

# VALIADIS S.A.

## ELECTRIC MOTOR TEST REPORT - THREE PHASE INDUCTION MOTOR

NAMEPLATE DATA			
AK112L-2 <b>FRAME REDUCED</b>	IEC TYPE 3 <b>PHASE</b>	7,5 kW 400 <b>VOLTS</b>	2920 r/min 50 <b>Hz</b>
2 <b>POLE</b>	13,9 <b>AMPS</b>	IP55 <b>IP</b>	
VALIADIS <b>MANUFACTURER</b>	S1 <b>DUTY</b>	F <b>INS.CLASS</b>	Δ <b>CONNECTION</b>

MAJOR CONTENTS	UNIT	TEST VALUE
EFFICIENCY	%	88,50
POWER FACTOR		0,8747
TEM. RISE OF STATOR WINDING	K	60,0
VIBRATION SPEED	mm/s	-
VIBRATION DISPLACEMENT	μm	-
VIBRATION ACCELERATION	m\ s <sup>2</sup>	-
NOISE	dB(A) (Lw)	-
BREAKDOWN TORQUE / RATED TORQUE		4,470
PULLUP TORQUE / RATED TORQUE		2,673
LOCKED ROTOR TORQUE / RATED TORQUE		-
LOCKED ROTOR CURRENT / RATED CURRENT		-
HIGH VOLTAGE TEST	V	1760
HOT INSULATION RES,OF STATOR WINDING	MΩ	-
TEMPERATURE OF BEARING	°C	-
UNBALANCE OF CURRENT	%	2173
FULL LOAD LINE CURRENT	A	13,980
FULL LOAD INPUT POWER	W	8474
FULL LOAD TORQUE	Nm	24,770
MAX.TEMP.OF ENCLOSURE SURFACE		-
NO LOAD CURRENT	A	6,388
SLIP	%	3,021
STATOR WINDING PHASE RESISTANCE 95 °C	Ω	1,695
STRAY LOAD LOSS	W	122,300
NO LOAD POWER	W	367,000
CORE LOSS	W	200,800
FRICTION & WINDAGE LOSS	W	88,130
LOCKED ROTOR POWER	W	-
STATOR LOSS COPPER	W	322,8
ROTOR LOSS COPPER	W	240,2

The data above is calculated as per IEC 34-2,all data at nominal Volts.

<b>VALIADIS S.A.</b>  <b>AK112L-2</b> <b>7,5 kW</b> <b>400 VOLTS 50 Hz</b>	<b>SERIAL NO.</b>		
	<b>DATE</b>		<b>REV</b>
	<b>DRAWN</b>		<b>DOCUMENT NO.</b>
	<b>APPRVD</b>		
	<b>CHECKED</b>		

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<b>Type</b>	AK112L-2		<b>Poles</b>	2	Frame Reduced		
<b>Voltage</b>	400	V	<b>Current</b>	13,9 A	<b>Power</b>	7,5	kW
<b>Speed</b>	2920	r/min	<b>Duty</b>	S1	<b>Frequency</b>	50	Hz
<b>Ins.class</b>	F		<b>Weight</b>	kg	<b>Connection</b>	Δ	

**1) Winding Resistance Measurement**

**R<sub>luv</sub>**=0,86433 Ω      **R<sub>luw</sub>**=0,86471 Ω      **R<sub>lvw</sub>**=0,87427 Ω      **Ambient Temperature** : 18,4 °C

**2) High-Voltage Test**

The high voltage test (frequency 50 Hz ,virtual value 1760 V ) had been applied on stator winding and been maintained for 1 min. with out breakdown.

**3) Vibration Test**

Position No.	1	2	3	4	5	6	Result
<b>Speed (mm/s)</b>	0	0	0	0	0	0	0
<b>Displacement (μ/s)</b>							
<b>Acceleration (m/s<sup>2</sup>)</b>							

**4) Noise Test**

Ambient Noise: 0,0 dB(, L= 1 m

Position No.	1	2	3	4	5
<b>Test Value</b>	0	0	0	0	0

**Test Way** : semi-sphere method

**L<sub>w</sub>**=L<sub>p</sub>+10lg(S/S<sub>0</sub>)= 0,00+8,00=8. dB(A)

**Noise Result** : L<sub>w</sub>=8,0 dB(A)

**5) Over Speed Test :**

Over Speed r/min , 2 min, Ok

**6) Over Torque Test :**

Over Torque N.m, 15 s , Ok

**7) Over Current Test :**

Over Current A, 2min, Ok.

