

Riga XL VI

Assembly Guide

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ABOUT THIS DOCUMENT

This document is an Assembly Guide intended for persons who have a moderate level of experience building small structures. It is specific to the six-meter Riga XL VI, but can be applied to Riga XL models of other lengths. If you are an experienced Riga greenhouse builder, this is the guide for you. Keep these pages for reference as you proceed with your assembly project.

If you lack experience, or if you wish to approach building your Riga XL with all uncertainties resolved, you should download and study the Riga XL Owner's Reference Manual. It is enhanced for online reading and is packed with valuable information that can be otherwise gained only from experience. Once you understand the details you can refer to the Assembly Guide throughout your project to assure a trouble-free experience and optimum results.

Download the Riga XL Owner's Reference Manual

<http://exaco.com/rigamanual/RigaXLRefManual.pdf>

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INTRODUCTION

Welcome to the Exciting World of Riga XL Ownership

Congratulations on your wise decision to acquire a Riga XL greenhouse. You have chosen the finest personal greenhouse available.

This manual will guide you through all aspects of Riga XL ownership with special emphasis on assembly. Please read it thoroughly, even before you unpack your shipment, and refer to it throughout the assembly process. If you follow the instructions and use the recommended tools, you should be able to easily assemble the greenhouse by yourself.

Riga XL Models

All Riga XL models are identical in width and height but there are five different lengths. The model variations are identified by a Roman numeral suffix equal to the number of 1-meter length sections for that model.

The Riga XL VI is the standard 6-meter length and is the subject of this manual. Available by special order are the smaller Riga XL IV and Riga XL V, which are 4 and 5 meter lengths respectively. Also available by special order are the stretch models Riga XL VII, Riga XL VIII, and Riga XL IX, which are 7, 8, and 9 meters long respectively.

The models differ only in the lengths of the horizontal side profiles, the number of side glazing panels and curved center profiles (arches), the number of roof windows and window openers, and the quantities of supporting fasteners and seals. The horizontal side profiles for all models are one piece except those of the Riga XL IX which are two pieces spliced near the center. The IX model includes a robust welded aluminum truss for additional support of the roof beam at the splice.

Available Options

Three options and an accessory kit are manufactured for the Riga XL.

- A shelving kit to be installed along one wall.
- A door extension kit to lower one door if the greenhouse is built on a stem wall.
- An aluminum foundation frame to use if you want your greenhouse at grade level.
- Adjustable hanger accessory kit provides attachment points for plant support.

Two shelving kits are required if you want shelving on both sides, and two door extension kits are required if you want both doors lowered into stem wall openings.

Tools and Additional Materials You Will Need

Mandatory tools and materials

- 8-foot step ladder
- #2 Phillips screwdriver
- Bubble level 2 to 3 ft. long
- Powered screw driver with #2 Phillips bits
- Rubber mallet
- 28 anchor fasteners appropriate for your foundation substrate (must fit 3/8" hole)
- Material to erect temporary bracing for the gables and roof beam

Recommended additional tools

- 10 millimeter socket wrench or nut driver
- 6-foot step ladder
- Work table
- At least three sawhorses
- Rubber mallet
- Industrial quality scissors to cut seal material
- At least four clamps such as Irwin "Quick Grip"
- Two adjustable hanger accessory kits
- Window screen bead roller to help press in window and door seals
- 10-foot length of ½" EMT electrical metallic tubing (conduit) to use as a window prop

Recommended additional materials

- Membrane to isolate the aluminum floor profiles from the foundation substrate
- Roll of 1-inch "Scotch blue painter's tape"
- Thread lubricant for self-tapping screws (a wax crayon will do)
- Additional M6 stainless cap screws of appropriate length for future attachments to profiles
- 8 tether cables for window uplift restraints

Tools and materials included in the Riga XL Essentials Kit

- 10 millimeter combination wrench
- Metric measuring tape, 6 meters or longer
- Two 10.1 fl. ounce tubes of medium modulus neutral cure clear silicone sealant
- Roof beam fitment tool
- Marking pen, such as Sharpie®
- At least two ratcheting cargo straps, 1-inch wide x 20 ft. long with double J-hooks
- 16 UNC ¼-20 x ¾ inch stainless cap screws with nuts, and 24 ¼ inch stainless flat washers
- Stainless self-tapping Phillips pan head screws; four #10 x ¾ inch and four #8 x ¾ inch
- Drill bits; one each #31 (0.120 inch) and #27 (0.144 inch) for door holders
- Four pieces of double sided mounting tape, ¾ by 2 inch, for door holders
- 36 M6 x 8 mm stainless cap screws

RECEIVING INSPECTION

Your Riga XL came all the way from Germany without damage, but domestic motor freight will expose it to more serious hazards. Have a camera ready when your Riga XL is delivered and carefully inspect the packages for damage before the delivery driver leaves. The polycarbonate panels are most vulnerable; a gentle kiss from a fork lift tine can do serious damage.



Photograph any damage and describe it on both your copy and the driver's copy of the Bill of Lading. This evidence will be needed to file an insurance claim. Immediately notify Exaco Customer Service at (877) 760-8500 or (512) 407-8500.

Take Inventory

One of the most helpful things you can do to make your project go smoothly is to carefully inspect and inventory the materials in your shipment. This will familiarize you with the parts and give you time to replace any that are missing or damaged before you start construction. An illustrated check list is provided in this section to help make inspection easy and accurate. **Report any shortages or damage to Exaco Customer Service within 30 days.**

Your Riga XL VI will arrive on a very long pallet. Bound to the pallet are two large flat bundles of glazing, two curved wrapped bundles, and three long boxes. In addition to the pallet is a very long cardboard tube containing a fourth long box. If you ordered any accessories you will receive additional boxes or bundles. Some accessories, such as heaters, ventilators, and solar lights, might be shipped separately.



Start your inspection with Box 3 and continue with Box 2 and then Box 1. Inspect Box 4 last. Then open and inspect Arch bundles 1 and 2 and finish with the Glazing bundles.

Components are identified by Pos. numbers. The extruded aluminum components are referred to as *profiles*. Some of the extruded parts are referred by more specific names, such as *edge stay bar*, *crossbar*, *lateral supports*, *roof beam*, and *reinforcement bar*.

Box 3: Small Parts

Box 3 contains the small parts, most of which are fasteners. Several sizes of screws may be mixed in a single bag. Sort and count them, then put each size in an individual marked bag. Count carefully; extra screws are rarely provided.

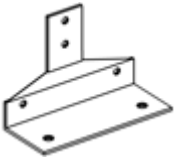
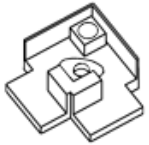

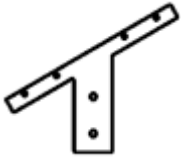
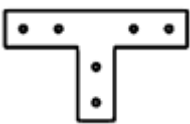
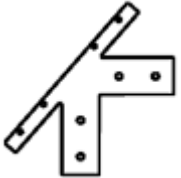


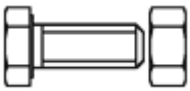

Illustration	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 6.7 Hold-down mounting bracket <i>Not used if assembling on an optional aluminum foundation frame.</i>	18 8 for gables, 10 for side walls Fasten vertical profiles to floor profiles and anchor all to foundation	
	Pos. 100 Plastic corner connector, black	4 1 at each floor profile corner to join profiles with edge stay bar	
	Pos. 101 Straight connector plate	4 Gables, fasten crossbars above doors	
	Pos. 102 Slanted T-connector plate	4 Gables, fasten edge stay bars to vertical door profiles	
	Pos. 103 T-connector plate	8 Gables, fasten lower crossbars between vertical door and middle profiles	
	Pos. 104 K-connector plate	4 Gables, fasten vertical middle profiles and crossbars to edge stay bars	
	Pos. 105 Floor profile connector	4 Floor profile, connect inside corners	
	Pos. 107.12 Set of M6 x 12 mm hex head cap screw with nut	188 92 for gable connector plates, 16 for gable mounting brackets, 44 for floor profiles, 28 for side wall arches, 8 for window crossbars	
	Pos. 107.16 Set of M6 x 16 mm hex head cap screw with nut	36 8 for gables, 2 for side wall arches, 8 for window crossbars	
	Pos. 108 M6 flat fender washer	28 Used under M6 nuts that fasten lateral supports to curved profiles	




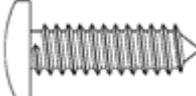


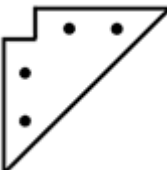



Illustration	Identifier and description	Quantity expected and where used	Quantity received
	<p>Pos. 110 Insulation seal, 6 x 8 mm thick shipped as dual-strand coil. Separate the strands and cut lengths to fit.</p>	<p>1 dual-strand coil Install in gap inside greenhouse between glazing and floor profile, 20 places.</p>	
	<p>Pos. 111 Phillips head screw, 4.2 x 13 mm pan head</p>	<p>12 4 for roof beam end cap cover plates, 8 to fasten gable profiles to floor profiles</p>	
	<p>Pos. 112 Phillips head screw, 4.2 x 60 mm flat head Caution! Do not confuse with Pos. 142 which is a 4.2 x 50 mm pan head screw.</p>	<p>64 8 on each of 2 top and 2 bottom doors, 8 on each of 4 roof windows</p>	
	<p>Pos. 113 Phillips head screw, 4.8 x 16 mm pan head</p>	<p>16 Fastens floor profile corner connector covers (Pos. 116) 4 places</p>	
	<p>Pos. 114 Roof beam end cap cover plate</p>	<p>2 Covers and retains the roof beam ends</p>	
	<p>Pos. 115 Connector plate NOTE: Might be bundled with large connector plates, Pos. 101 through 104.</p>	<p>8 Retains crossbars under roof windows</p>	
	<p>Pos. 116 Floor profile corner connector cover. NOTE: Might be bundled with large connector plates, Pos. 101 through 104.</p>	<p>4 Reinforce floor profile corners Fasten with 4.8 x 16 mm Phillips pan head screw (Pos. 113)</p>	
	<p>Pos. 117 Phillips head self-drilling screws, 3.5 x 13 mm pan head</p>	<p>32 Fastens K-connectors & slanted T-connectors (Pos. 102 & 104) to edge stay bars</p>	
	<p>Pos. 126, Pos. 138, Pos. 153 combined T-seal, cut from coil as required to fit</p>	<p>1 coil Weather seal for roof windows and doors</p>	
	<p>Pos. 127A Plastic corner connector, black, used at upper left and lower right window and door corners</p>	<p>14 2 for each of 4 roof windows 2 for each of 2 bottom doors 1 for each of 2 top doors, upper corners only</p>	


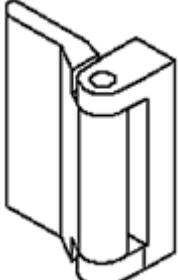

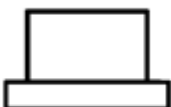






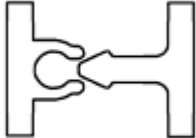


Illustration	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 127B Plastic corner connector, black, used at upper right and lower left window and door corners	14 2 for each of 4 roof windows 2 for each of 2 bottom doors 1 for each of 2 top doors, upper corners only	
	Pos. 135 Hinge set, black	8 2 for each of 2 bottom doors 2 for each of 2 top doors	
	Pos. 136 Sash lock, black	4 1 for each of 2 bottom doors 1 for each of 2 top doors	
	Pos. 137 End cap for rectangular tube, black	4 1 at each end of 2 rectangular tubes (Pos. 47) on bottom doors	
	Pos. 139 Phillips head screw, 4.8 x 25 mm flat head	16 Fasten 4 door hinges to each of 2 right vertical door profiles (Pos. 7)	
	Pos. 140 Phillips head screw, 4.8 x 16 mm flat head	16 Fasten 2 door hinges to each of 4 door frame profiles (Pos. 42 & 45)	
	Pos. 141 Phillips head screw, 3.5 x 22 mm flat head	8 Fasten 1 sash lock to each of 4 door frame profiles (Pos. 43 & 44)	
	Pos. 142 Phillips head screw, 4.2 x 50 mm pan head Caution! Do not confuse with Pos. 112 which is a 4.2 x 60 mm flat head screw.	8 4 (2 each door) to fasten rectangular tube (Pos. 47) to bottom door frame profiles (Pos. 46). 4 (2 each gable) to fasten crossbar to vertical door profiles	
	Pos. 143 Glazing block, white, 30mm x 16mm x 4mm	16 2 for each of 4 roof windows 2 for each of 2 top and 2 bottom doors	
	Pos. 150 Door lever sets, 8 boxed components	2 Door lever sets for each of 2 top doors	

Illustration	Identifier and description	Quantity expected and where used	Quantity received
	<p>Pos. 158 Two-part door holder set</p>	<p>2 1 set at each of 2 top doors</p>	
	<p>Pos. 159 Phillips head screws, 3.5 x 16 mm pan head</p>	<p>8 Intended to fasten door holder sets (Pos. 158) but these screws are incorrect. Instead use #10 x ¾ inch Phillips pan head for the male part and #8 x ¾ inch Phillips flat head for the female part.</p>	
	<p>(No Pos. assigned) Automatic window opener assembly</p>	<p>4 1 opener for each of 4 windows</p>	

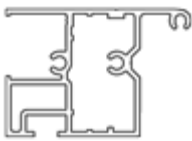
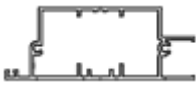

Box 2: Window and Door Profiles

Box 2 contains the profiles to construct four roof windows and two each upper and lower Dutch doors. All of the window and door profiles except Pos. 43 and Pos. 47 are cut from the same extrusion, differing only in length and borings for hinges or other attachments. Except for Pos. 43 and Pos. 47, the profiles are conveniently bundled as follows:

Four window bundles, each with two Pos. 34 and two Pos. 35.

Two lower door bundles, each with one Pos. 44, one Pos. 45, one Pos. 46, and one Pos. 48.


Two upper door bundles, each with one Pos. 41 and 1 Pos. 48.

Cross section	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 34 Roof window profile, 865 mm long	8 Top and bottom of each of 4 roof windows	
	Pos. 35 Roof window profile, 993 mm long	8 Left and right sides of each of 4 roof windows	
	Pos. 41 Upper door profile, 949 mm long, edge bored for latch and sash lock	2 Left side of each of 2 upper doors	
	Pos. 42 Upper door profile, 949 mm long, bored for hinges	2 Right side of each of 2 upper doors	
	Pos. 44 Lower door profile, left side, 887 mm long, bored for sash lock	2 Left side of each of 2 lower doors	
	Pos. 45 Lower door profile, right side, 887 mm long, bored for hinges	2 Right side of each of 2 lower doors	
	Pos. 46 Lower door profile, top side, 864 mm long, bored to attach rectangular tube	2 Top of each of 2 lower doors	
	Pos. 48 Upper and lower door profile, 864 mm long	4 Top of each of 2 upper doors and bottom of each of 2 lower doors	
	Pos. 43 Upper door profile, bottom side, 864 mm long, bored for lever set	2 Bottom of each of 2 upper doors	
	Pos. 47 Rectangular tube, 933 mm long, 2 holes bored on one face	2 Attach to Pos. 46 to fill space at top of each lower door	

Box 1: Profiles for Gables

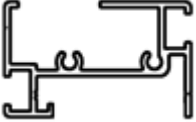



Box 1 contains the straight vertical and horizontal profiles used for the two gables, and the crossbars used beneath the roof windows. All of these profiles are cut from the same extrusion, differing only in length, end finishing, and borings.

The gable floor profiles are contained in Box 4.

Cross section	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 4 Vertical profile, middle left, 1929 mm long, 50° top angle	2 Vertical profile midway between left side door jamb and right outside corner of greenhouse	
	Pos. 5 Vertical profile, middle right, 1929 mm long, 50° top angle	2 Vertical profile midway between right side door jamb and right outside corner of greenhouse	
	Pos. 6 Vertical door profile, left, 2641 mm long, 30° top angle, bored for 4.2 x 50 mm crossbar screw (Pos. 142)	2 Vertical profile used as left side door jamb in each of two gables	
	Pos. 7 Vertical door profile, right, 2641 mm long, 30° top angle, bored for 4.2 x 50 mm crossbar screw (Pos. 142) and hinges	2 Vertical profile used as right side door jamb in each of two gables	
	Pos. 8 Crossbar, 952 mm long, identical to Pos. 25	10 Five horizontal glazing supports in each of two gables	
	Pos. 25 Crossbar, 952 mm long, identical to Pos. 8	4 Support top edge of side wall glazing beneath each of 4 roof windows	

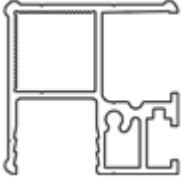
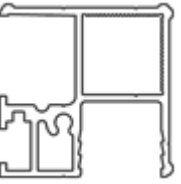
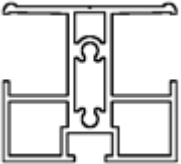
Box 4: Long Profiles

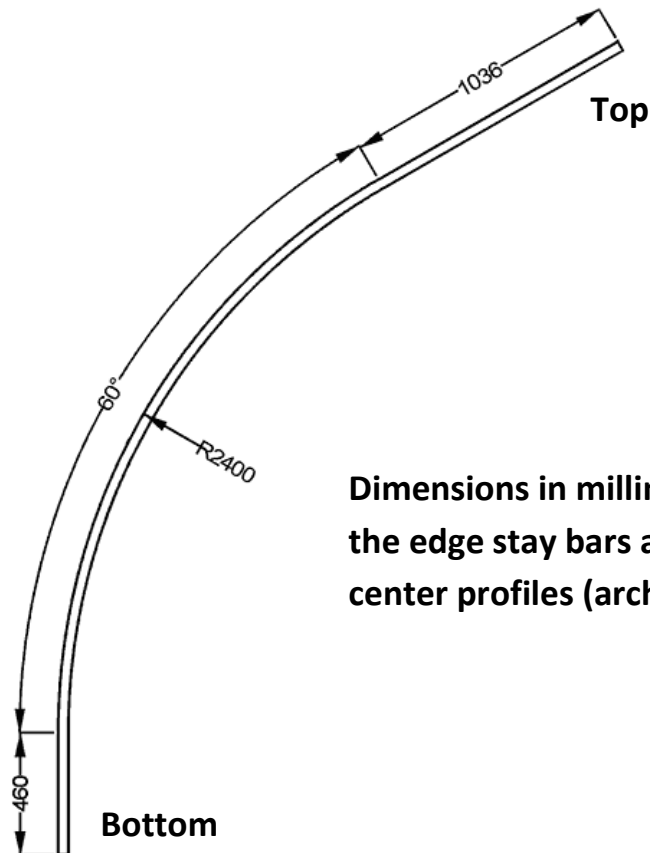
Box 4 is shipped inside of a heavy cardboard tube for additional protection during shipment. This box contains the longest straight parts; the floor profiles, the lateral supports, the roof beam, and the roof beam reinforcement bar.

Cross section	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 1 Gable floor profile, 4145 mm long	2 1 for each of 2 gables, retains bottom end of all vertical profiles	
	Pos. 18 Floor profile for side walls, 5903 mm long	2 1 for each of 2 side walls, retains bottom end of all curved center profiles (arches)	
	Pos. 22 Lateral supports, 5960 mm long	4 2 for each of 2 side walls, these full length horizontal braces index the position of the curved center profiles and provide longitudinal resistance to wind forces. They also provide attachment points for shelving and plant support systems.	
	Pos. 28 Roof beam, 6002 mm long	1 Main support beam at greenhouse ridge, also anchors top ends of edge stay bars and curved center profiles (arches)	
	Pos. 31 Roof beam reinforcement bar, 5960 mm long (will be bound to the roof beam)	1 Fortifies the roof beam and provides M6 cap screw capture slots to attach plant support systems	

Arch Bundles 1 and 2: Curved Profiles

There are two models of curved profiles. The curved center profiles (Pos. 19) form the arched framing for the side walls, and the edge stay bars (Pos. 2 and 3) form the arches of the gables. The curved center profiles are all identical, but the edge stay bars come in left and right configurations.

Cross section viewed from top	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 2 Edge stay bar, right side (also known as right edge clamp or right gable arch)	2 Right side of each gable as viewed from outside the greenhouse	
	Pos. 3 Edge stay bar, left side (also known as left edge clamp or left gable arch)	2 Left side of each gable as viewed from outside the greenhouse	
	Pos. 19 Curved center profile (also known as center clamp or side wall arch)	10 Side walls between the two gables	



Dimensions in millimeters of the edge stay bars and curved center profiles (arches).

Glazing Bundles 1 and 2

There are eight shapes of polycarbonate glazing panels, two of which exist in both left and right side version. All panels are 16 mm thick triple-wall. The illustration is as viewed from outside the greenhouse, looking at the ultraviolet-protected face.



Do not store glazing where any portion of it will be exposed to direct sunlight.


