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You can read the recommendations in the user guide, the technical guide or the installation guide for MITSUBISHI AUTOMATIC TRANSMISSION. You'll find the answers to all your questions on the MITSUBISHI AUTOMATIC TRANSMISSION in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual MITSUBISHI AUTOMATIC TRANSMISSION
User guide MITSUBISHI AUTOMATIC TRANSMISSION
Operating instructions MITSUBISHI AUTOMATIC TRANSMISSION
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23-1

AUTOMATIC TRANSMISSION

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2109000576

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

WARNING!

- (1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to driver and passenger (from rendering the SRS inoperative).
- (2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.
- (3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP S2B - Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE

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



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Manual abstract:

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..... @@@@NOTE The SRS includes the following components: SRS-ECU, SRS warning lamp, air bag module, clock spring, side impact sensors and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*). 23-2 AUTOMATIC TRANSMISSION - Service Specifications/Lubricant/Special Tools SERVICE SPECIFICATIONS Items Oil temperature sensor kW at 0_C at 100_C Resistance of damper clutch control solenoid valve coil (at 20_C) W Resistance of Low-Reverse solenoid valve coil (at 20_C) W Resistance of second solenoid valve coil (at 20_C) W Resistance of underdrive solenoid valve coil (at 20_C) W Resistance of overdrive solenoid valve coil (at 20_C) W Stall speed r/min 4G93 4G64 16.

5 - 20.5 0.57 - 0.69 2.7 - 3.4 2.7 - 3.4 2.7 - 3.4 2.

7 - 3.4 2.7 - 3.4 2,200 - 2,700 2,300 - 2,800 23100030284 Standard value LUBRICANT Items Transmission fluid Specified lubricant DIA QUEEN ATF SPII, ATF SPII M or equivalent Quantity L 7.8 23100040270 SPECIAL TOOLS Tool Number MB991502 Name MUT-II sub assembly Use Checking of the diagnosis code 23100060351 MD998330 (including MD998331) Oil pressure gauge (2,942 kPa) Measurement of oil pressure MD998332 Adapter MD998900 Adapter AUTOMATIC TRANSMISSION - Special Tools Tool Number MB990635 or MB991113 Name Steering linkage puller Use Ball joint

disconnection 23-3 MB991610 Oil filter wrench Removal and installation of automatic transmission oil filter GENERAL SERVICE TOOL MZ203827 Engine lifter Supporting the engine assembly during removal and installation of the transmission MB991453 Engine hanger assembly Supporting the engine assembly during removal and installation of the transmission 23-4 AUTOMATIC TRANSMISSION - Troubleshooting 23100760657 TROUBLESHOOTING STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING Gathering information from customer.

Check ATF. OK NG Replace ATF. Check trouble symptoms. Communication with MUT-II not possible Read the diagnosis code (GROUP 00 - How to Use Troubleshooting/Inspection Service Points.) Diagnosis code displayed Erase the diagnosis code (GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

) Inspection Chart For Trouble Symptoms (Refer to P.23-24.) No diagnosis code displayed Replace the A/T-ECU. Check trouble symptoms. NG Carry out the essential service (Refer to P.23-44.) Abnormality exists (no diagnosis code) No abnormality Recheck diagnosis codes which were read before the road test. Diagnosis code displayed To INSPECTION CHART DIAGNOSIS CODES (Refer to P.23-12.) FOR To INSPECTION CHART TROUBLE SYMPTOMS (Refer to P.

23-24.) No diagnosis code displayed FOR Road test (Refer to P.23-6.) Abnormality exists (diagnosis code present) Search for cause. Found Repair NG Not found INTERMITTENT MALFUNCTION (GROUP 00 - Points to Note for Intermittent Malfunctions.) OK Completed NG Confirmation test (road test) OK AUTOMATIC TRANSMISSION - Troubleshooting DIAGNOSIS FUNCTION 1. N range lamp The N range lamp flashes at a frequency 1 Hz if there is an abnormality in any of table below which are related to the A/T the diagnosis code output if the N range at a frequency of approximately 1 Hz. N range lamp flashing items Crank angle sensor Input shaft speed sensor Output shaft speed sensor Each solenoid valve Out of phase at each shift point 23-5 23100770292 of approximately the items in the system. Check lamp is flashing Caution If the N range lamp is flashing at a frequency of approximately 2 Hz (faster than at 1 Hz), it means that the automatic transmission fluid temperature is too high. Stop the vehicle in a safe place and wait until the N range lamp switches off. 2. Method of reading the diagnosis code Use the MUT-II or the N range lamp to take a reading of the diagnosis codes. (Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.) 23-6 ROAD TEST AUTOMATIC TRANSMISSION - Troubleshooting 23100780622 Check by the following procedure. No.

State prior to test and operation Ignition switch: OFF Ignition switch: ON Engine: Stopped Selector lever position: P Test and operation Judgement value Check item Diagnosis code No. 54 Inspection procedure page if there is an abnormality A/T Control relay system (23-23) Inhibitor switch system (23-35) Ignition switch (1) ON Selector lever position (1) P, (2) R, (3) N, (4) D, (5) 3, (6) 2, (7) L Data list No. 54 Battery voltage [V] Data list No. 61 (1) P, (2) R, (3)N, (4) D, (5) 3, (6) 2, (7) L Control relay 2 Inhibitor switch - Data list No. 11 Accelerator pedal (1) 300 - 1,000 mV (1) Released (2) Half depressed (2) Gradually rises from (1) (3) Depressed (3) 4,500 - 5,500 mV Data list No.

25 (1) OFF (2) ON Brake pedal (1) Depressed (2) Released 3 Ignition switch: ST Engine: Stopped Warming up Starting test with lever P or N range Drive for 15 minutes or more so that the automatic fluid temperature becomes 70 90_C. Data list No. 26 (1) ON (2) OFF Starting should be possible Data list No. 15 Gradually rises to 70 - 90_C Throttle position sensor <4G93> Accelerator pedal position sensor <4G64> Wide open throttle switch Stop lamp switch Starting possible or impossible Oil temperature sensor 11 12 14 Throttle position sensor system (23-13) Accelerator pedal position sensor system (23-13) Wide open throttle switch system (23-15) Stop lamp switch system (23-16) Starting impossible (23-27) Oil temperature sensor system (23-13) 25 26 - 4 15 AUTOMATIC TRANSMISSION - Troubleshooting No. State prior to test and operation Test and operation Judgement value Check item Diagnosis code No. 26 23-7 Inspection procedure page if there is an abnormality Stop lamp switch system (23-16) 5 Engine: Idling Selector lever position: N Brake pedal (Retest) (1) Depressed (2) Released A/C switch (1) ON (2) OFF Data list No. 26 (1) ON (2) OFF Data list No. 65 (1) ON (2) OFF Stop lamp switch Dual pressure switch - Dual pressure switch system (23-35) Crank angle sensor system (23-14) Serial communication system (23-23) Data list No. 21 Crank angle Accelerator pedal (1) 550 - 850 r/min sensor (1) Released (2) Half depressed Gradually rises from (1) Data list No.



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57 (2) Data changes Communication with engine ECU 21 51 Selector lever position (1) N® D (2) N® R Should be no abnormal shifting shocks Time lag should be within 2 seconds Malfunction when starting - Engine stalling during shifting (23-29) Shocks when changing from N to D and large time lag (23-29) Shocks when changing from N to R and large time lag (23-30) Shocks when changing from N to D, N to R and large time lag (23-31) Does not move forward (23-27) Does not reverse (23-28) Does not move (forward or reverse) (23-28) - - - Driving impossible - 23-8 No.

AUTOMATIC TRANSMISSION - Troubleshooting State prior to test and operation Test and operation Judgement value Check item Diagnosis code No.
Inspection procedure page if there is an abnormality - 6 Selector lever position: N (Carry out on a flat and straight road.) Selector lever position and vehicle speed (1) Idling in L range (Vehicle stopped) (2) Driving at constant speed of 10 km/h in L position (3) Driving at constant speed of 30 km/h in 2 position (4) Driving at 50 km/h in 3 position with accelerator fully closed (5) Driving at constant speed of 50 km/h in D position (Each condition should be maintained for 10 seconds or more.) Selector lever position and vehicle speed (1) Release the accelerator pedal fully while driving at 50 km/h in 3rd gear. (2) Driving at constant speed of 50 km/h in 3rd gear. Data list No. 63 (2) 1st, (4) 3rd, (3) 2nd, (5) 4th Data list No. 31 (2) 0 %, (4) 100 %, (3) 100 %, (5) 100 % Data list No. 32 (2) 0 %, (4) 0 %, (3) 0 %, (5) 100 % Data list No. 33 (2) 100 %, (4) 100 %, (3) 0 %, (5) 0 % Data list No.

34 (2) 100 %, (4) 0 %, (3) 100 %, (5) 0 % Data list No. 29 (1) 0 km/h (4) 50 km/h Shift condition Low and reverse 31 solenoid valve Low and reverse solenoid valve system (23-16) Underdrive solenoid valve system (23-16) Second solenoid valve system (23-16) Overdrive solenoid valve system (23-16) Vehicle speed sensor system (23-36) Input shaft speed sensor system (23-14) Output shaft speed sensor system (23-15) Damper clutch control solenoid valve system (23-17) Underdrive solenoid valve Second solenoid valve Overdrive solenoid valve 32 33 34 Vehicle speed sensor - Data list No. 22 Input shaft (4) 1,800 - 2,100 speed sensor r/min Data list No. 23 Output shaft (4) 1,800 - 2,100 speed sensor r/min Data list No. 36 Damper clutch control solenoid (1) 0 % (2) Approx. 70 - 90 valve % Data list No. 52 (1) Approx. 100 - 300 r/min (2) Approx. 0 - 10 r/min 22 23 7 Selector lever position: 3 (Carry out on a flat and straight road.) 36 52 **AUTOMATIC TRANSMISSION - Troubleshooting No.**

State prior to test and operation Test and operation Judgement value Check item Diagnosis code No. - 23-9 Inspection procedure page if there is an abnormality Shocks and running up (23-31) All points (23-32) Some points (23-33) No diagnosis code (23-33) Input shaft speed sensor system (23-14) Output shaft speed sensor system (23-15) Low and reverse solenoid valve system (23-16) Second solenoid valve system (23-16) 1st gear ratio is not specified (23-18) 2nd gear ratio is not specified (23-19) Second solenoid valve system (23-16) Overdrive solenoid valve system (23-16) 2nd gear ratio is not specified (23-19) 3rd gear ratio is not specified (23-20) Underdrive solenoid valve system (23-16) Second solenoid valve system (23-16) 3rd gear ratio is not specified (23-20) 4th gear ratio is not specified (23-21) 8 Use the MUT-II to stop the INVECSII function. Selector lever position: D (Carry out on a flat and straight road.) Monitor data list No. 11, 23, and 63 with the MUT-II. (1) Accelerate to 4th gear at a throttle position sensor output of 1.5V (accelerator opening angle of 30 %). (2) Gently decelerate to a standstill. (3) Accelerate to 4th gear at a throttle position sensor output of 2.5 V (accelerator opening angle of 50%).

(4) While driving at 60 km/h in 4th gear, shift down to 3 range. (5) While driving at 40 km/h in 3rd gear, shift down to 2 range. (6) While driving at 20 km/h in 2nd gear, shift down to L range. For (1), (2) and (3), the reading should be the same as the specified output shaft speed and no abnormal shocks should occur. For (4), (5) and (6), downshifting should occur immediately after the shifting operation is made. Malfunction when shifting Displaced shifting points Does not shift 22 23 Does not shift from 1 to 2 or 2 to 1 31 33 41 42 Does not shift from 2 to 3 or 3 to 2 33 34 42 43 Does not shift from 3 to 4 or 4 to 3 32 33 43 44

23-10 No. **AUTOMATIC TRANSMISSION - Troubleshooting Test and op Probable cause D D D D Malfunction Malfunction <4G64> Malfunction Malfunction of the throttle position sensor <4G93> of the accelerator pedal position sensor of connector of the A/T-ECU Throttle position sensor check <4G93> (Refer to GROUP 13B - On-vehicle Servicelink=13100320030.) Accelerator pedal position sensor check <4G64> (Refer to GROUP 13A - On-vehicle Servicelink=13600430011.) OK Check the following connectors: D A-73, B-11 <4G93> D A-63, A-27, B-11 <4G64> OK Harness check D Between throttle position sensor and A/T-ECU <4G93> D Between accelerator pedal position sensor and A/T-ECU <4G64> OK Check the trouble symptoms.**

Replace NG Repair NG Repair NG Replace the A/T-ECU.

Code No. 15 Oil temperature sensor system If the oil temperature sensor output voltage is 2.6 V or more even after driving for 10 minutes or more (if the oil temperature does not increase), it is judged that there is an open circuit in the oil temperature sensor and diagnosis code No. 15 is output. NG Probable cause D D D Malfunction of the oil temperature sensor Malfunction of connector Malfunction of the A/T-ECU Oil temperature sensor check (Refer to P.