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Frame Reduced

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<b>Speed</b>	2920 r/min	<b>Duty</b>	S1	<b>Connection</b>	Δ
<b>Ins.class</b>	F	<b>Weight</b>	kg		

### NO LOAD TEST

No.	Voltage	Freq	Current				Power		Stator Winding Temp.
	(V)	(Hz)	(A)				(W)		(°C)
1	440,43	49,997	9,885	10,056	10,232	1	-1860,70	2400,20	44,5
2	420,25	49,997	7,7899	7,928	8,0985	1	-1375,90	1813,60	43
3	400,19	49,997	6,2264	6,3102	6,4749	1	-1022,70	1391,80	42
4	360,04	49,997	4,3593	4,3674	4,4935	1	-618,84	895,71	41,4
5	300,03	49,997	3,0954	3,0892	3,167	1	-344,32	552,41	40,8
6	220,14	49,997	2,1063	2,0873	2,1552	1	-143,39	295,64	40,3
7	120,19	49,997	1,2025	1,1674	1,2213	1	-7,5116	114,22	39,4
8	80,94	49,997	1,0217	1,0077	1,0389	1	20,480	77,427	38,7

No.	Uo	Uo/Un	(Uo/Un) <sup>2</sup>	Io	Io <sub>j</sub>	Po	Po <sub>j</sub>	Pocul	Pfe+Pfw
	(V)			(A)	(A)	(W)	(W)	(W)	(W)
1	440,4	1,1010	1,2120	10,06	10,02	539,500	538,90	145,2	394,3
2	420,3	1,0510	1,1040	7,939	7,957	437,700	439,60	90,00	347,7
3	400,2	1,0000	1,0010	6,337	6,401	369,100	367,60	57,14	312
4	360	0,9001	0,8102	4,407	4,39	276,900	276,90	27,57	249,3
5	300	0,7501	0,5626	3,117	3,035	208,100	208,40	13,77	194,3
6	220,1	0,5504	0,3029	2,116	2,207	152,300	152,10	6,334	145,9
7	120,2	0,3005	0,0903	1,197	1,132	106,700	106,80	2,02	104,7
8	80,94	0,2024	0,0410	1,023	1,053	97,910	97,87	1,471	96,4

$\delta_i = 2,17\%$        $I_o = 6,388 \text{ A}$        $P_{ocul} = 58,20 \text{ W}$        $P_o = 367,0 \text{ W}$        $P_{fe} = 220,7 \text{ W}$   
 $P_{fw} = 88,13 \text{ W}$

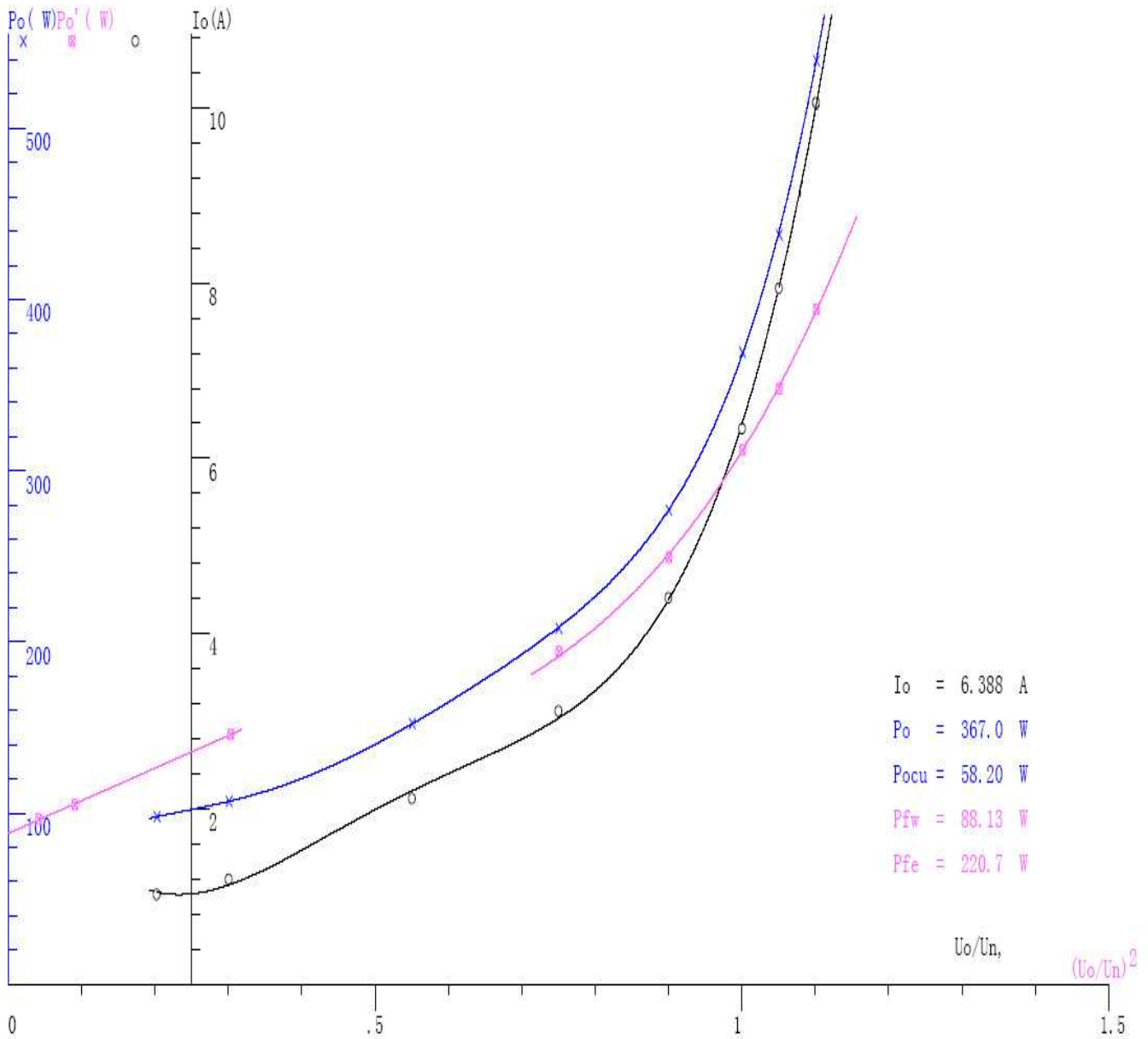
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		<b>Test Date</b>	<b>Report Number</b>

