PROJECT: EVS™ 2

VACUUM PRESS SYSTEM

Assembly Instructions

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Veneering Made Easy with Vacuum

The Project: EVS-2™ vacuum press is a very powerful veneering tool that is capable of producing over 1,400 lbs per square foot of pressure at sea level when used at its normal operating capacity. To put this into perspective, a full-size pick-up truck exerts about this much pressure onto the pavement under each tire. Even more impressive is that the vacuum creates this much pressure on *every* square foot within the vacuum bag. A simple 2' x 4' panel in a vacuum bag has a total of 11,200 lbs of "pressure" spread across the whole project. It's easy to see why vacuum pressing is considered the ideal method to bond wood veneers to substrates such as plywood, MDF, and particle board.

The vacuum inside the bag presses the veneer onto the substrate and compresses the fibers of the materials being glued. As this happens, some of the air inside of the veneer and substrate material is displaced with the adhesive. This gives the adhesive maximum grip or "bite" on the project pieces. A durable bond between a substrate and a wood veneer can be made in just 45 minutes using Better Bond X-Press™ veneer glue.

How Does the Project: EVS-2™ System Work?

The Project: EVS-2™ system is very easy to build and only requires a minimal understanding of the basic components and the purposes they serve.

- **Vacuum Pump:** This is the heart of the system. It removes air from the vacuum system and the vacuum bag allowing the atmosphere to exert pressure which results in a clamping effect upon the veneered panel.

- **Vacuum Controller:** If the vacuum pump is the heart, the vacuum controller is the brain. This critical piece controls the pump and the solenoid valve. Small leaks in any vacuum system are common and the controller is the part that monitors the vacuum level and turns the pump on and off as additional vacuum is needed to replace vacuum that has leaked out. When the vacuum drops, the vacuum controller turns the pump on and engages the solenoid valve causing it to direct the flow of vacuum from the pump into the main reservoirs and the vacuum bag.

- **Solenoid Valve:** This valve is a gateway for vacuum flow. When engaged, it directs vacuum flow from the vacuum pump to the main reservoirs. It is disengaged when the vacuum controller reaches a set level of vacuum and at that point, the solenoid valve is used to empty vacuum from the sub-reservoir and from the vacuum pump. This allows the pump to restart without any "back-pressure" against the pump heads which should greatly extend the life of the pump.

- **Vacuum Reservoirs/Sub-Reservoir:** The main reservoirs in the system hold spare vacuum just like a rechargeable battery. These reservoirs prevent the system from constantly cycling on and off by providing additional vacuum buffer. The sub-reservoir is a small holding tank of free air that allows the pump to achieve full RPM when starting up without back-pressure against the pump intake port.

- **Check Valve:** This simple device prevents air from flowing backwards into the pump during the initial stage of the recharging cycle. When the vacuum level in the sub-reservoir exceeds the vacuum level in the main reservoirs, the check valve opens and the vacuum from the pump begins filling/refilling the main reservoirs.

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PROJECT: EVS™ 2
VACUUM PRESS SYSTEM

Before You Begin

Conserve Paper
Please try to avoid printing out these instructions in their entirety. Save paper by viewing these instructions in your shop with a laptop, tablet, or PC. Viewing this as a PDF file will allow you to zoom in on the assembly pictures.

Time Estimates for Assembly
The total assembly time will vary, but it shouldn't take more than six hours. Some users will have the system running within just four hours. If these instructions appear excessively long, it is because of the large number of pictures included throughout this document. Don't let the length of these instructions prevent you from assembling the kit. The assembly process is very rewarding!

Vacuum Gauge Inspection – IMPORTANT!
The vacuum gauge is a sensitive measuring instrument containing a fragile sensing spring inside. Handle the gauge with care; do not drop it or allow a hard object such as a wrench to collide with the gauge. Open the vacuum gauge packaging now and make sure the gauge needle is resting at the zero position. If not, cut the rubber tip off the top of the gauge with scissors. That will often allow the gauge needle to drop to the zero mark.

Do not attach the gauge to the assembly if the needle is not at zero. Stop and contact us immediately so we can help with this issue. We cannot help resolve this issue once the gauge has been installed on the vacuum press assembly.

Required Tools and Abilities
The Project: EVS-2 system is offered as a kit which requires assembly. A certain amount of dexterity and physical strength will be needed to adequately assemble and tighten each fitting.

Required Tools

- Locking-Jaw Pliers (also known as "Vise Grips")
- Needle-Nose Pliers
- Wrenches: 1/2", 9/16", 5/8", 12mm, 15mm, 18mm
- Adjustable Wrench
- Hex Wrench: 6mm
- Wire Strippers
- Cross Tip Screwdriver and Electric Drill
- Drill Bits: 3/32", 7/64", 5/32"
- Tape Measure
- Bench Vise and Woodworking Clamps
- Scissors

Supplies

- Paper Towels
- Sandpaper (150 grit)
- WD-40
- Electrical Tape
- Paper Towels
- Masking Tape
- Woodworking Glue
- Synthetic Abrasive Pad *("Scotch-Brite" pad)*

PVC Cement

A small can of PVC cement is required to complete the assembly of the vacuum reservoirs. Shipping a flammable item is a challenge so the PVC cement is not included with the Project: EVS-2 kit. Most hardware stores offer this cement in a convenient 4 oz. size. Do not purchase CPVC cement; only PVC cement will work on the pipe and caps that are included with this kit.

PVC primer can be applied before cementing, but it is not absolutely necessary. Countless vacuum press reservoirs have been built without primer and are completely free of leaks.

How to Apply Thread Sealing Tape

All metal-to-metal connections must have tape applied to the male threads. Hold the fitting in your right hand and then apply the end of the tape to the threaded portion of the fitting and rotate the fitting clockwise. Rotate the fitting in the same direction as if it were being inserted into another fitting. No more than three layers of tape should be applied.

Optional Continuous-Run Kit

If the Project: EVS-2™ system is used for projects where there is a possibility that the system will cycle on very often, then it may be best to order and install the optional "continuous-run" add-on. The add-on kit includes a few extra pieces and replaces the standard vacuum controller cover plate with one that has been modified to accept the continuous-run switch.

Tightening Instructions

Throughout these pages, you will find three terms used to describe the amount of effort that must be applied when assembling any two parts.

"Loosely" or "Hand-Tighten" - Tighten by hand as far as possible.
"Firmly" - Use tools as required to tighten the fittings with firm but not aggressive force.
"Aggressively" - Use tools to tighten the fittings using as much force as reasonably possible.

Warnings

Brass Parts Warning

Proposition 65 Warning (Assembly Bill 1953) To California and Applicable States Brass fittings and other products may contain chemicals known to the state of California to cause cancer, birth defects or other reproductive toxicity. Brass fittings may contain lead and are not for use with potable water. This warning is provided to comply with California's Proposition 65 (Assembly Bill 1953) product labeling law and may apply to other states. Visit www.p65warnings.ca.gov for details.

As with any product of this nature, you should wash your hands after contact with brass parts. We provide this warning based on our knowledge concerning the possible presence of one or more such chemicals, without attempting to evaluate the level of exposure.

Not Suitable for Use Near Flammable or Combustible Materials

The individual components of this kit and the completed assembly of these components should not be considered suitable for use in areas where flammable or combustible gases or dusts are present.

PROJECT: EVS™ 2
VACUUM PRESS SYSTEM

Parts List

The Project: EVS-2 vacuum press kit comes with more than 95 parts. This is the most complete and comprehensive kit that we have ever offered. The list below will help identify the item for each section of the assembly instructions. If you have printed these instructions, you may find it helpful to separate the parts list from the other pages and keep it nearby as a reference.

Brass Parts


Lock-On Vacuum Connector (Qty: 2)


Lock-On Plug Fitting (Qty: 1)


Cross Fitting (Qty: 1)


2-1/2" Pipe (Qty: 1)


Barbed Elbow (Qty: 1)


Pipe Hex Nipple (Qty: 4)


Breather Fitting (Qty: 1)


Check Valve Male-to-Male (Qty: 1)


Branch Tee Fitting (Qty: 2)


Female Tee Fitting (Qty: 1)


Heavy Duty Vacuum Valve (Qty: 1)


Pipe Elbow (Qty: 3)


1/4" NPT Male Fitting with 3/8" Barb (Qty: 2)


1/8" NPT Male Fitting with 3/8" Barb (Qty: 2)


1/8" NPT Female Fitting with 1/4" Barb (Qty: 1)

Screws


Vacuum Pump Screw 6 x 1 x 25mm (Qty: 4)


Electrical Box Screw #6 x 1/2" (Qty: 4)


Reservoir Bracket Screw #8 x 1-1/2" (Qty: 8)


Mounting Plate Screw #12 x 1-3/4" (Qty: 2)


Carrier Upright Screw #10 x 2" (Qty: 3)

Vacuum Pump

Heavy-Duty Vacuum Pump

- Port size: 1/4 NPT
- Sound Rating: 55 dB @et, A-Scale
- Cylinder: Wetted Aluminum Alloy
- Valves: Stainless Steel
- Design: Oil-less Double Rocking Piston
- Maximum Bag Pressure: 1,785 lbs/sqr ft
- Maximum Vacuum: 25.5" Hg (at sea level)
- Blower Design: Air-Over-Motor
- Power Cord: 5 Ft with Plug End

Vacuum Parts

Vacuum Controller (Qty: 1)

Solenoid Valve (Qty: 1)

Vacuum Filter (Qty: 1)

1 Ft Braided Vacuum Tube (Qty: 1)

10 Ft Braided Vacuum Tube (Qty: 1)

Heavy Duty Vacuum Gauge (Qty: 1)

15" x 3" Sched. 40 PVC Pipe (Qty: 2)

6" x 1-1/2" PVC Pipe (Qty: 1)

3" PVC Cap (Qty: 2 - Tapped) (Qty: 2 - Untapped)

1-1/2" PVC Cap (Qty: 1 - Tapped) (Qty: 1 - Untapped)

Electrical and Miscellaneous Parts

Electrical Box
(Qty: 2)

Outlet Cover Plate
(Qty: 1)

Vacuum Controller Cover Plate
(Qty: 1)

Combination Switch/Outlet
(Qty: 1)

Power Cord w/ Plug End
(Qty: 1)

14" Wire w/ Connector
(Qty: 2)

Rubber Feet
(included w/ pump)
(Qty: 4)

Wire Ties
(Qty: 2 – 6")
(Qty: 1 – 16")

Wire Tie Anchors w/ Screw
(Qty: 2)

Electrical Lever Nut
(Qty: 2)

4" Bungee Cord
(Qty: 2)

6" Bungee Cord
(Qty: 1)

16" Black Vinyl Tube
(Qty: 1)

Thread-Sealing Tape
(Qty: 1)

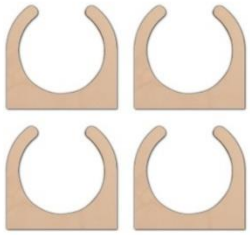
Self-Threading Insert
(Qty: 4)

Vacuum Press Carrier

Grade A, 13-Ply Birch

Carrier Base

Carrier Upright



Reservoir Brackets

Mounting Plate A

Mounting Plate B

Plywood Stick

Part A: Carrier Assembly

We're going to start off with some easy assembly work. The carrier is made from high-grade birch plywood which can be painted, stained, or left unfinished. You'll need some woodworking glue and sand paper for this section. Let's get started!

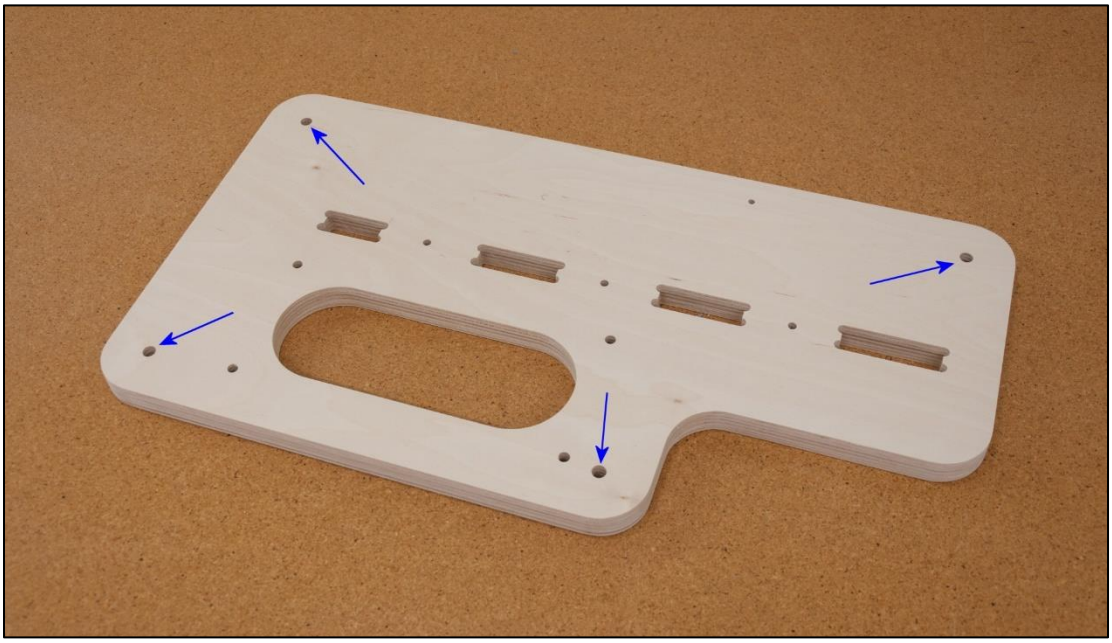
Assembly Time: 15 - 18 Minutes

Required Parts:
- Plywood Carrier Upright
- Plywood Carrier Base
- #10 x 2" Screws (x3)
- Rubber Mounting Feet (x4)
- Threaded Insert (x4)
- Wire Tie Anchor and Screw (x2)

Supplies: Sandpaper (150 grit)

1. The carrier parts will need light sanding. Use 150 grit sandpaper to smooth any rough spots or sharp edges. Some users may wish to use a router with a round-over bit to ease the edges of the carrier base and upright (particularly the handle area).

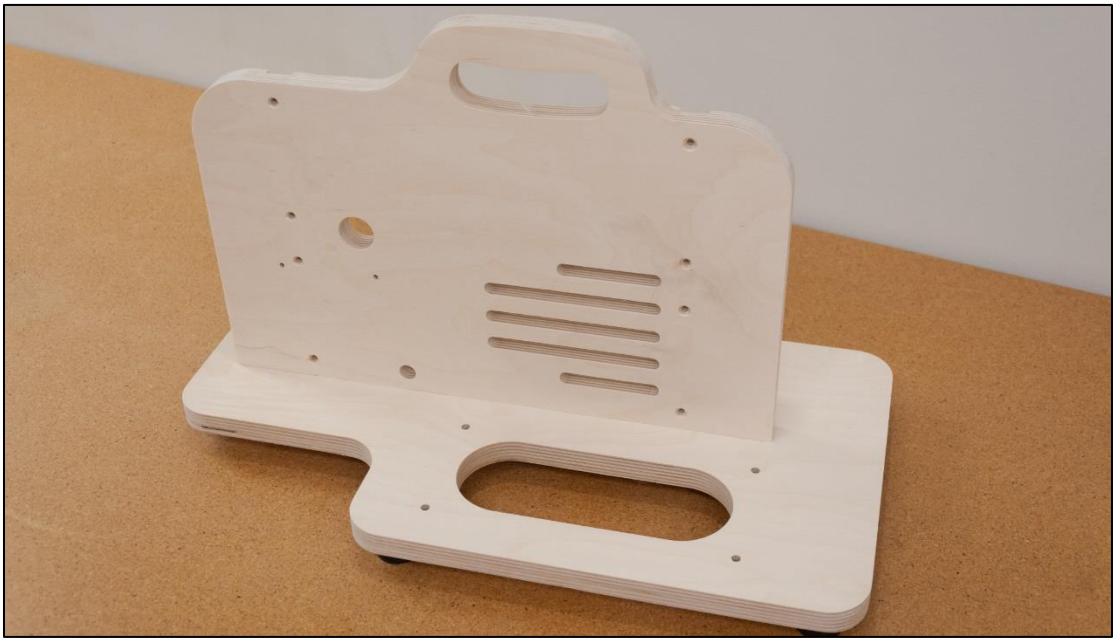
2. Use a 6 mm hex wrench to attach the four self-tapping threaded inserts to the bottom of the carrier base. The picture below shows the locations for the inserts.



3. Continue tightening the inserts until each is just about flush with the plywood surface.

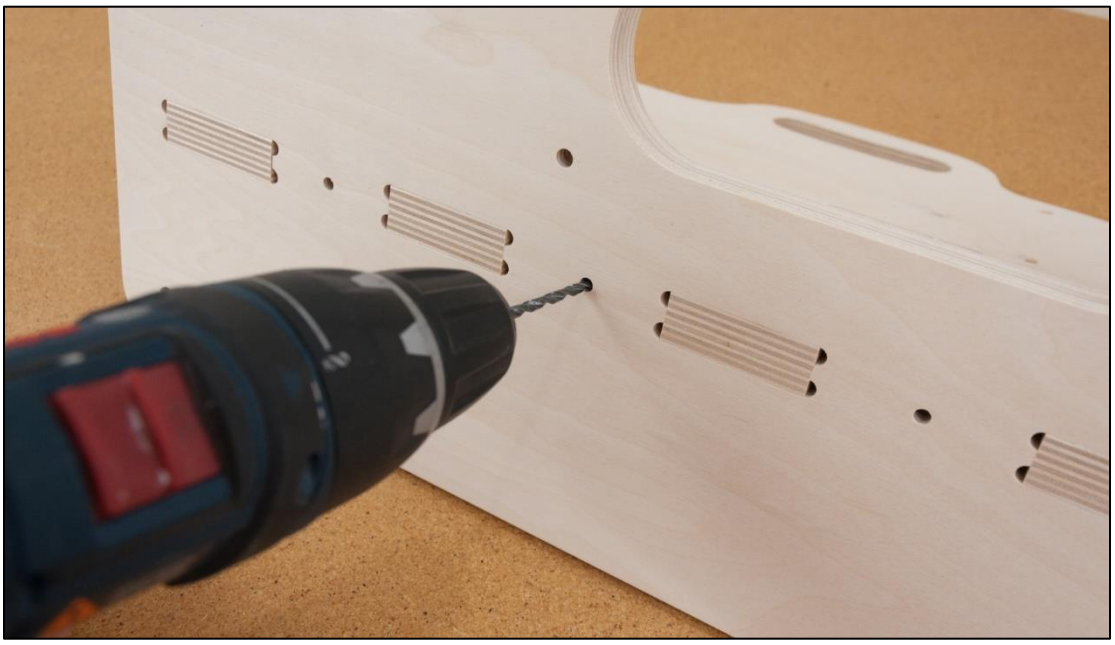
4. Four rubber mounting feet are included in the vacuum pump box. Gently tighten the nut and lock washer on the mounting feet. Then install and hand-tighten the rubber feet into the threaded inserts.

5. Install the upright carrier panel onto the base panel and test fit the tenons on the upright panel with the corresponding slots in the base panel. If the fit is too tight, use sandpaper to remove some thickness from the four sides of each tenon.



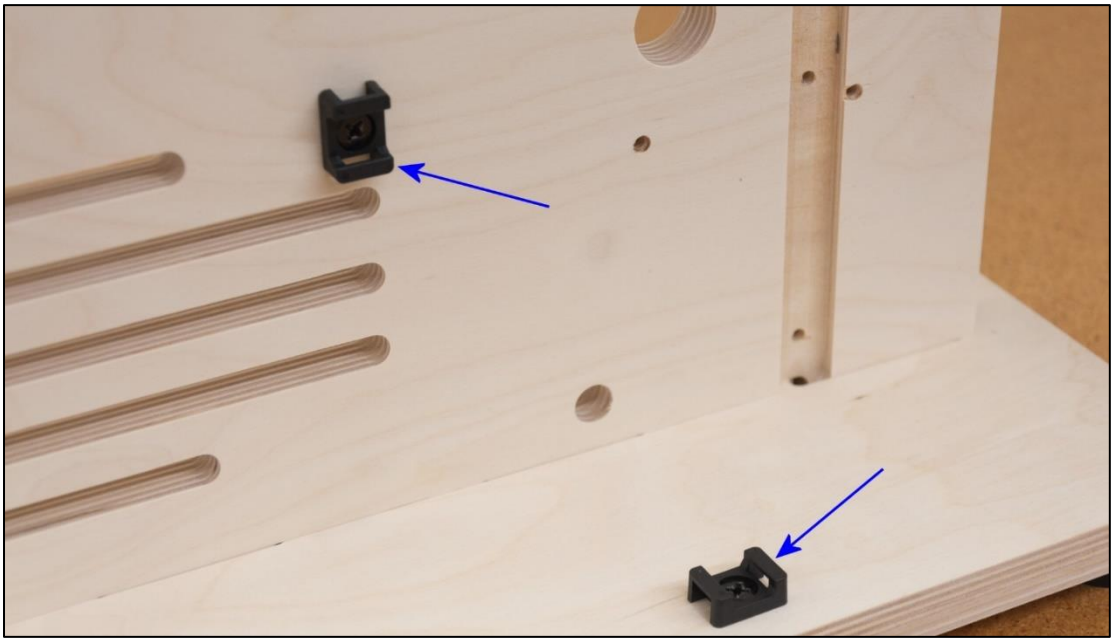
6. The upright carrier panel can now be permanently attached to the base. Apply woodworking glue to the tenons and the corresponding slots. Then attach the upright carrier piece to the base and make sure it is fully seated. Wipe off any excessive glue with a wet paper towel.

