AUTOMATIC TRANSAXLE

CONTENTS

M23AA- -

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

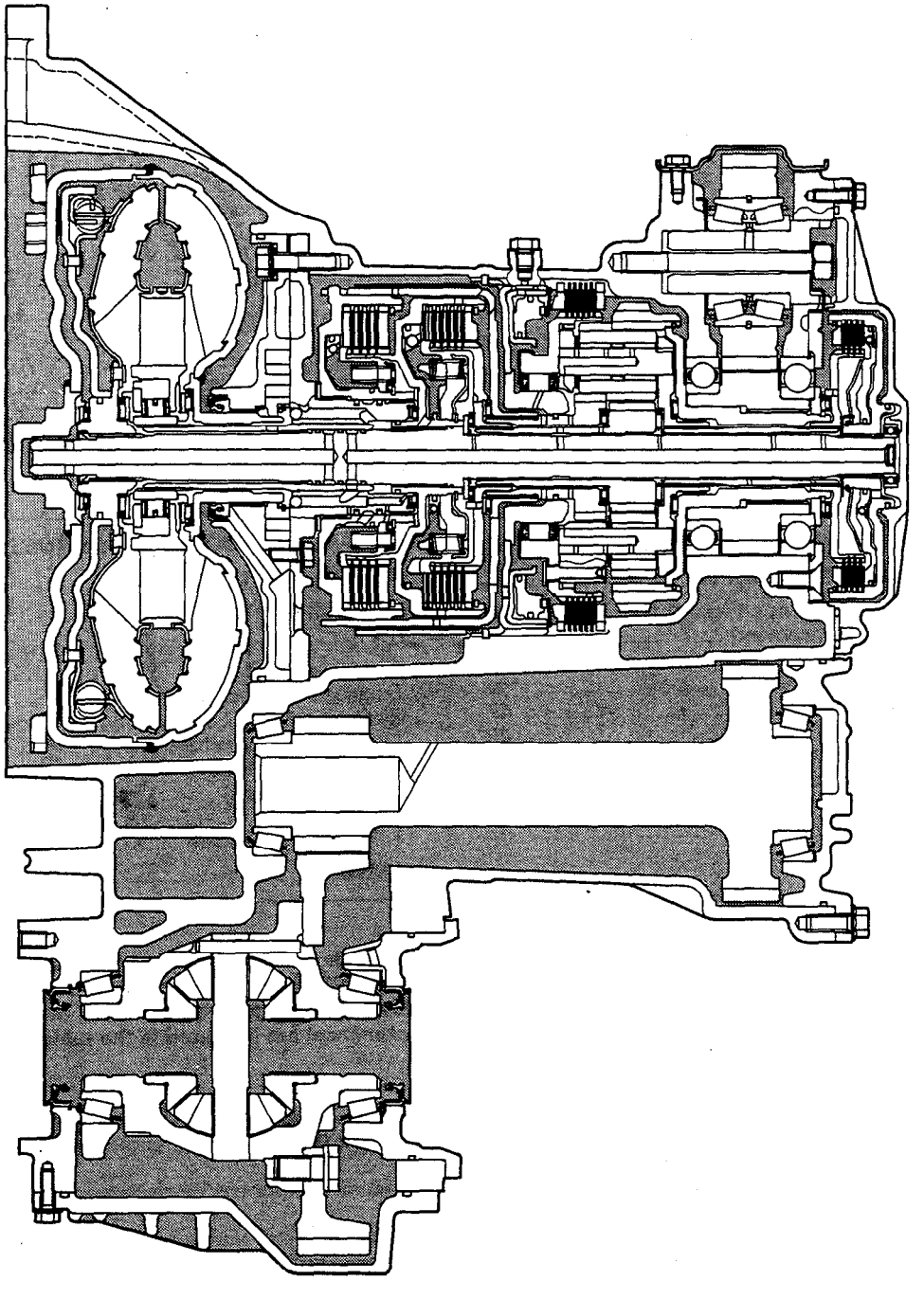
(1) A Supplemental Restraint System (SRS), which uses a driver-side air bag, has been installed in the 3000GT.
(2) The SRS includes the following components: impact sensors, SRS diagnosis unit: SRS warning light, air bag module, clock spring, interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

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.

GENERAL INFORMATION

M23BABW

CROSS-SECTIONAL VIEW

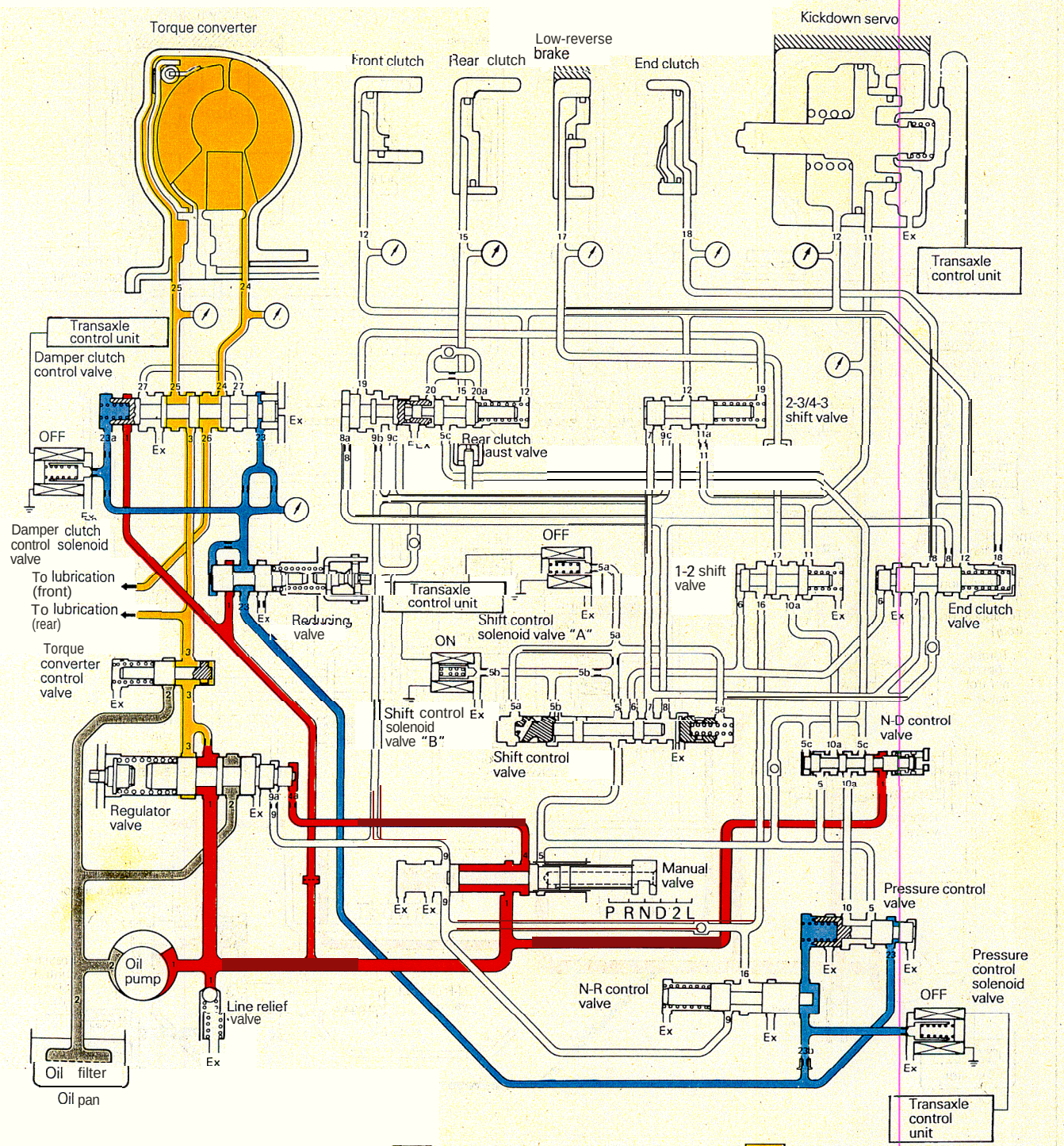


TFA0540

TSB Revision

HYDRAULIC CONTROL SYSTEM

<F4A21 – Neutral>

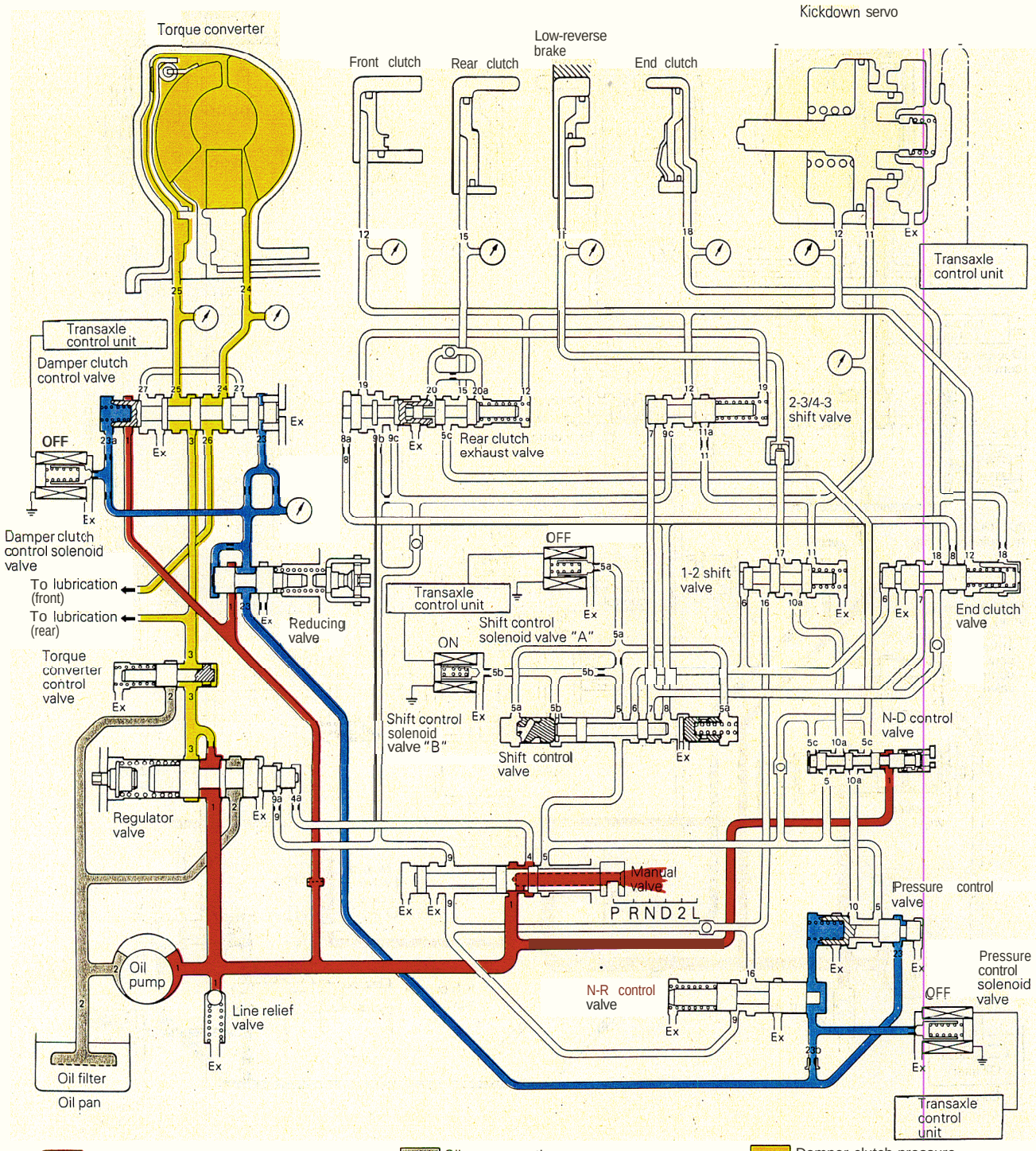


Neutral

TFA0070

TSB Revision

<F4A21– Parking>

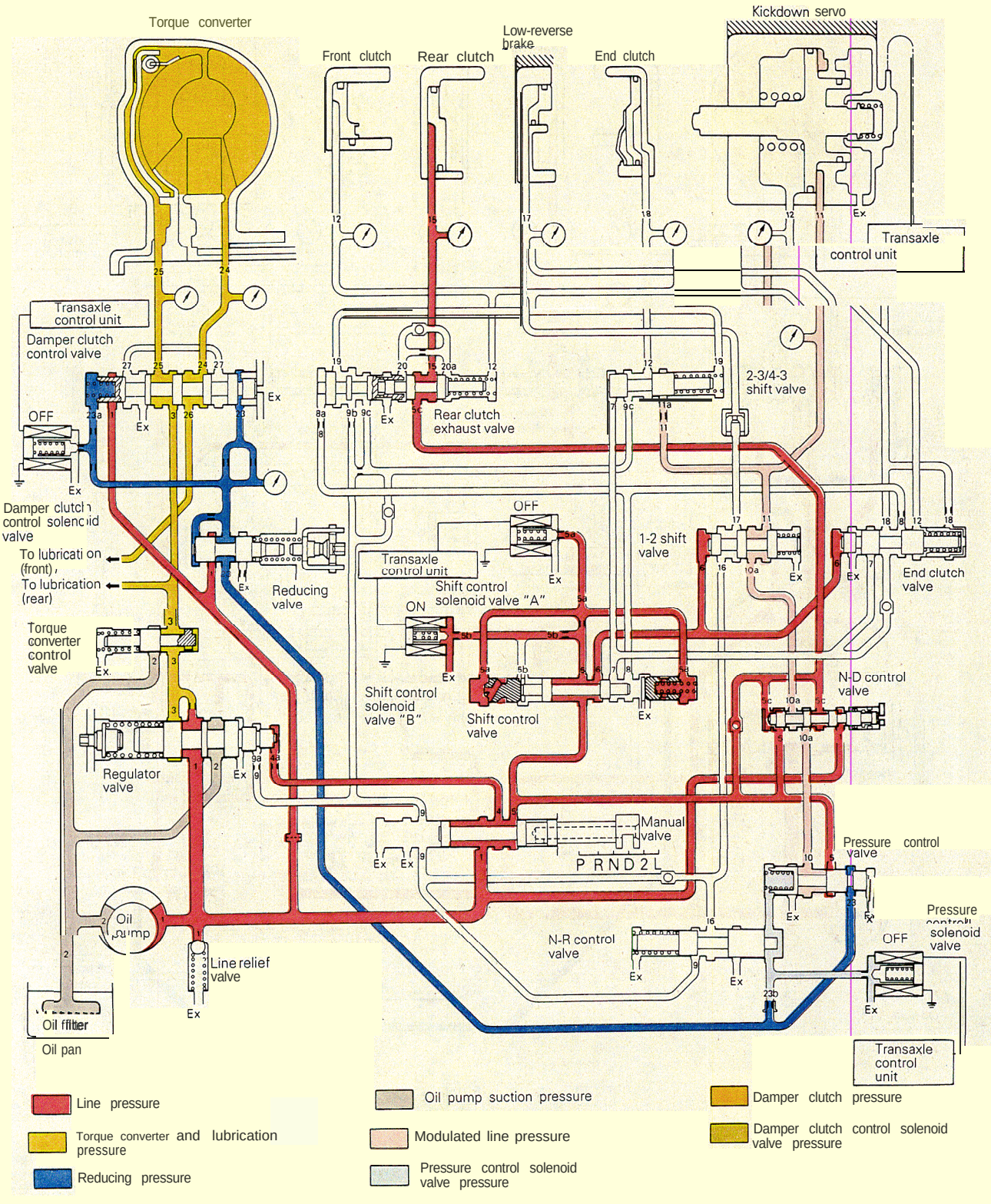


Parking

TFA0071

TSB Revision

<F4A21– Drive-Stopping>

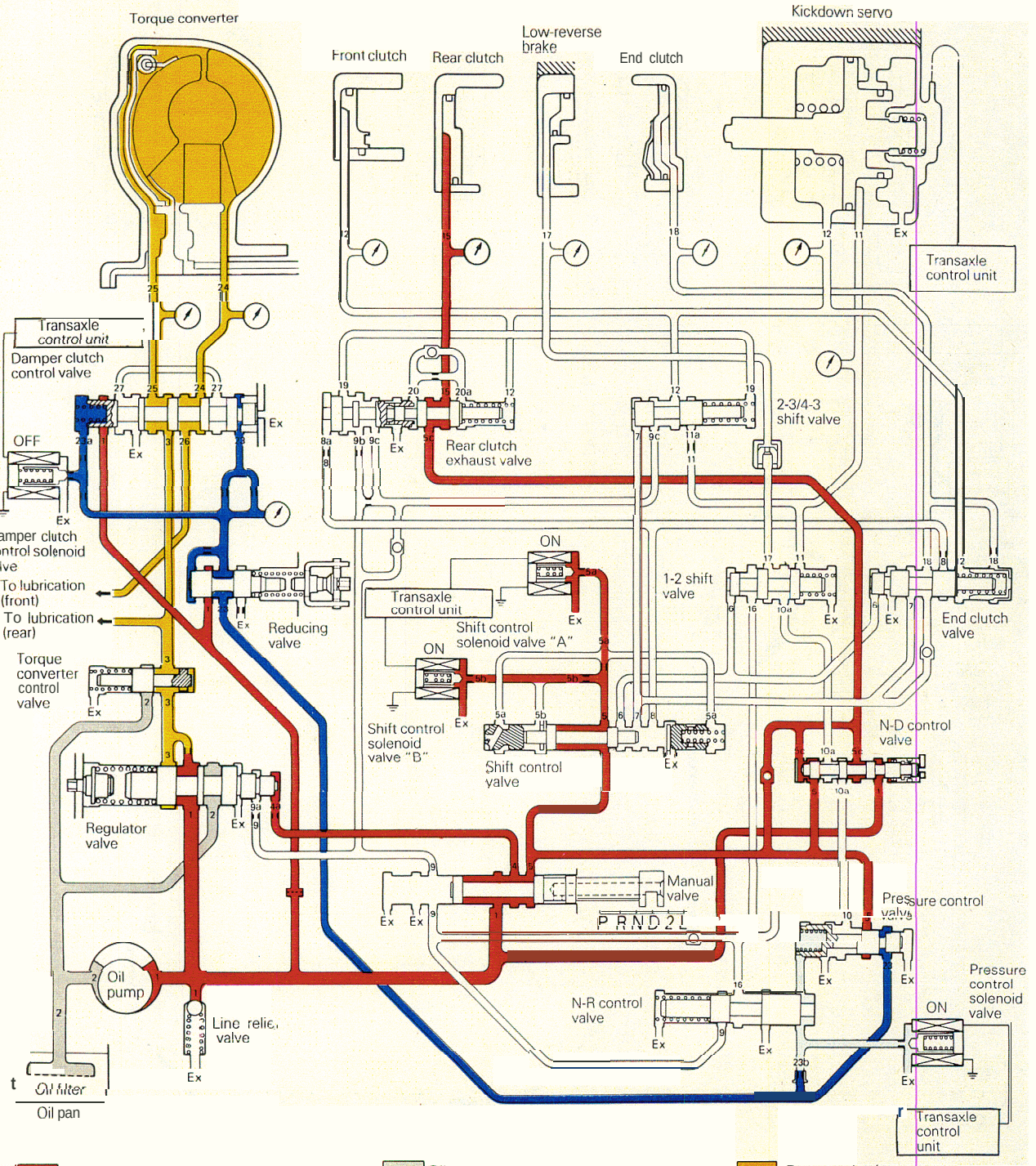


(Stop)

TFA0242

TSB Revision

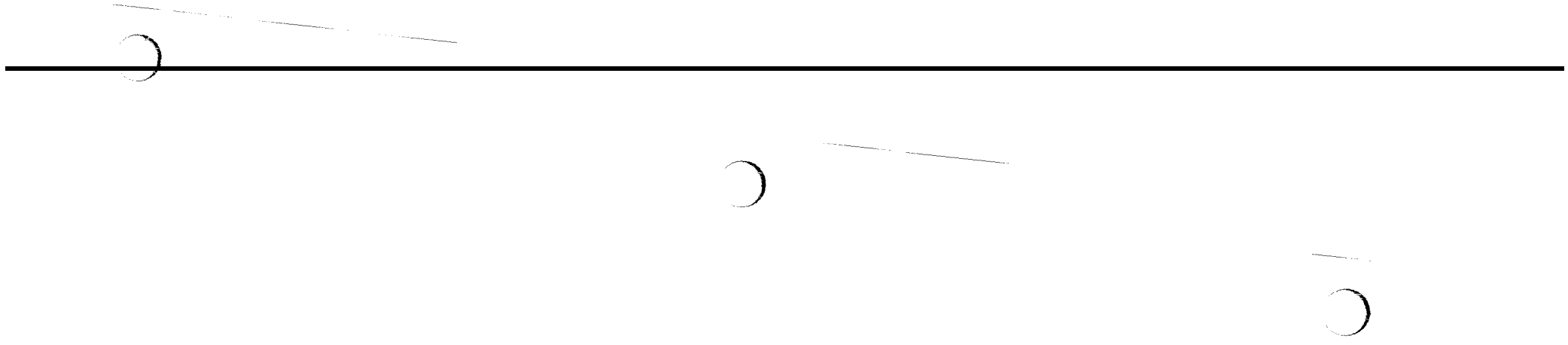
<F4A21– Drive-First>



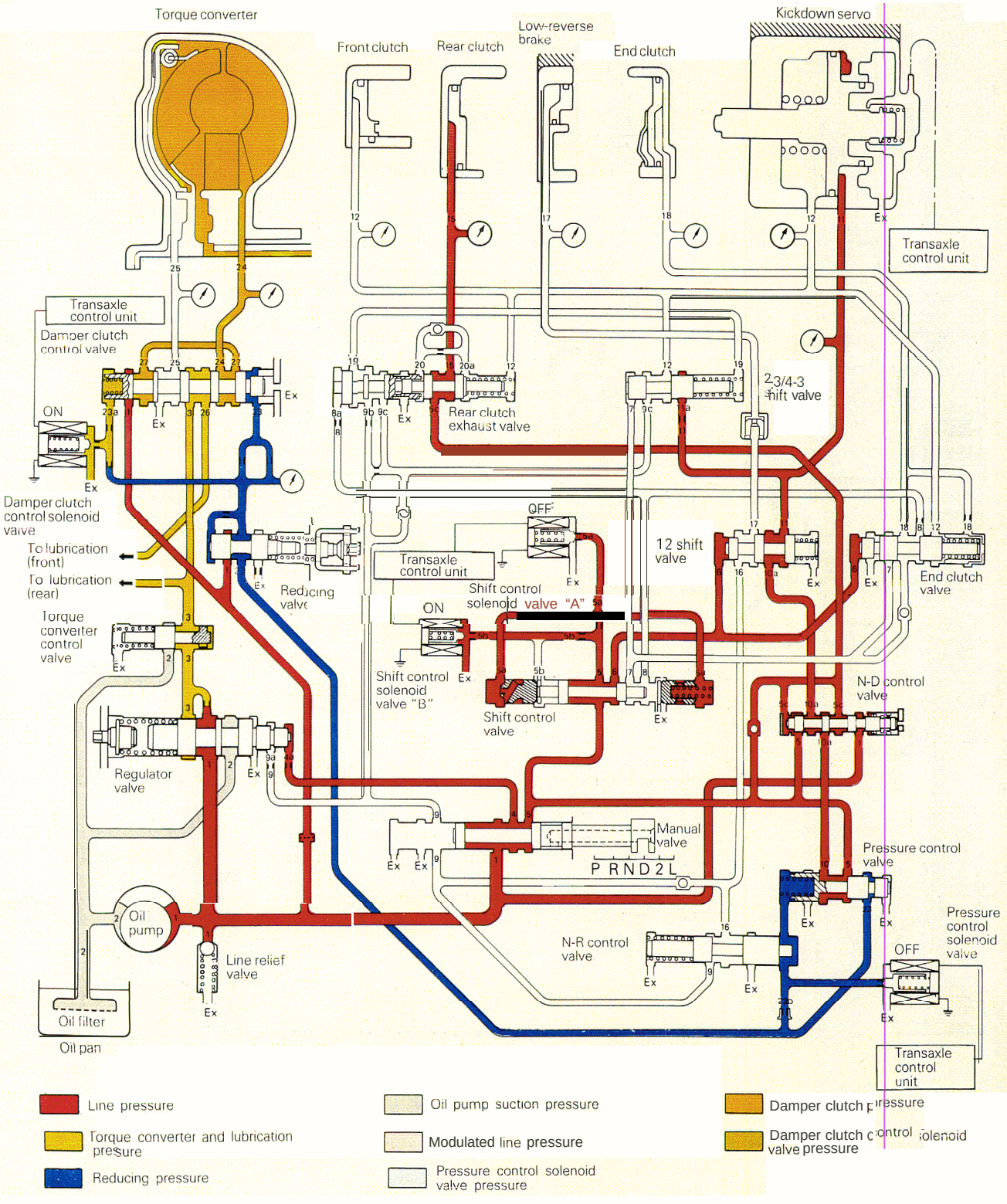
Drive (First)

TFA0072

TSB Revision



<F4A21– Drive-Second>

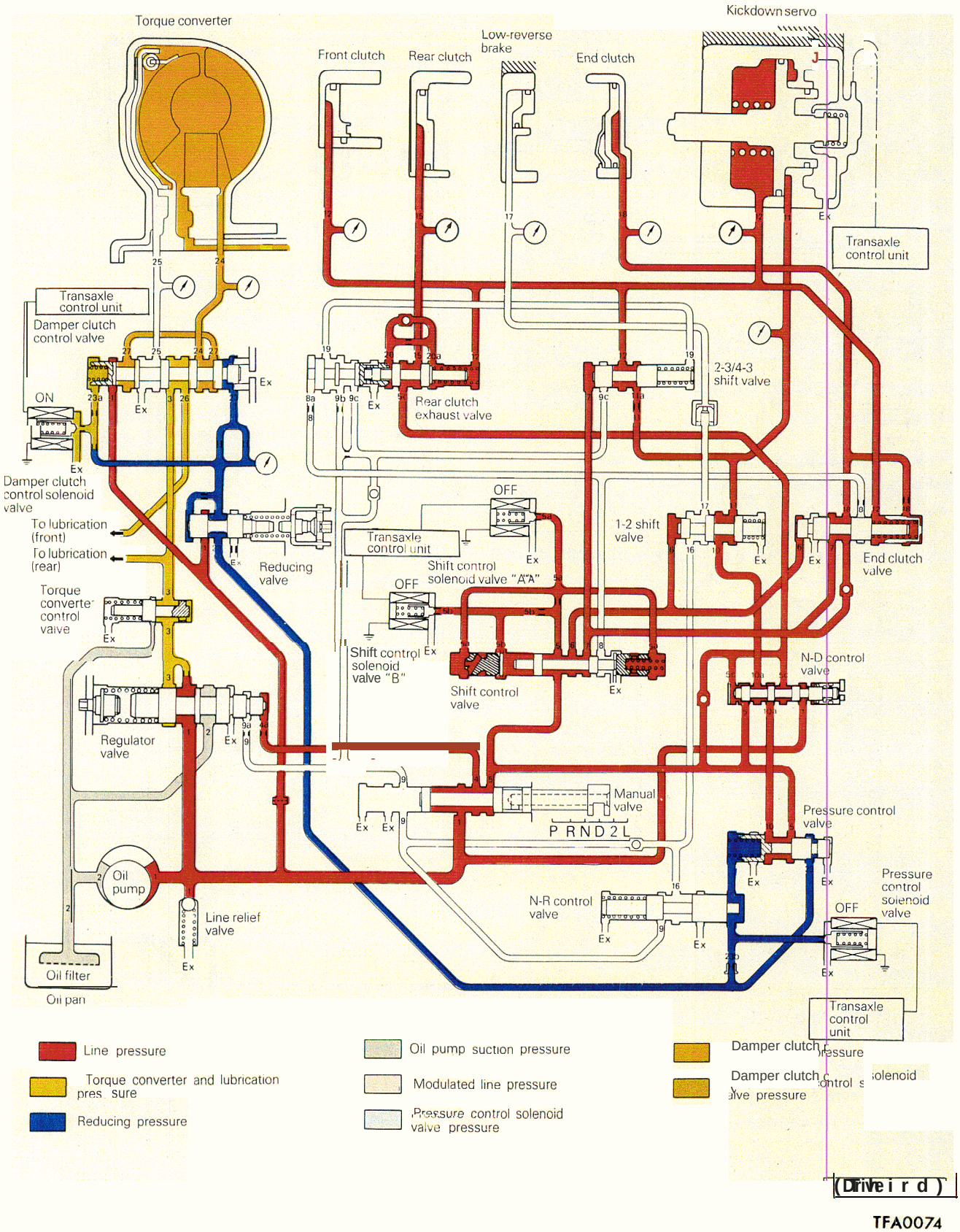


Drive (Second)

TFA0073

TSB Revision

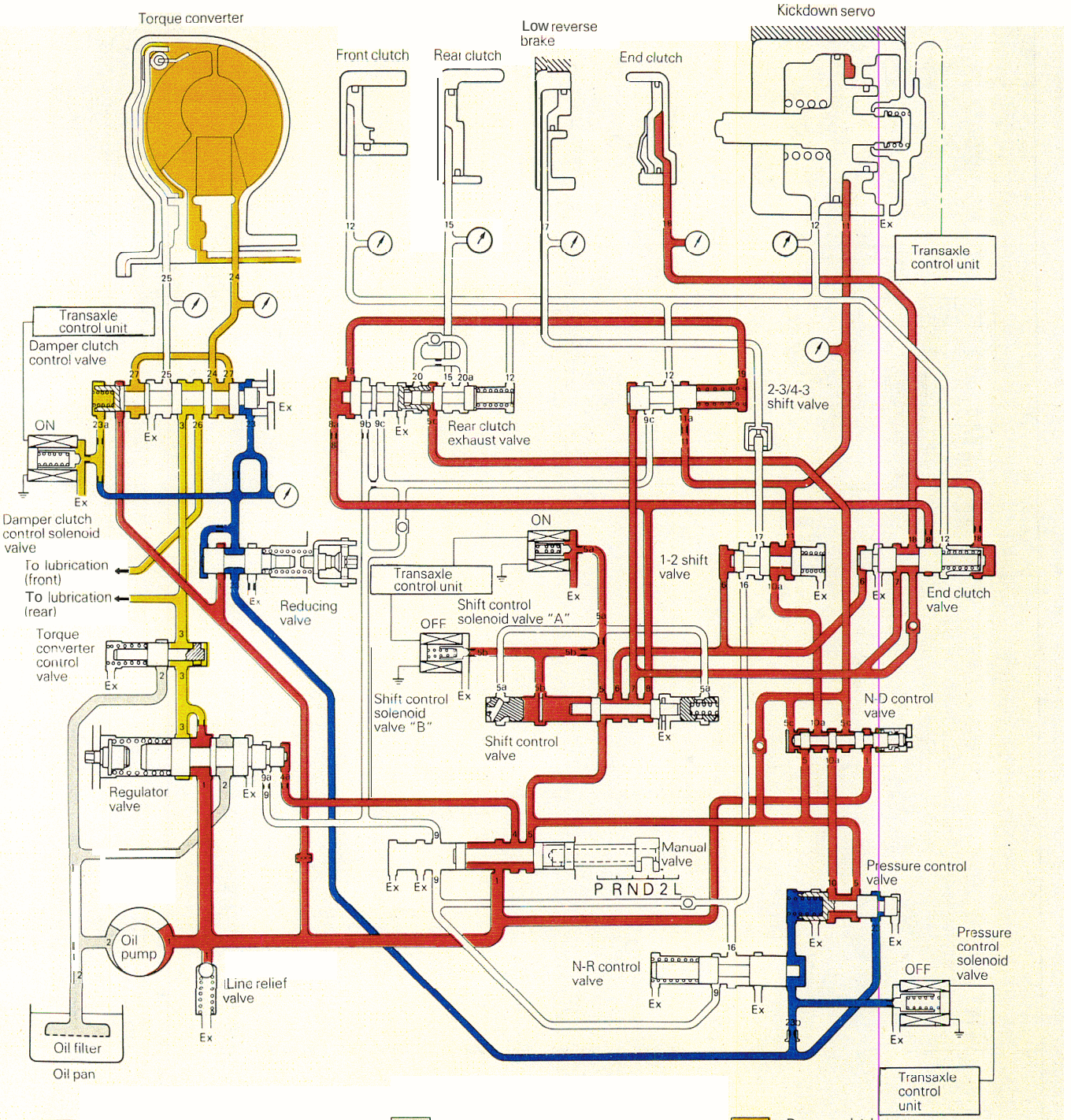
<F4A21– Drive-Third>



TFA0074

TSB Revision

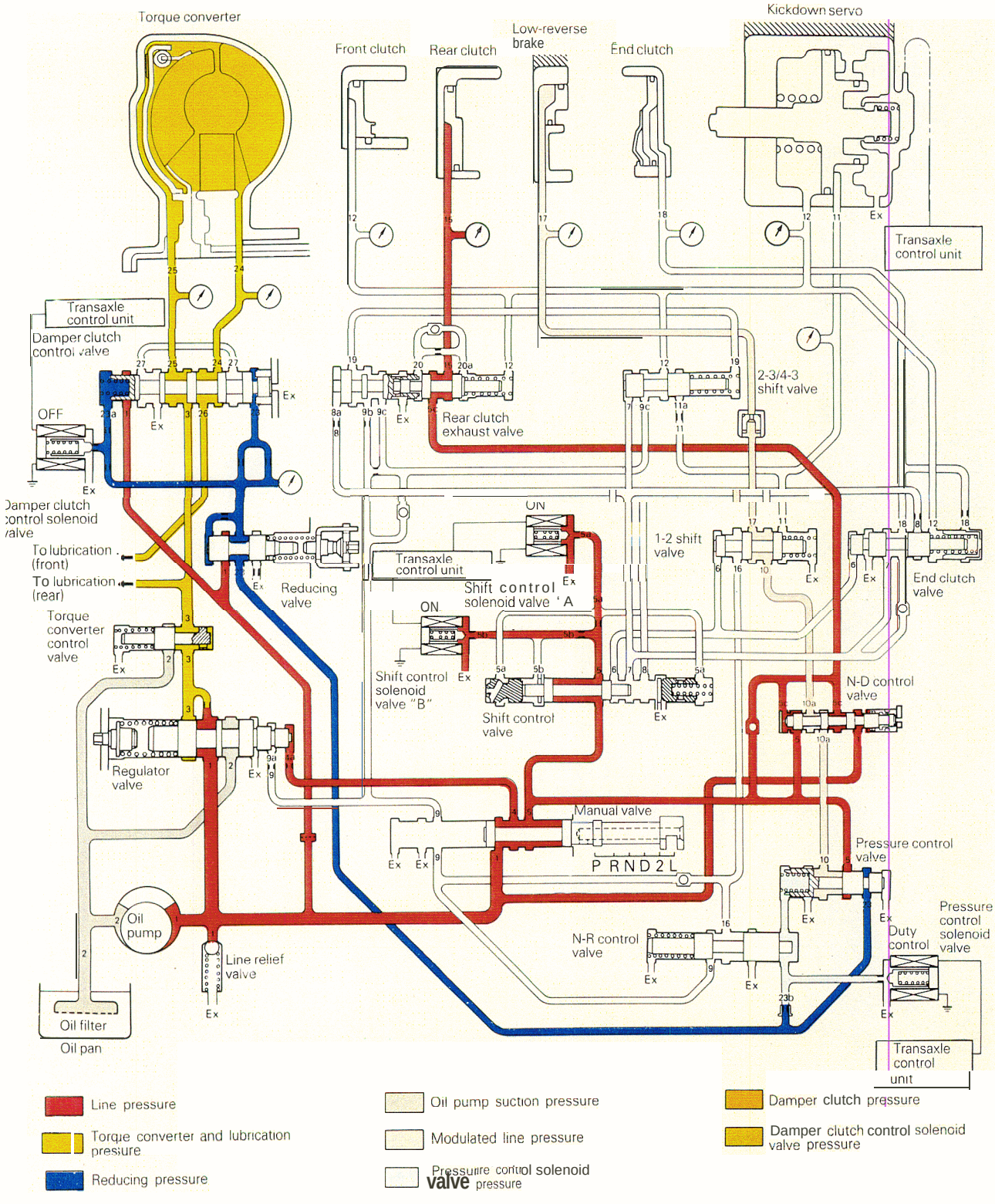
<F4A21– Drive-Fourth>



Drive (Fourth)

TFA007

<F4A21– Lock-up-First>

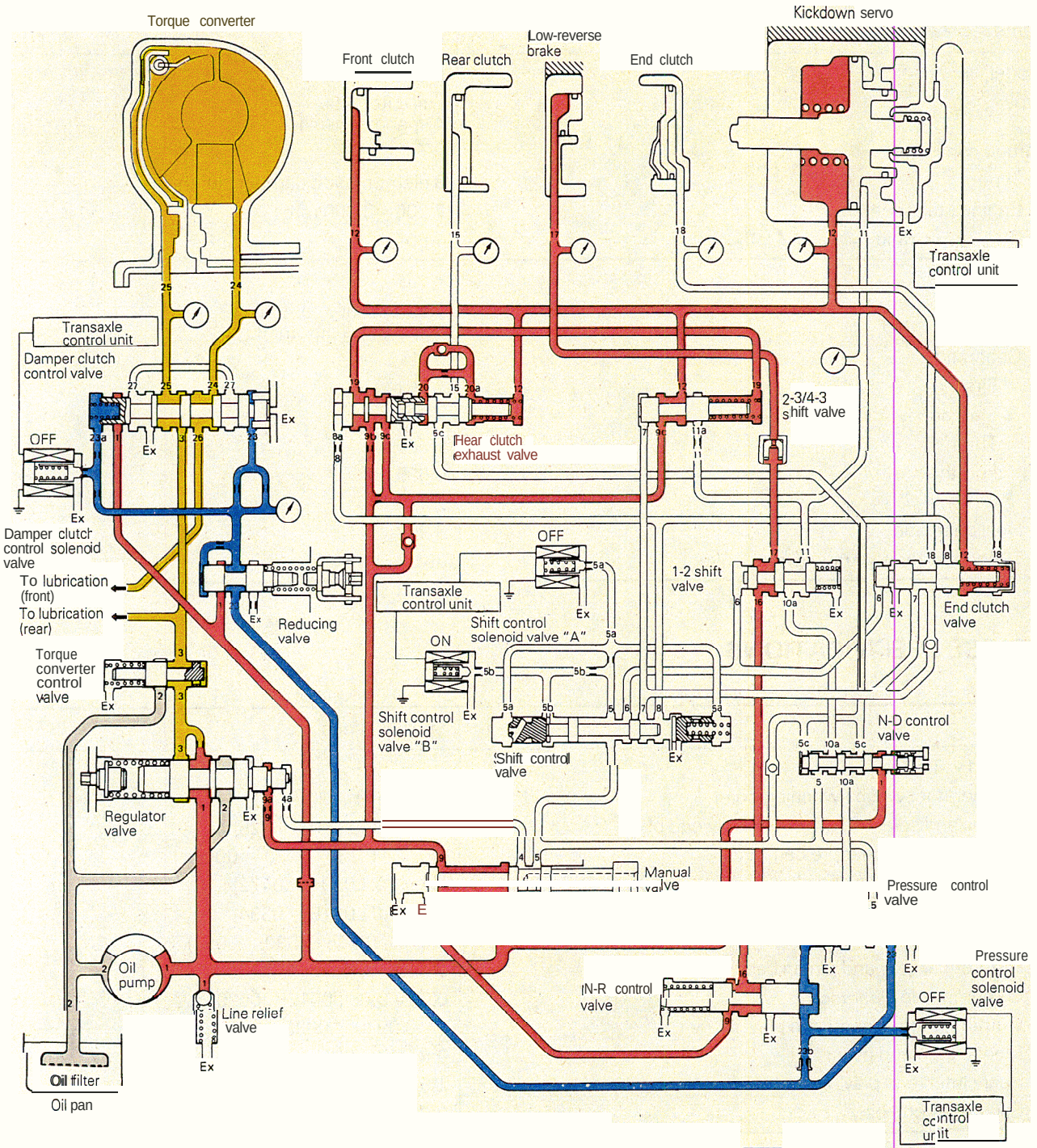


Lock-up (First)

TFA0076

TSB Revision

<F4A21 – Reverse>



I Reverse I

TFA0077

TSB Revision

SPECIFICATIONS

GENERAL SPECIFICATIONS

M23CA.C

Items	Specifications
Model	F4A33-1-MNN2
Type	Full automatic 4 speed transaxle
Torque converter	
Type	3 element with damper clutch
Engine stall speed	2,200 – 3,200 rpm
Stall torque ratio	1.80
Transaxle	
Type	Electronically controlled 4-speed full-automatic
Gear ratio	
First	2.551
Second	1.488
Third	1.000
Fourth	0.685
Reverse	2.176
Final gear ratio	3.958
Speedometer gear ratio (Drive/Driven)	36/28

SERVICE SPECIFICATIONS

M23CB-C

mm (in.)

terns	Specifications
Standard value	
Accelerator switch switching point	2 – 6 (.079 – .24)
Sleeve and selector lever assembly end play	15.2 – 15.9 (.598 – .625)
Transfer driven gear preload	0.075-0.135 (.0030 – .0053)
Low-reverse brake end play	1.0 – 1.2 (.0394 – .0472)
Input shaft end play	0.3 – 1.0 (.0118 – .0394)
Differential case preload	0.075 – 0.135 (.0030 – .0053)
Differential gear and pinion backlash	0.025 – 0.150 (.0010 – .0059)
Oil pump side clearance	0.03 – 0.05 (.0012 – .0020)
Output flange bearing end play	0 – 0.09 (0 – .0035)
Front clutch end play	0.8 – 1.0 (.0315 – .0394)
Rear clutch end play	1.0 – 1.2 (.0394 – .0472)
End clutch end play	0.60 – 0.85 (.0236 – .0335)

TSB Revision

VALVE BODY SPRING IDENTIFICATION CHART

M23CG-

mm (in.)

