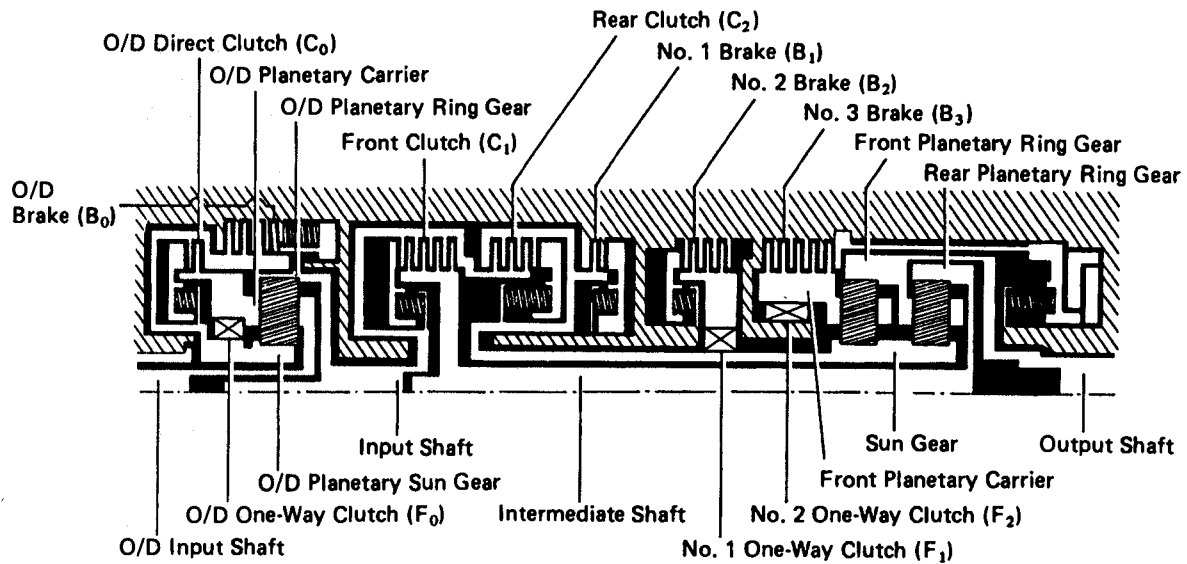


A43D AUTOMATIC TRANSMISSION

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OPERATION

AT112-01



AT3283

○ Operating

Shift lever position	Gear position	C ₀	C ₁	C ₂		B ₀	B ₁	B ₂	B ₃		F ₀	F ₁	F ₂
				I.P.	O.P.				I.P.	O.P.			
P	Parking	○							○	○	○		
R	Reverse	○		○	○				○	○	○		
N	Neutral	○									○		
D	1st	○	○								○		○
	2nd	○	○					○			○	○	
	3rd	○	○		○			○			○		
	O/D		○		○	○		○					
2	1st	○	○								○		○
	2nd	○	○				○	○			○	○	
L	1st	○	○						○	○	○		○

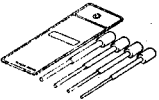
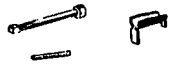
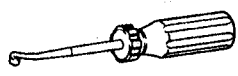
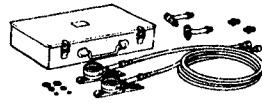
I.P. Inner Piston
O.P. Outer Piston

V00753

PREPARATION

SST (SPECIAL SERVICE TOOLS)

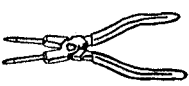
AT01R-04

	09201-10000 Valve Guide Bushing Remover & Replacer Set	Speedometer driven gear oil seal
	(09201-01080) Valve Guide Bushing Remover & Replacer 8	
	09308-10010 Oil Seal Puller	
	09325-20010 Transmission Oil Plug	
	09350-20015 TOYOTA Automatic Transmission Tool Set	
	(09397-22020) One-way Clutch Test Tool Set	
	09921-00010 Spring Tension Tool	Speedometer driven gear oil seal
	09992-00094 Automatic Transmission Oil Pressure Gauge Set	

AT

AT0LT-03

RECOMMENDED TOOLS

	09905-00013 Snap Ring Pliers .	
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AT01R-04

EQUIPMENT

Ohmmeter	
Voltmeter	
Torque wrench	
Dial indicator with magnetic base	Drive plate
Vernier calipers	Torque converter clutch
Straight edge	Torque converter clutch

LUBRICANT

AT01Y-08

Item	Capacity	Classification
Automatic transmission fluid		
Dry fill	6.5 liters (6.9 US qts, 5.7 Imp.qts)	ATF DEXRON® II
Drain and refill	2.4 liters (2.5 US qts, 2.1 Imp.qts)	

SSM (SPECIAL SERVICE MATERIALS)

AT01U-04

08833-00080	Adhesive 1344, THREE BOND 1344, LOCTITE 242 or equivalent	Extension housing set bolt
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TROUBLESHOOTING

BASIC TROUBLESHOOTING

1. Troubles occurring with the automatic transmission can be caused by either the engine, electrical control or the transmission itself. These 3 areas should be distinguished before proceeding with troubleshooting.
2. Troubleshooting should begin with the simplest operation, working up in order of difficulty, but first determine whether the trouble lies within the engine, electrical control or transmission.
3. Proceed with the inspection as follows:

PRELIMINARY CHECK (See page AT-8)

- (a) Check the tire inflation.
- (b) Check the idle speed.
- (c) Check the fluid level and fluid condition.
- (d) Check the throttle cable mark.
- (e) Check the shift linkage.
- (f) Check the park/neutral position switch.

STALL TEST (See page AT-12)

Check the engine and torque converter clutch.

TIME LAG TEST (See page AT-13)

Check the automatic transmission (each clutch, brake and gear) for wear.

HYDRAULIC TEST (See page AT-13)

Measure the line pressure and make basic check of fluid circuit.

ROAD TEST (See page AT-15)

Confirm if trouble lies within automatic transmission.
If noisy or vibrating, the possible cause could be with the engine, drive shaft, tires, etc.

ELECTRONIC CONTROL SYSTEM CHECK (See page AT-10)

AT

GENERAL TROUBLESHOOTING

NOTICE: Refer to A43D Automatic Transmission Repair Manual (Pub.No. RM387U) when ★ mark appears in the column for page numbers.

Problem	Possible cause	Remedy	Page
Fluid discolored or smells burnt	Fluid contaminated	Replace fluid	AT-8
	Torque converter clutch faulty	Replace torque converter clutch	AT-27
	Transmission faulty	Disassemble and inspect transmission	★
Vehicle does not move in any forward position or reverse	Manual linkage out of adjustment	Adjust linkage	AT-9
	Valve body or primary regulator faulty	Inspect valve body	★
	Parking lock pawl faulty	Inspect parking lock pawl	AT-20
	Torque converter clutch faulty	Replace torque converter clutch	AT-27
	Converter drive plate broken	Replace drive plate	AT-28
	Oil pump intake screen blocked	Clean screen	★
	Transmission faulty	Disassemble and inspect transmission	★
Shift lever position incorrect	Manual linkage out of adjustment	Adjust linkage	AT-9
	Manual valve and lever faulty	Inspect valve body	★
	Transmission faulty	Disassemble and inspect transmission	★
Harsh engagement into any drive position	Throttle cable out of adjustment	Adjust throttle cable	AT-9
	Valve body or primary regulator faulty	Inspect valve body	★
	Accumulator pistons faulty	Inspect accumulator pistons	★
	Transmission faulty	Disassemble and inspect transmission	★
Delayed 1-2, 2-3 or 3-O/D up-shift, or down-shift from O/D-3 or 3-2 then shifts back to O/D or 3	Throttle cable out of adjustment	Adjust throttle cable	AT-9
	Valve body faulty	Inspect valve body	★
	Governor body faulty	Inspect governor body	AT-24
Slips on 1-2, 2-3 or 3-O/D up-shift, or slips or shudders on acceleration	Manual linkage out of adjustment	Adjust linkage	AT-9
	Throttle cable out of adjustment	Adjust throttle cable	AT-9
	Valve body faulty	Inspect valve body	★
	Transmission faulty	Disassemble and inspect transmission	★

AT

NOTICE: Refer to A43D Automatic Transmission Repair Manual (Pub.No. RM387U) when ★ mark appears in the column for page numbers.

Problem	Possible cause	Remedy	Page
Drag, binding or tie-up on 1-2, 2-3 or 3-O/D up-shift	Manual linkage out of adjustment Valve body faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission	AT-9 ★ ★
Harsh down-shift	Throttle cable out of adjustment Throttle cable and cam faulty Accumulator pistons faulty Valve body faulty Transmission faulty	Adjust throttle cable Inspect throttle cable and cam Inspect accumulator pistons Inspect valve body Disassemble and inspect transmission	AT-9 AT-19 ★ ★ ★
No down-shift when coasting	Valve body faulty Governor body faulty	Inspect valve body Inspect governor body	★ AT-24
Down-shift occurs too quickly or too late while coasting	Throttle cable faulty Valve body faulty Governor body faulty Transmission faulty	Inspect throttle cable Inspect valve body Inspect governor body Disassemble and inspect transmission	AT-9 ★ AT-24 ★
No O/D-3, 3-2 or 2-1 kick-down	Throttle cable out of adjustment Governor body faulty Valve body faulty	Adjust throttle cable Inspect governor body Inspect valve body	AT-9 AT-24 ★
No engine braking in 2 or L position	Valve body faulty Transmission faulty	Inspect valve body Disassemble and inspect transmission	★ ★
Vehicle does not hold in P	Manual linkage out of adjustment Parking lock pawl cam and spring faulty	Adjust linkage Inspect cam and spring	AT-9 AT-19

AT

PRELIMINARY CHECK

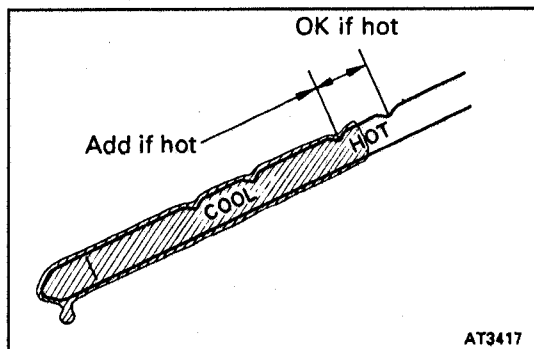
1. CHECK FLUID LEVEL

HINT:

- The vehicle must have been driven so that the engine and transmission are at normal operating temperature.

Fluid temperature: 70–80°C (158–176 °F)

- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.



- Park the vehicle on a level surface, set the parking brake.
- With the engine idling, shift the shift lever into all positions from the P to L position and return to the P position.

NOTICE: Depress brake pedal.

- Pull out the transmission dipstick and wipe it clean.
- Push it back fully into the pipe.
- Pull it out and check that the fluid level is in the HOT range.

If the level is at the low side, add fluid.

Fluid type: ATF DEXRON® II

NOTICE: Do not overfill.

2. CHECK FLUID CONDITION

If the fluid smells burnt or is black, replace it as follows.

- Remove the drain plug and drain the fluid.
- Reinstall the drain plug securely.
- With the engine OFF, add new fluid through the oil filler pipe.

