

LR Motor Shop Repairs

Job Number 102808

Prepared for KONE INC (10211)

5003 NORTH SHORE LANE NORTH LITTLE ROCK AR 72118

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Hi-Speed Industrial Service 7030 Ryburn Dr Millington, Tn 38053 901-873-5300

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AC Inspection as Found KONE INC (10211)

5003 NORTH SHORE LANE NORTH LITTLE ROCK, AR 72118

AC Inspection - Rev. 2

LITTLE ROCK MOTOR SHOP Location:

Serial Number: 329138 Description:23HP 1800 RPM

Hi-Speed Job Number:	102808
Product Number:	M: 343059
Spec/ID #:	NA
Serial Number:	329138
HP/kW:	23 (HP)
RPM:	1800 (RPM)
Frame:	UNKNOWN
Voltage:	480
Current:	29.5 (Amps)
Phase:	Three
Hz:	60 (Hz)
Service Factor:	1
Enclosure:	ODP
# of Leads:	6
J-box Included:	None
Coupling/Sheave:	None
Date Received:	05/08/2024
Bearing RTDs:	No
Stator RTDs:	No
Repair Stage:	Teardown Inspection
Rewind:	No
Shaft Machined Fit Repairs Required:	Yes
Bearing Housing Machined Fit Repairs Required:	Yes
Heaters:	No
Winding Type :	Random Wound
Bearing Type:	Rolling Element

Priorities Found: 5 - High





4 - Good

Overall Condition

05/06/2024 1. Report Date

Nameplate Picture





3. Photos of all six sides of the machine.









































4. Describe the Overall Condition of the Equipment as Received

Replace brushes, replace bearings, machine both shaft fits, machine both endbells, turn and undercut commutator

Initial Mechanical/Electrical 5. Does Shaft Turn Freely? (Y) Yes 6. Does the shaft require T.I.R in Lathe to identify additional repairs? (No) No 7. Does Shaft Have Visible Damage? (No) No 8. Assembled Shaft Runout Inches Na 9. Assembled Shaft End Play inches Na 10. Air Gap Variation <10% Na 11. Lead Condition (F) Fail Need to replace a couple leads 12. Lead Length Inches Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good			Replace brushes, replace bearings, machine both shaft fits, machine both endbells, turn and undercut commutator			
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7. Does Shaft Have Visible Damage? 8. Assembled Shaft Runout 9. Assembled Shaft End Play 10. Air Gap Variation <10% Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		5.	Does Shaft Turn Freely?	(Y) Yes		
8. Assembled Shaft Runout Na 9. Assembled Shaft End Play Na 10. Air Gap Variation <10% Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		6.	Does the shaft require T.I.R in Lathe to identify additional repairs?	(No) No		
 Na 9. Assembled Shaft End Play inches Na 10. Air Gap Variation <10% Na 11. Lead Condition (F) Fail Need to replace a couple leads 12. Lead Length Inches Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good 		7.	Does Shaft Have Visible Damage?	(No) No		
9. Assembled Shaft End Play Na 10. Air Gap Variation <10% Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		8.	Assembled Shaft Runout	Inches		
 Na 10. Air Gap Variation <10% Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition 		-	Na			
10. Air Gap Variation <10% Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		9.	Assembled Shaft End Play	inches		
 Na 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition 		-	Na			
 11. Lead Condition Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition 		10.	Air Gap Variation <10%			
Need to replace a couple leads 12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition Odd node services a couple leads Inches		-	Na			
12. Lead Length Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition		11.	Lead Condition	(F) Fail		
Lengths vary 13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		—	Need to replace a couple leads			
13. Does it have Lugs?, If so what is the Stud Size? Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		12.	Lead Length	Inches		
Yes and no 14. Lead Numbers Odd numbering 15. Frame Condition good		-	Lengths vary			
14. Lead Numbers Odd numbering 15. Frame Condition good		13.	Does it have Lugs?, If so what is the Stud Size?			
Odd numbering 15. Frame Condition good		-	Yes and no			
15. Frame Condition good		14.	Lead Numbers			
		7	Odd numbering			
16 Fan Condition (D) Page		15.	Frame Condition	good		
(F) Fass		16.	Fan Condition	(P) Pass		

