

AUTOMATIC TRANSMISSION

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E23AA--

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WARNING 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), 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 or maintenance) are indicated in the table of contents by an asterisk (*).

SPECIFICATIONS**GENERAL SPECIFICATIONS**

E23CA--

Items	2WD
Model	F4A22
Applicable engine	4G92
Type	Electronically controlled 4-speed full-automatic
Torque converter	
Type	3-element with damper clutch
Engine stall speed	r/min. 2,500–3,000
Gear ratio	
1st	2.846
2nd	1.581
3rd	1.000
4th	0.685
Reverse	2.176
Final gear ratio	4.007
Speedometer gear ratio (driven/drive)	31/36

SERVICE SPECIFICATIONS

E23CB--

Items	Specifications
Resistance of pulse generators A and B [at 20°C (68°F)]	Ω 215–275
Resistance of oil temperature sensor [at 20°C (68°F)] [at 100°C (212°F)]	Ω 8.0–8.2 0.57–0.69
Resistance of damper clutch control solenoid valve coil [at 20°C (68°F)]	Ω Approx. 3 <MODEL 1992> Approx. 13 <MODEL 1993>
Resistance of pressure control solenoid valve coil [at 20°C (68°F)]	Ω Approx. 3
Resistance of shift control solenoid valves A and B coils [at 20°C (68°F)]	Ω Approx. 22
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)
Reducing pressure kPa (kg/cm ² , psi)	415–435 (4.15–4.35, 59–61)
Oil pressure change for each turn of adjustment screw kPa (kg/cm ² , psi)	45 (0.45, 6.4)
Distance between sleeve and selector lever assembly mm (in.)	11.5–12.5 (0.453–0.492)

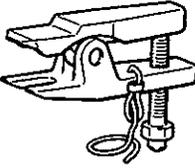
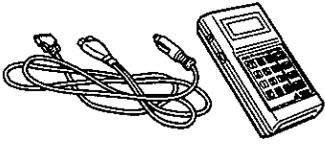
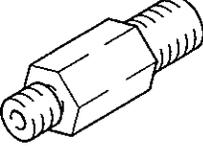
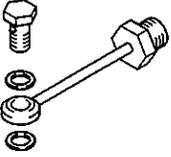
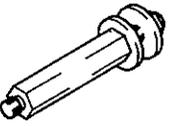
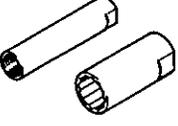
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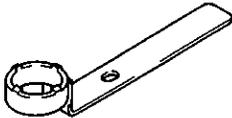
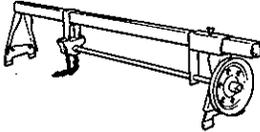
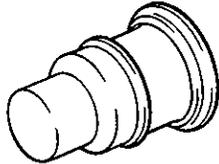
E23CD--

Items	Specified lubricant	Quantity dm ³ (U.S.qts., Imp.qts.)
Transmission fluid	Dia queen ATF SP or equivalent	6.0 (6.3, 5.3)

SPECIAL TOOLS

E23DA--

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
	MB991341	Multi-use tester sub assembly	Checking of the diagnosis code, actuator testing, and checking of the service data
	(For the number, refer to GROUP 00) – Precautions Before Service	ROM pack	
	MD998330	Oil pressure gauge 3,000 kPa (30 kg/cm ² , 400 psi)	Measuring oil pressure
	MD998332	Adapter	Connection of the oil pressure gauge
	MD998900	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

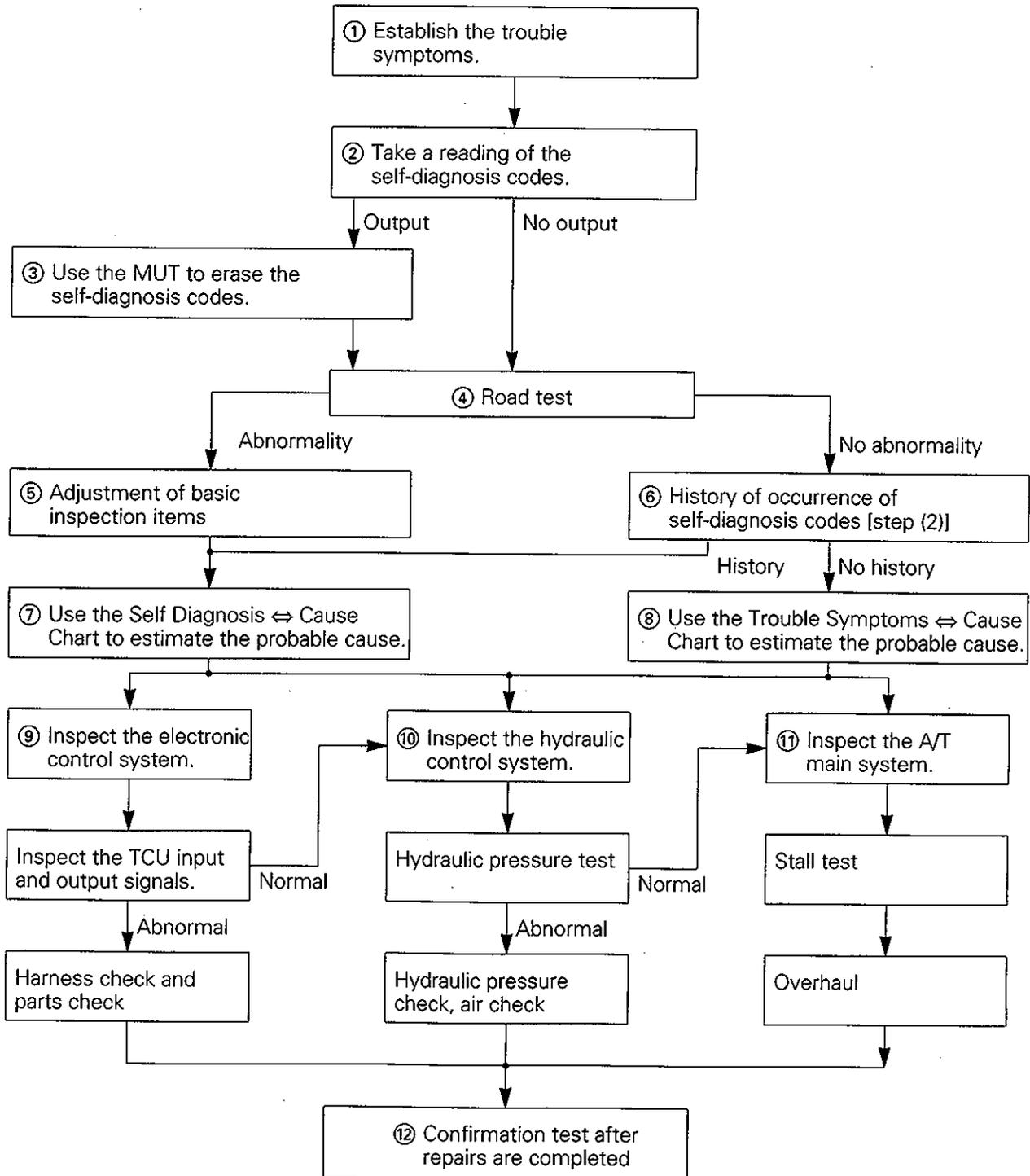
Tool	Number	Name	Use
	MD998918	Kickdown servo wrench	Adjustment of kickdown servo
	MD999563	Oil pressure gauge 1,000 kPa (10 kg/cm ² , 140 psi)	Measuring oil pressure
	GENERAL SERVICE TOOL MZ203827	Mechanic hanger, engine	Supporting the engine assembly during removal and installation of the transmission
	MB991460	Plug	Prevention of entry of foreign objects into the transmission case

TROUBLESHOOTING

1. TROUBLESHOOTING PROCEDURE

Malfunctions of the ELC-4A/T can be caused by malfunctions or defective adjustment of the electronic control system, hydraulic control system or the A/T main system, or of a combination of these systems.

In order to carry out diagnosis of these systems effectively, carry out troubleshooting by the following procedure.



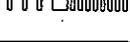
- ① Gain a full understanding of the conditions under which the trouble symptoms that the user is complaining about occur, including frequency of occurrence.
- ② Use the MUT to read and make a note of the self-diagnosis codes (including fail-safe codes).
- ③ Erase the self-diagnosis codes in order to carry out a road test.
- ④ Carry out a road test (P.23–10).
Always be sure to check that the basic inspection items and all self-diagnosis codes and reoccurrence conditions are covered during this test.
- ⑤ Carry out adjustment of the basic inspection items (ATF, TPS, inhibitor switch, manual control cable).
- ⑥ Check to be sure if the self-diagnosis codes read before the road test are present.
- ⑦ Determine the probable cause from the Self Diagnosis ⇔ Cause Chart (P.23–17).
Carry out the inspection of the electronic control system, hydraulic control system and the A/T main body in that order.
- ⑧ Determine the probable cause from the Trouble Symptoms ⇔ Cause Chart (P.23–18).
Carry out the inspection of the electronic control system, hydraulic control system and the A/T main body in that order.
- ⑨ If the probable cause is in the electronic control system, use the MUT or an oscilloscope to inspect the TCU input and output signals.
If the result is normal, check for the probable cause in one of the other systems. If there is an abnormality in the input and output signals, look at the wiring diagram and carry out a harness check. If there are no abnormalities in the harnesses, check the individual components.
- ⑩ If the probable cause is in the hydraulic control system, carry out a hydraulic test.
If the result is normal, check for the probable cause in one of the other systems. If there is an abnormality in the hydraulic test, carry out inspection and adjustment while referring to the flow chart (P.23–33).
- ⑪ If the probable cause is in the A/T main body system, determine which part is malfunctioning by means of a stall test, and then carry out an overhaul.
- ⑫ After repairs are completed, carry out a road test to check that the malfunction has been repaired.

2. INSPECTION OF SELF-DIAGNOSIS CODES AND FAIL-SAFE CODES

- (1) Connect the multi-use tester (MUT) to the diagnosis connector.
- (2) Check and make a note of the malfunction display using the tester.

SELF-DIAGNOSIS CHART

Code No.	Display pattern	Output conditions	Remedy
—		Malfunction condition is not being output.	Normal
11		TPS output is 4.8V or above when the engine is idling	TPS short circuit
12		TPS output is 0.2V or less at all times other than when the engine is idling	TPS open circuit
13		TPS output when the engine is idling and the target value inside the TCU are not the same, even after compensation	Defective TPS adjustment Defective TPS part
14		TPS output is 0.2V or below, or 1.2V or above, when the engine is idling	Defective TPS adjustment Defective TPS part
15		Oil temperature sensor output is 4.4V or above even after engine has been running for 10 minutes or more (oil temperature does not increase)	Open circuit in oil temperature sensor
21		Kickdown servo switch does not turn ON when in 1st or 3rd gear	Open circuit in kickdown servo switch
22		Kickdown servo switch does not turn OFF when in 2nd or 4th gear	Short circuit in kickdown servo switch
23		Ignition pulse (signal generator output) is not input when engine is running	Open circuit in ignition pulse signal wire Open circuit in signal generator
31		No output from pulse generator A (PG-A) at vehicle speeds of 43km/h (27 mph) or above	Open circuit in PG-A
32		Pulse generator B (PG-B) output and vehicle speed sensor output differ by 30% or more at vehicle speeds of 43km/h (27 mph) or above	Open circuit in PG-B
33		When the accelerator is fully open, wide open throttle switch is OFF	Open circuit in wide open throttle switch
34		Wide open throttle switch is ON even though accelerator is only slightly open	Short circuit in wide open throttle switch

Code No.	Display pattern	Output conditions	Item
41		Shift control solenoid valve A (SCSV-A) resistance value is large	Open circuit in SCSV-A
42		Shift control solenoid valve A (SCSV-A) resistance value is small	Short circuit in SCSV-A
43		Shift control solenoid valve B (SCSV-B) resistance value is large	Open circuit in SCSV-B
44		Shift control solenoid valve B (SCSV-B) resistance value is small	Short circuit in SCSV-B
45		Pressure control solenoid valve (PCSV) resistance value is large	Open circuit in PCSV
46		Pressure control solenoid valve (PCSV) resistance value is small	Short circuit in PCSV
47		Damper clutch control solenoid valve (DCCSV) resistance is large	Open circuit in DCCSV
48		Damper clutch control solenoid valve (DCCSV) resistance is small	Short circuit in DCCSV
49		Damper clutch control solenoid valve (DCCSV) is held in 100% for 10 seconds or more	Damper clutch system abnormality
51		After changing to 1st gear, the value of pulse generator A (PG-A) output (rotation speed of input axle) divided by the 1st gear ratio is not the same as pulse generator B (PG-B) output (rotation speed of output axle)	1st gear incorrect ratio
52		After changing to 2nd gear, the value of pulse generator A (PG-A) output (rotation speed of input axle) divided by the 2nd gear ratio is not the same as pulse generator B (PG-B) output (rotation speed of output axle)	2nd gear incorrect ratio
53		After changing to 3rd gear, the value of pulse generator A (PG-A) output (rotation speed of input axle) divided by the 3rd gear ratio is not the same as pulse generator B (PG-B) output (rotation speed of output axle)	3rd gear incorrect ratio
54		After changing to 4th gear, the value of pulse generator) A (PG-A) output (rotation speed of input axle) divided by the 4th gear ratio is not the same as pulse generator B (PG-B) output (rotation speed of output axle)	4th gear incorrect ratio
—	Regular output	Normal output is not possible due to TCU abnormality	TCU abnormality

FAIL-SAFE CHART

The respective fail-safe code is output when the related diagnosis code accumulates 4 times.

Code No.	Display pattern	Item	Fail-safe	Related diagnosis code
81		Open circuit in pulse generator A (PG-A)	Set at 3rd gear (D) or 2nd gear (2, L)	31
82		Open circuit in pulse generator B (PG-B)	Set at 3rd gear (D) or 2nd gear (2, L)	32
83		Open or short circuit in shift control solenoid valve A (SCSV-A)	Set at 3rd gear	41, 42
84		Open or short circuit in shift control solenoid valve B (SCSV-B)	Set at 3rd gear	43, 44
85		Open or short circuit in pressure control solenoid valve (PCSV)	Set at 3rd gear (D) or 2nd gear (2, L)	45, 46
86		Incorrect gear ratio	Set at 3rd gear (D) or 2nd gear (2, L)	51, 52, 53, 54

3. ROAD TEST

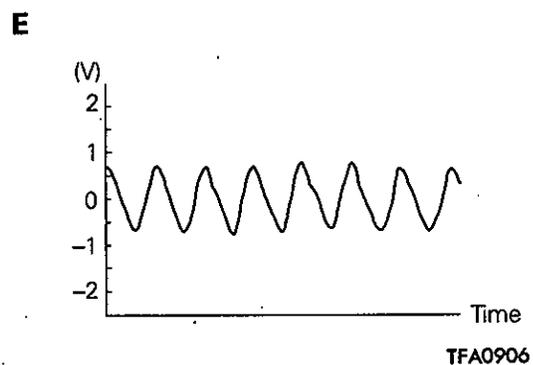
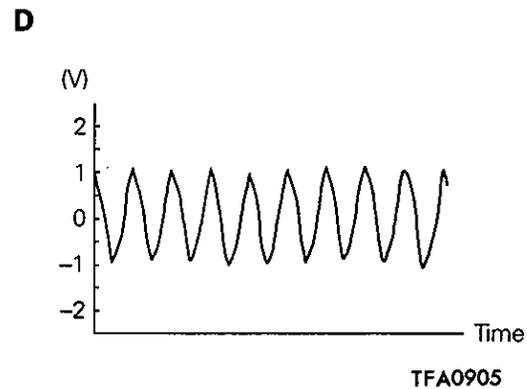
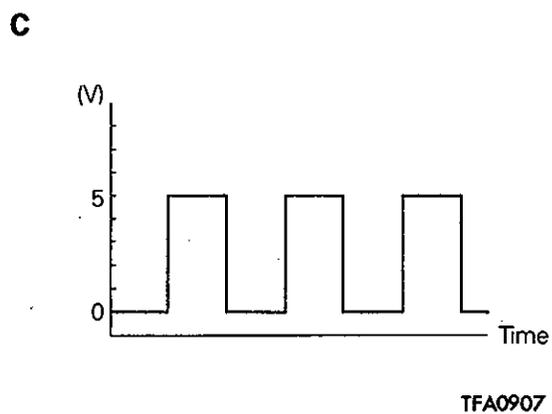
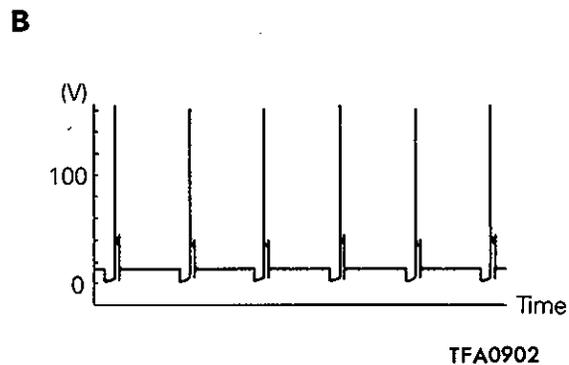
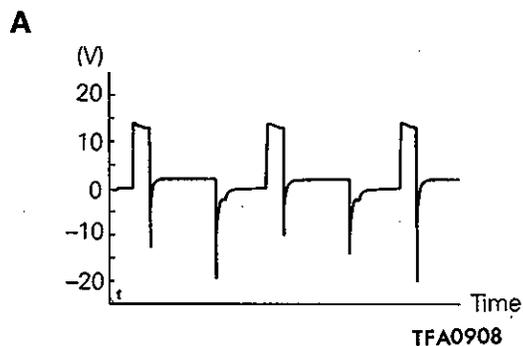
Procedure	Condition	Operation	Check item (Diagnosis No.)	Diagnosis value (MUT)	Diagnosis value (TCU terminal)	Probable malfunctioning system
1	IG position:ON Engine:Stopped	Overdrive switch ① ON ② OFF	Overdrive switch	Data list No. 35 ① OD ② OD-OFF	Voltage between terminal No. 37 and earth ① Battery voltage ② 0V	Overdrive switch
		Mode selection switch ① Economy ② Power	Mode selection switch	Data list No. 36 ① Economy ② Power	Between No. 38 and earth ① 0V ② Battery voltage	Mode selection switch
		Selector lever ① P ② R ③ N ④ D ⑤ 2 ⑥ L	Inhibitor switch	Data list No. 37 ① P ② R ③ N ④ D ⑤ 2 ⑥ L	Voltage between following terminals ① No. 31 and earth Battery voltage ② No. 32 and earth Battery voltage ③ No. 33 and earth Battery voltage ④ No. 34 and earth Battery voltage ⑤ No. 35 and earth Battery voltage ⑥ No. 36 and earth Battery voltage	Inhibitor switch Manual control cable
2	IG position:START Engine:Stopped	Starting test at each lever position ① P ② R ③ N ④ D ⑤ 2 ⑥ L	Inhibitor switch	① Starting possible ② Starting impossible ③ Starting possible ④ Starting impossible ⑤ Starting impossible ⑥ Starting impossible	Inhibitor switch Manual control cable	

Procedure	Condition	Operation	Check item (Diagnosis No.)	Diagnosis value (MUT)	Diagnosis value (TCU terminal)	Probable malfunctioning system
3	Driving after engine has warmed up	Drive for 15 minutes or more so that ATF temperature is 70–90°C (158–194°F)	Oil temperature sensor [15]	Data list No. 15 Gradually increases to 70–90°C (158–194°F)	Voltage between terminal No. 23 and earth gradually decreases to around 2V	Oil temperature sensor
4	Engine: Idle Selector lever: N position	Carry out ATF inspection. For details of procedure, refer to P. 23-19.	ATF	Oil amount should be at HOT on the oil level gauge, and there should be no abnormal colour or odour in the ATF. For details of procedure, refer to P. 23-19.		ATF
		Accelerator pedal ① Fully closed ② Depressed ③ Fully open (up to 2 seconds)	TPS [11, 12, 13, 14]	Data list No. 11 ① 400–1,000mV ② Increases depending on ① ③ 4,500–5,500mV	Voltage between terminal No. 21 and earth ① 0.4–1.0V ② Increases depending on ① ③ 4.5–5.5mV	TPS
		Idle position switch	Idle position switch	Data list No. 25 ① ON ② OFF ③ OFF	Voltage between terminal No. 20 and earth ① 5V ② 0V ③ 0V	TPS (built into idle position switch)
		Selector lever operation ① Shift from N → D ② Shift from N → R	Shift shock Time lag	There should be no abnormal shift shock Time lag should be within 2 seconds Time lag: Interval between shifting and vehicle movement response		PCSV, TCU, Valve body, A/T body
5	Engine: Idle (Vehicle stopped) Selector lever: D position Mode selection: Economy	Air conditioner switch ① ON ② OFF	Air conditioner load signal	Data list No. 26 ① ON ② OFF	Voltage between terminal No. 8 and earth ① Battery voltage ② 0V	Air conditioner
		Accelerator pedal ① Fully closed ② Slightly depressed	PCSV duty [45, 46, 85]	Data list No. 45 ① 50–70% ② 100%	(Voltage between terminal No. 14 and earth) (Using an oscilloscope) ① Waveform A	TCU Idle position switch
		SCSV-A drive signal SCSV-B drive signal [41, 42, 43, 44, 83, 84]	SCSV-A drive signal SCSV-B drive signal [41, 42, 43, 44, 83, 84]	Data list No. 27 ① C ② 1ST	Between No. 2 and earth ① 0V ② Battery voltage Between No. 15 and earth ① Battery voltage ② Battery voltage	TCU Idle position switch
6	Selector lever: L position Mode selection: Economy	① Idling (vehicle stopped) ② Driving at constant speed of 20km/h (12 mph) (for 20 seconds or more)	SCSV-A drive signal SCSV-B drive signal [51, 86]	Data list No. 27 ① 1ST	Between No. 2 and earth ① Battery voltage Between No. 15 and earth ① Battery voltage	TCU Inhibitor switch
		Kickdown servo switch [21]	Kickdown servo switch [21]	Data list No. 21 ① ON	Voltage between terminal No. 7 and earth ① 0V	Kickdown brake Kickdown servo switch
		Ignition signal	Ignition signal	Data list No. 23 ① 650–900 r/min.	(Voltage between terminal No. 46 and earth) (Using an oscilloscope) ① Waveform B	Ignition system

Procedure	Condition	Operation	Check item (Diagnosis No.)	Diagnosis value (MUT)	Diagnosis value (TCU terminal)	Probable mal- functioning system
7	Selector lever: 2 position Mode selection: Economy	① Idling (vehicle stopped) ② Driving at 10km/h (6 mph) ③ Driving at 40km/h (25 mph) (for 20 seconds or more)	SCSV-A drive signal SCSV-B drive signal [52, 86]	Data list No. 27 ① C ② 1ST ③ 2ND	Between No. 2 and earth ① 0V ② Battery voltage ③ 0V Between No. 15 and earth ① Battery voltage ② Battery voltage ③ Battery voltage	TCU Inhibitor switch Idle position switch
			Kickdown servo switch [22]	Data list No. 21 ① OFF ② OFF ③ ON	Voltage between ter- minal No. 7 and earth ① Battery voltage ② Battery voltage ③ 0V	Kickdown brake Kickdown servo switch
			Vehicle speed sensor	Data list No. 38 ① 0km/h ② 10km/h (6 mph) ③ 40km/h (25 mph)	(Voltage between terminal No. 40 and earth) (Using an oscillo- scope) ③ Waveform C	Vehicle speed sensor
8	Selector lever: D position Mode selection: Economy Overdrive: OFF	① Driving at constant speed of 50km/h (31 mph) (for 20 seconds or more) ② Driving at constant speed of 70km/h (43 mph)	SCSV-A drive signal SCSV-B drive signal [53, 86]	Data list No. 27 ① 3RD	Between No. 2 and earth ① 0V Between No. 15 and earth ① 0V	TCU Inhibitor switch Overdrive switch
			Kickdown servo switch [21]	Data list No. 21 ① OFF	Voltage between ter- minal No. 7 and earth ① 0V	Kickdown brake Kickdown servo switch
			Vehicle speed sensor [32, 82]	Data list No. 38 ① 50km/h (31 mph)	(Voltage between terminal No. 40 and earth) (Using an oscillo- scope) ① Waveform C	Vehicle speed sensor
			Pulse generator A (PG-A) [31, 81]	Data list No. 31 ① 1,800–2,200 r/min.	(Voltage between terminals No. 43 and No. 44) (Using an oscillo- scope) ① Waveform D	Pulse generator A A/T body
			Pulse generator B (PG-B) [32, 82]	Data list No. 32 ① 1,800–2,200 r/min.	(Voltage between terminals No. 41 and No. 42) (Using an oscillo- scope) ① Waveform E	Pulse generator B A/T body
			Ignition signal [23]	Data list No. 23 ① 1,800–2,200 r/min.	(Voltage between terminal No. 46 and earth) (Using an oscillo- scope) ① Waveform B	Ignition system
			Damper clutch for slipping [47, 48]	Data list No. 32 ① 100–300 r/min. ② 0–10 r/min.	None	Ignition system Pulse generator A
			DCCSV duty [49]	Data list No. 32 ① 0% ② 70–90%	None	TCU Ignition system TPS

