



M200

CONT 180 kVA



THREE-PHASE SYNCHRONOUS GENERATOR

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

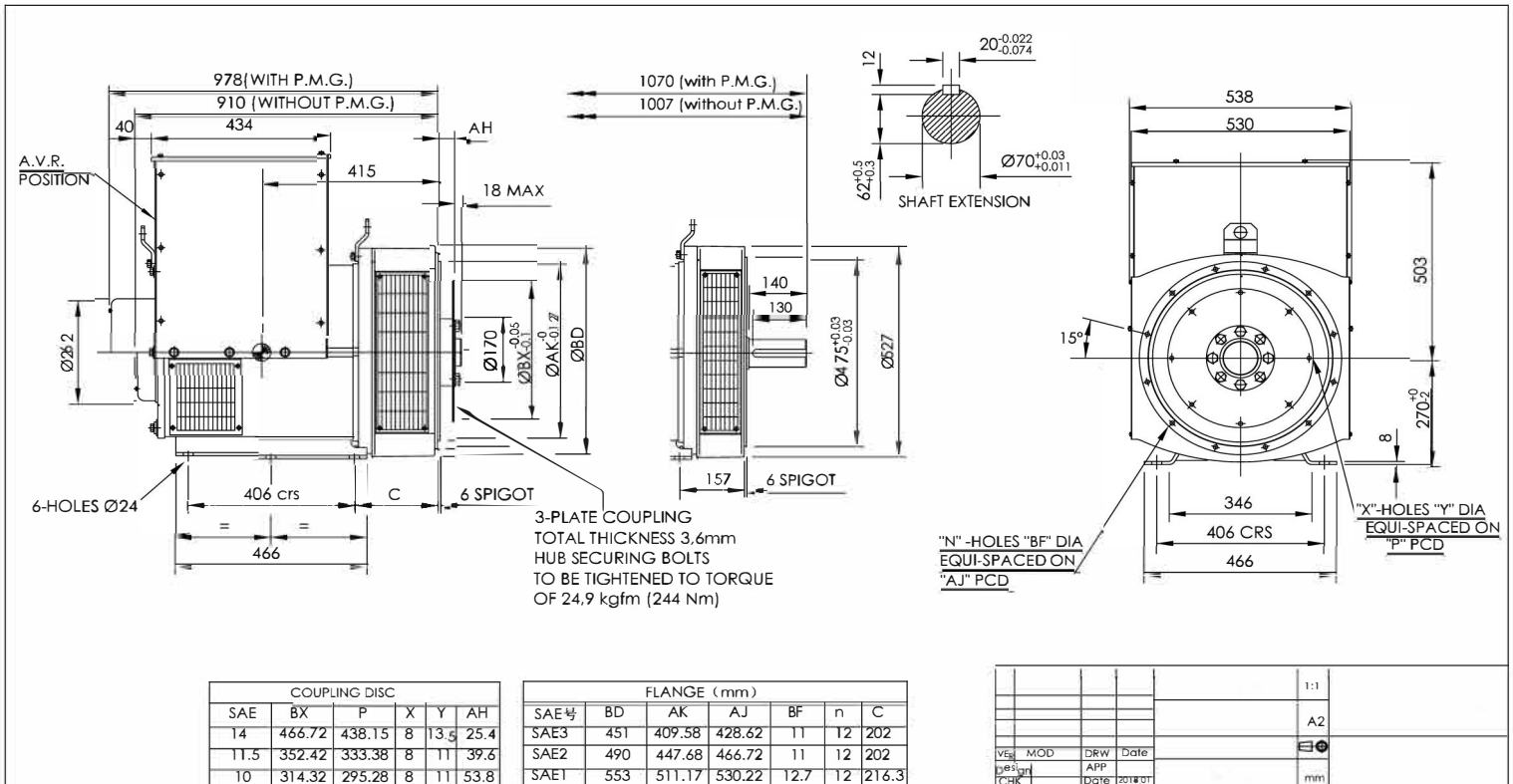
Ambient Temperature	40 °C	Method of Cooling				Air cooling			
Temperature Rise	125 °C	Direction of Rotation				Clockwise			
Insulation Class	H	Maximum Over-speed				2250r/min			
Power Factor	0.8	Degree of Protection / Enclosure				IP23			
Excitation	Brushless	Altitude				1000m			
Winding Pitch	2/3	Stator 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	±1.0	±0.5	±0.5			
Short Circuit Current Capacity	Control does not sustain a short circuit current				850A				
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	182	182	182	N/A	205	218	218	231
	kW	145.6	145.6	145.6	N/A	164.0	174.4	174.4	184.8
Efficiency at Class H (P.F.=0.8)	4/4%	92	92.2	92.5	N/A	92.2	92.3	92.7	92.8
	3/4%	92.8	93	93.1	N/A	93	93.1	93.2	93.2
	2/4%	93.2	93.2	93.2	N/A	93.3	93.3	93.3	93.3
Efficiency at Class H (P.F.=1.0)	4/4%	93.7	94	94.1	N/A	93.8	94	94.1	94.2
	3/4%	94.3	94.6	94.7	N/A	94.5	94.7	94.8	94.8
	2/4%	94.8	94.9	94.9	N/A	94.8	94.9	94.9	95
Reactances (%) at Class H									
Direct axis synchronous reactance unsaturated	Xd	2.15	1.94	1.8	N/A	2.43	2.31	2.11	2.06
Direct axis transient reactance saturated	X'd	0.19	0.17	0.16	N/A	0.21	0.2	0.18	0.18