Part name	Wire diameter	Outside diameter	Length	No. of turns
Regulator valve spring	1.4 (.055)	15 (.59)	52 (2.05)	11.5
I-2 shift valve spring	0.6 (.024)	7.6 (.299)	26.6 (1.047)	13.5
Pressure control valve spring	0.45 (.0177)	7.6 (.299)	21.3 (.839)	8.5
Rear clutch exhaust valve spring	0.7 (.028)	6.8 (.268)	27.4 (1.079)	12.5
End clutch valve spring	0.6 (.024)	6.6 (.260)	24.4 (.961)	15.5
2-3 shift valve spring	0.8 (.031)	7.0 (.276)	27.5 (1.083)	15.5
N-R control valve spring	0.7 (.028)	9.2 (.362)	32.1 (1.264)	8.5
Reducing valve spring	1.2 (.047)	8.9 (.350)	29.5 (1.161)	12.5
Line relief spring	1.0(.039)	7.0 (.276)	17.3 (.681)	10
Torque converter valve spring	1.3 (.051)	9.0 (.354)	22.6 (.890)	9.5
Shift control valve spring	0.5 (.020)	5.7 (.224)	26.8 (1.055)	22
Damper clutch control valve spring	0.7 (.028)	6.2 (.244)	14.2 (.559)	9.5

SPACER AND SNAP RING

M23CF-B

Part name	Thickness mm (in.)	Identification symbol	Part No.
Spacer (for adjustment of transfer driven gear preload)	3.62 (.0244)	62	MD737444
	3.65 (.0256)	65	MD737445
	3.68 (.0268)	68	MD737446
	3.71 (.0280)	71	MD737447
	3.74 (.0291)	74	MD728802
	3.77 (.0303)	77	MD728803
	3.80 (.0315)	80	MD726804
	3.83 (.0327)	83	MD728805
	3.86 (.0339)	86	MD728806
	3.89 (.0350)	89	MD726807
	3.92 (.0362)	92	MD726808
	3.95 (.0374)	95	MD728809
	3.98 (.0386)	98	MD72881 0
	1.01 (.0398)	01	MD72881 1
	1.04 (.0409)	04	MD72881 2
	1.07 (.0421)	07	MD72681 3
	1.10 (.0433)	10	MD72881 4
	1.13 (.0445)	13	MD72881 5
	1.16 (.0457)	16	MD72881 6
	1.19 (.0469)	19	MD72881 7
	1.22 (.0480)	22	MD72881 8
	1.25 (.0492)	25	MD72981 9
	1.28 (.0504)	28	MD728820
	1.31 (.0516)	31	MD72682 1

TSB Revision

Part name	Thickness mm (in.)	Identification symbol	Part No.
Pressure plate (for adjustment of low-reverse brake end play)	5.9 (.232)	A	MD731 736
	6.0 (.236)	0	MD731 737
	6.1 (.240)	1	MD731738
	6.2 (.244)	2	MD731 739
	6.3 (.248)	3	MD731 740
	6.4 (.252)	4	MD731 588
	6.5 (.256)	5	MD731 741
	6.6 (.260)	6	MD731742
	6.7 (.264)	7	MD731 743
	6.8 (.268)	8	MD731744
	6.9 (.272)	9	MD731 745
Spacer (for adjustment of differential case preload)	0.83 (.0327)	83	MD720937
	0.86 (.0339)	86	MD720938
	0.89 (.0350)	89	MD720939
	0.92 (.0362)	92	MD720940
	0.95 (.0374)	95	MD720941
	0.98 (.0386)	98	MD720942
	1 .01(.0398)	01	MD720943
	1.04 (.0409)	04	MD720944
	1.07 (.0421)	07	MD720945
	1.10(.0433)	J	MD710454
	1.13 (.0445)	D	MD700270
	1.16 (.0457)	K	MD710455
	1.19 (.0469)	L	MD710456
	1.22 (.0480)	G	MD700271
	1.25 (.0492)	M	MD710457
	1.28 (.0504)	N	MD71 0458
	1.31 (.0516)	E	MD706574
	1.34 (.0528)	0	MD710459
	1.37 (.0539)	P	MD710460
Snap ring for adjustment of output flange bearing end play)	1.76 (.0693)	Brown	MD73331 4
	1.82 (.0717)	None	MD722538
	1.88 (.0740)	Blue	MD721 014
	1.94 (.0764)	Brown	MD721015
	2.00 (.0787)	None	MD721016
	2.06 (.0811)	Blue	MD721017
	2.12 (.0835)	Brown	MD722539
	2.18 (.0858)	None	MD73331 5

TSB Revision

Part name	Thickness mm (in.)	Identification symbol	Part No.
Spacer (for adjustment of differential gear and pinion backlash)	0.75 – 0.82 (.0295 – .0323)	–	MD722986
	0.83 – 0.92 (.0327 – .0362)	–	MD722985
	0.93 – 1.00 (.0366 – .0394)	–	MD722984
	1.01 - 1.08 (.0398 – .0425)	–	MD722982
	1.09 – 1.16 (.0429 – .0457)	–	MD722983
Snap ring (for adjustment of front clutch and rear clutch end play) *... Only for rear clutch	1.3* (.051)	None	MD731 747
	1.4* (.055)	Blue	MD731 748
	1.5 (.059)	Brown	MD731 749
	1.6 (.063)	None	MD731750
	1.7 (.067)	Blue	MD731751
	1.8 (.071)	Brown	MD731 752
	1.9 (.075)	None	MD731 753
	2.0 (.079)	Blue	MD731 754
	2.1 (.083)	Brown	MD731 755
	2.2 (.087)	None	MD731756
	2.3 (.091)	Blue	MD731757
	2.4 (.094)	Brown	MD731 758
Snap ring (for adjustment of end clutch end play)	1.05 (.0413)	White	MD71 5800
	1.30 (.0512)	Yellow	MD71 5801
	1.55 (.0610)	None	MD71 5802
	1.80 (.0709)	Green	MD71 5803
	2.05 (.0807)	Pink	MD720849

LUBRICANTS

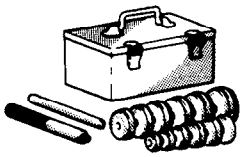
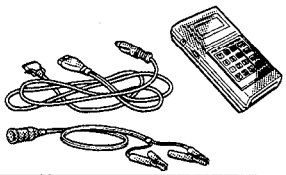
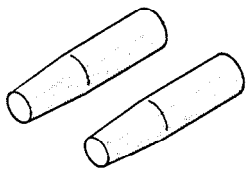
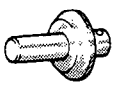
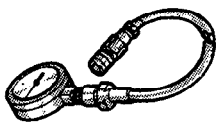
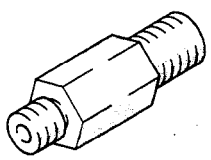
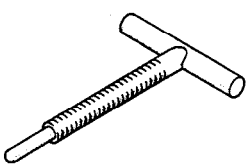
M23CD-B

Items	Specified lubricants	Quantity
Transaxle fluid liters (qts.)	Dia ATF SP or MITSUBISHI PLUS ATF or equivalent	7.5 (7.9)
Drive shaft oil seal lip		As required

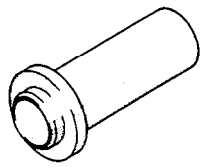
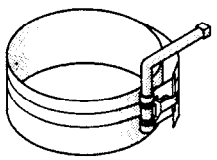
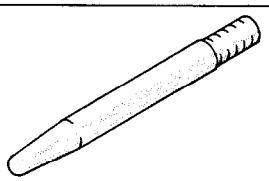
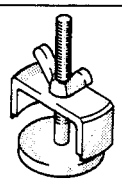
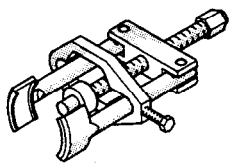
TSB Revision

SPECIAL TOOLS

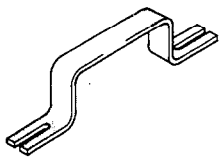
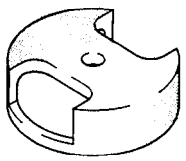
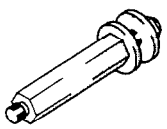
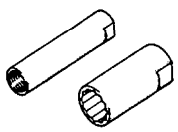
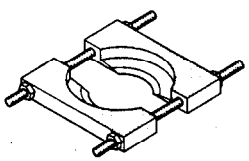
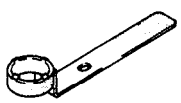
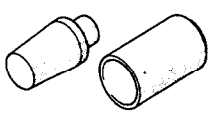
M23DA-B

Tool	Number	Name	Use
	MB991113-01	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
	MB990925-01	Bearing and oil seal installer	Installation of bearing outer race
	MB991359	ROM pack	Checking of the diagnosis code
	MB991341	Multi-use tester sub assembly	Checking of the diagnosis code
	MD998226-01	Guide pin	**Reassembly of valve body**
	MD998325-01	Oil seal installer	Installation of drive shaft oil seal
	MD998330-01	Oil pressure gauge	Measuring oil pressure
	MD998332-01	Adapter	Connection of the oil pressure gauge
	MD998333-01	Oil pump remover	Removal and installation of oil pump

TSB Revision

Tool	Number	Name	Use
	MD998334-01	Oil seal installer	Installation of oil pump oil seal
	MD998335-01	Oil pump band	Reassembly of oil pump
	MD998336-01	Guide pin	Removal and installation of oil pump assembly
	MD998337-01	Spring compressor	Disassembly and reassembly of front clutch and rear clutch
	MD998348-01	Bearing and gear puller	Removal of bearing
	MD998812	Installer cap	Driving of bearing
	MD998822	Installer adapter (46)	Driving of bearing
	MD998825	Installer adapter (52)	Driving of bearing
	**MD998829**	**Installer adapter** (60)	**Driving of bearing**

TSB Revision

Tool	Number	Name	Use
	MD998830	Installer adapter (66)	Driving of bearing
	MD998905	Handle	**Removal and installation of low/reverse** brake piston
	MD998907	Spring **compressor**	Disassembly and reassembly of front clutch and rear clutch
	MD998915	Kickdown servo wrench adapter	Adjustment of kickdown servo
	MD998916-01 MD998916-1-01 MD998916-2-01 MD998916-3-01	Kickdown servo wrench adapter set Kickdown **servo wrench adapter** **Outer sleeve** **Inner sleeve**	Adjustment of kickdown servo
	MD998917	Bearing remover	Disassembly and reassembly of output flange
	MD998918	Kickdown **servo** wrench	Adjustment of kickdown servo
	MD998919	Snap ring installer	Reassembly of end clutch

TSB Revision

TROUBLESHOOTING

M23EBAY

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.

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 voltmeter.

↓

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 transaxle itself, disassemble and repair the transaxle.**

TROUBLESHOOTING GUIDE

	'resumed cause		Problem: Driving impossible or abnormal (before start-off)												
			Starter motor won't function	Forward/backward movement impossible	Forward movement impossible	Backward movement impossible	Engine stalls when N → D or R	Clutch slips at D (stall rpm too high)	Clutch slips at R (stall rpm too high)	Stall rpm too low	Vehicle moves at P or N	Engine starts, or vehicle moves, between N-R or N-D	Parking doesn't hold	Abnormal vibration-shock when shift to D 2-L-R
Engine	1	Abnormal idling rpm					⊗							X
	2	Performance malfunction					X			X				
Transaxle (power train)	3	Improper adjustment of manual linkage	X	⊗	⊗	⊗		⊗	⊗		⊗	⊗	⊗	⊗
	4	Malfunction of torque convertor		X	X	X	X	X	X	X				
	5	Operation malfunction of oil pump		X	X	X		X	X					
	6	Malfunction of one-way clutch			X			X						
	7	Damaged or worn gear or other rotating part, or improper adjustment of the preload												
	8	Malfunction of parking mechanism									X		X	
	9	Cracked drive plate, or loose bolt		X										
	10	Worn inside diameter of front clutch retainer				X			X					
Oil pressure system (including friction elements)	11	Low fluid level		⊗	⊗	⊗		X	X					
	12	Line pressure too low (seal damaged, leakage, looseness, etc.)		⊗	⊗	⊗		⊗	⊗					
	13	Malfunction of valve body (sticking valve, working cavity, adjustment, etc.)		⊗	⊗	⊗	X	X	X		X	X		X
	14	Malfunction of front clutch or piston				X			X					X
	15	Malfunction of rear clutch or piston			⊗			X			X			X
	16	Malfunction of kickdown band or piston												X
	17	Improper adjustment of kickdown servo												X
	18	Malfunction of low-reverse brake or piston				X			X					X
	19	O-ring of low-reverse brake circuit between valve body and case not installed				X			X					
	20	Malfunction of end clutch or piston (check ball hole, other)												
Electronic control system	21	Malfunction of inhibitors switch, damaged or disconnected wiring, or improper adjustment	X									X		X
	22	Malfunction of TPS, or improper adjustment												X
	23	Pulse generator (A) damaged or disconnected wiring, or short-circuit												
	24	Pulse generator (B) damaged or disconnected wiring, or short-circuit												
	25	Malfunction of kickdown servo switch												
	26	SCSV-A or B damaged or disconnected wiring, or short-circuit or sticking (valve open)												
	27	Malfunction of ignition signal system												X
	28	Incorrectly grounded ground strap												
	29	PCSV damaged or disconnected wiring, or short-circuit												X
	30	PCSV damaged or disconnected wiring (valve open)		⊗	⊗	⊗		X	X					
	31	DCCSV damaged or disconnecting wiring (valve closed)						X						
	32	DCCSV short-circuit or sticking (valve open)					⊗							
	33	Malfunction of overdrive control switch												
	34	Malfunction of accelerator switch, or improper adjustment												X
	35	Malfunction of oil-temperature sensor												
	36	Malfunction of lead switch												
	37	Poor contact of ignition switch	X											
	38	Malfunction of transaxle control unit												X

NOTE- ⊗ indicates items of priority during inspection.
PSCV = Pressure control solenoid valve

Abbreviations TPS = Throttle position sensor
DCCSV = Damper clutch control solenoid valve

SCSV = Shift control solenoid valve
OD = Overdrive

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	Transaxle 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 convertor housing together with engine rpm	Mechanical noise (clatter noise) from convertor housing	Abnormal noise inside transaxle case	3rd gear is held
1						X														
2					X		X	X	X	X			X	X		X				
3		X																		
4					X										X	X				
5											X	X					X			
6																				
7																			X	
8																				
9																		X		
10	X	X									X	X								
11											X	X								
12											⊗	⊗		X						
13	X	X		X	X		X	X	X	X	X	X	X	X	X	X				
14	X							X	X		X									
15																				
16							X			X	X	X								
17							X			X	X	X		X						
18																				
19																				
20		⊗					X				X									
21	X	X																		X
22				⊗			X	X	⊗	X	⊗	X		X	X	X				
23							X	X	X	X	X	X		X	X	X				
24				X											X	X				X
25							X			X	X	X								
26																				X
27															X					
28																				X
29														X						X
30											X	X								
31															X					
32																X				X
33		X	X																	
34					X	X									X					
35														X	X	X				
36																				X
37																				X
38	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X			X

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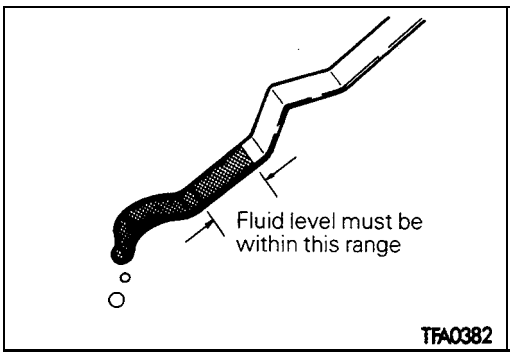
DIAGNOSIS AND TEST

FLUID LEVEL AND CONDITION

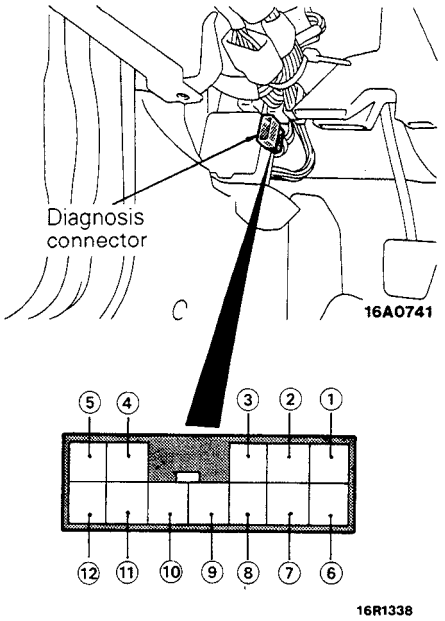


1. Drive until the fluid temperature reaches the usual temperature [70 – 80°C (160 – 180°F)].
2. Place vehicle on level floor.
3. Move selector lever sequentially to every position to fill torque converter and hydraulic circuit with fluid, then place lever in "N" Neutral position. This operation is necessary to be sure that fluid level check is accurate.
4. Before removing dipstick, wipe all dirt from area around dipstick. Then take out the dipstick and check the condition of the fluid.
   The transaxle 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 transaxle fluid until level reaches "HOT" range.
   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.
   Improper filling can also raise fluid level too high. When transaxle has too much fluid, gears churn up foam and cause same conditions which occur with low fluid level, resulting in accelerated deterioration of automatic transaxle 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 transaxle vent where it may be mistaken for a leak.
6. Be sure to examine fluid on dipstick closely.

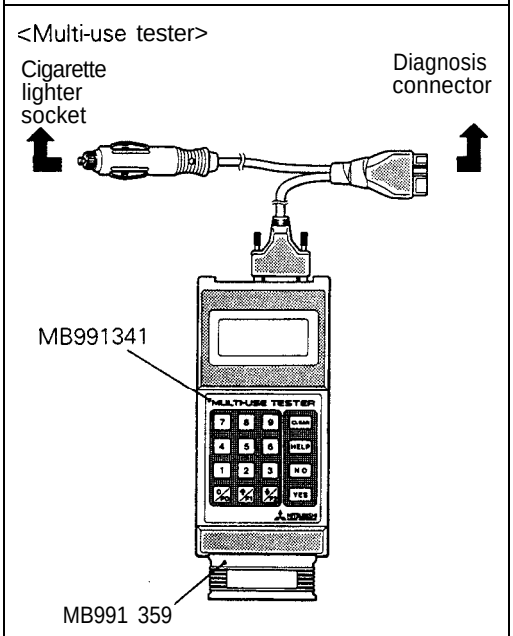
CONTROL CABLE

Whether control cable is properly adjusted can be confirmed by checking whether inhibitor switch is performing well.

1. Apply parking brakes and service brakes securely.
2. Place selector lever to "R" range.
3. Set ignition key to "ST" position.
4. Slowly move the selector lever upward until it clicks as it fits in notch of "P" range. If starter motor operates when lever makes a click, "P" position is correct.
5. Then slowly move selector lever to "N" range by the same procedure as in foregoing paragraph. If starter motor operates when selector lever fits in "N", "N" position is correct.
6. Also check to be sure the vehicle doesn't begin to move and the lever doesn't stop between P-R-N-D.
7. The control cable is properly adjusted if, as described above, the starter motor starts at both the "P" range and the "N" range.



⑥: E LC-4A/T
⑩: Diagnosis control
⑫: Ground



OBTAINING FAULT CODES

(1) Connect the voltmeter or multi-use tester to the connector for diagnosis.

(2) Read the output fault codes.
Then follow the remedy procedures according to the "FAULT CODE DESCRIPTION" on the following page.

NOTE
- As many as a maximum of ten fault codes, in the sequence of occurrence, can be stored in the Random Access Memory (RAM) incorporated within the control unit.
- If the number of stored fault codes or fault patterns exceeds ten, already stored fault codes will be erased, in sequence beginning with the oldest.
- Do not disconnect the battery until all fault codes or fault patterns have been read out, because all stored fault codes or fault patterns will be canceled when the battery is disconnected.

(3) If the fail-safe system is activated and the transaxle is locked in 3rd gear, the fault code in the Fail-Safe Code Description will be stored in the RAM.
Three of these fault codes can be stored.

(4) The cancellation will occur if, with the transaxle locked in 3rd gear, the ignition key is turned to the OFF position, but the fault code is stored in the RAM.

FAULT CODE DESCRIPTION

Code No.	Display Pattern	Item	Remedial Action
11		Excessively large throttle position sensor output	• Check throttle position sensor connector. • Check throttle position sensor on bench. • Adjust throttle position sensor. • Check accelerator switch (whether code number 24 is being output).
12		Excessively small throttle position sensor output	
13		Defective or improperly adjusted throttle position sensor	
14		Improperly adjusted throttle position sensor	
15		Open-circuited low-oil-temperature sensor	• Check oil temperature sensor connector. • Check oil temperature sensor on bench.
16		Short-circuited high-oil-temperature sensor	
17		Open-circuited high-oil-temperature sensor or short-circuited low-oil-temperature sensor	
21		Open-circuited kickdown servo switch	• Check kickdown servo switch connector. • Check kickdown servo switch on bench.
22		Short-circuited kickdown servo switch	
23		Open-circuited ignition pulse pickup cable	• Check ignition pulse signal line.
24		Open-circuited or improperly adjusted accelerator switch	• Check accelerator switch connector • Check accelerator switch on bench. • Adjust accelerator switch.

12A0104
12A0107

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Code No.	Display Pattern	Item	Remedial Action
31		Open-circuited pulse generator A	• Check pulse generator A or B on bench. • Check vehicle-speed reed switch (chattering).
32		Open-circuited pulse generator B	
41		Open-circuited shift control solenoid valve A	• Check solenoid valve connector. • Check shift control solenoid valve A on bench.
42		Short-circuited shift control solenoid valve A	
43		Open-circuited shift control solenoid valve B	• Check solenoid valve connector. • Check shift control solenoid valve B on bench.
44		Short-circuited shift control solenoid valve B	
45		Open-circuited pressure control solenoid valve	• Check solenoid valve connector. • Check pressure control solenoid valve on bench.
46		Short-circuited pressure control solenoid valve	
47		Open-circuited damper clutch control solenoid valve	• Check solenoid valve connector. • Check damper clutch control solenoid valve on bench.
48		Short-circuited damper clutch control solenoid valve	
49		Defective damper clutch system	• Check damper clutch hydraulic circuit. • Check damper clutch control solenoid valve on bench. • Replace control unit.

12A0107
12A0105

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Code No.	Display Pattern	Item	Remedial Action
51		1 st speed shift not finish	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Rear clutch slipping
52		2nd speed shift not finish	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Rear clutch slipping • Kickdown brake slipping
53		3rd speed shift not finish	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • Front clutch slipping • Rear clutch slipping
54		4th speed shift not finish	• Check connectors of pulse generators A and B. • Check pulse generators A and B on bench. • End clutch slipping • Kickdown brake slipping
61		Short-circuited torque reduction request signal line or open-circuited torque reduction execution signal line	• Check torque reduction request signal line. • Check torque reduction execution signal line.
62		Open-circuited torque reduction request signal line	• Check torque reduction request signal line.
63		Short-circuited torque reduction execution signal line	• Check torque reduction execution signal line.

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FAIL-SAFE CODE DESCRIPTION

ode No.	Display Pattern	Item	Fail-safe	Related Self-Diagnosis
81		Open-circuited pulse generator A	Fixed at 3rd (D) or 2nd (2, L)	31
82		Open-circuited pulse generator B	Fixed at 3rd (D) or 2nd (2, L)	32
8	3 	Open- or short-circuited shift control solenoid valve A	Fixed at 3rd	41, 42
84		Open- or short-circuited shift control solenoid valve B	Fixed at 3rd	43, 44
85		Open- or short-circuited pressure control solenoid valve	Fixed at 3rd (D) or 2nd (2, L)	45, 46
86		Shift not finish	Fixed at 3rd (D) or 2nd (2, L)	51, 52 53, 54

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INSPECTION OF CONTROL SYSTEM

Check the control system by using the multi-use tester and following the procedure given below.

CONTROL SYSTEM INSPECTION TABLE

Check Item	Description		Possible Cause of Trouble (or Remedy)
	Condition	Criteria	
Throttle position sensor (TPS) • Data list • Item No. 11	Accelerator pedal fully released	0.4 – 1.0 V	• TPS is improperly adjusted if voltage is high when accelerator pedal is fully depressed or released. • TPS or circuit harness is defective if there is no change. • TPS or accelerator pedal cable is defective if change is not smooth.
	Accelerator pedal slowly depressed	Varies with throttle opening degree	
	Accelerator pedal fully depressed	4.5 – 5.0 V	
Oil temperature sensor • Data list • Item No. 15	Cold engine (before start)	Equivalent to outside temperature	• Defective oil temperature sensor or circuit harness
	Engine warming up	Gradually increases	
	After engine warming up	80 – 110°C	
Kickdown servo switch • Data list • Item No. 21	L range, idle	ON	• Improperly adjusted kickdown servo • Defective kickdown servo switch or circuit harness • Defective kickdown servo
	D range, 1st or 3rd speed	ON	
	D range, 2nd or 4th speed	OFF	
Ignition signal line • Data list • Item No. 23	N range, idle	650 – 900 rpm	• Defective ignition system • Defective ignition signal pickup circuit harness
	N range, 2,500 rpm (tachometer reading)	2,400 – 2,600 rpm	
Accelerator pedal switch • Data list • Iten No. 24	Accelerator pedal fully released	ON	• Improperly adjusted accelerator pedal switch • Defective accelerator pedal switch or circuit harness
	Accelerator pedal slightly depressed	OFF	
Idle switch • Data list • Item No. 25	Accelerator pedal fully released	ON	• Improperly adjusted TPS • Defective TPS or circuit harness
	Accelerator pedal slightly depressed	OFF	
Air conditioner relay signal • Data list • Item No. 26	D range, air conditioner idle-up	ON	• Defective air-conditioner power relay ON signal detection circuit harness
	D range, air conditioner idle OFF	OFF	
Transaxle gear position • Data list • Item No. 27	D range, idle	C	• Defective TCU • Defective acce lerator pedal switch circuit • Defective inhibitor switch circuit • Defective TPS circuit
	L range, idle	1ST	
	2 range, 2nd speed	2ND	
	D range, O/D OFF, 3rd speed	3RD	
	D range, O/D, 4th speed	4TH	
Pulse generator A • Data list • Item No. 31	D range, stop	0 rpm	• Defective pulse generator A or circuit harness • Defective pulse generator A shielded wire • External noise interference
	D range, 3rd speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
	D range, 4th speed, driven at 50 km/h (31 mph)	1,100 – 1,400 rpm	

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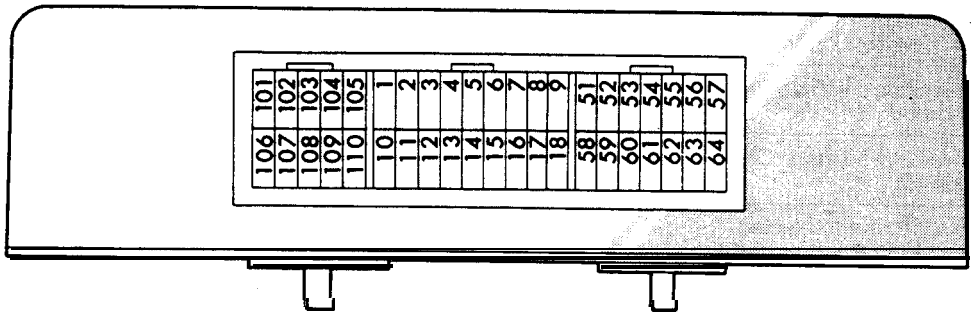
Check Item	Description		Possible Cause of Trouble (or Remedy)
	Condition	Criteria	
Pulse generator B • Data list • Item No. 32	D range, stop	0 rpm	• Defective pulse generator B or circuit harness • Defective pulse generator B shielded wire • External noise interference
	D range, 3rd speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
	D range, 4th speed, driven at 50 km/h (31 mph)	1,600 – 2,000 rpm	
Overdrive switch • Data list • Item No. 35	Overdrive switch in ON position	OD	• Defective overdrive switch or circuit harness
	Overdrive switch in OFF position	OD-OFF	
Power/economy select switch • Data list • Item No. 36	Power pattern selected (including economy pattern control with low oil temperature)	Power	• Defective power/economy select switch or circuit harness
	Economy pattern selected	Economy	
Inhibitor switch • Data list • Item No. 37	Shifted to P range	P	• Improperly adjusted inhibitor switch • Defective inhibitor switch or circuit harness • Defective manual control cable • If selector lever does not move, check shift lock mechanism.
	Shifted to R range	R	
	Shifted to N range	N	
	Shifted to D range	D	
	Shifted to 2 range	2	
	Shifted to L range	L	
Vehicle-speed reed switch • Data list • Item No. 38	Vehicle stationary	0 km/h (0 mph)	• Vehicle-speed reed switch is defective if a high-speed signal is output where vehicle is stationary. • Otherwise, vehicle-speed reed switch or circuit harness is defective.
	Driven at 30 km/h (19 mph)	30 km/h (19 mph)	
	Driven at 50 km/h (31 mph)	50 km/h (31 mph)	
PCSV duty • Data list • Item No. 45	D range, idle	50 – 70%	• Duty should become 100% when accelerator pedal is depressed even a little from D range idle conditions. • Defective TCU • Defective TPS circuit • Defective accelerator pedal switch circuit
	D range, 1st speed	100%	
	D range, gear being shifted	Depends on conditions	
Damper clutch slip • Data list • Item No. 47	D range, 3rd speed, 1,500 rpm (tachometer reading)	100 – 300 rpm	• Defective damper clutch • Defective ignition signal line or pulse generator B circuit • Incorrect transmission fluid pressure • Defective DCCSV
	D range, 3rd speed, 3,500 rpm (tachometer reading)	0 rpm	
DCCSV duty • Data list • Item No. 49	D range, 3rd speed, 1,500 rpm (tachometer reading)	0%	• Defective TCU • Defective TPS circuit • Defective pulse generator B circuit
	D range, 3rd speed, 3,500 rpm (tachometer reading)	Depends on loads	

TSB Revision

TRANSMISSION CONTROL UNIT

The connector has 42 pins to accommodate the increased number of sensor inputs. Here are the pin assignments.



TFA0360

101. Damper clutch control solenoid valve
102. Shift control solenoid valve A
103. –
104. Power source
105. Ground
106. Pressure control solenoid valve
107. Shift control solenoid valve B
108. Engine communication signal
109. Power source
110. Ground

1. Ground
2. –
3. Accelerator switch
4. –
5. Diagnosis output terminal
6. Air-conditioner relay signal
7. Engine communication signal
8. Diagnosis control terminal
9. Engine communication signal
10. Power source (backup)
11. Kickdown servo switch
12. Idle switch
13. –
14. Oil temperature sensor (Low temperature side)
15. Oil temperature sensor (High temperature side)
16. Throttle position sensor
17. Sensor ground
18. Vehicle-speed reed switch

51. Inhibitor switch (P)
52. Inhibitor switch (R)
53. Inhibitor switch (N)
54. Inhibitor switch (D)
55. Inhibitor switch (2)
56. Inhibitor switch (L)
57. Overdrive switch
58. Pulse generator B
59. Pulse generator B
60. Pulse generator A
61. Pulse generator A
62. Ground
63. Ignition pulse
64. Power mode signal

TSB Revision

ELEMENT IN USE AT EACH POSITION OF SELECTOR LEVER

Selector lever position	Overdrive control switch	Shifting gear	Gear ratio	Engine start	Parking mechanism	Clutch				Brake	
						C1	C2	C3	OWC	B1	B2
P	–	Neutral	–	Possible	•						
R	–	Reverse	2.176			•					•
N	–	Neutral	–	Possible							
D	ON	1st	2.551				•		•		
		2nd	1.488				•			•	
		3rd	1.000			•	•	•			
		OD	0.685					•		•	
D	OFF	1st	2.551				•		•		
		2nd	1.488				•			•	
		3rd	1.000			•	•	•			
2	–	1st	2.551				•		•		
		2nd	1.488				•			•	
L	–	1st	2.551				•				•

NOTE
Cl Front clutch
C2 . Rear clutch
C3 End clutch
B1. . . **Low reverse brake**
B2 . . Kickdown **brake**
OWC One way clutch

SHIFT PATTERNS

Two shift patterns are pre-stored in the control unit of this transaxle. One is the power pattern (for more powerful performance), and the other is the economy pattern (for improved fuel consumption and quieter operation).
The driver can select and switch to the desired pattern by using the power/economy select switch on the center console.
The solid **lines shown in these shift patterns indicate up-shifts,** and the broken lines indicate down-shifts. The reason why there is a difference between the shift points for upshifts and for down-shifts is so that up-shifts and down-shifts will not occur frequently when driving at a speed in the vicinity of the shift point.
When the vehicle is stopped, there is a shift to 2nd gear in order to obtain a suitable "creeping", but when the accelerator pedal is then depressed the vehicle starts off in 1st gear.

TSB Revision

INSPECTION OF ELECTRONIC CONTROL SYSTEM COMPONENTS

1. Wiring

→ Based on the wiring diagram. check whether the continuity and grounding of each harness is OK.

→ No continuity → Improper connection of connector, damaged or disconnected harness, or incorrect wiring connection.

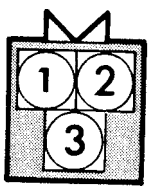
→ Reconnect the connector; repair or replace the harness.

Based on the wiring diagram. check whether the continuity and grounding of each harness is OK.

→ Continuity

→ Normal

2. Oil-temperature sensor



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1: Low temperature side
2: Ground
3: High temperature side

→ Vary the thermo-sensitive part from low temperature to high temperature and check the resistance between the terminals 1 and 2 or 2 and 3.

→ No continuity (resistance: ∞) → Damaged or disconnected wiring

→ Replace the oil-temperature sensor

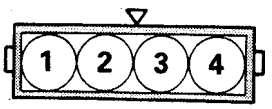
Vary the thermo-sensitive part from low temperature to high temperature and check the resistance between the terminals 1 and 2 or 2 and 3.

→ Changes of the resistance continuous and smooth.

→ Normal

3. Throttle-position sensor (TPS)

TPS terminal



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1. Ground
2. Idle switch
3. output
4. Power

→ Check the resistance between terminals 1 and 4 of the TPS.

→ Resistance: high or infinite → Damaged or disconnected wiring

→ Replace the TPS.

Check the resistance between terminals 1 and 4 of the TPS.

→ 3.5 – 6.5 kΩ/20°C (68°F)

→ Check the resistance between terminals 4 and 2 with the engine idling after throttle-valve opening warm-up.

→ Resistance: more or less than 0.4 kΩ/ 20°C (68°F) → Improper adjustment

→ Readjust the TPS installaiion.

Check the resistance between terminals 4 and 2 with the engine idling after throttle-valve opening warm-up.

→ Resistance: approx. 0.4 kΩ/ 20°C (68°F)

→ Check for changes of the resistance between terminals 4 and 2 when the throttle valve is operated from the idling position to the fully open position.

→ Changes of the resistance are not continuous. → Poor contact

→ Replace the TPS.

Check for changes of the resistance between terminals 4 and 2 when the throttle valve is operated from the idling position to the fully open position.

→ Changes of the resistance continuous and smooth.

→ Normal

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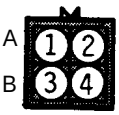
4. Pulse generator A or B

Check the resistance between terminals 1 and 2 or 3 and 4.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the pulse generator.

215–275 Ω/20°C (68°F) → Normal

Pulse generator terminals
1-2: pulse generator A
3-4 pulse generator B



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5. Pulse generator A or B (checking by an oscilloscope)

Connect the pulse generator and body harness, and connect an oscilloscope. Check with the chassis on a dynamo or with the front wheels raised.

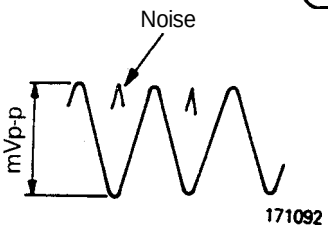
With the selector lever at the "L" position and the engine running at 1,000 rpm, check the voltage waveform between terminals 1 and 2.

Very low voltage → Incorrect installation of the pulse generator, or malfunction of the pulse generator. → Correct the installation condition, or replace the pulse generator.

Noise in the waveform → Improper grounding of the pulse generator circuit's shielded wiring. → Replace the pulse generator.

1,000 mVp-p or higher

Oscilloscope waveform



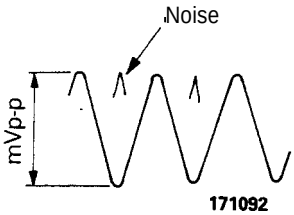
171092

With the selector lever at the "L" position and the engine running at 1,000 rpm. check the voltage waveform between terminals 3 and 4.

Very low voltage → Incorrect installation of the pulse generator, or malfunction of the pulse generator. → Correct the installation condition. or replace the pulse generator,.

Noise in the waveform → Improper grounding of the pulse generator circuit's shielded wiring. → Replace the pulse generator.

500 mVp-p or higher



171092

Normal

TSB Revision

6. Pressure-control solenoid valve (PCSV)

Check the resistance between terminal 1 of the solenoid valve connector and the transaxle case.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring

2.9 ± 0.3Ω/20°C (68°F)

Connect 12V between the transaxle case and terminal 2; switch ON and OFF and check for operation noise.

No operation noise. (stroke: 0.3 mm (.012 in.) or less) → Foreign material caught between the valve and guide → Replace the PCSV.

Noise exists.

Normal

Replace the PCSV.

Solenoid valve connector terminals

1 : PCSV
2: DCCSV
3: SCSV-A
4: SCSV-B

1750338

7. Shift-control solenoid valve (SCSV) A or B

Check the resistance between terminal 3 or 4 of the solenoid valve connector and the transaxle case.

Resistance: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the SCSV.

22.3 ± 1.5Ω/20°C (68°F)

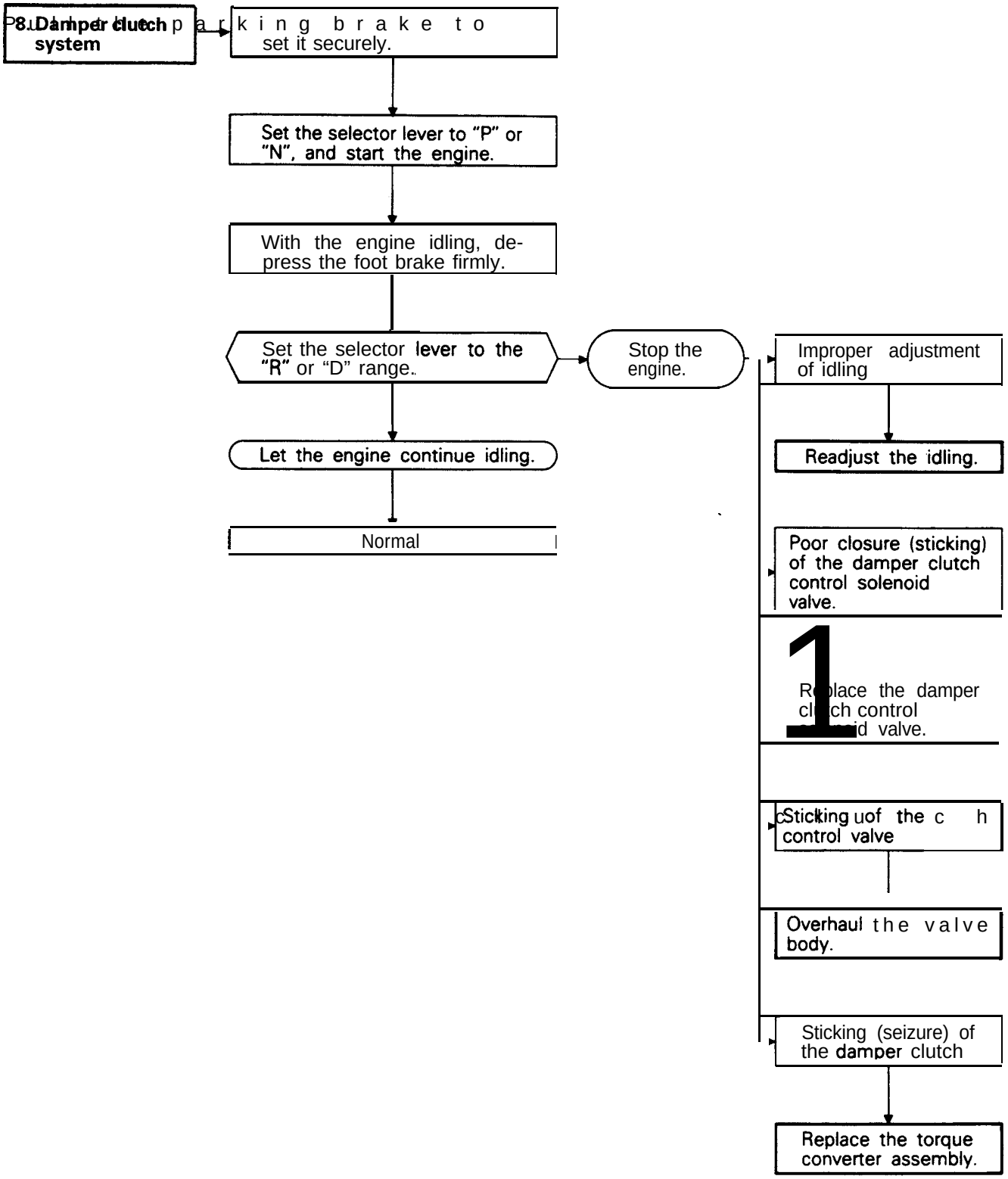
Connect 12V between the transaxle case and terminal 3 or 4; switch ON and OFF and check for operation noise of the solenoid valve, and check the valve stroke.

No operation noise. (stroke: 0.25 mm (.010 in.) or less) → Residue accumulated in valve and core. → Replace the SCSV.

Noise exists.

Normal

TSB Revision



TSB Revision

9. Damper clutch control solenoid valve (DCCSV)

Check the resistance between terminal 2 of the solenoid valve connector and the transmission case.

- **Resistance**: too low or too high → Short-circuit, or damaged or disconnected wiring → Replace the DCCSV.
- **Standard value: 3 Ω/20%**

Solenoid valve connector terminals

1 : PCSV
2: DCCSV
3: SCSV-A
4 : SCSV-B

1750338

Connect 12 V between the transmission case and terminal 2; switch ON and OFF and check for operation noise.

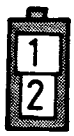
- **Noise exists.** → No operation noise. Check for sticking. * (Valve stroke: 0.3 mm (.012 in.) or less) → Foreign terminal caught between the valve and guide → Replace the DCCSV.
- Normal

*Sticking is usually at the release side.

10. Accelerator switch

With the accelerator pedal not depressed, check the resistance between terminals 1 and 2.

- No continuity (resistance: ∞) → Check the installation of the accelerator switch; adjust if necessary. → Problem not solved. → Replace the accelerator switch.
- Continuity exists (resistance: 0)



171096

With the accelerator pedal depressed slightly (about 5%), check the resistance between terminals 1 and 2.

- Continuity exists (resistance: 0) → (Check the installation of the accelerator switch; adjust if necessary.)
- No continuity (resistance: ∞)

Normal

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11. Inhibitor switch

1750339

In the "P" range, check for continuity between terminals 3 and 4, and terminals 8 and 9.

Continuity exists

In the "R" range, check for continuity between terminals 4 and 7, and terminals 10 and 11.

Continuity exists

In the "N" range, check for continuity between terminals 2 and 4, and terminals 8 and 9.

Continuity exists

In the "D" range, check for continuity between terminals 4 and 6.

Continuity exists

In the "2" range, check for continuity between terminals 1 and 4.

Continuity exists

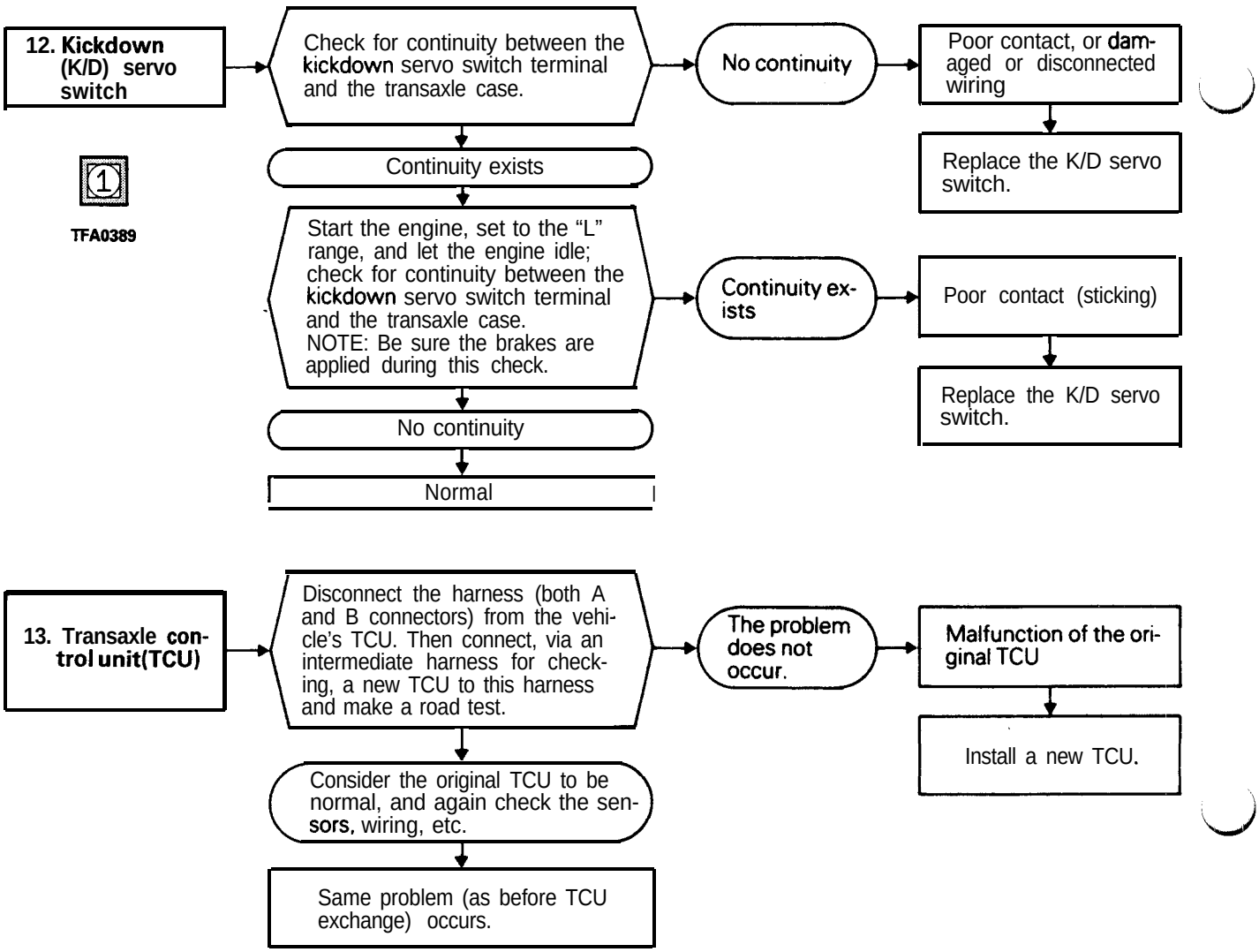
In the "L" range, check for continuity between terminals 4 and 5.

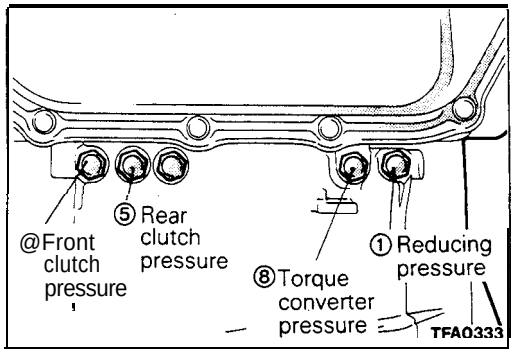
Continuity exists

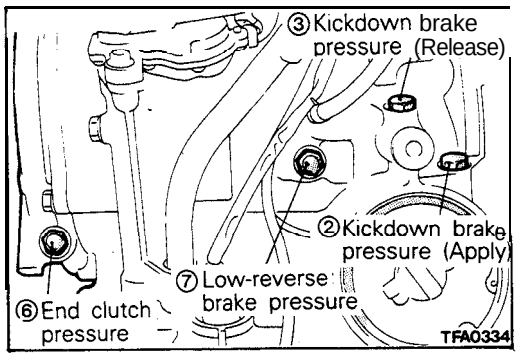
Normal

No continuity → Poor contact, or damaged or disconnected wiring.

