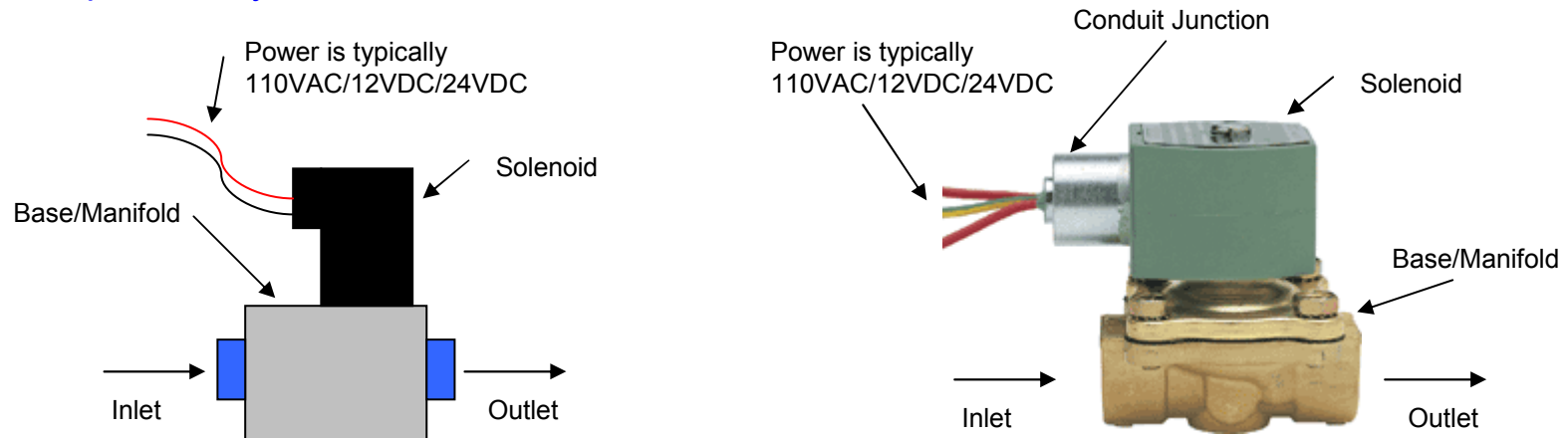


A Pneumatic Solenoid Valve Primer - Part 2

by SkeletalRemains

In Part 1 of the primer, valve function and application was presented and explained. Now that some of the mystery has been taken out of the valve types and functionality, we are going to unlock more of the mystery by showing some real-world valves next to the diagrams.

2 port, 2-way valve / shut-off valve



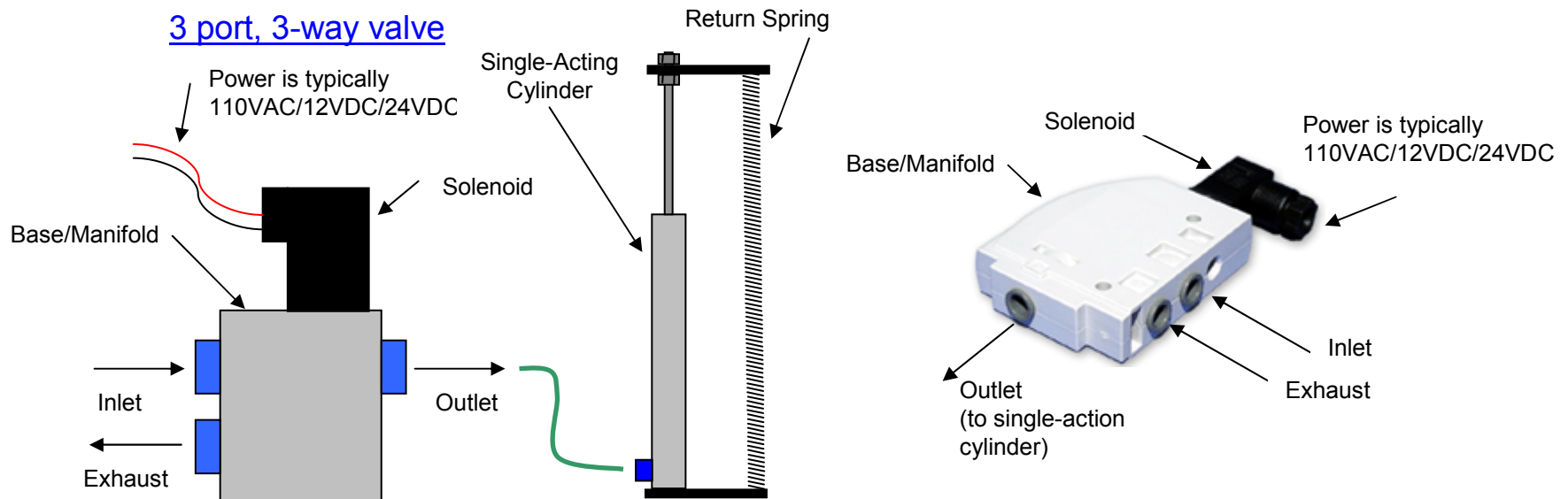
The picture on the right is a typical ½" ASCO valve. These are high volume valves that usually have a Cv flow rate of above 4. That really doesn't play into our calculation, since we are not actually distributing a measured product through this valve. Please note the conduit junction, as these valves are designed for use in harsh environments, and usually will use conduit to protect the wiring. The conduit can be added in a haunt application to look nice and make safer, but it usually isn't necessary. Haunters use these valves mainly for 3 things. By far, the biggest use here is air cannons. A simple air carry-tank, converted so that we can plumb ½" steel pipe straight in, and then connected to an air source and an ASCO valve, is what your typical air cannon consists of. Another use is for water control, where you might have misters setup to spray patrons on command. Lastly, these valves are very common with propane flame igniters. Haunters outside the city where code allows the use of these devices often have burning torches that get injected (on queue) with compressed air, meant to resemble a massive flame thrower. They are quite effective as they have a lot of 'startle factor'. ASCO valves can be picked up off of eBay pretty cheap. The valves used in flame devices are usually 2" to 4" in size.

