission side so that the value shown in the illustration becomes the reference value, install the transmission assembly to the engine.

Reference value (A): 12.4 mm (0.488 in.) or more

**19. INSTALLATION OF DRIVE SHAFT**

Provisionally install the drive shaft so that the inboard joint part of the drive shaft is straight, and not bent relative to the transmission.

Caution

Care must be taken to ensure that the oil seal lip part of the transmission is not damaged by the serrated part of the drive shaft.

TRANSMISSION ASSEMBLY <4WD>

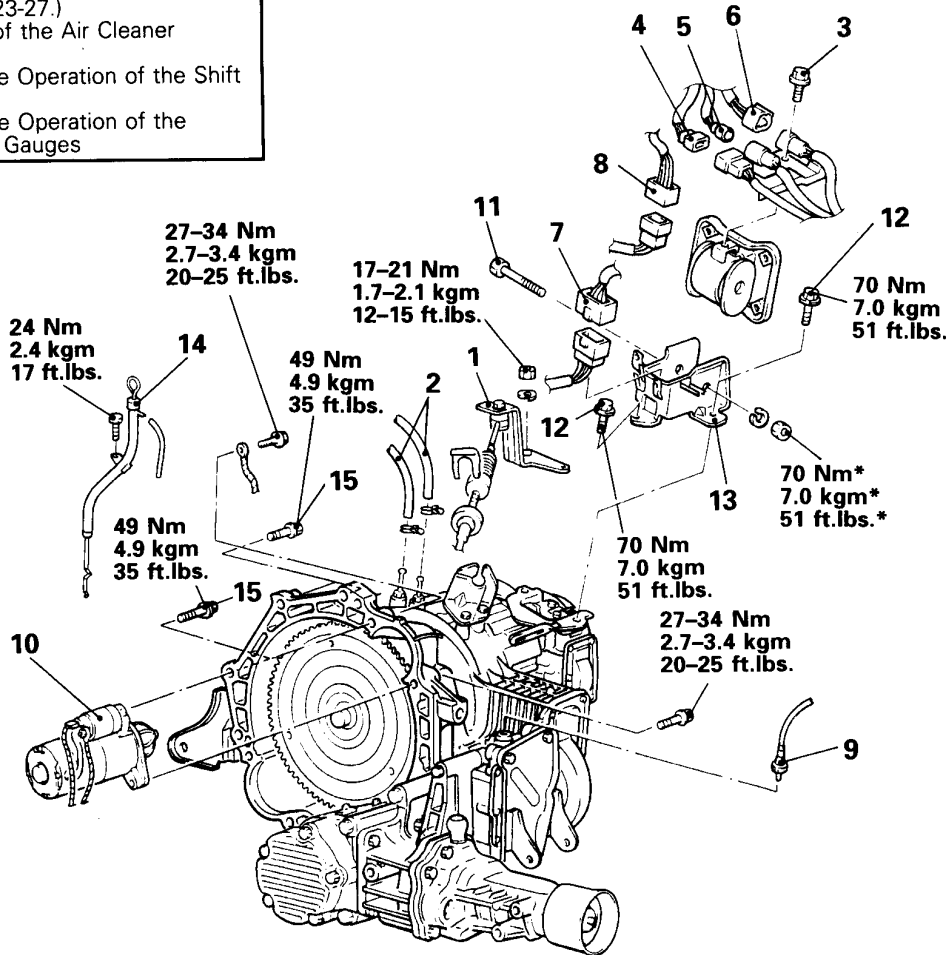
REMOVAL AND INSTALLATION

Pre-removal Operation

- Removal of the Air Cleaner Assembly

Post-installation Operation

- Supplying of Transmission Oil (Refer to P.23-27.)
- Installation of the Air Cleaner Assembly
- Checking the Operation of the Shift Lever
- Checking the Operation of the Meters and Gauges



