



# McIntosh Industries Inc.

**Electro Mechanical Technologies**

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676 Ramsey Ave.  
Hillside, NJ 07205

**Customer**

**Address**

**Address**

**Attn: Supervisor**

**Re: Job Address**

## **Gearless Hoist Motor Analysis**

### **Overview:**

The testing performed on the Gearless Traction Machines conform to acceptable standards of testing for DC elevator machines established by the Electrical Apparatus Service Association (EASA) and conform to all applicable I.E.E.E standards.

### **General Condition:**

In general, the machines are operating without significant concern for short term failure. However, several electrical and mechanical items are deficient and require corrective action.

### **Armature Tests:**

The armature is typically the most sensitive and critical component in a DC hoist machine. Commutation issues are a leading cause of premature armature failure. Many machine problems effect commutation and armature operation. It is necessary to isolate the armature from the other machine electrical components so that an accurate evaluation can be conducted.

**Armature ground fault readings:** The armature ground fault megger reading indicates the insulation value between the armature's electrical circuitry and ground. By recording the resistance at different voltages, indication of insulation deterioration can be charted and evaluated. The test results for armature ground fault megger readings are listed below.

**Armature Bar To Bar Test:** The armature bar to bar test compares thee individual electrical circuits of the armature winding. This test is used to detect turn to turn shorts.

**Visual Inspection:** Visual observations of the armature in static and dynamic operation are noted. Specific deficiencies are addressed in the recommendations.

**Voltage and Current Readings:** Armature voltage and current readings are observed on all cars. Readings are compared to the name plate data tag as well as from machine to machine. Measurements outside the normal range are indicative of motor problems which may reduce the

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life cycle of the machine. There are many possible causes for abnormal readings. Recommendations for additional tests will be enclosed if necessary.

### **Field Coil Tests:**

**Ground Fault Megger Test:** The field coil ground fault megger reading indicates the insulation value between the field coil's electrical circuitry and ground. By recording the resistance at different voltages, indication of insulation deterioration can be charted and evaluated. The test results for field coil ground fault megger readings are listed below.

**Field Voltage Drop Test:** The field voltage drop test measures the percentage of voltage carried by each individual field coil. It is superior to an ohm resistance test in that deterioration of the turn to turn resistance is more readily detectable.

### **General Test:**

**Visual Inspection:** Visual observations of the machine in static and dynamic operation are also noted. Specific deficiencies are addressed in the recommendations.

**Additional Measurements:** The following additional inspections are preformed and recorded

- Ground Fault Megger Test Brush Rig
- ~~Ground Fault Megger Test Interpoles~~
- ~~Brake Coil Resistance and Ground Fault Megger Test~~
- Inspect Bearing Clearances
- Inspect Brake Linkage
- Inspect Brake Pads For Excessive Wear

# TEST DATA - DC Elevator Motor

Job # Car # 1

Customer	Sample	Car #	1
Site Address	Sample	Floor	15
Supervisor	Samle	Rise	Mid

Type	131 HT	HP - KW	32	RPM	141 / 125
Frame		Volts	135	Amps	177
Mfg.	Otis	Fld Volts	150	*FLD Ohm	

## Inspection

Arm	Winding	Heavy carbon buildup, Original		
	Commutator	<b>Dragovers</b> , Moderate brush surface wear, Stock > .800		
Fields	Wrap	Brittle but intact		
	Winding	Not Visible		
Interpoles		N/A		
Bearings		Condition	Clearance	Lubrication
Drive		<b>Slight Rumble</b>	Visually Good	<b>Slight Weeping</b>
Opposite		Quiet and Smooth	Visually Good	Visually Good
Brake Linkage		Visually Good	Brake Pads	Not Visible
Other:				

## Electrical Readings

Ground Fault Meg Test	1000	500	250	ohms
Armature	<b>.5</b>	<b>.1</b>	5	
Interpoles				
Brush Rig A1	<b>.5</b>	<b>1</b>	<b>2</b>	
Brush Rig A2	<b>1</b>	<b>2</b>	5	
Brake Coils				
Fields	> 200	> 200	> 200	
Voltage Drop (122.3V)	P1 19.6   P2 20.25	P3 20.65   P4 20.43	P5 21.07   P6 20.52	P7   P8
NitroClean™	YES		Bar to Bar	PASS   FAIL
Ground Fault Meg Test	1000	500	250	ohms
Armature	20	50	100	
Interpoles				
Brush Rig A1	10	20	50	
Brush Rig A2	50	>200	>200	
Brake Coils				
Fields	> 200	> 200	> 200	

# TEST DATA - DC Elevator Motor

Job # Car # 1

Armature	Peak ↑	Median ↑	Peak ↓	Median ↓	Notes:
Volts					
Amps					
Fields	Standing	Forcing	Running	Notes:	
Volts					
Amps					

## Observations

There was a heavy buildup of carbon dust throughout the machine prior to NitroClean™. Commutation is good. There is no sparking on acceleration, deceleration, or during full speed operation. Pad thickness was acceptable.

