

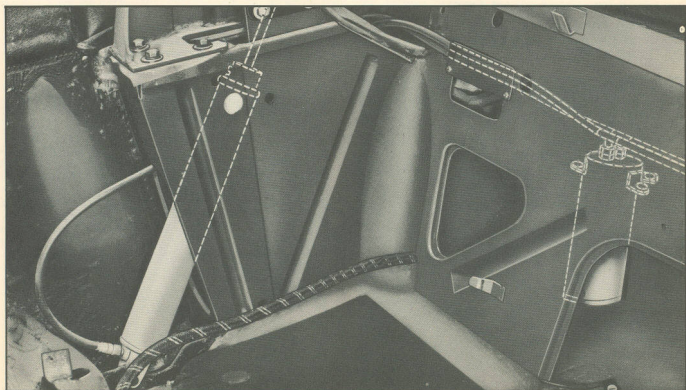
Body by Fisher

SERVICE NEWS

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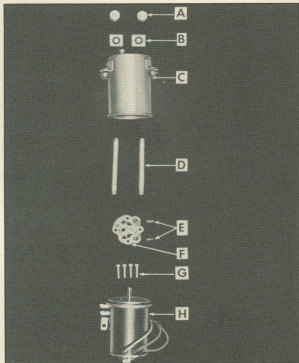
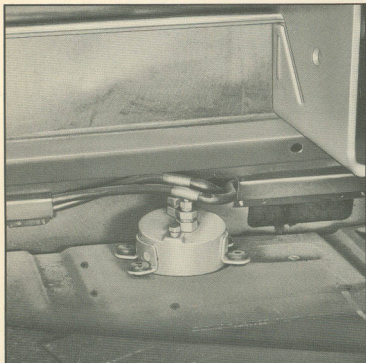
THE HYDRO-LECTRIC SYSTEM FOR OPERATING CONVERTIBLE TOPS ONLY 1951 OLDSMOBILE SUPER "88" SERIES

On 1951 Oldsmobile convertible style bodies in which the top only is operated hydraulically, a new "sealed-in" Hydro-Lectric system is now in use. This new Hydro-Lectric system, for operating convertible tops only only, employs a reversible type motor with a spur gear pump assembly, no circuit breaker or solenoid is used in the circuit. The self-centering top control switch located at the lower edge of the instrument panel is connected directly to the pump motor by means of two electrical leads. The motor and pump assembly is located behind the rear seat back (right side) underneath the fabric folding top compartment bag and is accessible through the rear compartment after the motor and pump shield is removed. The illustration below shows the location of the new "sealed-in" Hydro-Lectric unit for operating convertible tops only.



MOTOR AND PUMP ASSEMBLY

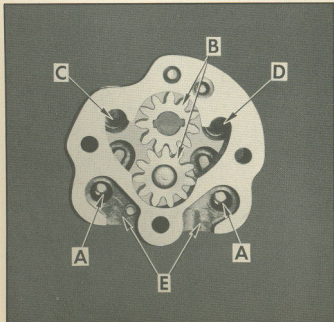
The Hydro-Lectric motor and pump assembly consists of an electric motor, a spur gear pump and a fluid reservoir assembled vertically into a single unit. The fluid reservoir is located at the top of the assembly, which is mounted with rubber attaching grommets on the right side of the rear compartment lower division panel under the fabric folding top compartment bag. The illustration below shows the pump installation after the shield has been removed. The entire unit is completely sealed and is not vented to the atmosphere.



An exploded view of the motor and pump assembly is shown in the right illustration above. The component parts of the assembly may be identified as follows:

- A. RESERVOIR RETAINING NUTS
- B. PUMP TUBE SEALING RINGS
- C. RESERVOIR AND FASTENER GROMMETS
- D. PUMP TUBES

- E. VALVE BALL CHECK SPRINGS
- F. SPUR GEAR PUMP UNIT
- G. PUMP ATTACHING SCREWS
- H. MOTOR UNIT AND END PLATE



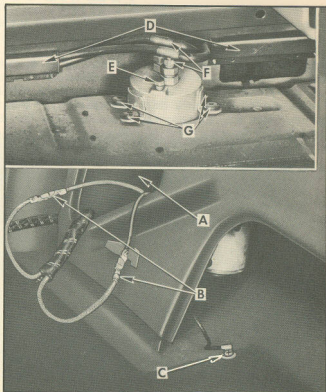
HYDRAULIC PUMP

A new spur gear pump is used in conjunction with the reversible type motor. This new pump employs only four moving parts, two spur gears and two ball-spring valves. The fluid pressure developed by this pump is proportional to the speed of the motor. A low battery will therefore result in a "sluggish" acting pump. The opposite illustration shows the component parts of the pump assembly, as viewed from the motor attaching side. These parts may be identified as follows:

- A. BALL AND SPRING VALVE
- B. SPUR GEARS
- C. PORT (LOWER CYLINDER END)
- D. PORT (UPPER CYLINDER END)
- E. PUMP OPENINGS TO RESERVOIR

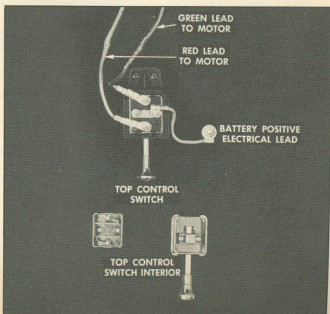
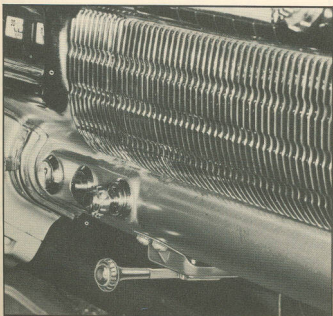
REMOVAL AND INSTALLATION OF MOTOR AND PUMP ASSEMBLY

1. Raise the folding top to the full "up" position.
2. Through the rear compartment opening on the right side, remove the power unit cover plate shield (four (4) screws) to expose pump unit.
3. Disconnect the positive battery cable or battery to top switch wire.
4. Remove rear seat cushion and back, also fold back the insulating pad on right side of body.
5. From inside of body, carefully pull wiring harness through cutout "A". Remove insulation from "jack knife" unions and disconnect red and green lead wires at "B". Also disconnect ground wire at "C".
6. Remove the two (2) hydraulic line retainers at "D" from inside of body. Remove filler cap at "E". Disconnect hydraulic lines "F" and cap open fittings to prevent leaking of hydraulic fluid. Keep a cloth handy to absorb any dripping of fluid from lines.
7. Loosen four (4) rubber grommets at "G" and lift motor and pump assembly from position.
8. To install, reverse the above procedure. Seal hydraulic fittings with a suitable hydraulic pipe thread sealer by applying the sealer to the threads of all male fittings prior to connecting lines. Check the hydraulic fluid level in the pump reservoir (see page 9).



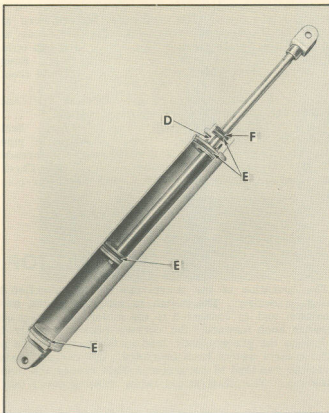
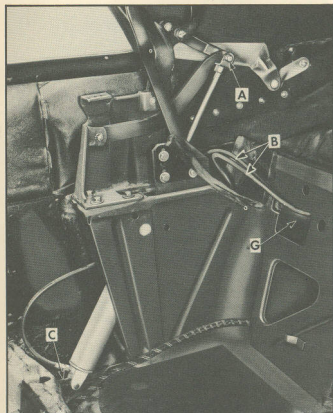
FOLDING TOP CONTROL SWITCH

The operation of the convertible top is controlled by means of a self-centering top control switch which is new in design. The switch is mounted at the bottom of the instrument panel to the right of the steering column and is connected to the motor and pump assembly with two electrical leads. By pushing the control switch knob forward, the current passes directly from the battery, through the top control switch, and out through the green "hot" lead to the motor. The motor and pump then operate to raise the top. By pulling the control switch knob rearward, the current passes directly from the battery, through the switch, and out via the red lead to the motor. This causes the motor and pump to operate in the opposite direction and lower the top. The illustrations below show in detail this operation of the folding top control switch.