Procedure	Condition	Operation	Check item (Diagnosis No.)	Diagnosis value (MUT)	Diagnosis value (TCU terminal)	Probable mal- functioning system
9	Selector lever: D position Mode selection: Economy Overdrive: ON	① Driving at constant speed of 50km/h (31 mph) (for 20 seconds or more)	SCSV-A drive signal SCSV-B drive signal [54, 86]	Data list No. 27 ① 4TH	Between No. 2 and earth ① Battery voltage Between No. 15 and earth ① 0V	TCU Inhibitor switch Overdrive switch
			Kickdown servo switch	Data list No. 21 ① OFF	Voltage between terminal 7 and earth ① Battery voltage	Kickdown brake Kickdown servo switch
			Pulse generator A (PG-A)	Data list No. 31 ① 1,200–1,500 r/min.	(Voltage between terminals No. 43 and 44) (Using an oscilloscope) ① Waveform D	Pulse generator A A/T body
			Pulse generator B (PG-B)	Data list No. 32 ① 1,800–2,200 r/min.	(Voltage between terminals No. 41 and 42) (Using an oscilloscope) ① Waveform E	Pulse generator B A/T body
10	Selector lever: D position Mode selection: Economy Overdrive: ON	Monitor MUT data lists No. 27 and 32 ① Accelerate up to 4th gear with TPS output of 1.5V (opening angle 30%). ② Slowly decelerate to a stop. ③ Accelerate up to 4th gear with TPS output of 2.5V (opening angle 50%). ④ From 50km/h (31 mph) in 4th gear, turn overdrive to OFF. ⑤ From 30km/h (17 mph) in 3rd gear, move selector lever to "2" position. ⑥ From 20km/h (12 mph) in 2nd gear, move selector lever to "L" position. ○ Set the mode selection switch to POWER and carry out the same test.	1st gear → 2nd gear Shift point Shift shock	Both ① and ③ Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks	TPS Pulse generator A Pulse generator B PCSV SCSV-A SCSV-B Overdrive switch Mode selection switch Inhibitor switch TCU A/T body Valve body	
			2nd gear → 3rd gear Shift point Shift shock	Both ① and ③ Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks		
			3rd gear → 4th gear Shift point Shift shock	Both ① and ③ Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks		
			4th gear → 3rd gear Shift point Shift shock	② Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks ④ Should downshift immediately after operation		
			3rd gear → 2nd gear Shift point Shift shock	② Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks ⑤ Should downshift immediately after operation		
			2nd gear → 1st gear Shift point Shift shock	② Standard output axle speed (vehicle speed) for each shift pattern should be the same, with no abnormal shocks ⑥ Should downshift immediately after operation		

WAVEFORM SAMPLES

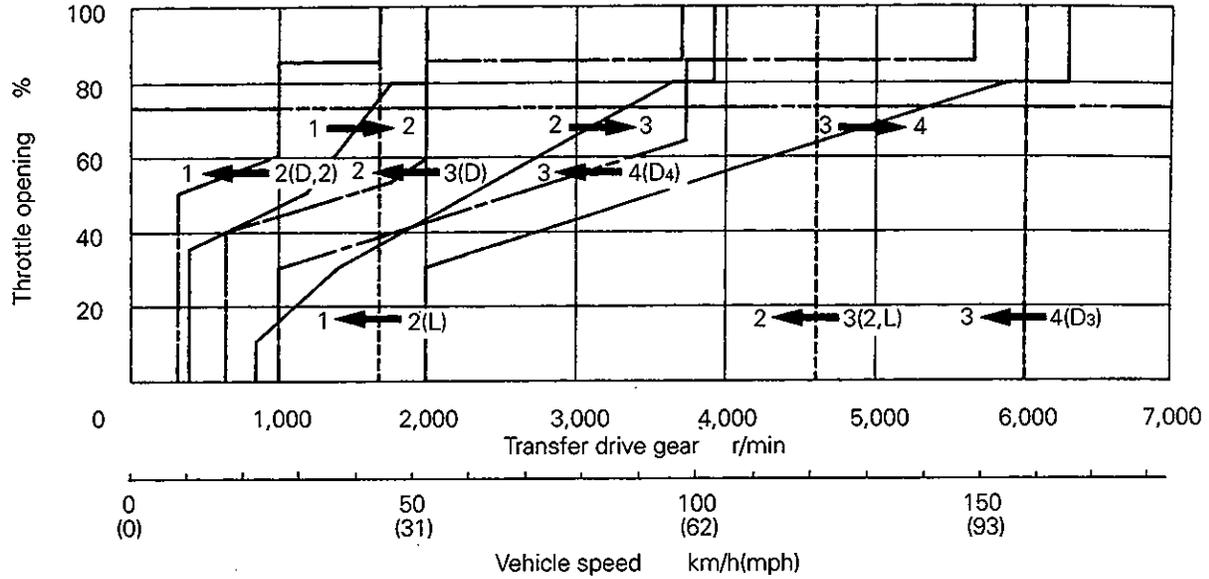


NOTES

4. SHIFT PATTERNS

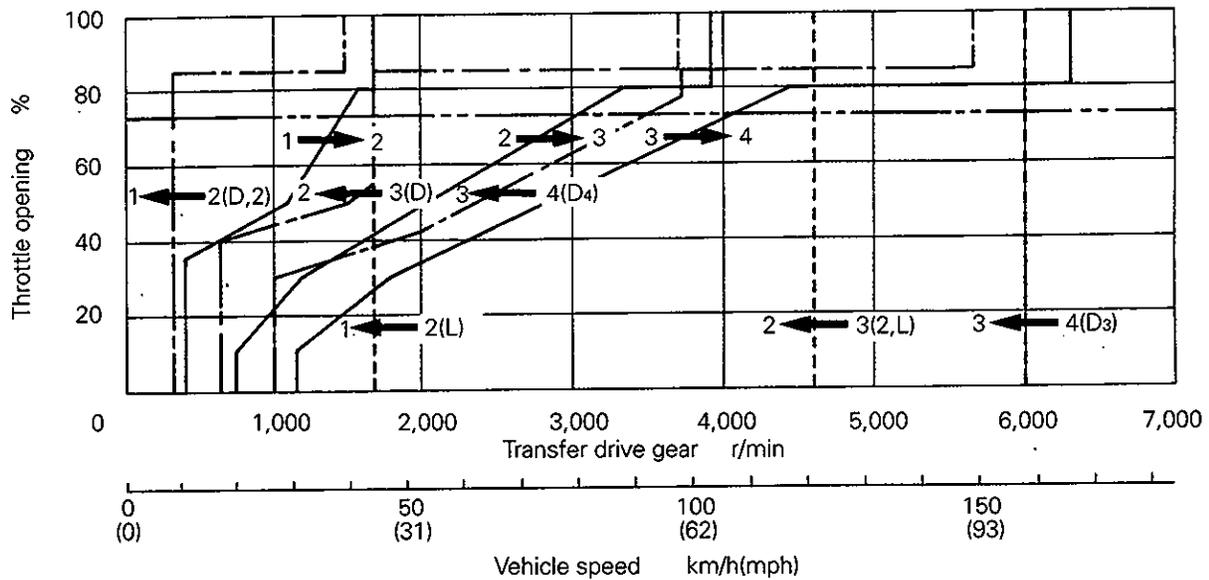
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POWER RANGE



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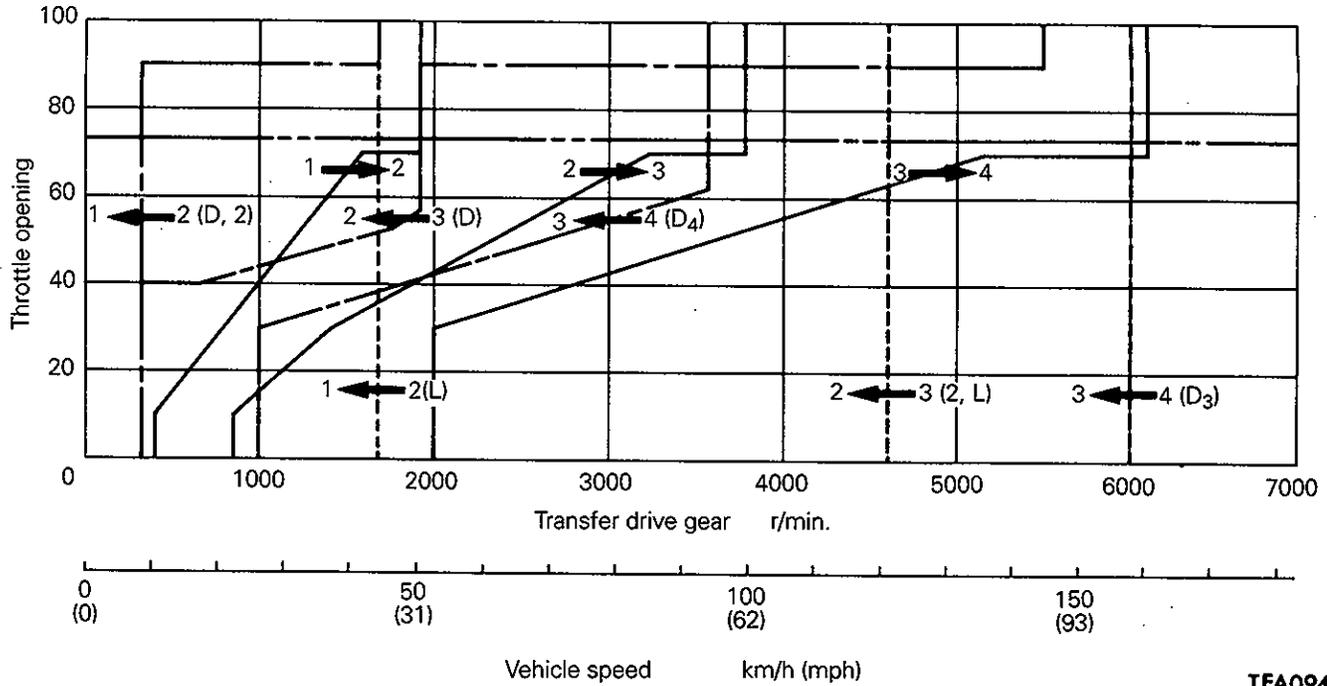
ECONOMY RANGE



TFA0764

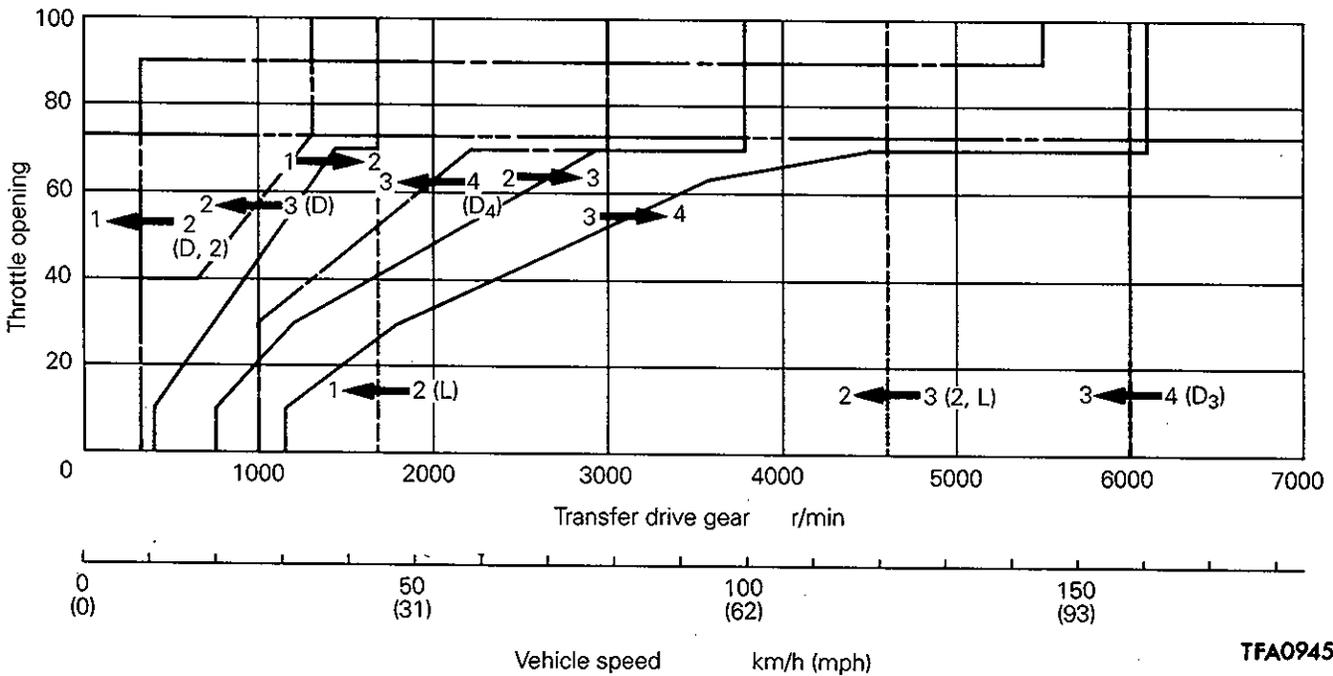
<F4A22-2-MRF1>

POWER RANGE



TFA0944

ECONOMY RANGE



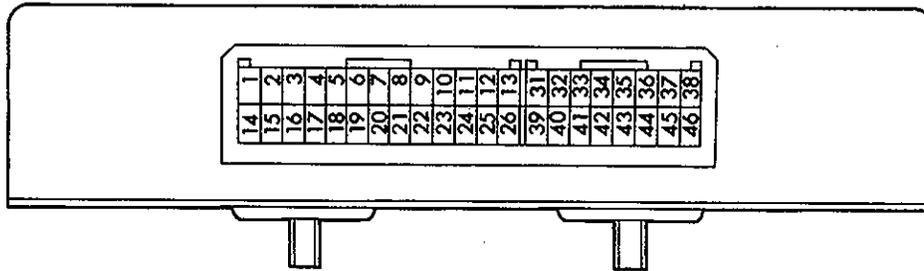
TFA0945

NOTES

5. TRANSMISSION CONTROL UNIT (TCU) TERMINAL VOLTAGE TABLE

NOTE

- (1) Voltage measurements should be made between each terminal and terminal No. 13 (earth terminal), with the transmission control unit connector connected.
- (2) The layout for the terminals is as shown in the illustration below.



TFA0744

Terminal	Terminal name	Standard voltage, measurement conditions	
1	Damper clutch control solenoid valve	D range, idling:0V	When damper operates:Not 0V
2	Shift control solenoid valve A	L range, idling: Battery voltage	2 range, idling:0V
3	—		
4	—		
5	—		
6	—		
7	Kickdown servo switch	L range idling:0V	D range, 2nd range: Battery voltage
8	Air conditioner relay signal	Air conditioner ON: Battery voltage	Air conditioner OFF:0V
9	Diagnosis output terminal	When normal:0 → 5V alternating	
10	—		
11	Diagnosis control terminal	—	
12	Power source	Idling:Battery voltage	
13	Earth	Idling:0V	
14	Pressure control solenoid valve	D range, idling:Not 0V	
15	Shift control solenoid valve B	1st gear, 2nd gear: Battery voltage	3rd gear, 4th gear:0V
16	Wide open throttle switch	Fully open:ON	Fully closed:OFF
17	—		
18	—		
19	—		

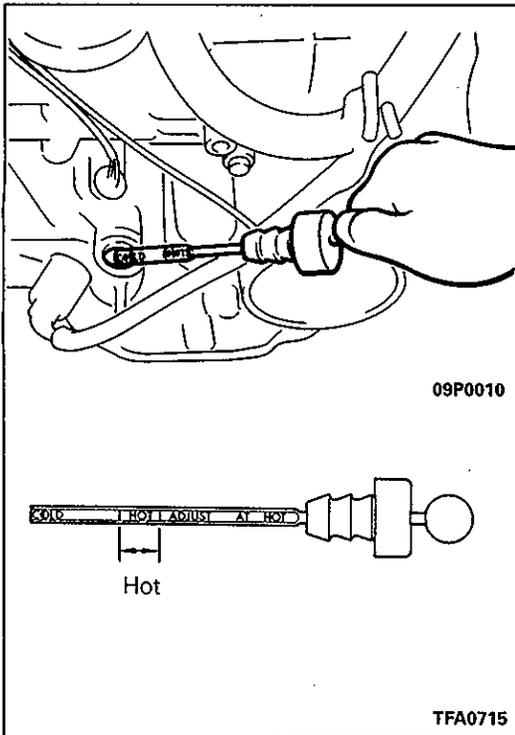
Terminal	Terminal name	Standard voltage, measurement conditions	
20	Idle position switch	Idling:0V	Not idling:5V
21	Throttle position sensor	Fully closed: 0.4–1.0V	Fully open: 4.5–5.5V
22	—		
23	Oil temperature sensor	Oil temperature 20°C (68°F): 3.9V, 100°C (212°F): 1.4V	
24	Sensor earth	Idling:0V	
25	Power source	Idling:Battery voltage	
26	Earth	Idling:0V	
31	Inhibitor switch (P)	When selector lever is at "P": Battery voltage, 0V at other times	
32	Inhibitor switch (R)	When selector lever is at "R": Battery voltage, 0V at other times	
33	Inhibitor switch (N)	When selector lever is at "N": Battery voltage, 0V at other times	
34	Inhibitor switch (D)	When selector lever is at "D": Battery voltage, 0V at other times	
35	Inhibitor switch (2)	When selector lever is at "2": Battery voltage, 0V at other times	
36	Inhibitor switch (L)	When selector lever is at "L": Battery voltage, 0V at other times	
37	Overdrive switch	When overdrive switch is ON: Battery voltage When overdrive switch is OFF: 0V	
38	"POWER" signal	"Power" selected: Battery voltage "Economy" selected: 0V	
39	Power source (Backup)	Ignition switch OFF: Battery voltage	
40	Vehicle speed reed switch	Moving slowly forward: 0 → 5V alternating	
41	Pulse generator (B)	Between Nos. 41–42, D range 3rd gear, 3,000 r/min.: AC1.5V or more	
42	Pulse generator (B)	Between Nos. 41–42, D range 3rd gear, 3,000 r/min.: AC1.5V or more	
43	Pulse generator (A)	Between Nos. 43–44, D range 3rd gear, 3,000 r/min.: AC1.0V or more	
44	Pulse generator (A)	Between Nos. 43–44, D range 3rd gear, 3,000 r/min.: AC1.0V or more	
45	Earth	Idling:0V	
46	Ignition pulse	Idling:100–400V	

Trouble Symptoms ↔ Cause Chart

		Driving impossible			Large time lag when moving forward			Poor acceleration when moving forward			Abnormal gear shifting point			Problem when accelerating		Problem during driving (not including when shifting)		Abnormal noise							
		Starting impossible	Engine stalls when shifting from N → D	Engine stalls when shifting from N → R	Moving forward impossible	Reversing impossible	Moving forward and reversing impossible	Only when moving forward	Only when reversing	Both moving forward and reversing	Only when moving forward	Only when reversing	Both moving forward and reversing	Will not change gear *1	Abnormality at all shifting points	Abnormality at specified shifting points	Shocks	Engine racing	Vibration (when accelerating)	Vibration (when driving at constant speed)	Poor acceleration	Engine braking is not effective	In P, N	In R, D, 2, L	
A/T body system	Torque converter	○			○	○	○					○						○							
	Damper clutch	○	○	○															○	○					
	Front clutch				○	○			○		○				○			○	○	○	○				
	Rear clutch				○	○		○		○				○	○			○	○	○	○				
	End clutch				○	○	○			○								○							
	Low-reverse brake							○			○							○	○						
	Kickdown brake				○	○								○	○			○	○						
	One-way clutch				○														○			○			
	Power train gears				○	○	○			○									○	○					○
	Parking brake mechanism				○	○	○																		○
Hydraulic control system	ATF	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	Oil pump	○			○	○	○	○	○				○	○	○	○	○	○	○	○	○	○		○	
	Valve body		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
	Seal rings for moving elements				○	○	○	○	○	○	○			○	○	○	○	○	○	○	○	○			
	Oil filter				○	○	○	○	○								○	○		○	○				
	Oil cooler		○	○						○	○	○					○								
	Gaskets, oil seals	○			○	○	○			○															
Electronic control system	TCU (Transmission control unit)		○	○						○			○	○			○	○	○			○			
	Idle position switch						○			○							○		○	○					
	Ignition signal						○										○		○	○					
	Wide open throttle switch													○											
	Inhibitor switch	○					○			○			○		○							○			
	Air conditioner load signal						○	○	○							○					○				
	Overdrive switch												○		○										
	Kickdown servo switch													○		○			○	○					
	TPS						○			○				○					○	○					
	Vehicle speed sensor									○															
	Pulse generator A									○															
	Pulse generator B									○															
	Mode selection switch									○				○											
	Oil temperature sensor						○	○	○							○			○			○			
	SCSV-A						○			○				○											
SCSV-B						○			○				○												
DCCSV		○	○															○	○						
PCSV				○	○	○	○	○		○			○					○							
Engine system defective	○											○									○				

NOTE

*1: Except when there is fail-safe output (If there is output, see the Self-diagnosis ↔ Cause Chart.)



SERVICE ADJUSTMENT PROCEDURES

E23FLAL

1. BASIC INSPECTION

1-1. 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 dip stick, wipe all dirt from area around dip stick. Then take out the dip stick and check the condition of the fluid.

The transmission should be overhauled under the following conditions.

- If there is a "burning" odour.
 - If the fluid colour 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.

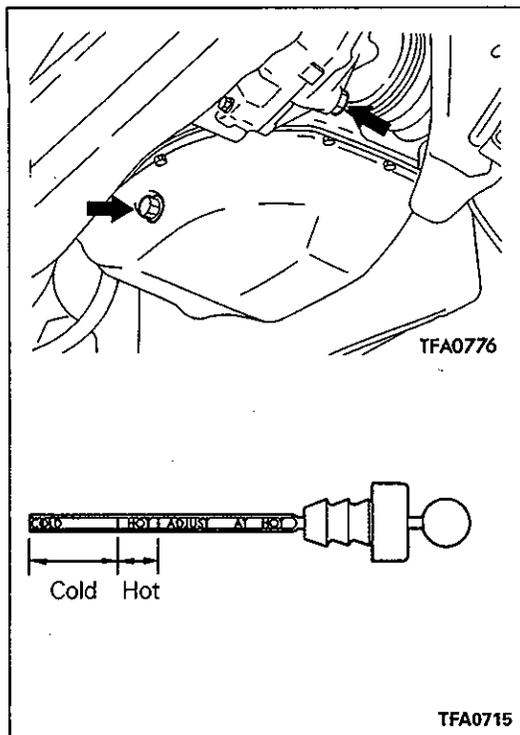
Transmission fluid: Dia Queen ATF SP or equivalent

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, slippery 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.



