

SUSPENSION - ELECTRONIC

1994 Mitsubishi 3000GT

1994 SUSPENSION
Chrysler Corp./Mitsubishi Electronic

Dodge; Stealth
Mitsubishi; 3000GT

DESCRIPTION

Electronically Controlled Suspension (ECS) is designed to improve vehicle ride characteristics while automatically compensating for driving conditions. System controls shock absorber damping through electronic valve (actuator) control of shock absorbers.

Using ECS switch on dash, driver can manually select damping characteristics for regular driving by selecting either TOUR mode (soft damping) or SPORT mode (hard damping). Shock absorber damping is automatically firmed up under braking (anti-dive function), quick acceleration (anti-squat function) or hard cornering (anti-roll function).

ECS control unit is equipped with self-diagnostic function which monitors several circuits and alerts driver when a malfunction is detected.

WARNING: Stealth and 3000GT are equipped with a Supplemental Restraint System (SRS) that includes an air bag, located in steering column. Use caution when working around steering column. Ensure battery is disconnected before attempting any repair. DO NOT apply electrical power to any component on steering column without disconnecting air bag module (air bag could deploy).

OPERATION

ECS control unit uses inputs from ECS switch, "G" sensor, shock absorber actuator position detection switches, vehicle speed sensor, throttle position sensor, stoplight switch and steering wheel angular velocity sensor. The control unit uses these inputs to determine proper valving for the specific ride characteristics. Valving inside strut housing governs strut dampening characteristics.

ECS switch is used to manually select basic ride characteristics. The "G" sensor detects pitching, bouncing and rough road. Steering wheel angular velocity sensor, located in steering column, detects how fast the steering wheel is being turned.

DISABLING & ACTIVATING AIR BAG SYSTEM

WARNING: Wait at least 60 seconds after disconnecting negative battery cable before servicing SRS. System reserve capacitor maintains SRS voltage for about 60 seconds after battery is disconnected. Servicing SRS before 60-second period may cause accidental air bag deployment and possible personal injury.

To disable system, turn ignition switch to OFF position. Disconnect and isolate negative battery cable end. Wait at least 60 seconds. To activate system, reconnect negative battery cable.

AIR BAG SERVICE PRECAUTIONS

The following precautions should be observed when working with SRS:

- * Disable SRS before servicing any SRS or steering column component. Failure to do this may result in accidental air bag deployment and possible personal injury. See DISABLING & ACTIVATING AIR BAG SYSTEM.
- * Wait at least 60 SECONDS after disabling air bag system. SRS system retains enough voltage, for a short time after system is disabled, to deploy air bag.
- * After repairs, always turn ignition on from passenger-side of vehicle in case of accidental air bag deployment. Ensure SRS warning light is working properly and no system faults are indicated.
- * Always wear safety glasses when servicing or handling an air bag.
- * DO NOT expose air bag module and clockspring to temperatures greater than 200°F (93°C).
- * When placing a live air bag on a bench or other surface, always face air bag and trim cover up, away from surface. This will reduce motion of module if air bag accidentally deploys.
- * After air bag deploys, air bag surface may contain deposits of sodium hydroxide, which irritate skin. Always wear safety glasses, rubber gloves and long-sleeved shirt during clean-up. Wash hands using mild soap and water. Follow correct clean-up and disposal procedures.
- * Because of critical system operating requirements, DO NOT service any SRS components. Repairs are only made by replacing defective part(s).
- * DO NOT allow any electrical source near inflator on the back of air bag module.
- * When carrying live air bag module, trim cover should be pointed away from body to minimize injury in case of accidental air bag deployment.
- * If SRS is not fully functional for any reason, DO NOT drive vehicle until system is repaired and is fully functional. DO NOT remove bulbs, modules, sensors or other components, or in any way disable system from operating normally. If SRS is not functional, park vehicle until repairs are made.

SELF-DIAGNOSTIC SYSTEM

SYSTEM DIAGNOSIS

Self-diagnostic system diagnoses and stores Electronically Controlled Suspension (ECS) malfunction data. ECS control unit monitors system circuits and stores a trouble code if a malfunction is detected. When a malfunction is detected, self-diagnostic system alerts driver by flashing TOUR SPORT light on dash. Self-diagnostic system has a fail-safe mode which terminates ECS control to maintain driving stability when a malfunction is detected in a monitored circuit.

SERVICE PRECAUTIONS

Before proceeding with diagnosis, following precautions must be observed:

- * Ensure vehicle has a fully charged battery and functional charging system.
- * Visually inspect connectors and circuit wiring being worked

- on.
- * DO NOT disconnect battery or ECS control unit unless instructed by specific test. This will erase any trouble codes stored in control unit memory.
- * DO NOT cause short circuits when performing electrical tests. This may set additional trouble codes, making diagnosis of original problem more difficult.
- * DO NOT use a test light in place of a voltmeter.
- * When a vehicle has multiple trouble codes, always repair lowest number trouble code first.

RETRIEVING CODES

NOTE: If no codes are present or ECS indicator does not light, proceed to SYSTEM TESTS (NO CODES).

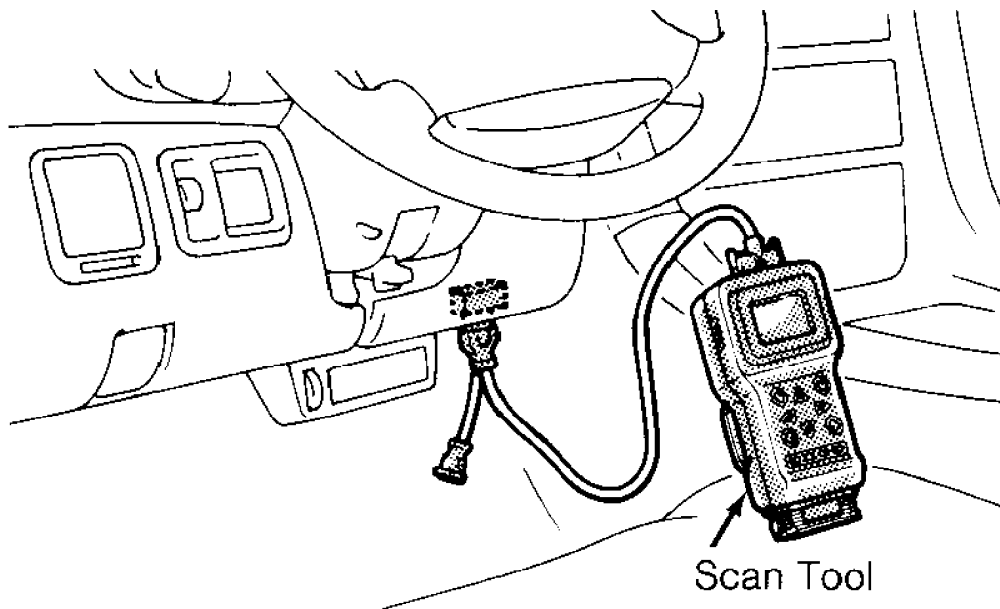
Turn ignition on. ECS indicator should light either TOUR or SPORT mode. If ECS indicator light flashes, a malfunction has been detected and a trouble code has been stored. If indicator lights but does not flash, ECS system is okay.

NOTE: Trouble codes can be retrieved using either Multi-Use Tester II (MB991501) or voltmeter. Use Multi-Use Tester II (MUT-II) to check service data and conduct actuator tests.

Retrieving Codes Using Scan Tester

1) Connect scan tester to ECS self-diagnostic connector. See Fig. 1. Refer to instructions for MUT operation, and check for self-diagnostic (trouble) codes.

2) Record trouble codes. If 2 or more trouble codes are stored, lowest number code will be indicated first. Proceed to appropriate code test for diagnosis and servicing procedure. See DIAGNOSTIC TESTS.



94F46271

Fig. 1: Connecting Multi-Use Tester II With ROM Pack
Courtesy of Mitsubishi Motor Sales of America

