

Test report - ELP20P2D

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: 151/I/11

Frame: 256T

Type: ELP

Serial no: 10/P/031

MOTOR DESCRIPTION:

Manufacturer: US Motors / FME Indukta S.A.
Rated power: 20 [Hp]
Number of poles: 4
Rated voltage: 460 [V]
Rated current: 22.9 [A]
Speed: 1775 [RPM]
Frequency: 60 [Hz]
Power factor: 0.88 [-]
Nominal efficiency" η ": 93.0 [%]
Number of phases: 3
Time rating: S1
Service factor: 1.2
NEMA design: A
KVA code: L
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
Cold stator winding resistance, R_{cold} (W). 0.30492

A.7.1.3 Heat-run test

Stator winding resistance, R_{hr} (W). 0.34841
Stator winding temperature, $t_{res\ hr}$ (°C) 58.6
Ambient temperature, $t_{amb\ hr}$ (°C) 24.2

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)

142	120	99	75	51	19
113.90	96.18	79.77	60.08	40.97	15.51
22.7837	19.2054	15.9473	12.113	8.3612	3.4968
31.450	26.804	22.926	17.915	13.651	9.291
1764.0	1772.0	1778.0	1783.0	1789.0	1796.0
61	61.2	60.8	60.3	60	59
25.0	25.0	25.0	25.0	25.0	25.0
460.77	459.55	460.58	459.69	460.37	459.35
60.00	60.01	60.01	60.00	60.00	60.00
No	T _{dyno cf} , (Nm)				0
113.90	96.18	79.77	60.08	40.97	15.51

A.7.1.5 Dynamometer correction test

Tlt 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)

105	100	95	50	35	25
483.47	460.57	437.07	230.44	161.89	112.70
8.934	8.269	7.659	3.619	2.558	1.921
0.62004	0.55622	0.52177	0.23077	0.1681	0.14372
49	48.9	48.8	48.4	48.2	47.9
60.00	60.00	60.00	60.00	60.01	60.02

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
26.00	23.00	20.00	15.00	10.00	5.00
19.40	17.16	14.93	11.19	7.46	3.73
31.45	26.80	22.93	17.92	13.65	9.29
0.0200	0.0157	0.0123	0.0095	0.0062	0.0023
22.784	19.205	15.947	12.113	8.361	3.497
0.395	0.395	0.398	0.399	0.402	0.404
0.114	0.114	0.114	0.114	0.114	0.114
0.266	0.189	0.130	0.074	0.034	0.005
0.518	0.376	0.275	0.168	0.098	0.045
0.437	0.289	0.188	0.110	0.048	0.007
90.773	90.018	87.194	84.920	76.813	47.305
92.407	92.898	93.064	92.861	91.669	83.571
					$\gamma =$ 0.986

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

Date of testing: 16-Jun-11

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.