

DIAGNOSING CAUSES OF BLOWN ELECTRIC HEATER KIT FUSE LINKS

Like all fuses, electric heater back-up safety fuse links, when blown, indicate a problem in the system. The following main contributing factors can be used to diagnose the root cause(s) of blown fuse links:

A. INSUFFICIENT AIRFLOW (LOW AIRFLOW)

1. Chronic - (a) undersized ductwork (supply and/or return); (b) undersized blower; (c) filter(s) with high initial pressure drop; (d) incorrect control application sequence and/or wiring causing blower to not operate during electric heating mode
2. Sporadic - (a) adjustments of outlets by user; (b) room doors in return air paths closed by users; (c) dirty filters (failure to maintain by owner); (d) excessive heat pump indoor coil temperature rise due to low airflow during moderate heating season increases the minimum required airflow for the heat pump auxiliary electric heaters (outdoor thermostats or other lock-out devices can eliminate this)
3. Intermittent - (a) automatic zoning damper systems; (b) voltage fluxuations causing increased KW (heat) and increased minimum required airflow. (c) long variable speed blower ramp up times

B. OVERVOLTAGE

1. Chronic - (a) continuously high voltage (usually found in rural areas)
2. Sporadic - (a) high resistive heating demands caused by extreme cold weather and voltage overcompensations by utility companies
3. Intermittent - (a) temporary spikes, surges, or swells lasting for short durations (caused by load shifting variances, automatic compensation lag time, lightning, and other unknown causes)

C. INSTALLER ISSUES

1. AHU too small for system
2. Heater KW too large for AHU
3. Incorrect fan speed setting (multispeed fan units and variable speed fan units)
4. Heater installed incorrectly (reverse airflow)
5. Improper start-up and check out procedures (temporary removal of access panels, etc.)

It is possible to have many of the above contributing factors present (in combination) in a system at any given time, when the actual damage to equipment occurs. Upon discovery of a blown fuse, many of the sporadic and intermittent factors may not be present, making diagnosis of the root cause(s) difficult. Only the chronic factors may be present at all times and are easily detected. All others are insidious and may require more intense investigation with the use of voltage recording devices.

All of the above factors contribute to system inefficiency; cause excessive wear and premature failure of all electrical equipment in the system (including compressors and controls); and may present a life safety risk.