FRAME 3104D WINDING 6

MODELS LL 3114D / LL3124D / LL3134D

REF: F3104DW6-0 SEP 2013

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	0.25/0.3

EXCITATION DETAILS

	SHUNT	AREP/PMG
Excitation system		
AVR model	R250	R438
Sustained short-circuit current	-	300%
Steady state voltage regulation	+/-0,5%	+/-0,5%

WAVEFORM

Line voltage on no load or balanced linear rated load

Total harmonic content THC	<2%
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**					
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 H rise BR	**125/40**	**kVA**	**95.0**	**95.0**	**95.0**	**85.0**	**100.0**	**105.0**	**110.0**	**115.0**	**120.0**	**120.0**
		kW	*76.0*	*76.0*	*76.0*	*68.0*	*80.0*	*84.0*	*88.0*	*92.0*	*96.0*	*96.0*
Class H rise PR	**150/40**	**kVA**	**100.7**	**100.7**	**100.7**	**90.1**	**106.0**	**111.3**	**116.6**	**121.9**	**127.2**	**127.2**
		kW	*80.6*	*80.6*	*80.6*	*72.1*	*84.8*	*89.0*	*93.3*	*97.5*	*101.8*	*101.8*
Class H rise PR	**163/27**	**kVA**	**104.5**	**104.5**	**104.5**	**93.5**	**110.0**	**115.5**	**121.0**	**126.5**	**132.0**	**132.0**
		kW	*83.6*	*83.6*	*83.6*	*74.8*	*88.0*	*92.4*	*96.8*	*101.2*	*105.6*	*105.6*
Class F rise BR	**105/40**	**kVA**	**86.5**	**86.5**	**86.5**	**77.5**	**91.0**	**95.5**	**100.0**	**104.5**	**109.0**	**109.0**
		kW	*69.2*	*69.2*	*69.2*	*62.0*	*72.8*	*76.4*	*80.0*	*83.6*	*87.2*	*87.2*

EFFICIENCIES

Power factor 0.8

110%	Class H BR	%	90.8	90.7	90.4	89.4	90.9	91.1	91.2	91.3	91.3	91.2
100%	Class H BR	%	91.2	91.1	90.7	89.6	91.3	91.5	91.6	91.7	91.6	91.5
75%	Class H BR	%	92.1	91.8	91.3	89.6	92.1	92.3	92.3	92.3	92.2	91.9
50%	Class H BR	%	92.3	91.7	91.0	88.3	92.4	92.4	92.4	92.3	92.0	91.5
25%	Class H BR	%	90.2	88.9	87.6	82.8	90.2	90.1	90.0	89.6	89.1	88.0

CHARACTERISTIC PARAMETERS

Reactance base class H BR rating

K_c	Short-circuit ratio		0.39	0.49	0.62	0.99	0.24	0.26	0.28	0.34	0.39	0.46
X_d	D-Axis synchronous reactance (unsaturated)	pu	3.59	3.24	3.01	2.40	4.53	4.30	4.16	3.89	3.71	3.41
X'_d	D-Axis transient reactance (saturated)	pu	0.16	0.14	0.13	0.10	0.20	0.19	0.18	0.17	0.16	0.15
X''_d	D-Axis sub-transient reactance (saturated)	pu	0.093	0.084	0.078	0.062	0.118	0.111	0.108	0.101	0.096	0.088
X_q	Q-Axis synchronous reactance (unsaturated)	pu	2.15	1.94	1.81	1.44	2.72	2.58	2.50	2.33	2.23	2.05
X''_q	Q-Axis sub-transient reactance (saturated)	pu	0.199	0.180	0.167	0.133	0.252	0.239	0.231	0.216	0.206	0.189
X_2	Negative-sequence reactance (saturated)	pu	0.146	0.132	0.123	0.098	0.185	0.175	0.170	0.158	0.151	0.139
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		2314					2314			
T_a	Armature time constant	ms		15					15			
T_r	Voltage recovery time	ms		< 500ms					< 500ms			

EXCITATION VOLTAGE AND CURRENT

No load excitation voltage	V	7.2	8.6	10.1	13.9	4.8	5.2	5.6	6.4	7.3	8.6
No load excitation current	A	0.62	0.74	0.87	1.19	0.41	0.45	0.48	0.55	0.63	0.74
Class H BR excitation voltage	V	29.9	32.1	34.4	38.0	25.4	26.1	27.0	28.3	30.2	31.6
Class H BR excitation current	A	2.57	2.76	2.95	3.26	2.18	2.24	2.32	2.43	2.59	2.71

