

Service Manual Supplement

3000GT SPYDER

1995 Volume 3

FOREWORD

This Service Manual Supplement has been prepared with the latest service information available at the time of publication. It is subdivided into various service groups that are unique to the retractable hardtop. Each section may contain one or more of the following: diagnosis, disassembly, repair, installation procedures, specifications, and tightening references. Service groups that are not specific to the retractable hardtop can be found in Volumes 1 & 2. Use of this manual will aid in properly performing any servicing necessary to maintain or restore the high levels of performance and reliability designed into these outstanding vehicles.



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

WARNING!

- (1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver (from rendering the SRS inoperative).**
- (2) If it is possible that the SRS components are subjected to heat over 93°C (200°F) in baking or in drying after painting, remove the SRS components (air bag module, SRS diagnosis unit, front impact sensors) beforehand.**
- (3) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.**
- (4) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) and GROUP 00 – Maintenance Service in Volume 1, before beginning any service or maintenance of any component of the SRS or any SRS-related component.**

NOTE

Section titles with asterisks (*) in the table of contents in each group indicate operations requiring warnings.

GENERAL

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GENERAL INFORMATION

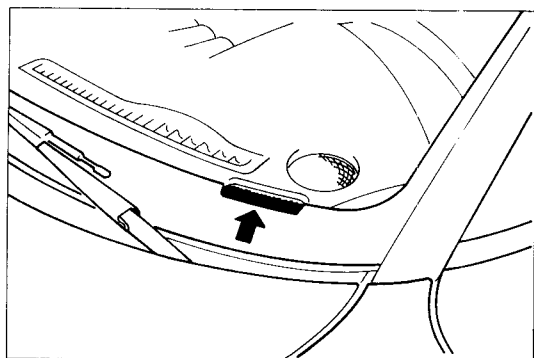
INTRODUCTION

The addition of a retractable hardtop feature creates changes to several other systems and components. These changes are summarized below. Detailed information can be found on the reference pages.

GROUP #	GROUP DESCRIPTION	CHANGE SUMMARY
33	Front Suspension	<ul style="list-style-type: none"> • Spyder-unique coil spring rate
33B	Electronic Control Suspension (ECS)	<ul style="list-style-type: none"> • Relocation of ECS control unit • Wiring harness changes • Coupe's ECS control unit mounting bracket modified to accommodate Spyder • Available modified as a service part
34	Rear Suspension	<ul style="list-style-type: none"> • Spyder-unique coil spring rate
35	Service Brakes	<ul style="list-style-type: none"> • Relocated ABS electronic control unit • ECU must be removed to perform system diagnostics • Spyder-unique proportioning valve
42	Body	Body Structure: <ul style="list-style-type: none"> • Incorporation of additional body strengthening components • Major body modifications
		Doors: <ul style="list-style-type: none"> • Spyder-unique due to strengthening components • Hole must be drilled in new service part to accept wire harness
		Door Windows: <ul style="list-style-type: none"> • Incorporate "Express-Down" feature when operating retractable hardtop • Automatic raising feature when pressing and holding retractable hardtop "CLOSE" switch • Operates normally using switches when not operating hardtop • Wiring harness changes • Drivers and passenger side window has 2 additional relays • Passenger side is controlled through hardtop ECU
		Front Fenders: <ul style="list-style-type: none"> • Spyder-unique • Lower portion modified to accommodate additional lower A-pillar structure • Lower mounting changed • RH fender has hole for mounting motor antenna
		Hardtop "CLOSE"/"OPEN" and hard tonneau "CLOSE"/"OPEN" switch replace Active Aero switch in center console
		Hard Tonneau: <ul style="list-style-type: none"> • Hard tonneau replaces liftgate • Forward opening, rear hinged • Powered by electro-hydraulic system • Driver's liftgate release lever is used for hard tonneau manual release • Twin, cable-actuated, gear motor-released latches with integrated limit switches • Tonneau hinge-mounted hardtop down-stop lock prevents hardtop movement
		Quarter Windows: <ul style="list-style-type: none"> • Power instead of fixed • Non-independent operation
		Roof: <ul style="list-style-type: none"> • Steel roof and liftgate replaced by two-piece retracting composite roof • Powered by electro-hydraulic system • Spyder-unique heated rear window replaces heated liftgate glass • Uses coupe timer and switch
		Weatherstrips: <ul style="list-style-type: none"> • Spyder-unique
		Windshield Header: <ul style="list-style-type: none"> • Electro-mechanical header latch system • Single motor-driven assembly with dual latches with integrated limit switches • Manual override release/latch feature

GROUP #	GROUP DESCRIPTION	CHANGE SUMMARY
42	Body (continued)	<ul style="list-style-type: none"> Wiring harness changes
51	Exterior	<p>Drip Moulding</p> <ul style="list-style-type: none"> Modified coupe part <p>Hard Tonneau Spoiler:</p> <ul style="list-style-type: none"> Spyder-unique Non-moveable design with integrated high-mount stop light <p>Liftgate Lock Cylinder:</p> <ul style="list-style-type: none"> Not used for Spyder Replaced by emblem cover <p>Rear Bumper Decal (LH):</p> <ul style="list-style-type: none"> MITSUBISHI decal is carry-over part without diamond star Spyder-unique location <p>Rear Bumper Decal (RH)</p> <ul style="list-style-type: none"> SPYDER VR4 and SL decal are Spyder-unique Spyder-unique location <p>Rear Bumper Upper Extensions:</p> <ul style="list-style-type: none"> LH and RH modified to accommodate Spyder-unique body structure <p>Side Air Dam:</p> <ul style="list-style-type: none"> Modified to accommodate Spyder-unique body structure
52	Interior	<p>Front Pillar Trim:</p> <ul style="list-style-type: none"> Modified coupe part <p>Front Seats:</p> <ul style="list-style-type: none"> Seat belt guides Spyder-unique Seat recline angle restricted <p>Headlining:</p> <ul style="list-style-type: none"> Hard, molded, vinyl wrapped, multi-section A/C in-car temperature sensor relocated to center headlining <p>Luggage Compartment Floor Boxes:</p> <ul style="list-style-type: none"> Modified coupe parts (LH) & (RH) <p>Luggage Compartment Trim:</p> <ul style="list-style-type: none"> Spyder-unique (soft trim) Floor board replaced by an object-in-trunk sensor Carry-over cargo lamp assembly, new switch and location changes Wiring harness changes <p>Quarter Trim:</p> <ul style="list-style-type: none"> Spyder-unique Courtesy lights carry-over coupe parts <p>Rearview Mirror:</p> <ul style="list-style-type: none"> Spyder-unique, self-dimming, lighted Spyder-unique mounting location and mounting button Coupe's mounting button may be existing but is not used and is covered by a garnish <p>Rear Seatbacks and Locking System:</p> <ul style="list-style-type: none"> Spyder-unique <p>Seat Belts (Front and Rear):</p> <ul style="list-style-type: none"> Spyder-unique Mounting points relocated <p>Sunvisors:</p> <ul style="list-style-type: none"> Spyder-unique
54	Chassis Electrical	<p>CD (Compact-Disc) Auto Changer:</p> <ul style="list-style-type: none"> CD changer cover deleted Location is in same proximity as coupe Spyder-unique front and rear mounting brackets Surrounded by Spyder-unique body structure Accessible through door in body structure behind RH rear seatback Can be serviced by removing rear-facing body structure cover

GROUP #	GROUP DESCRIPTION	CHANGE SUMMARY
54	Chassis Electrical (continued)	<p>HomeLink™ Universal Transmitter:</p> <ul style="list-style-type: none"> • All-new unit • Located in center of windshield header garnish • Must be removed to access header latch manual override • Wiring harness changes <p>Motor Antenna:</p> <ul style="list-style-type: none"> • Relocated from rear fender to front fender • Spyder-unique mounting hardware (some relocated coupe parts) • Relocated relay is mounted in passenger compartment, behind glove box • Wiring harness changes <p>Radio Amplifier:</p> <ul style="list-style-type: none"> • Spyder has a different amplifier • Externally appears the same as coupe • Internally modified for better bass • Same attaching hardware <p>Rear Combination Lights:</p> <ul style="list-style-type: none"> • LH and RH modified to accommodate Spyder-unique body structure • Not available as a service part modified for the Spyder • Modify prior to installation <p>Theft Alarm System:</p> <ul style="list-style-type: none"> • Relocated light automatic shut-off unit • Relocated keyless entry antenna and receiver • Coupe's keyless entry receiver mounting bracket modified to accommodate Spyder, available modified as a service part
55	Heater, Air Conditioning, and Ventilation	<p>Climate Control Temperature Sensor:</p> <ul style="list-style-type: none"> • Located in rear headlining section • See page 55-1 in this Manual for information on operating the system when the hardtop is open • Wiring harness changes
	Spare and Full Size Tire	<p>Spare Tire:</p> <ul style="list-style-type: none"> • When not in use, should be stored in well, same as coupe <p>Full Size Tire:</p> <ul style="list-style-type: none"> • When not in use, cannot be stored in spare tire well; reinstall object-in-trunk sensor, and place tire far left to clear hardtop down-stop



VEHICLE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER LOCATION

The vehicle identification number (V.I.N.) is located on a plate attached to the top of the instrument panel.

VEHICLE IDENTIFICATION CODE CHART PLATE

All vehicle identification numbers contain 17 digits. The vehicle number is a code which tells country, make, vehicle type, etc.

<1995 MODELS>



1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th Digit	9th Digit	10th Digit	11th Digit	12th to 17th Digits
Country	Make	Vehicle type	Others	Line	Price class	Body	Engine	*Check digit	Model year	Plant	Serial number
J- Japan	A- Mitsubishi	3- Passenger Car	A- Driver and Passenger Air Bag	M- 3000GT FWD N- 3000GT AWD V- 3000GT FWD Convertible W- 3000GT AWD Convertible	5- Sports 6- Premium 7- Ultimate	4- 3-door Hatchback 5- Convertible	J- 3.0 dm ³ (181.4 cu. in.) [DOHC-MFI] K- 3.0 dm ³ (181.4 cu. in.) [DOHC-MFI-Turbo]	1 2 3 - - - 9 X	R- 1994 Year S- 1995 Year	Y- Nagoya Plant	000001 to 999999

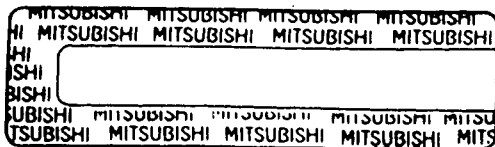
NOTE

*"Check digit" means a single number or letter X used to verify the accuracy of transcription of vehicle identification number.

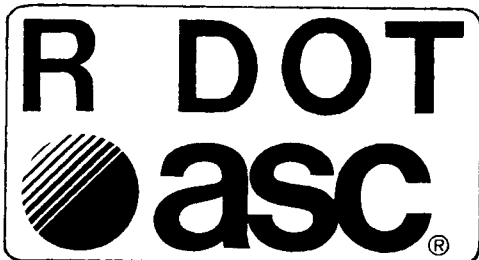
V.I.N. (except sequence number)	Brand	Engine displacement	Models code
JA3AV65J□SY	Mitsubishi 3000GT <FWD> (Spyder SL)	3.0 dm ³ (181.4 cu. in.) [DOHC-MFI]	Z11ABRPML7M
JA3AW75K□SY	Mitsubishi 3000GT <AWD> (Spyder VR4)	3.0 dm ³ (181.4 cu. in.) [DOHC-MFI-TURBO]	Z16ABJGFL7M

Theft protection label

For original parts



For replacement parts

**THEFT PROTECTION**

In order to protect against theft, a Vehicle Identification Number (VIN) is attached as a label to the hard tonneau.

In addition, a theft-protection label is attached to replacement parts for the hard tonneau.

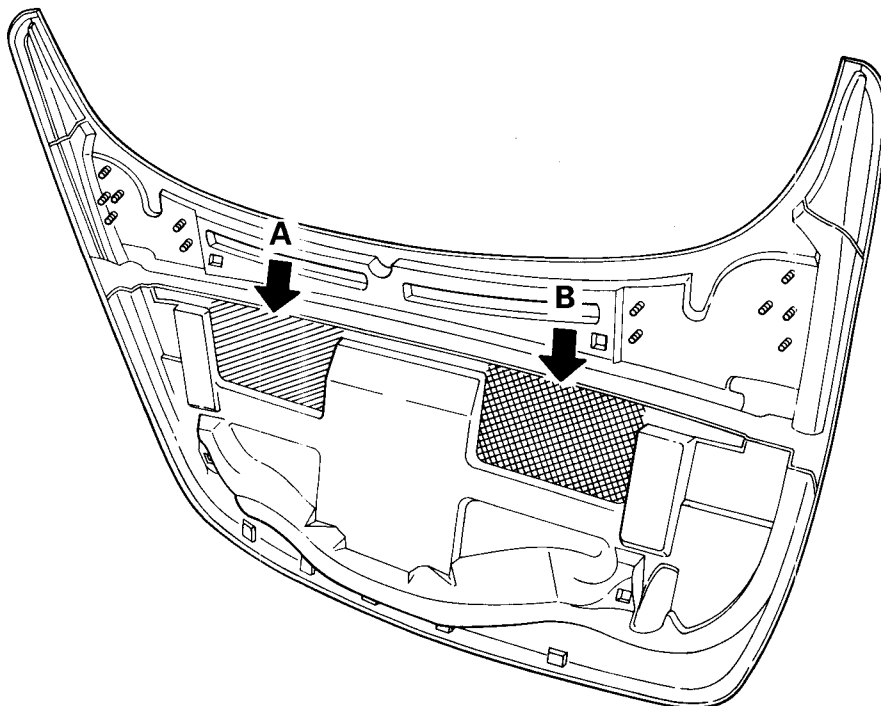
Caution regarding tonneau repairs:

1. When repainting original tonneau do so after first masking the theft-protection label, and, after painting, be sure to peel off the masking tape.
2. The theft-protection label for replacement parts may be covered by masking tape, so such parts may be able to be painted as is. If masking tape is not on the label, be sure to cover it. The masking tape should be removed after painting is finished.
3. The theft-protection label should not be removed from original parts or replacement parts.

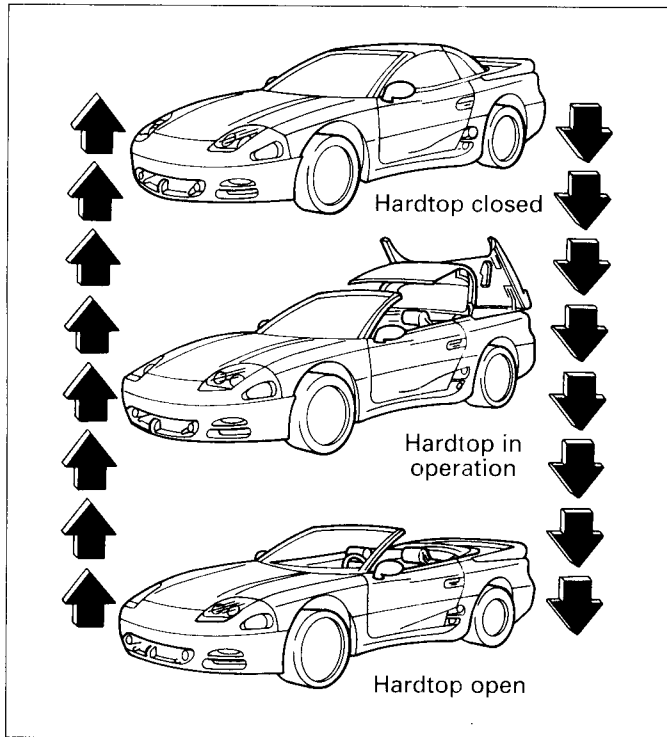
LOCATIONS

Target area (A: for original equipment parts, B: for replacement parts)

Tonneau



GENERAL INFORMATION ABOUT THE RETRACTABLE HARDTOP SYSTEM



This car has a "one-touch" (or single-switch) system, with a built-in delay safety feature, for operating the retractable hardtop, hard tonneau, windshield header latches, quarter windows and power door windows sequentially. The delay feature only works when closing the hardtop; it stops the hardtop several centimeters (inches) from the windshield in case there is something between the hardtop and where it secures to the windshield header. Releasing and pressing the hardtop switch on the "CLOSE" side will resume operation.

The hardtop system also has another feature called an automatic "all-window glass-closed and up" feature. This feature allows the operator to raise the door glass, and close the quarter windows simultaneously, but only after the hardtop has closed and the hard tonneau has fully latched. For more information and important precautions on this feature and all the power windows, refer to **POWER QUARTER WINDOWS AND DOOR WINDOWS** in this section.

While the hardtop is being opened or closed (which includes the automatic opening and closing of the hard tonneau) a chime will sound and the red indicator lamp to the left of the hardtop switch will flash at the normal rate of 1 flash per second. The vehicle **MUST NOT** be driven until the chime and indicator turn off. (Note that the hard

tonneau indicator will not light when operating the hardtop.)

In order for the closing of the hardtop to be complete, the header latches must have latched the hardtop, the quarter windows and door windows must have fully closed, and the hard tonneau must have fully latched. Otherwise, the chime and indicator will not turn off. The chime will sound for 1 second to indicate the closing of the hardtop is complete. To confirm that the hardtop is latched, push up on the hardtop after the 1 second chime turns off.

If a problem is encountered by the system, such as if an object is detected in the hardtop stowage area, the system will only allow the hardtop to open halfway, and stop. The chime and indicator will flash at twice the normal rate until the problem is resolved.

The switch located next to the hardtop switch is for operating the hard tonneau independently when operating the hardtop is not desired (refer to **NORMAL OPERATION - HARD TONNEAU**, in this section).

Before operating the hardtop system or hard tonneau the parking brake must be set and the gear selector should be in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle). Then, start the vehicle.

For complete operating procedures, refer to **NORMAL OPERATION - OPENING (or CLOSING) RETRACTABLE HARDTOP**, or **NORMAL OPERATION - HARD TONNEAU**, in this section.

NOTE

Should either the retractable hardtop or the hard tonneau's power systems become inoperable they can be operated manually (refer to **MANUAL OPERATION - OPENING [or CLOSING] RETRACTABLE HARDTOP**, or **MANUAL OPERATION - HARD TONNEAU**, in this section).

Caution

- (1) **WHEN OPENING THE RETRACTABLE HARDTOP**, always make sure there are no items or packages in the hardtop stowage area. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms. Personal injury could result.
- (2) The retractable hardtop stowage area has an object-in-trunk sensor that will restrict operation of the hardtop system if certain articles are within the top stowage area. Object shape, size, material, weight or placement may affect detection. **ALWAYS** check the hardtop stowage area for items when opening the hardtop.
- (3) When opening or closing the retractable hardtop, keep hands clear from roof panel

joints and any part of the hardtop or hard tonneau mechanisms.

- (4) Keep hands and any part of the body away from moving parts such as power quarter windows, power door windows, and the top of the windshield header where the hardtop secures.
- (5) Before and during opening and closing of the hardtop or hard tonneau, make sure that your passengers are aware that you will operate the system. Otherwise, personal injury may result from the quarter windows unexpectedly retracting or closing and the door windows raising or lowering.
- (6) Operating the retractable hardtop system without the engine running may discharge the vehicle battery, resulting in hard engine starting or a no start condition.
- (7) Once the hardtop is lowered do not place any cargo in or around the hardtop.
- (8) Make sure the hard tonneau is closed; driving with the hard tonneau incompletely closed is hazardous.
- (9) To avoid damage, do not sit or place excessive weight on the hard tonneau or the trim panels above the rear seatbacks.
- (10) Never operate the retractable hardtop or the hard tonneau while the vehicle is in motion.
- (11) Never press the hardtop "OPEN" switch solely to retract the quarter windows after the hardtop has closed and latched.
- (12) Never press the hardtop "OPEN" switch solely to lower the door windows.

OBJECT-IN-TRUNK SENSOR

The Spyder has an object-in-trunk sensor located in the cargo/hardtop stowage area. The sensor consists of a pressure-sensitive mat bonded to the removable trunk floor board. The sensor is designed to restrict operation of the hardtop system if articles are within the hardtop stowage area. Object size, shape, material, weight and placement may affect detection. **ALWAYS** check the stowage area for items when opening the hardtop. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms. Personal injury could result.

To remove the object-in-trunk sensor, raise the front of it, disconnect the wire connector at the luggage compartment floor box, then remove the sensor from the stowage area.

NOTE

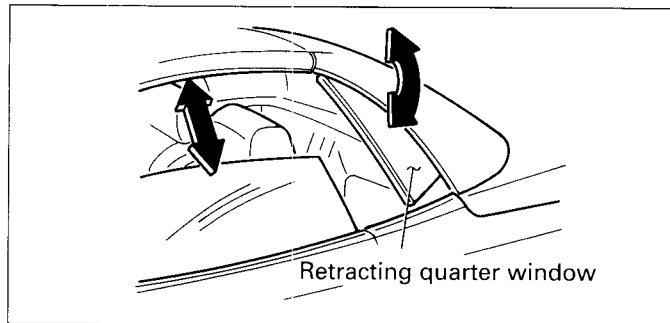
When you reinstall the sensor, be sure to reconnect the wire connector, otherwise the hardtop will only open partway and stop, until the sensor is reconnected.

COLD WEATHER DRIVING

Before opening or closing the retractable hardtop be sure to clean off any snow or ice from the vehicle, particularly the hardtop roof and tonneau, which could cause damage when the hardtop and/or tonneau is operated. Cleaning off the hardtop and tonneau will also avoid getting snow and ice in the cargo/hardtop stowage area which could melt and refreeze.

Do not operate the hardtop or tonneau if icing has not allowed either system to function. When icing has occurred, allow the vehicle to stand in a warm area to thaw.

POWER QUARTER WINDOWS AND DOOR WINDOWS



The power quarter windows and door windows are part of the retractable hardtop's "one-touch" system.

Unlike the door windows which have separate drive motors, the quarter windows cannot be operated individually because one motor drives both windows simultaneously. No switch is provided to operate the quarter windows separately. **DO NOT** use the quarter windows for ventilation; they must remain closed while the hardtop is closed and latched.

When the hardtop opens, automatically the quarter windows retract and the door windows lower. But only when closing the hardtop, what is called the automatic "all-window glass-closed and up" feature, can be used to close the quarter and door windows simultaneously. This feature can be used for convenience for when you want to secure and lock the vehicle after having the hardtop open.

To use this feature, for instance when closing the hardtop to secure the vehicle, press and hold the hardtop "CLOSE" switch after the safety stop feature stops the hardtop near the windshield. Holding the switch after the header latches latch, and the hard tonneau latches, will close the quarter windows and door windows.

NOTE

1. The quarter windows may be fully closed before the door windows. So continue to

press and hold the "CLOSE" switch until the quarter windows and door windows are closed and the 1 second chime sounds. Then, if you wish, use the door window switches to raise or lower the door windows.

2. Although the door windows can be raised and lowered independently of the quarter windows using the door window switches, they will also operate simultaneously with the quarter windows regardless of what position they are in when the hardtop "OPEN" or "CLOSE" switch is pressed.

Caution

- (1) **DO NOT** at any time press the hardtop "OPEN" switch to solely open the windows. Pressing the "OPEN" switch solely to open any of the window glass will, without notice, unlatch the hardtop and hard tonneau, and possibly start opening the hard tonneau and hardtop. **DO NOT** drive the vehicle with the header latches not fully latched.
- (2) Whenever the hardtop "OPEN" switch is accidentally pressed, open the hardtop 101.6 - 152.4 mm (4 - 6 inches) and then close the hardtop.
- (3) When opening the hardtop, **ALWAYS** be sure **BOTH** quarter windows have retracted. **DO NOT** open the hardtop if **BOTH** windows do not fully retract.
- (4) The hardtop may not open if the quarter windows do not retract. Therefore, do not attempt to open the hardtop manually until the headlining is removed, and the quarter windows are retracted manually. This can be done using a 5 mm allen wrench. Insert the 5 mm allen wrench into the center of the quarter window motor and turn clockwise to retract both quarter windows.
- (5) Do not force the door or quarter windows.

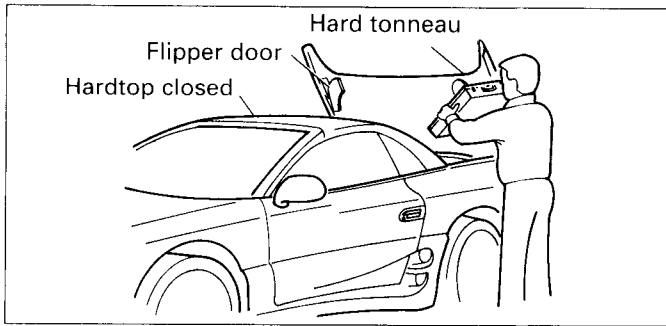
LOW OR DISCHARGED BATTERY

- (1) If the vehicle battery voltage is less than 10 volts for more than 2 consecutive seconds, the hardtop ECU will shut down until 10 or more volts is detected.
- (2) If the vehicle battery is discharged, the battery must be charged or the car must be started and the battery allowed to recharge before attempting to resume hardtop operation.
- (3) If the battery cannot be charged, or the car started, the closing of the hardtop, opening and closing of the hard tonneau or header latches can be operated manually. To do this, refer to the appropriate heading under **MANUAL OPERATION** - in this section.

OVER-CHARGED BATTERY

The hardtop ECU will instantly shut down whenever 16 or more volts is detected, and turn on after the voltage has dropped below 16 volts. This is a good indication of a faulty charging system.

HARD TONNEAU



The hard tonneau covers the retractable hardtop when the hardtop is open, or it covers the stowage area, which can be used for cargo only when the hardtop is closed. The hard tonneau may be opened and closed without operating the hardtop, but only when the hardtop is closed and latched. When the hardtop is open the hard tonneau switch is rendered inoperative.

The hard tonneau can be opened and closed several ways:

- automatically with the retractable hardtop operation;
- independently by pressing the hard tonneau switch;
- manually if the power system becomes inoperable.

NORMAL OPERATION - HARD TONNEAU

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Start the engine.

Caution

Operating the hard tonneau system without the engine running may discharge the vehicle's battery, resulting in hard engine starting or a no start condition.

3. Press and hold the hard tonneau switch on the "OPEN" or "CLOSE" side of the switch. Momentarily the hard tonneau will operate.

NOTE

When the switch is pressed the red indicator lamp to the right of the switch will flash and a chime will sound until the hard tonneau has closed and latched.

Caution

- (1) **WHEN OPENING THE RETRACTABLE HARD-
TOP**, always make sure there are no items or packages in the hardtop stowage area. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms. Personal injury could result.
- (2) The retractable hardtop stowage area has an object-in-trunk sensor that will restrict operation of the hardtop system if certain articles are within the top stowage area. Object shape, size, material, weight or placement may affect detection. **ALWAYS** check the hardtop stowage area for items when opening the hardtop.
- (3) Once the retractable hardtop is opened and stowed do not place any cargo in or around it.
- (4) Make sure the hard tonneau is closed and latched; driving with hard tonneau incompletely closed is hazardous.
- (5) To avoid damage, do not sit or place excessive weight on the hard tonneau or the trim panels above the rear seatbacks.
- (6) When opening or closing the hard tonneau keep hands and any part of the body away from moving parts, such as the flipper doors (located at the front ends of the hard tonneau) and along where the hard tonneau seals to the vehicle body.

