

FRAME 9304H WINDING 6S



MODELS LL9324H / LL9334H

REF: F9304HW6S-0 MAR 2015

WINDING DETAILS

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

MECHANICAL DETAILS

Standard protection		IP23
Overspeed	rpm	2250
Air flow 50Hz/60Hz	m ³ /s	2.50 / 2.80

EXCITATION DETAILS

Excitation system	AREP/PMG
AVR model	D510
Sustained short-circuit current	300%:10s
Steady state voltage regulation	±0.5%

WAVEFORM

Line voltage on no load or balanced linear rated load

Total harmonic content THC	<3.5%
Telephone influence factor TIF (NEMA)	<50
Telephone harmonic factor THF (IEC)	<2%

LINE VOLTAGE

No overvoltage tolerance for 440V 50Hz excitation level

Frequency / speed	V	50Hz / 1500rpm				60Hz / 1800rpm					
		380	400	415	440	380	400	416	440	460	480
Star	V	380	400	415	440	380	400	416	440	460	480
Delta	V	220	230	240		220	230	240			

RATING

Power factor 0.8, Altitude ≤1000m

Class	Rating	kVA	2050	2050	2050	1890	2050	2050	2135	2255	2360	2460
Class H rise BR	125/40	kVA	2050	2050	2050	1890	2050	2050	2135	2255	2360	2460
		kW	1640	1640	1640	1512	1640	1640	1708	1804	1888	1968
Class H rise PR	150/40	kVA	2173	2173	2173	2003	2173	2173	2263	2390	2502	2608
		kW	1738	1738	1738	1603	1738	1738	1810	1912	2001	2086
Class H rise PR	163/27	kVA	2255	2255	2255	2080	2255	2255	2349	2481	2596	2706
		kW	1804	1804	1804	1664	1804	1804	1879	1984	2077	2165
Class F rise BR	105/40	kVA	1866	1866	1866	1700	1866	1866	1943	2052	2148	2239
		kW	1492	1492	1492	1360	1492	1492	1554	1642	1718	1791

EFFICIENCIES

Power factor 0.8

Efficiency	Class	%	95.8	96.0	96.1	96.3	95.8	96.0	96.1	96.2	96.3	96.3
110%	Class H BR	%	95.8	96.0	96.1	96.3	95.8	96.0	96.1	96.2	96.3	96.3
100%	Class H BR	%	96.0	96.2	96.3	96.3	96.0	96.2	96.3	96.5	96.6	96.7
75%	Class H BR	%	96.4	96.5	96.5	96.5	96.4	96.5	96.6	96.7	96.7	96.7
50%	Class H BR	%	96.6	96.5	96.5	96.3	96.5	96.5	96.5	96.5	96.4	96.3
25%	Class H BR	%	95.6	95.4	95.1	94.6	95.3	95.2	95.1	94.9	94.7	94.4

CHARACTERISTIC PARAMETERS

Reactance base class H BR rating

Parameter	Unit	0.31	0.38	0.45	0.60	0.23	0.25	0.28	0.32	0.38	0.46
K _c Short-circuit ratio		0.31	0.38	0.45	0.60	0.23	0.25	0.28	0.32	0.38	0.46
X _d D-Axis synchronous reactance (unsaturated)	pu	3.88	3.50	3.25	2.67	4.65	4.20	4.04	3.82	3.65	3.50
X' _d D-Axis transient reactance (saturated)	pu	0.30	0.27	0.25	0.21	0.36	0.32	0.31	0.29	0.28	0.27
X'' _d D-Axis sub-transient reactance (saturated)	pu	0.156	0.141	0.131	0.107	0.187	0.169	0.163	0.154	0.147	0.141
X _q Q-Axis synchronous reactance (unsaturated)	pu	2.06	1.86	1.73	1.42	2.47	2.23	2.15	2.03	1.94	1.86
X'' _q Q-Axis sub-transient reactance (saturated)	pu	0.156	0.141	0.131	0.107	0.187	0.169	0.163	0.154	0.147	0.141
X ₂ Negative-sequence reactance (saturated)	pu	0.156	0.141	0.131	0.107	0.187	0.169	0.163	0.154	0.147	0.141
X ₀ Zero-sequence reactance (independent)	pu	0.028	0.026	0.024	0.020	0.034	0.031	0.030	0.028	0.027	0.026
T' _d D-Axis transient time constant	ms		261					261			
T'' _d D-Axis sub-transient time constant	ms		23					23			
T' _{do} D-Axis open-circuit time constant	ms		2873					2873			
T _a Armature time constant	ms		28					28			
T _r Voltage recovery time	ms		< 500					< 500			

EXCITATION VOLTAGE AND CURRENT

No load excitation voltage	V	8.7	10.4	12.2	14.8	6.1	7.0	7.0	7.8	8.7	10.4
No load excitation current	A	1.00	1.20	1.40	1.70	0.70	0.80	0.80	0.90	1.00	1.20
Class H BR excitation voltage	V	47.0	46.1	45.2	44.4	44.4	42.6	43.5	43.5	44.4	44.4
Class H BR excitation current	A	5.40	5.30	5.20	5.10	5.10	4.90	5.00	5.00	5.10	5.10

WINDING RESISTANCE

At 20° C

Stator line-to-line (series star)	Ω	0.0016		Exciter field	Ω	8.70
Main field	Ω	0.370				

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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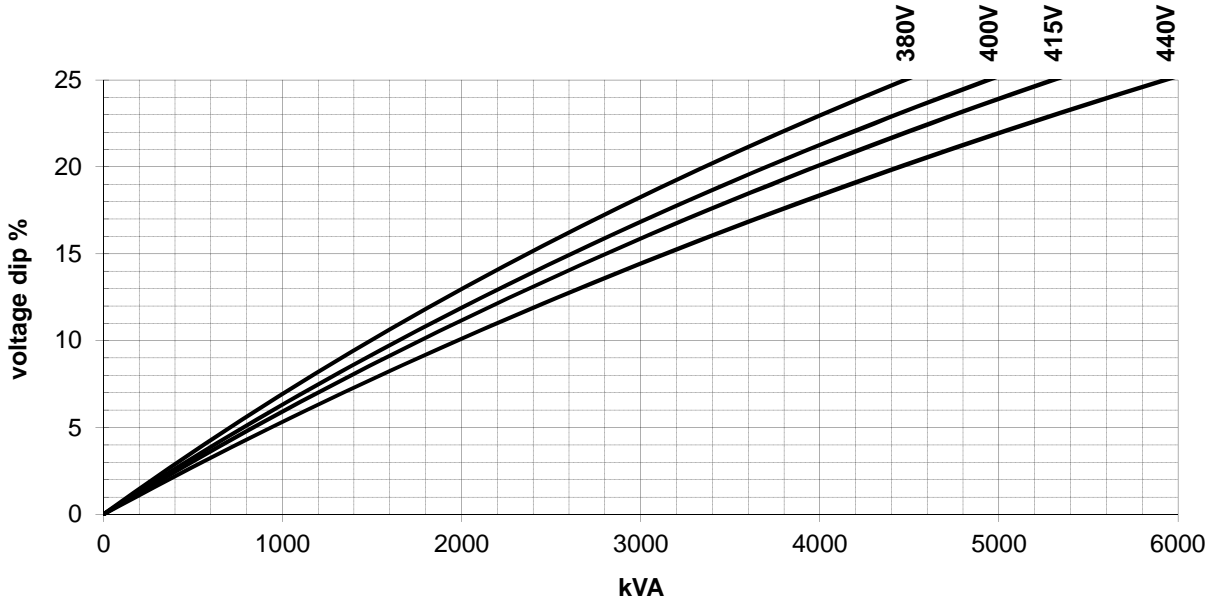
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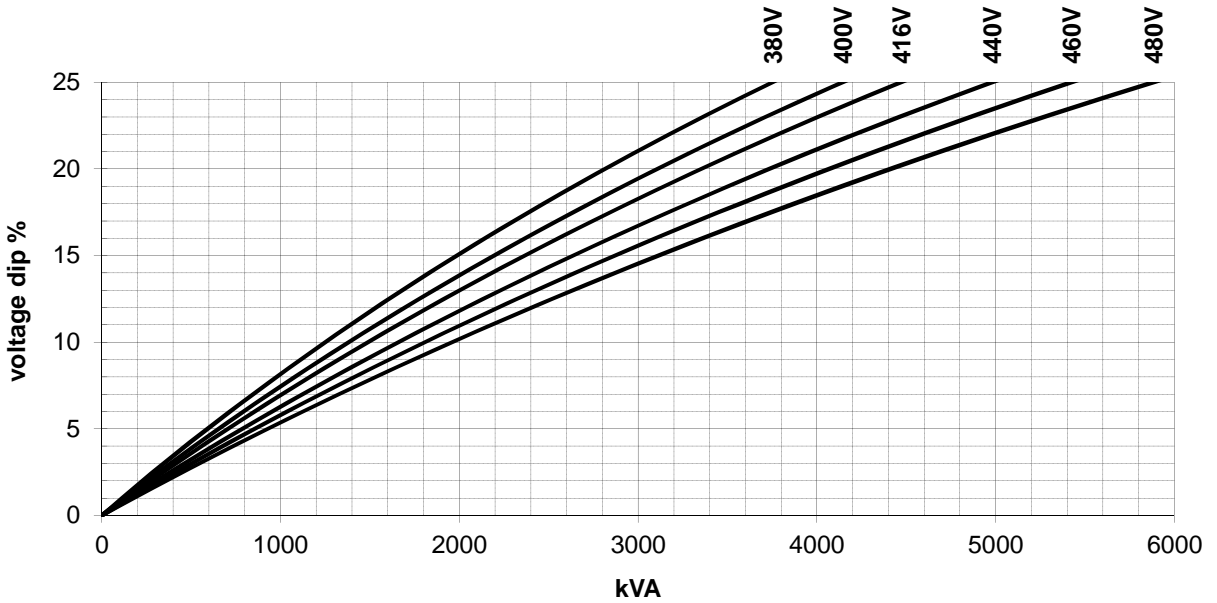
LOCKED ROTOR MOTOR STARTING CURVES

Power factor 0.4

50 Hz AREP / PMG



60 Hz AREP / PMG



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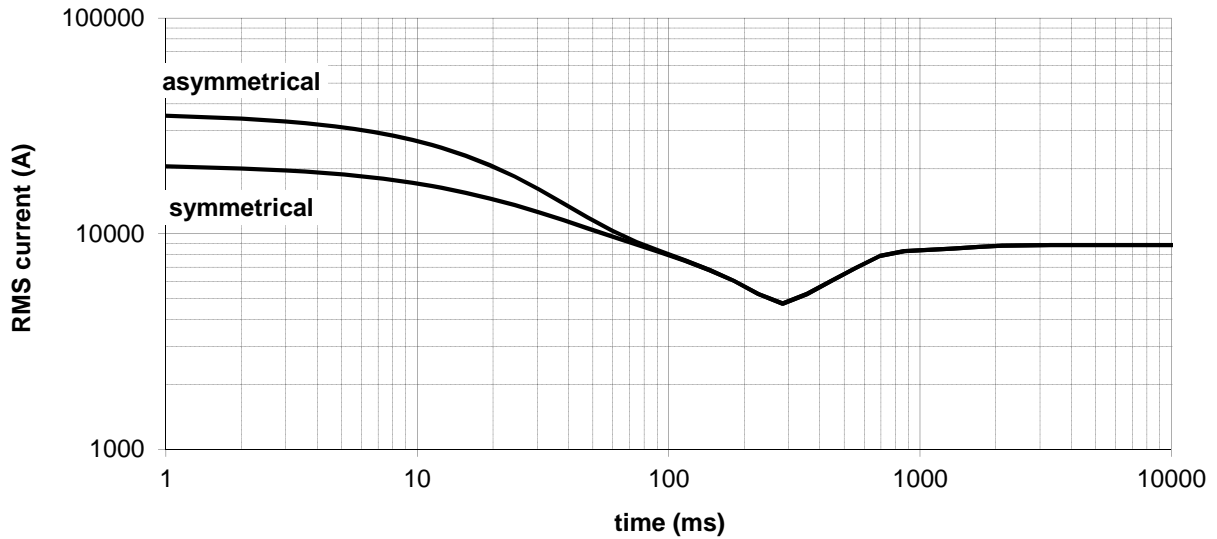
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THREE-PHASE SHORT-CIRCUIT DECREMENT CURVES

No-load excitation at rated speed

400V 50Hz, 480V 60Hz

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

Star	Delta	
Multiplication Factor	1.00	1.73

Apply factor to the complete curve

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