FOLDING TOP LIFT CYLINDERS

Each steel folding top lift cylinder is fitted with a piston rod assembly which raises and lowers the folding top through a connection with the top linkage as shown at "A" in the left illustration below. Hydraulic lines at "B" are connected to the top and bottom of the lift cylinder. The steel lift cylinder is fitted with die cast ends, which are crimp-retained. The lower end forms a yoke which together with a clevis pin, provides a movable anchorage to the bracket at the floor pan at "C". The upper end of the cylinder provides a bearing for the piston rod at "D", lower right illustration. The piston and both ends of the cylinder are rubber sealed at "E" to form a fluid tight assembly. Felt washer at the upper end of the lift cylinder at "F" should be lubricated with an approved hydraulic fluid (see Service Information and Suggestions on page 11). Folding top lift cylinders are interchangeable for right and left side use.



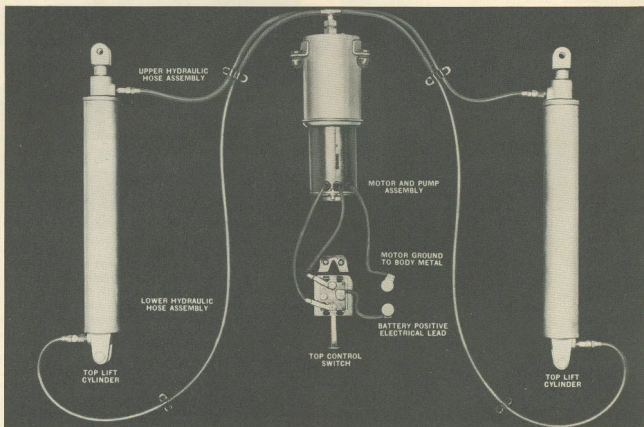
FOLDING TOP LIFT CYLINDER REMOVAL AND INSTALLATION

NOTE: Top should be in a raised or full "up" position during this operation.

1. Disconnect the positive battery cable or the battery to top switch wire.
2. Remove rear seat cushion and rear seat back (CAUTION: In addition to hangers and bend-over tabs, the rear seat back is secured with a screw at each upper corner.)
3. Remove the folding top rear quarter side trim panel to gain access to the top lift cylinder.
4. Remove nut and bolt at "A" connecting lift cylinder piston rod to top linkage.
5. Grasp piston rod and manually push the piston assembly down into cylinder to full bottom limit of travel.
6. Remove all retainers from hydraulic tubing leading to cylinder.
7. Remove the cotter key and clevis pin at "C" securing lift cylinder to floor bracket.
8. Lift folding top cylinder up through access hole in folding top compartment and then out through cut out in rear seat back compartment panel indicated at "G". Remove filler cap from reservoir.
9. Disconnect hydraulic tubing from top and bottom of top lift cylinder and remove cylinder. Cap ends of hydraulic lines to prevent dripping of hydraulic fluid. Keep a cloth handy to absorb any leaking of fluid.
10. To install, reverse this procedure. Make sure piston is at bottom of travel when installing. Before installing, apply a suitable hydraulic pipe thread sealer to all threads of male fittings. Connect battery cable or switch wire, after installation, and check operation of top. Inspect all tubing connections for leaks and check the hydraulic fluid level (see page 9). In case of a chronic leak, always install a new coupling.

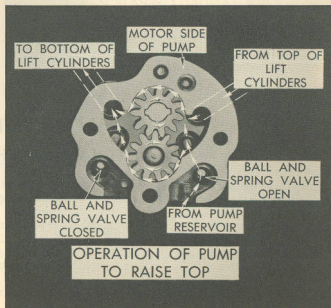
OPERATION OF THE FOLDING TOP

The operation of the push-pull control knob located at the instrument panel either raises or lowers the top. The directional flow of the hydraulic fluid is controlled by the reversible action of the spur gear pump. To raise the top - the control knob is pushed forward. Electrical current then passes directly from the battery, through the top control switch, and out through the green lead to the motor. The motor and spur gear pump then operate to force the hydraulic fluid under pressure through the hydraulic tubing to the lower ends of the double-acting lift cylinders. To lower the top, the control knob is pulled rearward allowing electrical current to pass directly from the battery, through the switch, and out via the red lead to the motor. The motor and pump then operate in the opposite direction to force the hydraulic fluid under pressure to the top of the lift cylinders.



