Johnson Controls

Ducted Systems
Technical Services
Service Letter

Letter: **YS-002-2020**

Date: April 27, 2020

To: Valued Customers

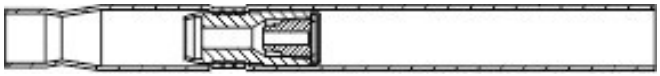
Subject: **Nuisance low-pressure switch fault – Low ambient conditions - 3.5 ton (2nd generation) models**

Product: YHE42B22S

Effective: **April 27, 2020** Expires**:** **April 27, 2022**

Summary: **This letter provides explanation and resolution for 3.5-ton heat pump nuisance low-pressure switch faults during low ambient operation.**

We have received complaints of nuisance low-pressure switch faults/compressor lockouts on the above-listed models. We have investigated this issue and were able to replicate the faults as described. When the above mentioned 3.5-ton models were converted from the Bristol reciprocating compressor (generation 1 model) to a Copeland scroll compressor (generation 2 model), the outdoor metering device was also changed from a TXV to a fixed orifice device as shown to the right.



The field issue described in this letter does not apply to generation 1 models.

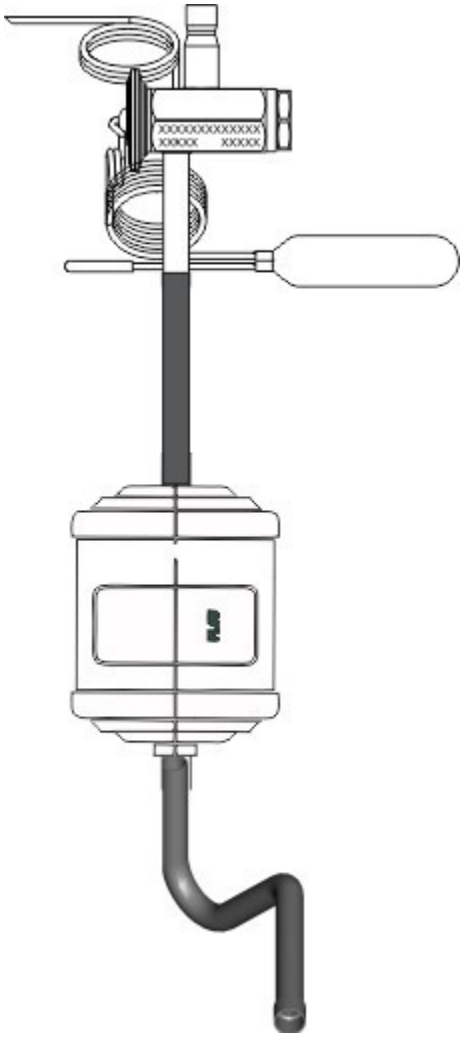
Many of the field complaints were able to be resolved by properly charging the heat pump. With the fixed metering device, system charge is very critical. Typically, the customer (contractor) would notice frost on the outdoor metering device and assume that it was restricted. The 14 SEER heat pump model installation manual contains heating charging charts for each tonnage and indoor coil combination. If charge is not adjusted using this method, in many instances the 3.5-ton heat pump model was not properly charged.

Our investigation revealed that even with a properly charged system when this model is operating in conditions lower than 15 degrees Fahrenheit, nuisance low-pressure switch trips will occur. The 15 degree Fahrenheit temperature data was verified through extensive engineering cold soak testing. The 5438494 demand defrost control utilized in this model unit ignores the low-pressure switch input during the following conditions:

- During defrost operation.
- During the first 120 seconds of compressor operation.
- During the first 120 seconds of compressor operation following a defrost cycle.
- While the test pin is shorted with a “Y” input.
- When the outdoor ambient temperature is lower than 5F

For installations where the above-listed model heat pumps are installed and operated in heating mode in conditions where the outdoor ambient temperature is lower than 15 degrees Fahrenheit, a repair must be made.

Required Method:



The field repair for this model unit is fairly quick and simple to perform. However, the majority of time spent on the repair is all the related work that must be performed such as hauling tools, refrigerant recovery, evacuation, and refrigerant re-charge.

