Operator’s Manual
Standing Gardener

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Important Safety Instructions

The Standing Gardener has been designed to accommodate different sized users, from children to adults. It is essential when using this device to make sure that the Standing Gardener settings are appropriate for the size of the user. The chest, knee, and foot supports and pads must all be set to their appropriate heights before the Standing Gardener is to be used. Not doing so could result in injury discomfort of the user.

One must make sure that at least two of the six wheels are in the “locked” position before stepping on to the Standing Gardener. This will create a much sturdier base than if all of the wheels are not in the “locked” position.

It is essential to make sure that all of the bolts that are secured by wing nuts are securely fastened and tightened before using the Standing Gardener. The bolts that should be checked are the ones that secure the height of the eight telescoping legs and position of the knee pad supports.

One should be conscious when working with the Standing Gardener of burrs and sharp edges in the metal material. Although extensive care was taken when making and cleaning of the device, it is possible that there may be one or two sharp edges. Care should be taken when handling or adjusting the device.

One minor risk exists with the user leaning back far enough to tip the device. Although the users’ motion will be limited due to the support system and the hip belt and extensive testing was done with the device, there still exists a slight risk the user should be aware of.

When assembling, disassembling, or adjusting any part of the Standing Gardener, washers should always be used between the surface and the head of the bolt or nut. This will prevent the wear and decrease the amount of stress on the bolt or nut, therefore increasing the life of the device.
Parts and Accessories

The frame consists of two 1/8th inch plates, 8 completely telescoping legs, and six lock-optional caster wheels.

The support system consists of chest pads and supports, knee pads and supports, hip belt (not shown) and foot supports.

The workspace consists of pot tray holders, pot holding template, template cover (not shown), handles with grips, and soil catching drawer.
Features

The Standing Gardener has a few interesting features that are worth noting. None of these features are present on any stander on the market today. These features include:

- The Standing Gardener is the only stander that is made specifically for the task of gardening. While other stands are mostly a table with a support system, the Standing Gardener has the same features along with a superior gardening capability. The Standing Gardener has a pot template that can fit four different sized and shaped pots. This template is recessed below the table so the user can push the soil right into the pot without the use of a shovel. All of the excess soil is caught by the soil catching drawer, which can be easily removed, carried, and emptied elsewhere. The Standing Gardener also has 2 areas for plants and finished planted items.
- For safety, the Standing Gardener has two stainless steel handles that the user can grab on to should he or she lose their balance.
- Every feature that supports the user and can customize to his size is completely telescopic. The Standing Gardener consists of eight legs, which can be telescoped out to 14 different lengths. This can accommodate users of different heights. Not only can the entire eight of the device change, but most of the pads can be moved in and out depending on the size of the user. In the case of the knee pads and supports, the entire knee support system can be moved in and out and side to side with the simple tightening or loosening of the long bolts. The entire knee support system can be moved up or down via the holes in the legs. The pads that support the users’ sides of his or her chest can also be moved in and out through the loosening or tightening of long bolts.
- Possibly the most exciting feature of this device is its core material. The Standing Gardener is made entirely of 304 Stainless Steel, a metal which is naturally corrosion and weather resistant. Since the device would be entirely in a
greenhouse, the designers wanted to make it as durable as possible. In addition, the pads are doubly wrapped in waterproof material for increased durability.
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1 Introduction

1.1 Overview of Device

1.1.1 Overview of Workspace

The pot tray holders, pictured in Figure 1 below, hold the trays that will house the finished and unfinished potted plants.

![Figure 1: Pot tray holding walls](image)

The tray holders pictured on the right will be to the users left and hold the tray with the plants themselves. The tray holders pictured on the left will hold the tray that will house the finished potted plants. This finished pot holding tray consists of three holding walls, two of which can be adjusted forward and backward depending on how large the finished pot tray will be. The adjustable holding walls are held in place with a bolt going through the table top and secured with a wing nut below the top stainless steel plate. In order to move these pot tray holding walls, the wing nut will have to be loosened and then the wall can slide along the allotted slot area.

