

## Assembly Instructions HarshGuard Operator Setup and wiring

### HarshGuard Operator Preparation:

Carefully remove the HarshGuard External Operator from its shipping carton. Use care when handling the operator as to not damage the plastic housing or capacitor mount. Locate the Operator Adapter Bracket, two M8 metric bolts, two lock washers and two flat washers. Install the Adapter Plate (Adapter Plates vary with the installation type) as shown in the following photo (Photo 1) (Right-hand operator shown, install the adapter on the opposite side of the operator for Left-hand installations).



**Photo #1**  
(Operator Adapter Plate)

## HarshGuard Operator Mounting:

Install the Operator Adapter and Angle Bracket Assembly onto your motorized curtain.

Install the Hand Crank in the bottom of the operator. Ensure that the crank goes all the way into the plastic housing and rotate the crank until it fully engages the motor drive shaft. Rotating the crank should cause the 1" output quill drive on the operator to turn.



**Photo #2**  
(Hand Crank)

Carefully lift the operator into place next to the Input Shaft. Using the hand crank, rotate the output quill until the keyway lines up with the key on the Input Shaft. Slide the operator all the way onto the Input Shaft. It may be necessary to rock the operator slightly in order to get it all the way onto the shaft. **Do not force the operator or use a hammer to get the unit onto the shaft!**

Secure the operator to the bracket with the 1/4-20 screws, washers, and aluminum spacer as shown in the following photo (Photo 3):



**Photo #3**  
(Operator Installation)

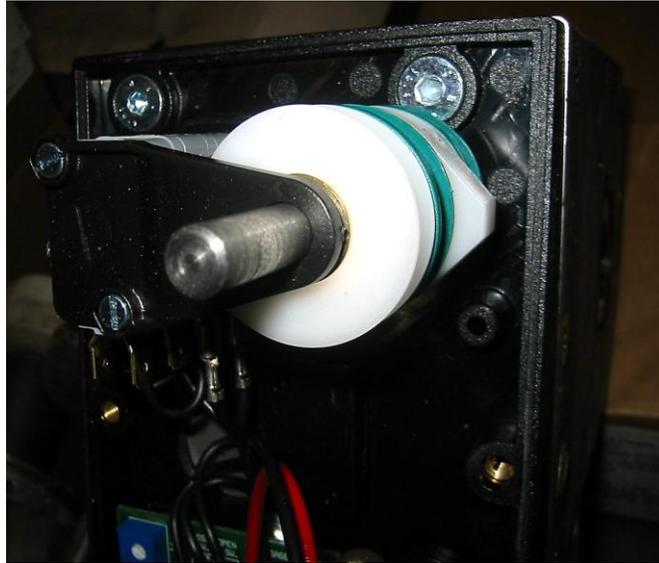
Use the hand crank to lower the curtain approximately one foot (1') from the "Open" position. Remove the operator cover (5 fasteners). The next step will involve pre-setting the approximate end stop (limit) positions for the operator travel. Locate the 2.5 Allen key included with your installation kit. Use it to loosen set screw for the first **GREEN** limit cam on the operator. Rotate the cam until the lobe of the cam comes in contact with the arm of the microswitch (from the under-side) and you can hear the switch click. Tighten the set screw firmly as shown in the following photo (Photo 4):

**NOTE:** If it is not possible to access the head of the set screw, use the hand crank to lower the curtain until the head is exposed. Loosen the screw, and then use the hand crank to raise the curtain back to the ~1' position. It is important that the curtain be approximately one foot from fully open when the starting position for the cam is set.



**Photo #4**  
(Open Cam Coarse Adjustment)

Loosen the set screw for the first WHITE limit cam on the operator. Rotate the cam until the lobe is at the “3 o-clock” position as shown in the following photo (Photo 5). Tighten the screw firmly.



