

# FRAME 8224H WINDING 6S



**MODELS** LL8224H / LL8234H

REF: F8204HW6S-2 JULY 2010

## 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 <sup>3</sup> /s 1.80 / 2.20

## EXCITATION DETAILS

Excitation system	AREP/PMG
AVR model	R450M
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	50Hz / 1500rpm				60Hz / 1800rpm						
	V	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	1250	1250	1250	1155	1235	1300	1355	1435	1500	1563
Class H rise BR	125/40	kVA	1250	1250	1250	1155	1235	1300	1355	1435	1500	1563
		kW	1000	1000	1000	924	988	1040	1084	1148	1200	1250
Class H rise PR	150/40	kVA	1325	1325	1325	1224	1309	1378	1436	1521	1590	1657
		kW	1060	1060	1060	979	1047	1102	1149	1217	1272	1325
Class H rise PR	163/27	kVA	1375	1375	1375	1271	1359	1430	1491	1579	1650	1719
		kW	1100	1100	1100	1016	1087	1144	1192	1263	1320	1375
Class F rise BR	105/40	kVA	1138	1138	1138	1051	1124	1183	1233	1306	1365	1422
		kW	910	910	910	841	899	946	986	1045	1092	1138

## EFFICIENCIES

*Power factor 0.8*

Efficiency	Class	Rating	%	94.7	94.9	95.0	95.2	94.2	94.4	94.5	94.7	94.8	94.9
110%	Class H BR		%	94.7	94.9	95.0	95.2	94.2	94.4	94.5	94.7	94.8	94.9
100%	Class H BR		%	94.9	95.1	95.2	95.3	94.4	94.6	94.7	94.9	95.0	95.1
75%	Class H BR		%	95.4	95.5	95.6	95.4	94.8	94.9	95.1	95.2	95.3	95.3
50%	Class H BR		%	95.7	95.6	95.5	95.1	94.7	94.9	95.0	95.1	95.1	95.2
25%	Class H BR		%	94.4	94.1	93.8	92.7	92.8	92.9	93.0	93.1	93.0	93.0

## CHARACTERISTIC PARAMETERS

*Reactance base class H BR rating*

Parameter	Description	Unit	0.26	0.31	0.36	0.51	0.20	0.21	0.23	0.25	0.27	0.30
K <sub>c</sub>	Short-circuit ratio		0.26	0.31	0.36	0.51	0.20	0.21	0.23	0.25	0.27	0.30
X <sub>d</sub>	D-Axis synchronous reactance (unsaturated)	pu	4.25	3.84	3.56	2.93	5.04	4.79	4.61	4.37	4.18	4.00
X' <sub>d</sub>	D-Axis transient reactance (saturated)	pu	0.29	0.27	0.25	0.20	0.35	0.33	0.32	0.30	0.29	0.28
X'' <sub>d</sub>	D-Axis sub-transient reactance (saturated)	pu	0.164	0.148	0.138	0.113	0.195	0.185	0.179	0.169	0.162	0.155
X <sub>q</sub>	Q-Axis synchronous reactance (unsaturated)	pu	2.55	2.30	2.14	1.76	3.03	2.88	2.77	2.62	2.51	2.40
X'' <sub>q</sub>	Q-Axis sub-transient reactance (saturated)	pu	0.192	0.173	0.161	0.132	0.228	0.216	0.209	0.197	0.189	0.181
X <sub>2</sub>	Negative-sequence reactance (saturated)	pu	0.178	0.161	0.150	0.123	0.211	0.201	0.194	0.183	0.175	0.168
X <sub>0</sub>	Zero-sequence reactance (independent)	pu	0.040	0.036	0.034	0.028	0.047	0.045	0.043	0.041	0.039	0.038
T' <sub>d</sub>	D-Axis transient time constant	ms		180						180		
T'' <sub>d</sub>	D-Axis sub-transient time constant	ms		18						18		
T' <sub>do</sub>	D-Axis open-circuit time constant	ms		2584						2584		
T <sub>a</sub>	Armature time constant	ms		27						27		
T <sub>r</sub>	Voltage recovery time	ms		< 500						< 500		

## EXCITATION VOLTAGE AND CURRENT

Parameter	Unit	9.2	10.3	11.6	14.2	6.9	7.4	7.8	8.6	9.4	10.3
No load excitation voltage	V	9.2	10.3	11.6	14.2	6.9	7.4	7.8	8.6	9.4	10.3
No load excitation current	A	0.84	0.94	1.05	1.29	0.63	0.67	0.71	0.78	0.85	0.94
Class H BR excitation voltage	V	45.4	45.3	45.9	45.4	41.4	41.9	42.6	43.7	44.9	46.5
Class H BR excitation current	A	4.13	4.12	4.17	4.13	3.76	3.81	3.87	3.97	4.08	4.23

## WINDING RESISTANCE

*At 20° C*

Stator line-to-line (series star)	Ω	0.0032	Exciter field	Ω	11.00
Main field	Ω	0.434			

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.

**FRAME 8224H**

**WINDING 6S**



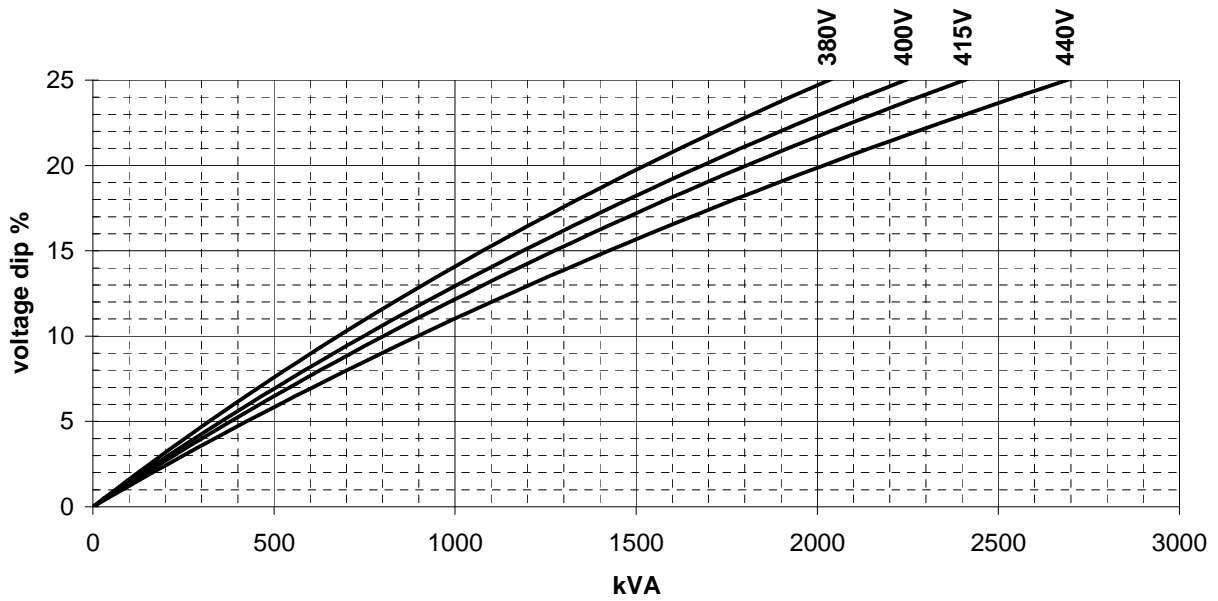
**MODELS LL8224H / LL8234H**

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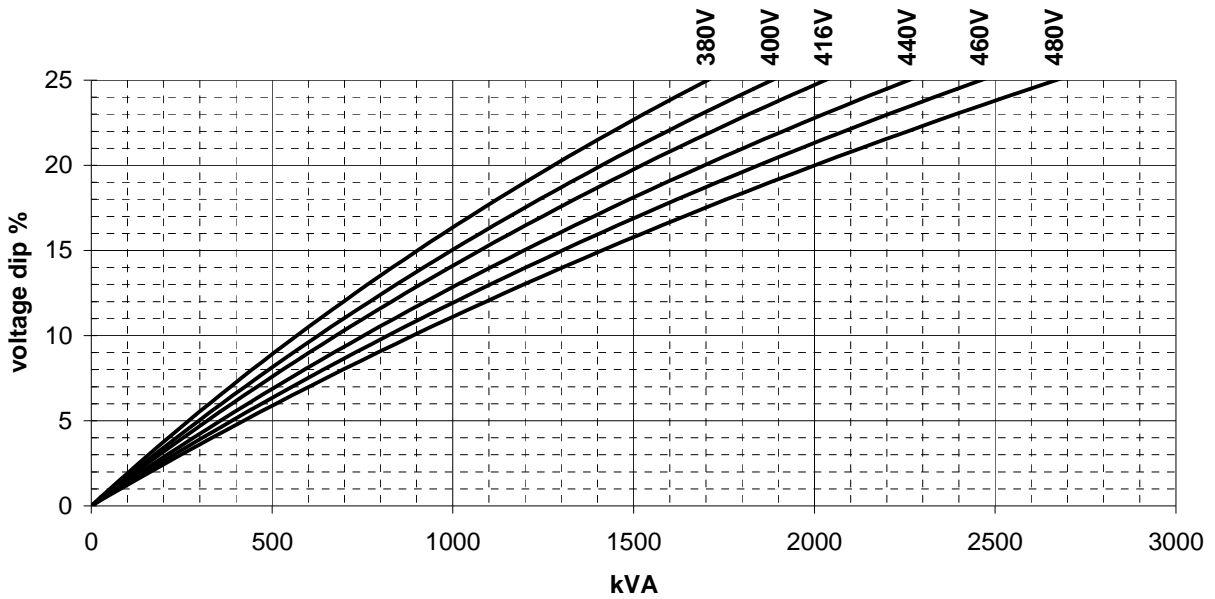
**LOCKED ROTOR MOTOR STARTING CURVES**

*Power factor 0.4*

**50 Hz AREP / PMG**



**60 Hz AREP / PMG**



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

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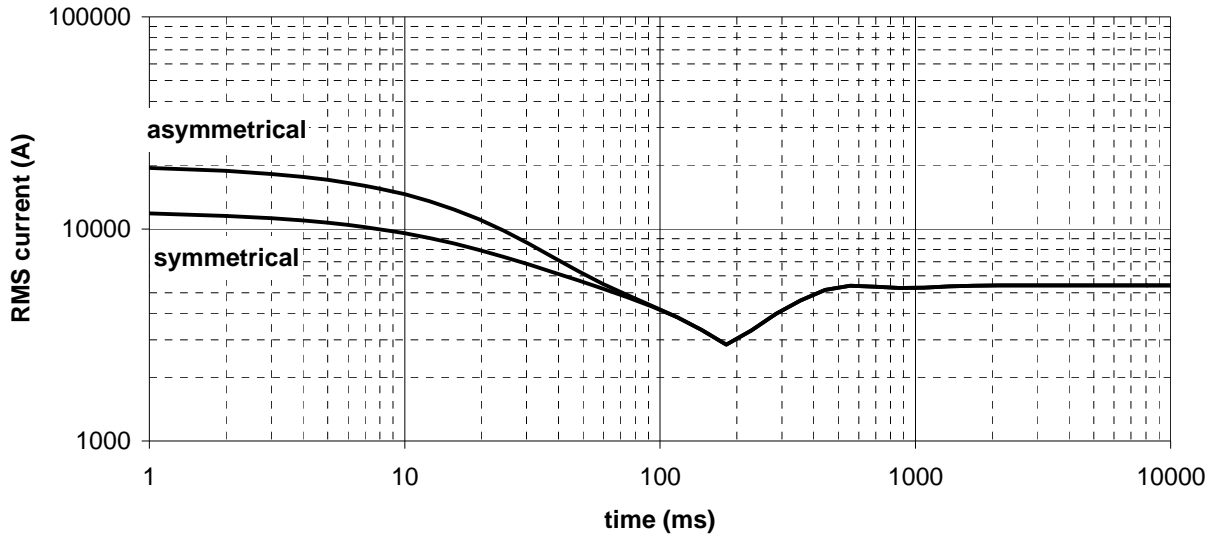
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**THREE-PHASE SHORT-CIRCUIT DECREMENT CURVES**

*No-load excitation at rated speed*

**400V 50Hz, 480V 60Hz**

*Star*



**Multiplication Factors**

**50Hz Voltages**

<b>380</b>	<b>400</b>	<b>415</b>	<b>440</b>	
Multiplication Factor	0.95	1.00	1.04	1.10

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

**60Hz Voltages**

<b>380</b>	<b>400</b>	<b>416</b>	<b>440</b>	<b>460</b>	<b>480</b>	
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**

<b>Star</b>	<b>Delta</b>	
Multiplication Factor	1.00	1.73

*Apply factor to the complete curve*

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

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