



ClearSpan™ Pro Solar Star™ Greenhouses

Double-Layer Greenhouse Film



Photo may show a building of a different length. Frame is shown with a roll-up side option and customer-supplied baseboards. End wall is not included and requires an additional purchase. Actual cover may differ.

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STK#	DIMENSIONS
R030	30' W x L (length varies)

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READ THIS BEFORE YOU BEGIN

The main building and any accessory (end wall, door, etc.) requires a specific installation sequence. *All buildings include an instruction guide; each accessory includes an instruction guide.*

Near the beginning of each instruction guide (building or accessory), you will find information to lead you through the installation and assembly steps. This information identifies at what point during the assembly a particular accessory is installed or attached to the main building frame.

In all instances and regardless of the type and number of accessories, the main building frame is always constructed first.

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 accessory.

When in doubt, consult the services of a qualified contractor experienced with the assembly of similar structures. Assemble the main building frame now.

IMPORTANT: After assembling the greenhouse frame, choose one of the following procedures to continue the assembly process based on the greenhouse that was ordered:

- Film Cover Installation with Drop-Down Sides
- Film Cover Installation with Roll-Up Sides

Consult the Table of Contents for the page that each procedure begins. To confirm what feature (drop-down or roll-up) you have ordered with your building, complete these steps (if needed):

1. Go to <http://www.farmtek.com> and type the sku number of your building into the **Catalog Item #** field near the upper left of the Home Page window.
2. Verify that you have typed the correct sku # in the field (e.g., R030036P02SS04F).
3. Click Go to view the building description for the sku # you have entered.

Mounting Feet (108500) Layout Diagram

Buildings equipped with the 108500 mounting feet require additional steps for the site preparation. Consult the Mounting Feet Layout diagram in the Quick Start section near the back of this guide for the required dimensions.

Do not prepare the site without first consulting the diagram for the proper dimensions! In addition, consult the MUST READ document for anchoring details.

Buildings that include "**P0**" within the building identification number (e.g., R030020**P0**2FC01W) are equipped with the 108500 mounting feet.

For buildings with ground posts, consult the Front Profile with Ground Post diagram in the Quick Start section to properly prepare the site.

Buildings that include "**GP**" within the building identification number (e.g., R030020**GP**2FC01W) are equipped with ground posts.

Important Information

YOU MUST READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLE THE SHELTER.

Thank you for purchasing this ClearSpan™ greenhouse. 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 greenhouse. Please read these instructions **before** you begin.

If you have any questions during the assembly, 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.
- Do not occupy the structure during high winds, tornadoes, or hurricanes.
- Provide adequate ventilation if the structure is enclosed.
- Do not store hazardous materials in the structure.
- Provide proper ingress and egress to prevent entrapment.

DOUBLE-LAYER FILM INSTALLATION

Greenhouses equipped with a double-layer film include a layer that is Infra Red (IR) Retention film.

IMPORTANT! During cover installation, the IR film must be installed first! Examine the film and install it according to the instructions printed on the film.

ANCHORING THE BUILDING

The anchoring methods shown in this manual for buildings with mounting feet or buildings with ground posts are temporary in nature. For the recommended permanent anchoring methods, consult the MUST READ documents that also shipped with your building. The diagrams presented in that guide show anchoring methods designed to meet typical loads and forces. Consult that document and read its contents *before* you begin construction.

WIND AND SNOW LOAD

Many Clearspan™ shelters and greenhouses can be designed to meet wind and snow loading in your area. Please consult with your account manager if needed for additional information.

LOCATION

Choosing the proper location is an important step before you begin to assemble the structure.


The following suggestions and precautions will help you determine whether your selected location is the best location.

- Never erect the structure under power lines.
- Identify whether underground cables and pipes are present *before* preparing the site, setting ground posts (if equipped), or anchoring the structure.
- Location should be away from structures that could cause snow to drift on or around the building.
- Do not position the structure where large loads such as snow and ice, large tree branches, or other overhead obstacles could fall.
- *Always check local building codes before you begin and follow codes as instructed.*

SITE

After choosing a location, proper preparation of the site is essential. Follow the information below.

- *A level site is required.* The site must be level to properly and safely erect and anchor the structure.
- If the site is not level, use footings to provide a secure base to assemble the structure. Pre-cast concrete blocks, pressure-treated wood posts, or poured footings are all acceptable when properly used. (Some shelters use ground posts or rafter feet.)
- **Drainage:** Water draining off the structure and from areas surrounding the site should drain away from the site to prevent damage to the site, the structure, and contents of the structure.

 **WARNING:** The individuals assembling this structure are responsible for designing and furnishing all temporary bracing, shoring and support needed during the assembly process. For safety reasons, those who are not familiar with recognized construction methods and techniques must seek the help of a qualified contractor.

Important Information

ASSEMBLY PROCEDURE

Following the instructions as presented will help ensure the proper assembly of your structure. Failing to follow these steps may result in an improperly assembled and anchored structure and may void all warranty and protection the owner is entitled to.

The steps outlining the assembly process are as follows:

1. Verify that all parts are included in the shipment. Notify Customer Service for questions or concerns.
2. Read these instructions, the **MUST READ** document, and **all additional documentation** included with the shipment **before** you begin.
3. Gather the tools, bracing, ladders (or lifts), and assistants needed to assemble the structure.
4. Check the weather **before** you install the roof cover and any panels (if equipped). Do not install covers or panels on a windy or stormy day.
5. Re-evaluate the location and site based on the information and precautions presented in the documentation included with the shipment.
6. Prepare the site (if applicable).
7. Assemble the frame components in the order they are presented in these instructions.
8. Assemble the frame including the struts (if equipped).
9. Consult the **MUST READ** document for important anchoring details.
10. Install, tighten, and secure end panels and main cover (if equipped). This applies to covers that stretch over the frame assembly. Your shelter may include roof panels, side panels, or both.
11. Read the care and maintenance information at the end of these instructions.
12. Complete and return all warranty information as instructed.

LIST OF WORDS AND PHRASES

Before you begin, it is important to become familiar with the words and phrases used in this instruction manual.

These words and phrases are common to most ClearSpan™ shelters and identify the different parts of the shelter. (Some are used in this document. Others may not apply to this particular shelter.) These terms describe the shipped parts and can also be found on the materials list/spec sheets included with the shipment. To aid in the assembly, read through the following definitions before you begin.

- **Conduit:** An assembly of pipes used to secure the main cover and end panels (if equipped). Some strut assemblies also consist of connected pipes to form a conduit. Each pipe joint of a conduit assembly is secured with a self-tapping Tek screw.
- **Hat Channel:** Frame components that are attached to either the inside or outside of the rafter legs or ground posts. Hat channel typically runs from the front to the back of the frame. It is used to secure panels to the frame.
- **Mounting Foot:** The part attached to and found at the base of the rafter or leg of the shelter. Depending on the shelter, the foot is an optional purchase. Some shelters do not offer an optional foot. Some use ground posts.
- **Must Read Document:** This document includes important building and shelter anchoring instructions, steps for end wall reinforcement, safety precautions, and notices and warnings. **The Must Read document is sent with all shelters and buildings.** If you did not receive a Must Read document, contact Customer Service to request one.
- **On-Center:** Term used to describe a measurement taken from the vertical center of the rafter or frame member to the vertical center of another.
- **Purlin:** The frame member that runs perpendicular to the rafters or framework that supports the main cover. Purlins are found on the roof of the assembled frame, are evenly spaced, and typically run from the front to the back of the shelter.
- **Plain or Straight Pipe:** A term used to describe a pipe that has the same diameter or width throughout its entire length.
- **Strut:** A strut is usually a length of pipe with two flattened ends; it is used for diagonal bracing of the shelter frame. A strut is typically secured to the frame by special brackets and bolts, or simply by Tek screws.
- **Swaged End or Swaged Pipe:** The term "swaged" refers to the tapered end of the pipe or tube. Swaged ends of a pipe can be inserted into the straight ends of other pipes.
- **Tek Screw:** A self-tapping fastener used to secure pipe joints and to fasten brackets to rafters.

Important Information

REQUIRED TOOLS

The following list identifies the main tools needed to assemble the shelter. Additional tools and supports may be needed depending on the structure, location, and application.

- Tape measure or measuring device and marker to mark locations on the pipes and rafters
- Variable speed drill and impact driver (A cordless with extra batteries works best.)
- Metal-cutting saw or tool to cut cable
- Wrenches and impact socket set and hammers and gloves
- Adjustable pliers and self-locking pliers
- Ladders, work platforms, and other machinery for lifting designed to work safely at the height of the building
- Safety equipment to protect head, eyes, hands and feet



Space below is reserved for customer notes.

UNPACK AND IDENTIFY PARTS

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

1. Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.
2. 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.

SPECIAL INSTALLATION NOTICE: DROP-DOWN SIDES AND RAFTER KITS

In some instances, additional rafter kits are purchased to add to a standard building. When installed, these kits typically change the standard 6' on-center spacing to 3' or 4' on-center, depending on design.

If your building includes drop-down sides and you have purchased additional rafter kits, please read the drop-down side installation steps carefully when you reach that part of this manual. *Slight modifications are noted to account for the altered rafter spacing that results from the installation of the additional rafter kits.*

No additional components are needed to install the drop-down sides when rafter kits are also installed.

Rafter Assembly Instructions

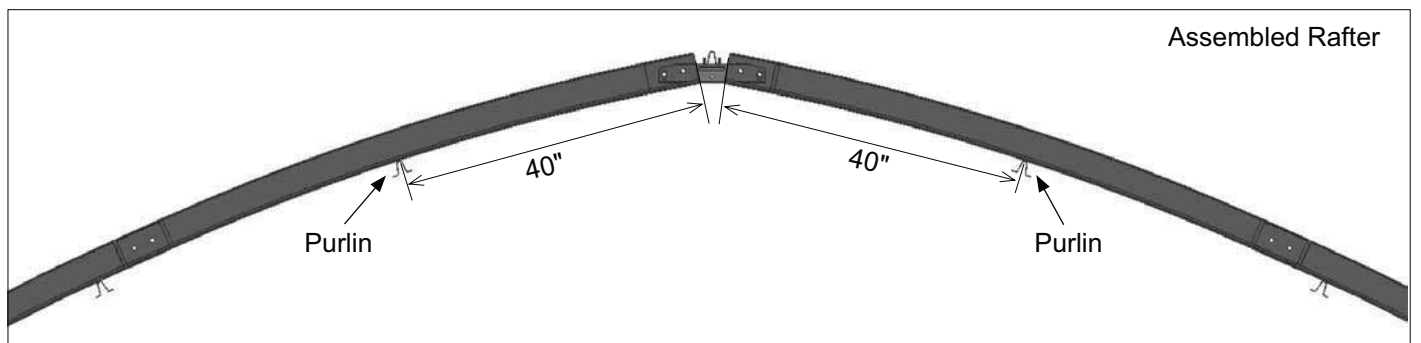
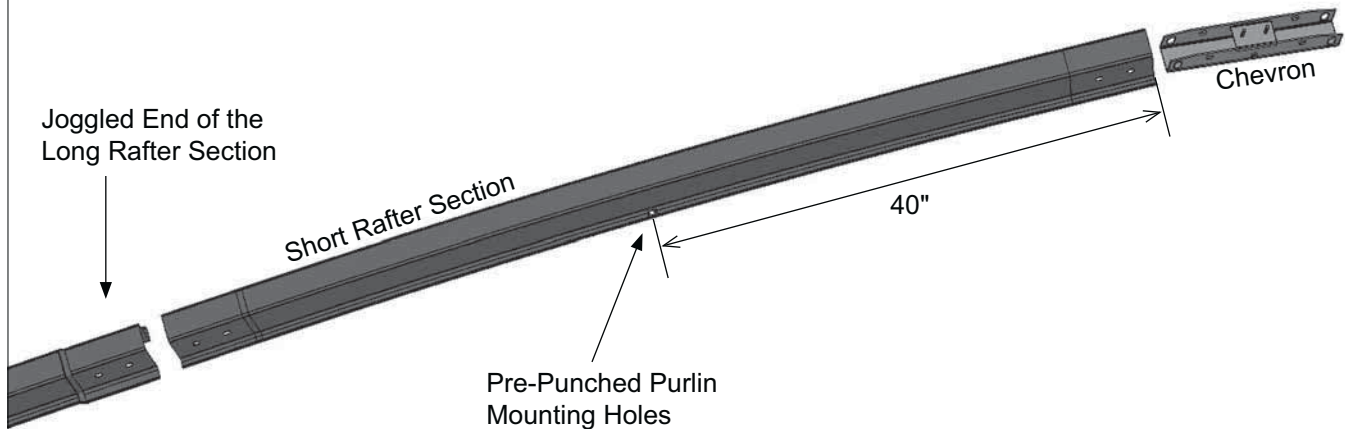
Short Rafter Section

Short Rafter Section

ATTENTION: The pre-punched purlin mounting holes in the short rafter sections *are not* centered. Before assembly, measure from the holes to the end of the rafter section and position the longer 40" section toward and connect it to the chevron, which will be at the top of the assembled rafter.

Repeat this procedure for all rafter assemblies to ensure that the purlin mounting holes remain aligned throughout the length of the frame. If the purlin holes do not align during the frame assembly, verify that all rafters are assembled as shown on this page and throughout this manual.

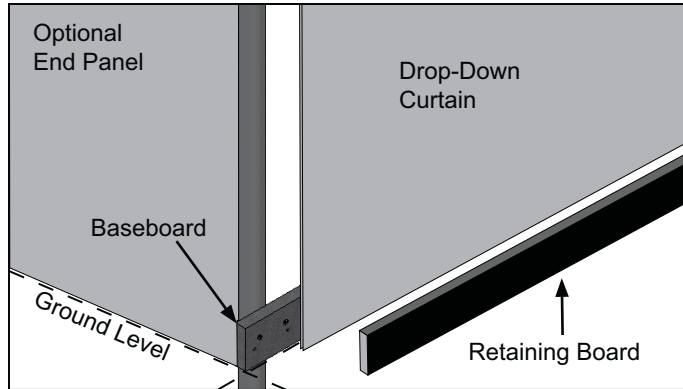
Consult the diagrams below and *all rafter diagrams* throughout this manual before you assemble the rafter.



Important Information

BASEBOARD NOTE

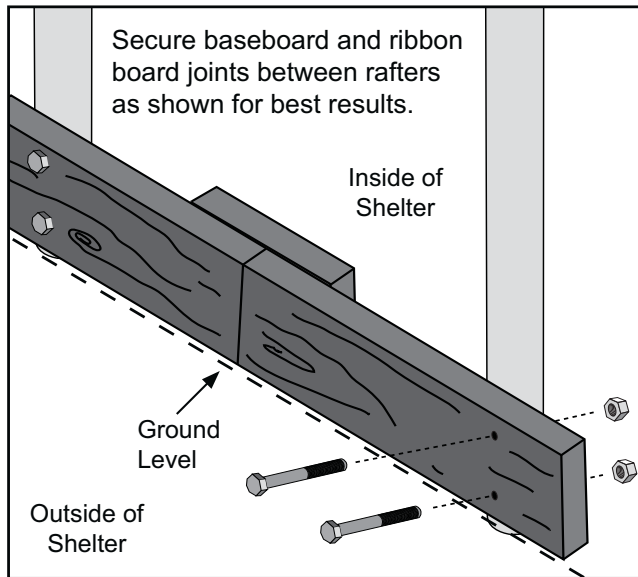
A customer-supplied baseboard and retaining board *are required* to attach the drop-down side panels. The baseboard is optional but recommended for a building with a roll-up side. See the exploded view below.



View shown from outside the shelter.

The baseboard runs the length of the frame at ground level. The retaining board secures the drop-down curtain to the baseboard. *The baseboard and retaining board are supplied by the customer.*

Retaining boards are attached during the drop-down curtain installation. The retaining board is not used when the building is equipped with a roll-up curtain.

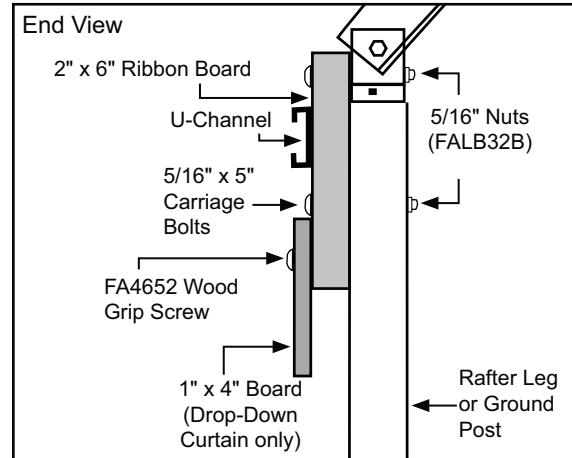


Fasteners (5/16" x 5" carriage bolts and FA4652 wood screws) are included. Depending on board width, use 2 carriage bolts per rafter connection for the baseboard and ribbon board. Evenly space the wood screws at 24". Countersink heads if needed.

ATTENTION: A baseboard is not required for buildings with a roll-up side panel, but installing a baseboard is strongly recommended. Fasteners are included to attach the boards to the frame.

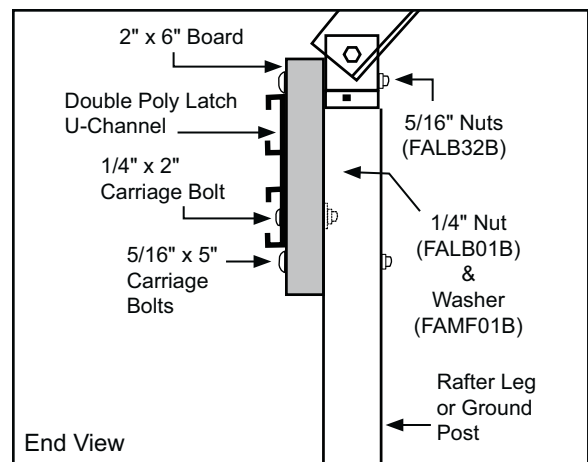
RIBBON BOARD REQUIRED: DROP-DOWN SIDES

A customer-supplied two-piece ribbon board is required for the installation of the drop-down curtain. Consult the Film Cover with Drop-Down Sides procedure for details regarding the installation of a two-piece ribbon board. Fasteners are included. *Customer supplies the materials for the ribbon board.*



RIBBON BOARD REQUIRED: ROLL-UP SIDES

A customer-supplied one-piece ribbon board is required for the installation of the roll-up curtain. Consult the Film Cover with Roll-Up Sides procedure for details regarding the installation of a one-piece ribbon board. Fasteners are included. *Customer supplies the materials for the ribbon board.*



DIAGRAMS ARE NOT TO SCALE.

Parts Identification



ClearSpan[™]
fabric structures and greenhouses

The following graphics and photos will help you identify the different parts. (Some parts are not shown.)



AS1084
1/4" Cable Thimble



FA2155 and
FA1960
Eye Screw



AS5020 Pulley



FA4482B
Tek Screw



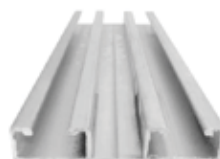
FAG304B
1/4" x 1" Hex Bolt



FALB01B
1/4" Zinc Nut



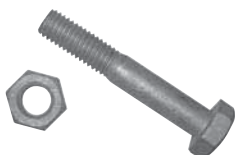
102197 Aluminum
U-Channel



104211 Aluminum
U-Channel
(roll-up sides only)



108503
Cable Bracket



104773
1/2" x 3" Hex Bolt & Nut



FAME09B
1/2" Flat washer



FALB08B
1/2" Locknut



103544
Mounting Plate



108867
Aluminum End Cap



FAME08B
3/8" Flat washer



FALB04B
3/8" Nut



FAG340B
5/16" x 3-1/2" Hex Bolt



104189 Turnbuckle



FAG330B
5/16" x 1" Hex Bolt (for
use with mounting feet
and diagonal struts)



FAME07B
5/16" Flat washer



FALF37B
5/16" Locknut



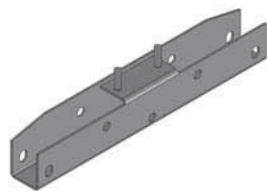
108873
Rafter Cable Plate



110136
Sleeve



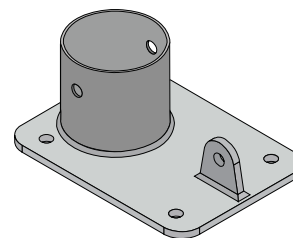
AS1004
Cable Clamp



CFG030PINSS01
Chevron



108874
Rafter Cable Plate
(36' & 48' Long Only)



108500 Mounting Foot
(Use depends on application.
Foot is not used with ground posts.)

Overview



Optional end panel shown. Additional purchase required.

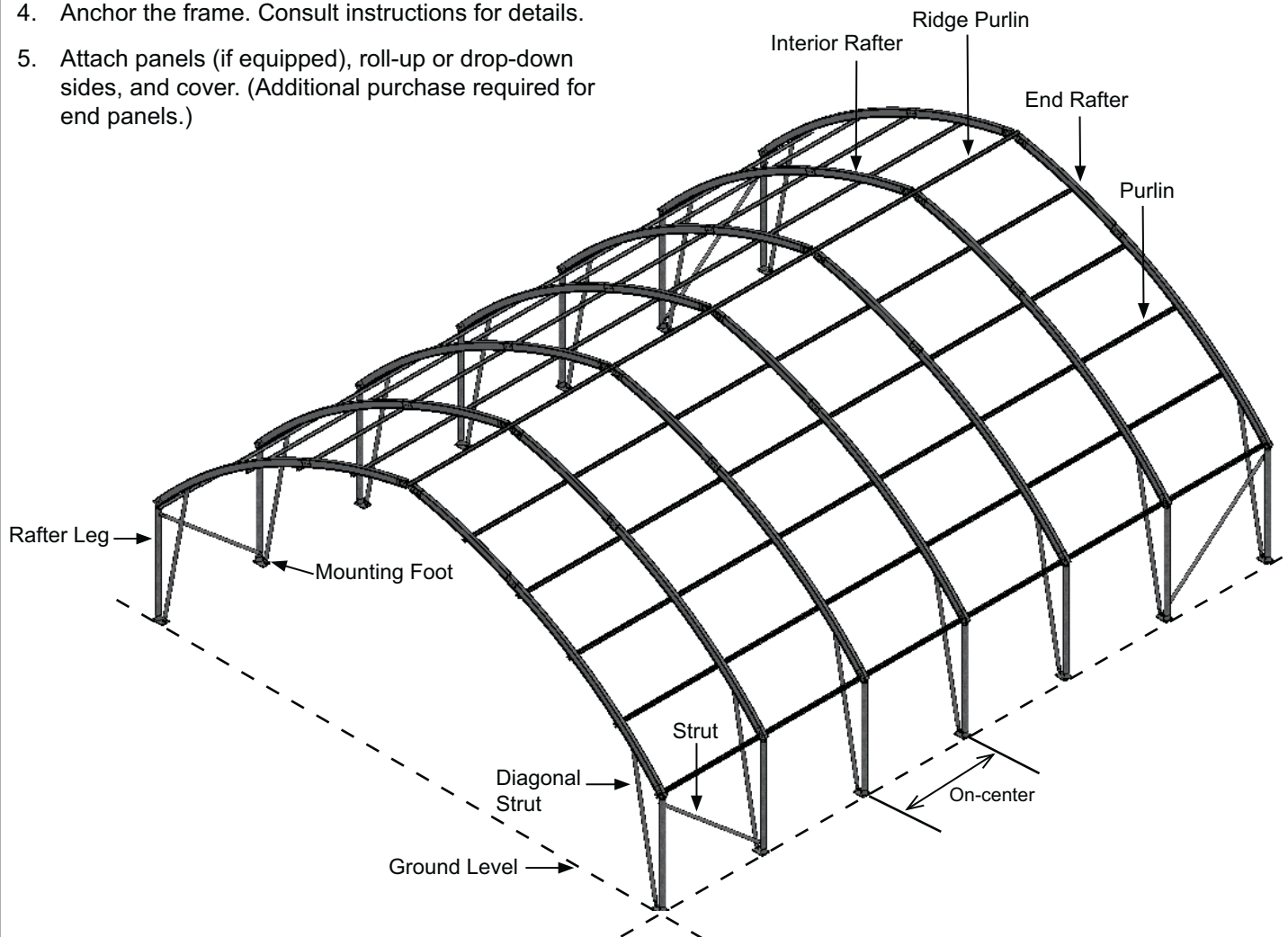
ClearSpan™ Pro Solar Star™ Greenhouses

OVERVIEW

This section describes assembling your greenhouse frame. See illustration below to identify main parts.

1. Set the ground posts or mounting feet (as equipped).
2. Locate the required parts for each assembly procedure.
3. Assemble the rafters and frame.
4. Anchor the frame. Consult instructions for details.
5. Attach panels (if equipped), roll-up or drop-down sides, and cover. (Additional purchase required for end panels.)

Drawing may show a model of a different length. Refer to Quick Start section located in the back of these instructions for on-center measurements and post layout.



Prepare and Square the Building Site

PREPARE THE BUILDING SITE

A level site is required to accurately and safely construct the building. Consult the services of a qualified contractor to properly grade and prepare the site.

Site should slope away from the building to allow water to properly drain away from the assembled building.

After the site is prepared, mark the location of the frame corners to square the frame during assembly. Taking these steps **before** assembling the shelter saves time and ensures that the structure is square and positioned as desired.

The following procedures are suggested methods. Their use depends on the size of the shelter, shelter application, the footings (if applicable), and the method used to anchor the shelter. **Consult the MUST READ document for anchoring details before you prepare the site and begin construction.**

When in doubt, consult the services of a qualified contractor experienced with the construction of similar structures.

Rafter Mounting Feet

If your frame includes mounting feet, prepare the site and anchor the feet to the site before assembling the frame. Use a baseboard placed under the feet to support the foot base. Read the information on the next page and use the diagram to layout the position of your building. Once the string lines are set to mark the location, continue with the Mounting Feet section.

Unless you are securing feet to concrete piers, do not dig holes if your building is equipped with rafter mounting feet! Read the information on the Mounting Feet (if equipped) page for additional details.

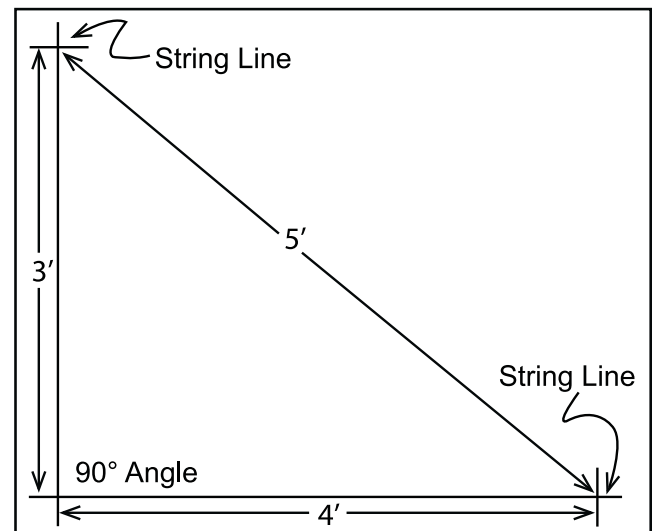
Ground Posts

If the frame includes ground posts, set all ground posts as described within this manual. Width of the shelter is measured from the center of one ground post to the center of the remaining ground post. Length is also measured center-to-center. If your building includes ground posts, continue with the Setting Ground Post section.

ATTENTION: The anchoring methods shown in this manual are not designed to satisfy local building codes and restrictions. These methods are best described as temporary in nature. For permanent anchoring methods, consult the MUST READ document *before* you continue.

SQUARE THE SITE: GENERAL STEPS

1. Identify a corner where a building rafter will be positioned, drive in a stake, and string a line the exact width of the building and stake in place. (Width of the rafter is measured from center-to-center of the rafter legs.)
2. After the first corner stake is in place, string a line the width of the building (center-to-center) and drive the second corner stake into the ground.
3. String a line at least as long as the building 90° from the line between the first and second stakes.



NOTE: A transit can be used to ensure an accurate 90° angle, or the 3-4-5 rule can be used. Refer to diagram. Using multiples of 3-4-5 such as 6-8-10 or 12-16-20 helps to maintain an accurate 90° angle.

4. After squaring the position of the building, measure the length and drive the third corner stake.
5. Repeat the same step for the last corner stake.

NOTE: The distance measured diagonally between corner stakes must be equal for the building to be square.

Set the Ground Posts (option)

MARK THE SITE AND DIG POST HOLES

These steps describe marking all post hole locations and digging the holes. For some sites, it may not be possible to complete the procedure in this manner. An alternative procedure such as working from one end of the building toward the other may be necessary. Determine the best procedure based on the site and other factors and proceed as needed.

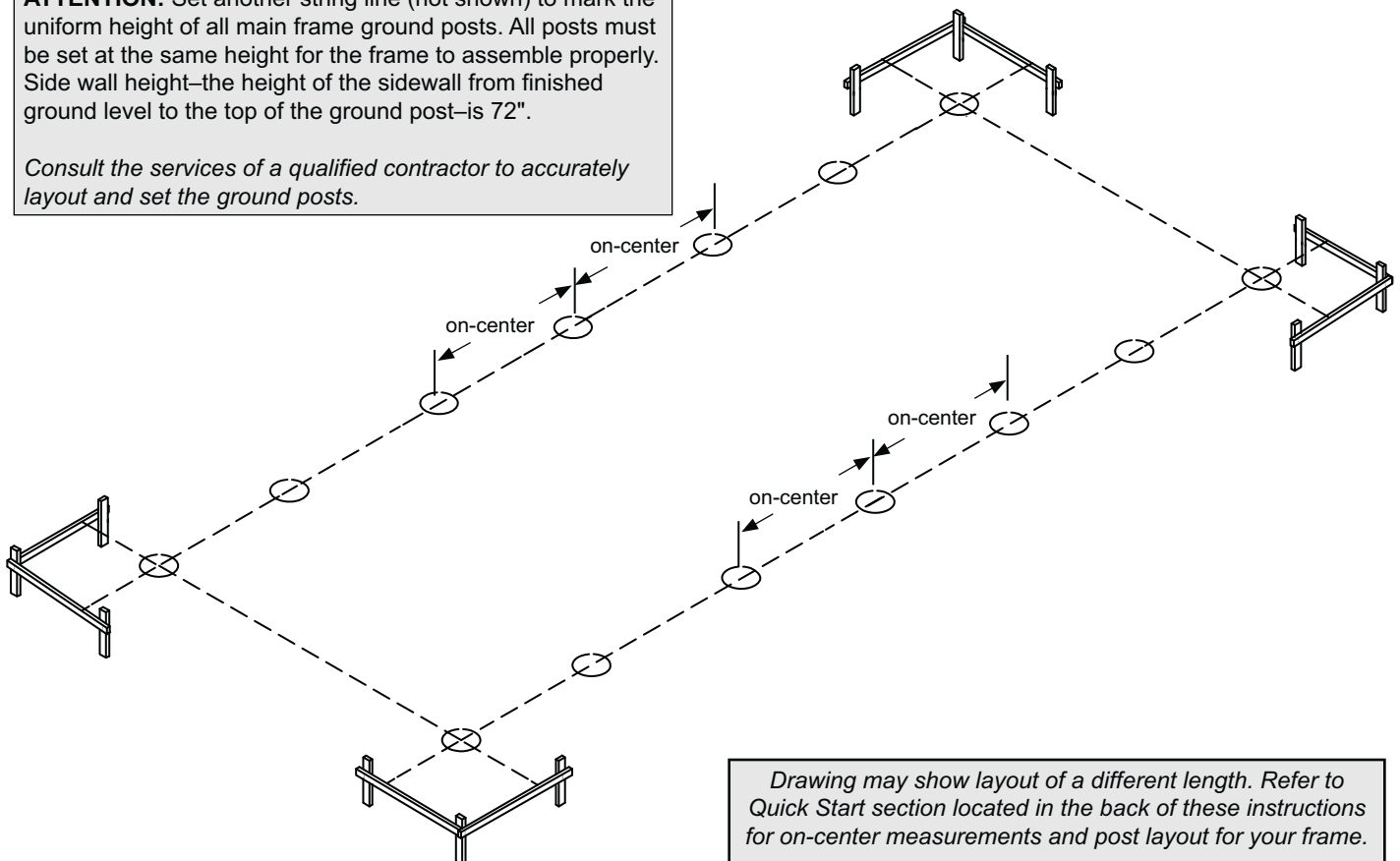


NOTE: Refer to the Quick Start Section located near the back of these instructions for the Side Profile and related diagrams. If your building includes mounting feet, complete Step 1 only of this procedure and continue with the Mounting Feet section. Consult the MUST READ document for anchoring suggestions.

1. Stake the outline of the building using string line and batter boards. Set batter boards 3' back from the building corners. Check to ensure that the building layout is square. Cover or panels (if equipped) will not install properly if the building frame is not square once assembled. (For buildings equipped with rafter mounting feet, stop here and continue with the Mounting Feet section.)
2. Consult the diagrams in the Quick Start section to verify the frame length and width dimensions and to accurately position the ground posts.
3. Guided by the string line, use a flag or stake to mark each ground post hole location.
4. Move the string line and dig a post hole a minimum of two feet (2') deep or to a depth that is below the geographic frost line, whichever is greater. Consult local building codes. A power auger (18") works best to dig the holes.
5. After digging all holes, reattach the string line to the batter boards and use it as a guide to set and align the ground posts.

ATTENTION: Set another string line (not shown) to mark the uniform height of all main frame ground posts. All posts must be set at the same height for the frame to assemble properly. Side wall height—the height of the sidewall from finished ground level to the top of the ground post—is 72".

Consult the services of a qualified contractor to accurately layout and set the ground posts.



Drawing may show layout of a different length. Refer to Quick Start section located in the back of these instructions for on-center measurements and post layout for your frame.

Set Ground Posts (option)

SET GROUND POSTS

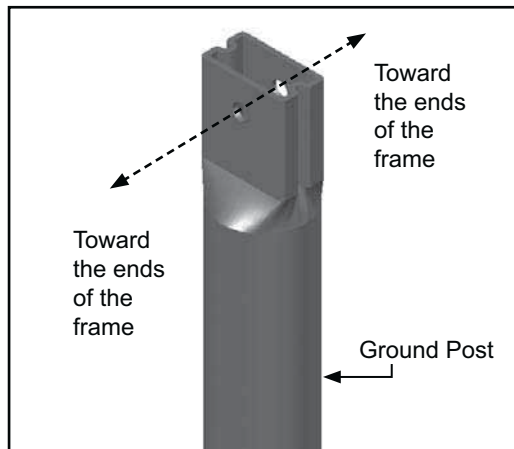
This procedure describes setting the ground posts in holes, bracing in place, and adding concrete. *If your building includes mounting feet, skip this procedure and continue with the installation of the mounting feet.*

Required parts and equipment:

- Ground post (no mounting feet)
- Equipment to level and brace posts

NOTE: Concrete (customer-supplied) is required to secure all ground post in the holes. All posts must be set at the same height for the frame to assemble properly. Consult the services of a qualified contractor to properly set posts.

1. Take one ground post, measure 24" from the plain end, and mark the location on the pipe. *Set all posts two (2) feet below ground level.* See diagram to the right.
2. Add concrete to a corner hole, set the first corner ground post into the hole, and brace in position. Fill hole so concrete remains below the finished grade.



ATTENTION: Position the pre-drilled holes facing toward the ends of the shelter so they align with the bolt holes in the rafter sections. Verify that the ground post is at the correct height.

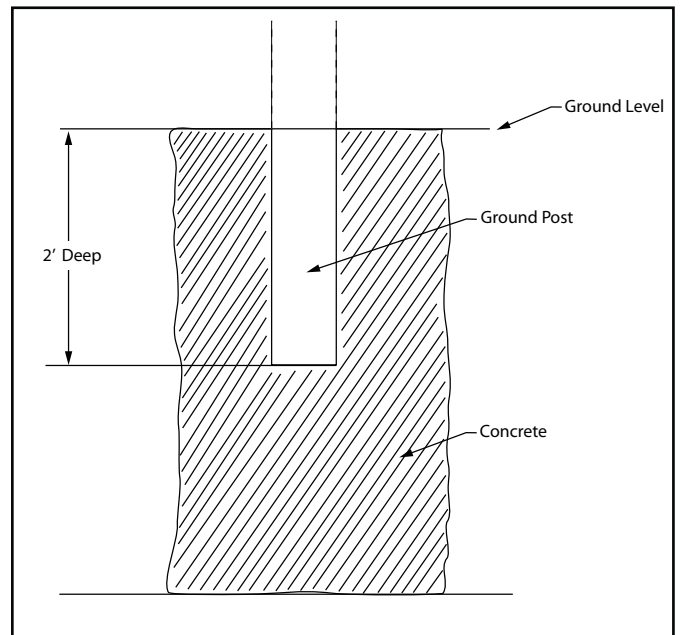
3. Check that the corner post is straight (plumb) and adjust as needed before the concrete sets.
4. Repeat the above steps to complete the installation of all ground posts.

ATTENTION: Allow the concrete to set *before* you attach the assembled rafters to the tops of the ground posts!

5. Continue with the rafter assembly.

DIAGRAM SHOWS A TYPICAL POST HOLE

Consult the MUST READ document **before** you set your ground posts for important anchoring and concrete details.



In areas where frost is common, dig each post hole so it falls below the frost line. *Minimum hole depth for all areas regardless of frost is 24".*

Consult local building codes and qualified contractors for additional details when digging the post holes and setting the ground posts.

Mounting Feet (option)

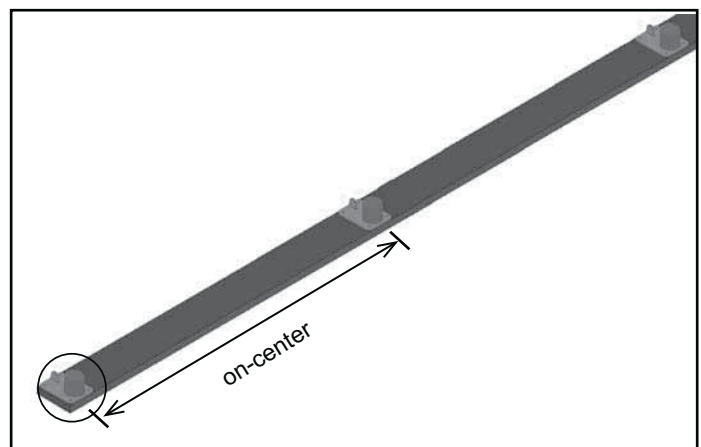
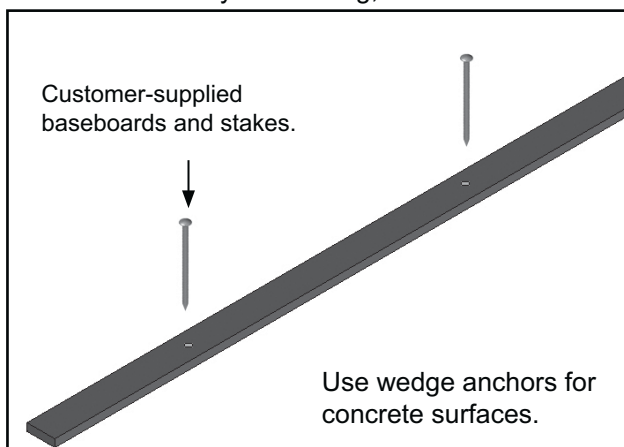
SETTING THE MOUNTING FEET

For those buildings equipped with mounting feet, secure the feet to a customer-supplied baseboard prior to attaching the rafter legs and assembling the frame. Customer is responsible for the necessary baseboards and fasteners used to secure the feet to the site. A baseboard is not needed when the feet are anchored to a concrete pier, footing, or foundation as described in the MUST READ document. **Consult that document for details.** Skip this section if your frame *does not include* mounting feet.

