ELECTRICAL

POWER WINDOWS

POWER OPERATED WINDOWS

DESCRIPTION

The wiring harness for the electrically operated windows consists of four major sections.

Front Cross-Over Harness - this harness is installed beneath the instrument panel and completes the circuit from the right door to the left door windows. See Figure 2L1.

Feed harness for Quarter Windows - this harness of flat wire construction connects to the front cross-over harness on the left side of the shroud (fire wall) and extends rearward under the flat body wire harness. The harness divides at the rear of the rear seat on coupe styles (See Fig. 2L2) and at the rear of the front seat on 4 door styles (see Fig. 2L3).

It is to be n.ed that the flat body wiring harness is positioned on top of the power window wire harness and the front connector of the body wire harness is in a lower position.

Quarter window harness - The left and right round wire harness connects to the main flat feed harness behind the rear quarter arm rest foundation on convertible styles (See Fig. 2L2) and under the rear seat cushion on "27", "37" styles (See Fig. 2L4).

Rear door window harness - The left and right rear door harness connects to the main flat feed harness in the base of the center pillar (See Figs. 2L3, 2L5). To disengage the connector, pull harness inboard at base of center pillar.

Power windows are optional equipment and are operated by a rectangular shaped 12 volt series wound motor with an internal circuit breaker and a self-locking rubber coupled gear drive. The harness to the door window motor connector is designed with a locking embossment to insure a

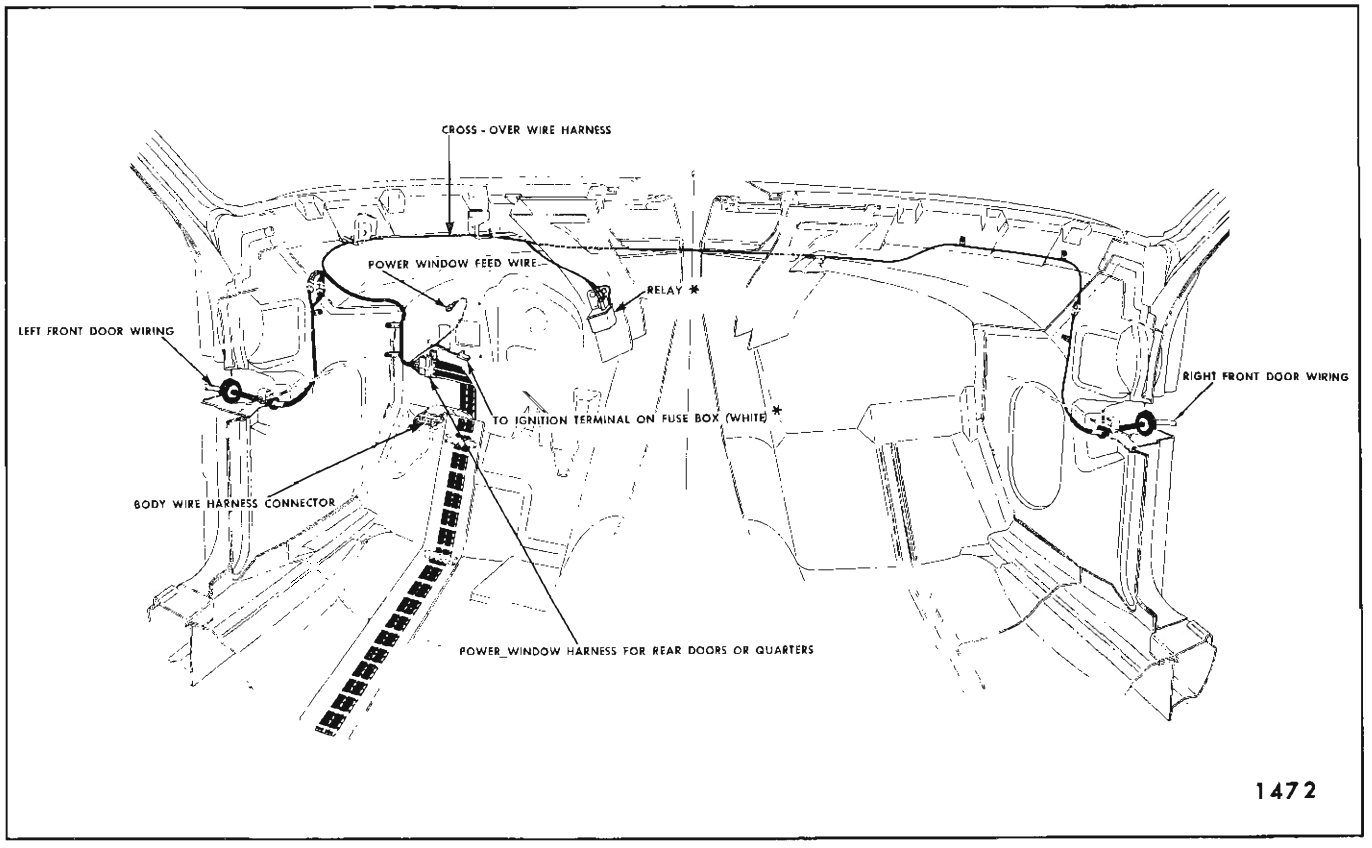


Fig. 2L1—Front End Power Window Wiring - All Styles *33000 Series Only

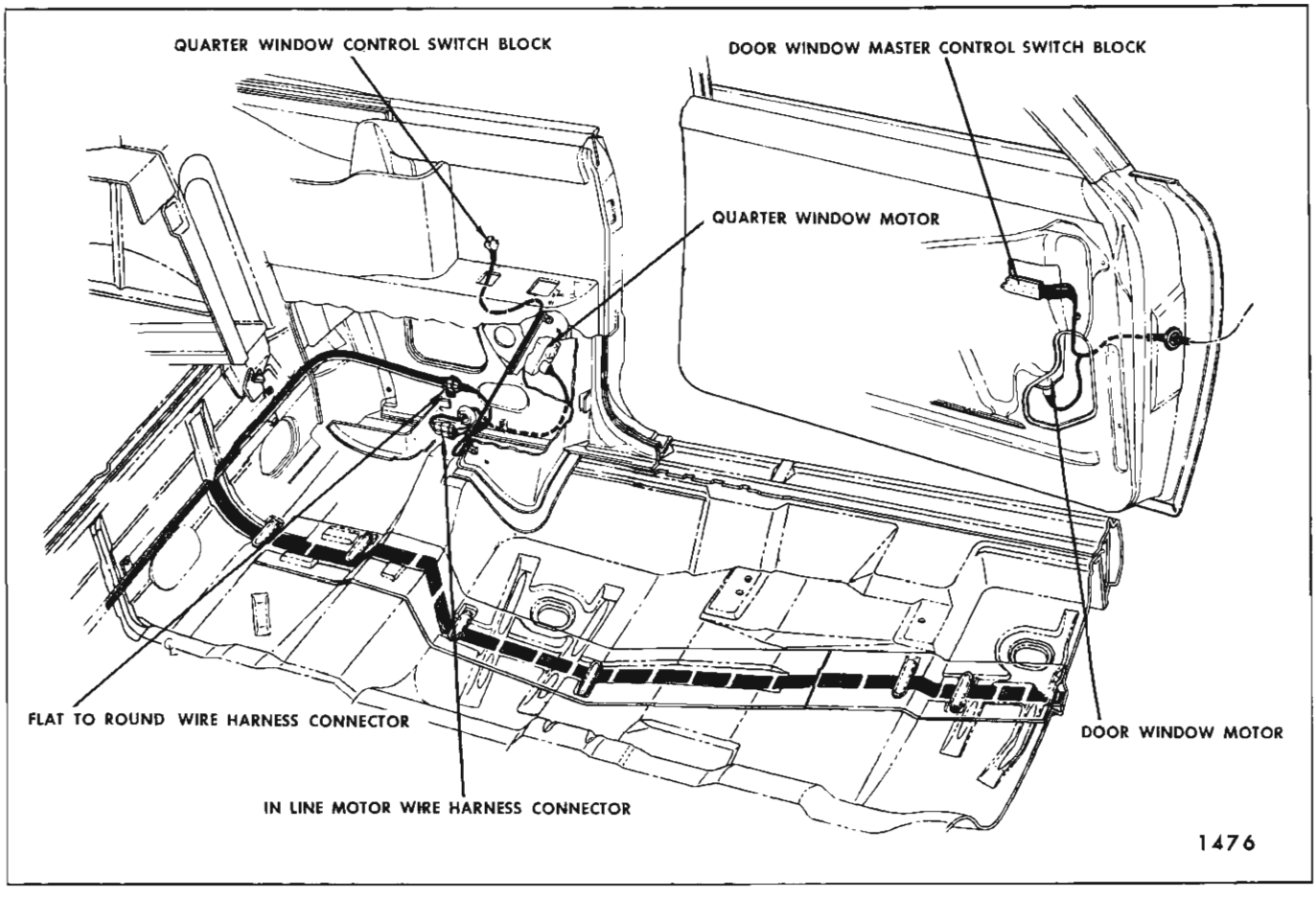


Fig. 2L2—Left Side Power Window Wiring "67" Style

positive connection. When disengaging the harness connector from the door motor, it is necessary to depress the thumb release. When installing the harness, the thumb release must be held depressed until the embossment on the female connector is locked in the hole of the motor connector.

The rear quarter window motor is designed with a locking type wire harness connector which should not be disengaged. When testing or removing the quarter window motor, the inline wire harness connector located inboard of the quarter inner panel should be disengaged. Tests are made at this location.

The current for the motor is obtained through the circuit breaker located: Left shroud - 13000 Series; Left fender skirt junction block. (V-8) styles, Top of starting motor solenoid - (6 cyl.) styles - 23000 Series; Dash panel of engine compartment - 33-34000 Series; at fuse block on 43-44000 Series.