# ELECTRIC MOTOR TEST REPORT - THREE PHASE INDUCTION MOTOR

**VALIADIS S.A.**

<b>Type</b>	AK112L-2	<b>Poles</b>	2	<b>Frame Reduced</b>	
<b>Voltage</b>	400 V	<b>Current</b>	13,9 A	<b>Power</b>	7,5 kW
<b>Speed</b>	2920 r/min	<b>Duty</b>	S1	<b>Frequency</b>	50 Hz
<b>Ins.class</b>	F	<b>Weight</b>	kg	<b>Connection</b>	$\Delta$

## No Load Test Curve



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Type	AK112L-2	Poles	2	Frame Reduced	Power	7,5 kW
Voltage	400 V	Current	13,9 A		Frequency	50 Hz
Speed	2920 r/min	Duty	S1		Connection	Δ
Ins.class	F	Weight	kg			

### Load Test Report

No	Voltage (V)	Freq (Hz)	Current (A)				Power (W)		Speed (r/min)	Torque (N.m.)	Temp (°C)
1	400,14	49,997	20,288	20,223	20,391	1	4904,2	8023,6	2874,6	37,346	47
2	400,21	49,997	16,991	16,896	17,103	1	3918,2	6721,5	2898,3	30,932	46,9
3	400,12	49,997	13,937	13,841	14,032	1	2915,3	5518,3	2921	24,587	47,2
4	400,36	49,997	11,16	11,06	11,221	1	1913,9	4390	2942,6	18,329	47,4
5	400,28	49,997	8,7897	8,7023	8,8863	1	943,5	3339,3	2962,5	12,127	47,4
6	400,37	49,997	6,987	6,9578	7,1563	1	-23840	2349,8	2981	6,1211	47
7	400,35	49,997	6,2363	6,2711	6,4552	1	-935,26	1465,5	2997,4	0,4387	45,6
8	400,05	49,997	6,2086	6,2745	6,4706	1	-1008,4	1384,2	2999,1	-	44,8

Pdo= 530,2 W      Pcudo=57,59 W      Pfe = 219,6 W      ndo = 2997.4 r/min      sdo = 0,0807 (%)  
 Po = 375,8 W      Pcuo =57,37 W      Rdo = 0,96092 Ω      Ro = 0,95818 Ω      Tdo = 0,4387 N.m

kd=9,549/2997,4\*[(Pdo-Pcudo-Pfe)(1-sdo)-(Po-Pcuo-Pfe)]-Tdo= 0,0531 N.m

U	I1	P1	Rt	T	st	Pcu1	Pcu2	Ptc1	P2'	PL	Pat1
400,1	20,3	12928	0,96571	37,4	4,174	597	506,6	1392	11258	283	1669
400,2	17	10640	0,96537	30,99	3,384	418,3	339,2	1046	9405	190,6	1235
400,1	13,94	8434	0,9664	24,64	2,627	281,6	208,9	779,3	7537	114,6	896,3
400,4	11,15	6304	0,96708	18,38	1,907	180,2	112,8	582	5665	50,66	639,3
400,3	8,793	4283	0,96708	12,18	1,244	112,2	49,25	450,3	3779	42,91	504
400,4	7,034	2326	0,96571	6,174	0,6274	71,66	12,79	373,4	1927	10,2	398,5

