

**ATTN: TSM VIBRATION ENGINEER**

**JOHNSON CONTROLS**  
For Internal Use Only

Fax completed form to: (414) 274-4120  
Or mail to: TSM VIBRATION ENGINEER M-14  
JOHNSON CONTROLS INC  
PO BOX 423  
MILWAUKEE WI 53201-0423

**Chiller Rebuild Form - York OT  
with LTD-126 compressor**

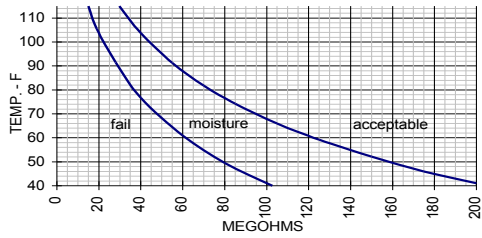
Branch \_\_\_\_\_  
Customer \_\_\_\_\_  
Machine model \_\_\_\_\_  
Serial \_\_\_\_\_  
Compressor model \_\_\_\_\_  
Serial \_\_\_\_\_  
Date \_\_\_\_\_  
Mechanic's name(s) \_\_\_\_\_

**Reason for Tear Down**

CHECK BOXES IF TRUE

- Scheduled maintenance
  - Problem suspected from oil analysis
  - Problem suspected from vibration analysis
  - Machine failed
- Other \_\_\_\_\_

<u>Tests</u>	<u>Teardown</u>	<u>Rebuild</u>	<u>Specifications</u>
<b>Voltage Imbalance test</b>			% Imbalance = $\frac{\max V_{1,2,or3} - V_{avg} }{V_{avg}} \times 100$ , where $V_{avg} = \frac{V_1 + V_2 + V_3}{3}$ % Imbalance should be < 3%
L1 to L2 (volts) _____	_____	_____	
L1 to L3 (volts) _____	_____	_____	
L2 to L3 (volts) _____	_____	_____	
% Imbalance _____	_____	_____	
<b>Tests - cont.</b>			
<b>Stator Megohm test</b>			
Temperature(F) _____	_____	_____	
<b>30-second test</b>			Motor must be at room temperature (idle for 24 hours with no water flow through the unit). Apply for 30 seconds. If failed apply for 1 minute. If still failed apply for 10 minutes.
<i>Between phases</i>			
T1 to T6 (Megohms) _____	_____	_____	
T2 to T4 (Megohms) _____	_____	_____	
T3 to T5 (Megohms) _____	_____	_____	
<i>Phase to Ground</i>			
T1 to GND (Megohms) _____	_____	_____	
T2 to GND (Megohms) _____	_____	_____	
T3 to GND (Megohms) _____	_____	_____	
<b>1-minute test</b>			
<i>Between phases</i>			
T1 to T6 (Megohms) _____	_____	_____	
T2 to T4 (Megohms) _____	_____	_____	
T3 to T5 (Megohms) _____	_____	_____	
<i>Phase to Ground</i>			
T1 to GND (Megohms) _____	_____	_____	



T2 to GND (Megohms) \_\_\_\_\_  
 T3 to GND (Megohms) \_\_\_\_\_

**10-minute test**

*Between phases*

T1 to T6 (Megohms) \_\_\_\_\_  
 T2 to T4 (Megohms) \_\_\_\_\_  
 T3 to T5 (Megohms) \_\_\_\_\_

*Phase to Ground*

T1 to GND (Megohms) \_\_\_\_\_  
 T2 to GND (Megohms) \_\_\_\_\_  
 T3 to GND (Megohms) \_\_\_\_\_

**Run Time Information**

Run hours \_\_\_\_\_ (Y/N) Run hours clock reset  
 Starts \_\_\_\_\_ (Y/N) Starts counter reset

<u>Condition</u>	<u>Teardown</u>	<u>Rebuild</u>	<u>Specifications</u>
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Alignment motor shaft to drive shaft (low speed)

Coupling part no. _____			
TIR rim @ 12 (mils) _____			See York form 160.58-N2 or 160.59-N1 for alignment specifications
TIR rim @ 3 (mils) _____			
TIR rim @ 6 (mils) _____			
TIR rim @ 9 (mils) _____			
TIR face @ 12 (mils) _____			
TIR face @ 3 (mils) _____			
TIR face @ 6 (mils) _____			
TIR face @ 9 (mils) _____			
Hot or Cold? _____			

<u>Motor shaft / Rotor</u>	<u>Teardown</u>	<u>Rebuild</u>	Direction	Min.	Max.
Shaft end runout TIR (in.) _____			radial		No spec
Shaft bent (Y/N) _____					
<b>Motor balanced (Y/N)</b> _____					
<i>Balance speed (RPM)</i> _____					
<i>Drive end displacement (mils)</i> _____					
<i>Opposite drive end displacement (mils)</i> _____					
Open rotor bar test (Pass/Fail) _____					
Number of loose or broken bars _____		_____ (Y/N) Rotor rebarred			
Warped laminations (Y/N) _____		_____ (Y/N) Shaft straightened			
Rub marks (Y/N) _____		_____ (Y/N) Shaft metalized			