The pot template, pictured in Figure 2 below, holds the respective pot that is being planted.
As seen in Figure 2, the pot template rests on the top stainless steel plate. The hole in the white tabletop material that the template sits in is slightly larger (about 1.5 inches larger in diameter) than the hole in the stainless steel plate. This allows for the template to rest on the plate and be held in place and have the ability to spin freely. The pot template offers the versatility to use four different sized and shaped pots with one template and not have to change the holder each time the type of pot has to be changed.

If the template is not desired when working, an exactly sized cutout of the tabletop material, called a template cover, will be provided to form a flush surface for the user to work. The template cover is the same material as the tabletop. The purpose of the template cover is to provide more versatility with the Standing Gardener, with the ability to make it much like other standers on the market with a flush tabletop surface to work.

The soil catching drawer, shown in Figure 3 below, is designed to catch any soil overflow that may fall through the template.
Figure 3: Soil Catching Drawer

The soil catching drawer is equipped with two handles with grips (one in front, which is shown, and one behind the drawer, which is not shown) for easy removal and carrying of the apparatus. It should be noted that in order to properly remove the soil drawer, the pot holding template must be removed first.

Two stainless steel handles were added on to the Standing Gardener for the user to grab if extra support is needed. Both of the handles have waterproof grips that will make grabbing easier in the event of an emergency. These are also bolted directly on to the top stainless steel plate.

Figure 4: Handles

1.2.2 Overview of Support System

Starting from the top, the first thing to support the user is the chest support system. This can be seen in Figure 5 below.
The chest support system consists of three pads. The front pad, which supports the front of the user's chest, stay stationary relative to the table, but can be moved up and down as the top plate moves up and down. The bolts holding this pad secured to the frame should not be loosened for whatever reason.

The side pads, on the other hand, can be moved in and out through the loosening and tightening of the long bolts. This phenomenon can be seen in Figure 6 below.
The long bolts that are shown above in the orange rectangles can be moved in and out by tightening or loosening the nuts that attach to the bracket secured to the Standing Gardener frame. By adjusting the lengths of these bolts, the entire pad fixture can be moved in and out to accommodate for a larger or smaller user.

Moving down from the chest pads, the next method of supporting the user is the hip belt. The Stenglein family already has such a belt that they will use that will wrap around the Standing Gardener legs to the side of where the user stands and act to keep him in place within the support system. Should the user lean back too far and lose his balance, the hip belt will keep him from falling out of the device. The hip belt is secured to itself through the use of Velcro.

The third part of the support system, and most versatile, is the knee support system, which can be seen in Figure 7 below.
This complex support system consists of seven different fixtures that combine together to be able to move and support the knees in the three planes of direction. The three bracket fixtures attach directly onto the legs of the Standing Gardener. The front bracket is shown in Figure 7 above, and the sample side bracket is shown in Figure 8 below (at the time when the picture was taken, the slots in the side bracket shown in Figure 8 were not yet milled out. The slots are currently milled out, allowing the knee support system to come together nicely).

The four padded fixtures attach to the brackets to form the knee support system. The proximal medial knee pads are attached to the front knee pad forming an “L” shape. The last knee pad in the fixture is the distal lateral knee pad, which comes in
from the opposite side through long bolts, completing the “U” shaped knee pad support system. This can be seen in Figure 9 below.

![Figure 9: Knee pad fixture](image)

The “U” shaped knee pads can be moved forward and back and side to side, depending on where the users’ knees are. They also can open wider or close tighter on to the users’ knees if the need presents itself.

The last part of the support system is the foot supports, which can be seen in Figure 10 below.

![Figure 10: Foot support system](image)

The footboard shown in Figure 10 below will eventually consist of movable straps that can adjust forward and back as well as side to side depending on where the users’ feet are most comfortably positioned. The straps will keep the users’ feet in place so the rest of his body is supported in the standing position.
1.2 Assembly and Adjustment

1.2.1 Raising or Lowering of the Tabletop/Workspace

The most important thing to remember when assembling and adjusting any part of the standing Gardener, especially the frame, is to tighten the bolts so the device is sturdy. Make sure that the bolts that secure the caster wheels are completely perpendicular to the bottom plate.