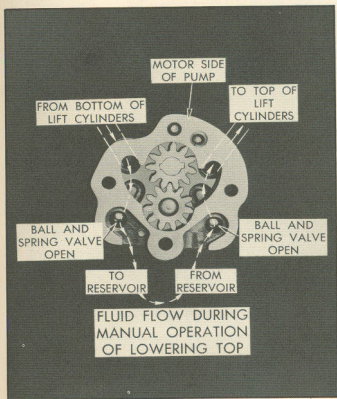
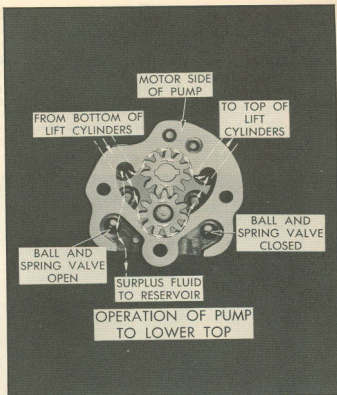
RAISING THE FOLDING TOP

To raise the folding top, the top control switch knob on the instrument panel is pushed "in" causing the motor to operate the pump spur gears in the direction as indicated in the opposite illustration. Pressurized hydraulic fluid from the pump is then forced to the bottom of each hydraulic lift cylinder causing the pistons to move upward, thus raising the top. By the same action, hydraulic fluid in each lift cylinder above the pistons is forced out and back via another line to the pump for recirculation to the bottom of the cylinders. The additional fluid required to fill the lift cylinder, due to piston rod displacement, is drawn from the reservoir as shown in the opposite illustration.



LOWERING THE FOLDING TOP

To lower the folding top, the top control switch on the instrument panel is pulled "out". This reverses the operation of the motor and causes the pump spur gears to rotate in the direction as shown in the opposite illustration. Pressurized hydraulic fluid from the pump is then forced to the top of each hydraulic lift cylinder causing the piston to move downward, thus lowering the top. By the same action, hydraulic fluid in each lift cylinder, below the piston is forced out and back via another line to the pump where it is again recirculated to the top of the lift cylinders. The surplus hydraulic fluid, due to piston rod displacement, flows into the reservoir through the ball and spring valve as shown in the opposite illustration.



The folding top may be lowered and raised by hand in the event of emergency. This manual operation however, must be done slowly to prevent the ball-spring valve in the pump from closing. If the valve in the pump closes when lowering or raising the top manually, release the tension on the top slightly, then slowly proceed to complete the operation. In manually operating the top, the hydraulic fluid is forced by the piston from one end of the lift cylinders through the hydraulic line into the pump. From the pump the fluid passes out through the ball-spring valve into the reservoir. NOTE: This is the valve that closes with excessive pressure from too rapid operation of the top as described above. From the reservoir, the fluid is forced past the second open ball and spring valve and back into the opposite end of the lift cylinder. The opposite illustration shows the flow of fluid through the pump during the manual operation of lowering the top.

HYDRO-LECTRIC SERVICE INFORMATION

MECHANICAL CHECKING PROCEDURE

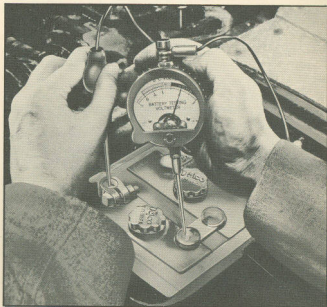
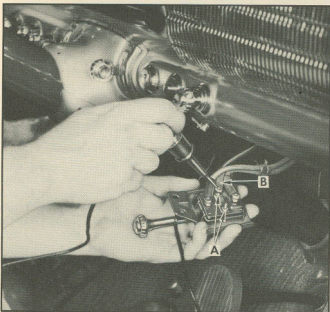
When checking out the Hydro-Letric system, unless it is obvious that the fault lies in electrical or hydraulic circuit, the first check should be of the mechanical operation of the top. Should the folding top assembly appear to have a binding action, check the top operation by manually raising and lowering the top by hand (see description above for precautions to be observed during manual operation of the top). A further manual check of the top may be made by disconnecting the top lift cylinder piston rods from the folding top linkage, then raising and lowering the top by hand. The folding top should travel freely through its up and down cycle without any evidence of a binding action. Should a binding action be noted when locking the top at the header, carefully check the alignment of the door windows, ventilators and rear quarter windows in relationship to the side roof rail weatherstrips. Make all adjustments necessary for correct top alignment then proceed with the electrical and hydraulic checks.

