

# I.C.R.A. Member

International Compressor Remanufacturers  
Association



## Handy Reference

### Compressor Failure Modes, Symptoms and Corrections

A handy reference for analysis of a failed compressor, to aid in finding cause of failure and take correction action. Replacement new or remanufactured compressors fail at four times the rate of original compressors indicating replacement failures are caused by system problems.

#### Liquid Slugging

Broken reeds, rods, or crankshaft. Loose or broken discharge bolts. Blown gaskets

*Slugging is a result of trying to compress liquid in the cylinders. Liquid may be either refrigerant or oil or more likely a combination of both. Slugging is a result primarily of refrigerant migration into the oil on the off cycle.*

**Correction:**

1. Check pump down cycle operation.
2. Is TXV sized and operating properly?
3. Suction line sized properly?
4. Check unloading

#### Liquid Washout

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

*This is a result of refrigerant washing oil off surfaces. Off cycle migration of saturated refrigerant into crankcase. Compressor starts up resulting in a mass of foam which when pumped washes bearing surfaces of oil film necessary for proper lubrication. WASHOUT is a minor condition of SLUGGING.*

**Correction:**

1. Check TXV bulb and super heat setting.
2. Is TXV oversized?
3. Check crankcase heater. (On during off cycle).

#### Liquid Dilution

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

*This is a result of liquid refrigerant returning to compressor during running cycle. Oil becomes diluted and lubrication for oil pump and end bearing may be adequate, but as it progresses down the crankshaft insufficient oil to lubricate the rods and main bearings will occur.*

**Correction:**

1. Check TXV bulb.
2. Check superheat setting.
3. Check defrost cycle.

#### High Discharge Temperature

Discolored valve plate (Cannot rub off). Overheated or burned valve reeds. Worn rings and pistons. Worn cylinders. Scored rods, bearings, and crankshaft. Spot burn in stator.

*This is a result of temperatures in the compressor head and cylinders becoming to hot that the oil loses its ability to lubricate.*

**Correction:**

1. High compression ratio: check for low suction and high discharge pressures. Low load and evaporator problems.
2. Check low pressure control setting.
3. Check for dirty condenser, in-operative condenser fan and ambient temperature
4. Check air flow across compressor.

### **Lack of Lubrication**

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

*This is a result of lack of enough oil in crankcase to properly lubricate the running gear*

#### **Correction:**

1. Check oil failure switch.
2. Check pipe sizing and also for oil traps
3. Inadequate defrost.
4. Low load.
5. Eliminate short cycling.

### **Electrical**

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

#### **General or Uniform Burn**

Entire winding is uniformly overheated or burned.

#### **Correction:**

1. Check for low voltage.
2. Rapid cycling of compressor.
3. Loose terminal connection.
4. Unbalanced voltage.

#### **Single Phase Burn**

Two phases of a three phase motor are overheated or burned.

*A result of not having current through the unburned phase and overloading the other two phases.*

#### **Correction:**

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

#### **Half Winding Single Phase Burn**

This shows as when one half of the motor has a single phasing condition on a PART WIND MOTOR with a two contactor system.

#### **Correction:**

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

#### **Start Winding Burn**

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

#### **Correction:**

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

#### **Run Winding Burn**

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

#### **Correction:**

1. Check relay.
2. Check run-capacitors.

#### **Primary Single Phase Burn**

This will show as only one phase burned. Other two will be O.K. A result of losing one phase in the primary of a  $\Delta$  to Y or Y to  $\Delta$  transformer.

#### **Correction:**

1. Check transformer for proper voltage incoming and outgoing.

### **Summary**

*After a compressor failure, field examination of the failed compressor often will reveal symptoms of system problems. Correction will eliminate future repeat failures.*