7. Now turn the carrier over and look on the bottom of the base for the three pre-drilled holes that will be used to hold the upright to the base. These holes are located between the tenon slots. Using these three holes as a guide, drill 5/32" pilot holes into the upright panel. Hold the drill so the bit goes straight into the upright. The pilot holes need only to go about 1-1/4" into the upright (or a total of 2" if you count the base thickness).

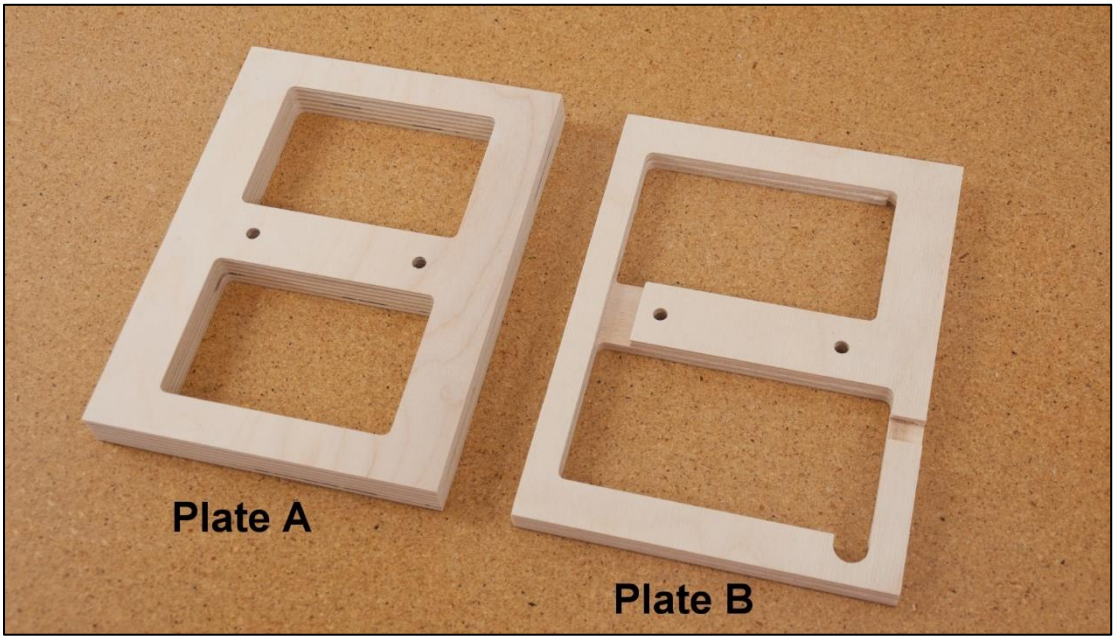


8. Install the three #10 x 2" coarse threaded screws into the case upright from the bottom of the carrier base. Be careful to avoid over-tightening the screws.

9. Now attach one wire tire anchor to the back of the carrier upright and one to the top side of the carrier base using #12 x 1/2" black screws. The following picture shows where these parts should be attached and the direction that each anchor should be installed.

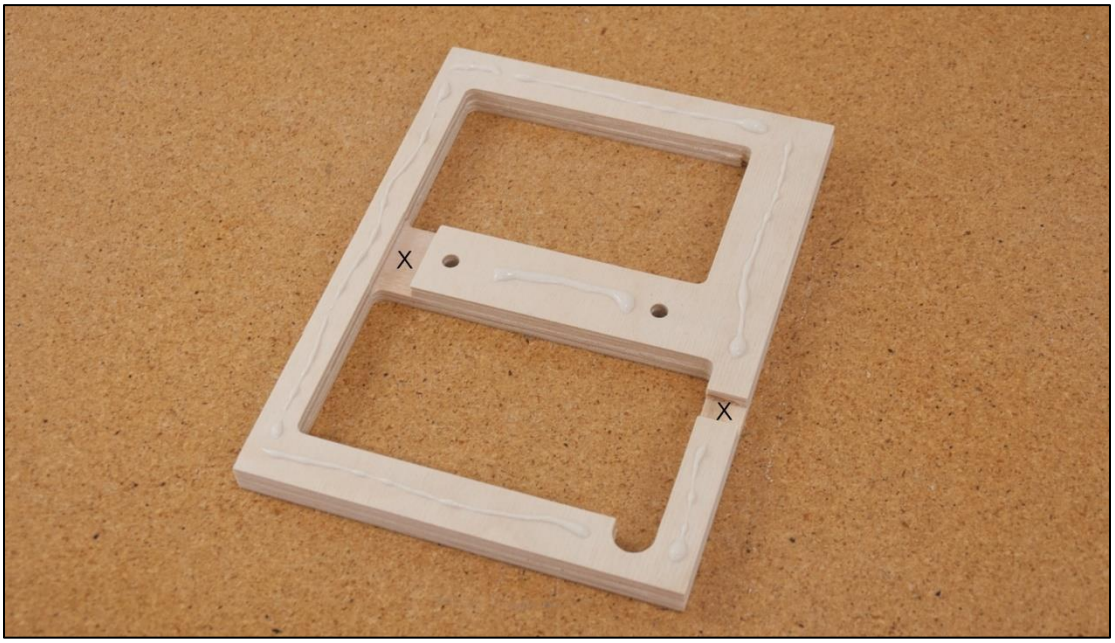


10. Find the plywood pieces that we'll call plates "A" & "B" going forward. Plate A does not have a defined front, back, top, or bottom side, but plate B does. It is critical to align the two plates as shown in the picture below.

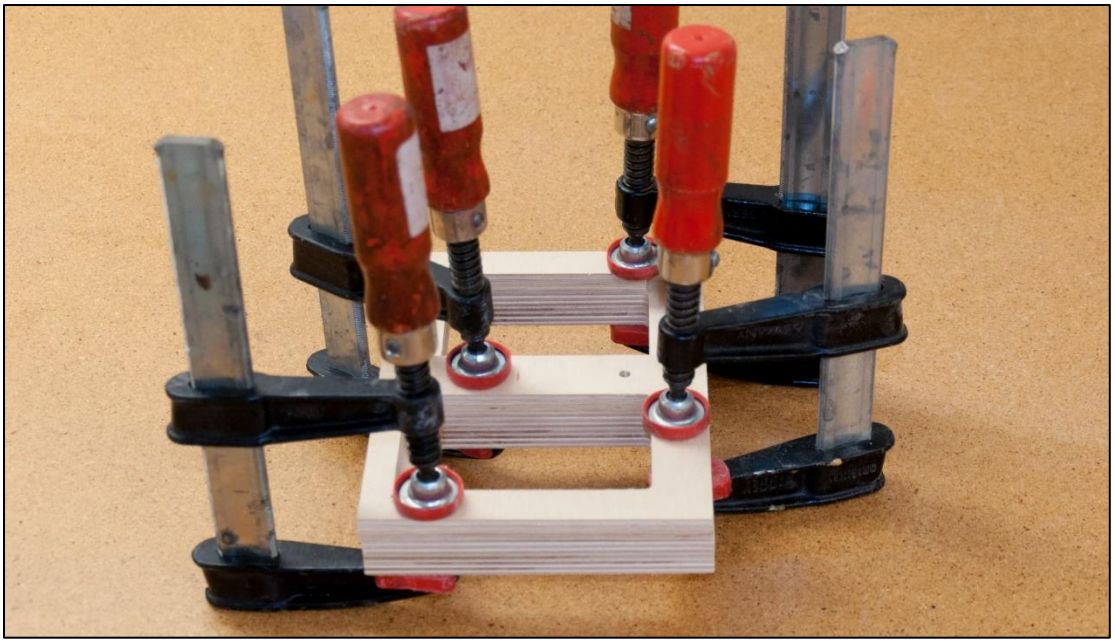


11. Apply a small amount of glue to the face of plate B. Do not apply glue near the channels that are cut into this plate. These two areas are identified with an "X" in the picture below.

    Then set mounting plate A onto the glued surface and align the edges with plate B. Be sure to prevent glue from dripping into the plate B channels.



12. Clamp this assembly together for at least an hour. It will be used in Section E of these instructions. Continue with the next section of the instructions while the glue is curing.



Part B: Main Manifold Assembly

The main manifold assembly is a network of fittings that distribute vacuum from the pump to the vacuum gauge, vacuum controller, reservoirs, and the port that goes out to the vacuum bag. It is important that each part is aggressively tightened to avoid leaks. Take your time with this section.

Assembly Time: 20 - 25 Minutes

Required Parts:

- Cross Fitting
- Pipe Hex Nipple * (x3)
- Barbed Elbow *
- Solenoid Valve
- Breather Fitting
- Vacuum Valve *
- Branch Tee (x2)
- Pipe Elbow *
- Check Valve *
- 1/4" NPT Male Fitting with 3/8" Barb *

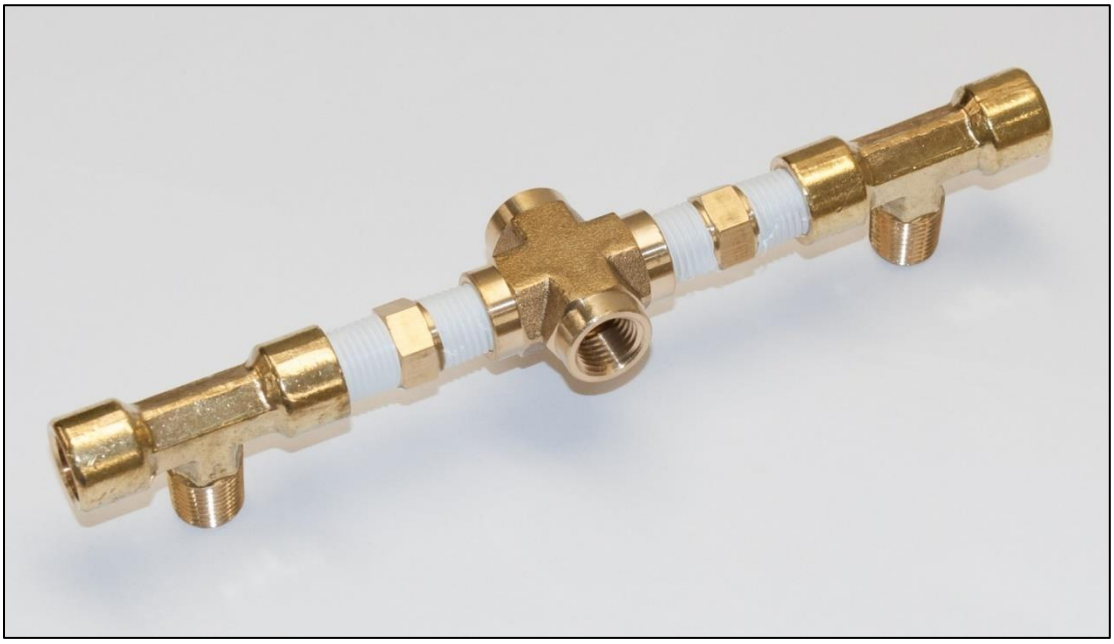
Supplies: Thread Sealing Tape

1. Apply thread sealing tape to each of the parts listed above that have an asterisk (*) next to the part name.

   Quick Tip: *Information about applying thread sealing tape can be found in the "Before You Begin" section of these instructions.*

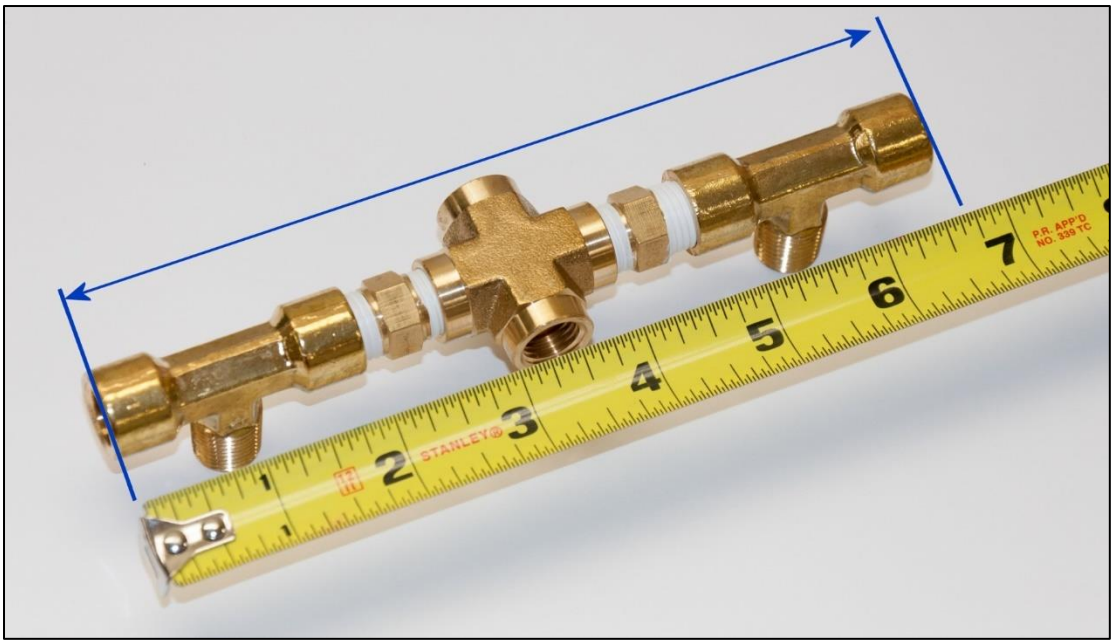
2. Loosely attach two pipe hex nipples to opposite sides of the cross fitting.

3. Loosely attach a branch tee to both pipe hex nipples. The assembly should appear as shown in the picture below.



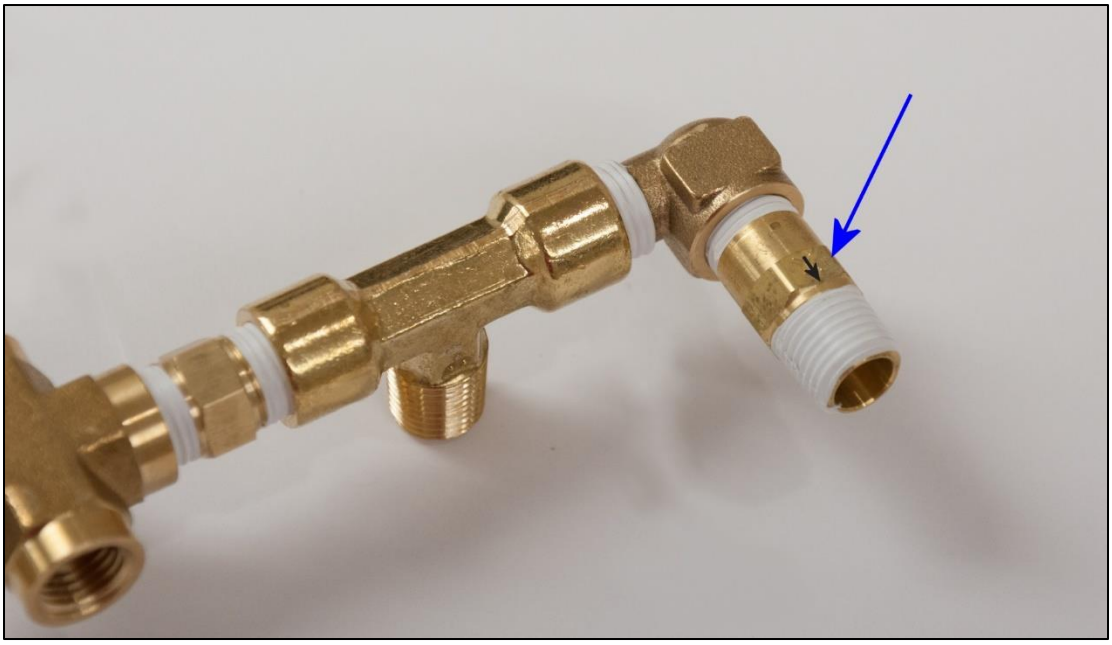
4. The assembly can now be aggressively tightened. You may find it easier to clamp the cross fitting in a bench-mounted vice and tighten the branch tees with an adjustable wrench. The hex nipples will be tightened in this process.

5. Give close attention to the two pictures below. When fully tightened, the male threads on the branch tees must align with each other and they must be 90° to the open ports on the cross fitting. It is also important that the fully-tightened assembly measures between 6-1/2" and 6-3/4" in length between the ends of the branch tees.

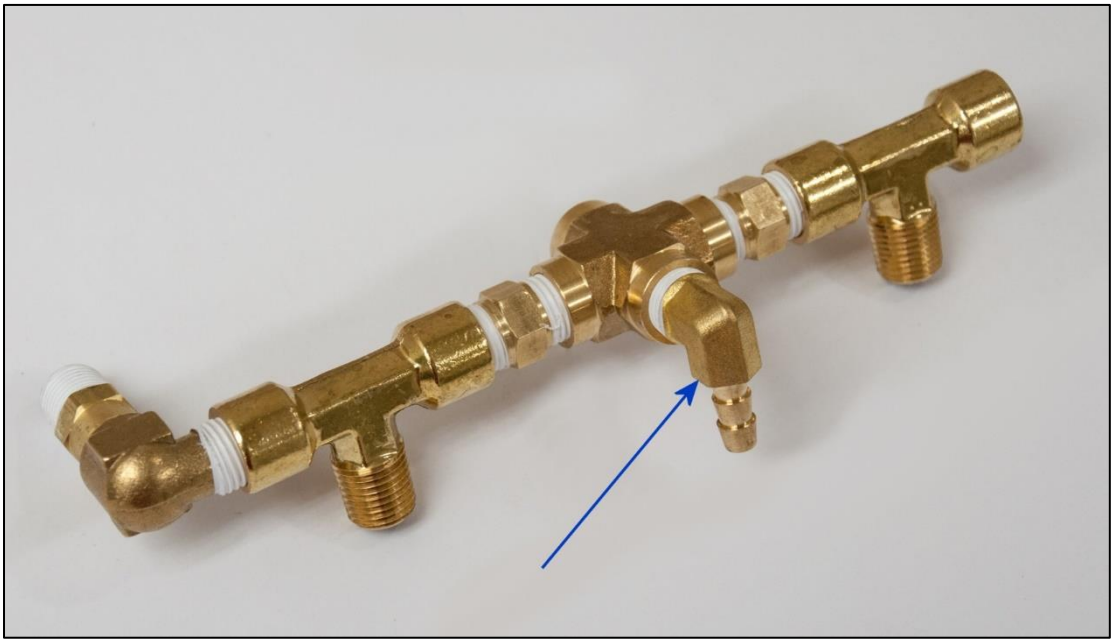


6. Attach the pipe elbow to one of the branch tees and aggressively tighten it using an adjustable wrench while holding the branch tee with a 12mm wrench. When finished, be sure the elbow is aligned as shown in the following picture. It should be 90° to the male threads on the branch tee.

7. Find the check valve that is included with the EVS-2 kit and look for the arrow stamped on the side. Attach the check valve to the pipe elbow with aggressive force using a 9/16" wrench. The arrow should be pointing away from the brass pipe elbow. The correct positioning of the check valve is very important.



8. Attach the barbed elbow to the cross fitting as shown below. Then aggressively tighten it with an adjustable wrench until the elbow fitting is pointing the direction as shown in the picture.



9. Attach a pipe hex nipple to the female side of the vacuum valve. Aggressively tighten the fittings using a 9/16" wrench on the hex nipple and an 18mm wrench on the vacuum valve.

10. Attach the male thread side of the vacuum valve to the remaining opening on the cross fitting using aggressive force. Exercise care to get this right - make sure you have not connected the hex pipe nipple to the opening on the cross fitting.

    Tighten this assembly by placing the 18mm hex section of the vacuum valve in a bench mounted vise and then turn the rest of the assembly by hand.