17. Br	roken or Missing Components		no
nitial Ele	ectrical Inspection		
18. In	sulation Resistance/Megger		2000 Megohms
19. W	/inding Resistance		
1-	-2	1-3	2-3
.0	.2	0.2	0.2
20. Pe	erform Surge Test		(P) Pass
21. N	umber of Stator Slots		48
22. St	tator Condition		good
23. St	tator Thermistors/Ohms		
■ Na	a		
24. St	tator Overloads/Ohms		
■ Na	а		
dechani	ical Inspection		
25. Di	rive End Bearing Brand		skf
26. Di	rive End Bearing Number-		6309 2z c3
27. Di	rive End Bearing Qty.		1
28. Di	rive End Bearing Type		(Ball) Ball Bearing
29. Di	rive End Lubrication Type		(Grease) Grease Lubricated
30. Di	rive End Bearing Insulation or Groun	ding Device?	
■ Na	a		
31. Di	rive End Wavy Washer/Snap-Ring O	ther Retention Device?	
■ Be	olt and washer		
32. Di	rive End Bearing Condition		fail
33. O	pposite Drive End Bearing Brand		fag
34. O	pposite Drive End Bearing Number-		6309rsr
35. O	pposite Drive End Bearing Qty.		1
36. O	pposite Drive End Bearing Type		(Ball) Ball Bearing
37. O	pposite Drive End Lubrication Type		(Grease) Grease Lubricated
38. O	pposite Drive End Bearing Insulation	or Grounding Device?	
■ Na	a		
39. O	pposite Drive End Wavy Washer/Sna	ap-Ring Other Retention Device?	no
40. O	pposite Drive End Bearing Condition		worn
41. Di	rive End Seal		
■ Na	а		
42. O	pposite Drive End Seal		
■ Na	a		
Rotor In	spection		
43. R	otor Type/Material		(Squirrel Aluminum) Squirrel Cage Aluminum Die Cast
44. G	rowler Test		(Pass) Pass
45. N	umber of Rotor Bars		64
46. R	otor Condition		pass
47. Li	st the Parts needed for the Repair B	elow	
63	309 2zc3 x2 brushes		

	48.	3. Signature of Technician that Disassembled Motor			or Hall
Me	echa	nical Fits- Rotor			
	49.	Shaft Runout			inches
	-	Na			
	50.	Rotor Runout			
		Drive End Bearing Fit	Rotor Body	Opposite Drive End Be	aring
		Na			
	51.	Coupling Fit Closest to Bearing Housing			
		0 Degrees	90 Degrees	120 Degrees	
	_	Mo			
	52.	Na Coupling Fit Closest to the end of the	Shaft		
	52.			100 Dagraga	
		0 Degrees	60 Degrees	120 Degrees	
		Na			
	53.	Drive End Bearing Shaft Fit			
		0 Degrees	60 Degrees	120 Degrees	
		1.7741	1.773	1.7716	
	54.	Drive End Bearing Shaft Fit Condition			(F) Fail
	-	Egg shaped and over max.			
	55.	Opposite Drive End Bearing Shaft Fit			
		0 Degrees	60 Degrees	120 Degrees	
		1.7723	1.7725	1.7727	
	56.	Opposite Drive End Bearing Shaft Fit	Condition		(F) Fail
	7	Egg shaped and oversized.			
	57.	Shaft Air Seal Fits			
		Drive End Air Seal	Opposite Drive End Air Seal		
		Na			
	-				
IVI		nnical Fits- Bearing Housings			
	56.	Drive End - Endbell Bearing Fit	60 Dagraca	120 Dogrado	
		0 Degrees 3.99	60 Degrees 3.99	120 Degrees 3.99	
		Bearing spun inside housing	3.33	J.33	
	5 9.	Drive End - Endbell Bearing Fit Condit	ion		(F) Fail
		Opposite Drive End - Endbell Bearing			(1) 1 all
	50.	0 Degrees	60 Degrees	120 Degrees	
		3.9378	3.9383	3.9382	
			0,000	0.0002	

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Oversized

62.	Bearing Cap Condition		
	Drive End Bearing Cap	Opposite Drive End Bearing Cap	
	good	good	
63.	End Bell Air Seal Fits		
	Drive End Air Seal	Opposite Drive End Air Seal	
	good	good	
64.	List Machine Work Needed Below		
	Both endbells, both shaft fits, turn and	undercut armature	
65.	Technician		Trevor Hall
65.	/- Jrla		Trevor Hall
	Co sign TRH		Trevor Hall
	/- Jrla		Trevor Hall
	Co sign TRH		Trevor Hall
Root	Co sign TRH Cause of Failure	or, bearings, brushes	Trevor Hall

Normal wear over time





DC Repair Report KONE INC (10211) 5003 NORTH SHORE LANE NORTH LITTLE ROCK, AR 72118 FolderID: 102808 FormID: 20332706

DC Repair Report Rev. 2

Location: LITTLE ROCK MOTOR SHOP

Job Number: 102808

Description:Ac, Dc Generator

Hi-Speed Job Number:	102808
Manufacturer:	Other
HP/KW:	23 (HP)
RPM:	1800
Armature Voltage:	160 (Volts)
Armature Current:	94 (Amps)
J-Box Included:	No
Bearing RTDS:	No
Winding RTDS:	No
Mounting Orientation :	Horizontal

Priorities Found: 1 - High





4 - Good

Overall Condition

Describe the Overall Condition of the Equipment as Received
 Motor is full of carbon. Needs new brushes, shaft fits machined, both endbells sleeved, turn and undercut armature

2. Nameplate Picture

















Initial Mechanical/Electrical Does the Shaft Turn Freely? (Y) Yes

Does Shaft Have Visible Damage? (No) No 5. Assembled Shaft Runout Inches 6.

