

**MODEL****FG29A320****WINDING****R1**

REF: FG29A320R1-0 JAN 2019

**WINDING DETAILS**

Code	R1	Insulation class	H
Phase	3	Leads	12
Pole number	4	Pitch	2/3

**MECHANICAL DETAILS**

Standard protection	IP21
Overspeed	rpm 2250
Air flow 50Hz/60Hz	m <sup>3</sup> /s 0.25/0.30

**EXCITATION DETAILS**

Excitation system	<b>SHUNT</b>	<b>PMG</b>
AVR model	GRT7-TH4E	IVR
Sustained short-circuit current	-	300:10s
Steady state voltage regulation	+/- 0.5 %	+/- 0.25 %

**WAVEFORM**

<i>Line voltage on no load or balanced linear rated load</i>	
Total harmonic content THC	< 3 %
Telephone influence factor TIF (NEMA)	< 50 %
Telephone harmonic factor THF (IEC)	< 2 %

**LINE VOLTAGE**

Frequency / speed	V	50Hz / 1500rpm			60Hz / 1800rpm				
		380	400	415	380	416	440	460	480
Series star	V	380	400	415	380	416	440	460	480
Series delta	V	220	230	240	220	240	254	266	277
Parallel star	V	190	200	208	190	208	220	230	240

**RATING**

Power factor 0.8, Altitude &lt;=1000m

Class	Rating	kVA	380	400	400	413	441	463	483	503
Class H rise BR	125/40	kVA	380	400	400	413	441	463	483	503
		kW	304	320	320	330	353	370	386	402
Class H rise PR	150/40	kVA	418	440	440	433	463	485	506	528
		kW	334	352	352	346	370	388	405	422
Class H rise PR	163/27	kVA	437	460	460	454	485	509	531	553
		kW	350	368	368	363	388	407	425	442
Class F rise BR	105/40	kVA	342	360	360	371	397	416	434	452
		kW	274	288	288	297	318	333	347	362

**EFFICIENCIES**

Power factor 0.8

Efficiency	Class	%	93.4	93.5	95.4	94.5	94.9	95.1	95.3	95.4
110%	Class H BR	%	93.4	93.5	95.4	94.5	94.9	95.1	95.3	95.4
100%	Class H BR	%	93.9	94.0	95.7	94.9	95.2	95.4	95.6	95.7
75%	Class H BR	%	94.7	94.8	96.1	95.5	95.7	95.9	96.0	96.0
50%	Class H BR	%	94.6	94.6	95.7	95.0	95.2	95.3	95.4	95.5
25%	Class H BR	%	92.9	92.9	93.9	93.0	93.1	93.2	93.3	93.3

**CHARACTERISTIC PARAMETERS**

Reactance base class H BR rating

K <sub>cc</sub>	Short-circuit ratio		0.34	0.37	0.40	0.23	0.27	0.29	0.31	0.34
X <sub>d</sub>	D-Axis synchronous reactance (unsaturated)	pu	3.66	3.47	3.23	4.77	4.25	3.99	3.80	3.64
X' <sub>d</sub>	D-Axis transient reactance (saturated)	pu	0.13	0.12	0.11	0.17	0.15	0.14	0.13	0.13
X'' <sub>d</sub>	D-Axis sub-transient reactance (saturated)	pu	0.116	0.110	0.102	0.151	0.135	0.126	0.120	0.115
X <sub>q</sub>	Q-Axis synchronous reactance (unsaturated)	pu	1.62	1.54	1.43	2.11	1.88	1.76	1.68	1.61
X'' <sub>q</sub>	Q-Axis sub-transient reactance (saturated)	pu	0.177	0.168	0.156	0.231	0.206	0.193	0.184	0.176
X <sub>2</sub>	Negative-sequence reactance (saturated)	pu	0.147	0.140	0.130	0.190	0.170	0.160	0.150	0.150
X <sub>0</sub>	Zero-sequence reactance (independent)	pu	0.007	0.006	0.006	0.009	0.008	0.008	0.007	0.007
T' <sub>d</sub>	D-Axis transient time constant	ms		84				84		
T'' <sub>d</sub>	D-Axis sub-transient time constant	ms		2				2		
T' <sub>do</sub>	D-Axis open-circuit time constant	ms		2410				2410		
T <sub>a</sub>	Armature time constant	ms		16				16		

**EXCITATION VOLTAGE AND CURRENT**

No load excitation voltage	V	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
No load excitation current	A	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Class H BR excitation voltage	V	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Class H BR excitation current	A	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50

**WINDING RESISTANCE**

At 20° C

Stator line-to-line (Series Star)	Ω	0.014			Exciter field	Ω	9.86
Main field	Ω	0.74					

According to: IEC 60034-1 &amp; 22, 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.

**MODEL FG29A320**

**WINDING R1**

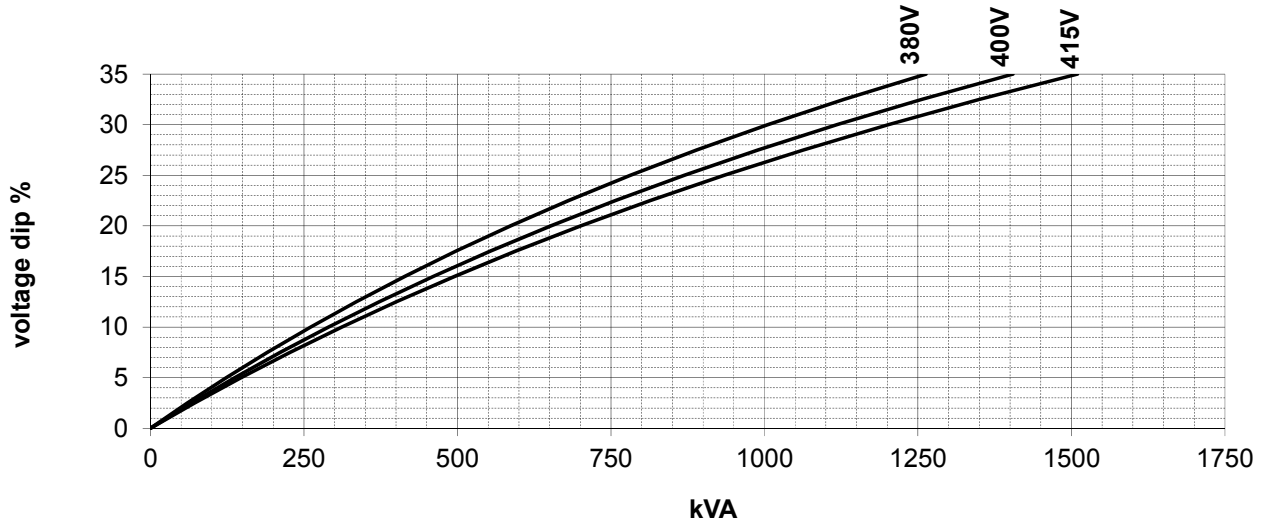


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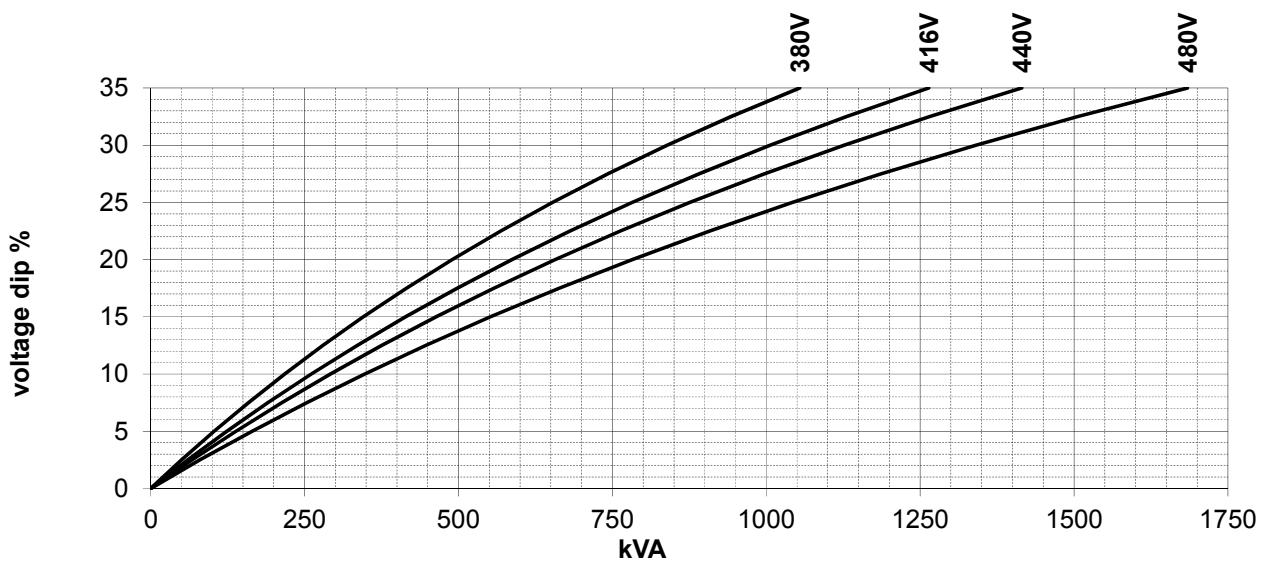
**LOCKED ROTOR MOTOR STARTING CURVES**

Power factor 0.6

**50 Hz**



**60 Hz**



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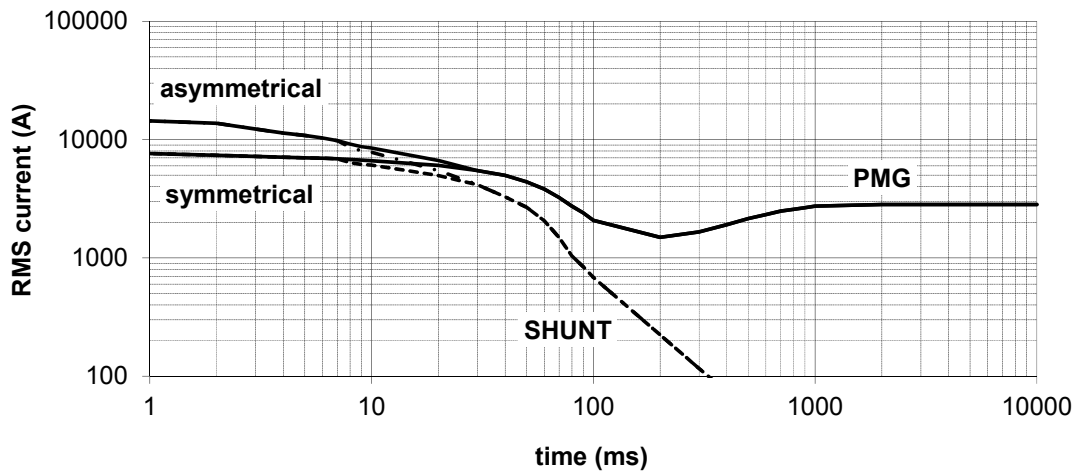
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THREE PHASE - SHORT CIRCUIT DECREMENT CURVES

No-load excitation at rated speed

400V 50Hz, 480V 60Hz

Series Star



Multiplication Factors

50Hz Voltages

380	400	415
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Multiplication Factor

0.95	1.00	1.04
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Apply factor up to 2xT'd, remainder of curve unchanged

60Hz Voltages

380	416	440	460	480
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Multiplication Factor

0.79	0.87	0.92	0.96	1.00
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Apply factor up to 2xT'd, remainder of curve unchanged

Winding Connection

Series Star	Parallel Star	Series Delta
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Multiplication Factor

1.00	2.00	1.73
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Apply factor to the complete curve

According to: IEC 60034-1 & 22, BS 4999/5000, NEMA MG 1-33

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