

# Project: V2 Premium Venturi Vacuum Press

(For V2 Standard and V2 Plus kits, please refer to the respective instructions)



## Project: V2 Premium – Venturi Powered Vacuum Press

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Parts Available at [www.VeneerSupplies.com](http://www.VeneerSupplies.com)

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### 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 Premium – 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 Premium venturi, which is included in the Project: V2 Premium Kit, requires a minimum 25 gallon air compressor capable of generating 7.8 CFM at 80 psi. The Vac Pro Premium 9 venturi, which is included in the Project: V2 Premium 9 Kit, requires 12.5 CFM at 80 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 Premium system a great alternative to ordinary air-powered vacuum presses.

- **Speed:** The Project: V2 Premium system will pull a full vacuum almost twice as fast as the Vac-Pro Plus venturi system which allows it to be used with bags as large as 4' x 12'.
- **Pressure Storage:** With an affordable ball valve and integrated barb fitting, the system can be pre-charged with vacuum to increase the initial pull down speed.
- **Quality:** The Project: V2 Premium 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.
- **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 Premium venturi has one other very welcomed improvement... an integrated silencer!
- **Price:** Commercial systems of this quality start at \$700. The Vac Pro Premium systems can be built for under \$350.

## 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. Visit [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov) for details.

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	
1	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 <a href="http://VeneerSupplies.com">VeneerSupplies.com</a>  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 <a href="http://VeneerSupplies.com">VeneerSupplies.com</a>  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 <a href="http://VeneerSupplies.com">VeneerSupplies.com</a>	\$8.00	



## Miscellaneous Items

A builder's kit containing each of these components is now available. This kit saves you nearly \$40 off the regular website price and \$105 off standard retail prices. Warning: Brass products may contain chemicals known to the state of California to cause cancer or reproductive toxicity. Visit [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov) for details.

Qty	Item Description	Retail Price	Veneer Supplies.com	Picture
1	Roll of thread sealing tape Makes the brass connections practically leak-proof	\$1.00	33 Piece Kit Available at VeneerSupplies.com	
4	Plastic spacers These support the venturi on the carrier	\$.25	33 Piece Kit Available at VeneerSupplies.com	
1	Hi-flex tubing (1/4" ID): 1 ft Makes a soft connection between the vacuum controller to the manifold	\$1.50	33 Piece Kit Available at VeneerSupplies.com	
*	Screws: 2 of #4 x 5/8" 6 of #10 x 2"	\$.70	33 Piece Kit Available at VeneerSupplies.com	
1	Venturi vacuum pump (vacuum generator) Creates vacuum using 80 psi of compressed air	\$150.00 to \$250.00	33 Piece Kit Available at VeneerSupplies.com	
1	Mac valve: Series 200, 3-Way, 110V, 1/4" NPT Controls the air flow from your air compressor	\$39.00	33 Piece Kit Available at VeneerSupplies.com	
1	Vacuum valve: 1/4" NPT to 3/8" barb Allows the system to pre-charge before connecting to a vacuum bag	\$10.00	33 Piece Kit Available at VeneerSupplies.com	
2	Brass street tee: 1/4" NPT Connects the reservoirs to the rest of the manifold assembly	\$4.00 ea	33 Piece Kit Available at VeneerSupplies.com	
2	Brass hex nipple: 1/4" NPT Used in the manifold assembly	\$2.50 ea	33 Piece Kit Available at VeneerSupplies.com	
1	Brass barb fitting: 1/4" NPT to 3/8" ID barb Connects the manifold to the venturi (on the manifold side)	\$1.50	33 Piece Kit Available at VeneerSupplies.com	
1	Brass barb fitting: 1/8" NPT to 1/4" ID barb Connects the vacuum line to the vacuum controller	\$1.50	33 Piece Kit Available at VeneerSupplies.com	

1 Brass cross: 1/4" NPT The heart of the manifold system	\$3.50	33 Piece Kit Available at VeneerSupplies.com	
1 Brass elbow: 1/4" NPT Connect the manifold to tubing which is then connected to the venturi and the vacuum controller	\$2.50 ea	33 Piece Kit Available at VeneerSupplies.com	
1 Quick connector for compressed air lines Allows you to easily connect your compressed air line to the system	\$1.99	33 Piece Kit Available at VeneerSupplies.com	
1 Brass close nipple: 1/4" NPT Connects the Mac valve to the venturi	\$.99	33 Piece Kit Available at VeneerSupplies.com	
1 Braided tubing: 3/8" I.D, 10 ft Supplies pressure to the vacuum bag	\$5.00	33 Piece Kit Available at VeneerSupplies.com	
1 Lock-on Vacuum Connector Connects the system to your vacuum bag	\$12.00	33 Piece Kit Available at VeneerSupplies.com	
1 Brass check valve: male-female, 3/8" NPT. This must be a high-flow unit. Prevents vacuum from escaping into the venturi when the Mac valve is closed	\$15.00	33 Piece Kit Available at VeneerSupplies.com	
1 Wika general purpose vacuum gauge Measures the vacuum level inside the system and vacuum bag	\$13.00	33 Piece Kit Available at VeneerSupplies.com	
1 Vacuum controller Monitors the vacuum level inside the system and recharges vacuum as needed	\$26.00- \$115.00	33 Piece Kit Available at VeneerSupplies.com	
1 Breather/filter: 1/4" NPT Prevents dirt and debris from getting inside the top port of the Mac valve	\$2.60	33 Piece Kit Available at VeneerSupplies.com	
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	33 Piece Kit Available at VeneerSupplies.com	
1 Brass barb fitting: 3/8" NPT to 3/8" ID barb Connects the manifold to the venturi (on the venturi side)	\$1.50	33 Piece Kit Available at VeneerSupplies.com	

## Build the Manifold System

The manifold creates a hard connection between the reservoirs, gauge, intake, vacuum controller and the vacuum source.

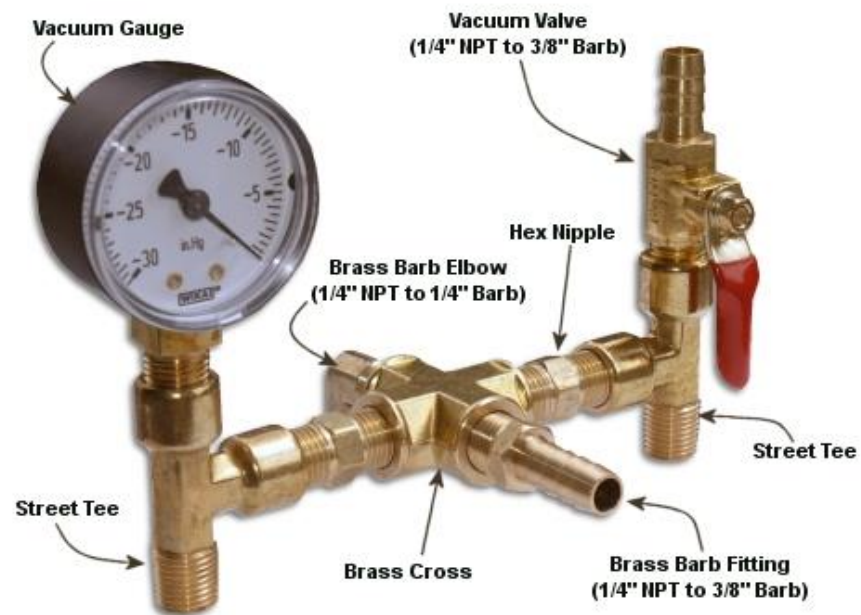
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Parts used in this section:		Tools Required:
Thread sealing tape	Brass barb elbow	Wrenches or pliers
Brass hex nipple (2)	Brass barb fitting (1/4" NPT to 3/8" barb)	
Brass cross fitting	Vacuum gauge	
Brass "street" tee (2)	Vacuum valve	

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. Using the picture below, note the orientation of the fittings when snug.
4. Attach the straight brass barb fitting to the brass cross.
5. Attach the remaining brass barb elbow to the last opening on the brass cross. It should also point in the direction of the male threads on the street tee.
6. Attach the vacuum gauge to one of the street tees as shown.
7. If the needle on the gauge is not resting at zero, you will need to release the pressure inside the gauge housing. Carefully remove the brass insert at the top of the gauge while held in the upright position. Any excess pressure inside will escape and the gauge needle will reset. If you are using a glycerine filled gauge, a few drops of the liquid inside may come out. Don't worry about it. Just wipe it off with a paper towel. Be sure to re-install the brass fitting when finished.
8. Attach the vacuum valve to the other street tee.



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:

3" PVC Pipe (2 at 14"L)  
PVC Caps (4)  
PVC Cement  
Pipe Tap (optional)

#### Tools Required:

Drill press  
7/16" Drill bit  
Vise-Grips or pliers  
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](http://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 1/4" 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 1/4" 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 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 vacuum generator (known as a venturi) operates on compressed air. For the Vac Pro Premium, the air requirement is 7.8 CFM at 80 psi. If you have opted for the V2 Premium 9 kit, you'll need 12.5 CFM at 80 psi.

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. You can find these valves at your local pneumatics dealer or you can help to keep this article ad-free by purchasing the Mac valve at VeneerSupplies.com. Here are the considerations for selecting the correct valve.

- 1/4" NPT fittings
- 120v AC operation
- 3-Way valve orientation
- 7.8 CFM minimum air flow

It's time to build the vacuum generating unit. Warning: Brass products may contain chemicals known to the state of California to cause cancer or reproductive toxicity.

### Parts used in this section:

Thread sealing tape  
Mac valve  
Breather fitting  
Quick connector

Brass "close" fitting  
Venturi  
Check valve  
Brass fitting (3/8" NPT male to 3/8" barb)

### Tools Required:

Wrench or pliers

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. This fitting allows the venturi to unload any back pressure after each vacuum cycle and gives the overall assembly a professional look.
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 check valve to the vacuum port on the venturi.
6. Attach the 3/8" NPT to 3/8" brass barb fitting to the check valve.
7. Attach the venturi to the close fitting on the Mac valve so it is oriented as shown below.

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



These instructions are provided for assembling the components available from VeneerSupplies.com. If you are using different components the exact connections may vary. If so, your best bet may be to take the venturi and the valve to the hardware store and play around with the fittings until you find a combination that works.

## 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:

3/4" Lumber or plywood  
Wood screws- #8 x 1.5" (4)  
Screws - #4 x 5/8" (2)

Screws - #8 x 1 1/2" (4)  
Handle

### Tools Required:

Table saw  
Screw driver  
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 on the next page.



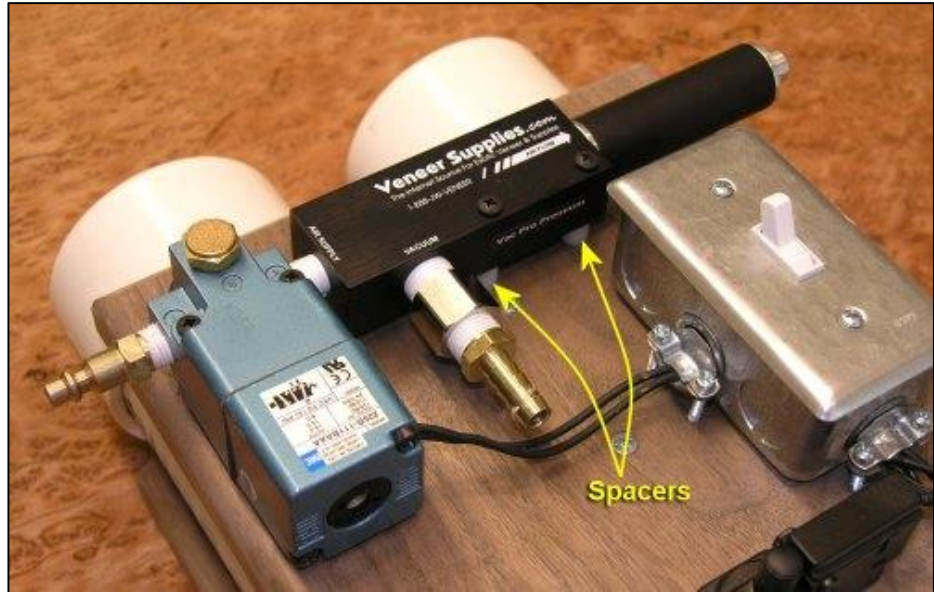
*Reservoirs on Carrier*

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.



## Attach the Vacuum Generator

Locate the area on the carrier where the assembled venturi will be mounted. Use two #8 x 2" wood screws to attach the Mac valve to the top of the carrier as shown below. Then place four plastic spacers under the holes on the venturi and use the remaining four screws to attach the venturi to the carrier as shown.



## 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 with screws to the system carrier and connected to the manifold via black tubing.

### Parts used in this section:

Vacuum controller  
1/8" NPTF barb fitting  
Screws - #8 x 5/8" (2)

Black tubing  
Thread sealing tape

### Tools Needed:

Wrench or pliers

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 barb 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 barb 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 insulate any exposed wire near the terminals.