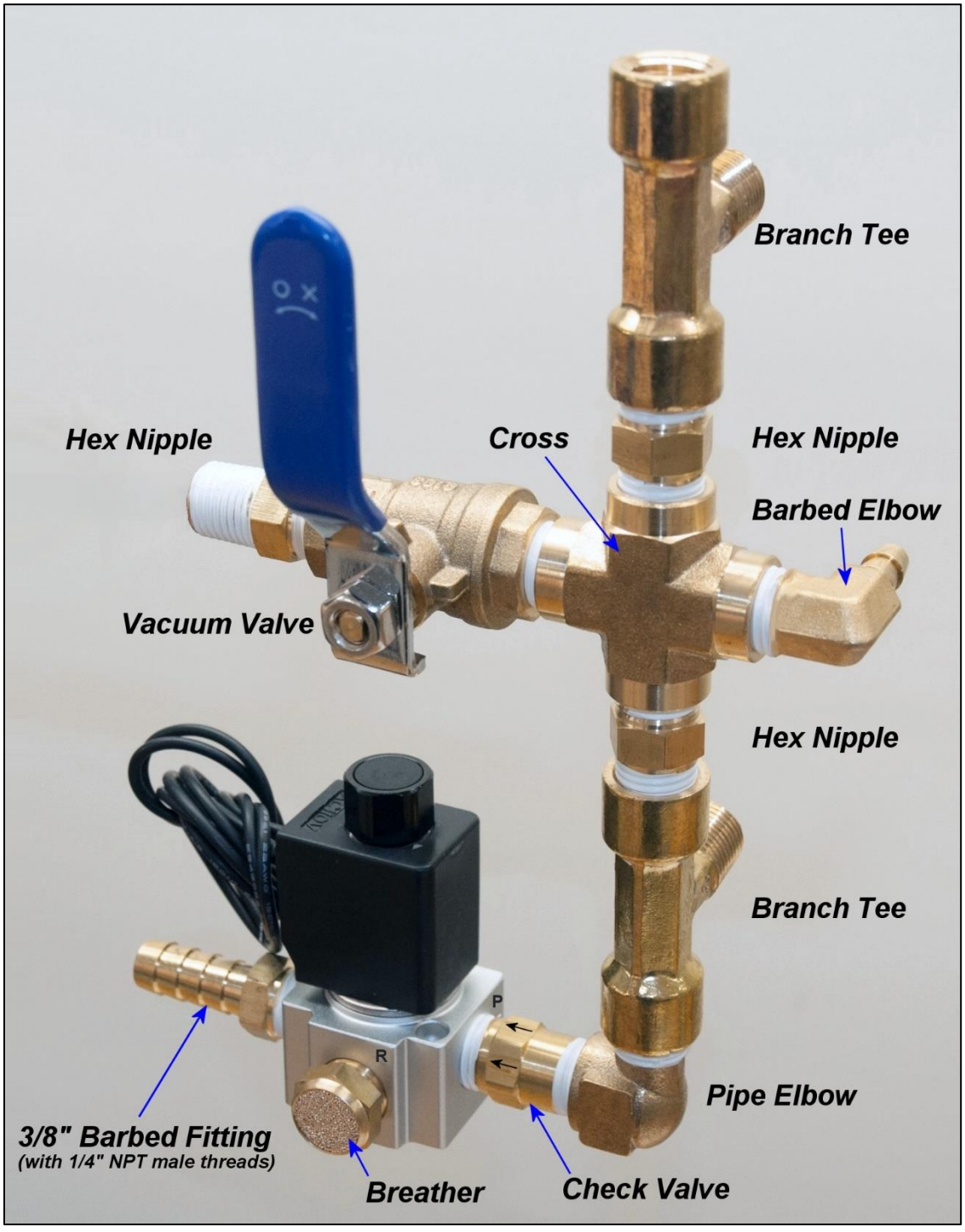
11. When finished, the alignment of the vacuum valve on the manifold assembly should match the picture below so that the handle on the valve is in the upright position when closed.

12. Find the breather fitting and solenoid valve that are included with the kit. Firmly attach the breather fitting to the "R" port on the solenoid valve using a 15mm wrench.

13. Firmly attach a 3/8" straight barbed fitting to the "N" port of the solenoid valve. Use a 9/16" wrench on the fitting and an adjustable wrench to hold the valve.

14. Attach the solenoid valve assembly to the check valve on the manifold with firm but not aggressive force. When completed, the solenoid valve should be aligned/positioned on the manifold as shown in the picture below.

The completed manifold assembly should appear as shown in the following picture.



Set the manifold assembly to the side for now. It will be attached to the vacuum reservoirs later in these instructions.

Part C: Main Vacuum Reservoir Assemblies

The main reservoirs in the system hold spare vacuum just like a rechargeable battery. These reservoirs prevent the system from excessive on/off cycles by providing vacuum buffer. The PVC pipe tends to be a bit dirty on the outside, but it can be easily cleaned with a synthetic abrasive pad. Be sure to complete this section of instructions in a well-ventilated area.

Assembly Time:	20 - 25 Minutes	
Required Parts:	3" PVC Caps (x4) 15" x 3" PVC Pipe (x2) Plywood Stick	Reservoir Brackets (x4) 4" Bungee Cords (x2)
Supplies:	Masking tape Paper Towels	PVC Cement Synthetic Abrasive Pad

1. For the first part of this assembly, two 3" PVC pipes and two 3" PVC caps with the pre-tapped holes are required. Inspect the PVC pipe for defects. There should be no chips, cracks, or surface issues.

2. Clean the inside of the 3" PVC caps and the outside mating area of the PVC pipe with a dry paper towel. If the areas on the PVC pipe where the caps will be installed are rough or exceptionally dirty, then clean those areas with a synthetic abrasive pad (also called a "Scotch-Brite" pad). Then inspect the parts to make sure no debris is left behind.

3. Draw a pencil line 1-5/8" from both edges of both 3" PVC pipes. This will help identify the area where PVC cement is to be applied. It will also identify how far the PVC caps will be installed onto the PVC pipe.

Warning: *Be sure to follow the application instructions and safety guidelines on the PVC cement container. Complete the following steps in a well-ventilated area and proceed carefully.*

4. Apply the cement (as directed by the cement instructions) to the inside wall of one of the pre-tapped caps assuring complete coverage.

5. Apply cement to the outside wall of one of the PVC pipes. About 1-5/8" of coverage from the edge of the pipe is adequate. Be sure to apply cement all the way around the pipe.

6. Immediately attach the pre-tapped cap from step 4 above to the PVC pipe making sure it is seated on the pipe up to the pencil line. Be sure to move quickly with this step so the cement does not dry.

   Important*: Hold the cap in place on the pipe for 30 seconds. It will have a tendency to push off due to the chemical reaction that takes place. Use paper towels to wipe off any excess cement at the edges of the PVC caps.*

7. Repeat this step with the other PVC pipe and the other pre-tapped cap. Do not install a cap on the other end of the pipe! When finished, you should have two PVC pipes with one tapped cap cemented to each.

8. Slide one of the plywood reservoir brackets onto each PVC pipe and push it up against the PVC cap.

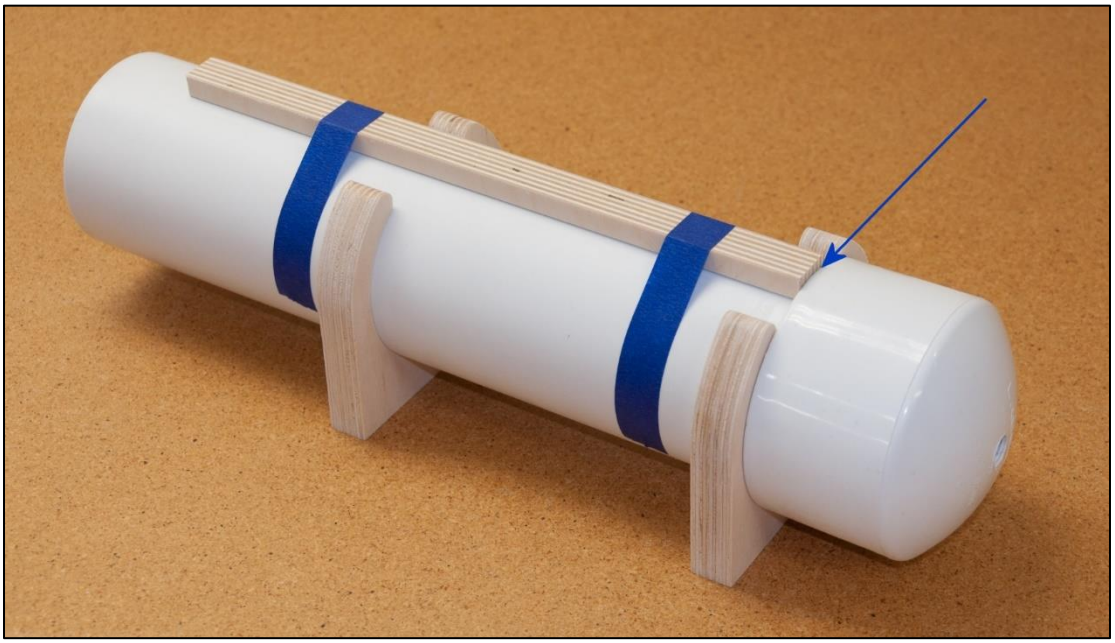
9. Slide both 4" bungee cords onto one of the PVC pipes. Allow the bungee cords to sit roughly at the middle of the PVC pipe. This assembly will be the top vacuum reservoir on the system. These bungees will be used to secure the power cord when the system is not in use.

10. Slide the second plywood reservoir bracket onto each of the two PVC pipes. Set the bracket about 6" onto the pipe. The second bracket should be set in the same direction as the first bracket as shown below.

11. We're reaching a point of no return on the vacuum reservoir assembly. Take a look at your two PVC pipes. One pipe should have a tapped cap, a reservoir bracket, two bungee cords, and another reservoir bracket attached in that order. The other PVC pipe should have a tapped cap and two reservoir brackets attached. If this is not what you are seeing, then please go back and re-read this section of the instructions. It is critical to get this right as there is no turning back after the next step.

12. The PVC pipe without the bungee cord is the bottom reservoir for this kit. You will be working with the bottom reservoir in the next few steps. Set the other reservoir aside for now.

13. Your vacuum press kit came with a plywood "stick" that is approximately 11-5/8" long and 3/4" wide. This piece will act as a temporary spacer between the two PVC caps on this reservoir. Set the stick onto the PVC pipe so that one edge of the stick is pressed against the edge of the cap. Use masking tape to hold the stick in place.

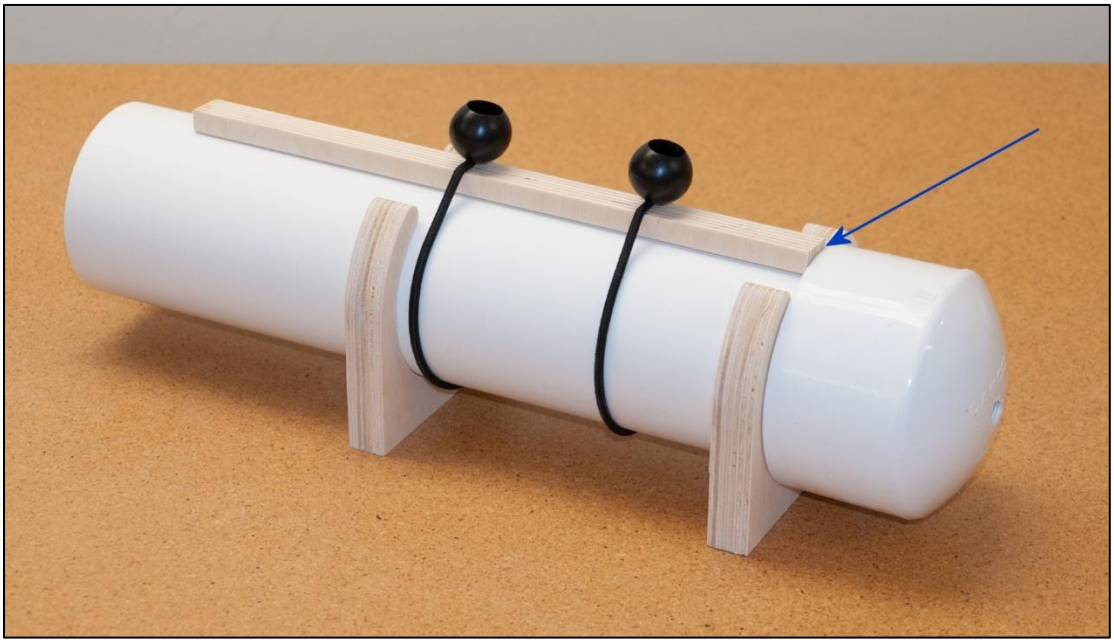


14. In a well-ventilated area, apply PVC cement to an untapped 3" cap assuring full coverage on the inside wall. Then apply cement to the outside of the PVC pipe where the cap will be attached. Be sure to get full coverage of the cement all the way around the pipe and up to the pencil line.

15. Slide the untapped cap onto the pipe until it presses against the stick that is taped to the reservoir. Work quickly with this step so the cement does not dry before the parts are assembled. Waiting too long will result in the cap requiring significant force to be fully seated.

16. Hold the cap in place for 30 seconds. Then wipe off any excess cement at the edges of the PVC caps.

17. Remove the tape and the plywood stick from the PVC pipe. Install the stick on the other reservoir. Tape will not be needed since the bungee cords will hold it in place. Make sure the stick is pressed against the cap on the pipe.



18. Apply PVC cement to the remaining untapped cap. Then apply cement to the outside of the PVC pipe that has the bungee cords attached. Be sure to get full coverage of the cement all the way around the pipe and up to the pencil line.

19. Slide the cap onto the pipe until the stick prevents it from going any further. Hold the cap in place for 30 seconds. Then wipe off any excess cement at the edges of the PVC caps.

20. Remove and discard the stick.

21. This step may not be necessary if the pipes and caps were well-coated with cement and there was excess PVC cement oozing from the caps edges when installed. It's a good idea to perform the following step anyhow. Don’t skip this step!

    Slide the brackets to the center of the PVC pipes.

    To help ensure a 100% leak-free seal between the PVC caps and pipe, hold one of the PVC pipes vertically and apply a thick coat of PVC cement to the edge of the caps where they meet the pipe. Do this in a well-ventilated area.

    Hold the pipe vertical for about two minutes so the cement does not drip off. When complete, turn the pipe over and apply cement to the edge of the other cap.

    Repeat the steps above for the other reservoir assembly. You should now have two perfectly sealed vacuum reservoirs.

Part D: Vacuum Reservoir Marriage

The vacuum reservoirs will now be attached to manifold assembly and then "married" to the vacuum press carrier. This process is very easy but you might need a helper for just a few minutes during this section of the kit instructions.

Assembly Time: 15 - 20 Minutes

Required Parts: Vacuum Reservoir Assemblies
Completed Manifold Assembly
#8 x 1-1/2" Screws (x8)

Supplies: Thread Sealing Tape

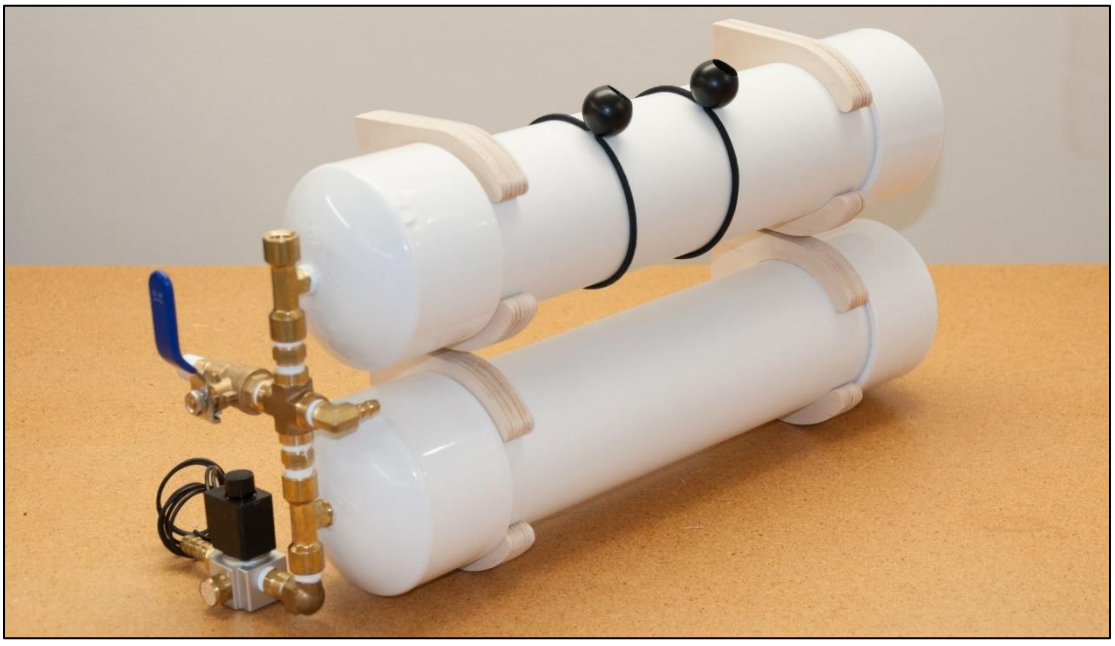
1. Apply thread sealing tape to the male threads on the manifold branch tees.

2. Attach the bottom reservoir (the one without bungee cords) to the lower male thread on the branch tee of the manifold assembly. The threads on the PVC cap are soft so do not use excessive force. Generally speaking, hand-tight is adequate.

3. Attach the top reservoir to the other branch tee of the manifold assembly. Tighten as described above. Turning this reservoir can be quite a challenge due to the reservoir brackets that will get in the way.

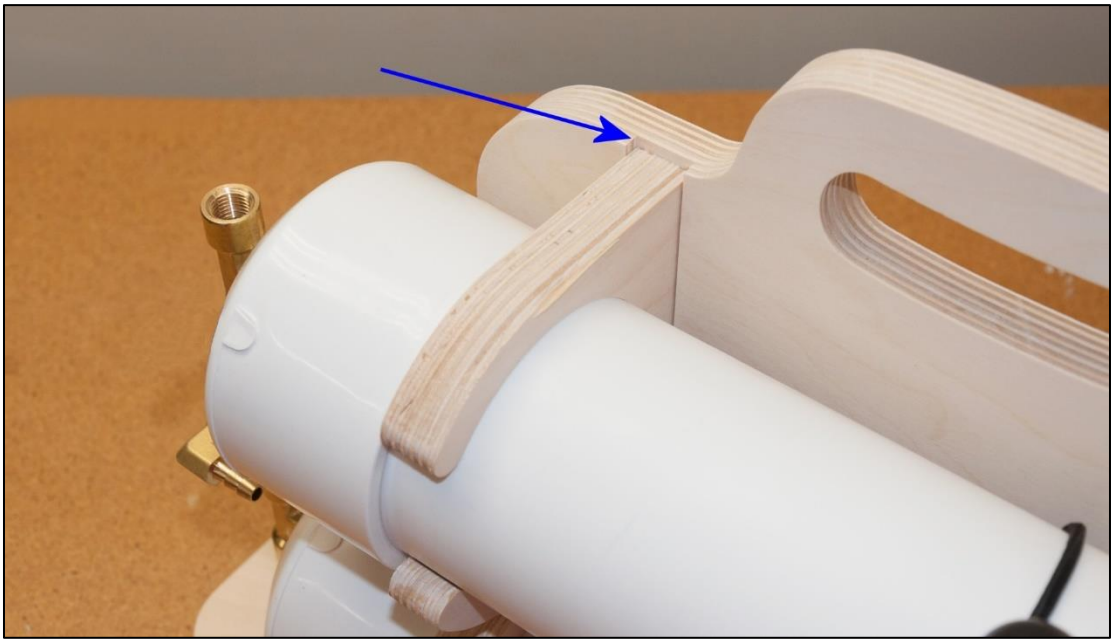
   For now, the brackets can be set anywhere on the pipe to make the assembly process a bit easier, but it will be very helpful to have a friend or spouse hold the brackets in place as you turn the PVC pipe.

   Generally speaking, hand-tight plus a half-turn is enough.



4. The manifold/reservoir assembly can now be married to the upright panel of the vacuum press carrier. The slots in the upright panel are spaced to match the approximate distance between the PVC caps.

   Start by getting the brackets into the slots on the upright carrier panel. You may notice that the top edge of the bracket is not flush with the top of the carrier.

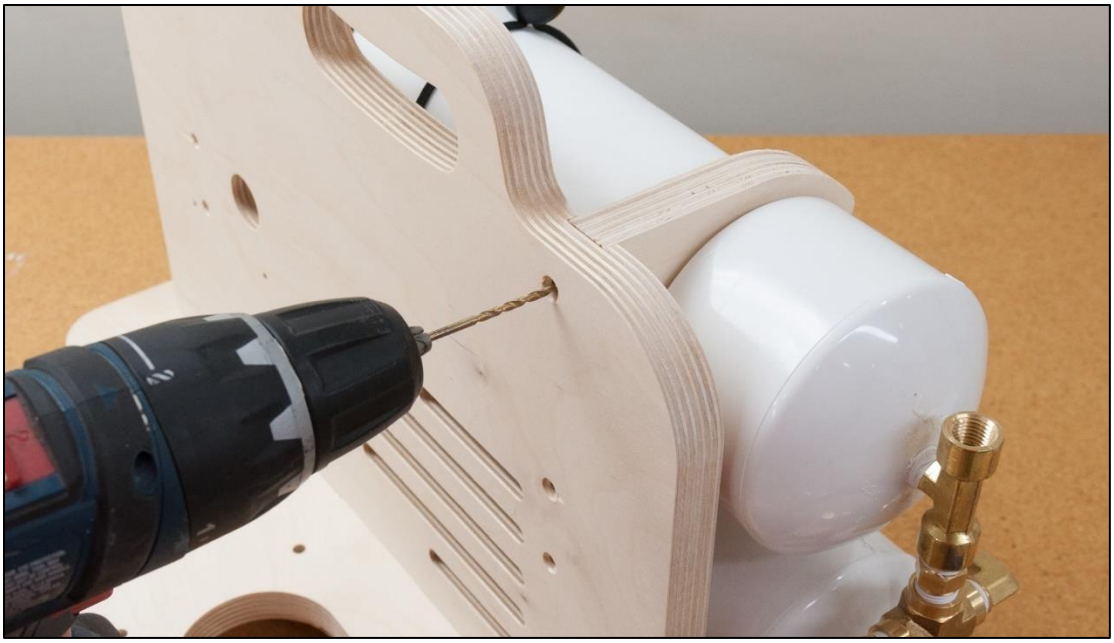


5. Slide the reservoirs/brackets up in the slots until the top edge of the top brackets are flush with the edge of the carrier upright. This step and the next step are not critical, but it will make the kit look better when complete.

6. Ask a helper to hold the position of the reservoirs/brackets, or use small shims/wedges between the carrier base and the lower reservoir brackets to hold the assembly in place.

