

**ARTICLE BEGINNING**

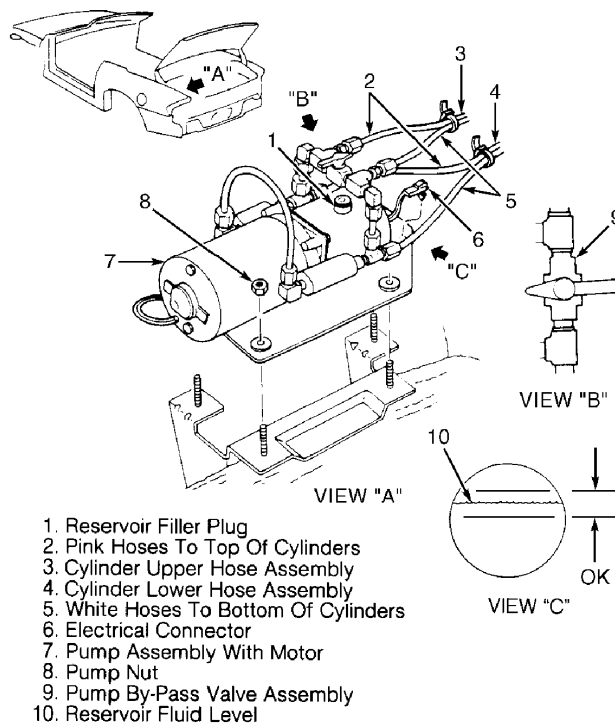
1999-2000 ACCESSORIES & EQUIPMENT  
General Motors Power Convertible Tops

Camaro & Firebird

**DESCRIPTION & OPERATION**

Convertible top is controlled via a center console-mounted convertible top switch which provides power to hydraulic pump assembly. System is protected by power window circuit breaker (30-amp). Pump assembly consists of 2 hydraulic cylinders, by-pass valve and reversible permanent magnet pump motor. Pump assembly has 2 hydraulic hoses for each cylinder that evenly control up and down movement of convertible top. See Fig. 1. Pump motor is protected against internal overload condition by an electronic circuit breaker.

If vehicle battery is low on charge or disconnected, convertible top can be raised or lowered by by-passing hydraulic pump. In rear compartment, locate access hole for pump valve in side trim. Rotate pump valve clockwise 1/4 turn until it stops. Unlock front latches. Manually lower folding top by lifting No. 1 bow near "A" pillar and lowering top as required. To raise, lift at center of No. 1 bow, lock front latches. Return pump by-pass valve to original position.



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Fig. 1: Identifying Pump/Motor Assembly Components  
Courtesy of General Motors Corp.

**ON-VEHICLE SERVICE****HYDRAULIC SYSTEM BLEEDING**

NOTE: DO NOT allow hydraulic oil level to drop below lower indicator line on reservoir or pump damage may result. See Fig. 1. To avoid damage during bleeding procedure, ensure cylinder rod does not touch body components or convertible top assembly when extending.

1) Remove cylinder assemblies from outer arm and main pivot bracket assemblies. Position cylinder assemblies so cylinder rods do not touch body components or convertible top assembly when fully extended.

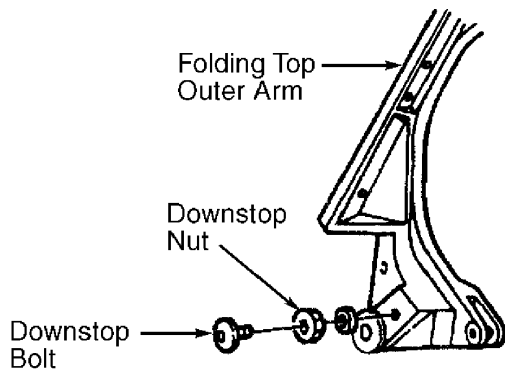
2) Remove left rear compartment side trim assembly. Remove reservoir filler plug. Remove one Pink hose from pump/motor assembly and place at reservoir filler plug opening. Use a rubber plug and seal open pump fitting to prevent air from entering system. Push and hold convertible top switch in UP position. After cylinders are fully extended, continue to depress switch until hose being bled is free of air bubbles. To install, reverse removal procedure. Tighten hose fitting to 62 INCH lbs. (7 N.m).