1-2. TRANSMISSION FLUID REPLACEMENT

E23FMAK

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.

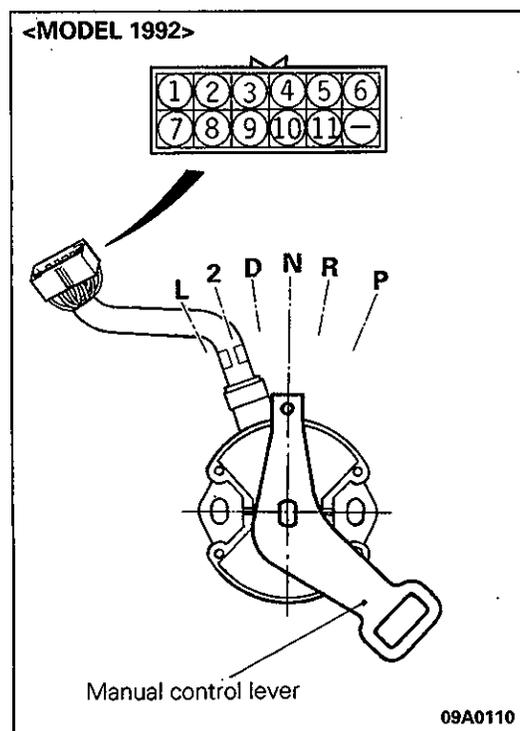
Drain plug: 40 Nm (40 kgm, 29 ft.lbs.)

- (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.



1-3. INHIBITOR SWITCH CONTINUITY CHECK

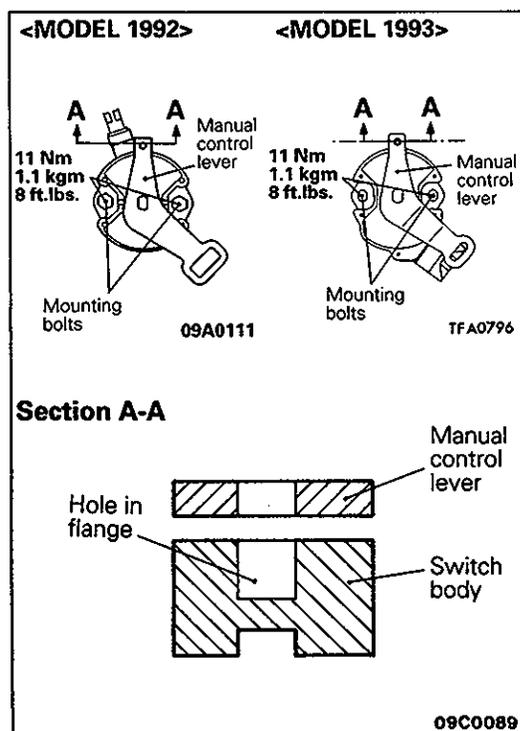
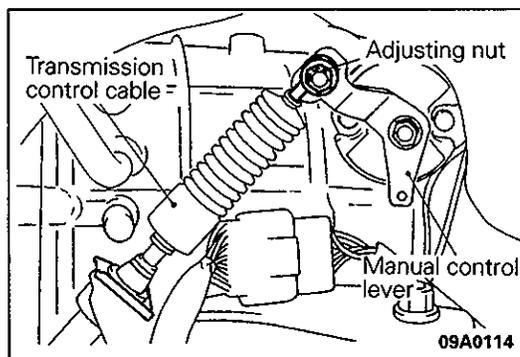
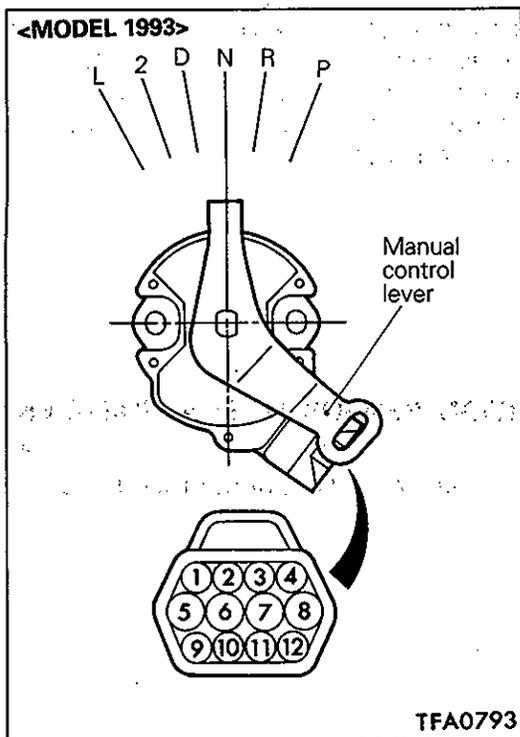
E23FYAB

<MODEL 1992>

Terminal No.	P	R	N	D	2	L
1					○	
2			○			
3	○		○			
4	○	○	○	○	○	○
5				○		○
6				○		
7		○				
8	○		○			
9	○		○			
10		○				
11		○				

NOTE

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



<MODEL 1993>

Terminal No.	P	R	N	D	2	L
1	○					
2			○			
3			○		○	
4	○	○	○	○	○	○
5	○		○			
6		○				
7		○				
8	○		○			
9				○		
10		○				
11						○

NOTE

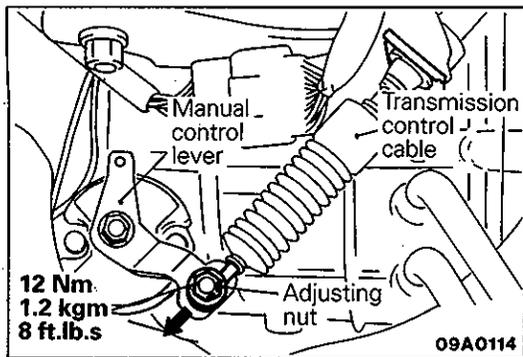
○—○ indicates that there is continuity between the terminals.

1-4. INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT E23FOAJ

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

Specified torque: 11 Nm (1.1 kgm, 8.0 ft.lbs.)

23-21-1 AUTOMATIC TRANSMISSION – Service Adjustment Procedures



- (6) Lightly pull the transmission control cable in the arrow direction, and tighten the adjusting nut to the specified torque.
- (7) Check that the selector lever is in the "N" position.
- (8) Check that each range on the transmission side operates and the selector lever functions correctly.

1-5. THROTTLE POSITION SENSOR (TPS) ADJUSTMENT

E23FZ-

Refer to GROUP 13 – Service Adjustment Procedures.

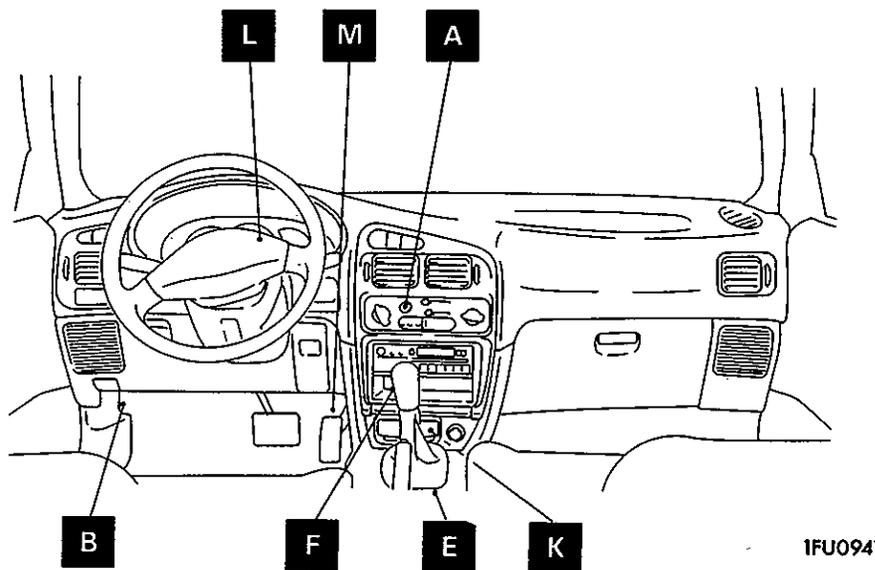
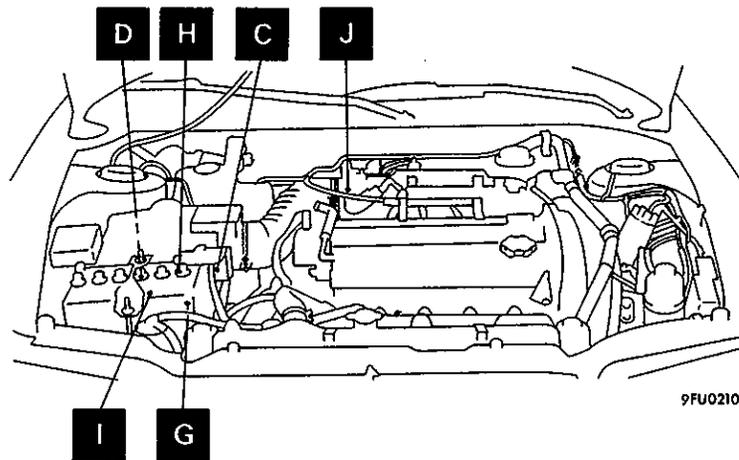
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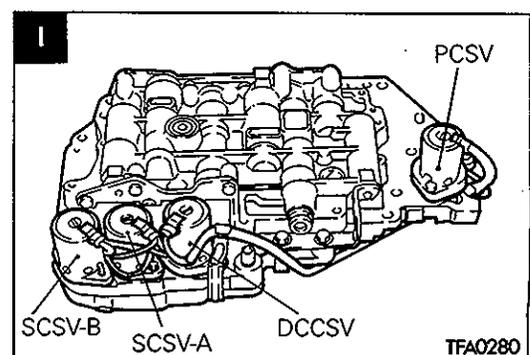
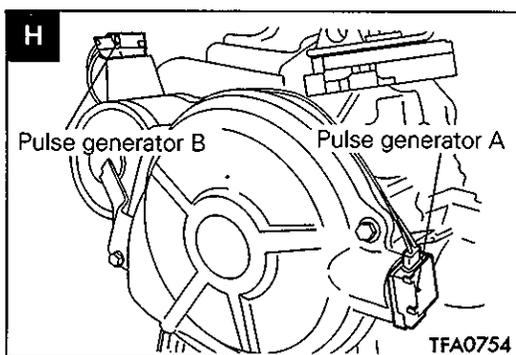
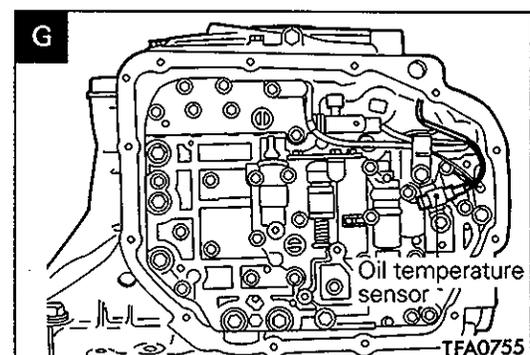
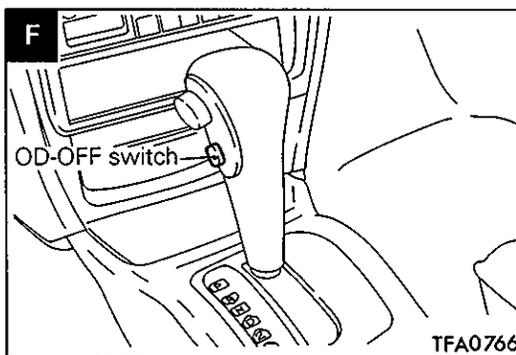
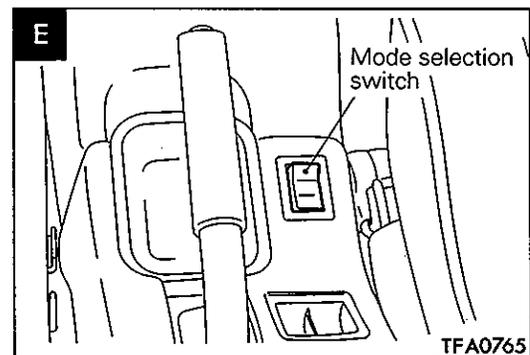
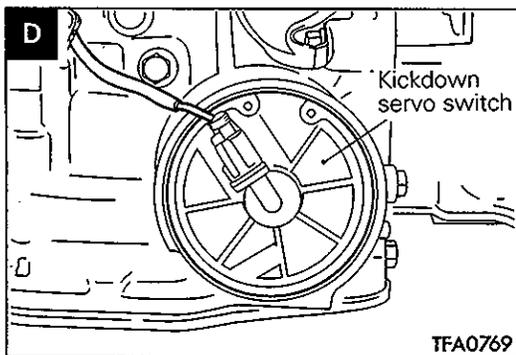
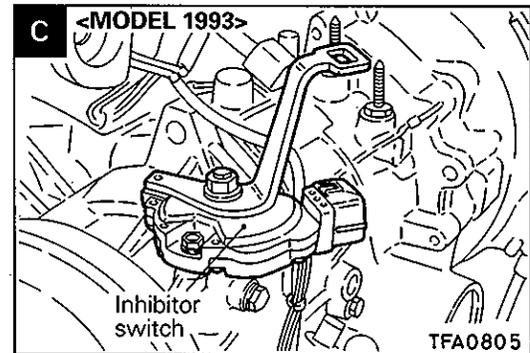
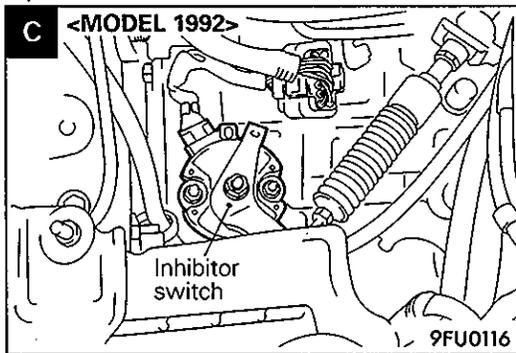
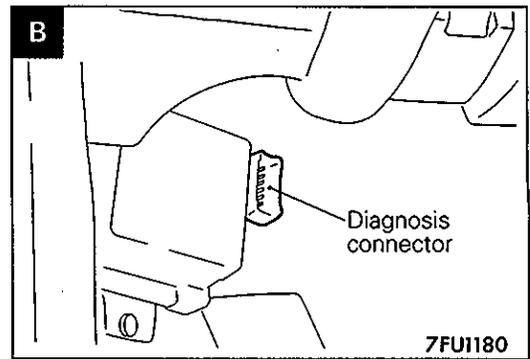
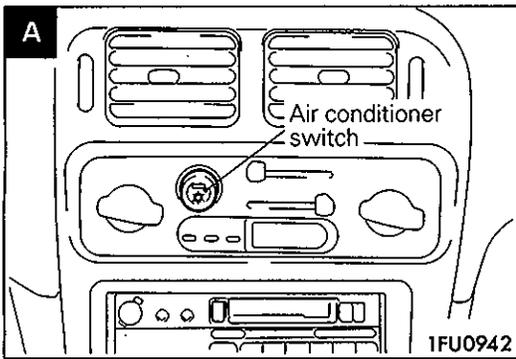
23-22 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

2. ELC 4-SPEED AUTOMATIC TRANSMISSION CONTROL COMPONENTS LAYOUT

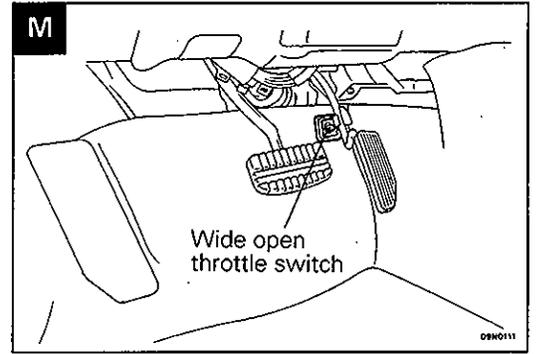
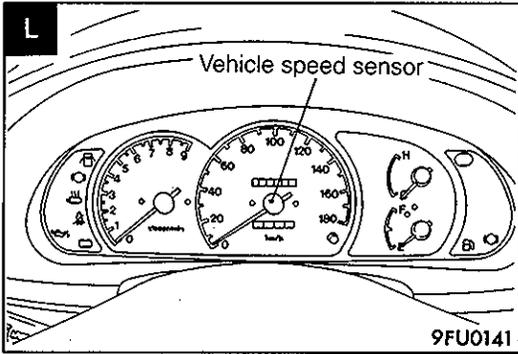
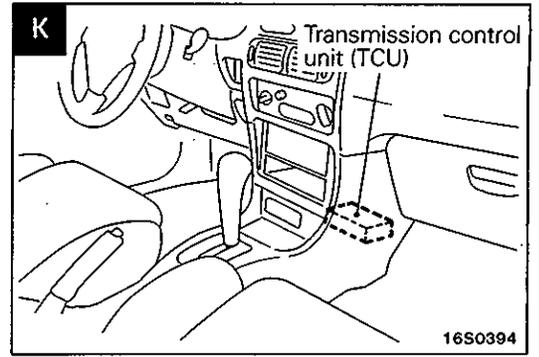
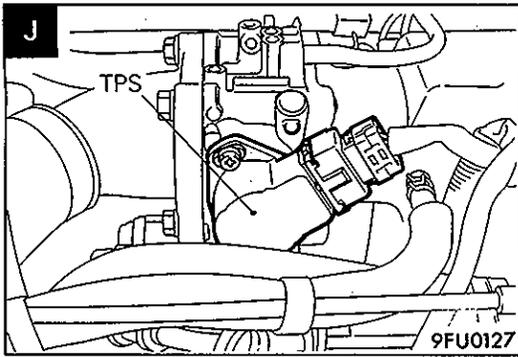
E23FZAA

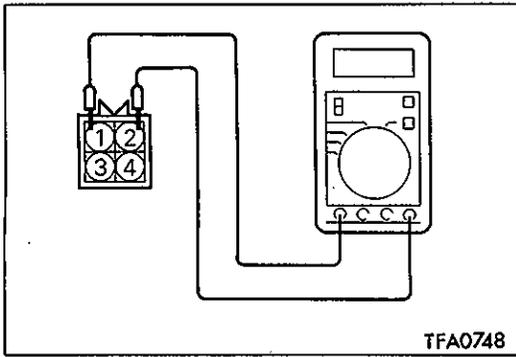
Name	Symbol	Name	Symbol
Air conditioner switch	A	Pulse generator A and B	H
Diagnosis connector	B	Solenoid valve	I
Inhibitor switch	C	Throttle position sensor	J
Kickdown servo switch	D	Transmission control unit	K
Mode selection switch	E	Vehicle speed sensor	L
OD-OFF switch	F	Wide open throttle switch	M
Oil temperature sensor	G		





23-24 AUTOMATIC TRANSMISSION – Service Adjustment Procedures





3. ELC-4A/T CONTROL COMPONENTS INSPECTION

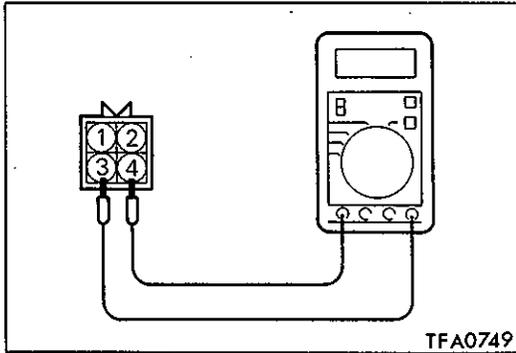
F23FZBA

3-1. PULSE GENERATOR A INSPECTION

- (1) Disconnect the pulse generator A connector.
- (2) Measure the resistance between the pulse generator A side connector terminals ① and ②.

Standard value: 215–275Ω [at 20°C (68°F)]

- (3) If the resistance is outside the standard value, replace the pulse generator assembly.



3-2. PULSE GENERATOR B INSPECTION

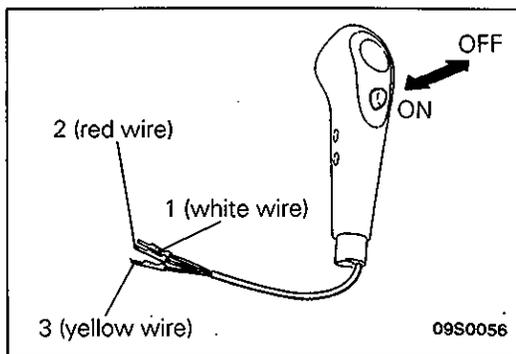
- (1) Disconnect the pulse generator B connector.
- (2) Measure the resistance between the pulse generator B side connector terminals ③ and ④.

Standard value: 215–275Ω [at 20°C (68°F)]

- (3) If the resistance is outside the standard value, replace the pulse generator assembly.

3-3. INHIBITOR SWITCH INSPECTION

Refer to P.23-20.



3-4. OVERDRIVE SWITCH INSPECTION

Overdrive Switch Continuity Inspection

Terminal	1 (white wire)	2 (red wire)	3 (yellow wire)
Switch position			
Overdrive operating (ON)	○—○	○—○	
Overdrive not operating (OFF)	○—○		○—○

NOTE

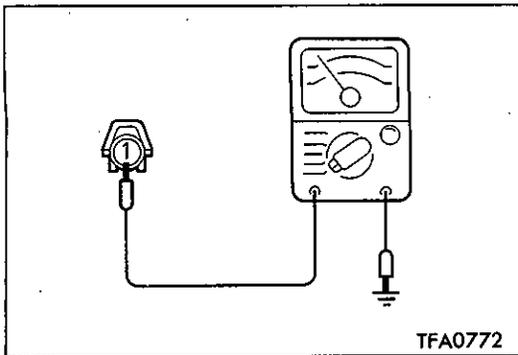
○—○ indicates that there is continuity between the terminals.

3-5. THROTTLE POSITION SENSOR (TPS) INSPECTION

Refer to GROUP 13 – On-vehicle Inspection of MPI Components.

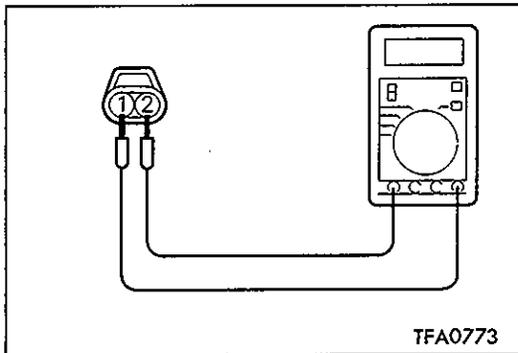
3-6. IDLE POSITION SWITCH INSPECTION

Refer to GROUP 13 – On-vehicle Inspection of MPI Components.



3-7. KICKDOWN SERVO SWITCH INSPECTION

- (1) Disconnect the kickdown servo switch connector.
- (2) Remove the kickdown servo switch.
- (3) Check to be sure that there is continuity between kickdown servo switch side connector terminal ① and the metal part inside the kickdown servo switch.
- (4) If there is no continuity, replace the kickdown servo switch.



3-8. OIL TEMPERATURE SENSOR INSPECTION

- (1) Disconnect the oil temperature sensor connector.
- (2) Measure the resistance between the oil temperature sensor side connector terminals ① and ②, and check to be sure that the values are as shown in the table below.

Standard values:

Oil temperature °C (°F)	Resistance value [kΩ]
20 (68)	8.0–8.2
100 (212)	0.57–0.69

- (3) If the values are outside the standard values, replace the oil temperature sensor.

3-9. VEHICLE SPEED SENSOR (REED SWITCH) INSPECTION

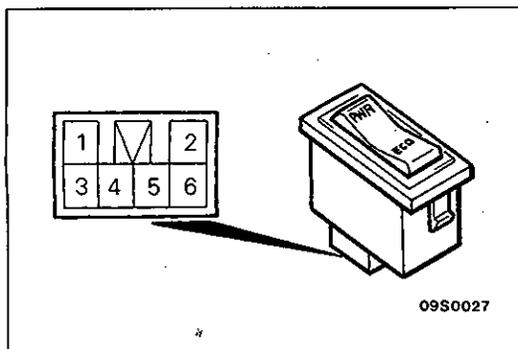
Refer to GROUP 54 – Service Adjustment Procedures.