ATTENTION: If local codes require a **permanent anchoring system**, you must choose one of the methods described in the MUST READ document.

The following information describes one way to anchor the mounting feet. *Consult a knowledgeable construction professional for suggestions and other safe and acceptable alternatives. Do not assemble the frame without first securing the mounting feet. Consult the Mounting Feet Layout diagram (Quick Start section) before you begin.*

⚠ WARNING: Securing the rafter feet to a baseboard as shown *does not* anchor the shelter. Secure each rafter to the site after assembly and before attaching the next rafter during the frame assembly steps. If you choose this method to anchor your building, consult the "Anchor the Assembled Frame" section **of this manual** for details.

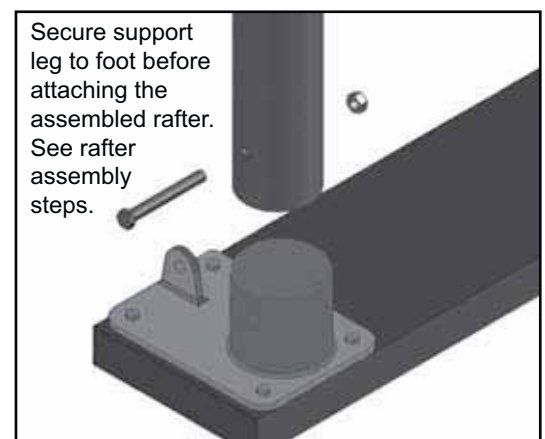
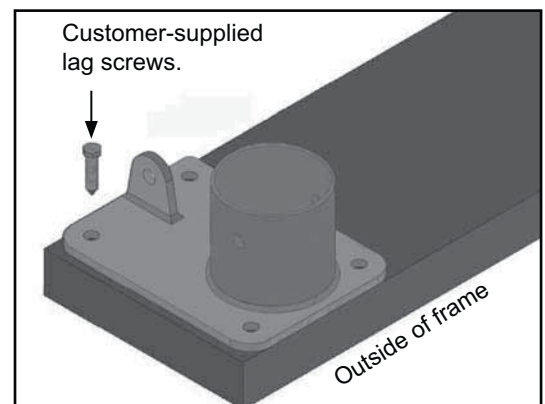


1. Place the first set of 2" x 8" baseboards on the site at the required on-center width of the building frame. Baseboards run parallel to each other. Use the layout instructions to accurately and properly set the baseboards on the site.
2. Drive a short length of rebar or similar stake, through a hole drilled in the boards, into the ground to keep the boards in place. See diagram above. *If mounting on concrete, use wedge anchors (purchased locally) to secure boards or mounting feet to the site.*

NOTE: Rods or stakes will help prevent the boards from shifting to maintain the on-center width of the building during frame assembly.

3. Anchor each mounting foot to the baseboards (on-center) using the appropriate customer-supplied fasteners. Consult the diagrams in the Quick Start section for layout dimensions and details.
4. Continue with the Rafter Assembly steps that follow.

ATTENTION: The augers for the anchoring system for your frame can be installed at this time. Consult the ANCHOR THE ASSEMBLED FRAME section in these instructions for auger installation suggestions. All anchoring components and hardware require an additional purchase and are not included. **You must anchor the building as shown in the diagram if mounting feet are used.**



Rafter Assembly

RAFTER ASSEMBLY

After setting the ground posts or anchoring the mounting feet, continue with the rafter assembly.

NOTE: All rafter assemblies consist of four rafter sections joined by a single chevron at the peak. Consult the rafter diagram in the Quick Start section of these instructions before and during the rafter assembly process for details.

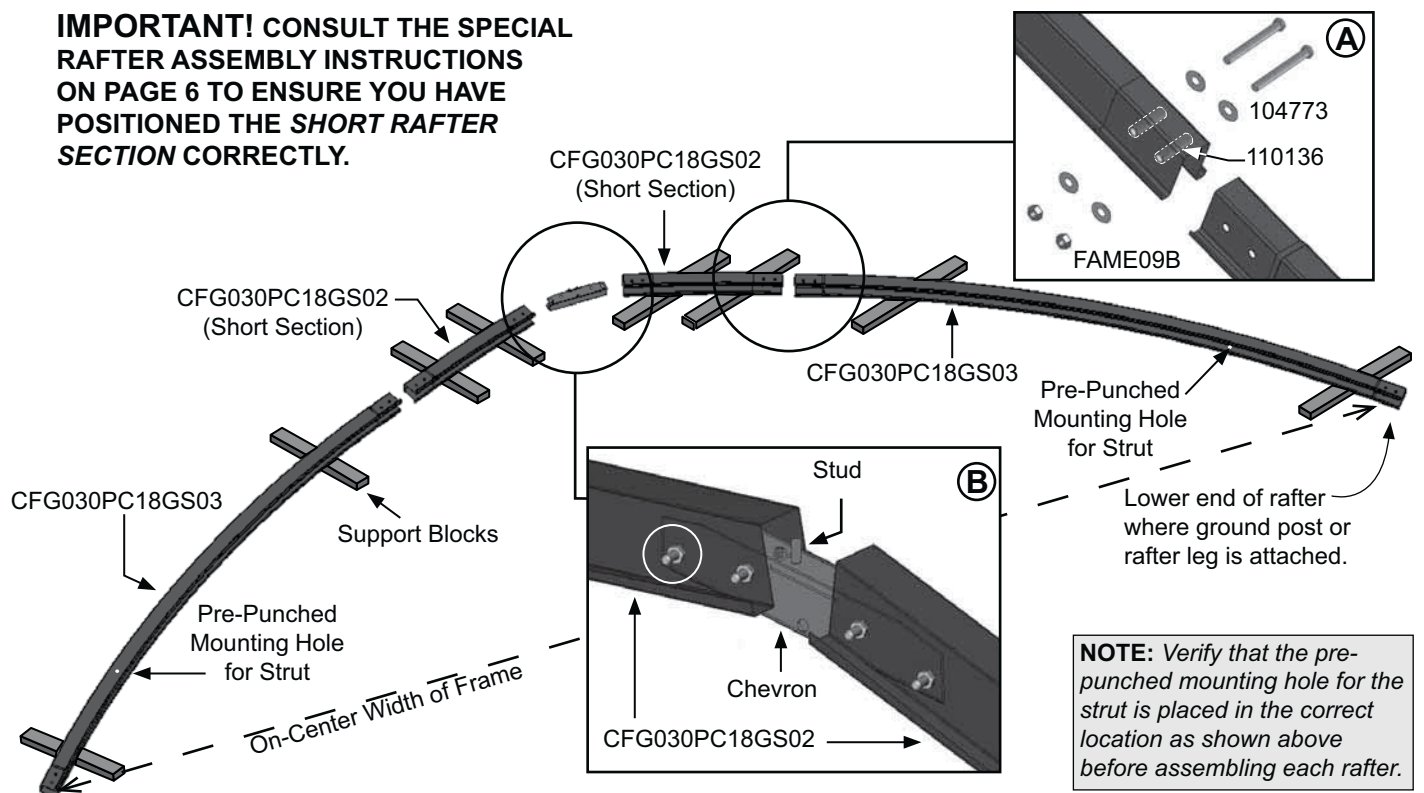
Assistance is required to assemble the rafters and frame.

Gather the parts:

- Rafter sections (CFG030PC18GS03 & CFG030PC18GS02)
- Rafter chevron (#CFG030PINSS03)
- 1/2" x 3" bolts with nuts (104773), sleeve (110136), and 1/2" flat washers (FAME09B)

1. Place the rafter sections on the ground end-to-end. Support the rafter sections with blocks as needed. Consult the diagrams.
2. Align and connect CFG030PC18GS03 and CFG030PC18GS02 rafter sections using 1/2" x 3" bolts and nuts, 110136 sleeve, and 1/2" flat washers. See diagram A below. Consult the Page 6 for important assembly information.
3. Connect the two assembled rafter sections using a chevron, 1/2" x 3" bolts and nuts, and 1/2" flat washers. Position the installed studs of the chevron so they point up to accept the ridge purlins when these are installed. See diagram B below. **Distance between the lower mounting holes at the end of the assembled rafter is the on-center width of the frame. Measure this distance before you tighten the bolts at the top of the rafter. For example, if your frame is 30' wide on-center, the distance between the mounting holes is 30' on-center.**
4. After assembling some (or all) rafters, continue with the frame assembly.

IMPORTANT! CONSULT THE SPECIAL RAFTER ASSEMBLY INSTRUCTIONS ON PAGE 6 TO ENSURE YOU HAVE POSITIONED THE SHORT RAFTER SECTION CORRECTLY.



Frame Assembly

FRAME ASSEMBLY

Gather the parts:

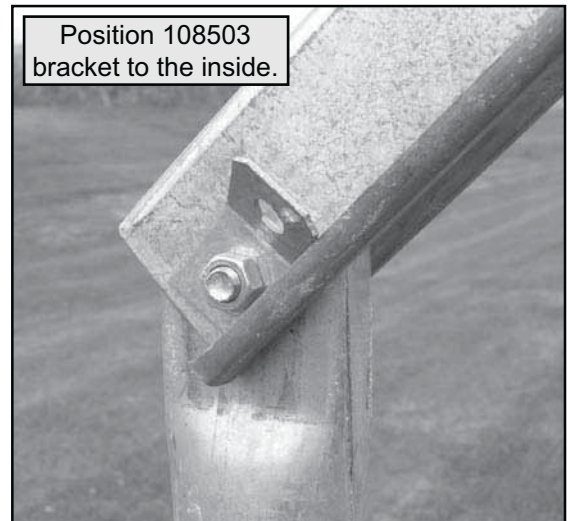
- Assembled rafters, 1/2" x 3" mounting bolts with nuts (104773), and flat washers (FAME09B)
- Purlins (see diagrams in Quick Start section for your building and for purlin identification/position) and 1/4" nuts and washers
- 108503 angle brackets to mount cables
- 108868 eyebolts, 3/8" lock washers, and 3/8" nuts
- Lifts, ladders, assistants, and cable, rope or lumber to secure rafters during the assembly process

Complete these steps:

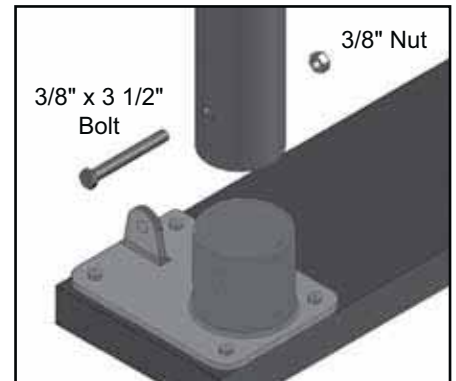
1. Using ladders and lifts, set an assembled rafter on the first set of ground posts (or rafter legs—see the note that follows), align the mounting holes, slide a flat washer onto a 1/2" x 3" bolt, and insert a bolt into each mounting hole.

ATTENTION: *If mounting feet are used, attach the first set of rafter legs to the mounted feet and secure with the 3/8" x 3 1/2" bolts and nuts. With the legs installed, set the first assembled rafter in place and secure. Consult the connection diagrams located in the Quick Start section of these instructions for additional details. See **diagonal strut note on next page.***

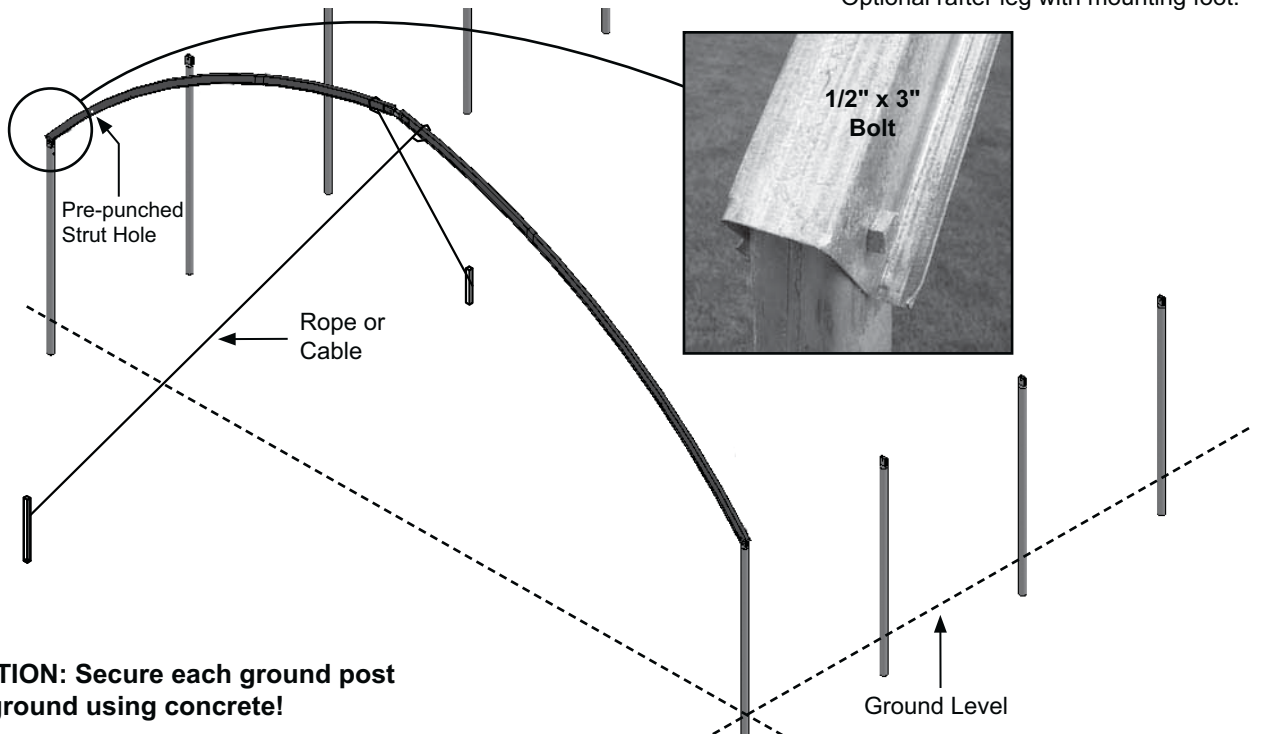
2. Slide one (1) 108503 angled bracket over each mounting bolt (**end rafters only**), add a 1/2" flat washer and nut to each bolt, and tighten. Bracket is to the inside of the frame and is used later in these instructions to secure the cable bracing to the frame.
3. Verify that the end rafter is vertical and not twisted and brace the rafter using ropes, cables, or lumber staked to the site. *Do not remove the end rafter bracing until the entire frame is assembled.*



Position 108503 bracket to the inside.



Optional rafter leg with mounting foot.



ATTENTION: Secure each ground post in the ground using concrete!

Frame Assembly

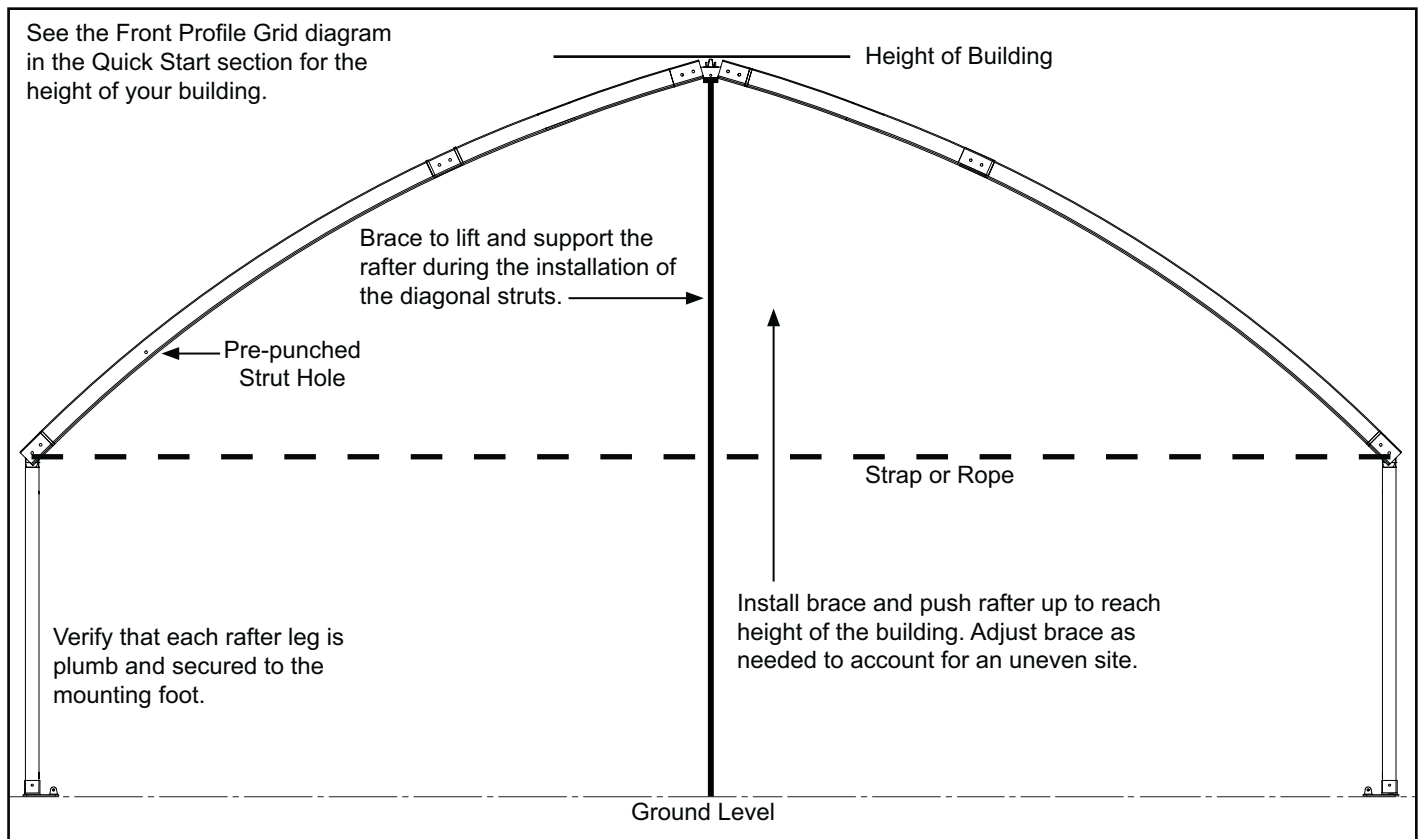
ASSEMBLY NOTE: INSTALLING THE 108865 DIAGONAL STRUT (mounting feet only)

For all frames that include the 108500 mounting feet and rafter legs, complete the following procedure after each rafter is assembled and attached to the rafter legs and *before* you add purlins to the entire frame. Completing these steps will help maintain a uniform result when assembling each rafter and the entire frame.

NOTE: If your building does not include the 108500 mounting feet as shown, skip this page and continue with the installation of the struts on Page 16.

Complete the following procedure:

- a. With the assembled rafter attached to the top of each rafter leg as previously described, install a brace under the middle of the rafter and push the rafter up to the height shown on the Front Profile Grid diagram in the Quick Start section for your building. (Brace is supplied by the customer/contractor. Brace may not be required for some frames. Consult a contractor if needed to determine the best way to support each rafter during assembly.)



- b. Verify that both rafter legs are plumb and that the rafter is not twisted or leaning toward the front or back.
- c. Measure center-to-center between the tops of the rafter legs to verify that the on-center measurement is equal to the width of the building. Adjust the brace as needed and use it to help secure the positions of the rafter legs.

NOTE: If needed, use a strap or rope to keep the tops of the rafter legs plumb until you install the diagonal struts. See the dashed line in the diagram above.

- d. With the rafter supported and braced in place, install the diagonal struts as described on the next page.

Frame Assembly

RAFTER STRUT INSTALLATION

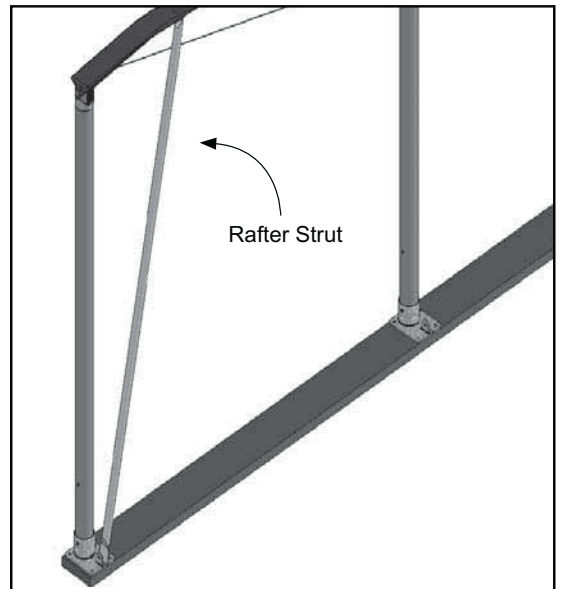
Complete the steps on the previous page to set the rafter and continue with the steps that follow to install the struts.

Required parts and tools:

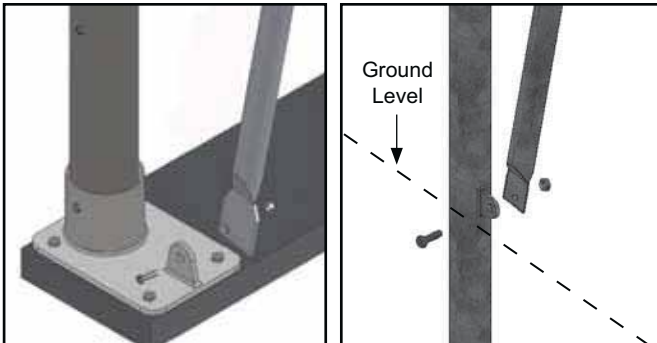
- 108865 struts for mounting foot; 108963 struts for ground post.
- Secure using FAG330B (5/16" x 1" bolts) and FALF37B 5/16" locknuts
- Tape measure and wrenches or ratchet and socket set to tighten bolts

Complete these steps:

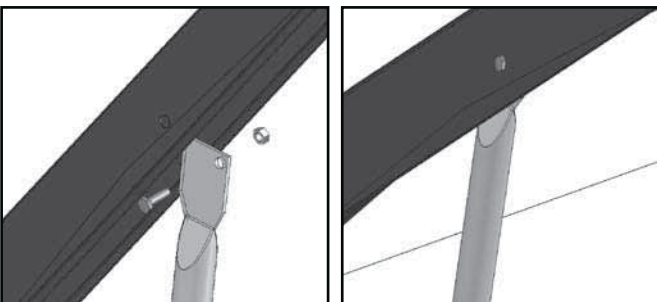
- Take a strut and loosely attach it to the rafter foot or ground post using the 5/16" fasteners listed above.
- Swing the diagonal strut up into position until it reaches the underside of the rafter.
- With assistance, align the rafter hole with the diagonal strut.
- Insert the bolt through the rafter hole and through the mounting hole in the diagonal strut.
- Add a locknut and tighten to secure the strut to the rafter.
- Return to the lower 5/16" bolt and tighten that locknut.
- Repeat to attach the remaining strut for the rafter.
- Continue with the Frame Assembly steps that follow.



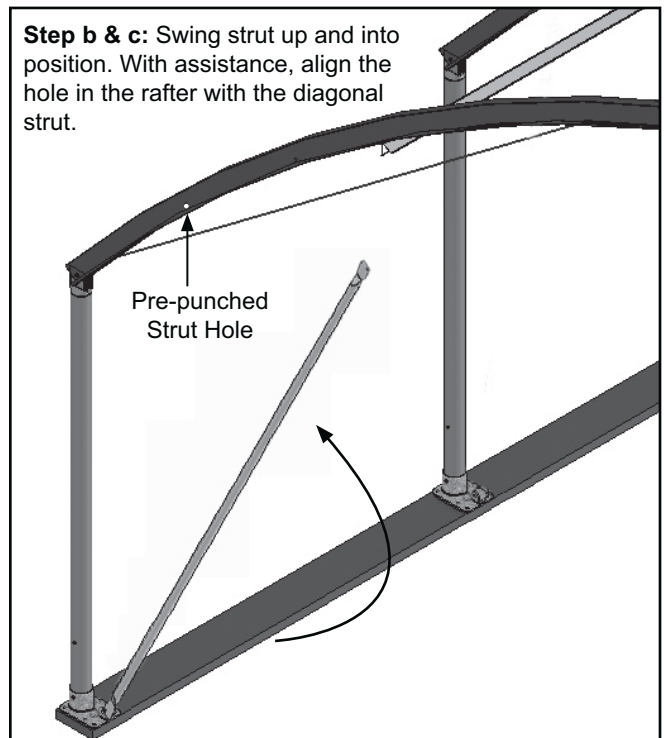
NOTE: Use the 5/16" x 1" bolts to secure strut to the rafter. Install bolt through punched hole in rafter and strut mounting hole of strut. *Mounting hole in rafter is through one side of rafter only.*



Step a: Loosely secure strut to foot using 5/16" x 1" bolt and locknut. Mounting Foot: above left; Ground Post: above right.



Step d & e: Secure upper end of strut to rafter using the 5/16" x 1" bolt and locknut. Tighten upper and lower 5/16" locknuts. **Procedure is the same for all frame designs.**



Step b & c: Swing strut up and into position. With assistance, align the hole in the rafter with the diagonal strut.

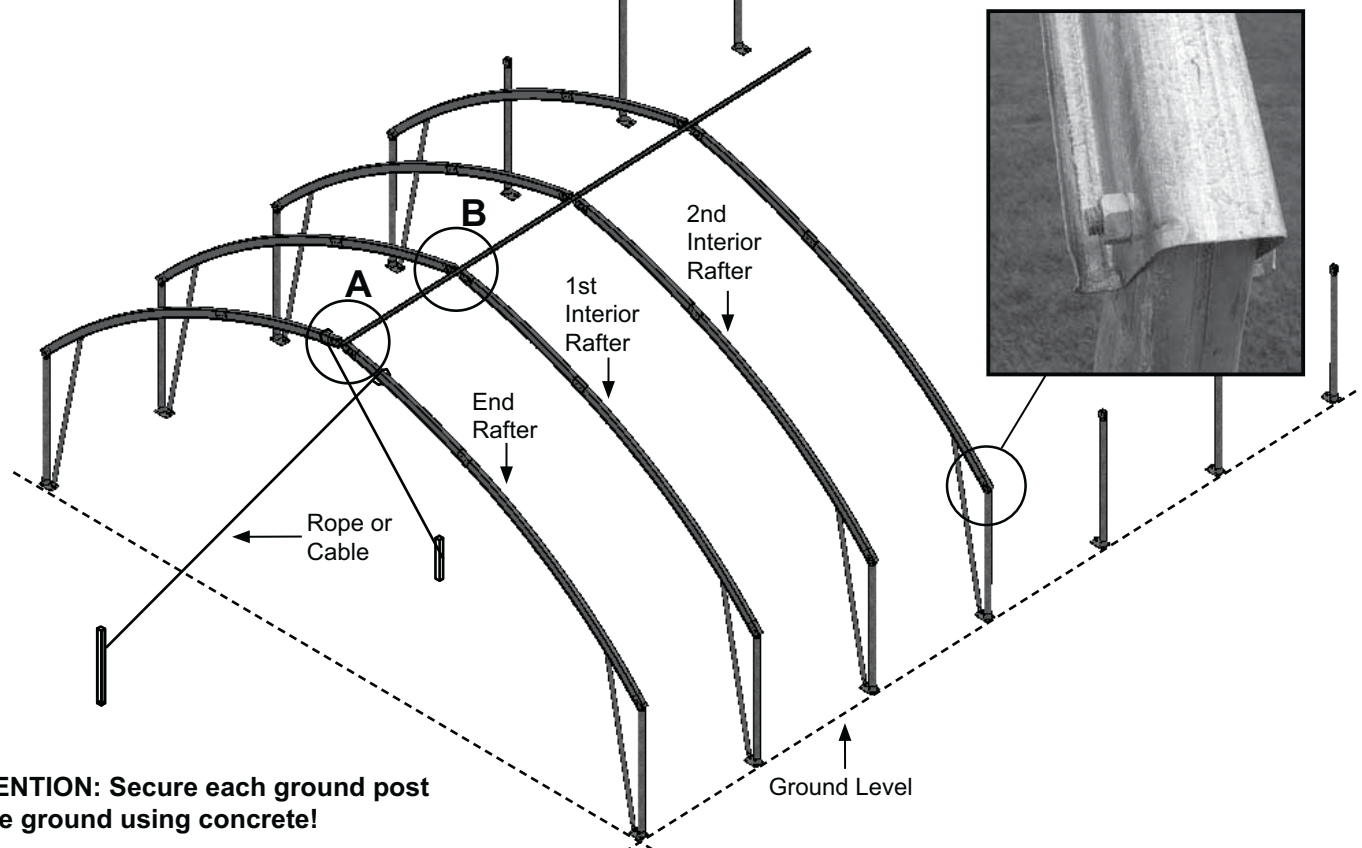
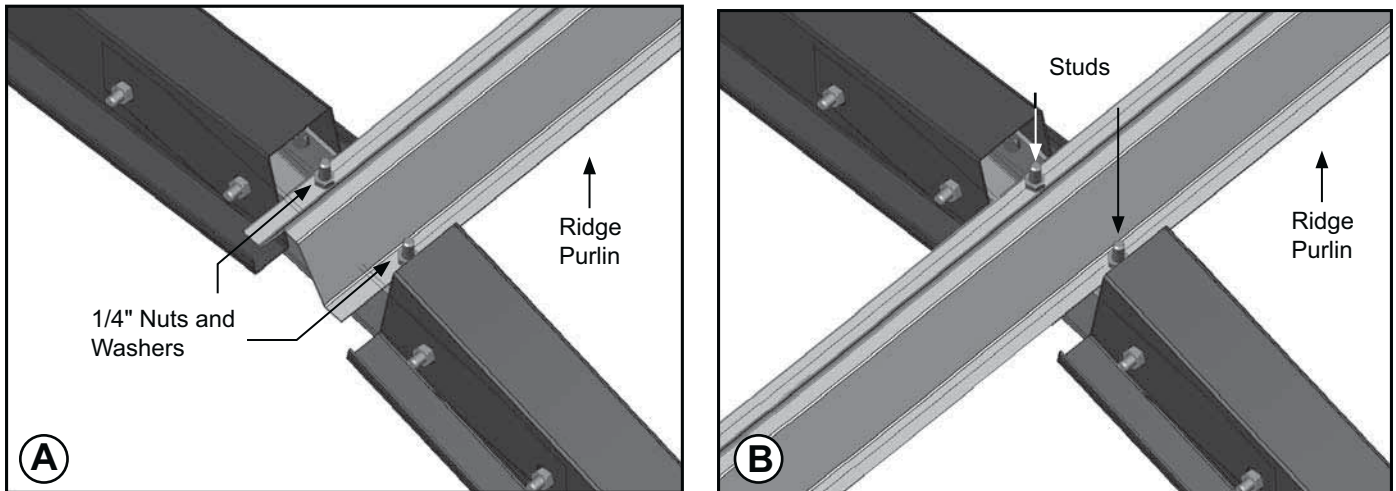
See the Quick Start Guide for the Front Profile with Ground Posts diagram if needed.

Frame Assembly

FRAME ASSEMBLY (continued)

4. Move to the next set of ground posts (or mounting feet), attach that rafter (and rafter legs if needed), and brace in place. As previously described, use the 1/2" bolts to secure the rafter to the tops of the ground posts or rafter legs. **Install the 108865 or 108963 struts.** See previous two pages.
5. Once the first two rafters are set in place, take the first purlin section (consult Side Profile diagram for your building for purlin identification), align the pre-drilled holes with the studs of the rafter chevron, and secure to the end rafter (A) and first interior rafter (B) using 1/4" nuts and 1/4" washers.
6. Repeat steps to set the next rafter in place and secure to the frame. Attach the 108865 struts if equipped.

NOTE: Consult the Side Profile diagram for your frame for connection details and fasteners. Frame shown throughout this procedure has 4' rafter spacing. Actual frame may be similar, or it may include 6' rafter spacing or a combination of 4' and 6' rafter spacing depending on length.



Frame Assembly

FRAME ASSEMBLY (continued)

7. Set the next rafter in place, secure it to the ground posts or rafter legs, brace in place as needed, and install the struts if equipped.
8. Secure the rafter to the previous purlin, or install another purlin section. View diagrams below for details. Depending on the rafter spacing, either of the configurations below will apply.

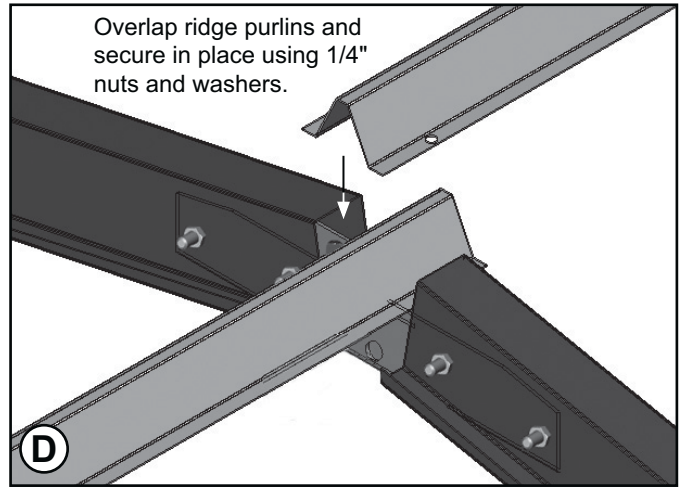
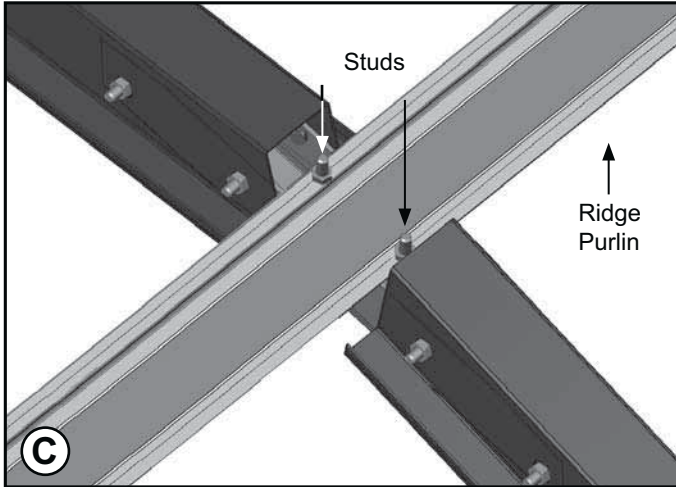
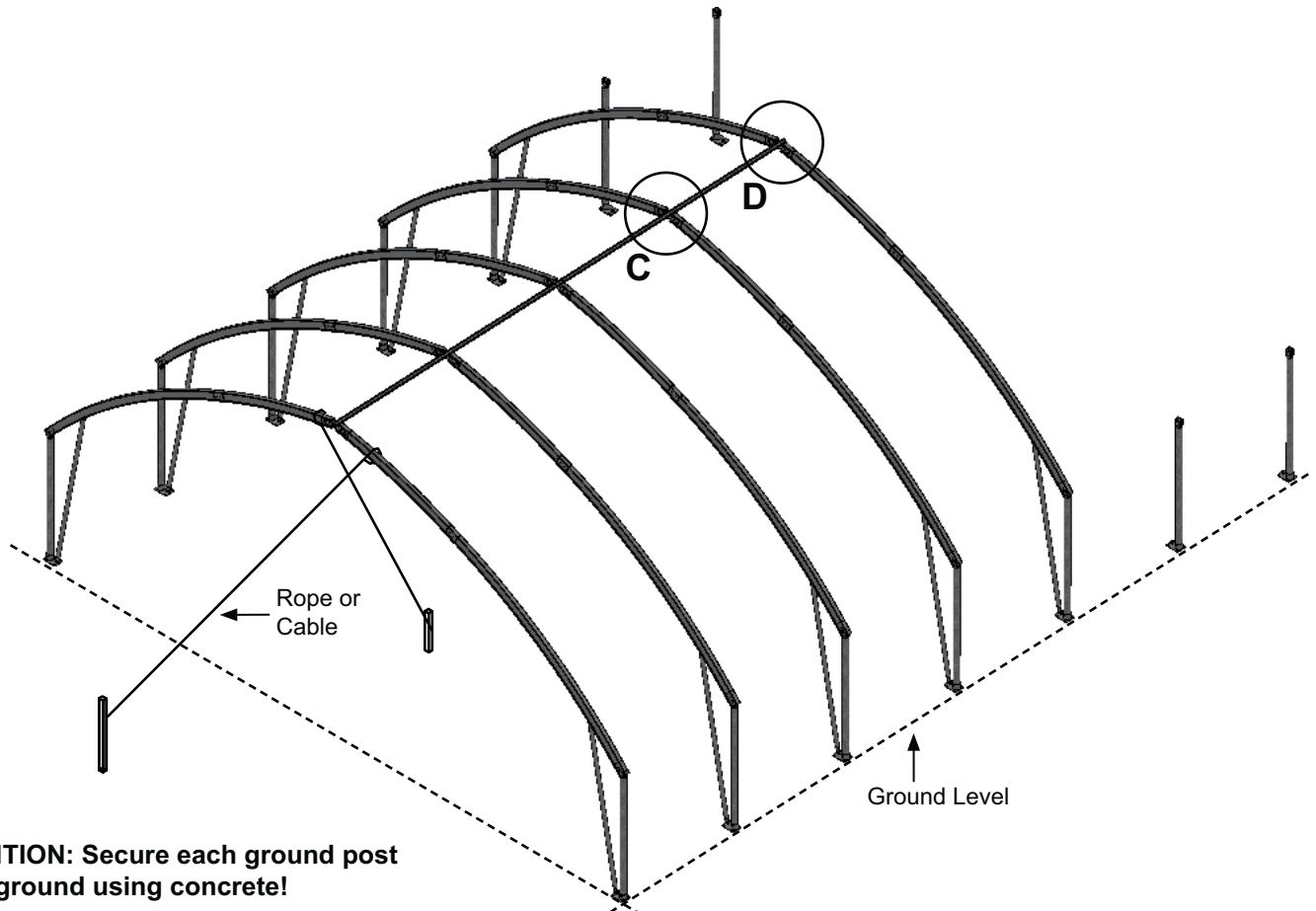


Diagram above shows how to connect the next purlin at the same chevron. Use one set of 1/4" nuts and washers to secure both purlins. Install another rafter if needed to support the free end of the second purlin.



