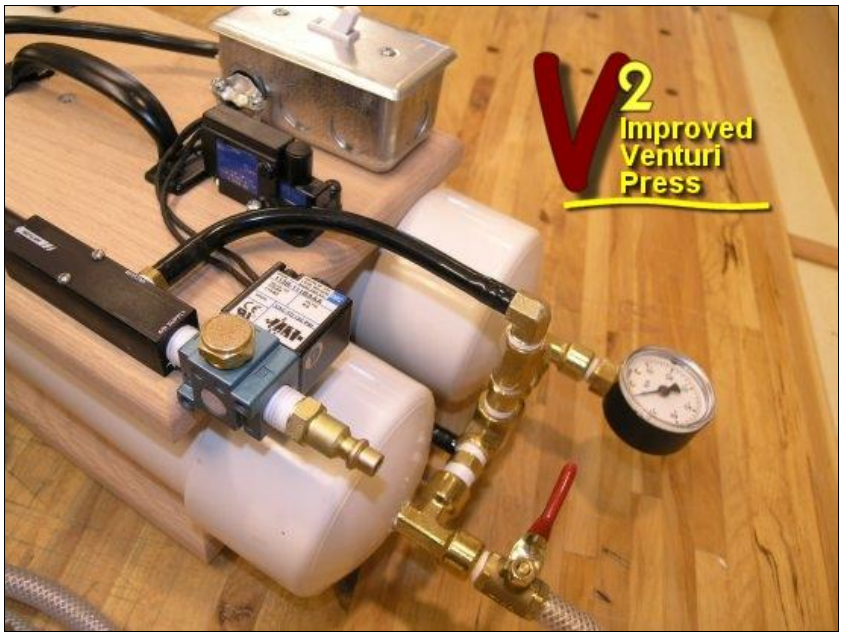
Project: V2 Mini, Basic, and Plus - Venturi Vacuum Press

(These instruction are not applicable to the V2 Premium systems)



Project: V2 – Venturi Powered Vacuum Press

Parts Available at www.VeneerSupplies.com

Revision 3.a.15 8/17/18

Welcome

After a year and a half of serious trial and error, and another year of updating and improving, I offer this free plan for building a vacuum veneer press. Make no mistake - this is a heavy duty, durable, and reliable piece of equipment. If you follow the instructions carefully, the press will last for as long as you enjoy the art of veneering.

Most of the veneering books and articles I have read are just too complicated and are geared toward proprietary materials and equipment. The construction method found in the JWW vacuum press article uses standardized parts that can be found on the Internet and at your local hardware store. I wrote this article to show that you don't need a mega-buck setup to build a professional-level veneer press. I hope you'll agree. I'm always looking for a way to simplify and improve the system which is why it's under continuous revision.

The Basic Idea

Vacuum can be achieved through the use of an electric vacuum pump (diaphragm, piston, or rotary vane) or with a pneumatic device called a venturi. On the following pages, you learn how the differences between these pumps affect their use in vacuum veneering. In either case, a pump or venturi is rated based on the CFM (cubic feet per minute) of air flow and the maximum achievable vacuum level which is usually referenced as a measurement of "inches of Mercury" or "inches of Hg".

A vacuum press is a very powerful tool that is capable of producing over 1800 pounds per square foot of pressure at full capacity. To put this into perspective, your car exerts only half of this amount onto the pavement under each tire! The actual formula is 1" of Hg equals 70.56 lbs per square foot. Atmospheric pressure is what makes a vacuum veneer press capable of such incredible strength. When vacuum is applied, atmospheric pressure puts down more than 1500 lbs per square foot of force. Not only does this press the veneer onto the substrate, it also compresses the fibers of the materials being glued. As the fibers are compressed, the air inside of the materials is displaced with glue and within an hour, a bond is made.

