



**maranello**  
**alternator**

**M22**

CONT 20 kVA



### THREE-PHASE SYNCHRONOUS GENERATOR

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

Ambient Temperature 环境温度	40 °C	Method of Cooling 冷却方式	Air cooling 风冷
Temperature Rise 温升	125 °C	Direction of Rotation 旋转方向	Clockwise 顺时针
Insulation Class 绝缘等级	H	Maximum Over-speed 最高转速	2250r/min
Power Factor 功率因数	0.8	Degree of Protection / Enclosure 防护等级	IP23
Excitation 励磁方式	Brushless 无刷	Altitude 海拔	1000m
Winding Pitch 绕组节距	2/3	Stator winding 定子绕组	双层同心式 DLC
Pole 极数	4	Number of Terminal 终端数量	12
Duty 工作制	S1- Continuous	Rotor 转子	With damping cage 带阻尼
Waveform 电话干扰因数	TIF<50		THF<2%
Waveform distortion 波形畸变率	BS EN 61000-6-2&BS EN 61000-6-4,VDE 0875G,VDE0874N		
Radio interference 无线电干扰	Noload<1.5%,Non-distorting balanced linear load<5%		
AVR MODEL AVR 型号	Standard 标配	Selection 选配	
	SX460	AS440	KRS440
Voltage Regulation - in steady state condition 电压调节	±1.0	±1.0	±1.0
Short Circuit Current Capacity 短路电流容量	Control does not sustain a short circuit current		

#### Electrical Characteristic

Frequency 频率	Hz	50				60			
		380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
Voltage ( series star ) 电压 Y	V	380/220	400/231	415/240	440/254	416/240	440/254	460/266	480/277
Voltage ( parallel star ) 电压 YY	V	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
Voltage ( series delta ) 电压 Δ	V	220	230	240	254	240	254	266	277
Rated power at Class H (125 °C) temperature rise 额定功率在H(125 °C)温升	kVA	20	20	20	19	22	23.5	24.3	25
	kW	16	16	16	15.2	17.6	18.8	19.44	20
Efficiency at Class H (P.F.=0.8) 绝缘等级H (P.F.=0.8) 效率	4/4%	84.8	85	85.1	84.9	85	85.1	85.1	84.7
	3/4%	86.1	86.1	86.1	86	86.1	86.1	86.1	85.1
	2/4%	86	86	85.8	84.4	85.8	85.8	85.8	84.8
Efficiency at Class H (P.F.=1.0) 绝缘等级H (P.F.=1.0) 效率	4/4%	88	88.1	88.5	88.4	88	88.1	88.1	88.2
	3/4%	89.1	89.1	89.1	88.6	89	89	89.1	88.7
	2/4%	89	88.9	88.8	88	88.7	88.8	88.7	88.2

#### Reactances (%) at Class H 绝缘等级H考核时的电抗

		1.66	1.5	1.39	1.18	1.97	1.88	1.78	1.68
Direct axis synchronous reactance unsaturated 直轴同步电抗	X <sub>d</sub>	1.66	1.5	1.39	1.18	1.97	1.88	1.78	1.68
Direct axis transient reactance saturated 直轴瞬态电抗	X' <sub>d</sub>	0.17	0.15	0.14	0.12	0.2	0.19	0.18	0.17
Direct axis subtransient reactance saturated 直轴瞬变电抗	X'' <sub>d</sub>	0.11	0.1	0.09	0.08	0.13	0.12	0.12	0.11
Quadrature axis synchronous reactance unsaturated 交轴同步电抗	X <sub>q</sub>	0.8	0.72	0.67	0.57	0.95	0.91	0.86	0.81
Quadrature axis subtransient reactance saturated 交轴起始瞬态电抗	X'' <sub>q</sub>	0.18	0.16	0.15	0.13	0.21	0.2	0.19	0.18
Leakage reactance 漏抗	X <sub>l</sub>	0.07	0.06	0.06	0.05	0.08	0.08	0.07	0.07
Negative sequence reactance saturated 负序电抗饱和	X <sub>2</sub>	0.14	0.13	0.12	0.1	0.17	0.16	0.15	0.15
Zero sequence reactance unsaturated 零序电抗不饱和	X <sub>0</sub>	0.07	0.06	0.06	0.05	0.08	0.08	0.07	0.07
Short-circuit ratio 短路比	K <sub>cc</sub>	0.6024	0.6667	0.7194	0.8475	0.5076	0.5319	0.5618	0.5952

