Physics of the Window Switch

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I. Physics of the single switch

Remove the switch from the armrest and dismantle the switch per "Refurbishing the Window Switch."
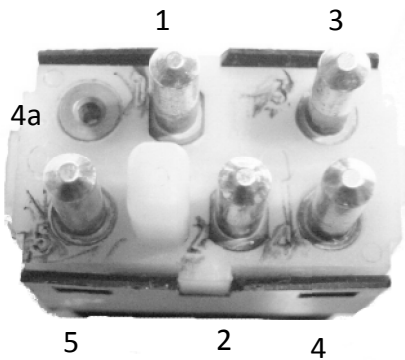

Figure 1. Bottom view of white terminal block showing the male leads. Numbers are stamped into white block next to each lead. For ease of reference, numbers have also been typed into the photo. 4a is connected to 4 and, electrically, they are the same.
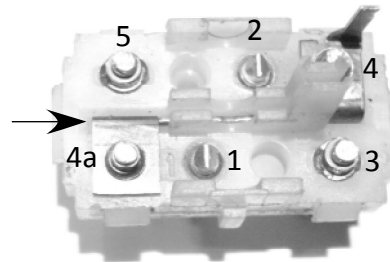

Figure 2. Top view of white terminal block. Arrow shows the connector between 4a and 4. The ridged terminals, 1 and 2, contact the underside of the leaf spring while the dot terminals contact the end nubs on underside of leaf spring (See "Refurbishing the Window Switch"). Depending on which end the leaf spring is depressed toward, the ridged terminal is connected to the dot terminal on that side. Therefore, if the springs are depressed to the right in the above photo, 2 & 4 are connected and 1 & 3 are connected. If the springs are depressed to the left, then 2 &5 are connected and 1 & 4 are connected. The depression of the leaf spring is opposite the actual mechanical push of the black plastic switch. See **Figure 10**.
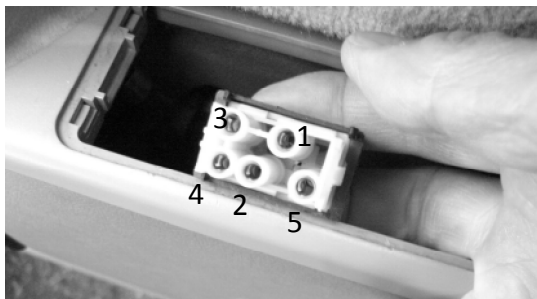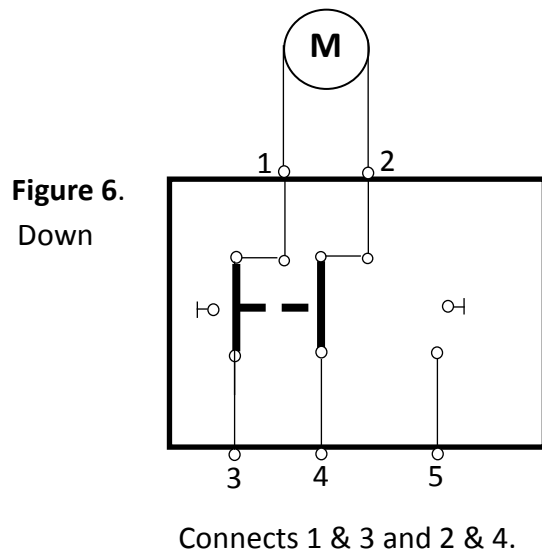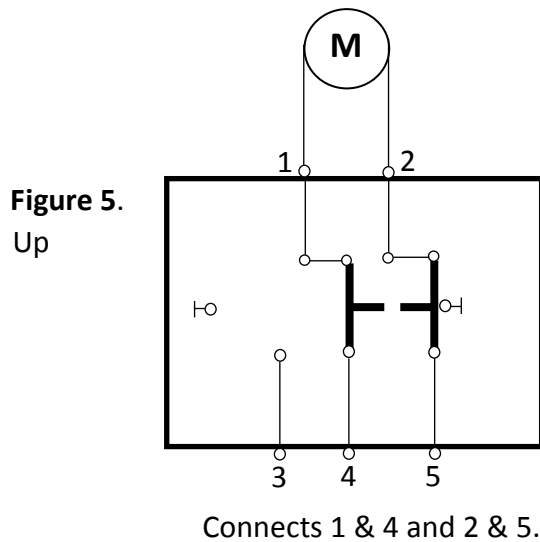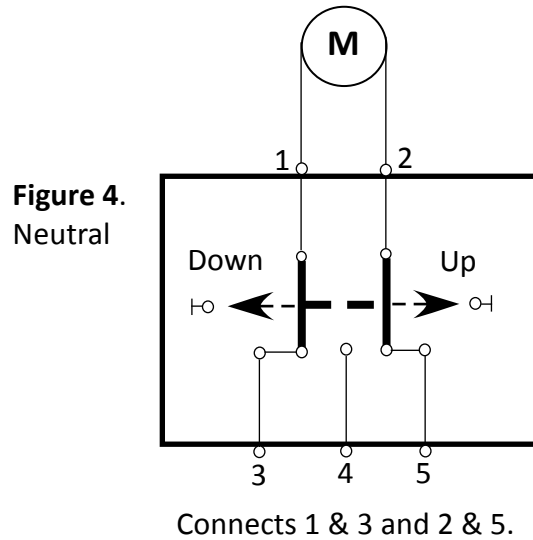

