



**maranello**  
**alternator**

**M55**

CONT 50 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	±0.5 ±0.5
Short Circuit Current Capacity	Control does not sustain a short circuit current			230A

#### Electrical Characteristic

Frequency	Hz	50				60			
Voltage ( series star ) <b>Y</b>	V	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
Voltage ( parallel star ) <b>YY</b>	V	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
Voltage ( series delta ) <b>Δ</b>	V	220	230	240	254	240	254	266	277
Rated power at Class H (125 °C) temperature rise	kVA	50	50	50	37.5	60	62.5	62.5	65
	kW	40.0	40.0	40.0	30.0	48.0	50.0	50.0	52.0
Rated power at Class F (105 °C) temperature rise	kVA	45	45	45	33.6	52.5	55	56	58
	kW	36.0	36.0	36.0	26.9	42.0	44.0	44.8	46.4
Efficiency at Class H (P.F.=0.8)	4/4%	87.8	88.1	88.3	89.6	88	88.2	88.8	89
	3/4%	89	89.1	89.2	89.9	89.2	89.5	89.8	89.9
	2/4%	89.8	89.8	89.8	89.1	90.1	90.1	90.1	90.1
Efficiency at Class H (P.F.=1.0)	4/4%	90.3	90.9	91	92	90.5	90.9	91.1	91.3
	3/4%	91.4	91.8	91.9	92.1	91.6	91.9	92	92.2
	2/4%	92.1	92.1	92.1	91.9	92.2	92.4	92.5	92.6

#### Reactances (%) at Class H

Direct axis synchronous reactance unsaturated	X <sub>d</sub>	2.33	2.1	1.95	1.3	3.04	2.83	2.59	2.47
Direct axis transient reactance saturated	X' <sub>d</sub>	0.18	0.16	0.15	0.1	0.22	0.2	0.19	0.18
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.12	0.11	0.1	0.07	0.15	0.14	0.13	0.12
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	1.07	0.97	0.9	0.6	1.4	1.3	1.19	1.14
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.14	0.13	0.12	0.08	0.14	0.13	0.12	0.11
Leakage reactance	X <sub>1</sub>	0.07	0.06	0.06	0.04	0.09	0.08	0.08	0.07
Negative sequence reactance saturated	X <sub>2</sub>	0.13	0.12	0.11	0.07	0.14	0.13	0.12	0.11
Zero sequence reactance unsaturated	X <sub>0</sub>	0.08	0.08	0.07	0.05	0.09	0.08	0.08	0.07
Short-circuit ratio	K <sub>cc</sub>	0.4292	0.4762	0.5128	0.7692	0.3289	0.3534	0.3861	0.4049

Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.027							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.006							
Open circuit time constant (sec.)	T' <sub>do</sub>	0.7							
Armature time constant (sec.)	T <sub>a</sub>	0.0055							
Stator Winding Resistance (20 °C)	ohm	0.129							
Rotor Winding Resistance (20 °C)	ohm	0.64							
Exciter Stator Resistance (20 °C)	ohm	21							
Exciter Rotor Phase resistance	ohm	0.07							
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 <sup>3</sup> /sec	0.216m3/s 458cfm				0.281m3/s 595cfm			

#### Mechanical Characteristic

Configuration	Single Bearing	Double Bearing
Type of Construction	B2-SAE	IM B34
Total Weight - kgs	249	242
Weight wound stator - kgs	84	84
Weight wound rotor - kgs	86	77
Inertia (J) [kgm <sup>2</sup> ]	0.4216kgm <sup>2</sup>	0.4198kgm <sup>2</sup>
Drive end bearing / Lubrication		BALL.6312-2RS(ISO)
Non-drive end bearing / Lubrication	BALL.6309-2RS(ISO)	BALL.6309-2RS(ISO)
Packing crate size (cm)	78X55X84	78X49X84