<u>Drive shaft (low speed)</u>	<u>Teardown</u>	<u>Rebuild</u>	Low speed pump bolt torque: 20 ft-lb		
Runout @ coupling TIR (in.) _____			radial		No spec
Axial thrust (in.) _____			axial	0.0100	0.0180
L.S. thrust collar - face runout TIR (in.) _____			axial		No spec

<u>Guide vanes</u>	<u>Teardown</u>	<u>Rebuild</u>
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Will not open/close properly (Y/N) \_\_\_  
 Vanes loose (worn bushings or rivets) (Y/N) \_\_\_

\_\_\_ (Y/N) Guide vanes repaired

<u>Impeller</u>	<u>Teardown</u>	<u>Rebuild</u>	<u>Specifications</u>	
			Direction	Min. Max.
Runout inlet TIR (in.) _____	_____	_____	radial	0.0030
Runout outlet TIR (in.) _____	_____	_____	radial	0.0050
Scored/Rubbed (Y/N) _____			Impeller bolt torque: 140 ft-lb	
Cracked (Y/N) _____				
Loose (Y/N) _____		___ (Y/N) Impeller machined		
<b>Impeller balanced (Y/N)</b> _____				
<i>Balance speed (RPM)</i> _____				
<i>Displacement (mils)</i> _____				

<u>Main shaft (high speed)</u>	<u>Teardown</u>	<u>Rebuild</u>		
Runout TIR (in.) _____	_____	_____	radial	No spec
Axial thrust (in.) _____	_____	_____	axial	0.0060 0.0140
H.S. thrust collar - face runout TIR (in.) _____	_____	_____	axial	No spec
H.S. thrust collar - oil pump chamfer (in.) _____	_____	_____	axial	0.0005

<u>Gears</u>	<u>Teardown</u>
<i>Drive</i>	
Number of broken teeth _____	
Worn teeth (Y/N) _____	
<i>Pinion</i>	
Number of broken teeth _____	
Worn teeth (Y/N) _____	

<u>Bearings, journals and seals</u>	<u>Teardown</u>
<b>Rear motor bearing</b>	
Loose/worn (Y/N) _____	
Inner race defect (Y/N) _____	
Outer race defect (Y/N) _____	
Ball defect (Y/N) _____	
Cage defect (Y/N) _____	
Describe bearing condition on teardown _____	
_____	
<b>Front motor bearing</b>	
Loose/worn (Y/N) _____	
Inner race defect (Y/N) _____	
Outer race defect (Y/N) _____	
Ball defect (Y/N) _____	
Cage defect (Y/N) _____	
Describe bearing condition on teardown _____	
_____	

<u>Bearings, journals and seals - cont.</u>	<u>Teardown</u>	<u>Rebuild</u>	<u>Specifications</u>	
<b>Rear gear bearing</b>			Direction	Min. Max.
Bearing scored (Y/N) _____			diameter	3.1270 3.1290
Shaft scored (Y/N) _____			diameter	3.1240 3.1250
Bearing I.D. (in.) _____	_____	_____	diameter	No spec No spec
Shaft O.D. (in.) _____	_____	_____	diameter	4.3760 4.3790
Bearing O.D. (in.) _____	_____	_____	diameter	2.6200 2.6230
Bearing housing I.D. (in.) _____	_____	_____		
Shaft seal collar surface O.D. (in.) _____	_____	_____		

Describe bearing condition on teardown \_\_\_\_\_

**Front gear bearing**

Bearing scored (Y/N) \_\_\_\_\_

Shaft scored (Y/N) \_\_\_\_\_

Bearing I.D. (in.) \_\_\_\_\_

Shaft O.D. (in.) \_\_\_\_\_

Bearing O.D. (in.) \_\_\_\_\_

Bearing housing I.D. (in.) \_\_\_\_\_

diameter	3.1270	3.1290
diameter	3.1240	3.1250
diameter	No spec	No spec
diameter	4.3760	4.3790

Describe bearing condition on teardown \_\_\_\_\_

**Main shaft (high speed) thrust bearing**

Bearing scored (Y/N) \_\_\_\_\_

Shaft scored (Y/N) \_\_\_\_\_

Bearing I.D. (in.) \_\_\_\_\_

Shaft O.D. (in.) \_\_\_\_\_

Bearing O.D. (large rm)(in.) \_\_\_\_\_

Bearing O.D. (small rm)(in.) \_\_\_\_\_

Bearing housing I.D. (large rm)(in.) \_\_\_\_\_

Bearing housing I.D. (small rm)(in.) \_\_\_\_\_

diameter	3.1300	3.1310
diameter	3.1245	3.1250
diameter	4.9960	4.9980
diameter	3.7460	3.7480
diameter	5.0010	5.0040
diameter	3.7510	3.7540