Fluid type: ATF DEXRON® II

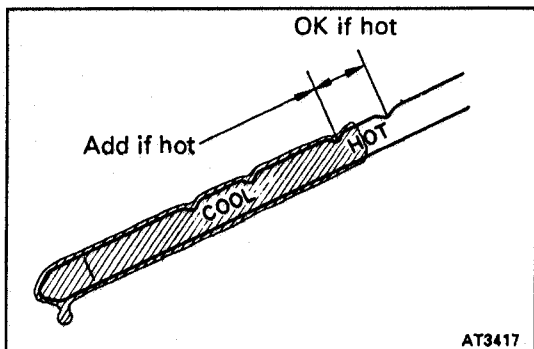
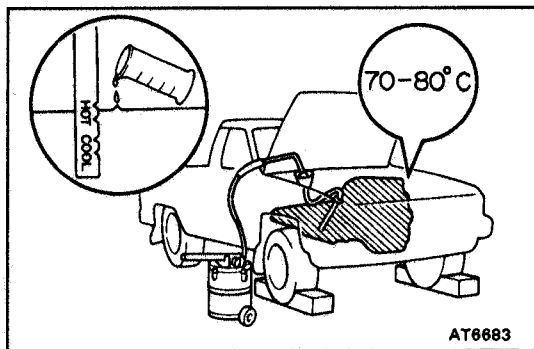
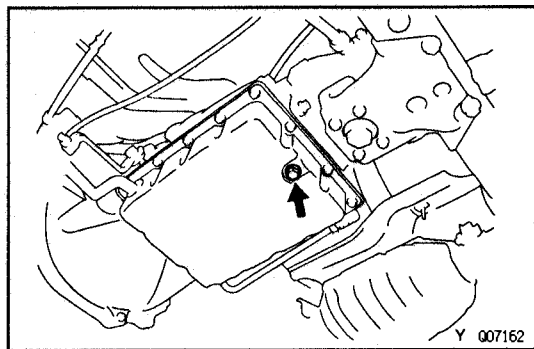
Capacity:

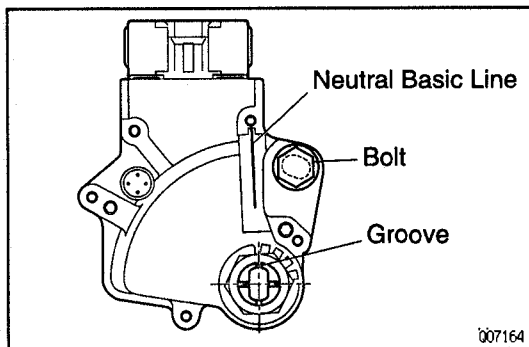
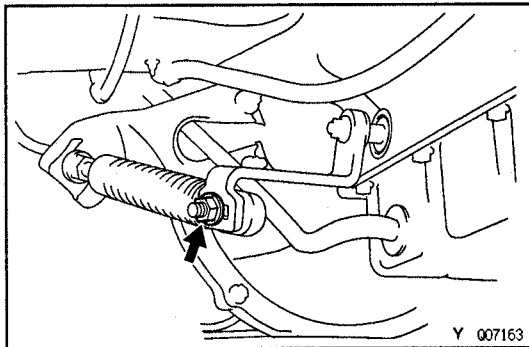
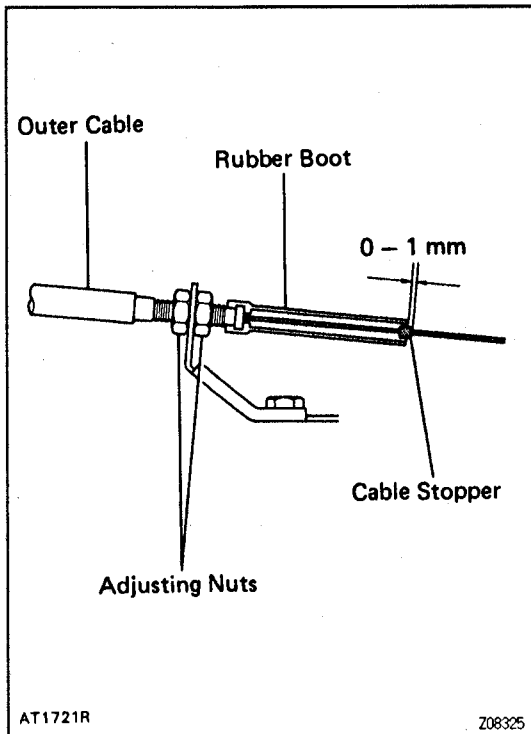
Dry fill: 6.5 liters (6.9 US qts, 5.7 Imp.qts)

Drain and refill: 2.4 liters (2.5 US qts, 2.1 Imp.qts)

- Start the engine and shift the shift lever into all positions from the P to L position and then shift into the P position.
- With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.
- Check the fluid level with the normal operating temperature 70–80 °C (158–176 °F) and add as necessary.

NOTICE: Do not overfill.





3. INSPECT AND ADJUST THROTTLE CABLE

- (a) Fully depress the accelerator pedal and check that the throttle valve opens fully.

HINT: If the valve does not open fully, adjust the accelerator cable.

- (b) Fully depress the accelerator pedal.
- (c) Measure the distance between the end of the boot and stopper on the cable.

Standard distance: 0 - 1 mm (0 - 0.04 in.)

If the distance is not within the standard, adjust the cable by the adjusting nuts.

4. INSPECT AND ADJUST SHIFT LEVER POSITION

When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator correctly indicates the position. If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

- (a) Loosen the nut on the control shaft lever.
- (b) Push the control shaft lever fully forward.
- (c) Return the control shaft lever 2 notches to the N position.
- (d) Set the shift lever to the N position.
- (e) While holding the shift lever lightly toward the R position side, adjust the control shaft lever nut.
- (f) Tighten the control shaft lever nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- (g) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverse when shifting it to the R position.

5. INSPECT AND ADJUST PARK/NEUTRAL POSITION SWITCH

Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

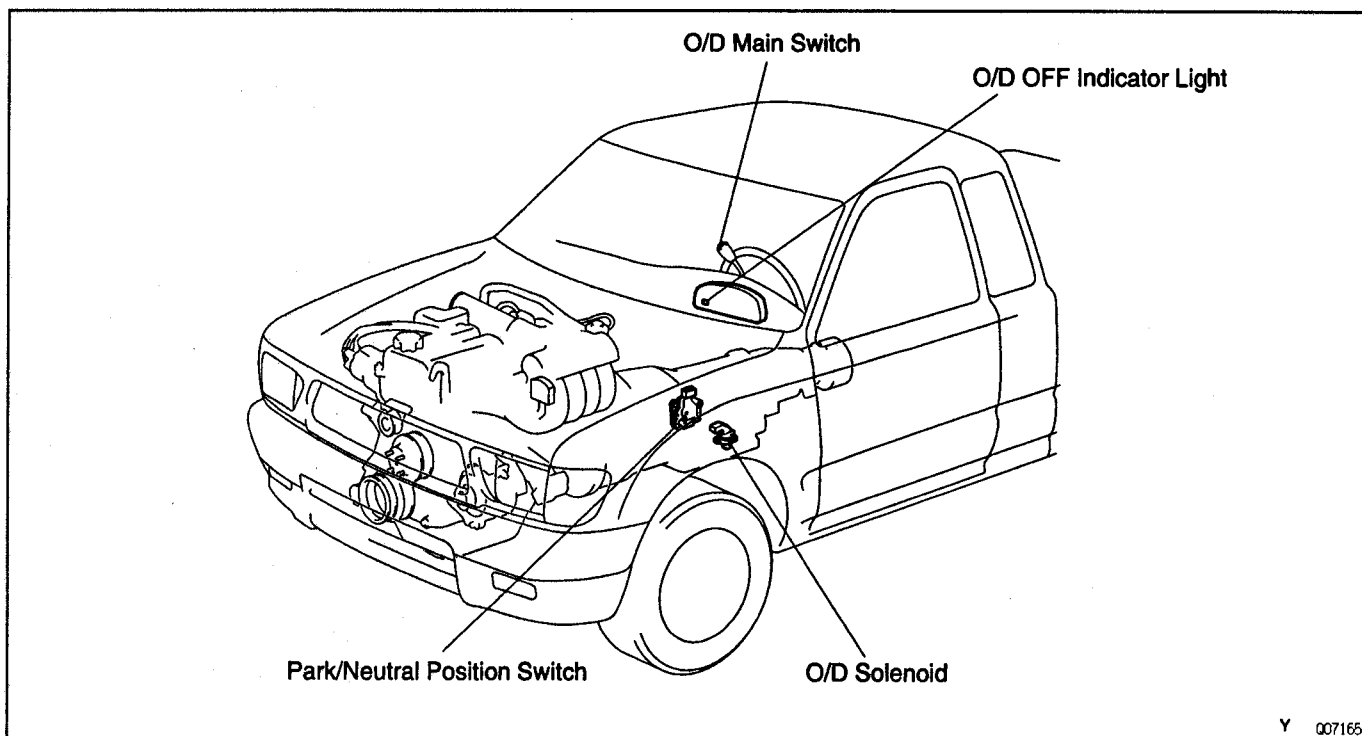
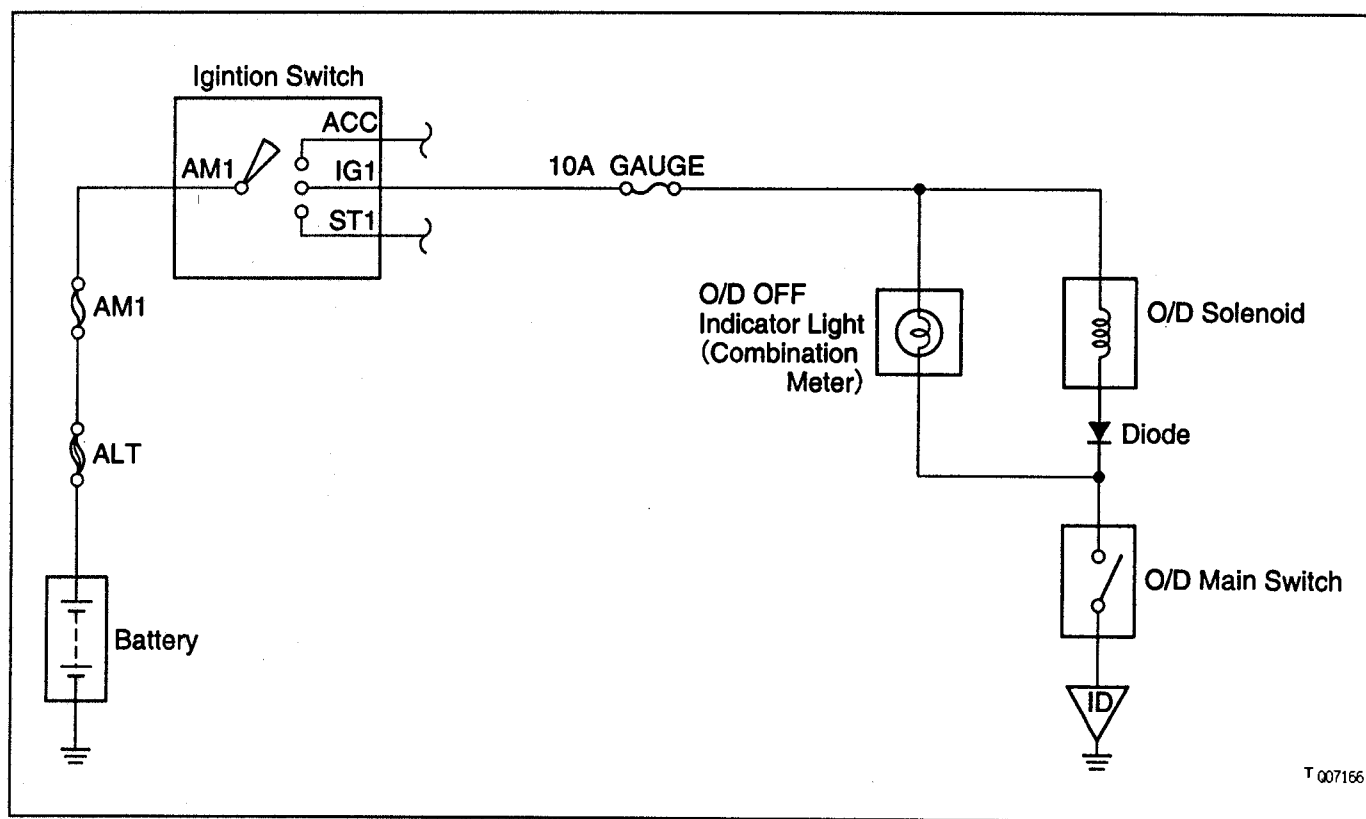
If not as started above, carry out the following adjustment procedures.

