

Test report - ELP3P3G

Object of test: Three-phase electric squirrel-cage motor

Kind of test: Determination of efficiency acc. To CSA C390-10 - clause 5.1

Test report no: 270/OPK/11

Frame: 213T

Type: ELP

Serial no: AC149387

MOTOR DESCRIPTION:

Manufacturer:	US Motors / FME Indukta	
Rated power:	3	[Hp]
Number of poles:	6	
Rated voltage:	575	[V]
Rated current:	3.4	[A]
Speed:	1165	[RPM]
Frequency:	60	[Hz]
Power factor:	0.74	[-]
Nominal efficiency"η":	89.5	[%]
Number of phases:	3	
Time rating:	S1	
Service factor:	1.4	
NEMA design:	B	
KVA code:	K	
Insulation class:	F	
Max. amb. temperature:	40	[°C]

TESTING SCHEDULE

- 1) Winding resistance measurements (clause 7.1.2)
- 2) Heat-run test for S.F 1.0 (clause 7.1.3)
- 3) Load test (clause 7.1.4)
- 4) No-load test. (clause 7.1.7)
- 5) Determination of efficiency (clause 7.2.6)

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A.7.1.2 Temperature measurement

Cold winding temperature, $t_{det\ cold}$ (°C) 22.8
Cold stator winding resistance, R_{cold} (W). 4.75475

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W). 5.15491
Stator winding temperature, $t_{es\ hr}$ (°C) 44.5
Ambient temperature, $t_{amb\ hr}$ (°C) 22.6

A.7.1.4 Load test

% of full load
Torque output, T_{it} (i), (Nm)
Power input, $P_{in\ it}$ (i), (kW)
each line current, $I_{a\ it}$ (i), $I_{b\ it}$ (i), $I_{c\ it}$ (i) (A)
Rotational speed, n_t (i), (RPM)
Stator winding temperature, $t_{et\ it}$ (i), (°C)
Ambient temperature, $t_{amb\ it}$ (i), (°C)
each line-to-line voltage, $V_{a-b\ it}$ (i), $V_{b-c\ it}$ (i), $V_{c-a\ it}$ (i) (V)
Frequency, f_t (i), (Hz)

A.7.1.5 Dynamometer correction test

$T_{it\ corr} =$

141	120	99	73	49	20
25.88	22.06	18.21	13.32	9.07	3.58
3.52173	2.99418	2.48033	1.83212	1.27456	0.57248
4.423	3.912	3.446	2.921	2.549	2.241
1165.0	1171.0	1176.0	1183.0	1189.0	1196.0
45.2	45.7	45.6	45	44.5	43.8
22.6	22.6	22.6	22.6	22.6	22.6
575.39	575.57	575.29	575.38	575.37	574.18
60.00	59.99	60.01	60.00	60.01	60.01
No	Tdyno cf, (Nm)			0	
25.88	22.06	18.21	13.32	9.07	3.58

A.7.1.7 No-Load test

% of nominal voltage,
each line-to-line voltage, $V_{a-b\ nl}$ (i), $V_{b-c\ nl}$ (i), $V_{c-a\ nl}$ (i) (V)
each line current, $I_{a\ nl}$ (i), $I_{b\ nl}$ (i), $I_{c\ nl}$ (i) (A)
(c) power input, $P_{in\ nl}$ (i), (kW)
(d-1) stator winding temperature, $t_{det\ nl}$ (i), (°C)
(h) frequency, f_{nl} (i), (Hz)

105	100	90	50	35	24
603.72	574.92	515.41	284.81	200.81	140.65
2.326	2.188	2.052	1.005	0.710	0.506
0.15253	0.14075	0.13063	0.04899	0.03707	0.02664
40.2	39.8	39.7	39.2	38.6	38.4
60.02	60.02	60.01	60.02	60.01	60.02

A 7.2 Calculation

% of full load
Power output corrected, $P_{corr\ out\ it}$ (i), (HP)
Power output corrected, $P_{corr\ out\ it}$ (i), (kW)
Line current, $I_{avg\ it}$ (i) (A)
Slip per unit corrected, $S_{corr\ it}$ (i)
Power input, $P_{in\ it}$ (i), (kW)
Core loss, P_{core} (i), (kW)
Windage-friction loss $P_{wind-frict}$ (kW)
Stray-load losses, $P_{stray-load\ it}$ (i) (kW)
Stator winding correction, $P_{corr\ stator\ it}$ (i) (kW)
Rotor winding correction, $P_{corr\ rotor\ it}$ (i) (kW)
Power Factor, PF_{it} (i), (%)
Efficiency, Eff_{it} (i), (%)

130	115	100	75	50	25
3.90	3.45	3.00	2.25	1.50	0.75
2.91	2.57	2.24	1.68	1.12	0.56
4.42	3.91	3.45	2.92	2.55	2.24
0.0295	0.0243	0.0203	0.0144	0.0094	0.0035
3.522	2.994	2.480	1.832	1.275	0.572
0.082	0.082	0.082	0.083	0.083	0.083
0.021	0.021	0.021	0.021	0.021	0.021
0.035	0.025	0.017	0.009	0.004	0.001
0.153	0.119	0.093	0.067	0.051	0.039
0.097	0.068	0.047	0.024	0.011	0.002
79.888	76.769	72.227	62.944	50.181	25.691
89.011	89.463	89.526	88.894	86.707	74.596
$\gamma =$					0.990

Summary: Parameters of tested motor are in compliance with requirements.

Date of testing: 10-Nov-11

Measurements made by:	D Formas	M Ptaszki	G Tialka
Test Report written by:	T Dobosz	Approved by:	A Opitek

Appendices:

1) List of measurement instruments used in tests.