ATTENTION: Secure each ground post in the ground using concrete!

Frame Assembly

FRAME ASSEMBLY (continued)

- With the first three (3) rafters assembled, take the first under purlin and secure it to the rafters using the 1/4" x 1" bolts and 1/4" hex nuts. See diagrams E and F at the right. Bolts can also be inserted from the purlin up through the rafter to more easily install nuts.

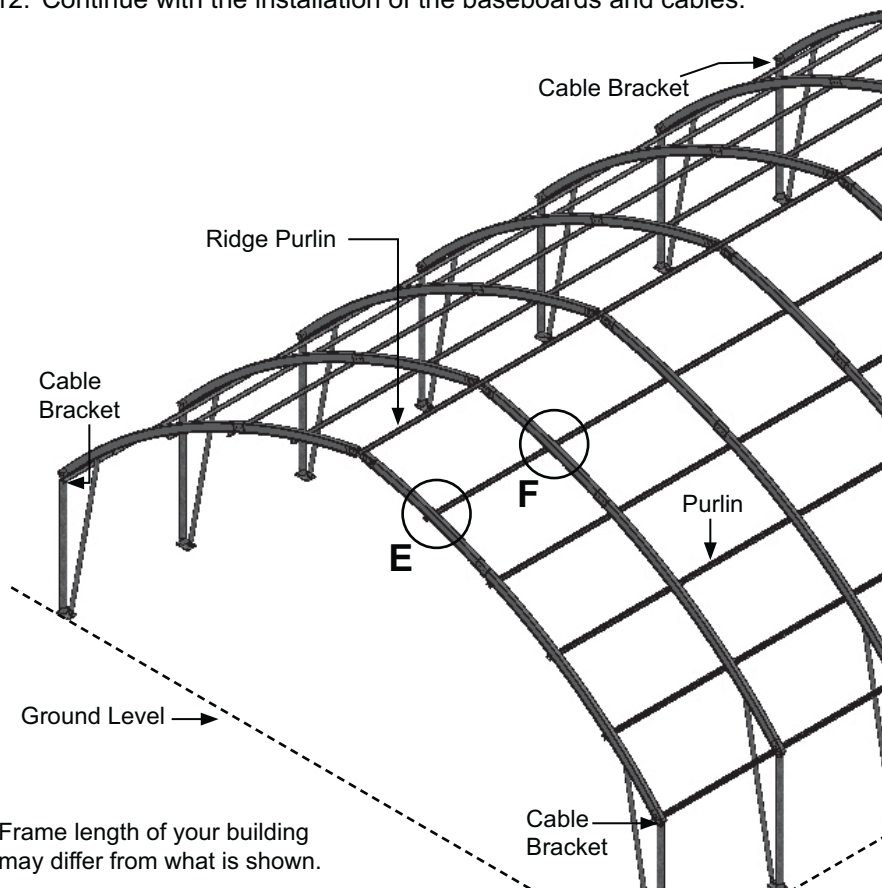
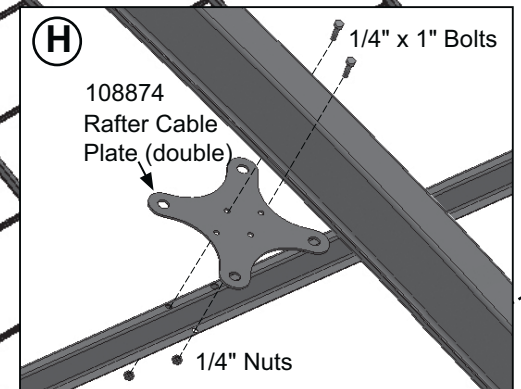
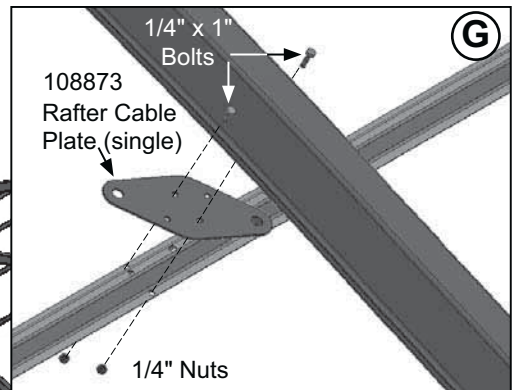
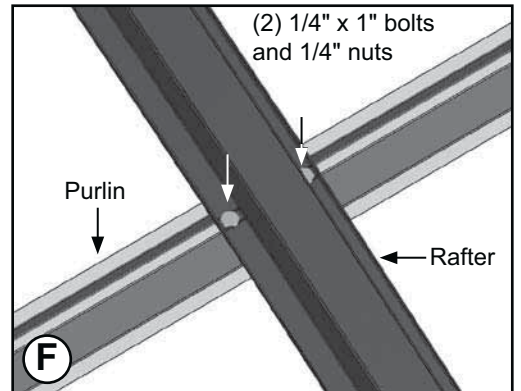
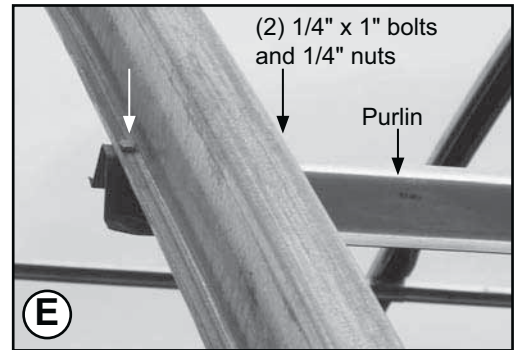
NOTE: In those instances where an under purlin and an interior rafter are also used to attach two cable assemblies, install the 108873 rafter cable plate (single) between the rafter and under purlin using 1/4" x 1" bolts and 1/4" hex nuts (G).

36' & 48' Long Frames: When four (4) cable assemblies meet at the same under purlin and rafter, install a 108874 rafter cable plate (double) to secure the cables (H). Consult the Quick Start guide for additional details regarding the location and installation of the rafter cable plates. Use assistants when installing the plates.

- Install and secure the remaining under purlins for the first few rafters as previously described and as shown in the Quick Start section of these instructions.
- Repeat the previous steps to assemble the remainder of the frame.

ATTENTION: You must install the under purlins after setting two or three rafters. Do not set all remaining rafters with only the ridge purlins in place. When mounting the remaining end rafter, remember to install the two (2) angled cable brackets (108503) as described in Steps 1 and 2.

- Continue with the installation of the baseboards and cables.



Frame length of your building may differ from what is shown.

Baseboard Installation

BASEBOARD INSTALLATION

Gather the parts:

- 2" x 6" or treated or recycled plastic lumber (supplied by customer)
- 5/16" x 5" carriage bolts (FAH325B)
- 5/16" nuts (FALB32B)

The following procedure describes one way to install the required baseboards (drop-down curtain). (Attaching baseboards to frames with roll-up sides is *strongly recommended*.) The size and type of the baseboard you choose may require the use of alternative steps.

When properly installed, baseboard runs the length of the frame at ground level. *The baseboard is supplied by the customer.*

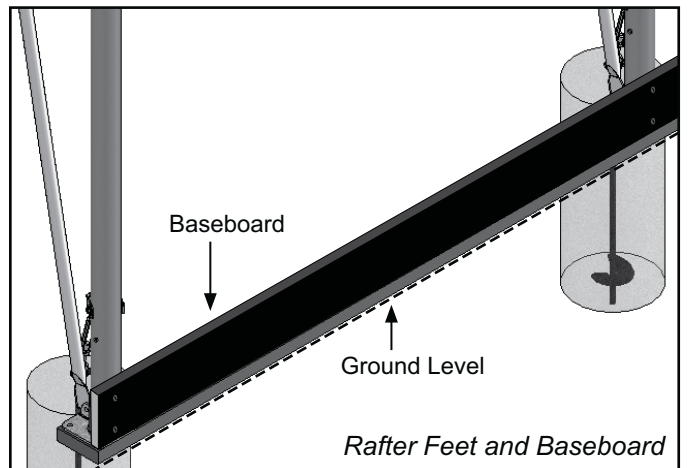
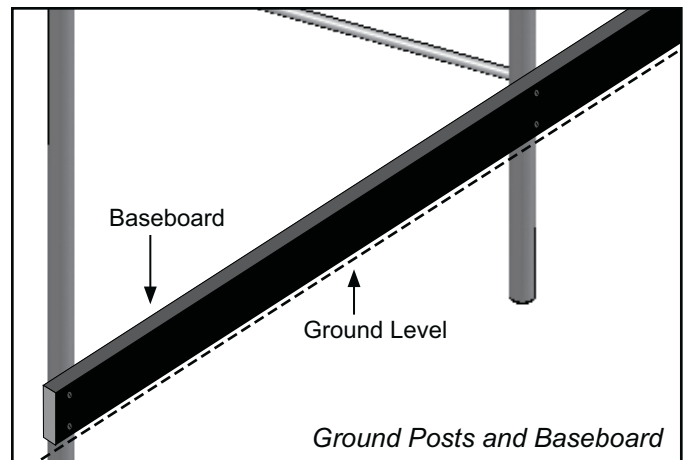
On the outside of the frame, attach the first baseboard to the rafter using two (2) 5/16" x 5" carriage bolts and nuts. Countersink bolt heads if needed. Continue adding baseboards to complete the first run.

Splices are made between posts as shown in the drawing below. Use a short section of baseboard to secure separate baseboards at a splice. See diagram below.

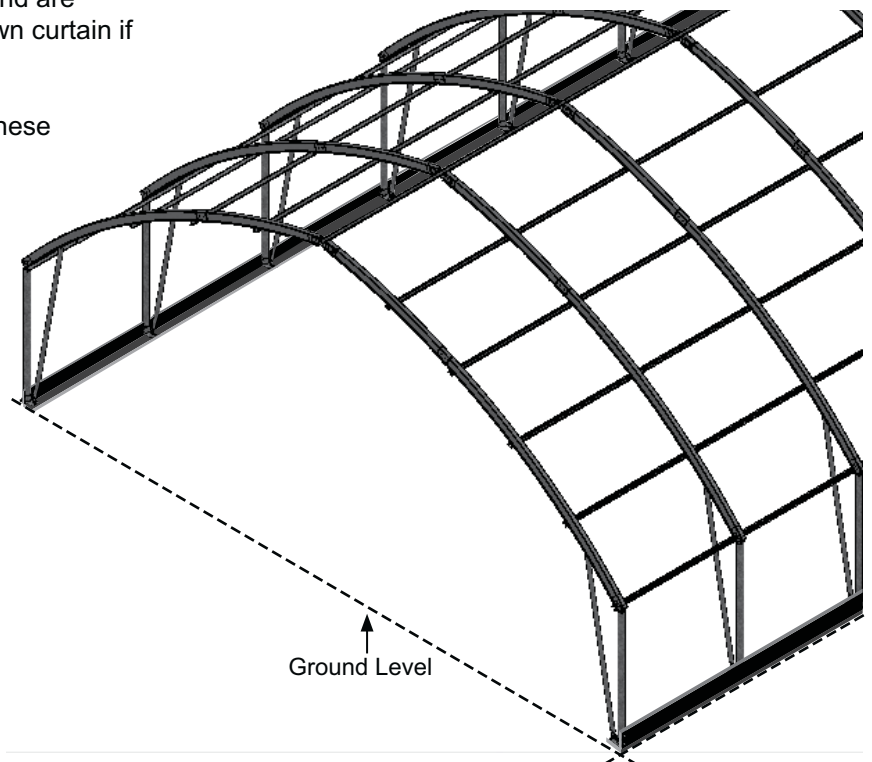
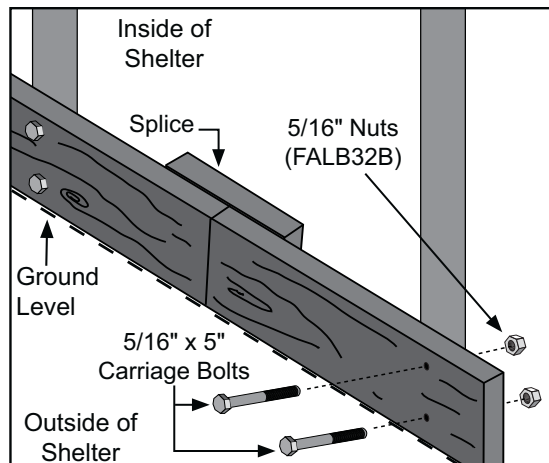
Repeat steps to install the second run of baseboards on the remaining side of the frame.

NOTE: The boards should be at ground level or slightly into grade to prevent the shelter from sinking and are required to attach the lower edge of a drop-down curtain if equipped.

After installing the baseboards, continue with these instructions.



The above diagrams present examples only. Actual installation depends on customer-supplied materials and other factors.

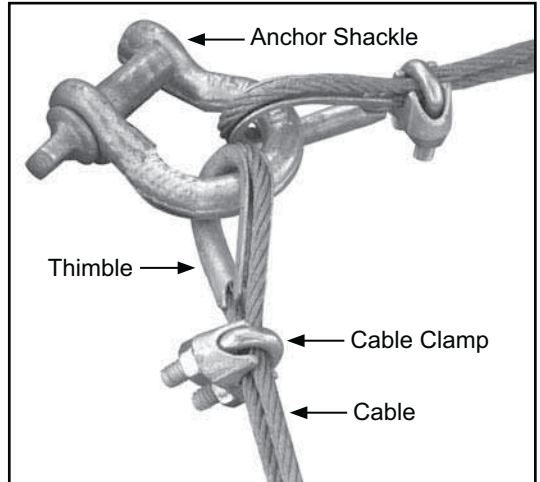


Cable Installation

CABLE ASSEMBLY

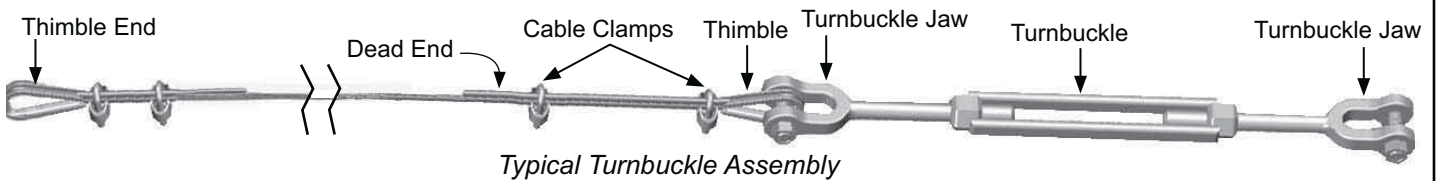
Each cable assembly includes the following:

- One (1) length of cable: Measure from point-to-point on the frame and cut cable as needed. **Remember to account for the extended turnbuckle and the cable needed to add the cable clamps when determining cable length.**
- Turnbuckle (1), anchor shackle (AS2167) (1), cable thimbles (2), cable clamps (4)

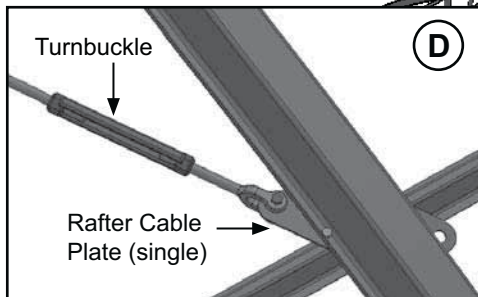
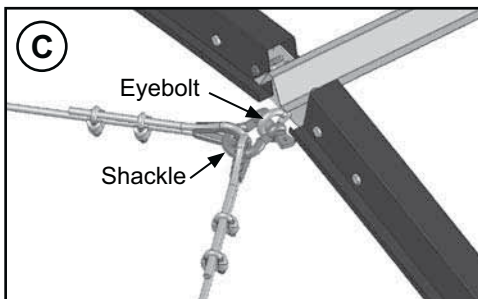


Cable Assembly Procedure

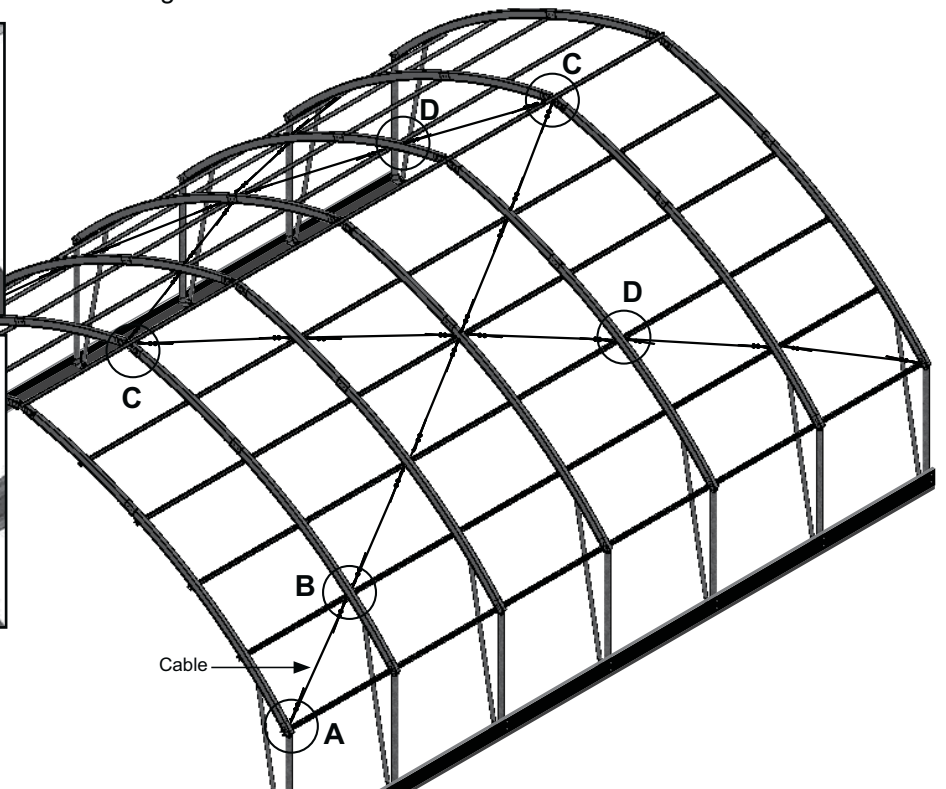
1. First, secure the 108868 eyebolts to the frame using FAMA38B lock washers and 3/8" nuts (FALB04B). See Diagram C (below) and **the Side Profile diagram (Quick Start) for your frame for location and orientation of eyebolts. Do not skip this step!**



2. Using the diagram below, measure between points A & B and cut one length of cable from the supplied roll to the determined length. Be sure to account for the turnbuckle (extended/open position) and the extra cable needed to install the clamps. In other words, subtract cable length for the extended turnbuckle; add length for cable wrap.
3. Create a cable assembly as shown above and in the Connection Details (Quick Start section). After the assembly is ready, open the turnbuckle to its extended position (if this has not been completed) and check to see how the assembly fits from point-to-point on the frame. Adjust length as needed.
4. Using the diagrams on this page and in the Quick Start guide, attach the first cable to the frame in the location that the cable was measured and created for. Do not tighten at this time.



Measure between Points A & B, add extra for connections, and cut the cable to length.



Cable Installation

CABLE ASSEMBLY (continued)

5. Move to the next cable position and repeat the previous steps to measure and cut cable and to create the next turnbuckle assembly. If the distance is the same, use the first assembly as a pattern.
6. Continue building cable assemblies until all have been completed and attached to the frame as shown in the diagrams. Check all clamps and bolts of each cable assembly to ensure they are tight. *Trim or tape cable ends.*
7. With all cables assembled and attached, tighten all turnbuckles. Do not overtighten. Once cables are taut, apply one additional full turn using a small bar or screwdriver. As you tighten each cable assembly, inspect the rafters to verify they are not pulled out of plumb. Work from one corner to the peak at one end of the frame and move to the remaining corner at the same end and repeat the tightening sequence. After tightening the cables at one end of the frame, repeat the same procedure at the other end.

REMEMBER: Do not overtighten the turnbuckles. Assemblies will not sag when properly tightened. Check cables regularly to verify that each is properly adjusted. Replace worn or frayed cable immediately.

8. After adjusting all cables, install the diagonal struts.

Install and Tighten all Cables

The diagram and inserts below identify the placement and proper way to attach the cable assemblies to the frame. **After attaching all cables to the frame, tighten the turnbuckles.** Turnbuckles should be snug and not overtightened. *Shorten cable if you are unable to tighten the turnbuckle to remove cable slack.*

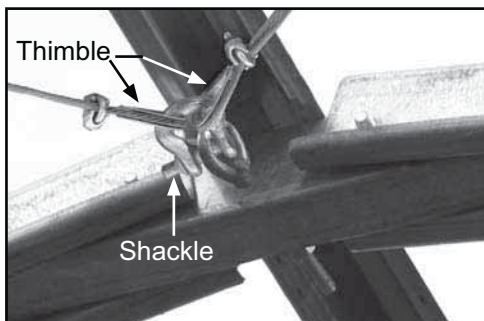
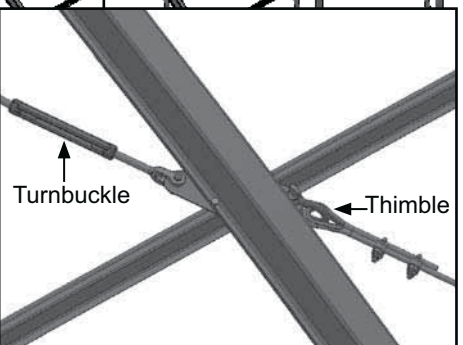
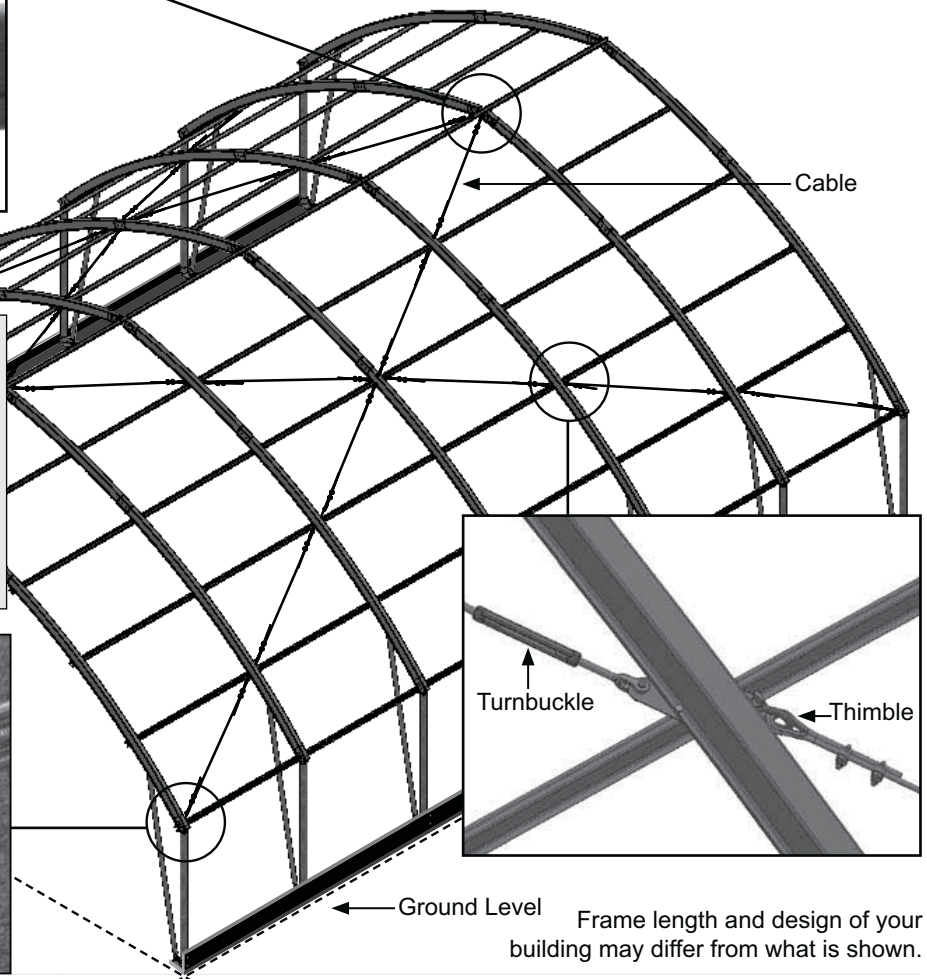
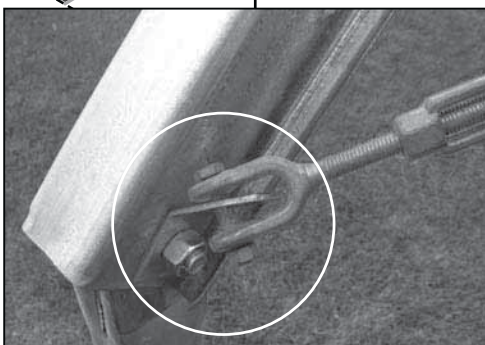


Diagram shows the cables attached to the shackle and the shackle secured to the eyebolt.

Secure the turnbuckle directly to the cable bracket attached to each end rafter mounting bolt.

If necessary, use a bar or clamp to slightly bend the bracket to allow the needed clearance to install the jaw bolt of the turnbuckle.

Actual turnbuckle may differ.



Diagonal Strut Installation

STRUT INSTALLATION

For additional support, attach diagonal struts to the frame between the end rafter and the first interior rafter at each end. Collect the needed parts and install the diagonal struts as instructed below.

Required parts and tools:

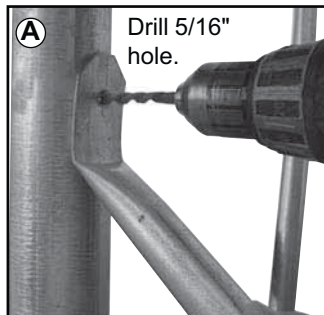
- Frame with 6' rafter spacing use the 108872 (8') strut; frame with a 4' rafter spacing use the 108871 (7') strut.
- Secure using FAG340B (5/16" x 3 1/2" bolt), FAME07B flat washers, and FALF37B 5/16" locknut
- Tape measure, marker, hammer, vise grip, center punch, and drill with 5/16" drill bit

Complete these steps:

1. Using a vise grip (or similar tool) or a vice, bend each flattened end of the strut as shown in the diagram and photos to the right. When installed, ends are tight to the frame.

ATTENTION: Verify you have selected the correct strut. Some frames include struts of different lengths. Consult the diagrams in the Quick Start section for your building for additional details.

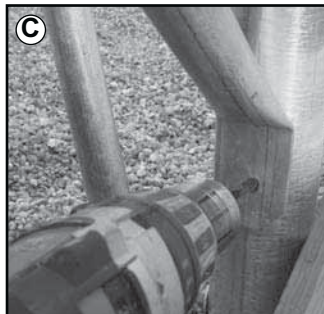
2. Position strut as shown (lower-right photo) *between the end rafter and first interior rafter*. (Adjust position so strut does not interfere with any other building component.)
3. Mark the mounting hole locations and drill holes using a 5/16" drill bit.
4. Insert a bolt with washer through the mounting holes and add another washer and locknut.
5. Tighten the nut to secure the strut to the frame.
6. Continue by installing the remaining diagonal struts.



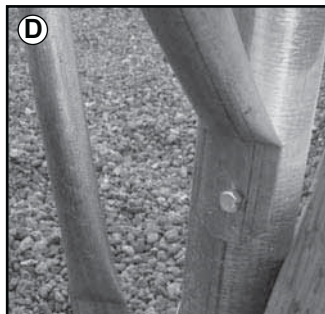
A Drill 5/16" hole.



B Secure with 5/16" bolt, washers, and locknut.

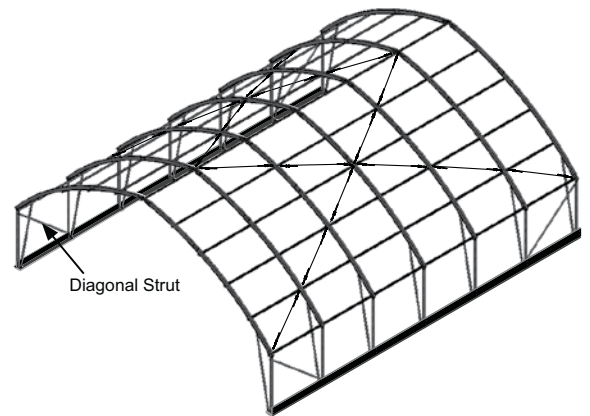


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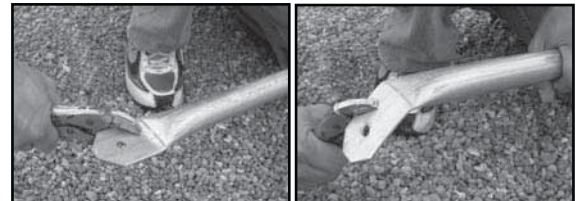


D

Diagrams above show how to secure strut to the assembled frame.



NOTE: For some strut designs, the mounting hole is offset. In such cases, center and drill the mounting hole through the flattened end of the strut so that it aligns with the center of the rafter leg.



Bend strut ends as shown.

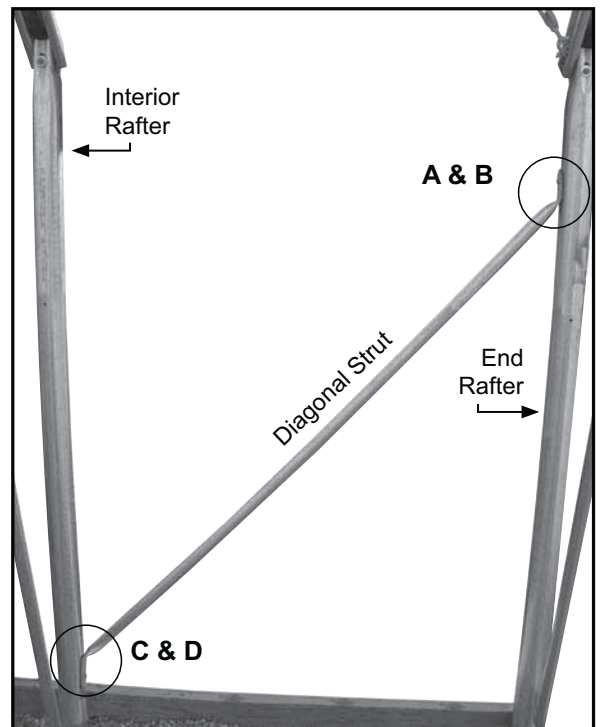


Diagram above shows strut position as seen from the inside of the frame.

Anchor the Assembled Frame

ANCHOR THE ASSEMBLED FRAME: MOUNTING FEET

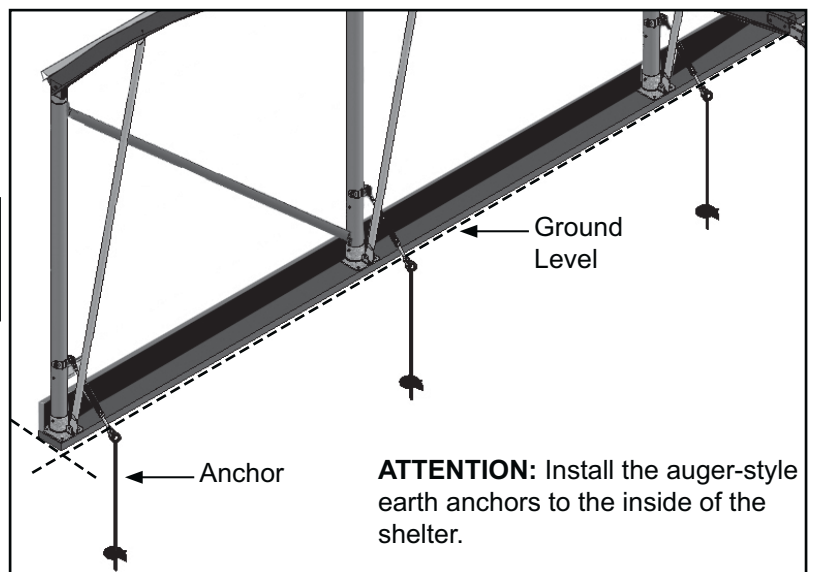
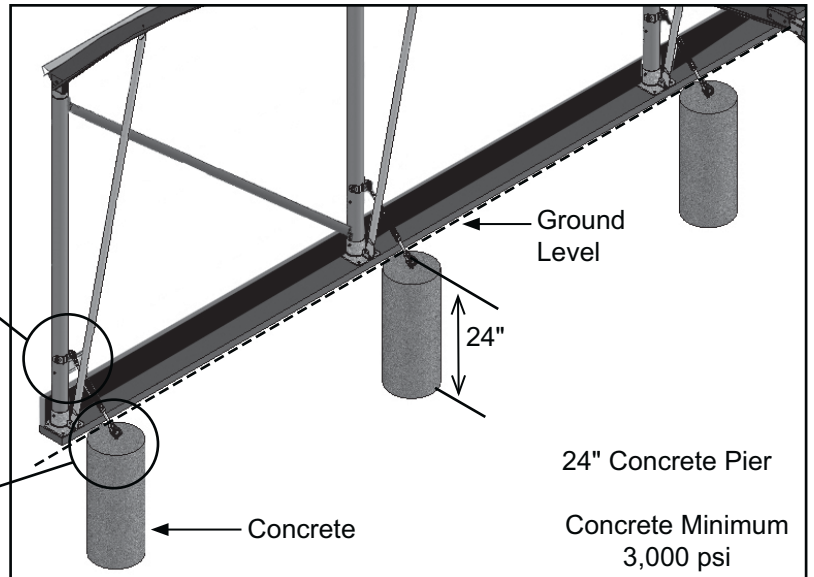
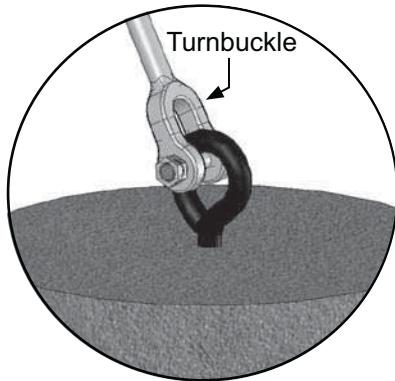
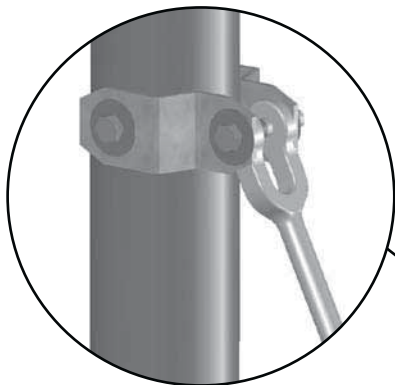
At this point, anchor the assembled frame. If you chose one of the anchoring methods described in the MUST READ document, you can continue with the next procedure. If you choose the method shown in this manual for building equipped with mounting feet, continue with the steps on this page. Call customer service for additional anchoring information if needed.

CAUTION: The anchor assembly is an integral part of the frame construction. Improper anchoring may cause instability and failure of the structure to perform as designed. Failing to anchor the shelter properly will void the manufacturer's warranty and may cause serious injury and damage.

If the optional anchor kit was purchased for each rafter leg, use the diagrams below to properly install the auger-style earth anchor and to attach the brackets to the rafter legs.

ATTENTION: Concrete must be used in loose or sandy soil types.

For best results, install the auger-style earth anchor as close to the rafter leg as possible. After anchoring the frame, continue with these instructions.



ATTENTION: All anchoring components shown require an additional purchase and are *not* included with the building kit.

Frame Check

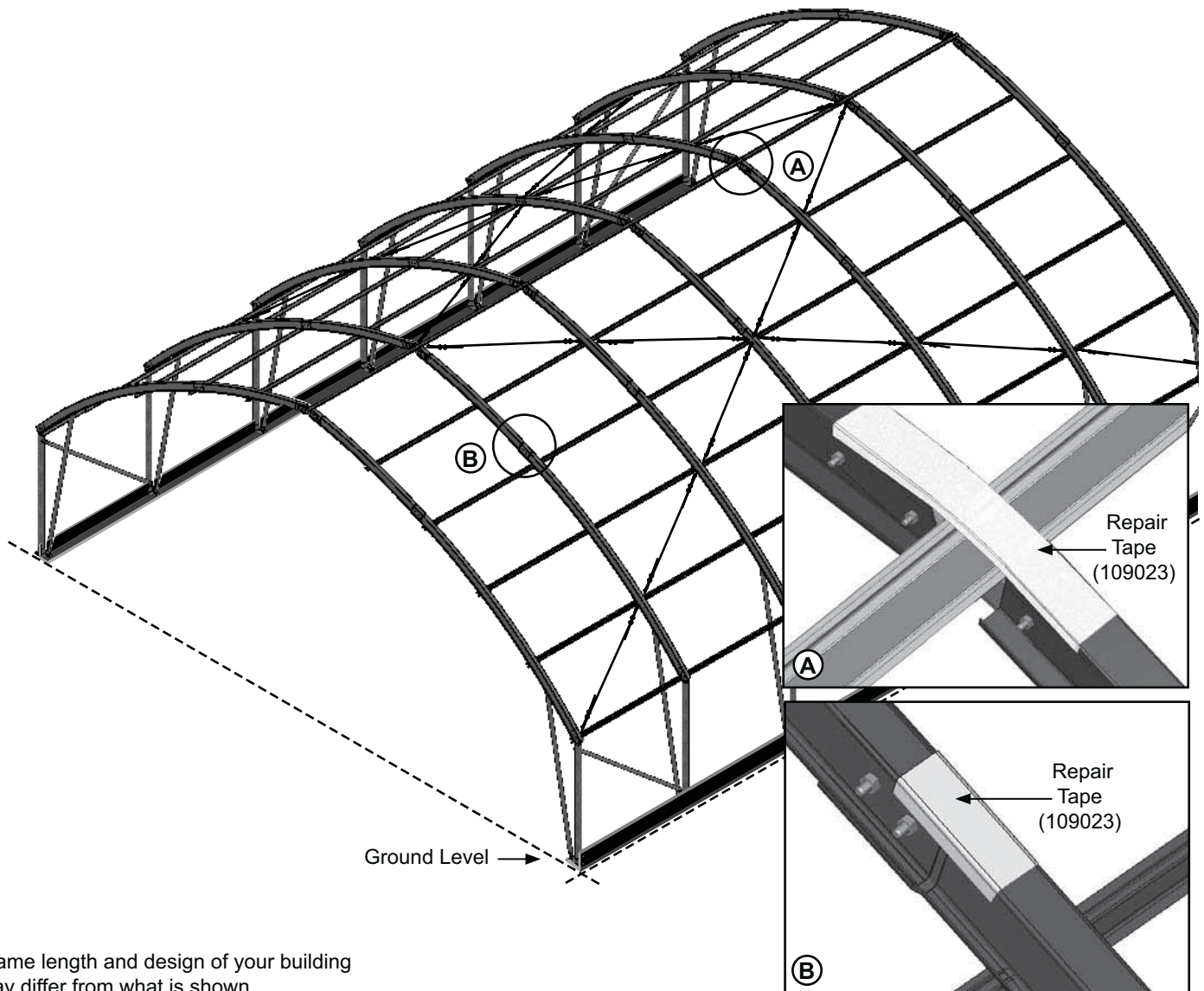
FRAME CHECK

Before you attach the main cover, inspect the frame for sharp edges or fasteners that could damage the cover.