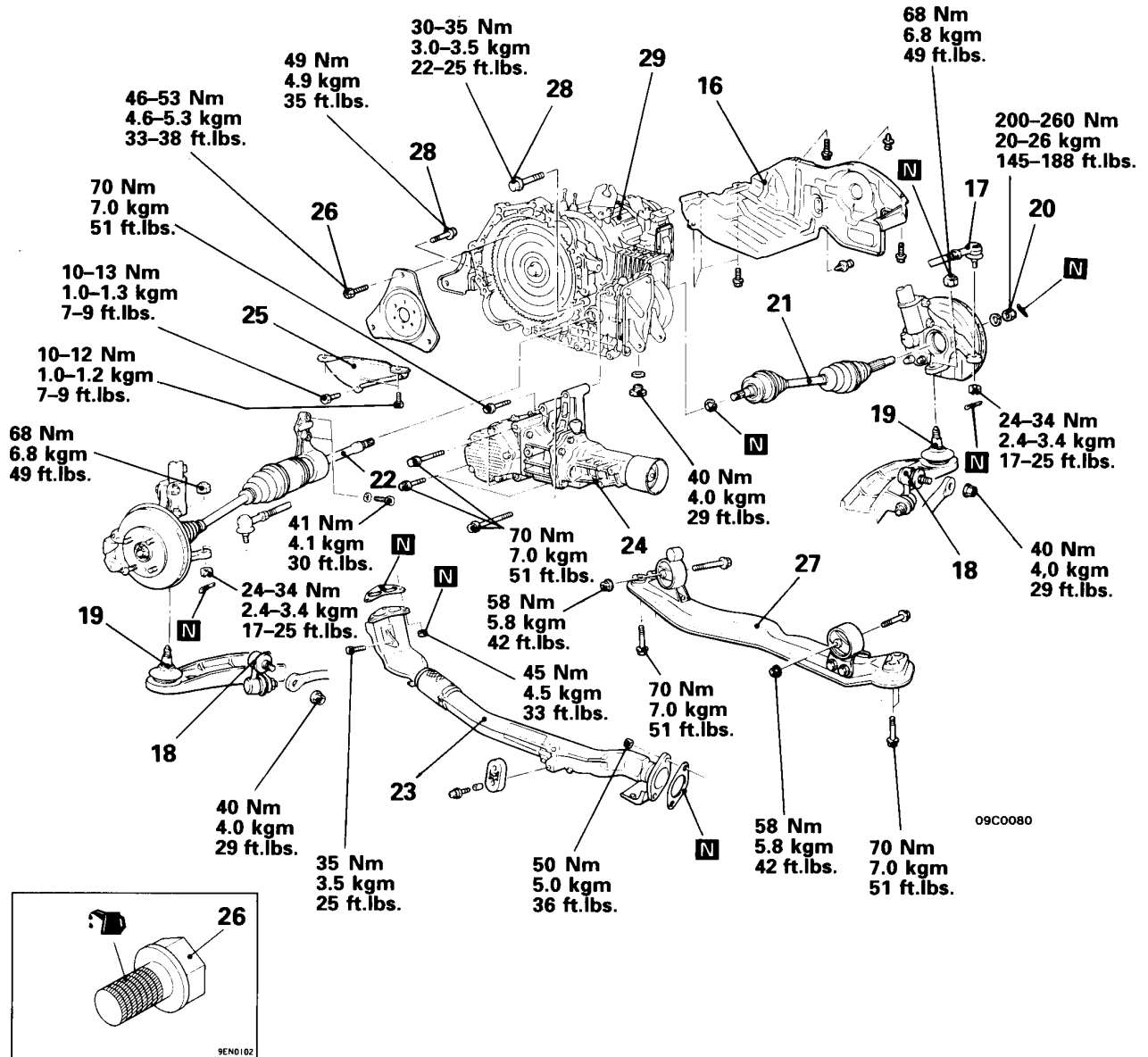
09C0075

Removal steps

- | | | |
|--|---|---|
| 1. Connection for manual control lever | | 9. Speedometer cable connection |
| 2. Transmission oil cooler hoses | | 10. Starter motor |
| 3. Bolt | ↔ | 11. Transmission mount bolt |
| 4. Pulse generator connector | ↔ | 12. Bolt |
| 5. Oil temperature connector | | 13. Transmission mount bracket |
| 6. Kickdown servo switch connector | | 14. Oil level gauge |
| 7. Inhibitor switch connector | | 15. Transmission assembly upper part coupling bolts |
| 8. Solenoid valve connector | | |

NOTE

For tightening locations indicated by the * symbol, first tighten temporarily, and then make the final tightening with the entire weight of the engine applied to the vehicle body.



