

Tensioned SkyLighter®

An installation guide



Table of Contents

| | |
|---|-------|
| System Introduction | 2 |
| Basic system Operation | 3 |
| Basic System Components & Options. | 4-5 |
| Wiring Instructions. | 6-7 |
| Hardware Assembly Instructions for Flat Roller Skylights. | 9-17 |
| Setting the Extended and Retract Limit Switches | 18-19 |
| Setting the Dynamic and Final Tension | 20-21 |
| Control Unit Wiring Diagrams | 22 |

NOTICE: Read instructions entirely before installing shade.

System Introduction

The Tensioned Skylighter® is a specialized shade tensioning system designed for the solar protection market where horizontal, inclined, angled or bottom up type shading is required with a flat shade design. The system consists of 2 motors, 1 electronic control unit, and 1 switch. One motor is inserted into the fabric roll-up tube, while the other is inserted into the cable take-up tube. Both motors are independently controlled from the electronic control unit, maintaining the desirable Dynamic (moving) tension and the Static (final) tension in the system. The Dynamic Tension reduces fabric sag when the shade is moving; while the Final Tension reduces fabric sag after the shade has stopped. Adjustments to both dynamic and final tension can be made via the electronic control module.

Before you begin...

You must determine the orientation of the Tensioned Skylighter shade that is being installed. There are many shade configuration possibilities and determining the correct wiring and limit switch specifications can be a bit confusing. To help simplify this process we have provided a chart (see page 8) illustrating the most commonly found configurations.

- First find the illustration that best corresponds to the shade you are installing.
- Then use the wiring configuration specified for that shade.
- Apply the numbered limit switch configuration for that scenario.

Basic System Operation

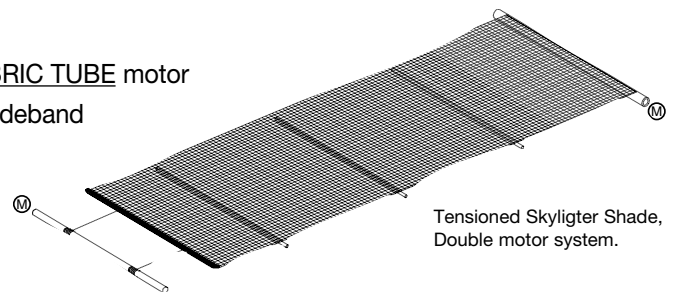
To extend the shade:

- 1) The FABRIC TUBE motor brake releases and the CABLE TUBE motor engages to turn the CABLE TUBE drawing the cable onto the tube. This draws the shade across the opening as the shade fabric unrolls from the FABRIC TUBE. The Dynamic Tension setting establishes the level of tension necessary to keep the fabric from sagging while it is moving.
- 2) When the shade reaches its limit, or any switch commanded pre-set position, the CABLE TUBE motor stops and the FABRIC TUBE motor engages briefly (turning in the opposite direction) providing tension to the fabric and drive cables. The Final Tension setting determines how tightly the fabric is drawn when stationary.

(Please see “Setting the Dynamic and Final Tension” on page 20.)

To retract the shade (uncovering the opening)

The CABLE TUBE motor brake releases and the FABRIC TUBE motor engages to turn the FABRIC TUBE and draw the shadeband onto the tube. This allows the shadeband to be drawn back across the opening as the cable is unrolled from the CABLE TUBE. When the shade reaches its limit, or any switch commanded pre-set position, the FABRIC TUBE motor stops and the CABLE TUBE engages briefly (turning in the opposite direction) providing tension to the fabric and drive cables.

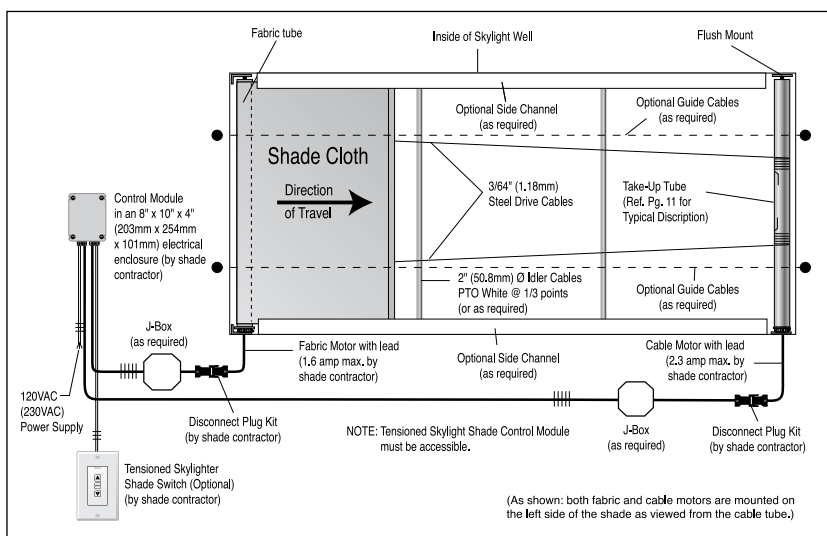


(Please see “Setting the Dynamic and Final Tension” on page 20.)

Basic System Components

Below is a partial list of components. Items (parts) will vary based on configuration, design and size of the Tension Skylighter Shade™.

- One Tensioned Skylighter Shade control module in a 8" x 10" x 4" (203mm x 254mm x 101mm) electrical enclosure required for each Skylighter shade.
- One Tensioned Skylighter Shade Switch (Optional).
- One fabric shadeband attached by means of a SnapLoc® Spline to a SnapLoc Extruded Aluminum Tube with a Tubular Bi-Directional Motor installed inside the tube (motor head and leads exposed).
- SnapLoc Extruded Aluminum Tube for cable take up with a Tubular Bi-Directional Motor installed inside the tube (motor head and leads exposed).
- One exposed (GP) hemtube (shipped separate from shade) OR Concealed hemtube with drive cables attached (shipped with shade).
- Nylon coated Galvanized Steel drive cable shipped separate if GP hemtube used.
- Two 5' (1524mm) long, 5 conductor j-box leads with mating disconnect plugs (mates with motor lead). Longer leads optional.
- Two pair of mounting brackets – one for each tube (pair consists of one drive end and one idle end bracket).



OR

- Concealed Hemtube with Drive Cables attached (shipped with shade).
- Drive Cable Kit for Concealed Hemtube. Kit contains:
 - Screws and Washers for attachment of Cables to Take Up Tube.

