

FRAME 5014F / 5024F WINDING 6



MODELS LL5014F / LL5024F / LL5034F

REF: F5004FW6-4 JULY 2010

WINDING DETAILS

Code	6	Insulation class	H
Phase	3	Leads	12
Pole number	4	Pitch	2/3

MECHANICAL DETAILS

Standard protection		IP23
Overspeed	rpm	2250
Air flow 50Hz/60Hz	m ³ /s	0.43 / 0.51

EXCITATION DETAILS

Excitation system	SHUNT	AREP/PMG
AVR model	R450M	R450M
Sustained short-circuit current	-	300%:10s
Steady state voltage regulation	±0.5%	±0.5%

WAVEFORM

Line voltage on no load or balanced linear rated load

Total harmonic content THC	<4%
Telephone influence factor TIF (NEMA)	<50
Telephone harmonic factor THF (IEC)	<2%

LINE VOLTAGE

No overvoltage tolerance for 440V 50Hz excitation level

Frequency / speed	50Hz / 1500rpm					60Hz / 1800rpm					
	V	380	400	415	440	380	400	416	440	460	480
Series star	V	380	400	415	440	380	400	416	440	460	480
Series delta	V	220	230	240		220	230	240			
Parallel star	V		200	208	220		200	208	220	230	240

RATING

Power factor 0.8, Altitude <=1000m

Class	Rating	kVA	200	200	200	180	210	220	226	236	245	250
Class H rise BR	125/40	kVA	200	200	200	180	210	220	226	236	245	250
		kW	160	160	160	144	168	176	181	189	196	200
Class H rise PR	150/40	kVA	212	212	212	191	223	233	240	250	260	265
		kW	170	170	170	153	178	187	192	200	208	212
Class H rise PR	163/27	kVA	220	220	220	200	231	242	249	260	270	275
		kW	176	176	176	160	185	194	199	208	216	220
Class F rise BR	105/40	kVA	182	182	182	164	191	200	206	215	223	228
		kW	146	146	146	131	153	160	165	172	178	182

EFFICIENCIES

Power factor 0.8

Efficiency	Class	Rating	%	91.9	92.1	92.0	91.7	91.7	92.0	92.2	92.4	92.4	92.5
110%	Class H BR		%	91.9	92.1	92.0	91.7	91.7	92.0	92.2	92.4	92.4	92.5
100%	Class H BR		%	92.3	92.4	92.3	91.9	92.1	92.4	92.5	92.7	92.8	92.7
75%	Class H BR		%	93.1	93.1	92.9	92.0	92.9	93.1	93.2	93.3	93.3	93.2
50%	Class H BR		%	93.5	93.2	92.8	91.3	93.3	93.4	93.4	93.4	93.3	93.0
25%	Class H BR		%	91.9	91.2	90.4	87.4	91.5	91.5	91.4	91.2	90.9	90.4

CHARACTERISTIC PARAMETERS

Reactance base class H BR rating

Parameter	Unit	0.36	0.44	0.52	0.80	0.25	0.27	0.29	0.32	0.37	0.42
K _c Short-circuit ratio		0.36	0.44	0.52	0.80	0.25	0.27	0.29	0.32	0.37	0.42
X _d D-Axis synchronous reactance (unsaturated)	pu	3.33	3.01	2.79	2.24	4.20	3.97	3.77	3.52	3.34	3.13
X' _d D-Axis transient reactance (saturated)	pu	0.16	0.15	0.14	0.11	0.21	0.19	0.18	0.17	0.16	0.15
X'' _d D-Axis sub-transient reactance (saturated)	pu	0.098	0.089	0.082	0.066	0.124	0.117	0.111	0.104	0.099	0.092
X _q Q-Axis synchronous reactance (unsaturated)	pu	2.00	1.80	1.68	1.34	2.52	2.38	2.26	2.11	2.00	1.88
X'' _q Q-Axis sub-transient reactance (saturated)	pu	0.121	0.110	0.102	0.081	0.153	0.145	0.137	0.128	0.122	0.114
X ₂ Negative-sequence reactance (saturated)	pu	0.109	0.099	0.092	0.073	0.138	0.130	0.123	0.115	0.109	0.103
X ₀ Zero-sequence reactance (independent)	pu	0.006	0.005	0.005	0.004	0.007	0.007	0.006	0.006	0.006	0.005
T' _d D-Axis transient time constant	ms		100					100			
T'' _d D-Axis sub-transient time constant	ms		10					10			
T' _{do} D-Axis open-circuit time constant	ms		2042					2042			
T _a Armature time constant	ms		15					15			
T _r Voltage recovery time	ms		< 500					< 500			

EXCITATION VOLTAGE AND CURRENT

No load excitation voltage	V	8.0	9.2	10.5	13.4	5.7	6.2	6.6	7.4	8.2	9.2
No load excitation current	A	0.91	1.05	1.19	1.52	0.65	0.70	0.75	0.84	0.93	1.04
Class H BR excitation voltage	V	31.8	32.6	34.1	35.3	29.0	29.5	29.7	30.6	31.9	33.1
Class H BR excitation current	A	3.61	3.71	3.87	4.01	3.29	3.35	3.38	3.48	3.62	3.76

WINDING RESISTANCE

At 20° C

Stator line-to-line (series star)	Ω	0.0364				Exciter field		Ω	8.80
Main field	Ω	0.24							

According to: IEC 60034, UTE NFC51.111, VDE 0530, BS 4999/5000, NEMA MG 1-33

Values quoted are typical. In line with our policy of continuous improvement, we reserve the right to change specification without notice.

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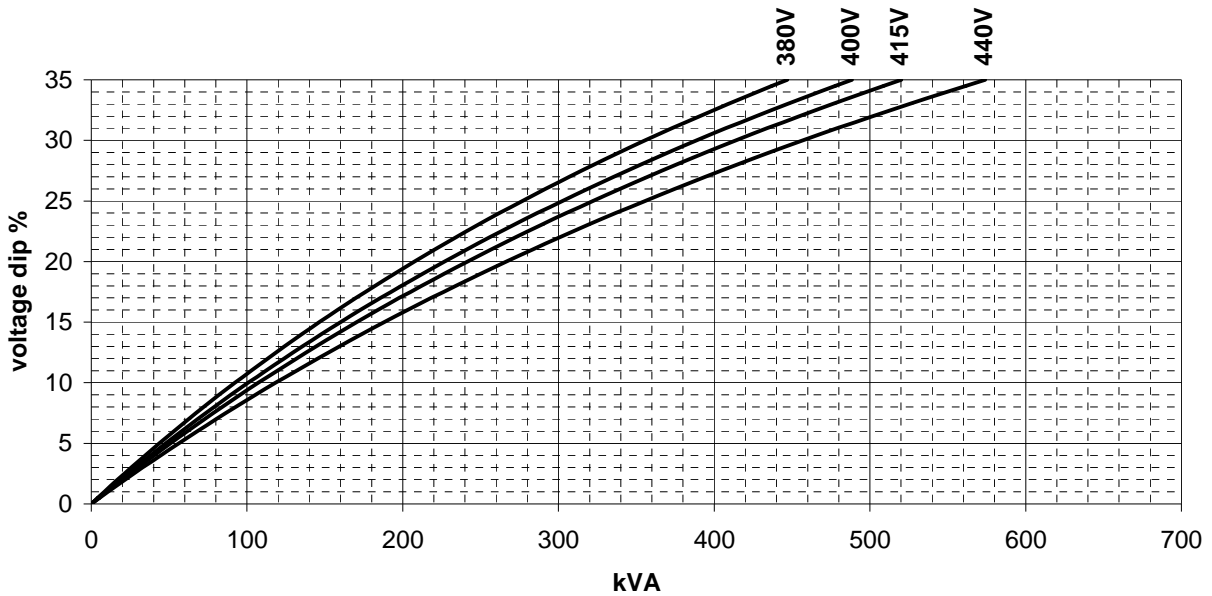


