



GrowSpan™ 20' Wide Series 500 Tall Greenhouses



Photo may show a building of a different length and style. Frame shown includes optional roll-up sides and customer-supplied baseboards. Building shown is equipped with an optional end wall and framing.

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WARNING: Cancer and Reproductive Toxicity - P65Warnings.ca.gov

20' Wide Series 500 Tall Greenhouse:
With Roll-up Sides. All Standard Lengths.

Revision date: 05.30.23

Important Information



READ THIS DOCUMENT BEFORE YOU BEGIN TO ASSEMBLY

Thank you for purchasing a Series 500 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 structure. Please read these instructions **before** you begin.

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

SAFETY PRECAUTIONS

- Wear eye protection.
- Wear head protection.
- Wear gloves when handling metal parts.
- Use a portable GFCI (Ground Fault Circuit Interrupter) when working with power tools and cords.
- Do not climb on the frame during or after construction.
- 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.

SETTING THE GROUND POSTS

The frame assembly of this building requires the setting of all ground post in concrete. Review the layout diagrams for additional details.

Enlist the services of a professional and competent contractor to prepare the site and set the ground posts.

Failing to secure ground posts in concrete as required may result in damage to the building, building contents, and surrounding property.

LOCATION

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

The following suggestions and precautions will help 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.
- **Drainage:** Water draining off the structure and from areas surrounding the site should drain away from the site to prevent damage to the site, 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 assembly. For safety reasons, those who are not familiar with recognized construction methods and techniques must seek the help of a qualified contractor.

DOUBLE-LAYER FILM INSTALLATION

Greenhouses equipped with a double-layer film include a layer that is Infra Red (IR) Retention film; item #109096, #109097, or #109098.

IMPORTANT! During cover installation, install the IR film first!

Examine the IR/AC film and install it according to the instructions printed on the film.

Important Information

ASSEMBLY NOTE: Install Tek screws using a clutched drill driver running approximately 750 RPM while applying approximately 50 lbs of force.

Do not use an impact driver!

ASSEMBLY

Following the instructions as presented will help ensure proper assembly. Failing to follow these steps may result in an improperly assembled and anchored structure.

NOTE: Once the main frame is assembled, many of the remaining procedures can occur simultaneously, depending on available assistants and equipment.

Before you begin, review all technical documents to better understand overall building design.

The steps outlining the basic frame assembly are as follows:

1. Verify that all parts are included in the shipment. Notify Customer Service for questions or concerns.
2. Read this guide and all additional documentation included with the shipment **before** you begin.
3. Gather the tools, bracing, ladders, lifts, and assistants needed to assemble the structure.
4. Check the weather **before** you install the roof cover and any end 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). Set ground posts in concrete, or attach base plates to concrete. If building includes end framing, review those instructions and drawings for additional end framing requirements.
7. Assemble rafter components and rafter support kit components (if equipped). Optional support kits require an additional purchase.
8. Assemble main building frame (rafters, cabling, purlins, etc).
9. If used, attach baseboards and ribbon boards (customer-supplied).
10. Attach the 111613Z144 along the sides for cover installation. Consult these instructions and all drawings for additional details.
11. Install end wall frame, door frame, and end wall cladding if equipped.

12. Attach the 111613Z144 to the end rafters.
13. Install main cover.
14. Install roll-up (or drop-down) sides and anti-billow ropes.
15. Complete and return all warranty information as instructed if present.

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 drills (with clutch) and impact drivers. (Cordless with extra batteries works best.)
- Metal-cutting saws or tools to cut pipe and aluminum.
- Magnetic nut setter (3/8" x 2-9/16", 1/4" x 2-9/16")
- Drill bit set
- Wrenches and impact socket set, hammer, 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.

UNPACK AND IDENTIFY PARTS

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

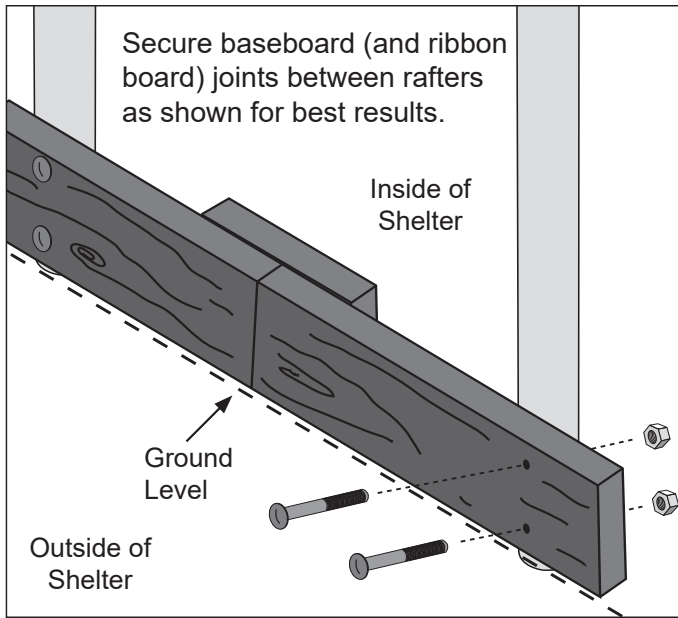
1. Unpack the contents of the shipment and place where you can easily inventory the parts. Refer to the Bill of Materials/Spec Sheets.
2. Verify that all parts listed on the Bill of Materials/Spec Sheets are present. If anything is missing or you have questions, consult the Pictorial Parts Guide and all diagrams for clarification, or contact Customer Service.

NOTE: Do not open plastic bags containing smaller parts such as fasteners or washers at this time. Simply verify quantity.

Baseboards and Ribbon Boards

A customer-supplied baseboard *is recommended* for roll-up sides. A baseboard runs the length of the frame and provides a seal.

All baseboard and ribbon board material and fasteners to secure these to frame are supplied by the customer. See photo below.



Dimensions

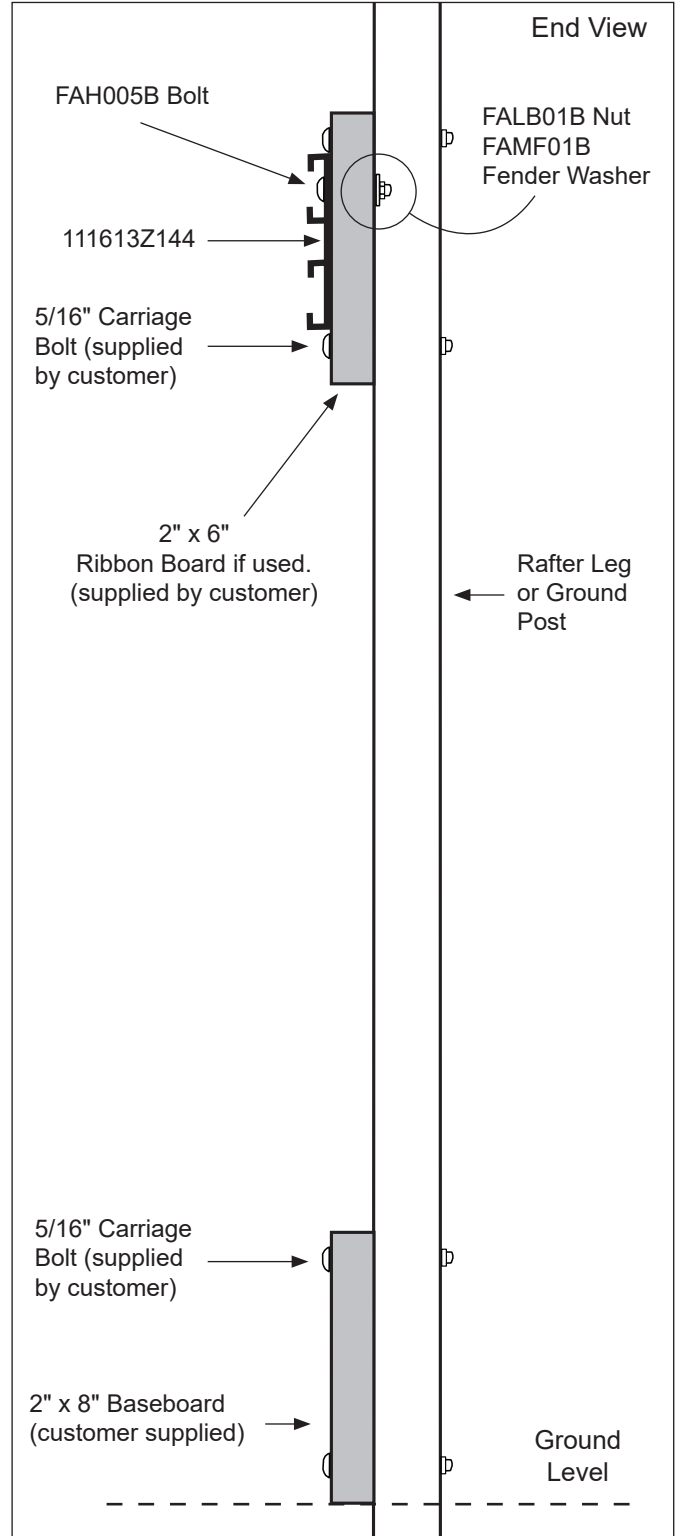
Recommended baseboard dimensions are 2" x 8" and ribbon board dimensions are 2" x 6" (minimum).

Recommendation: Use two (2) carriage bolts (exterior finish) per rafter connection to secure the baseboards and ribbon boards to the rafter legs/ground posts.

Actual frame shown in the examples above may differ. These are presented for illustration purposes only.

RIBBON BOARD FOR ROLL-UP SIDES—OPTIONAL

In some instances, a ribbon board is installed along the side of the frame. This is optional for buildings with roll-up side panels. *Customer supplies the materials and fasteners for the ribbon board.*



DIAGRAMS ARE NOT TO SCALE.

Parts Identification



greenhouse structures

The following graphics will help identify the basic parts of the frame. (Some parts are not shown.)

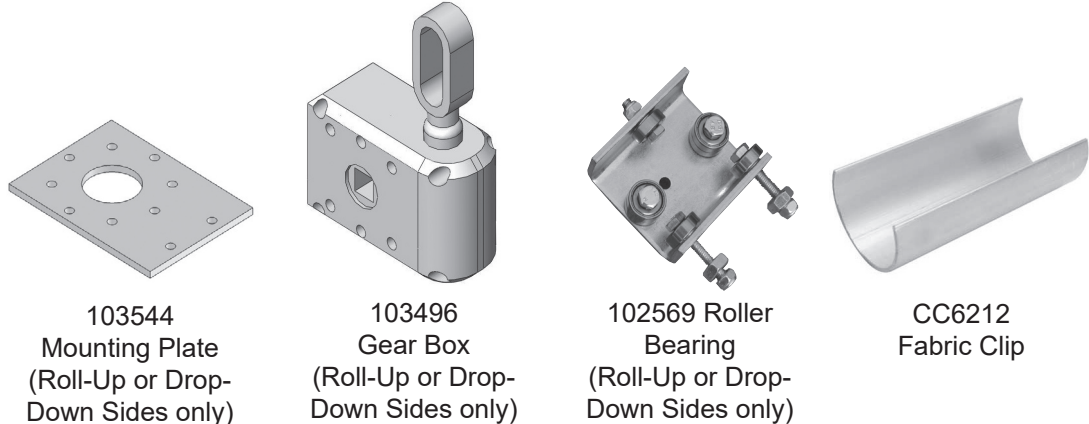
ASSEMBLY NOTE: Install Tek screws using a clutched drill driver running approximately 750 RPM while applying approximately 50 lbs of force.
Do not use an impact driver!



FA4482B Tek Screw FAG363B 3/8" x 3" Hex Bolt FAME08B 3/8" Flat washer FALB04B 3/8" Nut 111613Z144



102546 Cross Connector QH1070 Pipe Strap 103856 Band Clamp AS2167 Anchor Shackle 108503 Cable Bracket PGBRKAAS01 Bracket



103544 Mounting Plate (Roll-Up or Drop-Down Sides only) 103496 Gear Box (Roll-Up or Drop-Down Sides only) 102569 Roller Bearing (Roll-Up or Drop-Down Sides only) CC6212 Fabric Clip



104189 Turnbuckle 117063 EZ-Snap Rope Hooks GS0049 Splice Plate 115249 End Rafter (Base Plates Only) 115250 Mid Rafter (Base Plates Only)

Overview



Sample greenhouse shows roll-up sides and optional end wall and end wall cladding.

OVERVIEW

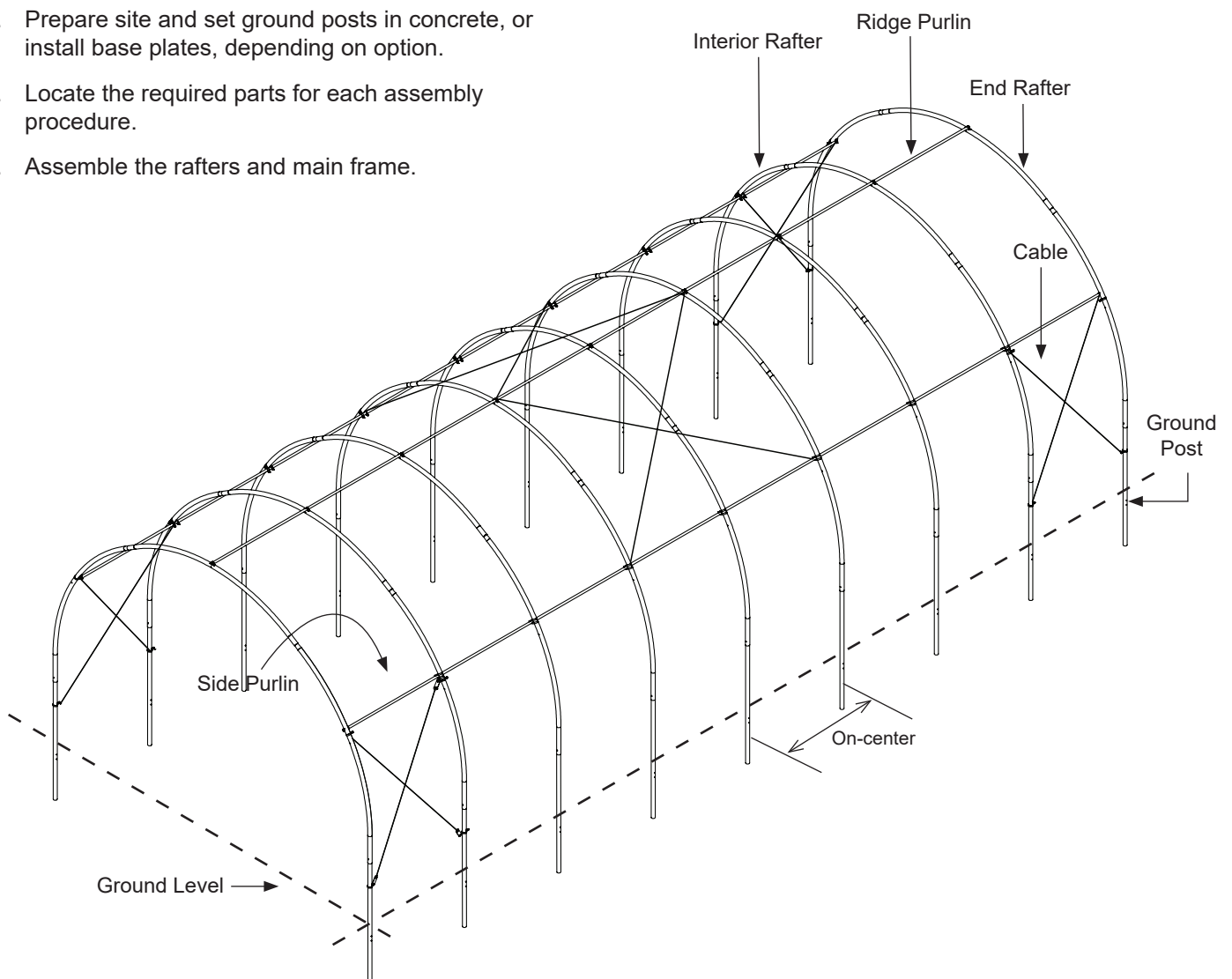
This section describes assembling your building frame. See illustration below to identify main parts.

1. Prepare site and set ground posts in concrete, or install base plates, depending on option.
2. Locate the required parts for each assembly procedure.
3. Assemble the rafters and main frame.

GrowSpan™ 20' Wide Series 500 Tall Greenhouses

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

GROUND POST OPTION SHOWN BELOW AND IN MOST DIAGRAMS THROUGHOUT THIS GUIDE. SEE QUICK START SECTION FOR ADDITIONAL GROUND POST AND BASE PLATE DETAILS.



Frame length may differ from diagram shown.

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 for proper water drainage.

After the site is prepared, mark the location of the frame corners to square the frame position. 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.

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

Base Plates

If your frame includes base plates, prepare the site and anchor the base plates to concrete before assembling the frame. Layout the site and continue with Base Plate Option section.

Base plates can be anchored to a concrete slab or concrete piers. Consult Ground Post section for concrete pier layout, then continue with Base Plate section.

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.

SETTING THE GROUND POSTS

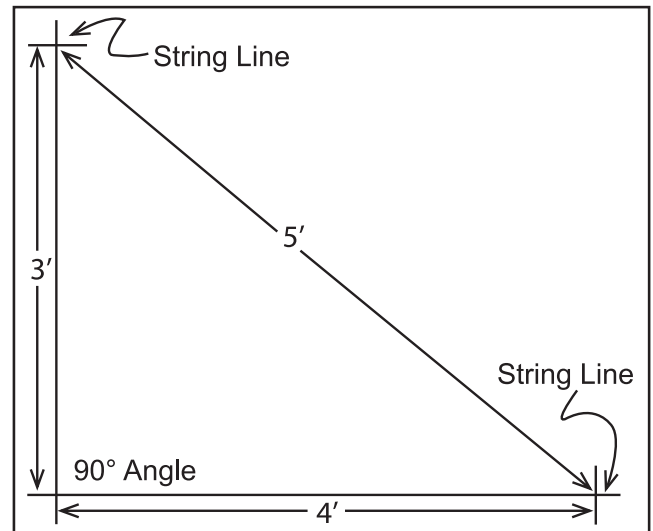
The frame assembly of this building requires the setting of all ground post in concrete. Review the layout diagrams for additional details.

Enlist the services of a professional and competent contractor to prepare the site and set the ground posts.

Failing to secure ground posts in concrete as required may result in damage to the building, building contents, and surrounding property.

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 Ground Posts

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.

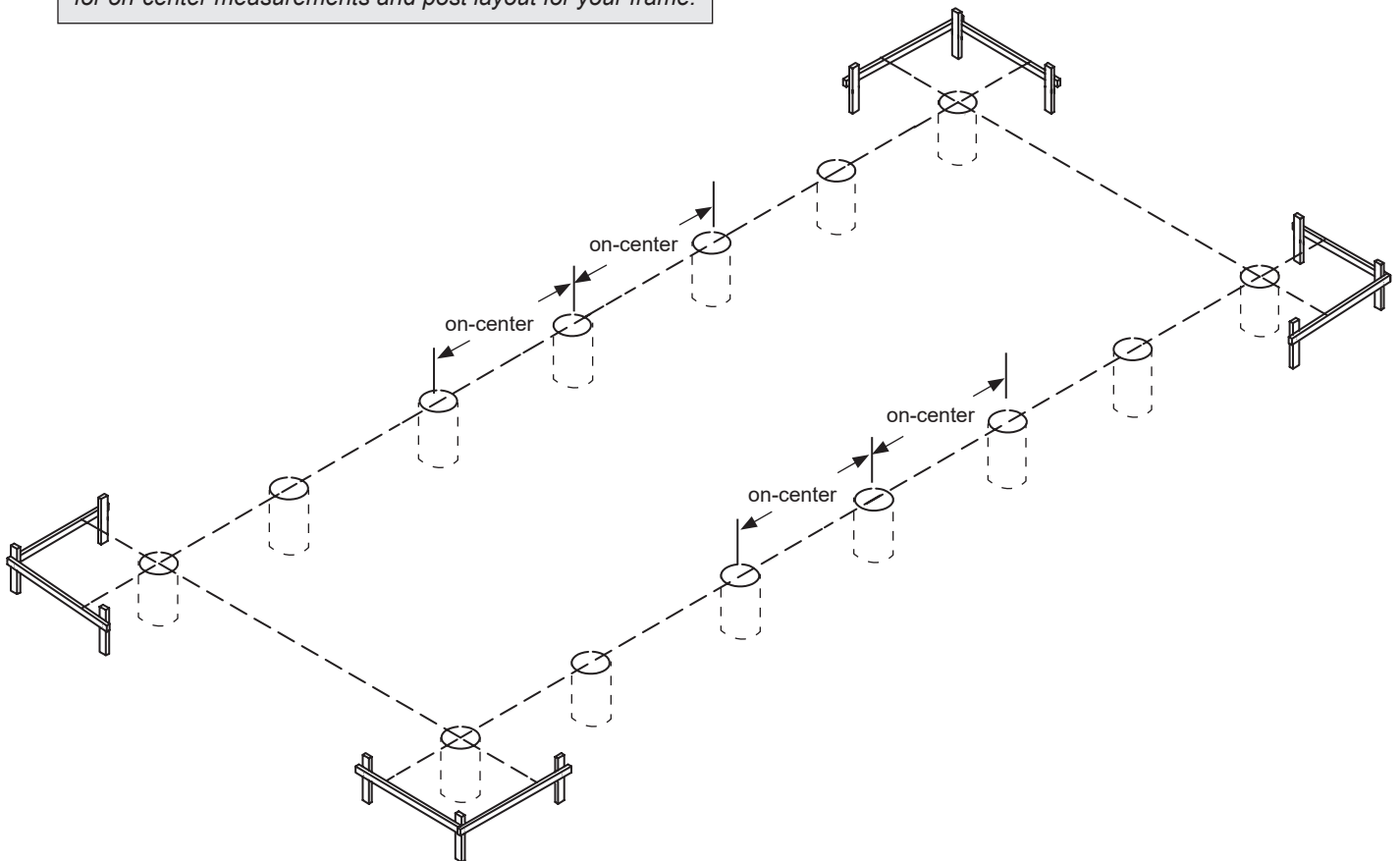
NOTE: Refer to the Quick Start Section located near the back of these instructions for the Side Profile and related diagrams.



Complete these steps:

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.
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*. Consult local building codes. A power auger works best. **Minimum hole diameter is 12"**.
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.

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

SET GROUND POSTS

Required parts and equipment:

- Ground Posts (113334) and 103856 Band Clamps
- Equipment to level and brace posts

NOTE: Concrete (customer-supplied) is required to secure all ground post in the holes. Set all posts at the same height for proper assembly. *Position all rafter mounting holes to point toward the ends of the frame.*

Enlist the services of a qualified contractor to properly set posts. Here are the basic steps:

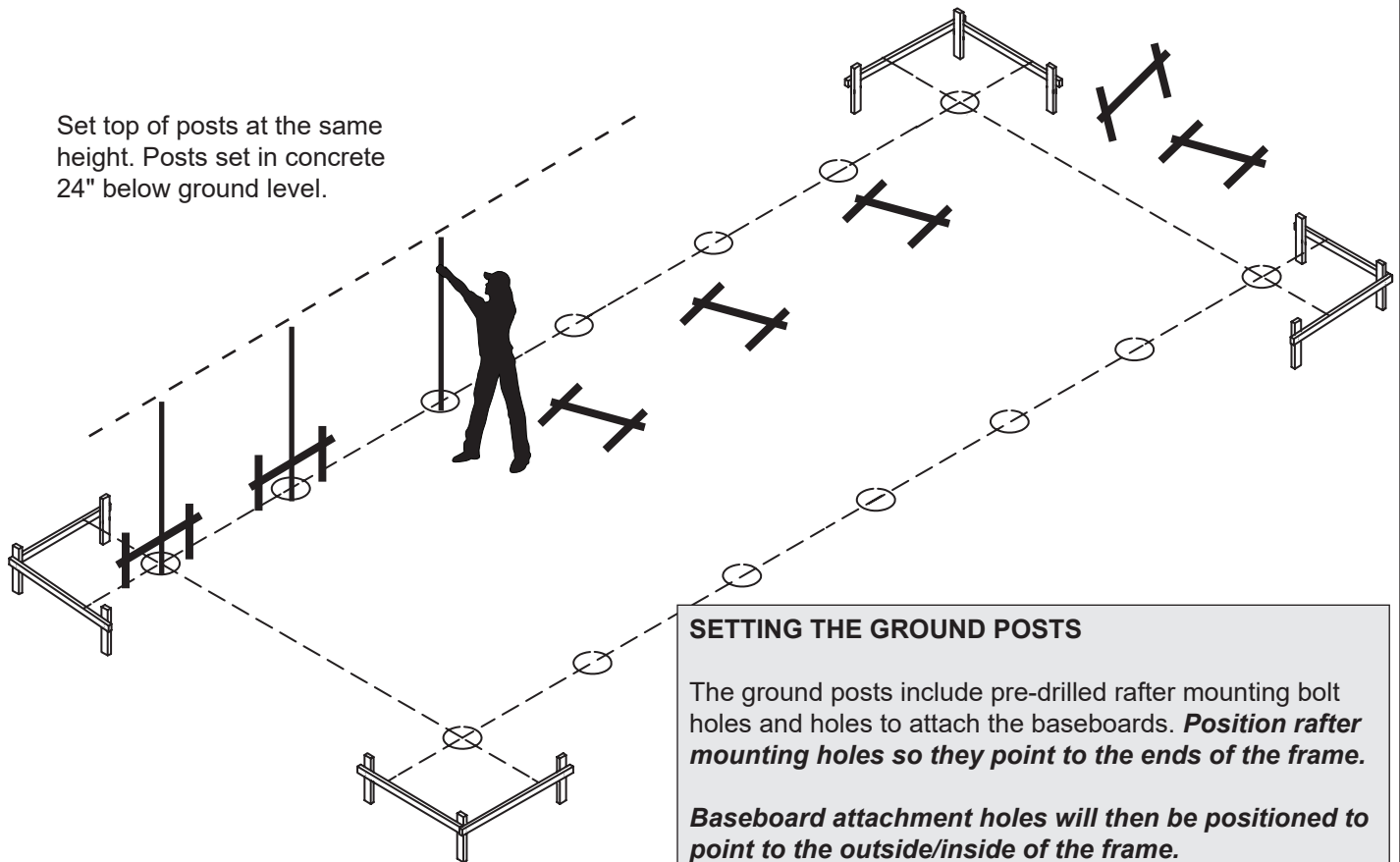
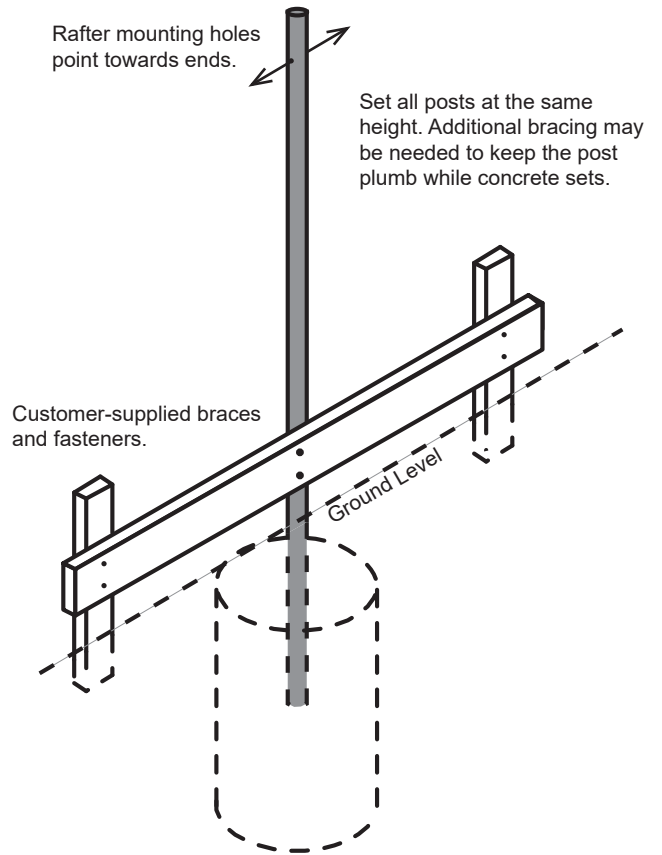
1. Take one ground post, measure 24" from the end opposite the single bolt hole, and mark the location on the ground post. Repeat to mark all ground posts.