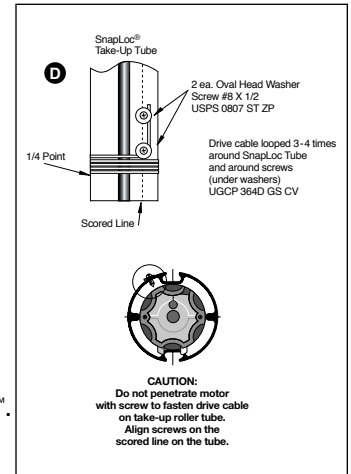
(Con't.)

- Finial for Concealed Hemtube.
- Nylon coated Galvanized Steel Drive Cable.
- Two 5' (1524mm) long, 5-conductor J-box leads with Mating Disconnect Plugs (mates with motor lead). Longer leads optional.
- Two pair of Mounting Brackets – one for each tube (pair consists of one drive end and one idle end bracket).

Optional System Components

Below is a list of optional components. Selection of these optional items (parts) will vary based on configuration, design and size of the Tension Skylighter Shade™.

- Optional Drive cable kit for GP hemtube. Kit contains:
 - Brass stop sleeves (minimum 2 per shade).
 - Two 1/4" (6.3mm) diameter x 2" (50.8mm) long (approx.) aluminum drive cable attachment rods.
 - 2 GP endcaps with attachment screws.
 - Drive cable attachment screws and washers (for attachment of drive cable to cable take up tube).
- Optional Drive cable kit for Concealed hemtube. Kit contains:
 - Screws and washers for attachment of cables to take up tube.
- Optional Finials for concealed hemtube.
- Optional Room darkening channel.
- Optional standard Guide Track.
- Optional Jumbo guide track (for room darkening).
- Optional Guide Wheel Assembly (for use with guide track).
- Optional Aluminum Block for use with guide wheel assembly and GP Hemtube.
- Optional Finial for use with Guide Wheel Assembly and 1" diameter hemtube.
- Optional Support Cables with Double Wheel Carriers, Turnbuckles, Staples, Thimbles, and Loop Sleeves.



Wiring Instructions

Tensioned Skylighter Shades™ use two independently operated motors.

The motors work in tandem with the Control Module. In some scenarios the motors may turn in opposite directions.

Note:
The terminals numbered 4, 5, & 6 on the control module are specifically designated for the Cable Motor; whereas the terminals numbered 7, 8, & 9 are designated for the Fabric Motor.

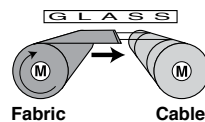
- The gray wire from the cable motor must terminate on terminal # 6. Similarly, the gray wire from the Fabric motor must terminate on terminal #9. Both these wires controls the brake release in their respective motors.
- The red and black wires from the cable motors must terminate on terminals 4 & 5 (shade configuration determines which wire goes to what terminal see below). Likewise, the red and black wires from the Fabric motor must terminate on terminals 7 & 8. The shade configuration determines which wire goes to what terminal (see below).
- The motor common (white wire) from both motors must both terminate on terminal 3.
- All ground wires must be terminated on the ground bar in the electrical box in which the control module is housed.
- Line voltage from source must terminate on terminals 1(hot) & 2(neutral).

Note:
All electrical-control equipment must be wired in accordance with the wiring instructions prepared by MechoShade Systems and in accordance with the N.E.C. and local codes.

Motor lead is a PVC 5 conductor #18 stranded cable approximately one foot (305mm) long with a six pole disconnect plug.

The standard electroshade furnished-only junction box lead is the same type as the motor lead and has a plug compatible to it. This lead is approximately five feet (1525mm) long.

For example:



Then, apply the wiring indicated for the Winding and Tension terminals for both the Fabric and Cable Motor (in this case scenario #1 on page 7).

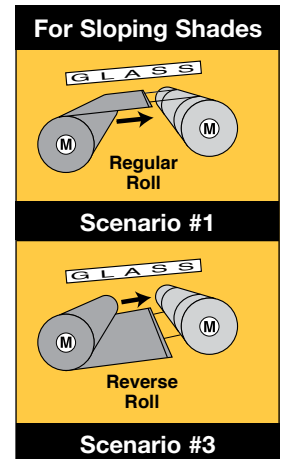
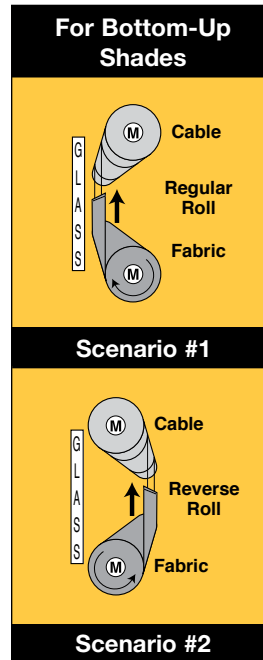
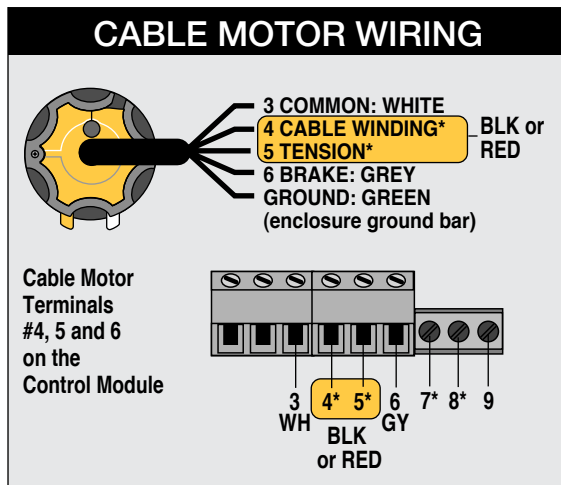
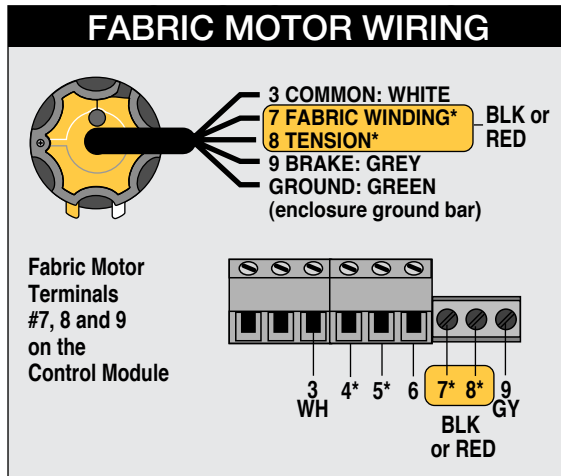
For example:

| Fabric | Cable |
|--------|-------|
| 7 BLK | 4 RED |
| 8 RED | 5 BLK |

(Hint: To determine whether the shade is a left or right drive, face the fabric tube standing above or below the shade. If the motors are on the left then the shade is left drive. If both motors are on the right, then the shade is a right drive.)

