



**M15**

CONT 14 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	
Voltage Regulation - in steady state condition	±1.0	±1.0	±1.0	
Short Circuit Current Capacity	Control does not sustain a short circuit current			

#### 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	13.5	13.5	13.5	11	16	16.9	16.9	16.9
	kW	10.8	10.8	10.8	8.8	12.8	13.5	13.5	13.5
Efficiency at Class H (P.F.=0.8)	4/4%	80	80.8	81	81.6	80.1	80.2	81	81.5
	3/4%	83	83.2	83.5	83.7	83	83	83.5	83.9
	2/4%	84.1	84.1	84.1	84	84.1	84.1	84.2	84.2
Efficiency at Class H (P.F.=1.0)	4/4%	84	84.7	85	85.6	84	84.1	84.9	85.2
	3/4%	86.5	87	87	87.1	86.4	86.7	87	87.2
	2/4%	87.8	87.8	87.8	87.5	87.5	87.6	87.7	87.6

#### Reactances (%) at Class H

Direct axis synchronous reactance unsaturated	X <sub>d</sub>	1.943	1.754	1.629	1.78	2.303	2.174	1.989	1.827
Direct axis transient reactance saturated	X' <sub>d</sub>	0.198	0.179	0.166	0.182	0.236	0.223	0.204	0.187
Direct axis subtransient reactance saturated	X'' <sub>d</sub>	0.124	0.112	0.104	0.114	0.147	0.139	0.127	0.117
Quadrature axis synchronous reactance unsaturated	X <sub>q</sub>	0.966	0.872	0.81	0.885	1.144	1.081	0.989	0.908
Quadrature axis subtransient reactance saturated	X'' <sub>q</sub>	0.223	0.201	0.187	0.204	0.263	0.249	0.228	0.209
Leakage reactance	X <sub>l</sub>	0.078	0.07	0.065	0.071	0.092	0.087	0.079	0.073
Negative sequence reactance saturated	X <sub>2</sub>	0.186	0.168	0.156	0.171	0.221	0.208	0.191	0.175
Zero sequence reactance unsaturated	X <sub>0</sub>	0.084	0.076	0.071	0.077	0.1	0.094	0.086	0.079
Short-circuit ratio	K <sub>cc</sub>	0.5147	0.5701	0.6139	0.5618	0.4342	0.4600	0.5028	0.5473

Short-circuit transient time constant (sec.)	T' <sub>d</sub>	0.016							
Subtransient time constant (sec.)	T'' <sub>d</sub>	0.004							
Open circuit time constant (sec.)	T' <sub>do</sub>	0.3							
Armature time constant (sec.)	T <sub>a</sub>	0.005							
Stator Winding Resistance (20 °C)	ohm	0.785							
Rotor Winding Resistance (20 °C)	ohm	0.52							
Exciter Stator Resistance (20 °C)	ohm	19							
Exciter Rotor Phase resistance	ohm	0.13							
No load excitation current	i <sub>o</sub> (A)	0.56	0.62	0.64	0.62	0.55	0.57	0.62	0.65
Full load excitation current	i <sub>c</sub> (A)	1.95	1.9	1.95	1.9	1.88	1.9	1.92	1.92
Cooling air requirement	m <sup>3</sup> /sec	0.071m <sup>3</sup> /s 150cfm				0.09m <sup>3</sup> /s 191cfm			