Direct axis subtransient reactance saturated	X''d	0.13	0.12	0.11	N/A	0.15	0.14	0.13	0.12
Quadrature axis synchronous reactance unsaturated	Xq	1.29	1.16	1.08	N/A	1.47	1.4	1.28	1.24
Quadrature axis subtransient reactance saturated	X''q	0.18	0.16	0.15	N/A	0.18	0.17	0.16	0.15
Leakage reactance	X1	0.08	0.07	0.07	N/A	0.09	0.08	0.08	0.07
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	0.07	0.07	N/A	0.1	0.09	0.08	0.08
Short-circuit ratio	Kcc	0.4651	0.5155	0.5556	N/A	0.4115	0.4329	0.4739	0.4854
Short-circuit transient time constant (sec.)	T'd	0.038							
Subtransient time constant (sec.)	T''d	0.012							
Open circuit time constant (sec.)	T'do	1							
Armature time constant (sec.)	Ta	0.01							
Stator Winding Resistance (20°C)	ohm	0.0199							
Rotor Winding Resistance (20°C)	ohm	1.76							
Exciter Stator Resistance (20°C)	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	563				558				
Weight wound stator - kgs	214				214				
Weight wound rotor - kgs	210.35				199.39				
Inertia (J) [kgm2]	1.7674kgm2				1.7169kgm2				
Drive end bearing / Lubrication					BALL.6315-2RS(ISO)				
Non-drive end bearing / Lubrication					BALL.6310-2RS(ISO)				
Packing crate size (cm)	104X63X94				108X63X94				