- Lifting up of the vehicle
- ◆◆ 16. Under cover (R.H.)
- ◆◆ 17. Connection for tie rod end
- ◆◆ 18. Connection for stabilizer bar
- ◆◆ 19. Connection for lower arm ball joint
- Draining of the transmission fluid
- ◆◆◆◆ 20. Drive shaft nut (R.H.)
- ◆◆◆◆ 21. Drive shaft (R.H.)
- ◆◆◆◆ 22. Connection for drive shaft and inner shaft
- ◆◆ 23. Front exhaust pipe
- ◆◆ 24. Transfer assembly
- ◆◆ 25. Bell housing cover
- ◆◆ 26. Drive plate connecting bolts
- ◆◆ 27. Center member
- ◆◆◆◆ 28. Transmission assembly lower part coupling bolts
- ◆◆◆◆◆◆ 29. Transmission assembly

Transfer assembly removal steps

- ◆◆ 23. Front exhaust pipe
- ◆◆ 24. Transfer assembly

SERVICE POINTS OF REMOVAL

10. REMOVAL OF STARTER MOTOR

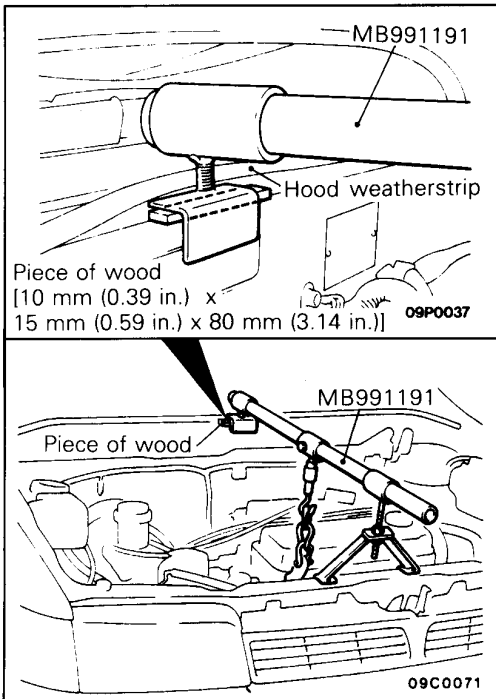
Remove the starter motor with the starter motor harness still connected, and secure it inside the engine compartment.

11. REMOVAL OF TRANSMISSION MOUNT BOLT

Set the special tool to the vehicle and support the engine assembly.

Caution

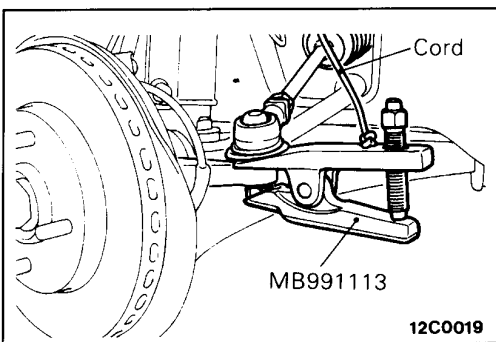
Be sure to insert a piece of wood between engine hanger assembly support and front deck. Make sure that the hood weatherstrip is not caught between the front deck and the piece of wood.



17. REMOVAL OF TIE ROD END

Caution

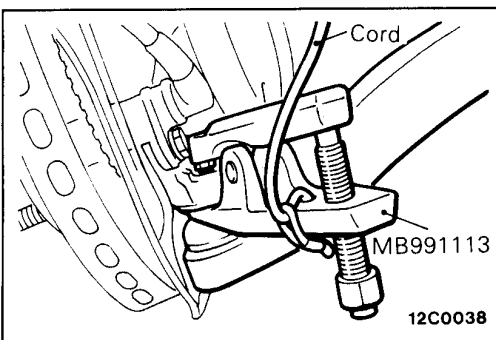
1. Loosen the nut only, don't remove it from the tie rod end.
2. Fix the special tool at the strut, etc by a cord in order to avoid dropping it.