1. Verify that all frame members are properly secured.
2. Verify that all bolts and screws are tight.
3. Recheck the frame assembly for sharp edges or screws and bolts that may interfere with the installation of the cover. Reposition if needed.
4. Cut 10"-12" pieces of repair tape (109023) and tape the *tops of all interior rafters* to protect the cover. See Diagram A.
5. Cut a 4" strip of repair tape (109023) and tape over each rafter splice. See Diagram B.
6. Verify that the main building frame is properly and adequately anchored. *Do not attach the cover to an unanchored frame.*



109023 Repair Tape



Frame length and design of your building may differ from what is shown.

End Cap Installation

INSTALL ALUMINUM END CAP

If optional *fabric or film end panels* have been ordered, skip the *End Cap Installation* and the *Install Poly Latch U-channel* steps. If you have a *film panel*, consult the *Optional Film End Panel Installation in the Quick Start* section for details. If you have a *fabric end panel*, consult the *Optional Fabric End Panel Installations* steps in the *Quick Start* section. Do not install the 108867 End Cap. It is only used for polycarbonate end panels.

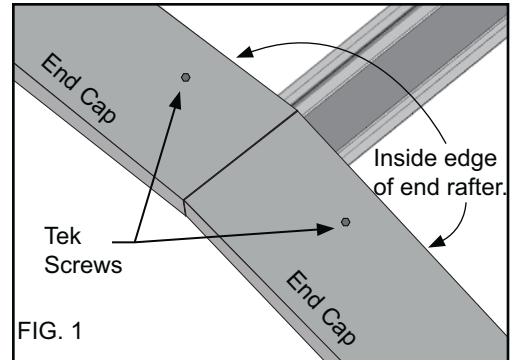
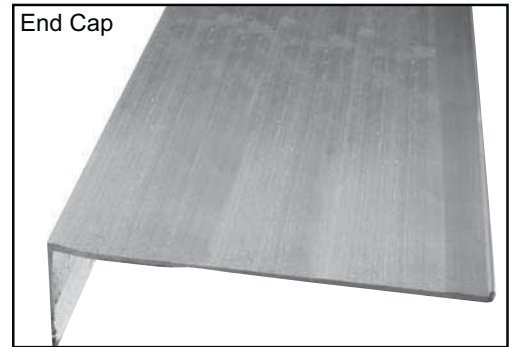
Gather the parts:

- Aluminum end caps (#108867)
- Tek screws (#FA4482B)

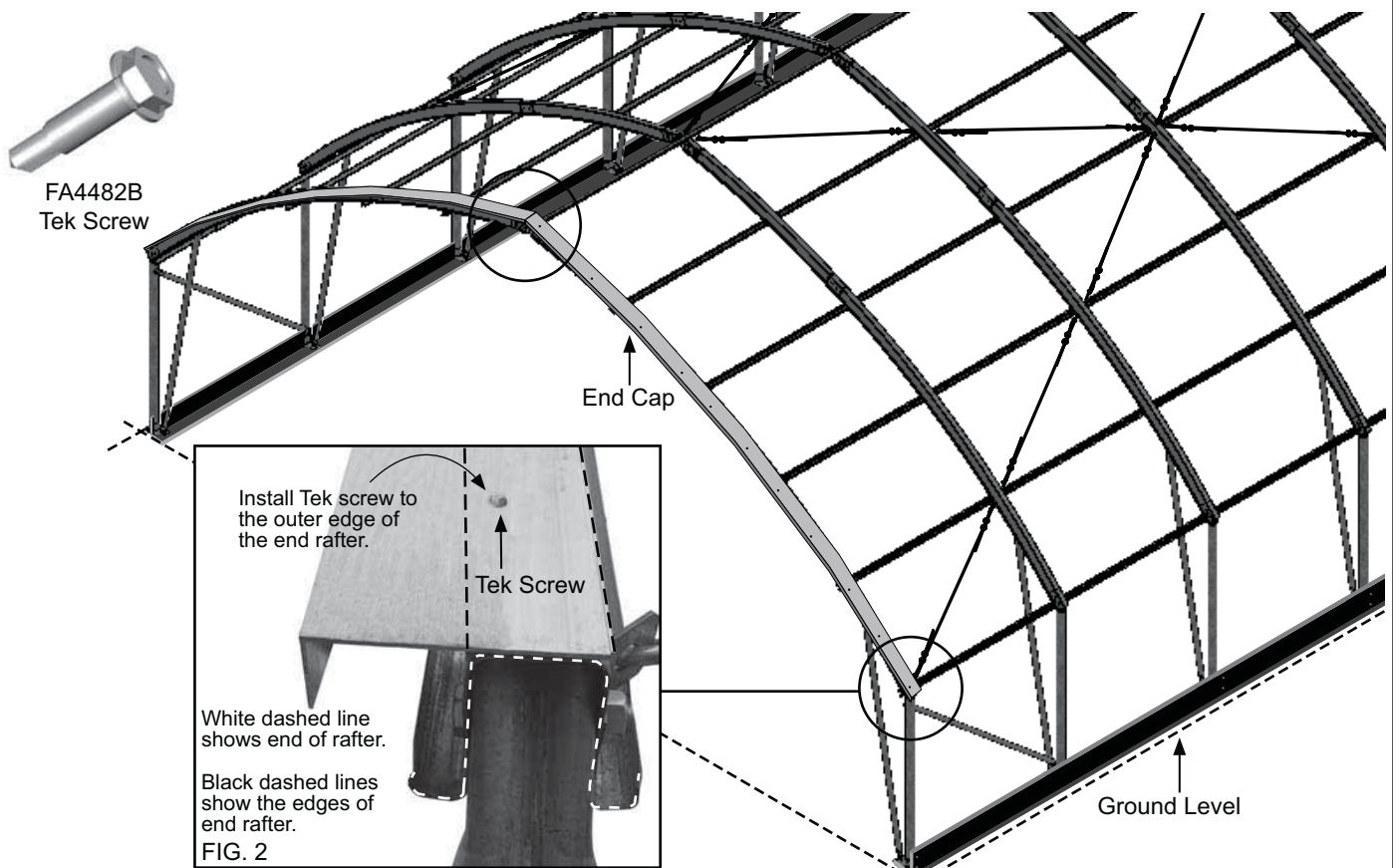
1. Attach two (2) sections of 108867 end cap to the top of the end rafters as shown in Fig. 1. Align the inside edge of each section with the inside edge of the end rafter. See Fig. 2.

NOTE: The upper end of each section can be trimmed to create a finished joint if desired (Fig. 1). Use FA4482B Tek screws installed every 24" along the rafter to secure each 108867 section. You must install the Tek screws at the outer edge of the rafter as shown in Fig. 2 to allow for the installation of the U-channel as shown on the following page.

2. Next, cut and install the remaining end cap to finish the end rafter. See Fig. 2.
3. Repeat the steps to attach the 108867 end cap to the remaining end rafter and continue with the installation of the 102197 U-channel.



Optional: Trim the end caps as needed for a finished appearance and to close the gap. Consult a professional contractor if needed when cutting the aluminum. *Wear safety glasses when handling and cutting end caps.*



Install Poly Latch U-Channel

INSTALL POLY LATCH U-CHANNEL

Gather the parts:

- Single U-channel (#102197)
- Tek screws (#FA4482B)

After attaching the end cap, use same methods to attach the single U-channel to the top edge of the end rafters.

1. Attach one section of the single U-channel to the top of the end cap using Tek screws (FA4482B) spaced at 12" intervals. Attach U-channel flush to the inside edge of the end rafter.
2. Continue to attach the single U-channel sections to the top of the end cap and work toward the bottom of the end rafter. Cut the last section of single U-channel to the required length so that it is flush with the end rafter as shown in Fig. 2.
3. Continue to attach the U-channel to the top of both end rafters until finished.

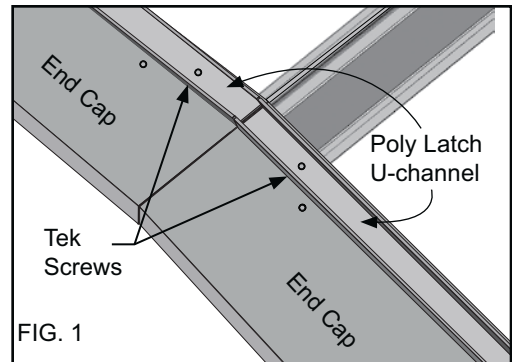
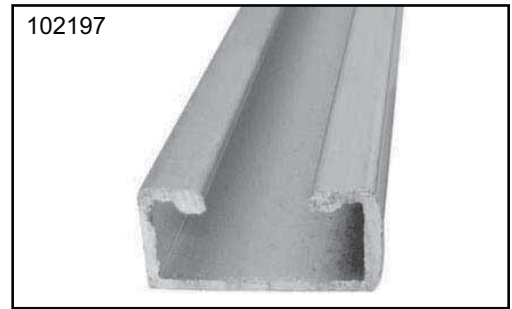
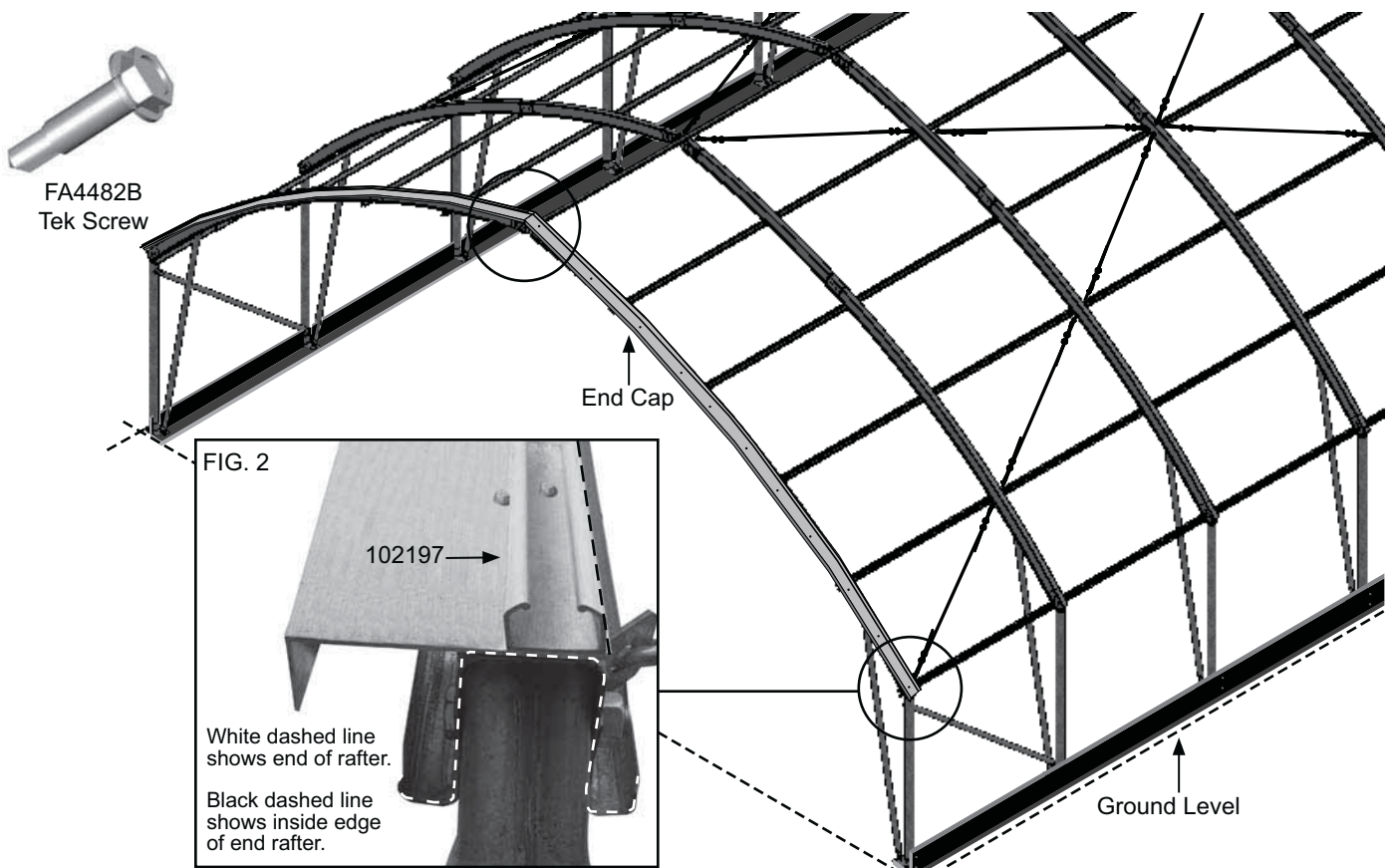


FIG. 1

Optional: Trim the poly latch U-channel as needed for a finished appearance and to close the gap. Consult a professional contractor if needed when cutting the aluminum. *Wear safety glasses when handling and cutting the U-channel.*



Film Cover Installation with Drop-Down Sides

INSTALL POLY LATCH U-CHANNEL (Drop-Down Sides Only)

If your building includes the roll-up side feature, skip to and continue with the "Film Cover Installation with Roll-up Sides" steps.

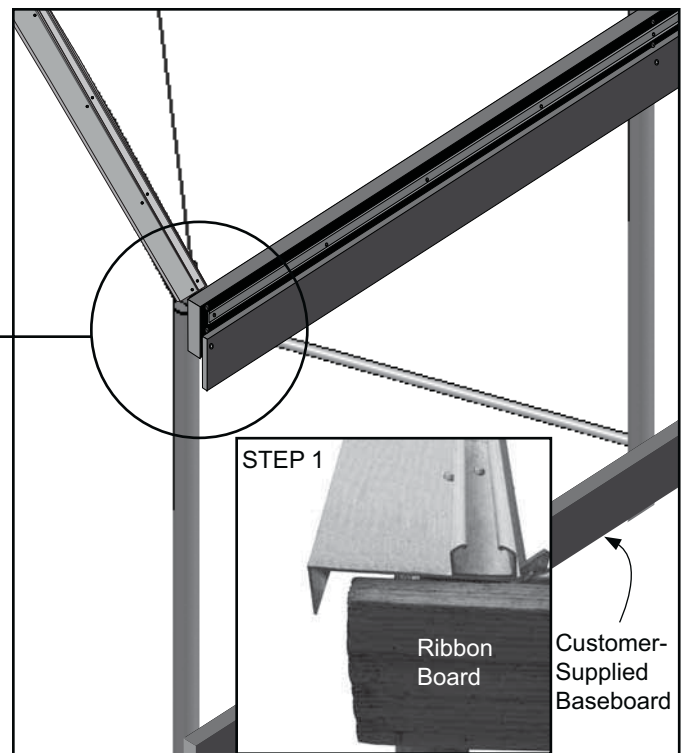
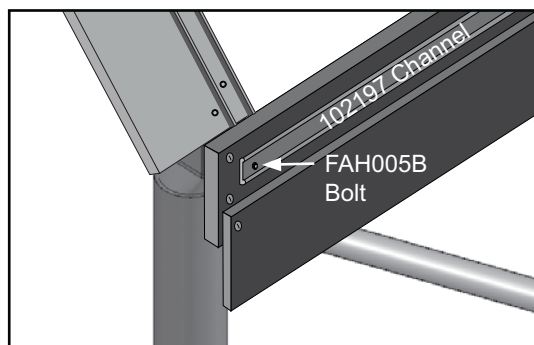
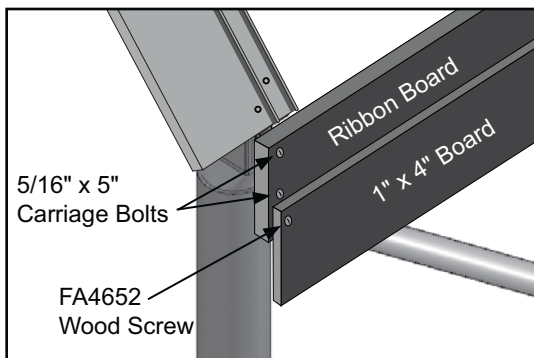
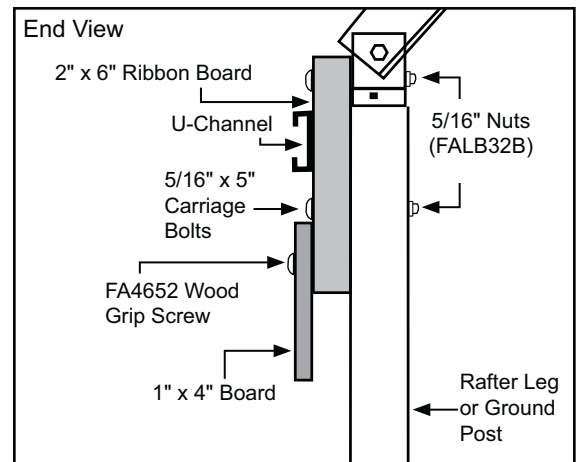
Gather the parts:

- Aluminum U-Channel (#102197) and customer-supplied ribbon board (2" x 6" board minimum dimensions)
- 1/4" x 2" carriage bolts (FAH005B), 1/4" nuts (FALB01B), and 1/4" fender washers (FAMF01B)
- 5/16" x 5" carriage bolts (FAH325B) and nuts (FALB32B) and wood grip screws (#FA4652)

1. Attach the ribbon boards to the side of the frame using 5/16" x 5" carriage bolts and nuts. **Align the end of the ribbon board with the lip of the installed end cap as shown. Drill 3/8" holes for the 5/16" bolts.**

NOTE: Required ribbon board and baseboard shown in the diagrams *are not included* and are supplied by the customer. Ribbon board will extend beyond the end rafter leg or ground post to align with the installed end cap.

2. Attach the 1" x 4" boards (customer-supplied) to the ribbon board using FA4652 wood screws. Space screws every 24".
3. Verify that the baseboard is installed properly at ground level. The baseboard must be level.
4. Attach the poly latch U-channel (102197) to the ribbon board. Drill a 5/16" hole through the U-channel and board. Secure using 1/4" x 2" carriage bolts, fender washers, and nuts. **Attach U-channel flush with the outside edge of the ribbon board. Install one 1/4" x 2" carriage bolt every 36" along each side to secure U-channel to ribbon board. Install fender washer against the ribbon board on the inside of the frame.**
5. Continue to attach the U-channel sections to the ribbon board and work toward the other end of the frame. Cut the last section of U-channel to the required length so that it is flush with the end of the ribbon board (if needed).
6. Repeat these steps to install the remaining run of poly latch U-channel for the other side of the frame and continue by installing the main cover.



Film Cover Installation with Drop-Down Sides

INSTALL MAIN COVER

Gather the parts:

- Main covers, inflation fan kit, box cutter or utility knife
- U-Channel spring (#102198) for 102197 U-channel
- Ropes long enough to reach over the frame (provided by customer)

Assembly Procedure

After the poly latch U-channel is attached to the frame, unpack the main cover and pull into place. Ropes or straps are typically used to pull the main cover onto and over the frame.

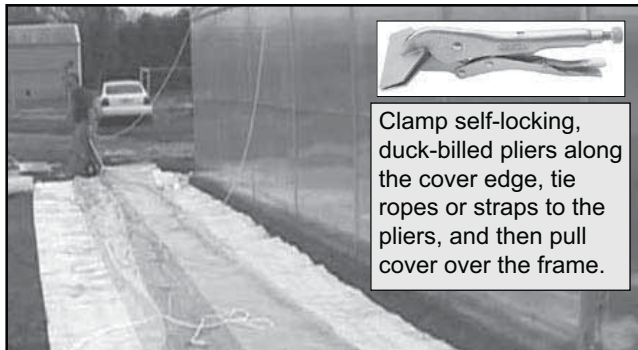
⚠ WARNING: To prevent damage to the cover and to prevent serious personal injury, **DO NOT** attempt to install the main cover on windy or stormy days.

Consult the Spec Sheets for cover identification. The greenhouse is equipped with double-layer main cover and an inflation fan kit. One cover is pulled into position and anchored to the frame, then the inflation kit is installed, and finally the last main cover is attached.

The steps that follow describe one way to complete this process.

ATTENTION: *Install the IR film cover first! Examine the IR film and install with the correct side facing in the direction indicated on the film.*

1. Take the cover film and position it along the base of one side of the building.



NOTE: Unfold the cover and locate the edge. *The frame shown in the photos differs from actual frame. Procedure is the same.*

Photo shows the cover film in position to pull over the building.



2. Along the edge, make small holes in the cover at evenly spaced intervals and tie rope or straps to the cover. ***If you do not want to cut holes in the material, clamp self-locking, duck-billed pliers to the cover and tie ropes or straps to the pliers.*** Photos show tying ropes to the cover. Pliers are not shown.

NOTE: The ropes or straps should be long enough to reach over the top of the building to the other side. Long buildings require additional ropes to prevent tearing the main cover when it is pulled into place.

Keep the holes, used to attach the rope or straps, near the edge of the material and below where the cover will be secured to the U-channel.

3. After tying the ropes to the main cover, throw the ropes over the top of the building and pull the cover into place.



IMPORTANT: To prevent damage to the main cover during installation, additional personnel and lifts may be needed.

Film Cover Installation with Drop-Down Sides

INSTALL MAIN COVER (continued)

- Center cover side-to-side and end-to-end. Some film covers include additional material for the width due to standard material dimensions. This film can be removed and recycled, or it can be used by the customer.

IMPORTANT: To prevent damage to the main cover during installation, additional personnel and lifts may be needed. **Verify that you have installed the IR film according to the markings shown on the film.**

- Once the main cover is in place and centered, begin at the peak of one end rafter and install the 102198 spring into the channel to secure the cover.

ATTENTION: Ensure that enough cover material is present to lock into the end cap channel. The cover material is cut longer/wider than is required to cover the building. For easier anchoring, allow approximately 10" to extend past the edge of the end rafter as the cover is anchored into place. Remove the ropes after the cover is secure.

- Continue down both edges of the first end rafter until the entire length of the end of the main cover film is secured in place.



CAUTION: Risk of Injury
Always wear eye protection when installing the 102198 spring!

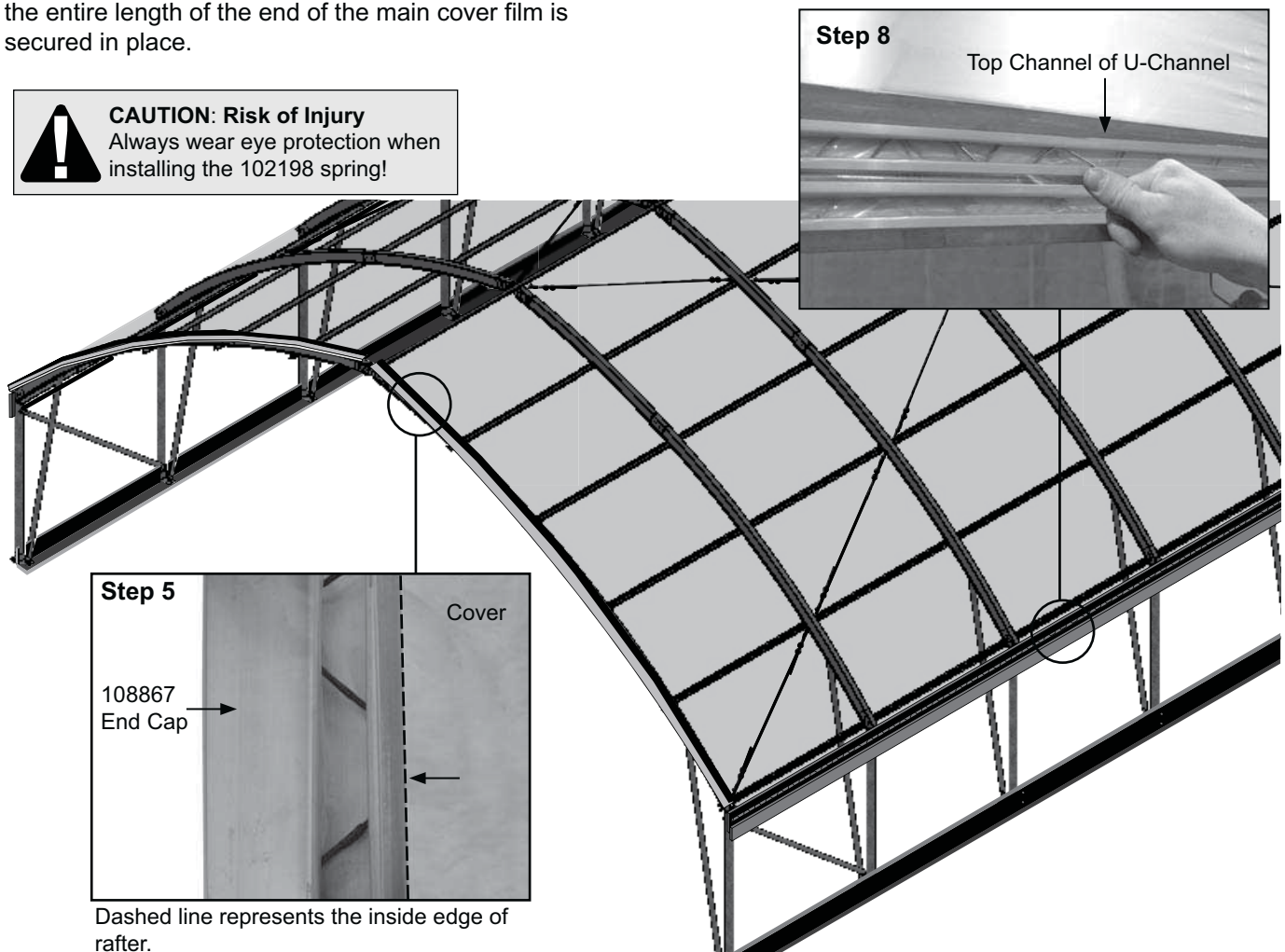
- Move to the other end of the building, pull the cover tight, and repeat the steps to secure the cover.
- After the cover is stretched end-to-end and secured, move to one side of the building and install the 102198 U-channel spring into the U-channel to anchor the cover to the first side.

NOTE: Begin at one end of the U-channel and work toward the other. Another option is to begin at the middle of each side and work toward each end. Maintain an even length as working along the side. The final stretching of the cover will take place when the last side is secured.

- After securing the first side, move to the remaining side, stretch the cover, and secure it in place.

NOTE: Pull the cover tight as the spring is inserted into the U-channel.

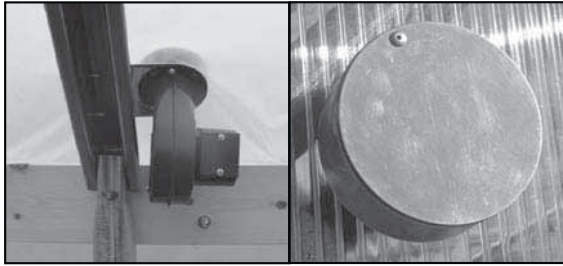
- Trim the excess cover material if desired.



Film Cover Installation with Drop-Down Sides

INSTALL MAIN COVER (continued)

- Once the first cover is stretched and secure, install the inflation fan kit in the desired location and **according to the instructions sent with the kit.**



ATTENTION: Install the inflation fan kit *before* installing the second main cover. Consult the instructions included with the fan kit to install the fan.

FOR ADDITIONAL DETAILS, CONSULT THE INFLATION FAN INSTALLATION PHOTOS FOR A SIMILAR BUILDING IN THE QUICK START GUIDE AT THE BACK OF THESE INSTRUCTIONS.

- After installing the inflation fan kit, repeat the steps to install the film for the second main cover.

NOTE: When installing the second cover film, use the same U-channel used for the first cover film, and a second run of the spring installed on top of the first spring.

- With the second cover film layer installed, test the operation of the inflation fan kit.

IMPORTANT: If trimming the excess cover material at the ends and sides, DO NOT remove too much of the excess material. Some excess main cover material (the material that extends beyond the end rafters) should remain in place to more easily re-stretch the film if needed.

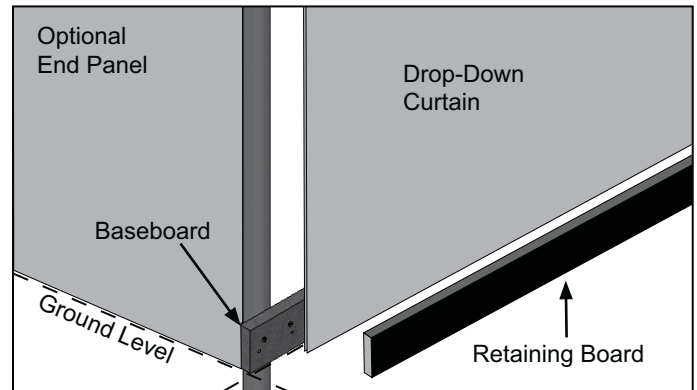
FRAME CHECK

Before you attach the drop-down curtain, inspect the frame for sharp edges or fasteners that could damage the curtain or kit components.

- Verify that all frame members are properly secured and that all bolts and clamps are tight.
- Recheck the frame assembly for sharp edges or clamps and bolts that may interfere with the installation of the curtain. File or tape sharp edges as needed.
- Reposition clamps and bolts as needed and tape all rafter pipe joints with duct tape to protect the curtain.
- Verify that the main building frame is properly and adequately anchored.

BASEBOARD NOTE

A customer-supplied baseboard and retaining board are required to attach the drop-down curtain's lower edge. See the exploded view below.



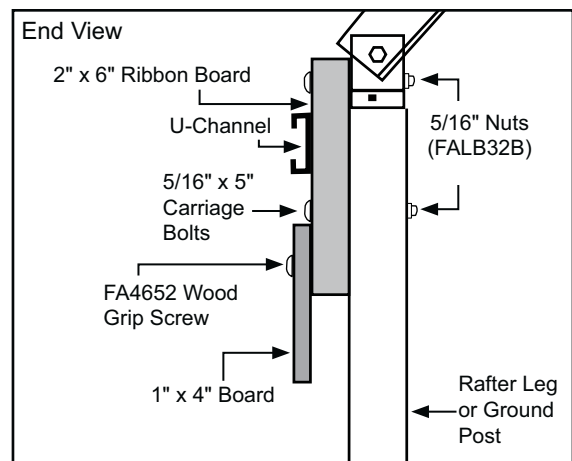
View shown from outside the shelter.

The baseboard runs the length of the frame at ground level. The retaining board secures the curtain to the baseboard. *The baseboard and retaining board are supplied by the customer.*

Fasteners (5/16" x 5" carriage bolts and FA4652 wood screws) are included. Depending on board width, use 2 carriage bolts per rafter connection for the baseboard and ribbon board. Evenly space the wood screws at 24".

FRAME CHECK AND CURTAIN PREPARATION

- If not already installed, attach the 1" x 4" board to the ribbon board using FA4652 wood screws as shown below. Space screws every 24" (minimum spacing).



- Verify that the baseboard is installed properly at ground level. The baseboard must be level for the drop-down curtain to install and function properly.
- Gather the boards needed for the retaining board of the baseboard. See diagram at the top of this page.
- Collect all drop-down curtain components and continue with the curtain installation.

Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN

Locate these parts to attach the pulleys and drop-down curtain axle:

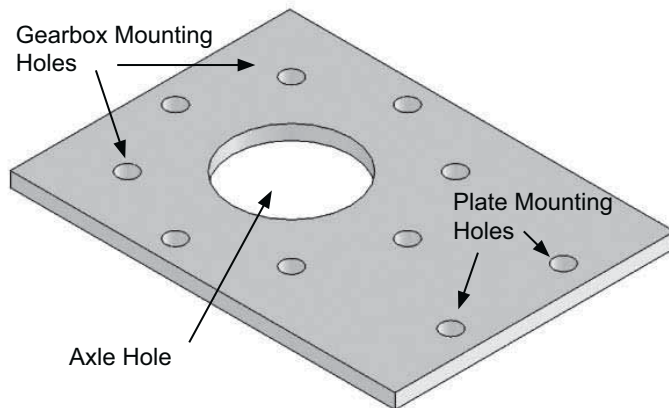
- 131S075 (1.315 swaged pipe for axle and curtain conduit)
- 106734 band clamps (for curtain axle)
- 103496 gearbox and 103544 mounting plate
- 102717 double drive
- FA4482B Tek screws (to secure band clamps and pipe joints)
- FAH325B (5/16" x 5" carriage bolts) and FALB32B 5/16" nuts
- FAH005B (1/4" x 2" carriage bolts) and FALB01B 1/4" nuts

Continue with the steps that follow to install the drop-down curtain components.

1. Take the 103544 mounting plate (shown above) and move outside the end wall where you want to position the gearbox.

103544 Mounting Plate (Figure 1)

Actual mounting plate may differ from what is shown.

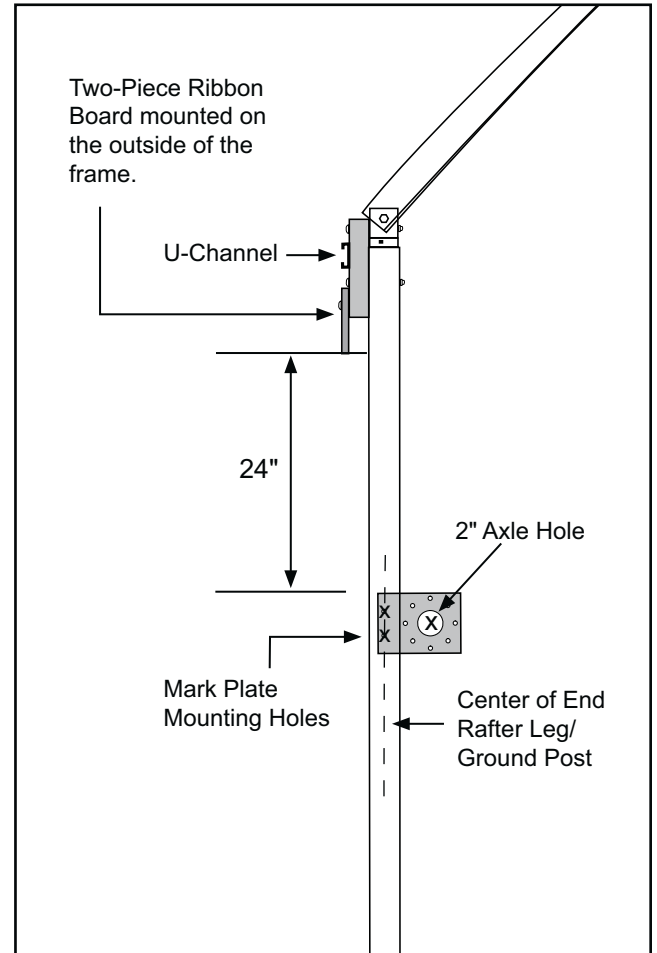


NOTE: Take a 3/8" bit and enlarge the plate mounting holes to accept the 5/16" x 5" carriage bolts to mount the plate to the rafter leg or ground post as described later in these steps.

2. Measure 24" down from the bottom of the *two-piece ribbon board*, place the mounting plate against the rafter leg or ground post, and align the plate mounting holes with the center of the end rafter leg/ground post.

See the following diagrams.

3. Mark plate mounting hole locations and drill the holes. Use a 3/8" drill bit for the mounting holes.



NOTE: Do not position the mounting plate in a location where purlins or other frame components will interfere with the installation of the drop-down curtain components. *The axle mounting clamps are attached to the inside surface of the rafter legs/ground posts in a later step.*

If an end panel is installed, carefully cut small holes for the mounting bolts, and attach the mounting plate on the outside as shown.

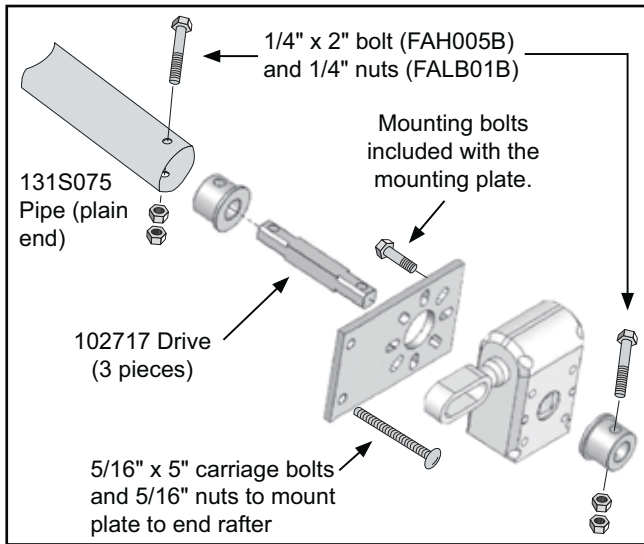
4. Using the 5/16" x 5" carriage bolts and 5/16" nuts, secure the 103544 plate to the outside of the rafter leg/ground post.

If the end wall is covered with a fabric panel, use a utility knife to cut a small X through the panel within the 2" hole position of the mounting plate for the axle and continue.

Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN (continued)

5. With the mounting plate installed, take the 103496 gearbox, place it against the mounting plate at the desired angle, and secure using the bolts included with the gearbox.
6. Take two (2) pieces of 131S075 (75") pipe, slide the swaged end of one into the plain end of the other and secure the joint using an FA4482B Tek screw.
7. Using the diagram below, attach the 103496 gearbox and assemble the remaining components as shown.



NOTE: Attach the plain end of the 131S075 pipe to the 102717 drive hub. Use the pipe insert to mark the hole location and drill the hole. Actual components may differ slightly from those shown in the diagrams. Have an assistant support the loose end of the axle to prevent damage.