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	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	164.6	164.6	164.6	N/A	182.0	182.0	182.0	N/A	187.0	187.0	187.0	N/A	200.0	200.0	200.0	N/A
	kW	131.7	131.7	131.7	N/A	145.6	145.6	145.6	N/A	149.6	149.6	149.6	N/A	160.0	160.0	160.0	N/A
	Efficiency (%)	92.3	92.6	92.8	N/A	92.0	92.3	92.5	N/A	91.9	92.2	92.5	N/A	91.6	92.0	92.2	N/A
	kW Input	142.7	142.2	141.9	N/A	158.3	157.7	157.4	N/A	162.8	162.2	161.8	N/A	174.7	173.9	173.5	N/A
60	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	192.8	199.0	199.0	212.2	205.0	218.5	218.5	231.4	213.0	228.8	228.8	250.0	218.5	234.0	234.0	253.3
	kW	154.2	159.2	159.2	169.8	164.0	174.8	174.8	185.1	170.4	183.0	183.0	200.0	174.8	187.2	187.2	202.6
	Efficiency (%)	92.4	92.7	92.9	93.0	92.2	92.4	92.7	92.7	92.0	92.2	92.5	92.5	91.9	92.1	92.4	92.5
	kW Input	166.9	171.7	171.4	182.5	177.9	189.2	188.6	199.7	185.2	198.5	197.9	216.2	190.2	203.3	202.6	219.1