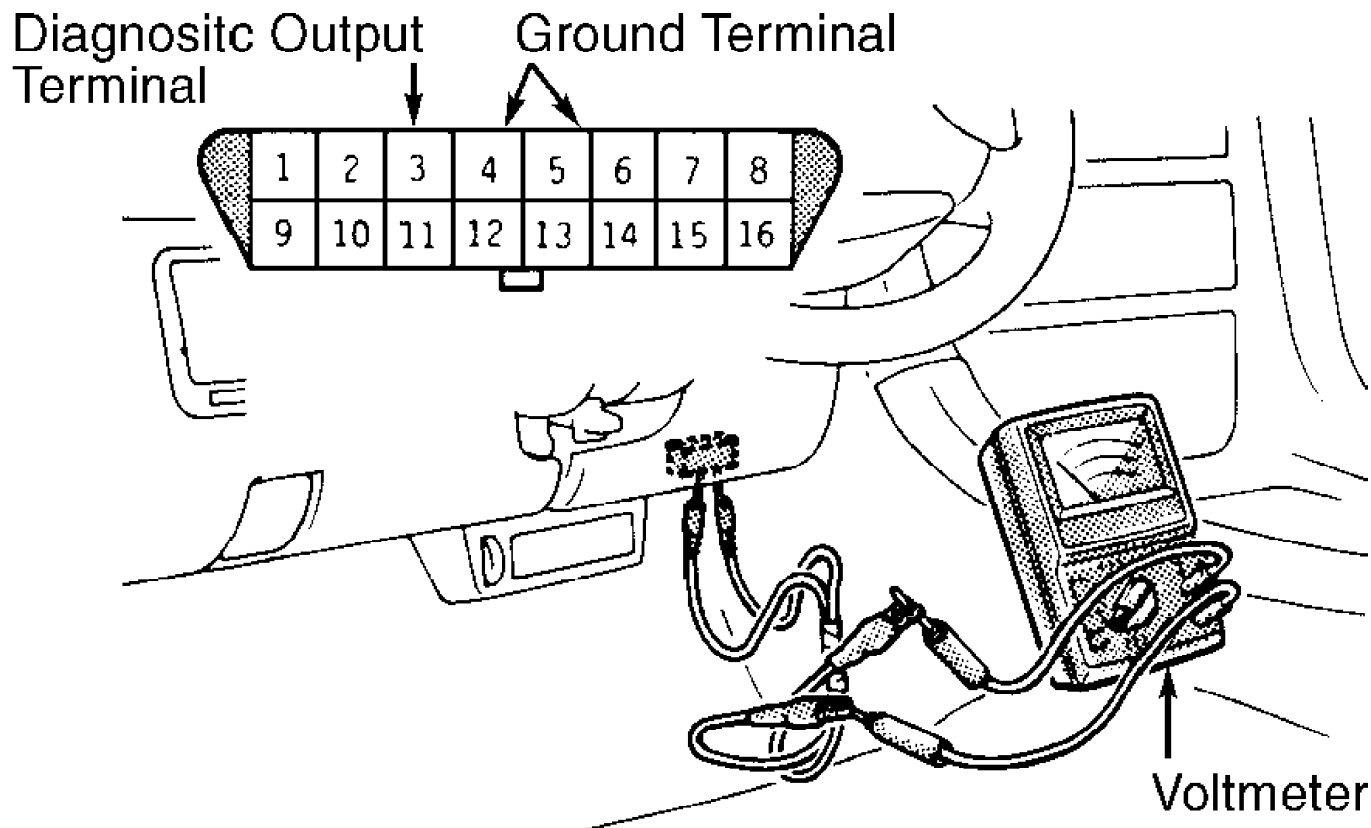
Retrieving Codes Using Voltmeter

1) With ignition off, connect voltmeter positive probe to

terminal No. 3 of self-diagnostic connector, located under right side of dash. See Fig. 2. Connect voltmeter negative probe to terminal No. 4 or 5 of self-diagnostic connector.

2) Turn ignition on. Voltage signals generated are read as needle sweeps. The needle sweep range is 0-12 volts. Longer duration pulses are recorded as the tens digit of code, and shorter duration pulses are recorded as ones digit of code. Codes are separated by a pause.

3) Read and record self-diagnostic (trouble) codes on basis of deflection of voltmeter needle. See TROUBLE CODE IDENTIFICATION table. Proceed to appropriate CODE test for diagnosis and servicing procedure. If 2 or more trouble codes are stored, lowest number code will be indicated first. After repairs are complete, erase trouble codes. See CLEARING CODES.



94G46272

Fig. 2: Connecting Voltmeter To Self-Diagnostic Connector
 Courtesy of Mitsubishi Motor Sales of America

TROUBLE CODE IDENTIFICATION TABLE

Code	Description
11	"G" Sensor
14	Throttle Position Sensor (TPS)
21	Steering Wheel Sensor
24	Vehicle Speed Sensor (VSS)
26	Brakelight Switch
61	Right Front Strut Actuator
62	Left Front Strut Actuator
63	Right Rear Strut Actuator
64	Left Rear Strut Actuator

CLEARING CODES

If using scan tester, refer to tester instructions. If using voltmeter, turn ignition off. Disconnect negative battery cable for at least 10 seconds. Reconnect battery cable. If code is not cleared and faults are not present, control unit will automatically clear codes after 60 ignition cycles.

DIAGNOSTIC TESTS

CODE 11: "G" SENSOR

1) Using scan tester, access service data for "G" sensor. With vehicle in stationary condition, voltage measurement should be 2-3 volts. While bouncing vehicle, voltage should fluctuate near 2.5 volts. If "G" sensor passes testing, go to next step. If "G" sensor fails testing, go to step 5).

2) Select TOUR mode using ECS switch. Using scan tester, check service data for items No. 61, 62, 63 and 64 (actuator indicators). All service data indications should be SOFT.

3) Remove "G" sensor. See "G" SENSOR under REMOVAL & INSTALLATION. Reconnect "G" sensor to harness connector. Turn ignition on. Slowly shake sensor up and down at about one cycle per second while observing scan tester service data indication for each actuator.

4) Each actuator indication should be HARD while shaking "G" sensor and should switch back to SOFT when sensor is held stationary. If each actuator indication tests as specified, "G" sensor circuit is okay. If any actuator indications do not test as specified, replace ECS control unit. See REMOVAL & INSTALLATION.

5) Disconnect "G" sensor connector. Turn ignition on. Using voltmeter, measure voltage between "G" sensor harness connector terminal No. 1 (Green/Red wire) and ground. Reading should be 5 volts. Using ohmmeter, check for continuity between "G" sensor harness connector terminal No. 3 (Black wire) and ground. Continuity should be present. If measurements are not within specification, go to step 6). If measurements are within specification, go to step 7).

6) Turn ignition off. Check for continuity between "G" sensor harness connector terminal No. 1 (Green/Red wire) and ECS control unit harness connector terminal No. 54 (Green/Red wire). See Fig. 3. Check for continuity between "G" sensor harness connector terminal No. 3 (Black wire) and ECS control unit harness connector terminal No. 57 (Black wire). If continuity does not exist, inspect and repair harness. If continuity does exist, replace ECS control unit.

7) Turn ignition off. Check for continuity between "G" sensor harness connector terminal No. 2 (Green/Brown wire) and ECS control unit harness connector terminal No. 61 (Green/Brown wire). See Fig. 3. If continuity does not exist, inspect and repair harness. If continuity does exist, install a known good "G" sensor. Recheck for Code 11. If Code 11 is reset, replace ECS control unit. If Code 11 is not reset, replace "G" sensor.

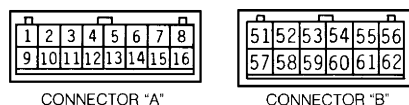


Fig. 3: Identifying ECS Control Unit Connector Terminals
Courtesy of Mitsubishi Motor Sales of America

CODE 14: THROTTLE POSITION SENSOR

Using scan tester, access Throttle Position Sensor (TPS) test. With TPS fully closed, voltage should be .3-1.0 volt. Slowly press down on accelerator pedal. TPS voltage should smoothly increase to 4.5-5.5 volts with throttle fully open. Replace TPS if it does not test as specified.

CODE 21: STEERING WHEEL ANGULAR VELOCITY SENSOR

1) Using scan tester, check service data for steering wheel angular velocity sensor. Monitor ST1 and ST2 readings. Scan tester should display oscillating ON and OFF signals when turning steering wheel clockwise and counterclockwise. If steering wheel angular velocity sensor passes test, go to next step. If steering wheel angular velocity sensor fails test, go to step 5).

2) Raise and support front of vehicle. Place steering wheel in straight-ahead position. Select TOUR mode using ECS switch. Using scan tester, enter a simulated vehicle speed of 62 MPH (100 KM/H). Check service data indications for items No. 61, 62, 63 and 64 (actuator indications). All service data indications should be SOFT.

3) While monitoring service data indication for item No. 61, turn steering wheel sharply clockwise or counterclockwise 90 degrees from straight-ahead position. Service data indication should switch from SOFT to MEDIUM or HARD in approximately 0.3 second. Service data indication should return to SOFT about one second after steering wheel is held stationary. Repeat this step for items No. 62, 63 and 64.

4) If all service data indications respond as specified, ECS system is okay. If any service data indications do not respond as specified, replace ECS control unit. Disconnect steering wheel angular velocity sensor connector. See STEERING WHEEL ANGULAR VELOCITY SENSOR under REMOVAL & INSTALLATION.

5) Turn ignition on. Measure voltage between ground and steering wheel angular velocity sensor harness connector terminals No. 2 (Green/Blue wire), No. 3 (Green/Black wire) and No. 4 (Green/Red wire). Voltage should be 5 volts at each terminal. If voltage is within specification, go to step 8).

6) If voltage is not within specification, turn ignition off. Check continuity between sensor terminal No. 2 and ECS control unit terminal No. 56, sensor terminal No. 3 and control unit terminal No. 55 and sensor terminal No. 4 and control unit terminal No. 54. See Fig. 3. Inspect and repair harness as necessary. If harness is okay, replace ECS control unit.

7) Check for continuity between steering wheel angular velocity sensor harness connector terminal No. 1 (Black wire) and ground. If continuity does not exist, go to next step.

8) Check for continuity between steering wheel angular velocity sensor harness connector terminal No. 1 (Black wire) and ECS control unit harness connector terminal No. 57 (Black wire). See Fig. 3.

9) If continuity is present, replace ECS control unit. If continuity is not present, repair Black wire between steering wheel angular velocity sensor and ECS harness connector.

10) Replace steering wheel angular velocity sensor with a known good sensor. Recheck for Code 21. If Code 21 is reset, replace ECS control unit. If Code 21 is not reset, replace steering wheel angular velocity sensor.

CODE 24: VEHICLE SPEED SENSOR (VSS)

Non-Turbo

1) Using scan tester, access service data for vehicle speed sensor. Raise and support vehicle. Start and operate vehicle. Monitor speedometer. Speedometer reading should match scan tester reading. If

vehicle speed sensor passes test, go to next step. If vehicle speed sensor service fails test, go to step 4).

2) Select TOUR mode using ECS switch. While monitoring service data indication for item No. 61, vary simulated vehicle speed using scan tester. See HIGH SPEED SENSITIVITY CONTROL TEST SPECIFICATIONS table. Repeat this step for items No. 62, 63 and 64.