   Use a 7/64" drill bit to create pilot holes in the brackets. A total of eight pilot holes will need to be drilled (two for each carrier bracket). The eight corresponding predrilled holes in the upright panel act as a guide.

   Starting with the two top holes, drill approximately one inch into the bracket (or 1-1/2" if measuring from the carrier upright panel). Be sure to hold the drill so the bit goes straight into the reservoir bracket.



Quick Tip: *The two holes closest to the carrier base may be a bit tricky. You can tilt the drill bit downward (by tilting the drill slightly upward) if needed to clear the base.*

7. Complete this part of the assembly by inserting a #8 x 1-1/2" screw through each hole and firmly tightening so the brackets are secured in place.

Part E: Miscellaneous Parts

Your vacuum press system is really starting to come together at this point. We're going to clean up some loose ends here and also assemble the vacuum tube and lock-on connectors. Keep up the good work!

Assembly Time: 20 - 25 Minutes

Required Parts:

- Vacuum Filter
- Pipe Elbow *
- Lock-On Plug Fitting *
- Vacuum Pump Screws (x4)
- Fine-Thread Barbed Fitting * (x2)
- Lock-on Connector (x2)
- Braided Vacuum Tube (10 ft)
- 6" Bungee Cord

1. Apply thread sealing tape to the each of the parts listed above that have an asterisk (*) next to the part name.

2. The pipe hex nipple that is attached to the vacuum valve should already have thread sealing tape applied. If not, apply it now.

3. Unscrew and remove the clear plastic bowl and filter cartridge from the vacuum filter.

4. The head of the filter can now be attached to the pipe hex nipple that is connected to the vacuum valve, but be sure to note the correct orientation. Look for the arrow embossed on the side of the filter head. The arrow must point toward the vacuum valve.

Attach the filter head by hand. There should be just one or two rows of the brass pipe thread visible when this is complete. Tightening beyond this point will cause the threaded part of the filter to crack. "Gently snug" is adequate. A pair of pliers can be carefully used if you are unable to turn the filter head by hand. When finished, the area where the filter bowl was attached should be facing down.

5. The filter cartridge and bowl can now be re-attached.

6. Attach the lock-on plug fitting to the brass pipe elbow with an adjustable wrench on the elbow and a 9/16" wrench on the plug fitting.

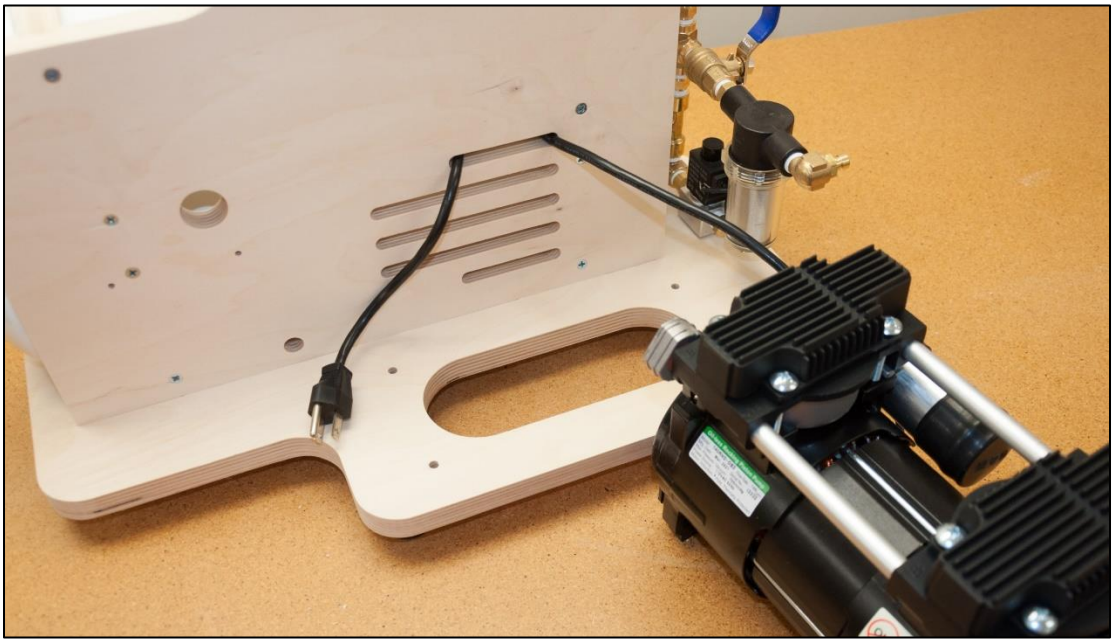
7. Attach the brass pipe elbow to the vacuum filter. Slowly tighten it until there are just one or two of the brass threads visible outside of the plastic filter head. This spacing is critical as it prevents the plastic head from splitting. Again, "gently snug" is adequate. When finished, the brass elbow should be pointing away from the vacuum press kit as shown below.

8. Use 5/8" and 9/16" wrenches to attach the barb fittings to each of the lock-on connectors with aggressive force. **Alternate Assembly Option:** It may be easier to clamp the barb fitting into a bench vise and tighten the lock-on connector with a 5/8" wrench.

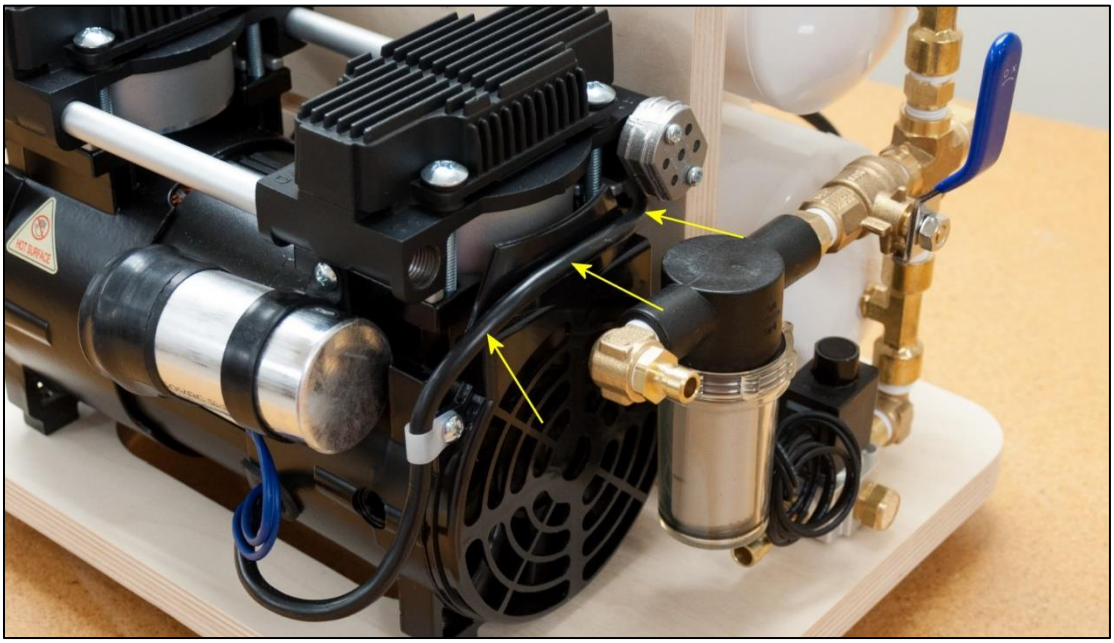
9. Attach each of the above assemblies to the 10 ft vacuum tube. A very-high grade of braided tube is included with the kit so the barb fittings should slide in without much force, but a very small amount of WD-40 can be applied to the barbed fittings to make assembly even easier

   Use the 6" bungee cord to keep the vacuum tube in a coil when the system is not in use.

10. Set the vacuum pump in front of the carrier as shown below. Pull the power cord wire through the top slot on upright panel (and through the opening between the two vacuum reservoirs) as shown in the picture below. Leave it loose for now. This will be cleaned up after the electrical work has been completed.



11. The vacuum pump can now be attached to the carrier base with the four metric screws that are included with the kit. Set the pump onto the carrier so the exhaust muffler is facing the vacuum filter. In the picture below, note the yellow arrows showing how the pump power cord is routed below the exhaust muffler and around the back of the pump.



12. The mounting holes in the carrier base are spaced to match the mounting holes on the vacuum pump. Insert the screws from under the carrier base into the pump body and firmly tighten.

Part F: Vacuum Controller Box Assembly

This section is the first of several that are focused on the wiring of the EVS-2 kit. Do not perform the steps in this section or the remaining electrical work sections if you are uncomfortable or uncertain about electrical work. Find a local electrician to help if needed.

Assembly Time: 20 - 25 Minutes

Required Parts:

Electrical Box	#6 x 1/2" Screws (x2)
Black Wire w/ Insulated Terminals	Vacuum Controller
Black Tubing (16")	1/8" NPT Female Fitting w/ 1/4" Barb
Mounting Plate Assembly	

Warning – Do not plug the end of the power cord into a wall socket at any time during the assembly process. Power must not be applied to the system until you have reached the section titled "Testing and Adjusting".

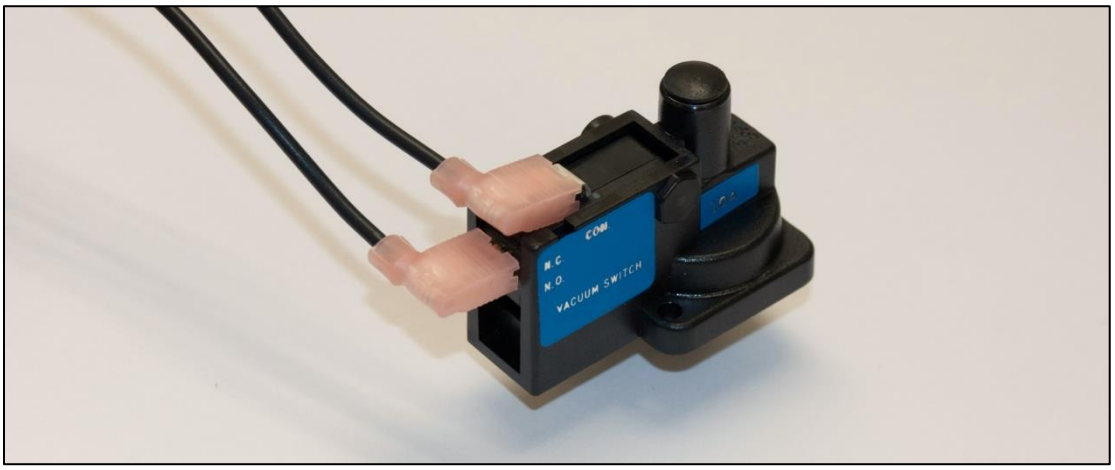
1. The two electrical boxes may be gray or blue. One of these boxes has a 7/16" diameter hole drilled in the back/bottom. Some versions of the electrical box have a larger additional hole in the center which is not used in this kit. This electrical box will be referred to as the "vacuum controller box" in these instructions and it will be used in the next step.

2. Use a screwdriver to push or pry open the flap cover on the side of the electrical box that is furthest away from the 7/16 hole. Then use the screwdriver to bend this flap to the fully open position.

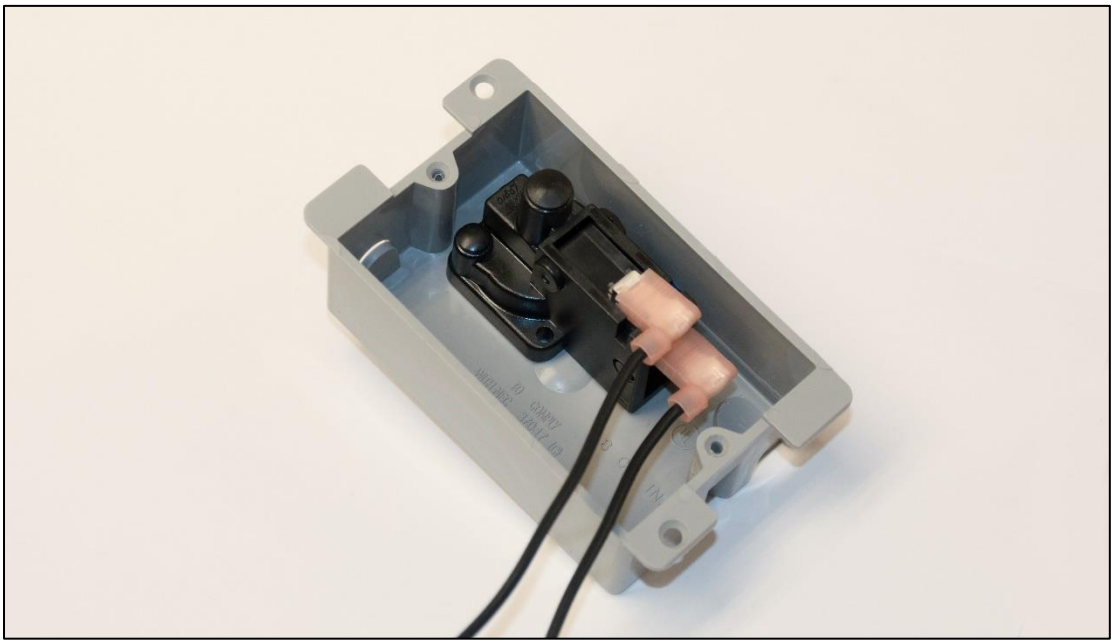
3. Remove the vacuum controller from the factory packaging. Notice that there is a removable plastic cover on the top of the vacuum controller as shown in the picture to the right. This part should be removed and discarded. Also discard the black plastic barb fitting that is included with the vacuum controller.

4. The kit includes two black wires each with pink connectors. Attach one connector to the middle tab on the vacuum controller and one connector to the top tab as shown below. You may find it helpful to use pliers to attach the connectors but be careful that the tab on the vacuum controller does not bend.

   Note the correct orientation of the pink connectors on the vacuum controller. Also note that the lower tab on the vacuum controller is not used.

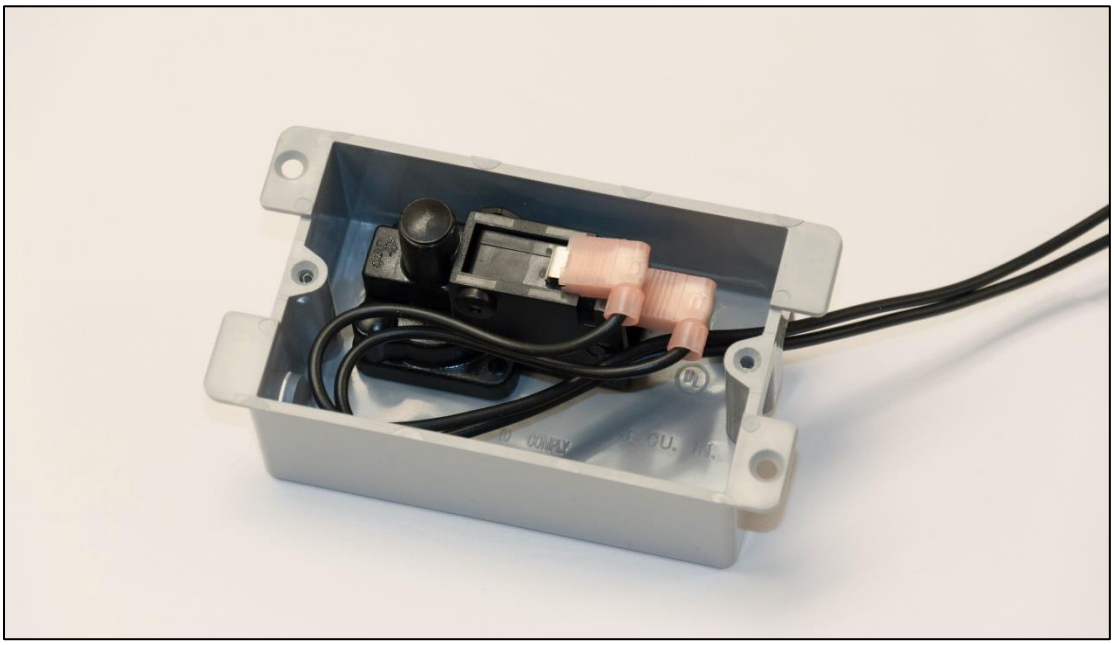


5. Remove the plastic nut from vacuum controller and insert the threaded portion of the vacuum controller through the 7/16" hole in the vacuum controller box so that the controller is positioned as shown below.

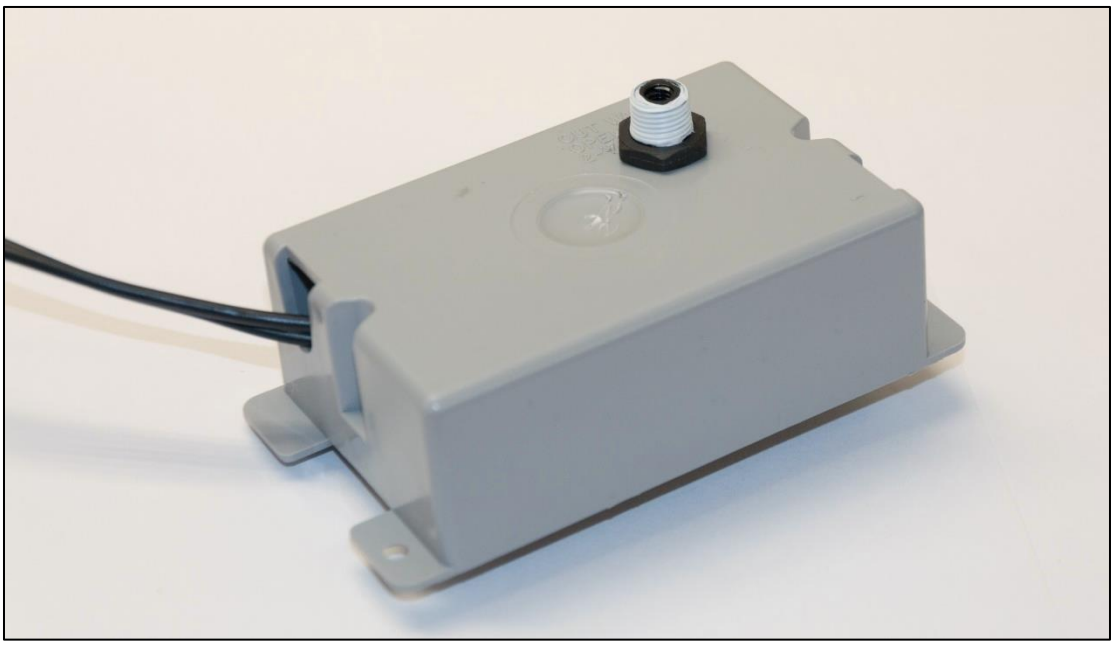


1. Now re-attach the plastic nut and lightly tighten it with a 9/16" wrench. Hand tight plus another 45 degrees of turn is enough. Over-tightening will cause the plastic stem to break off. The nut should be loose enough to still allow the vacuum controller to turn slightly inside the box.

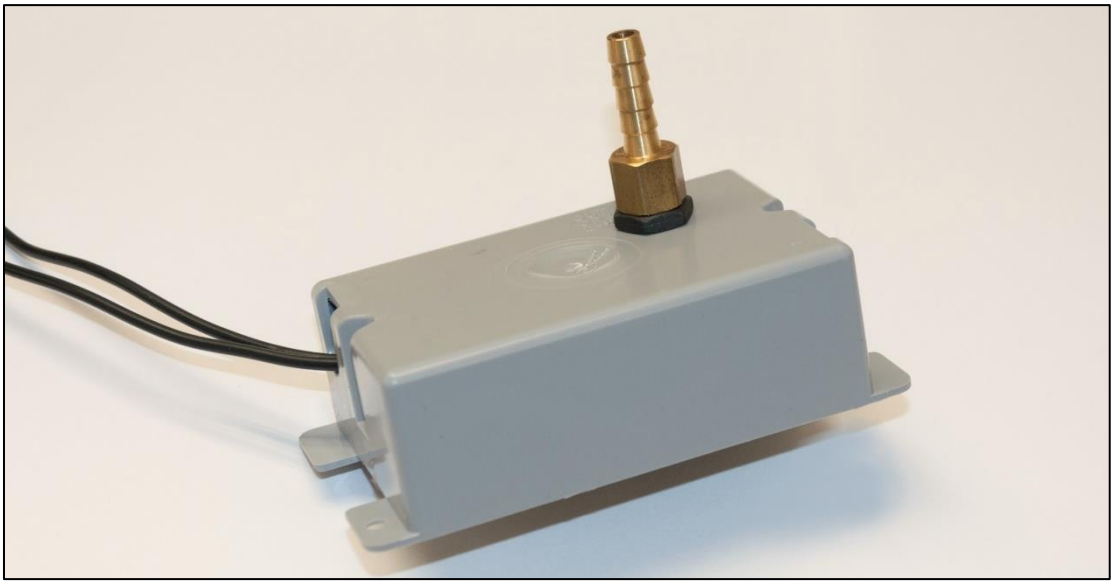
2. Insert the loose ends of both wires into the hole where you previously opened the flap cover. Pull the wires through the flap opening leaving about four inches of loose wire inside the box. This extra bit of wire inside the box will allow the *optional* "continuous-run" add-on to be installed at a later time.



3. Apply thread sealing tape to the threads on the vacuum controller. Use <u>exactly</u> two layers of tape on this part.