**ADJUSTMENTS****DOWNSTOP ADJUSTMENT**

1) Disconnect negative battery cable. Open trunk and locate access hole for by-pass valve assembly at left rear quarter inner trim panel. Turn pump by-pass valve assembly to OPEN (fully clockwise) position. See Fig. 1. Lower convertible top assembly. Lay straightedge across rearmost edge of side rail garnish moldings with straightedge extending to left and right edges of vehicle.

2) Reposition plastic splash shield to allow access to downstop bolts/screws. See Fig. 2. Loosen downstop bolt. Adjust octagonal downstop cams so convertible top assembly is level from left to right along straightedge, and allows sufficient clearance for boot cover installation. Tighten bolts/screws to 13 ft. lbs. (18 N.m).

3) Remove straightedge. Raise convertible top assembly. If upstop adjustment is needed, go to UPSTOP ADJUSTMENT. If all adjustment is complete, turn pump by-pass valve assembly to CLOSED (fully counterclockwise) position. Reconnect negative battery cable. Check top operation.



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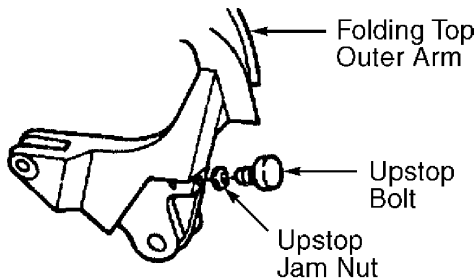
Fig. 2: Identifying Downstop Adjustment  
Courtesy of General Motors Corp.

**UPSTOP ADJUSTMENT**

1) Disconnect negative battery cable. Turn pump by-pass valve assembly to OPEN (fully clockwise) position. Lower convertible top assembly. Turn upstops fully inward to outer arm assemblies. See Fig. 3. Raise and latch convertible top assembly.

2) With convertible top assembly latched, turn each upstop outward from outer arm assembly until it touches pivot bracket assembly. Lower convertible top assembly. Turn upstops outward an additional 1/4 turn. Tighten jam nut to 13 ft. lbs. (18 N.m).

3) Check operation of convertible top assembly and readjust as necessary. Turn pump by-pass valve assembly to CLOSED (fully counterclockwise) position. Reconnect negative battery cable.



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Fig. 3: Identifying Upstop Adjustment  
Courtesy of General Motors Corp.

**LATCH ASSEMBLY ADJUSTMENT**

1) Front latch assembly adjustment determines sealing quality of No. 1 bow assembly to windshield header and latching or releasing effort of latch mechanism. A long latch hook adjustment can be identified by low latching effort, or No. 1 bow assembly setting too high off windshield header, causing wind noise or leaks. Short latch hook adjustment will cause excessively high latching effort and No. 1 bow assembly to sink below windshield header when latched. This can cause weatherstrip damage or latch assembly failure.

NOTE: Correct front latch hook adjustment should reveal 3-4 threads

outside of clamp body. If not, check convertible top assembly for mechanical problems. Ensure both sides of vehicle are checked, and adjusted accordingly.

2) Noting operation of latch assemblies and latching effort, raise convertible top assembly and latch to windshield header. Latching effort should be equal on both sides. Check fit between No. 1 bow assembly and windshield header. Bow assembly should be flush to 1/16" (2 mm) below windshield header trim.

3) To adjust, raise convertible top assembly off windshield header. Loosen clamp body set screw. Turn front latch hook in direction necessary for correct adjustment. Ensure front latch hook faces forward after adjustment.

4) Raise and latch convertible top assembly and check latch adjustment. Lower convertible top assembly and tighten clamp body set screw to 89 INCH lbs. (10 N.m).

## **TROUBLE SHOOTING**

### **PRELIMINARY INSPECTION**

Before performing system tests, check power window circuit breaker by operating power windows. If circuit breaker is open, check appropriate circuit for a short to ground. See WIRING DIAGRAMS. Ensure ground connections are clean and tight. Ensure top is not binding or folding unevenly. Check linkage and pivot points for misalignment or damage. Check for broken or damaged wiring. Check for proper installation of aftermarket electronic equipment which may affect integrity of other systems.