QUICK TROUBLESHOOTING GUIDE FOR THE HARD TONNEAU

(For information and troubleshooting on the hardtop and hard tonneau systems together, see **NORMAL OPERATION - OPENING [or CLOSING] RETRACTABLE HARDTOP**, in this section. For Diagnostics and Testing refer to GROUP 42.)

DESCRIPTION OF PROBLEM	POSSIBLE CAUSE	ACTION TO TAKE	COMMENTS
Hard Tonneau does not operate.	<ul style="list-style-type: none"> The gear selector is not in "P" (PARK) (automatic trans-axle). The gear selector is not in neutral (manual transaxle), and the parking brake is not applied. 	<ul style="list-style-type: none"> Set the parking brake and place the gear selector in "P" (PARK) (automatic trans-axle), then start the engine. Set the parking brake and place the gear selector in neutral (manual transaxle), then start the engine. 	Always apply the parking brake before operating the hardtop or the hard tonneau.
Hardtop is open and hard tonneau will not open using the hard tonneau switch.	Normal operation: tonneau switch is electrically locked-out.		In an emergency hard tonneau can be opened manually (refer to MANUAL OPERATION - HARD TONNEAU in this section).
Hardtop appears to be closed, but hardtop chime and indicator sound and blink at twice the normal rate, and the hard tonneau will not open or close using the hard tonneau switch.	Hardtop is not fully latched.	Open the hardtop 101.6 - 152.4 mm (4 - 6 in.) then close the hardtop again using the hardtop "CLOSE" switch. Release the switch when the chime and indicator turn off. Wait for the 1 second chime, then push up on the hardtop to be sure it has latched.	<ul style="list-style-type: none"> Service the vehicle. In an emergency, the header latches can be operated manually (refer to MANUAL OPERATION - HEADER LATCHES in this section).
Hard tonneau will not open or close without engine running.	Vehicle battery is discharged to less than 10 volts.	<ul style="list-style-type: none"> Recharge battery. Start the car and allow the battery to recharge. 	Make sure all accessories are off, and do not operate hardtop or hard tonneau while battery is recharging.
	Vehicle battery is over-charged (16 or more volts).	Turn on some or all accessories to lower the battery voltage below 16 volts.	Could indicate possible charging system malfunction.
Hard tonneau will not open, or opens slowly, with engine running, but pump can be heard running.	<ul style="list-style-type: none"> Pump's bypass valve may not be fully in the "POWER" position. Low pump pressure. 	Turn the bypass valve to the "POWER" position until it stops.	If turning bypass valve does not solve problem, service the vehicle.
Hard tonneau's chime and indicator sounding and blinking at twice the normal rate, will not turn off when the tonneau appears to be closed.	Indicates that hard tonneau is not fully closed and latched.	Open hard tonneau and check to see that nothing is preventing the hard tonneau from closing, then close the hard tonneau. If the tonneau still will not latch, push down on both front ends of the tonneau to engage latches.	Service the vehicle if you have to push down on the hard tonneau to get it to latch.
Only one hard tonneau latch releases and tonneau does not open.	Latch mechanisms may require service.	DO NOT continue to operate tonneau or hardtop.	<ul style="list-style-type: none"> Service the vehicle. In an emergency, the tonneau can be opened manually (refer to MANUAL OPERATION - HARD TONNEAU in this section).
Hard tonneau's chime and indicator sound and blink at twice the normal rate, but does not appear to be associated with any noticeable problem.	May indicate a general malfunction.	DO NOT operate the hardtop or hard tonneau.	<ul style="list-style-type: none"> Service the vehicle. In an emergency either system can be operated manually (refer to the appropriate heading under MANUAL OPERATION in this section).

RETRACTABLE HARDTOP**NORMAL OPERATION - OPENING RETRACTABLE HARDTOP**

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Be sure that the exterior of the hardtop is completely clean and dry.
3. Start the engine.

Caution

Operating the retractable hardtop system without the engine running may discharge the vehicle battery, resulting in hard engine starting or a no start condition.

Caution

- (1) **WHEN OPENING THE RETRACTABLE HARDTOP**, always make sure there are no packages in the hardtop stowage area. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms. Personal injury could result.
- (2) The retractable hardtop stowage area has an object-in-trunk sensor that will restrict operation of the hardtop system if certain articles are within the hardtop stowage area. Object shape, size, material, weight or placement may affect detection. **ALWAYS** check the hardtop stowage area for items when opening the hardtop.
- (3) When opening the hardtop, **ALWAYS** be sure **BOTH** quarter windows have retracted. **DO NOT** open the hardtop if **BOTH** windows do not fully retract until the headlining is removed, and the quarter windows are retracted manually. This can be done using a 5 mm allen wrench. Insert the 5 mm allen wrench into the center of the quarter window motor and turn clockwise to retract both quarter windows.

4. Press and hold the hardtop "OPEN" switch to open the hardtop.

NOTE

- (1) When the hardtop "OPEN" switch is pressed sequentially the quarter windows retract and door windows lower, and the header latches unlatch, and the hard tonneau unlatches and begins to open along with the hardtop.
- (2) If the hardtop only opens halfway and stops, and the chime and indicator flash and sound at twice their normal rate, that is an indication that:
 - an object has been detected by the object-in-trunk sensor or,
 - the object-in-trunk sensor is not connected.

Remove the object or reconnect the sensor, then go to Step 5.

5. Press and hold the hardtop "OPEN" switch. Release the switch after the hard tonneau has closed and latched and the chime and indicator have turned off. The chime will sound for 1 second to indicate the opening of the hardtop is complete.

NOTE

If the hardtop stops and reverses direction and stops at the halfway closed position, that is an indication that:

- an object that was not detected earlier (due to size, shape, material, weight or placement) has now been detected by the object-in-trunk sensor, or;
- an item has just been placed in the top stowage area while the hardtop was being opened.

Remove the object and resume opening the hardtop.

6. If desired, raise the door window glass using the door window switches.

AIR CONDITIONING - WHEN HARDTOP IS OPEN

When the hardtop is open, the in-car temperature sensor for the air conditioning is now reading the temperature inside the hardtop stowage area. Therefore, when using the A/C set the "MODE" to the desired selection and select the fan speed using "FAN". Set the temperature control ("TEMP") to a comfortable setting as required. The A/C system is not designed to cool the vehicle with the hardtop open.

NORMAL OPERATION - CLOSING RETRACTABLE HARDTOP

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Start the engine.

Caution

Operating the retractable hardtop system without the engine running may discharge the battery, resulting in hard engine starting or a no start condition.

3. Press and hold the hardtop switch on the "CLOSE" side until the hardtop stops near the windshield header, then release the switch.

NOTE

The hardtop has a safety stop feature that stops the hardtop near the windshield.

4. Make sure there is nothing atop the windshield header where the hardtop secures.
5. Press the "CLOSE" switch and release it only

after the quarter windows and door windows have fully closed, the hard tonneau has closed and latched, and the chime and indicator have turned off. The chime will sound for 1 second to indicate closing of the hardtop is complete.

NOTE

- (1) The quarter windows may be fully closed before the door windows. If you wish, use the door window switches to lower the door windows.
- (2) Although the door windows can be raised and lowered independently of the quarter windows using the door window switches, they will also operate simultaneously with the quarter windows regardless of what position they are in when the hardtop "OPEN" or "CLOSE" switch is pressed.

Caution

- (1) **DO NOT** at any time press the hardtop "OPEN" switch to solely open the windows. Pressing the "OPEN" switch solely to open any of the window glass will, without notice, unlatch the hardtop and hard tonneau, and possibly start opening the hard tonneau and hardtop. **DO NOT** drive the vehicle with the header latches not fully latched.
 - (2) Whenever the hardtop "OPEN" switch is accidentally pressed, open the hardtop 101.6 - 152.4 mm (4 - 6 inches) and then close the hardtop.
6. To confirm that the hardtop is latched, push up on the front of the hardtop.

If the hardtop is not latched, open it 101.6 - 152.4 mm (4 - 6 inches), then repeat Steps 5 and 6.

NOTE

If you still cannot latch the hardtop, operate the latches manually (refer to **MANUAL OPERATION - HEADER LATCHES**, in this section).

Caution

In an emergency, do not force the windows. If the quarter windows do not close, service the quarter window system.

NOTE

Although the rear compartment area is primarily intended for hardtop stowage, it may be used as a trunk or luggage compartment when the hardtop is in the closed position. Before lowering the hardtop, any item in this area must be removed.

Caution

Make sure there are no items or packages in the cargo/hardtop stowage area when you open the hardtop. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms.

ROOFTOP CARRIER AND LUGGAGE RACK

A rooftop or luggage carrier of any type or design **MUST NOT** be used on the Spyder's retractable hardtop or hard tonneau. This includes, but is not limited to ski, bicycle or luggage racks. Damage to the retractable hardtop and/or hard tonneau may result.

THEFT-ALARM SYSTEM**NOTE**

1. The theft-alarm system operates as described in the Owner's Manual, with the exception where references to the hatchback are made; the Spyder's hard tonneau replaces the hatchback. The hard tonneau cannot be unlocked by key.
2. The theft-alarm system is fully functional when the hardtop is open.
3. When the hardtop is open and the alarm is armed, the hard tonneau can still be manually opened and closed without activating the alarm.

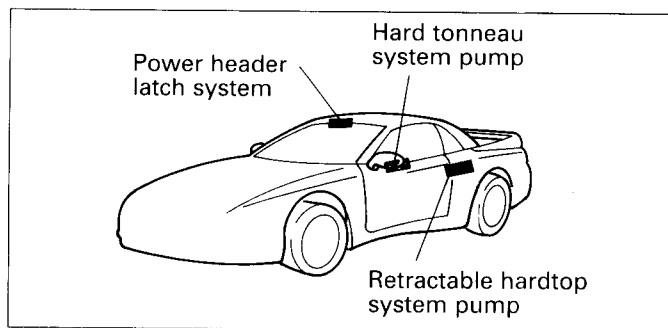
QUICK TROUBLESHOOTING GUIDE FOR THE HARDTOP AND HARD TONNEAU

(For information and troubleshooting on the hard tonneau system alone, see **NORMAL OPERATION - HARD TONNEAU**, in this section. For Diagnostics and Testing refer to GROUP 42.)

DESCRIPTION OF PROBLEM	POSSIBLE CAUSE	ACTION TO TAKE	COMMENTS
Hardtop or tonneau do not operate.	<ul style="list-style-type: none">• The gear selector is not in "P" (PARK) (automatic transaxle).• The gear selector is not in neutral (manual transaxle), and the parking brake is not applied.	<ul style="list-style-type: none">• Set the parking brake and place the gear selector in "P" (PARK) (automatic transaxle), then start the engine.• Set the parking brake and place the gear selector in neutral (manual transaxle), then start the engine.	Always apply the parking brake before operating the hardtop or the hard tonneau.
Hardtop is open and hard tonneau will not open using the hard tonneau switch.	Normal operation; tonneau switch is electrically locked-out.		In an emergency hard tonneau can be opened manually (refer to MANUAL OPERATION - HARD TONNEAU , in this section).
Hardtop appears to be closed, but hardtop chime and indicator sound and blink at twice the normal rate, and the hard tonneau will not open or close using the hard tonneau switch.	Hardtop is not fully latched.	Open the hardtop 101.6 - 152.4 mm (4 - 6 inches), then close the hardtop again using the hardtop "CLOSE" switch. Release the switch when the chime and indicator turn off. Wait for the 1 second chime, then push up on the hardtop to be sure it has latched.	In an emergency, the header latches can be operated manually (refer to MANUAL OPERATION - HEADER LATCHES , in this section).
Hardtop and/or tonneau will not open or close without engine running.	Vehicle battery is discharged to less than 10 volts.	<ul style="list-style-type: none">• Recharge the battery.• Start the car and allow the battery to recharge.	Make sure all accessories are off and do not operate the hardtop or hard tonneau while the battery is recharging.
	Vehicle battery is over-charged (16 or more volts).	Turn on some or all accessories to lower the battery voltage below 16 volts.	Could indicate possible charging system malfunction.
Hard tonneau and/or hardtop will not open, or opens slowly, with engine running, but pump(s) can be heard running.	<ul style="list-style-type: none">• Pump's bypass valve(s) may not be fully in the "POWER" position.• Low pump pressure.	Turn the bypass valve to the "POWER" position until it stops.	If turning bypass valve does not solve the problem, service the vehicle.
Hard tonneau's chime and indicator sounding and blinking at twice the normal rate, will not turn off when the tonneau appears to be closed.	Indicates that hard tonneau is not fully closed and latched.	Open hard tonneau and check to see that nothing is preventing the hard tonneau from closing, then close the hard tonneau. If the tonneau still will not latch, push down on both front ends of the tonneau to engage latches.	Service the vehicle if you have to push down on the hard tonneau to get it to latch.
Only one hard tonneau latch releases and tonneau does not open.	Latch mechanisms may require service.	<ul style="list-style-type: none">• DO NOT continue to operate tonneau or hardtop.• Service the vehicle.	In an emergency, the tonneau can be opened manually (refer to MANUAL OPERATION - HARD TONNEAU , in this section).
Hardtop stops at halfway open position while opening, and chime and indicator sound and blink at twice the normal rate.	<ul style="list-style-type: none">• Object-in-trunk sensor disconnected.• Object detected by object-in-trunk sensor.	<ul style="list-style-type: none">• Reconnect object-in-trunk sensor.• Remove detected object.	

Hardtop opens, but then reverses direction, and stops halfway closed.	<ul style="list-style-type: none">• Object detected by object-in-trunk sensor.• An object has been placed in the stowage area while the hardtop was being opened.	Remove detected object.	
Hardtop stops several inches from the windshield header while closing.	Normal operation.	Release the switch, make sure nothing is between the header and the hardtop, and press the switch again.	Normal condition; hardtop has a safety feature that allows you to check that nothing is between the header and the hardtop.
Hard tonneau or hardtop's chime and indicator sound and blink at twice the normal rate, but does not appear to be associated with any noticeable problem.	May indicate a general malfunction.	<ul style="list-style-type: none">• DO NOT operate the hardtop or hard tonneau.• Service the vehicle.	In an emergency either system can be operated manually (refer to the appropriate heading under Manual Operation, in this section).

GENERAL INFORMATION ON MANUAL OPERATION OF THE RETRACTABLE HARDTOP SYSTEM



The retractable hardtop system consists of two separate hydraulic systems; one powers the retractable hardtop and the other powers the hard tonneau. There is also a power latch system located in the windshield header. If one or more systems become inoperable, refer to the appropriate heading or combinations of headings, depending on the circumstances:

- **NORMAL OPERATION - OPENING (or CLOSING) RETRACTABLE HARDTOP**
- **NORMAL OPERATION - HARD TONNEAU**
- **MANUAL OPERATION - OPENING (or CLOSING) RETRACTABLE HARDTOP**
- **MANUAL OPERATION - HARD TONNEAU**
- **MANUAL OPERATION - HEADER LATCHES**

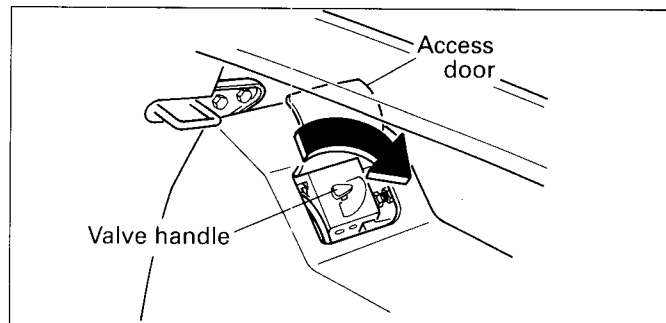
NOTE

- (1) Before you attempt to operate any system manually, check that nothing was overlooked that might otherwise allow normal automatic operation, such as:
 - Make sure the manual bypass valve for each hydraulic pump/motor is in the "POWER" position. The system may not work properly or at all if the valves are not closed all the way.
 - Be sure the object-in-trunk sensor is connected.
 - Make sure the vehicle battery is charged and, if possible, the engine running. If battery voltage is less than 10 volts, the hardtop system may not have enough energy to operate properly or at all.
 - Check that the battery is not overcharged; the hardtop ECU will instantly shut off at 16 volts and will not turn on until voltage drops below 16 volts.
- (2) Once you are reasonably satisfied that normal operation is not possible then proceed with manual operation.

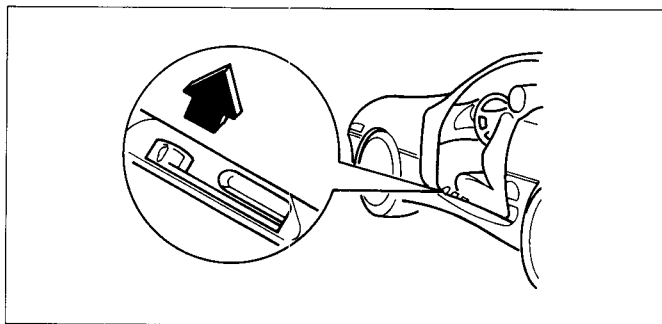
MANUAL OPERATION - HARD TONNEAU

OPENING THE HARD TONNEAU

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Open the vehicle passenger side door. Fold the passenger side rear seatback down to expose the carpeting behind the seats. The hard tonneau's pump/motor is on the passenger side.



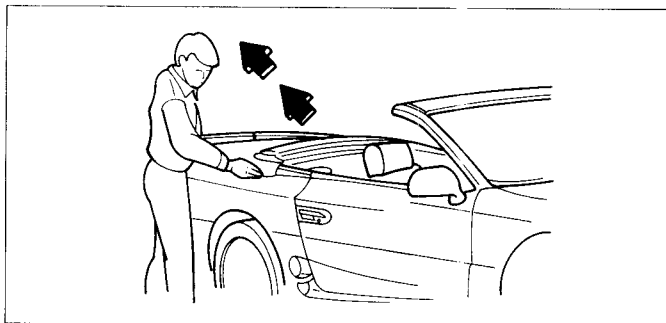
3. Open the passenger side access door on your left, and reach in and rotate the bypass valve handle clockwise 90° to the "MANUAL" position, until it stops.



4. Pull the hard tonneau release lever, located to the left beside the driver's seat, up to release the hard tonneau. Make sure both latches are released.

Caution

Never pull the tonneau release lever, except to operate the hard tonneau manually. Otherwise the tonneau will not be fully closed. Driving with the tonneau incompletely closed is hazardous.



5. Standing at the passenger side, grasp the hard tonneau along the side from underneath, with both hands placed near the front and side center. Slowly lift until it is all the way up.

NOTE

Hydraulic back-pressure created in the hard tonneau system prevents the hard tonneau from being raised quickly.

Caution

The hard tonneau may close unexpectedly before you return the bypass valve to the "POWER" position.

6. Immediately reach in and return the bypass valve to the "POWER" position by rotating the handle counterclockwise 90° until it stops. This will keep the hard tonneau up without additional support.

Caution

If the bypass valve is not completely closed after raising the hard tonneau it may slowly close without warning.

CLOSING THE HARD TONNEAU

1. Open the vehicle's passenger side door. Reach in and rotate the bypass valve handle clockwise 90° to the "MANUAL" position, until it stops.

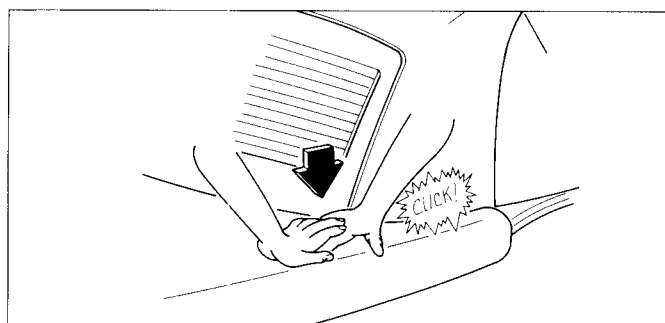
Caution

The hard tonneau may begin to close immediately when the bypass valve is turned to the "MANUAL" position.

2. Using gentle but firm pressure, push down on the hard tonneau until it is completely closed.

NOTE

The hard tonneau will not slam closed due to the back-pressure in the hydraulic system. **DO NOT APPLY EXCESSIVE FORCE TO CLOSE THE HARD TONNEAU.**



3. Using a hand-on-hand method, press down on the hard tonneau to latch it. You should hear a click when it latches. Make sure that it is latched by gently, but firmly, pulling up on the hard tonneau near the front and side center (near the latch). Repeat for the other latch.

Caution

Make sure the hard tonneau is closed and latched before driving.

4. Return the bypass valve to the "POWER" position until it stops.
5. Close access door.
6. Return seatback to its fully upright position and lock in place.

NOTE

The manual bypass valve must be in the "POWER" position in order to operate the hard tonneau electrically.

MANUAL OPERATION - RETRACTABLE HARDTOP

CLOSING RETRACTABLE HARDTOP

Caution

Closing the retractable hardtop requires two individuals. If you encounter any difficulties, do not continue to close the hardtop and seek assistance/help.

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Start the engine.

NOTE

If the engine will not start and the battery does not have enough energy to lower the door glass windows, open both vehicle doors.

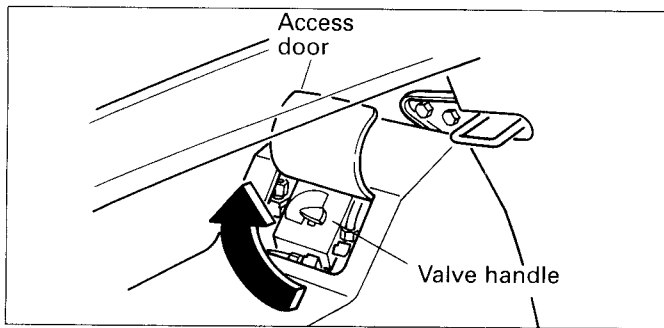
This will allow the hardtop's seals to mate correctly to the door glass windows when they shut, after the hardtop is closed.

3. Press and hold the hardtop switch on the "CLOSE" side.

NOTE

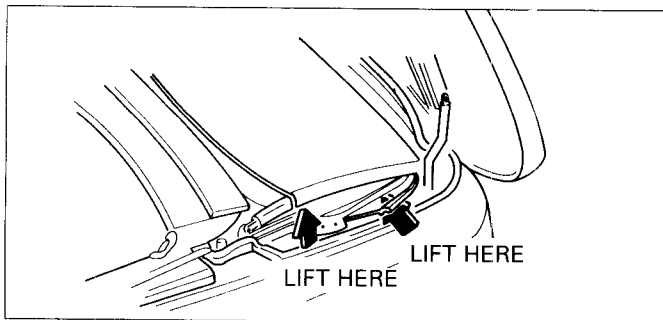
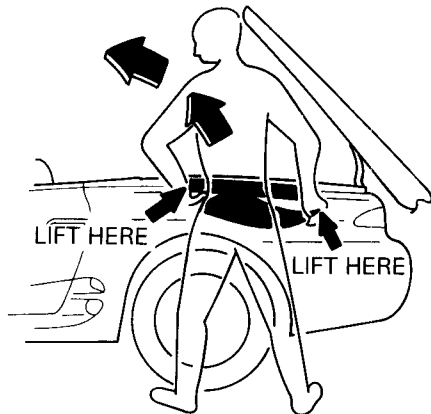
At this time the hard tonneau should open revealing the folded hardtop. If it does not open, see **MANUAL OPERATION - HARD TONNEAU**, in this section.

4. Fold the driver side rear seatback down to expose the carpeting behind the seatbacks. The retractable hardtop pump/motor is on the driver side.



5. Open the access door on the driver side, reach in and rotate the bypass valve handle clockwise 90° to the "MANUAL" position, until it stops.

NOTE: This procedure requires two people. For illustration clarity, only one person is shown.



6. With you on one side of the vehicle and your helper on the other, each put one hand under the rear portion of the hardtop, and the other hand under the front portion of the hardtop.

Caution

- (1) Keep your fingers clear of the hardtop hinges, mechanism and roof joints.
- (2) To avoid risk of personal injury, remove all jewelry (rings, bracelets, wristwatches, etc.) from your hands.
- (3) DO NOT lift the hardtop by the quarter windows. Damage to the quarter window system and/or personal injury may result.

NOTE: This procedure requires two people. For illustration clarity, only one person is shown.

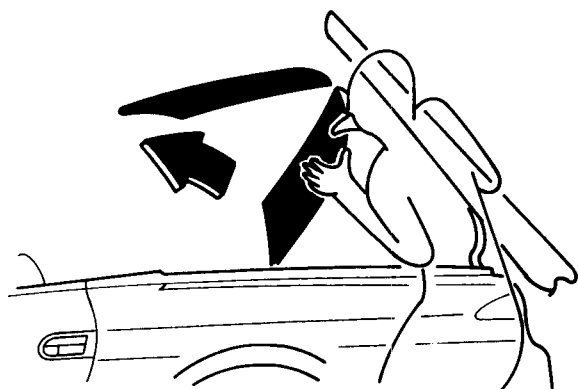


7. Using a constant lifting motion slowly lift the hardtop approximately halfway up.

NOTE

Hydraulic back-pressure created in the hydraulic system prevents the hardtop from being raised quickly.

NOTE: This procedure requires two people.
For illustration clarity, only one person is shown.



8. Push only on the rear portion of the hardtop as shown above; **DO NOT PUSH ON THE REAR WINDOW**. Push the hardtop forward until it drops into the windshield header latches.
9. Close header latches. Refer to **MANUAL OPERATION - HEADER LATCHES**, in this section.
10. Close hard tonneau. Refer to **MANUAL OPERATION - HARD TONNEAU**, in this section.

Caution

- (1) **DO NOT** drive the vehicle if the hardtop is not properly latched to the windshield header. Driving with the top incompletely latched is hazardous.
- (2) In an emergency, do not force the windows. If the quarter windows do not close, remove the headlining, and retract the quarter windows manually. This can be done using a 5 mm allen wrench. Insert the 5 mm allen wrench into the center of the quarter window motor and turn clockwise to retract both quarter windows.
11. Return the bypass valve to the "POWER" position by rotating the handle counterclockwise 90°.
12. Close the access door.
13. Return the seatback to its fully upright position and lock in place.

OPENING RETRACTABLE HARDTOP

Caution

- (1) To prevent damage to hardtop system components (especially the quarter windows), manual operation should only be performed by trained technicians, for the sole purpose of vehicle servicing or repair.
- (2) Manual operation of the retractable hardtop requires two individuals.

1. Set the parking brake. Make sure the gear selector lever is in the "P" (PARK) (automatic transaxle), or neutral position (manual transaxle).
2. Start the engine.
3. Open the hard tonneau one of three ways:
 - automatically using the hardtop "OPEN" switch;
 - automatically using the hard tonneau "OPEN" switch;
 - manually, if either system becomes inoperable.

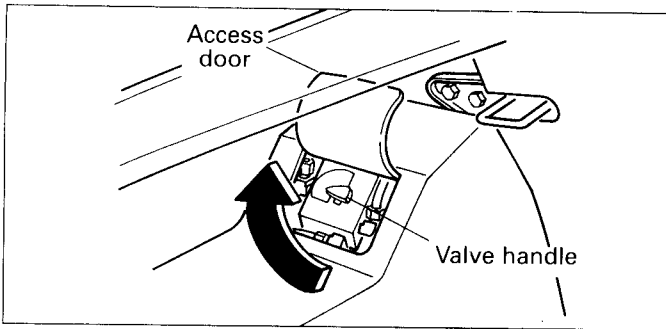
NOTE

When the hardtop "OPEN" switch is pressed sequentially the following may occur: the quarter windows may retract and door windows lower, and the header latches unlatch, and the hard tonneau unlatches and begins to open.