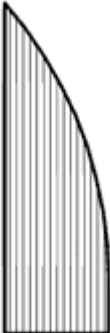

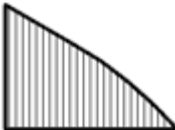
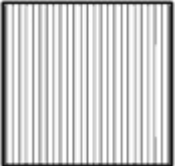
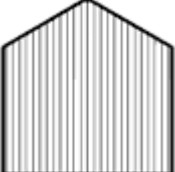
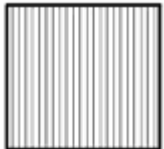

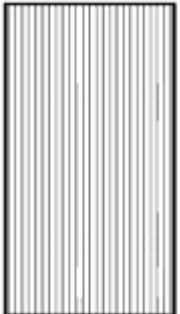
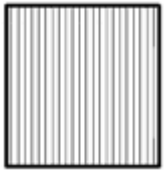

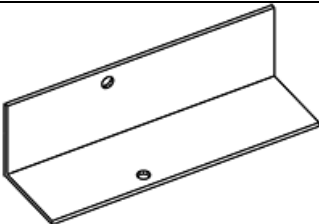


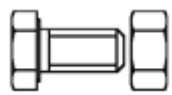
Illustration (Not to scale)	Overall dimensions (width x height) in millimeters	Quantity expected and where used	Quantity received
	602 x 1922 Curved glazing panel	2 Left outer cell of each gable	
	602 x 1922 Curved glazing panel	2 Right outer cell of each gable	
	980 x 727 Curved glazing panel	2 Upper left inner cell in each gable	
	980 x 727 Curved glazing panel	2 Upper right inner cell in each gable	
	980 x 944	8 Four inner cells either side of door in each gable	
	980 x 1008 5-sided glazing panel	2 Cell above door in each gable	

Illustration (Not to scale)	Overall dimensions (width x height) in millimeters	Quantity expected and where used	Quantity received
	<p align="center">888 x 835</p>	<p align="center">4</p> <p>Top and bottom door panels in each gable</p>	
	<p align="center">980 x 3893</p>	<p align="center">8</p> <p>Side wall bays without roof windows</p>	
	<p align="center">980 x 2830</p>	<p align="center">4</p> <p>Side wall bays with roof windows</p>	
	<p align="center">888 x 943</p>	<p align="center">4</p> <p>Roof window panels</p>	

Options and Accessories

Aluminum foundation frame

Cross section or illustration	Identifier and description	Quantity expected and where used	Quantity received
	Pos. 6.1 Foundation frame profile for gables, 4100 mm long	2 Supports each gable floor profile	
	Pos. 6.2 Foundation frame profile for sides, 5858 mm long	2 Supports each side wall floor profile	
	Pos. 6.3 Foundation corner connector, 40mm x 40mm x 135mm (1 mm thick)	4 At each corner of the foundation frame	
	Pos. 6.4 Hold-down plate	18 Connect each vertical profile to the foundation frame	
	Pos. 117 Phillips head self-drilling screw, 3.5 x 13 mm pan head	20 Four for each gable floor profile and six for each side floor profile to fasten the profile to the foundation frame	
	Pos. 107.12 Set of M6 x 12 mm hex head cap screw with nut	44 Two to fasten each corner connector to foundation profiles (4 places), two to fasten each hold-down plate to vertical profile and foundation frame (18 places)	

Shelf kit

This is preliminary information will be completed a future release of this manual.



A new style shelf system for Riga greenhouses began shipping in 2012. The suspension chains of the older system have been replaced by brackets attached to the arches.

Door extension kit

This preliminary information will be completed in a future release of this manual.



A kit is available for a Riga XL built on a stem wall. Use the door extension kit to relocate the doorway 500 millimeters downward for easy entry through the stem wall.

Adjustable hanger accessory kit?

The adjustable hanger accessory kit is an assortment of parts to install hooks on the roof beam reinforcement bar, or on any of the lateral supports. In fact the hooks can be installed in the screw capture slot of any profile. A kit includes parts for five hanging sites.



In addition to hanging things, the components of the hanger kit can be helpful during assembly.



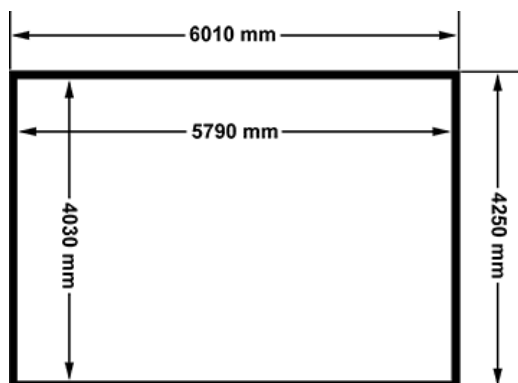
SITE PREPARATION

Foundation

A foundation consists of subsurface footings or piers and a substrate that is at or above grade level. Your Riga XL requires a stable, robust foundation with a substrate that is flat, level, and square. Footings are always made of cast concrete while piers can be either concrete columns or wood posts set in concrete. The bottoms of footings and piers must be well below the ground frost line. Descriptions of some popular foundations and substrates follow.

Greenhouse dimensions

The footprint of your six-meter-long Riga XL VI forms a rectangle of dimensions shown. The thickness of this footprint includes the floor profiles and mounting brackets, which must be anchored. The substrate must provide additional space both inside and outside of the footprint to accommodate construction and placement tolerances and to keep the anchors a safe distance from the inside edge.

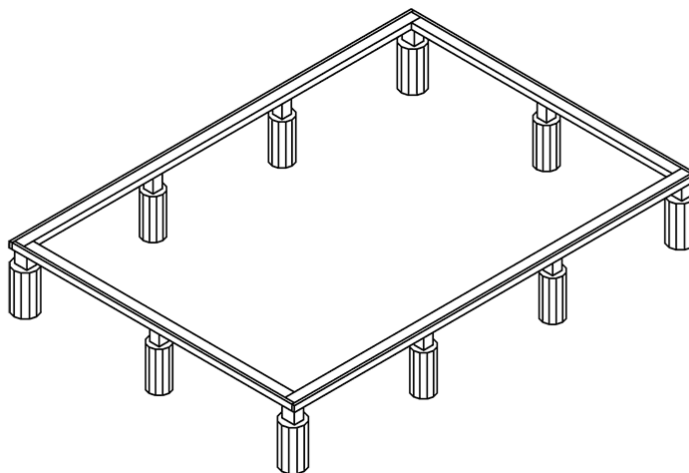


Substrate elevation

A substrate and floor at grade level accommodates a simple entry into the greenhouse, but might not provide adequate drainage and protection against water intrusion. A slightly raised substrate with a raised floor, improves these issues. The floor can be as simple as a layer of crushed rock.

Pier and beam foundation

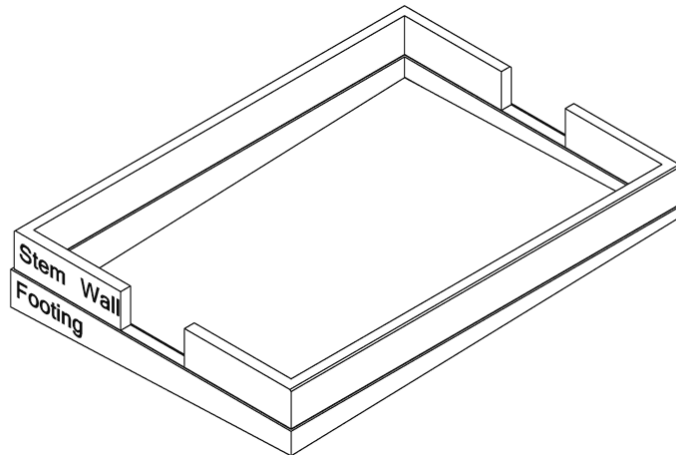
Pier and beam foundations are made mostly of wood, but usually include some concrete. The substrate on which the greenhouse rests is formed by wood beams supported by vertical piers. The piers can be concrete columns or wood posts set in concrete. Wood components must be chemically treated to retard deterioration caused by ground contact. For improved longevity the wood components should be elevated above ground level, even if they are treated. A pier and beam foundation constructed in this way could be considered a very low stem wall.



Pier and beam foundation with piers set in concrete below grade

Stem wall foundation

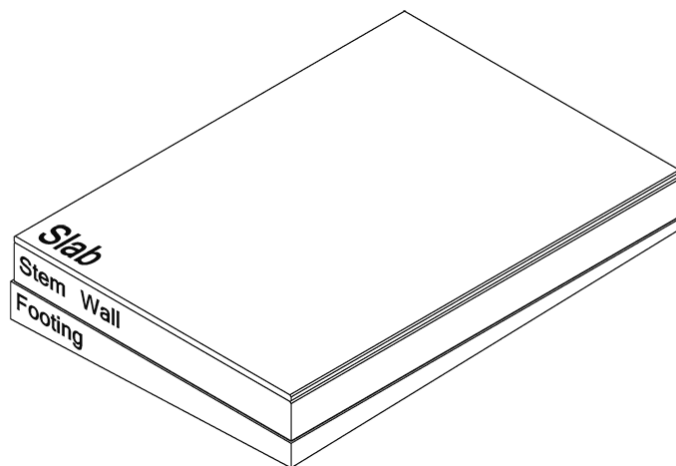
A stem wall is a low wall made of wood, grouted concrete blocks, or cast concrete. It is a solution for sloped sites. The wall elevates the greenhouse well above the floor level to provide additional interior height. This requires modifying the Riga door openings to extend them down to floor level. A kit is available to extend the door for a standardized stem wall height of 500 millimeters (19.69 inches). The profiles included in the kit can be cut for heights less than 500 millimeters.



Concrete stem wall foundation with door openings

Concrete slab foundation

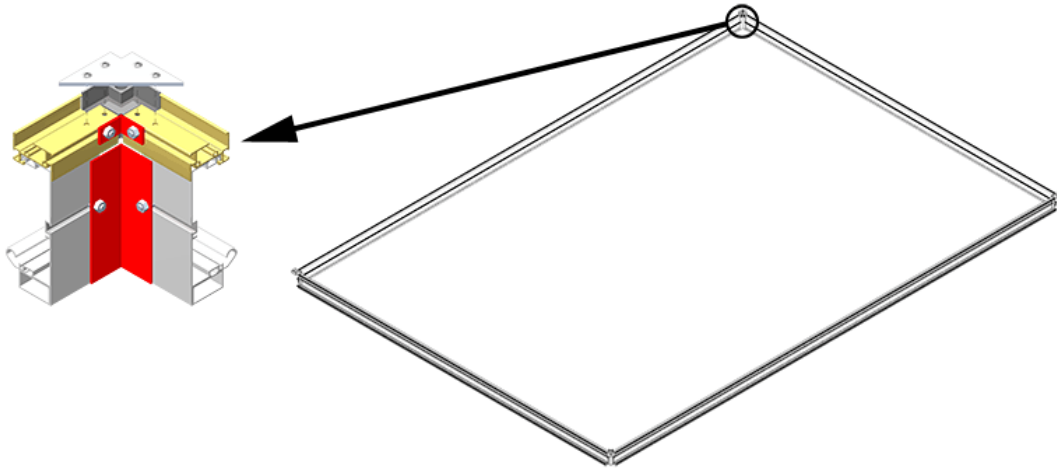
A concrete slab is usually cast at grade level but can also be elevated. An elevated slab is formed by first building a concrete stem wall. The volume within the wall perimeter is then filled with compacted sand, and the slab is cast over the entire upper surface.



Raised slab foundation

Aluminum foundation frame

A grade-level foundation can be implemented with an optional aluminum foundation frame made specifically for the Riga XL. The frame is buried with the greenhouse floor profiles already attached, and then the greenhouse is erected on the floor profiles. The frame cannot elevate any portion of the greenhouse above grade and is therefore appropriate only for sites that are perfectly level. With this foundation the grade becomes the greenhouse floor.



Optional aluminum foundation frame with floor profiles

Isolation membrane

Unless you use the optional aluminum foundation frame for your Riga XL, the substrate material will probably be concrete or pressure-treated alkaline copper quaternary ammonium (ACQ) lumber. ACQ is incompatible with aluminum. Prolonged contact will lead to corrosion. Prolonged contact between concrete and aluminum may cause abrasion and, in rare cases, electrolysis. In either case you should isolate the aluminum floor profiles and mounting brackets from the substrate material.

You can isolate the aluminum by applying a membrane to the substrate before you place the floor profiles. Some suitable products are Grace Vycor® Plus, Grace Vycor® V40, and Protect Wrap BT25-XL. If you wish to prevent rainwater from seeping beneath the floor profiles, consider using a thicker compressible membrane, such as Owens Corning Foam Seal, that functions as a gasket.

The membrane should be at least three inches wide and centered under the floor profiles. Excess portions can be trimmed away after the floor profiles are fastened in place. The outside edges of a foam membrane should be painted or sealed after trimming to resist degradation in sunlight.



Isolation membrane beneath floor profile and mounting bracket



Protect the membrane by restraining the floor profiles. Moving a profile over the membrane while building gables and side walls can lift or tear portions of it.

STEP-BY-STEP ASSEMBLY GUIDE



Some of the assembly steps will differ if your Riga is built on the optional aluminum foundation frame.

Summary of Assembly Steps

Steps 1 and 2: Assemble the roof windows and doors.

Assembling windows and doors is a good starting point because it helps initiate the builder and can be done indoors. The doors are the final items to be installed, but the roof windows must be ready for installation during Step 16.

Steps 3 through 10: Build the first gable.

The gable (end wall) can be assembled in place in its normal vertical position or if space permits it can be assembled horizontally on a flat surface with the interior face upward, and then tilted into position. You must provide temporary bracing to safely support the upright gable. Some builders assemble the gable off-site and transport it to the final site. These steps are repeated later for the second gable.

Steps 11 through 16: Build the roof and side walls.

Many steps are involved in building the greenhouse walls, which also form the roof. Begin by placing indexing marks on the floor profiles and roof beam, and load the required M6 screws into the profile capture slots at the approximate locations of use.

The roof windows must be ready for use in Step 16, and you must provide temporary support for the roof beam. Depending on your specific situation, you may or may not anchor the gable and side walls to the foundation during these steps. Follow the step sequence exactly to avoid problems.

Step 17: Build the second gable and join it to the side walls.

Step 17 is a repeat of steps 3 through 10 as you build the second gable. Erect temporary bracing to support the gable, and position a few inches away from the side walls during the assembly process. When the gable is completed you will move it and join it to the side walls, threading the edges of the side wall glazing panels in the process.

Step 18: Anchor the greenhouse to its foundation.

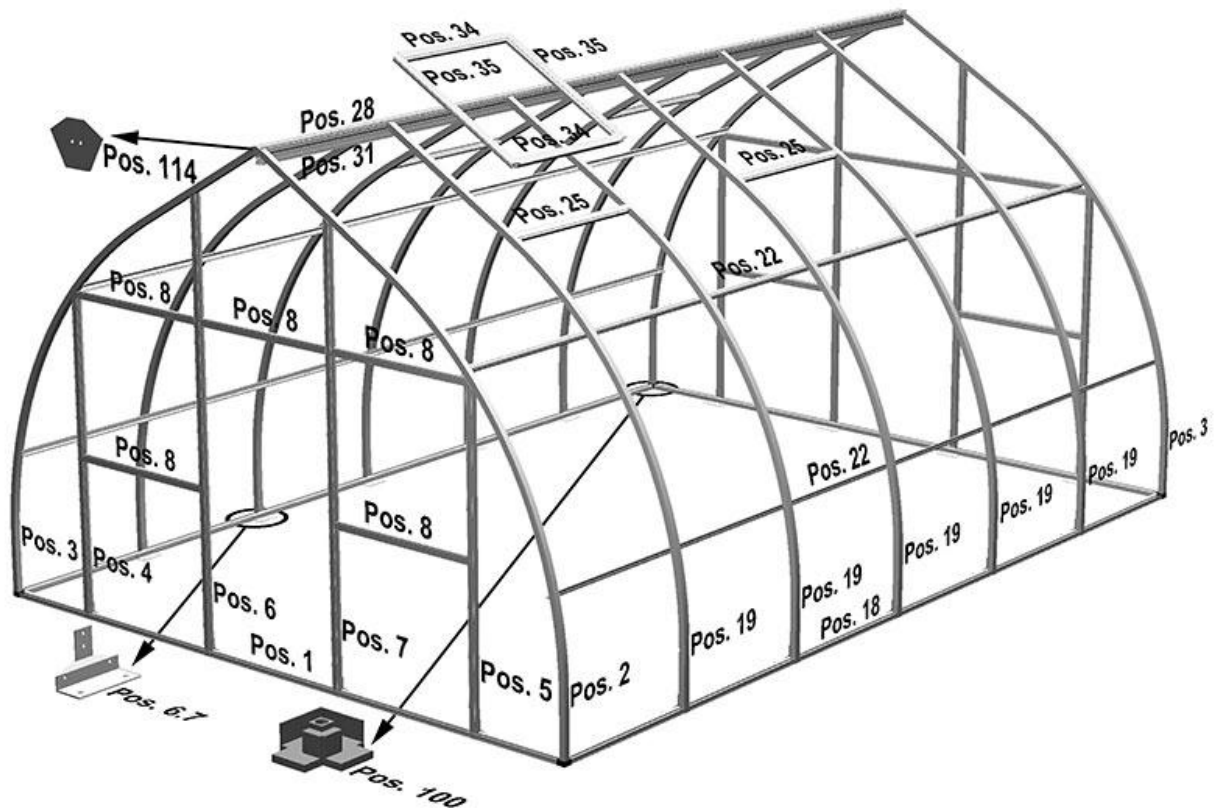
The greenhouse will be securely anchored to the foundation during step 18. Depending on your specific situation you may have already anchored the first gable and the two side walls in step 14, leaving only the second gable to be anchored in step 18.

Steps 19 through 23: Finish the interior and exterior.

The hard work is over by Step 19. You will install the lateral supports, floor profile seals, and roof window openers. Eventually you will apply sealant beads to specific places on the outside of the greenhouse. Finish by hanging the doors, then step back and admire your new Riga XL.

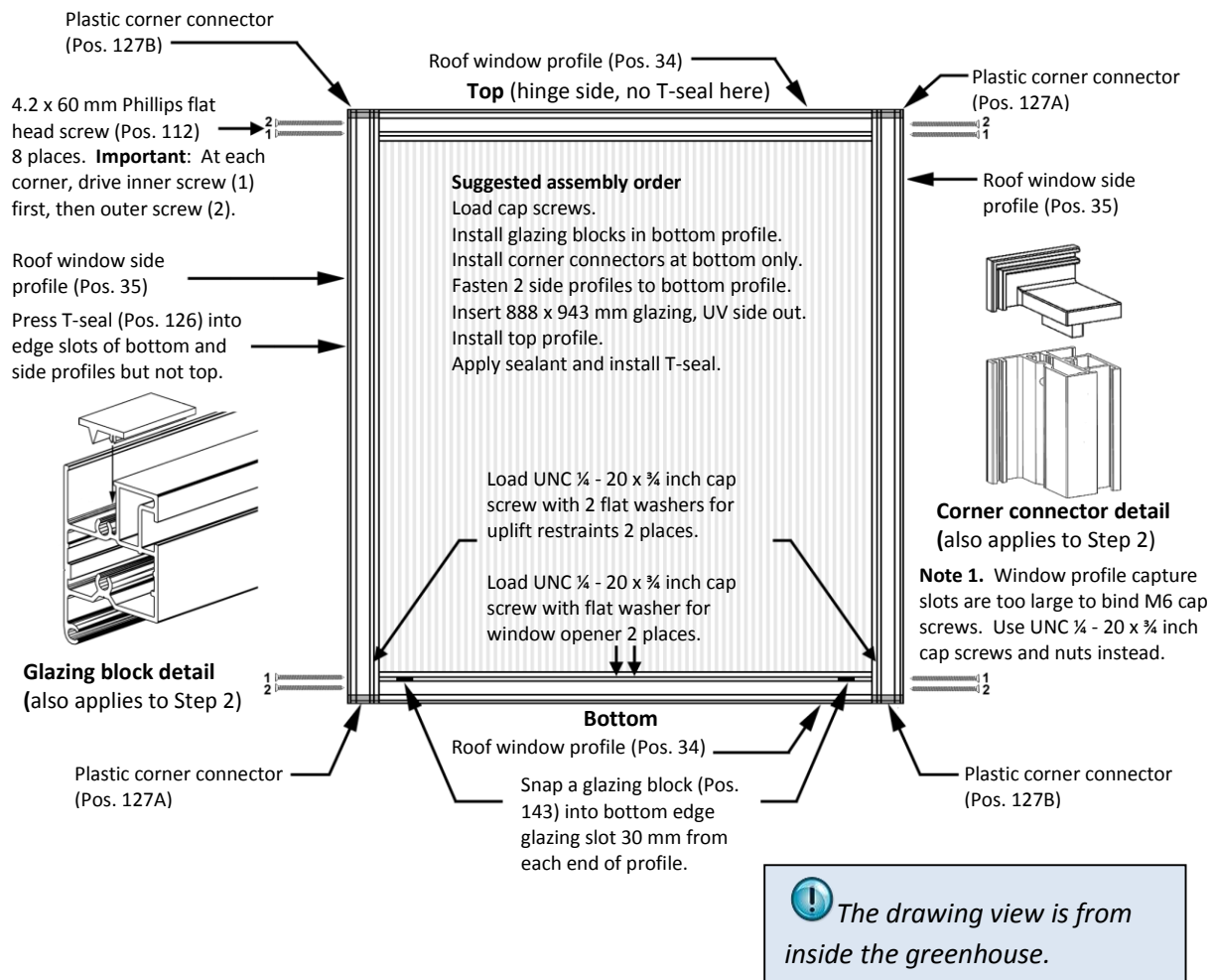
Locations of Frame Components

The components of your Riga XL are cataloged by Pos. number. Here are shown the Pos. numbers, names, and placements of the frame components.



