

Tech Tip Compressor Check

There are usually two different ways a compressor failure can happen.

- Mechanical failure of the IPR, valves, scroll or a bearing problem
- Electrical failure of the windings in the compressor

Before condemning a compressor for not starting these items must be confirmed.

- Voltage **at the compressor on start up** within 10% of nameplate
- Run capacitor checked and within tolerance
- Starting components checked and within tolerance

Checking windings using the Ohm meter

Disconnect wires **C**, Common, **S**, Start, and **R**, Run from the compressor terminals.

An Ohmmeter will typically give only a few readings techs are concerned with.

- An infinite amount of ohms **OL** indicates that there is not a path for current flow. This OL reading is an indication of an **Open**.
- An Ohm reading with a number such as 30k or 35m states that there is some resistance in the wire or coil (the resistive coil and current flow create the magnetism needed for a motor to turn).
- C to S should have a higher Ohm reading than C to R because the Start winding is a highly resistive winding. The reading between R and S should be equal to CS plus CR.
- A 0 Ohm reading states that there is no resistance in a coil but there is a path for current flow. This is an indicator of a short.

Checking Internal Pressure Relief Valve

The Internal Pressure Relief valve (IPR) for Copeland compressors will open if the pressure differential (psi differential from suction to discharge) is too great.

For the R22 compressors the differential is typically 375 – 450 psi.

For the R410A compressors the differential is typically 550 – 625 psi.

The IPR will open when the differential becomes too great, and will reset (close) when the pressure differential begins to equalize.

When it is open, the pressure may be the same on the high side as well as the low side even though the compressor is running.

If this happens, turn the unit off and allow the pressures to stabilize. Turn the unit back on and see if it has begun to pump properly.

If not, turn the system back off and install a temporary access port on hot gas line approximately 6 inches from the compressor.

Restart the compressor

Connect liquid gauge to the hot gas line and then the liquid line, the readings should be similar.

If the reading on the hot gas line is much higher than the liquid line, recheck for the possibility of a restriction in the condenser coil.



College of HVAC Education

Compressor Electrically OK

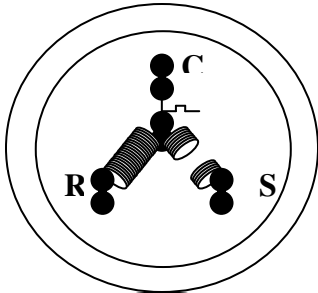
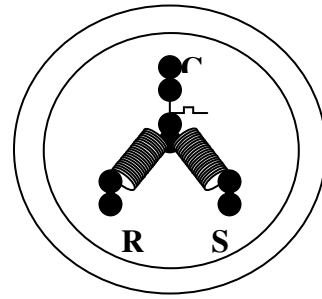
Ohm reading from C to R

Ohm reading from C to S

Ohm reading from RS = CS + CR

OL Ohm reading from any terminal to compressor case

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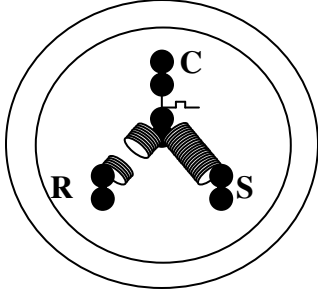
OPEN Start winding

Ohm reading from C to R

OL Ohm reading from C to S

OL Ohm reading from R to S

OL resistance reading from any terminal to compressor case



OPEN Run winding

Ohm reading from C to S

OL Ohm reading from C to R

OL Ohm reading from R to S

OL resistance reading from any terminal to compressor case

OPEN Thermal Overload

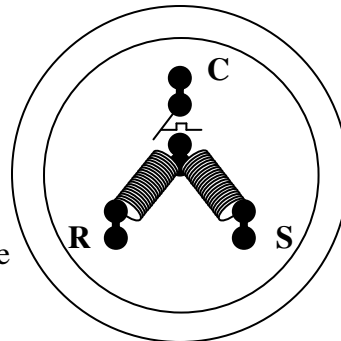
Ohm reading from C to S

OL Ohm reading from C to R

OL Ohm reading from R to S

OL resistance reading from any terminal to compressor case

DO NOT condemn compressor if it is still warm



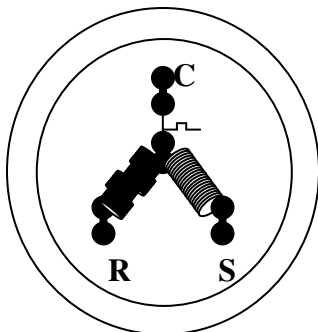
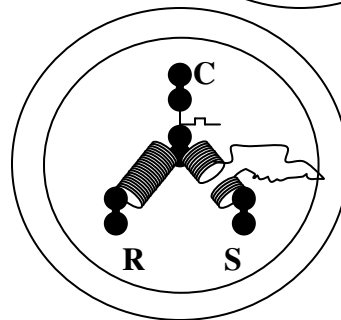
Grounded

Ohm reading from C to S

Ohm reading from C to R

Ohm reading from R to S

Ohm reading from any terminal to compressor case



Shorted Run Winding

Ohm reading from C to S

No Ohm resistance from C to R (Like a solid piece of wire)

Ohm reading from R to S

OL reading from any terminal to compressor case

Note: The Start windings could also be melted together resulting in a shorted Start winding