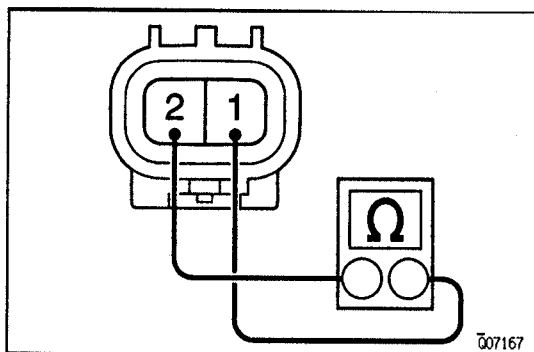
- (a) Loosen the park/neutral position switch bolt and set the shift lever to the N position.
- (b) Align the groove and neutral basic line.
- (c) Hold in position and tighten the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

6. INSPECT IDLE SPEED

Idle speed: 700 ± 50 rpm (In N position and A/C OFF)

ELECTRONIC CONTROL SYSTEM**ELECTRONIC CONTROL COMPONENTS****ELECTRONIC CONTROL CIRCUIT**

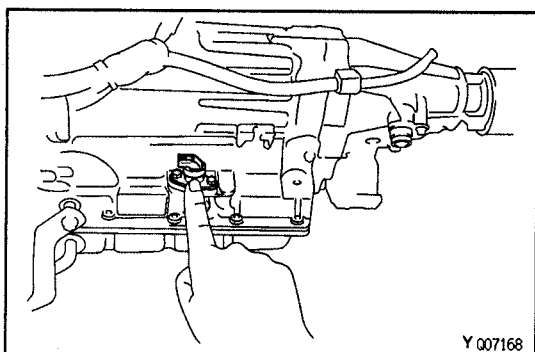


ELECTRIC CONTROL COMPONENTS INSPECTION

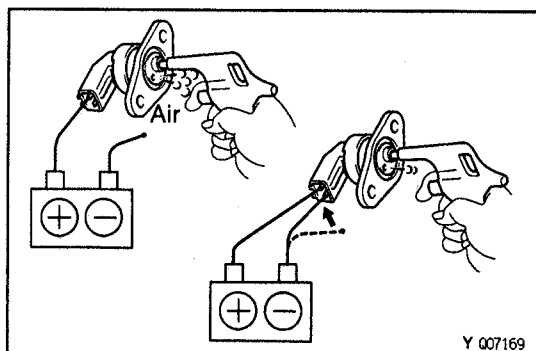
1. INSPECT O/D SOLENOID

- (a) Using an ohmmeter, measure the resistance between terminals.

Resistance: 11–15 Ω



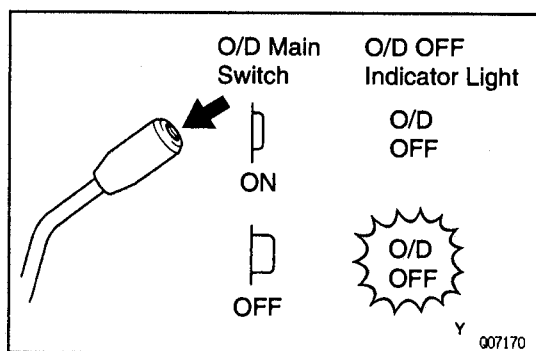
- (b) Apply battery positive voltage to the solenoid. Check that the solenoid operation sound is heard.



2. CHECK SOLENOID SEALS

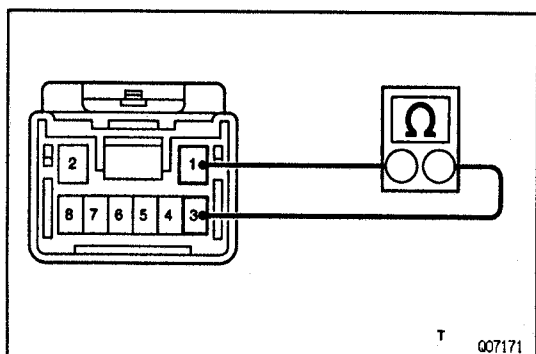
If there is foreign material in the solenoid valve, there will be no fluid control even with solenoid operation.

- (a) Check that the solenoid valve opens when low-pressure compressed air is applied.
- (b) When supplying battery positive voltage to the solenoid, check that the solenoid valve does not leak air.



3. INSPECT "O/D OFF" INDICATOR LIGHT

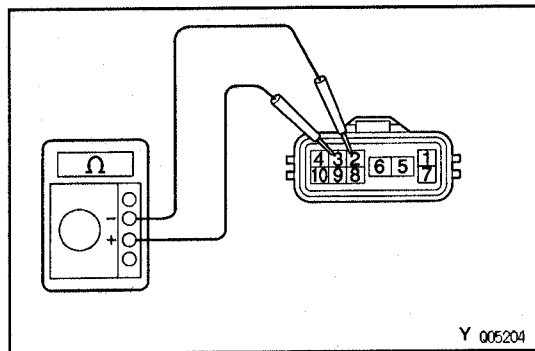
- (a) Turn on the ignition switch.
- (b) Check that the "O/D OFF" indicator light does not light, when the O/D main switch is turned ON.
- (c) Check that the "O/D OFF" indicator lights, when the O/D main switch is turned OFF.



4. INSPECT O/D MAIN SWITCH

- (a) Remove the lower finish panel.
- (b) Using an ohmmeter, check the continuity of the terminals for each switch position.

Switch position	Tester condition to terminal number	Specified value
ON	1 – 3	Continuity
OFF	1 – 3	No continuity



5. INSPECTION PARK/NEUTRAL POSITION SWITCH

Inspect that there is continuity between each terminals.

Terminal Shift Position	6	5	4	7	8	10	9	2	3
P	○	○	○	○					
R			○	○	○				
N	○	○	○			○			
D			○				○		
2			○					○	
L			○						○

V06485

AT118-01

STALL TEST

The objective of this test is to check the overall performance of the transmission and engine by measuring the maximum engine speeds in the D and R positions.

NOTICE:

- Do the test at normal operating fluid temperature 50–80 °C (122–176 °F).
- Do not continuously run this test longer than 5 seconds.
- To ensure safety, conduct this test in a wide, clear, level area which provides good traction.

MEASURE STALL SPEED

- Check the 4 wheels and fully apply the parking brake.
- Connect OBD II scan tool or TOYOTA hand-held tester to DLC3.
- Keep your left foot pressed firmly on the brake pedal, and start the engine.
- Shift into the D position. Fully depress the accelerator pedal with your right foot.

Quickly read the stall speed at this time.

Stall speed: 1,850 ± 150 rpm

- Do the same test in the R position.

Stall speed: 1,850 ± 150 rpm

EVALUATION

Problem	Possible cause
(a) Stall speed low in D and R positions.	• Engine output may be insufficient • Stator one-way clutch is not operating properly HINT: If the engine speed is more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(b) Stall speed high in D position.	• Line pressure too low • Front clutch slipping • No.2 one-way clutch not operating properly • O/D one-way clutch not operating properly
(c) Stall speed high in R position.	• Line pressure too low • Rear clutch slipping • No.3 brake slipping • O/D one-way clutch not operating properly
(d) Stall speed high in D and R positions.	• Line pressure too low • Improper fluid level • O/D one-way clutch not operating properly

TIME LAG TEST

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the O/D direct clutch, front clutch, rear clutch and No.3 brake.

NOTICE:

- Do the test at normal operating fluid temperature 50–80 (122–176 °F).
- Be sure to allow 1 minute interval between tests.
- Take 3 measurements and take the average value.

MEASURE TIME LAG

- Fully apply the parking brake.
- Start the engine and check the idle speed.
Idle speed: 700 ± 50 rpm (In N position and A/C OFF)
- Shift the shift lever from the N to D position. Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.
Time lag: Less than 1.2 seconds
- In same way, measure the time lag for N→R.
Time lag: Less than 1.5 seconds

EVALUATION

If N→D or N→R time lag are longer than specified:

Problem	Possible cause
N→D time lag is longer	• Line pressure too low • Front clutch worn • O/D one-way clutch not operating properly
N→R time lag is longer	• Line pressure too low • Rear clutch worn • No.3 brake worn • O/D one-way clutch not operating properly

AT

HYDRAULIC TEST

AT115-01

PREPARATION

- Warm up the transmission fluid.
 - Remove the transmission case test plug and connect SST.
SST 09992–00094 (09992–00111, 09992–00270)
(See page AT–26 for the location to connect SST)
- NOTICE: Do the test at normal operating fluid temperature 50–80 (122–176 °F).

1. MEASURE LINE PRESSURE

- Fully apply the parking brake and chock the 4 wheels.
- Start the engine and check the idle speed.
- Shift into the D position, keep your left foot pressed firmly on the brake pedal and while modulating the accelerator pedal with the right foot, measure the line pressure at the engine speeds specified in the table.
- In the same way, do the test in the R position.

Line pressure	D position kPa (kgf/cm ² , psi)	R position kPa (kgf/cm ² , psi)
Idling	441–500 (4.5–5.1, 64–73)	667–745 (6.8–7.6, 97–108)
Stall	990–1,167 (10.1–11.9, 144–169)	1,471–1,863 (15.0–19.0, 213–270)

If the measured pressure are not up to the specified value, recheck the throttle cable adjustment and retest.

EVALUATION

Problem	Possible cause
If the measured values at all positions are higher.	• Throttle cable out of adjustment • Throttle valve defective • Regulator valve defective
If the measured values at all positions are lower.	• Throttle cable out of adjustment • Throttle valve defective • Regulator valve defective • Oil pump defective • O/D direct clutch defective
If pressure is low in the D position only.	• D position circuit fluid leakage • Front clutch defective
If pressure is low in the R position only.	• R position circuit fluid leakage • No.3 brake defective • Rear clutch defective

2. MEASURE GOVERNOR PRESSURE

- (a) Warm up the transmission fluid.
- (b) Remove the transmission case test plug and connect SST.
SST 09992-00094 (09992-00111, 09992-00270)
(See page AT-26 for the location to connect SST)
NOTICE: Do the test at normal operating fluid temperature 50–80°C (122–176 °F).
- (c) Check the parking brake to see that it is not applied.
- (d) Start the engine.
- (e) Shift into the D position and measure the governor pressure at the speeds specified in the table.

EVALUATION

Problem	Possible cause
If governor pressure is defective.	• Line pressure defective • Fluid leakage in governor pressure circuit • Governor valve operation defective

Tire size: P195/75R14

Output shaft rpm	*Vehicle speed km/h (mph)	Governor pressure kPa (kgf/cm ² , psi)
1,000	32 (20)	98–157 (1.0–1.6, 14–23)
1,800	57 (35)	196–255 (2.0–2.6, 28–37)
3,500	111 (69)	500–618 (5.1–6.3, 73–90)

Tire size: P215/70R14

Output shaft rpm	*Vehicle speed km/h (mph)	Governor pressure kPa (kgf/cm ² , psi)
1,000	32 (20)	98–157 (1.0–1.6, 14–23)
1,800	58 (36)	196–255 (2.0–2.6, 28–37)
3,500	113 (70)	500–618 (5.1–6.3, 73–90)

*:Reference only

ROAD TEST

NOTICE: Do this test at normal fluid temperature 50–80 °C (122–176 °F).

