Greenhouse Assembly Instructions

We strive to offer the best quality greenhouses at the lowest possible price, in order to encourage sustainable, year-round agriculture and make the most of our wonderful climate. We fabricate and sell greenhouse components, but we do not offer installation or engineering services. We offer advice and recommendations, based on our own experience and that of our customers. It is just that, advice. We do not offer engineering or a warranty, as soil conditions, siting, wind load, and snow load can vary dramatically from site to site. Counties have differing requirements for snow load, engineering, and permit requirements, some of which vary depending on the size and /or the anchoring method of your structure. Please verify the above before you proceed in order to ensure compliance with state and local regulations.

Please unpack your kit and compare it to your pull list as soon as you get home. Shortages must be reported within 48 hours of delivery.

Before you begin constructing a hoop-house, grade an area four feet larger than its footprint to level within an inch or so. If level can't be attained without an unreasonable amount of earth moving, the hoop-house can be installed out of level as long as the area is graded to one plane.

1) Install your ground posts per the layout sheet provided with your greenhouse. We recommend concreting all ground posts in to augered holes, 12" in diameter and 36" deep. The easiest way to do this is to drive four temporary stakes with two strings tied tightly between them. The strings should be parallel and set at the outside width of your hoops. Install the ground posts 1/8" inside the strings. Locate the four corner posts first and "X" measure from corner to corner in both directions. When those two measurements are the same, you have squared the layout. This is really important and will affect every step after it. Temporary installations can be accomplished by driving the ground posts into the ground, but even then, we encourage you to concrete the four corner posts at a minimum. Ground posts should be installed 24" below grade and 12" above grade. This allows the hoops to slide down over the ground posts with approximately 12" of engagement.

2) Assemble all of your hoops, on flat ground. The male end of the pipes plugs into the female ends, and fastens with (2) tek screws per joint. Put the screws on the underside of the hoops so they don't chafe on the fabric. This end of the pipe slides over the ground posts.

3) Stand all of the hoops, sliding them over the ground posts with one person on each end. Fasten each side of each hoop to the ground posts with two tek screws, again holding the screws to the inside of the hoops so they don't chafe the fabric. If you are covering your ends with fabric, please see step #15 before standing all of the hoops, so you can use a hoop as a pattern for cutting the fabric.

4) When all of the hoops are installed, sight along them. They should be in plane with one another across the top. If your grading isn't perfect, the hoops can be cheated up or down on the ground posts a few inches to make them plane out. Keeping the hoops in plane will allow for a tight, well supported fabric installation which is critical to the life of the covering.

5) Assemble your purlins on the ground, again, with two tek screws per joint. Most greenhouses will have multiple sticks of pipe per purlin, with a cut piece to arrive at the requisite length. The cut piece is the "purlin extension". In all cases, the assembled purlins should be two inches longer than the length of the greenhouse to allow the cross ties to engage on the ends. Once they are assembled, lay them along the installed ground posts and mark the locations of the ground posts with a permanent marker; this will help to keep the hoops straight as you clamp them to the purlins.

6) With three or four people, raise the purlins up under the hoops and support them with a cross tie at each end and in the middle. Then add cross ties at every intersection, with the bolts to the underside of the frame to avoid having sharp hardware against your cover. Index the hoops to the marks you made on the purlins in step 5 to keep them parallel and straight. On most greenhouses, we use 3 purlins, however on wider greenhouses 27' and larger we suggest 5-7 purlins, depending on wind and snow possibilities. We have found that we get the least ponding with one right in the center of the hoops and the other two 54" either side of center. On larger frames with 5 purlins we recommend the same spacing, with the fourth and fifth purlins 54" outside the second and third ones. For frames with 7 purlins follow the same spacing or place them closer.

7) Fasten your side boards to the frame after the steel frame is squared, in plane, and parallel. For roll up sides, we have found that 36 to 60 inches up from the ground is optimum. We prefer pipe straps to connect the lumber, and we prefer 2" X 6" redwood lumber. The best method we have found is to strap the 2" X 6", in the longest lengths available, to the inside of the steel frame and then

pressure block between the hoops with more 2" X 6" so that the pressure blocking ends up relatively flush to the outside of the steel.