**Photo #5**  
(Close Cam Coarse Adjustment)

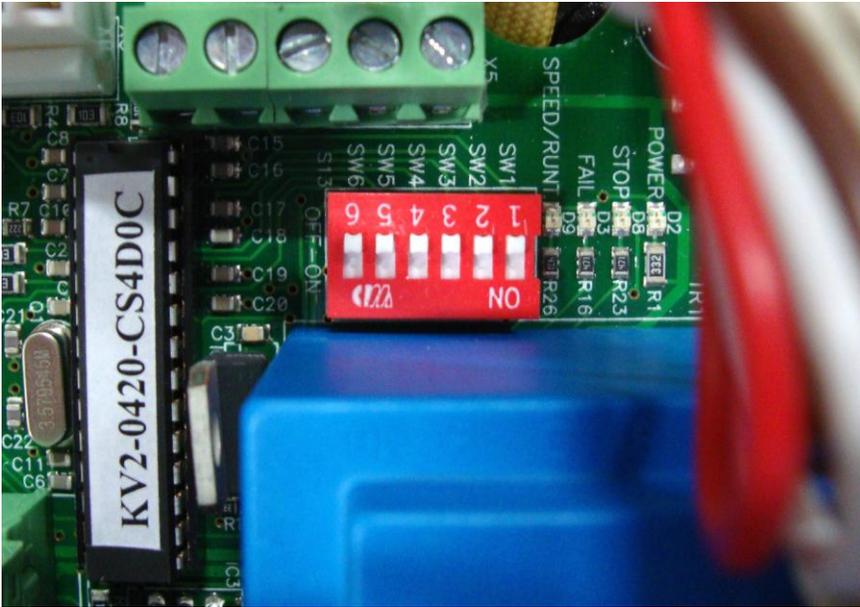
The other two outboard cams (white and green) are not electrically connected and are not used in a standard installation.

Using a small screwdriver, make sure that the “Auto-Close” potentiometer (P2) is rotated fully counter-clockwise as shown in the following photo (Photo 6). Failure to set this potentiometer properly will cause the curtain to automatically close during testing! Also make sure that the upper potentiometer (P1) is rotated fully counter-clockwise (factory position).



**Photo #6**  
(Auto-Close Potentiometer)

Locate the DIP Switch assembly and ensure that all of the switches are in the “OFF” (up) position as shown in the following photo (Photo 7):



**Photo #7**  
(Initial DIP Switch Settings)

## Electrical Connections:

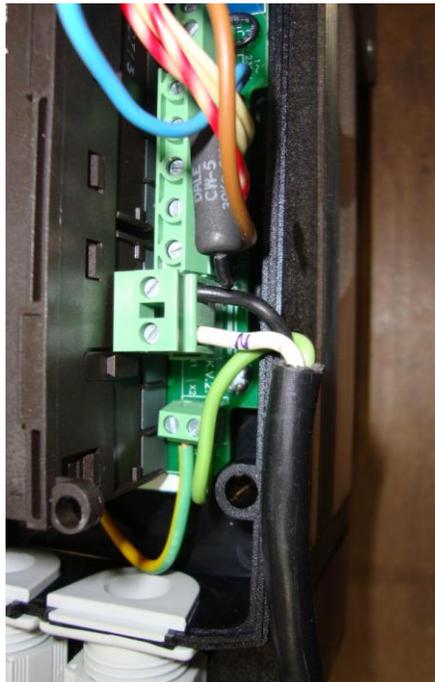
There are two independent and unique aspects of the wiring configuration for your Motorized Vertical Curtain. These are the 115VAC 60Hz power wiring and the low-voltage control wiring. While the low-voltage side of the control system can be configured and properly wired by anyone who has a rudimentary understanding of electrical circuitry, the power wiring should be performed by an electrical professional and done in such a manner to conform to all local and national wiring codes and regulations.

