

Cut-Out and Cut-In Operation

Residential – Heating & Cooling



WHY CUT-OUT?

During low ambient temperatures cut-out and cut-in functions actively control system operation to prevent damage to compressor due to lack of lubrication (oil) or cooling (refrigerant). In heat mode refrigerant temperature in the outdoor unit heat exchanger should always be roughly 10°C below the outdoor ambient temperature. If the outdoor ambient temperature reaches -30°C the refrigerant should be operating at -40°C, which is very close to the boiling point of R410A (-44°C). Below this temperature the refrigerant will not provide sufficient cooling and lubrication for the compressor.

At low outdoor ambient temperatures, the viscosity of the refrigerant oil changes decreasing the oil's ability to properly lubricate the compressor. If the unit does not initiate cut-out, the compressor will eventually overheat due to lack of lubrication. During low outdoor ambient temperatures, the system also activates PRE-HEAT function to maintain low oil viscosity and prevent refrigerant from liquefying.

CUT-IN OPERATION

During thermal off in very cold outdoor ambient temperatures the refrigerant in an outdoor unit's compressor will eventually turn to liquid and mix with the oil. As the compressor is designed and built to pressurize refrigerant vapour, this can drastically reduce the lifespan of the compressor. To help in these circumstances Mitsubishi Electric products have a jumper built into boards (JK jumper and switches) to initiate PRE-HEAT function. The pre-heat function energizes compressor windings warming the refrigerant to a vapour state. This ensures that the compressor is safe to operate without incurring any damage. Always make sure this jumper is cut prior to installing the system or replacing parts. The JK jumper is product specific, please refer to the model service manual for jumper availability.

Integrated cut-in and cut-out function provide protection for heat pump product in cold climates and operating conditions.

Example (not system specific):

- A) Heat pump operates to -30°C ambient temp in heat mode.
- B) When outdoor unit ambient thermistor reads -30°C The outdoor unit will stop working
- C) As soon as ambient thermistor reads -25°C the heat pump resumes operation
- D) While the system is in cut-out state, the auxiliary heat will automatically turn on if it's connected and enabled.

