

Common Compressor Failure Symptoms & Corrections

This reference is for the analysis of a failed compressor; to aid in finding the cause of failure; and take corrective action. Replacement compressors fail at four times the rate of original compressors, regardless of the replacement compressors being new or remanufactured. This illustrates that replacement failures are caused by system problems not identified and corrected.

Liquid Slugging is when the compressor tries to compress a liquid; liquid refrigerant, oil, or both; in the compressor's cylinders. Liquid refrigerant slugging is primarily caused by the migration of refrigerant into the oil during the off cycle.

Symptoms

- Blown gaskets
- Broken reeds
- Loose or broken discharge bolts
- Rods or crankshaft broken

Causes/Corrections

1. Check pump down cycle operation
2. Suction line sized properly?
3. TXV sized and operating properly?
4. Unloading duration? (extended unloaded operation leaves oil out in the system).
5. Excessive oil in compressor/system.

Liquid Washout is when liquid refrigerant washes oil off wearing surfaces in the compressor. During the off cycle, migration of saturated refrigerant into crankcase occurs and, when the compressor starts up, the resulting mass of foam, when pumped, washes bearing surfaces clear of oil film necessary for proper lubrication. WASHOUT is a minor condition of SLUGGING.

Symptoms

- Scored pins
- Scored and/or broken rods
- Worn bearings
- Scored crankshaft
- Worn pistons and/or rings
- Cylinders worn

Causes/Corrections

1. Check TXV bulb and super heat setting
2. Crankcase heater. (on during off cycle)
3. Liquid line solenoid malfunctioning
4. System overcharged
5. Broken/not seating discharge valves

Liquid Dilution is the condition where liquid refrigerant returns to the compressor during the running cycle diluting the oil Lubrication for the oil pump and end bearing may be adequate. However, as the diluted oil moves farther down the crankshaft, insufficient oil is present to lubricate the rods and main bearings effectively.

Symptoms

- Rotor Drag
- Worn bearings
- Scored and/or broken rods
- Scored crankshaft

Causes/Corrections

1. Check defrost cycle
2. Check superheat setting
3. Check TXV bulb
4. Evaporator has adequate heat load? (within 10% of rated amps on direct expansion)
5. System overcharged
6. Poor condensor operation/condition

Lack of Lubrication is simply the lack of enough oil in the crankcase to properly lubricate the running gear.

Symptoms

- Scored bearings
- Broken rods
- Scored crankshaft
- Low oil in crankcase

Causes/Corrections

1. Add oil management system
2. Check oil failure switch
3. Check pipe sizing and also for oil traps.
4. Eliminate extended periods of unloading
5. Eliminate short cycling
6. Inadequate defrost
7. Low load.

Electrical

Many motors fail as a result of a mechanical or lubrication failure. Many more fail due to malfunctioning external electrical components or supply voltage.

Single Phase Burn

Symptom

Two phases of a three phase motor are overheated or burned. This occurs by not having current through the unburned phase and overloading the other two phases.

Causes/Corrections

1. Blown Fuses
2. Check contacts in starter and contact slide mechanism for binding
3. Terminal connections on compressor
4. Unbalanced Voltage

Half Winding Single Phase Burn

Symptom

One half of the motor has a single phasing condition on a PART WIND MOTOR with a two contactor system

Causes/Corrections

1. Blown fuses
2. Check both contactors as one will be defective.
3. Check timer for proper time delay.

Start Winding Burn

Symptom

Only the start winding is burned in a single phase motor due to excessive current flowing through the start winding.

Causes/Corrections

1. Check C, S, and R wiring
2. Compressor overloaded.
3. Starting capacitor and/or start relay

Run Winding Burn

Symptom

Only the run winding is burned in a single phase motor.

Causes/Corrections

1. Check relay.
2. Check run capacitors

Primary Single Phase Burn

Symptom

Only one phase burned. Other two will be O.K. A result of losing one phase in the primary of a Δ to Y or Y to Δ transformer.

Causes/Corrections

Check transformer for proper voltage incoming and outgoing.

After a compressor fails, field examination of the compressor often will reveal symptoms of system problems. Correction of the problems found, followed by a detailed start-up and check will eliminate future repeat failures.