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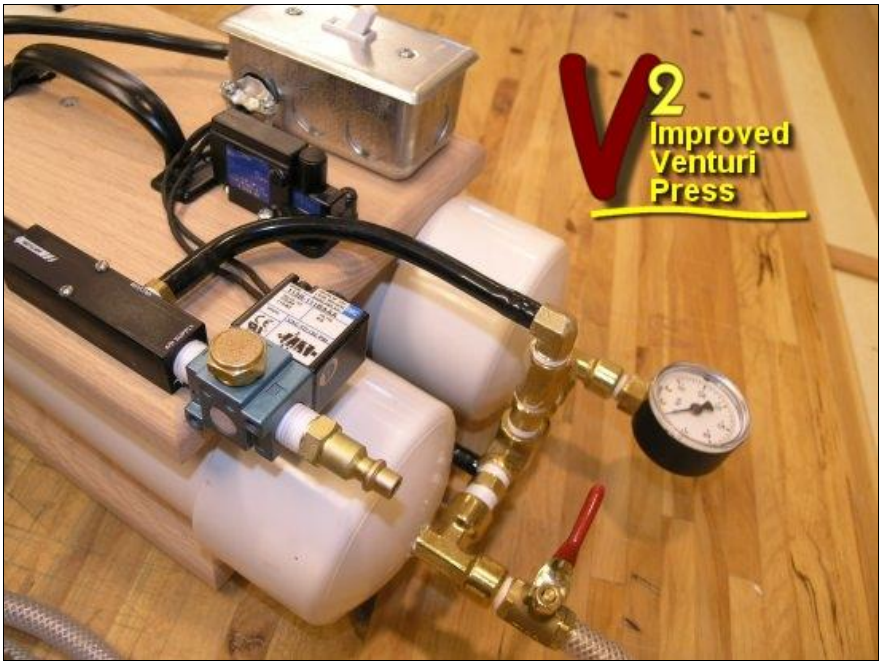
Overview



Project: V2 – Venturi Powered Vacuum Press

This version of the vacuum press uses 80 psi of compressed air to create vacuum via a venturi. The Vac Pro venturi (included in the Project: V2 Kit) requires an air compressor capable of generating 1.8 CFM at 80 psi or 2.2 CFM at 90 psi. The Vac Pro *Plus* version of the kit requires 4.8 CFM at 80 psi or 5.5 CFM at 90 psi.

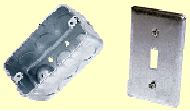
In the 18th century, Giovanni Battista Venturi discovered that when compressed air is forced through a restrictive nozzle, its velocity increases and the air is compressed. When the air exits the nozzle, it expands and creates vacuum. This amazing concept can be used to generate vacuum efficiently and economically on a vacuum press.

Here's what makes the Project: V2 system a great alternative to ordinary air-powered vacuum presses.

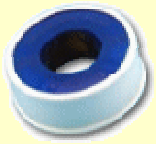
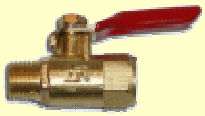
- **Speed:** The Project: V2 system will pull a full vacuum up to three times faster than the previous version of the venturi system which will allow it to be used with bags as large as 4' x 8'.
- **Pressure Storage:** With an affordable ball valve and integrated barbed fitting, the system can be pre-charged with vacuum pressure to increase the initial pull down speed.
- **Quality:** The Project: V2 system uses nearly all brass components.
- **Non-Proprietary Parts:** Most of the parts can be readily found on the Internet or at your local hardware store.
- **Efficiency:** This system requires less than half of the CFM of pressurized air compared to the previous model. This means even smaller compressors can pull down average size vacuum bags.
- **Simplicity:** The entire system can be built in 2 to 3 hours and has only one moving part.
- **Weight:** The completed system weighs only 11 lbs and can easily be carried from one location to another.
- **Noise:** The Vac Pro venturi has one other very welcomed improvement... an integrated silencer!
- **Price:** All of this without a significant price increase in the base construction cost. The entire press can be built for less than $165.

Parts

The following parts are available at the hardware store. Warning: Brass products may contain chemicals known to the state of California to cause cancer or reproductive toxicity.

Qty	Item Description	Approximate Cost	Picture
1	8' Extension cord Cheap: standard household extension cord Expensive: grounded tool extension cord Supplies electricity to the Mac valve	$6.00	
1	Light switch Controls the main power to the system	$.99	
1	Electrical utility box and switch plate cover Houses the switch and electrical connections	$2.49	
2	Romex box connectors Protects the wires entering into the utility box	$.29 ea	
*	Wood screws 4 of #8 x 1 1/2" 2 of #8 x 1/2" These screws will be used to build the carrier and to mount the electrical box.	$2.00	
1	3/4" Lumber (2 board ft) Holds the complete press in an easy-to-carry unit	$8.00	
30"	3" Diameter solid core, schedule 40 or 80 PVC pipe PVC is also available at VeneerSupplies.com Holds spare vacuum and prevents the unit from switching on and off too frequently	Varies	
4	3" PVC schedule 40 or 80 pipe cap PVC caps are also available at VeneerSupplies.com Holds spare vacuum and prevents the unit from switching on and off too frequently	$6.00 ea	
1	Small jar of PVC cement Permanently welds the PVC caps to the PVC pipe	$6.00	
1	Pipe Tap - 1/4" NPT The pipe tap is used to create threads in the PVC caps of the reservoir system. This item is also available at VeneerSupplies.com	$8.00	
1	Handle Used to carry the vacuum press This item is also available at VeneerSupplies.com	$4.00	

Miscellaneous Items
Save time and money by purchasing the following kit through the VeneerSupplies.com website. Warning: Brass products may contain chemicals known to the state of California to cause cancer or reproductive toxicity.