HIGH SPEED SENSITIVITY CONTROL TEST SPECIFICATIONS TABLE

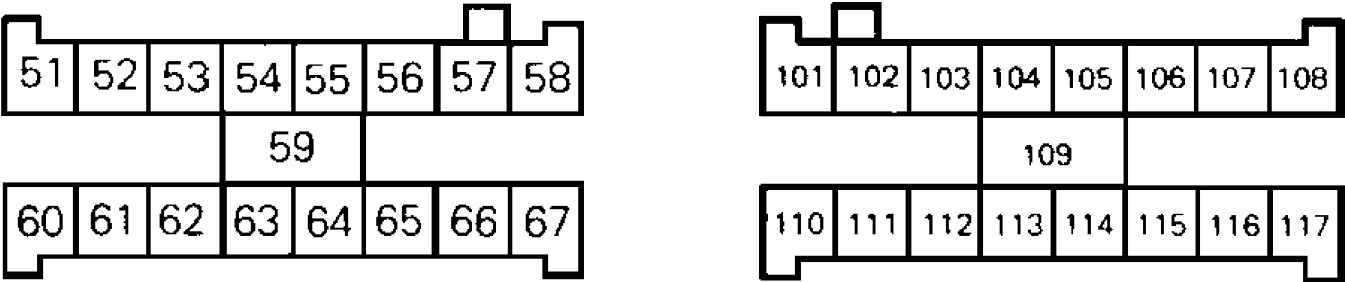
Simulated Vehicle Speed Change	Scan Tester Service Data Indication Change
Accelerate From 80 MPH To 81 MPH	From SOFT To MEDIUM
Decelerate From 75 MPH To 74 MPH	From MEDIUM To SOFT

3) If high speed sensitivity control passes test, ECS system is okay. If high speed sensitivity control fails test, replace ECS control unit.

4) Remove knee protector, steering column covers and meter bezel. Remove instrument cluster, and disconnect combination meter harness connector. Check for continuity between combination meter harness connector terminal No. 109 (Yellow/White wire) and ECS control unit harness connector terminal No. 53 (Yellow/White wire). See Figs. 3 and 4.

5) Check for continuity between combination meter harness connector terminal No. 64 (Black wire) and ground. See Fig. 4. Repair wiring harness if continuity does not exist. If continuity exists, go to next step.

6) Test vehicle speed sensor. See VEHICLE SPEED SENSOR under COMPONENT TESTING. If vehicle speed sensor is okay, replace ECS control unit. If vehicle speed sensor is faulty, replace combination meter.



92F00740

Fig. 4: Combination Mtr. Connector Terminal ID (Conn's. D-04 & D-05)
Courtesy of Mitsubishi Motor Sales of America

Turbo

1) Using scan tester, access service data for Vehicle Speed Sensor (VSS). Raise and support vehicle. Start and operate vehicle. Monitor speedometer. Speedometer reading should match scan tester reading. If vehicle speed sensor passes test, go to next step. If vehicle speed sensor service fails test, go to step 4).

2) Select TOUR mode using ECS switch. While monitoring service data indication for item No. 61, vary simulated vehicle speed using scan tester. See HIGH SPEED SENSITIVITY CONTROL TEST SPECIFICATIONS table under CODE 24. Repeat this step for items No. 62, 63 and 64.

3) If high speed sensitivity control tests okay, speed sensor circuit is functioning properly. If any high speed sensitivity control

fails tests, replace ECS control unit.

4) Remove knee protector, steering column covers and meter bezel. Remove instrument cluster, and separate speed sensor connector from cluster. Using an ohmmeter, check for continuity between vehicle speed sensor harness connector terminal No. 2 (Black wire) and ground. If continuity exists, go to next step. If continuity does not exist, repair wiring harness.

5) Turn ignition on. Using voltmeter, measure voltage between vehicle speed sensor harness connector terminal No. 1 (Black/White wire) and ground. If battery voltage is present, go to next step. If battery voltage is not present, inspect and repair wiring harness.

6) Turn ignition off. Check for continuity between vehicle speed sensor harness connector terminal No. 3 (Yellow wire) and ECS control unit harness connector terminal No. 53 (Yellow/White wire). See Fig. 4.

7) If continuity does not exist, inspect and repair harness. If continuity exists, test vehicle speed sensor. See VEHICLE SPEED SENSOR under COMPONENT TESTING. If vehicle speed sensor is okay, replace ECS control unit. Replace vehicle speed sensor if it is faulty.

CODE 26: BRAKE LIGHT SWITCH

Using scan tester, access stoplight switch test. Scan tester should display ON with brake pedal depressed, and OFF with brake pedal released. Replace switch is it does not operate within specification.

CODE 61, 62, 63 OR 64: STRUT ACTUATORS

1) Identify malfunctioning actuator or actuator circuit according to output trouble code. See TROUBLE CODE ACTUATOR IDENTIFICATION table. Using scan tester, access actuator testing. When TOUR mode is selected, scan tester should display SOFT for each actuator. When SPORT is selected, scan tester should display HARD for each actuator.

TROUBLE CODE ACTUATOR IDENTIFICATION TABLE

Trouble Code		Related Actuator Circuit
61	Right Front
62	Left Front
63	Right Rear
64	Left Rear

2) If actuator scan tester data test as specified, actuator is okay. If actuator scan tester data indications do not test as specified, go to next step.

3) Remove cap from top of shock absorber associated with diagnostic trouble code. Turn ignition on. Measure voltage between ground and actuator harness connector terminals No. 1 and 3. See Fig. 5.



Fig. 5: Identifying Actuator Connector Terminals
 Courtesy of Mitsubishi Motor Sales of America

4) Voltage at each terminal should be 5 volts. If voltage is

not within specification at any terminal, go to next step. If voltage is within specification at each terminal, go to step 6).

5) Turn ignition off. Check defective circuit(s) between actuator harness connector terminal No. 1 and/or 3 and appropriate ECS control unit harness connector terminal. See ECS-TO-ACTUATOR CIRCUIT TERMINAL IDENTIFICATION table. Inspect and repair harness as necessary. If harness is okay, replace ECS control unit.

ECS-TO-ACTUATOR CIRCUIT TERMINAL IDENTIFICATION TABLE

Actuator Connector Terminal No. (1)	ECS Control Unit Connector (2) Terminal No.
Front Right Actuator	
1	7
3	6
5	5
Front Left Actuator	
1	10
3	9
5	8
Rear Right Actuator	
1	3
3	2
5	11
Rear Left Actuator	
1	16
3	15
5	14

(1) - See Fig. 5.

(2) - See Fig. 3.

6) Using ohmmeter, check for continuity between ground and actuator harness connector terminals No. 2 and 4 (Black wires). See Fig. 5. If continuity exists at both terminals, go to next step. If continuity does not exist at either terminal, inspect repair appropriate circuit.

7) Turn ignition on. Using scan tester, energize appropriate actuator while measuring voltage between ground and actuator harness connector terminal No. 5. See Fig. 5. Refer to scan tester manufacturer instructions for specific procedure.

8) Voltage should be zero volts normally and jump to 9 volts during forced activation (drive) of actuator. If actuator does not test as specified, go to next step. If actuator passes test, go to step 10).

9) Turn ignition off. Check continuity between appropriate actuator harness connector terminal No. 5 and appropriate ECS control unit harness connector terminal. See ECS-TO-ACTUATOR CIRCUIT TERMINAL IDENTIFICATION table. Inspect and repair harness as necessary. If harness is okay, replace ECS control unit.

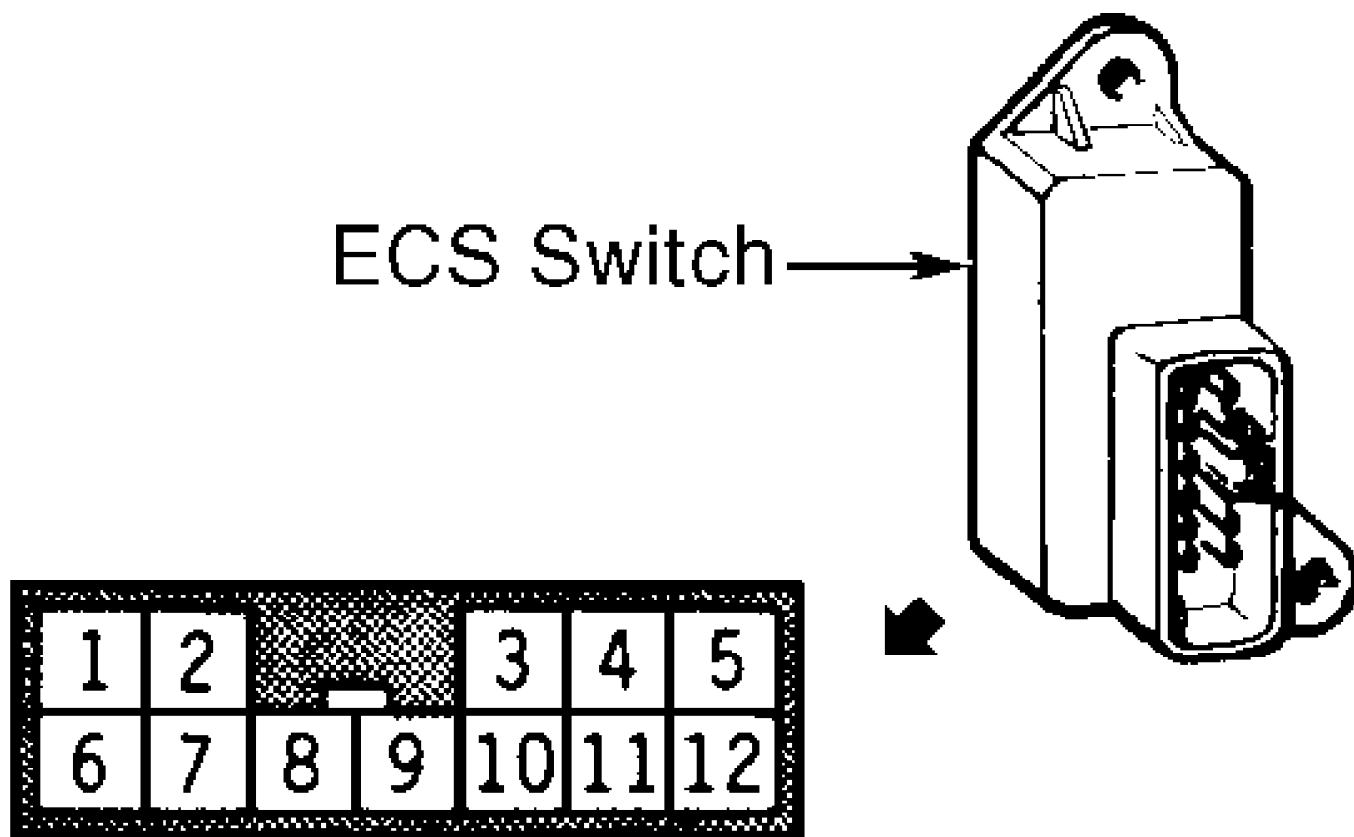
10) Replace malfunctioning strut assembly (and actuator) with a known good unit. Recheck for self-diagnostic trouble codes. If original trouble code is reset, replace ECS control unit. If original trouble code is not reset, replace strut assembly.