1. D POSITION TEST

Shift into the D position and while driving with the accelerator pedal held constant with the throttle valve fully open and the O/D main switch ON, check on the following points.

- (a) Check to see that the 1–2, 2–3 and 3–O/D up–shifts take place and also that the shift points conform to those shown in the automatic shift schedule.

HINT: 3→O/D up–shift does not take place with a throttle valve opening of more than 86 % or engine coolant temperature below 55 °C (122 °F).

EVALUATION

Problem	Possible cause
If there is no 1–2 up–shift.	• Governor valve is defective • 1–2 shift valve is stuck
If there is no 2–3 up–shift.	• 2–3 shift valve is stuck
If there is no 3–O/D up–shift (throttle valve opening less than 86%).	• 3–4 shift valve is stuck • Solenoid valve or circuit defective
If the shift point is defective.	• Throttle cable out of adjustment • Throttle valve, 1–2 shift valve, 2–3 shift valve, 3–4 shift valve etc., are defective

- (b) In the same way, check the shock and slip at 1→2, 2→3 and 3→O/D up–shifts.

EVALUATION

Problem	Possible cause
If the shock is excessive.	• Line pressure is too high • Accumulator is defective

- (c) Run in the 3rd gear or O/D of the D position and check for abnormal noise and vibration.
HINT: This check must be made with extreme care as noise and vibration could also be due to unbalance in the propeller shaft, differential, tires, torque converter clutch, etc.
- (d) While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible vehicle speed limits for 2→1, 3→2 and O/D→3 kick–downs conform to those indicated on the automatic shift schedule.
HINT: O/D→3 kick–down is always possible with a throttle valve opening of more than 86 %.
- (e) Check for abnormal shock and slip at kick–down.

2. 2 POSITION TEST

Shift into the 2 position and check on the following points while driving with the accelerator pedal held constantly at the fully throttle valve opening position.

- (a) Check to see that the 1→2 up–shift takes place and that the shift point conforms to that shown on the automatic shift schedule.
- (b) While running in the 2 position of the 2nd gear, release the accelerator pedal and check the engine braking effect.

EVALUATION

Problem	Possible cause
If there is no engine braking effect.	• No.1 brake is defective

- (c) Check for abnormal noise during acceleration and deceleration and for shock during up—shift and down—shift.

3. L POSITION TEST

- (a) While running in the L position, check to see that there is no up—shift to 2nd gear.
(b) While running in the L position, release the accelerator pedal and check the engine braking effect.

EVALUATION

Problem	Possible cause
If there is no engine braking effect.	• No.3 brake is defective

- (c) Check for abnormal noise during acceleration and deceleration.

4. R POSITION TEST

Shift into the R position and check for slipping while starting at wide open throttle.

CAUTION: Before conducting this test, ensure that the test area is free from personnel and obstruction.

5. P POSITION TEST

Stop the vehicle on a gradient (more than 5°) and after shifting into the P position, release the parking brake.

Then check that the parking lock pawl holds the vehicle in place.

TROUBLESHOOTING MATRIX CHART

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.
NOTICE: Refer to A43D Automatic Transmission Repair Manual (Pub.No. RM387U) when ★ mark appears in the column for page numbers.

(ON-VEHICLE)

See Page		AT-20	AT-24	★	★	★	★	★	★	★	★	★	★	★	★	★	★	★	AT-10	AT-18
Parts Name		Parking lock pawl	Governor valve	1-2 Shift valve	2-3 Shift valve	3rd coast shift valve	Intermediate shift valve	Throttle valve	Primary regulator valve	Down shift plug	Reverse clutch sequence valve	Low coast shift valve	C ₁ accumulator	C ₂ accumulator	B ₂ accumulator	Detent regulator valve	Manual valve	3-4 Shift valve	Electrical control system check	Off-vehicle repair matrix chart
Trouble																				
Does not move in any forward position																				1
Does not move in reverse position																				1
Does not move in any forward position or reverse position		1							3								2			4
No up-shift	1st → 2nd		1	2																3
	2nd → 3rd		1		2															3
	3rd → O/D		1															2	3	4
No down-shift	O/D → 3rd					5		2		3						4		6	1	
	3rd → 2nd				4			1		2						3				
	2nd → 1st			4				1		2						3				
Shift point too high or too low			1	4	4			3	2									4		
Up-shift 3rd → O/D with O/D main switch OFF		1				2														
Harsh engagement	"N" → "R"										2			1						3
	"N" → "D"												1							2
	"N" → "L"			1								2								3
	1st → 2nd ("D" position)														1					2
	1st → 2nd ("2" position)						2								1					3
	1st → 2nd → 3rd → O/D							1	2											
	2nd → 3rd													1						2
	3rd → O/D																			1
	O/D → 3rd																			1
	3rd → 2nd													1						2
Slip	Forward & Reverse								1											2
	"R"																			1
	1st																			1
	2nd																			1
	3rd																			1
No engine braking	1st ("L" position)																			1
	2nd ("2" position)																			1
No kick-down				4	4			1		2						3		4		
Poor acceleration																				1

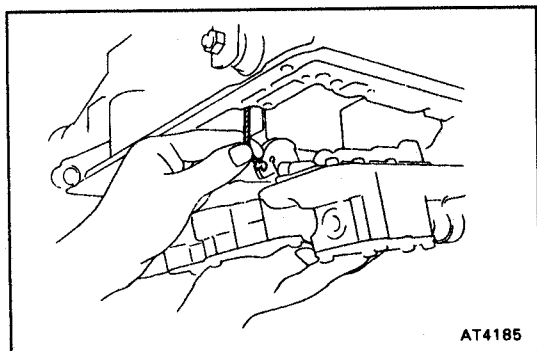
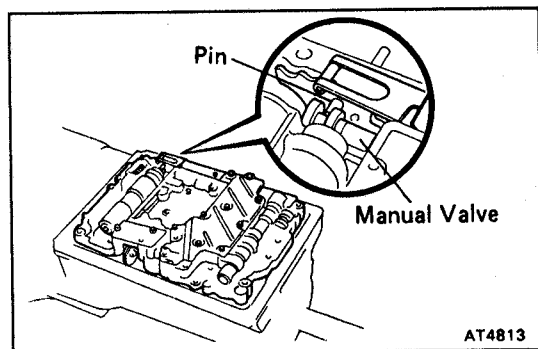
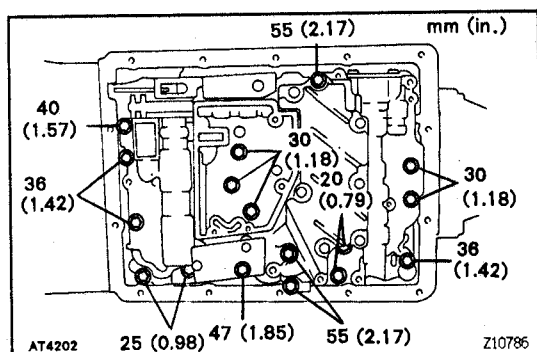
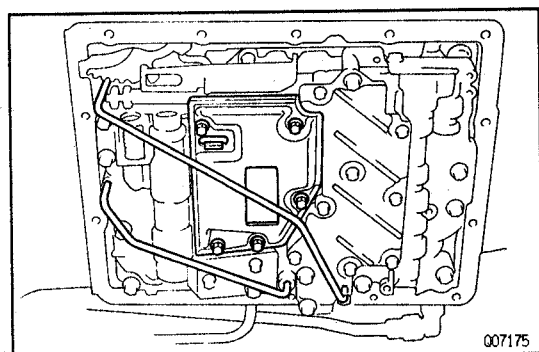
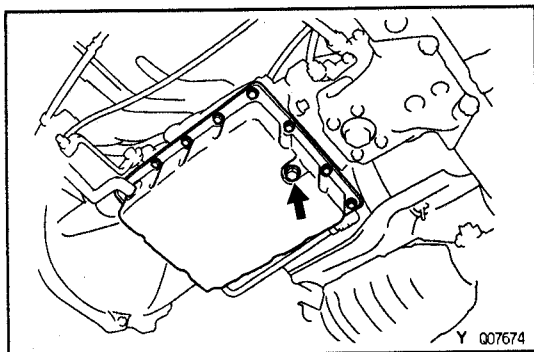
AT

NOTICE: Refer to A43D Automatic Transmission Repair Manual (Pub.No. RM387U) when ★ mark appears in the column for page numbers.

(OFF-VEHICLE)

See Page		AT-27	★	★	★	★	★	★	★	★	★	★	★	★	★	★
Parts Name		Torque converter clutch	Oil pump	O/D direct clutch (Co)	Front clutch (C ₁)	Rear clutch (C ₂)	O/D brake (B ₀)	No. 1 brake (B ₁)	No. 2 brake (B ₂)	No. 3 brake (B ₃)	No. 1 one-way clutch (F ₁)	No. 2 one-way clutch (F ₂)	O/D one-way clutch (F ₃)	Front planetary gear	Rear planetary gear	
Trouble																
Does not move in any forward position					1											
Does not move in reverse position						1				2						
Does not move in any forward position or reverse position		1	2	3									4	5	6	
No-up shift	1st → 2nd								1		2					
	2nd → 3rd					1										
	3rd → O/D						1									
Harsh engagement	"N" → "R"					1				2						
	"N" → "D"				1											
	"N" → "L"									1						
	1st → 2nd ("D" position)								1							
	1st → 2nd ("2" position)							1	2							
	2nd → 3rd					1										
	3rd → O/D						1									
	O/D → 3rd			1												
	3rd → 2nd								1							
Slip	Forward & Reverse	2	3	1									4			
	"R" position			1		2				3			4			
	1st			1	2							4	3			
	2nd			1	2				3		5		4			
	3rd			1	2	3			4				5			
	O/D				1	2	3									
No engine braking	1st ("L" position)									1						
	2nd ("2" position)							1								
Poor acceleration		1														

ON-VEHICLE REPAIR VALVE BODY REMOVAL



1. DRAIN ATF

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

2. REMOVE OIL PAN, FILLER PIPE AND GASKET

Remove all pan bolts, and carefully remove the pan assembly. Discard the gasket.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

REMOVAL NOTICE: Some fluid will remain in the oil pan.

Be careful not to damage the filler pipe.

INSTALLATION HINT: Replace used gasket with a new one.

3. REMOVE OIL PIPES

Pry up both pipe ends with a large screwdriver and remove the 2 pipes.

INSTALLATION NOTICE: Be careful not to bend or damage the pipes.

4. REMOVE OIL STRAINER

Remove the 5 bolts, and the oil strainer.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

REMOVAL NOTICE: Be careful as some oil will come out with the filter.

5. REMOVE VALVE BODY

(a) Remove the 17 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

INSTALLATION HINT: Align the groove of the manual valve to the pin of the lever.

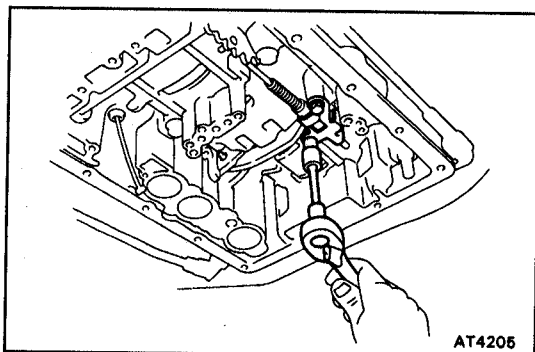
(b) Disconnect the throttle cable from the cam and remove the valve body.