ELECTRICAL CHECKING PROCEDURE

The electrical system should be checked out completely before testing the operation of the hydraulic system in cases where the complete Hydro-Lectric system is inoperative. An inoperative electrical system, aside from a low battery, may be due to any one of a number of causes, such as loose wiring terminals, broken wires, shorts, corrosion causing poor contacts, etc. The cause and location of these electrical troubles may be established by the use of the Electrical Checking Procedure described below.

1 CHECKING THE BATTERY

A low battery will seriously effect the proper operation of the Hydro-Lectric System. In cases where the Hydro-Lectric System fails to operate - first check the battery. For efficient operation, battery gravity reading should not be less than 1200 or equivalent voltage. Battery should be checked according to procedure recommended by Oldsmobile Motor Division. The necessity of running the engine to operate the top is also a sign of a low battery. Any battery reading under that specified, will result in a sluggish operating (low r.p.m.) Hydro-Lectric pump.



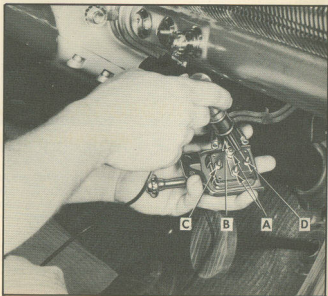
2. CHECKING BATTERY TO SWITCH LEAD WIRE

NOTE: When using a light tester for checking purposes, always ground one lead to the body.

With a light tester check the battery terminals "A" on the control switch. A metal band connects both battery terminals on the switch, and the "hot" electrical lead "B" from the battery attaches to one of these terminals. If the light tester does not react upon contact, the trouble lies in the "hot" battery to switch lead wire "B" and repairs should be made to this wire.

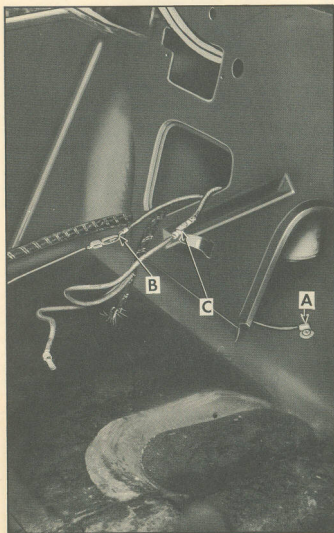
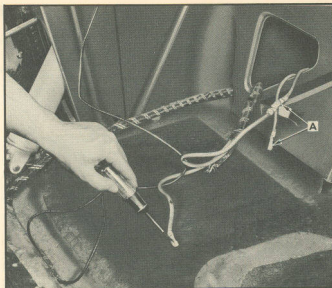
3. CHECKING THE TOP CONTROL SWITCH

Make sure the battery lead wire "B" is connected to either of the battery terminals at "A", then disconnect the switch to pump motor wires from terminals "C" and "D". Using a light tester with one lead grounded to body, place tester on the switch motor terminal "C" from which the "up cycle" green motor wire has been disconnected, and push the control knob forward. The tester should light up. Continue the switch check by placing tester on terminal "D", from which the "down cycle" red motor wire has been removed and pull control knob rearward. Again the tester should react. If the tester does not indicate a flow of electrical current through the switch for either the "up" or "down" cycle tests above, the trouble lies within the top control switch which should then be either repaired or replaced. After check is satisfactory, the green and red motor leads should be secured to terminals "C" and "D" respectively.



4. CHECKING SWITCH TO MOTOR LEAD WIRES

Disconnect the green and red switch to motor leads at "jack-knife" unions "A", ground tester wire, and proceed to check the lead wires separately as shown. Push top switch control knob forward and apply tester to the end connector of the green (up cycle) lead wire. Likewise, pull control knob rearward and apply tester to end of red (down cycle) lead wire. If tester fails to react in either case, the trouble lies within the lead wire or wires from the switch and repairs should be made to this part of the circuit.