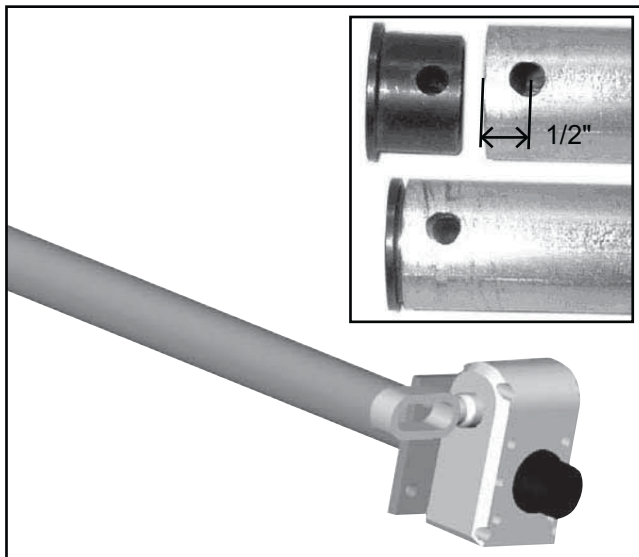
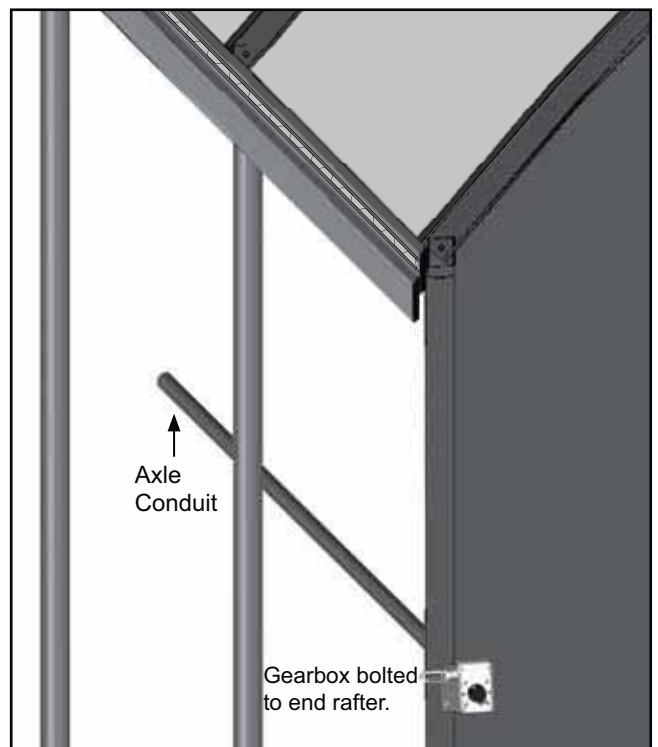
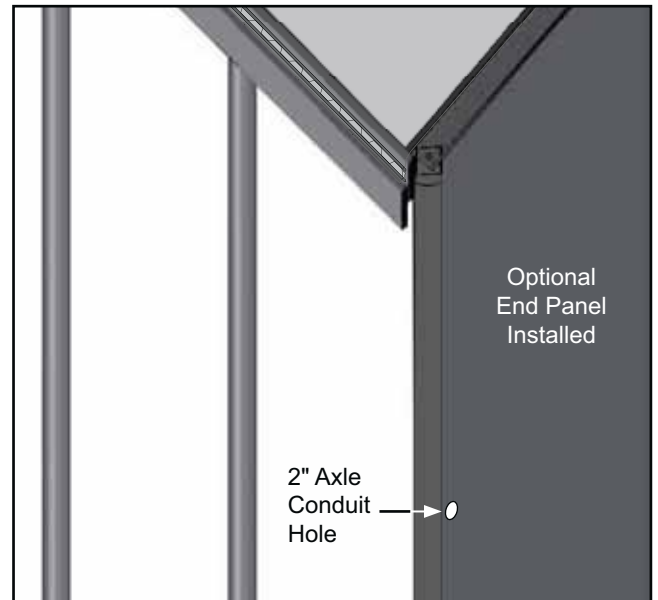


Diagram shows the assembled components.

If an optional end panel has been installed, carefully insert the axle through the 2" axle conduit hole in the optional end panel.



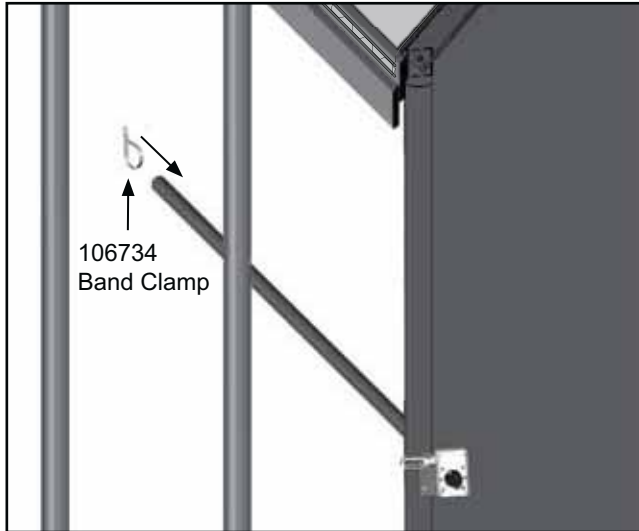
NOTE: Diagrams shows gearbox mounted to the end rafter on the outside of the optional end wall cover.

These instructions describe assembling the drop-down axle in sections and working toward the other end of the frame. If desired and assistants are present, you can first fully assemble the axle and then attach the axle to the rafters as a single unit. *This procedure is not shown.*

Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN (continued)

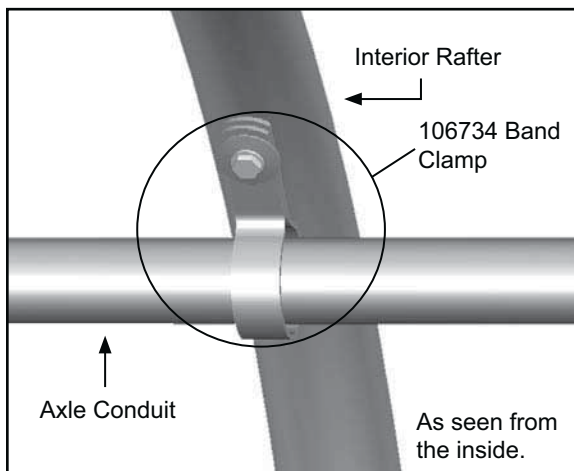
8. Move inside the frame and slide a 106734 band clamp over the tapered end of the 131S075 pipe.



NOTE: Verify that the pipe is level and secure the band clamp to the rafter leg (or ground post) that is **6' or 8' from the end wall** using an FA4482B Tek screw. For buildings with 4' on-center spacing, add another axle pipe so the assembly reaches the 8' mark.

Install band clamps every 6' or 8' throughout the frame length. After securing a clamp to a rafter, bend the clamp away from the rafter as needed to keep the axle aligned and level. (A customer-supplied spacer can also be installed between the clamp and the rafter if spacer is available. This option is not shown.)

9. Take a section of 131S075 pipe, attach it to the installed axle. *Do not secure the joint at this time.*
10. Slide another band clamp onto the tapered/swaged end of the conduit, level the conduit, and secure the band clamp to the next rafter leg/ground post at the 6' or 8' on-center spacing.

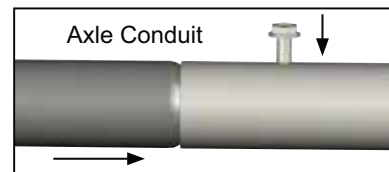


Actual rafter leg may differ slightly from the diagram.

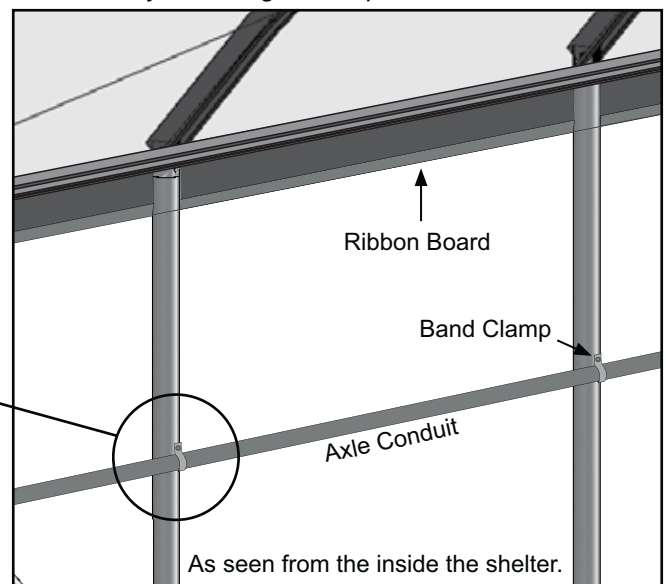
11. Continue adding 131S075 conduit and band clamps and work toward the other end of the shelter. Verify that the axle conduit remains level throughout the length. *Attach band clamps to the rafter legs or ground posts using the 6' or 8' on-center spacing.*

NOTE: If an optional end panel is installed at the other end of the frame, *do not allow the free end of the axle to touch the inside surface of the panel. Trim pipe if needed. Axle must turn freely.*

If the assembled axle is too short, adjust each pipe at each pipe joint until the desired length is achieved, or add another section of pipe. At least 1-1/2" of the swaged end of a pipe must remain inside the plain end of the adjacent pipe.



12. After installing all sections of axle conduit for the first drop-down curtain assembly, verify that the axle conduit is level and secure each conduit splice with a Tek screw (FA4482B) as shown above.
13. Move to the gearbox and test the assembly using the crank handle.
- NOTE:** The assembled axle conduit should turn freely throughout the length of the shelter. Adjust the band clamps as needed. Reposition clamps and screws if these prevent smooth operation of the axle conduit.
14. After verifying that the axle turns smoothly, repeat the procedure to assemble and attach the gearbox and axle conduit *to the other side of the shelter.*
15. Continue by attaching the drop-down curtains.

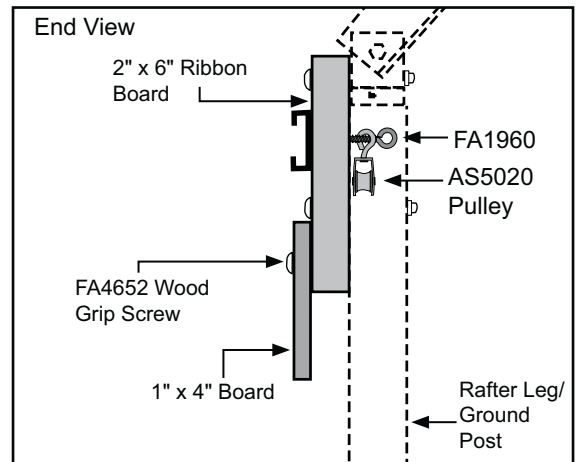


Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN (continued)

Locate these parts to prepare the drop-down curtain for installation and to attach it to the axle conduit:

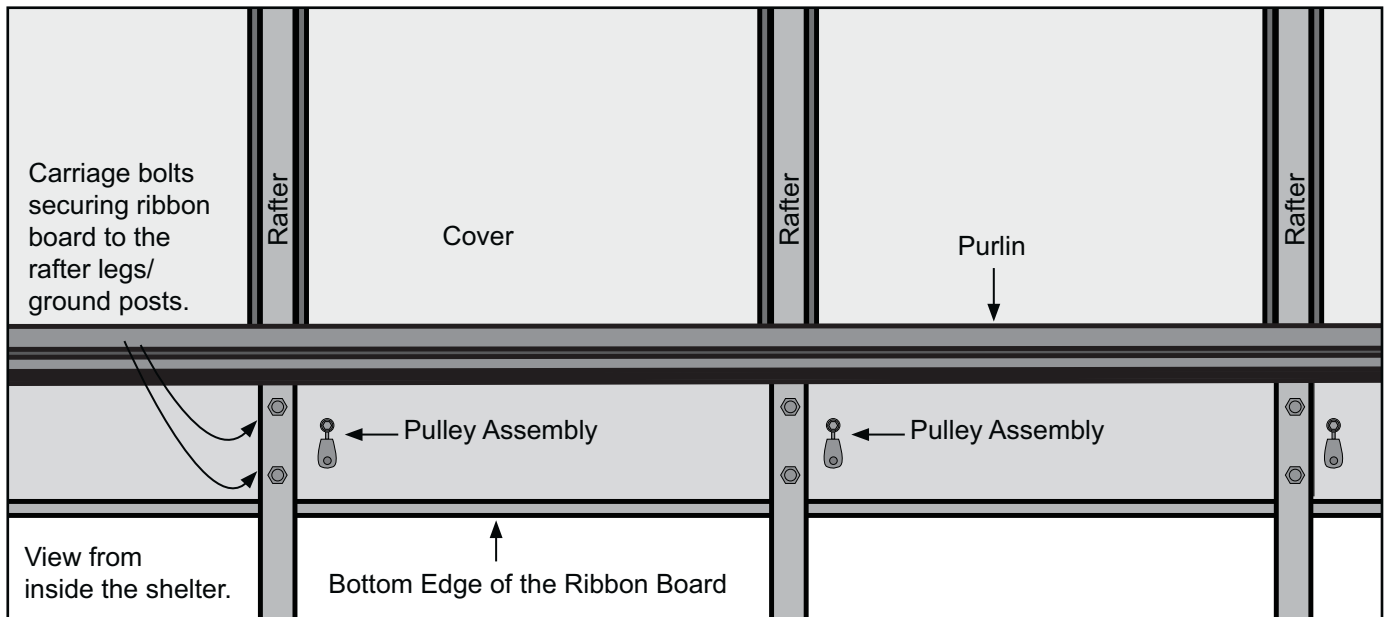
- 131S075 (75" pipe conduit)
- CC5505 (1/8" curtain cord)
- FA1960 (3/16" x 3" eye screw)
- AS5020 pulleys
- Duct tape and FA4482B Tek screws
- 102921 Neo-bonded washers
- Drop-down curtain (specific to the length of the frame)



Attach Drop-Down Curtain Pulleys

Continue with the steps that follow:

1. Gather the pulleys and the same quantity of eye screws (FA1960) and move to the inside of the shelter.
2. Slide one pulley onto the threaded shaft of the eye screw and twist the eye screw into the ribbon board a distance that is **6' from the end wall** to secure the pulley. **A building with 6' on-center rafter spacing is shown below.**



NOTE: Position the eye screw and pulley a few inches away from the rafter on either side of a rafter. Pulley should hang freely from the eye screw. **Install all pulleys at the same height. Do not overtighten the screw.**

3. Move to the next position and repeat the steps to install another pulley. *Install one pulley every 6' along each side of the frame regardless of the rafter spacing. Depending on the rafter spacing, pulley position may differ from what is shown in the diagram above. Maintain the 6' on-center spacing throughout the length of the frame.*
4. Continue installing eye screws and pulleys into the ribbon board at the 6' on-center spacing until all pulleys are installed *along both sides of the shelter.*
5. Install the curtain conduit and attach cords as described in the next procedure.

Film Cover Installation with Drop-Down Sides

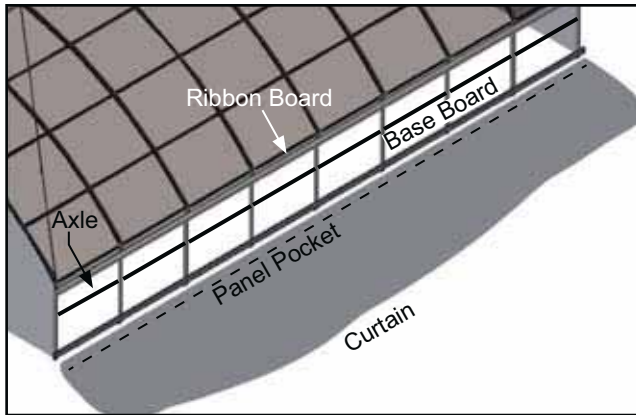
INSTALL THE DROP-DOWN CURTAIN (continued)

Install Curtain Conduit and Attach Cord

After installing all eye screws and pulleys, locate the curtain, 131S075 conduit, 1/8" rope, FA4652 screws, and duct tape. Refer to the parts list on the previous page if needed.

Complete these steps:

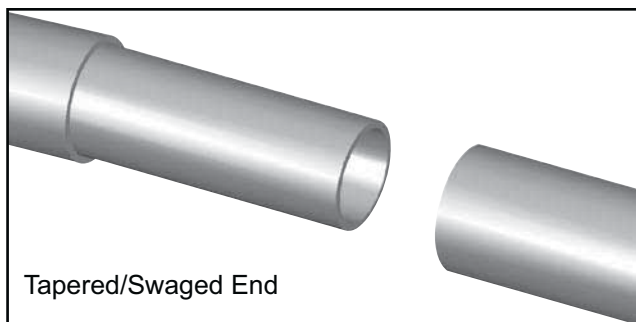
1. Unfold the curtain along one side of the shelter and position the conduit pocket of the drop-down curtain along the baseboard.



Dashed line shows where to position the pocket of the curtain. **Curtain is longer than the length of the building.**

Customer/installer is responsible for determining how to position curtain along the side. For example, consider whether curtain material is needed to secure the curtain at each end during cool or cold weather.

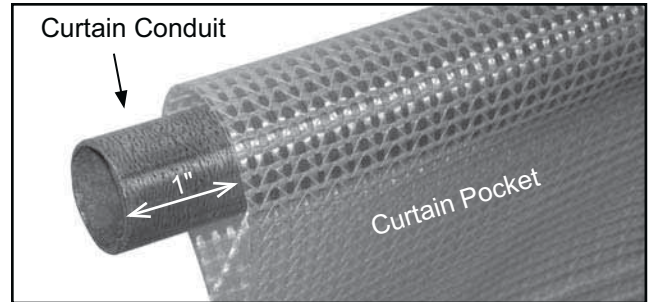
2. Take one section of 131S075 conduit (75") and insert the plain end (not the tapered/swaged end) into the curtain pocket.



3. With the first conduit section in the pocket, add another section to the first (plain end over tapered/swaged end), secure the joint using an FA4482B Tek screw, and tape the conduit joint using duct tape.
4. Continue adding conduit sections and securing each joint until the conduit is as long as the curtain.

5. Complete the curtain conduit installation by cutting the conduit so that it extends from the panel pocket approximately 1" at each end.

ATTENTION: Allowing the curtain to extend beyond the end rafters offers a way to secure the curtain to the end rafter legs/ground posts when temperatures drop. **The customer can customize this installation as needed for a different result and for different applications.**



6. Position the curtain and the installed curtain conduit as desired along the side of the frame.
7. At the first pulley position, measure from the curtain conduit up to pulley and back down to the axle conduit mounted to the frame. Add 12" to ensure that the cord length is sufficient and cut a cord from the bulk roll.

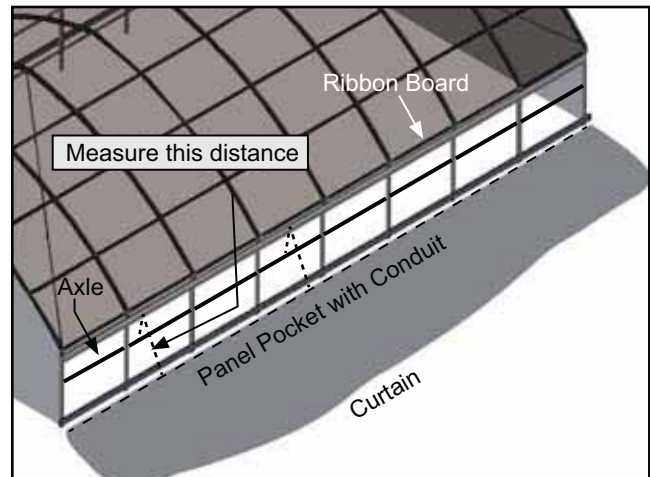
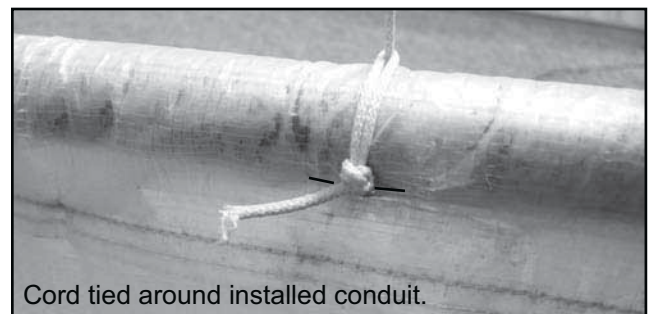


Diagram above shows where to measure to determine the length for each axle-to-curtain conduit cord.

8. On the curtain, make a small cut below the conduit and tie the cord around the conduit. **Align the cord/cut with the pulley attached to the ribbon board.**

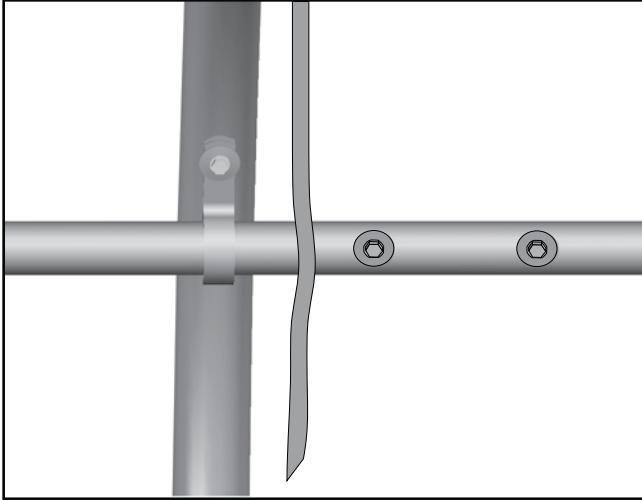


Cord tied around installed conduit.

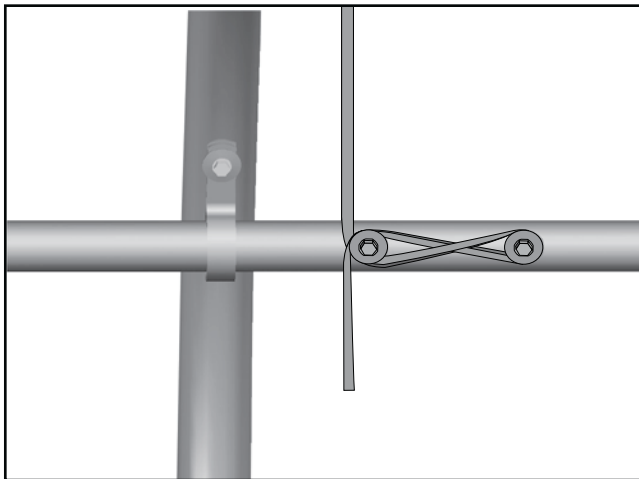
Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN (continued)

9. Move to the axle and drive two (2) FA4482 Tek screws with neo-bonded washers (102921) into the axle conduit where the cord is located. *Do not fully seat the Tek screws to the conduit.* Allow space to remain between the washer and conduit.



10. Verify that the curtain conduit remains against the baseboard and pull the slack from the cord.
11. Thread the cord through the pulley (if this has not been done), weave the cord around the Tek screws as shown, and tighten the screws to secure the cord to the axle.



12. Move to the next pulley position and repeat the steps to measure, cut, and attach another cord to the curtain and axle conduit.

ATTENTION: If the cord length was correct for the first, cut additional cords to the same length. To ensure that the curtain remains level during operation, verify that additional cords are wrapped around the axle conduit in the same direction and manner as the first cord.

13. Repeat the above steps until all cords are attached to the first curtain along one side of the shelter.

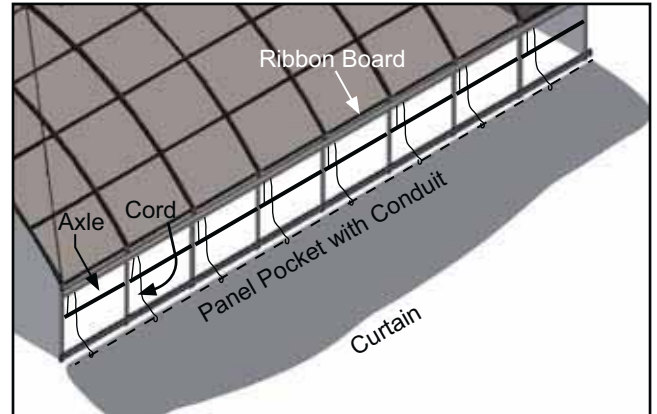
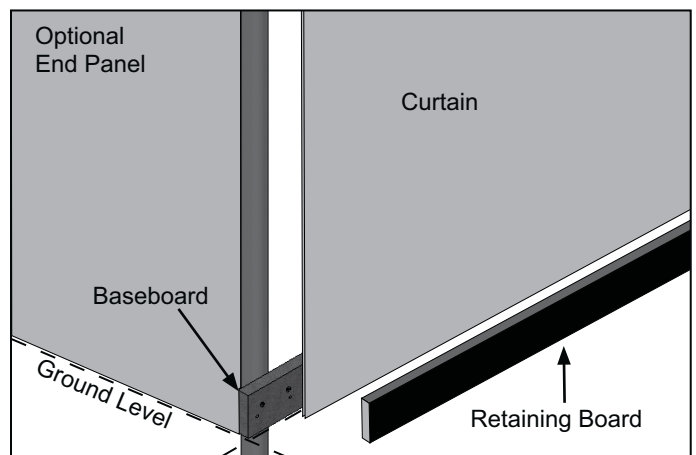


Diagram shows cords attached to the curtain conduit and to the axle. Dashed line shows the position of the curtain conduit.

14. Continue by attaching the lower curtain edge to the baseboard for the first curtain installation.

Attach Lower Edge of the Curtain to Baseboard

After tying all cords to the curtain and axle conduits for the first curtain assembly, secure the free edge (bottom) of the curtain to the baseboard.



View shown from outside the shelter.

Use customer-supplied dimension lumber as a retaining board for the lower edge of the curtain. The retaining board must be at least 1" x 2" to adequately secure the curtain to the baseboard.

Complete the steps that follow on the next page to attach the lower edge of the curtain.

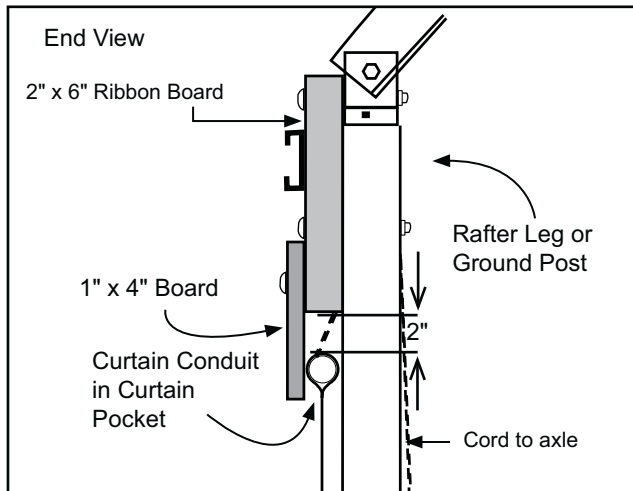
Film Cover Installation with Drop-Down Sides

INSTALL THE DROP-DOWN CURTAIN (continued)

Complete these steps to attach the lower edge of the curtain to the customer-supplied baseboard.

CAUTION: Do not attempt to attach the curtain to the baseboard during stormy or windy conditions or when such conditions are expected.

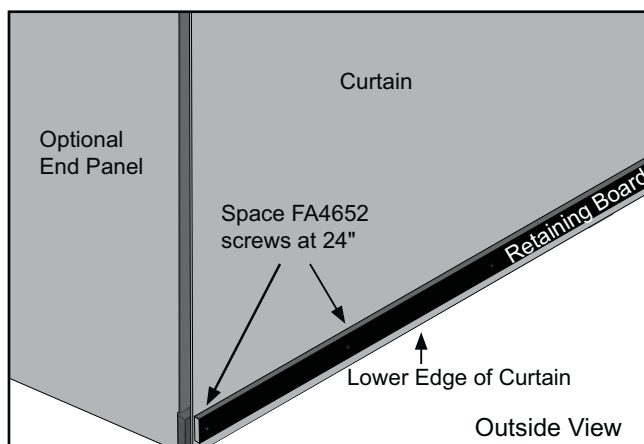
- Using the supplied-crank handle, roll the curtain up to within 2" of where it will seat into the channel created by the two-piece ribbon board.



- Move to the bottom of the panel and with assistance, evenly stretch the panel end-to-end along the baseboard.
- Take the first section of customer-supplied retaining board and place it against the curtain and the baseboard to hold the curtain in position.

NOTE: Evenly and gently pull the curtain edge down to remove wrinkles. *Applying too much force will bend the curtain conduit and may stretch the cord.*

- Using the supplied FA4652 fasteners, secure the retaining board to the baseboard as shown.



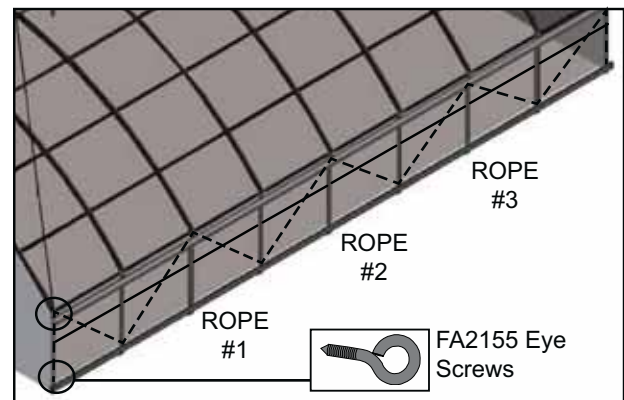
- Repeat the steps to secure the remaining lower edge of the curtain to the baseboard along the side.
- Return to the gearbox and check the operation of the drop-down curtain using the crank handle. Adjust cords as needed for a level curtain.
- Repeat the steps to attach the remaining curtain to the other side of the building.
- Install the anti-billow rope.

INSTALL THE ANTI-BILLOW ROPES

The anti-billow ropes keep the drop-down curtain in place when it is fully or partially open. Using the diagrams below, complete the anti-billow rope installation.

ATTENTION: INSTALL THE ANTI-BILLOW ROPE IN SHORT SECTIONS ALONG EACH SIDE TO KEEP THE CURTAIN SECURE IN CASE ONE ROPE BREAKS.

- Beginning at *one end rafter*, take two (2) eye screws (FA2155) and attach one to the baseboard and one to the ribbon board. Align the FA2155 eye screws with each other. See circles below.



- Using the sample diagrams as guides, move to the next rafter and attach the eye screw to either the baseboard or the ribbon board, depending on the desired pattern.
- Continue installing the eye screws until reaching the other end rafter and finish the installation by repeating Step 1.
- Install the anti-billow rope **in short lengths along each side**. Thread the free end of the rope through the end rafter eye screws and through the eye screws at two to three interior rafters. Cut the rope and tie the ends to the eye screws.
- Repeat this pattern of **installing short rope lengths** for the remainder of the first side and the other side.
- Continue by reading the Care and Maintenance information found later in this manual.

Film Cover Installation with Roll-Up Sides

INSTALL POLY LATCH U-CHANNEL (Roll-up Sides Only)

For the roll-up sides, the double poly latch U-Channel (#104211) is attached to each side of the frame and runs from the front to the back of the shelter.

If your building includes a drop-down side curtain, return to and complete the **"Film Cover Installation with Drop-Down Sides"** procedure. *Do not continue with these roll-up side steps.* Gather the parts:

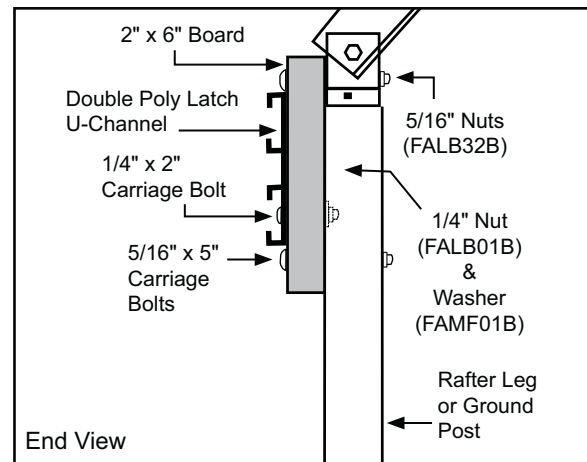
- Double poly latch U-Channel (#104211) and ribbon board - 2" x 6" board (minimum dimension)
- 5/16" x 5" carriage bolts (FAH325B) and nuts (FALB32B)
- 1/4" x 2" carriage bolts (FAH005B), 1/4" nuts (FALB01B), and fender washers (FAMF01B)

Complete these steps:

1. Position the ribbon board at the top of the rafter leg/ground post and align it with the end cap as shown in the diagram below. Drill two 3/8" holes through the ribbon board and rafter leg/ground post.

The ribbon board must extend beyond the end rafter and align with the end cap as shown below.

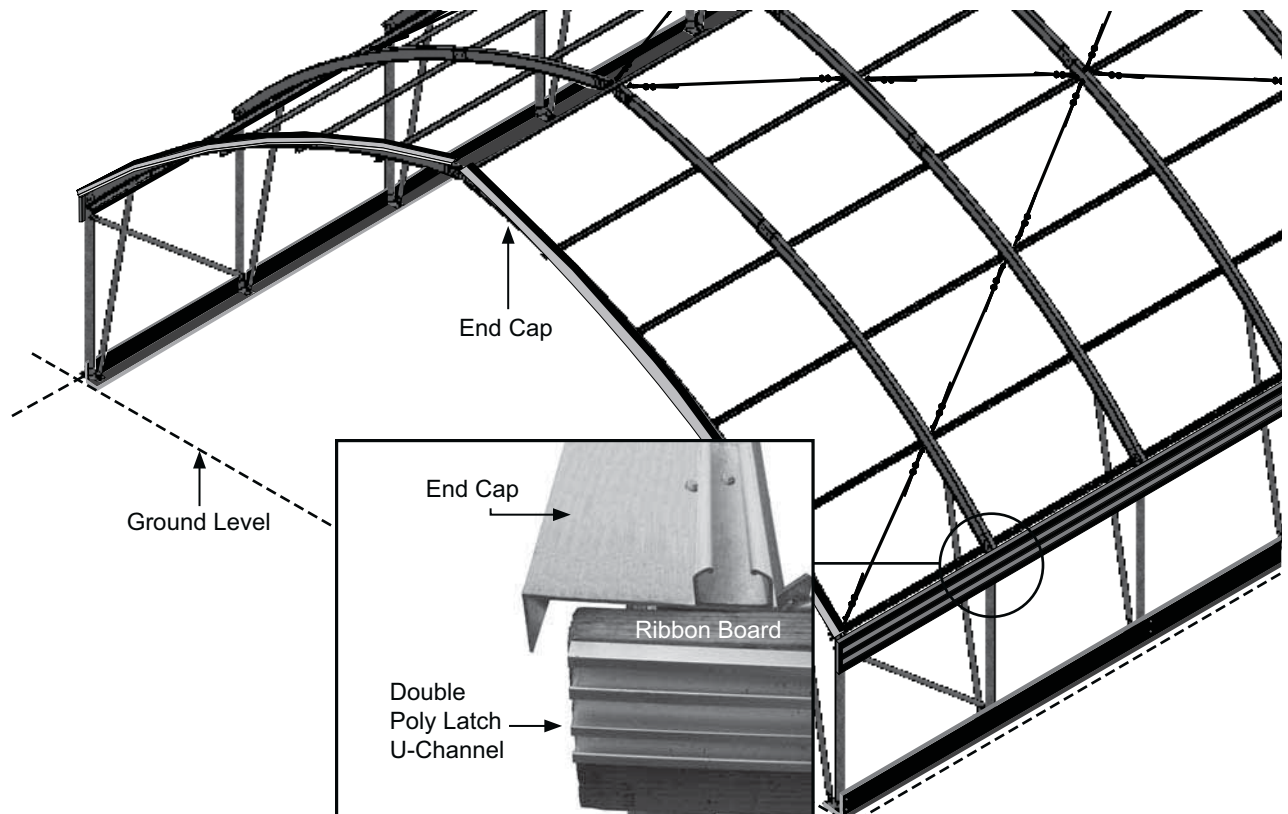
2. Attach ribbon board to the side of the frame using 5/16" x 5" carriage bolts and nuts. *Ribbon board is supplied by the customer.*



3. Attach the double poly latch U-channel (104211) to the ribbon board. Drill a 5/16" hole through the U-channel and board. Secure to ribbon board using 1/4" x 2" carriage bolts, fender washers, and nuts. *Attach U-channel flush with the outside edge of the ribbon board. See diagram above.*

Install one 1/4" x 2" carriage bolt every 36" along each side to secure U-channel to ribbon board.

4. Continue to attach the double poly latch U-channel to the ribbon board and work toward the other end of the frame. Cut the last section of double poly latch U-channel to the required length so that it is flush with edge of the ribbon board (if needed).
5. Repeat these steps for the remaining side.



Film Cover Installation with Roll-Up Sides

INSTALL MAIN COVER

Gather the parts:

- Main covers and inflation fan kit
- U-Channel spring (#102198) for 102197 U-channel
- Ropes long enough to reach over the frame (provided by customer)
- Box cutter or utility knife

Assembly Procedure

After the poly latch U-channel is attached to the frame, unpack the main cover and pull into place. Ropes or straps are typically used to pull the main cover onto and over the frame.

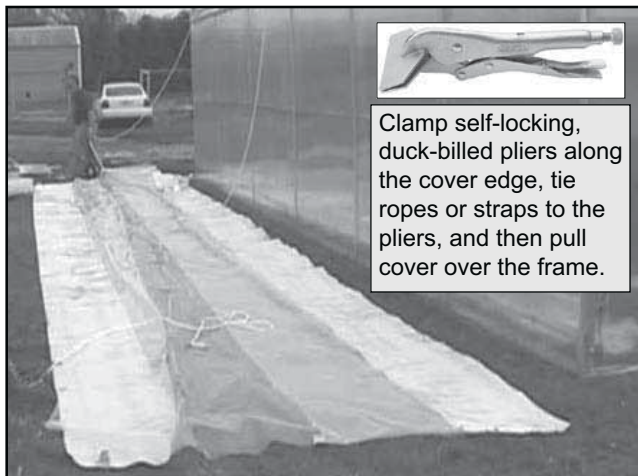
⚠ WARNING: To prevent damage to the cover and to prevent serious personal injury, DO NOT attempt to install the main cover on windy or stormy days.

Consult the Spec Sheets for cover identification. The greenhouse is equipped with double-layer main cover and an inflation fan kit. One cover is pulled into position and anchored to the frame, then the inflation kit is installed, and finally the last main cover is attached.

The steps that follow describe one way to complete this process.

ATTENTION: Install the IR film cover first! Examine the IR film and install with the correct side facing in the direction indicated on the film.

1. Take the cover film and position it along the base of one side of the building.



NOTE: Unfold the cover and locate the edge. The frame shown in the photos differs from actual frame. Procedure is the same.

Photo shows the cover film in position to pull over the building.



2. Along the edge, make small holes in the cover at evenly spaced intervals and tie rope or straps to the cover. **If you do not want to cut holes in the material, clamp self-locking, duck-billed pliers to the cover and tie ropes or straps to the pliers.** Photos show tying ropes to the cover. Pliers are not shown.

NOTE: The ropes or straps must be long enough to reach over the top of the building to the other side. Long buildings require additional ropes to prevent tearing the main cover when it is pulled into place.

Keep the holes, used to attach the rope or straps, near the edge of the material and below where the cover will be secured to the U-channel.

3. After tying the ropes to the main cover, throw the ropes over the top of the building and pull the cover into place.



IMPORTANT: To prevent damage to the main cover during installation, additional personnel and lifts may be needed.

Film Cover Installation with Roll-Up Sides

INSTALL MAIN COVER (continued)

- Center cover side-to-side and end-to-end. Some film covers include additional material for the width due to standard material dimensions. This film can be removed and recycled, or it can be used by the customer.

IMPORTANT: To prevent damage to the main cover during installation, additional personnel and lifts may be needed. **Verify that you have installed the IR film according to the markings shown on the film.**

- Once the main cover is in place and centered, begin at the peak of one end and install the 102198 spring into the channel to secure the cover.

ATTENTION: Ensure that enough cover material is present to lock into the end cap channel. The cover material is cut longer/wider than is required to cover the building. For easier anchoring, allow approximately 10" to extend past the edge of the end rafter as the cover is anchored into place. Remove the ropes after the cover is secure.

- Continue down both edges of the first end rafter until the entire length of the end of the main cover film is secured in place.