3-10. DUAL PRESSURE SWITCH OR TRIPLE PRESSURE SWITCH (AIR CONDITIONER LOAD) INSPECTION

Refer to GROUP 55 – Service Adjustment Procedures.

3-11. MODE SELECTION SWITCH

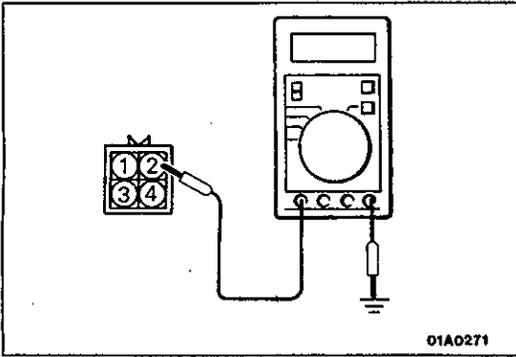
POWER (PWR)/ECONOMY (ECO) SELECTION SWITCH CONTINUITY INSPECTION



Terminal \ Switch position	Terminal					
	1	2	3	4	5	6
PWR		○			○	
ECO		○	○			

NOTE

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



3-12. DAMPER CLUTCH CONTROL SOLENOID VALVE (DCCSV) INSPECTION

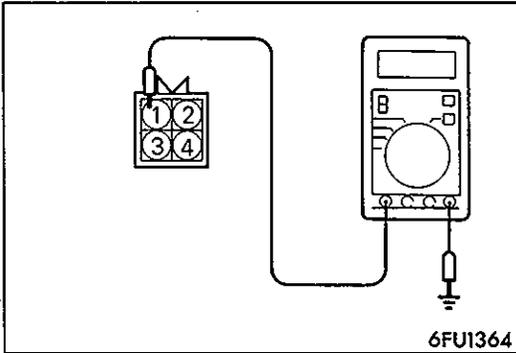
- (1) Disconnect the DCCSV connector.
- (2) Measure the resistance between the DCCSV side connector terminal ② and the body earth.

Standard value:

Approx. 3Ω [at 20°C (68°F)] <MODEL 1992>

Approx. 13Ω [at 20°C (68°F)] <MODEL 1993>

- (3) If the resistance is outside the standard value, replace the solenoid valve.

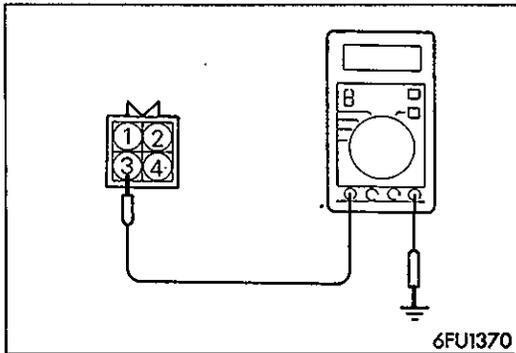


3-13. PRESSURE CONTROL SOLENOID VALVE (PCSV) INSPECTION

- (1) Disconnect the PCSV connector.
- (2) Measure the resistance between the PCSV side connector terminal ① and the body earth.

Standard value: Approx. 3Ω [at 20°C (68°F)]

- (3) If the resistance is outside the standard value, replace the solenoid valve.

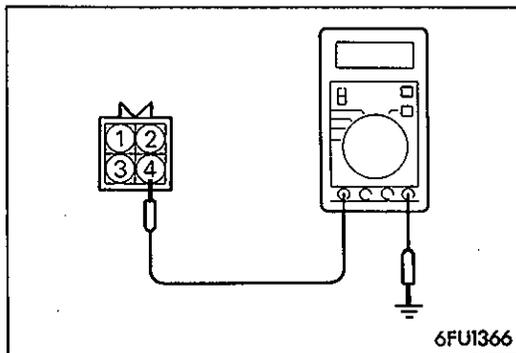


3-14. SHIFT CONTROL SOLENOID VALVE A (SCSV-A) INSPECTION

- (1) Disconnect the SCSV-A connector.
- (2) Measure the resistance between the SCSV-A side connector terminal ③ and the body earth.

Standard value: Approx. 22Ω [at 20°C (68°F)]

- (3) If the resistance is outside the standard value, replace the solenoid valve assembly.



3-15. SHIFT CONTROL SOLENOID VALVE B (SCSV-B) INSPECTION

- (1) Disconnect the SCSV-B connector.
- (2) Measure the resistance between the SCSV-B side connector terminal ④ and the body earth.

Standard value: Approx. 22Ω [at 20°C (68°F)]

- (3) If the resistance is outside the standard value, replace the solenoid valve assembly.

4. CONVERTER STALL TEST

E23FEAD

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 the transmission fluid level, fluid temperature and engine coolant temperature.
 - Fluid level: At "HOT" position in level gauge
 - Fluid temperature: 70–80°C (160–180°F)
 - Engine coolant 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: 2,500–3,000 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"

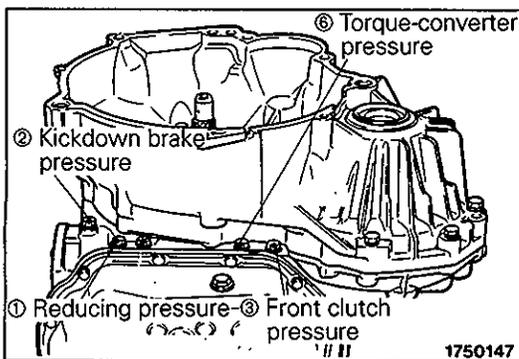
If stall speed is higher than specification, rear clutch or overrunning clutch of transmission is slipping. In this case, perform hydraulic test to locate cause of slippage.

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.



5. OIL PRESSURE TEST

E23FBAK

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, MD998900) to each oil-pressure outlet port.

When the reverse position pressure is to be tested, the 3,000 kPa (30 kg/cm², 400 psi) type of gauge should be used.

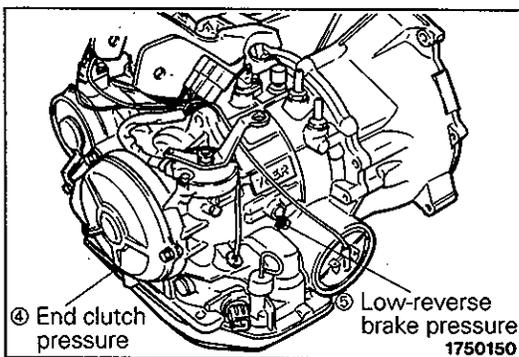
5. Measure each oil pressure under the conditions in the standard oil pressure table, and check to be sure that they are at the standard values.
6. Use the multi-use tester to force-drive the actuator, and measure the kickdown brake pressure (Apply) when the pressure control solenoid valve (PCSV) is at 50% duty.

NOTE

- ① Vehicle speed: 0km/h (0mph)
- ② Selector lever switch position: "D"
- ③ Accelerator condition: Fully closed.

If all of the above conditions are fulfilled, force-drive the actuator for 5 seconds to bring the PCSV to 50% duty.

7. If the pressure is outside the standard value, repair according to the hydraulic test diagnosis table.



23-30 AUTOMATIC TRANSMISSION – Service Adjustment Procedures

Standard Hydraulic 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 Front clutch pressure	④ End clutch pressure	⑤ Low-reverse brake pressure	⑥ Torque-converter pressure
1	N	Idling	Neutral	370–490 (3.7–4.9, 53–70)	–	–	–	–	*
2	D	Idling (using MUT)	2nd gear	370–490 (3.7–4.9, 53–70)	100–210 (1.0–2.1, 14–30) [250–300 (2.5–3.0, 36–43)]	–	–	–	*
3	D (SW-ON)	Approx. 2,500	4th gear	370–490 (3.7–4.9, 53–70)	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	370–490 (3.7–4.9, 53–70)	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	370–490 (3.7–4.9, 53–70)	830–900 (8.3–9.0, 118–128)	–	–	–	450–650 (4.5–6.5, 64–92)
6	L	Approx. 1,000	1st gear	370–490 (3.7–4.9, 53–70)	–	–	–	300–450 (3.0–4.5, 43–64)	*
7	R	Approx. 2,500	Reverse	370–490 (3.7–4.9, 53–70)	–	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, 143) or more		1,000 (10, 142) or more	

NOTE

– must be 10 kPa (0.1 kg/cm², 1.4 psi) or less.

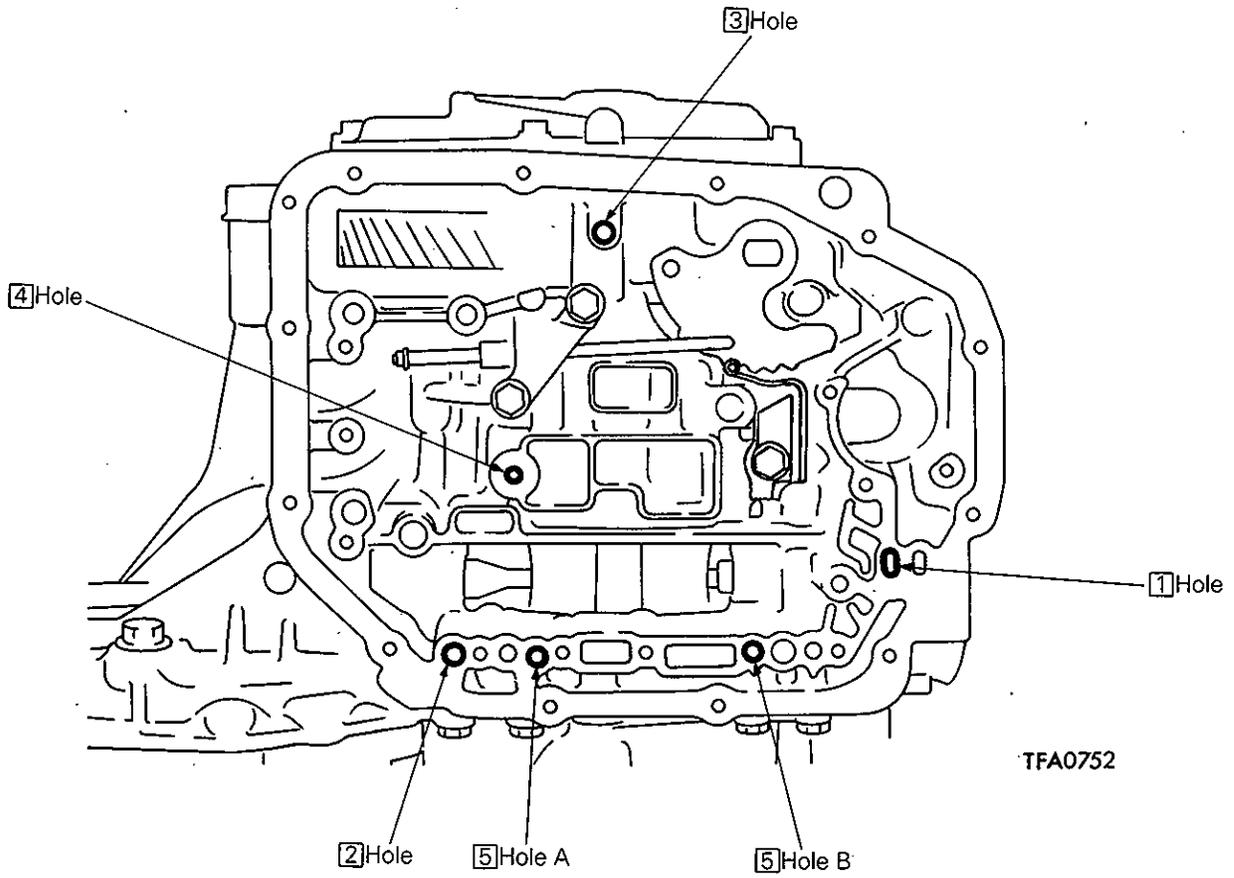
SW-ON: Switch ON the overdrive control switch

SW-OFF: Switch OFF the overdrive control switch

*: Hydraulic pressure is generated, but not the standard value.

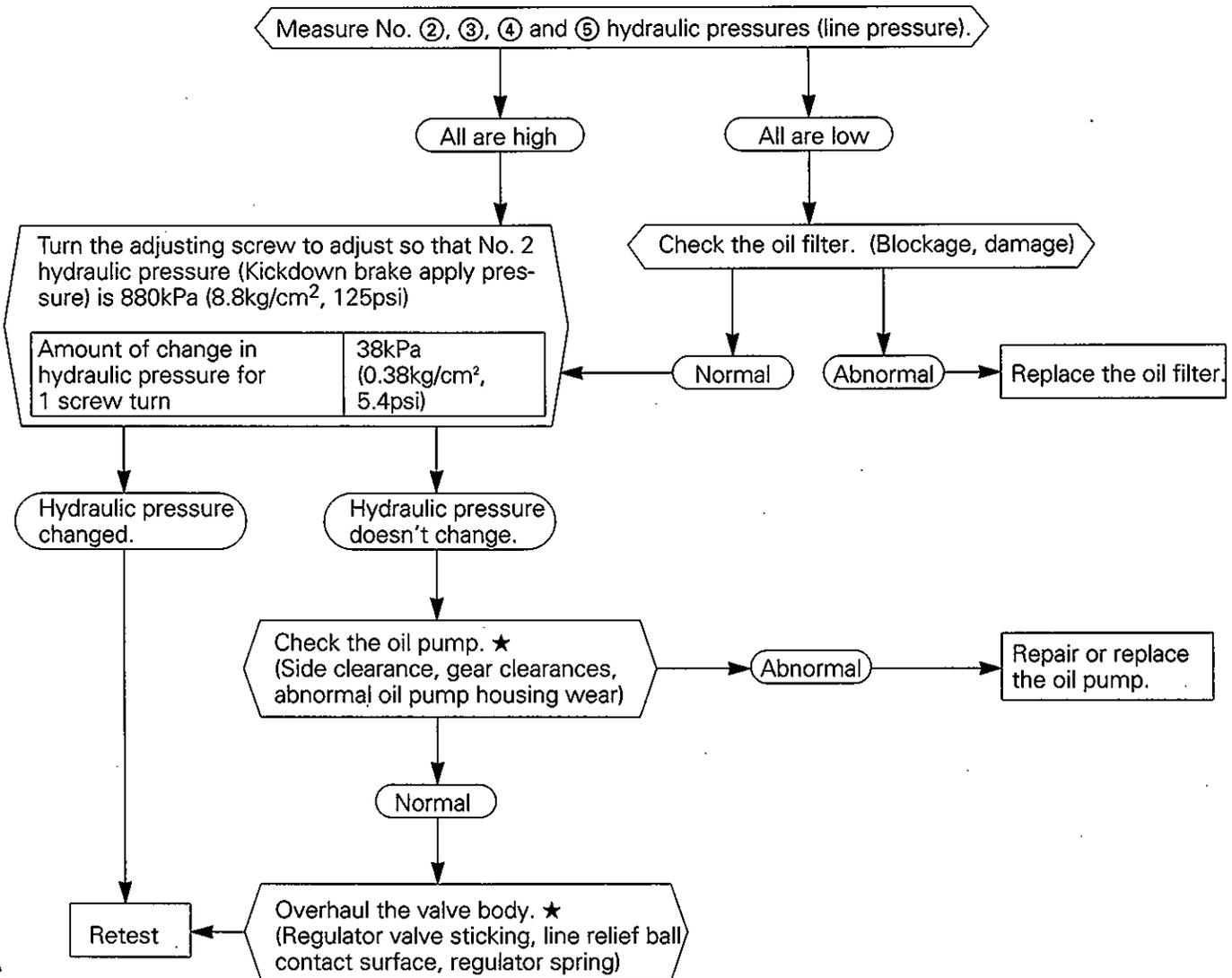
Hydraulic Pressure Test Diagnosis Chart

Case	Description	Reference page
1	Nos. ②, ③, ④ and ⑤ hydraulic pressures (line pressure) are all abnormal	P. 23-33
2	No. ① hydraulic pressure (reducing pressure) is abnormal	P. 23-34
3	No. ② hydraulic pressure (kickdown brake apply pressure) is abnormal	P. 23-35
4	No. ③ hydraulic pressure (front clutch pressure) is abnormal	P. 23-36
5	No. ④ hydraulic pressure (end clutch pressure) is abnormal	P. 23-37
6	No. ⑤ hydraulic pressure (low-reverse brake pressure) is abnormal	P. 23-37
7	No. ⑥ hydraulic pressure (torque converter pressure) is abnormal	P. 23-38
8	Hydraulic pressure appears in places where standard hydraulic pressure is 10kPa (0.1 kg/cm ² , 1.4 psi) or less	P. 23-38



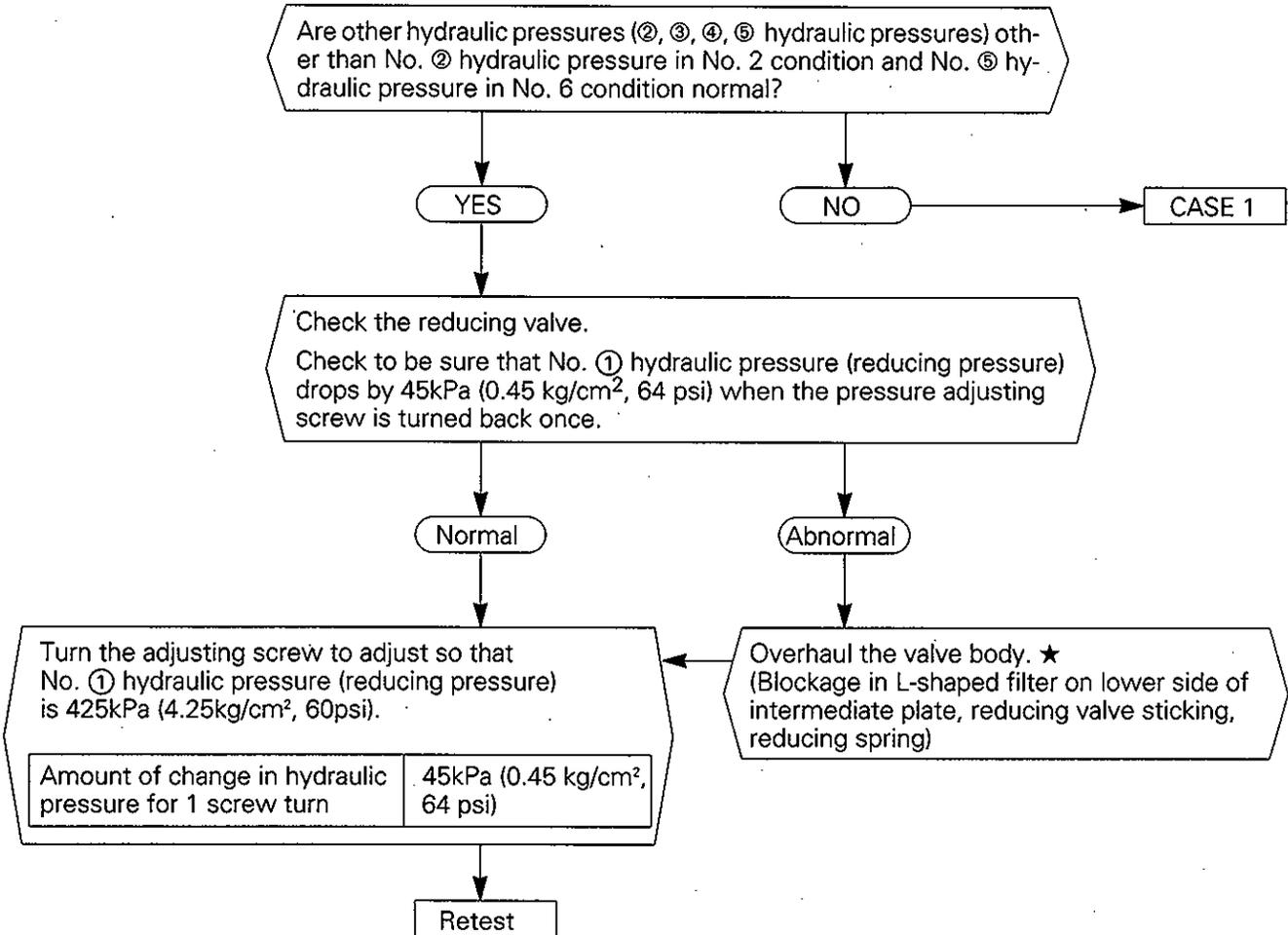
★: Refer to transmission repair manual

CASE1 No. ②, ③, ④ and ⑤ hydraulic pressures (line pressure) are all abnormal.



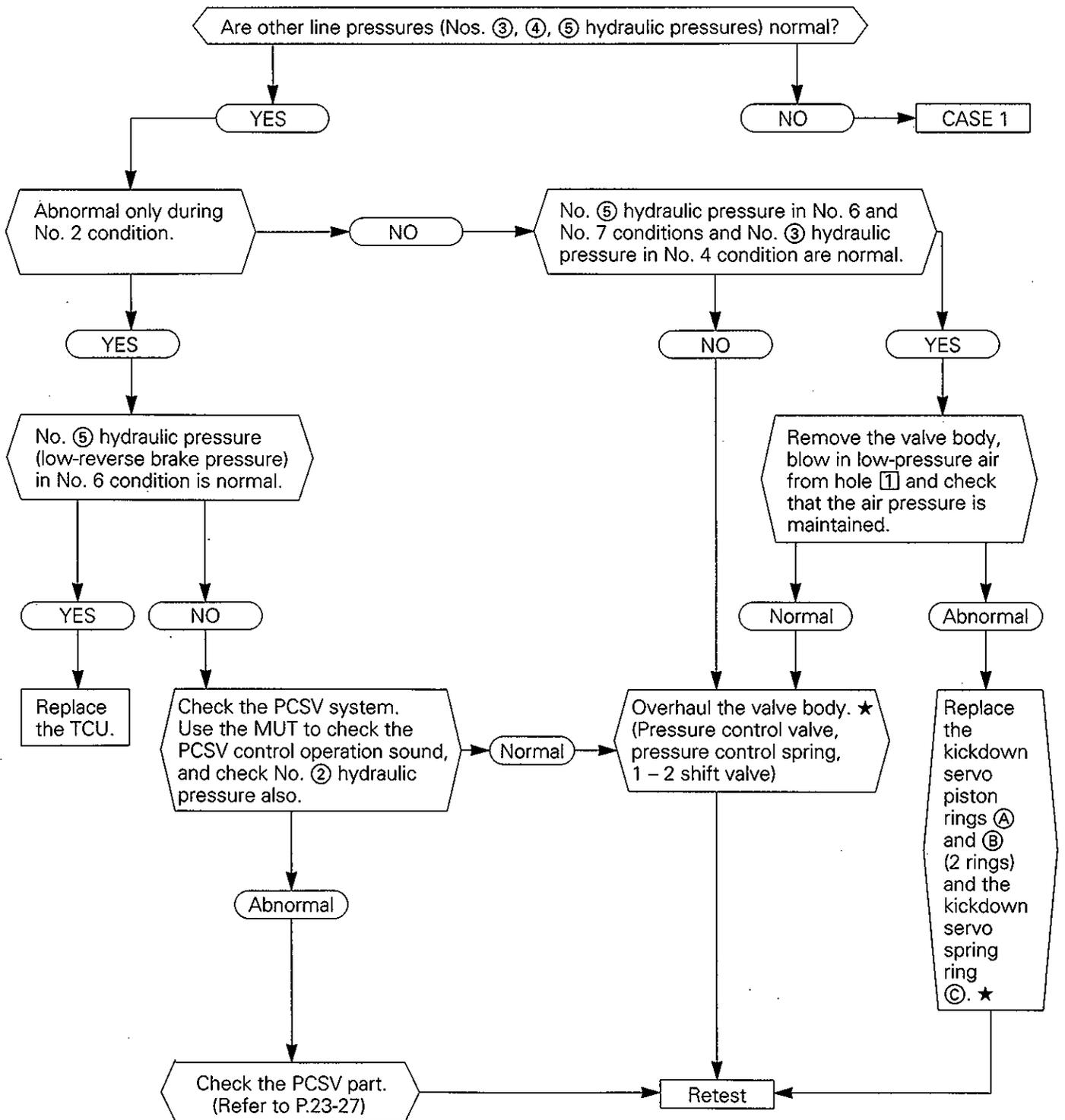
★: Refer to transmission repair manual

CASE 2 No. ① hydraulic pressure (reducing pressure) is abnormal.