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What makes these valves so mysterious and confusing? It is definitely the wide range of different styles of valves that all basically do the same thing for haunt purposes. Most solenoid valves are used in circuits for industrial automation or large building infrastructure systems. Because of the different environments that these are used in, there are literally hundreds of different styles of valve that all accomplish the same task. The solenoid below is a simple 3-way valve, and I chose this specific solenoid because it already has the ¼" OD tubing quick connects built right into the solenoid. It makes for quick connections and easy setup! I did not include a real cylinder picture because I am planning to get to those in Part 3.



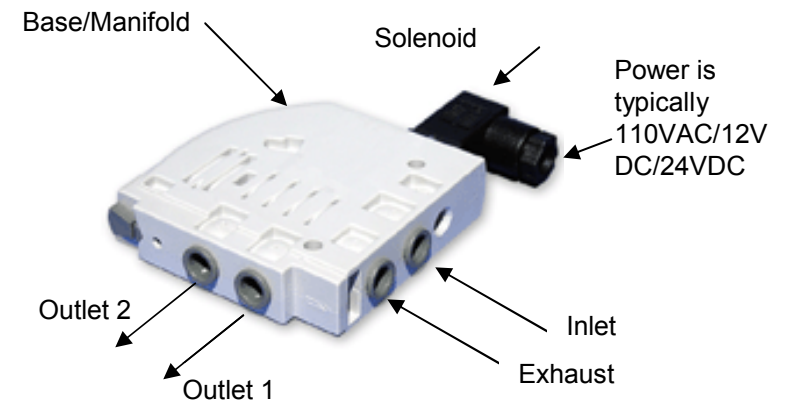
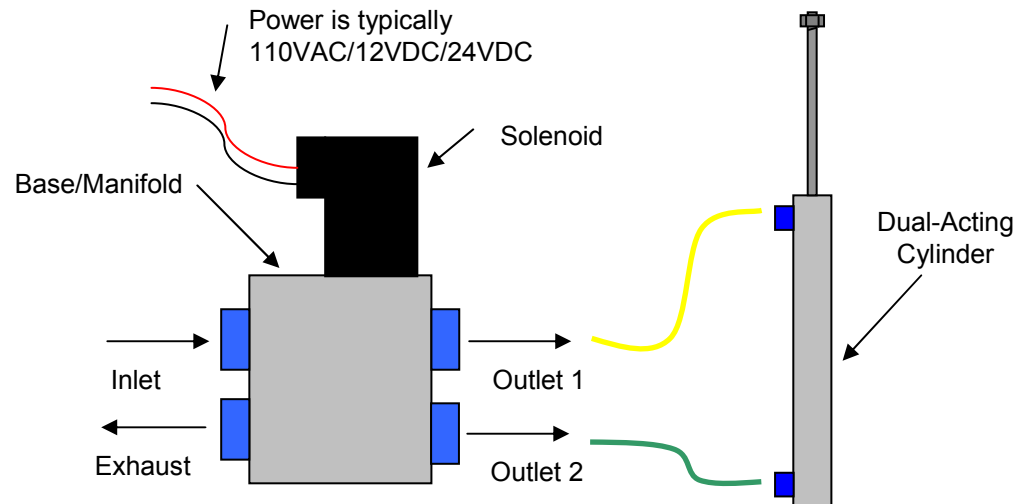
You can order this exact solenoid for about \$40 from Coast Pneumatics or PowerAire. Shipping is about \$12. Three-way valves come in many styles and are often very confusing. When you are browsing through eBay for cheap/used solenoid valves (what I do), you want to know what you are buying before you spend the money, which is completely understandable. The truth is, the folks selling these things online often don't know what they are or what they are used for. That's also where you find the best deals! If all of us haunters could run down to Home Depot and pick up a bag of these for \$10, I wouldn't be writing this primer. The bottom line here, is there is no consistent supply of these things at a cheap price, so each haunter will have to learn to adapt whatever they can get their hands on, to whatever their trying to build.

