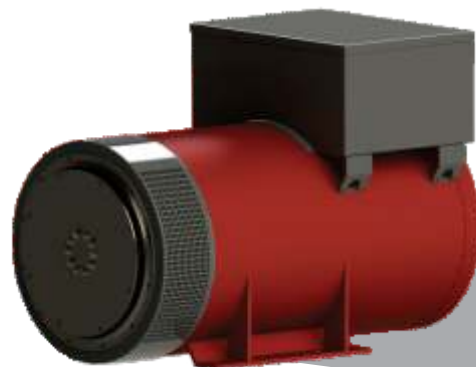


Application and Standard

The 4-pole generator is suitable for matching with a reciprocating internal combustion engine (commonly called a diesel engine) to form a generator set, which can be used as a fixed power supply or backup power supply for national defense, post and telecommunications, airports, hospitals, buildings, oil exploration, industrial and mining enterprises and other departments. Potenza Alternators are in compliance to the main domestic and international standards and regulations.



Electrical features

Automatic voltage regulators: Potenza 4 Pole Alternators are fitted with reliable and performant AVR, adapted to excitation systems, powered by transistors and fulfilling perfect regulation.

Short circuit capacity: Potenza propose two choices of excitation systems to meet different customer requirements:

- A) Self-Excitation system, without short-circuit capacity.
- B) PMG, with a short-circuit capacity of 3 times of the nominal current for 10 seconds.

Transient features: Transient voltage dip for 60% rated current at 0.4 power factor is less than 15%. Recovery time for a 15% transient voltage dip is less than 1.5s.

Parallel operation: All 4 pole alternators can operate in parallel with other alternators or with the mains, when they are equipped with the appropriate devices (AVR, current transformer...).

Overload acceptance: 4 pole alternators can be overloaded according to NEMA.

Single-phase operation: F5-500 series 4 pole alternators can be connected for single phase use.

Waveform: Total harmonic distortion (THD), at no load or linear load is less than 5% according to IEC. Telephone influence factor(TIF) according to NEMA is less than 50.

Frequency: 4 pole alternators may operate either 50Hz or 60Hz. The standard winding (B31, B32) is suitable both for 50Hz and 60Hz.

Power factor: 4 pole alternators are designed to operate between 0.8 and 1.0 power factor. A derating is necessary below 0.8 power factor (see derating table).

Mechanical features

Forms: 4 pole alternators can be provided in single bearing or double bearing configurations according to customer's requirements, as well as Engine adaptors and coupling discs which are fit for the major engines.

Balancing: All the rotors are dynamically balanced according to ISO1940. Double bearing rotors are balanced with a half key.

Insulation and protection: 4 pole alternators are class H insulated. The standard winding protection can accept up to 95% relative humidity and is suitable in the cabins. Specific added coatings can be proposed for harsh environments.

Enclosure: Standard enclosure is IP23.

Direction of rotation: F5-500 series can operate in both directions.

Terminal box and connectors: 4 pole alternators have a terminal box which allows easy access for connection of AVR or reconnection. Current transformers or other optional modules can be fitted within the box.

Bearings: Sealed for life bearings up to all Potenza 4 pole alternator.

Overspeed: The maximum overspeed is 2250 RPM for the 4 pole alternator (1.25 times the 60Hz rated speed).

Mechanical structure: Steel frame. Cast iron or steel housing and flanges depending on models.

General Parameters

Ambient temperature	40°C	Temperature rise	125K	Short circuit current multiple	/
Altitude	1000m	Voltage Regulation	±1%	Cooling method	IC01
Insulation class	Class H	Exciter method	Brushless self-excitation	Direction of rotation	Clockwise
Duty type	S1	Winding pitch	2/3	Maximum speed	2250 rpm
Phases	3	Power factor	0.8	Protection grade	IP23
Number of poles	4	TIF	<50	Frequency	50/60Hz
AVR model	SX440	THF	<2%	THD	1.2%~2.5%

Electrical parameters

50Hz/1500RPM		Standard winding / Power factor 0.8							
Duty type / temp rise / ambient temp		Cont. / 125K / 40°C				Standby / 163K / 27°C			
Phase		3 Phases				3 Phases			
Voltage	Y	380V	400V	415V	440V	380V	400V	415V	440V
	Δ	220V	230V	240V		220V	230V	240V	
	YY*				220V				220V
PO330	KVA	300	300	300	285	336	336	336	314
	KW	240	240	240	228	269	269	269	251
PO360	KVA	325	325	325	309	364	364	364	340
	KW	260	260	260	247	291	291	291	272
PO385	KVA	350	350	350	333	392	392	392	366
	KW	280	280	280	266	314	314	314	293
PO400	KVA	375	375	375	356	420	420	420	392
	KW	300	300	300	285	336	336	336	314
PO450	KVA	400	400	400	380	450	450	450	418
	KW	320	320	320	304	360	360	360	334
PO500	KVA	450	450	450	428	504	504	504	470
	KW	360	360	360	342	403	403	403	376

* Only 12-wire alternator can be realized, other voltages please consult the factory.

Electrical Parameters

60Hz/1800RPM		Standard winding / Power factor 0.8							
Duty type / temp rise / ambient temp		Cont. / 125K / 40°C				Standby / 163K / 27°C			
Phase		3 Phases				3 Phases			
Voltage	Y	416V	440V	460V	480V	416V	440V	460V	480V
	Δ	240V				240V			
	YY*	208V	220V	230V	240V	208V	220V	230V	240V
PO330	KVA	323	345	375	375	355	380	413	413
	KW	258	276	300	300	284	304	330	330
PO360	KVA	349	374	406	406	384	411	447	447
	KW	280	299	325	325	307	329	358	358
PO385	KVA	376	403	438	438	414	443	481	481
	KW	301	322	350	350	331	354	385	385
PO400	KVA	403	431	469	469	443	474	516	516
	KW	323	345	375	375	355	380	413	413
PO450	KVA	430	460	500	500	473	506	550	550
	KW	344	368	400	400	378	405	440	440
PO500	KVA	484	518	563	563	532	569	619	619
	KW	387	414	450	450	426	455	495	495

Moment of Inertia & Efficiency

Model	F5-500	PO330	PO360	PO385	PO400	PO450	PO500
Moment of Inertia (single-bearing).J	kgm^2	3.941	4.206	4.628	4.962	5.439	6.071
50Hz 400V Efficiency (100% Load)	%	94.4	94.5	94.7	94.7	94.8	94.9
60Hz 440V Efficiency (100% Load)	%	94.4	94.6	94.9	94.9	94.9	94.7

* Only 12-wire alternator can be realized, other voltages please consult the factory.

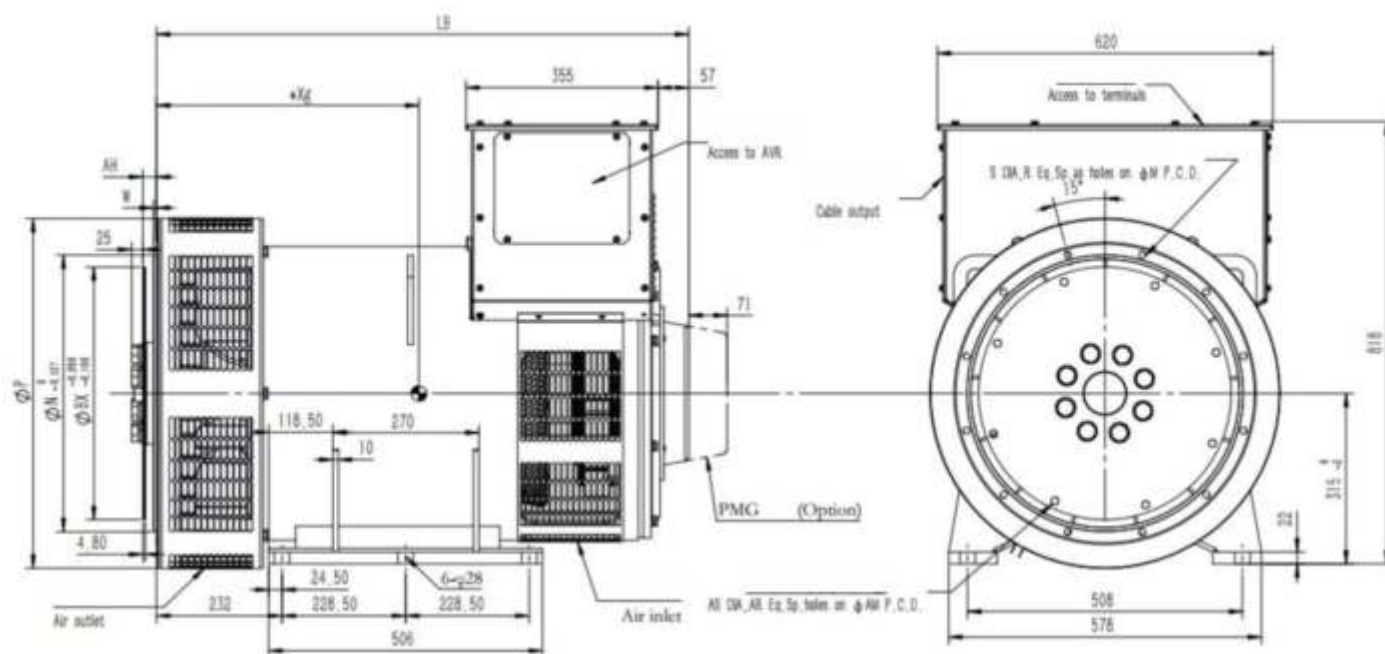
Reactance (%) - Time Constant (ms)

F5-500	50Hz @ 400V	PO330	PO360	PO385	PO400	PO450	PO500
Kcc	Short circuit ratio	0.25	0.22	0.25	0.23	0.25	0.24
Xd	Direct axis synchronous unsaturated reactance	393	455	401	431	399	418
X'd	Direct Axis Transient Saturation Reactance	25.5	29.2	26.8	27.7	25.0	27.9
X''d	Direct Axis Subtransient Saturation Reactance	16.9	19.3	17.9	18.2	16.2	18.8
Xq	Quadrature axis synchronous unsaturated reactance	225	261	230	247	228	240
X''q	Quadrature Subtransient Saturation Reactance	22.5	25.7	23.1	24.0	21.8	24.9
X2	Negative sequence saturation reactance	1.97	2.25	2.05	2.11	1.90	2.19
X0	Zero sequence unsaturated reactance	1.00	1.11	1.08	1.03	0.85	1.22
T'd	Short-circuit transient time constant	84	93	79	80	68	103
T''d	Subtransient time constant	11	12	10	10	9	13
T'do	Open circuit time constant	3604	4011	3274	3471	3036	4283
Ta	Armature time constant	41	47	58	56	59	32

Reactance (%) - Time Constant (ms)

F5-500	60Hz @ 440V	PO330	PO360	PO385	PO400	PO450	PO500
Kcc	Short circuit ratio	0.21	0.18	0.21	0.19	0.21	0.19
Xd	Direct axis synchronous unsaturated reactance	468	541	477	534	475	524
X'd	Direct Axis Transient Saturation Reactance	30.3	34.8	31.9	34.1	29.7	33.1
X''d	Direct Axis Subtransient Saturation Reactance	20.1	23.0	21.3	22.4	19.3	21.4
Xq	Quadrature axis synchronous unsaturated reactance	268	310	274	306	273	296
X''q	Quadrature Subtransient Saturation Reactance	26.8	30.6	27.5	29.5	25.9	28.5
X2	Negative sequence saturation reactance	2.35	2.68	2.44	2.59	2.26	2.49
X0	Zero sequence unsaturated reactance	1.19	1.32	1.29	1.25	1.01	1.15
T'd	Short-circuit transient time constant	83	92	78	80	67	80
T''d	Subtransient time constant	10	11	10	10	8	10
T'do	Open circuit time constant	4289	4773	3897	4191	3613	4091
Ta	Armature time constant	40	46	58	59	55	60

Outline Drawing (Single Bearing)



DIMENSION (MM)

Model	LB	*Xg	Weight	Package
	mm	mm	kg	L x W x H (mm)
PO330	936	423	741	1010*786*1060
PO360	936	433	721	1010*786*1060
PO385	986	453	783	1090*786*1060
PO400	986	458	801	1090*786*1060
PO450	1021	475	875	1090*786*1060
PO500	1081	505	983	1150*786*1060

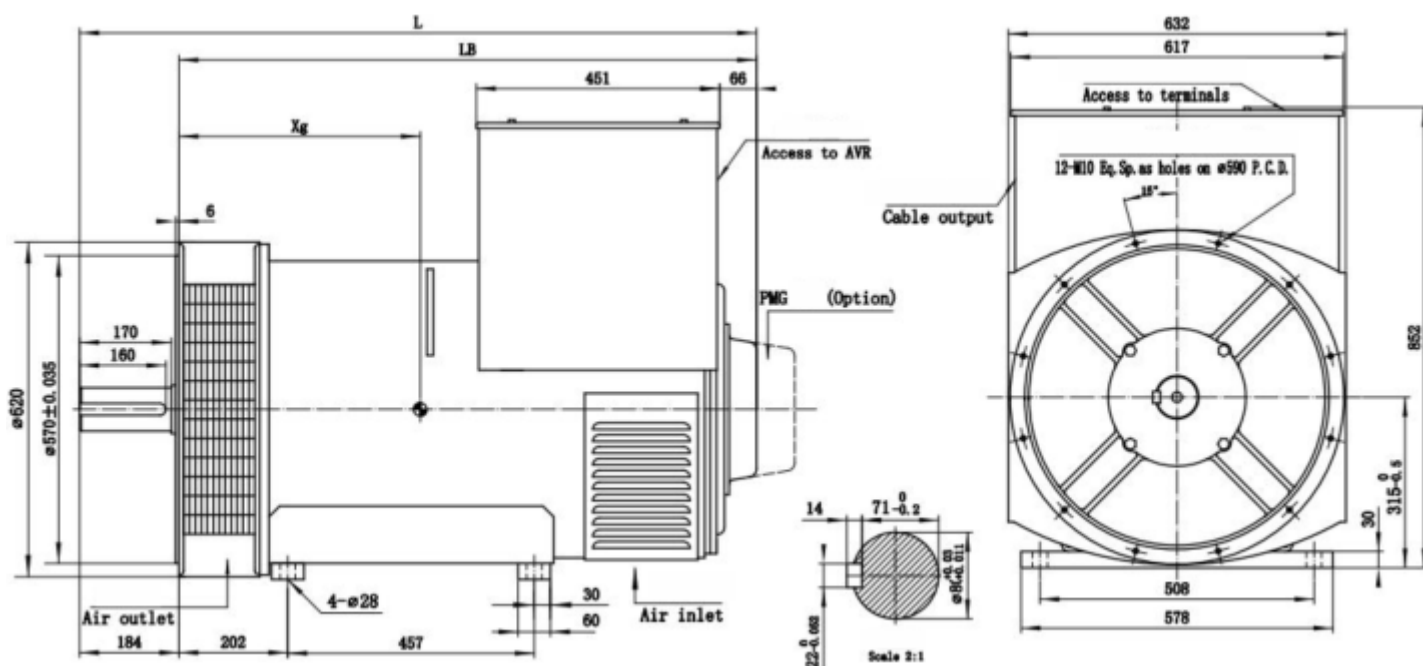
FRONT COVER (MM)

S.A.E	P	N	M	R-øS	W	a°
#0	711	647.7	679.45	16 - ø14	6	11.25°
#1/2	646	584.2	619.125	12 - ø14	6	15°
#1	646	511.175	530.225	12 - ø12	6	15°

COUPLING (MM)

S.A.E	BX	AM	AR-øAS	AH
#11.5	352.425	333.38	8 - ø11	39.6
#14	466.725	438.15	8 - ø14	25.4
#18	571.5	542.925	6 - ø17	15.7

Outline Drawing (Double Bearing)



DIMENSION (MM)

Model	L	LB	*Xg	Weight	Package
	mm	mm	mm	kg	L x W x H (mm)
PO330	1255	1071	453	756	1100*786*1040
PO360	1255	1071	474	736	1100*786*1040
PO385	1255	1071	485	798	1180*786*1040
PO400	1345	1071	500	816	1180*786*1040
PO450	1345	1161	512	890	1180*786*1040
PO500	1345	1161	528	998	1240*786*1040