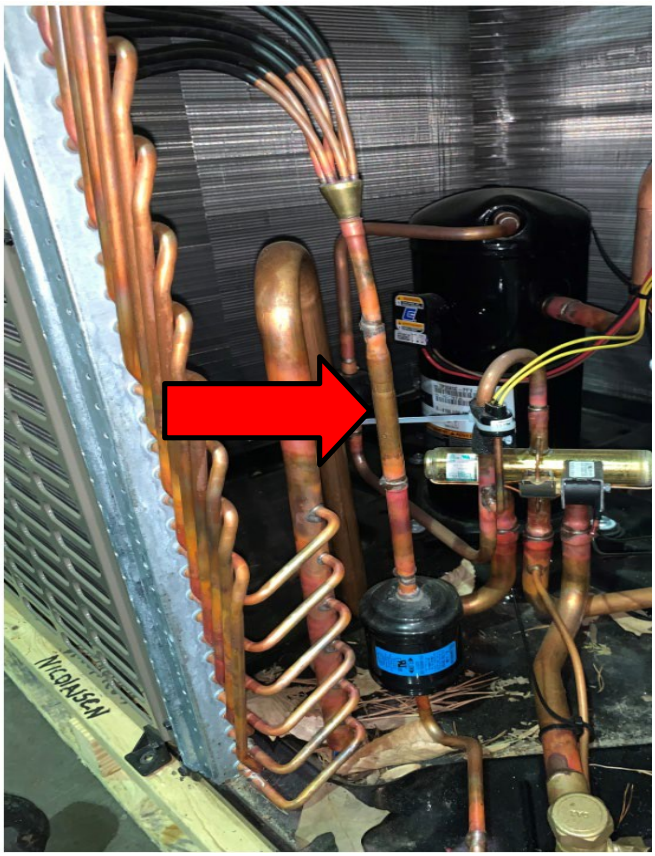
With the control panel swung open and the lower block off panel removed, there is adequate access to the existing metering device, filter drier, etc. Source One repair kit S1-32547301000 contains the following items:

1 - 5147597 - VALVE TXV
1 - 5256516 - DRIER - STEEL FILTER
1 - 1179260 - COPPER TUBE - LIQUID
1 - 5118412 - COPPER TUBE - LIQ TXV
1 - 158194 - CLAMP
1 - 158198 - SCREW CAP HEX 1/4
1 - 14976 - INSULATION - TXV BULB FOAM
2 - 7315 - CABLE TIES
1 - 13028 - PAD
1 - 348120 - SCREW
1 - 5917066 - INSTALL MANUAL - 14 SEER TXV RE-WORK KIT

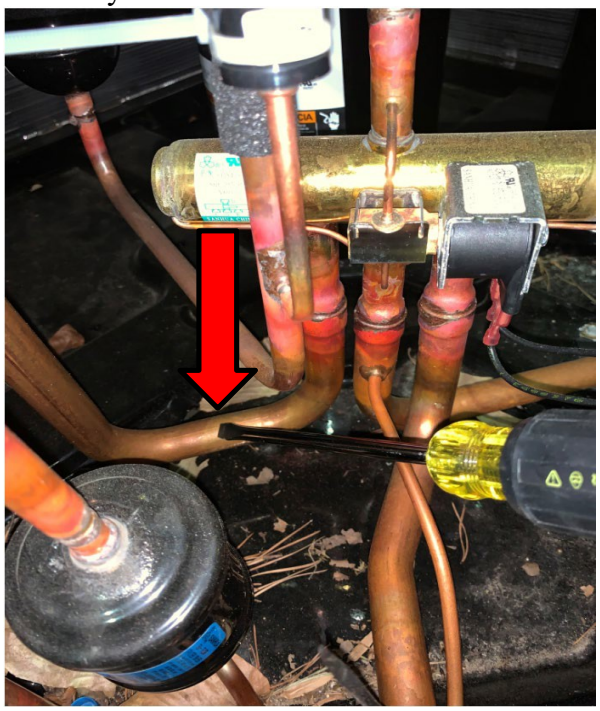
Using a tubing cutter, the existing 3/8 distributor line can be cut directly above the piston metering device. The existing 3/8 copper tube connecting the liquid line base valve to the filter drier can then be un-sweat from the base valve. The entire assembly can then be removed from the unit. Using the components in the kit, the assembly shown to the right can be put together all at one time inside the unit and then perform the five 3/8 braze joints. The only other braze joint is the 1/8 TXV equalizing line into the suction tube connecting the reversing valve to the outdoor coil. The suction tube does not have to be replaced, therefore there is no need to worry about potential damage to the reversing valve. Specific step by step repair instructions have been included in the Source One kit.