CAUTION: Risk of Injury
Always wear eye protection when installing the 102198 spring!

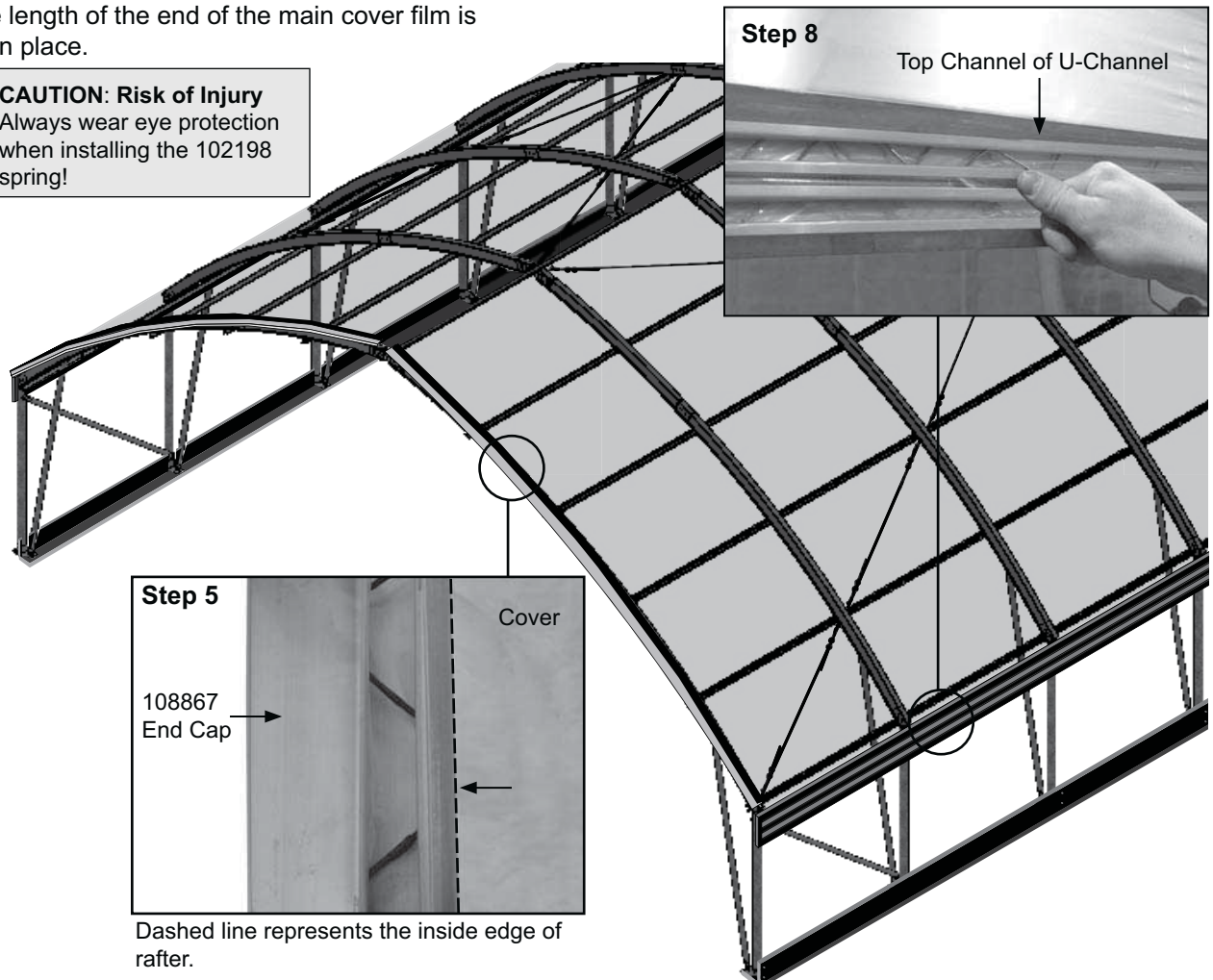
- Move to the other end of the building, pull the cover tight, and repeat the steps to secure the cover in the end cap channel.
- After the cover is stretched end-to-end and secured, move to one side of the building and install the 102198 U-channel spring into the U-channel to anchor the cover to the first side. Use the top channel for cover.

NOTE: Begin at one end of the U-channel and work toward the other. Another option is to begin at the middle of each side and work toward each end. Maintain an even length as working along the side. The final stretching of the cover will take place when the last side is secured.

- After securing the first side, move to the remaining side, stretch the cover, and secure it in place.

NOTE: Pull the cover tight as the spring is inserted into the U-channel.

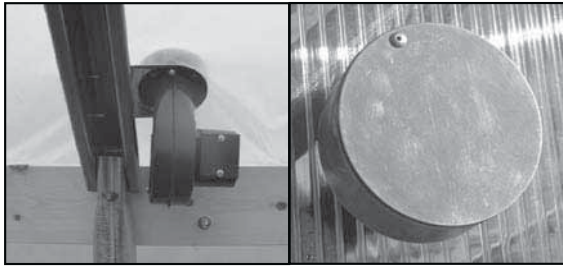
- Trim the excess cover material if desired.



Film Cover Installation with Roll-Up Sides

INSTALL MAIN COVER (continued)

- Once the first cover is stretched and secure, install the inflation fan kit in the desired location and **according to the instructions sent with the kit.**



ATTENTION: Install the inflation fan kit *before* installing the second main cover. Consult the instructions included with the fan kit to install the fan.

FOR ADDITIONAL DETAILS, CONSULT THE INFLATION FAN INSTALLATION PHOTOS FOR A SIMILAR BUILDING IN THE QUICK START GUIDE AT THE BACK OF THESE INSTRUCTIONS.

- After installing the inflation fan kit, repeat the steps to install the film for the second main cover.

NOTE: When installing the second cover film, use the same U-channel used for the first cover film, and a second run spring installed on top of the first spring.

- With the second cover film layer installed, test the operation of the inflation fan kit.

IMPORTANT: If trimming the excess cover material at the ends and sides, DO NOT remove too much of the excess material. Some excess main cover material (the material that extends beyond the end rafters) should remain in place to more easily re-stretch the film if needed.

FRAME CHECK

Before you attach the roll-up curtain, inspect the frame for sharp edges or fasteners that could damage the curtain or kit components.

- Verify that all frame members are properly secured and that all bolts and clamps are tight.
- Recheck the frame assembly for sharp edges or clamps and bolts that may interfere with the installation of the curtain. File or tape sharp edges as needed.
- Reposition clamps and bolts as needed and tape all rafter pipe joints with duct tape to protect the curtain.
- Verify that the main building frame is properly and adequately anchored.

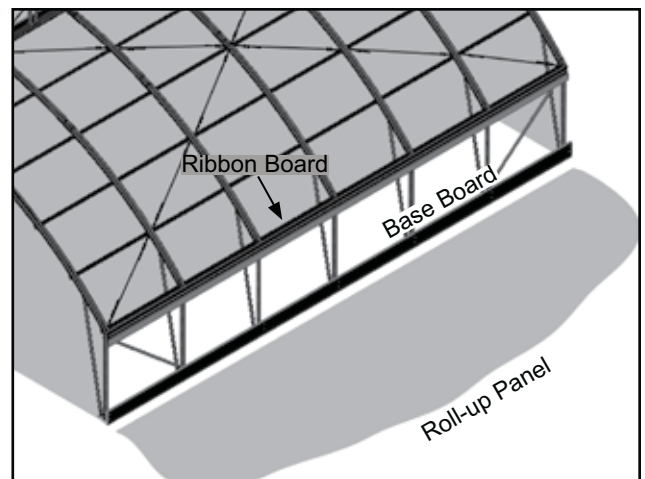
INSTALL ROLL-UP PANELS

This model includes a roll-up side panel for each side of the shelter. The panel film material is typically shipped as a single roll. Complete the following steps:

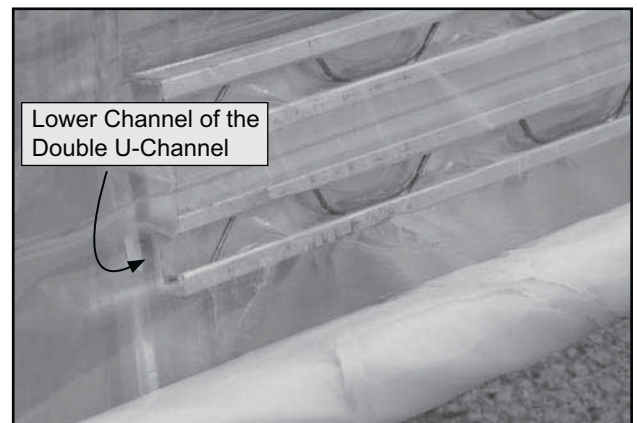
- Locate the roll of film for the roll-up sides, roll it out, and fold it in half (lengthwise). Cut the film in half.

ATTENTION: Measure the film *before cutting* to verify that the correct amount has been shipped. Do not cut the film too short or long. Film usually ships 2' longer per side (e.g., 36' building: roll-up panel is 38' long).

- Stretch the roll-up panel along the side of the shelter and center it from end-to-end.



- Using the lower channel of the double U-channel and the wire spring (102198), secure the top edge of the film to the U-channel.



- With the top edge secured, spread the free/loose edge of the panel out so that it hangs down evenly from the secured upper edge.

NOTE: Excess panel will be rolled onto the roll-up conduit during the next procedure.

- Continue with the following roll-up procedures to finish the installation.

Film Cover Installation with Roll-Up Sides

ASSEMBLE THE ROLL-UP SIDE CONDUIT

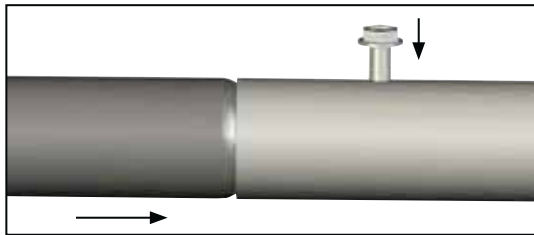
Gather the parts:

- Pipe 1.315" x 75" swaged (#131S075)
- Tek screws (#FA4482B)

The roll-up side conduit assembly attaches to the bottom edge of the roll-up film material. This assembly runs the length of the frame and serves as the center pipe that the roll-up film wraps around when it is opened to ventilate the shelter.

Complete these steps to assemble the roll-up side conduit.

1. Locate all sections of pipe (#131S075) needed to assemble the roll-up film conduit.
2. Insert the swaged end of each pipe into the plain end of another pipe until the conduit is assembled.
3. Secure each pipe joint with a Tek screw (FA4482B) and tape over the screw using duct tape.



4. Place the assembled conduit on the lower edge of the roll-up side film.
5. Center the conduit end-to-end, allowing at least 6" of pipe to extend beyond the end rafters. Pipe can be trimmed later if desired.

ATTENTION: In some instance, you may need to trim the pipe to length and use the remaining section to complete the assembly of the other roll-up conduit. Count the pipes to verify that you have enough to complete the assembly of the remaining conduit.

Consult the Twist-of-the-Wrist Assembly procedure on the next page for diagrams that show an assembled roll-up side.

6. Continue with the procedure that follows to attach the conduit to the roll-up side panels.

ATTACH CONDUIT TO ROLL-UP SIDE FILM

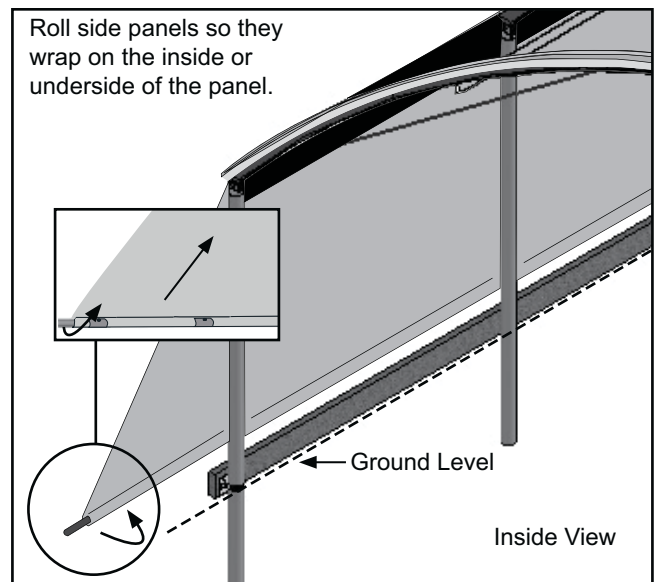
Gather the parts:

- Assembled conduit
- Fabric clips #CC6212 (Divide quantity in half.)
- Tek screws (#FA4482B)

To this point, the roll-up side film along one side is secured to and hanging down from the double U-channel. The assembled roll-up conduit should be positioned on the free end of the side roll-up file.

1. Roll the assembled conduit onto the edge of the roll-up film.
2. Verify that the film and conduit are evenly positioned, and, using half of the #CC6212 fabric clips and FA4482B screws, secure the film to the conduit.

Evenly space the clips along the length of the conduit.



NOTE: Twist the conduit in a direction that wraps the film toward the inside of the frame. This allows water to drain off the building and roll-up film.

3. Continue to roll the conduit until the excess film material is wound around the conduit and the lower edge is positioned at the base of the frame.
4. Temporarily anchor the conduit and curtain to the frame or ground *and repeat the steps to complete the installation of the roll-up side panel for the remaining side of the building up to this point.*
5. With the excess roll-up side film rolled on the conduit assemblies, continue with the installation of the Twist-of-the-Wrist components for the roll-up sides.

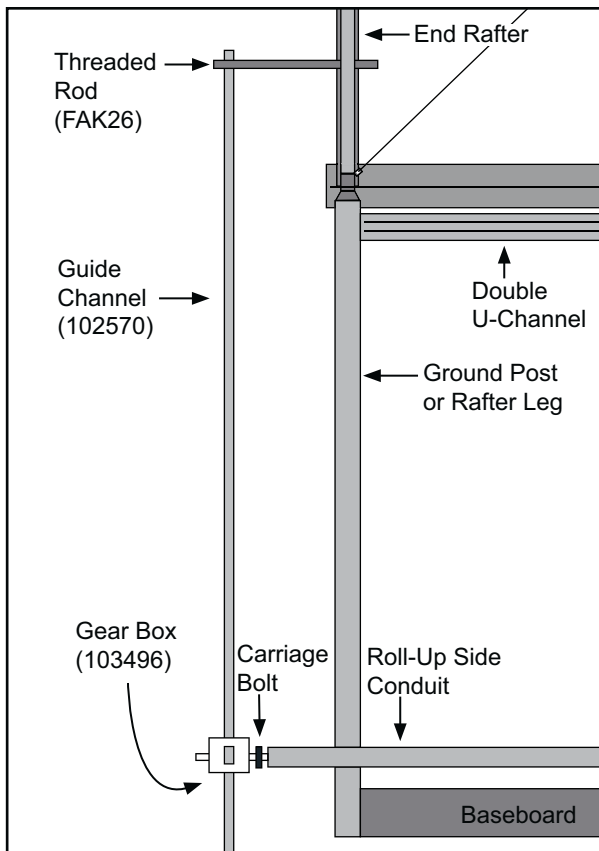
Film Cover Installation with Roll-Up Sides

TWIST-OF-THE-WRIST ASSEMBLY

Gather the parts:

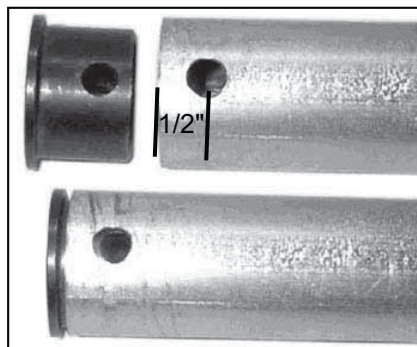
- Aluminum channel (102570) and drive handle (102480)
- Gearbox (103496) and gearbox drive (102717)
- Mounting plate (103544), bearing (102569), and threaded rod (FAK26)
- 3/8" nuts (FALB04B) and 3/8" washers (FAME08B)

The Twist-of-the-Wrist Assembly is designed to roll up the side film. The following steps describe the assembly and its installation.

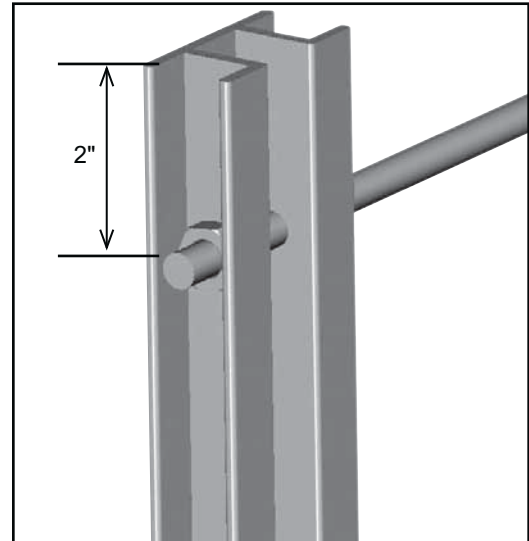


1. Measure 1/2" in from the end of the roll-up conduit, center-punch the location on the pipe, and drill a 5/16" hole through the conduit.

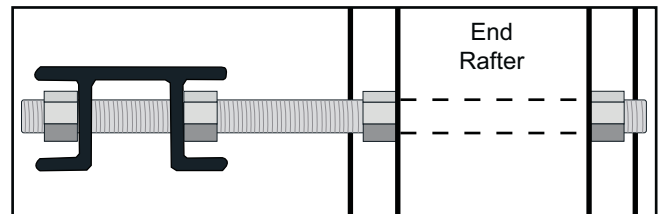
2. Insert a tubing adapter into the conduit and align the holes of the adapter with the drilled holes in the conduit.



3. Select the aluminum channel, drill a 3/8" hole through the channel approximately 2" from the end, and attach a threaded rod using a 3/8" nut on each side of the 102570 channel.



4. Position the channel along the end rafter where the Twist-of-the-Wrist assembly will be located.
5. Secure the upper end of the channel by drilling a 3/8" hole through the end rafter and attach as shown. The lower end of the channel will "float" and is not attached.



Top View

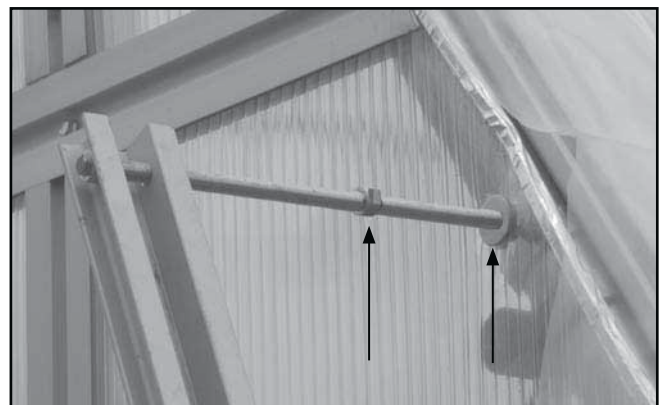


Photo shows a different model and is used for illustration purposes only.

Do not allow channel to contact the ground. Use the position of the roll-up conduit, which is at the base of the frame along the side, to help align the channel when securing it in place.

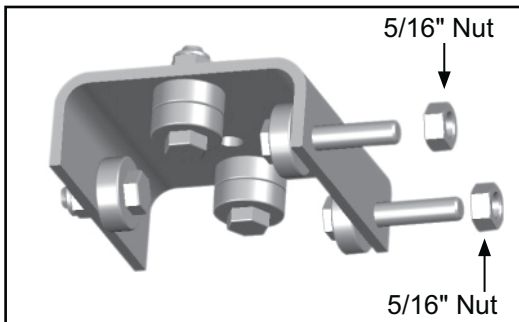
Film Cover Installation with Roll-Up Sides

TWIST-OF-THE-WRIST ASSEMBLY (continued)

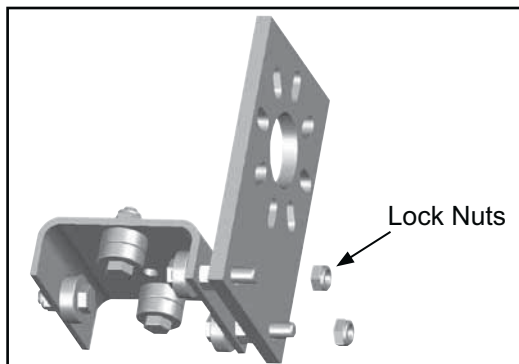
6. Select the bearing bracket and attach the bearings as needed. (In some instances, the bearings may come already attached.) Assemble as follows if needed:

NOTE: Single bearings are attached to the sides of the bracket and double bearings to the middle portion of the bracket. Use 1/4" hex bolts and locknuts as needed. Install a flat washer on both sides of each bearing to insure proper operation of bearings and the assembly.

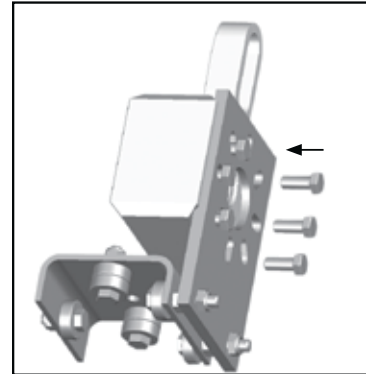
7. Install the longer bolts with bearings on the side of the bracket that has the two holes. Install these *before* installing the double bearing assemblies. See the figures below.
8. For the spacers on the long bolts, insert a 5/16" nut over each bolt. *These nuts are used as spacers only.*



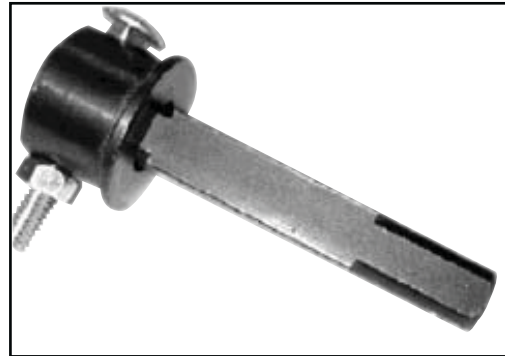
9. Slide the Twist-of-the-Wrist mounting plate over the long bolts and secure the plate with two lock nuts.



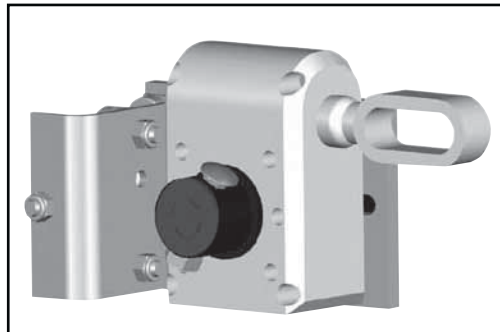
10. Attach the Twist-of-the-Wrist gearbox to the mounting plate using hex head bolts.



11. Using a 1/4" x 2" carriage bolt (FAH005B) and nut (FALB01B), attach the square shaft to a tubing adapter.



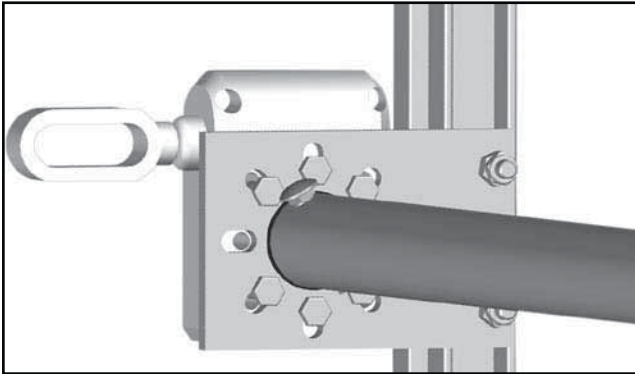
12. Slide the square shaft through the Twist-of-the-Wrist gearbox.



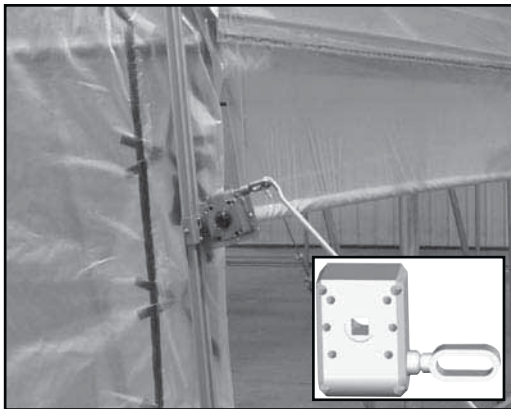
Film Cover Installation with Roll-Up Sides

TWIST-OF-THE-WRIST ASSEMBLY (continued)

- Slide the Twist-of-the-Wrist assembly onto the aluminum channel from the ground end. (This is the free end of the channel.)



- Using the conduit as a guide, adjust the aluminum channel on the threaded rod so the channel runs parallel with the end rafter. In some instances, you may need to trim the conduit.
- Attach the roll-up conduit to the square shaft of the assembly by inserting a 1/4" x 2" carriage bolt (FAH005B) through the hole in the conduit and tubing adapter. Tighten the nut.



- Test the operation of the Twist-of-the-Wrist assembly and repeat the steps for the remaining assembly.

NOTE: If the cover rolls in the desired direction, but you want to turn the crank in the opposite direction for the same result, unbolt, reposition the gearbox, and remount it *on the same side of the mounting bracket*.

- Repeat the steps to install the Twist-of-the-Wrist Assembly for the remaining roll-up side panel.
- Once both assemblies are installed, continue with the installation of the anti-billow rope.

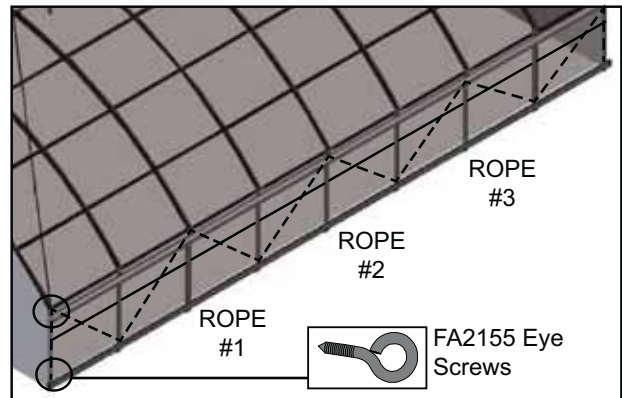
INSTALL THE ANTI-BILLOW ROPES

The anti-billow ropes keep the roll-up curtain in place when it is fully or partially open. Using the diagrams below, complete the anti-billow rope installation.

ATTENTION: INSTALL THE ANTI-BILLOW ROPE IN SHORT SECTIONS ALONG EACH SIDE TO KEEP THE CURTAIN SECURE IN CASE ONE ROPE BREAKS.

- Beginning at *one end rafter*, take two (2) eye screws (FA2155) and attach one to the baseboard and one to the ribbon board. Align the FA2155 eye screws with each other. See circles below.

ATTENTION: If a baseboard is not present to mount the eye screws, purchase eyebolts locally to mount to the individual rafter legs/ground posts.



- Using the sample diagrams as guides, move to the next rafter and attach the eye screw to either the baseboard or the ribbon board, depending on the desired pattern.
- Continue installing the eye screws until reaching the other end rafter and finish the installation by repeating Step 1.
- Install the anti-billow rope ***in short lengths along each side***. Thread the free end of the rope through the end rafter eye screws and through the eye screws at two to three interior rafters. Cut the rope and tie the ends to the eye screws.
- Repeat this pattern of ***installing short rope lengths*** for the remainder of the first side and the other side.
- Continue by reading the Care and Maintenance information found later in this manual.

Shelter Care and Maintenance

SHELTER CARE AND MAINTENANCE

Proper care and maintenance of the shelter is important. Check the following items periodically to properly maintain the shelter:



Space below is reserved for customer notes.

- Regularly check the cover to ensure that it remains tight and in proper repair. Tighten and adjust the tension as needed to prevent damage and wear.
- *Replace all damaged or broken components immediately.*
- Check connections and all fasteners to verify that they remain tight and in good condition.
- Do not climb or stand on the building at anytime.
- Inspect the anchoring system to verify that all components remain tight and in good condition.
- Verify that the side panel components are in good working condition.
- Do not allow drop-down curtain (if installed) to remain in the down position for extended periods. Raise the curtain to allow it to dry and for cleaning.
- Replace curtain cords (if installed) and anti-billow rope immediately if worn or broken.
- Remove debris and objects that can accumulate on the building. Use tools that will not damage the cover when removing debris.
- Remove snow to prevent excess accumulation. Use tools that will not damage the cover when removing snow.
- Check the contents of the shelter to verify that nothing is touching the cover that could cause damage.
- If the shelter is dismantled and moved, inspect all parts and connections before using.
- Depending on the contents, construction of the shelter, shelter materials, and shelter location, the potential for condensation exists. ClearSpan™ offers several items that can be used to alleviate a condensation condition. Please contact a ClearSpan™ representative for additional information.
- For replacement or missing parts, call 1-800-245-9881 for assistance.

NOTE: With the exception of Truss Arch buildings, ClearSpan™ shelters and buildings *do not* have any tested loading criteria.

Quick Start Guide

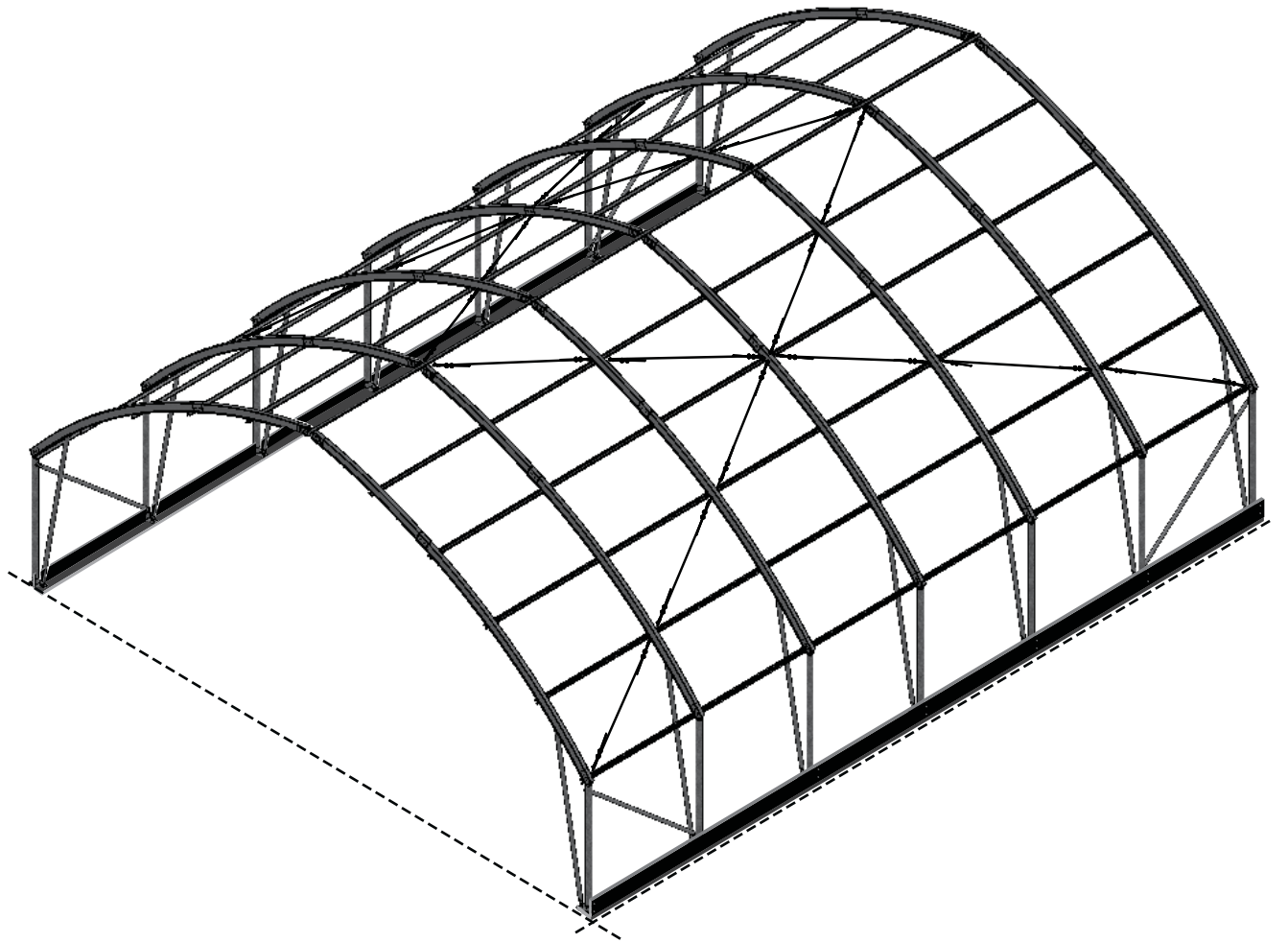
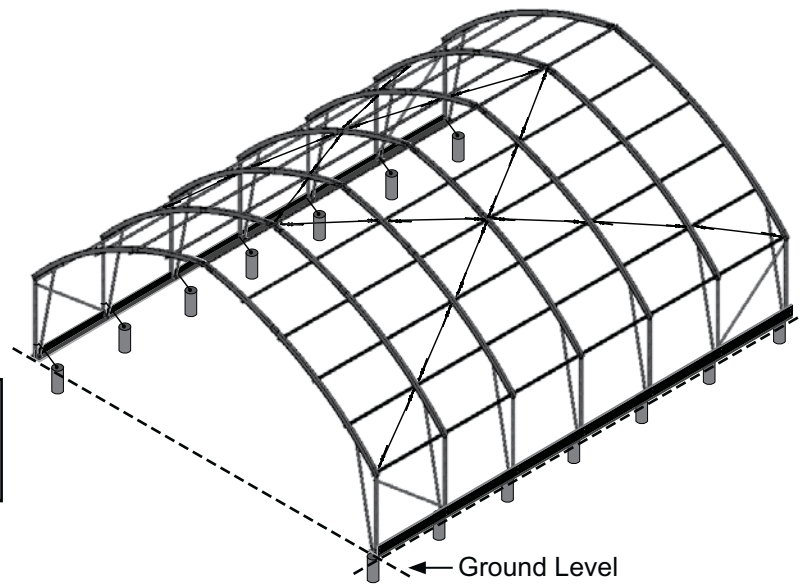


ClearSpan[®]
fabric structures and greenhouses

QUICK START GUIDE

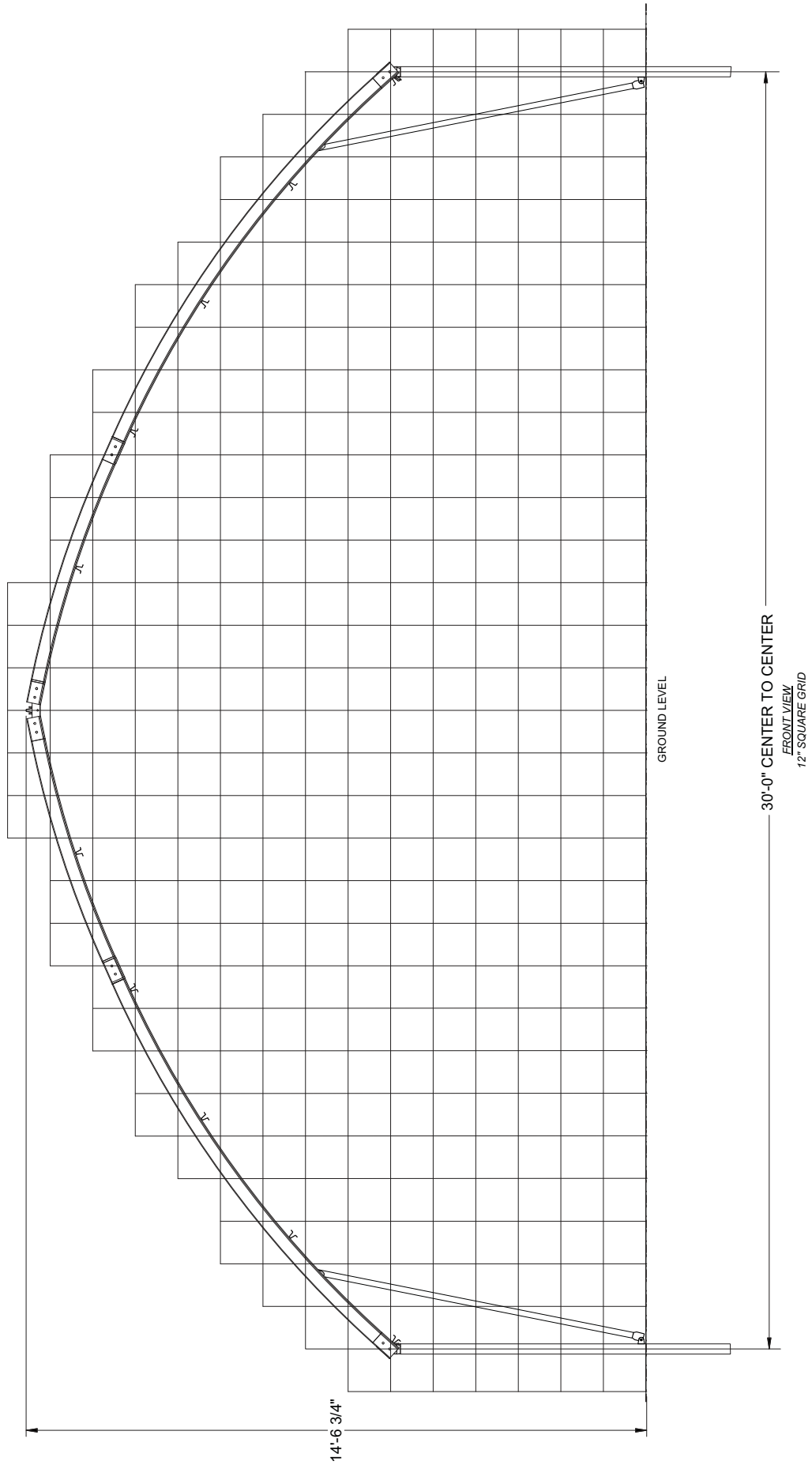
30' Wide Greenhouse with Film Cover

ATTENTION: Shelter to the right shows mounting feet and an installed anchor system. Actual building may differ in length or design or both.