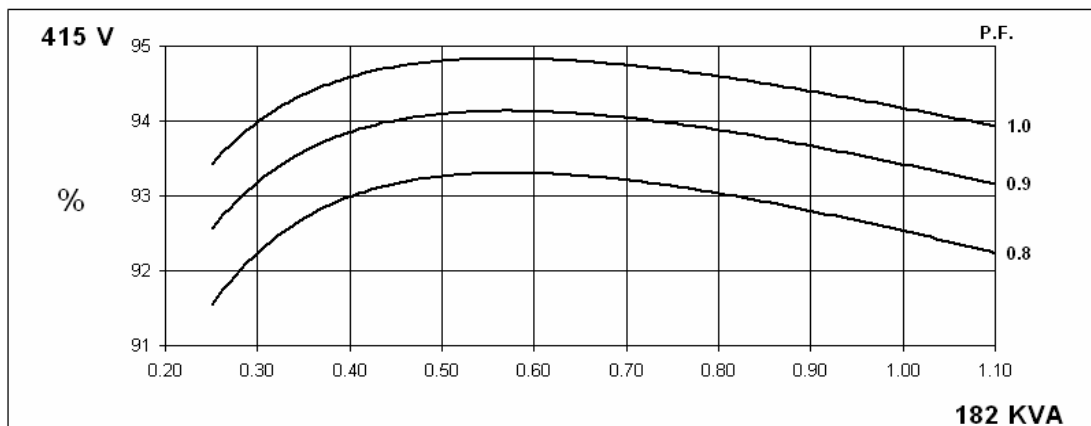
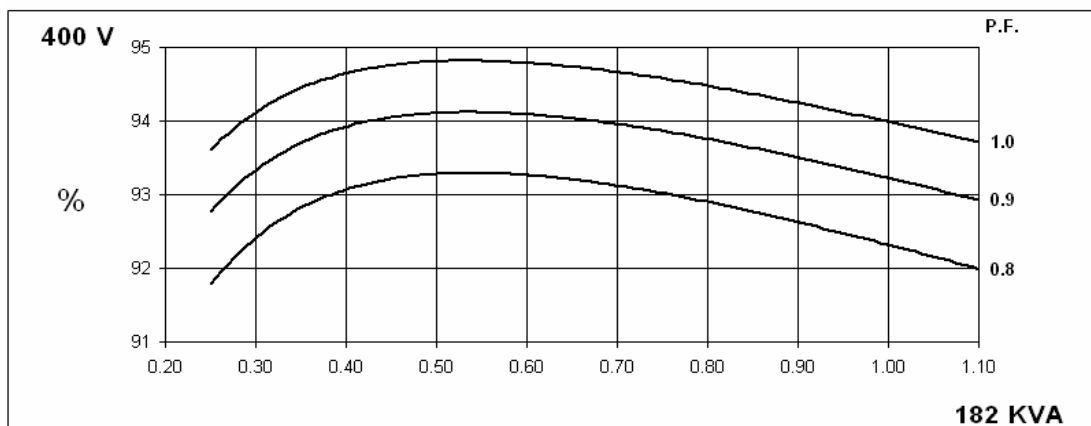
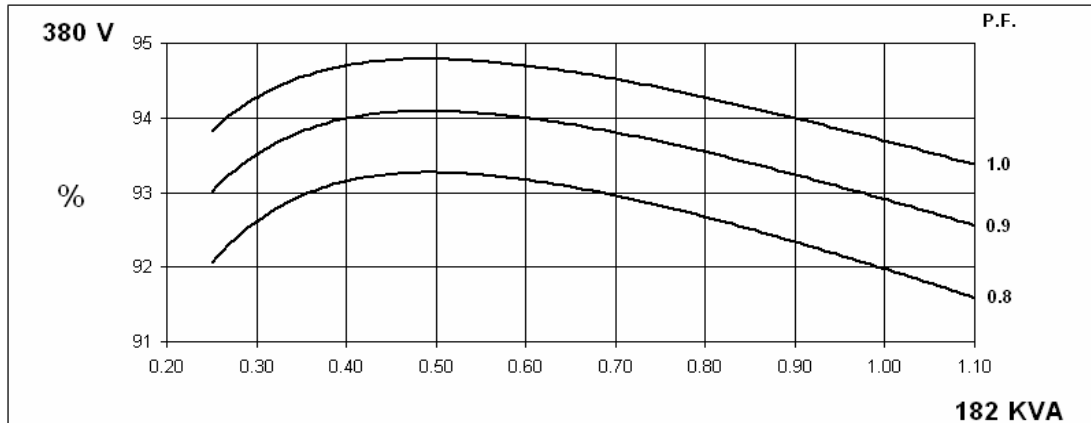
DIMENSIONS