### 115VAC Power Wiring:

**The external operator requires 115VAC, 60Hz with a current draw of 5A (1/2 HP PSC inductive motor). Make sure that the branch circuit and conductor size can support this load requirement. Low voltage can cause erratic behavior and operator overheating. Do NOT enable the 115VAC power until all of the wiring has been completed.**

**Pro Tip: All of the green terminal connectors for the power and control wiring are actually “plugs”. They can be unplugged and removed to make for better access and ease of wiring.**

The AC power wiring should be brought into the operator via the right waterproof gland (or a suitable replacement fitting). Route the wiring up the side of the printed circuit board and connect the “Neutral” to the “N” terminal, “Hot” to the “L1” terminal, and “Ground” to the “PE” terminal. Note: Local electrical codes may not allow the Earth Ground to be attached to the terminal strip and bonding to the motor case may be required. The following photo (Photo 8) is for reference only and does not necessarily represent a “legal” wiring configuration. If your operator has the optional High Duty Cycle External Fan Kit the power connections must share the terminals with the existing Black wires.



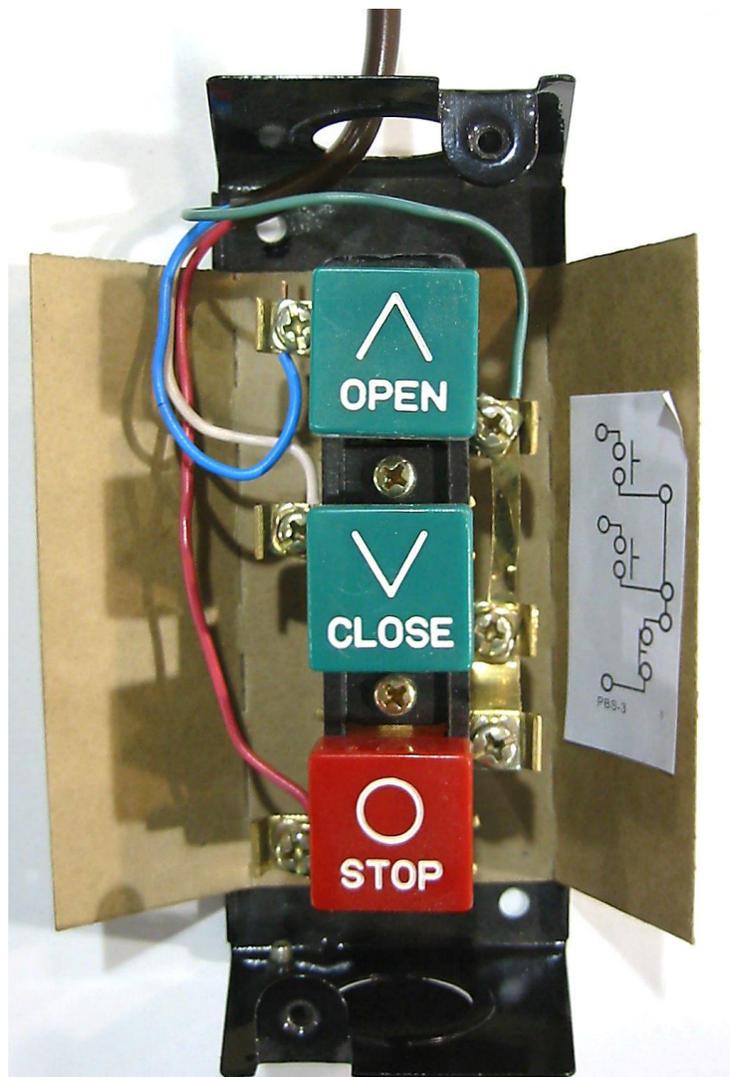
**Photo #8**  
(115VAC Power Wiring)

