



TEST REPORT

Type :	AK160L-4			Manufacturer:	Valiadis S.A.
Output:	22 kW	Voltage :	400 / 690 V	Serial No :	
Frequency :	50 Hz	Connection :	Δ / Y		

No	Test Item	Result
1	Efficiency %	89.94
2	Power Factor	0.8410
3	Tem. Rise of Stator Winding K	88.00
4	Vibration Speed mm/s	--
5	Vibration Displacement μm	
6	Vibration Acceleration m/s^2	
7	Noise dB(A) (Lw)	--
8	Breakdown Torque / Rated Torque	2.895
9	Pull up Torque / Rated Torque	1.230
10	Locked Rotor Torque./ Rated Torque	2.930
11	Locked Rotor Current / Rated Current	8.040
12	High Voltage Test V	2380
13	Hot Insulation Res. Of Stator Winding $\text{M}\Omega$	--
14	Temperature of Bearing $^{\circ}\text{C}$	--
15	Unbalance of Current %	0.5688
16	Full Load line Current A	41.97
17	Full Load input Power W	24461
18	Full Load Torque Nm	145.2
19	Max. Temp.of enclosure surface	--
20	No Load Current A	20.1
21	Slip %	2.438
22	Stator Winding Phase Resistance Ω (95 $^{\circ}\text{C}$)	0.4642
23	Stray Load Loss W	153.0
24	No load Stator Power W	1151
25	Core Loss W	695.8
26	Friction & windage Loss W	196.9
27	Locked Rotor Power W	140366
28	Stator Loss Cooper W	857.2
29	Rotor Loss Copper W	558.4
Conclusion :		



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1: Winding Resistance Measurement

R1uv=	0.2432 Ω	R1uw=	0.2431 Ω	R1vw=	0.2432 Ω	Ambient Temperature :	24.3 °C
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2:High- Voltage Test

The high – Voltage test (Frequency 50 Hz, virtual value 2380 V) had been applied on stator winding and been maintained for 1 min. Without breakdown.

3. Vibration Test

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

4. Noise Test Ambient

Noise : 0.0 dB(A)

L= 0.4 m

Position No.	1	2	3	4	5
Test Value	0	0	0	0	0

Test Way : semi-sphere method

$$L_w = L_p + 101 \text{ g (S/So)} = 0.00 + 0.00 = 0.00 \text{ dB (A)}$$

Noise Result: $L_w = 0.0 \text{ dB (A)}$

5. Over Speed Test

Over Speed r/ min, 2 min , Ok.

6. Over Torque Test

Over Torque Nm, 15 s, Ok.

7.Over Current Test

Over Current A, 2 min, Ok



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No – Load Test Report

No.	Voltage (V)	Freq (Hz)	Current (A)			Power (W)		Stator Winding Temp.(°C)	
1	462.63	49.996	0.78922	0.79151	0.78678	50	-161.43	208.49	110.1
2	431.35	49.997	0.55327	0.55521	0.55188	50	-104.98	136.70	110.5
3	400.73	49.997	0.40198	0.39849	0.39865	50	-69.334	92.577	110.7
4	350.32	49.997	0.26982	0.26784	0.26626	50	-39.678	55.867	110.0
5	300.49	49.996	0.21037	0.20821	0.20757	50	-25.557	38.093	109.2
6	250.31	49.997	0.16780	0.16596	0.16560	50	-16.144	26.045	108.3
7	200.08	49.996	0.13086	0.12879	0.12890	50	-9.1280	16.961	107.2
8	150.19	49.997	0.09808	0.09527	0.09617	50	-4.0625	10.255	105.9
9	100.79	49.997	0.07091	0.06634	0.06861	50	-0.63610	5.6347	104.5
10	50.734	49.997	0.05921	0.05717	0.05947	50	1.2039	2.9793	102.4

