LG ELECTRONICS U.S.A., INC.
Air Conditioning Systems
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Alpharetta, GA 30022

Understanding LG Auxiliary Heater control application and logic

The Auxiliary Heater Relay Kit allows additional sources of heat to be controlled by LG Systems. There are several control applications for the Auxiliary Heater Relay Kit:

- LG system acts as the primary heat source and the Auxiliary Heater Relay Kit controls the secondary and tertiary heat source.
- Auxiliary Heater Relay Kit controls the primary and secondary heat source and allows the LG system to be the tertiary heat source.
- Auxiliary Heater Relay Kit can stage heat sources based on Outside Ambient Temperature.
- The Auxiliary Heater Relay Kit can control the auxiliary heat source as an emergency heat source if the Outdoor unit fails.

Auxiliary Heater Relay Kit model and functions are dependent on connected system.

PRARH1	PRARS1	PRARH0
GEN4	GEN4	GEN2
Controls up to 2 additional heat sources	Controls 1 additional heat source	Controls 1 additional heat source
Compatible with IDUs **except** wall mounted units	Compatible with wall mounted units	Compatible with GEN2 IDUs **except** wall mounted units

Auxiliary Heater Relay Kit – Used to control a secondary heat source

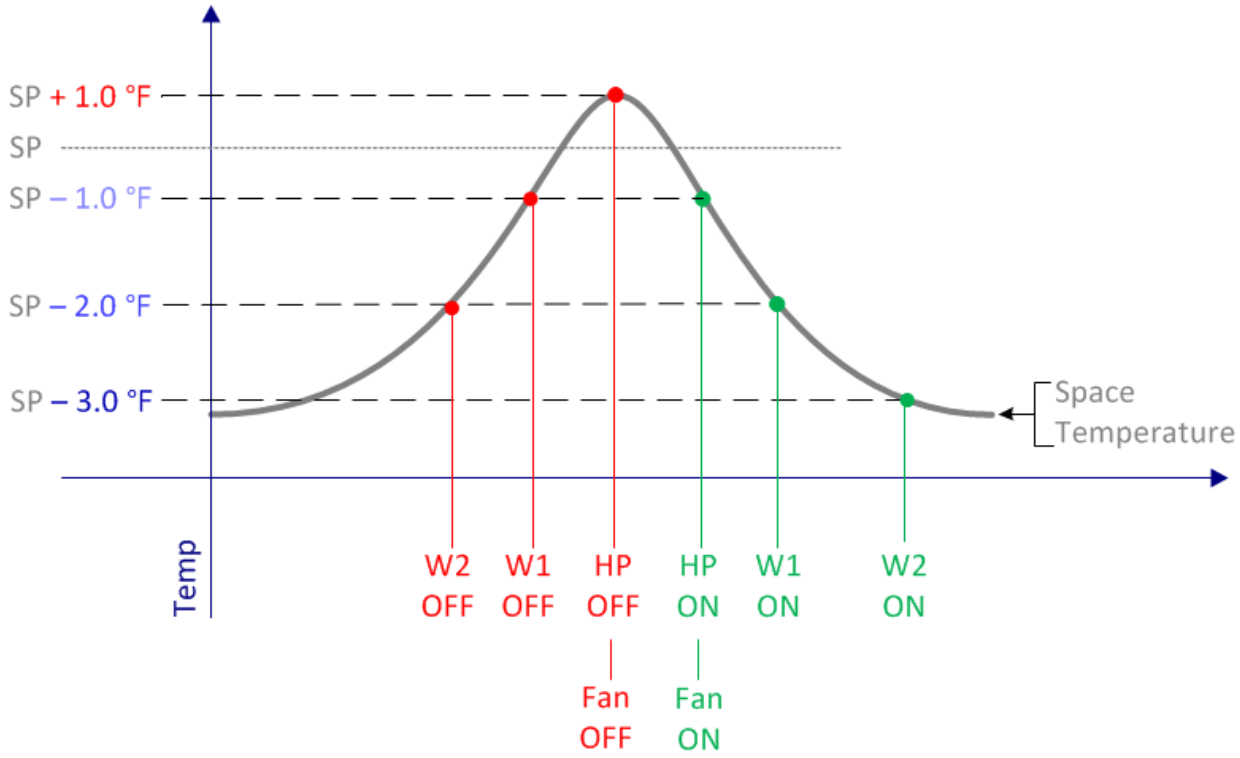
To set the LG System as the primary heating source and have the Auxiliary Heater Relay Kit control the other heating sources as secondary and tertiary stages, set function code 25 to 01(Installed General).