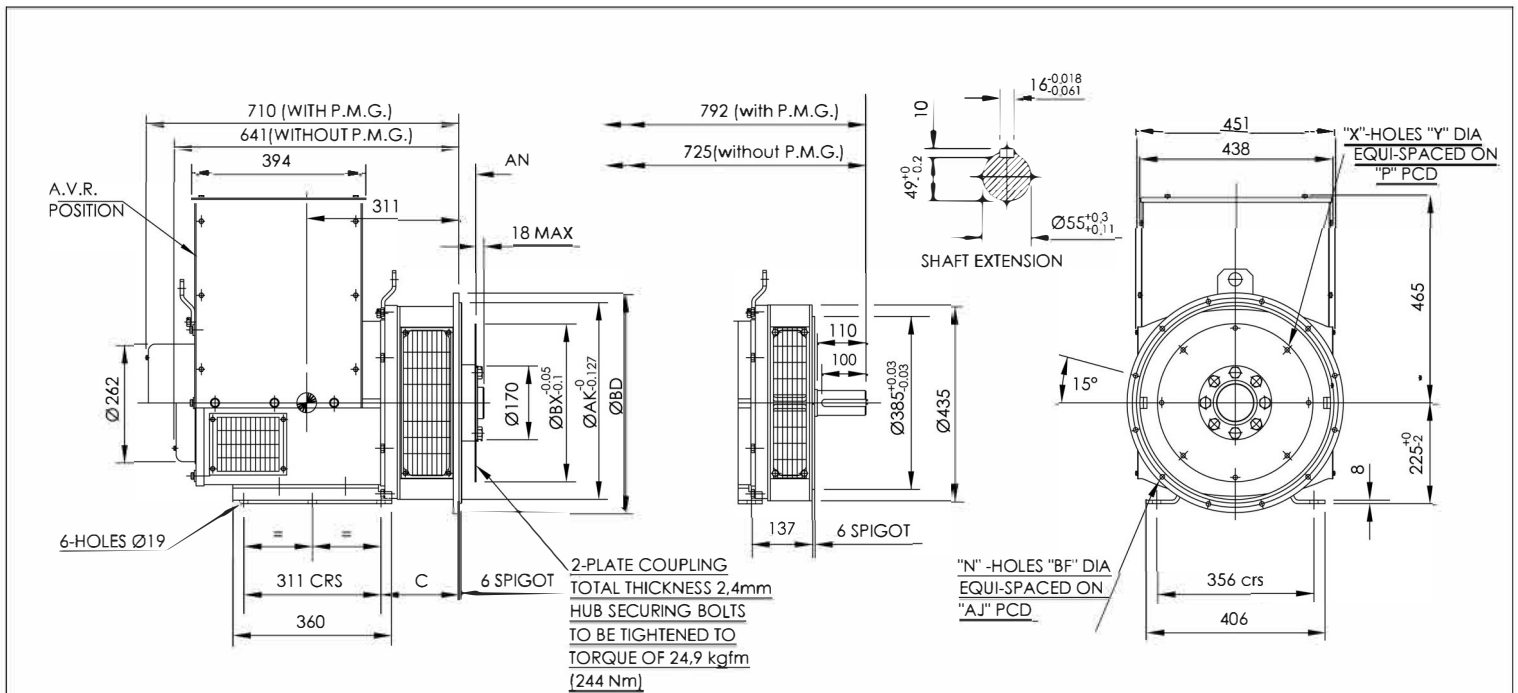
# Winding 311 / 0.8 Power Factor

## RATINGS

Class - Temp Rise		Cont. F - 105/40°C				Cont. H - 125/40°C				Standby - 150/40°C				Standby - 163/27°C			
<b>50 Hz</b>	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	45.0	45.0	45.0	33.6	50.0	50.0	50.0	37.5	53.0	53.0	53.0	39.1	55.0	55.0	55.0	41.2
	kW	36.0	36.0	36.0	26.9	40.0	40.0	40.0	30.0	42.4	42.4	42.4	31.3	44.0	44.0	44.0	33.0
	Efficiency (%)	88.3	88.6	88.9	89.7	87.7	88.2	88.5	89.6	87.4	87.9	88.2	89.5	87.2	87.7	88.0	89.4
	kW Input	40.8	40.6	40.5	30.0	45.6	45.4	45.2	33.5	48.5	48.2	48.1	35.0	50.5	50.2	50.0	36.9

<b>60 Hz</b>	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	52.5	55.0	56.0	58.0	60.0	62.5	62.5	65.0	62.5	65.0	65.0	68.8	65.0	66.3	66.3	71.3
	kW	42.0	44.0	44.8	46.4	48.0	50.0	50.0	52.0	50.0	52.0	52.0	55.0	52.0	53.0	53.0	57.0
	Efficiency (%)	88.7	89.0	89.2	89.4	88.0	88.4	88.8	89.0	87.8	88.2	88.6	88.7	87.5	88.1	88.5	88.5
	kW Input	47.4	49.4	50.2	51.9	54.5	56.6	56.3	58.4	56.9	59.0	58.7	62.1	59.4	60.2	59.9	64.5