33-34000 Series only: In addition to the circuit breaker, a relay is used in the circuit and installed under the instrument panel. The relay prevents the operation of the power windows until the ignition switch is turned "on".

POWER WINDOW CIRCUIT CHECKING PROCEDURES

Failures in a circuit are usually caused by short circuits or open circuits. Open circuits are usually caused by breaks in the wiring, faulty connection or mechanical failure in a component such as a switch or circuit breaker. Short circuits are usually caused by wires from different components of the circuit contacting one another or by a wire or component grounding to the metal of the body due to a screw through the wire, insulation cut through by sharp metal edge, etc.

It may be necessary to use only one or all of the procedures outlined to locate an electrical failure in the circuit. If the location of the failure is evident follow only the steps required to check the

affected wire or component. If the location of the failure is not evident, follow the procedure as outlined. Be sure to check the harness connectors for proper engagement and become familiar with the circuit diagram. (See Fig. 2L6 for all Styles except 33-34000 Series and Fig. 2L7 for 33-34000).

A. Checking Feed Circuit Continuity at Circuit Breaker

1. Connect one test light lead to battery side of circuit breaker and ground other lead. If tester does not light, there is an open or short circuit in feed circuit to breaker.

2. To check circuit breaker, disconnect the output feed wire from the breaker, connect one lead of the test light to terminal from which wire was disconnected and ground other tester lead. If tester does not light, circuit breaker is inoperative.

B. Checking Relay Assembly Under Instrument Panel - 33-34000 Series Only

1. With test light, check relay feed (orange - black stripe wire terminal). If tester does not light, there is an open or short circuit between relay and circuit breaker.

2. Turn ignition switch on and with test light check output terminal of relay (red - white stripe wire terminal). If tester does not light, the relay is inoperative or there is a short or open circuit between ignition switch (pink wire) and relay assembly. (Check fuse at dash panel).

C. Check Feed Circuit Continuity at Window Control Switch Block

1. Connect one test light lead to feed terminal of switch block and ground other tester lead to body metal (See Fig. 2L8).

2. If tester does not light, there is an open or short circuit between switch and power source.

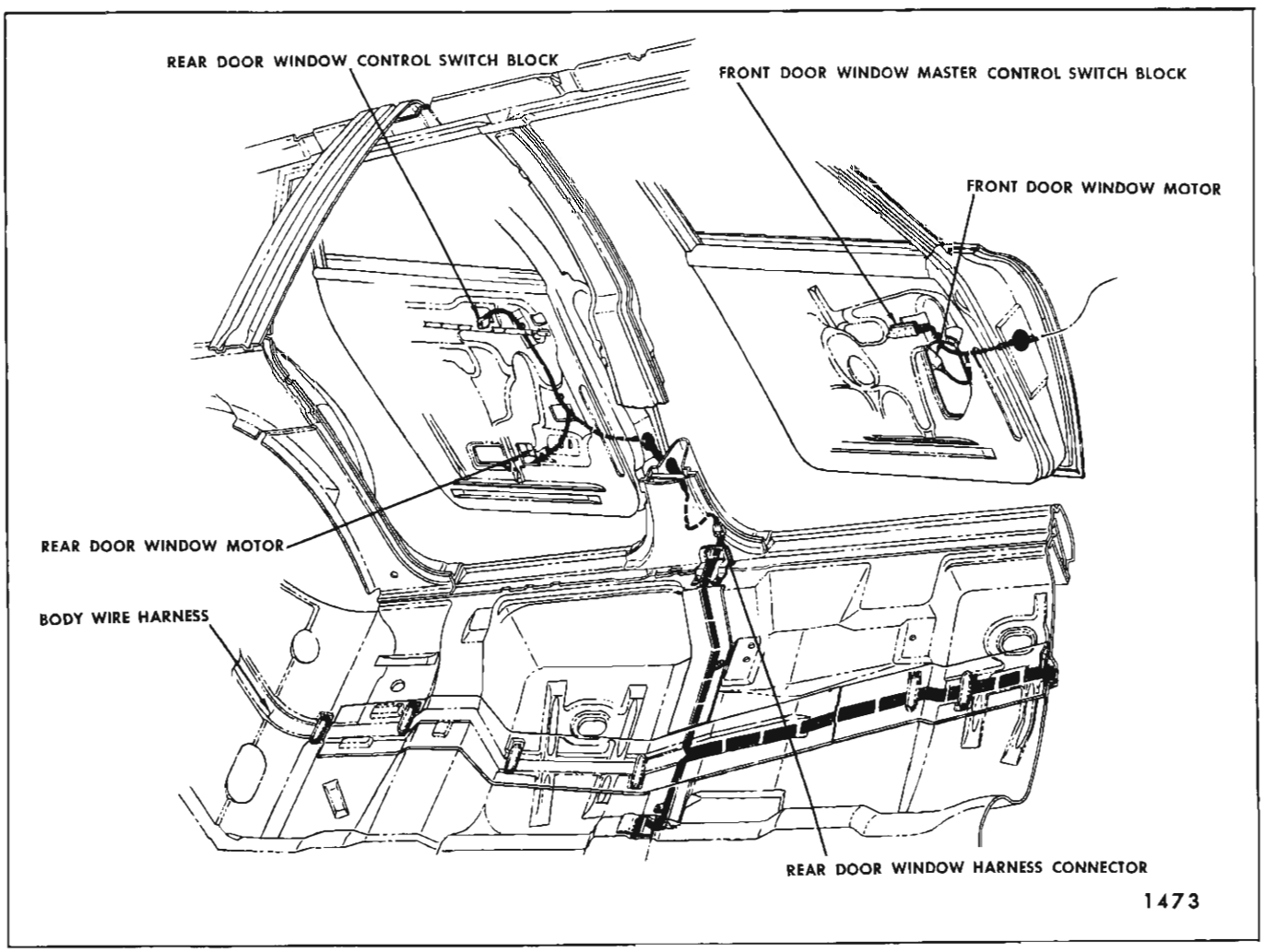


Fig. 2L3—Left Side Power Window Wiring

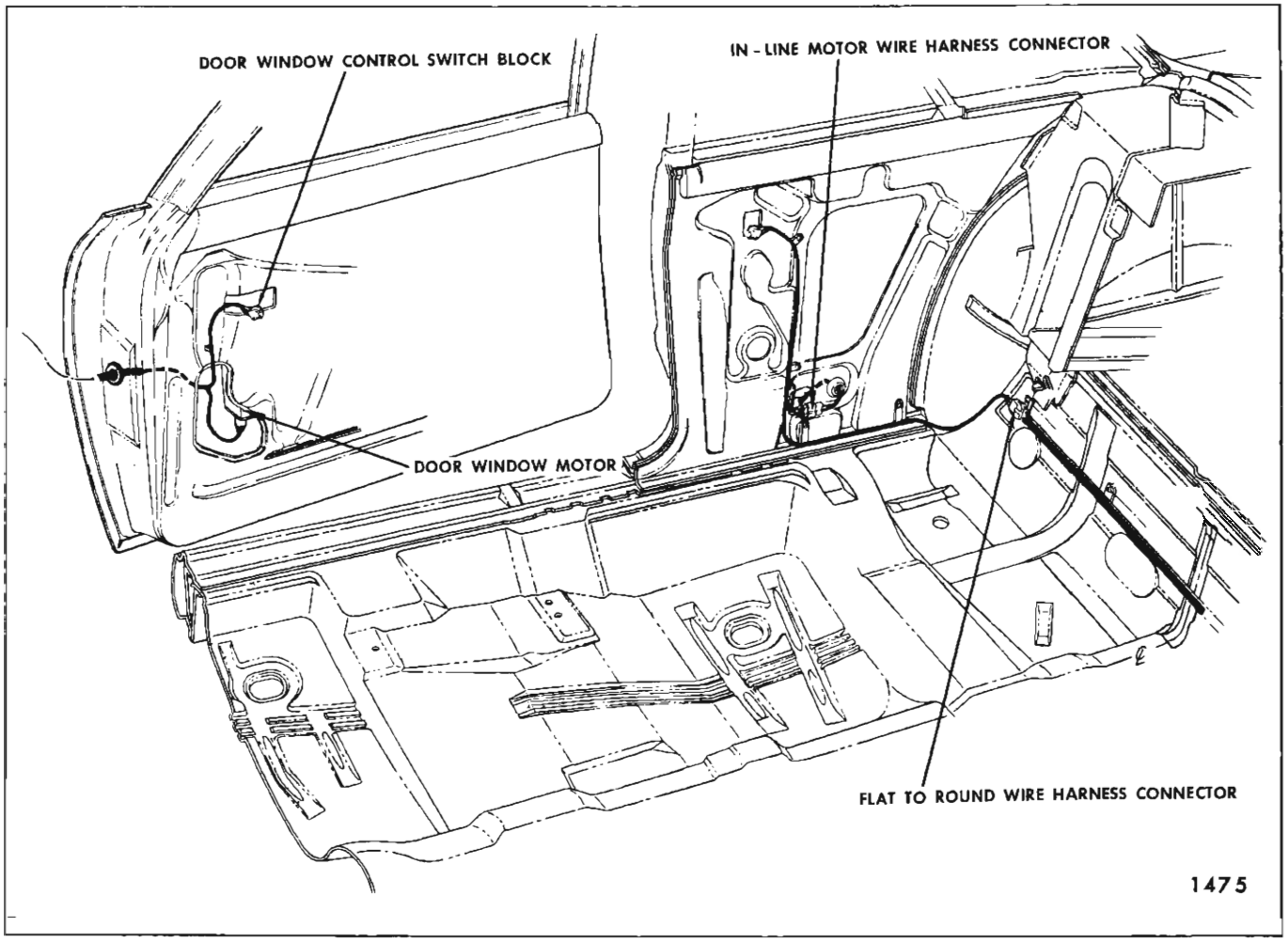


Fig. 2L4—Right Side Power Window - Coupe Styles

D. Checking Window Control Switch

1. Insert one end of a #12 gauge jumper wire to the switch feed terminal and the other end to one of the motor lead terminals in the switch block. Repeat this check on the remaining motor lead terminal (See Fig. 2L9).

2. If the motor operates with the jumper wire, but does not operate with the switch, the switch is defective.

E. Checking Wires Between Door Window Switch and Door Window Motor

1. Disengage harness connector from window motor connector. The thumb release on the harness connector must be depressed before it can be disengaged from the motor.

2. Insert one end of a #12 gauge jumper wire to the switch feed terminal and the other end to one of the motor lead terminals in the switch block (See Fig. 2L9).

3. With test light check for current at terminal being checked. If tester does not light, there is an open or short circuit in the harness between the control switch and motor connector (See Fig. 2L10).

4. Check other terminal.

F. Checking Wires Between Quarter Window Switch and Quarter Window Motor

1. Disengage the inline connector located inboard of the quarter inner panel.

2. Insert one end of a #12 gauge jumer wire in the switch feed terminal and the other end in one of the motor lead terminals of the switch block (See Fig. 2L9).

3. With a test light, check for current at the corresponding terminal at the inline motor connector. If tester does not light, there is an open or short circuit between control switch and motor connector.

4. Check other terminal.

G. Checking Window Motor

1. Check window regulator and channels for possible mechanical bind of window.

2. Check attachment of window motor to insure an effective ground.

3. Connect one end of a #12 gauge jumper wire to the power source and the other end to one of the terminals on the door window motor or the inline connector for the quarter window motor.

4. If the motor fails to operate with a jumper wire, the motor is defective and should be repaired or replaced as required. Check the other motor lead in the same manner.

H. Typical Failures of Power Windows

The following typical failures and corrections have been listed as an aid for eliminating electrical failures in the power window electrical circuit. It should be noted that multiple failures in the circuit may lead to a combination of conditions, each of which must be checked separately.

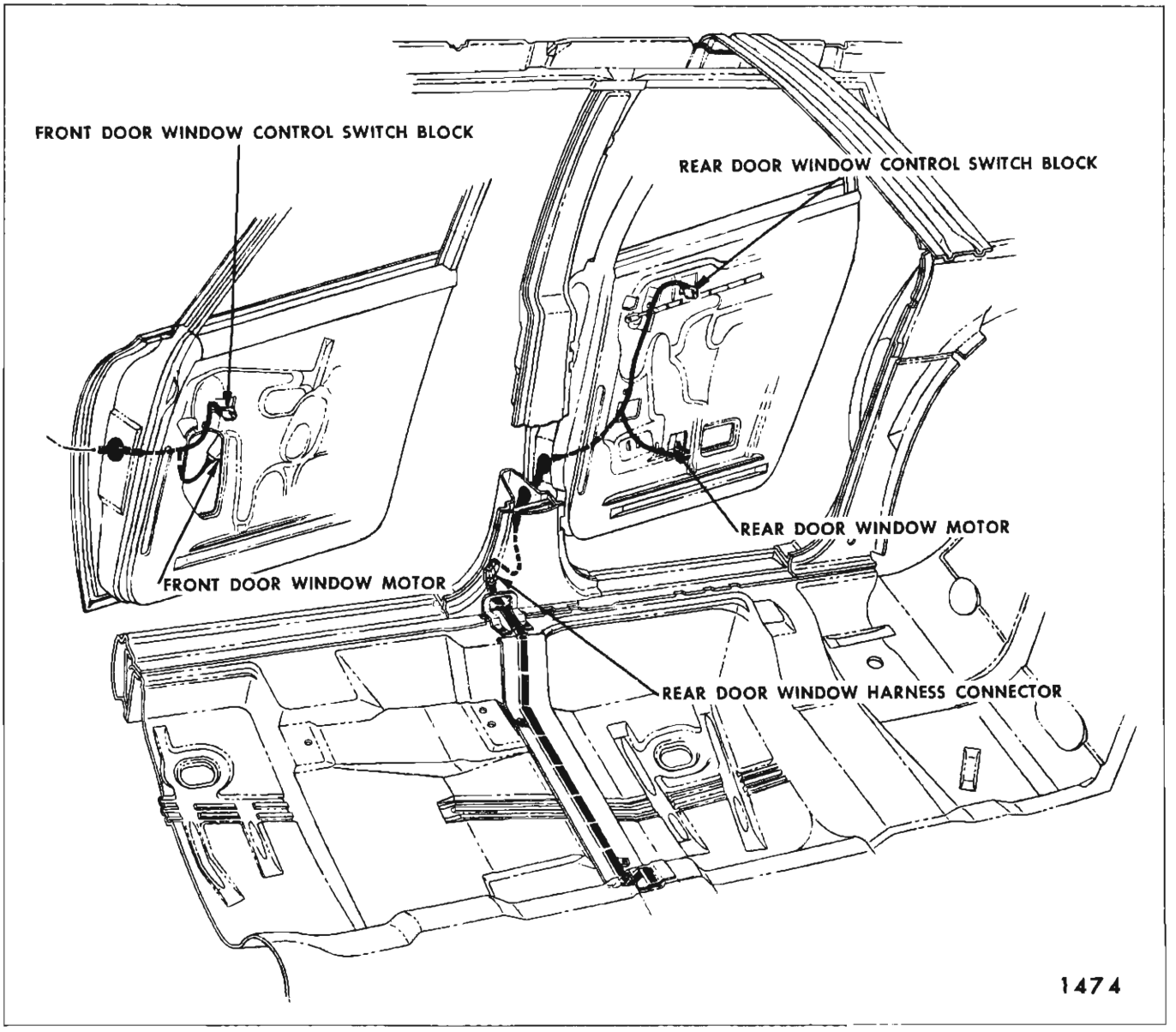


Fig. 2L5—Right Side Power Window Wiring - Four Door Styles

CONDITION	CAUSE	CORRECTION
1. None of the windows will operate.	Short or open circuits in power feed circuit.	A. Check circuit breaker operation. B. Check feed connector to power harness beneath instrument panel.
2. Right rear quarter window does not operate from master control switch on left door or from control switch on right rear quarter. Left door window operates.	A. Short or open circuit between right rear quarter harness and power window front harness.	A. Check harness connectors for proper engagement.
	B. Short or open circuit in affected window control switch or window motor circuit.	B. Check wires in power window front harness for possible short or open circuit.
	C. Possible mechanical failure or bind in window channels.	C. Check operation of rear quarter window control switch.
	D. Defective window motor.	D. Check circuit from window control switch to window motor for short or open circuit. E. Check window regulator and channels for possible mechanical failure or bind. F. Check operation of motor.
3. Right side windows will operate from left door master control switch but will not operate from right side control switches. Left side windows operate.	Open or short circuit in front harness feed wire circuit.	Follow up feed wire in front harness for possible short or open circuit.

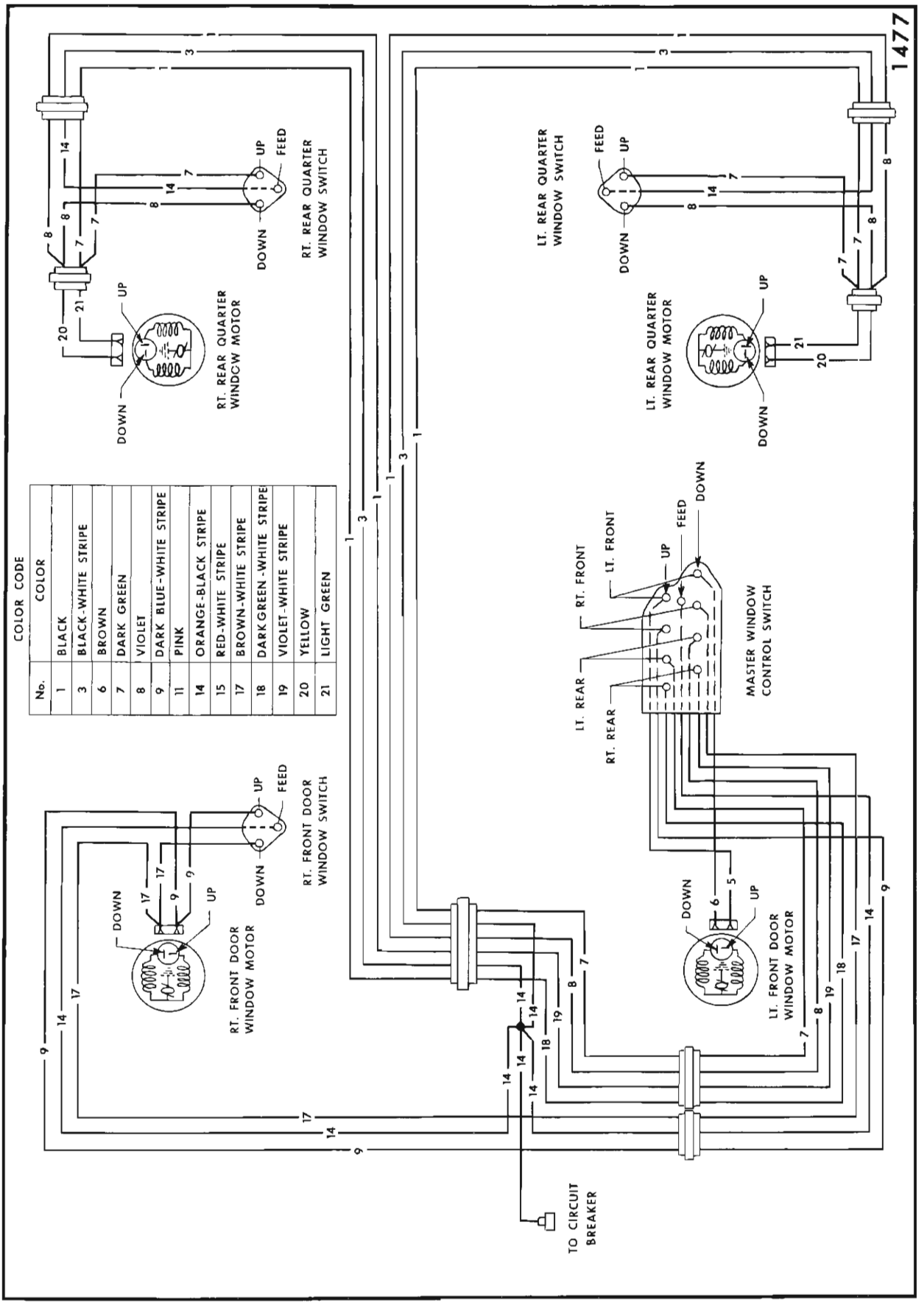


Fig. 2L6—Power Window Circuit Diagram

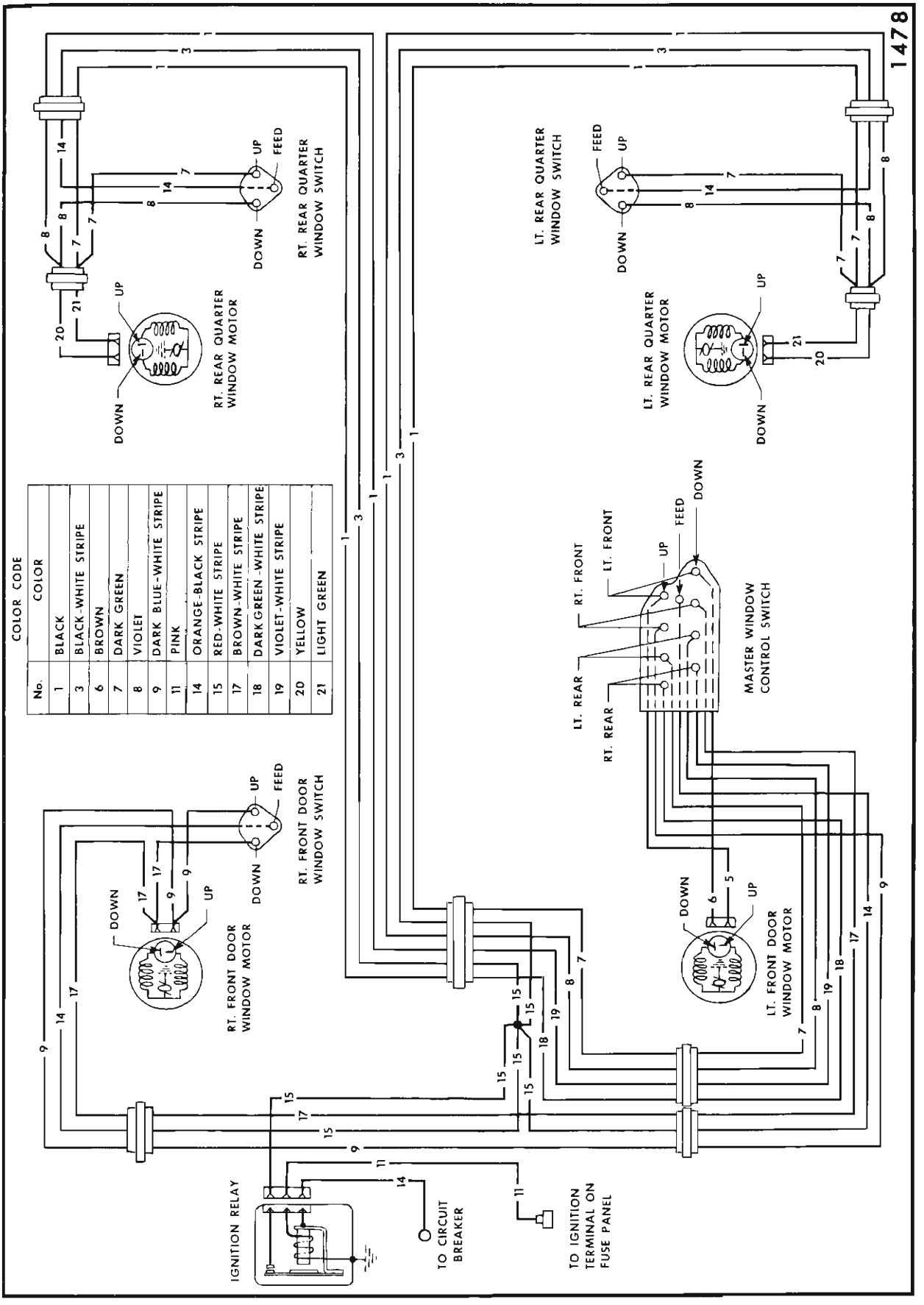


Fig. 2L7—Power Window Circuit Diagram - 33000 Series

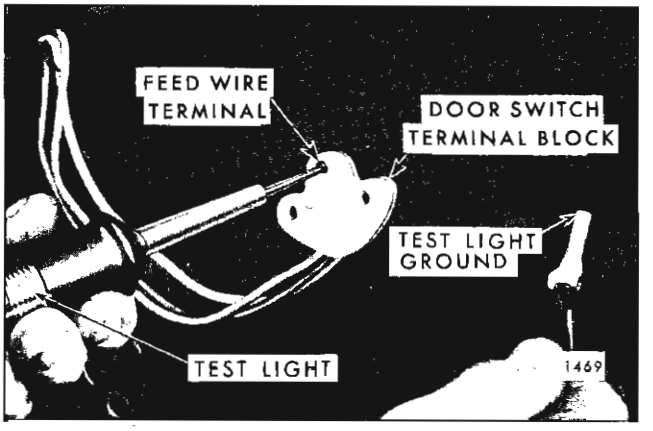


Fig. 2L8—Checking Feed Circuit

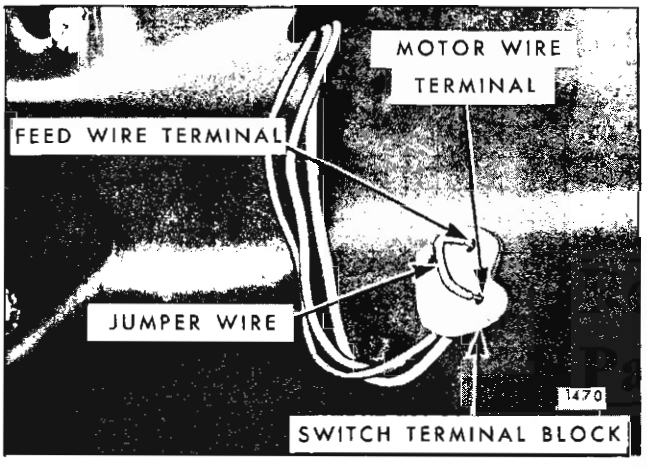


Fig. 2L9—Checking Window Control Switch

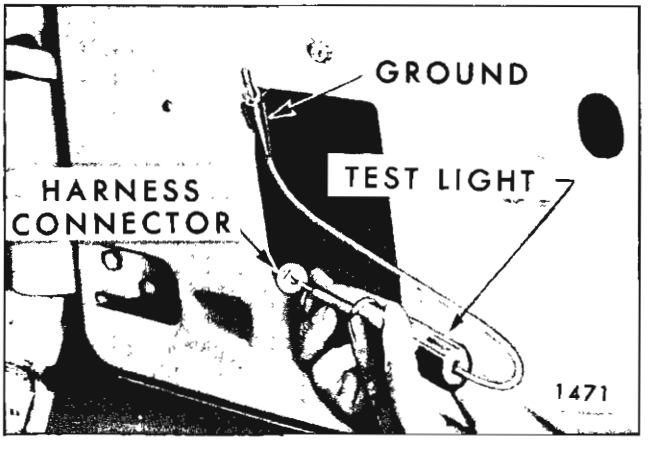


Fig. 2L10—Checking Circuit Between Switch and Motor

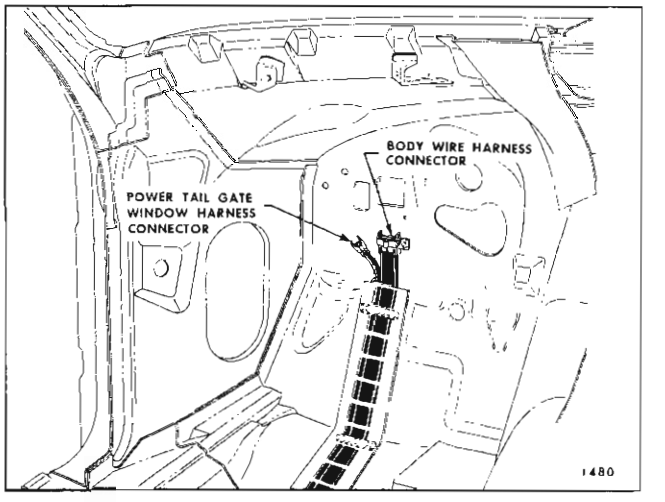


Fig. 2L11—Front End Tail Gate Wiring

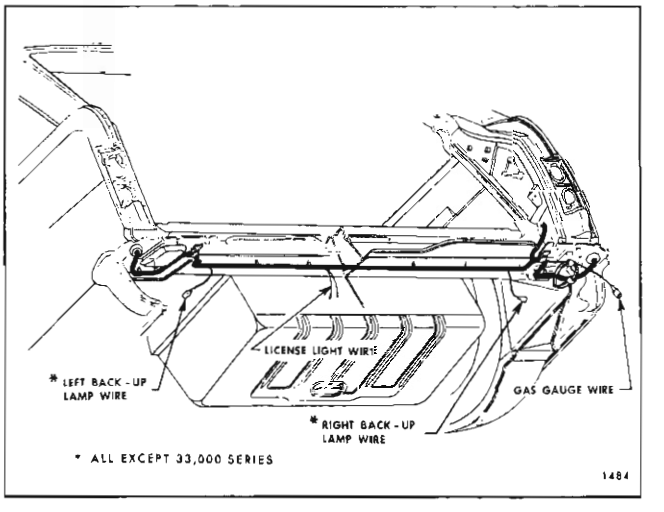


Fig. 2L12—Right Side Body and Tail Gate Window Wiring - 13000 Series

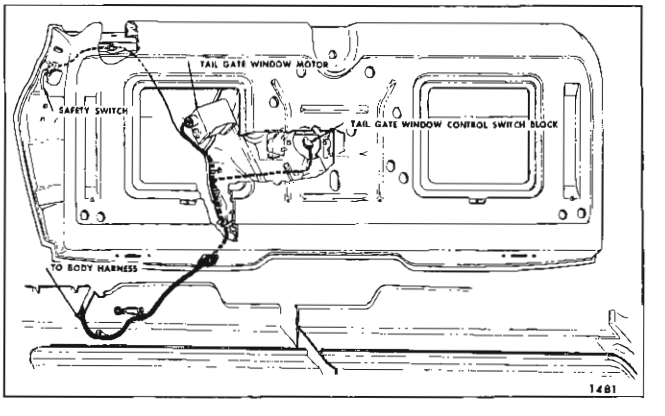


Fig. 2L13—Right Side Body and Tail Gate Window Wiring - Except 13000 Series

TAIL GATE WINDOWS

ELECTRIC TAIL GATE WINDOW CIRCUIT (STATION WAGON STYLES)

The station wagon style power operated tail gate dropping window is controlled by a window regulator assembly, equipped with a rectangular shaped, 12 volt D.C., reversible direction motor with an internal circuit breaker and a self-locking gear drive. The current for the motor is obtained through the circuit breaker located:

Left Shroud - 13000 Series; left fender skirt junction block (V-8) styles, top of starting motor solenoid - (6 cyl.) styles - 23000 Series; dash panel of engine compartment - 33-34000 Series; horn relay and junction block in engine compartment - 43-44000 Series.

33-34000 Series: - In addition to the circuit breaker, a relay is used in the circuit and installed at the shroud. The relay prevents the operation of the tail gate window from the instrument panel switch, until the ignition switch is turned "on".

The window may be lowered from the instrument panel control switch, or from the tail gate window lock cylinder which rotates to open or lower the window.

The tail gate window harness runs adjacent to the body wire and consists of two major sections. The front section of flat wire extends from the left center of the toe pan (Fig. 2L11), rearward and connects to the rear harness at the right rear quarter area (see Figs. 2L14 - 13000 Series only; 2L15 - all except 13000 Series). The rear cross bar wiring is shown in Fig. 2L12 and the tail gate wiring is shown in Fig. 2L13.

To prevent the window from being operated to the up position when the tail gate has been lowered, a safety switch is located adjacent to the right tail gate lock. The safety switch opens the ground circuit of the tail gate window motor, making it inoperative.

CHECKING PROCEDURE:

Before performing an intensive checking procedure to determine any failure of the circuit, check all the connectors for proper installation. The checking procedures below may be used to check the operation of a switch or motor after the cause of the electrical failure has been isolated to a particular part of the circuit. Refer to the circuit diagram of the power window circuit. See Fig. 2L16.