## Control Connections:

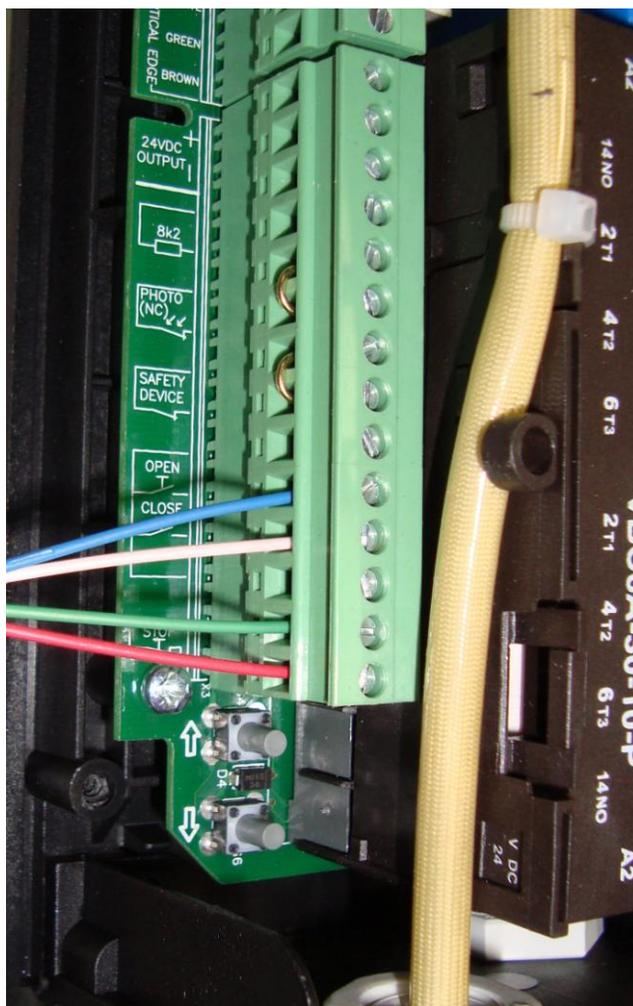
The operator supports NEMA-1 and NEMA-4 3-button control stations with N/O “Open” and “Close” buttons. The “Stop” buttons must be N/C. The low-voltage control connections for the primary (first) station should be made with the 4-conductor cable that was included with your kit. Although the color codes are arbitrary, Goff’s has selected the following standard:

- |          |   |              |
|----------|---|--------------|
| 1. Green | - | Common       |
| 2. Red   | - | Stop         |
| 3. Blue  | - | Open (UP)    |
| 4. White | - | Close (DOWN) |

Single-station control installations are performed by simply running the control wiring between the control station and the operator, and attaching the appropriate wires to the screw terminals on the operator and the control station as shown below.



**Photo #9**  
(NEMA-1 Low Voltage Wiring)

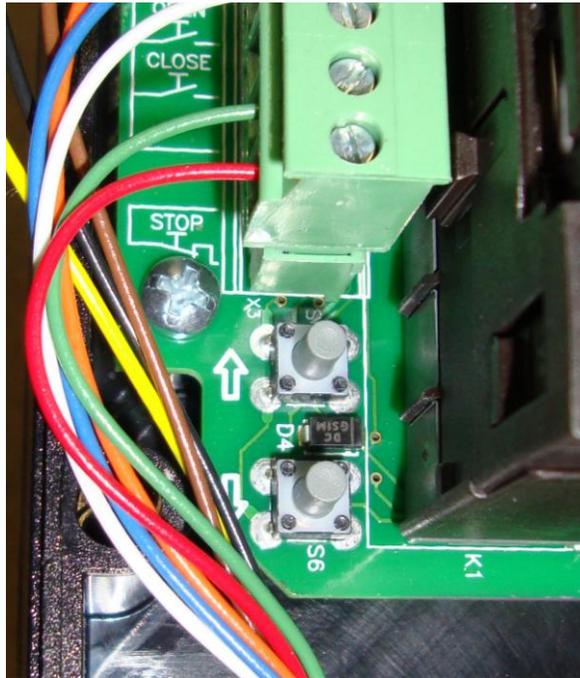


**Photo #10**  
(Operator Low Voltage Wiring)

### Preliminary Testing:

**Remove the hand crank.** The crank has an interlock switch and the curtain will not operate when the crank is inserted into the operator. Enable power (115VAC) to the unit. The curtain should not move and the green power LED should illuminate on the operator printed circuit board. If the curtain should begin to move, immediately disable the power and check/repair the control wiring from the NEMA-1 station to the operator.