## DIMENSIONS



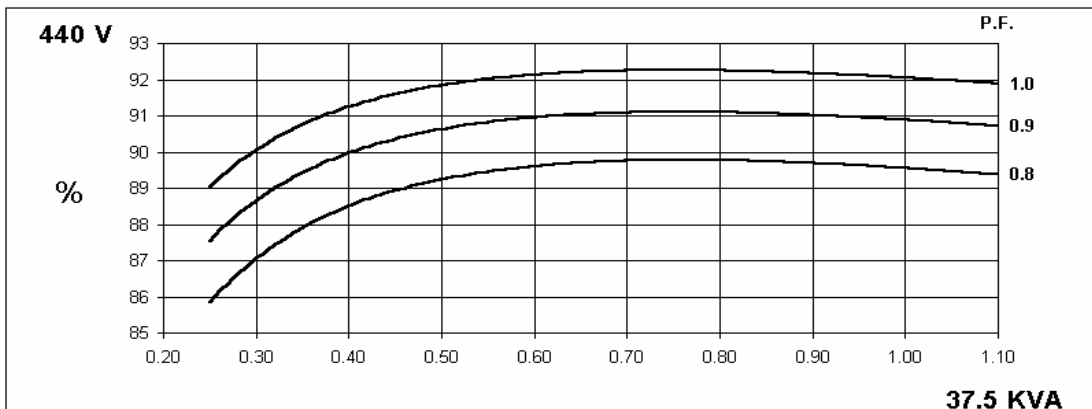
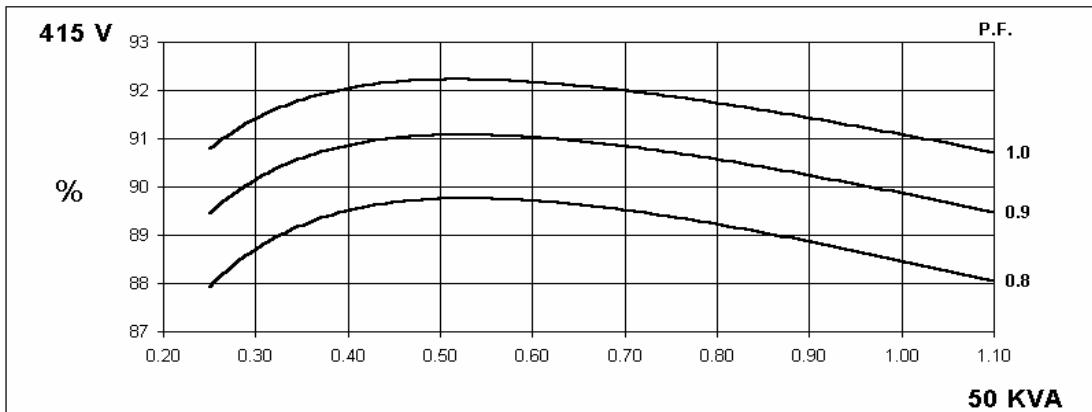
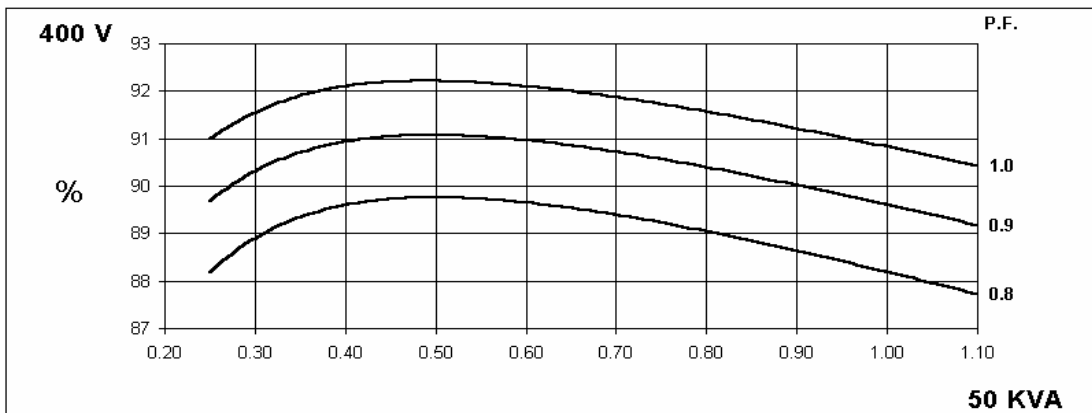
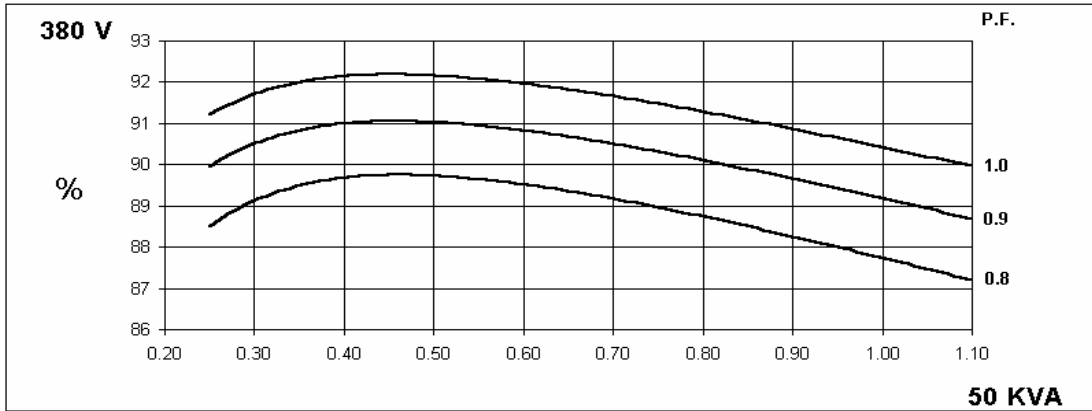
COUPLING DISC						FLANGE (mm)						
SAE	BX	P	X	Y	AH	SAE号	BD	AK	AJ	BF	n	C
14	466.72	438.15	8	13.5	25.4	SAE4	402	361.95	381	11	12	177
11.5	352.42	333.38	8	11	39.6	SAE3	451	409.58	428.62	11	12	177
10	314.32	295.28	8	11	53.8	SAE2	490	447.68	466.72	11	12	177
8	263.52	244.48	6	11	62	SAE1	553	511.18	530.22	12.7	12	191.3