Replace the inhibitor switch.


12. Kickdown (K/D) servo switch
Check for continuity between the kickdown servo switch terminal and the transaxle case.
No continuity
Poor contact, or damaged or disconnected wiring
Replace the K/D servo switch.
Continuity exists
Start the engine, set to the "L" range, and let the engine idle; check for continuity between the kickdown servo switch terminal and the transaxle case.
NOTE: Be sure the brakes are applied during this check.
Continuity exists
Poor contact (sticking)
Replace the K/D servo switch.
No continuity
Normal
1
TFA0389
13. Transaxle control unit(TCU)
Disconnect the harness (both A and B connectors) from the vehicle's TCU. Then connect, via an intermediate harness for checking, a new TCU to this harness and make a road test.
The problem does not occur.
Malfunction of the original TCU
Install a new TCU.
Consider the original TCU to be normal, and again check the sensors, wiring, etc.
Same problem (as before TCU exchange) occurs.





OIL PRESSURE TESTS

1. Completely warm up the transaxle.
2. Raise the vehicle by using a jack so that the front 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 (MD998330-01) and the adaptor (MD998332-01) to each oil-pressure outlet port. When the reverse 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" on the next page.

STANDARD OIL PRESSURE TABLE

No	Conditions			Standard oil pressure kPa (psi)							
	Select lever position	Engine speed rpm	Gear position	① Reducing pressure	② K/D brake pressure (application)	③ K/D 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 (51 – 68)							☆
2	D	Idling	2nd	360 – 480 (51 – 68)	100 – 210 (14 – 30)			730 – 830 (104 – 118)			☆
3	D (SW-ON)	Approx. 2,500	4th	360 480 (51 – 68)	830 – 900 (118 128)				830 900 (118 128)		450 - 650 (64 92)
4	D (SW-OFF)	Approx. 2,500	3rd	360 – 480 (51 – 68)	830 – 900 (118 128)	830 – 900 (118 – 128)	830 – 900 (118 – 128)	830 – 900 (118 128)	830 900 (118 128)		450 – 650 (64 – 921
5	2	Approx. 2,500	2nd	360 – 480 (51 – 68)	830 – 900 (118 – 128)			830 – 900 (118 – 128)			450 650 (64 – 92)
6	L	Approx 1,000	1 st	360 480 (51 – 68)				830 - 900 (118 - 128)		300 – 450 (43 - 64)	☆
7	R	Approx. 2,500	Reverse	360 480 (51 - 68)		1,640 2,240 (233 – 319)	1,640 2,240 (233 319)			1,640 – 2,240 (233 319)	450 - 650 (64 -92)
		Approx. 1,000	Reverse	360 – 480 (51 – 68)		1,500 (213) or more	1,500 (213) or more			1,500 (213) or more	450 – 650 (64 – 92)

NOTE
(1) –: Indicates pressure is below 10 kPa (1.4 psi).
(2) SW-ON: OD switch in ON position.
(3) SW-OFF: OD switch in OFF position.
(4) ☆: Pressure is not standard.

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REMEDIAL ACTION TO TAKE FOR INADEQUATE OIL PRESSURE

Symptom	Possible cause	Remedy
1. All line pressures are low (or high). NOTE: Line pressures are ②, ③, ④, ⑤, ⑥ and ⑦ shown on the Standard Oil Pressure Table on the preceding page.	a. Plugged oil filter b. Improperly adjusted regulator valve line pressure c. Defective valve body assembly d. Valve body left loose e. Improper oil pump delivery. pressure	a. Visually check oil filter and replace it if plugged. b. Measure line pressure ② (KID brake pressure) and readjust line pressure if it is out of specifications. Or, replace valve body assembly. c. Replace valve body assembly. d. Torque valve body clamp bolt and mounting bolt to specification. e. Check oil pump gear side clearance and replace oil pump assembly as necessary.
2. Improper reducing pressure	a. Plugged reducing pressure circuit filter (L-shaped) b. Improperly adjusted reducing pressure c. Defective valve body assembly	a. Disassemble valve body assembly to check filter and replace filter if it is plugged. b. Measure reducing pressure @and readjust as necessary. c. Replace valve body assembly.
3. Improper K/D brake pressure (application)	a. Defective seal ring Ⓐ and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly.
4. Improper K/D brake pressure (release)	a. Defective seal ring Ⓐ and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly.
5. Improper front clutch pressure	a. Defective seal ring @and D-ring Ⓑ of K/D servo piston and seal ring Ⓒ of sleeve b. Defective valve body assembly c. Worn front clutch piston and retainer or defective D-ring Ⓓ or seal ring Ⓔ	a. Disassemble K/D servo and check seal ring and D-ring for damage. Replace seal ring or D-ring if damaged or scratched. b. Replace valve body assembly. c. Disassemble transaxle and check front clutch piston and retainer for wear and D-ring and seal ring for damage. Replace piston, retainer, D-ring, or seal ring as necessary.
6. Improper rear clutch pressure	a. Defective D-ring Ⓕ of piston, seal ring Ⓖ of retainer, and seal ring Ⓗ and D-ring Ⓘ of input shaft b.Defective valve body assembly	a. Disassemble rear clutch and check input shaft D-ring, center support seal ring, and piston D-ring; replace if damaged or scratched. b. Replace valve body assembly.
7. Improper end clutch pressure	a. Defective seal ring Ⓙ, D-ring Ⓚ, and oil seal Ⓛ of end clutch b. Defective valve body assembly	a. Disassemble the end clutch and check piston oil seal, D-ring, and center support seal ring; replace if damage or scratches are evident. b. Replace valve body assembly.
8. Improper low-reverse brake pressure	a. Damaged O-ring between valve body and transmission b. Defective valve body assembly c. Defective D-ring Ⓜ of piston or O-ring Ⓝ of center support	a. Remove valve body assembly and check O-ring on top of upper valve body; replace if damage or scratches are evident. b. Replace valve body assembly. c. Disassemble transaxle and check D-ring and O-ring; replace if damage or scratches are eviden
3. Improper torque converter pressure	a. Sticking damper clutch control solenoid valve (DCCSV) or damper clutch control valve b. Plugged or leaky oil cooler and pipings c. Damaged seal ring Ⓞ of input shaft d. Defective torque converter	a. Check damper clutch system and DCCSV for operation. b. Repair or replace cooler or pipings. c. Disassemble transaxle and check seal ring; replace if it is damaged. d. Replace torque converter.

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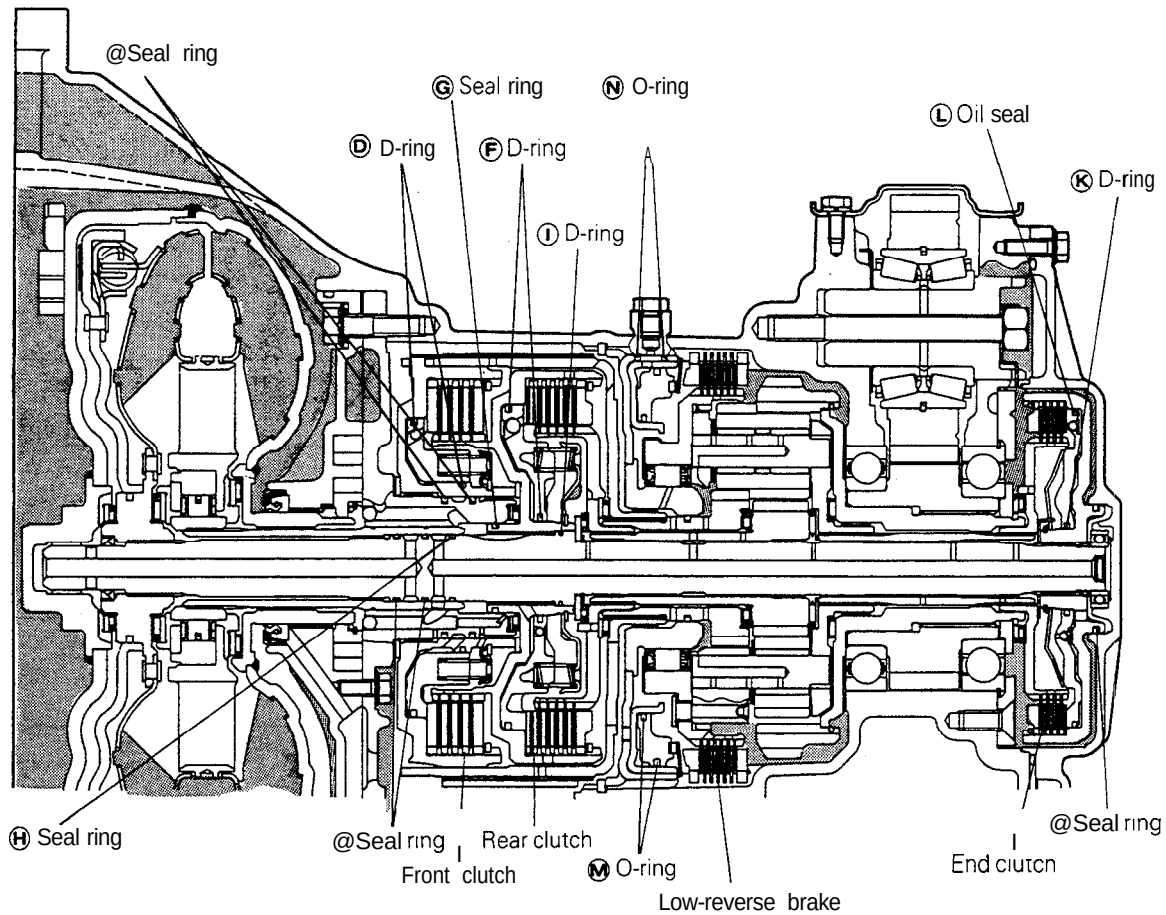

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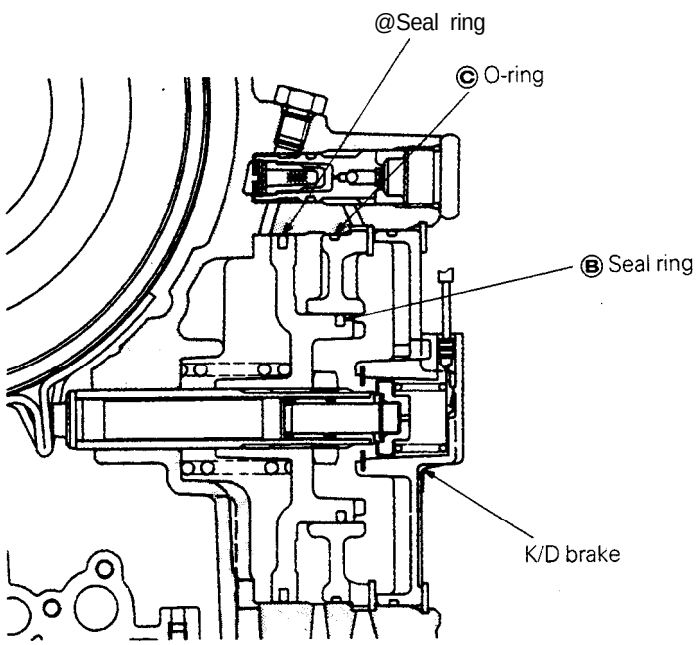

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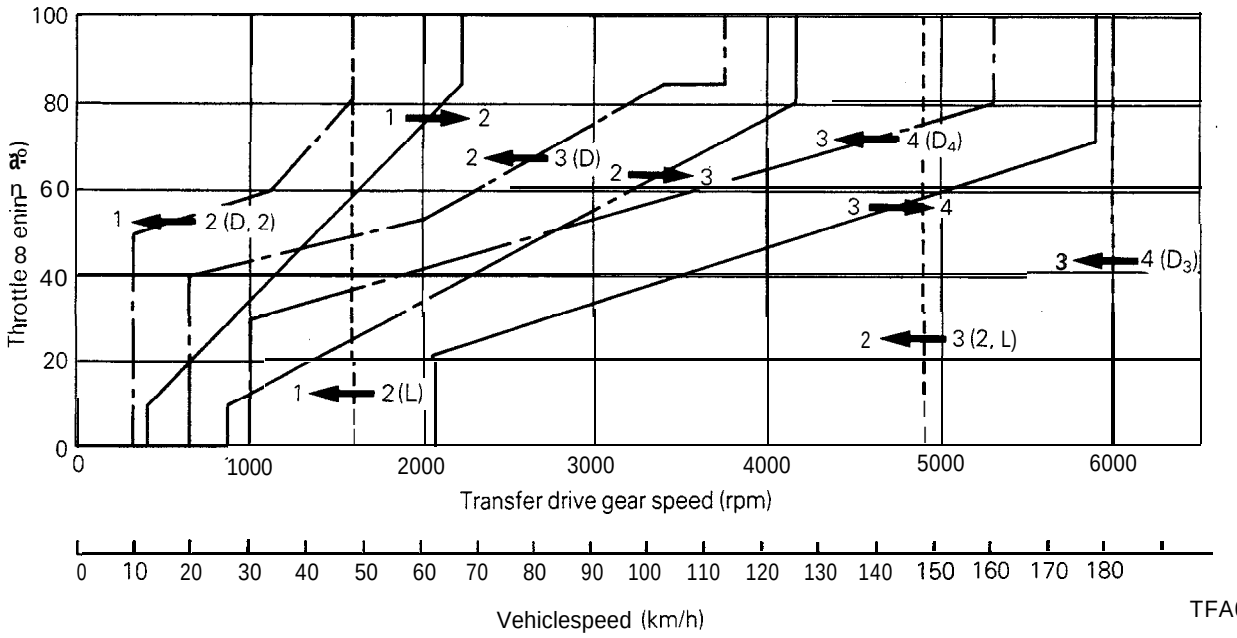
TSB Revision

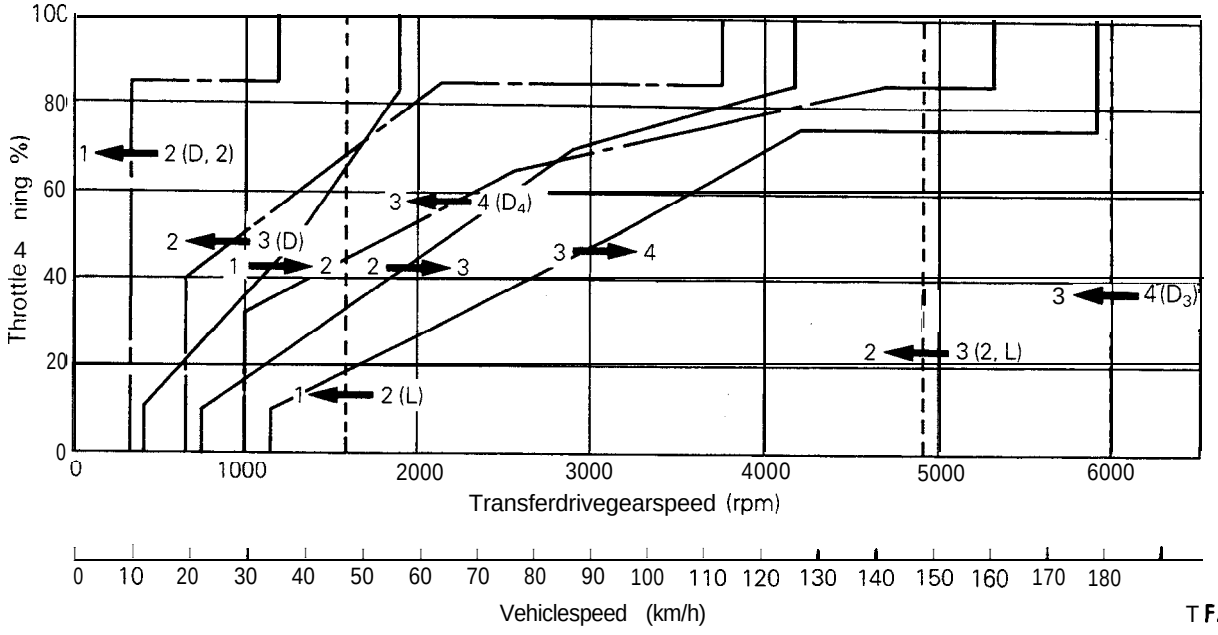
SHIFT PATTERNS

P range



TFA0570

E range



TFA0571

TSB **Revision**

CONVERTER STALL TEST

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 transaxle clutches and low-reverse brake.

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

1. Check transaxle 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 rpm in neutral for 2 minutes to cool transaxle fluid between tests.

   Stall speed: 2,200 – 3,200 rpm

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 transaxle 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 transaxle or low-reverse brake is slipping. In this case, perform hydraulic test to locate cause of slippage.

Stall Speed Below 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.

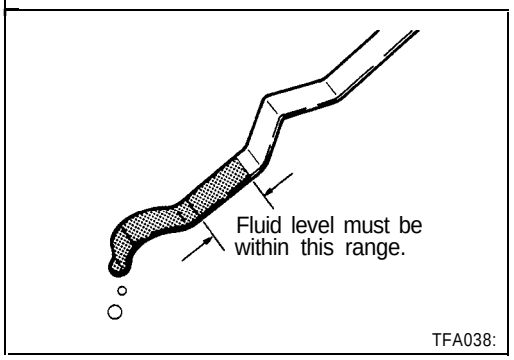
TRANSAXLE CONTROL

Symptom	Probable cause	Remedy
Selector lever operation is stiff	Incorrect adjustment of sleeve	Adjust
	Incorrect adjustment of control cable	Adjust
	Excessive wear of detent plate	Replace
	Worn contact surfaces of pushbutton and sleeve	Replace
Starter motor does not operate with the selector lever in the "N" or "P" position	Malfunction in inhibitor switch	Replace
	Incorrect adjustment of control cable	Adjust
	Malfunction of starter relay	Replace
Will not shift to 4-speed	Malfunction of OD switch	Replace

A/T SAFETY-LOCK SYSTEM TROUBLESHOOTING

Symptom	Probable cause	Remedy	Ref. page
Selector lever can be selected into R from P without depressing brake pedal with ignition key in a position other than LOCK.	Damaged lock cam B	Check and replace lock cam B.	23-58
	Improperly adjusted shift lock cable, broken inner cable, loose or off connections	Check, adjust or replace the shift lock cable.	23-56
	Broken or sagging outer cable (shift lock cable) return spring	Check and replace shift lock cable.	23-55
Selector lever cannot be selected into R from P by depressing brake pedal with ignition key in position other than LOCK.	Defective selector lever assembly	Check and replace selector lever assembly.	23-54
	Sticking shift lock cable, key interlock cable, and transaxle control cable	Check and replace shift lock cable, key interlock cable, and transaxle control cable.	23-54
	Foreign matter wedged in lock cams A and B	Check and adjust lock cams A and B.	23-58
	Improperly adjusted shift lock cable, elongated inner cable	Check, adjust, and replace shift lock cable.	23-55
	Sticking slide lever and cam lever inside key cylinder	Check and adjust slide lever and cam lever.	23-55
Selector lever can be selected into R from P when brake pedal is depressed even though the ignition key is in the LOCK position.	Damaged lock cam A	Check and replace lock cam A.	23-58
	Broken or disconnected key interlock cable	Check and replace key interlock cable.	23-55
	Damaged slide lever and cam lever inside key cylinder	Check and replace slide lever and cam lever.	23-55
Selector lever operation from P to R is not smooth.	Improperly adjusted key interlock cable	Check and adjust key interlock cable.	23-57
	Improperly adjusted shift lock cable, elongated inner cable	Check, adjust, and replace shift lock cable.	23-55
	Binding lock cams A and B (in rotation)	Check rotating parts of lock cams A and B.	23-58
	Defective selector lever assembly	Check and replace selector lever assembly.	23-54
	Binding slide lever inside key cylinder	Check slide lever and cam lever.	23-55

Symptom	Probable cause	Remedy	Ref. page
Selector lever cannot be shifted from R to P.	Defective selector lever assembly	Check and replace selector lever assembly.	23-54
	Improperly adjusted transaxle control cable	Adjust transaxle control cable.	23-56
Ignition key cannot be turned to LOCK position with selector lever in P.	Foreign matter wedged in lock cams A and B	Check and replace lock cams A and B.	23-58
	Improperly adjusted key interlock cable, sticking inner cable	Check, adjust, and replace key interlock cable.	23-55
	Binding slide lever inside key cylinder	Check slide lever.	23-55
Ignition key can be turned to LOCK position even with selector lever in position other than P.	Damaged lock cam A	Check and replace lock cam A.	23-58
	Loose key cylinder cover	Check and retighten cover.	23-55
	Broken key interlock cable, loose connections, elongated inner cable	Check and replace key interlock cable.	23-55
	Damaged cam lever inside key cylinder	Check and replace cam lever.	23-55
Buzzer does not sound even when selector lever is placed in R position.	Defective buzzer	Check and replace buzzer.	23-55
	Open-circuited buzzer circuit harness	Check or correct harness.	–
	Defective inhibitor switch	Check and replace inhibitor switch.	–
	Improperly adjusted transaxle control cable	Adjust transaxle control cable.	23-52



SERVICE ADJUSTMENT PROCEDURES

M23FBBJ

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 transaxle 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: MITSUBISHI PLUS ATF/Automatic transmission fluid "DEXRON" or "DEXRON II"

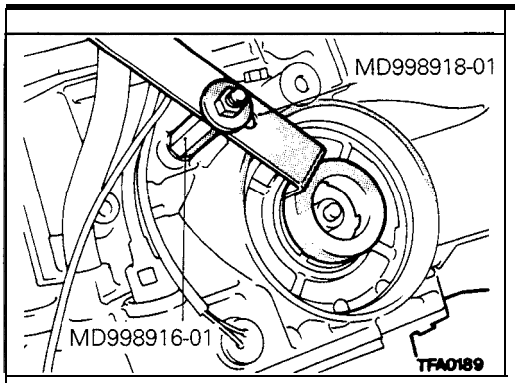
   Low fluid level can cause a variety of conditions because it allows pump to take in air along with fluid. Air trapped in hydraulic circuit forms bubbles which make fluid spongy. Therefore, pressures will be erratic, causing delayed shift, slippy clutch and brakes, etc.
   Improper filling can also raise fluid level too high. When transaxle 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 transaxle 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 transaxle vent where it may be mistaken for a leak.
6. Be sure to examine fluid on dipstick closely.

TRANSMISSION FLUID REPLACEMENT

M23FCBH

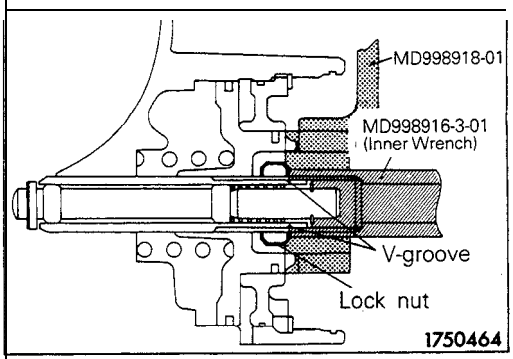
Refer to GROUP 00 – Maintenance Service.

KICKDOWN SERVO ADJUSTMENT M23FRAC

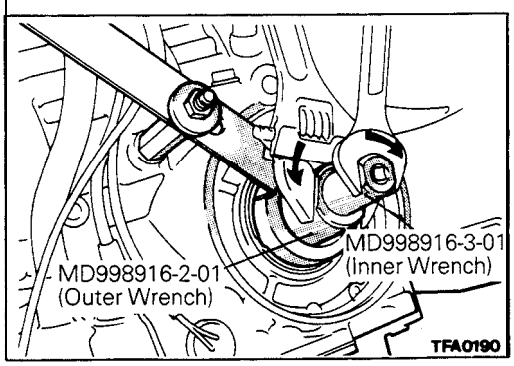


(1) Remove dust, dirt, and other contaminants completely from kickdown (K/D) servo cover and surrounding areas.
(2) Snap off the snap ring and remove K/D servo switch.
(3) Fit claw of special tool into cutout in piston to prevent piston from turning and use adapter to fix the piston into position.

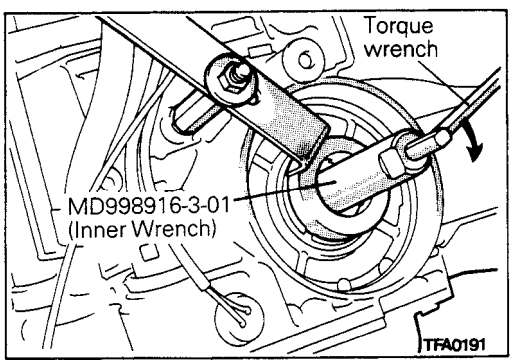
Caution
1. Do not push piston with the special tool.
2. Secure adapter only hand-tight to L/R brake pressure take-up port and do not apply excessive torque.



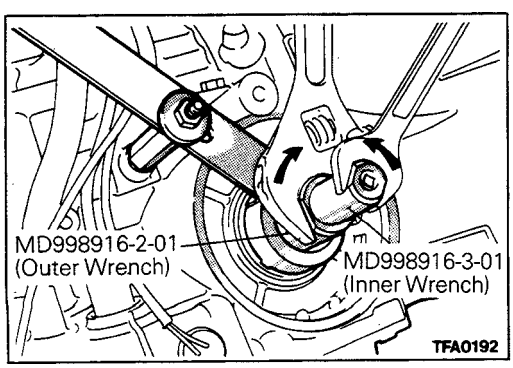
(4) Loosen lock nut to immediately before V-groove in adjust rod (see illustration on left) and tighten special tool (Inner Wrench) until it contacts lock nut.



(5) Fit special tool (Outer Wrench) over the lock nut. Turn Outer Wrench counterclockwise and turn inner cylinder clockwise to lock the lock nut and special tool (Inner Wrench).



(6) Fit torque wrench to special tool (Inner Wrench) and repeat tightening and loosening cycle two times with a torque of 10 Nm (7.2 ft.lbs.). Then, torque to 5 Nm (3.6 ft.lbs.). Next, back off special tool (Inner Wrench) 2 to 2¼ turns.



(7) Fit special tool (Outer Wrench) to lock nut.
Turn Outer Wrench clockwise and Inner Wrench counterclockwise to unlock the lock nut from special tool (Inner Wrench).

Caution
Be sure to apply even torque to the two special tools when unlocking.

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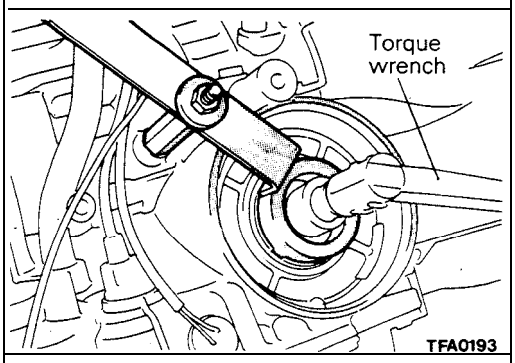


(8) Tighten lock nut by hand until it contacts piston. Then, using torque wrench, tighten to specification.

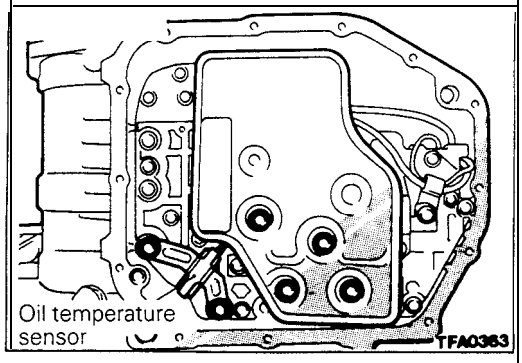
Lock nut: 29 Nm (21 ft.lbs.)

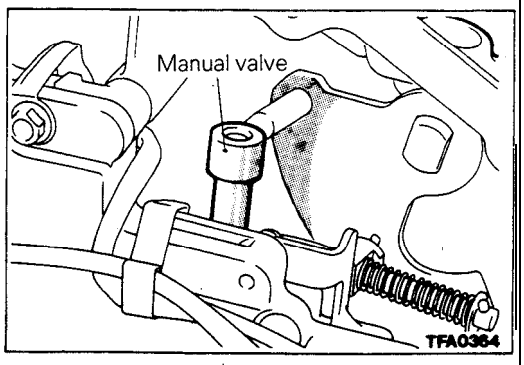
Caution
Use of socket wrench or torque wrench could result in lock nut being turned with adjust rod.

(9) Remove the special tool to secure the piston and torque plug to specification at L/R brake pressure take-up port.

LINE PRESSURE ADJUSTMENT M23FSAC

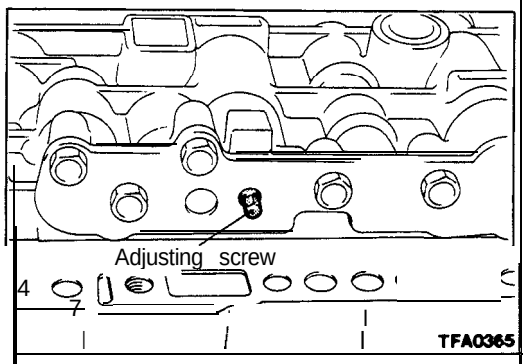
(1) Discharge AFT.
(2) Remove oil pan.
(3) Remove oil filter.
(4) Remove oil temperature sensor.





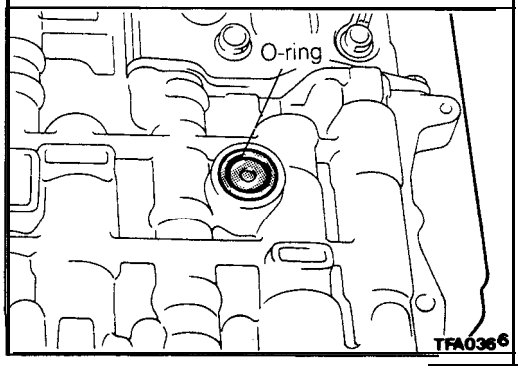
(5) Press solenoid valve harness grommet catch to push in grommet; then, remove valve body assembly.

Caution
Do not let manual valve fall.

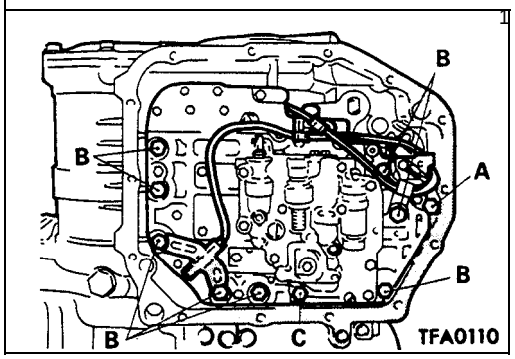


(6) Turn adjusting screw of regulator valve to obtain the specified line pressure (K/D brake pressure).

Standard value: 870 – 890 kPa (124 – 127 psi)
Oil pressure change for each turn of adjustment screw: 38 kPa (54 psi)



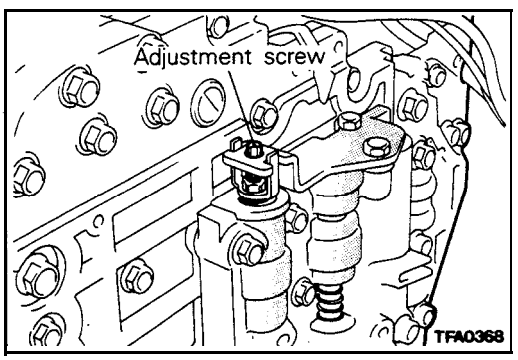
(7) Check that an O-ring is fitted at the location shown on top off valve body.
(8) Replace O-ring of solenoid valve intermediate grommet with a new one and then fit the O-ring into case.



(9) Install valve body and oil temperature sensor.
Bolt A = Length 18 mm (.709 in.)
Bolt B = Length 25 mm (.984 in.)
Bolt C = Length 40 mm (1.575 in.)

Caution
Secure solenoid valve and oil temperature sensor harness at locations shown.

(10) Install oil filter.
(11) Install new oil pan gasket and oil pan.
(12) Add the specified amount of ATF.
(13) Carry out hydraulic test.
Readjust as necessary.



REDUCING PRESSURE ADJUSTMENT M23FTAD

When multi-use tester is not used

(1) Following the same steps as those in line pressure adjustment, remove parts up to oil filter.
There is no need to remove valve body.
(2) Turn adjusting screw of lower valve body to obtain the specified reducing pressure. Turn it counterclockwise to increase the pressure.

Standard value: 425 ± 10 kPa (60 ± 1 psi)
Oil pressure change for each turn of adjusting screw: 45 kPa (6 psi)

(3) In the same way as in line pressure adjustment, install oil filter and oil pan.
(4) Perform hydraulic test.
Adjust as necessary.

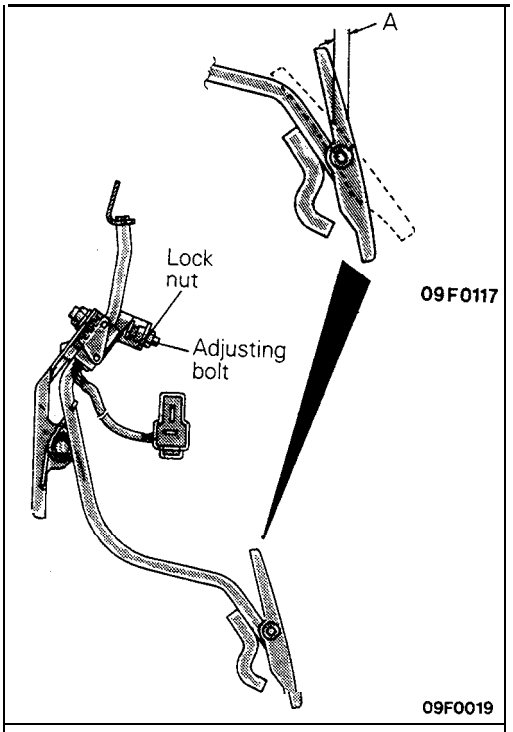
When multi-use tester is used

(1) Adjust to obtain the specified K/D brake pressure when PC solenoid is energized at duty 50% with the multi-use tester.

Standard value: 275 kPa (39 psi)
Oil pressure change for each turn of adjusting screw: 50 kPa (7 psi)

(2) After adjustment has been made, check that the recuding pressure is in the range 360 – 480 kPa (51 – 68 psi).

Caution
This adjustment should be made with oil temperature 70 – 80°C (160 – 180°F).
The adjustment made with high oil temperature could result in improper adjustment due to a line pressure drop at idle.

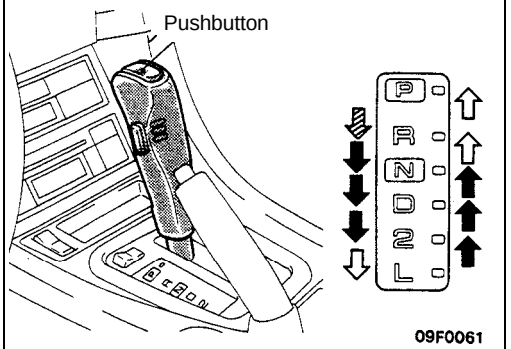


ACCELERATOR SWITCH INSPECTION AND ADJUSTMENT M23FZAA

Check that current flows between terminals of accelerator switch when accelerator pedal is in free state and that no current flows when the pedal is depressed and the specified stroke A is obtained.

Standard value: 2 – 6 mm (.079 – .24 in.)

'If stroke A is out of specification, adjust with adjusting bolt.

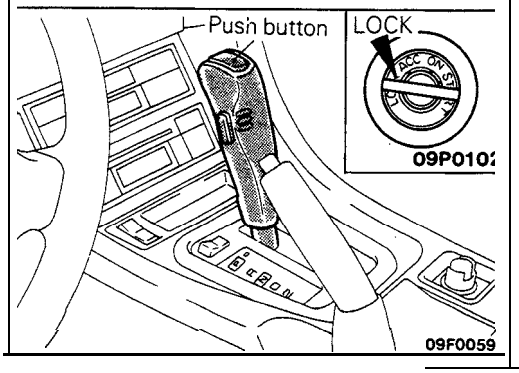


Button pressed (while brake pedal is depressed)
Button not pressed
Button pressed

SELECTOR LEVER OPERATION CHECK M23FIAG

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.

NOTE
To move the selector lever from the "P" position to any other position, first turn the ignition key to any position other than "LOCK" and depress the brake pedal.

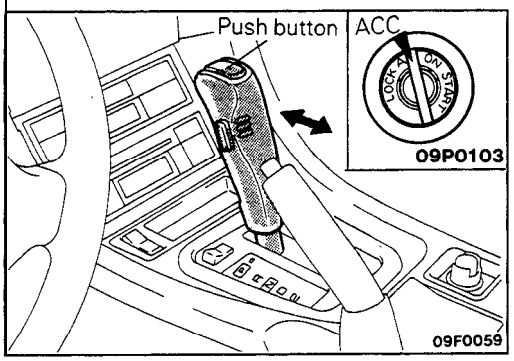


KEY INTERLOCK MECHANISM CHECK M23FUAC

Completely stop the vehicle and switch OFF the engine before making the check

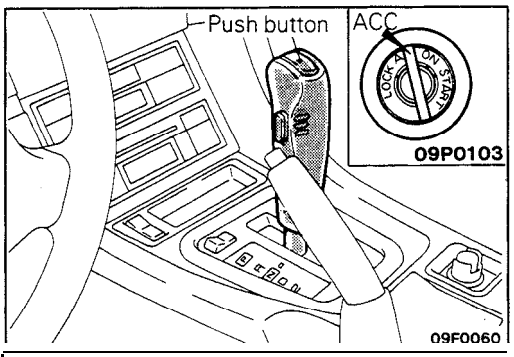
1. Check to be sure that, under the following conditions, the selector lever cannot be moved from the "P" position to any other position.
   Also check, at the same time, that the button cannot be pressed.

   Ignition key position: "LOCK" or removed
   Brake pedal: Depressed

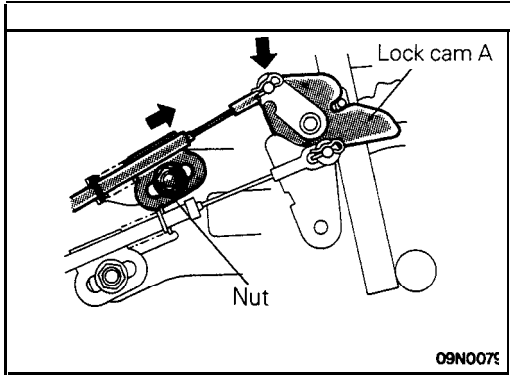


2. Check to be sure that, under the following conditions, the selector lever can be moved from the "P" position to any other position.
   Press the button a few times and check to be sure that the selector lever moves smoothly.

   Ignition key position: "ACC"
   Brake pedal: Depressed
   Button : Pressed



3. Check to be sure that, at all positions of the selector lever (other than "P"), the ignition key cannot be turned to the "LOCK" position.
   Check to be sure that the ignition key smoothly turns to the "LOCK" position when the selector lever is then set to the "P" position and the button is released.
4. If above are not checked okay, adjust key interlock cable mechanism as follows.
   (1) Remove front console assembly.
   (2) Place selector lever into "P" position.
   (3) Turn ignition key to the "LOCK" position.
   (4) Loosen nut that secures key interlock cable.
   (5) Lightly pressing lock cam A in the direction of arrow, lightly push key interlock cable to take up slack and tighten nut to secure key interlock cable.
   (6) Reinstall front console assembly.



SHIFT LOCK MECHANISM CHECK M23FVAC

1. Check to be sure that, under the following conditions, the selector lever cannot be moved from the "P" position to any other position.

   Ignition key position: "ACC"
   Brake pedal: Not depressed
   Button: Pressed

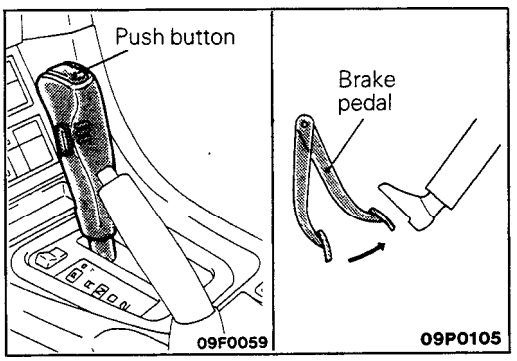
2. Check to be sure that, under the following conditions, the selector lever can be moved smoothly from the "P" position to other position.

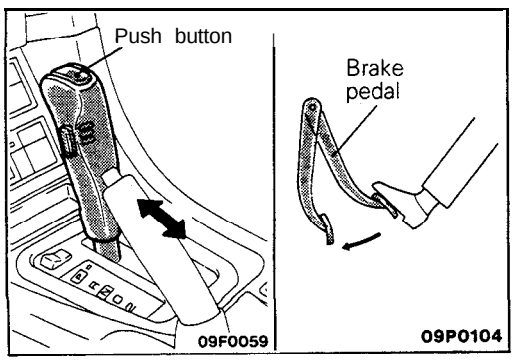
   Ignition key position: "ACC"
   Brake pedal : Depressed
   Button: Pressed

3. Check to be sure that, under the following conditions, the selector lever can be moved smoothly from the "R" position to the "P" position.

   Ignition key position: "ACC"
   Brake pedal: Released
   Button: Pressed

4. If a malfunction is discovered when following the above checking procedures, either adjust or check the shift lock cable mechanism. (Refer to P.23-56.)





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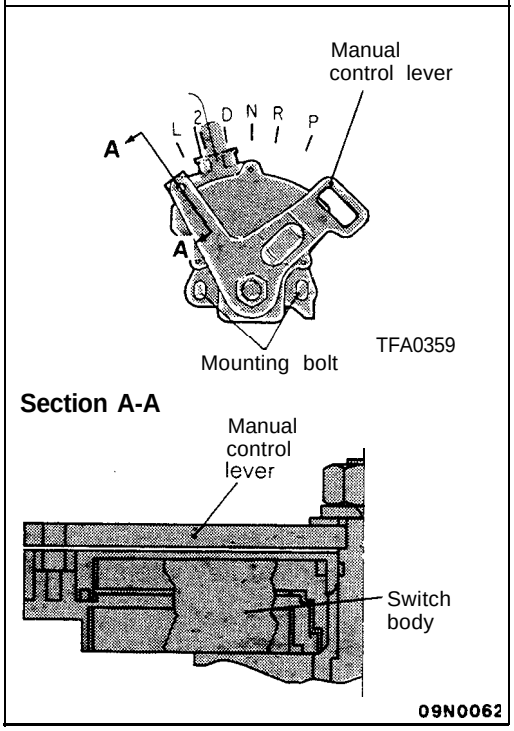
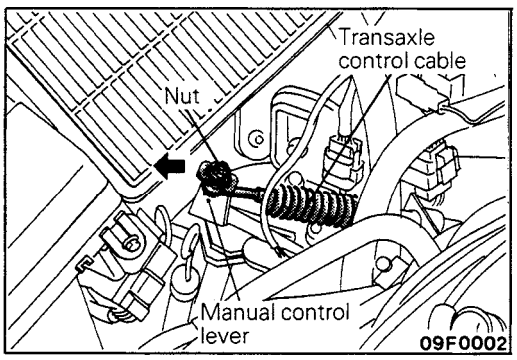


INHIBITOR SWITCH AND CONTROL CABLE ADJUSTMENT M23FJAD

1. Place selector lever in "N" (Neutral) position.
2. Place manual control lever in "N" (Neutral) position.
3. For adjustment, turn inhibitor switch body so that the end (section A-A in illustration on left) of manual control lever is aligned with the hole In inhibitor switch body flange.
4. Tighten the mounting bolts of the inhibitor switch body to the specified torque. At this time, take care to prevent dropping the switch body.

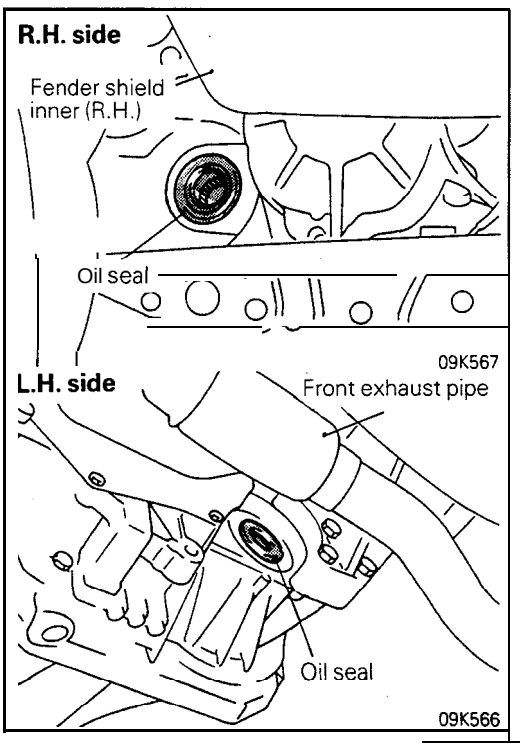
Specified torque: 10 – 12 Nm (7 – 9 ft.lbs.)