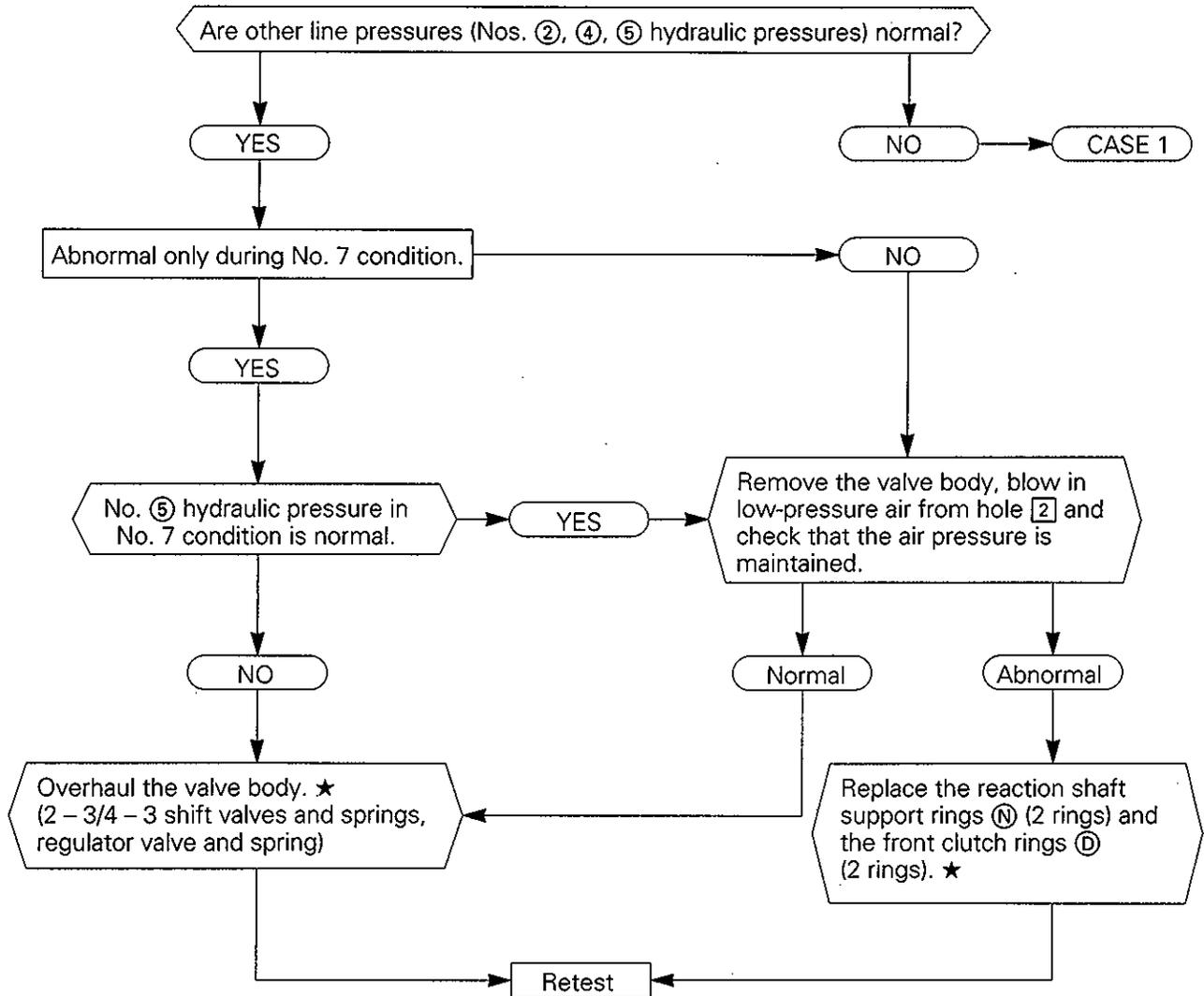
★: Refer to transmission repair manual

CASE 3 No. ② hydraulic pressure (kickdown brake apply pressure) is abnormal.



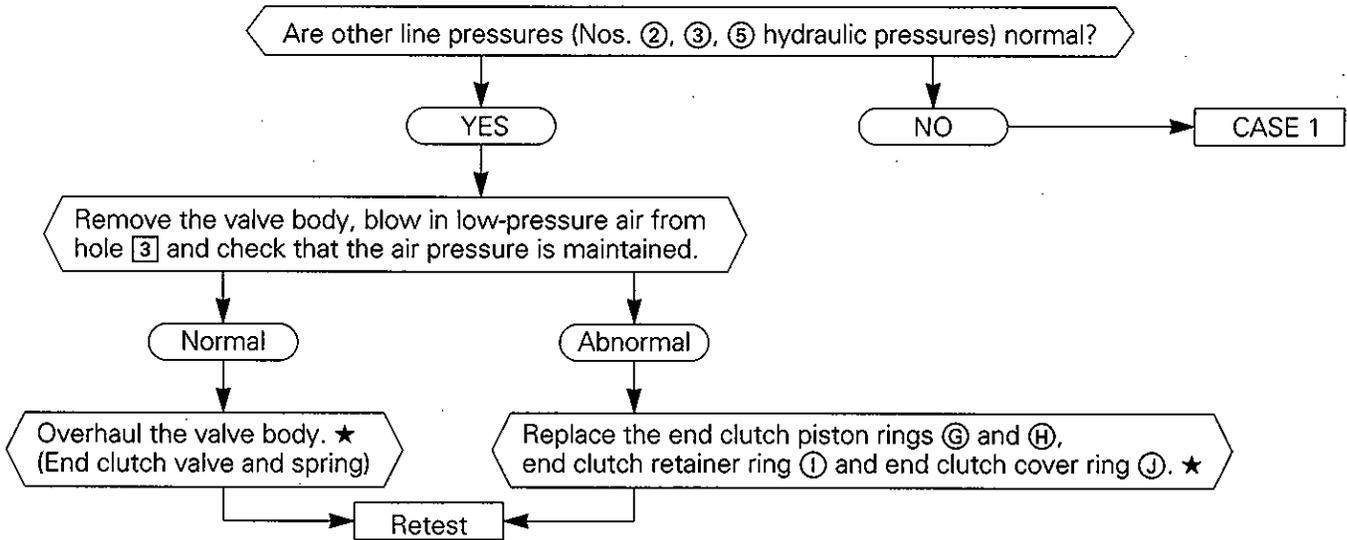
★: Refer to transmission repair manual

CASE 4 | No. ③ hydraulic pressure (front clutch pressure) is abnormal.

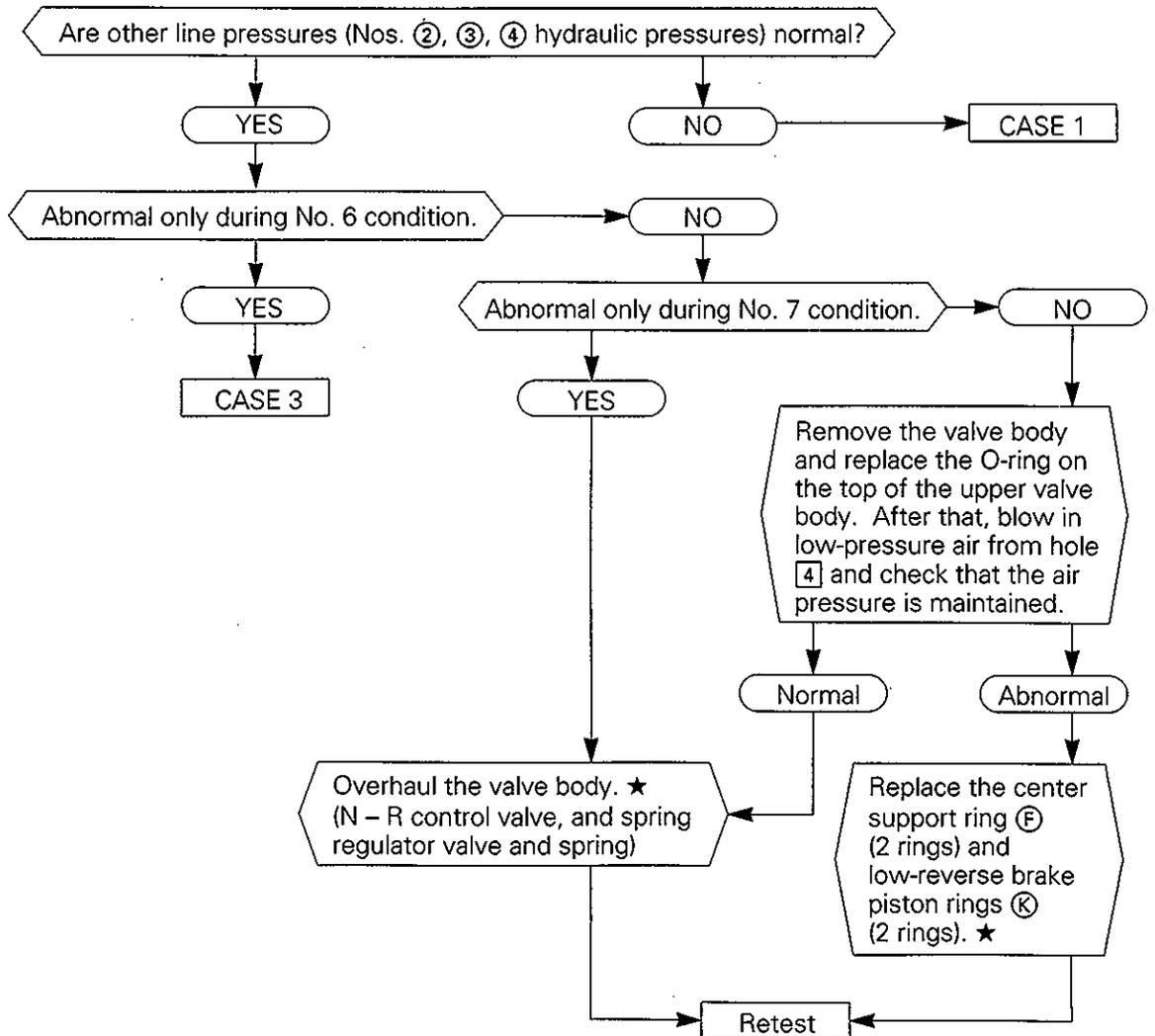


★: Refer to transmission repair manual

CASE 5 No. ④ hydraulic pressure (end clutch pressure) is abnormal.

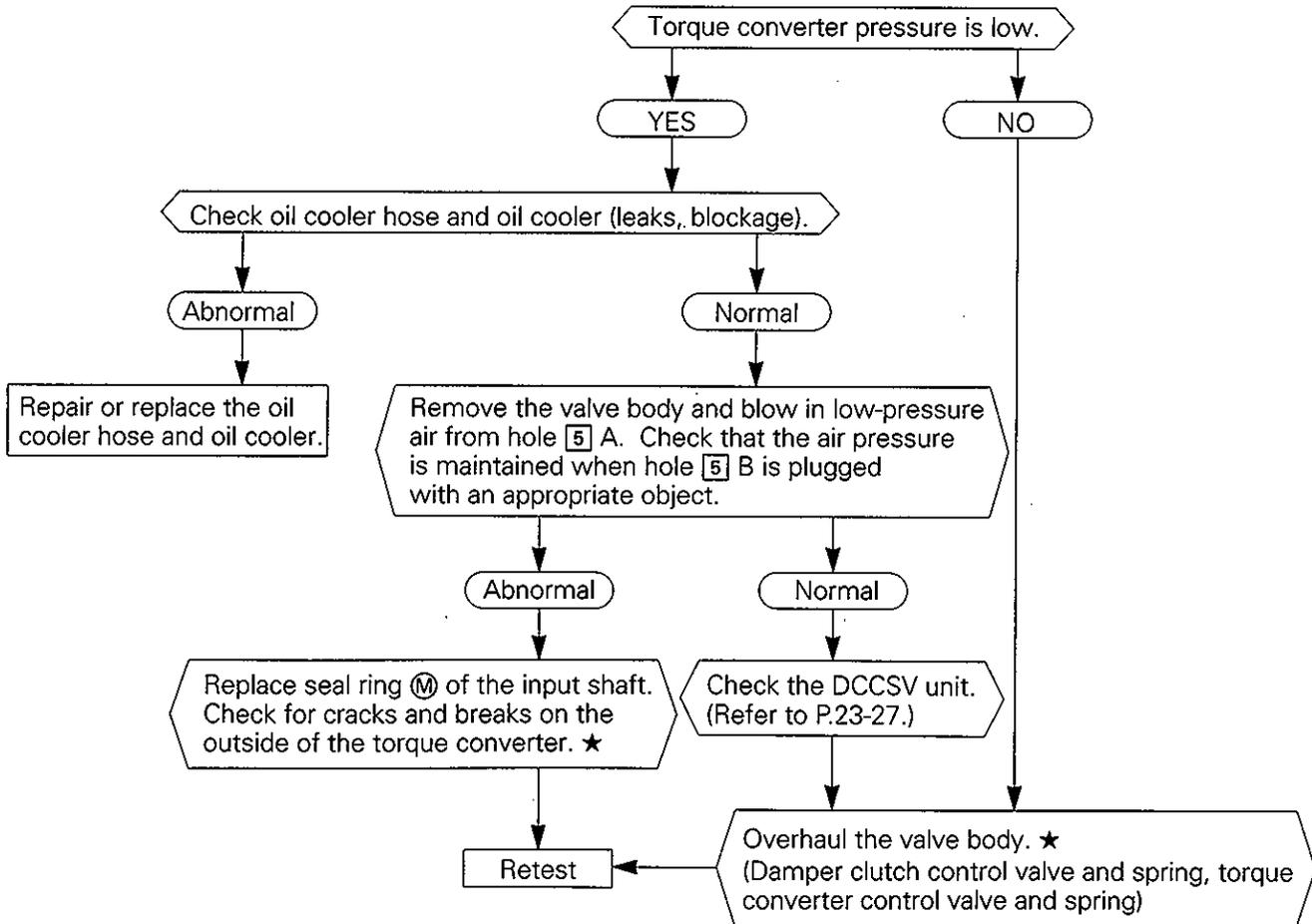


CASE 6 No. ⑤ hydraulic pressure (low-reverse brake pressure) is abnormal.

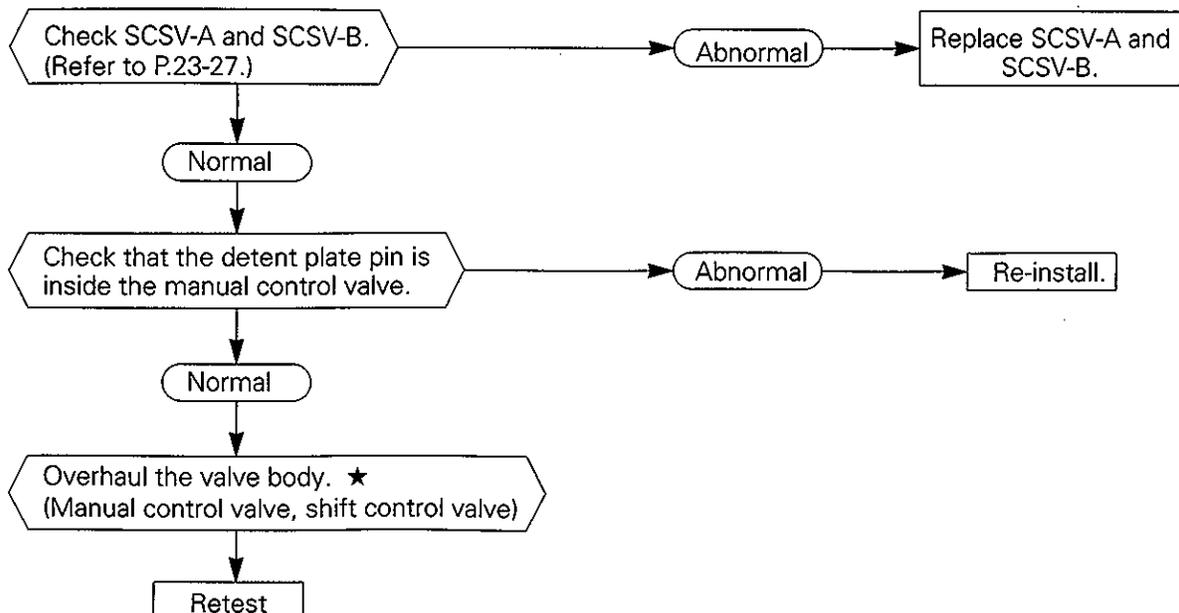


★: Refer to transmission repair manual

CASE 7 No. ⑥ hydraulic pressure (torque converter pressure) is abnormal.

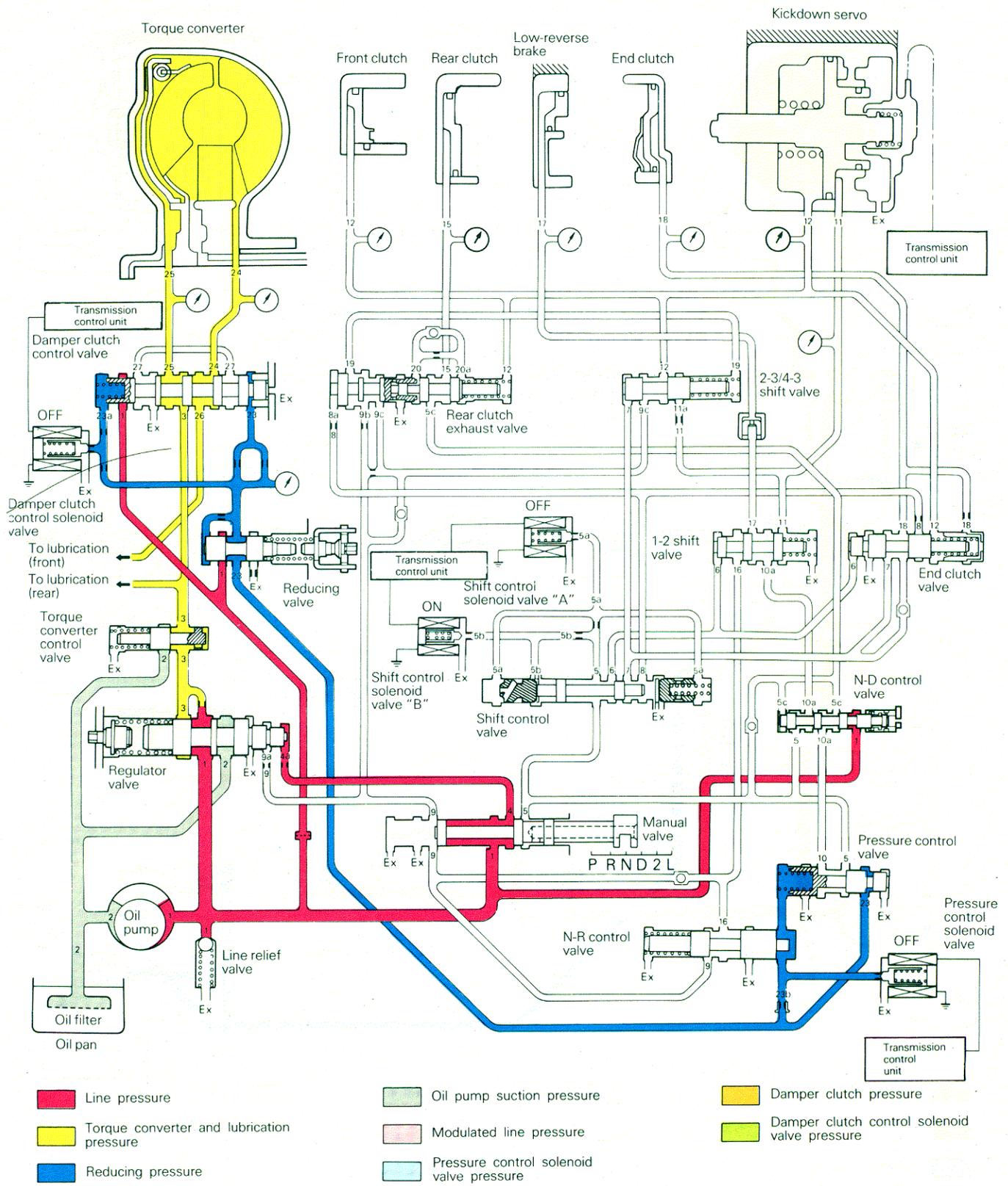


CASE 8 Hydraulic pressure appears in places where standard hydraulic pressure is 10kPa or less (0.1kg/cm², 1.4psi)