Pfw= 88,13 W      r= 0,9952      A= 0,1993      B=-0,5674X0,001      No Point Delete  
 R1= 1,0822 Ω      Rref=1,1006 Ω      Θs=86,4 °C      Δ θ=59,45 K      Θa=20,88 °C

I1i (A)	Pc1s (W)	Pcu2s (W)	Sref (%)	Srefj (%)	Ps (W)	P2 (W)	nref (r/min)	Tref N.m	n (%)	ni (%)	Cosφ	Cosφj
20,29	680,4	576	4,779	4,781	278,7	11110	2856,5	37,4	85,94	85,96	0,9188	0,9192
17,02	476,9	386,2	3,876	3,872	191,3	9298	2883,6	30,99	87,39	87,41	0,9031	0,9023
13,92	320,7	237,8	3,006	3,004	121	7463	2909,7	24,64	88,49	88,52	0,8732	0,874
11,13	205,1	128,5	2,18	2,183	67,33	5607	2934,4	18,38	88,95	88,99	0,8155	0,8169
8,813	127,6	56,08	1,422	1,425	29,56	3770	2957,2	12,18	88,02	88,03	0,7026	0,7014
7,027	81,67	14,57	0,7182	0,7161	7,596	1918	2978,3	6,174	82,47	82,5	0,4769	0,4776

Load point	P1 (W)	I1 (A)	Sref (%)	n (r/min)	Pcu1 (W)	Pcu2 (W)	Ps (W)	P2 (W)	T (N.m)	n (%)	Cosφ
1,50 PN	13105	20,55	4,854	2854,4	697,4	593	286,1	11250	37,89	85,85	0,9203
1,25 PN	10732	17,15	3,909	2882,7	485,7	392,9	194,8	9375	31,27	87,36	0,9031
1,00 PN	8474	13,98	3,021	2909,4	322,8	240,2	122,3	7500	24,77	88,5	0,8747
0,75 PN	6321	11,16	2,191	2934,3	205,5	129,5	67,47	5625	18,4	88,99	0,8177
0,50 PN	4261	8,791	1,417	2957,5	127,6	55,58	29,42	3750	12,15	88	0,6996
0,25 PN	2280	6,993	0,7002	2979	80,73	13,89	7,229	1875	6,023	82,23	0,4706