5. Loosen the nut shown in the figure, and lightly pull the end of the transaxle control cable in the direction of arrow by hand.
6. Tighten the nut to the specified torque.

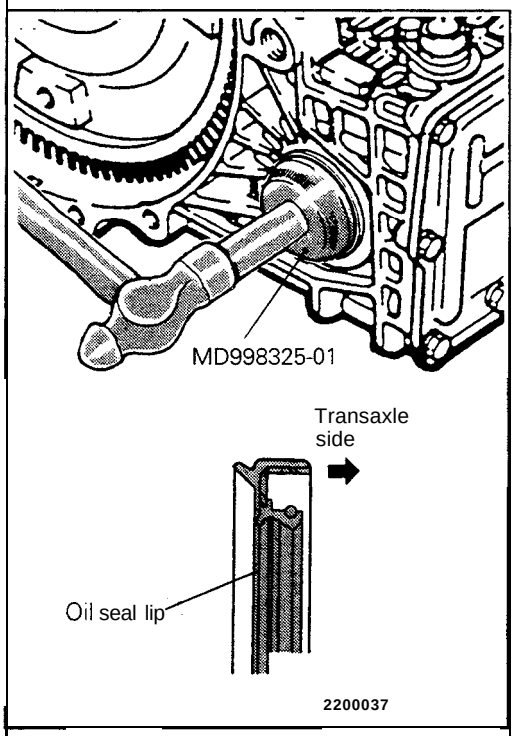
Specified torque: 13 Nm (9 ft.lbs.)

7. Check that the selector lever is in "N" position.
8. Check that it securely operates and functions on the transaxle side in the range which corresponds to each position of the selector lever.



DRIVE SHAFT OIL SEALS REPLACEMENT M23FDBD

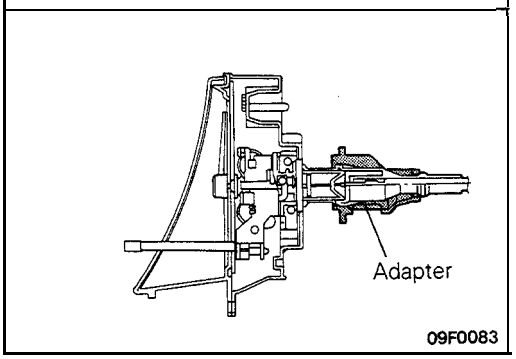
(1) Disconnect the drive shaft from the transaxle. (Refer to GROUP 26 – Drive Shaft.)
(2) Using-.a flat-tip (–) screwdriver, remove the oil seal.



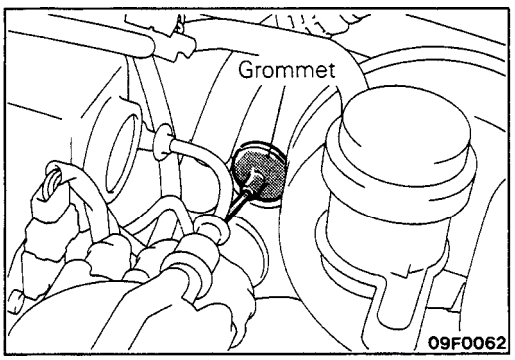
(3) Using the special tool, tap the drive shaft oil seal into the transaxle.
Note in illustration the direction of installation of drive shaft oil seal.
(4) Apply a coating of the transaxle fluid to the lip of the oil seal.

Transaxle fluid: Dia ATF SP or MITSUBISHI PLUS ATF or equivalent

SPEEDOMETER CABLE REPLACEMENT M23FEAL2

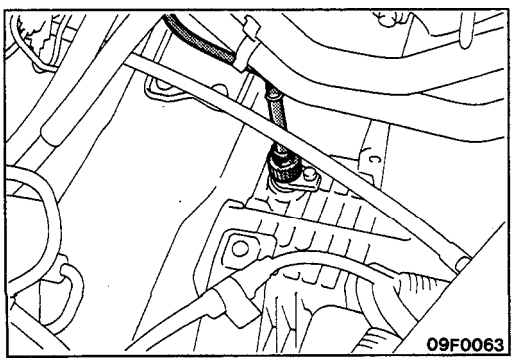


1. Correctly insert the adapter into the instrument panel, and fasten the new speedometer cable.



2. Install the grommet so that, as shown in the illustration, the cable attachment part and the projecting part are horizontal.

Caution
The cable arrangement should be made so that the radius of cable bends is 150 mm (5.9 in.) or more.



3.. At the transaxle end of the speedometer cable, the key joint should be inserted into the transaxle, and the nut should be securely tightened.

Caution
If the cable is not correctly and securely connected, it may cause incorrect indication by the speedometer, or abnormal noise. Be sure to connect it correctly.

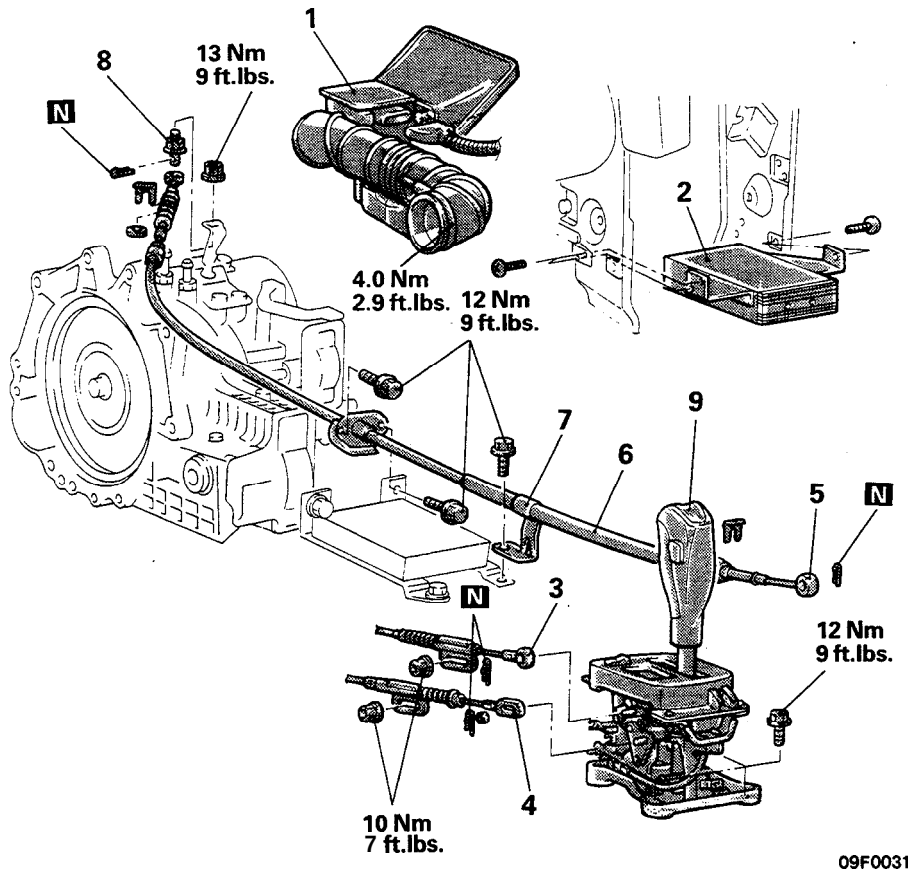
TSB Revision

TRANSAXLE CONTROL

M23IA- -

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Removal and Installation of Front Console Assembly (Refer to GROUP 52A – Floor Console.)



Transaxle control cable removal steps

1. Air cleaner cover, Air intake hose
2. CD amp. (Vehicles with CD player)
- 5. Connection for transaxle control cable assembly (Select lever assembly side)
6. Transaxle control cable, assembly
7. Clamp
8. Adjuster

Selector lever assembly removal steps

1. Air cleaner cover, Air intake hose
- + 3. Connection for key-interlock cable (Selector lever assembly side)
- ◆◆ 4. Connection for shift-lock cable (Selector lever assembly side)
- ◆◆ 5. Connection for transaxle control cable (Selector lever assembly side)
9. Selector lever assembly

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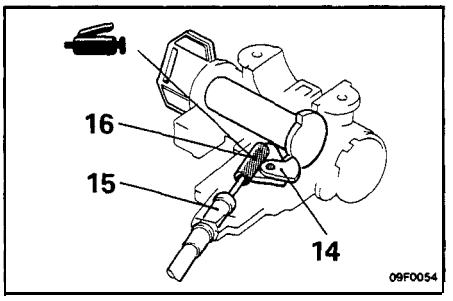

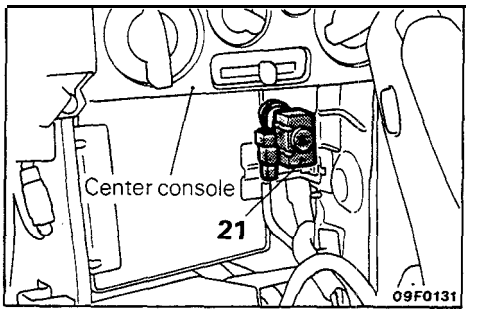

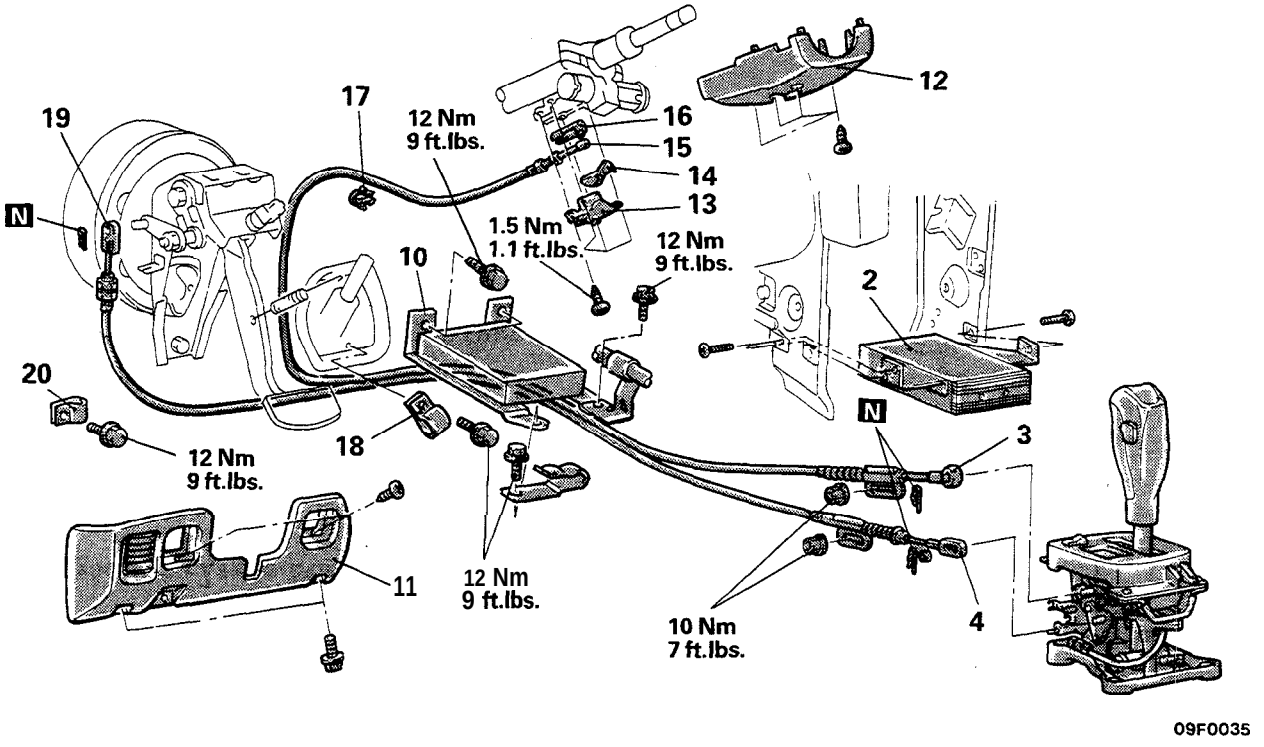

Key-interlock cable removal steps

- 2. CD amp. (Vehicles with CD player)
- ◆◆ 3. Connection for key-interlock cable (Selector lever assembly side)
- 10. Connection for transaxle control unit
- 11. Knee protector (Refer to GROUP 52A – Instrument Panel)
- 12. Column cover lower
- 13. Cover
- ◆◆ 14. Cam lever
- ◆◆ 15. Key-interlock cable
- ◆◆ 16. Slide lever
- 17. Cable guide
- 18. Clamp

Shift-lock cable removal steps

- 2. CD amp.
- ◆◆ 4. Connection for shift-lock cable (Selector lever assembly side)
- 10. Connection for transaxle control unil:
- ◆◆ 19. Shift-lock cable
- 20. Clamp

Reverse (R) position alarm buzzer removal

- 21. Reverse (R) position alarm buzzer

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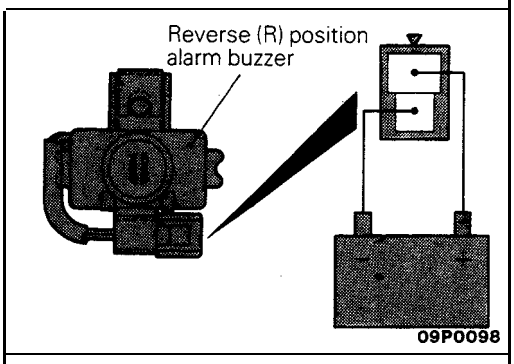
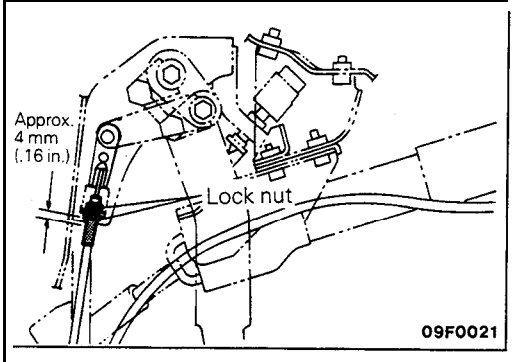


INSPECTION M23ICAM

- Check the control cable for function and for damage.
- Check the outer cable (key interlock cable, shift lock cable) for damage and spring for breakage and tension.
- Check the inner cable (key interlock cable, shift lock cable) for extension.

REVERSE (R) POSITION ALARM BUZZER

Check that the buzzer sounds when battery voltage is applied across terminals.

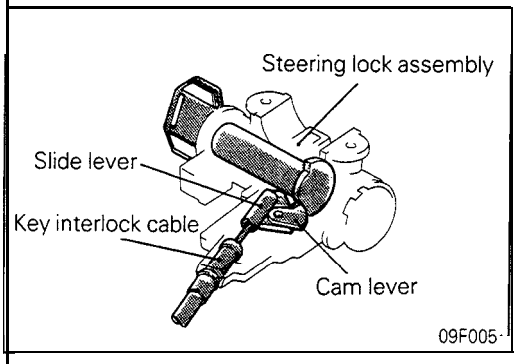


SERVICE POINTS OF INSTALLATION M23IDAW

19. CONNECTION OF SHIFT LOCK CABLE (BRAKE PEDAL SIDE)

Connect the shift lock cable so that its threads measure about 4 mm (.16 in.).

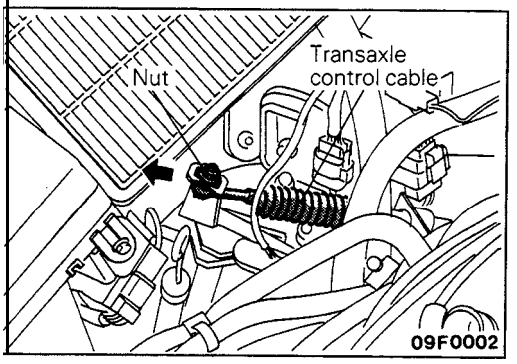
Caution
Do not change the routing of shift lock cable to the selector lever assembly.



16. INSTALLATION OF SLIDE LEVER / 15. KEY INTERLOCK CABLE (STEERING LOCK ASSEMBLY SIDE) / 14. CAM LEVER

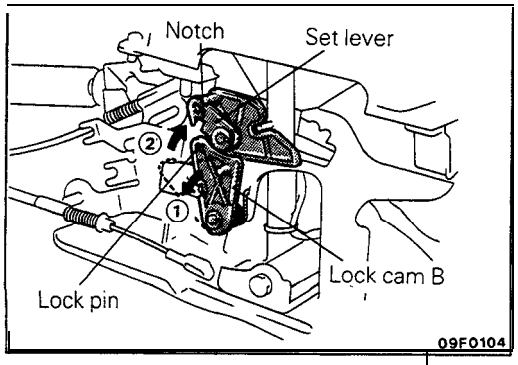
(1) Place the ignition key at the "LOCK" position or keep it removed.
(2) Install the slide lever, key interlock cable, and cam lever to the steering lock assembly as shown.

Caution
Do not change the routing of key interlock cable to the selector lever assembly.



5. CONNECTION OF TRANSAXLE CONTROL CABLE (SELECTOR LEVER ASSEMBLY SIDE)

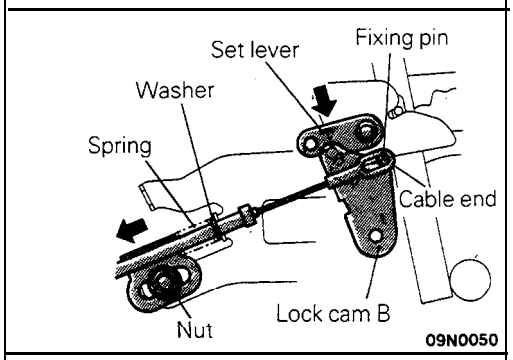
Connect the transaxle control cable, then make the following adjustment.
(1) Place the selector lever in "N" position.
(2) Loosen the nut and slightly pull the transaxle control cable in the direction of the arrow; then, tighten the nut.



4. CONNECTION OF SHIFT LOCK CABLE (SELECTOR LEVER ASSEMBLY SIDE)

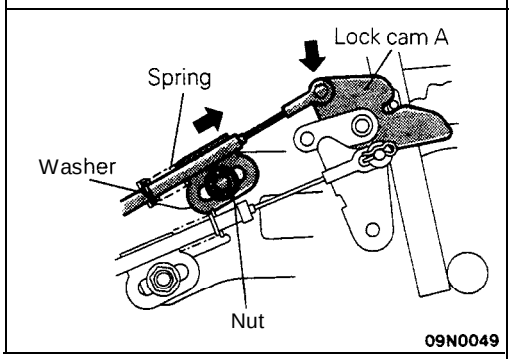
(1) Place the selector lever in "P" position.
(2) Disconnect the key interlock cable from the selector lever assembly side.
(3) Turn the lock cam B counterclockwise (arrow ①) to move the set lever upward (arrow ②).
(4) Fit the cutout in set lever to the jock pin ot lock cam B.

TSB Revision

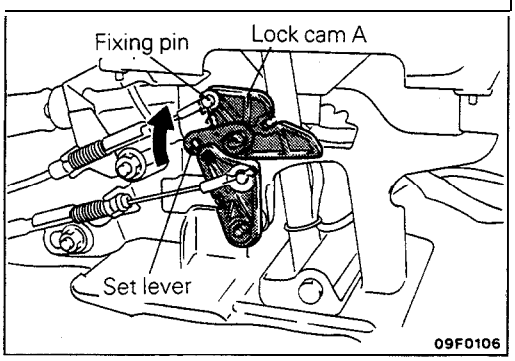


(5) Connect the shift lock cable to lock cam B and temporarily tighten the nut.
At this time, install the spring and washer, which have been fitted to the shift lock cable, as shown.
(6) Pressing the set lever to prevent lock cam B from moving, lightly pull the shift lock cable to take up slack and tighten the nut to secure the shift lock cable into position.

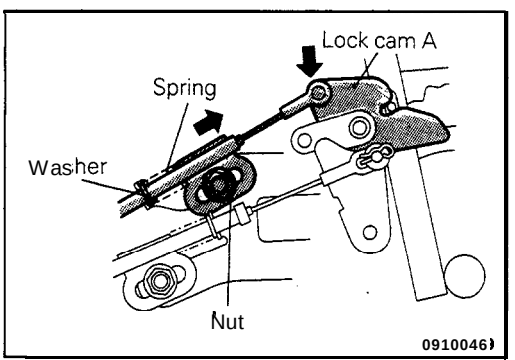
NOTE
Make sure that the shift lock cable end is in contact with the fixing pin of lock cam B as shown, then install the washer and snap pin.



(7) Connect the key interlock cable to lock cam A and temporarily tighten the nut.
At this time, install the spring and washer, which have been fitted to the key interlock cable, as shown.
(8) Lightly pressing lock cam A in the direction of arrow, lightly push the key interlock cable to take up slack and tighten the nut to secure the key interlock cable in position.

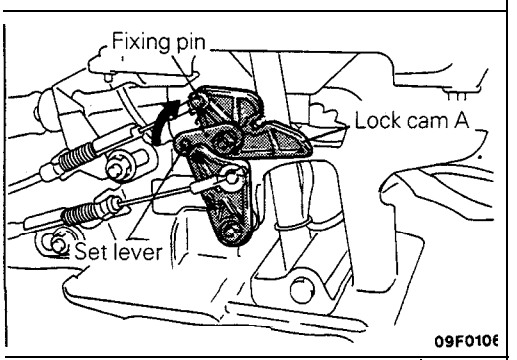


(9) Turn the set lever and fit it onto the fixing pin on lock cam A, then install the snap pin.
(lO)After the key interlock cable has been connected, check the shift lock and key interlock mechanism. (Refer to P.23-50.)



3. CONNECTION OF KEY INTERLOCK CABLE (SELECTOR LEVER ASSEMBLY SIDE)

(1) Place the selector lever into “P” position.
(2) Connect the key interlock cable to lock cam A and temporarily tighten the nut.
At this time, install the spring and washer, which have been fitted to the key interlock cable, as shown.
(3) Lightly pressing lock cam A in the direction of arrow, lightly push the key interlock cable to take up slack and tighten the nut to secure the key interlock cable in position.

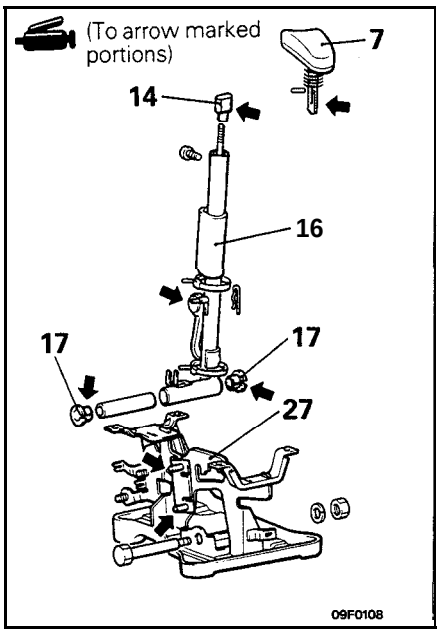


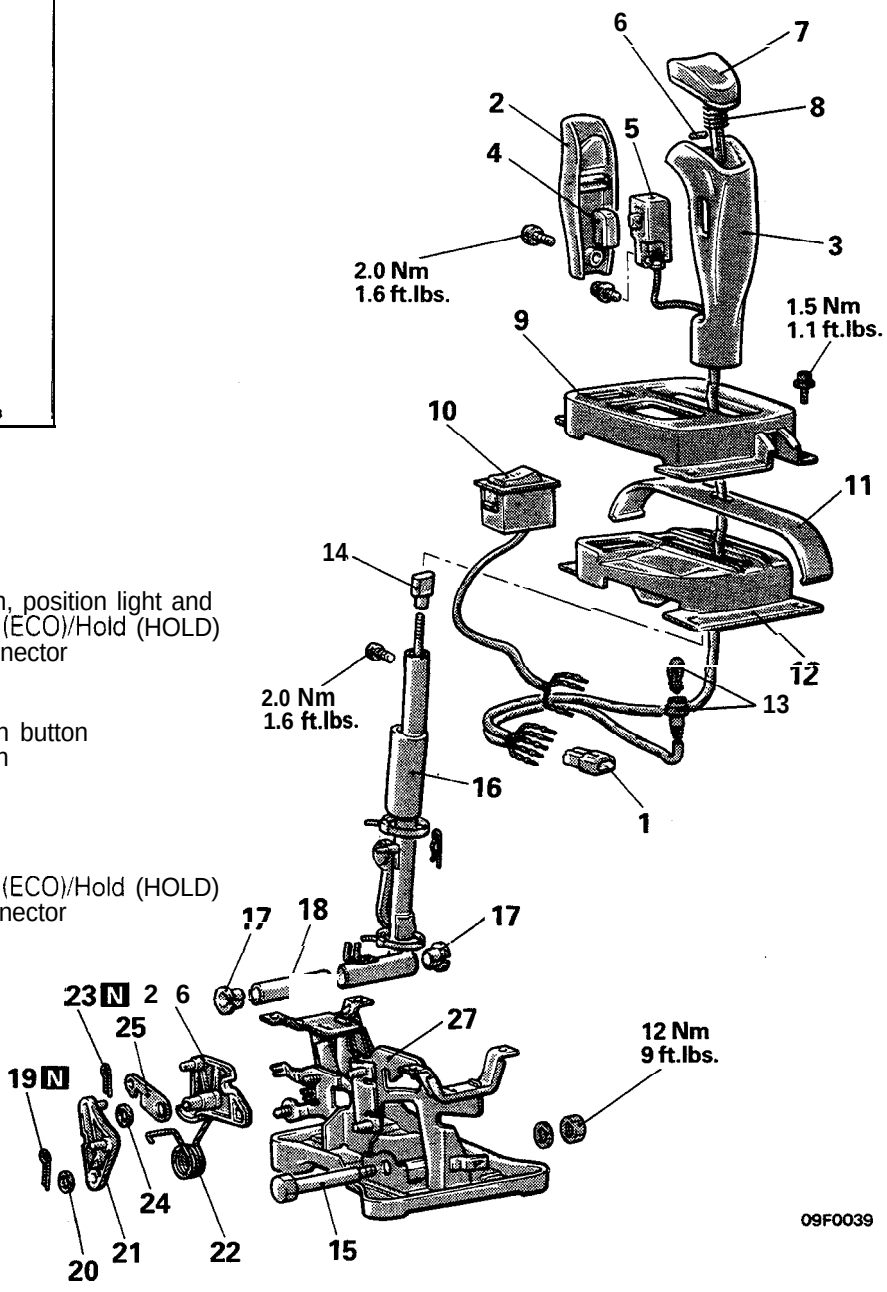
(4) Turn the set lever and fit it onto the fixing pin on lock cam A, then install the snap pin.
(5) After the key interlock cable has been connected, check the key interlock mechanism. (Refer to P.23-50.)

SELECTOR LEVER ASSEMBLY

DISASSEMBLY AND REASSEMBLY

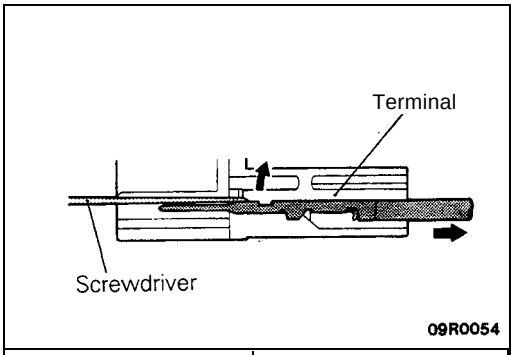
M23OE- -

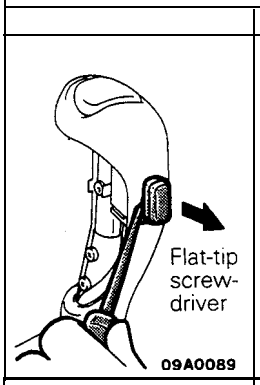


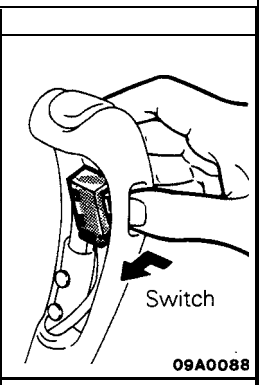


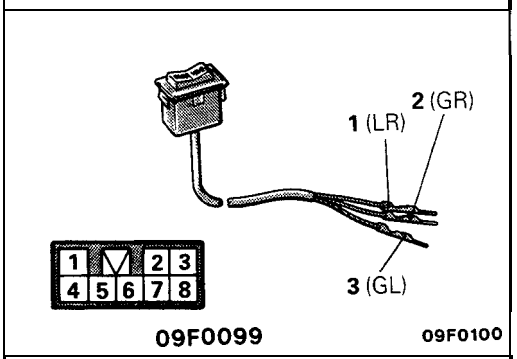
Disassembly steps

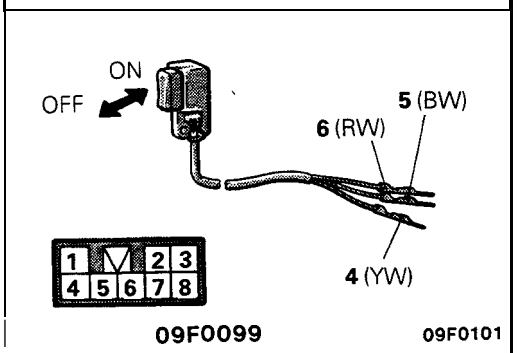
- ◆ ☒ ☒ Overdrive control switch, position light and Power (PWR)/Economy (ECO)/Hold (HOLD) changeover switch connector
- 2. Cover
- 3. Selector knob
- ◆◆ 4. Overdrive control switch button
- ◆◆ 5. Overdrive control switch
- 6. Pin
- 7. Pushbutton
- 8. Spring
- 9. Indicator panel
- 10. Power (PWR)/Economy (ECO)/Hold (HOLD) changeover switch connector
- **11:** Slider
- 12. Indicator panel lower
- 13. Socket assembly
- ● * 14. Sleeve
- 15. Bolt
- 16. Lever assembly
- 17. Bushing
- 18. Pipe
- 19. Cotter pin
- 20. Washer
- 21. Lock cam B
- 22. Spring
- 23. Cotter pin
- 24. Washer
- 25. Set lever
- 26. Lock cam A
- 27. Bracket assembly

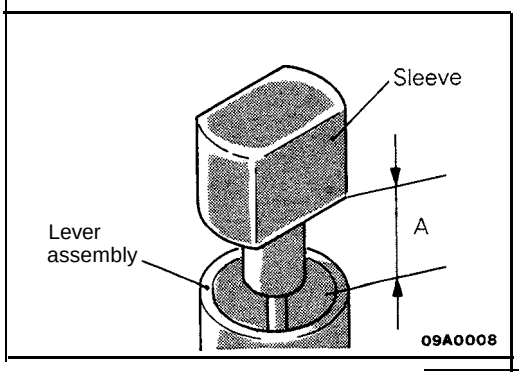












SERVICE POINTS OF DISASSEMBLY M23OFAD

1. REMOVAL OF OVERDRIVE CONTROL SWITCH CONNECTOR

Disconnect the overdrive control switch connector and then remove the terminal from the overdrive control switch connector.

4. REMOVAL OF OVERDRIVE CONTROL SWITCH BUTTON / 5. OVERDRIVE CONTROL SWITCH

(1) Using the flat-tip screwdriver, remove the overdrive control switch button.
(2) Remove the overdrive control switch mounting screw.
(3) Pressing the switch, remove the overdrive control switch.

INSPECTION M23OGAE

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

POWER (PWR)/ECONOMY (ECO)/HOLD (HOLD) SWITCH

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

Switch position \ Terminal	1	2	3
ON (PWR)	O	O	
OFF (ECO)			
ON (HOLD)		O	O

NOTE
O-O indicates that there is continuity between the terminals.

OVERDRIVE CONTROL SWITCH

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

Switch position \ Terminal	4	5	6
ON (Overdrive activation)		O	O
OFF (Overdrive non-activation)	0		O

NOTE
O-O indicates that there is continuity between the terminals.

SERVICE POINT OF REASSEMBLY M23OHAO

14. INSTALLATION OF SLEEVE

Place the selector lever in the "N" position, and then turn the sleeve so that the clearance between the sleeve and the lever assembly end is within the standard value.

Standard value (A): 15.2 – 15.9 mm (.598 – .625 in.)

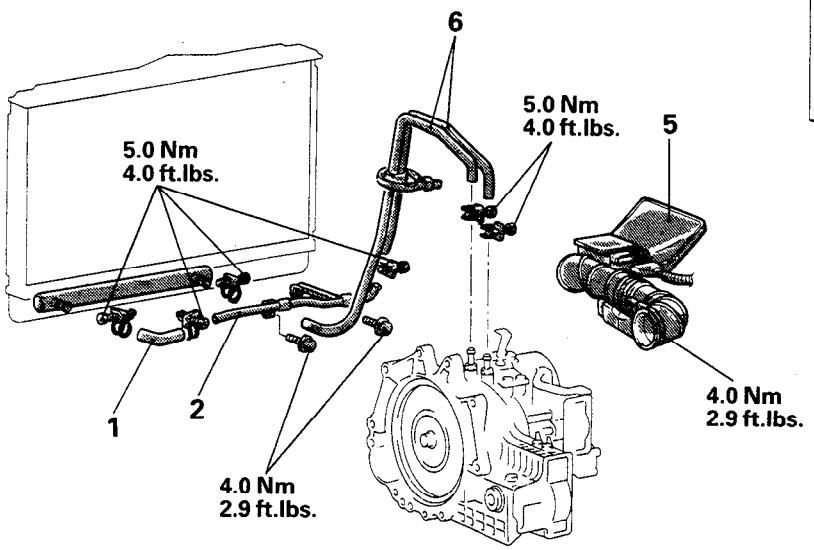
TRANSAXLE OIL COOLER, HOSES, TUBES

N21SA-

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Drainage and Filling of Automatic Transaxle Fluid (Refer to GROUP 00 – Maintenance Service.)
- Removal and Installation of Front Under Cover (Refer to GROUP 51 – Front Bumper.)

<Vehicles without oil cooler>



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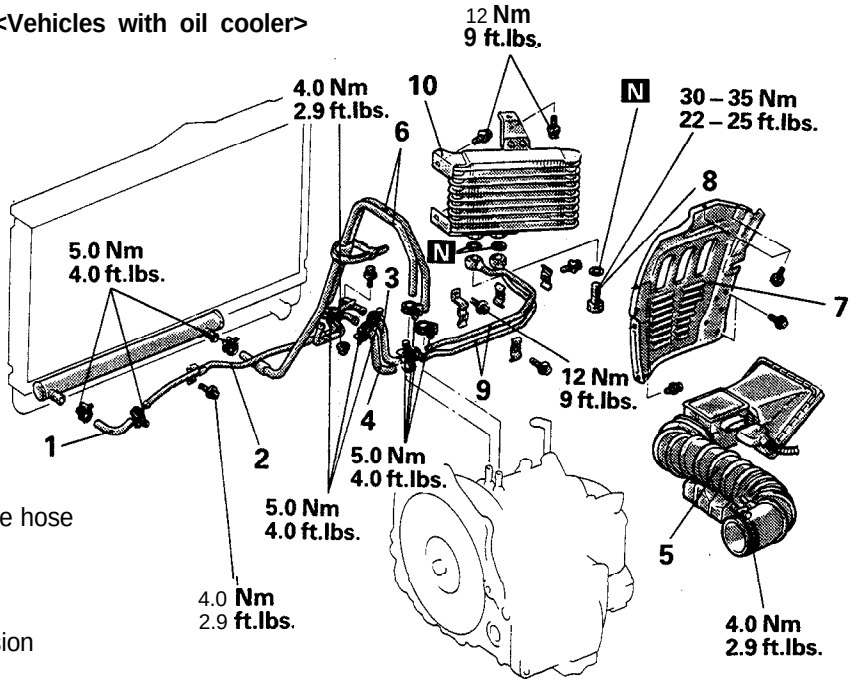
<Vehicles with oil cooler>



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◆◆ 1. Hose
◆◆ 2. Tube assembly
◆◆ **3.** Feed hose
◆◆ 4. Return hose

Hose assembly removal steps
- 5. Air cleaner cover, Air intake hose
- ◆◆ 6. Hose assembly

Tube assembly removal steps
- 7. Front splash shield extension (right side)
- ◆◆ • 4 **8.** Eye bolt
- 9. Tube assembly

Transaxle oil cooler removal steps
- 7. Front splash shield extension (right side)
- • *◆◆ 8. Eye bolt
- 10. Transaxle oil cooler

TSB Revision

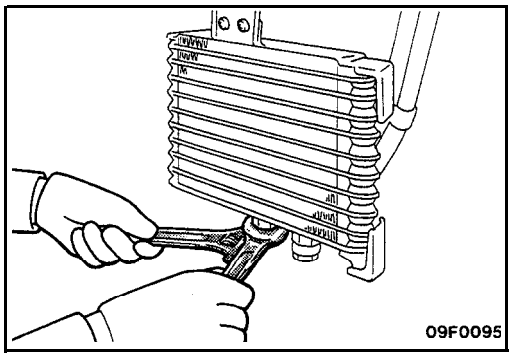
SERVICE POINTS OF REMOVAL M23SBAG

1. REMOVAL OF HOSE / 2. TUBE ASSEMBLY / 3. FEED HOSE / 4. RETURN HOSE

Caution
Take care not to spill the transaxlefluid when removing components.

6. REMOVAL OF HOSE ASSEMBLY

Caution
1. **When removing the hose assembly, use care not to allow the transaxle fluid to spill.**
2. **After removing the hose assembly, plug so that foreign materials cannot enter the transaxle.**

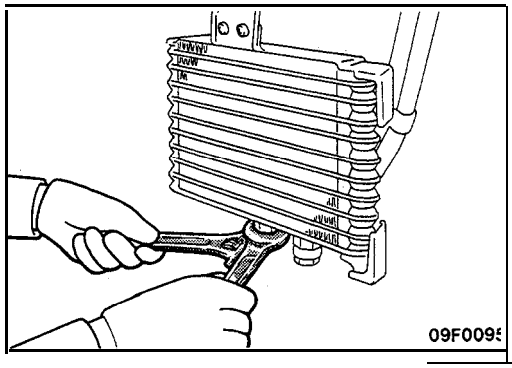


8. REMOVAL OF EYE BOLT

(1) Wipe the connection threads and tightly contacting surfaces clean of dust and dirt.
(2) Secure the oil cooler connector with a spanner to prevent excessive force from being applied to it, then loosen the eye bolt.

INSPECTION M23SCAH

- Check the hose for crack, damage and clog.
- Check for rusted or clogged radiator oil cooler.
- Check oil cooler fins for bend, damage, and clogged foreign matter.



SERVICE POINT OF INSTALLATION M23SDAD

8. INSTALLATION OF EYE BOLT

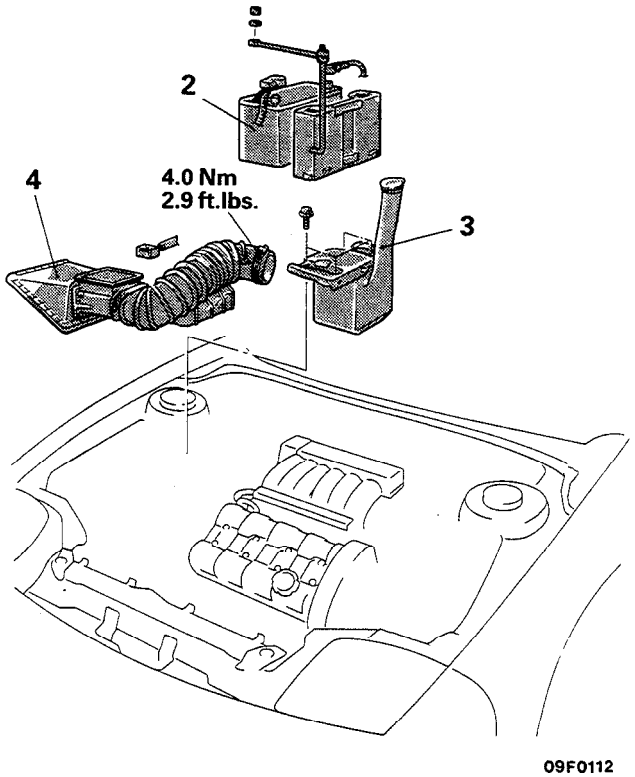
(1) Wipe the connection threads and tightly contacting surfaces clean of dust and dirt. .
(2) Secure the oil cooler connector with a spanner to prevent excessive force from being applied to it, then tighten the eye bolt.

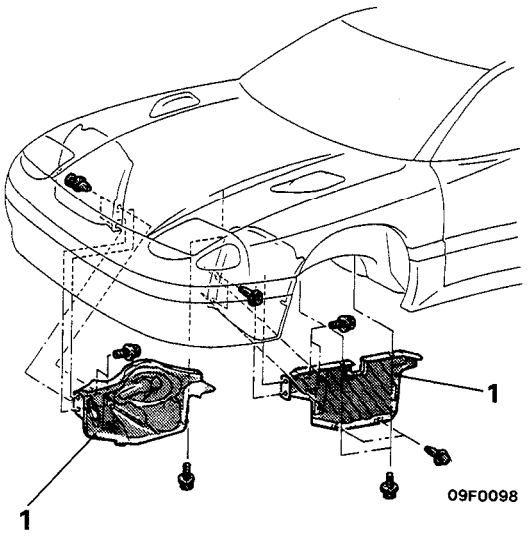
TRANSAXLE ASSEMBLY

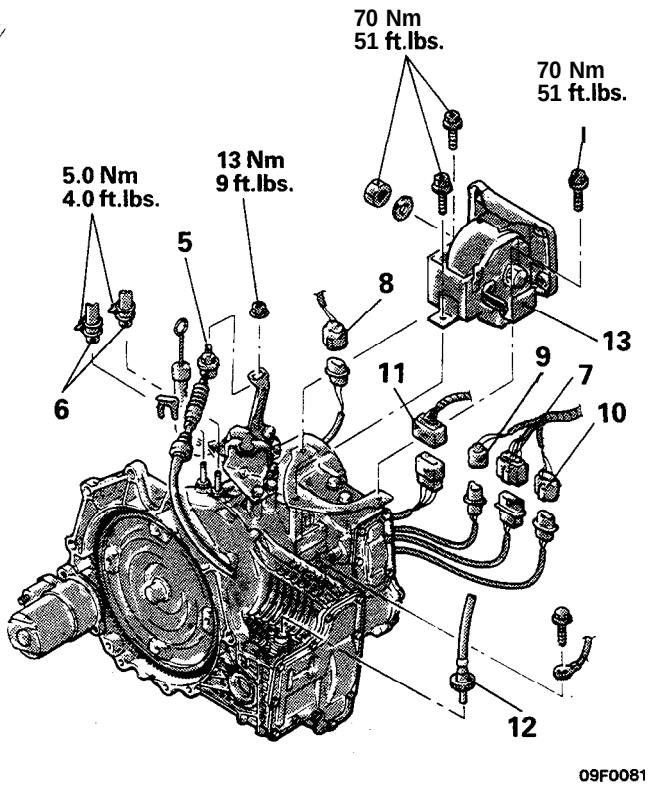
M23LA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Place Selector Lever in "N" Position and Stop the Engine.
- Draining of Transaxle Fluid (Refer to GROUP 00 – Maintenance Service.)
- Removal of Front Under Cover (Refer to GROUP 51 -Front Bumper.)