- Pos. 1 Gable floor profile, 2 places
- Pos. 2 Right side edge stay bar, 2 places
- Pos. 3 Left side edge stay bar, 2 places
- Pos. 4 Left side vertical middle profile, 2 places
- Pos. 5 Right side vertical middle profile, 2 places
- Pos. 6 Left side vertical door profile, 2 places
- Pos. 6.7 Mounting bracket, 18 places
- Pos. 7 Right side vertical door profile, 2 places
- Pos. 8 Crossbar for gables, 10 places
- Pos. 18 Side floor profile, 2 places
- Pos. 19 Vertical curved profile, 10 places
- Pos. 22 Lateral support, 4 places
- Pos. 25 Crossbar for window opening, 4 places
- Pos. 28 Roof beam, 1 place
- Pos. 31 Roof beam reinforcement bar, 1 place
- Pos. 34 Top and bottom window profile, 8 places
- Pos. 35 Left and right side window profile, 8 places
- Pos. 100 Plastic corner connector, 4 places
- Pos. 114 Roof beam end cap cover plate, 2 places

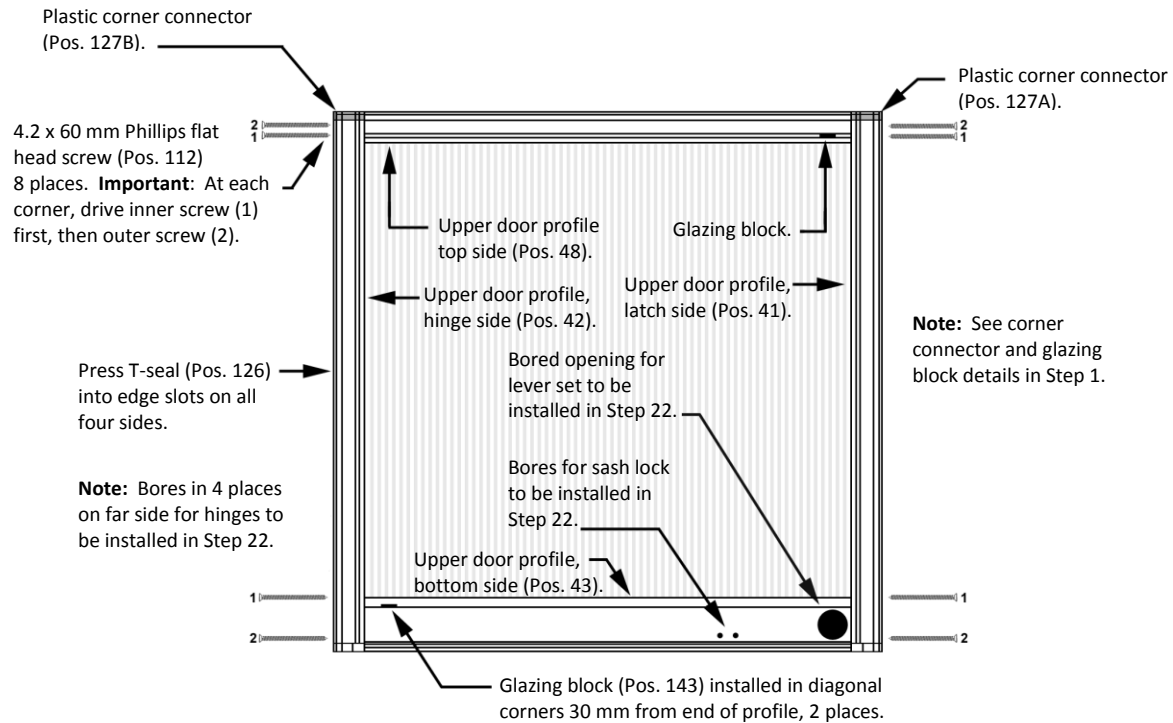
Step 1 Roof Windows



Parts required for four windows


8	Pos. 34	Roof window profile, 865 mm long, top and bottom
8	Pos. 35	Roof window profile, 993 mm long, left and right sides
8	Pos. 127A	Plastic corner connectors, configuration A
8	Pos. 127B	Plastic corner connectors, configuration B
8	Pos. 143	Glazing block, white, 30mm x 16mm x 4mm
32	Pos. 112	Phillips flat head screw, 4.2x60 mm stainless
4	(no Pos. #)	Polycarbonate glazing, 888 by 943 mm
	Pos. 126	T-seal, approximately 13.2 meters
16	REK	Hex head cap screw with nut, UNC ¼-20 x ¾ inch stainless
24	REK	Flat washer, ¼ inch stainless
	REK	Silicone glazing sealant

Step 2a Upper Doors



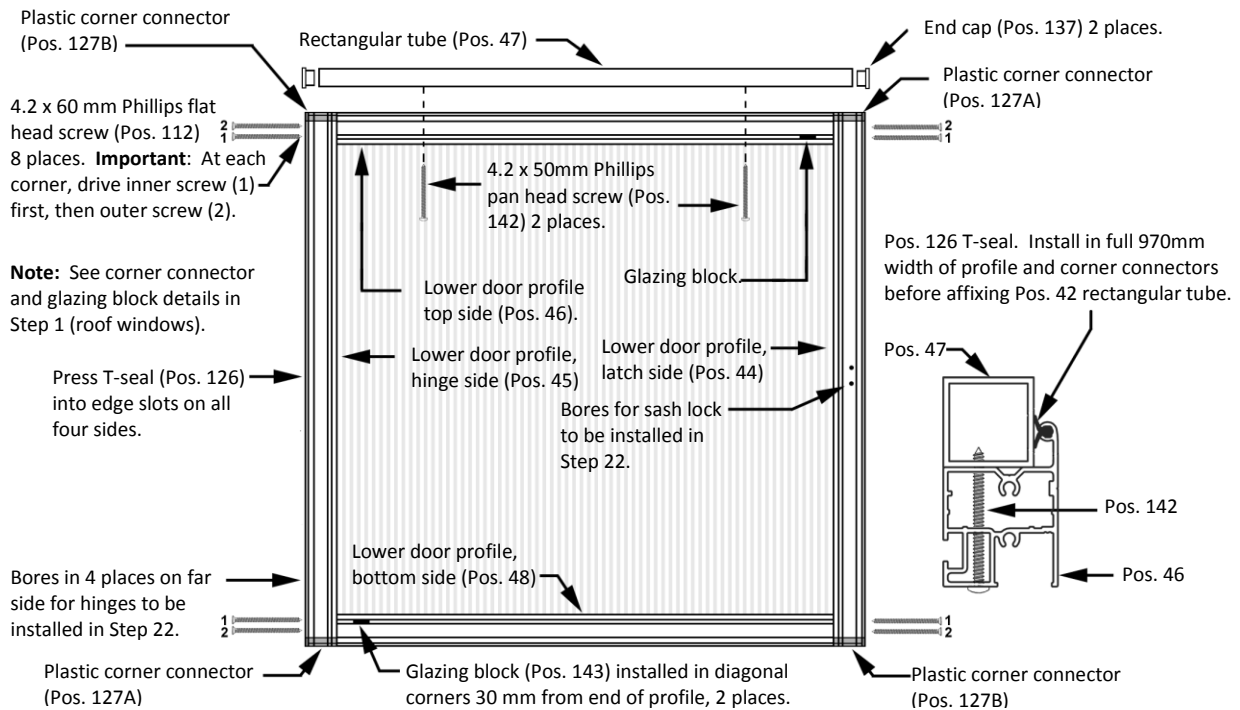
Parts required for two upper doors

2	Pos. 41	Upper door profile, latch side (left)
2	Pos. 42	Upper door profile, hinge side (right)
2	Pos.43	Upper door profile, bottom
2	Pos. 48	Upper door profile, top
16	Pos. 112	4.2 x 60 mm Phillips flat head screw
4	Pos. 143	Glazing block
2	Pos. 127A	Plastic corner connector A
2	Pos. 127B	Plastic corner connector B
2	(no Pos. #)	888 by 835 mm glazing panel
	Pos. 126	T-seal, approximately 4.4 meters
	REK	Silicone glazing sealant

 *The drawing view is from inside the greenhouse, so left and right callouts are reversed.*


- Install one glazing block in each top and bottom profile diagonally as shown.
- Fasten the side profiles to bottom profile.
- Insert 888 x 835 mm glazing with UV protected side facing outside (away from you).
- Press the corner connectors into the top ends of the side profiles, and install the top profile.
- Apply sealant to the outer interfaces of the profiles and glazing.
- After the sealant has cured, press T-seal into edge slots of all four profiles.

Step 2b Lower Doors



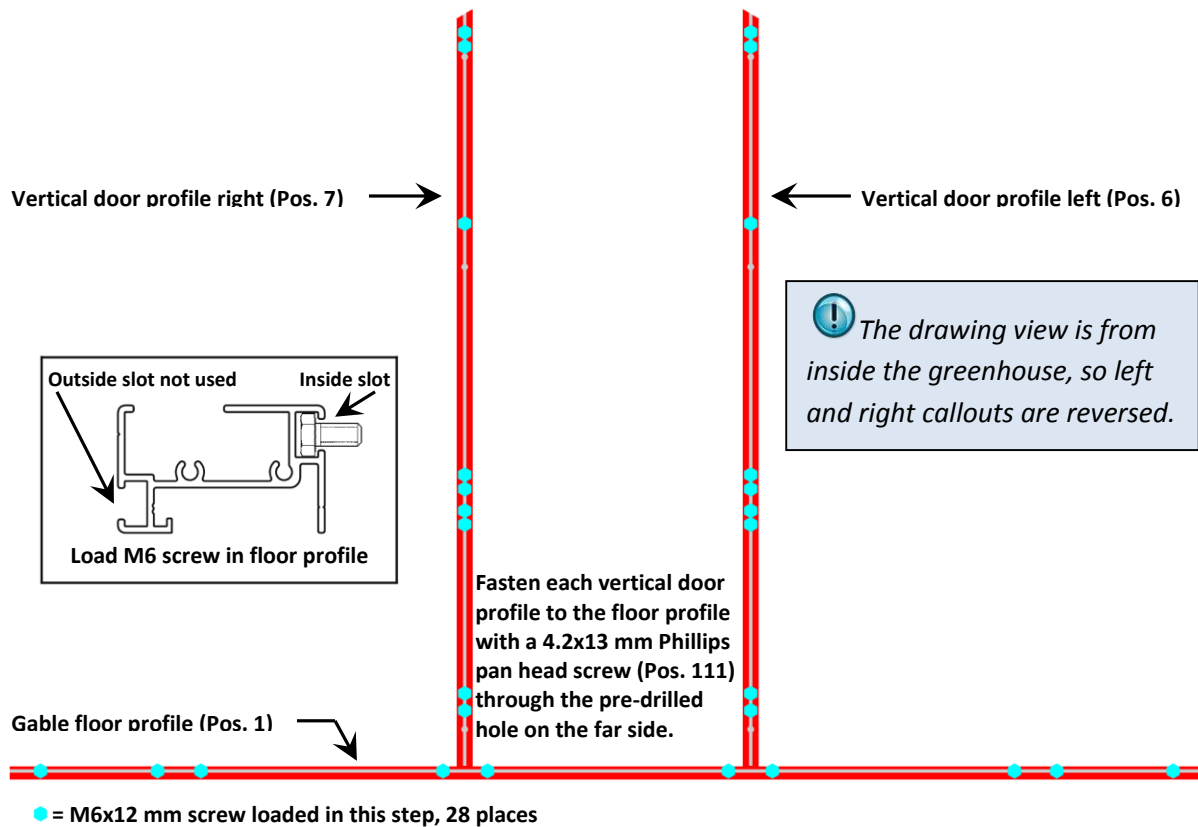
Parts required for two lower doors

2	Pos. 44	Lower door profile, latch side
2	Pos. 45	Lower door profile, hinge side
2	Pos. 48	Lower door profile, bottom
2	Pos. 46	Lower door profile, top
4	Pos. 127A	Plastic corner connector A
4	Pos. 127B	Plastic corner connector B
4	Pos. 143	Glazing block
2	Pos. 47	Rectangular tube
4	Pos. 137	End cap for rectangular tube
2	(No Pos. #)	888 by 835 mm glazing panel
	Pos. 126	T-seal, approximately 4.4 meters

 *The drawing view is from inside the greenhouse, so left and right callouts are reversed.*

- Install one glazing block in each top and bottom profile diagonally as shown.
- Press corner connectors into the bottom ends of the side profiles and fasten to the bottom profile.
- Insert 888 x 835 mm glazing with UV protected side facing outside (away from you).
- Prepare the top profile assembly per detail and fasten with 2 screws through the pre-drilled holes.
- Press corner connectors into the top ends of the side profiles and install the top profile assembly.
- Apply sealant to the outer interfaces of profiles and glazing.
- After the sealant has cured press T-seal into the edge slots of all four profiles.

Step 3 Gable Floor Profile and Vertical Door Profiles



Parts required

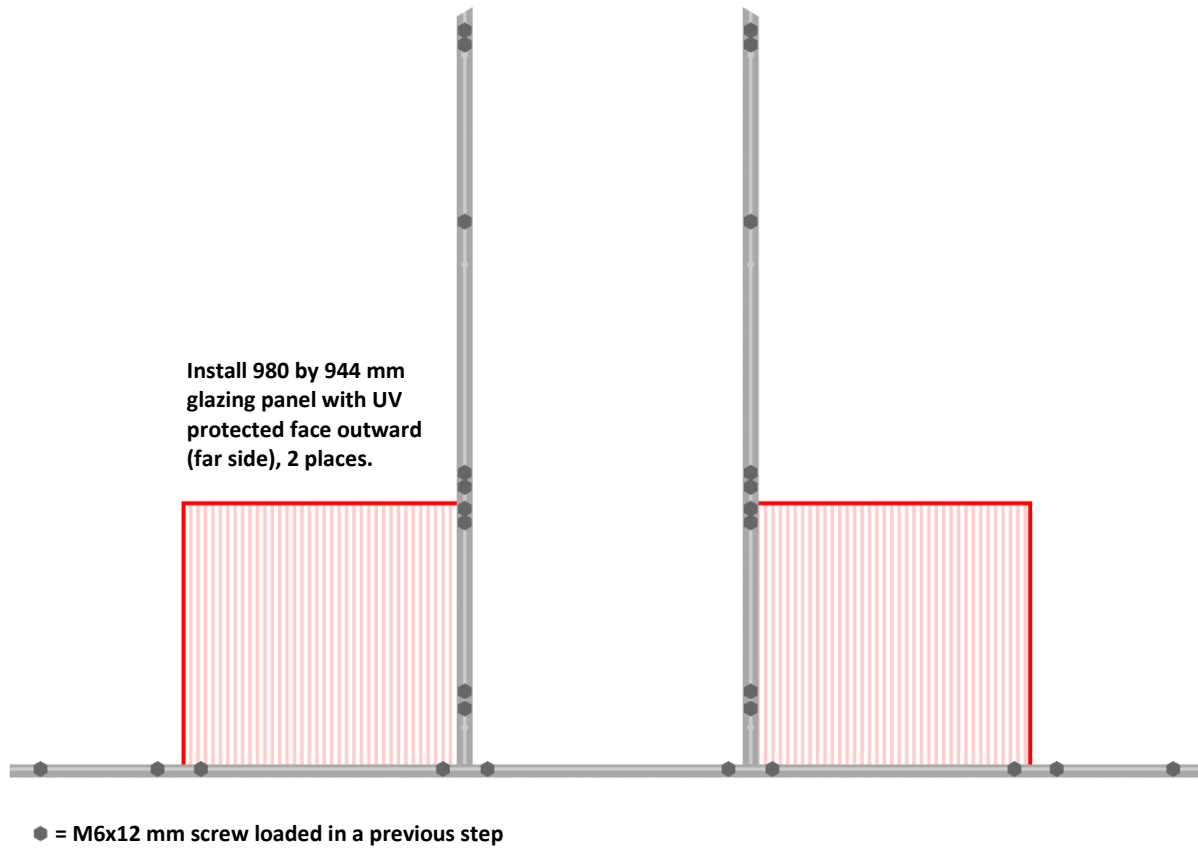
1	Pos. 1	Gable floor profile
1	Pos. 6	Vertical door profile, left
1	Pos. 7	Vertical door profile, right
28	Pos. 107.12	M6x12 mm hex head cap screw with nut
2	Pos. 111	Phillips pan head screw, 4.2x13 mm

- Load the floor profile and vertical door profiles with M6x12 mm screws as shown.
- Engage the left and right vertical door profiles into the floor profile and slide into position, aligning the pre-drilled holes in the profiles.
- Secure each vertical door profile to the floor profile with a 4.2x13mm Phillips pan head screw driven through the pre-drilled holes.



IMPORTANT: If your Riga will be anchored to the substrate with wedge anchors or other non-removable please read “Anchoring to Concrete” in the Supplemental Information section at the end of this document.

Step 4 Lower 980 x 944 mm Glazing Panels (1 & 2 of 4)

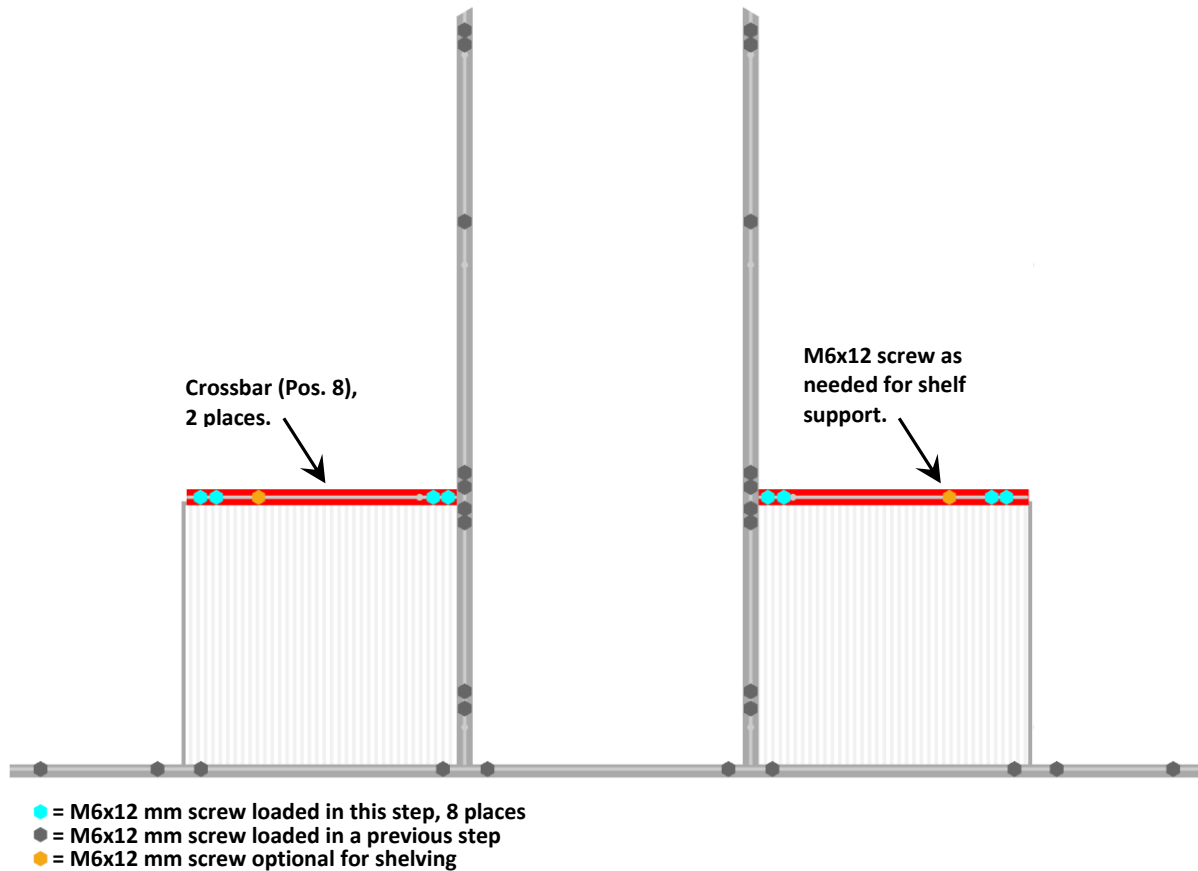


Parts required

2 (No Pos. #) 980 by 944 mm square glazing panel

- Place the glazing panels in position with the edges inside the vertical and floor profile slots. The UV protected faces must face outward, which in this inside view is away from you.

Step 5 Lower Crossbars (1 & 2 of 5m)



Parts required

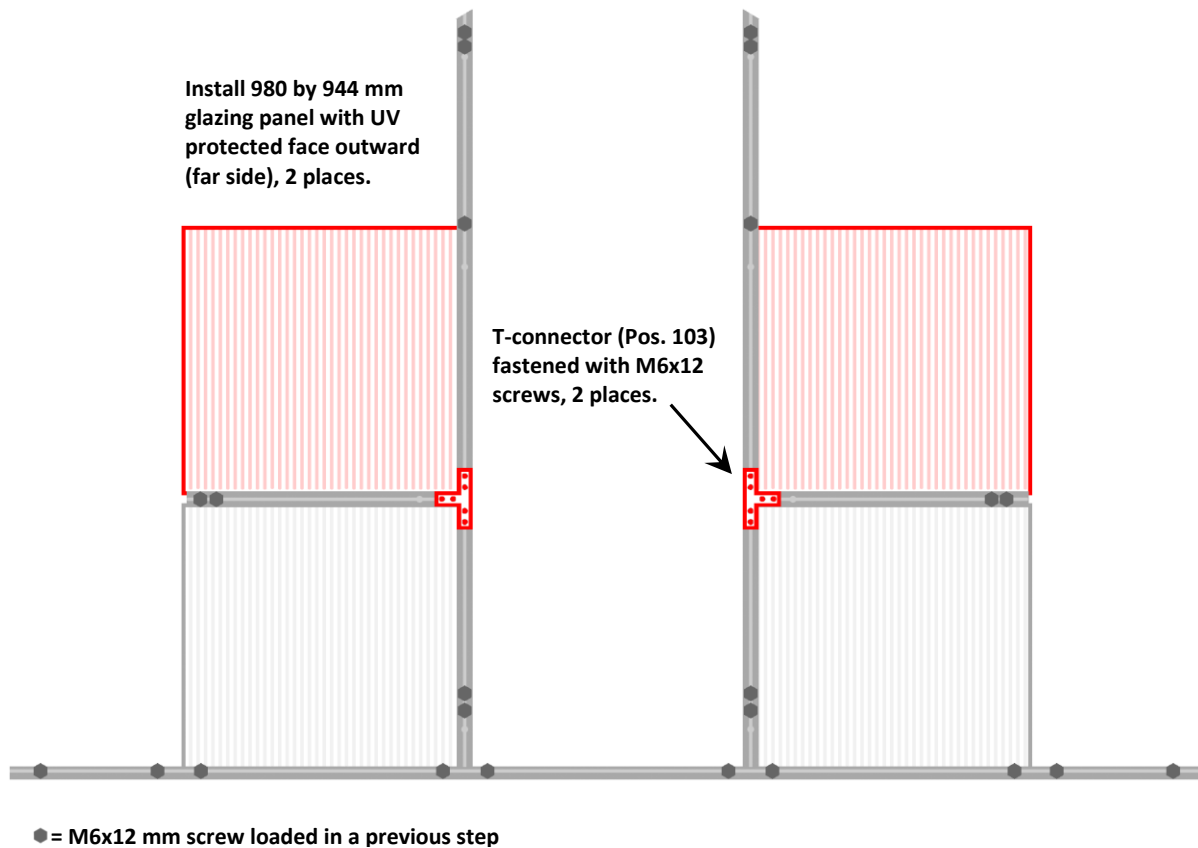
2	Pos. 8	Crossbar
8	Pos. 107.12	M6x12 hex head cap screw with nut
2 or 4	Pos. 107.12	Optional M6x12 hex head cap screw with nut for shelf support

- Load each crossbar with M6x12 mm screws as shown, and with optional screws as required.
- Place a crossbar on each glazing panel.



If your Riga XL includes an optional shelving kit, load an extra M6x12 screw in each crossbar to fasten the ends of the shelf. A shelving kit supplies materials for one side of the greenhouse. Two kits are needed for shelves on both sides.