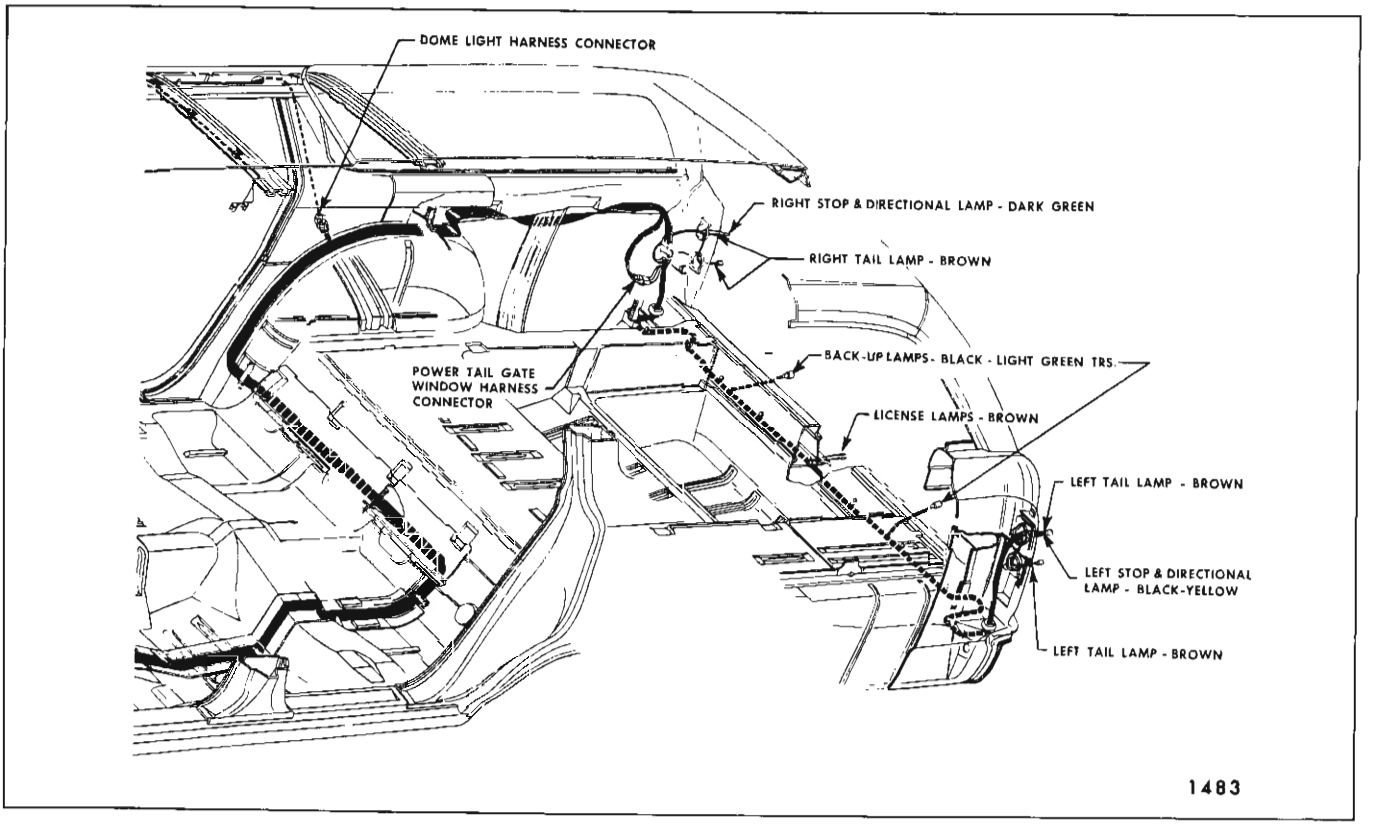


Fig. 2L14—Rear Cross Bar Wiring

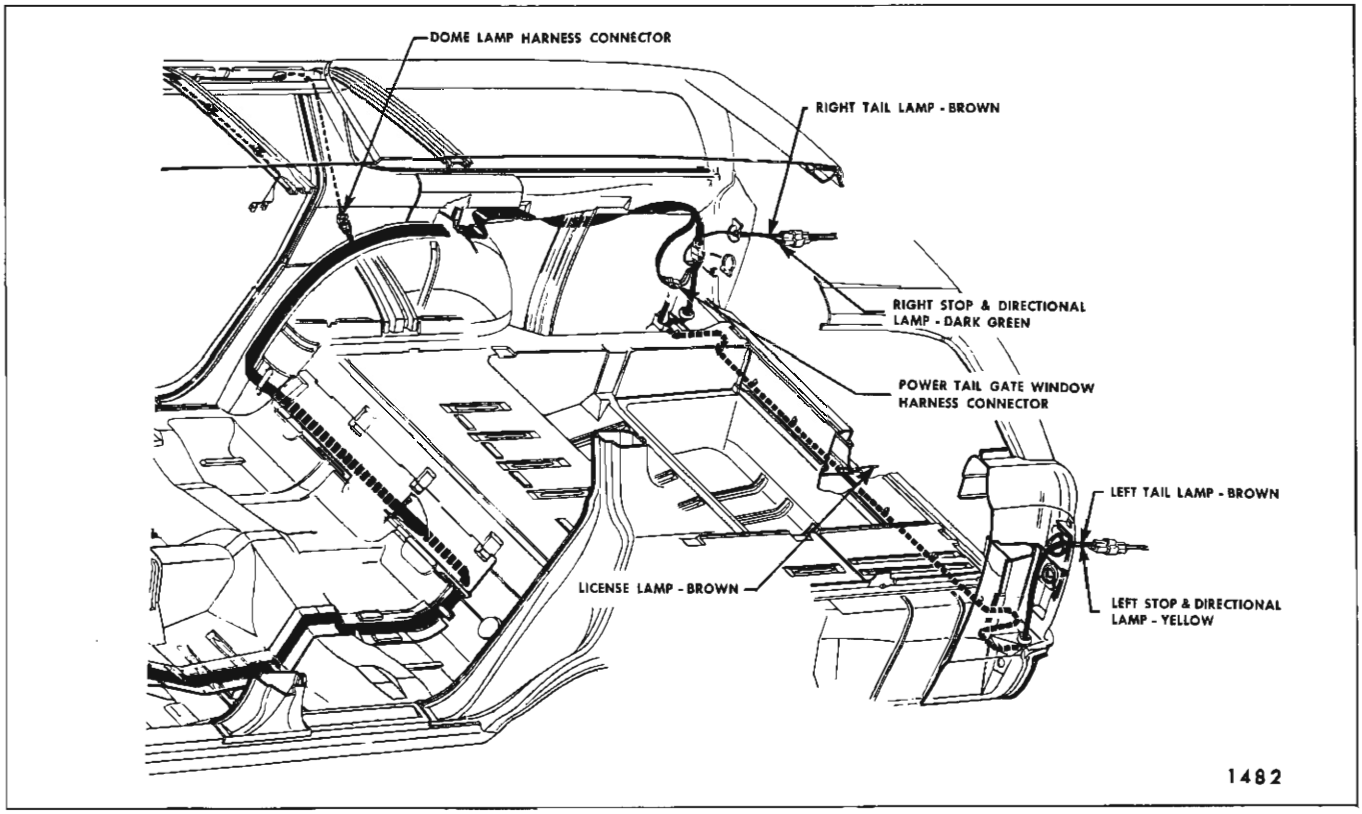


Fig. 2L15—Tail Gate Wiring

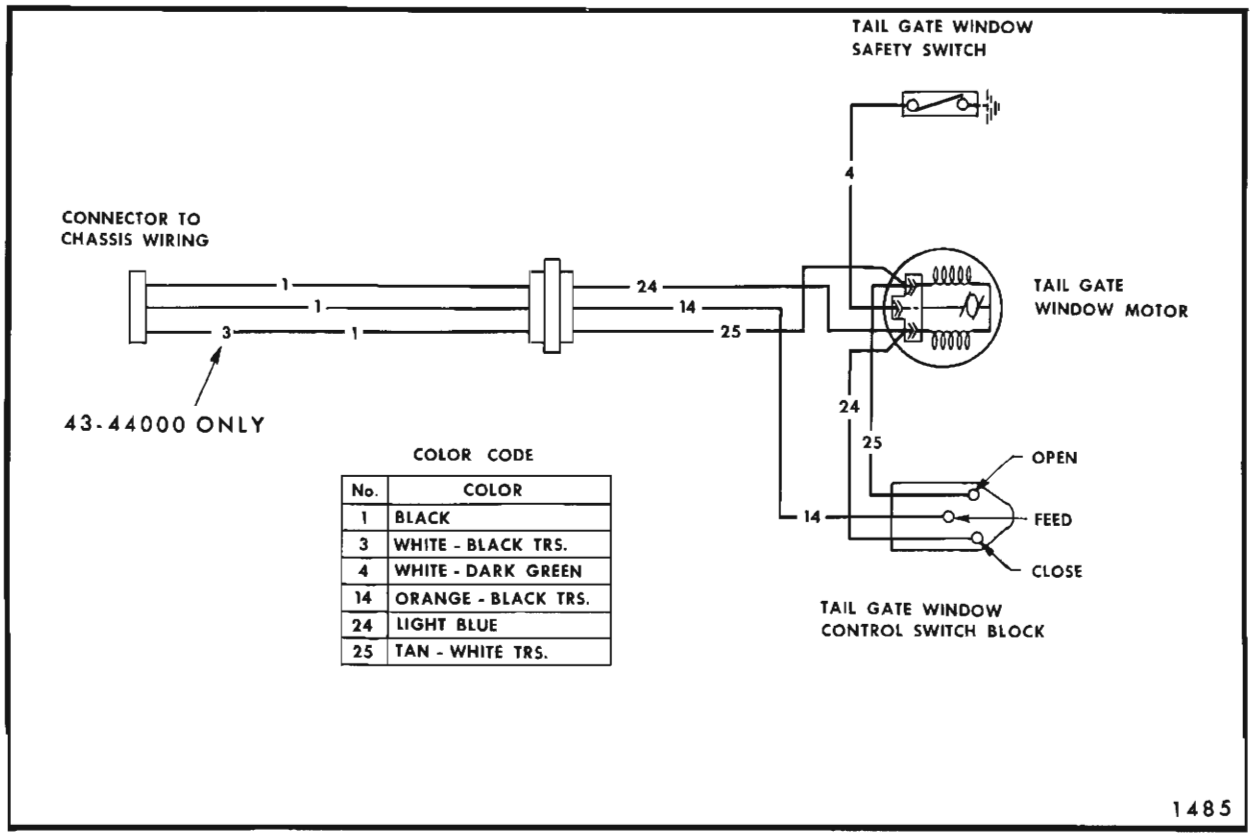


Fig. 2L16—Tail Gate Window Circuit

A. Checking Feed Circuit Continuity at Circuit Breaker

1. Connect one test light lead to battery side of circuit breaker and ground other lead. If tester does not light, there is an open or short circuit in feed circuit to breaker.

2. To check circuit breaker disconnect the output feed wire (the wire opposite the power source feed to the breaker) from the breaker. Connect one test light lead to the output terminal and ground other lead. If tester does not light, circuit breaker is inoperative.

B. Checking Relay Assembly at Shroud - 33-34000 Series Only

1. With test light check relay feed. If tester does not light, there is an open or short circuit between relay and circuit breaker.

2. Turn ignition switch on and with test light check output terminal of relay. If tester does not light, the relay is inoperative or there is a short or open circuit between ignition switch and relay assembly. (Check fuse at dash panel.)

C. Checking Feed Circuit Continuity at Control Switch on Instrument Panel

1. Disengage harness connector from switch. Connect one test light lead to feed terminal of switch connector and ground other test lead to body metal. If tester does not light, there is an open or short circuit between switch and power source.

NOTE: See Chassis Manual for instrument panel switch wiring.

D. Checking control Switch at Instrument Panel

1. Disengage harness connector from switch.

2. Use a 12 gauge jumper wire and insert one end into the feed terminal and the other end into one of the other terminals. Tail gate window motor should operate.

3. Repeat procedure for the other terminal. If the tail gate window motor operates with the jumper wire but does not operate with the control switch, the switch is defective.

E. Checking Control Switch on Tail Gate

Remove tail gate switch and escutcheon as described in tail gate section. Disengage connector from switch and determine that there is current at terminal block; then, use a 12 gauge jumper and perform the same checking procedure as outlined for the control switch at the instrument panel.

F. Checking the Tail Gate Window Motor

1. Disconnect harness connector from motor.

2. Connect the positive side of power source to the light blue wire terminal (close cycle) on the motor connector and the negative lead to the white - dark green (ground) wire terminal. Motor should operate. To check the reverse operation of the motor connect the power source to the tan - white wire terminal (open cycle). If motor does not operate in both directions, repair or replace motor.

G. Check Operation of Safety Switch

1. With tail gate open, depress switch arm to simulate the tail gate being closed. Operate control switch. If motor does not operate, either switch is defective or the circuit is open from the motor to the switch.

2. To check for defective switch, connect one end of test light to a source of power and the other lead to the safety switch terminal. If the tester lights when the switch lever is actuated, the switch is operative.

NOTE: Safety switch completes the ground circuit from the motor.

TROUBLE DIAGNOSIS

CONDITION	CAUSE	CORRECTION
A. The tail gate window operates up and down from the tail gate switch but does not operate from the switch at the instrument panel.	1. Open or short circuit from power source to control switch at instrument panel. 2. Defective or inoperative control switch.	1. Check affected wiring for open or short circuit and check connector at switch for proper installation. 2. Check operation of switch.

CONDITION	CAUSE	CORRECTION
B. With the tail gate closed, the window operates downward but does not operate upward when the switch at the instrument panel or tail gate is actuated.	Open or short circuit in up cycle feed wire.	Check affected wiring for open or short circuit.
C. The window will not operate up or down from any of the control switches.	1. Open or short circuit in circuit from power source to switches or motor. 2. Safety switch not connected or poor ground. 3. Mechanical bind or failure in tail gate window regulator mechanism. 4. Defective tail gate window regulator motor.	1. Check operation of circuit breaker. 2. Check affected circuit for open or short circuit. 3. Check connectors to safety switch and motor for proper engagement. 4. Check tail gate mechanical parts for bind or failure. 5. Check operation of tail gate motor.

ELECTRIC TILT (FOUR-WAY) SEATS

DESCRIPTION

The seat adjusters for the bench type and bucket type seats are actuated by a 12 volt, reversible, shunt wound motor with a built-in circuit breaker. See Figure 2L17 for bench type seat and Figure 2L18 for bucket seat installation.

The seat motor is energized by toggle-type control switch installed in the left seat side panel.

The seat adjuster operating mechanism incorporates a transmission assembly which includes two solenoids and four drive cables on bench type seats and two drive cables on bucket seats, leading to the seat adjusters. One solenoid controls the rear vertical movement of the seat while the other solenoid controls the horizontal movement of the seat. When the control switch is actuated, the motor and one of the solenoids are energized simultaneously. Then the solenoid plunger causes the shaft dog to engage with a large gear dog. Power is then transmitted through the transmission shaft which in turn drives the actuator cables. When the adjusters reach their limit of travel, the drive cables stop their rotating action and torque is absorbed by the rubber coupler connecting the motor and transmission. When the control switch lever is released, the switch contacts open, a spring returns the shaft dog and solenoid plunger to their original position. Disengaging the shaft dog from the large gear dog. See Seat Section for expleded view of transmission.