SYSTEM TESTS (NO CODES)

ECS INDICATOR LIGHT DOES NOT CHANGE WHEN ECS SW IS OPERATED

- 1) Remove ECS switch. See ECS SWITCH under REMOVAL &

INSTALLATION. Check for continuity between ground and ECS switch harness connector terminal No. 11 (Black wire). See Fig. 6. If continuity exists, go to next step. If continuity does not exist, repair Black wire between connector terminal No. 11 and ground.



92H00734

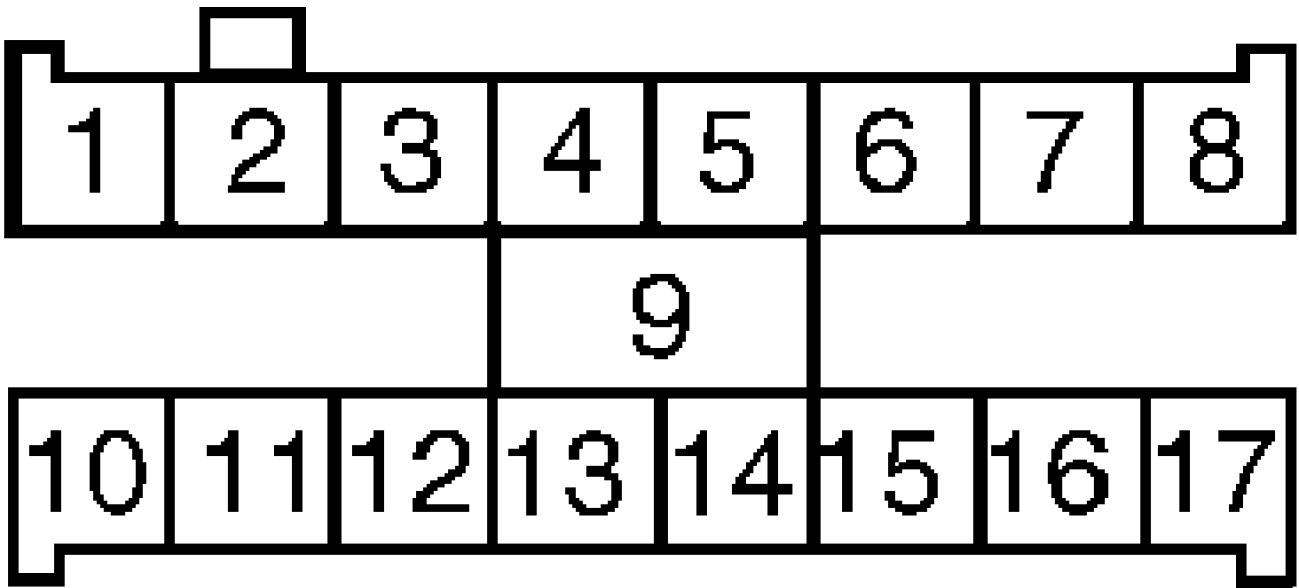
Fig. 6: Identifying ECS Switch Connector Terminals
Courtesy of Mitsubishi Motor Sales of America

2) Turn ignition on. Measure voltage between ground and ECS switch harness connector terminal No. 10 (Red/Black wire). See Fig. 6. If voltage is not 5 volts, go to next step. If voltage is 5 volts, go to step 4).

3) Turn ignition off. Using ohmmeter, check continuity between ECS switch harness connector terminal No. 10 and ECS control unit harness connector terminal No. 1. See Figs. 3 and 6. Inspect and repair harness if continuity does not exist. If continuity does exist, replace ECS control unit.

4) Test ECS switch. See ECS SWITCH under COMPONENT TESTING. Replace switch if it is faulty. If switch is okay, check for faulty ECS indicator light bulb. Replace bulb as necessary. If bulb is okay, go to next step.

5) Using ohmmeter, check for continuity between combination meter harness connector terminal No. 10 (White/Orange wire) and ECS control unit harness connector terminal No. 2 (White/Orange wire). See Figs. 3 and 7. Inspect and repair harness if continuity does not exist. If continuity does exist, go to next step.



92100735

Fig. 7: Combination Meter Connector Terminal ID (Connector D-03)
 Courtesy of Mitsubishi Motor Sales of America

6) Check for continuity between combination meter harness connector terminal No. 11 (White/Black wire) and ECS control unit harness connector terminal No. 3 (White/Black wire). See Figs. 3 and 7. Inspect and repair harness if continuity does not exist. If continuity does not exist, go to next step.

7) Check for continuity between ground and combination meter harness connector terminal No. 2 (Black/Yellow wire). See Fig. 7. Inspect and repair harness if continuity is not present. If continuity does exist, go to next step.

8) Replace combination meter with a known good unit. Check ECS indicator light operation. If ECS indicator light operates correctly, replace combination meter. If ECS indicator light still does not operate correctly, replace ECS control unit.

ANTI-DIVE CONTROL STOPS OPERATING

1) Using scan tester, access service data on stoplight switch. See CODE 26 under DIAGNOSTIC TESTS. If stoplight switch is functioning properly, go to next step. If stoplight switch is malfunctioning, go to step 5).

2) Select TOUR mode using ECS switch. Using scan tester, enter a simulated vehicle speed of 62 MPH. Refer to scan tester instructions for specific procedure. Using scan tester, ensure service data indication for items No. 61, 62, 63 and 64 is SOFT.

3) While monitoring service data indication for item No. 61, depress brake pedal and reduce simulated speed from scan tester. Service data indication should change to HARD until simulated vehicle speed falls below 50 MPH; indication should then change to SOFT. Repeat this step for service data items No. 62, 63 and 64.

4) If any service data items do not test as specified, replace ECS control unit. If all service data items test as specified, anti-dive control is functioning properly.

5) Turn ignition on. Depress brake pedal. Ensure stoplight comes on. If stoplight does not come on, go to step 7). If stoplight comes on, check continuity between stoplight switch harness connector terminal No. 3 (Green wire) and ECS control unit harness connector terminal No. 58 (Green wire). See Fig. 3.

6) If continuity exists, replace ECS control unit. If continuity does not exist, repair harness between stoplight switch and ECS control unit.

7) Disconnect stoplight switch harness connector. Measure voltage between ground and stoplight switch harness connector terminal No. 2 (Red/Black wire). If battery voltage is present, go to next step. If battery voltage is not present, repair harness.

8) Remove and test stoplight switch. See BRAKELIGHT SWITCH under COMPONENT TESTING. If stoplight switch is okay, replace ECS control unit. If stoplight switch is faulty, replace stoplight switch.

ANTI-SQUAT CONTROL STOPS OPERATING

1) Using scan tester, access data on Throttle Position Sensor (TPS). See CODE 14 under DIAGNOSTIC TESTS. If TPS tests okay, go to next step. If TPS is malfunctioning, go to step 7).

2) Select TOUR mode using EMS switch. Using scan tester, enter a simulated vehicle speed of 19 MPH. Refer to scan tester instructions for specific procedure. Using scan tester, ensure service data indication for items No. 61, 62, 63 and 64 is SOFT.

3) While monitoring service data indication for item No. 61, quickly depress accelerator pedal. Service data indication should change to HARD for a second and then change to MEDIUM. Release accelerator pedal. Service data indication should change to SOFT.

4) Increase simulated speed from scan tester to 37 MPH. Quickly depress accelerator pedal again. Service data indication should change to MEDIUM. Release accelerator pedal. Service data indication should change to SOFT.

5) Increase simulated speed from scan tester to 56 MPH. Quickly depress accelerator pedal again. Service data indication should remain at SOFT for a second and then change to MEDIUM. Release accelerator pedal. Service data indication should change to SOFT.

6) Repeat steps 3)-5) for scan tester items No. 62, 63 and 64. If any service data item does not test as specified, replace EMS control unit. If all service data items test as specified, anti-squat control is functioning properly.

7) Start engine. If CHECK ENGINE light comes on and stays on, go to step 9). If CHECK ENGINE light does not stay on, check continuity between TPS harness connector terminal No. 2 (Brown/Red wire) and EMS control unit harness connector terminal No. 59 (Brown/Red wire). See Fig. 3.

8) If continuity does not exist, repair harness. If continuity does exist, test TPS. See THROTTLE POSITION SENSOR under COMPONENT TESTING. If TPS is okay, replace EMS control unit. If TPS is faulty, replace TPS.

9) Disconnect TPS harness connector. Turn ignition on. Measure voltage between ground and TPS harness connector terminal No. 1 (Green/Yellow wire). If 5 volts are present, go to next step. If 5 volts are not present, check Green/Yellow wire between TPS connector terminal No. 1 and engine control unit connector terminal No. 61. Inspect and repair wire as necessary. If wire is okay, replace ECM.

10) Using an ohmmeter, check continuity between TPS harness connector terminal No. 4 (Black wire) and ground. If continuity exists, replace TPS. If continuity does not exist, check Black wire between TPS connector terminal No. 4 and engine control unit connector terminal No. 72. Repair wire as necessary. If wire is okay, replace ECM.

COMPONENT TESTING

ACTUATOR

Damping Force Check

Turn ignition on. Select TOUR mode using EMS switch. Push vehicle up and down at each corner of vehicle. Select SPORT mode using EMS switch. Push vehicle at same points and ensure damping force is stiffer than first check.