NOTE: *The single rafter mounting bolt hole is to the top of the ground post. Position the two pre-drilled holes in the ground post toward the ground.*

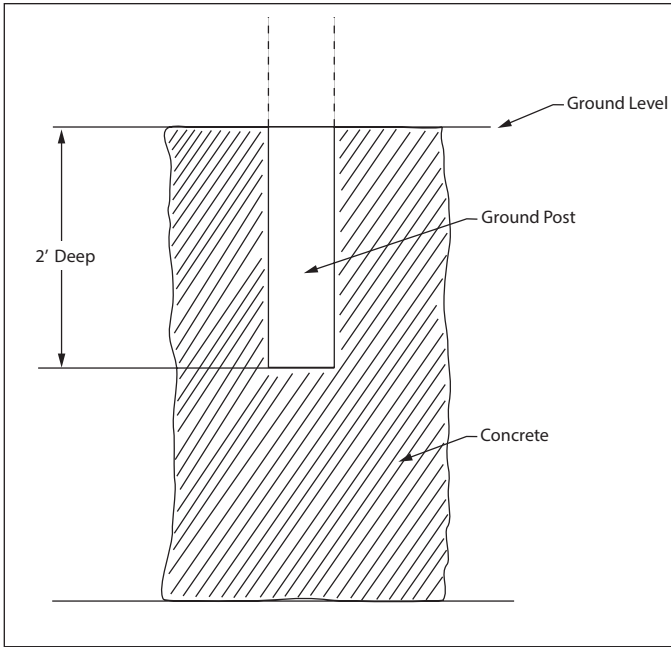
2. With assistance, brace all posts in place. See diagram below. All posts to be plumb before adding concrete. Use the baseboard mounting holes and customer-supplied fasteners and stakes to hold posts in place.
3. Add concrete to anchor posts in holes. Fill hole so concrete remains below the ground level.

Set top of posts at the same height. Posts set in concrete 24" below ground level.

Stake Ground Posts for Concrete



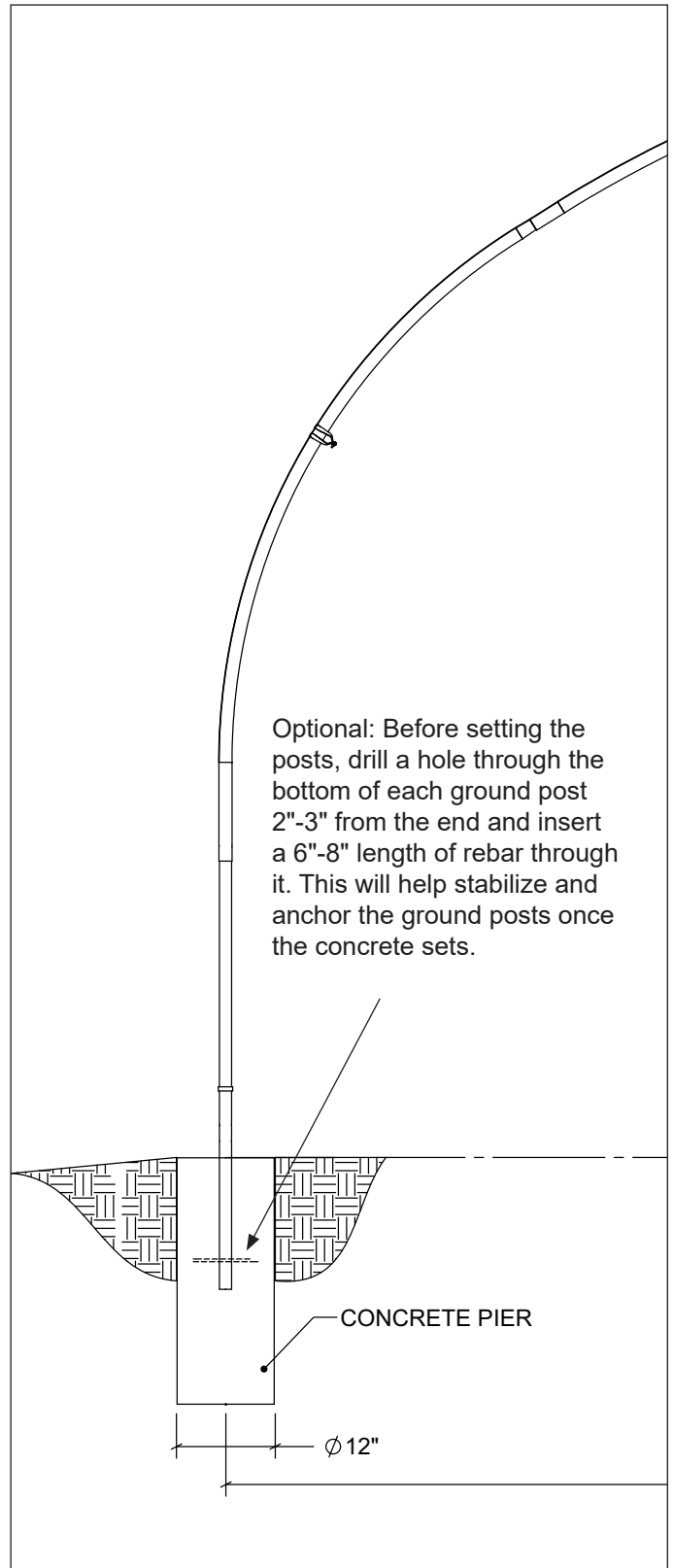
Set the Ground Posts



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". Minimum hole diameter is 12". Set all ground posts 24" below ground level.*

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

Follow established codes and construction practices.



Base Plates (Option)

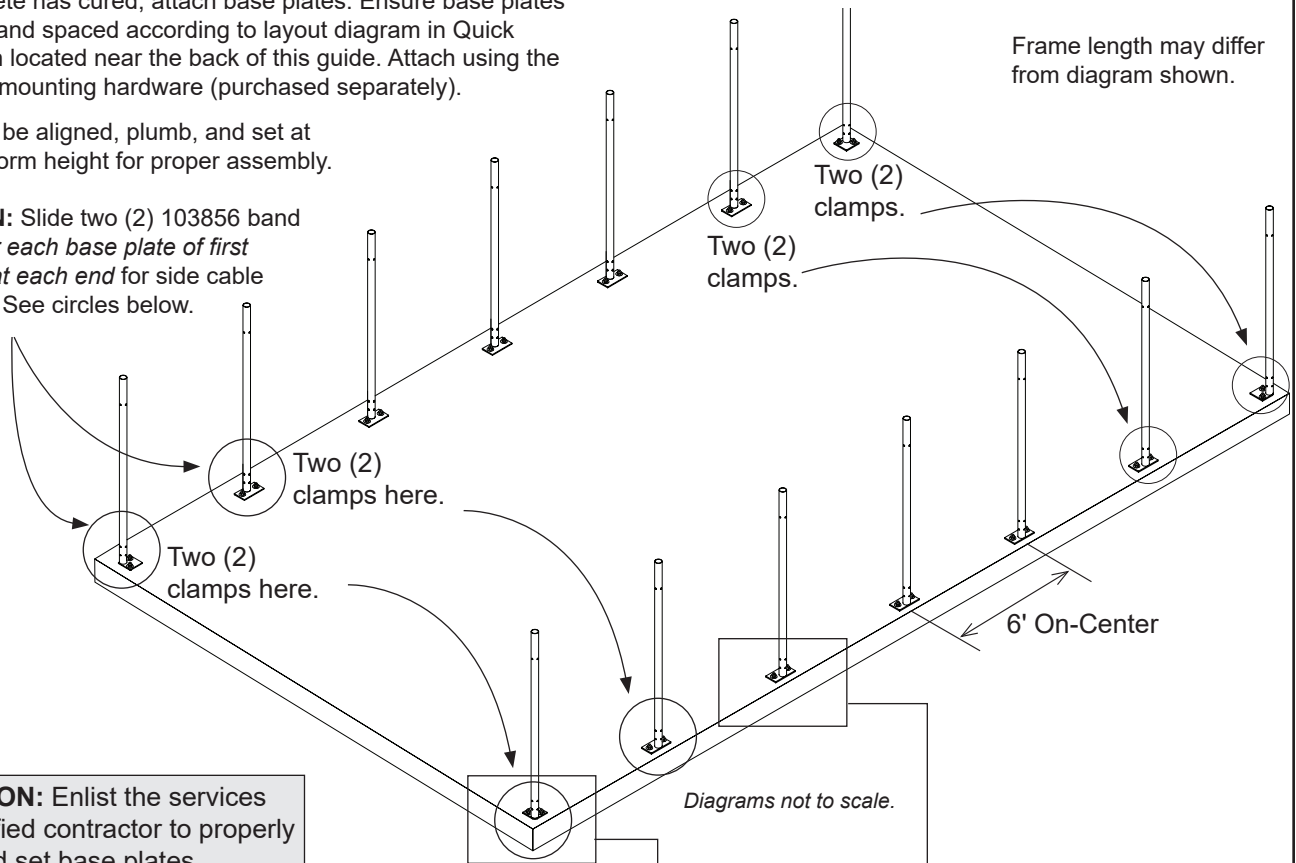
SETTING THE BASE PLATES

For buildings equipped with base plates, secure the plates to either a concrete foundation or concrete piers prior to attaching the rafter legs and assembling the frame. Customer is responsible for construction of the necessary concrete foundation or concrete piers. Consult and follow local and regional building codes for slab requirements.

Once concrete has cured, attach base plates. Ensure base plates are aligned and spaced according to layout diagram in Quick Start section located near the back of this guide. Attach using the appropriate mounting hardware (purchased separately).

Plates must be aligned, plumb, and set at correct, uniform height for proper assembly.

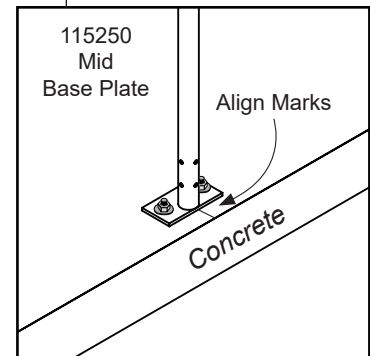
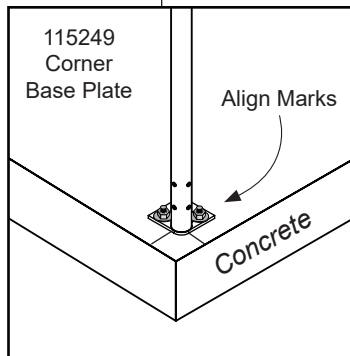
ATTENTION: Slide two (2) 103856 band clamps over each base plate of first two rafters at each end for side cable attachment. See circles below.



ATTENTION: Enlist the services of a qualified contractor to properly layout and set base plates.

General Anchor Bolt and Epoxy (recommended) Installation Steps:

1. Using the **Rafter Layout – Base Plates** diagram in Quick Start section, determine on-center positions of base plates. Use a string line to maintain alignment.
2. Square plate on foundation and mark bolt hole and base plate locations using base plate as a template.
3. Remove base plate and drill mounting holes according to requirements of customer-supplied anchor bolts.
4. Clean bolt holes according to anchor bolt specifications and directions on epoxy container.
5. Once holes are clean, set plate back in place and apply recommended epoxy into each hole as described by epoxy manufacturer.
6. Take anchor bolts (with nuts and washers installed) and carefully insert one into each bolt hole. Adjust nut and washer on anchor bolt to gauge how far bolt will drop into hole.
7. Allow epoxy to set according to manufacturer's instructions before tightening.
8. Repeat procedure to install remaining base plates.
9. After epoxy has set, return to all anchor bolts and tighten according to manufacturer's instructions.



Rafter Assembly

RAFTER ASSEMBLY

After setting the ground posts, continue with the rafter assembly. Do not set assembled rafters into position on the ground posts until concrete has set. Check with contractor for set times.

NOTE: All rafter assemblies consist of three main rafter sections. Consult the rafter diagrams 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. Assemble all main sections of rafters as described below and set aside.



STEP 1: Select the rafter pipes to assemble one rafter.



STEP 2: Slide the separate pipe pieces together.



STEP 3: Secure each rafter joint using two (2) Tek screws.



STEP 4: Wrap each splice and Tek screws with duct tape to protect the cover.

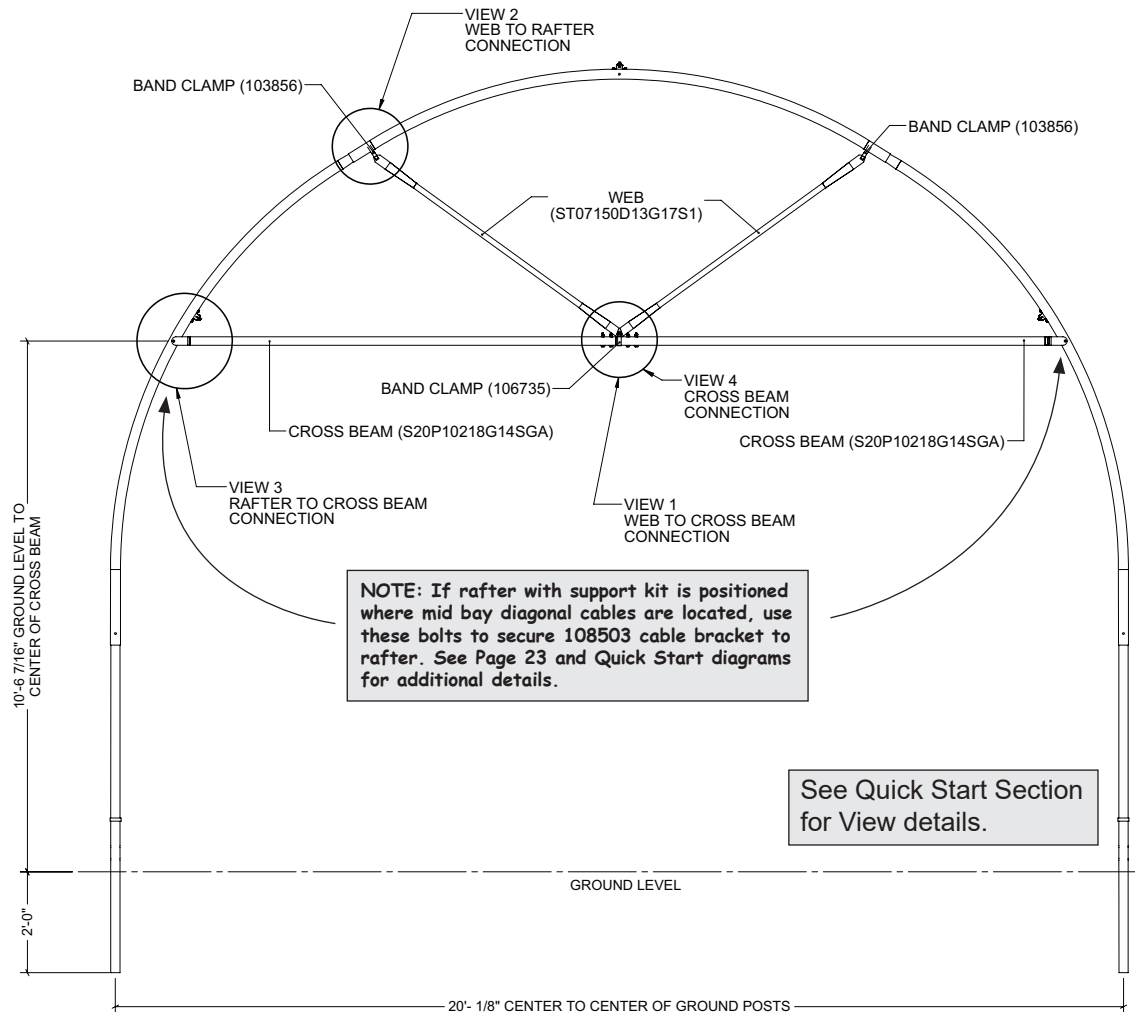


Rafter Assembly—Optional Support Kit

RAFTER ASSEMBLY—Optional Support Kits

If the optional support kits were purchased, continue with the assembly steps that follow. Consult the diagrams supplied with the rafter support kits for additional details. See also the diagram in the Quick Start section of this guide. If the support kits were not purchased, continue with the frame assembly.

ATTENTION: Support kit components are typically not installed for the end rafters when end wall framing is present.



Support Kit Components for a
20' Wide Rafter

Complete these basic steps:

1. Slide the band clamps into position on the assembled rafter.
2. Assemble the 2" x 2" square tube cross beam. Position cross beam band clamps as needed before installing bolts.
3. Verify dimensions and position of support kit components and install web components. Cross beam will run parallel with the ground will installed properly.
4. Return to each band clamp and secure each clamp to the rafter using a Tek screw. **Install Tek screw in a position that will not contact the cover when it is installed.**

GROUND POST OPTION SHOWN ABOVE AND IN MOST DIAGRAMS THROUGHOUT THIS GUIDE. SEE QUICK START SECTION FOR ADDITIONAL GROUND POST AND BASE PLATE DETAILS.

ATTENTION: Depending on position, bracket for roof cable (¹⁰⁸⁵⁰³) is secured using the mounting bolt that connects cross beam of support kit to the rafter. See cable positions on frame for additional detail.

Frame Assembly

FRAME ASSEMBLY

Use the diagrams and information that follows to assemble the main frame.

ATTENTION: Rafters are heavy. *Always lift rafter from two separate points to prevent damage and injury.* Examine the site to determine the best way to move the rafters into position and to set them onto the ends of each set of ground posts. Do not set rafters into position until the ground post concrete has set.

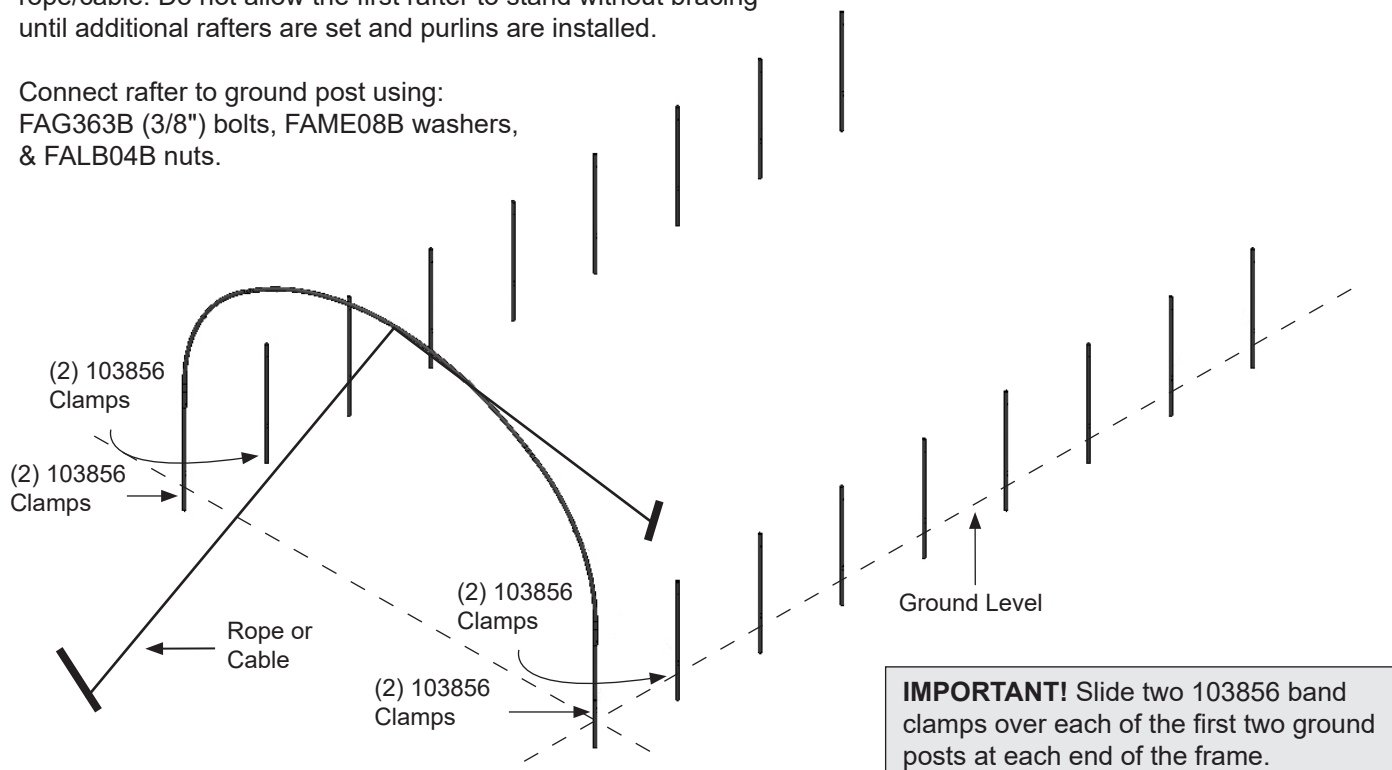
Optional, but recommended—especially for long buildings: Build a Rafter-Spacing Jig (Customer supplies materials.)

A spacing jig saves time and helps to evenly space the rafters. Jig sets the on-center spacing of rafters. Examine the photo below and use it to build a jig to space rafters during purlin installation. Use 2" x 4" lumber and wood fasteners.



ATTENTION: Anchor the first rafter in place using bracing or rope/cable. Do not allow the first rafter to stand without bracing until additional rafters are set and purlins are installed.

Connect rafter to ground post using:
FAG363B (3/8") bolts, FAME08B washers,
& FALB04B nuts.



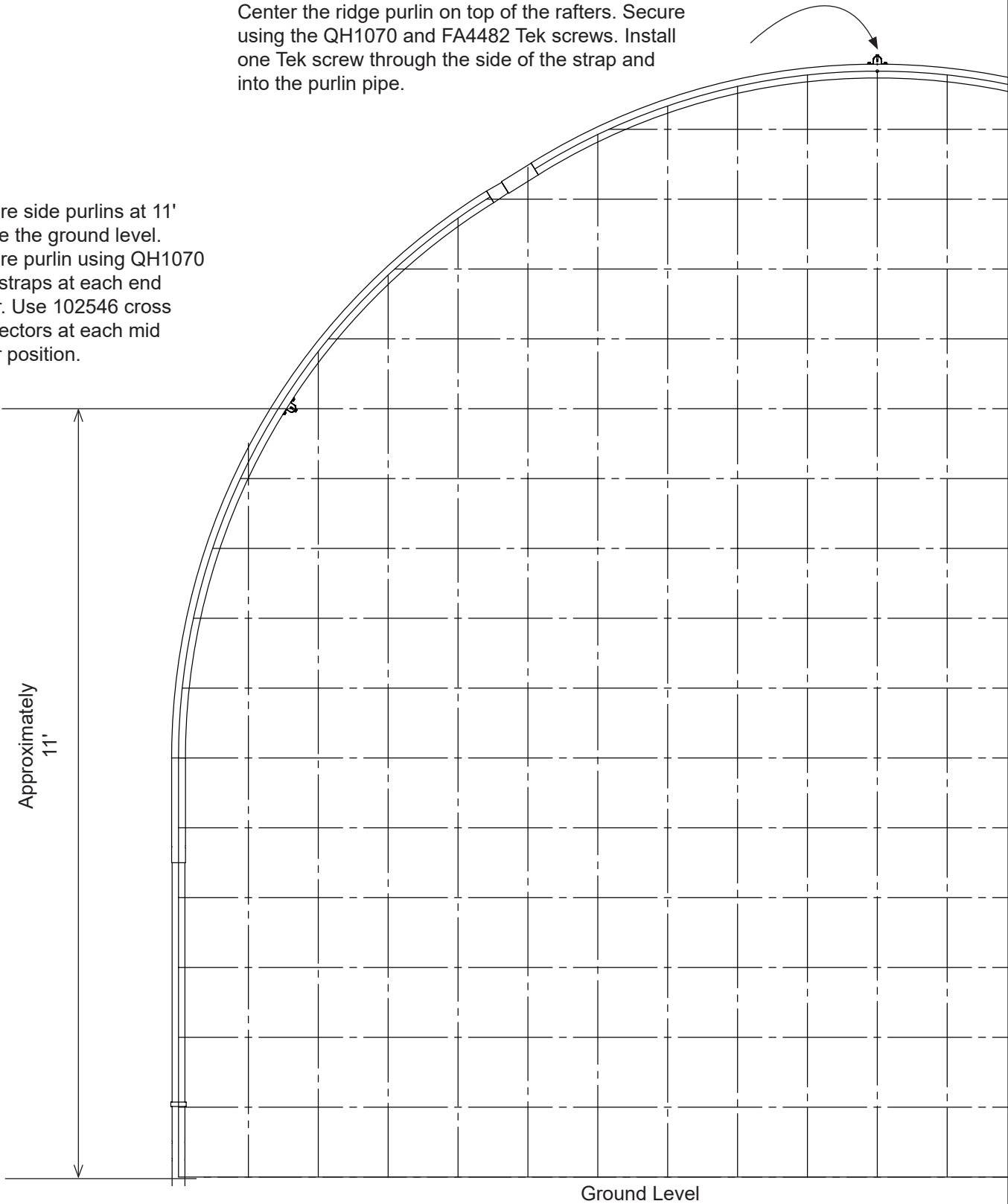
Frame Assembly

FRAME ASSEMBLY (continued)

Use this diagram to properly position the purlins during the frame assembly. Side purlins will run just above the cross beam of the rafter support kit components if equipped.

Center the ridge purlin on top of the rafters. Secure using the QH1070 and FA4482 Tek screws. Install one Tek screw through the side of the strap and into the purlin pipe.

Secure side purlins at 11' above the ground level. Secure purlin using QH1070 pipe straps at each end rafter. Use 102546 cross connectors at each mid rafter position.

