

Plain Ole' House Garage to Masterpiece of Working Space (I Hope) Part 2: Heating and Cooling

- Joe Parlanti

In Part 1 of the series of upgrades to a neighborhood 2-car garage, Joe insulated the garage doors, upgraded electrical system, added better lighting and hot water. All this in support a comfortable working environment.

Mini-split heat pump

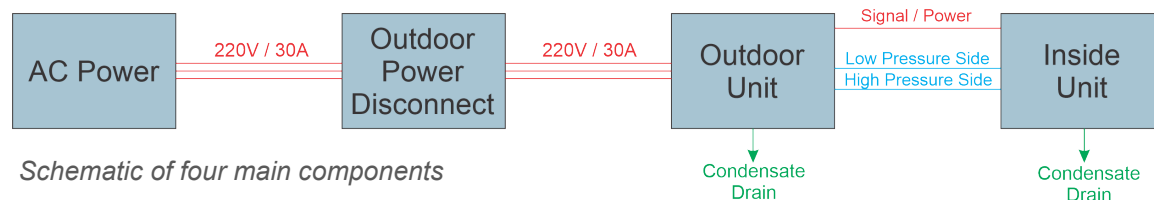
Mini-splits have become popular for supplemental HVAC because they are simple to install, provide both heating and cooling, and are relatively efficient. Even though most manufacturers recommend hiring a professional to install their systems, it's easily within the capability of the do-it-yourselfer. The systems come with most everything needed and are pre-charged with R410A so there's no need to hire and HVAC guy to charge the system.

Find the right sized unit

There are a bunch of handy online calculators to use. This one is very detailed <https://bit.ly/3dV9mdL> It's not the one I used, and it shows that I only need a 10,500 BTU system. But by the time I noticed it, I'd already opted for a 12,000 BTU system. The top tier brands are made by Mitsubishi and Bosch with many lower priced units from Senville, Della, Mr. Cool and others. I chose the Senville Aura Series system with a 22.5 Seasonal Energy Efficiency Ratio (SEER) at \$1,178 delivered (link below). Senville makes a lower cost version of the same size but this one had a better SEER rating and is WiFi enabled. <https://amzn.to/2R51Hk4>

Four main components:

The AC power (April RootesReview) feeds 220V to an outside disconnect box which provides a safety



Schematic of four main components



Senville mini-split full kit

disconnect if needed and it's required. The disconnect box I used is rated at 60A; \$19.55 from Amazon.

<https://amzn.to/3xEfC1k>

This box feeds power to the outside unit which changes it to DC providing power and control to the inside unit. Between the inside and outside units are a pair of copper tubes for the refrigerant. Each unit has a condensate drain

tube also.

Start the installation

This video was extremely helpful so I won't go into minute detail of each step. <https://bit.ly/2PwCD1A>



Disconnect box

The first thing you'll have to do is



Outside compressor set

provide a stable platform for the outside unit. I chose to pour a concrete slab 15" x 36" which worked out nicely. There are minimum spacing requirements outlined in the installation manual. If you haven't done this before, here's a video <https://bit.ly/32Q9UeE>

Once the slab has cured, you can anchor the outside unit. I used Tapcon anchors purchased at Lowes <https://low.es/3ezED4V>

You'll need a masonry bit to drill the concrete for the anchors. I also had to slightly raise the unit off of the slab because, even using the supplied rubber isolators, the condensate drain fitting hit the slab. I used some scrap PVC molding to make four blocks which worked nicely.

The inside unit is relatively easy to install. Once again,

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pay attention to the instructions relative to wall and ceiling clearance requirements. The kit comes supplied with a steel mounting plate and a cardboard template for marking mounting holes. You'll need to bore a large hole through the wall to for everything to pass through. Its location is on the template as well. Follow the video to prepare the copper tubing and electrical cable to feed through the wall. Once you're set, snap the unit in place and get ready to connect everything.



Indoor unit on the wall

Fiddly-est part

To me, the fiddly-est part of the whole process was routing the copper lines. The system comes with 16' of copper lines and pre-flared ends. If the inside and outside unite are relatively close together, you can just coil up the excess like in the video. In my case, they were quite far apart and as many times as I measured things I still had just a little too much length.

You are not supposed to shorten the copper lines significantly because the system charge is based on a volume matched to the line length. Shortening the lines too much can result in a higher than recommended pressure.

Unfortunately, as I was trying to make the copper lines fit, I managed to kink one near the outside end. This necessitated cutting the lines back and re-flaring the ends. HVAC flares use a different angle than the fuel and brake lines that we are used to playing with so the flaring kit you already have won't work. Luckily, they're not terribly expensive and mine is always available to borrow.

<https://amzn.to/3v1NX3a>

Once you are happy with the routing, connect the copper lines using Nylog Blue as a sealant
<https://amzn.to/3aJWPHY>

After everything is connected the lines are wrapped, along with the electrical cable and drainage lines

with the supplied vinyl tape. I also used this cover set which made things look nice and neat.

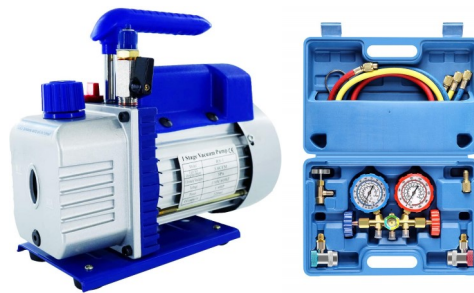
<https://amzn.to/3nvoXUj>

Wiring the AC to and from the disconnect panel is straightforward and everything terminates in the side of the outdoor unit.

Now we're finally ready to release the refrigerant stored in the outside unit. First though, the lines and the inside unit need to be evacuated. A cheap little pump like this one (pictured left) <https://amzn.to/3xlJe3r> and manifold set (also left) <https://amzn.to/3eqzoUY> are needed for this procedure. Follow the instructions in the video and when you are satisfied that there are no leaks, release the refrigerant into the system by backing out the allen screw in the outdoor unit fittings.



Line cover



Cheap little pump and manifold set

Show time!

Turn power on from the main panel and outdoor panel; use the remote set the desired temperature. You can set the system to provide heating, cooling or on automatic as desired. You can also set up schedules for days of the week, etc. I normally keep my garage at 65 deg F during the week and 72 deg F on the weekends during the colder months. The system does a good job maintaining temperature and on the coldest days of the winter was within one or two degrees of the setpoint. I have some more insulating to do where the slab comes up to meet the studs which will improve things a bit. Also, the WiFi enabled function is nice because you can set the temps from your phone.



Remote control

There you have it. Working in a climate controlled garage is definitely worth the effort! Your cars will thank you for the nice environment.

Next up: Installing a lift!

Until next time:

