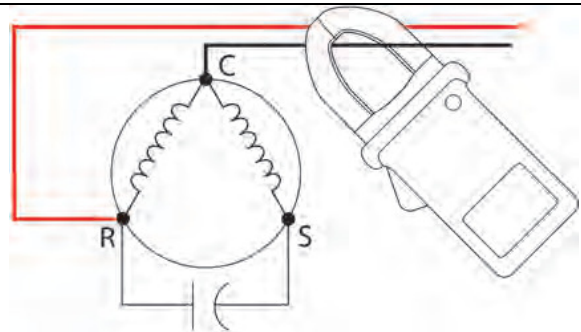


**There are many components outside of a compressor that will cause a Locked Rotor Condition. Thorough diagnostics are required to confirm a failed compressor.**

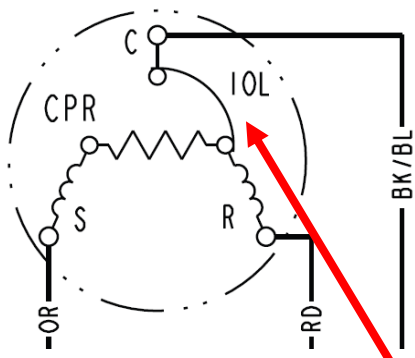
A compressor may draw locked current for several reasons. Simply confirming a high amp draw on the common winding is not enough.

A single phase compressor has two sets of windings: Run & Start. Something as simple as a broken wire or weak capacitor can generate a lock rotor condition.

The goal of this newsletter is to evaluate system environmental issues before condemning a compressor.



AMSTD & Copeland found that nearly 30% of all returned compressors had no defects found.

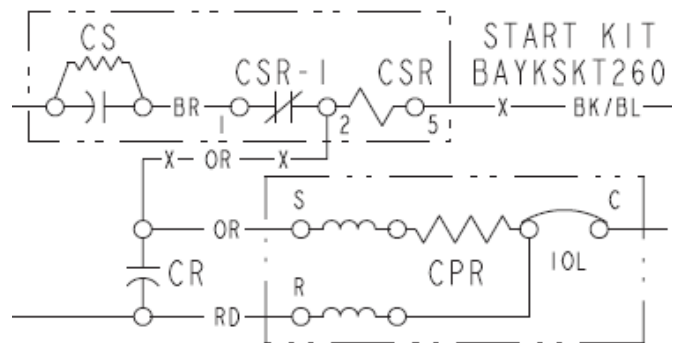


**Proper Diagnostic Procedures:**

- \*Isolate the circuits—obtain amp readings on the Start and Run windings to determine which circuit has the issue.
- \*If the run winding is not drawing any current, evaluate the wire connections & contactor to the run winding. If the wires look good, take an ohm reading between the R & C terminals at the compressor shell. An open reading confirms a compressor failure.
- \*If the start winding is not drawing any current, evaluate the contactor, wire connections and capacitors in that circuit.

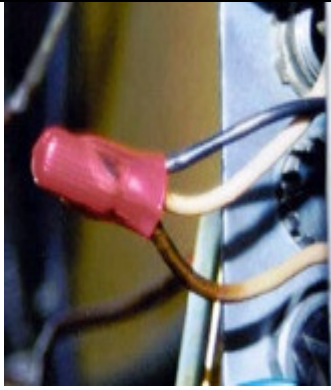
Ensure the compressor is cool when taking ohm readings across the terminals. An overheated compressor will open a safety circuit on the Common terminal (IOL). In this situation, you will read continuity between Run & Start, but nothing to Common.

- \*The locked rotor amps will vary based on the compressor size & incoming voltage.
- \*A compressor without start components will tend to pull fairly low amps through the start winding—estimate 5 to 15 amps.
- \*A compressor with start components will pull higher amps through the start winding—estimate 20 to 40 amps.
- \*If a compressor with starting components is only drawing 7 amps on the start winding, there is a good chance the start components have failed.



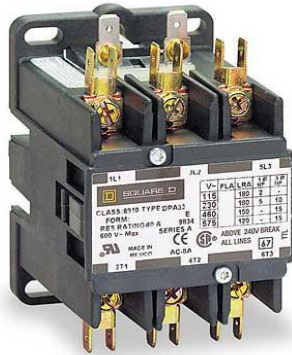
The start winding on a compressor is designed to handle a specific amount of energy. Placing an oversized start capacitor can overload & overheat the start winding every time the compressor starts—reducing the life of the compressor.

The wiring diagram in the Service Facts will list the OEM start components for each system. Contact the parts dept and give them this number when ordering an accessory start kit.



Look for any areas of voltage drop to the compressor. Burnt contactors, loose wire connections and wire splices can generate a voltage drop & a locked compressor. A voltage drop of 10% or more during locked rotor conditions should be evaluated--check for tight wire connections all the way back to the breaker panel.

Look at the MCA rating on the unit & ensure the wire size is large enough. Someone may have installed an oversized system without evaluating the wire size.

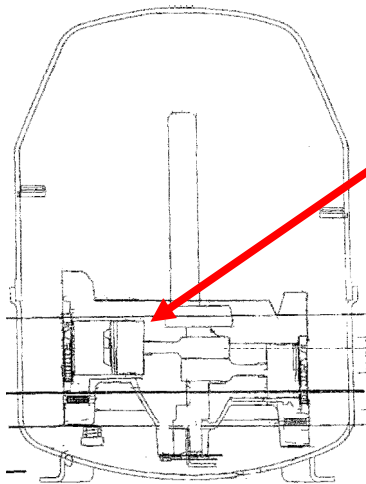


Many contactors have a cover over the contacts. Pull the cover and evaluate the points. Also take a voltage reading across the contacts—as picture on the right.

Replace the contactor if the voltage reading across the points exceeds 1/2 a volt—this reading must be taken when the compressor is energized.



## Proper Refrigerant Charge



\*The cylinder walls on a cold reciprocating compressor can fill with liquid refrigerant.  
 \*It is not uncommon to find a locked compressor during early spring maintenance visits. It is much warmer inside the home than outside (the furnace may still be running), and all the liquid has migrated to the condenser & inside the compressor shell. The compressor can not pump liquid refrigerant & locks. Allow the compressor to warm up or apply sump heat before condemning a compressor in this environment.

\*Typically, the outdoor temperature will warm the condenser and boil the liquid refrigerant in the compressor before the thermostat calls for cooling.

## SUMMARY:

- 1) Ensure proper locked rotor amps on the Run and Start windings.
- 2) Evaluate the capacitors, contactor & wire connections throughout the compressor circuit.
- 3) Allow the compressor to warm up and boil off the refrigerant if it is below 70 degrees.
- 4) Repair or replace any weak components—try a generic start kit for a temporary basis.
- 5) If all components check okay and the start kit does not work; then replace the compressor.