4. Unlatch the hardtop one of two ways:
 - automatically using the hardtop "OPEN" switch;
 - manually if either system becomes inoperable. (refer to **MANUAL OPERATION - HEADER LATCHES**, in this section).

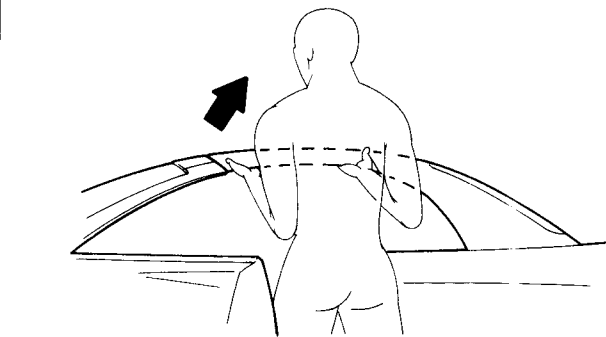
Caution

- (1) The quarter windows must be fully retracted in order for the header latches to unlatch. If the quarter windows do not retract, remove the headlining, and manually retract the windows. This can be done using a 5 mm allen wrench. Insert the 5 mm allen wrench into the center of the quarter window motor and turn clockwise to retract both quarter windows.
- (2) The header latches must be unlatched before opening the hardtop. If the header latches do not unlatch they can be opened manually (refer to **MANUAL OPERATION - HEADER LATCHES**, in this section).
- (3) Remove any items from the hardtop stowage area.
5. Fold the driver side rear seatback down to expose the carpeting behind the seatbacks. The retractable hardtop pump/motor is on the driver side.



6. Open the access door on the driver side, reach in and rotate the bypass valve handle clockwise 90° to the "MANUAL" position, until it stops.

NOTE: This procedure requires two people. For illustration clarity, only one person is shown.



7. Open both vehicle doors. With a person on each side of the vehicle, lift along the side portions of the hardtop front roof panel until the hardtop is halfway open.

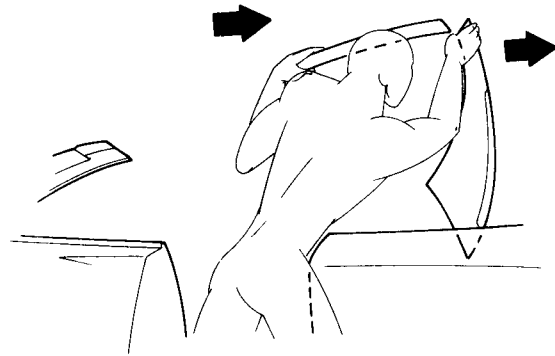
NOTE

Hydraulic back-pressure created in the hardtop hydraulic system prevents the hardtop from being lowered quickly.

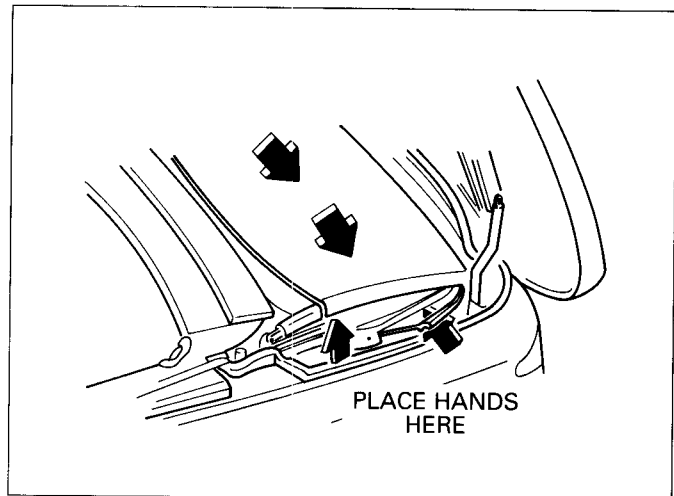
Caution

Keep your fingers clear of the hardtop hinges, mechanism and roof joints.

NOTE: This procedure requires two people. For illustration clarity, only one person is shown.



8. To move the hardtop into the stowage area, each person must place one hand on the rear portion of the hardtop at the top of the quarter window opening, and the other hand at the front edge of the hardtop. Pull the front portion while pushing the rear portion to get the hardtop moving into the stowage area.



9. Push the hardtop until it is 3/4 open. Then, place both hands under the rear portion of the hardtop to slow it to a stop.

Caution

Be sure to keep your hands and arms from getting caught under the hardtop.

10. Return the bypass valve to the "POWER" position by rotating the handle counterclockwise 90° as required.
11. Close the access door.

12. Return the seatback to its fully upright position and lock in place.
13. If necessary, close the hard tonneau manually.

Caution

Make sure the hard tonneau is closed and latched before driving.

MANUAL OPERATION - HEADER LATCHES

NOTE

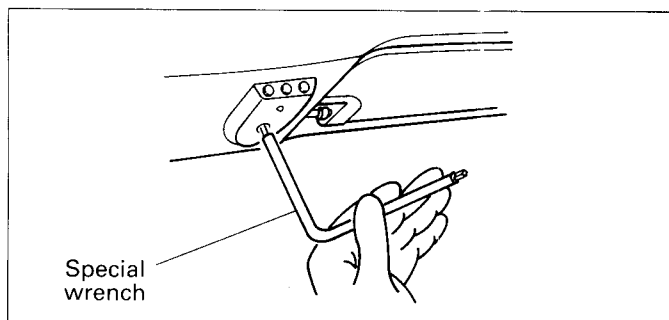
A special wrench is provided for removal and reinstallation of the HomeLink™ Universal Transmitter, and it is also used to manually operate the header latches. The special wrench is located inside the CD (Compact-Disc) changer access door behind the passenger side rear seatback.

The HomeLink™ Transmitter may also be removed using a standard #2 cross-tip screwdriver. The header latches may also be operated using a standard 1/4" square drive ratchet and extension.

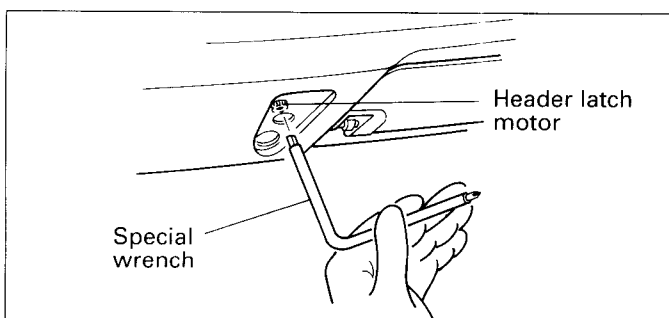
Caution

When operating the header latches manually, always be sure to remove the wrench from the header latch motor immediately. Otherwise, personal injury may result if the tool is not removed and the hardtop switch is pressed.

TO OPEN OR CLOSE HEADER LATCHES

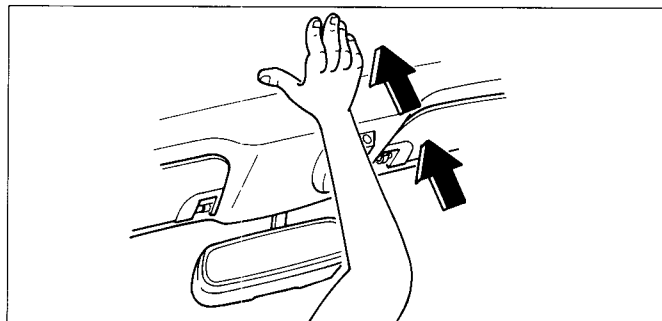


1. Using the special wrench (or a screw driver), remove the screw securing the HomeLink™ Universal Transmitter to the windshield header garnish.
2. Pull HomeLink™ Transmitter down from the header garnish, and move to one side out of your way.



3. Using the special wrench (or a 1/4" square

drive ratchet and extension), insert it into the latch motor and turn the wrench (1) full turn clockwise to close the latches.



4. To confirm that the hardtop is latched, push up on the front of the hardtop. If the hardtop is not latched, turn the wrench (1) full turn counterclockwise and repeat Steps 3 and 4.
5. Remove the special wrench (or ratchet and extension).
6. Tuck the HomeLink™ Transmitter wires up into the header garnish, and reinstall the HomeLink™ with the screw.
7. Return the seatback to its fully upright position and lock in place.

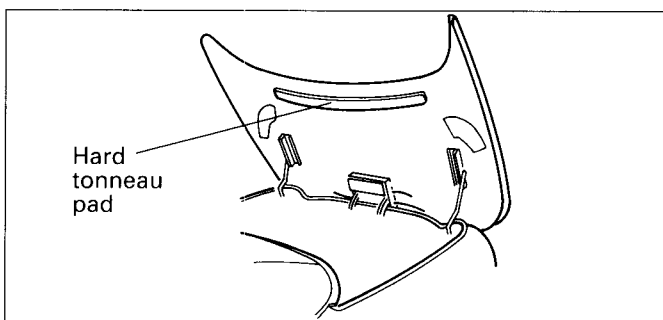
SPYDER CLEANING RECOMMENDATIONS

INTERIOR

HEADLINING

Clean with a mild soap or a reliable vinyl cleaner. Apply a small amount of solution with a clean cloth or sponge, then wipe with a damp cloth. When the lather has been removed, wipe again with a soft, clean cloth.

HARD TONNEAU PAD



Regularly vacuum the hard tonneau pad to keep it free of dust and dirt.

EXTERIOR

ABOUT THE SPYDER FINISH

The retractable hardtop and hard tonneau have been finished with same high-quality finish as the rest of the vehicle.

WASHING

Always make sure the retractable hardtop is closed and latched. Otherwise, water may enter the vehicle's interior, causing damage. As with the rest of the vehicle, wash it out of direct sunlight, using a mild soap and water solution. Start washing from the roof panels, working downward, using a sponge. After washing, wipe with a chamois or soft cloth.

NOTE

When using a high-pressure washer avoid directing high pressure spray at the weatherstrips.

WAXING THE RETRACTABLE HARDTOP AND HARD TONNEAU

The retractable hardtop and hard tonneau should be waxed like the rest of the vehicle. When waxing around the weatherstrip mating surfaces of the retractable hardtop and hard tonneau, be careful not to put any wax on the weatherstrips. If stained with wax the weatherstrip may not maintain a weatherproof seal with other components. If wax is accidentally applied to the weatherstrip, remove it promptly before it dries.

POLISHING THE RETRACTABLE HARDTOP AND HARD TONNEAU

Treat them the same recommended way as you would the rest of the vehicle.

SPARE TIRE, JACK AND TOOL SET STORAGE

The spare tire, jack and tool set are stowed in the cargo/hardtop stowage area. To access them, first close and latch the retractable hardtop, then open the hard tonneau using the hard tonneau "OPEN" switch, or use manual operation.

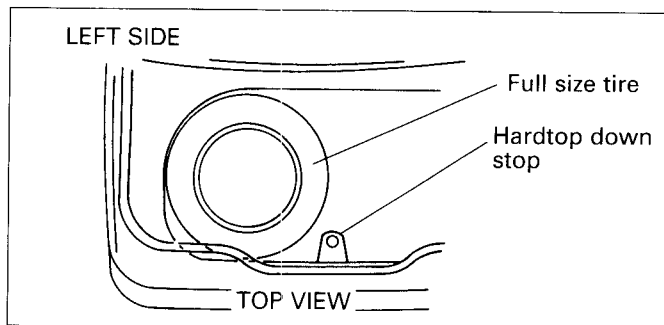
Caution

Lowering the retractable hardtop part way to open the hard tonneau is not recommended. You could easily scratch the hardtop while removing the spare tire. Use the hard tonneau "CLOSE/OPEN" switch.

For taking the jack, tire, etc. in and out, first disconnect and remove the object-in-trunk sensor (located in the cargo/hardtop stowage area covering the spare tire, tool set and luggage compartment floor boxes). For information on removal of the object-in-trunk sensor see page 00-9, in this section.

NOTE

It is easier to remove the spare tire from the passenger side (it is closer to you). You may want to protect your clothing and the vehicle finish by covering the rear fender.



To store the full size tire, reinstall the object-in-trunk sensor and reconnect the wire connector, and place the tire to the far left in the stowage area.

Caution

- (1) The stowage compartment for the spare tire is intended ONLY for the spare, not the full size tire and wheel.**
- (2) Make sure the hardtop down stop clears the tire while closing the hard tonneau.**

For more information regarding handling the spare, jacking and tire changing, etc., see the Owner's Manual.

HOMELINK™ UNIVERSAL TRANSMITTER

The HomeLink™ Transmitter is located in the center of the windshield header garnish. It provides a convenient way to consolidate the functions of up to three individual handheld transmitters into one built-in device. Once trained, the HomeLink™ Transmitter is designed to repeat both the frequency and the security code of the hand-held transmitters used for garage doors, security gates, or most radio frequency receivers. With the optional Lighting Package, home/office lighting systems, and security systems can be operated with the HomeLink™ Universal Transmitter.

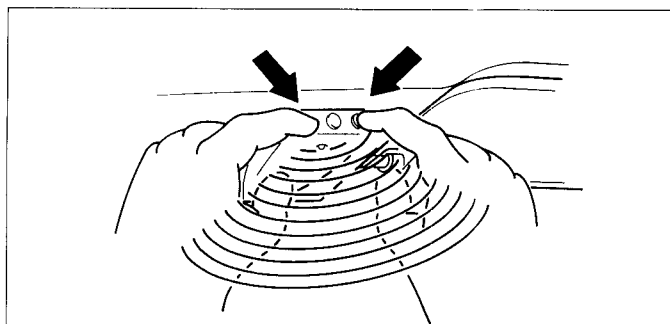
Continuous power is supplied to HomeLink™ Transmitter by the vehicle's battery and charging system.

PROPER TRAINING TECHNIQUE**Caution**

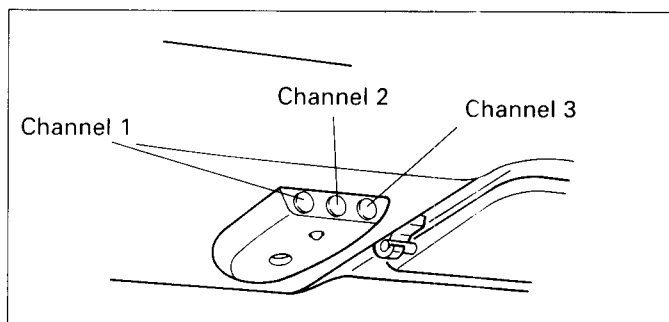
During this procedure, the system that you are training will be made to operate if it is within range of either the HomeLink™ or the hand-held transmitter. Make sure that people or objects are clear of the garage door, gate, etc. that you are training.

NOTE

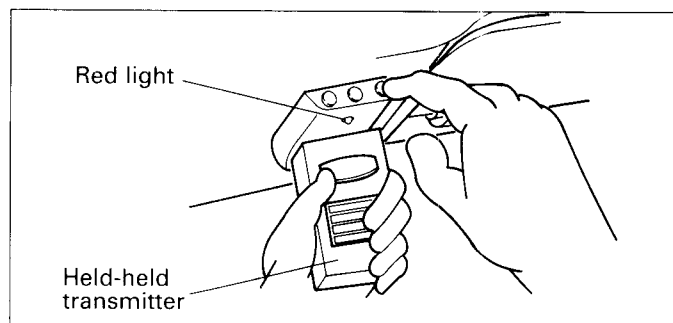
The vehicle's engine should be turned off while training the transmitter.



1. If you have previously trained this HomeLink™ Transmitter, proceed to Step 2. Hold down the outside two buttons on the HomeLink™ Transmitter until the red light begins to flash rapidly, then release both buttons.



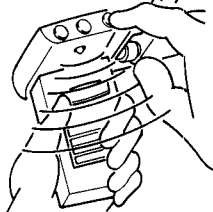
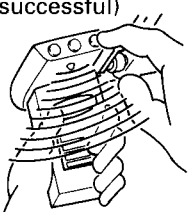
2. Decide which one of the three HomeLink™ channels you want to train.



3. Hold the end of your hand-held transmitter against the bottom of the HomeLink™ Transmitter so that you can see the red light.

NOTE

In order to train, you must hold the handheld transmitter less than one inch from the HomeLink™ Transmitter.

Slow Flash	Rapid Flash
(Continue holding)	Rapid Flash (Release buttons - training successful)
	

4. Press the desired HomeLink™ button until the red light flashes slowly. **Do not release the button.** Continue holding the button and press the hand-held transmitter button through Step 5.
5. Hold down both buttons until you see the red light on the HomeLink™ Transmitter flash rapidly (this may take 10-90 seconds). Then release both buttons.

TRANSMITTER COMPATIBILITY

If the HomeLink™ Transmitter has not indicated a successful train, note the brand name, model number, and frequency of the hand-held transmitter and refer to Table 1. Table 1 is a listing of all commonly known garage door opener transmitters, and identifies the different transmitters as compatible or not compatible with the HomeLink™ Transmitter.

- If the hand-held transmitter is identified in Table 1, is confirmed compatible to the HomeLink™ Transmitter and does not activate the receiver, refer to the diagnostic steps below.
- If the hand-held transmitter is identified in Table 1 and is confirmed not compatible to the HomeLink™ Transmitter, inform the customer of the problem and advise them to call HomeLink™ for product discounts on replacement garage door systems.
- If the hand-held transmitter is not identified in Table 1 and has not been successfully trained to the HomeLink™ Transmitter, contact HomeLink™ for technical assistance at 1-800-355-3515. Make sure you identify the brand name, model number, and frequency of the hand-held transmitter (if possible) for the HomeLink™ operator.

TRAINING PROBLEM DIAGNOSIS

- **NO SUCCESSFUL TRAIN INDICATION (INDICATOR LIGHT DOES NOT FLASH RAPIDLY) AND HOMELINK™ TRANSMITTER DOES NOT PROPERLY ACTIVATE RECEIVER**

If the HomeLink™ Transmitter does not train, please follow these steps to identify the cause of the problem.

1. Verify that the system (garage door opener, etc.) operates properly with the original transmitter.
2. Verify that the red light on the HomeLink™ Transmitter glows when any button is pushed. If the light glows, proceed to Step 4.
3. If the light does not glow, verify that battery power is available at the connector to the HomeLink™ Transmitter, replace the fuse and/or fix the vehicle wiring. If battery power is confirmed and the light still fails to operate, replace the HomeLink™ Transmitter with a new unit.
4. Verify that the hand-held transmitter has an effective battery. If a new battery is needed, replace and repeat training sequence.
5. Try reorienting the hand-held transmitter and repeating the training sequence. One effective way of reorienting is to touch a different side of the hand-held transmitter to the HomeLink™ Transmitter during training, i.e. place the opposite end of the handheld transmitter against the HomeLink™ Transmitter.
6. If the hand-held transmitter is confirmed compatible in Table 1 and does not properly activate the receiver after completing the above steps, then the HomeLink™ Transmitter may be defective and should be replaced. If the HomeLink™ has been previously replaced for the same problem, contact HomeLink™ at 1-800-355-3515 for additional assistance.

• **SUCCESSFUL TRAIN INDICATION (RAPID FLASH) BUT HOMELINK™ TRANSMITTER DOES NOT PROPERLY ACTIVATE RECEIVER**

NOTE

The effective range of the HomeLink™ Transmitter may differ from that of the original hand-held transmitter.

If the HomeLink™ Transmitter appears to have trained (rapid flash), but does not activate the system receiver, follow these steps to identify the cause of the problem:

1. Verify that the system (garage door opener, etc.) operates properly with the original transmitter.
2. Verify that the hand-held transmitter has an effective battery. If a new battery is needed, replace and repeat training sequence.
3. Try reorienting the hand-held transmitter and repeating the training sequence. One effective way of reorienting is to touch a different side of the hand-held transmitter to the HomeLink™ Transmitter during training, i.e. place the opposite end of the hand-held transmitter against the HomeLink™ Transmitter.
4. If the problem persists, and the hand-held transmitter is confirmed compatible in Table 1, then the HomeLink™ Transmitter may be defective and should be replaced. If the HomeLink™ Transmitter has been replaced for the same problem, contact HomeLink™ at 1-800-355-3515 for additional assistance.

NOTE

Should the vehicle be stolen, advise the customer to immediately retrain all their HomeLink™ programmed receiver codes in all applicable radio frequency appliances with their original hand-held transmitter.

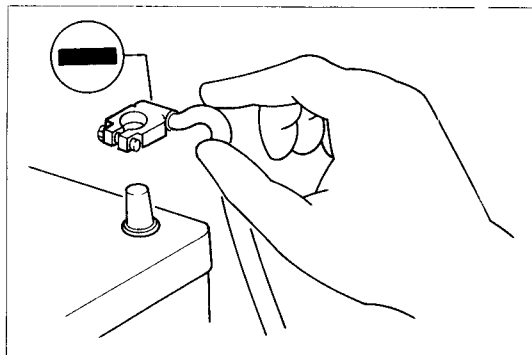
TABLE 1

LIST OF TESTED GARAGE DOOR OPENERS

Brand Name	Manufacturer	Model #	FCC ID	Frequency MHZ	Train?	Comments	Need receiver verification?
Chamberlain	Chamberlain	G-3684	BYF8GKG3684	390	YES		
Chamberlain	Chamberlain	66LC	-	390	YES		
Crusader	Advance Industries	-	BSH8YN213	340	YES		
Genie	Genie	AT85-P	B8Q8KL	390	YES		
Genie	Genie	AT85	-	390	YES	AT85 @ 290MHZ may have problems like AT79 below.	
Genie	Genie	AT90	B8Q8KL	390	YES		
Genie	Genie	MAT85	B8Q8KL	390	YES		
Genie	Genie	MAT90	B8Q8KL	390	YES		
Genie	Genie	AT285P	B8Q8KL	390	YES		
Genie	Genie	AT95	B8Q8KL	390	YES		
Genie	Genie	AT35A	-	390	YES		YES
Genie	Genie	AT79	-	290	NO	"Oscillator is FM, too wide for data reception **"	
Genie	Genie	AT55	-	290	NO	"Oscillator is FM, too wide for data reception **"	
Genie	Genie	GWK	-	390	YES		
Heathkit	-	-	-	-	YES		
Jackson	-	47-1001	ELY547-471001-T	315	YES		
Lift-A-Dor	Genie	LDT901	B8QGT50	390	YES		
Liftmaster	Chamberlain	G3466	132B873A	290	YES		
Liftmaster	Chamberlain	G3467	132B873A	400	NO	Illegal transmit frequency.	
Linear	Linear	DT-2A	CJF793	310	YES		
Linear	Linear	SNT00016	EF4793	304	YES		
Linear	Linear	EK11T	CJF793	290	YES		YES
Linear	Linear	SNT00016	EF4793	304	YES		
Linear	Linear	D-22B	CJF793	304	YES		
Linear	Linear	DT4	CJF794	310	YES		
Linear	Linear	SNT00048B	EFF4SNT00048B	304	YES		
Linear	Linear	MDT	EF4DNT00052	318	NO	Doesn't stay "on" long enough.	
Micom	International Dynamics	ESP-T9	ESP-T10	312	YES		
Micom	International Dynamics	ESP-T9	ESP-T10	312	YES		
CodeAble	Multi-Elmac (Stanley)	3010	BX79KG	300	YES		
Multi-Elmac	-	3089	-	300	YES		
Multi-Code	Stanley	-	A9K X Multicode	-	YES		
Multi-Code	Stanley	3070	BX79KGMICRO-10	300	YES		
Multi-Code	Stanley	3032	BX79KGT	300	YES		
Multi-Code	Multi-Elmac (Stanley)	1054	1054	250	NO	Illegal transmit frequency.	
Multi-Code	-	3034	-	300	YES		
Multi-Code	Stanley	3033	BX79KGT	300	YES		
Multi-Elmac	Multi-Elmac (Stanley)	1048	1048	250	NO	Illegal transmit frequency.	
Multi-Code	Stanley	3060	BX79KGMINI	299	YES		
Multi-Code	Multi-Elmac (Stanley)	1098	1098	301	YES		
Multi-Code	Martec	MK-1010	10-JCQMK-1010	300	YES		
Pulsar	Pulsar (Allister)	PDX9921	BPB83PXMIT	288	YES		
Allister	Pulsar (Allister)	ADX9931	BQA83XMIT	318	YES		
Allister	Pulsar (Allister)	ADX9932	BQA83XMIT	318	YES		
Allister	Pulsar (Allister)	ADX9933	BQA83XMIT	318	YES		
Allister	Pulsar (Allister)	ADX9934	BQA83XMIT	318	YES		
Allister	Pulsar (Allister)	ADX9935	BQA83XMIT	318	YES		
Allister	Pulsar (Allister)	ADX9936	BQA83XMIT	318	YES		

Brand Name	Manufacturer	Model #	FCC ID	Frequency MHZ	Train?	Comments	Need receiver verification?
Allister	-	20	-	340	NO	"Very Subtle FSK, can not distinguish"	
Sears	Sears	-	139-654020	-	YES		
Sears	Sears	-	139.664953	-	YES		
Sears	Sears	-	139.664030	-	YES		
Sears	Sears	-	HBW3CQ139.53738	390	YES		
Sears	Sears	9B53718	-	390	YES		
Sears	Sears	9B53708	-	390	YES		
Shima	Shima	T-18B	-	304	YES	Must repeat button push to keep transmitter on.	
Shima	Shima	Style D	-	319	YES		
Stanley	Stanley	2986	-	310	YES		
Stanley	Stanley	1047	1047	310	YES		
Stanley	Stanley	1050	1050	310	YES		
Stanley	Stanley	1076	A9K9KG LMX	310	YES		
Stanley	Stanley	1079	A9K9KG LMX	310	YES		
Stanley	Stanley	1016	-	-	YES		
Stanley	Stanley	-	-	310	YES		
Stanley	Stanley	331-1052	A9K99G TPEN-1	310	YES		
Stanley	Stanley	1077	A9K9KG LMX	310	YES		
Telectron	Telectron	TP-21	-	230	NO	Outside of HomeLink™ operating band width.	
Telectron	Telectron	T-80	-	230	NO	Outside of HomeLink™ operating band width.	
Telectron	Telectron	T-80G	-	245	NO	Illegal transmit frequency.	
Telectron	Telectron	T-22A	-	247	NO	Illegal transmit frequency.	YES
Touch-n-Go	Advance Industries	-	BSH8YN205	360	YES		

*** Data stream and frequency is compatible, 3 samples found to be un-trainable due to wide band transmission."



PRECAUTIONS BEFORE SERVICE

SERVICING THE ELECTRICAL SYSTEM

1. Before proceeding with work on the electrical system, the following must never be done:
Unauthorized modifications of any electrical device or wiring, because such modifications might lead to a vehicle malfunction, over-capacity, or short circuit, that could possibly result in a vehicle fire.
2. When servicing the electrical system, disconnect the negative terminal from the battery.

Caution

1. Before connecting or disconnecting the negative battery terminal, be sure to turn off the ignition switch and the lighting switch.
2. After completion of work steps, reconnect the negative battery terminal, warm up the engine, and allow the vehicle to idle for approximately 5 minutes under the conditions described below. This procedure will allow the vehicle's computer-controlled systems to stabilize.