For example:

Scenario #1, shown on page 8, has a left-hand drive fabric motor requiring the Black wire from the fabric motor to be connected to Winding Terminal #7 on the control module. The Red wire on the same motor should be connected to Tension Terminal #8. The Cable motor has the Red wire on the Winding Terminal #4 and the Black wire on the Tension Terminal #5.

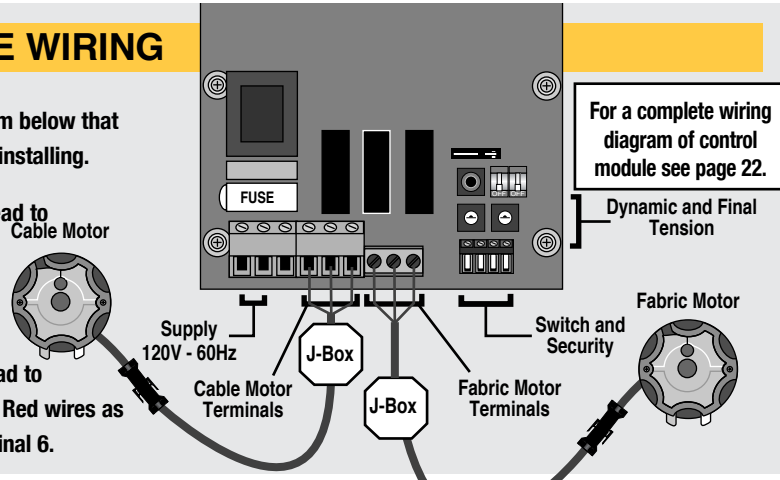


CONTROL MODULE WIRING

Step 1: Select the numbered diagram below that exactly matches the shade you are installing.

Step 2: Connect the Fabric Motor Lead to terminals 7 and 8 for the Black and Red wires as indicated and the Grey wire to terminal 9.

Step 3: Connect the Cable Motor Lead to terminals 4 and 5 for the Black and Red wires as indicated and the Grey wire to terminal 6.



For a complete wiring diagram of control module see page 22.

Dynamic and Final Tension

TOP UNWINDING HORIZONTAL TENSIONED SKYLIGHTER SHADES

Check Off

| | | | |
|--|---|--|--------------------------|
| TWO MOTORS ON THE SAME SIDE OF THE SHADE (FOR LEFT OR RIGHT HAND DRIVES.) (REGULAR ROLL) | #1 FABRIC MOTOR L.H. DRIVE 7 BLK 8 RED CABLE MOTOR L.H. DRIVE 4 RED 5 BLK | | <input type="checkbox"/> |
| | #2 FABRIC MOTOR R.H. DRIVE 7 RED 8 BLK CABLE MOTOR R.H. DRIVE 4 BLK 5 RED | | <input type="checkbox"/> |

BOTTOM UNWINDING HORIZONTAL TENSIONED SKYLIGHTER SHADES

| | | | |
|--|---|--|--------------------------|
| TWO MOTORS ON THE SAME SIDE OF THE SHADE (REVERSE ROLL) | #3 FABRIC MOTOR L.H. DRIVE 7 RED 8 BLK CABLE MOTOR L.H. DRIVE 4 BLK 5 RED | | <input type="checkbox"/> |
| | #4 FABRIC MOTOR R.H. DRIVE 7 BLK 8 RED CABLE MOTOR R.H. DRIVE 4 RED 5 BLK | | <input type="checkbox"/> |

Hardware Assembly Instructions for Flat Roller Type Skylights

CAUTION: All drive and idle end brackets must be adequately attached to the structure to handle loads of 200 lbs on each bracket. All brackets for both the Fabric and Cable Tubes must be level to within 1/8" (3mm) over a 72"(1829mm) span.

1) Fabric Tube and Bracket installation:

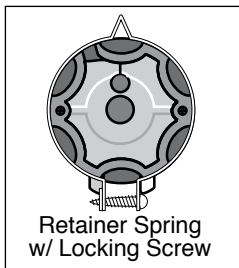


Fig. 3

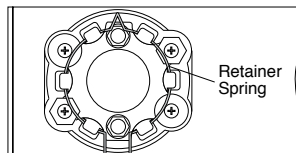


Fig. 4

A) Check the opening for squareness. (**Hint:** Check the lengths of the diagonals, they should be within a 1/8" of each other. Measure and compare the diamansions of both the length and widths of the opening. The Fabric Tube has the motor and fabric mounted and shipped according to one of the 4 numbered scenarios on page 8 for the shade specified.) Fasten the drive end and idle end brackets to the structure for the Fabric Tube. Brackets must be installed level (brackets may have to be shimmed).

B) Remove the screw from the Retainer Spring and slide the Retainer Spring from the motor head.

C) Unroll the shade 12-18 inches (this will facilitate installation of GP hembar and optional guide wheels or optional guide cables later on). Insert the collapsible (spring loaded) idle end pin of the fabric tube into the hole in the idle end bracket. While pushing against the collapsible idle end pin, swing the motor end of the tube up towards the drive bracket. **Insert the motor head fully into the center of the drive bracket.** Be sure the yellow cap (limit switch cover) at the end of the motor is accessible. **Reinstall the retainer spring ensuring that the spring engages the grooves in both the motor and the bracket before securing with the screw** as shown (Fig. 3). **Tighten the screw on the retainer spring to secure the motor and tube to the bracket** (Fig. 4).

C.1) In the event that the adjustable heavy duty idle end shaft is installed in the tube, the installation procedure is reversed. **Insert the motor head fully into the drive bracket.** Next swing the idle end of the tube up and into the "V"

(Con't.)

bracket provided. **Secure the tube to the bracket by inserting the cotter pin through the adjustable heavy duty shaft and “V” bracket. Reinstall the retainer spring ensuring that the spring engages the grooves in both the motor and the bracket before securing with the screw as shown (Fig. 3). Tighten the screw on the retainer spring to secure the motor and tube to the bracket (Fig. 4).**

- D) Connect the Fabric Motor lead disconnect plug to the Fabric Motor lead coming from the control module.

2) Cable Tube and Bracket installation:

- A) The Cable Tube is shipped with the motor already mounted. Follow the same exact procedures used to install the Fabric Tube.

3) Install the hembar on to the shadeband:

- A) Turn the hembar so the open slot faces the window and the two circular slots faces the direction of shade travel. Using one of the circular grooves in the hembar, slide the hembar onto the 1/4” (6mm) rod enclosed in the bottom of the shadeband. Be careful not to tear the shadeband. The hembar should slide on easily if it is kept aligned with the shadeband (Fig. 8).

4) Installing the optional Guide Tracks, Room Darkening Channels and/or Guide Cable:

- A) Attach the Guide Tracks or channels to the structure so that the centerline of the track or channel aligns with the bottom of the tube for fabric bottom

(Con't.)

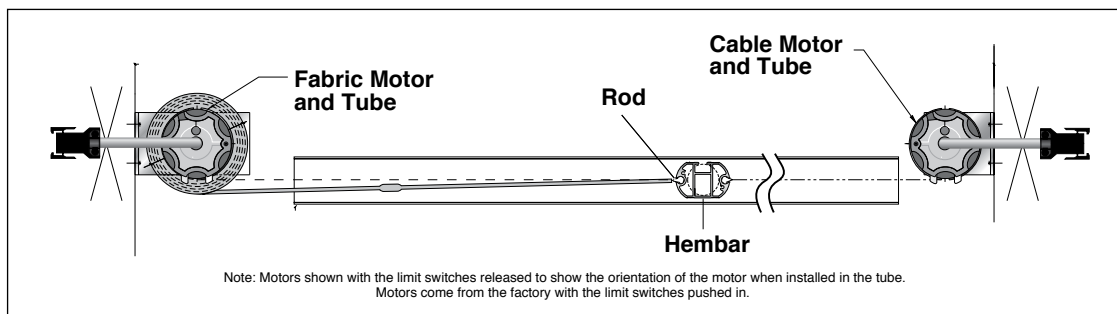


Fig. 5

unwinding (reverse roll) shades, or the top of the tube for top unwinding (regular roll) shades. This facilitates shade operation. Room Darkening channels should be installed using the base provided. (Note: All room darkening channel when used in a skylight covering application must be secured using screws. For very long shades, when more than 1 – 15 ft. length of guide track is required, leave a 1/8” gap between tracks. This reduces the possibility of tracks buckling when they expand due to extreme heat.)

- B) If the shade uses Guide Cables for support, attach the guide cable hardware securely to the structure.
- C) Install the Guide Cable Carriers onto the hembar by inserting the carrier nuts into the top slot in the hembar and bolting the carrier to the slot. The guide cables must be attached to its’ mounting hardware on one end and must be threaded through the wheel carrier before securing to the opposite end and tensioning (Fig. 9).

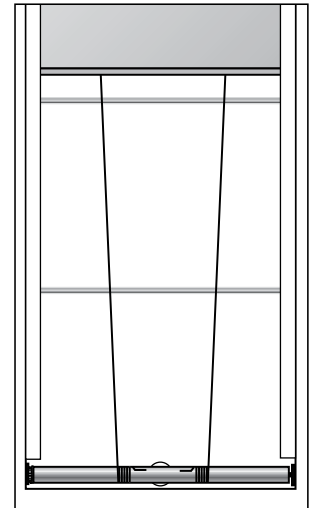


Fig. 6

5) Attaching the Drive Cable to the GP Hemtube:

(All other hembars are installed on the shade at the factory with cables attached.)

- A) Strip off approximately 3-4” of coating off the end of both drive cables. Thread one cable through one of the 2 holes in the 1/4” x 2” drive Cable Rods and out of the other hole in the rod. Using an appropriate tool, crimp the brass Nico press fitting (stop sleeve) to the end of the cable. This prevents the cable from sliding out of the rod when it is subjected to tension. (See Fig.8)
- B) The shade occupies one of the two slots on the hembar. Slide the 1/4” x 2” rods with the Drive Cable attached into the other slot in the hembar. Position the rods so that the Drive Cables are positioned at about 1/4 points along the hembar for shades wider than 8 feet (2438mm) or at least 12” (305mm) from either end of the hembar for narrow shades. Note that the drive cables are adjustable on the GP hemtube when there is no tension on them.

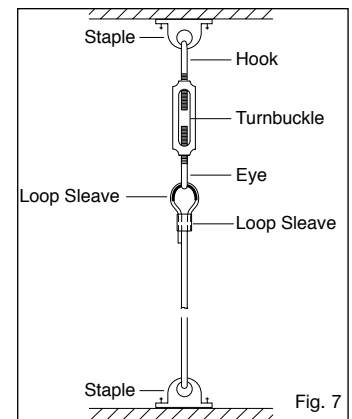


Fig. 7

Cable Guide Installation

(Con't.)

6) Install the optional guide track wheel assembly (if required):

- A) Insert the 1/2" x 3/4" x 4" aluminum block for guide wheel into one end of the GP hemtube. The aluminum block will be prevented from recessing too far into the tube because of a stop screw that is installed at the factory. Install the GP end cap using the screws provided. Repeat for the other side of the hemtube. (For 1" hemtube, insert the finial with the hole for the guide wheel into one end of the hemtube. Repeat for the other side of the hemtube.)
- B) Slide one wheel onto a guide track.
- C) Now push one end of the hemtube onto the axle of that wheel.
- D) Slide that wheel with the hemtube into the open end of the remaining track. The hembar will have to be pushed forward on the track at an angle to achieve this. Next, insert the axle of the remaining wheel into the other side of the hemtube.

7) Attach the Drive Cable to the Cable Tube:

- A) Run the Drive Cables across the opening to the Cable Tube. Avoid bending the cables as this can create undesirable kinks in the cables.
- B) Starting at the 1/4 point on the Cable Tube, tightly wrap each cable around the Cable Tube 3 to 4 times in the direction of the center of the tube. The cable must be wrapped uniformly and must not wrap over itself. Using the 1/2" (13mm) long screws and washers provided, place one screw with 2 washers at a point close to the loose end of the cable (**do not run the screw all the way in**). Wrap the loose end of the cable between the two washers and around the screw then tighten the screw to secure. **Do not place the screws in the SnapLoc® Spline Mounting Raceway as the screws may penetrate the motor (see Fig. 11). This may damage the motor and void the warranty.** Use the scored line next to the SnapLoc Spline mounting raceway as a starting point for the screws. This ensures that the screws line up on the tube. If installed correctly, the cable should wind towards the outside

(Con't.)

of the tube uniformly when the shade is operated. **It is extremely important that the tension on both cables be almost identical or the shade will not travel across the opening uniformly.**

Use the remaining screws with both washers to secure the remainder of each cable to the tube so they do not become entangled during shade operation.

8) Install the optional idler cable kit provided (if required). (Fig.8)

Note: MechoShade recommends an Idler Cable Kit be used for every 5ft. of shade travel for Skylighter Shades.

9) Set the Limit Switches. (See instructions on page 17.)

10) Set the Dynamic and Final Tensions. (See instructions on page 20.)

Note: The Dynamic and Final tensions should be set on sloped and horizontal shades.

11) On vertical shades (top down or bottom up), adjust the drag.

(See page 20).

Note: The drag on the top tube must be increased to compensate for the additional gravitational pull on that tube.

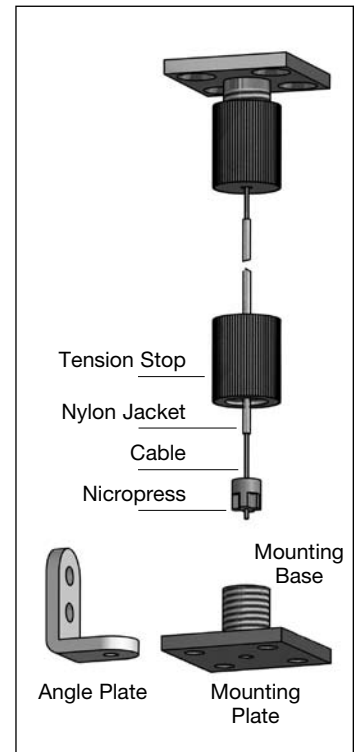


Fig. 8

GP HEMTUBE WITH GUIDE TRACK DETAIL
(OPTION B—Single Guide Track)*

For Shades up to 20 ft. x 20 ft.

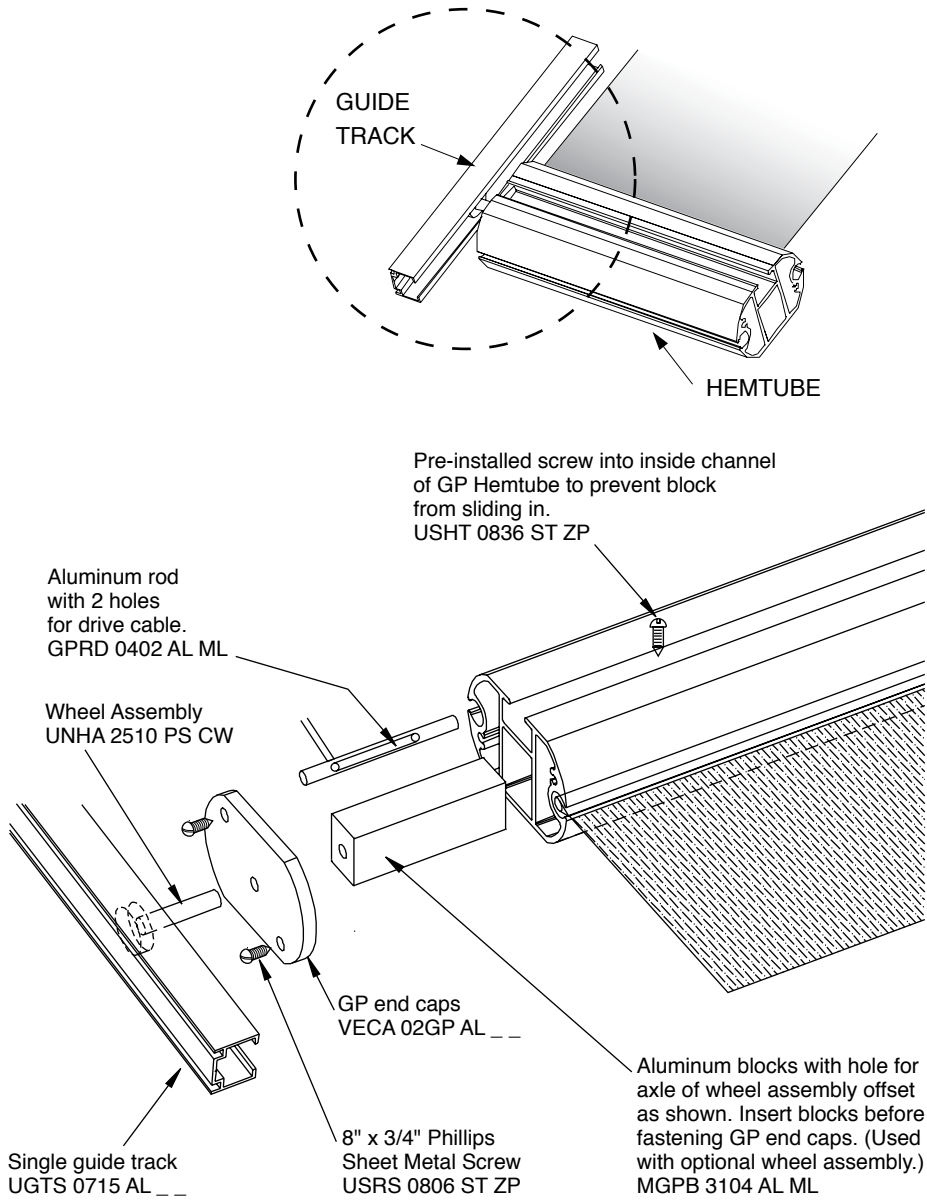
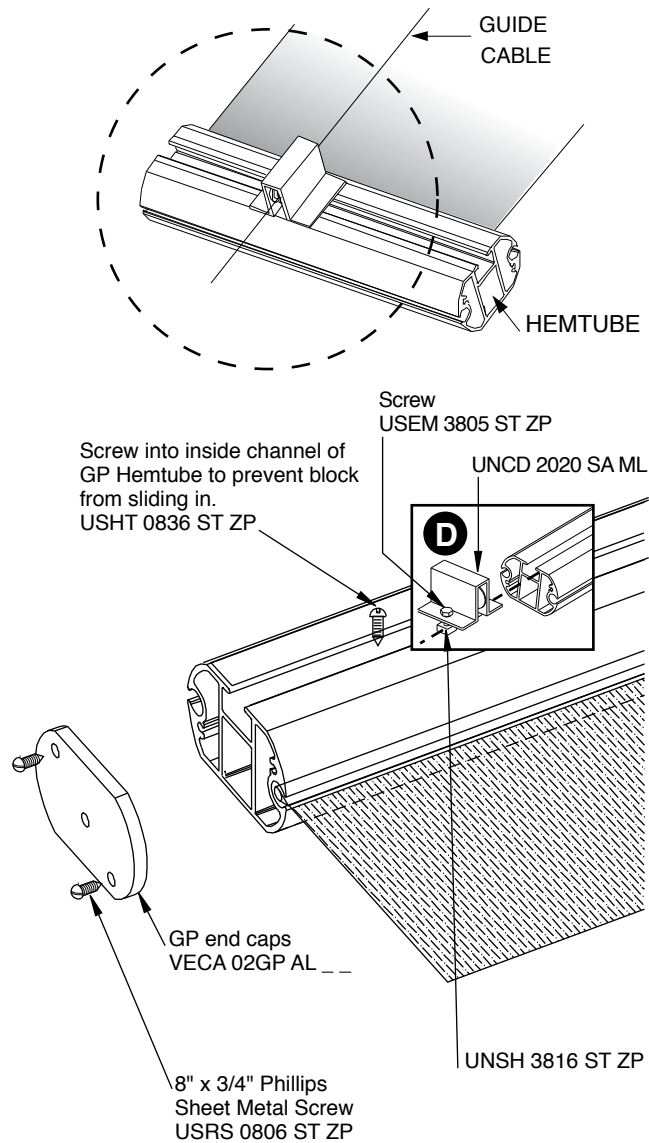


Fig. 9

**GP HEMTUBE WITH
GUIDE CABLE DETAIL
(OPTION D ñ Guide Cable) ***

For Shades up to 30 ft. length.
Side Channels must be used in shades over 30 ft. in length.



***Minimum of 3 Guide Cables for every 10 ft. of length. Minimum of 6 inches from edges.**

Fig. 10

GP HEMTUBE WITH SIDE CHANNEL DETAIL
A double motor system with Idler Rollers.
(OPTION C)

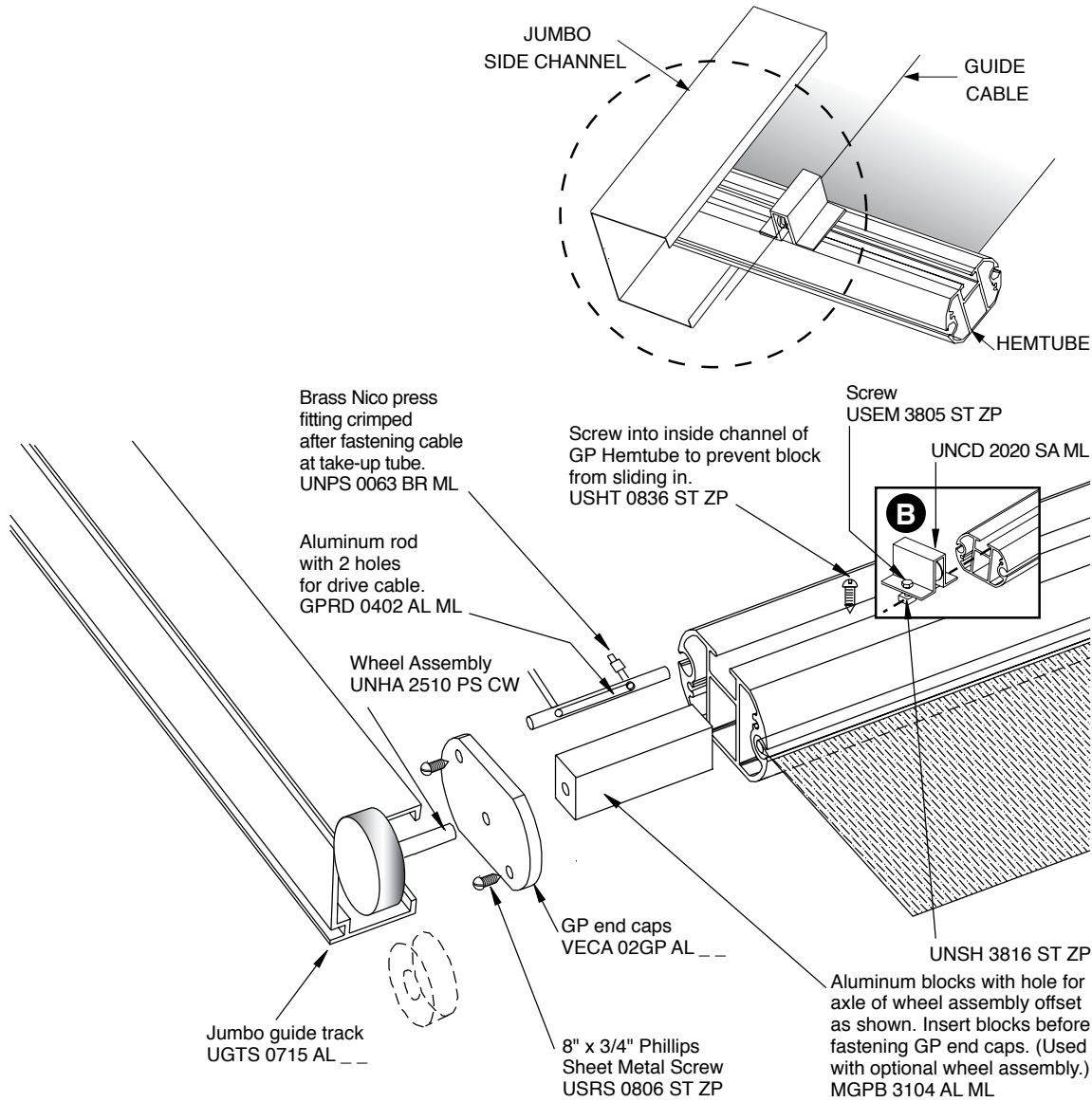


Fig. 11

Setting the Extend and Retract Limit Switches

The limit switches for both the Fabric Motor and Cable Motor must be set for the fully extended and fully retracted shade limit positions.

We recommend that a Tensioned Skylighter Shade Tester Switch with control module (stock #) be used to set the motor limits. Confirm that the tester switch is wired for the shade scenario that matches the shade being installed. Optional extension leads may also be required. The length of the extension leads is determined by the shade length.