## Measurements

Armature ground fault megger readings **LOW** prior to NitroClean™.  
 Armature retested March 23<sup>rd</sup> readings returned to original **LOW** readings.  
 Brush rig ground fault readings **LOW** prior to NitroClean™.  
 All other electrical results are acceptable after NitroClean™.

## Recommendations

Remove Armature to the shop for repair	3
Replace Bearings	3-4



Car 1: Otis 131 HT name plate data tag.



Dragover on commutator.

# TEST DATA - DC Elevator Motor

Job # Car 31

Customer	Sample	Car #	31
Site Address	Sample	Floor	53 +3
Supervisor	Sample	Rise	High

Type	214 H	HP - KW	105	RPM	128
Frame		Volts	388	Amps	225
Mfg.	Westinghouse	Fld Volts		*FLD Ohm	

## Inspection

Arm	Winding	Original, visually good		
	Commutator	Visually good, carbon packed, commutator stock > .200*		
Fields	Wrap	Visually good		
	Winding	Not Visible		
Interpoles		N/A		
Bearings		Condition	Clearance	Lubrication
Drive		Quiet and Smooth	Visually Good	Weeping Seals
Opposite		Quiet and Smooth	Visually Good	Weeping Seals
Brake Linkage		Visually Good	Brake Pads	L > .260 R > .200
Other: Heavy rouge condition throughout the machine. *To top of equalizer winding.				

## Electrical Readings

Ground Fault Meg Test	1000	500	250	ohms
Armature	> 200	> 200	> 200	
Interpoles	N/A	N/A	N/A	
Brush Rig A1	> 200	> 200	> 200	
Brush Rig A2	> 200	> 200	> 200	
Brake Coils				
Fields	> 200	> 200	> 200	
Voltage Drop ( 118.2 V)	P1 39.3   P2 39.9	P3 38.9   P4 38.9	P5 39.9   P6 39.4	P7   P8
NitroClean™	YES	NO	Bar to Bar	PASS   FAIL
Ground Fault Meg Test	1000	500	250	ohms
Armature	> 200	> 200	> 200	
Interpoles	N/A	N/A	N/A	
Brush Rig A1	> 200	> 200	> 200	
Brush Rig A2	> 200	> 200	> 200	
Brake Coils				
Fields	> 200	> 200	> 200	

# TEST DATA - DC Elevator Motor

Job # Car 31

Armature	Peak ↑	Median ↑	Peak ↓	Median ↓	Notes:
Volts					
Amps					
Fields	Standing	Forcing	Running	Notes:	
Volts					
Amps					

## Observations

There was a moderate to heavy buildup of carbon dust throughout the machine prior to NitroClean™. Commutation is good. There is no sparking on acceleration, deceleration or during full speed operation. Brake linkage and pins are good. Pad thickness was acceptable. Heavy rouge condition throughout the machine.

## Measurements

All electrical results are acceptable.

## Recommendations

Turndown and Undercut	4-5
Replace Seals	3

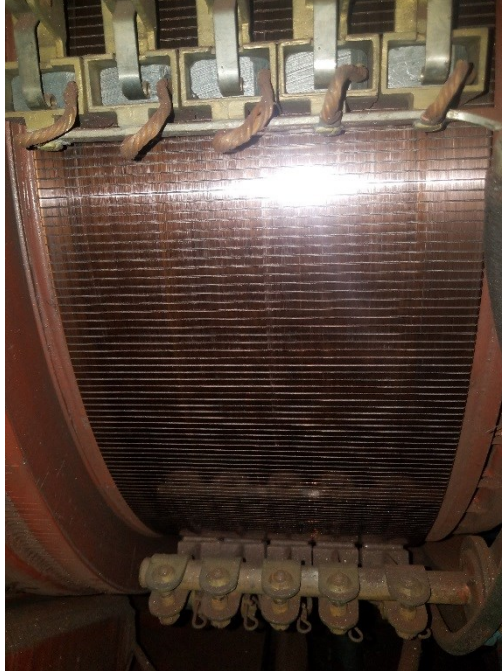




Car 31 Westinghouse 214 H.



Heavy carbon buildup throughout the machine prior to NitroClean™.



Commutator visually good.

## **Priority summary**

Priority Scale: 1-5

1 urgent – immediate attention required. Continued operation may result in additional damage.

2 high priority – repair as soon as possible. Continuous monitoring required.

3 priority – repair should be scheduled.

4 low priority – monitor and/or repair

5 lowest priority - monitor