

AUTOMATIC TRANSAXLE

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AT-2

1 BASIC CHECK

1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09302-87201-000 Gauge, neutral start switch adjust	For adjustment of neutral start switch
Lubricant	ATF DEXRON® III (or II)		

AT-BI-P-Z-00011

1-2 AUTOMATIC TRANSMISSION FLUID

1-2-1 INSPECTION

(1) CONDITION

1. Inspect the ATF conditions.

SPECIFIED VALUE: No contamination, burnt smell and mixing impurity.

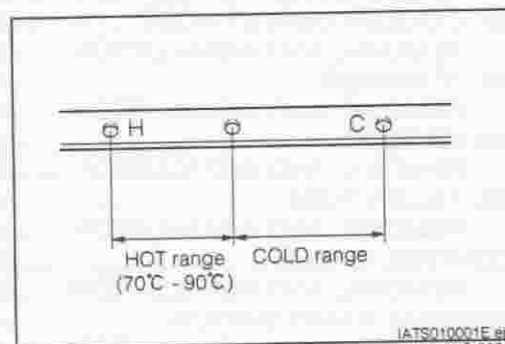
(2) LEVEL

1. Park the vehicle on a flat place.
2. Check the idle speed.
3. Operate the transmission until it is completely warmed up to a fluid temperature of (70-90°C).
4. Apply the parking brake.
5. With the engine idling, move the shift lever slowly from the P to 2, passing through each range. Then, return the lever to the P range.
6. Pull out the transaxle fluid level gauge and wipe out the oil with a cloth. Remove lint, etc. by blowing compressed air.
7. Pull out the oil level gauge that was inserted and check the ATF level.

SPECIFIED VALUE: The level is in the oil level gauge "H" range.

CAUTION

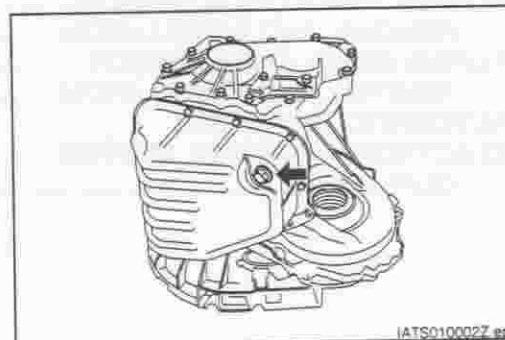
- If it necessary to check the fluid level at low temperature (20 - 30°C), e.g. at the time of fluid change, first adjust the fluid level so that it may become within the COLD level. Then, recheck the fluid level under the hot conditions.
- If the fluid level fails to reach the cold level on the fluid level gauge, be sure to check the transaxle for fluid leakage.



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AT-BI-X-C-00011

1-2-2 REPLACEMENT

1. Park the vehicle on a flat place.
2. Remove the drain plug on the bottom of the oil pan and drain out the ATF.



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3. Install the drain plug.
TIGHTENING TORQUE: $24.5 \pm 4.5\text{N}\cdot\text{m}$

CAUTION

- Never reuse the removed gasket.

4. Pull out the oil level gauge and add ATF.
LUBRICANT: ATF DEXRON® III or II
Filling Amount 5.0 ℓ
5. Install the drain plug.
TIGHTENING TORQUE: $24.5 \pm 4.5\text{N}\cdot\text{m}$

CAUTION

- Never reuse the removed gasket.

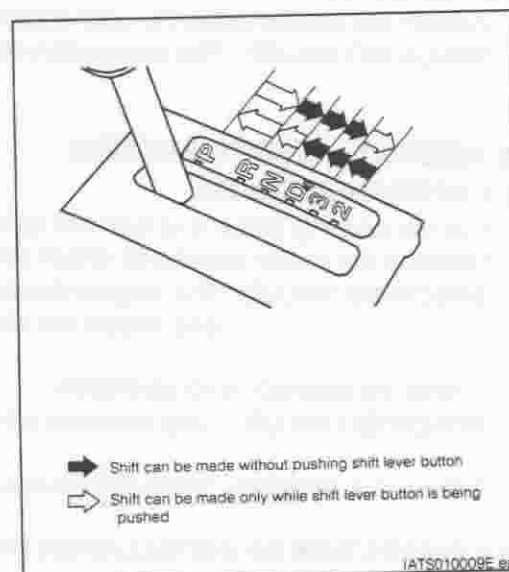
6. Step on the brake pedal and slowly move the shift lever through each range while the engine is idling and then return it to the **P** range.
7. Pull out the oil level gauge and check the ATF level.
SPECIFIED VALUE: The level is in the oil level gauge "C" range.
8. Recheck when completely warm.
SPECIFIED VALUE: The level is in the oil level gauge "H" range.

AT-BI-X-R-00011

1-3 SHIFT LEVER

1-3-1 INSPECTION

1. Check the shift lever operation.
SPECIFIED VALUE: It operates as shown in the illustration.
The shift lever can be operated smoothly.
Moves as intended through all the ranges.



2. Check the position indicator display.
SPECIFIED VALUE: Displays the corresponding shift lever position.
3. Start the engine and check the vehicle condition.
SPECIFIED VALUE: The vehicle moves forward when shifted to the **D4**, **3**, and **2** ranges and moves backward when shifted to the **R** range.

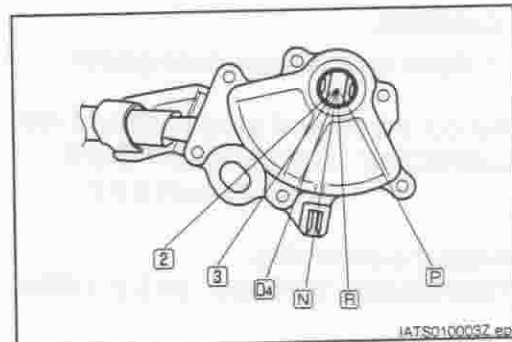
AT-BI-L-I-00011

AT-4

1-4 CONTROL CABLE

1-4-1 ADJUSTMENT

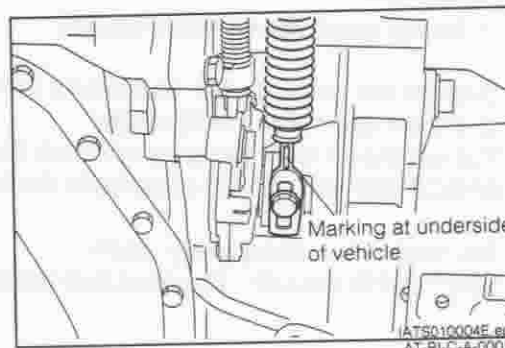
1. Disconnect the control cable Ay from the transmission side.
2. Put the shift lever and transmission control shaft lever into the **N** range.



3. Connect the control cable Ay to the transmission control shaft lever Ay.

CAUTION

- The control cable play does not tend to lean toward one side.



1-4-2 INSPECTION

1. Inspect the control cable Ay connection.
SPECIFIED VALUE: The connection should not be worn or deformed.

AT-BI-C-I-00011

1-5 NEUTRAL START SWITCH

1-5-1 OPERATION CHECK

1. Pull the parking brake and turn the ignition switch to "ON."
2. Depress the brake pedal and check the engine starting condition.
SPECIFIED VALUE: The engine should only start when the shift lever is shifted to the **P** or **N** range and should not start in any other range.

3. Check the backup lamp operation.
SPECIFIED VALUE: Only operates when the shift lever is shifted to the **R** range.

4. If there is a problem, check the neutral start switch installation position and the switch itself.

AT-BI-Y-O-00011

1-5-2 INSPECTION OF INSTALLATION POSITION

Refer to AT-38.

AT-BI-Y-P-00011

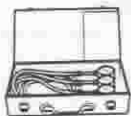
1-5-3 UNIT CHECK

Refer to AT-39.

AT-BI-Y-U-00011

2 OPERATION CHECK

2-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09325-87201-000 Adapter, A/T pressure gauge No.1	For hydraulic pressure test
Tool		Oil pressure gauge for A/T	For hydraulic pressure test
		Oil pressure gauge adapter	For hydraulic pressure test
Instrument	ATF DEXRON® III (or II)		

AT-OI-P-Z-00011

2-2 CAUTION

CAUTION

- Each test should be observed after performing the basic inspection and adjustments.
- The fluid should be at the normal running temperature. (70 - 90°C)
- Be sure to turn OFF the air conditioner (if equipped so) .

AT-OI-N-Z-00011

2-3 STALL TEST

NOTE

- The purpose of this test is to check the overall performance of the automatic transmission and engine by measuring the maximum engine speeds in the **D4** and **R** ranges.

AT-OI-S-Z-00011

2-3-1 INSPECTION

1. Place chocks at the four wheels.
2. Install an engine tachometer.
3. Fully apply the parking brake.
4. Start the engine.
5. Keep depressing the brake pedal firmly by your left foot during the test.
6. Move the shift lever to the **D4** range. Depress the accelerator pedal fully by your right foot. Quickly read the highest engine rpm at this time.
SPECIFIED VALUE: 1900 - 2400rpm

7. Perform the same test in the R range.

AT-OI-S-I-00011

2-3-2 CAUTION

CAUTION

- Do not conduct this test continuously for more than five seconds.
- Wait at least one minute before the switching is made from the **D4** range to the **R** range.

AT-OI-S-N-00011

AT-6

2-3-3 TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

If the engine speed is the same for both ranges (D4, R1) but lower than the specified value.	• Engine output probably insufficient (e.g. throttle valve is not opened fully.) • Torque convertor malfunctioning
If the stall speed in the R1 and D4 ranges is higher than the specified value.	• Line pressure too low • Fluid level improper
If the stall speed at the D4 range is higher than the specified value.	• Line pressure too low • Forward clutch slipping • Torque convertor malfunctioning
If the stall speed in the R1 range is higher than the specified value.	• Line pressure too low • Direct clutch slipping • First & reverse brake slipping

AT-OI-S-S-00011

2-4 TIME LAG TEST

NOTE

- When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before you can feel a shock. This time lag can be used for checking those conditions of the forward clutch, the direct clutch and the first & reverse brake.

AT-OI-H-Z-00011

2-4-1 INSPECTION

1. Place chocks at the four wheels.
2. Fully apply the parking brake.
3. Start the engine.
4. Keep depressing the brake pedal firmly by your left foot during the test.
5. Move the shift lever from the N range to the D4 range. Using a stopwatch, measure the time required from the lever shifting to the time when you feel a shock.
SPECIFIED VALUE: Not to exceed 1.0 second

6. In the same manner, measure the time lag when shifting is made from the N range to the R1 range.
SPECIFIED VALUE: Not to exceed 1.0 second

AT-OI-H-I-00011

2-4-2 CAUTION

CAUTION

- Be sure to allow one minute intervals between tests.
- Conduct the measurement three times and take the average value.

AT-OI-H-N-00011

2-4-3 TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

If the N→D4 time lag is longer than the specified value.	• Line pressure too low • Forward clutch worn
If the N→R1 time lag is longer than the specified value.	• Line pressure too low • Direct clutch worn • First & reverse brake worn

AT-OI-H-S-00011

2-5 HYDRAULIC TEST

2-5-1 PRESSURE GAUGE INSTALLATION PROCEDURE

1. Remove the test plug. Install the pressure gauge.
SST: 09325-87201-000
2. Measure each hydraulic pressure.
3. After completing the hydraulic test, remove the pressure gauge and replace the test plug.

TIGHTENING TORQUE: $9.8 \pm 2.9\text{N}\cdot\text{m}$

AT-OI-C-I-0001.1

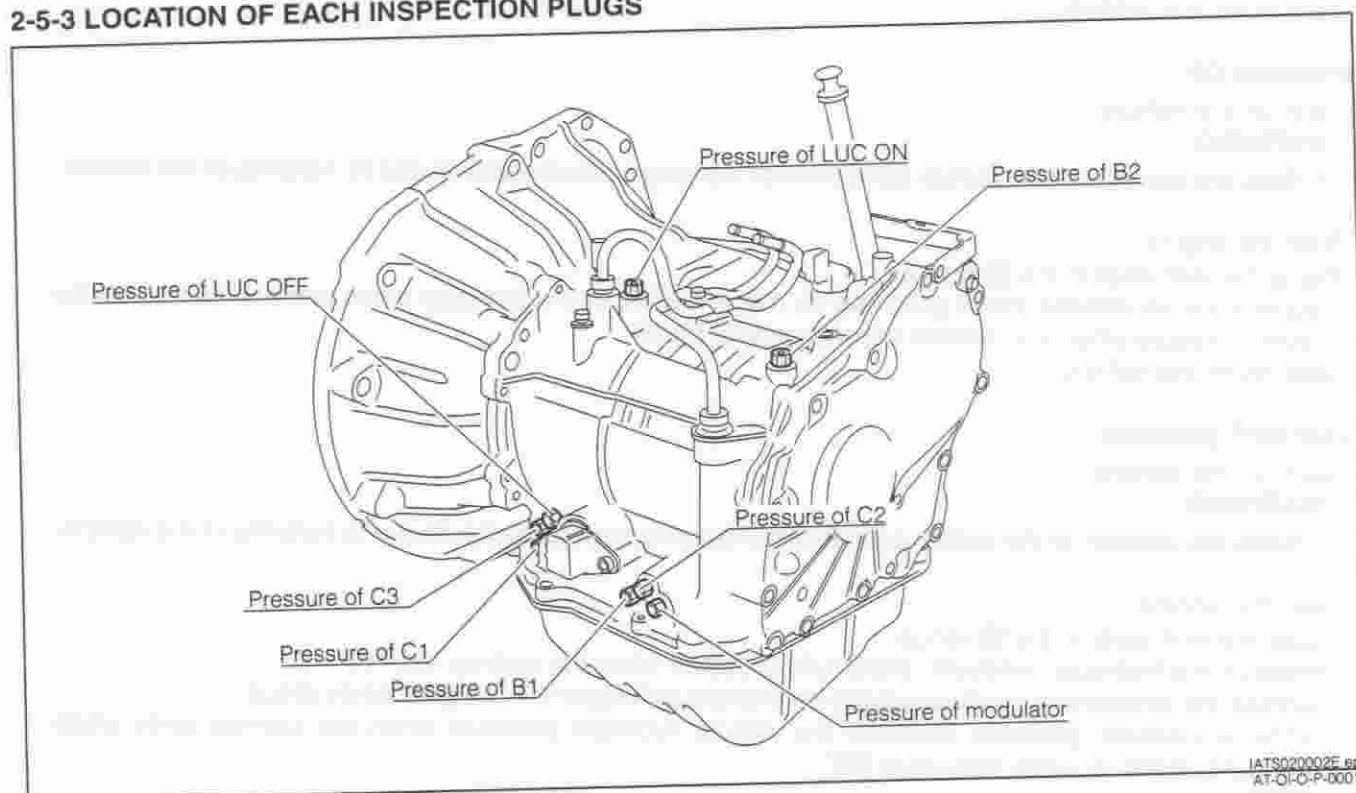
2-5-2 CAUTION

CAUTION

- Be sure to use new gaskets for the SST and instrument.
- The test plug is a non-reusable part.

AT-OI-C-N-0001.1

2-5-3 LOCATION OF EACH INSPECTION PLUGS



2-5-4 HYDRAULIC PRESSURE MEASURING PROCEDURE

(1) Pressure C2

1. Place chocks.
2. Apply the parking brake.
3. Start the engine.
4. While depressing the brake pedal strongly by your left foot, move the shift lever to the **D4** range.
5. Operate the accelerator pedal with your right foot and measure each hydraulic pressure.

AT-8

(2) Pressure C1, pressure B2

1. Place chocks.
2. Apply the parking brake.
3. Start the engine.
4. While depressing the brake pedal strongly by your left foot, move the shift lever to the **R** range.
5. Operate the accelerator pedal with your right foot and measure each hydraulic pressure.

(3) Pressure B1

1. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

2. Start the engine.
3. Place the shift lever in the **D4** range.
4. Depress the accelerator pedal gradually so that the shifting to the 2nd gear takes place. Measure the hydraulic pressure at the engine speed of 2000 rpm.
5. Jack down the vehicle.

(4) Pressure C3

1. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

2. Start the engine.
3. Place the shift lever in the **D4** range.
4. Depress the accelerator pedal gradually so that a shifting to the 3rd gear takes place. Measure the hydraulic pressure when you release the accelerator pedal.
5. Jack down the vehicle.

(5) LUC OFF pressure

1. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

2. Start the engine.
3. Place the shift lever in the **D4** range.
4. Measure the hydraulic pressure. (Hydraulic pressure when the lock-up is OFF)
5. Depress the accelerator pedal gradually so that the shifting to the 3rd gear takes place.
6. Further accelerate gradually. Measure the vehicle hydraulic pressure when the lock-up takes place. (Hydraulic pressure when lock-up is ON)

NOTE

- The lock-up in the 3rd gear takes place when the vehicle speed is about 45 km/h (about 46 km/h in the case of 4WD vehicles) and the throttle opening is 6 to 20 %.

SPECIFIED VALUE: Hydraulic pressure

Item	Measuring condition		Specification value (kPa)
	Range	Running condition	
C2	D4	Stall revolving condition	930 - 1120
C1,B2	R	Stall revolving condition	1520 - 2110
C3	D4	3rd gear, accelerator OFF (When lock - up is OFF)	440 - 640
B1	D4	2nd gear, engine revolution 2000rpm	930 - 1130
LUC OFF pressure	D4	When lock - up is OFF	590 - 750
		When lock - up is ON	20 or less

AT-OI-O-H-00011

2-6 ROAD TEST

2-6-1 CAUTION

CAUTION

- Thoroughly confirm the safety on the road during the tests.

AT-OI-M-N-00011

2-6-2 INSPECTION

(1) D4 range test

1. Start off in the D4 range and check the driving conditions.

SPECIFIED VALUE: No abnormal vibration or sound.

2. Depress the accelerator pedal and check the shifting conditions.

SPECIFIED VALUE: Shifts up and down to 1st→2nd, 2nd→3rd, 3rd→4th (O/D) .

All of the shift points are within the standard value.

No abnormal jolts, slippage, etc.

3. Perform a kick down operation while driving in 4th, 3rd, and 2nd and check the corresponding conditions.

SPECIFIED VALUE: Kick down to 4th→3rd, 3rd→2nd, 2nd→1st.

The kick down limit speeds for 3rd→2nd, 2nd→1st match the standard values.

No abnormal jolts, slippage, etc.

AT-10

(2) [3] range test

1. Start off in the [3] range and check the driving conditions.
SPECIFIED VALUE: No abnormal vibration or sound.
2. Depress the accelerator pedal and check the shifting conditions.
SPECIFIED VALUE: Shifts up and down to 1st↔2nd, 2nd↔3rd.
Does not shift up to 4th.
All of the shifting points match the standard values.
In addition, there are no abnormal jolts, slippage, etc.
Fixed in 3rd after shifting up to 1st→2nd, 2nd→3rd.
3. Conduct a kick down operation while driving in [3] range 3rd and 2nd and check the corresponding conditions.
SPECIFIED VALUE: Kicks down to 3rd→2nd, 2nd→1st.
The kick down limit speeds match the standard values.
No abnormal jolts, slippage, etc.
4. Check the conditions when shifting to the [3] range while driving in [D4] range 4th.
SPECIFIED VALUE: Shift down to 4th→3rd and operate the engine brake.
The shift point matches the standard value.

(3) [2] range test

1. Start off in the [2] range and check the driving conditions.
SPECIFIED VALUE: No abnormal vibration or sound.
Fixed in 2nd after shifting up to 1st→2nd.
2. Check the conditions when shifting to the [2] range while driving in [D4] range 4th.
SPECIFIED VALUE: Shifts down to 4th→3rd→2nd and the engine brake operates.
The shift point matches the standard value.
However, shifts down to 1st when the vehicle speed is approximately 12km/h (throttle open 0%) , but the engine brake does not operate in 1st.
3. While running in the [D4] range, 3rd gear, gradually accelerate.
SPECIFIED VALUE: The lock up turns on.
The engine speed drops and the vehicle speed matches the standard value lock up "ON" timing.
The engine speed does not change greatly even when the accelerator pedal is slightly depressed.
4. Perform the same test for the 4th gear.

(4) [P] range test

1. Park the vehicle at an uphill (about 5° or more) .
2. Move the shift lever to the [P] range and release the parking lever.
SPECIFIED VALUE: The parking lock mechanism operates and the vehicle does not move.
3. Perform the same test when the vehicle is parked at a downhill.
SPECIFIED VALUE: The vehicle moves when the shift lever is moved from the P range to other range.

(5) SHIFT POINT SPEEDS

Throttle opening degree	Range	Gear shifting	Vehicle speed (km/h)	
			2WD	
			Economy mode diagram	Power mode diagram
100%	D4	1st→2nd	53 - 68	←
		2nd→3rd	98 - 113	←
		3rd→4th	159 - 174	←
		4th→3rd	133 - 148	←
		3rd→2nd	70 - 85	75 - 90
		2nd→1st	33 - 48	37 - 52
0%	D4	1st→2nd	10 - 25	15 - 30
		2nd→3rd	18 - 33	25 - 40
		3rd→4th	38 - 53	45 - 60
		4th→3rd	22 - 37	35 - 50
		3rd→2nd	8 - 23	10 - 25
		2nd→1st	8 - 23	10 - 25
0 - 100%	D4→[3],[2]	4th→3rd	135 - 150	←
		3rd→2nd	88 - 103	←
		2nd→1st	40 - 55	←

- The shift point speeds in the 1st (2nd gears) and 2nd (3rd gears) of the 3 and 2 ranges with the throttle opening set to 100 % and 0 % are the same as with the D4 range.
- The economy mode diagram or power mode diagram is automatically selected, depending upon the throttle opening speed. Hence, evaluation should be made based on either gear shifting vehicle speed.

• LOCK-UP VEHICLE SPEED

Throttle opening degree	Gear shifting	Lock-up	Vehicle speed (km/h)
			2WD
6 - 20%	3rd	ON	50 - 65
	4th	ON	58 - 73
	3rd	OFF	35 - 50
	4th	OFF	52 - 67

The accelerator pedal should be depressed gradually.

AT-OI-M-I-00011

2-6-3 STEER SHIFT MODE TEST

(1) CAUTION

CAUTION

- Check the steer shift up-down buttons on the right and left sides.

AT-12

(2) INSPECTION

1. Perform the following tests with the D4 range selected and the vehicle speed kept at 60 km/h.
 - (1) Ensure that the steer shift indicator indicates "M4" when the steer shift switch is pushed.
 - (2) Ensure that the steer shift indicator indicates "M3" and a downshift to the 3rd gear takes place when the steering down switch (-) is pushed once.
 - (3) Ensure that the steer shift indicator indicates "M2" and a downshift to the 2nd gear takes place when the steering down switch (-) is pushed once more.
 - (4) Ensure that the steer shift indicator keeps indicating "M2", the inhibit buzzer is set off and no downshift to the 1st gear takes place when the steering down switch (-) is pushed once more.
 - (5) Ensure that the steer shift indicator indicates "M3" and an upshift to the 3rd gear takes place when the steering up switch (+) is pushed once.
 - (6) Ensure that the steer shift indicator indicates "M4" and an upshift to the 4th gear takes place when the steering up switch (+) is pushed once more.
 - (7) Ensure that the steer shift indicator keeps indicating "M4", and the inhibit buzzer is set off when the steering up switch (+) is pushed once more.
2. When you slow down the vehicle and stop it, ensure that the indicator in the meter indicates "M1".
3. When the shift lever is changed from D4 to 3 range, ensure that the steer shift indicator changes from "M1" to "1".

AT-OI-M-H-00011

3 AUTOMATIC TRANSAXLE

3-1 REMOVAL AND INSTALLATION

WARNING

- Do not get a flame or hot object close to the vehicle when the fuel system is operating.
- Take measures to prevent the fuel from splattering when disconnecting a fuel hose.
- Do not remove the radiator cap, drain plug, or water hose while the coolant is hot.
- Do not remove the drain plug or oil cooler hose while the oil is hot.

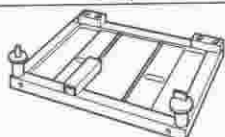
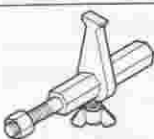
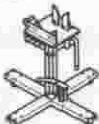
AT-ATX-D-P-00011

3-1-1 INSTRUCTIONS

1. This section explains the removal/installation procedures for the transaxle Ay from or to the vehicle. For disassembling, checking and assembling procedures for the transaxle Ay, refer to the separate Service Manual for Type A4B Series Automatic Transaxle.

Service Manual: Type A4B Series Automatic Transaxle No.9735

3-1-2 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09994-87201-000 Holder, engine frame	For removal/installation of engine frame
		09210-87701-000 Holder, flywheel	For prevention from turning of drive plate
Tool		Engine support bridge	For suspending engine and transaxle
		Engine support bridge	For suspending engine and transaxle
		Chain block	For suspending engine and transaxle (for addition to engine support bridge)
		High-transmission jack	For removal/installation of transaxle
Instrument	Torque wrench, Dial gauge		
Lubricant	MP grease, ATF DEXRON® III (or II)		

AT-ATX-D-Z-00011

AT-14

3-1-3 OPERATION BEFORE REMOVAL

1. Remove the fuel pressure.
2. Disconnect the battery ground cable from the negative terminal.

NOTE

- Memory such as troubleshooting code or radio shall be recorded to avoid being erased before disconnect the battery ground cable from the negative terminal.

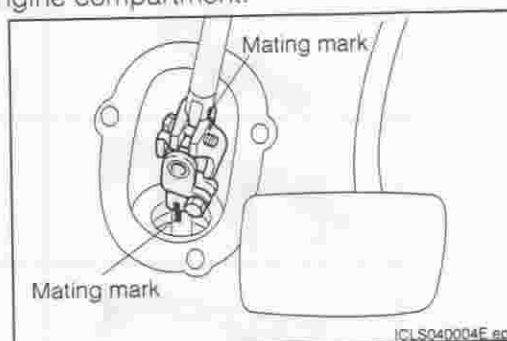
3. Disconnect the bond cable.
4. Remove the air cleaner case.
5. Drain the coolant.

WARNING

- Do not remove the radiator cap, drain plug, or water hose while the coolant is hot.

6. Drain the ATF.
Refer to AT-3.

7. Remove the radiator Ay.
8. Disconnect the heater hose.
9. Disconnect the vacuum hose.
10. Disconnect the fuel hose.
11. Disconnect the engine wire.
(1) Disconnect the engine control computer connector.
(2) From the cabin side, pull out the engine wire that is in the engine compartment.
12. Separation of universal joint
(1) Attach mating marks to universal joint and steering gear, and separate the joint portion.



13. Supporting engine and transaxle
(1) Install the engine hanger No.1, No.2.

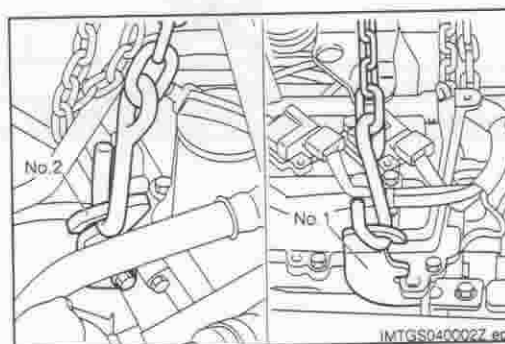
WARNING

- Do not work while the exhaust manifold is still hot to avoid getting burn.

NOTE

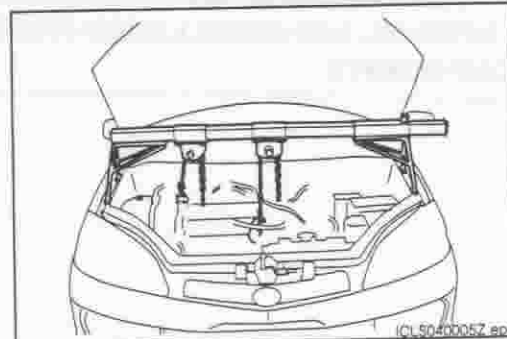
- The engine hanger No.1, No.2 and the installation bolts are supplies as replacement parts.

TIGHTENING TORQUE: $20.0 \pm 6.0\text{N}\cdot\text{m}$



(2) Using engine support bridge, hold engine Ay and transaxle Ay in direct coupling condition.

TOOL: Engine support bridge



14. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

15. Remove the wheel.

16. Remove the lower arm bracket connecting rod.
Refer to MTG-5.

17. Remove the stabilizer bar.
Refer to FS-26.

18. Remove the drive shaft.
Refer to DPS-3.

19. Remove the exhaust pipe.

WARNING

- Do not work while the exhaust pipe is still hot to avoid getting burn .

20. Separation of the tie rod end

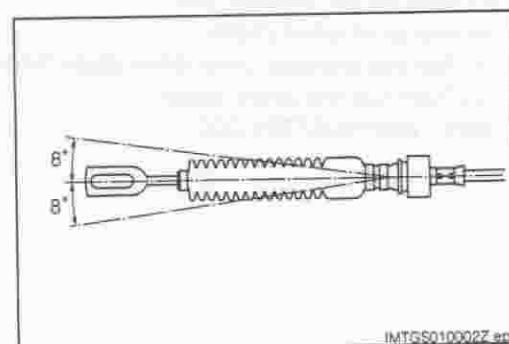
21. Separate the suspension lower arm S/A from the front frame side.
Refer to FS-20.

22. Separate of the control cable

(1) Disconnect the control cable from the control shaft lever Ay.

CAUTION

- Do not rock the control cable end (both the shift lever side and the transmission side) by 8° or more, or do not apply load.



23. Remove the alternator B terminal.

24. Remove the starter connector.

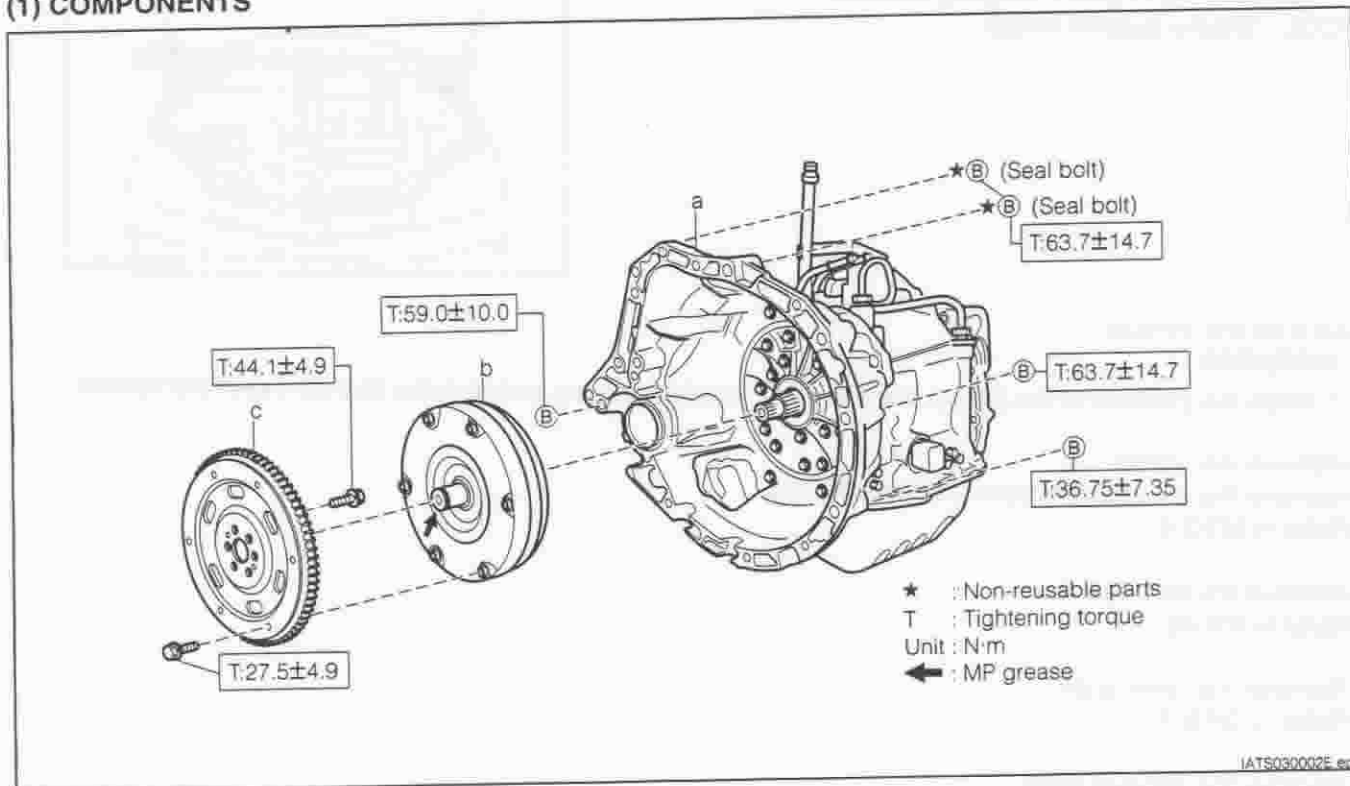
25. Remove the engine and transaxle.

AT-ATX-D-B-00011

AT-16

3-1-4 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



(2) REMOVAL AND INSTALLATION PROCEDURES

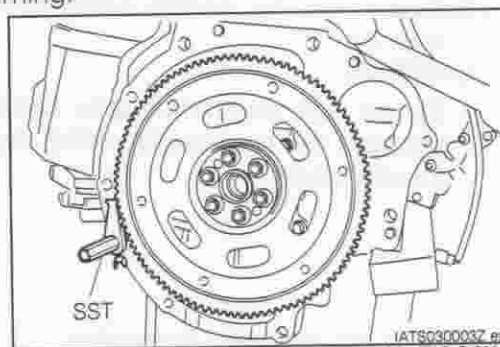
- 1 ③ a Transaxle Ay
- 2 ② b Converter Ay, torque
- ③ ① c Gear S/A, drive and ring

AT-ATX-D-T-00011

3-1-5 POINTS OF REMOVAL

1. Removal of drive plate
 - (1) Set the stopper onto drive plate ring gear to prevent from turning.
 - (2) Remove the drive plate.

SST: 09210-87701-000



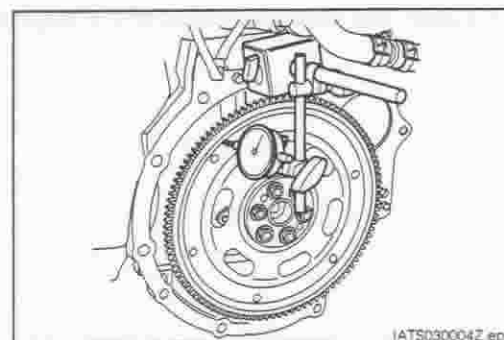
AT-ATX-D-D-00011

3-1-6 INSPECTION

(1) Drive plate

1. Check of runout
 - (1) Set the dial gauge to drive plate on right angle .
 - (2) Measure the runout by turning the drive plate.

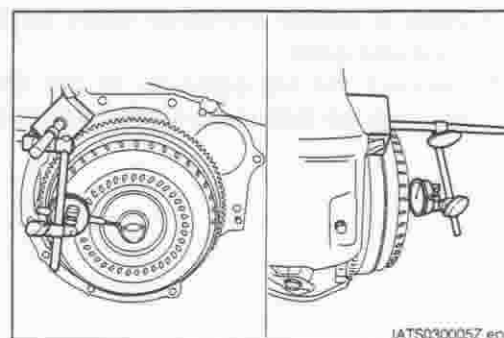
ALLOWABLE LIMIT: 0.25mm



(2) Torque converter

1. Check of runout
 - (1) Attach a torque converter to the drive plate.
 - (2) Set the dial gauge to torque converter shaft on right angle .
 - (3) Measure the runout by turning the torque converter.

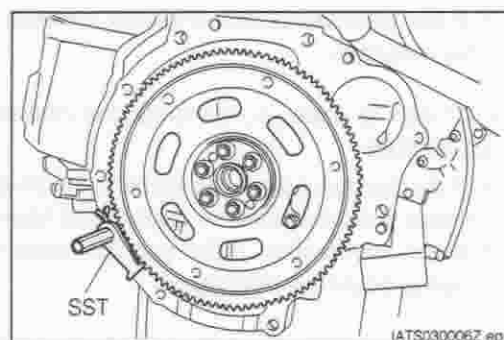
ALLOWABLE LIMIT: 0.30mm



3-1-7 POINTS OF INSTALLATION

1. Installation of drive plate
 - (1) Loosely tighten the drive plate to the crankshaft.
 - (2) Stop the drive plate from rotating.
 - (3) Firmly tighten the drive plate.

SST: 09210-87701-000



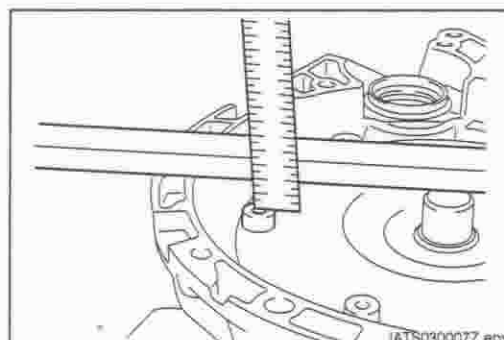
2. Installation of torque converter
 - (1) Insert the torque converter into the transaxle Ay while turning the torque converter.
 - (2) Ensure that the torque converter has been inserted positively.

SPECIFIED VALUE: Dimension A at least 16.5mm

The dimension A is a distance from the edge surface of the housing to the drive plate attaching surface of the torque converter.

NOTE

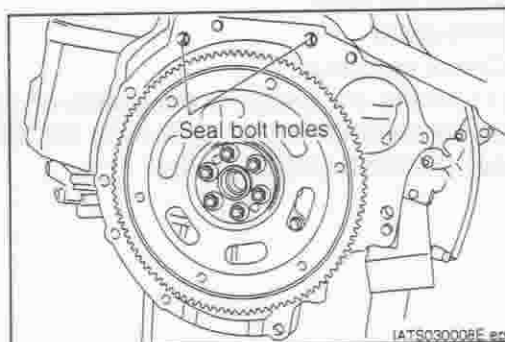
- When it is difficult to insert to the specified dimension, hold up and push the torque converter a little bit and try to insert it again.
- Do not strike or pound the torque converter.



AT-18

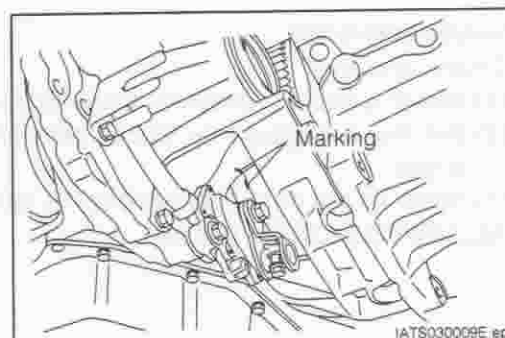
3. Installation of transaxle Ay

(1) Clean the seal bolt holes of the engine block.