23-51.) OK Check the following connectors: A-88, B-11 OK Harness check D Between oil temperature sensor and A/T-ECU OK Check the trouble symptoms. Replace NG Repair NG Repair NG Replace the A/T-ECU. 23-14 **AUTOMATIC TRANSMISSION - Troubleshooting Probable cause D D D Malfunction of the**

crank angle sensor Malfunction of connector Malfunction of the A/T-ECU Code No. 21 Crank angle sensor system If no output pulse is detected from the crank angle sensor for 5 seconds or more while driving at 25 km/h or more, it is judged that there is an open circuit in the crank angle sensor and diagnosis code No.

21 is output. NG Check the following connectors: A-71, B-51, B-11 OK Harness check D Between crank angle sensor and A/T-ECU OK Crank angle sensor system check (Refer to GROUP 13 - Troubleshooting.) OK Check the trouble symptoms. Repair NG Repair NG Replace the A/T-ECU. Code No. 22 Input shaft speed sensor system If no output pulse is detected from the input shaft speed sensor for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the input shaft speed sensor and diagnosis code No.



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22 is output. If diagnosis code No. 22 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. Probable cause D D D D Malfunction Malfunction Malfunction Malfunction of of of of the input shaft speed sensor the underdrive clutch retainer connector A/T-ECU L: Refer to the Transmission Workshop Manual.

Measure at the input shaft speed sensor connector A-90. D Disconnect the connector and measure at the harness side. (1) Voltage between 3 and earth (Ignition switch: ON) OK: Battery voltage (2) Voltage between 2 and earth (Ignition switch: ON) OK approx. 5 V (3) Continuity between 1 and earth OK: Continuity OK Measure output waveform of the input shaft speed sensor. (using an oscilloscope) D Engine: 2,000 r/min (approx. 50 km/h) D Transmission: 3rd gear (Voltage) OK: Conforms to the waveform shown at page 23-43 (Inspection procedure using an oscilloscope). There is no noise in the output waveform. OK Check the trouble symptoms. NG NG Check the following connectors: A-90, B-14, B-93, B-89, B-11 OK Check the following harness: D Between the input shaft speed sensor and the ignition switch D Between the input shaft speed sensor and A/T-ECU OK Check the trouble symptoms. Replace the input shaft speed sensor.

NG A/T overhaul K D Replace the retainer. NG Repair NG Repair NG Replace the A/T-ECU. Check the trouble symptoms. underdrive clutch Check the trouble symptoms. NG NG Replace the A/T-ECU.

Eliminate the cause of the noise. AUTOMATIC TRANSMISSION - Troubleshooting Code No. 23 Output shaft speed sensor system If the output from the output shaft speed sensor is continuously 50% lower than the vehicle speed for 1 second or more while driving in 3rd or 4th gear at a speed of 30 km/h or more, there is judged to be an open circuit or short-circuit in the output shaft speed sensor and diagnosis code No. 23 is output. If diagnosis code No. 23 is output four times, the transmission is locked into 3rd gear (D range) or 2nd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. 23-15 Probable cause D D D D Malfunction Malfunction Malfunction Malfunction of of of of the output shaft speed sensor the transfer drive gear or driven gear connector the A/T-ECU L: Refer to the Transmission Workshop Manual. Measure at the output shaft speed sensor connector A-82. D Disconnect the connector and measure at the harness side. (1) Voltage between 3 and earth (Ignition switch: ON) OK: Battery voltage (2) Voltage between 2 and earth (Ignition switch: ON) OK: approx. 5 V (3) Continuity between 1 and earth OK: Continuity OK Measure output waveform of the output shaft speed sensor. (using an oscilloscope) D Engine: 2,000 r/min (approx. 50 km/h) D Transmission: 3rd gear (Voltage) OK: Conforms to the waveform shown at page 23-43 (Inspection procedure using an oscilloscope). There is no noise in the output waveform. OK Check the trouble symptoms.

NG NG Check the following connectors: A-82, B-14, B-93, B-89, B-11 OK Check the following harness: D Between the output shaft speed sensor and the ignition switch D Between the output shaft speed sensor and A/T-ECU OK Check the trouble symptoms. Replace the output shaft speed sensor. Check the trouble symptoms. NG A/T overhaul L D Replace the transfer drive gear and driven gear. Check the trouble symptoms. NG Eliminate the cause of the noise. NG Replace the A/T-ECU. NG Repair NG Repair NG Replace the A/T-ECU. Code No. 25 Wide open throttle switch system If the wide open throttle switch is on for 1 second or more with the throttle valve opening angle at 70% or less, it is judged that there is a short circuit in the wide open throttle switch and diagnosis code No.

25 is output. Probable cause D D D Malfunction of the wide open throttle switch Malfunction of connector Malfunction of A/T-ECU Wide open throttle switch check (Refer to P.23-64.) OK Check the following connectors: B-61, B-10 OK Harness check D Between the wide open throttle switch and the A/T-ECU. OK Check the trouble symptoms.

NG Replace NG NG Repair Repair NG Replace the A/T-ECU. 23-16 AUTOMATIC TRANSMISSION - Troubleshooting Probable cause D D D Malfunction of the stop lamp switch Malfunction of connector Malfunction of the A/T-ECU Code No. 26 Stop lamp switch system If the stop lamp switch is on for 5 minutes or more while driving, it is judged that there is a short circuit in the stop lamp switch and diagnosis code No. 26 is output. Stop lamp switch check (Refer to GROUP 35 - Brake Pedal.

) OK Check the following connectors: B-28, B-65, B-14, B-10 OK Harness check D Between stop lamp switch and A/T-ECU OK Check the trouble symptoms. NG Replace NG Repair NG Repair NG Replace the A/T-ECU. Code No. 31 Low and reverse solenoid valve system Code No. 32 Underdrive solenoid valve system Code No. 33 Second solenoid valve system Code No. 34 Overdrive solenoid valve system If the resistance value for a solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the solenoid valve and the respective diagnosis code is output. The transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. NG Probable cause D D D Malfunction of solenoid valve Malfunction of connector Malfunction of the A/T-ECU Solenoid valve check (Refer to P.23-52.

) OK Check the following connectors: A-88, A-12X, B-12, B-10 OK Harness check D Between solenoid valve and A/T-ECU OK Replace the solenoid valve. Replace NG Repair NG Repair Check the trouble symptoms. NG Replace the A/T-ECU. AUTOMATIC TRANSMISSION - Troubleshooting Code No. 36, 52 Damper clutch control solenoid valve system If the resistance value for the damper clutch control solenoid valve is too large or too small, it is judged that there is a short-circuit or an open circuit in the damper clutch control solenoid valve and diagnosis code No. 36 is output. If the drive duty rate for the damper clutch control solenoid valve is 100 % for a continuous period of 4 seconds or more, it is judged that there is an abnormality in the damper clutch control system and diagnosis code No. 52 is output. When diagnosis code No. 36 is output, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.

NG 23-17 Probable cause D D D Malfunction of the damper clutch control solenoid valve Malfunction of connector Malfunction of the A/T-ECU Damper clutch control solenoid valve check (Refer to P.23-52.) OK Check the following connectors: A-88, A-12X, B-12 OK Harness check D Between damper clutch control solenoid valve and A/T-ECU OK Replace the damper clutch control solenoid valve. Check the trouble symptoms. Replace NG Repair NG Repair NG Replace the A/T-ECU.

23-18 AUTOMATIC TRANSMISSION - Troubleshooting Probable cause D D D D D D Malfunction of the Malfunction of the Malfunction of the Malfunction of the Noise generated input shaft speed sensor output shaft speed sensor underdrive clutch retainer transfer drive gear or driven gear low and reverse brake system underdrive clutch system Code No.



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41 1st gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 1st gear ratio is not the same as the output from the input shaft speed sensor after shifting to 1st gear has been completed, diagnosis code No. 41 is output. If diagnosis code No. 41 is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.

L: Refer to the Transmission Workshop Manual. MUT-II Self-Diag code Is the diagnosis code No. 22 output? No MUT-II Self-Diag code Is the diagnosis code No. 23 output? No Measure output waveform from the input shaft speed sensor. (using an oscilloscope) D Connect the connector A-90 and measure voltage between 31 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK Yes Code No. 22 Input shaft speed sensor system check (Refer to P.

23-14.) Code No. 23 Output shaft speed sensor system check (Refer to P.23-15.) Replace the input shaft speed sensor. Yes NG Check the trouble symptoms. NG A/T overhaul L D Replace the underdrive clutch retainer. Check the trouble symptoms. NG Eliminate the cause of the noise. Measure output waveform from the output shaft speed sensor.

(using an oscilloscope) D Connect the connector A-82 and measure voltage between 32 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK A/T overhaul L D Underdrive clutch system check (No. 42, No. 43, or no diagnosis code is output). D Low and reverse brake system check (No. 46 or no diagnosis code is output). NG Replace the output shaft speed sensor.

Check the trouble symptoms. NG A/T overhaul L D Replace the transfer drive gear and driven gear. Check the trouble symptoms. NG Eliminate the cause of the noise. AUTOMATIC TRANSMISSION - Troubleshooting Code No. 42 2nd gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 2nd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 2nd gear has been completed, diagnosis code No. 42 is output. If diagnosis code No. 42 is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. 23-19 Probable cause D D D D D D Malfunction of the Noise generated input shaft speed sensor output shaft speed sensor underdrive clutch retainer transfer drive gear or driven gear second brake system underdrive clutch system L: Refer to the Transmission Workshop Manual.

MUT-II Self-Diag code Is the diagnosis code No. 22 output? No MUT-II Self-Diag code Is the diagnosis code No. 23 output? No Measure output waveform from the input shaft speed sensor. (using an oscilloscope) D Connect the connector A-90 and measure voltage between 31 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK Yes Code No. 22 Input shaft speed sensor system check (Refer to P.23-14.

) Code No. 23 Output shaft speed sensor system check (Refer to P.23-15.) Replace the input shaft speed sensor. Yes NG Check the trouble symptoms. NG A/T overhaul L D Replace the underdrive clutch retainer. Check the trouble symptoms. NG Eliminate the cause of the noise. Measure output waveform from the output shaft speed sensor. (using an oscilloscope) D Connect the connector A-82 and measure voltage between 32 and 43 at the A/T-ECU.

D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK A/T overhaul L D Underdrive clutch system check (No. 41, No. 43, or no diagnosis code is output). D Second brake system check (No. 44 or no diagnosis code is output). NG Replace the output shaft speed sensor. Check the trouble symptoms.

NG A/T overhaul L D Replace the transfer drive gear and driven gear. Check the trouble symptoms. NG Eliminate the cause of the noise. 23-20 AUTOMATIC TRANSMISSION - Troubleshooting Probable cause D D D D D D Malfunction of the Noise generated input shaft speed sensor output shaft speed sensor underdrive clutch retainer transfer drive gear or driven gear underdrive clutch system overdrive clutch system Code No. 43 3rd gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 3rd gear ratio is not the same as the output from the input shaft speed sensor after shifting to 3rd gear has been completed, diagnosis code No. 43 is output. If diagnosis code No. 43 is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. L: Refer to the Transmission Workshop Manual. MUT-II Self-Diag code Is the diagnosis code No.

22 output? No MUT-II Self-Diag code Is the diagnosis code No. 23 output? No Measure output waveform from the input shaft speed sensor. (using an oscilloscope) D Connect the connector A-90 and measure voltage between 31 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P. 23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK Yes Code No. 22 Input shaft speed sensor system check (Refer to P.23-14.) Code No.

23 Output shaft speed sensor system check (Refer to P.23-15.) Replace the input shaft speed sensor. Yes NG Check the trouble symptoms. NG A/T overhaul L D Replace the underdrive clutch retainer. Check the trouble symptoms. NG Eliminate the cause of the noise. Measure output waveform from the output shaft speed sensor. (using an oscilloscope) D Connect the connector A-82 and measure voltage between 32 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx.

50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~⑤ 5V) and there is no noise appearing in the waveform. OK A/T overhaul L D Underdrive clutch system check (No.



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41, No. 42, or no diagnosis code is output). D Overdrive clutch system check (No. 44 or no diagnosis code is output). NG Replace the output shaft speed sensor. Check the trouble symptoms. NG A/T overhaul L D Replace the transfer drive gear and driven gear.

Check the trouble symptoms. NG Eliminate the cause of the noise. AUTOMATIC TRANSMISSION - Troubleshooting Code No. 44 4th gear ratio does not meet the specification If the output from the output shaft speed sensor multiplied by the 4th gear ratio is not the same as the output from the input shaft speed sensor after shifting to 4th gear has been completed, diagnosis code No. 44 is output.

If diagnosis code No. 44 is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. 23-21 Probable cause D D D D D D Malfunction of the Noise generated input shaft speed sensor output shaft speed sensor underdrive clutch retainer transfer drive gear or driven gear second brake system overdrive clutch system L: Refer to the Transmission Workshop Manual. MUT-II Self-Diag code Is the diagnosis code No. 22 output? No MUT-II Self-Diag code Is the diagnosis code No.