Function code 25 (01-Installed General) is used to enable the Auxiliary Heater Relay Kit.

Please refer to associated controller manual for steps to enable function code.

Sequence of Operations

1. **1st Stage** – Thermal **On** (LG System) occurs when the measured temperature is less than 1.0°F or more of setpoint.
2. **2nd Stage** – Relay 1 **On** (Aux Heat Kit) occurs when measured temperature is 2.0°F or more less than setpoint.
3. **3rd Stage** – Relay 2 **On** (Aux Heat Kit) occurs when measured temperature is less than 3.0°F or more of setpoint. The 2nd stage will only enable if temperature is 1°F less than the setpoint for 1 minute.



SP = Temp Set Point
HP = Heat Pump
W1 = Stage 1 Aux Heat Output
W2 = Stage 2 Aux Heat Output

Auxiliary Heater Relay Kit – Used to control primary heat source

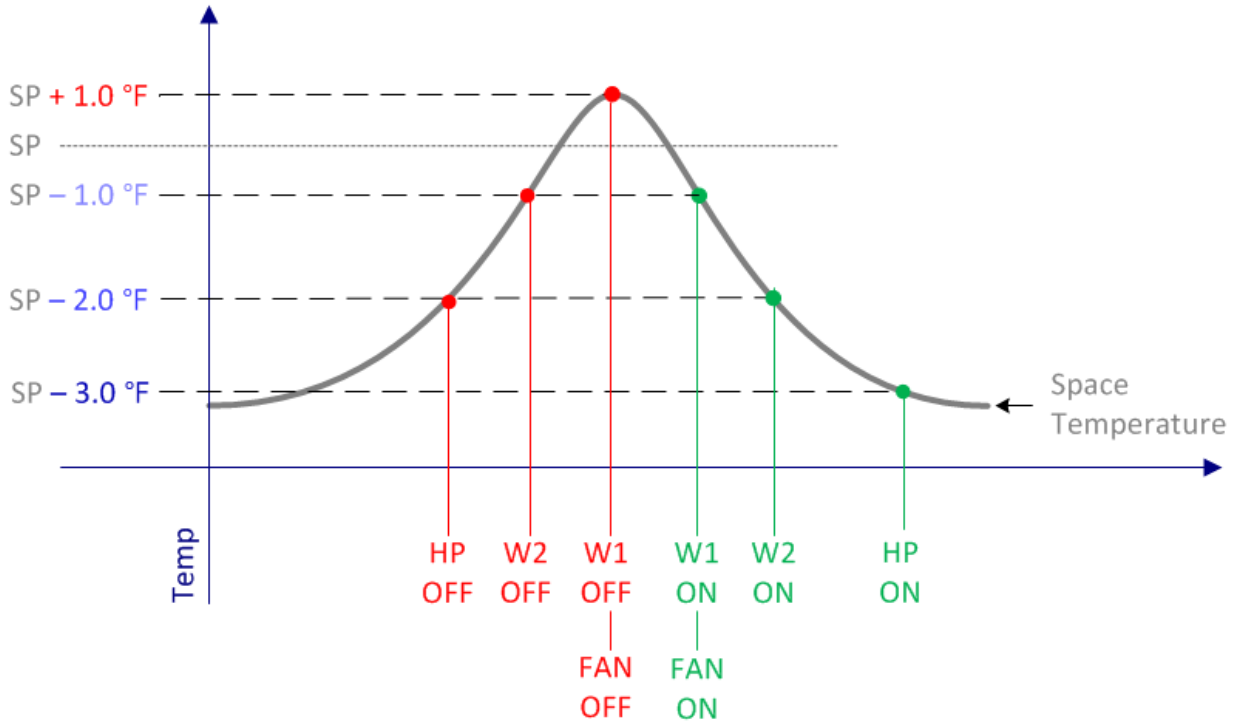
To set the Auxiliary Heater Relay Kit to control the primary and secondary heating source and have the LG System as the tertiary heating source, set function code 25 to 01(Installed General).