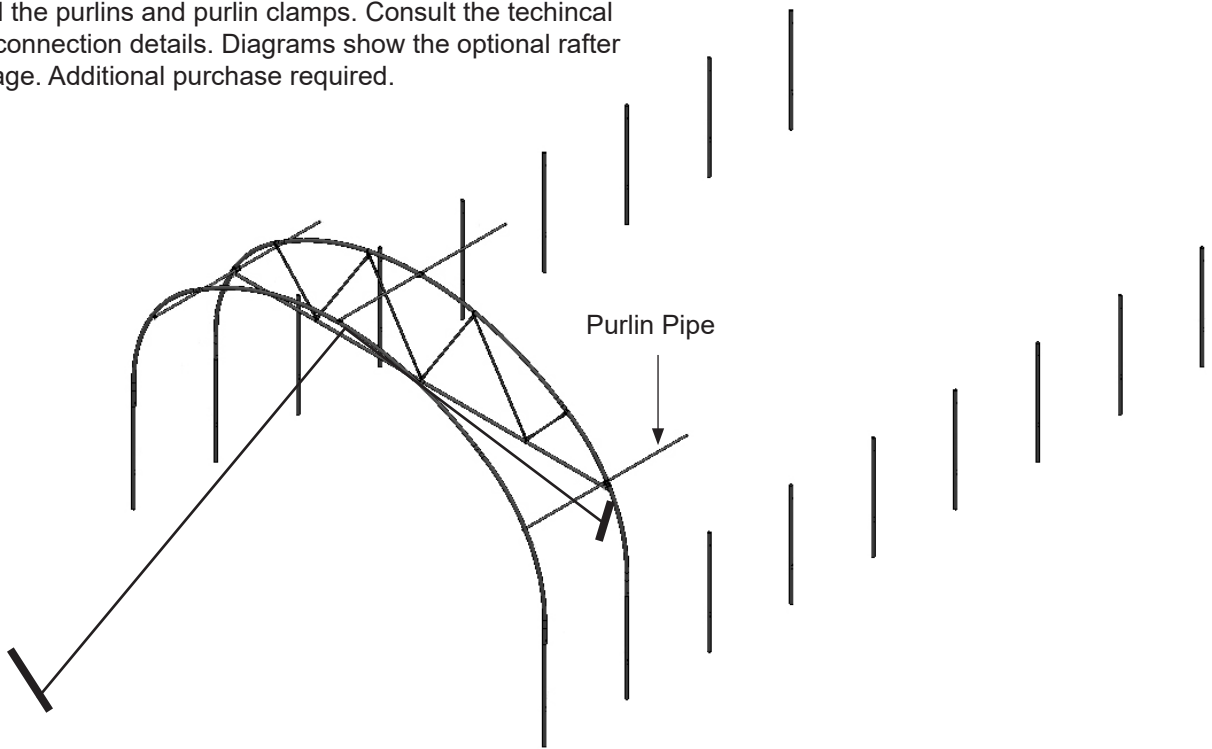


Frame Assembly

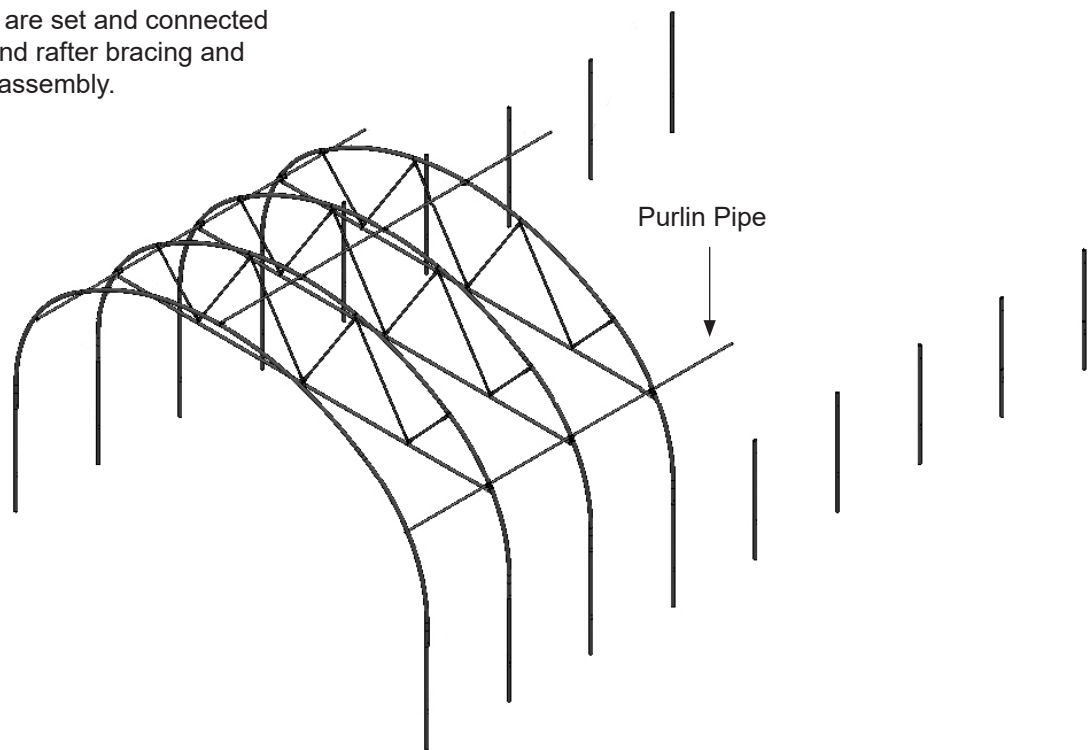
FRAME ASSEMBLY (continued)

After setting the first end rafter and bracing it in place, set the second rafter and add the purlins and purlin clamps. Consult the technical diagrams for connection details. Diagrams show the optional rafter support package. Additional purchase required.

Frame shown may differ from actual frame. Consult Quick Start guide for actual frame.



After the first few rafters are set and connected by purlins, remove the end rafter bracing and continue with the frame assembly.



IMPORTANT! Secure each QH1070 pipe strap to purlin pipe using one Tek screw. Secure all 102546 cross connectors to rafter and to purlin pipe using Tek screws. Secure all purlin pipe splices using two Tek screws. See photos on next page.

Frame Assembly

FRAME ASSEMBLY (continued)

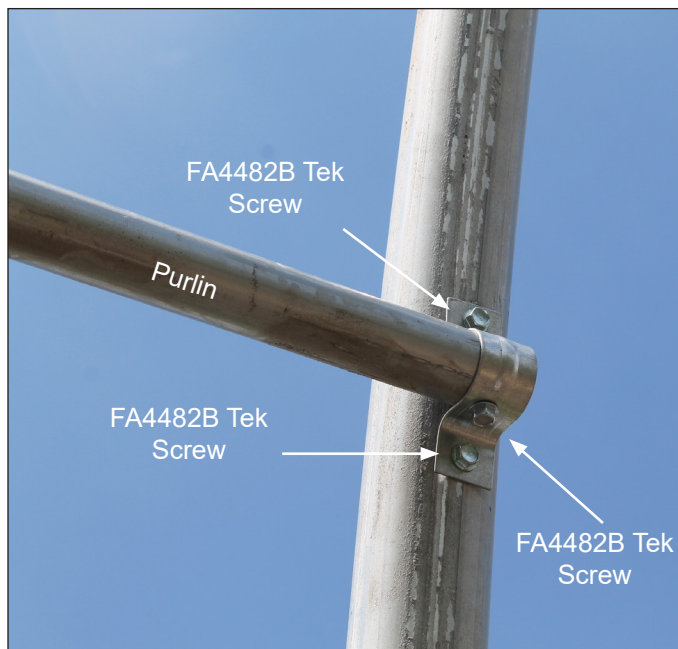
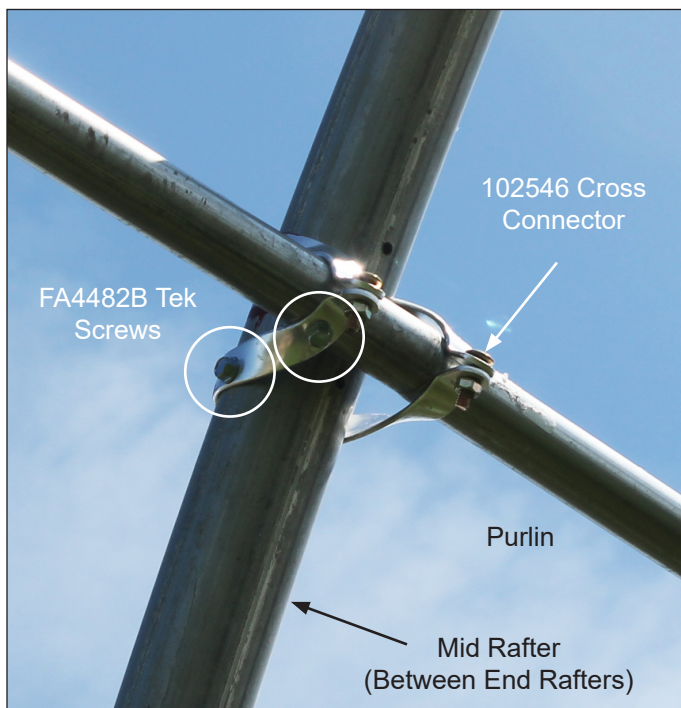
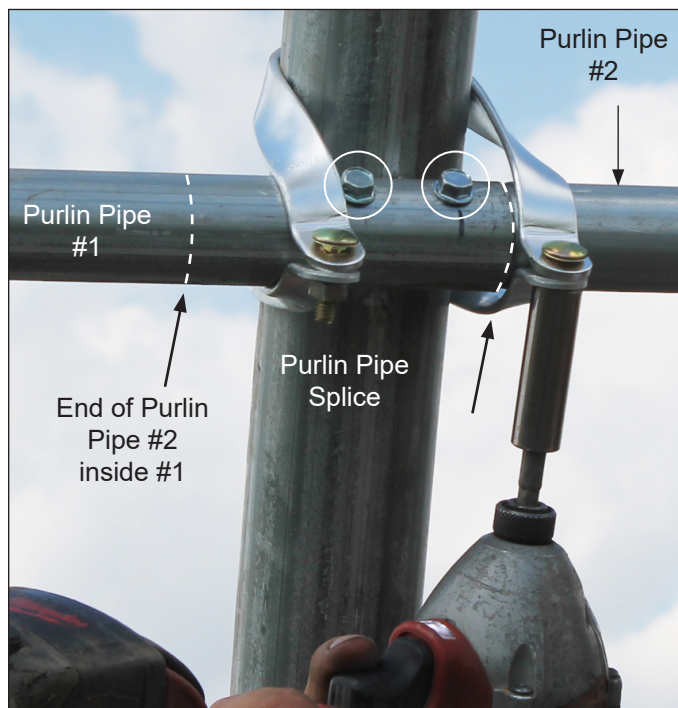


Photo shows the installation of the side purlin and pipe strap at the end rafter. See Connection Details in Quick Start section for additional information. Ridge purlin is installed on top of the rafters unless noted.

Secure each QH1070 pipe strap to the purlin pipe using one Tek screw.



Secure all 102546 cross connectors to the rafter *and* to the purlin pipe using Tek screws.



Secure each purlin pipe splice using two Tek screws.

Frame Assembly

FRAME ASSEMBLY (continued)

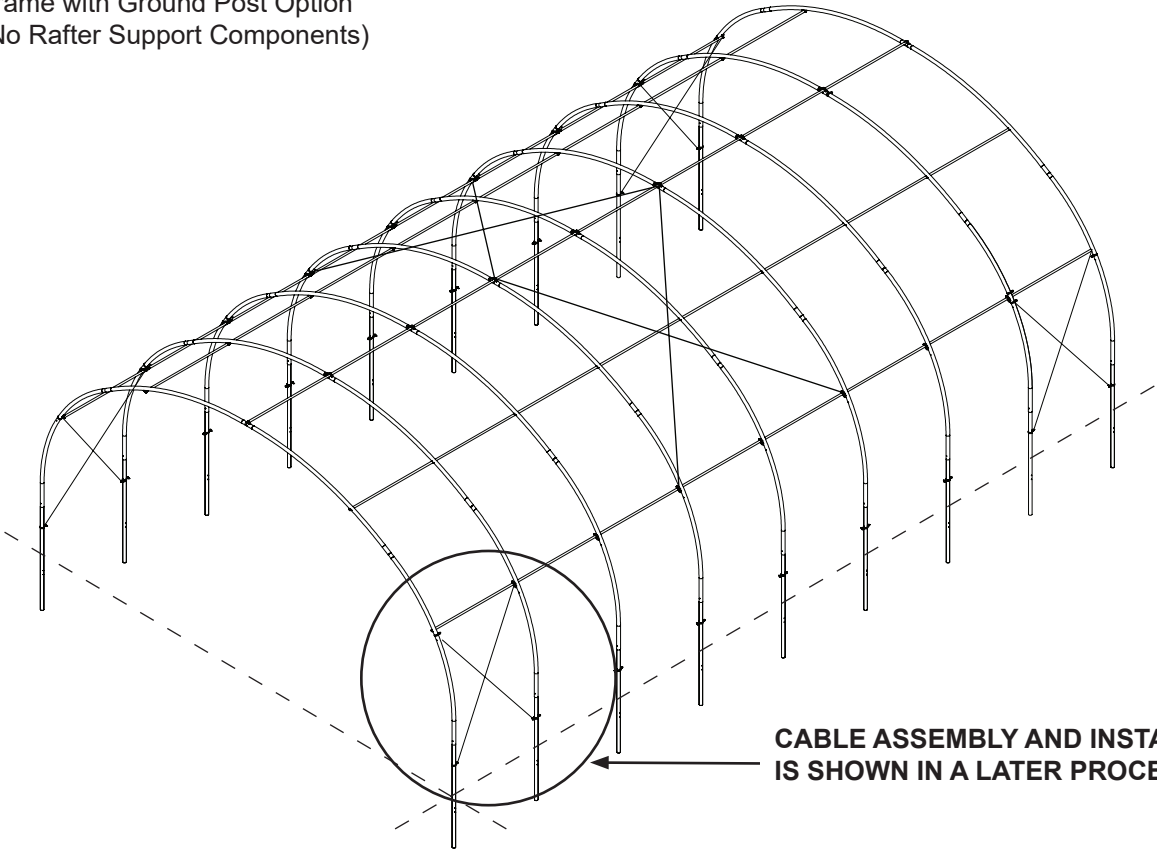


Frame Assembly

FRAME ASSEMBLY (continued)

Frame shown may differ from actual frame.
Consult Quick Start guide for actual frame.

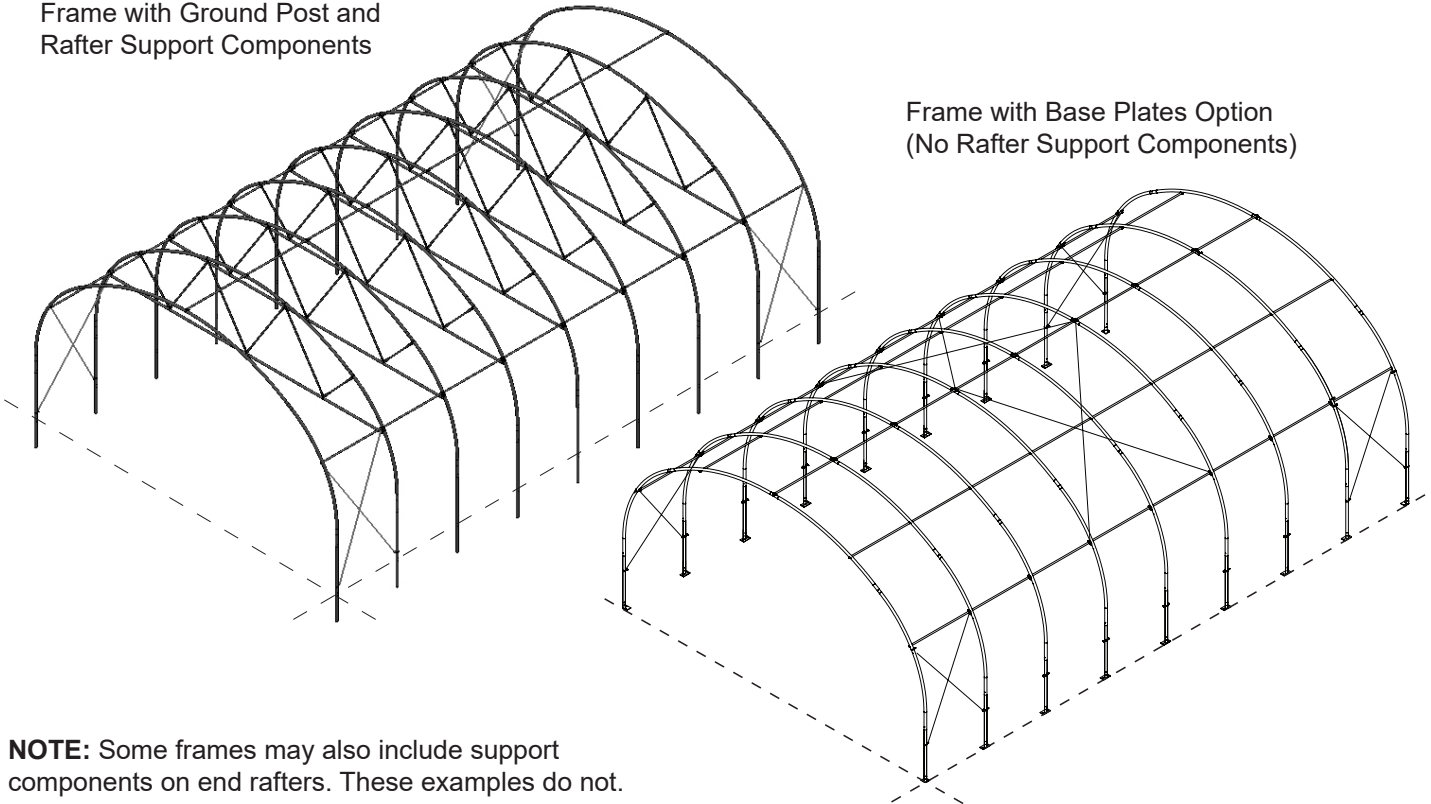
Frame with Ground Post Option
(No Rafter Support Components)



CABLE ASSEMBLY AND INSTALLATION IS SHOWN IN A LATER PROCEDURE.

Frame with Ground Post and
Rafter Support Components

Frame with Base Plates Option
(No Rafter Support Components)



NOTE: Some frames may also include support components on end rafters. These examples do not.

Baseboard Installation—Recommended

BASEBOARD INSTALLATION—RECOMMENDED

Gather the parts:

- 2" x 8" treated lumber (supplied by customer).
- 5/16" carriage bolts and nuts **supplied by customer**. Length depends on the thickness of the baseboard.

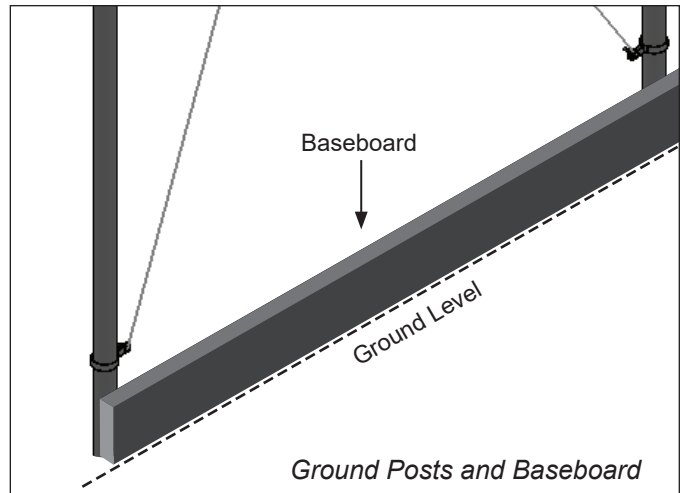
When properly installed, baseboard runs the length of the frame at ground level. *The baseboard is supplied by the customer.* The following procedure describes one way to install the baseboards. The size and type of the baseboard you choose may require the use of alternative steps.

On the outside of the frame, attach the first baseboard to the rafter using two (2) 5/16" carriage bolts and nuts. *Countersink bolt heads if carriage bolts are not used.* Continue adding baseboards to complete the first run.

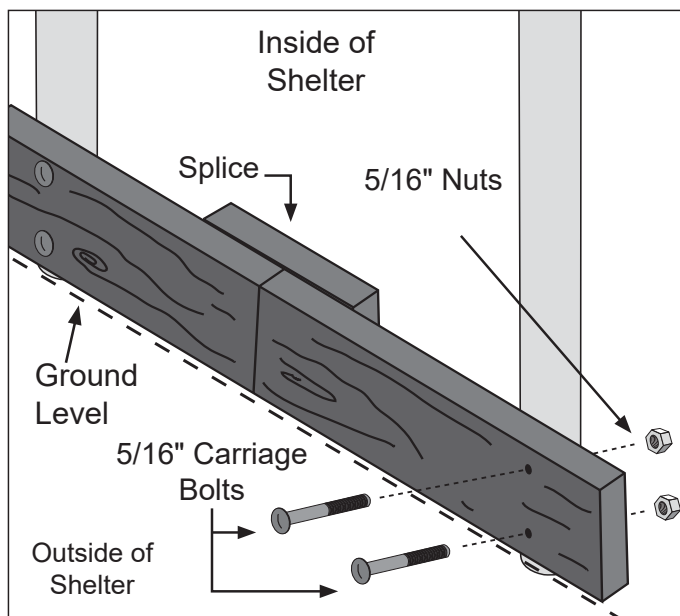
Splices are made between posts as shown in the drawing below. Use a short section of baseboard to secure separate baseboards at a splice. See diagram below.

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

NOTE: The boards should be at ground level or slightly into grade to create a good seal between the board and ground level. After installing the baseboards, continue with these instructions.



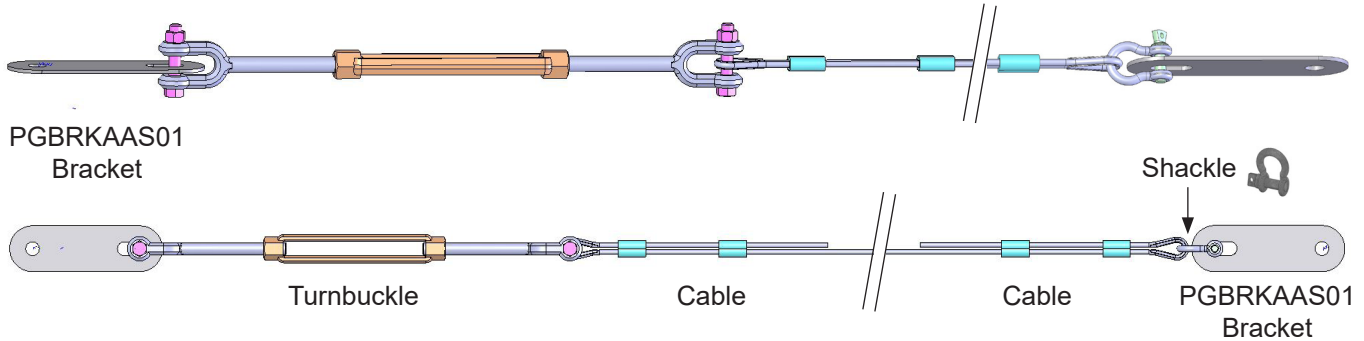
The above diagrams present examples only. Actual installation depends on customer-supplied materials and other factors.



Diagonal Cable Installation

Using the diagrams and photos, install diagonal cables at each end bay of the frame. Position turnbuckle either at the top end of the cable assembly as shown in the Quick Start diagrams, or at the bottom end (for easier adjustment) as shown in the photos on the next page.

Secure each band clamp to the rafter using a Tek screw. **Install Tek screw in a location that will not contact film cover when it is installed. Apply duct tape over band clamp on top of rafters to protect film.**



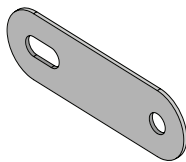
CABLE ASSEMBLY PART NUMBERS (20' WIDE)		
RAFTER SPACING	4'	6'
END BAYS (SIDEWALL)	CAB25G0602	CAB25G0702
MID BAYS (ROOF)	CAB25G1103	CAB25G1310



104189 Turnbuckle



AS2167
Anchor
Shackle



PGBRKAAS01
Bracket

Complete these steps:

1. Consult the **Cable Assembly table** above (also found in the Quick Start guide) and choose a cable for the **end bay sidewall** location. Verify on-center rafter spacing to ensure correct cable is selected.
2. Construct a cable assembly using the components shown in the cable diagrams above. Ensure shackle is tighten after installation.
3. Fully open turnbuckle. Threads of threaded jaw should remain fully in turnbuckle body when properly opened. See below.

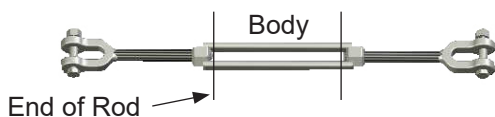


Photo shows installation of end bay sidewall diagonal cable assemblies with turnbuckles at the lower end.

Diagonal Cable Installation

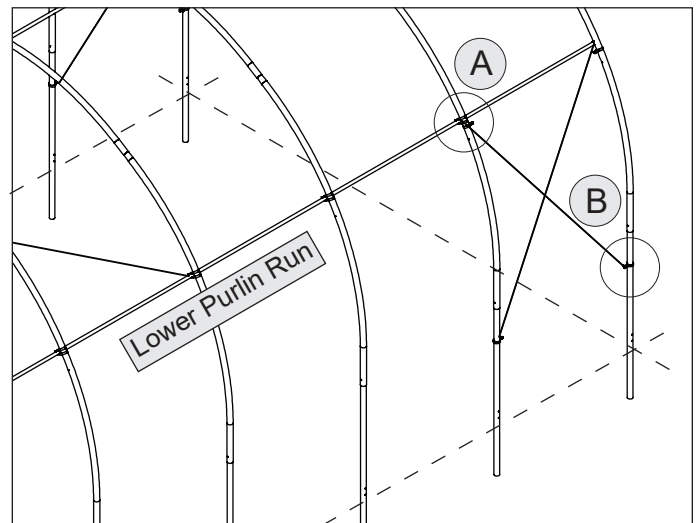
CABLE ASSEMBLY AND INSTALLATION (continued)

4. For end bay sidewall cables, secure the upper band clamp 3"- 4" **below the clamp** of the lower purlin run. (See A below.)



ATTENTION: If band clamps were not installed as described on Pages 11 and 14, install those now.

5. Take cable assembly and attach one end to the band clamp. Depending on preference, attach either end to the band clamp.
6. Take remaining end of the cable assembly and use it to judge the position of the lower band clamp. Mark position on rafter and secure lower band clamp to rafter using a Tek screw. See B at the right.
7. Attach cable assembly to band clamp.
8. Repeat Steps 1-7 to construct and install the remaining seven (7) end bay sidewall cables.
9. Check to ensure each band clamp is secured to rafter tube using a Tek screw. *Tape over clamp to protect film when it is installed.*
10. Return to all cable turnbuckles and hand-tighten until snug to remove all slack. **DO NOT OVER TIGHTEN CABLES.**
11. Continue with the construction and installation of diagonal roof cables. See next page.



Sample frame (above) showing installed cables. Frame has ground posts. Dashed lines show ground level.



Lower photos show attaching the PGBRKAAS01 bracket to the installed band clamp.

Diagonal Cable Installation

In addition to the end bay sidewall diagonal cables, this frame includes mid bay roof diagonal cable assemblies. Consult the frame connection diagrams in the Quick Start section near the back of this guide for all connection details. See Cable Assembly table on Page 21 (and in Quick Start section) for cable part number.