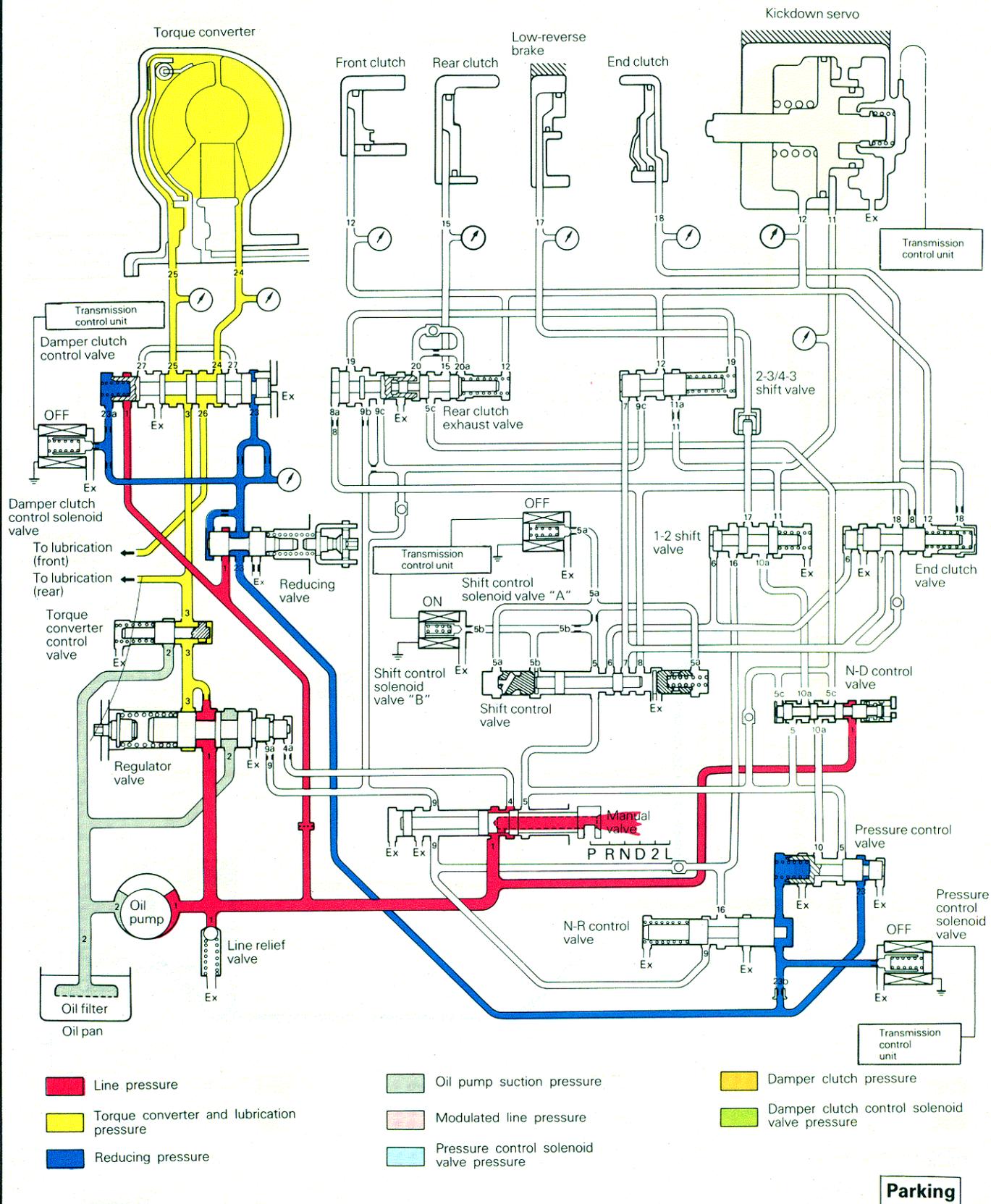
6. HYDRAULIC CIRCUIT

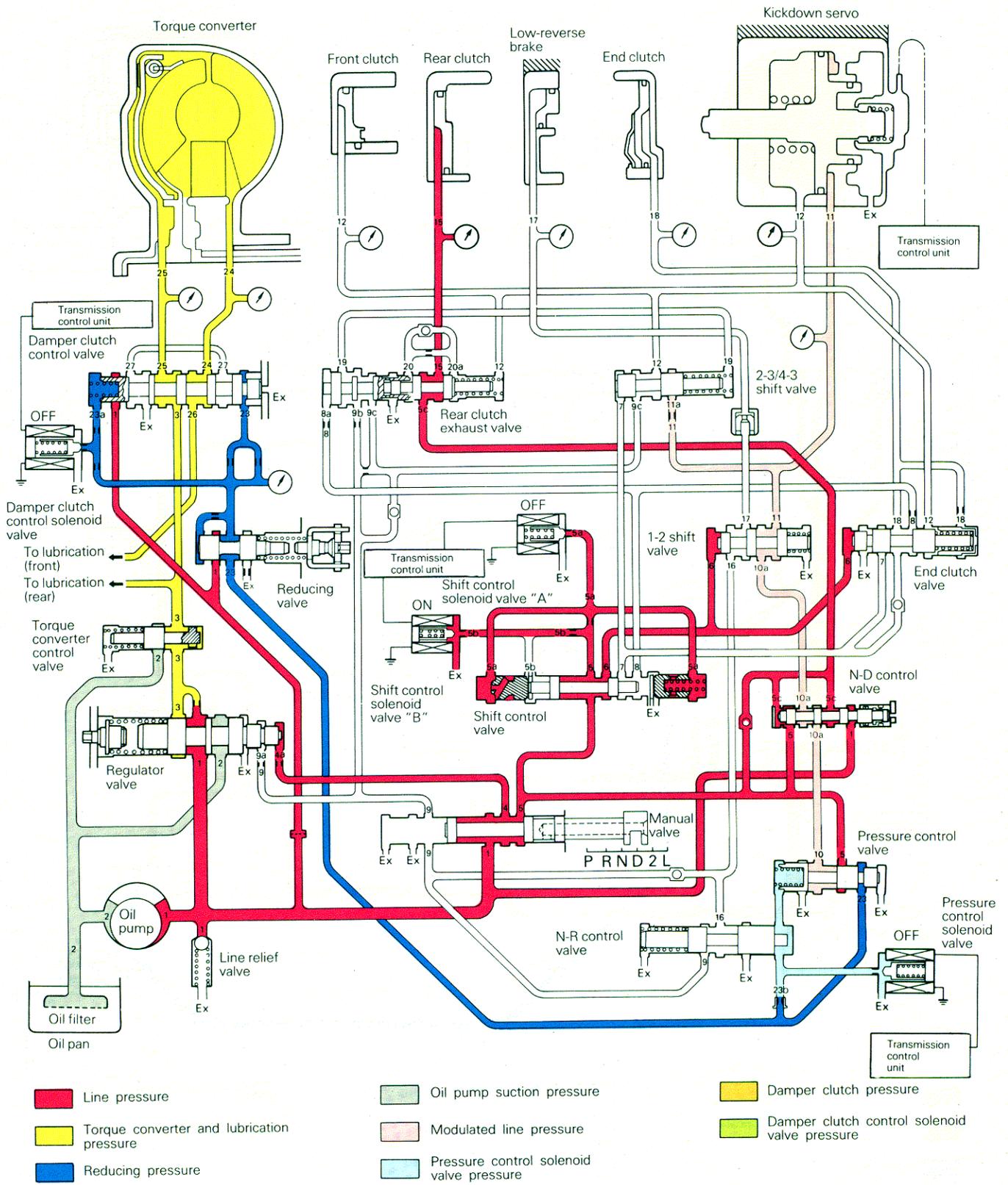
E23TF--



Neutral

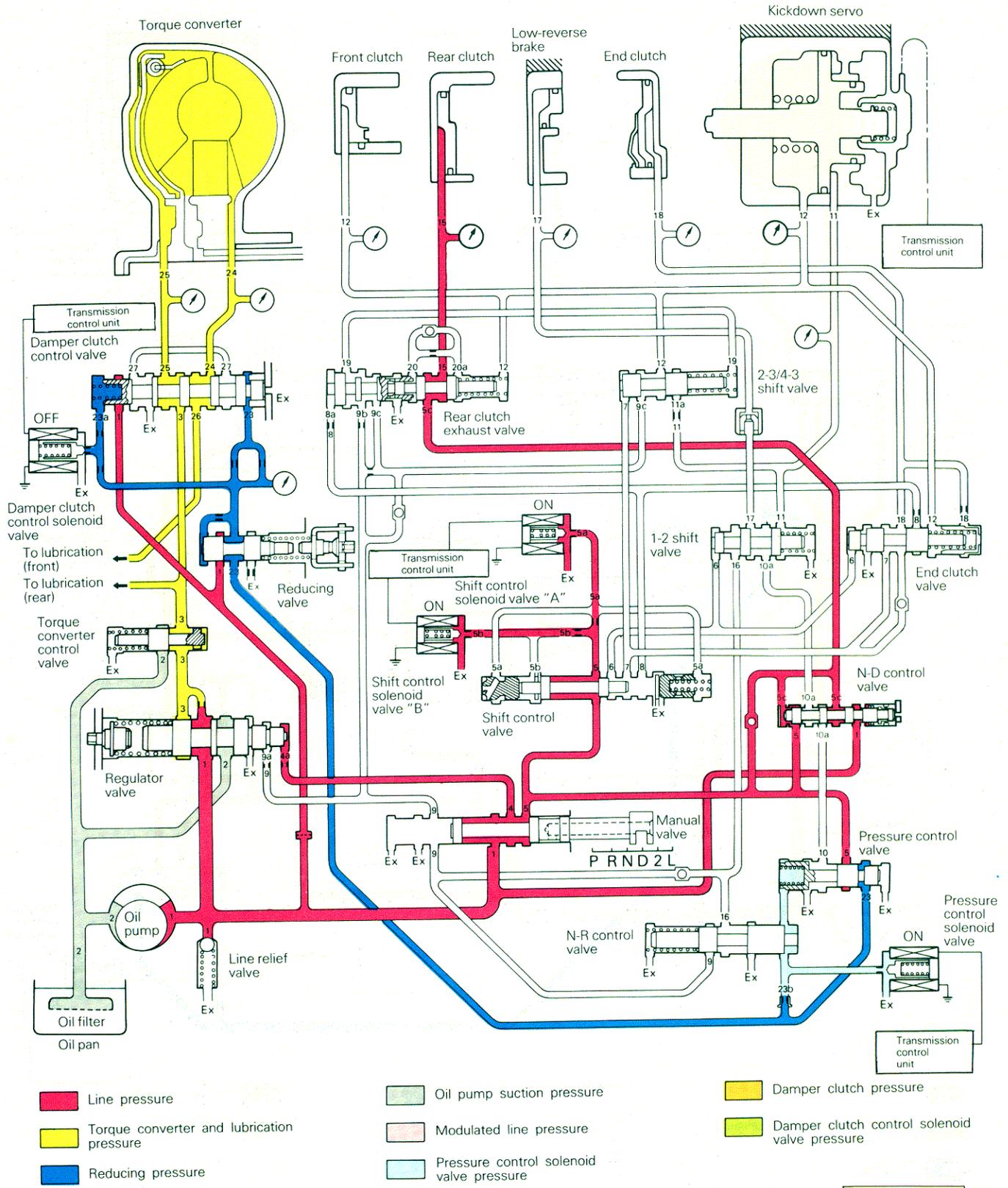
TFA0070





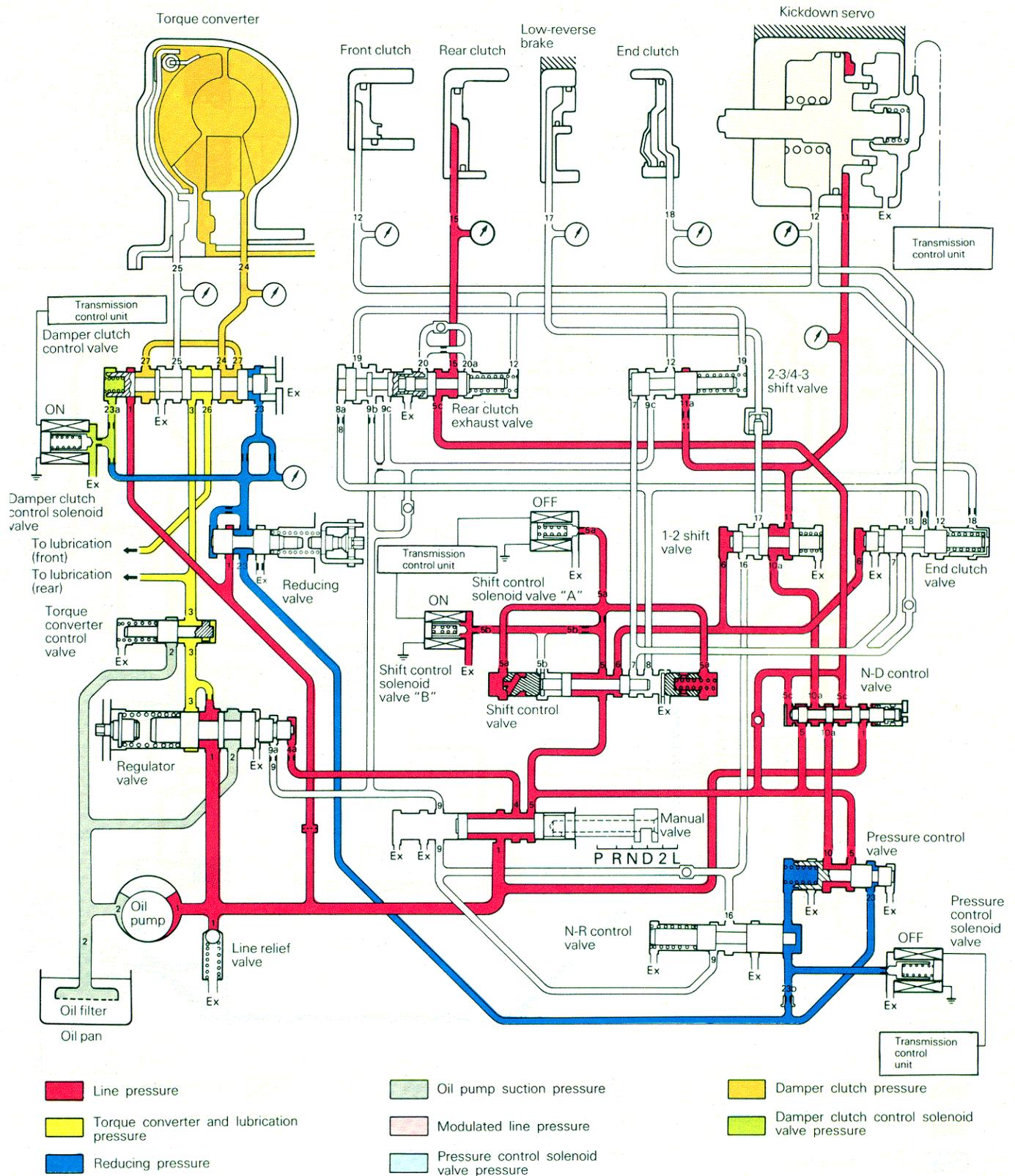
Drive (Stop)

TFA0242



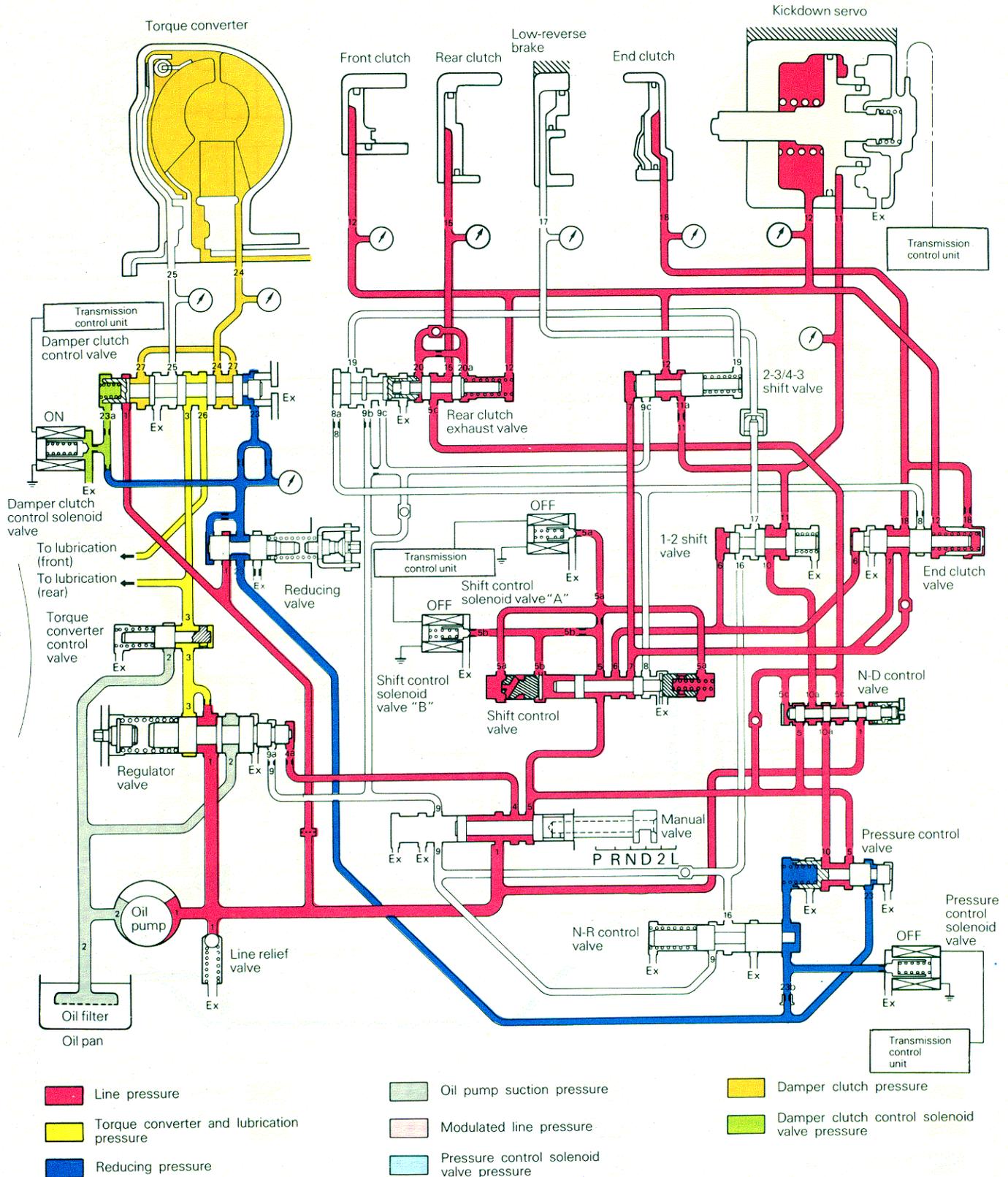
Drive (First)

TFA0072



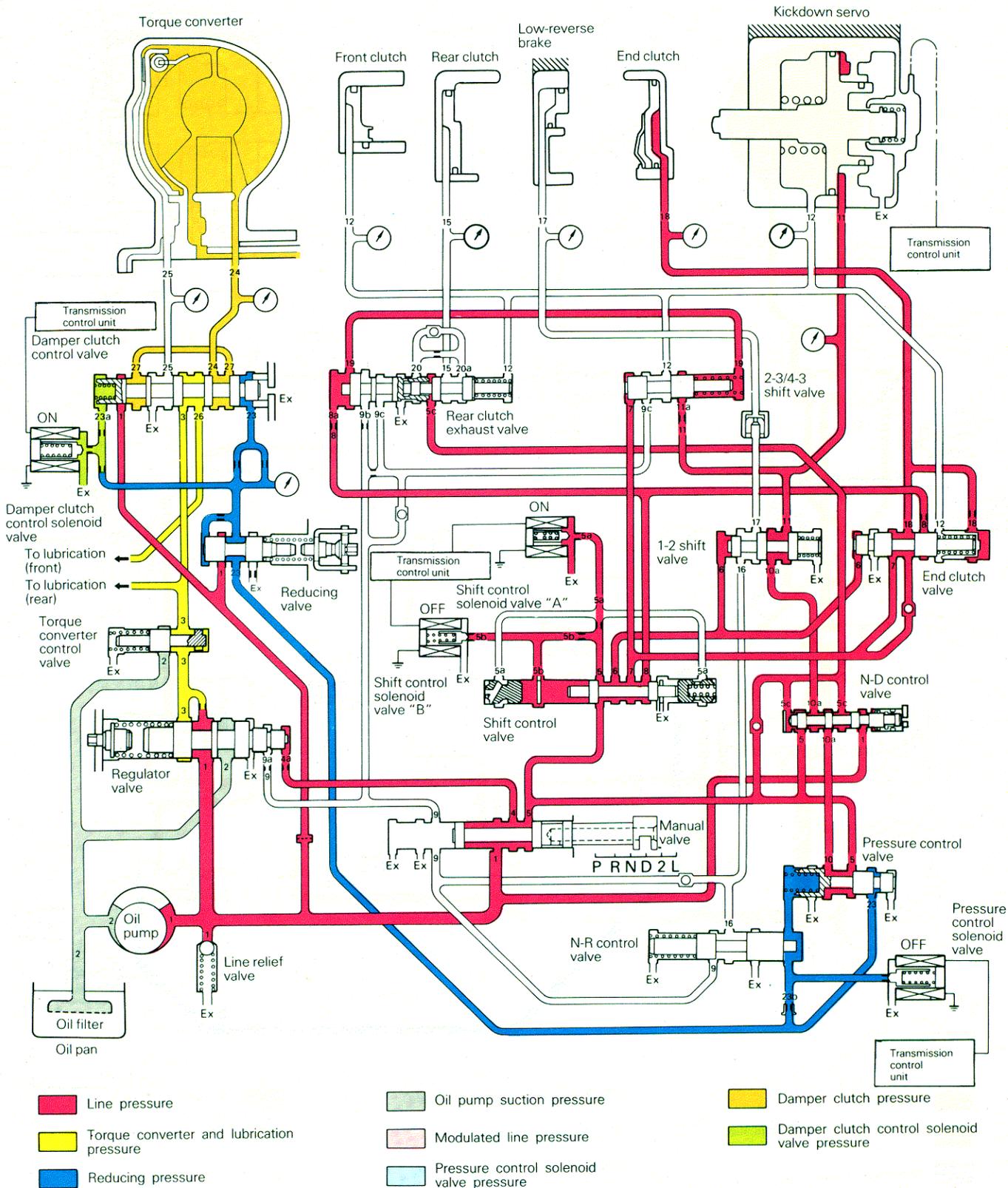
Drive (Second)

TFA0073



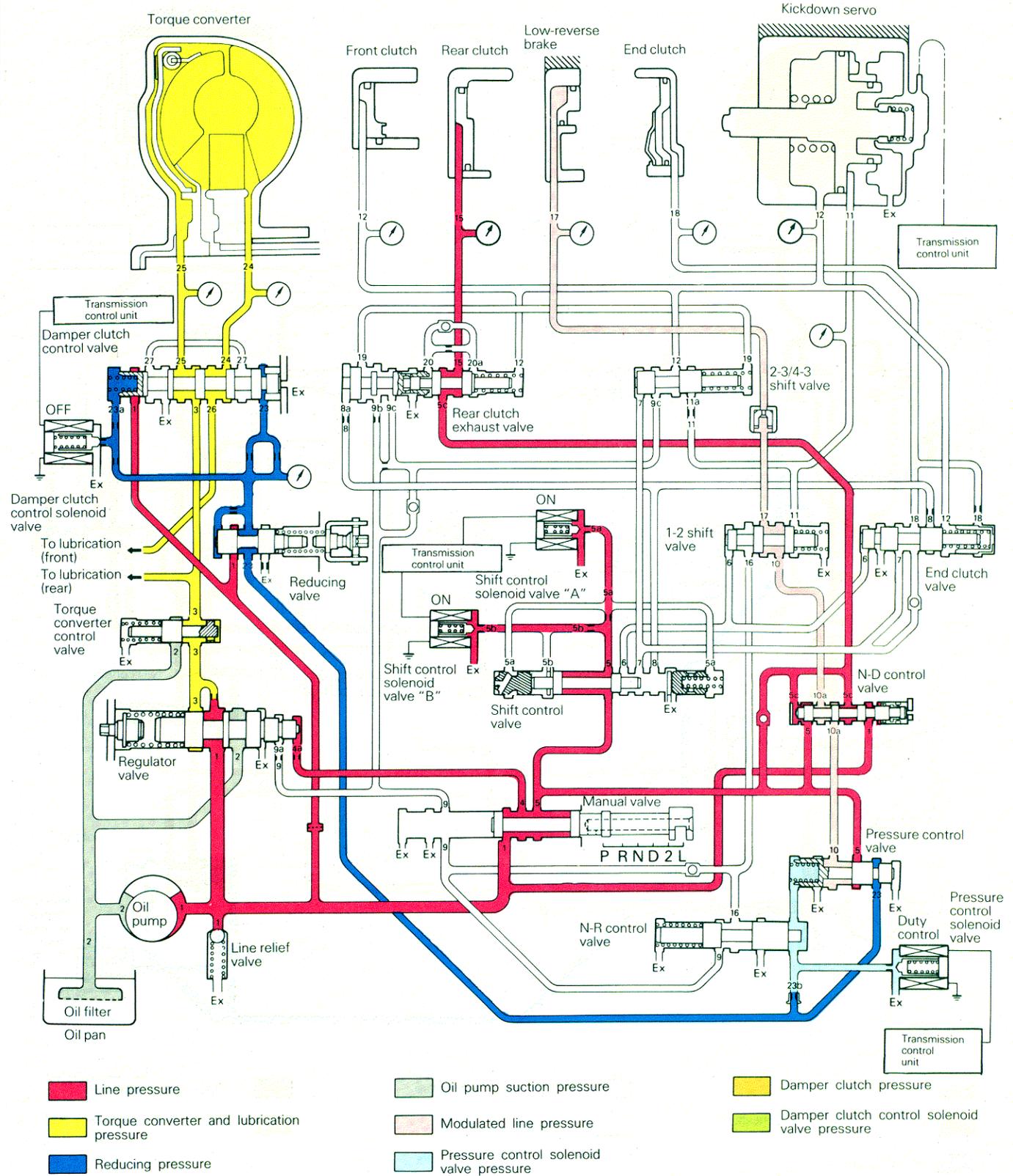
Drive (Third)