23 output? No Measure output waveform from the input shaft speed sensor. (using an oscilloscope) D Connect the connector A-90 and measure voltage between 31 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~ 5V) and there is no noise appearing in the waveform. OK Yes Code No. 22 Input shaft speed sensor system check (Refer to P.23-14.) Code No. 23 Output shaft speed sensor system check (Refer to P.

23-15.) Replace the input shaft speed sensor. Yes NG Check the trouble symptoms. NG A/T overhaul L D Replace the underdrive clutch retainer. Check the trouble symptoms. NG Eliminate the cause of the noise. Measure output waveform from the output shaft speed sensor. (using an oscilloscope) D Connect the connector A-82 and measure voltage between 32 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.

23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~ 5V) and there is no noise appearing in the waveform. OK A/T overhaul L D Second brake system check (No. 42 or no diagnosis code is output). D Overdrive clutch system check (No. 43 or no diagnosis code is output). NG Replace the output shaft speed sensor. Check the trouble symptoms. NG A/T overhaul L D Replace the transfer drive gear and driven gear. Check the trouble symptoms. NG Eliminate the cause of the noise.

23-22 AUTOMATIC TRANSMISSION - Troubleshooting does not meet the Probable cause D D D D D D Malfunction of the Malfunction of the Malfunction of the Malfunction of the Noise generated input shaft speed sensor output shaft speed sensor underdrive clutch retainer transfer drive gear or driven gear low and reverse brake system reverse clutch system Code No. 46 Reverse gear ratio specification If the output from the output shaft speed sensor multiplied by the reverse gear ratio is not the same as the output from the input shaft speed sensor after shifting to reverse gear has been completed, diagnosis code No. 46 is output. If diagnosis code No. 46 is output four times, the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz. L: Refer to the Transmission Workshop Manual. MUT-II Self-Diag code Is the diagnosis code No. 22 output? No MUT-II Self-Diag code Is the diagnosis code No. 23 output? No Measure output waveform from the input shaft speed sensor. (using an oscilloscope) D Connect the connector A-90 and measure voltage between 31 and 43 at the A/T-ECU.

D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~ 5V) and there is no noise appearing in the waveform. OK Yes Code No. 22 Input shaft speed sensor system check (Refer to P.23-14.) Code No. 23 Output shaft speed sensor system check (Refer to P.23-15.) Replace the input shaft speed sensor.

Yes NG Check the trouble symptoms. NG A/T overhaul L D Replace the underdrive clutch retainer. Check the trouble symptoms. NG Eliminate the cause of the noise. Measure output waveform from the output shaft speed sensor.

(using an oscilloscope) D Connect the connector A-82 and measure voltage between 32 and 43 at the A/T-ECU. D Engine: 2,000 r/min (approx. 50 km/h) D Selector lever position: 3 (Voltage) OK: A waveform such as the one shown on P.23-43 (Inspection Procedure Using an Oscilloscope) is output (flashing between 0 ~ 5V) and there is no noise appearing in the waveform. OK A/T overhaul L D Low and reverse brake system check (No.

41 or no diagnosis code is output). D Reverse clutch system check (No diagnosis code is output). NG Replace the output shaft speed sensor. Check the trouble symptoms. NG A/T overhaul L D Replace the transfer drive gear and driven gear. Check the trouble symptoms. NG Eliminate the cause of the noise.

AUTOMATIC TRANSMISSION - Troubleshooting Code No. 51 Abnormal communication with engine-ECU If normal communication is not possible for a continuous period of 1 second or more when the ignition switch is at the ON position, the battery voltage is 10 V or more and the engine speed is 450 r/min or more, diagnosis code No. 51 is output.

Diagnosis code No. 51 is also output if the data being received is abnormal for a continuous period of 4 seconds under the same conditions. Check the following connectors: D B-54, B-52, B-10 <4G93> D B-53, B-52, B-10 <4G64> OK Harness check D Between engine-ECU and A/T-ECU OK Check the trouble symptoms. NG Replace the engine-ECU. Check the trouble symptoms. NG Replace the A/T-ECU. NG 23-23 Probable cause D D D Malfunction of connector Malfunction of the engine-ECU Malfunction of the A/T-ECU Repair NG Repair Code No. 54 A/T control relay system If the A/T control relay voltage is less than 7 V after the ignition switch has been turned ON, it is judged that there is an open circuit or a short-circuit in the A/T control relay circuit and diagnosis code No. 54 is output. Then the transmission is locked into 3rd gear as a fail-safe measure, and the N range lamp flashes at a frequency of 1 Hz.

NG Probable cause D D D Malfunction of the A/T control relay Malfunction of connector Malfunction of the A/T-ECU Check the A/T control relay. (Refer to P.23-52.) OK Check the following connectors: A-12X, A-29, B-12, B-10 OK Harness check D Between control relay and body earth D Between control relay and fusible link D Between control relay and A/T-ECU OK Check the trouble symptoms.



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Replace NG Repair NG Repair NG Replace the A/T-ECU.

23-24 AUTOMATIC TRANSMISSION - Troubleshooting Probable cause D D D Malfunction of the N range lamp bulb Malfunction of the A/T-ECU Code No. 56 N range lamp system If the N range signal is off after an N range lamp illumination instruction (ON instruction) has been given, it is judged that there is a short-circuit in the N range lamp earth and diagnosis code No. 56 is output. NG Check the N range lamp bulb (Refer to GROUP 52A - Instrument Panel.) OK Check the following connectors: B-01, B-14, A-89, B-10 OK Harness check D Between N range lamp bulb and A/T-ECU OK Check the trouble symptoms.

Replace NG Repair NG Repair NG Replace the A/T-ECU. INSPECTION CHART FOR TROUBLE SYMPTOMS Trouble symptom MUT-II can not communicate with any systems. MUT-II can not communicate with the A/T-ECU. Driving impossible Starting impossible Does not move forward Does not reverse Does not move (forward or reverse) Malfunction when starting Engine stalling when shifting Shocks when changing from N to D and large time lag Shocks when changing from N to R and large time lag Shocks when changing from N to D, N to R and large time lag Malfunction when shifting Shocks and running up Inspection procedure No. 1 2 3 4 5 6 7 8 9 10 11 23100800588 Reference page 23-25 23-26 23-27 23-27 23-28 23-28 23-29 23-29 23-30 23-31 23-31 AUTOMATIC TRANSMISSION - Troubleshooting Trouble symptom Displaced shifting points All points Does not shift Malfunction while driving No diagnosis codes Poor acceleration Vibration Inhibitor switch system Dual pressure switch system Vehicle speed sensor system Inspection procedure No. 12 13 14 15 16 17 18 19 23-25 Reference page 23-32 23-33 23-33 23-34 23-34 23-35 23-35 23-36 INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS INSPECTION PROCEDURE 1 MUT-II can not communicate with any systems. It is suspected that this malfunction is caused by a defective power supply and earth circuits of the diagnosis connector. Measure at diagnosis connector B-25. NG D Voltage between terminal No. 16 and body earth OK: Battery voltage OK Measure at diagnosis connector B-25.