5. CHECKING MOTOR UNIT

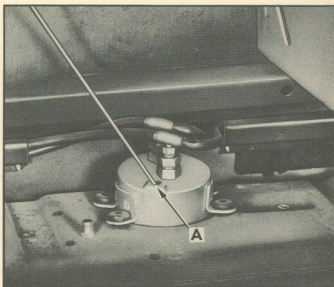
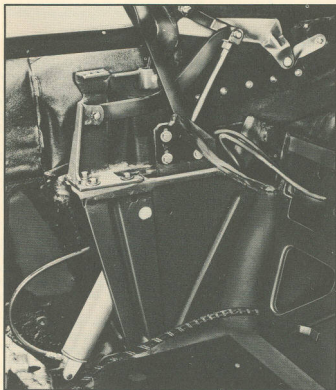
If, after the above test the lead wires from the operating switch to the motor indicate a flow of current according to the light tester, and the motor unit still does not operate when the switch is moved for "up or down" operation, a final check of the motor unit itself should be made. First check the motor ground strap "A" for proper connection to the body metal, then use a No. 8 stranded "jumper" wire as follows. Connect one end of "jumper" to battery positive pole and connect the opposite end to the motor green wire terminal at "B". The motor should operate to raise the top. Then break jack knife union "C" and move "jumper" wire over to motor red wire terminal, motor should operate to lower top. If the motor fails to operate on either or both electrical checks, the motor should be repaired or replaced. If the motor operates with the "jumper" wire but does not operate when connected to the switch to motor leads, even after current flow through these leads has been indicated, the trouble may be caused by reduced current flow, resulting from damaged lead wires somewhere between the motor and the battery terminals. Reconnect red and green switch lead wires to motor after completing check.

HYDRAULIC CHECKING PROCEDURE

If the folding top still fails to operate or operates in a faulty manner after the previously described mechanical and electrical checks have proved satisfactory, then the source of trouble probably lies within the hydraulic system. Improper operation of the hydraulic system can be caused by----lack of hydraulic fluid----leaking of fluid----obstruction in hydraulic tubing or connecting "tees" or faulty operation of the lift cylinder or pump. The following information on testing the hydraulic units may be employed to locate and correct any trouble in this portion of the Hydro-Lectric System. NOTE: When testing fluid pressure with a hydraulic pressure gauge on the 1951 "Sealed-in" hydraulic system, it will be necessary to have a 1/4" connector fitting on the gauge to hook up to the hydraulic lines. If using a gauge equipped with 5/16" fittings of the type used for testing 1950 or earlier convertible models, an adapter will have to be used.

1. CHECKING HYDRAULIC FLUID IN RESERVOIR

With the top in a raised position, from the right side front of the rear compartment, remove the hydraulic motor and pump assembly shield. Remove the filler plug from the pump reservoir indicated as "A". Through the filler hole, using a suitable dip stick check the fluid level in the reservoir. The fluid level should be 2" from the top of the reservoir. If the fluid is low, add enough to bring to the proper level (see hydraulic fluid recommendations on page 11). An inspection for fluid leakage should also be made if an odor of hydraulic fluid is detected inside the body.



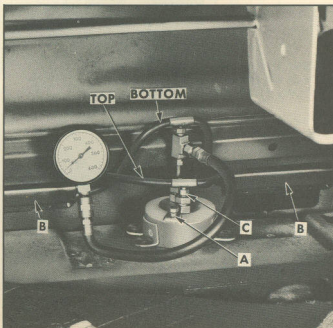
2. OBSERVING OPERATION OF LIFT CYLINDERS

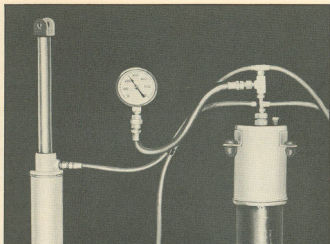
Remove the rear seat cushions and rear quarter side trim. Operate the folding top control switch to activate the motor and pump for both "up" and "down" cycles, then observe the operation of both lift cylinders. If the top in its movement appears to be sluggish or out of alignment, causing binding of the top linkage, then one of the lift cylinders is either inoperative or is operating too slow. This condition may be caused by either a defective cylinder or clogged hydraulic lines somewhere in the faulty operating circuit. An inspection of the hydraulic tubing, from the "T" couplings on top of the reservoir unit, to the top and bottom of the lift cylinder with the system under pressure should be made to determine if the obstruction lies within the hoses to the cylinder.