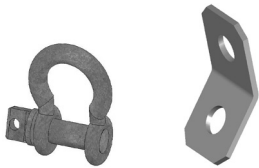
PARTS TO ASSEMBLE AND INSTALL MID BAY CABLES



FAME18B 3/8" Washers FALB04B 3/8" Nuts FAG365B 3/8" x 3-1/2" Bolt

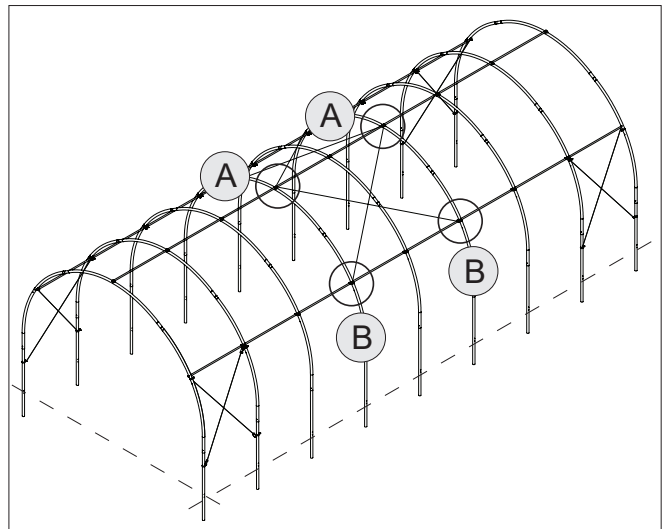


104189 Turnbuckle



AS2167 Anchor Shackle 108503 Cable Bracket

IMPORTANT: Review all connection detail diagrams in the Quick Start section to better understand how to install these cable assemblies and 108503 brackets.



PROCEDURE 1: INSTALL 108503 CABLE BRACKETS

Unlike end bay sidewall diagonal cables, mid bay roof cables attach to a 108503 angled bracket secured to the rafter using a bolt and nut. **Read and understand the following conditions before installing the 108503 brackets.** Review connection details and Side Profile diagram for your building length in Quick Start section. Install all 108503 cable brackets once positions are determined.

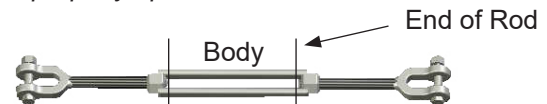
- **Standard Roof:** Secure two (2) 108503 brackets — there will be two per through-bolt connection (A) — using the fasteners noted above. Use the pre-drilled hole at the rafter peak.
- **No Rafter Support Kit (See Page 13):** If no rafter support components are installed at the rafter where cable bracket is attached (B), secure 108503 brackets to the rafter using the fasteners noted above. Use the predrilled hole in rafter. Each (B) location will have one (1) 108503 bracket attached.
- **Rafter Support Kit Installed (See Page 13):** If rafter support kit components are installed, loosen nut and bolt at each (B) location, add the 108503 bracket, and reinstall and tighten nut.

ATTENTION: The B locations are identical on opposite side of frame (not shown) on same two rafters.

PROCEDURE 2: ATTACH MID BAY CABLES

Complete these steps to attach mid bay diagonal cables to the installed 108503 angled cable brackets:

1. Consult table on Page 21 for cable part number. Verify on-center rafter spacing to ensure correct cable is selected.
2. Attach an AS2167 shackle to one end of the cable.
3. Fully open a turnbuckle and attach it to the free end of the cable opposite the shackle. *Threads of threaded jaw should remain fully in turnbuckle body when properly opened. See below.*
4. Move to the frame and attach cable end with shackle to upper 108503 bracket secured to rafter (A) above.
5. Take cable end with turnbuckle and attach turnbuckle to lower 108503 bracket (B).
6. Repeat Steps 2-5 to construct and install the three (3) remaining mid bay roof cable assemblies.
7. Return to all turnbuckles and hand-tighten until snug to remove all slack.
8. Continue with the next procedure.



Install Ribbon Board—Optional

RIBBON BOARD INSTALLATION—Optional for Roll-Up Sides

Gather the parts:

- 2" x 6" treated lumber (supplied by customer).
- Fasteners supplied by customer to attach boards to metal rafter pipes. Length depends on material thickness.

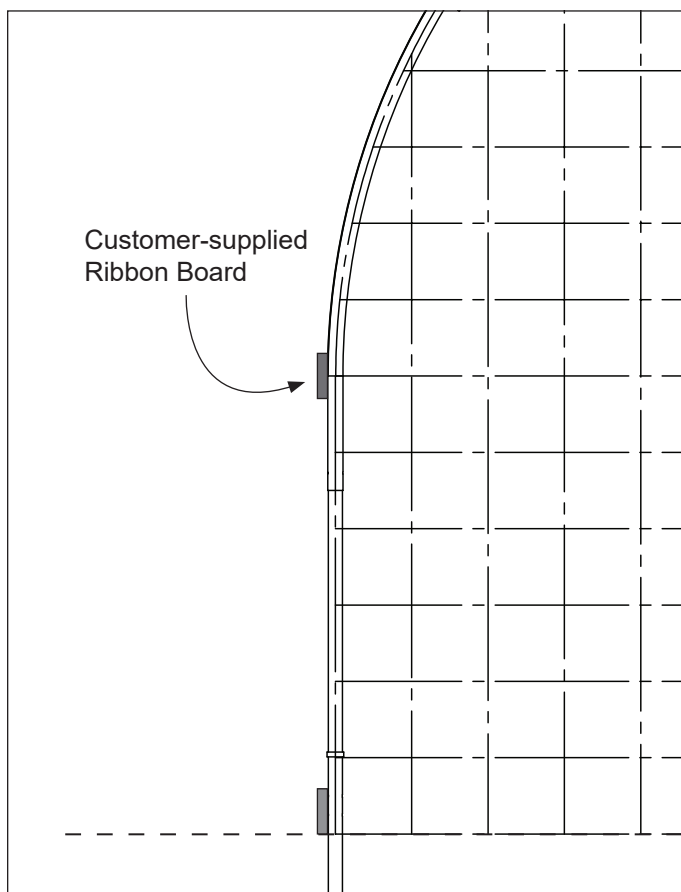
The size and type of material you choose may require the use of alternative steps. When properly installed, the ribbon board runs the length of the frame along each side. *The ribbon board is supplied by the customer as are the fasteners to secure board to the rafters.*

The following procedure describes one way to install the ribbon boards.

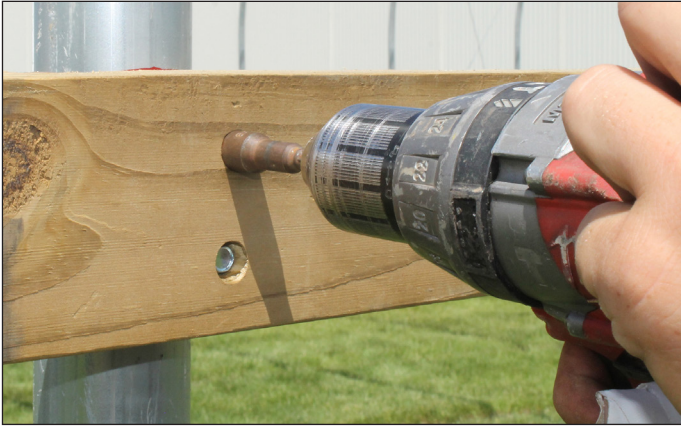
1. Mark ribbon board height along the outside of the frame from end-to-end using a chalk line. Consult the diagram.
2. Align board with outer edge of end rafter and attach to the frame. Fastener heads must be flush with board surface. Countersink if needed.

ATTENTION: Consult the photos on the next page for additional details.

3. Continue adding boards to complete the first run. Splices are made between rafters as shown in the baseboard procedure. Use a short section of material to secure the splice between separate boards.
4. Repeat steps to install the second run of ribbon board along the other side.
5. Continue with the installation of the 111613Z144.



Install Ribbon Board



Photos above show ribbon board attached to the side of an assembled frame. Example shows using 2" Tek screws (additional purchase) to secure board to rafters. Screw heads are countersunk below board surface to allow for the installation of the 111613Z144. Customer-supplied exterior grade carriage bolts are also an option for fasteners.

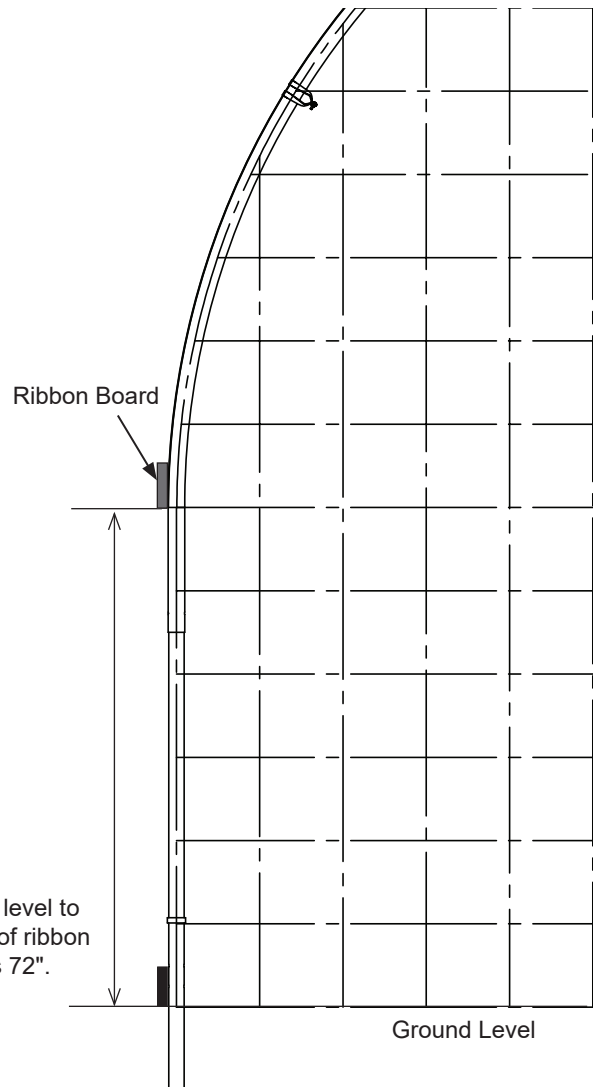
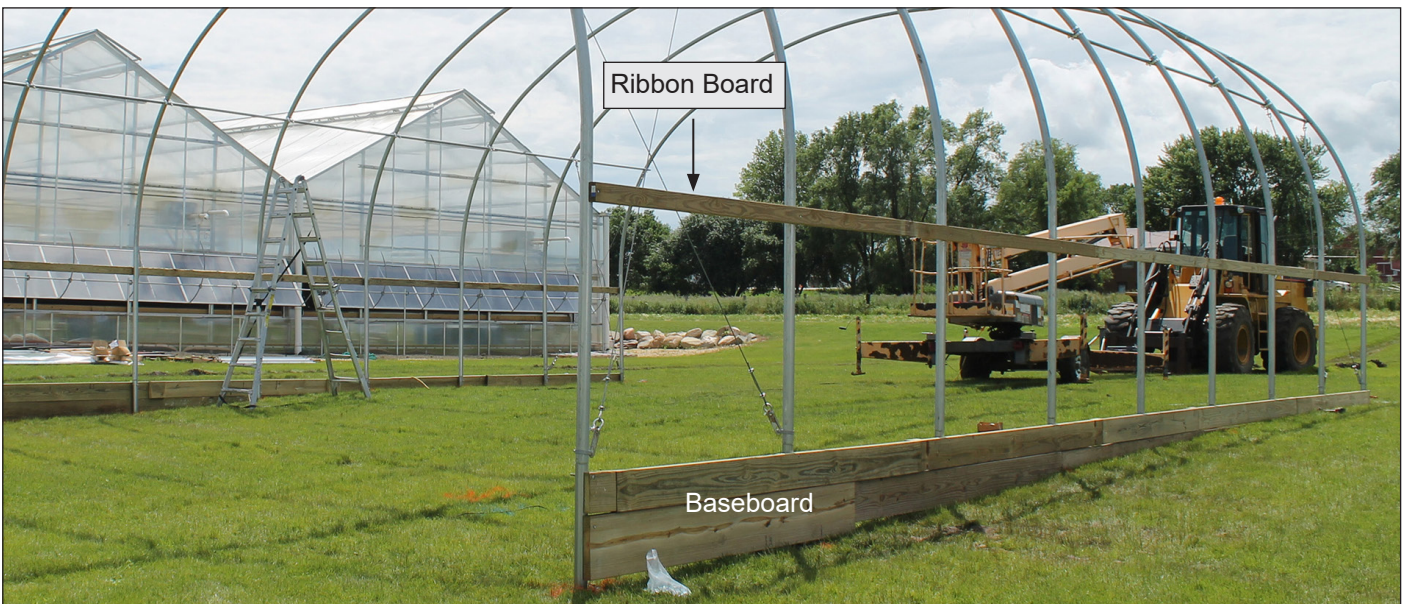


Photo below shows the installed ribbon board and the installed baseboard on a sample frame.



Attach 111613Z144 to Ribbon Board

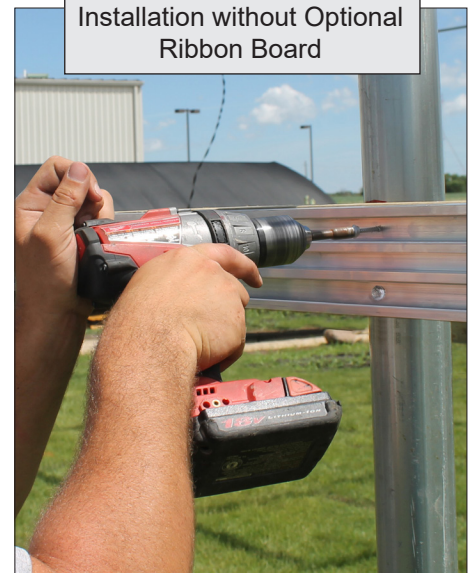
Buildings with roll-up side panels require 111613Z144 for installation. The photos below show where to install the 111613Z144.

Secure 111613Z144 to ribbon board (if present) using FAH005B (1/4" x 2") carriage bolts, FAMF01B (1/4") fender washers, and FALB01B (1/4") nut. Install 111613Z144 flush with ends of ribbon board and end rafters. Pre-drill bolt holes. **Space fasteners at 24" on-center throughout the length of building on both sides.** If no ribbon board was installed, secure directly to rafters using two (2) Tek screws per rafter.

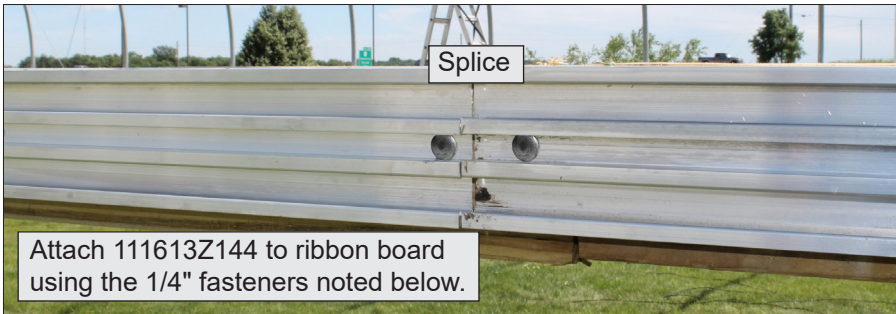
111613Z144
for Roll-Up
Sides.



Clamp or hold against the ribbon board and drill a 3/8" bolt hole.



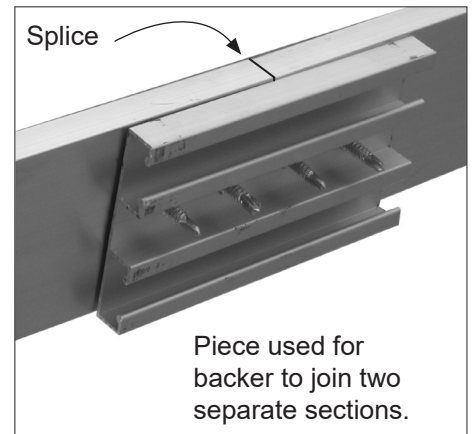
Installation without Optional Ribbon Board



Splice

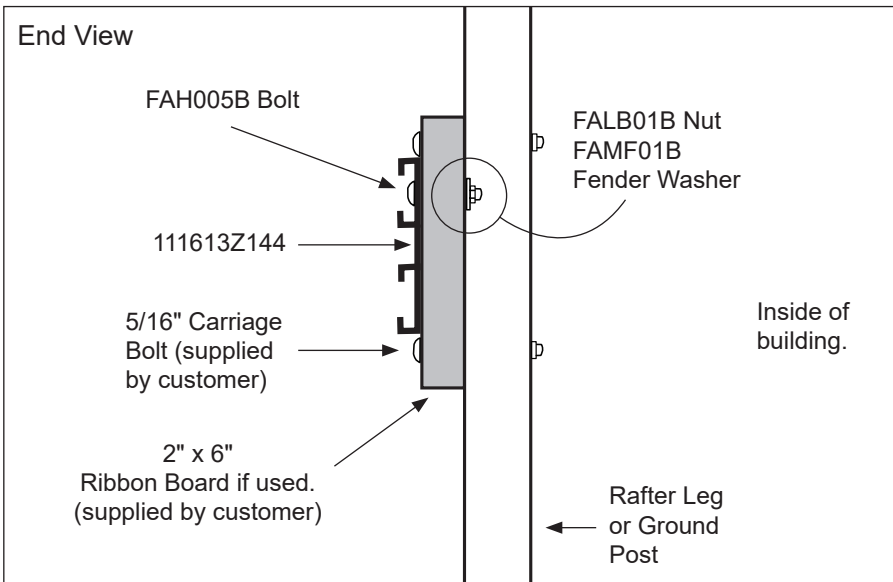
Attach 111613Z144 to ribbon board using the 1/4" fasteners noted below.

ATTENTION: If a ribbon board is not installed, attach the 111613Z144 directly to the rafters using two (2) FA4482B Tek screws at each rafter position. See photo.



Splice

Piece used for backer to join two separate sections.

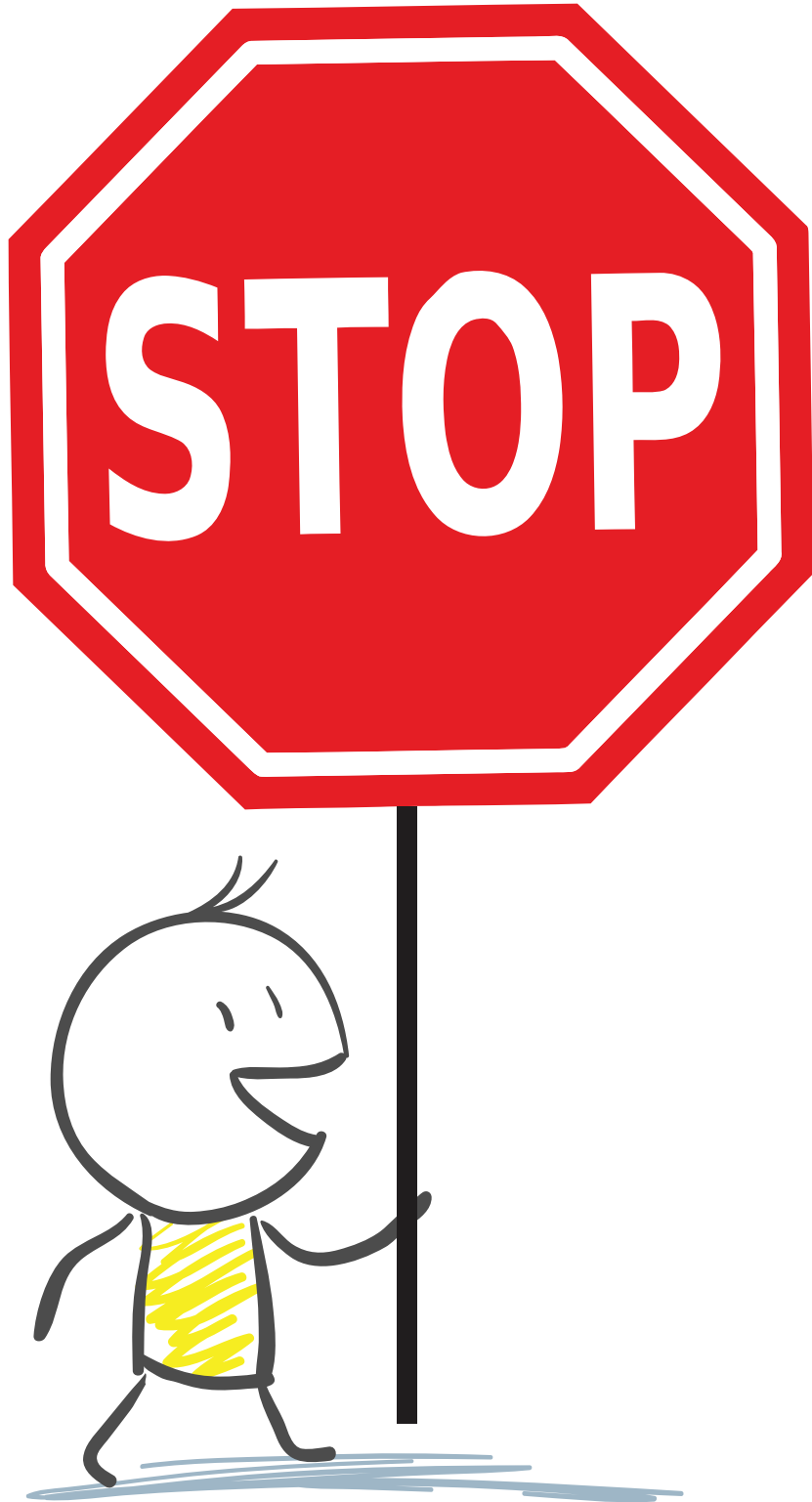


Do not secure two separate sections to the same rafter. Splice between the rafters and use a small section of 111613Z144 (or other material) as a backer. Secure using Tek screws as shown (or wood screws if backer is wood). Ensure you have enough 111613Z144 before cutting backers.

Optional End Frame and Panel Installation

Typically, end framing and end panels are installed before the cover is pulled onto the frame. If your building is equipped with an end wall and end wall covering, review the instructions sent with the end panel kit and end wall framing and proceed as instructed.

After installing the end framing and cladding, return to this guide and continue with the installation of the main cover and roll-up sides.

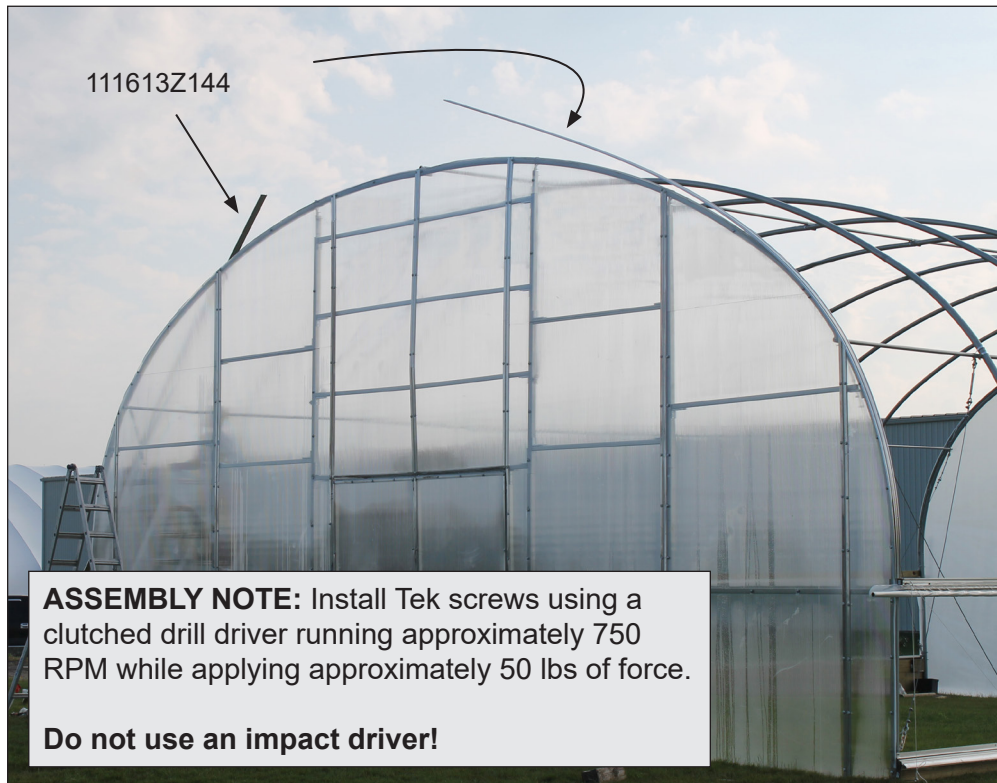


Attach 111613Z144 to End Rafters

INSTALL 111613Z144

Buildings with film covers require 111613Z144 attached to end rafters to secure covers. *Photos show a building with an optional end wall with polycarbonate cladding. Additional purchase required.*

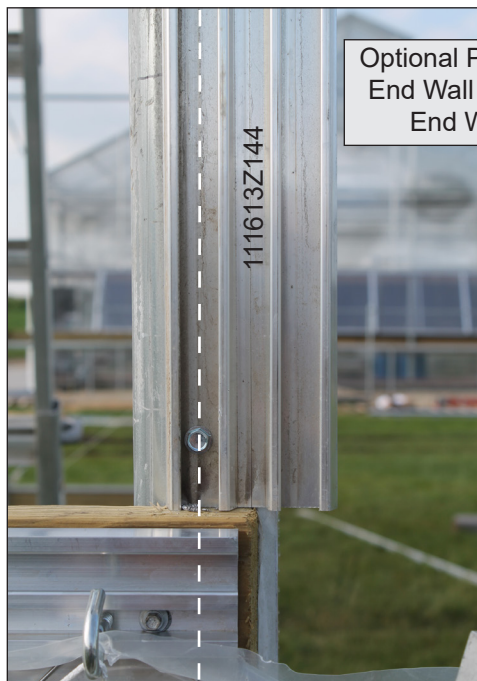
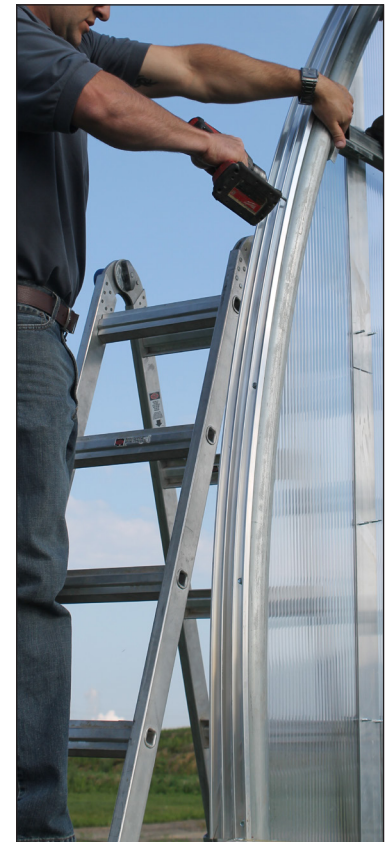
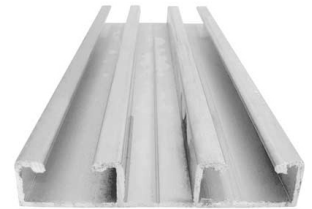
Secure the 111613Z144 to top of both end rafters using FA4482 Tek screws spaced at 16" on-center. **See comments below for details about position of 111613Z144 on end rafter. After installation, continue with the steps on the next page.**



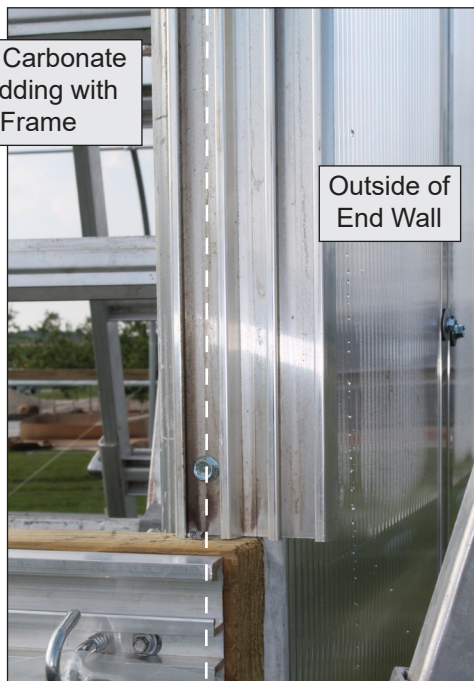
ASSEMBLY NOTE: Install Tek screws using a clutched drill driver running approximately 750 RPM while applying approximately 50 lbs of force.

Do not use an impact driver!

111613Z144 for cover installation.



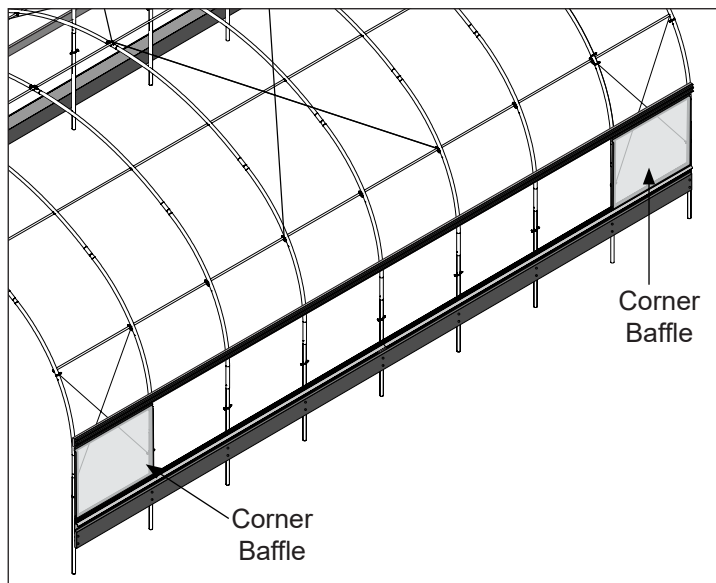
Optional Poly Carbonate End Wall Cladding with End Wall Frame



The 111613Z144 is shown attached to the top of an end rafter. When end wall cladding is polycarbonate panels, install 111613Z144 so it extends over the top of the end wall panels to create a finished edge. **Dashed line identifies the center of the end rafter.**

Install Corner Baffles

If you do not want corner baffles installed, skip this section and continue with the next page. Corner baffles for roll-up sides can be installed later; however, it is easier to install before installing cover, roll-up panels, and anti-billow ropes.

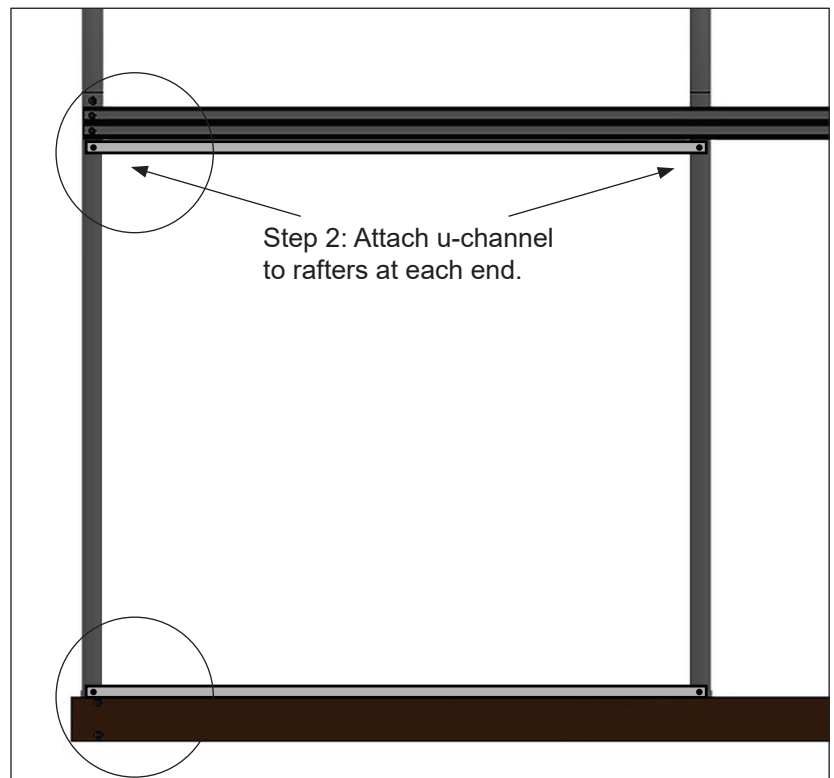
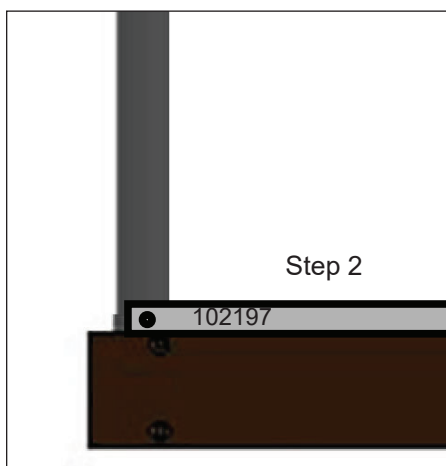
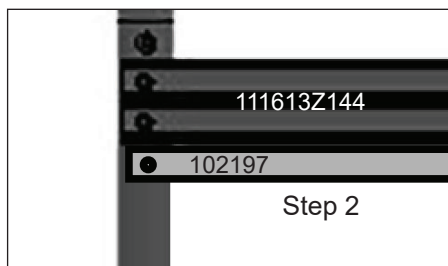


REQUIRED PARTS:

- 102197 U-channel
- 102198A Poly-Coated Spring Wire
- 108654 6' Wide 6 MIL Film
- FA4482B Tek Screws

Complete these steps to install a baffle at each corner of the assembled frame.

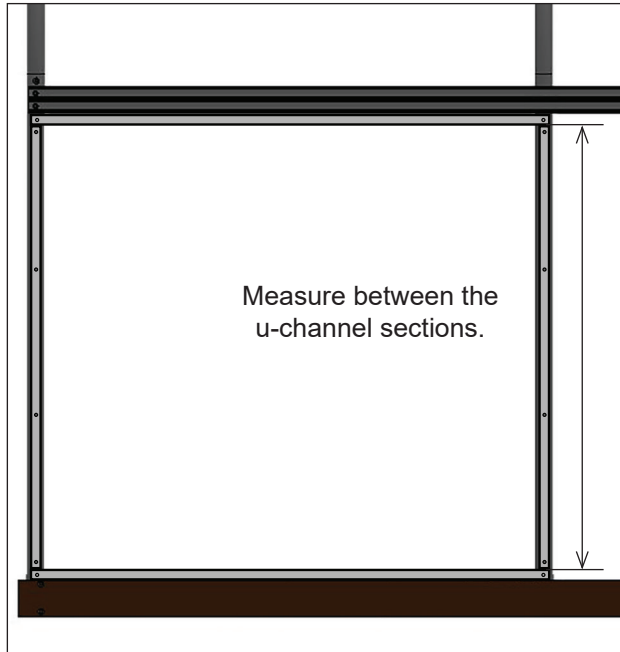
1. Locate four (4) pieces of 102197 single u-channel, additional 102198A spring wire, and the 108654 roll of 6 mil film.
2. At one corner, cut and attach the 102197 u-channel to the end rafter and first interior rafter as shown. Install these horizontal runs of single u-channel below the double u-channel.



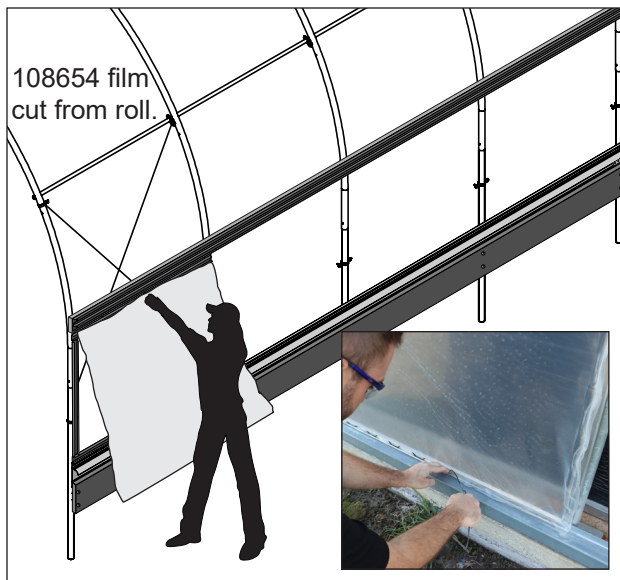
Install Corner Baffles

INSTALL CORNER BAFFLES (continued)

3. Measure the distance between the upper and lower single u-channel installed in Step 2. Cut two additional u-channel sections to this length and attach these vertical runs to the end rafter and interior rafter. *Space Tek screws (FA4482B) approximately 12" on-center. Vertical channel runs may consist of multiple small lengths of available u-channel.*



4. Take the 108654 roll of 6 mil film and cut a piece to cover the end bay opening framed by the single u-channel. Roll out the film and measure length to determine the best way to cut the film. You need four (4) identical panels from the film roll.
5. With assistance, secure the film panel in the u-channel using the 102198A wire spring.



6. Trim the film as needed and repeat the steps to install all remaining corner baffles.
7. After installing all baffles, continue with the next procedure.

Frame Check

FRAME CHECK

Inspect the frame for sharp edges or fasteners that could damage the cover during installation.

1. Verify that all frame members are properly secured and that all bolts and clamps are tight.
2. 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.
3. Reposition clamps and bolts as needed and tape all rafter pipe joints with duct tape to protect the cover material.
4. Verify that the main building frame is properly and adequately anchored.
5. Clear the site around the building to prepare a staging area for the cover material.
6. Continue with the cover installation steps.

ATTENTION: Before you install the cover, verify that these options if present have been installed: end wall frame, door frames, and end wall cladding. Consult the documentation for those items and proceed as instructed. If these items have been installed or are not present, continue with the cover installation.

Film Cover Installation

INSTALL IR/AC FILM COVER

Continue with the following procedure. **Greenhouse includes two film types. Install the IR/AC film first!**

WEAR EYE PROTECTION WHEN INSTALLING SPRING WIRE!

Gather the parts:

- Main cover and spring (#102198A)
- Ropes long enough to reach over the frame (provided by customer)

After attaching the 111613Z144 to end rafters and along the sides, install the IR/AC main cover. 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.

DOUBLE-LAYER FILM INSTALLATION

Greenhouses equipped with a double-layer film include a layer that is Infra Red (IR) Retention film; item #109096, #109097, or #109098.

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

Complete these steps:

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



NOTE: Unfold the cover and locate the edge.

Film Cover Installation

2. Along the edge, clamp self-locking, duck-billed pliers to the cover material and tie ropes or straps to the pliers.

NOTE: The ropes or straps must reach over the top of the building to the other side. The number of ropes depends on building length; use additional ropes spaced even throughout the length to prevent tearing the main cover when it is pulled into place.



Clamp self-locking, duck-billed pliers along the cover edge, tie ropes or straps to the pliers, and then pull cover over the frame.

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



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

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



Film Cover Installation

INSTALL MAIN COVER (continued)

- Once main cover is in place and centered, begin at the peak of one end and install the 102198A wire spring into the 11613Z144.

ATTENTION: Ensure that enough cover material is present to lock into the end rafter 11613Z144. Typically, the cover material is cut longer/wider than 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. Remove the ropes after the cover is secure.

- Continue down both edges of first end rafter until main cover is secured to the first end rafter.
- Move to the other end, pull cover tight, and repeat steps to secure cover in end rafter 11613Z144.
- After securing cover end-to-end, move to one side and install the 102198A spring in the top channel of the 11613Z144.

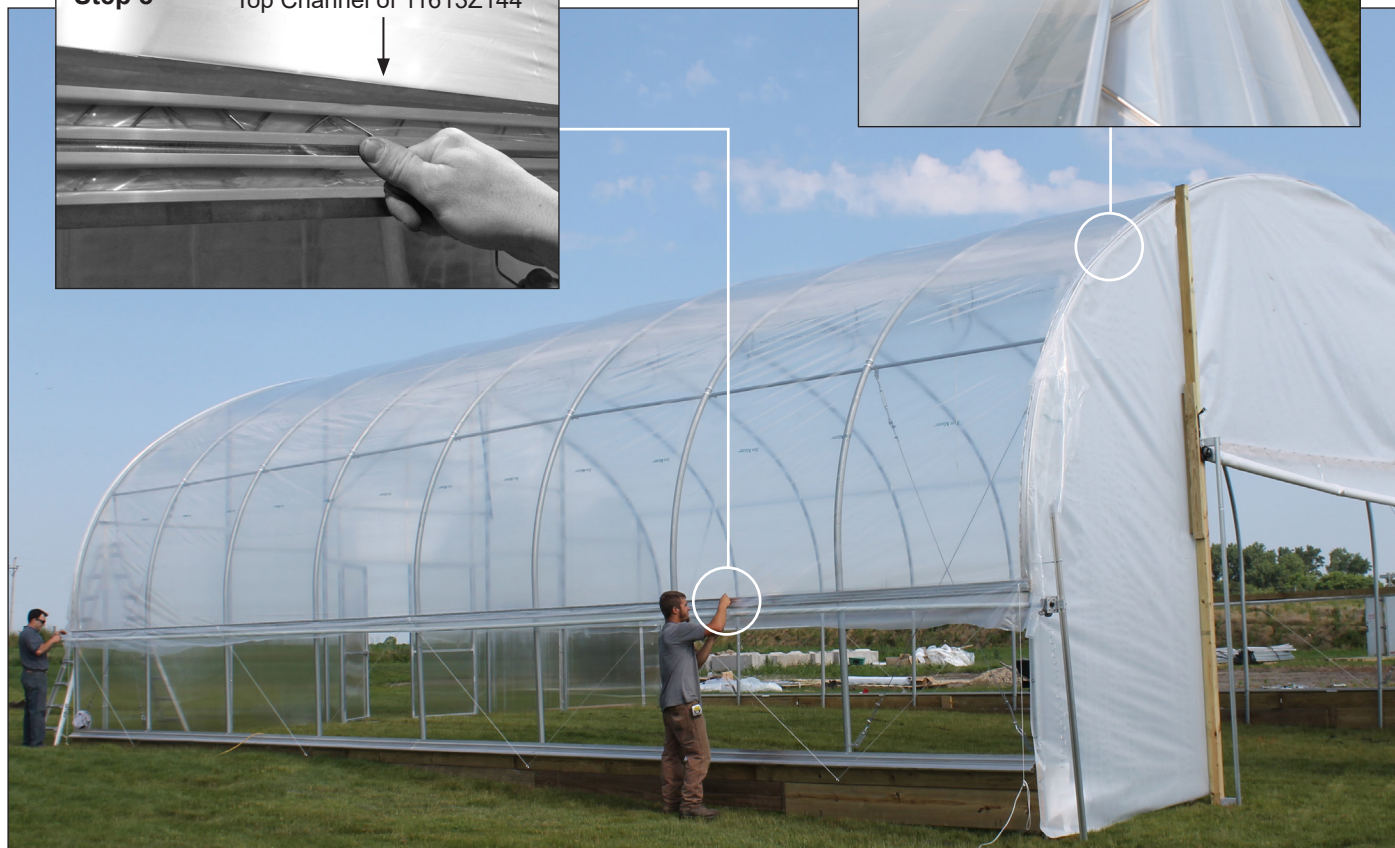
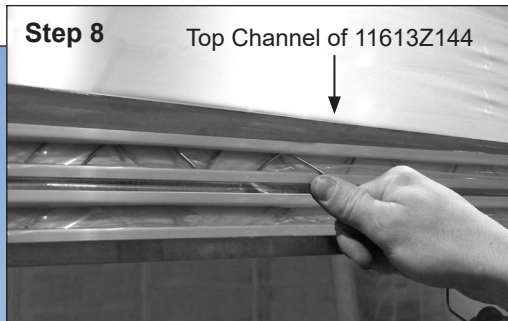
NOTE: Begin at one end of 11613Z144 and work toward the other. Maintain an even length working along the side. Final stretching of cover takes place when last side is secured.

- Next, move to the remaining side, stretch the cover, and secure it in place. Pull the cover tight and insert spring into 11613Z144.
- Trim excess cover material if desired.

ATTENTION: Allow some material to remain. This allows easier stretching of the cover in the event that the material expands after it is installed.

- Complete the installation of the inflation fan kit (or kits).

WEAR EYE PROTECTION WHEN INSTALLING SPRING WIRE!



Inflation Fan Kit (115842 or 117120)

The 115842 or 117120 Air Inflation System assembly is quick and easy. Follow instructions included with 115842 or 117120 kit components. After installing the air inflation system (or systems), continue by installing the second layer of film as described on the following pages.

ATTENTION: Longer and wider greenhouses include multiple air inflation systems. If greenhouse includes two (2) air inflation kits, install these diagonally opposite (kitty-corner from) each other.



IMPORTANT! All wiring to be completed by a qualified electrician. Consult and follow all local and regional codes when connecting fan motor to power.



Install Second Layer of Cover Film

Once air inflation kit (or kits) are installed, install remaining layer of greenhouse film. Simply repeat cover installation steps for your greenhouse. After installing second layer of film, install drop-down side panels.

Follow these guidelines to install remaining film:

- Test air inflation operation *before* installing second layer of film.
- Secure film. Add a second run of 102198A spring wire over the first in the same channel.
- Be careful not to damage first film during installation and cutting of second film layer.
- Test air inflation system *after* installing second film.



Photo shows pulling the second layer of film onto the frame. End wall shows optional roll-up door panel. Additional purchase required. Actual building will differ from what is shown.

Roll-Up Side Panel Installation



Roll-Up Side Panel Installation

INSTALL ROLL-UP PANELS

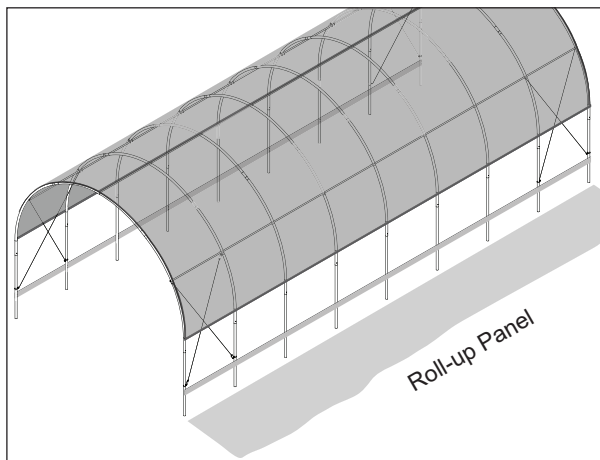
- Film: Single roll of 108655: Field cut length in half.

Complete these steps:

1. For film, locate the roll of 108655 film, roll it out and fold it in half (lengthwise). Cut the film in half.

ATTENTION: Before cutting, measure film to verify correct amount. Film typically ships 2' longer *per side* (e.g., 36' building: film panel is 38' long).

2. Stretch a panel along one side of shelter and center it end-to-end. Panel will extend beyond end rafters.



3. Using the *lower channel* of the 111613Z144 and wire spring (102198A), secure one edge of film panel to the 111613Z144.



4. With edge secured, spread free/loose edge of panel out so it hangs down evenly from 111613Z144. Excess film panel can be rolled onto the roll-up conduit during the next procedure or trimmed. Do not trim too much off.
5. Continue with the following procedures to finish the roll-up side panel installation.

ASSEMBLE ROLL-UP SIDE PANEL CONDUIT

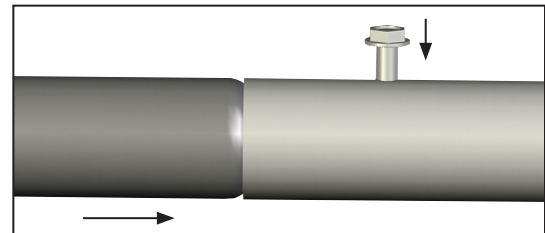
Gather the parts:

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

The roll-up conduit assembly attaches to the bottom edge of the roll-up panel. This assembly runs the length of the frame and serves as the center pipe that the roll-up panel wraps around when it is opened for ventilation.

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

1. Locate sections of pipe (#131S075) to assemble the roll-up panel conduit.
2. Insert the swaged end of each pipe into the plain end of another pipe until conduit is assembled.
3. Secure each pipe joint with a Tek screw (FA4482B) and tape over the screw using duct tape. Construct a conduit that is longer than the building. Conduit is cut to length in a later procedure.



4. With assistance, place the assembled conduit on the lower edge of the roll-up side film.
5. Allow 6" of pipe to extend beyond the end rafter opposite where gearbox will be installed. Allow approximately 8" to extend beyond the end rafter at the gearbox end of the frame.
6. Cut the pipe to length at the gearbox end.

ATTENTION: After conduit is cut to length, remainder of pipe is used for the remaining 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.*

7. Continue with the procedure that follows to attach the conduit to the roll-up side panel.

Roll-Up Side Panel Installation

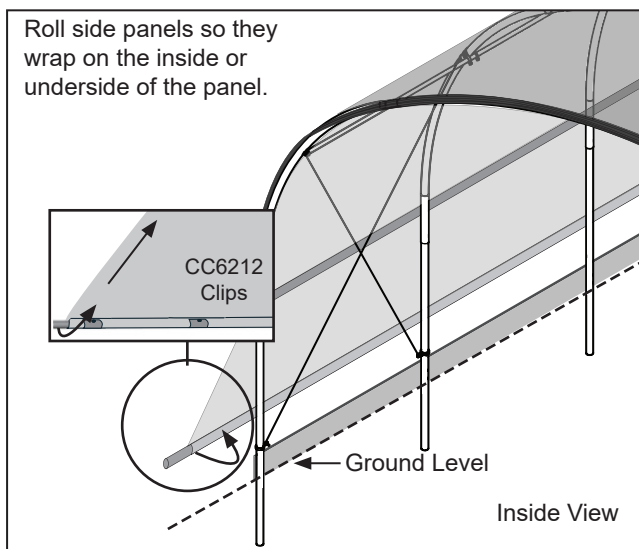
ATTACH CONDUIT TO ROLL-UP PANEL

Gather the parts:

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

To this point, the roll-up side panel along one side is secured to and hanging down from the 111613Z144. The assembled roll-up conduit should be positioned on the free/lower end of roll-up panel.

1. Roll assembled conduit onto the edge of film roll-up panel a few turns.
2. Verify the conduit is evenly positioned; using half of the #CC6212 fabric clips and the same number of FA4482B screws, secure the panel to the conduit. *Evenly space clips throughout length of conduit.*



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

3. Continue to roll the conduit until excess panel material is wound around conduit and lower edge is positioned at the base of frame.
4. Temporarily anchor conduit and panel to the frame or ground to prevent the wind from lifting it away from the frame.
5. Continue with the installation of the Twist-of-the-Wrist components.



Photo above shows an assembled roll-up side panel with gearbox. The lower end of the 102570 aluminum channel is not anchored. Channel should float above the ground.

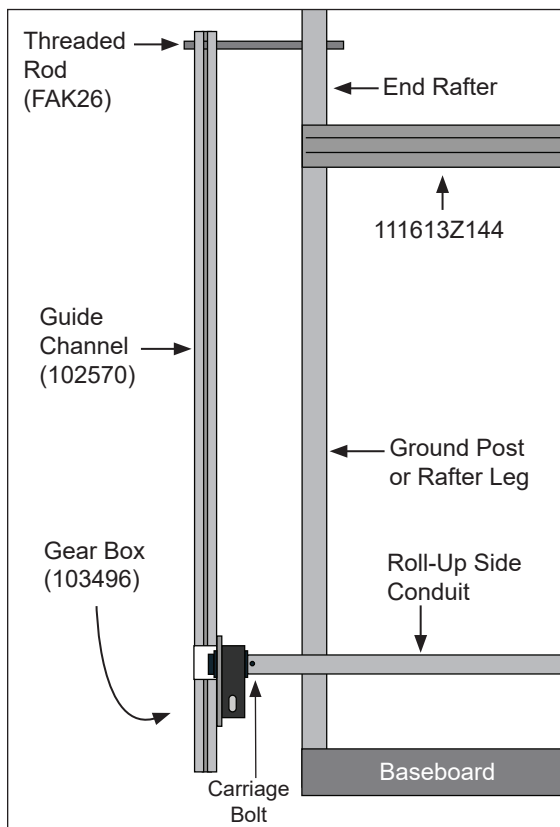
Roll-Up Side Panel Installation

TWIST-OF-THE-WRIST ASSEMBLY

Gather the parts:

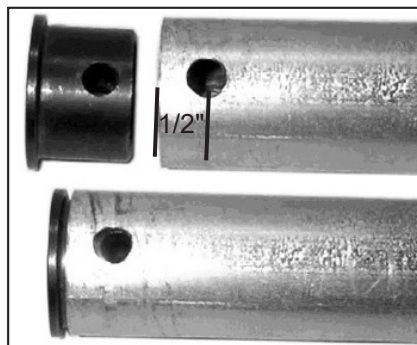
- Aluminum channel (102570) and drive handle (102480)
- Gearbox (103496) and gearbox drive (102717)
- Mounting plate (103544), bearing (102569), and threaded rod (FAK26)
- 3/8" nuts (FALB04B) and 3/8" washers (FAME08B)

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

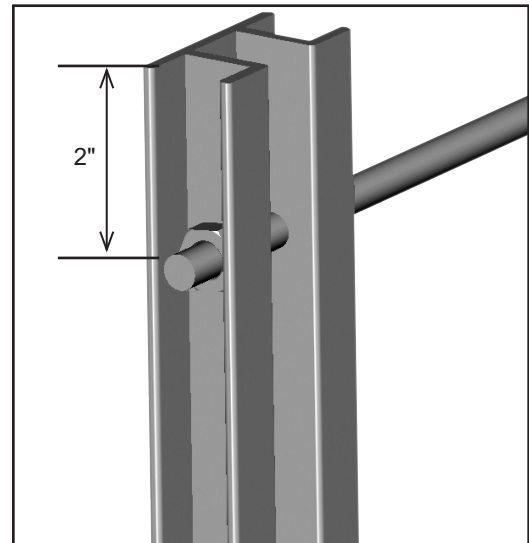


1. Measure 1/2" in from the end of the roll-up conduit, center-punch the location on the pipe, and drill a 5/16" hole through the conduit.

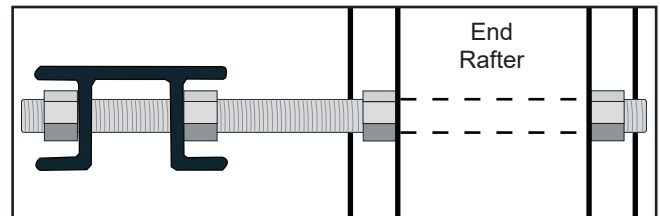
2. Insert a tubing adapter into the conduit and align the holes of the adapter with the drilled holes in the conduit.



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 upper end of the channel by drilling a 3/8" hole through end rafter and attach as shown. Lower end of channel will "float" and is not attached.



Top View



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

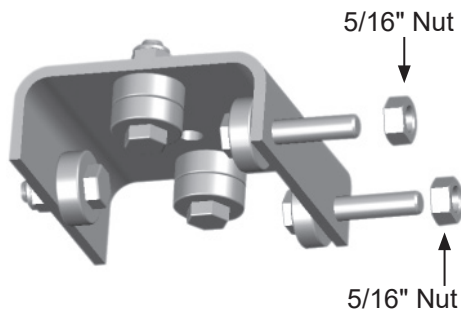
Roll-Up Side Panel Installation

TWIST-OF-THE-WRIST ASSEMBLY (continued)

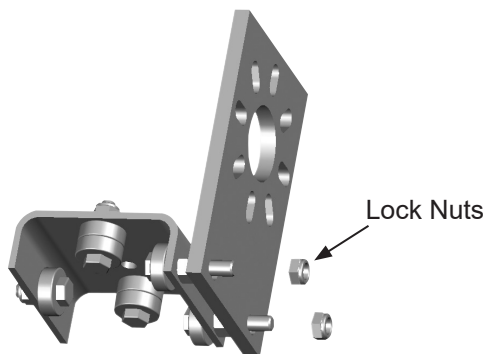
6. Select the bearing bracket and attach the bearings as needed. (In some instances, the bearings may come already attached.) Assemble as follows if needed:

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.

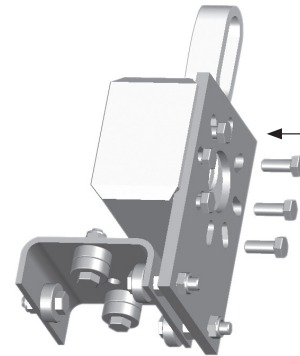
7. Install the longer bolts with bearings on the side of the bracket that has the two holes. Install these *before* installing the double bearing assemblies. See the figures below.
8. For the spacers on the long bolts, insert a 5/16" nut over each bolt. *These nuts are used as spacers only.*



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



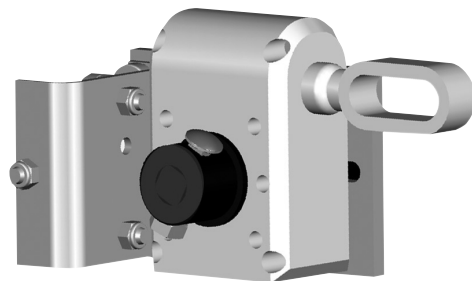
10. Attach the Twist-of-the-Wrist gearbox to the mounting plate using hex head bolts.



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



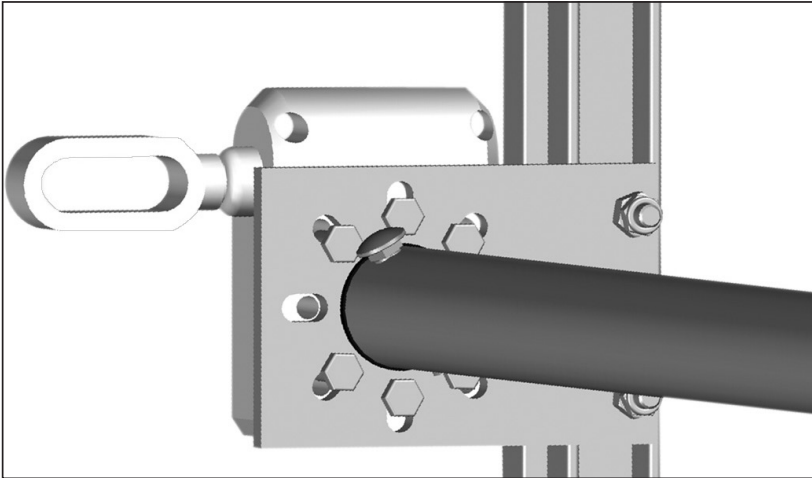
12. Slide the square shaft through the Twist-of-the-Wrist gearbox.



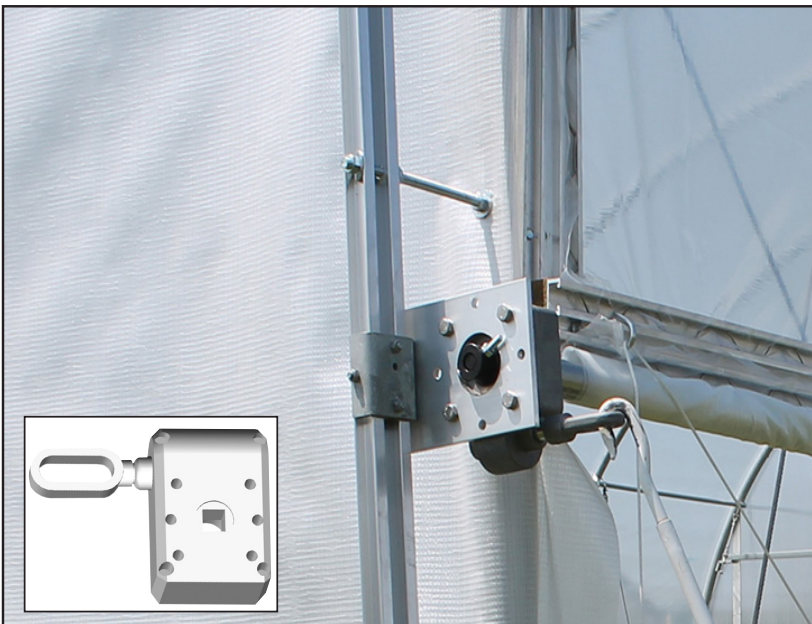
Roll-Up Side Panel Installation

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

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

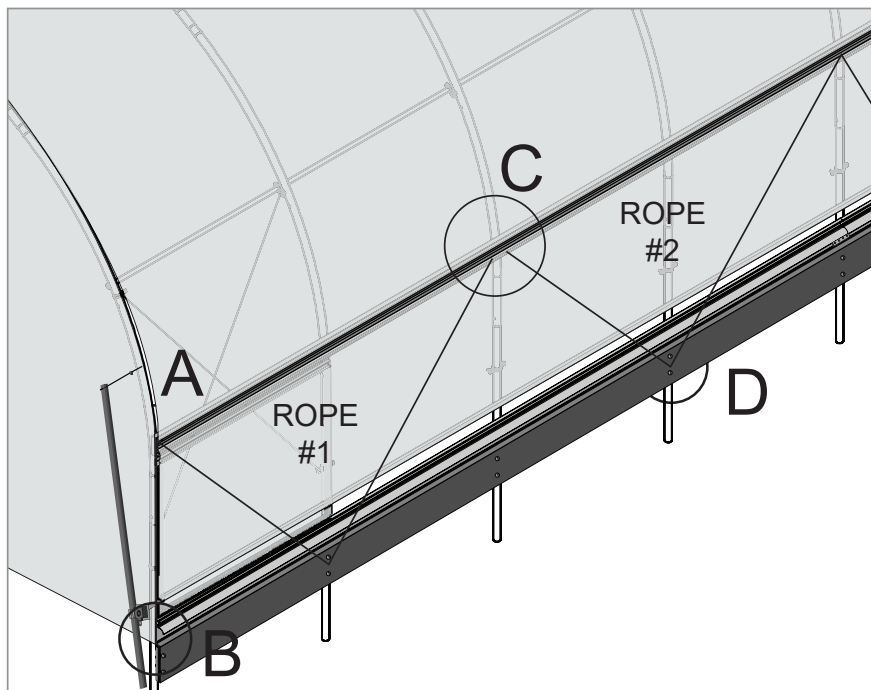
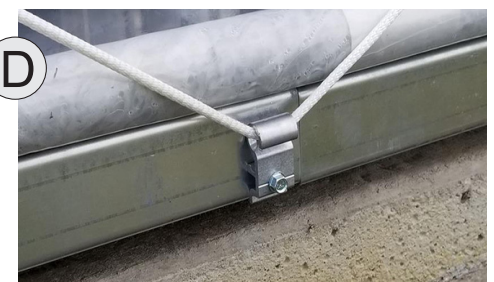
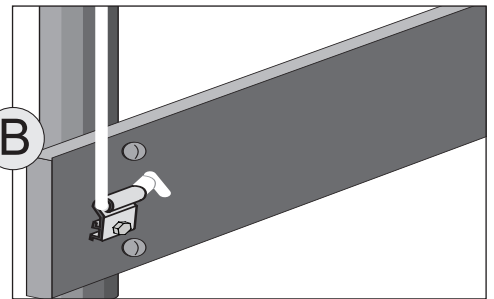
Install Anti-Billow Ropes

ANTI-BILLOW ROPE INSTALLATION

TO PREVENT DAMAGE AND POSSIBLE INJURY, INSTALL ANTI-BILLOW ROPES **IN SHORT LENGTHS** ALONG EACH SIDE. DO NOT INSTALL AS A SINGLE LENGTH TIED AT EACH END. DOING SO WILL RESULT IN A LOOSE SIDE PANEL IF SINGLE ROPE BREAKS. **CONSULT THE SIDE PROFILE DIAGRAM FOR YOUR FRAME LENGTH IN THE QUICK START SECTION FOR ROPE PATTERN AND ROPE HOOK LOCATIONS.**

Follow these general steps to attach the 117063 rope hooks and install the anti-billow ropes:

1. Determine the location of rope hooks and the number of anti-billow ropes for each side using the Side Profile diagram in the Quick Start section for your frame length.
2. Attach the 117063 rope hooks using Tek screws to the lower channel of the double u-channel. Attach the 117063 rope hooks for projects to the baseboard (see Quick Start Guide). Be sure to note where one rope stops and the next rope begins.
3. Take the CC5525 (1/4") rope and install it in short lengths along each side. Pull tight to keep panels in place.
4. Test the operation of the roll-up side.
5. Repeat to install the anti-billow rope for the remaining side once the panel is installed.



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:

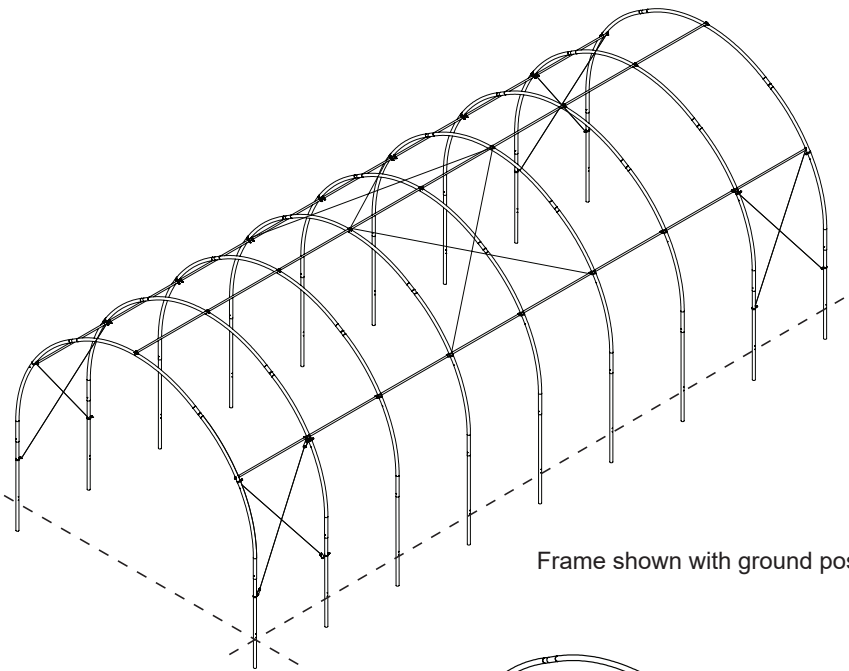
- Regularly check the cover to ensure that it remains tight and in proper repair.
- *Replace all damaged or broken components immediately.*
- Check connections and all fasteners to verify that they remain tight and in good condition.
- Do not climb or stand on the building at anytime.
- Inspect the anchoring 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 the roll-up panel to remain in the open position for extended periods. Lower the panel periodically to allow it to dry and for cleaning.
- Replace anti-billow rope immediately if worn or broken.
- Remove debris and objects that 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. Keep heated during non-growing season to prevent snow and ice buildup.
- 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.
- For replacement or missing parts, call 1-800-245-9881 for assistance.

NOTE: With the exception of engineered structures, GrowSpan™ shelters and buildings *do not* have any tested loading criteria unless otherwise specified.

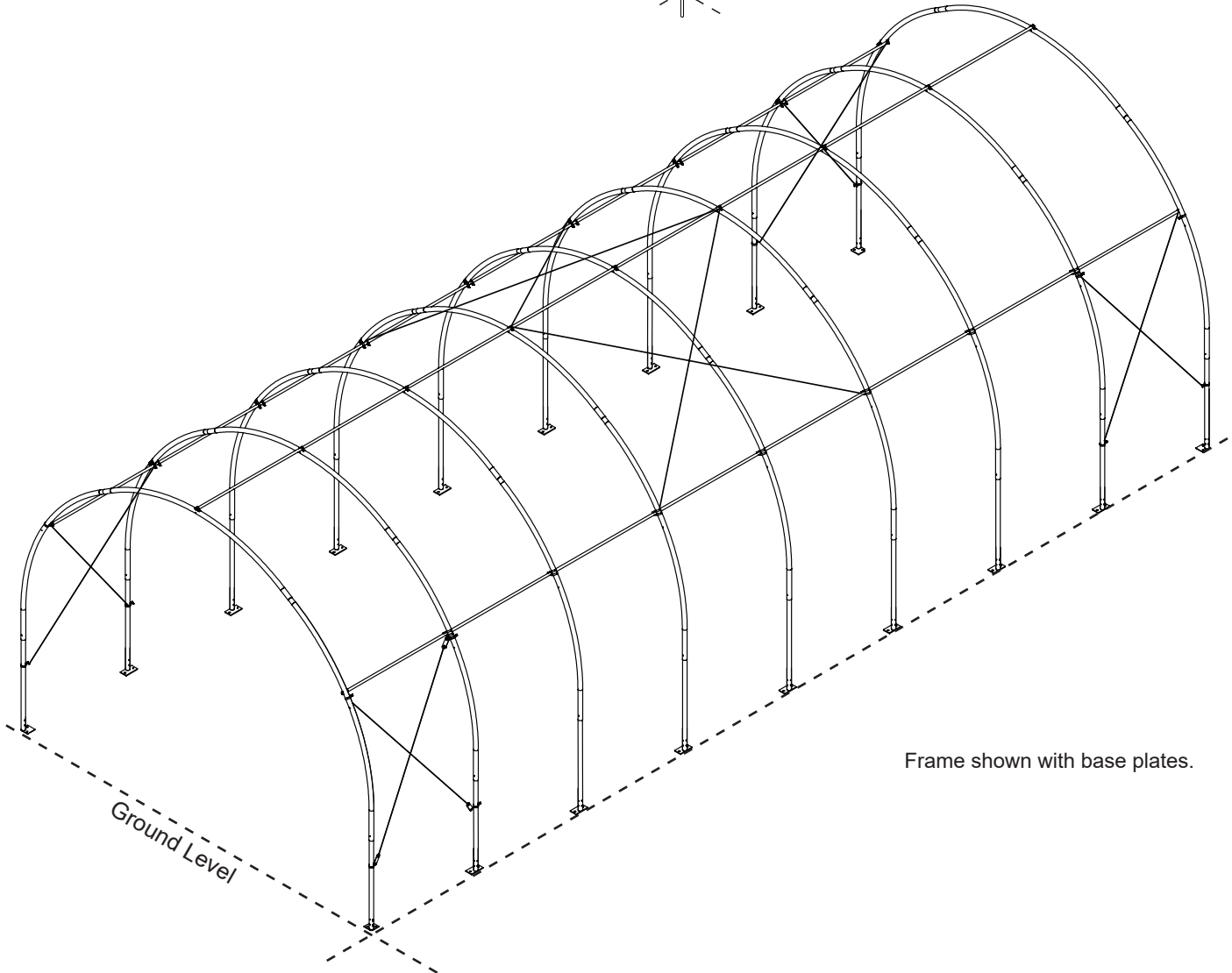
Quick Start Guide



20' Wide Frame



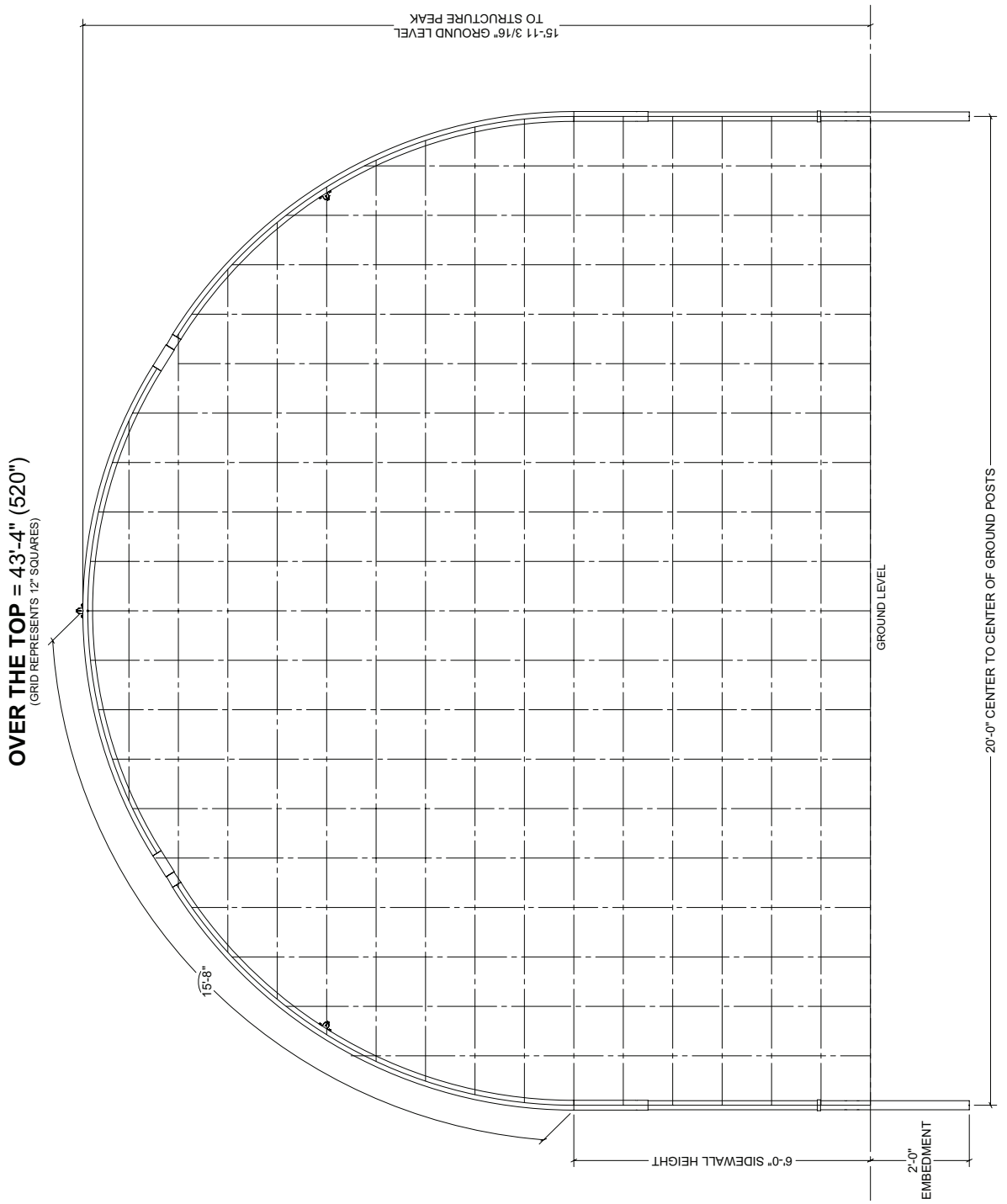
Frame shown with ground posts.



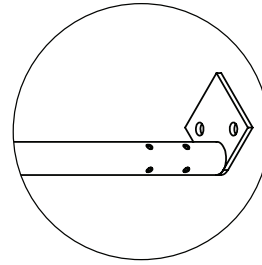
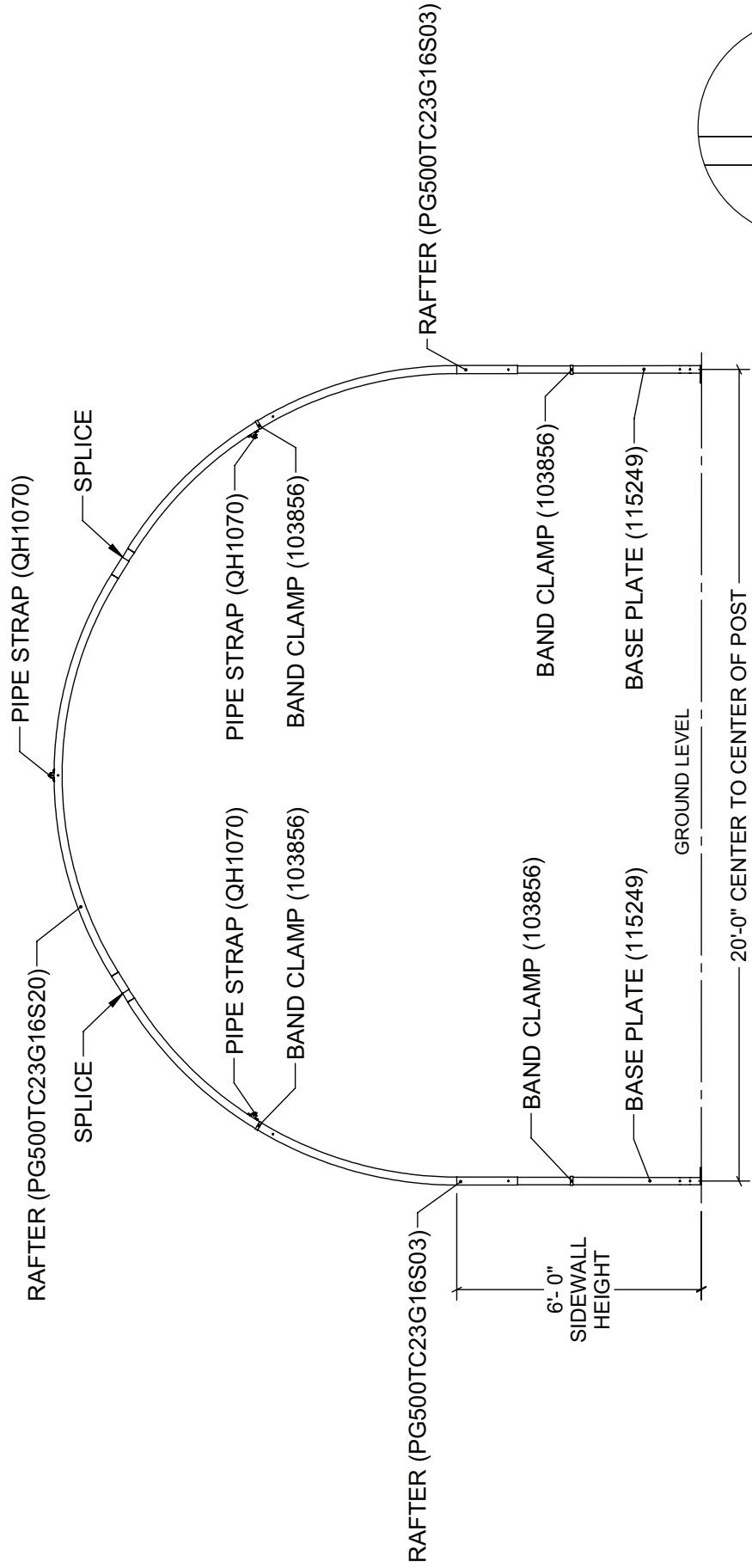
Frame shown with base plates.

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

20' Wide Rafter Profile with Grid

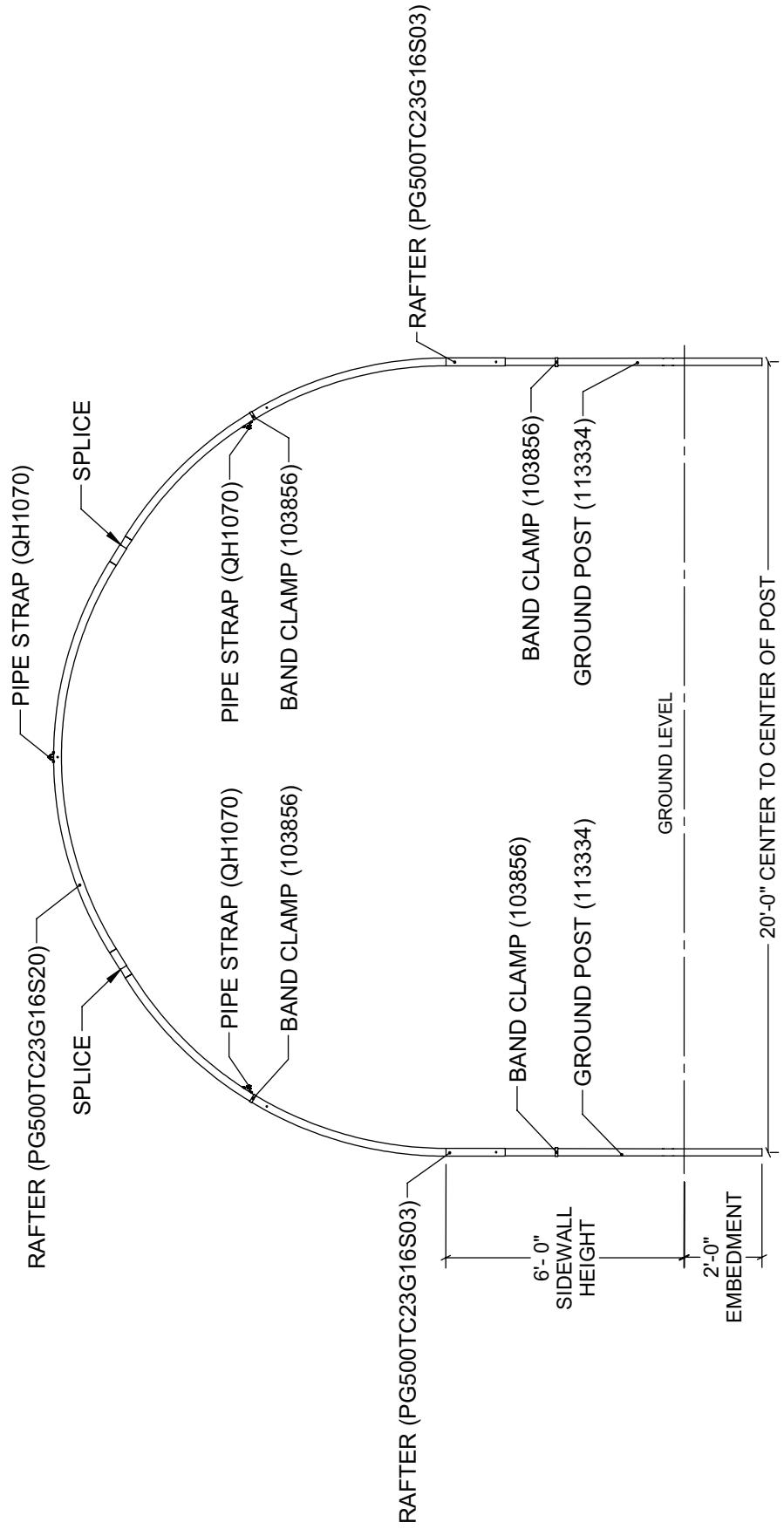


End Rafter Profile — Base Plates

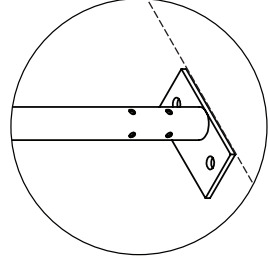
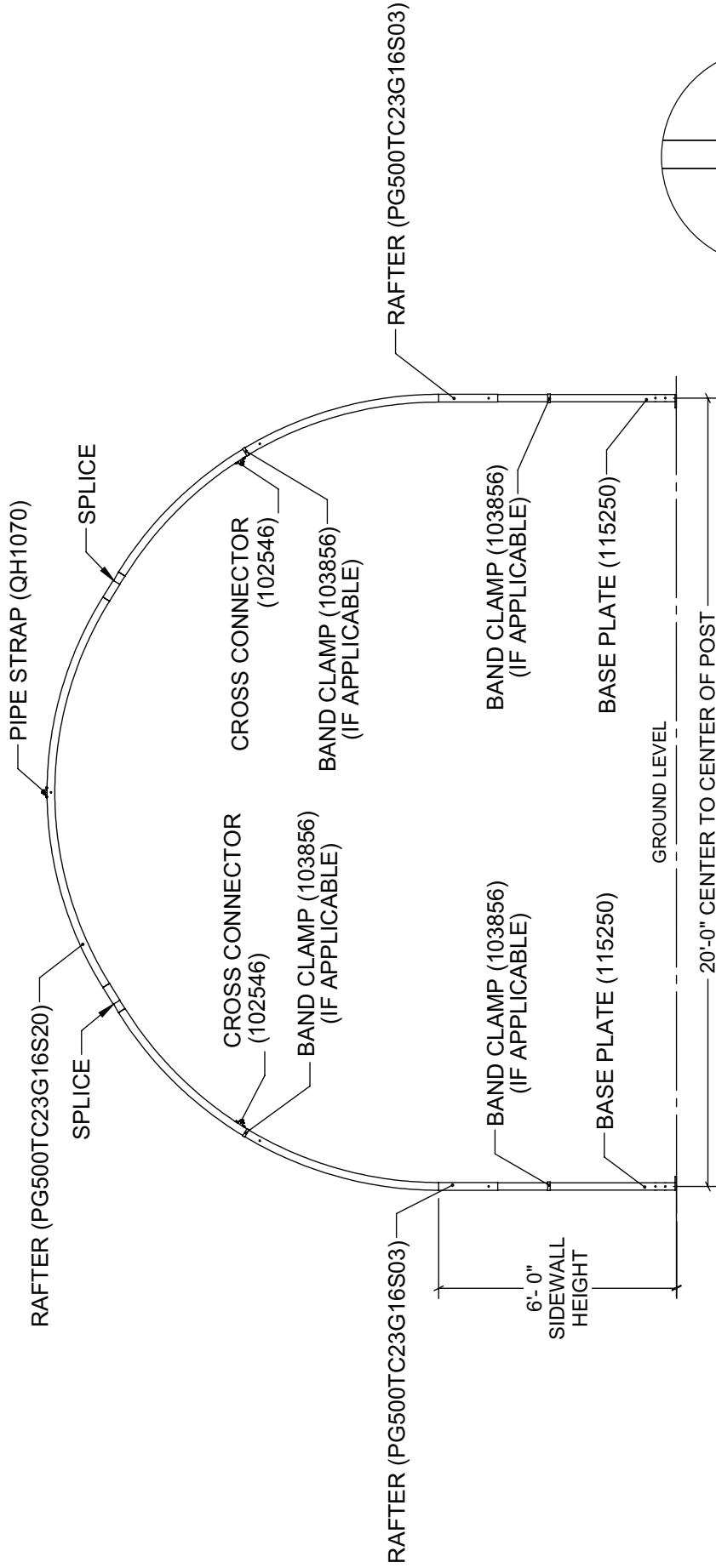


End rafter with **115249** base plate.

End Rafter Profile — Ground Post

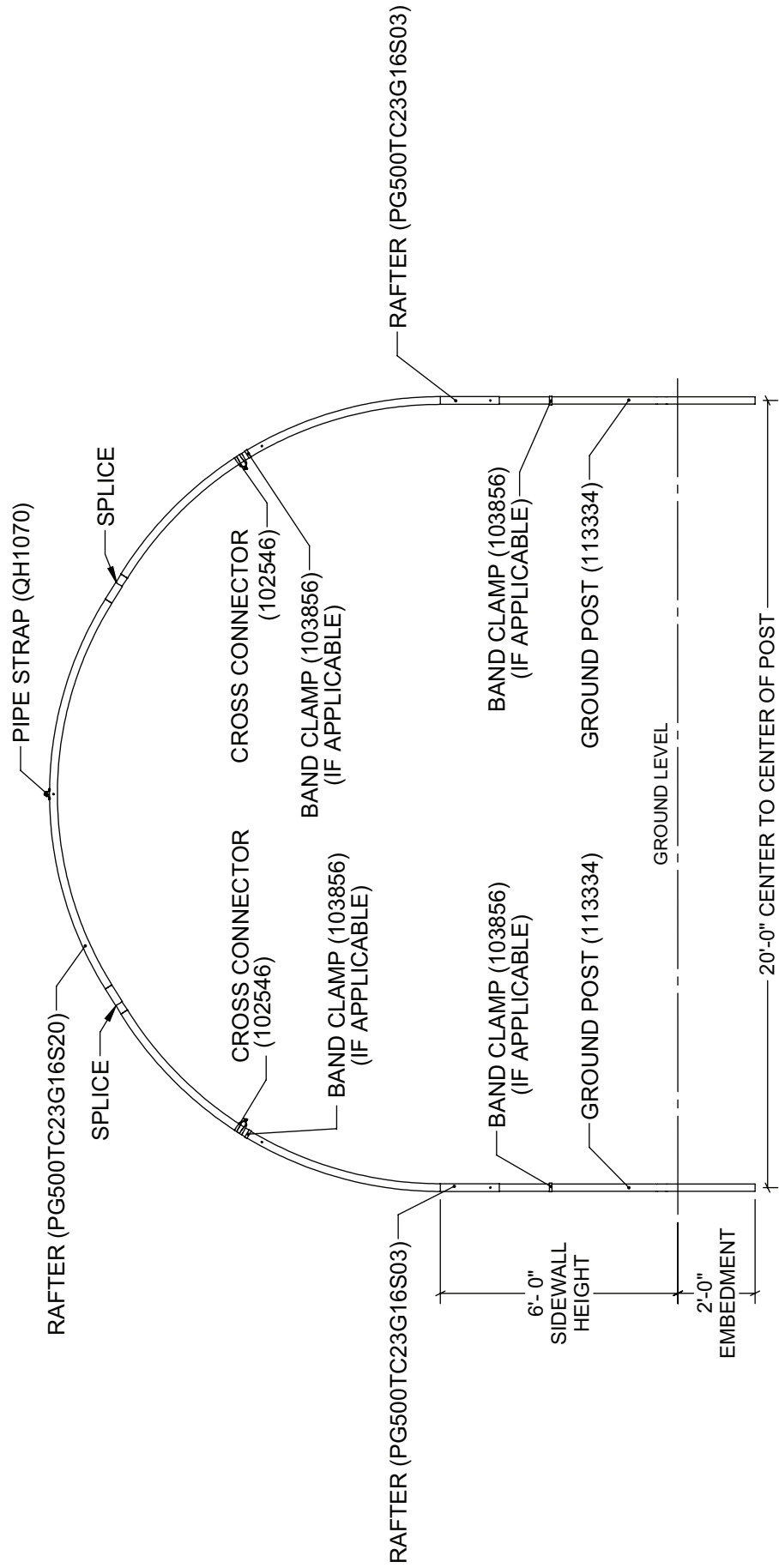


Mid Rafter Profile — Base Plates

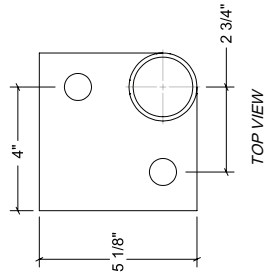
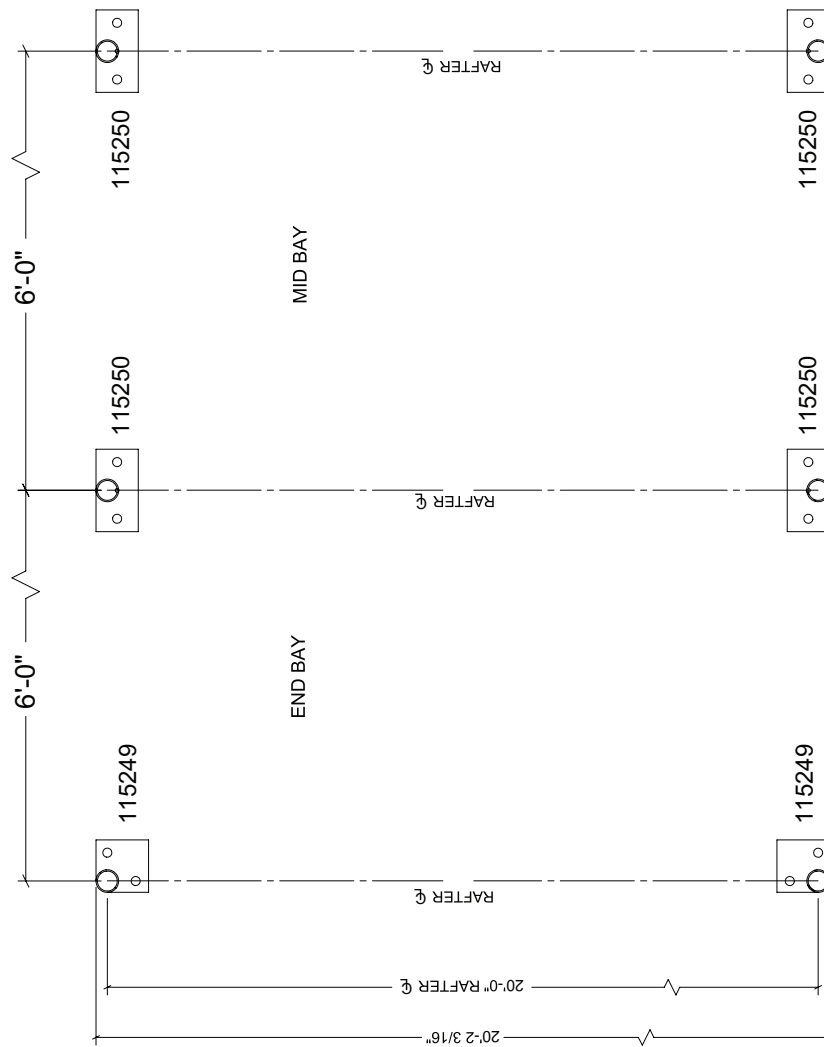


Mid rafter with 115250 base plate.

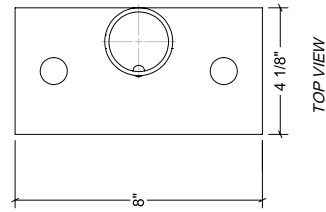
Mid Rafter Profile — Ground Posts



Rafter Layout - Base Plates

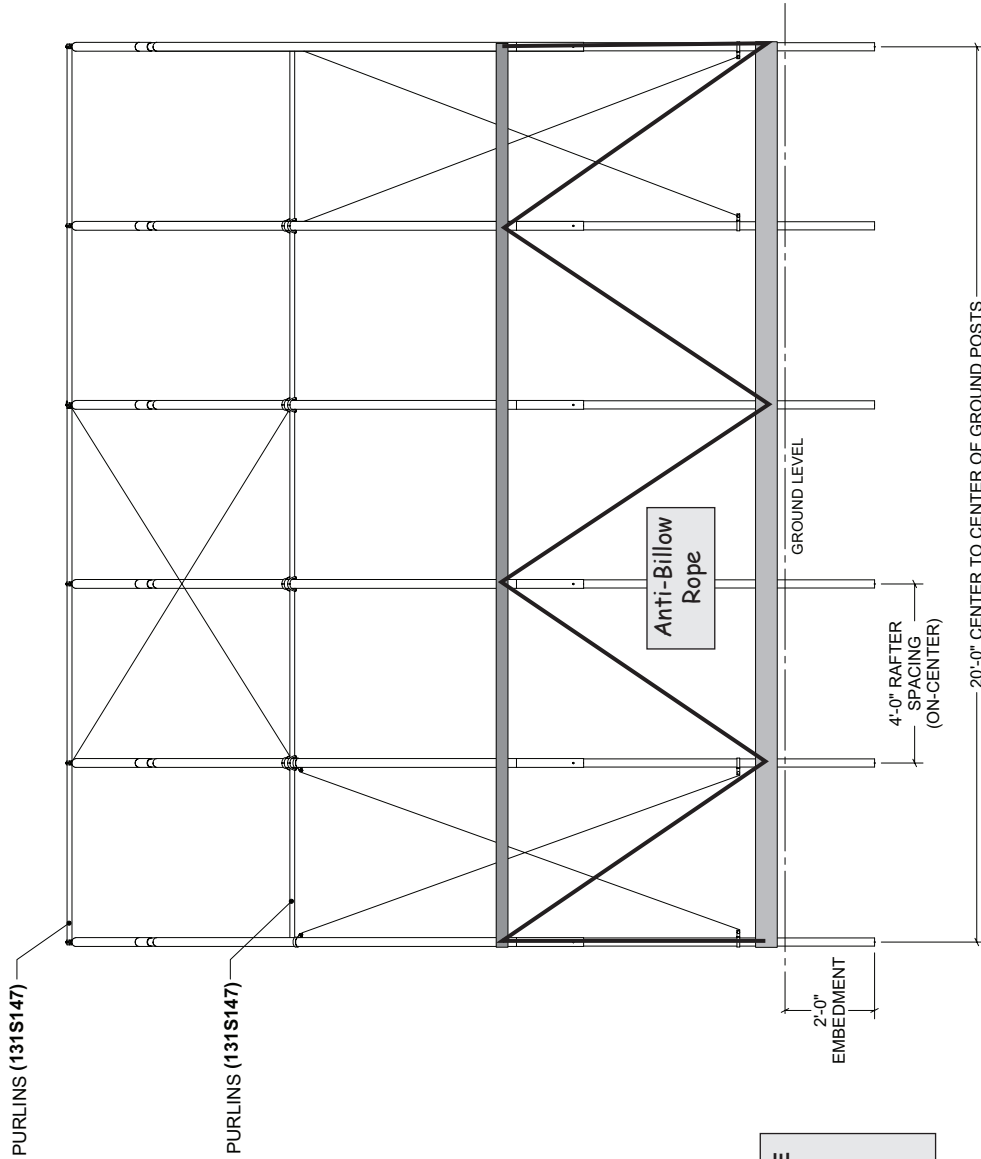


115249 DETAILS



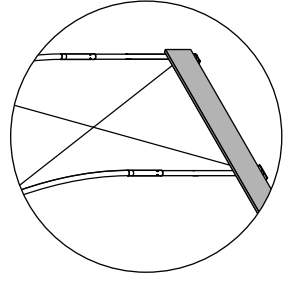
115250 DETAILS

Side Profile - 20' Length



ANTI-BILLOW ROPES PER SIDE
 This frame length requires one (1) anti-billow ropes and eight (8) 117063 EZ-Snap Rope Clips *per side*.

ATTENTION: Baseboards, ribbon boards, and related fasteners are supplied by the customer.



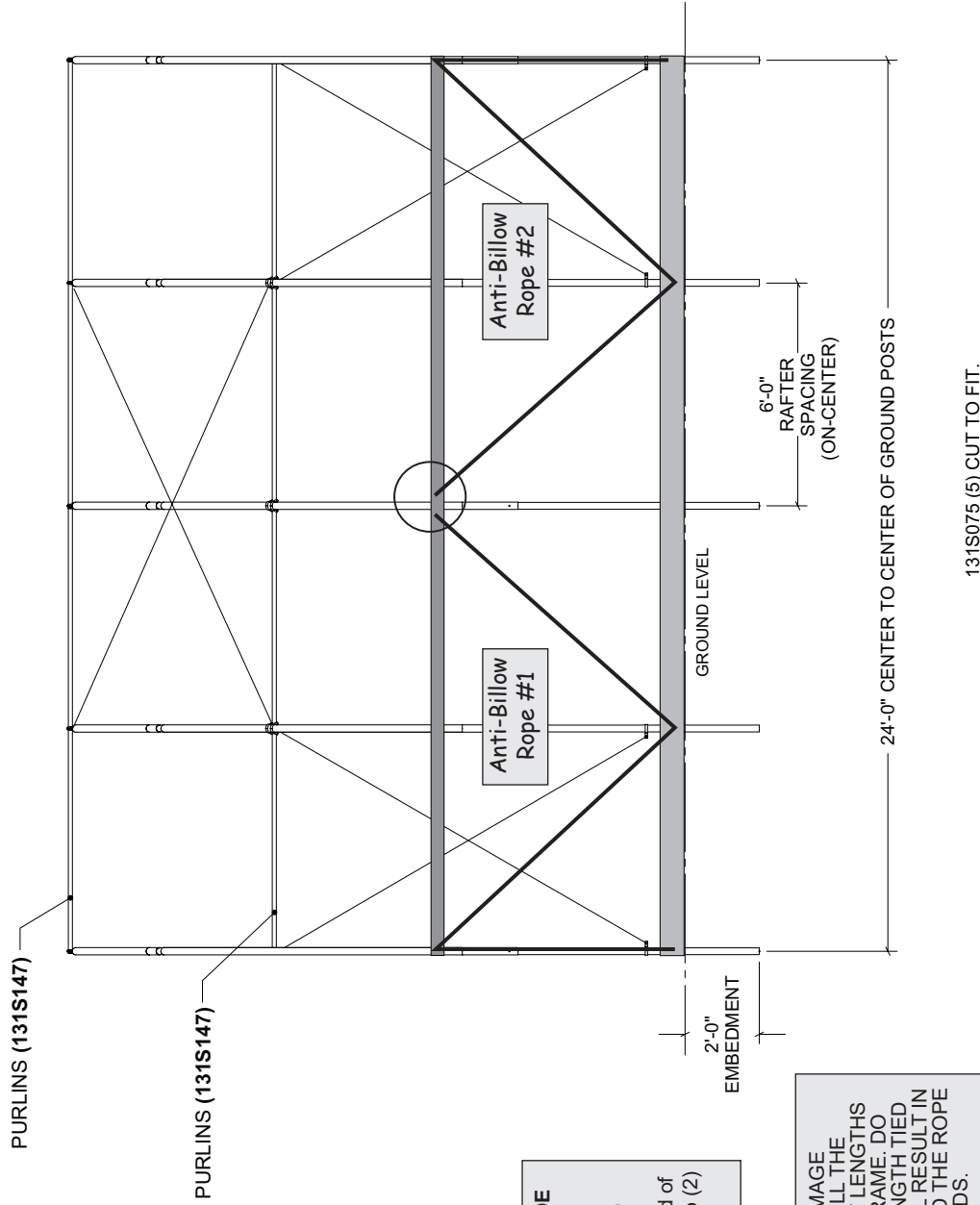
Baseboard shown with base plates.

131S075 (5) CUT TO FIT.

ROLL-UP OR DROP DOWN CONDUIT ASSEMBLY

LATERAL PURLINS		
BUILDING LENGTH	NUMBER OF PURLIN RUNS	QUANTITY OF 131S147 PIPE NEEDED
20'	3	6 (2 PER RUN – CUT TO LENGTH)

Side Profile - 24' Length



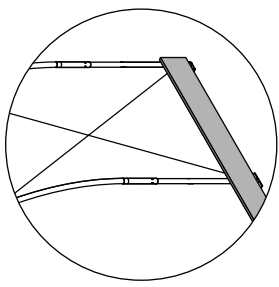
ANTI-BILLOW ROPES PER SIDE
 This frame length requires two (2) anti-billow ropes and eight (8) 117063 EZ-Snap Rope Clips **per side**. Circled point shows the end of each rope and the location of two (2) 117063 EZ-Snap Rope Clips.

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.

ATTENTION: Baseboards, ribbon boards, and related fasteners are supplied by the customer.

131S075 (5) CUT TO FIT.

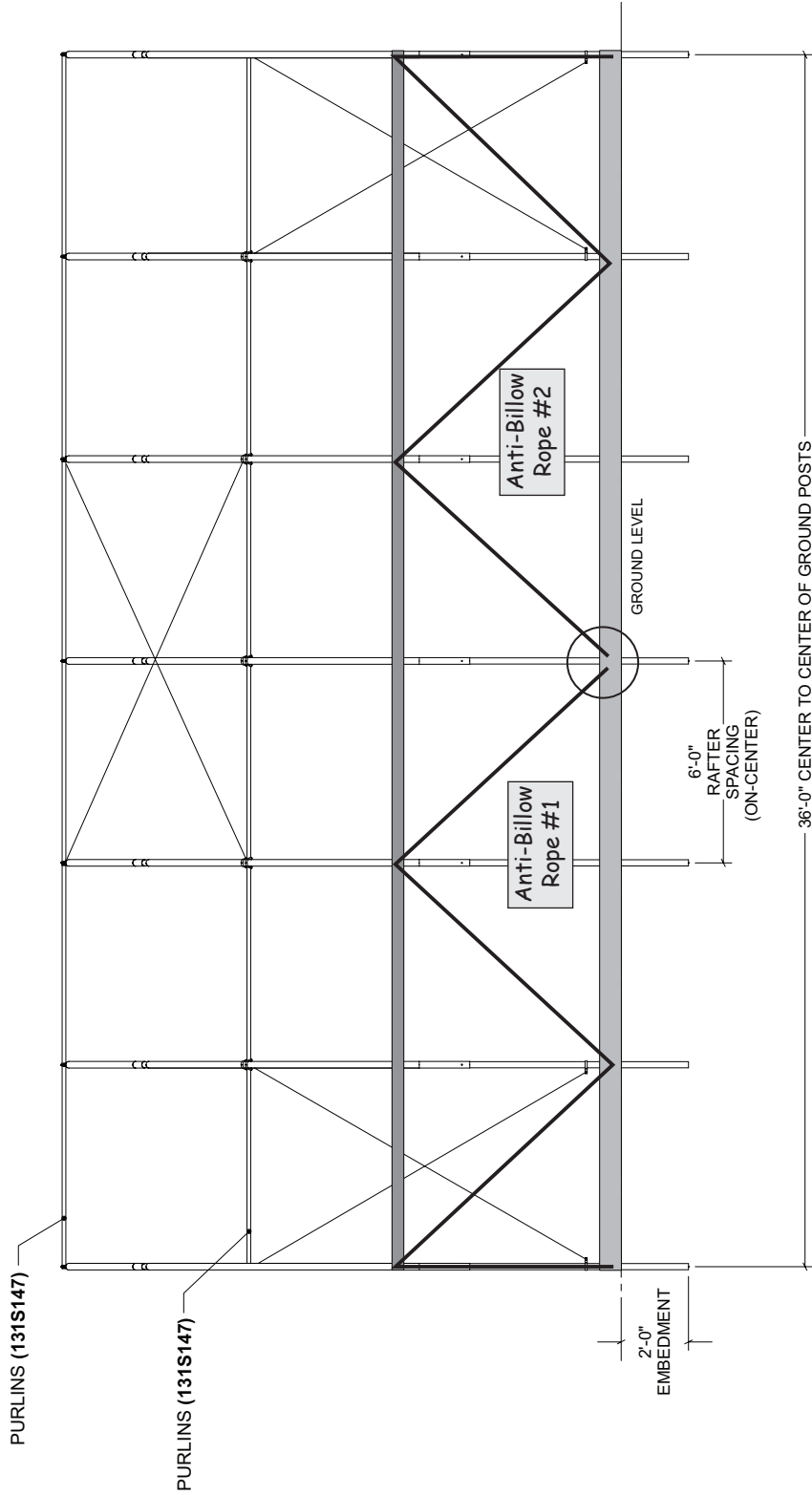
ROLL-UP OR DROP DOWN CONDUIT ASSEMBLY



Baseboard shown with base plates.

LATERAL PURLINS		
BUILDING LENGTH	NUMBER OF PURLIN RUNS	QUANTITY OF 131S147 PIPE NEEDED
24'	3	6 (2 PER RUN)

Side Profile - 36' Length



131S075 (7) CUT TO FIT.

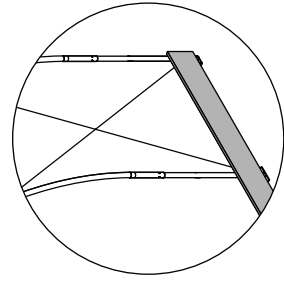
ROLL-UP OR DROP DOWN CONDUIT ASSEMBLY

ANTI-BILLOW ROPES PER SIDE

This frame length requires two (2) anti-billow ropes and ten (10) 117063 EZ-Snap Rope Clips **per side**. Circled point shows the end of each rope and the location of two (2) 117063 EZ Snap Rope Clips.

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.