#### Mechanical Characteristic

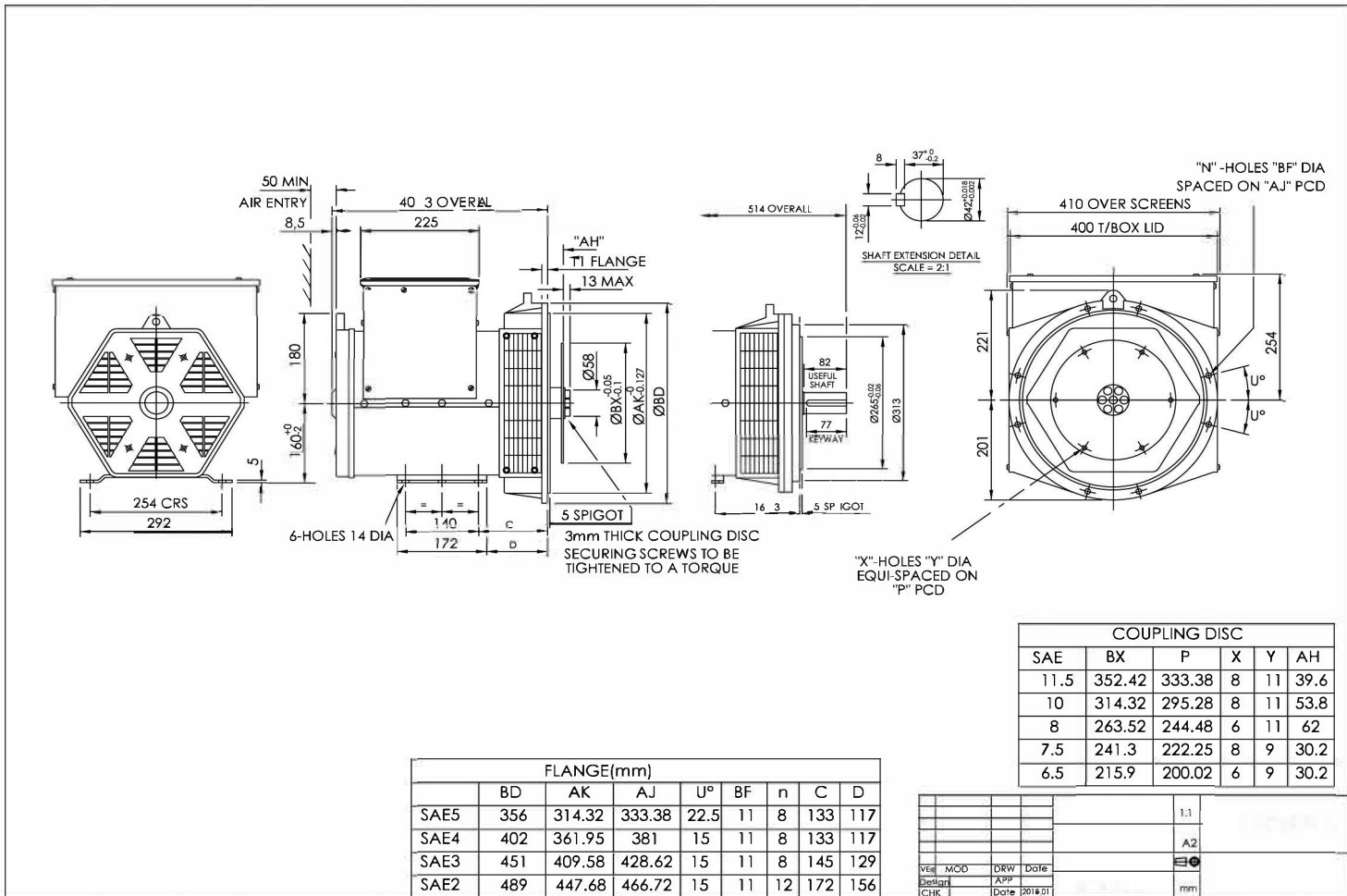
Configuration	Single Bearing	Double Bearing
Type of Construction	B2-SAE	IM B34
Total Weight - kgs	98	108
Weight wound stator - kgs	29.5	29.5
Weight wound rotor - kgs	31.4	32.18
Inertia (J) [kgm <sup>2</sup> ]	0.117kgm <sup>2</sup>	0.1171kgm <sup>3</sup>
Drive end bearing / Lubrication		BALL.6309-2RS(ISO)
Non-drive end bearing / Lubrication	BALL.6306-2RS(ISO)	BALL.6306-3RS(ISO)
Packing crate size (cm)	49X45X58	58X45X57

# 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	12.5	12.5	12.5	10.2	13.5	13.5	13.5	11.0	<b>N/A</b>				<b>N/A</b>			
kW	10.0	10.0	10.0	8.2	10.8	10.8	10.8	8.8									
Efficiency (%)	81.0	81.6	81.9	82.4	80.1	80.7	81.1	81.7									
kW Input	12.3	12.3	12.2	12.1	13.5	13.4	13.3	13.2									
<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	14.8	15.6	15.6	15.6	16.0	16.9	16.9	16.9	<b>N/A</b>				<b>N/A</b>			
kW	11.8	12.5	12.5	12.5	12.8	13.5	13.5	13.5									
Efficiency (%)	81.2	81.4	81.9	82.4	80.3	80.4	81.0	81.5									
kW Input	14.6	15.3	15.2	15.1	15.9	16.8	16.7	16.6									