When raising or lowering the top plate (and tabletop/workspace area), first take out all of the bolts that hold the telescoping legs at their current height. When adjusting anything any part of the Standing Gardener, at least two of the caster wheels should be in the locked position. Then remove the bolts that attach the knee supports to the telescoping legs. Take the soil drawer out so it doesn’t fall out and get damaged while the lowering process is taking place. At this point, the only thing that is keeping the top of the table at its current height is the friction within the legs. Push down or pull up on the top plate until the desired height is reached.

Go to the nearest height so that the height of all eight of the legs line up with each other. Then it is safe to put the bolts into the legs to secure that height. Also reattach the knee support system before using the Standing Gardener.

1.2.2 Adjusting the Chest Supports

The front chest support will not be taken off or moved because it remains stationary relative to the device. The side chest supports, however, can be moved in and out depending on the size of the user.

In order to accomplish this task of adjusting the side chest pads, the nuts on the outside of the chest bracket that attaches to the Standing Gardener frame must be loosened slightly. Then the inside nut can be brought in or out along the long bolt until an appropriate length is reached. It is the inside nuts that determine the distance of the pad from the attachment bracket. These bolts are found in Figure 11, highlighted in red squares.
1.2.3 Assembling the Knee Supports

The first step in assembling the knee supports is to find an appropriate height to place the knee support brackets. Find a comfortable height for the knee support system and line up the holes with the front support bracket and side support bracket holes.

The next step is to assemble the brackets in the correct order: first the front bracket, then the side brackets. The front bracket should have the shorter slots on top and the longer slots on the bottom. An assembly diagram is shown in Figure 12 below.
Correct assembly is essential to the device working properly. Make sure the spacer is in the correct place when assembling as well. The spacers should be on the legs closest to, but behind the users' knees. These spacers make the side brackets perpendicular to the front bracket, which is essential for the knee support system to work properly.

The next part is to attach the “L” shaped pads to the front knee bracket. It should be noted that the pads perpendicular to the front bracket should be on the inside of the knees. For correct assembly, these pads should have been taken completely off of the Standing Gardener for the tabletop/workspace to be raised or lowered. The single long bolt on the “L” shaped pads should be in the shorter slot on top, and the two bolts should be in the longer slot on the bottom. The pad assembly can be found in Figure 13 below. Finally the side knee pads are ready to be attached.

![Figure 13: Knee pad assembly](image)

It doesn’t matter which one goes in either side because both sides are identical. The bolts may have to be squeezed together to be able to fit into the slots.

The completed knee support system assembly should look like Figure 7 in section 1.2.2. Use these diagrams as guides when assembling.

1.2.4 Removing Pot Template and Template Cover

There may come a time when the user may want to change from the pot template in the workspace to a flush surface to work on with the template cover. In order to make this switch, the soil drawer must be taken out part of the way so the user can get underneath the template hole.

The user should then gently bang on the bottom of the template cover until the material is jarred from its position. The template cover can now be carefully removed.
When removing the pot template, the user can just lift it out by the black “T” handle in the center.

1.2.5 Moving the Pot Tray Holders

The nuts that hold the pot tray holders and finished pot tray holders in place can be found below the top plate. These nuts should be loosened just enough so the pot tray holders can slide along the slots provided. When the desired position of the pot tray holders is reached, the nuts should be tightened again to lock them in place and for safety reasons.

2 Maintenance

The Standing Gardener was built to be able to withstand most weather conditions for an extended period of time. The Standing Gardener is made up of entirely Stainless Steel, Kleer PVC Board, polycarbonate plastic, and pads covered in waterproof Naugahyde fabric. Each one of these materials is waterproof and weather resistant. However, care should be taken when the Standing Gardener is not in use to ensure that it will last for an extended period of time.

