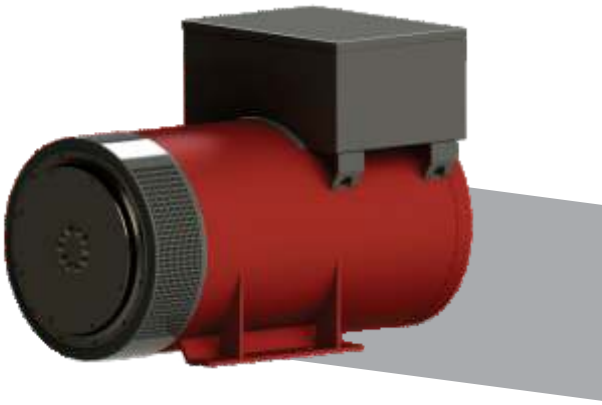
Application and Standard

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-Excition 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: F4-275 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: F4-275 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	SX460	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
PO125	KVA	114	114	114	107	125	**125**	125	118
	KW	*91*	*91*	*91*	*86*	*100*	*100*	*100*	*94*
PO155	KVA	141	141	141	133	155	**155**	155	146
	KW	*113*	*113*	*113*	*106*	*124*	*124*	*124*	*117*
PO175	KVA	160	160	160	152	175	**175**	175	167
	KW	*128*	*128*	*128*	*122*	*140*	*140*	*140*	*134*
PO200	KVA	188	188	188	178	206	**206**	206	196
	KW	*150*	*150*	*150*	*143*	*165*	*165*	*165*	*157*
PO220	KVA	200	200	200	190	220	**220**	220	209
	KW	*160*	*160*	*160*	*152*	*176*	*176*	*176*	*167*
PO275	KVA	250	250	250	238	275	**275**	275	252
	KW	*200*	*200*	*200*	*190*	*220*	*220*	*220*	*201*

* 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
PO125	KVA	121	129	141	141	133	**142**	155	155
	KW	*97*	*104*	*113*	*113*	*106*	*114*	*124*	*124*
PO155	KVA	151	161	175	175	166	**177**	193	193
	KW	*120*	*129*	*140*	*140*	*132*	*142*	*154*	*154*
PO175	KVA	172	184	200	200	189	**202**	220	220
	KW	*138*	*147*	*160*	*160*	*151*	*162*	*176*	*176*
PO200	KVA	202	216	234	234	222	**237**	258	258
	KW	*161*	*173*	*188*	*188*	*177*	*190*	*206*	*206*
PO220	KVA	215	230	250	250	237	**253**	275	275
	KW	*172*	*184*	*200*	*200*	*189*	*202*	*220*	*220*
PO275	KVA	269	288	313	313	296	**316**	344	344
	KW	*215*	*230*	*250*	*250*	*237*	*253*	*275*	*275*

Moment of Inertia & Efficiency

Model	F4-275	PO125	PO155	PO175	PO200	PO220	PO275
Moment of Inertia (single-bearing).J	kgm^2	1.147	1.281	1.439	1.704	1.712	2.318
50Hz 400V Efficiency (100% Load)	%	91.8	92.7	93.1	93.4	93.7	94.3
60Hz 440V Efficiency (100% Load)	%	92.6	93.3	93.6	93.9	94.2	94.8