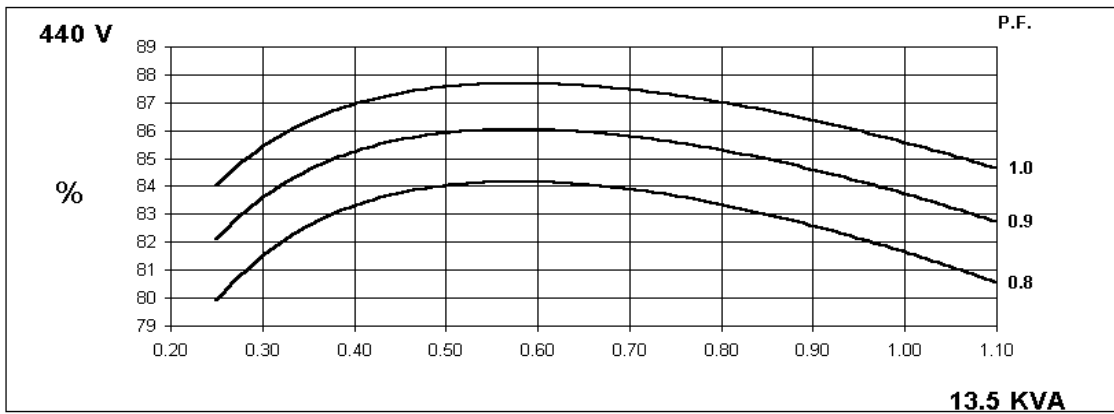
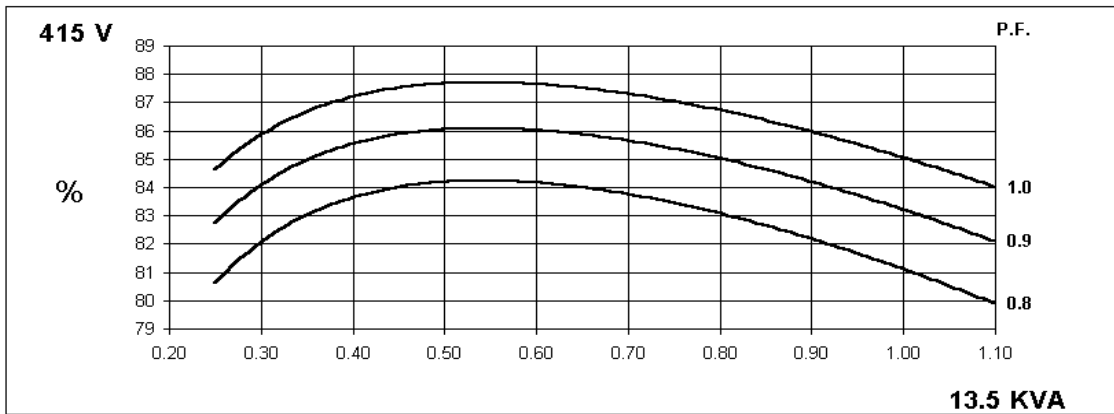
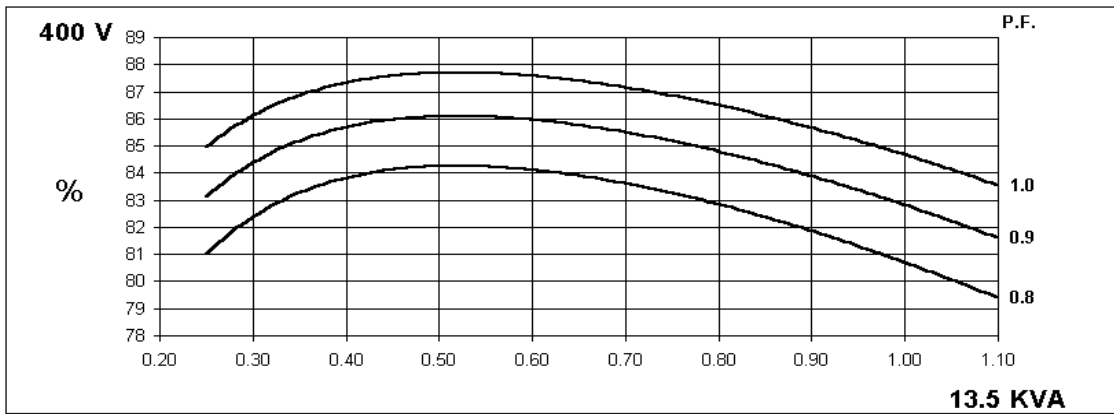
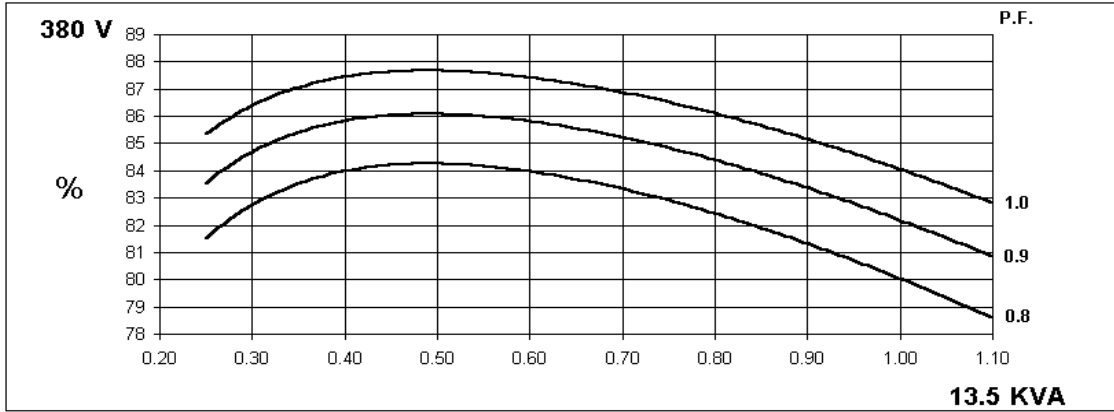
## DIMENSIONS