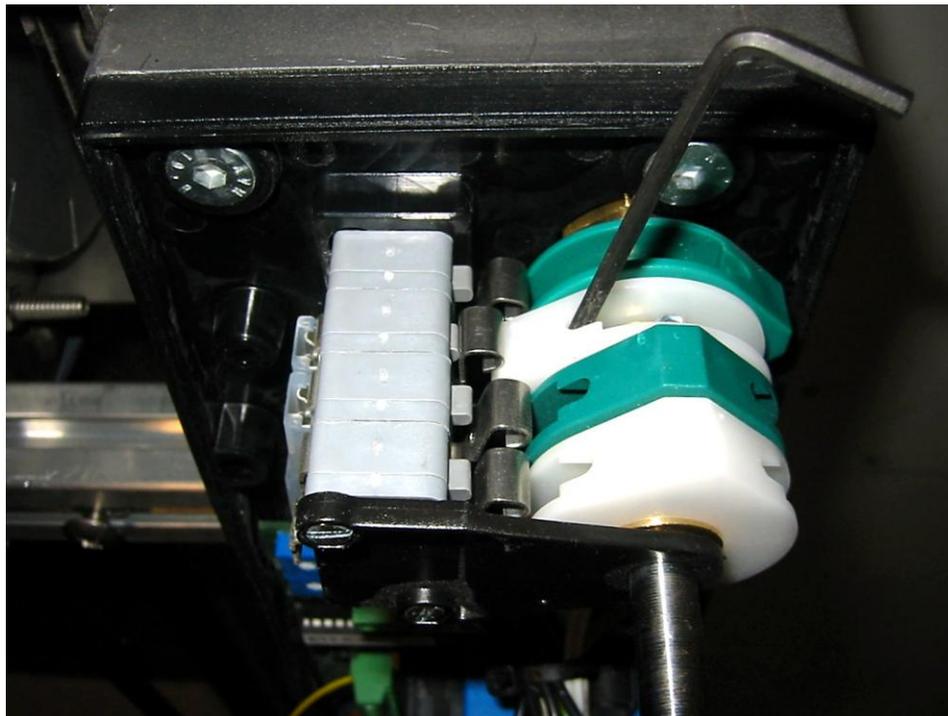
There are two gray manual override buttons on the lower left edge of the operator printed circuit board as shown in the following photo (Photo 11). With all of the DIP switches in the “OFF” position, these buttons will operate in a “momentary” fashion, meaning that the curtain should move as long as the button is being held and it should stop when the button is released. Press the “Down” (lower) button and observe the action of the curtain. It should begin to close. Watch for mechanical binds and/or problems and release the button after the curtain has moved approximately a foot. Press the “Up” (upper) button and observe the action of the curtain. The curtain should move upward and stop when you release the button or when the “Open” limit switch (white cam) is tripped. If the curtain does not operate in the described manner please contact Goff’s Enterprises for debug and technical support.



**Photo #11**  
(Manual Override Buttons)

#### Setting the End Limits:

The gross/coarse adjustment of the end limit cams is made by loosening the set screw for the cam and changing its position on the shaft. Fine tuning and small adjustments can be made by using the internal cam “phase screw” which can be accessed by putting the 2.5mm Allen wrench into the slot/hole of the cam as shown in the following photo (Photo 12):



**Photo #12**  
(Cam Phase Screw Adjustment)

If you run out of available travel on the “phase screw” it will be necessary to reposition the cam with the set screw and start over.

**NOTE: Always release the gray manual override buttons before adjusting the end position cams!**

Setting the limits is a two-step operation and either end stop can be modified at any time without upsetting the other position. It is preferred to initially have the curtain “stop short” of the desired position and then incrementally work toward the final adjustment. To set the “Full Down” (Closed) position press the brown “Close” button on the operator and monitor the position of the curtain.

The curtain should stop automatically before the bottom of the curtain comes within three inches (3”) of the floor. If it doesn’t, release the “Close” button as the weighted bottom seal of the curtain contacts the floor and begins to compress. Press the “Open” button. Monitor the position of the curtain and release button when the curtain is open by approximately 1’ (one foot). Using the Allen wrench, turn the phase screw on the white cam clockwise (CW) until the cam contacts the lever on the microswitch (from the top) and you can hear the “click”. Press the Open button and allow the curtain to open about an additional foot (1’). Press the “Close” button. The curtain should stop before the bottom of the curtain comes within three inches (3”) of the floor. You are now ready to incrementally work toward the final position.

