# Electric Windows - Audi 80/90 Models

# All B3 & B4 Platforms 1987 – 1996
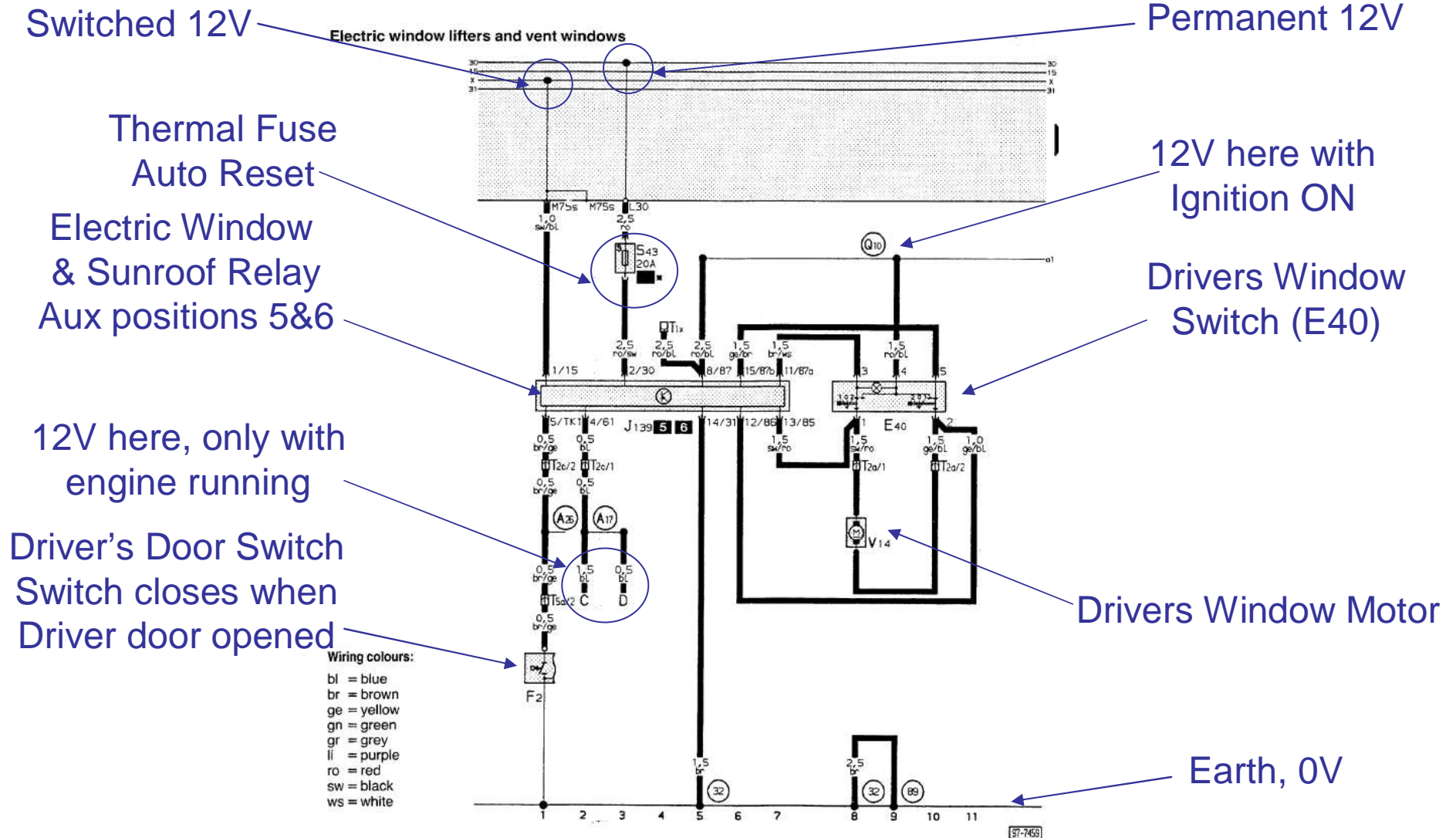# includes Coupe, Cabrio, Sedan, Avant, S2 & RS2

