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AIR BAG RESTRAINT SYSTEM
Article Text

1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 11:52AM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Air Bags

RX7

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all WARNINGS and SERVICE PRECAUTIONS.

DESCRIPTION & OPERATION

System consists of air bag module (inflator assembly), diagnostic module, clockspring, front impact (crash) sensors, rear safing sensor, AIR BAG warning light and wiring harness. See ELECTRICAL COMPONENT LOCATIONS table. See Fig. 1.

Air bag deploys if impact is great enough to cause contacts in rear safing sensor and at least one front impact sensor to close. Back-up battery in diagnostic module supplies current for the ignitor if the vehicle battery or fuses fail during a collision. Diagnostic module monitors the air bag system for failures. If a failure occurs, diagnostic module causes AIR BAG warning light to begin flashing.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Air Bag Module	(1) At Center Of Steering Wheel
Clockspring	(1) Under Steering Wheel
Diagnostic Module	(1) To Right Of Accelerator Pedal, On Left Side Of A/C-Heater Case
Front Impact Sensors	(1) Forward Of Engine Compartment
Fuse Blocks	
Engine Compartment	(2) On Left Inner Fender Panel
Passenger Compartment	(2) Behind Left Side Of Dash
Rear Safing Sensor	(3) In Passenger Compartment, Forward Of A/C-Heater Case

(1) - See Fig. 1.
(2) - See Fig. 4.
(3) - See Figs. 1 and 6.

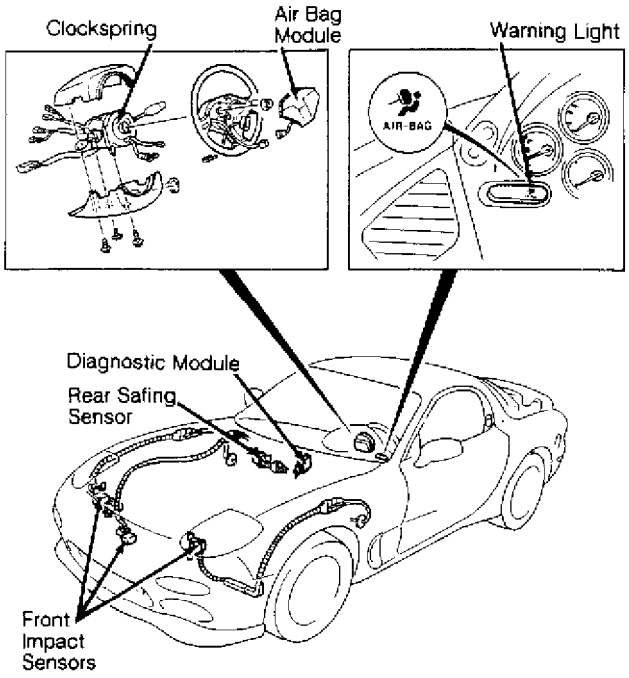

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Fig. 1: Locating Air Bag System Components
Courtesy of Mazda Motors Corp.

SYSTEM OPERATION CHECK

1) Turn ignition on. AIR BAG warning light on instrument cluster should come on for about 6 seconds and then go out. If light stays on after 6-second system check, or if light comes on while driving, air bag system is malfunctioning and needs repair. Always follow SERVICE PRECAUTIONS and disable air bag system before performing repairs. See DISABLING AND ACTIVATING AIR BAG SYSTEM.

2) If light functions as specified, system is functioning properly. Check horn operation. If horn does not sound, remove air bag module and check air bag module and horn switch connections.

SERVICE PRECAUTIONS

Following precautions should be observed when working with air bag systems.

* Disable air bag system before servicing any air bag system or steering column component. See DISABLING & ACTIVATING AIR BAG SYSTEM.
* Wait at least 10 minutes after disabling air bag system before servicing. Air bag system voltage is maintained for about 10 minutes after system is disabled. Failure to wait at least 10 minutes before servicing system may cause accidental air bag deployment and possible personal injury.

* Obtain radio code number from customer, and deactivate radio anti-theft function before disconnecting battery.
* Because of critical system operating requirements, DO NOT service any air bag system component. Corrections are made by replacement only.
* DO NOT use an ohmmeter to check resistance of air bag module, as it may cause air bag deployment.
* When carrying a live (undeployed) module, ensure trim cover is pointed away from your body. This minimizes chance of injury in event of accidental air bag deployment.
* When placing a live air bag module on any surface, always face trim cover upward to reduce motion of module if it is accidentally deployed.
* If an open circuit is present, replace entire wiring harness. DO NOT repair wiring harness.
* Impact sensors must always be installed with arrow on sensor facing front of vehicle. Also, check sensors for cracks, defects and rust before installation. Replace impact sensor(s) if required.
* Air bag system clockspring MUST be aligned in neutral position, since its rotation ability is limited. DO NOT turn steering wheel or column after removal of steering gear.
* A double-lock mechanism is used on clockspring connectors. DO NOT use excessive force when disconnecting connectors, as damage to connector may occur.

DISABLING & ACTIVATING AIR BAG SYSTEM

WARNING: After disabling air bag system, wait at least 10 minutes before servicing. Air bag system voltage is maintained for about 10 minutes after system is disabled. Failure to wait at least 10 minutes may cause accidental air bag deployment and possible personal injury.

Disabling System

Disconnect and shield negative battery cable. Wait at least 10 minutes for back-up power supply to be depleted. Remove cover panel below left side of instrument panel. See Fig. 2. Disconnect clockspring lower connector.

Activating System

Connect clockspring lower connector. Install cover panel. Connect negative battery cable. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

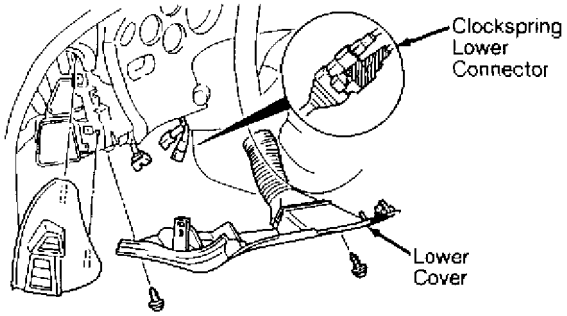

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Fig. 2: Locating Clockspring Lower Connector
Courtesy of Mazda Motors Corp.

DISPOSAL PROCEDURES

DEPLOYED AIR BAG

Wrap deployed air bag module in a vinyl bag and dispose of as you would any other part. Wear gloves and safety glasses when handling air bag module.

SCRAPPED VEHICLE

NOTE: Perform following procedure when scrapping a vehicle with undeployed air bag.

1) Ensure vehicle is outside and away from other vehicles and people. Open doors. Open convertible top (if equipped). Disconnect negative battery cable.
2) Ensure air bag module is firmly mounted to steering wheel. Remove knee protector. Disconnect clockspring lower connector. See Fig. 2. Cut clockspring lower connector off of harness. Strip back the Red and Green/Yellow wires.
3) Connect 2 jumper wires (20 feet long) to stripped wire ends. Connect other ends of wires to a 12-volt battery to deploy air bag. Because of heat, wait 15 minutes before touching deployed air bag module.

REMOVAL & INSTALLATION

WARNING: Follow air bag service precautions to prevent accidental air bag deployment and personal injury. See SERVICE PRECAUTIONS.

NOTE: After replacing components, check system to ensure proper operation. See SYSTEM OPERATION CHECK.

AIR BAG MODULE

Removal & Installation

1) Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Remove air bag module bolts from back side of steering wheel. Remove air bag module.

2) To install, reverse removal procedure. Tighten air bag module bolts to specification. See TORQUE SPECIFICATIONS table at the end of this article. Activate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

CLOCKSPRING

NOTE: Clockspring is part of combination switch. When replacing clockspring, replace clockspring and combination switch as an assembly.

Removal

1) Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM.

2) Remove air bag module. See AIR BAG MODULE. Remove steering wheel nut. Remove steering wheel using steering wheel puller. Remove column covers. Remove clockspring screws. Remove clockspring and combination switch as assembly.

Installation

1) To install, reverse removal procedure. Before installing steering wheel, center clockspring. See CLOCKSPRING CENTERING under ADJUSTMENTS. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS table at the end of this article.

2) After installation, activate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

FRONT IMPACT SENSORS

CAUTION: Impact sensor orientation and mounting is important for proper operation. All sensors must be positioned so arrow points forward. If sheet metal damage exists near sensor mounting point, inspect body structure at sensor mounting point for deformation. If structure is damaged, restore it to original shape. Ensure sensor mounting bolts or nuts are tightened to specification. See TORQUE SPECIFICATIONS table at the end of this article.

Removal

1) Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM.

2) Remove wheelwell undercover. Disconnect sensor connector. See Fig. 1. Remove harness retaining clips and sensor bolts. Remove

sensor.

Installation

To install, reverse removal procedure. Position sensor with arrow toward front of vehicle. Tighten sensor bolts to specification. See TORQUE SPECIFICATIONS table at the end of this article. Activate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

REAR SAFING SENSOR

Removal

Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Rear safing sensor is located in passenger compartment, forward of A/C-heater case. See Fig. 6. Remove instrument panel. Remove A/C-heater case. Disconnect rear safing sensor connectors. Remove sensor nuts and sensor.

Installation

To install, reverse removal procedure. Position sensor with arrow toward front of vehicle. Tighten sensor nuts to specification. See TORQUE SPECIFICATIONS table at the end of this article. Activate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

DIAGNOSTIC MODULE

Removal & Installation

1) Before proceeding, follow air bag service precautions. See SERVICE PRECAUTIONS. Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM.

2) Diagnostic module is located behind instrument panel, on left side of A/C-heater case (to right of accelerator pedal). Disconnect diagnostic module connectors. Remove nuts. Remove diagnostic module.

3) To install, reverse removal procedure. After installation, activate air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check AIR BAG warning light to ensure system is functioning properly. See SYSTEM OPERATION CHECK.

STEERING WHEEL

Removal & Installation

Remove air bag module. See AIR BAG MODULE. Remove steering wheel nut. Steering shaft may collapse if it is struck with a hammer. DO NOT strike steering shaft. Remove steering wheel using steering wheel puller. To install, reverse removal procedure. Tighten steering wheel nut to specification. See TORQUE SPECIFICATIONS table at the end of this article.

ADJUSTMENTS

CLOCKSPRING CENTERING

Set front wheels in straight-ahead position. Turn clockspring clockwise until it stops (DO NOT force). Return clockspring 2 3/4 turns counterclockwise until arrows at 12 o'clock position are aligned.

WIRE REPAIR

DO NOT repair air bag system wiring. If air bag harness connectors are faulty, replace faulty wiring harness.

DIAGNOSIS & TESTING

WARNING: Follow air bag service precautions to prevent accidental air bag deployment and personal injury. See SERVICE PRECAUTIONS.

NOTE: After component replacement, check system to ensure proper operation. See SYSTEM OPERATION CHECK.

SELF-DIAGNOSTIC SYSTEM

Retrieving & Clearing Codes

If codes are stored, AIR BAG warning light will flash or remain on when ignition is turned on. Codes are automatically cleared when fault is corrected. See AIR BAG FLASH CODES table.

Warning Light Flashes

If AIR BAG warning light flashes, fault code(s) are stored in diagnostic module. Count the number of flashes between pauses to determine code. See AIR BAG FLASH CODES table. Codes are prioritized. If 2 or more faults are present, highest test-priority fault indication will remain until corrected.

Warning Light Does Not Come On

See DIAGNOSTIC TEST NO. 7.

Warning Light Remains On

See DIAGNOSTIC TEST NO. 1.

AIR BAG FLASH CODES TABLE

Priority	Flash Code	Cause/Diagnosis
1	Remains On	Faulty Diagnostic Module Or Poor Connection At Diagnostic Module (See DIAGNOSTIC TEST NO. 1)

2	Flashes 3 Times	Open Circuit Or Poor Connection Of Power Source Circuit (See DIAGNOSTIC TEST NO. 2)
3	Flashes 5 Times	Faulty Front Impact Sensor (See DIAGNOSTIC TEST NO. 3)
4	Flashes 10 Times	Faulty Diagnostic Module Due To Open System-Down Fuse (See DIAGNOSTIC TEST NO. 4)
5	Flashes 4 Times	Faulty Rear Safing Sensor (See DIAGNOSTIC TEST NO. 5)
6	Flashes 6 Times	Faulty Air Bag Module Or Poor Connection At Clockspring (See DIAGNOSTIC TEST NO. 6)
7	Flashes 9 Times	Open Circuit Between Diagnostic Module And Front Impact Sensor (See DIAGNOSTIC TEST NO. 3)
N/A	Remains Off	Damaged Warning Light Circuit (See DIAGNOSTIC TEST NO. 7)

DIAGNOSTIC TEST NO. 1

Warning Light Remains On

Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Ensure diagnostic module connectors are properly connected. If connectors are okay, replace diagnostic module.

DIAGNOSTIC TEST NO. 2

Warning Light Flashes 3 Times

1) Measure battery voltage. If battery voltage is less than 9 volts, charge battery. If battery voltage is more than 9 volts, check fuses. See Fig. 4. Replace fuse(s) if blown (repair short circuit if necessary).

2) If fuses are okay, disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Check for proper electrical connections at diagnostic module. Correct as necessary. If connections are okay, disconnect diagnostic module connectors.

3) Reconnect negative battery cable. Turn ignition on. Measure voltage between ground and terminal 1A (Black/Light Green wire) of diagnostic module connector. If battery voltage is not present, replace wiring harness between 15-amp ENGINE fuse and diagnostic module.

4) If battery voltage is present, measure voltage between ground and terminal 2M (Green/Black wire) of diagnostic module connector. If battery voltage is not present, replace wiring harness

between 10-amp AIR BAG fuse and diagnostic module.

5) If battery voltage is present, measure voltage between ground and terminal 2N (White/Green wire) of diagnostic module connector. If battery voltage is present, replace diagnostic module. If battery voltage is not present, replace wiring harness between 30-amp EGI fuse and diagnostic module.

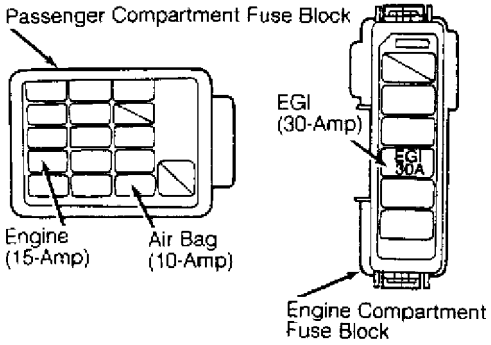

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Fig. 3: Locating Fuses
Courtesy of Mazda Motors Corp.

DIAGNOSTIC TEST NO. 3

Warning Light Flashes 5 Or 9 Times

1) Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Disconnect electrical connector from each front impact sensor connector. See Fig. 1. Measure resistance across terminals "C" and "D" of each front impact sensor connector. See Fig. 5. If resistance is not about 1200 ohms, replace sensor.

2) If resistance is about 1200 ohms, reconnect all front impact sensor connectors. Disconnect diagnostic module connectors. Measure resistance between terminals 1H (Yellow wire) and 1M (Brown wire) of diagnostic module connector. If resistance is 1200 ohms, go to next step. If resistance is not 1200 ohms, replace wiring harness.

3) Measure resistance between terminals 1G (Green wire) and 1O (Orange wire) of diagnostic module connector. If resistance is 1200 ohms, go to next step. If resistance is not 1200 ohms, replace wiring harness.

4) Measure resistance between terminals 2H (Blue wire) and 2F (Gray wire) of diagnostic module connector. If resistance is 1200 ohms, replace diagnostic module. If resistance is not 1200 ohms, replace wiring harness.

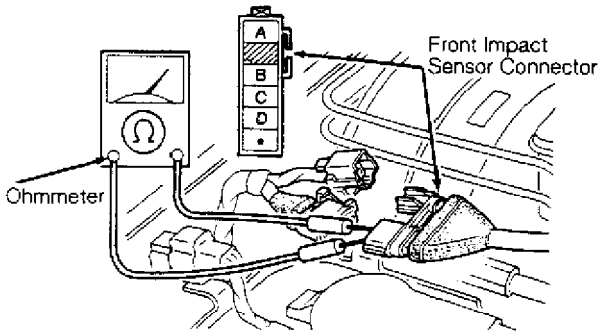

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Fig. 4: Measuring Front Impact Sensor Resistance
Courtesy of Mazda Motors Corp.

DIAGNOSTIC TEST NO. 4

Warning Light Flashes 10 Times

1) Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Disconnect electrical connector from each front impact sensor. Measure the resistance across terminals "C" and "D" of each front impact sensor connector. See Fig. 5. If resistance is not about 1200 ohms, replace sensor.

2) If resistance is about 1200 ohms, reconnect all front impact sensor connectors. Disconnect diagnostic module connectors. Measure resistance between terminals 1H (Yellow wire) and 1M (Brown wire) of diagnostic module connector. If resistance is not 1200 ohms, replace wiring harness.

3) If resistance is 1200 ohms, measure resistance between terminals 1G (White wire) and 1O (Violet wire) of diagnostic module connector. If resistance is not 1200 ohms, replace wiring harness.

4) If resistance is 1200 ohms, measure resistance between terminals 2H (Blue wire) and 2F (Gray wire) of diagnostic module connector. If resistance is not 1200 ohms, replace wiring harness.

5) If resistance is 1200 ohms, check for continuity between ground and terminal 2J (Red wire) of diagnostic module connector. If there is continuity, replace diagnostic module. If there is no continuity, replace wiring harness.

DIAGNOSTIC TEST NO. 5

Warning Light Flashes 4 Times

1) Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Disconnect diagnostic module connectors. Check continuity between terminals 1J (Green wire) and 2L (Orange wire) of diagnostic module connectors. If there is no continuity, go to step).

2) If there is continuity, check continuity between terminals 1L (Pink wire) and 2K (Light Green wire) of diagnostic module connectors. If there is no continuity, go to step 4). If there is continuity, check continuity between terminals 2L (Orange wire) and 2K (Light Green wire) of diagnostic module connectors.

3) If there is no continuity, go to step 4). If there is continuity, check continuity between ground and terminals 2L (Orange wire) and 2K (Light Green wire) of diagnostic module connector. If there is continuity in each case, replace diagnostic module.

4) Disconnect rear safing sensor connector. Check for continuity between terminals "A" and "B" of rear safing sensor connector. See Fig. 6. If there is no continuity, replace rear safing sensor.

5) If there is continuity, check for continuity between terminals "C" and "D" of rear safing sensor connector. If there is no continuity, replace rear safing sensor. If there is continuity, replace wiring harness.

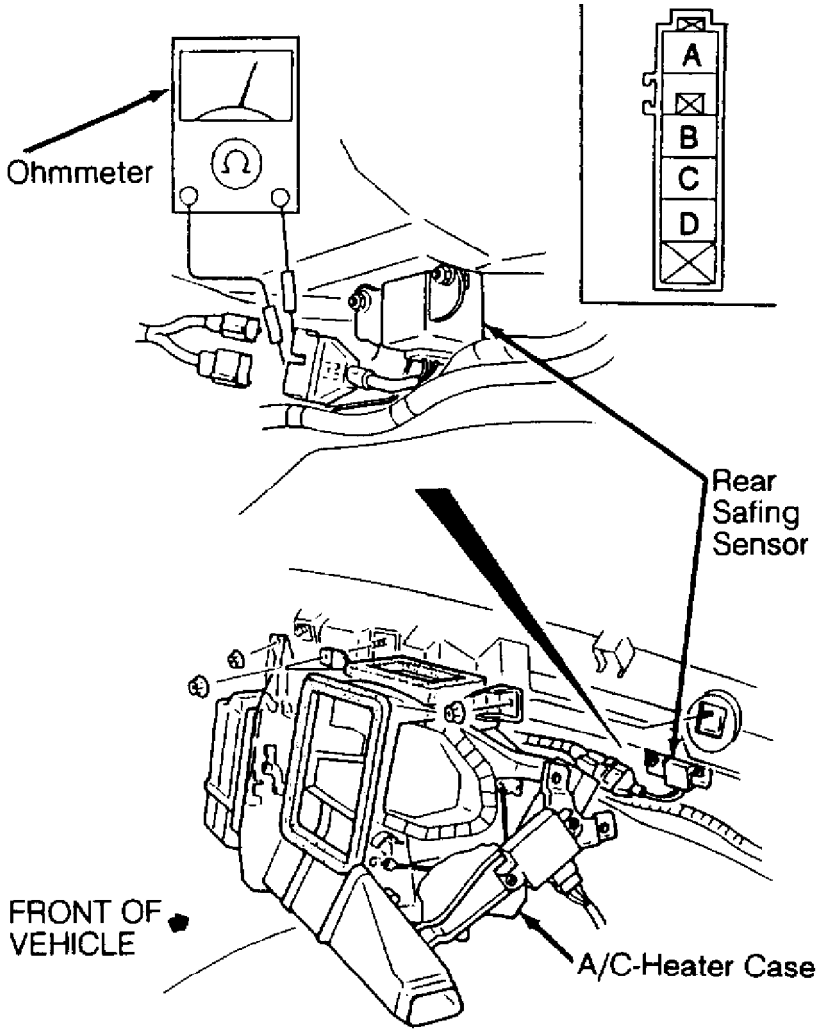

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Fig. 5: Identifying Rear Safing Sensor Connector Terminals
Courtesy of Mazda Motors Corp.

DIAGNOSTIC TEST NO. 6

Warning Light Flashes 6 Times

1) Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Remove air bag module bolts. Remove air bag module, suspending it by support rope. Check clockspring lower connector. See Fig. 2. Repair as necessary.

2) If connection is okay, disconnect air bag module connector and completely remove air bag module. Check for continuity between terminal "B" of clockspring upper connector and terminal "B" of clockspring lower connector. See Fig. 7.

3) If there is no continuity, replace clockspring. If there is continuity, check for continuity between terminal "C" of clockspring upper connector and terminal "C" of clockspring lower connector. If there is no continuity, replace clockspring. If there is continuity, disconnect diagnostic module connector.

4) Check for continuity between terminal 2I (Green/White wire) of diagnostic module connector and terminal "B" (Green/White wire) of clockspring lower connector. If there is no continuity, replace wiring harness.

5) If there is continuity, check for continuity between terminal 2J (Red wire) of diagnostic module connector and terminal "C" (Red wire) of clockspring lower connector. If there is no continuity, replace wiring harness. If there is continuity, replace air bag module. Check warning light operation. If warning light flashes 6 times, replace diagnostic module.

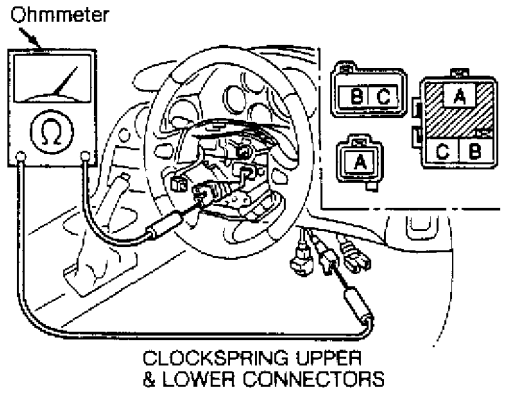

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Fig. 6: Checking Resistance Between Clockspring Connector Terminals Courtesy of Mazda Motors Corp.

DIAGNOSTIC TEST NO. 7

Warning Light Does Not Come On

1) Check fuses. See Fig. 4. If fuse(s) are blown, check/repair harness and replace fuse(s) as necessary. If fuses are okay, remove instrument cluster. Check AIR BAG warning light bulb. See Fig. 8.

2) Replace bulb if burnt. If bulb is okay, check for continuity between terminals 2D and 1D of instrument cluster

connectors. See Fig. 8. If there is no continuity, replace instrument cluster. If there is continuity, disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM.

3) Disconnect diagnostic module connectors. Check for continuity between terminal 2A (Red/Yellow wire) of diagnostic module connector and terminal 1A (Red/Yellow wire) of instrument cluster connector. If there is no continuity, replace wiring harness.

4) If there is continuity, check for continuity between terminal 2C (Green/Yellow wire) of diagnostic module connector and terminal 1C (Green/Yellow wire) of instrument cluster connector. If there is no continuity, replace wiring harness. If there is continuity, replace diagnostic module.

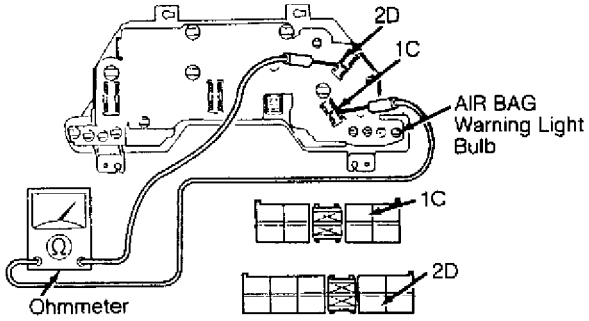

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Fig. 7: Identifying Instrument Cluster Connector Terminals
Courtesy of Mazda Motors Corp.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Left & Right Front Impact Sensor Bolt	13-20 (18-27)
Steering Wheel Nut	29-36 (39-49)
	INCH Lbs. (N.m)
Air Bag Module Bolt	70-104 (8-12)
Center Front Impact Sensor Bolt	70-104 (8-12)
Rear Safing Sensor Nut	61-86 (7-10)

POST-COLLISION AIR BAG SAFETY INSPECTION

POST-COLLISION AIR BAG SAFETY INSPECTION TABLE

Replace After Deployment	*	Air Bag Module(s)	
	*	Clockspring	

AIR BAG RESTRAINT SYSTEM
Article Text (p. 14)

1993 Mazda RX7

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Sunday, August 19, 2001 11:52AM

³Inspect & If Damaged,	*	Air Bag Diagnosis Control Unit	³
³Replace Component	*	Impact Sensors & Sensors Mountings	³
³(Even If Air Bag Did	*	Steering Column	³
³Not Deploy)	*	Steering Wheel	³
³	*	Wiring Harness	³
³Comments	*	DO NOT attempt wiring harness	³
³		repairs. Replace entire wiring	³
³		harness.	³
³	*	Impact sensors must always be	³
³		installed with arrow on sensor	³
³		facing front of vehicle.	³

WIRING DIAGRAM

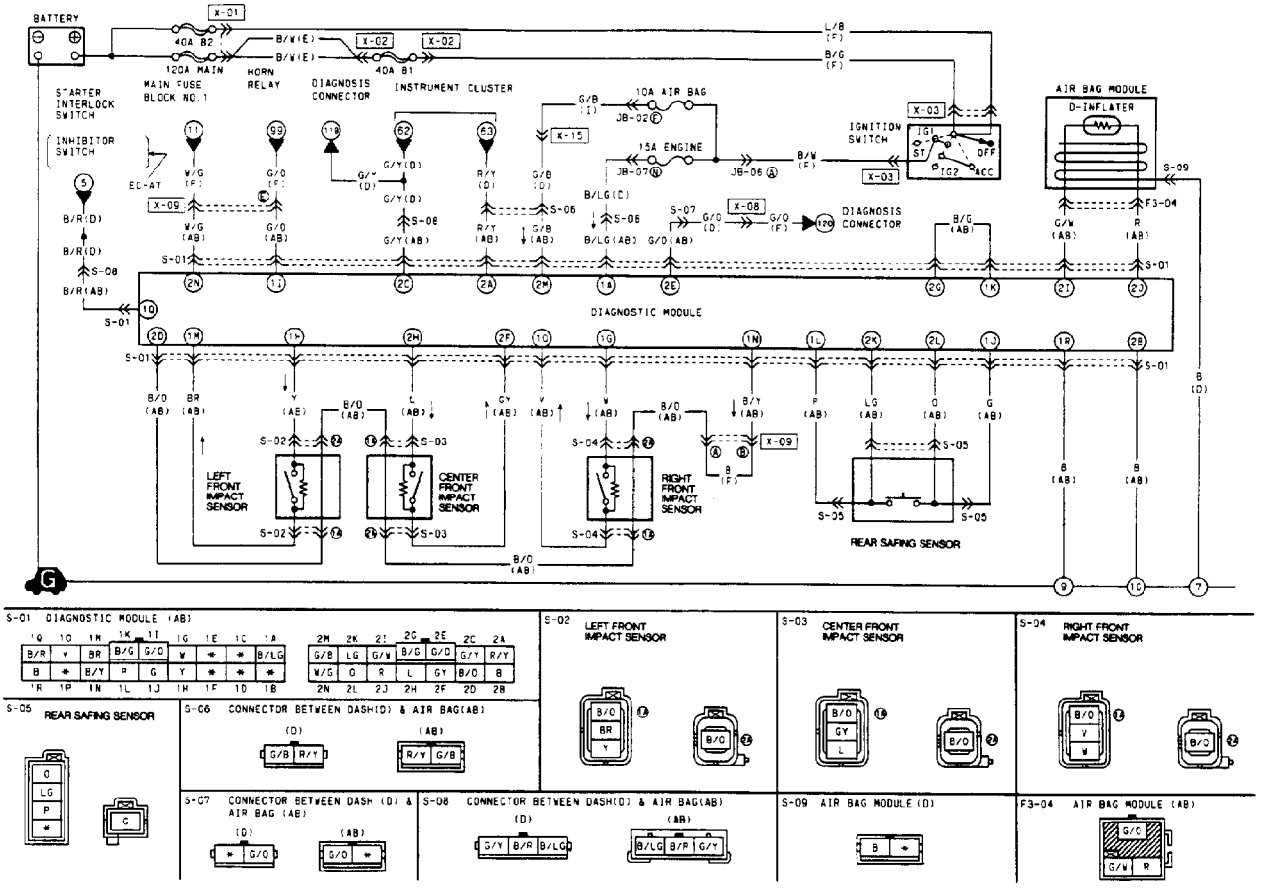

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Fig. 8: Air Bag System Wiring Diagram & Connector ID
Courtesy of Mazda Motors Corp.

END OF ARTICLE

ANTI-THEFT SYSTEM
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 12:13PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Anti-Theft System

RX7

DESCRIPTION & OPERATION

If alarm goes off, headlights and hazard lights flash, horn sounds and starter is disabled. Alarm goes off if the hood, rear hatch or a door is opened without a key, or if ignition switch is forced into START position without a key. Two Central Processing Units (CPUs) control the system based on inputs they receive from the following switches:

* Door switches indicate whether a door is open or closed.
* Key cylinder switches indicate whether or not the key cylinder for a door or the rear hatch is turned to the unlocked position.
* Door lock link switches indicate whether a door is locked or unlocked.
* Hood switch indicates whether the hood is open or closed.
* Cargo compartment light switch indicates whether the rear hatch is open or closed.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Cargo Compartment Light Switch	On Rear Hatch Latch
CPUs No. 1 & 2	(1) Behind Left Kick Panel, (Part Of Joint Box)
Flasher Unit	Integral Part Of CPU No. 2
Headlight Relay	On Left Front Inner Fender
Hood Switch	On Hood Latch
Horn Relay	In Relay Block Above Radiator
Starter Cut Relay	Behind Left Kick Panel, On Joint Box

(1) - See Figs. 1 and 2.

TESTING

SYSTEM OPERATION TEST

Initial Phase
Remove ignition key.

Pre-arming Phase 1

With hood and rear hatch closed, open any door. Security light will come on.

Pre-arming Phase 2
Lock and close all doors. After security light stays lit for 10 seconds, system proceeds to arming phase 1.

Arming Phase 1
Security light flashes every 3 seconds, and system is armed.

Arming Phase 2
Rear hatch may be opened with key during arming phase 1. Security light should continue to flash. Process returns to arming phase 1 after rear hatch is closed.

Alarm Phase 1
If a door, hood or rear hatch is opened without a key, or if ignition switch is forced to the ON position, alarm is activated (horn sounds intermittently, headlights and hazard lights flash for 5 minutes, and starter does not operate).

Alarm Phase 2
Horn stops sounding, headlights and hazard lights stop flashing, but starter remains inoperative.

Alarm Stop Phase
Unlock any door or rear hatch with key.

NOTE: If system does not operate as previously described, use the following procedure to determine where to begin testing.

1) Open any door window. Close both doors. Remove ignition key. With hood and rear hatch closed, open either door. If security light comes on and buzzer sounds once, go to next step. If security light does not come on and buzzer does not sound, go to TEST NO. 1. If buzzer sounds but security light does not come on, go to TEST NO. 2. If security light comes on but buzzer does not sound, go to TEST NO. 3.
2) Turn ignition on. If security light does not go out, go to TEST NO. 4. If security light goes out, go to next step.
3) Perform steps 1) and 2) to set arming condition. Unlock either door lock knob. Security light should go out, horn should sound and headlights and hazard lights should flash. Starter should not operate. If results are as specified, go to next step. If results are not as specified, go to appropriate test.

* If security light does not go out, go to TEST NO. 5.
* If horn does not sound, go to TEST NO. 6.
* If headlights do not flash, go to TEST NO. 7.
* If hazard lights do not flash, go to TEST NO. 8.
* If starter operates, go to TEST NO. 9.

4) Using key, unlock driver or passenger door or rear hatch. Warning should cancel (horn should stop sounding, headlights and hazard lights should stop flashing and starter should operate).

* If warning cancels when door and rear hatch are unlocked, go to next step.
* If warning does not cancel when door is unlocked but cancels when rear hatch is unlocked, go to TEST NO. 10.
* If warning does not cancel when rear hatch is unlocked but cancels when door is unlocked, go to TEST NO. 11.

5) Remove STOP and HEAD fuses. Perform steps 1), 2) and 3). If hazard lights do not flash, go to TEST NO. 12. If hazard lights do not stop flashing after about 5 minutes, go to TEST NO. 13.

SYSTEM DIAGNOSTIC TESTS

NOTE: Before performing the following tests, perform SYSTEM OPERATION TEST to determine which test to follow.

Test No. 1

1) Check ROOM fuse. If fuse is faulty, replace fuse (repair circuit if shorted). If fuse is okay, go to next step.

2) Measure voltage at terminal 1A (Blue/Red wire) of CPU No. 2 (20-pin connector). See Fig. 1. If battery voltage is not present, repair wiring between ROOM fuse and CPU No. 2. If battery voltage is present, go to next step.

3) Check continuity between ground and terminal 1H (Black wire) of CPU No. 2 (20-pin connector). If there is no continuity, repair wiring between CPU No. 2 and ground. If there is continuity, go to next step.

4) Measure voltage at terminal 1B (White wire) of CPU No. 2 (20-pin connector). If battery voltage is present, replace key reminder switch or repair wiring between ROOM fuse and CPU No. 2. If battery voltage is not present, go to next step.

5) Disconnect 20-pin connector from CPU No. 2. Close passenger door. Open driver door. Check continuity between ground and terminal 1E (Blue/White wire) of CPU No. 2 (20-pin connector). If there is no continuity, go to next step. If there is continuity, go to step 7).

6) Remove driver door switch. Check continuity between switch terminal and switch body with switch button released. If there is continuity, repair wiring between CPU No. 2 and door switch. If there is no continuity, replace door switch.

7) Close driver door. Open passenger door. Check continuity between ground and terminal 1E (Blue/White wire) of CPU No. 2 (20-pin connector). If there is continuity, go to next step. If there is no continuity, go to step 9).

8) Remove passenger door switch. Check continuity between switch terminal and switch body with switch button released. If there is continuity, repair wiring between CPU No. 2 and door switch. If there is no continuity, replace door switch.

9) Disconnect 20-pin connector from CPU No. 2. Close hood and rear hatch. Check continuity between ground and terminal 1F (Green/Yellow wire) of CPU No. 2 (20-pin connector). If there is continuity, go to next step. If there is no continuity, check continuity between ground and terminal 1G (Brown/Yellow wire) of CPU No. 2 (20-pin connector). If there is continuity, go to step 11). If there is no continuity, go to step 12).

10) Remove cargo compartment light switch. Check continuity between switch connector terminals. With switch button pushed (rear hatch closed), there should be no continuity. With switch button released (rear hatch open), there should be continuity. If continuity is not as specified, replace switch. If continuity is as specified, repair wiring between CPU No. 2 and switch.

11) Disconnect hood switch connector. Check continuity between switch connector terminals. With switch lever pushed (hood closed), there should be no continuity. With switch lever released (hood open), there should be continuity. If continuity is not as specified, replace switch. If continuity is as specified, repair wiring between CPU No. 2 and switch.

12) Remove security light. Measure voltage at Blue/Red wire terminal of security light connector. If battery voltage is not present, repair wiring between ROOM fuse and CPU No. 2. If battery voltage is present, go to next step.

13) Check continuity between security light connector terminals. If there is no continuity, replace security light. If there is continuity, go to next step.

14) Check continuity between Violet/Green wire terminal of security light connector and terminal 1R (Violet/Green wire) of CPU No. 2 (20-pin connector). If there is no continuity, repair wiring between security light and CPU No. 2. If there is continuity, replace CPU No. 2.

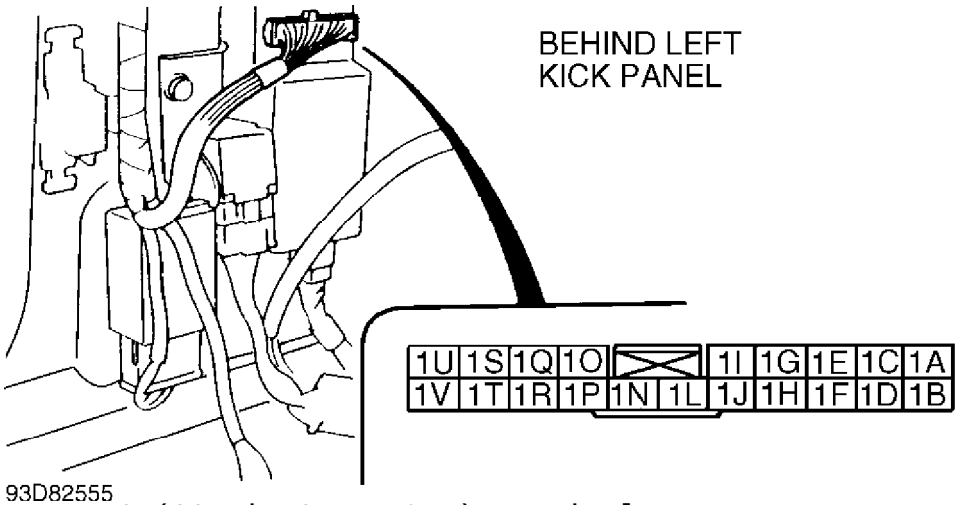


Fig. 1: CPU No. 2 (20-Pin Connector) Terminal ID
Courtesy of Mazda Motors Corp.