Qty	Item Description	Retail Price	Veneer Supplies.com	Picture
1	Roll of thread sealing tape Makes the brass connections practically leak-proof	$1.00	32 Piece Builder's Kit $149.50	
*	Screws: 2 of #4 x 5/8" 2 of #10 x 1¼"	$1.90	32 Piece Builder's Kit $149.50	
1	Venturi vacuum pump (vacuum generator) Creates vacuum using 80 psi of compressed air	$50.00 to $150.00	32 Piece Builder's Kit $149.50	
1	3-Way Mac valve: 110V, 1/4" NPT Controls the air flow from your air compressor	$29.00	32 Piece Builder's Kit $149.50	
2	Hi-flex tubing (1/4" ID): 1 ft Makes a soft connection between the venturi and vacuum controller to the manifold	$1.50 ea	32 Piece Builder's Kit $149.50	
2	Brass elbows: 1/4" NPT Connect the manifold to tubing which is then connected to the venturi and the vacuum controller	$2.50 ea	32 Piece Builder's Kit $149.50	
1	Ball valve: 1/4" NPT Allows the system to pre-charge before connecting to a vacuum bag	$8.00	32 Piece Builder's Kit $149.50	
2	Brass street tee: 1/4" NPT Connects the reservoirs to the rest of the manifold assembly	$4.00 ea	32 Piece Builder's Kit $149.50	
2	Brass hex nipple: 1/4" NPT Used in the manifold assembly	$2.50 ea	32 Piece Builder's Kit $149.50	
1	Brass barbed fitting: 1/8" NPT to 1/4" ID barb Connects the vacuum line to the vacuum controller	$2.50	32 Piece Builder's Kit $149.50	
1	Brass cross: 1/4" NPT The heart of the manifold system	$3.50	32 Piece Builder's Kit $149.50	

1	Straight brass barbed fitting: 1/4" NPT to 1/4" barb Attaches manifold assembly to the venturi assembly with 1/4" ID vacuum tube	$1.55	32 Piece Builder's Kit $149.50	
1	Quick connector for compressed air lines Allows you to easily connect your compressed air line to the system	$1.99	32 Piece Builder's Kit $149.50	
1	Brass close nipple: 1/4" NPT Connects the Mac valve to the venturi	$.99	32 Piece Builder's Kit $149.50	
1	Braided tubing: 3/8" I.D, 10 ft Supplies vacuum to the vacuum bag	$8.00	32 Piece Builder's Kit $149.50	
1	Lock-On Vacuum connector Connects the system to your vacuum bag	$12.00	32 Piece Builder's Kit $149.50	
1	Brass check valve: female-male, 1/4" NPT Prevents vacuum from escaping into the venturi when the Mac valve is closed	$15.00	32 Piece Builder's Kit $149.50	
1	Wika general purpose vacuum gauge Measures the vacuum level inside the system and vacuum bag	$13.00	32 Piece Builder's Kit $149.50	
1	Vacuum controller Monitors the pressure inside the system and recharges vacuum as needed	$26.00-$115.00	32 Piece Builder's Kit $149.50	
1	Breather/filter: 1/4" NPT Prevents dirt and debris for getting inside the top port of the Mac valve	$2.60	32 Piece Builder's Kit $149.50	
2	Crimp-On Connectors: Red 3/16" wide for 16 to 22 gauge wire Connects the wire to the terminals on the vacuum controller without soldering	$.79	32 Piece Builder's Kit $149.50	
2	Straight brass barbed fitting: 1/4" NPT to 3/8" barb Attaches vacuum valve to 3/8" ID vacuum tube and attaches lock-on connector to 3/8" ID vacuum tube	$1.55	32 Piece Builder's Kit $149.50	

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Build the Manifold System

The manifold creates a hard connection between the reservoirs, gauge, intake, pressure controller and the vacuum source. The parts should be assembled as shown below.

Important: These instructions are for the Mini, Basic, and Plus version of the V2 vacuum press system. If you are building the V2 Premium, be sure to follow the instruction set found here.