Removal steps

1. Side under cover
2. Battery
3. Battery seat, Washer tank
4. Air cleaner cover, Air intake hose

◖+ 5. Connection for transaxle control cable

6. Connection for oil cooler hose
7. Inhibitor switch connector
8. Kickdown servo switch connector
9. Pulse generator connector
10. Oil temperature sensor connector
11. Shift control solenoid valve connector
12. Connection for speedometer cable

◆◆ 13. Connection for transaxle mount bracket

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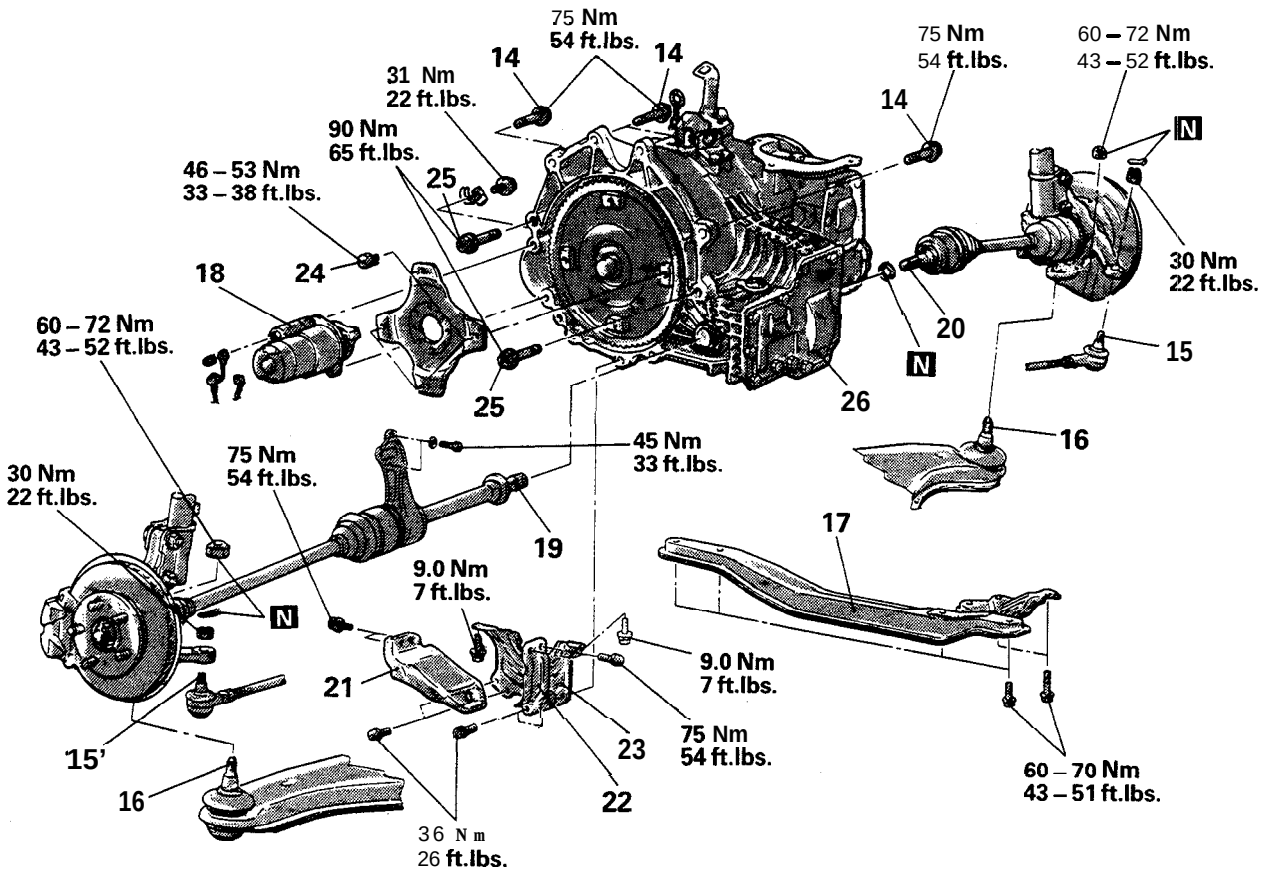
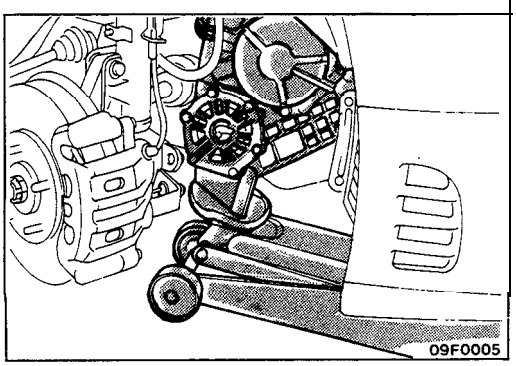


14. Transaxle assembly upper part coupling bolt
15. Connection for tie rod end
16. Connection for lower arm ball joint
17. Right member
18. Starter
19. Drive shaft (left side), Inner shaft assembly
* 20. Drive shaft (right side)
21. Transaxle stay (front bank side)
22. Transaxle stay (rear bank side)
23. Bell housing cover
24. Special bolts
25. Transaxle assembly lower part coupling bolt
26. Transaxle assembly

Post-installation Operation
- Installation of Front Under Cover (Refer to GROUP 51 -Front Bumper.)
- Supplying of Transaxle Fluid (Refer to GROUP 00 – Maintenance Service.)
- Checking the Operation of Selector Lever
- Checking the Operation of Speedometer



SERVICE POINTS OF REMOVAL M23LBAV

13. DISCONNECTION OF TRANSAXLE MOUNT BRACKET

(1) Raise the transaxle assembly with a jack up to a level where no weight is applied to the mount bracket.

Caution
When raising the transaxle assembly, make sure it is supported over a wide area and no local force is being applied.

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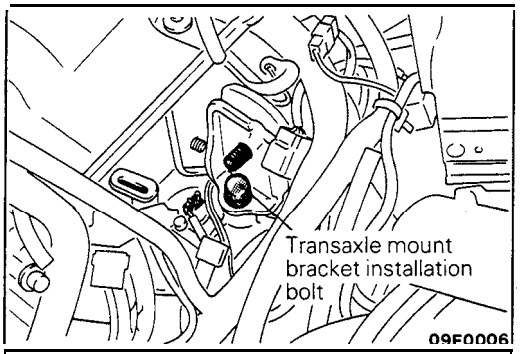
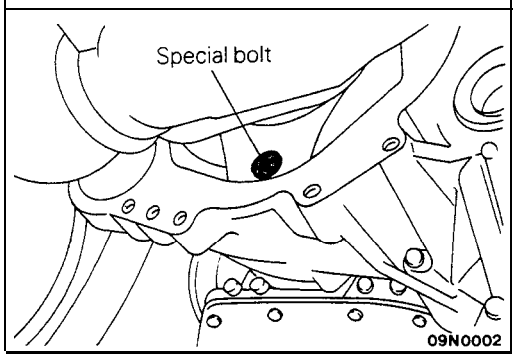




(2) Remove the nut and move the bolt so that a spanner can be applied to the transaxle mount bracket mounting bolt; then, remove the transaxle mount bracket mounting bolt.

15. DISCONNECTION OF TIE ROD END / 16. LOWER ARM BALL JOINT

Refer to GROUP 22 – Manual Transaxle.

19. REMOVAL OF DRIVE SHAFT (LEFT SIDE) AND INNER SHAFT ASSEMBLY / 20. DRIVE SHAFT (RIGHT SIDE)

Refer to GROUP 22 – Manual Transaxle.

24. REMOVAL OF SPECIAL BOLTS / 25. TRANSAXLE ASSEMBLY LOWER PART COUPLING BOLT / 26. TRANSAXLE ASSEMBLY

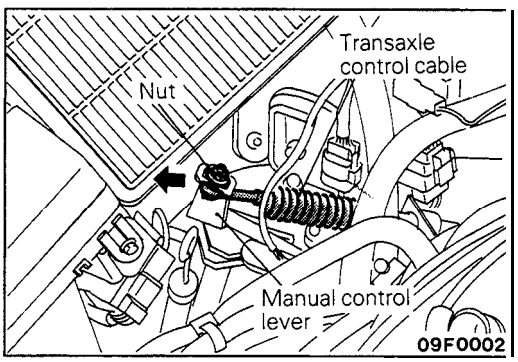
(1) Support the transaxle assembly with the transaxle jack.
(2) Rotating the crankshaft, remove the special bolts at four places.
(3) After removing the special bolts, push the torque converter toward transaxle so that it does not remain on the engine side.
(4) Remove coupling bolt at the bottom of transaxle assembly and lower the transaxle assembly.

SERVICE POINTS OF INSTALLATION M23LDAD

26. INSTALLATION OF TRANSAXLE ASSEMBLY

Attach the torque converter on the transaxle side and mount the transaxle assembly on the engine.

Caution
If the torque converter is mounted first on the engine, the oil seal on the transaxle side may be damaged. Therefore, be sure to first assemble the torque converter on the transaxle side.



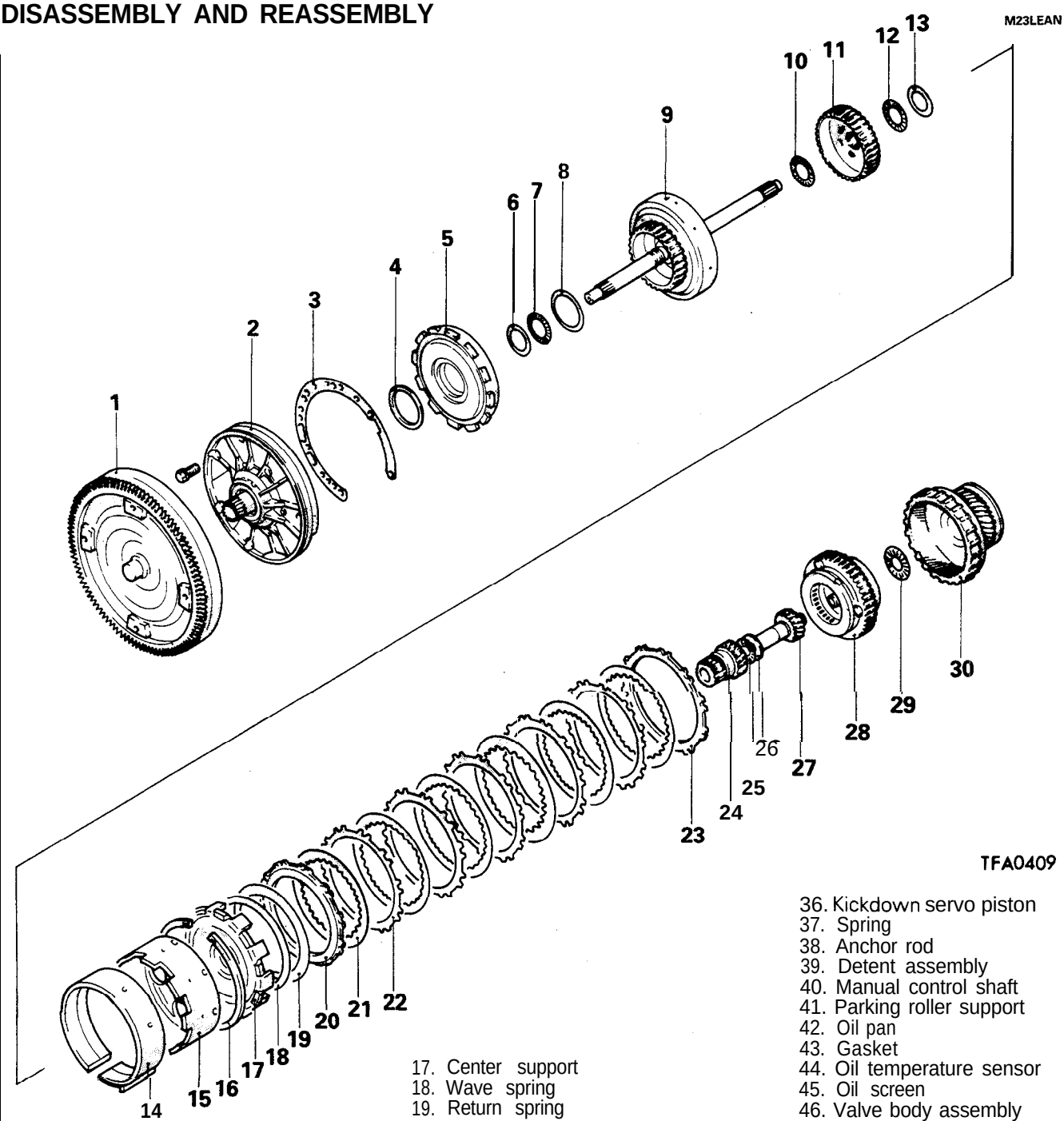
20. INSTALLATION OF DRIVE SHAFT (RIGHT SIDE)

Refer to GROUP 22 – Manual Transaxle.

5. CONNECTION OF TRANSAXLE CONTROL CABLE

(1) Connect the transaxle control cable to the manual control lever and tighten the nut temporarily.
(2) Loosen the nut, pull the transaxle control cable lightly in the arrow direction and retighten the nut.

DISASSEMBLY AND REASSEMBLY



1 Torque converter
2. Oil pump assembly
3. Gasket
4. Thrust washer #1
5. Front clutch assembly
6. Thrust race #3
7. Thrust bearing #4
8. Thrust washer #2
9. Rear clutch assembly
10. Thrust bearing #5
11. Rear clutch hub
12. Thrust race #6
13. Thrust bearing #7
14. Kickdown band
15. Kickdown drum
16. Snap ring
17. Center support
18. Wave spring
19. Return spring
20. Pressure plate
21. Brake disc
22. Brake plate
23. Reaction plate
24. Reverse sun gear
25. Thrust bearing #8
26. Thrust race #9
27. Forward sun gear
28. Planetary carrier assembly
29. Thrust bearing #10
30. Output flange
31. Oil level gauge
32. Oil filler tube
33. Snap ring
34. Kickdown servo switch
35. Snap ring
36. Kickdown servo piston
37. Spring
38. Anchor rod
39. Detent assembly
40. Manual control shaft
41. Parking roller support
42. Oil pan
43. Gasket
44. Oil temperature sensor
45. Oil screen
46. Valve body assembly
47. Manual control lever
48. Inhibitor switch
49. End clutch shaft
50. Bearing retainer
51. Thrust bearing #11
52. End clutch hub
53. Thrust washer
54. End clutch assembly
55. O-ring
56. End clutch cover
57. Pulse generator
58: Lock bolt
59. Idler shaft
60. Idler gear
61. Spacer
62. Gasket

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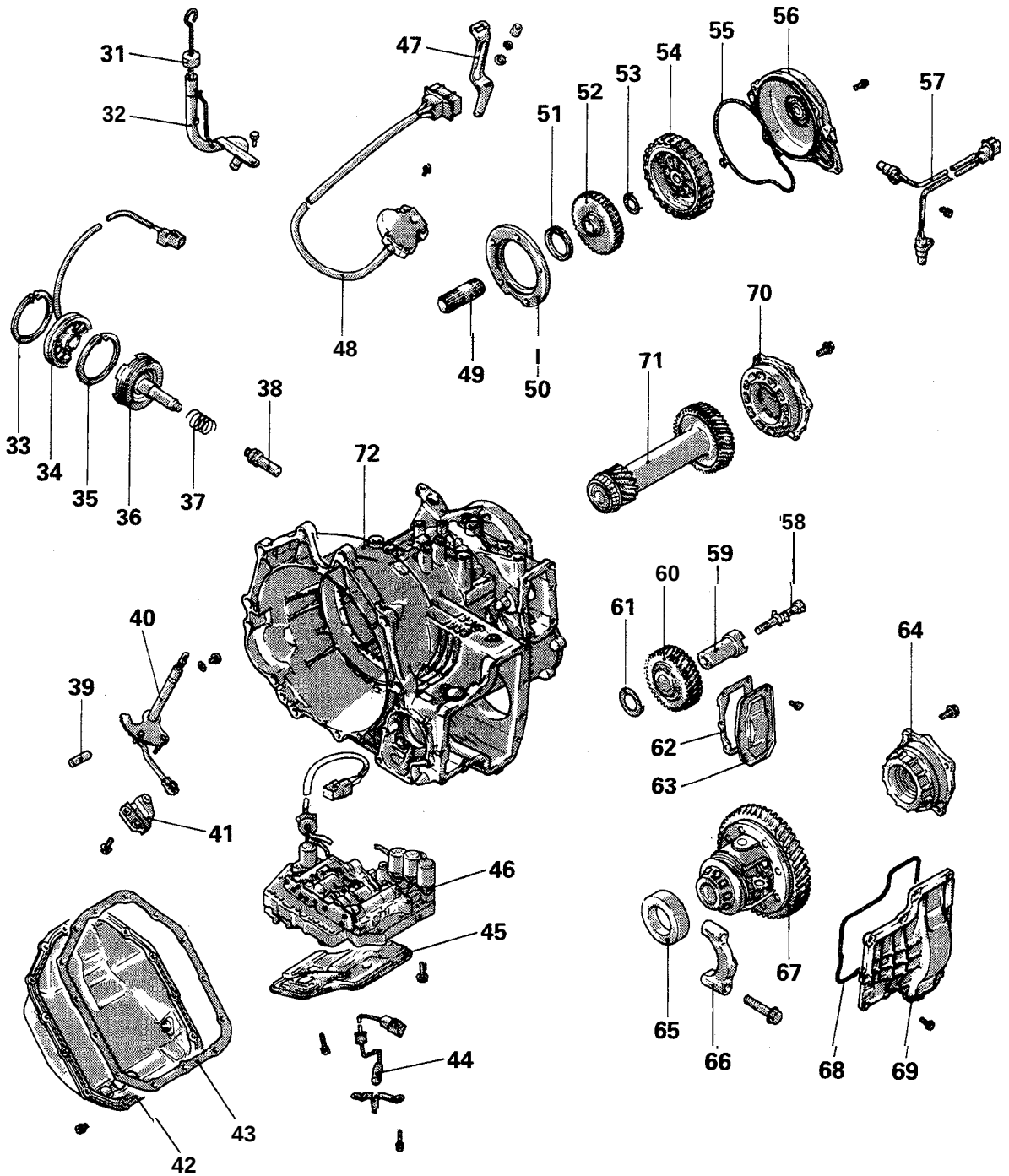


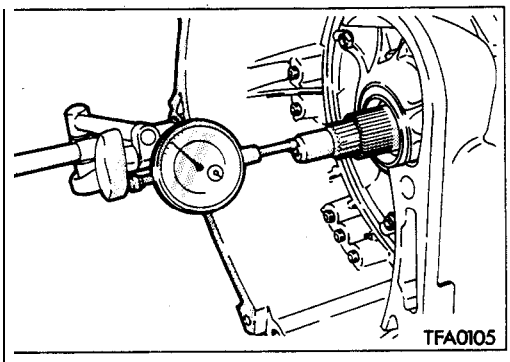
63. Idler gear cover
64. Differential bearing retainer
65. Outer race
66. Differential front bearing cap
67. Differential assembly
68. Gasket
69. Differential cover
70. Output bearing retainer
71. Transfer shaft
72. Transaxle case

TFA0410

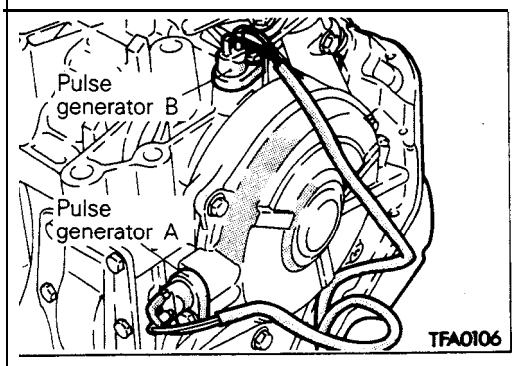
DISASSEMBLY

Caution

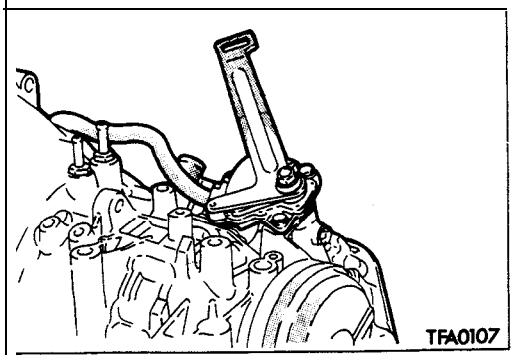
1. The automatic transaxle consists of high-precision parts and utmost care must be exercised during disassembly and reassembly to prevent damage to the parts.
2. Place a rubber mat on the workbench and keep it clean at all times.
3. **Do not use cotton work gloves or waste cloth for the disassembly job. Use nylon cloth or paper towel if necessary.**
4. Clean all disassembled parts. Commercially available detergent may be used to clean the metallic parts; however, be sure to dry them completely with air.
5. Clean the clutch disc, plastic thrust plates, and rubber parts with ATF (automatic transmission fluid) to prevent adhesion of dust and dirt.
6. If the transaxle is damaged, the cooler system should also be disassembled and cleaned.



(1) Remove the torque converter.
(2) Install the dial indicator to the transaxle case and measure the end play in the input shaft.
(3) Remove brackets.
(4) Remove the oil level gauge and oil level gauge guide.



(5) Remove pulse generators A and B



(6) Remove the manual control lever and then remove the inhibitor switch.
(7) Remove the speedometer drive gear assembly.

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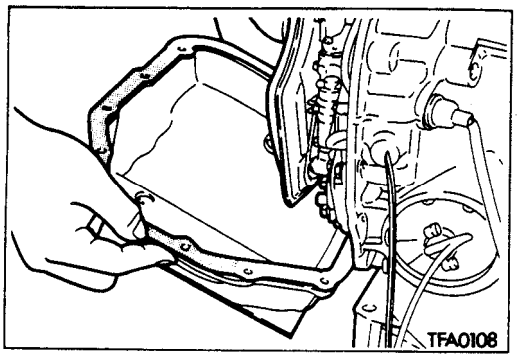
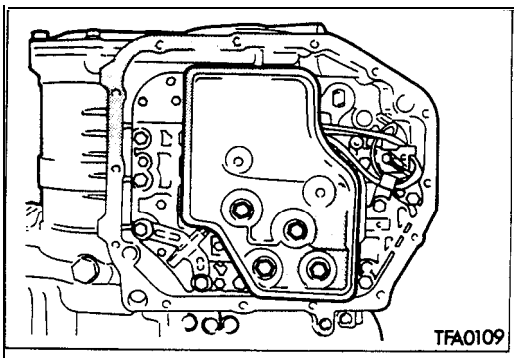
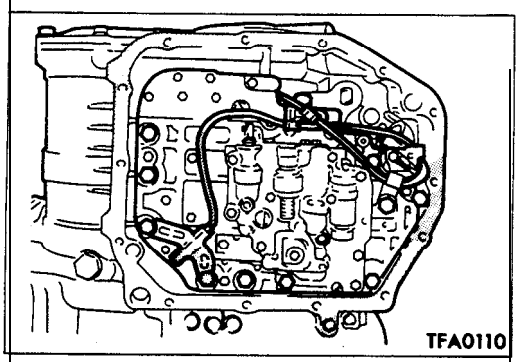


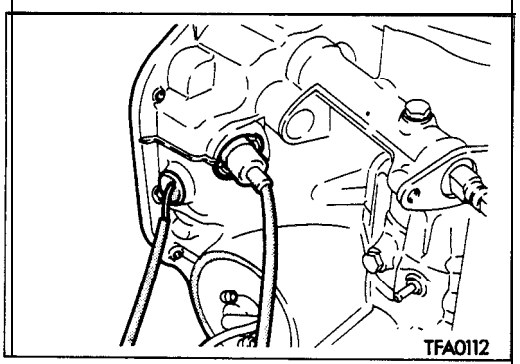
(8) **Remove** the oil pan, magnet, and gasket.



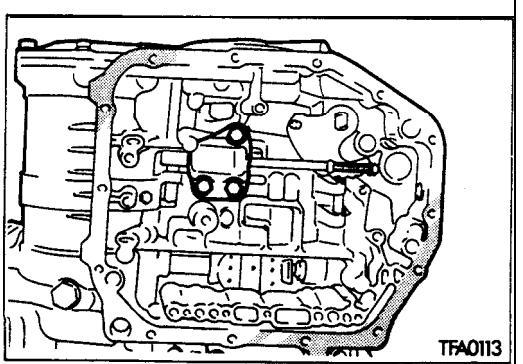
(9) Remove the oil screen.



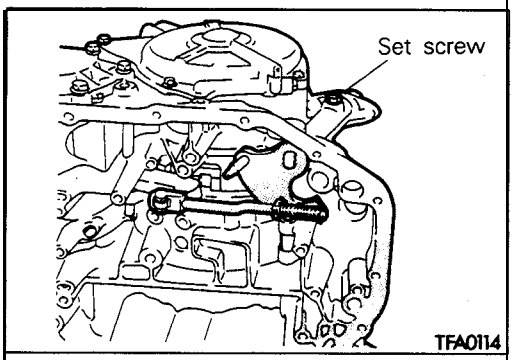
(10) Remove the ten valve body mounting bolts.
(11) Remove the oil temperature sensor holder and remove the oil temperature sensor harness from the clamp.



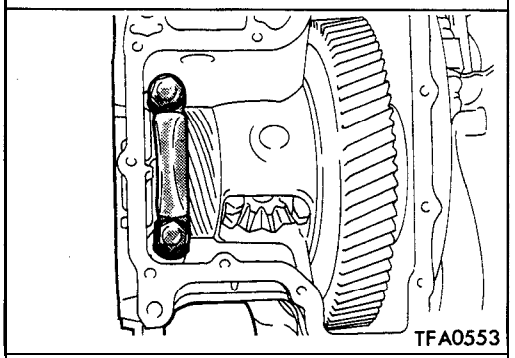
(12) Press the solenoid valve harness grommet claw to push the grommet into the case; then, remove the valve body assembly.
(13) Pull off the oil temperature sensor.



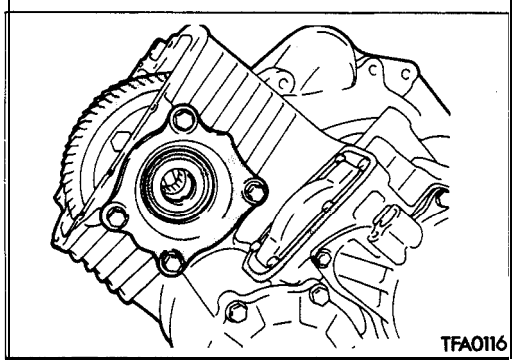
(14) Remove the parking roller support.



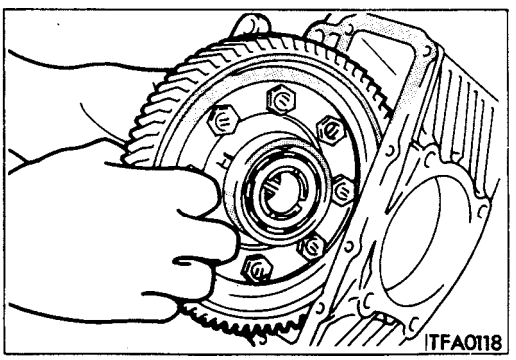
(15)Remove the set screw from the manual control shaft and remove the manual control shaft assembly.
(16)Remove the detent assembly.



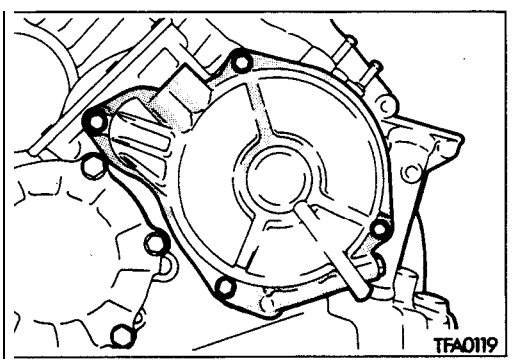
(17)Remove the differential cover and gasket.
(18)Remove the differential front bearing cap.



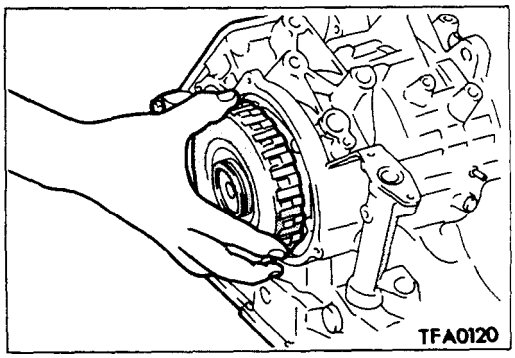
(19)Remove the differential bearing retainer, spacer, and outer race.



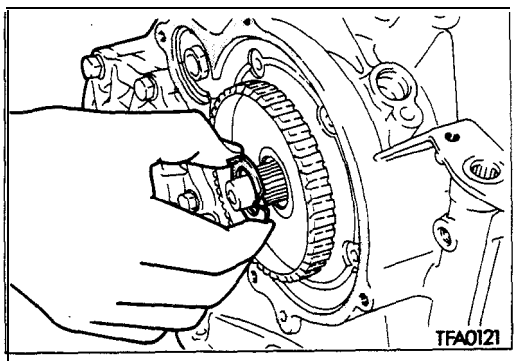
(20)Remove the differential assembly



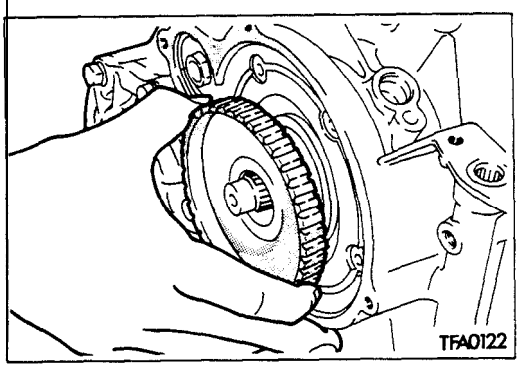
(21)Remove the end clutch cover mounting bolts and remove the end clutch cover.



(22)Remove the end clutch assembly.

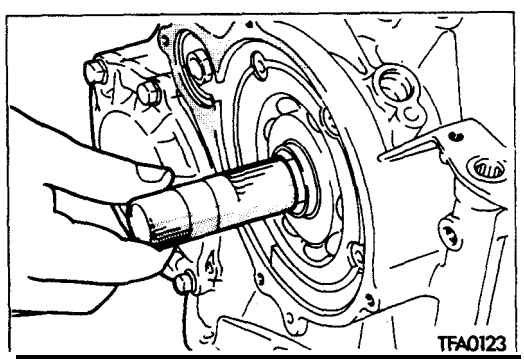


(23)Remove the thrust plate.

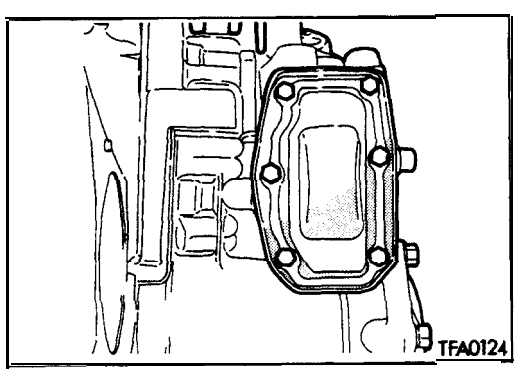


(24)Remove the end clutch hub.
(25)Remove the thrust bearing.

NOTE
The bearing may be adhering to the end clutch hub.

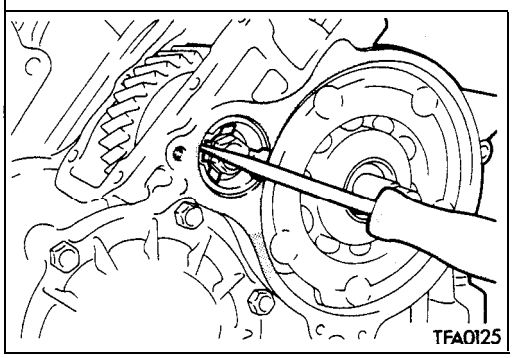


(26)Pull out the end clutch shaft.

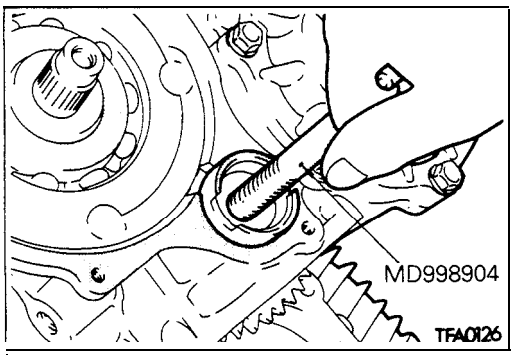


(27)Remove the idler gear cover mounting bolts and remove the idler gear cover and gasket.

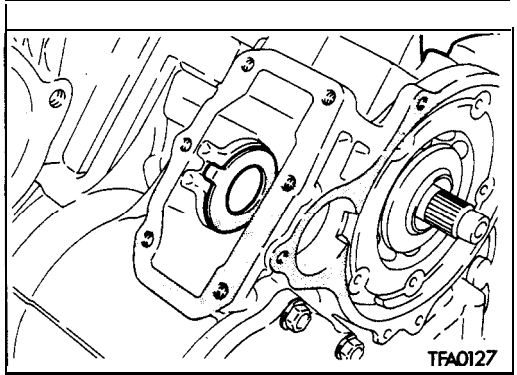
TSB Revision



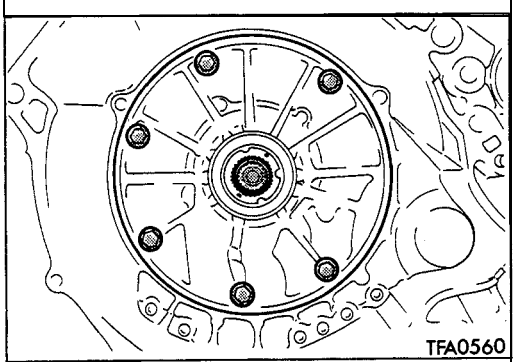
(28)Straighten the lock where it forms over the bolt and remove the bolt.



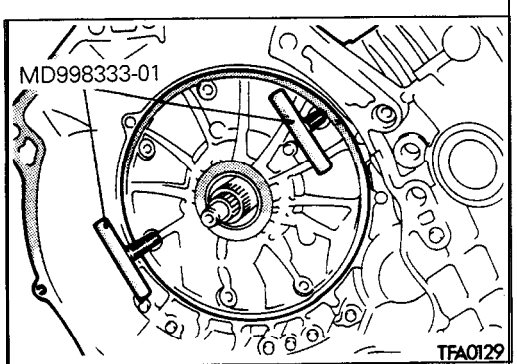
(29)Pull off the idler shaft and remove the idler gear and bearing inner race.



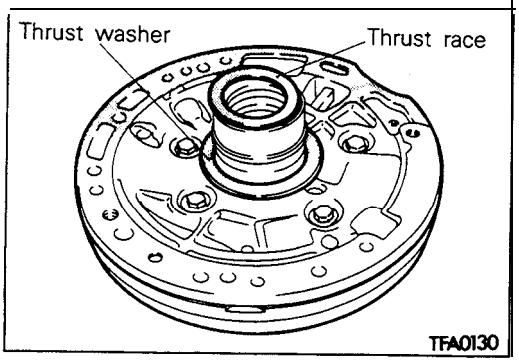
(30)Remove the spacer.



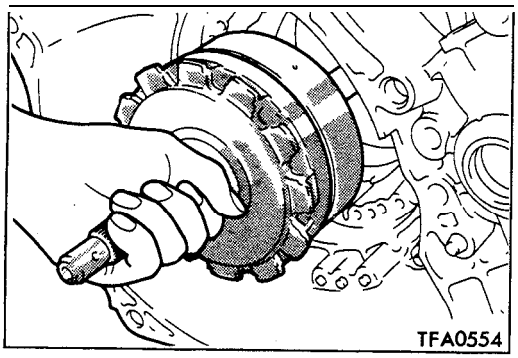
(3I)Remove the oil pump bolts.



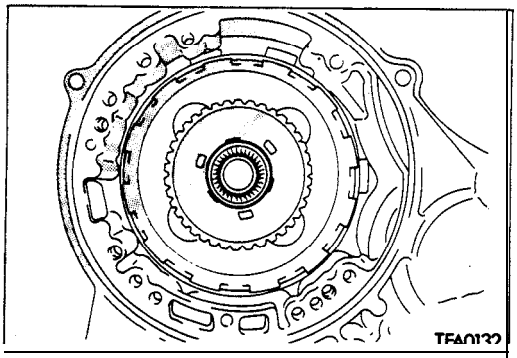
(32)Using the special tool, remove the oil pump.



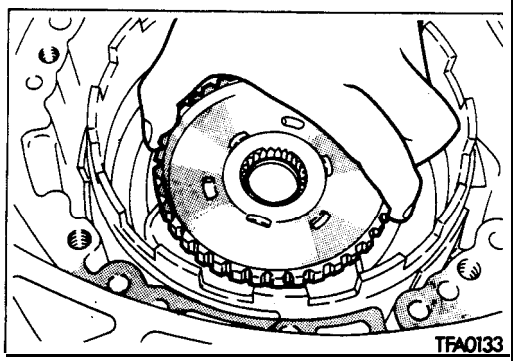
(33)Remove the thrust washer and thrust race.



(34)Holding 'onto the input shaft, remove the front clutch assembly and rear clutch assembly together.

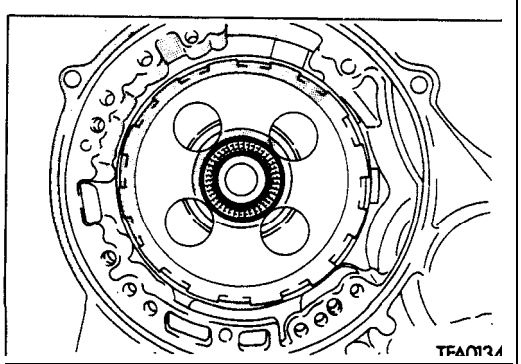


(35)Remove the thrust bearing.

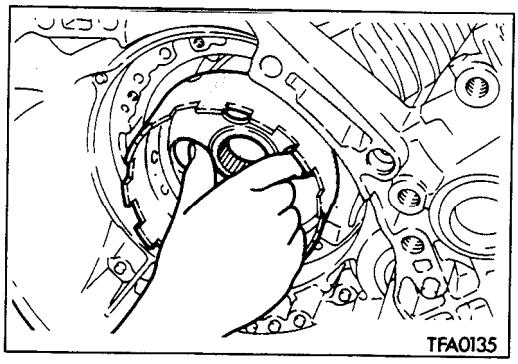


(36)Remove the rear clutch hub.

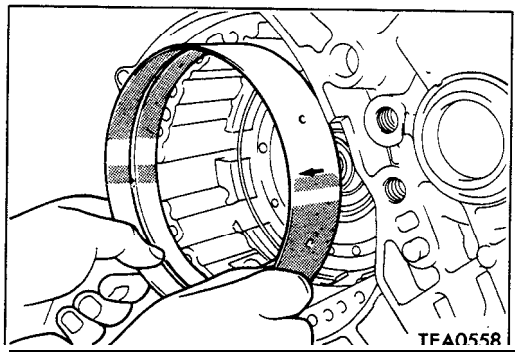
NOTE
The thrust race may be sticking to the clutch hub.



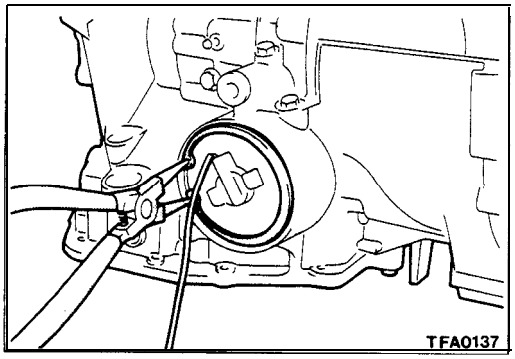
(37)Remove the thrust bearing.



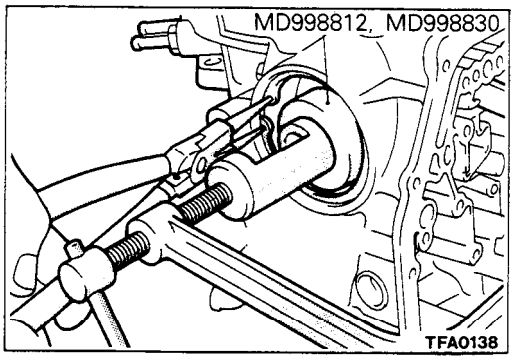
(38)Remove the kickdown drum.



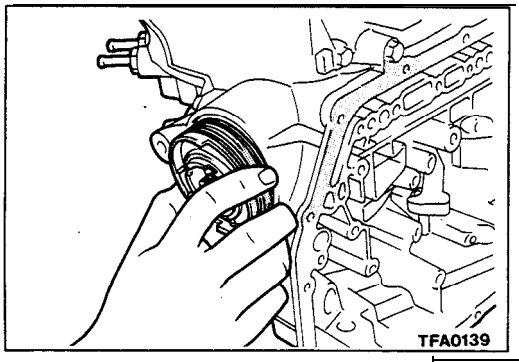
(39)Remove the kickdown band.



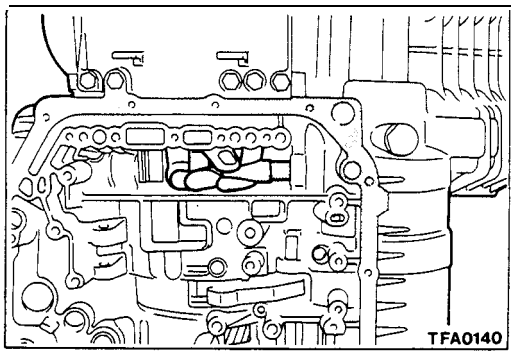
(40)Snap off the snap ring and remove the kickdown servo switch.



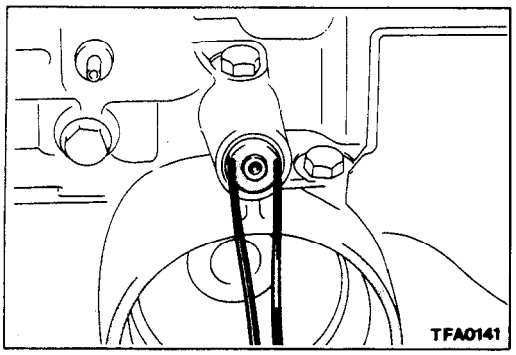
(41)Using the special tool, push in the kickdown servo piston to snap off the snap ring.



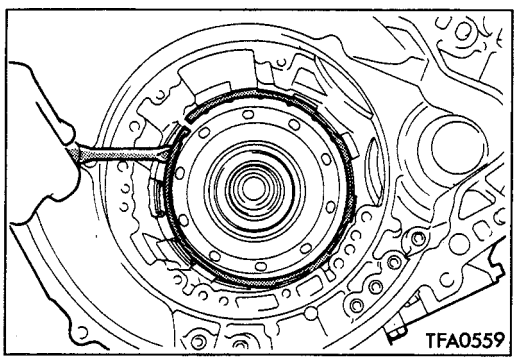
(42)Remove the kickdown servo piston.



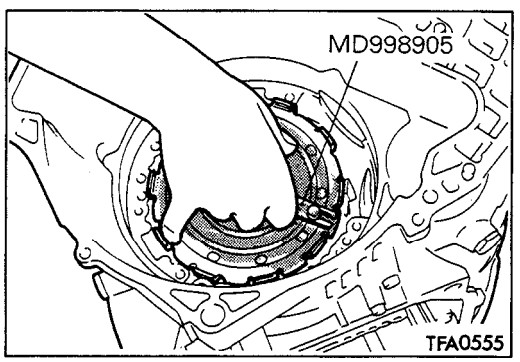
(43)Remove the anchor rod.



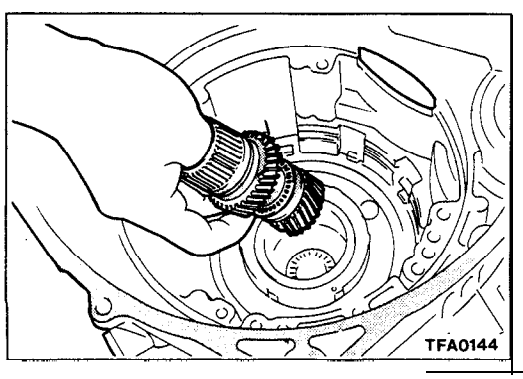
(44)Remove the plug and pull out the air exhaust plug.



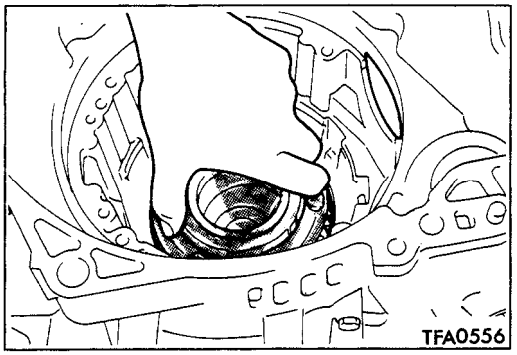
(45)Remove the snap ring.



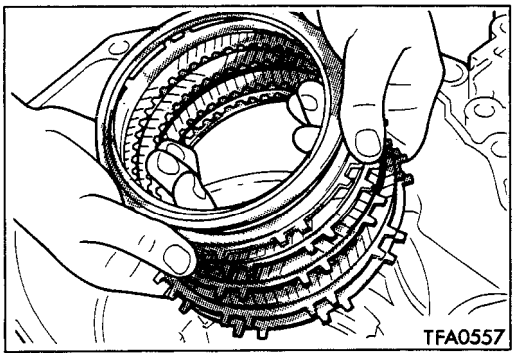
(46)Using the special tool, remove the center support



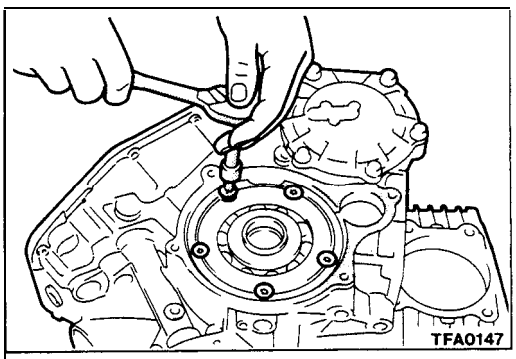
(47)Remove the reverse sun gear and forward sun gear.



