maranello alternator

M220

CONT 200 kVA

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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		
	SX460	AS440	KRS440	MX341B	MX321	
Voltage Regulation - in steady state condition	±1.0	±1.0	±1.0	±0.5	±0.5	
Short Circuit Current Capacity	Control does not sustain a short circuit current			1000A		

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	200	200	200	N/A	237.5	245	245	255
	kW	160.0	160.0	160.0	N/A	190.0	196.0	196.0	204.0
Efficiency at Class H (P.F.=0.8)	4/4%	93	93.2	93.3	N/A	93	93.2	93.4	93.6
	3/4%	93.7	93.8	93.9	N/A	93.7	93.8	94	94
	2/4%	93.9	93.9	93.9	N/A	93.9	94	94	94
Efficiency at Class H (P.F.=1.0)	4/4%	94.6	94.8	94.9	N/A	94.5	94.7	94.9	95
	3/4%	95.1	95.1	95.2	N/A	95	95.2	95.2	95.2
	2/4%	95.2	95.2	95.2	N/A	95.2	95.3	95.2	95.2
Reactances (%) at Class H									
Direct axis synchronous reactance unsaturated	Xd	2.11	1.91	1.77	N/A	2.5	2.31	2.11	2.02
Direct axis transient reactance saturated	X'd	0.18	0.16	0.15	N/A	0.21	0.19	0.18	0.17
Direct axis subtransient reactance saturated	X"d	0.12	0.11	0.1	N/A	0.14	0.13	0.12	0.11
Quadrature axis synchronous reactance unsaturated	Xq	1.28	1.15	1.07	N/A	1.53	1.41	1.29	1.23
Quadrature axis subtransient reactance saturated	X"q	0.17	0.15	0.14	N/A	0.2	0.18	0.17	0.16
Leakage reactance	X1	0.08	0.08	0.07	N/A	0.1	0.09	0.08	0.08
Negative sequence reactance saturated	X2	0.13	0.12	0.11	N/A	0.16	0.15	0.13	0.13
Zero sequence reactance unsaturated	X0	0.08	0.08	0.07	N/A	0.1	0.09	0.08	0.08
Short-circuit ratio	Kcc	0.4739	0.5236	0.5650	N/A	0.4000	0.4329	0.4739	0.4950
Short-circuit transient time constant (sec.)	T'd	0.042							
Subtransient time constant (sec.)	T"d	0.012							
Open circuit time constant (sec.)	T'do	1.1							
Armature time constant (sec.)	Tα	0.012							
Stator Winding Resistance (20℃)	ohm	0.0153							
Rotor Winding Resistance (20℃)	ohm	1.92							
Exciter Stator Resistance (20℃)	ohm	20							
Exciter Rotor Phase resistance	ohm	0.091							
No load excitation current	io (A)	0.5	0.52	0.6	0.5	0.5	0.51	0.52	0.53
Full load excitation current	ic(A)	1.8	1.8	1.9	1.8	1.8	1.8	1.9	1.9
Cooling air requirement	m^3/sec	0.514m3/s 1090cfm				0.617m3/s 1308cfm			