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

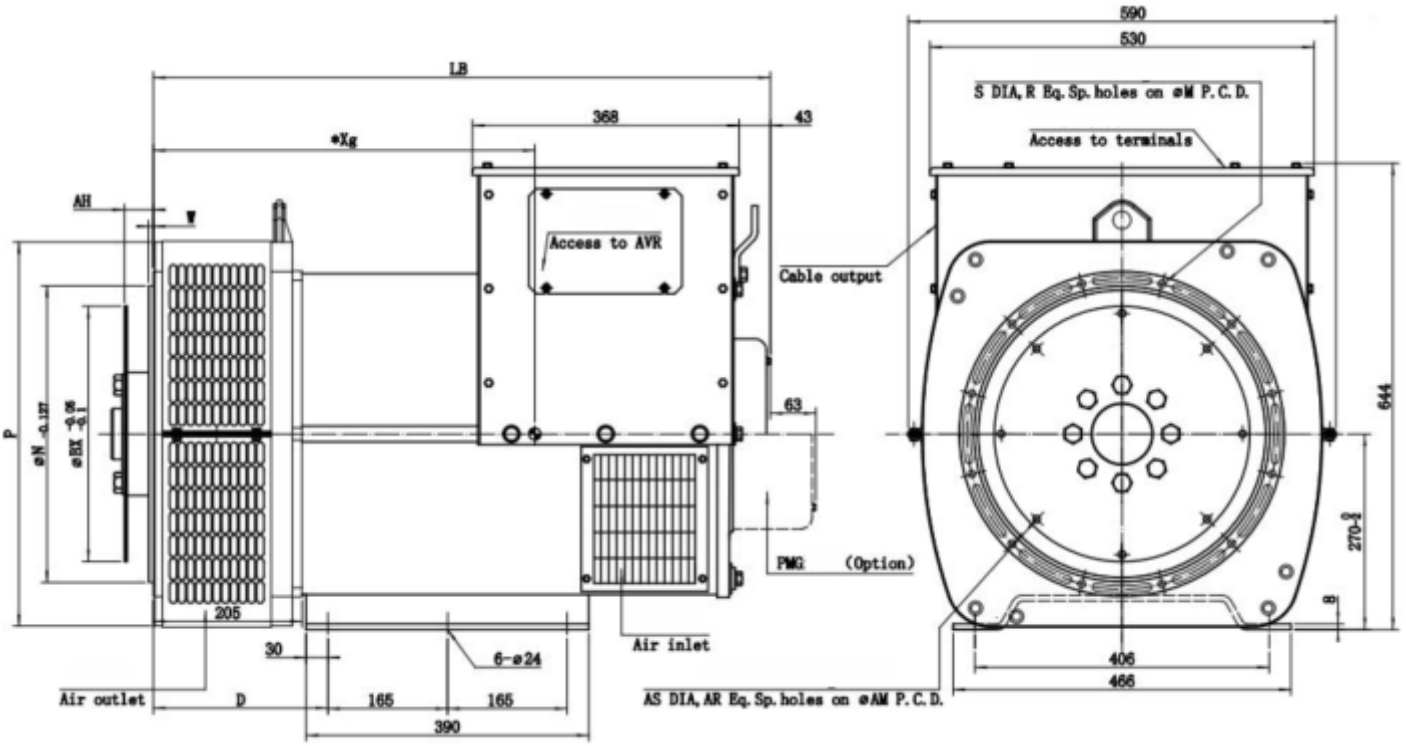
Reactance (%) - Time Constant (ms)

F4-275	50Hz @ 400V	PO125	PO155	PO175	PO200	PO220	PO275
Kcc	Short circuit ratio	0.28	0.27	0.28	0.26	0.27	0.32
Xd	Direct axis synchronous unsaturated reactance	355	374	358	384	374	310
X'd	Direct Axis Transient Saturation Reactance	26.6	27.2	25.6	26.9	26.1	20.2
X''d	Direct Axis Subtransient Saturation Reactance	15.6	15.6	14.3	14.8	14.3	10.4
Xq	Quadrature axis synchronous unsaturated reactance	201	211	202	216	211	174
X''q	Quadrature Subtransient Saturation Reactance	16.8	16.7	15.4	15.9	15.3	11.3
X2	Negative sequence saturation reactance	1.62	1.61	1.49	1.53	1.48	1.08
X0	Zero sequence unsaturated reactance	1.29	1.21	1.07	1.06	1.01	0.63
T'd	Short-circuit transient time constant	67	62	54	52	49	32
T''d	Subtransient time constant	8	8	7	6	6	4
T'do	No-load time constant	2493	2383	2106	2057	1949	1346
Ta	Armature time constant	10	13	15	19	20	20

Reactance (%) - Time Constant (ms)

F4-275	60Hz @ 440V	PO125	PO155	PO175	PO200	PO220	PO275
Kcc	Short circuit ratio	0.24	0.22	0.23	0.22	0.22	0.27
Xd	Direct axis synchronous unsaturated reactance	423	446	426	457	445	368
X'd	Direct Axis Transient Saturation Reactance	31.7	32.4	30.4	32.0	31.1	24.1
X''d	Direct Axis Subtransient Saturation Reactance	18.6	18.5	17.1	17.6	17.0	12.4
Xq	Quadrature axis synchronous unsaturated reactance	239	252	240	257	251	207
X''q	Quadrature Subtransient Saturation Reactance	20.0	19.9	18.3	18.9	18.2	13.4
X2	Negative sequence saturation reactance	1.93	1.92	1.77	1.83	1.76	1.29
X0	Zero sequence unsaturated reactance	1.54	1.44	1.27	12.56	18.22	0.75
T'd	Short-circuit transient time constant	67	62	54	51	49	31
T''d	Subtransient time constant	8	8	7	6	6	4
T'do	No-load time constant	2967	2836	2506	2448	2319	1601
Ta	Armature time constant	10	13	14	18	20	20

Outline Drawing (Single Bearing)



Dimension (mm)