Operating Sound Check

Turn ignition on. Listen at top of each shock absorber while an assistant switches suspension modes by pressing EMS switch. Actuators should be heard each time EMS switch is pressed.

EMS CONTROL UNIT POWER SUPPLY & GROUND CIRCUIT

Ground Circuit Inspection

1) Disconnect EMS control unit harness connector. Using an ohmmeter, check continuity between harness connector terminal No. 52 (Black wire) and ground. See Fig. 3.

2) If continuity exists, ground circuit is okay. If continuity does not exist, repair Black wire between ECS control unit harness connector and ground connection on chassis below rear glass latch point.

Power Circuit Inspection

1) Disconnect ECS control unit harness connector. Turn ignition on. Using a voltmeter, measure voltage between harness connector terminal No. 51 (Blue/Red wire) and ground. See Fig. 3.

2) If battery voltage is present, go to next step. If battery voltage is not present, check fuse No. 3 in passenger compartment fuse box. Replace fuse if it is blown. If fuse is okay, check Blue/Red wire between ECS control unit harness connector and fuse No. 3. Repair wiring as necessary.

3) Using a voltmeter, measure voltage between harness connector terminal No. 62 (Red/Black wire) and ground. See Fig. 3. If battery voltage is present, power circuits are okay. If battery voltage is not present, go to next step.

4) Check fuse No. 19 in passenger compartment fuse box. Replace blown fuse. If fuse is okay, check Red/Black wire between ECS control unit harness connector and junction block. Repair wire as necessary.

ECS SWITCH

Continuity Test

Using an ohmmeter, check for continuity between appropriate switch terminals with ECS switch in ON and OFF positions. See ECS SWITCH CONTINUITY TEST SPECIFICATIONS table.

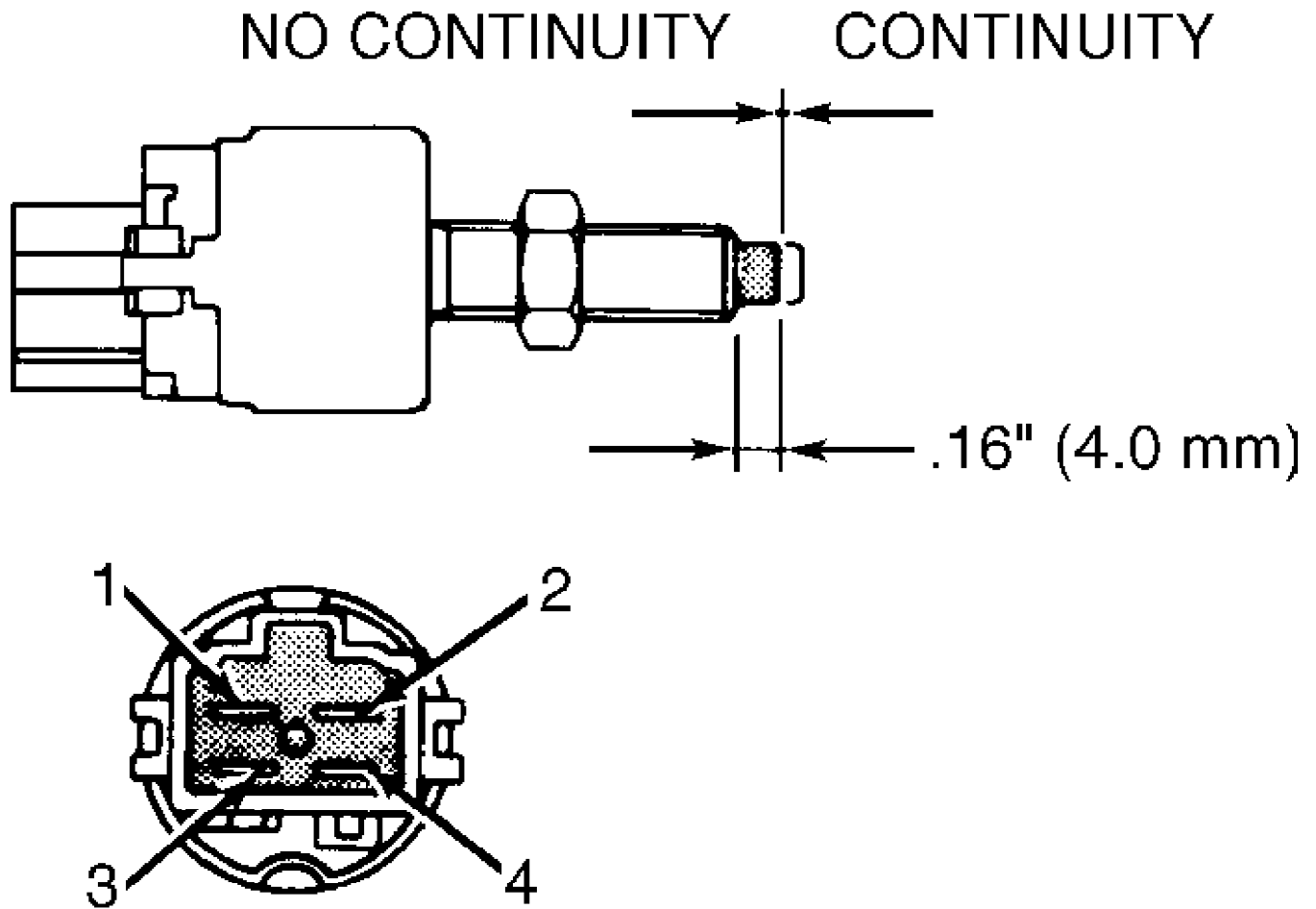
ECS SWITCH CONTINUITY TEST SPECIFICATIONS TABLE

Application	Continuity Between Terminals No.
ECS Switch Position	
ON	3 & 4; 10 & 11
OFF	3 & 4

BRAKELIGHT SWITCH

Continuity Test

Remove brakelight switch. Using an ohmmeter, check continuity between brakelight switch terminals No. 2 and 3. See Fig. 8. Continuity should exist. Continuity should not exist when brakelight switch plunger is depressed at least .16" (4.0 mm). Replace switch if continuity does not change as specified.



93A00331

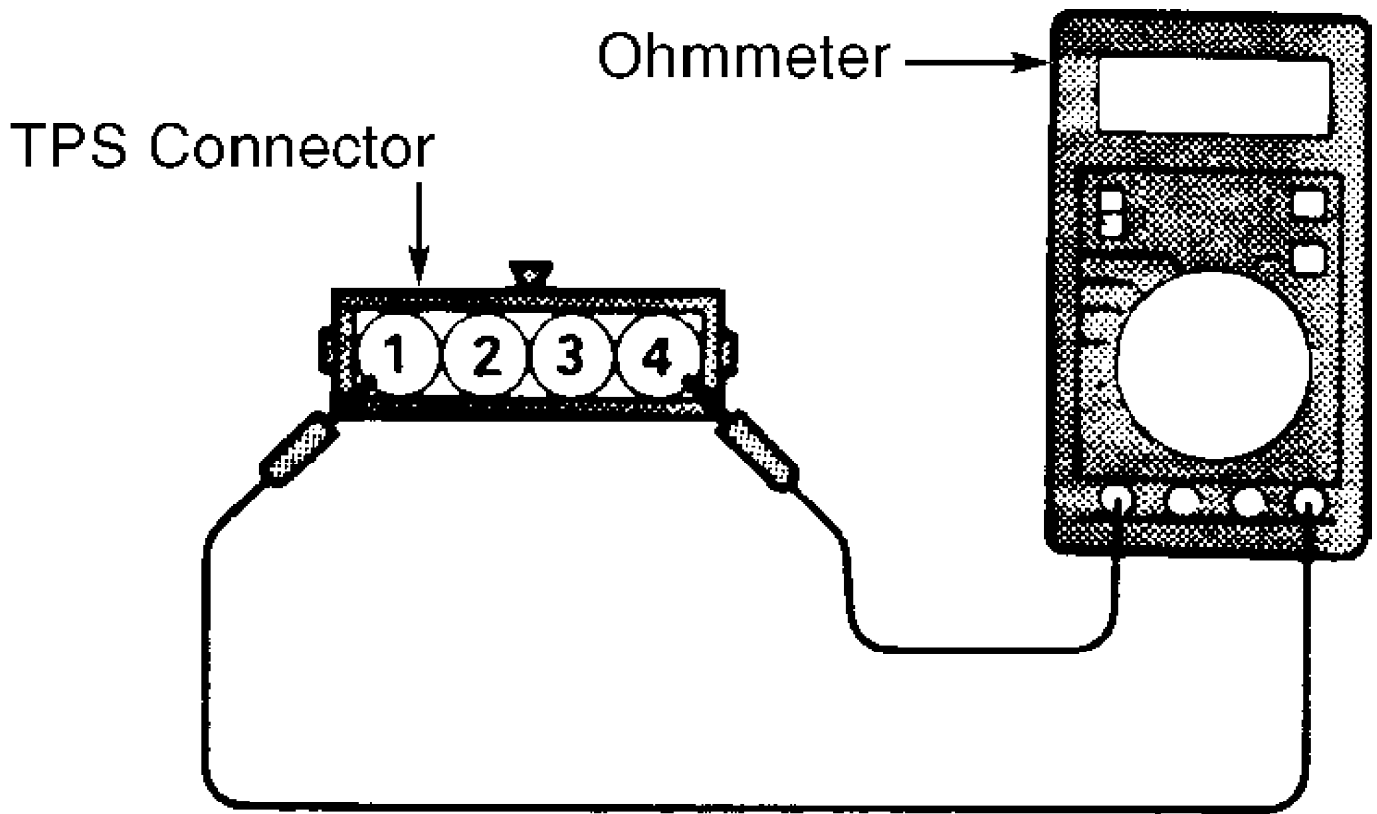
Fig. 8: Testing Brakelight Switch
Courtesy of Mitsubishi Motor Sales of America

THROTTLE POSITION SENSOR

Resistance Test

1) Disconnect Throttle Position Sensor (TPS). Using an ohmmeter, measure resistance between TPS terminals No. 1 and 4. See Fig. 9. If resistance is 3500-6500 ohms, go to next step. If resistance is not 3500-6500 ohms, replace TPS.

