



Ducted Systems Technical Services Service Tips Letter

Letter: **ST-005-2020**

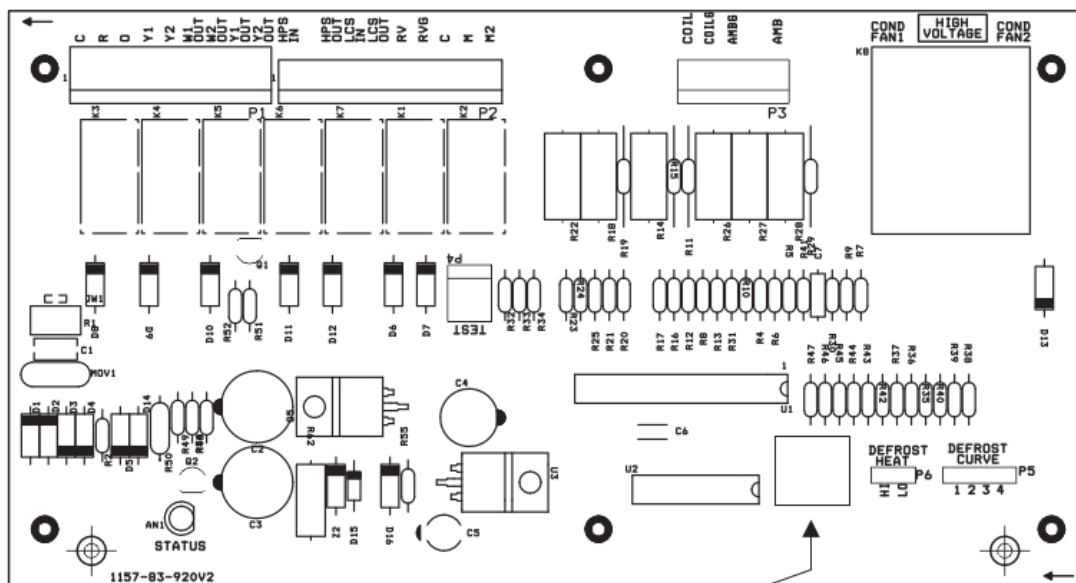
Date: March 24, 2020

To: All Ducted Systems Branch Service, Sales, and Training Managers
All Ducted Systems Distribution Service, Sales, and Training Managers

Subject: **Control Logic Change – Multi-stage residential package unit demand defrost control.**

Product: All multi-stage residential heat pump package unit models PHE6 / PHG6.

There were several changes recently implemented on the 2 stage demand defrost control used in the multi-stage residential package heat pump unit models PHE6*** and PHG6***. These logic changes are on both single and three-phase models. Cooling laboratory design tests have changed and the product team can no longer run and pass the H11 (low compressor heating during low ambient conditions) test on all applicable models. Due to this, the “reduced indoor airflow feature” know as HOT HEAT PUMP has been removed from the defrost control board. An image of the new defrost control is shown below. Note that the hot heat pump terminal P7 has been removed.



Previous location - Hot Heat Pump

Another logic change on the above defrost control board was its behavior in relationship with the ambient and liquid line (coil) temperature sensor. On the previous control, if the ambient sensor OR liquid line (coil) sensor would fail, the control would lock out compressor operation regardless of heat pump heating **OR** cooling operation. On the new control, logic changes were made to still allow compressor operation with a failed sensor during certain conditions. **Operation listed below is with a failed ambient sensor:**

Heat Pump Heating Mode

- During a heating call, if the coil temperature falls below 38F the control shall prohibit compressor operation.
- Compressor operation shall be allowed if the coil temperature is > 40F and the 5-minute ASCD (anti-short cycle delay) timer has expired.

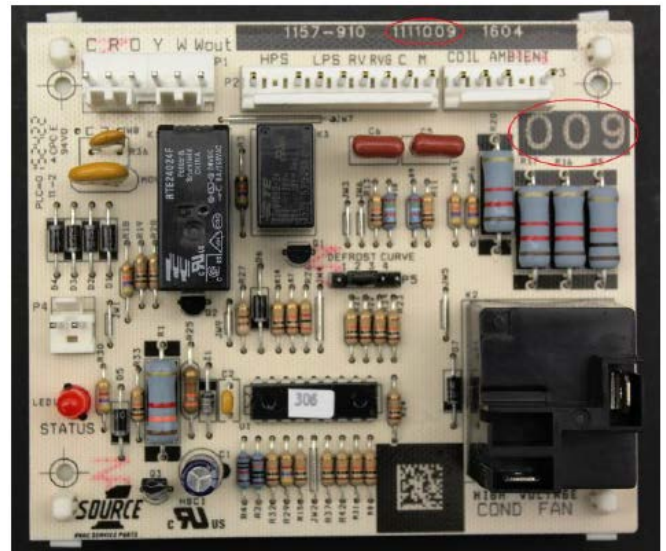
Cooling Mode

- During a cooling call, the control will flag the ambient sensor fault but will allow compressor operation.

Single Stage Demand Defrost Controls

Single-stage residential heat pump split system outdoor units and single-stage residential heat pump package unit models utilize a defrost control similar to the one shown to the right.

Just like the 2 stage defrost control, the single-stage defrost control utilizes two temperature sensors which are the liquid line (coil) sensor and outdoor ambient sensor. For proper defrost operation the sensors are necessary. For cooling operation, the sensors are not needed. Initial production control board logic locked out compressor operation if a sensor failed even in cooling mode. **Control logic on the single-stage board was changed in 2018.**



During cooling operation, if the ambient sensor fails and the liquid line (coil) temperature sensor falls below 40F, the control shall prohibit compressor operation. If the ambient sensor fails and the liquid line (coil) temperature sensor is above 40F, compressor operation is allowed.

Single-stage product literature/fault code tables were updated in 2018 when the control logic was changed. This information was never announced in a service letter since a hardware change was not made. The 2 stage defrost board did require a hardware change (removal of the HOT HEAT PUMP jumper) therefore this publication is warranted. Literature for the two-stage package heat pump equipment has been updated although there may be a few units that were shipped with literature still showing the HOT HEAT PUMP feature.

The single-stage defrost controls can be identified by the part number shown above the wire harness connections. 1111009 and 1111162 – Original defrost controls. 5438494 and 5449748 – Current defrost controls.

If you have any questions on this feel free to call Ducted Systems Technical Services at 1-877-UPG-SERV and speak with a technical support representative.

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