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Parts used in this section:		**Tools Required:**
Brass hex nipple (2)	1/4" Brass barb fitting (elbow)	Thread sealing tape
Brass cross fitting	1/4" Brass barb fitting (straight)	Wrenches or pliers
Brass "street" tee (2)	3/8" Brass barb fitting (straight)	
Vacuum gauge	Vacuum valve	

1. Place two passes of thread sealing tape on each of the male threads in the manifold. Make the passes in a clockwise direction following the threads.

2. Attach the two brass hex nipples to opposite sides of the brass cross fitting.

3. Attach one brass "street" tee to each of the brass hex nipples. Be sure to use the middle opening on the tee as shown the diagram below. When tight, the fittings should be pointing the direction as shown in the diagram.

4. Attach the vacuum gauge to one of the street tees.

5. Attach the brass barb elbow fitting to the brass cross as shown in the diagram below. The fitting should point downward - in the same direction as the male threads on the street tees.

6. Attach the 1/4" brass barb fitting (straight) to the remaining open side of the brass cross.

7. If the needle on the gauge is not resting at zero, you may need to release the pressure inside the gauge housing. Carefully lift the brass, plastic, or rubber insert (depending on the model version) at the top of the gauge. Any excess pressure inside will escape and the gauge needle will reset. If you are using a glycerin filled gauge, be sure to keep the gauge in the upright position to minimize loss of the fluid inside. If a few drops of the liquid come out, don't worry about it. Just wipe it off with a paper towel. Be sure to re-install the insert fitting when finished.

8. Attach the vacuum valve to the other street tee.

9. Attach the 3/8" straight brass barb fitting to the vacuum valve.

The final assembly should appear as shown in the picture below.

Completed Manifold Assembly

Build the Reservoir Tanks

The reservoir tanks are used to hold spare vacuum. It prevents the vacuum source from having to cycle on and off frequently. The reservoir tanks that are used with this system are 3" diameter, solid core, schedule 40 PVC that can be found at most local plumbing shops. In fact, it is best to buy it at a plumbing shop because if you were to find it at a hardware store, you would have to buy a 10' length of it. Your local plumber may even give it to you for free if you are lucky. Be 100% sure that it is solid core schedule 40 PVC. If you can not find this type of PVC, ask your local plumbing supplier to order it for you. Do not substitute any other type of PVC. Foam core PVC and black ABS pipe will collapse under pressure.

You will need 2 pieces that are 14" long. The more reservoir space that is available, the less the unit has to turn on and off. This minimizes the wear and tear on the Mac valve. However, these valves are designed to withstand tens of thousands of cycles so don't feel the need create a jumbo reservoir system. You can opt for 4" diameter PVC but the end caps are nearly twice as expensive and the entire system will double in weight. Two schedule 40 end caps are used to make the reservoir ends.

Tap the Tank

There are two ways to tap the reservoir caps. The first involves the use of a dedicated pipe tapping tool. This is the easiest method and produces the cleanest threads. The second method involves using the fitting itself to cut the threads and requires a bit of strength and patience.

Parts used in this section:	**Tools Required:**
3" PVC Pipe (2 at 14"L)	Drill press
PVC Caps (4)	7/16" Drill bit
PVC Cement	Vise-Grips or pliers
Pipe Tap (optional)	Tape measure

Method #1

The easiest and most reliable way to create the threads is with a dedicated 1/4" NPT tap. Note that pipe tap sizes do not refer to diameter. The actual outside diameter of a 1/4" NPT pipe thread is .54 inch. Most hardware stores carry pipe taps for about $9 but you can save a couple of bucks and pick one up at VeneerSupplies.com.

To create the threads use a drill press and a 7/16" bit. It is critical that the hole be drilled straight through the top center of the cap. To do this, be certain to drill into the cap from the top as shown.

Use a pair of Vise-Grips to hold the tap. Carefully screw in the tap using about 3/4 of the tap length. Then test the threads with a brass fitting. If it is too snug, re-tap the hole and screw in the tapping tool a bit further. This will slightly widen the hole. You may find it necessary to use a chisel or razor to remove the burr on the top of the cap caused by the tapping tool. Be sure to tap only two of the four caps in the system.

If you don’t have a tap, you can make your own using an old 1/4" NPT brass fitting. Simply bevel the leading threads and then cut an angled groove in them with a hacksaw so you have something similar to what is shown in the picture to the right. The sharp brass edges won't last long but will hold up for a couple of uses.

Method #2
If you prefer to tap the caps with the brass fitting itself, you can drill a 31/64” hole into the cap and create the threads with the ¼" pipe thread of the fittings.