Na

Assembled Shaft End Play Inches 7. Na

8.	Air Gap Variation <10%		
-	Na		
9.	Lead Condition		(F) Fail
-	Need to replace a couple leads		
10.	Lead Length		45 Inches
11.	Frame Condition		(P) Pass
12.	Fan Condition		(P) Pass
13.	Brush Information		
	Brush Number	Quantity	Condition
	75-501533	8	fail



14. Brush Holder Condition - Verify proper gap to Commutator

good



Incom	Incoming Electrical Test			
15.	5. General Condition of the Armature/Commutator		needs turned and full of carbon	
16.	Armature Insulation Resistance to Gro	ound	0 Megohms	
17.	Field Circuit Insulation Resistance to 0	Ground	0 Megohms	
18.	Interpole Circuit Insulation Resistance	to Ground	0 Megohms	
19.	Total Field Ohms		239.3	
20.	Field Ohms			
	Between F1/F2	Between F3/F4		
	121	120		
21.	MegOhms between Fields and Series		300	

Series Drop Test 1&2 Series 1 Series 2 4.6 4.6 23. Series 3 Series 4 7.5 7.5 Connected on different tap than other two series coils 24. Field Drop Test Fields 1&2 Total AC Voltage Field #1 Field #2 115 1.6 1.6 25. Field Drop Test Fields 3&4 Field #3 Fleld #4 Field #2 115 1.6 26. Field Drop Test Fields 5&6 Field #5 Fleld #6 Field #2 Na 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 5&6 Interpole #3 Interpole #4 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #5 Interpole #6 Field #2 Na 31. Interpole #7 Interpole #8 Field #2 Na 31. Interpole #7 Interpole #8 Field #2				
4.6 23. Series Drop Test 3&4 Series 3 Series 4 7.5 7.5 7.5 Connected on different tap than other two series coils 24. Field Drop Test Fields 1&2 Total AC Voltage Field #1 Field #2 115 1.6 1.6 25. Field Drop Test Fields 3&4 Field #3 Field #4 Field #3 Field #4 Field #5 1.6 6 Field #5 Field #6 Field #5 Field #6 Field #7 Field Brop Test Fields 7&8 Field #7 Field Brop Test Fields 7&8 Field #7 Field Brop Test Fields 7&8 Field #7 Field #8 Field #2 Na 22. Field Drop Test 1&2 Total AC Voltage Interpole Drop Test 3&4 Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 Na 31. Interpole Drop Test 7&8 Interpole Brop Test 7&8 Interpole Drop Test 7&8 Interpole Drop Test 7&8 Interpole Drop Test 7&8 Interpole Brop Test 7&8 Interpole #7 Interpole #8 Field #2	22.	-		
23. Series Drop Test 3&4		Series 1	Series 2	
Series 3 Series 4 7.5 7.5 Connected on different tap than other two series coils 24. Field Drop Test Fields 1&2 Total AC Voltage Field #1 115 1.6 25. Field Drop Test Fields 3&4 Field #2 Field #3 Fleld #4 Field #2 115 1.6 115 1.6 1.6 26. Field Drop Test Fields 5&6 Field #2 Field #5 Fleld #6 Field #2 Na Field #7 Fleld #8 Field #2 Na Pield #2 1.0		4.6	4.6	
7.5	23.	Series Drop Test 3&4		
## Connected on different tap than other two series coils 24. Field Drop Test Fields 1&2 Total AC Voltage Field #1 Field #2 115 1.6 1.6 25. Field Drop Test Fields 3&4 Field #3 Fleld #4 Field #2 115 1.6 115 1.6 26. Field Drop Test Fields 5&6 Field #5 Field #6 Field #2 ***Na** 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 ***Na** 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 ***Na** 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 ***Na** 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2		Series 3	Series 4	
24. Field Drop Test Fields 182 Total AC Voltage Field #1 Field #2 115 1.6 1.6 25. Field Drop Test Fields 38.4 Field #3 Fleld #4 Field #2 115 1.6 26. Field Drop Test Fields 58.6 Field #5 Fleld #6 Field #2 ***Na** 27. Field Drop Test Fields 78.8 Field #7 Fleld #8 Field #2 ***Na** 28. Interpole Drop Test 18.2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 38.4 Interpole #3 Interpole #4 Field #2 ***Na** 30. Interpole Drop Test 58.6 Interpole #5 Interpole #6 Field #2 ***Na** 31. Interpole Drop Test 78.8 Interpole #7 Interpole #8 Field #2		7.5	7.5	
Total AC Voltage Field #1 Field #2 115 1.6 1.6 25. Field Drop Test Fields 3&4 Field #3 Fleld #4 Field #2 115 1.6 115 1.6 26. Field Drop Test Fields 5&6 Field #5 Fleld #6 Field #2	-	Connected on different tap than other to	vo series coils	
115	24.	Field Drop Test Fields 1&2		
25. Field Drop Test Fields 3&4 Field #3 Field #4 Field #2 115 1.6 115 1.6 26. Field Drop Test Fields 5&6 Field #5 Fleld #6 Field #2 ***Na** 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 ***Na** 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Brop Test 3&4 Interpole #3 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 ***Na** 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2		Total AC Voltage	Field #1	Field #2
Field #3 Field #4 Field #2 115 1.6 115 1.6 26. Field Drop Test Fields 5&6 Field #5 Fleld #6 Field #2 Na 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 15 29. Interpole Brop Test 3&4 Interpole #3 Interpole #4 Field #2 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2		115	1.6	1.6
115	25.	Field Drop Test Fields 3&4		
115		Field #3	Fleld #4	Field #2
26. Field Drop Test Fields 5&6 Field #5 Fleld #6 Field #2 Na 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 15 29. Interpole #3 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2		115	1.6	
Field #5 Field #6 Field #2 Na 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2			1.6	
P Na 27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2	26.			
27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #8 Field #2		Field #5	Fleld #6	Field #2
27. Field Drop Test Fields 7&8 Field #7 Fleld #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #8 Field #2				
Field #7 Field #8 Field #2 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2				
 Na 28. Interpole Drop Test 1&2 Total AC Voltage Interpole #1 Interpole #2 29 15 15 29. Interpole Drop Test 3&4 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #8 Field #2 	27.		EL 1.1.10	F: 11 #0
28. Interpole Drop Test 1&2 Total AC Voltage		FIEIG #/	FIEIG #8	FIEID #2
28. Interpole Drop Test 1&2 Total AC Voltage	_	Na		
Total AC Voltage				
29	_0.		Internale #1	Internole #2
29. Interpole Drop Test 3&4 Interpole #3 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2			-	-
Interpole #3 Interpole #4 Field #2 15 15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2	29.			
15 30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2			Interpole #4	Field #2
30. Interpole Drop Test 5&6 Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2			-	. 13.6 // _
Interpole #5 Interpole #6 Field #2 Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2	30.			
Na 31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2			Interpole #6	Field #2
31. Interpole Drop Test 7&8 Interpole #7 Interpole #8 Field #2		and percent		
Interpole #7 Interpole #8 Field #2	-	Na		
	31.	Interpole Drop Test 7&8		
■ Na		Interpole #7	Interpole #8	Field #2
→ Na				
	-	Na		