Note the position of the curtain. Each full counter-clockwise (CCW) rotation of the phase screw will move the Closed stop position down by approximately 2”. Remove the appropriate number of turns (CCW) to the phase screw and press the “Close” button. Monitor the position of the curtain. It should automatically stop when the weighted bottom seal of the curtain is approximately three inches (3”) from the floor. If the curtain does not reach this point, release the “Close” button and remove some more turns (CCW) from the phase screw. If the curtain closes too far, use the “Open” button to open the curtain a few inches, add some turns (CW) to the adjuster, and repeat the adjustment procedure.

Once the Closed position has been established, press the “Open” button on the operator in order to set the “full Up” position.

The curtain should stop automatically well before the bottom stiffener reaches the aluminum roll tube. If it doesn’t, release the “Open” button when the bottom of the curtain is within 2” of the tube. **DO NOT** allow the curtain to continue above this point. If it should happen to completely wrap around the motorized roll it will become necessary to reestablish the “Closed” position via the above procedure. Press the “Close” button. Monitor the position of the curtain and release the button when the curtain is closed by approximately 1’ (one foot). Turn the phase screw on the green cam counter-clockwise (CCW) until the cam contacts the lever on the microswitch (from the bottom) and you can hear the “click”. Press the “Close” button and allow the curtain to close about an additional foot (1’). Press the “Open” button. The curtain should now stop automatically before the bottom of the curtain reaches the roll tube. You are now ready to incrementally work toward the final position.

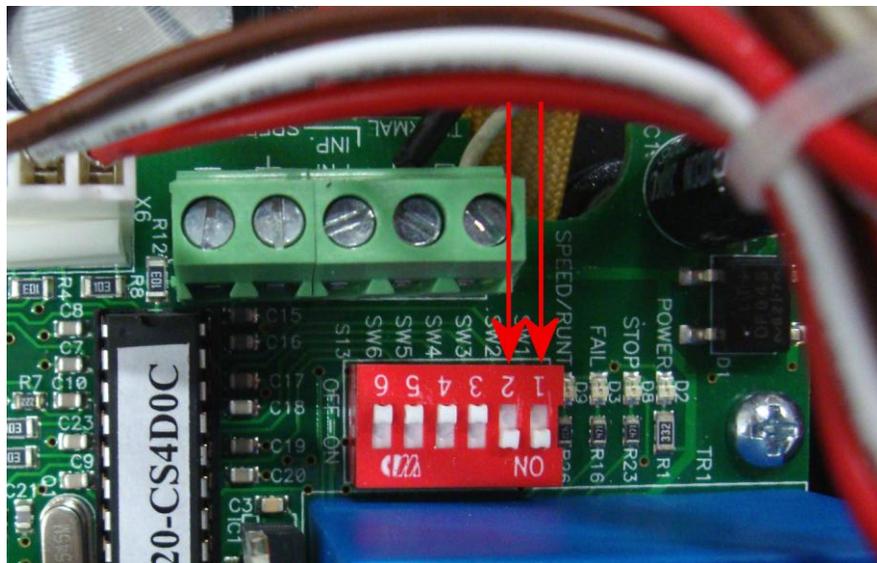
Note the position of the curtain. Each full clockwise (CW) rotation of the adjuster will move the Open stop position up by approximately 2”. Add the appropriate number of turns (CW) to the phase screw and press the “Open” button. Monitor the position of the curtain. If the curtain is not fully open, release the button and add some more turns to the adjuster.

If the curtain opens too far, use the “Close” button to close the curtain a few inches, remove some turns (CCW) from the phase screw, and repeat the adjustment procedure.