Step 6 T-connectors and Upper 980 by 944 mm Glazing Panels (3 & 4 of 4)

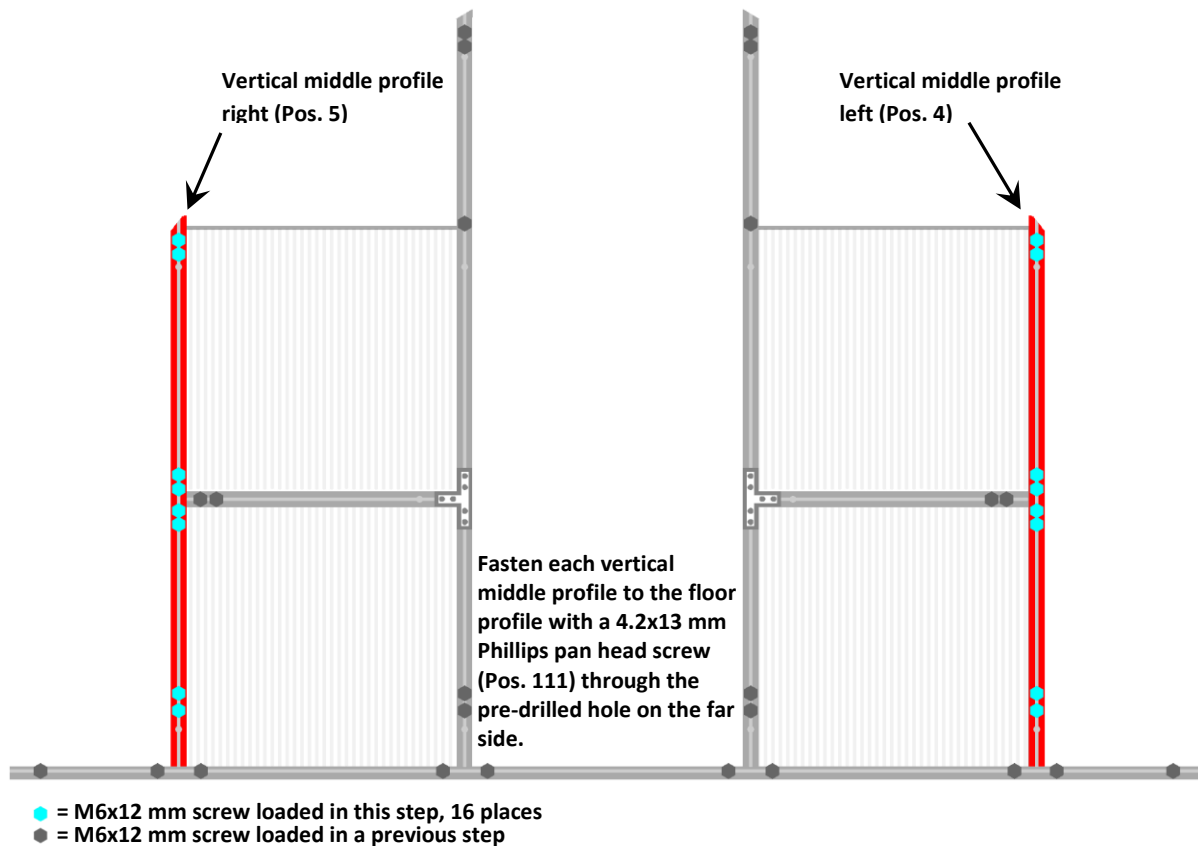


Parts required

2	Pos. 103	T-connector plate
2	(No Pos. #)	980 by 944 mm square glazing panel

- Install a T connector at each vertical-to-crossbar joint. Fasten in place with the M6 screws previously loaded into the profiles. Tighten the nuts finger tight at this time; they will be fully tightened in a later step.
- Place the glazing panels in position with edges in the retaining slots of the crossbars and vertical profiles. Orient the UV protected faces outward, which for this inside view is away from you.

Step 7 Vertical Middle Profiles



Parts required

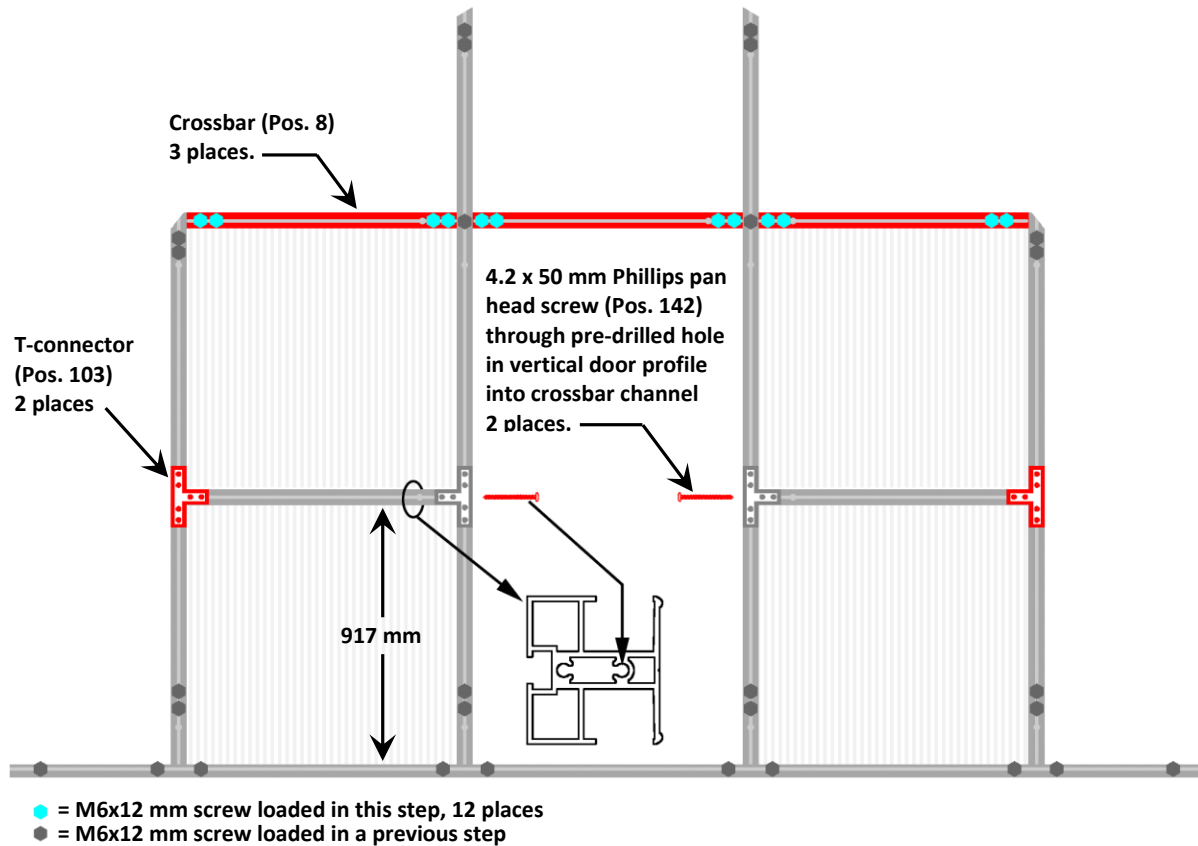
1	Pos. 4	Vertical middle profile, left
1	Pos. 5	Vertical middle profile, right
16	Pos. 107.12	M6x12 mm hex head cap screw with nut
2	Pos. 111	Phillips pan head screw, 4.2x13 mm

- Load the vertical middle profiles with M6x12 mm screws as shown.
- Engage the left and right vertical middle profiles into the floor profile and slide into position, aligning the pre-drilled holes in the profiles.
- Secure each vertical middle profile to the floor profile with a 4.2x13mm Phillips pan head screw driven through the pre-drilled holes.



IMPORTANT: A vertical profile engaged with a floor profile must be braced against tipping to prevent deforming both profiles.

Step 8 T-connectors and Upper Crossbars (3, 4, & 5 of 5)

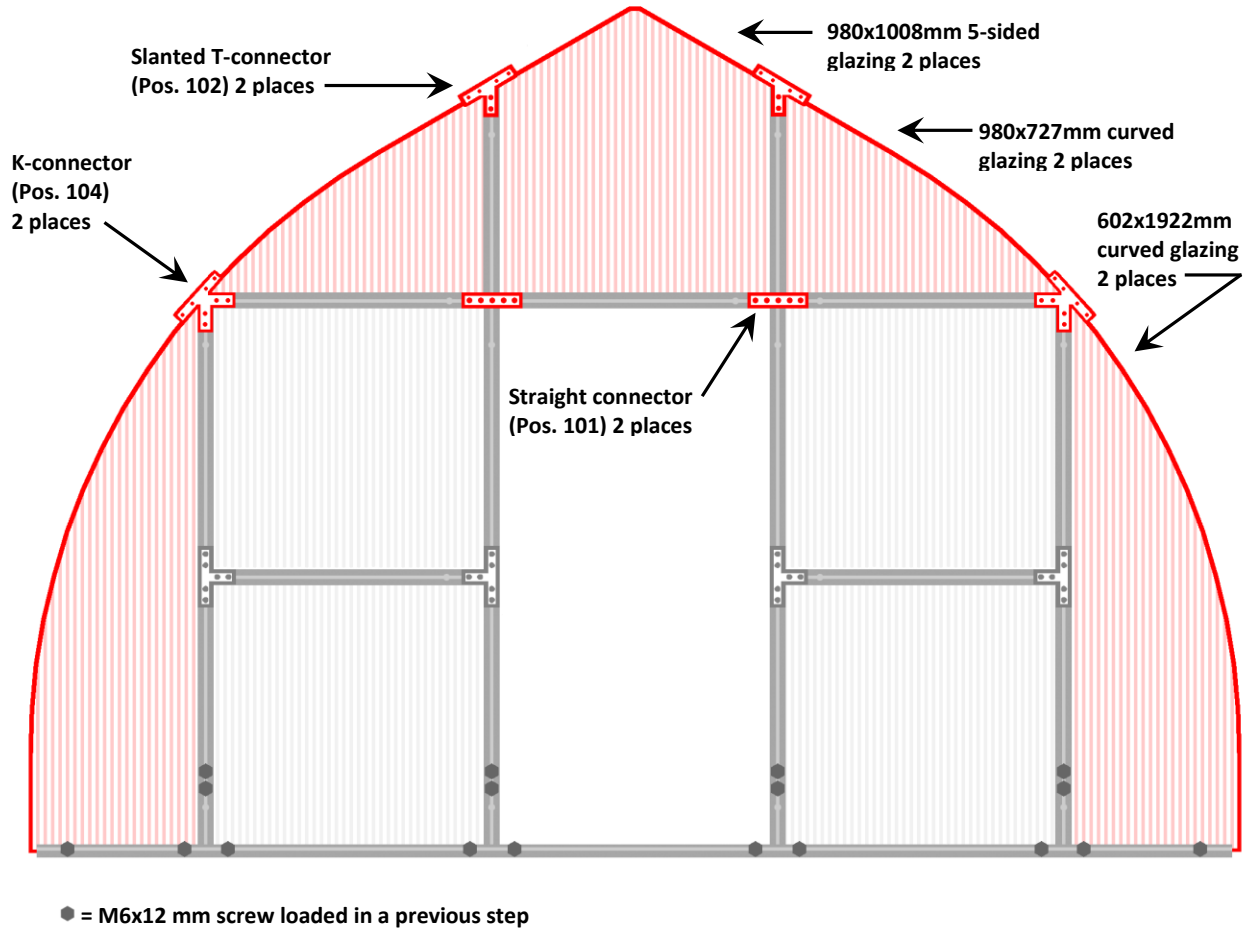


Parts required

12	Pos. 107.12	M6x12 mm hex head cap screw with nut
2	Pos. 142	Phillips pan head screw, 4.2 by 50 mm
3	Pos. 8	Crossbar
2	Pos. 103	T-connector plate

- Drive a 4.2 by 50 mm Phillips pan head screw through each vertical door profile into the crossbar.
- Install a T connector at the junction of each vertical middle profile and its lower crossbar.
- Load three upper crossbars with screws as shown and set in place.

Step 9 Curved & 5-sided Glazing, Straight, K, and Slanted T-connectors

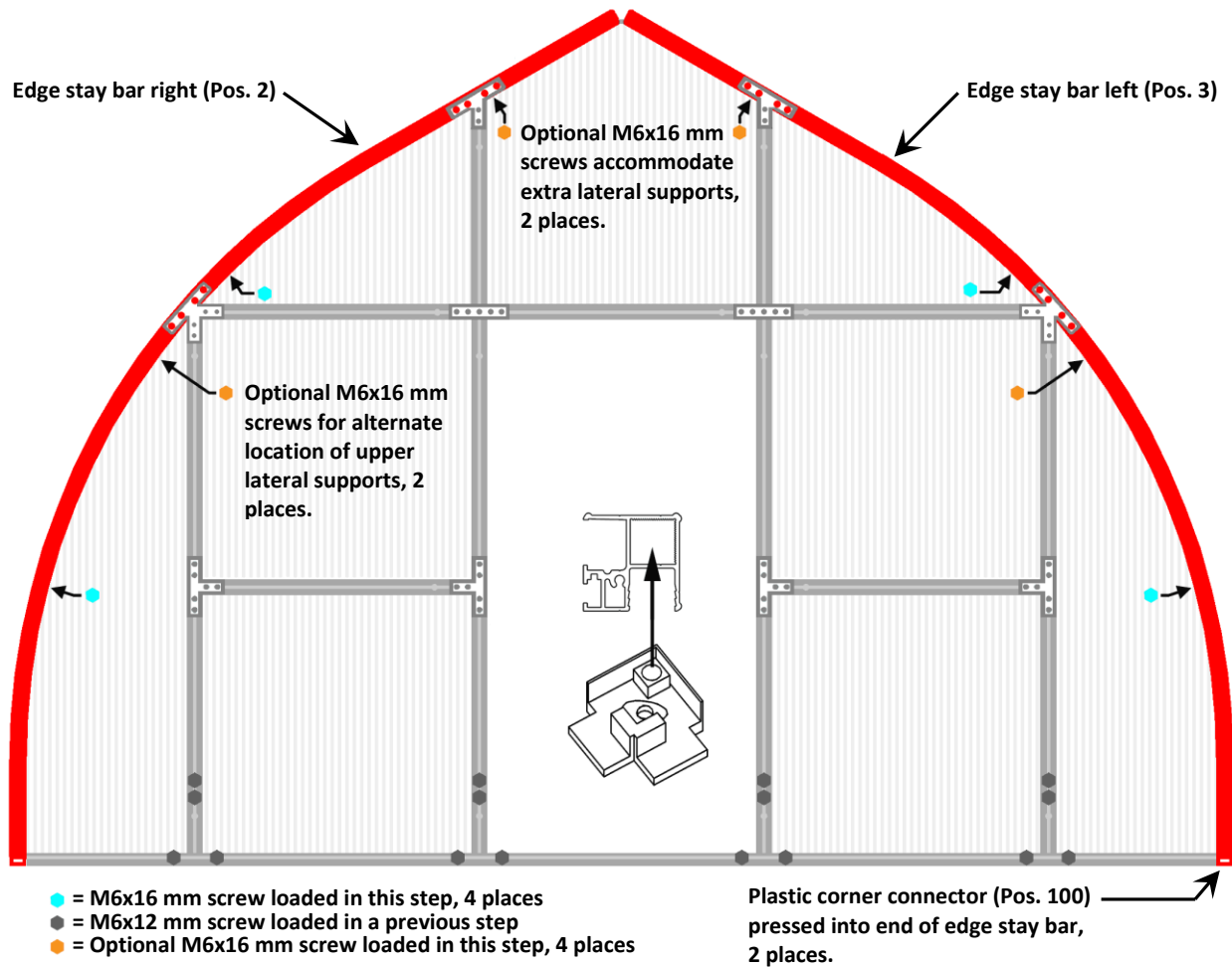


Parts required

2	Pos. 101	Straight connector plate
2	Pos. 102	Slanted T-connector plate
2	Pos. 104	K-connector plate
1	(No Pos. #)	602 by 1922 mm curved glazing panel, left
1	(No Pos. #)	602 by 1922 mm curved glazing panel, right
1	(No Pos. #)	980 by 727 mm curved glazing panel, left
1	(No Pos. #)	980 by 727 mm curved glazing panel, right
1	(No Pos. #)	980 by 1008 mm 5-sided glazing panel

- Install the straight connector plates, then the K connector plates, and finish with the slanted T connector plates. Confirm that the crossbar ends are in intimate contact with their corresponding vertical profiles, and then fasten with the previously loaded M6x12 screws.
- There is a left and a right version of each curved glazing panel so that all can be installed with the UV-protected side outward. Place the curved panels and the 5-sided panel in their cells with the UV protected side outward, which as viewed in the drawing is away from you.

Step 10 Edge Stay Bars with Pressed-on Plastic Corner Connectors



Parts required

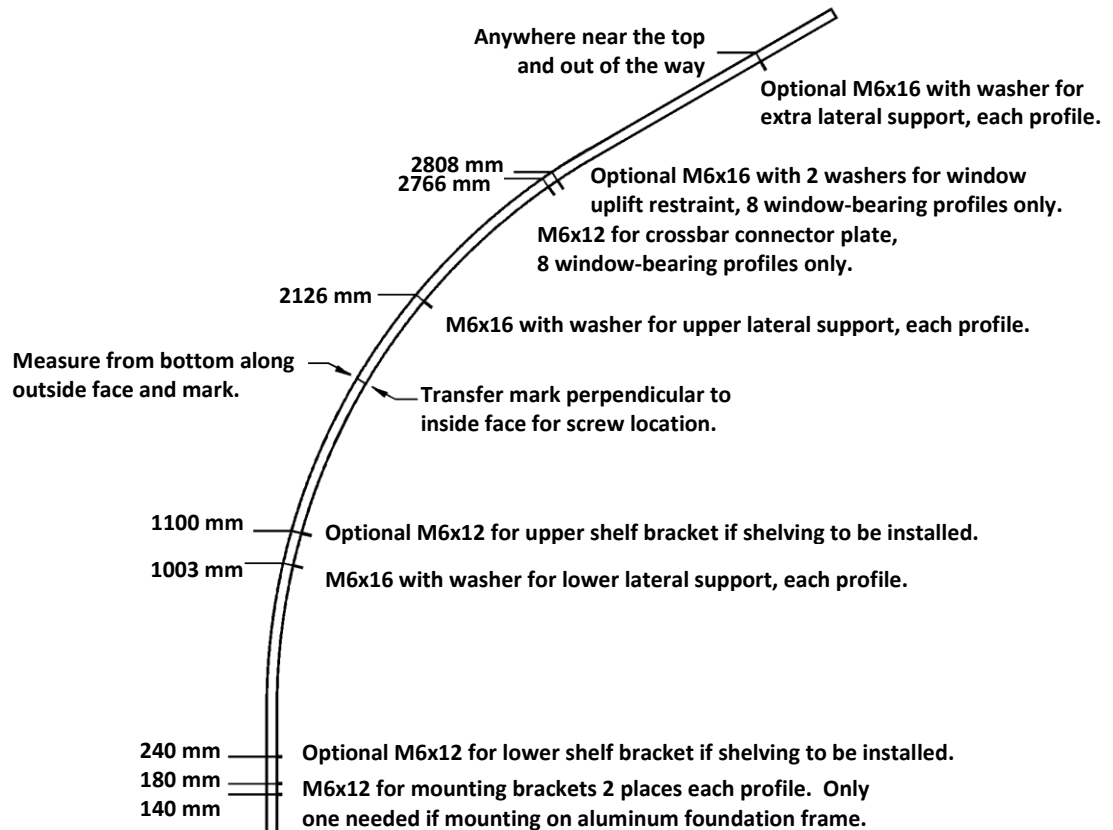
1	Pos. 2	Edge stay bar, curved, right side
1	Pos. 3	Edge stay bar, curved, left side
2	Pos. 100	Plastic corner connector
2	Pos. 105	Floor profile connector
16	Pos. 118	3.5 x 13 mm self-drilling Phillips pan head screws
4	Pos. 107.16	M6x16 hex head cap screw with nut
4	Pos. 107.16	Optional M6x16 hex head cap screw with nut



WARNING! You must engage the roof beam or a Roof Beam Fitment Tool before driving the self-drilling screws.

- Attach a floor profile connector at each end of the floor profile using pre-loaded M6x12 screws.
- Load M6x16 screws into each edge stay bar as shown and optional screws as needed.
- Install a plastic corner connector on the lower end of each edge stay bar (see detail in drawing).
- Place the edge stay bars into position with plastic corner connector engaged in the floor profile.
- Fasten edge stay bars to K and slanted T connectors with 3.5 x 13 mm self-drilling screws.

Step 11 Load Screws in the Curved Center Profiles



Parts required

10	Pos. 19	Curved center profiles
20	Pos. 107.16	M6x16 hex head cap screw with nut
28	Pos. 107.12	M6x12 hex head cap screw with nut
20	Pos. 108	M6 flat fender washer for lateral supports
10 max	Pos. 108	Optional M6 flat fender washer for extra lateral supports
16 max	Pos. 108	Optional M6 flat fender washer for uplift restraint
8 max	Pos. 107.16	Optional M6x16 hex head cap screw with nut for uplift restraint
10 max	Pos. 107.16	Optional M6x16 hex head cap screw with nut for extra lateral supports
20 max	Pos. 107.12	Optional M6x12 hex head cap screw with nut for shelf brackets

Eight of the ten profiles will support one side of a roof window and must be loaded with all of the screws shown. Omit the screws at 2766 and 2808 mm for the remaining two profiles.



The screws at 240 mm, 1100 mm, 2808 mm, and near the top are optional fastening points. You may omit these screws for any options you don't intend to install.

- Measure along convex face and mark the locations.
- Transfer marks to concave face.
- Load each screw at its approximate location, including washers if specified.
- Lightly tighten nut to hold in place.

Step 12 Prepare the Floor Profiles, Crossbars, and Roof Beam

Parts required

2	Pos. 18	Side floor profiles
1	Pos. 1	Gable floor profile
4	Pos. 25	Crossbar
1	Pos. 28	Roof beam
1	Pos. 31	Roof beam reinforcement bar
32	Pos. 107.12	M6x12 hex head cap screw with nut
8	Pos. 107.16	M6x16 hex head cap screw with nut



If your Riga will be anchored to the substrate with wedge anchors or other non-removable please read “Anchoring to Concrete” in the Supplemental Information section at the end of this document.

Measure and mark the floor profiles and roof beam reinforcement bar

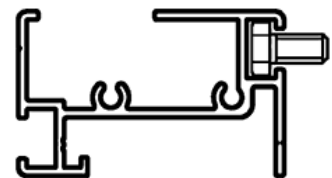
Installing the curved center profiles (arches) is easier if you know exactly where to place them. Precise index marks on the side floor profiles and roof beam reinforcement bar make this possible. The floor profiles and the reinforcement bar differ slightly in length so the measurement values are slightly different.