2) Measure resistance between TPS terminals No. 2 and 4 while slowly moving throttle plate. If resistance varies in direct relation to throttle plate position, TPS is okay. If resistance does not vary in direct relation to throttle plate position, replace TPS.



92100743

Fig. 9: Testing Throttle Position Sensor (TPS) Resistance
Courtesy of Mitsubishi Motor Sales of America

VEHICLE SPEED SENSOR

Non-Turbo

1) Remove knee protector, steering column covers and meter bezel. Disconnect speedometer cable and electrical harness. Remove instrument cluster.

2) Using an ohmmeter, check circuit continuity between reed switch (speedometer) terminal and ground terminal of combination meter. See Fig. 10. Rotate speedometer input shaft and ensure continuity pulses on and off 4 times per shaft revolution. Replace combination meter if continuity does not pulse with shaft rotation.

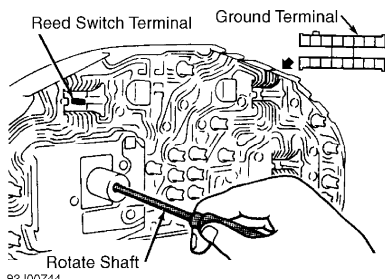


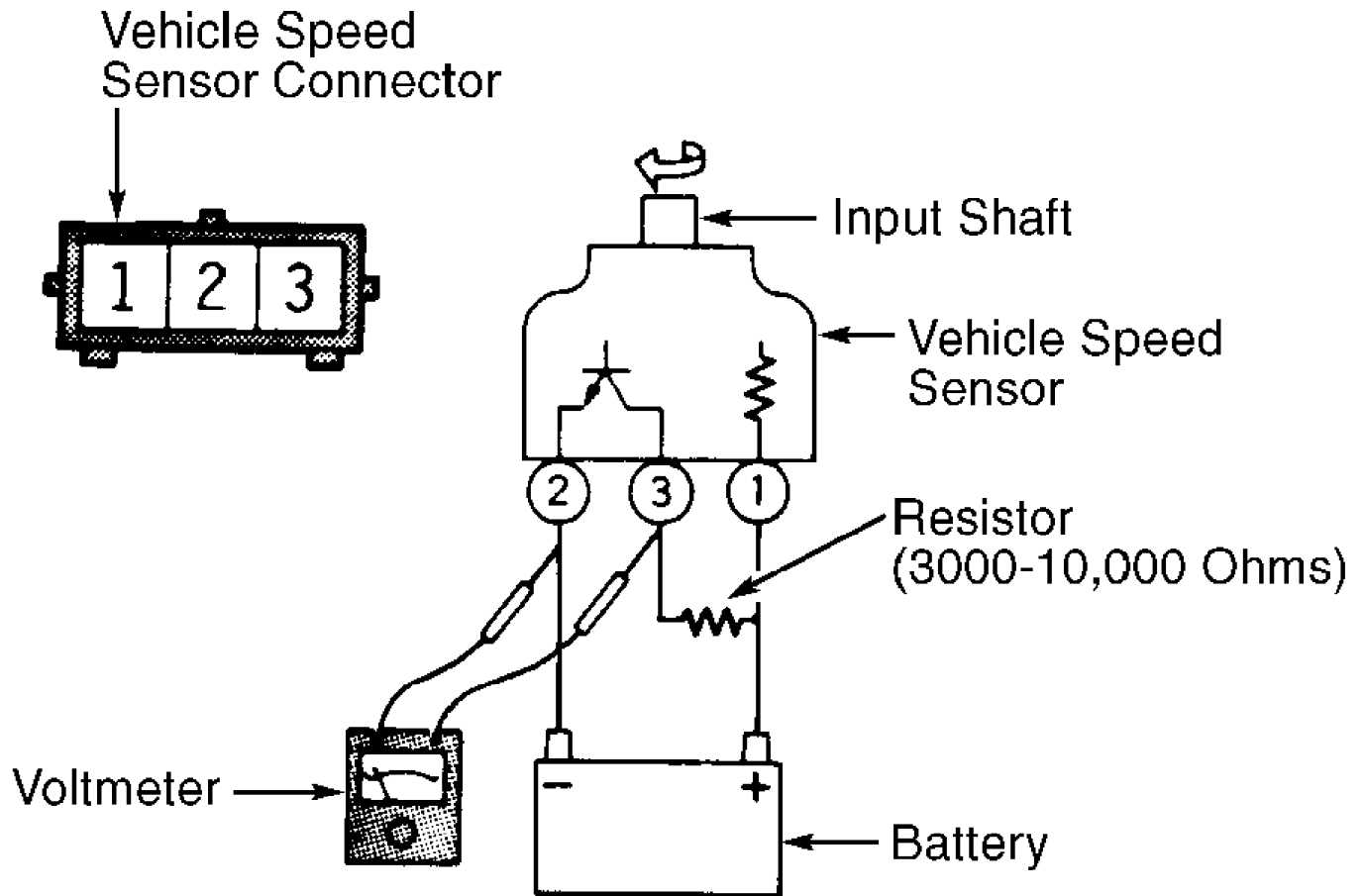
Fig. 10: Testing Vehicle Speed Sensor (Non-Turbo)
Courtesy of Mitsubishi Motor Sales of America

Turbo

1) Remove knee protector, steering column covers and meter

bezel. Disconnect speedometer cable and electrical harness. Remove instrument cluster. Remove vehicle speed sensor from instrument cluster.

2) Connect a battery and resistor (3000-10,000 ohms) to vehicle speed sensor as shown. See Fig. 11. Using an analog voltmeter, measure voltage between sensor terminals No. 2 and 3. Rotate speed sensor input shaft and ensure voltage pulses 4 times per shaft revolution. Replace vehicle speed sensor if voltage does not pulse as specified.



92A00745

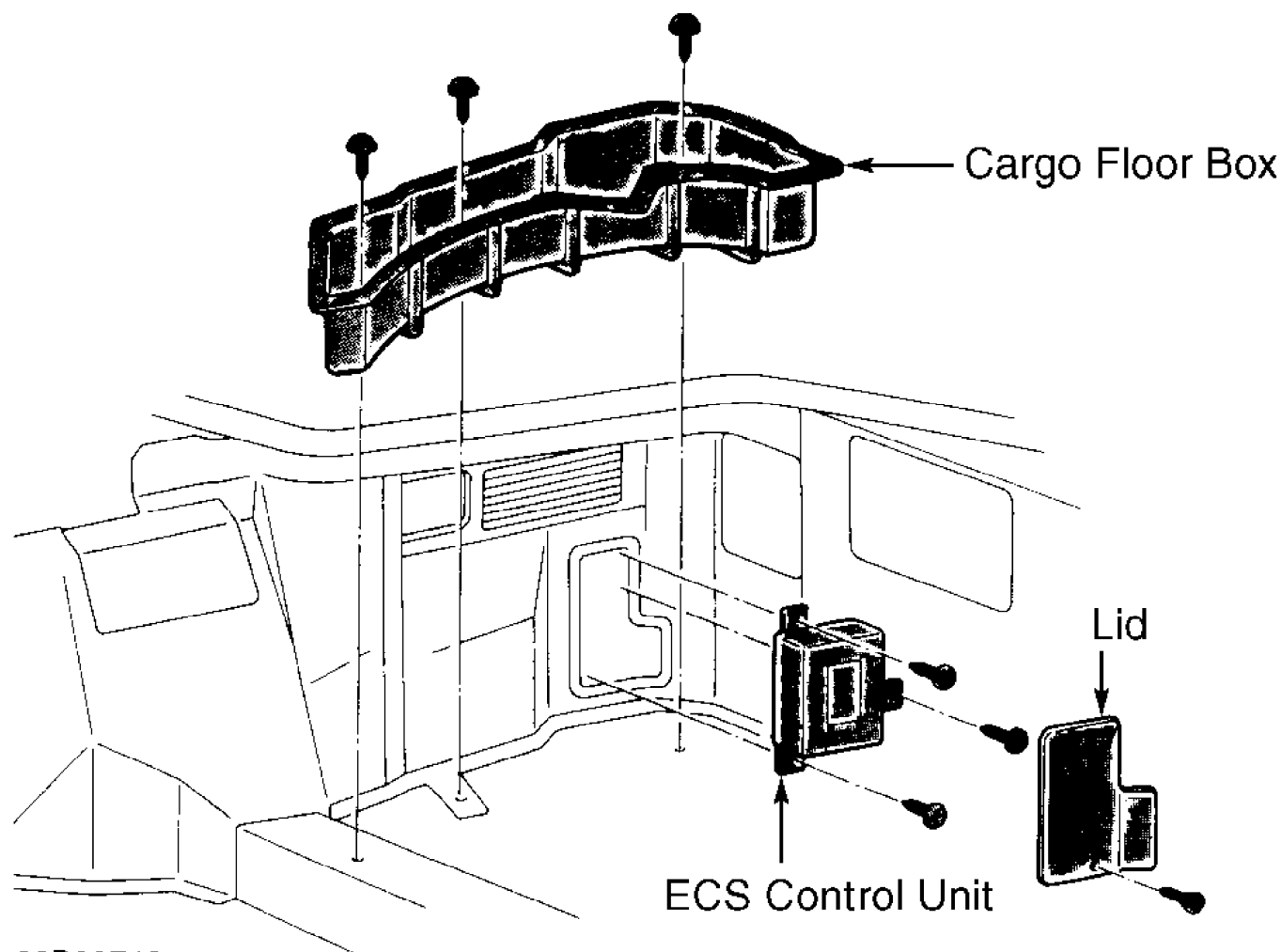
Fig. 11: Testing Vehicle Speed Sensor (Turbo)
Courtesy of Mitsubishi Motor Sales of America

REMOVAL & INSTALLATION

ECS CONTROL UNIT

Removal & Installation

Remove luggage compartment right cargo floor box. See Fig. 12. Remove ECS control unit lid. Disconnect harness connectors, and remove ECS control unit. To install, reverse removal procedure.