To create the threads in the cap, use a wrench or socket to insert a brass fitting. Any fitting with ¼" NPT threads and a hex nut on the top will work fine. Remember, you will be threading the fittings into unthreaded plastic so work slowly. A small amount of light oil will assist in the threading process. After you have inserted the fitting completely through the hole, remove it and repeat the process on the other cap. Be sure to tap only two of the four caps in the system.

Assemble the Reservoirs

Cut two pieces of 3" PVC to 14" in length. They must be the same length to make it easier to mount them on the carrier.

You can now cement the caps to the PVC pipe to make one of the reservoirs. Remember to use one tapped and one untapped cap on each of the two reservoirs. Use regular PVC cement and apply it generously to both sides of the mating areas. Give the cap a slight twist (1/4 turn) as the parts slide together. For goodness sake, do this in a well ventilated area.

Before assembling the second reservoir, measure the length of PVC pipe between the two caps on the first reservoir (in my example, the measurement was 10.5”). Now, attach one of the caps to the second reservoir using the cement. Measure from the edge of this cap to the length you just measured on the first reservoir and mark the PVC with a pencil. Apply cement and attach the last PVC cap. Slide it up to the pencil line to ensure that both reservoirs are the exact same size. This will make it easier to attach them to the carrier.

Attach the Manifold to the Reservoirs

Now attach the manifold system to the PVC reservoirs. Be sure that you have applied thread sealing tape to the male threads that are remaining on the street tees.

Assemble the Venturi

The venturi requires specific air flow to operate efficiently. The unit will be cycling on and off during operation. To do this, an electro-mechanical valve is needed to open and close the airflow from your air compressor. I suggest the use of Mac Valve brand pneumatics.

The vacuum generator (known as a venturi) operates on compressed air. The Vac Pro Basic venturi requires a 5 gallon compressor capable of generating 2.1 CFM at 80 psi. The Vac Pro Plus venturi requires 4.8 CFM at 80 psi.

Warning: Brass products may contain chemicals known to the state of California to cause cancer or reproductive toxicity.

Parts used in this section:		**Tools Required:**
Mac valve	Brass "close" fitting	Thread sealing tape
Breather fitting	Vac-Pro Venturi	Wrench or pliers
Quick connector	1/4" Brass barb fitting (elbow)	
Female to male check valve		

1. Apply thread sealing tape to all of the male sides of the fittings for this assembly.
2. Attach the breather fitting to port #3 on the Mac valve.
3. Attach the compressed air quick connector to port #1.
4. Attach the brass "close" fitting to port #2 on the Mac valve.
5. Attach the venturi to the close fitting so it is oriented as shown below.
6. Attach the female to male check valve to the vacuum port on the venturi.
7. Attach the brass barb elbow fitting. When tight, the fitting should be pointing in the same direction as the quick connector fitting.
8. The final assembly should appear as shown in the picture below.

Build the Carrier

The carrier is made of three pieces of wood and holds the reservoirs in two ways. The top and bottom pieces are 8.5" wide and 10.5" long. The latter of these measurements is taken from the distance between the two PVC caps on the system. This holds the reservoirs in place horizontally. The third piece of wood (the middle rail) for the carrier is 3.5" x 6.5". The critical measurement is 3.5" because it is slightly less than the diameter of the 3" PVC reservoirs. This is how the vacuum reservoirs are held in place vertically.

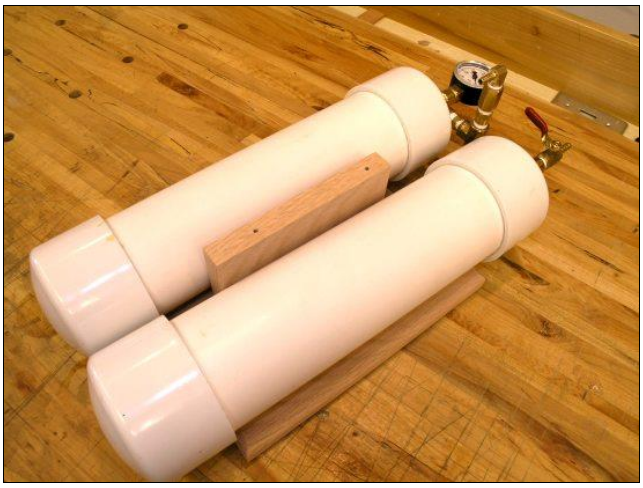
Parts used in this section:		**Tools Required:**
3/4" Lumber or plywood	Screws - #4 x 1 ¼" (2)	Table saw
Wood screws- #8 x 1.5" (4)	Handle	Screw driver
Screws - #4 x 5/8" (2)		5/8" Drill bit