Short-circuit transient time constant (sec.) 瞬变时间常数 (秒)	T' <sub>d</sub>	0.017							
Subtransient time constant (sec.) 超瞬变时间常数 (秒。)	T'' <sub>d</sub>	0.004							
Open circuit time constant (sec.) 开路时间常数	T' <sub>do</sub>	0.38							
Armature time constant (sec.) 电枢时间常数	T <sub>a</sub>	0.007							
Stator Winding Resistance (20°C) 定子绕组电阻(20°C)	ohm	0.49							
Rotor Winding Resistance (20°C) 转子绕组电阻(20°C)	ohm	0.604							
Exciter Stator Resistance (20°C) 励磁机定子电阻(20°C)	ohm	20							
Exciter Rotor Phase resistance 励磁机转子相电阻	ohm	0.11							
No load excitation current 空载励磁电流	io (A)	0.52	0.55	0.58	0.53	0.51	0.52	0.53	0.55
Full load excitation current 满载励磁电流	ic(A)	2.1	2.2	2.3	2.2	2.1	2.15	2.2	2.3
Cooling air requirement 空气冷却要求	m <sup>3</sup> /sec	0.095m <sup>3</sup> /s 200cfm				0.119m <sup>3</sup> /s 250cfm			

#### Mechanical Characteristic

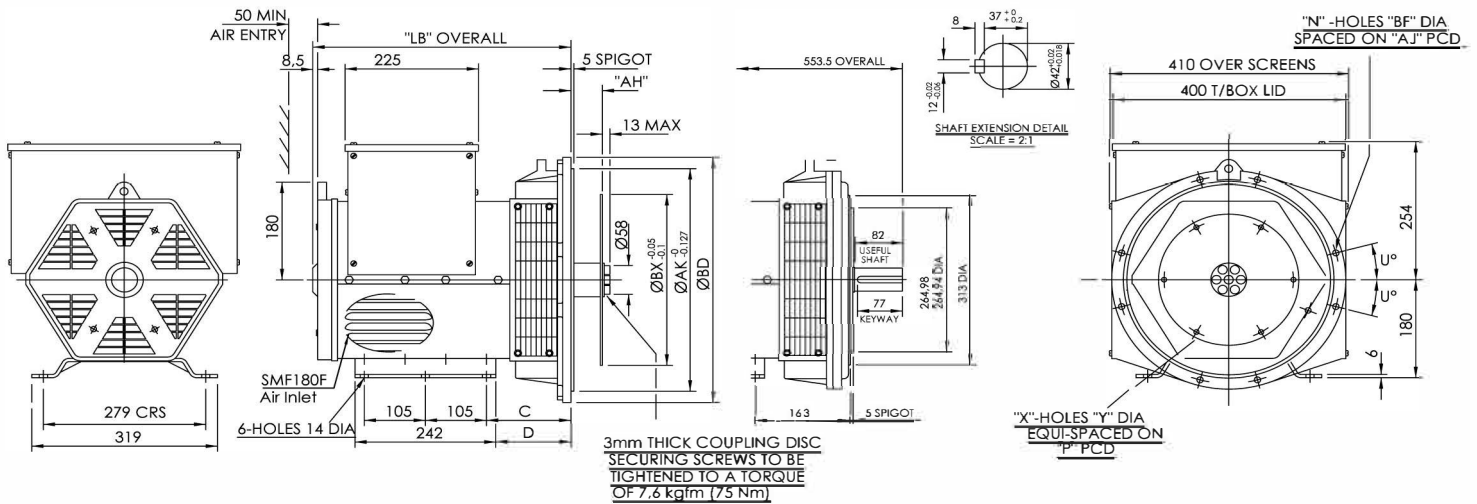
Configuration 结构	Single Bearing 单轴承	Double Bearing 双轴承
Type of Construction 结构形式	B2-SAE	IM B34
Total Weight - kgs 总重量-公斤	117	121
Weight wound stator - kgs 定子重量-公斤	39	39
Weight wound rotor - kgs 转子重量-公斤	37.1	37.9
Inertia (J) [kgm <sup>2</sup> ] 转动惯量 (J) [kgm <sup>2</sup> ]	0.1398kgm <sup>2</sup>	0.1398kgm <sup>2</sup>
Drive end bearing / Lubrication 驱动端轴承/润滑		BALL.6309-2RS(ISO)
Non-drive end bearing / Lubrication 非驱动端轴承/润滑	BALL.6306-2RS(ISO)	BALL.6306-2RS(ISO)
Packing crate size 包装尺寸 (cm)	55X49X58	62X45X57

# 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	18.2	18.2	18.2	17.3	20.0	20.0	20.0	19.0	21.5	21.5	21.5	20.4	22.0	22.0	22.0	20.9
	kW	14.6	14.6	14.6	13.8	16.0	16.0	16.0	15.2	17.2	17.2	17.2	16.3	17.6	17.6	17.6	16.7
	Efficiency (%)	85.4	85.7	85.8	86.0	84.8	85.1	85.3	85.7	84.2	84.6	84.8	85.4	84.0	84.4	84.6	85.2
	kW Input	17.0	17.0	17.0	16.1	18.9	18.8	18.8	17.7	20.4	20.3	20.3	19.1	21.0	20.9	20.8	19.6
<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	20.0	21.4	22.1	22.8	22.0	23.5	24.3	25.0	23.7	25.3	26.1	26.9	24.2	25.9	26.7	27.5
	kW	16.0	17.1	17.7	18.2	17.6	18.8	19.4	20.0	19.0	20.2	20.9	21.5	19.4	20.7	21.4	22.0
	Efficiency (%)	85.6	85.7	85.7	85.8	85.1	85.2	85.3	85.3	84.6	84.6	84.8	84.8	84.5	84.5	84.6	84.7
	kW Input	18.7	20.0	20.6	21.3	20.7	22.1	22.8	23.4	22.4	23.9	24.6	25.4	22.9	24.5	25.3	26.0

## DIMENSIONS



DIMENSIONS(mm)				WEIGHE
SAE	TYPE	LB		KG
SAE 2	QYI 184E	470.5		130
SAE 3	QYI 184E	443		132
SAE 4/5	QYI 184E	431		130

FLANGE(mm)								
	BD	AK	AJ	U°	BF	n	C	D
SAE5	356	314.32	333.38	22.5	11	8	133	117
SAE4	402	361.95	381	15	11	8	133	117
SAE3	451	409.58	428.62	15	11	8	145	129
SAE2	489	447.68	466.72	15	11	12	172	156

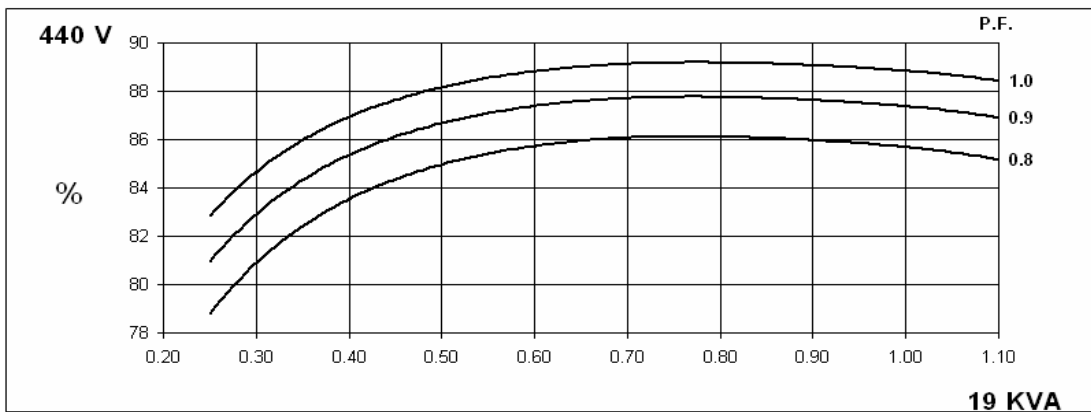
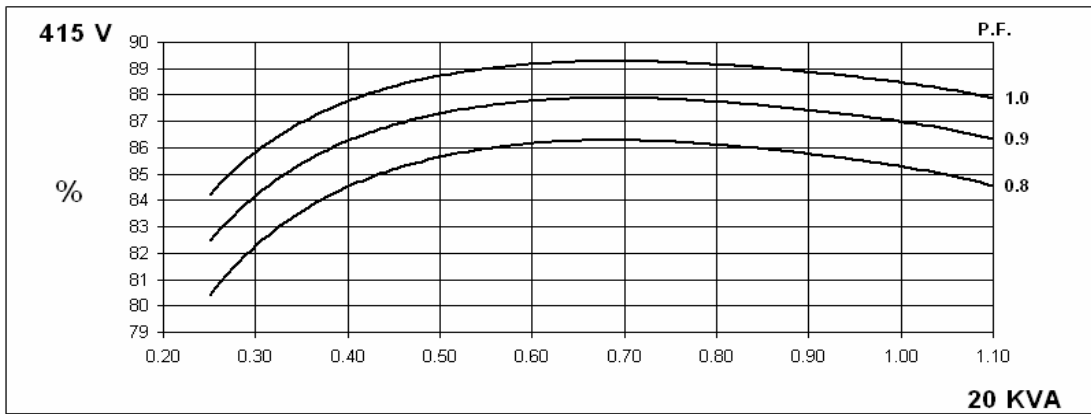
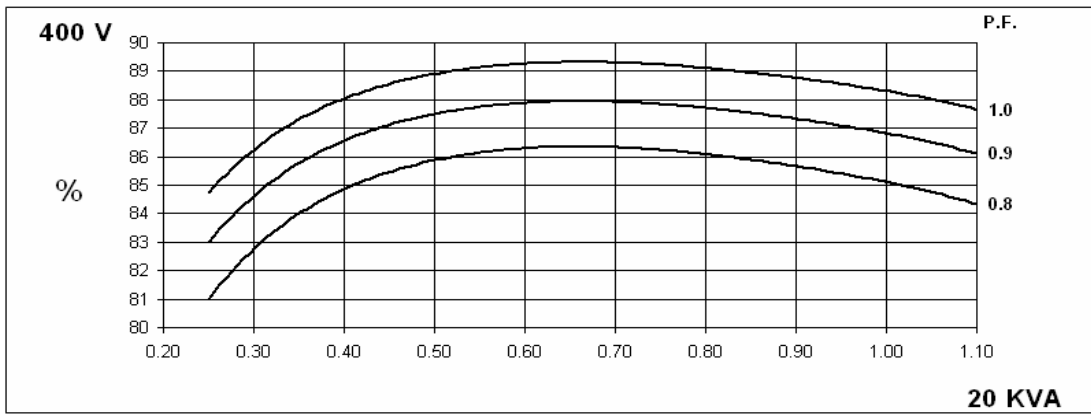
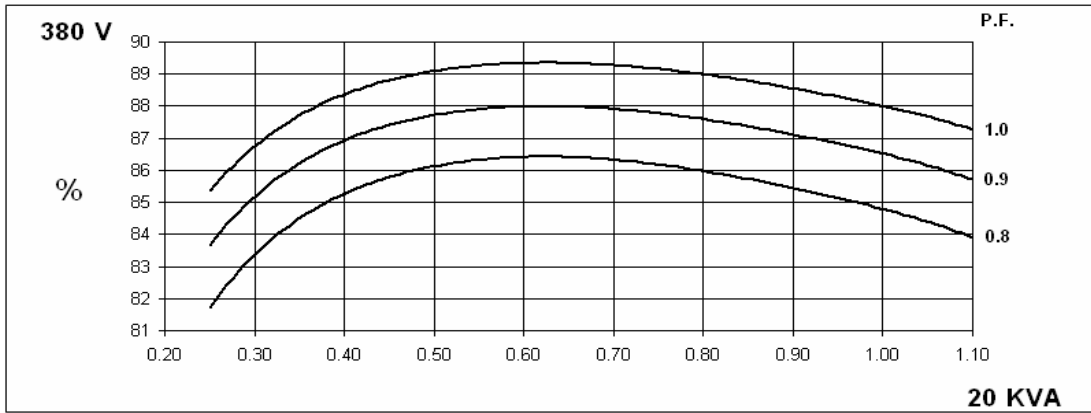
COUPLING DISC					
SAE	BX	P	X	Y	AH
11.5	352.42	333.38	8	11	39.6
10	314.32	295.28	8	11	53.8
8	263.52	244.48	6	11	62
7.5	241.3	222.25	8	9	30.2
6.5	215.9	200.02	6	9	30.2

VER	MOD	DRW	Date		1:1
DESIGN	APP				A2
CHK	Date	2018.01			mm

50  
Hz

### Winding 311

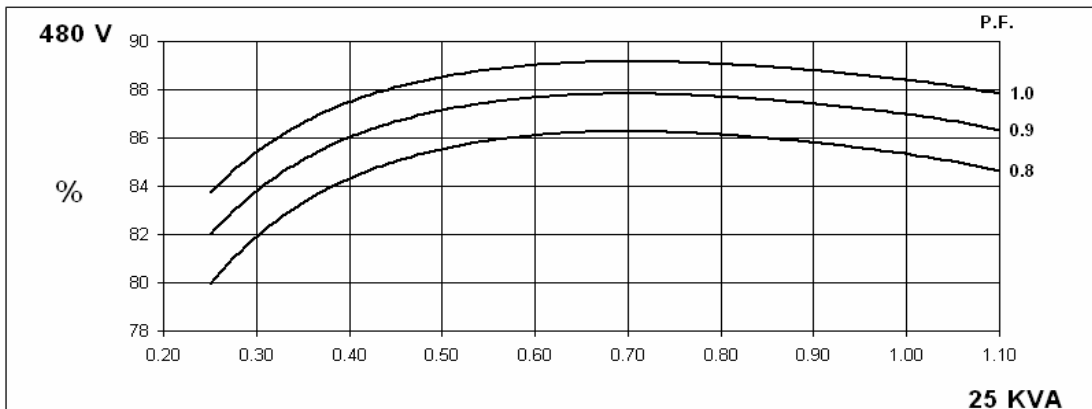
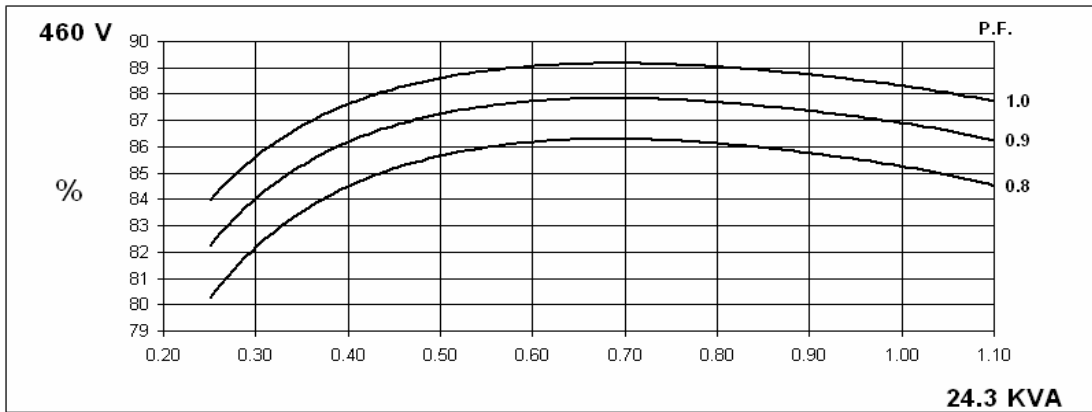
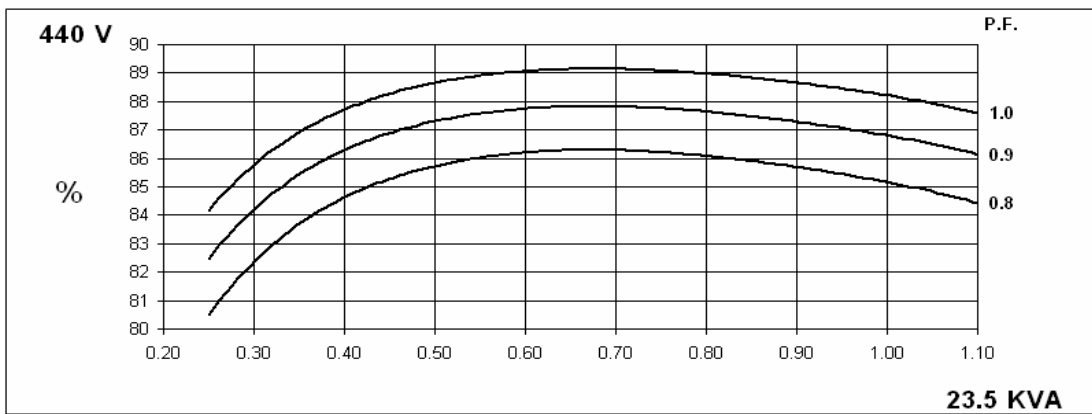
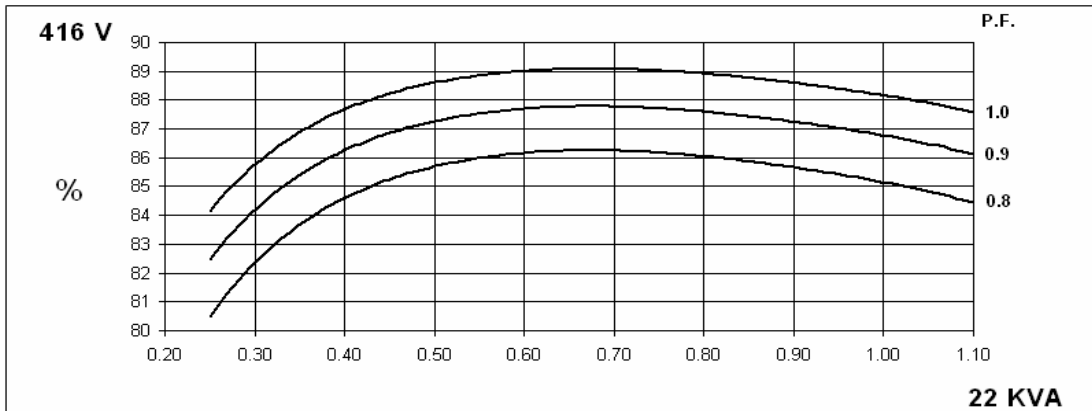
### THREE PHASE EFFICIENCY CURVES