Engine coolant temperature: 80 - 95° C (176 - 203° F)

Lights, electric fans, accessories: OFF

Transaxle: neutral position

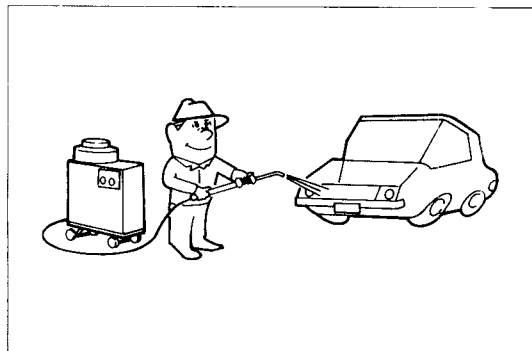
(A/T models: "N" or "P")

Steering wheel: neutral (center) position

SERVICING OR ADJUSTING THE RETRACTABLE HARDTOP SYSTEM

Caution

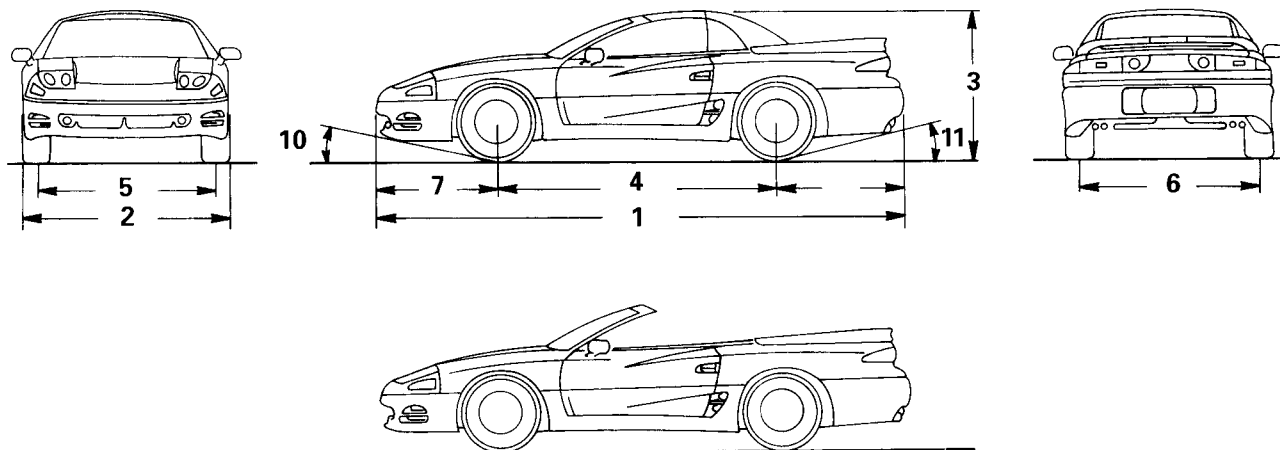
Mechanical adjustments to, or replacement of components of the retractable hardtop system, with the exception of hard and soft trim, will require that the hardtop ECU be run through "auto-configuration" using the ASC INCORPORATED computerized diagnostic system. When applicable DO NOT perform any adjustment or replacement of those retractable hardtop components without having the latest version of the ASC INCORPORATED diagnostic system.



VEHICLE WASHING

If high-pressure car-washing equipment or steam car-washing equipment is used to wash the vehicle, avoid directing high pressure spray at the weatherstrips.

GENERAL DATA AND SPECIFICATIONS



GENERAL SPECIFICATIONS

Models			3000GT SL Spyder <DOHC> (Non-Turbo)	3000GT VR-4 Spyder <DOHC> (Turbo)
Items				
Vehicle dimensions mm (in.)				
Overall length		1	4,565 (179.7)	4,545 (178.9)
Overall width		2	1,840 (72.4)	1,840 (72.4)
Overall height		3	1,285 (50.6)	1,285 (50.6)
Wheelbase		4	2,470 (97.2)	2,470 (97.2)
Tread	Front	5	1,560 (61.4)	1,560 (61.4)
	Rear	6	1,580 (62.2)	1,580 (62.2)
Overhang	Front	7	1,025 (40.4)	1,025 (40.4)
	Rear	8	1,050 (41.3)	1,050 (41.3)
Minimum running ground clearance		9	145 (5.7)	145 (5.7)
Angle of approach	degrees	10	12.2°	12.2°
Angle of departure	degrees	11	16.9°	16.9°
Vehicle weight kg (lbs.)				
Curb weights				
M/T			1,450 (3,197)	1,725 (3,803)*
A/T			1,490 (3,285)	—
Gross vehicle weight rating			2,050 (4,519)	2,205 (4,861)
Gross axle weight rating				
Front			1,090 (2,403)	1,145 (2,524)
Rear			960 (2,116)	1,060 (2,337)
Seating capacity			4	4
For Engine and Transaxle Specifications, refer to Volume 1 of the Service Manual.				

NOTE

* <4WS>

LUBRICATION AND MAINTENANCE

The retractable hardtop system has been designed to provide reliable, maintenance-free service under normal driving conditions. This is accomplished by using specially formulated, self-lubricating, long wearing components.

Most of these components do not require lubrication. The only parts requiring periodic lubrication are the header latches, hard tonneau latches, and hard tonneau lifting mechanism slide tracks. Note that lubrication, where it is not required, may actually deteriorate the materials or attract dirt which could cause rapid wear and/or component breakage.

MAINTENANCE SCHEDULES

Due to the virtually maintenance-free design of the retractable hardtop system maintenance schedules are not required. Typically, wiping off the mechanism component with a clean damp cloth to remove dust and dirt is all that is needed.

SEVERE SERVICE

Vehicles operating under severe service conditions will require more frequent cleaning of system components under one or more of the following conditions:

- Operation of the vehicle
- (1) Driving in sandy areas
- (2) Driving in salty areas
- (3) Driving in dusty conditions

HARD TONNEAU AND RETRACTABLE HARDTOP HYDRAULIC SYSTEM FLUID

When it is necessary to re-fill the pump reservoir, hydraulic cylinders, hoses, or the entire hydraulic system, MIL-H-5606 (**AVIATION HYDRAULIC FLUID**), or equivalent, can be used in the tonneau and hardtop hydraulic systems. Some examples of this aviation hydraulic fluid are Mobil Aero HFA, Aeroshell Fluid 4, or Royco 756. When it is necessary to top-off the reservoir, SAE 10W may be used.

As the name implies, the fluid must be an aviation-type fluid, not an automotive or other type. **DO NOT** use any other fluid or oils other than what is specified. Other types or weights of fluids or oils may slow operation, particularly during cold weather.

Generally, but not in all instances, if the hardtop ECU detects slower-than-normal operation (in this case due to using the wrong hydraulic fluid), it will set a diagnostic trouble code (DTC). The DTC can only be recovered using the ASC INCORPORATED computerized diagnostic system.

In addition to slowing operation, other oils may not be compatible with system components such as the O-ring seals.

Warning

When servicing the hydraulic system, use protective eyewear. Also, wear gloves and clothing that cannot be penetrated by the hydraulic fluid. If fluid contacts the skin, wash the area thoroughly with soap and water or waterless hand soap. Do not use gasoline, thinner, or solvents to clean the fluid from the skin.

LUBRICANTS - GREASES

Semi-solid lubricants bear the NLGI designation and are further classified as grades 0, 1, 2, 3, etc. Whenever "Chassis Lubricant" is specified, Multi-Purpose Grease, NLGI grade 2, should be used.

RECOMMENDED LUBRICANTS AND LUBRICANT CAPACITIES TABLE**RECOMMENDED LUBRICANTS**

Items	Recommended Lubricants
Retractable hardtop hydraulic pump/motor	System factory-filled with MIL-H-5606 (AVIATION HYDRAULIC FLUID), or equivalent. For re-filling the pump reservoir, hydraulic cylinders, hoses, or the entire hydraulic system use Mobil Aero HFA, Aeroshell Fluid 4, or Royco 756, or equivalent. When topping-off the reservoir, SAE 10W may be used.
Hard tonneau pump/motor	
Quarter windows mechanisms	Multipurpose grease NLGI Grade 2
Header latch mechanism	
Hard tonneau slide mechanism	

LUBRICANT CAPACITIES TABLE

Description	Metric Measure (dm ³)	U.S. Measure
Retractable hardtop hydraulic system	.976 dm ³ (976 ml)	1.03 qt
Hard tonneau hydraulic system	.614 dm ³ (614 ml)	.65 qt

ELECTRONIC CONTROL SUSPENSION (ECS)

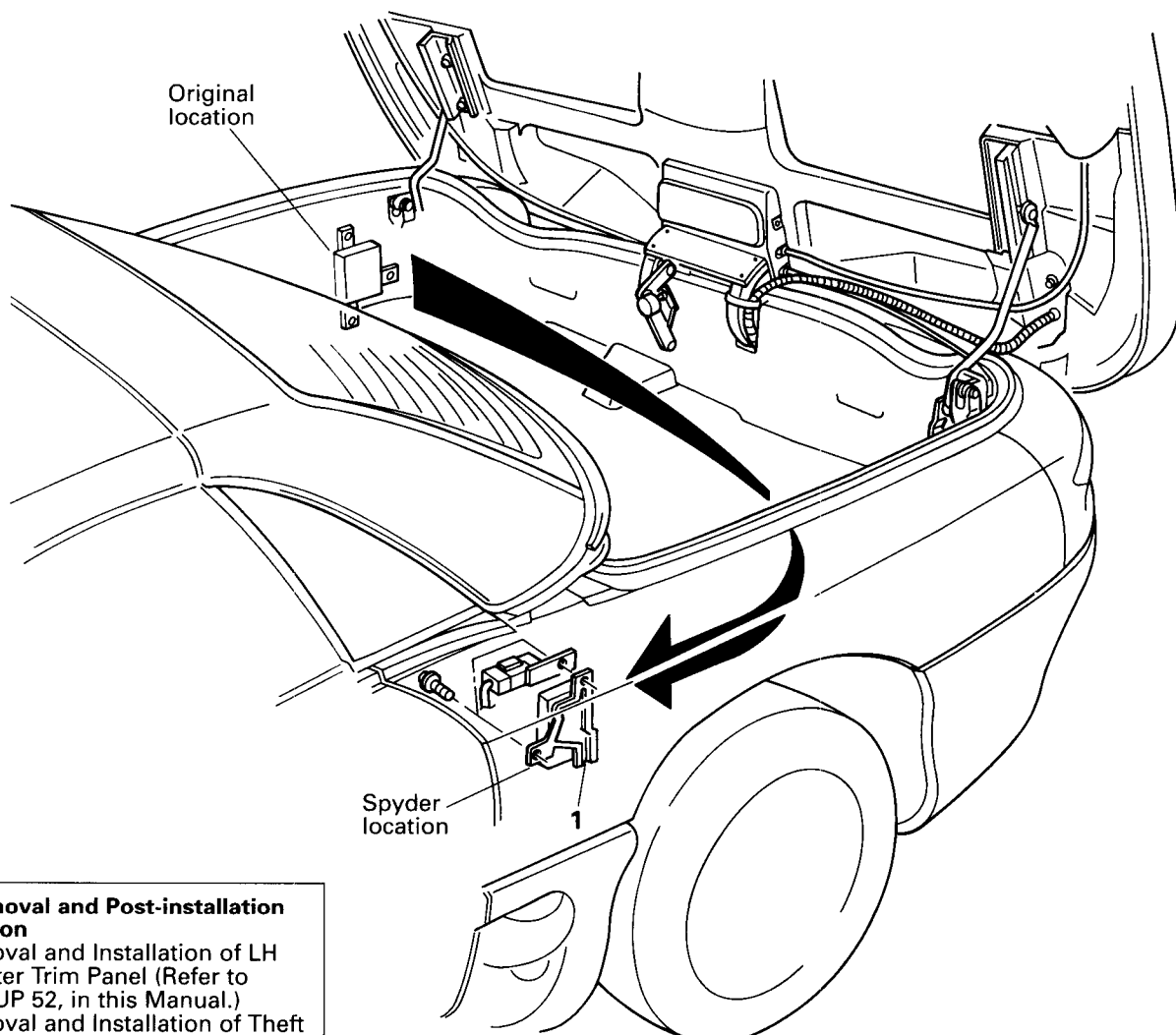
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ECS CONTROL UNIT (SPYDER-UNIQUE RELOCATION)

REMOVAL AND INSTALLATION

NOTE
Refer to Volume 1 of the Service Manual for more information.



Pre-removal and Post-installation Operation

- Removal and Installation of LH Quarter Trim Panel (Refer to GROUP 52, in this Manual.)
- Removal and Installation of Theft Alarm System Automatic Shut-Off Unit and Keyless Entry Receiver Assembly (Refer to GROUP 54, in this Manual.)

NOTE

The ECS control unit mounting bracket for the Spyder has been modified. When replacing this part use the Spyder-unique service part.

Removal step

1. ECS control unit

SERVICE BRAKES

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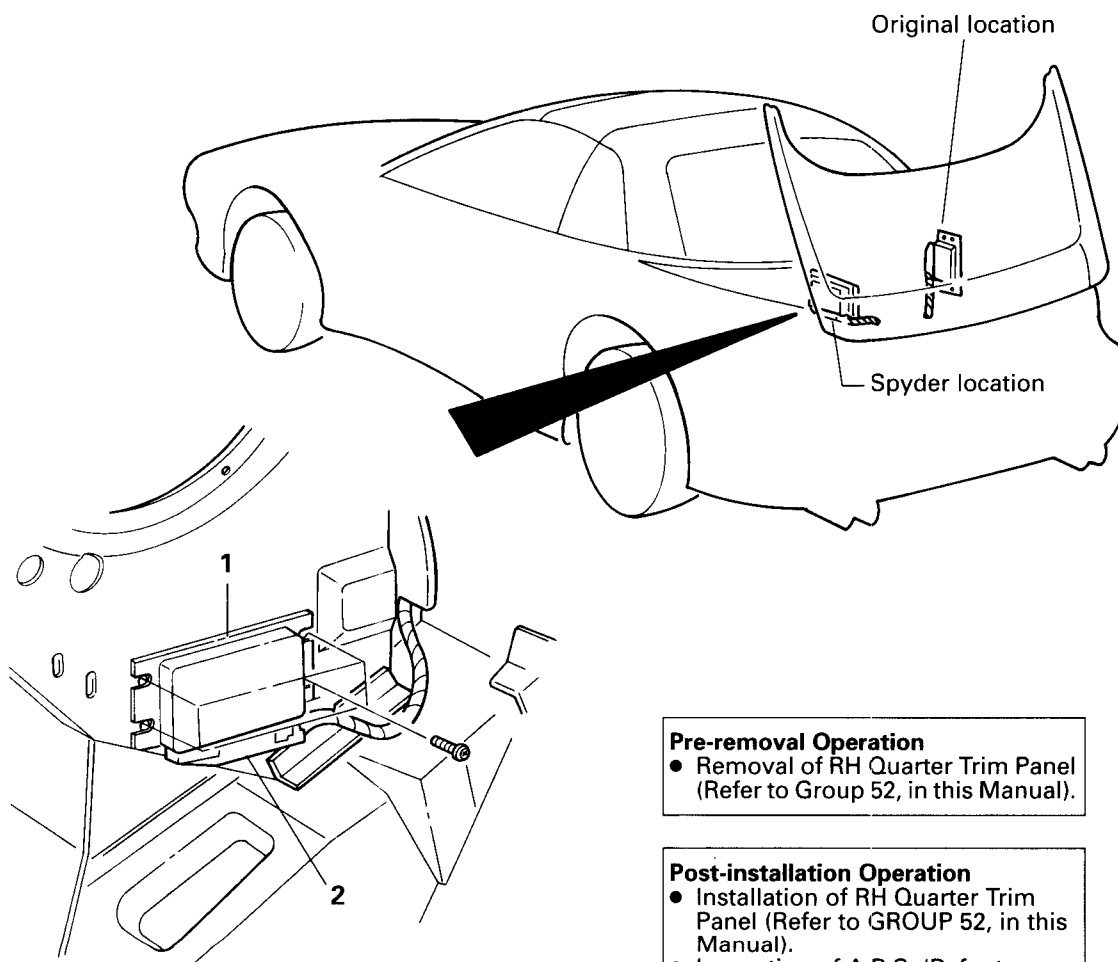
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Removal and Installation	2

ABS ELECTRONIC CONTROL UNIT (SPYDER-UNIQUE RELOCATION)

REMOVAL AND INSTALLATION

NOTE

Refer to Volume 1 of the Service Manual for more information.



Pre-removal Operation

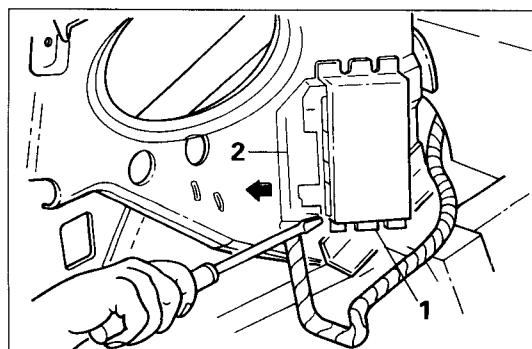
- Removal of RH Quarter Trim Panel (Refer to Group 52, in this Manual).

Post-installation Operation

- Installation of RH Quarter Trim Panel (Refer to GROUP 52, in this Manual).
- Inspection of A.B.S. (Refer to Volume 1 of the Service Manual).

Removal steps

- ↔
1. Electronic control unit
 2. Control unit connector connection



SERVICE POINT OF REMOVAL

2. REMOVAL OF CONTROL UNIT CONNECTOR

Carefully insert a screwdriver into the lock section as illustrated, and carefully pull out the connector from below.

BODY

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GENERAL INFORMATION

DESCRIPTION

Overview

The retractable hardtop system is actually composed of five separate systems that work in unison. The systems are as follows:

- retractable hardtop
- power quarter windows
- automatic header latch system
- hard tonneau
- object-in-trunk sensor (trunk floor)

The hard tonneau and hardtop have their own electric, motor-driven pumps that actuate hydraulic cylinders. An electronic control unit (ECU) controls all electrical functions of the hardtop system. In addition this includes lowering and raising of the door window glass when operating the hardtop.

Manual transaxle-equipped vehicles have the ECU connected to the vehicle speed sensor and the parking brake switch. This prevents operation of the retractable hardtop or the hard tonneau if the vehicle is moving 3-5 mph or more. Automatic transaxle-equipped vehicles have the ECU connected to the PARK switch and the speed sensor. Operating the hardtop and/or hard tonneau while the vehicle is in motion is hazardous. Never operate the hardtop and/or tonneau while the vehicle is in motion. In addition, always set the parking brake before operating the hardtop or hard tonneau. The retractable hardtop system should only be operated with the ignition switch in the "ON" position and with the engine running.

About the Hardtop and Power Quarter Windows

The retractable hardtop consists of two composite roof panels hinged where the panels join and also at the body. A mechanized rear shelf panel that rests above the rear seatbacks is forward when the hardtop is closed. When the hardtop is open, the shelf panel moves back to cover the gap at the hard tonneau. In an emergency, the hardtop can be closed manually by bypassing the hydraulic pump. Opening the hardtop manually should only be performed by trained service personnel. The retractable hardtop system has a "one-touch" (or single-switch) system, with a built-in delay safety feature when closing the hardtop. This allows the operator to make sure nothing is between the header and the hardtop when it closes.

During operation of the hardtop, the quarter windows automatically retract into the sides of the rear roof panel. The quarter windows cannot be operated independently of hardtop operation; they move to full open (retracted) position when the hardtop is opened, and full closed when the hardtop is closed. The door windows can be operated after the retractable hardtop operation is complete.

About the Automatic Header Latch System

The windshield header contains the automatic latch system. The dual latches are driven by a single electric motor controlled by the ECU. The latches may be manually operated in an emergency by removing the HomeLink™ Universal Transmitter and using a standard 1/4" square drive ratchet and extension to drive the motor. A special combination HomeLink™ Transmitter removal and installation tool/header latch wrench is provided. It is located inside the CD changer compartment. When operating the header latches manually, always be sure to remove the wrench from the header latch motor immediately. Otherwise personal injury may result if the tool is not removed and the hardtop switch is pressed.

About the Hard Tonneau

The hard tonneau covers the hardtop when it is open, and covers the stowage area when the hardtop is closed. The tonneau is a one-piece composite with a serviceable fixed spoiler and center high mount

stop light. It is hinged at the rear, opening from the front. Twin, cable-actuated, gear motor-released latches (with manual release), secure the hard tonneau. The hard tonneau may be operated independently of the hardtop by means of the hard tonneau "OPEN"/"CLOSE" switch. It can be operated only with the ignition switch in the "ON" position. The hard tonneau cannot be opened independently if the hardtop is open; the switch is electrically locked-out. The hard tonneau system should only be operated with the engine running.

About the Object-In-Trunk Sensor

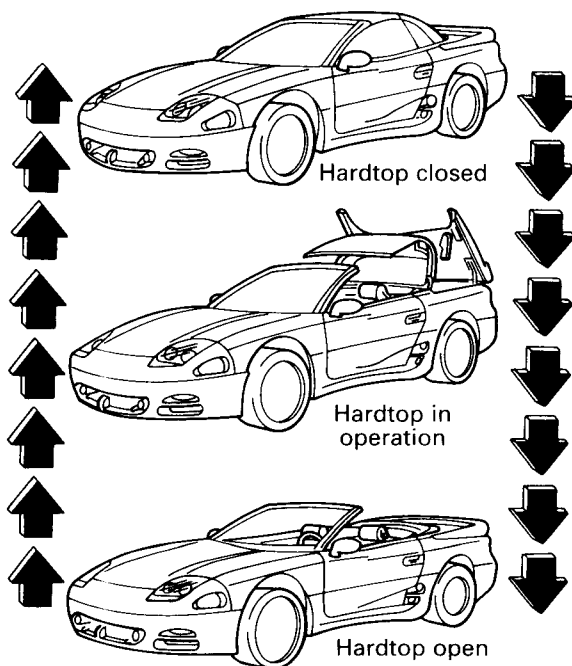
The object-in-trunk sensor consists of two electrically conductive grids separated by an insulator, and laminated together to form a pressure-sensitive mat. The mat is bonded to a rigid board and covered with a low-pile carpet. A short pigtail connector on the mat connects to the rear harness in the luggage compartment floor box. The object-in-trunk sensor must be connected for the hardtop system to operate, as the ECU can detect if the sensor is not connected. When the object-in-trunk sensor is disconnected, the hardtop system is restricted.

The purpose of the object-in-trunk sensor is to prevent the hardtop (or objects) from being damaged if an object is within the hardtop stowage area when the hardtop is being stowed. When opening the hardtop, and an object is detected in the hardtop stowage area, the hardtop will only open halfway and not proceed until the object is removed. Similarly, if an object is within the stowage area or placed in there while the hardtop is operating, but is not heavy enough to be detected, and the hardtop contacts it while opening, the hardtop will reverse direction and stop halfway closed until the object is removed.

General Precautions

During normal system operation, a chime and visual warning indicator lights (next to the hardtop and hard tonneau control switches) alert the vehicle occupants that the hardtop is not fully open or closed, or that the tonneau is not fully closed. When a problem is encountered by the system, the chime and indicators will sound and flash at twice the normal rate. The chime will sound for 1 second to indicate that the opening or closing of the hardtop is complete. When the tonneau closes the chime and indicator turn off (no 1 second chime like the hardtop) to indicate closing of the hard tonneau is complete.

The system should only be operated when the vehicle is stationary, the transmission is in "PARK" (A/T) or Neutral (M/T), the parking brake set, and the engine is idling. If the battery becomes discharged (battery voltage below 10 volts), the system's ECU will not permit the hardtop or hard tonneau to operate. If the battery voltage exceeds 16 volts, the system's ECU will shut down until the voltage drops to 16 or lower.



RETRACTABLE HARDTOP SEQUENCE OF OPERATION - OPENING**Conditions:**

- Hardtop and hard tonneau completely closed and latched
- Ignition "ON" with engine running at idle
- Transmission in "PARK" (A/T) or "Neutral" (M/T)
- Parking brake set
- Vehicle battery fully charged
- All vehicle accessories off
- All items or packages removed from hardtop stowage area

NOTE

- (1) If the hardtop "OPEN" switch is released before the hardtop is fully open, the hardtop stops in mid-movement. Pressing the switch a second time causes the hardtop to continue the opening cycle. Whenever the hardtop "OPEN" switch is pressed, released, and pressed again, an audible sound may be heard as the hard tonneau latch motors release and reset.
- (2) System operational time may vary due to conditions such as vehicle age and condition, ambient temperature (affecting oil viscosity), battery condition, and level of hardtop ECU software.

Time lapse tolerance +20/-10 seconds

1. Press and hold the "HARDTOP OPEN" switch.	
Time Lapse:	Operation
0.0 sec to 4 sec:	<ul style="list-style-type: none"> • Chime and indicator light comes on and stays on until the end of the hardtop open cycle. • Door windows open and quarter windows retract.
4 sec to 11 sec:	<ul style="list-style-type: none"> • Hard tonneau and header latches unlatch. • Hard tonneau pump/motor starts and raises the hard tonneau to the full open position and turns off.
10 sec to 18 sec:	<ul style="list-style-type: none"> • Hardtop pump/motor starts and moves the hardtop to the fully open position and turns off.
18 sec to 25 sec:	<ul style="list-style-type: none"> • Hard tonneau pump/motor starts and moves the hard tonneau to the fully closed and latched position and turns off. • One second chime sounds indicating the completion of the hardtop open cycle. • Chime and indicator turn off.
2. Release the switch.	

RETRACTABLE HARDTOP SEQUENCE OF OPERATION - CLOSING**Conditions:**

- Hardtop completely opened and hard tonneau closed and latched
- Ignition "ON" with engine running at idle.
- Transmission in "PARK" (A/T) or "Neutral" (M/T)
- Parking brake set
- Vehicle battery fully charged
- All vehicle accessories off

NOTE

- (1) If hardtop "CLOSE" switch is released before the hardtop is fully closed, the hardtop stops in mid-movement. Pressing the switch a second time causes the hardtop to continue the closing cycle.
- (2) System operational time may vary due to conditions such as vehicle age and condition, ambient temperature (affecting oil viscosity), battery condition and level of hardtop ECU software.

Time lapse tolerance +20/-10 seconds

1. Press and hold the "HARDTOP CLOSE" switch.	
Time Lapse:	Operation
0.0 sec to 5 sec:	<ul style="list-style-type: none"> • Chime and indicator light comes on and stays on until the end of the hardtop close cycle. • Hard tonneau latches release and the hard tonneau opens to the full open position.
5 sec to 16 sec:	<ul style="list-style-type: none"> • Hardtop pump/motor starts and raises the hardtop to the safety stop approximately 270 mm (10 inches) from the header and stops.
0 sec to 6 sec:	<ul style="list-style-type: none"> • Hardtop switch must be pressed a second time. • Hardtop closes and latches. • Hard tonneau pump/motor starts the tonneau to the close position. • Hard tonneau closes and latches.
6 sec to 11 sec:	<ul style="list-style-type: none"> • Quarter windows and door windows extend and close. • One second chime sounds indicating the completion of the hardtop close cycle. • Chime and indicator turn off.
2. Release the switch.	

HARD TONNEAU SEQUENCE OF OPERATION - OPENING**Conditions:**

- Hard tonneau closed and latched.
- Ignition "ON" with engine running at idle.
- Transmission in "PARK" (A/T) or "Neutral" (M/T)
- Parking brake set
- Vehicle battery fully charged
- All vehicle accessories off
- Hardtop closed (hard tonneau will not operate with the hard tonneau switch if hardtop is stowed)

NOTE

- (1) If hard tonneau "OPEN" switch is released before the hard tonneau is fully open, the hard tonneau stops in mid-movement. Pressing the switch a second time causes the hard tonneau system to continue to the open position. Whenever the hard tonneau "OPEN" switch is pressed, released and pressed again, an audible sound may be heard as the hard tonneau latches release and reset.
- (2) System operational time may vary due to conditions such as vehicle age and condition, ambient temperature (affecting oil viscosity), battery condition and level of hardtop ECU software.

Time lapse tolerance +10/-5 seconds

1. Press and hold the "HARD TONNEAU OPEN" switch.	
Time Lapse:	Operation
0.0 sec to 7 sec:	<ul style="list-style-type: none">• Chime/indicator light comes on and stays on until the hard tonneau is closed and latched.• Hard tonneau latches release.• Hard tonneau pump/motor starts and moves the hard tonneau to the fully open position.
2. Release the switch	

HARD TONNEAU SEQUENCE OF OPERATION - CLOSING**Conditions:**

- Hard tonneau completely open
- Ignition "ON" with engine running at idle
- Transmission in "PARK" (A/T) or "Neutral" (M/T)
- Parking brake set
- Vehicle battery fully charged
- All vehicle accessories off
- Hardtop closed (hard tonneau will not operate with the hard tonneau switch if hardtop is stowed)

NOTE

- (1) If the hard tonneau "CLOSE" switch is released before the hard tonneau is fully closed, the hard tonneau stops in mid-movement. Pressing the switch a second time causes the hard tonneau to continue the closing cycle.
- (2) System operational time may vary due to conditions such as vehicle age and condition, ambient temperature (affecting oil viscosity), battery condition, and level of hardtop ECU software.

Time lapse tolerance +10/-5 seconds

1. Press and hold the "HARD TONNEAU CLOSE" switch.	
Time Lapse:	Operation
0.0 sec to 6 sec:	<ul style="list-style-type: none">• Chime/indicator light comes on and stays on until the hard tonneau is closed and latched.• Hard tonneau pump/motor starts and moves the hard tonneau to the full closed position.• Hard tonneau latches latch.• Chime and indicator turn off.
2. Release the switch	

SPECIFICATIONS

GENERAL SPECIFICATIONS

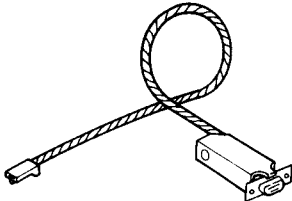
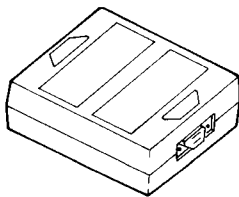
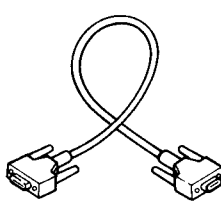
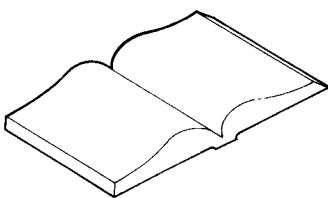
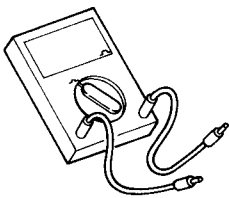
Items	Specifications
Roof (retractable hardtop) Type	2-piece molded composite, folding, self-storing, hydraulically actuated (spring assisted) with manual bypass and rigid headlining
Locking system	Two electrically operated, mechanical latches through retractable hardtop ECU logic interlock
Retractable hardtop "CLOSE OPEN" switch Type Rated load current A Rated voltage DC	SPDT rocker 20 12
Retractable hardtop hydraulic pump/motor Type Normal operating voltage DC Run current A Bound current A Direction of rotation	Permanent magnet type (built-in circuit breaker) 10-16 25 50 Clockwise and counter-clockwise
Windshield header latch system Type	Mechanical, single-motor, dual opposing gear racks
Windshield header latch motor Type Run current A Bound current A Direction of rotation	Permanent magnet type (built-in circuit breaker) 8 18 Clockwise and counter-clockwise
Hard tonneau Type	2-piece composite, rear hinged, front opening type, hydraulically actuated with manual bypass
Locking system	Dual, cable actuated latches with electric gear motor release, and remote manual release, via cable
Hard tonneau "CLOSE/OPEN" switch Type Rated load current A Rated voltage DC	SPDT rocker 20 12
Hard tonneau hydraulic pump/motor Type Normal operating voltage DC Run current A Bound current A Direction or rotation	Permanent magnet type (built-in circuit breaker) 10-16 13 50 Clockwise and counter-clockwise
Hard tonneau latch	One latch per side, cable-actuated, gear motor-released with integrated limit switch, and manual release provision
Door Locating system (anti-rattle)	Spring-loaded pin-in-receiver
Glass installation method Roof window glass Quarter window glass	Adhesive Fasteners
Glass installation method Roof window glass Quarter window	Adhesive Fasteners


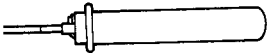
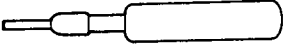
Items	Specifications
Glass thickness mm (in.) Rear roof glass Quarter window glass	4.0 ± 0.3 (0.15 ± 0.01) 5.0 ± 0.3 (0.19 ± 0.01)
Power quarter window Type	Retracting (beetle-wing style), single switch operation (with retractable hardtop ECU logic interlock), single motor drive, dual cable actuated, non-independently operated (windows synchronized with each other)
Power quarter window motor Type Run current A Bound current A Direction of rotation	Permanent magnet type (built-in circuit breaker) 8.0 18.0 Clockwise and counterclockwise

SEALANT AND ADHESIVES

Items	Specified sealant	Remarks
Rear roof glass	BETASEAL 57502 urethane adhesive	Use only BETASEAL 57502 urethane adhesive
Weatherstrips	3M SUPER WEATHERSTRIP ADHESIVE 08008, or equivalent Butyl tape	

SPECIAL TOOLS

ASC tool number and tool name	Supersession	Application
 <p>ASC p/n E-45X8-T005-CXXX Cable from vehicle to ISO convertor box</p>	Available only through ASC	Diagnosis and troubleshooting of hardtop electrical system
 <p>ASC p/n E-4568-T003-BXXX ISO 9141 convertor box</p>		
 <p>ASC p/n E-45X8-T004-CXXX Cable from convertor to PC</p>		
 <p>ASC p/n E-45X8-T002-BXXX PC User's Manual</p>		
Personal computer		
 <p>Digital VOM</p>		

AMP tool number and tool name	Application
<p data-bbox="586 178 789 210">AMP p/n 726503-1</p> 	<p data-bbox="829 178 1393 210">ECU connector F-124 large terminal extraction tool</p>
<p data-bbox="586 415 789 447">AMP p/n 726534-1</p> 	<p data-bbox="829 415 1398 447">ECU connector F-124 small terminal extraction tool</p>
<p data-bbox="586 653 789 684">AMP p/n 872070-1</p> 	<p data-bbox="829 653 1458 684">ECU connectors F-123 and F-125 terminal extraction tool</p>

NOTES

Observe ALL Cautions and Warnings in Removal and Installation, and Adjustment procedures.

Warning!

- (1) Depending on system malfunction and/or diagnostic procedure, inadvertent operation of the hardtop and/or hard tonneau may occur. For example: if one circuit to hard tonneau pump/motor is shorted to ground or voltage and you connect the other circuit to ground or voltage, hard tonneau may close.

ALWAYS stay clear of hardtop and hard tonneau moving components when diagnosing and/or operating system.

Caution

- (1) Make sure both retractable quarter windows are retracted before opening hardtop. DO NOT open the hardtop if BOTH retractable quarter windows do not fully retract.
- (2) When opening the retractable hardtop, always make sure there are no items or packages in the hardtop stowage area. Even a small article could scratch the hardtop's finish or damage the hardtop, glass windows or mechanisms. Personal injury could result.
- (3) The retractable hardtop stowage area has an object-in-trunk sensor that will restrict operation of the hardtop system if certain articles are within the hardtop stowage area. Object shape, size, material or placement may affect detection. ALWAYS check the hardtop stowage area for items when opening the hardtop.
- (4) Once the retractable hardtop is opened and stowed do not place any cargo in or around it.
- (5) Make sure the hardtop and hard tonneau are closed and latched; driving with hardtop or hard tonneau partially open is hazardous.
- (6) Never operate the retractable hardtop or the hard tonneau while the vehicle is in motion.
- (7) To avoid damage, do not sit or place excessive weight on the hard tonneau or the trim panels above the rear seat backs.
- (8) When opening and closing the hardtop or hard tonneau keep hands and any part of the body away from moving parts, such as the flipper doors (located at the front ends of the hard tonneau) and along where the hard tonneau seals to the vehicle body.
- (9) When MANUALLY operating hardtop and/or hard tonneau the weight and/or the position of the hardtop and/or hard tonneau may cause it to continue movement.
- (10) Depending on the nature of the concern when operating hardtop and/or hard tonneau, the weight and/or position of the hardtop and/or hard tonneau may cause it to continue movement. Turning bypass valve to POWER position MAY NOT stop movement of hardtop and/or hard tonneau, for example; if hydraulic system leaks, or if hydraulic cylinders are damaged.

READ ALL OF THE FOLLOWING NOTES AND TERMS BEFORE PROCEEDING.**NOTE:**

1. Refer to Volume 2 of the Service Manual General Section for How to Diagnose, How to Read Configuration Diagram, and How to Read Circuit Diagrams.
2. For information that may be needed that is not contained in this Service Manual, Refer to Volume 1 and/or 2 of Service Manual.
3. Make sure hardtop and hard tonneau mechanical adjustments are correct before performing electrical diagnostics.
4. Make sure that the vehicle battery is fully charged and in good condition before performing diagnostics.
5. Inspect system fuses and ground connections before performing diagnostics.
6. If fuses are blown, do not immediately replace them, refer to Inspection and Verification.
7. Intermittent DTCs may occur, DTCs must be active (high-lighted on PC screen) to properly diagnose. It may be necessary to move wiring harnesses and/or individual wires (wiggle) for DTCs to become active. DO NOT replace components if DTCs are not active.
8. When recovering Diagnostic Trouble Codes (DTCs) from the Electronic Control Unit (ECU) using the Personal Computer (PC) write down all DTCs that are in the memory. Some DTCs may occur as a result of other failures the ECU has seen.
9. Turn ignition switch to the OFF position after each test unless instructed to leave it in the ON position.
10. Manual operation of the hardtop or hard tonneau may be required to gain access to some components for diagnosing.
11. Wire harness and/or component connectors that are identified with pin locations on them, shall use that numbering system, and not the standard Mitsubishi numbering system.
12. Circuit numbers for the retractable hardtop system are on the circuit diagrams listed vertically on the wires.
13. With the ignition switch on, the ECU uses a high reference voltage (1.7-2.5 vdc, typically 2.1 vdc), and a low reference voltage (0.5-0.9 vdc, typically 0.7 vdc), provided to each of the position switches (this allows the ECU to know which position the switch is in), the ECU must not be in the sleep mode (end of cycle completely up or down) while testing for these voltages. The easiest way to keep the ECU awake is to raise the tonneau. If the tonneau is cycled closed to allow quarter windows to extend, or the header latch motor to latch, the ECU can be awakened by operating the tonneau with the hard tonneau switch.
14. In the Pinpoint Tests, normal testing for the resistance of a good wire with an ohmmeter should

have a value of 3 ohms or less. However, this may vary depending on the ohmmeter used, the length and size of the wire, the use of jumper wires for testing, the amount of connectors in the wire, etc. If a value much larger is found (e.g. 10 ohms), the wire and/or connectors may be suspect to loose connections, corrosion, and/or damage.

15. Under certain fault conditions, it may be necessary to cycle the ignition to the OFF position, and then back to the ON position, to resume hardtop operation.
16. Refer to Quick Reference Chart at the back of this Service Manual for Hatchback to Retractable hardtop wiring harness connector changes.
17. Refer to Configuration diagrams and Removal and Installation procedures for component locations.

DEFINITION OF TERMS

AUTO-CONFIGURATION

Refers to resetting of parameters of hardtop and hard tonneau movement in the ECU by use of a PC and the latest version of the ASC Incorporated software. It may be necessary to service and clear DTCs before auto-configuration can be performed. Refer to PC User's Manual for details on running Auto-Configuration.

DAMAGED

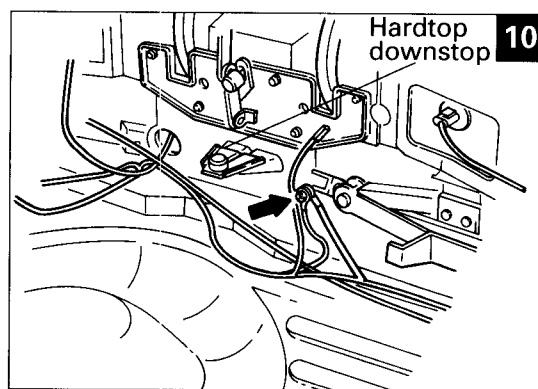
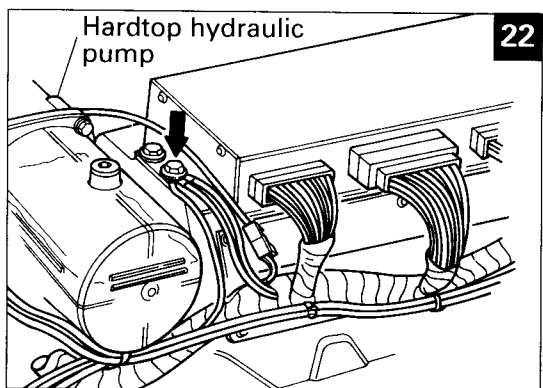
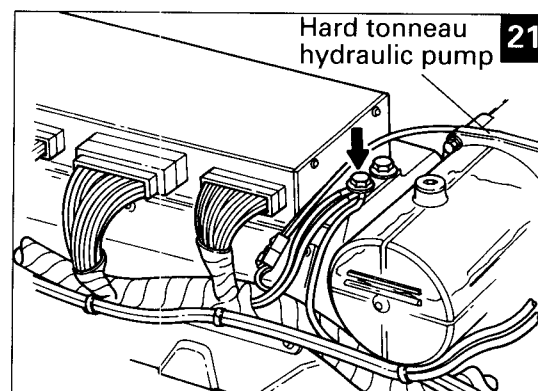
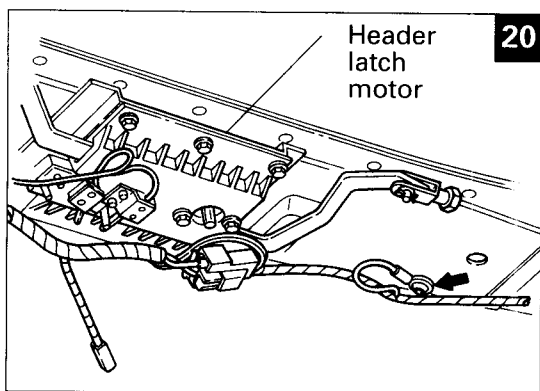
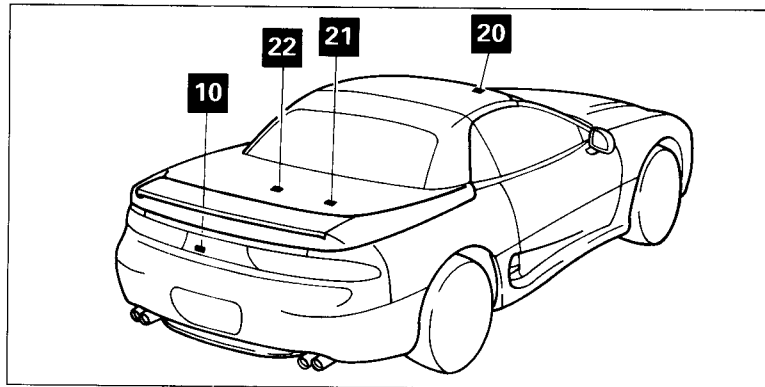
Refers to a mechanically or electrically inoperative component.

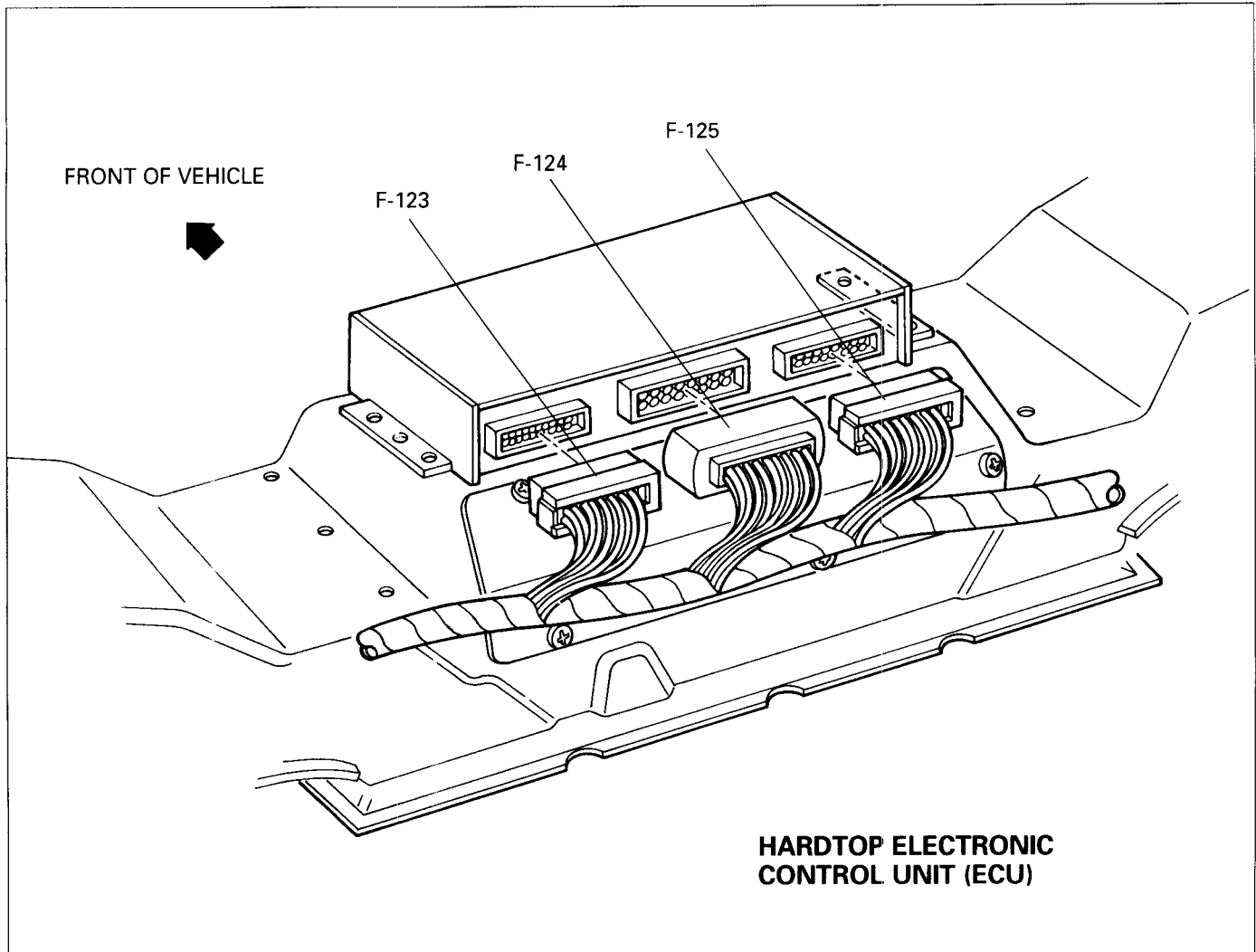
RESTORE VEHICLE

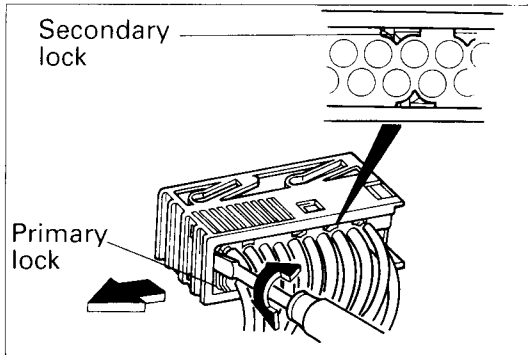
Is to install or connect components that were removed or disconnected for testing purpose. DTCs should not be cleared from the ECUs memory until all recorded DTC's have been resolved. The system **MUST** be run through AUTO-CONFIGURATION whenever a repair is made or a part is replaced. Refer to PC User's Manual.

RETEST SYSTEM

Is to check for additional concerns after the original concern has been verified and repaired. This may involve checking for DTCs and/or operating the system and checking for proper operation.

**GROUNDING
LOCATIONS**

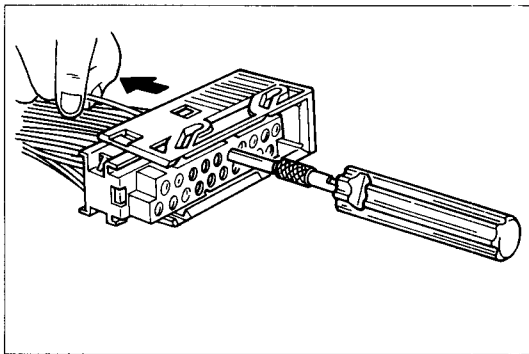
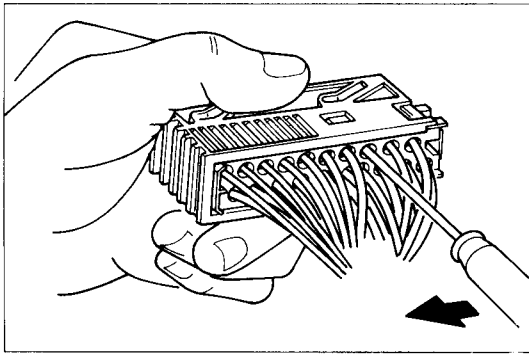
ECU CONNECTOR LOCATION

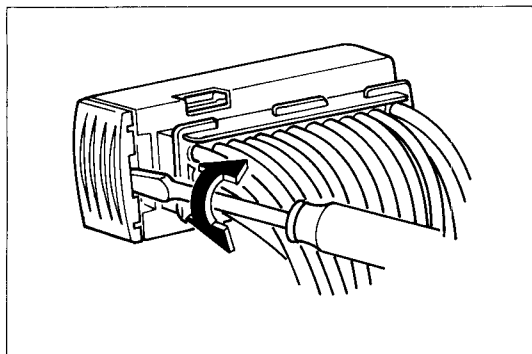


ELECTRONIC CONTROL UNIT (ECU) CONNECTOR TERMINAL DISENGAGEMENT

ECU CONNECTOR F-125 AND F-123

1. Insert screwdriver into LH side of connector, between lock and connector and rotate screwdriver, then slide lock to LH side to disengage connector.
2. With connector removed, grasp the connector and insert a small screwdriver into an empty cavity and pry side-ways to release the secondary lock.
3. Using AMP tool number 0-0872070-1 or equivalent, insert tool straight into face of connector to disengage locking tabs on wire terminal, and pull wire and terminal from connector.

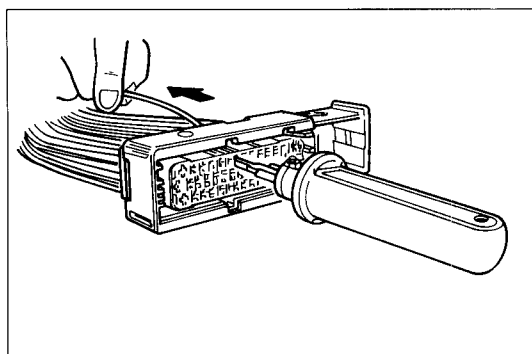




ELECTRONIC CONTROL UNIT (ECU) CONNECTOR TERMINAL DISENGAGEMENT

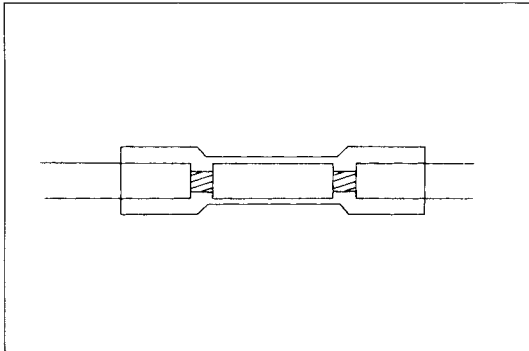
ECU CONNECTOR F-124

1. Insert screwdriver into LH side of connector, between lock and connector and rotate screwdriver, then slide lock to LH side to disengage connector.
2. Using AMP tool number 726534-1 for small terminals, 726503-1 for larger terminals or equivalent, insert tool straight into face of connector to disengage locking tabs on wire terminal, and pull wire and terminal from connector.

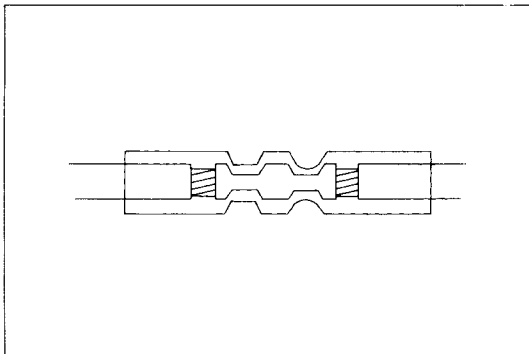


RECOMMENDED WIRE REPAIR PROCEDURE

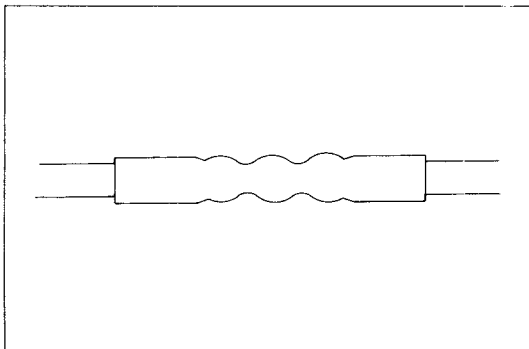
A seal splice can be easily installed using a standard insulated crimp tool and a heat gun. The seal splices are color coded for easy identification of gauge sizes, and are transparent for visual inspection of the final repair.



1. Strip the wire ends 7.6 mm (0.3 inch) and insert into crimp barrel.

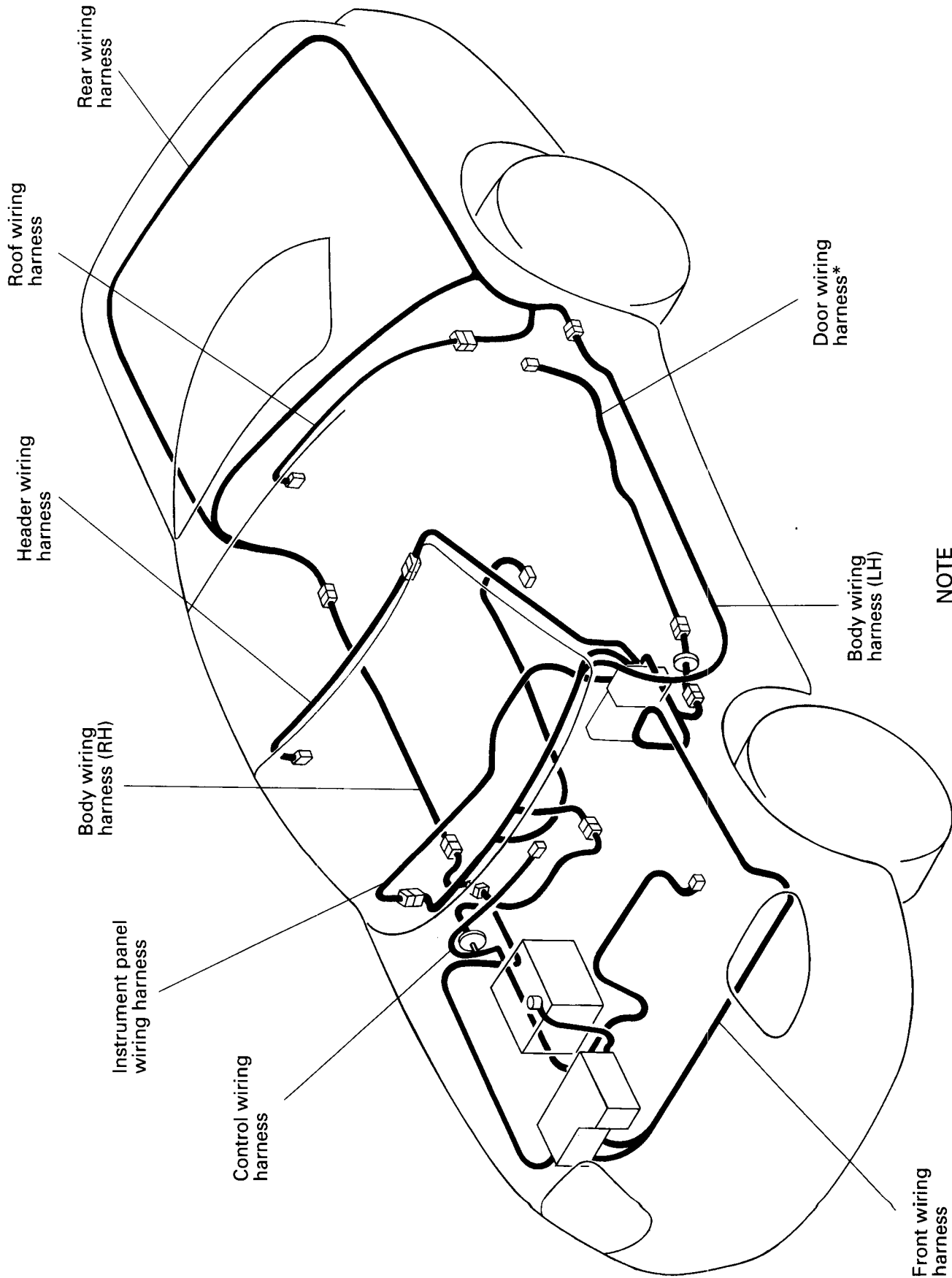


2. Push wires firmly into crimp barrel while crimping barrel.
3. Grasp seal splice and wire, and pull gently to ensure proper connection.



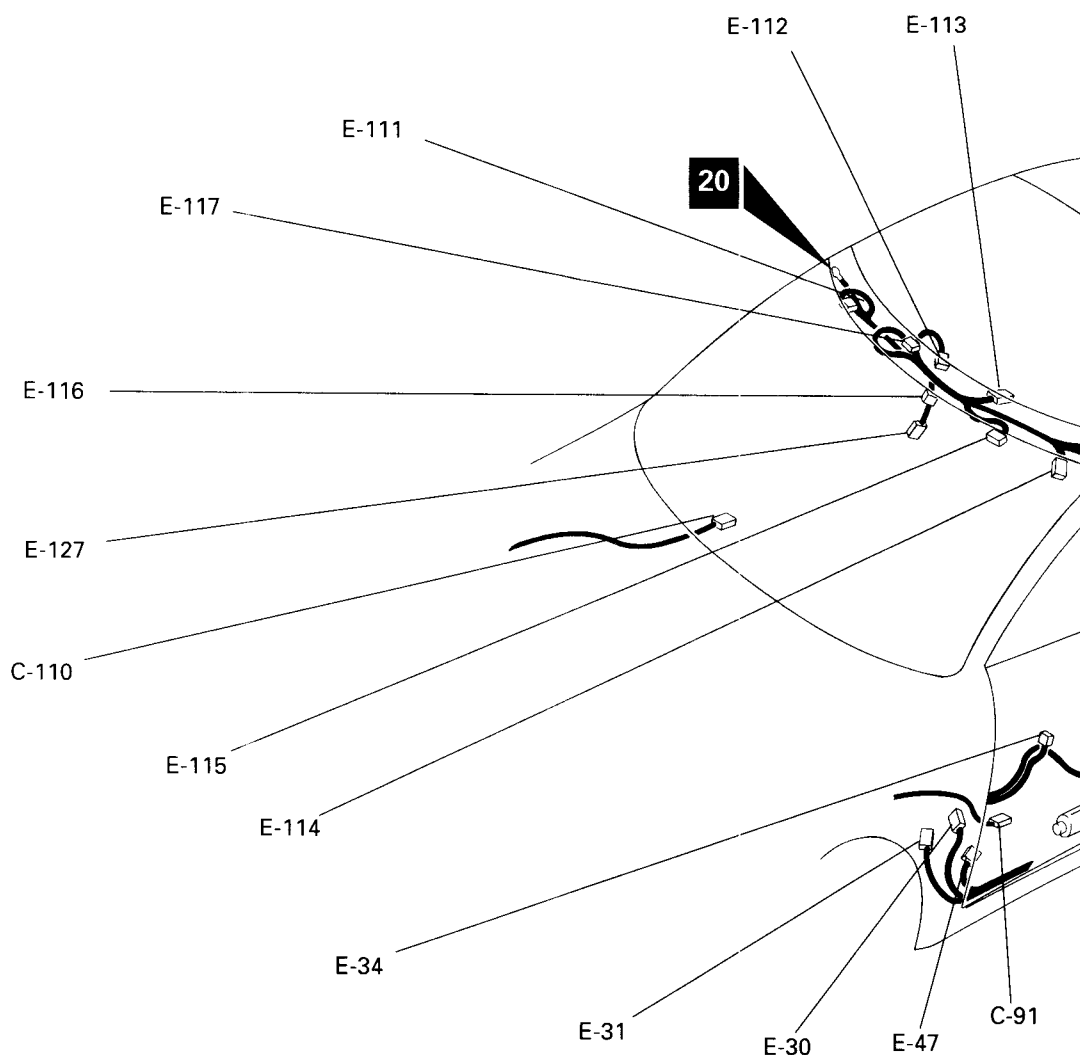
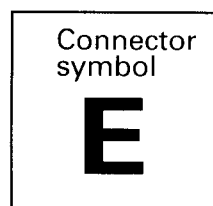
4. Heat splice with heat gun until tubing shrinks and adhesive flows from each end of seal splice.

OVERALL CONFIGURATION DIAGRAM



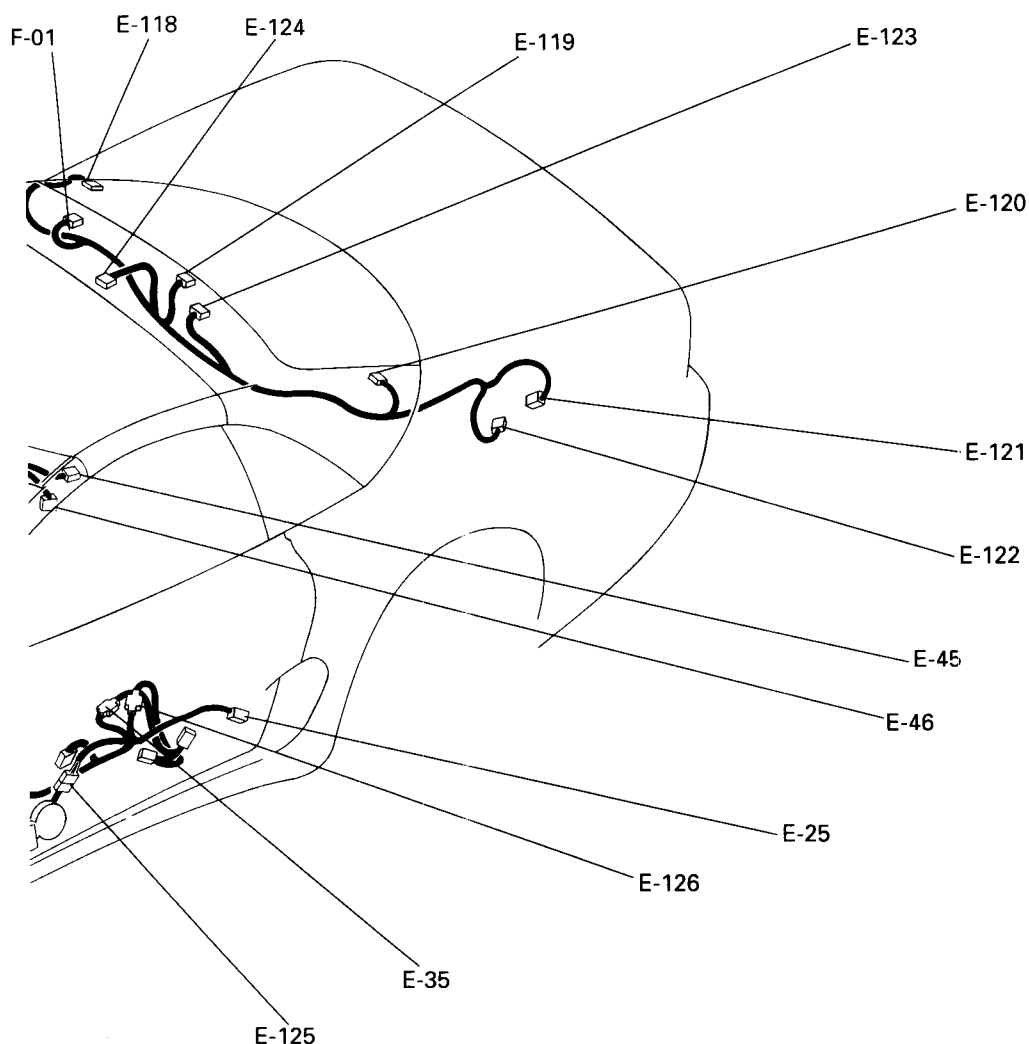
NOTE
 (1) This illustration shows only the major wiring harness.
 (2) * indicates also equipped at the right side.

INTERIOR



C-91	Data Link Connector (DLC) Retractable hardtop
C-10	Battery supply to hardtop ECU.
E-01	MMC (refer to Volume 2)*
E-02	-
E-03	MMC (refer to Volume 2)*
E-04	MMC (refer to Volume 2)*
E-05	MMC (refer to Volume 2)*
E-06	MMC (refer to Volume 2)*
E-07	-
E-08	MMC (refer to Volume 2)*
E-09	MMC (refer to Volume 2)*
E-10	MMC (refer to Volume 2)*
E-11	MMC (refer to Volume 2)*
E-12	MMC (refer to Volume 2)*
E-13	MMC (refer to Volume 2)*
E-14	MMC (refer to Volume 2)*
E-15	MMC (refer to Volume 2)*
E-16	MMC (refer to Volume 2)*
E-17	MMC (refer to Volume 2)*
E-18	MMC (refer to Volume 2)*
E-19	MMC (refer to Volume 2)*

E-20	MMC (refer to Volume 2)*
E-21	MMC (refer to Volume 2)*
E-22	MMC (refer to Volume 2)*
E-23	MMC (refer to Volume 2)*
E-24	MMC (refer to Volume 2)*
E-25	Door light (LH)
E-26	MMC (refer to Volume 2)*
E-27	MMC (refer to Volume 2)*
E-28	MMC (refer to Volume 2)*
E-29	MMC (refer to Volume 2)*
E-30	Turn signal and hazard flasher unit
E-31	Diode (for MFI circuit)
E-32	MMC (refer to Volume 2)*
E-33	MMC (refer to Volume 2)*
E-34	Power window main switch
E-35	Power window motor
E-36	MMC (refer to Volume 2)*
E-37	MMC (refer to Volume 2)*
E-38	MMC (refer to Volume 2)*
E-39	MMC (refer to Volume 2)*
E-40	MMC (refer to Volume 2)*
E-41	MMC (refer to Volume 2)*



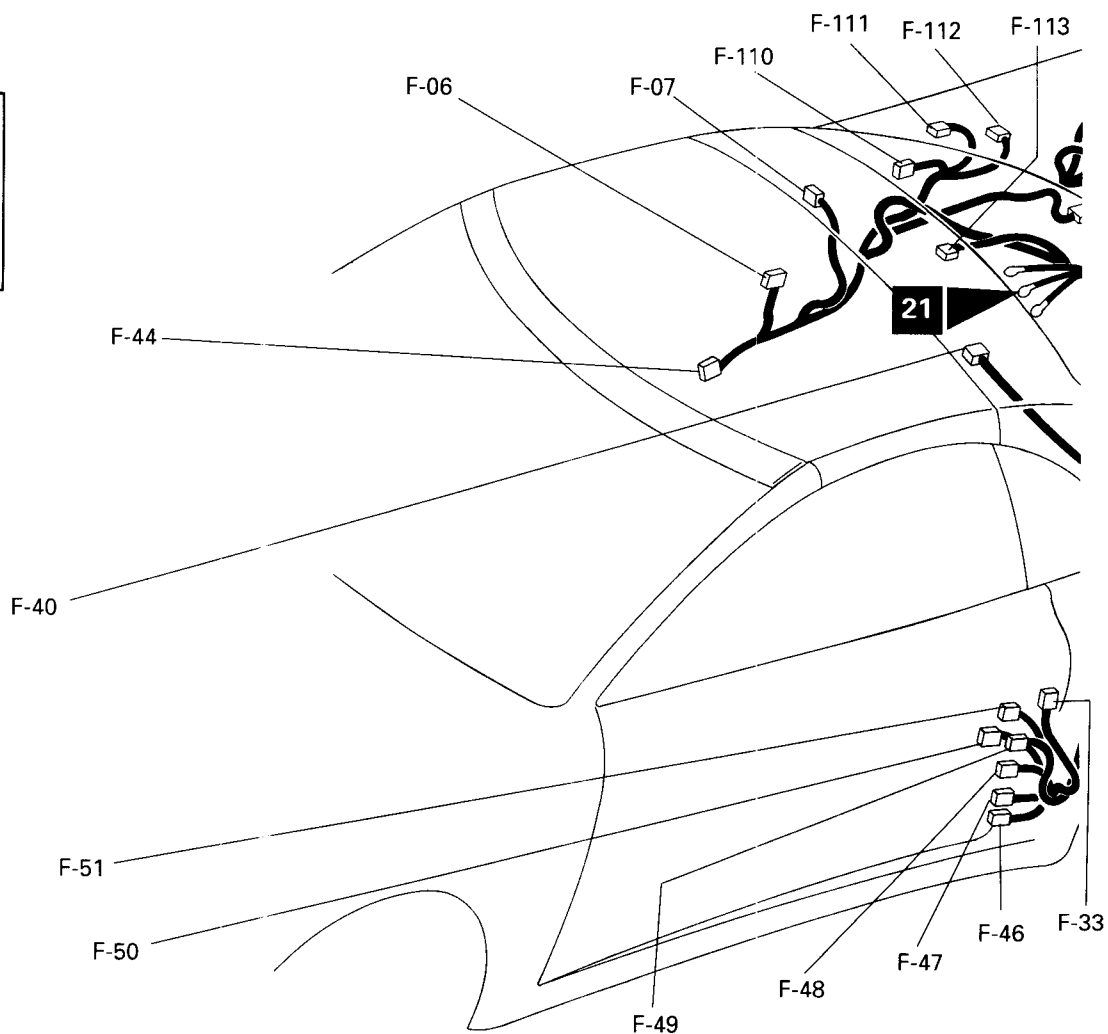
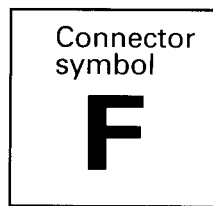
- E-42 MMC (refer to Volume 2)*
- E-43 MMC (refer to Volume 2)*
- E-44 MMC (refer to Volume 2)*
- E-45 Body to Header harness (LH)(6 way)
- E-46 Body to Header harness (LH)(9 way)
- E-47 Chime Module (retractable hardtop)
- E-110** Not used
- E-111 Header position switch (RH)
- E-112 HomeLink™ Universal transmitter
- E-113 Header unlatch switch
- E-114 Header position switch (LH)
- E-115 Header latch switch
- E-116 Rearview mirror (self dimming and lighted)
- E-117 Header latch motor
- E-118 Defogger (neg)
- E-119 Retractable quarter window retract switch
- E-120 Defogger (pos)
- E-121 Roof harness to rear harness (four way connector)

- E-122 Roof harness to rear harness (eight way connector)
- E-123 Retractable quarter window extend switch
- E-124 Retractable quarter window motor
- E-125 Drivers window relay to power window motor
- E-126 Drivers window relay to power window main switch
- E-127 Jumper to mirror (from E-116)(P.I.A. mirror)
- F-01 Interior temperature sensor

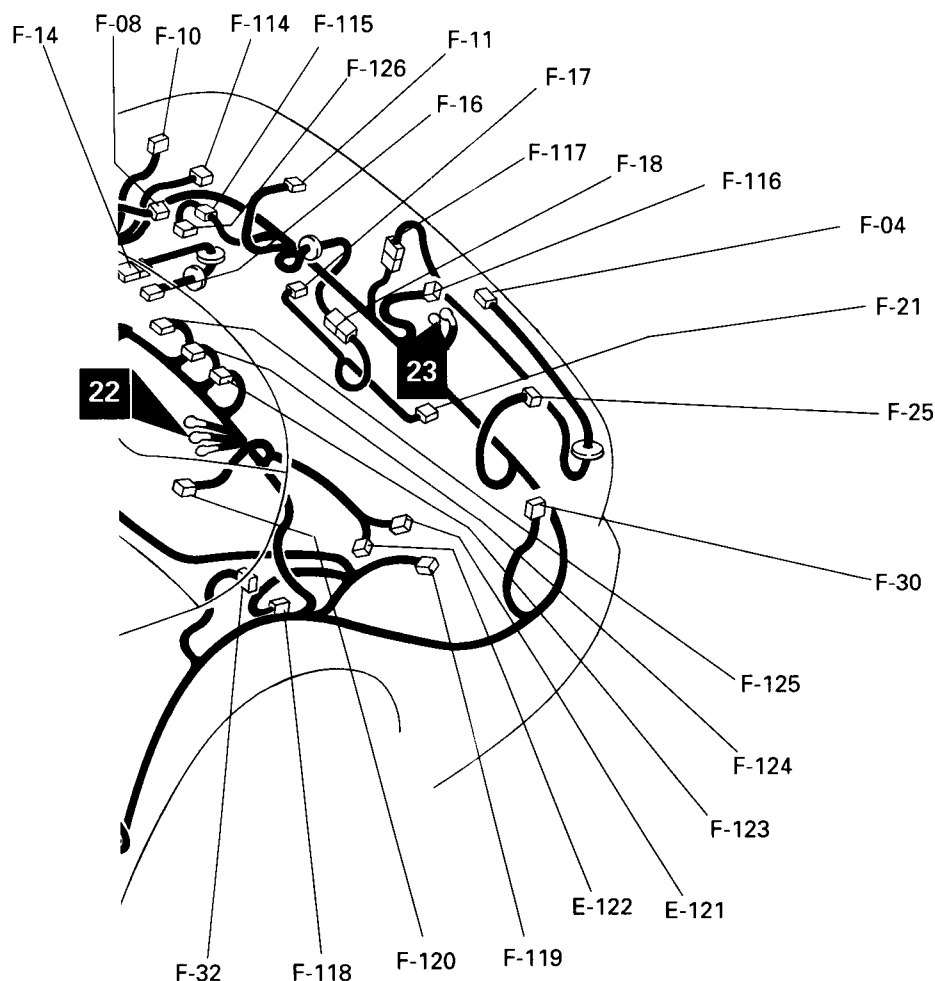
* Connectors (not shown) are in Mitsubishi wiring harness and are used on retractable hardtop.

** Connectors numbered 110 and higher are new connectors in ASC Inc. wiring harnesses for retractable hardtop.

LUGGAGE COMPARTMENT



E-121**	Roof harness to rear harness (four way connector)	F-18	Rear wiring harness (RH) and rear bumper wiring harness combination
E-122	Roof harness to rear harness (eight way connector)	F-19	-
F-01	Refer to Configuration Diagram E	F-20	-
F-02	Changed to E-120 (refer to Configuration Diagram E)	F-21	License plate light (LH)
F-03	-	F-22	Changed to F-116
F-04	High mounted stop light	F-23	-
F-05	Changed to E-118 (refer to Configuration Diagram E)	F-24	-
F-06	Rear speaker (RH)	F-25	Back up light (LH)
F-07	ECS rear shock absorber (RH)	F-26	-
F-08	Luggage compartment lamp	F-27	-
F-09	-	F-28	-
F-10	Rear combination light (RH)	F-29	-
F-11	Back up light (RH)	F-30	Rear combination light (LH)
F-12	MMC (refer to Volume 2)*	F-31	Changed to A-79, MMC (refer to Volume 2)*
F-13	MMC (refer to Volume 2)*	F-32	ECS rear shock absorber (LH)
F-14	Rear wiring harness (RH) and fuel tank wiring harness combination	F-33	Rear speaker (LH)
F-15	-	F-34	-
F-16	Fuel tank	F-35	-
F-17	License plate light (RH)	F-36	-
		F-37	-
		F-38	-
		F-39	-



F-40	CD changer	F-114	Hard tonneau potentiometer
F-41	-	F-115	Object in trunk sensor to rear harness (jumper)
F-42	-	F-116	Luggage compartment lamp switch
F-43	-	F-117	High mounted stop light to rear harness
F-44	Body wiring harness (RH) and rear wiring harness combination (22 way)	F-118	Hard tonneau latch motor (LH)
F-45	-	F-119	Hard tonneau latch switch (LH)
F-46	Body wiring harness (LH) and rear wiring harness combination (17 way)	F-120	Hardtop drive motor
F-47	Body wiring harness (LH) and rear wiring harness combination (4 way)	F-121	Not used
F-48	Body wiring harness (LH) and rear wiring harness combination (19 way)	F-122	Not used
F-49	Body wiring harness (LH) and rear wiring harness combination (8 way)	F-123	ECU window motors and tonneau control
F-50	Body wiring harness (LH) and rear wiring harness combination (2 way)	F-124	ECU low current (control)
F-51	Body wiring harness (LH) and rear wiring harness combination (13 way)	F-125	ECU high current
F-110	Hardtop potentiometer	F-126	Object in trunk sensor
F-111	Hard tonneau latch switch (RH)		
F-112	Hard tonneau latch motor (RH)		
F-113	Hard tonneau drive motor		

* Connectors (not shown) are in Mitsubishi wiring harness and are used on retractable hardtop.

** Connectors numbered 110 and higher are new connectors in ASC Inc. wiring harnesses for retractable hardtop.

WIRE COLOR CODES

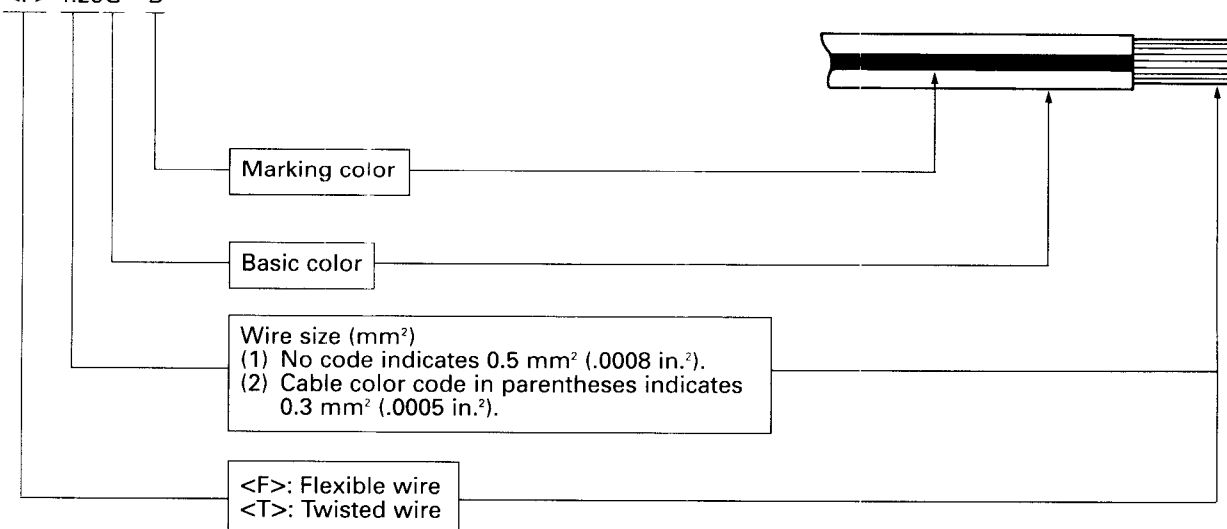
Wire colors are identified by the following color codes.

Code	Wire color	Code	Wire color
B	Black	PL	Purple
BR	Brown	R	Red
G	Green	SB	Sky blue
GR	Gray	T	Tan
L	Blue	V	Violet
LG	Light green	W	White
O	Orange	Y	Yellow
P	Pink	–	–

NOTE

If a cable has two colors, the first of the two color code characters indicates the basic color (color of the cable coating) and the second indicates the marking color.

Example: <F> 1.25G – B



RETRACTABLE HARDTOP OPERATION

OPENING THE HARDTOP

The Electronic Control Unit (ECU) for the Mitsubishi 3000GT Spyder retractable hardtop is a self-contained computer. All electrical functions of the hardtop system are controlled by the ECU.

Power is supplied to the ECU through a 60-amp fuse in the junction box in the engine compartment. The ECU has a sleep mode. When no power is supplied to the ECU from the ignition circuit, or at the completion of its full cycle (either close or open) the ECU goes to sleep. This allows the ECU to draw minimal power from the battery.

The high-current grounds and the electronic logic ground are supplied through the vehicle chassis.

The following is the sequence of events for the retractable hardtop to move from the fully closed position, to the fully open position, under normal conditions:

- The hardtop is in the fully closed position;
- Header latches are latched;
- Quarter windows are closed;
- Door windows are in any position;
- Tonneau is latched;
- Hardtop stowage area is empty;
- Vehicle in Park (A/T) or Neutral (M/T);
- Hand brake is applied.

To open the hardtop, start the vehicle. Power is then supplied to the ECU from the ignition circuit. At this time the ECU will go through internal diagnostics that will check its internal memory and circuits and will monitor all hardtop and tonneau switches and sensors. If the internal circuitry is found fully operational and the hardtop or tonneau control switch is not pressed, then the ECU will go to sleep waiting for movement of the hardtop, tonneau or passenger side door window switch.

