maranello alternator

M500

CONT 450 kVA

www.maranellogenerators.com

THREE-PHASE SYNCHRONOUS GENERATOR

Datasheet for 4 poles -50Hz @ 1500rpm/ 60Hz @ 1800rpm

Ambient Temperature	40°C	Method of Cooling	Air cooling
Temperature Rise	125°C	Direction of Rotation	Clockwise
Insulation Class	H	Maximum Over-speed	2250r/min
Power Factor	0.8	Degree of Protection / Enclosure	IP23
Excitation	Brushless	Altitude	1000m
Winding Pitch	2/3	Stator winding	DLL
Pole	4	Number of Terminal	12
Duty	S1- Continuous	Rotor	With damping cage
Waveform	TIF<50	THF<2%	
Waveform distortion	BS EN 61000-6-2&BS EN 61000-6-4,VDE 0875G,VDE0874N		
Radio interference	Noload<1.5%,Non-distorting balanced linear load<5%		

AVR MODEL AVR	Standard	Selection		PMG		
	AS440	KRS440		MX341B	MX321	
Voltage Regulation - in steady state condition	±1.0	±1.0		±0.5	±0.5	
Short Circuit Current Capacity	Control does not sustain a short circuit current			2050A		

Electrical Characteristic

Frequency	Hz	50				60			
Voltage (series star) Y	V	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
Voltage (parallel star) YY	V	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
Voltage (series delta) Δ	V	220	230	240	254	240	254	266	277
Rated power at Class H (125° C) temperature rise	kVA	455	500	455	450	525	550	581	594
	kW	364.0	400.0	364.0	360.0	420.0	440.0	464.8	475.2
Efficiency at Class H (P.F.=0.8)	4/4%	94	93.8	94.4	94.7	94	94	94.1	94.1
	3/4%	94.8	94.7	95	95	94.7	94.8	94.9	94.9
	2/4%	95	95	94.9	94.8	94.7	94.7	94.8	94.8
Efficiency at Class H (P.F.=1.0)	4/4%	95.3	95.1	95.6	95.8	95.2	95.2	95.2	95.4
	3/4%	95.9	95.9	96.1	96.1	95.8	95.9	95.9	96
	2/4%	96	96.1	96	95.9	95.7	95.8	95.9	95.9
Reactances (%) at Class H									
Direct axis synchronous reactance unsaturated	Xd	3.3	3.28	2.77	2.44	3.94	3.69	3.57	3.35
Direct axis transient reactance saturated	X'd	0.18	0.18	0.15	0.13	0.18	0.17	0.16	0.15
Direct axis subtransient reactance saturated	X"d	0.13	0.13	0.11	0.1	0.13	0.12	0.12	0.11
Quadrature axis synchronous reactance unsaturated	Xq	2.69	2.67	2.25	1.98	3.12	2.92	2.82	2.65
Quadrature axis subtransient reactance saturated	X"q	0.27	0.26	0.22	0.2	0.34	0.32	0.31	0.29
Leakage reactance	X1	0.07	0.07	0.06	0.05	0.08	0.07	0.07	0.07
Negative sequence reactance saturated	X2	0.19	0.19	0.16	0.14	0.23	0.22	0.21	0.2
Zero sequence reactance unsaturated	X0	0.11	0.11	0.09	0.08	0.11	0.1	0.1	0.09
Short-circuit ratio	Kcc	0.3030	0.3049	0.3610	0.4098	0.2538	0.2710	0.2801	0.2985

Short-circuit transient time constant (sec.)	T'd	0.08							
Subtransient time constant (sec.)	T"d	0.012							
Open circuit time constant (sec.)	T'do	2							
Armature time constant (sec.)	Tα	0.017							
Stator Winding Resistance (20℃)	ohm	0.00653							
Rotor Winding Resistance (20℃)	ohm	1.55							
Exciter Stator Resistance (20℃)	ohm	17							
Exciter Rotor Phase resistance	ohm	0.092							
No load excitation current	io (A)	0.6	0.61	0.65	0.65	0.6	0.6	0.62	0.65
Full load excitation current	ic(A)	2.4	2.4	2.5	2.5	2.4	2.4	2.5	2.5
Cooling air requirement	m^3/sec	1.035m3/s 2202cfm				1.312m3/s 2780cfm			

Mechanical Characteristic

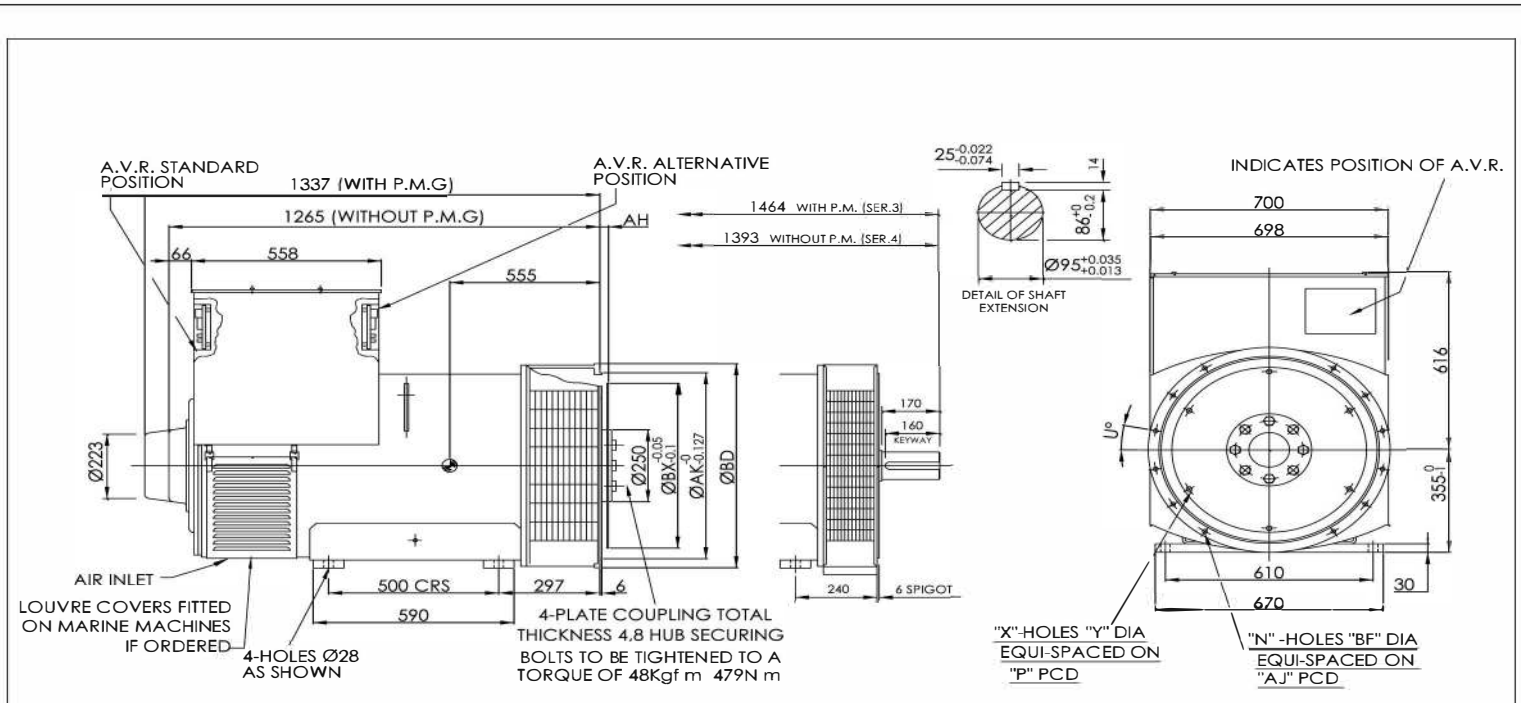
Configuration	Single Bearing	Double Bearing
Type of Construction	B2-SAE	IM B34
Total Weight - kgs	1213	1202
Weight wound stator - kgs	580	580
Weight wound rotor - kgs	502	473
Inertia (J) [kgm2]	4.6331kgm2	4.4343kgm2
Drive end bearing / Lubrication		BALL.6220-2RS(ISO)
Non-drive end bearing / Lubrication	BALL.6314-2RS(ISO)	BALL.6314-2RS(ISO)
Packing crate size（cm）	138X80X115	149X80X115

Winding 311 0.8 Power Factor

RATINGS

	Class - Temp Rise	Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
50 Hz	Series Star (V)	380	400	415	440	380	400	415	440	380	400	415	440	380	400	415	440
	Parallel Star (V)	190	200	208	220	190	200	208	220	190	200	208	220	190	200	208	220
	Series Delta (V)	220	230	240	254	220	230	240	254	220	230	240	254	220	230	240	254
	kVA	400	445	400	400	455	500	455	450	478	512	478	478	500	520	500	495
	kW	320	356	320	320	364	400	364	360	382	410	382	382	400	416	400	396
	Efficiency (%)	94.5	94.3	94.8	94.9	94.0	93.8	94.4	94.6	93.8	93.7	94.2	94.4	93.5	93.6	94.0	94.3
	kW Input	339	378	338	337	387	426	386	381	408	437	406	405	428	444	425	420
60 Hz	Series Star (V)	416	440	460	480	416	440	460	480	416	440	460	480	416	440	460	480
	Parallel Star (V)	208	220	230	240	208	220	230	240	208	220	230	240	208	220	230	240
	Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	481	500	531	538	525	550	581	594	550	581	613	625	569	600	631	644
	kW	385	400	425	430	420	440	465	475	440	465	490	500	455	480	505	515
	Efficiency (%)	94.3	94.4	94.4	94.5	94.0	94.1	94.1	94.2	93.8	93.9	93.9	94.0	93.6	93.7	93.7	93.9
	kW Input	408	424	450	455	447	468	494	504	469	495	522	532	486	512	539	549

DIMENSIONS



COUPLING DISC					
SAE	BX	P	X	Y	AH
21	673.10	641.35	12	16.7	0
18	571.50	542.92	6	16.7	15.7
14	466.72	438.15	8	13.5	25.4

FLANGE (mm)						
SAE	BD	AK	AJ	U°	BF	n
SAE1	553	511.18	530.22	15	12.7	12
SAE1/2	648	584.20	619.12	15	14	12
SAE0	711	647.70	679.45	11.25	14	16
SAE00	882	787.40	850.90	11.25	14	16

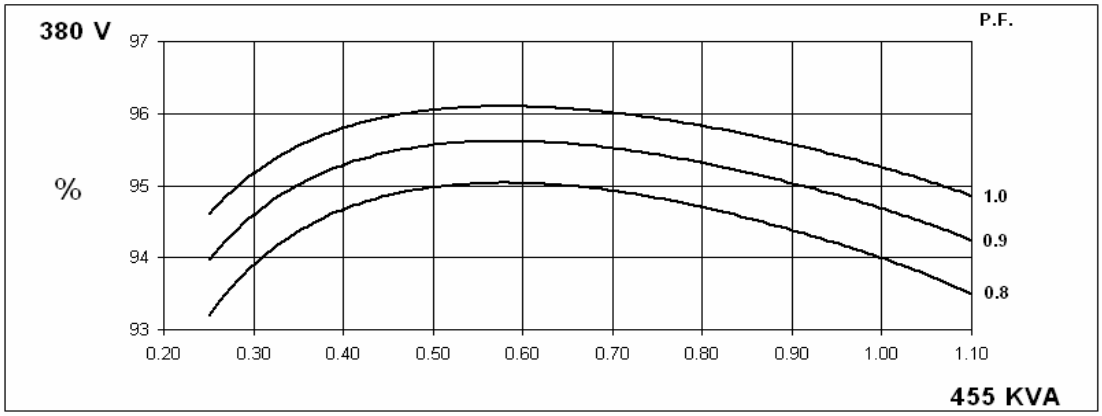
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Design		APP	
CHK		Date	2018.01

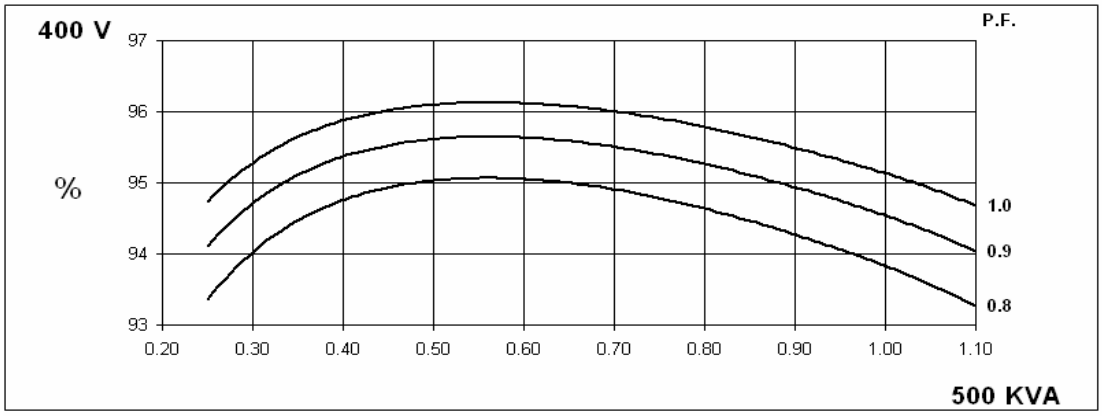
1:1 A2 mm

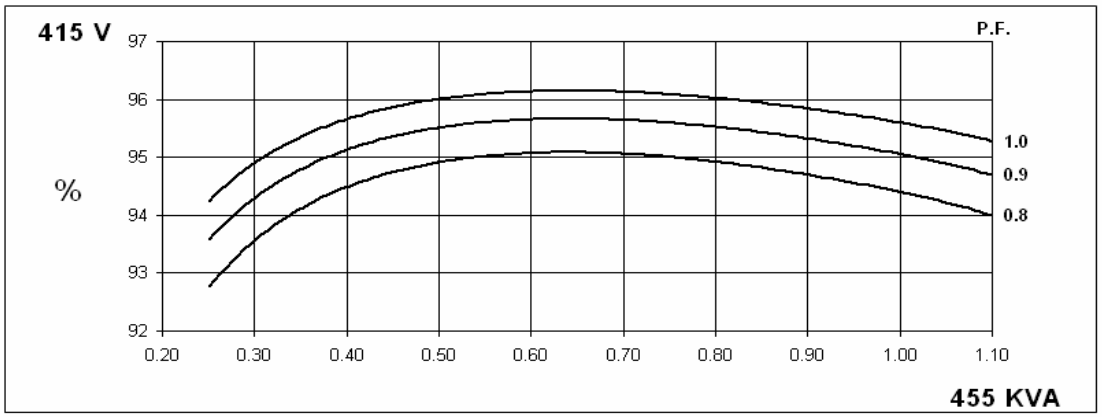
50 Hz

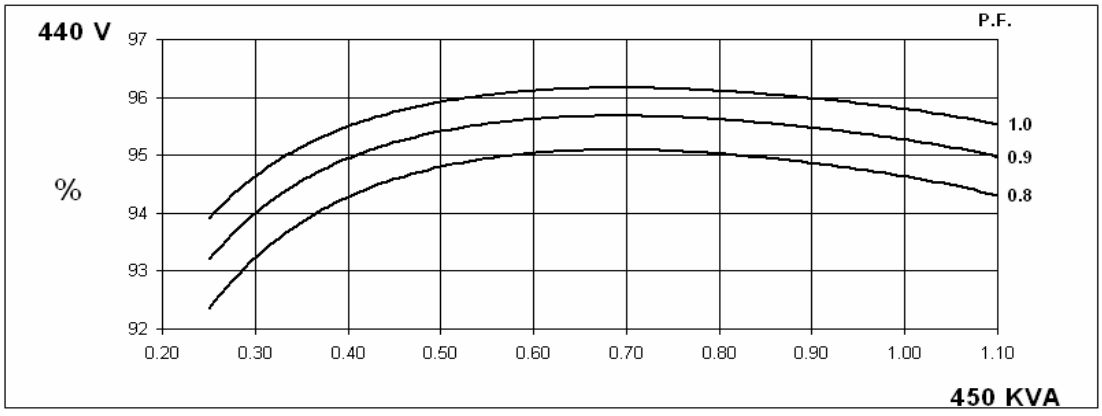
Winding 311

THREE PHASE EFFICIENCY CURVES





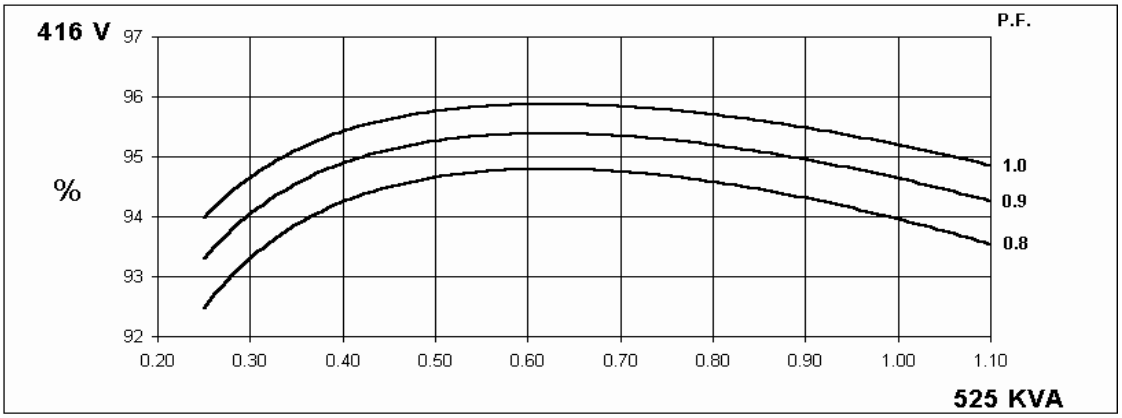


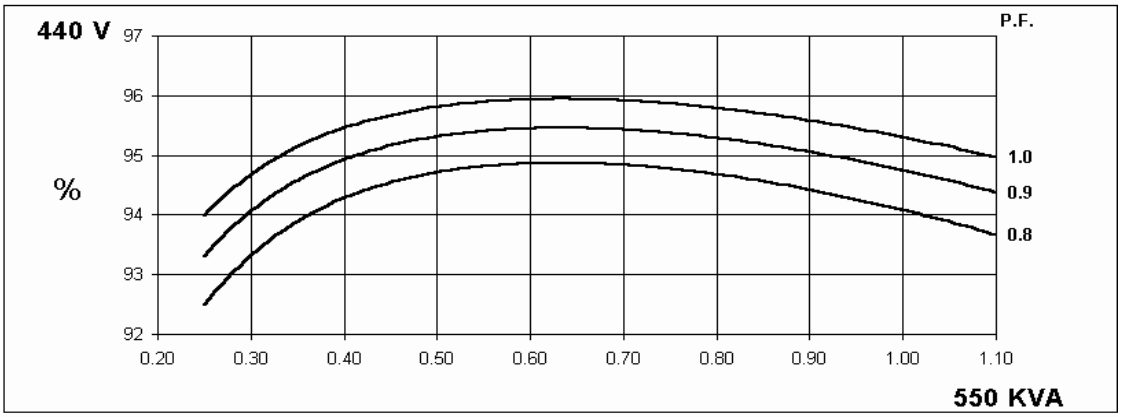


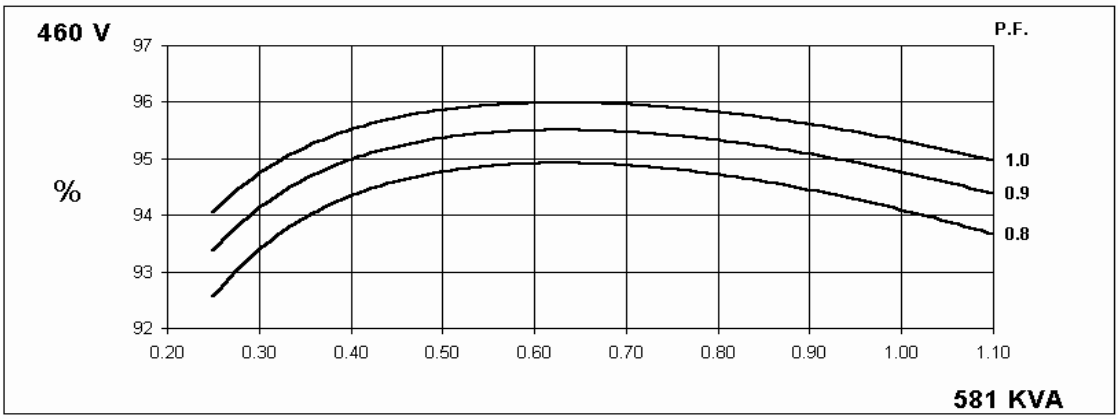
60 Hz

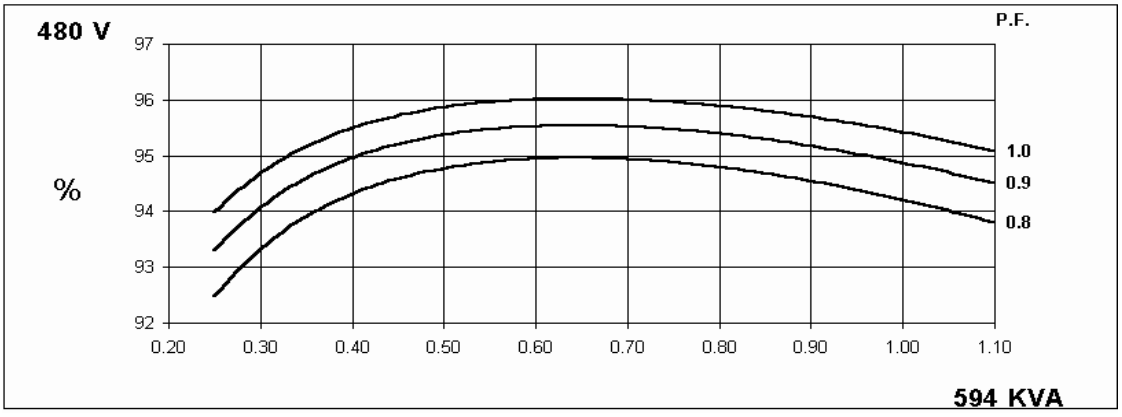
Winding 311

THREE PHASE EFFICIENCY CURVES



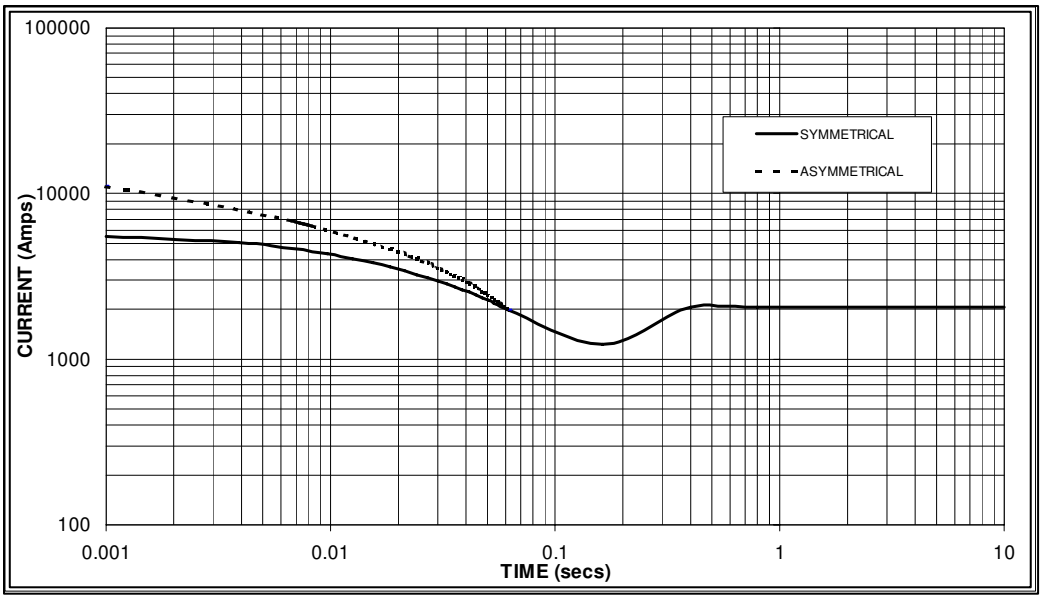






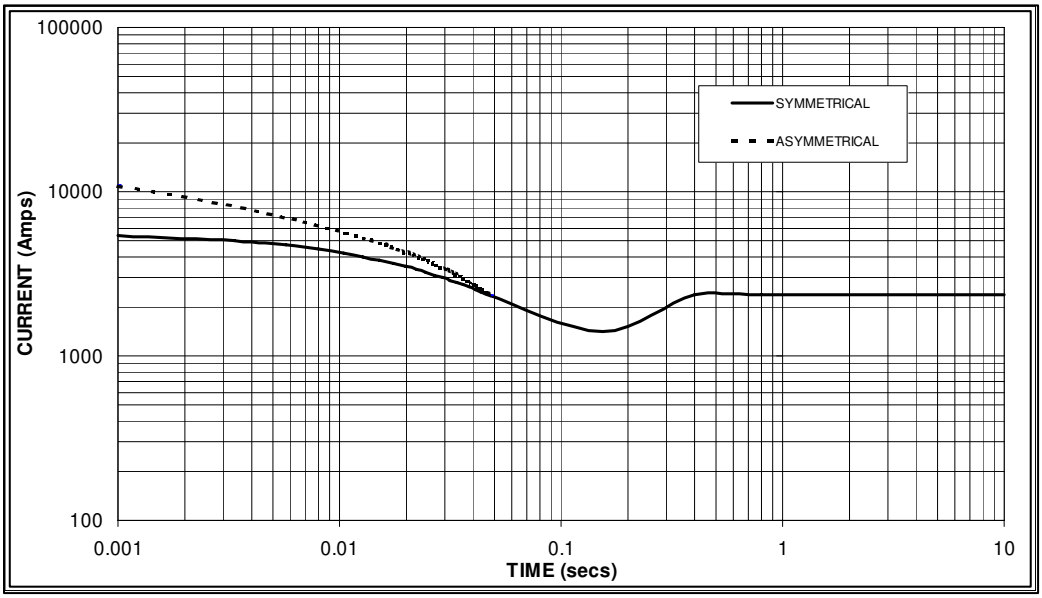
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 2,050 Amps

60 Hz



Sustained Short Circuit = 2,350 Amps

Note 1

The following multiplication factors should be used to adjust the values from curve between time 0.001 seconds and the minimum current point in respect of nominal operating voltage :

50Hz		60Hz	
Voltage	Factor	Voltage	Factor
380v	X 1.00	416v	X 1.00
400v	X 1.03	440v	X 1.06
415v	X 1.05	460v	X 1.12
440v	X 1.07	480v	X 1.20

The sustained current value is constant irrespective of voltage level

Note 2

The following multiplication factor should be used to convert the values calculated in accordance with NOTE 1 to those applicable to the various types of short circuit :

	3-phase	2-phase L-L	1-phase L-N
Instantaneous	x 1.00	x 0.87	x 1.30
Minimum	x 1.00	x 1.80	x 3.20
Sustained	x 1.00	x 1.50	x 2.50
Max. sustained duration	10 sec.	5 sec.	2 sec.

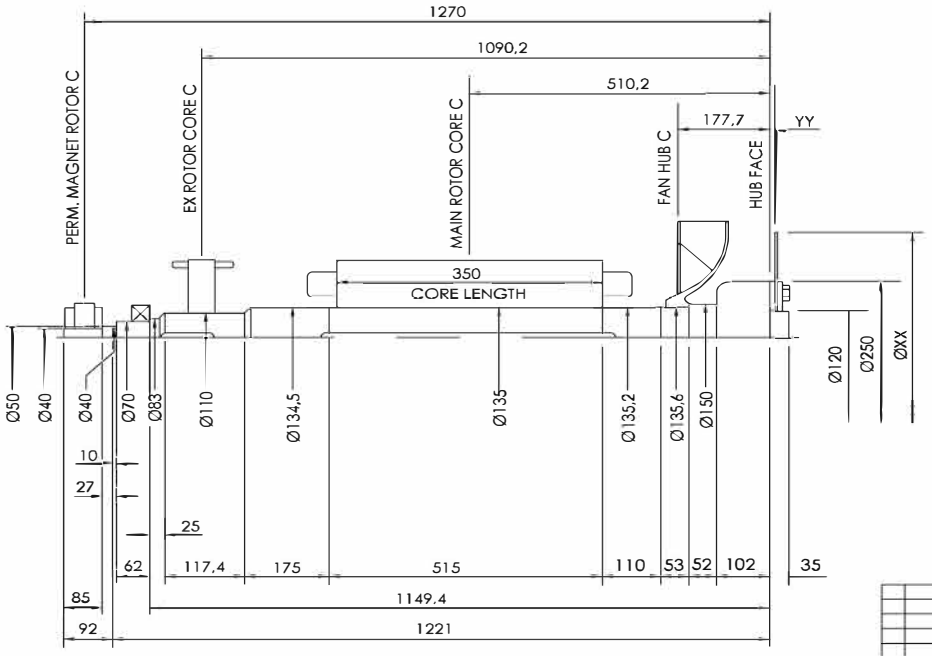
All other times are unchanged

Note 3

Curves are drawn for Star (Wye) connected machines. For other connections the following multipliers should be applied to current values as shown :

Parallel Star = Curve current value X 2

Series Delta = Curve current value X 1.732



COMPONENT	Wt kg	J kgm^2
EX. ROTOR	31,290	0,5100
MAIN ROTOR	296.82	5.439
FAN	12.53	0,393
SHAFT	129.664	0,287
HUB	23.922	0,2455
TOTAL	494.226	6.8745
PERM. MAG.	7.899	0,0183
TOTAL	502.125	6.8928

COUPLING SAE No	COUPLING DIMEN's		COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC J kgm^2
	XX	YY		
11,5	352	23,8	12,08	0,055
14	467	9,5	11,66	0,172
18	572	0,0	12,07	0,386

					1:1
VER	MOD	DRW	Date		
Design		APP			mm
CHK		Date	2018.01		



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