A demystifying guide to the schematics & functionality
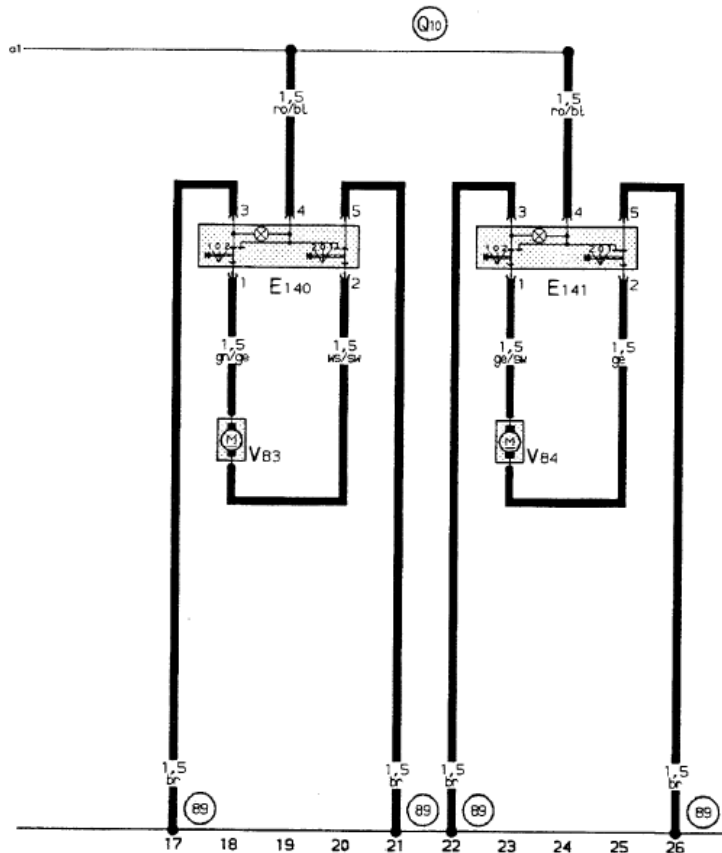
**Rev01** - Paul Nugent, 13th September 2009

# Schematic Demystified, Pt 1

http://s2central.net/S2_Schematics/D/D32.PDF

Switched 12V

Permanent 12V

Electric window lifters and vent windows

Thermal Fuse
Auto Reset

Electric Window
& Sunroof Relay
Aux positions 5&6

12V here with
Ignition ON

Drivers Window
Switch (E40)

12V here, only with
engine running

Driver's Door Switch
Switch closes when
Driver door opened

Drivers Window Motor

Wiring colours:

bl = blue
br = brown
ge = yellow
gn = green
gr = grey
li = purple
ro = red
sw = black
ws = white

Earth, 0V

- Ignore the relay for now…
- Consider switchgear. Switches shown here are actually for rear windows, but principle is the same
- Internal of each switch is a double pole device
- At idle there is 0V presented to pins 1,2,3 & 5
  - 0V across the motor ➔ no movement
- When pressing UP or DN buttons on the window switch, pins 1 & 2 are such that
  - UP sets one polarity to motor to move window upwards
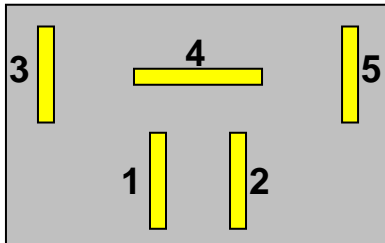  - DN sets opposite polarity across the motor to move window down
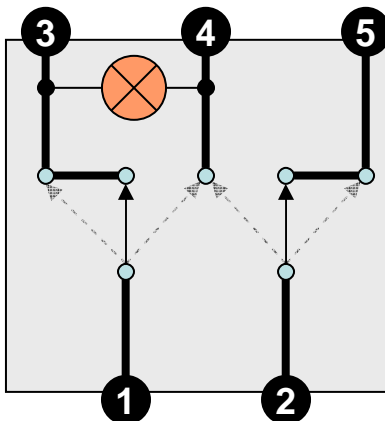
# Inside the switch