50
Hz

Winding 311

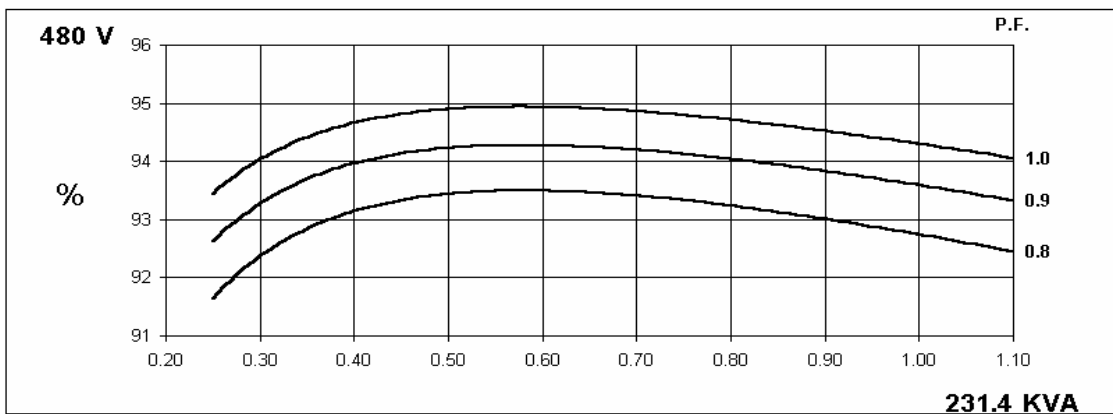
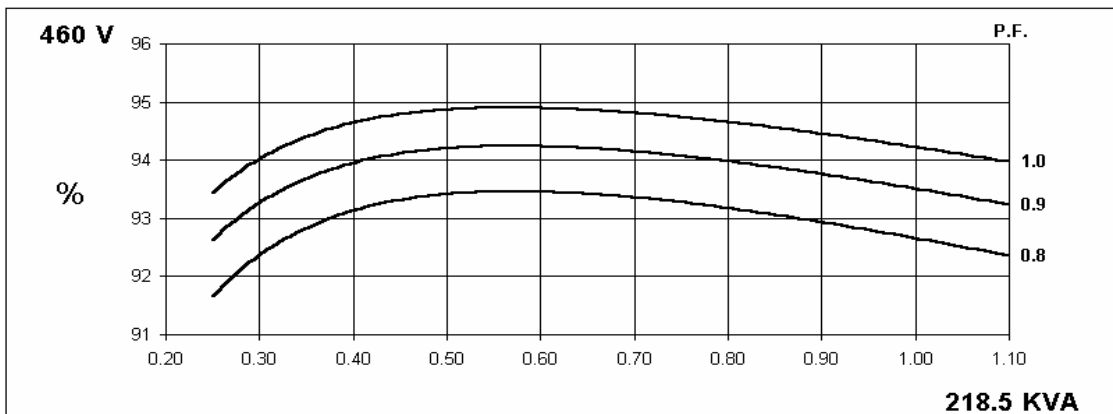
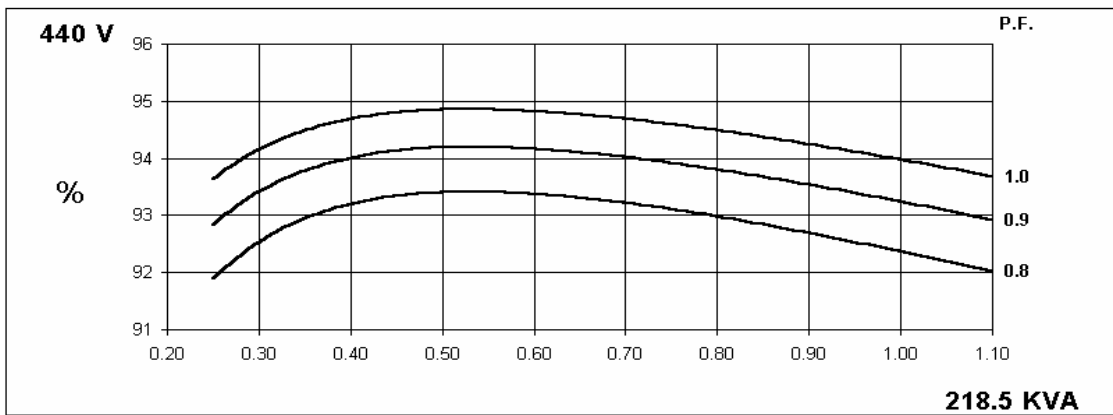
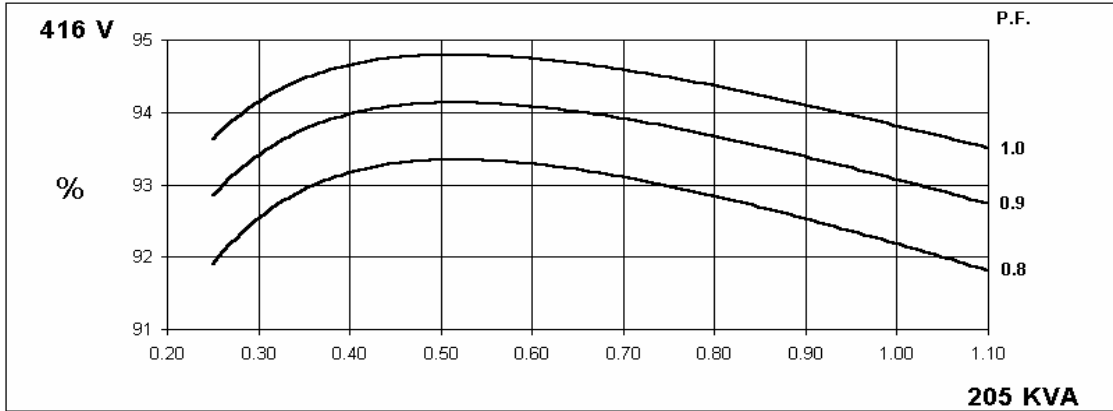
THREE PHASE EFFICIENCY CURVES