Measuring from one end, place marks at the distances shown in the instructions below. Then measure from the other end and mark again. Use the midpoint between marked pairs if they differ by 2 mm or less. If the marks are farther apart than 2 millimeters, there may be a problem with the profile or with your measuring tape.

Use a framing square to extend each mark to all visible faces of the profiles so they can be seen from all directions. The curved center profiles will be centered on the marks.

Prepare the side floor profiles

- Measure and mark the side floor profiles (Pos. 18) at 960, 1955, 2950, 3945, and 4940 millimeters.
- Load twelve M6x12 cap screws into the inside capture slots of each side floor profile. Position a screw 55 millimeters to either side of each mark to fasten a mounting bracket, and one at each end to fasten a floor profile connector. Put a nut on each screw and tighten it to keep it in place.



Temporarily prepare the south gable floor profile

- You will fully load the south gable floor profile (Pos. 1) when you return to Step 3 to build the second gable. For now, just load a single M6x12 cap screw near each end so you can later attach floor profile connectors (Pos. 105) to help position the side floor profiles.

Prepare the roof beam reinforcement bar

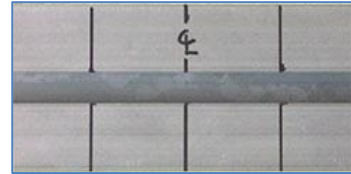
- The reinforcement bar (Pos. 31) is bound to the roof beam (Pos. 28). Measure and mark the reinforcement bar at 990, 1985, 2980, 3975, and 4970 millimeters.



No screws need to be loaded into the reinforcement bar unless you expect to install equipment on it for plant support or other purposes.

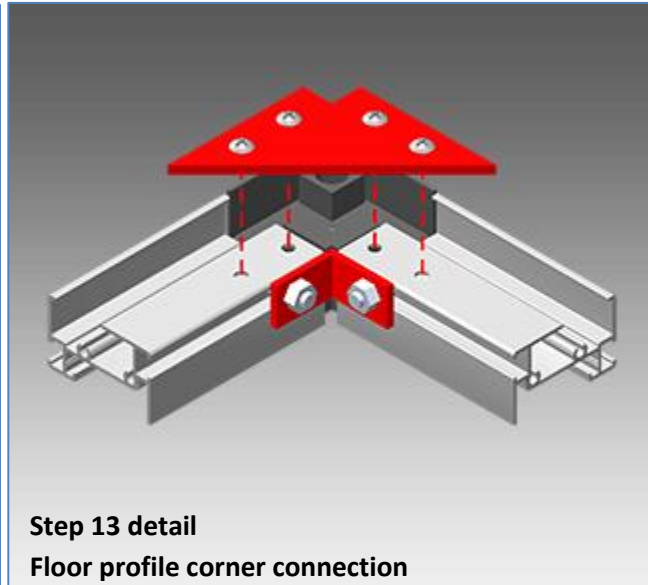
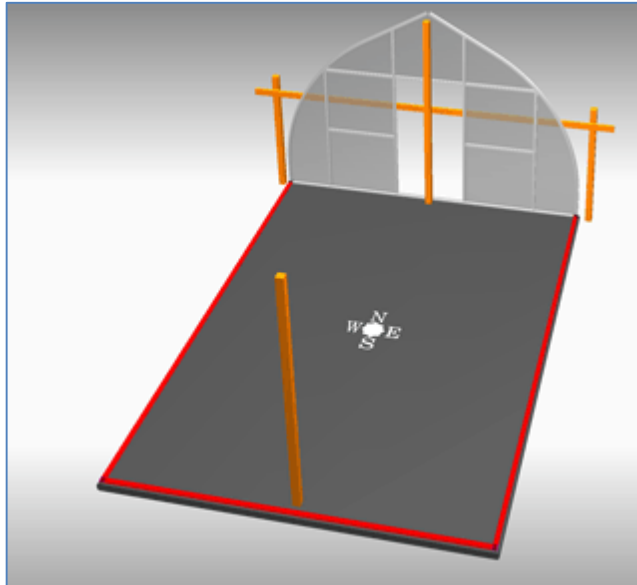
Prepare the window opening crossbars

Measure and mark the center of each crossbar (Pos. 25). Place additional marks 24 millimeters each side of the center mark. These show the position for the lower mounting foot of the automatic window opener.



- Load two M6x16 screws into each Pos. 25 crossbar, placing them near the marks. These will fasten a window opener. Stow a nut on each screw and tighten to retain its position.
- Load two M6x12 screws into each Pos. 25 crossbar, placing them near the ends. These will fasten the connector plates. Stow a nut on each screw and tighten to retain its position.

Step 13 Set the Floor Profiles



Step 13 detail
Floor profile corner connection

Legends for steps 13 through 19

For reference, consider the greenhouse to be oriented as shown by the compass rose. The work of each step is highlighted red and reverts to gray tones in subsequent steps.

Parts required

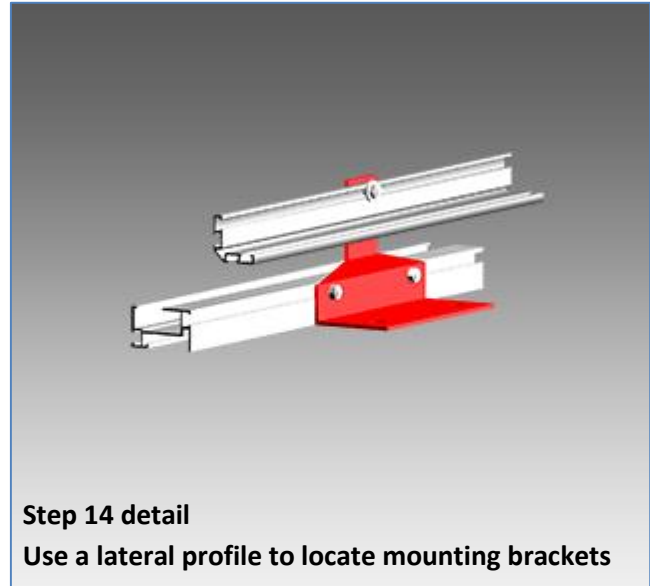
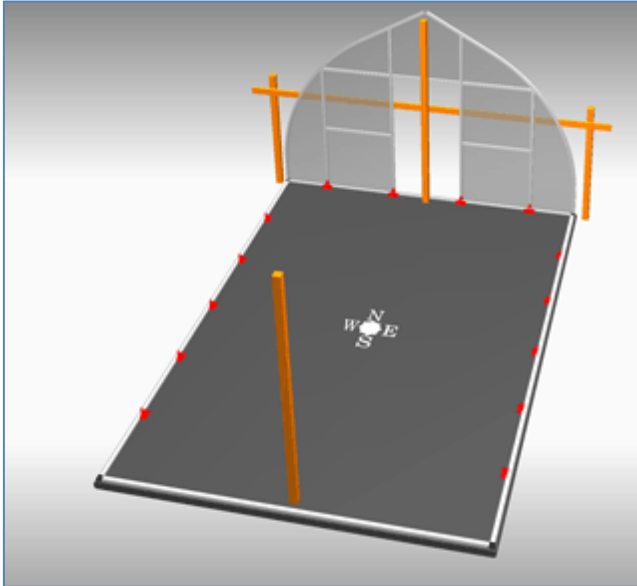
2	Pos. 18	Side floor profile
1	Pos. 1	Gable floor profile (for south end)
2	Pos. 100	Plastic corner connector (for south end)
2	Pos. 105	Floor profile connector (for south end)
2	Pos. 116	Floor profile corner connector cover (for north end only)
8	Pos. 113	4.8 x 16 mm Phillips pan head screw



The need for the south gable floor profile is temporary. If you decide to defer Step 14 (coming up next), you can omit the south gable floor profile and its corner connector parts from Step 13.

- Connect the side floor profiles to the north gable floor profile.
- Fasten the connection with the floor profile connectors and M6 screws and nuts but do not fully tighten the nuts. Some adjustment may be necessary.
- Install the corner connector covers and adjust so the cover holes align with the holes in the floor profiles, then fasten the cover with 4.8 x 16 mm Phillips pan head screws.
- Tighten the M6 nuts to secure the floor profile connector
- Using two additional plastic corner connectors, connect the south gable floor profile to the side floor profiles. Secure the connections with floor profile connectors. Corner connector covers are not needed for the south corners at this time.

Step 14 Install the North, East, and West Mounting Brackets



Step 14 detail
Use a lateral profile to locate mounting brackets



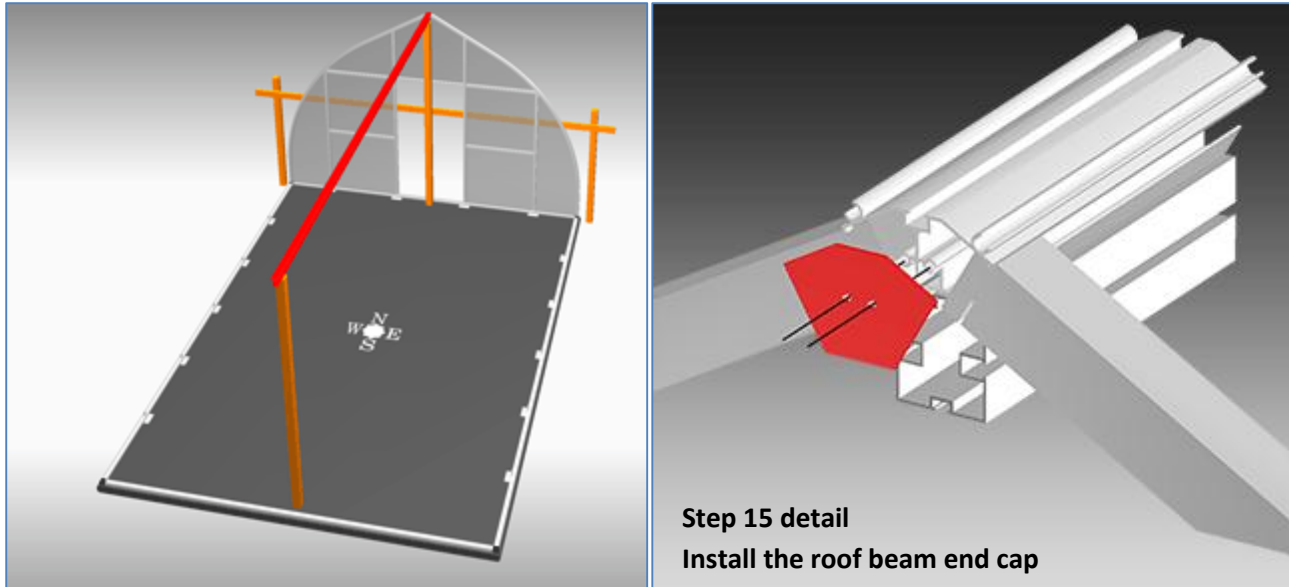
***Proceed with this step only if your substrate is square, flat, and true.
You must maintain the floor profiles square and straight throughout anchoring process.
Your anchoring method must allow the bracket to be loosened or removed.
Please read “All About Anchoring” in the SUPPLEMENTAL INFORMATION
section of this document before you proceed with Step 14.***

Parts required

14	Pos. 6.7	Mounting bracket
1	Pos. 22	Lateral support
28		Anchor

- Align the four floor profiles perfectly square on the substrate. The profiles must not be bowed.
- Install the four north gable mounting brackets first. Fasten a bracket to each vertical profile and to the floor profile with the M6x12 screws that were loaded in Step 12.
- At each position, restrain the bracket and drill perfectly plumb holes through the bracket holes into the substrate. Install the anchors, and then proceed to the next bracket.
- For the east and west sides, temporarily fasten lateral supports to the gable edge stay bars. Then fasten a bracket to each of the pre-drilled holes in the lateral supports, and to the floor profile with the M6x12 screws that were loaded in Step 12.
- Start with the bracket most distant from the gable. Restrain the bracket to prevent movement and drill through the bracket holes. Install the anchors, and then proceed to the next bracket
- Remove the lateral supports, the south gable floor profile, and the south plastic corner connectors after all brackets are anchored. The south gable mounting brackets will be installed in Step 18 after the gable has been joined to the side walls.

Step 15 Set the Roof Beam



Parts required

1	Pos. 28	Roof beam
1	Pos. 31	Reinforcement bar engaged with roof beam and previously marked in Step 12
1	Pos. 114	Roof beam end cap cover (plate)
2	Pos. 111	4.2 x 13 mm self-tapping Phillips head screws



If in Step 10 the edge stay bars were not fastened to the K and slanted T connectors, fasten them in this step after the roof beam is engaged. Confirm that all profiles are plumb, square, and properly aligned. Clamp the edge stay bars to keep them in intimate contact with the vertical profiles, and then drive the self-drilling screws.

- Hoist the roof beam and reinforcement bar assembly into place on the supports and confirm that the two pieces are evenly aligned.
- Engage the roof beam into the gable edge stay bars (curved profiles). The north end of the beam must be flush with the outer face of the edge stay bars.
- Secure the roof beam end cap cover to the end of the beam with the 4.2 x 13 mm screws.



If a Roof Beam Fitment Tool is not available you must build the second gable before proceeding to Step 16. This is because you must use the unencumbered roof beam before any side wall arches or glazing are in place.

Step 16 Assemble the Side Walls

Introduction to Step 16

Step 16 is implemented in 26 individual operations numbered Step 16.01 through Step 16.26. Each operation is illustrated with a drawing. It is important that you perform these operations in order.

The following terms are used to describe the operations of Step 16:

1. **Arch** is a short name for a curved vertical profile. The arches occur in east-west pairs numbered 1 through 7 counting from north to south. The arches of the north gable are named 1E and 1W, and the arches of the south gable are named Arch 7E and Arch 7W.
2. **Bay** is the space between two consecutive arches. Every bay is occupied by a glazing panel, and in four instances by a roof window above the panel. Bays occur in east-west pairs numbered 1 through 6 from north to south and are named for their count position. For example the first bay against the north gable on the east side is named Bay 1E.
3. **Glazing** is a 980-millimeter wide triple-wall polycarbonate panel that occupies a bay. Glazing is held in place by arches on each side, a floor profile at the bottom, and either a crossbar or the roof beam at the top. Eight of the glazing panels are 3893 millimeters long and extend from the floor profile to the roof beam. Glazing panels in bays 2W, 3E, 4W, and 5E are only 2830 millimeters long and do not reach the roof beam, so they are installed with a crossbar between the arches to retain the top edge. The bay space from the crossbar to the roof beam is occupied by a roof window. Glazing is named after the bay it occupies; for example the panel that occupies the space in Bay 1E is named Glazing 1E.
4. **Crossbar** is a straight aluminum profile with a slot into which fits the top edge of a 2830 millimeter glazing panel. A crossbar fits perfectly between two arches and each end is fastened to an arch by a connector plate and two captive M6x12 screws. A crossbar is named after the bay it occupies, so Crossbar 2W will be found in Bay 2W.
5. **Window** is a roof window joined to the roof beam by an integral hinge. Windows are normally installed in bays 2W, 3E, 4W, and 5E and are named after the bay they occupy. A window is installed by engaging it at one end of the roof beam and sliding it into position.



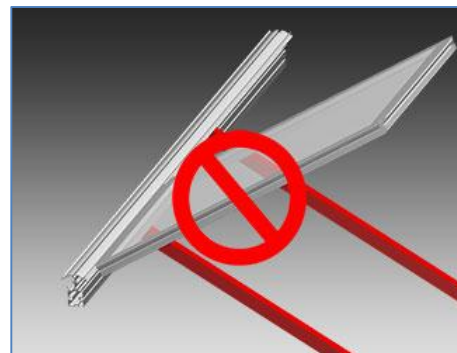
The Window Installation Rule

It is difficult to pass a window over arches but almost impossible if glazing is present. When sliding a window into position there must be no curved profiles or glazing in its path. Install a window in its bay before the bay is completed with a second arch.



Watch a time-lapse video to see how the Window Installation Rule was discovered.

<http://www.youtube.com/watch?v=KgCiE8ZWdow>



General instructions for Step 16

Parts required for Step 16

10	Pos. 19	Curved center profile, previously loaded with screws in Step 11
4	Pos. 25	Crossbar, previously marked and loaded with screws in Step 12
8	Pos. 115	Connector plate for crossbar
4		Roof window, previously assembled and sealed in Step 1
4		Glazing panel for windowed bays, 980 x 2830 mm
8		Glazing panel for non-windowed bays, 980 x 3893 mm

Apply the instructions below as you follow the pictorial guide for Steps 16.01 through 16.26.

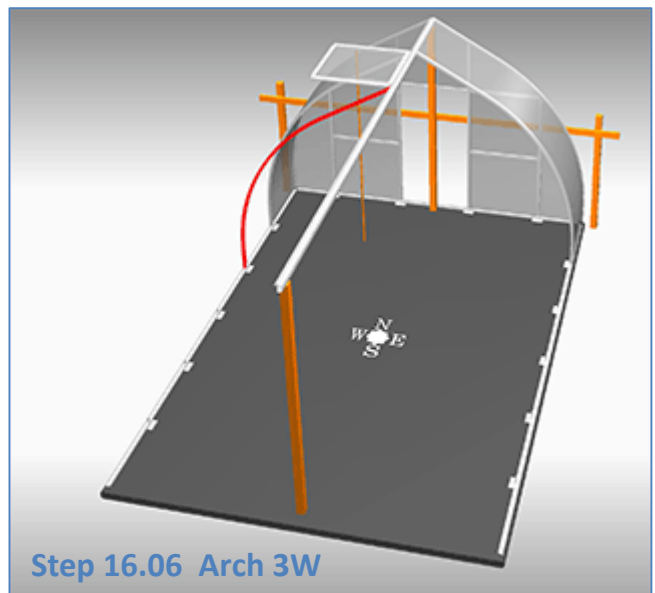
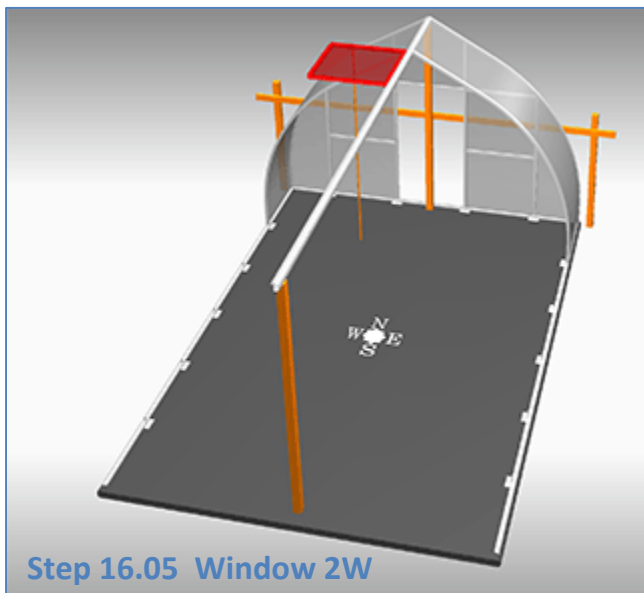
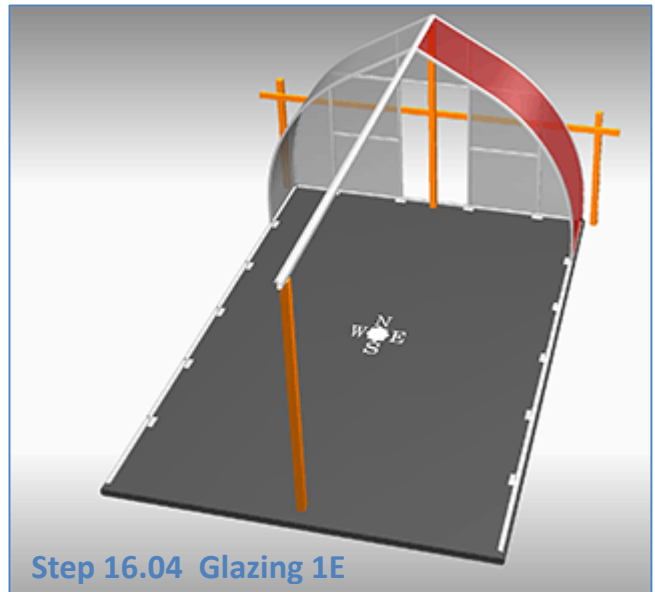
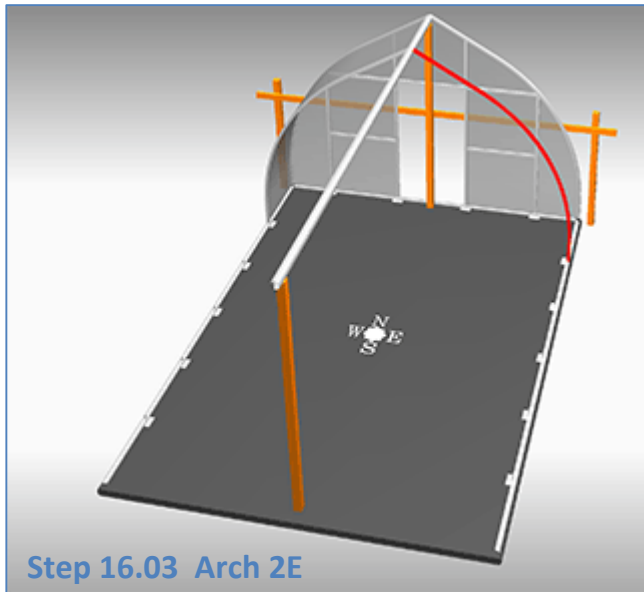
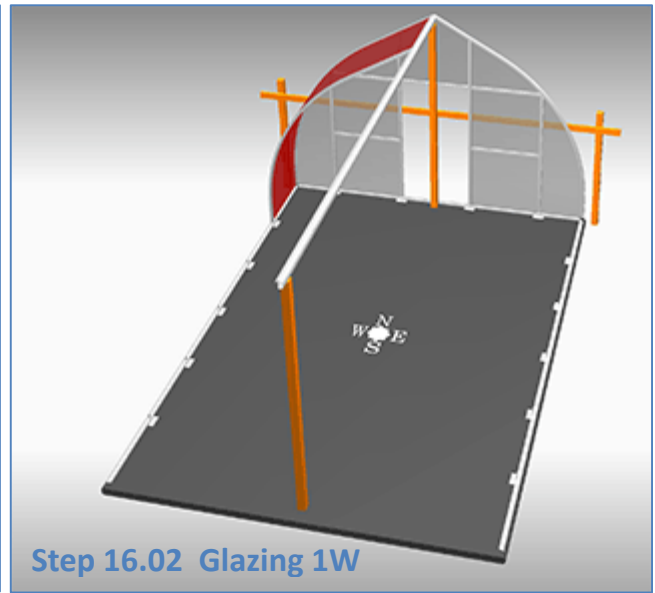
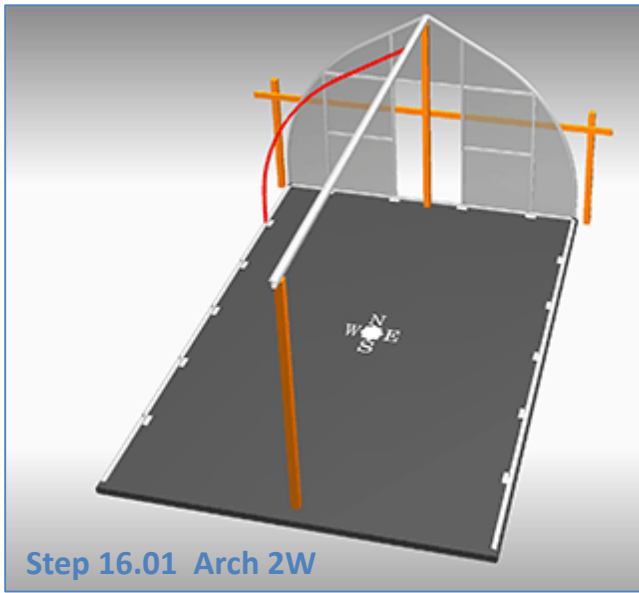