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32. Armature Number of Bars - Bar to Bar Test

Number of Bars Bar to Bar Test

123 pass



Mach	anical Inspection		
	Shaft Runout Drive End		
	Shaft Runout Armature		
J -1 .	Drive End Bearing Journal	Armature Core	ODE Bearing Journal
	Drive Life Bearing Journal	Amature core	ODE Bearing Journal
35.	Drive End Bearing Number		
36.	Drive End Bearing Quantity		
37.	Drive End Bearing Type		
38.	Drive End Lubrication Type		
39.	Drive End Bearing Insulation or Groun	nding Device?	
40.	Drive End Wavy Washer/Snap-Ring C	Other Retention Device?	
41.	Drive End Bearing Condition		
42.	Opposite Drive End Bearing Number		
43.	Opposite Drive End Bearing Quantity		
44.	Opposite Drive End Bearing Type		
45.	Opposite Drive End Lubrication Type		
46.	Opposite Drive End Bearing Insulation	or Grounding Device?	
47.	Opposite Drive End Wavy Washer/Sn	ap-Ring Other Retention Device?	
48.	Opposite Drive End Bearing Condition	1	
	Signature of Technician who Performe		
50.	List Parts Needed Prior to Reassemb	У	
Mech	anical Fits - Armature		
51.	Coupling Fit Closest to Bearing Housi	ng	
	0 Degrees	60 degrees	120 degrees
	0 15 550 11 15 1 11	01.6	
52.	Coupling Fit Closest to the End of the		400 1
	0 Degrees	60 degrees	120 degrees
53.	Drive End Bearing Shaft Fit		
	0 Degrees	60 Degrees	120 Degrees
	2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	22 2 23. 300	0 _ 000
54.	Drive End Bearing Shaft Fit Condition		

FF	Opposite Drive End Dearing Shoft Fit		
55.	Opposite Drive End Bearing Shaft Fit	CO D	400 Damasa
	0 Degrees	60 Degrees	120 Degrees
56.	Opposite Drive End Bearing Shaft Fit	Condition	
57.		Condition	
07.	Drive End Air Seal	Opposite Drive End Air Seal	
	Drive Erid Ali Seai	Opposite Drive Erid Ali Seai	
Mecha	anical Fits- Bearing Housings		
	Drive End - End Bell Bearing Fit		
33.	0 Degrees	60 Degrees	120 Degrees
	0 Dog.000	00 D0g.000	120 Dog1000
59.	Drive End - Endbell Bearing Fit Condi	tion	
60.	Opposite Drive End - End Bell Bearing	g Fit	
	0 Degrees	60 Degrees	120 Degrees
	3	3	
61.	Opposite Drive End - Endbell Bearing	Fit Condition	
62.	Bearing Cap Condition		
	Drive End	Opposite Drive End	
63.	End Bell Air Seal Fits		
	Drive End Air Seal	Opposite Drive End Air Seal	
64.	List any Machine work Needed Below		
65.	Signature of Technician Performing M	easurements	
Root	Cause of Failure		
66.	Failure Locations		
67.	Root Cause of Failure		
Comn	nutator Data		
68.	Total Copper Segment Length		
69.	Number of Bars		123
70.	Number of Wires Per Copper Bar and	Size	
	Number of Wires per Bar	Wire Size	
71.	Equalizers per Copper Bar and Equal		
	Equalizers per Bar	Wire Size	
	B		
72.			
	Current Comm Diameter	Minimum Comm Diameter	Maximum Comm Diameter
73.	Commutator Shaft Diameter		
	Front Shaft Diameter	Back Shaft Diameter	
	Commutator Type		
75.			
	Signature of Technician Recording Da	ata	
-	mic Balance Report		
77.	Rotor Weight and Balance Grade		
	Rotor Weight	Balance Grade	

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78.	Initial Balance Readings					
	Drive End Readings	Opposite Drive End Readings				
79.	Final Balance Readings					
	Drive End Readings	Opposite Drive End Readings				
	Signature of the Balance Technician					
	Armature Rewind Testing					
81.	Post Rewind Armature Insulation Resistance to Ground					
82.	Post Rewind Field Circuit Measure the Insulation Resistance to Ground					
83.	Post Rewind Armature Number of Bar	s - Bar to Bar Test				
	Number of Bars	Bar to Bar Test				
	Post Rewind Field Circuit Insulation R					
	Post Rewind Interpole Circuit Insulation Resistance to Ground					
86.	Post Rewind Field Drop Test Fields 18					
	Total AC Voltage	Field #1	Field #2			
0.7	Doct Dowind Field Drop Teet Fields 29.4					
87.	Post Rewind Field Drop Test Fields 38		F:-11 #0			
	Field #3	Fleld #4	Field #2			
ΩΩ	. Post Rewind Field Drop Test Fields 5&6					
00.	Field #5	Fleld #6	Field #2			
	rieiu #5	rieiu #o	Field #2			
89.	Post Rewind Field Drop Test Fields 7&8					
	Field #7	Fleld #8	Field #2			
	Tota // T	110.00 // 0	11010 112			
90.	Post Rewind Interpole Drop Test 1&2					
	Total AC Voltage	Interpole #1	Interpole #2			
	Ţ.	·	·			
91.	Post Rewind Interpole Drop Test 3&4					
	Interpole #3	Interpole #4	Field #2			
92.	Post Rewind Interpole Drop Test 5&6					
	Interpole #5	Interpole #6	Field #2			
00	Deat Desired leterante Dear Test 700					
93.	' '	1	E: 11 #0			
	Interpole #7	Interpole #8	Field #2			
Post I	Mechanical Repair					
	Post Repair Coupling Fit Closest to Be	paring Housing				
94.		•	120 degrees			
	0 Degrees	60 degrees	120 degrees			
95.	Post Repair Coupling Fit Closest to the	e End of the Shaft				
00.	0 Degrees	60 degrees	120 degrees			
	o Dogioco	oo dogrood	120 4091003			
96.	Post Repair Drive End Bearing Shaft Fit					
	0 Degrees	60 Degrees	120 Degrees			
	9	3	0 111			

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97.	Post Repair Drive End Bearing Shaft	Post Repair Drive End Bearing Shaft Fit Condition					
98.	Post Repair Drive End Opposite Drive End Bearing Shaft Fit						
	0 Degrees	60 Degrees	120 Degrees				
			_				
99.	Post Repair Drive End Opposite Drive End Bearing Shaft Fit Condition						
100.	Post Repair Drive End - End Bell Bea	ring Fit					
	0 Degrees	60 Degrees	120 Degrees				
404	Deat Deadis Daire Ford Fordball Dead	on Fit One dition					
	Post Repair Opposite Prive End - End	-					
102.	Post Repair Opposite Drive End - End	-	420 Daggae				
	0 Degrees	60 Degrees	120 Degrees				
103.	Post Repair Opposite Drive End - Endbell Bearing Fit Condition						
	Post Repair Bearing Cap Condition						
	Drive End	Opposite Drive End					
		· ·					
105.	Post Repair End Bell Air Seal Fits						
	Drive End Air Seal	Opposite Drive End Air Seal					
400	O: (T. I. D. (M. I.	· 18 ·					
	106. Signature of Tech Performing Mechanical Repairs						
Assembly							
	Take Pictures of all Major Components Prior to Reassembly						
	Verify Brush Box Holders Have the Proper Clearance, and Brushes have been Seated Properly						
109.	Assembled Shaft End Play and Runor						
	Shaft Endplay	Shaft Runout					
110.	Perform No-Load Test Run, Record A	rmature Voltage and Current					
	Voltage	Current					
111.	Perform No-Load Test Run, Record F	-					
	Voltage	Current					
112.	Document Vibration Readings Drive E	ind					
	Horizontal	Vertical	Axial				
113.	Document Vibration Readings Opposit	te Drive End					
	Horizontal	Vertical	Axial				
114.	Perform Full-Load Test Run, Record	•					
	Voltage	Current					
115	Perform Full-Load Test Run, Record I	erform Full-Load Test Run, Record Field Voltage and Current					
	Voltage	Current					
	90	23.73.11					
116.	Document Vibration Readings Under	Full Load Drive End					
	Horizontal	Vertical	Axial				