For repair using the required method, this letter will allow credit for Source One kit S1-32547301000, 10 lbs. R-410A refrigerant and 4 hours labor to perform metering device replacement. File a warranty claim using the service letter number.

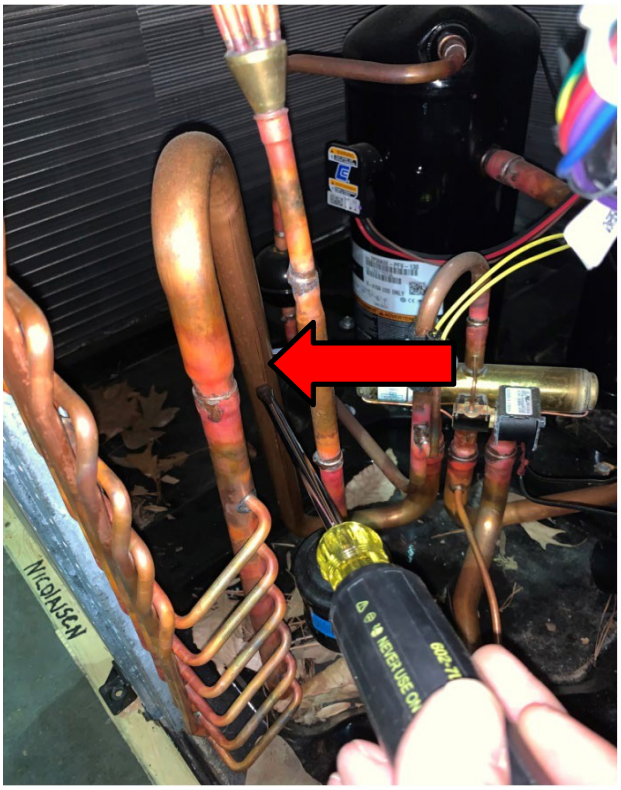
The warranty claim must include the invoice from the servicing dealer.



The above photo shows specifically where the orifice assembly is located



The above photo illustrates where to make the penetration for the external equalization tube utilizing a scratch awl type punch or the screw included in the Source 1 kit.



The above photo shows the location for mounting the sensing bulb. This will need to be mounted with the appropriate clamp that is included with the kit. Make sure to mount the bulb tail up and insulate the bulb.

If you have any questions on this feel free to call Virginia Air's Technical Support Team at 888-823- 4357 The instructions included with the source 1 kit are included below.

Source 1 Kit Instructions

INSTALLATION

1. Operate unit in COOLING mode and remove power at the outdoor section service disconnect.
2. Connect manifold gauges to the unit base valves and recover refrigerant charge.
3. Cover the unit top with a drop cloth, cardboard, or other means to protect the unit finish. Refer to Figure 1 for location of the following panels in steps 4 - 6

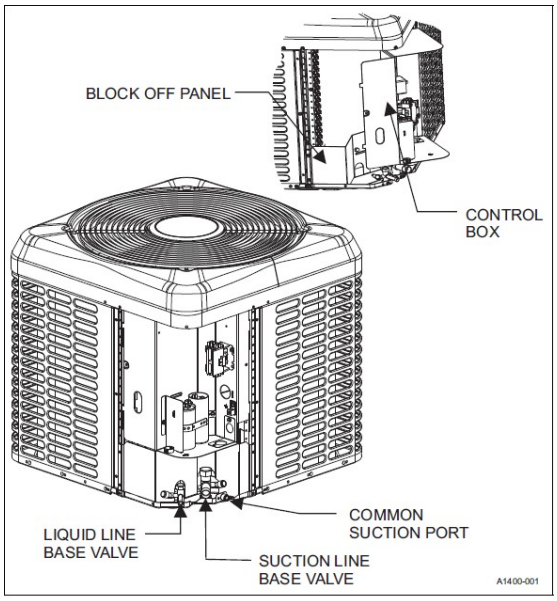


FIGURE 1: Control Box

4. Remove control access panel and place it on top of unit. See Figure 2.
5. Remove control box screw and swing open control box.
6. Remove lower block off panel and place it on top of unit. See Figure 3.