WINDING RESISTANCE

At 20° C

Stator line-to-line (series star)	Ω	0.101	Exciter field	Ω	11.6
Main field	Ω	2.35			

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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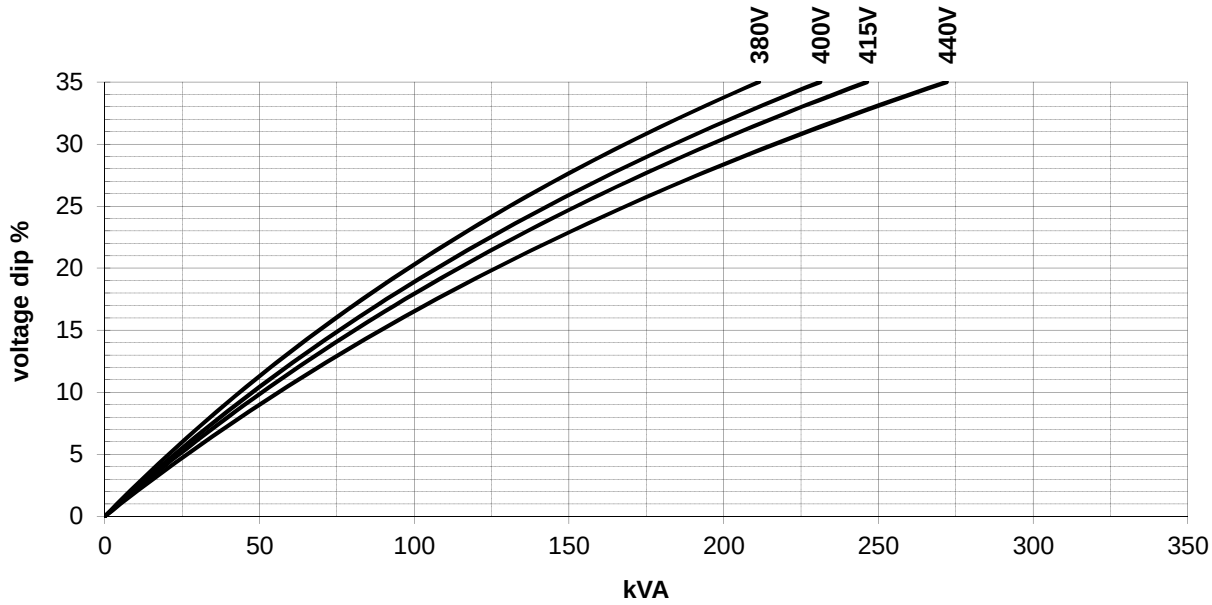
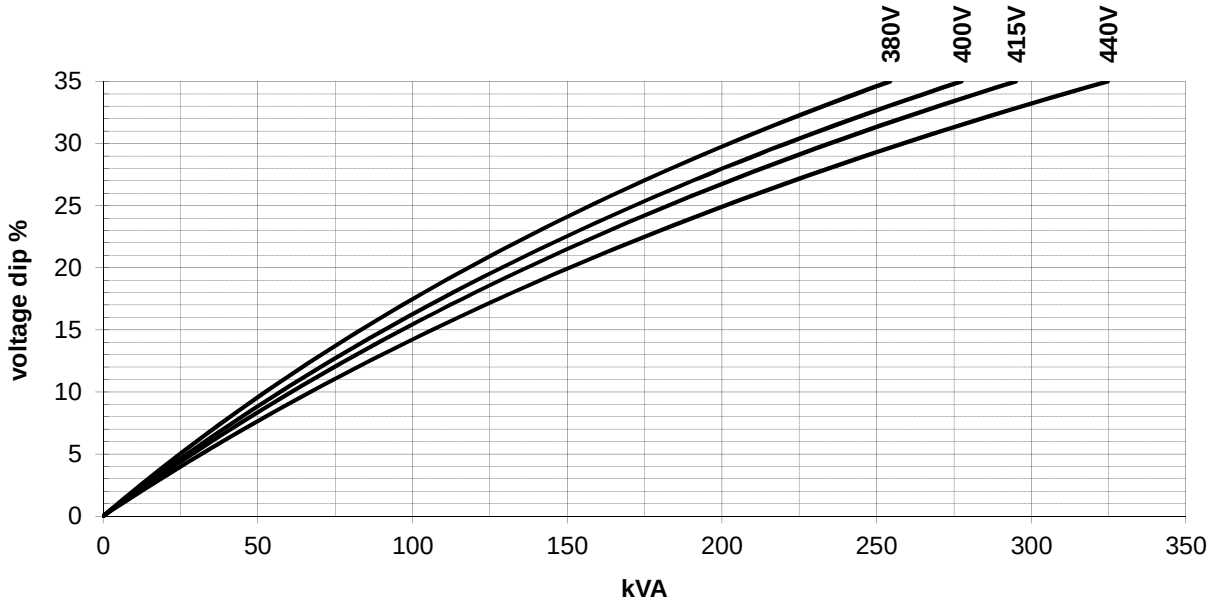
LOCKED ROTOR MOTOR STARTING CURVES

Power factor 0.6

50 Hz SHUNT



50 Hz AREP/PMG



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MODELS LL 3114D / LL3124D / LL3134D

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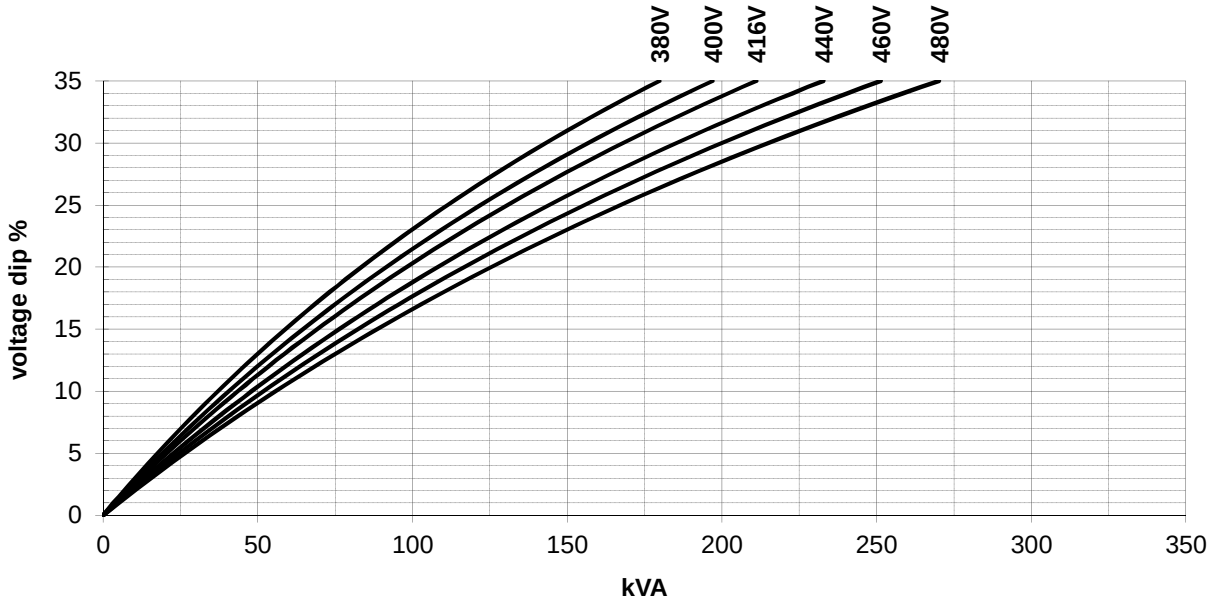
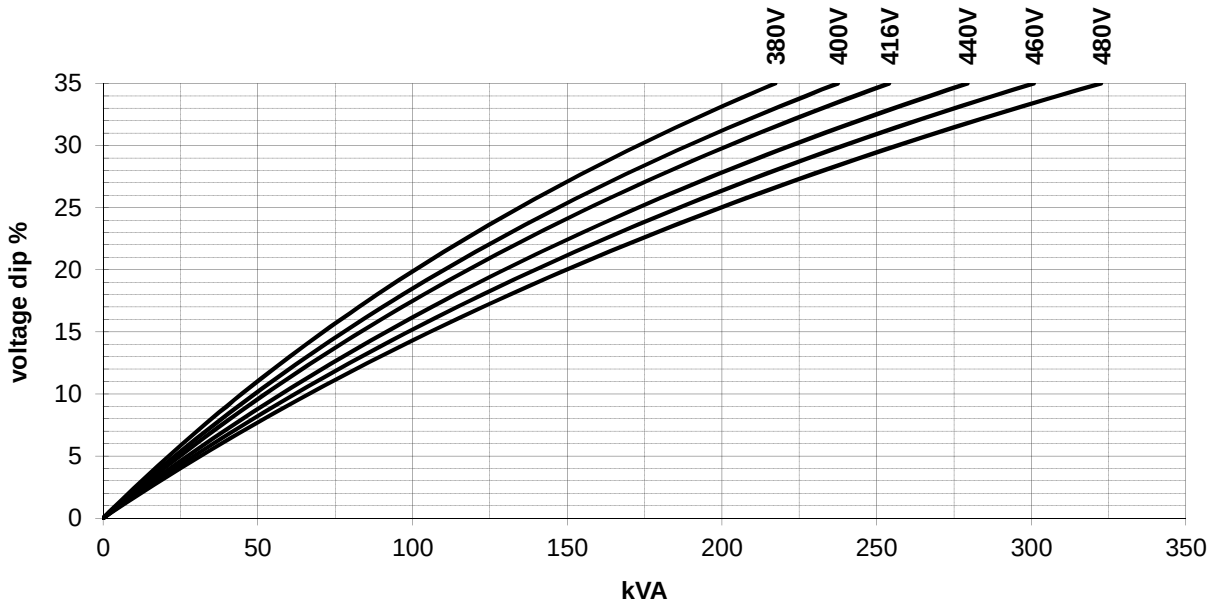
LOCKED ROTOR MOTOR STARTING CURVES

