

Contactors may be one of the most critical components found in HVAC and Refrigeration applications. Contactors are expected to handle the heavy inductive motor starting loads of compressors, fan motors, pump motors and a host of other motors. Contactors are also tasked with switching resistive loads in electric heat applications.



A.R.I. (Air-conditioning and Refrigeration Institute) created the 780 standard for contactors and set a requirement of 200,000 electrical life cycles. A.R.I. established some very difficult test parameters manufacturers had to test to for acceptance.

The basic 1 pole contactor with shunt (1.5 pole) or 2 pole contactor used in a residential HVAC compressor application needs to switch single phase power of 208-230 Volts with a load rating of 25 to 40 amps. Think about the number of times this has to happen in a typical year – especially in a Heat Pump or Geothermal unit that runs year round? What number do you think is reasonable for a typical season? Start doing the math and you will be amazed. For a typical cooling system, estimates for annual cycles may experience run as high as 4,000 cycles annually. If you are looking at a heat pump then you can easily double that number.

Contactors replacement is fairly straightforward. We only need to know a few pieces of information.

- Amperage rating
- Number of poles
- Coil voltage
- Auxiliary switch configuration

A few contactor manufacturers offer replacement coils. The real benefit to having replacement coils is so you can carry several different voltage replacement coils on a truck without having to stock a contactor for every voltage. This can get you out of a bind during an after hours service call.

If the contactor uses an auxiliary switch you need to make sure you match the existing switch ratings and use one of the manufacturers switches designed for the contactor. Auxiliary switches are specific to a manufacturer and not typically interchangeable.

The requirements we place on contactors become even more demanding with 3 Pole contactors.

Three pole contactors have to handle more complex and demanding loads;

- 3 phase power
- Amperage ratings from 40 through 90 amps
- Voltages up to 480V
- Horse Power Ratings from 7.5 up to 50 H.P.

When a contactor starts a compressor motor (Inductive Load) it can see amperages in excess of 150% of the rated motor amps. Once the motor starts it will typically settle to or below the rated amps.

Selecting a good contactor can be confusing and you shouldn't make the mistake of just shopping price because not all contactors are created equally.

- Look for a contactor that uses copper and brass components in the electrical path. This will minimize resistance and heat, allowing the contactor to run cooler and provide a longer service life. If the manufacturer skimped on materials and used steel that should be a good indication that they have also taken other shortcuts in design and materials.
- Contacts – make sure you pick a contactor with Silver Cadmium Oxide contacts. These offer the best service life for HVAC applications. Some manufacturers have opted to use a cheaper Silver Tin Oxide Contact which has a reduced service life.
- Enclosed body – eliminates dirt and insects contaminating the contacts.
- Enclosed coil – this helps eliminate dirt and insect intrusion into the coil and key components. This will also extend the life of the contactor.
- Arch window lugs can also help when using a number of wires per pole.

Think about what a contactor does and the expectations we place on them to perform year after year, we really don't have much room for error. Selecting a contactor that uses inferior components will leave you with problems and customer call-backs especially when you warranty repairs.