CHECKING PROCEDURE (4-WAY SEAT)

It may be necessary to use only one or all of the procedures outlined to locate an electrical failure in the circuit. If the location of the failure is evident follow only the steps required to check the affected wire or component. If the location of the failure is not evident, follow the procedures as outlined. Before performing any extensive checking procedures, check the seat adjuster drive cables for proper attachment, possible mechanical bind and loose connections. In addition, study the seat circuit diagram to become familiar with the seat circuit. See Fig. 2L19.

1. Checking for Current at Circuit Breaker

A. Connect one test light lead to battery side of circuit breaker and ground other lead. If tester does not light, there is no current at battery side of circuit breaker.

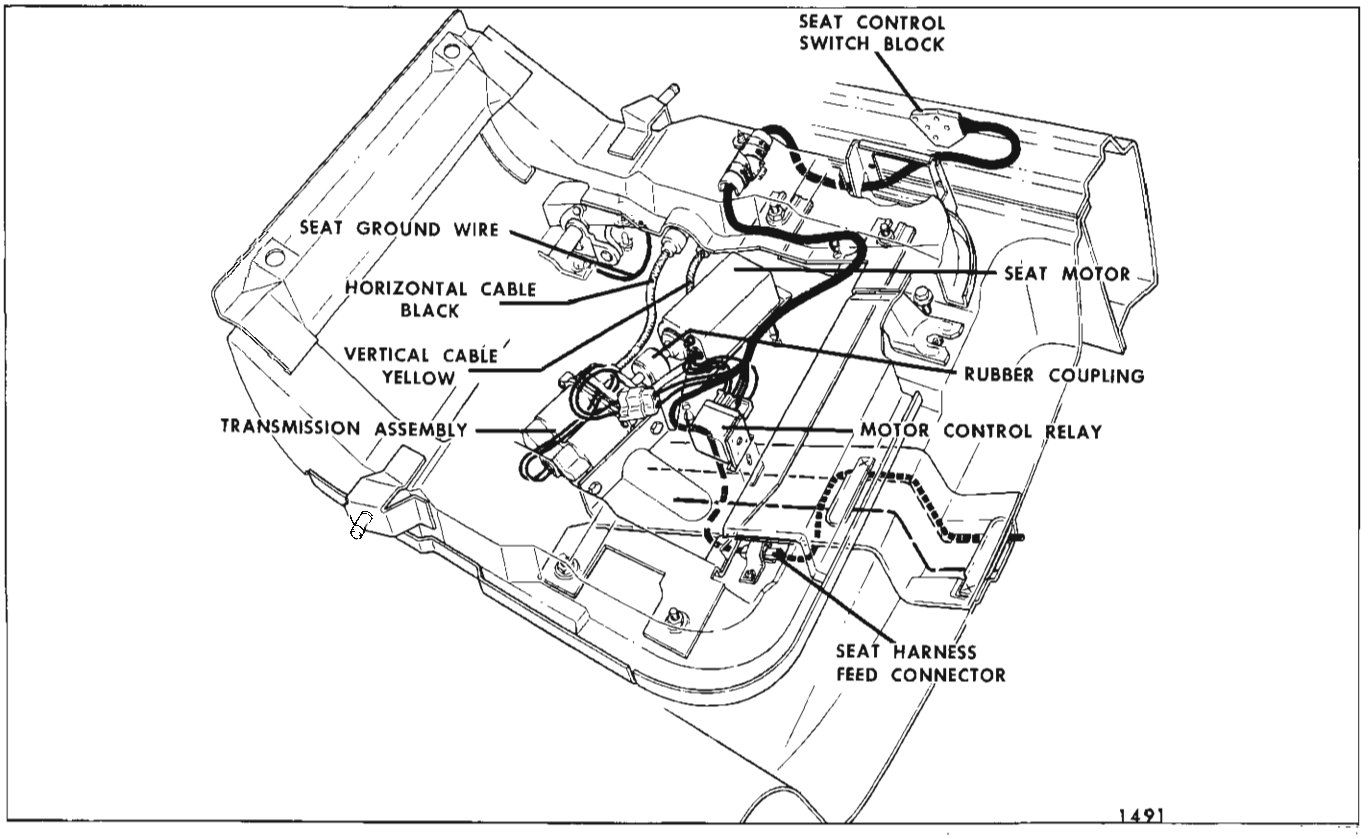


Fig. 2L17—Four Way Bucket Seat

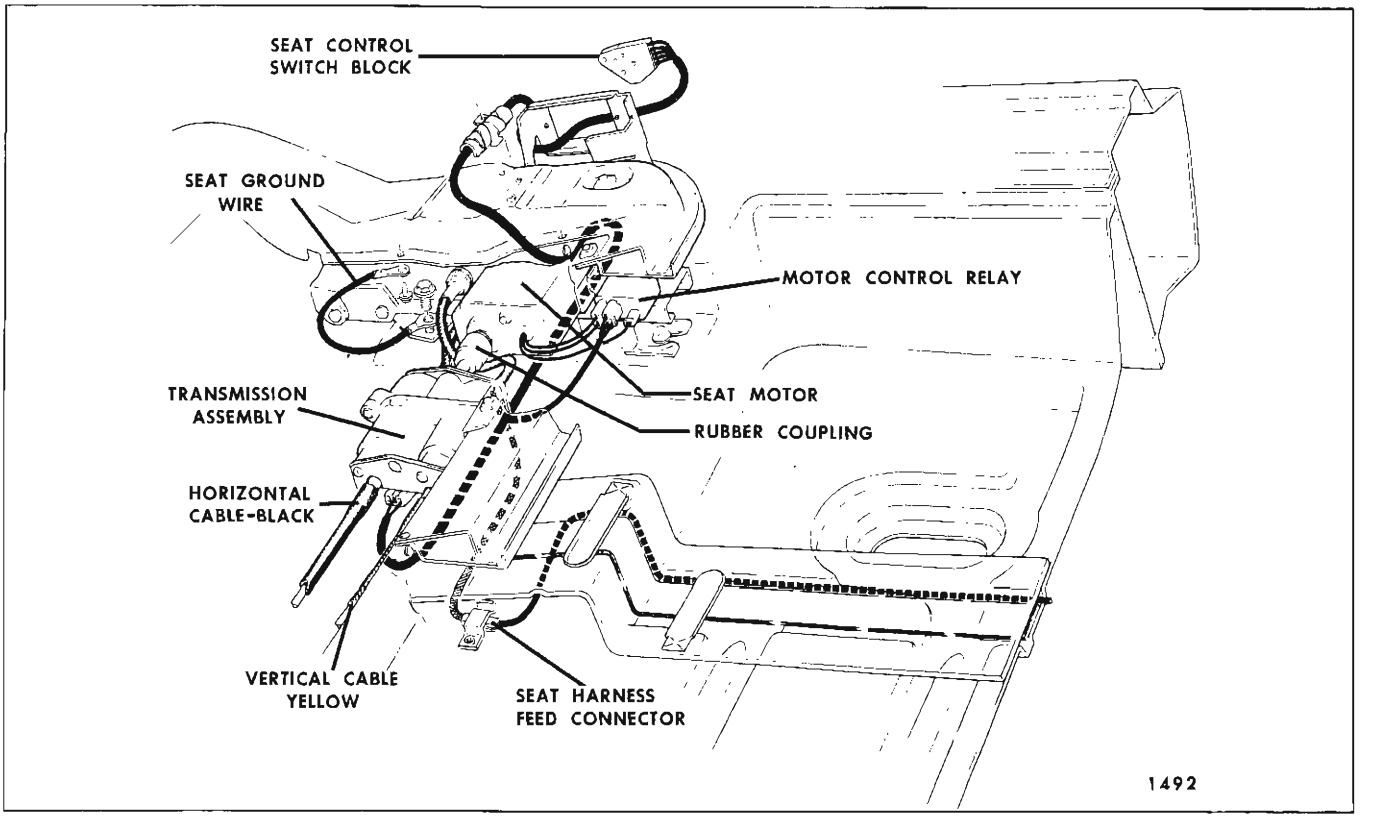
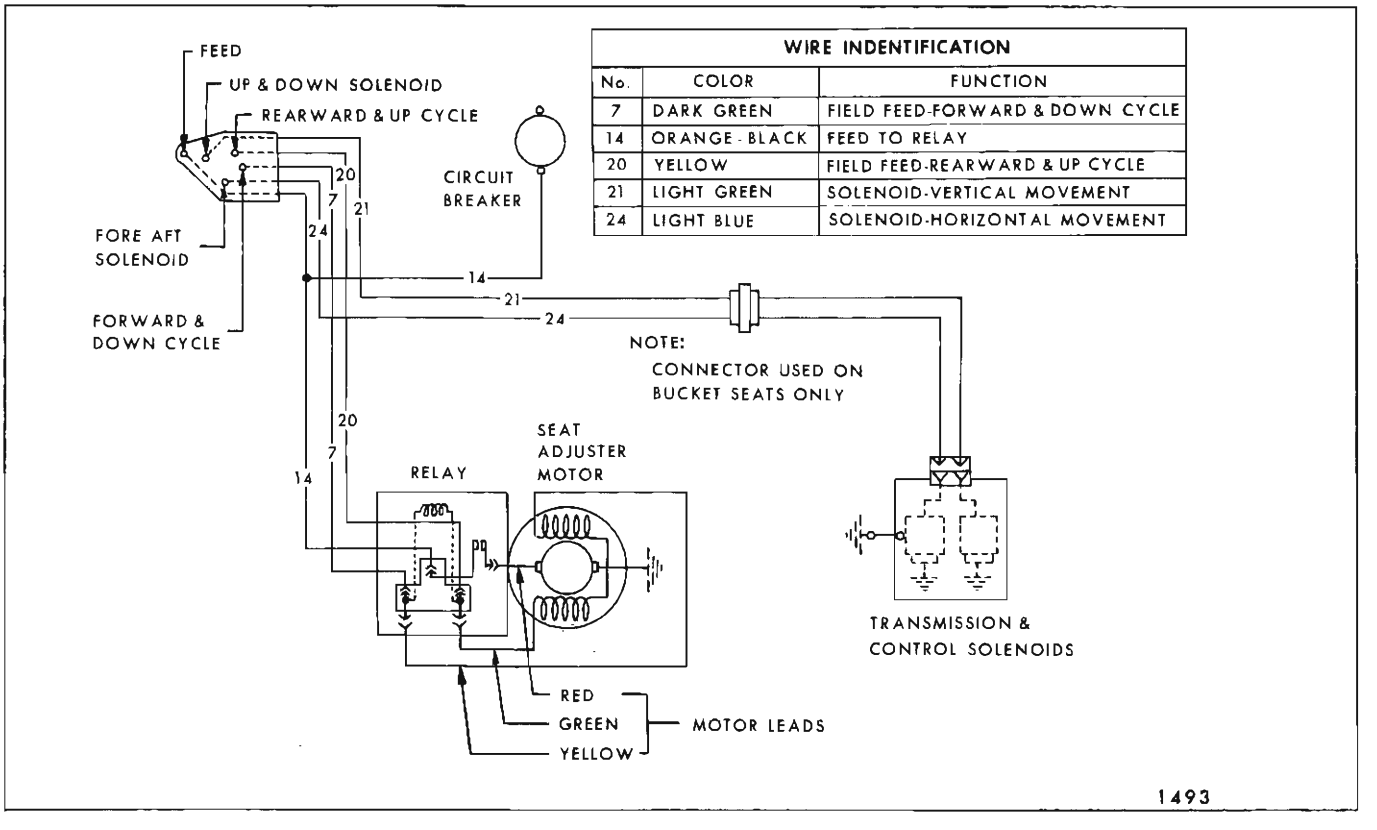
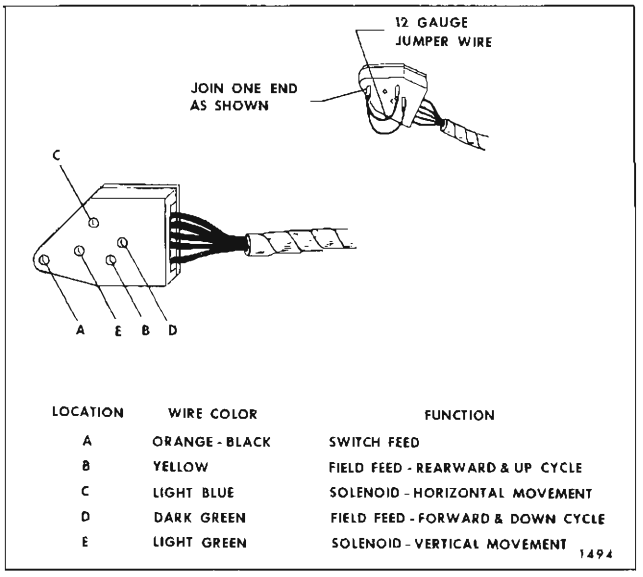