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A Pneumatic Solenoid Valve Primer - Part 2

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4 port, 4-way valve



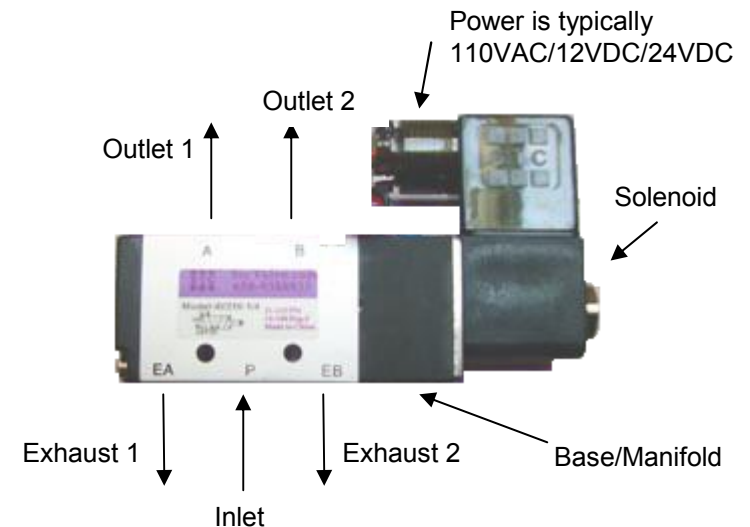
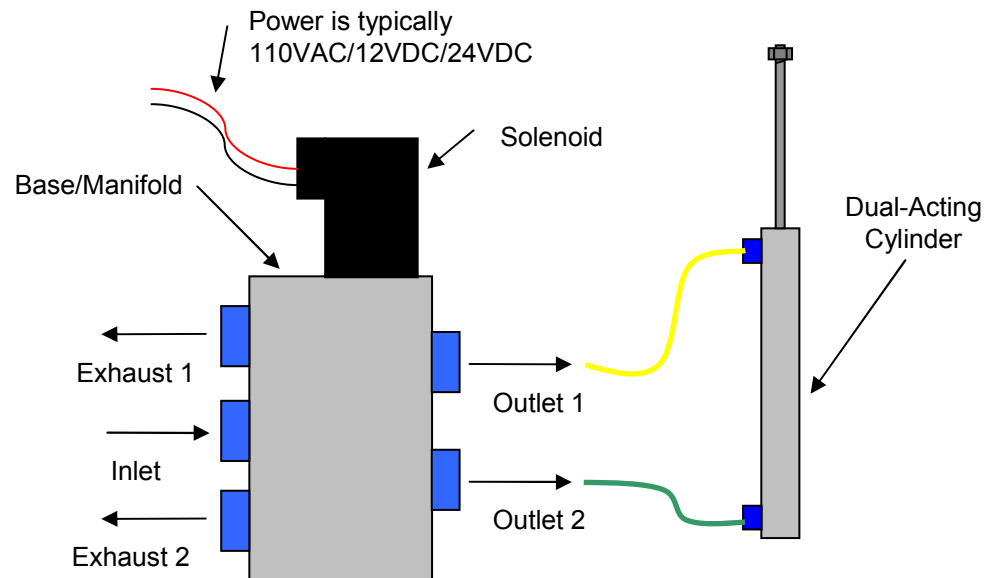
Again, I chose this simple 4 port, 4 way solenoid from Coast Pneumatics/PowerAire because it is about the only one I could find that shows all four ports in the same picture! Most solenoids will either have 2 ports on one side and 2 on the other, or they will have all 4 ports around a cylindrical brass manifold. Again, the cylinder isn't shown here because I plan to go into much deeper detail on those in either Part 3 or Part 4 of this primer, as soon as I write them! Remember when I said that hunters have to get what they can and adapt to what they need? Well, if you just happen to have the means to go out and purchase solenoids new, you can specify what voltage your coil (solenoid) needs to actuate, so there is little adapting in that case, but the only time I really ever see that is with really big for-profit haunts or amusement parks.