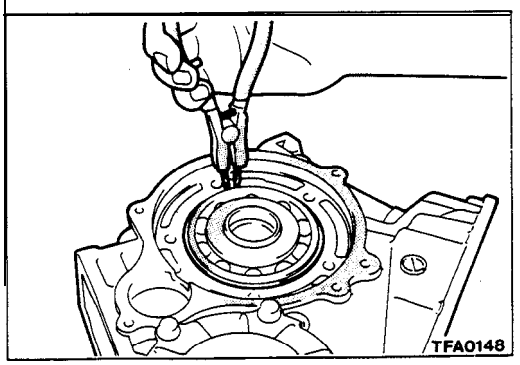
(48)Remove the planetary carrier assembly.



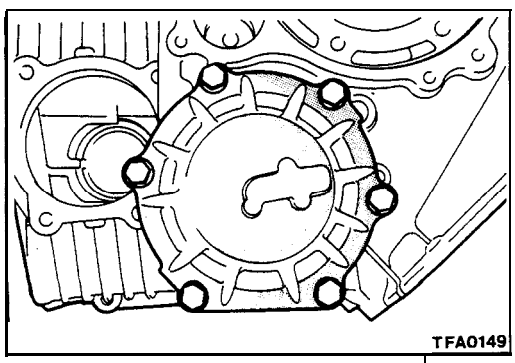
(49)Remove the wave spring, return spring, reaction plate, brake disc, and brake plate.



(50)Remove the screw and remove the rear bearing retainer.

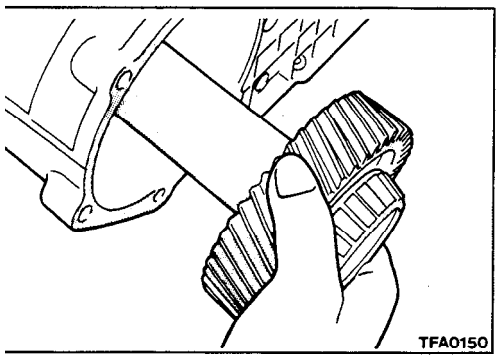


(51)Snap off the snap ring and remove the output flange assemblv.

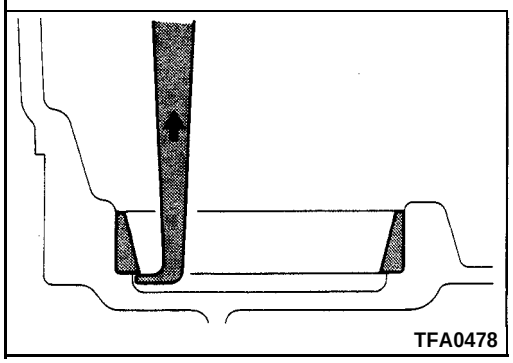


(52)Remove the output bearing retainer mounting bolts and remove the output bearing retainer and outer race.

TSB Revision



(53)Remove the transfer shaft.



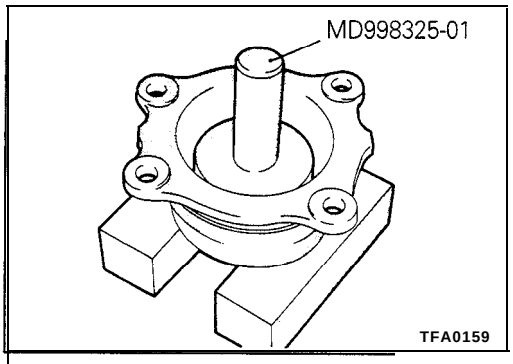
(54)Using a sliding hammer, remove the outer race.
(55)Remove oil seals.

REASSEMBLY

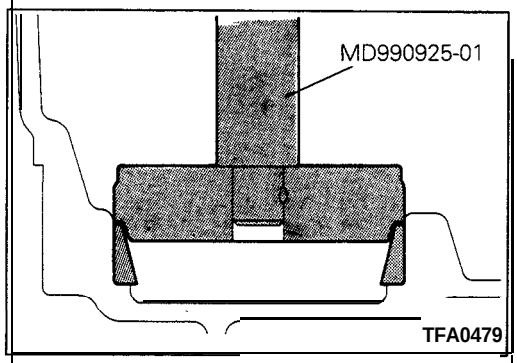
M23LFAP

Caution

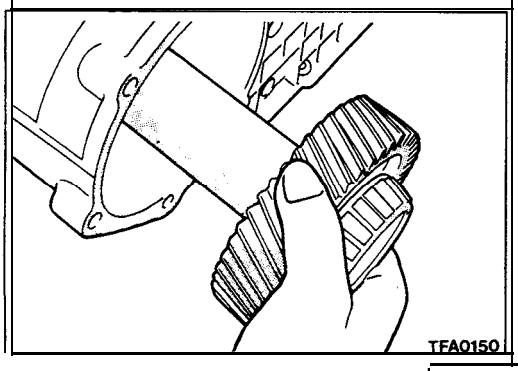
1. **The gasket, O-ring, and oil seal should never be reused. Whenever they have been removed, they must be replaced with new ones. (Note: The rubber used in the oil level gauge does not require replacement.)**
2. **Never use grease other than petrolatum.**
3. **Be sure to apply ATF to the friction elements and rotary and sliding surfaces before reassembly.**
   A new clutch disc and brake disc should be dipped in ATF for more than 2 hours before installation.
4. **Do not use sealant or adhesive for gaskets.**
5. **When replacing a bushing, replace the whole assembly containing that bushing.**
6. **Do not use cotton work gloves or waste cloth for the reassembly job. Use nylon cloth or paper towel if necessary.**
7. **Replace oil in the cooler.**



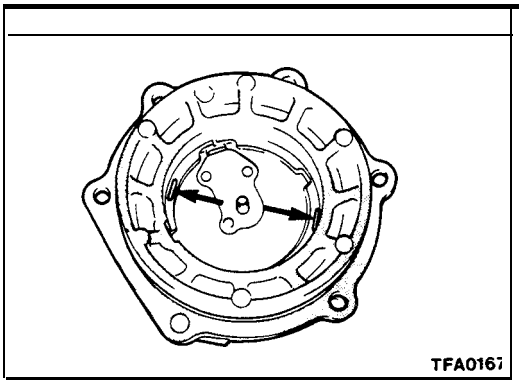
(1) Using the special tool, press-fit the drive shaft oil seal into position.



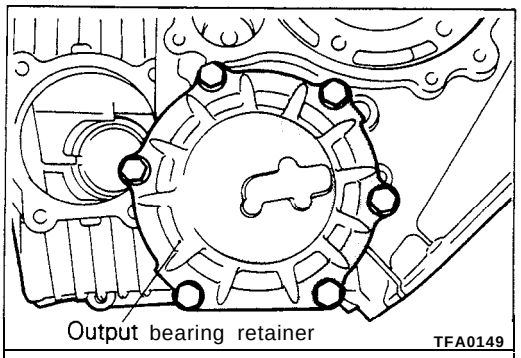
(2) Using the special tool, press-fit the outer race into the transaxle case.



(3) Install the transfer shaft.

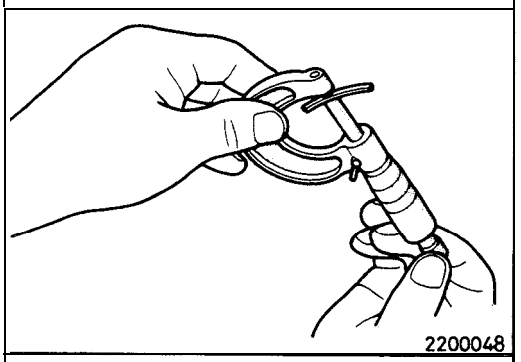

TFA0167

(4) Place 10 mm-long (.39 in.), 1.6 mm-dia. (.06 in.) solders at the locations shown of the output bearing retainer and install the outer race.



TFA0149

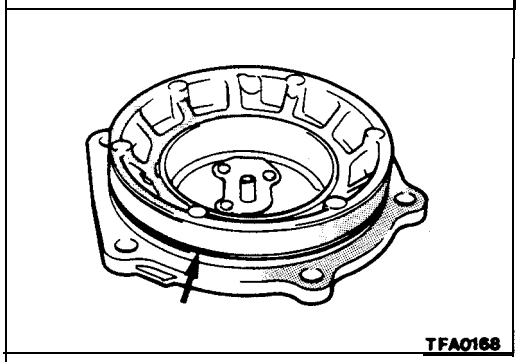
(5) Install the output bearing retainer and tighten bolts to specification.
(6) Loosen the bolts and remove the output bearing retainer.


2200048

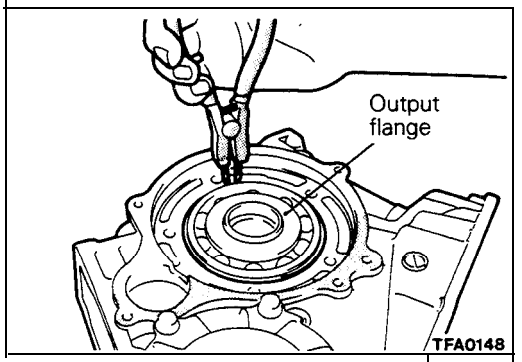
(7) Remove the outer race from the output bearing retainer and remove the solders. If the solders are not crushed, use larger dia. (3 mm or .12 in.) solders to repeat steps (4) to (6). Measure the thickness of the solders crushed with a micrometer and select a spacer to obtain the specified preload.

Standard value: 0.075 – 0.135 mm (.003 – .0053 in.)

(8) Install the spacer selected in the preceding step as well as outer race into the output bearing retainer.

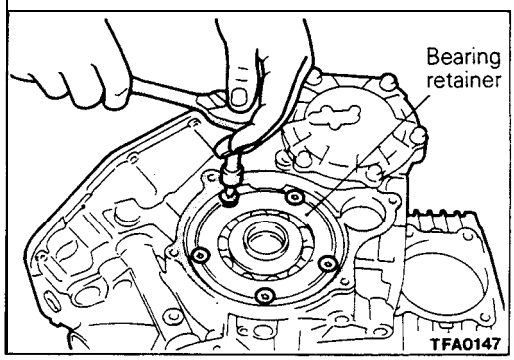

TFA0168

(9) Fit a new O-ring over the periphery of the output bearing retainer.
(lO) Coat the O-ring with ATF and tighten the output bearing retainer mounting bolts to specification.

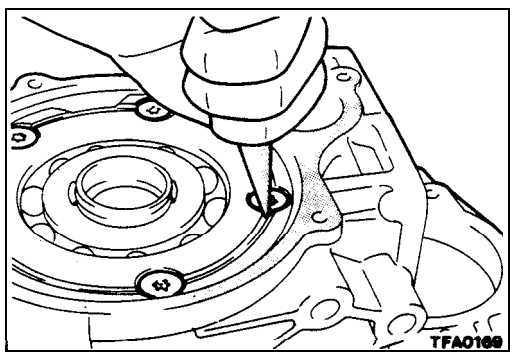


TFA0148

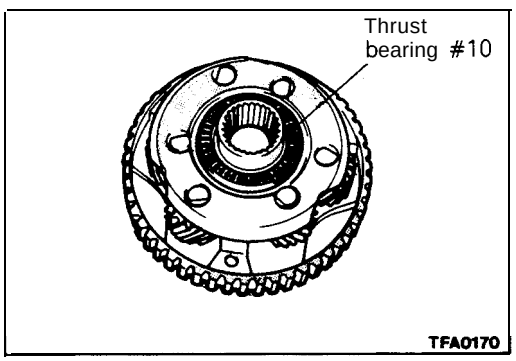
(11) Insert the output flange into the case and fit the snap ring over the periphery of the bearing.



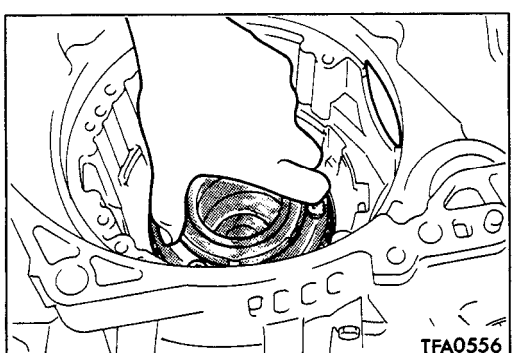
(12)Install the bearing retainer with new bolts.



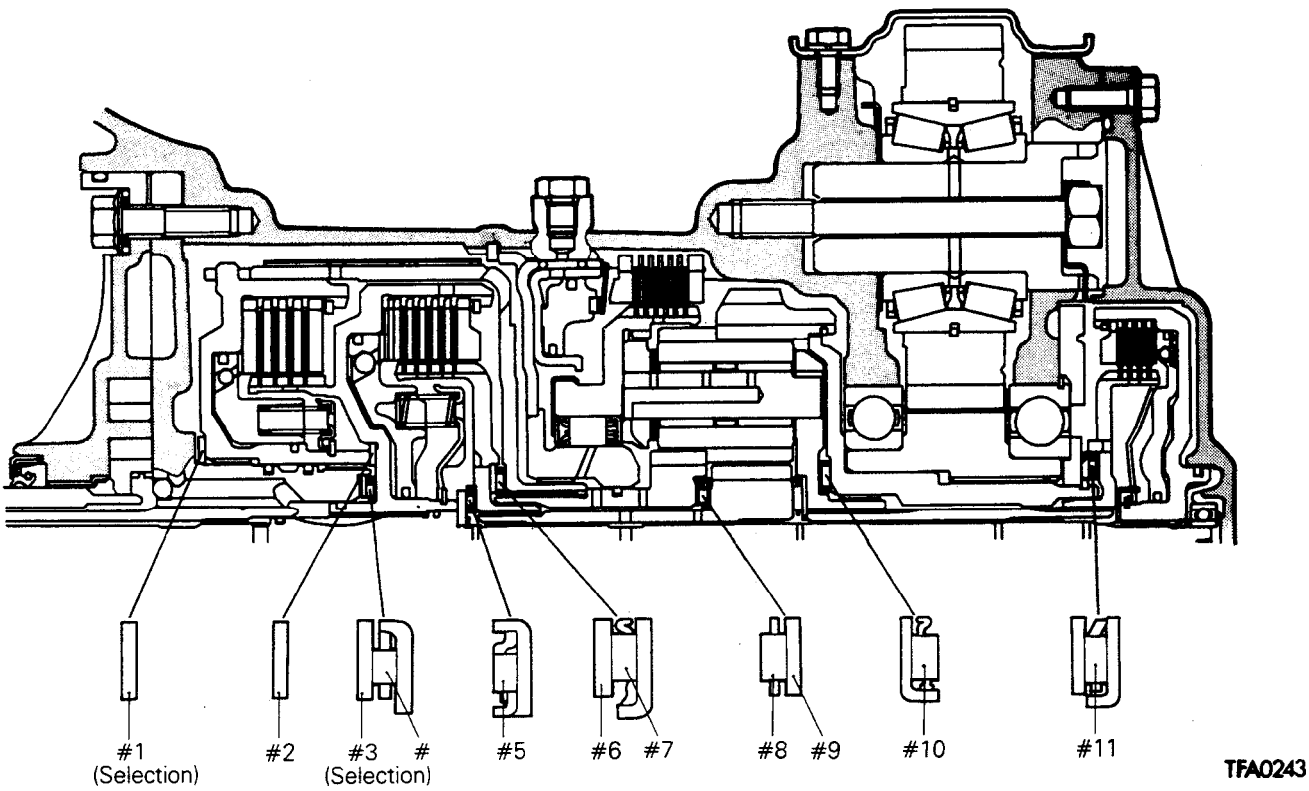
(13)Stake the heads of the bolts.



(14)Coat thrust bearing #10 with petrolatum and affix the bearing to the planetary carrier.



(15)Install the planetary carrier.

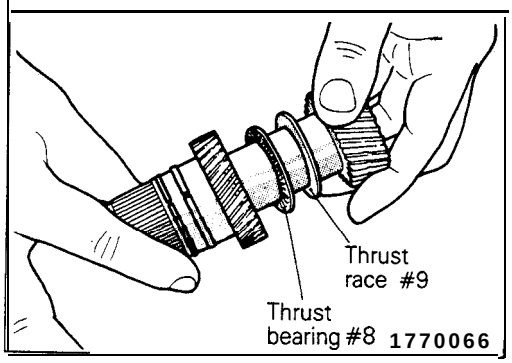


IDENTIFICATION OF THRUST BEARINGS, THRUST RACES AND THRUST WASHERS LOCATION

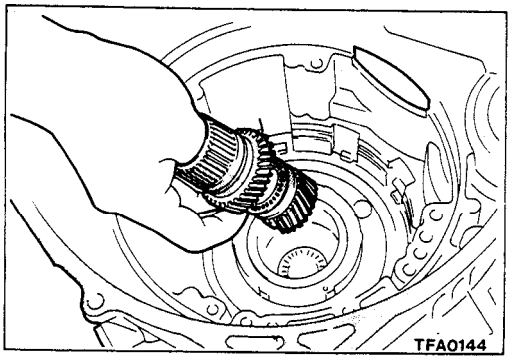
mm (in.)

O.D.	I.D.	Thickness	Part No.	Code	O.D.	I.D.	Thickness	Part No.	Code
70 (2.76)	55.7 (2.193)	1.4 (.055)	*1	#1	48.9 (1.925)	37 (1.46)	2.2 (.087)	MD997852 (included *4)	#3
70 (2.76)	55.7 (2,193)	1.8 (.071)	*2		48.9 (1.925)	37 (1.46)	2.4 (.094)	MD997853 (included *4)	
70 (2.76)	55.7 (2.193)	2.2 (.087)	*3		48.1 (1.874)	34.4 (1.354)	–	MD707271	#4
70 (2.76)	55.7 (2.193)	2.6 (.102)	*4		42.6 (1.677)	28 (1.10)	–	MD720753	#5
66 (2.60)	54 (2.13)	1.8 (.071)	MD731212	#2	54 (2.13)	38.7 (1.524)	1.6 (.063)	MD704936	#6
48.9 (1.925)	37 (1.46)	1.0 (.039)	MD997854 (Included *1)	#3	52 (2.05)	36.4 (1.433)	–	MD720010	#7
48.9 (1.925)	37 (1.46)	1.2 (.047)	MD997847 (included *1)		45 (1.77)	28 (1.10)	–	MD735062	#8
48.9 (1.925)	37 (1.46)	1.4 (.055)	MD997848 (included *2)		46 (1.81)	31 (1.22)	0.8 (.031)	MD735063	#9
48.9 (1.925)	37 (1.46)	1.6 (.063)	MD997849 (included *2)		52 (2.05)	36.4 (1.453)	–	MD720010	#10
48.9 (1.925)	37 (1.46)	1.8 (.071)	MD997850 (included *3)		58 (2.28)	44 (1.73)	–	MD724206	#11
48.9 (1.925)	37 (1.46)	2.0 (.079)	MD997851 (included *3)						

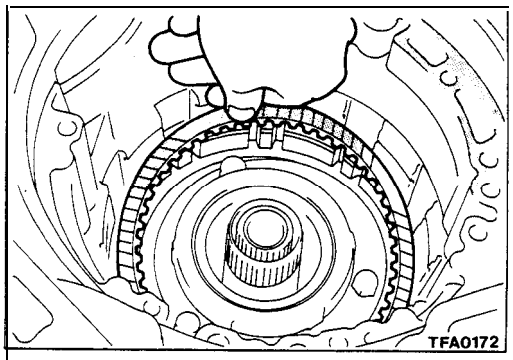
TSB Revision



(16)Assemble the forward sun gear, thrust race #9, thrust bearing #8, and reverse sun gear.

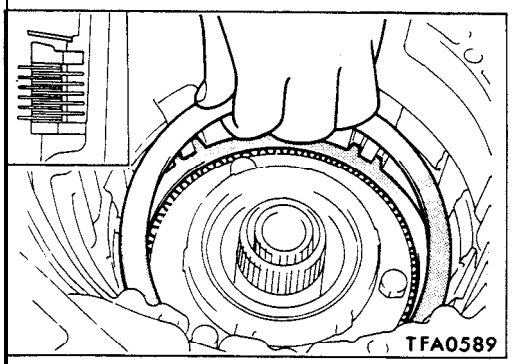


(17)Install the two sun gears assembled in the preceding step into the planetary carrier.



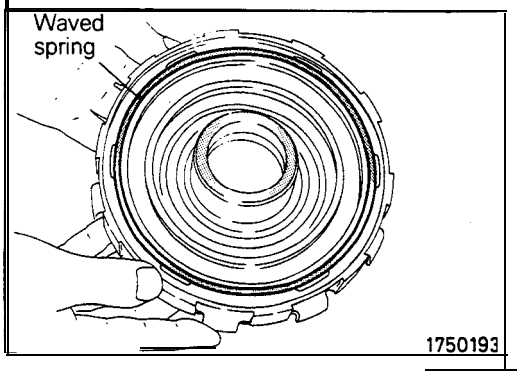
(18)Install the reaction plate, brake disc, and brake plate.

Caution
If a new brake disc is to be used, it should be dipped in ATF for more than two hours.

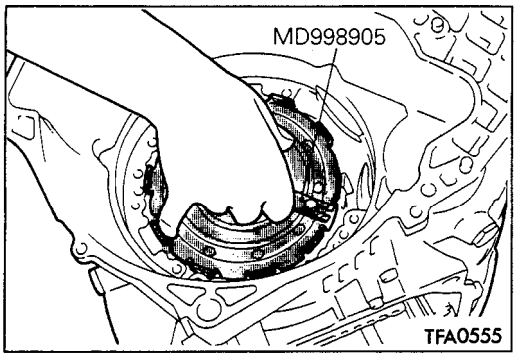


(19)Install the pressure plate disassembled and return spring.

Caution
Make sure the return spring is installed in the correct direction.

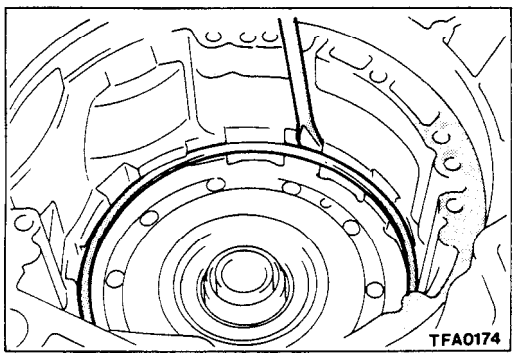


(20)Coat the wave spring with petrolatum and affix it to the center support.

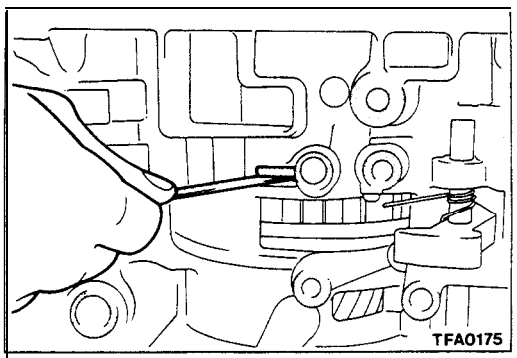


(21)Install the special tool to the center support, fit new O-rings (at two places), and press the center support into the transaxle case.

Caution
1. Coat the O-rings with ATF and align oil holes.
2. Install with care not to allow the wave spring to shift its position.

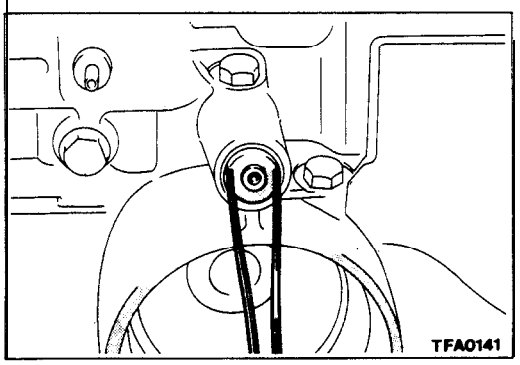


(22)Fit the snap ring.

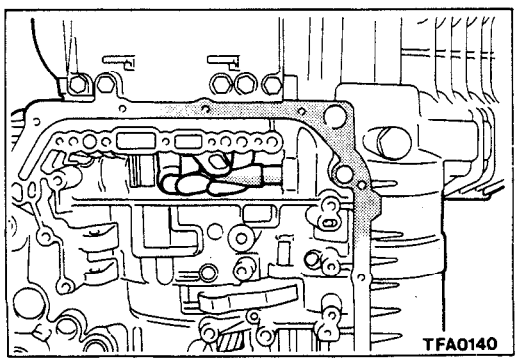


(23)Using a feeler gauge, measure the end play in low-reverse brake. Select a pressure plate to obtain the specified end play.

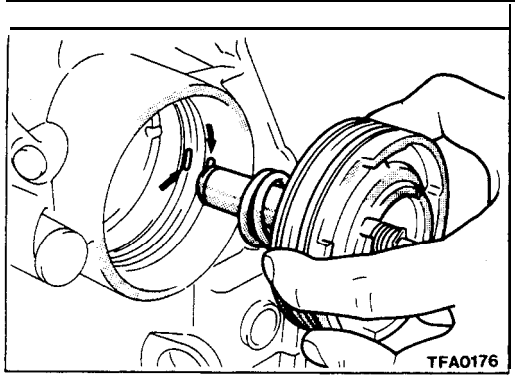
Standard value: 1.0 – 1.2 mm (.039 – .047 in.)



(24)Install the air exhaust plug and mount the plug.

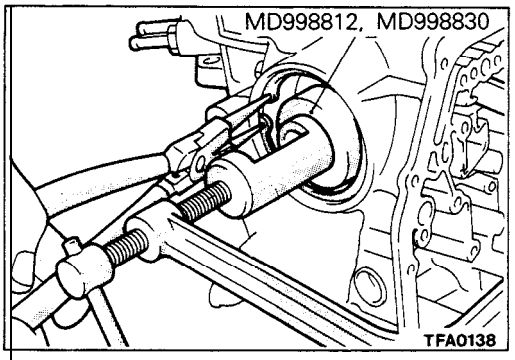


(25)Install the anchor rod.

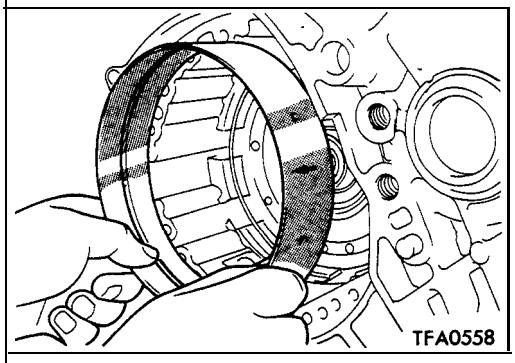


(26)Install the kickdown servo spring, piston, and sleeve.

Caution
Make sure that the ends of seal ring on the kickdown servo piston are not located at the oil supply port (indicated by arrows).

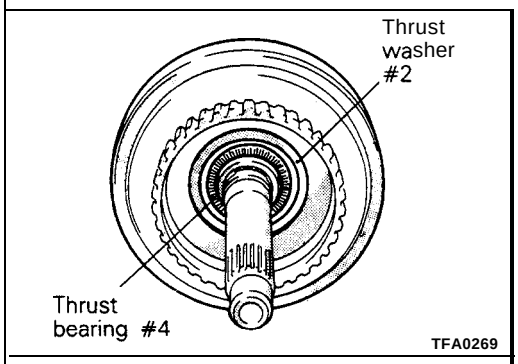


(27)Using the special tools, press the kickdown servo piston and sleeve into position and fit the snap ring.

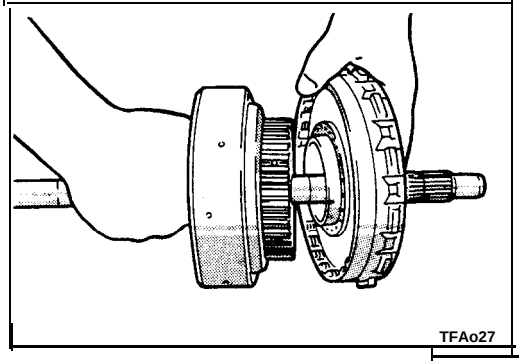


(28)Fit the kickdown band.

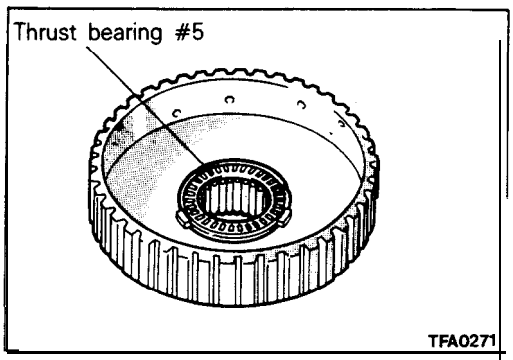
Caution
Install so that the arrow points to the front.



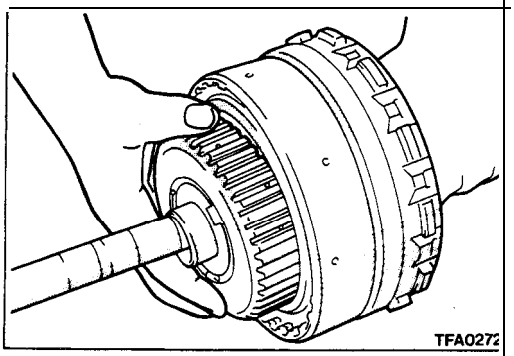
(29)Install thrust bearing #4 and thrust washer #2 to the rear clutch.



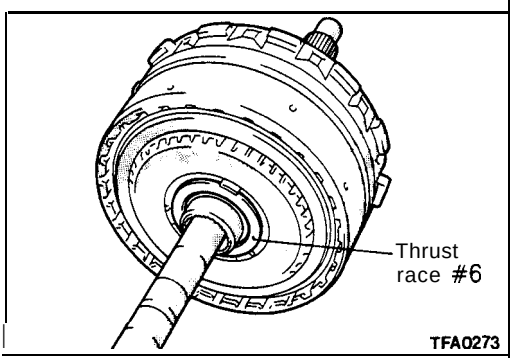
(30)Mate the rear clutch with the front clutch.



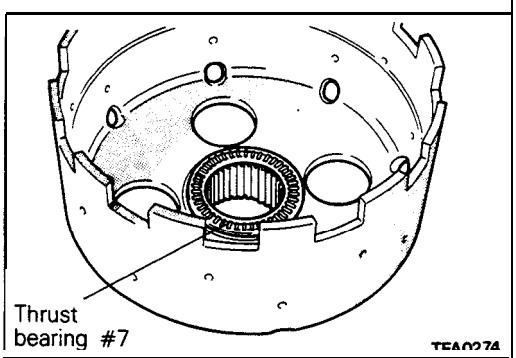
(31)Mount thrust bearing #5 to the rear clutch hub.



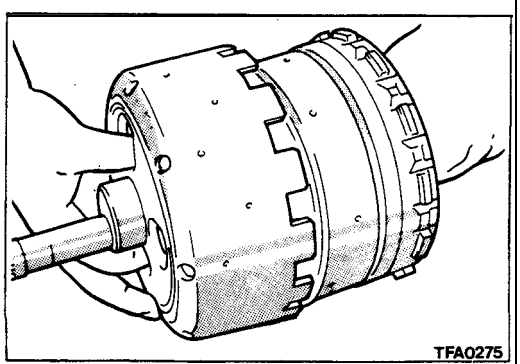
(32)Assemble the rear clutch hub to rear clutch.



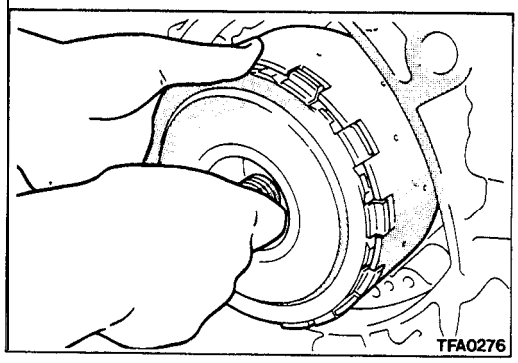
(33)Install thrust race #6 to the rear clutch hub end face.



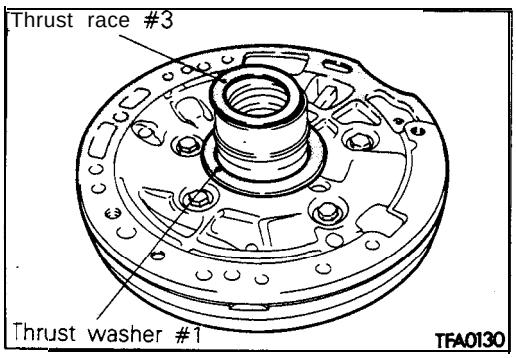
(34)Install thrust bearing #7 to the kickdown drum



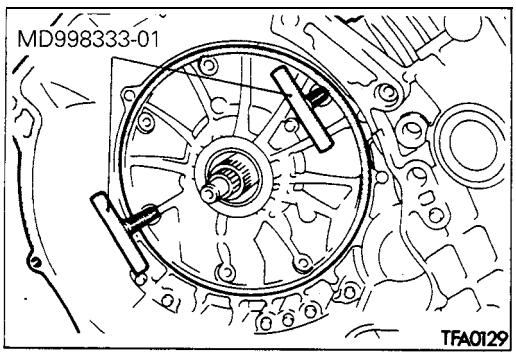
(35)Assemble the clutch assembly to kickdown drum.



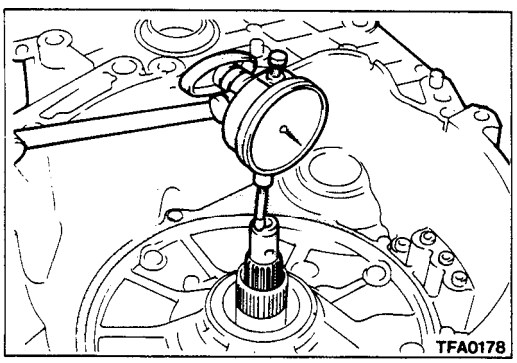
(36)Install the clutch assembly and kickdown drum to the transaxle case at the same time.



(37)Using petrolatum, affix thrust race #3 and thrust washer #1 to the rear end face of oil pump.

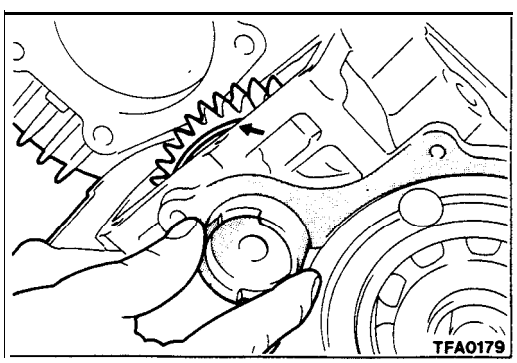


(38)Using the special tool, install a new oil pump gasket and oil pump assembly.



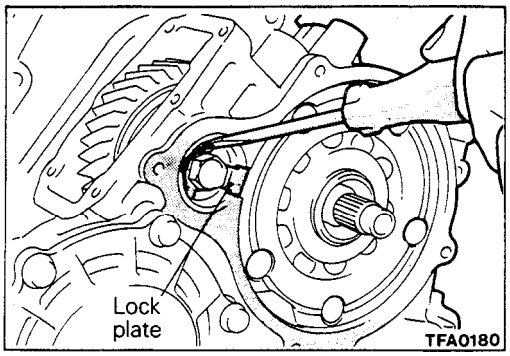
(39)Measure the end play in input shaft. If the measurement is out of specification, replace thrust race #3 and thrust washer #1 to obtain the specified end play.

Standard value: 0.3 – 1.0 mm (.012 – .039 in.)

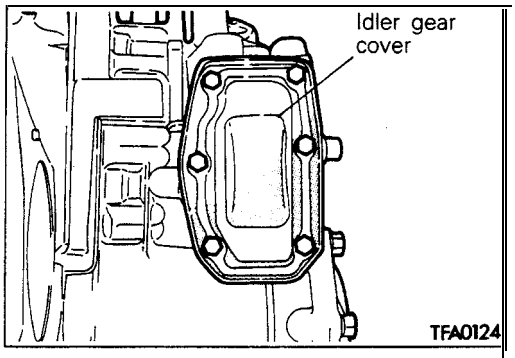


(40)Install the spacer, idler gear, and bearing and insert the idler shaft.

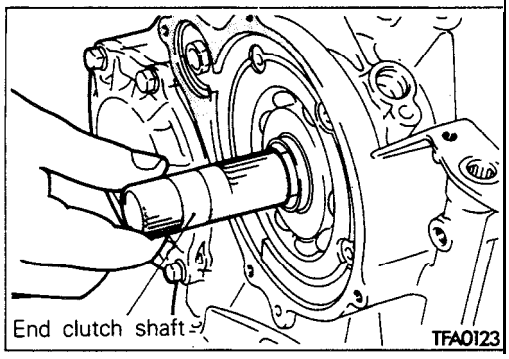
Caution
Install so that the identification groove in the idler gear end face is on the rear face side.



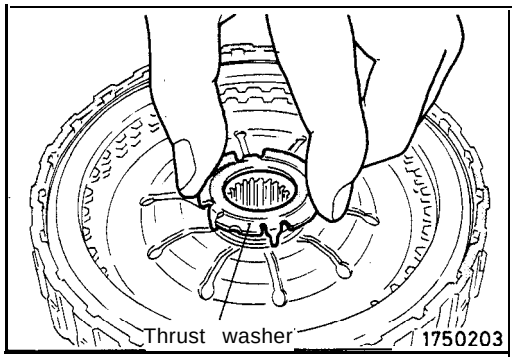
(41)Tighten the idler shaft lock bolt to specification and raise the new lock plate for locking.



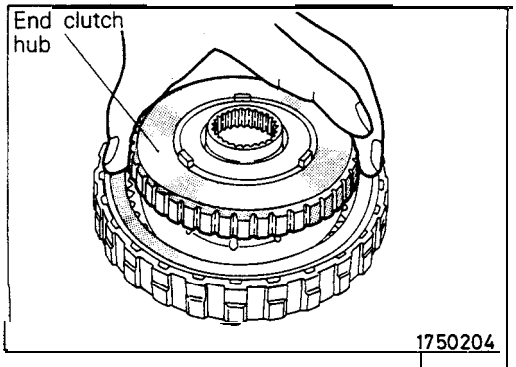
(42)Install the idler gear cover and new gasket



(43)Insert the end clutch shaft with its longer splines facing front.

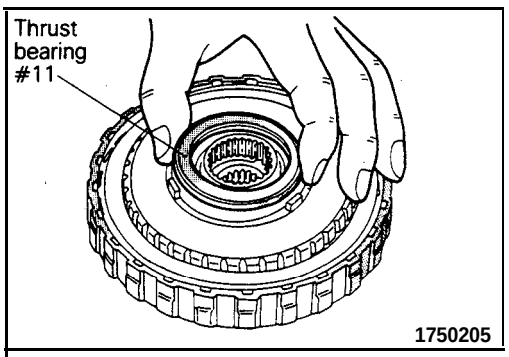


(44)Fit the thrust washer onto the end clutch return spring.

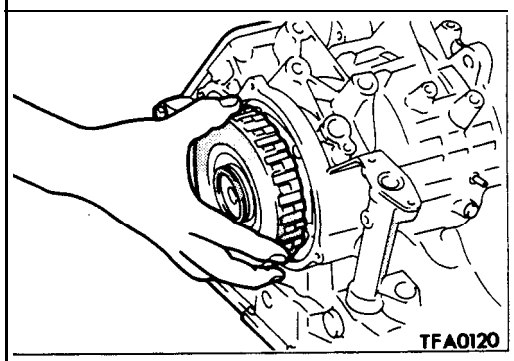


(45)Install the end clutch hub to the end clutch assembly.

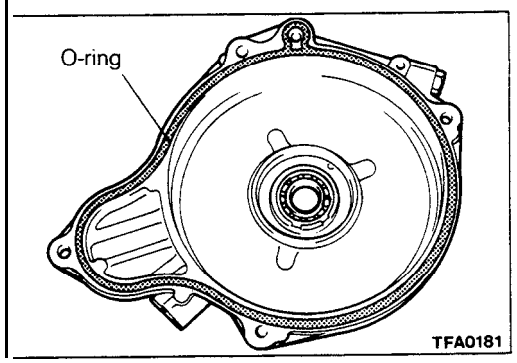
TSB Revision



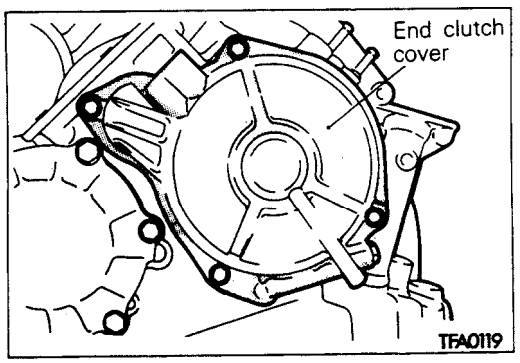
(46)Using petrolatum, affix the thrust bearing to the end clutch hub.



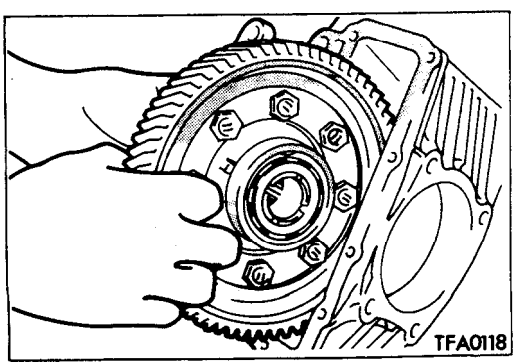
(47)Install the end clutch assembly.



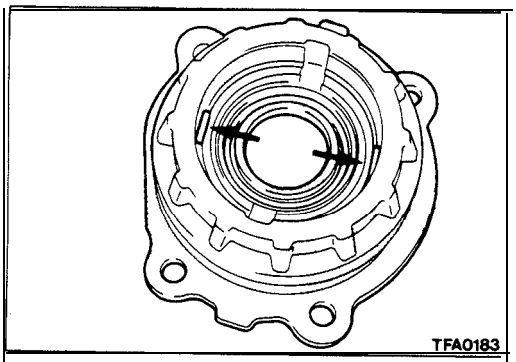
(48)Mount a new O-ring onto the end clutch cover.



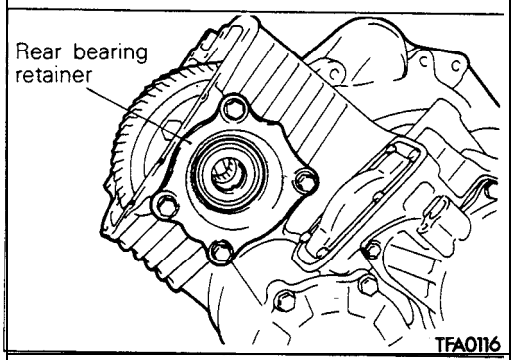
(49)Install the end clutch cover and tighten bolts to specification.



(50)Install the differential assembly.

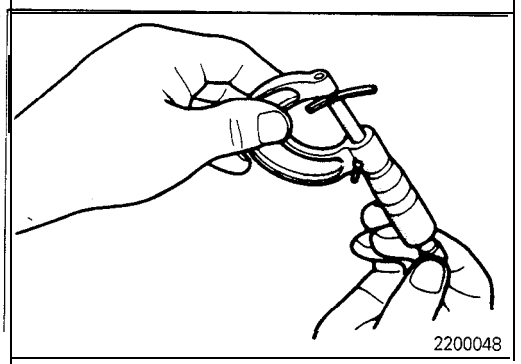

TFA0183

(51)Place 10 mm-long (.39 in.), 1.6 mm-dia. (.06 in.) solders at the locations shown of the differential rear bearing retainer and install the outer race.



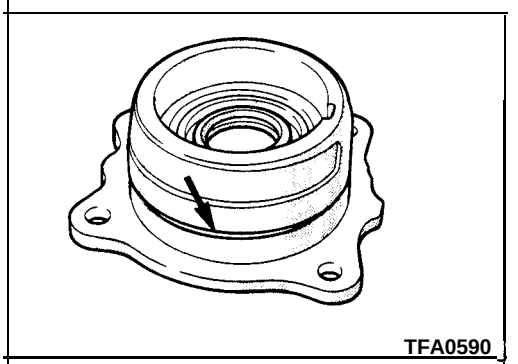
TFA0116

(52)Install the differential rear bearing retainer and tighten bolts to specification.
(53)Loosen the bolts, remove the differential rear bearing retainer, and remove the solders. If the solders are not crushed, use larger dia. [3 mm (.12 in.)] solders to repeat steps (51) to (53).

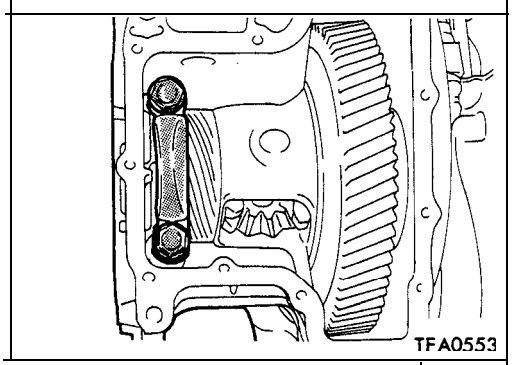

2200048

(54)Measure the thickness of the solders crushed with a micrometer and select a spacer to obtain the specified end play and preload.

