

“THE DUCT-FREE ZONE”

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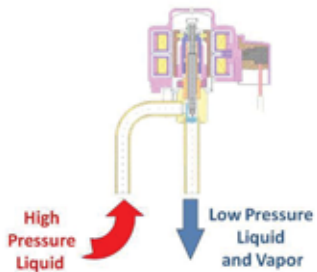


WHY NO HIGH-SIDE SERVICE PORT ON A MINI SPLIT? This is what I call the great mystery of the inverter mini split and one that the industry, and myself for that matter, hasn't done a great job solving. I'm going to attempt to change all that right now...

First, we have to review what some may think is elementary and rudimentary, but I feel strongly that I need to lay a basic foundation so I can eventually get to the bottom of this.

Let's take a look at what the expansion valve does to system pressure...

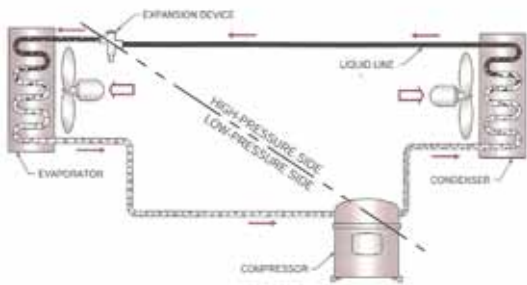
THE MINI SPLIT REFRIGERATION CYCLE
EEV Valve Operation



The expansion valve in an inverter mini split, an Electronic Expansion Valve EEV, takes in high pressure liquid refrigerant and discharges low pressure liquid / vapor refrigerant.

OK...now let's see how this works in a "standard" refrigeration system where the Thermostatic eXpansion Valve TXV is located in the fan coil unit / evaporator.

THE STANDARD REFRIGERATION CYCLE

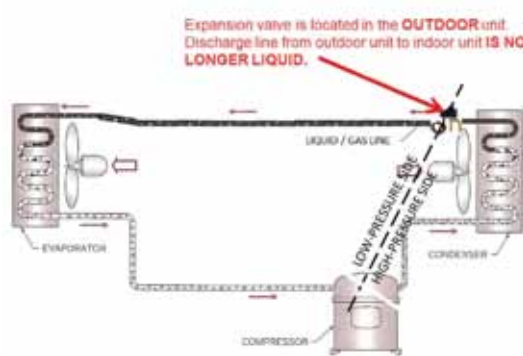


In this case, the system has a clearly defined high & low side which can be accessed at the two service ports (suction & liquid), of the outdoor unit. Because the expansion valve is in the fan coil / evaporator

located inside the home, the suction service port will display low pressure and the liquid service port will display high pressure. This is why standard, (unitary) outdoor units have two service ports.

The inverter mini split however, places the expansion valve in the outdoor unit and that changes EVERYTHING!

THE MINI SPLIT REFRIGERATION CYCLE



It shifts the low pressure / high pressure border to within the outdoor unit. The high pressure side is now only represented by the internal piping between the compressor discharge and the expansion valve inlet.

You know what this means don't you?

Now, what has commonly been known as the suction (low pressure gas), valve and the liquid, (high pressure liquid), are now both low pressure gas. Even if the mini split had a second service port on what is commonly called the liquid, it would display essentially the same pressure as the suction service port because it is located downstream of the expansion valve outlet, which as described earlier, takes in high pressure liquid and discharges low pressure liquid / vapor.

I believe, and more importantly the inverter mini split industry believes, that placing a second service valve at the outdoor unit would only confuse the situ-

ation by implying that something different, (pressure) would / should be found there...and as you now know, that's not the case.

I had a gentleman in one of my recent classes say to me, "look, the compressor still has suction and discharge so there has to be a high side."

He is right...the problem however is that the high side discharge tubing coming off the compressor is internal to the outdoor unit and only about a foot or two in length between the discharge of the compressor and the inlet of the expansion valve (of course the condenser is between the two).

Remember, the connection on the outdoor unit for the liquid, (although it's not liquid), is downstream of the expansion valve outlet...so its low pressure gas / liquid!

I have seen a mini split outdoor unit that did provide a Schrader valve on the high side piping internal to the outdoor unit's cabinet... only accessed by removing an outer cabinet panel.

I consider this a novelty at best...

If you want to see the high side pressure on a mini split it's really easy to do...simply place the system in the HEAT mode and be sure you have your high side gauge and hose attached to the singular service valve of the outdoor unit.

...mystery solved!

ABOUT THE AUTHOR: Gerry Wagner is the Vice President of HVAC Technical Training for Tradewinds Climate Systems. He has 38 years in the HVACR industry working in manufacturing, contracting and now training. You can contact Gerry by email: gwagner@twclimate.com and also please visit our website: www.twclimate.com



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