Also, set function code 36 to 01-Use primary heater control.

Please refer to associated controller manual for steps to enable function code.

Sequence of Operations

1. **1st Stage** –Relay 1 **On** (Aux Heat Kit) occurs when the measured temperature is less than 1.0°F or more of the setpoint.
2. **2nd Stage** –Relay 2 **On** (Aux Heat Kit) occurs when the measured temperature is less than 2.0°F or more of setpoint. The 2nd stage will only enable if temperature is 1.0°F less than the setpoint for 1 minute.
3. **3rd Stage** – Thermal **On** (LG System) occurs when the measured temperature is less than 3.0°F or more of setpoint.



SP = Temp Set Point
HP = Heat Pump
W1 = Stage 1 Aux Heat Output
W2 = Stage 2 Aux Heat Output

Auxiliary Heater Relay Kit – Used to control ducted heat source

This mode is used if the desired sequence of operation is to have the Auxiliary Heater Relay Kit control the duct heating source.

Disclaimer

Any electric duct heater that is connected to an LG Auxiliary/Emergency Heat Relay Kit must meet UL 1996 Standards and include a built-in safety device to prevent heater from overheating.

The built in safety device is a thermal protection to prevent the electric duct heater from overheating. Preventing operation when there is inadequate airflow must be handled with a fan interlock that locks out the duct heater when the fan is not running.

⚠ **WARNING:** Use of an electric duct heater that does not include a built-in safety device may result in fire, property damage, and/or personal injury when the indoor unit fan is off.

⚠ **WARNING:** Failure to follow all design and installation requirements for the indoor units may result in malfunction of the indoor unit, which may result in electric shock, fire, property damage, personal injury, and/or death.

⚠ **WARNING:** Failure to follow all design and installation requirements for LG's Auxiliary/Emergency Heat Relay Kit, including but not limited to the requirement that it only be used with a 24V control circuit, may result in electric shock, fire, property damage, personal injury, and/or death.

The duct heater and other system elements (i.e., the indoor heating/cooling unit and Auxiliary/Emergency Heat Relay Kit) must be designed and installed in accordance with NEC (National Electric Code) requirements, local code requirements, and the recommendations of the relevant manufacturers, and must be properly sized to meet the temperature and load requirements of the application. ***LG's Limited Warranty applies only to LG Products manufactured by or for LG that can be clearly identified by the "LG" trademark, trade name, or logo affixed to such LG Product. The LG Limited Warranty does not apply to duct heaters or other 3rd party system products that are not manufactured by or for LG, even if such Product is packaged or sold with LG Products.***

⚠ **WARNING:** ***The Contractor and product end user must consult the electric duct heater manufacturer's literature, product guide, product manual, customer support department and/or website before installing, attempting repairs, modifying, or performing maintenance to the product as the failure to do so may result in electrical shock and fire resulting in personal injury and/or death.***

System Setup

1. Set function code 25 (02-Installed-Duct type) is used to enable the Auxiliary Heater Relay Kit.
   1.1. Indoor Unit Fan will run whenever there is a request for heating when sub function 02 (Installed-Duct type) is selected.
   1.2. Please refer to associated controller manual for steps to enable function code.

Sequence of Operations

1. **1st Stage** – Thermal **On** (LG System) occurs when the measured temperature is less than 1.0°F or more of the setpoint.
2. **2nd Stage** –Relay 1 **On** (Aux Heat Kit) occurs when the measured temperature is less than 2.0°F or more of setpoint. The 2nd stage will only enable if temperature is 1.0°F less than the setpoint for 1 minute.
3. **3rd Stage** –Relay 2 **On** (Aux Heat Kit) occurs when the measured temperature is less than 3.0°F or more of setpoint.