60
Hz

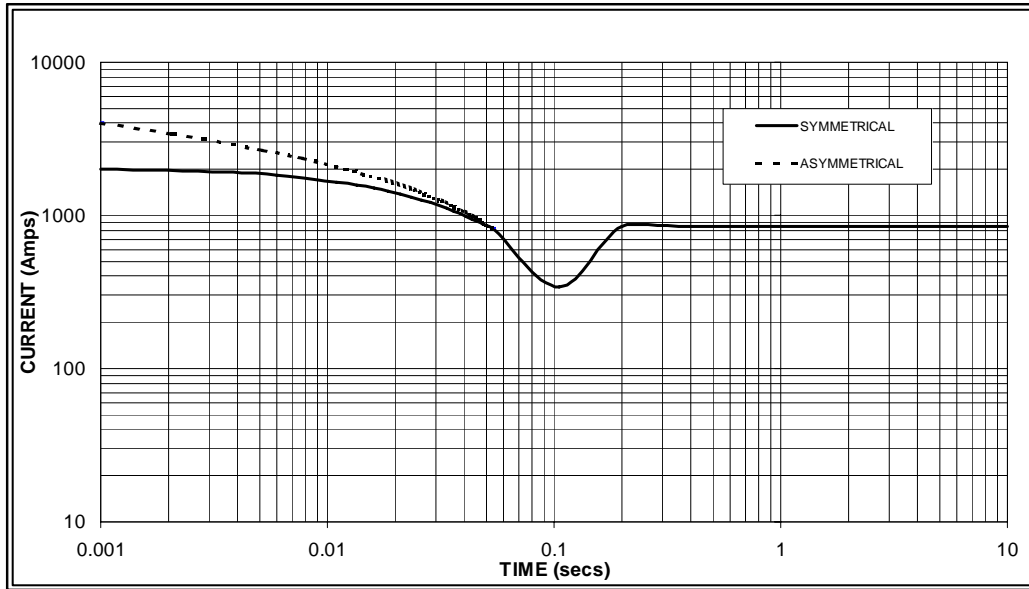
Winding 311

THREE PHASE EFFICIENCY CURVES



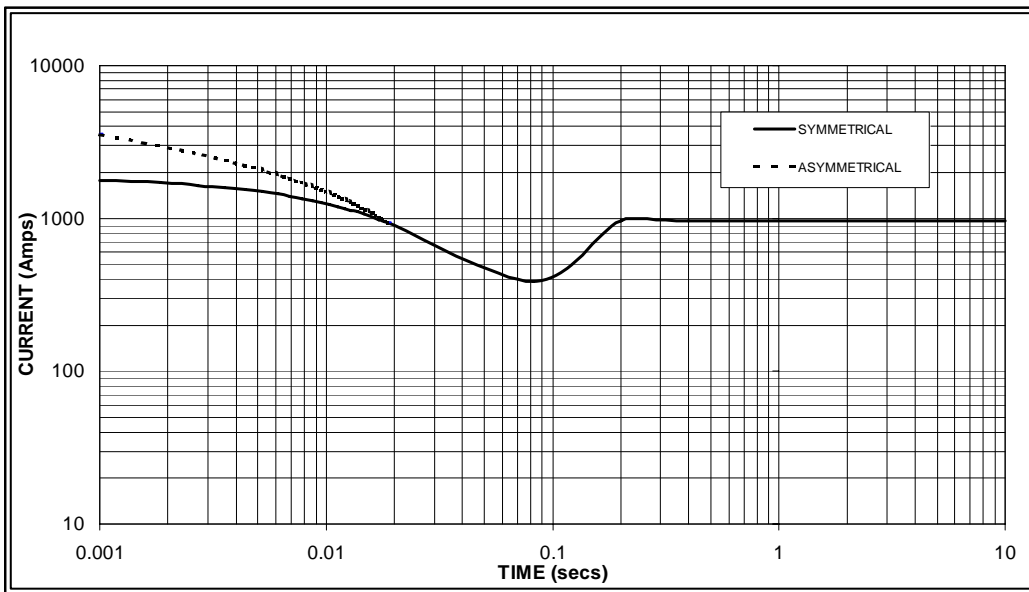
Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50
Hz



Sustained Short Circuit = 850 Amps

60
Hz



Sustained Short Circuit = 970 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.

