

Mike's Vacuum Chuck System

This article is a rewrite of my 12/24/08 post on <http://sawmillcreek.org/showthread.php?t=99878>

I want to provide some pictures and details of my vacuum chucking system in case you are considering building one. It is based on Steve Schlumpf's [tutorial](#) on Sawmillcreek.org which helped immensely. I also got a lot of useful info from joewoodworker.com.

Pump Setup

Here is my pump setup mounted on the wall next to my lathe using my existing French cleat system for easy relocation. Instead of wiring a switch I simply wired an old computer power cord to the pump and used an old power strip with a switch. I bought this power strip in the early '80s for my Commodore Vic 20! I was going to mount the pump on a shelf but opted for mounting this simpler way. The pump instructions say, "This product can be installed in any orientation. Mounting the product to a stable, rigid operating surface and using shock mounts will reduce noise and vibration."

I was able to buy a late model GAST 523 110V with internal filters off eBay for less than a \$100 including shipping. This is an oilless rotary vane pump identical to the one sold by CSUSA and Packard for almost \$450 for vacuum chucking.



The Gast Model 522 is an older model of the 523 and pulls 4.0 CFM whereas the 523 model pulls 4.5 CFM. I know nothing about vacuum pumps other than these two pumps work and are popular for vacuum chucks. Most older models require external filters which is an additional expense. The 110V Gast saved me the inconvenience and expense of having to run another 220 line or buying and wiring a 220 duplex receptacle to the circuit my lathe is connected to as well as the 220 V pigtail. Consider these extra costs when comparing a 220V GAST 522 which used to be available from Surplus Center or a 220V Gast 523 as reasonably priced 110 V as Gast pumps come up on eBay quite often.

Manifold

The manifold consists of a couple of plumbing Tees, a gage and a valve to regulate the vacuum pressure. I used Steve's idea for a Fram G2 fuel filter to filter any external shop dust for about \$3. If I had not already had some of the parts, I would consider buying the manifold kit from [Veneer Supplies](#) as shown here for \$44.25. It includes a bearing and a liquid filled gage.



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Rotary Adapter

Some folks use an adapter with a threaded lamp rod that goes through the headstock. You can buy a commercial one like the "Holdfast Vacuum Adapter." I wanted the convenience of a quick removal rotary adapter.

If you make your own rotary adapter I would suggest using corian like this one I saw on one of the Turning forums.



I got to meet Tom Steyer at the Southern States Symposium in 2010 and saw his rotary vacuum adapter in action. It has **two** bearings and **two** O rings.

Wow! My home made adapter could not come close in performance to his. I picked up a couple of pounds pressure but the main thing is that his runs so smooth at any speed whereas my home made tended to wobble a little and needed a velco strap as insurance that it would not come off. I highly recommend his adapter for \$89.

<http://www.jtturningtools.com/vacuum-adapters>



This is what I made originally. I ran across the idea of using a plastic garden hose quick disconnect. I turned a 4 ply laminated MDF outboard spinner sized the same as my PM 3520's hand wheel. This picture shows the side that slides into the spindle taken before final assembly. I built my rotary bearing adapter with a pump bearing from Lowes, part 99502-H .625 Bore, double sealed for Ace Pump found in Drawer K10, Specialty Fasteners.



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Cost was \$7.10. Be sure to get a double sealed and not a shielded bearing or the vacuum pump will suck out all the grease. I added a 3/8 barb to 3/8 MIP brass fitting. I turned down the threads on the lathe with a parting tool to closely fit the .625 bore of the bearing and glued with JB Weld. This is the outboard side before assembly.



I fastened the bearing adapter with three washers in case I decide to make a better outboard spinner from Corian or something else if the MDF leaked too much. Some folks use epoxy. The small end of the garden hose fits snugly in the hand wheel and has an "O" ring that appears to seal very well. You may be able to see the white closed foam gasket on the end of the adapter that seals against the hand wheel snugly when the pump is on.



I made a holder for the rotary adapter when not in use as shown here.

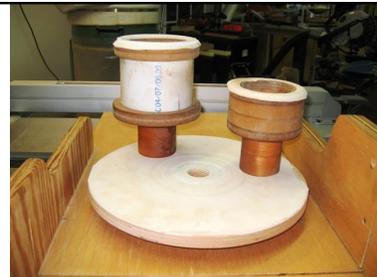


Chuck

Here is a picture of my first chuck. I made a wooden face plate using a couple of pieces 5/4 cherry and the Beall 1-1/4" tap I recently picked up at the local WC. The white gasket on the chuck and the outboard spinner is from a sheet of thin closed cell Fun Foam, 99 cents at Michaels.



Here are pictures of some more chucks. Total costs for my pump system with my shop made rotary adapter was less than \$150! It pulls about 25 inches of mercury so I think I am set.



Hope these instructions helped. Good luck with your system.

Mike Peace, mtpeace@bellsouth.net