8) Bolt your baseboards along the ground. We like to put the baseboards outside of the steel frame. Again, we prefer 2" X 6" redwood lumber, but for base boards we recommend thru bolting with galvanized carriage bolts; 3/8" X 5" hot dip galvanized bolts are preferable.

9) Install the corner braces. These are the 1 3/8" pipe parts with flattened ends, and they bolt to the baseboard and to the end hoop, at a 45* angle. If you aren't using a baseboard, they can bolt to the bottom of the second to the last hoop and as high as they will reach on the end hoops.

10) Fasten c-channel all along the top surface of each end hoop. Fasten it all along the side boards if you are using roll up sides, or along the baseboard if you are not using roll up sides. We recommend screwing the c-channel at each end of each piece and every 12" or less in the field. Use tek screws on the steel frame and wood construction screws where it fastens to the side boards. File any cut ends of c-channel to avoid tearing the fabric.

11) Frame your end framing and doors to your liking. The cheapest way to do so is with 2X lumber and our steel to wood frame connectors, but a sturdier, more permanent frame is built with more of our galvanized tubing. We can fabricate sliding or swinging door frames, and we stock welded fan frames with vent louvers in them. You may want to allow for a powered vent fan, either solar or AC depending on your site.

12) Check your entire frame for sharp edges which can cut the fabric. File them as necessary, and wrap any protruding screws or pipe edges with duct tape or pipe wrap tape to protect the fabric.

13) Prepare to cover your structure! On a warm, calm day, unfold your fabric and spread it out flat in the sun. Make sure that when the fabric is attached to the greenhouse you can read the writing from inside the greenhouse. Tie a rope or two to the fabric, and with several people, slide the fabric up and over the frame. Pull it as tightly as you can (a warm day is critical…the fabric becomes more pliable and stretches tightly) and fasten the wiggle wire all around the frame. We have found that we can get the fabric tighter by then going all around the frame, after the fabric is initially installed, and removing one piece of wiggle wire at a time and retightening the fabric. Use batten tape for high wind exposures; run the batten tape between every other hoop to further take play

out of the fabric. Most of the time when we see a cover fail, it is caused by fabric not being installed tightly and thereby flapping in the wind, causing mechanical damage.

14) Assemble the roll up pipe and a crank at each end if you are using roll up sides. Again, use two tek screws per joint. The roll up curtain rod should be about 1' longer than the greenhouse, so it rides up the end hoops as you wind the handle. The fabric can be attached most easily with aluminum fabric clips, or can be fastened with a piece of 1 ¼" PVC pipe ripped on a table saw. Alternately, tek screws and wood battens can be used. Try the curtain a few times before attaching it permanently. You will want the rod parallel to your side board so it rolls up and down squarely.

15) Install your end coverings. Corrugated greenhouse plastic is the easiest way to finish the ends, but fabric or film can be attached with c-channel or wood battens and screws as well. If you got end fabric with your frame, the easiest way to cut the end pieces is to lay the fabric out flat on the ground, lay one of your hoops on top of the fabric, making sure that the outside dimension of the legs is at the proper dimension, and then draw a line 12" outside of the hoop to cut on. Lay out both ends BEFORE CUTTING…we often supply a piece of fabric sized so that two ends can just be cut out of it with one right side up and the other nested upside down to maximize the material. Don't forget to vent it! We can supply solar or AC fans, as well as solar panels and thermostats. Our welded fan frames serve as a really easy door frame kit as well.

16) At the end of the season, we recommend taking the cover off of the frame, if not in use, to eliminate damage from winter wind and snow. Alternately, heat the structure to avoid snow building up on the covering and/or install our guy cables along with snow supports along the ridge line.

HAPPY GARDENING!

KARMEN'S GARDEN AND GREENHOUSE

530-274-7472