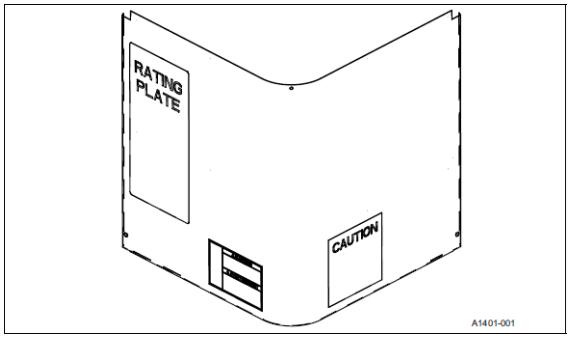


FIGURE 2: Control Access Panel

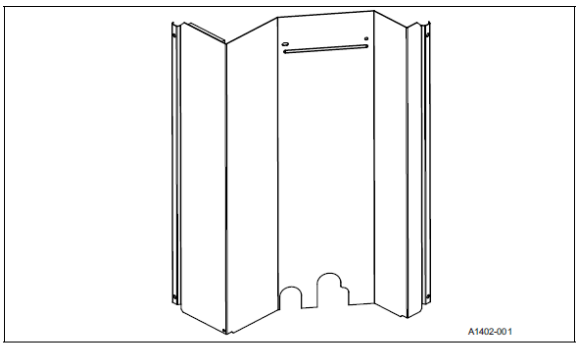


FIGURE 3: Block Off Panel

7. Disconnect manifold gauges and remove Schrader core valve from the liquid line base valve.
8. Close the suction line base valve.
9. Connect dry nitrogen to the common suction port and begin a low pressure nitrogen purge. Nitrogen will flow through the outdoor section and exit at the liquid line base valve where the Schrader core was removed.
10. Un-braze the 3/8 liquid line from the liquid line base valve at location shown in Figure 4.

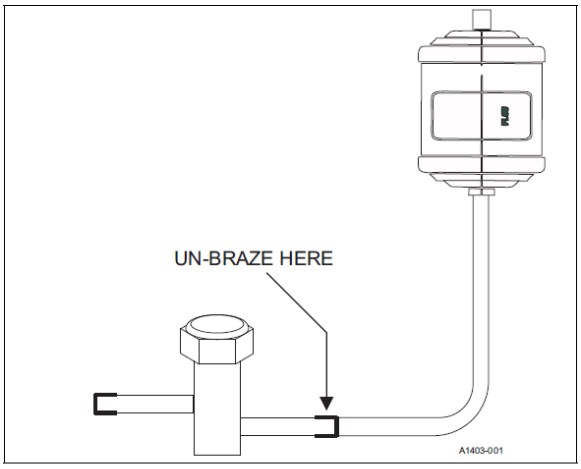


FIGURE 4: Service Valve Un-Braze

11. Using a small tubing cutter, cut the 3/8 line at the distributor assembly just above the factory braze as shown in Figure 5. De-burr the distributor assembly where it was cut.
12. Remove the tubing, drier, and piston metering device from the unit.
13. Using the 1/4" hex head screw included with the repair kit and a cordless drill, pierce the suction tube where TXV equalizer line will be installed as shown in Figure 6. DO NOT use a self-drilling type screw or twist drill bit. Use of the screw included with the repair kit will cause copper debris to form on the outside of the suction tube. Clear debris away from the

suction tube and remove the screw. Using the TXV included with the kit, check for proper equalizer line fit into the suction tube hole created with the screw. In some instances, it may be necessary to slightly increase the hole size using an awl. DO NOT over-size the suction tube hole.

14. Install the 3/8 copper tubes, filter drier, and TXV to the base valve and unit distributor assembly as shown in Figure 7. Downward tension can be placed on the distributor assembly to keep the kit components in place for brazing. Be sure that the TXV is rotated so that the adjustment cap is facing the control panel opening.