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50  
Hz

### Winding 311

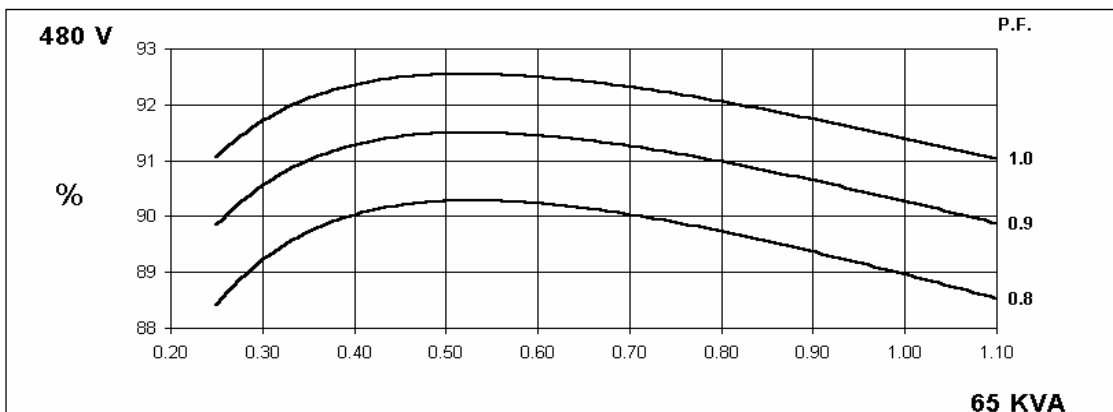
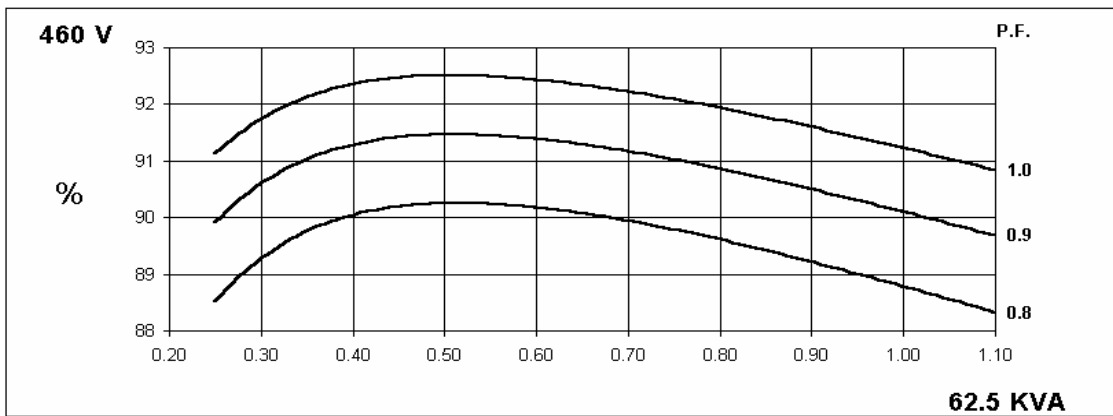
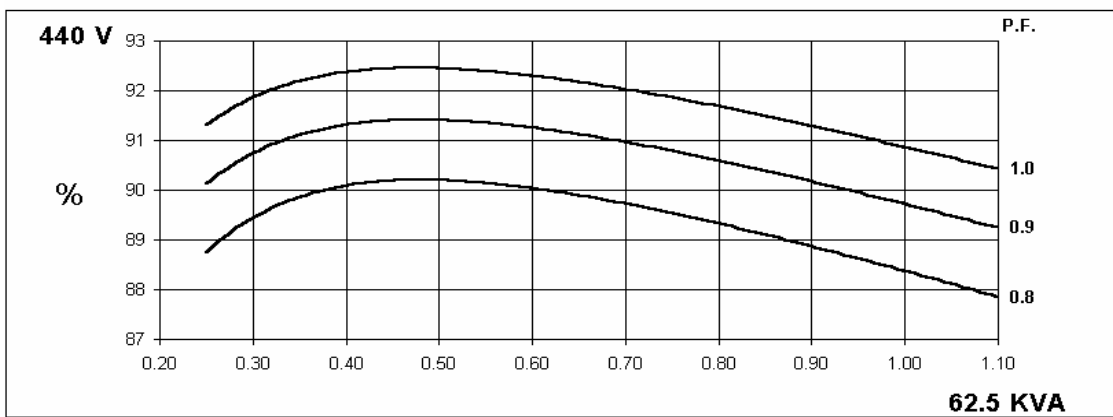
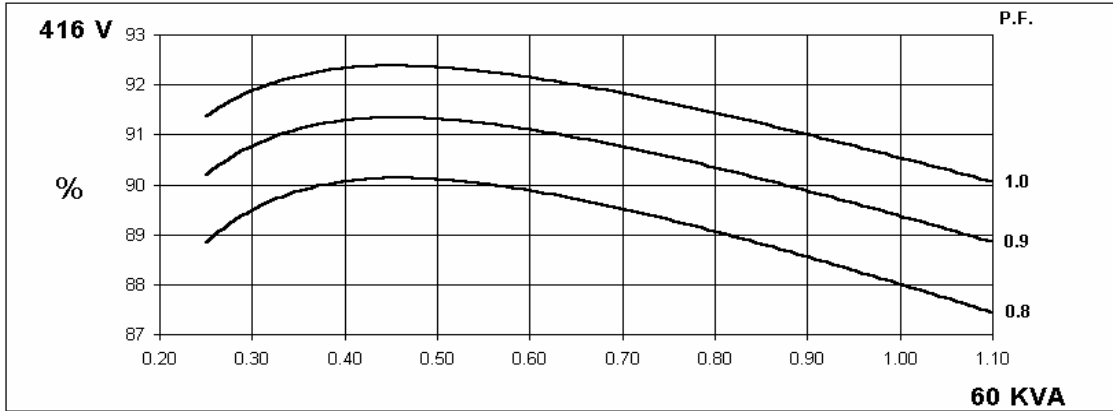
### THREE PHASE EFFICIENCY CURVES



60  
Hz

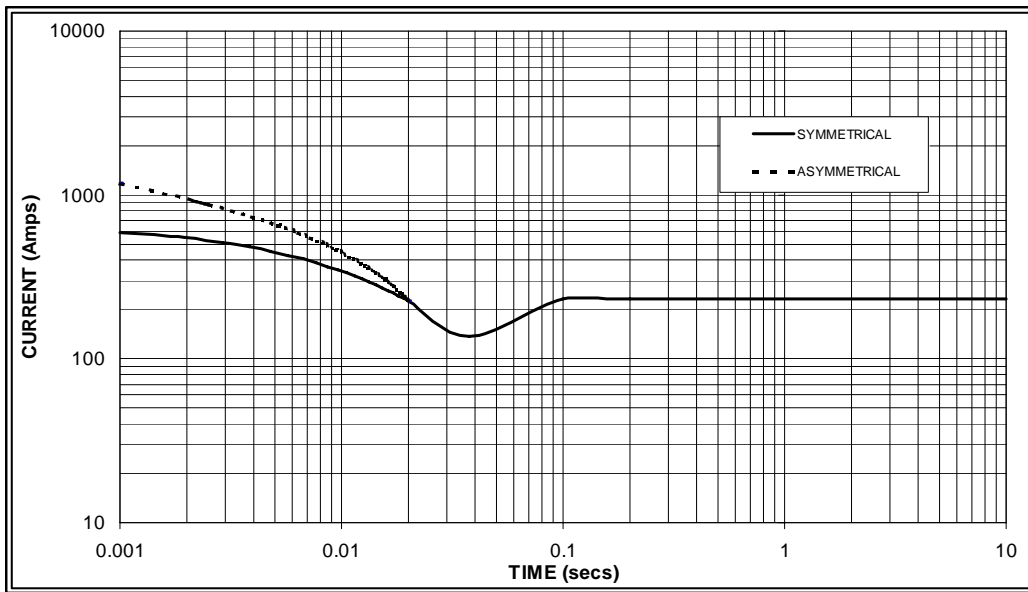
### Winding 311

### THREE PHASE EFFICIENCY CURVES



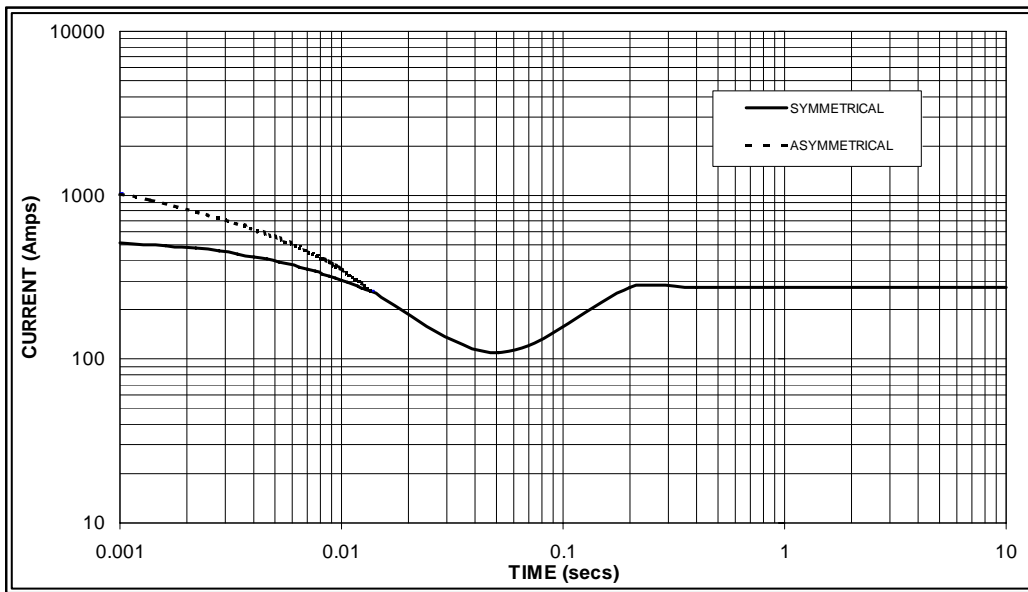
## Three-phase Short Circuit Decrement Curve. No-load Excitation at Rated Speed Based on star (wye) connection.

50  
Hz



Sustained Short Circuit = 230 Amps

60  
Hz



Sustained Short Circuit = 275 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
440v	X 1.18	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.