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117. Document Vibration Readings Under Full Load Opposite Drive End				
Vertical	Axial			
Ambient Temperature				
19. Drive End Bearing Temps Under Full Load				
10 Minutes	15 Minutes			
Opposite Drive End Bearing Temps Under Full Load				
10 Minutes	15 Minutes			
21. Final Test Run Sign-Off				
2. Document Final Condition With Pictures				
	Vertical Full Load 10 Minutes ps Under Full Load 10 Minutes			

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STANDARD TERMS AND CONDITIONS FOR PURCHASE OF GOOD AND/OR SERVICES

- 1. APPLICABILITY. The sale of any and all goods and/or services by Mock, Inc. d/b/a Hi-Speed Industrial Service ("Hi-Speed") shall be specifically conditioned upon and subject to the following terms and conditions which are incorporated by reference into any contracts and purchase orders with Hi-Speed, and which shall form and become a part of any agreement related thereto. Buyer's acceptance of any offer or quotation made by Hi-Speed for sale of any goods or services is expressly made subject to the terms and conditions set forth herein and to be so effective, Buyer need not sign or approve these Terms and Conditions to be bound hereunder provided a copy of same is provided to Buyer through any means. None of the terms and conditions contained herein may be added to, expanded, changed, modified, superseded or otherwise altered except as revised in writing and duly executed by Hi-Speed, and all orders received by Hi-Speed shall be governed only by the terms and conditions contained herein, notwithstanding any terms, conditions or provisions of any purchase order, release order, authorization or any other form issued by the Buyer. Hi-Speed hereby objects to any additional, modified, changed, deleted, altered or other terms and conditions not contained herein and notifies Buyer that any such terms or provisions are expressly rejected by Hi-Speed.
- 2. PRICE. All quoted prices shall remain firm and binding for a period of thirty (30) days from the date of quotation or for the period specifically stated in the quotation. The price for any and all goods and/or services ordered or approved by Buyer after thirty (30) days from the date of any quotation are subject to any increase in price that may occur after the expiration of thirty (30) days from the issuance of the quotation and the date the Buyer releases any shipment.
- 3. SCOPE OF GOODS AND/OR SERVICES. The goods and/or services provided by Hi-Speed pursuant to any quotation shall be limited exclusively to those goods and/or services expressly identified therein. Hi-Speed does not assume any responsibility and/or liability for the failure to provide any other goods and/or services not identified in any quotation. Modifications, additions or deletions to or from the scope referenced in any quotation shall only bee effective if evidenced in writing and signed by Hi-Speed. The sale of any of all goods and/or services affected by such modification, addition or deletion shall be subject to these same Standard Terms and Conditions whether or not referenced therein.
- 4. <u>BILLING AND PAYMENT TERMS.</u> Hi-Speed shall invoice Buyer for all goods and/or services as same are rendered at the address listed on the quotation. Payments for all goods and/or services shall be due thirty (30) days from the date of the current invoice or as otherwise set forth in the quotation. Late payments are subject to a late fee of 5% of the total invoice amount. Recurring late payments may lead to a deposit requirement on future services or sale of goods. Buyer shall be liable to Hi-Speed for any and all fees and expenses incurred by Hi-Speed to collect any invoices or to enforce these Standard Terms and Conditions, including but not limited to, attorney's fees.
- 5. <u>DELIVERY OF GOODS AND/OR SERVICES.</u> Unless otherwise identified in the quotation, all shipments are F.O.B. Hi-Speed's warehouse and the title to and all risk of loss with respect to any goods shipped shall pass to Buyer when such goods are delivered to the carrier at Hi-Speed's warehouse. Hi-Speed will use its best efforts to affect delivery by the date or dates specified in the quotation. However, Hi-Speed shall not be liable for delay in or failure to make shipment, or to perform services, by any identified date for any reason whatsoever, including but not limited to, causes beyond its reasonable control, such as strikes, fires, floods, epidemics, quarantines, restrictions, severe weather, embargos, acts of God, or public enemy, war, riot, delays in transportation or the inability to obtain necessary labor, materials or manufacturing facilities.
- **DELIVERY SITE AND TIME FOR PERFORMANCE.** Hi-Speed and Buver agree that time is of the essence for the purchase order and that Buyer shall fully cooperate with Hi-Speed in order to allow Hi-Speed full access to prosecute its work diligently and in an orderly manner. Buyer shall assist Hi-Speed in every way possible to avoid delaying, disrupting or interfering with the progress of Hi-Speed's work at the project site. In the event Hi-Speed's work is delayed, hindered, suspended, disrupted, re-sequenced or interfered with or rendered less efficient or more costly or adversely affected in any way as a result of acts or omissions of Buyer or other contractors or employees of Buyer or by any other reason beyond Hi-Speed's control and without the fault of Hi-Speed, then, in such event, Buyer shall be liable to Hi-Speed for any damages, additional costs, expenses, labor, materials, man hours, acceleration costs, overtime, additional jobsite overhead, extended home office overhead, and any and all other direct and indirect expenses of whatsoever nature or kind, caused in whole or in part, as a result of any of the above-referenced occurrences. Hi-Speed's project records will be the basis for computing the additional costs and damages of Hi-Speed's labor, materials, expenses and overhead related to such changes. BUYER WARRANTS THAT THE SITE FOR DELIVERY OR INSTALLATION OF ANY GOODS AND/OR FOR THE PERFORMANCE OF ANY SERVICES SHALL BE READY AND ADEQUATE FOR HI-SPEED'S DELIVERY OF GOODS AND/OR PERFORMANCE OF SERVICES AND THAT HI-SPEED SHALL HAVE FULL ACCESS THERETO, FREE OF ALL OBSTRUCTIONS. BUYER SHALL ASSUME ALL EXTRA COSTS ASSOCIATED WITH HI-SPEED'S INABILITY TO INSTALL ANY GOODS OR PERFORM ANY SERVICES AS A RESULT OF BUYER'S FAILURE TO COMPLY WITH THIS PROVISION. HI-SPEED MAY NOT INSPECT THE SITE PRIOR TO DELIVERY AND/OR INSTALLATION OF GOODS AND/OR PERFORMANCE OF SERVICES AND MAKES NO WARRANTY AS TO THE SUFFICIENCY OF THE SITE FOR THE DELIVERY AND/OR INSTALLATION OF GOODS AND/OR THE PERFORMANCE OF SERVICES AT SUCH SITE.
- 7. INSPECTION/ACCEPTANCE. All goods and services ordered pursuant to any quotation shall be subject to inspection by Buyer after delivery or performance to determine conformity with the quotation and/or purchase order and Hi-Speed's advertised or published specifications. Buyer shall have a period of thirty (30) days from shipment of goods at the delivery destination specified in the quotation within which to inspect the goods for conformity with the quotation, order and/or Hi-Speed's advertised and published specifications and to provide Hi-Speed with written notice of any discrepancy or rejection. Buyer shall have a period of thirty (30) days following completion of any services within which to inspect the services for conformity with the quotation, purchase order and/or Hi-Speed's advertised and published specifications and to provide Hi-Speed with written notice of any discrepancy or rejection. If the goods delivered or services performed do not so conform, upon delivery of notice to Hi-Speed of any discrepancy, nonconformance or rejection, Hi-Speed shall have sixty (60) days to cure the alleged discrepancy and/or nonconformance. If Hi-Speed fails to cure in this time period, Buyer shall have the right to reject such goods or services. After the cure period, goods that have been delivered and rejected, in whole or in part, shall be returned to Hi-Speed. Buyer shall notify Hi-Speed and arrange for the return of the goods as required. Should such non-conforming services be rejected Hi-Speed shall, at its sole cost, re-perform the non-conforming services. Inspection or failure to inspect on any occasion shall not affect Buyer's rights under the warranty provisions herein.
- 8. <u>WARRANTIES.</u> Hi-Speed warrants that all goods shall conform in all material aspects to the goods identified in the quotation to Buyer and/or purchase order, and Hi-Speed makes to Buyer the manufacturer's express warranty for any goods sold to Buyer, which is offered by the manufacturer at the time of acceptance of any quotation by Buyer. This warranty is conditioned upon the installation, operation, and maintenance of the goods in accordance with the manufacturer's recommendations and/or standard industry practice and the goods at all times being operated or used under normal operating conditions for which they were designed. Hi-Speed, at its sole option, will repair or