**50  
Hz**

Winding 311

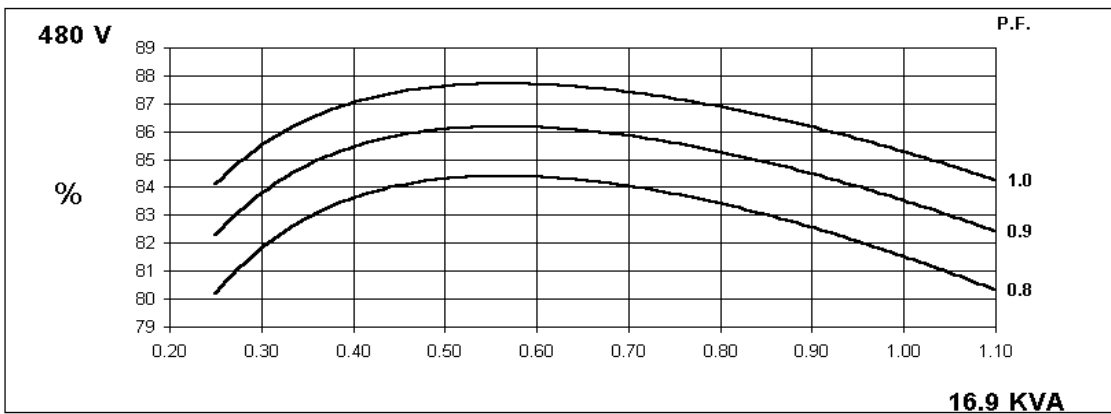
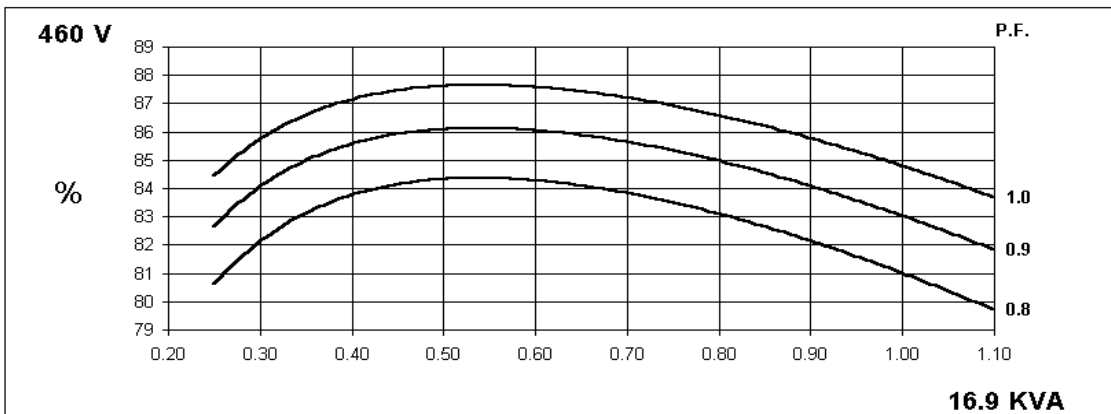