Photo
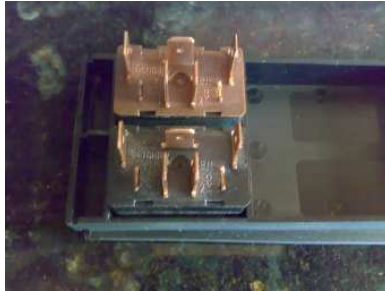


Pinout



Internal



- Consider pins 1 & 2 to be switch 'outputs'
- And pins 3, 4, 5 to be the 'inputs'
- In the idle/rest position there is 0V presented to pins 3 & 5
- 12V presented to pin 4 whilst ignition ON
  – See page 6 for more details
- Indicator lamp between pins 3 & 4
  – Approx 1M ohm resistance

- Pin 1 selects 0V or 12V from pins 3 & 4

- Pin 2 selects 0V or 12V from pins 5 & 4

# Testing the window switch

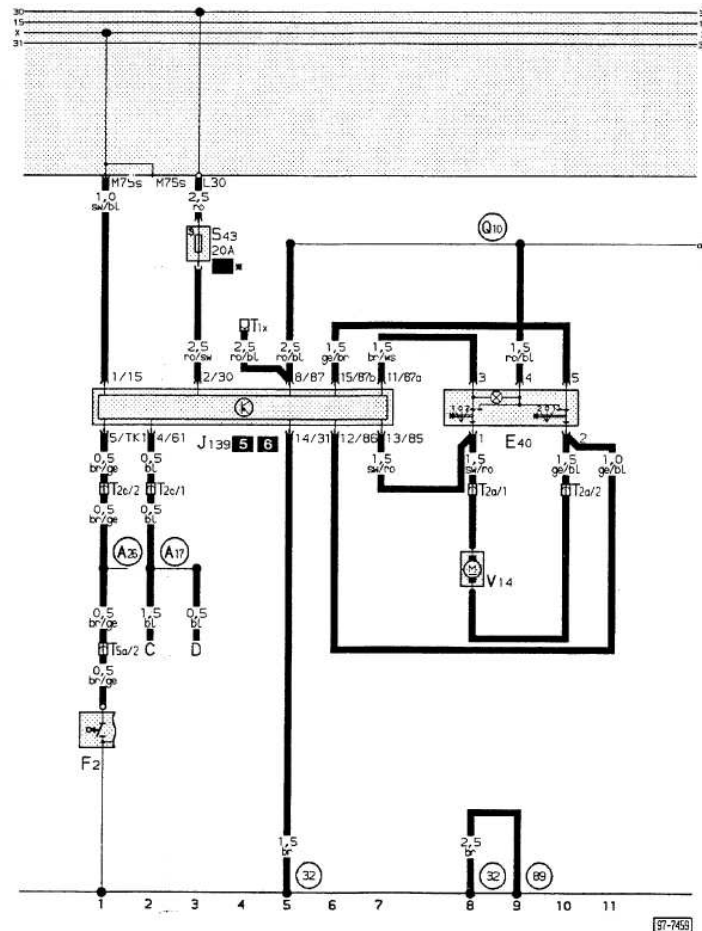| Test | 3 to 1 | 4 to 1 | 5 to 2 | 4 to 2 |
|------|--------|--------|--------|--------|
| UP | O | C | C | O |
| Idle | C | O | C | O |
| DN | C | O | O | C |