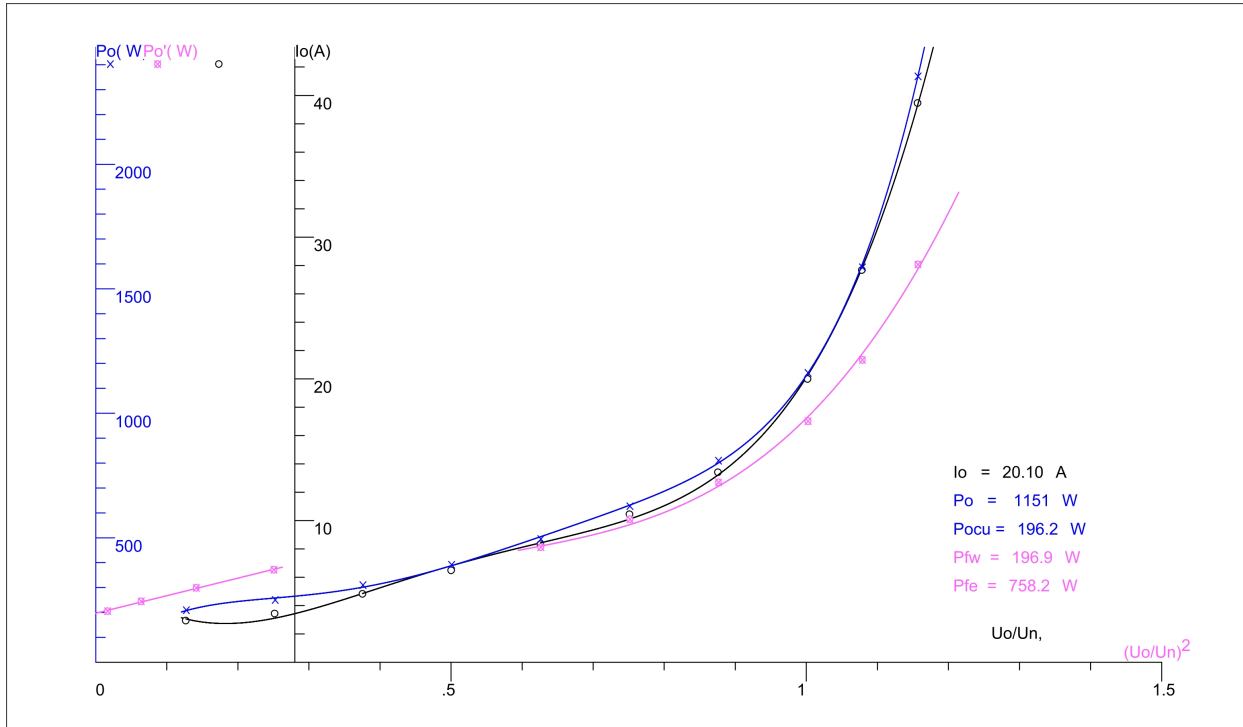
No	Uo (V)	Uo/Un	(Uo/Un) ²	Io (A)	Ioj (A)	Po (W)	Poj (W)	Pocul (W)	Pfe+Pfw (W)
1	462.6	1.157	1.338	39.46	39.30	2353	2349	755.8	1597
2	431.4	1.078	1.163	27.67	27.82	1586	1597	372.2	1214
3	400.7	1.002	1.004	19.99	20.24	1162	1159	194.2	967.9
4	350.3	0.8758	0.7670	13.40	13.22	809.5	799.6	87.13	722.3
5	300.5	0.7512	0.5643	10.44	10.10	626.8	630.8	52.73	574.1
6	250.3	0.6258	0.3916	8.323	8.423	495.0	504.1	33.45	461.6
7	200.1	0.5002	0.2502	6.476	6.808	391.6	387.5	20.19	371.5
8	150.2	0.3755	0.1410	4.825	4.852	309.6	301.3	11.16	298.5
9	100.8	0.2520	0.0635	3.431	3.111	249.9	258.0	5.622	244.3
10	50.73	0.1268	0.0161	2.931	3.060	209.2	207.1	4.077	205.1

$\delta_i = 0,57\%$, $I_o = 20.10$ A , $P_{ocul} = 196.2$ W , $P_o = 1151$ W , $P_{fe} = 758,2$ W , $P_{fw} = 196.9$ W



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No – Load Test Curve





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Locked Rotor Test Report

No.	Voltage (V)	Current (A)			Power (W)	Torque (Nm)			
1	190.84	2.6537	2.7604	2.7000	50	-24.246	459.05	65.9	1.0
2	172.00	2.2968	2.3969	2.3474	50	-21.877	356.57	50.7	1.0
3	142.72	1.7917	1.8790	1.8466	50	-18.568	227.93	32.2	1.0
4	114.35	1.3500	1.4191	1.3991	50	-14.449	135.15	19.3	1.0
5	85.508	0.95486	1.0026	0.99237	50	-9.2687	69.945	10.0	1.0