1. Cut two pieces of 3/4" thick wood to 8.5" wide and whatever the length is between your reservoir caps.

2. Make the middle rail with a piece of wood that is 3.5" wide by 6.5" long.

3. Assemble the middle rail to the bottom piece of the carrier using two woods screws.

4. Place the reservoirs units onto the carrier as shown.



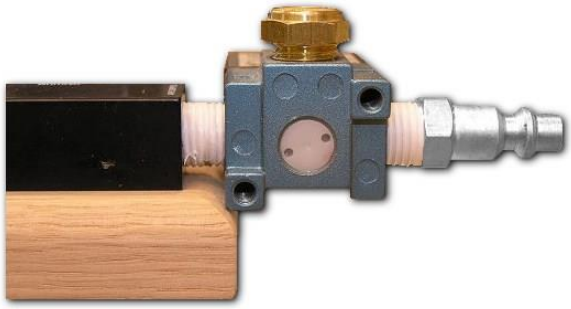
Reservoirs on Carrier

5. Drill a 5/8" diameter hole through the top carrier board. It should be centered on the width and approximately 1" from the edge. Now attach the carrier top using two wood screws. Do not over tighten these screws. You'll only need enough pressure to hold the unit together and to keep the reservoirs from sliding inside the carrier.

6. Now is a good time to attach a handle to the carrier.

Attach the Vacuum Generator

There are mounting holes on the venturi unit which allow you to use two #10 screws (1 ¼" long) to attach the assembly to the top of the carrier. Pay attention to the positioning of the Mac valve. Be sure the body of the Mac valve is snug against the edge of the carrier as shown in the picture* and use a suitably-sized drill bit to create pilot holes for the attachment screws. Install the screws and prepare to move onto the next section of these instructions.



*This will steady the force upon the screws that hold the venturi in place when the quick connector from your air compressor is attached to the system.

Set up the Vacuum Controller

The vacuum controller regulates the pressure inside the system and turns the vacuum device on and off as needed. These are adjustable up to 28" of Hg. The vacuum controller is mounted to the system carrier and connected via vacuum tube.

Parts used in this section:		**Tools Needed:**
Vacuum controller	Black tubing	Wrench or pliers
1/8" NPTF barb fitting	Thread sealing tape	
Screws - #4 x 5/8" (2)		

There is a plastic nut threaded on to the vacuum controller. This part is not used so remove it and discard it. Also, the vacuum controller includes a small plastic barbed fitting in the box. It is also not used.

Wrap the threads of the vacuum controller with two passes of thread sealing tape. Attach a 1/4" barb to 1/8" NPT-female brass fitting to the unit. Do not over-tighten the fitting. The maximum torque for the plastic body of the vacuum controller is 4 inch lbs. If you over-tighten brass fitting, the plastic threads will break off. This is not covered by any warranty so do not over-tighten this fitting. In most cases, "hand tight" is tight enough.

Attach a piece of tubing to the barbed side of the fitting and insert the tubing through the hole in the carrier so that the tubing is pushed forward toward the manifold. Use two #4 by 5/8" screws to attach the vacuum controller to the carrier. Do not over tighten these screws.

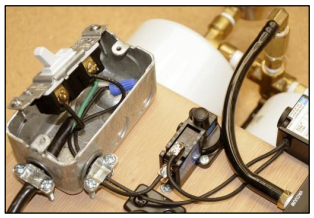
Wiring the Vacuum Press

You don't need an electronics degree to successfully wire the system but you must be aware of the essential practices and principles of safety when working with 120 volts. Do not proceed to wire this system without the help of a certified electrician if you are unable to safely work with electrical components, or if you are unfamiliar with the risks associated with electricity. Be sure to read the disclaimer near the beginning of this article before proceeding.

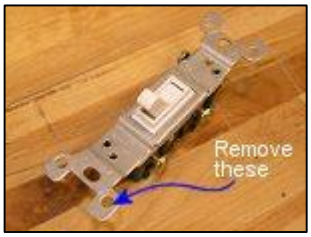
If you are soldering the wires to the vacuum controller, be careful not to damage the vacuum controller by over-heating the tabs. Allow the soldering iron to reach full heat before you begin. Then apply solder to the common and normally closed tabs. Next apply solder to the wire ends. Lastly, reheat the wire ends onto the tabs. This last step should not require any additional solder. Be sure to adequately insulation any exposed wire near the terminals.