D Continuity between terminal Nos. 4, NG 5 and body earth OK: Continuity OK Probable cause D D Malfunction of diagnosis connector Malfunction of harness or connector Check the following connectors: NG B-25, B-91, B-92, B-66 OK Check the trouble symptoms. NG Repair Check the harness wire between the fusible link and the diagnosis connector, and repair if necessary. Repair Check the following connector: B-25 OK Check trouble symptoms. NG NG Check trouble symptoms. NG Replace the MUT-II. Check the harness wire between the diagnosis connector and the earth, and repair if necessary. 23-26 AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 2 MUT-II can not communicate with the A/T-ECU. It is suspected that this malfunction is caused by an open circuit in A/T-ECU power supply circuit or diagnosis output circuit. NG Check the following connectors: B-12, B-10, B-14, B-102, B-25 OK Check trouble symptoms.

NG Check the harness wire between the A/T-ECU and the diagnosis connector, and repair if necessary. Probable cause D D Malfunction of harness or connector Malfunction of A/T-ECU NG Measure at diagnosis connector B-25 and A/T-ECU connectors B-12, B-10. D Disconnect the connectors, and measure at the harness side. D Continuity between the following terminals: No. 1 (of diagnosis connector) and 23 (of B-12) No. 7 (of diagnosis connector) and 63 (of B-10) OK: Continuity OK Measure at A/T-ECU connector B-12. D Disconnect the connector, and measure at the harness side. D Ignition switch: ON D Voltage between Nos. 11, 24 and body earth OK: Battery voltage OK Repair NG Check the following connectors: B-12, B-14, B-93, B-89 OK Check trouble symptoms. NG Repair NG Check the harness wire between the ignition switch and the A/T-ECU, and repair if necessary. Measure at A/T-ECU connectors B-12, NG B-10. D Disconnect the connector, and measure at the harness side. D Continuity between terminal Nos. 12, 13, 25, 26, 72 - body earth OK: Continuity OK OK Check the following connectors: B-12, B-10 OK Check trouble symptoms. NG Repair NG Check the harness wire between the A/T-ECU and the earth, and repair if necessary. Replace the A/T-ECU. Check the following connectors: B-12, B-10 NG Repair Check trouble symptoms. NG AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 3 Starting impossible Starting is not possible when the selector lever is in P or N range. In such cases, the cause is probably a defective inhibitor switch system, transmission control cable assembly, engine system, torque converter or oil pump. 23-27 Probable cause D D D D D Malfunction of the inhibitor switch system Malfunction of the transmission control cable assembly Malfunction of the engine system Malfunction of the torque converter Malfunction of the oil pump Check the inhibitor switch system (Refer to P.

23-35, INSPECTION PROCEDURE 17). OK Check the transmission control cable assembly. OK Check the engine system. D Control system, ignition system, fuel system, main engine system OK NG L: Refer to the Transmission Workshop Manual. Repair, replace NG Repair, replace NG Repair, replace NG Torque converter check D Check for incorrect installation (inserted at an angle, etc.) and for damaged splines. OK Replace the oil pump assembly. L (The oil pump cannot be disassembled.) Repair if possible. If the splines are damaged and repairs are not possible, replace the torque converter assembly.

INSPECTION PROCEDURE 4 Does not move (forward) If the vehicle does not move forward when the selector lever is shifted from N to D, 3, 2 or L range while the engine is idling, the cause is probably abnormal line pressure or a malfunction of the underdrive clutch or valve body. Probable cause D D D D D Abnormal line Malfunction of Malfunction of pressure the underdrive solenoid valve the underdrive clutch the valve body L: Refer to the Transmission Workshop Manual. MUT-II Actuator test D No. 2 Underdrive solenoid valve OK: Sound of operation can be heard. OK Hydraulic pressure test (Refer to P.

23-55.) D Measure the hydraulic pressure for each element when in L range. Standard value: Refer to P.23-56. OK OK Underdrive clutch system check L D Remove the transmission assembly, valve body cover and valve body.

NG D Pistons should operate and pressure should be maintained when air is blown through the underdrive clutch oil hole in the transmission case. NG Replace the solenoid valve. L NG Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. Underdrive clutch check L D Check for burning of the facing, defective piston seal rings and interference at the retainer.



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23-28 Does not reverse AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 5 Probable cause D D D D D Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body If the vehicle does not reverse when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal pressure in the reverse clutch or low and reverse brake or a malfunction of the reverse clutch, low and reverse brake or valve body. L: Refer to the Transmission Workshop Manual. MUT-II Actuator test D No. 1 Low and reverse solenoid valve OK: Sound of operation can be heard. OK Hydraulic pressure check (Refer to P.

23-55.) D Measure the reverse clutch pressure in R range. Standard value: Refer to P.23-56. OK Hydraulic pressure check (Refer to P.23-55.) D Measure the low and reverse brake pressure in R range. Standard value: Refer to P.23-56. OK Reverse clutch system and low and reverse brake system check OK L D Remove the transmission assembly, valve body cover and valve body.

D Pistons should operate and pressure should be maintained NG when air is blown through the reverse clutch oil hole and the low reverse brake oil hole in the transmission case. NG Replace the low and reverse solenoid valve. L NG NG Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. Reverse clutch and low and reverse brake check L D Check for burning of the facing, defective piston seal rings and interference at the retainer.