(2) Make a torque converter edge position mark on the transaxle case.

(3) Connect the transaxle Ay to the engine block while keeping the torque converter edge position in place.



CAUTION

- If the position is out of place, remove the transaxle and recheck how far the torque converter should be inserted.

(4) Check to make sure the torque converter Ay can turn easily while tightening the connection bolts.

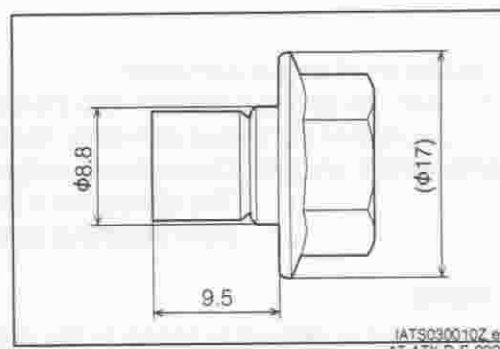
CAUTION

- If the torque converter does not turn easily, the torque converter is not in the specified position, so remove the transaxle Ay and check how far the torque converter should be inserted.
- If the connection bolts are tightened when the torque converter is not in the correct position, the oil pump could be damaged.

(5) Attach the torque converter to the drive plate.

CAUTION

- First tighten the drive plate's reference bolt (silver).
- Only the specified bolts can be used. (Using any but the specified bolts could cause tightening problems and deformation of the converter's interior.)



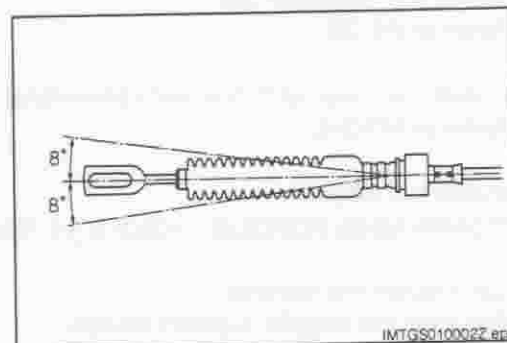
3-1-8 OPERATION AFTER INSTALLATION

1. Install the transaxle in the vehicle together with the engine.
2. Connect the starter connector.
3. Connect the alternator B terminal.
4. Connect the control cable.

CAUTION

- Do not rock the control cable end (both the shift lever side and the transmission side) by 8° or more, or do not apply load.

Refer to AT-35.



AT-20

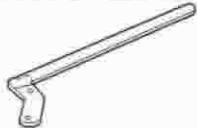
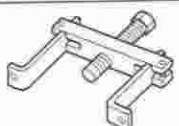
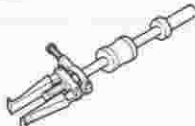
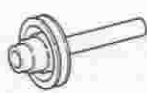
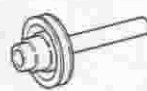
5. Install the suspension lower arm S/A.
Refer to FS-20.
6. Install the tie rod end.
7. Install the exhaust pipe.
8. Install the drive shaft.
Refer to DPS-3.
9. Install the stabilizer bar.
Refer to FS-26.
10. Install the lower arm bracket connecting rod.
Refer to MTG-5.
11. Install the wheels.
TIGHTENING TORQUE: $103.0 \pm 14.7\text{N}\cdot\text{m}$
12. Jack down the vehicle.
13. Remove the engine support bridge.
14. Remove the engine hangers.
15. Connection of universal joint
(1) Fit the mating marks together, and connect the joint portion.
CAUTION
 - Align the position of roll connector when fit wheel centre together, in case mating mark is disappeared (For the vehicle equipped with the air bag) .
16. Connection of engine wire
(1) Pull the engine wire into the cabin side.
(2) Connect the engine control computer connector.
17. Connect the fuel hose.
18. Connect the vacuum hose.
19. Connect the heater hose.
20. Install the radiator.
21. Install the air cleaner case.
22. Connect the bond cable.
23. Connect the battery negative terminal.
24. Fill the coolant.
25. Fill the ATF.
Refer to AT-3.
26. Perform the basic inspection and adjustment of engine.
27. Perform the basic inspection and adjustment of A/T.
Refer to AT-2.
28. When the automatic transmission Ay is replaced, the automatic transmission ECU learned values are erased.
Refer to AT-51.

AT-ATX-D-A-00011

4 DIFFERENTIAL SIDE OIL SEAL

4-1 REMOVAL AND INSTALLATION

4-1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09511-87202-000 Stopper, brake drum	For prevention from turning of hub
		09510-87301-000 Puller, front hub & drum	For separation of hub and drive shaft
		09611-87701-000 Puller, Tie-rod end	For separation of tie-rod end /lower arm and steering knuckle
		09308-00010-000 Puller, oil seal	For removal of oil seal
		09517-87705-000 Replacer, oil seal	For installation of oil seal
		09517-87706-000 Replacer, oil seal	For installation of oil seal
Tool	Slide hammer		
Instrument	Torque wrench		
Lubricant	MP grease, DEXRON® III(or II)		

AT-DSO-D-P-00011

4-1-2 OPERATION BEFORE REMOVAL

1. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

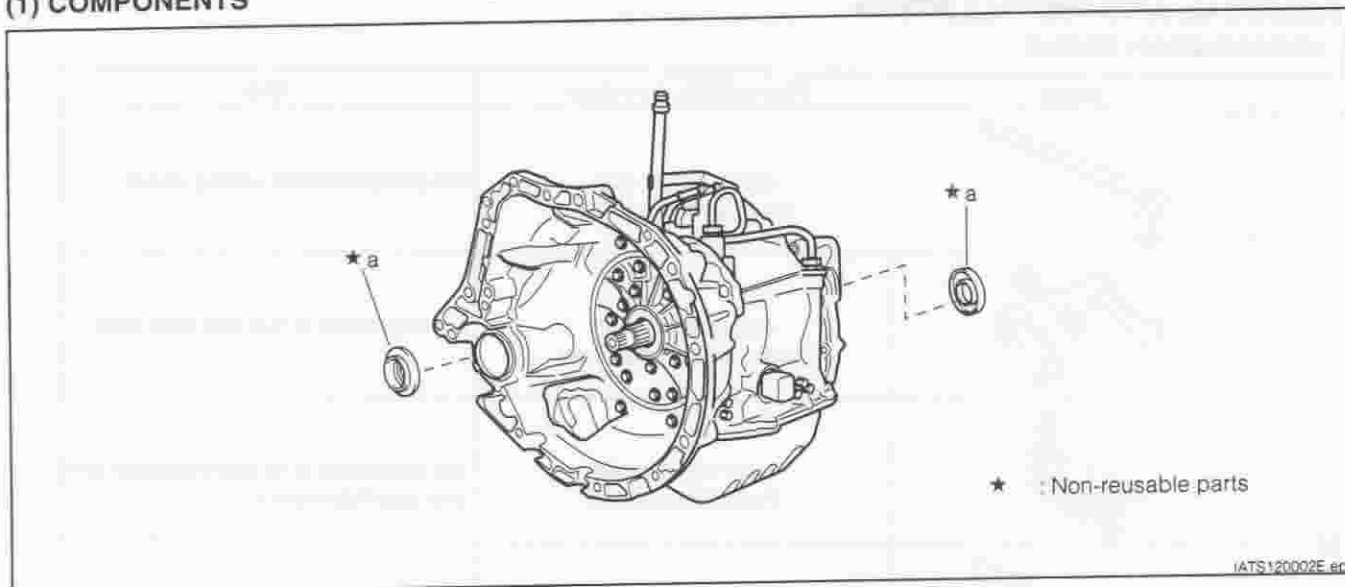
2. Remove the wheels.
3. Drain the ATF.
Refer to AT-3.
4. Remove the drive shaft.
Refer to DPS-3.

AT-DSO-D-B-00011

AT-22

4-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



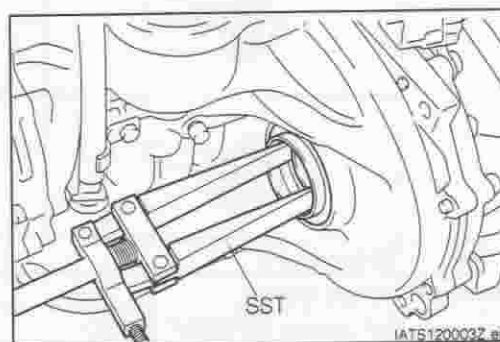
(2) REMOVAL AND INSTALLATION PROCEDURES

- ① ① a Seal, type T oil

AT-DSO-D-T-00011

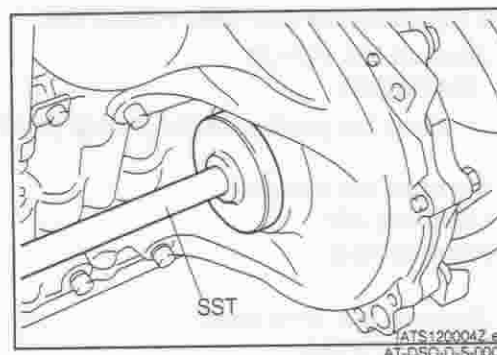
4-1-4 POINTS OF REMOVAL

1. Remove the type T oil seal
SST: 09308-00010-000



4-1-5 POINTS OF INSTALLATION

1. Install the T type oil seal.
SST: 09517-87705-000
09517-87706-000



4-1-6 OPERATION AFTER INSTALLATION

1. Install the drive shaft.
Refer to DPS-3.
2. Fill the ATF.
Refer to AT-3.
3. Install the wheels.
TIGHTENING TORQUE: $103.0 \pm 14.7\text{N}\cdot\text{m}$
4. Jack down the vehicle.

AT-DSO-D-A-00011

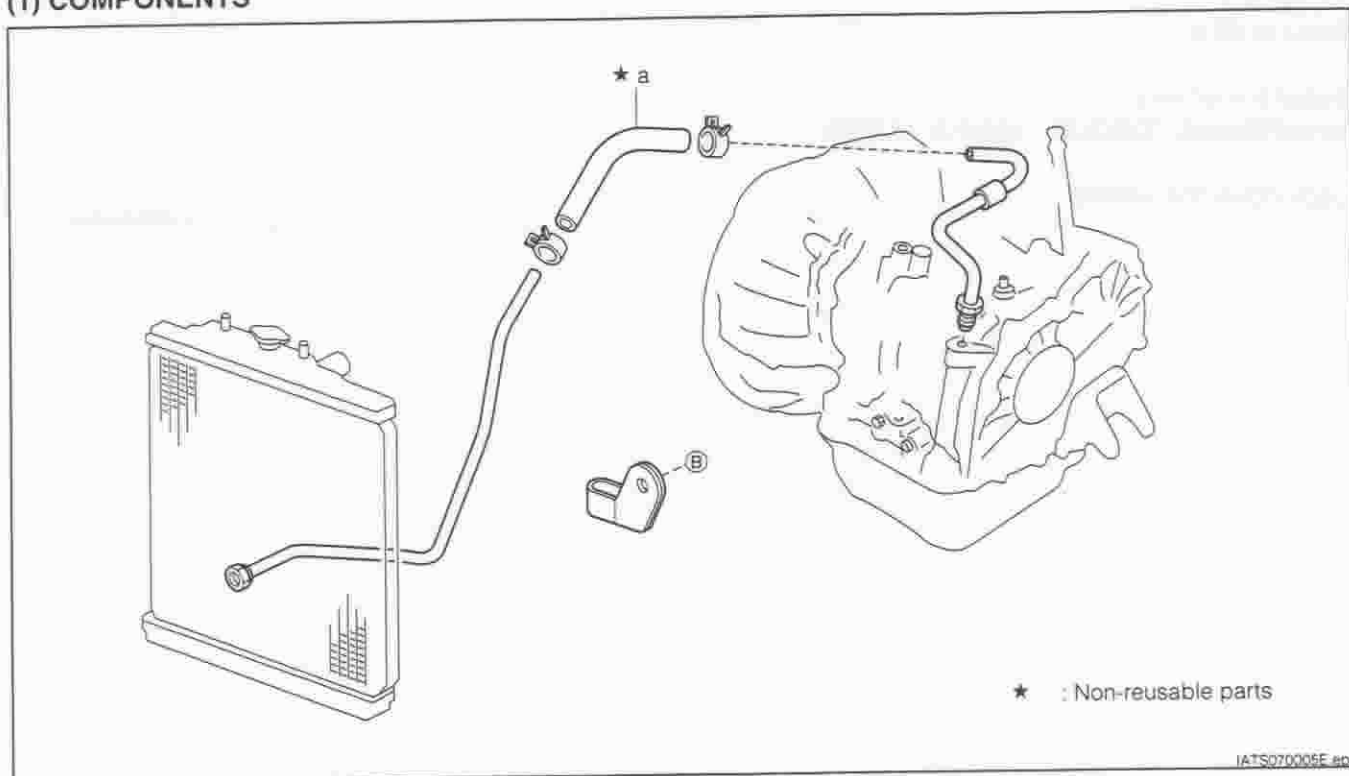
AT-24

5 OIL COOLER INLET HOSE

5-1 REMOVAL AND INSTALLATION

5-1-1 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



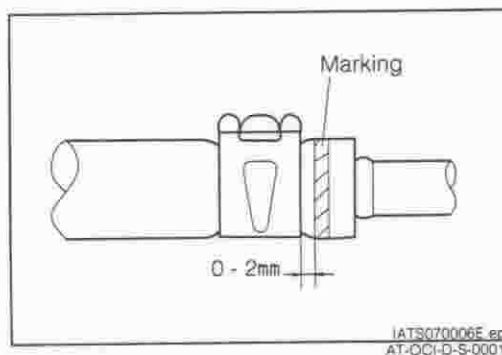
(2) REMOVAL AND INSTALLATION PROCEDURES

- 1 ① a Hose, oil cooler inlet

AT-OCI-D-T-00011

5-1-2 POINTS OF INSTALLATION

1. Installation of oil cooler inlet hose
 - (1) Wash the transaxle side union and radiator side oil hose connection area with white gas.
 - (2) Insert the oil cooler hose all the way to the second spool of the attachment pipe in the direction shown in the figure.
 - (3) Align with the oil cooler hose paint and attach the clip.



5-1-3 OPERATION AFTER INSTALLATION

1. Fill the ATF.
Refer to AT-3.

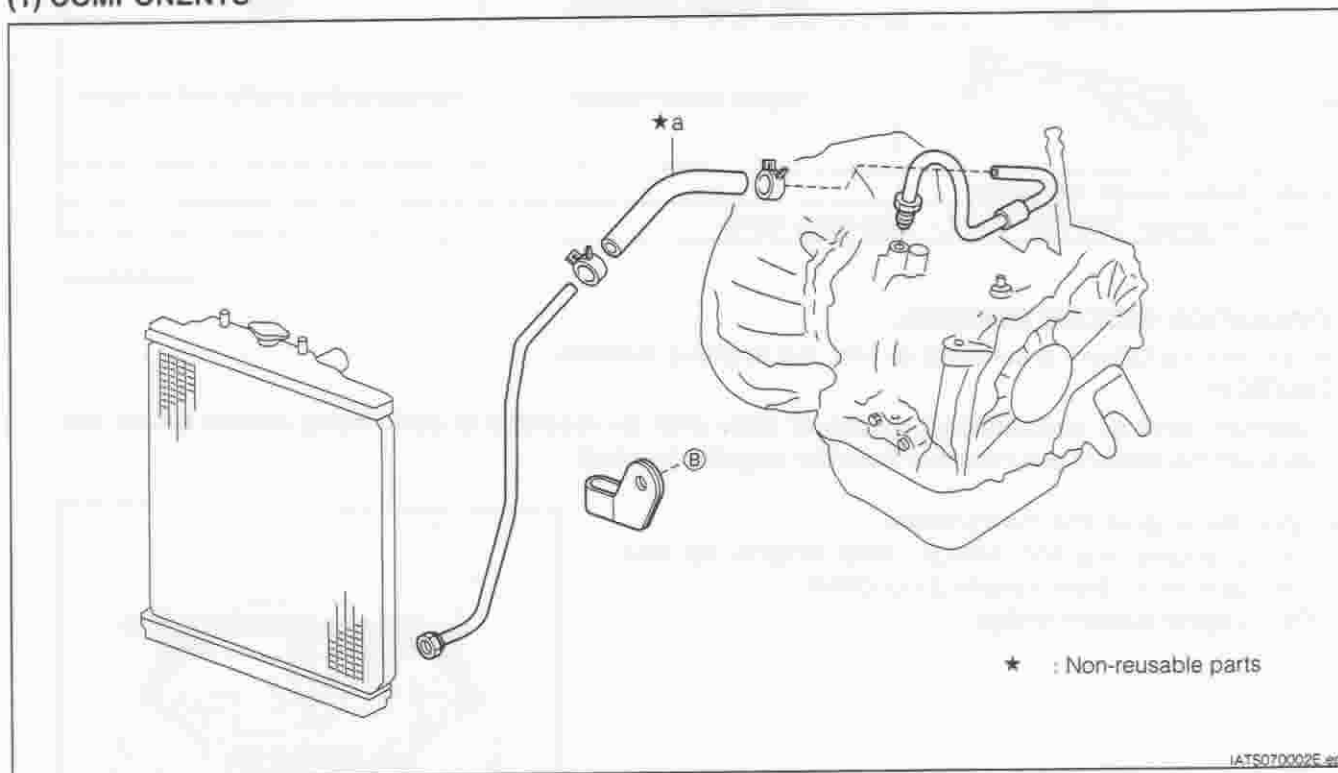
AT-OCI-D-A-00011

6 OIL COOLER OUTLET HOSE

6-1 REMOVAL AND INSTALLATION

6-1-1 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



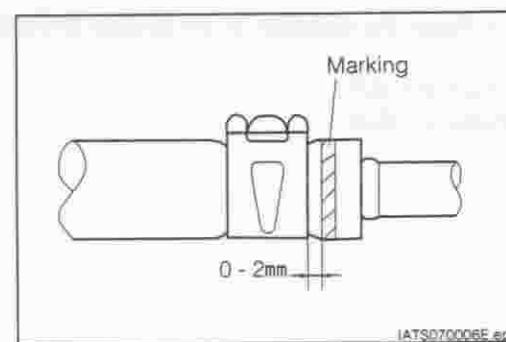
(2) REMOVAL AND INSTALLATION PROCEDURES

- 1 ① a Hose, oil cooler outlet

AT-OCO-D-T-00011

6-1-2 POINTS OF INSTALLATION

- Installation of oil cooler outlet hose
 - Wash the transaxle side union and radiator side oil hose connection area with white gas.
 - Insert the oil cooler hose all the way to the second spool of the attachment pipe in the direction shown in the figure.
 - Align with the oil cooler hose paint and attach the clip.



6-1-3 OPERATION AFTER INSTALLATION

- Fill the ATF.
Refer to AT-3.

AT-OCO-D-A-00011

AT-26

7 OIL STRAINER

7-1 REMOVAL AND INSTALLATION

7-1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
Tool		Engine support bridge	For suspending engine and transaxle
Instrument	Torque wrench, Dial gauge		
Lubricant	MP grease, DEXRON® III (or II), Three Bond 1281B		

AT-OST-D-P-00011

7-1-2 OPERATION BEFORE REMOVAL

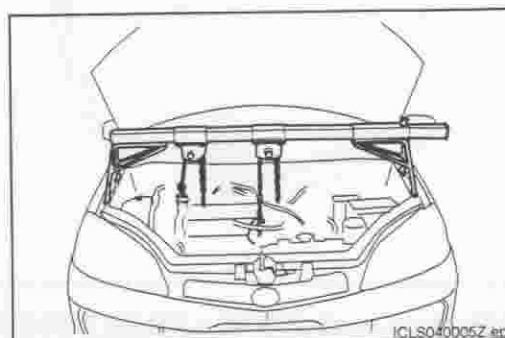
1. Disconnect the battery ground cable from the negative terminal.

CAUTION

- Memory such as troubleshooting code or radio shall be recorded to avoid being erased before disconnect the battery ground cable from the negative terminal.

2. Support the engine and the transaxle.
(1) Using engine support bridge, hold engine Ay and transaxle Ay in direct coupling condition.

TOOL: Engine support bridge



ICLS040005Z.eps

3. Jack up the vehicle.

WARNING

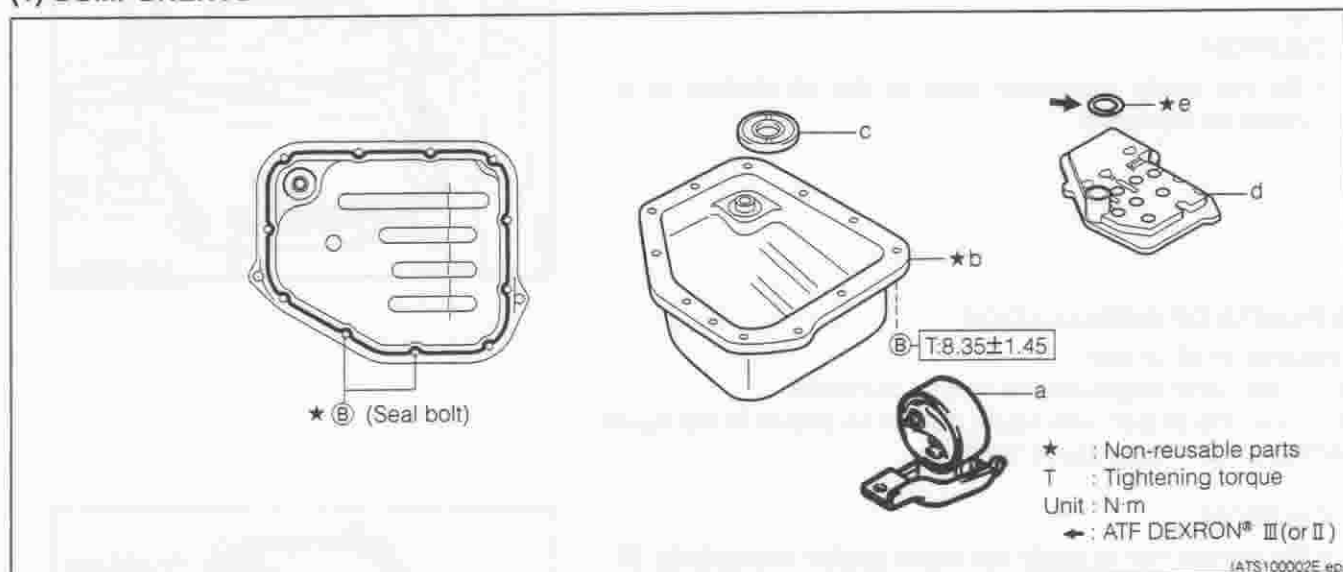
- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

4. Drain the ATF.
Refer to AT-3.

AT-OST-D-B-00011

7-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



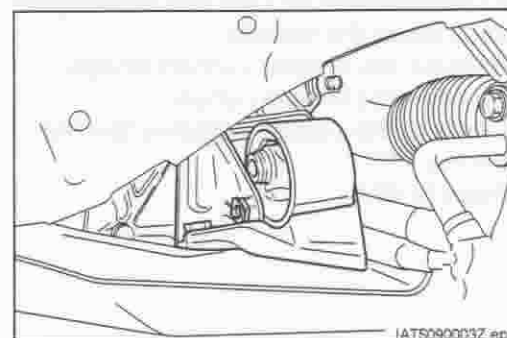
(2) REMOVAL AND INSTALLATION PROCEDURES

- ① 5 a Engine, mounting lower left insulator
- ② ④ b Pan S/A, transaxle
- 3 3 c Magnet, oil cleaner
- ④ 2 d Strainer Ay, oil
- 5 1 e ring, O

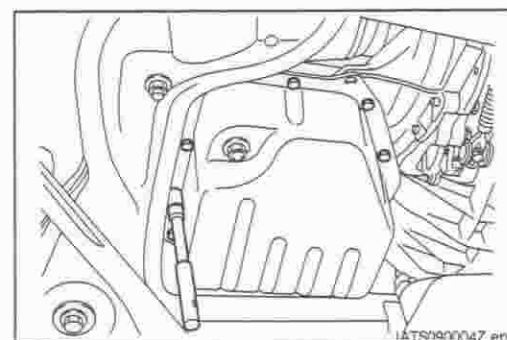
AT-OST-D-T-00011

7-1-4 POINTS OF REMOVAL

1. Separation of the engine mounting lower left insulator
 - (1) Separate the engine mounting lower left insulator and bracket.
 - (2) Use a bridge to completely lower the transmission.



2. Removal of oil pan
 - (1) Hold the oil pan with your hands after removing the installation bolts.
 - (2) Light tap the oil pan flange with a plastic hammer to loosen and remove it.



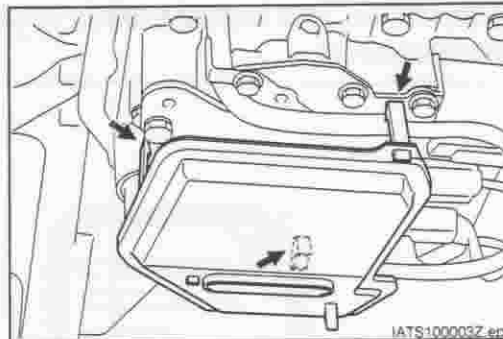
AT-28

3. Removal of oil strainer

- (1) Spread the oil strainer pawls and remove the oil strainer.

CAUTION

- Do not apply excessive force to the oil strainer or it could be damaged.



IATS100003Z.eps
AT-OST-D-D-00011

7-1-5 POINTS OF INSTALLATION

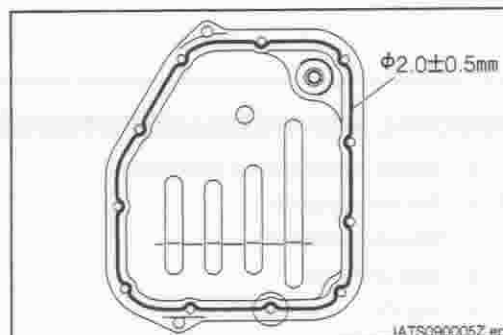
1. Installation of oil pan

- (1) Clean and degrease the mating surfaces.
- (2) Coat the oil pan with liquid gasket as shown in the figure.

ADHESIVE: Three Bond 1281B

CAUTION

- Be careful not to apply the liquid gasket excessively. (If a large amount of liquid gasket dissolves to the ATF, then it may deteriorate the ATF.)



IATS090005Z.eps
AT-OST-D-S-00011

7-1-6 OPERATION AFTER INSTALLATION

1. Jack down the vehicle.
2. Remove the engine support bridge.
3. Remove the engine hanger.
4. Connect the battery negative terminal.
5. Fill the ATF.

Refer to AT-3.

AT-OST-D-A-00011

8 VALVE BODY

8-1 REMOVAL AND INSTALLATION

8-1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09350-87202-000 Tool set, automatic transmission	For installation of manual valve
Tool		Engine support bridge	For suspending engine and transaxle
Instrument	Torque wrench, Dial gauge		
Lubricant	MP grease, DEXRON® III(or II) , Three Bond 1281B		

AT-VB-D-P-00011

CAUTION

- Prior to the operations, be sure to completely remove sands and mud that have adhered to the external of the transmission so that no foreign matters enter the transmission.
- Perform the operations at a clean place free of dirt and dust.
- Perform the operations with bare hands or by wearing vinyl gloves.
- Do not use working gloves nor cloth to prevent admission of lint. (Use nylon cloth, or paper cloth.)
- Place removed parts in order at all times. Keep them away from dust.
- Thoroughly wash the removed parts before assembling. After drying, apply automatic transmission fluid (DEXRON® III or II) . However, do not wash aluminum and rubber parts with alkali chemicals. Never wash rubber parts, such as O-rings, gaskets, oil seals, with cleaning solvent (white gasoline or the like) .

AT-VB-D-Z-00011

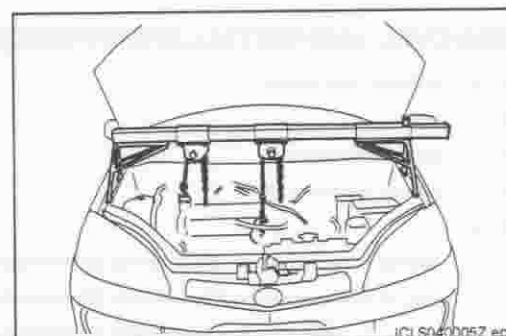
8-1-2 OPERATION BEFORE REMOVAL

1. Disconnect the battery ground cable from the negative terminal.

CAUTION

- Memory such as troubleshooting code or radio shall be recorded to avoid being erased before disconnect the battery ground cable from the negative terminal .

2. Supporting engine and transaxle
(1) Using engine support bridge, hold engine Ay and transaxle Ay in direct coupling condition.
TOOL: Engine support bridge



AT-30

3. Jack up the vehicle.

WARNING

- Keep the position of the jackup point to avoid causing serious accident due to inclining of the vehicle.

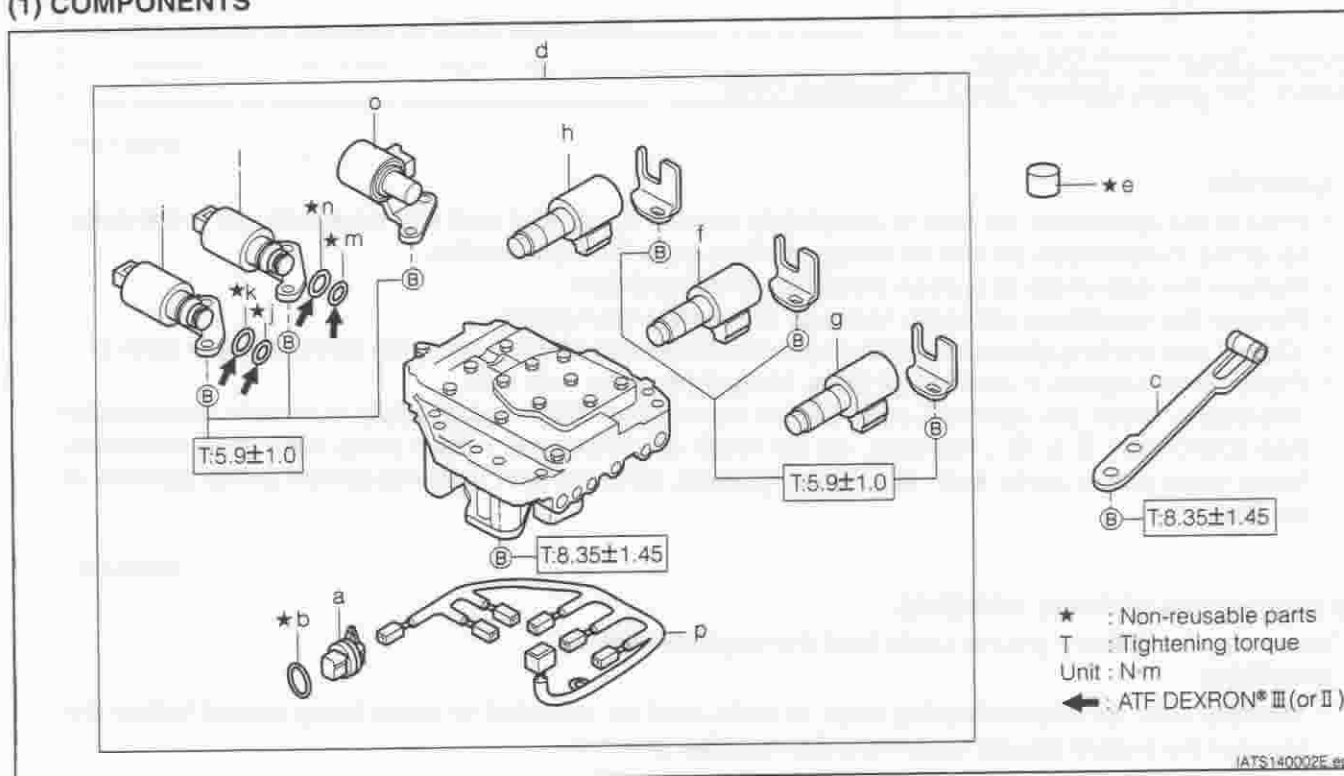
4. Drain the ATF.
Refer to AT-3.

5. Remove the oil strainer.
Refer to AT-27.

AT-VB-D-B-00011

8-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



(2) REMOVAL AND INSTALLATION PROCEDURES

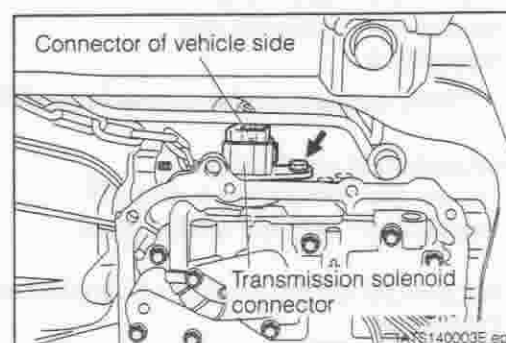
① 16 a	Connector, trans solenoid	9 8 i	Solenoid Ay, transmission 3Way (Switch solenoid)
2 15 b	ring, O	10 7 j	ring, O
③ ④ c	Spring, manual detent	11 6 k	ring, O
④ ⑤ d	Body Ay, transmission valve	12 5 l	Solenoid Ay, transmission 3Way (LUC solenoid)
5 ⑥ e		13 4 m	ring, O
6 11 f	Solenoid Ay, clutch control No.1 (Solenoid No.2) (White connector)	14 3 n	ring, O
7 10 g	Solenoid Ay, clutch control No.2 (Solenoid No.1) (Black connector)	15 2 o	Solenoid Ay, lock up clutch control (duty solenoid)
8 9 h	Solenoid Ay, clutch control No.3 (Solenoid No.3) (White connector)	16 1 p	Wire Ay, solenoid

AT-VB-D-T-00011

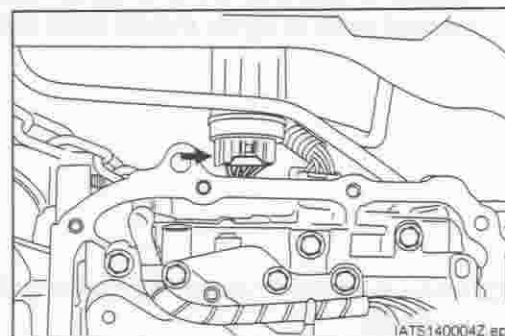
8-1-4 POINTS OF REMOVAL

1. Removal of trans solenoid connector

- (1) Disconnect the connector at the vehicle side.
- (2) Remove the trans solenoid connector from the A/T.

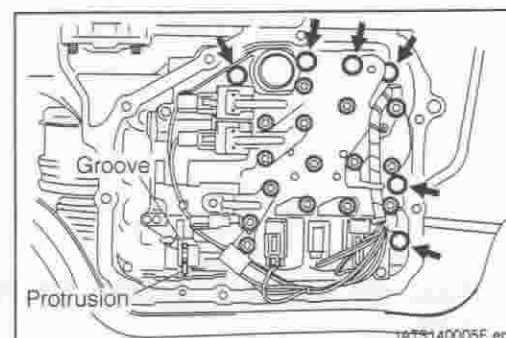


- (3) Disconnect the connector at the A/T side.

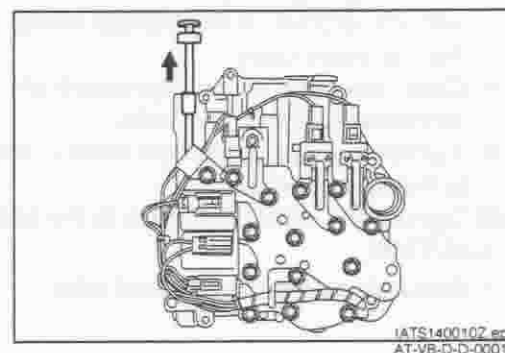


2. Removal of valve body

- (1) Uniformly loosen the bolts and remove the valve body Ay.



- (2) Remove gently the manual valve from the valve body Ay.



AT-32

8-1-5 POINTS OF INSTALLATION

1. Installation of solenoid wire

WARNING

- Firmly connect all the connectors until they make a locking sound.

2. Installation of valve body

- (1) Coat the manual valve with ATF.

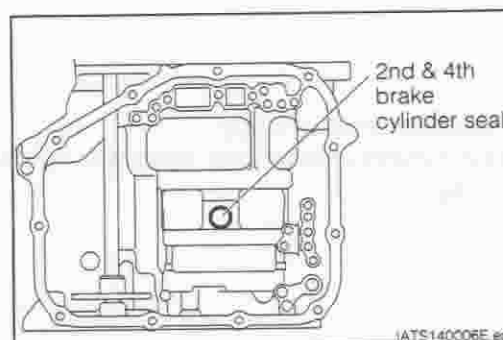
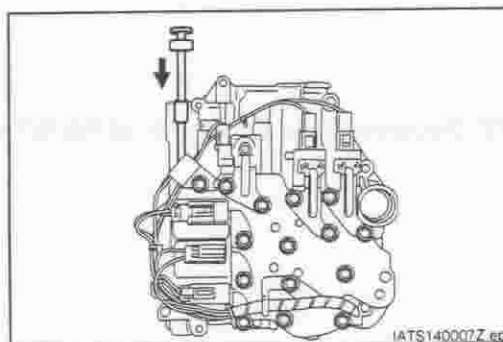
LUBRICANT: ATF DEXRON® IIIorII

- (2) Carefully set the manual valve into the valve body.

CAUTION

- Check to see that there is abnormally catch when the manual valve is lightly moved back and forth.

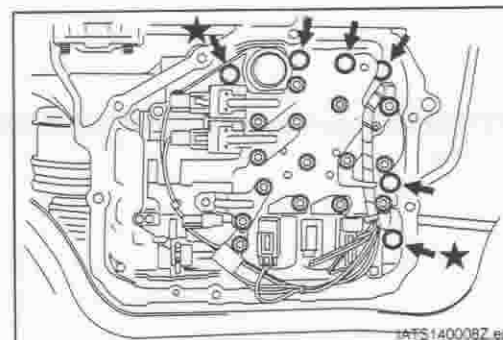
- (3) Make sure the 2nd and 4th brake cylinder seal are assembled.



- (4) Pass the connector through the transmission case hole.
- (5) While aligning the protrusion of the manual valve lever with the groove of the manual valve, assemble them in the transaxle case.
- (6) Clean the bolts with compressed air.
- (7) Temporarily attach the bolts.
- (8) Tighten the two reference bolts (* marks in the figure) to the specified torque.
- (9) Tighten the remaining bolts to the specified torque.