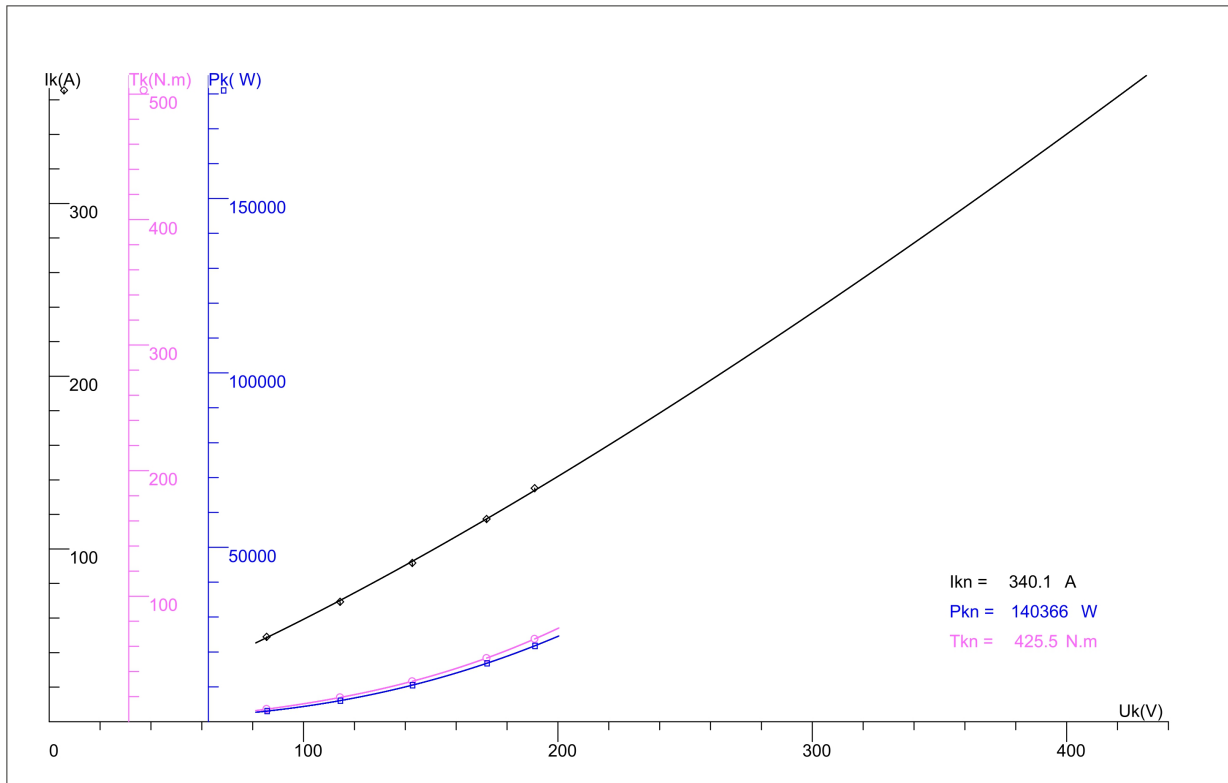
No	Uk (V)	Lg (Un)	Ik (A)	Ikj (A)	lg (Ik)	Pk (W)	Pkj (W)	Tk (Nm)	Tkj (Nm)
1	190.84	2.2807	135.24	133.86	2.1311	21740	21740	65.900	65.900
2	172.00	2.2355	117.35	117.42	2.0695	16735	16735	50.700	50.700
3	142.72	2.1545	91.955	92.818	1.9636	10468	10468	32.200	32.200
4	114.35	2.0582	69.470	70.199	1.8418	6035.0	6035.0	19.300	19.300
5	85.508	1.9320	49.164	48.669	1.6916	3033.8	3033.8	10.000	10.000

In=In A, Ikn= 340.13A, Ik/In= 8.040 n= r/min, Tn= 145.2 Nm, Tk/Tn= 2.931
Uk=100 V, Ik=59.284 A, Pk=4362.6 W, Tk= 14.281 Nm, Pkn= 140366 W, Tkn= 425.49 Nm