3. CHECKING PRESSURE IN HYDRAULIC LINES

For an inoperative or slowly operating top, first check the fluid pressure in the hydraulic lines as follows: Remove the filler plug "A". In order to obtain the required slack in the hydraulic tubing for pressure gauge installation and line pinching operations described in the following procedure, remove all retainers "B" holding hydraulic tubing. With the top in a raised position, install a standard pressure gauge between the pump port and "T" of the hydraulic lines leading to the bottom of the lift cylinders as shown in opposite illustration.

NOTE: In cases where the top is inoperative or is operating slowly through the "down" cycle, the gauge should be installed into the lines leading to the top of the lift cylinders at "C" and the top placed in a full "down" position. Reinstall filler plug "A" before proceeding with pressure check.

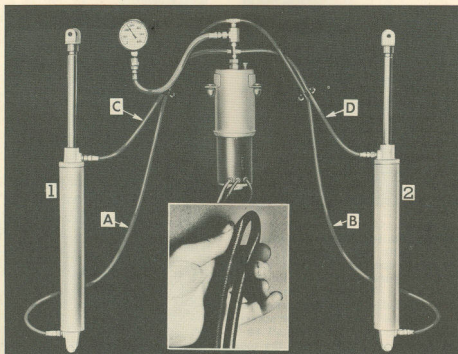




For efficient operation of the hydraulic system, the fluid pressure in the system must be at a maximum of 220 to 260 psi. With top in a full "up" position, push "in" control switch knob and hold a few seconds. The pressure should read 220 to 260 psi. If pressure indicated is below this prescribed maximum range, then either the pump is not delivering required pressure or there is fluid leakage past the piston in one or both cylinders.

4. CHECKING FLUID PRESSURE DELIVERED BY PUMP

To check the fluid pressure delivered by the pump, install pressure gauge, as illustrated below, in hydraulic lines leading to the bottom of lift cylinders. Pinch or "kink" hydraulic tubing "A" and "B" to completely shut off fluid flow to the bottom of each of the folding top lift cylinders, then push switch knob forward and hold a few seconds. The pressure should read 220 to 260 psi. The fluid pressure to the top of lift cylinders is checked by installing pressure gauge in hydraulic lines leading to top of lift cylinders, pulling switch knob rearward and pinching or "kinking" hydraulic lines "C" and "D". If pressure reads below the prescribed maximum on either check, then the trouble lies within the pump unit which must be repaired or replaced. If however the pump pressure reads within the prescribed maximum range, then fluid must be leaking past the piston in one or both lift cylinders and the following check should be made.



5. CHECKING FOR FLUID LEAKAGE PAST CYLINDER PISTONS

With the top in a fully raised position and pressure gauge installed in lines leading to the bottom of the lift cylinders, test for leakage past the piston in cylinder No. 2 by pinching lines "A" and "C" so as to shut off fluid flow to cylinder No. 1, push control switch knob forward and hold a few seconds. If the pressure gauge reads 220 to 260 psi, then cylinder No. 2 is not defective. However, if the pressure reads below the prescribed maximum range, then the fluid is leaking past the piston in cylinder No. 2 and the cylinder must be replaced. To test cylinder No. 1, repeat this procedure and pinch off lines "B" and "D". With the top in a fully lowered position and the pressure gauge installed in lines leading to the top of the lift cylinder, pull control switch knob rearward and repeat forementioned procedure.

SERVICE INFORMATION AND SUGGESTIONS ON THE HYDRO-LECTRIC SYSTEM

Two Hydro-Lectric systems are used on the 1951 Oldsmobile Super "88" Series. On convertible bodies in which the folding top is the only hydraulic installation in the body, the new "sealed-in" unit is used. On convertible bodies in which the folding top windows and seat are hydraulically controlled, the same Hydro-Lectric system as used in 1950 with minor modifications is in use.