### **Final Setup and Operation:**

#### Conversion to “Maintained” Switching:

With all of the DIP switches in the “OFF” position the Open and Close buttons operate in a “momentary” manner. The curtain will move as long as the button is being pushed and the end limits have not been reached. “Maintained” switching allows a user to push and release a button in order to initiate movement. After the button is pushed the curtain will continue to move until a different button is pushed, the Stop button is pressed, or the end limits are. In order to convert the operator to “Maintained” mode, turn the SW1 and SW2 DIP switches “ON” (down) as shown in the following photo (Photo 13):

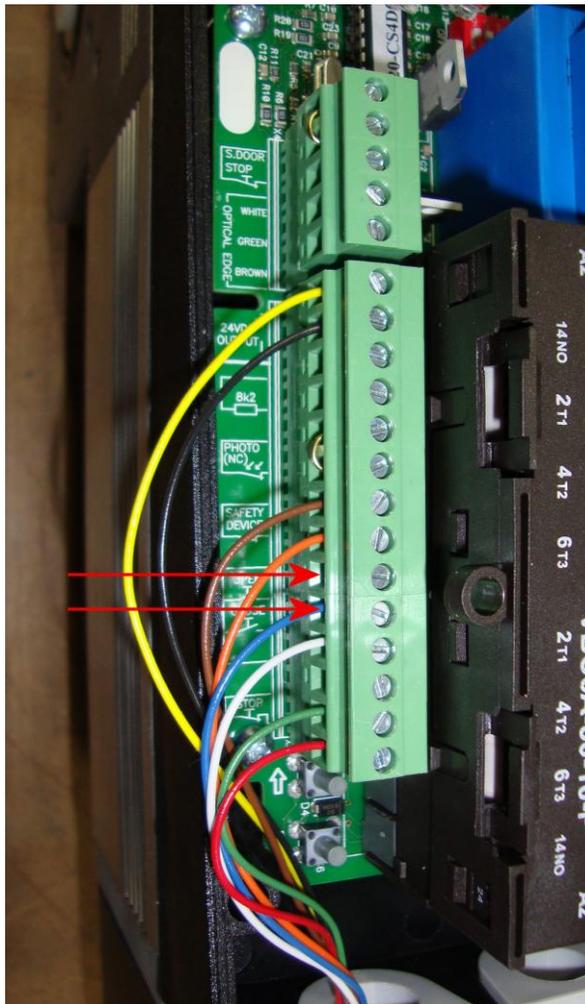


**Photo #13**  
 (“Maintained” Switches)

# Addendum

## Adding PullCord or Single Button Control Stations:

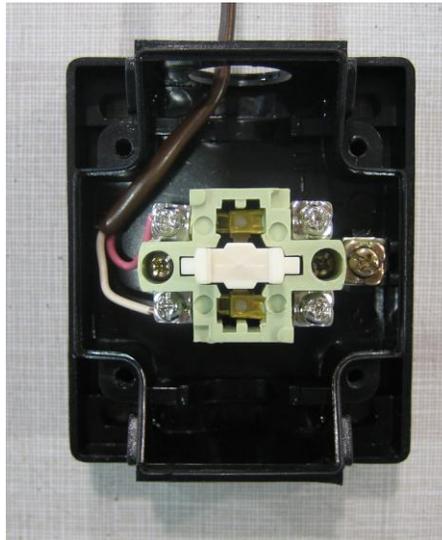
The HarshGuard Operator supports N/O (Normal Open) Pullcord Switches, N/O Single Button Control Stations, and any other N/O dry contact. All N/O switches should be wired in PARALLEL and the wiring junctions can be made either at the switches (daisy-chain) or at the HarshGuard Operator (Home-Run). Switches should be connected using two-conductor wiring (supplied) and terminated at the HarshGuard Operator at the “Open” terminals (#5 and #6 from the bottom) as shown in the following photo (Photo 14). Color codes are not important. Do not accidentally disconnect the existing blue wire.



**Photo #14**  
(Sequencer Connections)

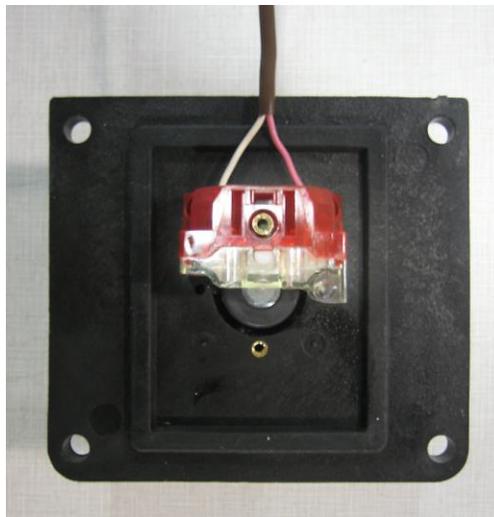
## Switch Wiring:

Control wiring should be attached to the NEMA-4 Single Button Control Station at the lower two N/O terminals (#'s 13 & 14) as shown in the following photo (Photo 15):



**Photo #15**  
(Single Button Station Wiring)

Control wiring should be attached to the Pullcord Switch Stations at the two N/O terminals as shown in the following photo (Photo 16):



**Photo #16**  
(Pullcord Switch Station Wiring)

**NOTE:** In order to allow the Pullcord or Single Button Control Station to both **OPEN** *and* **CLOSE** the curtain the operator must be converted to “Sequencer Mode”. “Sequencer Mode” changes the performance of the “Open” button, allowing it to alternately issue an “Open” and then a “Close” command when actuated. To enable “Sequencer Mode”, turn the SW4 DIP switch “ON” (down). All “Open” buttons connected to the operator will now act as sequencers.

### **Installing the Goff’s Universal RF Receiver:**

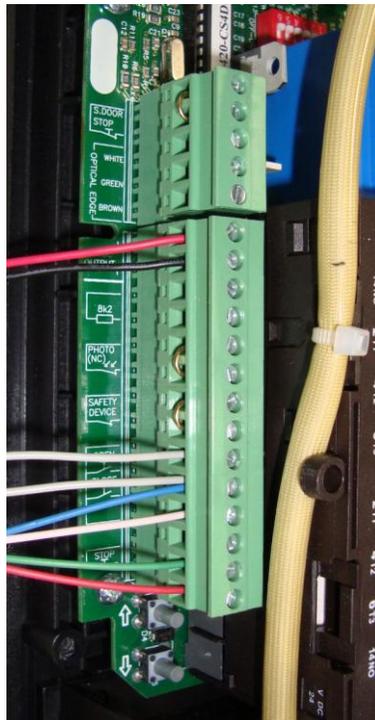
Please see the instruction included with your Universal Receiver kit.

## Installing the Multi-Code RF Receiver:

The Multi-Code RF Transmitter/Receiver can be used in conjunction with NEMA-1, NEMA-4, PullCord, Single Button, and any other operator stations.

The wires from the RF Receiver are attached to the Open and 24VDC terminals in the operator. Locate the receiver in a suitable location where the wires will reach and secure it to the building or operator. Carefully route the wires from the receiver to the terminals on the operator. Use tie-wraps or other means to ensure that the wires will not get caught or pinched in the operator mechanisms.

Install one of the gray wires on the unused terminal above the Open terminal. The other gray wire will be attached to the same terminal as the blue Open wire from the NEMA-1. The red and black wires go to the 24VDC power terminals as shown. Your wiring should resemble the following photo (Photo 17):



**Photo #17**  
(RF Receiver Wiring)

Per the included instructions, set the DIP switch codes on the transmitter and receiver to the same value. Your RF system should now be ready to use.

**NOTE:** In order to allow the RF Receiver to both **OPEN** and **CLOSE** the curtain the operator must be converted to “Sequencer Mode”. “Sequencer Mode” changes the performance of the “Open” button, allowing it to alternately issue an “Open” and then a “Close” command when actuated. To enable “Sequencer Mode”, turn the SW4 DIP switch “ON” (down). All “Open” buttons connected to the operator will now act as sequencers.

Door hardware, the operator, and building configurations can substantially reduce the range of your RF system. If your performance is substandard, try repositioning the green antennae wire until you get optimal performance. If good performance cannot be achieved, an external co-ax antennae can be added to your system. Please contact your local dealer or the Goff’s factory.