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Locked Test Curve





VALIADIS

HELLENIC MOTORS

Quality Assurance Certificate EN ISO 9001:2015



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Load Test Report

No.	Voltage (V)	Freq (Hz)	Current (A)				Power (W)		Speed (r/min)	Torque (Nm)	Temp. (°C)
1	399.45	49.997	1.2279	1.2282	1.2269	50	241.38	505.58	1439.7	219.06	116.3
2	399.76	49.996	1.0208	1.0210	1.0202	50	191.95	420.75	1451.8	180.87	116.8
3	399.84	49.988	0.83700	0.83590	0.83530	50	142.91	343.82	1462.8	144.10	116.8
4	399.97	49.997	0.67092	0.66981	0.67004	50	91.923	272.46	1473.1	107.30	116.3
5	399.97	49.996	0.53208	0.53178	0.53103	50	40.438	207.69	1482.4	71.521	115.6
6	400.22	49.997	0.43356	0.43112	0.43198	50	-12.403	147.26	1491.2	35.726	114.5
7	399.91	49.996	0.39617	0.39258	0.39317	50	-67.323	91.708	1499.4	0.06421	113.2
8	399.71	49.996	0.39776	0.39504	0.39516	50	-68.406	91.418	-	-	112.2

Pdo= 1219 W, Pcu do= 190.1 W, Pfe=755.1 W, ndo=1499.4 r/min, sdo=0.0320 (%),

Po=1151 W, Pcuo=191.5 W, Rdo=0.32654, Ro=0.32560, Tdo=0.0642 Nm,

Kd=9.549 [(Pdo-Pcu do-Pfe)(1-sdo)-(Po-Pcuo-Pfe)]-Tdo=0.3826 Nm.

1499.4

U	I1	P1	Rt	T	st	Pcu1	Pcu2	Ptc1	P2'	PL	Pat1
399.5	61.38	37348	0.32944	219.4	4.014	1862	1398	4122	33085	141.1	4263
399.8	51.03	30635	0.32991	181.3	3.206	1289	918.9	3085	27557	-6.870	3078
399.8	41.80	24337	0.32991	144.5	2.457	864.8	559.5	2316	22133	-112.9	2203
400.0	33.51	18219	0.32944	107.7	1.787	555.0	303.0	1765	16612	-157.9	1607
400.0	26.58	12406	0.32879	71.90	1.165	348.5	132.1	1403	11162	-158.5	1244
400.2	21.61	6743	0.32775	36.11	0.5807	229.6	33.53	1200	5639	-96.10	1104

Pfw=196.9 W, r=0.9754, A=7.261x0.001, B= -0.2313, Delete at 6

R1= 0.32470 Ω, Rref= 0.32442 Ω, θs= 110.9 °C, Δθ= 85.94 K, θa= 25.25 °C

Tli (A)	Pcu1s (W)	Pcu2s (W)	Sref (%)	Sref (%)	Ps (W)	P2 (W)	nref (r/min)	Tref Nm	n (%)	ni (%)	Cosφ	Cosφ j
61.38	1834	1378	3.953	3.953	349.6	32925	1440.6	219.4	88.16	88.15	0.8794	0.8783
51.04	1267	904.3	3.152	3.149	238.5	27348	1452.6	181.3	89.27	89.27	0.8670	0.8664
41.80	850.4	550.6	2.416	2.424	151.6	21892	1463.4	144.5	89.96	89.95	0.8406	0.8405
33.52	546.5	298.6	1.760	1.752	84.19	16383	1473.5	107.7	89.92	89.92	0.7847	0.7846
26.58	343.8	130.4	1.150	1.153	37.54	10973	1482.6	71.90	88.44	88.44	0.6737	0.6737
20.97	227.3	33.20	0.5748	0.6095	9.467	5536	1491.3	36.11	82.10	82.24	0.4501	0.4634