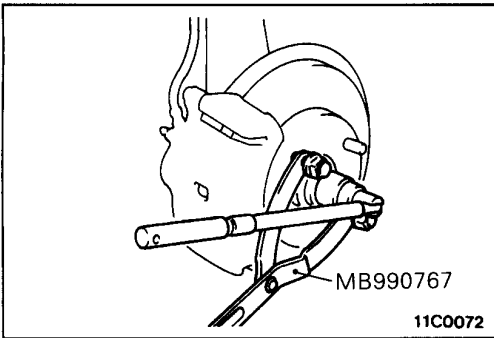


19. REMOVAL OF LOWER ARM BALL JOINT

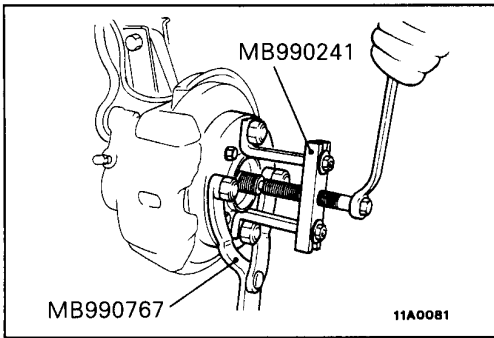
Caution

1. Loosen the nut only, don't remove it from the knuckle.
2. Fix the special tool at the strut, etc by a cord in order to avoid dropping it.



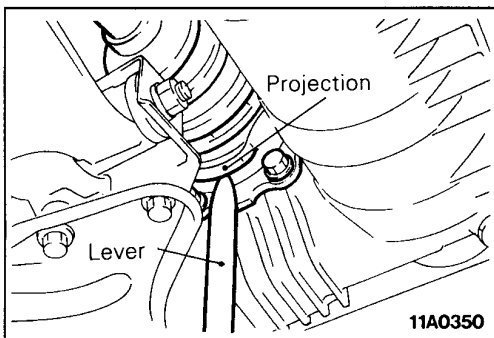


20. REMOVAL OF DRIVE SHAFT NUT (RH)



21. REMOVAL OF DRIVE SHAFT (R.H.)

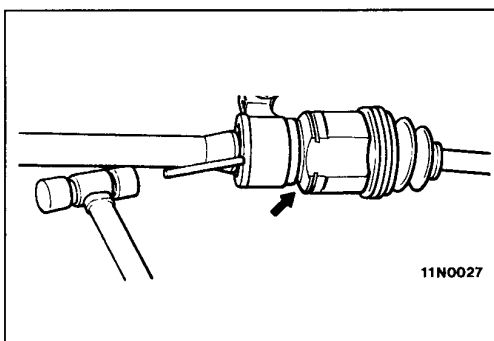
- (1) Use the special tools to push out the drive shaft from the front hub.



- (2) Apply a lever to the projecting part of the drive shaft to remove the drive shaft from the transmission.

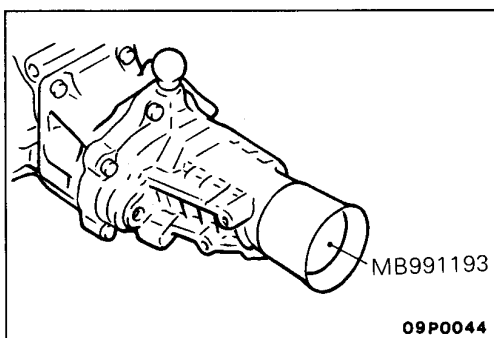
Caution

Do not pull on the drive shaft; doing so will damage the D.O.J.; be sure to use the lever.



22. REMOVAL OF DRIVE SHAFT AND INNER SHAFT

- (1) If the inner shaft and transmission are tightly joined, tap the center bearing bracket lightly with a plastic hammer, etc. to remove the drive shaft and inner shaft (LH) from the transmission.
- (2) Suspend the removed drive shaft and inner shaft with wire so that there are no sharp bends in any of the joints.

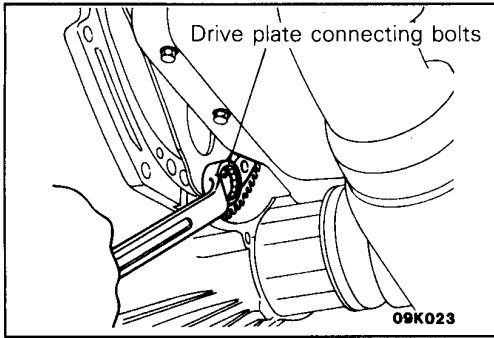


24. REMOVAL OF TRANSFER ASSEMBLY

Cover the transfer opening with the special tool to prevent transmission oil discharge and the entry of foreign objects.

