CRUISE CONTROL SYSTEM

1998 Mitsubishi Montero

1998 ACCESSORIES & EQUIPMENT
Mitsubishi - Cruise Control Systems

Montero

DESCRIPTION & OPERATION

WARNING: Deactivate air bag system before performing any service operation. See AIR BAG RESTRAINT SYSTEMS article. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

Cruise control system is electronically and vacuum controlled. System components include a control unit, actuator, vacuum pump, cruise control switch, clutch pedal position switch (M/T), cruise indicator light, diode, Park/Neutral (P/N) switch (A/T), stoplight switch, vehicle speed sensor and A/T control unit (if equipped).

System has self-diagnostic capability. When self-diagnostic mode is activated, each switch and sensor is checked for defects. When cruise control system has been canceled without using a normal cancel method, a trouble code will be set and stored in control unit. Trouble codes can be retrieved to help determine which circuit is malfunctioning.

COMPONENT LOCATIONS

COMPONENT LOCATIONS TABLE

Component	Location
Cruise Control ECU	Behind Dash, On Steering Column Bracket
Data Link Connector (DLC)	Under Left Side Of Dash, Near Steering Column
Vehicle Speed Sensor	On Speedometer Assembly & On Transmission
Throttle Position Sensor	Mounted On Throttle Body

ADJUSTMENTS

CRUISE CONTROL CABLE

Remove link protector. Loosen lock nut. Hold link "A" so that it touches link "B". Adjust free play by turning adjusting nut until free play is.04-.08" (1-2 mm). Tighten lock nut. See Fig. 1 or 2.

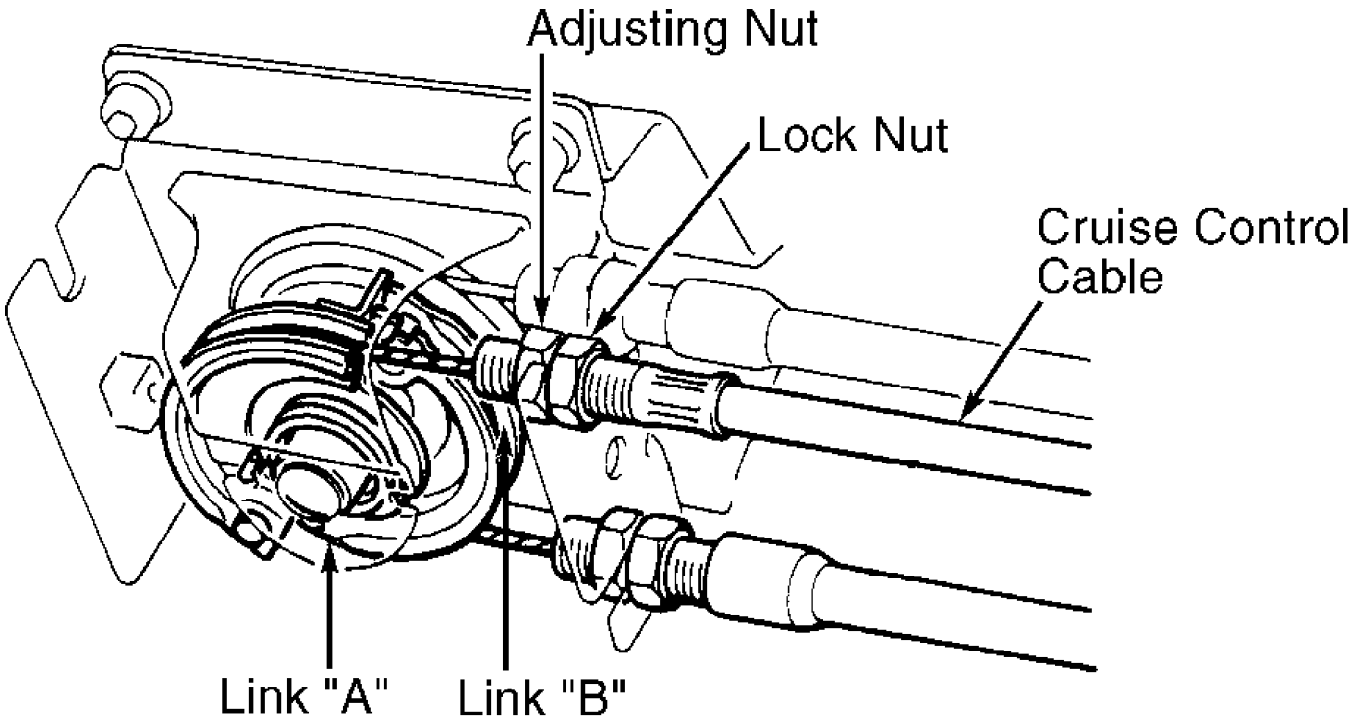


Fig. 1: Adjusting Cruise Control Cable (Except California)
Courtesy of Mitsubishi Motor Sales of America

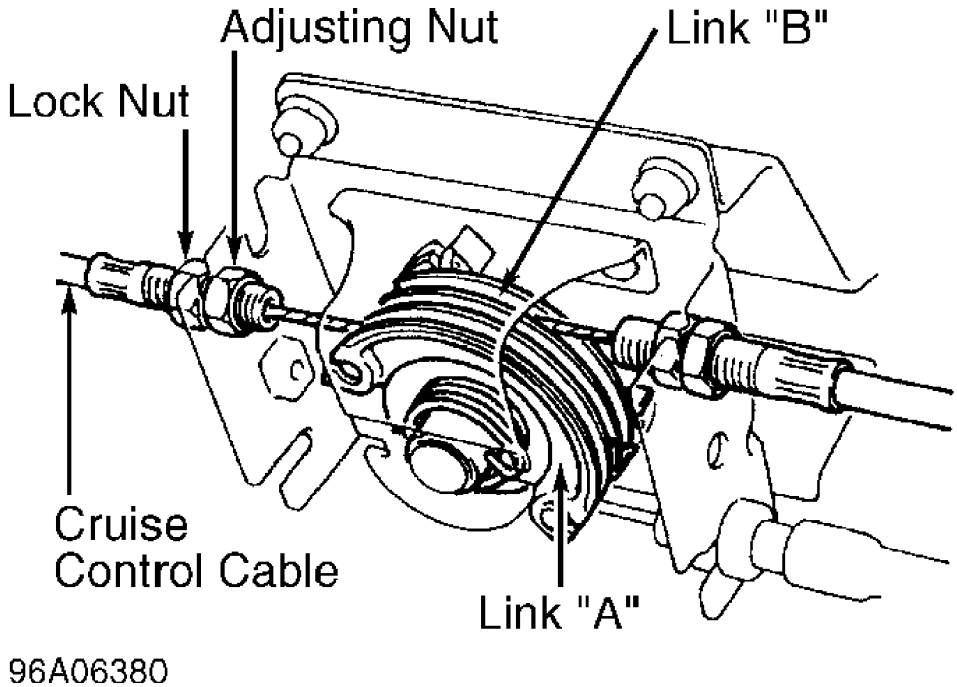


Fig. 2: Adjusting Cruise Control Cable (California)
Courtesy of Mitsubishi Motor Sales of America

TROUBLE SHOOTING

* PLEASE READ THIS FIRST *

NOTE: For further trouble shooting information, see INPUT INSPECTION CHART. See Fig. 3. See INSPECTION CHART FOR TROUBLE SYMPTOMS table under SYMPTOM TESTS.

PRELIMINARY CHECKS

Inspect vacuum pump, linkage assembly, actuator, cables and vacuum hoses. Ensure linkage and cables move smoothly. Ensure cables do not have excessive slack or tension.

CRUISE CONTROL SWITCH FUNCTION TEST

NOTE: If vehicle speed decreases about 9 MPH less than the set speed, set speed will be canceled. Speed will not set beyond system limit of 124 MPH.

1) Cruise control switch is part of multifunction switch mounted on steering column. To operate cruise control system, turn ignition on. Turn cruise control switch to ON position. Ensure switch indicator light comes on.

2) With cruise control switch in ON position, drive vehicle at least 25 MPH. Press and release SET button. Vehicle speed should stay at set speed. Instrument cluster cruise indicator light should come on. To increase set speed, turn control switch to RESUME position and hold until new set speed is reached.

3) To lower set speed, press SET button and hold until new set speed is reached. To return to set speed after cancellation, move resume switch to ON position. Vehicle speed should return to previous setting before cancellation. Set speed should cancel when any of the following occurs:

* Brake pedal is depressed.
* Cruise control main switch is turned to OFF position.
* Ignition switch is turned to OFF position.
* Transmission is shifted to Neutral.

SYSTEM CANCELS OR WILL NOT RESET AFTER CANCELLATION

1) Check for trouble codes. See RETRIEVING CODES under SELF-DIAGNOSTIC SYSTEM. If no trouble codes are stored, ensure cruise control can be set.

2) If cruise control can be set, system may have canceled due to driving on steep hills, or a loose wiring connection. If cruise control still cannot be set, perform SYSTEM INPUT TESTS under SYMPTOMS TESTS.

3) If SYSTEM INPUT TESTS check okay, check vacuum pump circuit. See CODE 11 under DIAGNOSTIC TESTS. If SYSTEM INPUT TESTS do not check okay, see INPUT INSPECTION CHART. See Fig. 3.

SYMPTOM TESTS

SYSTEM INPUT TESTS

1) System input tests should be performed if no trouble codes are stored when performing RETRIEVING CODES under SELF-DIAGNOSTIC SYSTEM. System input tests cycle each cruise control switch and sensor.

2) Use scan tool for system input check according to operating instructions provided with scan tool. Connect leads of analog voltmeter between cruise control terminal and ground terminal of data link connector. See Fig. 35.

3) Turn ignition on. To display results of input check, move cruise control SET switch to ON position. Then turn MAIN switch to ON position. Within one second, activate RESUME switch. Codes will display if circuit tested is okay. See Fig. 3.

Code No.	Input operation	Operation judgement
21	SET switch ON	Auto-cruise control-ECU judges that SET switch is ON
22	RESUME switch ON	Auto-cruise control-ECU judges that RESUME switch is ON
23	Stop light switch (ON when brake pedal depressed)	Auto-cruise control-ECU judges that stop light switch is ON
24	Vehicle speed signal	Auto-cruise control-ECU judges that vehicle speed is 40 km/h (25 mph) or higher
25		Auto-cruise control-ECU judges that vehicle speed is lower than 40 km/h (25 mph)
26	• Park/neutral position switch (ON when selector lever in N range)	Auto-cruise control-ECU judges that park/neutral position switch is ON
27	CANCEL switch ON	Auto-cruise control-ECU judges that CANCEL switch is ON
28	Throttle position sensor signal	Auto-cruise control-ECU judges that throttle position sensor voltage is 1.5 V or more
29	Closed throttle position switch	Auto-cruise control-ECU judges that closed throttle position switch is OFF

98B03805

Fig. 3: Input Inspection Chart
Courtesy of Mitsubishi Motor Sales of America

INSPECTION CHART FOR TROUBLE SYMPTOMS TABLE

Trouble Symptom	Perform Test No.
Communication With Scan Tool Not Possible (Communication With All Systems Not Possible)	1
Communication With Cruise Control ECU Not Possible	2
Diagnostic Inspection Possible/Input Inspection Not Possible	3
Cruise Control Does Not Cancel	
With Brake Pedal Depressed	4
With Select Lever In Neutral	5
With CANCEL Switch ON	6
Diagnosis Display Normal/Cruise Control Will Not Set	7
Cruise Control Cannot Be Set	8
Hunting Occurs At Set Speed	9
With Cruise Control Main Switch ON, Switch Indicator Does Not Illuminate (Cruise Control Operation Normal)	10
Cruise Control Main Switch Illumination Light Does Not Illuminate	11
Indicator Light Inside Combination Meter	

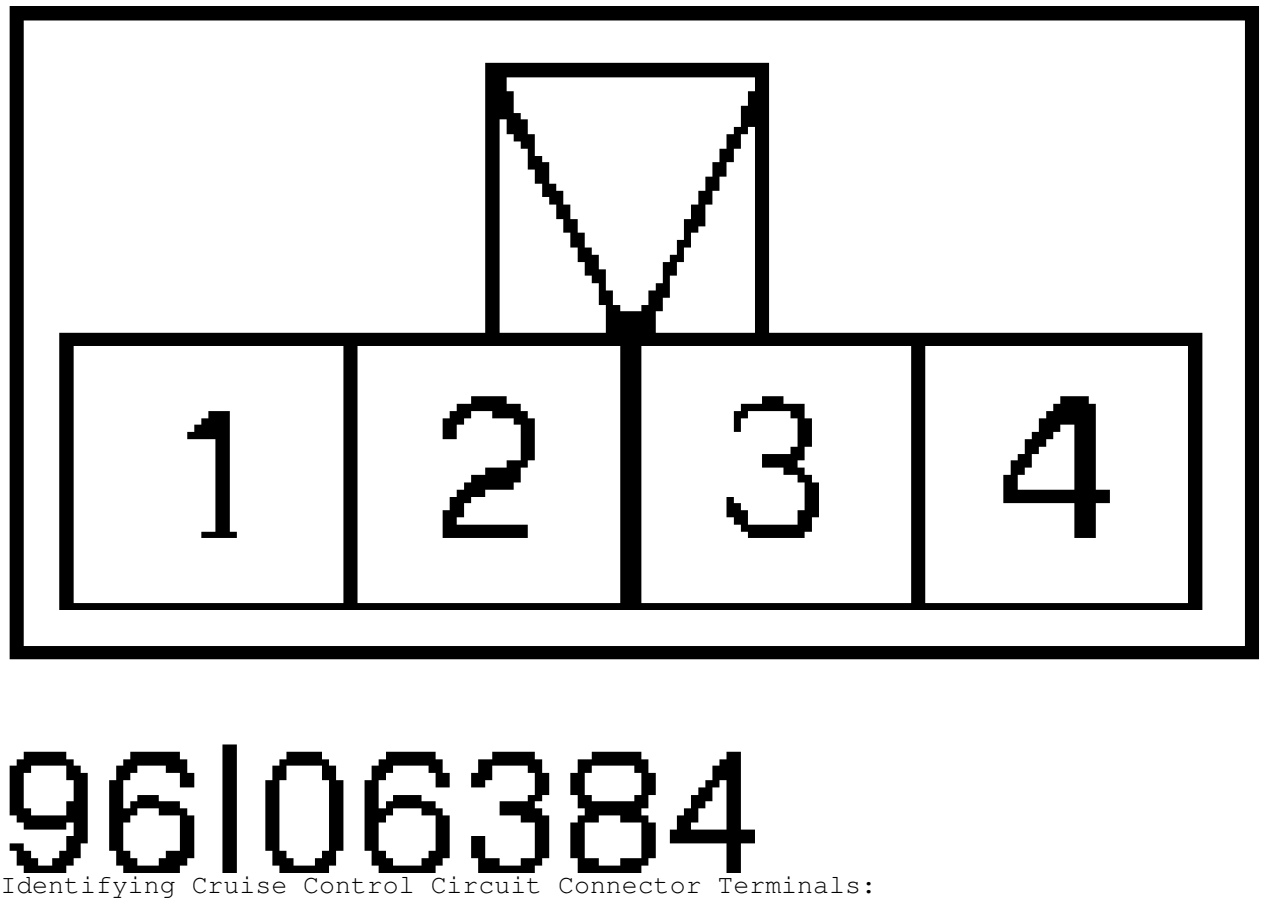


Fig. 4: Identifying Cruise Control Circuit Connector Terminals: IOD Or Storage Connector (A-09X)
Courtesy of Mitsubishi Motor Sales of America