Test No. 2

1) Remove security light. Measure voltage at Blue/Red wire

terminal of security light connector. If battery voltage is not present, repair wiring between ROOM fuse and CPU No. 2.

2) If battery voltage is present, check continuity between security light connector terminals. If there is no continuity, replace security light.

3) If there is continuity, check continuity between Violet/Green wire terminal of security light connector and terminal 1R (Violet/Green wire) of CPU No. 2 (20-pin connector). See Fig. 1. If there is no continuity, repair wiring between security light and CPU No. 2. If there is continuity, replace CPU No. 2.

Test No. 3
Replace CPU.

Test No. 4
Replace CPU.

Test No. 5
Replace CPU.

Test No. 6
Press horn pad. If horn does not sound, repair horn circuit. If horn sounds, measure voltage at terminal 2B (Green/Orange wire) of CPU No. 2 (8-pin connector). See Fig. 2. If battery voltage is not present, repair wiring between horn relay and CPU No. 2. If battery voltage is present, replace CPU No. 2.

Test No. 7
Turn on headlights. If headlights do not come on, repair headlight circuit. If headlights come on, turn off headlights. Measure voltage at terminal 2H (White/Blue wire) of CPU No. 2 (8-pin connector). See Fig. 2. If battery voltage is not present, repair wiring between headlight relay and CPU No. 2. If battery voltage is present, replace CPU No. 2.

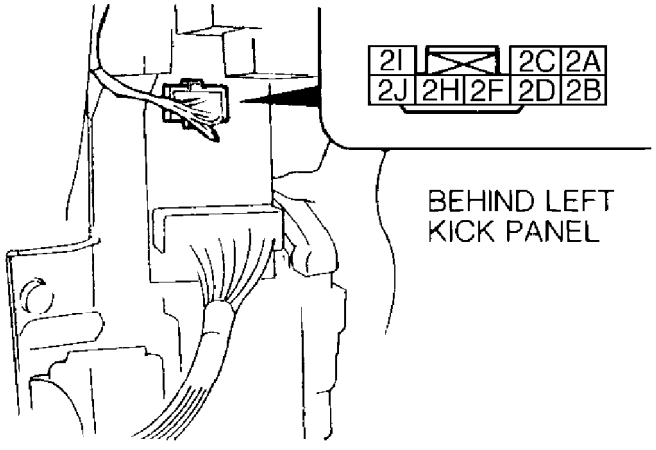


Fig. 2: CPU No. 2 (8-Pin Connector) Terminal ID
Courtesy of Mazda Motors Corp.

Test No. 8

Turn on hazard lights. If hazard lights do not come on, repair hazard lights. If hazard lights come on, turn off hazard lights. Check voltage at terminal 1V (Orange wire) of CPU No. 2 (20-pin connector). See Fig. 1. If battery voltage is not present, repair wiring between flasher unit and CPU No. 2. If battery voltage is present, replace CPU No. 2.

Test No. 9

1) Check ENGINE fuse. If fuse is faulty, replace fuse (repair circuit if shorted). If fuse is okay, remove starter cut relay. Turn ignition on. Measure voltage at terminal "A" (Black/Light Green wire) of starter cut relay connector. See Fig. 6. If battery voltage is not present, repair wiring between ENGINE fuse and starter cut relay.

2) If battery voltage is present, check continuity between terminals "C" and "F" of starter cut relay. If there is continuity, replace starter cut relay. If there is no continuity, apply battery voltage across starter cut relay terminals "A" and "B". Check continuity between terminals "C" and "F".

3) If there is no continuity, replace starter cut relay. If there is continuity, turn ignition switch to LOCK position. Install starter cut relay. Turn ignition on.

4) Measure voltage at terminal 2D (Light Green/Red wire) of CPU No. 2 (8-pin connector). If battery voltage is not present, repair wiring between starter cut relay and CPU No. 2. If battery voltage is present, replace CPU No. 2.

Test No. 10

1) Disconnect 20-pin connector from CPU No. 2. See Fig. 1. Connect continuity tester between ground and terminal 1N (Light Green/Black wire) of CPU No. 2 (20-pin connector). Lock passenger door, and unlock driver door. If there is continuity, replace CPU No. 2. If there is no continuity, lock driver door and unlock passenger door. If there is no continuity, go to next step 2). If there is continuity, replace CPU No. 2.

2) Disconnect driver door key cylinder switch connector. Check continuity between ground and Black wire terminal of driver door key cylinder switch connector. If there is no continuity, repair wiring between driver door key cylinder switch and ground.

3) If there is continuity, disconnect passenger door key cylinder switch connector. Check continuity between ground and Black wire terminal of passenger door key cylinder switch connector. If there is no continuity, repair wiring between passenger door key cylinder switch and ground.

4) If there is continuity, check continuity between terminals of both door key cylinder switches with cylinder held in unlocked position. If there is continuity, repair wiring between CPU No. 2 and door key cylinder switch. If there is no continuity, replace appropriate door key cylinder switch.

Test No. 11

1) Disconnect 20-pin connector from CPU No. 2. See Fig. 1.

Unlock rear hatch. Check continuity between ground and terminal 1O (Light Green/Red wire) of CPU No. 2 (20-pin connector). If there is continuity, replace CPU No. 2.

2) If there is no continuity, disconnect rear hatch key cylinder (remove rear hatch trim for access). Unlock rear hatch key cylinder. Check continuity between terminals of rear hatch key cylinder switch connector.

3) If there is no continuity, replace rear hatch key cylinder. If there is continuity, check continuity between ground and Black wire terminal of rear hatch key cylinder switch connector. If there is no continuity, repair wiring between rear hatch key cylinder and ground. If there is continuity, repair wiring between CPU No. 2 and rear hatch key cylinder.

Test No. 12
Replace CPU.

Test No. 13
Replace CPU.

CPU CONNECTOR PIN VOLTAGES & CONTINUITY

CPU CONNECTOR PIN VOLTAGES (1) & CONTINUITY (2) TABLE

Terminal	Desired Condition
8-Pin Connector	
2B (Horn Relay)	
Horn Sounding	No Voltage
Alarm	No Voltage
Other	Battery Voltage
2D (Starter Cut Relay)	
Ignition On	Battery Voltage
Ignition Off	No Voltage
20-Pin Connector	
1B (Ign. Key Reminder Switch)	
Key Inserted	Battery Voltage
Key Removed	No Voltage
1E (Door Switch)	
Door Open	Continuity
Door Closed	No Continuity
1F (Cargo Comp. Light Switch)	
Rear Hatch Open	Continuity
Rear Hatch Closed	No Continuity
1G (Hood Switch)	
Hood Open	Continuity
Hood Closed	No Continuity
1I (Passenger Door Lock Switch)	
Locked	More Than 0 Volts
Unlocked	No Voltage
1J (Driver Door Lock Switch)	
Locked	More Than 0 Volts

```
   Unlocked  ..................................  No Voltage
  1N (Door Key Cylinder Switch)
   Unlocked (3)  ..............................  No Voltage
   Locked  ....................................  5 Volts
  1O (Rear Hatch Key Cylinder Switch)
   Locked  ..................................  No Continuity
   Unlocked (3)  ..............................  Continuity
  1V (Hazard Switch)
   Hazard Switch On  ..........................  No Voltage
   Hazard Switch Off  .....................  Battery Voltage

(1) - Measure voltage with CPU connector connected and
      ignition on, unless specified otherwise.
(2) - Check continuity with ignition off and CPU connector
      disconnected.
(3) - Hold key cylinder in unlocked position.
```

COMPONENT TESTING

Door Switch

Remove door switch. Check continuity between switch connector terminal and switch body. With door switch button pressed (door closed), there should be no continuity. With door switch button released (door open), there should be continuity. If continuity is not as specified, replace switch.

Door Key Cylinder Switch

Remove door trim panel. Disconnect door key cylinder switch connector. Check continuity between Light Green/Black and Black wire terminals of door key cylinder switch connector. With door key cylinder held in unlocked position, there should be continuity. With door key cylinder in any other position, there should be no continuity. If continuity is not as specified, replace door key cylinder.

Door Lock Link Switch (Driver Door)

There is no door lock link switch for driver door. To determine if door is locked or unlocked, CPU receives input from power door lock switch (indirectly, via the door lock timer unit). To check power door lock switch and door lock timer unit, proceed to DOOR LOCKS - POWER article in the ACCESSORIES/SAFETY EQUIPMENT section.

Door Lock Link Switch (Passenger Door)

Door lock link switch is inside power door lock actuator. Remove door trim panel. Disconnect door lock actuator 4-pin connector. Check continuity between Green/Black and Black wire terminals of door lock actuator connector. With door locked, there should be no continuity. With door unlocked, there should be continuity. If continuity is not as specified, replace actuator.

Flasher Unit

If turn signal and/or hazard flasher operation is incorrect, check for faults in circuits leading to flasher unit. See Fig. 3. If no faults are found, replace flasher unit.

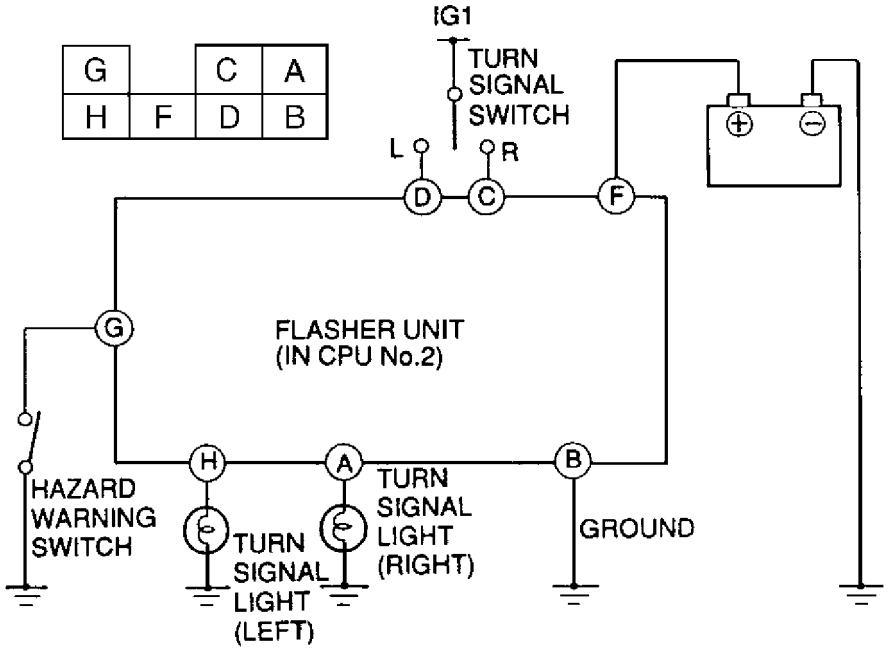


Fig. 3: Flasher Unit Circuit Diagram/Connector Terminals
Courtesy of Mazda Motors Corp.

Horn Relay

Remove relay. Check continuity between relay terminals "A" and "C". See Fig. 4. If there is continuity, replace relay. If there is no continuity, apply battery voltage across relay terminals "B" and "D". Check continuity between terminals "A" and "C". If there is continuity, relay is okay. If there is no continuity, replace relay.

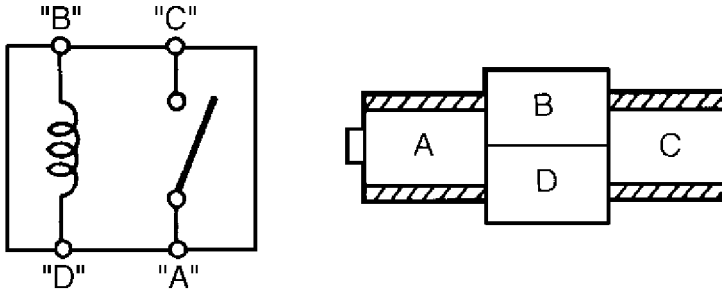


Fig. 4: Horn Relay Terminal ID
Courtesy of Mazda Motors Corp.

Headlight Relay

Remove relay. Check continuity between relay terminals "C" and "D". See Fig. 5. If there is continuity, replace relay. If there is no continuity, apply battery voltage across relay terminals "A" and

"B". Check continuity between terminals "C" and "D". If there is continuity, relay is okay. If there is no continuity, replace relay.

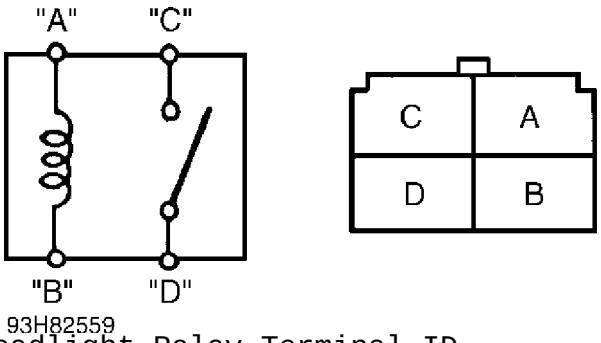


Fig. 5: Headlight Relay Terminal ID
Courtesy of Mazda Motors Corp.

Starter Cut Relay

Remove relay. Check continuity between relay terminals "C" and "F". See Fig. 6. If there is continuity, replace relay. If there is no continuity, apply battery voltage across relay terminals "A" and "B". Check continuity between terminals "C" and "F". If there is continuity, relay is okay. If there is no continuity, replace relay.

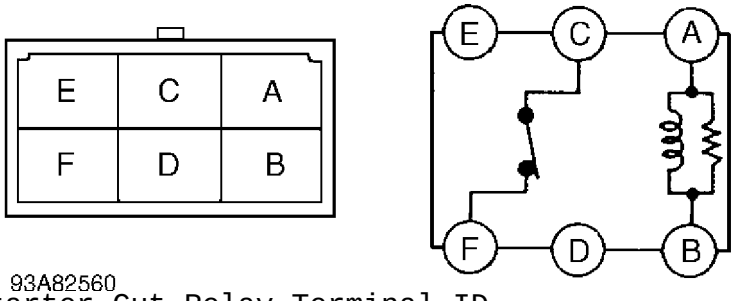


Fig. 6: Starter Cut Relay Terminal ID
Courtesy of Mazda Motors Corp.

Rear Hatch Key Cylinder Switch

Disconnect rear hatch key cylinder switch connector behind trim panel in rear hatch. Check continuity between switch connector terminals. With rear hatch key cylinder held in unlocked position, there should be continuity. With rear hatch key cylinder in any other position, there should be no continuity. If continuity is not as specified, replace switch.

Cargo Compartment Light Switch

Cargo compartment light switch is inside rear hatch striker assembly. Disconnect switch connector. Check continuity between switch connector terminal and switch body. With switch button pushed in (rear hatch closed), there should be no continuity. With switch button released (rear hatch open), there should be continuity. If continuity is not as specified, replace switch.

Hood Switch

Disconnect hood switch connector near hood latch. Check continuity between switch connector terminals. With switch lever released (hood open), there should be continuity. With switch lever pushed (hood closed), there should be no continuity. If continuity is not as specified, replace switch.

Key Reminder Switch

Remove steering column cover. Disconnect key reminder switch connector. Check continuity between Blue/Red and White wire terminals of switch connector. With ignition key inserted, there should be continuity. With ignition key removed, there should be no continuity. If continuity is not as specified, replace switch.

WIRING DIAGRAMS

NOTE: See appropriate WIRING DIAGRAMS article in the WIRING DIAGRAMS section.

END OF ARTICLE

CRUISE CONTROL SYSTEM
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:08PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Cruise Control System

RX-7

DESCRIPTION & OPERATION

System uses an electric motor actuator to control throttle position, maintaining desired vehicle speed. Based on various inputs, cruise control unit controls operation of actuator motor. See ELECTRICAL COMPONENT LOCATIONS table.

When main switch is in ON position, system is ready to be engaged. Cruise control switch sets or adjusts desired speed. Cruise control switch contains SET, COAST, RESUME and ACCEL switches (and CANCEL switch on some models). System will not operate at speeds less than 25 MPH.

To engage system, accelerate to desired speed and momentarily activate SET switch. To disengage system, apply brakes, press clutch pedal (M/T) or turn main switch to OFF position.

To accelerate from a set cruising speed, activate ACCEL switch until vehicle speed is as desired, then turn off ACCEL switch. To decrease speed, activate COAST switch until vehicle speed is as desired, then turn off COAST switch. To resume previous set speed, activate RESUME switch (previous set speed cannot be resumed if system was disengaged using main switch).

If a fault occurs, cruise control unit stores a self-diagnostic code in memory. See RETRIEVING FAULT CODES under SYSTEM TESTING. Self-diagnostic system also includes an inspection mode that can be initiated to check individual components and their circuits. See INITIATING INSPECTION MODE under SYSTEM TESTING.

NOTE: System uses 2 switches to determine if brakes are being applied: cruise brake switch (dedicated to cruise control system) and brakelight switch (part of brakelight system).

NOTE: On vehicles with automatic overdrive transmission, if speed drops 5 MPH less than set speed, cruise control unit cancels or prevents OD transmission function. When vehicle speed returns to within 2 MPH of set speed for at least 20 seconds, OD transmission function is restored.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Cruise Control Unit	Behind Left Kick Panel
ECAT Control Unit	Behind Right Kick Panel
Neutral Switch (M/T)	Top Right Side Of Transmission
Park/Neutral (Inhibitor) Switch (A/T)	On Right Side Of Transmission

Vehicle Speed Sensor ..... On Transmission

TROUBLE SHOOTING

Check for blown fuse. Check for faulty main switch, cruise control switch, vehicle speed sensor, actuator, cruise brake switch, brakelight switch, or clutch switch. Inspect wiring and ground circuits.

ADJUSTMENTS

ACTUATOR INNER CABLE FREE PLAY

Ensure throttle is fully closed. Beginning at fully relaxed position, rotate actuator link as if actuator were pulling inner cable. Measure free play (distance that the outer diameter of the actuator link rotates before cable tightens). If free play is not as specified, turn adjusting nuts as necessary until free play is within specification. See ACTUATOR INNER CABLE FREE PLAY SPECIFICATIONS table.

ACTUATOR INNER CABLE FREE PLAY SPECIFICATIONS TABLE

Application	In. (mm)
RX-7	.039-.197 (1.00-5.00)

BRAKELIGHT SWITCH & CRUISE BRAKE SWITCH

1) Disconnect switch electrical connector. Loosen switch adjustment nuts. Loosen switch until it does not contact brake pedal. Loosen adjustment nuts at brake booster push rod. Rotate push rod until distance between carpet and center of brake pedal pad at firewall is within specification. See BRAKE PEDAL HEIGHT table. See Fig. 1.

2) Tighten switch until it contacts brake pedal. Tighten switch an additional 1/2 turn. Tighten switch adjustment nuts. Tighten push rod adjustment nuts. Reconnect switch electrical connector. Ensure brakelights operate.

BRAKE PEDAL HEIGHT TABLE

Application	(1) In. (mm)
RX7	6.48-6.93 (164.5-176.0)

(1) - Measure with carpet installed.

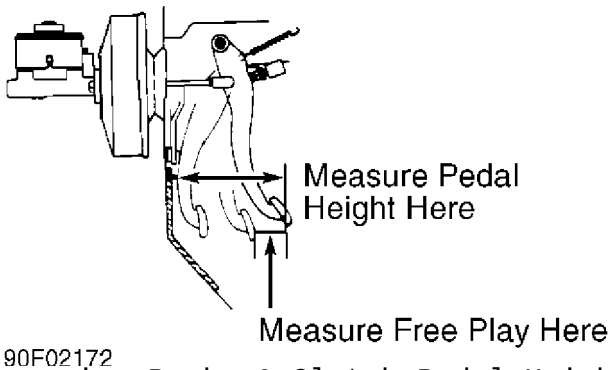


Fig. 1: Measuring Brake & Clutch Pedal Height
Courtesy of Mazda Motors Corp.

CLUTCH SWITCH

Loosen clutch switch adjustment nuts. Rotate clutch switch until distance between carpet and center of clutch pedal pad at firewall is within specification. See CLUTCH PEDAL HEIGHT table. See Fig. 1. Tighten clutch switch adjustment nuts.

CLUTCH PEDAL HEIGHT TABLE

Application	(1) In. (mm)
RX7	6.52-6.97 (165.5-177.0)

(1) - Measure with carpet installed.

SYSTEM TESTING

1) If vehicle speed cannot be set or controlled, check for fault codes and initiate inspection mode (inspection codes). See RETRIEVING FAULT CODES and INITIATING INSPECTION MODE.
2) If no fault codes are set and all inspection codes are okay, check components in the following order: main switch, cruise control unit, cruise brake switch, brakelight switch, clutch switch (M/T), cruise control switch, actuator and vehicle speed sensor. See COMPONENT TESTING.

RETRIEVING FAULT CODES

1) Go to next step.

NOTE: There is no wire in terminal "D" of cruise control unit connector. Push test light probe through connector cavity until probe contacts terminal on cruise control unit.

2) Turn ignition on. Turn main switch to ON position. Ensure cruise indicator light comes on. If indicator light does not come on, repair it before continuing.

3) Activate RESUME switch for at least 3 seconds. Indicator light will come on for 3 seconds, then go out for 2 seconds. After this, light will flash codes (if stored). See FAULT CODE DIRECTORY. If no fault codes are stored, light will not flash. To exit self-diagnostics, drive vehicle at a speed greater than 10 MPH or turn main switch to OFF position. Ensure light goes off.

FAULT CODE DIRECTORY

A list of fault codes with the appropriate diagnosis follows. A long pause separates codes. On 2-digit codes, a short pause separates each digit of the code (example of Code 15: long flash, short pause, 5 short flashes).

Fault Code 01
Check wiring harness leading to actuator, brakelight switch and cruise brake switch. Check actuator. See ACTUATOR under COMPONENT TESTING. Check cruise brake switch and brakelight switch. See CRUISE BRAKE SWITCH and BRAKELIGHT SWITCH under COMPONENT TESTING.

Fault Code 05
Check STOP fuse. Check wiring between STOP fuse and cruise control unit.

Fault Code 07
Check cruise brake switch and brakelight switch. See CRUISE BRAKE SWITCH and BRAKELIGHT SWITCH under COMPONENT TESTING.

Fault Code 11
Check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Fault Code 12
Check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Fault Code 15
Check for defective cruise control unit. See CRUISE CONTROL UNIT under COMPONENT TESTING.

INITIATING INSPECTION MODE

1) Leave electrical connector attached to cruise control unit.

NOTE: There is no wire in terminal "D" of cruise control unit connector. Push test light probe through connector cavity until probe contacts terminal on cruise control unit.

2) Shift transmission into Drive or Reverse (any gear except Neutral on M/T). Turn ignition on. Ensure main switch is in OFF position (indicator light must be off). Simultaneously activate RESUME

switch and turn MAIN switch to ON position. Ensure cruise indicator light comes on. Inspection mode is now initiated. Go to INSPECTION CODE DIRECTORY.

INSPECTION CODE DIRECTORY

A list of inspection codes follows. Beginning with Inspection Code 21, perform procedure listed after each code. If system is operating properly, indicator light will flash code. If light does not flash code, inspect system as described. To exit self-diagnostics, turn main switch to OFF position or turn ignition off.

Inspection Code 21
Press SET/COAST button. If Code 21 does not flash, check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Inspection Code 22
Press RESUME/ACCEL button. If Code 22 does not flash, check cruise control switch. See CRUISE CONTROL SWITCH under COMPONENT TESTING.

Inspection Code 31
Depress brake pedal. If Code 31 does not flash, check brakelight switch and cruise brake switch. See BRAKELIGHT SWITCH and CRUISE BRAKE SWITCH under COMPONENT TESTING.

Inspection Code 35 (A/T)
Turn ignition on. Shift transmission into Park or Neutral. If Code 35 does not flash, check Park/Neutral (inhibitor) switch.

Inspection Code 35 (M/T)
Turn ignition on. Depress clutch pedal. Shift transmission into Neutral. If Code 35 does not flash, check clutch switch or neutral switch.

Inspection Code 37
Drive vehicle at speed of 25 MPH (40 km/h) or greater. If Code 37 does not flash, check vehicle speed sensor and circuit. See VEHICLE SPEED SENSOR under COMPONENT TESTING.

COMPONENT TESTING

ACTUATOR

Resistance Test
Check resistance between specified terminals of actuator connector. See ACTUATOR RESISTANCE SPECIFICATIONS table. See Fig. 2. If resistance is not as specified, replace actuator. If resistance is as specified, perform FUNCTION TEST.

ACTUATOR RESISTANCE SPECIFICATIONS TABLE

Application	(1) Ohms
Between Terminals	
"A" & "C"	26,000
"B" & "D"	11,200

(1) - Values are approximate.

93B83320

Fig. 2: Actuator Connector Terminal ID
Courtesy of Mazda Motors Corp.

Function Test

Observe actuator arm when battery voltage is connected across specified terminals of actuator connector. See Fig. 2. If actuator arm does not function as specified, replace actuator.

ACTUATOR FUNCTION TEST TABLE

Application	Actuator Arm Result
Apply 12 Volts To Terminals "B" & "C" & Ground Terminals "A" & "D"	Pull
Apply 12 Volts To Terminals "B" & "C" & Ground Terminal "A"	Hold
Apply 12 Volts To Terminals "C" & "D" & Ground Terminals "A" & "B"	Extend
Disconnect All Voltage & Ground	Release

BRAKELIGHT SWITCH

NOTE: Brakelight switch can be distinguished from cruise brake switch by color of wires connected to switch. See BRAKELIGHT & CRUISE BRAKE SWITCHES IDENTIFICATION table.

Disconnect brakelight switch connector. Check continuity between brakelight switch connector terminals with brake pedal in specified position. See BRAKELIGHT SWITCH CONTINUITY TEST table. If continuity is not as specified, replace brakelight switch.

BRAKELIGHT SWITCH CONTINUITY TEST TABLE

Pedal Position	Specification
Released	No Continuity

Pressed ..... Continuity

BRAKELIGHT & CRUISE BRAKE SWITCHES IDENTIFICATION TABLE

Application	Wire Colors
Brakelight Switch	Green/White & Green
Cruise Brake Switch	Blue/Black & Light Green/Black

CLUTCH SWITCH

Disconnect clutch switch connector. Check continuity between clutch switch connector terminals with clutch pedal in specified position. See CLUTCH SWITCH CONTINUITY TEST table. If continuity is not as specified, replace clutch switch.

CLUTCH SWITCH CONTINUITY TEST TABLE

Pedal Position	Specification
Released	No Continuity
Pressed	Continuity

CRUISE BRAKE SWITCH

NOTE: Cruise brake switch can be distinguished from brakelight switch by color of wires connected to switch. See BRAKELIGHT & CRUISE BRAKE SWITCHES IDENTIFICATION table under BRAKELIGHT SWITCH.

Disconnect cruise brake switch connector. Check continuity between cruise brake switch connector terminals with brake pedal in specified position. See CRUISE BRAKE SWITCH CONTINUITY TEST table. If continuity is not as specified, replace cruise brake switch.

CRUISE BRAKE SWITCH CONTINUITY TEST TABLE

Pedal Position	Specification
Released	Continuity
Pressed	No Continuity

CRUISE CONTROL SWITCH

1) Remove steering wheel cover. With button pressed, check resistance between specified terminals of cruise control switch connector. See CRUISE CONTROL SWITCH RESISTANCE TEST table. See Fig. 3.

2) Replace switch if resistance is not as specified. If resistance is as specified but problem still exists, remove steering wheel and check slip rings and wiring.

CRUISE CNTRL SW RESISTANCE TEST TABLE

Switch Position	Ohms
No Buttons Pressed	Infinite Ohms
RESUME/ACCEL	910 Ohms
SET/COAST	240 Ohms
CANCEL	0 Ohms

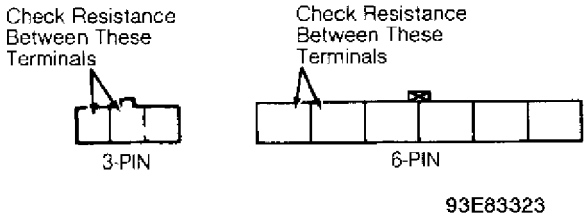


Fig. 3: Cruise Control Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

CRUISE CONTROL UNIT

Turn ignition on. Check voltage at cruise control unit connector terminals with electrical connector attached (backprobe terminals). See Fig. 6. If voltages are not as specified, check appropriate circuit and component. If circuit and component are okay, replace cruise control unit.

MAIN SWITCH

Disconnect main switch connector. With main switch in specified position, check continuity between main switch connector terminals. See MAIN SWITCH CONTINUITY TEST table. See Fig. 4. If continuity is not as specified, replace main switch.

MAIN SWITCH CONTINUITY TEST TABLE

Switch Position	Continuity Between Terminals
OFF	"D" & "E"
ON	"C" & "D"; (1) "B" & "D"

(1) - Apply battery voltage across these terminals to test switch backlighting or indicator light.

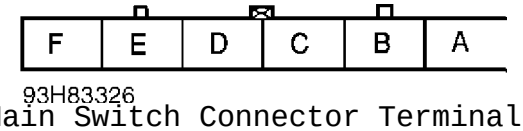


Fig. 4: Main Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

VEHICLE SPEED SENSOR

NOTE: If speedometer operates, vehicle speed sensor is okay.

Speedometer Needle Moves But Fluctuates Or Is Inaccurate

Disconnect vehicle speed sensor connector. Connect AC voltmeter (5-volt scale) across vehicle speed sensor connector terminals. See Fig. 5. Slowly turn rear wheels. If voltage pulses are detected, vehicle speed sensor is okay. If voltage pulses are not detected, replace vehicle speed sensor.

Speedometer Needle Does Not Move

Remove vehicle speed sensor. Turn shaft gear by hand. See Fig. 5. If magnetic resistance is not felt, replace vehicle speed sensor. If magnetic resistance is felt, measure resistance across vehicle speed sensor connector terminals. If resistance is about 290 ohms at 68øF (20øC), vehicle speed sensor is okay. If resistance is not as specified, replace vehicle speed sensor.

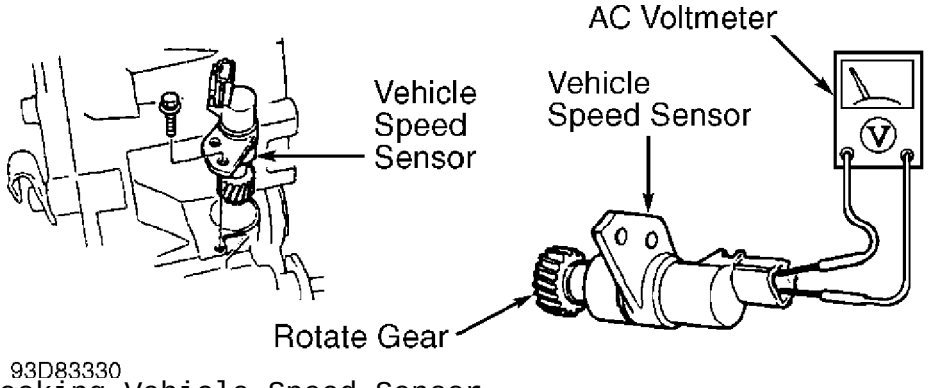
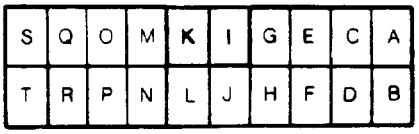


Fig. 5: Checking Vehicle Speed Sensor
Courtesy of Mazda Motors Corp.

VOLTAGE TEST CHARTS



CRUISE CONTROL UNIT VOLTAGE TEST CHART (RX7)

Pin	Circuit	Test Conditions [1] (Voltage)
A	Main Switch	Main Switch On (Battery)
B	Main Switch	Main Switch Off (Battery); Main Switch On (0)
C	Actuator Clutch	Main Switch Off (0); Main Switch On (9)
D	Cruise Control Switch	Main Switch On. No Buttons Pressed (About 5); SET Button Pressed (About 2); RESUME Button Pressed (About 3); CANCEL Button Pressed (0)
E	Vehicle Speed Sensor	Rotate Rear Wheels (Fluctuating 2-3)
G (A/T)	Inhibitor Switch	Disconnect Engine PCM Connector. Park Or Neutral (0); Except Park Or Nuetral (Battery)
G (M/T)	Clutch Switch	Disconnect Engine PCM Connector. Depress Pedal (0)
H	Brakelight Switch	Depress Pedal (Battery); Release Pedal (0)
I	CRUISE Indicator Light	Light Off (Battery); Light On (0)
J	STOP Fuse	All Conditions (Battery)
L	ECAT Control Unit (A/T)	All Conditions (Battery)
M	Actuator Motor	Main Switch Off (0); Main Switch On (Battery)
O	Actuator Motor	Main Switch Off (0); Main Switch On (Battery)
Q	Cruise Brake Switch	Release Pedal (9); Depress Pedal (0)
S	Actuator Clutch	Main Switch Off (0); Main Switch On (9)
T	Ground	All Conditions (0)

Gray/Red
Blue/Red
Light Green/Black
Blue
Green/Red
Blue/White
Blue/Orange
Green
Violet/White
Green/White
Pink
Light Green/Red
Red/Black
Blue/Black
Blue/Yellow
Black

[1] – Turn ignition on, unless specified otherwise.

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Fig. 6: Cruise Control Unit Voltage Test Chart
Courtesy of Mazda Motors Corp.

WIRING DIAGRAMS

Refer to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

DEFOGGER - REAR WINDOW
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:09PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Rear Window Defogger

RX7

DESCRIPTION & OPERATION

Heating grid filament is bonded to inside of rear window. Defogger relay allows power to heating grid filament. See ELECTRICAL COMPONENT LOCATIONS table. Defogger timer maintains power to grid for 10 or 15 minutes or until ignition is turned off. Indicator light comes on when defogger is on.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Defogger Relay	In Luggage Compartment, On Left Wall
Defogger Timer	(1)

(1) - Defogger timer is an integral part of Central Processing Unit (CPU). CPU is attached to joint box at left kick panel.

TESTING

SYSTEM TEST

Turn ignition on. Turn defogger switch to ON position. If glass is not warm after a few minutes, check fuse. If fuse is okay, use a test light or voltmeter to check for battery voltage at grid feed wire. If battery voltage is present, repair grid filament or grid filament ground. If battery voltage is not present, check defogger switch, defogger relay and wiring harness. If components are okay, replace defogger timer.

DEFOGGER SWITCH TEST

Disconnect defogger switch connector. Check continuity between specified terminals of defogger switch connector. See DEFOGGER SWITCH CONTINUITY TEST table. See Fig. 1. With defogger switch in OFF position, there should be no continuity. With defogger switch in ON position, there should be continuity. Replace defogger switch if continuity is not as specified.

DEFOGGER SWITCH CONTINUITY TEST (EXCEPT MIATA, MPV & NAVAJO)

Application	Terminals

RX7 ..... C & D

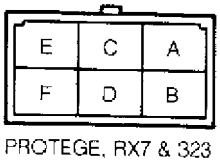

Fig. 1: Testing Defogger Switch
Courtesy of Mazda Motors Corp.

DEFOGGER RELAY TEST

Remove relay. Continuity should not exist between terminals "C" and "D". See Fig. 2. Apply battery voltage across terminals "A" and "B". Continuity should exist between terminals "C" and "D". If continuity is not as specified, replace relay.

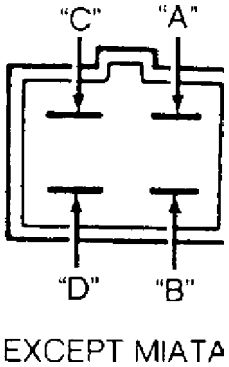

Fig. 2: Relay Terminal ID
Courtesy of Mazda Motors Corp.

GRID FILAMENT TEST

1) To locate breaks in grid wire filaments, attach a voltmeter probe to middle portion of filament. See Fig. 3. Attach other voltmeter probe to vertical section of window grid.
2) If wire is not broken, voltmeter will register about one half of battery voltage. If a grid is broken, voltmeter will register zero volts or battery voltage, depending on whether grid is broken between test leads or outside test leads. To locate break, move probe along wire until voltmeter needle moves abruptly.

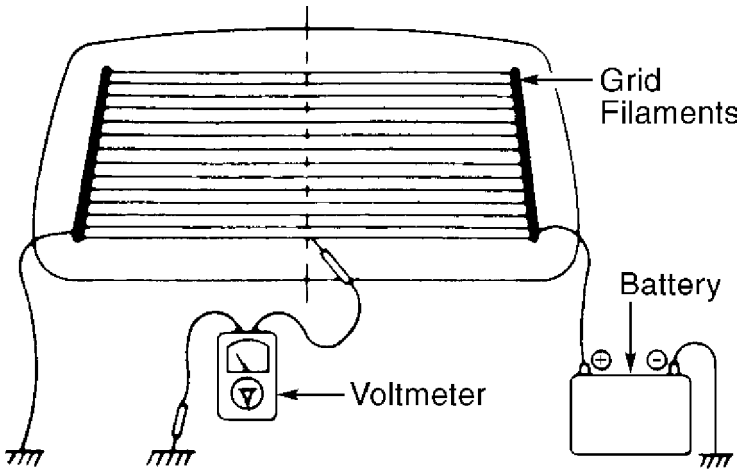

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Fig. 3: Testing Grid Filaments
Courtesy of Mazda Motors Corp.

ON-VEHICLE SERVICE

GRID FILAMENT REPAIR

1) If necessary, use razor blade or equivalent to remove small amount of silicone from damaged area to expose grid line. Clean exposed broken grid line area with alcohol. Place tape along both sides of grid line area to be repaired. See Fig. 4. If Brown filament is broken, apply Brown touch-up paint to Brown grid line break area (if necessary).

2) Apply Silver Touch-Up Paint (2835-77-600) over Brown touch-up paint at break area, overlapping both lines. Allow a few minute drying time before carefully removing tape from line edges. DO NOT touch repaired area for 24 hours.