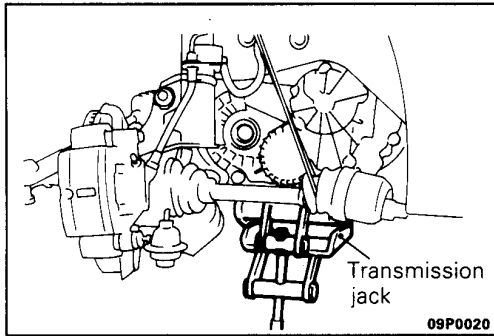
Caution

1. Be careful to avoid damaging the transfer oil seal lip.
2. The propeller shaft should be suspended so that it is not sharply bent.



26. REMOVAL OF DRIVE PLATE CONNECTING BOLT

Remove the connection bolts while turning the crank shaft.



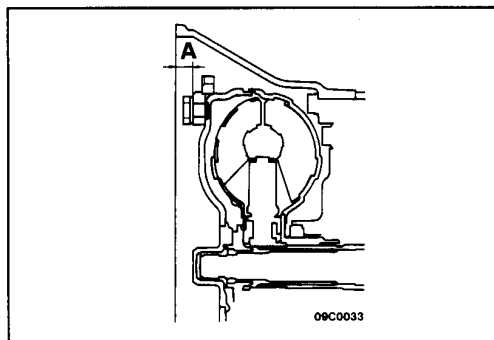
28. REMOVAL OF TRANSMISSION ASSEMBLY LOWER PART CONNECTING BOLTS/29. TRANSMISSION ASSEMBLY

- (1) Support the transmission assembly by using a transmission jack.

Caution

The transmission jack should be used to support the transmission case side, not the oil pan.

- (2) Press in the torque converter to the transmission side so the torque converter does not remain on the engine side.
- (3) Remove the transmission assembly lower connection bolt and lower the transmission assembly.



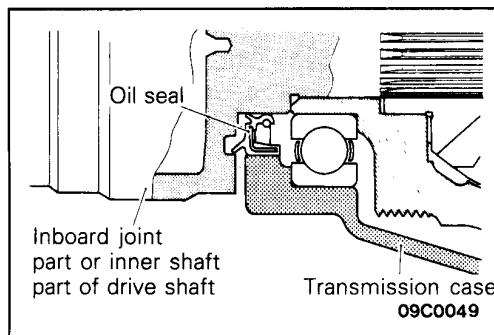
SERVICE POINTS OF INSTALLATION

E23LDAM

29. INSTALLATION OF TRANSMISSION ASSEMBLY

After securely inserting the torque converter into the transmission side so that the value shown in the illustration becomes the reference value, install the transmission assembly to the engine.

Reference value (A): 12.4 mm (0.488 in.) or more

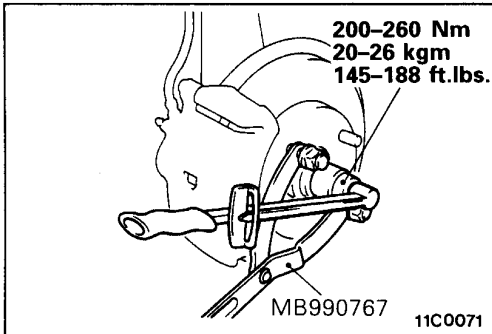
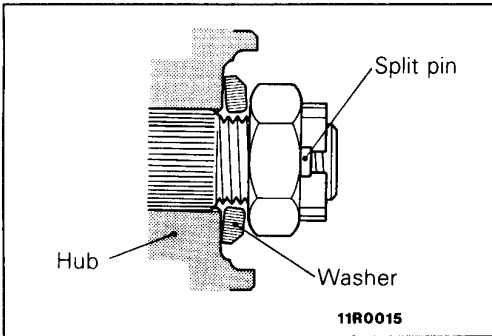


22. INSTALLATION OF DRIVE SHAFT AND INNER SHAFT/21. DRIVE SHAFT (RH)

Provisionally insert the drive shaft so that the inner joint section and the inner shaft section are straight and not bent relative to the transmission.

Caution

Care must be taken to ensure that the oil seal lip part of the transmission is not damaged by the serrated part of the drive shaft.



20. INSTALLATION OF DRIVE SHAFT NUT (RH)

(1) Be sure to install the washer and drive shaft nut in the specified direction.

(2) Using the special tool, tighten the drive shaft nut.

Caution

Before securely tightening the drive shaft nuts, make sure there is no load on the wheel bearings.

(3) If the position of the split pin holes does not match, tighten the nut up to 260 Nm (26 kgm, 188 ft.lbs.) in maximum.

(4) Install the split pin in the first matching holes and bend it securely.