Standard value:
Front differential case preload
0.075 – 0.135 mm (.003 – .0053 in.)

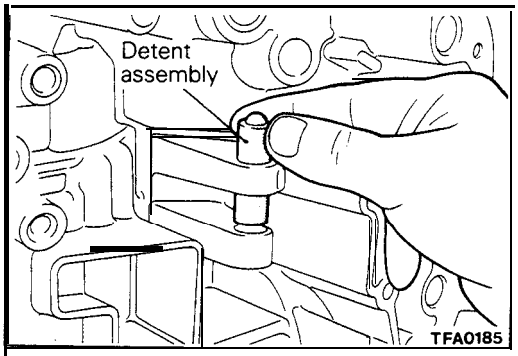

TFA0590

(55)Fit a new O-ring to the differential rear bearing retainer, apply ATF, and mount the retainer to the transaxle case before torquing the bolts to specification.'

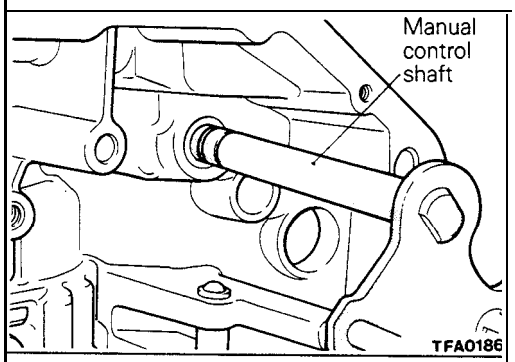

TFA0553

(56)Mount the front bearing cap and tighten bolts to specification.
(57)Install the differential cover and new gasket.

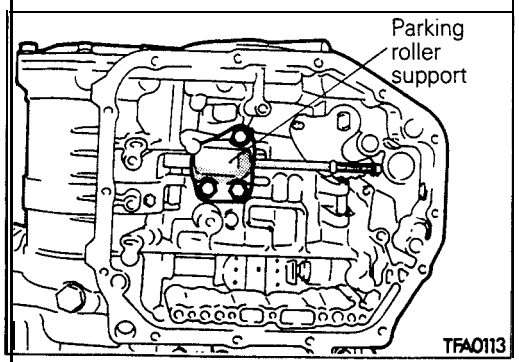
TSB Revision



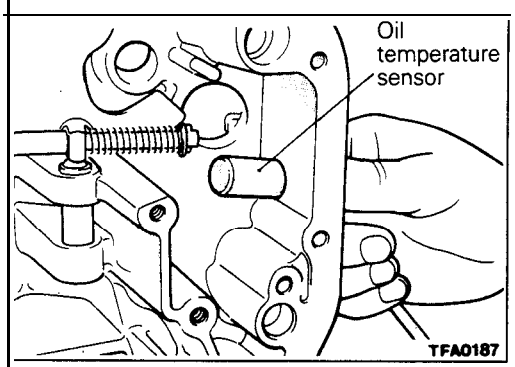
(58)Install the detent assembly.



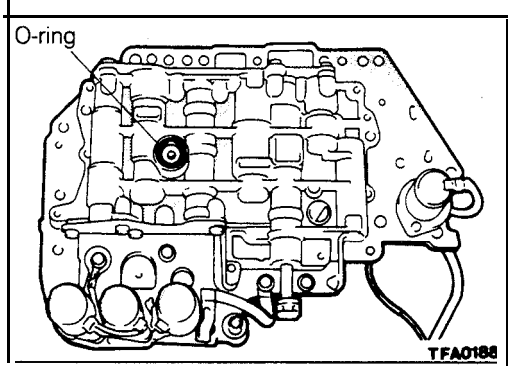
(59)Fit a new O-ring to the manual control shaft assembly, apply ATF, and insert it into the transaxle case.
(60)Align the groove in manual control shaft with the set screw hole and install the set screw.



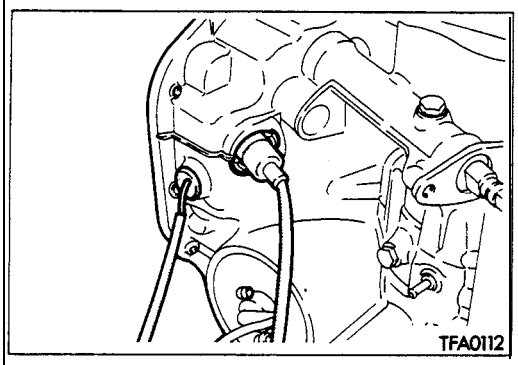
(61)Mount the parking roller support.



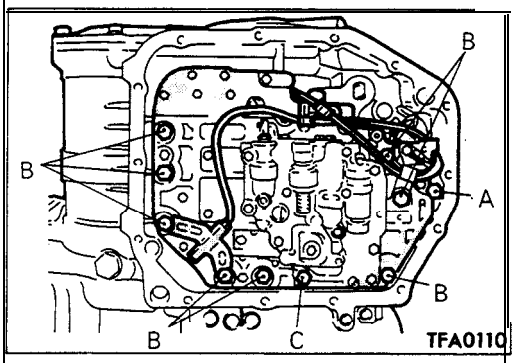
(62)Install the oil temperature sensor into the case.



(63)Fit the O-ring into the O-ring groove in the top surface of valve body assembly.



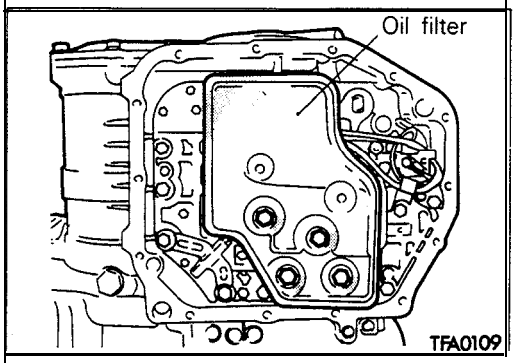
(64)Replace the solenoid valve harness grommet O-ring with a new one.
(65)Pass the solenoid valve connector into the hole in transaxle case from the inside.
(66)Press the solenoid valve harness grommet into the case hole.



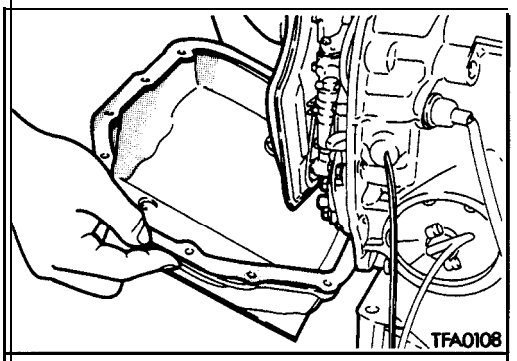
(67)Fitting the detent plate pin into the groove in manual valve, temporarily secure the valve body. Then, install the oil temperature sensor and holder and tighten bolts to specification.

Bolt A = 18 mm (.71 in.)
Bolt B = 25 mm (.98 in.)
Bolt C = 40 mm (1.57 in.)

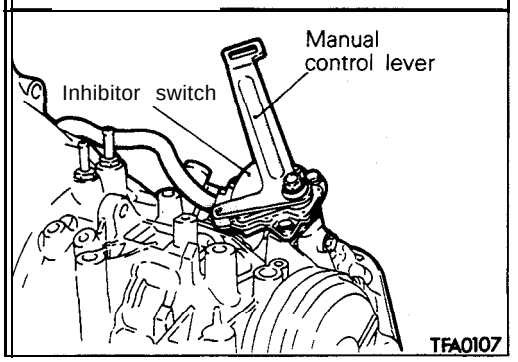
Caution
Secure the solenoid valve and oil temperature sensor harnesses as shown.



(68)Install the oil screen.

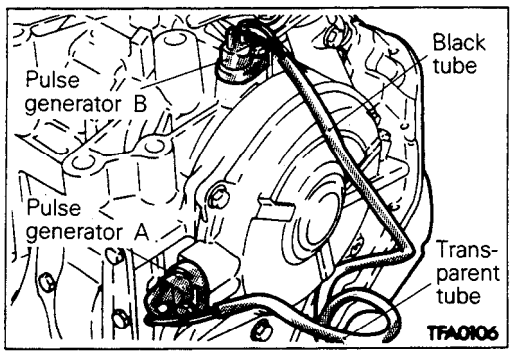


(69)Mount the magnet to oil pan and install the oil pan



(70)Install the inhibitor switch and manual control lever.
(71)Install the speedometer gear assembly.

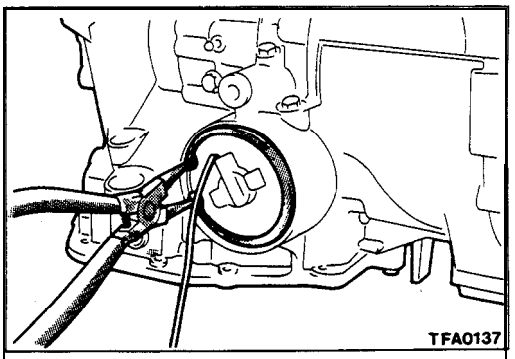
TSB Revision



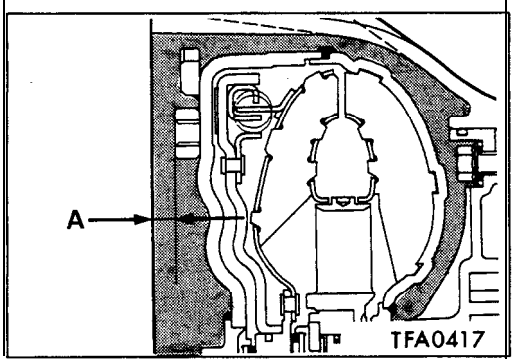
(72)Install pulse generator A and B.

Caution
Install the black tube to the output gear side and transparent tube to end clutch side.

(73)Mount the oil filler tube and insert the level gauge.
(74)Install the brackets.
(75)Adjust the kickdown servo.



(76)Install the kickdown servo switch and secure it with the snap ring.



(77)Apply ATF to the oil pump drive hub, install the torque converter, and push converter into position so that dimension A is up to specification.

Standard value: Approx. 16.3 mm (.642 in.)

COMPONENT DISASSEMBLY/REASSEMBLY PRECAUTIONS

M23NEAB

GENERAL CLEANING PRECAUTIONS

(1) Clean parts and blow the oil passages and oil holes with compressed air to check that they are not clogged.
(2) For the cleaning solution, use the specified ATF or kerosene.
(3) When drying parts with compressed air, use care not to allow ATF or kerosene to splash over your face.

PARTS HANDLING PRECAUTIONS

(1) Keep parts after cleaning in good order to ensure correct inspection, repair, and reinstallation.
(2) When disassembling the valve body, keep each valve with the mating spring.
(3) Keep the new brake disc and clutch disc for replacement dipped in ATF for more than two hours.

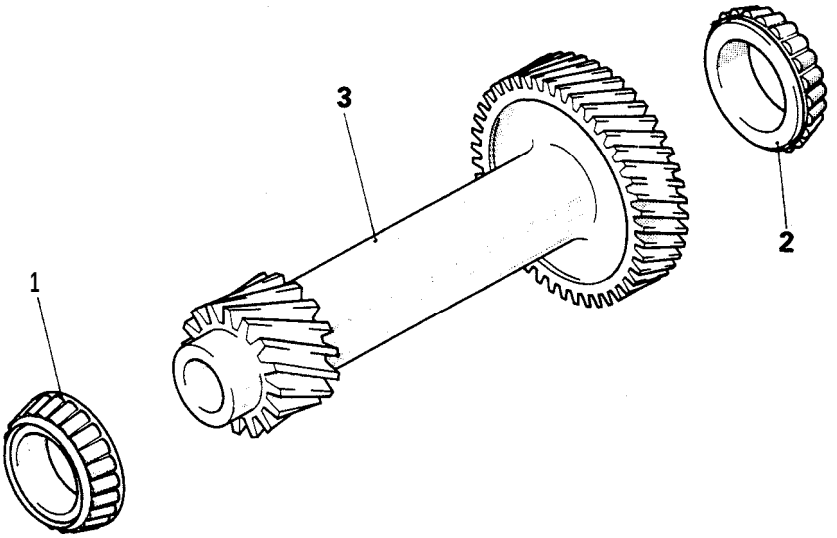
GENERAL REASSEMBLY PRECAUTIONS

(1) Coat the seal rings, clutch disc, clutch plate, and rotary and sliding surfaces with ATF before installation.
(2) Replace all gaskets and O-rings with new parts. They should not be reused.
(3) Use petrolatum to secure parts in position.

TRANSFER SHAFT

M23LMAE

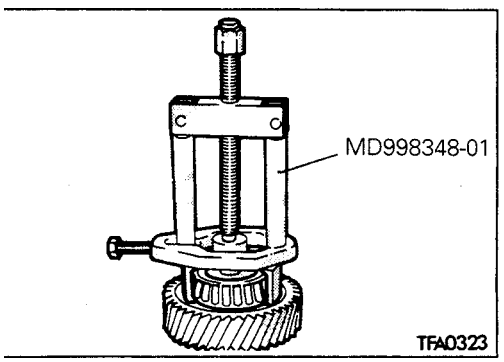
DISASSEMBLY AND REASSEMBLY



Disassembly steps

◆■►◆1. Bearing
2. Transfer shaft
◆■► ● 4 3. Bearing

TFA0322

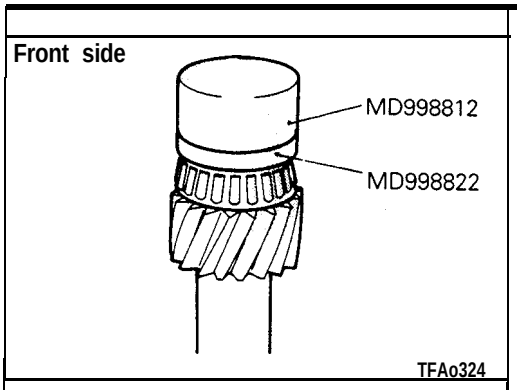


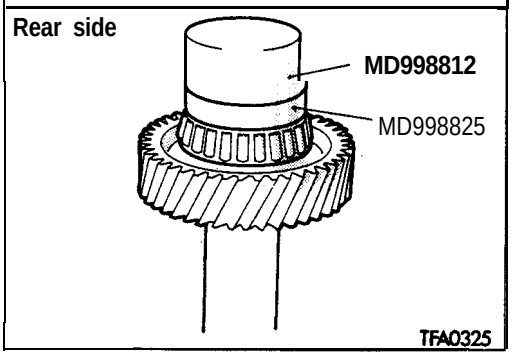
SERVICE POINTS OF DISASSEMBLY

1. 3. REMOVAL OF BEARING

Using the special tool, remove bearings from both ends of the transfer shaft.

TSB Revision





SERVICE POINTS OF REASSEMBLY

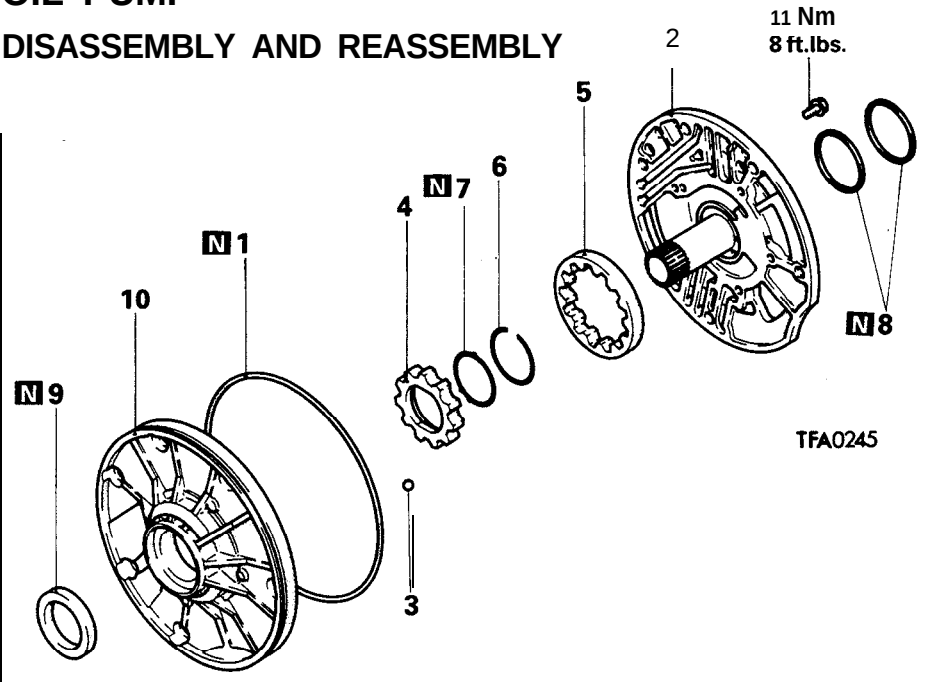
1. 3. INSTALLATION OF BEARING

Using the special tool, install the bearings to the transfer shaft.

OIL PUMP

DISASSEMBLY AND REASSEMBLY

M23LGAL



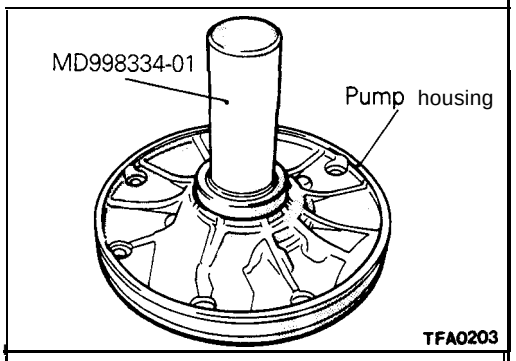
Disassembly steps

- ◆◆ 1. O-ring
- ◆◆ 2. Reaction shaft support
- ● * 3. Steel ball
- ● *● + 4. Drive gear
- ◆◆ ● * 5. Driven gear
- 6. Snap ring
- 7. Oil seal
- 8. Seal ring
- ● 4 9. Oil seal
- 10. Oil pump housing

SERVICE. POINTS OF DISASSEMBLY

4. REMOVAL OF DRIVE GEAR / 5. DRIVEN GEAR

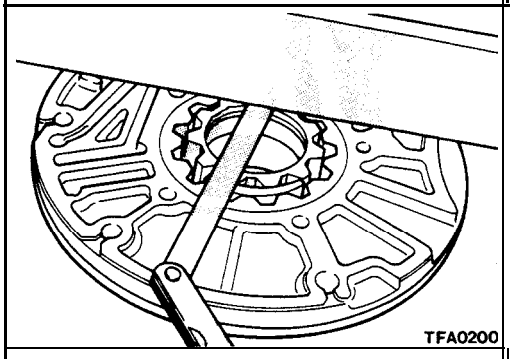
Make reassembly alignment marks on the drive and driven gears.



SERVICE POINTS OF REASSEMBLY

9. INSTALLATION OF OIL SEAL

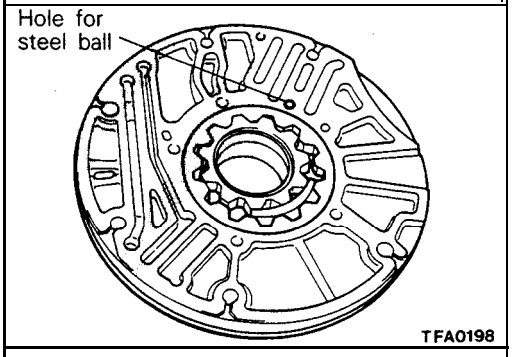
Using the special tool, install the oil seal to the pump housing.



5. MEASUREMENT SIDE CLEARANCE OF DRIVEN GEAR / 4. DRIVE GEAR

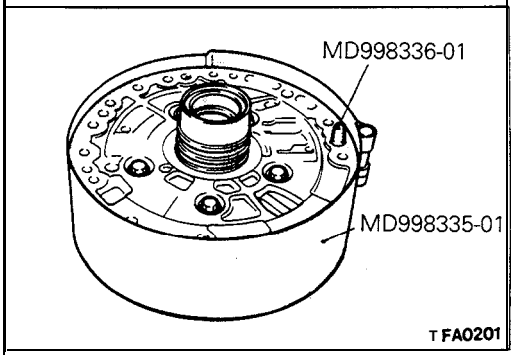
Measure the side clearance of the oil pump gear and, if the specification is exceeded, replace the gear or oil pump assembly.

Standard value: 0.03 – 0.05 mm (.001– .002 in.)



3. LOCATION OF STEEL BALL

Install the steel ball at the location shown.



2. INSTALLATION OF REACTION SHAFT SUPPORT

(1) Assemble the reaction shaft support and the pump housing, and tighten the bolts by fingers.
(2) Insert the special tool (Guide Pin, MD998336-01) into the oil pump mounting bolt hole and clamp the periphery with the special tool (Band, MD998335-01) to position the support and housing.
(3) Tighten the five bolts to the specified torque.
(4) Make sure that the oil pump gear turns freely.

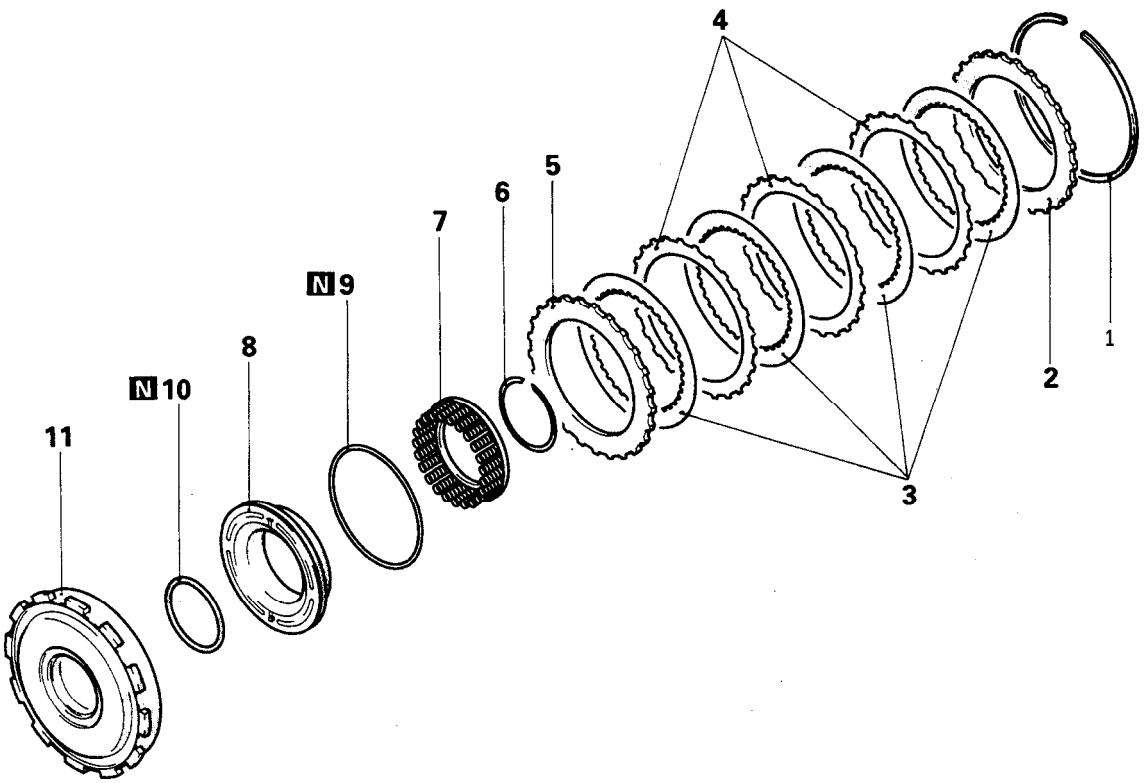
1. INSTALLATION OF O-RING

Install a new O-ring in the groove of the pump housing and apply petrolatum jelly to the O-ring.

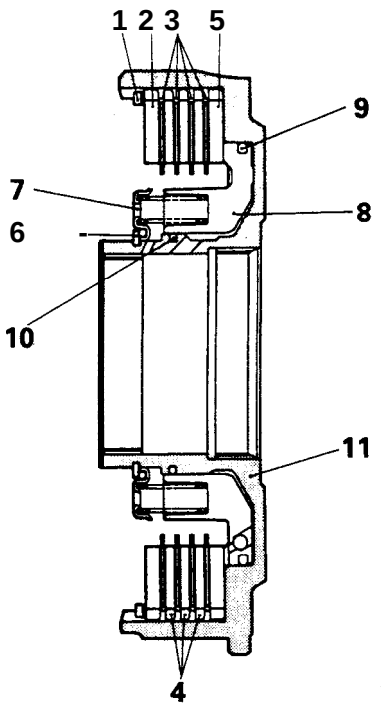
FRONT CLUTCH ASSEMBLY

MWLHAH

DISASSEMBLY AND REASSEMBLY



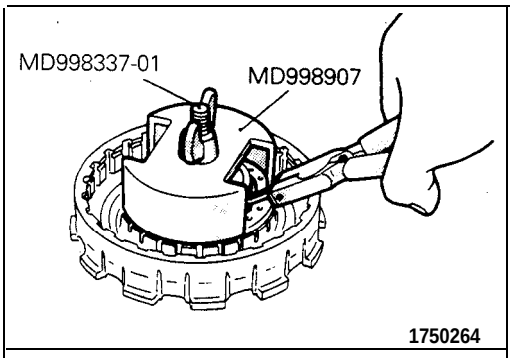
TFA0422



- ● a 1. Snap ring
- ● a 2. Clutch reaction plate
- ● * 3. Clutch plate
- 4. Clutch disc
- ● * 5. Clutch pressure plate
- ● *● * 6. Snap ring
- 7. Return spring
- 8. Front clutch piston
- 9. D-ring
- 10. D-ring
- 11. Front clutch retainer

TFA0423

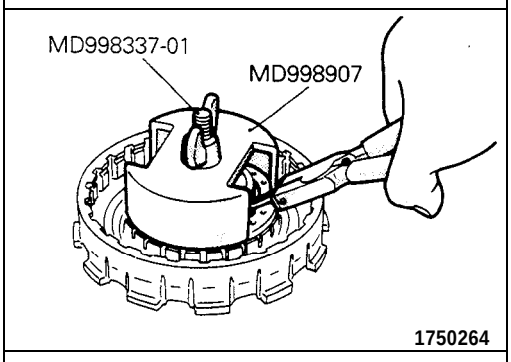
TSB Revision



SERVICE POINT OF DISASSEMBLY

6. REMOVAL OF SNAP RING

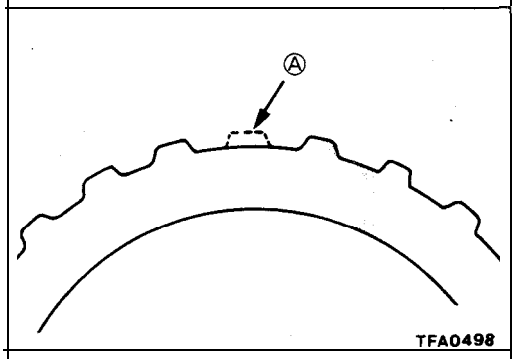
(1) Compress the return spring with the special tool.
(2) Remove the snap ring.



SERVICE POINTS OF REASSEMBLY

6. INSTALLATION OF SNAP RING

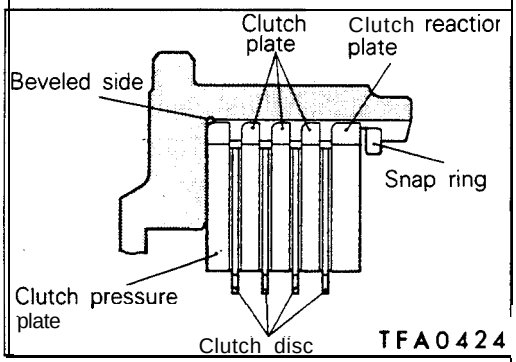
(1) Compress the return spring with the special tool.
(2) Install the snap ring.



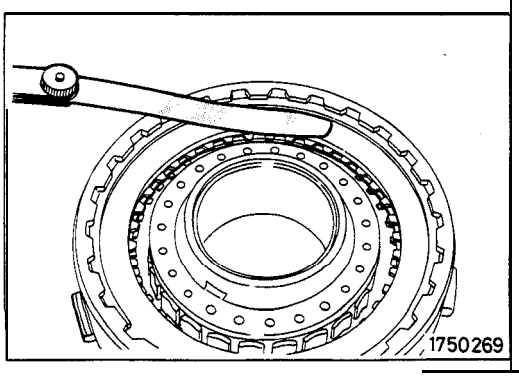
5. INSTALLATION OF CLUTCH PRESSURE PLATE / 3. CLUTCH PLATE / 2. CLUTCH REACTION PLATE

(1) When installing the clutch pressure plate, clutch plate, and clutch reaction plate, align the areas where one tooth is missing [indicated by Ⓐ].

N O T E
This ensures that the automatic transmission fluid escapes well and the plate and disc are cooled efficiently.



(2) Install the plates so that the shear droop side of each plate is located as shown.
(3) Make sure that the thickest plate (clutch reaction plate) is located on the snap ring side.



1. SELECTION OF SNAP RING

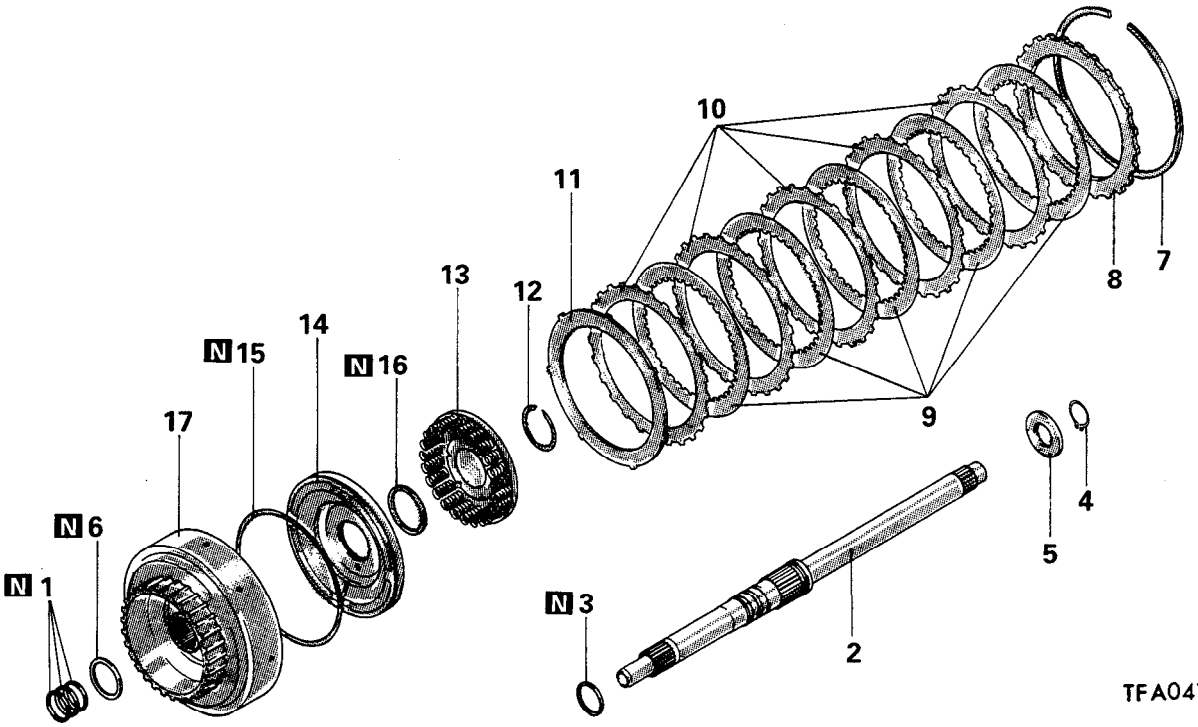
(1) Check clearance between the snap ring and clutch reaction plate. To check the clearance, hold entire circumference of the clutch reaction plate down with 50 N (11 lbs.) force. If clearance is out of standard value, select a snap ring to obtain the standard value.

Standard value: 0.8 – 1.0 mm (.032 – .039 in.)

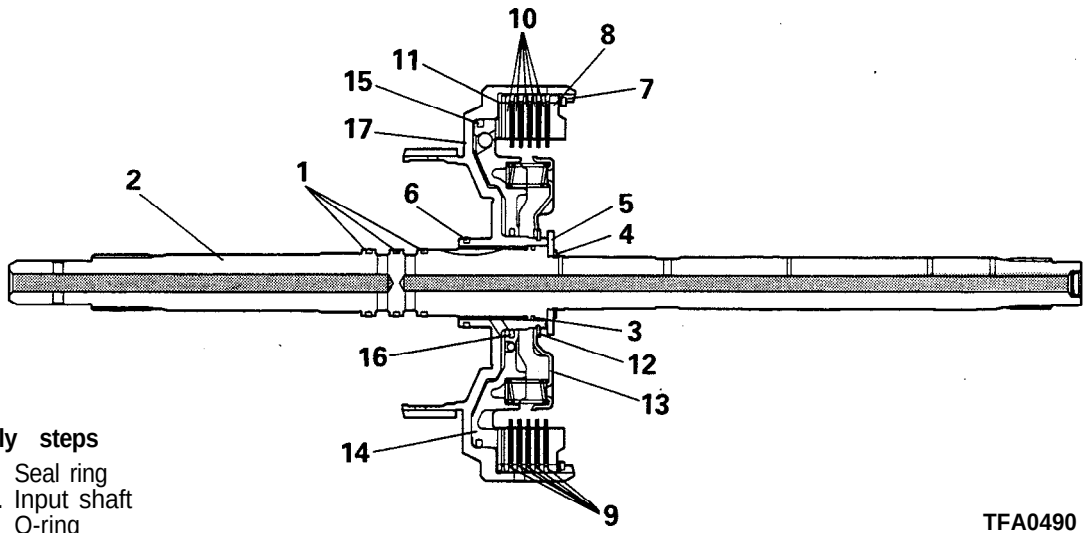
REAR CLUTCH ASSEMBLY

M23LHBI

DISASSEMBLY AND REASSEMBLY



TFA0418

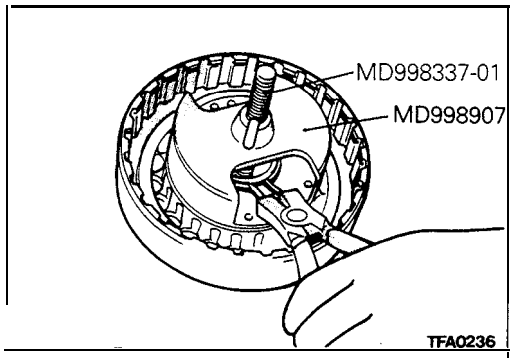


TFA0490

Disassembly steps

1. Seal ring
- + 2. Input shaft
3. O-ring
4. Snap ring
5. Thrust race
6. Seal ring
- * 7. Snap ring
- ◆◆ 8. Clutch reaction plate
9. Clutch disc
- + 10. Clutch plate
11. Wave spring
- ◆◆ a 12. Snap ring
13. Return spring
14. Rear clutch piston
15. D-ring
16. D-ring
17. Rear clutch retainer

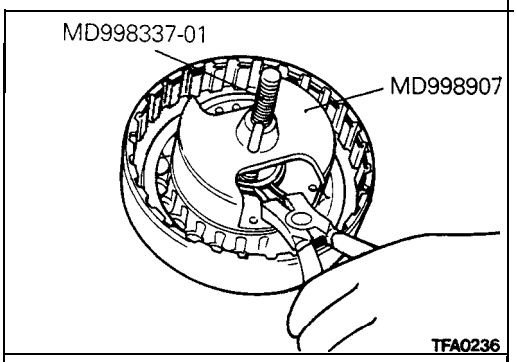
TSB Revision



SERVICE POINT OF DISASSEMBLY

12. REMOVAL OF SNAP RING

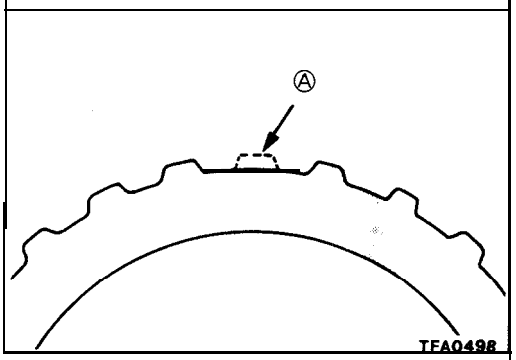
(1) Using the special tool, compress the return spring.
(2) Using the snap ring pliers, remove the snap ring.



SERVICE POINTS OF REASSEMBLY

12. INSTALLATION OF SNAP RING

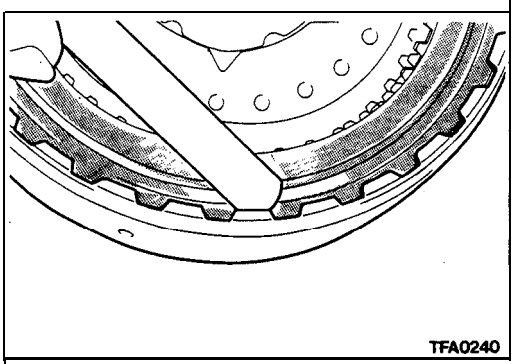
(1) Using the special tool, compress the return spring.
(2) Using the snap ring pliers, install the snap ring.



10. INSTALLATION OF CLUTCH PLATE / 8. CLUTCH REACTION PLATE

Install the clutch plate and reaction plate so that the areas where one tooth is missing [indicated by Ⓐ] are aligned with each other.

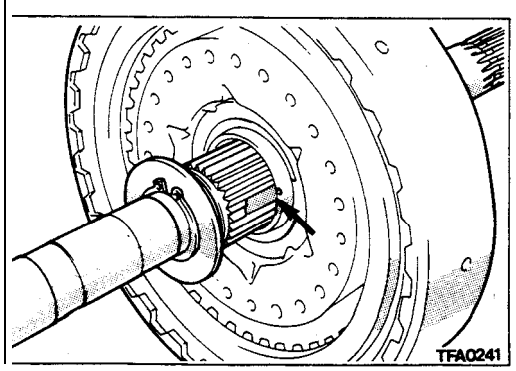
NOTE
This ensures that the automatic transmission fluid escapes well and the plate and disc are cooled efficiently.



7. SELECTION OF SNAP RING

Check clearance between the snap ring and clutch reaction plate. To check the clearance, hold entire circumference of the clutch reaction plate down with 50 N (11 lbs.) force. If clearance is out of standard value, select a snap ring to obtain the standard value.

Standard value: 1.0 – 1.2 mm (.034 – .047 in.)



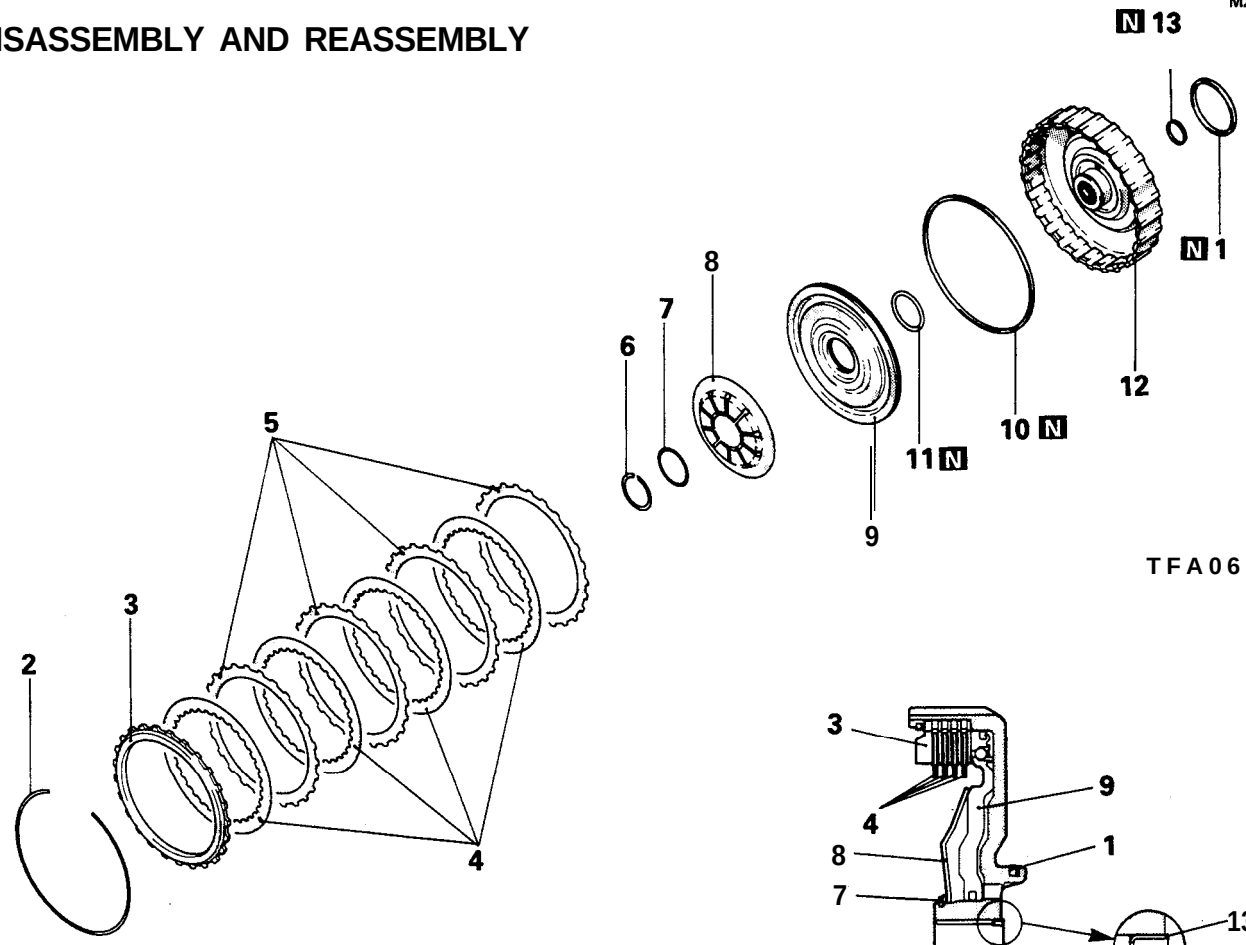
2. INSTALLATION OF INPUT SHAFT

Align the oil groove in the input shaft with the alignment mark on the rear clutch retainer.

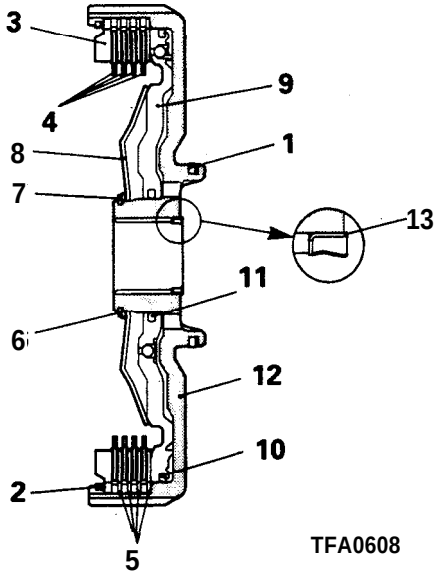
END CLUTCH ASSEMBLY

DISASSEMBLY AND REASSEMBLY

M23LHFF



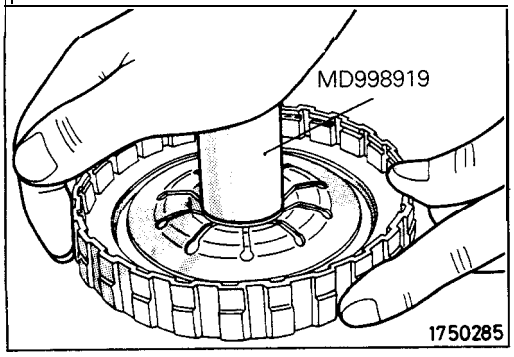
TFA0607



TFA0608

Disassembly steps

1. Seal ring
2. Snap ring
3. Clutch reaction plate
4. Clutch disc
5. Clutch plate
6. Snap ring
7. Washer
8. Return spring
9. End clutch piston
10. Oil seal
11. D-ring
12. End clutch retainer
13. Oil seal



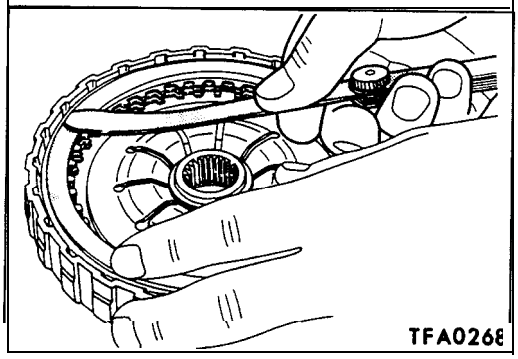
SERVICE POINTS OF REASSEMBLY

6. INSTALLATION OF SNAP RING

Using the special tool, fit the snap ring.

Caution
Make sure that the snap ring is fitted in position in the groove.