C = Closed
O = Open
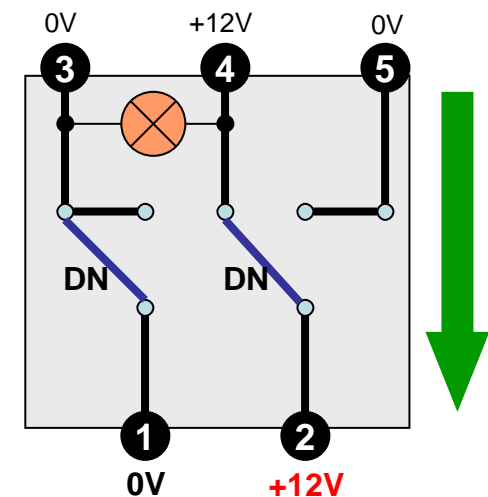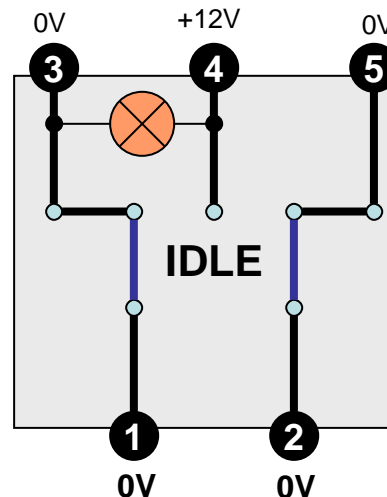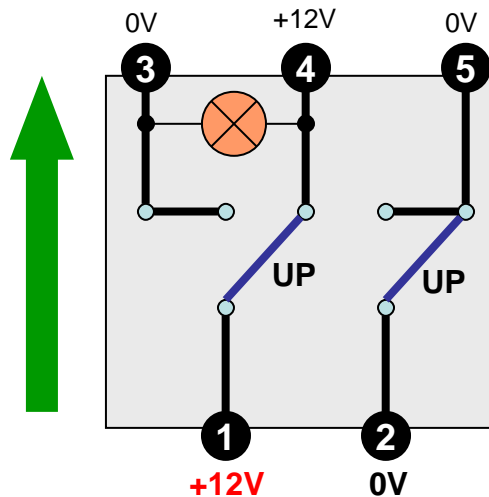
# The window relay module

Electric window lifters and vent windows



Wiring colours:

bl = blue
br = brown
ge = yellow
gn = green
gr = grey
li = purple
ro = red
sw = black
ws = white

- 1/15 : Switched +12V (key ON)
- 2/30 : Permanent +12V
- 4/61 : +12V when engine running
  - From the alternator blue wire
  - Only used on early relay modules (see note below)
- 5/TK1 : Driver side door switch
  - Replaced by TK2 and TK3 on later relay modules for driver and passenger door switches
- 8/87 : Main relay output +12V
  - Activated when ignition is ON
  - Connects to pin 4 of all the window switches (and sunroof)
  - Pulling current through pin 2/30 via Fuse S43
- 11/87a : 1-touch output A
- 12/86 : 1-touch relay coil
- 13/85 : 1-touch relay coil
- 14/31 : 0V Earth
- 15/87b : 1-touch output B

## NOTE

- Up to 09/92 the relay module provided both 1-touch driver's window up (1TWU) & down functionality
- Later relay modules do not have 1TWU operation. Furthermore, pin 61 is deleted as this was used as a control gate for 1TWU such that it permitted operation only with the engine running.

•12V presented to pin 4 of ALL switches whilst ignition ON
- Actually it stays at 12V after key removal until the drivers door is opened
    - Note how the indicator lamp stays illuminated until the drivers door is opened

# 1-Touch Operation

- Note how pins 1,2,3 & 5 of the driver's switch connect to the window relay module

- This facilitates 1-touch window operation
  - 1TWU and 1TWD for the early relays
  - 1TWD <u>only</u> for the later relays

- This works by relay contacts which override the voltage at pins 3 & 5 of the switch… These connect thru to pins 1 & 2 respectively onto the drivers window motor while the switch is in the idle position i.e. after driver has removed his/her finger from the button !