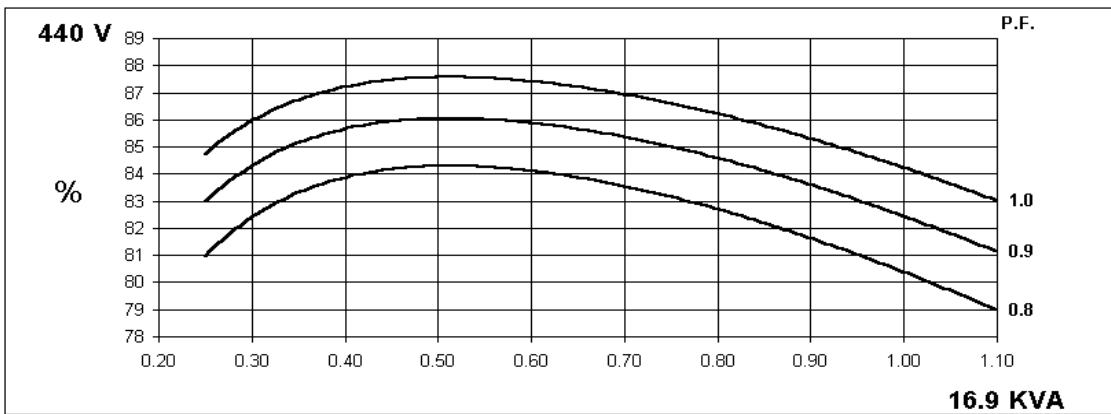
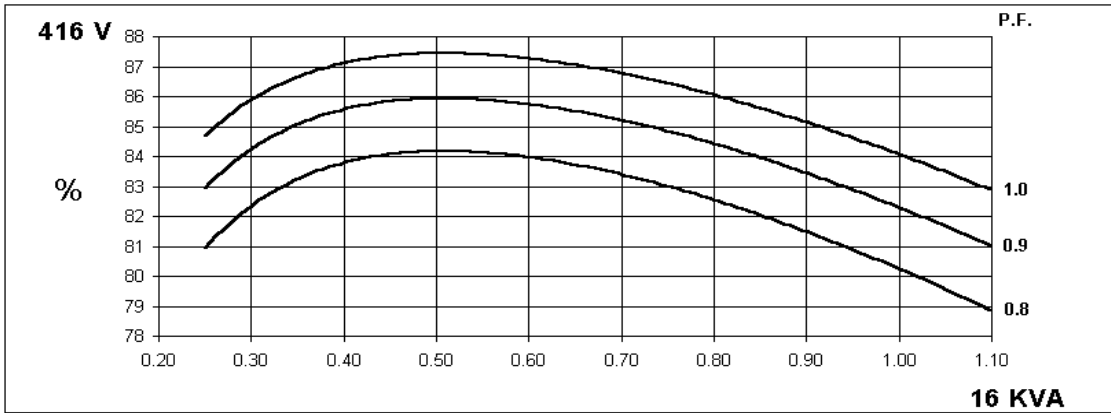
THREE PHASE EFFICIENCY CURVES