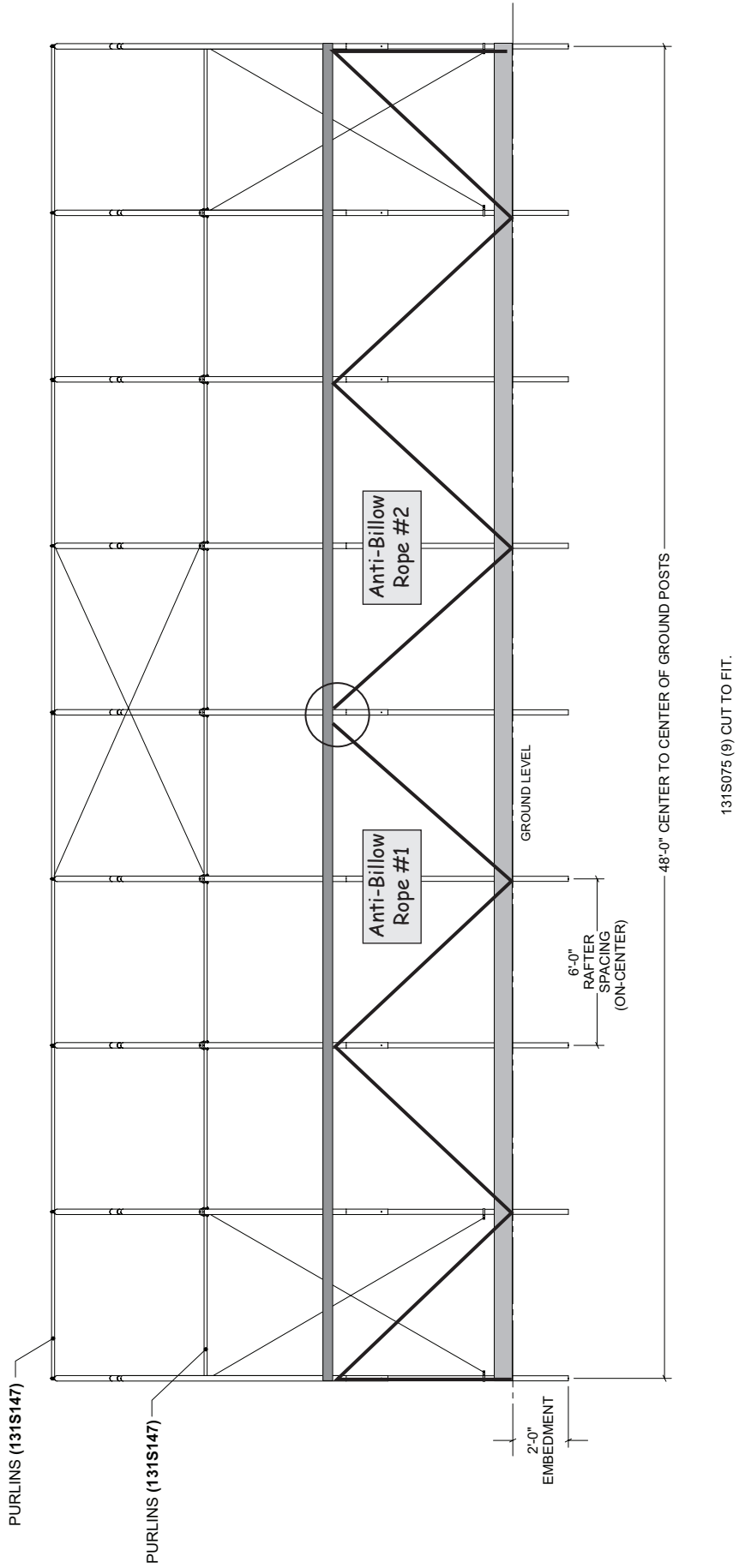
ATTENTION: Baseboards, ribbon boards, and related fasteners are supplied by the customer.



Baseboard shown with base plates.

LATERAL PURLINS		
BUILDING LENGTH	NUMBER OF PURLIN RUNS	QUANTITY OF 131S147 PIPE NEEDED
36'	3	9 (3 PER RUN)

Side Profile - 48' Length



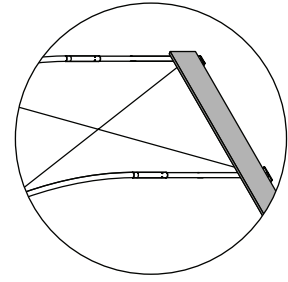
131S075 (9) CUT TO FIT.
ROLL-UP OR DROP DOWN CONDUIT ASSEMBLY

ANTI-BILLOW ROPES PER SIDE

This frame length requires two (2) anti-billow ropes and twelve (12) 117063 EZ-Snap Rope Clips **per side**. Circled point shows the end of each rope and the location of two (2) 117063 EZ-Snap Rope Clips.

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.

ATTENTION: Baseboards, ribbon boards, and related fasteners are supplied by the customer.

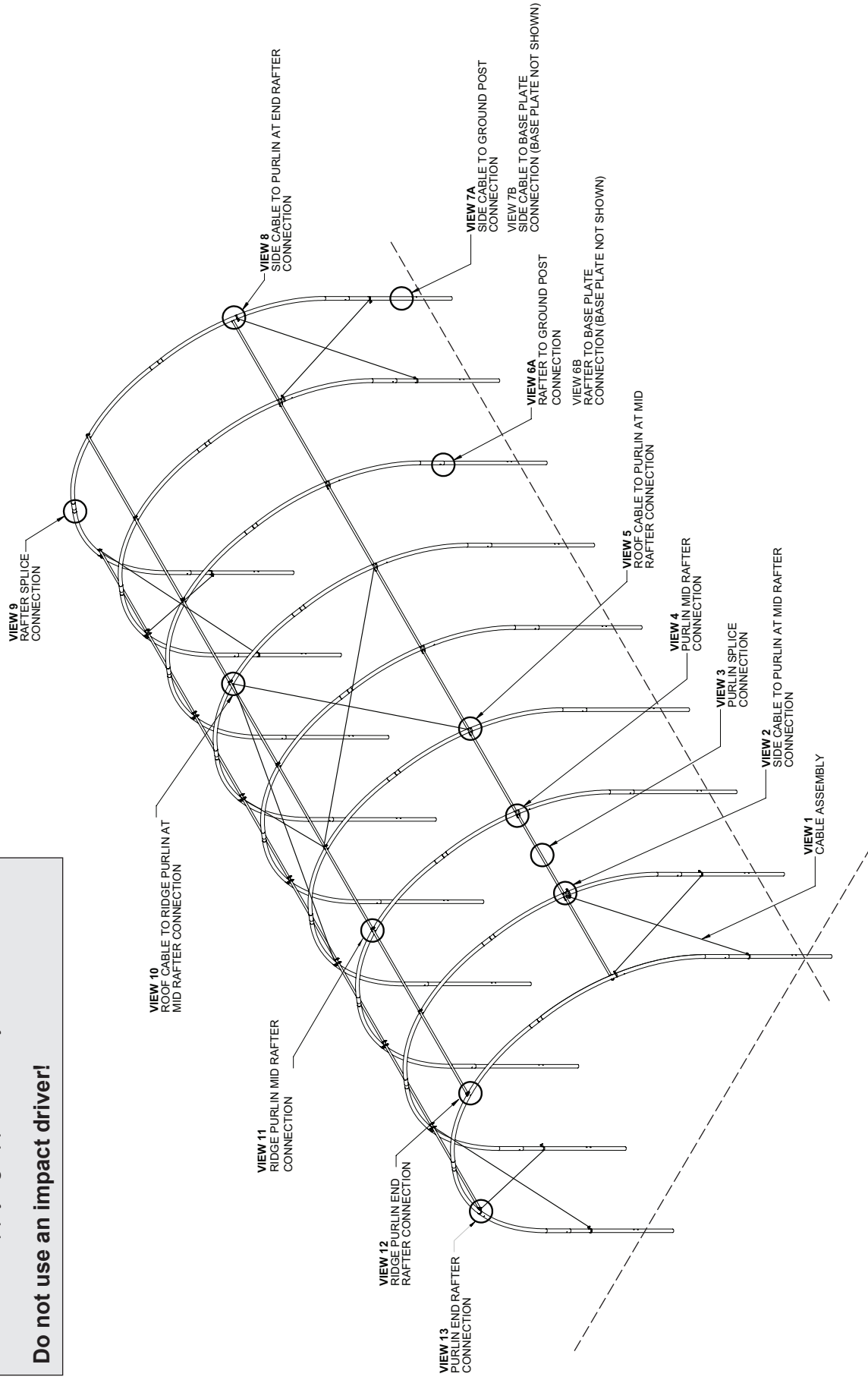


Baseboard shown with base plates.

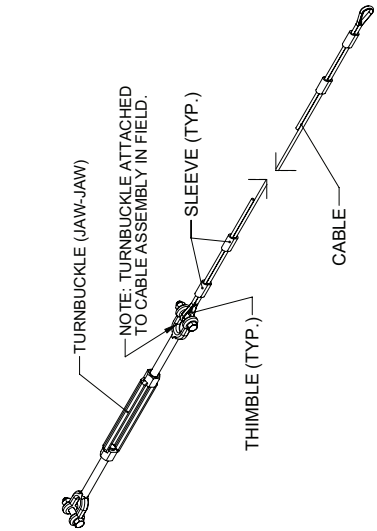
LATERAL PURLINS		
BUILDING LENGTH	NUMBER OF PURLIN RUNS	QUANTITY OF 131S147 PIPE NEEDED
48'	3	12 (4 PER RUN)

Connections

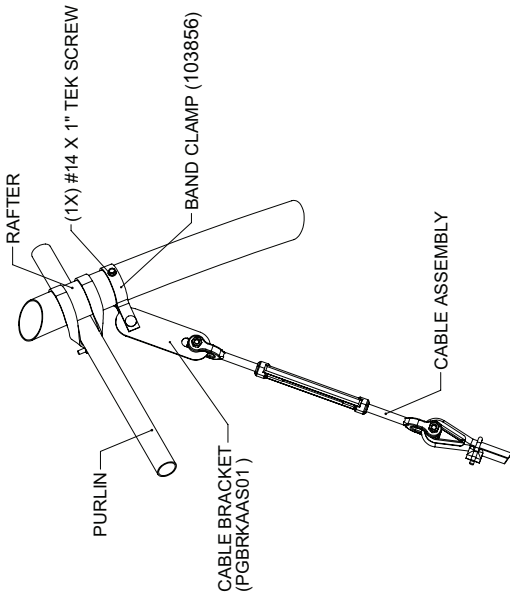
ASSEMBLY NOTE: Install Tek screws using a clutched drill driver running approximately 750 RPM while applying approximately 50 lbs of force.
Do not use an impact driver!



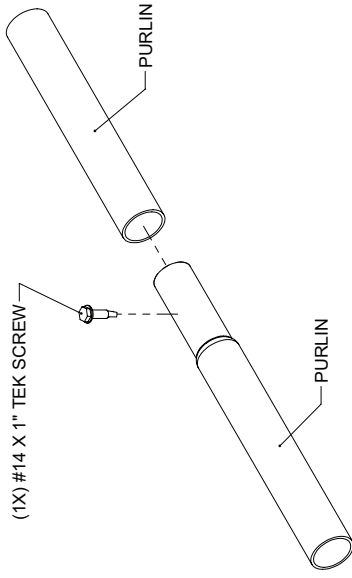
Frame Connection Details — Views 1 – 5



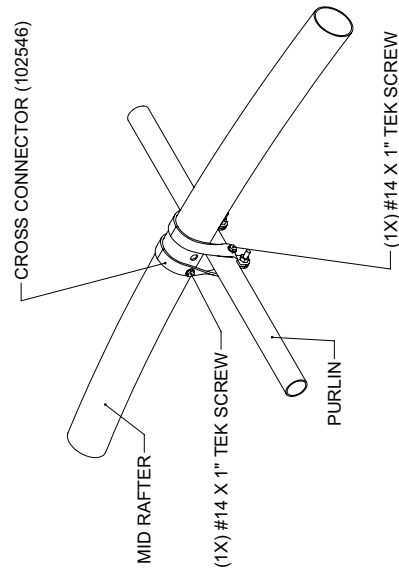
VIEW 1
CABLE ASSEMBLY



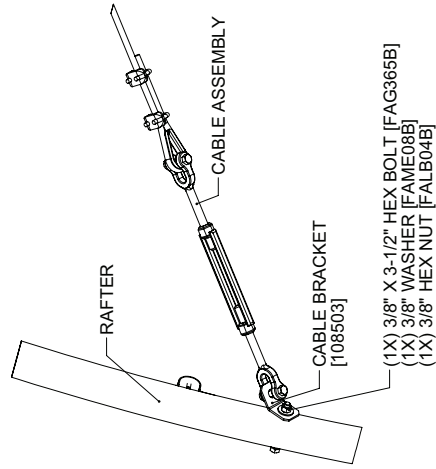
VIEW 2
SIDE CABLE TO PURLIN AT MID RAFTER CONNECTION



VIEW 3
PURLIN SPLICE CONNECTION

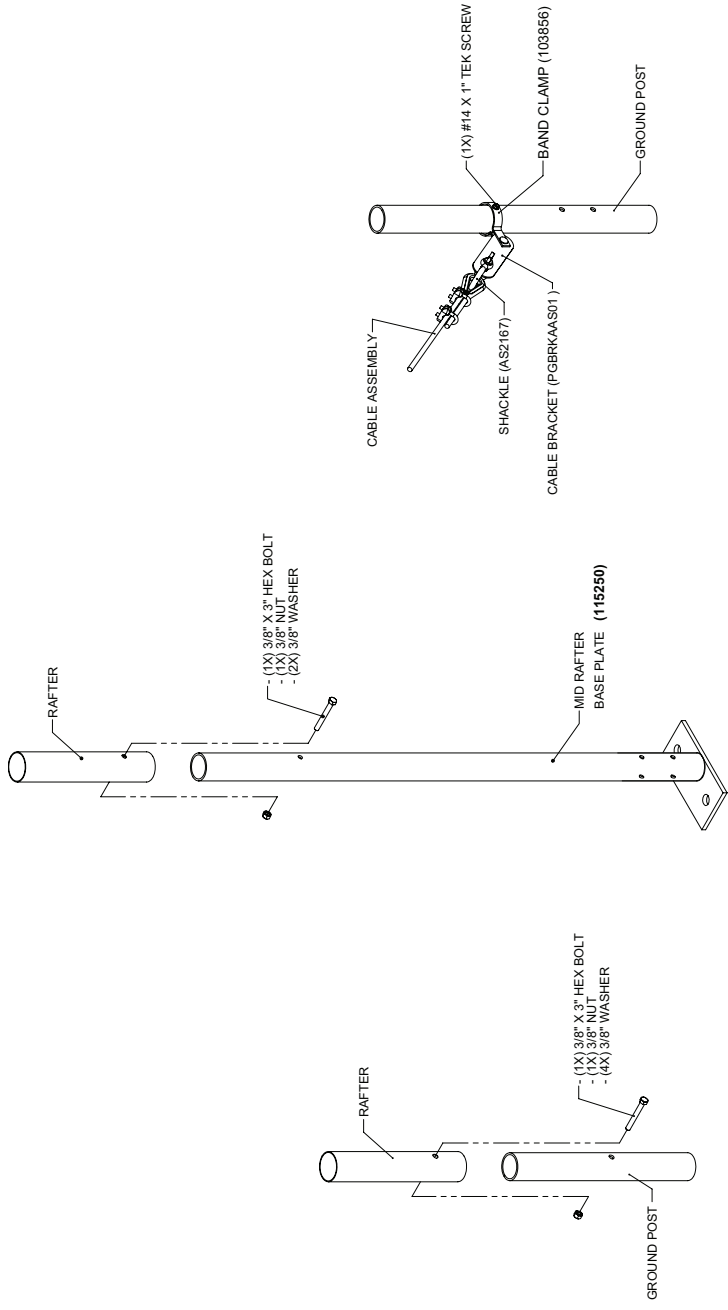


VIEW 4
PURLIN/MID RAFTER CONNECTION

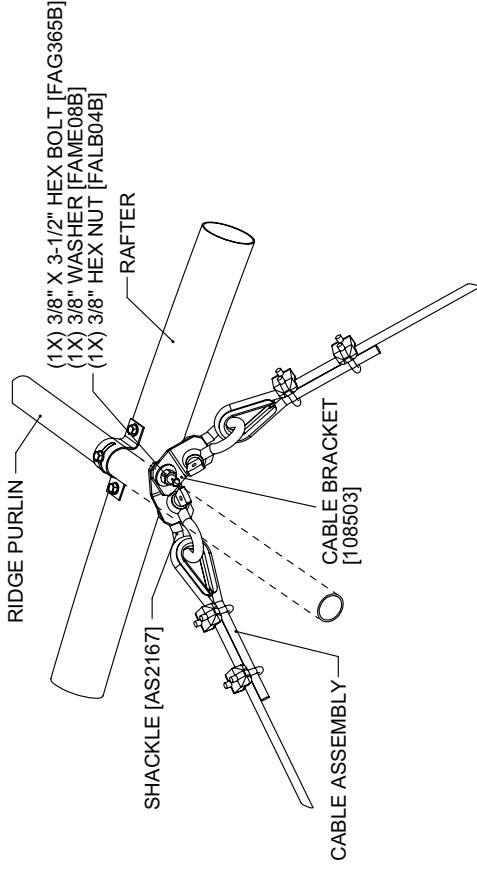


VIEW 5
ROOF CABLE TO PURLIN AT MID RAFTER CONNECTION

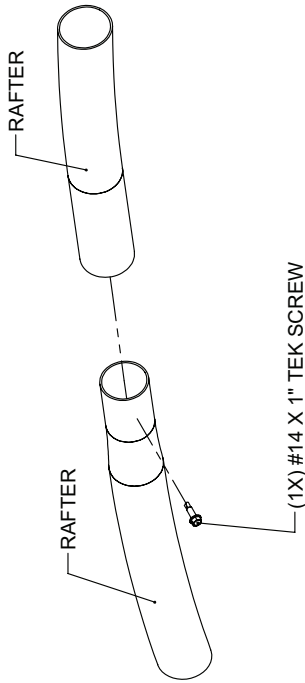
Frame Connection Details — Views 6A – 8



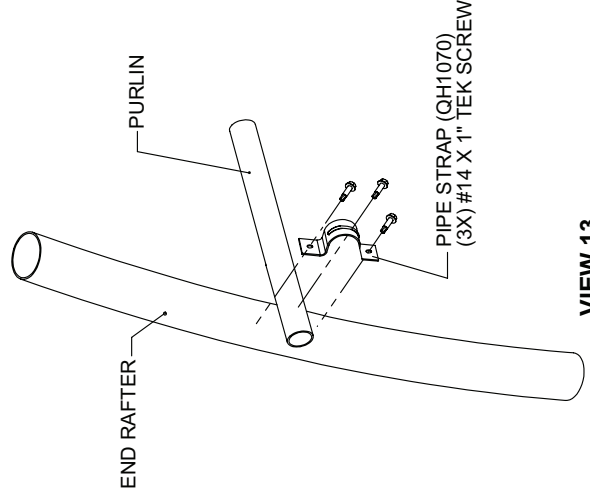
Frame Connection Details — Views 9 – 13



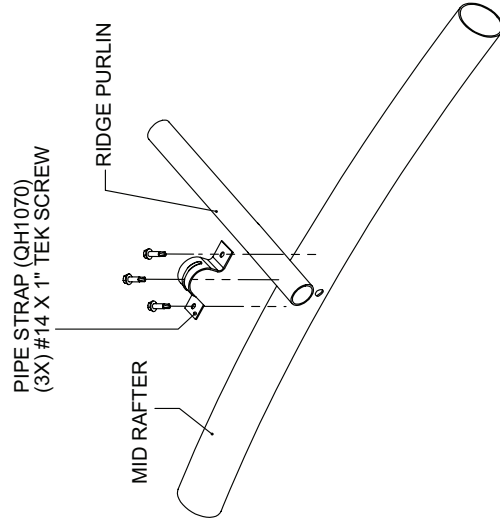
VIEW 10
 ROOF CABLE TO RIDGE PURLIN AT MID RAFTER CONNECTION



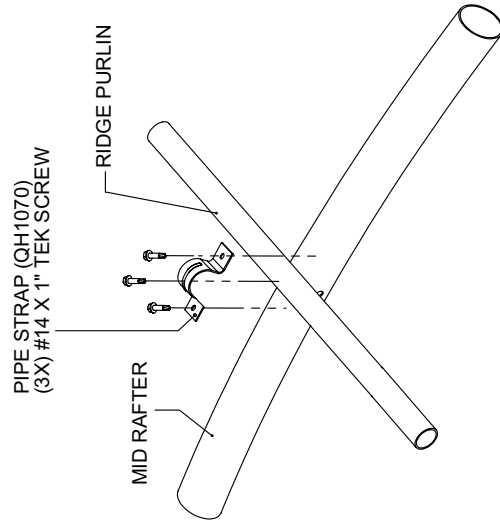
VIEW 9
 RAFTER SPLICE CONNECTION



VIEW 13
 PURLIN END RAFTER CONNECTION

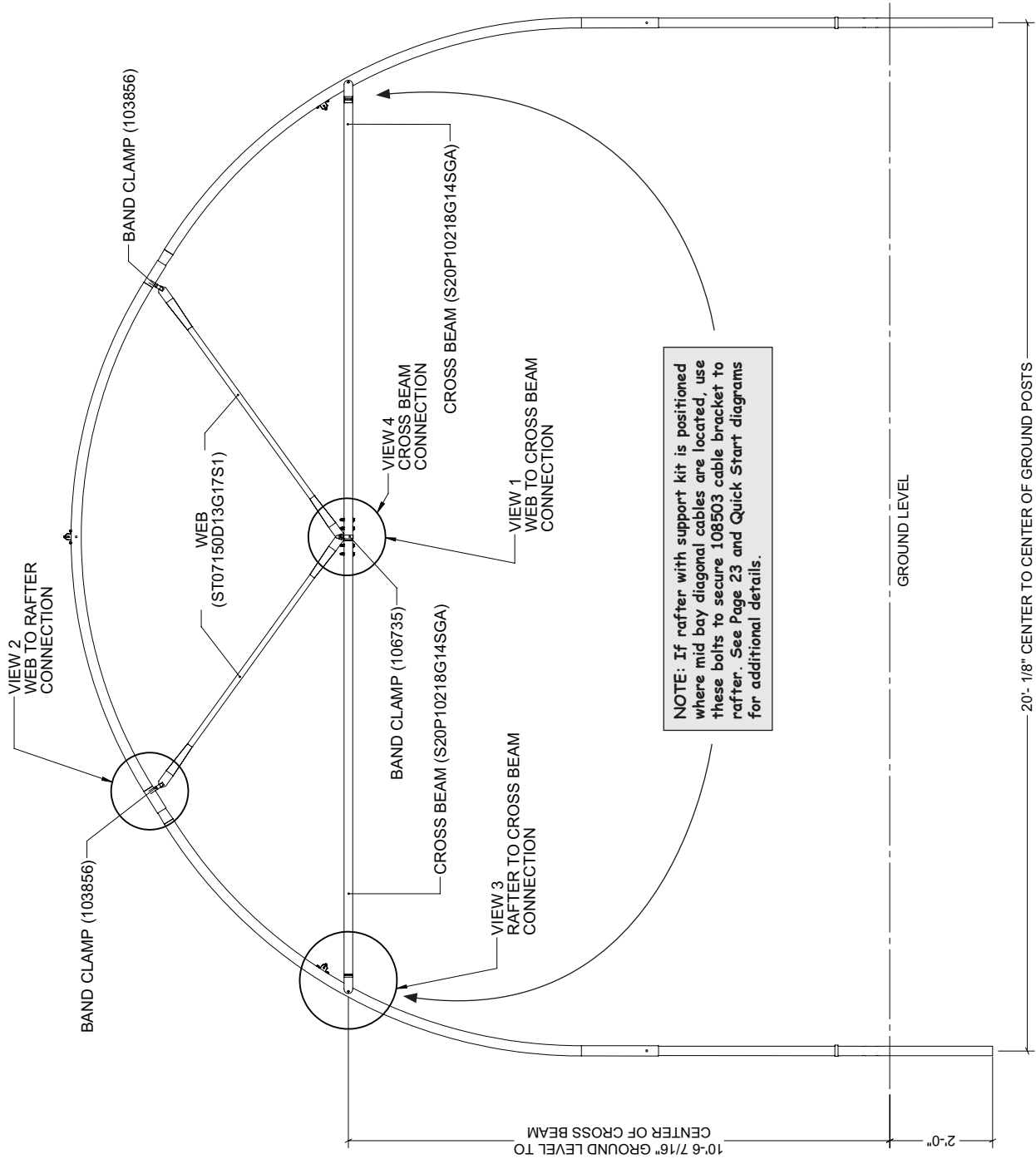


VIEW 12
 RIDGE PURLIN END RAFTER CONNECTION

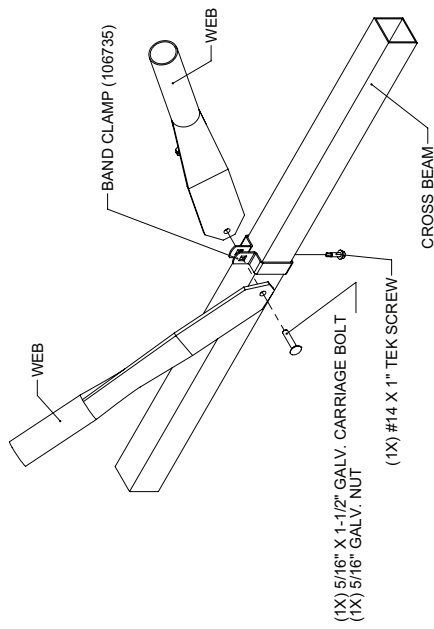


VIEW 11
 RIDGE PURLIN MID RAFTER CONNECTION

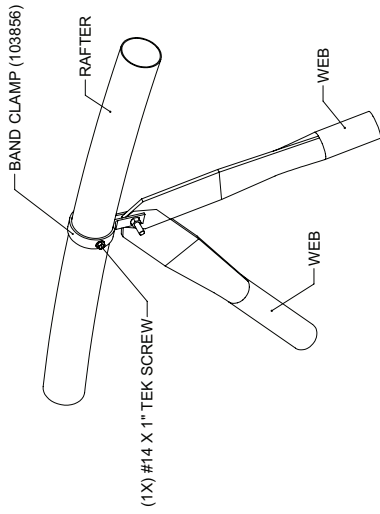
20' Rafter Profile with Optional Support Kit



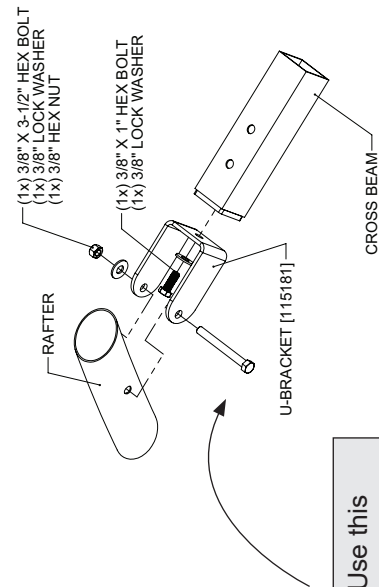
Optional Support Kit—Connection Details



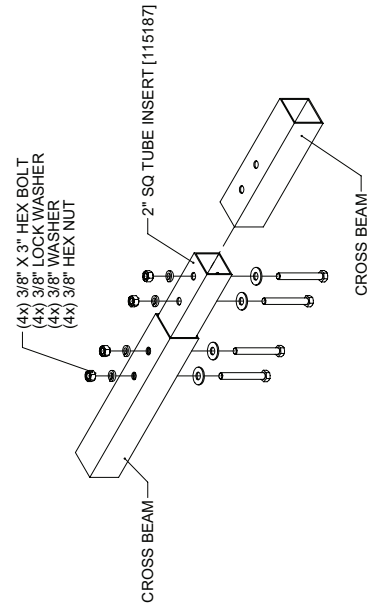
VIEW 1
WEB TO CROSS BEAM CONNECTION



VIEW 2
WEB TO RAFTER CONNECTION



VIEW 3
RAFTER TO CROSS BEAM CONNECTION



VIEW 4
CROSS BEAM CONNECTION

ATTENTION: Use this bolt to secure the 108503 bracket to the rafter for mid bay roof cables when support kit is installed.