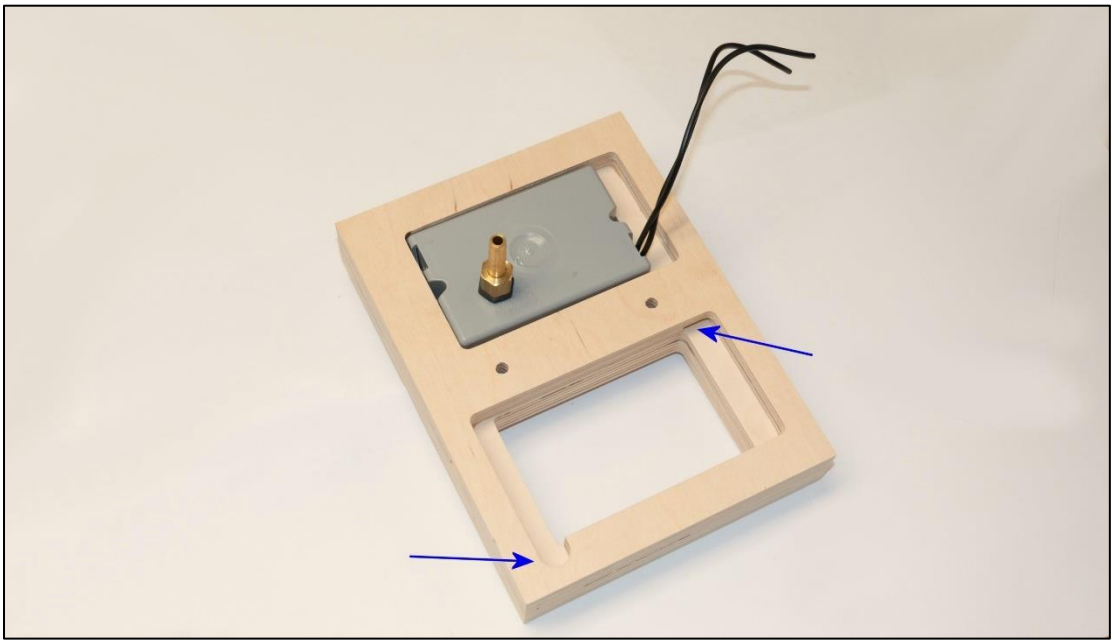


4. Attach the small barb fitting to the vacuum controller. Use the *closed end* of a 1/2" wrench to slowly tighten the fitting. Continue tightening the brass fitting until it just touches the plastic nut. Over-tightening will cause the plastic stem to break off. The maximum amount of torque on this part is just 4 inch-lbs.

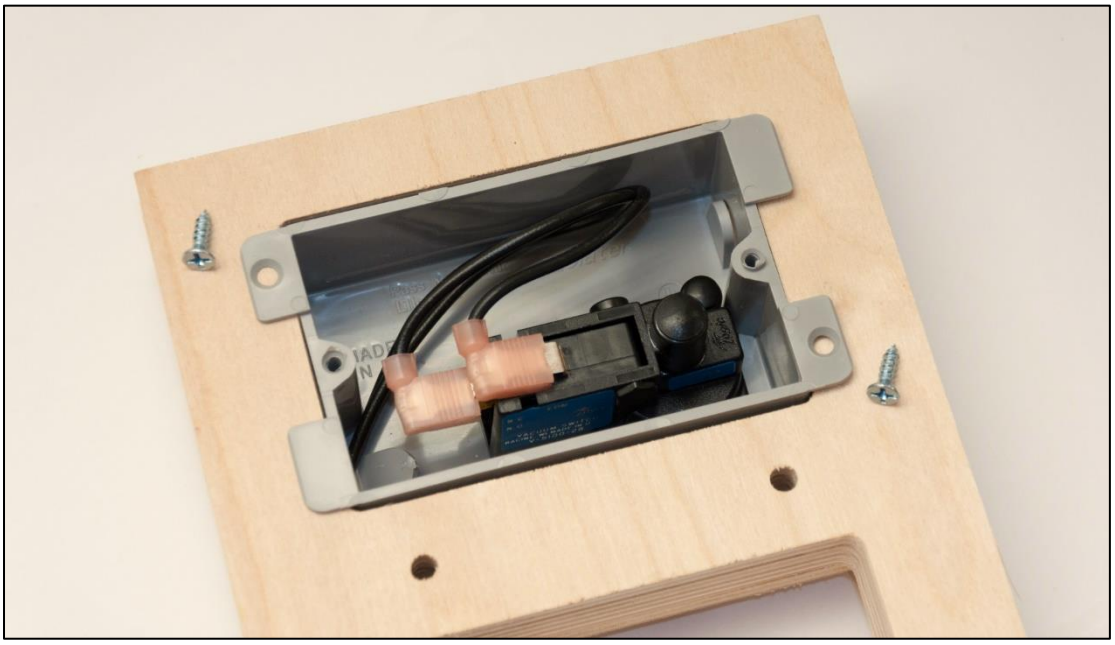


5. Find the plywood mounting plates that were glued together earlier and sand off any glue that has seeped from the edges.

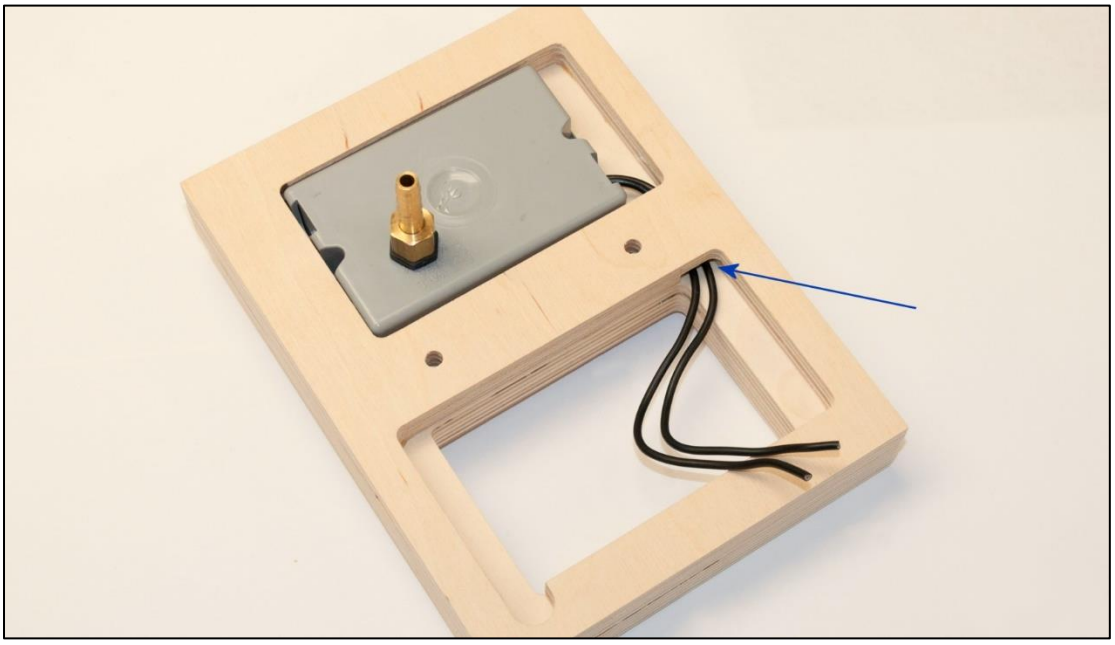
6. Set the electrical box into the mounting plate as shown in the picture below. The correct orientation of electric box in the mounting plate is important. Note the arrows in the picture. The left arrow identifies an elongated opening in the plywood. The right arrow shows a channel between the two plywood pieces.



7. From the front side of the mounting plate, center the vacuum controller box in the opening and use two #6 x 1/2" screws to attach the vacuum controller box to the mounting plate. Pre-drilling with a 3/32" bit is helpful but not required for the mounting screws.



8. Route the two loose black wires through the channel between the plywood mounting plates as shown below.



9. Attach the 16" piece of black vacuum tube to the end of the brass barb fitting. Be sure it is pressed completely onto the barb fitting. Then set this assembly aside as it will be installed later.

Part G: Combination Switch/Outlet Box Assembly

Do not perform this section if you are uncomfortable or uncertain about electrical work. Find a local electrician to help if needed. Follow the instructions shown here even if the optional "continuous-run" add-on was ordered with your EVS-2 kit. Later in these instructions, additional information is provided for installation of the add-on.

Assembly Time: 30 - 35 Minutes

Required Parts:

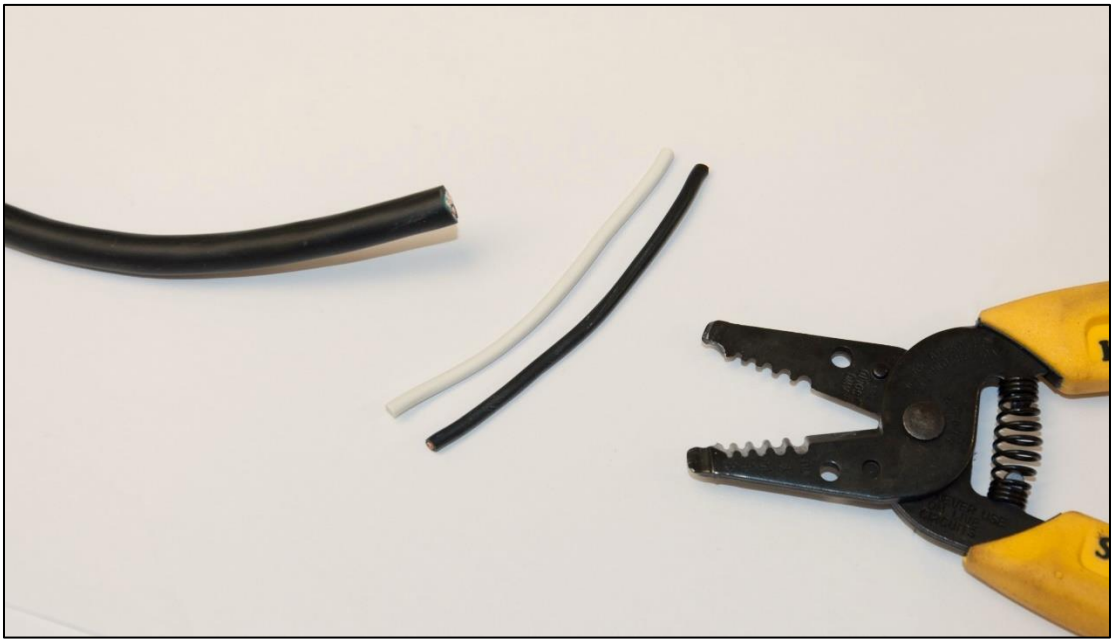
- Electrical Box
- Combination Switch/Outlet
- Lever Nut (x2)
- Power Cord (9 ft)
- #6 x 1/2" Screw (x2)
- 6" Wire Tie

Warning – Do not plug the end of the power cord into a wall socket at any time during the assembly process. Power must not be applied to the system until you have reached the section titled "Testing and Adjusting".

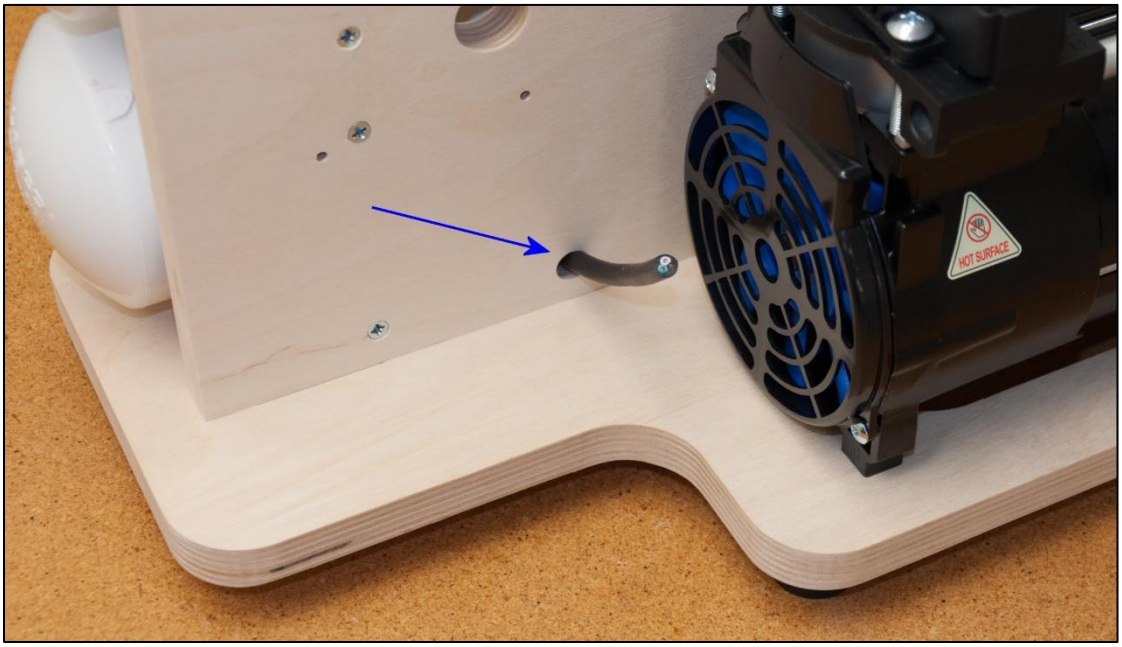
1. Locate the 9-foot power cord and remove 3" of wire from the cut end of the power cord.

2. Carefully slice open the outer black insulation and pull out the three wires (green, black, and white) from this 3" piece. Discard the green wire, but keep the 3" black and white wires.

3. Remove 1/2" to 5/8" of insulation from both ends of the 3" black and white wires and twist the ends of each so the strands stay tight.



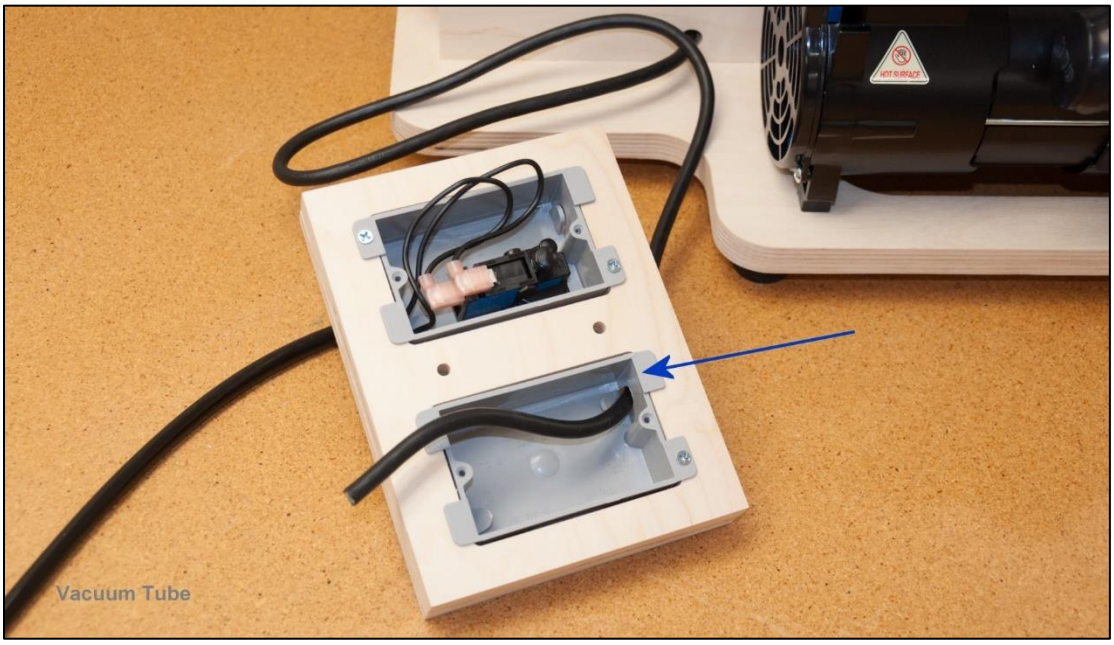
4. From the reservoir side of the carrier upright panel, insert the cut end of the 9-foot power cord under the bottom reservoir and through the 1/2" hole shown in the picture below. Pull about 3 feet of power cord through as this will make the next wiring steps easier.



5. Find the other electrical box included with the EVS-2 kit. Unlike the vacuum controller box, this box has no holes drilled in the back/bottom. Use a screw driver to push open the flap covers on both sides of the box. Then use the screwdriver to force both flaps to the fully open position.

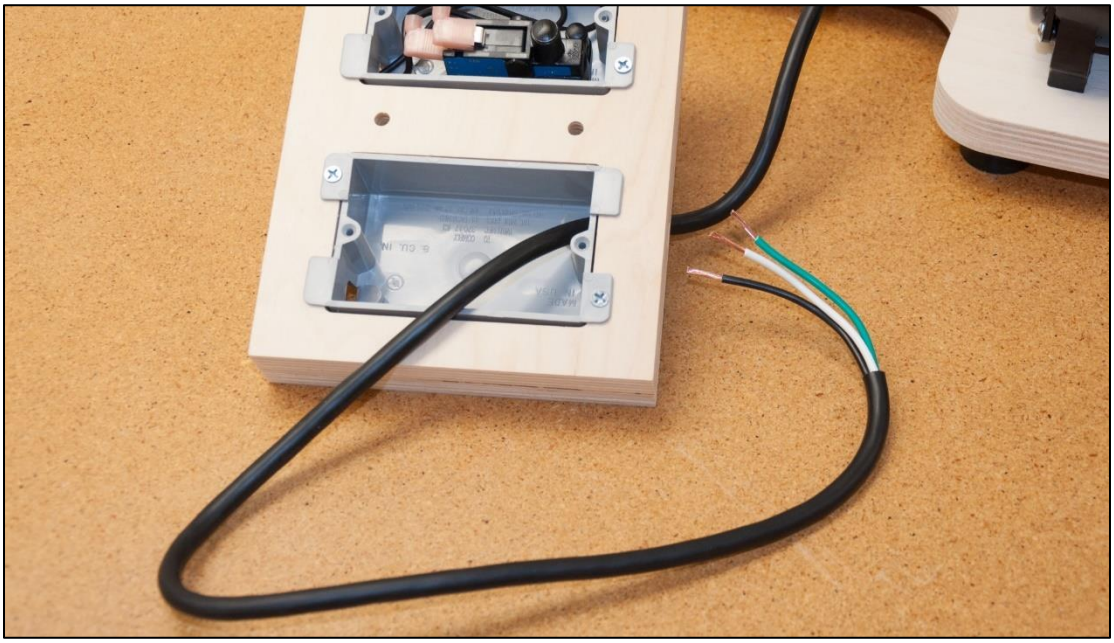
6. Attach the second electric box to mounting plate using two #6 x 1/2" screws. Pre-drilling with a 3/32" drill bit is helpful but not required for these screws.

7. Insert the cut end of the power cord through the flap opening in the right side of the electrical box as shown below. Then pull about 15" of wire into the box. This will make the rest of the wiring instructions a bit easier. Most of this wire will be pulled back out of the box in a later step.

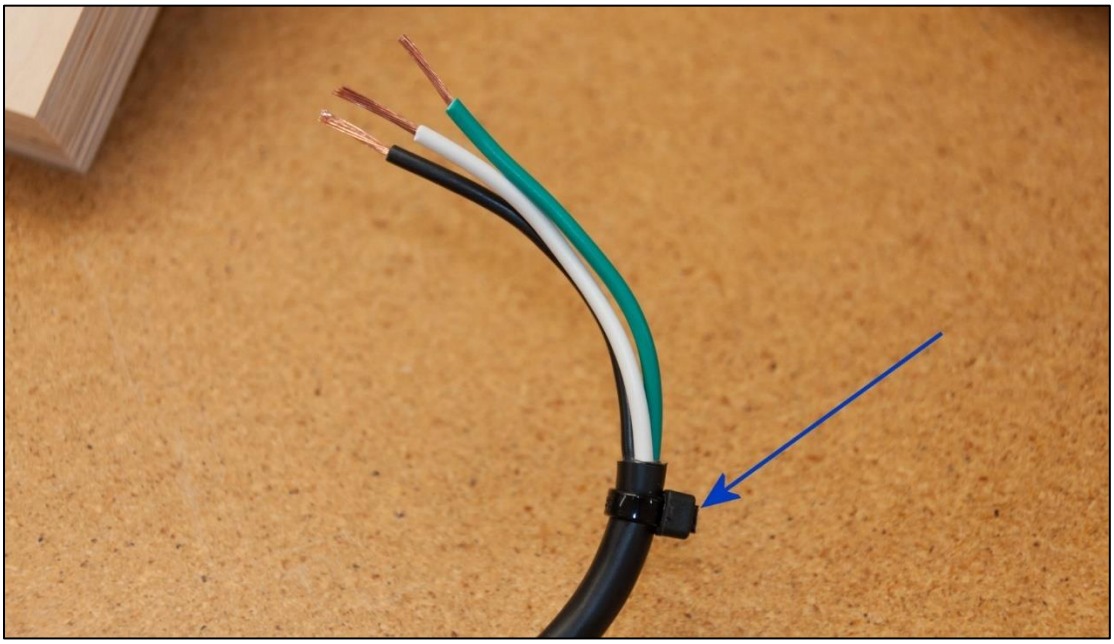


8. Remove 3" of the black insulation from the cut end of the power cord. Some users may prefer to use a razor knife for this step. Do not cut into the insulation of the white, black, and green wires. If the individual insulation on those wires is breached, then completely cut off and discard the 3 inches of wire and start this step over again.

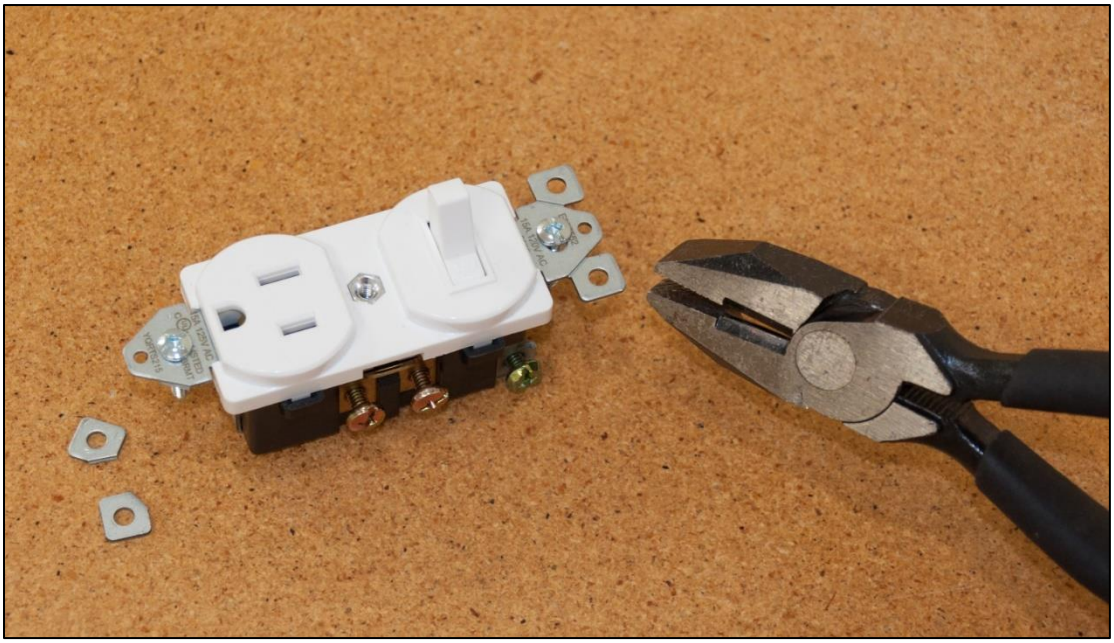
9. Remove 1/2" to 5/8" of insulation from the ends of each of the three wires on the end of the power cord.



10. Tightly attach one of the 6" wire ties onto the power cord right at the edge of the black insulation as shown in the picture below. Then cut off any excess material from the wire tie. This wire tie will prevent the cord from accidentally being pulled out of the electrical box.



11. Locate the combination switch/outlet. This part will be called the "CSO" for the remainder of these instructions. The ears at each end of the CSO are removable. Use pliers to bend the ears on both sides of the CSO and continue working the ears back and forth until they come off.

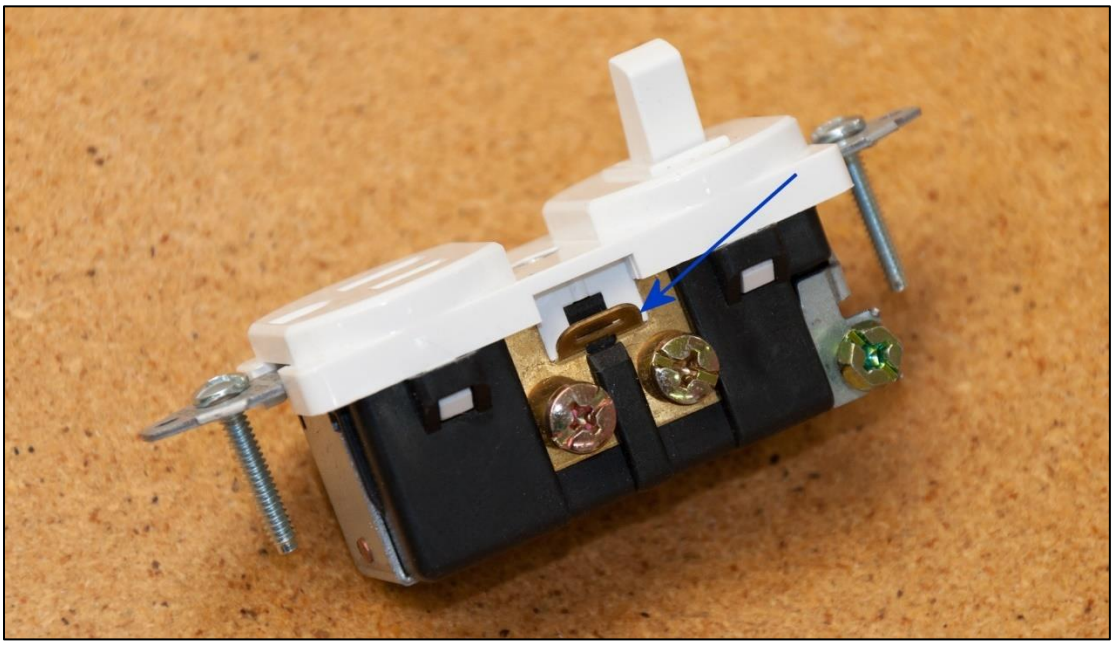


12. Take a look at the right side of the CSO. You will see a "bridge" of metal between the two wire terminal screws. This bridge is designed to be removed when necessary, and with the Project EVS-2 kit the removal of the bridge is critical as it allows the switch and the outlet to function independently.

    Warning: *This step is very important. Do not proceed any further in these instructions until you have successfully completed this step. Failure to complete this step can result in blown circuit breakers/fuses and permanent damage to the vacuum press kit*.

    It will take a bit of patience to remove the bridge. The manufacturer sure could make it a bit easier to do this! Use a small flat screw driver or a pair of needle-nose pliers to work the bridge back and forth until it breaks off. Some users may find it easier to use snips, wire cutters, or even a moto-tool. Simply breaking the bridge is not enough. The entire bridge must be removed and any sharp remnants must also be removed by filing or cutting. It may be easier to temporarily tighten the terminal screws on this side of the CSO.

    When finished, make sure there are no sharp edges left where the bridge was removed.



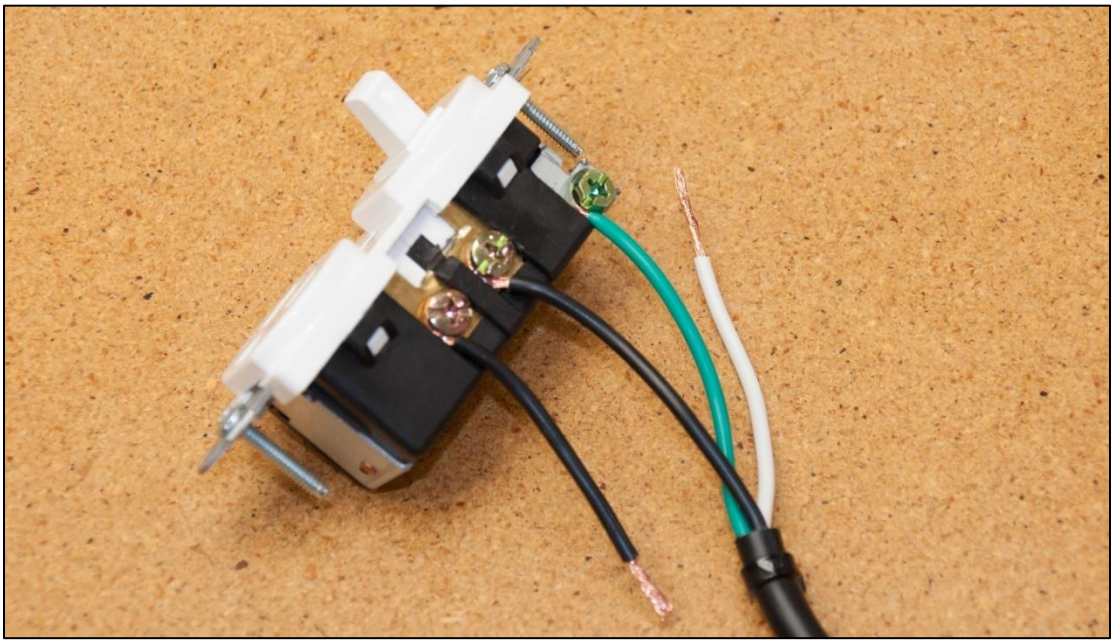
13. Did you complete the previous step? Are you certain? Check again, because if you skipped that step and got it wrong then damage to the vacuum press will occur. The picture below shows the bridge properly removed.

14. Find the green wire on the power cord and twist the exposed copper strands. Then bend it into a hook shape. Some users may prefer to melt solder onto the hook shape of the wire, but doing so is optional.

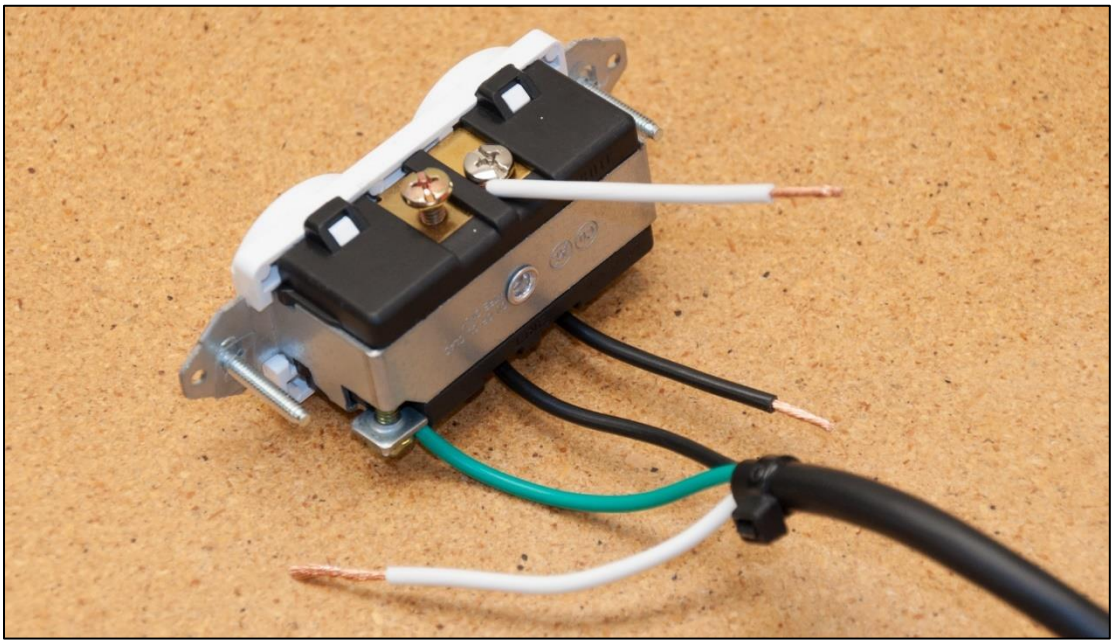
15. Attach this wire to the green grounding terminal on the CSO. The wire should wrap clockwise around the screw terminal for this connection and the remaining screw connections in these instructions. Make sure the copper strands do not fray.

16. Attach the black wire from the power cord to the top-right terminal screw (using the twist and hook method used on the green ground wire). This should be the terminal screw next to the ground terminal and close to the switch side of the CSO. Be sure to inspect the connection and make certain that the copper strands have not frayed. It is important for this to be a very clean connection.

17. Attach the 3" black wire to the screw terminal on the CSO adjacent to the other black wire that was previously attached. This terminal is next to the area where the "bridge" used to be. Be sure to inspect the connection and make certain that the copper strands have not frayed. It is important for this to be a very clean connection.



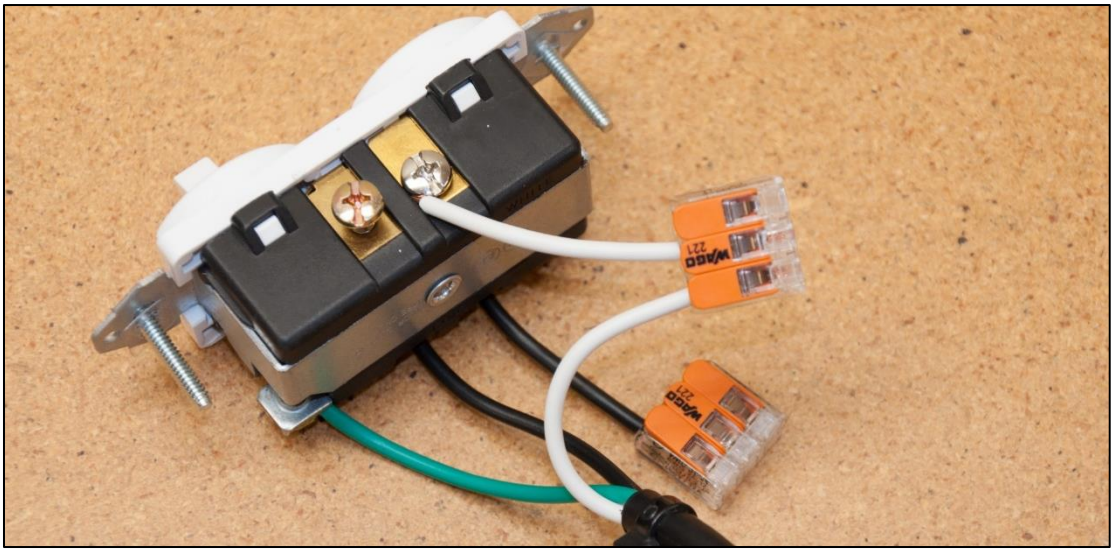
18. Attach the 3" white wire to the silver screw terminal on the CSO. This terminal is on the side opposite from where the black wires were attached, and it is the terminal closest to the outlet part on that side of the CSO. Be sure to inspect the connection and make certain that the copper strands have not frayed. It is important for this to be a very clean connection.



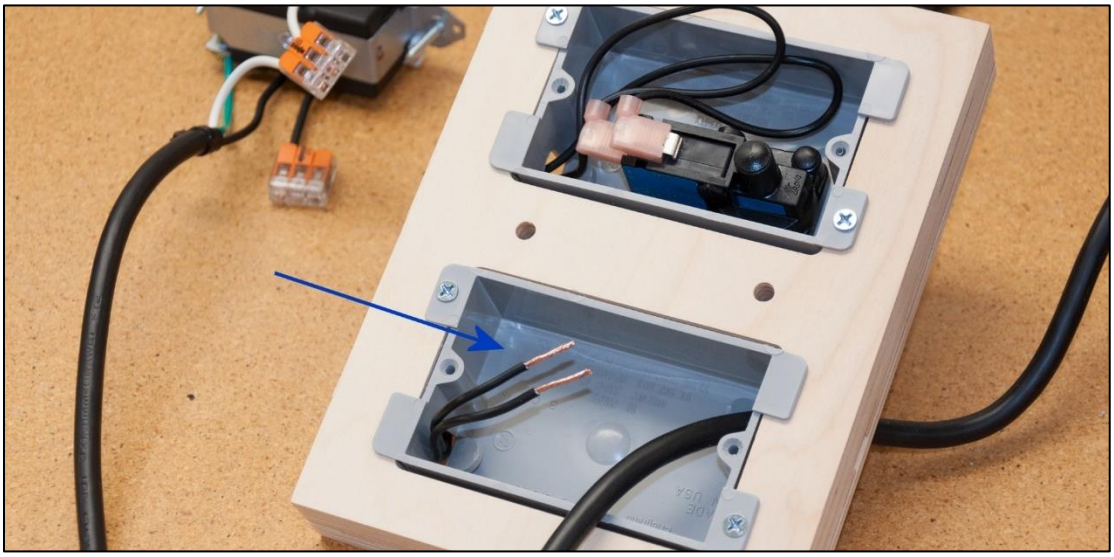
19. Find the lever nuts and you'll see that there are three levers on each. Fully lift up any one of the levers and it will stay in the open position. Insert the end of the 3" black wire into the slot for the opened lever. Then close the lever. The lever will snap shut so watch your fingers when doing this. Make sure no bare wire is outside of the lever nut.

20. Attach the second lever nut to the end of the 3" white wire in the same way as described above.

21. Attach the remaining white wire on the power cord to the lever nut that has the 3" piece of white wire attached.



22. The two wires from the vacuum controller box should already be inserted through the channel in the back of the plate assembly. Check to make sure of this. Then route these two wires through to the remaining open flap cover on the CSO box as shown in the picture below.

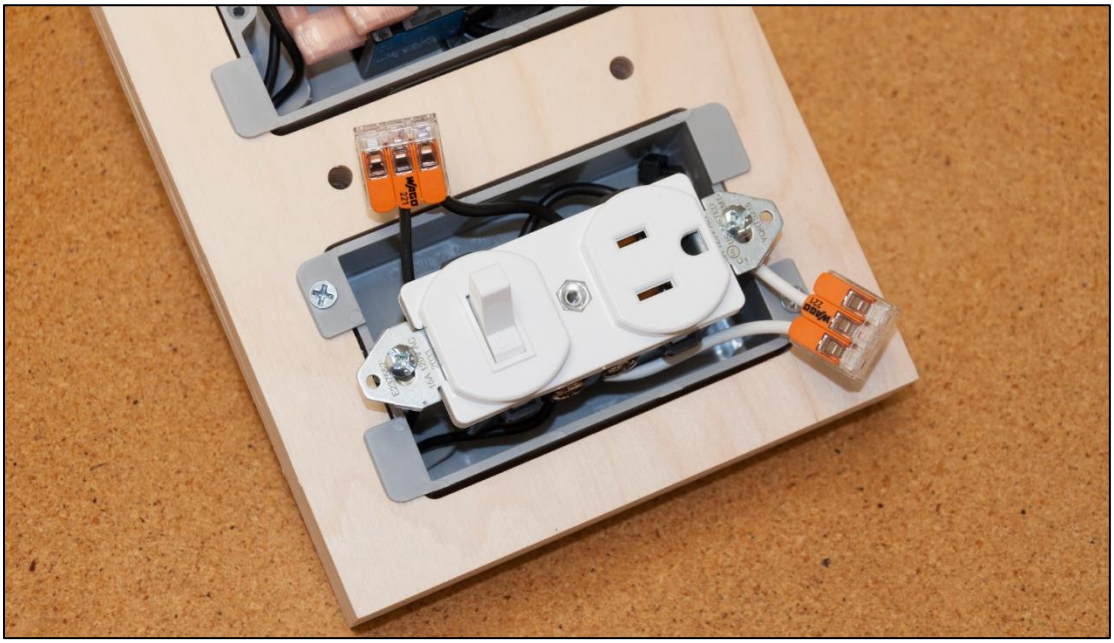


23. Strip 1/2" to 5/8" of insulation from both of these wires.

24. Attach either one of these two wires to the remaining unused screw terminal on the CSO. This will be the terminal next to the terminal with the silver screw (and close to the switch part of the CSO). Be sure to inspect the connection and make certain that the copper strands have not frayed. It is important for this to be a very clean connection.

25. Attach the remaining wire from the vacuum controller box to the lever nut with the 3" black wire already attached. When complete, two of the three slots on this lever nut will be in use. Make sure no bare wire is outside of the lever nut.

26. Pull the excess power cord out of the CSO box and align the CSO in the box as shown below.



Part H: Solenoid Valve Wiring

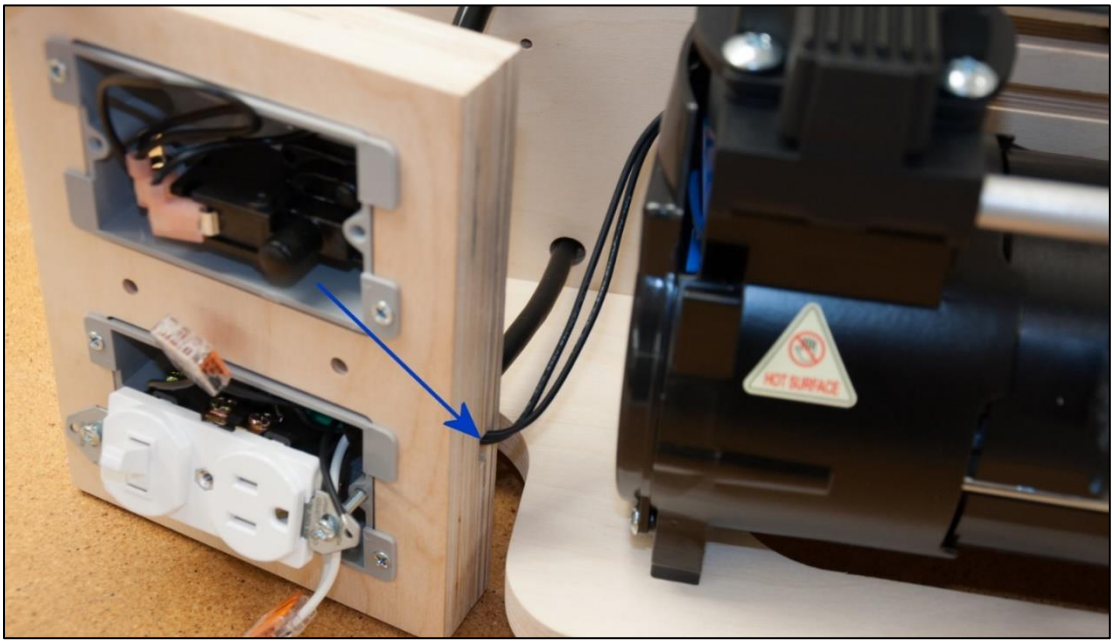
This is an easy part. There are just two wires left to attach and once completed, the core electrical work is finished. If you purchased the optional "continuous-run" add-on kit, you will find the steps for installing it further along in this document. But for now, it's just a few quick steps to get the main system wiring completed.