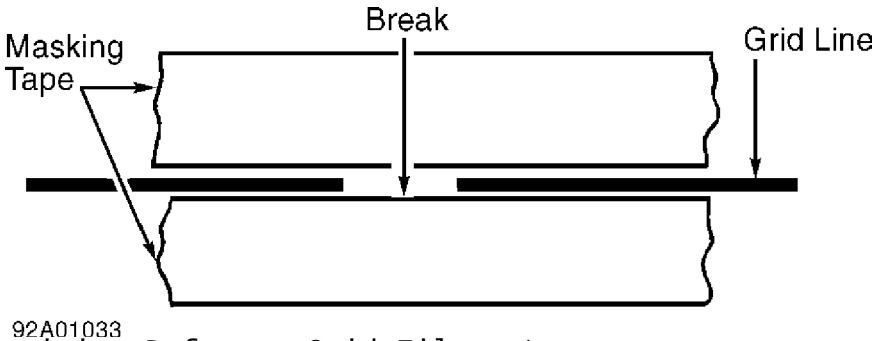

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Fig. 4: Repairing Defogger Grid Filament

WIRING DIAGRAMS

Refer to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

DOOR LOCKS - POWER

Article Text

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:10PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Power Door Locks

RX7

DESCRIPTION & OPERATION

When driver door is locked or unlocked using key or door lock button/knob, all other doors are automatically locked or unlocked by an electric actuator. Door lock timer unit controls door lock actuator based on position of door lock link switch (part of door lock mechanism). See ELECTRICAL COMPONENT LOCATIONS table.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Central Processing Unit (CPU)	Behind Left Kick Panel, On Joint Box
Door Lock Timer Unit (1)	Behind Left Kick Panel, Near Door

(1) - May also be referred to as door lock relay.

TROUBLE SHOOTING

Check fuse or circuit breaker. If fuse and circuit breaker are okay, check individual components. See TESTING. If components are okay, repair wiring.

TESTING

DOOR LOCK LINK SWITCH

Remove door trim panel. Disconnect door lock link switch connector. Ensure continuity exists between specified terminals of door lock link switch connector with switch in specified position. See DOOR LOCK LINK SWITCH CONTINUITY TEST table. If there is no continuity, replace door lock mechanism.

DOOR LOCK LINK SWITCH CONTINUITY TEST TABLE

Application & Switch Position	Terminals
Locked	Green/Yellow & Black
Unlocked	Green/Red & Black

DOOR LOCK ACTUATOR

2-Pin Connector
Remove door trim panel. Disconnect door lock actuator connector. Apply battery voltage and ground across terminals of door lock actuator connector. Reverse polarity across terminals to move door lock actuator in opposite direction. Replace door lock actuator if it does not operate.

4-Pin Connector
Remove door trim panel. Disconnect door lock actuator connector. Apply battery voltage across the following terminals of door lock actuator connector. Reverse polarity across terminals to move door lock actuator in opposite direction. Replace door lock actuator if it does not operate.

* Orange and Green wire terminals.

DOOR LOCK TIMER UNIT

Leave door lock timer unit connector attached. Check voltage at the following terminals of door lock timer unit connector (backprobe connector). If voltages are not as specified, check circuit (including component, if applicable). If circuit is okay, replace door lock timer unit.

Black Wire (To Ground)
No voltage should be present under all conditions.

Blue Wire (To DOOR LOCK Fuse)
Battery voltage should be present under all conditions.

Green/Red Wire (To Door Lock Link Switch)
With door unlocked, no voltage should be present. With door locked, battery voltage should be present.

Green/Yellow Wire (To Door Lock Link Switch)
With door locked, no voltage should be present. With door unlocked, battery voltage should be present.

Green Wire (To Door Lock Actuator)
With door locked, battery voltage should be present. With door unlocked, no voltage should be present.

Orange Wire (To Door Lock Actuator)
With door unlocked, battery voltage should be present. With door locked, no voltage should be present.

WIRING DIAGRAMS

Proceed to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

HEADLIGHT DOORS - AUTOMATIC
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:10PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Automatic Headlight Doors

RX7

DESCRIPTION & OPERATION

Headlights can be raised by turning on headlights, or by turning retractor switch to the ON position. Retractor relay provides power to retractor motors. If system does not operate, headlights can be raised or lowered using manual knob on top of each retractor motor.

WARNING: Before using manual knobs to raise or lower headlights, disconnect negative battery cable to prevent accidental operation of headlight retractor motors.

NOTE: Before disconnecting negative battery cable, obtain code number from vehicle owner and deactivate audio anti-theft system.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
HEAD Fuse	In Main Fuse Block
Main Fuse Block	On Left Front Inner Fender
RETRA (RETRACTOR) Fuse	In Main Fuse Block
Retractor Relay	To Right Of Hood Latch
Retractor Switch	On Dash, Between Center Vents

ADJUSTMENTS

HEADLIGHT LID

Loosen headlight lid adjustment screws. See Fig. 1. Adjust headlight lid so distance between headlight lid and body is as specified when headlight is lower.

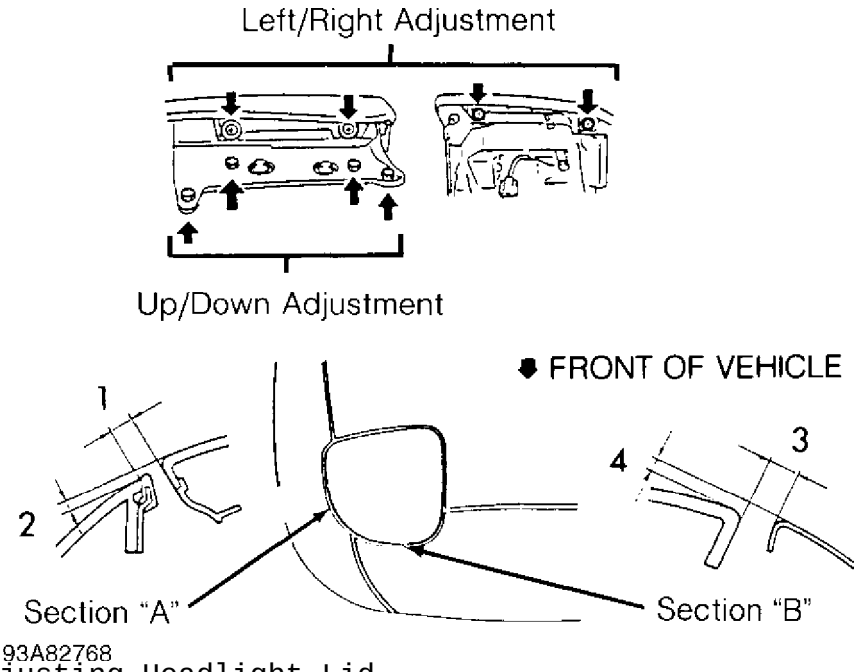

Fig. 1: Adjusting Headlight Lid
Courtesy of Mazda Motors Corp.

TESTING

BOTH RETRACTORS INOPERATIVE USING EITHER SWITCH

1) Check HEAD and RETRA fuses in main fuse block. If fuse is faulty, replace fuse (repair circuit if shorted). If fuse is okay, remove retractor switch. Measure voltage at terminal "C" of retractor switch connector. See Fig. 2. If battery voltage is not present, repair Red wire.

2) If battery voltage is present, disconnect retractor switch connector. Turn on retractor switch. Check continuity between terminals "A" and "C" of retractor switch connector. Turn off switch. Check continuity between terminals "B" and "C". Continuity should exist in both checks.

3) If continuity is not as specified, replace retractor switch. If continuity is as specified, reconnect retractor switch connector. Disconnect retractor motor connector. Measure voltage at Black/White wire terminal of retractor motor connector. If battery voltage is not present, repair wire between RETRA fuse and retractor motor.

4) If battery voltage is present, check continuity between ground and Black wire terminal of retractor motor connector. If continuity is not present, repair wire between retractor motor and ground. If battery voltage is present, check retractor motor. See RETRACTOR MOTOR TEST. If retractor motor is okay, check for mechanical problem.

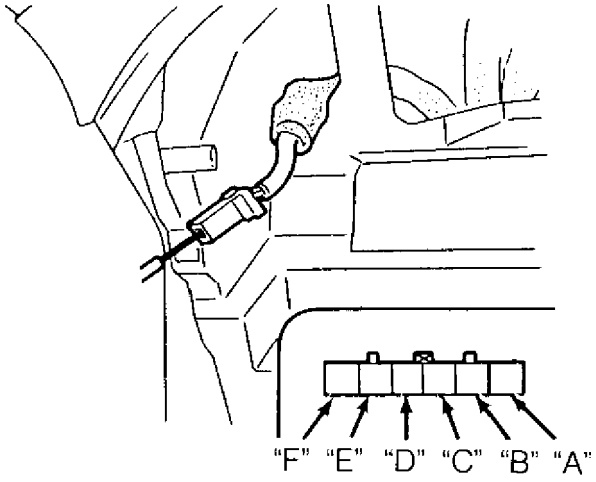

Fig. 2: Retractor Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

BOTH RETRACTORS INOPERATIVE USING HEADLIGHT SWITCH

Turn on headlight switch. Measure voltage at terminal "C" of retractor relay connector. See Fig. 3. If battery voltage is not present, repair Brown wire between headlight relay and retractor relay. If battery voltage is present, check retractor relay. See RETRACTOR RELAY TEST. If retractor relay is okay, repair Black wire between retractor relay and ground.

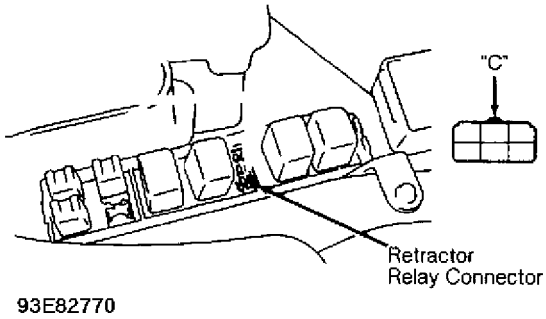

Fig. 3: Retractor Relay Connector Terminal ID
Courtesy of Mazda Motors Corp.

BOTH RETRACTORS INOPERATIVE USING RETRACTOR SWITCH

Check retractor switch. If retractor switch is okay, repair wiring harness.

ONE RETRACTOR INOPERATIVE

1) Measure voltage at Black/White wire terminal of retractor motor connector. If battery voltage is not present, repair wire between RETRA fuse and retractor motor.
2) If battery voltage is present, check continuity between

ground and Black wire terminal of retractor motor connector. If battery voltage is not present, repair wire between retractor motor and ground. If battery voltage is present, replace retractor motor.

RETRACTOR MOTOR TEST

1) A link connects retractor motor to headlight assembly. Disconnect link from headlight assembly. Disconnect retractor motor connector. Apply battery voltage across terminals "B" (positive) and "A" (negative) of retractor motor connector. See Fig. 4. Leave battery voltage connected across these terminals.

2) To raise headlight, apply battery voltage across terminals "C" (positive) and "A" (negative) of retractor motor connector. To lower headlight, apply battery voltage across terminals "D" (positive) and "A" (negative) of retractor motor connector. Replace retractor motor if it does not operate as specified.

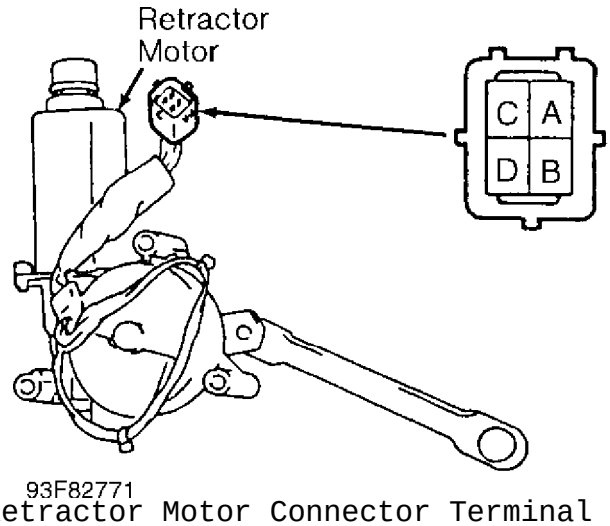

Fig. 4: Retractor Motor Connector Terminal ID
Courtesy of Mazda Motors Corp.

RETRACTOR SWITCH TEST

Disconnect retractor switch connector (remove switch, if necessary). With switch turned off, there should be continuity between terminals "A" and "C". See Fig. 5. With switch turned on, there should be continuity between terminals "B" and "C". Replace retractor switch if continuity is not as specified.

RETRACTOR RELAY TEST

Remove relay. Check continuity between specified terminals of relay connector. See RETRACTOR RELAY TEST table. See Fig. 5. If continuity is not as specified, replace relay.

RETRACTOR RELAY TEST TABLE

Continuity Between

Condition	Terminals
Relay Not Energized	"A" & "B" "C" & "E"
Relay Energized (1)	"C" & "F"

(1) - Apply battery voltage across terminals "A" and "B".

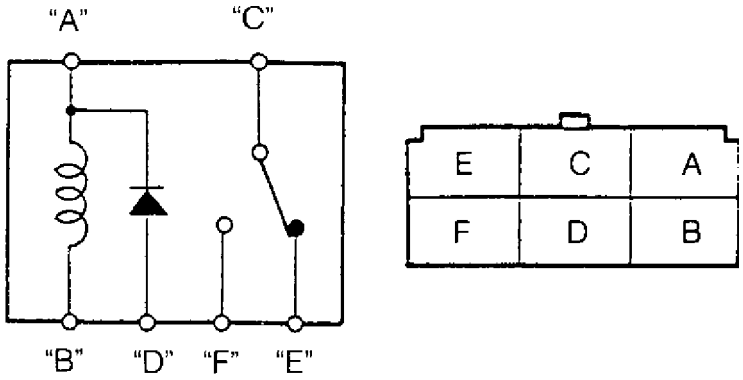

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Fig. 5: Retractor Relay Terminals/Internal Circuit ID
Courtesy of Mazda Motors Corp.

REMOVAL & INSTALLATION

HEADLIGHT & RETRACTOR MOTOR ASSEMBLY

NOTE: Use illustration for exploded view of headlight and retractor motor assembly. See Fig. 6.

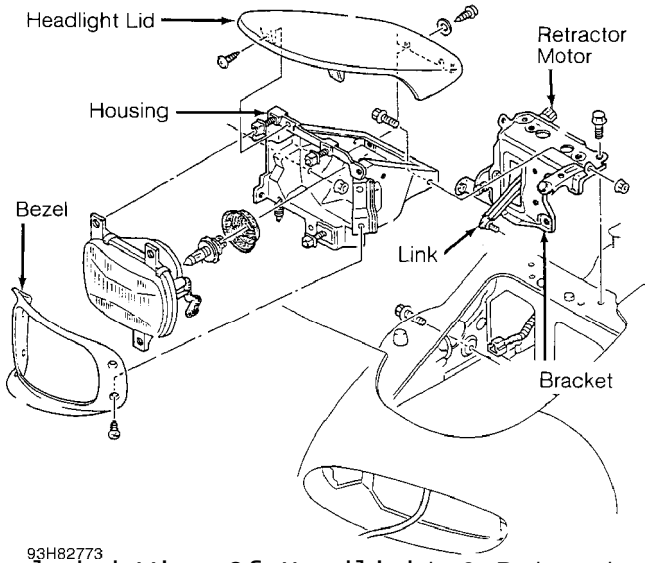

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Fig. 6: Exploded View Of Headlight & Retractor Motor Assembly
Courtesy of Mazda Motors Corp.

WIRING DIAGRAMS

Refer to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

INSTRUMENT PANEL
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:11PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Instrument Panels

RX7

DESCRIPTION & OPERATION

Speedometer senses road speed through a speed sensor (AC voltage signal generator). Fuel gauge, oil pressure gauge and temperature gauge receive signals from variable-resistance sending units. See ELECTRICAL COMPONENT LOCATIONS table.

ELECTRICAL COMPONENT LOCATIONS TABLE

Component	Location
Oil Pressure Sensor (Gauge)	Near Oil Filter
Oil Pressure Switch (Indicator)	
Speed Sensor	On Transmission
Temperature Gauge	
Sending Unit	On Left Side Of Engine, At Rear

TESTING

NOTE: Checker (49-0839-285) simulates sending unit resistance when testing gauges. If checker is not available, gauges may be tested with specific resistors listed in appropriate table.

FUEL GAUGE TEST

1) Disconnect fuel gauge sending unit connector at fuel tank. Connect Red wire lead of Checker (49-0839-285) to Black/Blue wire terminal of sending unit connector. Ground checker Black wire lead.
2) Turn ignition on. Set checker to specified resistance value. See FUEL GAUGE RESISTANCE table. If fuel gauge needle rests at specified position for each resistance value setting, replace fuel gauge sending unit. If fuel gauge needle does not rest at specified position, check wiring. If wiring is okay, replace fuel gauge.

NOTE: After changing checker resistance value, allow 2 minutes for needle to stabilize. Allowable limit of needle deflection is twice width of needle.

FUEL GAUGE TEST TABLE

Resistance Setting (Ohms)	Needle Position
7	Full

32	Half
76	Empty

FUEL GAUGE SENDING UNIT TEST

WARNING: On vehicles with fuel-injected engine, relieve fuel pressure before servicing fuel system.

1) Remove fuel gauge sending unit. Connect ohmmeter between the following wire terminals of sending unit connector:

* Black/Blue and White/Green

2) Check resistance with sending unit float at specified position. See FUEL GAUGE SENDING UNIT RESISTANCE table. If resistance is not as specified, replace fuel gauge sending unit.

FUEL GAUGE SENDING UNIT RESISTANCE TABLE (1)

Float Position	Ohms
Fully Raised	6
Mid-Range	32
Fully Lowered	80

(1) - Resistance values and float positions are approximate.

OIL PRESSURE GAUGE TEST

NOTE: After changing checker resistance value, allow 2 minutes for needle to stabilize. Allowable limit of needle deflection is twice width of needle.

1) Disconnect oil pressure sensor connector. Connect Checker (49-0839-285) Red wire lead to oil pressure sensor connector terminal. Connect checker Black wire lead to ground.

2) Set checker to specified resistance value. See OIL PRESSURE GAUGE RESISTANCE table. Turn ignition on. If gauge needle does not rest at specified position for each resistance value setting, check wiring. If wiring is okay, replace gauge.

OIL PRESSURE GAUGE RESISTANCE TABLE

Resistance Setting (Ohms)	Needle Position
Infinite	0 psi
28	60 psi
10	120 psi

OIL PRESSURE SENSOR TEST

Ensure oil pressure is okay. Disconnect oil pressure sensor connector. Measure resistance between oil pressure sensor connector terminal and ground. Replace oil pressure sensor if resistance is not as specified. See OIL PRESSURE SENSOR RESISTANCE table.

OIL PRESSURE SWITCH TEST

Check continuity between oil pressure switch connector terminal and ground. With engine stopped, there should be continuity. With engine running, there should be no continuity. Replace oil pressure switch if continuity is not as specified.

SPEEDOMETER TEST

NOTE: Tire size, wear and incorrect inflation can affect speedometer reading and odometer measurement. Allowable variance between actual vehicle speed and indicated speed is about 1/2 MPH for every 10 MPH of vehicle speed.

Disconnect speed sensor connector. Connect AC voltmeter (5-volt scale) across speed sensor connector terminals. With transmission in Neutral, slowly turn drive wheels. If voltage pulses are not detected, replace speed sensor. If voltage pulses are detected, check wiring. If wiring is okay, replace speedometer.

TACHOMETER VARIANCE TEST

Connect positive lead of test tachometer to negative terminal of ignition coil. Connect negative lead of tachometer to ground. Start engine. Compare vehicle tachometer with test tachometer. Vehicle tachometer performance is acceptable if specification is within allowable range. See TACHOMETER VARIATION SPECIFICATIONS table. If tachometer performance is not within specifications, replace tachometer.

TACHOMETER VARIATION SPECIFICATIONS TABLE

Standard Indication	Allowable Range
A/T	
2000 RPM	1810-2110 RPM
3000 RPM	2800-3100 RPM
4000 RPM	3820-4020 RPM
5000 RPM	4700-5000 RPM

TEMPERATURE GAUGE TEST

NOTE: After changing checker resistance value, allow 2 minutes for needle to stabilize. Allowable limit of needle deflection is

twice width of needle.

1) Disconnect temperature gauge sending unit connector. Connect Red wire lead of Checker (49-0839-285) to sending unit connector terminal and Black wire lead to ground.
2) Turn ignition on. Set checker to specified resistance value. See TEMPERATURE GAUGE RESISTANCE table. If gauge needle rests at specified position for each resistance value setting, replace sending unit. If gauge needle does not rest at specified position, check wiring. If wiring is okay, replace gauge.

TEMPERATURE GAUGE RESISTANCE TABLE

Application & Resistance Setting (Ohms)	Needle Position
17	HOT
178	COLD

TEMPERATURE GAUGE SENDING UNIT TEST

Remove sending unit. Place sending unit in a pan of water with a thermometer. Gradually heat water. Measure resistance between sending unit connector terminal and sending unit body. Replace sending unit if resistance is not as specified. See TEMPERATURE GAUGE SENDING UNIT RESISTANCE table.

TEMPERATURE GAUGE SENDING UNIT RESISTANCE TABLE

Application	Specification
RX7	190-260 Ohms @ 122øF (50øC)

REMOVAL & INSTALLATION

NOTE: For exploded view of instrument cluster, see Fig. 2.

INSTRUMENT CLUSTER

WARNING: RX7 is equipped with air bag restraint system. See AIR BAG RESTRAINT SYSTEM article in the ACCESSORIES/SAFETY EQUIPMENT section for warnings and safety precautions.

Removal & Installation
1) Remove switch panel. See Fig. 1. Remove air bag module and steering wheel. Remove instrument cluster. Disconnect wiring harness connectors. Remove steering column covers. To install, reverse removal procedure.

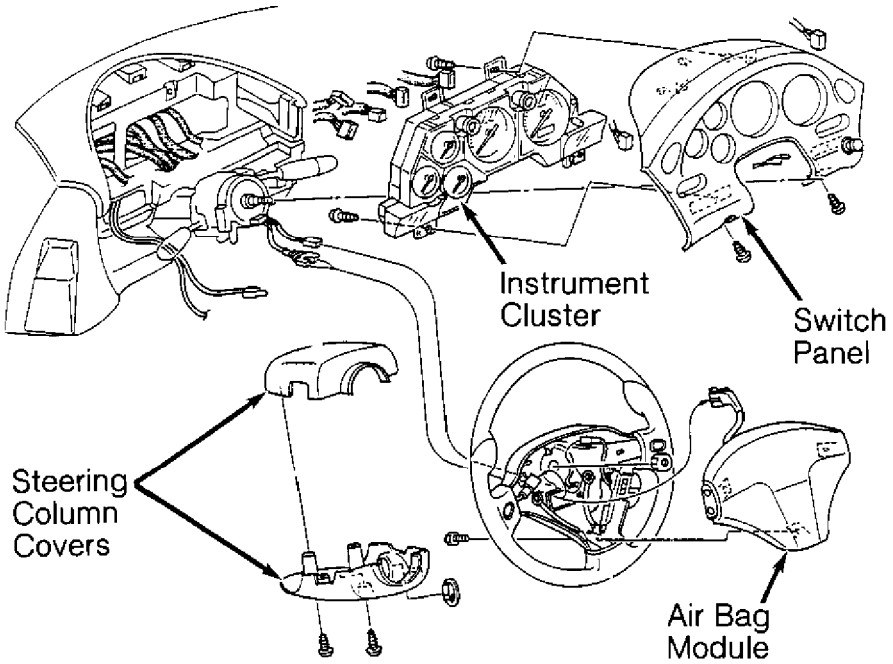

Fig. 1: Removing Instrument Cluster
Courtesy of Mazda Motors Corp.

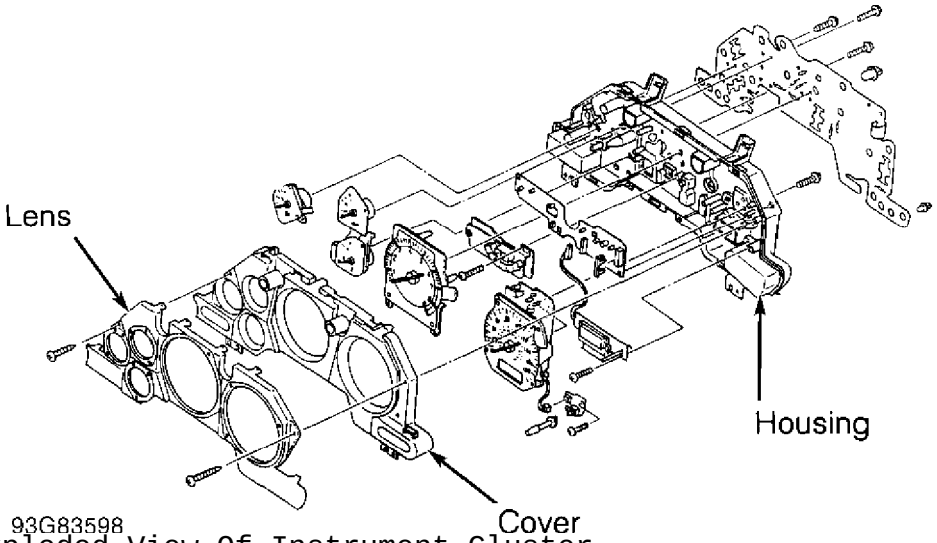

Fig. 2: Exploded View Of Instrument Cluster
Courtesy of Mazda Motors Corp.

WIRING DIAGRAMS

Refer to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

MIRRORS - POWER
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:12PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Power Mirrors

RX7

DESCRIPTION & OPERATION

Each mirror contains 2 reversible motors, one for horizontal movement and the other for vertical movement. Power mirror switch on dash controls power and ground circuits of power mirror motors. Power mirror switch has a selector switch and a perimeter switch. Position of selector switch determines whether left or right mirror is controlled by switch. Perimeter switch controls vertical and horizontal movements of selected mirror.

TROUBLE SHOOTING

Both Mirrors Inoperative
Check fuse. See POWER MIRROR FUSE IDENTIFICATION table. Check power and ground circuits of power mirror switch. Check power mirror switch. Check wiring between power mirror switch and power mirror motors.

One Mirror Inoperative
Check power mirror motor. Check wiring between power mirror switch and power mirror motor. Check power mirror switch.

POWER MIRROR FUSE IDENTIFICATION TABLE

Application	(1) Fuse
RX7	CIGAR

(1) - Fuse is located in fuse block behind left side of instrument panel.

SYSTEM TESTING

NOTE: If both mirrors are inoperative, begin testing at step 1). If one mirror is inoperative, begin testing at step 3).

1) Turn ignition on. Check CIGAR fuse. If fuse is blown, replace fuse (repair wiring if necessary). If fuse is okay, check voltage at Blue/Black wire terminal of power mirror switch connector. If battery voltage is not present, repair Blue/Black wire between fuse and power mirror switch.
2) If battery voltage is present, disconnect power mirror switch connector. Check continuity between ground and Black wire

terminal of power mirror switch connector. If there is no continuity, repair Black wire. If there is continuity, reconnect power mirror switch connector.

3) Check voltage at the following terminals of power mirror switch connector with switch in specified position. If battery voltage is not present at all terminals, replace power mirror switch. If battery voltage is present at all terminals, go to next step.

* Brown wire (right mirror UP)
* Light Green/Red wire (right mirror DOWN)
* Light Green/Red wire (right mirror LEFT)
* Brown/Black wire (right mirror RIGHT)
* Brown wire (left mirror UP)
* Light Green wire (left mirror DOWN)
* Light Green wire (left mirror LEFT)
* Brown/Yellow wire (left mirror RIGHT).

4) At power mirror motor connector, check voltage at terminals specified in previous step with switch in specified position. If battery voltage is not present at all terminals, repair wiring between power mirror switch and power mirror motor. If battery voltage is present at all terminals, replace power mirror motor.

COMPONENT TESTING

POWER MIRROR MOTOR TEST

Disconnect power mirror motor connector. Apply battery voltage across specified terminals of power mirror motor connector. See Fig. 1. If mirror does not move as specified, replace power mirror assembly.

V_B: Battery voltage

Terminal connections		Operation
V_B	Ground	
c	b	UP
b	c	DOWN
b	a	LEFT
a	b	RIGHT

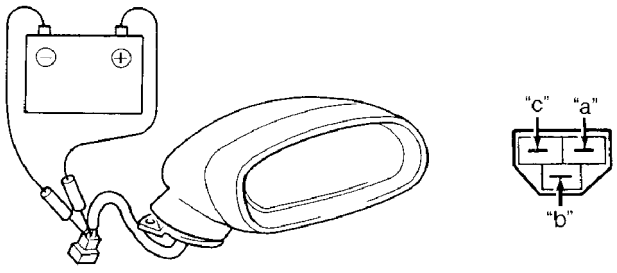

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Fig. 1: Testing Power Mirror Motor
Courtesy of Mazda Motors Corp.

POWER MIRROR SWITCH TEST

Disconnect switch connector (remove switch if necessary). See POWER MIRROR SWITCH under REMOVAL & INSTALLATION. With switch in specified position, check continuity between specified terminals of switch connector. See Fig. 2. Replace switch if continuity is not as specified.

Switch position \ Terminal		i	j	c	h	a	f	l
Right	UP	○				○	○	○
	DOWN	○	○			○		○
	LEFT	○	○			○	○	
	RIGHT	○	○			○	○	○
Left	UP	○	○	○	○			○
	DOWN	○	○	○				○
	LEFT	○	○	○	○			
	RIGHT	○	○	○	○			○

○—○ : Indicates continuity.

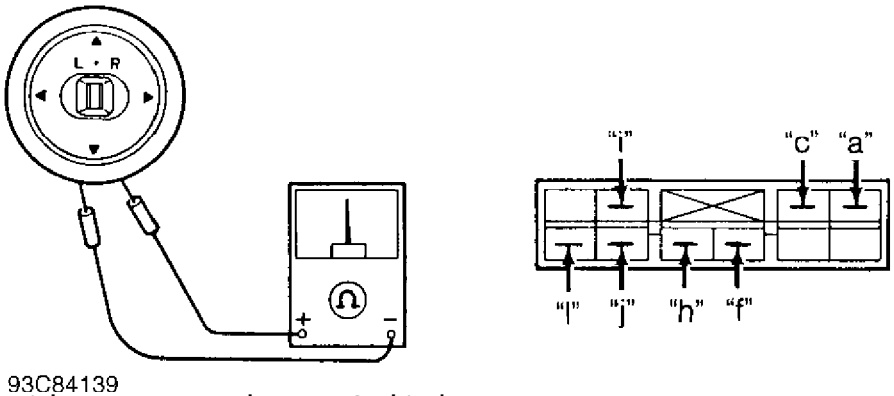

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Fig. 2: Testing Power Mirror Switch
Courtesy of Mazda Motors Corp.

REMOVAL & INSTALLATION

POWER MIRROR SWITCH

Removal & Installation

Push out switch from behind or carefully pry switch from dash. Disconnect wiring connector. To install, reverse removal procedure.

POWER MIRROR ASSEMBLY

Removal & Installation

Remove door garnish at front of door frame. Remove door trim panel. Remove power mirror screws. Disconnect wiring connector. Remove power mirror assembly. To install, reverse removal procedure.

WIRING DIAGRAMS

Proceed to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

POWER WINDOWS
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:12PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Power Windows

RX7

DESCRIPTION & OPERATION

Main switch (master switch) on driver's door controls all windows. Sub-switch on passenger's door and rear doors controls individual window. RX7 uses a power cut switch on driver's door to prevent operation of windows. When power cut switch is in ON position, windows can be operated by main switch or sub-switch. When power cut switch is in OFF position:

* Driver's window can be operated using main switch; no other windows can be operated using main switch or sub-switch.

SYSTEM TESTING

SYMPTOM DIRECTORY TABLE

Symptom	Symptom No.
Both Windows Inoperative	1
Driver's Window Inoperative, Passenger's Window Okay	2
Passenger's Window Inoperative Using Main Switch	3
Passenger's Window Okay Using Main Switch, Inoperative Using Sub-Switch	4
With Power Cut Switch Off, Passenger's Window Operates Using Sub-Switch	5

NOTE: "Main switch/passenger's" refers to passenger's window switch on main switch.

SYMPTOM NO. 1

1) Turn ignition on. Check 30-amp power window fuse in fuse block, near left kick panel. If fuse is okay, go to next step. If fuse is blown, replace fuse (repair wiring if necessary).
2) Check voltage at White/Blue wire terminal of main switch connector. If battery voltage is present, go to next step. If battery voltage is not present, repair White/Blue wire between fuse and main switch.
3) Disconnect main switch connector. Check continuity between ground and Black wire terminal of main switch connector. If there is continuity, reconnect main switch connector and go to next step. If

there is no continuity, repair Black wire.

4) At main switch connector, check voltage at the following terminals. If battery voltage is present at all terminals, go to next step. If battery voltage is not present at all terminals, replace main switch.

* Red wire (driver's switch in UP position)
* Green wire (driver's switch in DOWN position)
* Black/White wire (main switch/passenger's in UP position)
* Red/Yellow wire (main switch/passenger's in DOWN position).

5) At driver's window motor connector, check voltage at Red wire terminal (driver's switch in UP position) and Green wire terminal (driver's switch in DOWN position). If battery voltage is not present at both terminals, repair wiring between main switch and driver's window motor. If battery voltage is present at both terminals, replace driver's window motor.

NOTE: If passenger's window motor is still inoperative at this point, go to next step.

6) At sub-switch connector, check voltage at Black/White wire terminal (main switch/passenger's in UP position) and Black/Yellow wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, repair wiring between main switch and sub-switch.

7) At sub-switch connector, check voltage at Red wire terminal (main switch/passenger's in UP position) and Green wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, replace sub-switch.

8) At passenger's window motor connector, check voltage at Red wire terminal (main switch/passenger's in UP position) and Green wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, replace passenger's window motor. If battery voltage is not present at both terminals, repair wiring between sub-switch and window motor.

SYMPTOM NO. 2

1) Turn ignition on. At main switch connector, check voltage at the following terminals. If battery voltage is present at all terminals, go to next step. If battery voltage is not present at all terminals, replace main switch.

* Red wire (driver's switch in UP position)
* Green wire (driver's switch in DOWN position)
* Black/White wire (main switch/passenger's in UP position)
* Black/Yellow wire (main switch/passenger's in DOWN position).

2) At driver's window motor connector, check voltage at Red

wire terminal (driver's switch in UP position) and Green wire terminal (driver's switch in DOWN position). If battery voltage is present at both terminals, replace window motor. If battery voltage is not present at both terminals, repair wiring between main switch and window motor.

SYMPTOM NO. 3

1) Turn ignition on. At main switch connector, check voltage at the following wire terminals. If battery voltage is present at all terminals, go to next step. If battery voltage is not present at all terminals, replace main switch.

* Red wire (driver's switch in UP position)
* Green wire (driver's switch in DOWN position)
* Black/White wire (main switch/passenger's in UP position)
* Black/Yellow wire (main switch/passenger's in DOWN position).

2) At sub-switch connector, check voltage at Black/White wire terminal (main switch/passenger's in UP position) and Black/Yellow wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, repair wiring between main switch and sub-switch.

3) At sub-switch connector, check voltage at Red wire terminal (main switch/passenger's in UP position) and Green wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, replace sub-switch.

4) At passenger's window motor connector, check voltage at Red wire terminal (main switch/passenger's in UP position) and Green wire terminal (main switch/passenger's in DOWN position). If battery voltage is present at both terminals, replace window motor. If battery voltage is not present at both terminals, repair wiring between sub-switch and window motor.

SYMPTOM NO. 4

Turn ignition on. Turn power cut switch to ON position. Check voltage at White/Blue wire terminal of sub-switch connector.If battery voltage is present, replace sub-switch. If battery voltage is not present, repair White/Blue wire.

SYMPTOM NO. 5

Replace main switch.

COMPONENT TESTING

MAIN SWITCH TEST

Check continuity across specified terminals of main switch

connector with switch button held in specified position. See appropriate MAIN SWITCH CONTINUITY TEST table. See Fig. 1. Replace main switch if continuity is not as specified.

MAIN SWITCH CONTINUITY TEST TABLE

Switch Position	Terminals
Driver	
UP	A & G; B & H
Off (Neutral)	B, G & H
DOWN	A & H; B & G
Passenger	
UP	A & D; B & F
Off (Neutral)	B, D & F
DOWN	A & F; B & D

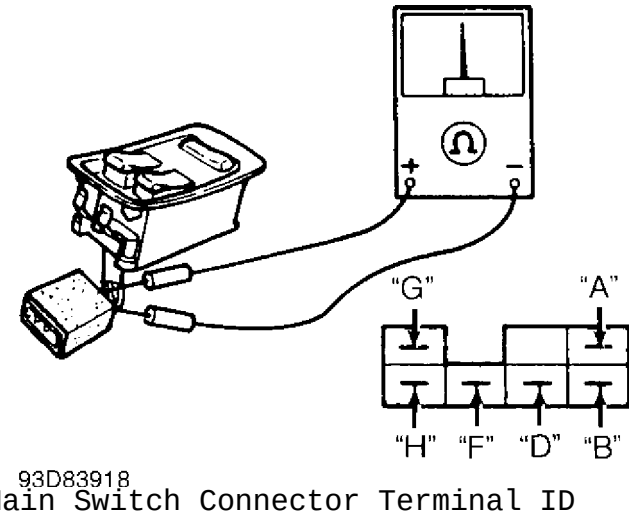

Fig. 1: Main Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

POWER CUT SWITCH TEST

Check continuity across specified terminals of main switch connector with power cut switch button held in specified position. See POWER CUT SWITCH CONTINUITY TEST table. See Fig. 1. Replace main switch if continuity is not as specified.

SUB-SWITCH TEST

Check continuity across specified terminals of sub-switch connector with switch button held in specified position. See SUB-SWITCH CONTINUITY TEST table. See Fig. 2. Replace sub-switch if continuity is not as specified.

SUB-SWITCH CONTINUITY TEST TABLE

Application & Switch Position	Terminals

UP	B & G; F & H
Off (Neutral)	A & B; F & H
DOWN	A & B; F & G

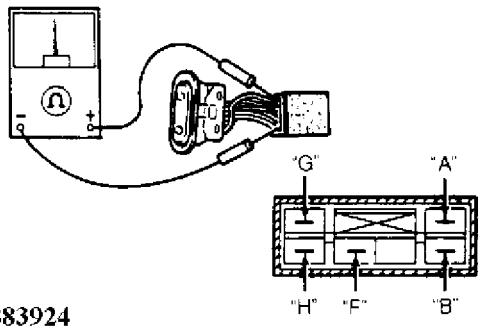

Fig. 2: Sub-Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

WINDOW MOTOR TEST

Disconnect window motor connector. Apply battery voltage and ground across window motor connector terminals. Reverse polarity to move window in opposite direction. Replace window motor if it does not operate.

REMOVAL & INSTALLATION

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION section before disconnecting battery.

MAIN SWITCH

Removal & Installation

Wrap tape around end of screwdriver. Carefully pry main switch out of door with screwdriver. Disconnect electrical connector. To install, reconnect electrical connector. Press main switch into door until lock tabs engage.

SUB-SWITCH

Removal & Installation

Wrap tape around end of screwdriver. Pry sub-switch out of door with screwdriver. Disconnect electrical connector. To install, reconnect electrical connector. Press sub-switch into door until lock tabs engage.

WINDOW MOTOR

WARNING: Window regulator is spring-loaded to assist window motor during upward movement. Before separating window motor from regulator, securely position regulator arms in full-up position (if possible). This will relieve spring pressure as much as possible, preventing injury when window motor is separated from regulator.

Removal & Installation

Fully open window. Raise window until height of glass (measured at top rear edge) is as specified. See WINDOW HEIGHT SPECIFICATIONS table. Disconnect negative battery cable. Remove door trim panel. Remove window regulator and motor as an assembly. Securely position regulator arms in full-up position (if possible) to relieve spring pressure. Remove window motor from regulator. To install, reverse removal procedure.

WINDOW HEIGHT SPECIFICATIONS TABLE

Application	In. (mm)
RX7	11.0 (280)

WIRING DIAGRAMS

Proceed to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

STEERING COLUMN SWITCHES
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:13PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Steering Column Switches

RX7

WARNING: RX7 is equipped with Supplemental Inflatable Restraint (SIR) system. To prevent air bag deployment, use extreme caution while servicing steering column. Ensure battery is disconnected before attempting any repair. DO NOT apply electrical power to any component on steering column without first disabling air bag. See DISABLING & ACTIVATING AIR BAG SYSTEM.

DESCRIPTION

Switches covered in this article include combination switch, ignition switch and hazard switch. Hazard switch is not part of combination switch but is covered in this article.

Combination switch includes turn signal switch, headlight switch and windshield wiper/washer switch. Ignition switch and lock cylinder are mounted on steering column.

DISABLING & ACTIVATING AIR BAG SYSTEM

WARNING: After disabling air bag system, wait at least 10 minutes before servicing system. Voltage is maintained for about 10 minutes (or one minute) after system is disabled. Failure to wait may cause accidental air bag deployment and possible personal injury.

Disabling System

Obtain radio code number from customer, and deactivate audio anti-theft function. Turn ignition off. Disconnect and shield negative battery cable. Disconnect clockspring lower connectors (Orange and Blue connectors under steering column). Wait 10 minutes before servicing.

Activating System

Reconnect clockspring lower connectors and negative battery cable. Turn ignition switch to ON position. Check AIR BAG indicator light to ensure system is operating properly. For more information, see AIR BAG RESTRAINT SYSTEM article in the ACCESSORIES/SAFETY EQUIPMENT section.

TESTING

WARNING: Before servicing steering column, see DISABLING & ACTIVATING AIR BAG SYSTEM.

COMBINATION SWITCH

Remove steering column covers. Remove combination switch (if necessary). See COMBINATION SWITCH under REMOVAL & INSTALLATION. Check continuity between specified terminals of combination switch connector. See Fig. 1. Replace switch if continuity is not as specified.

HAZARD SWITCH

Remove hazard switch from instrument cluster cover. Check continuity between specified terminals of hazard switch connector. See Fig. 2. Replace hazard switch if continuity is not as specified.

IGNITION SWITCH

Disconnect negative battery cable. Remove covers from steering column. Disconnect ignition switch connector. Ensure continuity is present as indicated. See Fig. 3. If necessary, replace ignition switch.

TURN SIGNAL SWITCH

Turn signal switch is part of combination switch. See COMBINATION SWITCH under TESTING.

WIPER SWITCH

Front
Wiper switch is part of combination switch. See COMBINATION SWITCH under TESTING.

Rear
See appropriate WIPER/WASHER SYSTEM article in the ACCESSORIES/SAFETY EQUIPMENT section.

REMOVAL & INSTALLATION

WARNING: Before servicing steering column, see DISABLING & ACTIVATING AIR BAG SYSTEM.

STEERING WHEEL & HORN PAD

Removal
1) Set front wheels in straight-ahead position. Disconnect negative battery cable. On vehicles without air bag, remove horn pad and go to next step. On vehicles with air bag, disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Remove air bag module.
2) Mark steering wheel and shaft for reassembly reference. Remove steering wheel nut or bolt. Remove damper (if equipped). Using appropriate puller, remove steering wheel.

Installation

1) Ensure front wheels are in straight-ahead position. Install steering wheel, ensuring reference marks are aligned. Ensure damper is aligned with holes of steering wheel. Tighten steering wheel bolt or nut to specification. See TORQUE SPECIFICATIONS. To install remaining components, reverse removal procedure.

HAZARD SWITCH

Removal & Installation

Remove instrument cluster cover. Remove hazard switch. To install, reverse removal procedure.

COMBINATION SWITCH

Removal & Installation

Disable air bag system. See DISABLING & ACTIVATING AIR BAG SYSTEM. Remove air bag module. Remove steering column covers. Disconnect combination switch electrical connectors. Remove combination switch screws. Remove combination switch. See Fig. 3.

2) To install, ensure front wheels are in straight-ahead position. Install combination switch. Turn clockspring connector (housing) clockwise until it stops (DO NOT force). Return clockspring connector 2 3/4 turns counterclockwise until arrow marks are aligned.

3) Install steering wheel, aligning reference marks made during removal. Ensure damper is aligned with holes of steering wheel. Tighten steering wheel bolt or nut to specification. See TORQUE SPECIFICATIONS.

LOCK CYLINDER

NOTE: To remove lock cylinder, see IGNITION SWITCH under REMOVAL & INSTALLATION.

IGNITION SWITCH

Removal & Installation

Disconnect negative battery cable. Remove steering column covers. Remove screws mounting ignition switch to steering column. Disconnect ignition switch wiring. Remove ignition switch. To install, reverse removal procedure.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Steering Wheel Nut	29-36 (39-49)
	INCH Lbs. (N.m)
Air Bag Module Bolt	70-104 (8-12)

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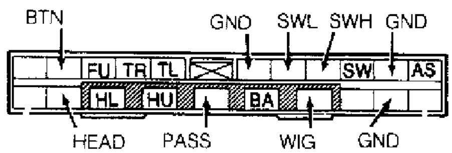
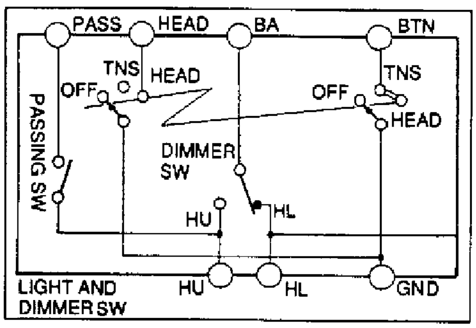
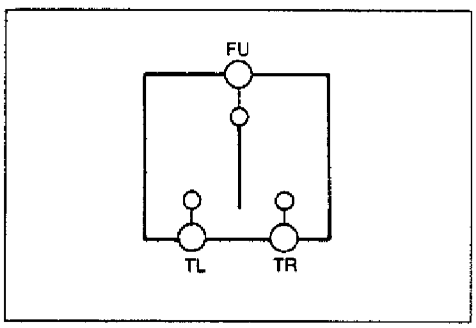




LIGHTS, DIMMER & PASSING SWITCH

Position \ Terminal		GND	BTN	HEAD	BA	HL	HU	PASS
OFF								
Parking		○—	—○					
Headlight ON		○—	—○—	—○				
	Low				○—	—○		
	High				○—	——	—○	
Flash-to-pass							○—	—○

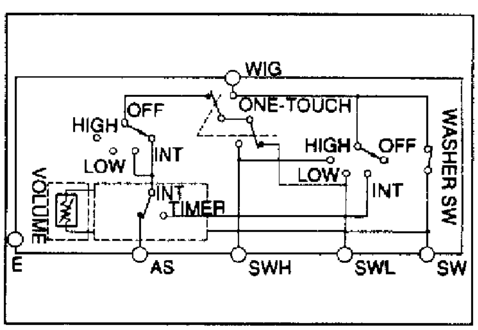
○–○ : Indicates continuity.



TURN SIGNAL SWITCH

Position \ Terminal	FU	TL	TR
Left	○—	—○	
OFF			
Right	○—	——	—○

○–○ : Indicates continuity.



WINDSHIELD WIPER & WASHER SWITCH

Position \ Terminal			AS	SWL	SWH	WIG	SW
Wiper switch	OFF	One-touch OFF	○—	—○			
		One-touch ON			○—	—○	
	INT		○—	—○			
	I (LOW)			○—	——	—○	
	II				○—	—○	
Washer ON						○—	—○

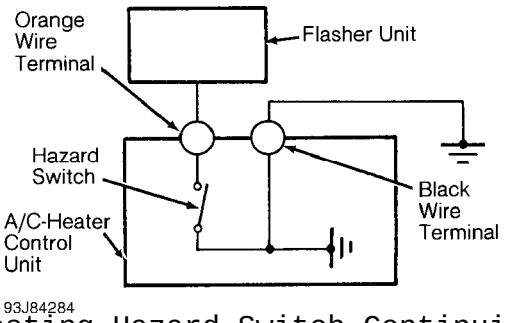
○–○ : Indicates continuity.

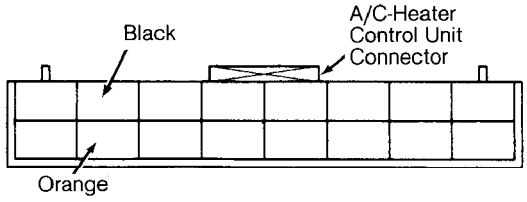
93G84281

Fig. 1: Testing Combination Switch Continuity
Courtesy of Mazda Motors Corp.

STEERING COLUMN SWITCHES
Article Text (p. 5)
1993 Mazda RX7
For www.iluvmyrx7.com

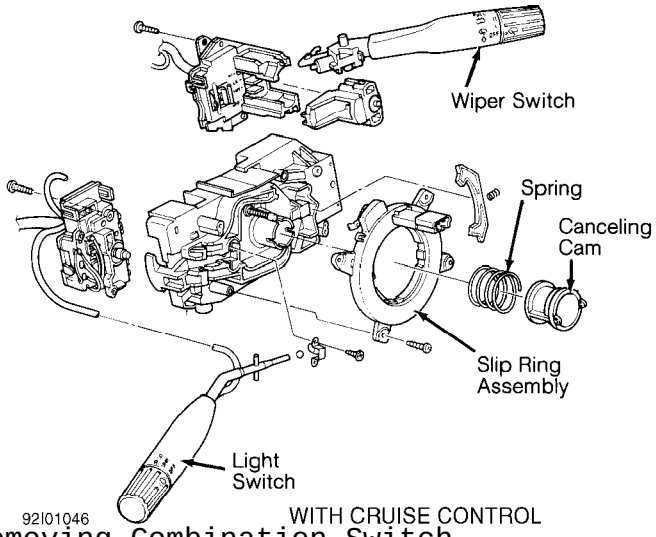
Sunday, August 19, 2001 01:13PM





NOTE: Hazard switch is on A/C-heater control panel. Check continuity between Orange and Black wire terminals of A/C-heater control unit connector. With switch in ON position, there should be continuity. With switch in OFF position, there should be no continuity. Replace hazard switch if continuity is not as specified.

Fig. 2: Testing Hazard Switch Continuity
Courtesy of Mazda Motors Corp.



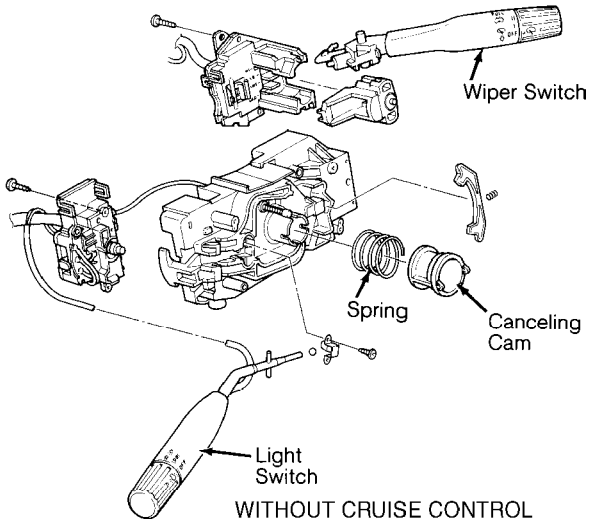


Fig. 3: Removing Combination Switch
Courtesy of Mazda Motors Corp.

END OF ARTICLE

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Power Sun Roof

RX7

DESCRIPTION & OPERATION

System Components

System components include sun roof motor, sun roof relay(s), limit switch(es) and sun roof switch(es). Sun roof motor is located rearward of sun roof opening. Sun roof relay(s) are located near sun roof motor. Limit switch(es), which sense position of sun roof panel, are an integral part of sun roof motor.

Tilt Function

To tilt sun roof upward:

* Quickly press slide switch toward OPEN position and release

Manually Opening & Closing Sun Roof

If sun roof is inoperative, it can be opened and closed manually. To manually open and close sun roof, use emergency hex wrench. See Fig. 1. For access, remove access cap.

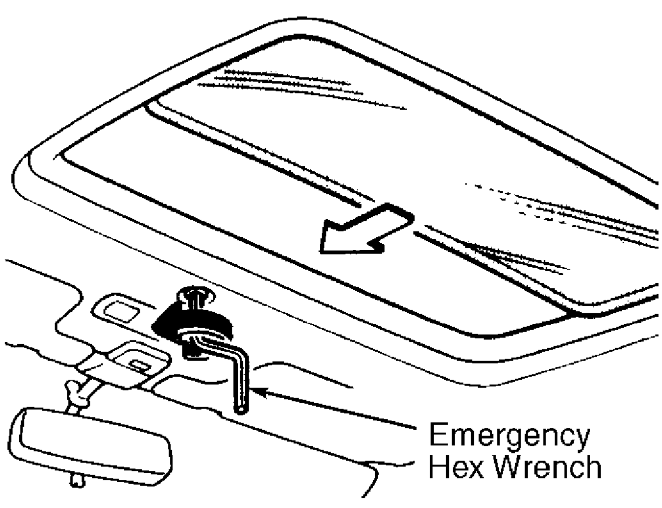


Fig. 1: Manually Opening & Closing Sun Roof Panel
Courtesy of Mazda Motors Corp.

SYSTEM TESTING

SYMPTOM DIRECTORY TABLE
ÄÄ

Symptom	Symptom No.

SUN ROOF - POWER
Article Text (p. 2)
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:13PM

SYMPTOM NO. 1

1) Turn ignition on. Check 15-amp sun roof fuse in fuse block, near left kick panel. If fuse is blown, replace fuse (repair wiring if necessary). If fuse is okay, go to next step.

2) Check voltage at Green/Orange wire terminal of sun roof switch connector. If battery voltage is present, go to next step. If battery voltage is not present, repair Green/Orange wire between fuse and sun roof switch.

3) Disconnect sun roof switch connector. Check continuity between ground and Black wire terminal of sun roof switch connector. If there is continuity, reconnect sun roof switch connector and go to next step. If there is no continuity, repair Black wire.

NOTE: OPEN position of sun roof switch includes 2 positions: OPEN/tilt position (with sun roof closed, quickly press and release button) and OPEN/slide position (with sun roof open, hold button down).

4) Ensure battery voltage is present at the following terminals of sun roof switch connector. If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, replace sun roof switch.

* Yellow/Red wire (switch in OPEN/tilt and OPEN/slide positions)
* Yellow/Blue wire (switch in CLOSE position).

5) Ensure battery voltage is present at the following terminals of sun roof relay connector. If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, repair wiring between sun roof switch and sun roof relay.

* Yellow/Red wire (switch in OPEN/tilt and OPEN/slide positions)
* Yellow/Blue wire (switch in CLOSE position).

6) Ensure battery voltage is present at the following terminals of sun roof relay connector. If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, replace sun roof relay.

* Yellow/Red wire (switch in OPEN/tilt and OPEN/slide position)
* Yellow wire (switch in CLOSE position).

7) Ensure battery voltage is present at the following terminals of sun roof motor connector. If battery voltage is present at both terminals, replace sun roof motor. If battery voltage is not present at both terminals, repair wiring between sun roof relay and sun roof motor.

* Yellow/Red wire (switch in OPEN/tilt and OPEN/slide positions)
* Yellow wire (switch in CLOSE position).

SYMPTOM NO. 2

1) Ensure battery voltage is present at the following terminals of sun roof switch connector. If battery voltage is present at both terminals, go to next step. If battery voltage is not present at both terminals, replace sun roof switch.

* Yellow/Red wire (switch in OPEN/tilt and OPEN/slide positions)
* Yellow/Blue wire (switch in CLOSE position).

2) Ensure battery voltage is present at terminals of sun roof relay connector specified in previous step. If battery voltage is present at both terminals, replace sun roof relay. If battery voltage is not present at both terminals, repair wiring between sun roof switch and sun roof relay.

SYMPTOM NO. 3

1) Move sun roof to tilted up position using emergency handle. Disconnect electrical connectors at sun roof relay and sun roof motor. Check continuity of Blue/Green and Blue wires between sun roof relay and sun roof motor. If there is no continuity, repair wiring.

2) If there is continuity, check continuity between Blue/Green and Blue wire terminals of sun roof motor connector. If there is continuity, replace sun roof relay. If there is no continuity, replace sun roof motor.

COMPONENT TESTING

LIMIT SWITCH TEST

Manually move sun roof panel. See DESCRIPTION & OPERATION at beginning of article. With sun roof panel in specified position, check continuity between specified terminals of sun roof motor connector. See LIMIT SWITCH CONTINUITY TEST table. See Fig. 2. Replace sun roof motor if continuity is not as specified.

LIMIT SWITCH CONTINUITY TEST TABLE
ÄÄ
Application & Sun Roof

Position (Wire Terminals)	Continuity
Opened (A & B)	No
Closed (A & B)	No
Tilted Up (A & B)	Yes

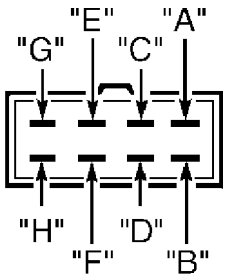


Fig. 2: Sun Roof Motor Connector Terminal ID
Courtesy of Mazda Motors Corp

SUN ROOF MOTOR TEST

Disconnect sun roof motor connector. Apply battery voltage across specified wire terminals of sun roof motor connector (reverse polarity to move motor in opposite direction). See SUN ROOF MOTOR TEST table. Replace sun roof motor if it does not operate.

SUN ROOF MOTOR TEST TABLE

Application	Wire Colors
RX7	Yellow & Yellow/Red

SUN ROOF RELAY TEST

A list of sun roof relay connector terminals with specified voltages follows. Leave sun roof relay connected. With ignition on, check voltage at terminals of sun roof relay connector (backprobe connector). If voltages are not as specified, check circuit. If circuit is okay, replace sun roof relay.

* "B" (Yellow/Blue Wire) - To Sun Roof Switch

  When sun roof is closing, battery voltage should be present. Under all other conditions, no voltage should be present.

* "F" (Yellow/Red Wire) - To Sun Roof Switch

  When sun roof is tilting up or opening, battery voltage should be present. Under all other conditions, no voltage should be present.

* "H" (Blue Wire) - To Limit Switch

  Under all other conditions, no voltage should be present.

* "I" (Yellow Wire) - To Sun Roof Motor

  When sun roof is closing, battery voltage should be present.
  Under all other conditions, no voltage should be present.

* "J" (Light Green Wire) - To Limit Switch

  When sun roof is tilting up, no voltage should be present.
  Under all other conditions, battery voltage should be present.

SUN ROOF SWITCH TEST

Disconnect sun roof switch connector. Check continuity between specified terminals of sun roof switch connector. See SUN ROOF SWITCH CONTINUITY TEST table. See Fig. 3. Replace sun roof switch if continuity is not as specified.

SUN ROOF SWITCH CONTINUITY TEST TABLE

Switch Position	Terminals
OPEN	A & B
CLOSE	B & C

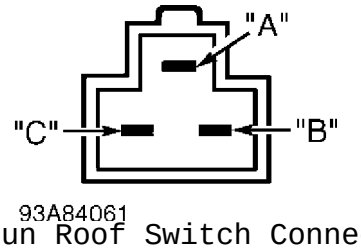
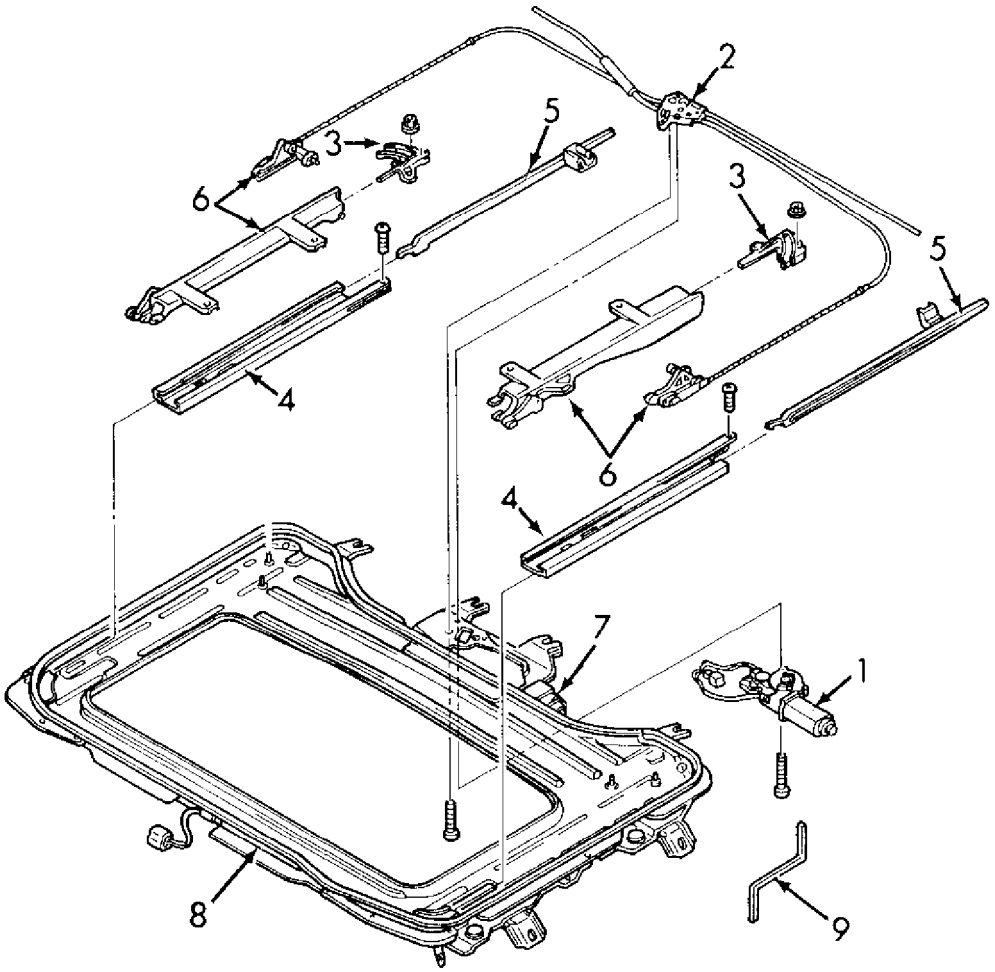


Fig. 3: Sun Roof Switch Connector Terminal ID
Courtesy of Mazda Motors Corp.

REMOVAL & INSTALLATION

NOTE: For removal and installation, refer to Fig. 4.



1. Sun Roof Motor
2. Drive Unit Assembly
3. Guide Plate
4. Guide Rail
5. Shutting Assembly
6. Shutting
7. Sun Roof Relay
8. Sun Roof Frame
9. Emergency Handle

93H84068

Fig. 4: Exploded View Of Sun Roof Assembly
Courtesy of Mazda Motors Corp.

WIRING DIAGRAMS

Proceed to chassis WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

WIPER/WASHER SYSTEM
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:14PM

ARTICLE BEGINNING

1993 ACCESSORIES/SAFETY EQUIPMENT
Mazda Wiper/Wash Systems

RX7

DESCRIPTION & OPERATION

RX7 is equipped with a 2-speed wiper motor with an optional intermittent wiper feature.

ADJUSTMENTS

FRONT WIPER ARM ADJUSTMENT

Ensure wiper motor is in park position. Position wiper arm and blade assembly so tip of blade is specified distance above front window trim. See FRONT WIPER ADJUSTMENT SPECIFICATIONS table.

FRONT WIPER ADJUSTMENT SPECIFICATIONS TABLE

Model	Driver's Side	Passenger's Side
RX7	1.0" (25 mm)	1.0" (25 mm)

TESTING

FRONT WIPER MOTOR CONTINUITY TEST

NOTE: Refer to Fig. 1 when conducting the following tests.

With wiper motor in park position, ensure continuity exists between terminals "B", "C" and "D". Continuity should not exist between terminals "A" and "E" in park position. With wiper motor not in park position, continuity should exist between terminals "A", "B", "C" and "E". Continuity should not exist between terminal "D" and any other terminals.

FRONT WIPER MOTOR LOW SPEED TEST

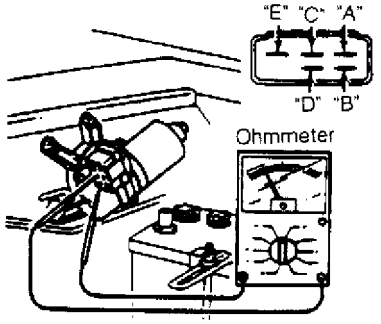
NOTE: Refer to Fig. 1 when conducting the following tests.

Connect battery voltage to wiper motor terminal "C". Connect ground to wiper motor housing. Motor should run at low speed.

FRONT WIPER MOTOR HIGH SPEED TEST

NOTE: Refer to Fig. 1 when conducting the following tests.

Connect battery voltage to wiper motor terminal "A". Connect ground to wiper motor housing. Motor should run at high speed.



93E84545

Fig. 1: Wiper Motor Terminal ID
Courtesy of Mazda Motors Corp.

FRONT WIPER RELAY

NOTE: Intermittent wiper relay is incorporated into wiper switch. See COMBINATION SWITCH in STEERING COLUMN SWITCHES article in the ACCESSORIES/SAFETY EQUIPMENT section.

FRONT WIPER SWITCH TEST

NOTE: See COMBINATION SWITCH in STEERING COLUMN SWITCHES article in the ACCESSORIES/SAFETY EQUIPMENT section.

REMOVAL & INSTALLATION

NOTE: On RX7 models with anti-theft radio system, obtain code number from customer and deactivate audio anti-theft function before disconnecting battery.

FRONT WIPER MOTOR

CAUTION: DO NOT remove wiper motor arm unless necessary. If wiper motor arm removal is necessary, mark wiper arm position on adapter plate or motor housing for reassembly.

Removal & Installation

1) Wiper motor is located on engine compartment firewall. Disconnect negative battery cable. Remove wiper arms and cowl grille (if necessary). Remove wiper motor cover (if necessary).

2) Remove electrical connector. Remove wiper motor or wiper motor bracket attaching bolts. Move motor and adapter plate out slightly. Separate wiper arm/link pivot joint and remove motor. To install, reverse removal procedure.

FRONT WIPER SWITCH

NOTE: See COMBINATION SWITCH in STEERING COLUMN SWITCHES article in the ACCESSORIES/SAFETY EQUIPMENT section.

REAR WIPER MOTOR

Removal & Installation

Disconnect negative battery cable. Remove wiper arm and blade assembly. From underside of hatch, remove upper, side and lower hatch trim (if necessary). Carefully remove hatch screen. Disconnect rear wiper motor electrical connector. Remove wiper motor. To install, reverse removal procedure.

WIRING DIAGRAMS

Refer to WIRING DIAGRAMS article in WIRING DIAGRAMS section.

END OF ARTICLE

ELECTRICAL COMPONENT LOCATOR
Article Text

1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

ARTICLE BEGINNING

1993 ELECTRICAL COMPONENT LOCATION
Mazda Electrical Components

RX7

SAFETY PRECAUTION

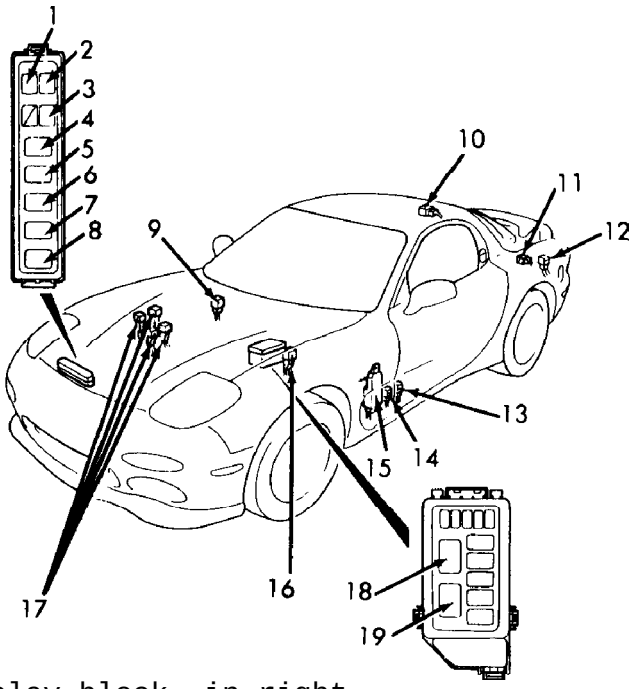
WARNING: When working on vehicles equipped with Supplemental Restraint System (SRS), never apply electrical voltage to the system. This could cause the SRS (air bag) to be deployed. For complete Air Bag Safety precautions refer to AIR BAG RESTRAINT SYSTEM article in ACCESSORIES/SAFETY EQUIPMENT Section.

BUZZERS, RELAYS & TIMERS

Component	Component Location
ABS Relays	On top of ABS hydraulic unit, on right rear of engine compartment.
A/C Relay	On relay block, in right front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Graphic No. 1

ELECTRICAL COMPONENT LOCATOR

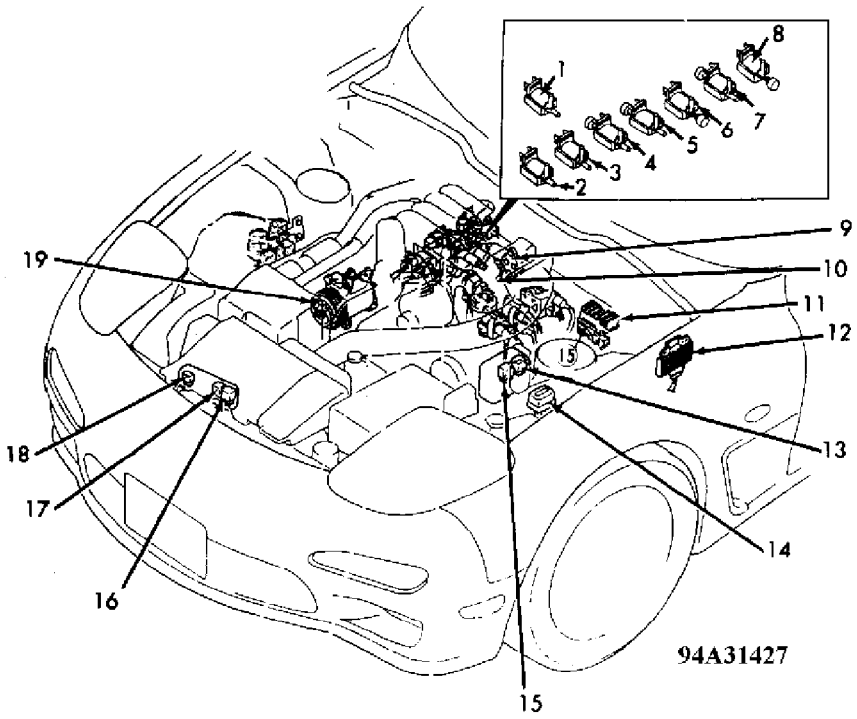
Article Text (p. 2)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



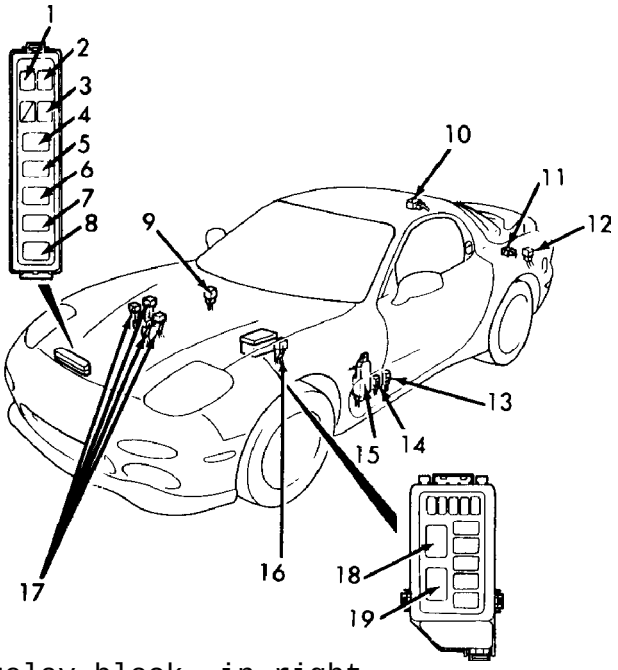
Engine Compartment View

On relay block, in right front of engine compartment.

Air Pump Relay

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Graphic No. 1

On relay block, in right front of engine compartment.

ELECTRICAL COMPONENT LOCATOR

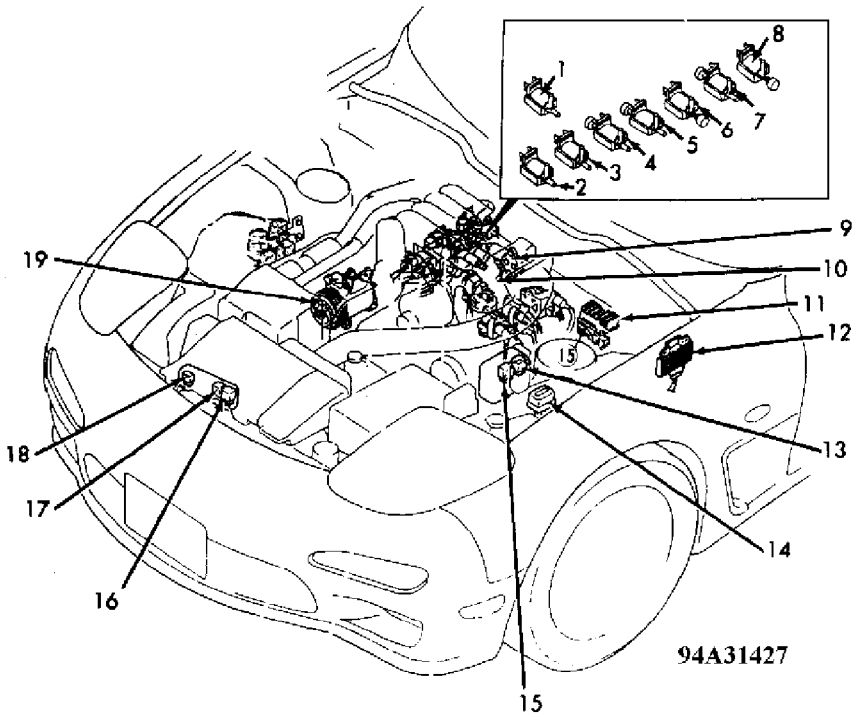
Article Text (p. 3)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

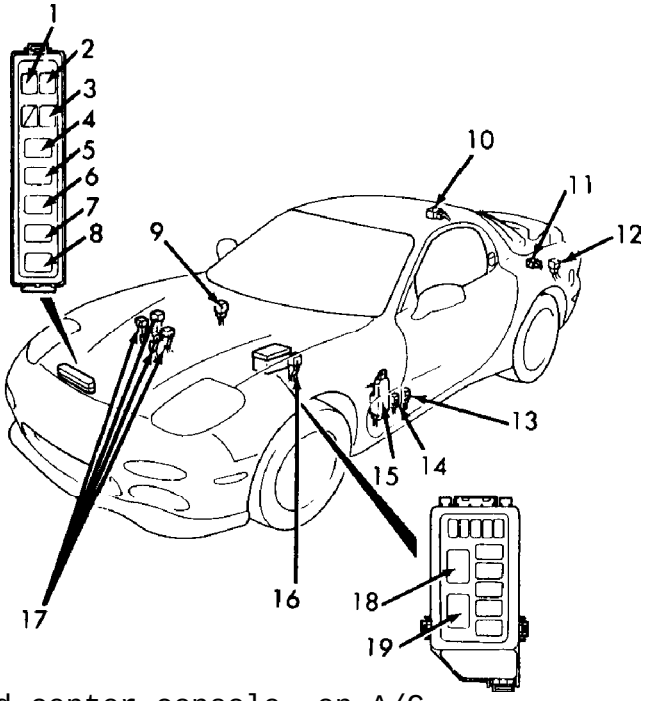


Engine Compartment View

On relay block, in right front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Blower Motor Relay

Behind center console, on A/C -heater housing.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 4)

1993 Mazda RX7

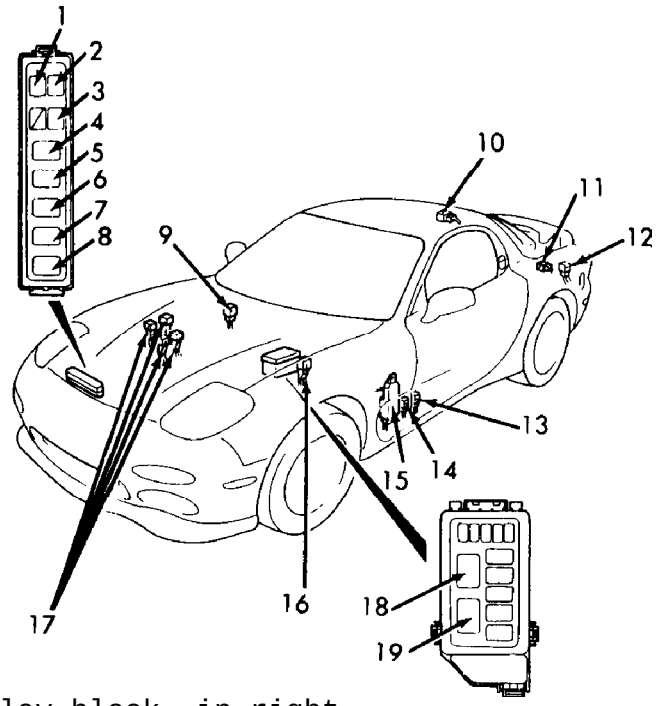
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

Circuit Opening Relay

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

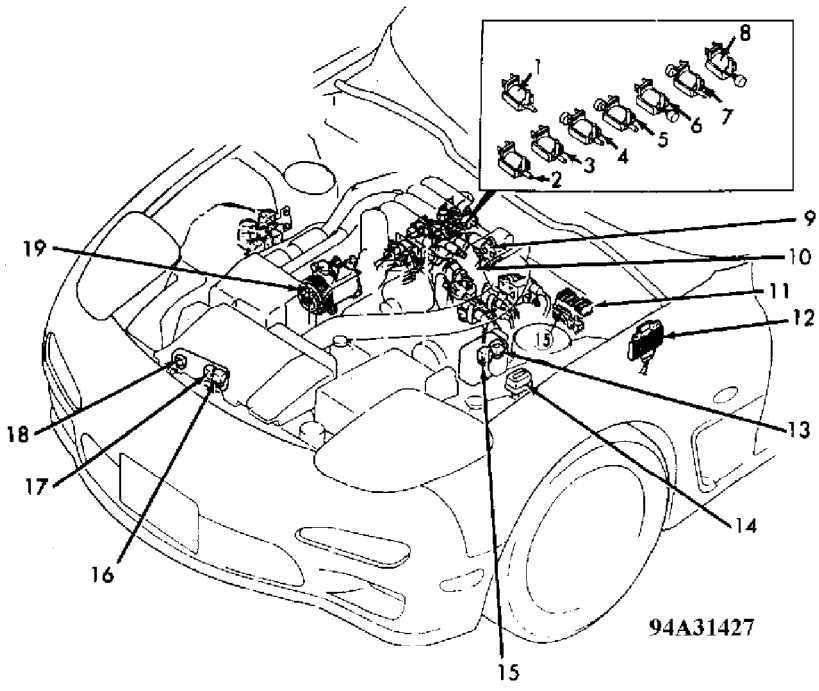
94I31425



Graphic No. 1

On relay block, in right front of engine compartment.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Engine Compartment View

On relay block, in right front of engine compartment.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 5)

1993 Mazda RX7

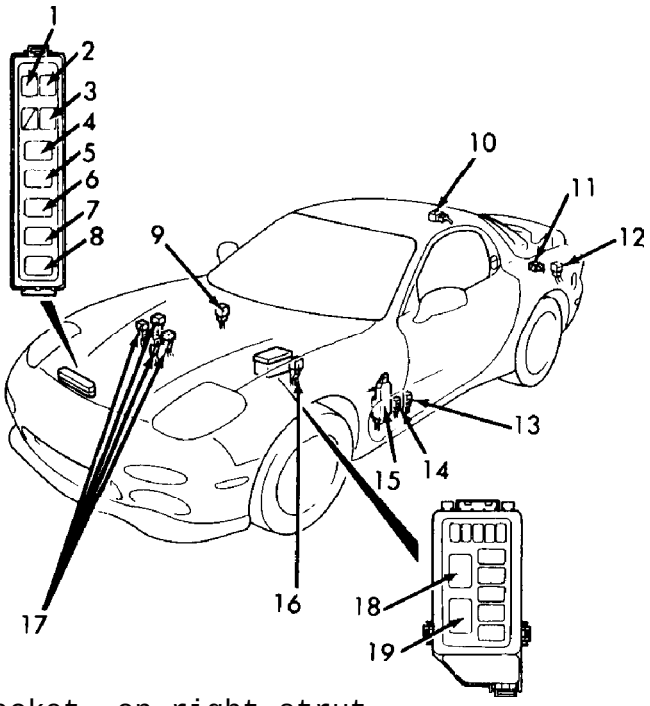
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

Cooling Fan Relays (4)

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

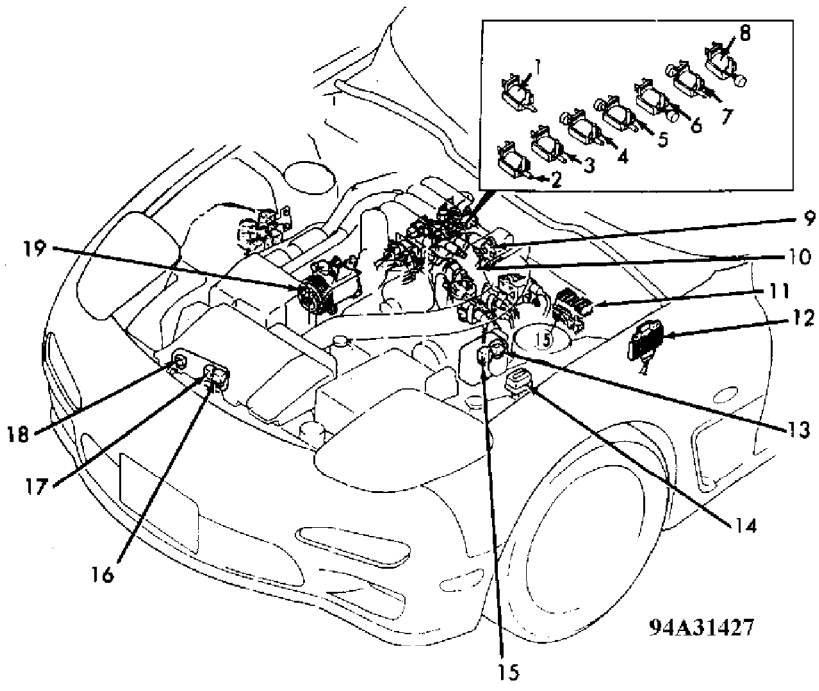
94I31425



Graphic No. 1

On bracket, on right strut tower.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Engine Compartment View

On bracket, on right strut tower.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 6)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

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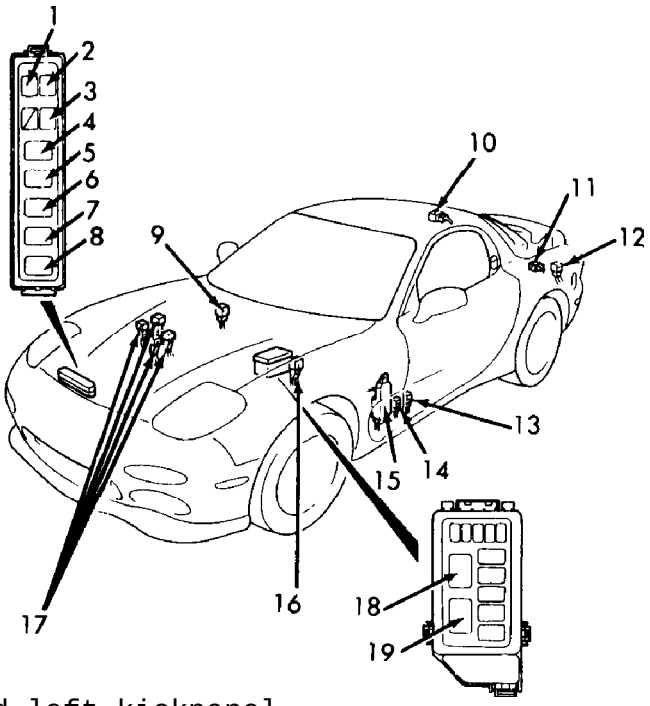

Door Lock Timer

Behind left kickpanel.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

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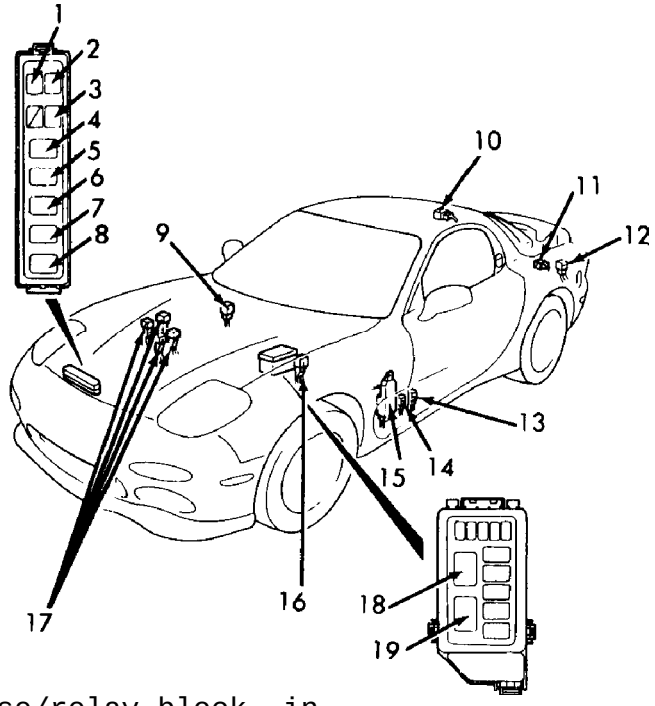


EGI Main Relay

On fuse/relay block, in engine compartment.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 7)

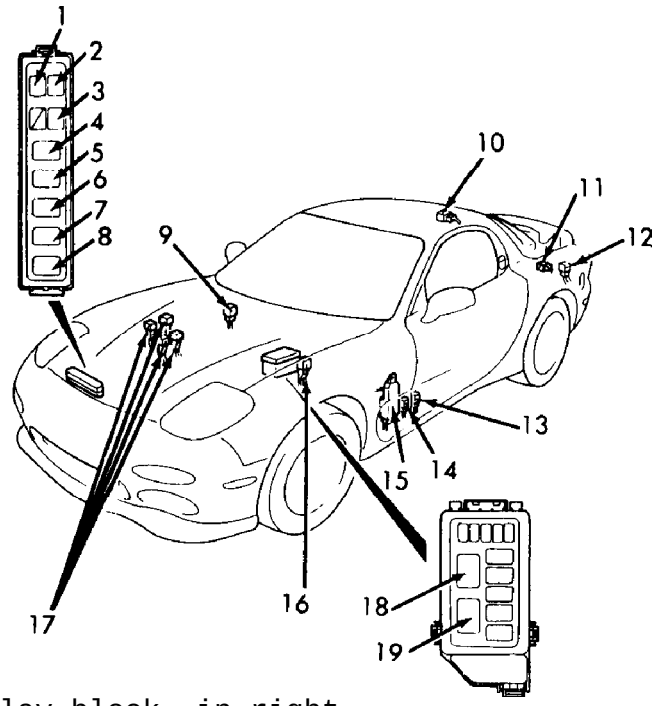
1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



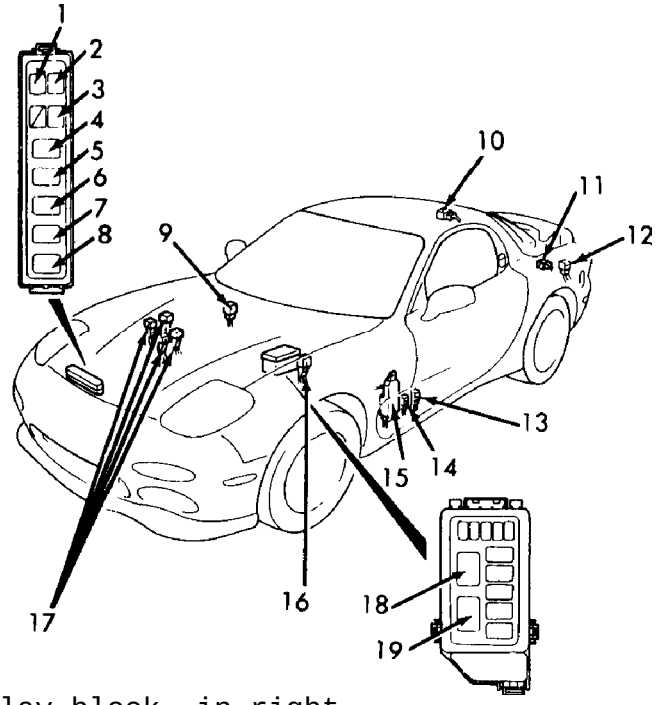
Foglight Relay

On relay block, in right front of engine compartment.

Fuel Pump Relay

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Graphic No. 1

On relay block, in right front of engine compartment.

ELECTRICAL COMPONENT LOCATOR

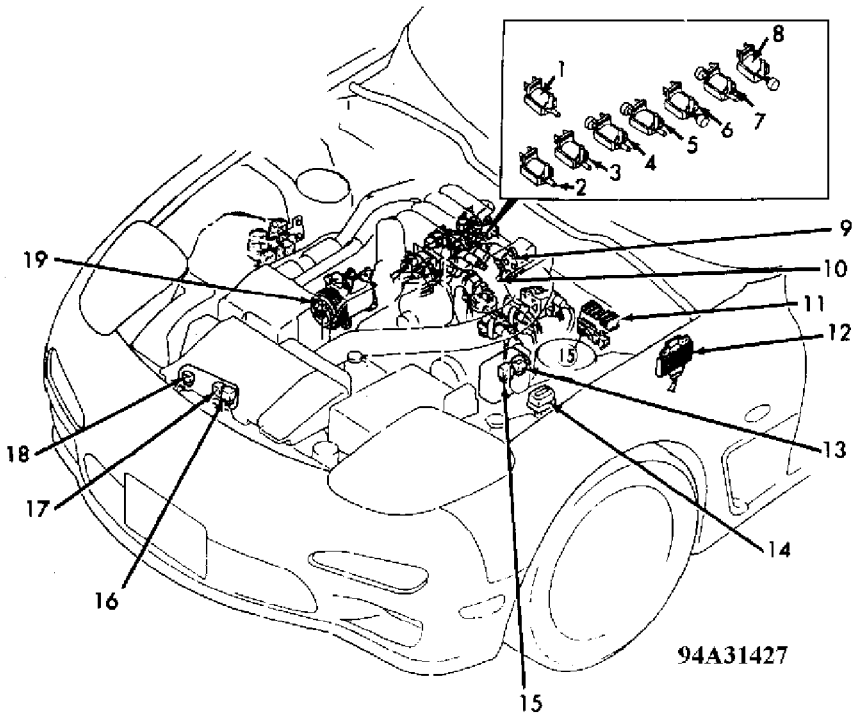
Article Text (p. 8)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

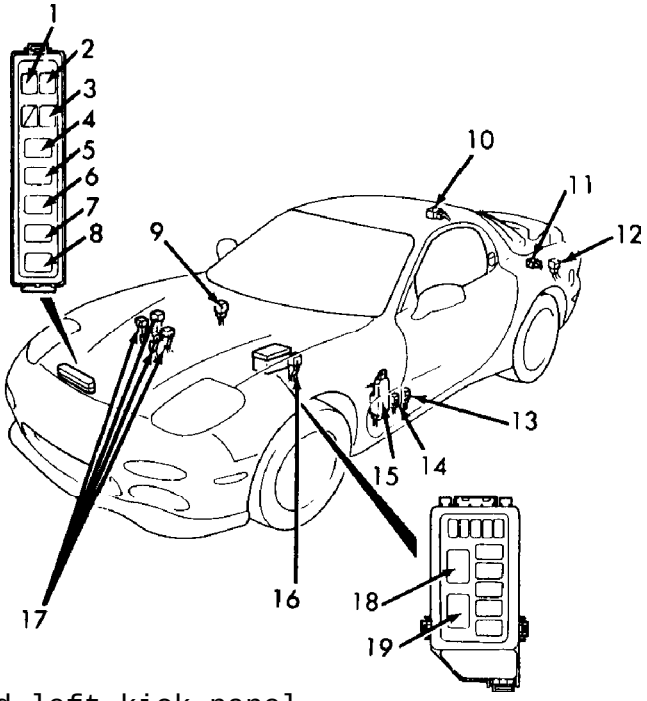


Engine Compartment View

On relay block, in right front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425

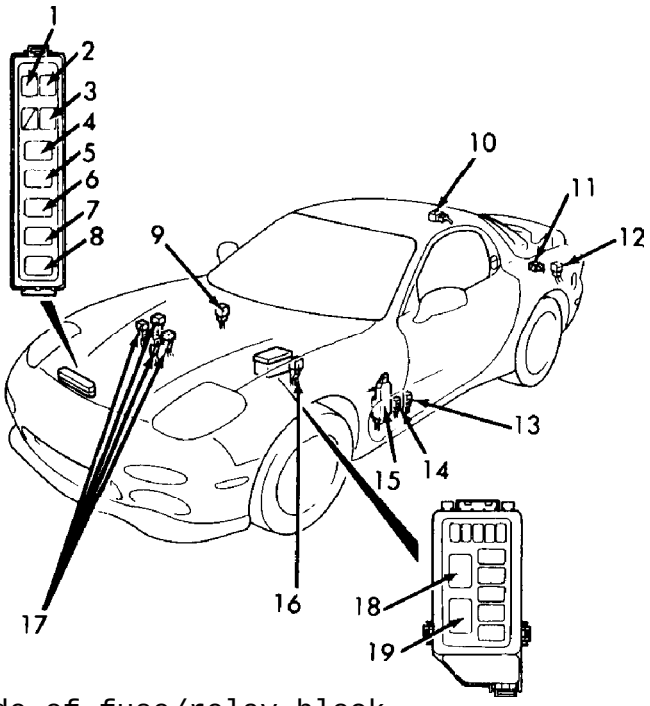


Hazard Flasher Relay

Behind left kick panel.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425

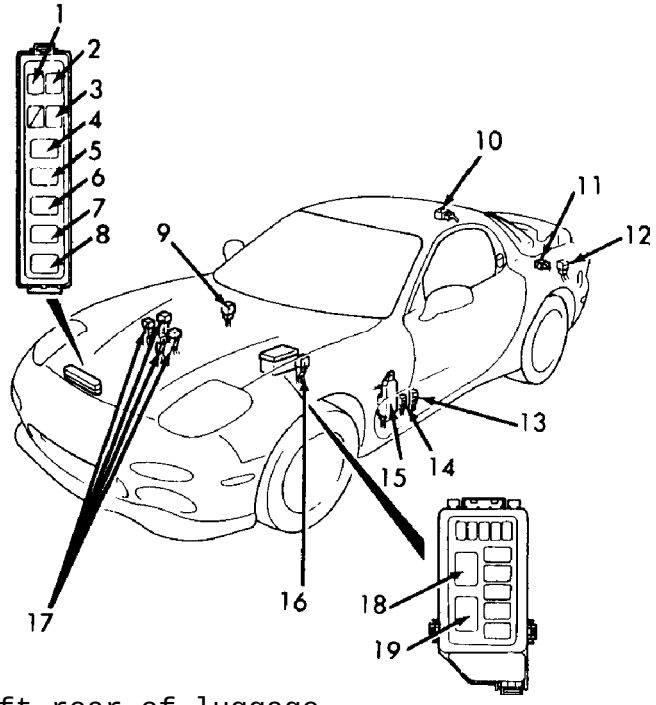


Headlight Relay

On side of fuse/relay block, in left front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Headlight Cleaner Relay

On left rear of luggage compartment, behind trim panel.

Horn Relay

On relay block, in right front

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 10)

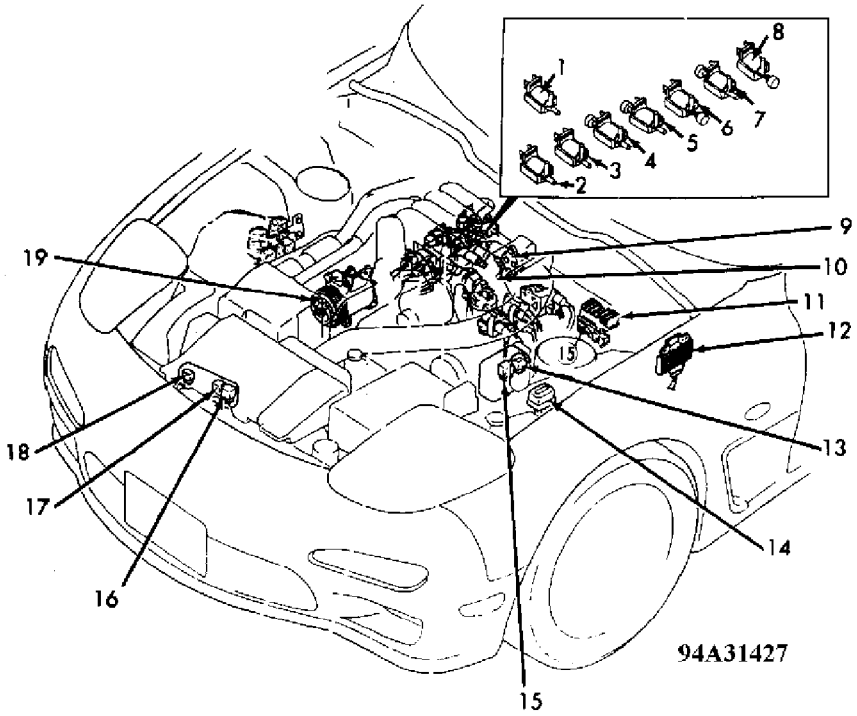
1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

of engine compartment.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

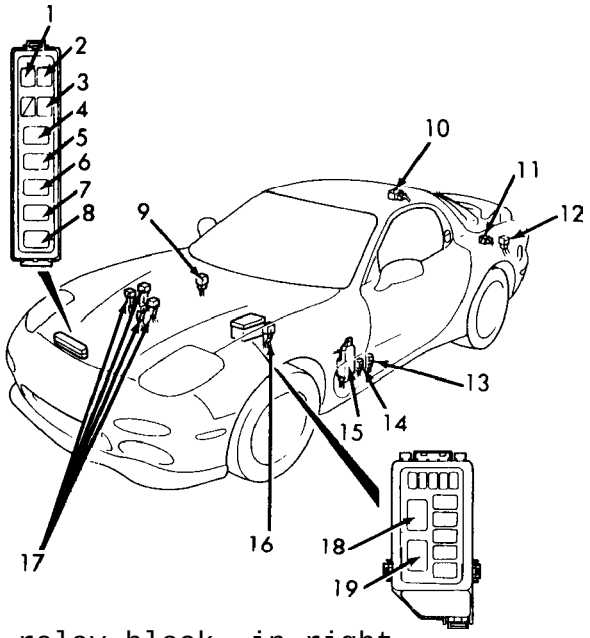


Main Relay

On fuse/relay block, on right front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425

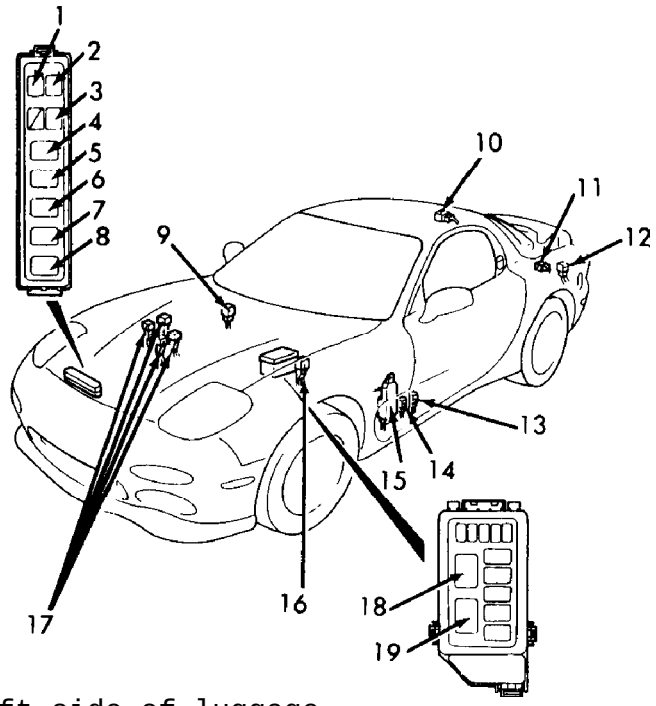


Radio Relay

On relay block, in right front of engine compartment.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425

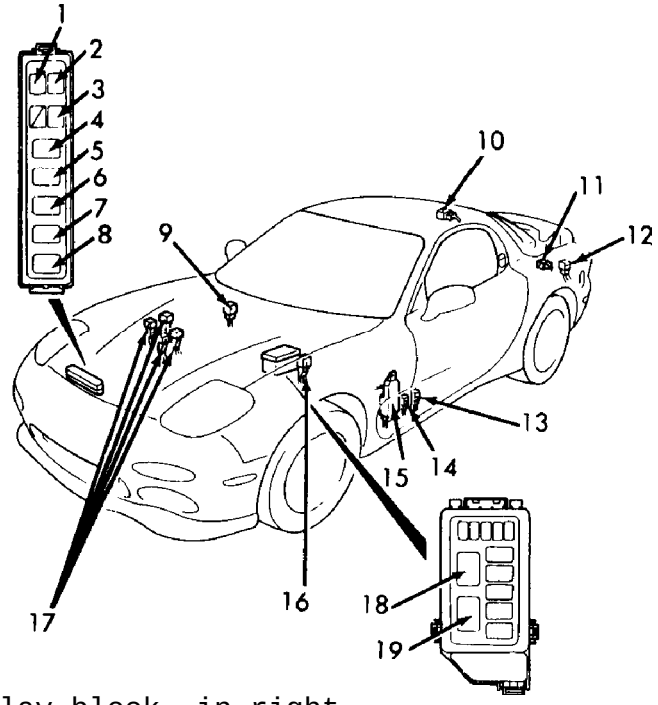


Rear Window Defroster Relay

On left side of luggage compartment, behind trim panel.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Retractable Headlight Relay

On relay block, in right front of engine compartment.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 12)

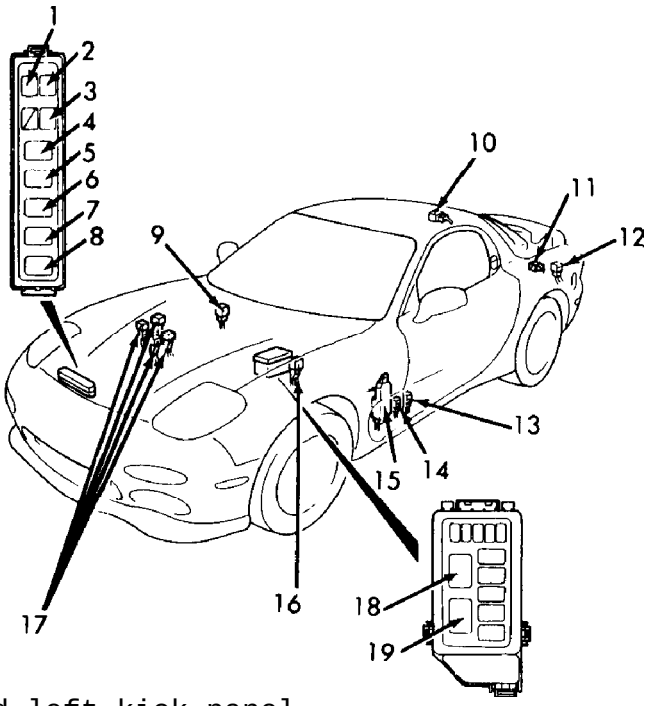
1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425

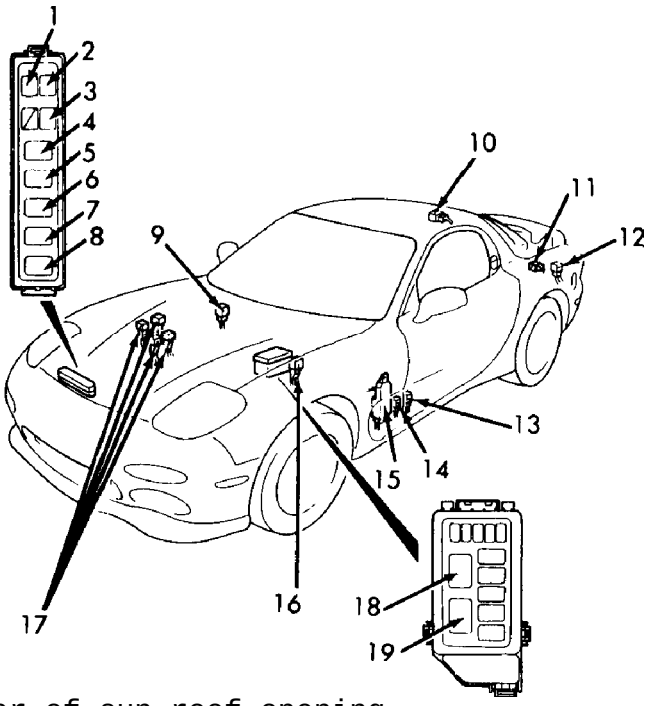


Starter Cut Relay

Behind left kick panel.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Sun Roof Relay

On rear of sun roof opening, under headliner.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 13)

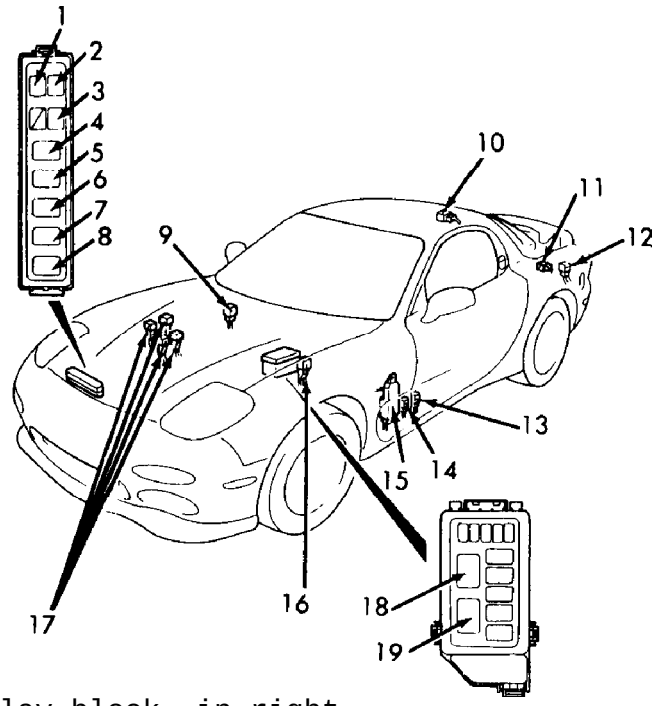
1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



TNS Relay	On relay block, in right front of engine compartment.

CIRCUIT PROTECTION DEVICES

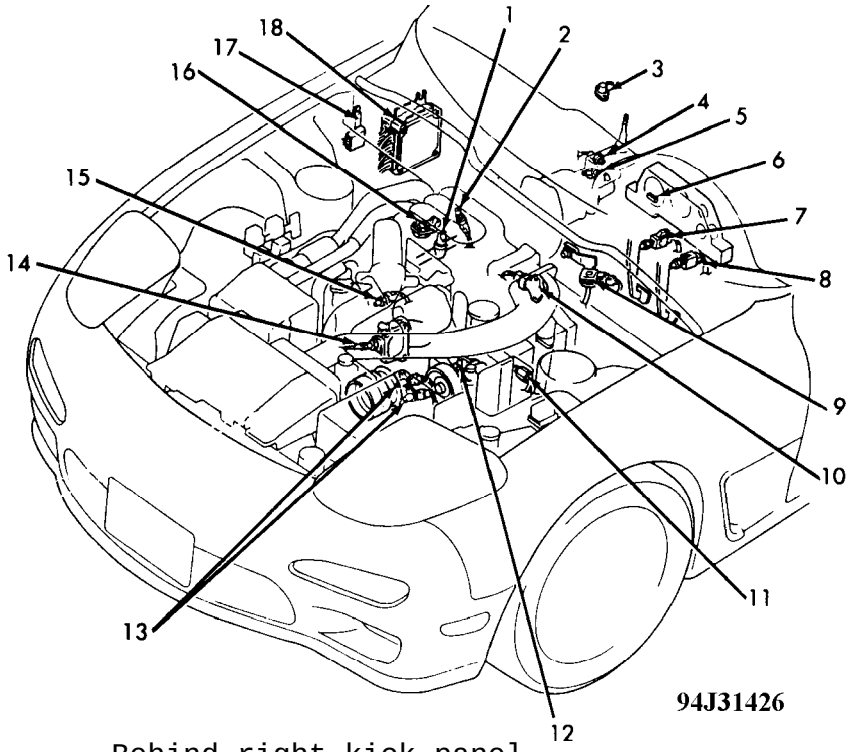
Component	Component Location
Blower Motor Fuse	On blower motor housing.
Fuse Block	Behind left side of dash.
Fuse/Relay Block	On left front inner fender panel, near battery.
Relay Block	On right front of engine compartment.

CONTROL UNITS

Component	Component Location
ABS Control Unit	On left side of luggage compartment, behind trim panel.
Central Processing Unit No. 1	Behind fuse block, under left side of dash.

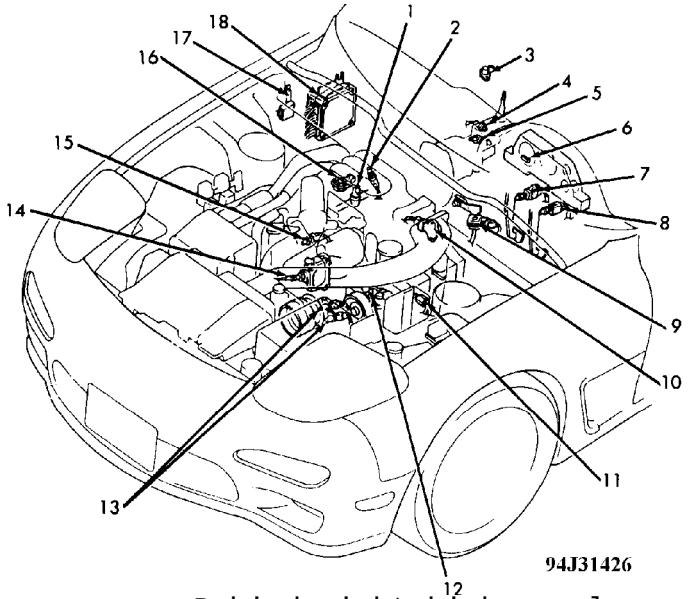
No. 2	Behind left kick panel.
Cruise Control Unit	Behind left kick panel.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Electrical Load Control Unit	Behind right kick panel, above ECU.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Engine Control Unit (ECU)	Behind right kick panel.
Shift Lock Control Unit	Under console, forward of

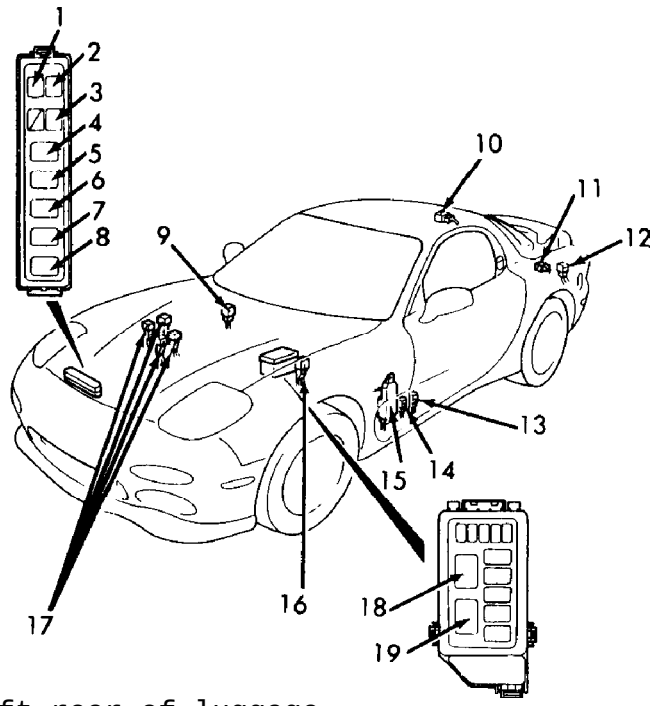
shift lever.

MOTORS

Component	Component Location
Blower Motor	Behind right side of dash.

1. Air Pump Relay
2. Foglight Relay
3. Horn Relay
4. Radio Relay
5. TNS Relay
6. Retractable Headlight Relay
7. A/C Relay
8. Fuel Pump Relay
9. Blower Motor Relay
10. Sun Roof Relay
11. Headlight Cleaner Motor & Relay
12. Rear Window Defroster Relay
13. Door Lock Timer
14. Stater Cut Relay
15. Hazard Flasher Relay
16. Headlight Relay
17. Cooling Fan Relays (4)
18. Circuit Opening Relay
19. EGI Main Relay

94I31425



Headlight Cleaner Motor	On left rear of luggage compartment, behind trim panel.
Sun Roof Motor	On center rear of sun roof opening.
Washer Motor	
Front	Bottom of washer fluid reservoir, behind left headlight.
Rear	Bottom of washer fluid reservoir, left rear of luggage compartment.
Wiper Motor	
Front	On right side of firewall.
Rear	On left bottom of liftgate.

ELECTRICAL COMPONENT LOCATOR

Article Text (p. 16)

1993 Mazda RX7

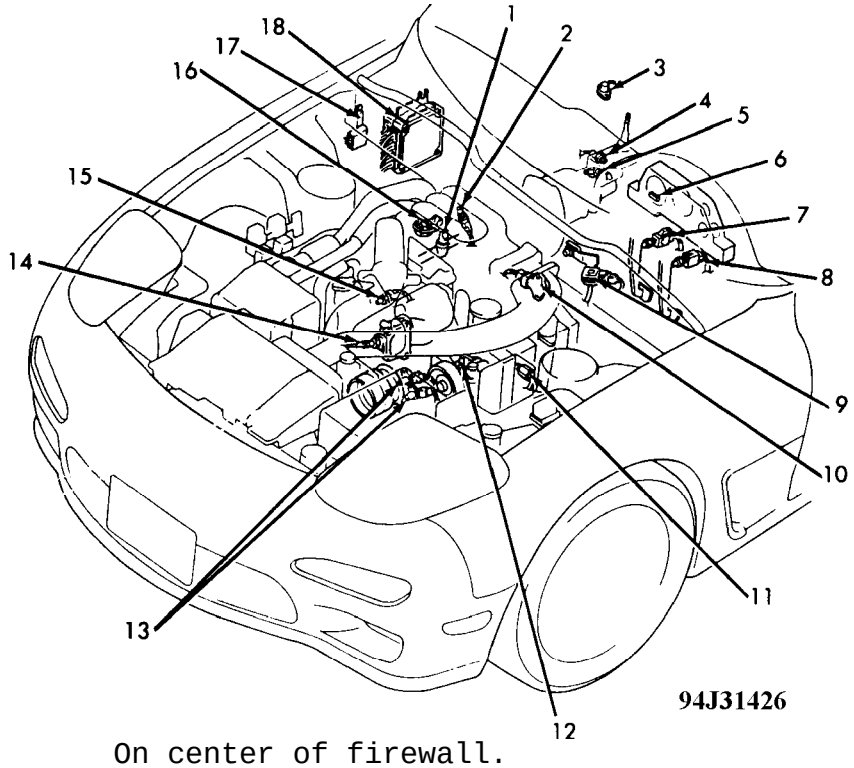
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

SENDING UNITS & SENSORS

Component	Component Location
ABS Wheel Speed Sensors	On bracket, on each wheel hub.
Air Bag Crash Sensors	
"D" Sensors (3)	On left, right and center of vehicle front.
"S" Sensor	On center of firewall.
ATF Thermosensor	Inside transmission.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Barometric Pressure Sensor	On center of firewall.
Brake Fluid Level Sensor	In brake master cylinder.
Coolant Level Sensor	On top front of engine.
Coolant Temp. Sending Unit	On left rear of engine.

ELECTRICAL COMPONENT LOCATOR

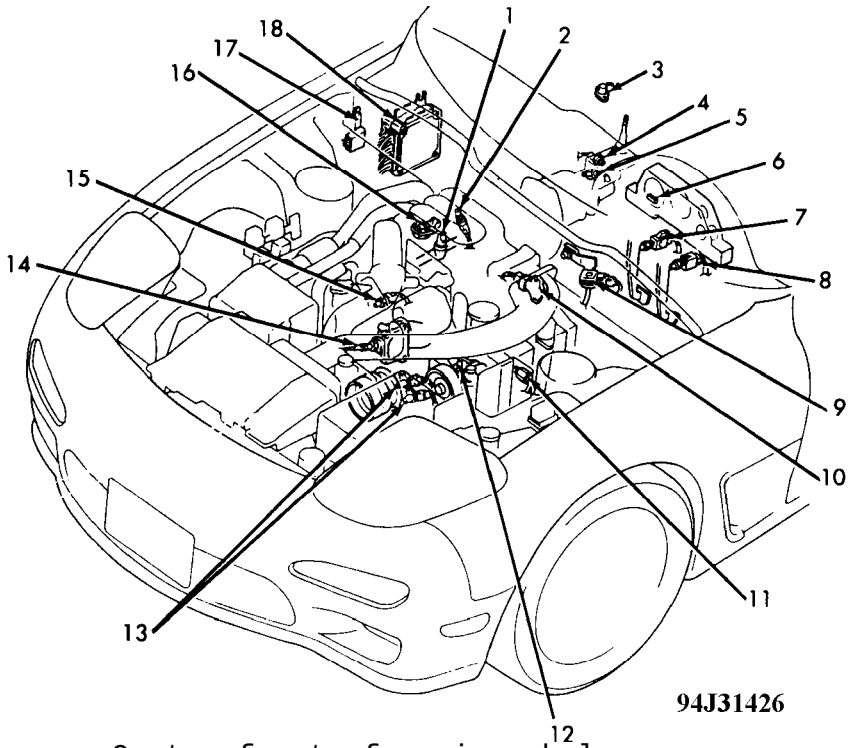
Article Text (p. 17)

1993 Mazda RX7

For www.iluvmyrx7.com

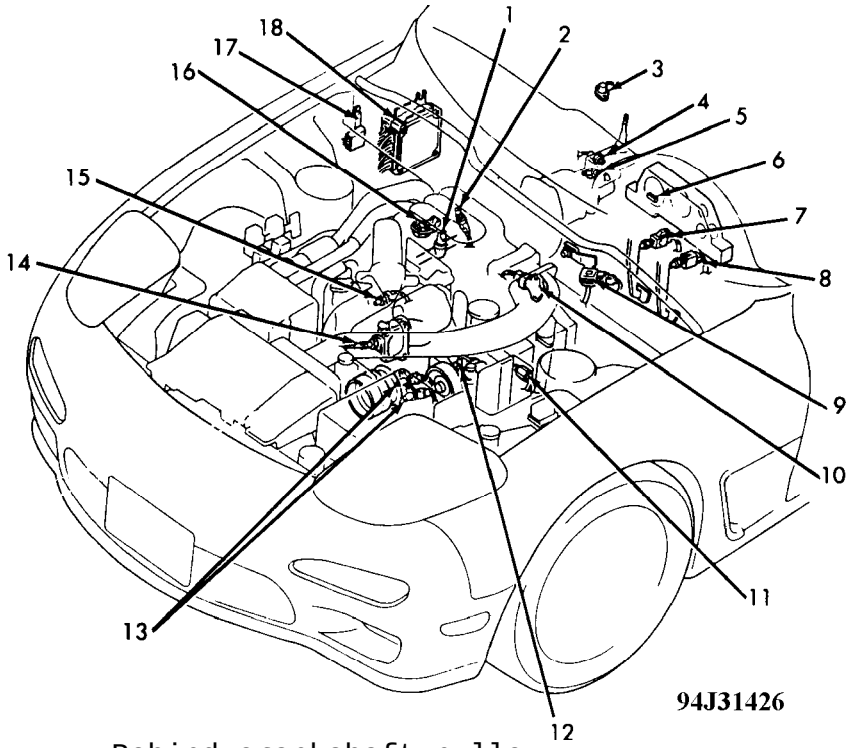
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Coolant Temperature Sensor	On top front of engine, below alternator.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Crank Angle Sensors (2)	Behind crankshaft pulley.

ELECTRICAL COMPONENT LOCATOR

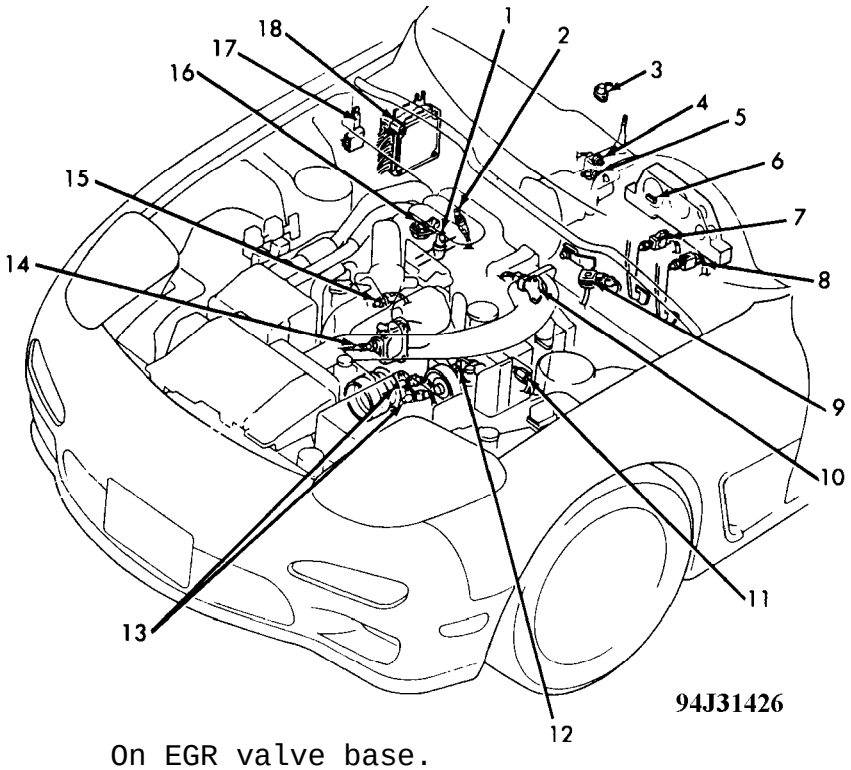
Article Text (p. 18)

1993 Mazda RX7

For www.iluvmyrx7.com

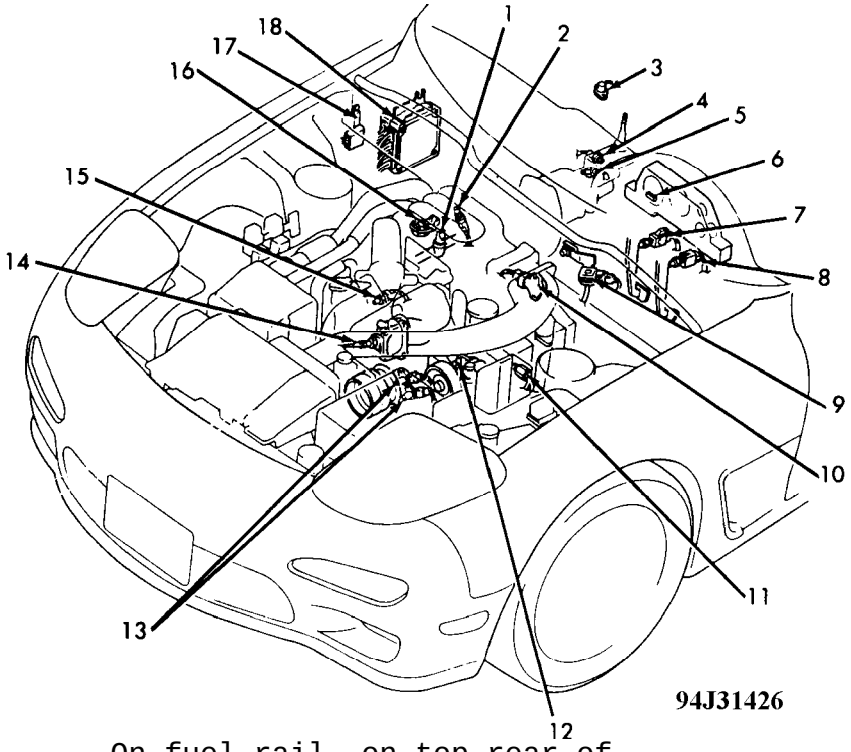
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



EGR Position Sensor (Calif.) — On EGR valve base.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Fuel Thermosensor — On fuel rail, on top rear of engine.

ELECTRICAL COMPONENT LOCATOR

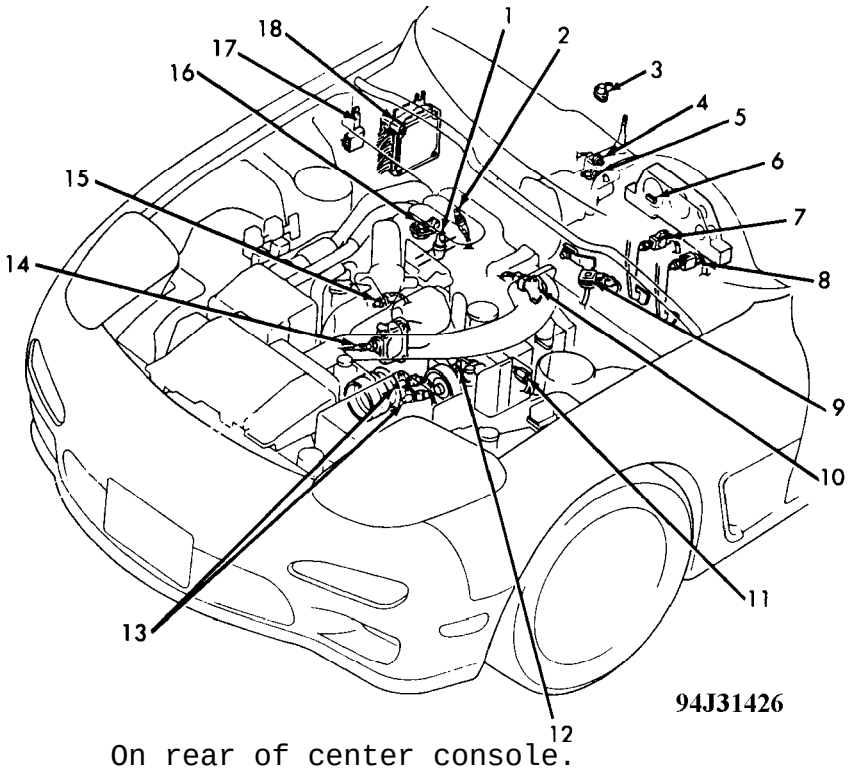
Article Text (p. 19)

1993 Mazda RX7

For www.iluvmyrx7.com

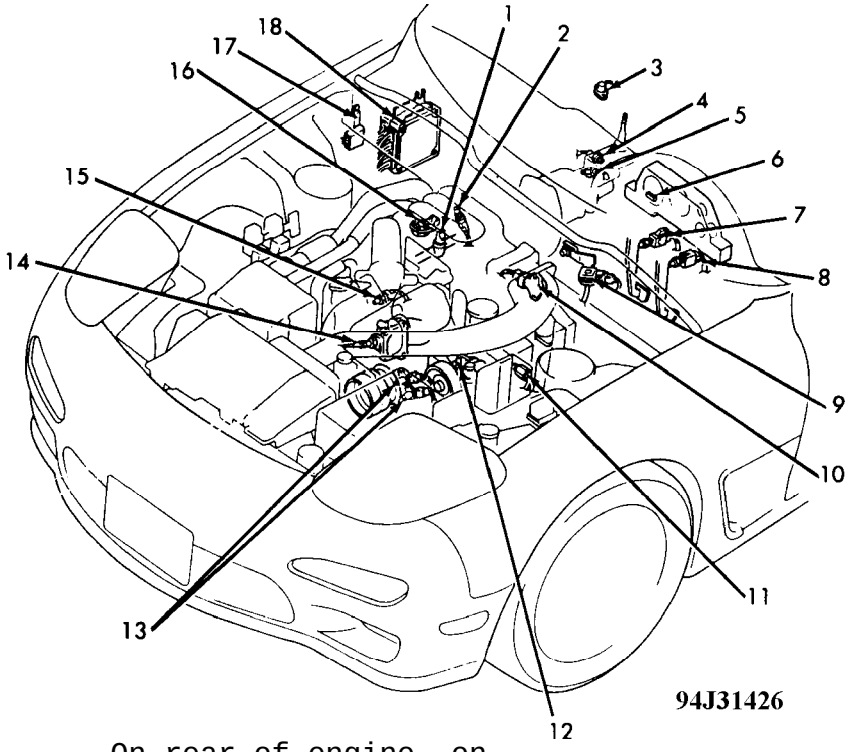
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Heat Hazard Sensor — On rear of center console.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Intake Air Temperature Sensor — On rear of engine, on underside of intake extension housing.

ELECTRICAL COMPONENT LOCATOR

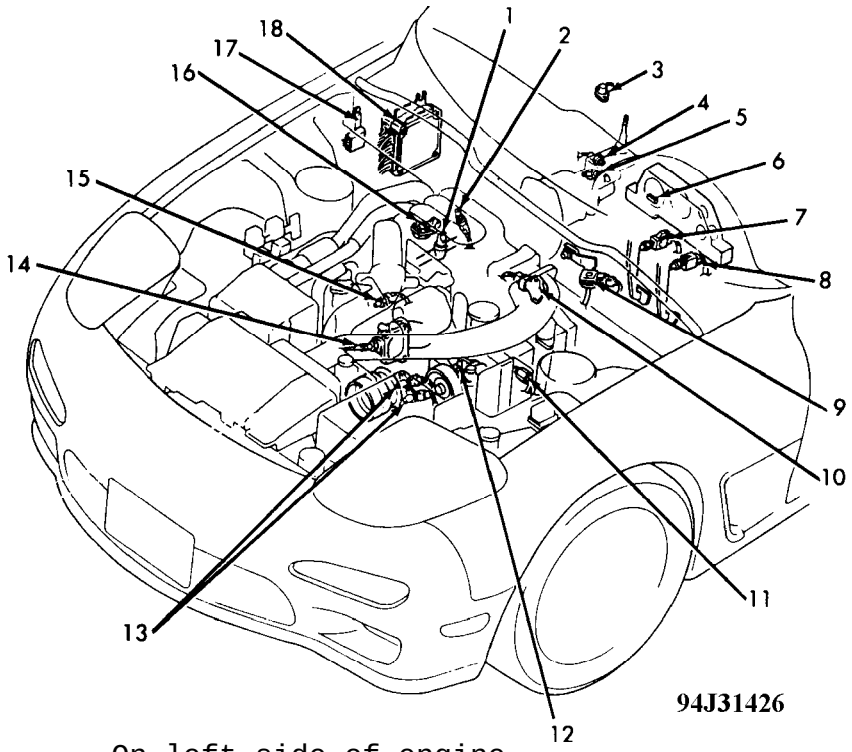
Article Text (p. 20)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Knock Sensor	On left side of engine.
Oil Level Sensor	On left side of oil pan.
Oil Pressure Sensor	On left rear of engine.
Speed Sensor	
No. 1 (Revolution)	On top left of transmission.
No. 2 (Speedometer)	On left rear of transmission.

ELECTRICAL COMPONENT LOCATOR

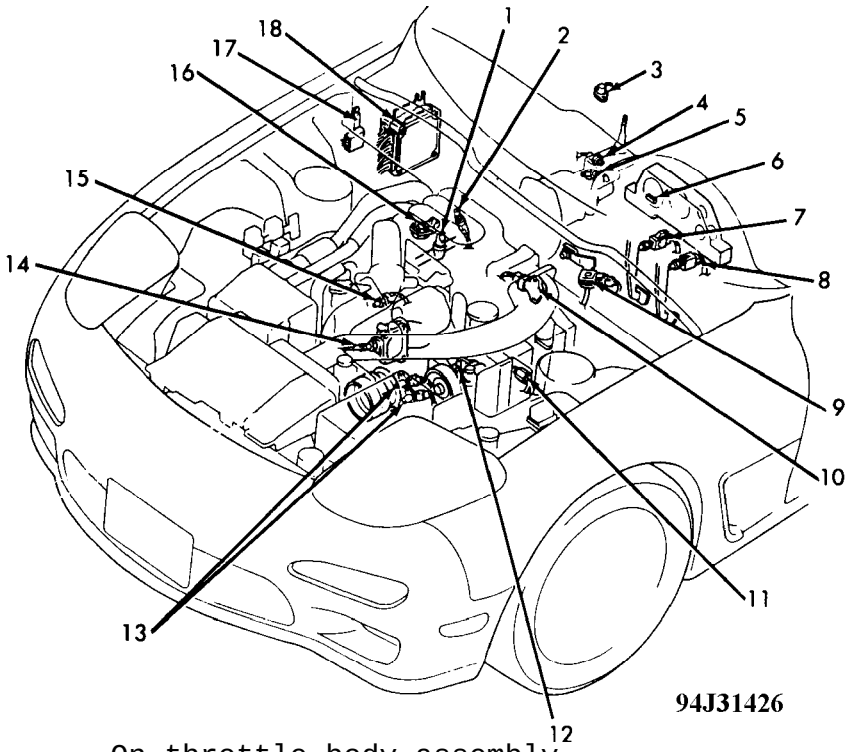
Article Text (p. 21)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Throttle Position (TP) Sensor	On throttle body assembly.
Washer Fluid Level Sensor	On bottom of washer fluid reservoir, behind right headlight.

SOLENOIDS & SOLENOID VALVES

Component	Component Location
Accelerated Warm-Up System	

ELECTRICAL COMPONENT LOCATOR

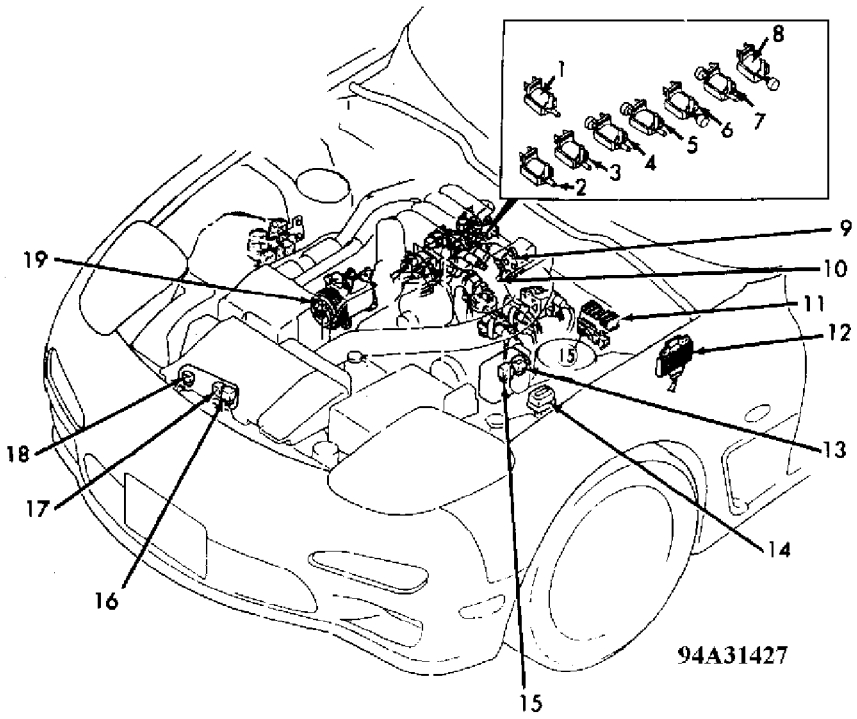
Article Text (p. 22)

1993 Mazda RX7

For www.iluvmyrx7.com

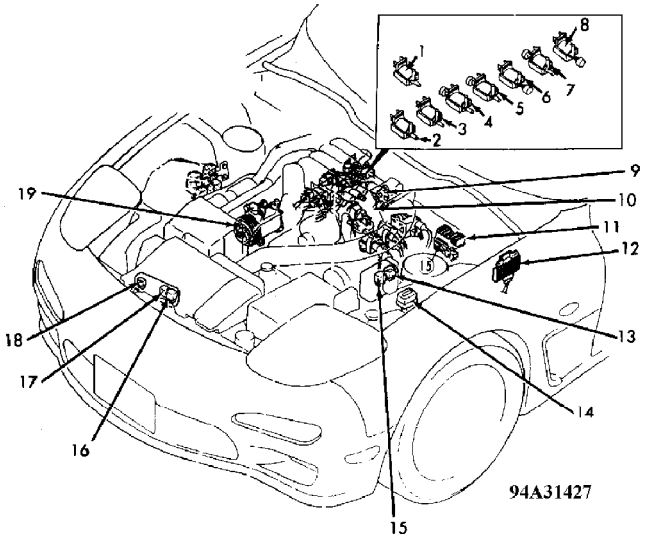
Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



(AWS) Solenoid	On top left of engine, under intake manifold.
A/T Solenoids	In transmission upper control valve body.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Charge Control Solenoid	On top left of engine, under intake manifold.

ELECTRICAL COMPONENT LOCATOR

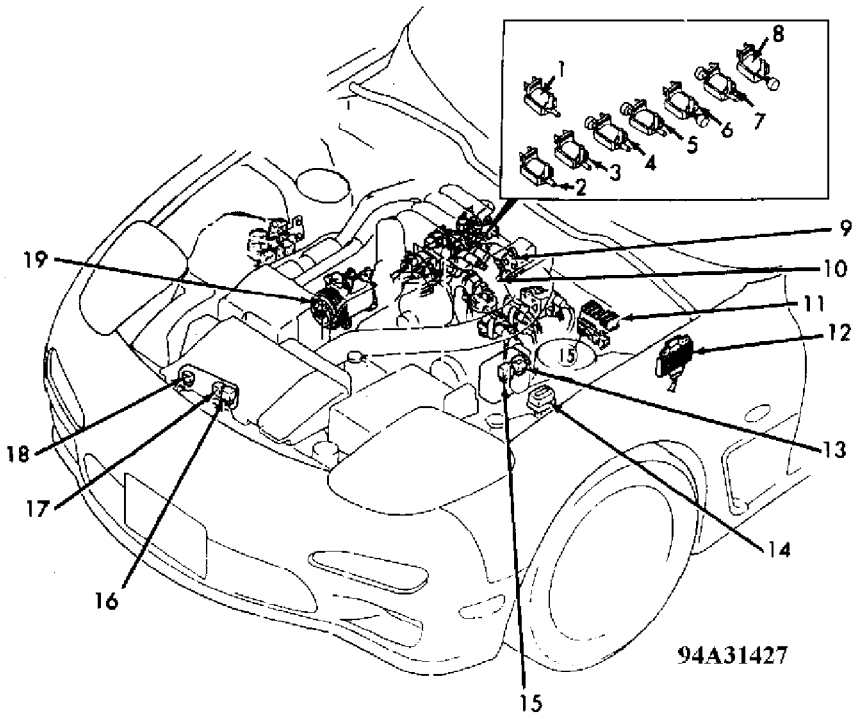
Article Text (p. 23)

1993 Mazda RX7

For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

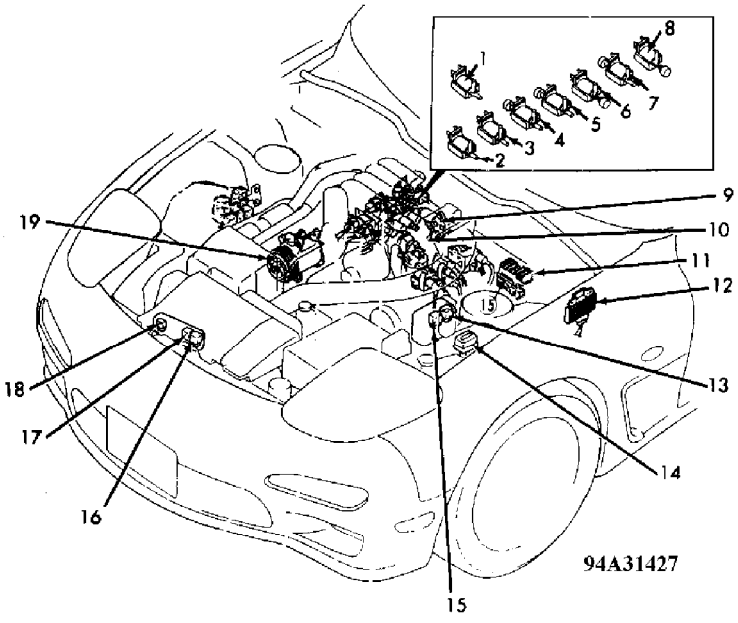
1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Charge Relief Solenoids (2)

On top left of engine, under intake manifold.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



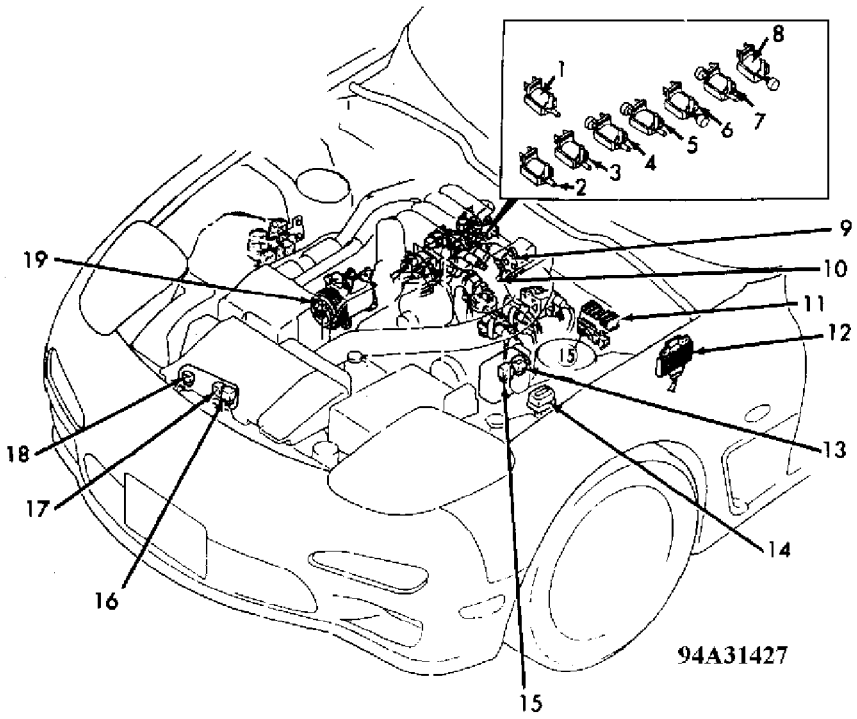
Double Throttle Control Solenoid

On top left of engine, under intake manifold.

ELECTRICAL COMPONENT LOCATOR
Article Text (p. 24)
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

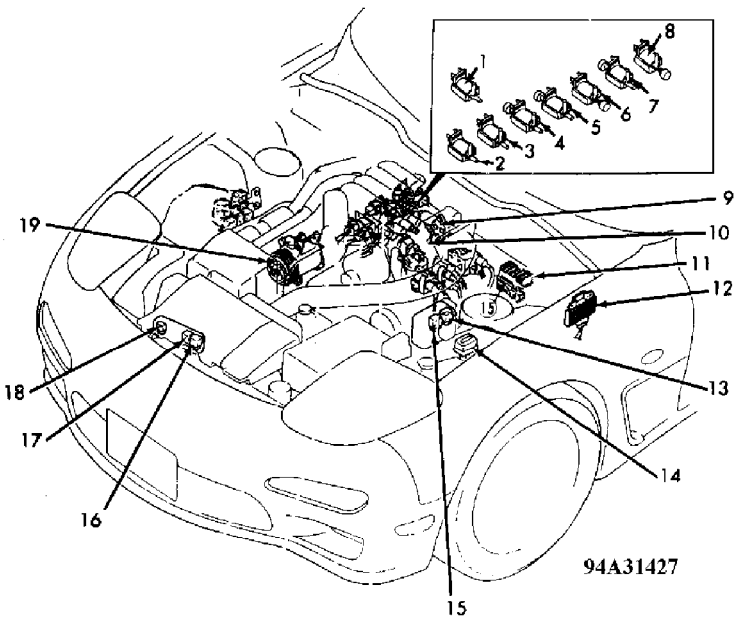
1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



EGR Solenoid

On top left of engine, under intake manifold.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

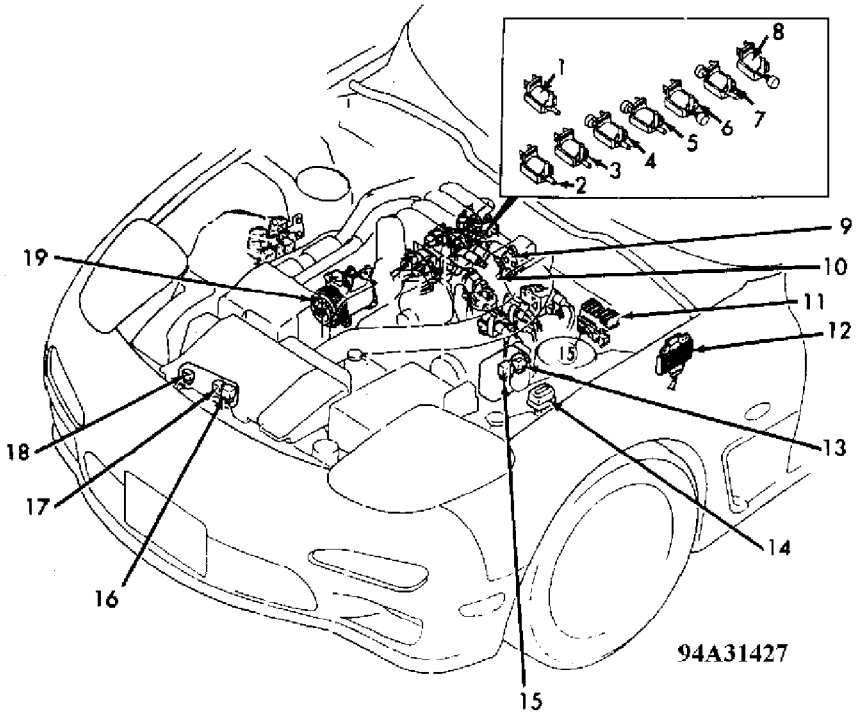


Fuel Pressure Regulator Control Solenoid

On top left of engine compartment, under intake

manifold.

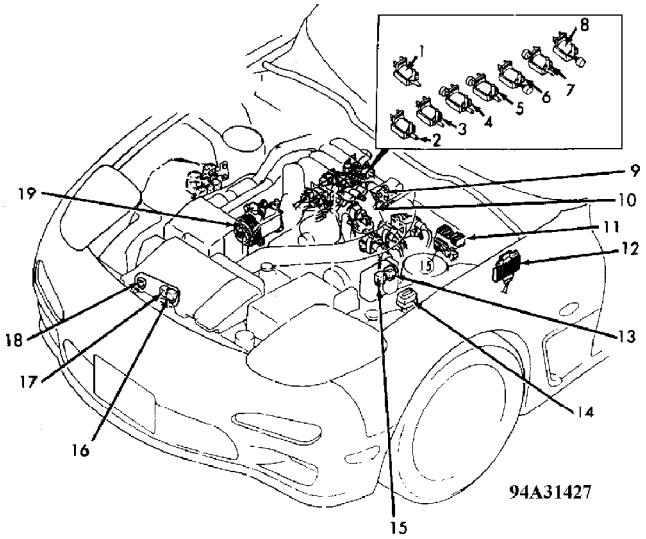
1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Idle Speed Control (ISC) Valve — On throttle body assembly.

Purge Control Solenoid — On bracket, near throttle body assembly.

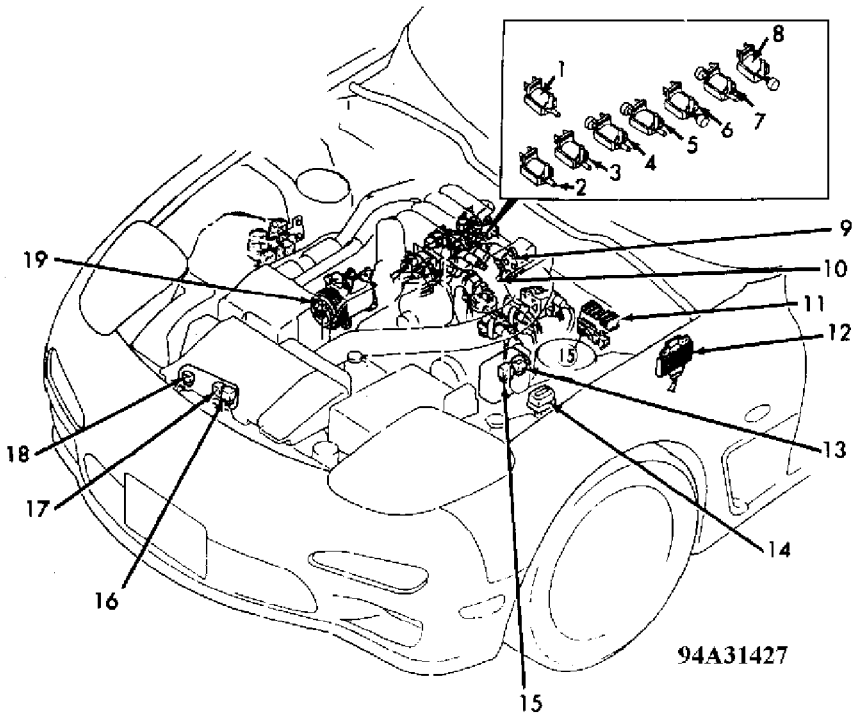
1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Relief Solenoid — On top left of engine, under intake manifold.

Secondary Air Injection Solenoids	Mounted on intake manifold extension.
Shift Lock Solenoid	Under console, base of shift lever.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

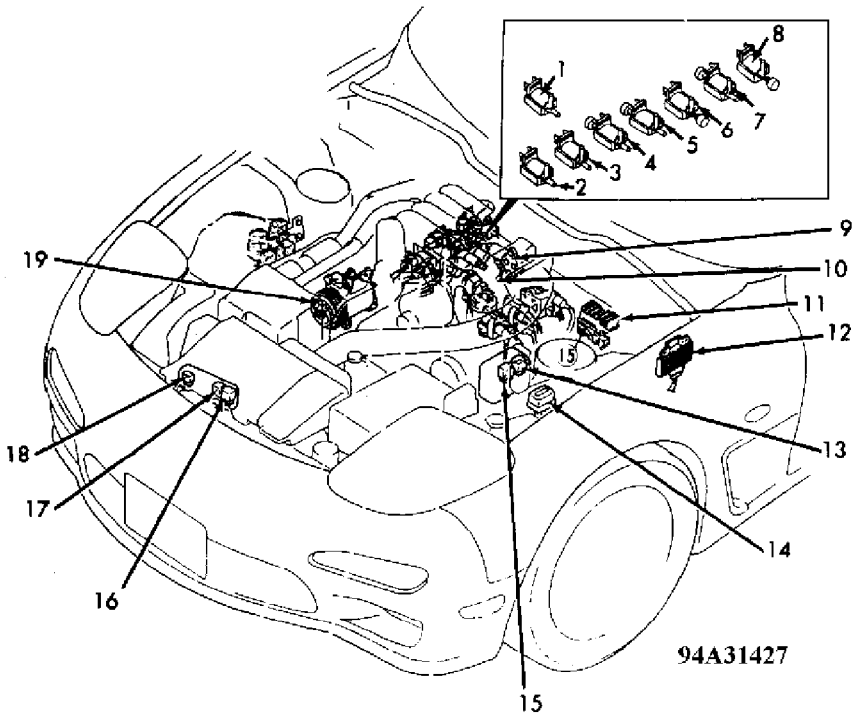


Switching Solenoid	On top left of engine, under intake manifold.

ELECTRICAL COMPONENT LOCATOR
Article Text (p. 27)
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Turbo Pre-Control Solenoid	On top left of engine, under intake manifold.

SWITCHES

Component	Component Location
A/C Pressure Switch	On A/C line, near receiver -drier.
Back-Up Light Switch	On left side of transmission.
Brake Fluid Level Switch	In master cylinder.

ELECTRICAL COMPONENT LOCATOR

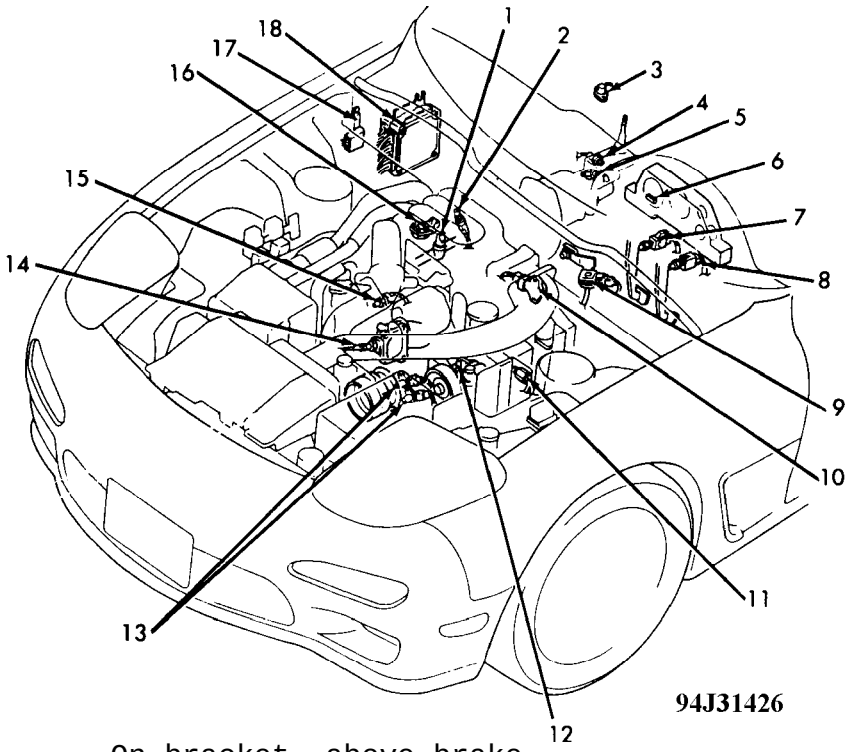
Article Text (p. 28)

1993 Mazda RX7

For www.iluvmyrx7.com

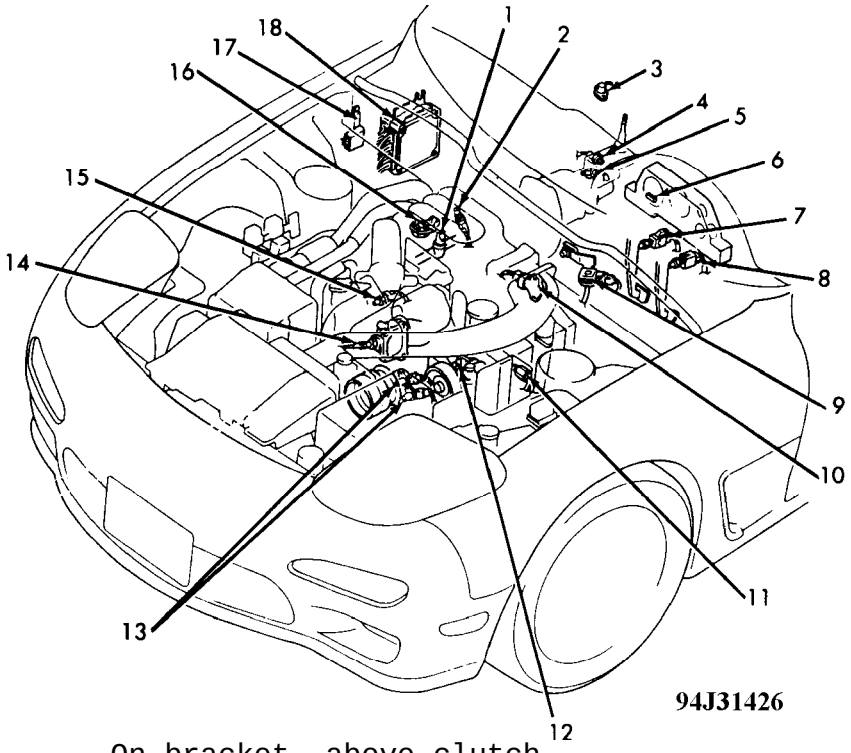
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Brake/Stoplight Switch	On bracket, above brake pedal.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Clutch Switch	On bracket, above clutch pedal.
Inhibitor Switch (A/T)	On right side of transmission.

ELECTRICAL COMPONENT LOCATOR

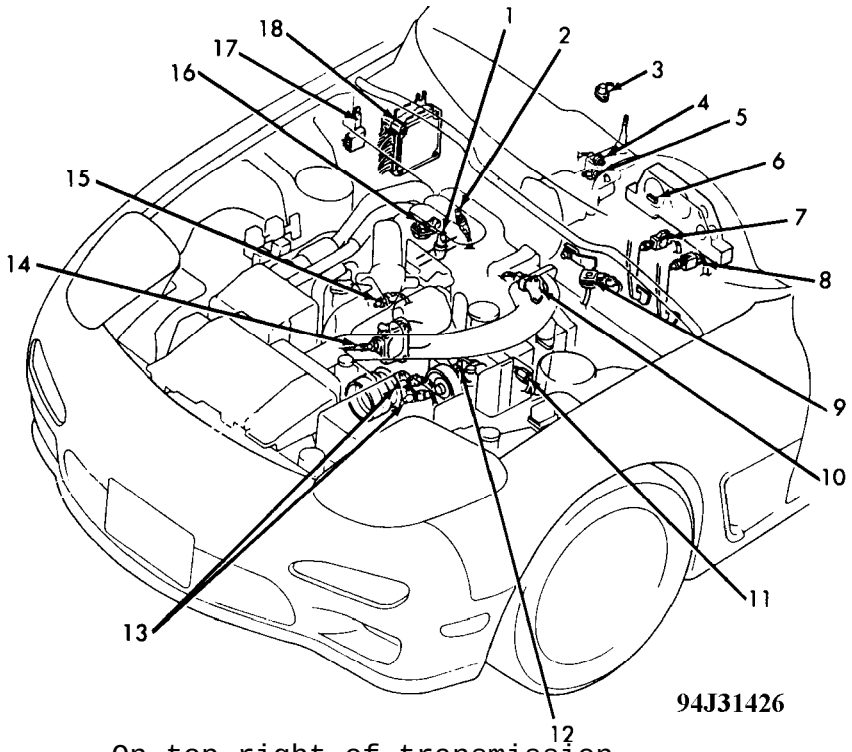
Article Text (p. 29)

1993 Mazda RX7

For www.iluvmyrx7.com

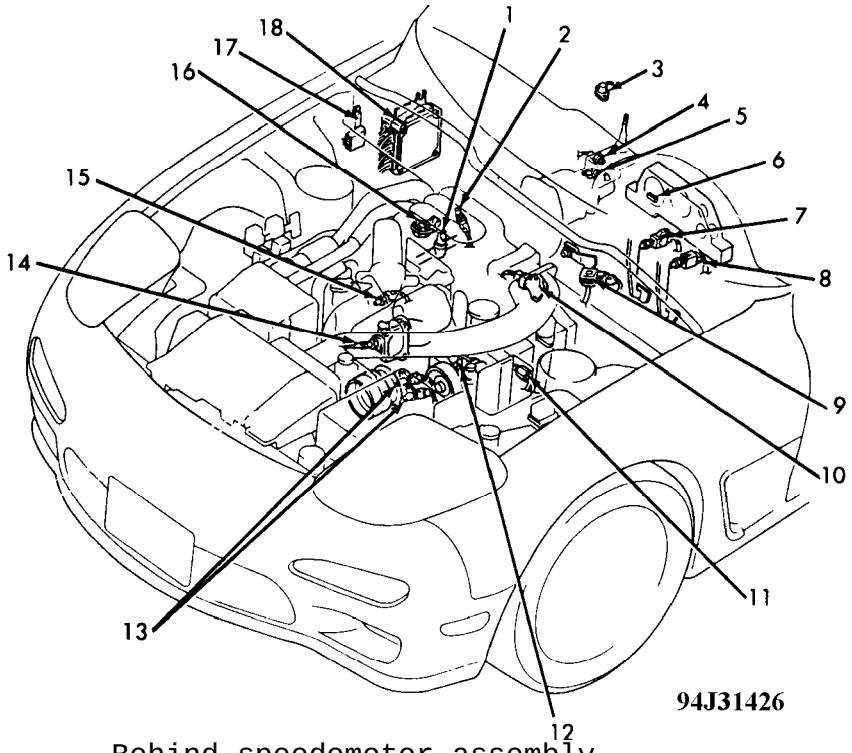
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Neutral Switch (M/T)	On top right of transmission.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Mileage Switch	Behind speedometer assembly.
Parking Brake Switch	On bottom of parking brake lever.

ELECTRICAL COMPONENT LOCATOR

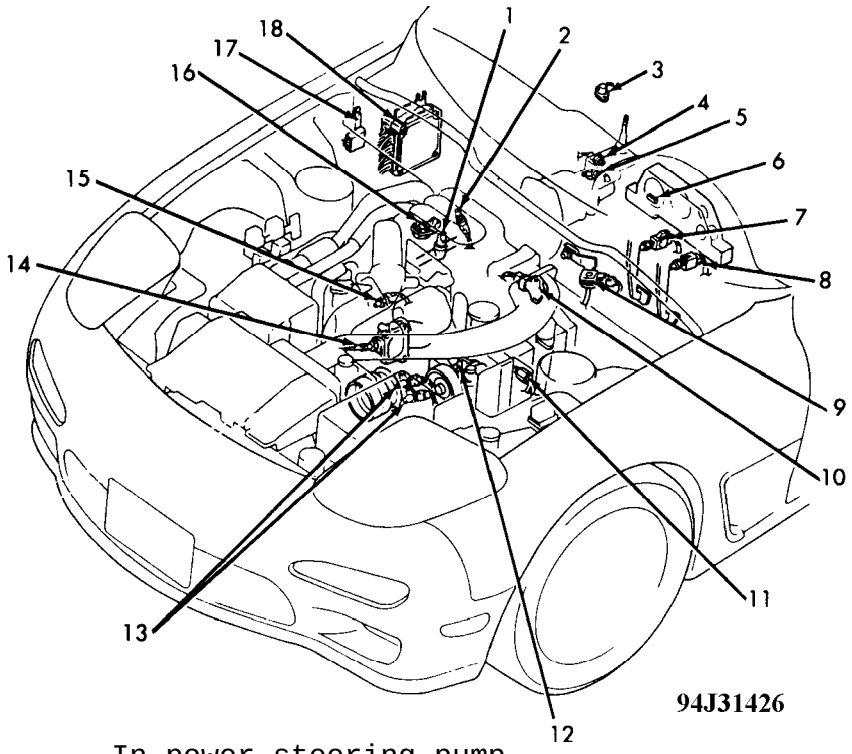
Article Text (p. 30)

1993 Mazda RX7

For www.iluvmyrx7.com

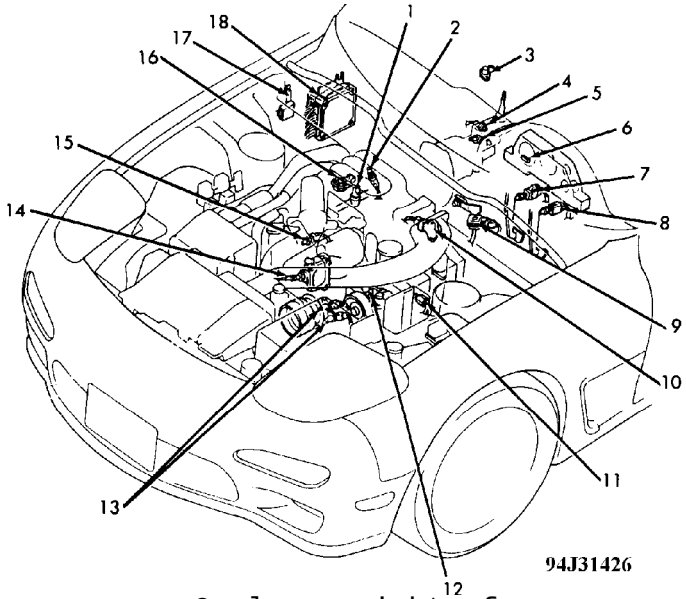
Sunday, August 19, 2001 01:15PM

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)



Power Steering Pressure Switch	In power steering pump assembly.
Seat Belt Switch	In driver's seat belt buckle.
Starter Interlock Switch	On top rear of clutch pedal.

1. Fuel Thermosensor
2. Intake Air Temp. Sensor
3. Heat Hazard Sensor
4. Neutral Switch (M/T)
5. 1-2 Shift Switch (M/T)
6. Mileage Switch
7. Brake/Stoplight Switch
8. Clutch Switch
9. Barometric Pressure Sensor
10. Throttle Position (TP) Sensor
11. Knock Sensor
12. Power Steering Pressure Switch
13. Crank Angle Sensors
14. Oxygen Sensor (O2S)
15. Coolant Temperature Sensor
16. EGR Position Sensor (Calif.)
17. Electrical Load Control Unit
18. Engine Control Unit (ECU)

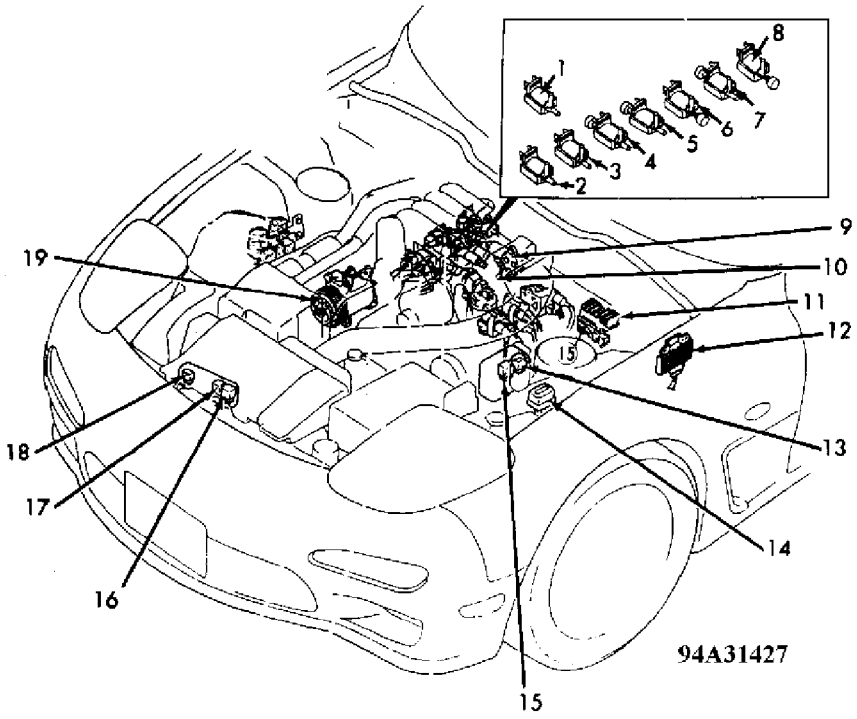


1-2 Shift Switch (M/T)	On lower right of transmission.

MISCELLANEOUS

Component	Component Location
A/T Pulse Generator	On front left of transmission.
Blower Motor Resistor	Behind right side of dash, on blower motor housing.

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)

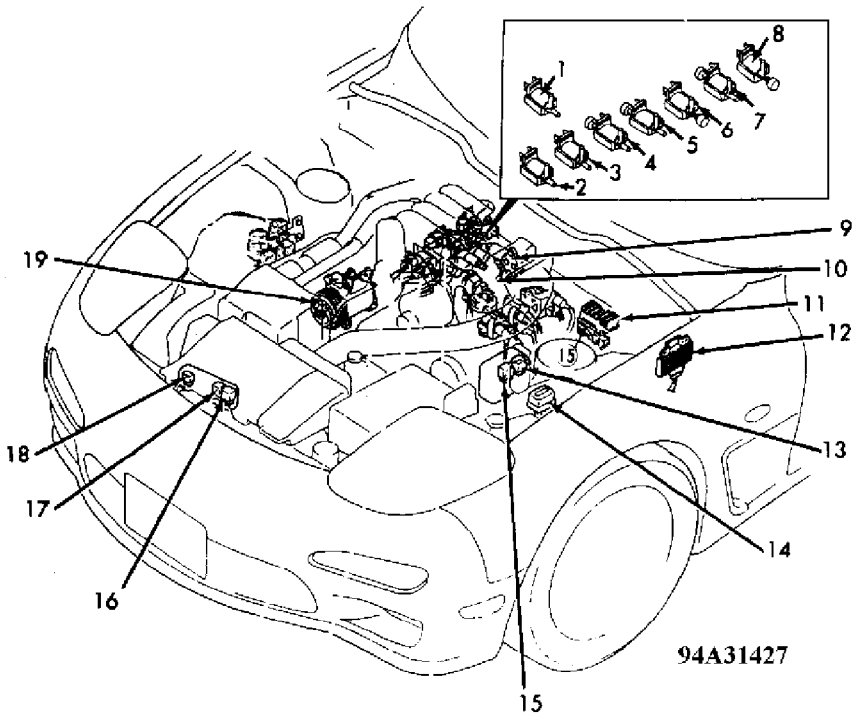


Data Link Connector (DLC)	Mounted on bracket, on left strut tower.

ELECTRICAL COMPONENT LOCATOR
Article Text (p. 32)
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:15PM

1. Charge Relief Solenoid
2. Double Throttle Control Solenoid
3. Charge Control Solenoid
4. Turbo Pre-Control Solenoid
5. EGR Solenoid
6. Relief Solenoid
7. Switching Solenoid
8. Fuel Pressure Regulator Control Solenoid
9. Idle Speed Control Valve
10. AWS Solenoid
11. Fuel Injector Resistor
12. Ignitor
13. Main Relay
14. Data Link Connector (DLC)
15. Circuit Opening Relay
16. Fuel Pump Relay
17. A/C Relay
18. Air Pump Relay
19. Air Pump
20. Cooling Fan Relays (4)



Fuel Injector Resistor On left side of firewall.

END OF ARTICLE

ALTERNATOR & REGULATOR
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:17PM

ARTICLE BEGINNING

1993 ELECTRICAL
Mazda Alternators & Regulators - Mitsubishi

B2200, B2600i, Miata, MPV, MX-3,
MX-6, Protege, RX7, 323, 626, 929

DESCRIPTION

Alternator is a conventional 3-phase, self-rectifying type with 6 diodes (3 positive and 3 negative) that rectify current. See Fig. 1. Internal regulator is solid-state type.

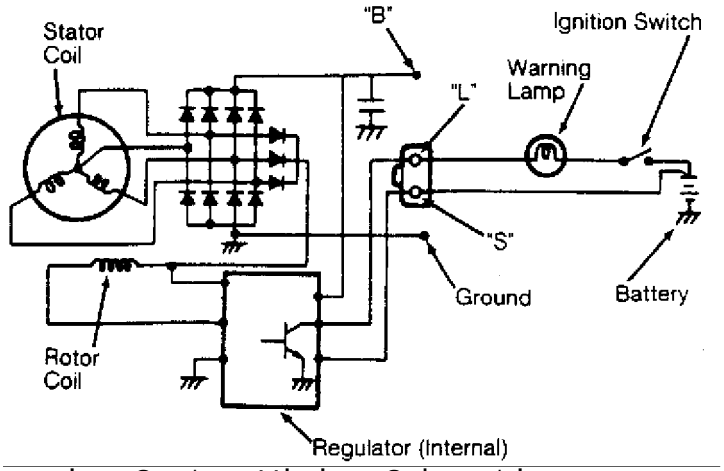


Fig. 1: Charging System Wiring Schematic
Courtesy of Mazda Motors Corp.

ADJUSTMENTS

BELT DEFLECTION

Measure belt deflection in center of longest pulley-to-pulley span. See BELT DEFLECTION SPECIFICATIONS table. If belt deflection is not as specified, adjust as necessary.

BELT DEFLECTION SPECIFICATIONS TABLE

Application	(1) Deflection - In. (mm)
B2200	
New Belt	0.28-0.31 (7.0-8.0)
Used Belt	0.31-0.35 (8.0-9.0)
B2600i	
New Belt	0.39-0.47 (10.0-12.0)
Used Belt	0.43-0.51 (11.0-13.0)
Miata	
New Belt	0.31-0.35 (8.0-9.0)

```
  Used Belt  ........................  0.35-0.39 (9.0-10.0)
MPV
  4-Cylinder
   New Belt  ........................  0.39-0.47 (10.0-12.0)
   Used Belt  .......................  0.43-0.57 (11.0-13.0)
  V6
   New Belt  ........................  0.35-0.39 (9.0-10.0)
   Used Belt  .......................  0.39-0.47 (10.0-12.0)
MX-3
 4-Cylinder
   New Belt  .........................  0.22-0.28 (5.5-7.0)
   Used Belt  ........................  0.24-0.30 (6.0-7.5)
  V6
   With A/C
     New Belt  .......................  0.22-0.26 (5.5-6.5)
     Used Belt  ......................  0.26-0.30 (6.5-7.5)
   Without A/C
     New Belt  .......................  0.24-0.28 (6.0-7.0)
     Used Belt  ......................  0.28-0.31 (7.0-8.0)
MX-6 & 626
  4-Cylinder
   New Belt  .........................  0.26-0.28 (6.5-7.0)
   Used Belt  ........................  0.28-0.35 (7.0-9.0)
  V6
   With A/C
     New Belt  .......................  0.22-0.26 (5.5-6.5)
     Used Belt  ......................  0.26-0.30 (6.5-7.5)
   Without A/C
     New Belt  .......................  0.24-0.28 (6.0-7.0)
     Used Belt  ......................  0.28-0.31 (7.0-8.0)
Protege & 323
  New Belt  ..........................  0.31-0.35 (8.0-9.0)
  Used Belt  ........................  0.35-0.39 (9.0-10.0)
RX7
  New Belt  ..........................  0.24-0.31 (6.0-8.0)
  Used Belt  .........................  0.28-0.35 (7.0-9.0)
929
  New Belt  .........................  0.39-0.47 (10.0-12.0)
  Used Belt  ........................  0.43-0.51 (11.0-13.0)

(1) - With 22 lbs. (10 kg) applied to belt.
```

ÄÄ

TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING - BASIC PROCEDURES article in GENERAL INFORMATION section.

TROUBLE SHOOTING PRECAUTIONS

Observe the following precautions when trouble shooting or testing charging system:

Miata

* Obtain code number and deactivate audio anti-theft system before disconnecting battery.

All Models

* DO NOT reverse battery cable connections. Rectifier will be damaged.
* DO NOT use high voltage type testers.
* Battery voltage is always present at terminal "B".
* DO NOT ground terminal "L" while engine is running.
* DO NOT start engine with connector disconnected from terminals "L" and "S".
* DO NOT apply battery voltage to terminal "L".

ON-VEHICLE TESTING

NOTE: Check alternator wiring harness connections and drive belt tension. Battery must be fully charged before testing. Wait at least 30 seconds after starting engine before measuring system voltage.

CAUTION: Ensure alternator terminal "B" does not contact ground.

ALTERNATOR OUTPUT

1) Connect an ammeter (100-amp minimum) in-line between terminal "B" connector and wire. See Fig. 2, 3 or 4. Turn headlights and all accessories on. Depress brake pedal. Operate engine at 2500-3000 RPM.

2) If amperage is not as specified in ALTERNATOR MAXIMUM RATED OUTPUT table, repair or replace alternator as necessary. If amperage is as specified, turn off headlights and all accessories. Release brake pedal. Operate engine at 2500-3000 RPM. If amperage is not about 5 amps or more, repair or replace alternator as necessary.

3) If amperage is about 5 amps or more, measure voltage between ground and terminals "S" and "L" while operating engine at 2500-3000 RPM. If 14.1-14.7 volts is not present, repair or replace alternator as necessary. If 14.1-14.7 volts is present, alternator output is okay.

ALTERNATOR MAXIMUM RATED OUTPUT TABLE

Application	Amps
B2200	55
B2600i	60
Miata	
A/T	65
M/T	60

MPV	70
MX-3	
4-Cylinder	70
V6	90
MX-6 & 626	
4-Cylinder	80
V6	90
Protege & 323	65
RX7	100
929	90

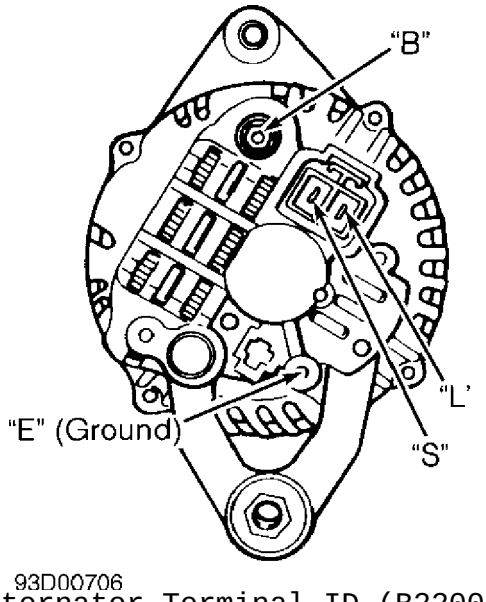


Fig. 2: Alternator Terminal ID (B2200, B2600i & MPV)
Courtesy of Mazda Motors Corp.

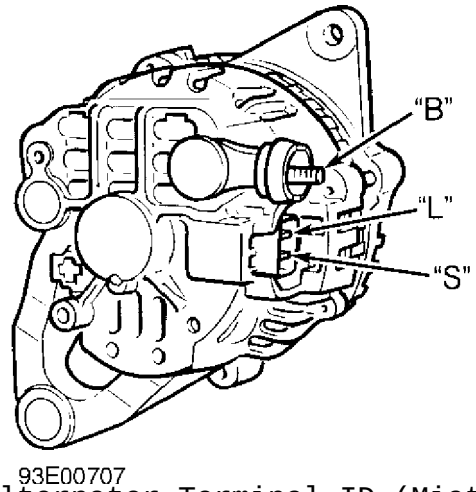


Fig. 3: Alternator Terminal ID (Miata, MX-3 4-Cyl., MX-6 4-Cyl., Protege, 323, 626 4-Cyl. & 929)
Courtesy of Mazda Motors Corp.

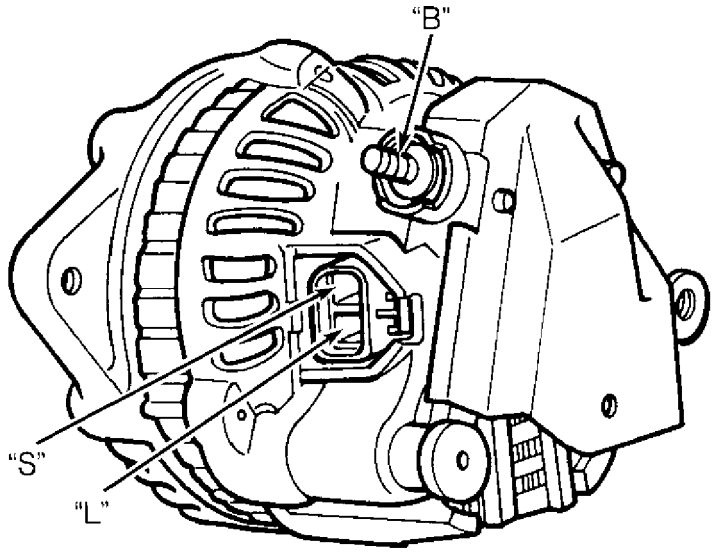


Fig. 4: Alternator Terminal ID (MX-3 V6, MX-6 V6, RX7 & 626 V6) Courtesy of Mazda Motors Corp.

BENCH TESTING

Rectifier/Diode Assembly

1) Using an ohmmeter, check continuity of each diode in both directions (polarity). See Figs. 5-9. If diode shows high resistance in one direction and low resistance in other direction, diode is okay.

2) If diode shows low resistance in both directions, it is shorted. If diode shows high resistance in both directions, diode is open. If any diode is defective, replace rectifier assembly.

Rotor & Slip Rings

Measure resistance between rotor slip ring contacts. See Fig. 10-14. If resistance is not within specification, replace rotor. See ROTOR RESISTANCE SPECIFICATIONS table. Check continuity between individual slip rings and rotor core/shaft. If there is continuity, replace rotor.

ROTOR RESISTANCE SPECIFICATIONS TABLE

Application	Ohms
B2200, B2600i, Miata, Protege & 323	3.5-4.5
MPV	2.7-2.9
MX-3 & RX7	(1)
MX-6 & 626	2.5-3.5

(1) - Information is not available from manufacturer.

Stator

Check continuity between stator coil leads and stator core.

See Figs. 10-14. If there is continuity, replace stator. Check continuity between leads of stator coil. If there is no continuity, replace stator.

Brushes

Replace brushes if worn to limit line. See Figs. 10-14. Replace brush springs if corroded. For brush replacement procedure, see OVERHAUL.

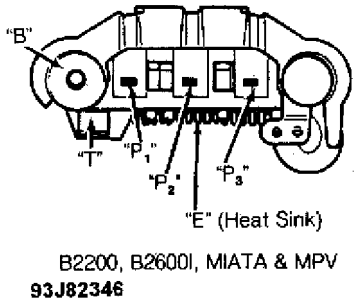


Fig. 5: Testing Rectifier Diodes (B220, B2600I, Miata & MPV)
Courtesy of Mazda Motors Corp.

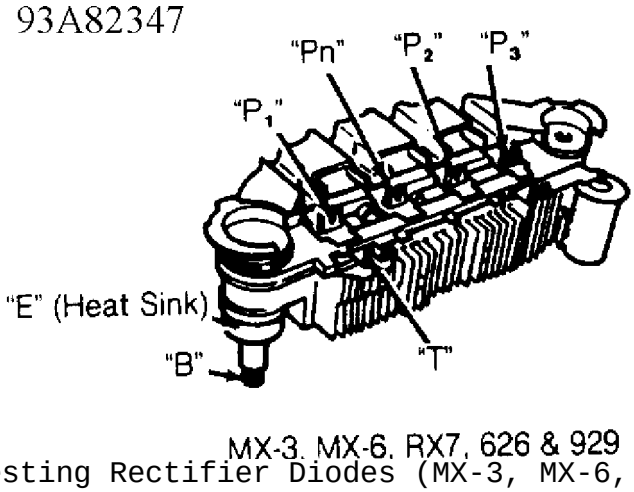


Fig. 6: Testing Rectifier Diodes (MX-3, MX-6, RX7, 626, 929)
Courtesy of Mazda Motors Corp.

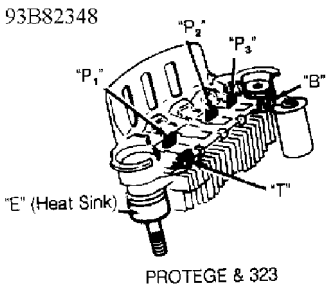
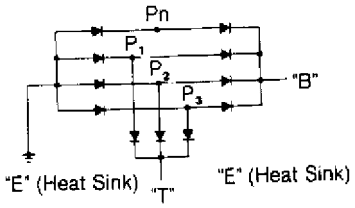


Fig. 7: Testing Rectifier Diodes (Protege & 323)
Courtesy of Mazda Motors Corp.



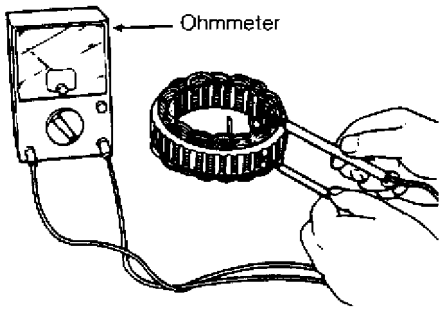
93C92349

Fig. 8: Testing Rectifier Diodes
Courtesy of Mazda Motors Corp.

Negative	Positive	Continuity
E	Pn, P1, P2, P3	Yes
B		No
T		No
Pn, P1, P2, P3	E	No
	B	Yes
P1, P2, P3	T	Yes
Pn		No

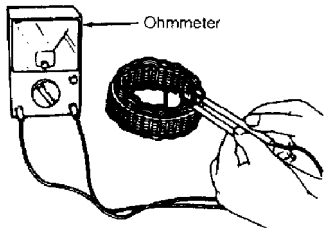
93G82350

Fig. 9: Testing Rectifier Diodes
Courtesy of Mazda Motors Corp.



CHECKING STATOR FOR SHORTS
93H82351

Fig. 10: Checking Stator For Shorts
Courtesy of Mazda Motors Corp.



CHECKING STATOR WINDING CONTINUITY
93I82352

Fig. 11: Checking Stator Winding Continuity
Courtesy of Mazda Motors Corp.

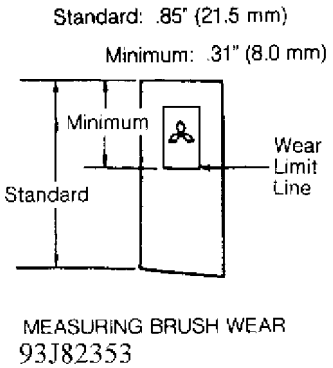


Fig. 12: Measuring Brush Wear
Courtesy of Mazda Motors Corp.

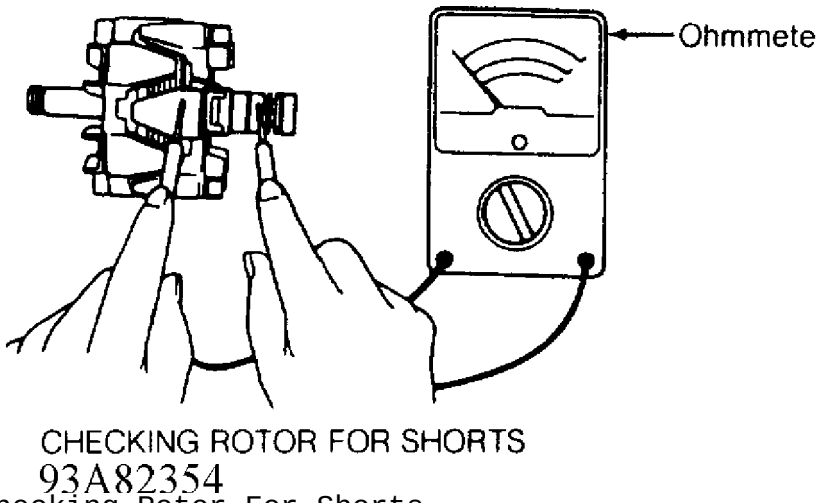


Fig. 13: Checking Rotor For Shorts
Courtesy of Mazda Motors Corp.

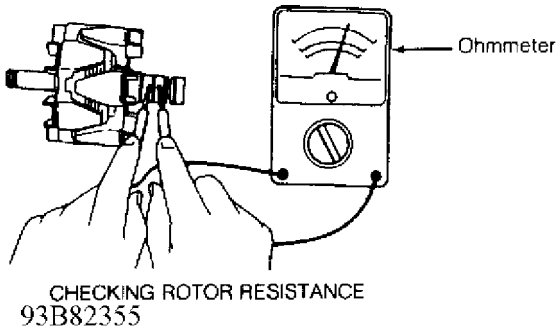


Fig. 14: Checking Rotor Resistance
Courtesy of Mazda Motors Corp.

OVERHAUL

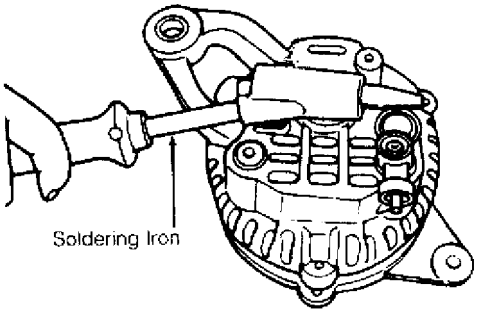
DISASSEMBLY

1) Place a 200-watt soldering iron against rear bearing for

3-4 minutes to heat rear cover to 122-140øF (50-60øC). Carefully separate front case and rotor from rear cover and stator. See Figs. 15-20 and 22-24.

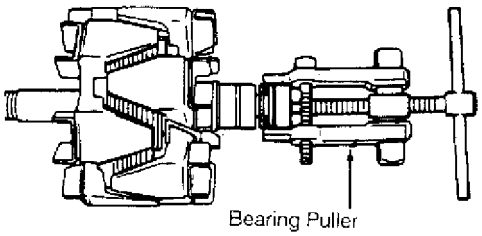
2) Position rotor in vise. Remove pulley. Disassemble pulley, rotor and front case. Remove front bearing from front case. Using a bearing puller, remove rear bearing.

3) Remove "B" terminal nut and bushing from rear cover. Remove screws from brush holder and rectifier. Separate rear cover and stator. When unsoldering rectifier and stator leads, disconnect as quickly as possible (5 seconds maximum) to avoid damage to rectifier. To remove brushes from holder, unsolder pigtail from terminal.



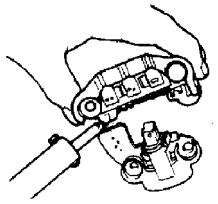
USING A SOLDERING IRON
TO HEAT REAR BEARING HOUSING
93C82356

Fig. 15: Overhauling Alternator
Courtesy of Mazda Motors Corp.



REMOVING REAR BEARING
93D82357

Fig. 16: Overhauling Alternator
Courtesy of Mazda Motors Corp.



UNSOLDERING RECTIFIER FROM REGULATOR
93E82358

Fig. 17: Overhauling Alternator
Courtesy of Mazda Motors Corp.

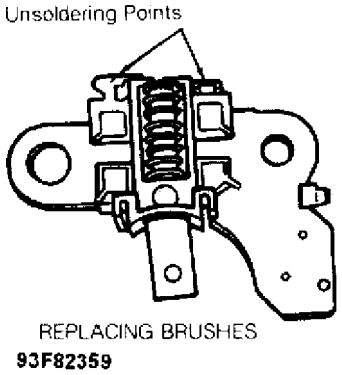


Fig. 18: Overhauling Alternator
Courtesy of Mazda Motors Corp.

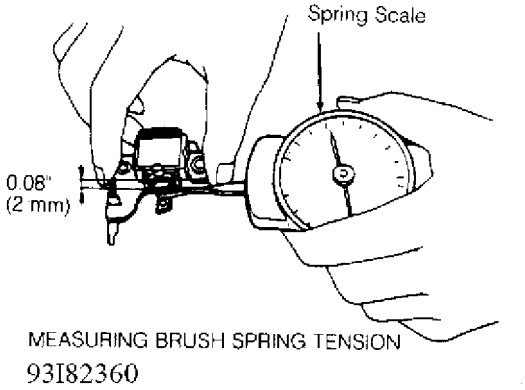


Fig. 19: Overhauling Alternator
Courtesy of Mazda Motors Corp.

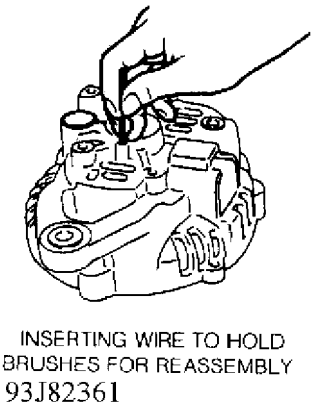


Fig. 20: Overhauling Alternator
Courtesy of Mazda Motors Corp.

REASSEMBLY

Brush Installation

1) Install brush and spring into holder. Allow brush to extend out of holder until wear limit line extends .08-.16" (2-4 mm) beyond end of brush holder. See Fig. 21. Solder pigtail onto brush holder.

2) Insert spring and brush into brush holder. Using a spring scale, pull brush into holder until end of brush protrudes .08" (2.0 mm) from holder. See Fig. 15-20. Note reading on spring scale. Replace spring if tension is not 5.6-15.5 ozs. (160-440 g).

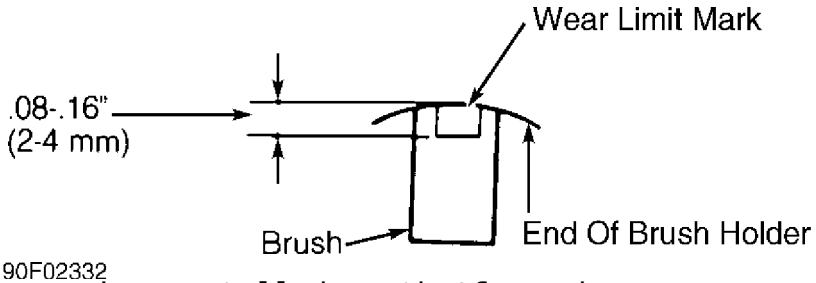
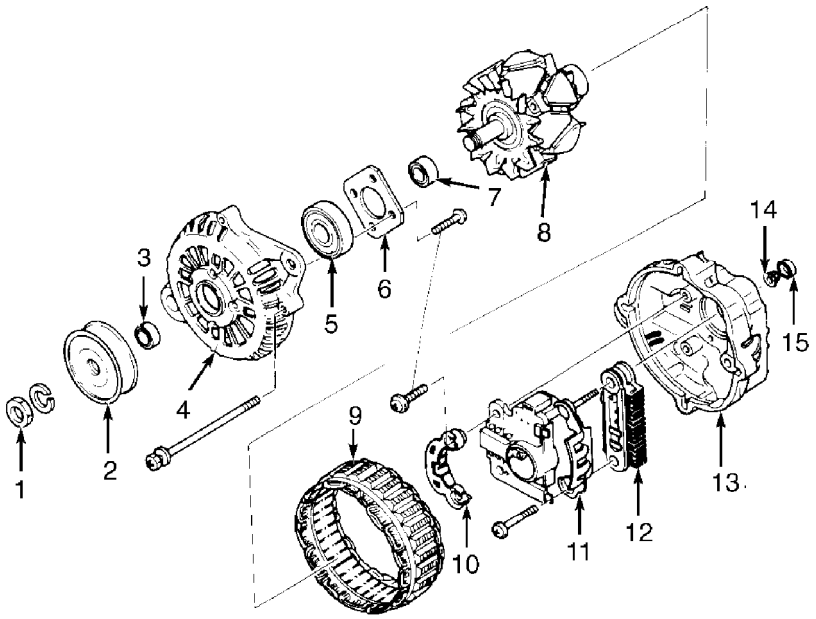
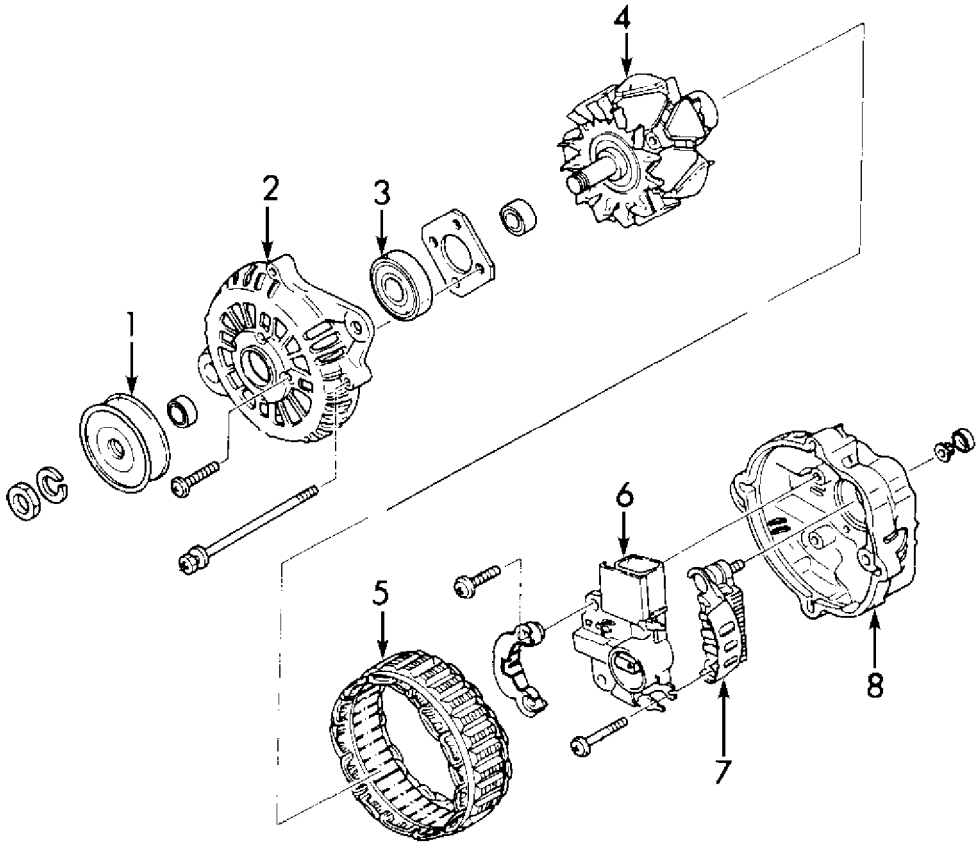


Fig. 21: Measuring Installed Depth Of Brush
Courtesy of Mazda Motors Corp.



1. Pulley Nut
2. Pulley
3. Spacer
4. Front Case
5. Front Bearing
6. Bearing Retainer Plate
7. Spacer
8. Rotor
9. Stator
10. Brush Shield
11. Brush Holder
12. Rectifier
13. Rear Cover
14. Nut
15. Bushing

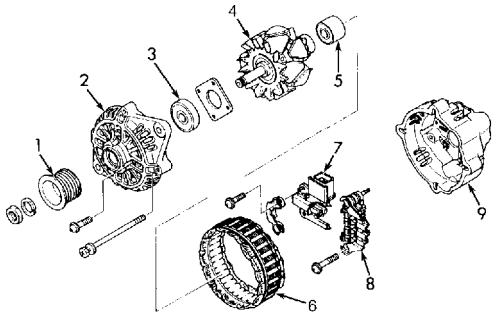
Fig. 22: Exploded View Of Alternator (B2200, B2600i, Miata & MPV)
Courtesy of Mazda Motors Corp.



1. Pulley
2. Front Case
3. Front Bearing
4. Rotor
5. Stator
6. Brush Holder
7. Rectifier
8. Rear Cover

93B82363

Fig. 23: View Of Alternator (MX-3 4-Cyl., MX-6 4-Cyl., Protege, 323, 626 4-Cyl. & 929)
Courtesy of Mazda Motors Corp.



1. Pulley
2. Front Case
3. Front Bearing
4. Rotor
5. Rear Bearing
6. Stator
7. Brush Holder
8. Rectifier
9. Rear Cover

93C82364

Fig. 24: Exploded View Of Alternator (MX-3 V6, MX-6 V6, RX7 & 626 V6)
Courtesy of Mazda Motors Corp.

END OF ARTICLE

FUSES & CIRCUIT BREAKERS
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:50PM

ARTICLE BEGINNING

Fuses & Circuit Breakers
1993-95 Mazda

Mazda; RX7

FUSES & CIRCUIT BREAKERS

FUSE PANEL LOCATION

The main fuse block is located at the right rear side of the engine compartment and contains high amperage fuses which protect multiple circuits. Fuse box located above driver's left knee, accessible through a removable cover, contains fuses for individual circuits.

PASSENGER COMPARTMENT FUSE PANEL IDENTIFICATION

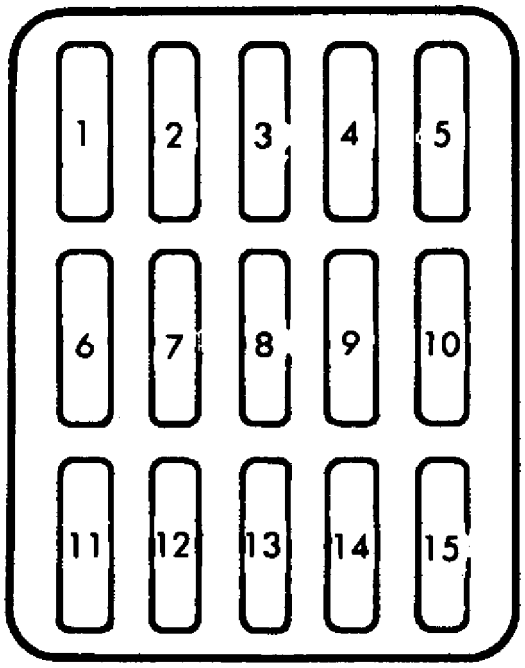


Fig. 1: Passenger Compartment Fuse Panel Identification
Courtesy of Mazda Motor of America Inc.

Fuse & Circuit Breaker Identification

1 - 20 Amp (Yellow)
Brakelights, Cruise Control, Shift Lock, ABS Control Unit
2 - Not Used
3 - 15 Amp (Blue)

Sun Roof
4 - 20 Amp (Yellow)
Fuel Pump
5 - 10 Amp (Red)
Air Bag Unit
6 - 10 Amp (Red)
Power Door Locks
7 - 15 Amp (Blue)
Tail, License, Side Marker & Parking Lights, Glove Box Light, Instrument Panel Lights
8 - 30 Amp (Pink)
Power Windows
9 - 15 Amp (Blue)
Back-Up Lights, Meters, Warning Indicators, Cruise Control, Shift Lock, Flasher Unit, Defogger, Rear Washer Motor, Power Antenna
10 - 20 Amp (Yellow)
Windshield Wiper/Washer
11 - 10 Amp (Red)
Rear Wiper & Washer, Heater, ABS System
12 - 15 Amp (Blue)
Hazard Warning Lights, Horn
13 - 10 Amp (Red)
Radio, Interior Light, Cargo Light
14 - 15 Amp (Blue)
Starter, EGI, Fuel Pump, Air Bag
15 - 15 Amp (Blue)
Audio System, Cigarette Lighter, Power Mirrors, Power Antenna, Ignition Light, Security Indicator, Meters

ENGINE COMPARTMENT SMALL FUSE PANEL IDENTIFICATION

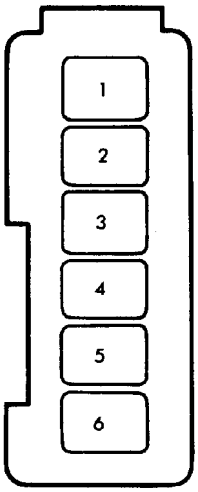


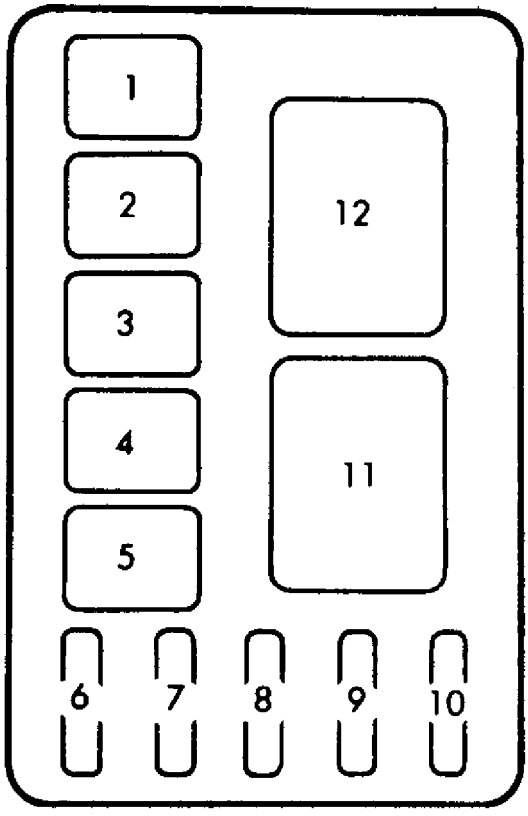
Fig. 2: Engine Compartment Small Fuse Panel Identification
Courtesy of Mazda Motor of America Inc.

WARNING: Always disconnect battery ground cable before servicing "high-current fuses. It is recommended that "high-current" fuses be replaced by a qualified technician.

Fuse & Circuit Breaker Identification

1 - Not Used
2 - 120 Amp (White)
Main Circuit Protection
3 - 30 Amp (Pink)
Foglights, Headlights
4 - 30 Amp (Pink)
EGI System, Alternator
5 - 30 Amp (Pink)
Headlight Retractors
6 - 40 Amp (Green)
Heater-A/C Blower Motor, Rear Wiper, Power Windows, Windshield Wipers, Sun Roof

ENGINE COMPARTMENT LARGE FUSE PANEL IDENTIFICATION



ENGINE COMPARTMENT LARGE FUSE BLOCK

93J45392

Fig. 3: Engine Compartment Large Fuse Panel Identification
Courtesy of Mazda Motor of America Inc.

WARNING: Always disconnect battery ground cable before servicing "high-current fuses. It is recommended that "high-current" fuses be replaced by a qualified technician.

Fuse & Circuit Breaker Identification

1 - 60 Amp (Yellow)
Hazard, Stoplight, Taillight, Power Door Lock & Courtesy Fuse Protection
2 - 40 Amp (Green)
Ignition Switch
3 - 60 Amp (Yellow)
Rear Window Defogger
4 - 60 Amp (Yellow)
ABS System
5 - 60 Amp (Yellow)
Cooling System Fan
6 - 30 Amp (Green)
Speaker Amplifiers
7 - 15 Amp (Blue)
A/C Cooling Fan
8 - 15 Amp (Blue)
ABS Valve, ABS Unit
9 - Not Used
10 - Not Used
11 - Circuit Relay
12 - EGI Main Relay

BATTERY SPECIFICATIONS

CAUTION: When battery is disconnected, vehicles equipped with computers may lose memory data. When battery power is restored, driveability problems may exist on some vehicles. These vehicles may require a relearn procedure. See COMPUTER RELEARN PROCEDURES article in the GENERAL INFORMATION Section.

If battery is replaced, new battery should be of the same group number as shown on the original battery's label. Use group 24 batteries with a cold crank rating of 600 amps.

CAUTIONS & WARNINGS

SUPPLEMENTAL RESTRAINT SYSTEM (AIR BAG)

NOTE: See the AIR BAGS article in the ACCESSORIES/SAFETY EQUIPMENT Section.

Modifications or improper maintenance, including incorrect removal and installation of the Supplemental Restraint System (SRS), can adversely affect system performance. DO NOT cover, obstruct or change the steering wheel horn pad in any way, as such action could

cause improper function of the system. Use only plain water when cleaning the horn pad. Solvents or cleaners could adversely affect the air bag cover and cause improper deployment of the system.

WARNING: To avoid injury from accidental air bag deployment, read and carefully follow all warnings and service precautions. See appropriate AIR BAGS article in ACCESSORIES/SAFETY EQUIPMENT.

CAUTION: Disconnect negative battery cable before servicing any air bag system, steering column or passenger side dash component. After any repair, turn ignition key to the ON position from passenger's side of vehicle in case of accidental air bag inflation

AIR CONDITIONING SERVICING

CAUTION: Avoid breathing R-134a refrigerant and PAG lubricant vapors, exposure may irritate eyes, nose and throat. To remove R-134a from system use R-134a recycling equipment that meets SAE J2210 specifications. If accidental system discharge occurs, ventilate work area before resuming service.

WARNING: R-134a service equipment or vehicle A/C systems SHOULD NOT be pressure tested or leak tested with compressed air. Some mixtures of air/R134a have shown to be combustible at elevated pressures. These mixtures are dangerous and may cause fire and/or explosions. See AIR CONDITIONING SERVICE article in GENERAL INFORMATION section.

ANTI-LOCK BRAKE SYSTEM

The anti-lock brake system contains electronic equipment that can be susceptible to interference caused by improperly installed or high output radio transmitting equipment. Since this interference could cause the possible loss of the anti-lock braking capability, such equipment should be installed by qualified professionals.

On models equipped with anti-lock brake systems, ALWAYS observe the following cautions:

* DO NOT attempt to bleed hydraulic system without first referring to the appropriate ANTI-LOCK BRAKE SYSTEM article in the BRAKES Section.
* DO NOT mix tire sizes. As long as tires remain close to the original diameter, increasing the width is acceptable. Rolling diameter must be identical for all 4 tires. Some manufacturers recommend tires of the same brand, style and type. Failure to follow this precaution may cause inaccurate wheel speed readings.
* Use ONLY recommended brake fluids. DO NOT use silicone brake fluids in an ABS-equipped vehicle.

BATTERY WARNING

WARNING: When battery is disconnected, vehicles equipped with computers may lose memory data. When battery power is restored, driveability problems may exist on some vehicles. These vehicles may require a relearn procedure. See COMPUTER RELEARN PROCEDURES article in GENERAL INFORMATION section.

REPLACING BLOWN FUSES

Before replacing a blown fuse, remove ignition key, turn off all lights and accessories to avoid damaging the electrical system. Be sure to use fuse with the correct indicated amperage rating. The use of an incorrect amperage rating fuse may result in a dangerous electrical system overload.

BRAKE PAD WEAR INDICATOR

Indicator will cause a squealing or scraping noise, warning that brake pads need replacement.

CATALYTIC CONVERTER

Continued operation of vehicle with a severe malfunction could cause converter to overheat, resulting in possible damage to converter and vehicle.

Any modification to the exhaust system on turbo models, which reduces exhaust backpressure, will lead to lean fuel mixtures and excessive spark advance. This could cause serious engine damage.

ELECTROSTATIC DISCHARGE SENSITIVE (ESD) PARTS

WARNING: Many solid state electrical components can be damaged by static electricity (ESD). Some will display a warning label, but many will not. Discharge personal static electricity by touching a metal ground point on the vehicle prior to servicing any ESD sensitive component.

ENGINE OIL

CAUTION: Never use non-detergent or straight mineral oil.

FUEL SYSTEM SERVICE

WARNING: Relieve fuel system pressure prior to servicing any fuel system component (fuel injection models).

HALOGEN BULBS

Halogen bulbs contain pressurized gas which may explode if overheated. DO NOT touch glass portion of bulb with bare hands. Eye protection should be worn when handling or working around halogen

bulbs.

HEADLIGHT RETRACTOR

CAUTION: Never operate headlight retractor when a person's hands, or other objects are on or near the headlights. When working on the headlights always remove the headlight retractor fuse.

RADIATOR CAP

CAUTION: Always disconnect the fan motor when working near the radiator fan. The fan is temperature controlled and could start at any time even when the ignition key is in the OFF position. DO NOT loosen or remove radiator cap when cooling system is hot.

RADIATOR FAN

WARNING: Keep hands away from radiator fan. Fan is controlled by a thermostatic switch which may come on or run for up to 15 minutes even after engine is turned off.

TURBOCHARGED MODELS

CAUTION: Do not race engine immediately after starting. When stopping engine, allow engine to idle for approximately 60 seconds before shutting it off. Failure to do so may cause turbocharger damage due to lack of oil flowing to the turbocharger bearings.

END OF ARTICLE

STARTER - DIRECT DRIVE
Article Text
1993 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 19, 2001 01:50PM

ARTICLE BEGINNING

1993 ELECTRICAL
Mazda Starters - Direct Drive

B2200 M/T, Miata, MX-3 4-Cylinder,
Protege M/T, RX7 M/T, 323

DESCRIPTION

Nippondenso direct drive starter is a conventional 12-volt, 4-pole, brush-type starter. The integral solenoid is attached to the drive housing. The overrunning clutch pinion drive is mounted directly on end of armature shaft drive.

NOTE: For information on B2200 (A/T), MX-3 (V6) and Protege (A/T), proceed to STARTER - REDUCTION GEAR article in the ELECTRICAL section.

TROUBLE SHOOTING

NOTE: See TROUBLE SHOOTING - BASIC PROCEDURES article in the GENERAL INFORMATION section.

ON-VEHICLE TESTING

NOTE: Before testing, ensure battery is fully charged, battery cables and terminals are clean and tight and engine grounds are good.

CIRCUIT TESTING

If starter does not operate, check voltage at starter "S" terminal with ignition switch in START position (and clutch depressed on M/T). See Fig. 1. If voltage is greater than 8 volts, repair or replace as required. If voltage is less than 8 volts, check ignition switch, inhibitor switch (A/T), interlock switch (M/T) and wiring.

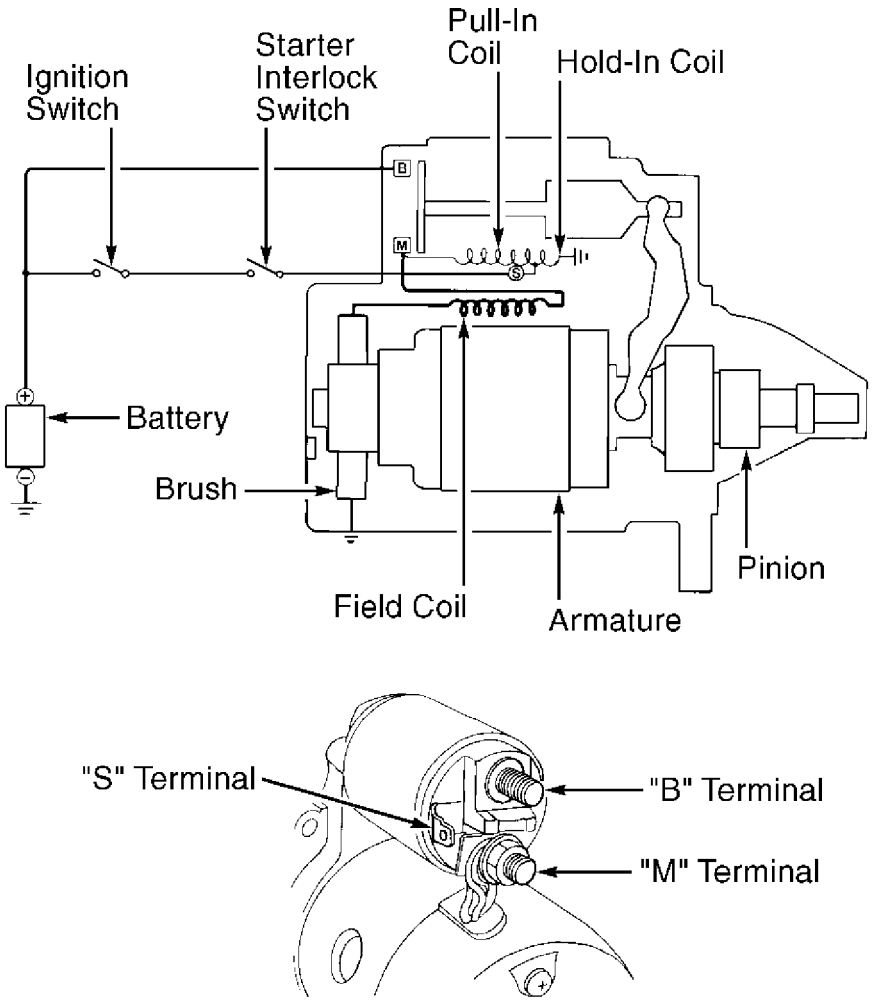


Fig. 1: Direct Drive Starter Circuit Diagrams
Courtesy of Mazda Motors Corp.

STARTER INTERLOCK SWITCH (CLUTCH START SWITCH)

Switch is mounted on bracket near top front of clutch pedal. Disconnect switch wiring connector. Using ohmmeter, ensure continuity exists between switch connector terminals when clutch pedal is depressed. If continuity does not exist, adjust or replace switch.

BENCH TESTING

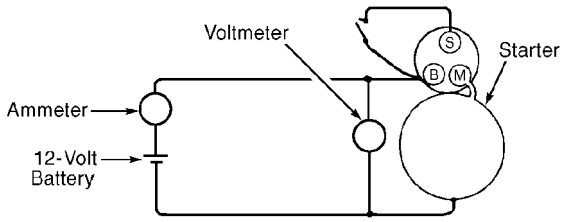
NO-LOAD TEST

Connect fully-charged 12-volt battery, voltmeter and ammeter to starter. See Fig. 2. Using remote starter wires or jumper, engage solenoid. Starter should spin smoothly. Compare readings with specifications. See NO-LOAD TEST SPECIFICATIONS table. If voltage is less than specified or amperage is more than specified, disassemble and inspect starter components.

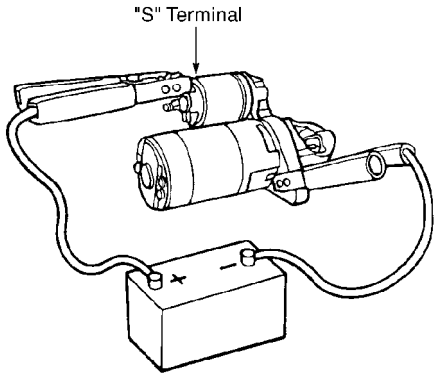
NO-LOAD TEST SPECIFICATIONS TABLE

Application	Minimum Voltage	Maximum Amperage
B2200 M/T, Miata & MX-3 4-Cyl.	11.5	60
Protege & 323	(1)	(1)
RX7	11.0	90

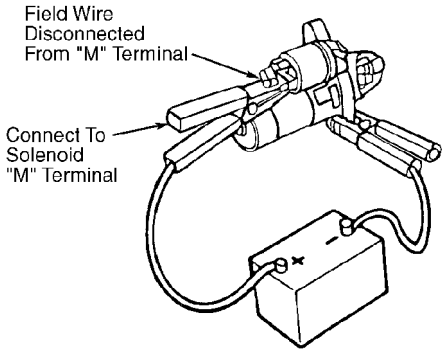
(1) - Information is not available from manufacturer.



NO-LOAD TESTING HOOKUP



SOLENOID PULL-IN TEST



SOLENOID RETURN TEST

91D01831
Fig. 2: Testing Direct Drive Starter Circuits
Courtesy of Mazda Motors Corp.

SOLENOID TEST

NOTE: Perform solenoid tests with starter assembled and field lead ("M" terminal wire) disconnected at the solenoid. See Fig. 2.

CAUTION: DO NOT engage starter solenoid for more than 10 seconds during testing or damage to coil winding may result.

Solenoid Pull-In Test

Connect positive battery lead to solenoid "S" terminal and negative battery lead to starter body. See Fig. 2. Starter pinion drive gear should extend quickly and maintain this position. If starter pinion drive gear does not extend, replace solenoid.

Solenoid Return Test

Connect positive battery lead to solenoid "M" terminal and ground negative battery lead to starter body. See Fig. 2. Using screwdriver, pry overrunning clutch pinion drive outward. Release screwdriver and ensure overrunning clutch pinion drive returns to original position.

Solenoid Hold-In Test

Remove solenoid from starter. Connect positive battery lead to solenoid "S" terminal and negative battery lead to solenoid case. Push plunger into switch. If plunger stays in solenoid, hold-in windings are okay. If plunger does not stay in solenoid, replace solenoid.

Solenoid

1) Disconnect all wires from solenoid, including "M" wire between solenoid and starter. Using ohmmeter, ensure there is continuity between "S" and "M" terminals, and between "S" terminal and solenoid body. See Figs. 1 and 2. If continuity does not exist between these terminals, replace solenoid.

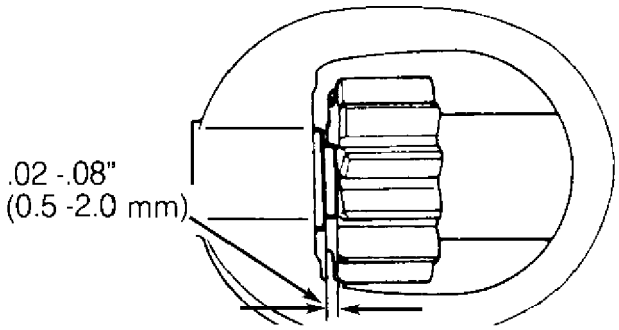
2) Ensure continuity does not exist between "M" and "B" terminals. If continuity exists between these terminals, solenoid is shorted. Replace solenoid.

PINION GAP ADJUSTMENT

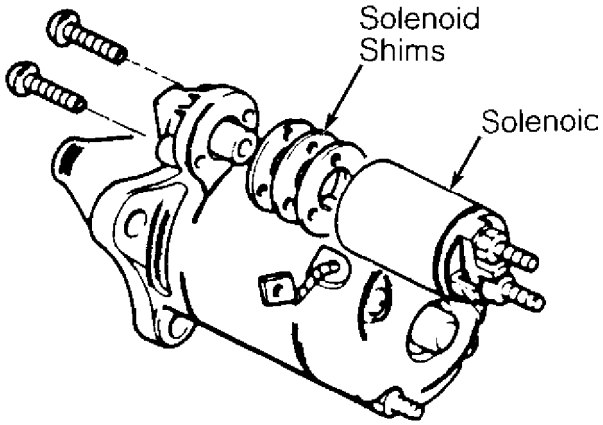
1) Disconnect field wire from solenoid "M" terminal. See Fig. 2. Connect positive battery lead to "S" terminal and negative battery lead to starter case. Starter pinion drive gear will extend outward and stop.

2) Quickly measure pinion gap between end of pinion drive and circlip retainer. See Fig. 3. DO NOT operate starter solenoid for more than 10 seconds. Pinion gap should be .02-.08" (0.5-2.0 mm).

3) If pinion gap is not within specification, adjust by increasing or decreasing thickness of solenoid shims located between solenoid and drive housing.



CHECKING PINION GAP



ADJUSTING PINION GAP

91F01832

Fig. 3: Checking & Adjusting Pinion Gap
Courtesy of Mazda Motors Corp.

ARMATURE TEST

1) Place armature in growler. Turn on growler and hold a piece of hacksaw blade over armature. Slowly rotate armature. If hacksaw blade is attracted to core or if it vibrates, replace armature.

2) Remove armature from growler. Using an ohmmeter, check continuity between commutator and core. If continuity exists, replace armature. Check continuity between commutator and shaft. If continuity exists, replace armature.

3) Check continuity between each commutator segment. If an open exists between any 2 segments, replace armature.

COMMUTATOR TEST

1) Clean surface and polish with No. 400 sandpaper if required. If surface is scored, out of round or pitted, turn commutator in a lathe.

2) Maximum commutator runout and minimum diameter of commutator must not exceed specification after turning. See COMMUTATOR SPECIFICATIONS table.

3) Commutator mica undercut depth should be .020 -.030" (.50

-.80 mm). Minimum mica undercut depth is .008" (.20 mm). If not within specification, undercut to standard depth.

COMMUTATOR SPECIFICATIONS TABLE

Application	Maximum Runout In. (mm)	Minimum Diameter In. (mm)
B2200 M/T, Protege M/T & 323	.004 (.10)	1.24 (31.4)
Miata	.001 (.03)	1.21 (30.8)
MX-3 4-Cyl.	.004 (.10)	1.22 (31.0)
RX7 M/T	.002 (.05)	1.26 (32.0)

BRUSH TEST

1) Connect ohmmeter lead to positive brush holder and other lead to negative brush holder. If continuity exists, brush holder assembly is shorted and must be replaced.
2) Check brush length. Standard brush length is .67" (17.0 mm). Minimum brush length is .45" (11.5 mm). If length is less than specified, replace brushes.
3) Using brush spring scale, measure spring tension. Tension should be greater than 2 lbs. (0.9 kg). Tension for a NEW spring should be 3.1-5.7 lbs. (1.4-2.6 kg). Ensure brushes move freely in holders.

FIELD WINDING TEST

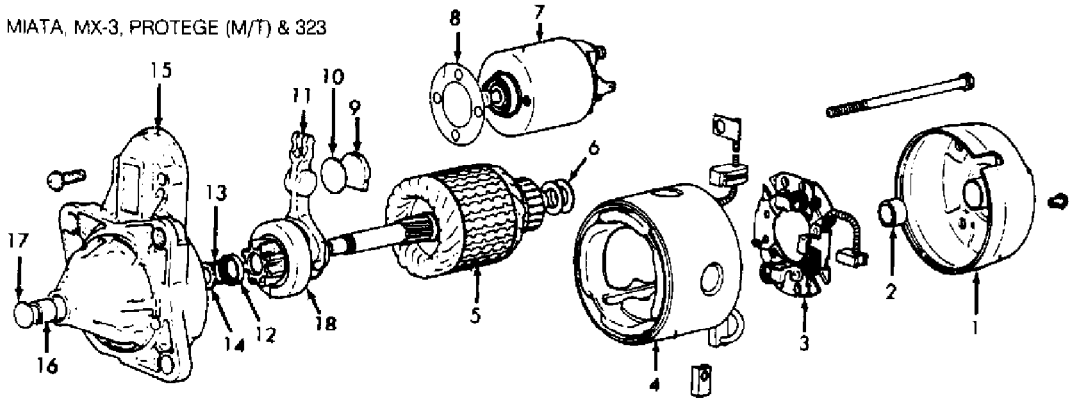
1) Connect one ohmmeter lead to field coil lead ("M" terminal lead). Connect other lead to soldered portion of brush lead. If continuity does not exist, repair or replace field coil.
2) Check field coil for shorts to ground by connecting ohmmeter lead to field coil lead. Connect other lead to field coil housing. If continuity exists, repair or replace field coil.

OVERRUNNING CLUTCH PINION DRIVE

Hold overrunning clutch housing and turn pinion gear by hand. If pinion turns in both directions, clutch is faulty. Replace clutch. DO NOT clean overrunning clutch with solvent, as it is packed with grease and sealed by manufacturer.

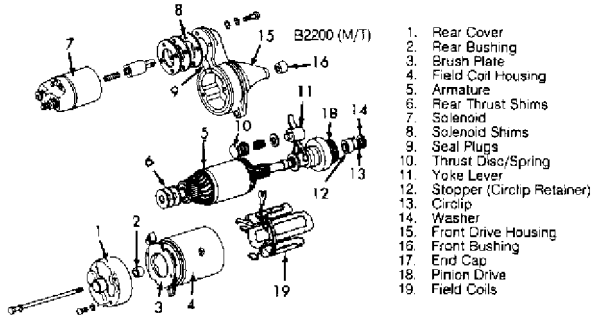
OVERHAUL

NOTE: Overhaul procedures are not available from manufacturer. Use illustration for exploded view of starter. See Fig. 4 and 5.



1. Rear Cover
2. Rear Bushing
3. Brush Plate
4. Field Coil Housing
5. Armature
6. Rear Thrust Shims
7. Solenoid
8. Solenoid Shims
9. Seal Plugs
10. Thrust Disc/Spring
11. Yoke Lever
12. Stopper (Circlip Retainer)
13. Circlip
14. Washer
15. Front Drive Housing
16. Front Bushing
17. End Cap
18. Pinion Drive

Fig. 4: Exploded View Of Direct Drive Starter
Courtesy of Mazda Motors Corp.



1. Rear Cover
2. Rear Bushing
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12. Stopper (Circlip Retainer)
13. Circlip
14. Washer
15. Front Drive Housing
16. Front Bushing
17. End Cap
18. Pinion Drive
19. Field Coils

Fig. 5: Exploded View Of Direct Drive Starter
Courtesy of Mazda Motors Corp.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS TABLE

Application	Ft. Lbs. (N.m)
Starter Mounting Bolt	(1) 27-38 (37-52)

	INCH Lbs. (N.m)
Battery Cable Nut (Solenoid Terminal "B")	96 (8)

(1) - On Miata, tighten small bolt to 60-86 INCH lbs. (5.0-7.2 N.m).

END OF ARTICLE