In no case should mineral oil be used in the system. To guard against contamination of the hydraulic fluid which may be injurious to the system, hydraulic fluid should not be put into dirty containers or squirt cans containing mineral oil or oil residue.

The 6 volt D. C. Motor incorporated in the Hydro-Lectric sealed-in unit requires 95 amps when operating the pump at a fluid pressure of 230 psi.

The wiring harness used in the electrical circuit of the Hydro-Lectric System consists of heavy No. 8 stranded wire due to the large electrical load the harness must carry when the hydraulic motor is operating. It is imperative that the same type wire be used for replacement of damaged portions of the circuit or for making "jumper" wire checks where the wire will carry full current flow to the hydraulic motor.

The pump unit must deliver a maximum fluid pressure within the range of 220 to 260 psi. The operation of raising or lowering the top through its complete up and down travel cycle, should not require more than 15 seconds, with a maximum fluid pressure of 250 psi.

The 1951 hydraulic fluid lines consist of rubber hoses, while all hydraulic fittings in the system are 1/4". When testing fluid pressure with a hydraulic pressure gauge on the 1951 "Sealed-in" hydraulic system, it will be necessary to have a 1/4" connector fitting on the gauge to hook-up to the hydraulic lines. If using a gauge equipped with 5/16" fittings of the type used for testing 1950 or earlier convertible models, an adapter will have to be used.

If the electric wiring harness is disconnected for service purposes, make sure this wiring is reinstalled to its proper terminals both at the hydraulic motor and the push-pull control switch at the instrument panel, otherwise reverse operation of the system may occur. Make sure also all electrical "grounds" and wiring connectors are tight. In addition, both wiring harness and hydraulic tubing must be routed and secured securely with original retaining clips so as to avoid contact with sharp edges of body metal.

Be careful when disconnecting hydraulic fluid lines. Make sure the electrical current is disconnected, otherwise, an accidental touch of the push-pull switch may cause pressurized fluid to squirt out the end of the disconnected tubing causing serious damage.

Before working on the hydraulic system, make sure trim and parts adjacent to the working area are protected with a suitable cover. Hydraulic fluid is injurious to a car finish. Its damage to a car finish is almost instantaneous. Hydraulic fluid is also inflammable. Suitable cloths should be on hand to wipe up any slight drizzle of fluid when lines are disconnected.

When connecting "Teas" or "Elbows" on the hydraulic tubing, make sure all connections are tight. The threads of male couplings before installation, must be coated with a suitable pipe thread sealer to insure a leakproof connection. Use the sealer recommended by Oldsmobile Motor Division. In cases of chronic leaks install a new coupling.

The new Hydro-Lectric System is a sealed-in unit and is not vented to the atmosphere. Therefore, it is not necessary to replace hydraulic fluid periodically as has been the practice in the past. The new system is "self-air bleeding". Should air become trapped in the lines due to replacement of hydraulic units, a few operational cycles of the top will expel the trapped air into the reservoir.

In cases of emergency, the top may be raised or lowered manually. If manual operation is necessary, it should be done slowly and gradually. Too fast a movement of the top may cause the ball spring valve in the pump to close. Should this occur, slack off slightly on the tension and then carefully start the operation again.

Before disconnecting any fluid lines, always remove the filler cap on top of the reservoir, then replace filler cap again before operating system. Venting of the reservoir is necessary in this "sealed-in" system to equalize the pressure in the reservoir to that of the atmosphere and avoid the possibility of hydraulic fluid being forced under pressure from the disconnected lines.

In the event of fluid loss, it is important to correct the cause of the fluid loss before bringing the hydraulic fluid up to its specified level in the pump reservoir.

Use only an approved hydraulic fluid in the system, as recommended by Oldsmobile Motor Division, preferably Delco Super #11 heavy duty hydraulic fluid, which may be obtained at all General Motors Parts Department Warehouses. The fluid capacity of Hydro-Lectric is 3.86 pints. To refill the hydraulic system, fill the reservoir to the prescribed level and operate the top through several cycles, check the reservoir and add fluid, repeat this operation as often as necessary. One filling of the reservoir may not be sufficient, as the fluid capacity of the two (2) top lift cylinders is almost double that of the reservoir.