Auxiliary Heater Relay Kit – Emergency heat mode

This mode is used to heat the space during an emergency when the Outdoor Unit has an error that prevents it from providing heat to the Indoor Units. Emergency Heat can be set up in conjunction with all Auxiliary Heater Relay Kit Modes.

In addition, Emergency Heat mode can also be used to shut down the Outdoor Unit compressor based on a lack of heat call from all Indoor units equipped and configured for emergency heat based on a specific Outdoor Temperature.

NOTE: Outdoor ambient condition setting is used to prevent a call from the individual indoor unit for heat to the outdoor unit.

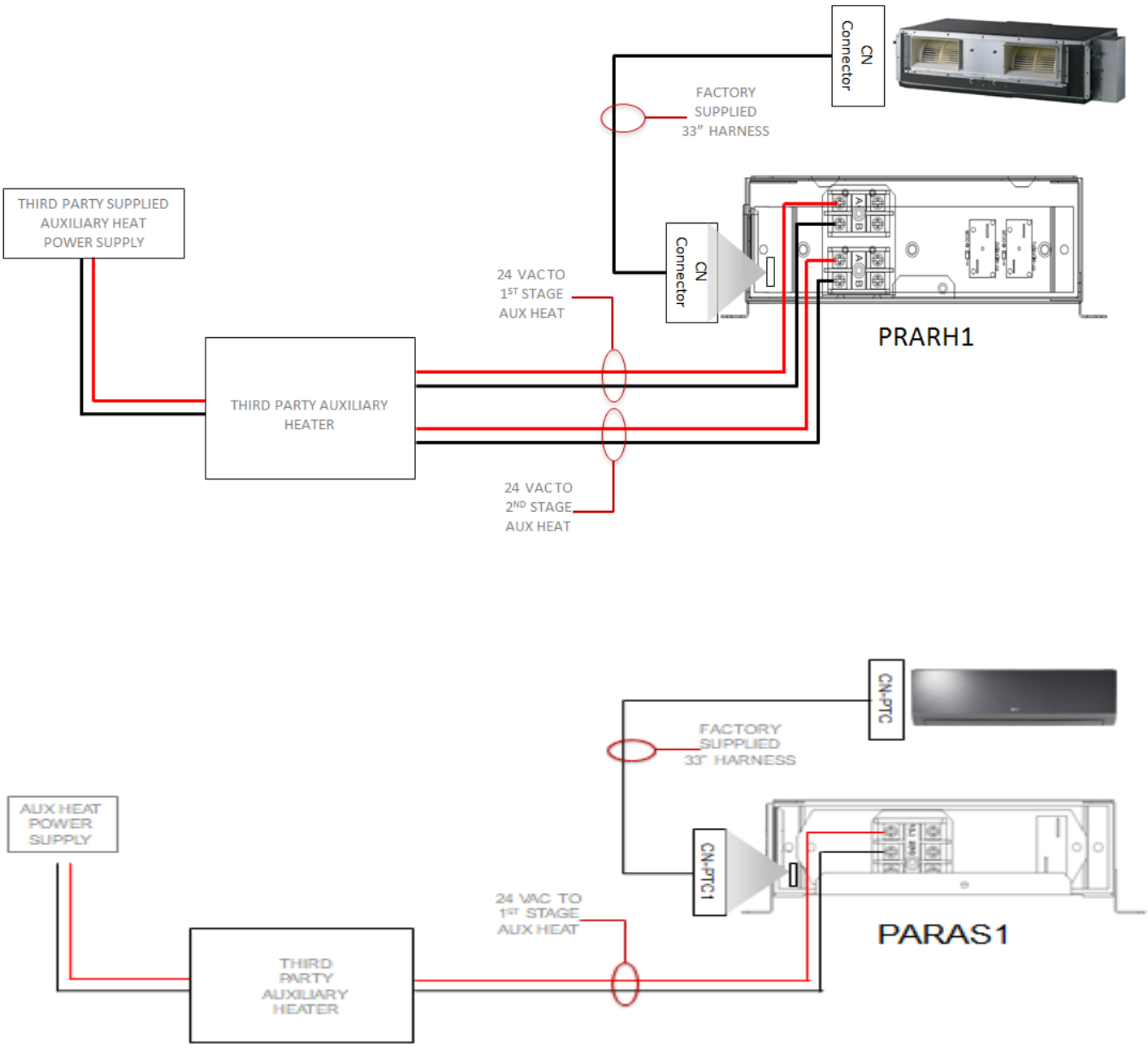
System Setup

1. Set function code 18 to enable the Emergency Heat Mode.
   1.1. Please refer to associated controller manual for steps to enable function code.

Auxiliary Heater Relay Kit model and functions are dependent on connected system.

Function Code 18	Compressor Off at	Compressor On at
Setting 01	> -10°F	< -5°F
Setting 02	> -5°F	< 0°F
Setting 03	> 0°F	< 5°F
Setting 04	> 5°F	< 10°F
Setting 05	> 10°F	< 15°F
Setting 06	> 15°F	< 20°F
Setting 07	> 20°F	< 25°F
Setting 08	> 25°F	< 30°F
Setting 09	> 30°F	< 35°F
Setting 10	> 35°F	< 40°F
Setting 11	> 40°F	<45°F
Setting 12	>45°F	<50°F
Setting 13	>50°F	<55°F
Setting 14	>55°F	<60°F