### **SYSTEM TESTS**

NOTE: If hydraulic system problem is suspected, go to HYDRAULIC SYSTEM BLEEDING under ON-VEHICLE SERVICE.

### **SYSTEM CHECK**

1) Remove all items that could obstruct convertible top movement. Lower both sun visors. Release 2 latches (one above each sun visor). Turn ignition switch to RUN position. Lower all side windows. Press convertible top switch to DOWN position. Convertible top should lower quietly and smoothly without binding. If top does not lower, go to TOP RAISES BUT DOES NOT LOWER USING SWITCH.

2) Move folding top switch to UP position. Convertible top should raise quietly and smoothly without binding. If top does not raise, go to TOP LOWERS BUT DOES NOT RAISE USING SWITCH. If top does not operate, go to CONVERTIBLE TOP INOPERATIVE.

### **CONVERTIBLE TOP INOPERATIVE**

1) Check system operation. If top does not operate properly, go to next step. If top operates properly, check operation while wiggl ing wiring and connectors.

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2) Turn ignition switch to RUN position. Using test light, backprobe between 8-pin convertible top switch harness connector terminal "F" (Brown wire) and ground. If test light illuminates, go to next step. If test light does not illuminate, go to step 12).

3) Using test light, backprobe between 8-pin convertible top switch harness connector terminal "F" (Brown wire) and "H" (Black wire). Press convertible top switch to DOWN position. Using test light, backprobe between 8-pin convertible top switch harness connector terminal "F" (Brown wire) and "D" (Black wire). Press convertible top switch to UP position. If test light illuminates both times, go to next step. If test light does not illuminate both times, go to step 5).

4) Using test light, backprobe between 8-pin convertible top switch harness connector terminal "A" (Purple wire) and "E" (Gray wire). Press convertible top switch to UP and DOWN positions. If test light illuminates both times, go to step 6). If test light does not illuminate both times, go to step 7).

5) If test light illuminated in one position, go to step 13). If test light did not illuminate at all, go to step 14).

6) Using test light, backprobe between 2-pin convertible top motor harness connector terminals "A" (Gray wire) and "B" (Purple wire). Press convertible top switch to UP and DOWN positions. If test light illuminates both times, go to step 9). If test light does not illuminate both times, go to step 11).

7) Check for poor connection at convertible top switch. If connection is okay, go to next step. If problem is found, repair as necessary. After repair, go to step 24).

8) Replace convertible top switch. After repair, go to step 24).

9) Check for poor connection at motor. If connection is okay, go to next step. If problem is found, repair as necessary. After repair, go to step 24).

10) Replace pump/motor assembly. After repair, go to step 24).

11) Repair open or short to ground in Purple wire or Gray wire between convertible top switch and motor. See WIRING DIAGRAMS. After repair, go to step 24).

12) Repair open in power feed circuit. See WIRING DIAGRAMS. After repair, go to step 24).

13) Repair open or poor connection in Black wire between affected switch terminal and splice 232, located in the instrument panel harness, about 2.8" (70mm) from parking brake switch breakout. See WIRING DIAGRAMS. After repair, go to step 24).

NOTE: Some rental agency vehicles have Regular Production Order (RPO) ETA, which prevents top operation unless transmission is in Park. RPO label is located on driver's door jamb.

14) If vehicle is equipped with ETA, go to next step. If vehicle is not equipped with ETA, go to step 20).

15) Ensure vehicle is still in Park and ignition is on. Access power top relay located behind right side of instrument panel. Connect a test light (backprobe) between power top relay terminal C2 (Brown wire) and ground. If test light illuminates, go to next step.

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If test light does not illuminate, repair open in Brown wire between power top relay terminal C2 and power feed circuit. See WIRING DIAGRAMS. After repair, go to step 24).

16) Connect a test light (backprobe) between power top relay cavity terminals C2 (Brown wire) and A1 (Tan/White wire). If test light illuminates, go to next step. If test light does not illuminate, go to step 21).