replace any defective or non-conforming goods in accordance with the applicable manufacturer's warranty. Warranty for any defective or incorrect parts is limited to the repair or replacement of those parts. Hi-Speed warrants that all services will conform in all material respects to the description of services identified in the quotation and will be performed in a good and workmanlike manner in accordance with industry practices and standards. Should the services be reasonably rejected or not conform with the foregoing warranties, Hi-Speed shall, at its sole cost, re-perform the defective or nonconforming services. Notwithstanding the foregoing, these warranties do not extend to goods or services to the extent that such goods have been subject to misuse, neglect or abuse not caused by Hi-Speed or have been used in violation of the approved written instructions furnished to Buyer. THE FOREGOING REPRESENTS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY HI-SPEED WITH RESPECT TO ALL GOODS SOLD AND IS IN LIEU OF ALL OTHER WARRANTIES EITHER EXPRESS OR IMPLIED. HI-SPEED EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICLAR USE OR PURPOSE. BUYER WAIVES ANY CLAIM THAT THESE EXCLUSIONS OR LIMITATIONS DEPRIVE IT OF AN ADEQUATE REMEDY AT EQUITY OR LAW OR CAUSE THIS AGREEMENT TO FAIL IN ITS ESSENTIAL PURPOSE. BUYER SHALL BE ENTITLED TO NO OTHER REMEDY OTHER THAN AS SET FORTH HEREIN, REGARDLESS OF THE CLAIM OR CAUSE OF ACTION, WHETHER BASED IN CONTRACT, TORT, NEGLIGENCE, GOODS LIABILITY, STRICT LIABILITY OR OTHERWISE.