Setting 15	>60°F	<65°F

Auxiliary Heater Relay Kit Wiring Diagram



VAHU SUPPLEMENTAL ELECTRIC HEAT OPTION

This allows supplemental electric heat. When setup is complete, electric heater will automatically engage in the heating mode.

System Setup

1. Set Dip switch SW6 (VAHU PC board) to ON (automatic).

Sequence of operations

1. Outside Temperature
   IDU decides heater should be enabled or disabled based on the outdoor temperature provided from ODU
   [Heater 1, 2 disabled condition: Outdoor temp. ≥ 59°F] ↔ [1, 2 enabled condition: Outdoor Temp. < 54°F]
2. Pipe-In Temperature
   Based on the pipe-in temperature, IDU will make enable/disable decision.
   [Heater1 Disable: Pipe-In Temp ≥ 113°F]↔ [Enable: Pipe-In Temp < 108°F]
   [Heater2 Disable: Pipe-In Temp ≥ 86°F] ↔ [Enable: Pipe-In Temp < 82°F]
3. Difference between Space Temp. and Setpoint
   (Based on the product type and production date there are two different condition)

   [Case 1] _ Traditional VAHU (Multi-V GEN2 , Multi F/Multi F Max)
   [Heater 1,2 on/off condition]
   - Room Temp < Set Point - 4°F → Heater1,2 ON
   - Room Temp ≥ Set Point - 2°F → Heater1,2 OFF

   [Case 2] _ New VAHU (Multi-V GEN4, New Single VAHU)
   [Heater 2 on/off condition]
   - Room Temp < Set Point - 3°F → Heater2 ON
   - Room Temp ≥ Set Point - 1°F → Heater2 OFF