17) Connect a test light (backprobe) between power top relay terminals C2 (Brown wire) and A2 (Black wire). If test light illuminates, go to next step. If test light does not illuminate, repair open or poor connection in Black wire between top relay terminal A2 and ground G202, located on right kick panel. After repair, go to step 24).

18) Connect a test light (backprobe) between power top relay cavity terminals C2 (Brown wire) and C1 (Black wire). If test light does not illuminate, go to next step. If test light illuminates, repair open or poor connection in Black wire between splice 232, located in the instrument panel harness, about 2.8" (70 mm) from parking brake switch breakout and power top relay cavity terminal C1. After repair, go to step 24).

19) Replace power top relay. After repair, go to step 24).

20) Repair open or poor connection in Black wire between splice 232, located in the instrument panel harness, about 2.8" (70mm) from parking brake switch breakout and ground G202 located on right kick panel. After repair, go to step 24).

21) Turn ignition off. Disconnect Black, 5-pin Park Neutral Position (PNP) switch connector. Using a DVOM, check continuity of circuit between power top relay terminal A1 (Tan/White wire) and PNP switch harness connector terminal "B" (Orange/Black wire). If continuity exists, go to next step. If continuity does not exist, repair wiring as necessary. See WIRING DIAGRAMS. After repair, go to step 24).

22) Check continuity between PNP switch terminals "A" and "B" with switch in park and neutral positions. If continuity exists in both positions, go to next step. If continuity does not exist in both positions, replace PNP switch. After repair, go to step 24).

23) Repair poor contact or open on Black/White wire between PNP switch harness connector terminal "B" and ground. See WIRING DIAGRAMS. After repair, go to next step.

24) Reconnect all connectors and components. Recheck system operation.

### TOP LOWERS BUT DOES NOT RAISE USING SWITCH

Check for open circuit in Black wire between convertible top switch harness connector terminal "D" and splice S232. See WIRING DIAGRAMS. If circuit is okay, replace convertible top switch.

### TOP RAISES BUT DOES NOT LOWER USING SWITCH

Check for open circuit in Black wire between convertible top switch harness connector terminal "H" and splice S232. See WIRING DIAGRAMS. If circuit is okay, replace convertible top switch.

**REMOVAL & INSTALLATION**

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

**CYLINDER ASSEMBLY**

## Removal

1) Disconnect negative battery cable. Turn pump by-pass valve assembly to OPEN (fully clockwise) position. See Fig. 1. Remove rear quarter inner trim panel assembly and speaker assembly.

2) Remove pivot bracket locking pin and cylinder pivot pin. Remove cylinder assembly from outer arm assembly. Remove cylinder bolt/screw. Remove cylinder upper hose assembly (left side) or lower hose assembly (right side) from cylinder. Use a shop towel to control leakage.

**NOTE:** Replacement cylinder assemblies are supplied with oil. DO NOT remove sealing caps until cylinder is ready to connect.

## Installation

Install upper hose assembly (left side) and lower hose assembly (right side). Install cylinder. Tighten bolt/screw to 44 INCH lbs. (5 N.m). Install cylinder assembly to outer arm assembly. Install cylinder pivot pin and pivot bracket locking pin. Tighten cylinder hose assembly fittings to 62 INCH lbs. (7 N.m). To complete installation, reverse removal procedure. Check power top system fluid level. Check top operation. Bleed system if necessary. See **HYDRAULIC SYSTEM BLEEDING** under **ON-VEHICLE SERVICE**.

**PUMP/MOTOR ASSEMBLY**

## Removal &amp; Installation

Disconnect negative battery cable. Disconnect pump/motor harness connector. Use a shop towel to control leakage, and remove cylinder hose assemblies from pump. Remove pump/motor assembly nuts. Remove pump/motor assembly. To install, reverse removal procedure. Tighten pump/motor assembly nuts to 53 INCH lbs. (6 N.m). Tighten cylinder hose fittings to 62 INCH lbs. (7 N.m). Check power top system fluid level. Check top operation. Bleed system if necessary. See **HYDRAULIC SYSTEM BLEEDING** under **ON-VEHICLE SERVICE**.

**FRONT LATCH**

## Removal &amp; Installation

Lower convertible top. Mark relation of fabric to front edge of No. 1 bow for installation reference. Remove front cover No. 1 bow retainer screws. Peel back top cover to access latch screws. Remove latch. To install, reverse removal procedure. Tighten screws to 89 INCH lbs. (10 N.m).