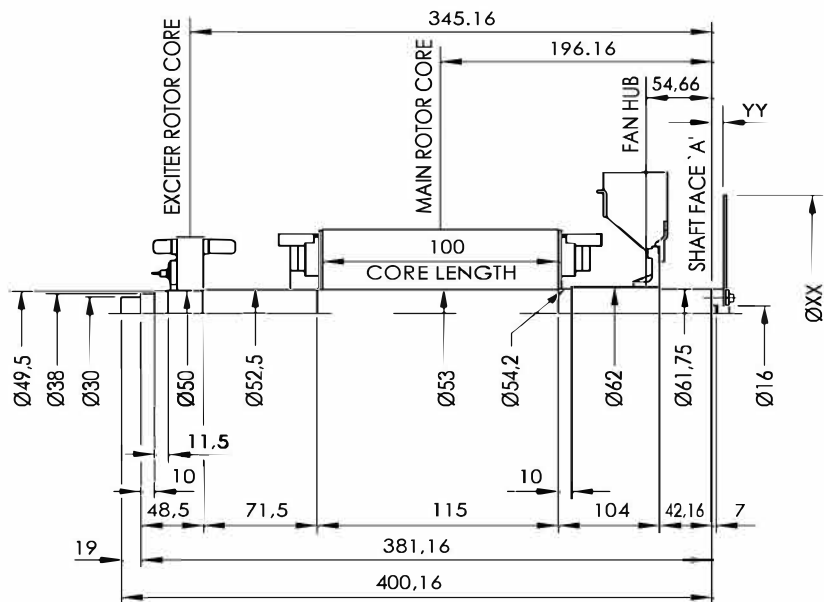
Winding 311

THREE PHASE EFFICIENCY CURVES

**60  
Hz**



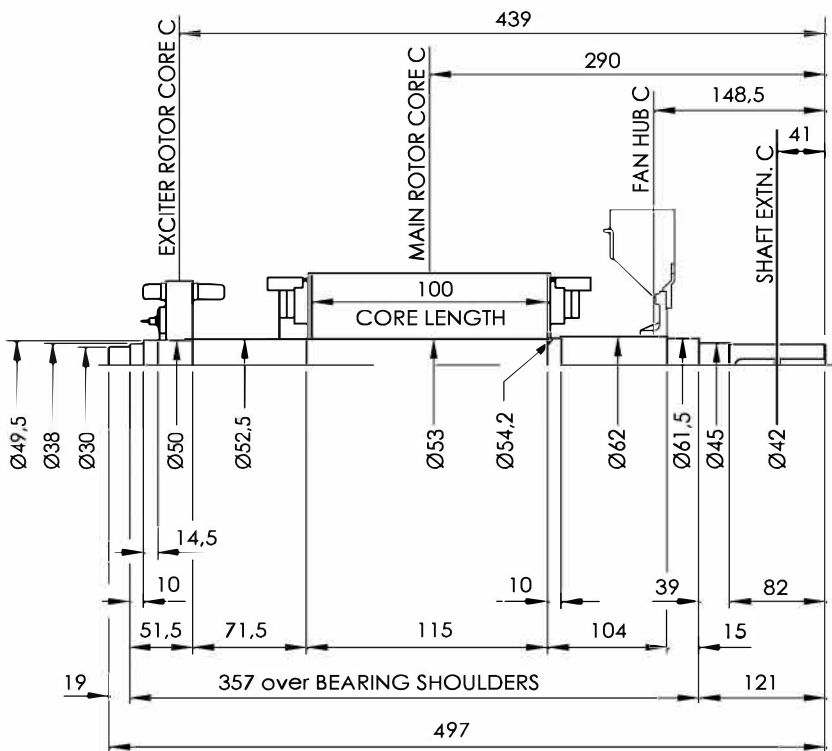
SECRET



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	4,300	0,0170
MAIN ROTOR	18,960	0,0910
FAN	0,744	0,0061
SHAFT	7,391	0,0029
TOTAL	31,395	0,1170

ADAPTOR SAE No.	COUPLING SAE No.	COUPLING DIMENSIONS		COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC J kgm <sup>2</sup>
		XX	YY		
6	7½	241,2	31,7	1,810	0,0078
4/5	7½	241,2	0	1,071	0,0078
4/5	8	263	31,7	2,018	0,0111
4	10	314	23,8	2,377	0,0225
3	10	314	35,8	2,657	0,0225
3	1½	352	21,5	2,793	0,0356

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



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	4,300	0,0170
MAIN ROTOR	18,960	0,0910
FAN	0,744	0,0061
SHAFT	8,174	0,0030
TOTAL	32,178	0,1171

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