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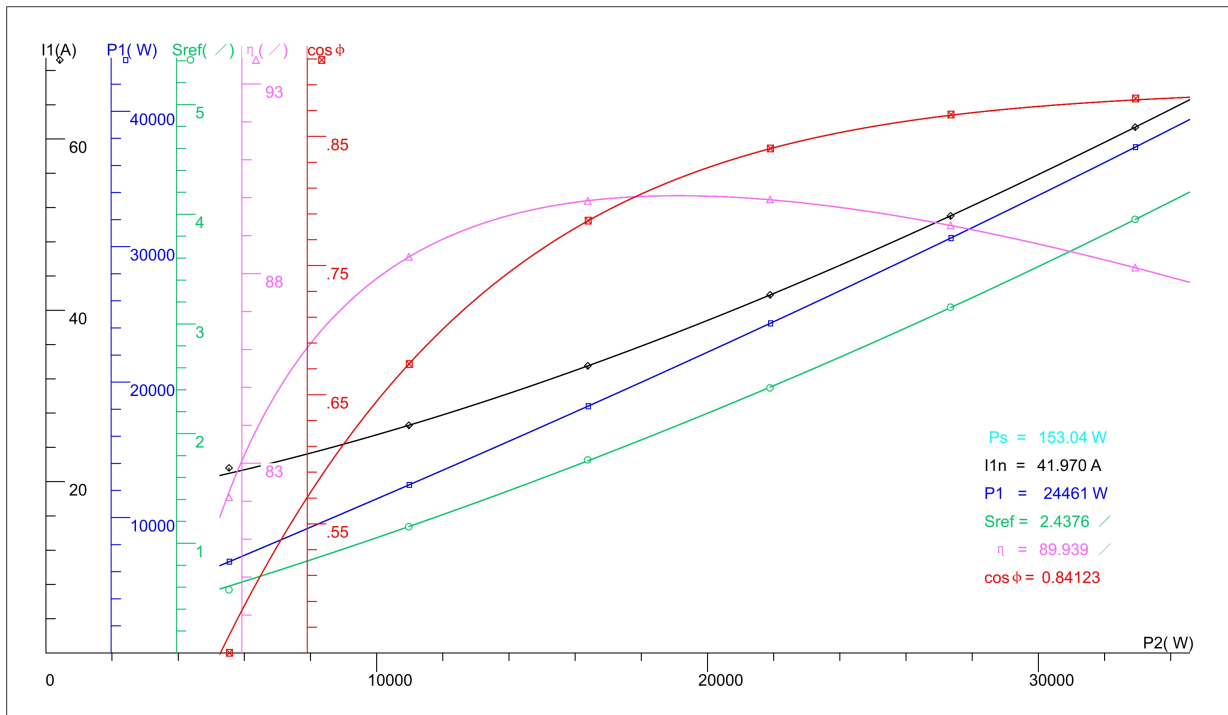


Load point	P1 (W)	I1 (A)	Sref (%)	n (r/min)	Pcu1 (W)	Pcu2 (W)	Ps (W)	P2 (W)	T (Nm)	n (%)	Cosφ
1.5PN	37441	61.53	3.964	1440.5	1842	1385	351.3	33000	219.9	88.14	0.8784
1.25PN	30815	51.31	3.170	1452.4	1281	914.8	241.3	27500	182.3	89.24	0.8669
PN	24461	41.97	2.438	1463.4	857.2	558.4	153.0	22000	145.2	89.94	0.8412
0.75PN	18347	33.68	1.766	1473.5	552.0	301.7	85.44	16500	108.5	89.93	0.7862
0.5PN	12436	26.61	1.156	1482.7	344.6	131.3	37.72	11000	72.08	88.45	0.6745
0.25PN	6695	20.93	0.6061	1490.9	213.3	34.80	9.345	5500	35.88	82.15	0.4616



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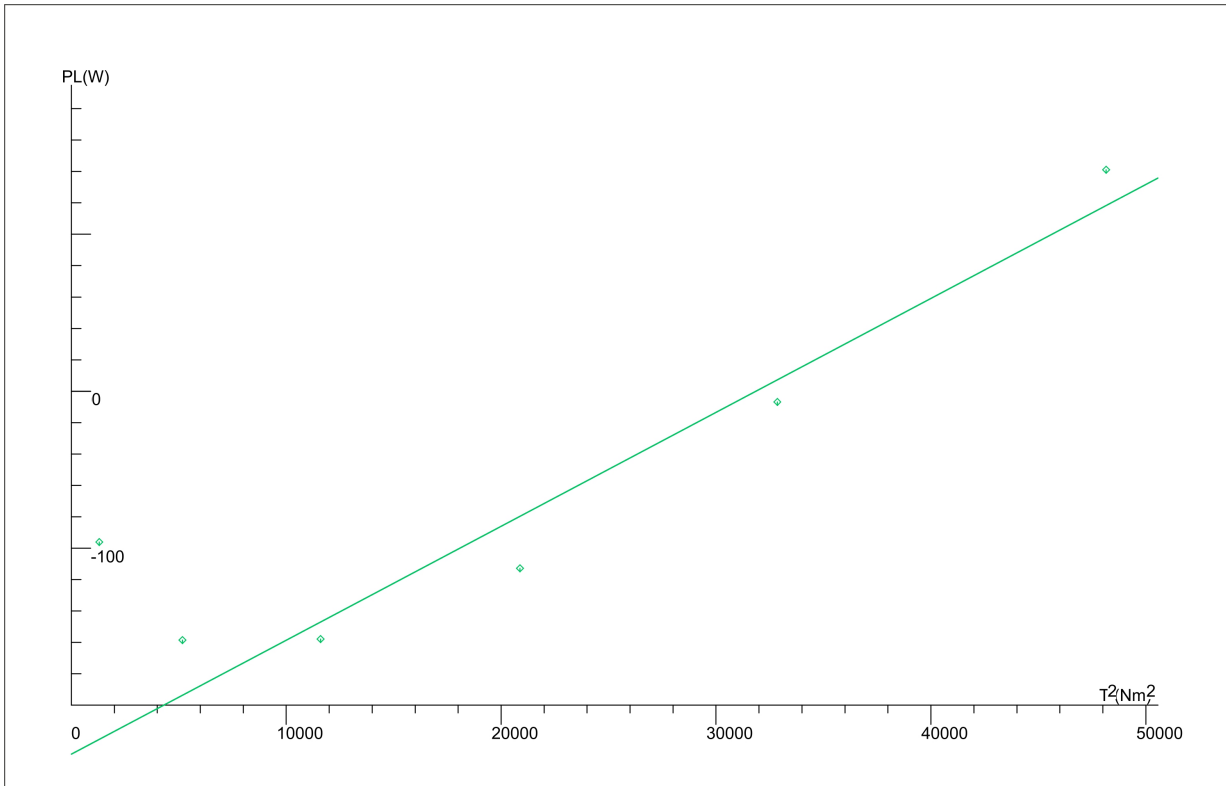
Load Test Curve