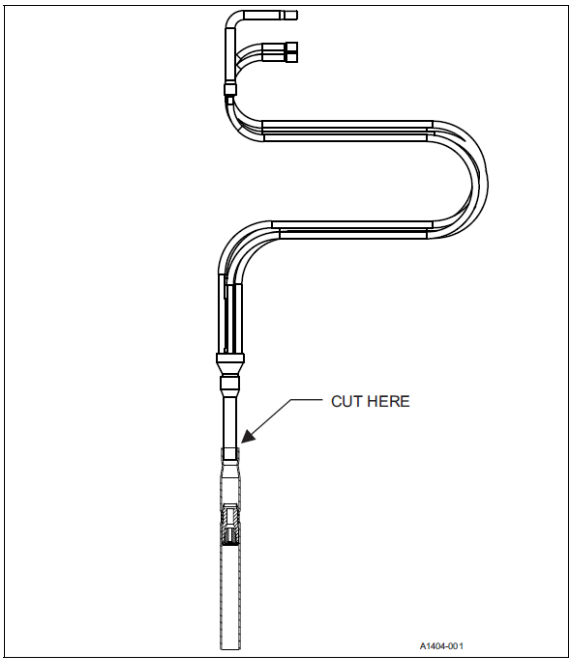


FIGURE 5:

15. Route the TXV equalizer line down to the suction tube hole. Over-extend the equalizer line and insert the equalizer line into the suction tube. There is a small notch in the equalizer line. It is extremely important that the equalizer line is fully inserted into the suction tube. By over-extending the line, this pressure will keep it inserted properly into the suction tube.
16. Perform brazing on the five 3/8 joints and the TXV equalizer line. Cool the parts using wet rags.
17. Re-install the Schrader core into the liquid line base valve.
18. Open the suction line base valve.
19. Pressurize the system with dry nitrogen and check for leaks using a bubble type leak detector solution.
20. Evacuate refrigeration circuit to 500 microns or less.
21. Install the new 2-inch self-adhesive foam pad under the 3/8 liquid line (below the filter drier) that was included with the repair kit.
22. Secure the TXV sensing bulb to the outdoor coil suction line as shown in Figure 6. Be sure the bulb tail is in the upward position. Insulate the bulb with the included foam insulation and secure the insulation with the two included nylon cable ties.

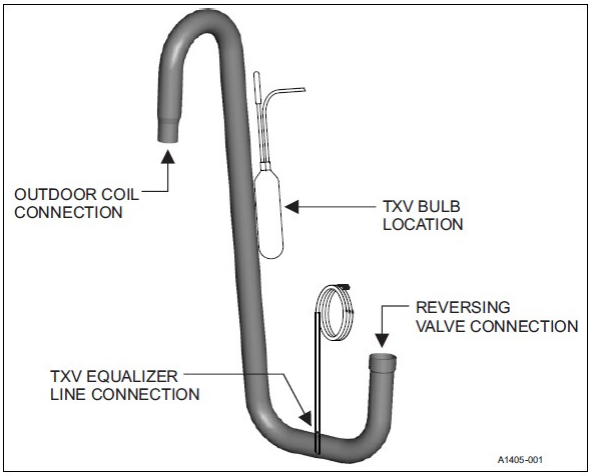


FIGURE 6: TXV Bulb Location

23. Replace the unit block off panel, close and secure the control box.
24. Weigh factory charge into the 3/8 liquid line.
25. Remove any materials still on the top of the outdoor unit.
26. Replace control access panel.
27. Apply power to the outdoor unit and adjust charge per the charging chart.

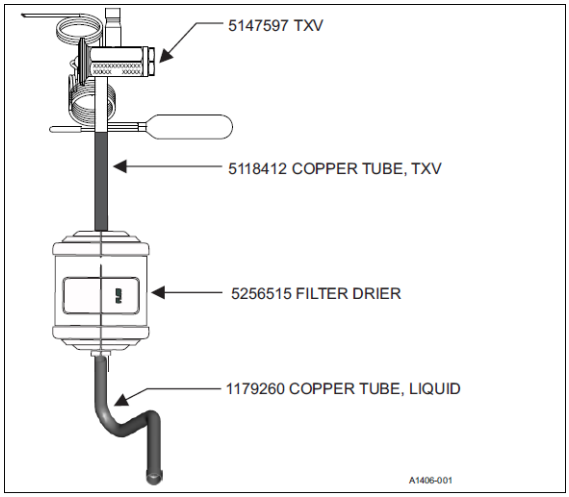


FIGURE 7: