COLOR CODING

READ THIS BEFORE YOU BEGIN

Purchased blackout system requires a specific installation sequence. All components have been separated into different categories based on common grouping and/or the chronology of installation. Each category has been color coded. All parts within any given color category will be labeled accordingly, and each color category will have its own respective instruction manual.

The following illustrates a highly recommended order in which all components should be installed.

IMPORTANT: There are some procedures that can occur simultaneously, depending on available assistants and equipment, but there are some procedures that MUST be done in chronological order. Before you begin, review below step recommendation and all technical documents to better understand overall building kit design.

1. RED - RETRO-FIT FRAMING (Mid-Rafter Vertical Headers & End Wall Headers)
2. PURPLE - STATIC BLACKOUT (Monofilament, Fixation and Sealing)
3. BLACK - MOVABLE BLACKOUT (Fabric, Leading Edge, Motor and Drive Shaft)
4. GRAY - BLACKOUT SIDE POCKET (Framing and Polycarbonate)

Near the beginning of each color-coded instruction guide, you will find information to lead you through the installation and assembly steps. This information identifies at what point during the assembly the respective components are installed or attached to the main building frame.

Since we cannot anticipate changes made by the customer/contractor, all instructions assume the use of accessories purchased from us to be used on the building the accessory was designed for. Each instruction guide presents the basic steps to install the color-coded components.

When in doubt, consult the services of a qualified contractor experienced with the assembly of similar structures.
All components that are color coded PURPLE represent the static blackout components, which are components of the system that are fixed in place.

***Color coded components that MUST be installed before installing PURPLE:

- **RED**

If above color coded components have not yet been installed, put this manual down and consult those manuals to install those components before returning.

If above color coded components have been installed, gather all components that have been color coded with a PURPLE label or paint splotch, and continue on the next page with the blackout installation.

**ATTENTION:** Recommended installation order is not critically definitive. Installation of film cladding will protect the interior of the greenhouse from weather elements, but it will also increase the temperature. Depending on personal preference and/or availability of assistants and equipment, there are some procedures that can occur before or simultaneously with this procedure.

**Color coded components that can be installed before or at the same time as PURPLE:**

- **GRAY**
Important Information

READ THIS DOCUMENT BEFORE YOU BEGIN

Thank you for purchasing a Series 500 black-out system kit. When properly assembled and maintained, this product will provide years of reliable service. These instructions include helpful hints and important information needed to safely assemble and properly maintain the system. Please read these instructions before you begin.

If you have any questions during the assembly, please contact customer service for assistance.

SAFETY PRECAUTIONS

- Wear eye protection.
- Wear head protection.
- Wear gloves when handling metal parts.
- Use a portable GFCI (Ground Fault Circuit Interrupter) when working with power tools and cords.
- Do not climb on the frame during or after construction. NEVER hang items from the system components!

UNPACK AND IDENTIFY PARTS

The following steps will ensure that you have all the necessary parts before you begin to assemble the blackout system.

Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.

1. Verify that all parts listed on the Bill of Materials/Spec Sheets are present. If anything is missing or you have questions, consult the Pictorial Parts Guide and all diagrams for clarification, or contact Customer Service.

   NOTE: You do not need to open the plastic bags containing smaller parts such as fasteners or washers.

REQUIRED TOOLS

The following list identifies the main tools needed to assemble the black-out system. Additional tools and supports may be needed depending on the structure, system, location, conditions and application.

- Tape measure or measuring device and marker to mark locations on the pipes and rafters.
- Variable speed drills, impact drivers & drill bit set. (Cordless with extra batteries works best.)
- Metal-cutting saws or tools to cut pipe and aluminum.
- Wrenches & impact socket set, hammer, and gloves.
- Adjustable pliers and self-locking pliers.
- Level 6’ (or longer) preferred
- String line (or chalk line)
- Scissors or utility knife
- Ladders, work platforms, and other machinery for lifting designed to work safely at system height.
- Safety equipment to protect head, eyes, hands & feet.

RECOMMENDED INSTALLATION CHRONOLOGY

The blackout system requires a specific installation sequence. The follow pages illustrate a highly recommended order in which the blackout system components should be installed. This information identifies at what point during the assembly a particular component is to be installed or attached to the main building frame.

1. Monofilament & Corner Cable Tensioners.
2. Monofilament Clips (MUST be installed before Panel Fixation components--102197 channel).
3. Panel Sealing components (MUST be installed before Blackout purlins).
4. Panel Fixation components.
5. Blackout Purlins (MUST be installed before corner cables and monofilament wires).
6. Corner Cables.
7. Monofilament Wires.
The following graphics will help identify the basic parts of the system. (Some parts are not shown.)
The monofilament tensioners are used to string lines of monofilament wire from one end header to the other. These wire lines will serve as support, guiding tracks, and anti-billow agents for the shade/black-out material.

MEASURE & MARK MOUNT LOCATIONS
Each monofilament line consists of one (1) 113650 wire tensioner, attached at one end, and one (1) FA4482B Tek screw with a neo-bonded washer attached at the other end (shown below). At one end wall, attach the 113650 tensioners. Starting in the center, install one 113650 tensioner below the header, and one above. From there, attach a lower tensioner every 24". Attach an upper tensioner every 48". Repeat for Tek screws at the opposite end header. See below for orientation details. Adjust as needed, but it is important to MIRROR locations exactly at each end.

ATTACH WIRE MOUNTS
Attach all upper and lower 113650 tensioners at one end header using FA4482 Tek screws. At the other end header, install one Tek screw & neo-bonded washer every 24". Consult diagrams for orientation of hardware.

**NOTE:** WIRE TENSIONER BRACKETS SPACED EVERY 24" ON THE BOTTOM OF FRONT ENDWALL HEADER (48" ON THE TOP) AND ARE TO BE PATTERNED AS SHOWN.

NOTE: Additional end framing removed for clarity.

ATTENTION: Dashed boxes above indicate the locations along the header profile where drive components will be installed. Avoid installing wire tensioners or brackets in these locations. Consult BLACK manual for drive component dimensions, and install accordingly.

IMPORTANT: If necessary, adjust wire mounts left or right as needed to avoid obstructions such as end wall columns, mid-rafter webbing etc. Spacing is approximate recommendation and not critical, however, remember to mirror accordingly on the opposite end.
INSTALL CORNER CABLE WIRE MOUNTS

Each corner cable line consists of two (2) 113650 wire tensioners; one attached ON THE TOPSIDE at each end header. At one end, attach the 113650 tensioners in locations shown below using FAG312B bolts & FALF01B nuts. Field drill 5/16" attachment holes. Repeat for the other end. Verify wire tensioners are oriented towards the inside of the greenhouse as shown.

NOTE: Additional end framing removed for clarity.

Arrows indicate wire tensioner locations.

FAG312B bolt & FALF35B lock nut.

Towards INSIDE of structure.

113650 wire tensioner

Pre-drill 5/16" through-holes.

HEADER

ATTENTION: If completing this step before finishing end wall cladding, return to the BLUE manual at this point, and return to this manual when ready.
INSTALL MONOFILAMENT WIRE CLIPS

Consult diagrams below and technical documents at the back of these instructions for location details.

IMPORTANT: Orientation of the monofilament clips is critical. Use side view diagram to the right to determine orientation of the monofilament wire clips. Verify that the faces of the 113323 monofilament wire clips are facing towards the end wall header with the FA4482B Tek screws & neo-washers attached.

1. Consult diagram below and pages 6 & 7 and install a 113323 monofilament tube clip at EVERY monofilament wire & corner cable location at EVERY mid-rafter header. It is important that clip locations mirror the monofilament wire mount locations. Note that the motor and rack drive locations on the power rafter may interfere with tube clip installation. It is acceptable to not install tube clips at those locations on the power rafter only, if necessary.

HELPFUL HINT: At every top and bottom monofilament wire location, snap chalk lines from one 113650 wire tensioner at one end wall to the corresponding Tek screws & washers at the opposite end wall, and install the monofilament wire clips at the marks on every mid-rafter.

Tube clips are pushed into place over the 2"x2" rafter chord and will stay in place, once installed. Orient each clip so that the monofilament support tab is on the side the monofilament will run in that location. See above.

Tube clips ARE attached to End Black-Out Header #1, but NOT in the the monofilament wire mount locations. These tube clips serve as panel fixation components only. Attach in between the monofilament wire mounts on End Black-Out Header #1.
ATTACH PANEL SEALING COMPONENTS

Consult diagrams below and technical documents at the back of these instructions for location details.

IMPORTANT: Orientation of the 111984 sealing keder channel is critical. Use side view diagram to the right to determine orientation. Verify that the open channel of the 111984 keder channel is facing towards the end wall header with the 113650 wire tensioners attached.

1. Using FA4482B Tek screws, attach the 111984 sealing keder channel to the topside of all headers except end black-out header #1. Keder channel will follow the contour of the header tubes and continue down the outside edge of the vertical header as shown below.

ATTENTION: There will be obstructions preventing the flat uniform surface to attach the keder channels—webbing brackets, bolt heads & threads etc. A certain high level of craftsmanship will need to be exercised to attach over top these obstructions. Notch around obstructions as best as possible. See below.

2. Where the horizontal header meets the vertical header, cut keder channel to fit, leaving 1" to 2" of space between. Bottom of the vertical keder channels to be level with the bottom of the vertical header profile tube.

3. File sharp edges of keder channel where cut.

ATTENTION: Dashed lines around the "x"s indicate sections of keder channel to notch and discard. Notch around obstruction areas, and where horizontal and vertical sections meet for a uniform attachment surface.

NOTE: Leave approximately 1" to 2" of space between the vertical and horizontal sections to allow for the keder sealing strip to pass through (installed later).
**INSERT KEDER SEALING STRIP**

1. Once an entire run of keder channel has been installed on a rafter, slide a continuous length of 115018Z047 keder sealing strip into the 111984 keder channel along the entire contour of the profile. Cut to fit, if necessary.

   **HELPFUL HINT:** For ease of installation, slide the sealing strip through the horizontal section of the keder channel first, leaving approximately 8' of sealing strip dangling on either side. Then slide those dangling sections into the vertical sections of keder channel from the top.

2. Once installed, use provided 115198 blackout-out tape, sealing caulk, etc. to seal these locations for light leakage prevention. See below.
INSTALL EXPANDING FOAM SEALING TAPE

1. Once an entire run of keder channel has been installed on a rafter, line the 2”x2” rafter underneath the keder sealing strip with a continuous length of 111983 expanding foam tape along the entire contour of the profile. Cut to fit where necessary.

2. Repeat for every bay.
ATTACH PANEL FIXATION COMPONENTS

Consult diagrams below and technical documents at the back of these instructions for location details.

**IMPORTANT:** Orientation of the 102197 spring channel is critical. Use side view diagram to the right to determine orientation. Verify that the open channel of the 102197 spring channel is facing towards the end wall header with the Tek screws & neo-bonded washers attached.

1. Using FA4482B Tek screws, attach the 102197 spring channel as shown to all headers except end black-out header #2. Spring channel will follow the contour of the header tubes and continue down the outside edge of the vertical header as shown below.

**IMPORTANT:** 102197 spring channel is to be attached over the top of the installed 113323 monofilament wire clips. *If clips have not been installed at this point, reference page 8 and install BEFORE attaching the spring channel.*

2. Where the horizontal header meets the vertical header, cut spring channel to fit, leaving 1” to 2” of space between. Bottom of the vertical spring channel sections to be level with the bottom of the vertical header profile tube.

3. File sharp edges of spring channel where cut.
Black-out System Installation

Blackout Purlin Installation

Tensioning of the corner cables and monofilament wires (installed later) puts lateral pressure on the greenhouse end walls. Blackout purlins reinforce the structure lengthwise, and help to prevent end walls from bowing inward.

Install blackout purlin components as shown in diagrams below. KEDER SEALING CHANNEL AND MONOFILAMENT WIRE CLIPS MUST BE INSTALLED BEFORE INSTALLING BLACKOUT PURLINS. If those components have not been installed, return to those instructions and do so before continuing with blackout purlin installation.

Each end bay support pipe consists of a section of 1.315" pipe attached to the underside of the header profiles with 115859 support pipe brackets & 115858 U-bolts and one 116260 slipper clamp.

At each end and every first interior header rafter, attach a 115859 support pipe bracket in the indicated locations using FAG312B bolts and FALB01B nuts.

IMPORTANT: Verify bracket locations on end rafters and first interior rafters are MIRRORED and that no header brackets will obstruct the support pipes. Support pipes MUST run perpendicular to the rafters.

NOTE: Unfasten existing bolt, and reattach accordingly.
INSTALL CORNER CABLES

INSTALL UPPER CABLES

1. Using the upper cable wire tensioners installed on top of the end black-out headers, string AR3030 cable lengthwise from one tensioner to the tensioner at the opposite end and secure with AS1002 clamps. Tension until taut, but do not over-tighten.

**IMPORTANT:** Tape loose ends of the cable to avoid snagging on material when installed.

2. Using FA4482B Tek screws & 102921B neo-bonded washers, secure AR3030 wire to the upper wire spacers installed at each rafter as shown below.

3. To protect the black-out material from the upper cables, install sections of 112569 PVC tube clip on the upper cables in every bay, as shown below. Cut to fit between headers.

**NOTE:** Diagram shows only end headers and one mid header for illustrational purposes. Install FA4482B Tek screws and 102921B washers at each mid rafter.

**IMPORTANT:** Diagram may not exactly reflect actual frame. Applications are the same. Adjust accordingly.
STRING AND TENSION MONOFILAMENT WIRES

1. Starting in the middle of the header profile, string 112570 monofilament wire from one wire tensioner installed every 24” along one end wall header, to the Tek screw wire anchor in the exact location along the opposite end wall header.

2. Tie wire off around the wire anchor Tek screw, and then tighten anchor screw to secure in place.

3. Snap monofilament wires into the tabs of the corresponding 113323 tube clips at EACH mid rafter header.

4. Crank wire tensioner until monofilament wire is taut. **DO NOT OVER-TIGHTEN.**

5. Once tightened, cut excess monofilament wire from each end.

6. Repeat for each bottom and top wire tensioner.
Space below is reserved for customer notes.