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PL-T² Curve





Type :	AK160L-4			Manufacturer:	Valiadis S.A.
Output:	22 kW	Voltage :	400 / 690 V	Serial No :	
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Temperature Rise Test Report

Time	Voltage (V)	Current (A)			Input Power (W)	Speed r/min	Torque (Nm)	Winding Temp. (°C)	Ambient Temperature (°C)		
		Ia	Ib	Ic							
09:25	401.7	41.851	41.794	41.738	23938	1471.8	142.67	20.4	20.4	24.0	23.9
11:55	401.5	41.469	41.392	41.378	24027	1463.7	142.31	115.3	41.5	25.6	25.4
12:00	401.4	41.435	41.323	41.322	23989	1463.6	142.04	115.5	41.7	25.5	25.2
12:05	401.1	41.355	41.244	41.253	23939	1463.7	141.77	115.5	41.9	25.6	25.2
12:10	401.7	41.345	41.245	41.249	23942	1463.7	141.77	115.7	42.2	25.6	25.4
12:15	401.4	41.306	41.202	41.211	23909	1463.6	141.53	115.9	42.4	25.7	25.3
12:20	401.5	41.284	41.187	41.192	23893	1463.7	141.53	116.0	42.5	25.7	25.3
12:25	401.7	41.635	41.541	41.540	24152	1463.2	142.92	116.0	42.2	25.0	25.1
12:30	401.3	41.569	41.499	41.485	24108	1463.2	142.76	116.1	41.9	25.2	25.2
12:35	401.6	41.575	41.493	41.485	24117	1463.3	142.79	116.2	42.0	24.9	25.2
12:40	401.6	41.813	41.713	41.703	24270	1462.9	143.68	116.3	41.9	25.3	25.2
12:45	401.4	41.743	41.674	41.657	24240	1462.9	143.60	116.3	42.1	25.1	25.2
12:50	401.5	41.755	41.642	41.648	24237	1462.9	143.47	113.4	42.4	25.1	25.2
12:55	401.2	41.707	41.608	41.605	24211	1462.9	143.23	116.3	42.3	24.8	25.4
13:00	401.5	41.693	41.631	41.613	24223	1462.9	143.43	116.5	42.5	25.0	25.2
13:05	401.7	41.700	41.619	41.603	24209	1462.9	143.25	116.5	42.5	25.1	25.4

At the end of test, winding resistance measurement $R_2 = 0.3247 \Omega$

$$\Delta \theta = \frac{0.3247 - 0.24320}{0.24320} (235 + 24,3) + 24,3 - 25 = 85,94 \text{ K}$$

$$\Delta \theta_n = \Delta \theta \left(\frac{41.97}{41.51} \right)^2 = 87.84 \text{ K}$$

Max Temp. of enclosure Surface : °C Hot Insulation Resistance : 500.00 MΩ
 Temperature of Bearing : °C Test Current : 41.51 A



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Torque – Speed Curve