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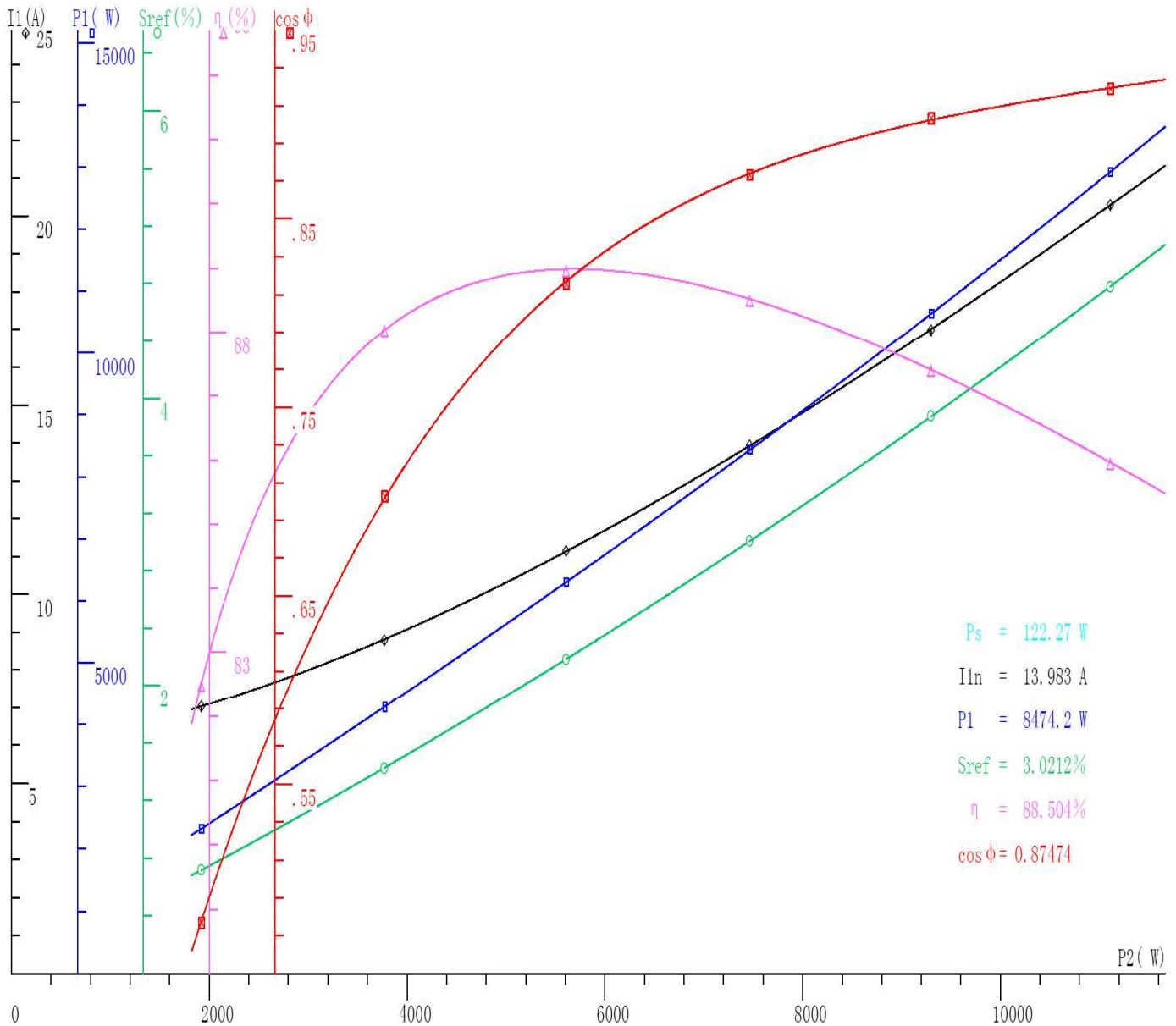
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<b>Voltage</b>	400 V	<b>Current</b>	13,9 A	<b>Power</b>	7,5 kW
<b>Speed</b>	2920 r/min	<b>Duty</b>	S1	<b>Frequency</b>	50 Hz
<b>Ins.class</b>	F	<b>Weight</b>	kg	<b>Connection</b>	$\Delta$

## Load Test Curve



**VALIADIS S.A.**

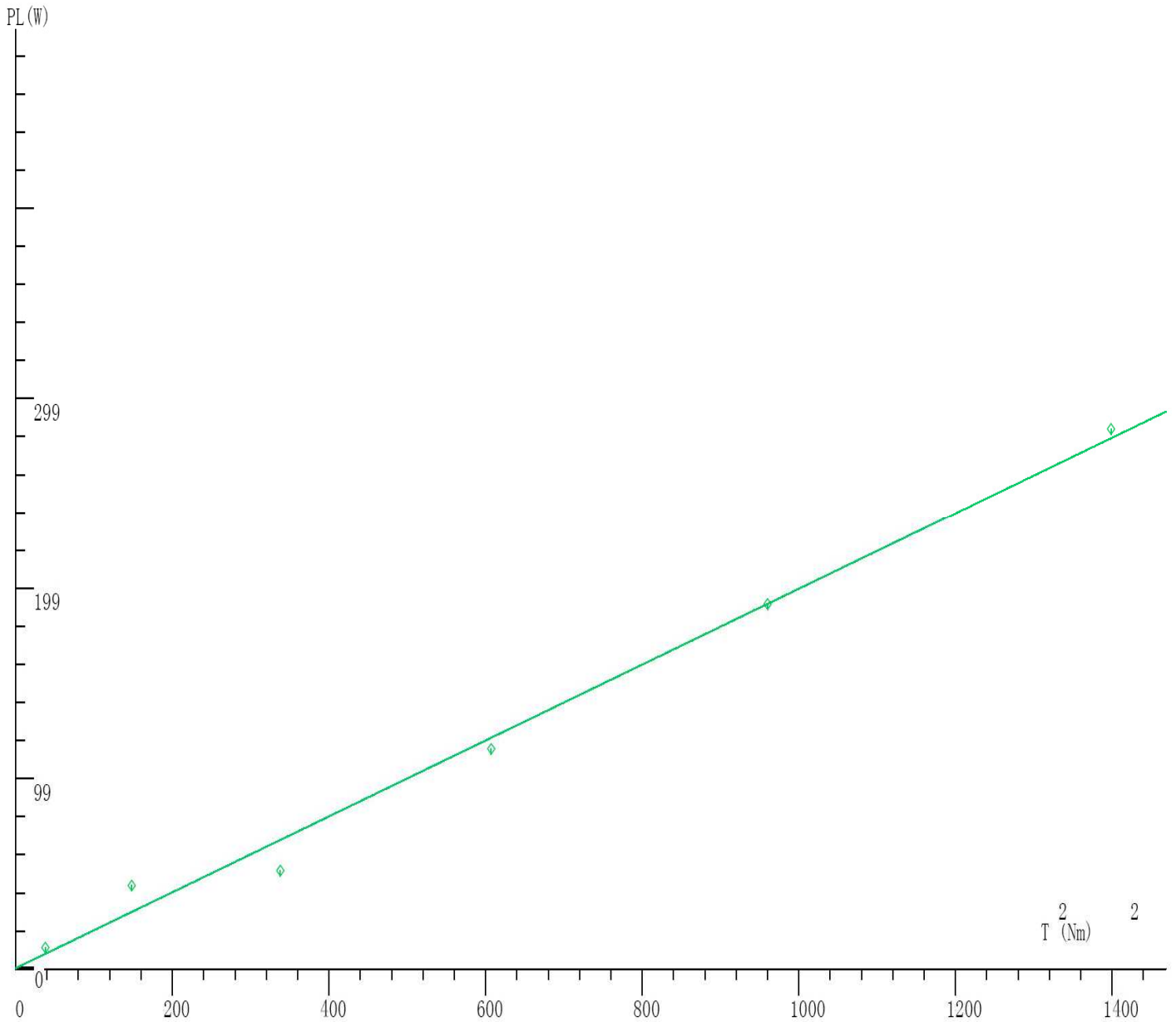
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<b>Speed</b>	2920 r/min	<b>Duty</b>	S1		<b>Connection</b>	Δ	
<b>Ins.class</b>	F	<b>Weight</b>	kg				

### PL - T<sup>2</sup> Curve



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<b>Speed</b>	2920 r/min	<b>Duty</b>	S1		<b>Frequency</b>	50	<b>Hz</b>
<b>Ins.class</b>	F	<b>Weight</b>		<b>kg</b>	<b>Connection</b>	Δ	

## Temperature Rise Test Report

Time	Voltage (V)	Current (A)			Input Power (W)	Speed r/min	Torque (N.m)	Winding Temp. (°C)	Core Temp. (°C)	Bearing Temp. (°C)	Ambient Temp. (°C)
		Ia	Ib	Ic							
10:00	400,0	14,030	13,9480	14,128	8523,5	2916,2	24,849	48,1	20,7	21,1	21
10:05	400,1	13,976	13,8870	14,075	8482,9	2916,9	24,747	47,8	20,8	21	20,9
10:10	400,0	13,921	13,8320	14,018	8440,2	2918,9	24,621	47,7	20,8	20,9	20,8
10:15	400,1	13,971	13,8830	14,071	8476,3	2919,9	24,723	47,6	20,9	20,9	20,9
10:20	399,9	13,997	13,9100	14,111	8497,1	2918,7	24,766	47,5	20,6	20,6	20,2
10:25	400,1	14,036	13,9440	14,143	8521,8	2919,2	24,818	47,4	20,5	21	20,7
10:30	400,1	14,057	13,9620	14,162	8534,8	2918,7	24,916	47,3	20,8	21,1	20,9
10:35	400,1	13,924	13,8370	14,026	8437,9	2920,6	24,551	47,2	20,8	20,9	20,8
10:40	400,1	13,943	13,8510	14,046	8449,6	2919,8	24,622	47,1	21	21,1	20,9
10:45	400,1	13,953	13,8670	14,069	8461	2921	24,691	47	20,9	21,3	21
10:50	400,1	13,973	13,8790	14,075	8469,9	2920,4	24,675	47,9	21	21,2	21
10:55	400,0	13,983	13,8860	14,078	8474	2920,3	24,717	47,9	21	21	20,9
11:00	400,0	13,985	13,8950	14,085	8478,2	2920,5	24,716	47,8	21,1	21,2	21,1
11:05	399,9	13,966	13,8660	14,059	8459,1	2920,9	24,595	46,8	21,1	21,3	21,2
11:10	400,0	13,943	13,8500	14,045	8446,1	2921	24,627	46,8	21,2	21,2	21,1

At the end of test, winding end resistance measurement and extrapolation

R2= 1,0756 Ω                      extrapolated to : 13s

	t (s)	R(Ω)	Rj (Ω)		t (s)	R(Ω)	Rj (Ω)
1	13	1,0756	1,0756	7	19	1,0727	1,0727
2	14	1,0752	1,0751	8	20	1,0722	1,0722
3	15	1,0747	1,0747	9	21	1,0718	1,0717
4	16	1,0741	1,0742	10	22	1,0714	1,0713
5	17	1,0737	1,0737	11	23	1,0707	1,0708
6	18	1,0731	1,0732	12	24	1,0703	1,0703

$$\Delta\theta = \frac{1,0756 - 0,86433}{0,86433} * (235 + 18,4) + 18,4 - 20,9 = 59,45 \text{ K}$$

$$\Delta \theta n = \Delta \theta \left( \frac{13,98}{13,98} \right)^2 = 59,51 \text{ K}$$

Max.temp. of enclosure Surface : °C

Hot Insulation Resistance: 0,00 MΩ

Temperature of Bearing : 0,0 °C

Test Current : 13,98 A

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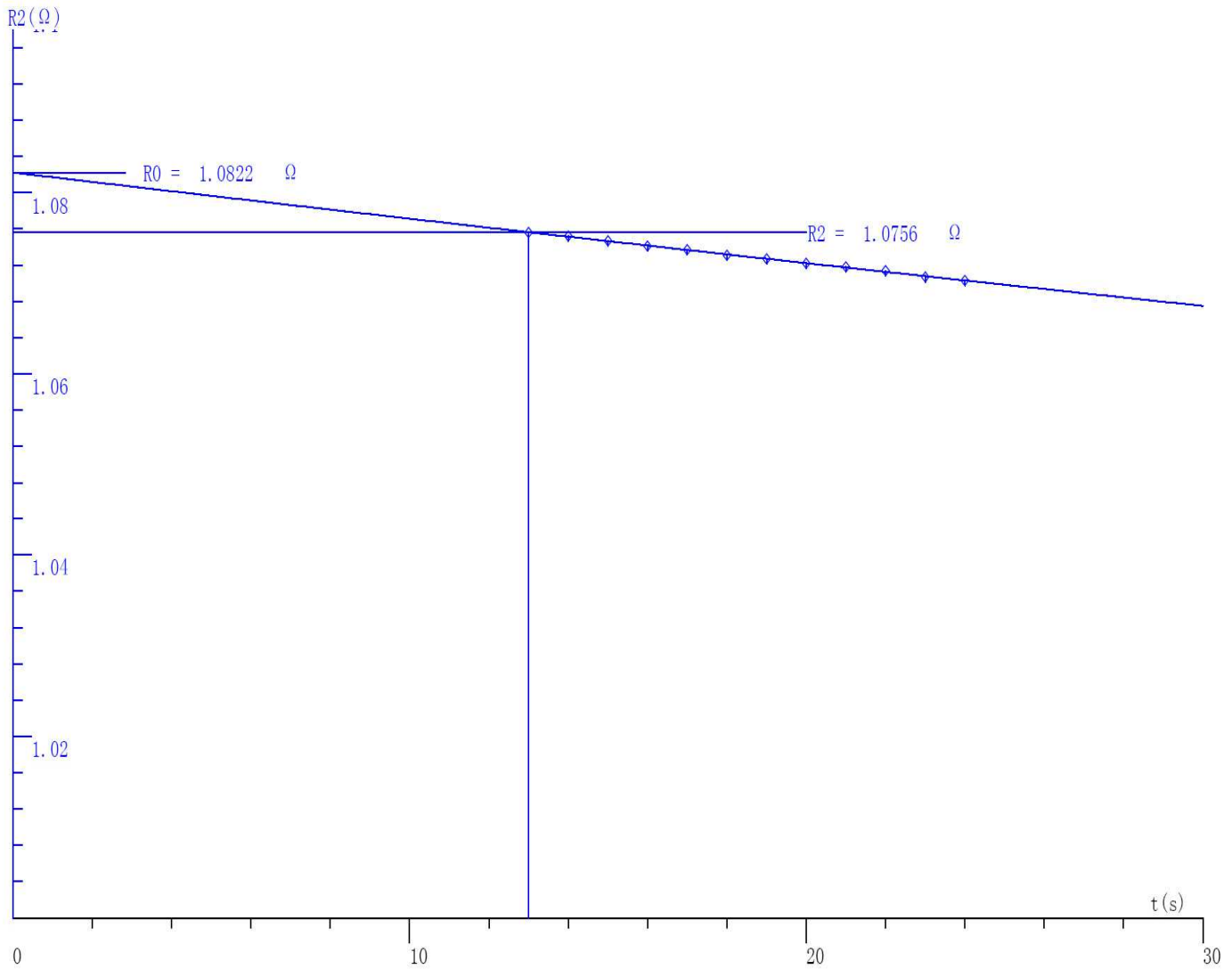