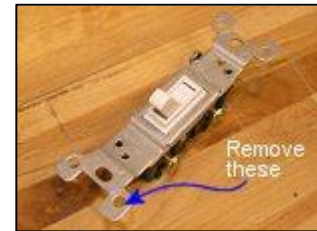
### Parts used in this section:

Light switch	Wire nut
Light switch plate	Wood Screws - #8 x 1/2" (2)
Handybox	Electrical power cord
Romex box connectors (2)	Crimp-on connectors (2) optional

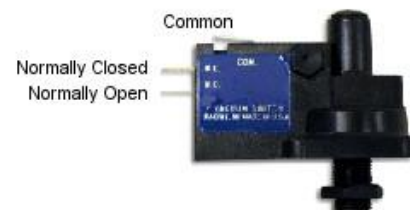
### Tools Required:

Soldering iron
Solder
Wire cutters
Screw driver

1. Knock out two of the utility box holes (as shown in the picture on the next page) and insert a Romex connector in each. Tighten the locking nut on each connector.
2. Remove the "ears" from the light switch.
3. 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.
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. 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. 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.
13. Attach the light switch to the utility box and screw on the light switch plate cover.
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".

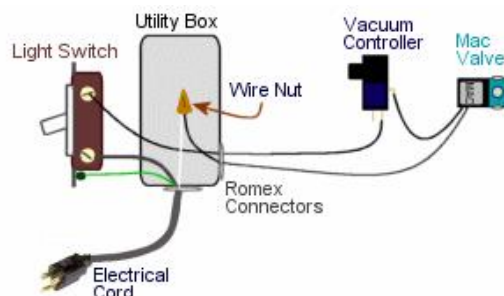


*Completed Wiring of the Press*

### **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 Pneumatic Connections

## Parts used in this section:

Vacuum tubing

## Tools Required:

Scissors

1. Attach the piece of the black tubing from the vacuum controller to the brass barb fitting on the lower end of the manifold assembly. You may have to trim it to fit neatly.
2. Now cut a piece of braided vacuum tube and connect it between the barb fitting on the venturi and the barb fitting in the top-middle of the manifold.

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



*Completed Pneumatics and Manifold Assembly*

## 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.

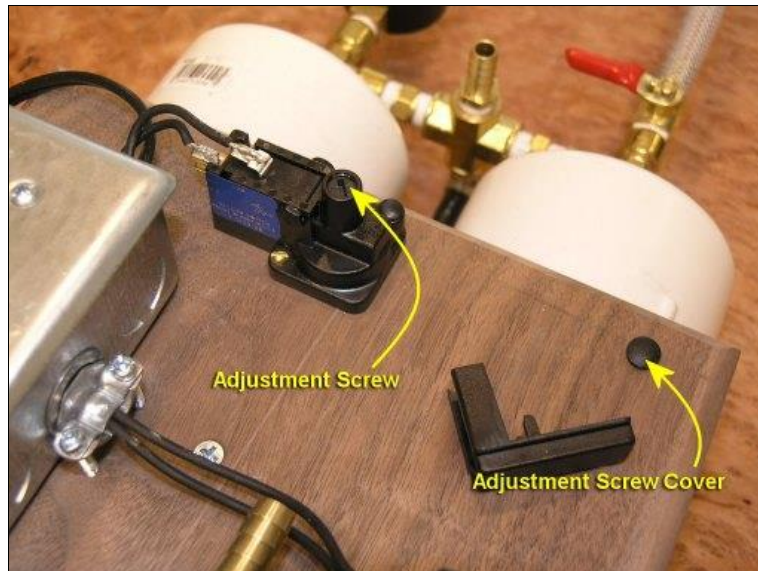
### Important Information

The Premium version of the V2 system requires a significant amount of air flow from the compressor. Exceptionally long or thin air lines will restrict flow and not allow the venturi to create full vacuum. The minimum inside diameter of your air hose should be 3/8" if the hose is less than 25 feet in length. Longer air lines require 1/2" or greater air hose.

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.



*Location of Adjustment Screw*

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.

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 so the silicone can cure.

### **Troubleshooting**

Some users report that they have to tap on the vacuum controller to make the system cycle off. This issue is not caused by a faulty vacuum controller. It is caused by insufficient flow of air to the system. If your compressor is not delivering the required PSI and CFM, then the vacuum press will not create enough vacuum to allow the vacuum controller reach the shut-off level. This is typically caused by an air hose that is too long, too thin, or both. In this case, you will need to upgrade to a thicker and shorter air hose. Also be aware that tapping on the vacuum controller will damage the unit.

### **Final Steps**

1. Apply thread-sealing tape to a 3/8" barb to 1/4 NPT-male fitting.
2. Attach the barb fitting to the lock-on connector. Be sure to hold the lock-on connector at the hexagon part of the casting when attaching the barb fitting. If you hold the head of the lock-on connector and apply too much torque to the barb fitting, the connector will break.
3. Attach the braided vacuum tube to the vacuum valve on the manifold.
4. Slide on the lock-on vacuum connector to the other end.



*Completed Project: V2 Premium Vacuum Press*

## 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](http://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...

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### Current Stock List

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