Parts used in this section:		**Tools Required:**
Light switch	Wire nut	Soldering iron
Light switch plate	Wood Screws - #8 x 1/2" (2)	Solder
Handybox	Electrical power cord	Wire cutters
Romex box connectors (2)	Crimp-on connectors (2) optional	Screw driver

1. Knock out two of the utility box holes (as shown in the picture) and insert a Romex connector in each. Tighten the locking nut on each connector.



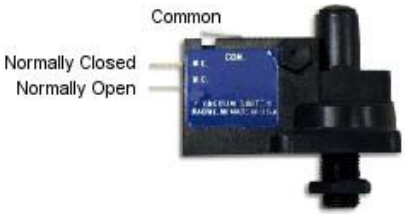
2. Utility boxes usually have a couple of small holes in the back of the box which can be used to mount it to a wall or other attachment surface. Using these holes, attach the utility box to the top of the carrier with two small screws. Be certain that the screws do not protrude through the bottom of the board.



3. Remove the "ears" from the light switch.

4. Insert the electrical cord into the box through one of the connectors leaving 3" of wire inside the box. To make the wiring process easier, do not tighten the locking screws on the Romex connectors yet.

5. Cut one of the wires from the Mac valve just longer than needed to reach the common tab on the vacuum controller. Attach this wire to the vacuum controller with solder or a crimp-on connector.



   Important: The terminals on the vacuum controller are covered by a removable plastic lid. Remove this piece for easy access to the tabs by pulling upward on it. Be sure to attach the wires to the correct terminals.

6. Using the remaining piece of wire that was cut off in the step above, attach one end to the normally closed terminal on the vacuum controller with solder or a crimp-on connector. Keep in mind that the normally open tab on the vacuum controller is not used.

7. Insert the other end of this wire into the utility box and attach it to one of the terminals on the light switch (not the ground terminal).

8. Insert the remaining black wire from the Mac valve into the utility box and with a wire nut, attach it to the white wire (neutral) from the power cord. If the power cord you are using is all black, the wire with the ribbed texture is the same as the white (neutral) side.

9. Attach the black wire from the power cord to the opposite terminal on the light switch (again, not the ground terminal).

10. Tighten the locking screws on the Romex connectors.

11. If your power cord has a ground wire, attach it to the green grounding screw on the light switch and to the utility box.

12. Attach the light switch to the utility box and screw on the light switch plate cover. The final assembly should appear as shown in the following picture.

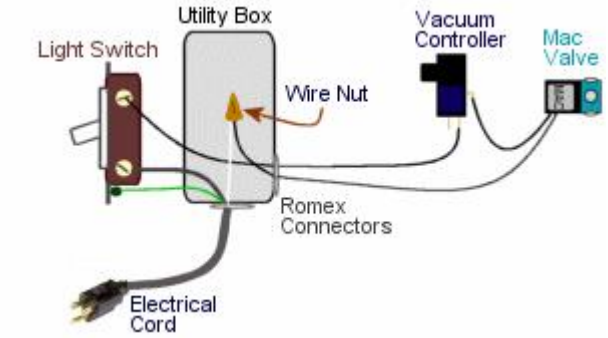
13. Take a second look at what you have completed so far. Make sure the common wire is attached to the top tab of the vacuum controller (marked as 'common') and the hot power wire is attached to the normally closed tab just below it. The bottom tab on the vacuum controller ('normally open') is not used.

14. Do not apply power to the system yet. Proceed with the next page of these instructions and then continue to the section titled "Testing and Adjusting".

Wiring Check

Let's re-examine the path of electricity. Start with the black wire from the electrical cord. The flow should go this way:

- The black A/C line goes to a switch terminal.
- From the other switch terminal, a black power line is going to the normally closed tab on the vacuum controller.
- The power then flows from the common tab on the vacuum controller to the Mac valve.
- The remaining wire on the Mac valve goes to the white wire on the electrical supply cord.



Final Connections

Parts used in this section:	Tools Required:
Black tubing	Scissors
Braided vacuum tube (10')	9/16” Wrench
Brass barb fitting (1/4" NPT to 3/8 barb)	
Lock-on connector	

1. Cut the black vacuum tubing to fit from the barbed fitting on the vacuum controller to the barbed fitting on the lower end of the manifold assembly. Attach the tube to these two fittings.

2. Now cut a piece of black tubing and connect it between the brass barbed elbow coming off the venturi and the remaining brass barbed fitting on the manifold.