Mechanical Characteristic

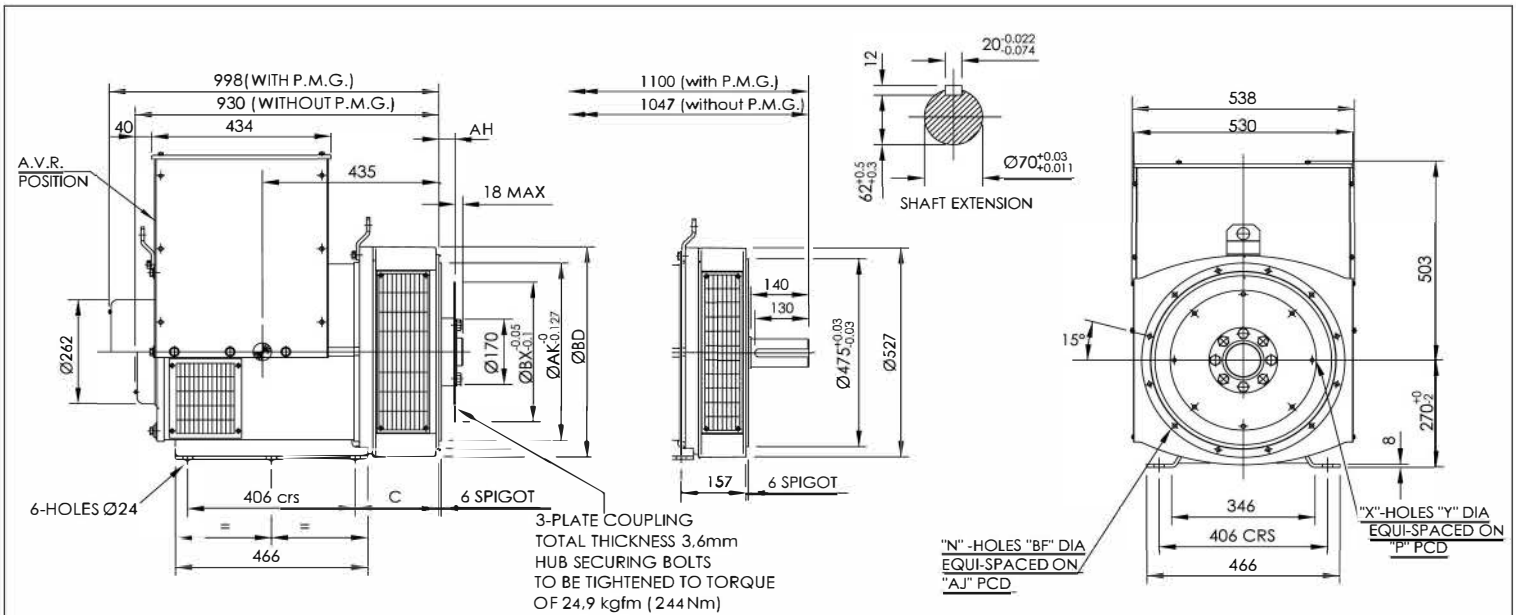
Configuration	Single Bearing	Double Bearing
Type of Construction	B2-SAE	IM B34
Total Weight - kgs	615	605
Weight wound stator - kgs	251	251
Weight wound rotor - kgs	226	216
Inertia (J) [kgm2]	1.9349kgm2	1.8843kgm2
Drive end bearing / Lubrication		BALL.6315-2RS(ISO)
Non-drive end bearing / Lubrication	BALL.6310-2RS(ISO)	BALL.6310-2RS(ISO)
Packing crate size（cm）	108X63X94	115X63X94

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	182.0	182.0	182.0	N/A	200.0	200.0	200.0	N/A	212.0	212.0	212.0	N/A	220.0	220.0	220.0	N/A
	kW	145.6	145.6	145.6	N/A	160.0	160.0	160.0	N/A	169.6	169.6	169.6	N/A	176.0	176.0	176.0	N/A
	Efficiency (%)	93.3	93.5	93.6	N/A	93.0	93.3	93.4	N/A	92.8	93.1	93.3	N/A	92.7	93.0	93.2	N/A
	kW Input	156.1	155.7	155.6	N/A	172.0	171.5	171.3	N/A	182.8	182.2	181.8	N/A	189.9	189.2	188.8	N/A
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
	Series Delta (V)	240	254	266	277	240	254	266	277	240	254	266	277	240	254	266	277
	kVA	218.8	225.0	225.0	235.0	237.5	245.0	245.0	255.0	250.0	258.8	258.8	275.0	256.3	265.0	265.0	280.0
	kW	175.0	180.0	180.0	188.0	190.0	196.0	196.0	204.0	200.0	207.0	207.0	220.0	205.0	212.0	212.0	224.0
	Efficiency (%)	93.2	93.4	93.6	93.7	93.0	93.2	93.5	93.6	92.8	93.1	93.3	93.4	92.7	93.0	93.3	93.3
	kW Input	187.8	192.7	192.3	200.6	204.3	210.3	209.6	217.9	215.5	222.4	221.9	235.5	221.2	228.0	227.2	240.1

DIMENSIONS



COUPLING DISC					
SAE	BX	P	X	Y	AH
14	466.72	438.15	8	13.5	25.4
11.5	352.42	333.38	8	11	39.6
10	314.32	295.28	8	11	53.8

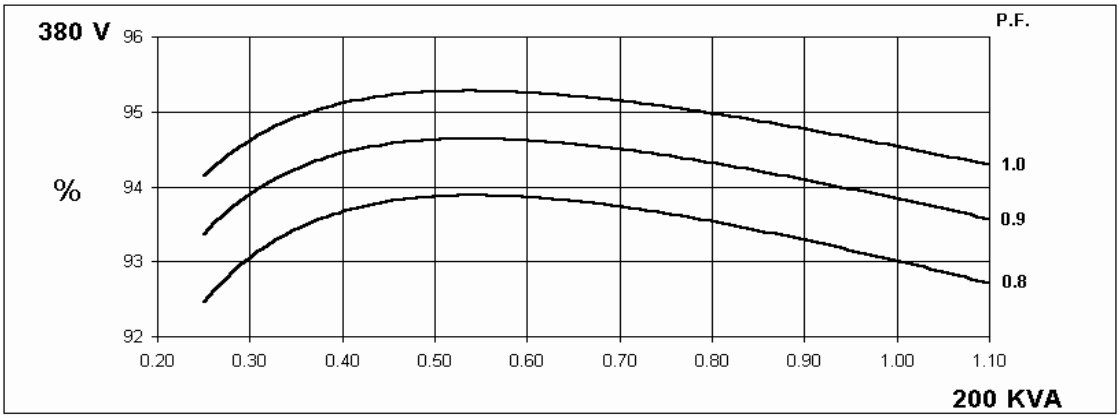
FLANGE (mm)						
SAE号	BD	AK	AJ	BF	n	C
SAE3	451	409.58	428.62	11	12	202
SAE2	490	447.68	466.72	11	12	202
SAE1	553	511.17	530.22	12.7	12	216.3

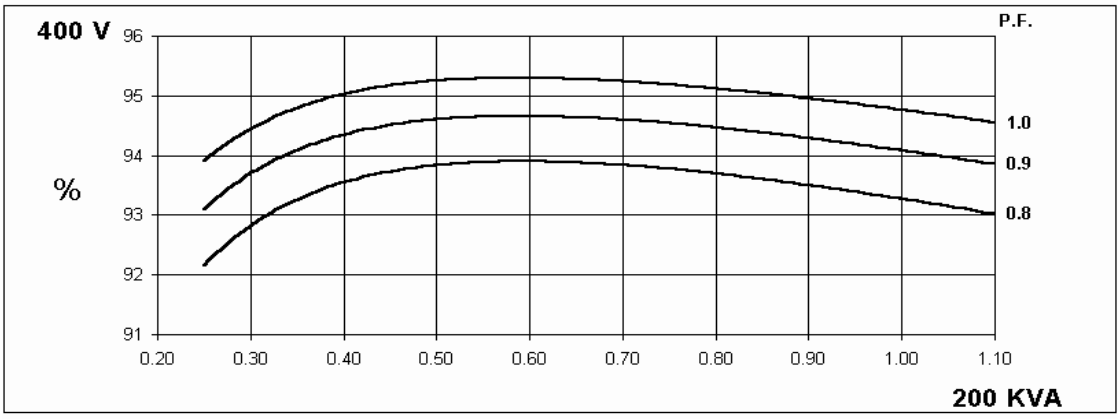
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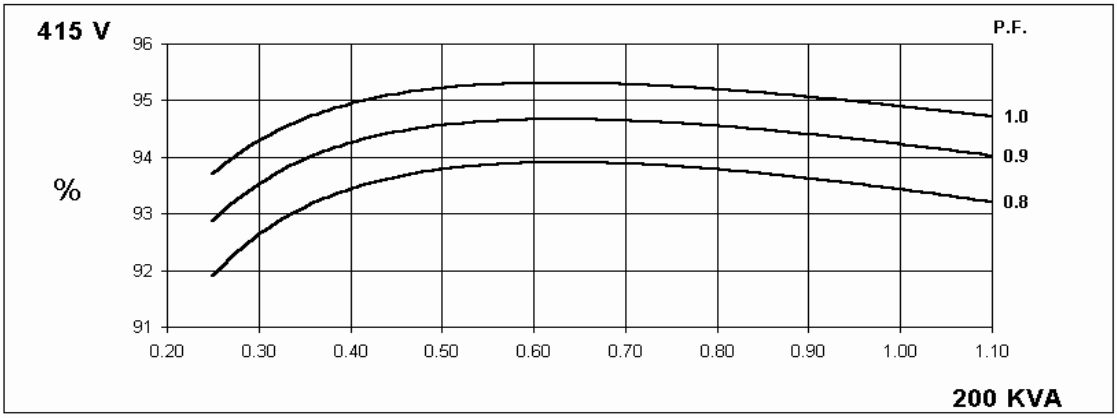
50 Hz

Winding 311

THREE PHASE EFFICIENCY CURVES



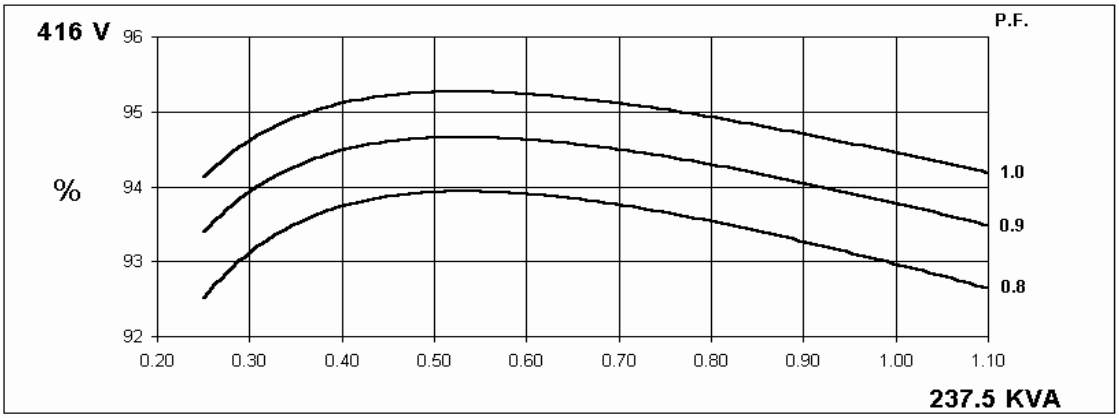


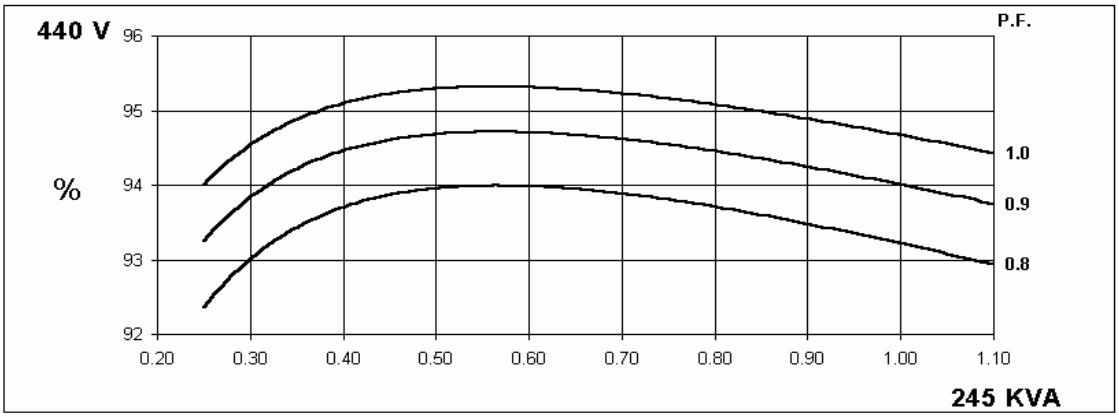


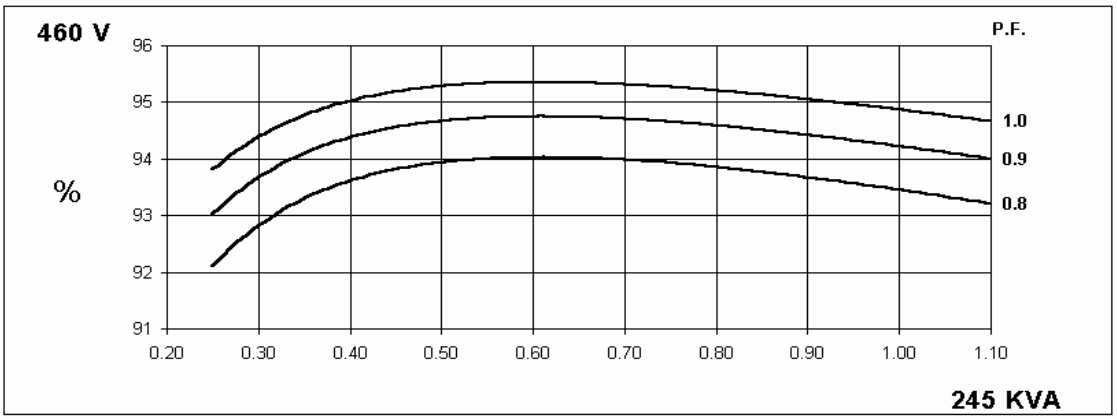
60 Hz

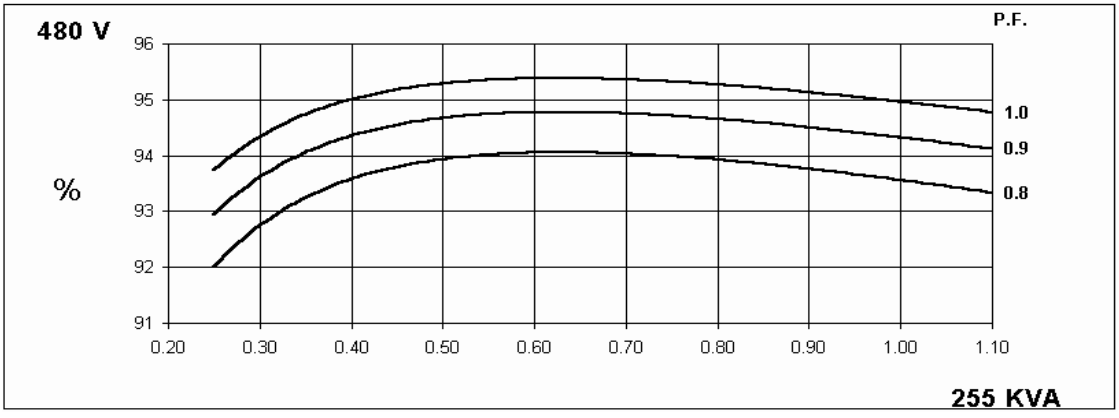
Winding 311

THREE PHASE EFFICIENCY CURVES



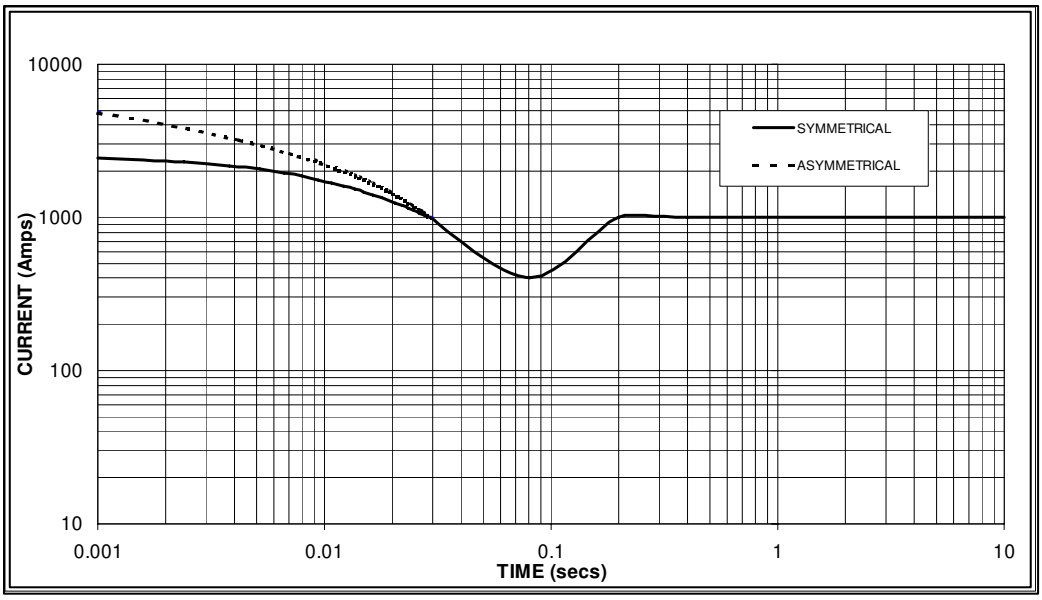






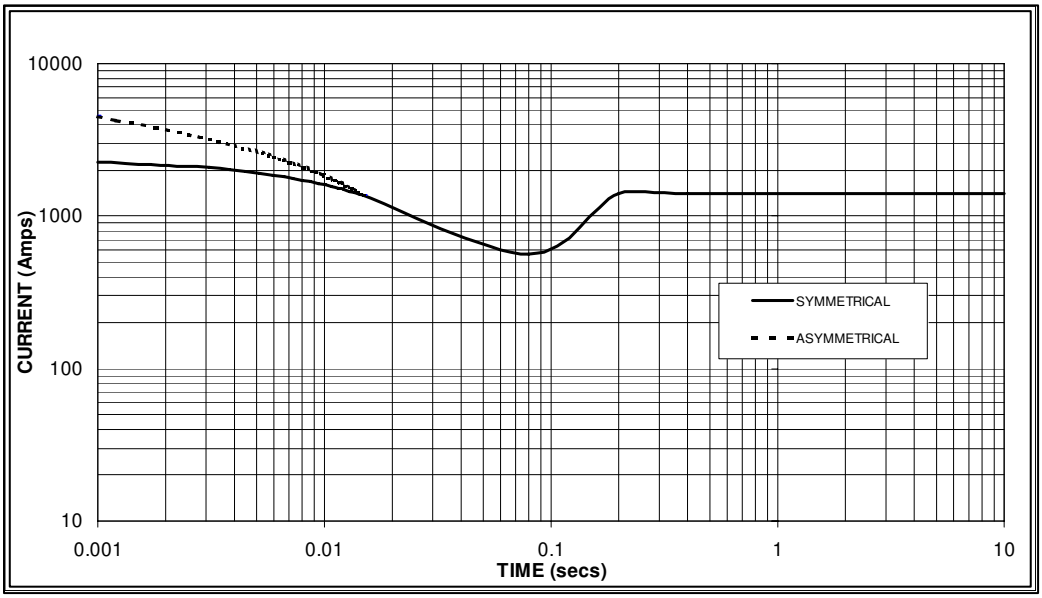
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed
Based on star (wye) connection.

50 Hz



Sustained Short Circuit = 1,000 Amps

60 Hz



Sustained Short Circuit = 1,400 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 1.07	440v	X 1.06
415v	X 1.12	460v	X 1.12
		480v	X 1.17

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.

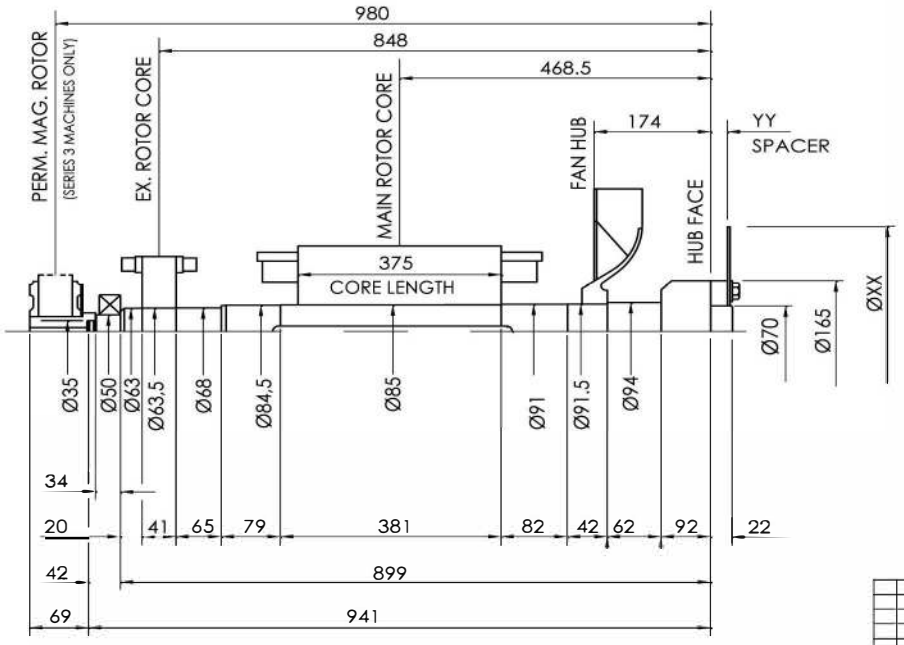
All other times are unchanged

Note 3

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

Parallel Star = Curve current value X 2

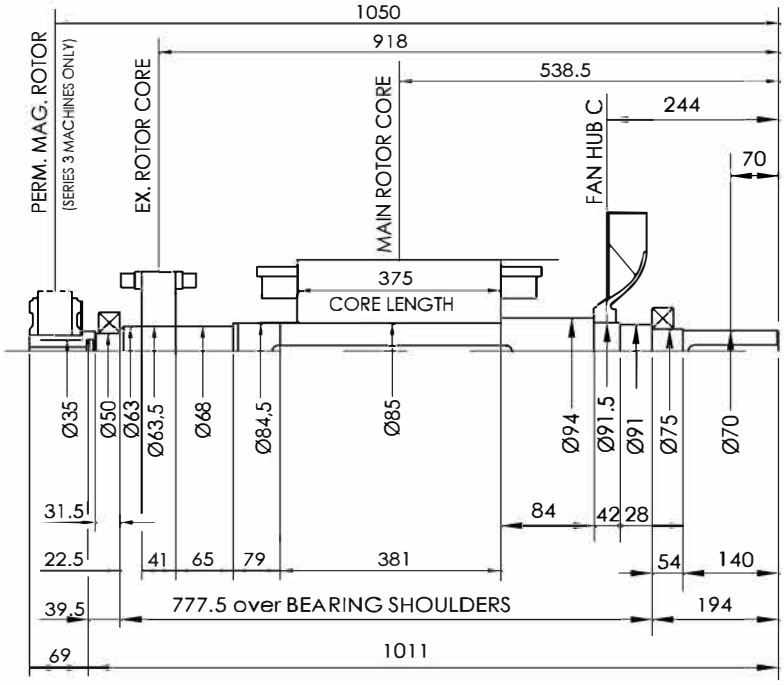
Series Delta = Curve current value X 1.732



COMPONENT	Wt kg	J kgm^2
EX. ROTOR	12.28	0.0726
MAIN ROTOR	155.8	1.6921
FAN	3.389	0,0709
SHAFT	39.736	0,0352
HUB	10.878	0,0491
TOTAL	222.083	1.9199
PERM. MAG.	5,450	0,0150
TOTAL	227.533	1.9349

COUPLING SAE No	COUPLING DIMEN's XX	COUPLING DIMEN's YY	COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC J kgm^2
* 10	314	14,3	5.55	0,0266
* 11½	352	-	2.64	0,0423
! 11½	352	14,3	4,95	0,0423
! 14	467	-	4.74	0,1317

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



COMPONENT	Wt kg	J kgm^2
EX. ROTOR	12.28	0,0726
MAIN ROTOR	155.8	1.6921
FAN	3.389	0,0709
SHAFT	39.651	0,0337
TOTAL	211.12	1.8693
PERM. MAG.	5,450	0,0150
TOTAL	216.57	1.8843

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Design		APP			
CHK		Date	2018.01		mm



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