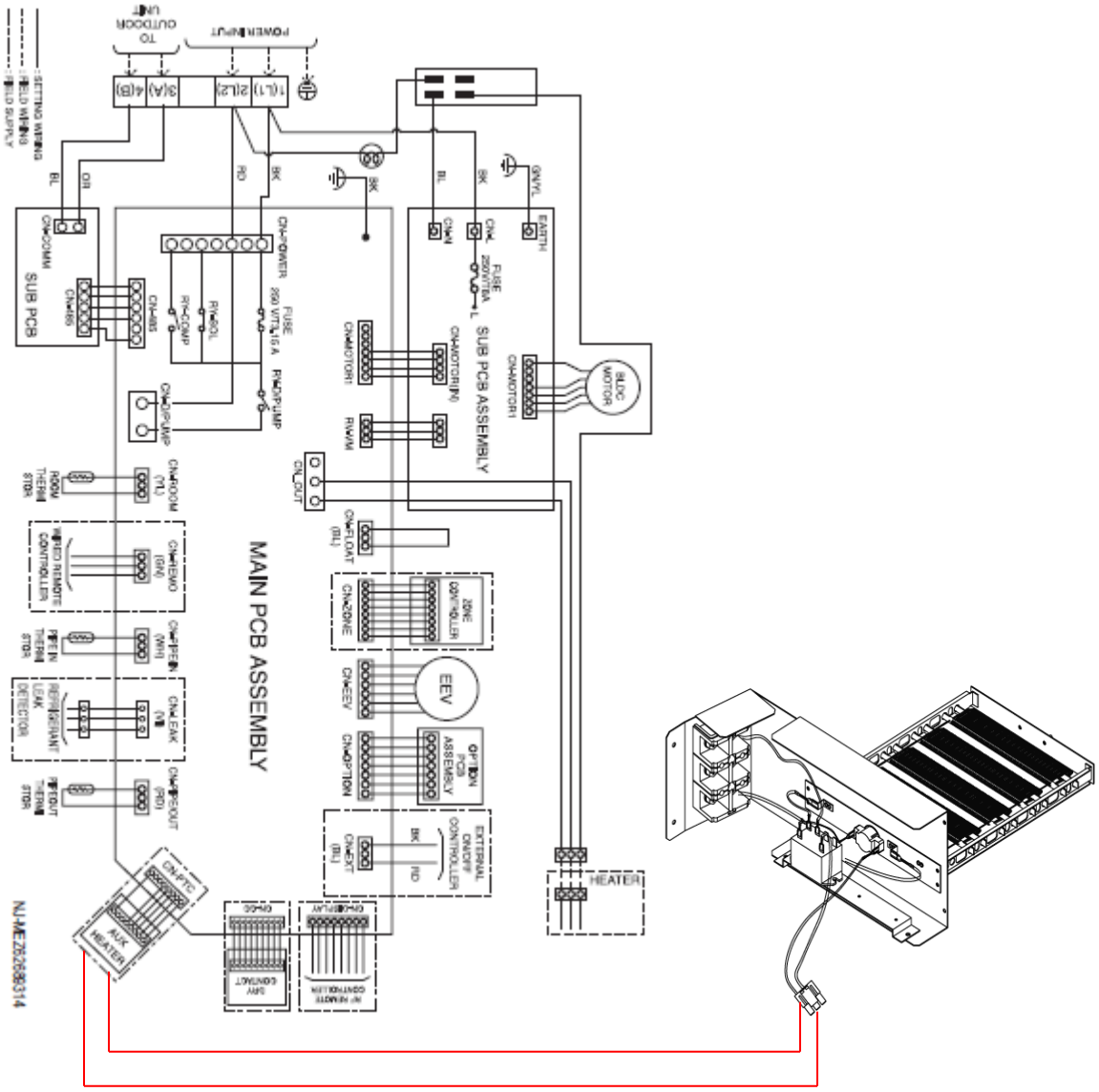
   [Heater 1 on/off condition]
   - Room Temp < Set Point - 2°F → Heater1 ON
   - Room Temp ≥ Set Point → Heater1 OFF

4. 10 sec delay
   - After Heater is off, it will take 10 sec to turn it on again.

5. Stage delay
   - There is 40 or 60 sec delay between Heater1 and Heater2 on time
   - Heater2 will be turned on after Heater1 has been turned on for 40 or 60 sec
     (GEN2 and Multi F/Multi F Max : 40 sec, Gen4 : 60sec)

Note: All conditions above have to be met for operation.

VAHU Supplemental Electric Heat Kit Wiring



VAHU will support the use of Auxillary heater relay kit PRARH1. The applications and sequesnce are mentioned above.