With the engine running and hardtop control switch pressed to the OPEN position, power is supplied to the ECU from the hardtop control switch, and this awakens the ECU. During normal hardtop operation the Light Emitting Diodes (LEDs) flash. The chime will sound at the same rate as the LED flash. The hardtop LEDs and chime will continue to operate as long as the tonneau is not latched and the ignition is turned to the ON position.

The ECU supplies power to the driver and passenger's side door window motors, and quarter window motor to drive them to the open position.

Once the quarter windows have been retracted the quarter window limit switch sends a signal to the ECU and power is supplied to drive the header latch motor to the fully unlatched position. The header latch motor will continue to move until the header latch limit switch indicates a fully unlatched position. Power is also supplied to the tonneau latch solenoids to pull the release cables, which releases the tonneau latches. Power is then supplied to the tonneau pump motor. This raises the tonneau allowing the hardtop to retract into the hardtop stowage area.

Once the potentiometer located on the tonneau lift mechanism senses a position where there is enough clearance for the hardtop, the hardtop pump motor will begin to move the hardtop to the open position.

If sufficient pressure from an object is detected in the hardtop stowage area by the object-in-trunk sensor, the hardtop operation is restricted and can only open halfway, and the chime and LEDs will respond at twice the normal rate. In the event that an object does not apply sufficient pressure to activate the object-in-trunk sensor, the hardtop will continue to move to the open position until the hardtop applies pressure against the object in the hardtop stowage area and activates the object-in-trunk sensor. The hardtop will automatically reverse direction to the halfway position. Normal operation can start once the object in the hardtop stowage area has been removed.

The potentiometer located on the hardtop main pivot then indicates the hardtop is stowed in the hardtop stowage area and the hardtop pump motor will shut off.

The tonneau continues to the closed position and is mechanically pulled to the latched position by cables attached to the tonneau lift mechanisms. The tonneau latch position switches confirm a latched position to the ECU and the tonneau pump motor is shut off. The chime sounds for one second and the chime and LEDs turn off, and the ECU will go to sleep.

CLOSING THE HARDTOP

Under normal conditions:

- The hardtop in the fully open position (in stowage area);
- Tonneau is latched;
- Vehicle in Park (A/T) or Neutral (M/T);
- Hand brake applied.

Start the engine, press hardtop control switch to the CLOSED position. Power is supplied to the tonneau latch solenoids, which pull on the tonneau latch release cables, releasing the tonneau latches. Power is supplied to the chime and LED's, and the chime will sound and the LED's will flash.

Power is then supplied to the tonneau pump motor, which starts to raise the tonneau. The tonneau potentiometer sends a signal to the ECU indicating that the tonneau is fully opened.

This signal causes power to be supplied to the hardtop pump motor, raising the hardtop out of the stowage area.

As the hardtop moves forward the hardtop potentiometer sends a signal to the ECU to indicate that the tonneau can start closing.

The hardtop continues closing until coming to a safety stop position, which allows for checking for obstructions between hardtop and header. The hardtop control switch must be pressed again to continue movement.

When the header latch striker enters the header latch, the header latch position switches sends a signal to the ECU indicating that the hardtop is in a position to be latched, then power will be provided to the header latch motor to engage the latches. The header unlatch limit switch sends a signal to the ECU and then the hardtop pump motor is turned off.

The tonneau continues to the closed position and is mechanically pulled to the latched position by cables attached to the tonneau lift mechanisms. The tonneau latch position switches confirm a latched position to the ECU and the tonneau pump motor is shut off.

Only after tonneau is closed and latched, power is provided to the quarter window motor and side door window motors. When the quarter windows have fully extended and the door windows have fully raised, the chime will sound for one second to indicate the completion of the hardtop up cycle. The chime and LEDs turn off, and the ECU will go to sleep.

INSPECTION AND VERIFICATION

1. Verify the customer's original concern by operating the system to duplicate the concern.
2. Inspect to determine if any of the following mechanical or electrical concerns apply:

MECHANICAL	ELECTRICAL
<ul style="list-style-type: none">• Damaged linkage. (Linkage binding or bent).• Damaged or misaligned latches.• Damaged or misaligned strikers.• Damaged or misaligned cables.• Damaged hydraulic cylinders.• Damaged hydraulic lines.• Damaged hydraulic pump/motor.• Damaged header latch limit switch pins.	<ul style="list-style-type: none">• Blown fuse.• Circuitry open or shorted.• Damaged control or window switches.• Damaged motors.

3. If the inspection reveals obvious concern(s) that can be readily identified, service as required.
4. If the concern(s) remain after inspection, determine the symptom and go to the Symptom Chart.

NOTE: A PC MUST BE CONNECTED AT THIS TIME TO CHECK AND RECOVER DTCs FROM THE ECU. REFER TO PC USER'S MANUAL.

SYMPTOM CHART

NO DIAGNOSTIC TROUBLE CODES PRESENT

NOTE: AFTER DETERMINING THE PINPOINT TEST, REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.

CONDITION	POSSIBLE CAUSE	ACTION
• Chime does not operate with hardtop or hard tonneau open.	• Circuitry open/shorted. • Damaged chime module. • Damaged ECU.	• Go to Pinpoint Test A.
• Chime stays on continuously with hardtop and hard tonneau closed/no DTCs present.	• Circuitry shorted. • Damaged chime module. • Damaged ECU.	• Go to Pinpoint Test B.
• Driver window inoperative with driver window switch.	• Circuitry open/shorted. • Damaged window motor. • Damaged window switches. • Damaged ECU.	• Go to Pinpoint Test C.
• Driver window inoperative with hardtop operation.	• Circuitry open/shorted. • Damaged window motor. • Damaged window relays. • Damaged ECU.	• Go to Pinpoint Test DTC 52.
• Hard tonneau hydraulic system inoperative. (Possible DTC 54)	• Low fluid level. • Excessive air in system. • Internal or external leaks. • Damaged pump/motor. • Damaged hydraulic cylinders. • Damaged bypass valve. • Valve in bypass. • Damaged manifold.	• Go to Pinpoint Test D.
• Hard tonneau inoperative with control switch.	• Circuitry open/shorted. • Damaged control switch. • Damaged ECU.	• Go to Pinpoint Test E.
• Hard tonneau will not unlatch with control switch.	• Circuitry open/shorted. • Damaged hard tonneau latch solenoids. • Damaged ECU.	• Go to Pinpoint Test F.
• Hardtop Hydraulic system inoperative. (Possible DTC 55)	• Low fluid level. • Excessive air in system. • Internal or External leaks. • Damaged pump/motor. • Damaged hydraulic cylinders. • Damaged bypass valve. • Valve in bypass. • Damaged manifold.	• Go to Pinpoint Test G.
• Hardtop inoperative with control switch.	• Circuitry open/shorted. • Damaged control switch. • Damaged ECU.	• Go to Pinpoint Test H.
• Hardtop operates when automatic transmission is out of park position.	• Circuitry shorted. • Damaged ECU.	• Go to Pinpoint Test J.
• Hardtop operates when vehicle is moving. Note: Two different conditions must exist for this to occur. Proceed as indicated.	• Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test J for automatic transaxle and Pinpoint Test L for manual transaxle, then proceed to Pinpoint Test K.
• Hardtop operates without parking brake applied, (manual transmission).	• Circuitry shorted. • Damaged ECU.	• Go to Pinpoint Test L.

SYMPTOM CHART

NO DIAGNOSTIC TROUBLE CODES PRESENT (CONTINUED)
NOTE: AFTER DETERMINING THE PINPOINT TEST, REFER TO TROUBLESHOOTING HINTS
FOLLOWING SYMPTOM CHART.

CONDITION	POSSIBLE CAUSE	ACTION
• LEDs inoperative or on all the time.	• Circuitry open/shorted. • Damaged control switch. • Damaged ECU.	• Go to Pinpoint Test M.
• Passenger window inoperative with hardtop.	• Circuitry open/shorted. • Damaged passenger window motor. • Damaged ECU.	• Go to Pinpoint Test DTC 53.
• Passenger window inoperative with window switch.	• Circuitry open/shorted. • Damaged switch. • Damaged passenger window motor. • Damaged ECU.	• Go to Pinpoint Test N.
• Passenger window will not work from drivers window switch.	• Circuitry open/shorted. • Damaged switches.	• Refer to Vol. 1 and 2 of Service Manual for window service.
• PC will not communicate with ECU.	• Circuitry open/shorted. • Damaged PC. • Damaged converter. • Damaged cables. • Damaged ECU.	• Go to Pinpoint Test P.
• Retractable quarter window (one side) inoperative.	• Damaged cable. • Damaged guide.	• Inspect and service mechanical problems.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES

NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 00	• No fault.	• Check for possible mechanical or hydraulic concerns. • Go to Symptom Chart-No Diagnostic Trouble Codes present.
• DTC 01	• Reserved	• Reserved.
• DTC 02	• Damaged ECU. • Circuitry open/shorted. • Damaged limit switch.	• Go to Pinpoint Test DTC 02-06.
• DTC 03	• Damaged ECU. • Circuitry open/shorted. • Damaged limit switch.	• Go to Pinpoint Test DTC 02-06.
• DTC 04	• Damaged ECU. • Circuitry open/shorted. • Damaged limit switch.	• Go to Pinpoint Test DTC 02-06.
• DTC 05	• Damaged ECU. • Circuitry open/shorted. • Damaged limit switch.	• Go to Pinpoint Test DTC 02-06.
• DTC 06	• Damaged ECU. • Circuitry open/shorted. • Damaged limit switch.	• Go to Pinpoint Test DTC 02-06.
• DTC 07	• Blown fuse. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 07.
• DTC 08	• Damaged battery. • Charging system malfunction. • Damaged ECU.	• Go to Pinpoint Test DTC 08.
• DTC 09	• Damaged hardtop potentiometer. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 09-11.
• DTC 10	• Damaged hardtop potentiometer. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 09-11.
• DTC 11	• Damaged hardtop potentiometer. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 09-11.
• DTC 12	• Damaged hard tonneau potentiometer. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 12-14.
• DTC 13	• Damaged hard tonneau potentiometer. • Circuitry open/shorted. • Damaged ECU.	• Go to Pinpoint Test DTC 12-14.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES

NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 14	<ul style="list-style-type: none"> • Damaged hard tonneau potentiometer. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 12-14.
• DTC 15	<ul style="list-style-type: none"> • Damaged hardtop and/or hard tonneau potentiometer. 	• Go to Pinpoint Test DTC 15.
• DTC 16	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 16.
• DTC 17	<ul style="list-style-type: none"> • Damaged hardtop and/or hard tonneau potentiometer. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 17.
• DTC 18	<ul style="list-style-type: none"> • Damaged header latch limit switch. • Circuitry open/shorted. • Damaged header latch motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 18.
• DTC 19	<ul style="list-style-type: none"> • Damaged header latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 19.
• DTC 20	<ul style="list-style-type: none"> • Damaged header latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 20.
• DTC 21	<ul style="list-style-type: none"> • Damaged header latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 21.
• DTC 22	<ul style="list-style-type: none"> • Damaged header unlatch limit switch. • Circuitry open/shorted. • Damaged header latch motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 22.
• DTC 23	<ul style="list-style-type: none"> • Damaged header unlatch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 23.
• DTC 24	<ul style="list-style-type: none"> • Damaged header unlatch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 24.
• DTC 25	<ul style="list-style-type: none"> • Damaged header unlatch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 25.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES (CONTINUED)

**NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48**

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 26	<ul style="list-style-type: none"> • Damaged LH retractable quarter window extend limit switch. • Circuitry open/shorted. • Damaged retractable quarter window motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 26.
• DTC 27	<ul style="list-style-type: none"> • Damaged LH retractable quarter window extend limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 27.
• DTC 28	<ul style="list-style-type: none"> • Damaged LH retractable quarter window extend limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 28.
• DTC 29	<ul style="list-style-type: none"> • Damaged LH retractable quarter window extend limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 29.
• DTC 30	<ul style="list-style-type: none"> • Damaged RH retractable quarter window retract limit switch. • Circuitry open/shorted. • Damaged retractable quarter window motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 30.
• DTC 31	<ul style="list-style-type: none"> • Damaged RH retractable quarter window retract limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 31.
• DTC 32	<ul style="list-style-type: none"> • Damaged RH retractable quarter window retract limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 32.
• DTC 33	<ul style="list-style-type: none"> • Damaged RH retractable quarter window retract limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 33.
• DTC 34	<ul style="list-style-type: none"> • Damaged LH header position limit switch. • Circuitry open/shorted. • Damaged header latch motor. • Damaged ECU. 	• Go to Pinpoint Test DTC 34.
• DTC 35	<ul style="list-style-type: none"> • Damaged LH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 35.
• DTC 36	<ul style="list-style-type: none"> • Damaged LH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 36.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES (CONTINUED)

NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 37	<ul style="list-style-type: none"> • Damaged LH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 37.
• DTC 38	<ul style="list-style-type: none"> • Damaged RH header position limit switch. • Circuitry open/shorted. • Damaged ECU 	• Go to Pinpoint Test DTC 38.
• DTC 39	<ul style="list-style-type: none"> • Damaged RH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 39.
• DTC 40	<ul style="list-style-type: none"> • Damaged RH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 40.
• DTC 41	<ul style="list-style-type: none"> • Damaged RH header position limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 41.
• DTC 42	<ul style="list-style-type: none"> • Damaged LH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 42.
• DTC 43	<ul style="list-style-type: none"> • Damaged LH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 43.
• DTC 44	<ul style="list-style-type: none"> • Damaged LH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 44.
• DTC 45	<ul style="list-style-type: none"> • Damaged LH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 45.
• DTC 46	<ul style="list-style-type: none"> • Damaged RH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 46.
• DTC 47	<ul style="list-style-type: none"> • Damaged RH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 47.
• DTC 48	<ul style="list-style-type: none"> • Damaged RH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 48.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES (CONTINUED)

NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 49	<ul style="list-style-type: none"> • Damaged RH tonneau latch limit switch. • Circuitry open/shorted. • Damaged ECU. 	• Go to Pinpoint Test DTC 49.
• DTC 50	<ul style="list-style-type: none"> • Circuitry shorted. • Damaged hardtop pump/motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 50.
• DTC 51	<ul style="list-style-type: none"> • Circuitry shorted. • Damaged hard tonneau pump/motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 51.
• DTC 52	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged driver window relay assembly. • Damaged driver window motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 52.
• DTC 53	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged passenger window motor. • Damaged ECU. • Damaged and/or binding linkage. 	• Go to Pinpoint Test DTC 53.
• DTC 54	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged hard tonneau pump/motor. • Damaged ECU. • Damaged and/or binding linkage or latches. • Operating off poor battery or poor power supply. • Obstruction of hard tonneau (other than linkage). 	<ul style="list-style-type: none"> • Refer to Pinpoint Test for any other DTC that occurred. • Go to Pinpoint Test D, E, and F.
• DTC 55	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged hardtop pump/motor. • Damaged ECU. • Damaged and/or binding linkage or latches. • Operating off poor battery or poor power supply. • Obstruction of hard tonneau (other than linkage). 	<ul style="list-style-type: none"> • Refer to Pinpoint Test for any other DTC that occurred. • Go to Pinpoint Test G, and H.
• DTC 56	<ul style="list-style-type: none"> • Circuitry open/shorted. • Damaged object-in-trunk sensor. • Damaged ECU. • Object-in-trunk sensor disconnected. 	• Go to Pinpoint Test DTC 56.
• DTC 57	<ul style="list-style-type: none"> • Damaged and/or binding LH tonneau latches or cables. • Damaged LH tonneau latch release motor. • Circuitry open. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Go to Pinpoint Test F.
• DTC 58	<ul style="list-style-type: none"> • Damaged and/or binding RH tonneau latches or cables. • Damaged RH tonneau latch release motor. • Circuitry open. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Go to Pinpoint Test F.

SYMPTOM CHART

DIAGNOSTIC TROUBLE CODES (CONTINUED)

NOTE: AFTER DETERMINING THE DTC REFER TO TROUBLESHOOTING HINTS FOLLOWING SYMPTOM CHART.
FOR DTC DESCRIPTION REFER TO PAGES 42-47 AND 42-48

CONDITION	POSSIBLE CAUSE	ACTION
• DTC 59	<ul style="list-style-type: none"> • Damaged and/or binding hardtop linkage. • Damaged header latch strikers. • Damaged header latch position switches. • Circuitry open/shorted. • Damaged ECU. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Go to Pinpoint Test DTC 44 and DTC 48.
• DTC 60	<ul style="list-style-type: none"> • Damaged and/or binding hard tonneau linkage. • Damaged tonneau latch strikers. • Damaged tonneau latch position switches. • Circuitry open/shorted. • Damaged ECU. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Go to Pinpoint Test DTC 42 and DTC 46.
• DTC 61	<ul style="list-style-type: none"> • Damaged and/or binding hardtop linkage. • Obstruction in path of normal travel. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Remove obstruction. • Refer to other DTCs that may have occurred.
• DTC 62	<ul style="list-style-type: none"> • Damaged and/or binding hard tonneau linkage. • Obstruction in path of normal travel. 	<ul style="list-style-type: none"> • Check and service mechanical concerns. • Remove obstruction. • Refer to other DTCs that may have occurred.

TROUBLESHOOTING HINTS FOR NO DTCs PRESENT

Pinpoint Test A:

Indicates that the chime module is not operating when it should. This may occur if ignition voltage is not supplied to pins 1 and 2 of the chime module, ground is not provided to pin 7 of the chime module, ground is not provided to pin 10 of the chime module through circuit AC 3, or the ECU or chime module are not responding to proper inputs.

Pinpoint Test B:

Indicates that the chime module is on at all times. This may occur if circuit AC 3 is grounded, or if the ECU or chime module is grounding this circuit.

Pinpoint Test C:

Indicates that the drivers window does not operate with the drivers window switch. This may occur if there is an open/short in circuits up to the drivers window relay assembly, or damaged drivers window relay assembly.

Driver window inoperative with hardtop operation:

Indicates that the drivers window does not operate with the hardtop operation. This may occur if circuits GW 51 or GW 52 are open/shorted, drivers window relay assembly is not functioning properly, ECU is not applying voltage and ground to circuits GW 51 and GW 52, or the drivers window motor is damaged.

Pinpoint Test D:

Indicates that the hard tonneau hydraulic system is not operating properly. This may occur with damaged pump/motor, not producing proper pressure to move hard tonneau, external leaks in cylinders and/or lines, internal leaks in cylinders or excessive air in the system.

Pinpoint Test E:

Indicates that the hard tonneau did not respond to control switch operation. This may occur if ignition voltage is not supplied to the hard tonneau control switch, damaged switch, circuits GC 5 and GC 6 open/shorted, or ECU does not respond to proper inputs.

Pinpoint Test F:

Indicates that the tonneau latches did not unlatch electrically. This may occur if circuit GC 32 or the ground wire to the tonneau latch solenoids are open/shorted, or the ECU did not send power to the solenoids.

Pinpoint Test G:

Indicates that the hardtop hydraulic system is not operating properly. This may occur with damaged pump/motor, not producing proper pressure to move hardtop, external leaks in cylinders and/or lines, internal leaks in cylinders or excessive air in the system.

Pinpoint Test H:

Indicates that the hardtop did not respond to control switch operation. This may occur if ignition voltage is not supplied to the hardtop control switch, damaged switch, circuits GC 28 and GC 4 open/shorted, or ECU does not respond to proper inputs.

TROUBLESHOOTING HINTS (CONTINUED)

Pinpoint Test J:

Indicates that the ECU is seeing voltage still supplied to circuit GC 7. This may occur with an internal ECU short to voltage, circuit GC 7 shorted to voltage, or parking switch damaged or out of adjustment.

Pinpoint Test K:

Indicates that the hardtop and/or hard tonneau may be operated while driving vehicle over 3 mph. Two conditions must be present for this to occur, circuit GC 7 must have voltage present, or circuit GC 28 must be grounded, and GC 12 (HE 3 at the ETAC) must have approximately 9 volts or greater present. These conditions may occur in the circuits, ECU, or both.

Pinpoint Test L:

Indicates that the ECU is seeing a ground supplied to circuit GC 28. This may occur with an internal ECU short to ground, circuit GC 28 shorted to ground, or the parking brake switch damaged or out of adjustment.

Pinpoint Test M:

Indicates that the LEDs either do not operate or are on all the time. If the LEDs are on all the time circuits GC 51 and/or GC 52 would be shorted to ground, depending on which LED was on. If the both LEDs do not work, this may occur if voltage is not present on circuit GC 53 from the ECU, or control switch, or ECU is damaged. If one LED does not work, this may occur if circuit GC 51 or GC 52 is open, or control switch, or ECU is damaged.

Passenger window inoperative with hardtop:

Indicates that the passengers window does not operate with the hardtop operation. This may occur if circuits GW 53 or GW 54 are open/shorted, ECU is not applying voltage and ground to circuits GW 53 and GW 54, or the passengers window motor is damaged.

Pinpoint Test N:

Indicates that the passenger window does not operate with the passenger window switch. This may occur if circuits GW 43, GW 44, are open/shorted, damaged passenger window switch, or ignition voltage not supplied to switch, or if ECU does not respond to input voltage.

Passenger window will not work from drivers window switch:

Indicates that passenger window works with hardtop and passenger window switch operation, this may occur if circuits GW 9 and/or GW 10 from drivers window switch to passenger window is open/shorted or damaged switch.

Pinpoint Test P:

Indicates that the Personal Computer (PC) and the ECU cannot communicate with each other. This may occur if ignition and ground are not supplied to the Data Link Connector (DLC), circuit GC 9 is open/shorted, PC version software does not match ECU version software, convertor and/or cables damaged, or the PC is not functioning properly.

Retractable quarter window (one side) inoperative:

If one retractable quarter window operates properly then the electrical components must be operating properly and mechanical binding or breakage is the probable cause.

TROUBLESHOOTING HINTS FOR DTCs

DTC 02-06:

Indicates an internal ECU fault. This may also occur if the ECU no longer sees its reference voltage (circuits GC 20 and GC 23), which could occur if reference voltage (circuit GC 20 or GC 23) are shorted to ground or to voltage above reference voltage. These circuits must be tested before replacing ECU.

DTC 07:

Indicates that battery voltage is missing from both circuits (GC1A AND GC 1) at the ECU. This may occur if there is an open in circuits or heavy current draw (such as a short circuit or shorted motor) causing the fuse to blow.

DTC 08:

Indicates that battery voltage is below 10 VDC or above 16 VDC. Normally caused by a damaged battery or malfunctioning charging system.

DTC 09-11:

Indicates a fault with hardtop potentiometer and/or potentiometer feed circuit GC 18, potentiometer ground circuit GC 19, or potentiometer signal return circuit GC 16.

DTC 12-14:

Indicates a fault with hard tonneau potentiometer and/or potentiometer feed circuit GC 18, potentiometer ground circuit GC 19, or potentiometer signal return circuit GC 17.

DTC 15:

Indicates an internal diode fault in either the hardtop or hard tonneau potentiometer.

DTC 16:

Indicates that the ECU is seeing higher than reference voltage on the potentiometer feed circuit. This may occur if circuit GC 18 is shorted to voltage.

DTC 17:

Indicates that the ECU is seeing the potentiometer feed circuit being grounded. This may occur if circuit GC 18 is shorted to ground.

DTC 18,22,26,30:

Indicates that the ECU did not see a change in limit switch position within the specified time (timeout). This may occur if a switch or circuits are damaged, or the motor did not move the component to move the switch.

NOTE: If the concern is with the retractable quarter window switch the magnet on the end of the cable may need to be inspected.

TROUBLESHOOTING HINTS FOR DTCs (CONTINUED)

DTC 19,23,27,31,35,39,43,47:

Indicates that the limit switch return circuit must be grounded on the ECU side and also open, this can occur in the limit switch return circuit to the ECU, through the limit switch, or in the reference circuits (GC 20 and GC 23) to the point where they would splice together to go to other limit switches. If the reference circuits (GC 20 and GC 23) are grounded beyond the splice point (grounding the circuit to more than one limit switch) the ECU will log an internal fault indicating the reference voltage is too low or missing.

DTC 20,24,28,32,36,40,44,48:

Indicates that the limit switch return circuit must be shorted to higher than reference voltage on the ECU side and also open, this can occur in the limit switch return circuit to the ECU, through the limit switch, or in the reference circuits (GC 20 and GC 23) to the point where they would splice together to go to other limit switches. If the reference circuits (GC 20 and GC 23) are shorted to voltage beyond the splice point (shorting the circuit to more than one limit switch) the ECU will log an internal fault indicating the reference voltage is too high. The short to higher voltage may occur from any circuit in or near the limit switch harness, therefore it is necessary to operate all accessories and hardtop system that may affect the harness, while locating the short.

DTC 21,25,29,33,37,41,45,49:

Indicates that the limit switch return circuit is open on the ECU side, this can occur in the limit switch return circuit to the ECU, through the limit switch, or in the reference circuits (GC 20 and GC 23) to the point where they would splice together to go to other limit switches. If the reference circuits (GC 20 and GC 23) are open beyond the splice point (opening the circuit to more than one switch) then multiple limit switch DTCs will log indicating the reference voltage is missing.

DTC 34,38:

Indicates that the ECU did not see a change in limit switch position when the hardtop is in the closed position. This may occur if the hardtop did not enter the header properly, or with damaged switches or circuitry.

DTC 42,46:

Indicates that the ECU did not see a change in limit switch position when it has seen a change in hard tonneau potentiometer position. This can occur in either the latched or unlatched position. This may indicate that the hard tonneau did not latch or unlatch properly, or damaged switch and/or circuitry.

DTC 50:

Indicates that the ECU has seen an excessive current draw from the hardtop pump and motor circuit (GC 29 and GC 30). This may occur if hardtop linkage is binding, or motor or circuitry is shorted.

DTC 51:

Indicates that the ECU has seen an excessive current draw from the hard tonneau pump and motor circuit (GC 31 and GC 32). This may occur if hard tonneau is binding, or motor or circuitry is shorted.

DTC 52: Indicates that the ECU has not seen the driver side window motor stall current before a specified time (timeout). This may occur if there is mechanical failure allowing the window motor to run without a load, or if the motor or circuitry is open. (Window may operate from driver's window switch.)

TROUBLESHOOTING HINTS FOR DTCs (CONTINUED)

DTC 53:

Indicates that the ECU has not seen the passenger window motor stall current before a specified time (timeout). This may occur if there is mechanical failure allowing the window motor to run without a load, or if the motor or circuitry is open.

DTC 54:

This DTC will normally occur with other DTC's, this indicates that the ECU has not seen movement from the hard tonneau when it should have seen movement, this DTC is recorded as the result of other concerns and not the cause. This may occur as a result of various components not allowing movement, latches not releasing, motors not operating, limit switches indicating wrong positions, etc.

DTC 55: This DTC will normally occur with other DTC's, this indicates that the ECU has not seen movement from the hardtop when it should have seen movement, this DTC is recorded as the result of other concerns and not the cause. This may occur as a result of various components not allowing movement, latches not releasing, motors not operating, limit switches indicating wrong positions, etc.

DTC 56:

Indicates that the ECU is no longer seeing a return voltage from the object-in-trunk sensor (OTS) on circuit GC 49. This may occur with damaged OTS, circuits GC 47 or GC 49 open or OTS is disconnected.

DTC 57:

Indicates that the LH tonneau latch has stayed latched for too long after the ECU has received input to release and open the tonneau. This may occur with damaged and/or binding, LH tonneau latch, release cable, and/or latch release motor, or if LH tonneau latch limit switch is sticking.

DTC 58:

Indicates that the RH tonneau latch has stayed latched for too long after the ECU has received input to release and open the tonneau. This may occur with damaged and/or binding, RH tonneau latch, release cable, and/or latch release motor, or if RH tonneau latch limit switch is sticking.

DTC 59:

Indicates that the ECU has not received input from either the RH or LH header position switch when the hardtop is in the CLOSED position. This may occur with binding, misaligned and/or damaged hardtop linkage, header latch strikers, header position switches.

DTC 60:

Indicates that the ECU has not received input from either the RH or LH tonneau position switch when the hard tonneau is in the CLOSED position. This may occur with binding, misaligned and/or damaged hard tonneau linkage, tonneau latch strikers, tonneau position switches.

TROUBLESHOOTING HINTS FOR DTCs (CONTINUED)**DTC 61:**

Indicates the ECU has seen the hardtop hydraulic pump stall current (high current), when the hardtop is not either fully open (against the down stop), or fully closed (against the header). This would normally occur if there is binding hardtop linkage, or an obstruction in the normal path of travel.

DTC 62:

Indicates the ECU has seen the hard tonneau hydraulic pump stall current (high current), when the hard tonneau is not either fully open, or fully closed. This would normally occur if there is binding hard tonneau linkage, or an obstruction in the normal path of travel.

DTC* LOG IDENTIFICATION LIST

DTC*	D.R.C.** When ACTIVE	ALLOWS MOTION	DESCRIPTION
00	NO	UP/DOWN	No Fault
01	--	--	Reserved
02	NO	NO MOTION	EEPROM Failure
03	NO	NO MOTION	Abnormal Reset
04	NO	NO MOTION	A/D Failure or Quarter Window Switches shorted to bat/ign (8-16 volts dc)
05	NO	NO MOTION	ROM Checksum Failure
06	NO	NO MOTION	RAM Checksum Failure
07	NO	NO MOTION	Battery missing when ignition is on
08	NO	UP	Supply voltage out of limits (10 to 16 volts)
09	NO	UP/DOWN	Hardtop potentiometer reading beyond limit
10	NO	NO MOTION	Hardtop potentiometer short/open
11	NO	UP/DOWN	Hardtop potentiometer reading unstable
12	NO	UP/DOWN	Tonneau potentiometer reading beyond limit
13	NO	NO MOTION	Tonneau potentiometer short/open
14	NO	UP/DOWN	Tonneau potentiometer reading unstable
15	NO	NO MOTION	Potentiometer diode fault
16	NO	UP/DOWN	Potentiometer feed overload
17	NO	NO MOTION	Potentiometer feed short
18	YES	UP/DOWN	Header latch limit switch does not indicate latched before timeout
19	YES	NO MOTION	Header latch limit switch grounded
20	YES	NO MOTION	Header latch limit switch voltage too high (3 - 5 volts dc)
21	YES	NO MOTION	Header latch limit switch wiring open
22	YES	UP/DOWN	Header unlatch limit switch does not indicate unlatched before timeout
23	YES	NO MOTION	Header unlatch limit switch grounded
24	YES	NO MOTION	Header unlatch limit switch voltage too high (3 - 5 volts dc)
25	YES	NO MOTION	Header unlatch limit switch wiring open
26	YES	UP/DOWN	Retracted quarter window limit switch indicates not retracted after timeout
27	YES	UP	Retracted quarter window limit switch grounded
28	YES	UP	Retracted quarter window limit switch voltage too high (3 - 5 volts dc)
29	YES	UP	Retracted quarter window limit switch wiring open
30	YES	UP/DOWN	Extended quarter window limit switch indicates not retracted after timeout
31	YES	UP/DOWN	Extended quarter window limit switch grounded
32	YES	NO MOTION	Extended quarter window limit switch voltage too high (3 - 5 volts dc)
33	YES	UP	Extended quarter window limit switch wiring open
34	YES	UP/DOWN	Left header position switch indicates not in position when top is up
35	YES	NO MOTION	Left header position switch grounded
36	YES	NO MOTION	Left header position switch voltage too high (3 - 5 volts dc)
37	YES	NO MOTION	Left header position switch wiring open
38	YES	UP/DOWN	Right header position switch indicates not in position when top is up
39	YES	NO MOTION	Right header position switch grounded
40	YES	NO MOTION	Right header position switch voltage too high (3 - 5 volts dc)
41	YES	NO MOTION	Right header position switch wiring open
42	YES	UP/DOWN	Left tonneau latch limit switch indicates unlatched while in latched position or Left tonneau latch limit switch indicates latched while in unlatched position
43	YES	UP/DOWN	Left tonneau latch limit switch grounded
44	YES	NO MOTION	Left tonneau latch limit switch voltage too high (3 - 5 volts dc)

DTC* LOG IDENTIFICATION LIST

DTC*	D.R.C.** When ACTIVE	ALLOW	DESCRIPTION
45	YES	UP	Left tonneau latch limit switch wiring open
46	YES	UP/DOWN	Right tonneau latch limit switch indicates unlatched while in latched position or Right tonneau latch limit switch indicates latched while in unlatched position
47	YES	UP/DOWN	Right tonneau latch limit switch grounded
48	YES	NO MOTION	Right tonneau latch limit switch voltage too high (3 - 5 volts dc)
49	YES	UP	Right tonneau latch limit switch wiring open
50	NO	UP/DOWN	Hardtop motor short circuit/grounded
51	NO	UP/DOWN	Tonneau motor short circuit/grounded
52	NO	UP/DOWN	Driver window timeout without stall
53	NO	UP/DOWN	Passenger window timeout without stall
54	NO	UP/DOWN	Hardtop motion fault (dV/dt)
55	NO	UP/DOWN	Tonneau motion fault (dV/dt)
56	YES	UP	Object in trunk sensor not connected
57	YES	UP/DOWN	Left tonneau latch limit switch latched too long on tonneau up motion
58	YES	UP/DOWN	Right tonneau latch limit switch latched too long on tonneau up motion
59	YES	UP/DOWN	No header position switches when hardtop is full up
60	YES	UP/DOWN	No tonneau limit switches when tonneau is full down
61	NO	UP/DOWN	Hardtop motor detected stall while not in end position
62	NO	UP/DOWN	Tonneau motor detected stall while not in end position

* DTC - Diagnostic Trouble Code.

** Double Rate Chime.

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST A
 CHIME DOES NOT OPERATE WITH HARDTOP OR HARD TONNEAU OPEN

TEST STEP		RESULT	ACTION TO TAKE
A-1	CHECK IGNITION TO PIN 2 AT CHIME MODULE		
	<ul style="list-style-type: none"> Access and disconnect connector E-47 at chime module. Using a Digital Volt/Ohm Meter (DVOM) set to DC volt, connect negative lead to known good ground. Connect positive lead to pin 2 at chime module connector E-47. Turn ignition to ON position. Read voltmeter. <p>• Is system voltage present?</p>	Yes No	Go to A-2. Repair circuit AC 2. Restore vehicle. Retest system.
A-2	CHECK IGNITION TO PIN 1 AT CHIME MODULE		
	<ul style="list-style-type: none"> Connector E-47 at chime module disconnected. Using a DVOM set to DC volt, connect negative lead to known good ground. Connect positive lead to pin 1 at chime module connector E-47. Turn ignition to ON position. Read voltmeter. <p>• Is system voltage present?</p>	Yes No	Go to A-3. Repair ignition circuit between pin 2 and pin 1. Restore vehicle. Retest system.
A-3	CHECK GROUND CIRCUIT TO CHIME MODULE		
	<ul style="list-style-type: none"> Connector E-47 at chime module disconnected. Using a DVOM set to ohm scale, connect negative lead to known good ground. Connect positive lead to pin 7 at chime module connector E-47. Read ohmmeter. <p>• Is there 3 ohms or less?</p>	Yes No	Go to A-4. Repair circuit AC 4. Restore vehicle. Retest system.
A-4	CHECK CHIME MODULE OPERATION		
	<ul style="list-style-type: none"> Connect connector E-47 at chime module. Access connector F-124 at ECU. Using a jumper wire, connect one end to a known good ground. Back probe and connect the second end to pin 9 at ECU connector F-124. Turn ignition to ON position. <p>• Does chime sound?</p>	Yes No	Replace ECU. Restore vehicle. Retest system. Go to A-5.
A-5	CHECK CIRCUIT GC 39 FOR OPEN		
	<ul style="list-style-type: none"> Disconnect connector F-124 at ECU. Disconnect connector E-47 at chime module. Using a DVOM set to ohm scale connect positive lead to pin 9 at ECU connector F-124. Connect the negative lead to pin 10 at chime module connector E-47. Read ohmmeter. <p>• Is there 3 ohms or less?</p>	Yes No	Replace chime module. Restore vehicle. Retest system. Repair circuit AC 3. Restore vehicle. Retest system.

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST B
 CHIME STAYS ON CONTINUOUSLY WITH NO DTCs PRESENT

TEST STEP		RESULT	ACTION TO TAKE
B-1	CHECK ECU GROUND CIRCUIT		
	<ul style="list-style-type: none"> • Access and disconnect connector F-124 at ECU. • Turn ignition to ON position. • Does chime still sound? 	Yes No	Go to B-2 . Replace ECU. Restore vehicle. Retest system.
B-2	CHECK CIRCUIT GC 39 FOR SHORT TO GROUND		
	<ul style="list-style-type: none"> • Connector F-124 at ECU disconnected. • Access and disconnect connector E-47 at chime module. • Using a Digital Volt/Ohm Meter (DVOM) set to ohm scale, connect negative lead to known good ground. • Connect positive lead to pin 9 at ECU connector F-124. • Read ohmmeter. • Is there continuity? 	Yes No	Repair circuit AC 3. Restore vehicle. Retest system. Replace chime module. Restore vehicle. Retest system.

PINPOINT TESTS

**REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE, NOTES AND DEFINITIONS OF TERMS.
PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.**

**TEST C
DRIVER WINDOW INOPERATIVE WITH DRIVER WINDOW SWITCH**

TEST STEP		RESULT	ACTION TO TAKE
C-1	CHECK DRIVER WINDOW OPERATION		
<ul style="list-style-type: none"> • Access and disconnect driver window relay assembly. • Connect driver window switch connector E-126 to driver window motor connector E-35. • Turn ignition to ON position. • Operate driver window. • Observe driver window operation. 		Yes	Refer to PINPOINT TEST DTC 52.
		No	Refer to Vol. 2 of Service Manual, for window repair.
• Does driver window operate properly?			

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

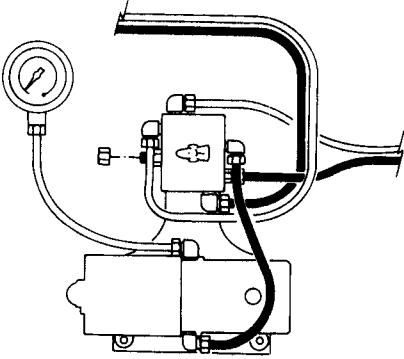
TEST D
 HARD TONNEAU HYDRAULIC SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
D-1	CHECK HARD TONNEAU HYDRAULIC PUMP MOTOR OPERATION		
	<ul style="list-style-type: none"> Place automatic transaxle in Park (P) manual transaxle in neutral. Apply parking brake. Turn ignition switch to ON position. Operate hard tonneau control switch to OPEN position. 	Yes	Go to D-2 .
	<ul style="list-style-type: none"> Does hard tonneau pump motor run? 	No	Go to Pinpoint Test E.
D-2	CHECK HARD TONNEAU BYPASS VALVE POSITION		
	<ul style="list-style-type: none"> Access and check hard tonneau bypass valve position. 	Yes	Go to D-3 .
	<ul style="list-style-type: none"> Is hard tonneau bypass valve in POWER position? 	No	Rotate hard tonneau bypass valve to the POWER position. Restore vehicle. Retest system.
D-3	CHECK HARD TONNEAU HYDRAULIC FLUID LEVEL		
	<ul style="list-style-type: none"> Access hard tonneau hydraulic fluid reservoir. 	Yes	Go to D-4 .
	<ul style="list-style-type: none"> Is hard tonneau hydraulic fluid at proper level? 	No	Add fluid, bleed system if necessary. Restore vehicle. Retest system.
D-4	CHECK HARD TONNEAU HYDRAULIC LINES		
	<ul style="list-style-type: none"> Access lines from hard tonneau pump to hydraulic cylinders. 	Yes	Service as required. Restore vehicle. Retest system.
	<ul style="list-style-type: none"> Are lines bent or kinked? 	No	Go to D-5 .
D-5	CHECK HARD TONNEAU MANUAL OPERATION		
	<ul style="list-style-type: none"> Turn hard tonneau bypass valve to MANUAL position. Operate hard tonneau manually. 	Yes	Go to D-6 .
	<ul style="list-style-type: none"> Does hard tonneau operate manually? 	No	Check for binding linkage or hinges. Service as required. Restore vehicle. Retest system.

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

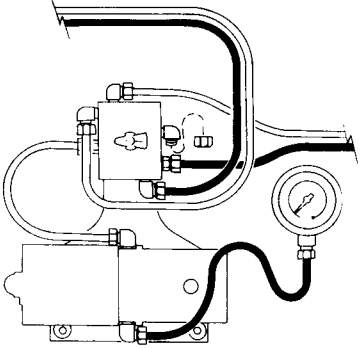
TEST D (CONTINUED)
 HARD TONNEAU HYDRAULIC SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
D-6	CHECK HARD TONNEAU HYDRAULIC PUMP OPEN (EXTEND) PRESSURE		
<p>NOTE: BE CAREFUL CONNECTING PRESSURE GAUGE IF HARD TONNEAU IS OPEN. MOVEMENT OF THE HARD TONNEAU MAY OCCUR.</p> <ul style="list-style-type: none"> • Route pressure gauge and hose through rear seat, in order to stay clear of moving components. • Place transaxle in park (P) automatic, neutral for manual. • Parking brake applied. • Open and manually move and support hard tonneau to half open position. • Turn hard tonneau bypass valve to MANUAL position. • Connect pressure gauge to hard tonneau hydraulic pump open (extend) side. • Cap open fitting on manifold.  <ul style="list-style-type: none"> • Turn ignition to ON position. • Operate hard tonneau control switch to OPEN position. • Read pressure gauge. <p>• Is pressure 250 psi \pm 20 psi?</p>		<p>Yes</p> <p>No</p>	<p>Go to D-7.</p> <p>Replace hard tonneau hydraulic pump. Restore vehicle. Retest system.</p>

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

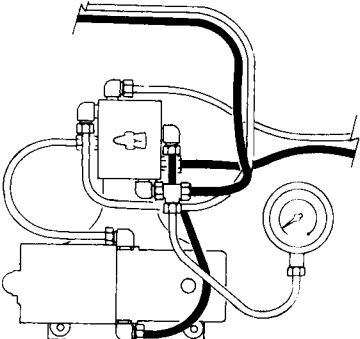
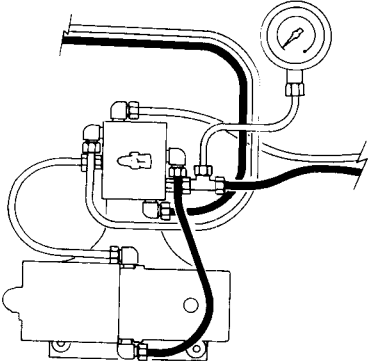
TEST D (CONTINUED)
 HARD TONNEAU HYDRAULIC SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
D-7	CHECK HARD TONNEAU HYDRAULIC PUMP CLOSE (RETRACT) PRESSURE		
<p>NOTE: BE CAREFUL CONNECTING PRESSURE GAUGE IF HARD TONNEAU IS OPEN. MOVEMENT OF THE HARD TONNEAU MAY OCCUR.</p> <ul style="list-style-type: none"> Place transaxle in park (P) automatic, neutral for manual. Parking brake applied. Open and manually move and support hard tonneau to half open position. Connect pressure gauge to hard tonneau hydraulic pump close (retract) side. Cap open fitting on manifold.  <ul style="list-style-type: none"> Turn ignition to ON position. Operate hard tonneau control switch to CLOSE position. Read pressure gauge. Is pressure 350 psi or greater? 		<p>Yes</p> <p>No</p>	<p>Go to D-8.</p> <p>Replace hard tonneau hydraulic pump. Restore vehicle. Retest system.</p>

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE, NOTES AND DEFINITIONS OF TERMS.
PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST D (CONTINUED)
HARD TONNEAU HYDRAULIC SYSTEM

TEST STEP	RESULT	ACTION TO TAKE
D-8 CHECK HARD TONNEAU HYDRAULIC SYSTEM FLOW PRESSURE		
<ul style="list-style-type: none"> • Operate hard tonneau and support in OPEN position. • Turn hard tonneau bypass valve to MANUAL position. • Connect pressure gauge to LH cylinder retract side. 	<p>Yes</p> <p>No</p>	<p>▶ Hydraulic system Okay. Restore vehicle. Retest system.</p> <p>▶ Pressure over 250 psi \pm 20 psi check for hard tonneau binding. Under 250 psi \pm 20 psi replace hydraulic cylinder on side with the lowest pressure. Restore vehicle. Retest system.</p>
<ul style="list-style-type: none"> • Turn hard tonneau bypass valve to POWER position, remove support. • Turn ignition to ON position. • Press hard tonneau control switch and operate hard tonneau to CLOSE position. • Press hard tonneau control switch and operate hard tonneau to OPEN position. • Read and record highest pressure indicated. • Restore LH cylinder retract side. • Support hard tonneau in open position. • Turn hard tonneau bypass valve to MANUAL position. • Connect pressure gauge to RH cylinder retract side.  <ul style="list-style-type: none"> • Turn hard tonneau bypass valve to POWER position, remove support. • Turn ignition to ON position. • Press hard tonneau control switch and operate hard tonneau to CLOSE position. • Press hard tonneau control switch and operate hard tonneau to OPEN position. • Read and record highest pressure indicated. <p>• Are pressures less than 250 psi \pm 20 psi and within 100 psi of each other?</p>		

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST E
 HARD TONNEAU INOPERATIVE WITH CONTROL SWITCH

TEST STEP		RESULT	ACTION TO TAKE
E-1	CHECK CIRCUIT GC 2 FOR VOLTAGE AT HARD TONNEAU CONTROL SWITCH		
<ul style="list-style-type: none"> Access connector D48 at hardtop and hard tonneau control switch. Using a Digital Volt/Ohm Meter (DVOM) set to DC volt, connect negative lead to a known good ground. Back probe and connect the positive lead to pin 8 at hardtop and hard tonneau control switch connector D48. Turn ignition to ON position. Read voltmeter. <p>• Is system voltage present?</p>		Yes	Go to E-2.
		No	Repair circuit GC 2. Restore vehicle. Retest system.
E-2	CHECK CIRCUIT GC 5 AT HARDTOP AND HARD TONNEAU CONTROL SWITCH		
<ul style="list-style-type: none"> Access connector D48 at hardtop and hard tonneau control switch. Using a DVOM set to DC volt, connect negative lead to a known good ground. Back probe and connect the positive lead to pin 10 at hardtop and hard tonneau control switch connector D48. Turn ignition to ON position. Press hard tonneau control switch to OPEN position. Read voltmeter. <p>• Is system voltage present?</p>		Yes	Go to E-3.
		No	Replace hardtop and hard tonneau control switch. Restore vehicle. Retest system.
E-3	CHECK CIRCUIT GC 5 FOR VOLTAGE AT ECU		
<ul style="list-style-type: none"> Access connector F-123 at ECU. Using a DVOM set to DC volt, connect negative lead to a known good ground. Back probe and connect the positive lead to pin 3 at ECU connector F-123. Turn ignition to ON position. Press hard tonneau control switch to the OPEN position. Read voltmeter. <p>• Is system voltage present?</p>		Yes	Go to E-4.
		No	Repair circuit GC 5. Restore vehicle. Retest system.
E-4	CHECK CIRCUIT GC 6 AT HARDTOP AND HARD TONNEAU CONTROL SWITCH		
<ul style="list-style-type: none"> Access connector D48 at hardtop and hard tonneau control switch. Using a DVOM set to DC volt, connect negative lead to a known good ground. Back probe and connect the positive lead to pin 9 at hardtop and hard tonneau control switch connector D48. Turn ignition to ON position. Press hard tonneau control switch to CLOSE position. Read voltmeter. <p>• Is system voltage present?</p>		Yes	Go to E-5.
		No	Replace hardtop and hard tonneau control switch. Restore vehicle. Retest system.

PINPOINT TESTS **REFER TO:** **PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE, NOTES AND DEFINITIONS OF TERMS.**
PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST E (CONTINUED)
HARD TONNEAU INOPERATIVE WITH CONTROL SWITCH

TEST STEP		RESULT	ACTION TO TAKE
E-5	CHECK CIRCUIT GC 6 FOR VOLTAGE AT ECU		
<ul style="list-style-type: none"> • Access connector F-123 at ECU. • Using a Digital Volt/Ohm Meter (DVOM) set to DC volt, connect negative lead to a known good ground. • Back probe and connect the positive lead to pin 4 at ECU connector F-123. • Turn ignition to ON position • Press hard tonneau control switch to the CLOSE position. • Read voltmeter 		Yes	Replace ECU. Restore vehicle. Retest system.
<ul style="list-style-type: none"> • Is system voltage present? 		No	Repair circuit GC 6. Restore vehicle. Retest system.

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
NOTES AND DEFINITIONS OF TERMS.
PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST F
HARD TONNEAU WILL NOT UNLATCH WITH CONTROL SWITCH

TEST STEP		RESULT	ACTION TO TAKE
F-1	CHECK TONNEAU LATCH OPERATION		
	<ul style="list-style-type: none"> Position tonneau to latched position. Access and turn tonneau by-pass valve to MANUAL position. Turn ignition to ON position. Operate tonneau to OPEN position Observe tonneau operation. <p>• Did either tonneau latch release?</p>	Yes No	Go to F-2. Go to F-4.
F-2	CHECK CIRCUIT GC 35 BETWEEN TONNEAU LATCH SOLENOIDS		
	<ul style="list-style-type: none"> Access and disconnect connector F-125 at ECU. Disconnect RH and LH tonneau latch solenoid connectors F-112 and F-118. Using a Digital Volt/Ohm Meter (DVOM) set to ohm scale, connect one lead to pin A at RH tonneau latch solenoid connector F-112. Connect the second lead to pin A at LH tonneau latch solenoid connector F-118. Read ohmmeter. <p>• Is there 3 ohms or less?</p>	Yes No	Go to F-3. Repair circuit GC 35. Restore vehicle. Retest system.
F-3	CHECK CIRCUIT GC 50 AT SUSPECT TONNEAU LATCH SOLENOID		
	<ul style="list-style-type: none"> Connectors F-112 and F-118 at RH and LH tonneau latch solenoids disconnected. Connector F-125 at ECU disconnected. Using a DVOM set to ohm scale, connect negative lead to known good ground. Connect the positive lead to pin B at suspect tonneau latch solenoid, connector (F-112 or F-118). Read ohmmeter. <p>• Is there 3 ohms or less?</p>	Yes No	Replace suspect solenoid. Restore vehicle. Retest system. Repair circuit GC 50. Restore vehicle. Retest system.
F-4	CHECK CIRCUIT GC 35 FOR OPEN		
	<ul style="list-style-type: none"> Access and disconnect RH and LH tonneau latch solenoids. Access and disconnect connector F-125 at ECU. Using a Digital Volt/Ohm Meter (DVOM) set to ohm scale, connect one lead to pin A at either solenoid connector F-112 or F-118. Connect the second lead to pin 12 at ECU connector F-125. Read ohmmeter. <p>• Is there 3 ohms or less?</p>	Yes No	Go to F-5. Repair circuit GC 35. Restore vehicle. Retest system.

PINPOINT TESTS **REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE, NOTES AND DEFINITIONS OF TERMS.**
PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST F (CONTINUED)
HARD TONNEAU WILL NOT UNLATCH WITH CONTROL SWITCH

F-5	CHECK CIRCUIT GC 50 FOR OPEN		
<ul style="list-style-type: none"> • Connectors F-112 and F-118 at RH and LH tonneau latch solenoids disconnected. • Connector F-125 at ECU disconnected. • Using a DVOM set to ohm scale, connect one lead to a known good ground. • Connect the second lead to pin B at each tonneau latch solenoid connector F-112 or F-118. • Read ohmmeter. • Is there 3 ohms or less? 			
		Yes	▶ Replace ECU. Restore vehicle. Retest system.
		No	▶ Repair circuit GC 50. Restore vehicle. Retest system.

PINPOINT TESTS

REFER TO: PAGES 42-15 THROUGH 42-17 FOR PRECAUTIONS BEFORE SERVICE,
 NOTES AND DEFINITIONS OF TERMS.
 PAGES 42-33 THROUGH 42-40 FOR SYMPTOM CHARTS.
 PAGES 42-41 THROUGH 42-46 FOR TROUBLESHOOTING HINTS.

TEST G
 HARDTOP HYDRAULIC SYSTEM

TEST STEP		RESULT	ACTION TO TAKE
G-1	CHECK HARDTOP HYDRAULIC PUMP MOTOR OPERATION		
	<ul style="list-style-type: none"> Place automatic transaxle in Park (P) manual transaxle in neutral. Apply parking brake. Turn ignition switch to ON position. Operate hardtop control switch to OPEN position. 	Yes	Go to G-2 .
	<ul style="list-style-type: none"> After hard tonneau opens does hardtop pump motor run? 	No	Go to Pinpoint Test H.
G-2	CHECK HARDTOP BYPASS VALVE POSITION		
	<ul style="list-style-type: none"> Access and check hardtop bypass valve position. 	Yes	Go to G-3 .
	<ul style="list-style-type: none"> Is hardtop bypass valve in POWER position? 	No	Rotate hardtop bypass valve to the POWER position. Restore vehicle. Retest system.
G-3	CHECK HARDTOP HYDRAULIC FLUID LEVEL		
	<ul style="list-style-type: none"> Access hardtop hydraulic fluid reservoir. 	Yes	Go to G-4 .
	<ul style="list-style-type: none"> Is hardtop hydraulic fluid at proper level? 	No	Add fluid, bleed system if necessary. Restore vehicle. Retest system.
G-4	CHECK HARDTOP HYDRAULIC LINES		
	<ul style="list-style-type: none"> Access lines from hardtop pump to hydraulic cylinders. 	Yes	Serviced as required. Restore vehicle. Retest system.
	<ul style="list-style-type: none"> Are lines bent or kinked? 	No	Go to G-5 .
G-5	CHECK HARDTOP MANUAL OPERATION		
	<ul style="list-style-type: none"> Note: A second person will be needed for manual operation. 	Yes	Go to G-6 .
	<ul style="list-style-type: none"> Turn hardtop bypass valve to MANUAL position. Operate hardtop manually. 	No	Check for binding linkage or hinges. Service as required. Restore vehicle. Retest system.
	<ul style="list-style-type: none"> Does hardtop operate manually? 		