Assembly Time: 10 Minutes

Warning – Do not plug the end of the power cord into a wall socket at any time during the assembly process. Power must not be applied to the system until you have reached the section titled "Testing and Adjusting".

1. Route the two wires from the solenoid valve behind the vacuum pump and below the pump's power cord.

2. Insert the wires through the slot on the right side of the mounting plate.



3. Then route both wires into CSO box through the same opening where the power cord is inserted.

   Quick Tip: *The manufacturer of the solenoid valve should have already removed about 3/8" of insulation from the ends of both wires. If not, please remove that much insulation using a wire stripping tool.*

4. Attach one wire from the solenoid valve to the lever nut where the two white wires are already attached. This will use the third and final slot available on this lever nut. Gently tug on each of the three wires to make sure they are firmly seated. Then inspect the wiring at the lever nut to ensure there is no bare metal exposed on any of these three wires.

5. Attach the remaining wire from the solenoid valve to the lever nut with the two black wires already attached. This will use the third and final slot available on this lever nut. Gently tug on each of the three wires to make sure they are firmly seated. Then inspect the wiring at the lever nut to ensure there is no bare metal exposed on any of these three wires.

6. Slide the plywood mounting plates close to the carrier upright and then insert the black vacuum tube into the 1" diameter hole in the upright carrier. Now pull the excess power cord back through the 1/2" hole in the upright.

PROJECT: EVS™ 2
VACUUM PRESS SYSTEM

Part I: Wiring Check List

Don't skip this section! It's critically important that each of the previous wiring steps have been completed accurately. If you missed something or got one of the steps wrong, then the system will not run correctly and any mistake or omission could result in damage to multiple parts of the kit. Something worth doing is worth doing well.

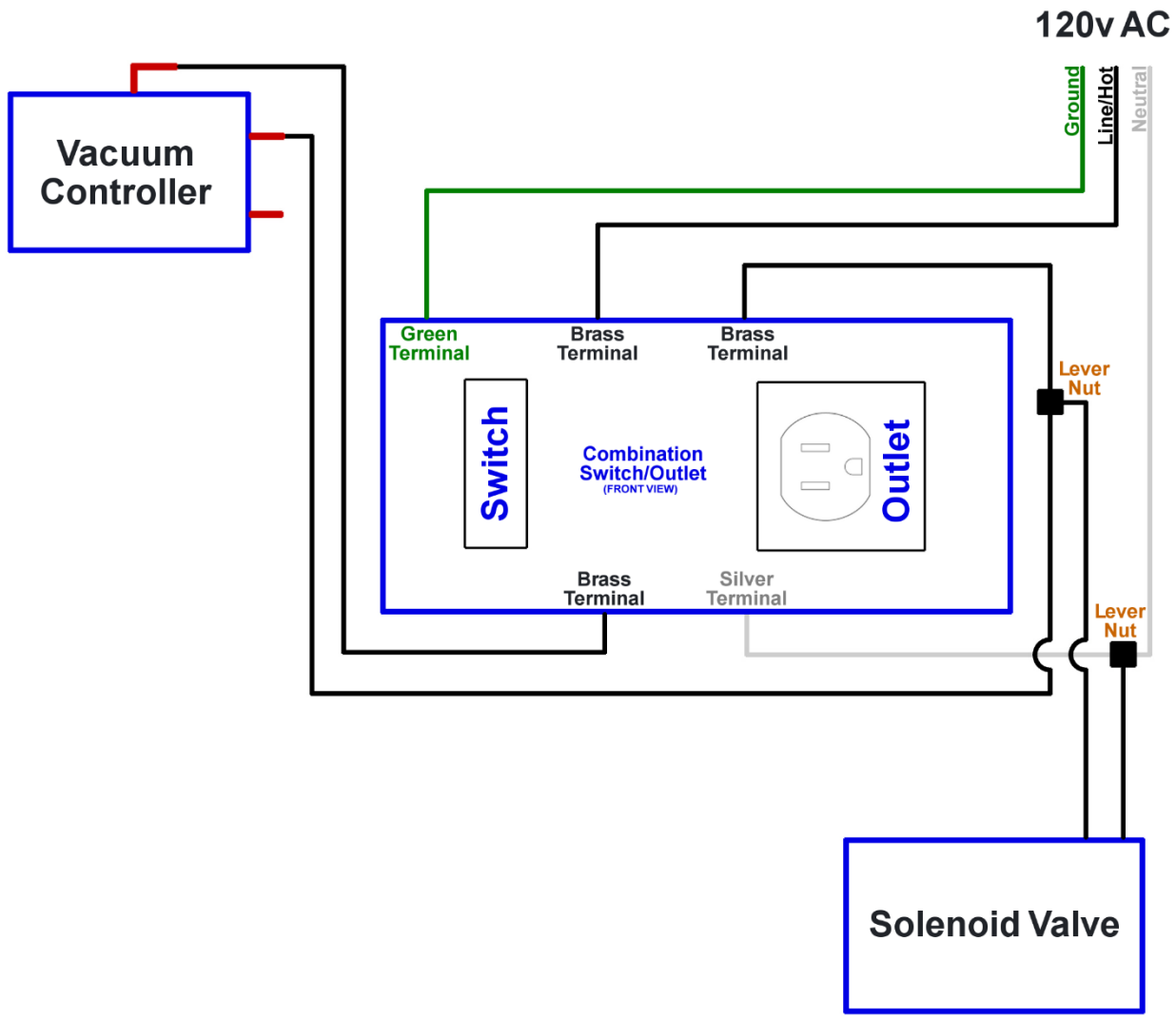
Completion Time: 10 Minutes

Take a close look at the wires inside the CSO box and answer the following questions.

Question	Yes	No
Is the "bridge" between the two gold terminal screws on the CSO completely removed and is that area free of any sharp edges or protrusions?	☐	☐
Does the green wire from the power cord go to the green ground terminal on the CSO?	☐	☐
Does the black wire from the power cord go to the gold screw next to the switch part of the CSO on the side where the bridge was removed?	☐	☐
Does the white wire from the power cord go to a lever nut that has one other white wire and a wire from the solenoid valve attached to it?	☐	☐
Does the other white wire on the lever nut go to the silver terminal screw on the CSO?	☐	☐
Does one of the wires from the vacuum controller box go to the lever nut that has another black power wire and a wire from the solenoid valve attached to it?	☐	☐
Does the other wire from the vacuum controller box go to the screw terminal adjacent to the silver terminal screw?	☐	☐
Are you certain there are no exposed wires or wire strands outside of the lever nuts?	☐	☐
Are the wires that are attached to the screw terminals on the CSO free of any fraying?	☐	☐
Are the wires that are attached to the CSO screw terminals insulated from each other? In other words, are you certain that no two wires on any screw terminals can touch each other?	☐	☐

Do not proceed with any further assembly steps if you answered "no" to any of the questions above. Stop and fix any wiring issues first.

Wiring Schematic



Part J: Wiring Wrap-Up

You're just about finished with the electrical work. Those were a lot of steps but you've done it, and it won't be long before you fire up the system for the first time. I hope your starting to get excited about this project.

Assembly Time: 15 - 20 Minutes

Required Parts:

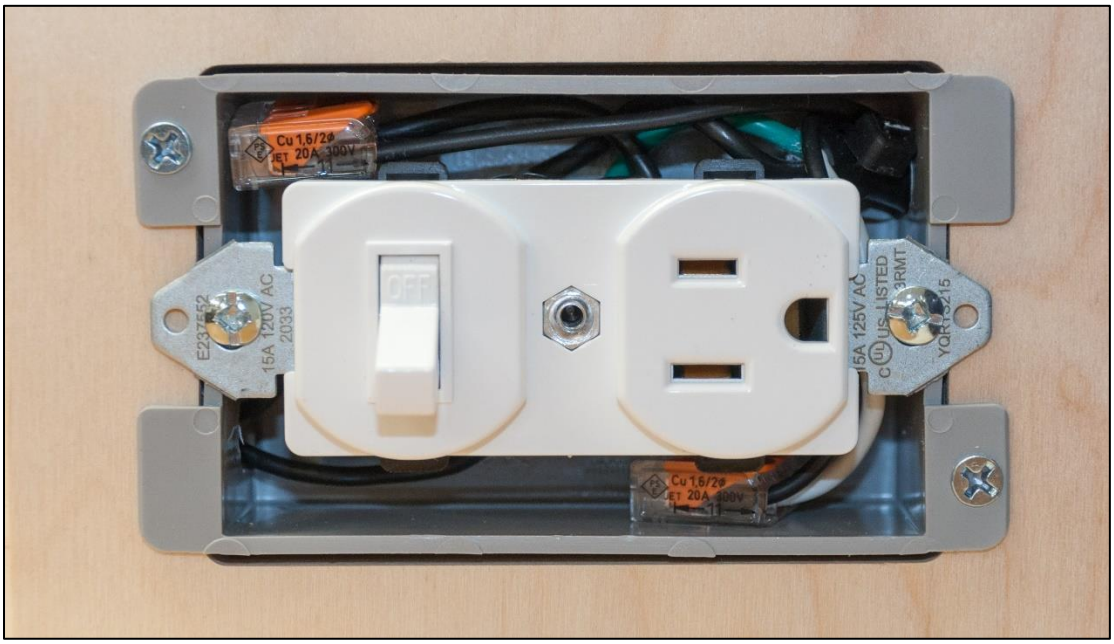
Switch/Outlet Cover (w/ screws)	#12 x 1-3/4" Screw (x2)
Vacuum Controller Cover (w/ screws)	6" Wire Tie

Warning – Do not plug the end of the power cord into a wall socket at any time during the assembly process. Power must not be applied to the system until you have reached the section titled "Testing and Adjusting".

1. The CSO can now be attached to the electrical box with the two screws that are loosely attached to it. The CSO, lever nuts, and wiring will fit inside the box with a bit of careful organization.

    - The lever nut with the three black wires will fit between the top side of the CSO and the inside wall of the electrical box. And the lever nut with two white wires and one black wire will fit between the bottom of the CSO along the inside wall of the electrical box.

    - It is best if the CSO is mounted in the dead center of the electrical box. Use the slotted opening where the mounting screws are located as a guide to get the CSO centered.



2. Attach the corresponding cover plates to both electrical boxes.

3. There is space in the back side of the mounting plate for the power cord to fit. This allows the power cord to be directed toward the power cord hole in the carrier upright panel. The picture below will help make this clear.

4. Insert the black tube on the vacuum controller through the large hole in the carrier upright as shown in the picture above.

5. With the power cord correctly aligned in the mounting plate assembly, press the assembly against the upright carrier panel. Then use two #12 x 1-3/4" button-head screws to attach the mounting plate to the carrier upright. The pilot holes for these two screws are pre-dilled. Use care to avoid over-tightening these screws.

6. Use the 6" wire tie included with the kit to secure the main system power cord to the wire tie anchor on the back part of the carrier base as shown in the picture below. Then use scissors or a similar cutting tool to remove any excess wire tie material.

Part K: Vacuum Pump Power Cord Clean-Up

We're just going to tidy-up the excess power cord from the vacuum pump in this section. Once this is completed, we'll move on to the final assembly steps and get ready to adjust the kit for optimum vacuum. You're going to be vacuum bagging a project very soon!

Assembly Time: 5 Minutes

Required Parts: 16" Wire Tie

1. Plug the power cord from the vacuum pump into the outlet part of the CSO. **Do not plug in the main power cord to a wall socket at this time.**

2. The excess power cord from the vacuum pump can now be wrapped up and tied to the carrier upright. It will take a bit of patience and dexterity to get this right. To make it as easy as possible, this kit includes a 16" wire tie for this step. Insert the wire tie into the anchor from above the top reservoir.

3. Reach through the space between the two reservoirs and pull both ends of the wire tie forward as shown. Needle-nose pliers may be helpful for this step.

4. Shape the excess power cord wire into a series of loops approximately 5 inches in length and enclose the loops with the wire tie. Gently pull on the end of the wire tie to tighten it. Hold the loops in place until the wire tie is tight and the power cord wire loops are snug and pulled in behind the reservoirs and secured against the wire tie anchor.

5. Use scissors or a similar cutting tool to remove any excess wire tie material.

Part L: Sub-Reservoir Manifold Assembly

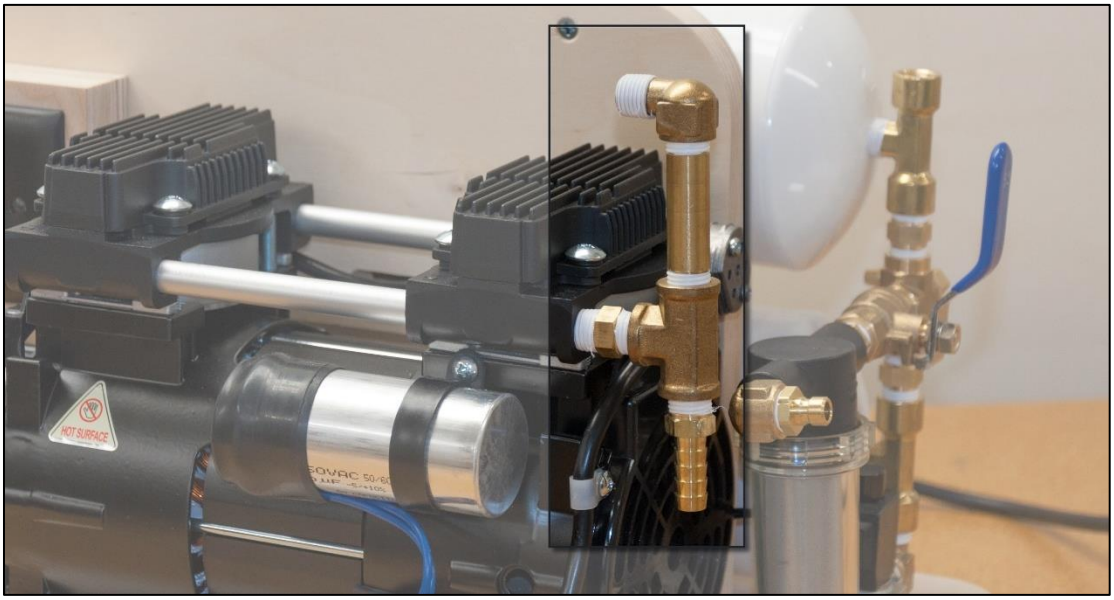
Here's another easy section of assembly items. Be sure to look at the pictures provided in the steps below so that each fitting is aligned correctly. Once this section is complete, we'll move on to the sub-reservoir assembly.

Assembly Time: 10 - 15 Minutes

Required Parts:
- Pipe Hex Nipple *
- Female Tee
- 2-1/2" Pipe *
- Pipe Elbow *
- 1/4" NPT Male Fitting with 3/8" Barb *

Supplies:
- Paper Towels
- Synthetic Abrasive Pad

1. Apply thread sealing tape to the each of the threaded portion of the parts listed above.
2. Loosely attach the pipe hex nipple to the vacuum port on the vacuum pump.
3. Attach the bottom of the brass tee fitting to hex nipple from the previous step.
4. Firmly tighten the hex nipple and the brass tee with an adjustable wrench. The brass tee should be vertical when complete.
5. Attach a 3/8" barb fitting to the bottom port on the female tee fitting. Use a 9/16" wrench to firmly tighten this assembly.
6. Loosely attach the 2-1/2" pipe to the top port of the female tee fitting.
7. Loosely attach the brass elbow to the other side of 2-1/2" pipe.
8. Use an adjustable wrench to firmly tighten the brass elbow. This process will also tighten the 2-1/2" pipe. When finished, make sure the male threads on the elbow fitting are parallel to the hex nipple as shown below.



Part M: Sub-Reservoir Assembly

The sub-reservoir is a small holding tank of free air that allows the pump to achieve full RPM when starting up without back-pressure against the pump's vacuum port. This will be assembled in a way that is very similar to how the larger PVC reservoirs were assembled.

Assembly Time:	10 - 15 Minutes	
Required Parts:	1-1/2" PVC Caps (x2)	6" x 1-1/2" PVC Pipe
Supplies:	PVC Cement	Paper Towel

1. Inspect the PVC pipe for defects. There should be no cracks or surface issues.

2. Clean the inside of the 1-1/2" PVC caps and the outside mating area of the PVC pipe with a dry paper towel. If the mating area on the PVC pipe is rough or exceptionally dirty, clean it with a synthetic abrasive pad such as a "Scotch-Brite" pad. Then inspect the parts to make sure there is no debris left behind.

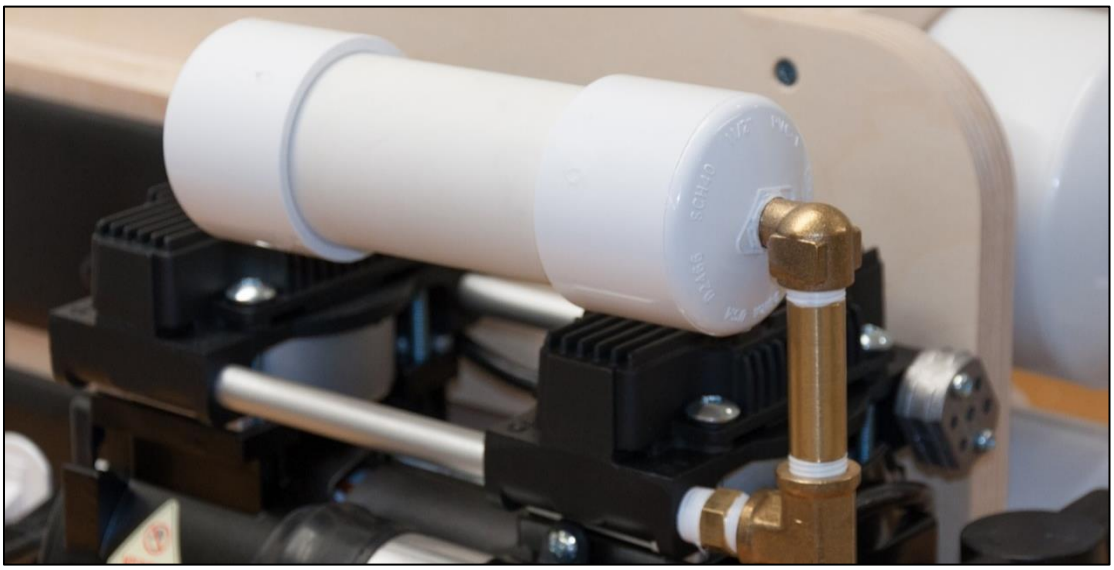
Warning: *Be sure to follow the application instructions and safety guidelines on the PVC cement container. Complete these steps in a well-ventilated area and proceed carefully.*

3. Apply the cement (as directed by the cement instructions) to the inside wall of one of the PVC caps assuring complete coverage. Then apply the cement to the outside wall of the PVC pipe. About 1-1/2" of coverage from the edge of the pipe is adequate.

4. Immediately attach the cap to the pipe making sure it is fully seated on the pipe. Then hold the cap in place on the pipe for 30 seconds. Wipe off any excess cement at the edges of the PVC caps.

5. Cement on the other PVC cap using the same technique as the previous PVC cap.

6. Attach the sub-reservoir to the elbow fitting on the sub-manifold on the vacuum pump. This part does not need to be extremely tight. Generally speaking, hand-tight is enough.



Part N: Miscellaneous Assembly Items

This is the last section of instructions before the system gets powered-up for the first time. You've come a long way and I hope you're feeling some excitement. Let's get to it!

Assembly Time: 10 - 15 Minutes

Required Parts: 12" Braided Tube Vacuum Gauge

1. Attach the black tube from the vacuum controller box to the barbed elbow on the main system manifold. Some trimming (with scissors) of excess length may be desirable.

2. Attach one end of the short piece of braided vacuum tube to the brass barbed fitting on the solenoid valve. Some force will be required. While attaching the vacuum tube, use your other hand to prevent the main manifold from shifting back on the plywood carrier.

Quick Tip: *A very small amount of WD-40 can be wiped onto the barbed fitting to make assembly easier.*

3. Line up the other end of the vacuum tube with the brass barbed fitting on the bottom of the sub-manifold and mark where the tube should be cut.

4. Use scissors to carefully cut the tube to size, and install the tubing onto the fitting.

5. Find the vacuum gauge that comes with this kit. If the vacuum gauge is not reading zero, use scissors to cut off the tip of the rubber cap on the top of the vacuum gauge. If the gauge does not then reset to zero, do not attach it to the manifold. Please contact us immediately and do not continue with these instructions until we have replied.

   Apply thread sealing tape to the vacuum gauge and attach it to the manifold with aggressive force using a 9/16" wrench. When finished, the gauge should be facing forward.