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A Pneumatic Solenoid Valve Primer - Part 2

by SkeletalRemains

5 port, 4-way valve



Like I said in the first part of this primer, this is the valve of choice for me. Again, these can vary GREATLY in style, size, and many other attributes. These solenoid valves can easily be picked up on eBay for around \$20 each. Really, a small price to pay for such an impressive valve, that allows so much flexibility. I chose this valve because I own this particular valve and am quite familiar with it. It is quite reliable and resembles many of the other 5-port, 4-way valves.

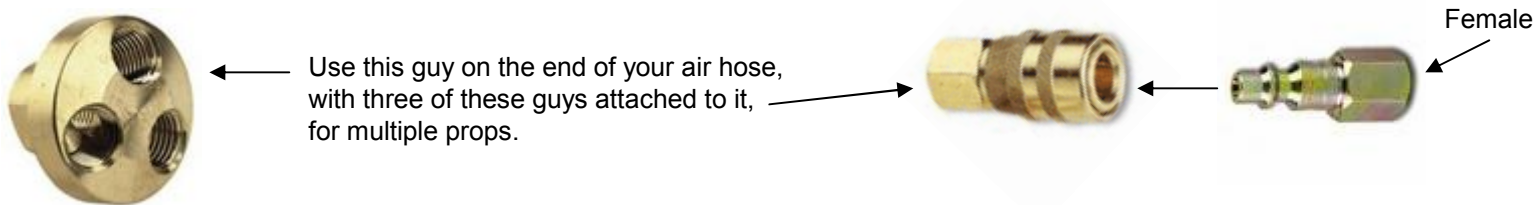
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A Pneumatic Solenoid Valve Primer - Part 2

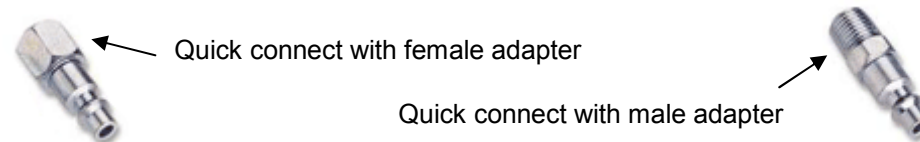
by SkeletalRemains

Now, we're going to take a look at some of the connectors that are used in haunt pneumatics that make it very easy to hook up or reconfigure on the fly. Let me tell you, if you are using brass barbs, please read on and I'll bring you into the 21st century (1/4" quick connectors have been around for along time, just always wanted to say that...)

To start, let's talk about your air compressor. Almost every light duty air compressor for home use will have a universal 3/8" quick connector on it. All of your tools will have a male connector that slides into a female locking-slide connector. This connection is shown below.



Now, on the right side of this connection is typically where your air tool would be connected, but most air tools accept a male quick-connect, whereas I have shown a female back end on this quick-connect. Now, this is a little confusing, so I'm going to illustrate this in a little finer detail below.



Use the adapter on the left. This is because you want to use a reducer to get from 3/8" down to 1/4". This is accomplished by using a 3/8" to 1/4" reducer. Check this out below. The reducer bushing shown below needs to fit into the back of the female quick connect, and the inside threads of the reducer should receive a 1/4" NPT male fitting perfectly. Print out these pages and take them with you when you go to the hardware store, so you know for sure!



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Now that we are down to a 1/4" female fitting, we can begin with our real quick-connects. These quick connectors will fit directly into your new adapter, as well as into your solenoid valve ports. The only thing to do now is determine the requirements. Take a look at the quick connects below...



The quick connect, or instant fitting, on the left is the most common. This is a 1/4" male fitting and will plug into the adapter you made on the previous page. Use this guy for all ports that are 1/4". Use this same guy on your solenoids. Some solenoids have 1/8" fittings, but not to worry, because these are available in 1/8" as well. Use of these connectors will make your life easier, and you can throw away all your brass barbs, if you're currently using them... If you get into trouble on clearance, use the middle fitting, as it has the 90 degree bend making some installation easier. The fitting on the right is a speed controller that is commonly used on a cylinder, something we haven't got to yet, but I wanted to throw it in as a teaser.

Now, on to tubing, the air has to flow through something, so better make it polyethylene tubing, NOT polyurethane, and certainly NOT nylon tubing. These other types of tubing have special properties that we just don't need in haunt applications most of the time. The only thing polyethylene is really susceptible to are UV rays and deterioration from outside use. Most haunts are inside, and yard haunts only last a few days if even a month, so no worries, and it is much cheaper. A 100' roll of polyethylene tubing in any color can be purchased for about \$7.50 at poweraire.com. See rolls below in many colors, but trust me, sticking with black is my recommendation because it hides really well.



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