- 1) Be sure the tubes are parallel to each other and that tension on both cables are almost identical.
- 2) Connect the motor leads to the control module of the Tensioned Skylighter Shade Tester Switch. (Use the optional extension leads if required).
- 3) Select the numbered drawing at the left that matches the wiring scenario used to wire the control unit. This will determine the sequence of setting the limit switches for both motors.

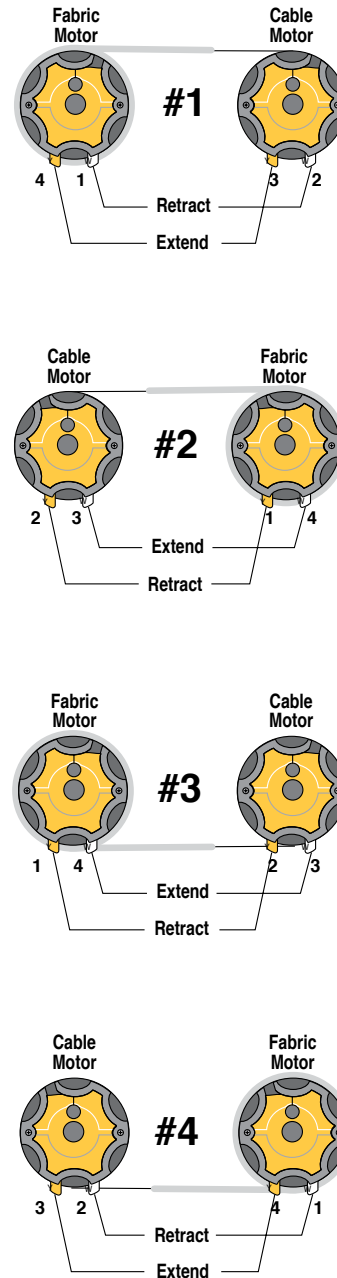


Fig. 13

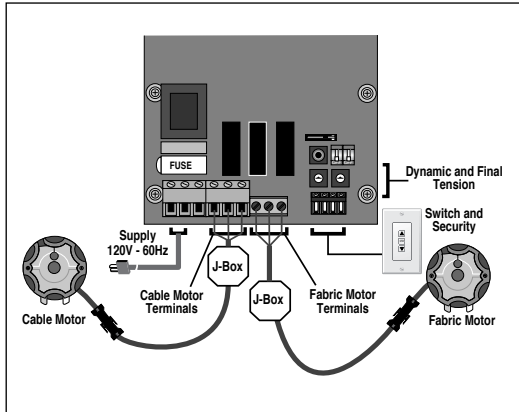


Fig. 14

- 4) As explained on the previous pages, the yellow cap on the end of the motor should be accessible. Pop off the yellow cap on each motor. Under the cap you will find the limit switches. Push in and lock BOTH the YELLOW limit button and the WHITE limit button on each motor. Note: Both limit switches MUST be pushed in for the motors to turn.
- 5) Use the tester switch to retract the shade to the desired fully retracted position and using the numbered drawing selected, press and release limit button #1 on the fabric motor and the limit button #2 on the cable motor.

- 6) Extend the shade to the desired fully extended position. Using the same drawing selected, press and release button #3 on the cable motor, then button #4 on the fabric motor.
- 7) Run the shade to check that it stops at the limits set.
- 8) Reconnect the motors to the building control unit and test the system to be sure it works correctly.

(Con't.)

Setting the Dynamic and Final Tension

Dynamic Tension

Dynamic Tension affects the sagging of the shade when it is moving. There are 2 potentiometers above the switch terminals on the control module. The potentiometer on the right (closest to the edge of the board) controls the Dynamic Tension of the system.

- A) Set both potentiometers to 3.
Assuming the shade has been cycled at least 2 times after setting the limits, (this removes any slack

in the fabric) observe the shade while in motion to see if the sag is visually acceptable. If the sag is not acceptable, increase the Dynamic tension by rotating the potentiometer clockwise until the desired setting is achieved.

Note: If this is a vertical mounted shade see “Adjusting Drag of Vertical Mounted Shades” before setting the tension.

(Con't.)

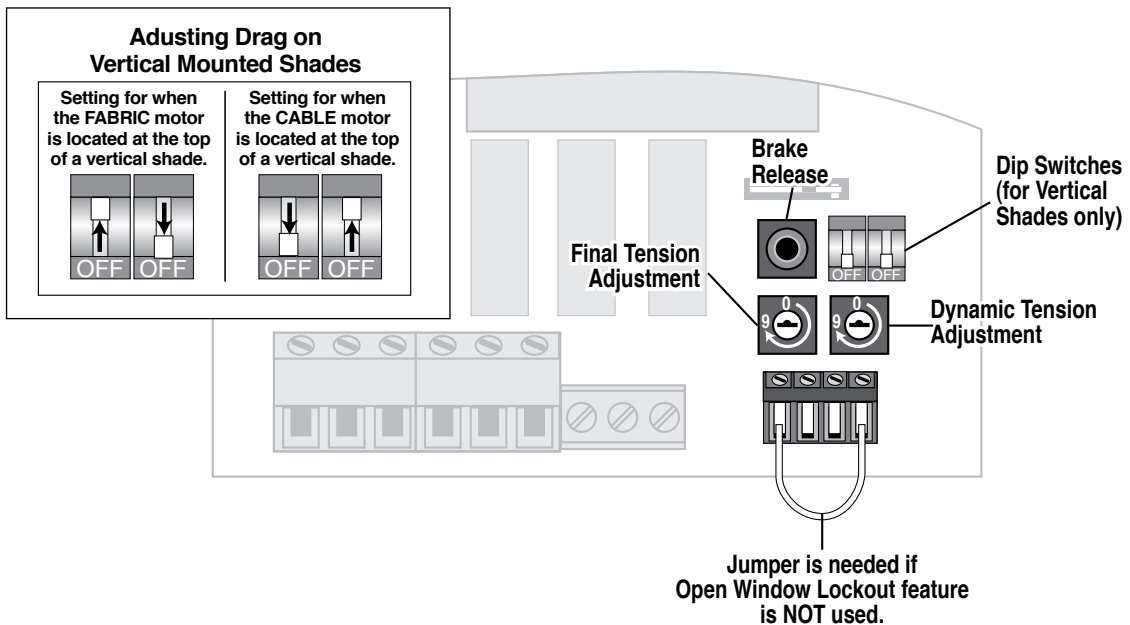


Fig. 15

Final Tension

Final Tension affects sagging of a stationary shade. After the shade stops at its desired position, or hits one of the shade limit positions, the control unit instructs one motor to slightly rotate to adjust the final tension. Care should be taken to ensure that all the mounting hardware and cable are capable of withstanding the load.