Quick Tip: *The vacuum gauge is last to be attached because it contains a fragile sensing element inside and if it hit with a hard object, the gauge can be damaged and the needle pointer will be inaccurate.*

Part O: Adjustment and Testing

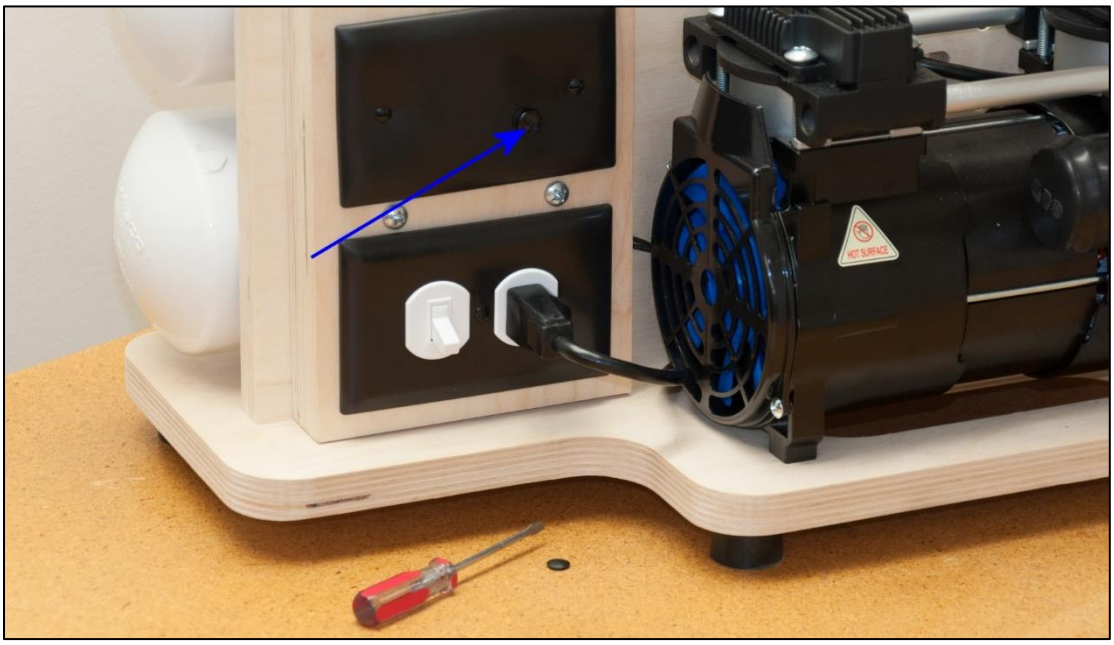
The assembly of the EVS-2 system is now complete. You did it! Within the next few minutes, you'll be ready to run the vacuum press for the first time. All that is left now is to adjust the shut-off point on the vacuum controller.

Average Time to Complete: 5 - 10 minutes

1. Make sure the switch on the CSO is in the "off" setting. If installed correctly, the switch should be in the down position. Then attach the system power cord to a live 110/120v AC power outlet. The pump should not turn on. If it does, there is a mistake in the wiring process. Do not continue with these instructions until this issue is resolved.

2. Set the vacuum valve to the closed (vertical) position.

3. Use a small flat screwdriver to pop off the small plastic cap on the top of the vacuum controller where it protrudes through the cover plate. This will expose a small slotted screw inside the vacuum controller that is used to adjust the set point at which the system has reached the desired vacuum level and the pump shuts off.



4. Flip the CSO switch to the "on" position. It is possible that the pump could turn on for just a second or two and then turn off. It is fine if the pump does or does not turn on at this point.

   Quick Tip: *The odor of PVC cement may be present during this testing and also during the first few uses of your vacuum press system. Ventilate the area if needed.*

5. Use the small flat screwdriver to slowly turn the vacuum controller adjustment counter-clockwise. The pump should turn on and begin to generate vacuum inside the reservoirs. The system will likely cycle off before the vacuum controller is set correctly. Open the vacuum valve a bit to allow some vacuum to escape. This will cause the system to cycle on again so further adjustments can be made. Continue adjusting the screw until the system cycles off between 20 and 22" Hg as measured on the vacuum gauge.

Quick Tip: *Remember that counterclockwise turns of the adjustment screw will increase the amount of vacuum required before the vacuum controller will turn the system off. Most systems cycle off at 21" Hg when there is about 1/16" of space between the top of the adjustment screw and the top of the vacuum controller. Do not completely remove the adjustment screw as this may cause damage.*

6. The EVS-2 system will automatically cycle on again when the vacuum has decreased. The manufacturer of the vacuum controller claims that the controller will cycle back to the "on" mode within 2 to 5" of Hg decrease. This amount of differential is not adjustable. You can test this by slightly opening the vacuum valve and slowly releasing a bit of vacuum from the system.

7. Reinstall the plastic cap on the top of the vacuum controller. It will snap back into place.

8. Close the vacuum valve and allow the system to fully charge with vacuum. Then watch the gauge needle for several minutes. There should be virtually no loss of vacuum.

   Some users will find that the system holds vacuum indefinitely which is ideal. Others may find that the system recharges vacuum every few minutes. If the system is losing vacuum and recharging in less than 10 minutes after cycling off, then there is a leak worth investigating. These leaks can usually be found somewhere on the manifold section.

9. Now place a small piece of electrical tape over the opening on the lock-on plug fitting. While holding the tape firmly in place with your thumb, open the vacuum valve handle and watch the vacuum gauge needle for a minute or so to make sure there are no leaks in that area. If vacuum holds, then you vacuum press is complete. Congratulations!

   Quick Tip: *Contact me if you have any trouble with leaks. I'll work with you to find and fix it. I've built many of these systems and I'm glad to help.*

Using The Project: EVS-2™ System

1. Attach the main power cord to a 120-volt AC outlet and set the vacuum valve handle to the "closed" position.

2. If the system includes the continuous-run add-on, be sure to disengage this option by depressing the area on the rocker switch opposite from where the printed dot is located.

3. Turn on the main power switch on the CSO to charge the system with vacuum.

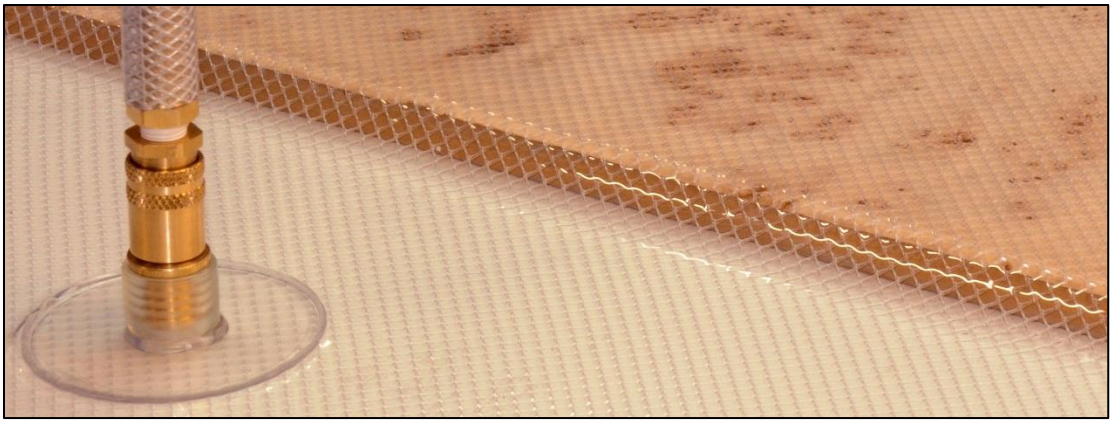
4. Attach the vacuum tube to the system by pulling back the sleeve on the lock-on connector and pressing it onto the brass fitting on the vacuum filter. Release the sleeve and the connector will snap into position.

5. Set up the vacuum bag with a bottom platen inside.

6. Apply glue to project substrate and set the veneer in place.

7. Put the project in the bag, place breather mesh on top of the project, and close the bag.

8. Attach the lock-on connector to the brass stem on the vacuum bag.



9. Open the vacuum valve in the Project: EVS-2 system and allow the system to maintain vacuum on the panel for the amount of time shown on the instruction label for the veneer glue being used. X-Press™ veneer glue requires just 45 to 60 minutes of vacuum clamping.

10. After the veneer glue has "set", it is important to remove the project from the vacuum bag and allow it to "cure". There is a great article on the JoeWoodworker.com website that discusses methods of allowing a panel to cure correctly.

11. When not in use, the EVS-2 main power cord can be coiled up and placed under the bungee cords on the top reservoir.

12. Disconnect the vacuum tube and coil it up when the system is not in use. Use the 6" bungee cord to hold the vacuum tube together.

Notes and Reminders

You did it! Your system is now ready for use. There are just a few notes and reminders below. Check them out and then get started on your first vacuum pressing project.

- The system is set to turn off at around 21" of Hg. This is the ideal vacuum level for most veneer projects. The system will turn on again when the vacuum drops by 2" to 5" of Hg.
- The on/off cycling of the Project: EVS-2 system is harmless. It is not uncommon for it to cycle on and off every 10 to 20 minutes with a vacuum bag connected. Project: EVS-2 systems that are assembled exceptionally well may hold vacuum for many hours without cycling on. Some users may find their systems hold vacuum without recharging for more than 24 hours!
- The odor of PVC cement may be present during the first few uses of your system. Ventilate the area as needed.
- The individual components of this kit and the completed assembly of this kit should not be considered suitable for use in areas where flammable or combustible gases or dusts are present.

- The vacuum gauge is a sensitive instrument and will be rendered inaccurate if dropped or struck with a hard object.
- This system is not designed for unattended use.
- When the system is not in use, always disconnect power, release the vacuum from the reservoirs by opening the vacuum valve, and then disconnect the main vacuum tube from the system.
- Carry the system by the handle and with the reservoirs on the side closest to you.

Maintenance

- The breather fitting on the solenoid valve will make a "psss" sound for a couple of seconds each time the unit cycles off. This short release of vacuum allows the safe restarting of the vacuum pump when it cycles on. The absence of this sound indicates a problem that requires attention. This typically occurs if the wiring for the solenoid valve is incorrect or if the breather fitting is clogged. Periodically clean the breather fitting with compressed air, or remove it and clean the fitting with denatured alcohol.
- The vacuum filter should not require frequent cleaning under normal use. However, if you find excessive amounts of debris in the filter, simply unscrew the clear bowl. Then remove the filter element and clean it with compressed air.
- The vacuum pump is virtually maintenance-free, but it is best to periodically remove the exhaust muffler from the pump and inspect it for clogging. The muffler can easily be disassembled and cleaned.

Optional Conversion Kit for Continuous-Run

If the Project: EVS-2™ system is used for projects where there is a possibility that the system will cycle on very often, then it may be best to order and install the optional "continuous-run" add-on. The add-on kit includes a few extra pieces and replaces the standard vacuum controller cover plate with one that has been modified to accept the continuous-run switch.

Assembly Time: 10 - 15 Minutes

Required Parts:

4" Wire w/ Connectors (Qty: 2)

Rocker Switch (Qty: 1)

Electrical Lever Nuts (Qty: 2)

Alternate Vacuum Controller Box Cover (Qty: 1)

Warning – Unplug the EVS-2 system from the power source. Do not mistake the main system power cord with the vacuum pump power cord. It is the main system power cord that must be disconnected from the power source for these steps.

1. Once the main system power cord has been removed from the power source and it is certain that no power is present anywhere in the EVS-2 system, remove the cover plate from the vacuum controller box.

2. If the main system wiring instructions were followed correctly, then there should be 4" of excess wire inside the vacuum controller box. Pull both wires to a loop and then cut the wire at the top of the loop. This will leave about 2" of wires from the pink connectors and 2" of loose wire inside the electrical box.

3. Carefully strip 1/2" of insulation from the ends of two loose wires and from the two wires connected to the vacuum controller.

4. Find one of the two lever nuts that are included with this add-on kit. Lift one lever on the lever nut and fully insert the end of one of the black wires from the vacuum controller into open slot. Lower the lever to lock the wire in place. The lever will snap shut so watch your fingers when doing this.

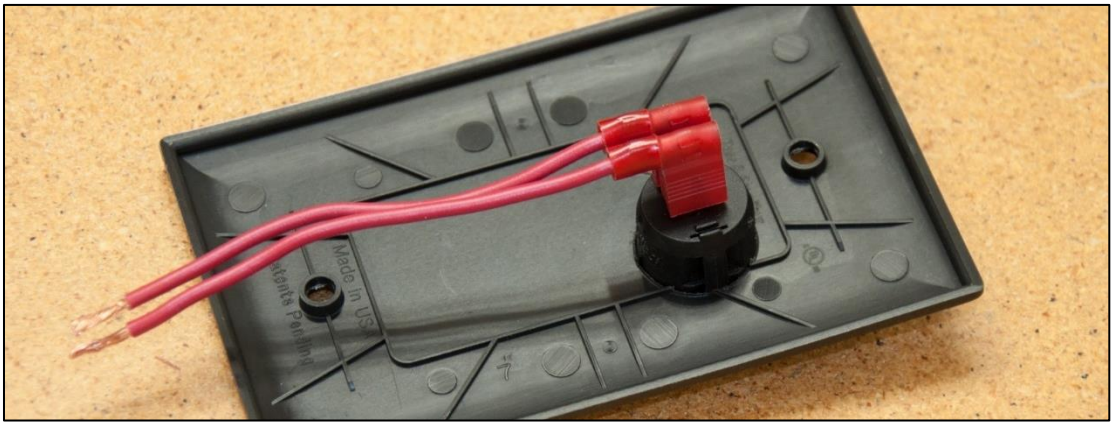
5. Repeat this step for the other black wire that is attached to the vacuum controller

6. Attach one of the two remaining loose black wires inside the vacuum controller box to a lever nut. Then attach the other loose wire to the other lever nut. At this point, the connectivity of the wiring in the vacuum controller box should appear no different than it was before this section of instructions was started. The preceding steps simply allow the easy connection of the "jumper" rocker switch which is what will allow the system to run-continuously as needed. When finished, the assembly should appear as shown below.

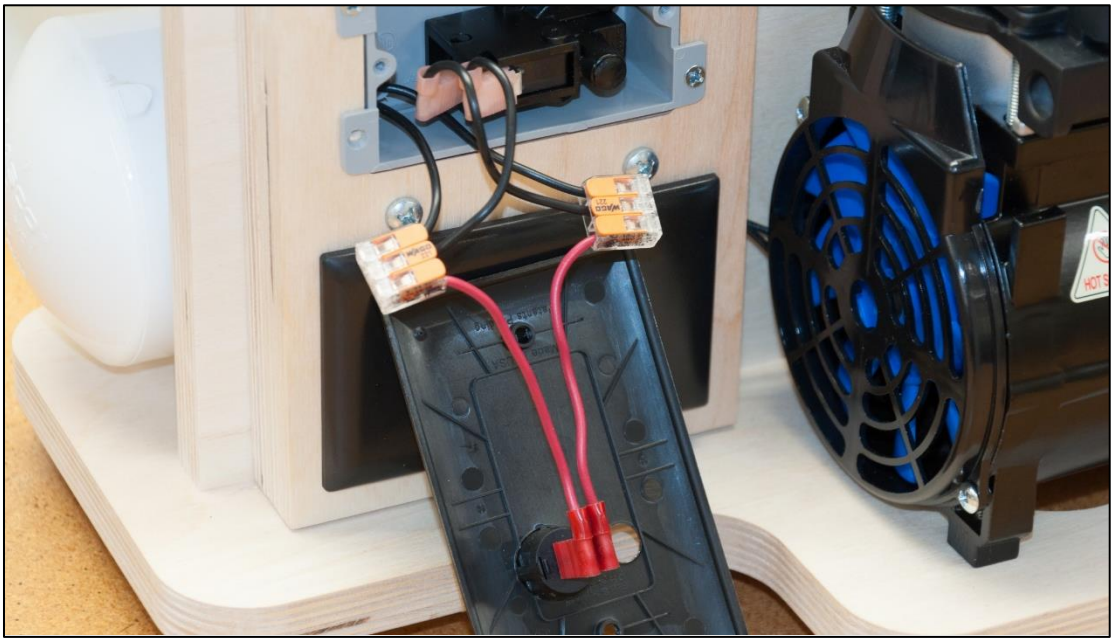
7. Find the rocker switch that is included with the kit and press it through the large hole on the front of the cover plate. This will take a bit of force. Once installed, rotate the switch on the cover plate so that the white dot on the switch is at the 12 o'clock position.

8. Included with the add-on kit are two 4" wires with the red connectors. Find these two wires and strip 1/2" of insulation from the end of both wires.

9. Attach the red connectors to the tabs on the rocker switch. With the white dot on the rocker switch in the correct position, the connectors should be attached with the wires pointing to the left (or 9 ‘clock) position.



10. There should be one available slot left on each of the lever nuts. Attach one wire from the rocker switch to each of the lever nuts. The assembly should appear as shown below. If not, please check these instructions again and verify that each step has been completed properly.

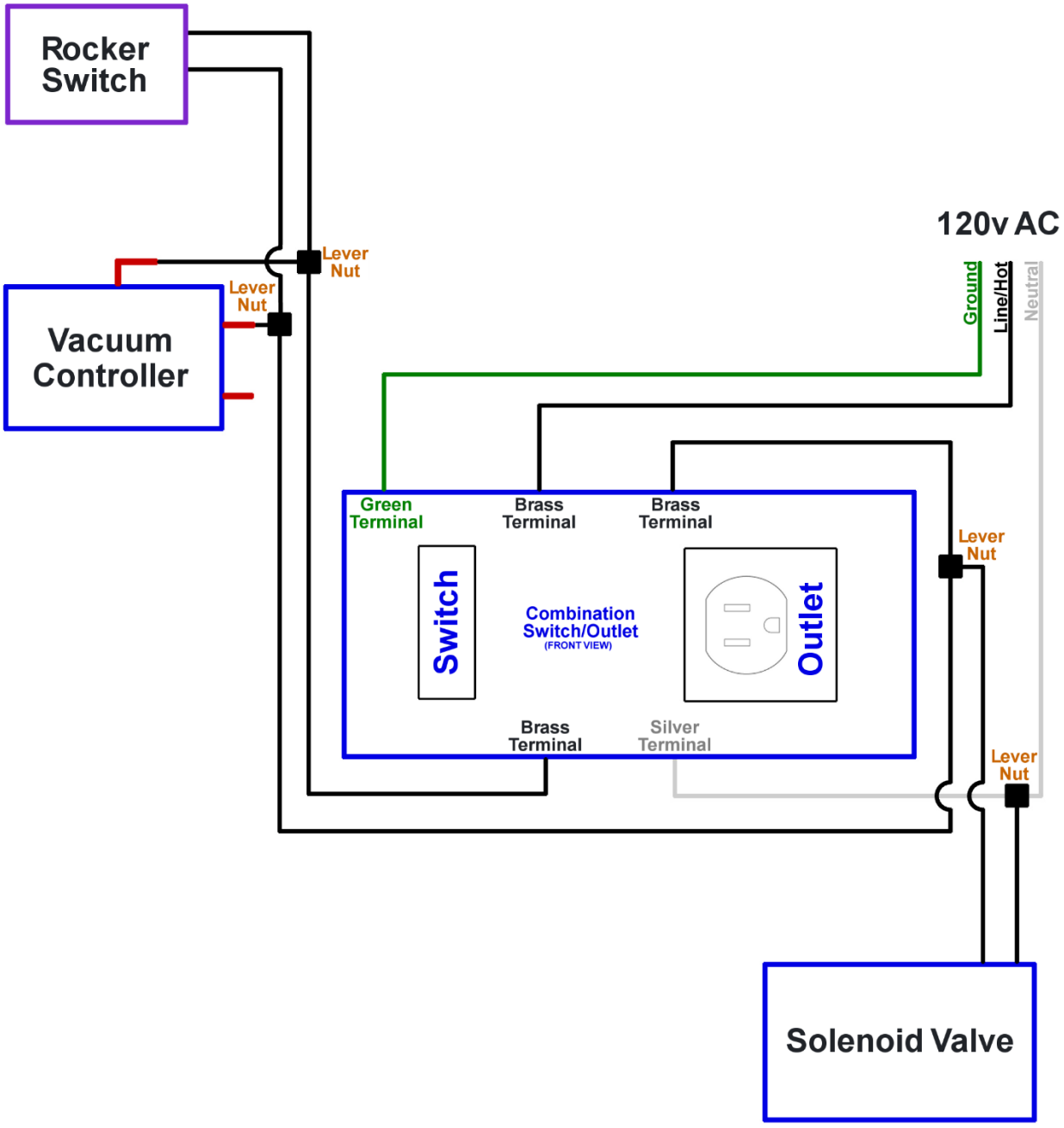


11. Use the two black screws to reinstall the cover plate onto the vacuum controller box.

Enabling Continuous-Run Mode

Continuous-run mode is enabled when the "dot" printed on the rocker switch is depressed. In this mode, the switching ability of the vacuum controller is bypassed so the system runs non-stop and regardless of the vacuum level in the reservoirs. When disengaged, the system will return to auto-cycling on and off to maintain the vacuum level set by the vacuum controller.

Wiring Schematic for Continuous-Run Option



Vacuum Clamping Add-On Kit

The Project: EVS-2™ vacuum press can be used for much more than just veneering. With the optional vacuum clamping add-on, you can use the massive power of vacuum to instantly hold work pieces to your bench top for sanding, routing, carving and more. The kit includes a pneumatic latching foot pedal to apply and release vacuum to clamping jigs on the work bench.

Vacuum clamping jigs are required to complete this clamping system. We offer everything needed to make custom jigs or simply order our affordable and versatile Podz™ jigs.

Thank You

Buying a tool without seeing it in person can be a stressful process, but in this age of Internet shopping it's something that many of us woodworkers have come to accept. Thank you for ordering on my website. Your support is genuinely appreciated.

I hope you enjoyed assembling this kit. Feel free to let me know of any suggestions you have for improvement. Also, let me know how long it took for the entire project so I can update others with this information.

Be sure to check out the veneering and vacuum pressing articles on the JoeWoodworker.com website to learn more about vacuum bags, platens, breather mesh, and veneer adhesives.

I look forward to seeing what you build with your EVS-2 system and I wish you the best with all of the many vacuum pressing projects in your future.

Joe