VALVE BODY INSTALLATION

AT118-01

Installation is in the reverse order of removal.

INSTALLATION HINT: After installation, fill ATF and check fluid level. (See page AT-8)



AT4205

PARKING LOCK PAWL REMOVAL

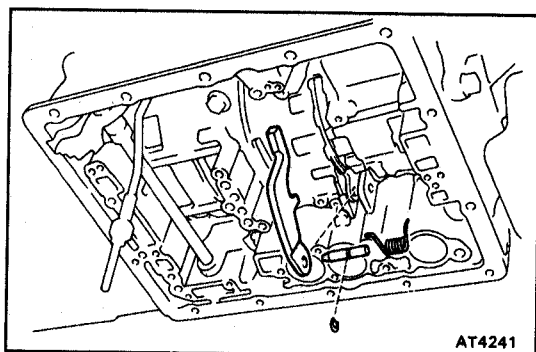
AT02A-04

1. REMOVE VALVE BODY (See page AT-19)
2. REMOVE PARKING LOCK PAWL BRACKET

INSTALLATION HINT:

- Push lock rod fully forward.
- Check that the pawl operates smoothly.

Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)



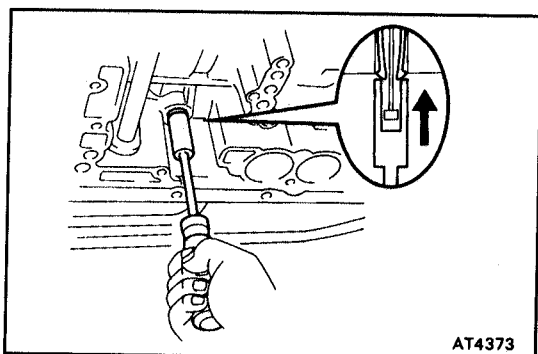
AT4241

3. REMOVE SPRING FROM PARKING LOCK PAWL PIVOT PIN
4. REMOVE PIVOT PIN AND PARKING LOCK PAWL

PARKING LOCK PAWL INSTALLATION

AT118-01

Installation is in the reverse order of removal.



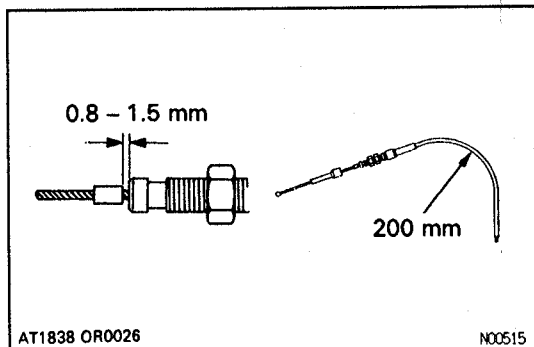
AT4373

THROTTLE CABLE REMOVAL

AT11H-01

1. DISCONNECT THROTTLE CABLE
 - (a) Disconnect the cable from the throttle linkage.
 - (b) Disconnect the cable from the cable clamps.
2. REMOVE VALVE BODY (See page AT-19)
3. PUSH THROTTLE CABLE OUT OF TRANSMISSION CASE

Using a 10-mm socket, push the throttle cable out.

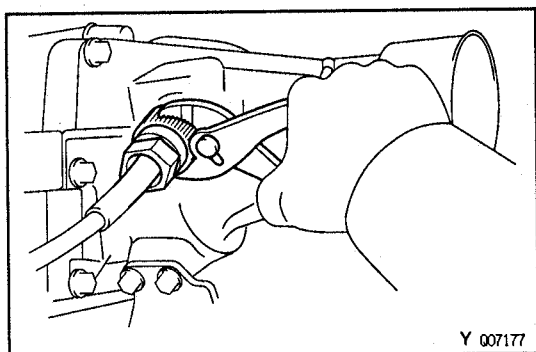


THROTTLE CABLE INSTALLATION

Installation is in the reverse order of removal.

INSTALLATION HINT:

- If throttle cable is new, stake stopper on inner cable.
- (a) Bend the cable so there is a radius of about 200 mm (7.87 in.).
 - (b) Pull the inner cable lightly until a slight resistance is felt, and hold it.
 - (c) Stake the stopper 0.8–1.5 mm (0.031–0.059 in.) from the end of outer cable, as shown.
 - After installation, fill ATF and check the fluid level. (See page AT-8)
 - Adjust the throttle cable. (See page AT-9)



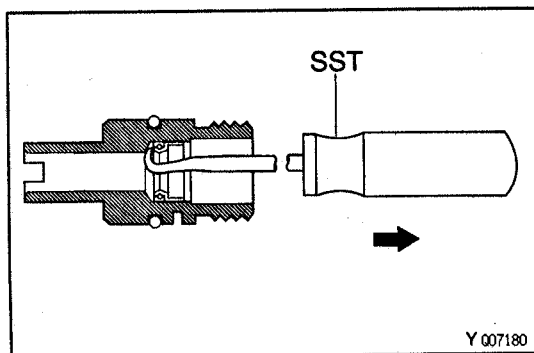
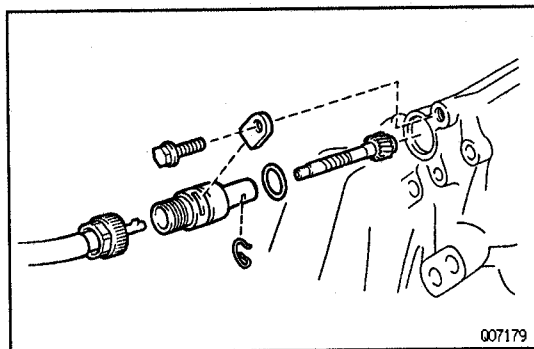
SPEEDOMETER DRIVEN GEAR REPLACEMENT

AT0X8-02

AT

1. DISCONNECT SPEEDOMETER CABLE AND REMOVE SPEEDOMETER DRIVEN GEAR

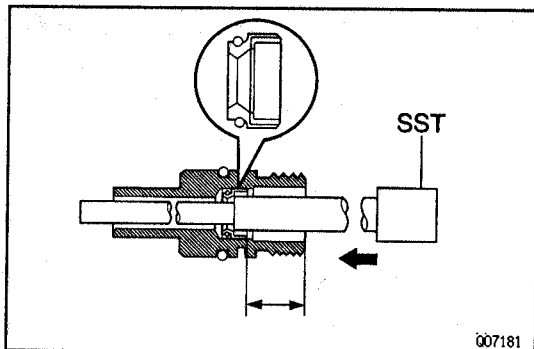
- (a) Loosen the serrated collar with pliers. Do not lose the felt dust protector and washer.
- (b) Disconnect the speedometer cable.
- (c) Remove the bolt and locking plate. Pry out the speedometer driven gear assembly.
- (d) Remove the O-ring from the speedometer drive gear assembly.
- (e) Remove the clip and speedometer driven gear from the speedometer driven gear sleeve.



2. REMOVE SPEEDOMETER DRIVEN GEAR OIL SEAL

Using SST, remove the oil seal.

SST 09921-00010

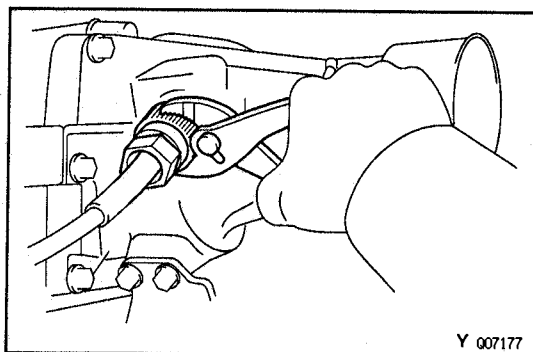


3. INSTALL SPEEDOMETER DRIVEN GEAR OIL SEAL

Using SST, install a new oil seal.

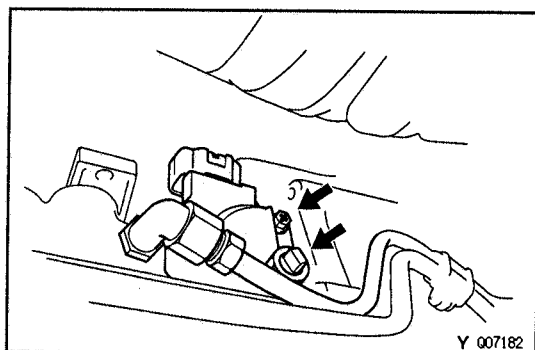
SST 09201—10000 (09201—01080)

Drive in depth: 20 mm (0.79 in.)



4. INSTALL SPEEDOMETER DRIVEN GEAR AND CONNECT SPEEDOMETER CABLE

- (a) Install the clip and speedometer driven gear to the speedometer driven gear sleeve.
- (b) Install a new O—ring to the speedometer driven gear assembly.
- (c) Install the speedometer driven gear.
- (d) Install the locking plate with the bolt.
- (e) Connect the speedometer cable.
- (f) Tighten the serrated collar with pliers.



PARK/NEUTRAL POSITION SWITCH REPLACEMENT

ATOK8-02

1. REMOVE FRONT EXHAUST PIPE AND HEAT INSULATOR

2. DISCONNECT OIL COOLER PIPE

- (a) Remove the 3 oil cooler pipe clamps.
- (b) Disconnect the oil cooler pipe.

3. REMOVE ELBOW AND O—RING

4. REMOVE PARK/NEUTRAL POSITION SWITCH

- (a) Disconnect the connector.
- (b) Pry off the lock washer and remove the nut.
- (c) Remove the bolt and park/neutral position switch.

5. INSTALL PARK/NEUTRAL POSITION SWITCH

- (a) Install the park/neutral position switch and bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)
- (b) Install a new lock plate and the nut.
Torque: 3.9 N·m (40 kgf·cm, 35 in·lbf)
- (c) Stake the nut with lock plate.
- (d) Adjust the park/neutral position switch.
(See page AT—9)

- (e) Connect the connector.

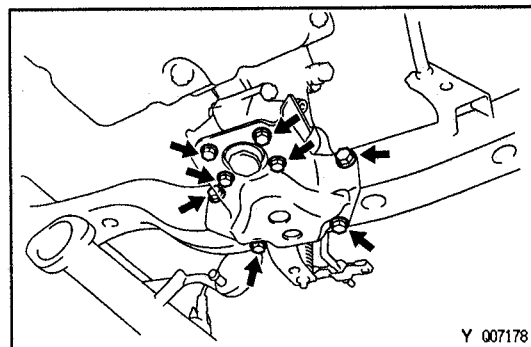
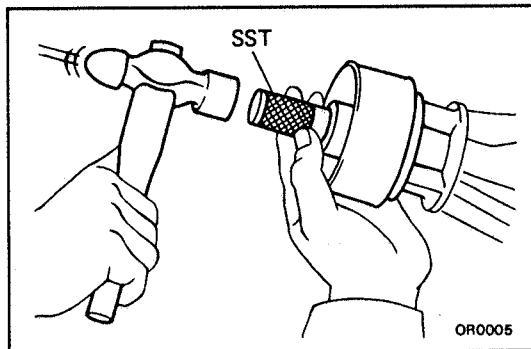
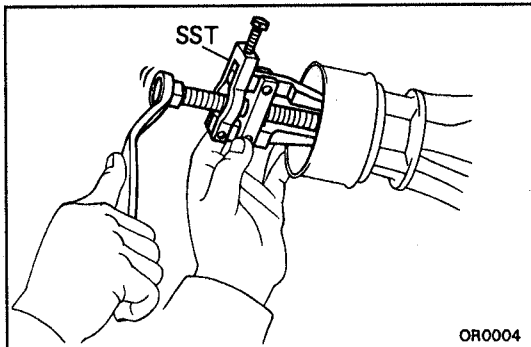
6. INSTALL ELBOW AND NEW O—RING

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

7. CONNECT OIL COOLER PIPES

- (a) Connect the oil cooler pipe.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)
- (b) Install the 3 oil cooler pipe clamps.

8. INSTALL FRONT EXHAUST PIPE AND HEAT INSULATOR



EXTENSION HOUSING OIL SEAL REPLACEMENT

AT0UJ-00

1. REMOVE PROPELLER SHAFT (See page PR-6)
2. REMOVE REAR OIL SEAL
Using SST, remove the oil seal.
SST 09308-10010
NOTICE: Clean the extension housing before removing the oil seal.
3. INSTALL NEW OIL SEAL
Coat the lip of a new oil seal with MP grease and using SST and a hammer, carefully drive the oil seal in as far as it will go.
SST 09325-20010
4. INSTALL PROPELLER SHAFT (See page PR-14)
5. CHECK FLUID LEVEL (See page AT-8)

AT

EXTENSION HOUSING REMOVAL

AT11C-01

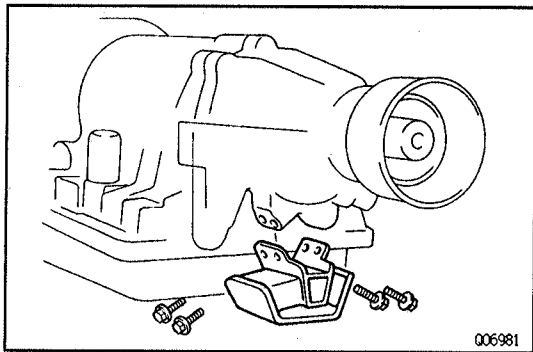
1. REMOVE PROPELLER SHAFT (See page PR-6)
2. DISCONNECT SPEEDOMETER CABLE AND REMOVE SPEEDOMETER DRIVEN GEAR (See page AT-21)
3. REMOVE REAR MOUNTING BRACKET FROM REAR SUPPORT MEMBER

Remove the 8 bolts from the rear mounting bracket.

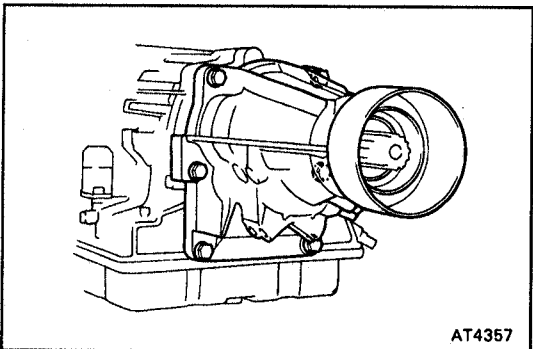
Torque:

Rear mounting side: 18 N·m (185 kgf·cm, 13 ft·lbf)

Frame side: 58 N·m (590 kgf·cm, 42 ft·lbf)



006981



AT4357

4. REMOVE REAR MOUNTING INSULATOR FROM EXTENSION HOUSING

Remove the 4 bolts and the engine rear mounting insulator from the extension housing.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

5. REMOVE EXTENSION HOUSING AND GASKET

Remove the 6 bolts. If necessary, tap the extension housing with a plastic hammer or block of wood to loosen it.

Torque: 34 N·m (345 kgf·cm, 25 ft·lbf)

INSTALLATION HINT:

- Replace used gasket with a new one.
- Coat the threads of the all bolts with sealant.
- The 2 lower bolts are shorter.

Sealant: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

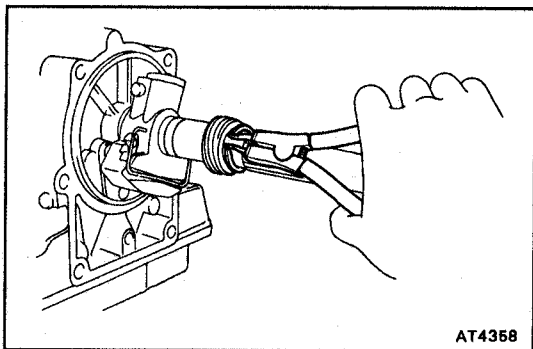
EXTENSION HOUSING INSTALLATION

AT11D-01

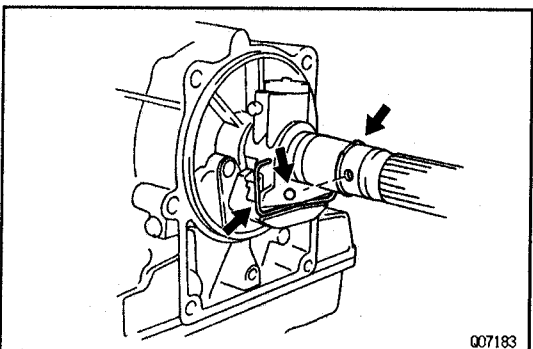
Installation is in the reverse order of removal.

INSTALLATION HINT: After installation, fill ATF and check fluid lever. (See page AT-8)

AT



AT4358



007183

GOVERNOR BODY REMOVAL

AT0X7-02

1. REMOVE EXTENSION HOUSING

(See page AT-23)

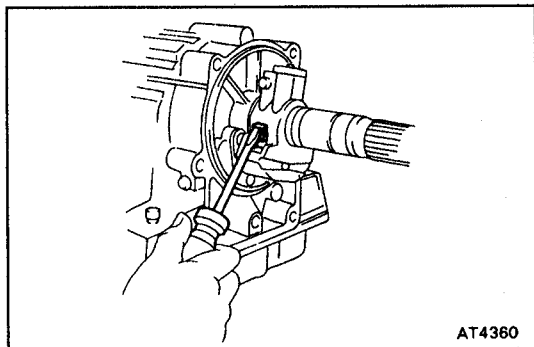
2. REMOVE SPEEDOMETER DRIVE GEAR

- (a) Using snap ring pliers, remove the snap ring.
- (b) Slide off the speedometer drive gear.

- (c) Remove the lock ball and outer snap ring.

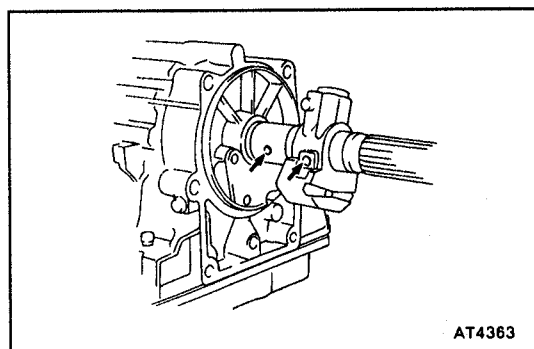
3. REMOVE GOVERNOR FROM OUTPUT SHAFT

- (a) Using a large screwdriver, remove the retaining clip.



- (b) Using a screwdriver unstick the lock plate, remove the bolt and lock plate.

Torque: 3.9 N·m (40 kgf·cm, 35 in.-lbf)



4. REMOVE GOVERNOR BODY

Remove the governor body from output shaft.

INSTALLATION HINT: Align the governor body and bolt hole on the output shaft.

GOVERNOR BODY INSTALLATION

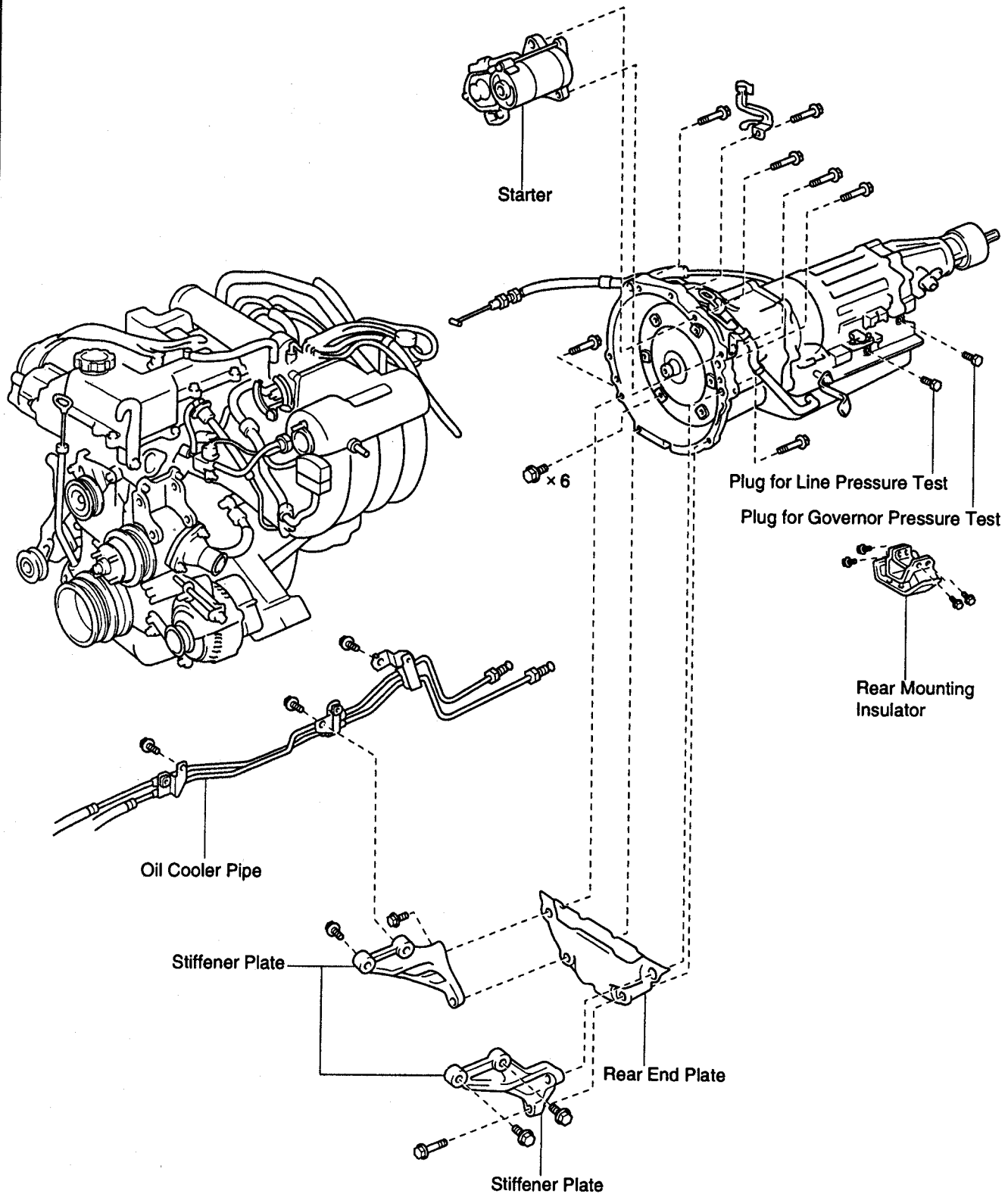
AT11E-01

Installation is in the reverse order of removal.

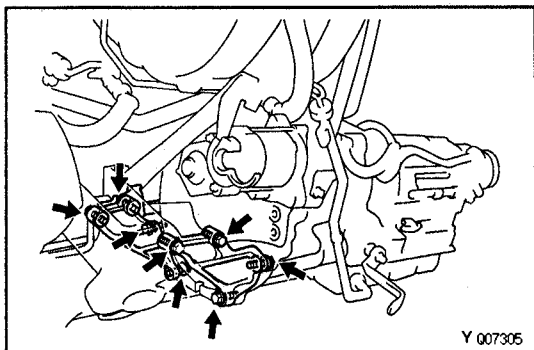
AT

ASSEMBLY REMOVAL AND INSTALLATION COMPONENTS

AT11F-01

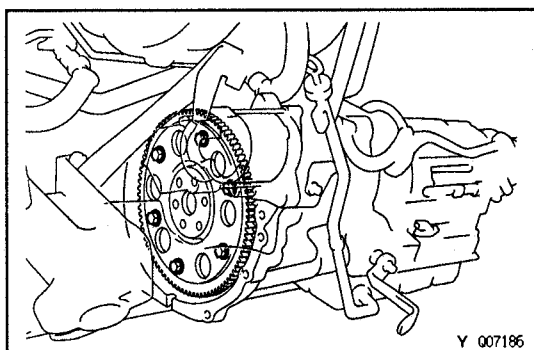


TRANSMISSION REMOVAL

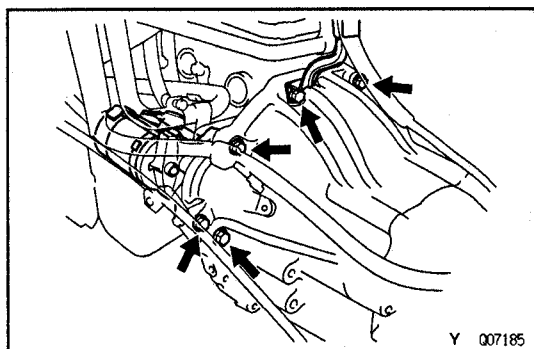


1. **REMOVE TRANSMISSION WITH ENGINE**
(See page 2RZ—FE, 3RZ—FE EG—61)
2. **REMOVE LEFT AND RIGHT SIDE STIFFENER PLATES**

(a) Remove the 8 bolts, 2 stiffener plates and rear end plate.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)



(b) Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft pulley set bolt a wrench.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)



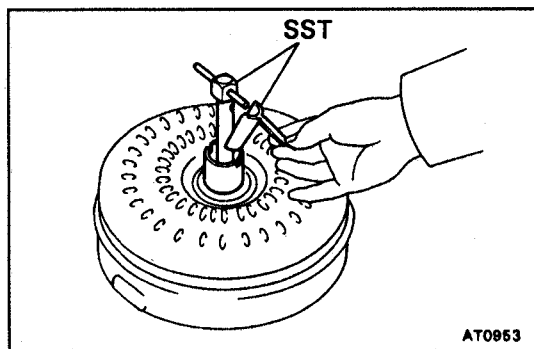
3. REMOVE STARTER

Remove the 2 bolts and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

4. REMOVE TRANSMISSION FROM ENGINE

- (a) Remove the 3 transmission mounting bolts from the engine.
Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)
- (b) Pull out the transmission toward the rear.

AT

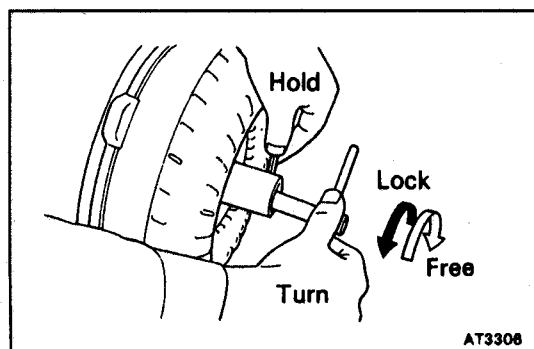


TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

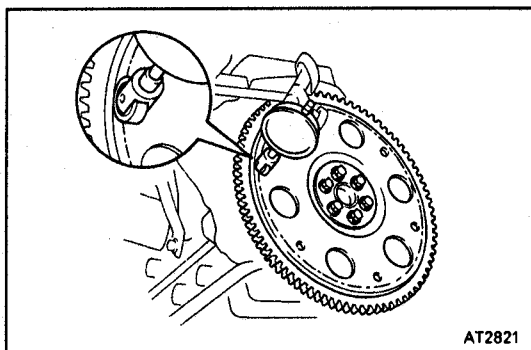
AT0X9-02

1. INSPECT ONE-WAY CLUTCH

- (a) Install SST in the inner race of the one-way clutch.
SST 09350-20015 (09397-22020)
- (b) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.
SST 09350-20015 (09397-22020)



- (c) With the torque converter clutch held upright, the clutch should lock when turned counterclockwise, and rotate freely and smoothly clockwise.
If necessary, clean the converter clutch and retest the clutch. Replace the converter clutch if the clutch still fails the test.



2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

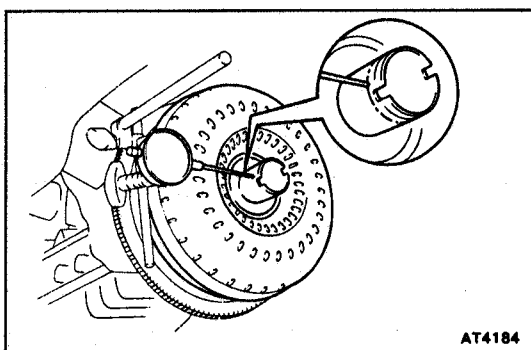
Set up a dial indicator and measure the drive plate runout.

Maximum runout: 0.20 mm (0.0079 in)

If runout is not within the specification or if the ring gear is damaged, replace the drive plate.

If installing a new drive plate, note the orientation of spacers and tighten the bolts.

Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



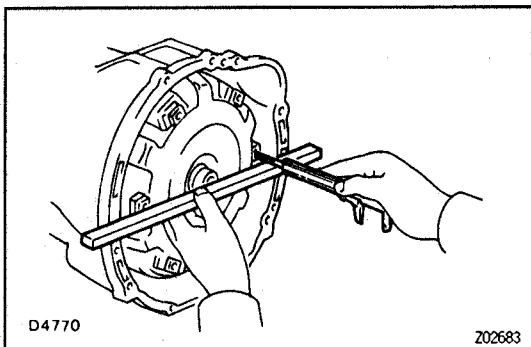
3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch to the drive plate. Set up a dial indicator.

Maximum runout: 0.30 mm (0.0118 in.)

If runout is not within the specification, try to correct by reorienting the installation of the converter.

HINT: Mark the position of the converter to ensure correct installation.



TORQUE CONVERTER CLUTCH INSTALLATION

AT0M1-08

Using calipers and a straight edge, measure from the installed surface to the torque converter clutch to the front surface of the transmission housing.

Correct distance: More than 31.75 mm (1.2500 in.)

If the distance is less than the standard, check for an improper installation.

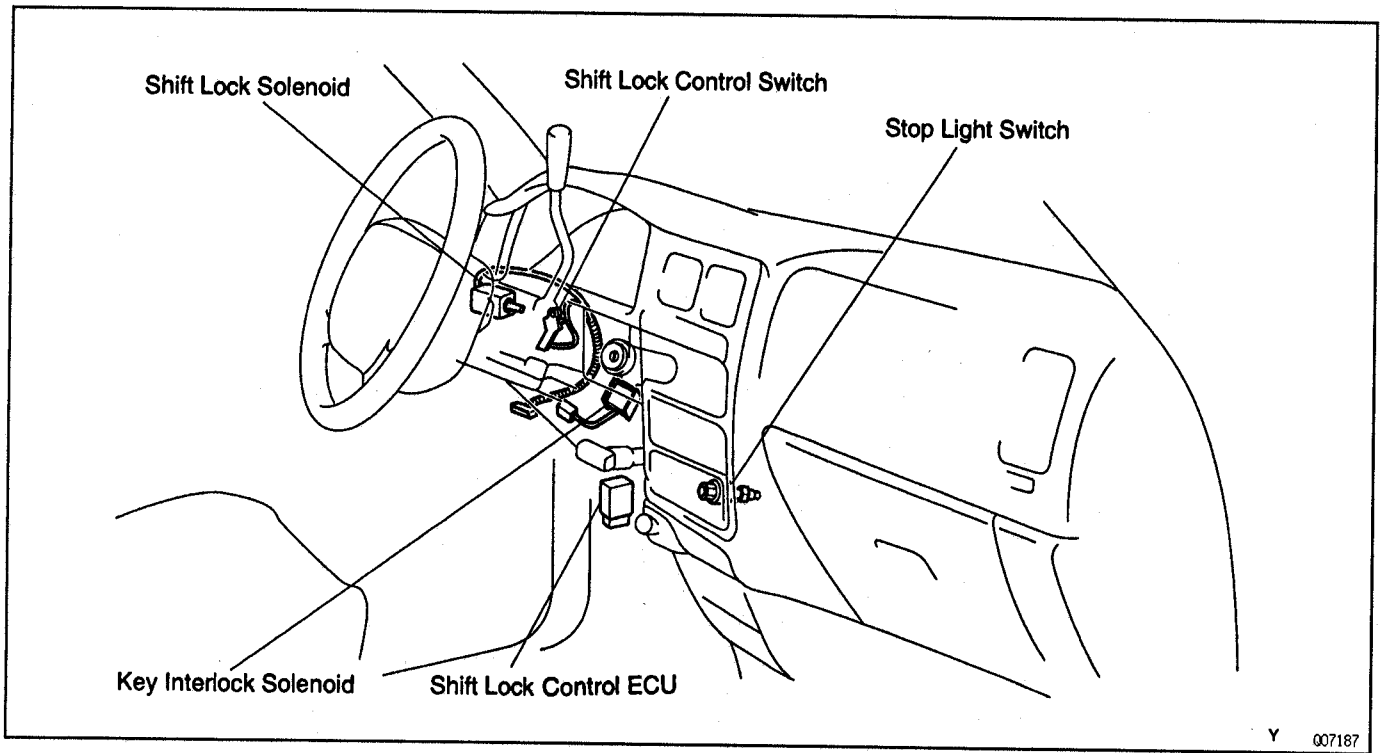
TRANSMISSION INSTALLATION

AT116-01

Installation is in the reverse order of removal.

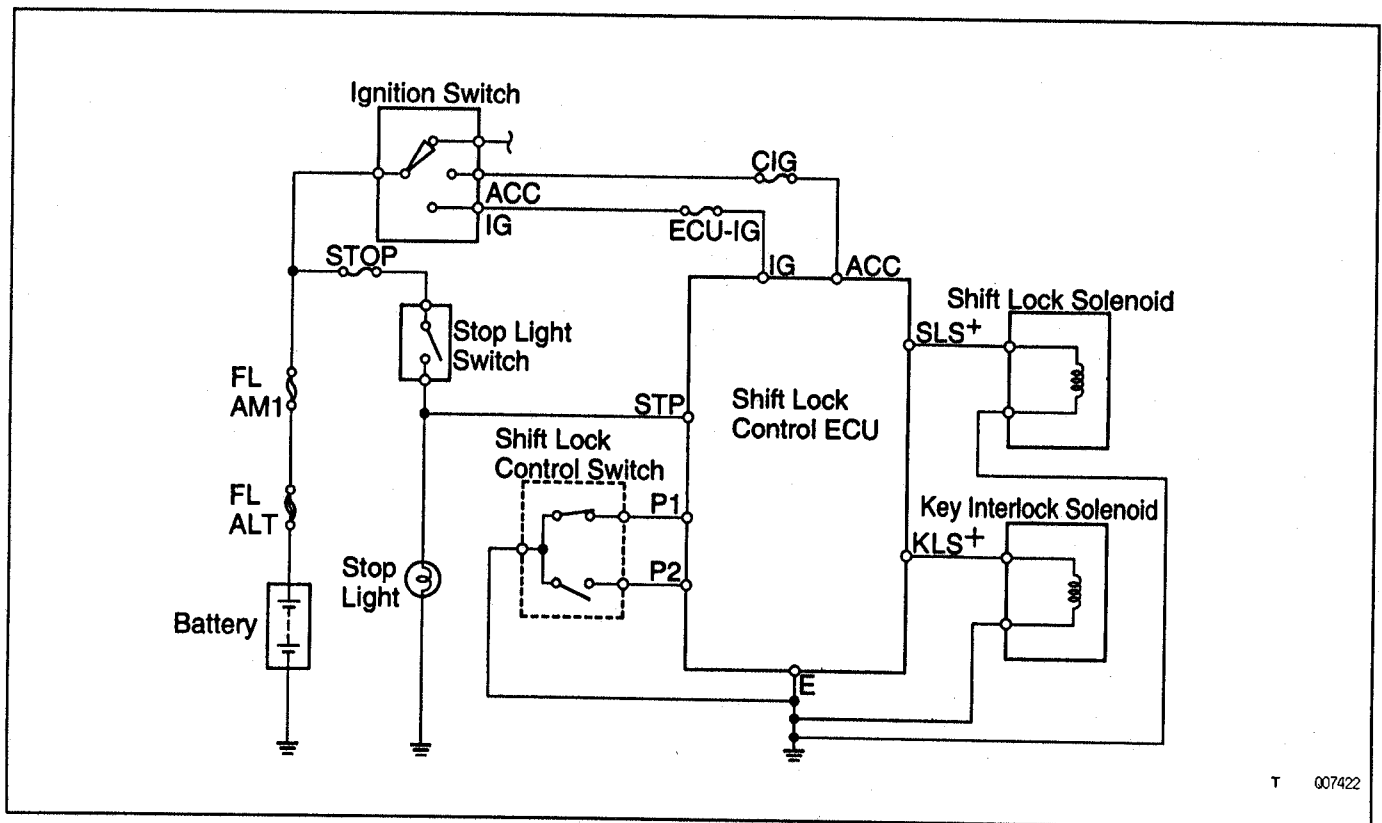
SHIFT LOCK SYSTEM COMPONENTS

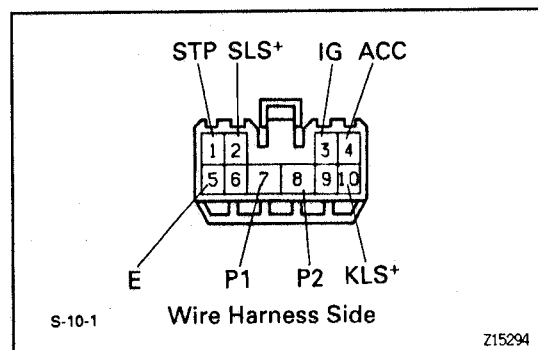
AT042-03



WIRING DIAGRAM

AX012-06





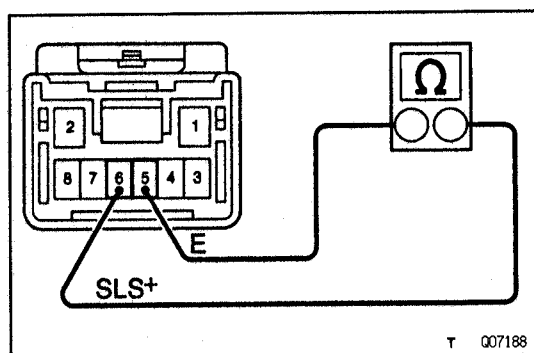
ELECTRIC CONTROL COMPONENTS INSPECTION

1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT: Do not disconnect the ECU connector.

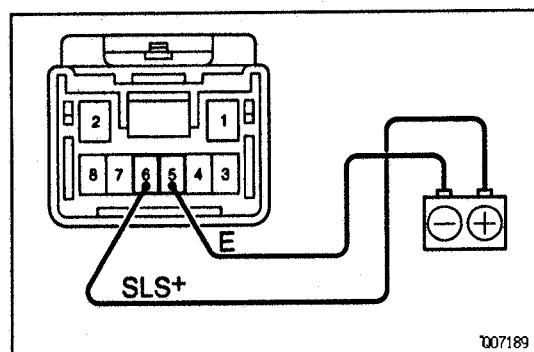
Terminal	Measuring Condition	Voltage (V)
ACC — E	Ignition switch ACC	10 — 14
IG — E	Ignition switch ON	10 — 14
STP — E	Depressing brake pedal	10 — 14
KLS+ — E	① Ignition switch ACC and P position	0
	② Ignition switch ACC and except P position	10 — 14
	③ (After approx 1 second)	6 — 9
SLS+ — E	① Ignition switch ON and P position	0
	② Depress brake pedal	8.5 — 13.5
	③ Except P position	0
P1 — E	① Ignition switch ON, P position and depress brake pedal	0
	② Shift except P position under conditions above	9 — 13.5
P2 — E	① Ignition switch ACC and P position	9 — 13.5
	② Shift except P position under conditions above	0



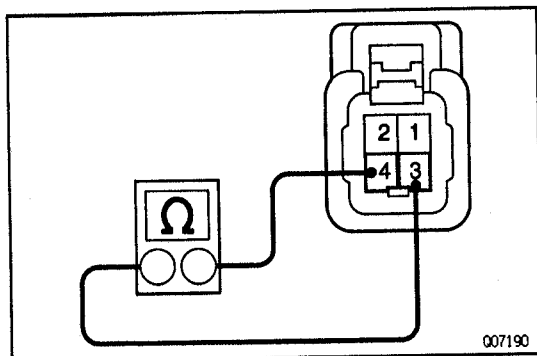
2. INSPECT SHIFT LOCK SOLENOID

- Disconnect the solenoid connector.
- Using an ohmmeter, measure the resistance between terminals.

Standard resistance: 29 — 35 Ω



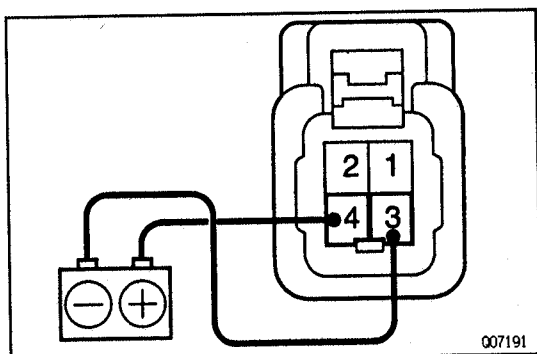
- Apply the battery positive voltage between terminals. Check that an operation noise can be heard from the solenoid.



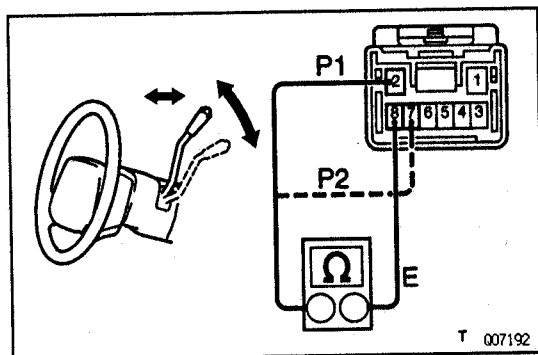
3. INSPECT KEY INTERLOCK SOLENOID

- (a) Disconnect the solenoid connector.
- (b) Using an ohmmeter, measure the resistance between terminals.

Standard resistance: 12.5–16.5 Ω



- (c) Apply battery positive voltage between the terminals. Check that an operation noise can be heard from the solenoid.



4. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that there is continuity between each terminal.

Shift position	Tester condition to terminal number	Specified value
P position	E — P1	Continuity
P position (Pull the shift lever toward you)	E — P1	Continuity
	E — P2	
R, N, D, 2, L position	E — P2	Continuity

SERVICE SPECIFICATIONS

SERVICE DATA

AT04M3-06

Governor Pressure				
Tire size: P195/75R14				
Output shaft rpm (Vehicle speed reference)				
1.000 rpm (32 km/h, 20 mph)		98—157 kPa	1.0—1.6 kgf/cm ²	14—23 psi
1.800 rpm (57 km/h, 35 mph)		196—255 kPa	2.0—2.6 kgf/cm ²	28—37 psi
3.500 rpm (111 km/h, 69 mph)		500—618 kPa	5.1—6.3 kgf/cm ²	73—90 psi
Tire size: P215/70R14				
Output shaft rpm (Vehicle speed reference)				
1.000 rpm (32 km/h, 20 mph)		98—157 kPa	1.0—1.6 kgf/cm ²	14—23 psi
1.800 rpm (58 km/h, 36 mph)		196—255 kPa	2.0—2.6 kgf/cm ²	28—37 psi
3.500 rpm (113 km/h, 70 mph)		500—618 kPa	5.1—6.3 kgf/cm ²	73—90 psi
Line pressure (wheel locked)	Engine idling			
	D position	441—500 kPa	4.5—5.1 kgf/cm ²	64—73 psi
	R position	667—745 kPa	6.8—7.6 kgf/cm ²	97—108 psi
	AT stall (throttle valve fully opened)			
	D position	990—1,167 kPa	10.1—11.9 kgf/cm ²	144—169 psi
	R position	1,471—1,863 kPa	15.0—19.0 kgf/cm ²	213—270 psi
Engine stall revolution	D and R position	1,850 ± 150 rpm		
Time lag	N → D position	Less than 1.2 seconds		
	N → R position	Less than 1.5 seconds		
Engine idle speed (A/C OFF)				
	N position	700 ± 50 rpm		
Throttle cable adjustment (Throttle valve fully opened)		Between boot and face and inner cable stopper		
		0—1 mm	0—0.04 in.	
Drive plate runout	Max.	0.20 mm	0.0079 in.	
Torque converter clutch sleeve runout	Max.	0.30 mm	0.0118 in.	
Torque converter clutch installation distance		More than 31.75 mm	1.2500 in.	
Speedometer driven gear oil seal drive in depth		20 mm	0.79 in.	

SHIFT POINT

Shift position	Shifting point		Vehicle speed km/h (mph)
D	Throttle valve fully opened	1→2	55—69 (34—43)
		2→3	101—116 (63—72)
		O/D→3	*
	Throttle valve fully closed	3→2	96—111 (60—69)
		2→1	44—57 (27—35)
		3→O/D	43—55 (27—34)
L	Throttle valve fully opened	2→1	47—64 (29—40)

* O/D→3 down—shift is possible up to maximum speed.

TORQUE SPECIFICATIONS

Part tightened		N-m	kgf-cm	ft-lbf
Oil cooler pipe flare nut		34	350	25
Torque converter clutch x Drive plate		41	420	30
Drive plate x Crankshaft		74	750	54
Extension housing x Transmission case		34	345	25
Parking lock pawl bracket x Transmission case		7.4	75	65 in.-lbf
Valve body x Transmission case		10	100	7
Oil strainer x Valve body		5.4	55	48 in.-lbf
Oil pan		5.4	55	48 in.-lbf
Governor body		3.9	40	35 in.-lbf
Control shaft lever		6.9	70	61 in.-lbf
Oil cooler union		34	350	25
Oil cooler elbow		34	350	25
Park/neutral position switch	Bolt	5.4	55	48 in.-lbf
	Nut	3.9	40	35 in.-lbf
Drain plug		20	205	15
Extension housing x Rear mounting insulator		25	260	19
Rear mounting bracket x Rear support member		58	590	43
Rear mounting bracket x Rear mounting insulator		18	185	13
Stiffener plate x Engine		37	380	27
Stiffener plate x Torque converter clutch housing		37	380	27
Exhaust manifold x Exhaust pipe		62	630	46
Front exhaust pipe clamp bolt		19	195	14
Exhaust pipe bracket x Torque converter clutch housing		19	195	14
Control shaft lever x Control cable		13	130	9
Overdrive solenoid x Transmission case		13	130	9
Transmission x Engine		71	730	53
Tail pipe x TWC		48	490	35

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