When the Standing Gardener is not in use, it should be wiped reasonably dry. The Stainless Steel will not rust or tarnish, so having the device be somewhat moist should not be a problem. The bolts made for the six caster wheels, however, are not stainless steel and might have a tendency to rust or tarnish over time. Care should be taken with these specific bolts, and they should be kept reasonably dry.

The white tabletop material and the material for the footboard and foot supports is made of Kleer PVC board. This material is a type of plastic that is used in decking for the outer portions of houses. Although it is weather resistant to a reasonable extent, it can get dirty over time if the proper care is not taken. The dirt will not harm the material or compromise its effectiveness, but it makes the Standing Gardener look less aesthetically pleasing. If the PVC board needs to be cleaned, a simple soapy sponge and water should be fine and take care of most dirt and spots.

The pads should be wiped reasonably dry before and after use if the Standing Gardener is to be kept in a wet environment. The purpose of this is not to preserve the Naugahyde fabric, which is waterproof, but rather to lessen the risk of water getting inside the pad and compromising its effectiveness. To combat this risk, the inside of each of the pads is wrapped in a waterproof plastic wrap before being wrapped in the waterproof Naugahyde fabric. This factor should lessen the risk of anything happening to the inside of the pads, but care should be taken at all possible instances to keep the pads functioning well.
Should any sharp edges or burrs arise, they should be filed down immediately. Extensive care was taken when building the Standing Gardener to make sure that there were as little sharp edges and burrs as possible. However, it is possible, although improbable, that some edges and burrs were missed. In areas where there were many sharp edges, not only were they filed and sanded, but a film was put over the area to round the edges even more. For this reason, care should be taken when assembling or disassembling the Standing Gardener.

The bolts should always be placed perpendicular to the holes where they are inserted. Not doing so will compromise both the hole and the bolt itself and the device will not be as strong.

Should any of the bolts break or become defective, specifications can be found in section 3 of this manual that will say which kind of bolts to purchase. The Standing Gardener was designed for the event that a failure of the device is highly improbable. Most likely what will happen is small parts will have to be replaced here and there to keep the device functioning. Extensive care was taken when designing and building this device so that it would last as long as possible without breaking or being compromised.

3 Technical Specifications

Three dimensional modeled drawings can be seen in Figure 14 and 15 of the bottom and top stainless steel plates, respectively. The purpose of these drawings is to provide dimensions, should any future modification need to be made to the plates.
Figure 14: Dimensions of bottom plate

Table 1 shows what kind of bolts were used in putting the Standing Gardener together in case some need to be replaced after an extended period of time.

<table>
<thead>
<tr>
<th>Use of Bolt</th>
<th>Size of Bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attaching Legs to Plates</td>
<td>1/4 inch - 20 Flathead bolts</td>
</tr>
<tr>
<td>Locking Legs</td>
<td>1/4 inch - 20 Hex bolts</td>
</tr>
<tr>
<td>Long Bolts for Support System</td>
<td>5/16 inch - 18 Threaded rod</td>
</tr>
<tr>
<td>Attaching Pads to Brackets</td>
<td>1/4 inch - 20 Hex bolts</td>
</tr>
<tr>
<td>Attaching PVC Board to Top Plate</td>
<td>3/8 inch long Wood Screws</td>
</tr>
</tbody>
</table>

Table 1: Sizes of Bolts in Standing Gardener

Appropriate wing nuts, hex nuts, and washers can be purchased with respect to the kind of bolt that was used.

4 Troubleshooting

The most common problem when using the Standing Gardener would be that the bolts or screws are not perpendicular to the holes in which they go into. A simple
resolution to this problem would be to take the bolt out and replace it with another one, according to the specifications laid out in Table 1.

Should any of the bolts break or become stripped or worn, they should be replaced immediately. The optimal metal to use would be stainless steel when replacing anything in the Standing Gardener to prevent any chemical interference that might result in corrosion or tarnishing.

One must make sure that at least two of the six wheels are in the locked position when adjusting or attempting to use the Standing Gardener.

Should the PVC tabletop material become damaged or scratched, the use of a fine sand paper will remove any deformities that may arise.