INSPECTION PROCEDURE 6 Does not move (forward or reverse) If the vehicle does not move forward or reverse when the selector lever is shifted to any position while the engine is idling, the cause is probably abnormal line pressure, or a malfunction of the power train, oil pump or valve body. Probable cause D D D D Abnormal line Malfunction of Malfunction of Malfunction of pressure power train the oil pump the valve body L: Refer to the Transmission Workshop Manual. Hydraulic pressure check (Refer to P.23-55.) D Measure the hydraulic pressure for each element when moving forward and back. Standard value: Refer to P.23-56. NG Replace the oil pump assembly. L (The oil pump cannot be disassembled.) OK Power train check L D Disassemble the transmission, check the condition of the planetary carrier, output shaft and differential, etc. NG Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 7 Engine stalling when shifting If the engine stalls when the selector lever is shifted from N to D or R range while the engine is idling, the cause is probably a malfunction of the engine system, damper clutch solenoid valve, valve body or torque converter (damper clutch malfunction). 23-29 Probable cause D D D D Malfunction of the engine system Malfunction of the damper clutch control solenoid valve Malfunction of the valve body Malfunction of the torque converter (Malfunction of the damper clutch) L: Refer to the Transmission Workshop Manual. Engine system check D Check the control system, ignition system, fuel system and main system.

OK Replace the damper clutch control solenoid valve. Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. NG Replace the torque converter. NG Repair, replace INSPECTION PROCEDURE 8 Shocks when changing from N to D and large time lag If abnormal shocks or a time lag of 2 seconds or more occur when the selector lever is shifted from N to D range while the engine is idling, the cause is probably abnormal underdrive clutch pressure or a malfunction of the underdrive clutch, valve body, TPS <4G93> or APS <4G64>. Probable cause D D D D D D Abnormal underdrive clutch pressure Malfunction of the underdrive solenoid valve Malfunction of the underdrive clutch Malfunction of the valve body Malfunction of the idle position switch Malfunction of the TPS <4G93> Malfunction of the APS <4G64> L: Refer to the Transmission Workshop Manual. MUT-II Actuator test D No. 2 Underdrive solenoid valve OK: Sound of operation can be heard. OK When does the shock occur? When shifting Hydraulic pressure test (Refer to P.23-55.) D Measure the underdrive clutch pressure when shifting from N to D. Standard value: Refer to P.23-56. OK Underdrive clutch system check L D Remove the transmission assembly, valve body cover and valve body. D Pistons should operate and pressure should be maintained when air is blown through the underdrive clutch oil hole in the transmission case.

NG Underdrive clutch check L D Check for burning of the facing, defective piston seal rings and interference at the retainer. OK NG NG Replace the underdrive solenoid valve. L When starting Shocks sometimes occur No Yes MUT-II Data list D No. 11 TPS/APS OK: Increases in proportion to accelerator pedal opening angle. OK NG Code Nos.

11, 12, 14 TPS/APS system check (Refer to P.23-13.) Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. 23-30 AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 9 Shocks when changing from N to R and large time lag If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body, TPS <4G93> or APS <4G64>. Probable cause D D D D D D D D Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body Malfunction of the idle position switch Malfunction of the TPS <4G93> Malfunction of the APS <4G64> L: Refer to the Transmission Workshop Manual. MUT-II Actuator test D No. 1 Low and reverse solenoid valve OK: Sound of operation can be heard. OK When does the shock occur? When shifting Hydraulic pressure test (Refer to P.23-55.)

) D Measure the reverse clutch pressure in R range. Standard value: Refer to P.23-56. OK NG NG NG Replace the low and reverse solenoid valve. L When starting Shocks sometimes occur No Yes MUT-II Data list D No.

11, 12, 14 TPS/APS system check (Refer to P.23-13.) Valve body disassembly, cleaning and reassembly L D Pay particular attention to loosening of bolts, and to damage and slippage of O-rings, valves and valve bodies. D If the damage cannot be repaired, replace the valve body assembly. 23-30 AUTOMATIC TRANSMISSION - Troubleshooting INSPECTION PROCEDURE 9 Shocks when changing from N to R and large time lag If abnormal shocks or a time lag of 2 seconds or more occurs when the selector lever is shifted from N to R range while the engine is idling, the cause is probably abnormal reverse clutch pressure or low and reverse brake pressure, or a malfunction of the reverse clutch, low and reverse brake, valve body, TPS <4G93> or APS <4G64>. Probable cause D D D D D D D D Abnormal reverse clutch pressure Abnormal low and reverse brake pressure Malfunction of the low and reverse solenoid valve Malfunction of the reverse clutch Malfunction of the low and reverse brake Malfunction of the valve body Malfunction of the idle position switch Malfunction of the TPS <4G93> Malfunction of the APS <4G64> L: Refer to the Transmission Workshop Manual. MUT-II Actuator test D No. 1 Low and reverse solenoid valve OK: Sound of operation can be heard. OK When does the shock occur? When shifting Hydraulic pressure test (Refer to P.23-55.)

) D Measure the reverse clutch pressure in R range. Standard value: Refer to P.23-56. OK NG NG NG Replace the low and reverse solenoid valve. L When starting Shocks sometimes occur No Yes MUT-II Data list D No.

) D Measure the reverse clutch pressure in R range. Standard value: Refer to P.23-56. OK NG NG NG Replace the low and reverse solenoid valve. L When starting Shocks sometimes occur No Yes MUT-II Data list D No.



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8 - 5.2 V (3) Continuity between 2 and earth OK: Continuity OK Check the connector: A-85 following NG Repair Check the following connectors: A-81, B-14, B-91, B-89 OK Check trouble symptom. NG Check the harness wire between the vehicle speed sensor and ignition switch connector. OK NG Repair NG Repair OK Check trouble symptom. NG Check the harness wire between the engine-ECU and the vehicle speed sensor connector. OK Replace the engine-ECU. NG Check the ignition switch. (Refer to GROUP 54 - Ignition switch.)

) NG Repair Check the following connectors: A-81, B-14, B-10 OK Check trouble symptom. NG Check the harness wire between the engine-ECU and the vehicle speed sensor connector. OK Replace the engine-ECU. Check the connectors: A-81 following Repair NG Repair NG Repair OK Check trouble symptom. NG Check the harness wire between the vehicle speed sensor and the earth, and repair if necessary.

AUTOMATIC TRANSMISSION - Troubleshooting DATA LIST REFERENCE TABLE Item No. Check item 11 Throttle position sensor <4G93> Accelerator pedal position sensor <4G64> Check requirement Engine: Stopped Selector lever position: P Accelerator pedal: Released Accelerator pedal: Half depressed Accelerator pedal: Depressed 15 Oil temperature sensor Warming up Drive for 15 minutes or more so that the automatic transmission fluid temperature becomes 70 - 90 °C. Accelerator pedal: Released Accelerator pedal: Half depressed Driving at constant speed of 50 km/h in 3rd gear Driving at constant speed of 50 km/h in 3rd gear Released Depressed Brake pedal: Depressed Brake pedal: Released Idling with 1st gear (Vehicle stopped) Driving at constant speed of 50 km/h in 3rd gear 31 Low and reverse solenoid valve duty % Underdrive solenoid valve duty % Second solenoid valve duty % Overdrive solenoid valve duty % Selector lever position: L, 2, 3, D 10 km/h in 1st gear Normal value 300 - 1,000 mV 23-37 23100810284 Gradually rises from the above value 4,500 - 5,500 mV Gradually rises to 70 - 90 °C 21 Crank angle sensor Engine: Idling Selector lever position: P 550 - 900 r/min Gradually rises from the above value 1,800 - 2,100 r/min 1,800 - 2,100 r/min OFF ON ON OFF 0 km/h 50 km/h No. 31: 0 %, No. 32: 0 %, No. 33: 100 %, No. 34: 100% No. 31: 100 %, No. 32: 0 %, No. 33: 0 %, No. 34: 100% No. 31: 100 %, No. 32: 0 %, No. 33: 100 %, No. 34: 0% No.

