

Test report - ELP10P1D

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: 101/I/11

Frame: 215T

Type: ELP

Serial no: 10/P/017

MOTOR DESCRIPTION:

Manufacturer: US Motors / FME Indukta S.A.
Rated power: 10 [Hp]
Number of poles: 2
Rated voltage: 460 [V]
Rated current: 11.4 [A]
Speed: 3535 [RPM]
Frequency: 60 [Hz]
Power factor: 0.91 [-]
Nominal efficiency" η ": 90.2 [%]
Number of phases: 3
Time rating: S1
Service factor: 1.3
NEMA design: A
KVA code: J
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) 20.1
Cold stator winding resistance, R_{cold} (W). 0.97670

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W). 1.14300
Stator winding temperature, $t_{res\ hr}$ (°C) 63.5
Ambient temperature, $t_{amb\ hr}$ (°C) 22.1

A.7.1.4 Load test

% of full load
Torque output, T_{lt} (i), (Nm)
Power input, $P_{in\ lt}$ (i), (kW)
each line current, $I_a\ lt(i)$, $I_b\ lt(i)$, $I_c\ lt(i)$ (A)
Rotational speed, n_{lt} (i), (RPM)
Stator winding temperature, $t_{det\ lt}$ (i), (°C)
Ambient temperature, $t_{amb\ lt}$ (i), (°C)
each line-to-line voltage, $V_{a-b\ lt(i)}$, $V_{b-c\ lt(i)}$, $V_{c-a\ lt(i)}$ (V)
Frequency, f_{lt} (i), (Hz)

141	121	101	74	49	20
28.45	24.40	20.33	14.82	9.81	4.08
11.841	10.158	8.424	6.228	4.2076	1.9399
15.917	13.693	11.550	8.863	6.593	4.597
3507.0	3521.8	3535.2	3553.5	3568.8	3586.9
75.6	77.2	75	71.9	69.2	66.3
23.2	23.2	23.2	23.2	23.2	23.2
460.37	460.57	460.07	459.90	459.63	460.07
60.02	60.02	60.00	60.01	59.98	60.01
No	T _{dyno cf} , (Nm)				0
28.45	24.40	20.33	14.82	9.81	4.08

A.7.1.5 Dynamometer correction test

$T_{lt\ corr} =$

A.7.1.7 No-Load test

% of nominal voltage,
each line-to-line voltage, $V_{a-b\ lt(i)}$, $V_{b-c\ lt(i)}$, $V_{c-a\ lt(i)}$ (V)
each line current, $I_a\ lt(i)$, $I_b\ lt(i)$, $I_c\ lt(i)$ (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)

104	100	96	50	35	25
480.20	459.93	440.47	229.83	160.80	113.00
4.117	3.887	3.663	1.816	1.338	1.138
0.3511	0.32323	0.31219	0.1688	0.14906	0.14306
39.5	39.4	38.2	37.9	37.3	35.5
59.98	59.99	59.99	60.02	60.01	60.01

A 7.2 Calculation

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

130	115	100	75	50	25
13.00	11.50	10.00	7.50	5.00	2.50
9.70	8.58	7.46	5.60	3.73	1.87
15.92	13.69	11.55	8.86	6.59	4.60
0.0263	0.0220	0.0181	0.0133	0.0085	0.0039
11.841	10.158	8.424	6.228	4.208	1.940
0.160	0.161	0.161	0.162	0.163	0.165
0.133	0.133	0.133	0.133	0.133	0.133
0.292	0.215	0.149	0.079	0.035	0.006
0.439	0.325	0.231	0.136	0.075	0.037
0.296	0.213	0.145	0.079	0.034	0.007
93.298	92.992	91.528	88.212	80.160	52.961
88.861	89.707	90.274	90.543	89.541	82.087
					$\gamma =$ 0.975

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

Date of testing: 26-Mar-10

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

Appendices:

1) List of measurement instruments used in tests.