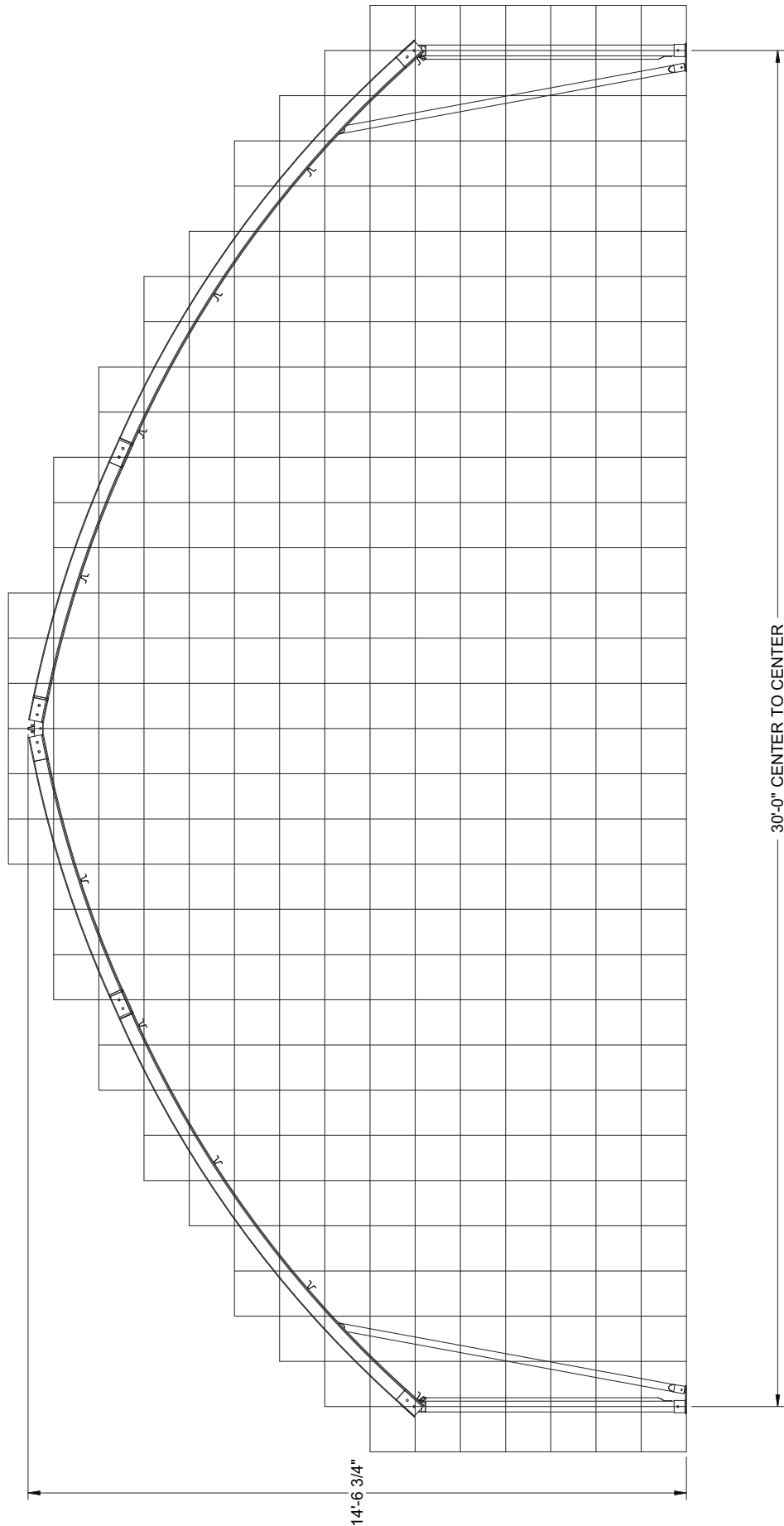


Frame length of your building may differ from what is shown.

30' Wide Front Profile Grid with Ground Posts



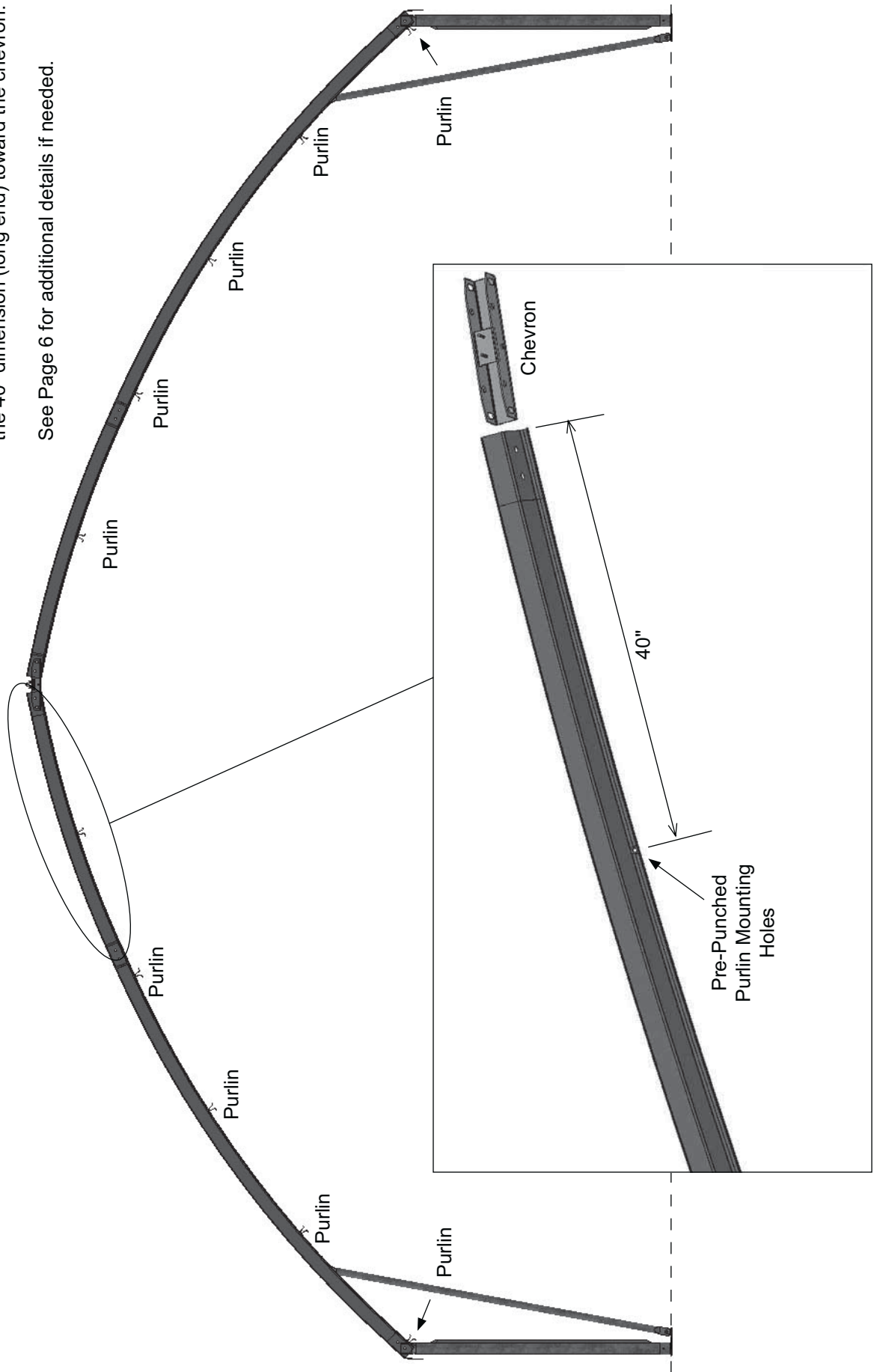
30' Wide Front Profile Grid with Mounting Feet



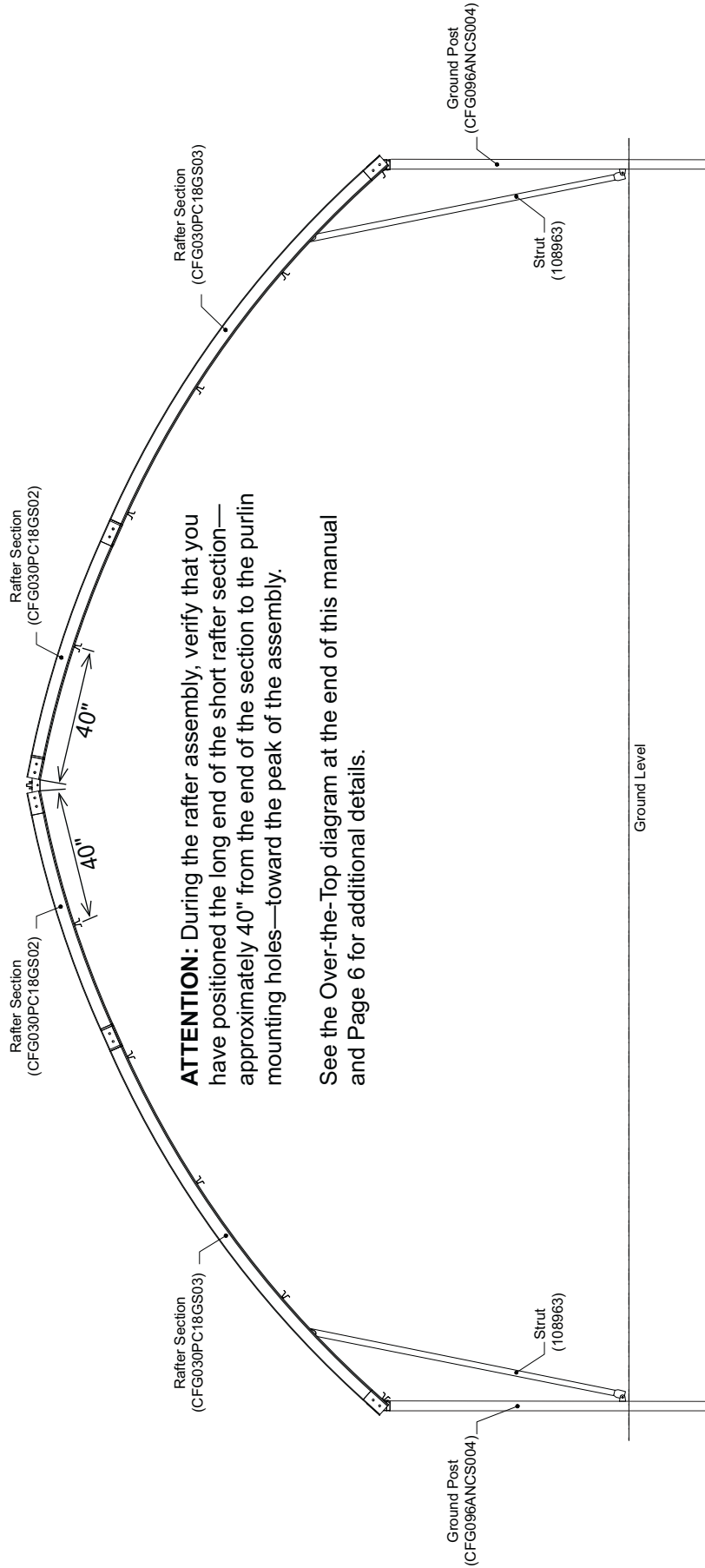
30' Wide: Important Rafter Assembly Dimension

ATTENTION: Pre-punched purlin mounting holes are not in the center of the rafter section. Measure and position the short rafter section with the 40" dimension (long end) toward the chevron.

See Page 6 for additional details if needed.



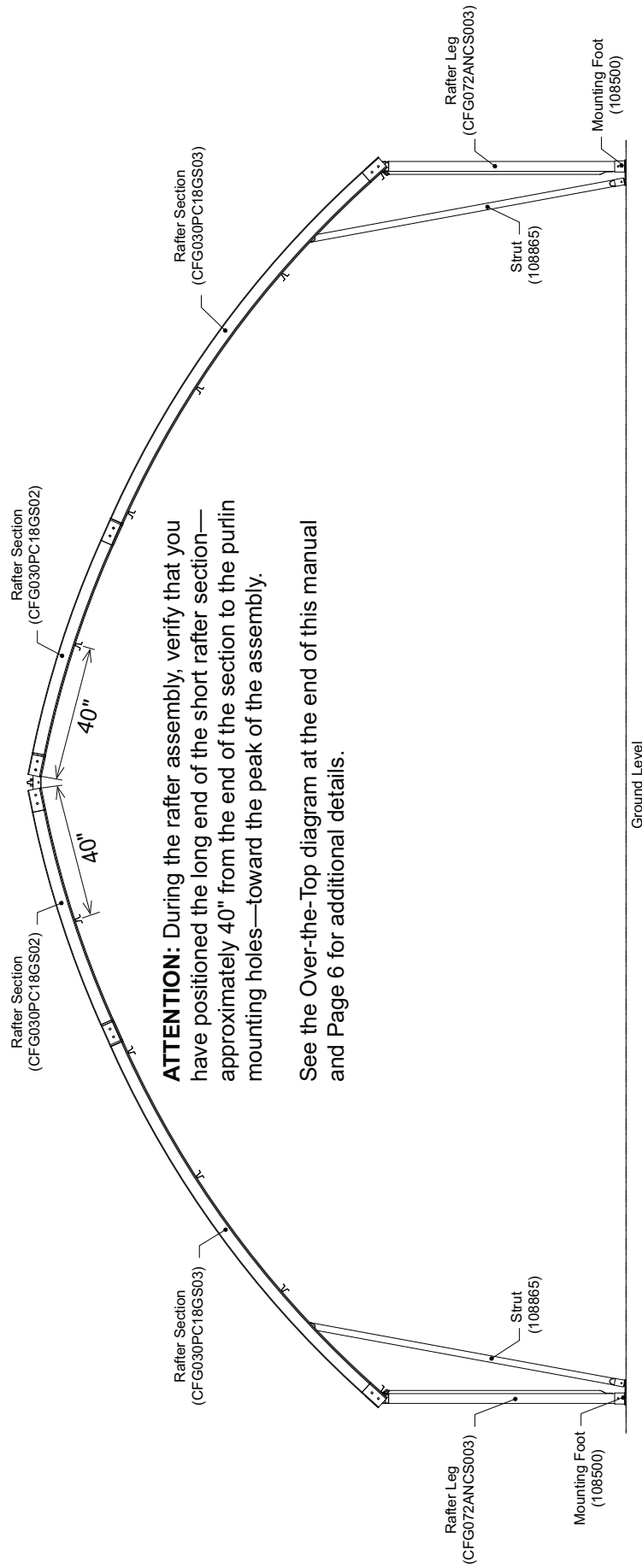
30' Wide Front Profile with Ground Posts



ATTENTION: During the rafter assembly, verify that you have positioned the long end of the short rafter section—approximately 40" from the end of the section to the purlin mounting holes—toward the peak of the assembly.

See the Over-the-Top diagram at the end of this manual and Page 6 for additional details.

30' Wide Front Profile with Mounting Feet

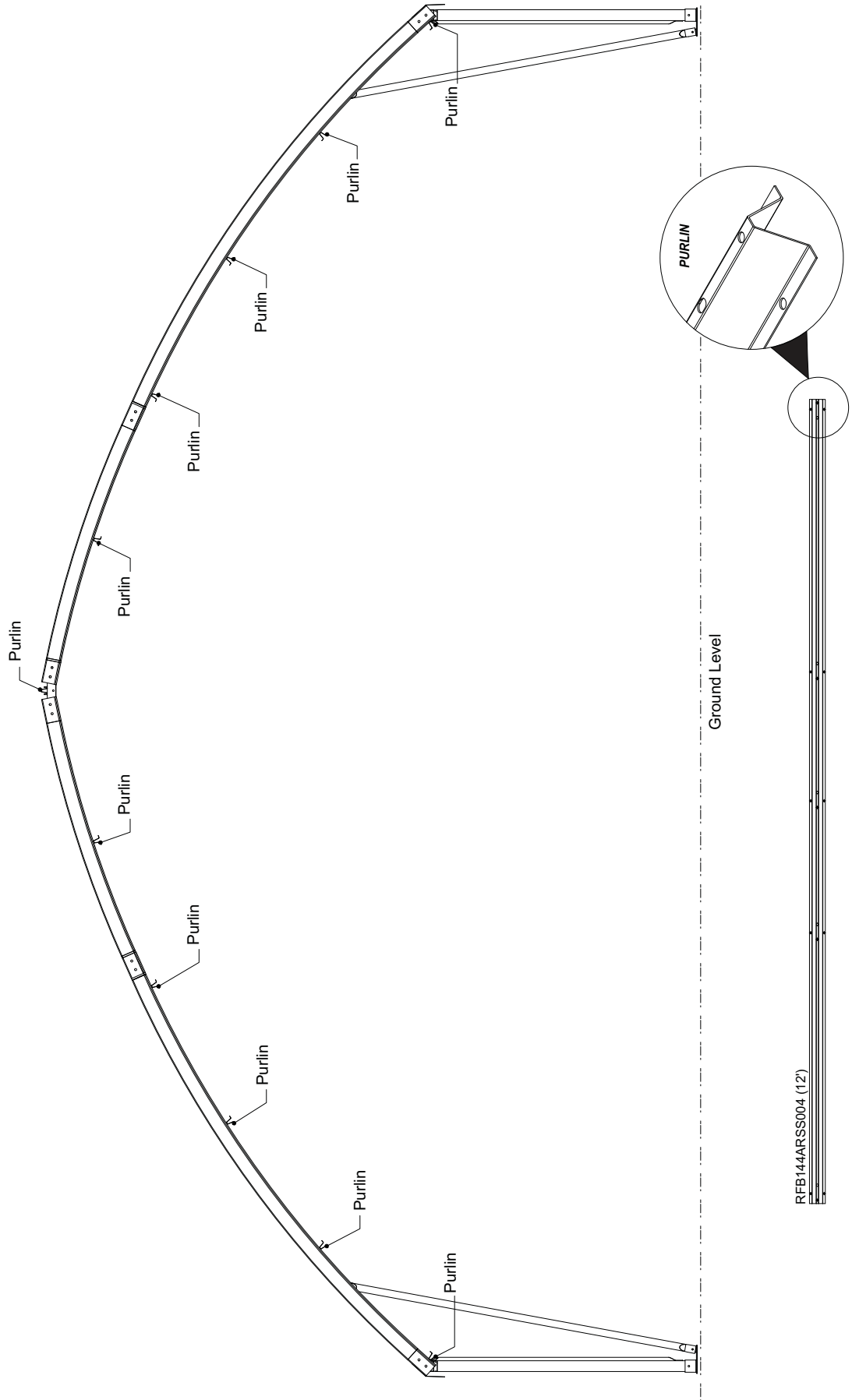


ATTENTION: During the rafter assembly, verify that you have positioned the long end of the short rafter section—approximately 40" from the end of the section to the purlin mounting holes—toward the peak of the assembly.

See the Over-the-Top diagram at the end of this manual and Page 6 for additional details.

30' Wide Purlin Locations

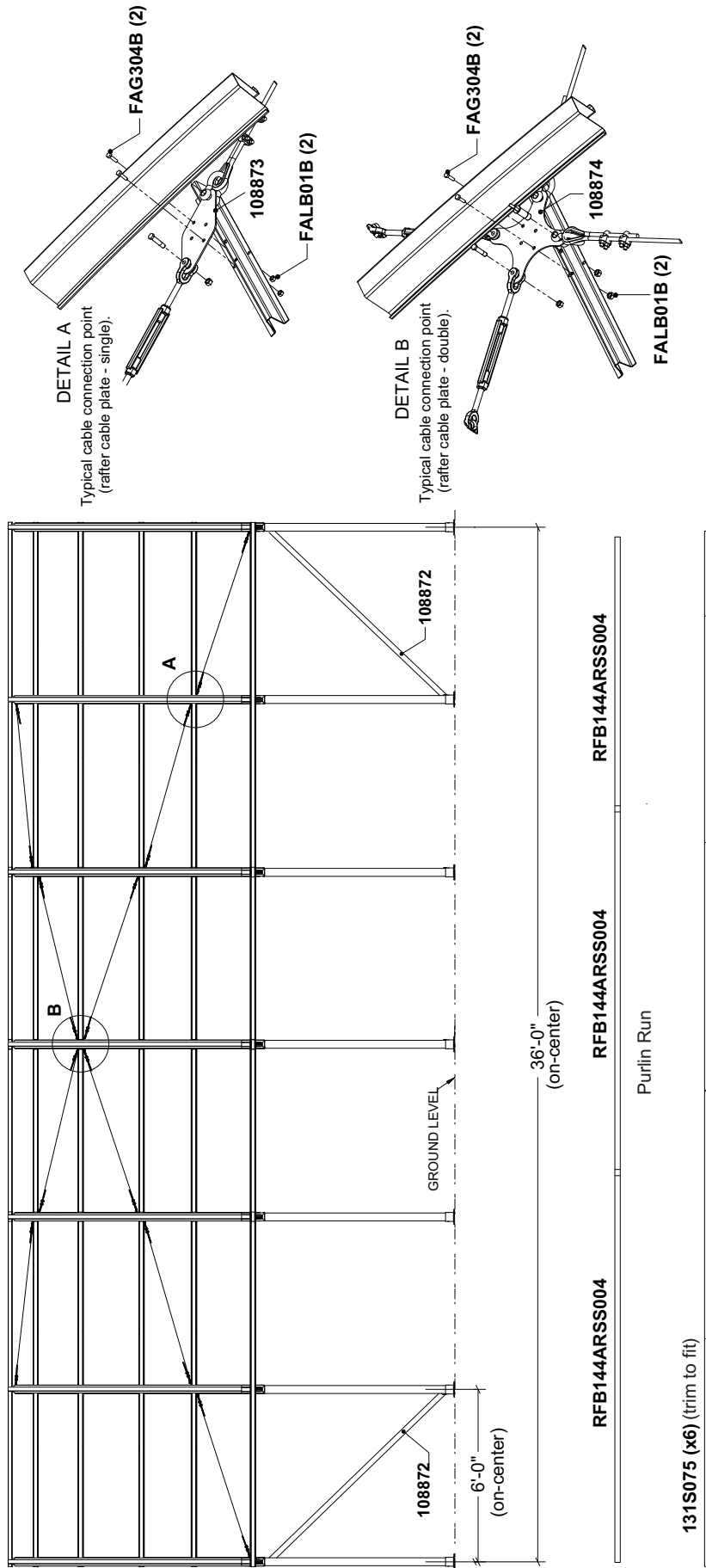
ATTENTION: The purlin locations are the same for frame with ground posts.



RFB144ARSS004 (12)

Side Profile - 36' Length

NOTE: Side profile shows a frame with mounting feet. Profile is similar for ground posts.



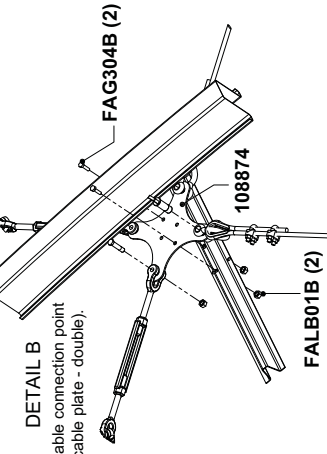
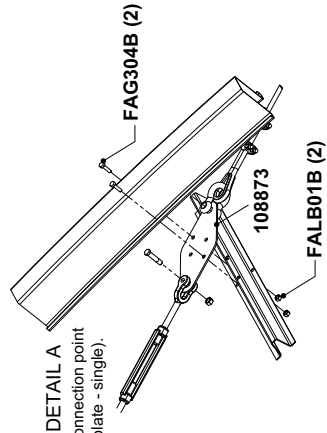
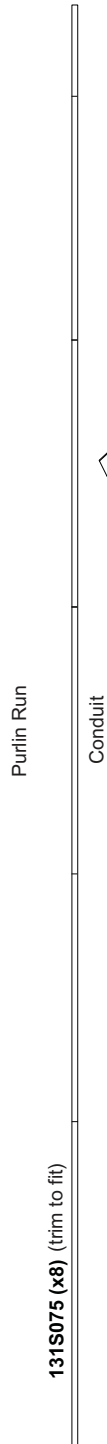
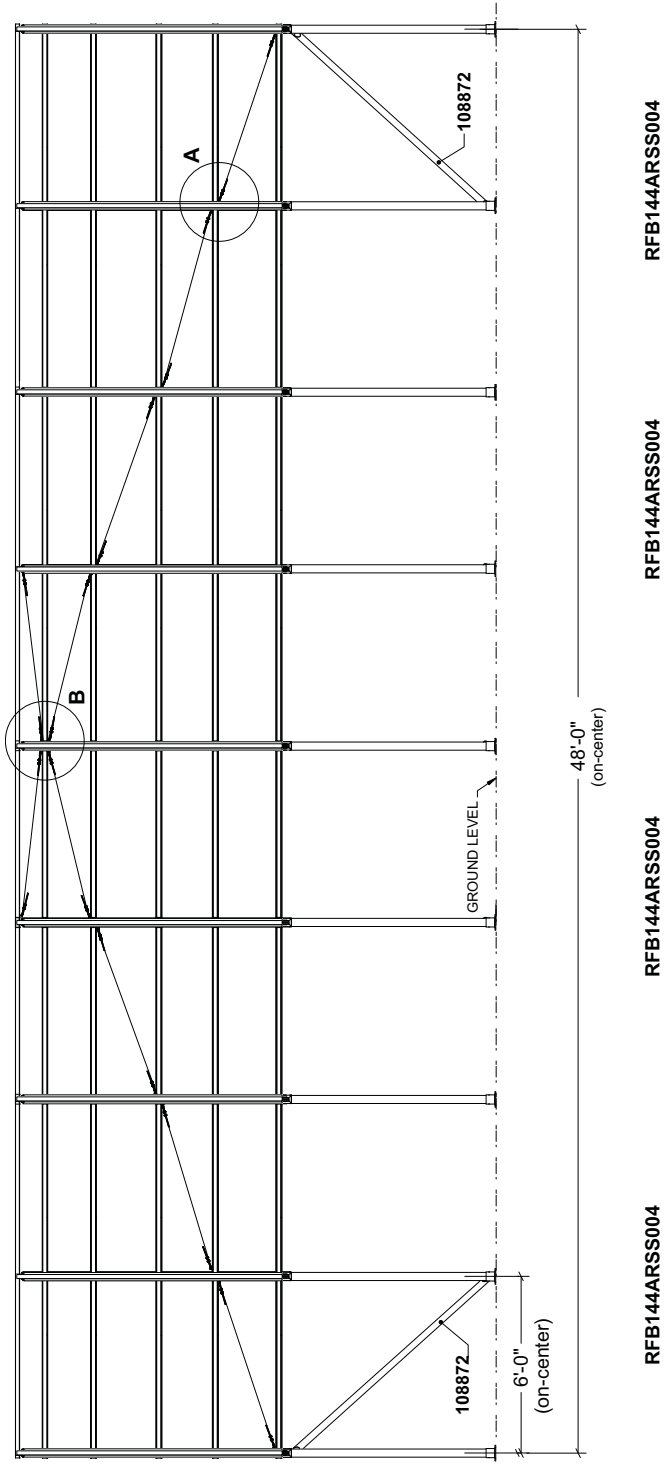
ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

Overlap the purlins as needed to install as shown.

Side Profile - 48' Length

NOTE: Side profile shows a frame with mounting feet. Profile is similar for ground posts.

ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

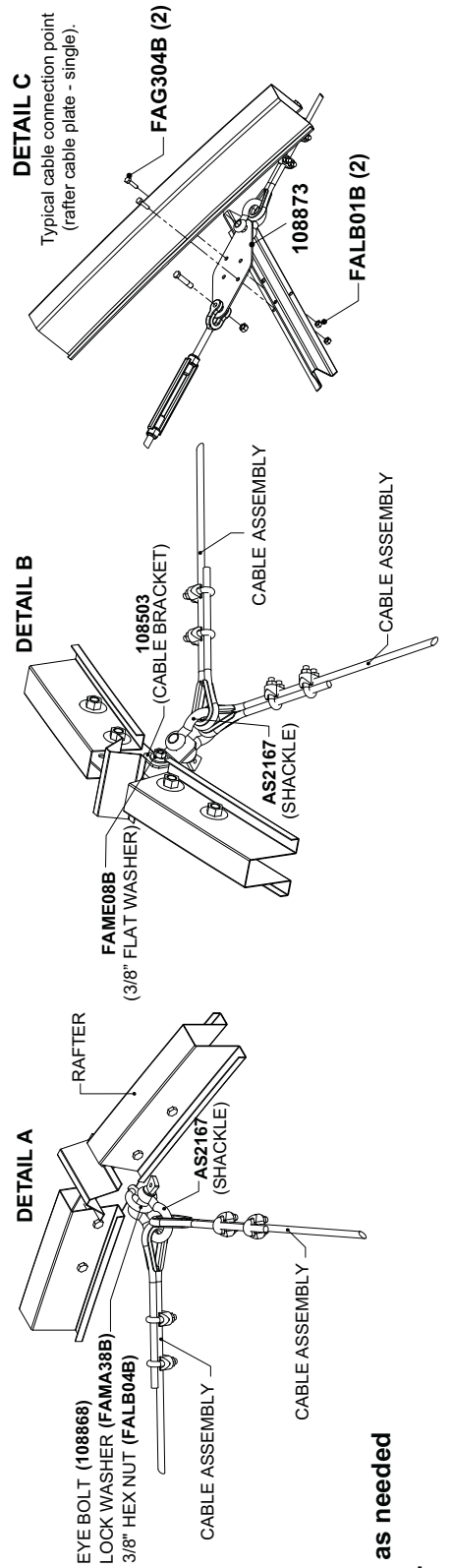
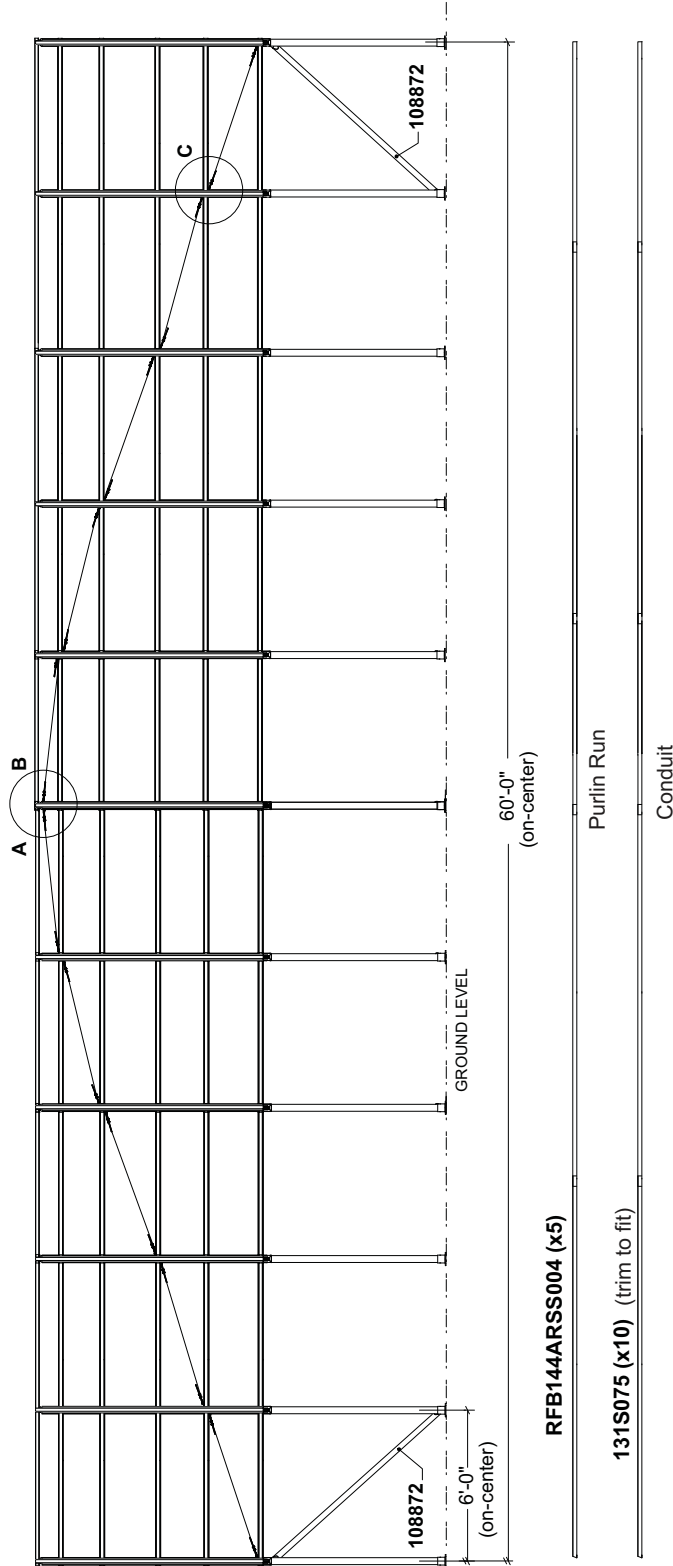


Overlap the purlins as needed to install as shown.

Side Profile - 60' Length

NOTE: Side profile shows a frame with mounting feet. Profile is similar for ground posts.

ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

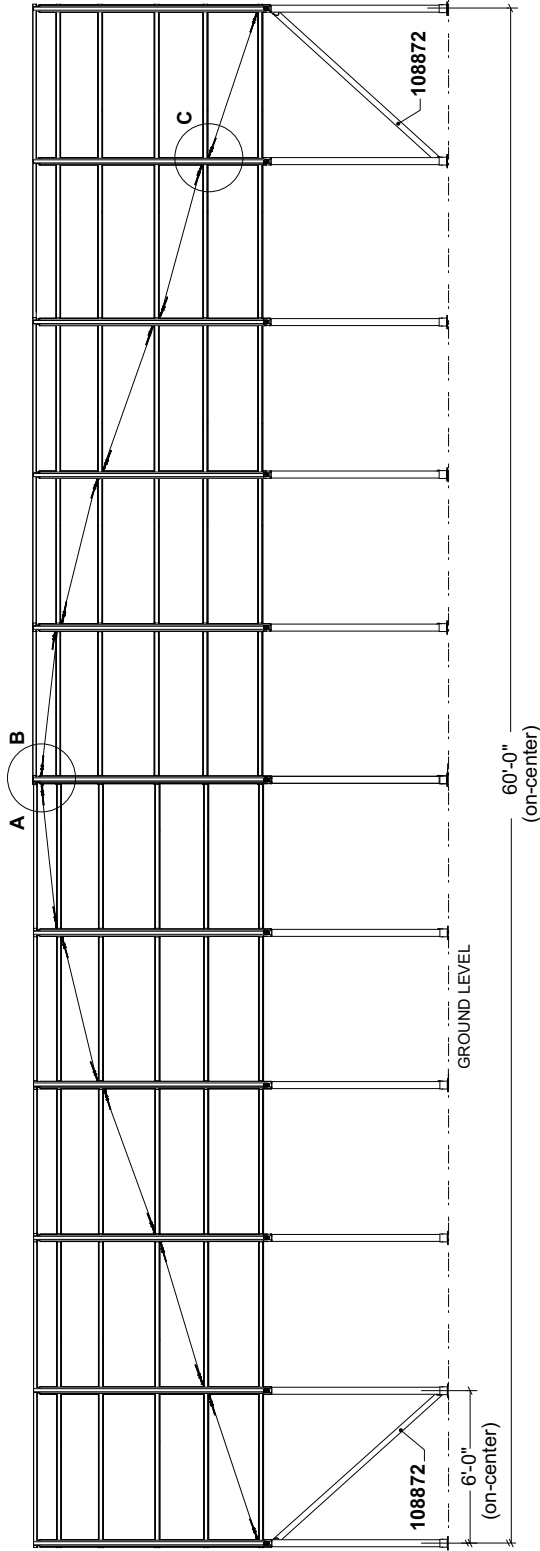


Overlap the purlins as needed to install as shown.

Side Profile - Longer than 60'

NOTE: Side profile shows a frame with mounting feet. Profile is similar for ground posts.

ATTENTION: TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL THE ANTI-BILLOW ROPE IN SHORT LENGTHS ALONG EACH SIDE OF THE FRAME. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL SHOULD THE ROPE BREAK DURING STRONG WINDS.

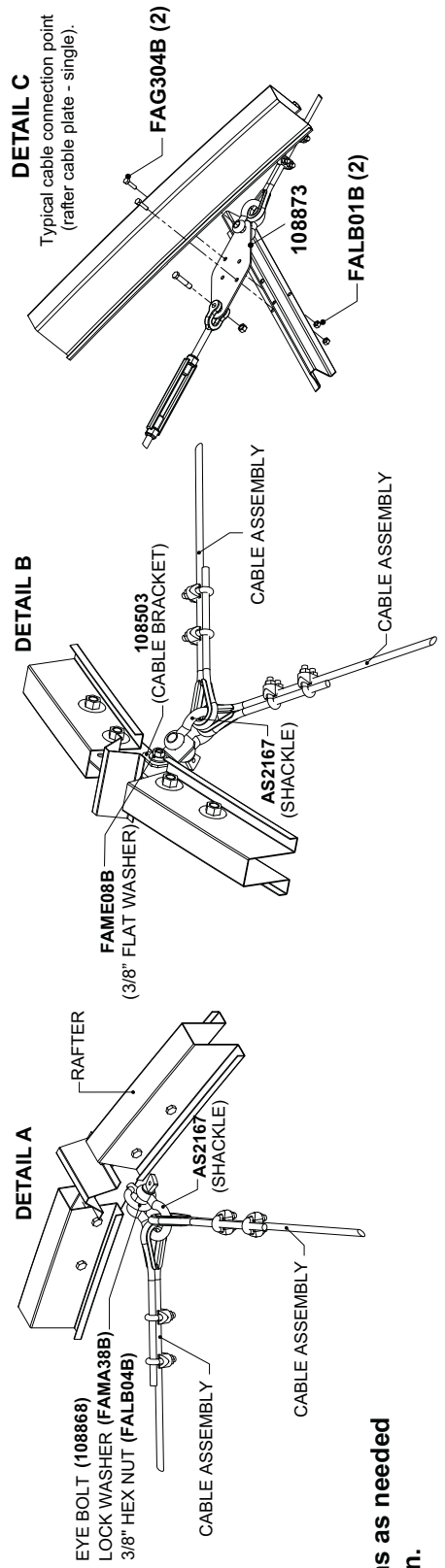


RFB144ARSS004 (x5)

131S075 (x10) (trim to fit)

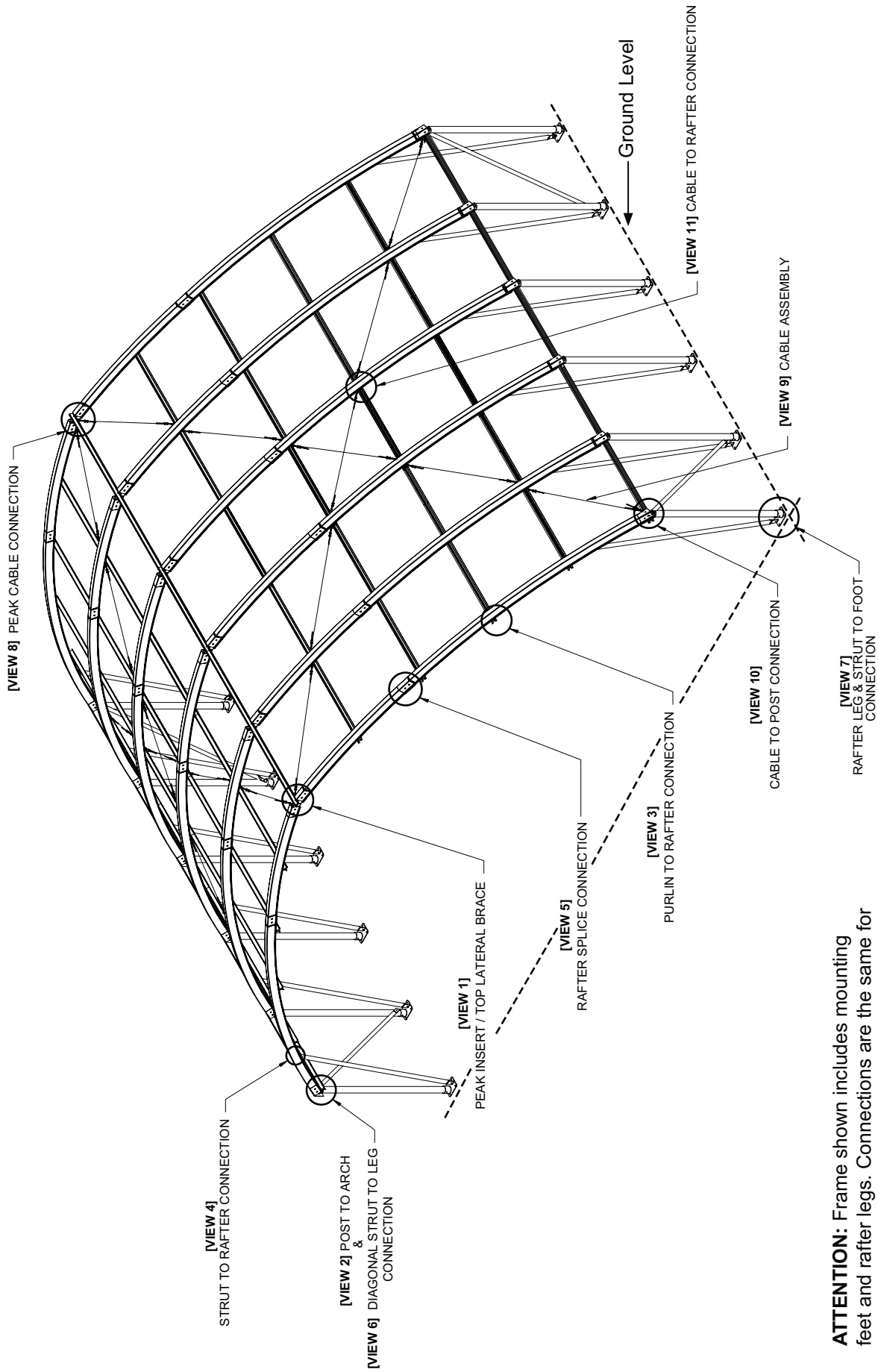
Purlin Run

Conduit



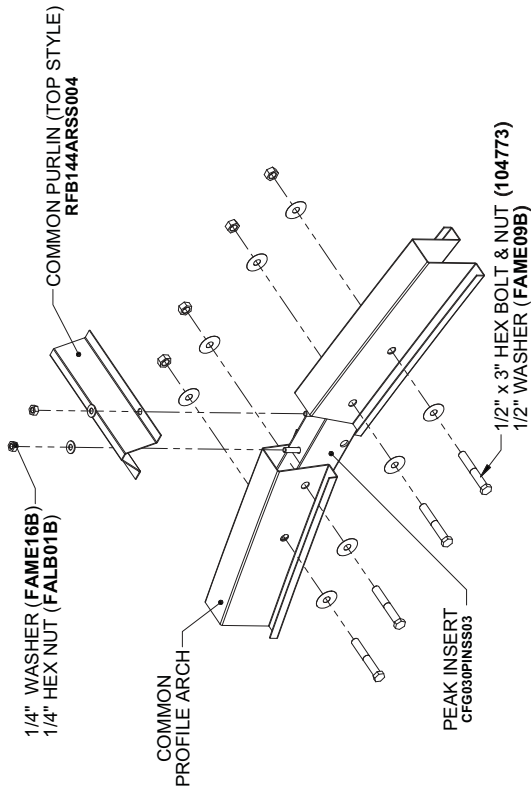
Overlap the purlins as needed to install as shown.