A) Starting with the Final Tension set at “3”, to increase simply rotate the potentiometer on the left clockwise.

Note: The Final Tension setting must be no more than 2 clicks higher than the Dynamic Tension.

- For optimal performance from this system, it is recommended not to exceed a setting of 7 on the Final Tension, and 5 on the Dynamic Tension.
- It is also recommended that the final and dynamic tension should not be left at zero.
- As a general rule, Final Tension adjustment = Dynamic adjustment +2.

Brake Release

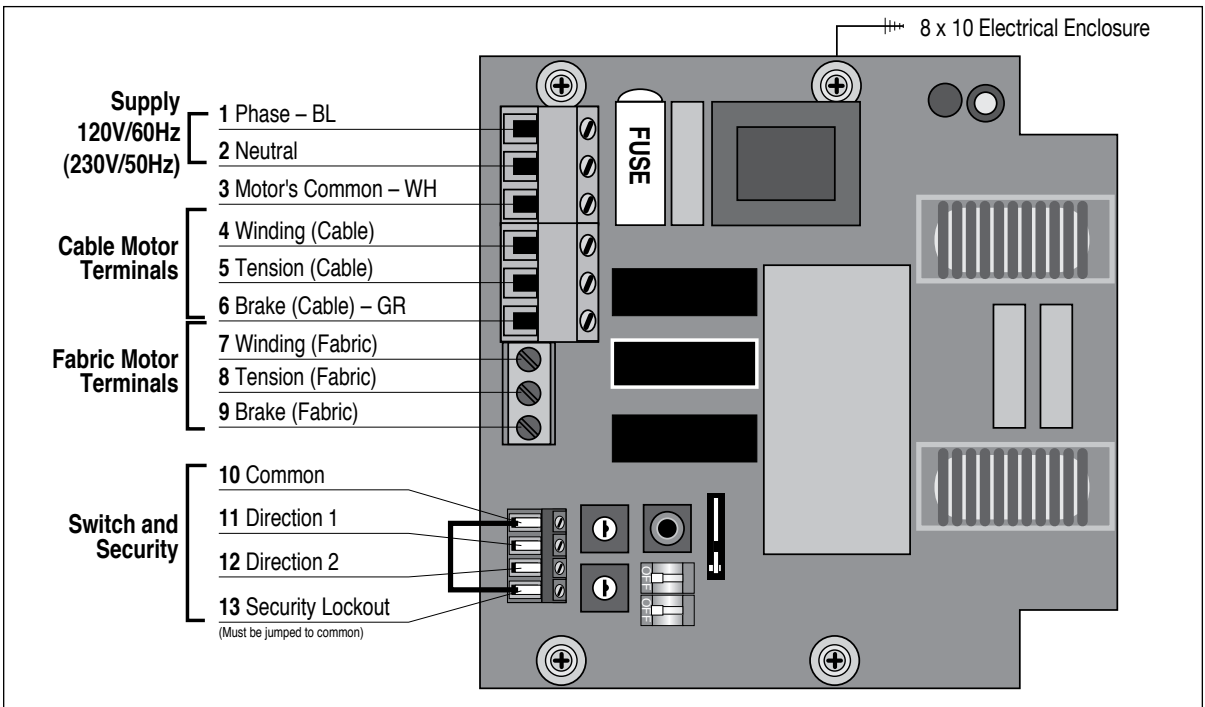
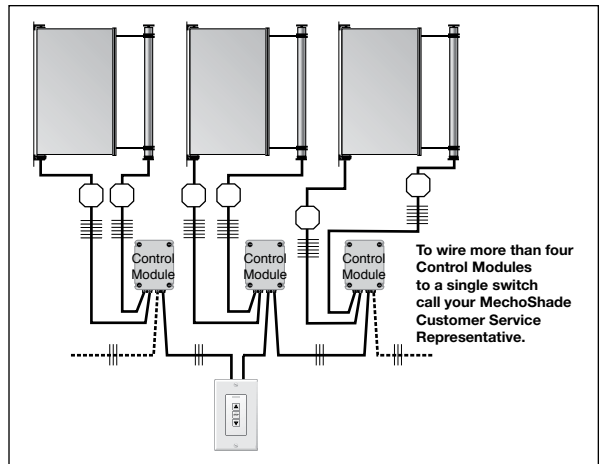
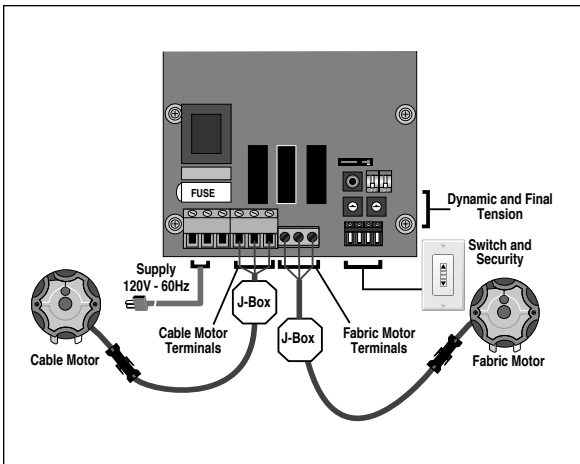
Should the shade need servicing the first step requires disengaging the motor brakes. To do this depress the brake release button inside the electronic unit. The brake release button is the blue button above the potentiometer for Final Tension adjustment. When finished the system will automatically take up the slack and operate normally.

Open Window Lockout

The Open Window Lockout feature helps prevent damage to the system (when connected to an open window alarm contact) by disabling the control when the window is open. If an alarm contact is used, the circuit should be opened when the control is to be locked out. However, if this feature is not used there should be a jumper in place as shown.

Wiring Diagram

Be sure to wire the Control Module according to the correct numbered scenario for the winding and tension terminals of the black and red wires for both the fabric and cable motors as indicated on page 4.





MechoSystems
Design with light®

MechoSystems
Corporate Headquarters
42-03 35th Street
Long Island City, NY 11101
T: +1 (718) 729-2020
F: +1 (718) 729-2941
E: marketing@mechosystems.com
W: mechosystems.com

Copyright © 2011 MechoShade Systems, Inc. All rights reserved. All trademarks herein are owned by MechoShade Systems, Inc. No part of this document may be reproduced or otherwise used without the express written consent of MechoShade Systems, Inc. This literature was printed on post-consumer paper with soy-based ink.



L10020.0911