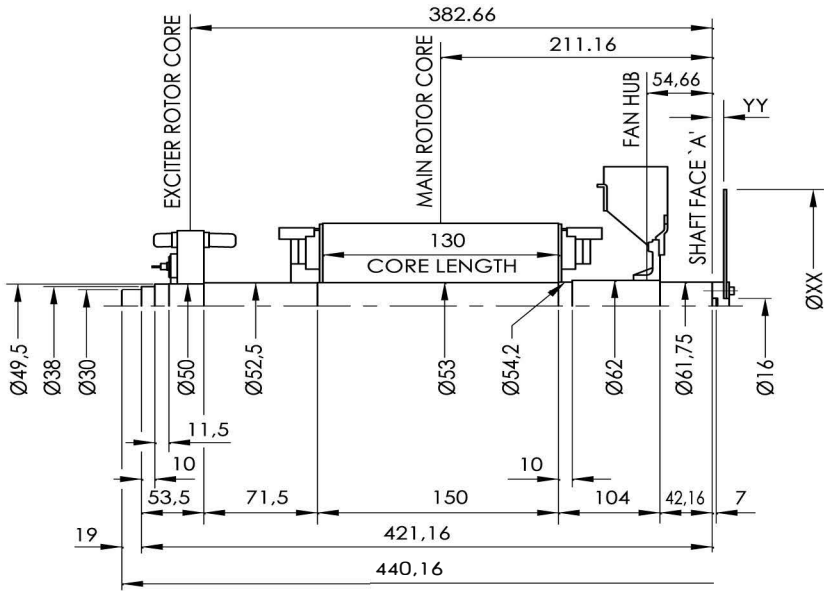
60  
Hz

### Winding 311

### THREE PHASE EFFICIENCY CURVES



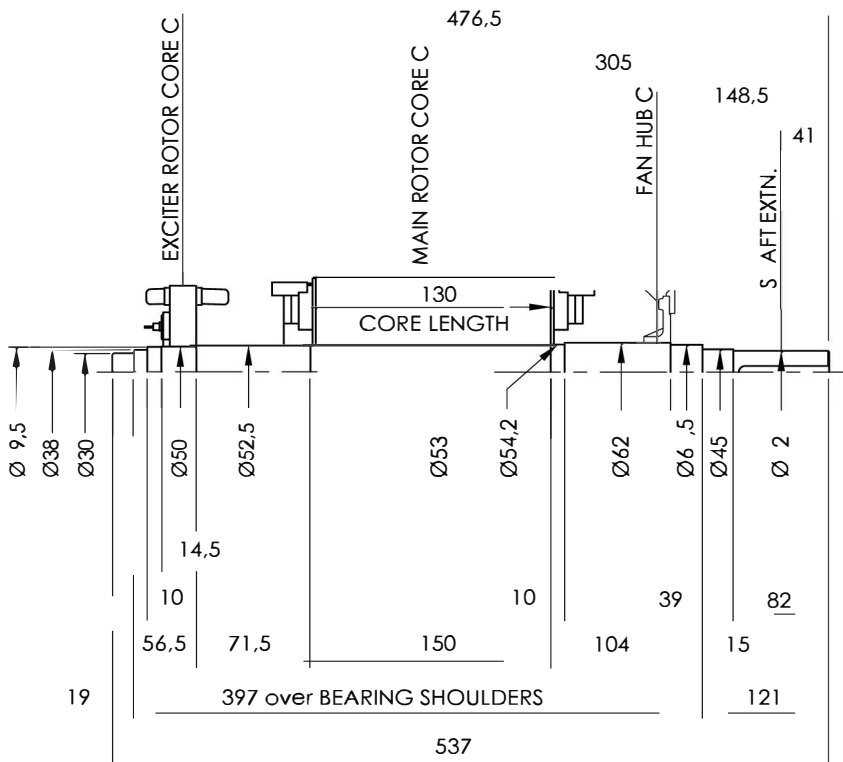
# Winding 311



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	5,120	0 0201
MAIN ROTOR	23.18	0 1104
FAN	0,744	0,0061
SHAFT	8,075	0 0032
TOTAL	37.123	0 1398

ADAPTOR SAE No.	COUPLING SAE No.	COUPLING DIMENSIONS		COUPLING ASSEMBLY WEIGHT kg	COUPLING DISC kgm <sup>2</sup>
		XX	YY		
6		241,2	31,7	1,810	0,0078
4/5		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	mm
Design	APP	Date	2018.01	
CHK				



COMPONENT	Wt kg	J kgm <sup>2</sup>
EX. ROTOR	5.120	0,0201
MAIN ROTOR	23.18	0,1104
FAN	0,744	0,0061
SHAFT	8,857	0,0032
TOTAL	37.905	0,1398

VE	MOD	DRW	Date	mm
esi	APP	Date	2018.01	
CHK				