WIRING DIAGRAMS

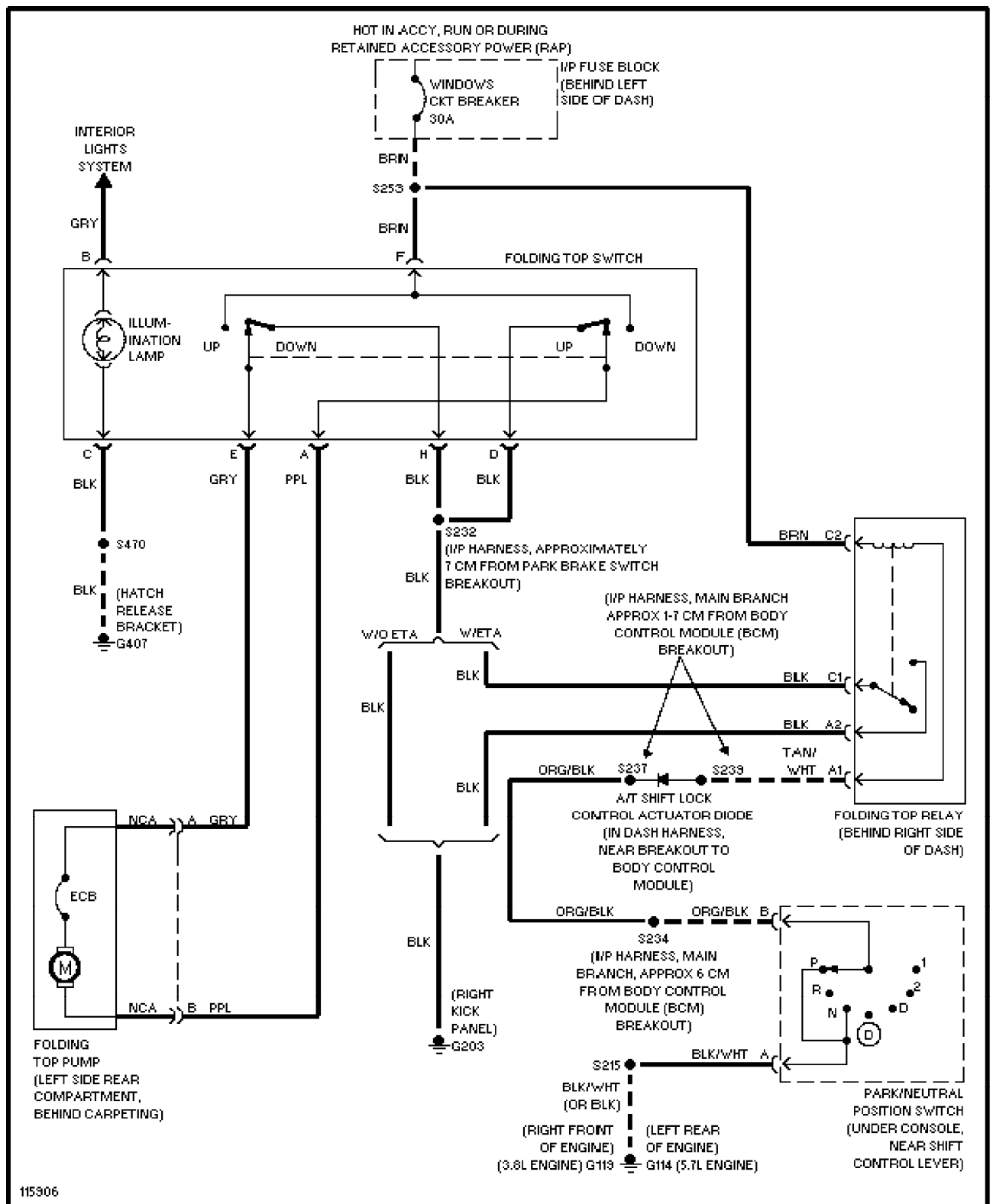


Fig. 4: Power Convertible Top System Wiring Diagram (Camaro & Firebird)



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