92B00746

Fig. 12: Removing & Installing ECS Control Unit
Courtesy of Mitsubishi Motor Sales of America

ECS SWITCH

Removal & Installation

Remove lower knee protector and steering column covers. Remove meter bezel. Remove ECS switch from meter bezel. To install, reverse removal procedure.

"G" SENSOR

Removal

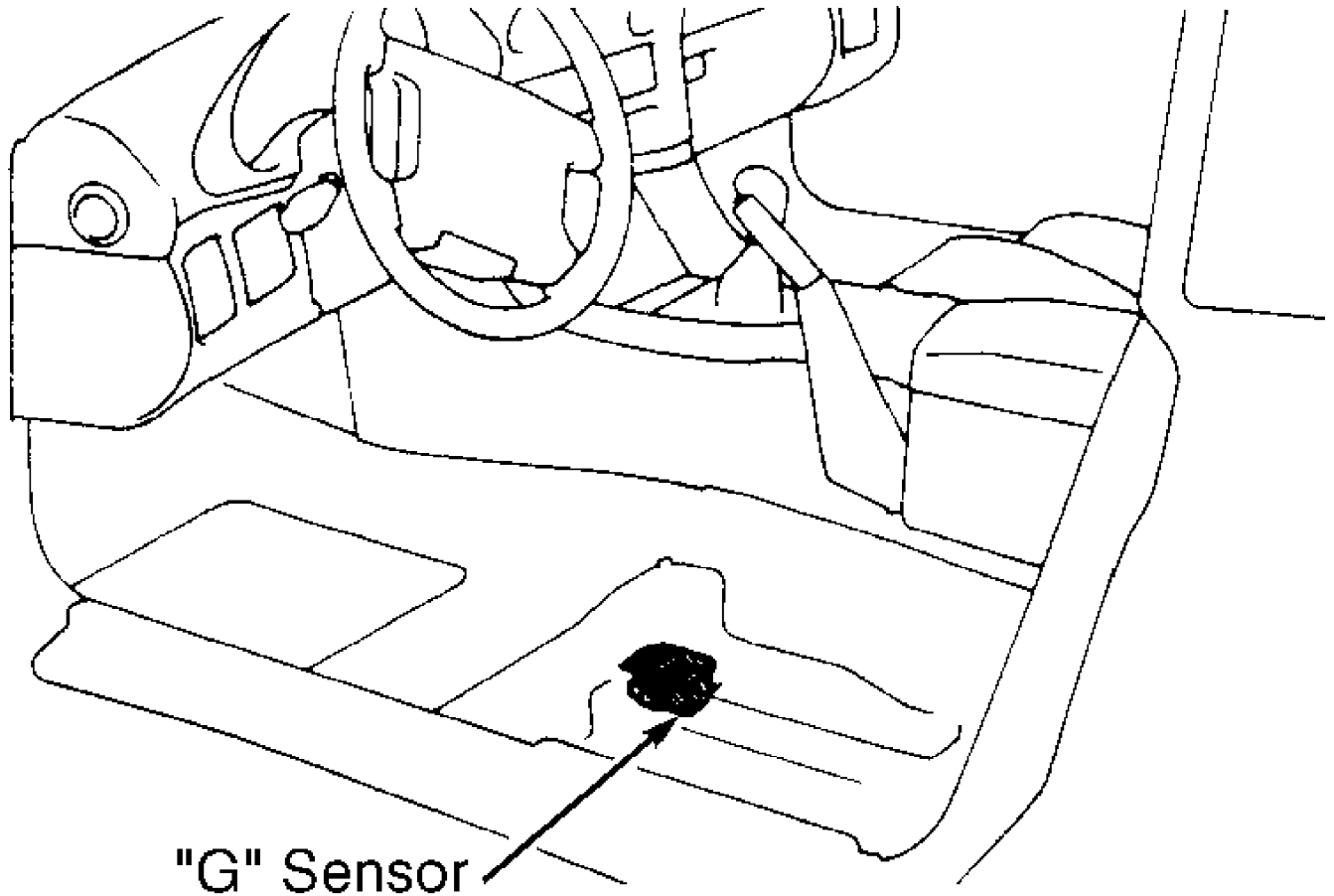
"G" sensor is located under driver's seat. See Fig. 13. Remove seat headrest. Remove seat anchor covers and front mounting nuts. Remove seat rear mounting bolts. Disconnect harness connectors (if equipped). Remove seat assembly. Remove "G" sensor.

Installation

1) Install "G" sensor. When installing seat assembly, ensure slide rail adjuster is locked at both sides and rails are in same relative positions.

2) Install seat assembly. Temporarily tighten fasteners in following order: front outboard nut, front inboard nut, rear outboard

bolt and rear inboard bolt. Tighten nuts to 22 ft. lbs. (30 N.m) and bolts to 33 ft. lbs. (45 N.m). Reverse removal procedure for remaining components.



92C00747

Fig. 13: Locating "G" Sensor
Courtesy of Mitsubishi Motor Sales of America

STEERING WHEEL ANGULAR VELOCITY SENSOR

WARNING: Wait at least 60 seconds after disconnecting negative battery cable before servicing SRS. System reserve capacitor maintains SRS voltage for about 60 seconds after battery is disconnected. Servicing SRS before 60-second period may cause accidental air bag deployment and possible personal injury.

NOTE: Steering wheel angular velocity sensor is an electronic unit using photo-couplers. Clean hands and working environment are recommended to avoid contaminating this component.

Removal

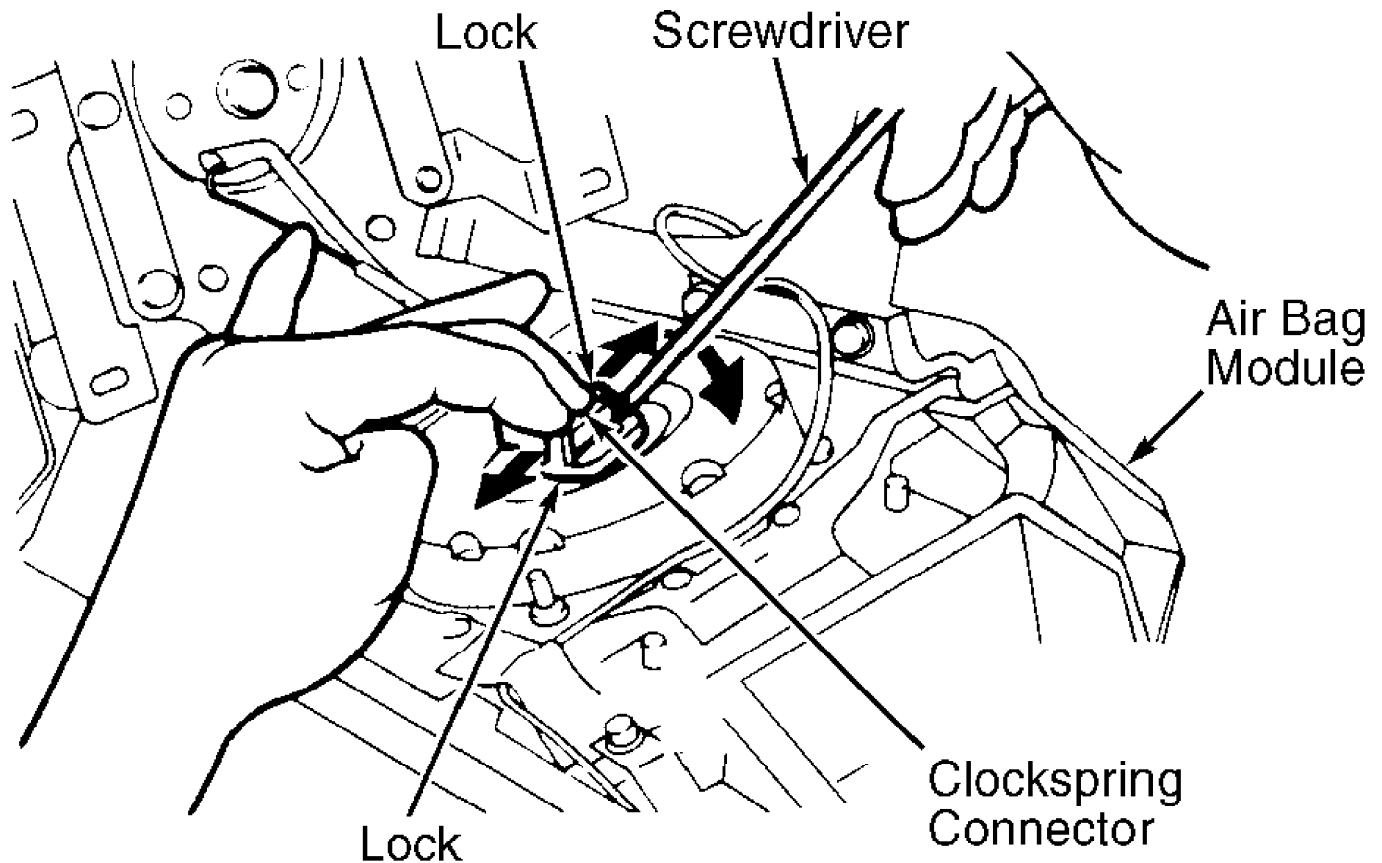
- 1) Before proceeding, follow air bag service precautions. See AIR BAG SERVICE PRECAUTIONS. Disable SRS. See DISABLING & ACTIVATING AIR BAG SYSTEM. Ensure front wheels are in straight-ahead position.
- 2) Turn ignition off. Remove ignition key. Disconnect and isolate negative battery cable to prevent accidental grounding. Wait 60 seconds before continuing. Remove air bag module mounting nuts from back side of steering wheel. Lift air bag module.

3) Disconnect electrical connector from air bag module by pressing air bag connector lock toward outer side to spread it open. Pry upward gently to remove connector. See Fig. 14. DO NOT apply excessive force. Remove air bag module. Remove air bag module. Place air bag in clean, dry area with pad cover face up.

CAUTION: DO NOT hammer steering wheel during removal, as it may damage steering column.

4) Place reference mark on steering wheel and steering column shaft for reassembly reference. Remove steering wheel nut and washer. Using steering wheel puller, remove steering wheel. Remove steering column covers.

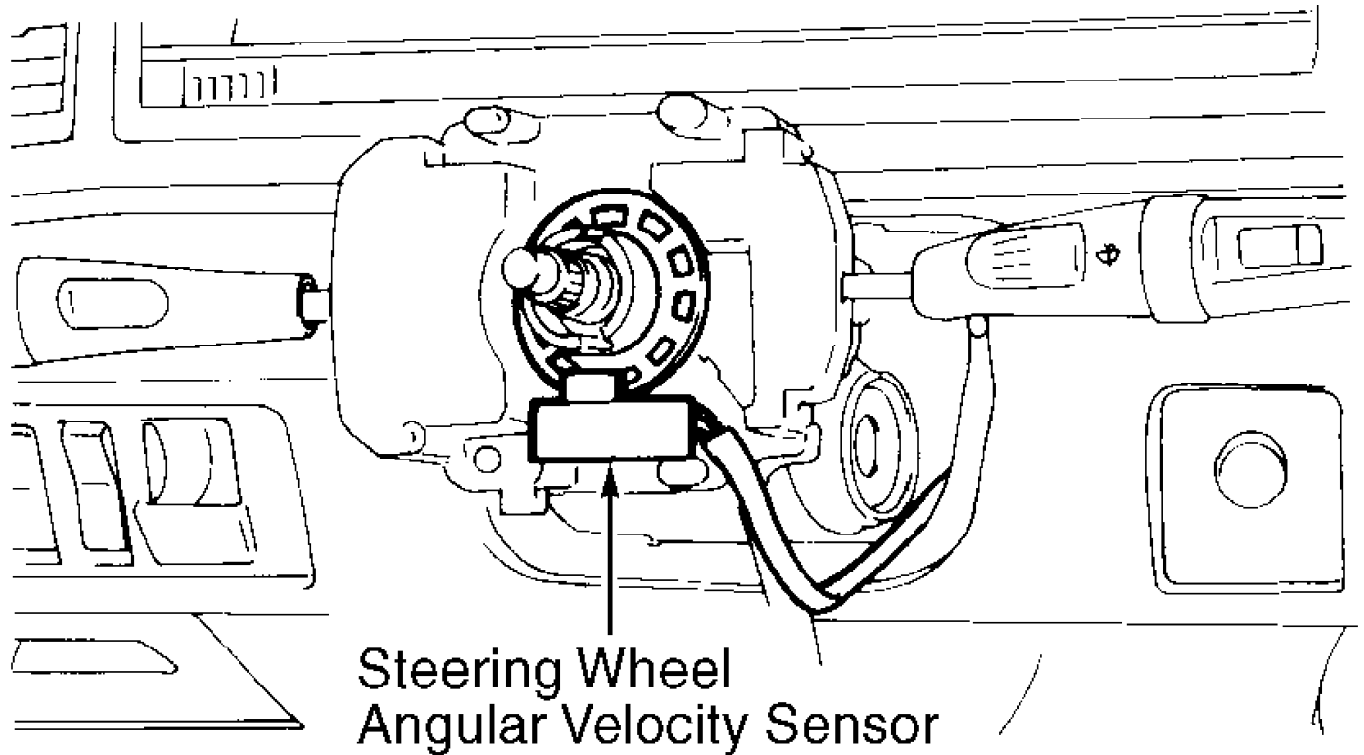
5) Clockspring is located behind steering wheel. Remove rear console assembly. Using a screwdriver, push in SRS Diagnostic Unit (SDU) lock spring to unlock wiring connector lock lever. Disconnect 2-pin Red clockspring connector at SDU. Remove knee protector. Remove screws attaching clockspring. Remove clockspring.



91D03726

Fig. 14: Disconnecting Clockspring Connector From Air Bag
Courtesy of Mitsubishi Motor Sales of America

6) Disconnect steering wheel angular velocity sensor wiring connectors. See Fig. 15. Remove column switch. Remove sensor from steering column.



91F03751

Fig. 15: Locating Steering Wheel Angular Velocity Sensor
Courtesy of Mitsubishi Motor Sales of America

Installation

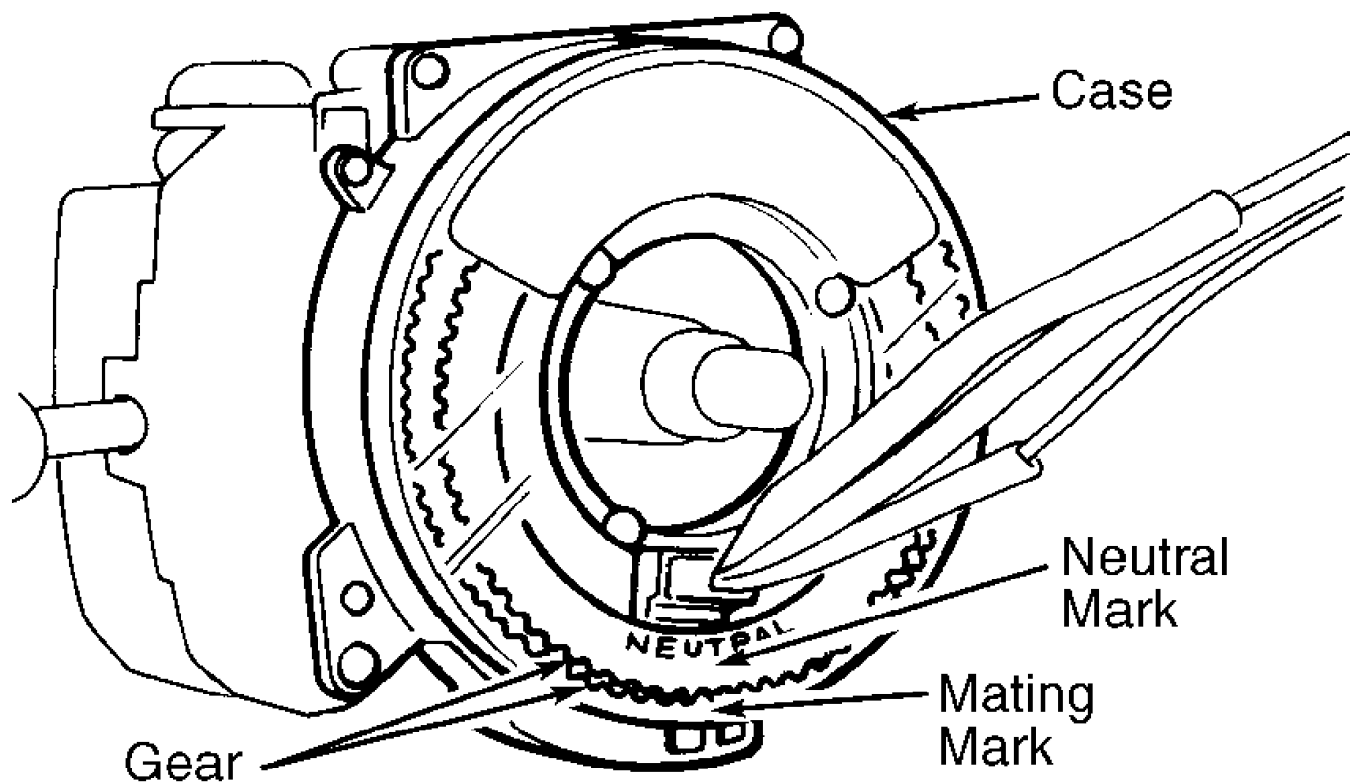
1) To install, gently position sensor in steering column. DO NOT bend or contaminate slit plate. Install mounting screws and wire connector. Reverse removal procedure to install remaining components.

CAUTION: If rotating part of clockspring is not properly centered with steering column and front wheels, clockspring failure will result. The following procedure must be used to center clockspring.

2) Ensure wheels are straight ahead and steering wheel is locked. With air bag module and steering wheel removed, align clockspring mating mark and NEUTRAL position mark. See Fig. 16.

3) Ensure horn switch wires are properly positioned. Install steering wheel and air bag module. Turn steering wheel all the way in both directions to ensure steering is normal.

4) Ensure horn switch wires are properly positioned. Tighten air bag module-to-steering wheel nuts to 48 INCH lbs. (5 N.m). Connect negative battery cable. Check SRS warning light to ensure system is functioning properly. See AIR BAG SYSTEM OPERATION CHECK.



91J03729

Fig. 16: Aligning Clockspring
Courtesy of Mitsubishi Motor Sales of America

WARNING: After any repair, always turn ignition on from passenger-side of vehicle. Air bag could deploy.

Air Bag System Operation Check

Turn ignition switch to ON or START position. SRS warning light on instrument panel should illuminate for approximately 7 seconds then turn off. This indicates SRS is functioning properly. If any of the following conditions exist, SRS is malfunctioning and needs repair.

- * SRS warning light does not illuminate as described.
- * SRS warning light stays on for more than 7 seconds.
- * SRS warning light illuminates while driving.

If SRS warning light does not illuminate as described, SRS is malfunctioning.

STRUT ASSEMBLY

NOTE: For removal and installation information, see SUSPENSION - FRONT article or SUSPENSION - REAR - AWD & FWD article in the SUSPENSION section below.

- * SUSPENSION - FRONT (FWD)
- * SUSPENSION - REAR (AWD & FWD)

WIRING DIAGRAM