Fig. 2L18—Four Way Bench Seat



WIRE INDENTIFICATION		
No.	COLOR	FUNCTION
7	DARK GREEN	FIELD FEED-FORWARD & DOWN CYCLE
14	ORANGE - BLACK	FEED TO RELAY
20	YELLOW	FIELD FEED-REARWARD & UP CYCLE
21	LIGHT GREEN	SOLENOID-VERTICAL MOVEMENT
24	LIGHT BLUE	SOLENOID-HORIZONTAL MOVEMENT

Fig. 2L19—Four Way Seat Circuit Diagram



LOCATION	WIRE COLOR	FUNCTION
A	ORANGE - BLACK	SWITCH FEED
B	YELLOW	FIELD FEED - REARWARD & UP CYCLE
C	LIGHT BLUE	SOLENOID - HORIZONTAL MOVEMENT
D	DARK GREEN	FIELD FEED - FORWARD & DOWN CYCLE
E	LIGHT GREEN	SOLENOID - VERTICAL MOVEMENT

1494

Fig. 2L20—Four Way Switch Block

B. To check circuit breaker, disconnect switch feed wire from breaker, and with a test light check for current at switch side of circuit breaker. If tester does not light, there is no current flowing through circuit breaker.

2. Checking for Current at Seat Control Switch Block

A. Connect one test light lead to feed terminal of switch block and ground other tester lead to body metal.

B. If tester does not light, there is no current at switch block. Failure is caused by an open or short circuit between switch block and power source.

3. Checking the Seat Control Switch

In the following operations which specify the seat control switch to be actuated, a switch that has been checked for proper operation may be connected to the switch block. If a switch is not available, a three-way jumper wire can be made to perform the switch function. The method of making the jumper wire and the switch locations to be connected to obtain a specific movement of the seat are shown in Fig. 2L20. If a jumper wire is used, letter the locations on the switch block as indicated in the illustration.

NOTE: To make jumper wire, obtain two pieces of #12 gauge wire, each 4 1/2" long. Join one end of each wire as shown in diagram. The joined end can be inserted in the feed location in the switch block.

A. Obtain switch or jumper wire and connect to switch block.

B. Operate switch if used. If adjusters operate with switch or jumper wire, but did not operate with original switch, the original switch is defective or connector block was not sufficiently engaged.

IMPORTANT: To obtain a seat movement using a three-way jumper wire at the switch block, the switch feed location, one of the motor field wire locations and one of the solenoid locations have to be connected simultaneously.

The switch locations to be connected to obtain a specific seat movement are outlined as follows:

(1) To raise seat, place jumper wire in locations A, B and E.

(2) To lower seat, place jumper wire in locations A, D and E.

(3) To operate seat forward, place jumper wire in locations A, C and D.

(4) To operate seat rearward, place jumper wire in locations A, B and C.

NOTE: Remove seat assembly to perform the following checks.

4. Checking Feed Circuit Continuity at Motor Control Relay

A. Disengage three-way connector body from the seat relay.

B. Insert one test light lead into one motor feed (orange - black stripe) connector slot on the harness, and ground other tester lead.

C. If tester does not light, there is no current at end of feed wire. Failure is caused by an open or short circuit in feed circuit.

5. Checking Wires Between Control Switch and Motor Control Relay

A. Disengage three-wire harness connector from relay.

B. Insert one test light lead into one motor field connector slot on harness and ground other lead.

C. Actuate seat switch to energize field wire being tested.

D. If tester does not light, there is no current at end of wire. Failure is caused by an open or short circuit between end of wire and switch. Check other motor field wire in the same manner.

6. Checking the Relay Assembly

A. Disconnect the three motor control leads at the relay assembly (Red - Arm. Feed, Green and Yellow - Field Feeds).

B. Connect one end of a jumper wire to one of the motor field feed studs on the relay and ground the other end of the jumper wire.

C. Connect one test light lead to motor armature feed stud on relay and ground other tester lead.

D. With jumper wire, energize the field stud which is not grounded.

If tester does not light, the relay is defective.

CAUTION: Do not energize grounded side.

7. Checking the Motor Assembly

A. Disconnect motor field feed wires from motor.

B. Connect one end of a #12 gauge jumper wire to battery positive pole and other end to one of the motor field feeds and the armature feed wires.

C. If motor does not operate, motor is defective. Check the remaining motor field feed wire in the same manner.

8. Checking Wires Between Switch and Solenoids

A. Disconnect harness connector from transmission assembly.

B. Connect one test light lead to one terminal at the harness and ground other tester lead to body metal.

C. Operate switch to wire being tested. If tester does not light, there is no current at the end of harness wire. Failure is caused by an open or short circuit between end of wire and switch or defective switch.

D. Check other wire in same manner.

9. Checking the Solenoid

A. Check transmission attaching bolts for proper ground.

B. Connect one end of a #12 gauge jumper wire to the battery positive pole and the other end to the lead of the solenoid being checked.

CAUTION: To prevent damaging the solenoid, do not energize solenoid for more than one minute.

NOTE: When solenoid is functioning properly, a "click" may be heard when solenoid plunger operates.

After checks have been performed and seat adjusters still do not operate, remove transmission assembly and disassemble as described in the "seat section".

TYPICAL ELECTRICAL FAILURES OF (FOUR-WAY POWER SEATS)

CONDITION	CAUSE	CORRECTION
1. Seat adjuster motor does not operate.	a. Short or open circuit between power source or switch and motor.	a. Check circuit from power source and switch to motor to locate failure.
	b. Defective motor relay.	b. Replace relay.
	c. Defective motor.	c. Check Motor. If defective repair or replace as required.
	d. Defective switch.	d. Replace switch.
	e. Defective circuit breaker.	e. Replace circuit breaker.
2. Seat adjuster motor operates in both directions but seat adjusters are not actuated.	a. Short or open circuit between switch and affected solenoid.	a. Check circuit from switch to solenoid to locate failure.
	b. Defective solenoid.	b. Check solenoid. If defective, repair or replace as required.
	c. Defective switch.	c. Replace switch.

CONDITION	CAUSE	CORRECTION
3. Seat Adjuster motor operates in one direction only, seat moves down and forward, but does not move up and rearward.	a. Short or open circuit between one of the motor relay wires and seat control switch.	a. Check circuit between affected motor relay wire and seat switch.
	b. Defective field coil in motor.	b. Check motor. If defective repair or replace as required.
	c. Defective switch.	c. Replace switch.