Power factor 0.6

60 Hz SHUNT



60 Hz AREP/PMG



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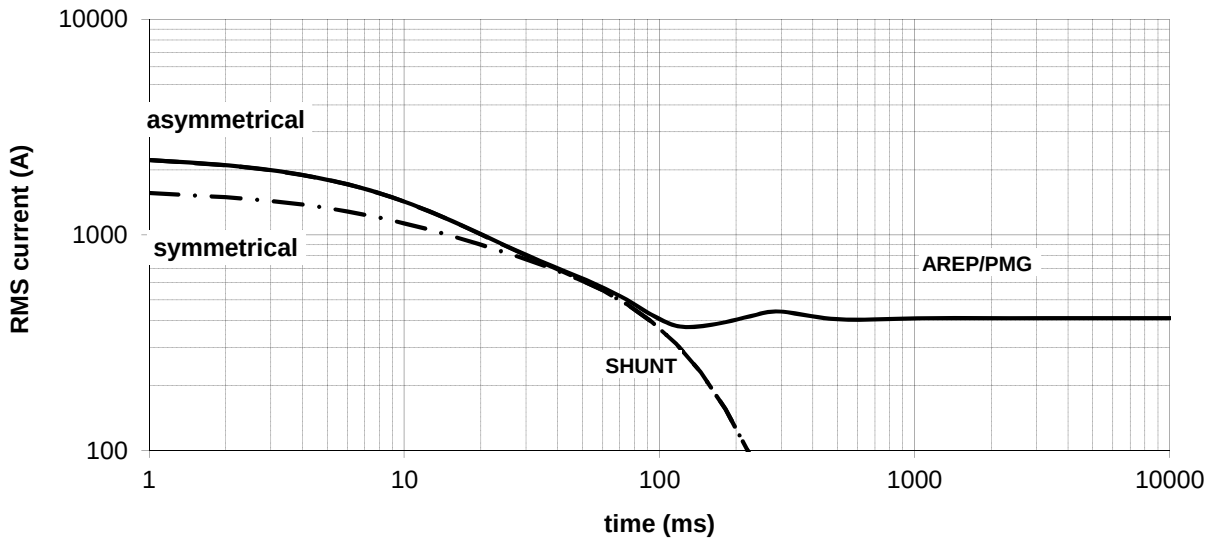
THREE-PHASE SHORT-CIRCUIT DECREMENT CURVES

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

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