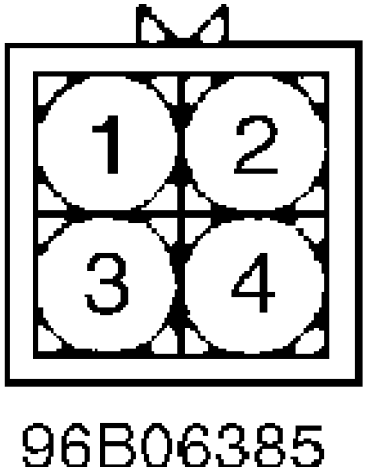
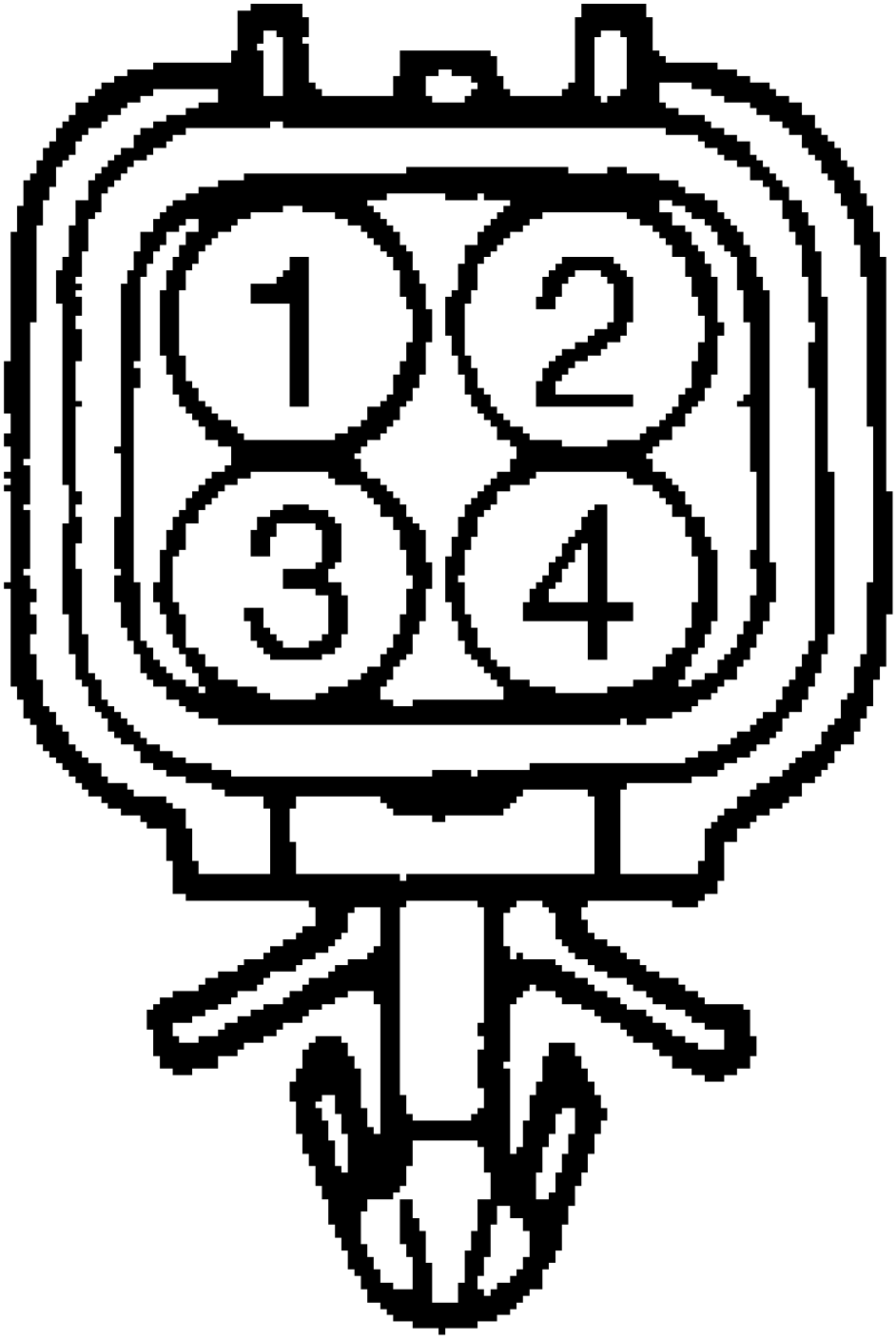


Fig. 5: Identifying Cruise Control Circuit Connector Terminals: Cruise Control Actuator Connector (A-57 Or A-95)
Courtesy of Mitsubishi Motor Sales of America



93I82261

Fig. 6: Identifying Cruise Control Circuit Connector Terminals: Vacuum Pump Connector (A-105)
Courtesy of Mitsubishi Motor Sales of America

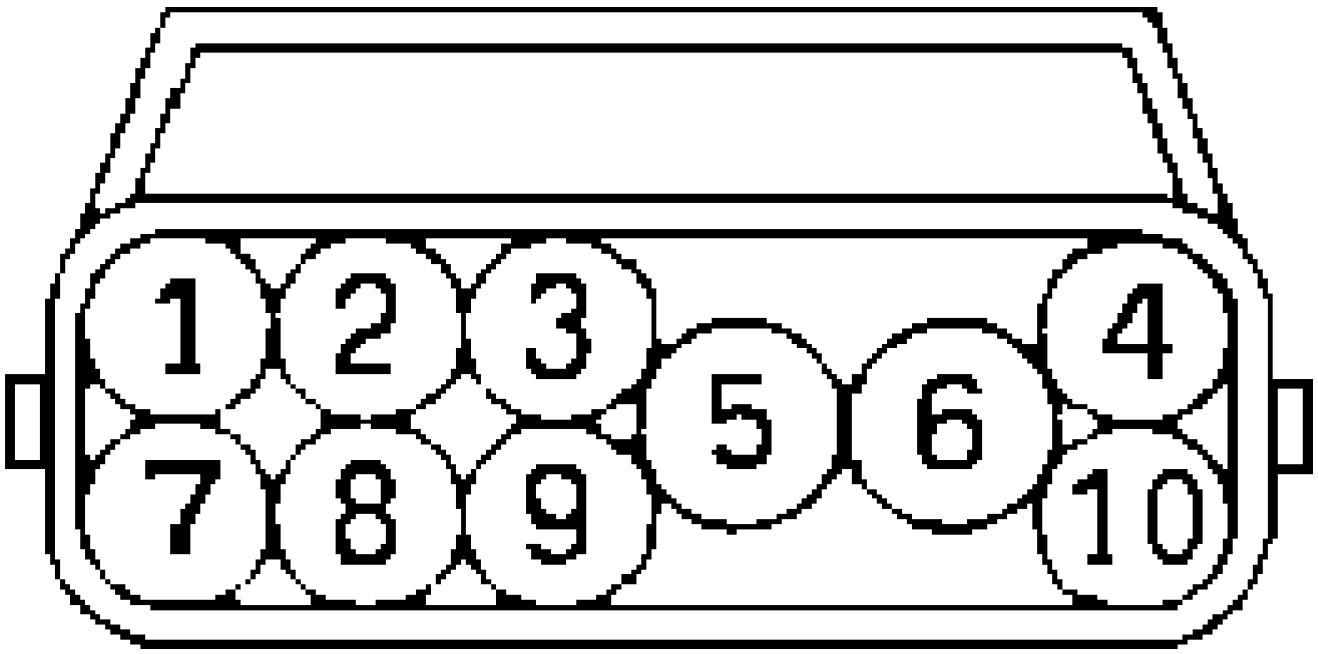


Fig. 7: Identifying Cruise Control Circuit Connector Terminals: Park/Neutral Switch Connector (B-08)
Courtesy of Mitsubishi Motor Sales of America

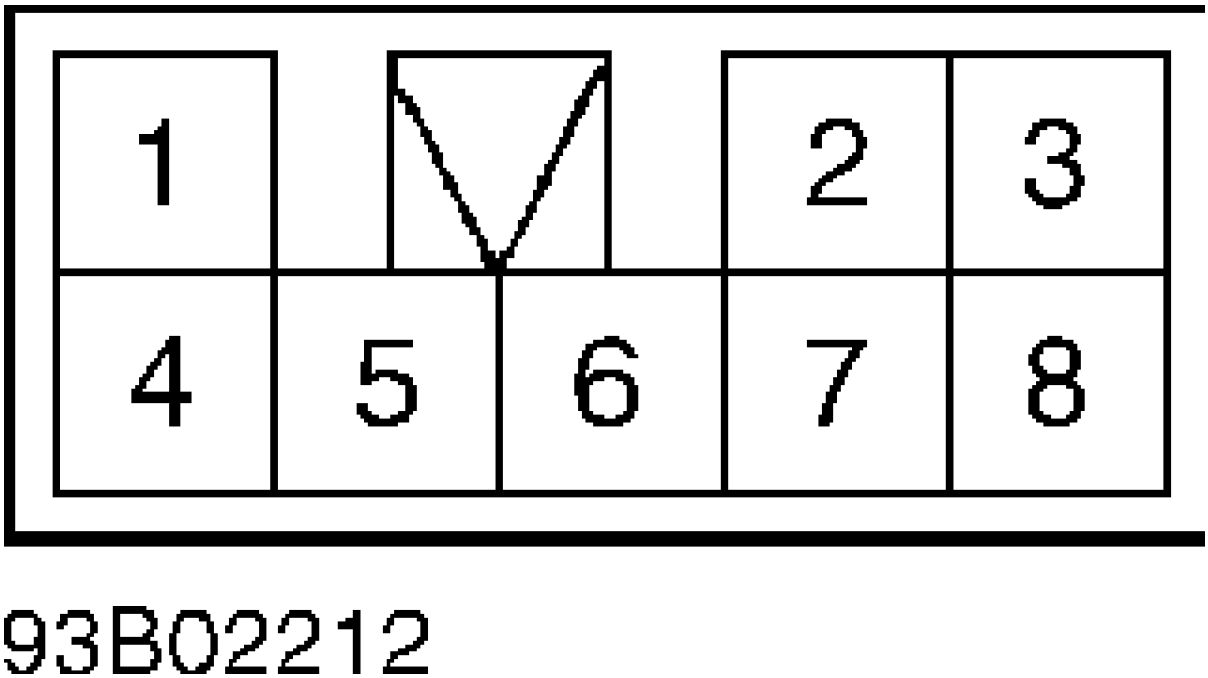
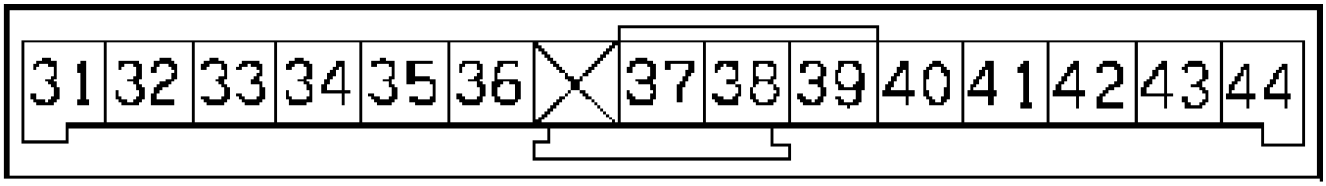
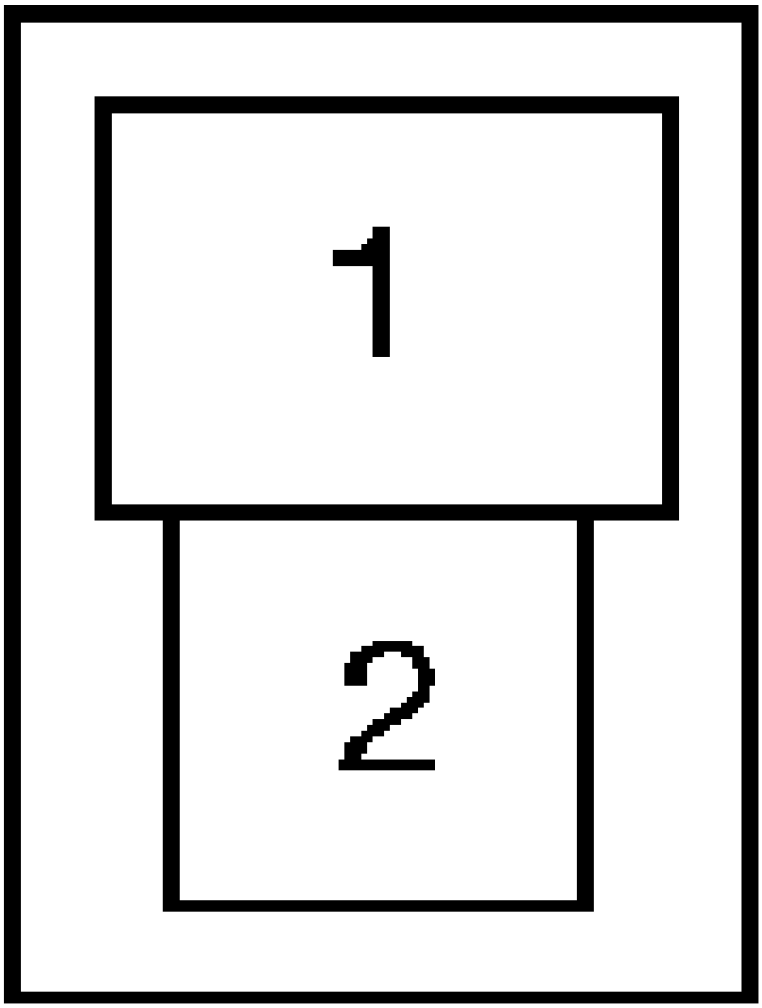


Fig. 8: Identifying Cruise Control Circuit Connector Terminals: Cruise Control Main Switch Connector (C-01)
Courtesy of Mitsubishi Motor Sales of America



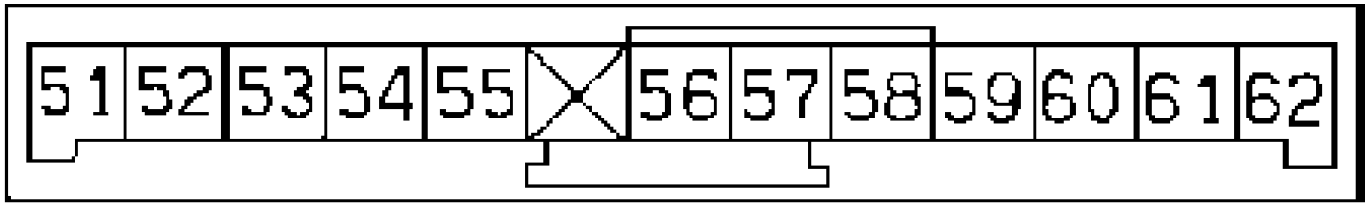
96D06386

Fig. 9: Identifying Cruise Control Circuit Connector Terminals: Combination Meter Connector (C-04)
Courtesy of Mitsubishi Motor Sales of America