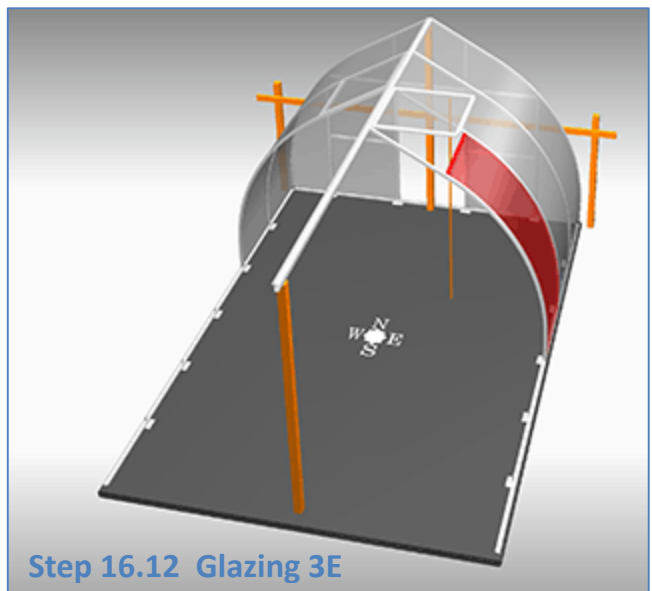
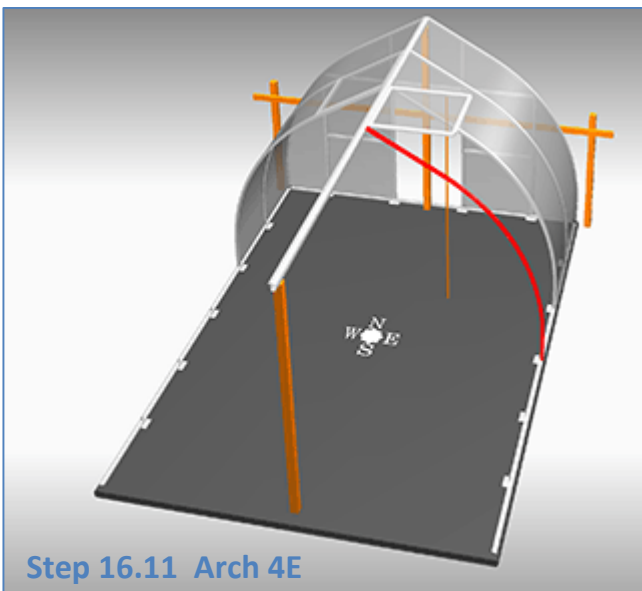
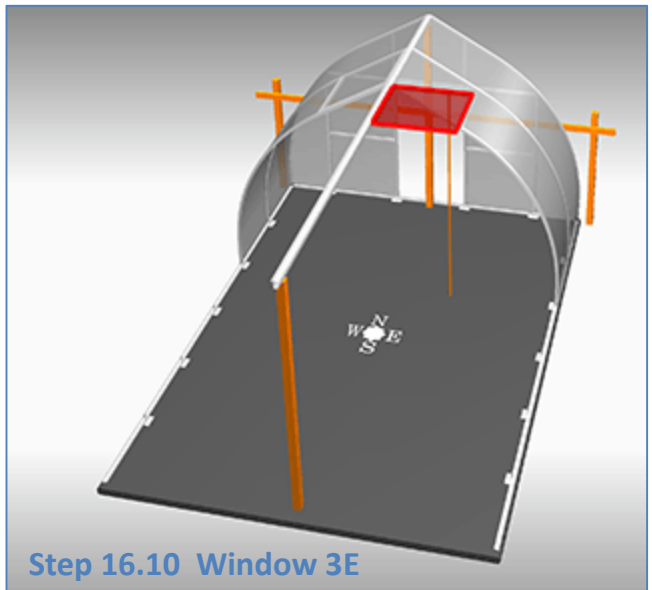
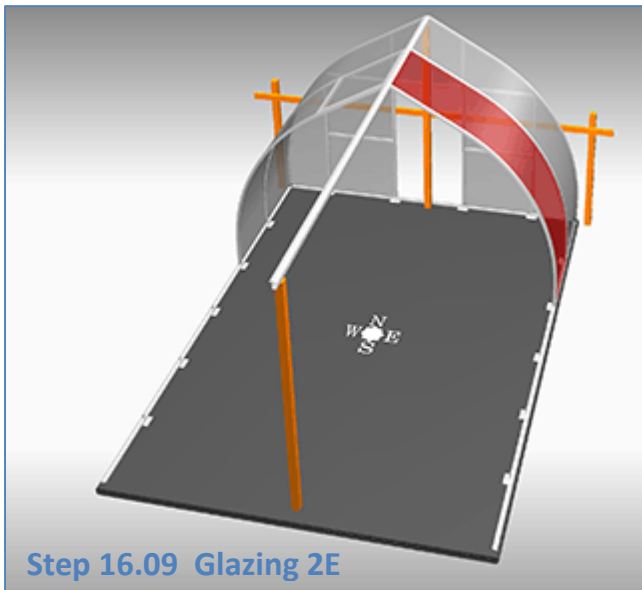
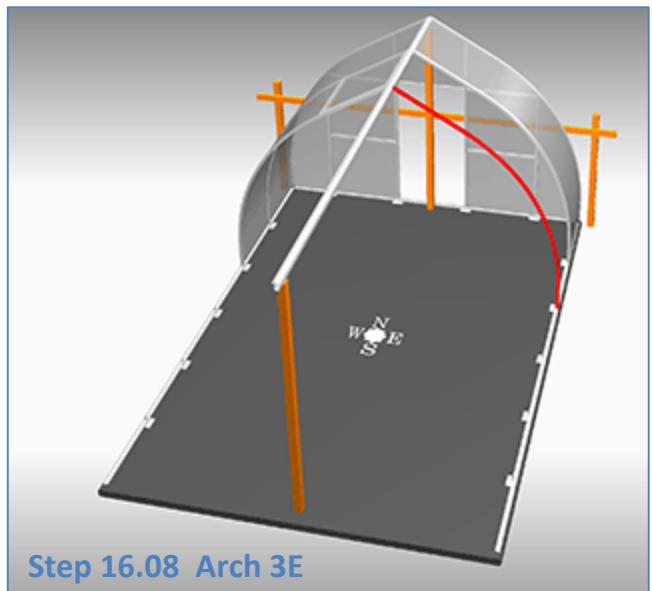
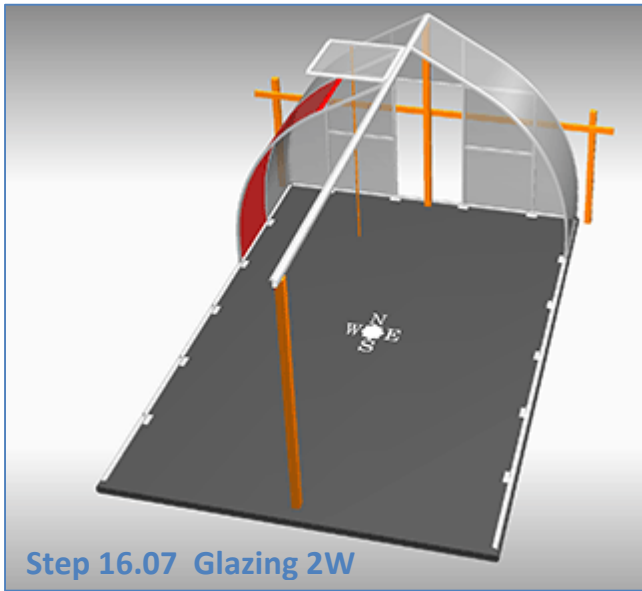
Force should not be needed to move components! Gentle taps with a rubber mallet are acceptable but heavy blows will disrupt the alignment of other components. If you perceive a need for high force you have done something wrong. Stop immediately and solve the problem.

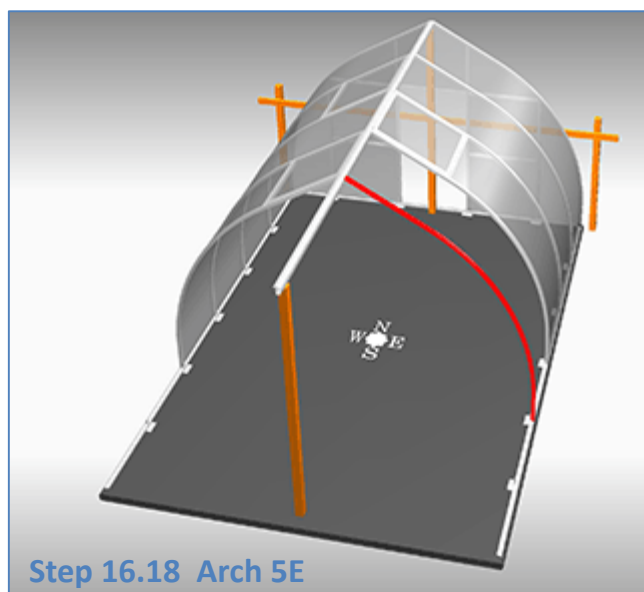
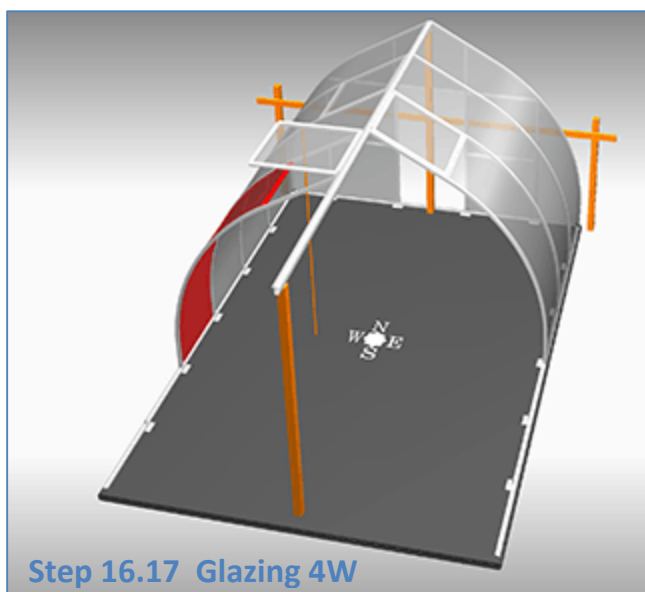
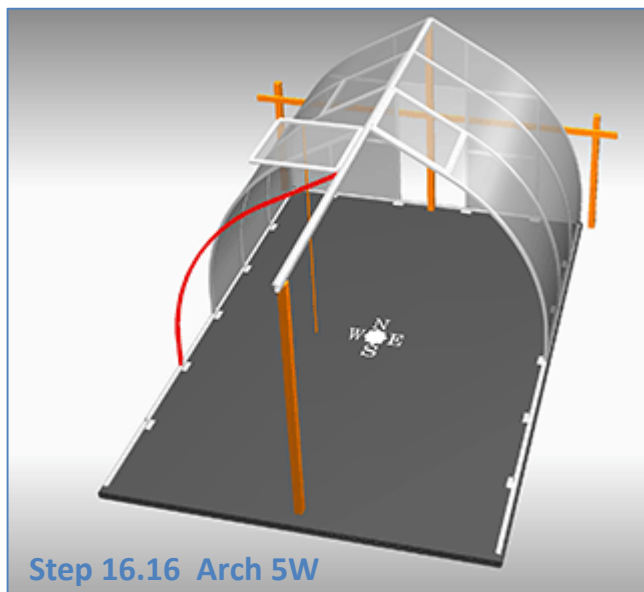
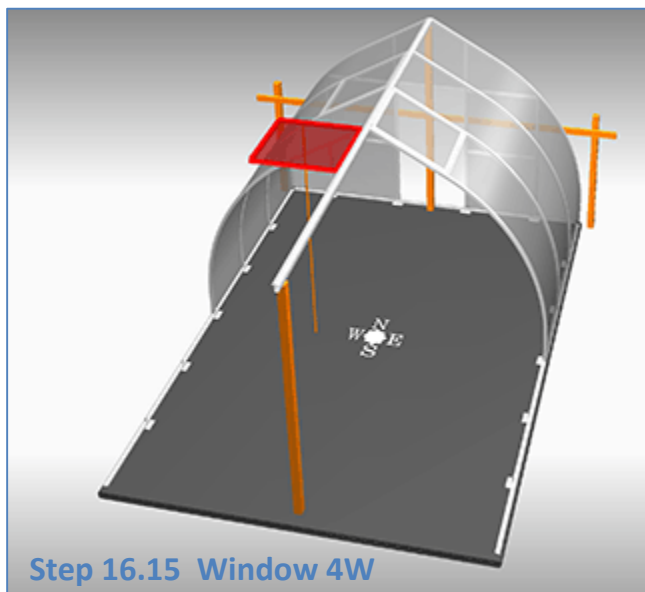
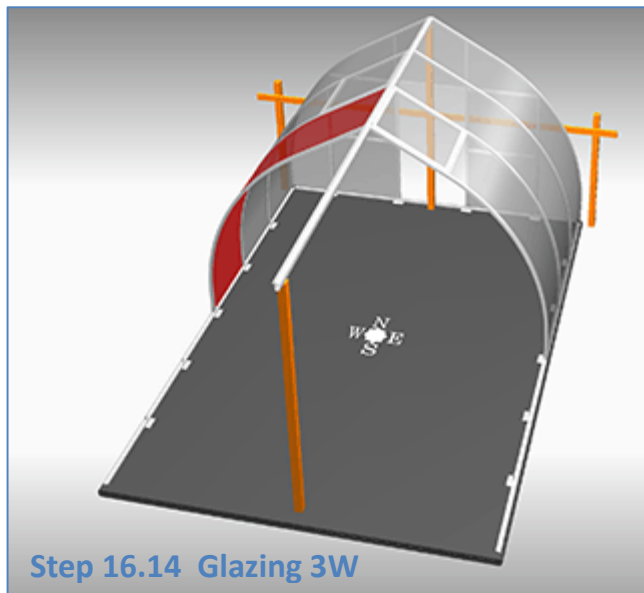
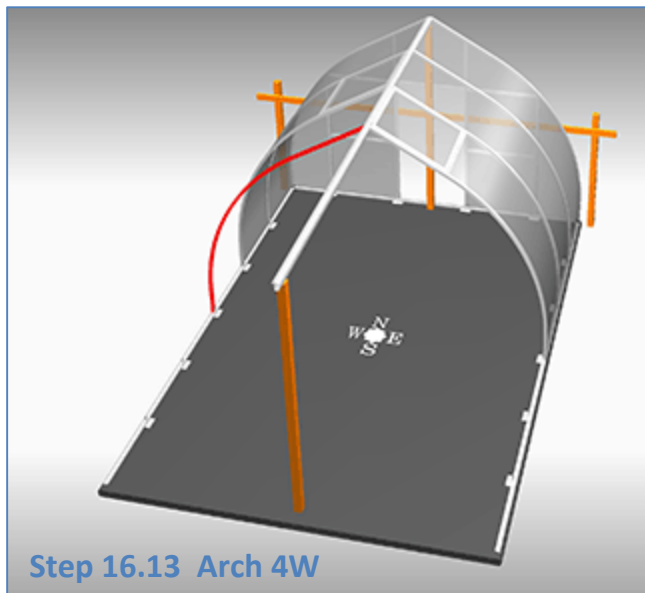
- **To install an arch:** Engage the lower end of the arch with the floor profile and the upper end with the roof beam. Gently slide the arch in small increments toward its position, keeping the positions of upper and lower ends synchronized. You may need to loosen mounting brackets to make them easier to pass. Stop the arch 2 to 3 inches before its marked position to leave working space for glazing installation.
- **Install all glazing panels with the UV-protected face outward.**
- **If mounting brackets are present:** Remove them on both sides of a bay before installing glazing in that bay. While this is not technically necessary, it is a safety precaution. The brackets may damage the glazing if you should lose control of the panel and allow it to fall forward against them. After the glazing is in place, replace the brackets and fasten them to the floor profile and arches.
- **To install a 3893 mm full-length glazing panel:** Wear rubber-coated gloves to securely grip the glazing. Maneuver the upper glazing edge into the roof beam slot. Then lift up the lower end of the panel, bending the panel, and set the edge into the floor profile slot. Move the glazing and its south arch northward while threading the edges into the arch retention slots.
- **To install a 2830 mm reduced-length glazing panel:** Place the lower edge into the floor profile slot and place a crossbar on the top edge. Bend the panel to match the curvature of the adjacent arches and work the panel and arches northward, threading the glazing sides into the arch slots. Fasten the crossbar to the arches using connector plates and the M6 screws previously loaded in Step 12.
- **To install a window:** Be prepared to prop the window in a raised position before you release it to step down from the ladder. Engage the window hinge in the roof beam's receiving channel at the south end and slide it northward. Then slide the window into position using the prop to maneuver it. Leave the window propped while the glazing panel and crossbar is being installed beneath it.
- **Remove the gable bracing and roof beam supports at the completion of Step 16.**