3. Apply thread-sealing tape to the 3/8" barb to 1/4 NPT-male fitting.

4. Attach the barbed fitting to the lock-on connector. Be sure to hold the lock-on connector at the hexagon part of the casting when attaching the barbed fitting. If you hold the head of the lock-on connector and apply too much torque to the barb fitting, the connector will break.

5. Attach the braided vacuum tube to the vacuum valve on the manifold.

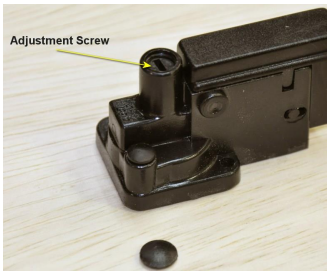
6. Slide on the lock-on vacuum connector to the other end of the braided tubing.

Testing and Adjusting

Do not plug in the V2 system power cord to your wall socket until instructed below.

Set your air compressor to put out approximately 100 PSI. Higher pressure does not increase the CFM or maximum vacuum from the venturi unit. The V2 system can handle up to 120 PSI.

Close the vacuum valve by turning the handle to the left or right until it stops. Then attach your compressed air line to the quick connector on the Mac valve.



There is a small plastic cap on the vacuum controller in front of the "common" tab. Under this cap is a plastic slotted set screw where the shut-off adjustment is made for vacuum system. Use a flat-head screwdriver to turn the set screw counter-clockwise until it is approximately 1/8" from the top edge of the vacuum controller body. In other words, there should be about 1/8" of the female threads visible when you look inside the adjustment area of the unit.

Be aware that particles in the air stream from the exhaust on the venturi can cause eye damage.

With the vacuum press power switch turned off, plug the electrical cord into your wall socket. Turn on the light switch and air should begin flowing through the venturi and the needle on the vacuum gauge should rise. The vacuum controller should shut off before it reaches 21" of Hg.

For the next stage of testing, you will want to carefully adjust the vacuum setting to 21". Using a small flat screwdriver, slowly turn the adjusting screw counter-clockwise until the unit creates 21" of vacuum and cycles off. Remember counterclockwise turns of the screw will increase the amount of vacuum required before the vacuum controller will turn off the air pressure at the Mac valve. I've found that most often, 21" of Hg is when there is about 1/16" of threads showing above the adjustment screw.

It will automatically cycle on again when the vacuum has decreased. You can test this by opening the vacuum valve and releasing a bit of vacuum from the system. The manufacturer of the vacuum controller claims that the controller will cycle back to the "on" mode within 4" of Hg decrease. This 4" amount of "differential" is not adjustable. In my opinion, this constant increase and decrease in vacuum inside the press bag allows for an even greater bond of the veneer to the substrate.

For venturi systems, the frequent on and off cycling is harmless. During normal operation of a tightly sealed unit, it is still common to have the unit cycle on every 10 minutes for 5 - 8 seconds.

Close the vacuum valve and allow the system to recharge. Watch the needle on the vacuum gauge to see if the system shows signs of a leak. It shouldn't leak if the brass fittings were correctly attached to the reservoir with thread-sealing tape. However, it's not uncommon to have a small leak show up. The fix for this is simple.

Got A Leak? No Problem!

First, remove the manifold system from the reservoirs and re-tighten all of the brass joints. While it is somewhat possible to over-tighten the fittings, it is more common to find that the fittings are not tight enough. Re-assemble the system and test it again. I've found that this solves 99% of leak problems.

If the leak persists, leave the system charged with vacuum and apply a small amount of silicone to each of the brass fittings and gauge where they attach to the PVC caps. If a leak does exist, the vacuum will pull the silicone into the void area causing the leak to seal itself. Also consider applying silicone to the area around the edge of the PVC caps on the pipe.

After you have applied the silicone, turn the system off and let the air back into the PVC pipe by opening the vacuum valve. Allow the unit to sit overnight while the silicone cures.

Your Project: V2 Vacuum Press is Now Complete!

I've written a short but helpful article that explains what else you will need to use your vacuum press. The article also includes a step by step guide to using your system for vacuum pressing a veneered panel. Follow the guide carefully and your first veneer project will turn out perfectly.

Check it out here…
www.JoeWoodworker.com/veneering/getting-started.htm

Reminder: Do not leave the vacuum press system running unattended.

Your Turn to Help Out

Did you find any misspellings, grammatical errors, or something that just doesn't make sense? Feel free to email me with any questions or suggestions about this article.

I've spent countless evenings working on this project and even more time creating this article for my woodworking friends. I look forward to your comments and suggestions.

You can help to keep this article on the Internet (ad-free) by purchasing various components of the vacuum system and other veneer related items at…