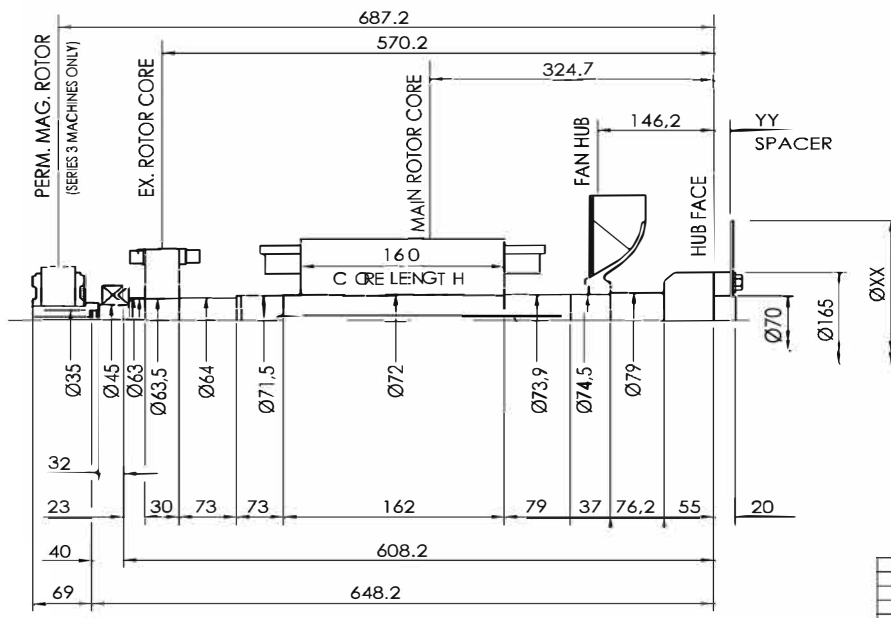
All other times are unchanged

**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

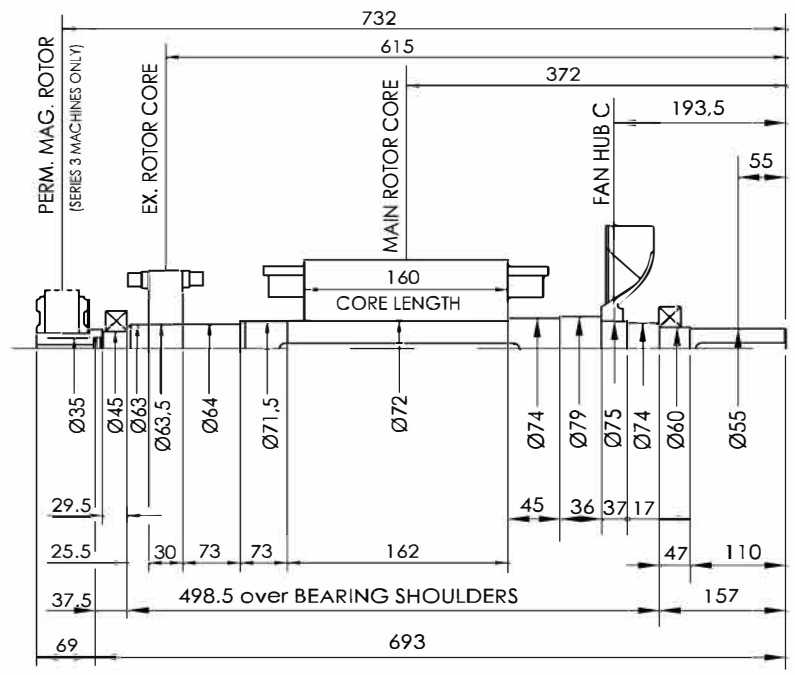
Series Delta = Curve current value X 1.732



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	6.570	0,0394
MAIN ROTOR	44.78	0,3269
FAN	1,940	0,0271
SHAFT	20.442	0,0132
HUB	7,093	0,0300
TOTAL	80.825	0,4066
PERM. MAG.	5,450	0,0150
TOTAL	86.275	0,4216

COUPLING SAE No	COUPLING DIMEN's		COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC J kgm <sup>2</sup>
	XX	YY		
* 8	263	22,2	4,43	0,0087
* 10	314	14,3	3,70	0,0178
* 11½	352	-	1,76	0,0282
! 11½	352	14,3	4,07	0,0282
! 14	467	-	3,16	0,0878

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				mm



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	6.570	0,0394
MAIN ROTOR	44.780	0,3269
FAN	1,940	0,0271
SHAFT	19.166	0,0114
TOTAL	72.456	0,4048
PERM. MAG.	5,450	0,0150
TOTAL	77.906	0,4198

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