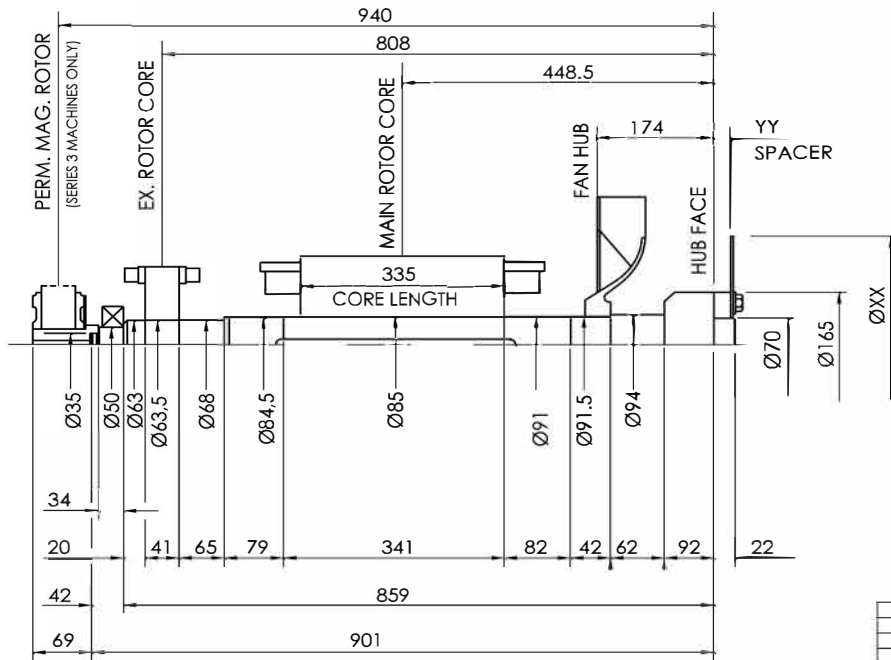
All other times are unchanged

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

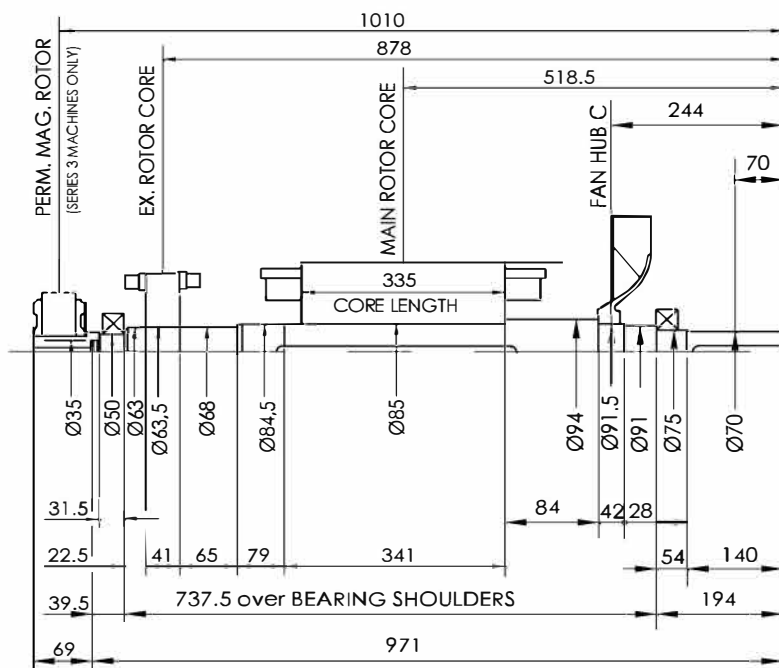
Series Delta = Curve current value X 1.732



COMPONENT	Wt kg	J kgm ²
EX. ROTOR	12.28	0.0726
MAIN ROTOR	140.4	1.5263
FAN	3.389	0.0709
SHAFT	37.954	0.0335
HUB	10.878	0.0491
TOTAL	204.901	1.7524
PERM. MAG.	5,450	0,0150
TOTAL	210.351	1.7674

COUPLING SAE No	COUPLING DIMEN's		COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC J kgm ²
	XX	YY		
* 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

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



COMPONENT	Wt kg	J kgm ²
EX. ROTOR	12.28	0.0726
MAIN ROTOR	140.4	1.5263
FAN	3.389	0.0709
SHAFT	37.87	0.0321
TOTAL	193.939	1.7019
PERM. MAG.	5,450	0,0150
TOTAL	199.389	1.7169

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