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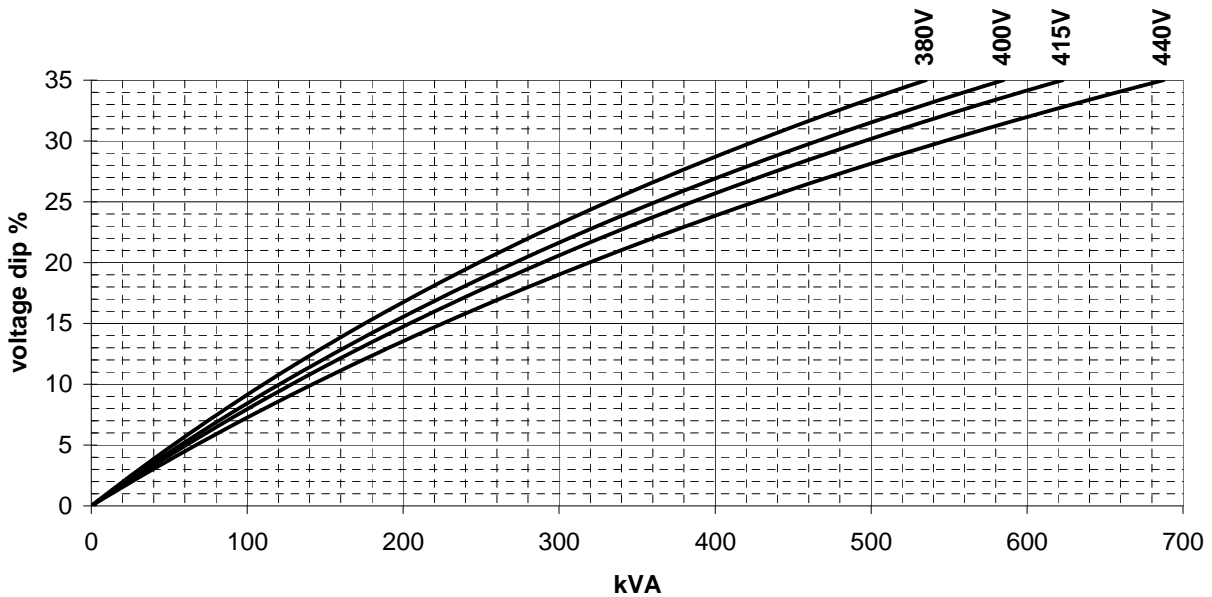
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LOCKED ROTOR MOTOR STARTING CURVES *Power factor 0.6*

50 Hz SHUNT



50 Hz AREP / PMG



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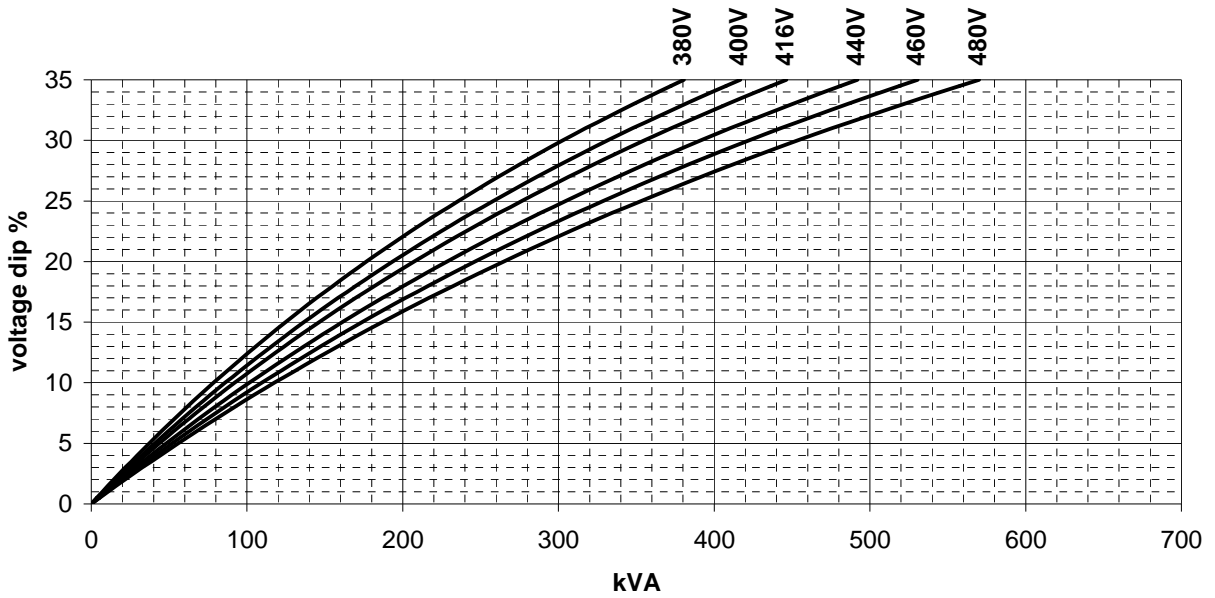


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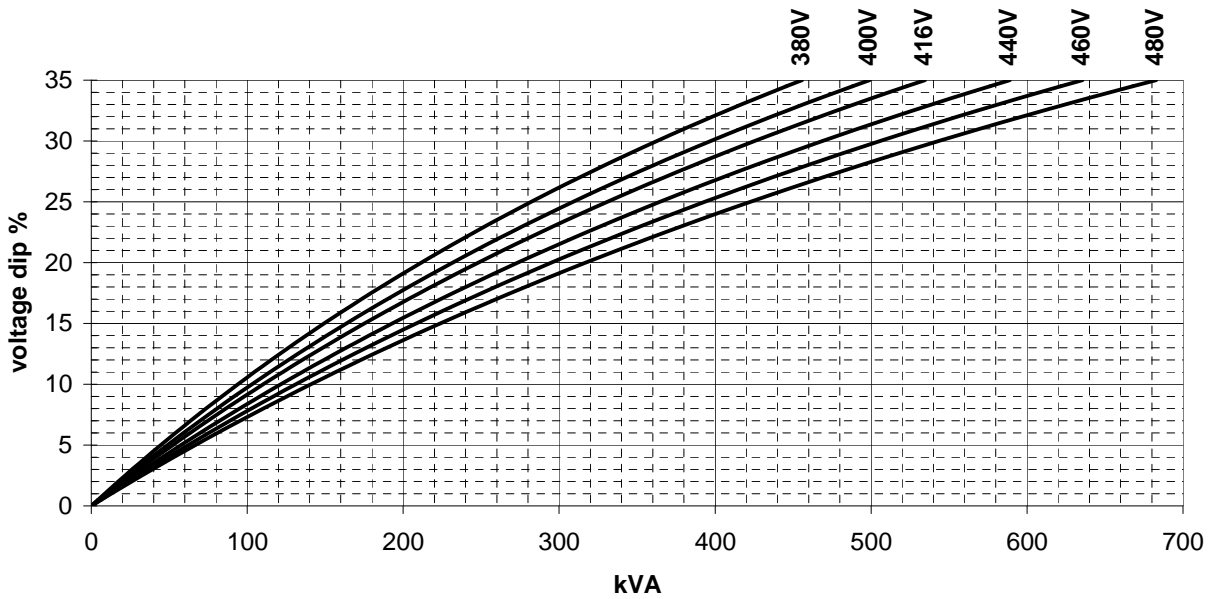
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LOCKED ROTOR MOTOR STARTING CURVES *Power factor 0.6*

60 Hz SHUNT



60 Hz AREP / PMG



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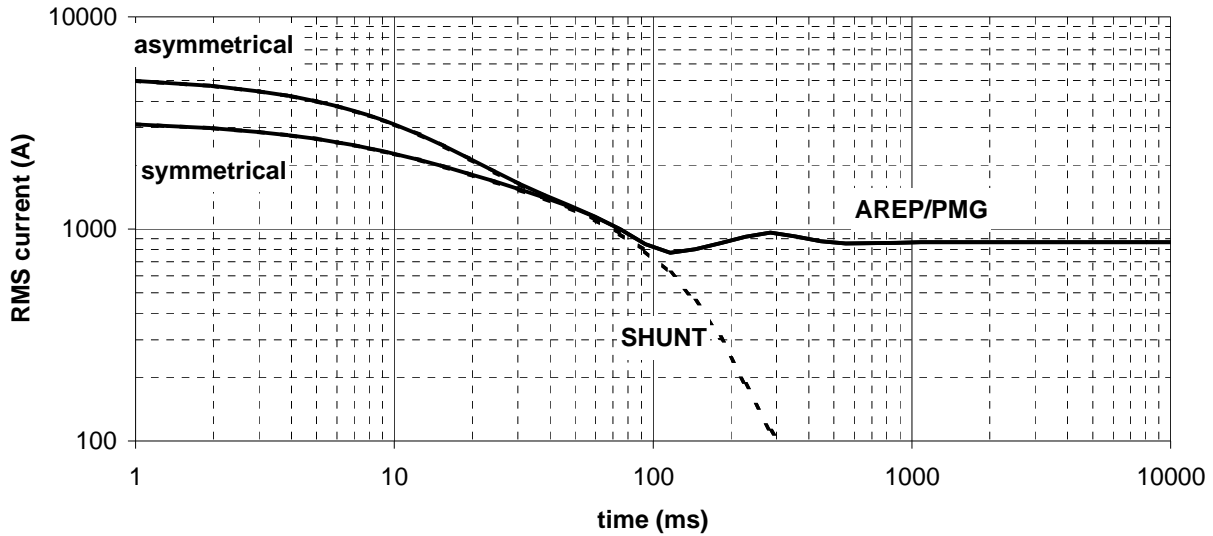


THREE-PHASE SHORT-CIRCUIT DECREMENT CURVES

No-load excitation at rated speed

400V 50Hz, 480V 60Hz

Series Star



Multiplication Factors

50Hz Voltages	380	400	415	440
Multiplication Factor	0.95	1.00	1.04	1.10

Apply factor up to 2xT'd, remainder of curve unchanged

60Hz Voltages	380	400	416	440	460	480
Multiplication Factor	0.79	0.83	0.87	0.92	0.96	1.00

Apply factor up to 2xT'd, remainder of curve unchanged

Winding Connection	Series Star	Parallel Star	Series Delta
Multiplication Factor	1.00	2.00	1.73

Apply factor to the complete curve