Describe bearing condition on teardown \_\_\_\_\_

**Pinion gear bearing**

Bearing scored (Y/N) \_\_\_\_\_

Shaft scored (Y/N) \_\_\_\_\_

Bearing I.D. (in.) \_\_\_\_\_

Shaft O.D. (in.) \_\_\_\_\_

Bearing O.D. (in.) \_\_\_\_\_

Bearing housing I.D. (in.) \_\_\_\_\_

diameter	3.1300	3.1310
diameter	3.1245	3.1250
diameter	No spec	No spec
diameter	4.0010	4.0040

Describe bearing condition on teardown \_\_\_\_\_

**Bearings, journals and seals - cont.**

**Teardown**

**Rebuild**

**Specifications**

**Main shaft bearing**

Bearing scored (Y/N) \_\_\_\_\_

Shaft scored (Y/N) \_\_\_\_\_

Bearing I.D. (large end of taper) (in.) \_\_\_\_\_

Bearing I.D. (small end of taper) (in.) \_\_\_\_\_

Shaft O.D. (pinion end) (in.) \_\_\_\_\_

Shaft O.D. (impeller end) (in.) \_\_\_\_\_

Bearing O.D. (in.) \_\_\_\_\_

Bearing housing I.D. (impeller end) (in.) \_\_\_\_\_

Seal (balance piston) O.D. (in.) \_\_\_\_\_

Seal ring (balance piston) I.D. (in.) \_\_\_\_\_

Direction	Min.	Max.
diameter	2.5060	2.5075
diameter	2.5015	2.5030
diameter	2.4995	2.5000
diameter	2.4995	2.5000
diameter	3.3720	3.3740
diameter	3.3760	3.3790
diameter	7.9320	7.9340
diameter	7.9420	7.9490
diameter		

Describe bearing condition on teardown \_\_\_\_\_

**Stator**

**Teardown**

**Rebuild**

Loose windings or ties (Y/N) \_\_\_\_\_

Warped laminations (Y/N) \_\_\_\_\_

Winding shorts (Y/N) \_\_\_\_\_

Poor connections at motor or starter (Y/N) \_\_\_\_\_

\_\_\_\_ (Y/N) Stator rewind

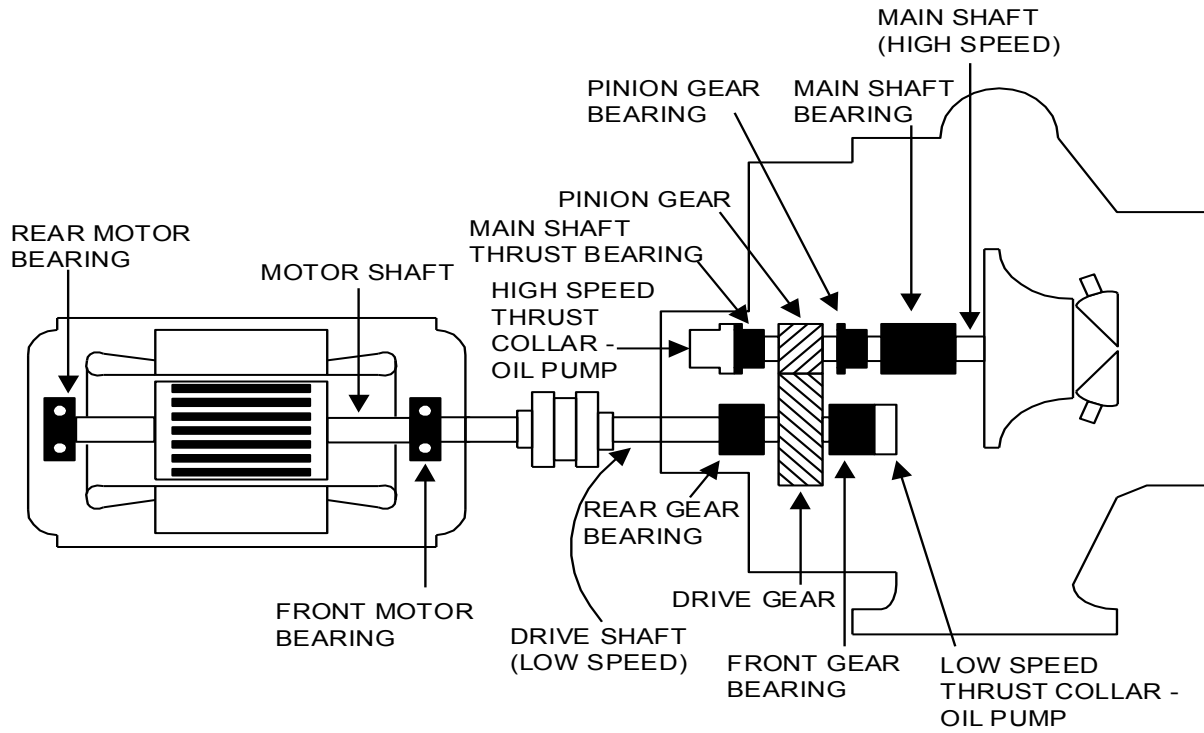
\_\_\_\_ (Y/N) Stator baked and dipped

**Parts Replaced**

CHECK BOXES IF PART REPLACED



**Chiller Components**



**Chiller Dial Indicator, or Feeler Gauge Measurements**