CAUTION

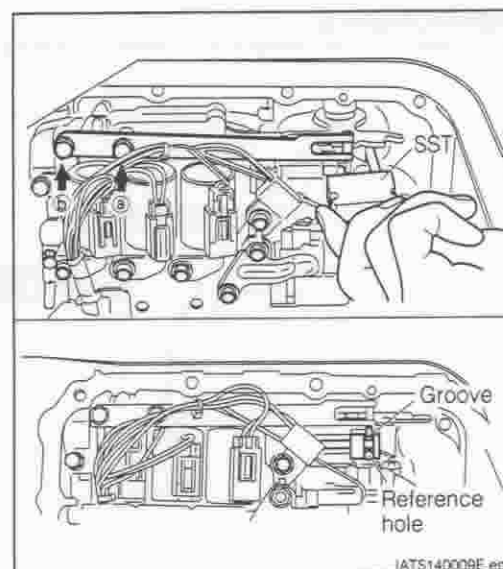
- Securely clamp the solenoid wire.



3. Installation of manual detent spring
 - (1) Align the manual valve groove with the valve body hole. (N range position)

SST: 09351-87211-000

- (2) Loosely tighten the manual detent spring.
- (3) In order, tighten the bolt ① (with a nominal length of 12 mm) and bolt ② (with a nominal length of 35 mm).



8-1-6 OPERATION AFTER INSTALLATION

1. Install the oil strainer S/A.
Refer to AT-27.
2. Jack down the vehicle.
3. Remove the engine support bridge.
4. Remove the engine hangers.
5. Install the air cleaner Ay.
6. Connect the battery negative terminal.
7. Fill the ATF.
Refer to AT-3.

AT-VB-D-A-00011

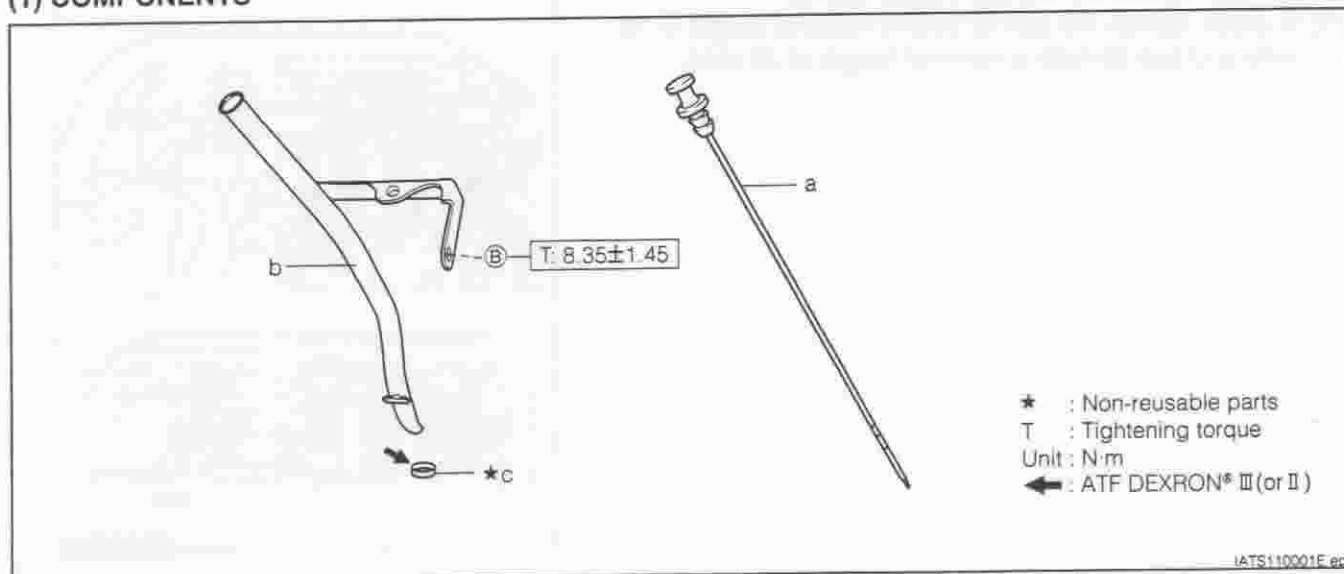
AT-34

9 OIL FILLER TUBE

9-1 REMOVAL AND INSTALLATION

9-1-1 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



(2) REMOVAL AND INSTALLATION PROCEDURES

- 1 3 a Gauge Ay, transmission oil level
- 2 2 b Tube, transaxle oil filler
- 3 1 c ring, O

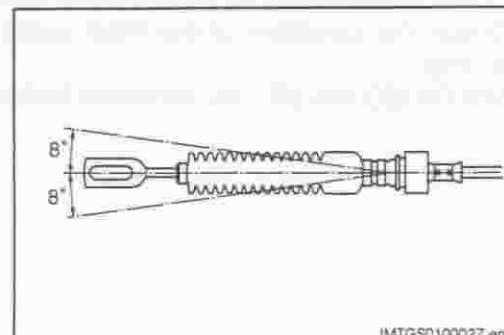
AT-OFT-D-T-00011

10 CONTROL CABLE

10-1 REMOVAL AND INSTALLATION

CAUTION

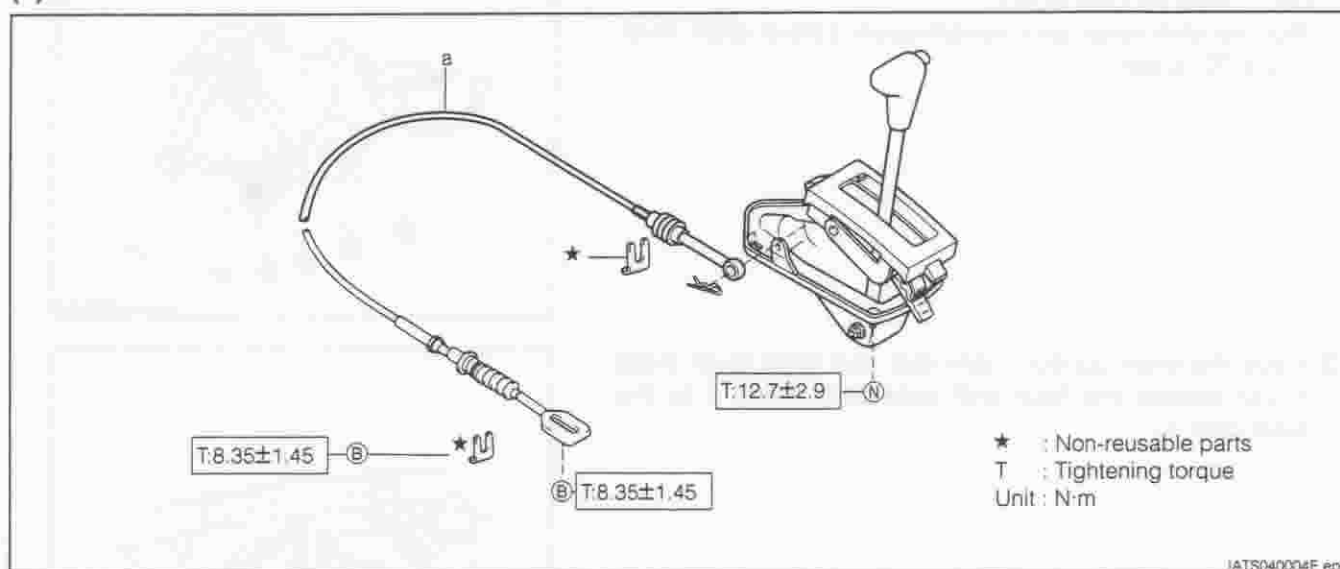
- Do not rock the control cable end (both the shift lever side and the transmission side) by 8° or more, or do not apply load.



IMTGS010002Z.eps
AT-CTC-D-2-00011

10-1-1 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



IATS040004E.eps

(2) REMOVAL AND INSTALLATION PROCEDURES

- ① a Cable Ay, control

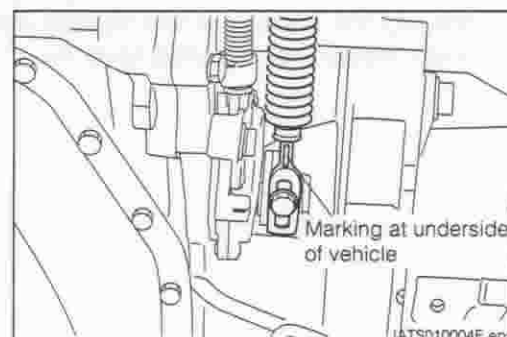
AT-CTC-D-7-00011

10-1-2 POINTS OF REMOVAL

- Removal of control cable Ay
 - (1) Separate the control cable Ay transmission side.

NOTE

- If the cable end vehicle bottom mark has been erased, make a mark.



IATS010004E.eps

- (2) Separate the control cable Ay shift lever side.

AT-CTC-D-D-00011

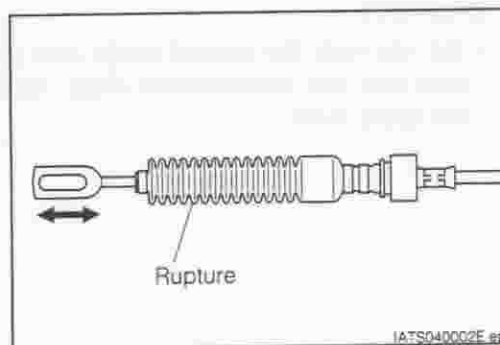
AT-36

10-1-3 INSPECTION

(1) CONTROL CABLE

1. Check each portion for no abnormal condition.
2. Check the condition of the inner cable by pushing and pulling it.

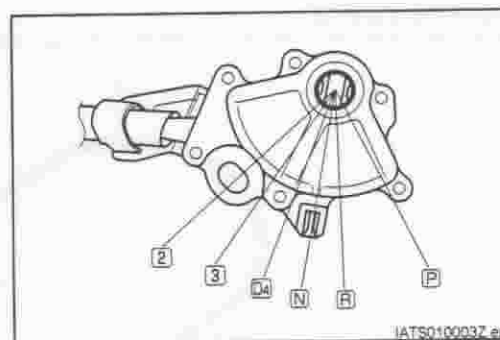
SPECIFIED VALUE: No abnormal feel or catching.



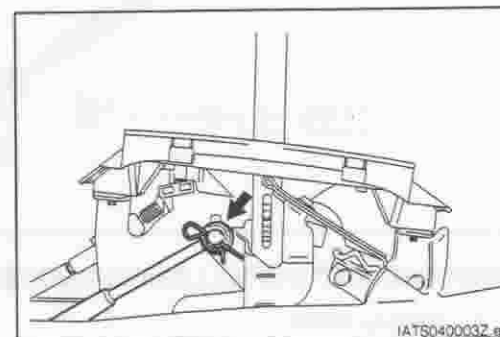
10-1-4 POINTS OF INSTALLATION

1. Control cable Ay connection

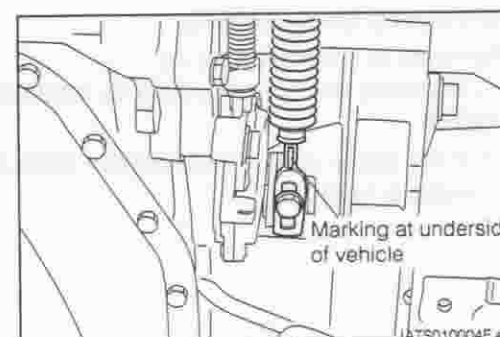
(1) Put the shift lever and transmission control shaft lever in the **N** range.



(2) Face the wide control cable eye end (shift lever side) collar toward the floor shift side and attach it to the floor shift Ay.



(3) Face the control cable end mark (transmission side) toward the bottom of the vehicle and attach it to the transmission control shaft lever Ay.



CAUTION

- The control cable play does not tend to lean toward one side.

AT-CTC-D-S-00011

10-1-5 OPERATION AFTER INSTALLATION

1. Perform the basic inspection of shift lever.
Refer to AT-3.

AT-CTC-D-A-00011



When the shift lever is moved to the P position, the shift lever lock mechanism will engage and the shift lever will be locked in the P position.



AT-38

11 NEUTRAL START SWITCH

11-1 REMOVAL AND INSTALLATION

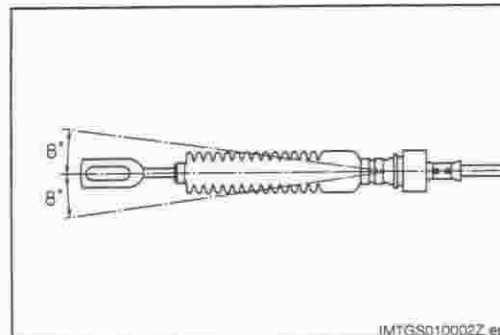
11-1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09302-87201-000 Gauge, neutral start switch adjust	For adjustment of neutral start switch

AT-NSS-D-P-00011

CAUTION

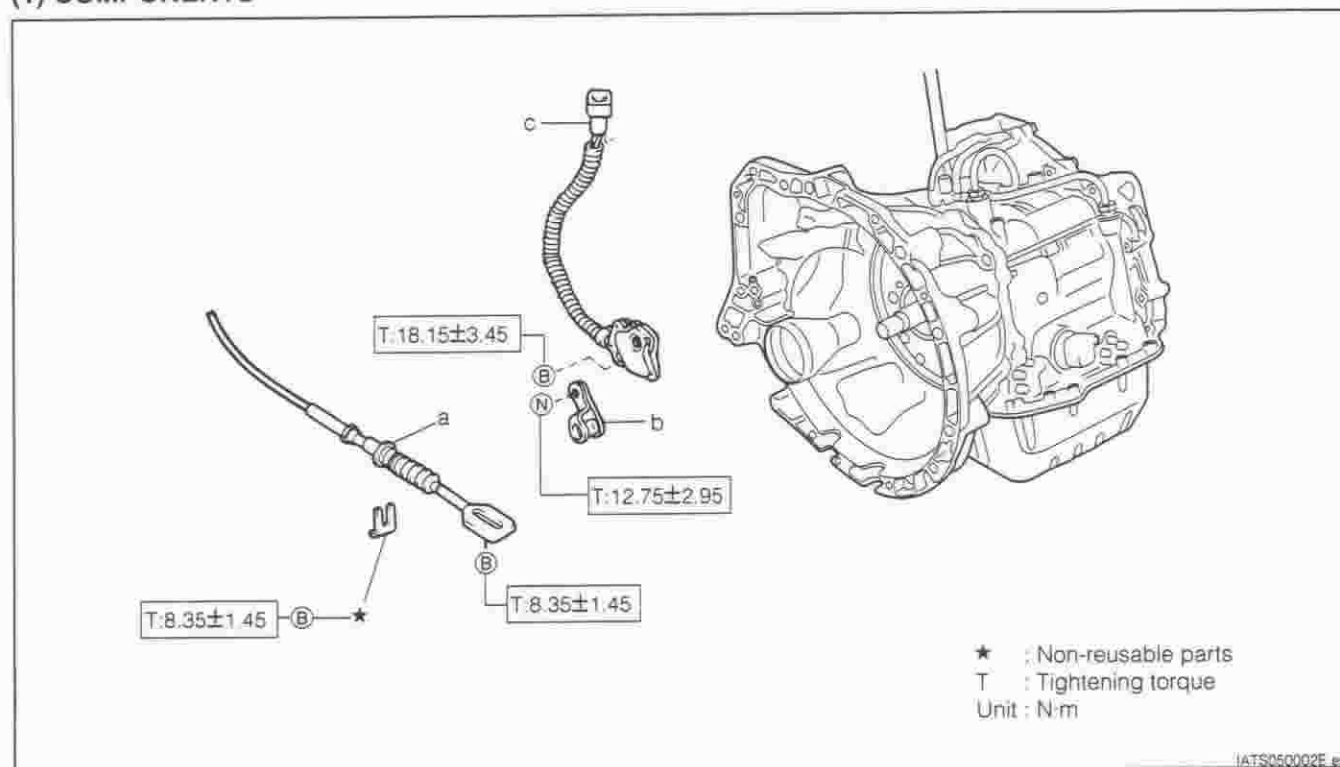
- Do not rock the control cable end (both the shift lever side and the transmission side) by 8° or more, or do not apply load.



IMTGS010002Z.epf
AT-NSS-D-Z-00011

11-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



IATS050002E.epf

(2) REMOVAL AND INSTALLATION PROCEDURES

- ③ a Cable Ay, control
- 2 b Lever Ay, transmission control shaft
- ① c Switch Ay, neutral start

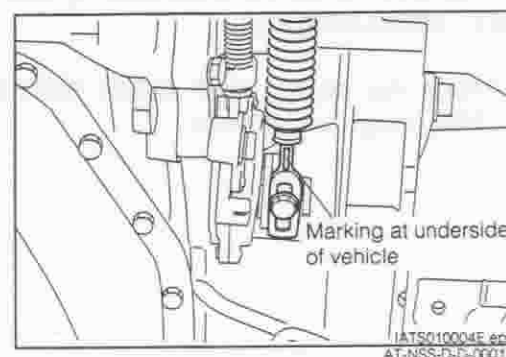
AT-NSS-D-T-00011

11-1-3 POINTS OF REMOVAL

1. Separation of control cable Ay
 - (1) Separate the control cable Ay transmission side.

NOTE

- If the cable end vehicle bottom mark has been erased, make a mark.

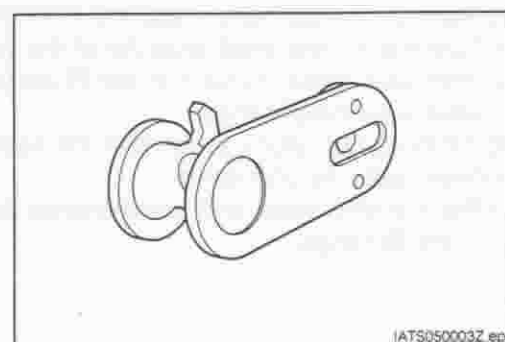


11-1-4 INSPECTION

(1) Transmission control shaft lever Ay

1. Check each portion for no abnormal condition.
2. Check the cable attachment area.

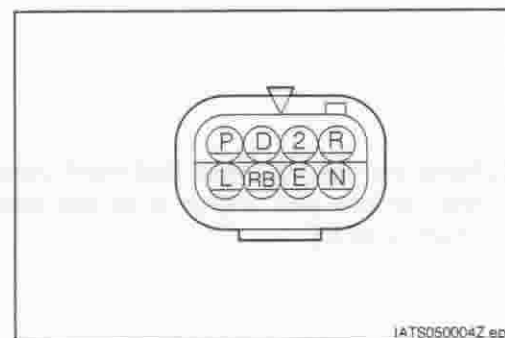
SPECIFIED VALUE: Rotates easily



(2) NEUTRAL START SWITCH

1. Check the continuity between terminals of the connector.
- SPECIFIED VALUE: Ensure that continuity exists as following table.

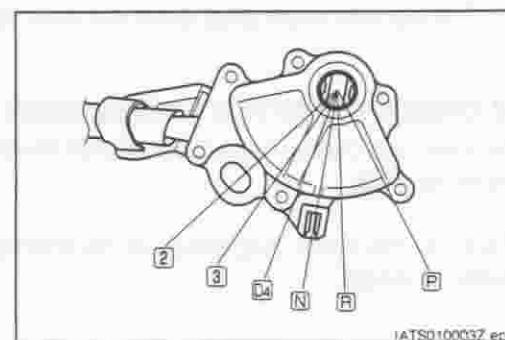
Range \ Terminal	E	R	RB	P	N	D	2	L
P	○			○				
R		○	○					
N	○				○			
D	○					○		
3	○						○	
2	○							○



AT-NSS-D-C-00011

11-1-5 POINTS OF INSTALLATION

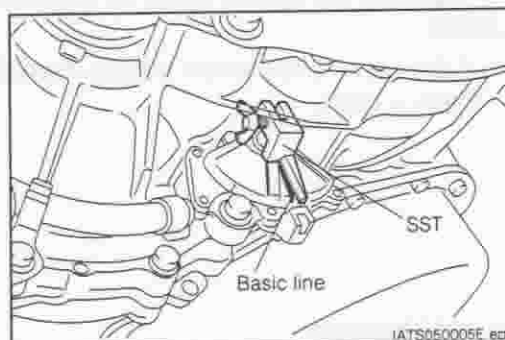
1. Neutral start switch Ay installation
 - (1) Loosely install the neutral start switch Ay and control shaft lever Ay.
 - (2) Turn the control shaft lever Ay all the way counter clockwise. (P range)
 - (3) Return the control shaft lever Ay back two stages. (N range)



AT-40

(4) Remove the control shaft lever Ay and attach the SST.
SST: 09302-87201-000

(5) Align the neutral start switch reference line with the SST gauge and tighten.

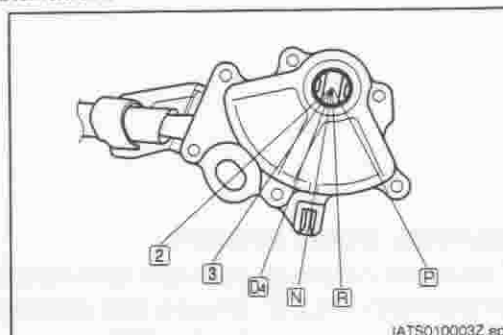


2. Control shaft lever Ay installation

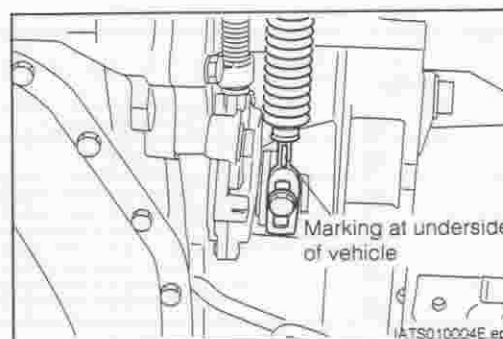
- (1) Remove the SST and install the control shaft lever Ay.
- (2) Turn the control shaft lever Ay all the way counter clockwise. (P range)
- (3) With your hand, move it in the R direction approximately 2 to 3 mm and then let go to confirm that it returns to the P range.
- (4) If it does not return, reconduct the neutral start switch Ay installation.

3. Control cable Ay connection

- (1) Put the shift lever and transmission control shaft lever in the N range.



- (2) Face the control cable end mark toward the bottom of the vehicle and attach it to the transmission control shaft lever Ay.



CAUTION

- The control cable play does not tend to lean toward one side.

AT-NSS-D-S-00011

11-1-6 OPERATION AFTER INSTALLATION

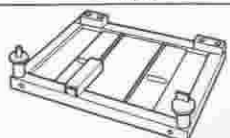
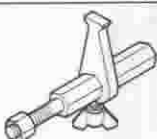
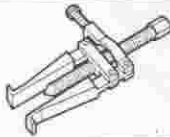
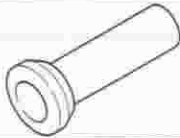
1. Perform the basic inspection of shift lever.
Refer to AT-3.
2. Perform the basic inspection of neutral start switch.
Refer to AT-39.

AT-NSS-D-A-00011

12 OIL PUMP OIL SEAL

12-1 REMOVAL AND INSTALLATION

12-1-1 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09994-87201-000 Holder, engine frame	For removal/installation of engine frame
		09210-87701-000 Holder, flywheel	For prevention from turning of drive plate
		09308-10010-000 Puller, oil seal	For removal of type T oil seal
		09310-87301-000 Replacer, counter shaft front bearing	For installation of type T oil seal
Tool		Engine support bridge	For suspending engine and transaxle
		Engine support bridge	For suspending engine and transaxle
		Chain block	For suspending engine and transaxle (for addition to engine support bridge)
		High-transmission jack	For removal/installation of transaxle
Instrument	Torque wrench, Dial gauge		
Lubricant	MP grease, ATF DEXRON® III(or II)		

AT-OPO-D-P-00011

12-1-2 OPERATION BEFORE REMOVAL

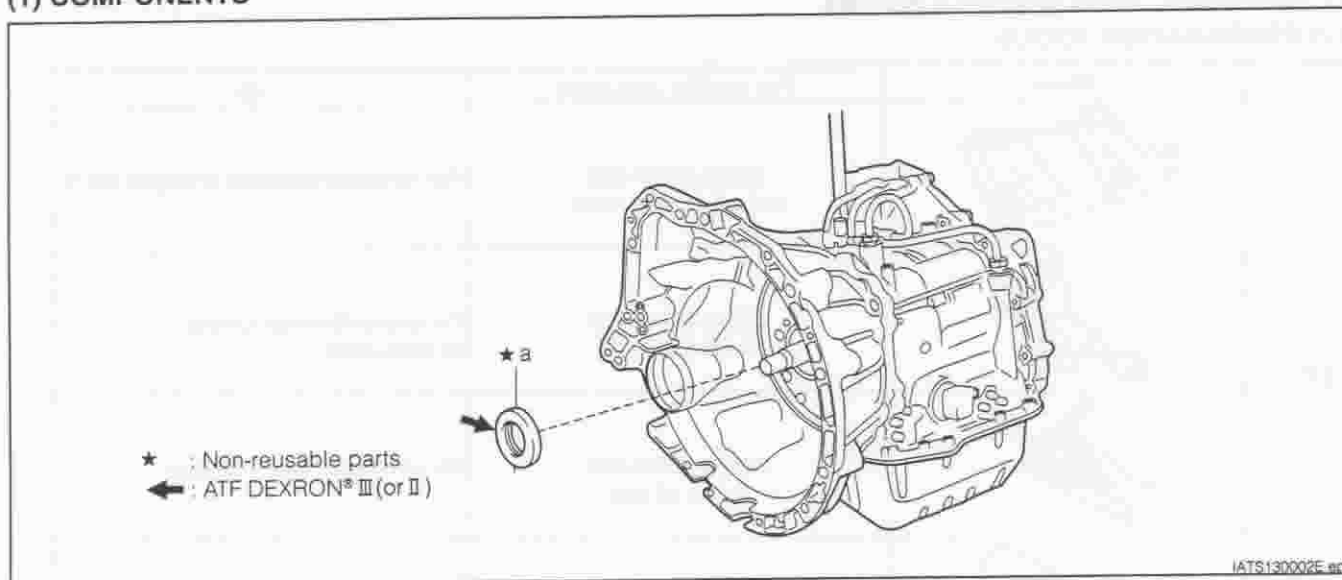
1. Remove the transaxle Ay.
Refer to AT-16.

AT-OPO-D-B-00011

AT-42

12-1-3 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



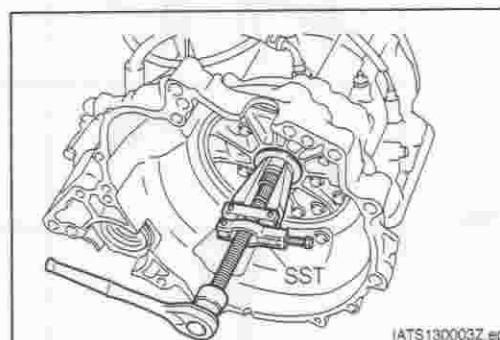
(2) REMOVAL AND INSTALLATION PROCEDURES

- ① ① a Seal, type T oil

AT-OPQ-D-T-00011

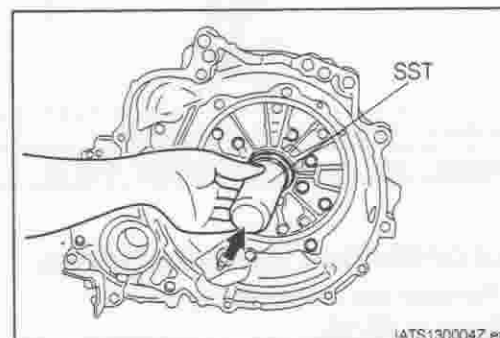
12-1-4 POINTS OF REMOVAL

1. Remove the type T oil seal
SST: 09308-10010-000



12-1-5 POINTS OF INSTALLATION

1. Install the T type oil seal.
SST: 09310-87301-000



12-1-6 OPERATION AFTER INSTALLATION

1. Install the automatic transaxle Ay.
Refer to AT-16.

AT-OPQ-D-A-00011

13 OUTPUT REVOLUTION SENSOR

13-1 REMOVAL AND INSTALLATION

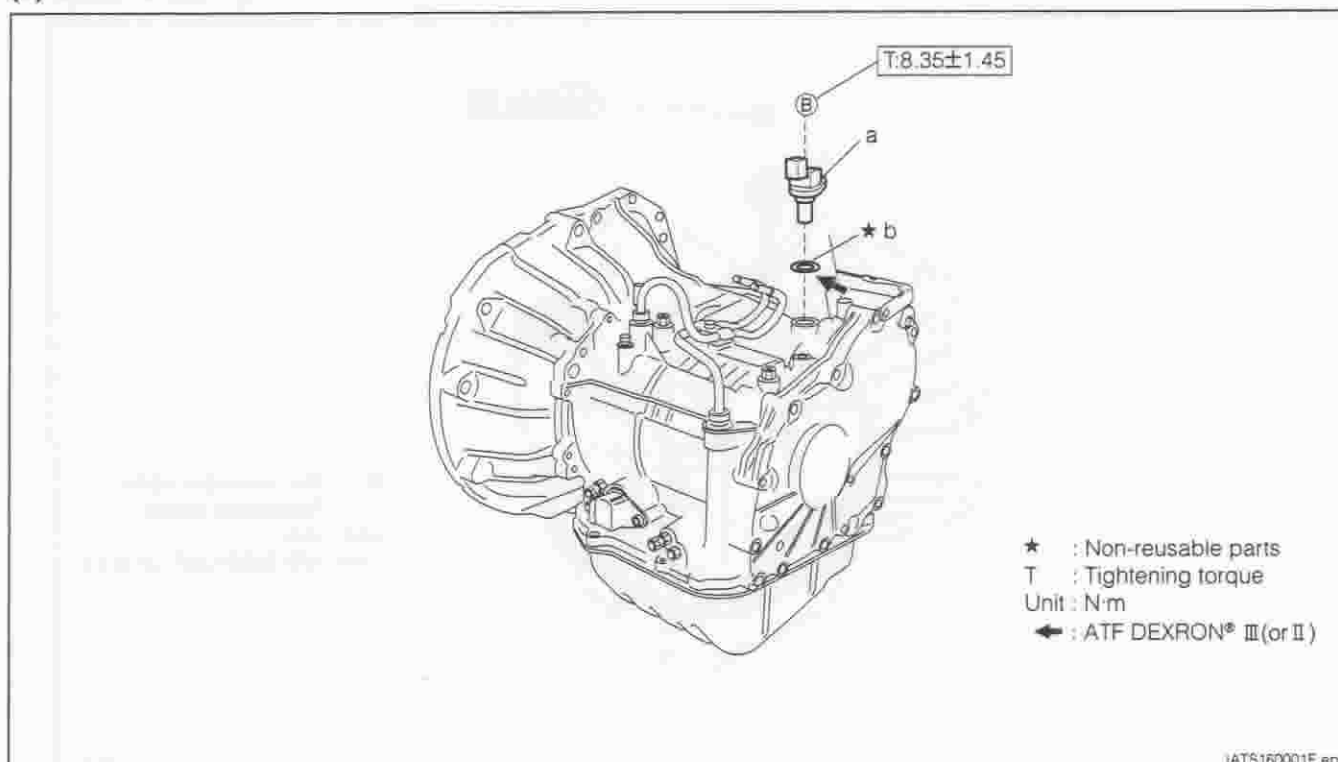
13-1-1 PREPARATION TOOLS

Lubricant	DEXRON® III(or II)
-----------	--------------------

AT-ORS-D-P-00011

13-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



(2) REMOVAL AND INSTALLATION PROCEDURES

- 1 2 a Sensor, transmission revolution
- 2 1 b Ring, O

AT-ORS-D-T-00011

13-1-3 INSPECTION

Refer to AT-110.

AT-ORS-D-C-00011

AT-44

14 TURBIN REVOLUTION SENSOR

14-1 REMOVAL AND INSTALLATION

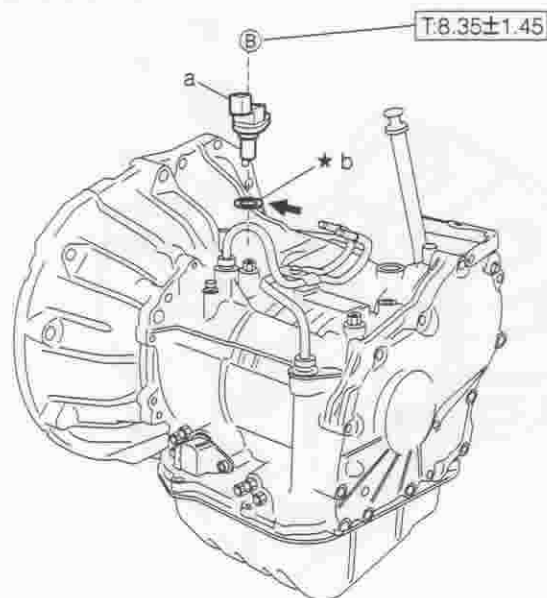
14-1-1 PREPARATION TOOLS

Lubricant	DEXRON® III (or II)
-----------	---------------------

AT-TRS-D-P-00011

14-1-2 REMOVAL AND INSTALLATION PROCEDURES

(1) COMPONENTS



★ : Non-reusable parts
T : Tightening torque
Unit : N·m
← : ATF DEXRON® III (or II)

IATS150002E.eps

(2) REMOVAL AND INSTALLATION PROCEDURES

- 1 2 a Sensor, transmission revolution
- 2 1 b Ring, O

AT-TRS-D-T-00011

14-1-3 INSPECTION

Refer to AT-110.

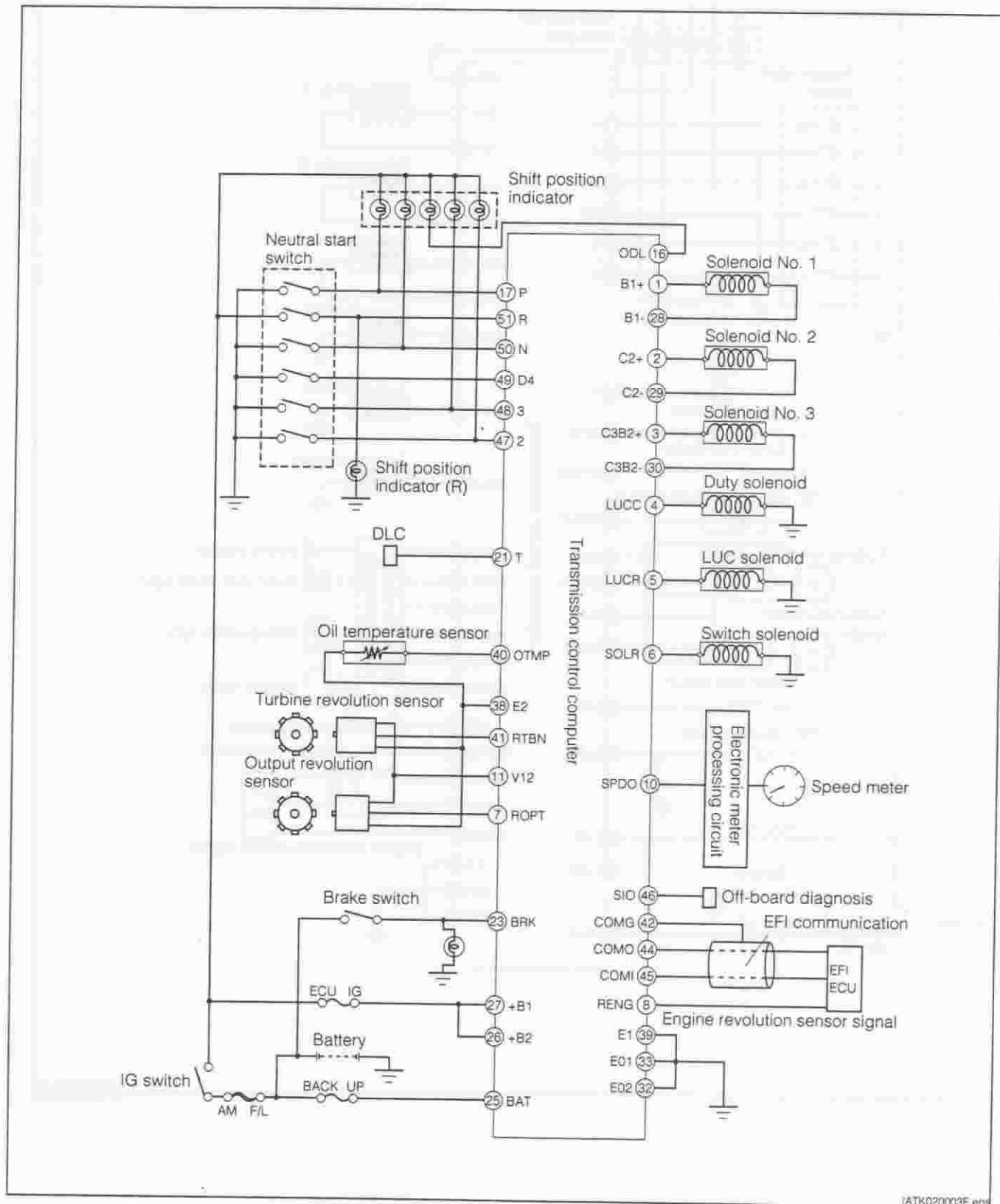
AT-TRS-D-C-00011

15 AUTOMATIC TRANSAXLE ELECTRONIC CONTROL SYSTEM

15-1 OUTLINE

15-1-1 SYSTEM WIRING DIAGRAM

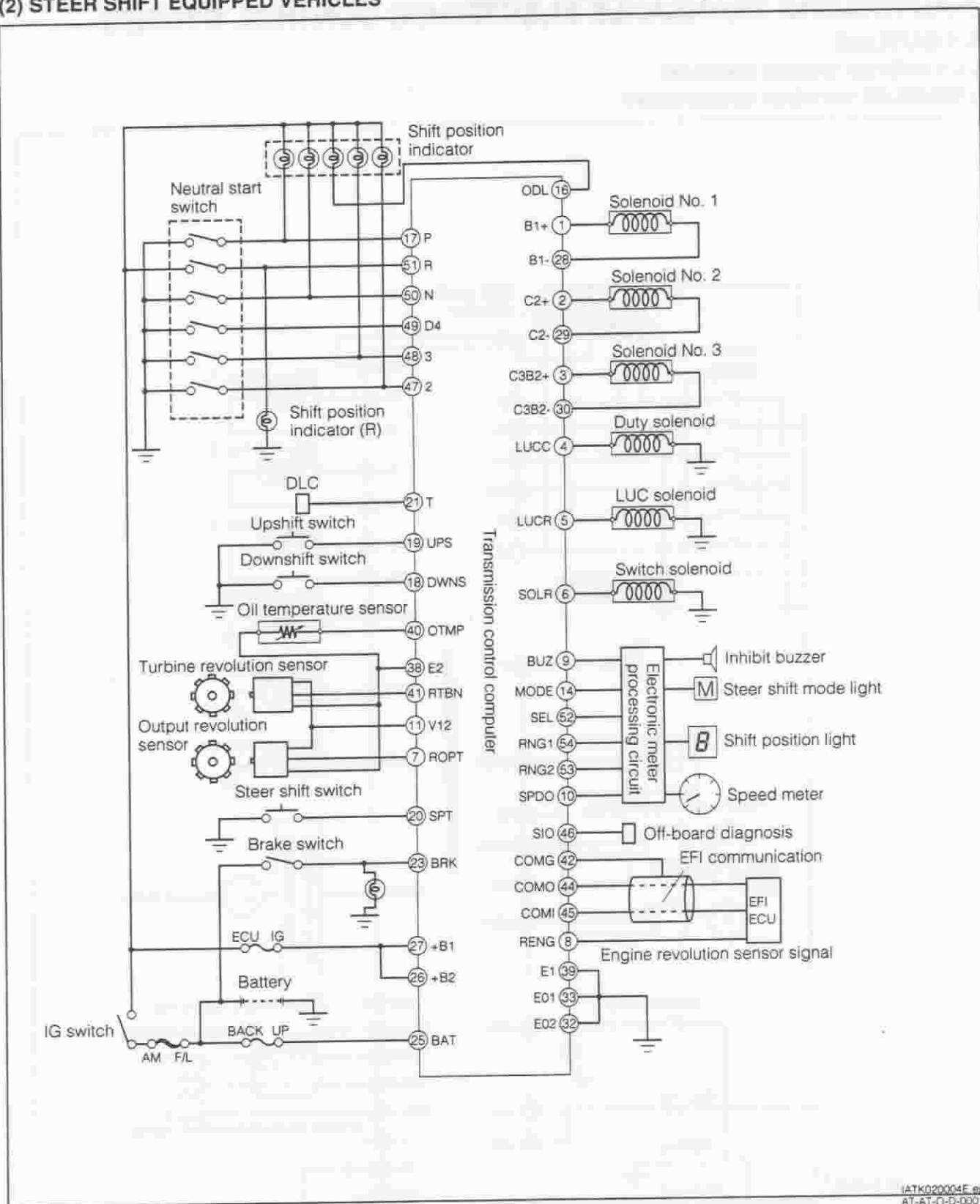
(1) VEHICLES WITHOUT STEER SHIFT



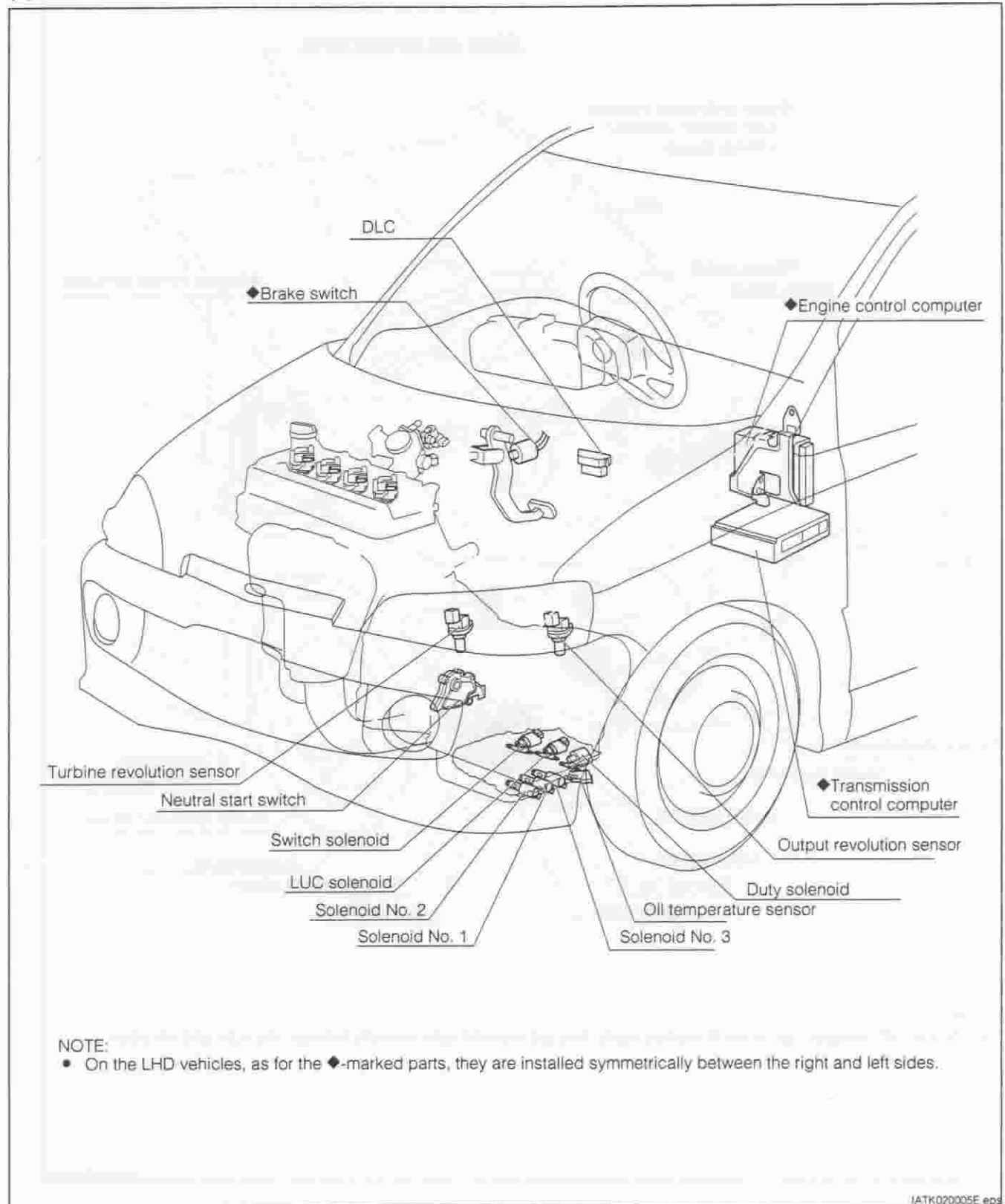
1ATK020003E.eps

AT-46

(2) STEER SHIFT EQUIPPED VEHICLES

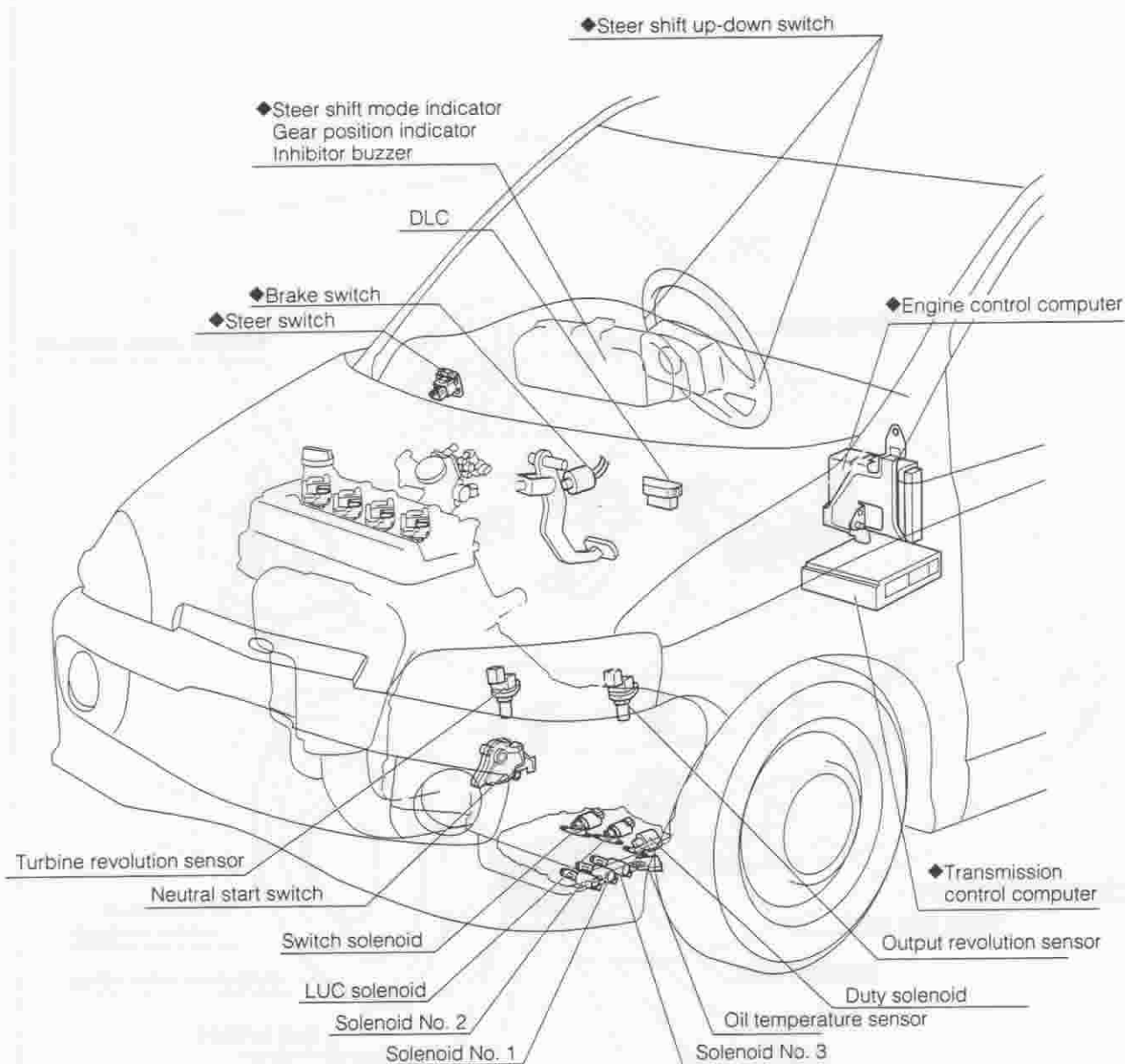


15-1-2 LOCATION ON COMPONENTS
(1) VEHICLES WITHOUT STEER SHIFT



AT-48

(2) STEER SHIFT EQUIPPED VEHICLES

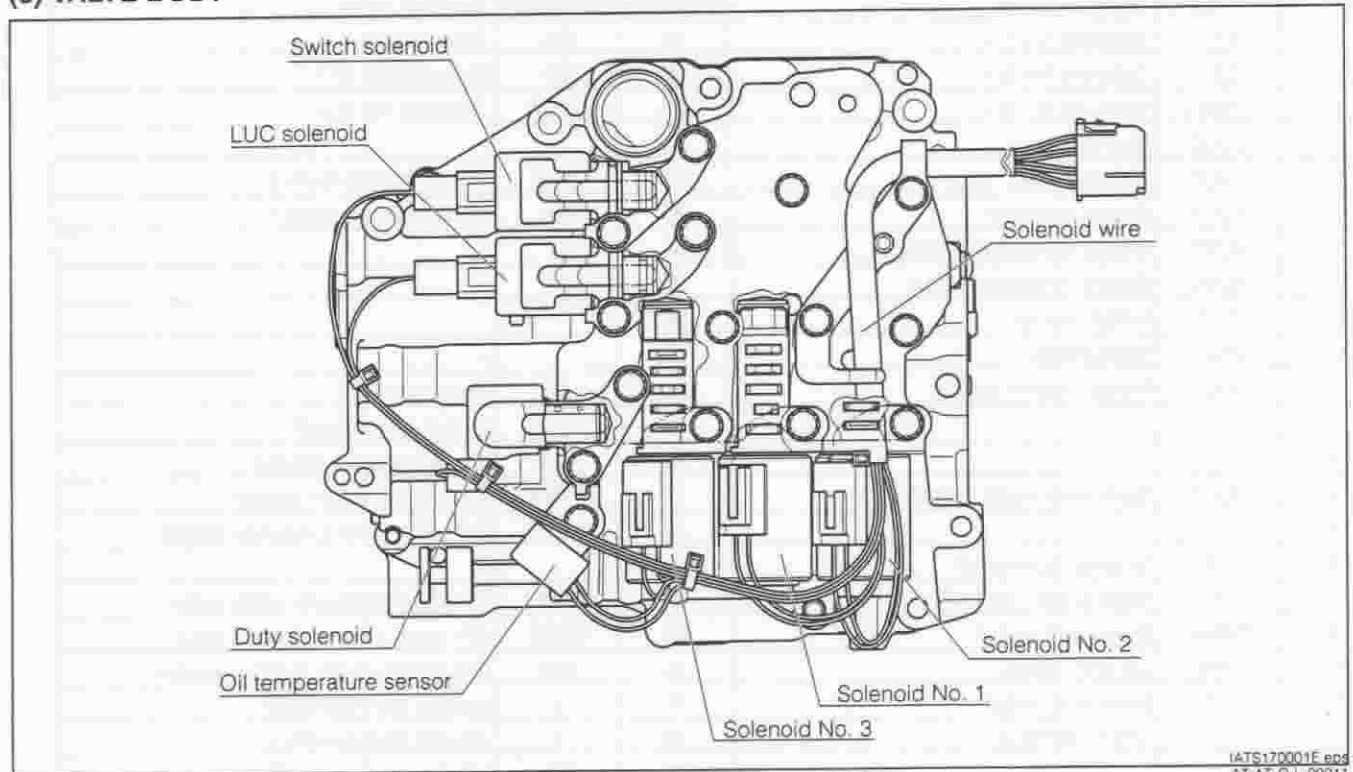


NOTE:

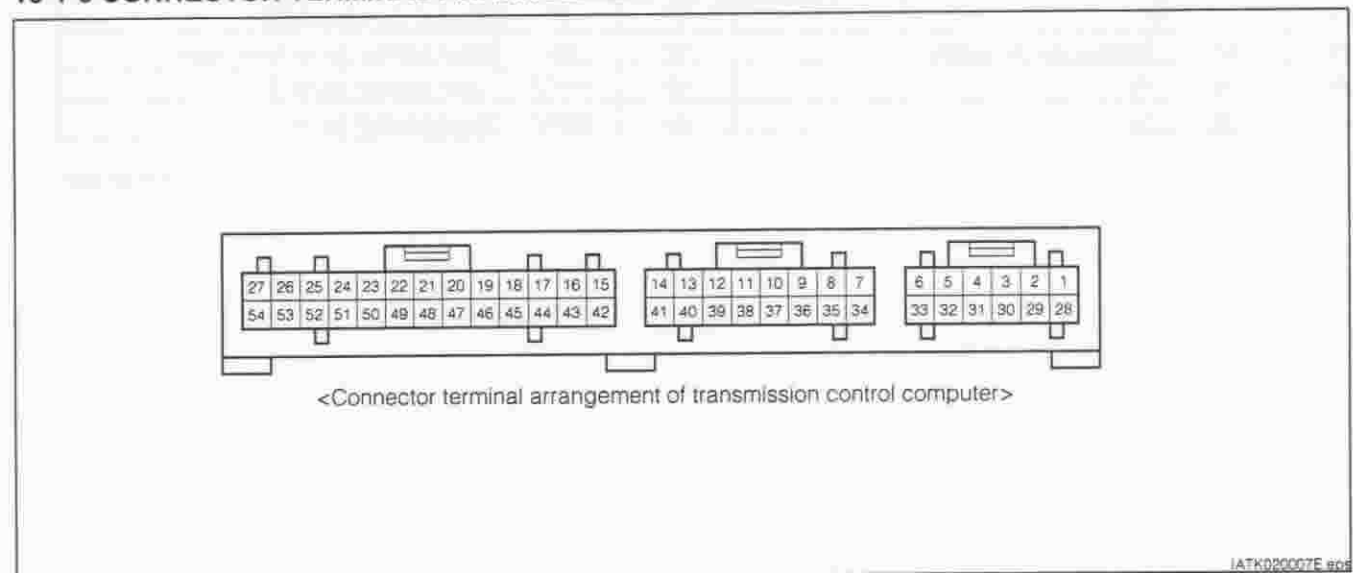
- On the LHD vehicles, as for the ◆-marked parts, they are installed symmetrically between the right and left sides.

IATK020006E.eps

(3) VALVE BODY



15-1-3 CONNECTOR TERMINAL ARRANGEMENT OF TRANSMISSION CONTROL COMPUTER



AT-50

Terminal No.	Terminal code	Terminal name	Terminal No.	Terminal code	Terminal name
1	B1+	Solenoid No.1(+)	28	B1-	Solenoid No.1(-)
2	C2+	Solenoid No.2(+)	29	C2-	Solenoid No.2(-)
3	C3B2+	Solenoid No.3(+)	30	C3B2-	Solenoid No.3(-)
4	LUCC	Duty solenoid	31	-	-
5	LUCR	LUC solenoid	32	E02	Power system earth 2
6	SOLR	Switch solenoid	33	E01	Power system earth 1
7	ROPT	Output revolution sensor	34	-	-
8	RENG	Engine revolution signal	35	-	-
9	BUZ	Inhibit buzzer	36	-	-
10	SPDO	Speedmeter	37	-	-
11	V12	Sensor power supply	38	E2	Sensor earth
12	-	-	39	E1	Signal system earth
13	-	-	40	OTMP	Oil temperature sensor
14	MODE	Steer shift mode indicator	41	RTBN	Turbine revolution sensor
15	-	-	42	COMG	EFI serial communication Shield
16	ODL	Oil lamp illumination	43	-	-
17	P	Neutral start switch(P)	44	COMO	EFI serial communication output
18	DWNS	Down shift switch	45	COMI	EFI serial communication input
19	UPS	Up shift switch	46	SIO	Diagnostic tester communication
20	SPT	Steer shift switch	47	2	Neutral start switch(2)
21	T	Check terminal	48	3	Neutral start switch(3)
22	-	-	49	D4	Neutral start switch(D4)
23	BRK	Brake switch	50	N	Neutral start switch(N)
24	-	-	51	R	Neutral start switch(R)
25	BAT	Backup power supply	52	SEL	Gear position lamp illumination
26	+B2	IG	53	RNG2	Gear position signal 2
27	+B1	IG	54	RNG1	Gear position signal 1

AT-AT-O-T-00011



15-2 HANDLING INSTRUCTIONS ON AUTOMATIC TRANSAXLE CONTROL SYSTEM

15-2-1 ERASING LEARNING VALUES OF A/T ECU

- When the automatic transaxle assembly and valve body assembly (including the solenoid valve) have been replaced, it is necessary to erase the learning values of the transmission control computer given below.

(1) ERASING THE LEARNING VALUES WITHOUT USING DIAGNOSIS TESTER

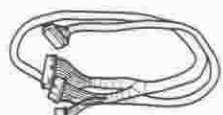
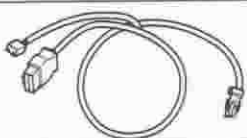
- Short the terminal ECUT with the terminal E in the DLC.
- Depress the brake pedal within three seconds after the ignition switch is set to the ON position (without starting the engine). Keep the brake depressed, until the operations in the steps 3 and 4 are completed.
- Move the shift lever from  to  and, then, to  within one second. (The time spent for moving from  to  and, then, to  should be within one second.)
- Repeat the step 3 above eight times.
- Set the ignition switch to the OFF position. Set the ignition switch to the ON position again.
- Run the vehicle in an urban area for about fifteen minutes. (Go through all operations, such as shifting to each gear and kickdown operations.)

(2) ERASING THE LEARNING VALUES WITH USING DIAGNOSIS TESTER

- Connect the diagnosis tester to the vehicle. Set the ignition key to the ON position.
- Execute "Erasing memory" from the individual function of the diagnosis tester.
- Set the ignition switch to the OFF position. Remove the diagnosis tester. Set the ignition switch to the ON position.
- Run the vehicle in an urban area for about fifteen minutes. (Go through all operations, such as shifting to each gear and kickdown operations.)

AT-AT-N-S-00011

15-3 PREPARATION TOOLS

	Shape	Part number, part name	Use
SST		09842-97205-000 Sub harness, transmission control computer check	For checking transmission control computer
		09991-87404-000 Wire, engine control system inspection	For diagnosis starting, erasing and for connecting DS-21
		09991-87403-000 Wire, diagnosis check	For diagnosis starting and erasing
		09990-97201-000 Sub harness, A/T solenoid wire check	For in-vehicle check of solenoid wires instruments
		09660-87001-000 DS-21 diagnosis tester	For checking computer input/output signals of transmission control computer, and for reading and erasing
Tool		Diagnosis program card	For checking computer input/output signals of transmission control computer, and for reading and erasing

AT-AT-P-Z-00011

connector.

SST: 09991-87404-000

09991-87403-000

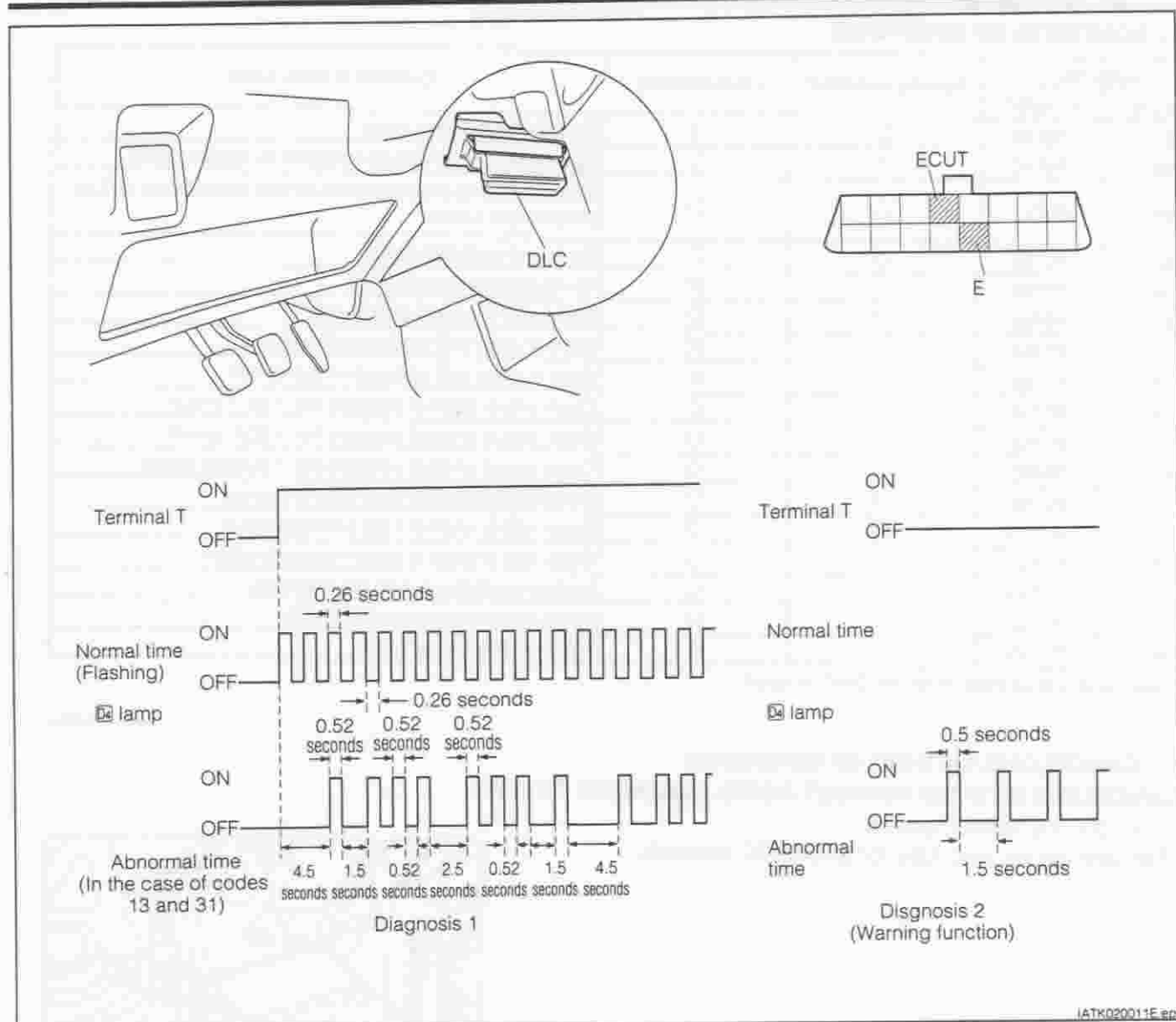
2. Turn the ignition switch to "ON" and read the number of times the  range lamp flashes.

CAUTION

- If the connector connection position is wrong, it could cause malfunction, so make sure the connection position is correct.

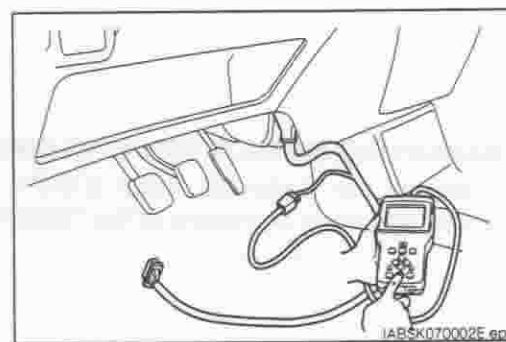
NOTE

- When the situation is normal, the flashing interval is 0.25 seconds.
- If there is one malfunction code, the lamp will flash at an interval of 4 seconds and the same code will be output. If multiple codes are output, the respective codes will be output in order at an interval of 2.5 seconds, and after all the codes have been output, there will be another 4 second pause before output of the codes starts over again.
- When multiple codes are output, the codes will be output in the order of smallest code number first.



(2) CHECKING METHOD BY USING DIAGNOSIS TESTER

1. Connect the diagnosis tester (DS-21) to the DLC located under the instrument panel to get the indication by means of the "diagnosis check" function.
SST: 09991-87404-000



AT-54

15-4-2 CONTENTS OF DIAGNOSIS

Code No.		Warning indication	Code Memory	Contents of malfunction
2 digits	4 digits*			
37	P0715	○	○	No turbine revolution input
38	P0710	○	○	Open wire or short of fluid temperature sensor circuit
38	P0711	○	○	Abnormal rising characteristics of fluid temperature of fluid temperature sensor
42	P0720	○	○	No output revolution input
55	P0705	○	×	No neutral start switch input
56	P0705	○	○	Multi-input of neutral start switch
57	P1704	○	×	Short of steer shift mode switch circuit
58	P1705	○	×	Short of steer shift up/down switch circuit
61	P0753	○	○	Open wire or short of solenoid No. 1 (B1) circuit
62	P0758	○	○	Open wire or short of solenoid No. 2 (C2) circuit
63	P0763	○	○	Open wire or short of solenoid No. 3 (C3/B2) circuit
64	P0768	○	○	Open wire or short of Duty solenoid circuit
65	P0773	○	○	Open wire or short of LUC solenoid circuit
66	P1780	○	○	Open wire or short of switch solenoid circuit
72	P1703	○	○	Lockup revolution speed not matching
82	P1602	○	○	Faulty communication with EFI-ECU
86	P0725	○	○	No engine revolution input

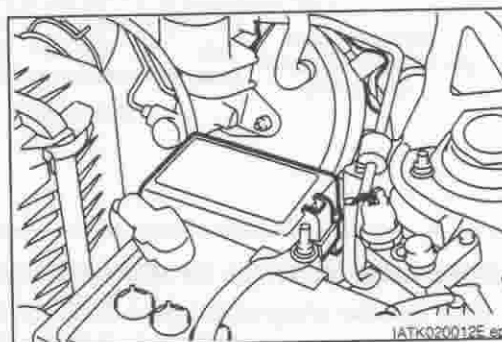
* Denotes those output code when the DS-21 is used.

AT-AT-G-D-00011

15-4-3 CANCELING METHOD OF DIAGNOSIS

(1) CANCELING METHOD WITHOUT USING DIAGNOSIS TESTER

1. Turn OFF the ignition switch.
2. Remove the backup fuse for at least 30 seconds.



(2) CANCELING METHOD BY USING DIAGNOSIS TESTER

1. Connect the diagnosis tester (DS-21) to the check connector located under the instrument panel. Erase the code by means of the "diagnosis code erasure" function of the "Individual function".

AT-AT-G-E-00011

15-5 BASIC CHECK

15-5-1 MEASUREMENT OF BATTERY VOLTAGE

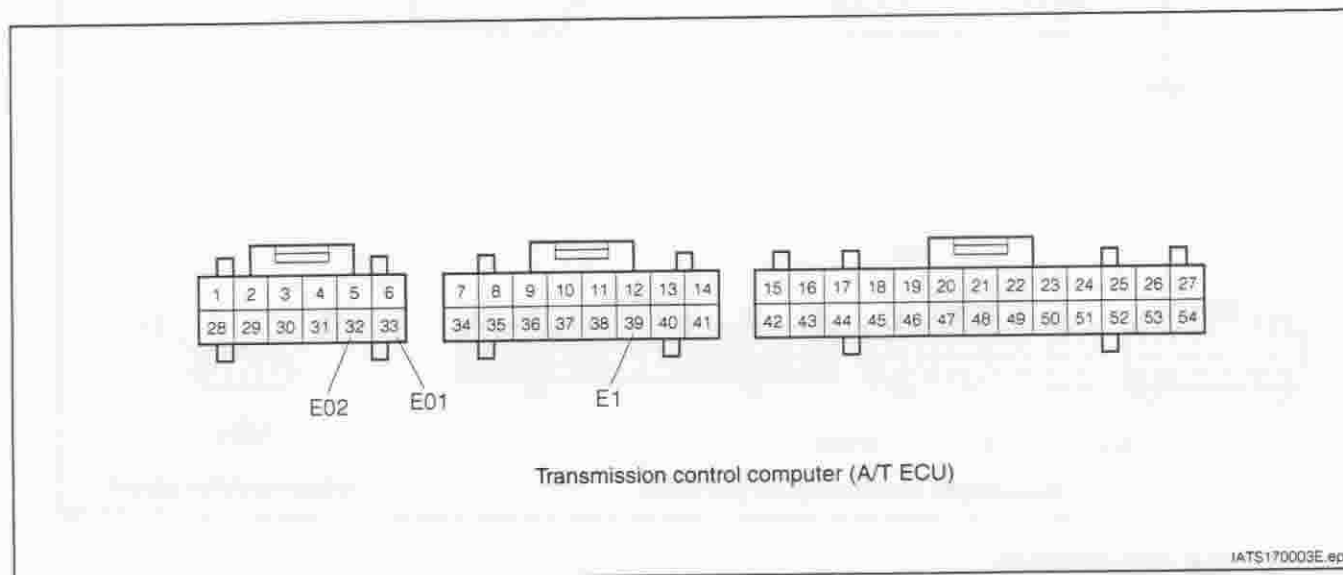
1. Measure the battery voltage with the engine stopped.
SPECIFIED VALUE: 10-14V (when engine is stopped)

AT-AT-I-B-00011

15-5-2 INSPECTION OF GROUND CIRCUIT

1. Disconnect the ECU connector and check the conductivity between the vehicle side connector ground terminal and the body ground.
SPECIFIED VALUE: There is conductivity.

AT-AT-I-G-00011

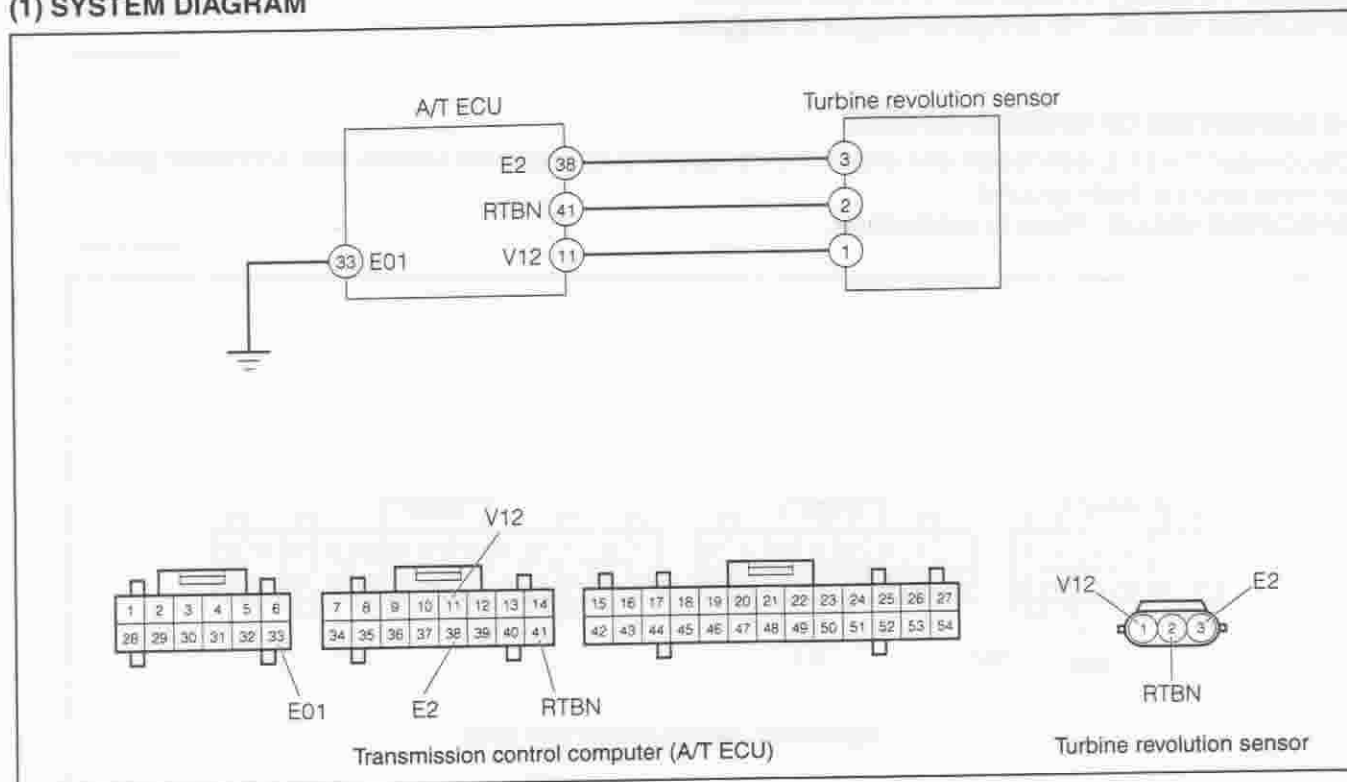


AT-56

15-6 TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

15-6-1 DIAGNOSIS CODE 37[P0715]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. When no input is made from the turbine revolution sensor for a certain length of time with the engine running in ranges other than P or N range, it is judged that the turbine revolution sensor is malfunctioning. Then, the diagnosis code No. 37 is outputted.

(3) CHECKING POINTS

1. Is the neutral start switch faulty?

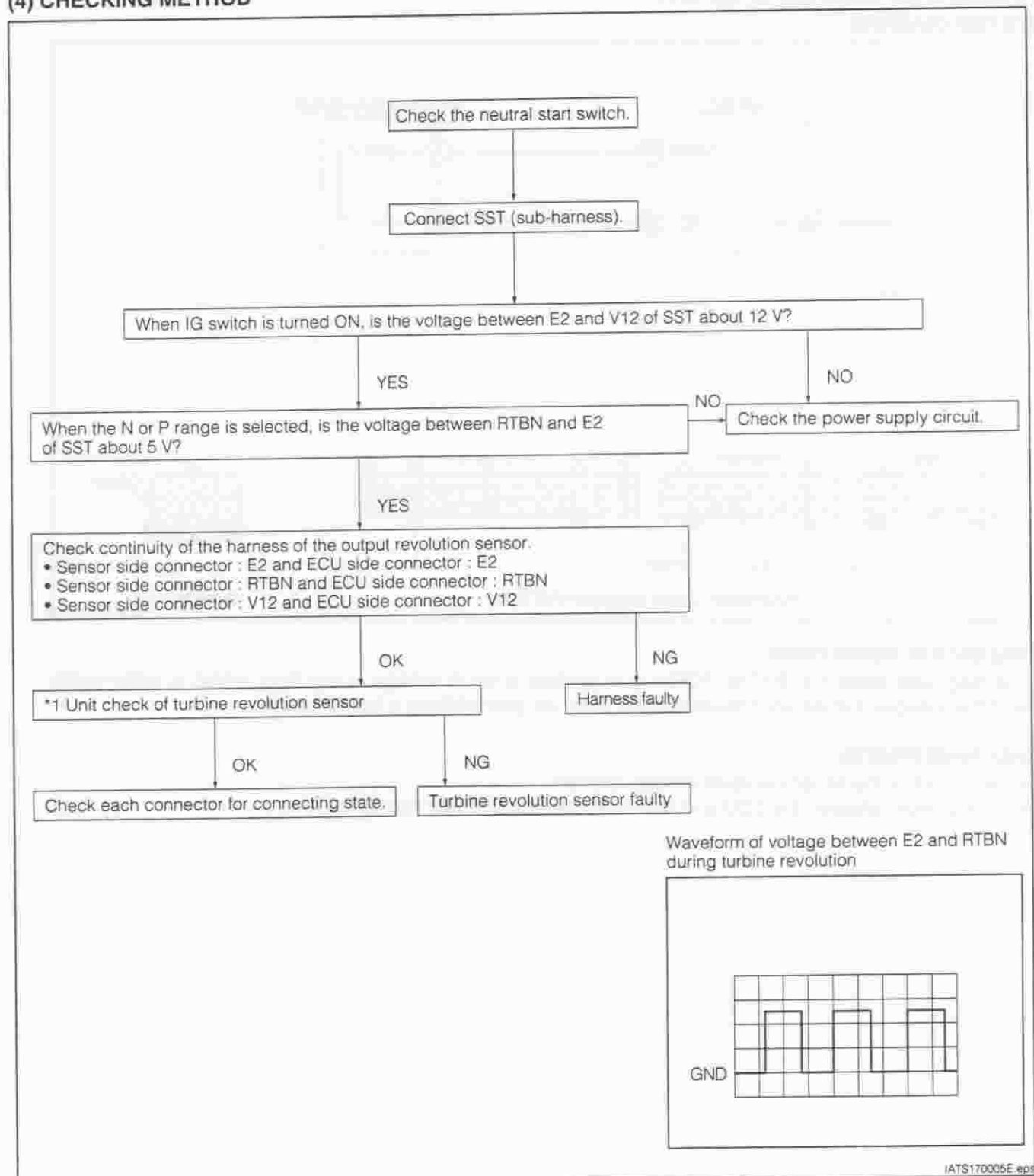
NOTE

- When the neutral start switch is malfunctioning, too, the diagnosis code P1715 may be outputted.

2. Is the signal from the turbine revolution sensor inputted into the ECU?
3. Is the output of the turbine revolution sensor normal?
4. Is the harness between the turbine revolution sensor and the ECU normal?

IATS170004E.eps

(4) CHECKING METHOD



1. *1
Refer to AT-105.

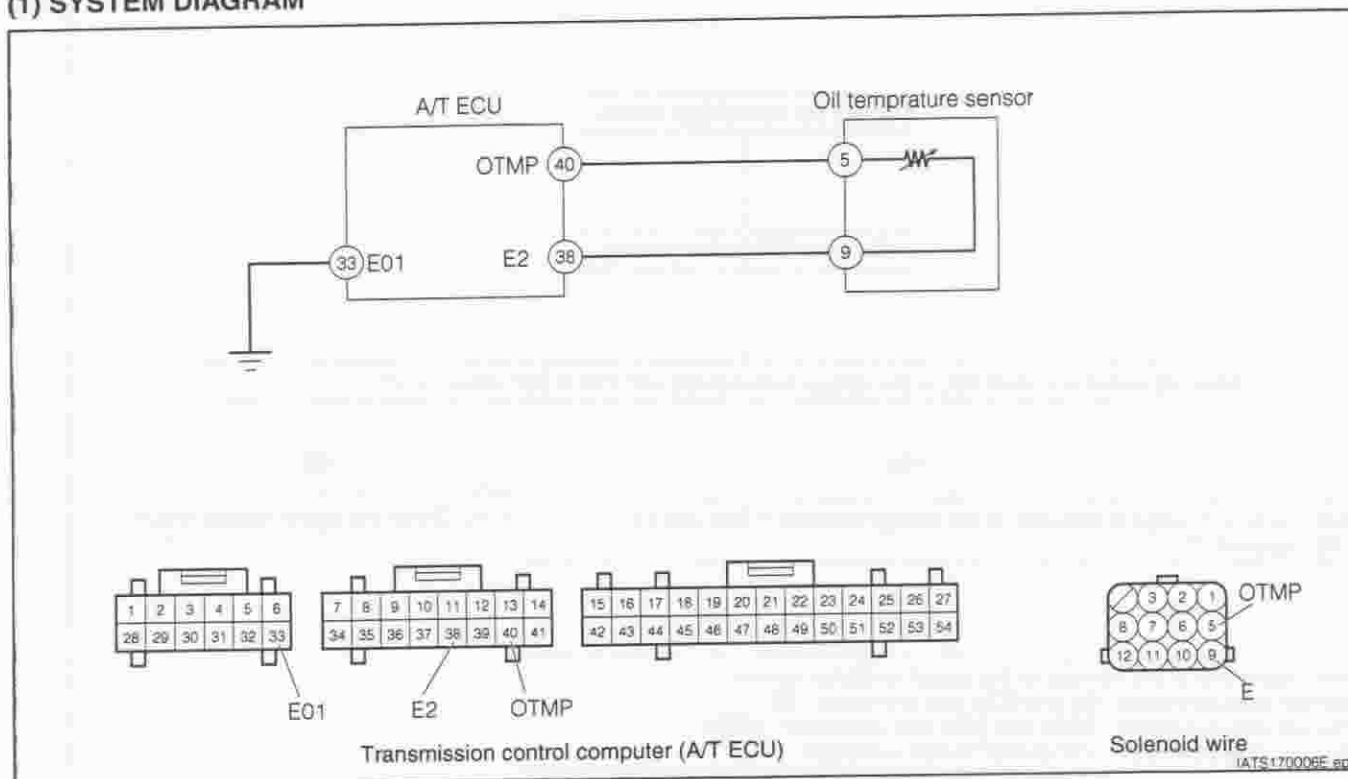
IATS17D005E.eps

AT-AT-L-R-00011

AT-58

15-6-2 DIAGNOSIS CODE 38[P0710,P0711]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0710, P0711 is outputted when a voltage is inputted, which is unthinkable from the viewpoint of sensor characteristics when no gear shifting is being made.

(3) CHECKING POINTS

1. Is the output of the oil temperature sensor normal?
2. Is the harness between the ECU and the oil temperature sensor normal?

4) CHECKING METHOD

```
graph TD
    A[Connect SST (sub-harness).] --> B[With the IG switch turned ON, measure the voltage between the SST E2 and OTMP.  
3.32 - 3.53 V (when fluid temperature is 20°C)  
1.05 - 1.17 V (when fluid temperature is 80°C)]
    B -- NG --> C[Disconnect the connectors at sensor side and at ECU side of the harness]
    B -- OK --> D[Check each connector for connecting condition.]
    C -- NG --> E[Perform continuity check for the fluid temperature sensor harness.  
• Sensor side connector : E and ECU side connector : E2  
• Sensor side connector : OTMP and ECU side connector : OTMP]
    C -- OK --> D
    E -- OK --> F[Ensure that no continuity exists between the fluid temperature sensor harness and the body.  
Harness sensor side connector E and body  
Harness sensor side connector OTMP and body  
Harness ECU side connector E2 and body  
Harness ECU side connector OTMP and body]
    E -- NG --> G[Harness faulty]
    F -- OK --> H[Unit check of fluid temperature sensor.  
Measure the resistance between E and OTMP of the sensor.  
Specified Value:  
Approx. 14.8 kΩ (when fluid temperature is 20°C)  
Approx. 0.313 kΩ (when fluid temperature is 80°C)]
    F -- NG --> I[Sensor faulty]
    H -- OK --> J[ECU faulty]
    D -- OK --> J
```

Connect SST (sub-harness).

With the IG switch turned ON, measure the voltage between the SST E2 and OTMP.
3.32 - 3.53 V (when fluid temperature is 20°C)
1.05 - 1.17 V (when fluid temperature is 80°C)

NG

OK

Disconnect the connectors at sensor side and at ECU side of the harness

NG

OK

Perform continuity check for the fluid temperature sensor harness.
• Sensor side connector : E and ECU side connector : E2
• Sensor side connector : OTMP and ECU side connector : OTMP

OK

NG

NG

Ensure that no continuity exists between the fluid temperature sensor harness and the body.
Harness sensor side connector E and body
Harness sensor side connector OTMP and body
Harness ECU side connector E2 and body
Harness ECU side connector OTMP and body

NG

Harness faulty

OK

Unit check of fluid temperature sensor.
Measure the resistance between E and OTMP of the sensor.
Specified Value:
Approx. 14.8 kΩ (when fluid temperature is 20°C)
Approx. 0.313 kΩ (when fluid temperature is 80°C)

NG

Sensor faulty

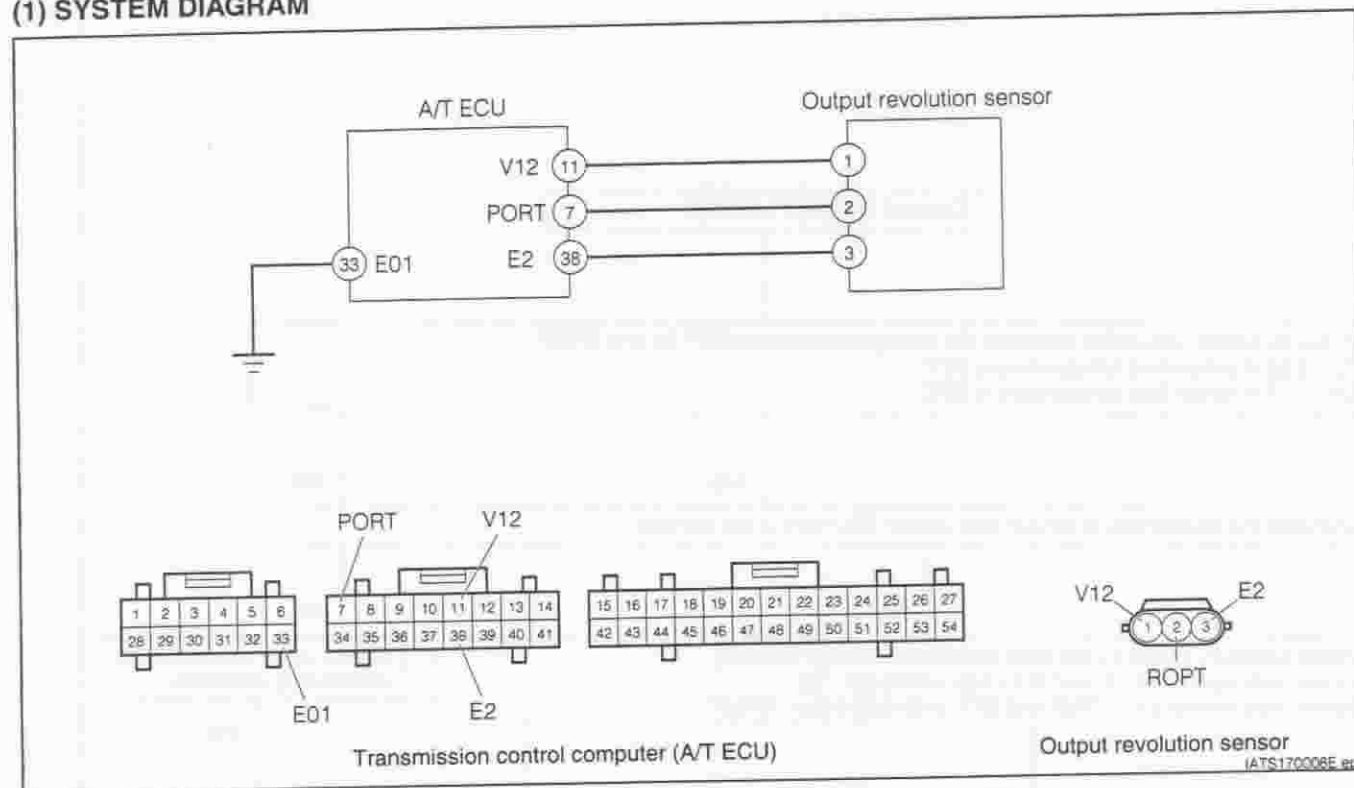
OK

ECU faulty

AT-60

15-6-3 DIAGNOSIS CODE 42[P0720]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. When the vehicle is running at a speed of 5 km/h or more, the present vehicle speed is compared with that 16 ms before. If deceleration exceeds a certain level, it is evaluated that the output revolution sensor is malfunctioning, thereby outputting the diagnosis code No. P0720.

(3) CHECKING POINTS

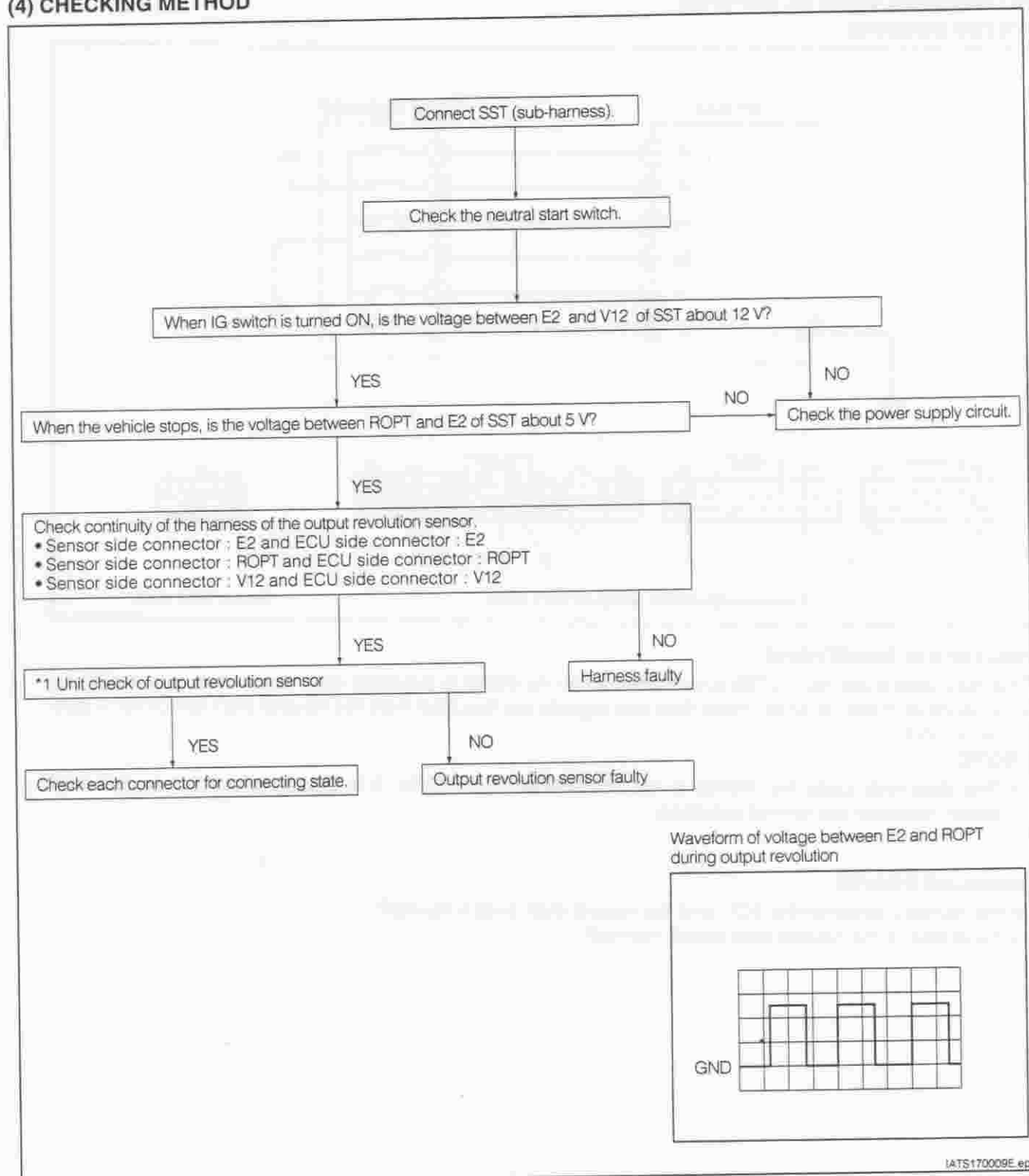
1. Is the neutral start switch malfunctioning?

NOTE

- When the neutral start switch is malfunctioning, the diagnosis code P0720 may also be outputted.

2. Is the output of the output revolution sensor normal?
3. Is the harness between the output revolution sensor and the ECU normal?
4. Is the signal from the output revolution sensor inputted to the ECU?

(4) CHECKING METHOD



IATS170009E.eps

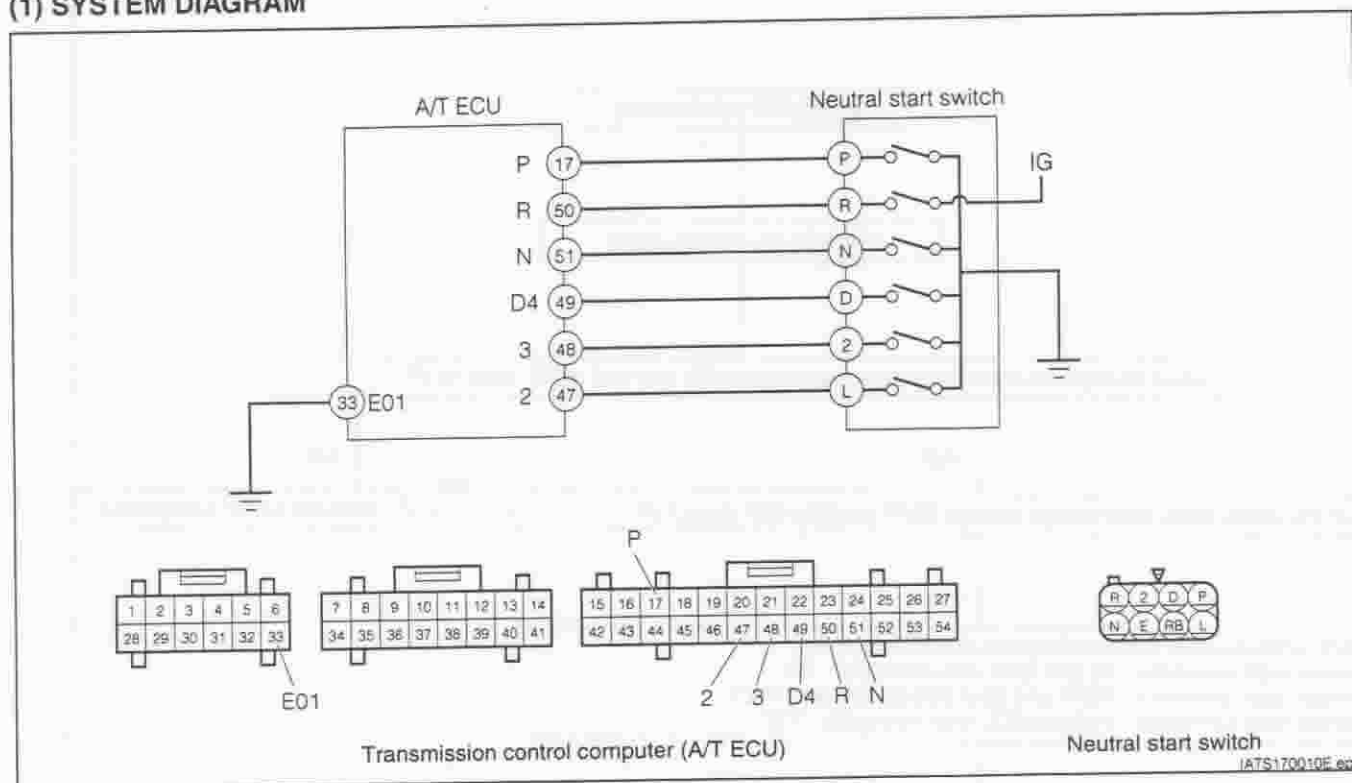
1. *1
Refer to AT-105.

AT-AT-LIO-00011

AT-62

15-6-4 DIAGNOSIS CODE 55, 56[P0705]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0705 is outputted when no signal is available from the neutral start switch for 2 seconds or more, or when more than one signals are inputted from the neutral start switch for 2 seconds or more.

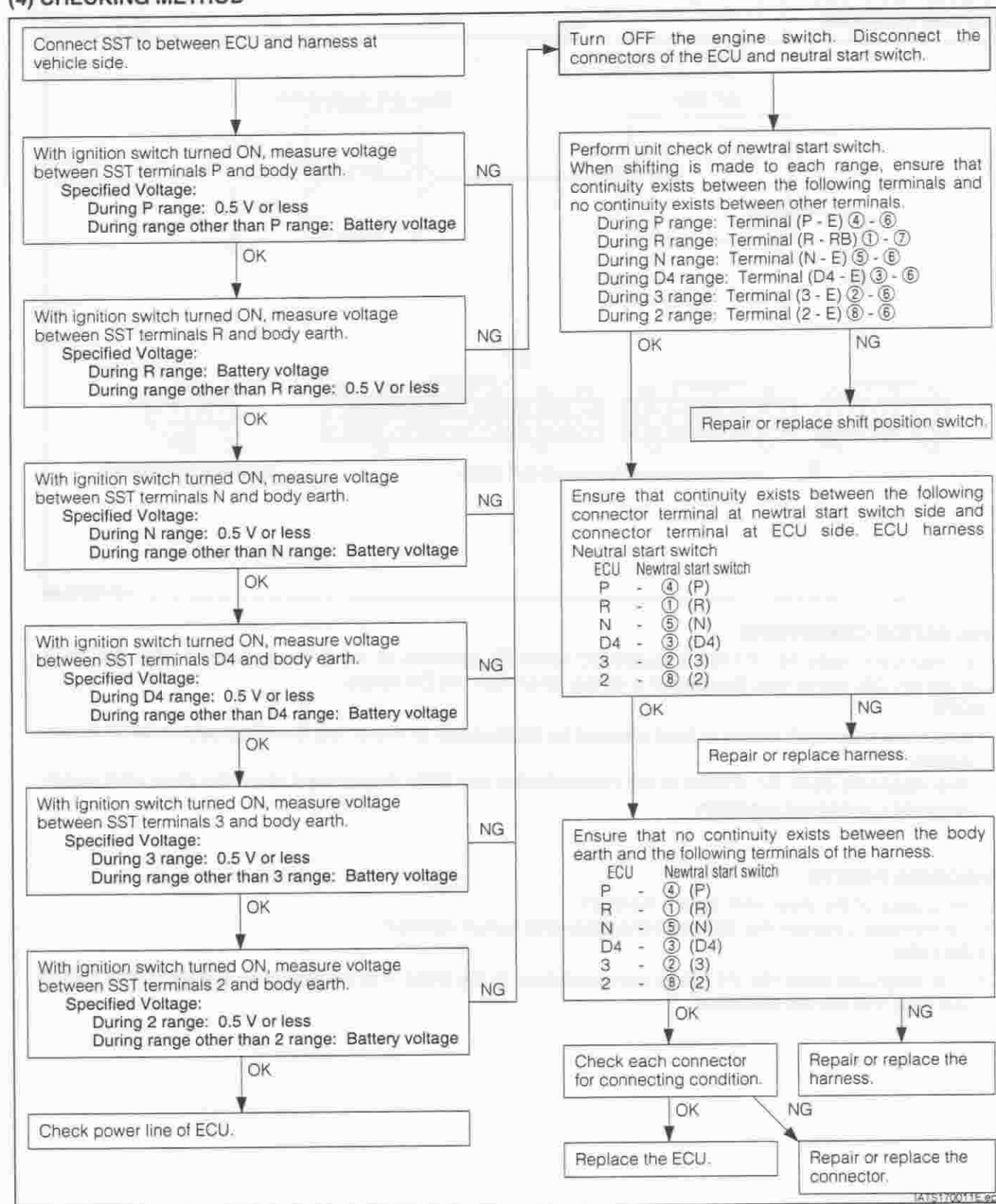
NOTE

- The diagnosis code No. P0705 is not memorized in the ECU. It is erased when the neutral start switch resumes the normal condition.

(3) CHECKING POINTS

1. Is the harness between the ECU and the neutral start switch normal?
2. Is the output of the neutral start switch normal?

(4) CHECKING METHOD

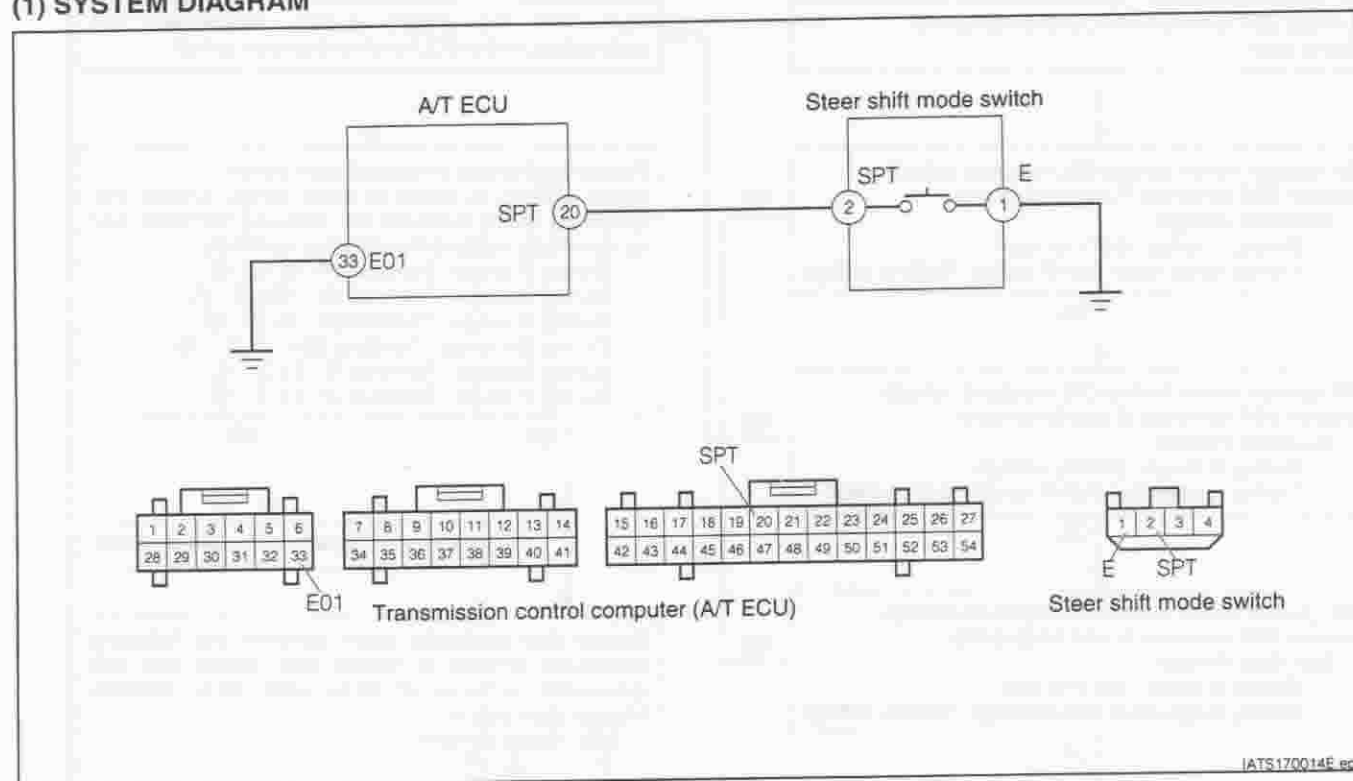


IA/S17/2011E 6/3
AT-AT-L-N-00011

AT-64

15-6-5 DIAGNOSIS CODE 57[P1704]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. The diagnosis code No. P1704 is outputted when 20 seconds or more have elapsed after the steer shift switch ON signal was inputted in a range other than the D4 range.

NOTE

- When the steer shift switch is kept pressed for 20 seconds or more, too, the diagnosis code 57 is outputted.
- The diagnosis code No. P1704 is not memorized in the ECU. It is erased when the steer shift switch resumes the normal condition.

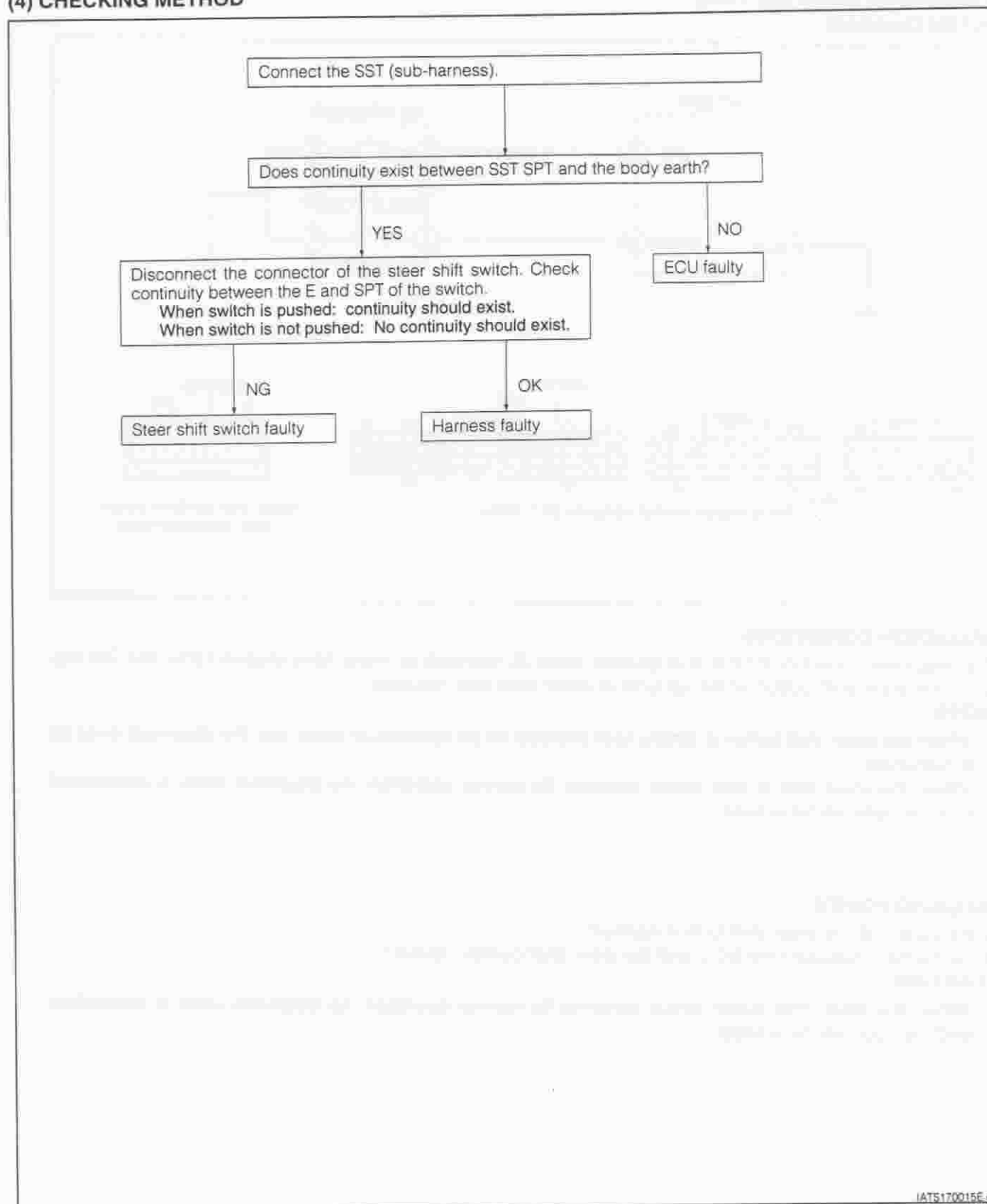
(3) CHECKING POINTS

1. Is the output of the steer shift switch normal?
2. Is the harness between the ECU and the steer shift switch normal?

CAUTION

- The diagnosis code No. P1704 is not memorized in the ECU. It is erased when the steer shift switch resumes the normal condition.

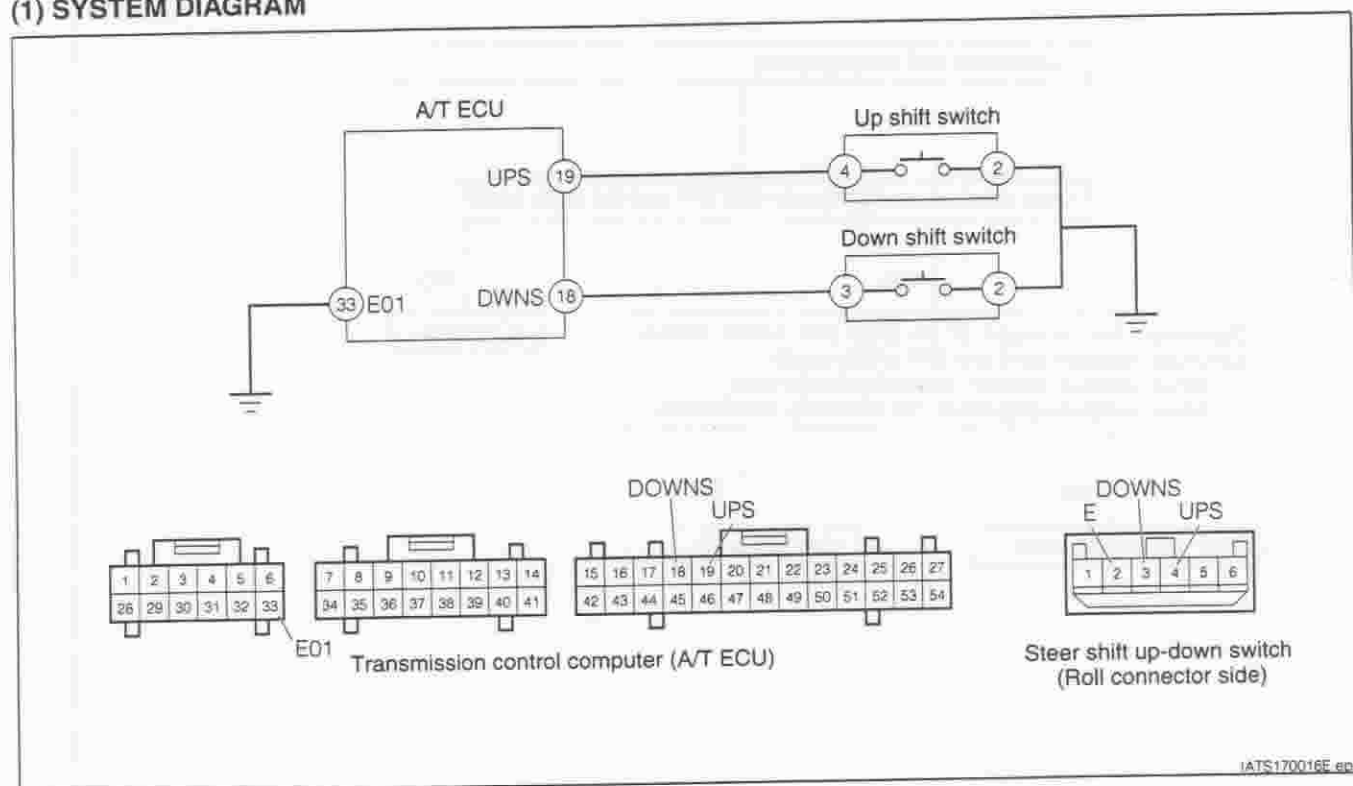
(4) CHECKING METHOD

IATS1700155.eps
AT-AT-LH-00011

AT-66

15-6-6 DIAGNOSIS CODE 58[P1705]

(1) SYSTEM DIAGRAM



(2) EVALUATION CONDITIONS

1. The diagnosis code No. P1705 is outputted when 20 seconds or more have elapsed after the ON signal of the steer shift button at the up side or down side was inputted.

NOTE

- When the steer shift button is simply kept pressed for 20 seconds or more, too, the diagnosis code 58 is outputted.
- When the steer shift button circuit resumes its normal operation, no diagnosis code is memorized and the code will be erased.

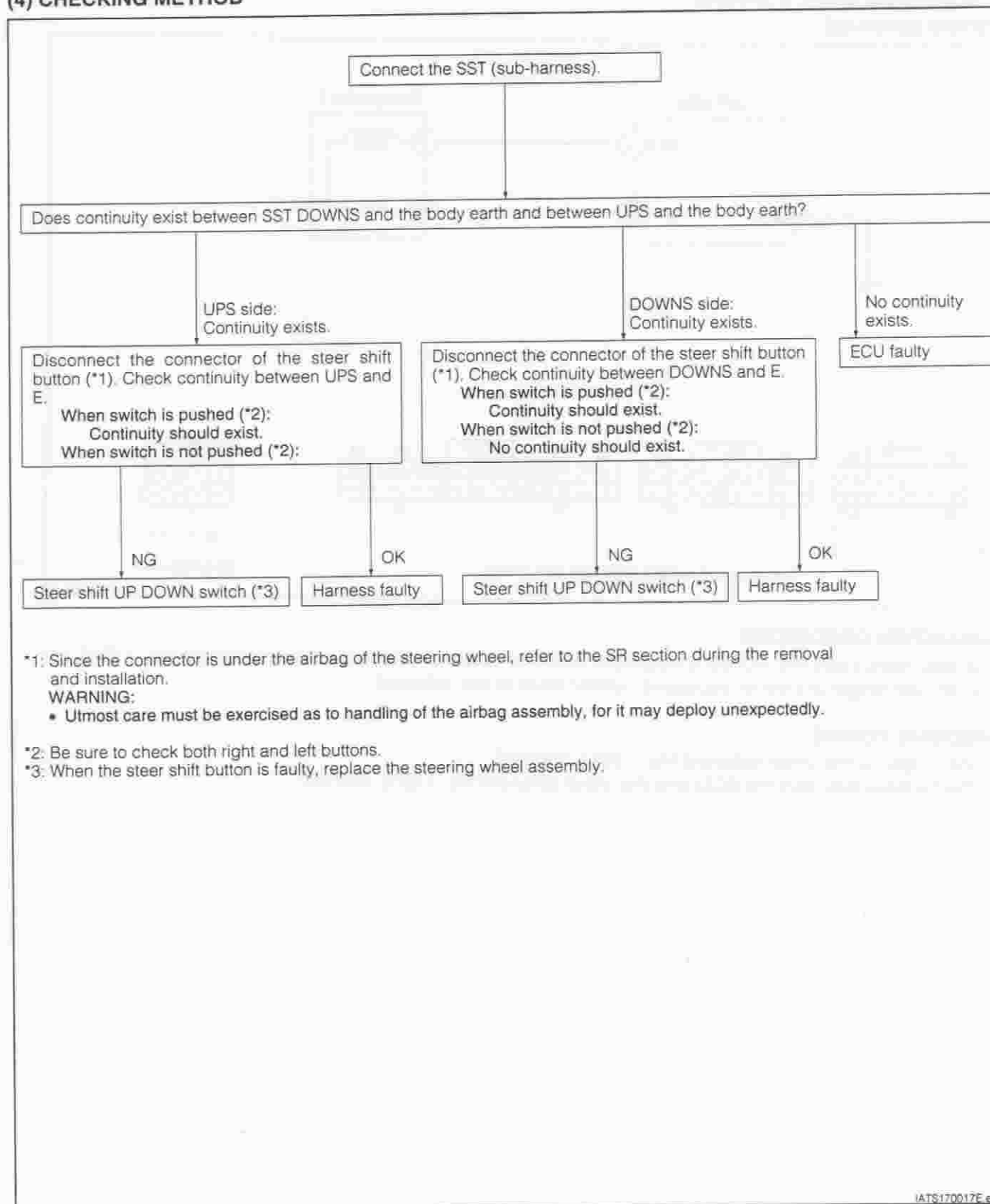
(3) CHECKING POINTS

1. Is the output of the steer shift button normal?
2. Is the harness between the ECU and the steer shift button normal?

CAUTION

- When the steer shift button circuit resumes its normal operation, no diagnosis code is memorized and the code will be erased.

(4) CHECKING METHOD

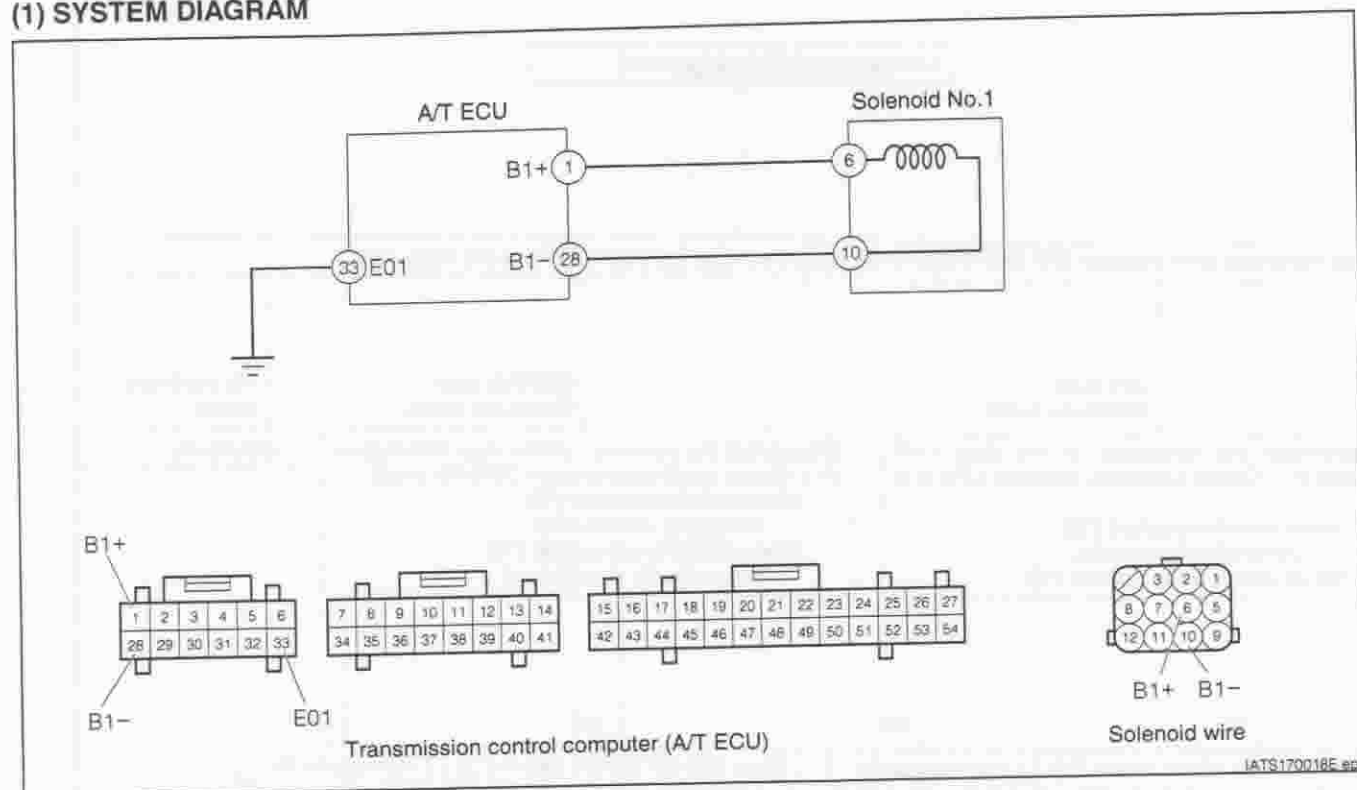


IATS170017E.eps
AT-AT-L-U-00011

AT-68

15-6-7 DIAGNOSIS CODE 61[P0753]

(1) SYSTEM DIAGRAM



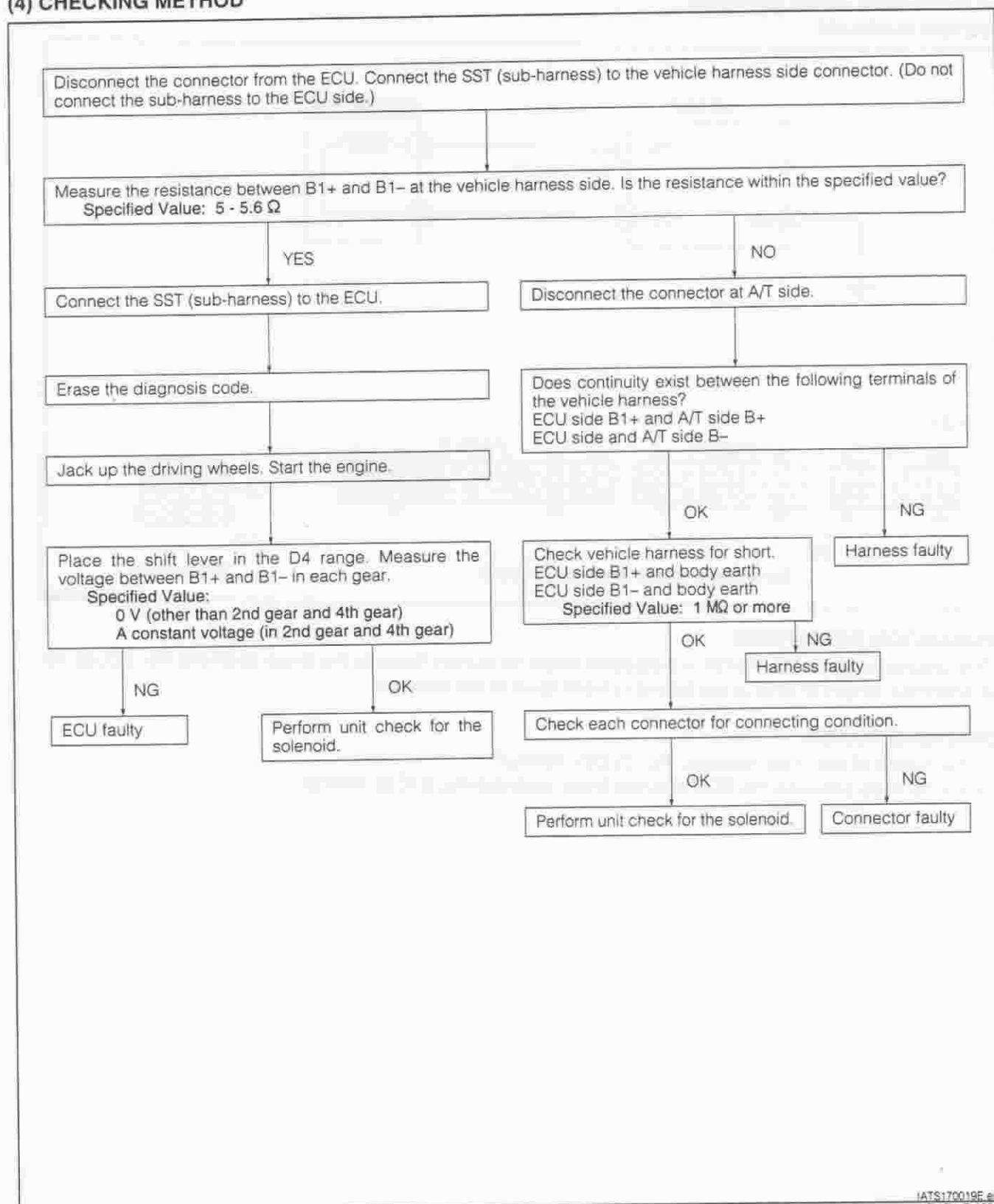
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0753 is outputted when no current flows to the linear solenoid No. 1 (B1) for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the linear solenoid No. 1 (B1) normal?
2. Is the harness between the ECU and the linear solenoid No. 1 (B1) normal?

(4) CHECKING METHOD

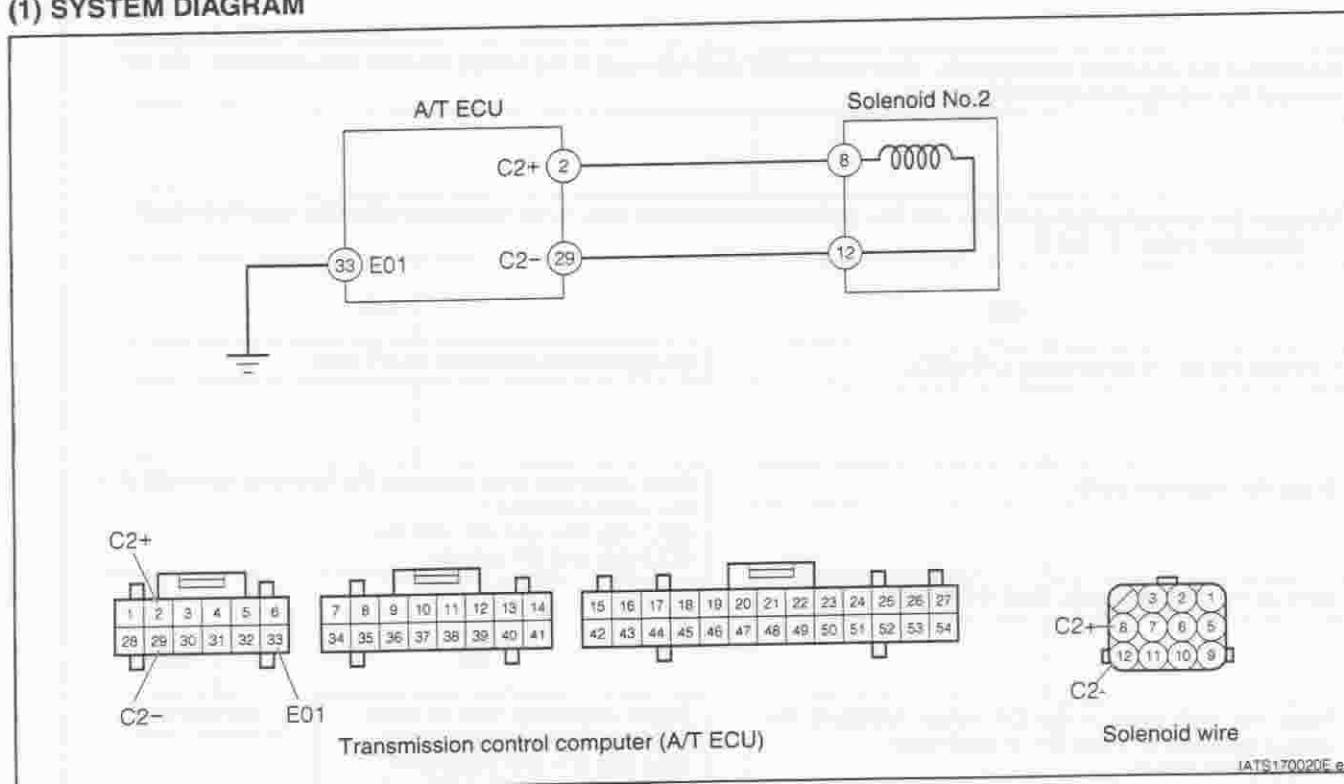


IATS170019E.eps
AT-AT-L-B-00011

AT-70

15-6-8 DIAGNOSIS CODE 62[P0758]

(1) SYSTEM DIAGRAM



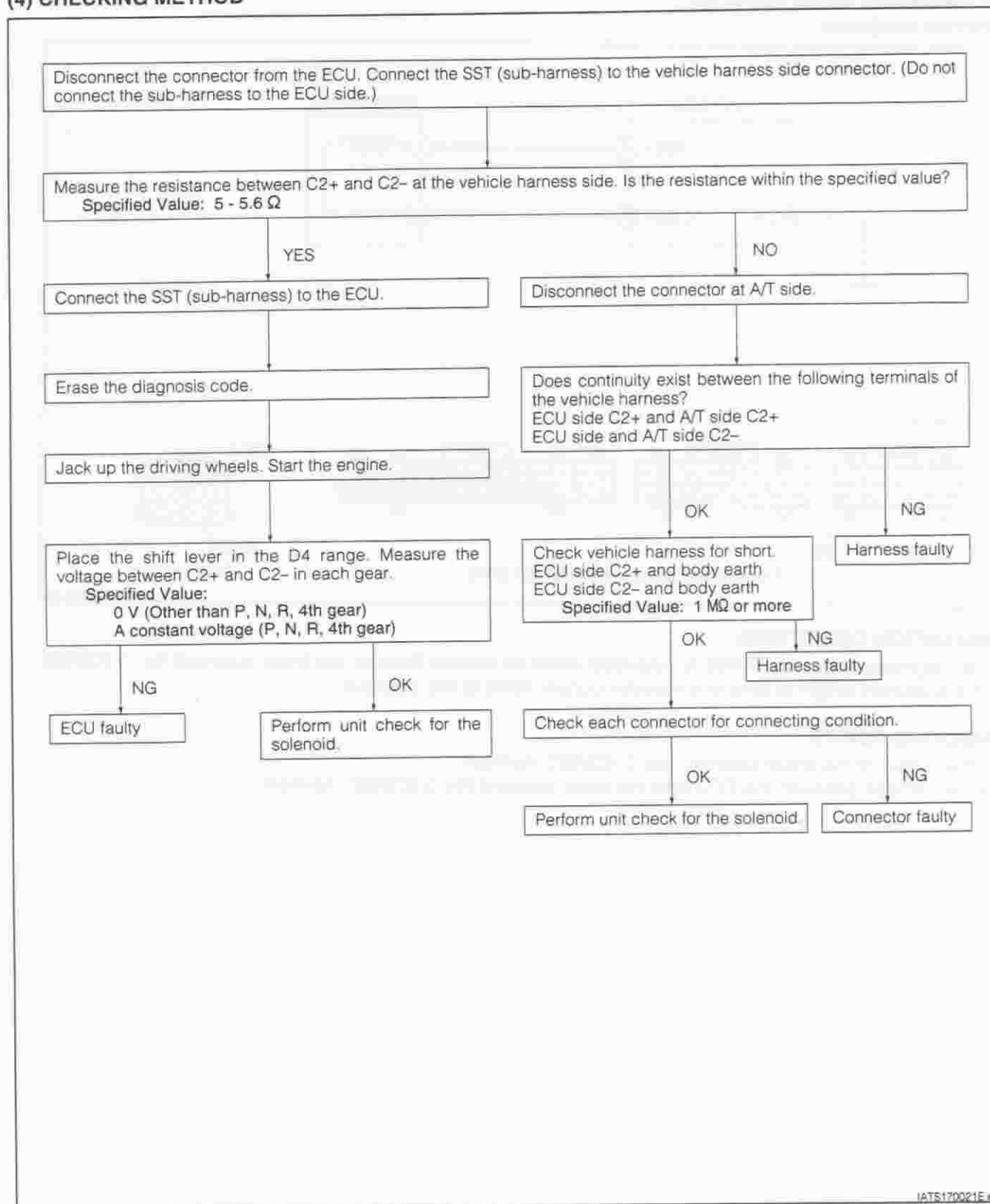
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0758 is outputted when no current flows to the linear solenoid No. 2 (C2) for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the linear solenoid No. 2 (C2) normal?
2. Is the harness between the ECU and the linear solenoid No. 2 (C2) normal?

(4) CHECKING METHOD

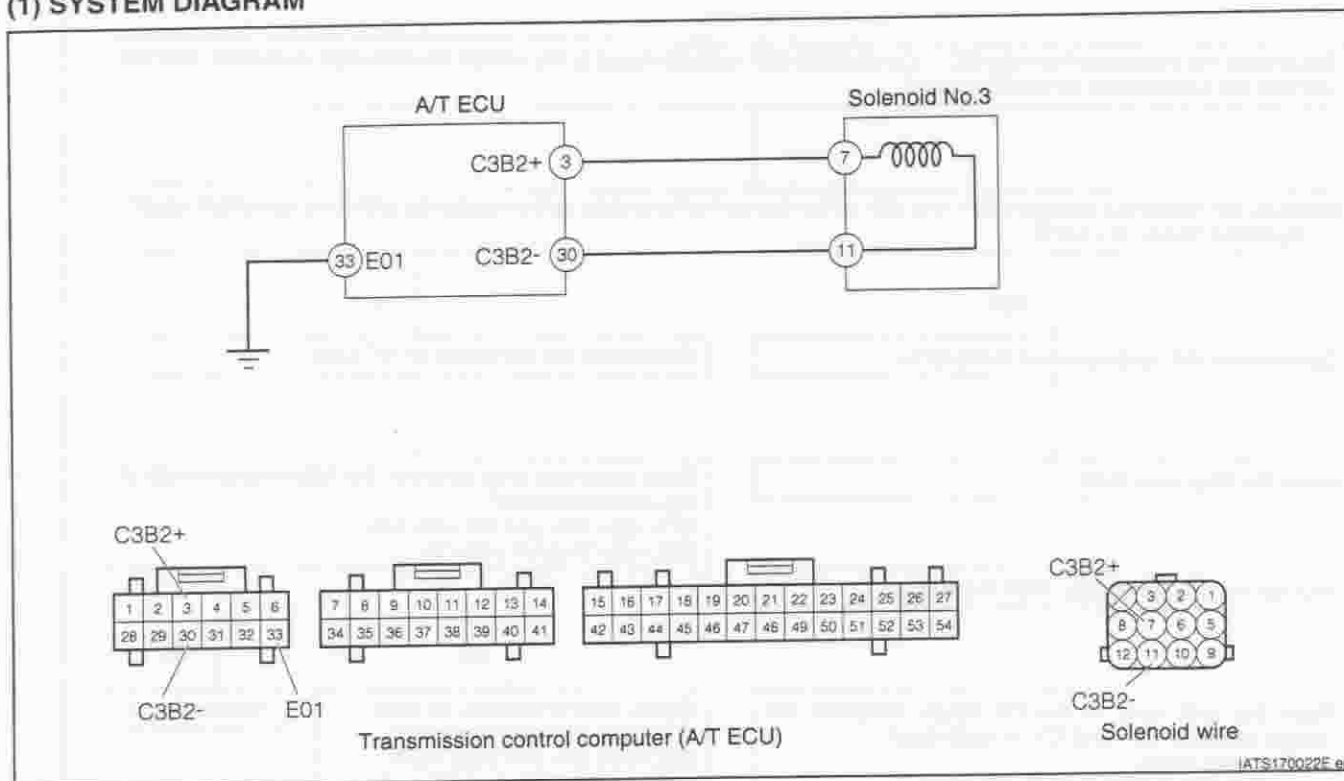


IATS170021E.eps
AT-AT-LC-00011

AT-72

15-6-9 DIAGNOSIS CODE 63[P0763]

(1) SYSTEM DIAGRAM



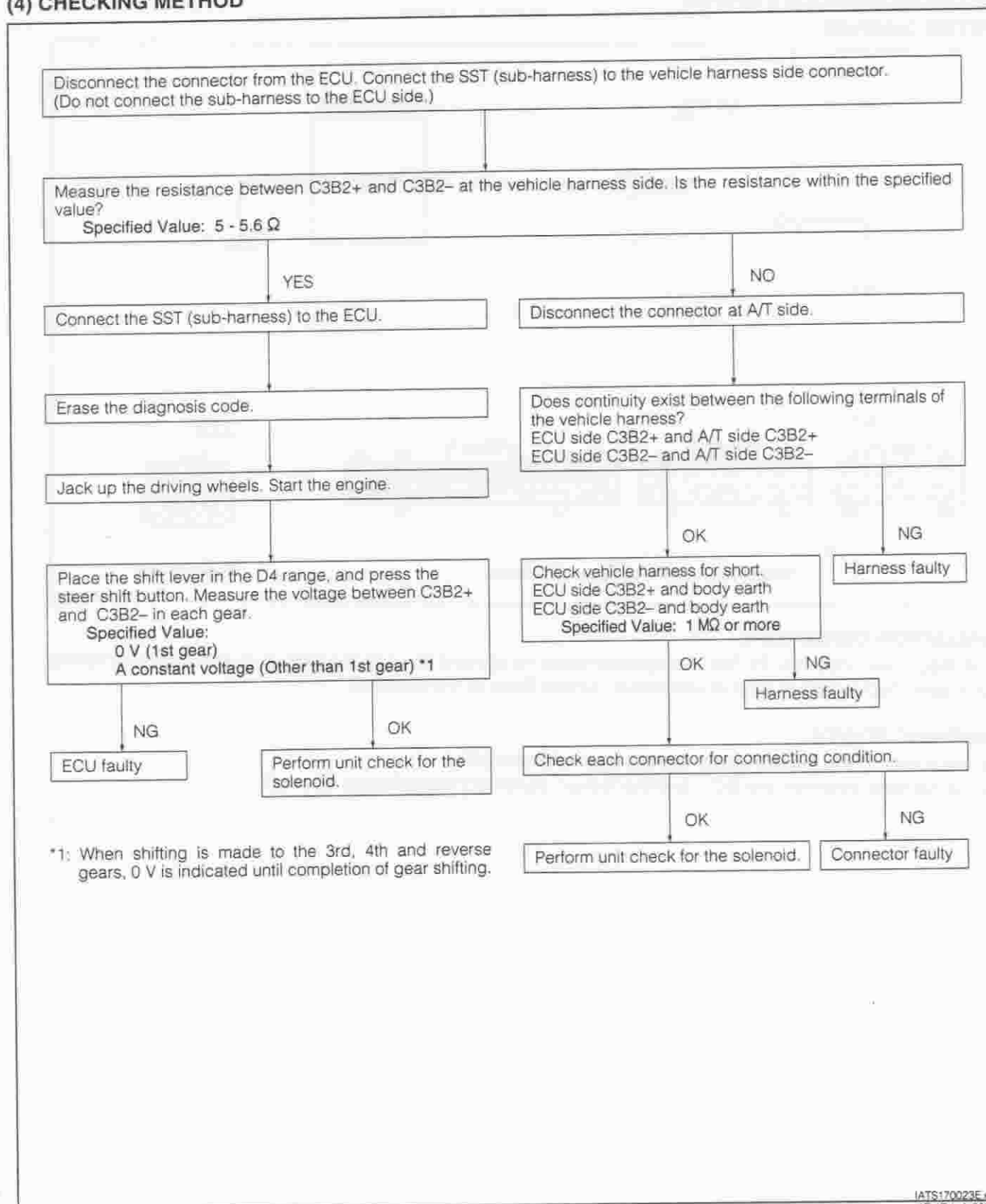
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0763 is outputted when no current flows to the linear solenoid No. 3 (C3/B2) for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the linear solenoid No. 3 (C3/B2) normal?
2. Is the harness between the ECU and the linear solenoid No. 3 (C3/B2) normal?

(4) CHECKING METHOD

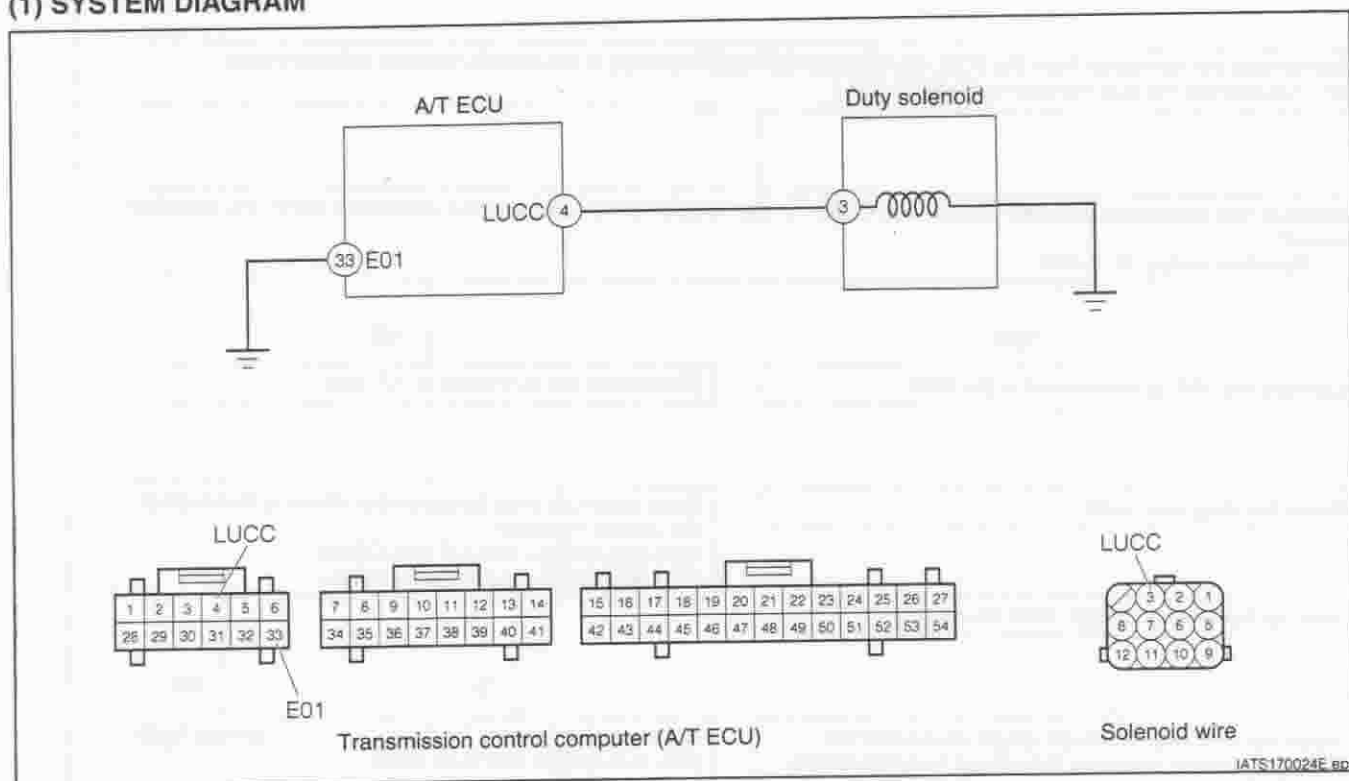


IATS170023E.eps
AT-AT-L-A-00011

AT-74

15-6-10 DIAGNOSIS CODE 64[P0768]

(1) SYSTEM DIAGRAM



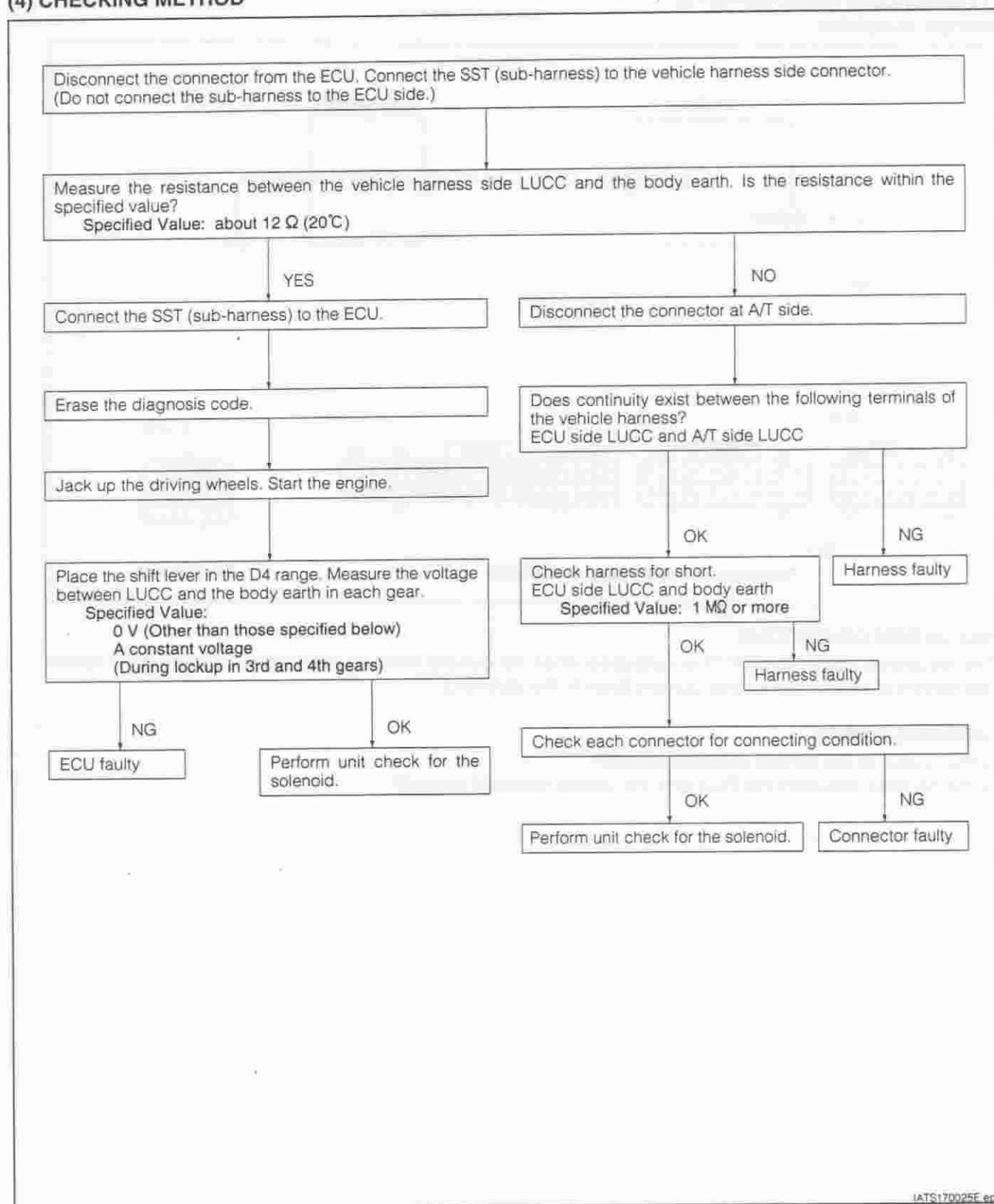
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0768 is outputted when no current flows to the lockup clutch control solenoid for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the lockup clutch control solenoid normal?
2. Is the harness between the ECU and the lockup clutch control solenoid normal?

(4) CHECKING METHOD

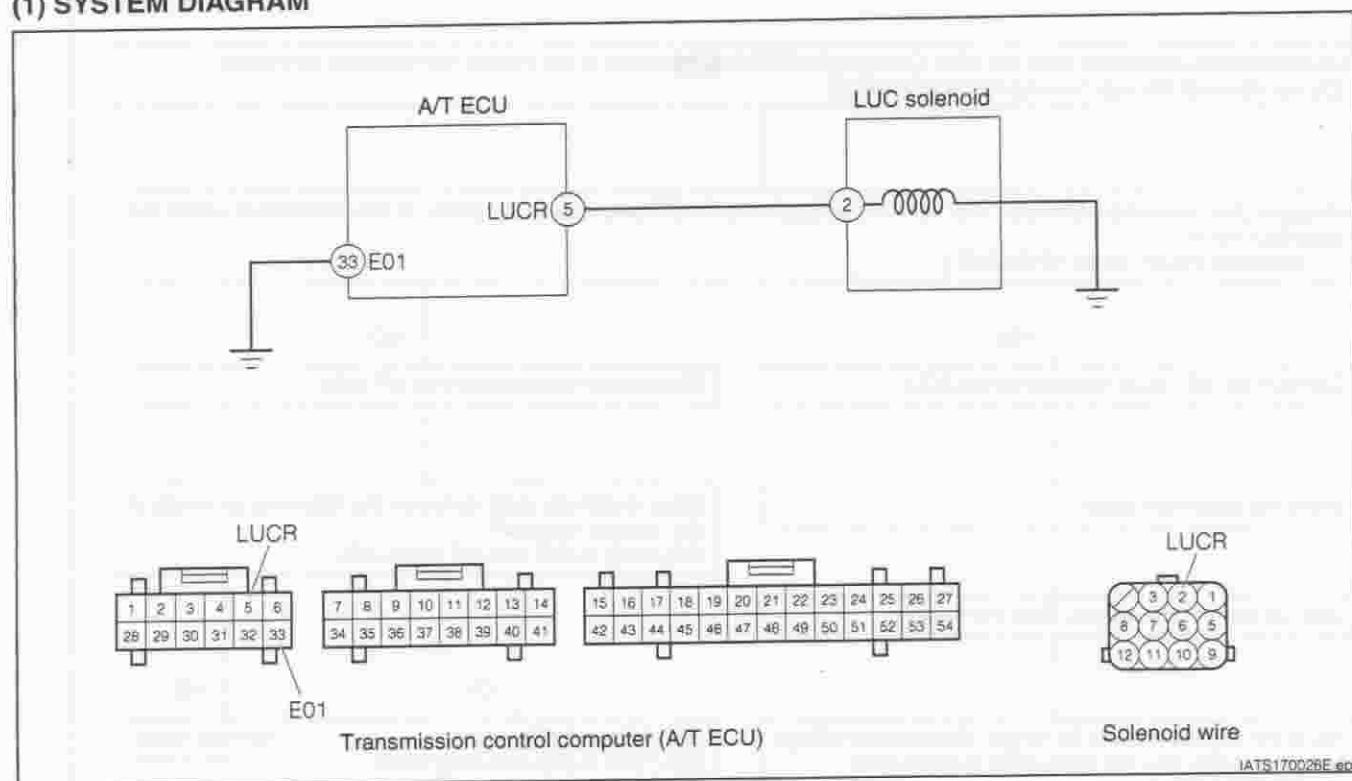


IATS170025E.eps
AT-AT-L-D-00011

AT-76

15-6-11 DIAGNOSIS CODE 65[P0773]

(1) SYSTEM DIAGRAM



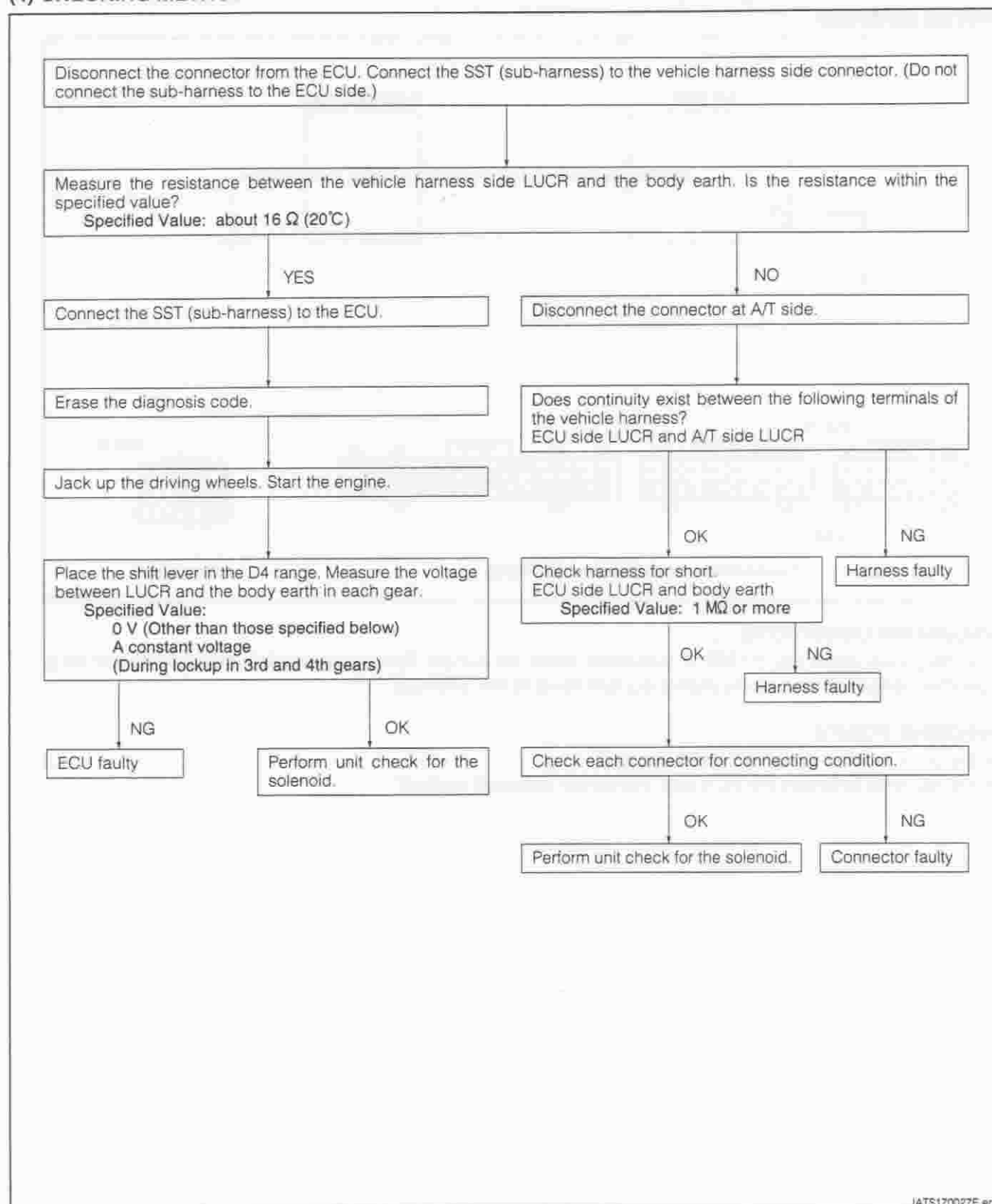
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P0773 is outputted when no current flows to the lockup solenoid for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the lockup solenoid normal?
2. Is the harness between the ECU and the lockup solenoid normal?

(4) CHECKING METHOD

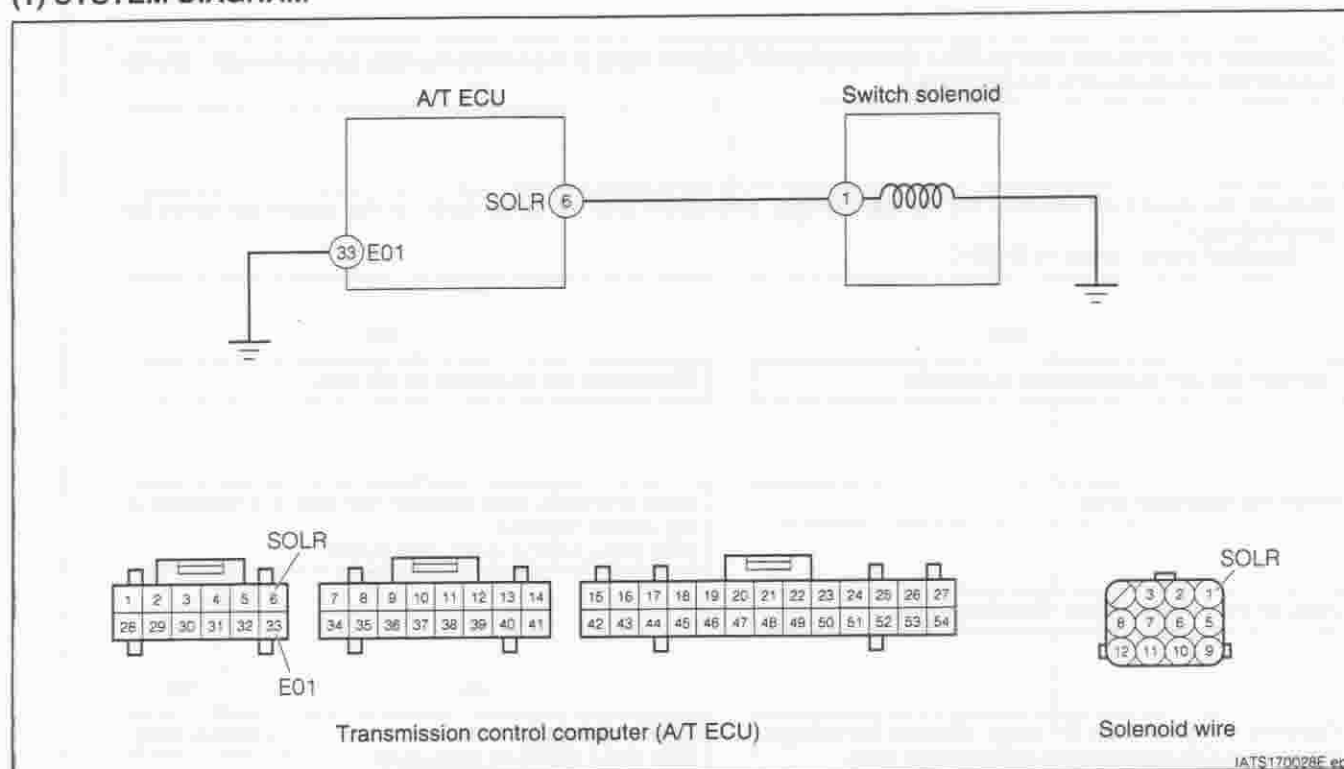


IATS170027E.eps
AT-AT-L-L-00011

AT-78

15-6-12 DIAGNOSIS CODE 66[P1780]

(1) SYSTEM DIAGRAM



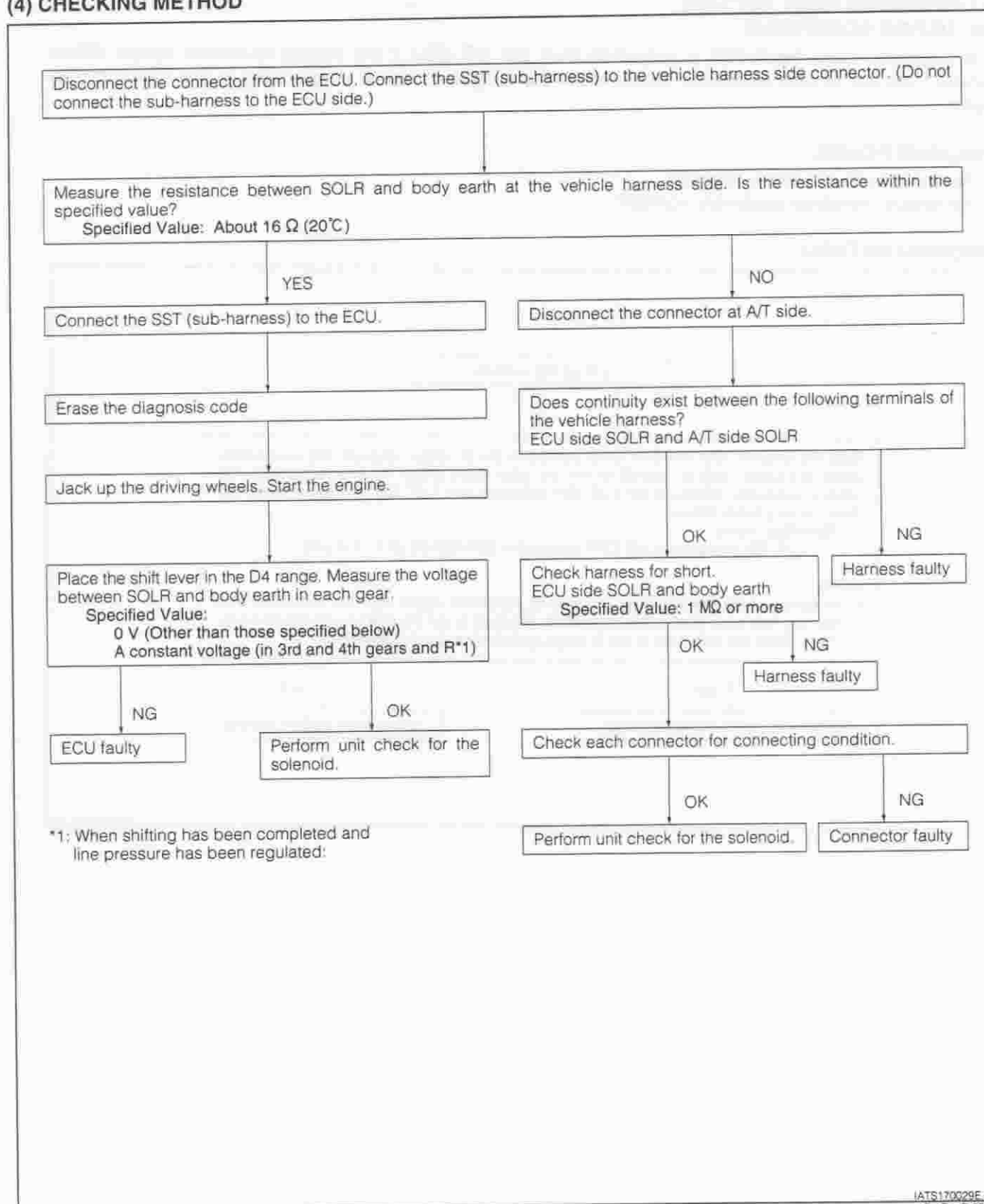
(2) EVALUATION CONDITIONS

1. The diagnosis code No. P1780 is outputted when no current flows to the switch solenoid circuit for a specified length of time or excessive current flows to the solenoid.

(3) CHECKING POINTS

1. Is the output of the switch solenoid normal?
2. Is the harness between the ECU and the switch solenoid normal?

(4) CHECKING METHOD



IATS170029E.eps
AT-AT-L-F-00011

AT-80

15-6-13 DIAGNOSIS CODE 72[P1703]

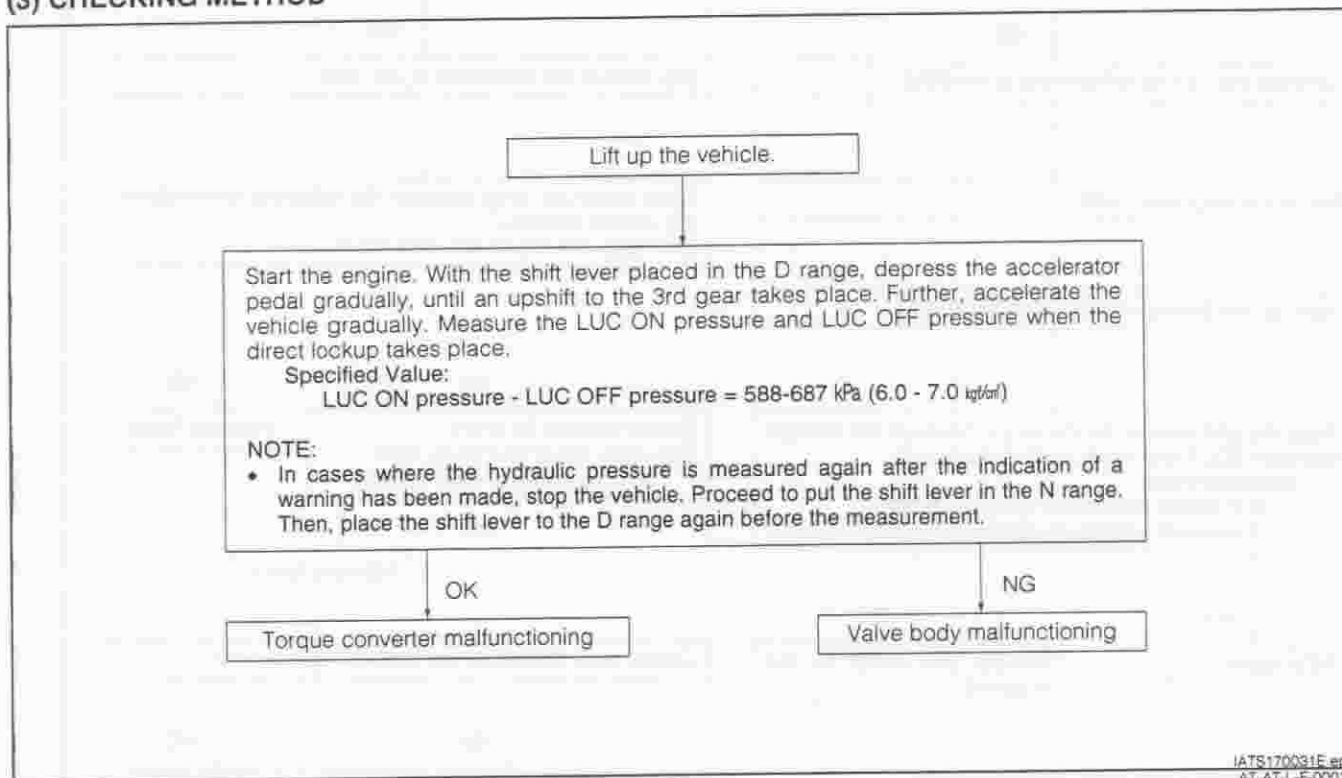
(1) EVALUATION CONDITIONS

1. The diagnosis code No.P1703 is outputted from the A/T ECU if the engine revolution speed differs greatly from the turbine revolution speed when the torque converter is operating in the direct lockup state.

(2) CHECKING POINTS

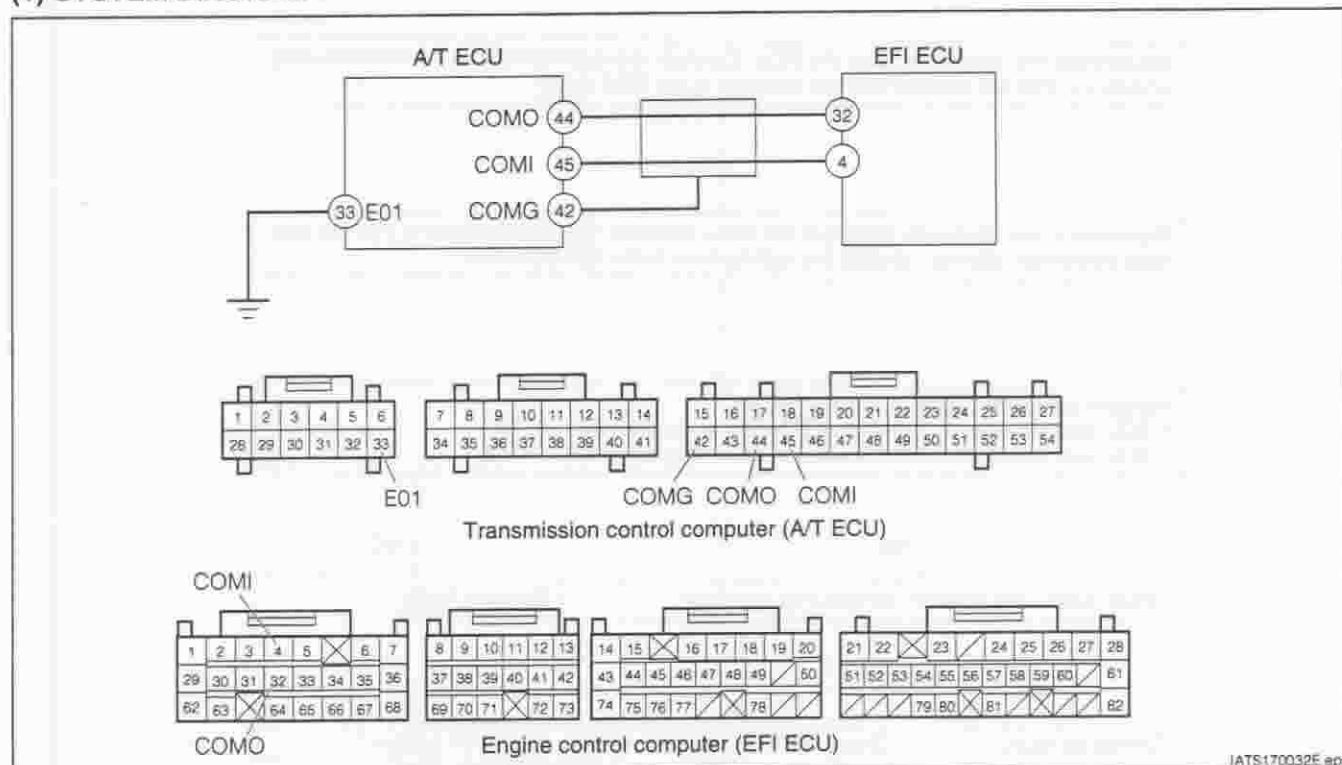
1. Is the valve body assembly normal?
2. Is the torque converter assembly normal?

(3) CHECKING METHOD



15-6-14 DIAGNOSIS CODE 82[P1602]

(1) SYSTEM DIAGRAM



IATS170032E.eps

(2) EVALUATION CONDITIONS

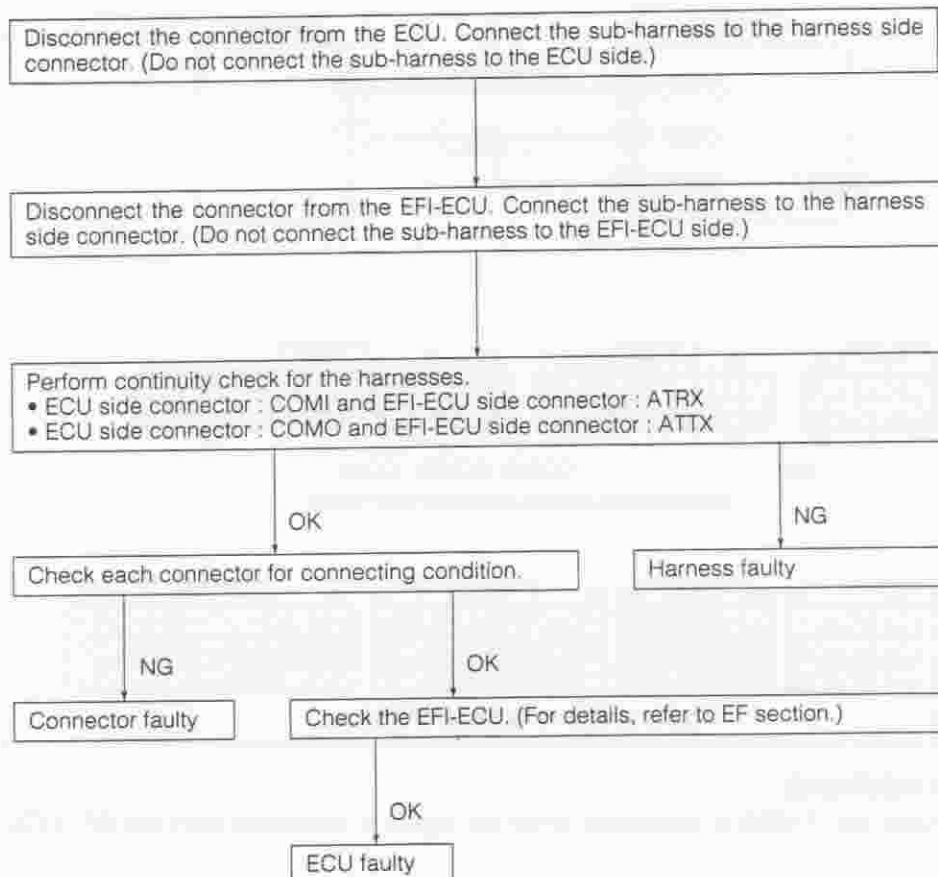
1. The diagnosis code No. P1602 is outputted when no signal is available from the EFI-ECU for a certain length of time.

(3) CHECKING POINTS

1. Is the harness between the EFI-ECU and the ECU normal?
2. Is the EFI-ECU normal?

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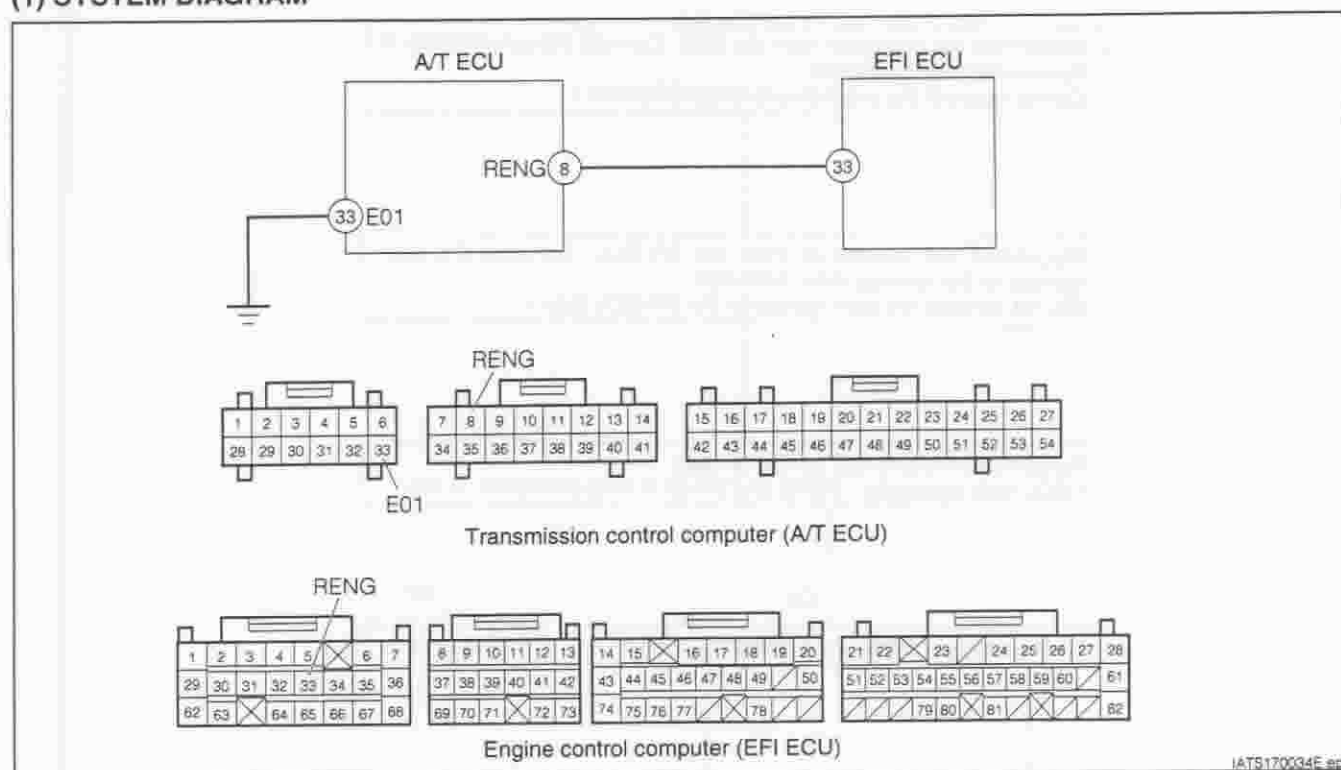
(4) CHECKING METHOD



IATS170033E.eps
AT-AT-L-E-00011

15-6-15 DIAGNOSIS CODE 86[P0725]

(1) SYSTEM DIAGRAM

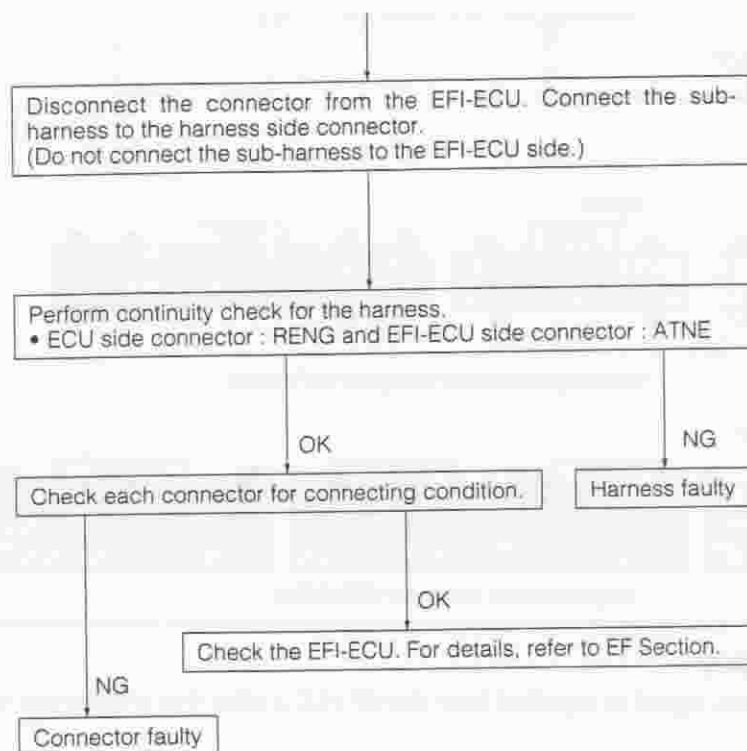


(2) EVALUATION CONDITIONS

1. When no engine revolution signal is inputted from the EFI-ECU after the engine has started, this code is outputted.

(3) CHECKING POINTS

1. Is the harness between the EFI-ECU and ECU normal?
2. Is the signal from EFI-ECU inputted to the ECU?



IATS170035E.doc
AT-AT-L-G-00011

15-7 TROUBLE SHOOTING ACCORDING TO MALFUNCTION PHENOMENA

15-7-1 TABLE OF HYPOTHESIZED CAUSES BY MALFUNCTION PHENOMENA

◆ High possibility ◇ Average possibility ○ Low possibility

Phenomena		Possible causes	Engine										Hydraulic pressure control system										The unit proper									
			Engine malfunctioning	Valve body faulty	C2 linear solenoid faulty	C3-B2 linear solenoid faulty	B1 linear solenoid faulty	LUC control solenoid faulty	LUC relay solenoid faulty	Solenoid relay solenoid faulty	Fluid temperature sensor faulty	Strainer O-ring torn or worn	Torque converter faulty	Oil pump faulty	Planetary carrier faulty	C1 disc burnt	C1 piston O-ring torn	C2 disc burnt	C2 piston faulty	C2 canceller lip torn or worn	C2 piston return spring faulty	C2 clearance improperly adjusted										
Vehicle will not run. Abnormality before moving off	Starter will not function.																															
	Vehicle will not go forth or back.		○								○	◇																				
	Vehicle will not go forth.		◇	◇													◇	◇														
	Vehicle will not go back.														◇																	
	Engine stalls during N → D4 or N → R shifting.	◆	◇					◇			◇																					
	Clutch slips in 1st gear.		◇	◇						◇							◇	◆		○												
	Clutch slips in 2nd gear.		◇	◇		◇				◇							◇	◆		○												
	Clutch slips in 3rd gear.		◇	◇	◇				◇		◇						◇	◆		○												
	Clutch slips in 4th gear.		◇		◇	◇			◇		◇																					
	Clutch slips in R range.		◇		◇		◇				◇				◇	◆																
	Stall revolution speed abnormal	◇									◇																					
	Vehicle moves off in P or N range.															◇					◇											
	Vehicle moves off when revolution speed rises in N range.																		◇		◇											
	Engine can start in ranges other than P and N ranges.																															
	Parking will not work effectively.																															
	Parking can not be released.																															
	Shift can not be made to parking.																															
	After shifting to parking, slipping out of gear occurs.																															
Gear shifting faulty, shifting shocks	No gear shifting (fixed at 1st gear)		◇					◇																								
	No gear shifting (fixed at 2nd gear)		◇																													
	No gear shifting (fixed at 3rd gear)		◇	◇	◇	◇	◇	◇																								
	No gear shifting (fixed at 4th gear)																															
	Gear shift shock and time lag too large (N → D4)		◇	◆				◇			○					◇	◇	◇		○	◇											
	Gear shift shock and time lag too large (N → R)		◇		◆			◇			○				◇	◇																
	Gear shift shock and time lag too large (1 → 2)		◇			◆					○																					

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◆ High possibility ◇ Average possibility ○ Low possibility

Phenomena Possible causes		The unit proper																			
		C3 disc burnt	C3 piston lip torn or worn	C3 canceller lip torn or worn	C3 piston return spring faulty	C3 clearance improperly adjusted	B1 disc burnt	B1 piston lip torn or worn	B1 piston return spring faulty	B1 piston seal crooked	B1 clearance improperly adjusted	B2 disc burnt	B2 piston lip torn or worn	B2 piston return spring faulty	B2 clearance improperly adjusted	Stator seal ring faulty	Input shaft seal ring faulty	Stator faulty	Input shaft faulty	Front sun gear faulty	Intermediate shaft faulty
Vehicle will not run. Abnormality before moving off	Starter will not function.																				
	Vehicle will not go forth or back.																				
	Vehicle will not go forth.															◇		◇			
	Vehicle will not go back.											◇				◇		◇		◇	
	Engine stalls during N → D4 or N → R shifting.															◇					
	Clutch slips in 1st gear.						◇	◆	○	◇						◇					
	Clutch slips in 2nd gear.															◇					
	Clutch slips in 3rd gear.	◇	◆		○											◇	◇			◇	
	Clutch slips in 4th gear.	◇	◆		○		◇	◆	○	◇							◇			◇	
	Clutch slips in R range.											◇	◆	○		◇					
	Stall revolution speed abnormal																				
	Vehicle moves off in P or N range.																				
	Vehicle moves off when revolution speed rises in N range.																				
	Engine can start in ranges other than P and N ranges.																				
	Parking will not work effectively.																				
Parking can not be released.																					
Shift can not be made to parking.																					
After shifting to parking, slipping out of gear occurs.																					
Gear shifting faulty, shifting shocks	No gear shifting (fixed at 1st gear)																				
	No gear shifting (fixed at 2nd gear)																				
	No gear shifting (fixed at 3rd gear)																				
	No gear shifting (fixed at 4th gear)																				
	Gear shift shock and time lag too large (N → D4)																				
	Gear shift shock and time lag too large (N → R)																				
	Gear shift shock and time lag too large (1 → 2)						◇	◇	○	◇	◇										

◆ High possibility ◇ Average possibility ○ Low possibility

Possible causes Phenomena		The unit proper										Causes at vehicle side									
		Planetary needle not assembled	One-way clutch faulty	Damage, chip or dent of each gear	Bearing faulty	Neutral start switch improperly adjusted	Manual lever improperly adjusted	Parking pawl stick	Parking cam x rod not aligned	Parking detent spring faulty	Parking torsion spring faulty	Parking link system not aligned	Drive plate crack, bolt loose	Control cable improperly adjusted	Neutral start switch connector improperly fitted	Solenoid connector disconnected	Turbine revolution sensor disconnected, or shorted	Vehicle speed sensor connector disconnected or shorted	Oil level too low	Mount bracket improperly installed	ECU faulty
Vehicle will not run. Abnormality before moving off	Starter will not function.					◇							◆								
	Vehicle will not go forth or back.						◇					◇	◆						◆		◇
	Vehicle will not go forth.		◇				◇						◆								◇
	Vehicle will not go back.						◇						◆								◇
	Engine stalls during N → D4 or N → R shifting.																				
	Clutch slips in 1st gear.		◇				◇						◆						◇		◇
	Clutch slips in 2nd gear.						◇												◇		◇
	Clutch slips in 3rd gear.						◇												◇		◇
	Clutch slips in 4th gear.						◇												◇		◇
	Clutch slips in R range.						◇						◆						◇		◇
	Stall revolution speed abnormal													◆							
	Vehicle moves off in P or N range.						◇						◆								
	Vehicle moves off when revolution speed rises in N range.																				
	Engine can start in ranges other than P and N ranges.					◇							◆								
	Parking will not work effectively.						◇	◇					◆								
	Parking can not be released.						◇	◇			◇	◇									
	Shift can not be made to parking.								◇			◇									
	After shifting to parking, slipping out of gear occurs.						◇	◇		◇	◇										
Gear shifting faulty, shifting shocks	No gear shifting (fixed at 1st gear)																◇				
	No gear shifting (fixed at 2nd gear)																				
	No gear shifting (fixed at 3rd gear)														◇						◇
	No gear shifting (fixed at 4th gear)																				◇
	Gear shift shock and time lag too large (N → D4)																		○		◇
	Gear shift shock and time lag too large (N → R)													◇					○		◇
	Gear shift shock and time lag too large (1 → 2)																		○		◇

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◆ High possibility ◇ Average possibility ○ Low possibility

Phenomena		Possible causes																			
		Engine	Hydraulic pressure control system	The unit proper																	
		Engine malfunctioning	Valve body faulty	C2 linear solenoid faulty	C3-B2 linear solenoid faulty	B1 linear solenoid faulty	LUC control solenoid faulty	LUC relay solenoid faulty	Solenoid relay solenoid faulty	Fluid temperature sensor faulty	Strainer O-ring torn or worn	Torque converter faulty	Oil pump faulty	Planetary carrier faulty	C1 disc burnt	C1 piston O-ring torn	C2 disc burnt	C2 piston faulty	C2 canceller lip torn or worn	C2 piston return spring faulty	C2 clearance improperly adjusted
Gear shifting faulty, shifting shocks	Gear shift shock and time lag too large (2 → 3)		◇		◆	◆						○									
	Gear shift shock and time lag too large (3 → 4)		◇	◆		◆			◇		○										
	Gear shift shock and time lag too large (2 → 1)		◇			◆					○										
	Gear shift shock and time lag too large (3 → 2)		◇		◆	◆					○										
	Gear shift shock and time lag too large (4 → 3)		◇	◆		◆			◇		○						◇	◇	◇		
	Gear shift shock and time lag too large (D4 → 2)		◇		◆	◆					○						◇	◇	◇		
	Gear shift shock and time lag too large (D4, 3 → 2)		◇		◆						○						◇	◇	◇		
	Engine revs up during gear shift (2 → 3).		◇				◆														
	Engine revs up during gear shift (3 → 4).		◇	◆														◇	◇		
	Lockup will not function.		◇	◇	◇	◇	◇	◇	◇				◆								
	Creep, idle vibration too large	◇											◇								
	Vibration at time of gear shift too large		◇	◇	◇	◇															
	Vibration during running too large		◇					◇													
	Poor fuel economy and poor running	◇	◇	◇	◇	◇			◇	◇			◇	◇							
	Gear shifts only in 1 - 3 gear.		◇	◇			◇	◇	◇		◇										
Abnormal noises	Abnormal noise related to engine revolution																				
	Abnormal noise from converter housing											◇	◆	◇							
	Abnormal noise from oil pan											◇	◇								
	Abnormal noise from parking section										◆										
	Abnormal noise (N → P)		◇																		
	Abnormal noise (R)																				
	Abnormal noise (1st)																				
	Abnormal noise (2nd)																				
	Abnormal noise (4th)																				
	Abnormal noise (at time of lockup function)							◇					◇								

◆ High possibility ◇ Average possibility ○ Low possibility

Phenomena		Possible causes																					
		Hydraulic pressure control system																					
		C3 disc burnt	C3 piston lip torn or worn	C3 canceller lip torn or worn	C3 piston return spring faulty	C3 clearance improperly adjusted	B1 disc burnt	B1 piston lip torn or worn	B1 piston return spring faulty	B1 piston seal crooked	B1 clearance improperly adjusted	B2 disc burnt	B2 piston lip torn or worn	B2 piston return spring faulty	B2 clearance improperly adjusted	Stator seal ring faulty	Input shaft seal ring faulty	Stator faulty	Input shaft faulty	Front sun gear faulty	Intermediate shaft faulty		
Gear shifting faulty, shifting shocks	Gear shift shock and time lag too large (2 → 3)	◇	◇		○	◇																	
	Gear shift shock and time lag too large (3 → 4)						◇	◇	○	◇	◇												
	Gear shift shock and time lag too large (2 → 1)																						
	Gear shift shock and time lag too large (3 → 2)						◇	◇	○	◇	◇												
	Gear shift shock and time lag too large (4 → 3)																						
	Gear shift shock and time lag too large (D4 → 2)						◇	◇	○	◇	◇												
	Gear shift shock and time lag too large (D4, 3 → 2)											◇	◇	○	◇								
	Engine revs up during gear shift (2 → 3).						◇	◇	○	◇										◇		◇	
	Engine revs up during gear shift (3 → 4).																						
	Lockup will not function.																		◇				
	Creep, idle vibration too large																						
	Vibration at time of gear shift too large																						
	Vibration during running too large																						
	Poor fuel economy and poor running			◇		◇						◇				◇							
	Gear shifts only in 1 - 3 gear.																						
Abnormal noises	Abnormal noise related to engine revolution																		◇			◇	
	Abnormal noise from converter housing																						
	Abnormal noise from oil pan																						
	Abnormal noise from parking section																						
	Abnormal noise (N → P)																						
	Abnormal noise (R)																						
	Abnormal noise (1st)																						
	Abnormal noise (2nd)																						
	Abnormal noise (4th)																						
	Abnormal noise (at time of lockup function)																						

AT-90

◆ High possibility ◇ Average possibility ○ Low possibility

Phenomena		Possible causes	The unit proper													Cause at vehicle side						
			Planetary needle not assembled	One-way clutch faulty	Damage, chip or dent of each gear	Bearing faulty	Neutral start switch improperly adjusted	Manual lever improperly adjusted	Parking pawl stick	Parking cam x rod not aligned	Parking detent spring faulty	Parking torsion spring faulty	Parking link system not aligned	Drive plate crack, bolt loose	Control cable improperly adjusted	Neutral start switch connector improperly fitted	Solenoid connector disconnected	Turbine revolution sensor disconnected, or shorted	Vehicle speed sensor connector disconnected or shorted	Oil level too low	Mount bracket improperly installed	ECU faulty
Gear shifting faulty, shifting shocks	Gear shift shock and time lag too large (2 → 3)																		○		◇	
	Gear shift shock and time lag too large (3 → 4)																		○		◇	
	Gear shift shock and time lag too large (2 → 1)																		○		◇	
	Gear shift shock and time lag too large (3 → 2)																		○		◇	
	Gear shift shock and time lag too large (4 → 3)																		○		◇	
	Gear shift shock and time lag too large (D4 → 2)																		○		◇	
	Gear shift shock and time lag too large (D4, 3 → 2)																		○		◇	
	Engine revs up during gear shift (2 → 3).																				◇	
	Engine revs up during gear shift (3 → 4).																				◇	
	Lockup will not function.																				◇	
	Creep, idle vibration too large																			○	◇	
	Vibration at time of gear shift too large	◇																		○	◇	
	Vibration during running too large	◇																		○	◇	
	Poor fuel economy and poor running		○																			◇
	Gear shifts only in 1 - 3 gear.																◇					◇
Abnormal noises	Abnormal noise related to engine revolution			◇	◇																	
	Abnormal noise from converter housing											◇										
	Abnormal noise from oil pan																	○				
	Abnormal noise from parking section										◆											
	Abnormal noise (N → P)																					
	Abnormal noise (R)	◇																				
	Abnormal noise (1st)	◇																				
	Abnormal noise (2nd)	◇																				
	Abnormal noise (4th)	◇																				
	Abnormal noise (at time of lockup function)																					

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15-7-2 INSPECTION

(1) Starter will not operate.

Procedure	Operation	Judgement	Measure
1	*1 Check and adjustment of control cable	OK	2
		NG	Adjustment
2	*2 Check and adjustment of neutral start switch	OK	Check of engine cranking system
		NG	Adjustment

1. *1
Refer to AT-4.

2. *2
Refer to AT-4.

(2) Vehicle will not move forward nor backward.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check and adjustment of control cable	OK	3
		NG	Adjustment
3	Manual running test Refer to "Manual running test"	OK	4
		NG	6
4	*3 Check of ECU power supply circuit	OK	5
		NG	Repair
5	Replace the A/T ECU.	OK	Finish
		NG	6
6	Check of manual valve position Refer to "Check of manual valve position"	OK	7
		NG	Adjustment
7	*4 After replacement of valve body, confirmation of phenomenon	OK	Finish
		NG	8
8	*5 Measure the LUC OFF pressure at time of lockup OFF.	OK	Replace the torque converter Ay.
		NG	9
9	Remove the automatic transmission from the vehicle. Check it for cracks of the drive plate and loose bolts.	OK	Replace the oil pump Ay.
		NG	Replace the drive plate or tighten the bolts.

1. *1
Refer to AT-2.

2. *2
Refer to AT-4.

3. *3
Refer to GI-21.

4. *4
Refer to AT-30.

5. *5
Refer to AT-7.

AT-92

(3) Vehicle will not move forward.

Procedure	Operation	Judgement	Measure
1	*1 Check of control cable Refer to * Manual running test*	OK	2
		NG	Adjustment
2	Manual running test Refer to * Manual running test*	OK	3
		NG	5
3	*2 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, conformation of phenomenon.	OK	Finish
		NG	5
5	Check of manual valve position Refer to * Check of manual valve position*	OK	6
		NG	Adjustment
6	*3 Unit check of solenoid No. 2	OK	7
		NG	Replacement
7	*4 After replacement of valve body, conformation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-4.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
4. *4
Refer to AT-30.

(4) Vehicle will not move backward.

Procedure	Operation	Judgement	Measure
1	*1 Check of control cable	OK	2
		NG	Adjustment
2	Manual running test Refer to "Manual running test"	OK	3
		NG	5
3	*2 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, conformation of phenomenon.	OK	Finish
		NG	5
5	Check of manual valve position Refer to "Check of manual valve position"	OK	Replace the automatic transmission Ay.
		NG	Adjustment

1. *1
Refer to AT-4.

2. *2
Refer to GI-21.

(5) Engine stalls when shift is made from N to D4, from N to R

Procedure	Operation	Judgement	Measure
1	Check of idle speed	OK	2
		NG	Repair the engine idling system.
2	*1 Unit check of LUC solenoid	OK	3
		NG	Replacement
3	*2 After replacement of valve body, conformation of phenomenon	OK	Finish
		NG	Replace the torque converter Ay.

1. *1
Refer to AT-110.

2. *2
Refer to AT-30.

AT-94

(6) Clutch slip takes place in 1st gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check and adjustment of control cable	OK	3
		NG	Adjustment
3	Manual running test Refer to * Manual running test*	OK	4
		NG	6
4	*3 Check of ECU power supply circuit	OK	5
		NG	Repair
5	After replacement of A/T ECU, comformtation of phenomenon	OK	Finish
		NG	6
6	Check of O ring of oil strainer	OK	7
		NG	Replace the O ring.
7	Check of manual valve position Refer to * Check of manual valve position*	OK	8
		NG	Adjustment
8	*4 Unit check of solenoid No. 2	OK	9
		NG	Replacement
9	*5 After replacement of valve body, comformtation of phenomenon	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to AT-4.
3. *3
Refer to GI-21.
4. *4
Refer to AT-109.
5. *5
Refer to AT-30.

(7) Clutch slip takes place in 2nd gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	Manual running test Refer to * Manual running test"	OK	3
		NG	5
3	*2 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, comformtation of phenomenon	OK	Finish
		NG	5
5	Check of O ring of oil strainer	OK	6
		NG	Replace the O ring.
6	Check of manual valve position Refer to *Check of manual valve position"	OK	7
		NG	Adjustment
7	*3 Unit check of solenoid No. 2, solenoid No. 1	OK	8
		NG	Replacement
8	*4 After replacement of valve body, comformtation of phenomenon	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
4. *4
Refer to AT-30.

AT-96

(8) Clutch slip takes place in 3rd gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	Manual running test Refer to "Manual running test"	OK	3
		NG	5
3	*2 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, conformation of phenomenon	OK	Finish
		NG	5
5	Check of O ring of oil strainer	OK	6
		NG	Replace the O ring.
6	Check of manual valve position Refer to "Check of manual valve position"	OK	7
		NG	Adjustment
7	*3 Unit check of solenoid No. 2, solenoid No. 3 and switch solenoid	OK	8
		NG	Replacement
8	*4 After replacement of valve body, conformation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
Refer to AT-110.
4. *4
Refer to AT-30.

(9) Clutch slip takes place in 4th gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	Manual running test Refer to * Manual running test*	OK	3
		NG	5
3	*2 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, conformation of phenomenon.	OK	Finish
		NG	5
5	Check of O ring of oil strainer	OK	6
		NG	Replace the O ring.
6	Check of manual valve position Refer to * Check of manual valve position*	OK	7
		NG	Adjustment
7	*3 Unit check of solenoid No. 1, solenoid No. 3 and switch solenoid	OK	8
		NG	Replacement
8	*4 After replacement of valve body, conformation of phenomenon	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
Refer to AT-110.
4. *4
Refer to AT-30.

AT-98

(10) Clutch slip takes place in R range.

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check and adjustment of control cable	OK	3
		NG	Adjustment
3	Manual running test Refer to * Manual running test*	OK	4
		NG	6
4	*3 Check of ECU power supply circuit	OK	5
		NG	Repair
5	After replacement of A/T ECU, comformtation of phenomenon	OK	Finish
		NG	6
6	Check of O ring of oil strainer for cut or wear of the O-ring	OK	7
		NG	Replace the O ring.
7	Check of manual valve position Refer to * Check of manual valve position*	OK	8
		NG	Adjustment
8	*4 Unit check of solenoid No. 3, duty solenoid	OK	9
		NG	Replacement
9	*5 After replacement of valve body, comformtation of phenomenon	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to AT-4.
3. *3
Refer to GI-21.
4. *4
Refer to AT-109.
Refer to AT-110.
5. *5
Refer to AT-30.

(11) Vehicle starts to move in P or N range.

Procedure	Operation	Judgement	Measure
1	*1 Check of control cable	OK	2
		NG	Adjustment
2	Check of manual valve position Refer to * Check of manual valve position*	OK	Replace the automatic transmission Ay.
		NG	Adjustment

1. *1
Refer to AT-4.

(12) Vehicle starts to move when engine revolution is raised in N range.

Procedure	Operation	Judgement	Measure
1			Replace the automatic transmission Ay.

(13) Engine starts in a range other than P and N

Procedure	Operation	Judgement	Measure
1	*1 Check of neutral start switch	OK	Check and adjustment of control cable
		NG	Adjust the position of the neutral start switch.

- *1
Refer to AT-4.

(14) No gear shift takes place. (1st gear fixed)

Procedure	Operation	Judgement	Measure
1	*1 Unit check of duty solenoid	OK	Replace the valve body
		NG	Replacement

- *1
Refer to AT-110.

(15) No gear shift takes place. (3rd gear fixed)

Procedure	Operation	Judgement	Measure
1	*1 Check of ECU power supply circuit	OK	Replace the A/T ECU.
		NG	Repair

- *1
Refer to GI-21.

(16) Vehicle moves off in 2nd gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of input/output signals of transmission control computer(Brake switch system)	OK	2
		NG	Check and repair the brake switch system
2	*2 Check of ECU power supply circuit	OK	Replace the A/T ECU
		NG	Repair

- *1
Refer to AT-116.
- *2
Refer to GI-21.

AT-100

(17) Gear shift shock and time lag too large (N - D4)

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check of input/output signals of transmission control computer (Brake switch system)	OK	3
		NG	Repair
3	*3 Check of ECU power supply circuit	OK	4
		NG	Repair
4	After replacement of A/T ECU, comformation of phenomenon.	OK	Finish
		NG	5
5	Check of O ring of oil strainer	OK	6
		NG	Replace the O ring.
6	*4 Unit check of solenoid No. 2 and duty solenoid	OK	7
		NG	Replacement
7	*5 After replacement of valve body, comformation of phenomenon	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to AT-116.
3. *3
Refer to GI-21.
4. *4
Refer to AT-109.
Refer to AT-110.
5. *5
Refer to AT-30.

(18) Gear shift shock and time lag too large (N - R)

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, comformation of phenomenon	OK	Finish
		NG	4
4	Check of O ring of oil strainer	OK	5
		NG	Replace the O ring.
5	*3 Unit check of solenoid No.3, duty solenoid	OK	6
		NG	Replacement
6	*4 After replacement of valve body, comformation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

(19) Gear shift shock and time lag too large (1 - 2)

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, conformation of phenomenon	OK	Finish
		NG	4
4	Check of O ring of oil strainer	OK	5
		NG	Replace the O ring.
5	*3 Unit check of solenoid No.1	OK	6
		NG	Replacement
6	*4 After replacement of valve body, conformation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
4. *4
Refer to AT-30.

AT-102

(20) Gear shift shock and time lag too large (2 - 3)

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, comformtation of phenomenon	OK	Finish
		NG	4
4	Check of O ring of oil strainer	OK	5
		NG	Replace the O ring.
5	*3 Unit check of solenoid No.3, solenoid No.1	OK	6
		NG	Replacement
6	*4 After replacement of valve body, comformtation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
4. *4
Refer to AT-30.

(21) Gear shift shock and time lag too large (3 - 4)

Procedure	Operation	Judgement	Measure
1	*1 Check of oil level	OK	2
		NG	Adjustment
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, comformtation of phenomenon.	OK	Finish
		NG	4
4	Check of O ring of oil strainer	OK	5
		NG	Replace the O ring.
5	*3 Unit check of solenoid No. 2, solenoid No. 1	OK	6
		NG	Replacement
6	*4 After replacement of valve body, comformtation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-2.
2. *2
Refer to GI-21.
3. *3
Refer to AT-109.
4. *4
Refer to AT-30.

(22) Engine races during gear shifting (2 - 3)

Procedure	Operation	Judgement	Measure
1	*1 Unit check of solenoid No. 1	OK	2
		NG	Replacement
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, comformtation of phenomenon.	OK	Finish
		NG	4
4	*3 After replacement of valve body, comformtation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-109.
2. *2
Refer to GI-21.
3. *3
Refer to AT-30.

AT-104

(23) Engine races during gear shifting (3 - 4)

Procedure	Operation	Judgement	Measure
1	*1 Unit check of solenoid No.2	OK	2
		NG	Replacement
2	*2 Check of ECU power supply circuit	OK	3
		NG	Repair
3	After replacement of A/T ECU, conformation of phenomenon.	OK	Finish
		NG	4
4	*3 After replacement of valve body, conformation of phenomenon.	OK	Finish
		NG	Replace the automatic transmission Ay.

1. *1
Refer to AT-109.
2. *2
Refer to GI-21.
3. *3
Refer to AT-30.

(24) Gear shifting takes place only between 1st gear and 3rd gear.

Procedure	Operation	Judgement	Measure
1	*1 Check of ECU power supply circuit	OK	2
		NG	Repair
2	After replacement of A/T ECU, conformation of phenomenon.	OK	Finish
		NG	Replace the valve body

1. *1
Refer to GI-21.

(25) Not shift into the steer shift mode. (The inhibit buzzer doesn't sound.)

Procedure	Operation	Judgement	Measure
1	Check of harness between steer shift switch and A/T ECU.	OK	2
		NG	Repair
2	*1 Check of steershift switch	OK	3
		NG	Replacement
3	*2 Check of ECU power supply circuit	OK	Replace the A/T ECU.
		NG	Repair

1. *1
Refer to AT-111.
2. *2
Refer to GI-21.

(26) Gear shifting doesn't take place with the steer Shi up down switch. (The inhibit buzzer doesn't sound.)

Procedure	Operation	Judgement	Measure
1	Check of harness between steer shift switch and A/T ECU.	OK	2
		NG	Repair
2	*1 Check of steershift up down switch	OK	3
		NG	Replacement
3	*2 Check of ECU power supply circuit	OK	Replace the A/T ECU.
		NG	Repair

1. *1
Refer to AT-112.

2. *2
Refer to GI-21.

(27) MANUAL DRIVING TEST

1. Separate the automatic transmission ECU connector.
2. Inspect the gear positions for all ranges while driving.

SPECIFIED VALUE: GEAR POSITION

range	P,N	D,2,L	R
Gear position	neutral	3 rd	reverse

(28) CHECK OF MANUAL VALVE POSITION

1. Remove the oil pan
Refer to AT-27.
2. Check the manual valve position.
SPECIFIED VALUE: The manual valve groove and the valve body hole match while in the N range.

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15-8 UNIT CHECK

15-8-1 TURBINE REVOLUTION SENSOR, OUTPUT REVOLUTIONS SENSOR

1. The construction of the turbine revolution sensor and the output revolution sensor prevent fault detection for individual components, so a comprehensive determination must be made using troubleshooting by diagnostic code (No1, 37, 42) and by checking the transmission control computer I/O signal (oscilloscope waveform).

Refer to AT-110.

Refer to AT-60.

Refer to AT-116.

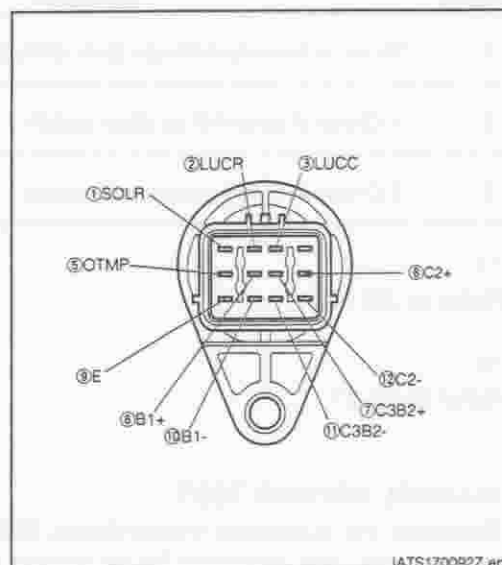
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AT-106

15-8-2 SOLENOID WIRE (INCLUDING FLUID TEMPERATURE SENSOR)

(1) IN-VEHICLE INSPECTION

1. Disconnect the solenoid connector of the transaxle.
2. Connect the SST to the transaxle.
SST: 09990-97201-000



① SWITCH SOLENOID SYSTEM

1. Measure the resistance between the SOLR and the transmission ground.
SPECIFIED VALUE: $16 \pm 2.0\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to the solenoid terminal and the battery minus side is connected to the transmission ground.
SPECIFIED VALUE: There is a clicking sound.

② LUC SOLENOID SYSTEM

1. Measure the resistance between the LUCR and the transmission ground.
SPECIFIED VALUE: $16 \pm 2.0\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to the LUCR and the battery minus side is connected to the transmission ground.
3. There is a clicking sound.

③ DUTY SOLENOID SYSTEM

1. Measure the resistance between the LUCC and the transmission ground.
SPECIFIED VALUE: $12 \pm 1\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to the LUCC and the battery minus side is connected to the transmission ground.
3. There is a clicking sound.

④ OIL TEMPERATURE SYSTEM

1. Measure the resistance between the OTMP and E.
SPECIFIED VALUE: $5.63 \pm 0.56 \text{ k}\Omega$ (at 0°C)
 $0.072 \pm 0.0022 \text{ k}\Omega$ (at 140°C)

NOTE

- Approx. $2.4 \text{ k}\Omega$ (20°C)
- Approx. $0.313 \text{ k}\Omega$ (80°C)

CAUTION

- Make the final decision based on an individual inspection of the following items.

⑤ SOLENOID No.1 SYSTEM

1. Measure the resistance between B1+ and B1-.
SPECIFIED VALUE: $5.3 \pm 0.3\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to B1+ via the 12V-21W valve and the battery minus side is connected to B1-.
SPECIFIED VALUE: There is a clicking sound.

⑥ SOLENOID No.2 SYSTEM

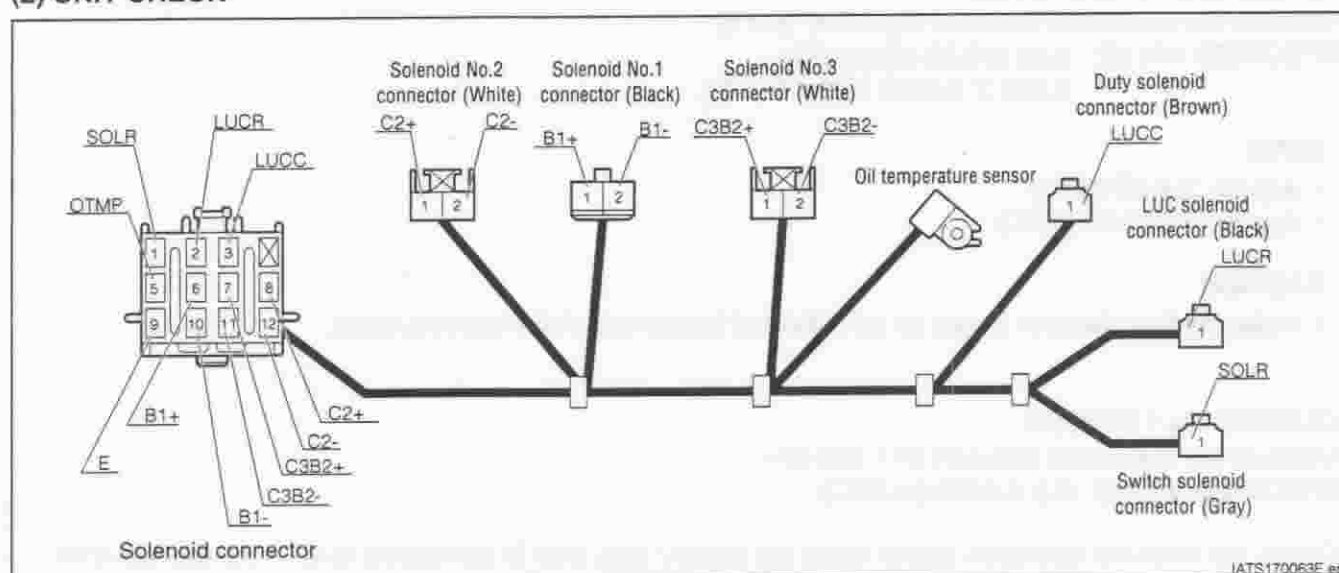
1. Measure the resistance between C2+ and C2-.
SPECIFIED VALUE: $5.3 \pm 0.2\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to C2+ via the 12V-21W valve and the battery minus side is connected to C2-.
SPECIFIED VALUE: There is a clicking sound.

⑦ SOLENOID No.3 SYSTEM

1. Measure the resistance between C3B2+ and C3B2-.
SPECIFIED VALUE: $5.3 \pm 0.2\Omega$ (at 20°C)
2. Check the solenoid operation sound when the battery plus side is connected to C3B2+ via the 12V-21W valve and the battery minus side is connected to C3B2-.
SPECIFIED VALUE: There is a clicking sound.

AT-108

(2) UNIT CHECK



1. Remove the solenoid wire Ay from the transaxle.
Refer to AT-30.

① Harness

1. Check the continuity between terminals of the connector.
SPECIFIED VALUE: The conductivity is as shown in the table.
There are no short circuits among the connector terminals.

Switch solenoid system	Solenoid connector (SOLR) - Switch solenoid connector (SOLR)
LUC solenoid system	Solenoid connector (LUCR) - LUC solenoid connector (LUCR)
Duty solenoid system	Solenoid connector (LUCC) - Duty solenoid connector (LUCC)
Solenoid No. 1 system	Solenoid connector (B1+) - Solenoid No. 1 connector (B1+)
	Solenoid connector (B1-) - Solenoid No. 1 connector (B1-)
Solenoid No. 2 system	Solenoid connector (C2+) - Solenoid No. 2 connector (C2+)
	Solenoid connector (C2-) - Solenoid No. 2 connector (C2-)
Solenoid No. 3 system	Solenoid connector (C3B2+) - Solenoid No. 3 connector (C3B2+)
	Solenoid connector (C3B2-) - Solenoid No. 3 connector (C3B2-)

② Oil temperature sensor system

1. Measure the resistance between the solenoid connector OTMP and E.
2. $5.63 \pm 0.56 \text{ k}\Omega$ (at 0°C)
3. $0.072 \pm 0.0022 \text{ k}\Omega$ (at 140°C)

AT-AT-U-W-00011

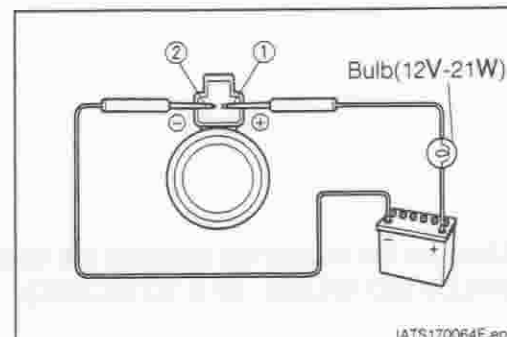
15-8-3 SOLENOID No.1

1. Connect the circuit as shown in the figure.
2. Check the solenoid operation when voltage is applied.

CAUTION

- The solenoid positive and negative are correct.

SPECIFIED VALUE: The valve inside the solenoid is operating.



3. Measure the resistance between the terminals 1 and 2.
SPECIFIED VALUE: $5.3 \pm 0.3\Omega$ (at 20°C)

AT-AT-U-B-00011

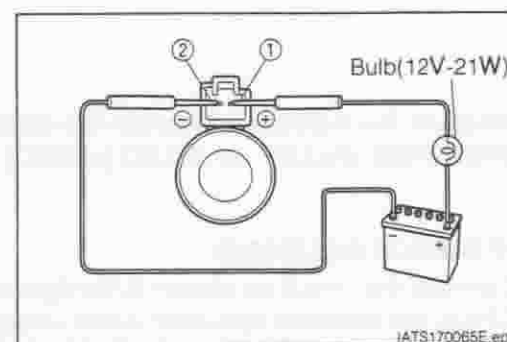
15-8-4 SOLENOID No.2, SOLENOID No.3

1. Connect the circuit as shown in the figure.
2. Check the solenoid operation when voltage is applied.

CAUTION

- The solenoid positive and negative are correct.

SPECIFIED VALUE: The valve inside the solenoid is operating.



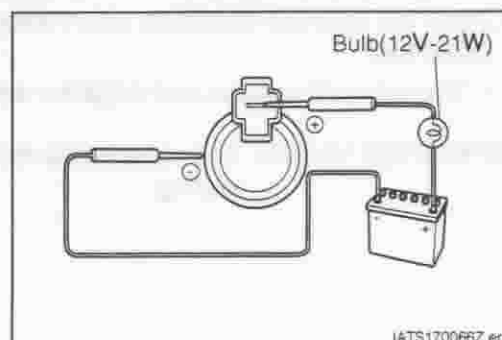
3. Measure the resistance between the terminals 1 and 2.
SPECIFIED VALUE: $5.3 \pm 0.2\Omega$ (at 20°C)

AT-AT-U-C-00011

AT-110

15-8-5 DUTY SOLENOID

1. Connect the circuit as shown in the figure.
2. Check the solenoid operation when voltage is applied.
SPECIFIED VALUE: The valve inside the solenoid is operating when voltage is applied.

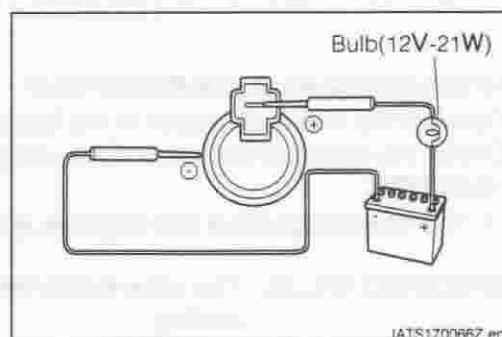


3. Measure the resistance between the solenoid terminal and the solenoid body.
SPECIFIED VALUE: $12 \pm 1\Omega$ (at 20°C)

AT-AT-U-D-00011

15-8-6 LUC SOLENOID

1. Connect the circuit as shown in the figure.
2. Check the solenoid operation when voltage is applied.
SPECIFIED VALUE: The valve inside the solenoid is operating when voltage is applied.

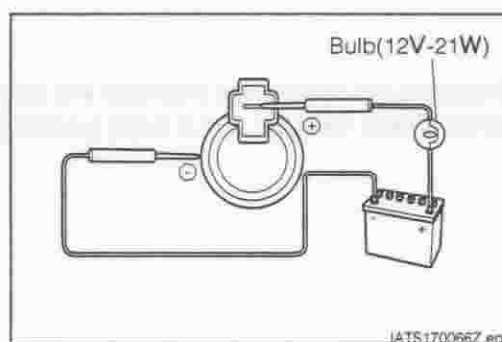


3. Measure the resistance between the solenoid terminal and the solenoid body.
SPECIFIED VALUE: $16 \pm 2.0\Omega$ (at 20°C)

AT-AT-U-L-00011

15-8-7 SWITCH SOLENOID

1. Connect the circuit as shown in the figure.
2. Check the solenoid operation when voltage is applied.
SPECIFIED VALUE: The valve inside the solenoid is operating when voltage is applied.



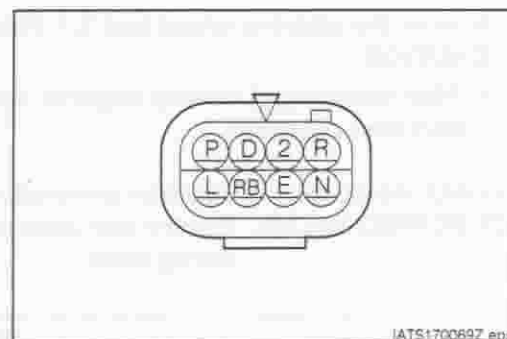
3. Measure the resistance between the solenoid terminal and the solenoid body.
SPECIFIED VALUE: $16 \pm 2.0\Omega$ (at 20°C)

AT-AT-U-R-00011

15-8-8 NEUTRAL START SWITCH

1. Check the continuity between terminals of the connector.
SPECIFIED VALUE: Ensure that continuity exists as following table.

Range \ Terminal	E	R	RB	P	N	D	2	L
P	○			○				
R		○	○					
N	○				○			
D	○					○		
3	○						○	
2	○							○



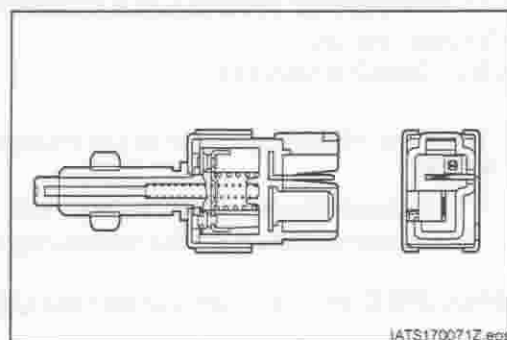
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AT-AT-U-N-00011

15-8-9 BRAKE SWITCH

1. Check the continuity between terminals of the connector.
SPECIFIED VALUE: Ensure that continuity exists as following table.

Switch position	Specified condition
Push(Pedal depressed)	Continuity
Free(Pedal released)	No continuity

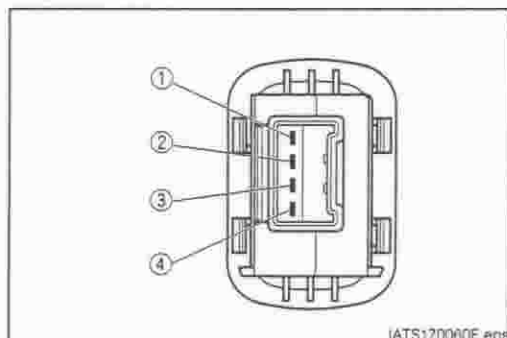


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AT-AT-U-K-00011

15-8-10 STEER SHIFT SWITCH

1. Check the continuity between terminals 1 and 2.
SPECIFIED VALUE: Ensure that continuity exists as following table.

Switch position	Specified condition
Push(ON)	Continuity
Free(OFF)	No continuity



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AT-AT-U-H-00011

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15-8-11 STEER SHFT UP-DOWN SWITCH

1. Remove the steering wheel pad S/A W/airbag.

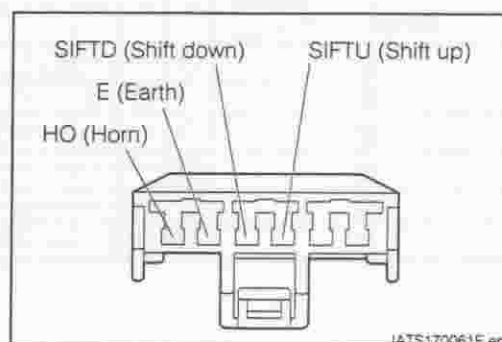
CAUTION

- After removing of battery negative terminal for the vehicle equipped with air bag , wait 60 seconds to start next operation.

2. Check the continuity between terminals of the connector.

SPECIFIED VALUE: Ensure that continuity exists as following table.

Switch position		Terminals	
		SIFTU-E	SIFTD-E
Push(ON)	UP	Continuity	No continuity
	DOWN	No continuity	Continuity
Free (OFF)		No continuity	No continuity



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AT-AT-U-U-00011

15-8-12 AUTOMATIC TRANSAXLE COMPUTER

1. Connect the SST.
SST: 09842-97205-000
2. Check the voltage, pulse and continuity between the terminals.

NOTE

- The check should be performed with the engine stopped and the ignition switch turned ON unless otherwise specified for the measuring conditions.

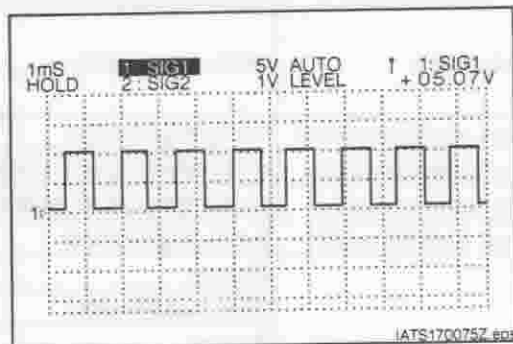
SPECIFIED VALUE: SPECIFIED VALUES FOR INPUT/OUTPUT SIGNALS

Check system	Measuring condition	Specified value	Reference value(Example of measured value)
Turbine revolution sensor	During engine idling	Pulse generation	•
Output revolution sensor	When vehicle speed is 20 km/h	Pulse generation	•
Sensor power supply	Engine stopped, IG switch turned ON	Battery voltage	13.3 V
Engine revolution signal	During engine idling	Pulse generation	•
Neutral start switch	P range	About 0 V	0 V
	Other than P range	Battery voltage	12.1 V
	R range	Battery voltage	11.2 V
	Other than R range	About 0 V	0 V
	N range	About 0 V	0 V
	Other than N range	Battery voltage	11.9 V
	D range	About 0 V	0 V
	Other than D range	Battery voltage	10.8 V
	3 range	About 0 V	0 V
	Other than 3 range	Battery voltage	12.4 V
	2 range	About 0 V	0 V
	Other than 2 range	Battery voltage	12.3 V
Steer shift switch	Button released	Battery voltage	11.0 V
	Button pressed	About 0 V	0 V
Steer shift up switch	Button released	Battery voltage	11.0 V
	Button pressed	About 0 V	0 V
Steer shift down switch	Button released	Battery voltage	10.9 V
	Button pressed	About 0 V	0 V
Fluid temperature sensor	When fluid temperature is 20 °C	About 3.4 V	-
	When fluid temperature is 80 °C	About 1.1 V	-
Brake switch	Brake OFF	About 0 V	0 V
	Brake ON	Battery voltage	11.9 V
Self-diagnosis switch	Terminal T opened	Battery voltage	11.9 V
	Terminal T shorted	About 0 V	0 V
Solenoid No. 1	Under non-energizing conditions	About 0 V	0 V
	Under energizing conditions	Pulse generation	•
Solenoid No. 2	Under non-energizing conditions	About 0 V	0 V
	Under energizing conditions	Pulse generation	•
Solenoid No. 3	Under non-energizing conditions	About 0 V	0 V
	Under energizing conditions	Pulse generation	•
Duty solenoid	Lockup OFF	About 0 V	0 V
	Slip lockup	Pulse generation	•
LUC solenoid	Under non-energizing conditions	About 0 V	0 V
	Under energizing conditions	Battery voltage	12.6 V
Switch solenoid	Under non-energizing conditions	About 0 V	0 V
	Under energizing conditions	Battery voltage	12.6 V
Speedometer	When vehicle speed is about 40 km/h	Pulse generation	•
	Engine stopped, IG switch turned ON	Pulse generation	•
EFI communication	Engine stopped, IG switch turned ON	Pulse generation	•
	At all times	Continuity exists.	Continuity exists.
Power supply	Engine stopped, IG switch turned ON	Battery voltage	12.3 V
	Engine stopped, IG switch turned ON	Battery voltage	12.3 V
	At all times	Battery voltage	12.3 V
Earth	At all times	Continuity exists.	Continuity exists.
	At all times	Continuity exists.	Continuity exists.
	At all times	Continuity exists.	Continuity exists.

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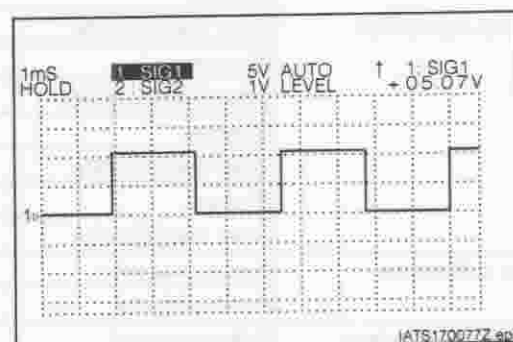
(1) TURBINE REVOLUTION SENSOR

Measuring terminals	RTBN - E2
Measuring conditions	During engine idling (The measured waveform is the one at an engine speed of 1360 rpm.)
Measuring range	voltage axis 5V time axis 1ms
The waveform cycle	As the turbine revolution rises, the cycle is shortened.
Note	-



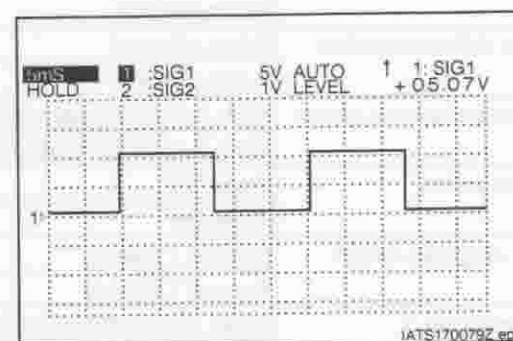
(2) OUTPUT REVOLUTION SENSOR

Measuring terminals	ROPT - E2
Measuring conditions	When vehicle speed is about 20 km/h
Measuring range	voltage axis 5V time axis 1ms
The waveform cycle	As the output revolution (vehicle speed) rises, the cycle is shortened.
Note	-



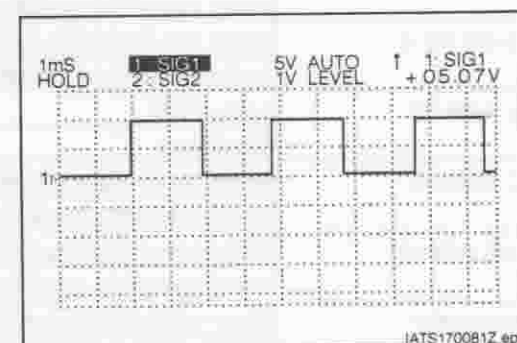
(3) ENGINE REVOLUTION SIGNAL WAVEFORM

Measuring terminals	RENG - E1
Measuring conditions	During engine idling (The measured waveform is the one at an engine speed of 1100 rpm.)
Measuring range	voltage axis 5V time axis 5ms
The waveform cycle	As the engine revolution rises, the cycle is shortened.
Note	-



(4) SPEEDOMETER SIGNAL

Measuring terminals	SPDO - E1
Measuring conditions	When vehicle speed is about 40
Measuring range	voltage axis 5V time axis 10ms
The waveform cycle	As the vehicle speed rises, the cycle is shortened.
Note	-

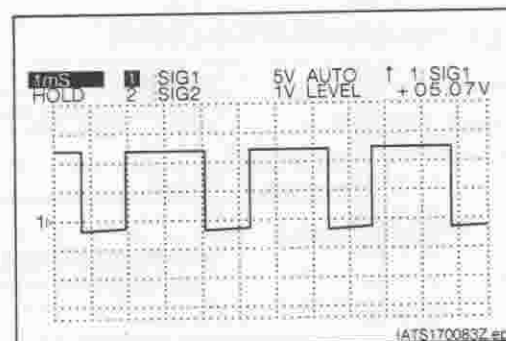


The waveform cycle	300Hz
Note	The duty ratio decreases during the gear shift transient period.



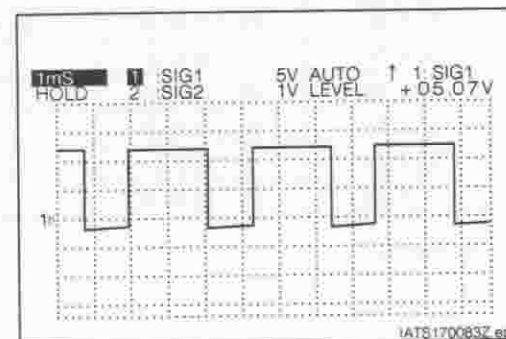
(6) SOLENOID No.2

Measuring terminals	C2+ - C2-
Measuring conditions	Under energizing conditions
Measuring range	voltage axis 5V
	time axis 1ms
The waveform cycle	300Hz
Note	The duty ratio decreases during the gear shift transient period.



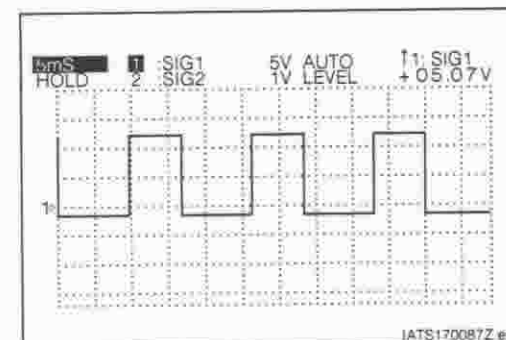
(7) SOLENOID No.3

Measuring terminals	C3B2+ - C3B2-
Measuring conditions	Under energizing conditions
Measuring range	voltage axis 5V
	time axis 1ms
The waveform cycle	300Hz
Note	The duty ratio decreases during the gear shift transient period or line pressure regulating period.



(8) DUTY SOLENOID

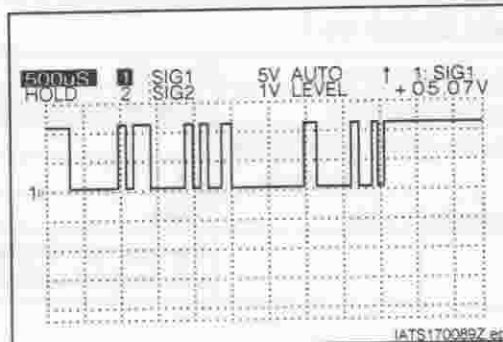
Measuring terminals	LUCC - E01
Measuring conditions	During slip lockup period
Measuring range	voltage axis 5V
	time axis 1ms
The waveform cycle	60Hz
Note	The duty ratio becomes 100 % during direct lockup period.



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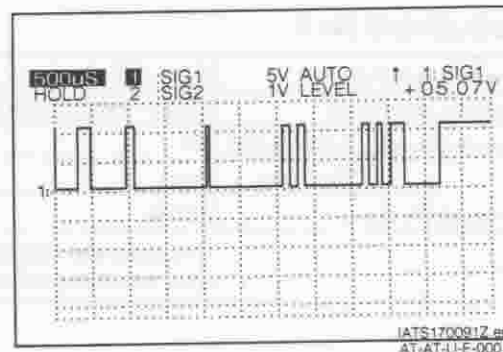
(9) EFI COMMUNICATION (COMO)

Measuring terminals	COMO - E1	
Measuring conditions	Engine stopped, IG switch turned ON	
Measuring range	voltage axis	5V
	time axis	500 μ s
The waveform cycle	-	
Note	Waveforms changes according to communication information.	



(10) EFI COMMUNICATION (COMI)

Measuring terminals	COMG - E1	
Measuring conditions	Engine stopped, IG switch turned ON	
Measuring range	voltage axis	5V
	time axis	500 μ s
The waveform cycle	-	
Note	Waveforms changes according to communication information.	



16 TIGHTENING TORQUE

Tightening components		N·m	kgf·cm
Transaxle	× Cylinder block	63.7 ± 14.7	650 ± 150
Transaxle	× Oil pan (engine)	36.8 ± 7.3	375 ± 75
Transaxle	× Starter	59 ± 10	600 ± 100
Power train stiffener	× Transaxle (front)	18.2 ± 3.4	185 ± 35
Power train stiffener	× Transaxle (Rear)	59 ± 10	600 ± 100
Power train stiffener	× Cylinder block (front)	18.2 ± 3.4	185 ± 35
Power train stiffener	× Cylinder block (Rear)	36.8 ± 7.3	375 ± 75
Engine mounting rear bracket	× Transaxle	59 ± 10	600 ± 100
Cylinder block	× Engine mounting rear bracket	63.7 ± 14.7	650 ± 150
Drive plate	× Torque converter	36.8 ± 7.3	375 ± 75
Drive plate	× Crankshaft	44.1 ± 4.9	450 ± 50
Drain plug	× Transaxle	24.5 ± 4.5	250 ± 50
Oil pan	× Transaxle case	8.35 ± 1.45	85 ± 15
Neutral start switch	× Transaxle	18.2 ± 3.4	185 ± 35
Transsmission control shaft lever Ay	× Neutral start switch	12.9 ± 3.1	130 ± 30
Control cable Ay	× Transsmission control shaft lever Ay	8.35 ± 1.45	85 ± 15
Floor shift Ay	× Body	12.9 ± 3.1	130 ± 30
Valve Body	× Transaxle	8.35 ± 1.45	85 ± 15
Manual detent spring	× Transaxle	8.35 ± 1.45	85 ± 15
Solenoid	× Valve Body	5.9 ± 1.0	60 ± 10
T/M revolution sensor	× Transaxle	8.35 ± 1.45	85 ± 15

AT-TQE-Z-Z-00011