TFA0074



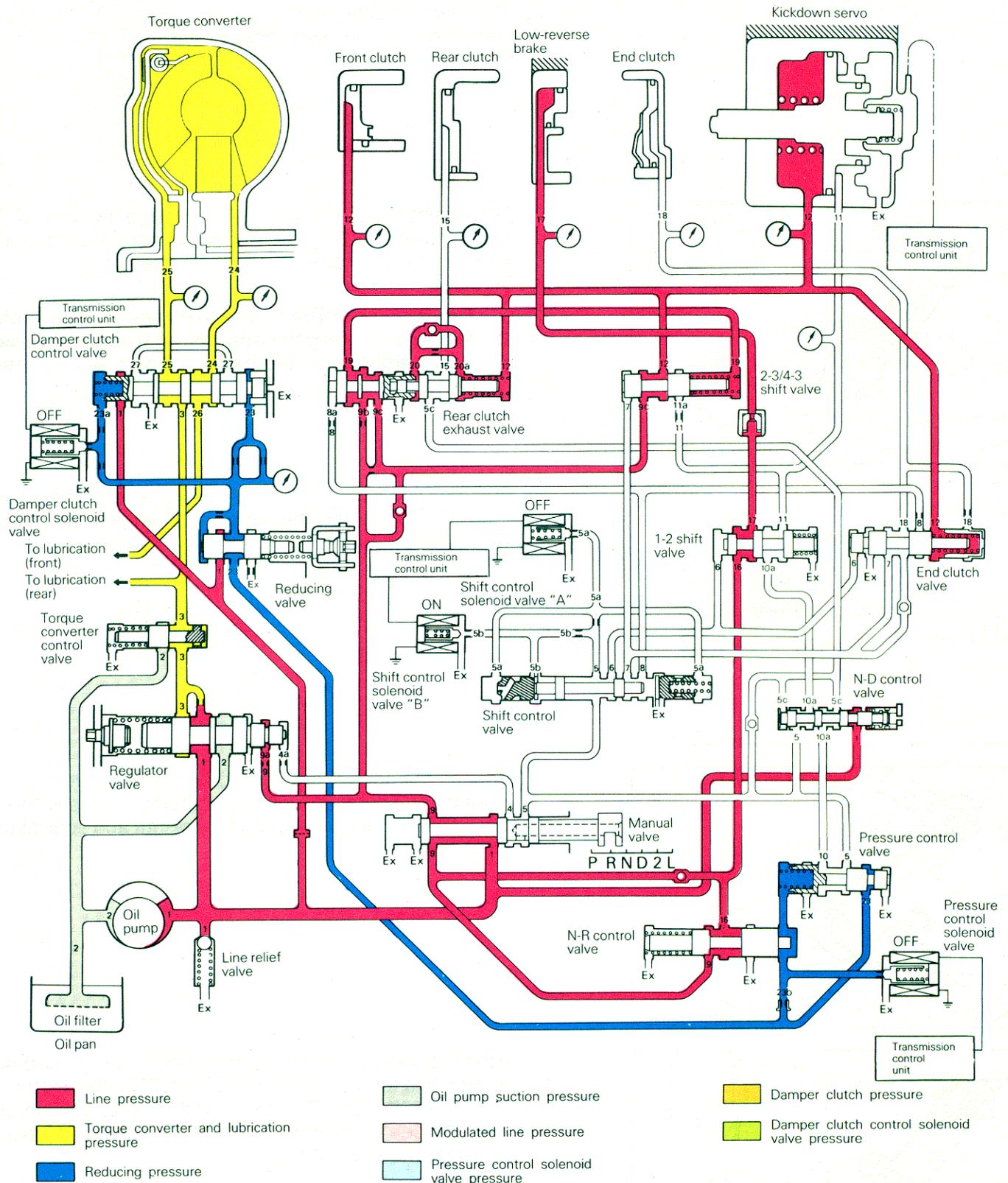
Drive (Fourth)

TFA0075



Lock-up (First)

TFA0076



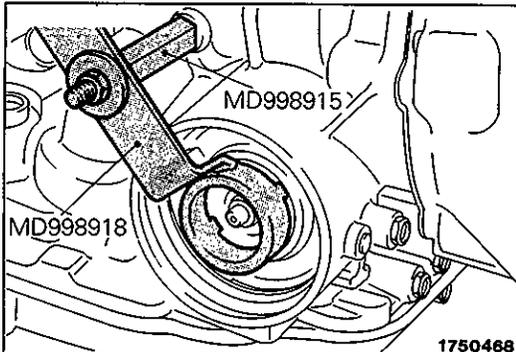
Reverse

TFA0077

7. KICKDOWN SERVO ADJUSTMENT

E23FHBD

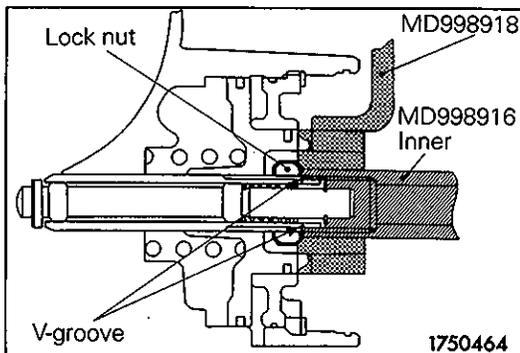
1. Completely remove all dirt and other materials adhered around the kickdown servo switch.
2. Remove the snap ring.
3. Remove the kickdown servo switch.



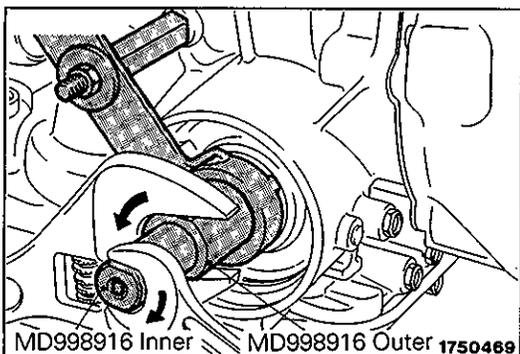
4. To prevent rotation of the piston, engage the pawl of the special tool into the notch of the piston, and using the adapter, fix the piston as shown in the left.

Caution

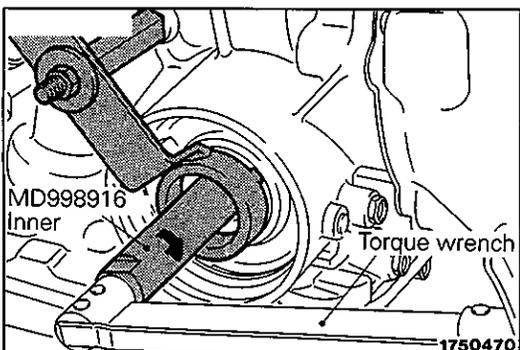
1. Don't press in the piston with the special tool.
2. When mounting the adapter on the transmission case, tighten it by hand. Don't apply much torque.



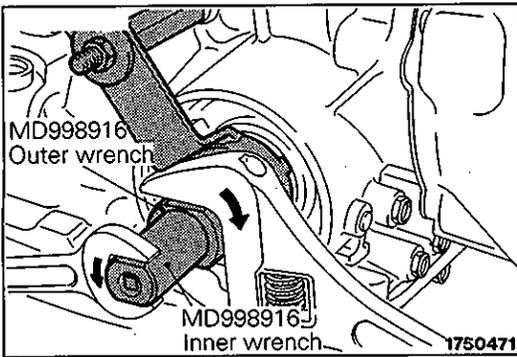
5. Loosen the lock nut to before the V-groove of the adjusting rod, and tighten the special tool (inner) until it contacts the lock nut.



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).



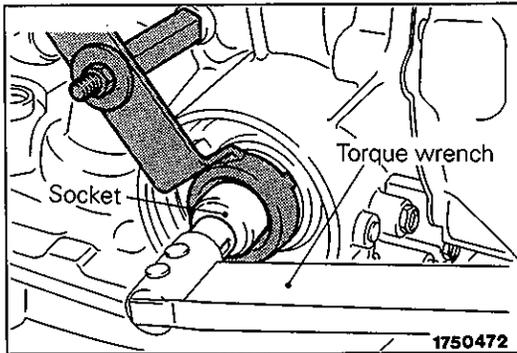
7. Attach a torque wrench to the special tool (inner) and tighten to a torque of 5 Nm (0.5 kgm, 3.6 ft.lbs.) after using 10 Nm (1 kgm, 7.2 ft.lbs.) and repeating "Tighten" and "Loosen" two times. After that, back off the special tool (inner) 2 to 2-1/4 turns.



8. 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.



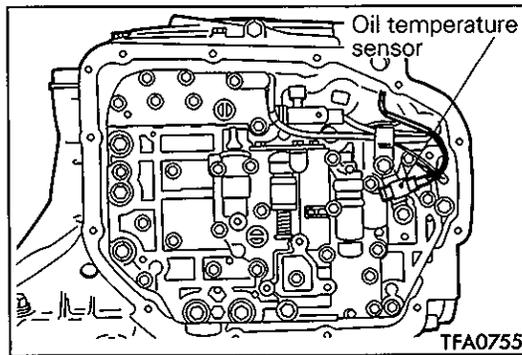
9. Tighten the lock nut by hand until the lock nut contacts the piston. Then using the torque wrench, tighten to the specified torque.

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.

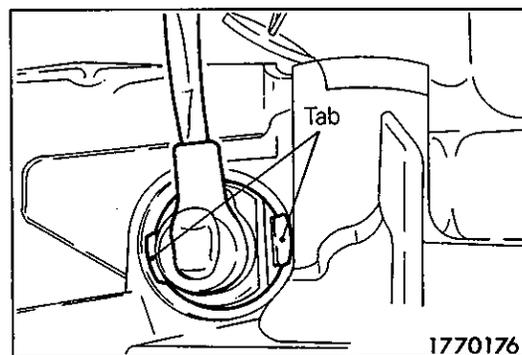
10. Remove the special tool which fastens the piston. Attach the plug to the outlet of the low-reverse pressure.



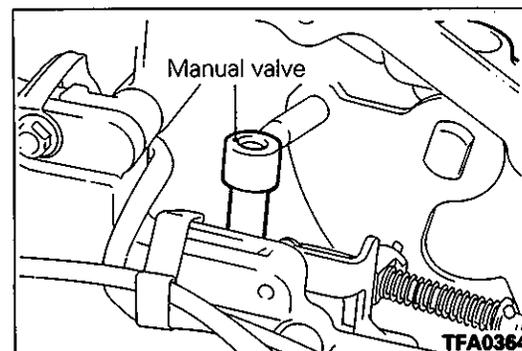
8. LINE PRESSURE ADJUSTMENT

E23FNAH

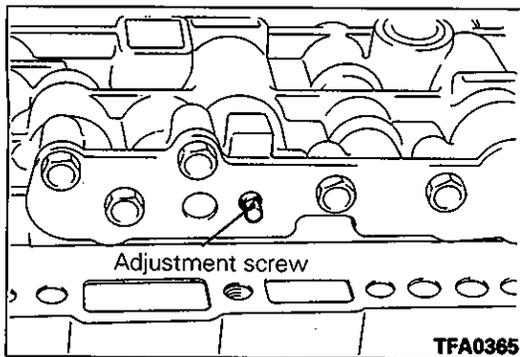
1. Drain out the automatic transmission fluid.
2. Remove the oil pan.
3. Remove the oil filter.
4. Remove the oil temperature sensor.
5. Press the solenoid valve harness grommet and connector into the transmission case.



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



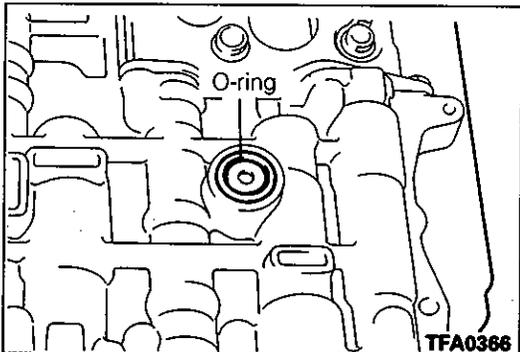
7. Remove the valve body assembly. The manual valve can come out, so be careful not to drop it.



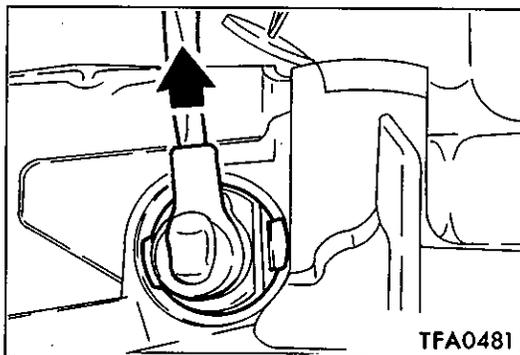
8. Turn the adjustment screw of the regulator valve and adjust so that the line pressure (kickdown brake pressure) becomes the standard value.
When the adjustment screw is turned to the clockwise, the line pressure becomes lower; when it is turned to counter-clockwise, it becomes higher.

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

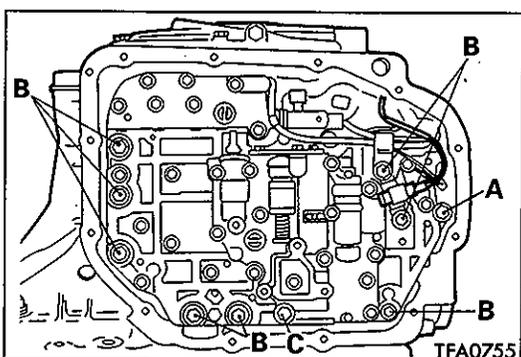
Oil pressure change for each turn of adjustment screw: 38 kPa (0.38 kg/cm², 5.4 psi)



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.



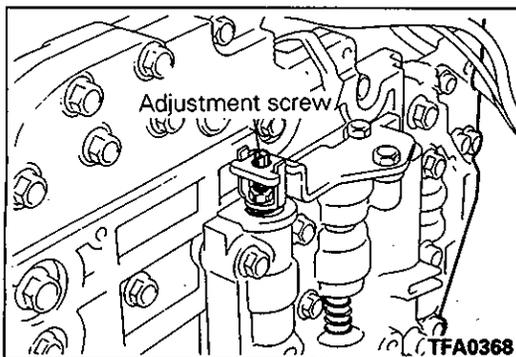
11. Pass the solenoid valve connector through the inside of the hole in the case.



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.)**

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.



9. REDUCING PRESSURE ADJUSTMENT

E23FNBE

9-1. WHEN A MULTI-USE TESTER (MUT) IS NOT USED

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: 415–435 kPa
(4.15–4.35 kg/cm², 59–61 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.

9-2. WHEN A MULTI-USE TESTER (MUT) IS USED

1. Use the MUT 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 apply pressure is not within the standard value, adjust using the reducing pressure adjustment screw.

**Standard value: 250–300 kPa
(2.5–3.0 kg/cm², 35–43 psi)**

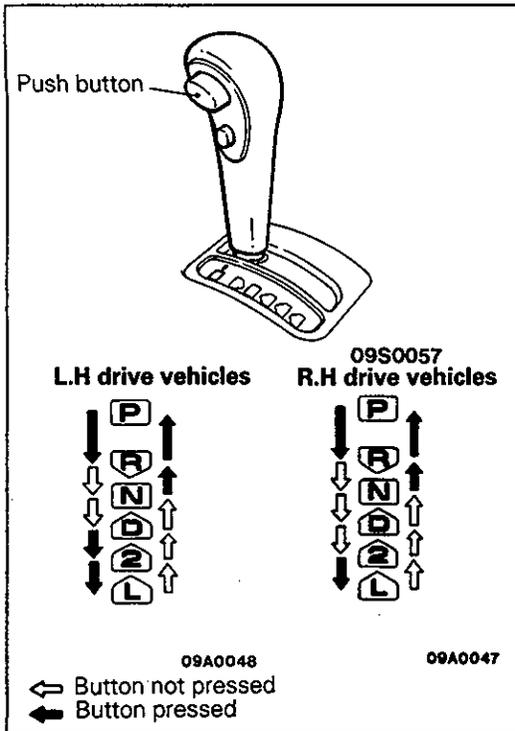
Oil pressure change for each turn of adjustment screw: 22 kPa (0.22 kg/cm², 3 psi)

2. Check to be sure, after completing this adjustment, that the reducing pressure is within the range of 370–490 kPa (3.7–4.9 kg/cm², 53–70 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.



10. 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.

11. SPEEDOMETER CABLE REPLACEMENT E23FPAE

Refer to GROUP 22 – Service Adjustment Procedures.

TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

Pre-removal Operation

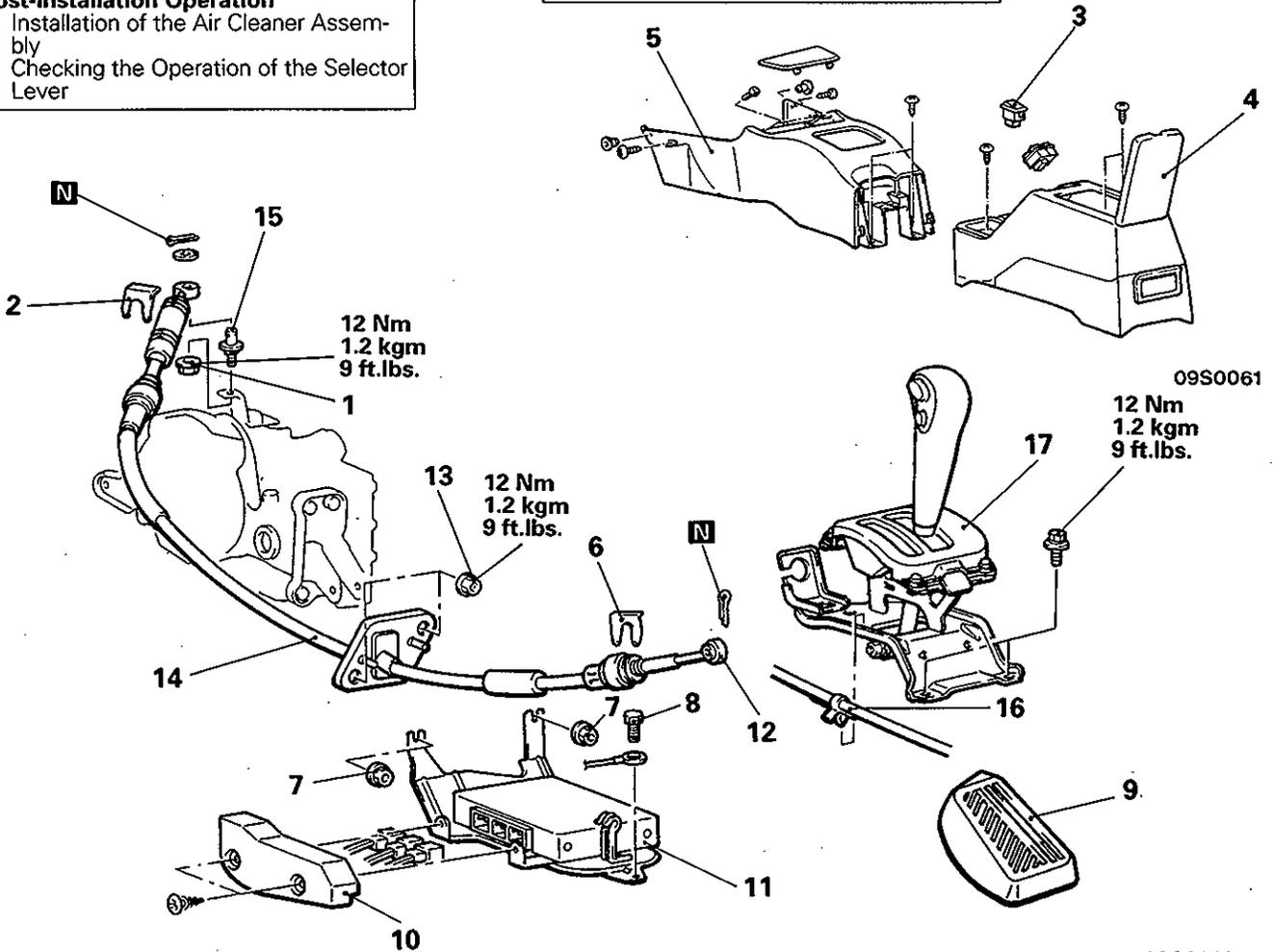
- Removal of the Air Cleaner Assembly

Post-installation Operation

- Installation of the Air Cleaner Assembly
- Checking the Operation of the Selector Lever

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.



Transmission control cable assembly re-removal steps



1. Nut
2. Clip
3. Power (PWR)/Economy (ECO) selection switch
4. Rear floor console
5. Front floor console
6. Clip
7. Nut
8. Bolt
9. Foot rest <R.H. drive vehicles>
10. Cover
11. ELC-4A/T control unit
12. Connection for the transmission control cable assembly

13. Nut
14. Transmission control cable assembly
15. Adjuster

Selector lever assembly removal steps

3. Power (PWR)/Economy (ECO) selection switch
4. Rear floor console
5. Front floor console
12. Connection for the transmission control cable assembly
16. Clip
17. Selector lever assembly

Power (PWR)/Economy (ECO) selection switch removal steps

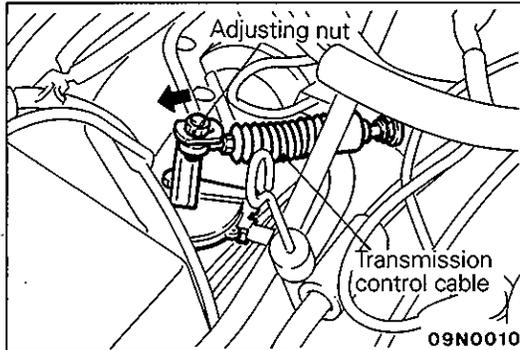
3. Power (PWR)/Economy (ECO) selection switch

INSPECTION

E231CAK

**POWER (PWR)/ECONOMY (ECO) SELECTION SWITCH
CONTINUITY CHECK**

Refer to P. 23-26.

**SERVICE POINTS OF INSTALLATION**

E231DAL

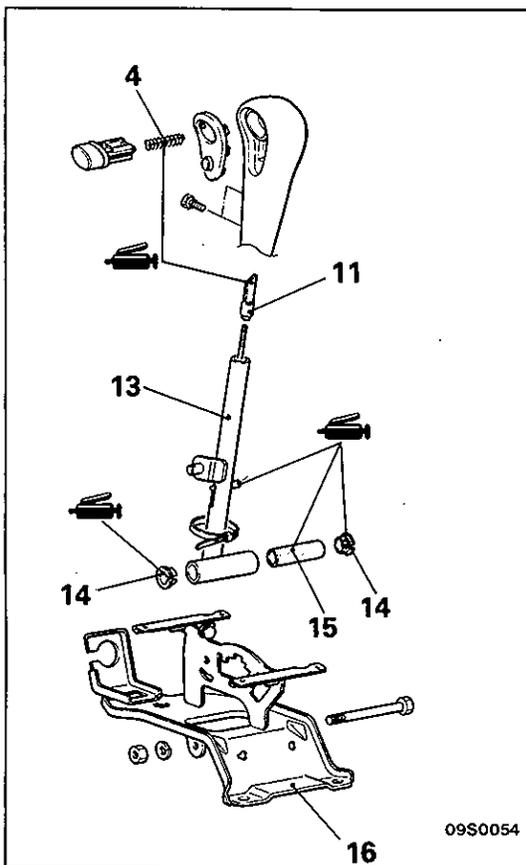
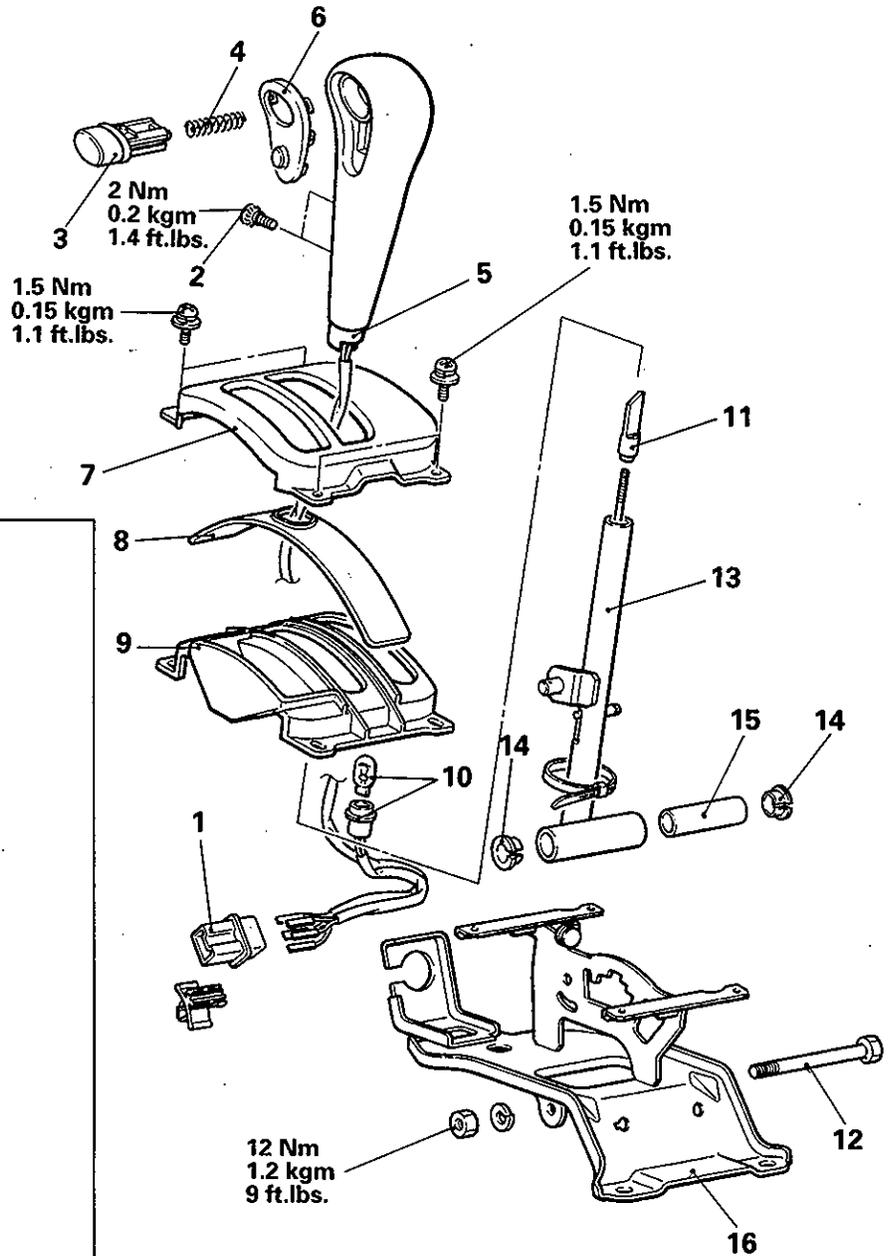
1. INSTALLATION OF NUT

- (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.