Model	LB SAE1	LB SAE2&3	*Xg	Weight	Package
	mm		mm	kg	L x W x H (mm)
PO125	730	715	335	384	880*650*830
PO155	770	756	355	445	970*650*830
PO175	810	796	373	476	970*650*830
PO200	850	836	395	518	1010*650*830
PO220	850	836	403	531	1010*650*830
PO275	965	951	455	640	1120*650*830

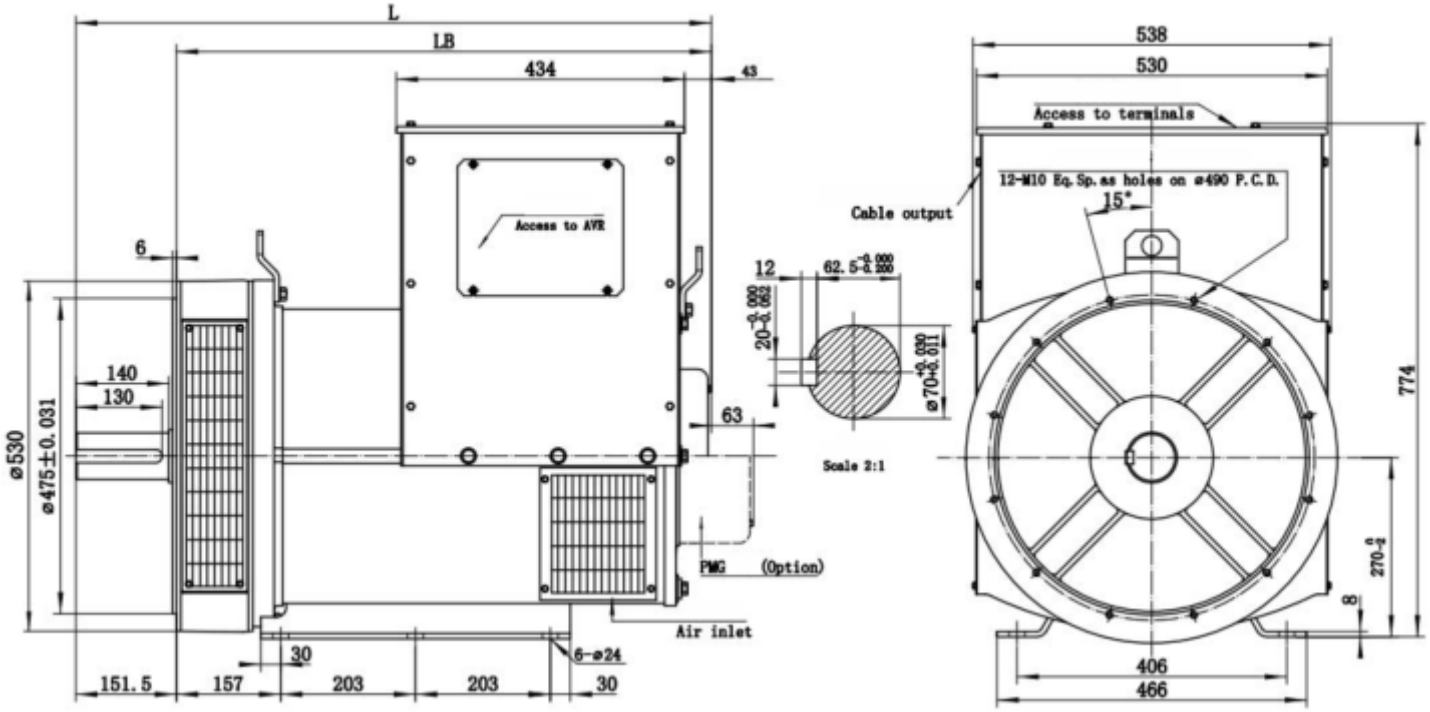
Front cover (mm)

S.A.E	P	N	M	R-øS	W	D	a°
#1	560	511.175	530.225	12 - ø12	6.5	255	15°
#2	530	447.675	466.725	12 - ø12	6.5	241	15°
#3	530	409.575	428.625	12 - ø12	6.5	241	15°

Coupling (mm)

S.A.E	BX	AM	AR-øAS	AH
#10	314.325	295.3	8 - ø11	53.8
#11.5	352.425	333.38	8 - ø11	39.6
#14	466.725	438.15	8 - ø14	25.4

Outline Drawing (Double Bearing)



Dimension (mm)						
Model	L	LB	D	*Xg	Weight	Package
	mm	mm	mm	mm	kg	L x W x H (mm)
PO125	842	690.5	319.5	304	399	1010*650*880
PO155	957	805.5	359.5	319	460	1100*650*880
PO175	957	805.5	359.5	350	491	1100*650*880
PO200	1007	855.5	359.5	368	533	1140*650*880
PO220	1007	855.5	359.5	384	546	1140*650*880
PO275	1092	940.5	370.3	425	655	1250*650*880