- 1-Touch operation is active for approx 10 seconds
  - 1TWU was deleted due to safety concerns in North America
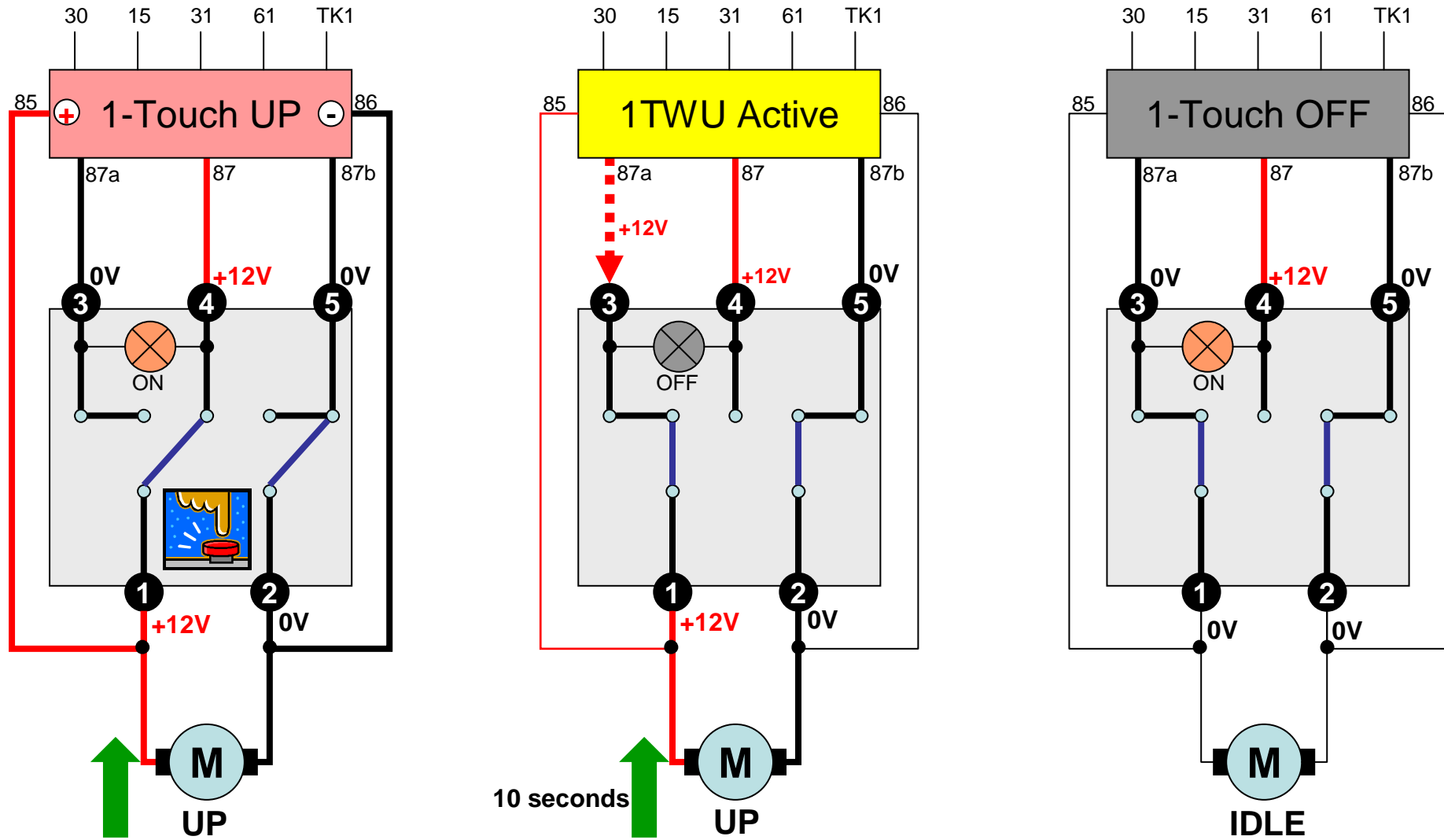  - Note there is no voltage across the indicator lamp during 1TWU