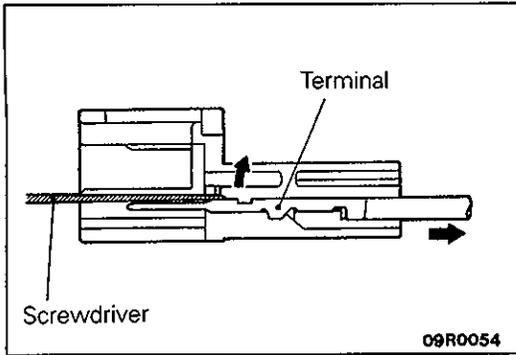
**SELECTOR LEVER ASSEMBLY
DISASSEMBLY AND REASSEMBLY**

Disassembly steps

- ◄◄ 1. Overdrive switch/position indicator lamp connector case
- 2. Screw
- 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. Bushing
- 15. Pipe
- 16. Bracket assembly



09S0055

**SERVICE POINTS OF DISASSEMBLY**

E23NBAD

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

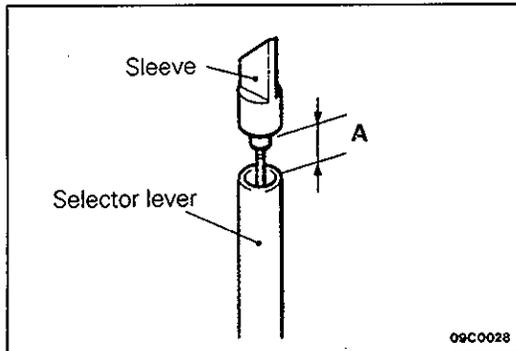
Use a flat-tip screwdriver or similar tool and pull out the terminal from the overdrive switch/position indicator lamp connector case.

INSPECTION

E23NCAD

OVERDRIVE SWITCH CONTINUITY CHECK

Refer to P.23-25.

**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): 11.5–12.5 mm (0.453–0.492 in.)

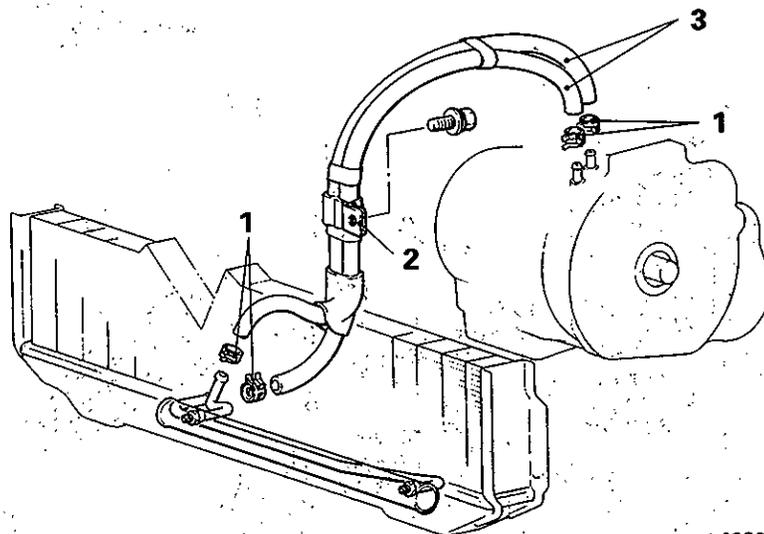
TRANSMISSION OIL COOLER HOSES

REMOVAL AND INSTALLATION

E23KA-

Pre-removal and Post-installation Operation

- Draining and Filling with Transmission Fluid (Refer to P.23-20.)



09S0072

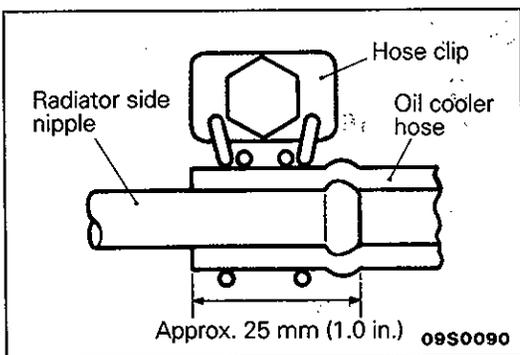
Removal steps

1. Clip
2. Clamp
3. Hose assembly

SERVICE POINTS OF INSTALLATION

3. INSTALLATION OF HOSE ASSEMBLY

After inserting the hose so that the dimension shown in the illustration is approximately 25 mm (1.0 in.), install the hose assembly securely so that the hose clip is not touching the projection on the radiator side nipple.

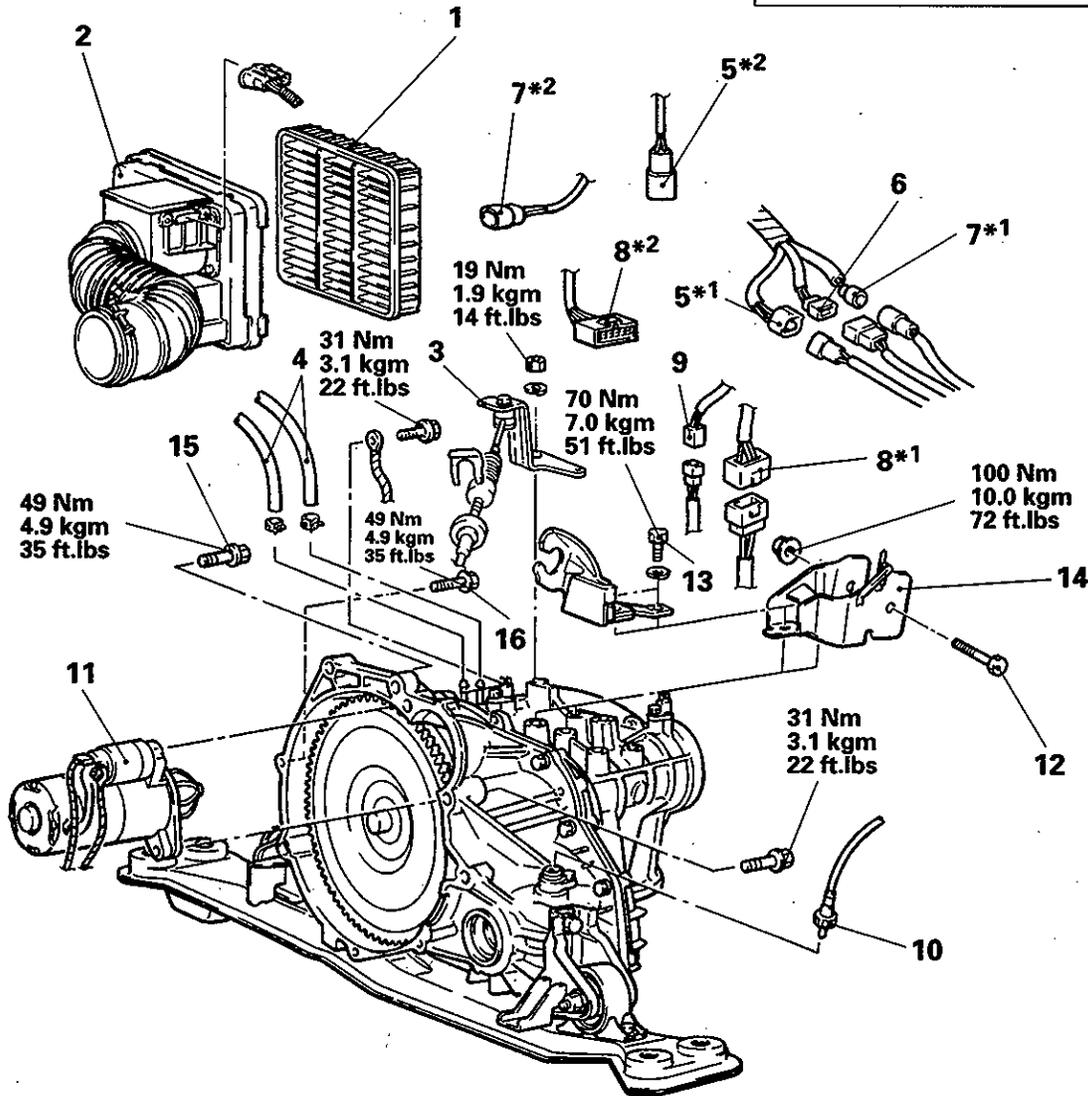


09S0090

TRANSMISSION ASSEMBLY REMOVAL AND INSTALLATION

Post-installation Operation

- Supplying of Transmission Fluid (Refer to P. 23-20.)
- Checking the Operation of the Selector Lever
- Checking the Operation of the Meters and Gauges



09S0080

Removal steps

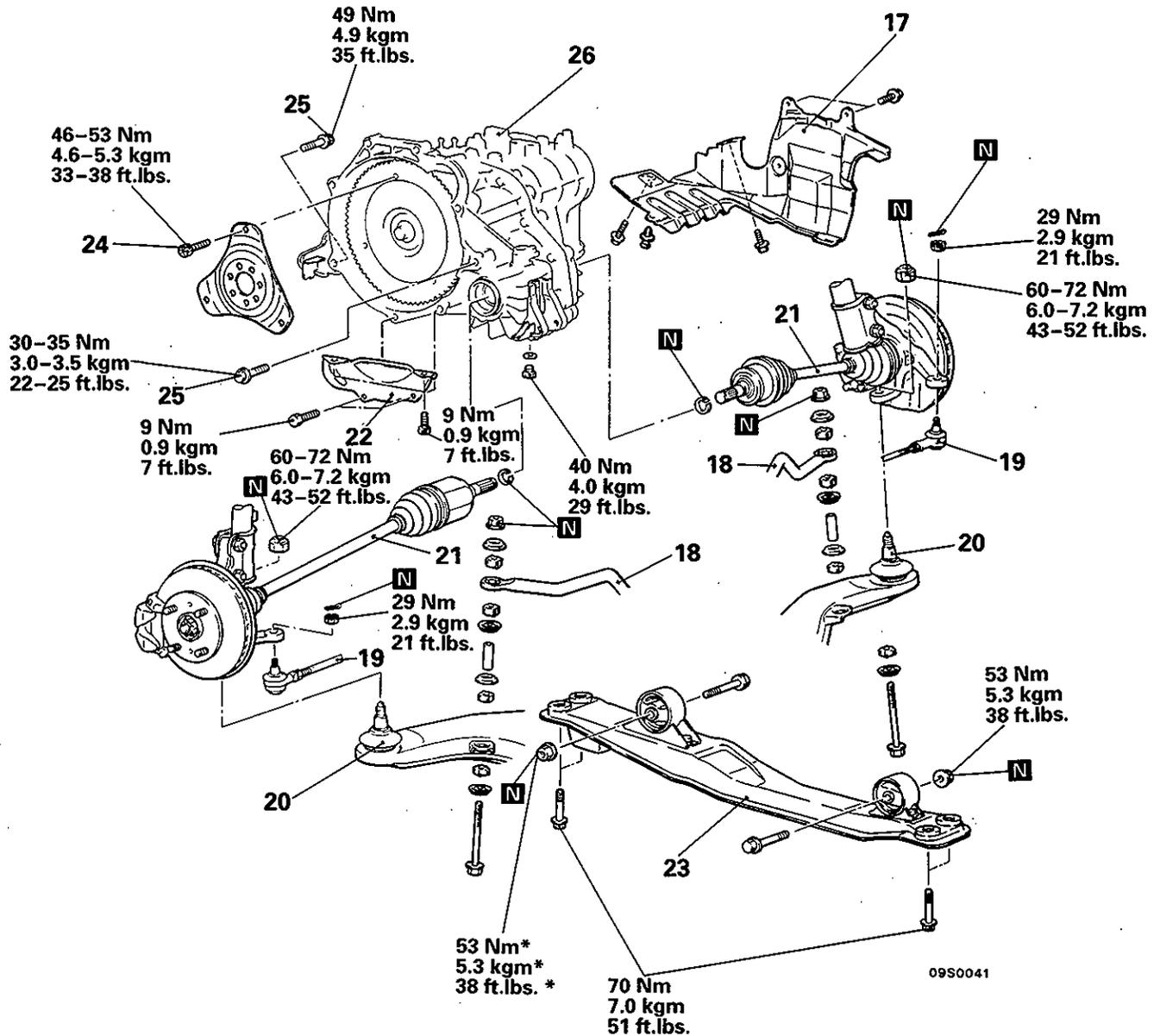
1. Air cleaner element
2. Air cleaner cover and hose assembly
3. Manual control lever connection
4. Transmission oil cooler hoses connection
5. Oil temperature sensor connector
6. Pulse generator connector
7. Kickdown servo switch connector
8. Inhibitor switch connector
9. Solenoid valve connector
10. Speedometer cable connection



11. Starter motor
12. Transmission mount bolt
13. Bolt
14. Transmission mount bracket
15. Transmission assembly upper part coupling bolt
16. Bolt
- Support of engine assembly

NOTE

*1 indicates applicable for vehicles built up to December, 1991, and *2 indicates applicable from January, 1992.



Lifting up of the vehicle

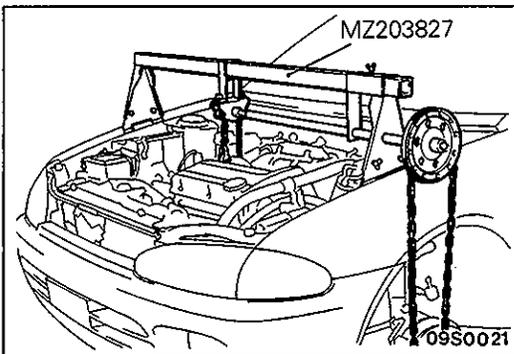
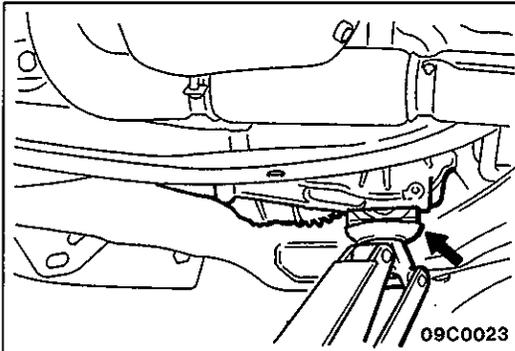
- Draining of the transmission fluid
- 17. Under cover (RH)
- 18. Connection for stabilizer bar
- ◄◄ 19. Connection for tie rod end
- ◄◄ 20. Connection for lower arm ball joint
- ◄◄ ◄◄ 21. Connection for drive shaft
- 22. Bell housing cover
- 23. Center member assembly
- ◄◄ 24. Drive plate connecting bolt
- ◄◄ 25. Transmission assembly lower part coupling bolt
- ◄◄ ◄◄ 26. Transmission assembly

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.

SERVICE POINTS OF REMOVAL**11. REMOVAL OF STARTER MOTOR**

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

**12. REMOVAL OF TRANSMISSION MOUNT BOLT**

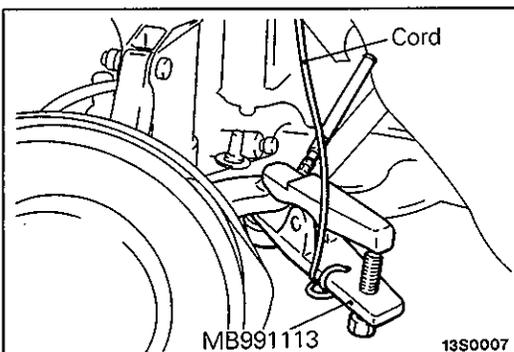
Use a garage jack to raise the transmission assembly until there is no load on the transmission insulator, and then remove the transmission mounting bolts.

Caution

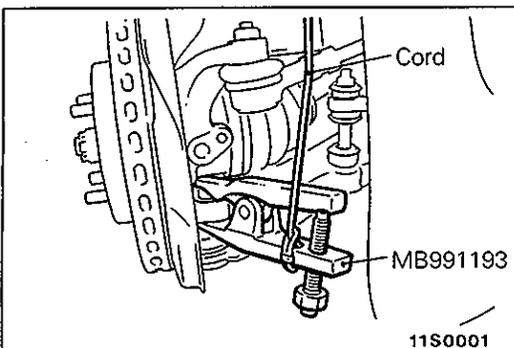
When jacking up the transmission assembly, support it over a wide area so force is not applied to only one part of it.

● **SUPPORT OF ENGINE ASSEMBLY**

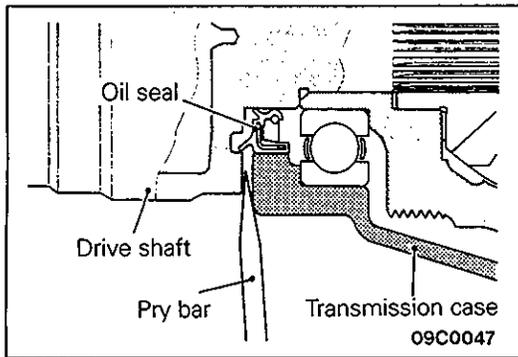
Set the special tool to the vehicle to support the engine assembly.

**19. 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.

**20. 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.



21. DISCONNECTION OF DRIVE SHAFT

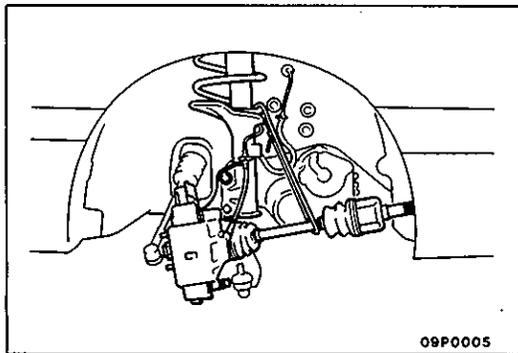
- (1) Insert a pry bar between the transmission case and the drive shaft, and then pry the drive shaft from the transmission.

NOTE

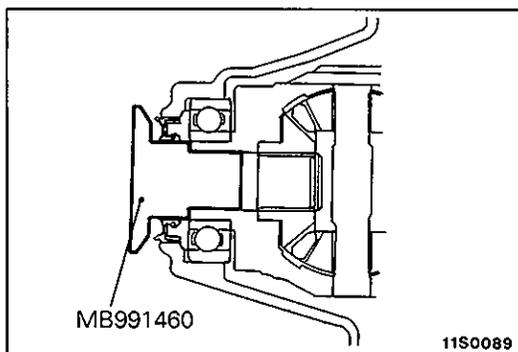
Take out the drive shaft with the hub and knuckle, etc., still attached.

Caution

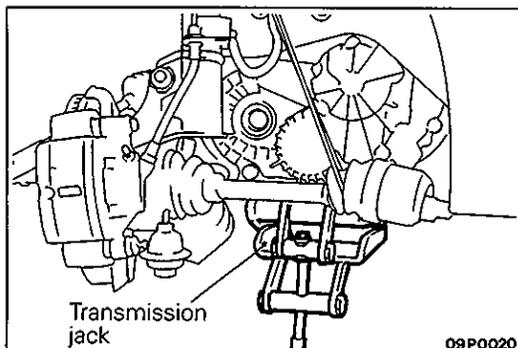
1. **Do not pull on the drive shaft; doing so will damage the TJ assembly; be sure to use the pry bar.**
2. **Do not insert the pry bar so deep as to damaged the oil seal.**



- (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.



- (4) Use the special tool provided as a cover to prevent the entry of foreign objects into the transmission case.

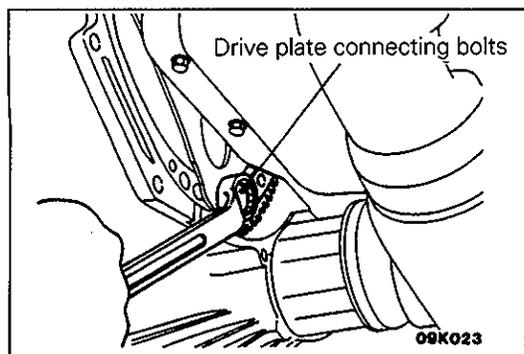


24. REMOVAL OF DRIVE PLATE CONNECTING BOLT/25. TRANSMISSION ASSEMBLY LOWER PART CONNECTING BOLT/26. TRANSMISSION ASSEMBLY

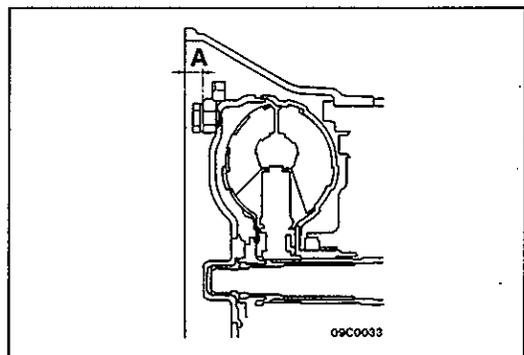
- (1) Support the transmission assembly by using a transmission jack.

Caution

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



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



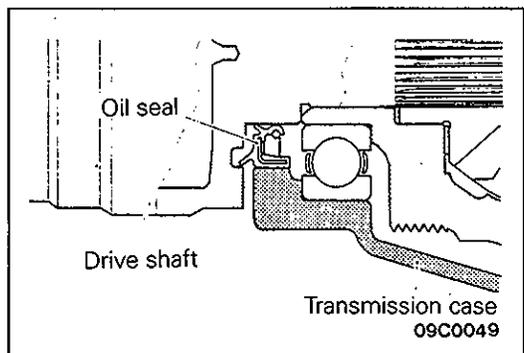
SERVICE POINTS OF INSTALLATION

E23LDAO

26. 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): Approx. 12 mm (0.472 in.)



21. INSTALLATION OF DRIVE SHAFT

Provisionally install the drive shaft so that the TJ case 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.