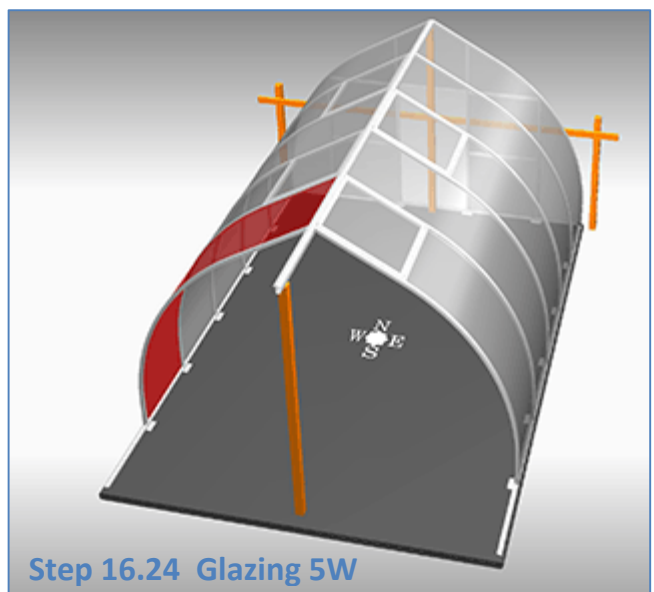
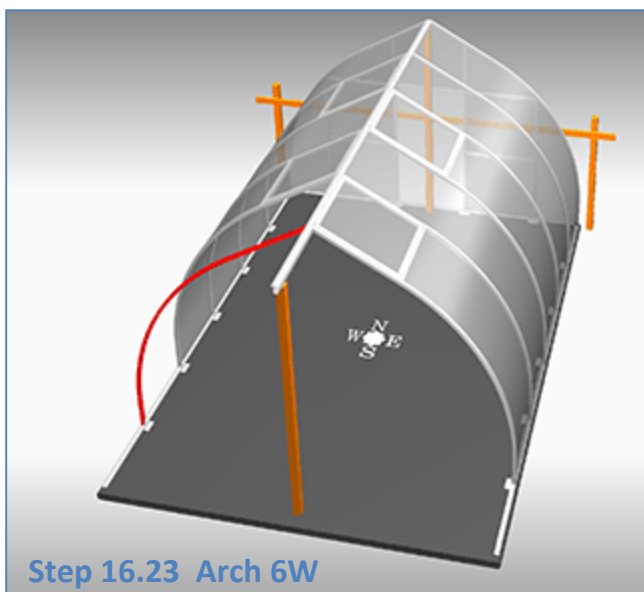
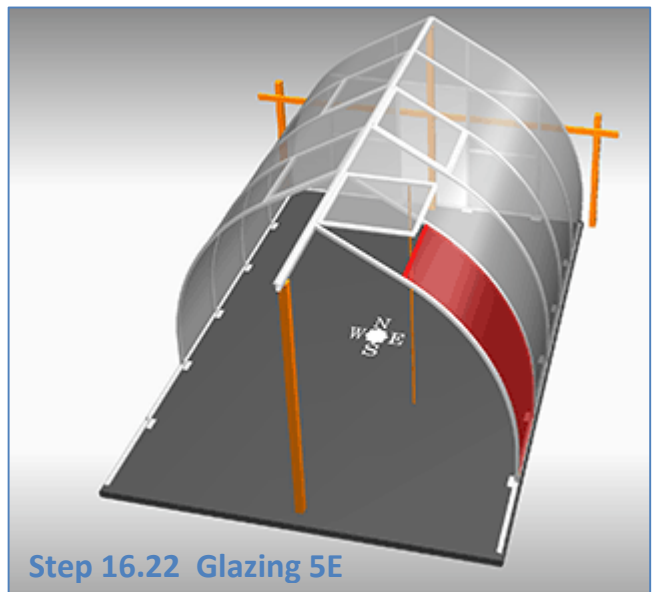
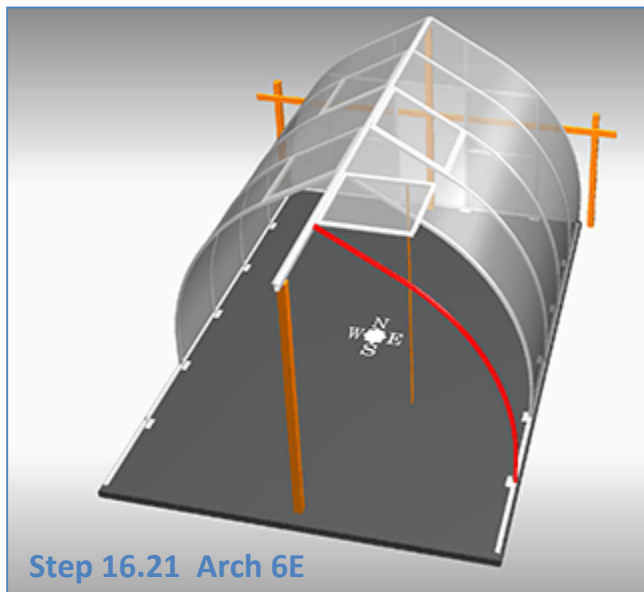
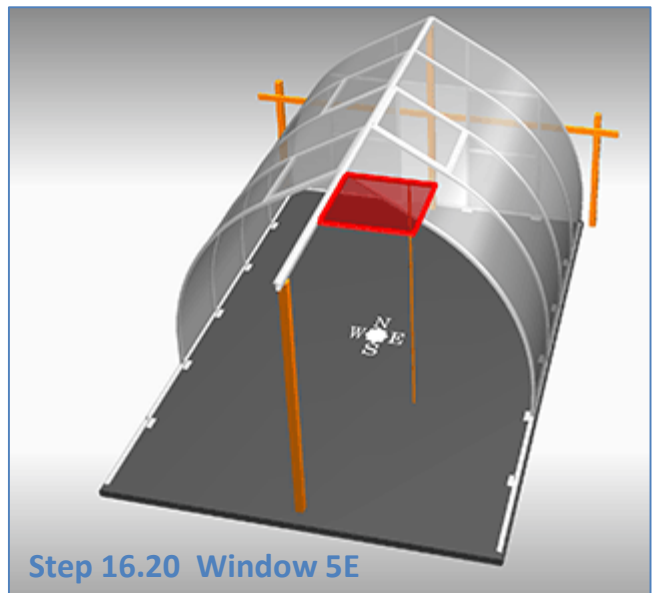
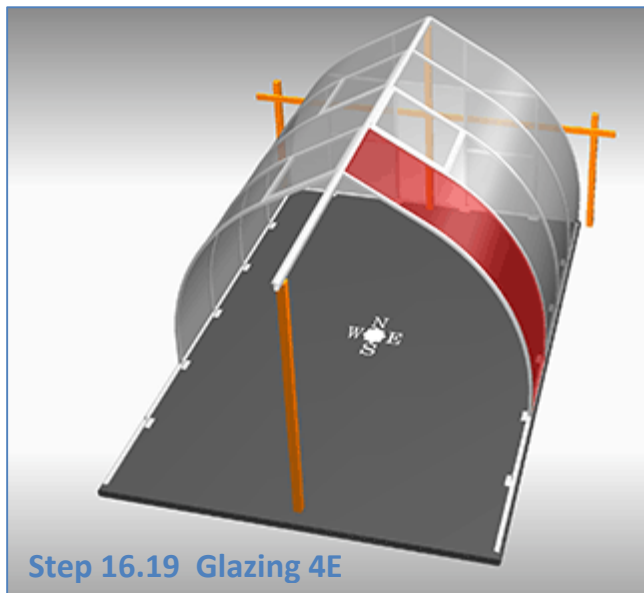


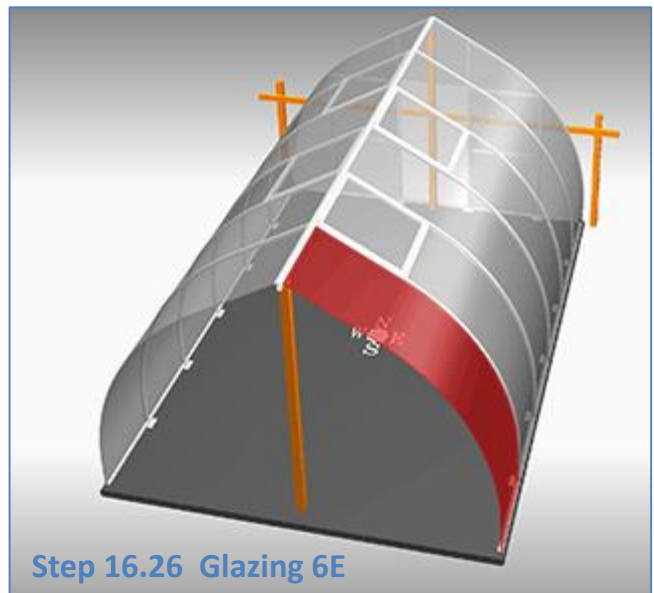
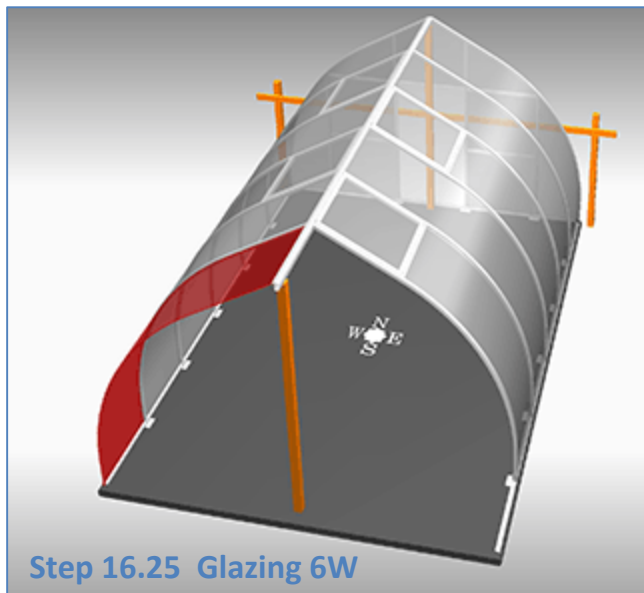
The 2830 millimeter glazing panels are very difficult to bend. You will need some form of assistance.











If your greenhouse is built on the optional aluminum foundation frame you must defer installing Glazing 6W and 6E until after the second gable is built (Step 17). If you are building on a wood or concrete substrate you may still find it more convenient to defer these. There will be more room to work around the gable.

Step 17 Assemble and Set the Second Gable

Parts required

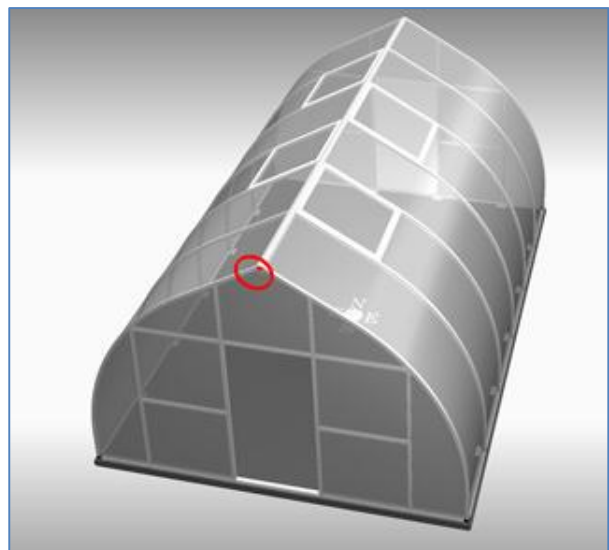
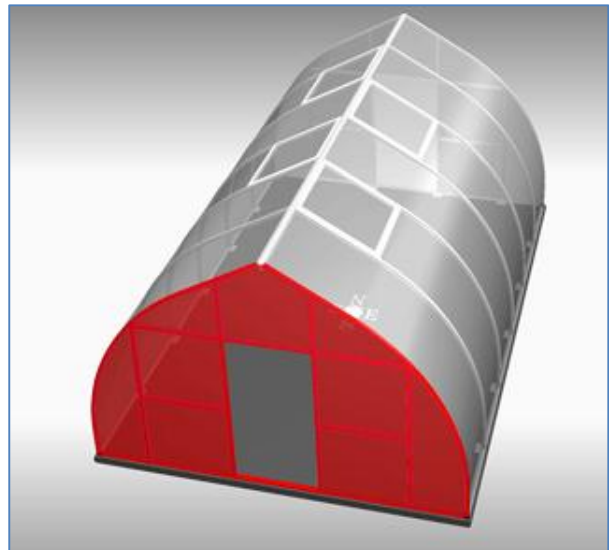
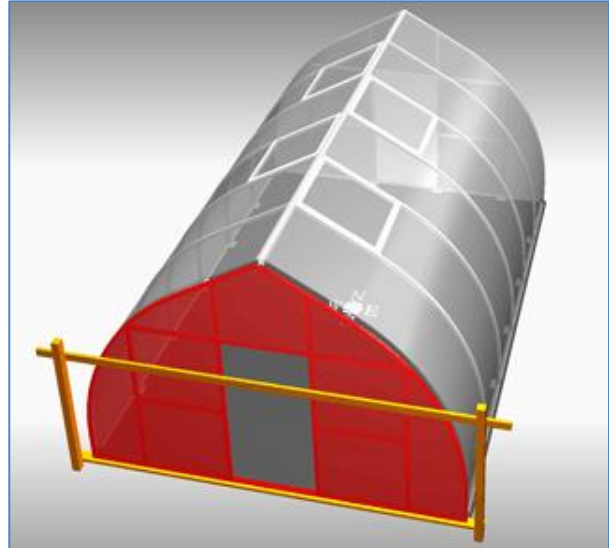
Completed gable per Steps 3 through 10

- 1 Pos. 114 Roof beam end cap cover
- 2 Pos. 111 4.2 x 13mm Phillips head screw
- 2 Pos. 116 floor profile corner connector cover
- 8 Pos. 113 4.8 x 16 mm Phillips pan head screw

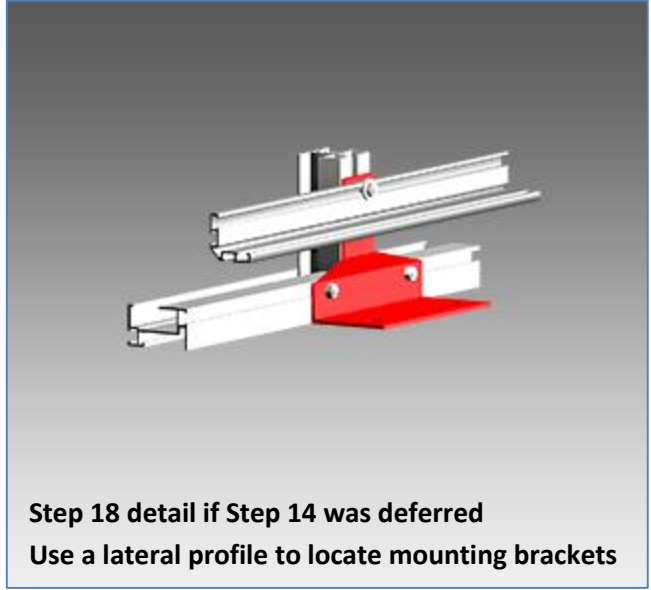
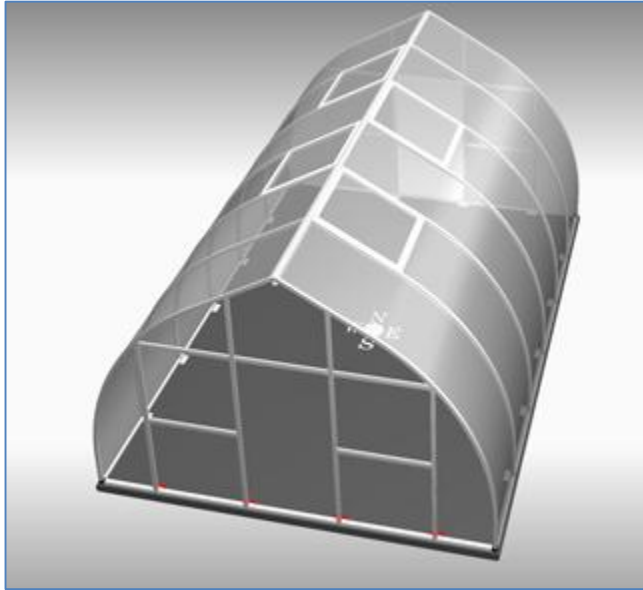
Build the gable about 3 inches south of its final position to allow working space. If your substrate is not long enough to support the displaced gable you must build temporary support into the bracing.

As you move the completed gable into position, join its plastic corner connectors to the side floor profiles and work upward as you thread the edges of Glazing 6W and 6E into the gable arch slots. Engage the arches with the roof beam when they have approached close enough. You can remove the bracing when the gable is securely in place.

Secure the roof beam end cap cover to the end of the beam with the 4.2 x 13 mm screws. Fasten the floor profile connectors (Pos. 105) and install the floor profile corner connector covers (Pos. 116), securing each with 4.8 x 16 mm Phillips pan head screw (Pos. 113).



Step 18 Install the South Gable Mounting Brackets



Parts required

4	Pos. 6.7	Mounting bracket
8		Anchor, 3/8 inch



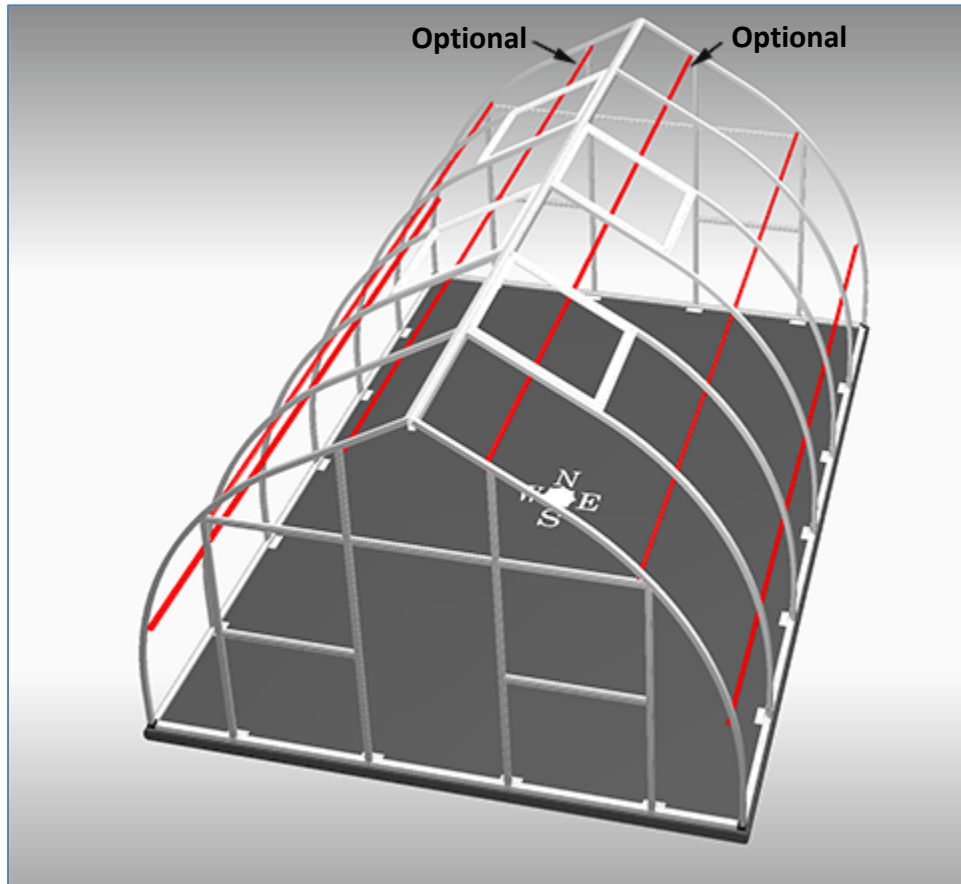
For the aluminum foundation frame use Pos. 6.4 hold down plates instead of mounting brackets.



If you deferred Step 14 (installing the north, east, and west mounting brackets) perform that step now. You will have to contend with the arches when you use the lateral profile to locate the bracket positions (see detail drawing above). Return here when finished and install the south gable mounting brackets.

- Precisely locate each mounting bracket and fasten it to the floor profile and to the vertical profile.
- Restrain the bracket; it must not move during drilling.
- Use the holes in the bracket to transfer-drill perfectly plumb holes in the substrate.
- Install the anchors and fasten down each bracket before moving to the next.

Step 19 Install the Lateral Supports



Parts required

4	Pos. 22	Lateral supports
2	Pos. 22	Optional extra lateral supports for lighting and plant support

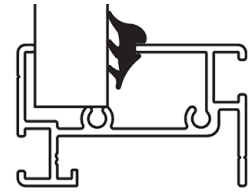


If an optional shelving kit will be installed the shelf height is fixed by the lateral support elevations. You may wish to adjust these elevations.

- Lower laterals should be at the approximate height of the lower gable crossbars and upper laterals at the approximate height of the upper crossbars. Optional extra laterals can be anywhere you wish, but are convenient just above the slanted T connectors.
- Stretch a gable-to-gable string between preloaded screws in the arches to mark elevations along all of the arches.
- M6x16 screws with nuts and washers have been preloaded into the arches.
- It may be necessary to adjust the position of some side wall arches to align with the pre-drilled holes in the lateral supports.

Step 20 Install Interior Seals

The interior insulation seal (Pos. 110) is delivered as two joined strands in a single coil. Its purpose is to seal the openings at the base of each glazing panel against debris and condensate that runs down the glazing surface. Segments are pressed into the floor profile slot between vertical profiles, fitting tightly against the inside face of the glazing. Separate the strands before starting.



- You may precut the seal if you wish, or cut as you finish each bay. You will need two different lengths if you precut. The wide bays of the side walls and gables are 952 mm and the smaller bays at the curved gable profiles are 571 mm. You should cut a little extra; 972 mm and 580 mm are recommended so you can compress the seal lengthwise as you press it into place. This will prevent the ends from pulling away from the vertical profiles during cold weather shrinkage.



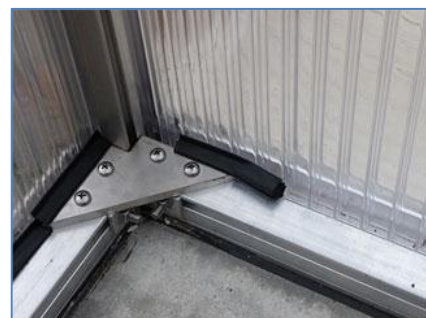
- Press the seal into the slot until the inside lip of the floor profile engages with the slot in the side of the seal. Pressing in over 60 feet of seal takes a toll on your fingers. Fashion a simple roll-in tool to provide some relief.



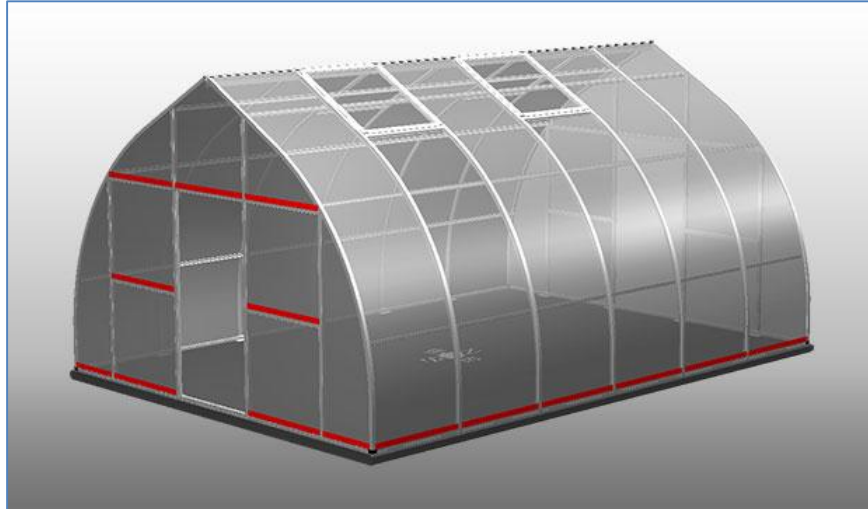
- Cut the seal about 12 mm long when you near the end of the bay if you have not already precut it. The extra material will provide some longitudinal compression. Each end of the seal should fit tightly against the vertical profile.



- It is more difficult to press seal behind the corner connector cover plates but it can be done. Try sliding the seal into place endwise instead of pressing down.



Step 21 Apply Exterior Sealant



Seal the bottom edge of every glazing panel. Mask with Scotch Blue painter's tape to form a bead on the glazing surface 3 to 5 millimeters wide from the profile edges. Apply the sealant and tool it to slope from glazing surface to profile edge. Allow it to cure for 24 hours before removing the tape.

Windows are sealed individually when they are assembled in Steps 1. Doors should be sealed after they have been hung and adjusted for proper fit in the doorway.



Sealant should have been applied to the ends of the window crossbars as they were installed. Minor leakage will occur if this was not done.



If you would like to defer sealing the exterior until better weather, apply 1-inch Scotch Blue painter's tape over the glazing interface to act as a flashing. It will last for months. For even longer life flash with aluminum foil tape.

Step 22 Hang the Doors

Parts required

8	Pos. 135	Hinge set
16	Pos. 140	Stainless 4.8 x 16 mm self-tapping Phillips flat head screw
16	Pos. 139	Stainless 4.8 x 25 mm self-tapping Phillips flat head screw
4	Pos. 136	Sash lock
8	Pos. 141	Stainless 3.5 x 22 mm self-tapping Phillips flat head screw
2	Pos. 150	Door lever set
2	Pos. 158	Two-part door holder set
4	REK	Double sided mounting tape, ¾ by 2 inch
4	REK	Stainless #8 x ¾ inch self-tapping Phillips flat head screw
4	REK	Stainless #10 x ¾ inch self-tapping Phillips pan head screw



When viewing the doors from outside the greenhouse, the latch side is left and the hinge side is right.