Connections

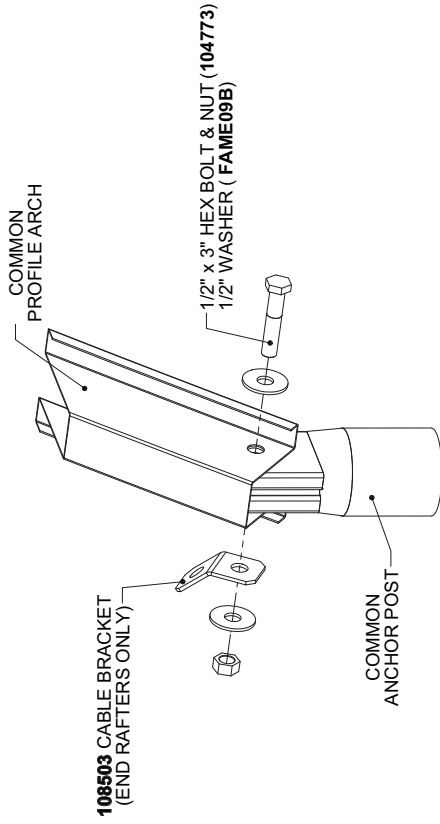


ATTENTION: Frame shown includes mounting feet and rafter legs. Connections are the same for frames with ground posts and no mounting feet. See Connection Details for additional information.

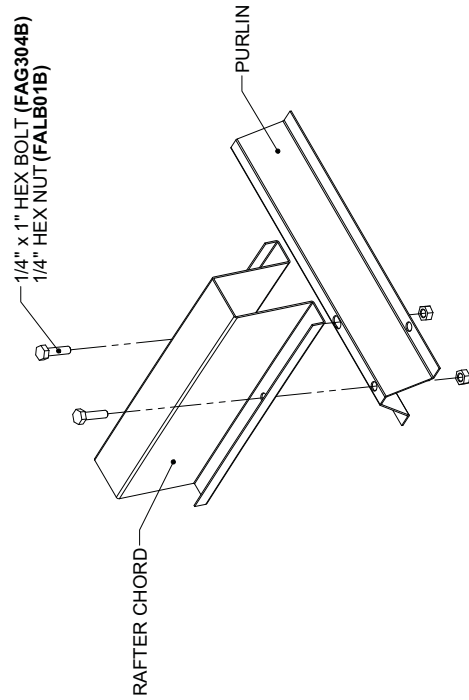
Connection Details (1-4)



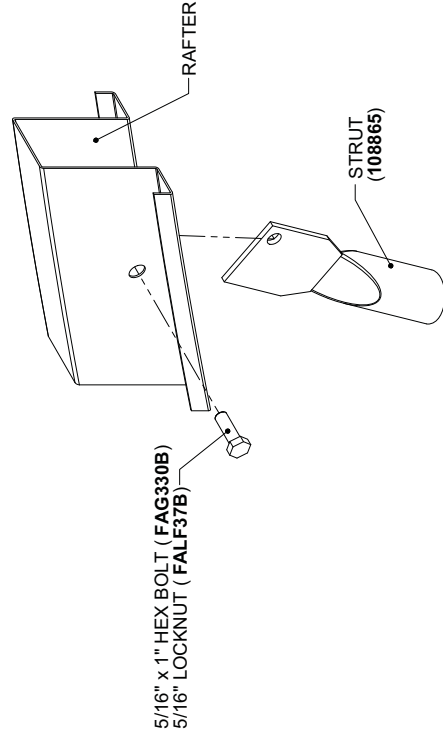
[VIEW 1] PEAK INSERT / TOP LATERAL BRACE



[VIEW 2] POST TO ARCH

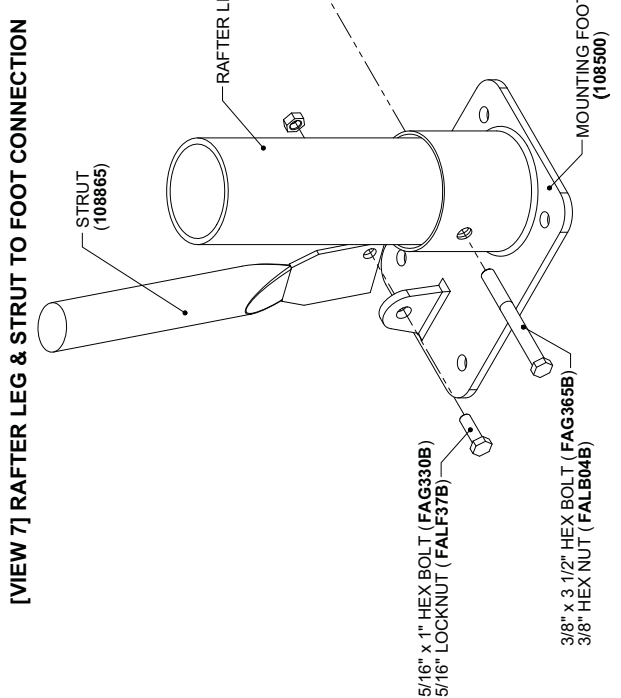
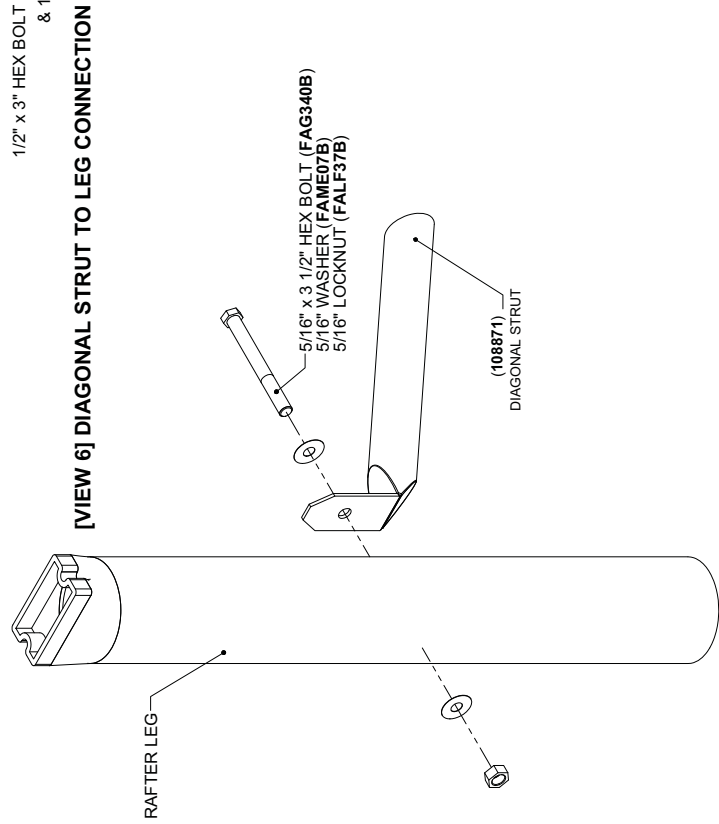
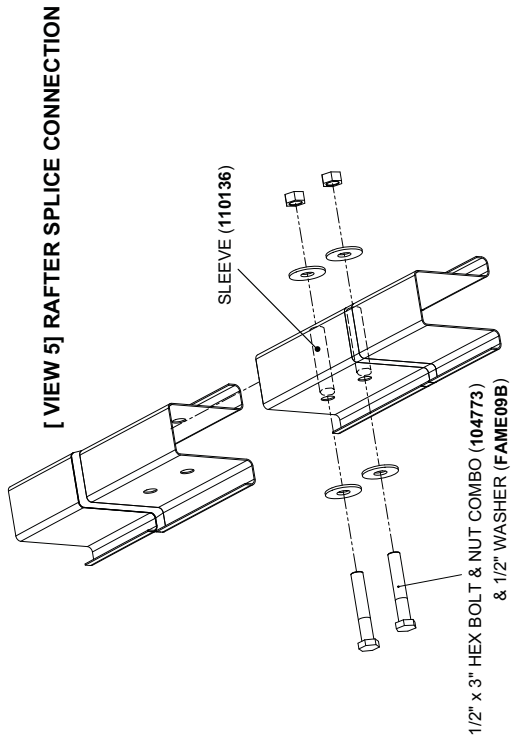


[VIEW 3] PURLIN TO RAFTER CONNECTION



[VIEW 4] STRUT TO RAFTER CONNECTION

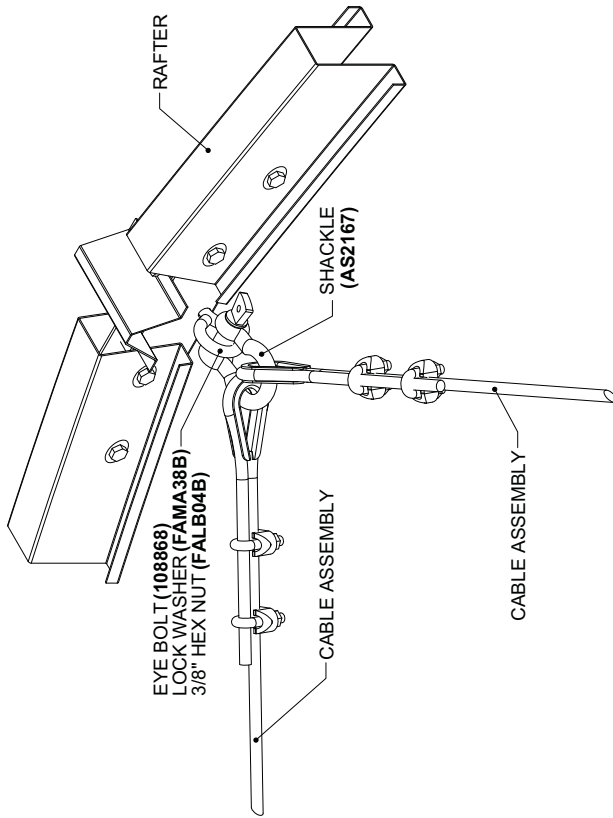
Connection Details (5-7)



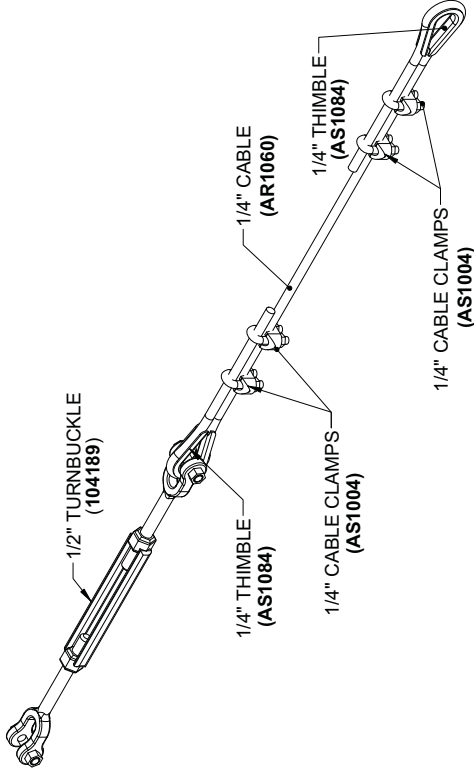
ATTENTION: Rafter leg and strut to foot connection detail applies only to frames equipped with the 108500 mounting foot. Detail does not apply to frames with ground posts.

Connection Details (8-11)

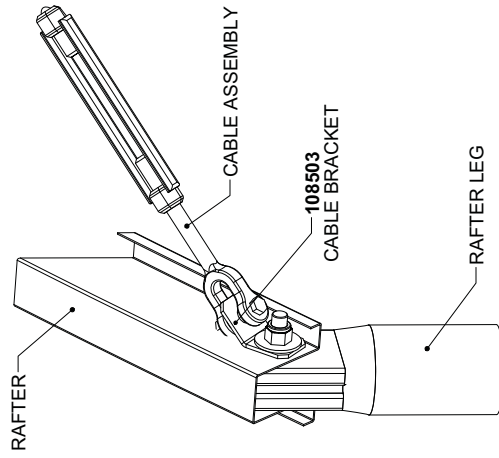
[VIEW 8] PEAK CABLE CONNECTION



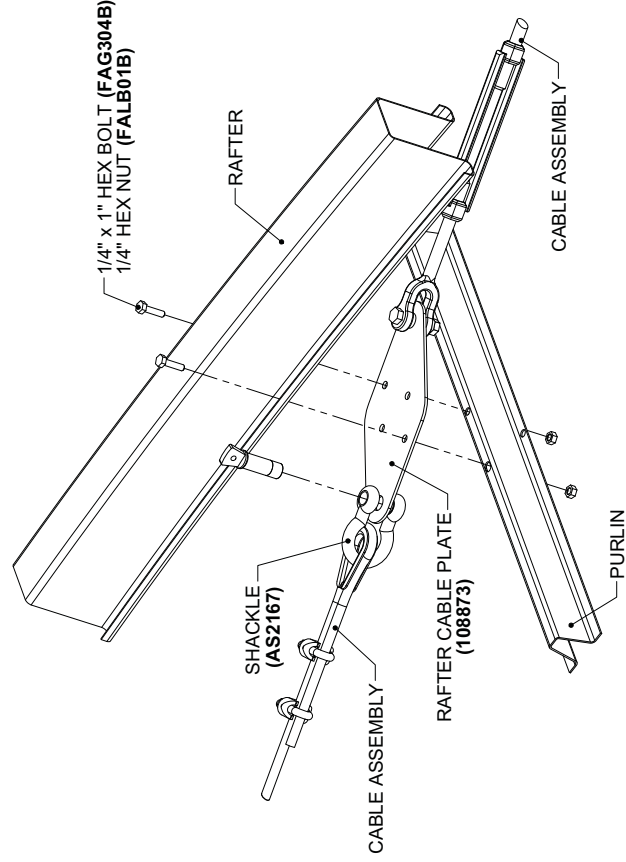
[VIEW 9] CABLE ASSEMBLY



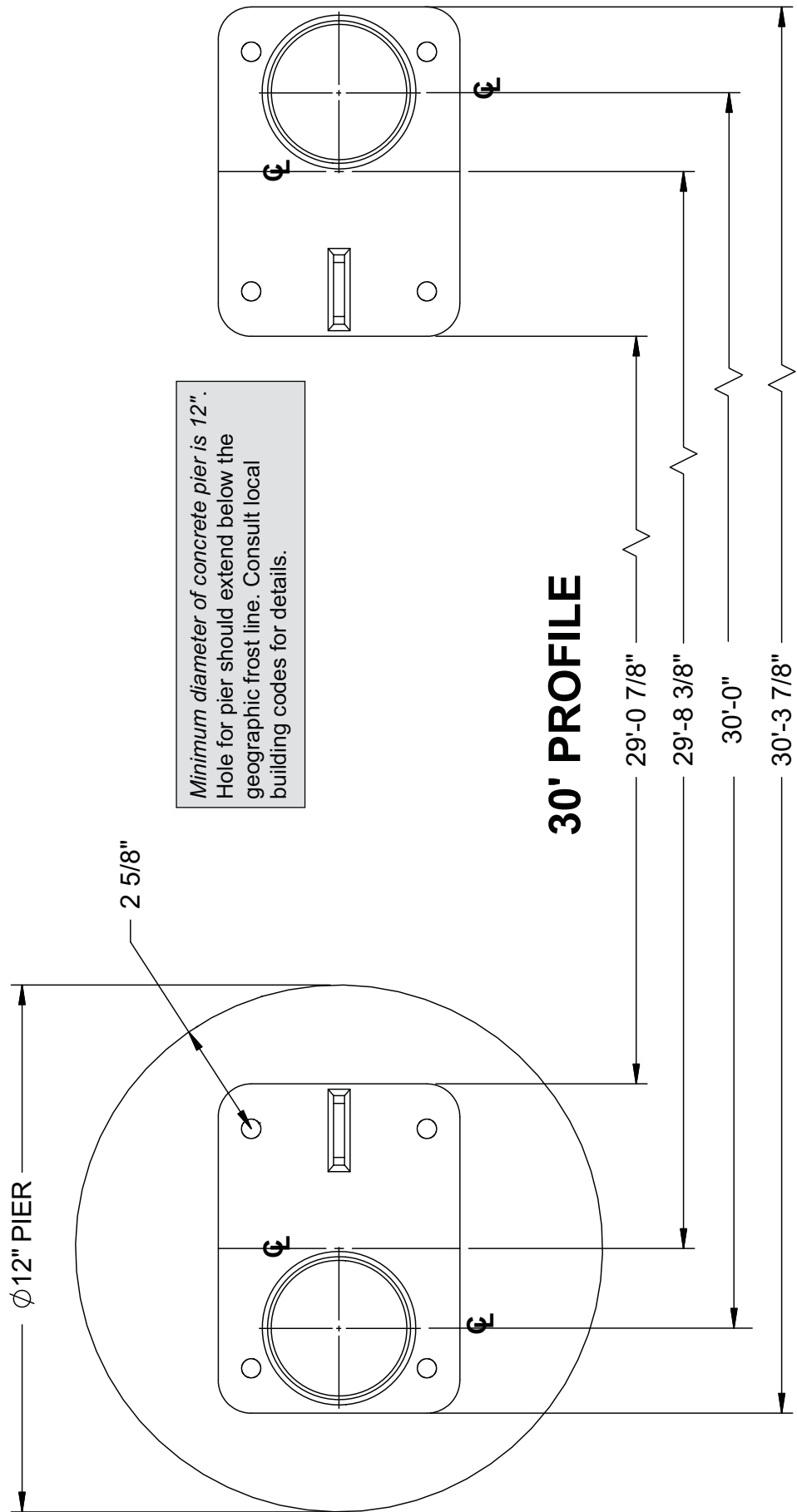
[VIEW 10] CABLE TO POST CONNECTION



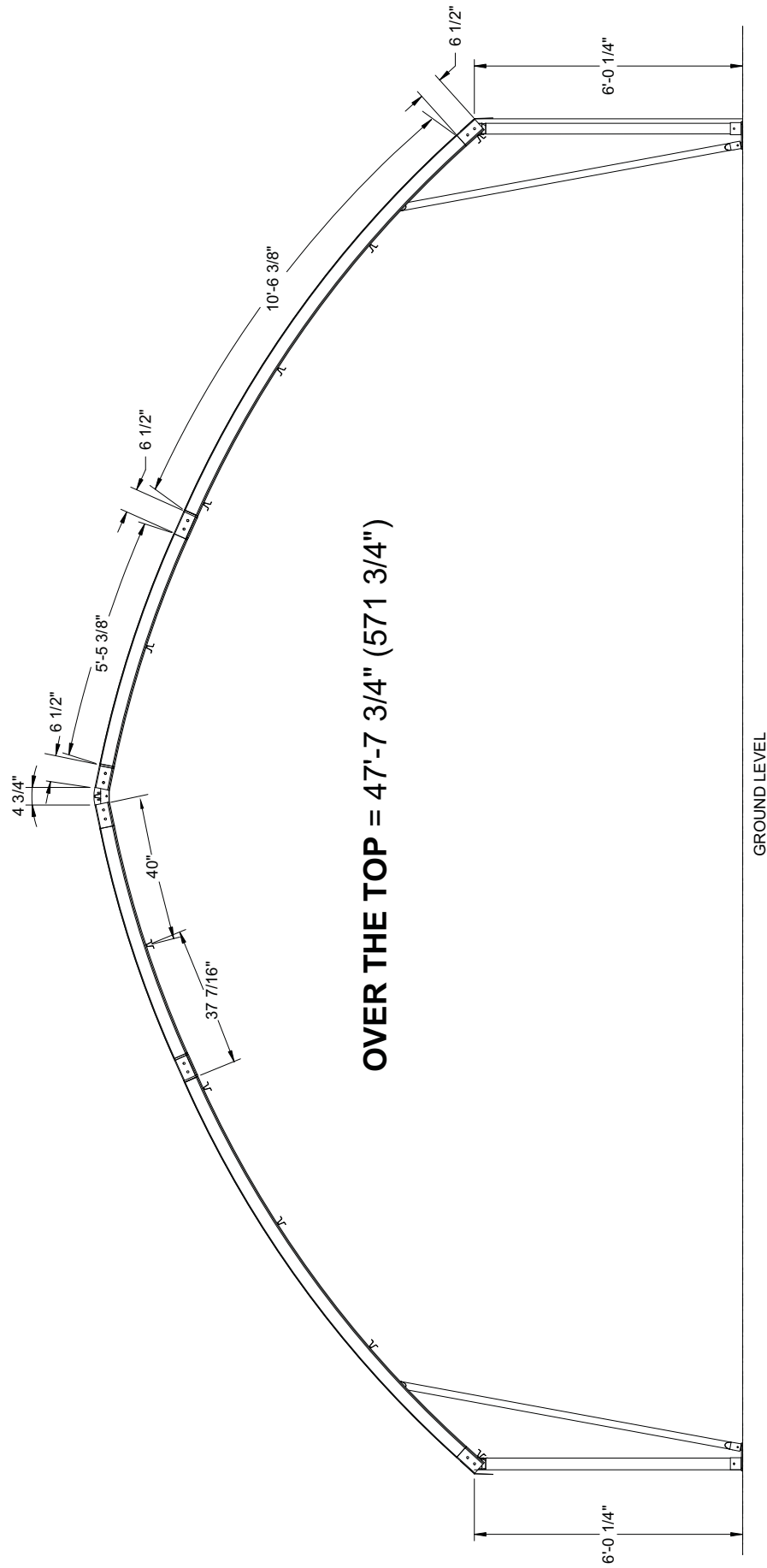
[VIEW 11] CABLE TO RAFTER CONNECTION



Mounting Feet Layout



30' Wide Over-The-Top Measurements



Inflation Fan Kit Photos

These photos show an installed inflation fan kit. Consult the instructions sent with the kit and use these photos to help with the installation. (Building design may differ from actual building. Some photos may not apply to your building.)

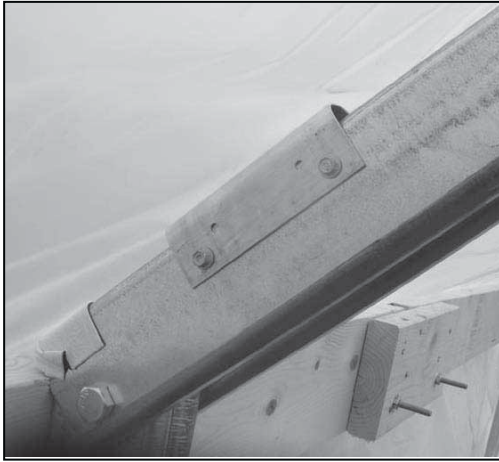
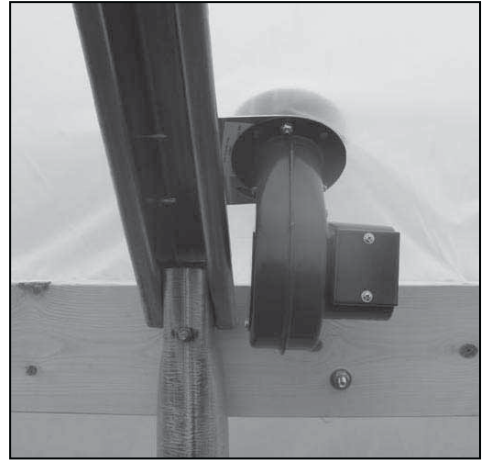


Photo shows fan bracket secured to the rafter. Apply tape (not shown) over bracket to protect covers.



Fan motor shown attached to fan bracket (View 1).



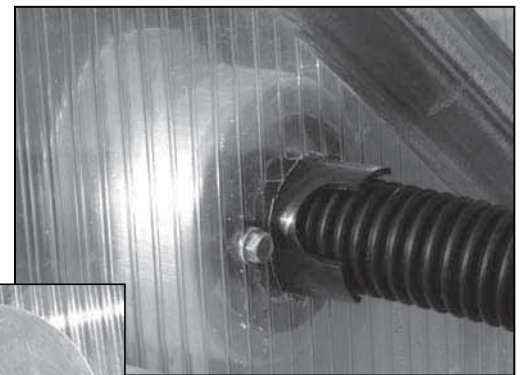
Inside view showing fan mounting bracket and the mounting bolts for the fan.



Fan motor shown with intake hose attached.



Inside view showing fan mounting bracket and the mounting bolts for the fan.



Intake hose (above) shown attached through end wall polycarbonate panel as seen from the inside.

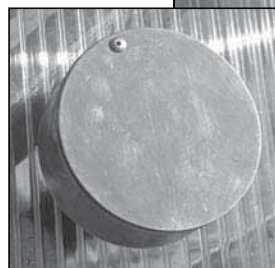


Photo above shows the intake manifold from the outside. (May not apply to all fan installations.)

Optional Film End Panel Installation

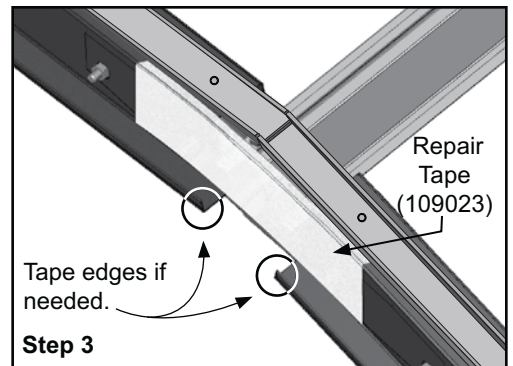
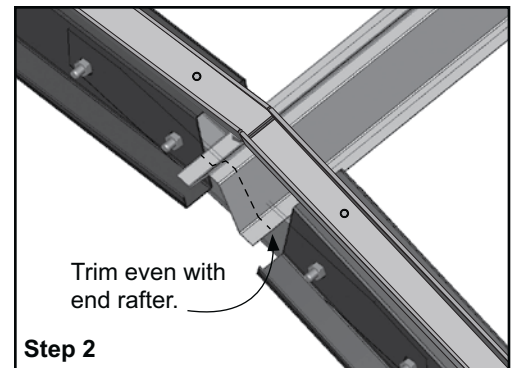
OPTIONAL FILM END PANEL INSTALLATION

Before you attach the main cover, first attach the optional film end panel (if equipped). End panel, end wall framing, additional spring, and fasteners are not included with the building. Additional purchase is required.

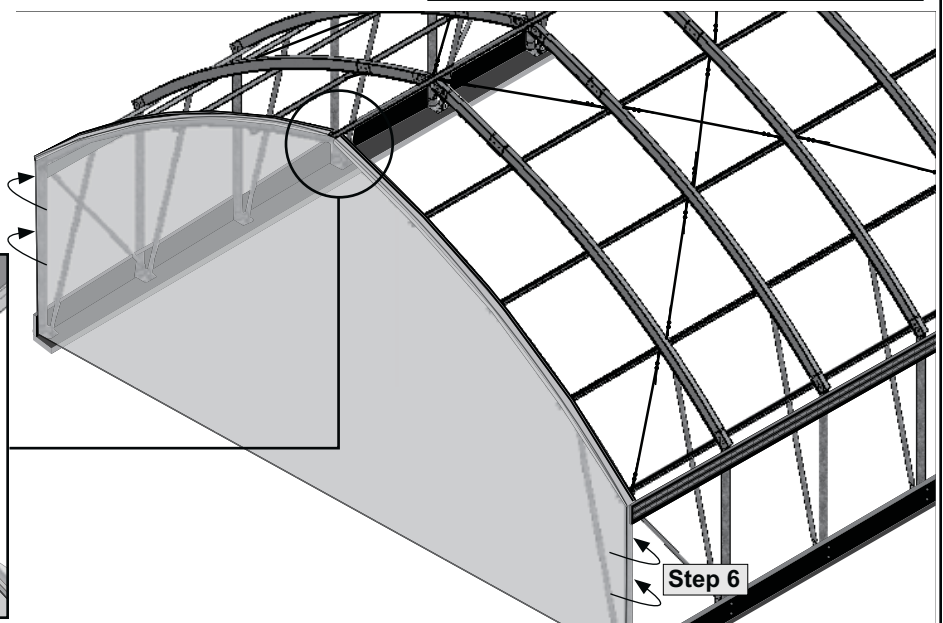
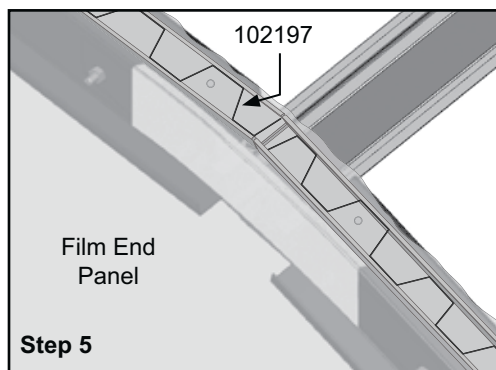
1. Attach 102197 U-channel to the end rafter using FA4482B Tek screws as shown in the diagrams to the right.
2. After installing the U-channel, trim the top purlin even with end rafter using a metal-cutting saw. *Wear eye protection!*
3. Cut 10" - 12" piece of 109023 repair tape and tape the trimmed edge of the purlin. Tape edges of rafter profile if needed.
4. Carefully lift the end panel into place and center side-to-side and end-to-end. To prevent damage to the panel during installation, additional personnel and lifts may be needed.

ATTENTION: The end panel film can be installed *after the main cover film* is installed if desired.

5. Once the end panel is in place and centered, begin at the peak of one end rafter and install 102198 spring into the U-channel to secure the panel. Continue down both edges of the end rafter until the film panel is secured in place.
6. With the top edge of the panel installed, secure the sides of the panel to the rafter legs/ground posts using FA4482B Tek screws and 102921B neo-bonded washers.
7. Secure the lower edge of the film end panel to the optional end wall framing (sold separate) using FA4482B Tek screws and 102921B neo-bonded washers.
8. Repeat the steps to install the remaining film end panel (if equipped).
9. After installing the film end panels, continue with the main cover installation steps in this manual if you have not installed the main cover yet.



CAUTION: Risk of Injury
Always wear eye protection when installing the 102197 spring!

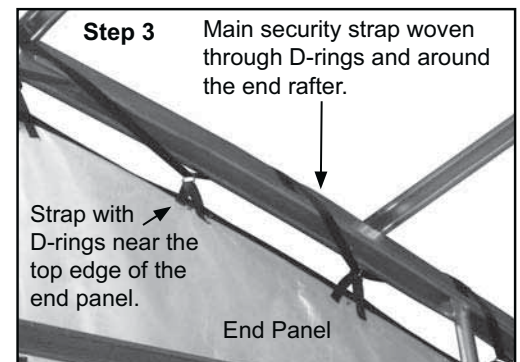
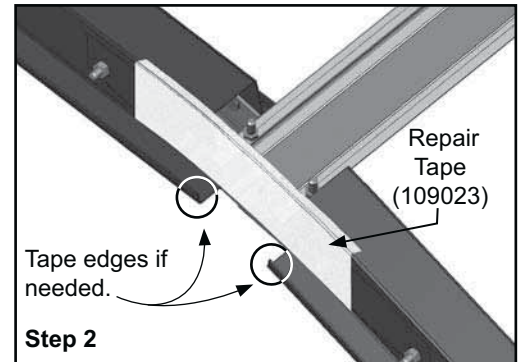
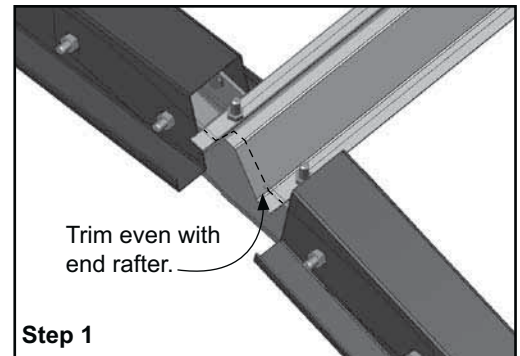


Optional Fabric End Panel Installation

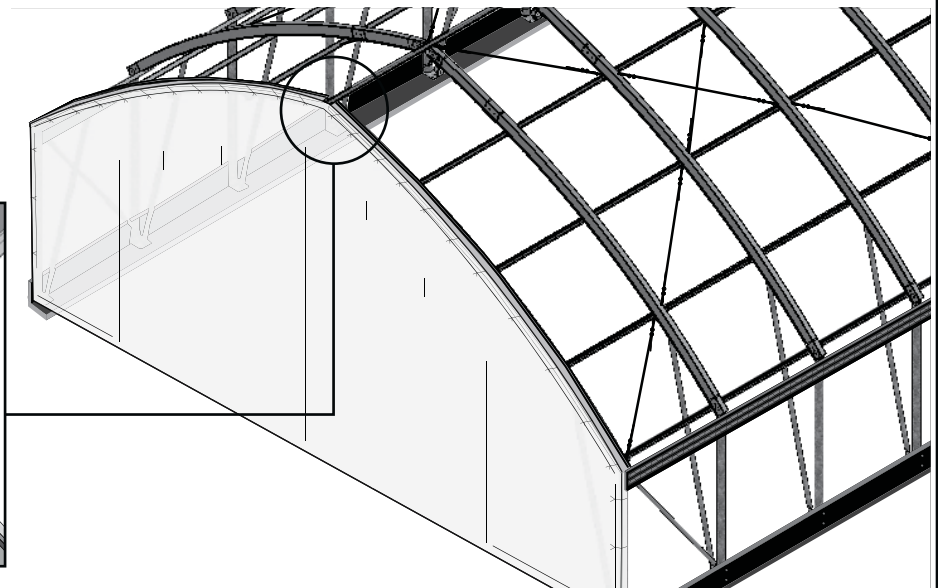
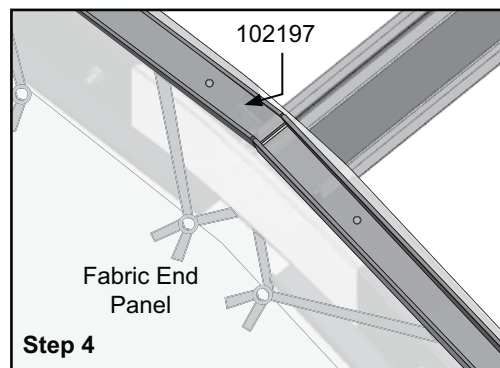
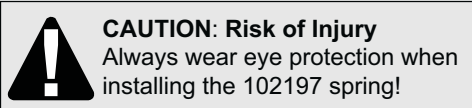
OPTIONAL FABRIC END PANEL INSTALLATION

Before you attach the main cover, first install the 5.2 oz. end panel if equipped. End panel, strapping, and fasteners *are not included* with building. Additional purchase is required.

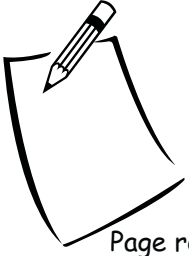
1. Before installing the 5.2 oz. fabric end panel, trim the top purlin even with end rafter using a metal-cutting saw.
2. Cut 10" - 12" piece of 109023 repair tape and tape the trimmed edge of the purlin. Tape edges of rafter profile if needed.
3. Install the fabric end panel according to the instructions sent with your panel. *After the panel is installed, pull the end panel flap back over the end rafter to the inside of the shelter.*
4. With the end panel installed, attach 102197 U-channel sections to each end rafter using FA4482B Tek screws as shown in the diagrams below. *The U-channel must be installed on top of the end panel. Consult the "Install Poly Latch U-Channel" installation steps for additional diagrams and details if needed.*
5. After installing the U-channel, continue with the main cover installation steps.



View is from the inside looking up at the rafter. Rafter design may differ from actual rafter. Photo shows optional end wall frame.



Notes



Page reserved for customer notes.