- 9. <u>LIMITATION OF DAMAGES.</u> HI-SPEED SHALL HAVE NO LIABILITY TO BUYER WITH RESPECT TO THE SALE OR DELIVERY OF ANY GOODS OR THE REPAIR THEREOF OR WITH RESPECT TO THE SALE OR PERFORMANCE OF ANY SERVICES, FOR LOST PROFITS, SPECIAL, CONSEQUENTIAL, EXEMPLARY, PUNITIVE OR INCIDENTAL DAMAGES OF ANY KIND OR NATURE WHETHER ARISING IN CONTRACT, TORT, GOODS LIABILITY OR OTHERWISE, EVEN IF HI-SPEED WAS ADVISED OF THE POSSIBILITY OF SUCH LOSS OR DAMAGES. HI-SPEED SHALL NOT BE LIABLE FOR ANY DAMAGES OR DELAYS CAUSED BY ANY FAILURE TO MAKE ANY DELIVERY OF GOODS BY ANY EXPECTED TIME OR DATE OR THE FAILURE TO PROVIDE OR COMPLETE ANY SERVICES BY ANY EXPECTED DATE OR TIME. IN NO EVENT SHALL HI-SPEED BE LIABLE TO BUYER FOR ANY DAMAGES WHATSOEVER IN EXCESS OF THE TOTAL PRICE PAID FOR ALL GOODS AND/OR SERVICES HEREUNDER OR REFERENCED IN ANY QUOTATION OR THE PURCHASE ORDER.
- 10. <u>SEVERABILITY.</u> The partial or complete invalidity of any provision of these Standard Terms and Conditions shall not affect the enforceability of the remainder of these Standard Terms and Conditions. If any provision is found to be invalid or unenforceable, that portion shall be modified to make it enforceable or shall be stricken and the remainder of these Standard Terms and Conditions shall enforced.
- 11. **GOVERNING LAW AND JURISDICTION.** Any controversy arising out of any quotation, the purchase order, the goods sold or delivered, repair or replacement thereof, or any services provided pursuant to any quotation or any purchase order, or these Standard Terms and Conditions shall be governed by the laws of the state of Tennessee without regard to any choice of law provisions and any cause of action related in any manner thereto shall be brought only in the state or federal courts of Shelby County, Tennessee.
- 12. ABANDONED EQUIPMENT. Hi-Speed requires that Buyer promptly pick up or provide shipment instructions for Buyer equipment or other Buyer property in Hi-Speed's possession. If equipment or other Buyer property is left with Hi-Speed and not picked up within six (6) months after Hi-Speed's final action related to the applicable property (e.g. evaluation, teardown, estimate, completion of services), Hi-Speed will consider such property abandoned and may dispose of it in accordance with applicable law. Buyer agrees to hold Hi-Speed harmless for any damage or claim for such abandoned property and acknowledges that Hi-Speed may discard or recycle it at Hi-Speed's sole and absolute discretion. Specifically, Hi-Speed may sell Buyer's abandoned property at a private or public sale and retain the proceeds to offset Hi-Speed's storage, inspection and servicing costs. For the avoidance of doubt, Hi-Speed reserves its statutory and other lawful liens for unpaid charges related to abandoned property.
- 13. FORCE MAJEURE. Neither party shall be responsible for any delay or failure in performance of any party of the quotation, purchase order or these Standard Terms and Conditions to the extent that such delays or failures are caused by fire, flood, earth quake, explosion, war, embargo, government requirement, civil or military authority, acts of God, or any other circumstances beyond its reasonable control and not involving any fault or negligence on the party affected ("Condition"). If any such Condition occurs, the party delayed or unable to perform shall promptly give written notice to the other party and, if such Condition remains at the end of thirty (30) days, the party affected by the other party's delay and inability to perform may elect to (i) terminate such order or part thereof, or (ii) suspend the order for the duration of the Condition, if the Buyer is the suspending party, buy elsewhere comparable material to be sold under the order and apply to any commitment the purchase price of such purchase, and resume performance of the order once the Condition ceases, with an option in the affected party to extend the period of this order up to the length of the time the Condition endures.
- 14. <u>NONWAIVER.</u> No course of dealing or failure of either party to strictly enforce any term, right, or condition of these Standard Terms and Conditions will be construed as a waiver of such term, right or condition. Any waiver by Hi-Speed will only be in writing and will waive no succeeding breach of a term, right or condition.
- 15. **ASSIGNMENT.** The rights and obligations of the parties shall neither be assigned nor delegated without the prior written consent of the other party. However, any party may assign or delegate its respective rights and obligations, in whole or in part, (i) to any subsidiary, (ii) pursuant to other financing, merger or reorganization or (iii) pursuant to any sale or transfer of substantially all of the assets of the assigning party. These Standard Terms and Conditions shall bind the heirs, successors and assigns of the parties hereto.
- 16. NO INDIVIDUAL LIABILITY. Notwithstanding any other agreement to the contrary, the Buyer agrees that in no event will the Buyer hold and HI-Speed owner, director, officer or employee personally liable for unintentional tortious conduct or conduct that constitutes the breach of any contract between HI-Speed and the Buyer, even if the HI-Speed owner, director, officer or employee is or could be construed to be a party to such contract.