31: 100 %, No. 32: 100 %, No. 33: 0 %, No. 34: 0% 22 23 25 Input shaft speed sensor Output shaft speed sensor Wide open throttle switch Stop lamp switch Selector lever position: 3 Selector lever position: 3 Accelerator pedal position Ignition switch: ON Engine: Stopped Selector lever position: 3 26 29 Vehicle speed sensor 32 30 km/h in 2nd gear 33 50 km/h in 3rd gear 34 70 km/h in 4th gear 23-38 Item No. Check item 36 **AUTOMATIC TRANSMISSION - Troubleshooting** Check requirement Selector lever position: 3 Driving at 50 km/h in 3rd gear with accelerator released Driving at constant speed of 70 km/h in 3rd gear Normal value 0% Damper clutch control solenoid valve duty % Approx. 70 - 90 % Approx. 100 - 300 r/min 52 Amount of damper clutch slippage Selector lever position: 3 Driving at 50 km/h in 3rd gear with accelerator fully closed Driving at constant speed of 70 km/h in 3rd gear Approx. 0 - 10 r/min Battery voltage (V) @0V Data changes 54 57 Control relay output voltage Engine volumetric efficiency Inhibitor switch Ignition switch : OFF Selector lever position: N Ignition switch: ON Engine: Stopped Ignition switch: ON @ OFF N range with accelerator pedal released @ depressed. Selector lever position: P Selector lever position: R Selector lever position: N Selector lever position: D Selector lever position: 3 Selector lever position: 2 Selector lever position: L 61 P R N D 3 2 L 1st 2nd 3rd 4th ON OFF 63 Shift position Selector lever position: L, 2, 3, D Driving at constant speed of 10 km/h in 1st gear Driving at constant speed of 30 km/h in 2nd gear Driving at constant speed of 50 km/h in 3rd gear Driving at constant speed of 70 km/h in 4th gear 65 Dual pressure switch Engine: Idling Selector lever position: N A/C switch: ON A/C switch: OFF **AUTOMATIC TRANSMISSION - Troubleshooting ACTUATOR TEST JUDGEMENT VALUE** Item No. 1 2 3 4 6 12 Check item Low reverse solenoid valve Underdrive solenoid valve Second solenoid valve Overdrive solenoid valve Damper clutch control solenoid valve A/T control relay Control relay is OFF for 3 seconds.

Test content Drive the solenoid valve specified by the MUT-II at 50 % duty for 5 seconds. No other solenoid valve should be energized. Check requirement Ignition switch: ON Selector lever position: P Engine: 0 r/min Vehicle speed: 0 km/h (Vehicle stopped) Throttle (Accelerator) opening voltage: Less than 0 V Normal value 23-39 23100820157 The operation sound should be audible when the solenoid valve is driven. Data list No. 54 (1) During test: 0 V (2) Normal: Battery voltage [V] 23100950122 INVECS-II CANCEL COMMAND Item No.

14 Item INVECS-II Content Stop the INVECS-II control and change gears according to the standard shift pattern. Remarks Use this function when carrying out procedure 8 in the road tests. 23-40 **AUTOMATIC TRANSMISSION - Troubleshooting** 23100840252 CHECK AT A/T-ECU TERMINALS Terminal No. 1 Check item Underdrive solenoid valve Check requirement Selector lever position: D (1st gear) Selector lever position: P Standard value Battery voltage Approx. 7 - 9 V 0V Battery voltage 0V Battery voltage 0V Battery voltage 0V Battery voltage 0V 0V Battery voltage Approx.

7 - 9 V Battery voltage Other than battery voltage Battery voltage Approx. 7 - 9 V 0V Battery voltage 0V 2 Solenoid valve power supply Ignition switch: OFF Ignition switch: ON 3 Solenoid valve power supply Ignition switch: OFF Ignition switch: ON 10 A/C compressor load signal A/C switch: OFF A/C switch: ON 11 Power supply Ignition switch: OFF Ignition switch: ON 12 13 14 Earth Earth Overdrive solenoid valve Always Always Selector lever position: D (3rd gear) Selector lever position: P 15 Damper clutch control solenoid valve Selector lever position: L (1st gear) Selector lever position: 3 (50 km/h in 3rd gear) Selector lever position: 2 (2nd gear) Selector lever position: P 16 Second solenoid valve 23 24 Diagnosis control Power supply Ignition switch: OFF Ignition switch: ON 25 Earth Always **AUTOMATIC TRANSMISSION - Troubleshooting** Terminal No. 26 31 Check item Earth Input shaft speed sensor Check requirement Always Measure between terminal No. 31 and No. 43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 Measure between terminal No. 32 and No. 43 by an oscilloscope. Engine: 2,000 r/min Selector lever position: 3 Engine: Idling Ignition switch: OFF Always ATF temperature: 25 °C ATF temperature: 80 °C 45 Throttle position sensor (TPS) <4G93> Accelerator pedal position sensor (APS) <4G64> Communication with engine-ECU Communication with engine-ECU Inhibitor switch P Accelerator pedal: Released (Engine stopped) Accelerator pedal: Depressed (Engine stopped) Engine: Idling Selector lever position: D Engine: Idling Selector lever position: D Selector lever position: P Selector lever position: Other than above 56 Inhibitor switch N Selector lever position: N Selector lever position: Other than above 57 Inhibitor switch 3 Selector lever position: 3 Selector lever position: Other than above 58 Inhibitor switch L Selector lever position: L Selector lever position: Other than above 59 Stop lamp switch Brake pedal: Depressed Brake pedal: Released 62 Low and reverse solenoid valve Selector lever position: D (1st gear) Selector lever position: D (2nd gear) 63 Diagnosis output Normal (No diagnosis code output) 23-41 Standard value 0V Refer to P.



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