- Disassemble the hinge pairs by removing the pins.
- Fasten four hinge fixed parts to each right vertical door profile with 4.8 x 25 mm Phillips flat head screws driven into the pre-drilled holes. Tighten the screws.
- Fasten two hinge swinging parts to each door with 4.8 x 16 mm Phillips flat head screws driven into the pre-drilled holes. Leave the screws slightly loose.
- Engage each door to its respect hinge fixed parts and install the hinge pin to secure it. Then install the circlips to retain the pin.
- Tighten the screws that fasten the hinge swinging parts to the doors.
- Install one part of a door holder set on each door and its mate on the corresponding gable crossbar. Use #8 x ¾ inch Phillips flat head screws for the female part and #10 x ¾ inch screws for the male part.
- Install a door lever set in each upper door following the pictorial instructions included with the lever set.
- Fasten a sash lock to each door with 3.5 x 22 mm Phillips flat head screws.

Step 23 Install the Window Openers

Parts required

4 (No Pos.) Automatic window opener assembly



The window openers are easier to install if you temporarily remove the springs and leave the actuator detached. Washers are not called for, but ¼ inch stainless flat washers over the slots of the upper foot will make it easier to keep the foot in position while tightening the nuts.

Install each window opener by fastening one foot to the window's lower profile and the other foot to the crossbar immediately below. The mounting screws have been preloaded in Step 1 and the positions have been marked in Step 12.



Chill the actuator in a refrigerator for about 10 minutes to assure that it is fully retracted. Manually press the shaft as far as it will go into the cylinder, and then fully thread the actuator into the yoke on the mechanism. Raise the window as needed to align the hole in the shaft with that of the bushing and install the locking pin. Finish by replacing the springs.



The opening temperature is controlled by the distance you thread the cylinder into the yoke. Fully threaded, the window will open at the minimum temperature. Thread the cylinder farther out (anti clockwise) to raise the opening temperature.

INSTALL OPTIONS

Install the Optional Shelving

This preliminary information will be completed in a future release of this manual.



A new style shelf system for Riga greenhouses began shipping in 2012. The suspension chains of the older system have been replaced by brackets attached to the arches.

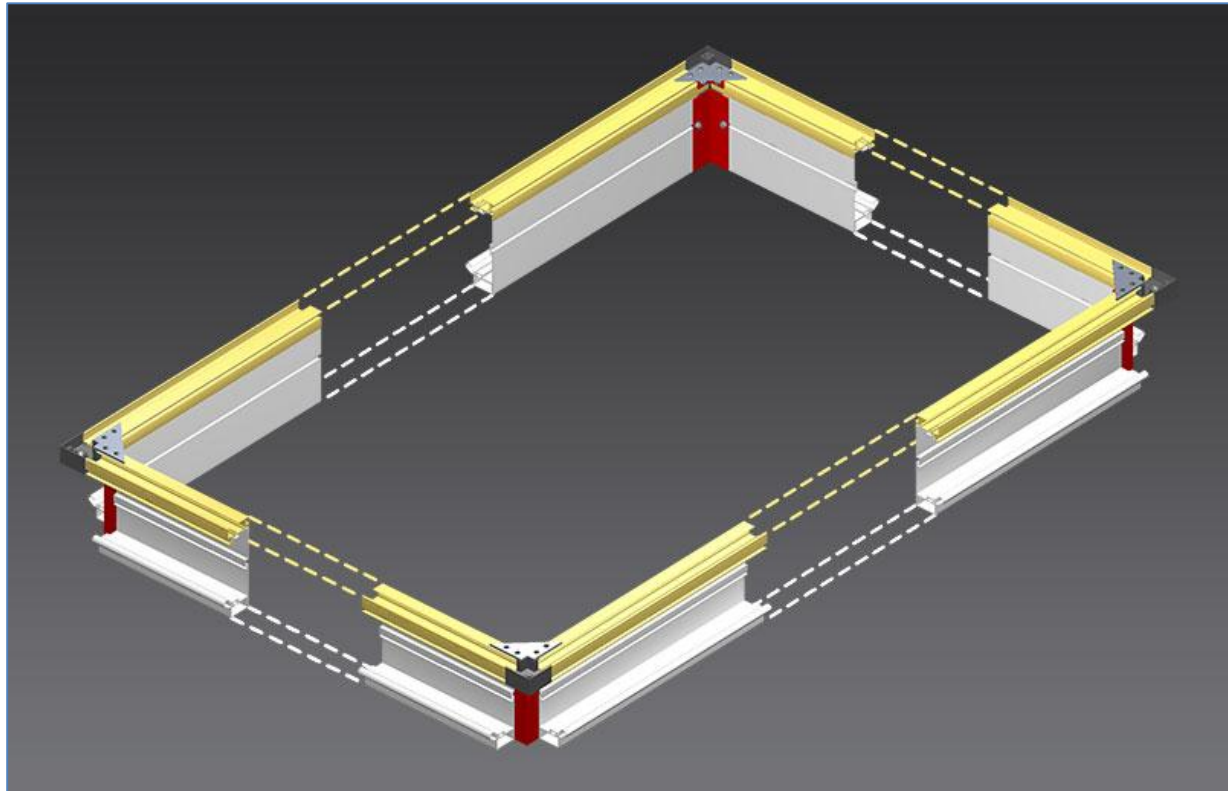
Install the 500 Millimeter Door Extension Kit

This preliminary information will be completed in a future release of this manual.



A kit is available for a Riga XL built on a stem wall. Use the door extension kit to relocate the doorway 500 millimeters downward for easy entry through the stem wall.

Assemble the Aluminum Foundation Frame



Compact view of an assembled foundation frame with floor profiles attached



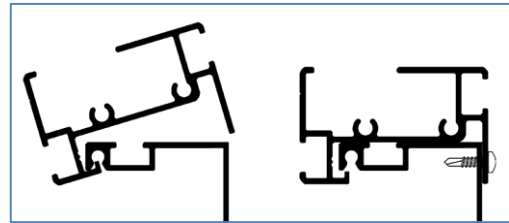
The floor profiles must be installed on the foundation frame profiles before the greenhouse assembly begins. Some deviations from the normal assembly instructions will be necessary. Place the foundation in a trench with the bottom surface of the floor profiles at grade level. Backfill and compact the trench after assembly is complete.

Parts required

2	Pos. 6.1	Foundation frame profile for gables, 4100 mm long
2	Pos. 6.2	Foundation frame profile for sides, 5858 mm long
4	Pos. 6.3	Foundation corner connector (pictured in red)
18	Pos. 6.4	Hold-down plate
20	Pos. 117	Self-drilling screw, 3.5 x 13 mm Phillips pan head
34	Pos. 107.12	M6x12 hex head cap screw with nut
2	Pos. 1	Gable floor profile, 4145 mm long (pictured in gold)
2	Pos. 18	Side floor profile, 5903 mm long (pictured in gold)
2	Pos. 105	Floor profile connector (pictured in red)
4	Pos. 100	Plastic corner connector (pictured in dark gray)
4	Pos. 116	Floor profile corner connector cover
16	Pos. 113	Screw, 4.8 x 16 mm Phillips pan head

- Mark the floor profiles per Step 12 but load only two M6x12 cap screws in each.
- Load 6 M6x12 cap screws in each foundation frame for gables (Pos. 6.1).
- Load 7 M6x12 cap screws in each foundation frame for sides (Pos. 6.2).

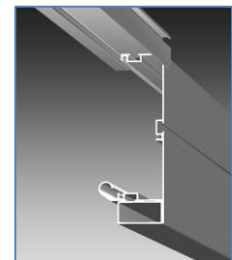
- Engage a floor profile with each foundation frame profile and align the centers. The floor profiles are 45 mm longer than their corresponding foundation frame profiles to allow socket space at the ends for the plastic corner connectors. They will extend 22.5 mm beyond each end of the foundation frame profile.



- Fasten with 3.5 x 13mm self-drilling screws (Pos. 117), six along each side profile and four along each gable profile. **Locate the screws well away from the floor profile marks so they don't interfere with the vertical profile hold down plates.**



It might be easiest to engage the floor profiles by sliding them onto the foundation frame profile from one end.



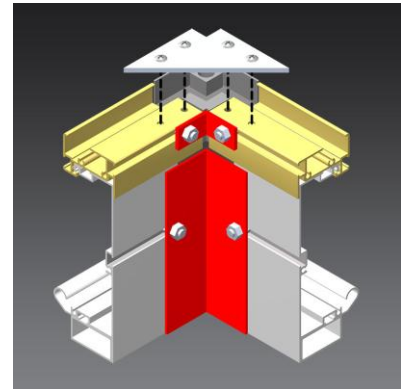
- Assemble the corners:

Join the floor profiles with a plastic corner connector (Pos. 100).

Install a floor profile connector (Pos. 105). Confirm proper hole alignment before tightening the M6 screws.

Join the foundation frame profiles with a foundation corner connector (Pos. 6.3) fastened with the preloaded M6 screws.

Install a floor profile corner connector cover (Pos. 116) and fasten with four 4.8 x 16 mm Phillips pan head screws (Pos. 113).

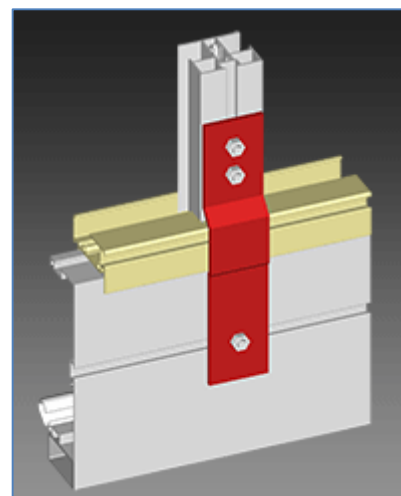


Foundation frame hold-down plates

Pos. 6.7 mounting brackets are not used in Steps 14 and 18. Instead use a Pos. 6.4 hold-down plate to anchor each profile to the aluminum foundation frame. Fasten the plates with the M6x12 cap screws previously-loaded into the profiles.



Before building the second gable you must temporarily detach and move the gable's floor profile and associated foundation frame profile to gain access for threading side wall glazing panels into the gable.



SUPPLEMENTAL INFORMATION

All About Anchoring

Your Riga XL is equipped with a robust anchoring system which when properly installed will safely tolerate very high wind loads. Proper installation requires the included mounting brackets (Pos. 6.7) to be fastened to a strong and massive substrate with appropriate anchors.

About installing mounting brackets

Mounting brackets can be installed in Step 14 before the side walls are assembled, or in Step 18 after the second gable is in place. Step 14 installation is recommended and offers some advantages but Step 18 installation should be considered under some conditions.

Reasons to install mounting brackets in Step 14

Step 14	Step 18
Floor profiles anchored before installing arches and glazing will not move, fall off the substrate, or damage the isolation membrane.	Outward forces from glazing tend to push the floor profiles off of the substrate, damaging the isolation membrane in the process. Temporary restraints are required.
Once anchored, floor profiles remain square and true with no need for subsequent adjustment.	Side floor profiles bow from glazing forces; not easily straightened to install mounting brackets.
Access to drill the substrate for anchors is not impaired by obstacles; easier to drill accurate and plumb holes from any position.	Access to drill substrate is impaired by proximity to arches and glazing, and can only be done inside the greenhouse.

Reasons to defer mounting bracket installation until Step 18

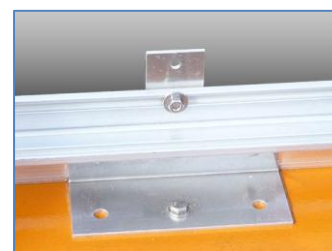
Step 14	Step 18
High quality substrate required. Anchors cannot be conveniently moved to accommodate unexpected substrate anomalies.	More tolerant of moderate substrate anomalies and careless positioning of arches but out-of-tolerance conditions might accumulate and present problems at the second gable.
Mounting brackets must be loosened or removed during Step 16. If non-removable anchors are used, parts and method revision is required for fastening the mounting brackets to the floor profiles.	No requirement to remove mounting brackets in later steps so no parts and method revision is required for non-removable anchors. Disassembly for future repairs, however, will be difficult or impossible without the revision.



Can't decide? If your substrate is square and level install in Step 14 using temporary anchors. Enjoy all of the benefits of early anchoring and still be able to move the bracket if it becomes necessary. Install the permanent anchors later in Step 18.

Installing temporary anchors

Drill a $\frac{5}{16}$ inch hole in each mounting bracket, midway between the two foundation anchor holes. Choose Step 14 mounting but install only a temporary $\frac{1}{4}$ inch anchor through the new hole. Use a lag screw for wood or a Tapcon® screw for concrete.



Anchoring to Concrete: A Special Case

A popular method for anchoring to concrete makes use of a threaded stud embedded into the concrete with very high pull-out resistance. One such device that is appropriate for anchoring your Riga XL is ITW RED HEAD Trubolt Wedge Anchor, part number SWW-3822 or equivalent.

A wedge anchor is permanent; it cannot be removed. There will be occasions when a Riga XL mounting bracket (Pos. 6.7) must be removed. If anchored with wedge anchors or similar non-removable anchors the bracket can only be removed by lifting it above the ends of the threaded stud.

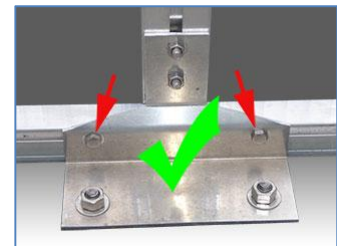
The problem

The picture shows a bracket fastened to the floor profile by two M6x12 screws in the profile's capture slots. This bracket cannot be lifted up to clear the anchor studs because the M6 screws cannot be removed. The entire floor profile must be elevated if the bracket is to be removed. This will be the situation for any stud-type non-removable anchor regardless of the substrate material.

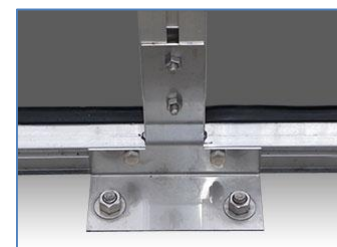


The solution

This problem can be avoided if M6 nuts are loaded into the floor profile capture slot instead of screws. The screws are then driven through the bracket holes into the nuts, and can be easily removed. For proper fit use M6x8 cap screws (8 mm long) instead of the provided M6x12 so they will not be forced against the back wall of the capture slot.



The Pos. 6.7 mounting brackets shipped prior to 2011 were made of stainless steel 1.6 millimeters thick. Brackets shipped 2011 and later are made of aluminum 3.0 millimeters thick. If your brackets are the earlier stainless models it may be necessary to include a washer beneath the head of each M6x8 screw to prevent contact with the back wall of the capture slot.



FREQUENTLY ASKED QUESTIONS

What is the Riga XL Essentials Kit (REK)?

The Riga XL Essentials Kit is a collection of parts and materials that are needed to make assembly easier and assure the high quality of the finished greenhouse. These important items are not provided by the manufacturer but are added for your convenience by Exaco Trading Company, the U. S. Riga distributor.

Why are ratcheting cargo straps recommended?

Widely available ratcheting cargo straps are helpful for many construction tasks and are indispensable if you are working without a helper. Select straps that are long enough to span the full twenty foot length of your Riga XL. An important feature for your greenhouse project is a double J hook on each end. Straps with ordinary S hooks will not be helpful to install the glazing.



Hold gable edges in place



Restrain mounting brackets



Help thread glazing

Why are additional M6x12 cap screws recommended?

Historically M6x16 cap screws have provided with Riga XL greenhouses for nearly all fastening requirements, but in reality almost every place fastened with M6 screws will benefit from using shorter screws. For example the floor profile connectors (Pos. 105) cannot be properly installed with 16 mm screws because they mutually exclude each other from being tightened with a socket wrench.

Use M6x12 screws in all M6 positions except those retaining the lateral supports and the window uplift restraints. For these use M6x16.

Why would anyone want extra lateral supports?

Four lateral supports are installed in the Riga XL to longitudinally fortify the structure. An additional pair of supports near the ridge provides robust high-elevation anchoring rails for a plant support system. Serious tomato growers, among others, need such a system.

If you want an extra pair of laterals supports they should be ordered with your Riga XL to avoid extra shipping expense. You will need 14 M6x16 cap screws with M6 nuts and fender washers to install them.

Why UNC ¼-20 cap screws instead of M6 in the windows, and why extras?

The capture slots in the window profiles are too wide to bind the heads of M6 screws. An M6 screw will turn in the slot as you try to tighten a nut on it but a UNC ¼-20 cap screws will be properly anchored.

Two cap screws are required in the lowest profile of each roof window to fasten the automatic window opener. An additional cap screw in the each side profile is recommended as a tie-point for uplift restraints, which are short tethers about 14 inches long.

Why #10 x ¾ inch pan head and #8 x ¾ inch flat head Phillips screws?

The 3.5 x 16 mm pan head screws (Pos. 159) provided to fasten the door holder parts (Pos. 158) are not the right size for a proper and robust fit. You will need #27 and #31 drill bits to bore holes for the new screws, and four pieces of double-sided mounting tape to make installation easier.

Why preload extra M6x16 screws in each edge stay bar?

The edge stay bars (gable arches) do not have post-assembly screw loading ports. They are impossible to remove for loading afterthought screws, and the nearby glazing makes it very difficult to cut a loading port. You should preload at least one and possibly two extra screws in each for these reasons:

- 1 You may at a future time wish to add an additional lateral support (Pos. 22) or other member to provide attachment points for a plant support system. This would require an extra screw in each edge stay bar above the slanted T connector. It would be prudent to also load each of the curved center profiles with an extra screw at the same elevation, although they are more accessible for cutting a loading port for afterthought screws.
- 2 The upper lateral support is normally installed above the gable K connector, and a screw is preloaded there for it. If you expect to install one or two optional shelving kits the upper lateral supports might be more convenient below the K connector. The preloaded screw cannot be moved past the connector, so the extra will be needed.
- 3 If your Riga XL is a stretched model with an odd number of 1-meter length increments, there may be one window in a bay next to a gable. An extra screw in this gable's edge stay bar is needed to fasten the crossbar beneath the window.

Why must a window's installation path be free of glazing and vertical profiles?

Side wall glazing exerts high upward force on the roof beam which bends the beam upward. The window's hinge engagement with the roof beam will bind if the path is not perfectly straight.

A window must be lifted high to pass over a curved vertical profile, exceeding the height limit for free movement of the hinge. The hinge engagement with the roof beam will bind at this height.

Riga XL builders faced with either of these situations might resort to heavy pounding with a rubber mallet, and gain about 1/8 inch of movement with each blow. But the blows transfer forces through the roof beam, disrupting the alignment of other installed components and degrading the quality of the installation.

What is a roof beam fitment tool?

A roof beam fitment tool is a replica of one end of a roof beam. Use it during construction of each gable to assure proper alignment of the edge stay bars (gable arches, Pos. 2 & 3) so they will be ready to receive the roof beam in a subsequent operation. This tool is available from your Riga dealer.



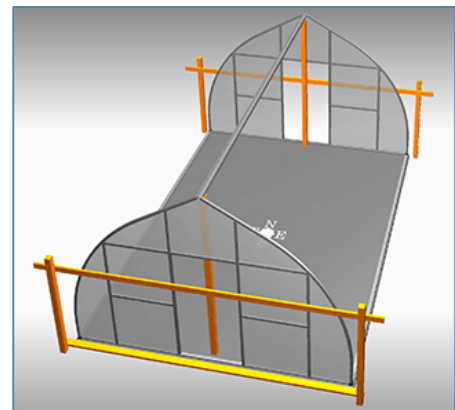
The self-drilling screws that fasten the edge stay bars to the K connectors and slanted T connectors (Pos. 104 and 102) must not be installed unless the fitment tool or the roof beam itself is engaged. If the screws are installed without the tool or beam in place the ends of the bars are likely to be misaligned and it may not be possible to later engage the roof beam.

What if a roof beam fitment tool is not available?

The roof beam itself can be used to align the ends of the edge stay bars. For this the roof beam must be safely braced and unencumbered by side wall arches, glazing, and roof windows.



You cannot use the roof beam itself to align the edge stay bars if side wall arches and glazing are in place. Upward thrust by the bowed glazing interferes with proper alignment, and the glazing blocks the space needed to safely drive the self-drilling screws.



If you use the roof beam to align the second gable, you must disengage it and move the gable away after the final screws are driven to make room for installing the side wall arches and glazing.

What is a medium modulus neutral cure silicone sealant?

It is recommended to seal certain areas of your Riga XL to prevent rainwater intrusion. Sealant also adds diaphragm strength that helps keep windows and doors square and true. Silicone sealant delivers the best performance for this application.

The modulus of the sealant refers to its rigidity after it is fully cured. Medium modulus is moderately rigid but sufficiently flexible to tolerate the minor stresses of thermal expansion and contraction. Medium modulus silicone sealants are commonly used as glazing sealants.

Silicone sealants utilize various chemical methods for vulcanization (curing). Most low-cost silicone sealants offered in retail stores use acetoxycuring in which acetic acid is released during the curing process. Acetoxycure sealants should not be used on materials that might react with acetic acid. An acetoxycure silicone sealant commonly offered in retail stores is GE Silicone I, though it is not specified as such and the modulus is not specified.

Neutral cure sealants are less likely to react with other materials. A neutral-cure silicone sealant commonly offered in retail stores is GE Silicone II, though it is not specified as such and the modulus is not specified.

The modulus and cure chemistry of silicone sealants is rarely specified for the retail offerings. Specification-grade sealants can be purchased from professional outlets. One clear medium modulus neutral cure silicone sealant is BOSS 39900, which is offered by sources that cater to the professional trade. You might find a suitable sealant at a local glass shop. Your Riga dealer might also offer a sealant.

Silicone sealants have limited shelf life and are generally considered unfit for use if more than one year old. The consequence of aging is failure to cure, which will require a serious clean-up effort. Reputable manufacturers stamp a date code on the package which could be either the date of manufacture or the expiration date. This code is often disguised in a format that does not easily reveal a date. To cite an example, the BOSS 39900 sealant mentioned above is stamped with the date of manufacture as “yyddd bbbb”, where “yy” are the two least significant year digits, “ddd” is the day of the year, and “bbbb” is a batch code. A tube of BOSS 39900 stamped “121154433” was manufactured on the 115th day of 2012 (April 25) and its batch code is 4433. Its usage warranty will expire at midnight on April 24, 2013.

Before you accept a sealant you should insist that the seller clarify its age. If you suspect your sealant has gone geriatric, lay a test bead on a disposable material to test its curing properties before you use it.