Figure 3. Female socket leads still attached to wires in armrest. Note terminal numbers. In this instance, depressing the switch forward (toward 3) moves the window up.

Schematics (Figures 4 - 6)

Shown are the electrical schematics for opera-
tion of the window switch. While schematics
are true representations of electrical functions
of the circuit, they rarely show the real physi-
cal layout. Terminal 4 is the hot wire lead.
Reversal of current in **Figures 5** and **6** means
the rotation of the motor **M** is reversed, giving
up or down.

Figure 4.
Neutral

Connects 1 & 3 and 2 & 5.

Figure 5.
Up

Connects 1 & 4 and 2 & 5.

Figure 6.
Down

Connects 1 & 3 and 2 & 4.

True to Life Diagrams (Figures 7 - 9)

The following diagrams show the electrical and actual
physical layout of the switch, as in **Figure 1**. You can
doublecheck these results by running your own continu-
ity checks.

Figure 7.

Switch in
neutral.
1 & 3 connect,
2 & 5 connect.
4 is hot wire.
No current flow here.

Figure 8.
Window Up:
1& 4 connect,
2 & 5 connect. 4 & 4a
are always connected.
Arrows show direction
of current flow, feeding
the motor M.

switch depressed this way

M

4a   1   3
                o

5   2   4

i

Figure 9.
Window Down:
1 &3 connect,
2 & 4 connect.
Current is reversed
from **Figure 8**.

M

4a   1   3

5   2   4
o

switch depressed this way

i

switch depressed this way

contacts made this way

Figure 10. Depressing the switch one way moves the contacts in the opposite direction. That's why when you depress the switch toward 3 to move the window up, 1 & 4 connect, and 2 & 5 connect (**Figures 2, 5, and 8**). And, when you depress the switch toward 5 to lower the window, 2 & 4 connect, and 1 & 3 connect (**Figures 2, 6, and 9**).

II. Physics of the remote switch

Note how the driver's remote switch B works through 57 to engage the front passenger window motor. For instance, if we move the switch of B to Up position, 1 & 4 are connected and 2 & 5 are connected in B. Current then flows from B through 3 & 1 of 57 through front passenger window motor to 2 & 5, raising the window. This happens even though switch 57 is in the neutral position.

I suspect (meaning I didn't actually run tests in the car) that ignition "On" closes the switch in 124, which in turn feeds current through the positive terminal block to the ignition switch to 124/1 via 30/5, then to 124/5, and on to terminal 4 of all the window switches—awaiting only the push of the switch to open or close the window.
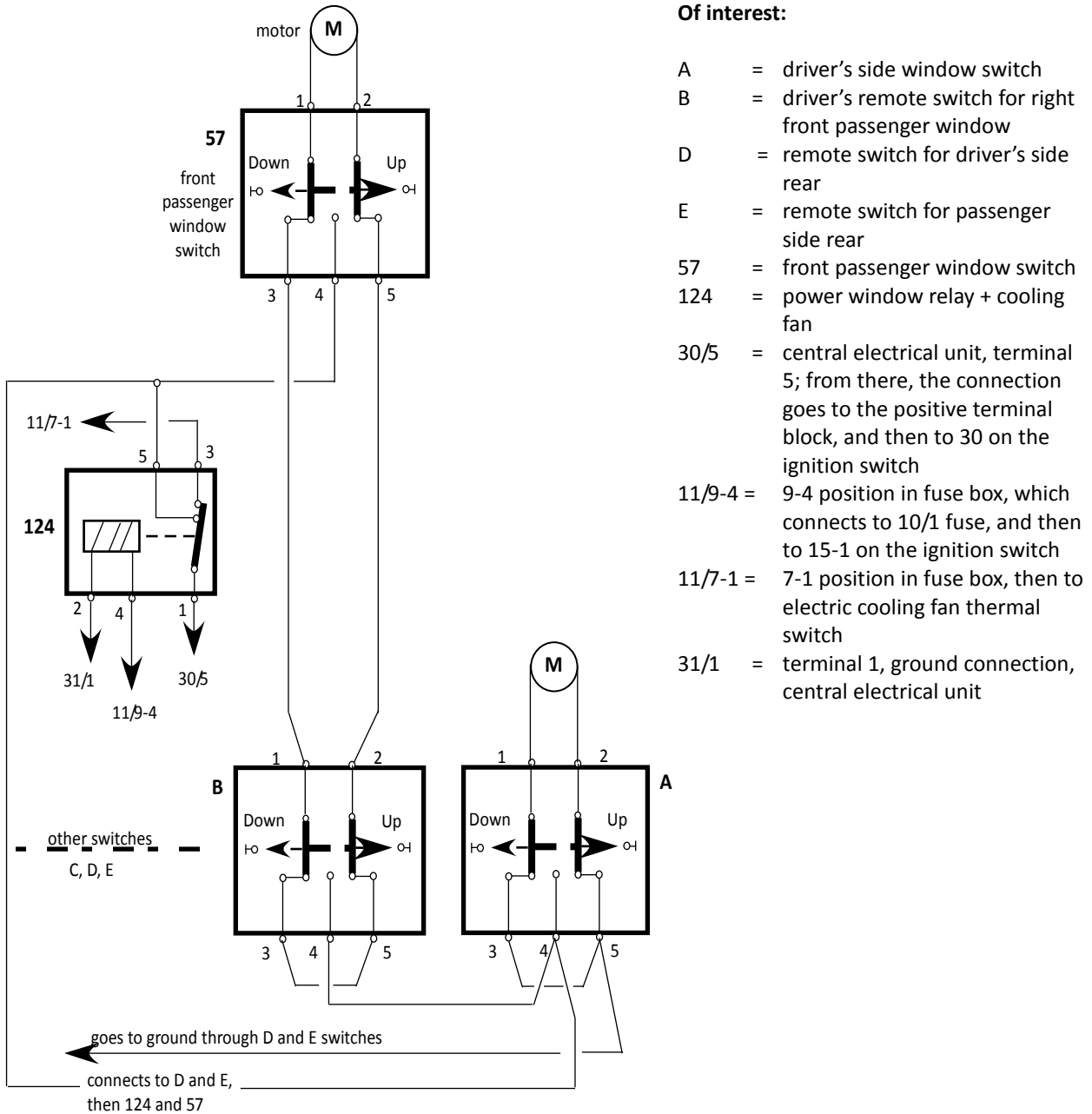

Of interest:

A = driver's side window switch
B = driver's remote switch for right front passenger window
D = remote switch for driver's side rear
E = remote switch for passenger side rear
57 = front passenger window switch
124 = power window relay + cooling fan
30/5 = central electrical unit, terminal 5; from there, the connection goes to the positive terminal block, and then to 30 on the ignition switch
11/9-4 = 9-4 position in fuse box, which connects to 10/1 fuse, and then to 15-1 on the ignition switch
11/7-1 = 7-1 position in fuse box, then to electric cooling fan thermal switch
31/1 = terminal 1, ground connection, central electrical unit

Figure 11. Schematic of window switches, showing remote operation.