



TRANE™

**General
Service
Bulletin**

CTV-SB-48A

Library	Service Literature
Product Section	Refrigeration
Product	Centrifugal Liquid Chillers
Model	CTV
Literature Type	General Service Bulletin
Sequence	48A
Date	5/7/85
File No.	SV-RF-CTV-CTV-SB-48A-585
Supersedes	CTV-SB-48 781

SUBJECT: CENTRAVAC OPEN ROTOR DIAGNOSTIC PROCEDURE

INTRODUCTION:

This service bulletin provides the recommended procedure for diagnosing an open rotor bar condition in a CenTraVac motor.

DISCUSSION:

Each rotor bar in a CenTraVac motor is an electrical conductor intended to carry an electrical current between the two rotor end rings. When the rotor bar material is no longer metallurgically continuous due to a break, an open rotor bar condition exists. Partial separation of a rotor bar results in an increase in resistance which leads to localized heating in the rotor bar. If this condition is not corrected, the rotor bar(s) will continue to overheat and eventually burn open to the point where other damage to the motor bearings or stator may result.

When a CenTraVac motor has an open rotor bar, it will exhibit the following symptoms in varying degrees depending on the severity of the failure.

1. Fluctuating amperage under steady operating conditions.

The magnitude and frequency of the current fluctuations will increase as the unit load increases. The frequency change results from rotor slip at high loads.

2. Oil pressure fluctuation.

An open rotor bar may cause fluctuation of the unit oil pressure. This is a result of movement of the rotor within the journal bearing, which is caused by the disrupted current flow in the rotor as it passes around the stator fields.

3. Mechanical vibration and noise.

A motor with an open rotor has a definite beat to the sound level of the unit which follows the current fluctuations. There will also be an increased amount of machine vibration as the condition worsens.

To properly diagnose an open rotor, the unit must be operated at a steady condition and be observed for the symptoms previously described. Control stability and machine operation without carryover or surging are absolute requirements for properly diagnosing an open rotor condition.

A simple field test using a variac can also be performed to aid in confirming an open rotor. This test is very limited due to its low current output and should not be used as the only basis for determining a defective rotor.

Variac Test Procedure

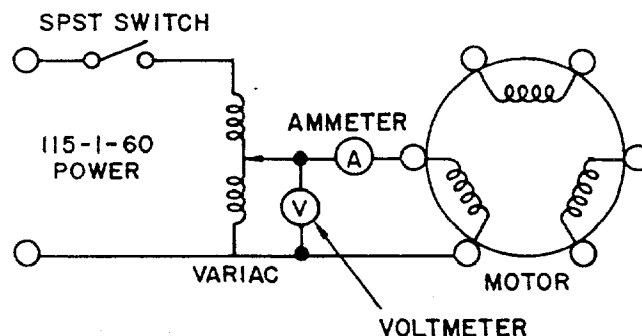
The following items are necessary to field test a rotor:

- Multi-amp relay tester or an amperage source with a maximum output of 110/60/1 volts and fused for a maximum of 5 watts output. This is the variac.
 - An accurate A.C. voltmeter.
 - An accurate low scale ammeter.
1. Open the unit disconnect switch and verify that there is no power available to the unit starter.

WARNING: OPEN AND LOCK UNIT DISCONNECT TO PREVENT INJURY OR DEATH FROM ELECTRICAL SHOCK OR CONTACT WITH MOVING PARTS.

2. Remove the refrigerant charge and evacuate the unit. Break the vacuum with dry nitrogen to bring the unit to atmospheric pressure.
3. Remove the compressor suction elbow or second stage suction cover as required to gain access to the motor windings.
4. Connect the test equipment as shown in Figure 1.

Figure 1
Test Circuit
With Variac



-
5. Apply 5 to 100 volts across one winding of motor. Control the output at 4 amps.
 6. Slowly rotate the rotor by hand.
 7. An amperage fluctuation of greater than 1/4 amp indicates an open rotor.

A more accepted test for confirming rotor defects requires the use higher voltage and current levels. The equipment needed to perform these tests is only available in a large motor rebuild shop or test facility. For this reason, the test will not be discussed in this bulletin.