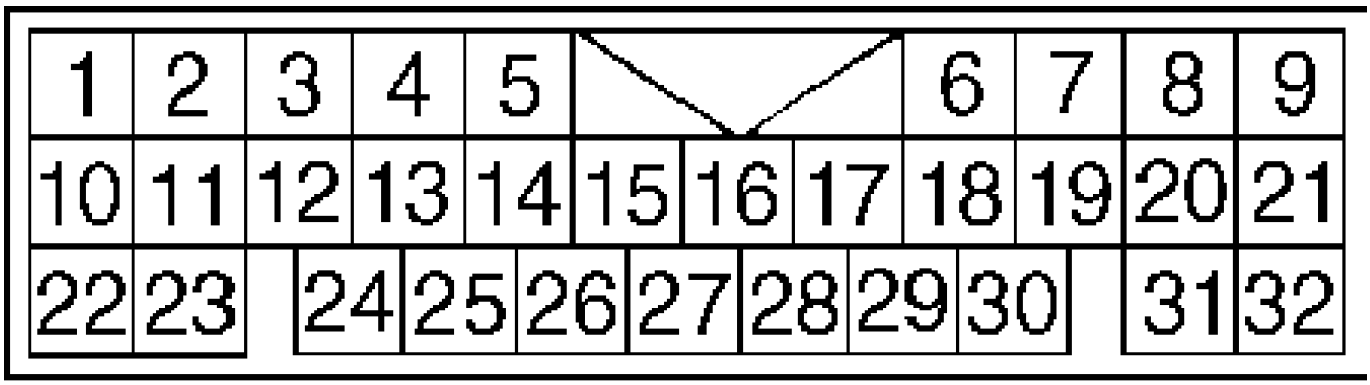
96F06387

Fig. 10: Identifying Cruise Control Circuit Connector Terminals: Combination Meter Connector (C-06)
Courtesy of Mitsubishi Motor Sales of America



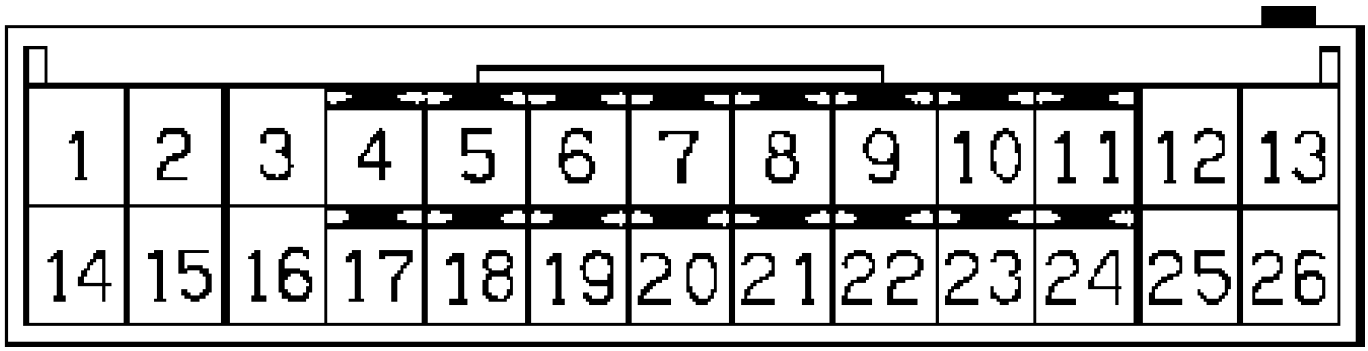
96H06388

Fig. 11: Identifying Cruise Control Circuit Connector Terminals: Combination Meter Connector (C-12)
Courtesy of Mitsubishi Motor Sales of America



96J06389

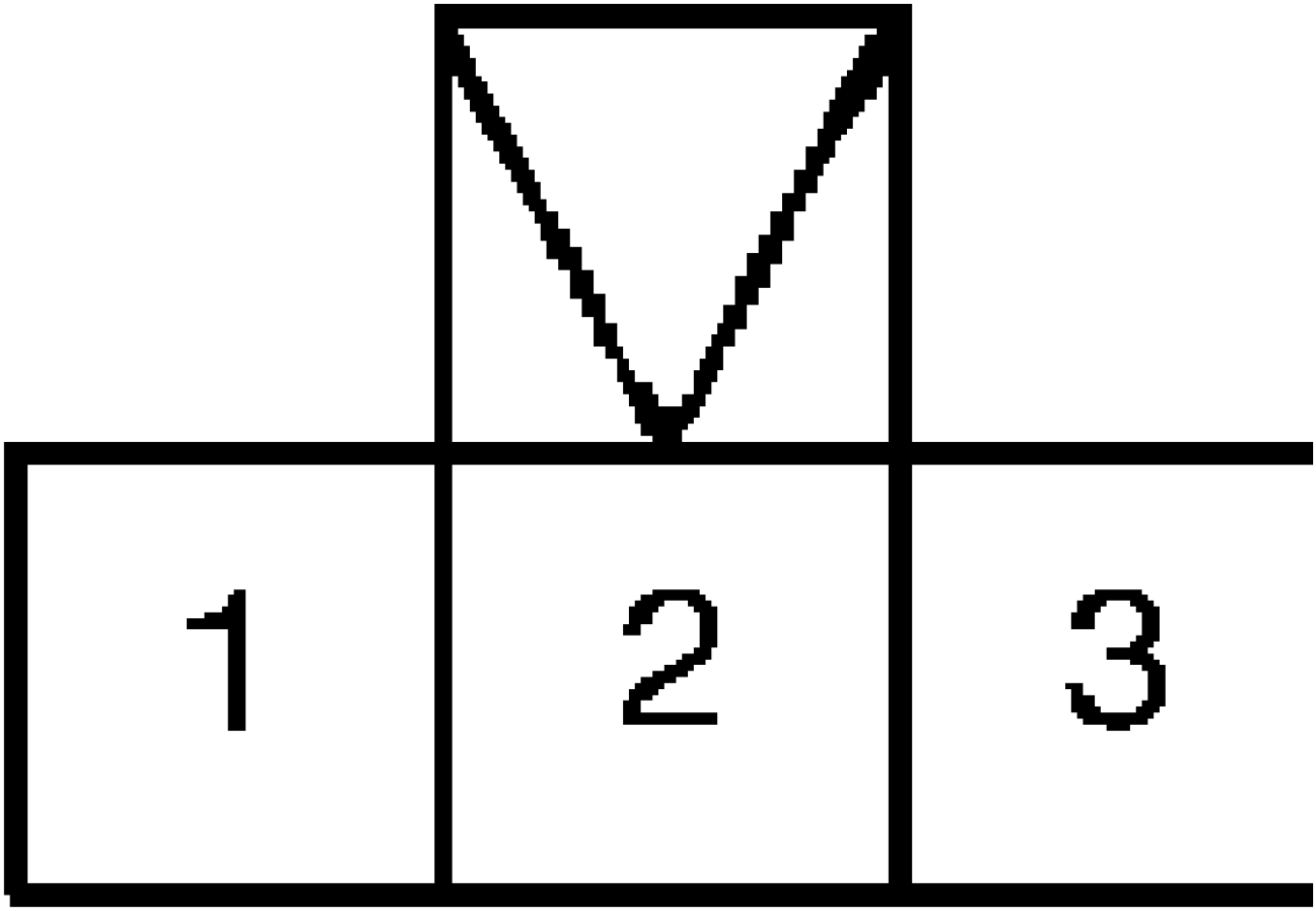
Fig. 12: Identifying Cruise Control Circuit Connector Terminals: Dash Harness/Transmission Harness Connector (C-124)
Courtesy of Mitsubishi Motor Sales of America



93J02211

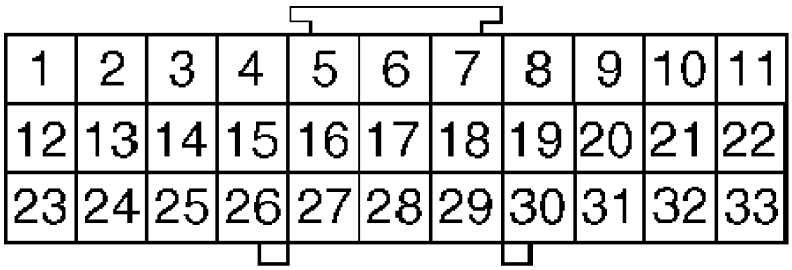
Fig. 13: Identifying Cruise Control Circuit Connector Terminals: Cruise Control ECU Connector (C-50)
Courtesy of Mitsubishi Motor Sales of America

Fig. 14: Identifying Cruise Control Circuit Connector Terminals: Stoplight Switch Connector (C-55)
Courtesy of Mitsubishi Motor Sales of America



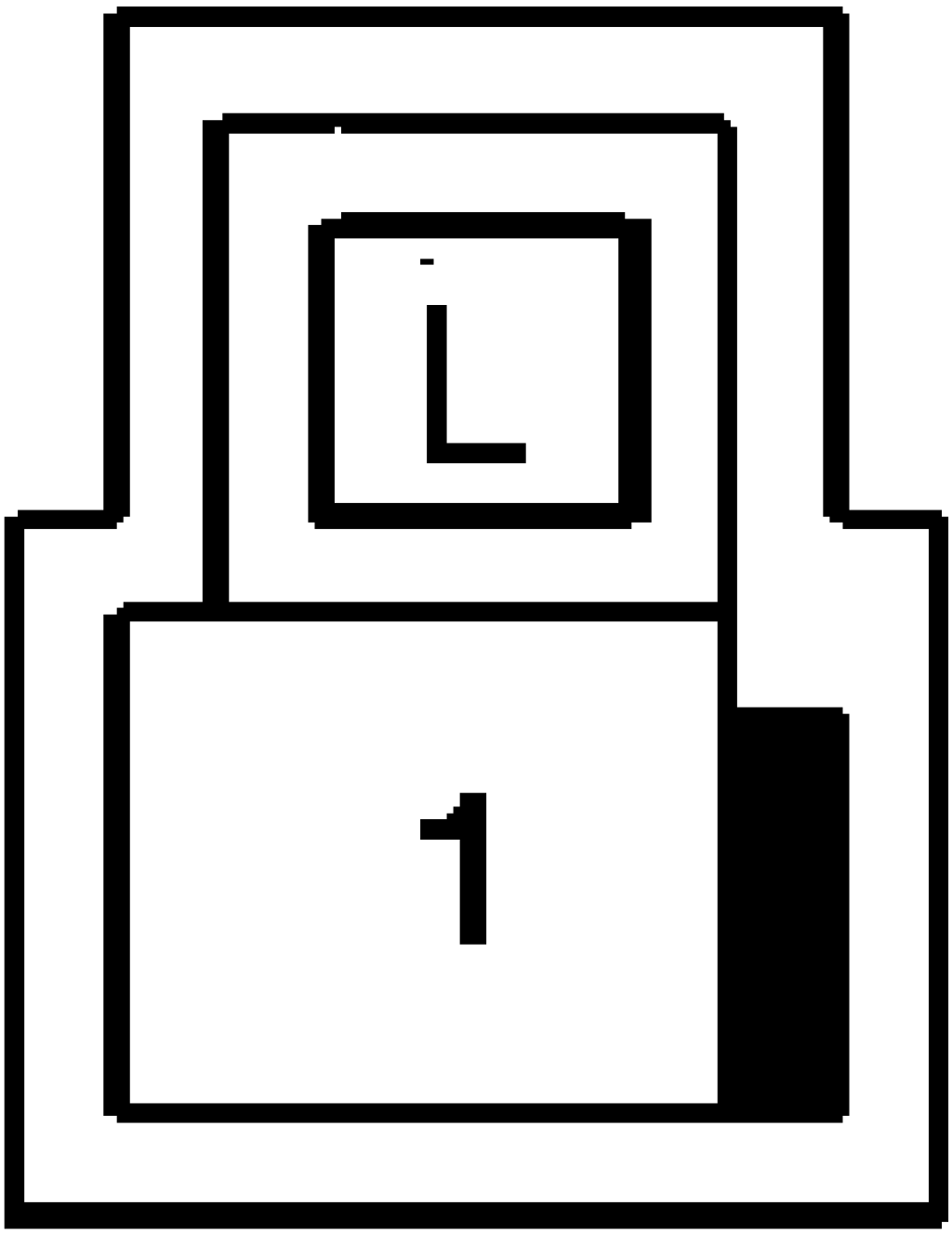
96B06390

Fig. 15: Identifying Cruise Control Circuit Connector Terminals: Clockspring Connector (C-128)
Courtesy of Mitsubishi Motor Sales of America



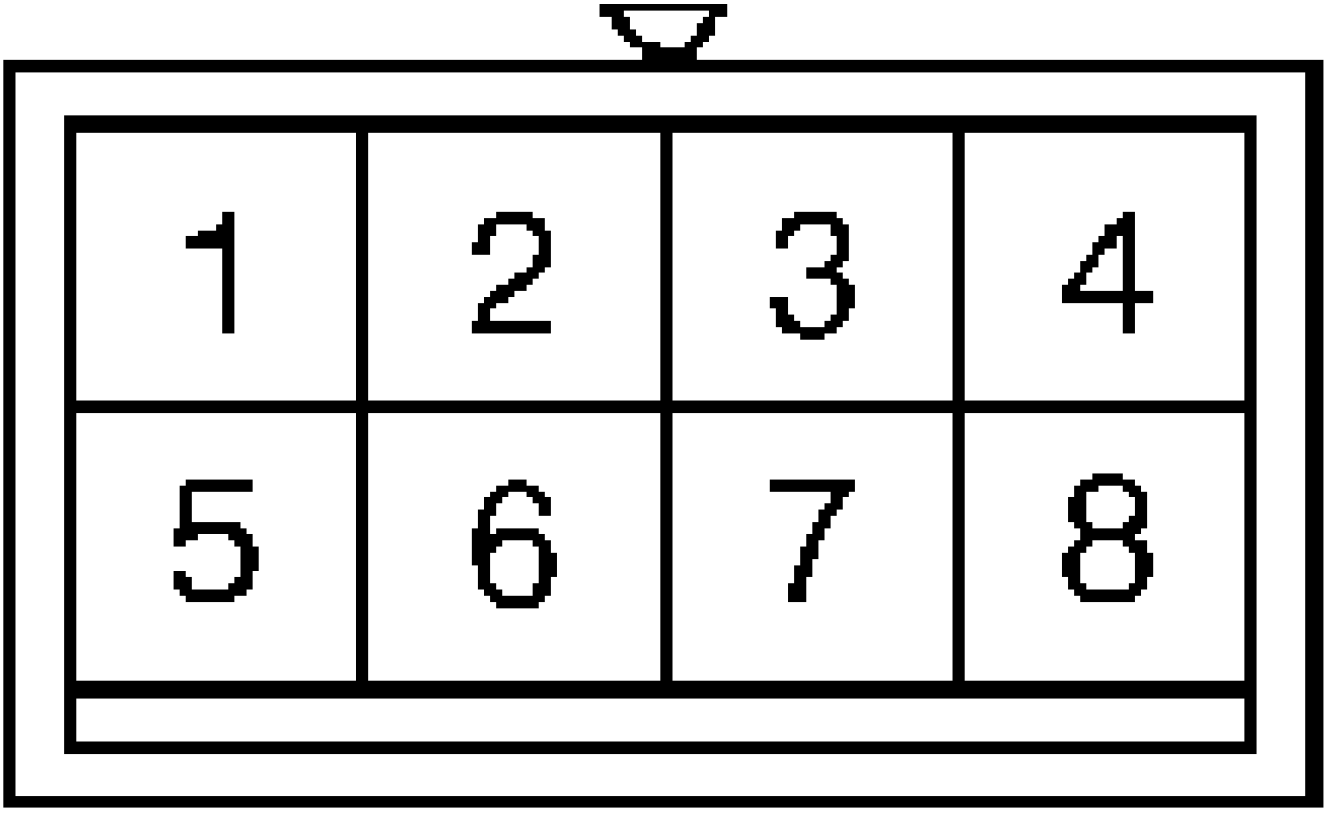
96D06391

Fig. 16: Identifying Cruise Control Circuit Connector Terminals: Joint Connectors No. 1, 2 & 3 (C-130, C-131 & C-132)
Courtesy of Mitsubishi Motor Sales of America



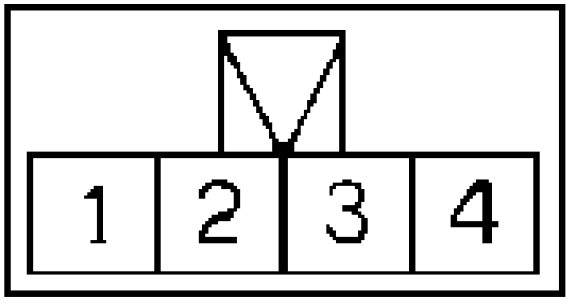
96F06392

Fig. 17: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-79)
Courtesy of Mitsubishi Motor Sales of America



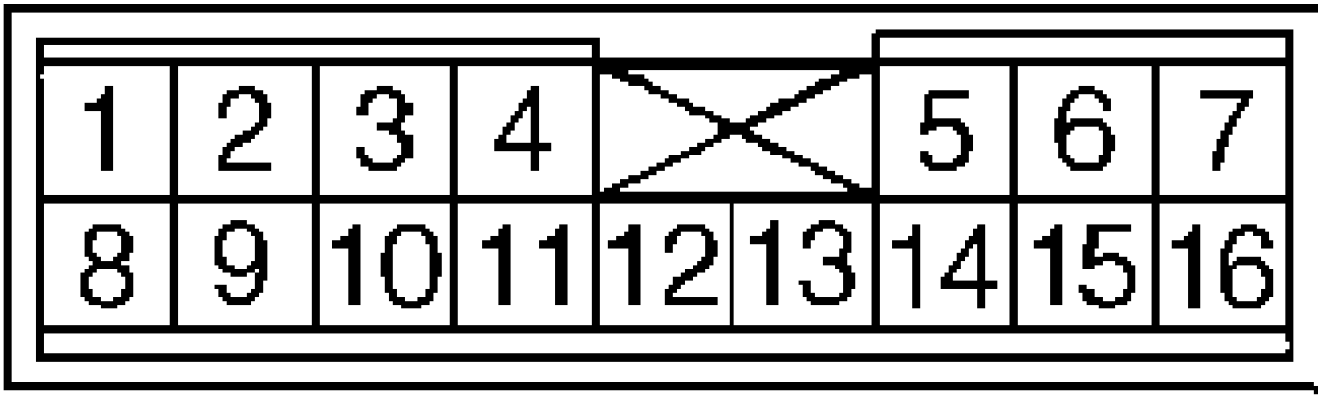
96H06393

Fig. 18: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-80)
Courtesy of Mitsubishi Motor Sales of America



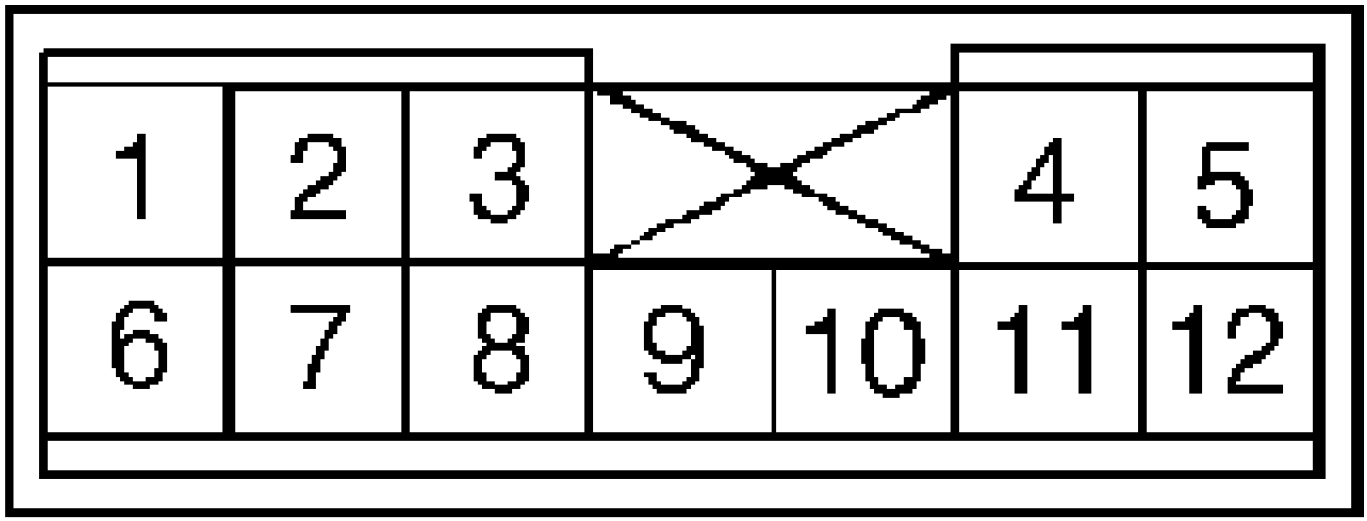
96I06384

Fig. 19: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-81)
Courtesy of Mitsubishi Motor Sales of America



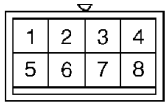
96C06395

Fig. 20: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-93)
Courtesy of Mitsubishi Motor Sales of America



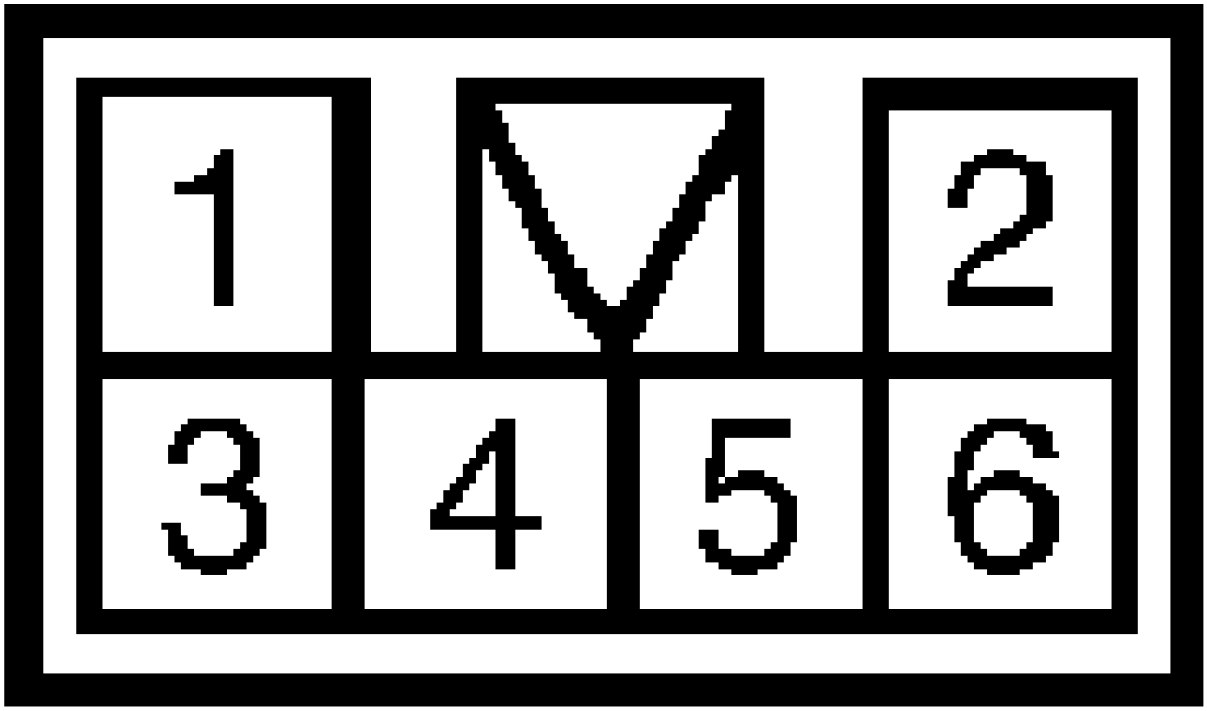
96E06396

Fig. 21: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-94)
Courtesy of Mitsubishi Motor Sales of America



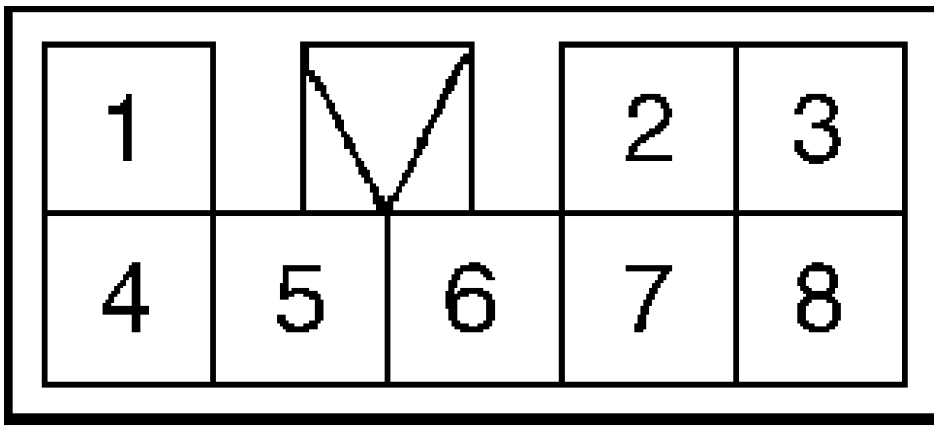
96H06393

Fig. 22: Identifying Cruise Control Circuit Connector Terminals: Junction Block Connector (C-101)
Courtesy of Mitsubishi Motor Sales of America



93E02218

Fig. 23: Identifying Cruise Control Circuit Connector Terminals: O/D Switch Connector (D-09)
Courtesy of Mitsubishi Motor Sales of America



93B02212

Fig. 24: Identifying Cruise Control Circuit Connector Terminals: Front Harness/ Dash Harness Connector (C-111)
Courtesy of Mitsubishi Motor Sales of America

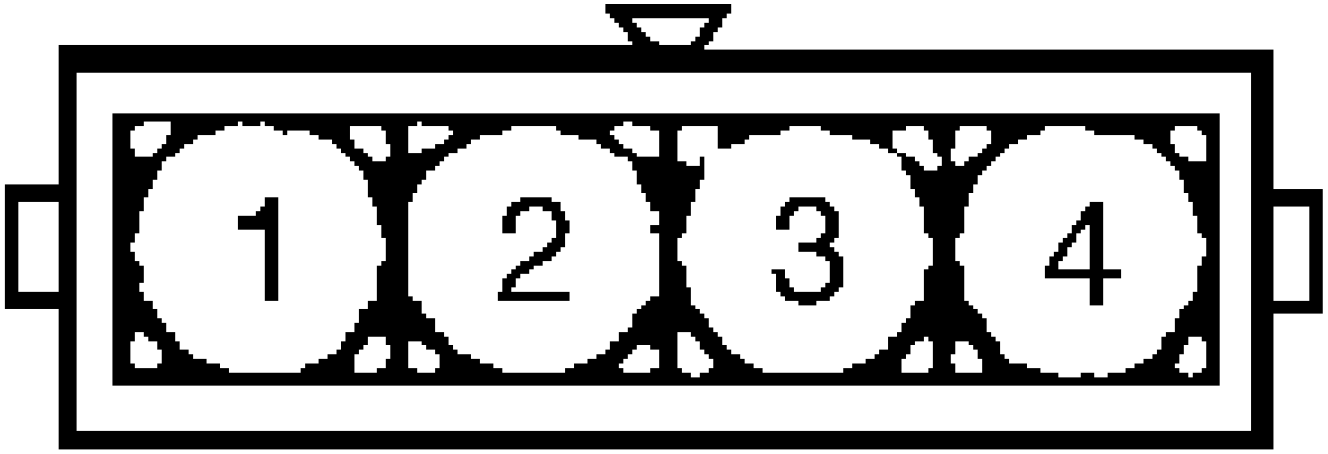


Fig. 25: Identifying Cruise Control Circuit Connector Terminals: Closed Throttle Switch & Throttle Position Sensor Connector
Courtesy of Mitsubishi Motor Sales of America

INSPECTION PROCEDURES FOR TROUBLE SHOOTING SYMPTOMS

Test No. 1

Defect in power supply system (including ground) for diagnostic line may be possible. Probable causes are:

* Malfunction of connector.
* Malfunction of harness.

1) Check voltage between data link connector pin No. 16 and ground. See Fig. 35. If battery voltage is present, go to next step. If battery voltage is not present, check junction block connectors C-81 and C-94. See Figs. 19, 21, 26 and 27. If connectors are defective, repair as necessary. If connectors are okay and malfunction remains, check harness between power supply and data link connector. Repair as necessary.

2) At data link connector, measure continuity between pin No. 4 and ground and pin No. 5 and ground. If continuity is present, replace scan tool. If continuity is not present, check data link connector for damage or loose connections. Repair as necessary. If connector is okay and malfunction remains, check harness between data link connector and ground. Repair as necessary.

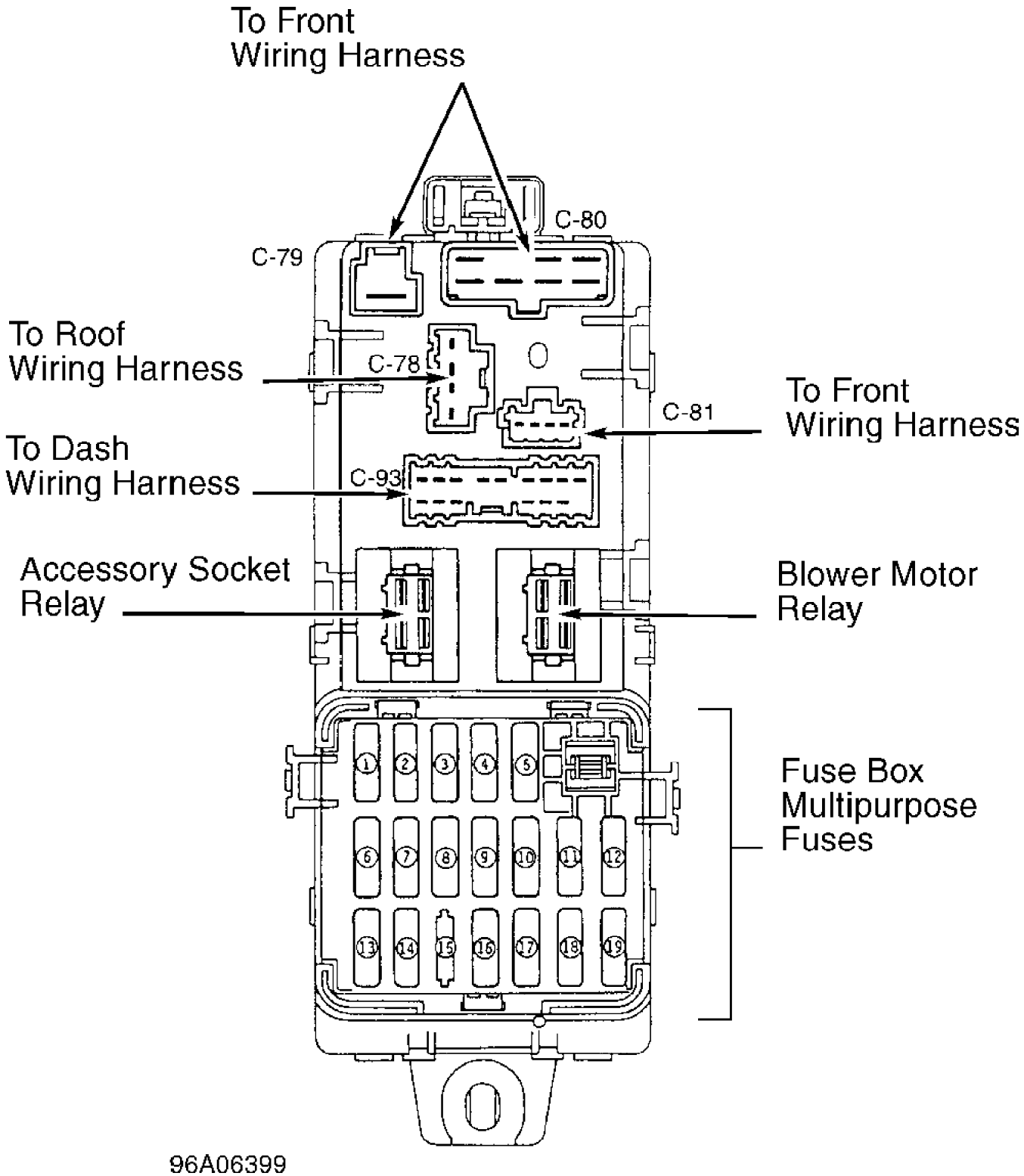


Fig. 26: Identifying Junction Block Connectors & Joint Connectors: Junction Block (Front)
Courtesy of Mitsubishi Motor Sales of America

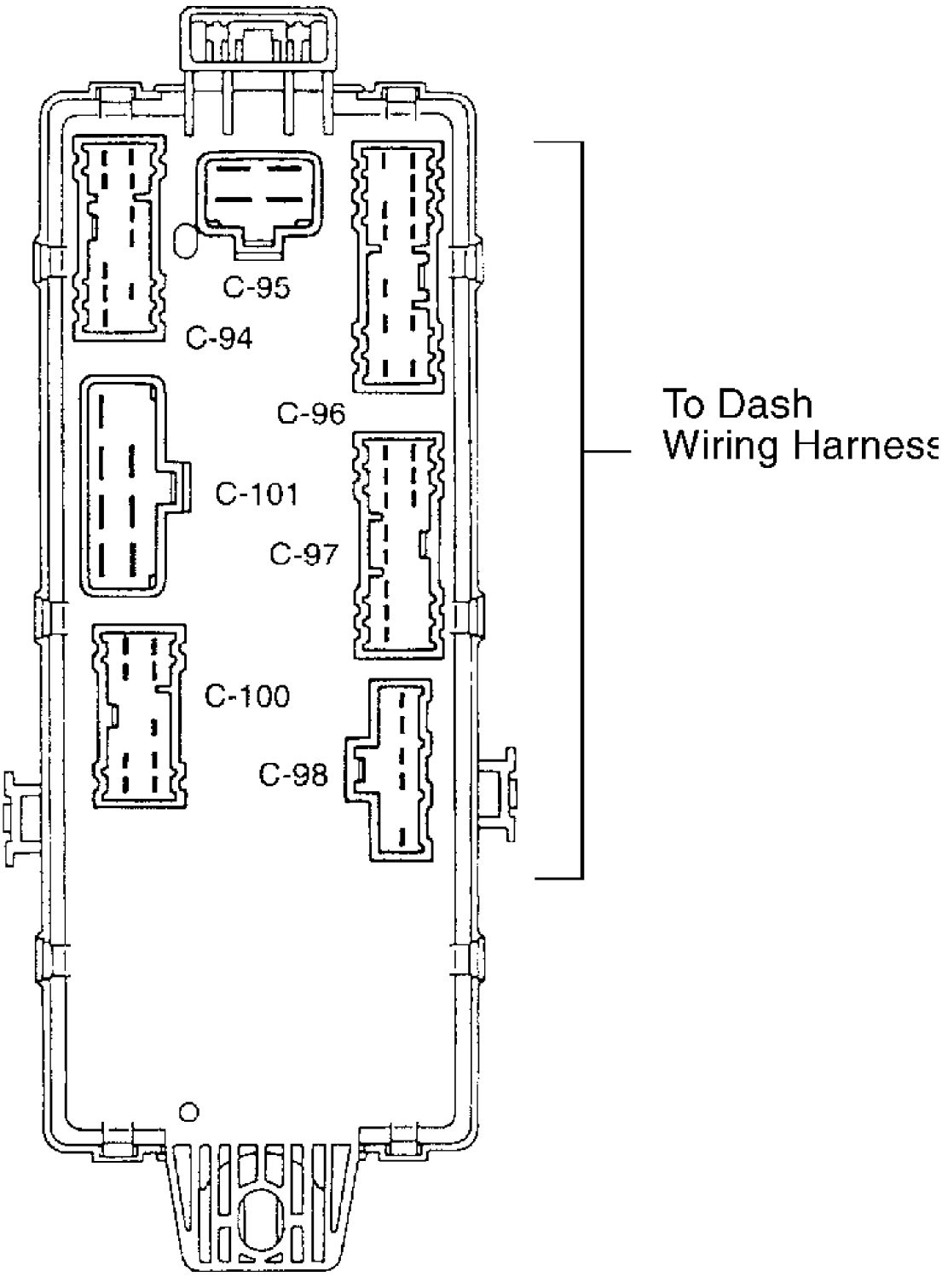


Fig. 27: Identifying Junction Block Connectors & Joint Connectors: Junction Block (Rear)
Courtesy of Mitsubishi Motor Sales of America

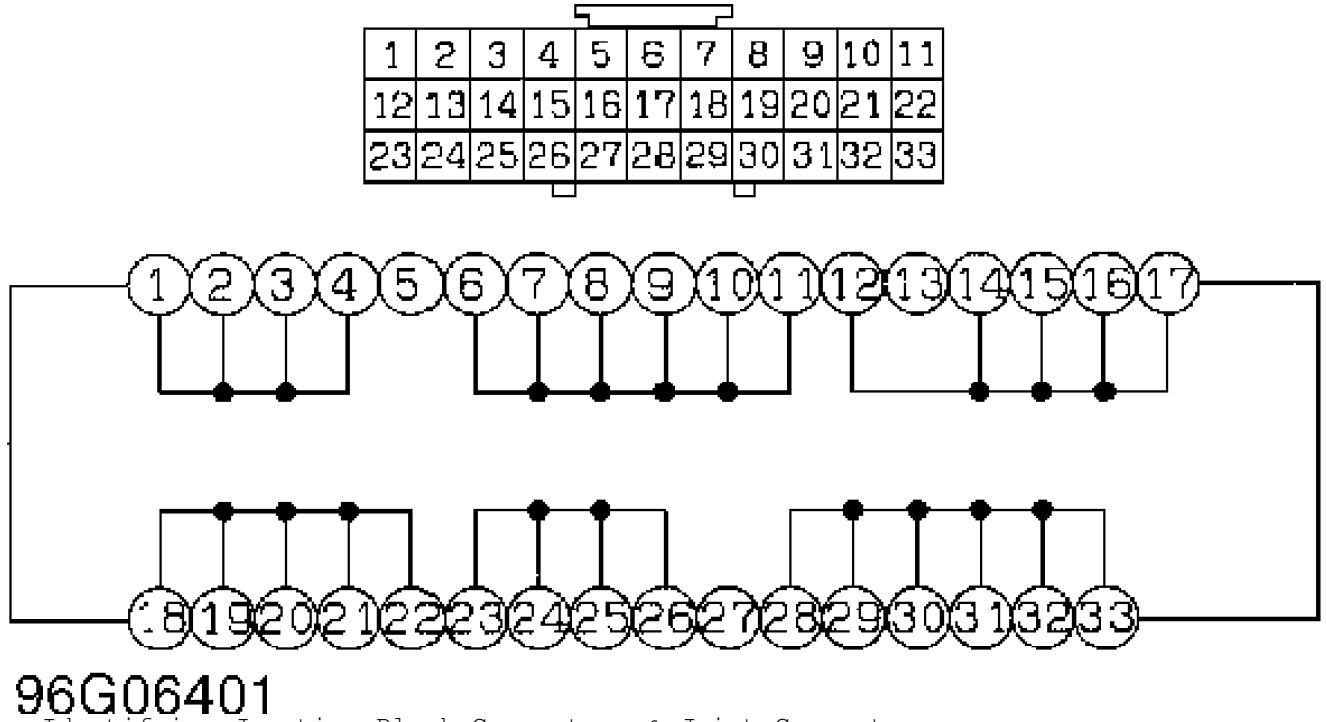


Fig. 28: Identifying Junction Block Connectors & Joint Connectors: Joint Connector C-130
Courtesy of Mitsubishi Motor Sales of America

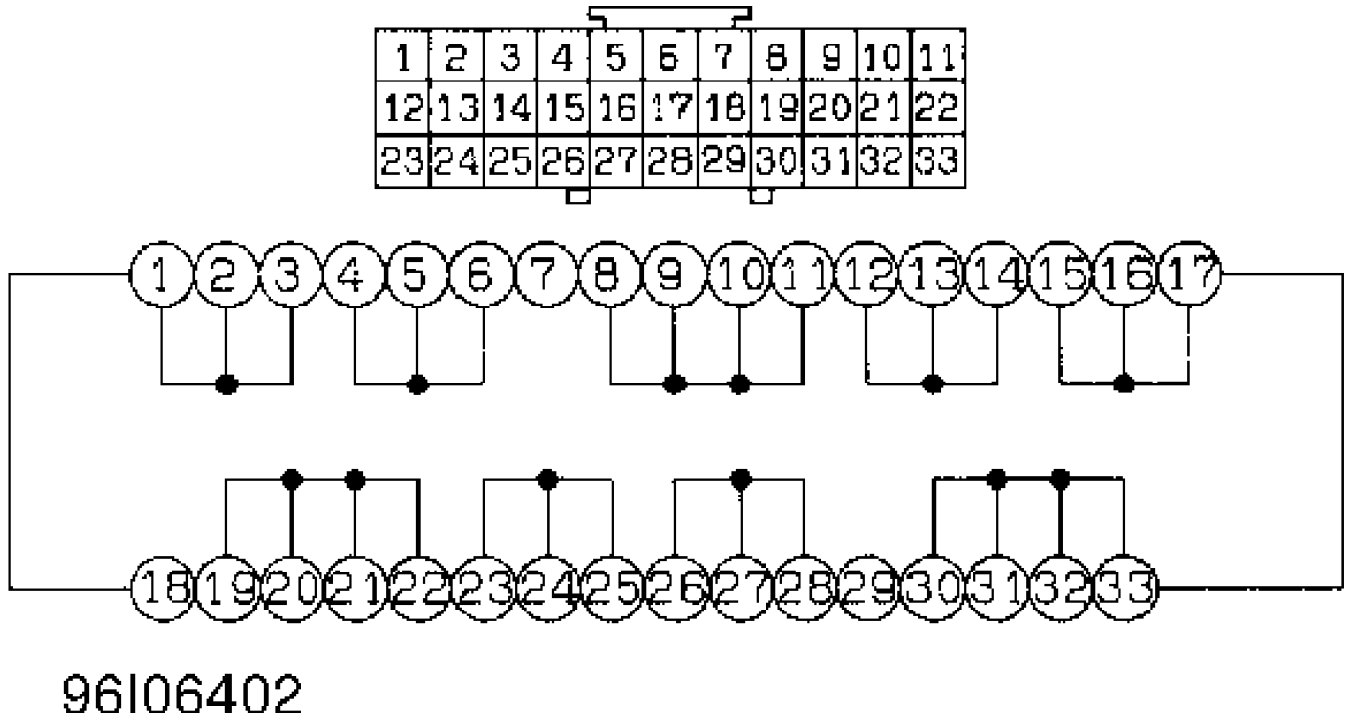


Fig. 29: Identifying Junction Block Connectors & Joint Connectors: Joint Connector C-131
Courtesy of Mitsubishi Motor Sales of America

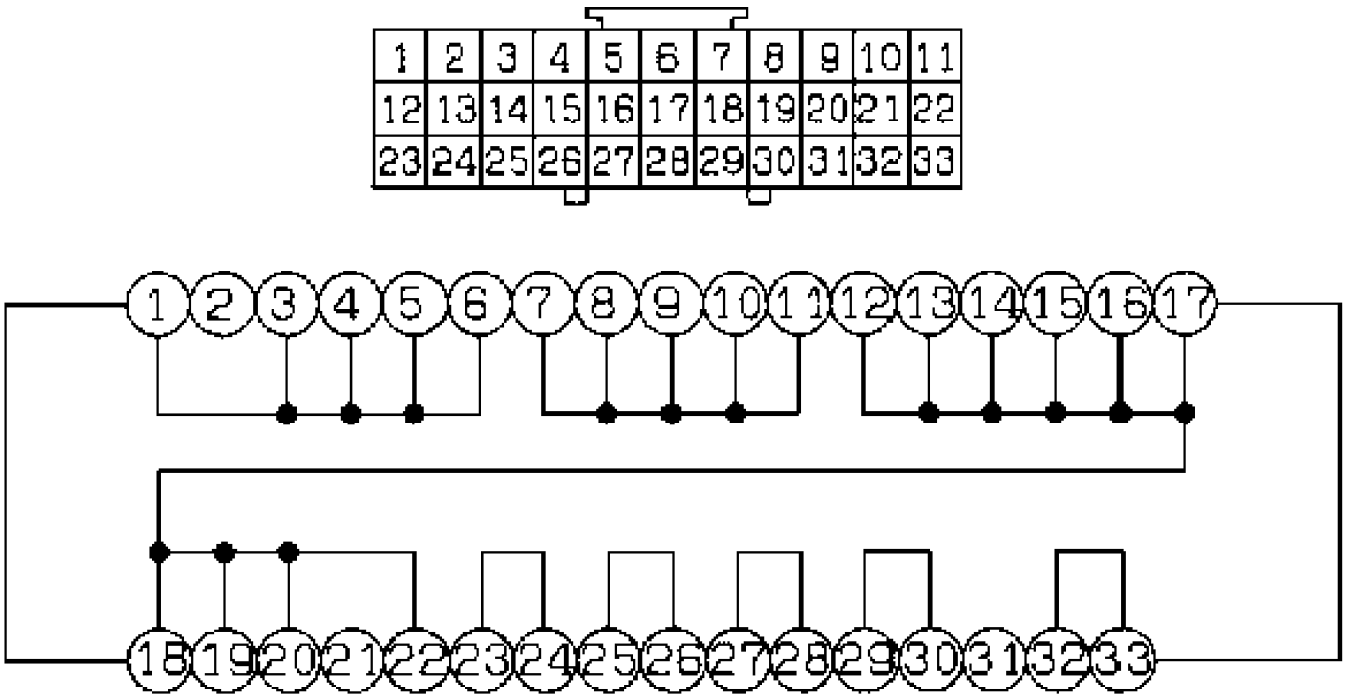


Fig. 30: Identifying Junction Block Connectors & Joint Connectors: Joint Connector C-132
Courtesy of Mitsubishi Motor Sales of America

Test No. 2

Malfunction of cruise control main switch or cruise control ECU ground circuit may be present. Probable causes are:

* Malfunction of cruise control main switch.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Check cruise control main switch. See CRUISE CONTROL SWITCH TESTS under COMPONENT TESTS. If switch is okay, go to next step. If switch is defective, repair or replace as necessary.

2) Disconnect main switch connector C-01. See Fig. 8. At harness side of connector, measure voltage between connector terminal No. 1 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check condition of junction block connectors C-94 and C-101. If connector(s) are defective, repair as necessary. If connectors are okay and malfunction remains, check harness between cruise control main switch and power supply. Repair as necessary.

3) Check condition of cruise control main switch connector C-01, joint connector C-132 and cruise control ECU connector C-50. Repair as necessary. If connectors are okay and malfunction remains, check harness between cruise control main switch and ground, and between main switch and cruise control ECU. Repair as necessary.

4) Disconnect cruise control ECU connector C-50. See Fig. 13. Check for continuity between ground and connector terminals No. 6, 8, and 14. If continuity is present, go to next step. If continuity is not present, check condition of connectors between front wiring

harness, dash wiring harness and joint connector C-132. Repair as necessary. If malfunction remains, check harness between cruise control main switch and power supply. Repair as necessary.

5) Check condition of cruise control ECU connector C-50. Repair as necessary. If connector is okay and malfunction persists, replace cruise control ECU.

Test No. 3

Malfunction of cruise control main switch or cruise control ECU ground circuit may be present. Probable causes are:

* Malfunction of cruise control main switch.
* Malfunction of clockspring.
* Malfunction of connector.
* Malfunction of harness.

1) Check cruise control switches. See CRUISE CONTROL SWITCH TESTS under COMPONENT TESTS. Replace any failed switch. If switches are okay, check clockspring. See CLOCKSPRING TEST under COMPONENT TESTS. If clockspring is okay, go to next step. Replace clockspring if not okay.

2) Disconnect clockspring connector C-128 and measure voltage between terminal No. 2 and ground. See Fig. 15. If battery voltage is present, go to next step. If battery voltage is not present, check condition of IOD connector A-09X, joint connector C-131, junction block connector C-81, junction block connector C-94 and junction block connector C-101. Repair as necessary. See Figs. 4, 16, 19, 21, 22, 26, 27 and 29. If connectors are okay and malfunction remains, check harness between clockspring and power supply. Repair as necessary.

3) Check condition of cruise control ECU connector C-50 and clockspring connector C-128. Repair as necessary. See Figs. 13 and 15. If connectors are okay and malfunction remains, check harness between clockspring and cruise control ECU. Repair as necessary.

Test No. 4

Malfunction of stoplight switch or stoplight circuit may be present. Probable causes are:

* Malfunction of stoplight switch.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) If stoplight does not illuminate with brake pedal depressed, go to next step. If stoplight illuminates with pedal depressed, replace cruise control ECU.

2) Check stoplight switch. See BRAKELIGHT/STOPLIGHT SWITCH TEST under COMPONENT TESTS. Replace stoplight switch as necessary. If stoplight switch is okay, go to next step.

3) Disconnect stoplight switch connector C-55. See Fig. 14. At harness side of connector, measure voltage between terminal No. 2 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check condition of joint connector C-131 and junction block connector C-94. Repair as necessary. See Fig. 26. If connectors are okay and malfunction remains, check harness between stoplight switch and power supply. Repair as necessary.

4) Check condition of cruise control ECU connector C-50 and stoplight switch connector C-55. Repair as necessary. If connectors are okay and malfunction remains, check harness between stoplight switch and cruise control ECU. Repair as necessary.

Test No. 5

An open circuit in output signal circuit in Neutral range is likely reason for malfunction. Probable causes are:

* Malfunction of park/neutral switch.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

Check condition of park/neutral switch connector B-08, dash harness/transmission harness connector C-124, cruise control ECU connector C-50 and joint connector C-130. Repair as necessary. If connectors are okay and malfunction remains, check harness between park/neutral switch and cruise control ECU. Repair as necessary. If harness is okay, replace cruise control ECU.

Test No. 6

An open circuit in circuit inside CANCEL switch is likely caused by a malfunction in cruise control switch. Replace cruise control switch.

Test No. 7

Because of an open circuit in battery back-up circuit system, fail-safe function prevents diagnostic trouble codes from being memorized and displayed even though cruise control is canceled. Probable causes are:

* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Disconnect cruise control ECU connector C-50. See Fig. 13. At harness side of connector, measure voltage between terminal No. 16 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check and repair IOD connector A-09X, joint connector C-132, junction block connector C-81 and junction block connector C-93 as necessary. See Figs. 4, 16, 19, 20, 26 and 30. If connectors are okay and malfunction remains, check harness between cruise control ECU and power supply. Repair as necessary.

2) Check condition of cruise control ECU connector C-50. Repair as necessary. If connector is okay and malfunction remains, replace cruise control ECU.

Test No. 8

A malfunction of switches or fail-safe function cancelling cruise control may be present. Probable causes are:

* Malfunction of cruise control main switch.
* Malfunction of cruise control switch.
* Malfunction of clockspring.
* Malfunction of harnesses or connectors.
* Malfunction of park/neutral position switch.
* Malfunction of cruise control ECU.

1) Attach scan tool to DLC. If scan tool can communicate with cruise control, go to next step. If scan tool cannot communicate with cruise control, go to TEST NO. 2.

2) If input switch inspection is possible with scan tool, go to next step. If input switch inspection is not possible, go to TEST NO. 3.

3) If input switch Code 21, 22 or 27 are still displayed, replace cruise control main switch. If codes are no longer displayed, go to next step.

4) If input switch Code 23 is still displayed, go to TEST NO.

13. If input switch Code 26 is still displayed, go to TEST NO. 14. If codes are no longer displayed, replace cruise control ECU.

Test No. 9

A malfunction of Vehicle Speed Sensor (VSS) or incorrect vacuum in cruise control vacuum pump or actuator may be present. Probable causes are:

* Malfunction of VSS.
* Malfunction of cruise control vacuum pump.
* Malfunction of actuator.
* Malfunction of cruise control ECU.

1) Check vehicle speed sensor. See VEHICLE SPEED SENSOR TEST under COMPONENT TESTS. If speed sensor is okay, go to next step. If speed sensor is defective, replace VSS.

2) Check cruise control vacuum pump. See VACUUM PUMP TEST under COMPONENT TESTS. If pump is defective, replace pump. If pump is okay, go to next step.

3) Check actuator. See ACTUATOR TEST under COMPONENT TESTS. If actuator is defective, replace actuator. If actuator is okay, replace cruise control ECU.

Test No. 10

A blown bulb in cruise control main switch or malfunction of cruise control main switch is probable cause of malfunction. Replace cruise control main switch.

Test No. 11

A malfunction of cruise control main switch, harness or connector may exist. Probable causes are:

* Malfunction of cruise control main switch.
* Malfunction of connector.
* Malfunction of harness.

1) Check cruise control main switch. See CRUISE CONTROL SWITCH TESTS under COMPONENT TESTS. If switch is okay, go to next step. If switch is defective, replace cruise control main switch.

2) Disconnect cruise control main switch connector C-01. At harness side of connector, measure voltage between terminal No. 2 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check joint connector C-130 and junction block connector C-80. Repair as necessary. See Figs. 16, 18, 26 and 28. If connectors are okay and malfunction remains, check harness between cruise control main switch and power supply. Repair as necessary.

3) Check cruise control main switch connector C-01, combination meter connector C-04, and joint connector C-130. Repair as necessary. See Figs. 8, 9, 16 and 28. If connectors are okay and malfunction remains, check harness between cruise control main switch and dash lights rheostat. Repair as necessary.

Test No. 12

A malfunction of bulb, connector or harness may exist. Probable causes are:

* Malfunction of bulb.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Perform cruise control indicator test. See

CRUISE CONTROL INDICATOR TEST under COMPONENT TESTS. If cruise control indicator is defective, replace indicator. If indicator checks okay, go to next step.

2) If cruise control indicator illuminates when cruise control connector C-50 terminal No. 23 is grounded at harness side, replace cruise control ECU. If indicator does not illuminate, check combination meter connector C-12 and cruise control ECU connector C-50. Repair as necessary. If connectors are okay and malfunction remains, check harness between combination meter and cruise control ECU. Repair as necessary.

Test No. 13

1) Perform stoplight switch test. See BRAKELIGHT/STOPLIGHT SWITCH TEST under COMPONENT TESTS. If switch is okay, go to next step. If switch is defective, replace brakelight switch.

2) Check cruise control ECU connector C-50, stoplight switch connector C-55 and joint connector C-131. Repair as necessary. See Figs. 13, 14, 16 and 29. If connectors are okay and malfunction remains, check harness between joint connector C-131 and cruise control ECU.

Test No. 14 (A/T)

1) Perform park/neutral switch test. See PARK/NEUTRAL SWITCH TEST under COMPONENT TESTS. If switch is okay, go to next step. If switch is defective, replace switch.

2) Check starter relay. Replace if defective. If relay is okay, check cruise control ECU connector C-50 and joint connector C-130. Repair as necessary. See Figs. 13, 16 and 28. If connectors are okay and malfunction remains, check harness between cruise control ECU and power supply.

COMPONENT TESTS

ACTUATOR TEST

Remove actuator. Apply vacuum to actuator. Actuator linkage holder should move more than 1.38" (35 mm). Actuator diaphragm should hold vacuum. Replace actuator if actuator does not test as specified.

BRAKELIGHT/STOPLIGHT SWITCH TEST

Disconnect stoplight switch connector C-55. When brake pedal is pressed, continuity should be present between terminals No. 2 and 3. See Fig. 14. When brake pedal is released, continuity should be present between terminals No. 1 and 4. Replace switch if it does not test as specified.

CLOCKSPRING TEST

WARNING: Deactivate air bag system before performing any service operation. See AIR BAG RESTRAINT SYSTEMS article. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

If clockspring fails any check, replace with a NEW clockspring.

1) Check connectors and protective tube for damage and deformities.

2) Visually check case for damage or deformities.

3) Continuity should be present between:

* Connector No. 1, terminal No. 1 and connector No. 4, terminal No. 2.
* Connector No. 1, terminal No. 2 and connector No. 4, terminal No. 1.
* Connector No. 1, terminal No. 3 and connector No. 3. See Fig. 31.

4) Align paint mark on SRS connector No. 4 with notch in clockspring connector No. 2 and join connectors. See Fig. 32. Using a DVOM, check for continuity between terminals No. 22 and 23 at SRS Test Harness (MB991613) connector No. 5.

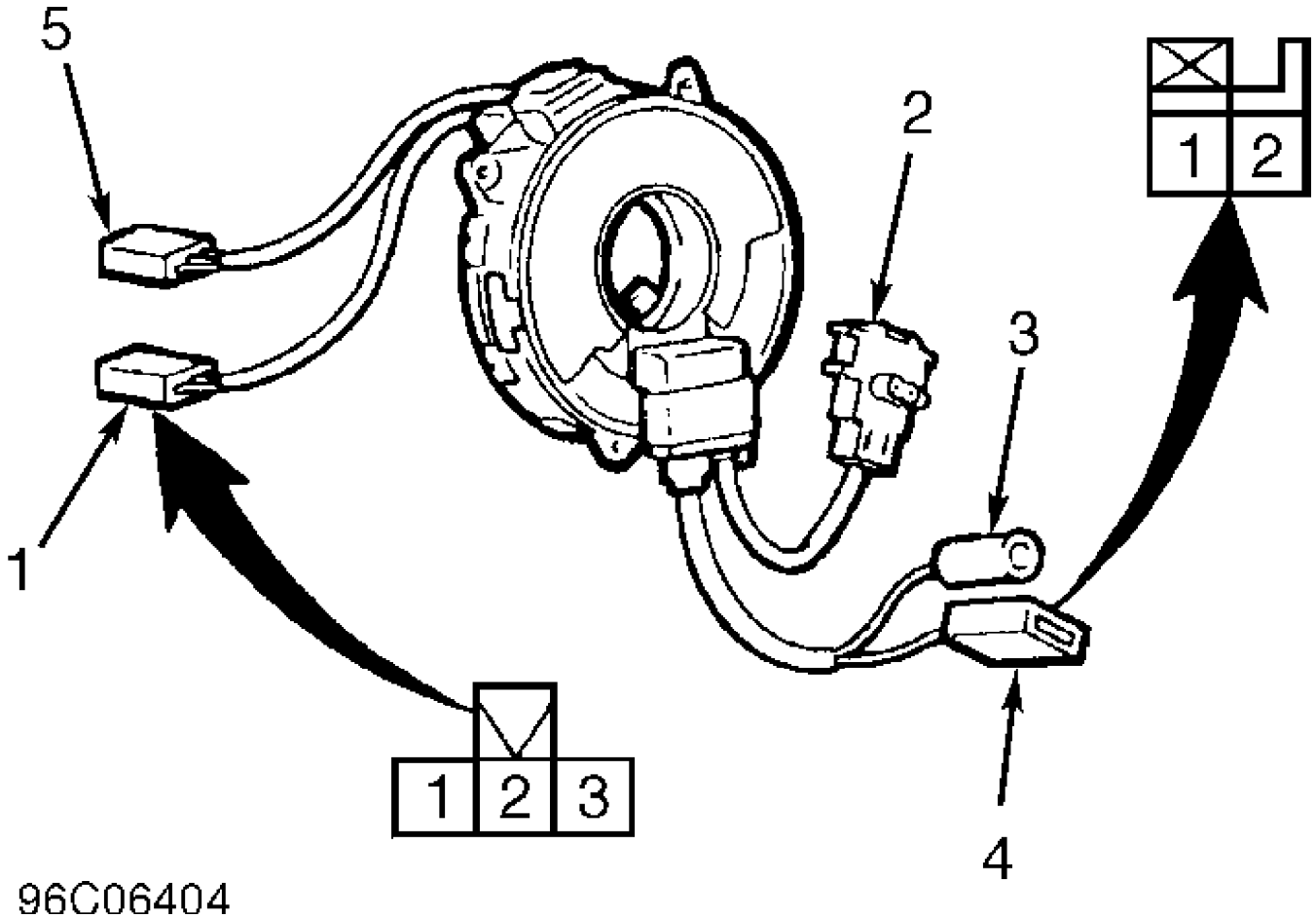


Fig. 31: Identifying Clockspring Connectors
Courtesy of Mitsubishi Motor Sales of America

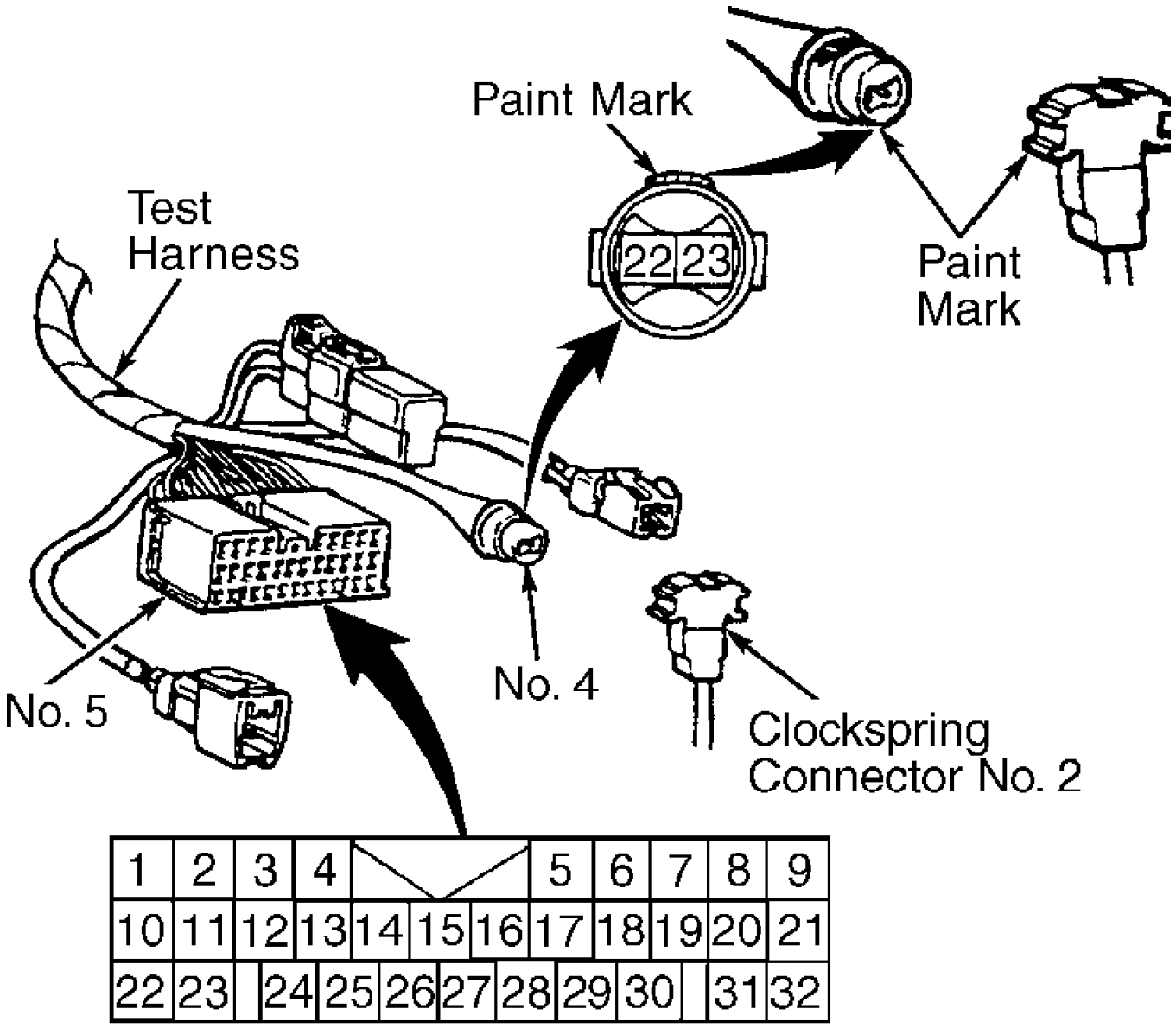


Fig. 32: Identifying SRS Harness Connectors
Courtesy of Mitsubishi Motor Sales of America

CLOSED THROTTLE POSITION SWITCH TEST & THROTTLE POSITION SENSOR TEST

Closed Throttle Position Switch

1) Disconnect throttle position sensor connector. Continuity should be present between terminals No. 1 and 2 with accelerator pedal released. See Fig. 25. Continuity should not be present with accelerator pedal pressed.

2) If continuity is not present with accelerator released, loosen throttle position sensor mounting screw. Turn throttle position sensor completely clockwise. Recheck continuity. Replace throttle position sensor if closed throttle position switch does not test as specified.

Throttle Position Sensor

1) Disconnect sensor connector. Resistance between terminals No. 1 and 4 should be 3500-6500 ohms. Use an analog ohmmeter to measure resistance between terminals No. 1 and 3. See Fig. 25.

2) Slowly open throttle valve to wide open throttle. Resistance should change smoothly as throttle is opened. Replace throttle position sensor if it does not test as specified.

CRUISE CONTROL INDICATOR TEST

With combination meter (instrument cluster) removed, check for continuity between terminals No. 4 and 5. See Fig. 33. If there is no continuity, replace cruise control indicator bulb.

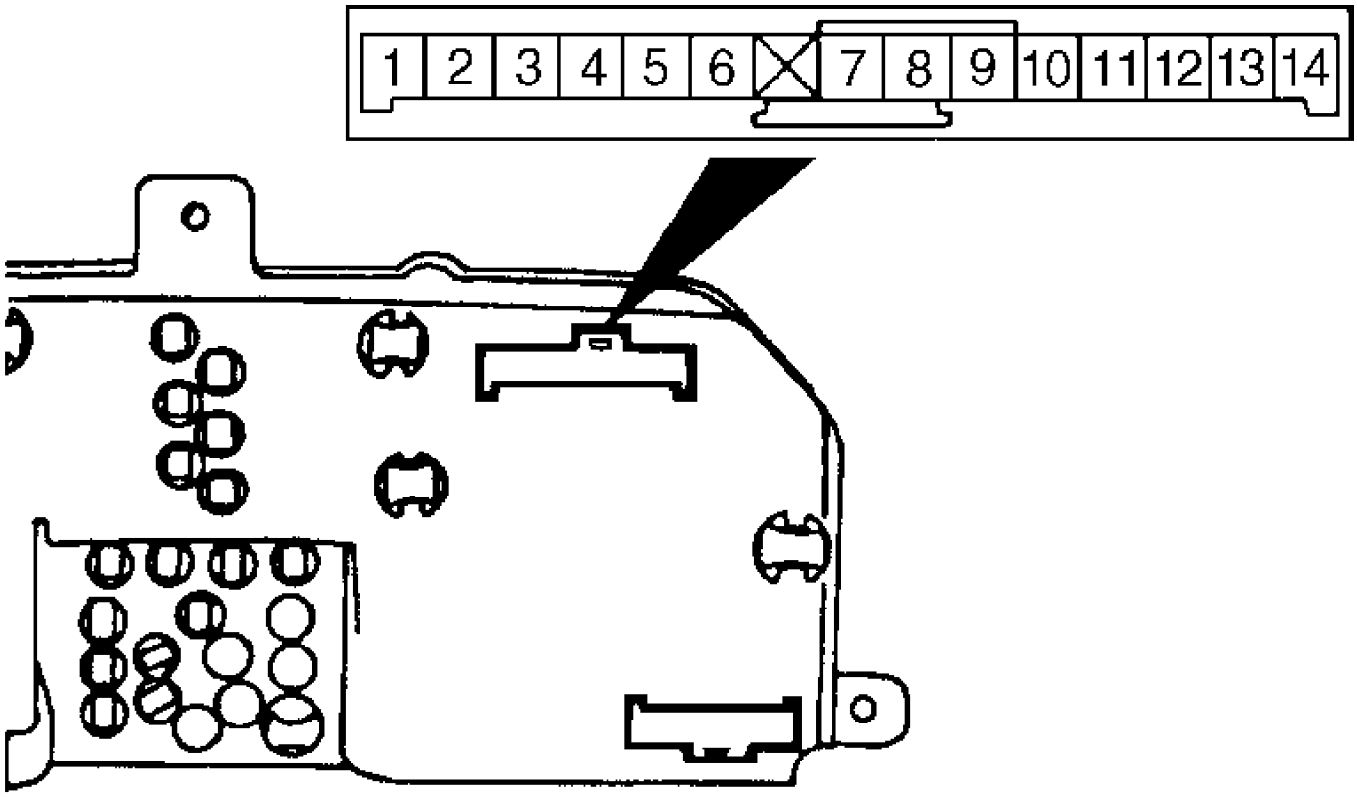


Fig. 33: Identifying Combination Meter Connector
Courtesy of Mitsubishi Motor Sales of America

CRUISE CONTROL SWITCH TESTS

CANCEL, SET & RESUME Switches

1) Remove lower steering column cover. Disconnect 2-pin switch connector. Operate and test switch. When CANCEL switch is operated between terminals No. 1 and 2, zero ohms resistance should be indicated.

2) When RESUME switch is operated, 820 ohms resistance should be present between terminals No. 1 and 2. When SET switch is operated, 2700 ohms resistance should be present between terminals No. 1 and 2. Replace cruise control switch if it does not test as specified.

Main Switch

1) In each switch position, continuity should be present between terminals No. 2 and 7 for switch illumination. See Fig. 8. When switch is moved to Neutral position, continuity should be present between terminals No. 1 and 4.

2) When switch is moved to ON position, continuity should be present between terminals No. 4 and 5. Connect battery voltage to terminal No. 5 and ground terminal No. 4.

3) Battery voltage should be present on terminal No. 1 when main switch is moved to ON position. Replace main switch if it does not test as specified.

PARK/NEUTRAL SWITCH TEST

Disconnect switch connector. Shift transmission into Neutral position. Continuity should be present between terminals No. 5 (Black/Blue wire) and No. 6 (Blue/Black wire). See Fig. 7. If continuity is not present, adjust park/neutral switch. If switch is adjusted properly, replace switch.

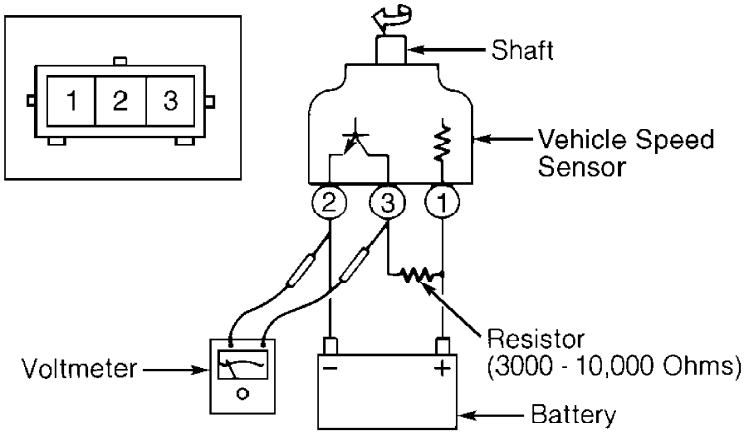
VACUUM PUMP TEST

1) Disconnect vacuum pump connector A-105. Resistance should be 50-60 ohms between terminals No. 1 and 2 and terminals No. 1 and 3. See Fig. 6. Ensure solenoid valve makes operating noise when battery voltage is applied between terminals No. 1 and 2 and terminals No. 1 and 3.

2) If solenoid valve does not operate, replace vacuum pump assembly. Apply battery voltage and ground between terminals No. 1 and 4. Motor should operate. Replace vacuum pump if motor does not operate.

VEHICLE SPEED SENSOR TEST

Remove speed sensor from transmission. Connect speed sensor, resistor (3000-10,000 ohms) and battery. See Fig. 34. Using a voltmeter, ensure voltage pulses on and off 4 times per revolution of speedometer shaft. Replace sensor if voltage is not as specified.



92H00197

Fig. 34: Testing Vehicle Speed Sensor
Courtesy of Mitsubishi Motor Sales of America

SELF-DIAGNOSTIC SYSTEM

* PLEASE READ THIS FIRST *

NOTE: Self-diagnostics should be performed when cruise control cancels without driver using normal cancel modes.

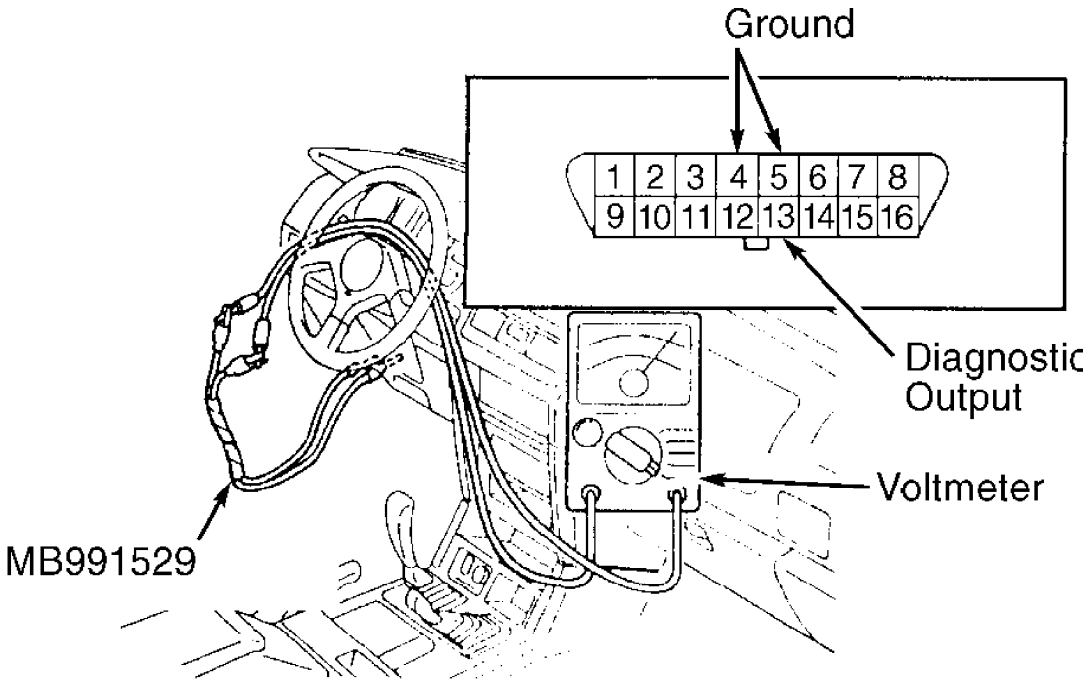
RETRIEVING CODES

1) Data Link Connector (DLC) is located to left of steering column. Use analog voltmeter or scan tool for code retrieval. Follow scan tool manufacturer's instructions.

2) Using an analog voltmeter, connect leads between cruise control terminal and ground terminal of DLC. See Fig. 35. Count number of deflections and pauses of voltmeter needle to determine trouble code. Digit count is about 0.5 second per pulse and pause between digits is about 2 seconds. Once trouble codes have been displayed, see DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION table.

DIAGNOSTIC TROUBLE CODE (DTC) IDENTIFICATION TABLE

Code	Diagnostic Item
11	Vacuum Pump Drive System
12	Vehicle Speed Sensor Signal
14	Vacuum Pump Power Supply System
15	Cruise Control Switch
16	Cruise Control ECU
17	Throttle Position Sensor System



96E06382

Fig. 35: Identifying Data Link Connector Terminals
Courtesy of Mitsubishi Motor Sales of America

CLEARING CODES

1) To clear trouble codes, disconnect battery cable, or use alternative method to prevent memory loss.

2) Turn ignition on. Turn main cruise control switch and SET switch to ON position, and within one second, turn RES switch to ON position. Hold stoplight switch and cruise control switch in ON position for greater than 5 seconds. Verify codes are cleared.

DIAGNOSTIC TESTS

CODE 11: VACUUM PUMP DRIVE SYSTEM

Code 11 is displayed if release valve, control valve and motor drive signals from vacuum pump are not input to cruise control ECU. Probable causes are:

* Malfunction of vacuum pump.
* Malfunction of stoplight switch.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Check vacuum pump. See VACUUM PUMP TEST under COMPONENT TESTS. If vacuum pump is defective, replace vacuum pump. If vacuum pump is okay, go to next step.

2) Disconnect cruise control actuator harness connector A-57 or A-95. See Fig. 5. At harness side of connector, check voltage between terminal No. 1 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check stoplight switch. See BRAKELIGHT/STOPLIGHT SWITCH TEST under COMPONENT TESTS. Replace switch if defective. Check cruise control main switch harness connector C-01 and stoplight switch harness connector C-55. Repair as necessary. If malfunction remains, check harness between cruise control main switch and vacuum pump. Repair as necessary.

3) Disconnect cruise control ECU connector C-50. See Fig. 13. At harness side of connector, check voltage between ground and terminals No. 12 (driving release valve), No. 13 (driving control valve), and No. 26 (driving motor). If battery voltage is present, go to next step. If battery voltage is not present, check and repair connectors A-57 or A-95 and C-111 as necessary. See Figs. 5 and 24. If malfunction remains, check and repair harness between vacuum pump and cruise control ECU as necessary.

4) Check cruise control ECU connector C-50. Repair as necessary. If malfunction remains, replace cruise control ECU.

CODE 12: VEHICLE SPEED SENSOR SIGNAL

Code 12 is displayed if vehicle speed signals from vehicle speed sensor are not input to cruise control ECU when vehicle speed is 25 MPH or more. Probable causes are:

* Malfunction of VSS.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Check vehicle speed sensor. See VEHICLE SPEED SENSOR TEST under COMPONENT TESTS. If speed sensor is okay, go to next step. If speed sensor is defective, repair or replace as necessary.

2) Disconnect combination meter connector C-06. See Fig. 10. At harness side of connector, with ignition switch in ON position, measure voltage between terminal No. 1 and ground. If voltage is 4.5 volts or more, go to next step. If voltage is less than 4.5 volts,

check cruise control ECU connector C-50 and joint connector C-130. Repair as necessary. See Figs. 13, 16 and 28. If malfunction remains, check harness between combination meter (instrument cluster) and cruise control ECU. Repair as necessary.

3) Disconnect combination meter connector C-04. See Fig. 9. Check for continuity at harness side between terminal No. 43 and ground. If continuity is present, go to next step. If continuity is not present, check harness between combination meter and ground. Repair as necessary.

4) Inspect combination meter connector C-04. If connector is defective, repair as necessary. If connector is okay and malfunction remains, replace cruise control ECU.

CODE 14: VACUUM PUMP POWER SUPPLY

Code 14 is displayed when drive signals for vacuum pump release valve, control valve and motor are not input into cruise control ECU. Probable causes are:

* Malfunction of stoplight switch.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) Disconnect vacuum pump connector A-105. See Fig. 6. At harness side of connector, check voltage between terminal No. 1 and ground. If battery voltage is present, go to next step. If battery voltage is not present, check stoplight switch. See BRAKELIGHT/STOPLIGHT SWITCH TEST under COMPONENT TESTS. Replace as necessary. If switch is okay, check connectors to combination meter, stoplight switch and vacuum pump. Repair as necessary. If connectors are okay and malfunction remains, check and repair circuit between cruise control ECU and vacuum pump. If malfunction remains, replace cruise control ECU.

2) Check connectors and circuit between cruise control ECU and vacuum pump. See WIRING DIAGRAMS. Repair as necessary. If connectors and circuit are okay, replace cruise control ECU.

CODE 15: CRUISE CONTROL SWITCH

Code 15 is displayed if RESUME switch or SET switch remains on. Probable cause is malfunction of cruise control switch. Replace cruise control switch.

CODE 16: CRUISE CONTROL ECU

Code 16 is displayed if there is an abnormality in CANCEL hold circuit or microprocessor monitor circuit in cruise control ECU. Probable cause is malfunction of cruise control ECU. Replace cruise control ECU.

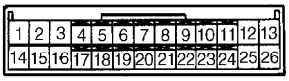
CODE 17: THROTTLE POSITION SENSOR

Code 17 is displayed if a voltage of 1.5 volts or more exists when closed throttle position switch is ON or 0.2 volt or less exists when closed throttle position switch is OFF for a continuous period of 4 seconds or more. Probable causes are:

* Malfunction of throttle position sensor.
* Malfunction of connector.
* Malfunction of harness.
* Malfunction of cruise control ECU.

1) If PCM DTC P0120 (engine performance code) is also set, see CLOSED THROTTLE POSITION SWITCH TEST & THROTTLE POSITION SENSOR TEST under COMPONENT TESTS. If DTC P0120 is not set, go to next step.
2) Check cruise control ECU connector C-50. If connector is okay, go to next step. If connector is defective, repair as necessary.
3) If malfunction remains, inspect harness between throttle position sensor and cruise control ECU. Repair as necessary. If harness is okay, replace cruise control ECU.

PIN VOLTAGE TESTS



Terminal No.	Check item	Check conditions		Normal condition
1	Park/neutral position switch input <A/T>	When selector lever is in a position other than N range	When park/neutral position switch is OFF	Battery positive voltage
		When selector lever is in N range	When park/neutral position switch is ON	0 V
2	ECU power supply	When ignition switch is ON		Battery positive voltage
3	Power supply for OD signal control <A/T>	When ignition switch is ON		Battery positive voltage
4	Closed throttle position switch output	When accelerator pedal is depressed	When closed throttle position switch is OFF	4.5 – 5.5 V
		When accelerator pedal is not depressed	When closed throttle position switch is ON	0 V
5	Throttle position sensor input	When accelerator pedal is fully depressed		4.0 – 5.5 V
		When accelerator pedal is released		0.5 – 0.7 V
6	Ground	At all times		Continuity
8	Ground	At all times		Continuity
10	OD control signal <A/T>	OD-OFF request		4 V or more
		No OD-OFF request		0 – 1 V
12	Auto-cruise vacuum pump release valve and control valve input	When driving at constant speed using the SET switch	Release valve closed	0 V
13			Control valve closed	0 V
12		When accelerating with the RESUME switch while driving at constant speed	Release valve closed	0 V
13			Release valve closed	0 V
12		When decelerating with the SET switch while driving at constant speed	Release valve closed	0 V
13			Control valve open	Battery positive voltage
12		When canceling constant speed driving with the CANCEL switch	Release valve open	Battery positive voltage
13			Control valve open	Battery positive voltage
14	Ground	At all times		Continuity

98D03806

Fig. 36: Pin Voltage Chart (1 Of 2)
Courtesy of Mitsubishi Motor Sales of America

Terminal No.	Check item	Check conditions		Normal condition
15	Stop light switch input	When brake pedal is depressed	When stop light switch is ON	Battery positive voltage
		When brake pedal is not depressed	When stop light switch is OFF	0 V
16	ECU backup power supply	At all times		Battery positive voltage
18	Auto-cruise control switch input	When SET switch is pressed	When SET switch is ON	3 V
		When SET switch is not pressed	When SET switch is OFF	0 V
		When RESUME switch is pressed	When RESUME switch is ON	6 V
		When RESUME switch is not pressed	When RESUME switch is OFF	0 V
		When CANCEL switch is pressed	When CANCEL switch is ON	Battery positive voltage
		When CANCEL switch is not pressed	When CANCEL switch is OFF	0 V
19	Vehicle speed sensor input	When vehicle is moved forwards and backwards, sensor turns ON and OFF repeatedly.	When sensor is ON	0 V
			When sensor is OFF	4.5 V or more
20	ACC power supply	When ignition switch is in ACC position		Battery positive voltage
23	Indicator input (inside combination meter)	When driving at constant speed	When indicator is illuminated	0 V
		When constant speed driving is cancelled	When indicator is switched off	Battery positive voltage
24	Diagnosis control input	When ignition switch is ON		4 V or more
25	Surge absorption circuit terminal	When auto-cruise main switch is ON		Battery positive voltage
26	Auto-cruise vacuum pump motor input	When driving at constant speed using the SET switch	Motor stopped	Battery positive voltage
		When accelerating with the RESUME switch while driving at constant speed	Motor running	0 V
		When decelerating with the SET switch while driving at constant speed	Motor stopped	Battery positive voltage
		When cancelling constant speed driving with the CANCEL switch	Motor stopped	Battery positive voltage

97J11162

Fig. 37: Pin Voltage Chart (2 Of 2)
Courtesy of Mitsubishi Motor Sales of America

REMOVAL & INSTALLATION

* PLEASE READ THIS FIRST *

WARNING: Deactivate air bag system before performing any service operation. See AIR BAG RESTRAINT SYSTEMS article. Do not apply electrical power to any component on steering column without first deactivating air bag system. Air bag may deploy.

ACTUATOR

Removal & Installation

Disconnect cruise control cable from link. Disconnect actuator wiring connector. Remove vacuum pump and vacuum pump bracket. Remove actuator and actuator bracket. To install, reverse removal procedure.

CRUISE CONTROL ECU

Removal & Installation

Cruise control ECU is located behind center of dash panel. Remove center trim panel and radio or radio plug bezel. Remove control unit. To install, reverse removal procedure.

CRUISE CONTROL SWITCH

Removal & Installation

Remove lower steering column cover. Disconnect electrical connectors. Remove screws attaching cruise control switch to steering column. Remove switch. To install, reverse removal procedure.

INSTRUMENT CLUSTER

Removal & Installation

Disconnect negative battery cable. Remove cluster cover. Disconnect speedometer cable. Remove instrument cluster. To install, reverse removal procedure.

WIRING DIAGRAMS

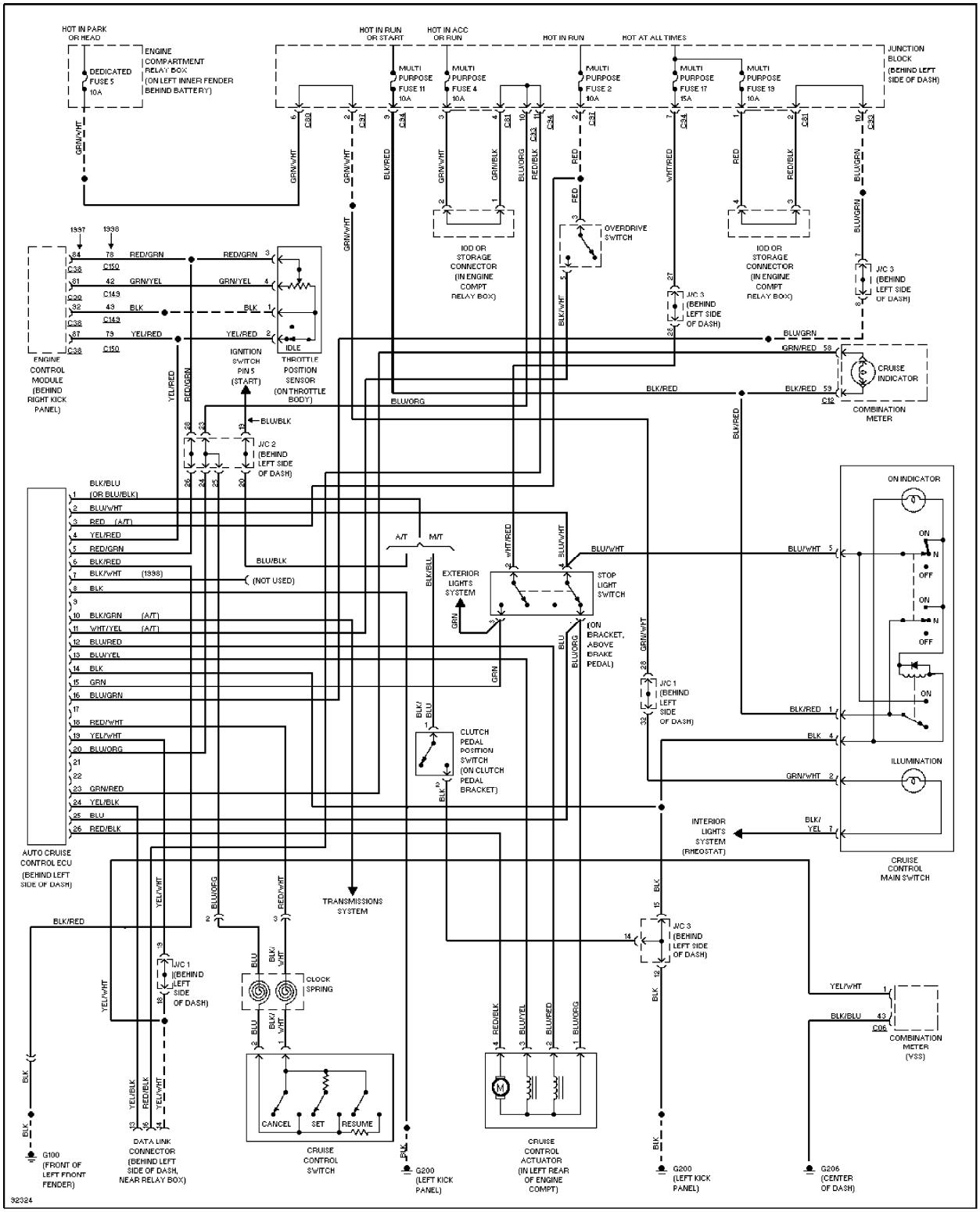


Fig. 38: Cruise Control System Wiring Diagram