# 1-Touch Window Down (1TWD)



Sequence of events
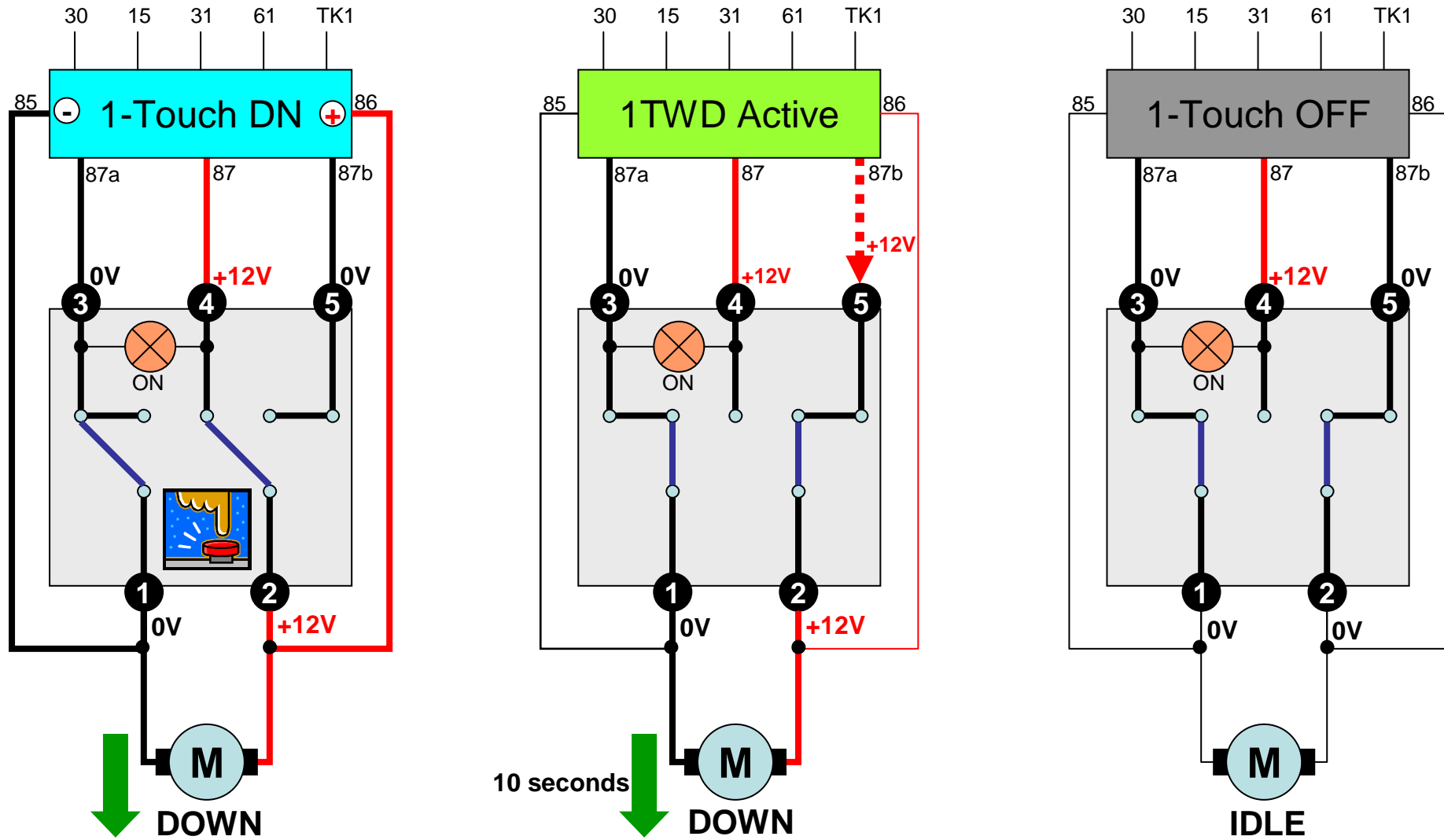
# 1-Touch Window Up (1TWU)

# END

# Please send any comments, questions or corrections to S2central@mac.com