TSB Revision



2. SELECTION OF SNAP RING

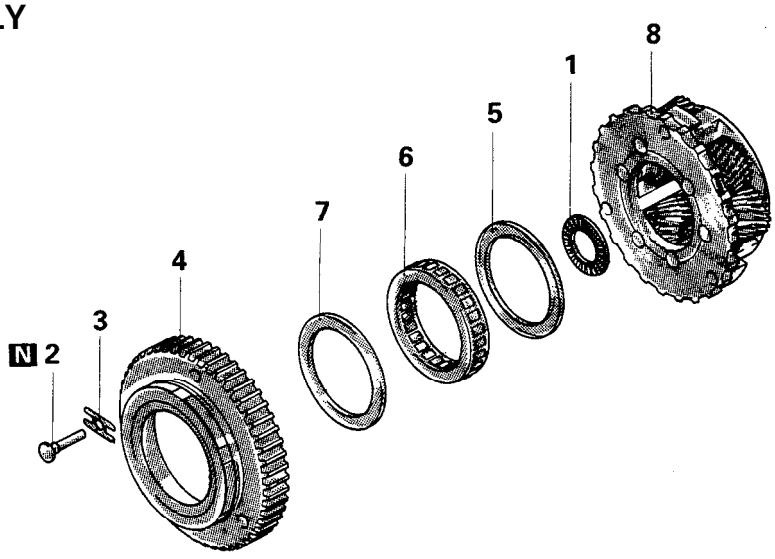
After the snap ring has been installed, check to see if the clearance between the snap ring and clutch reaction plate is up to specification. When measuring the clearance, press the entire periphery of the clutch reaction plate with a force of **50** N (1 1 lbs.). If the clearance is out of specification, reselect the snap ring to obtain the specified clearance.

Standard value: 0.6 – 0.85 mm (0.24 – 0.33 in.)

PLANETARY GEAR

DISASSEMBLY AND REASSEMBLY

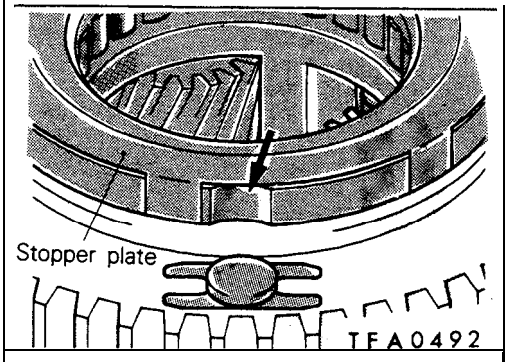
M23LKAL



Disassembly steps

1. Thrust bearing
◆◆ ● * 2. Rivet
● * 3. Waved washer
4. One-way clutch outer race
5. End plate
● * 6. One-way clutch
7. End plate
8. Planet carrier

TFA0491

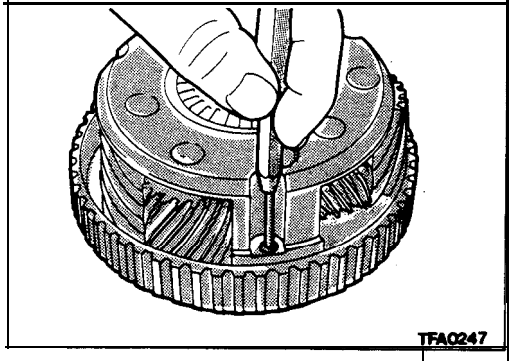


SERVICE POINT OF DISASSEMBLY

2. REMOVAL OF RIVET

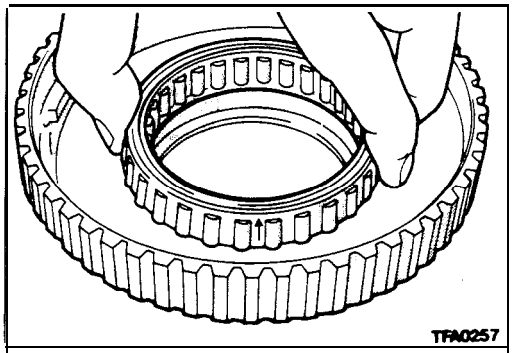
(1) Shift the stopper plate to ensure that the rivet head does not hit it.

NOTE
Make sure that the stopper plate claw is not located at the groove in the one-way clutch outer race.



(2) Using a pin punch, drive out the rivet.

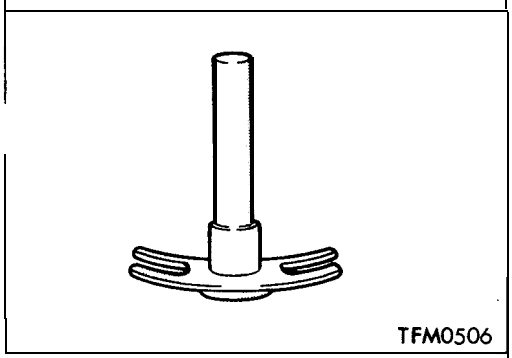
TSB Revision



SERVICE POINTS OF REASSEMBLY

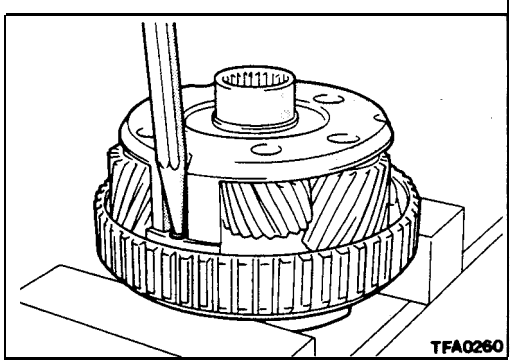
6. INSTALLATION OF ONE-WAY CLUTCH

Push the one-way clutch into position so that the arrow on its gauge points at a direction as shown.



3. INSTALLATION OF WAVED WASHER

Install the waved washer to the rivet so that its indentation is placed on the outer race side.



2. INSTALLATION OF RIVET

Stake the rivet using a punch and press.

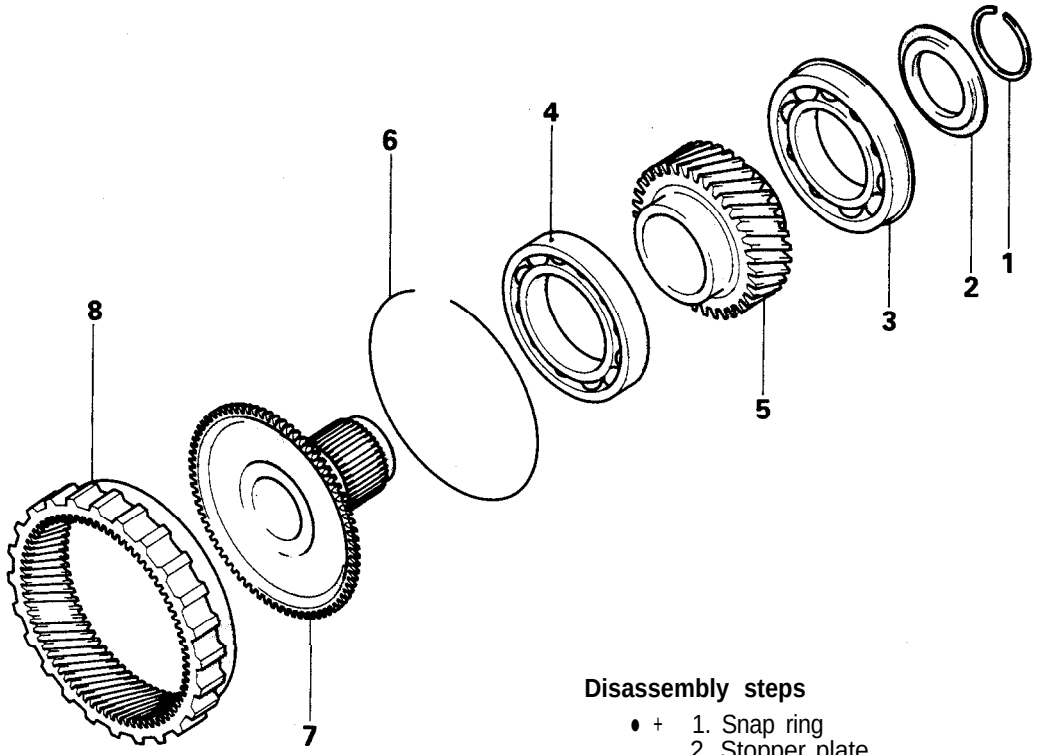
NOTE
(1) Use a punch with a 60" tip angle.
(2) Stake the rivet with a load of 11,000 – 13,000 N (2,425 – 2,866 lbs.).

TSB Revision

ANNULUS GEAR AND TRANSFER DRIVE GEAR SET

M23LLAG

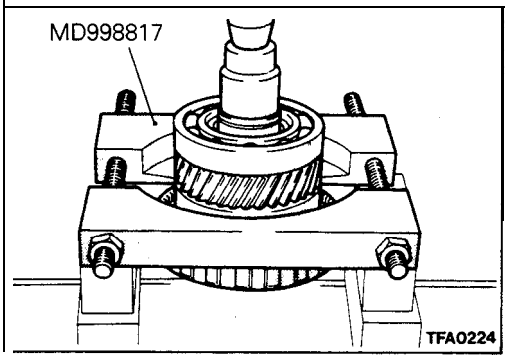
DISASSEMBLY AND REASSEMBLY

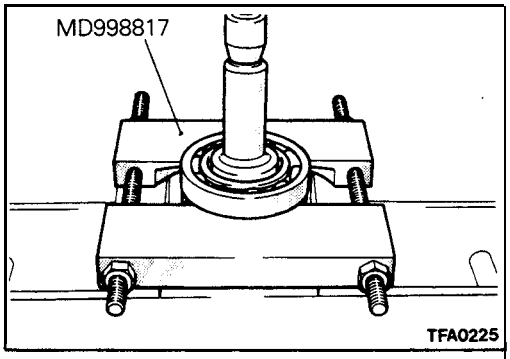


TFA0262

Disassembly steps

- ⬮ + 1. Snap ring
  2. Stopper plate
- ● * ◆◆ 3. Bearing
- ◆◆ ◆◆ 4. Bearing
- ◆◆ ◆◆ 5. Transferdrivegear
  6. Snap ring
  7. Output flange
  8. Annulus gear





SERVICE POINTS OF DISASSEMBLY

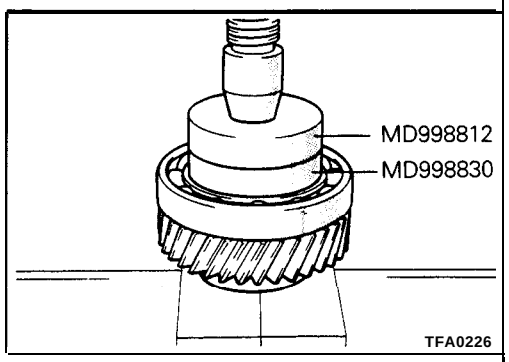
3. 4. REMOVAL OF BEARING / 5. TRANSFER DRIVE GEAR

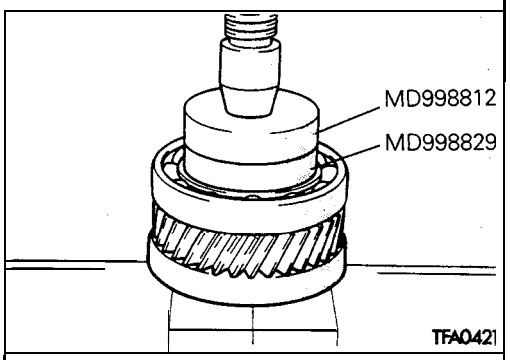
(1) Using the special tool, remove the transfer drive gear together with two bearings from the output flange.

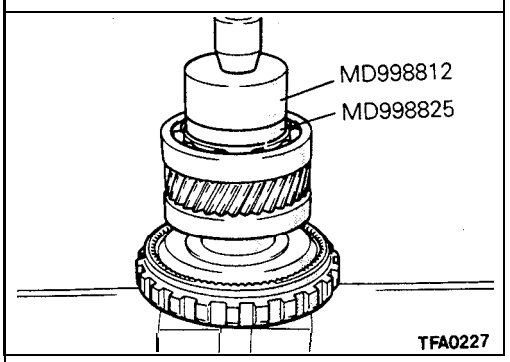
Caution
Install the special tool in position between the output flange and bearings.

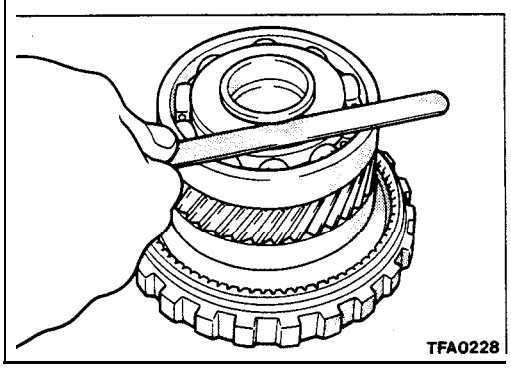
(2) Using the special tool, remove the bearings from both sides of the transfer drive gear.

TSB Revision









SERVICE POINTS OF REASSEMBLY

5. INSTALLATION OF TRANSFER DRIVE GEAR / 4. 3. BEARING

(1) Using the special tool, press-fit the bearings into both sides of the transfer drive gear.

(2) Using the special tool, install the transfer drive gear to the output flange.

1.. SELECTION. OF SNAP RING

Measure the snap ring groove clearance and select the appropriate spacer to obtain the specified end play.

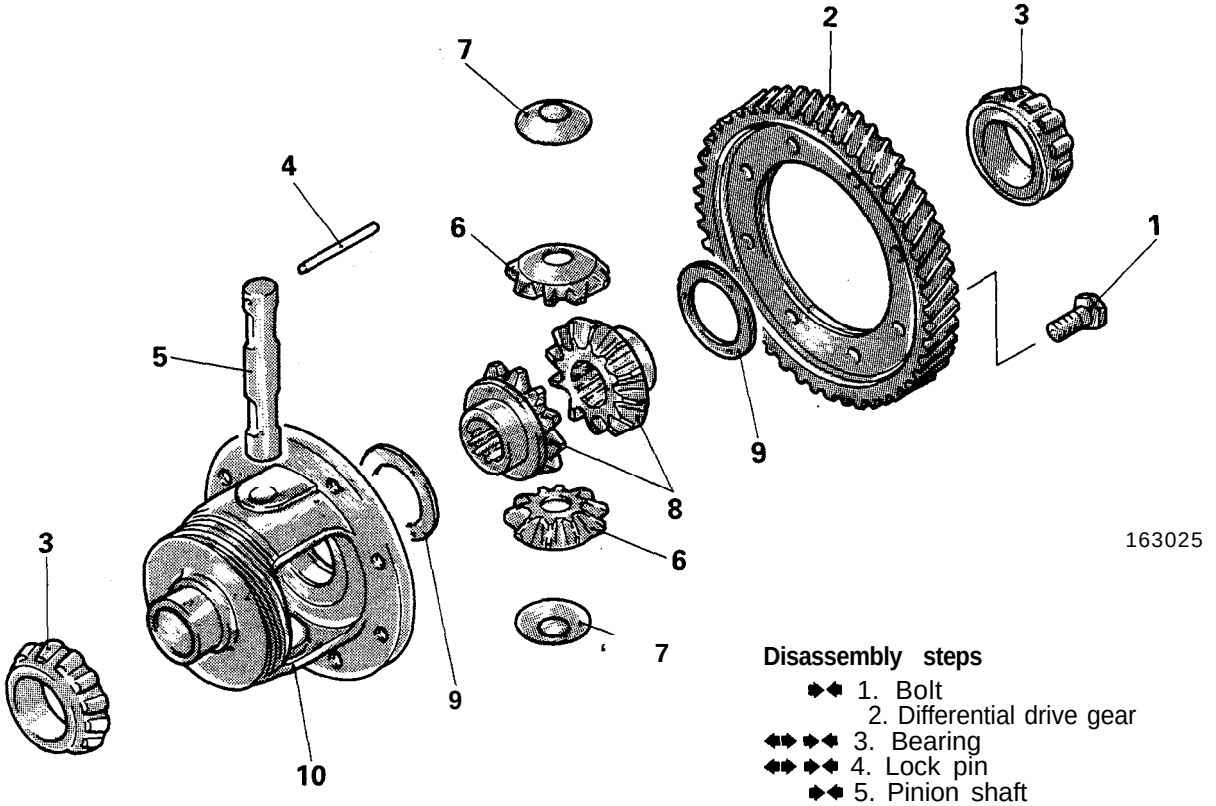
Standard value: 0 – 0.09 mm (0 – .0035 in.)

TSB Revision

DIFFERENTIAL

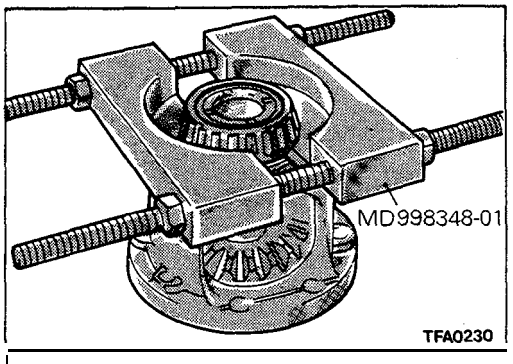
M23LNAH

DISASSEMBLY AND REASSEMBLY



Disassembly steps

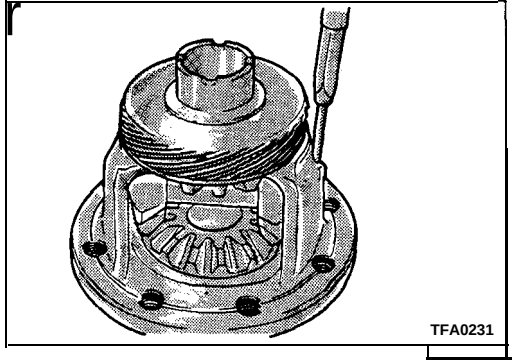
- ◆◆ 1. Bolt
  2. Differential drive gear
- ◆◆ ◆◆ 3. Bearing
- ◆◆ ◆◆ 4. Lock pin
- ◆◆ 5. Pinion shaft
- ◆◆ 6. Pinion
- ● a 7. Washer
- ● * 8. Side gear
- ◆◆ 9. Spacer
  10. Differential case



SERVICE POINTS OF DISASSEMBLY

3. REMOVAL OF BEARING

Using the special tool; remove the bearing.

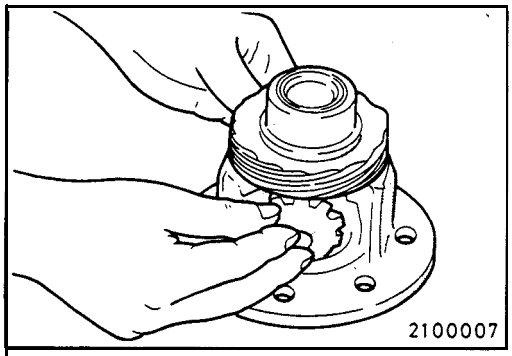


4. REMOVAL OF LOCK PIN

Using a pin punch, drive out the lock pin.

NOTE
The lock pin can be easily driven out.

TSB Revision

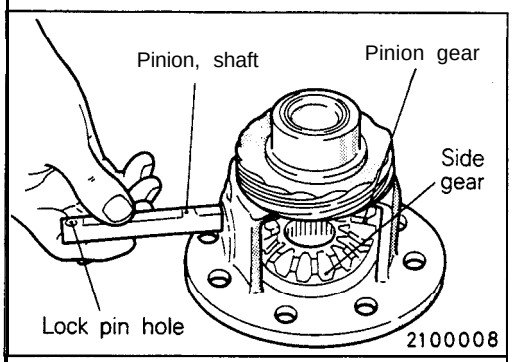


SERVICE POINTS OF DISASSEMBLY

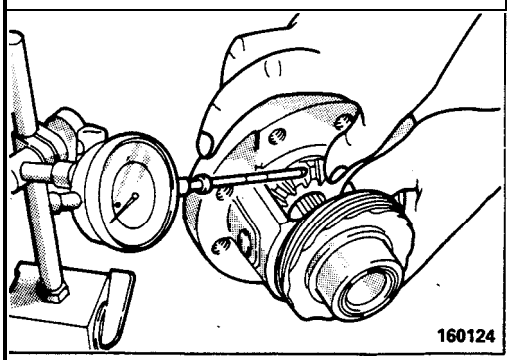
9. INSTALLATION OF SPACER / 8. SIDE GEAR / 7. WASHER / 6. PINION / 5. PINION SHAFT

(1) Fit the spacer to the back face of the side gear, then install the gear into the differential case.

(2) Fit washer to back of pinion and rotate two pinions at the same time into position to mesh with the side gear.



(3) Insert the pinion shaft

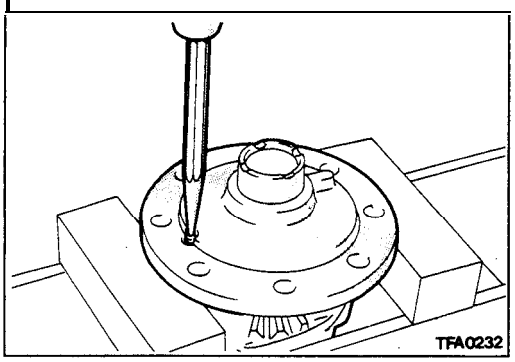


(4) Measure the backlash between the side gear and pinion.

Standard value: 0.025 – 0.150 mm (.001 – .0059 in.)

(5) If the backlash is out of specification, select the appropriate spacer and disassemble and reassemble the gears as necessary.

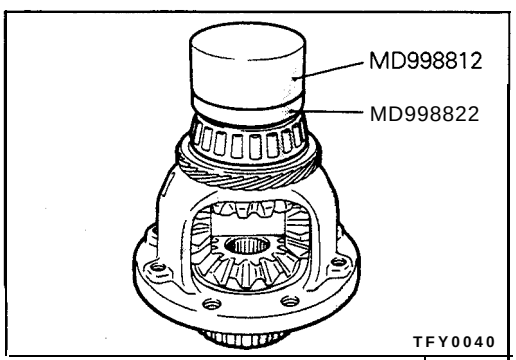
NOTE
Adjust so that the backlash in both side gears equals.



4. INSTALLATION OF LOCK PIN

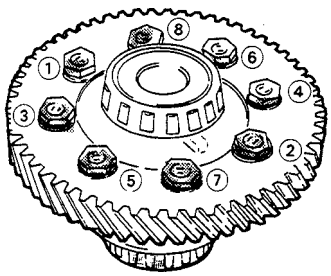
Align the lock pin hole in pinion shaft with that in the case and install the lock pin.

Cautipn
The lock pin should be lower than the differential case flange surface.



3. INSTALLATION OF BEARING

Using the special tool, press-fit the bearings into both sides of the differential case.



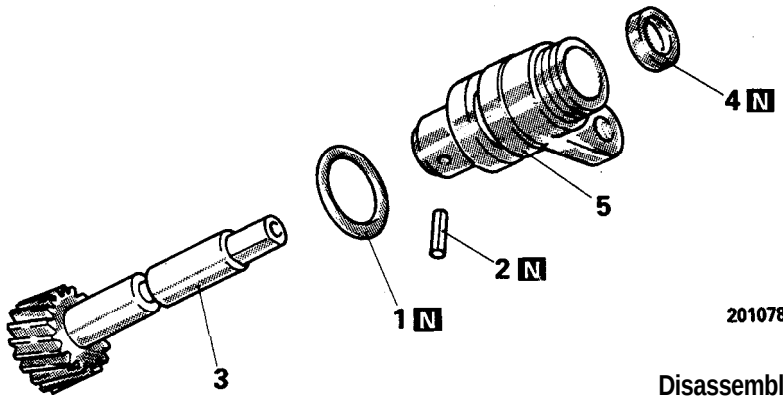
1. INSTALLATION OF BOLTS

Coat the differential drive gear bolts with ATF and tighten them to specification in the numerical order shown.

SPEEDOMETER DRIVEN GEAR ASSEMBLY

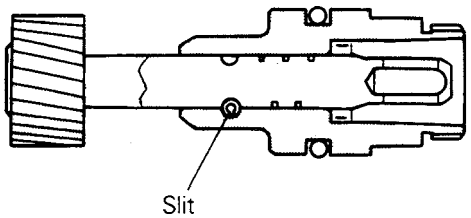
M23LQAF

DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. O-ring
- * 2. Spring pin
- * 3. Speedometer driven gear
4. Oil seal
5. Sleeve



SERVICE POINTS OF REASSEMBLY

3. INSTALLATION OF SPEEDOMETER DRIVEN GEAR

Apply gear oil sparingly to the speedometer driven gear shaft and insert the shaft.

2. INSTALLATION OF SPRING PIN

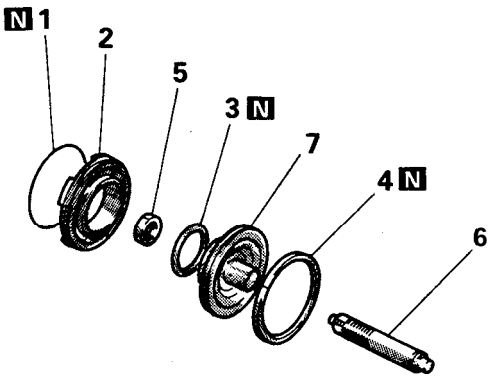
Install the spring pin in such a way that its slit does not face the gear shaft.

TSB Revision

KICKDOWN SERVO

M23LPAF

DISASSEMBLY AND REASSEMBLY



1750299

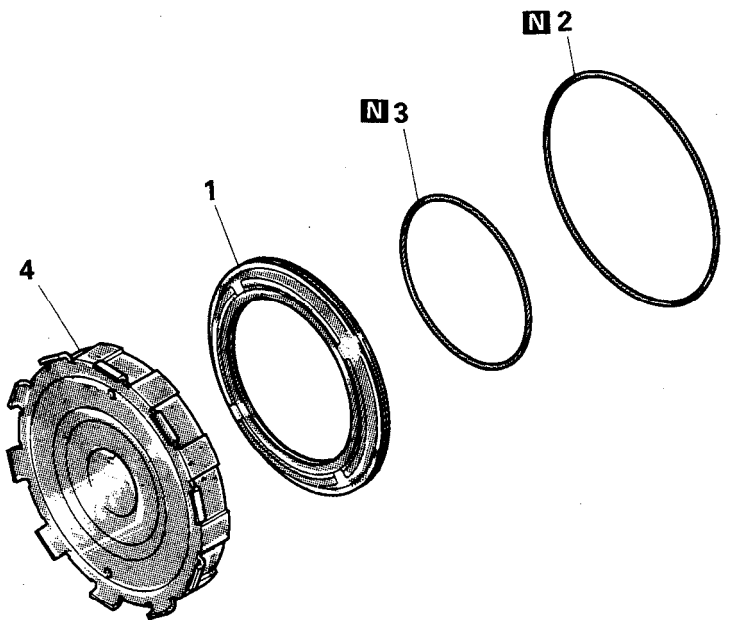
Disassembly steps

1. O-ring
2. Kickdown servo
3. D-ring
4. Seal ring
5. Lock nut
6. Kickdown servo rod
7. Kickdown servo piston

LOW-REVERSE BRAKE

M23LJAF

DISASSEMBLY AND REASSEMBLY



TFA0386

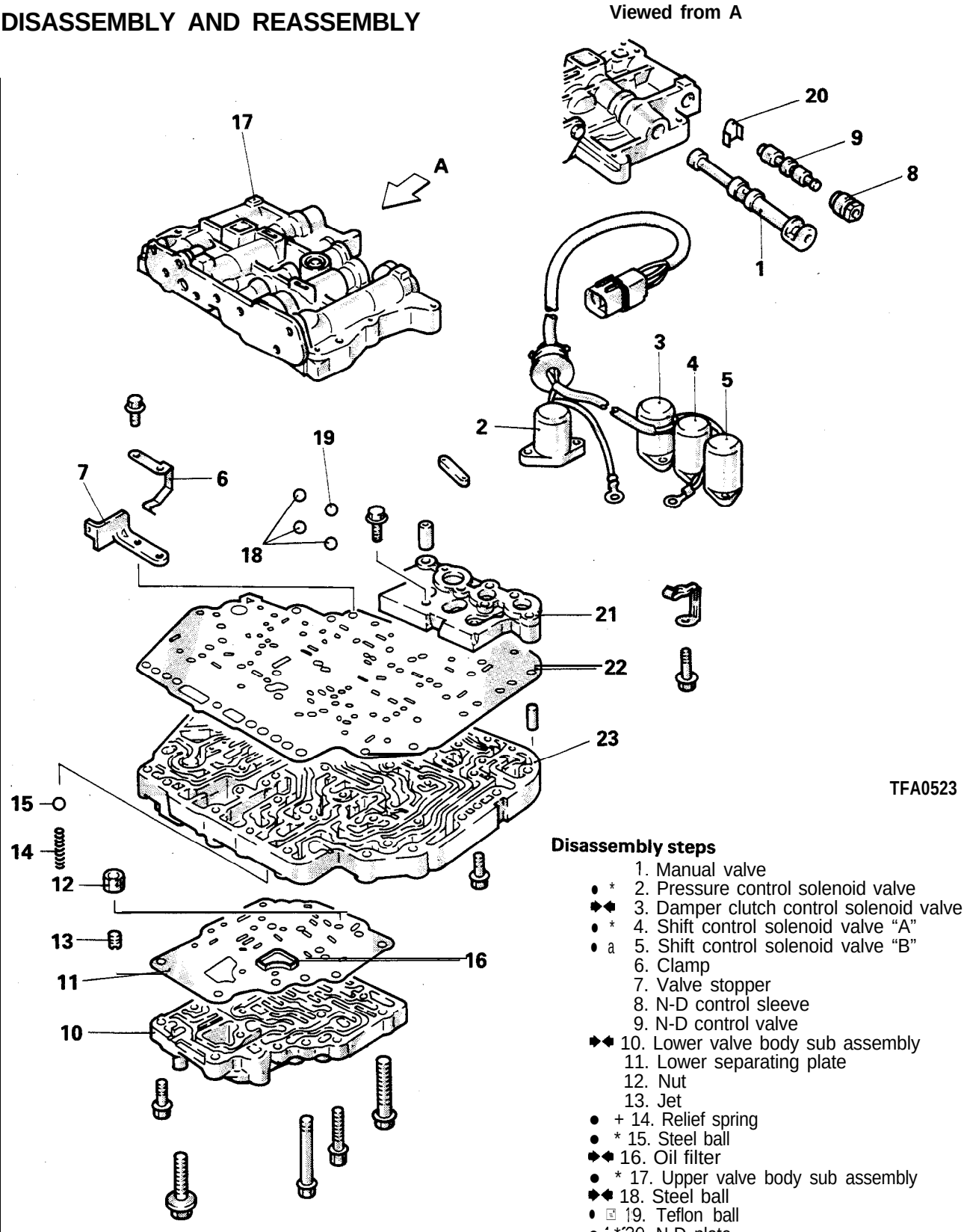
Disassembly steps

1. Low-reverse brake piston
2. D-ring
3. D-ring
4. Center support

VALVE BODY

M23LOAM

DISASSEMBLY AND REASSEMBLY

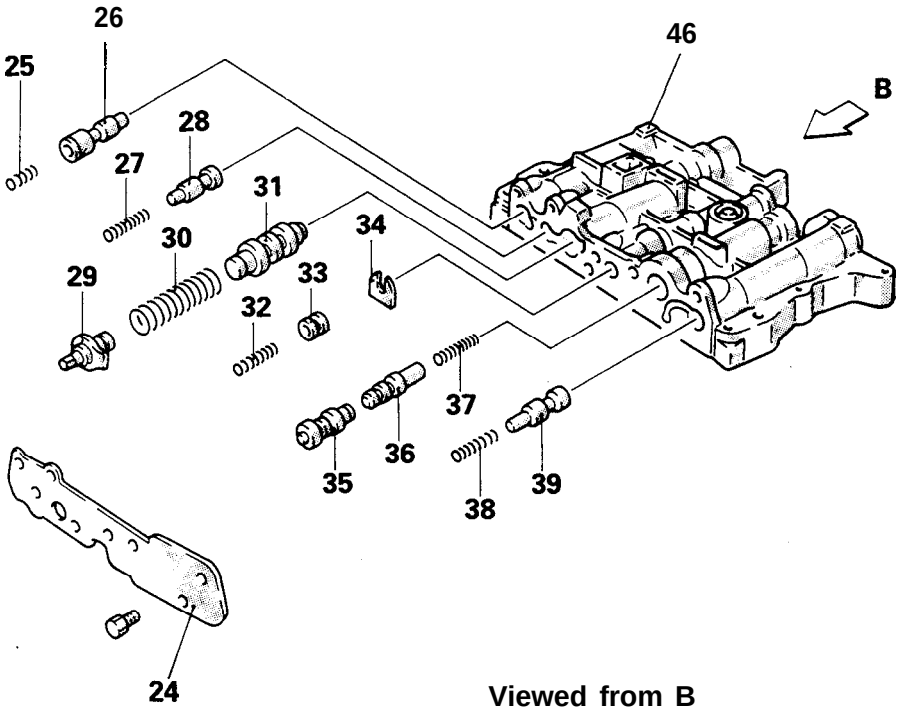


TFA0523

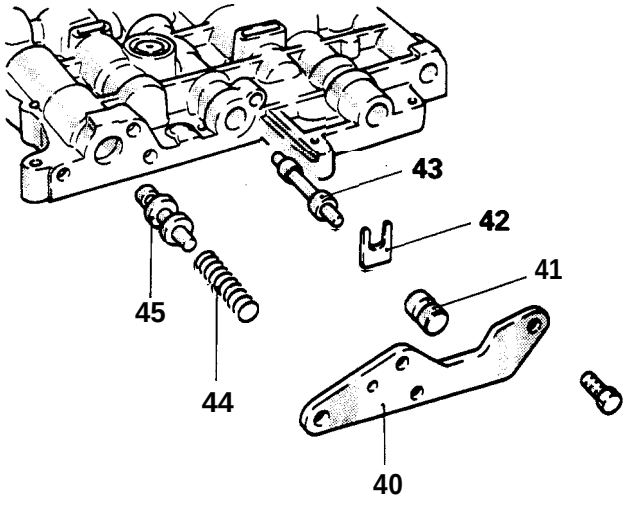
Disassembly steps

- 1. Manual valve
- ● * 2. Pressure control solenoid valve
- ➡◀ 3. Damper clutch control solenoid valve
- ● * 4. Shift control solenoid valve “A”
- ● a 5. Shift control solenoid valve “B”
- 6. Clamp
- 7. Valve stopper
- 8. N-D control sleeve
- 9. N-D control valve
- ➡◀ 10. Lower valve body sub assembly
- 11. Lower separating plate
- 12. Nut
- 13. Jet
- ● + 14. Relief spring
- ● * 15. Steel ball
- ➡◀ 16. Oil filter
- ● * 17. Upper valve body sub assembly
- ➡◀ 18. Steel ball
- ● □ 19. Teflon ball
- ● * 20. N-D plate
- 21. Block
- 22. Upper separating plate
- 23. Intermediate plate

TSB Revision



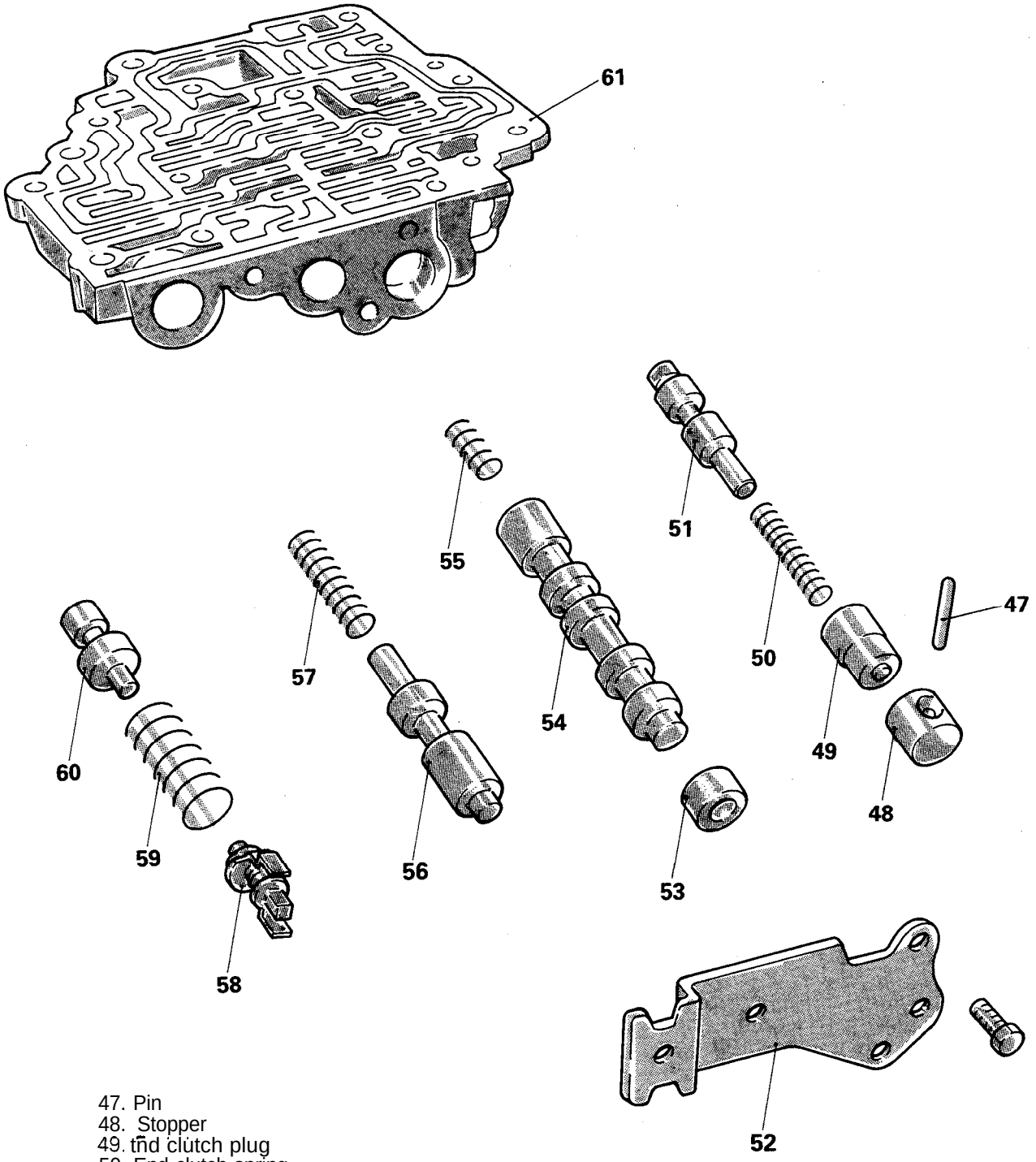
Viewed from B



TFA0518

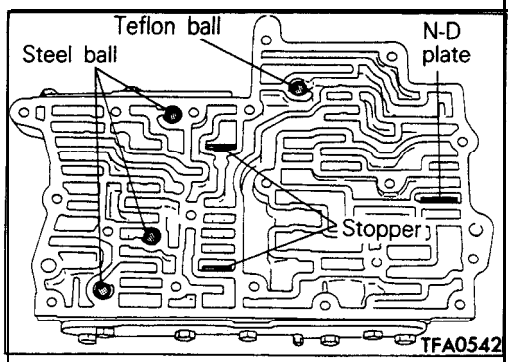
24. Front end cover
25. Pressure control spring
26. Pressure control valve
27. Torque converter control spring
28. Torque converter control valve
29. Adjusting screw
30. Regulator spring
31. Regulator valve
32. Shift control spring
- \+ 33. Stopper plate
34. Shift control plug
35. Rear clutch exhaust valve A
36. Rear clutch exhaust valve B
37. Rear clutch exhaust spring
38. 2-3/4-3 shift spring
39. 2-3/4-3 shift valve
40. Rear end cover
41. Shift control plug B
- * 42. Stopper plate
43. Shift control valve
44. 1-2 shift spring
45. 1-2 shift valve
46. Upper valve body

TSB Revision



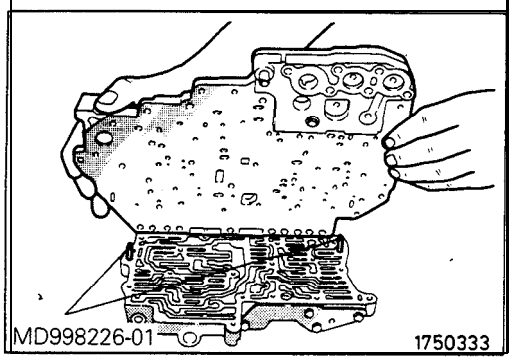
T F A 0 5 4 1

47. Pin
48. Stopper
49. End clutch plug
50. End clutch spring
51. End clutch valve
52. End cover
53. Damper clutch control sleeve
54. Damper clutch control valve
55. Damper clutch control spring
56. N-R control valve
57. N-R control spring
58. Adjusting screw
59. Reducing spring
60. Reducing valve
61. Lower valve body



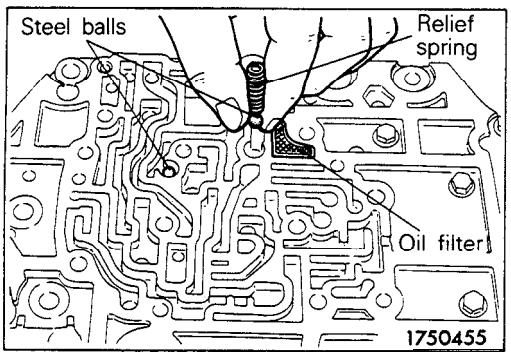
42.33. LOCATION OF STOPPER PLATE / 20. N-D PLATE / 19. TEFLON BALL / 18. STEEL BALL

Install the stopper plates, N-D plate, teflon ball, and steel balls into the upper valve body as shown.



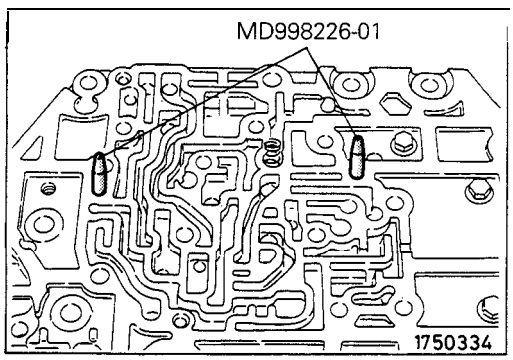
17. INSTALLATION OF UPPER VALVE BODY SUB ASSEMBLY

Install the special tool and secure the upper separating plate and intermediate plate with eight mounting bolts. Then, remove the special tool.



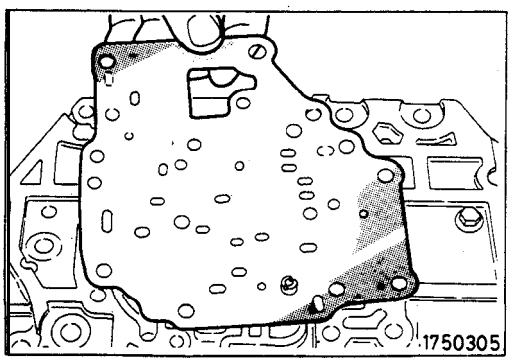
16. INSTALLATION OF OIL FILTER / 15. STEEL BALL / 14. RELIEF SPRING

Install the oil filter, two steel balls, and spring to the intermediate plate.

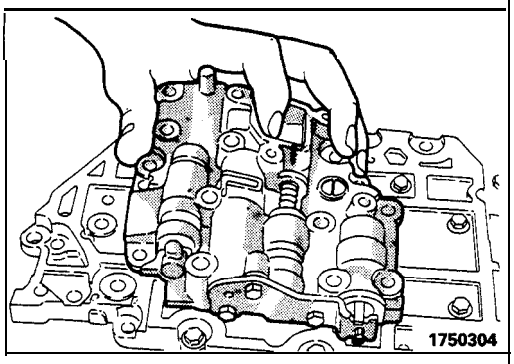


10. INSTALLATION OF LOWER VALVE BODY SUB ASSEMBLY

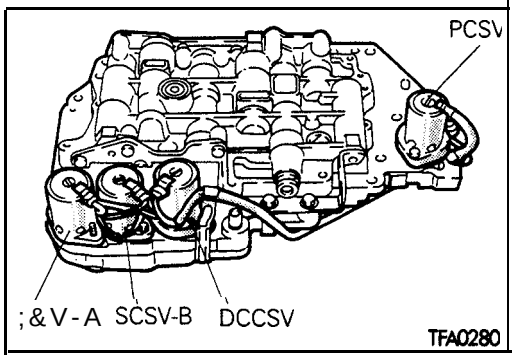
(1) Mount the special tool to the intermediate plate.



(2) Install the separating plate.



(3) Secure the lower valve body with mounting bolts and then remove the special tool.



5. 4. 3.2. INSTALLATION OF SOLENOID VALVE ASSEMBLY

Install the solenoid valves as shown.

Solenoid valve	Wire color
Shift control solenoid valve A	Orange
Shift control solenoid valve B	Yellow
Damper clutch control solenoid valve	Red
Pressure control solenoid valve	Blue