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<b>Ins.class</b>	F	<b>Weight</b>	kg	<b>Connection</b>	$\Delta$

## Resistance Extrapolation Curve



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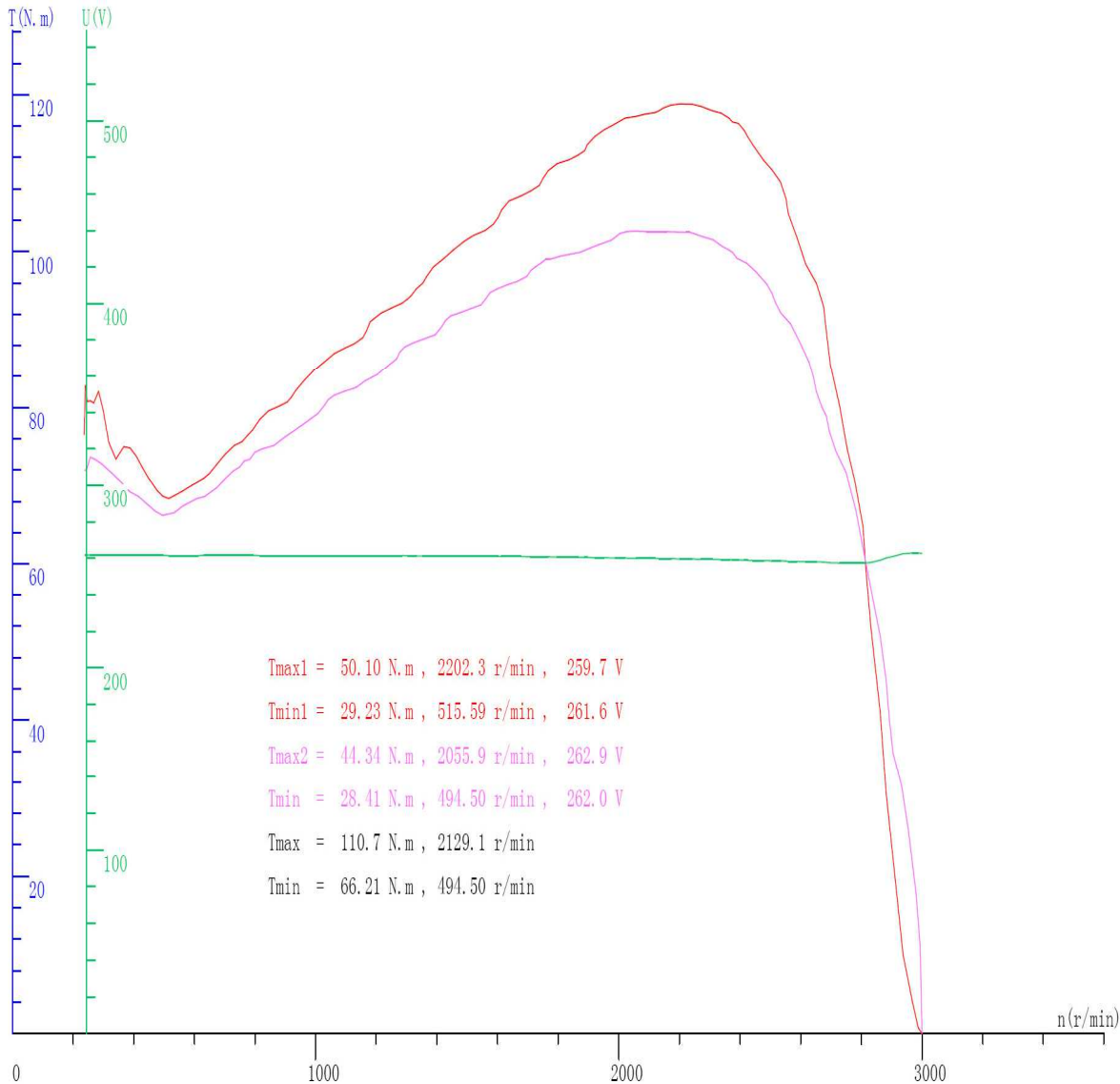
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<b>Voltage</b>	400	<b>V</b>	<b>Current</b>	13,9	<b>A</b>	<b>Frequency</b>
<b>Speed</b>	2920	<b>r/min</b>	<b>Duty</b>	S1	<b>Connection</b>	Δ
<b>Ins.class</b>	F	<b>Weight</b>				

## Torque- Speed Curve



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