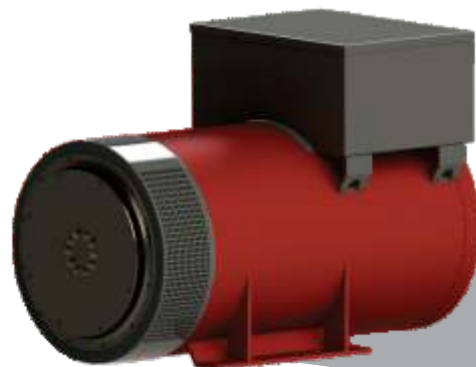


Application and Standard

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.

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: F7-1650 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	KR440	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	
PO900	KVA	800	800	800	760	900	900	900	836
	KW	640	640	640	608	720	720	720	669
PO1000	KVA	910	910	910	865	1019	1019	1019	951
	KW	728	728	728	692	815	815	815	761
PO1100	KVA	1000	1000	1000	950	1120	1120	1120	1045
	KW	800	800	800	760	896	896	896	836
PO1250	KVA	1125	1125	1125	1069	1260	1260	1260	1176
	KW	900	900	900	855	1008	1008	1008	941
PO1400	KVA	1250	1250	1250	1188	1400	1400	1400	1306
	KW	1000	1000	1000	950	1120	1120	1120	1045
PO1500	KVA	1375	1375	1375	1306	1540	1540	1540	1437
	KW	1100	1100	1100	1045	1232	1232	1232	1150
PO1650	KVA	1500	1500	1500	1425	1680	1680	1680	1568
	KW	1200	1200	1200	1140	1344	1344	1344	1254

* Consult factory for other voltages

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			
PO900	KVA	860	920	1000	1000	946	1012	1100	1100
	KW	<i>688</i>	<i>736</i>	<i>800</i>	<i>800</i>	<i>757</i>	<i>810</i>	<i>880</i>	<i>880</i>
PO1000	KVA	978	1047	1138	1138	1076	1151	1251	1251
	KW	<i>783</i>	<i>837</i>	<i>910</i>	<i>910</i>	<i>861</i>	<i>921</i>	<i>1001</i>	<i>1001</i>
PO1100	KVA	1075	1150	1250	1250	1183	1265	1375	1375
	KW	<i>860</i>	<i>920</i>	<i>1000</i>	<i>1000</i>	<i>946</i>	<i>1012</i>	<i>1100</i>	<i>1100</i>
PO1250	KVA	1209	1294	1406	1406	1330	1423	1547	1547
	KW	<i>968</i>	<i>1035</i>	<i>1125</i>	<i>1125</i>	<i>1064</i>	<i>1139</i>	<i>1238</i>	<i>1238</i>
PO1400	KVA	1344	1438	1563	1563	1478	1581	1719	1719
	KW	<i>1075</i>	<i>1150</i>	<i>1250</i>	<i>1250</i>	<i>1183</i>	<i>1265</i>	<i>1375</i>	<i>1375</i>
PO1500	KVA	1478	1581	1719	1719	1626	1739	1891	1891
	KW	<i>1183</i>	<i>1265</i>	<i>1375</i>	<i>1375</i>	<i>1301</i>	<i>1392</i>	<i>1513</i>	<i>1513</i>
PO1650	KVA	1613	1725	1875	1875	1774	1898	2063	2063
	KW	<i>1290</i>	<i>1380</i>	<i>1500</i>	<i>1500</i>	<i>1419</i>	<i>1518</i>	<i>1650</i>	<i>1650</i>

Moment of Inertia & Efficiency

Model	F7-1650	PO900	PO1000	PO1100	PO1250	PO1400	PO1500	PO1650
Moment of Inertia (single-bearing).J	kgm^2	16.837	18.283	19.945	22.724	27.481	31.031	31.956
50Hz 400V Efficiency (100% Load)	%	95.2	95.5	95.8	95.8	95.9	96.1	96.2
60Hz 440V Efficiency (100% Load)	%	95.4	95.5	95.9	96.9	96.0	96.0	96.2

* Consult factory for other voltages

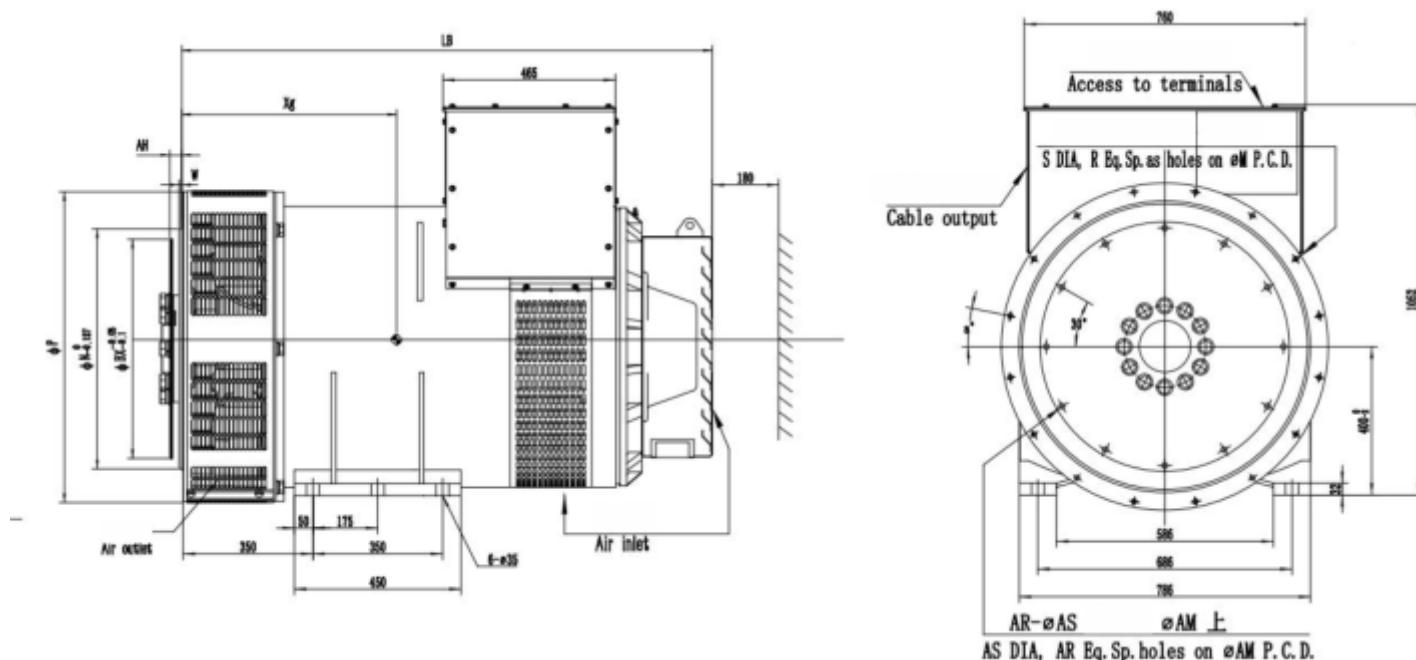
Reactance (%) - Time Constant (ms)

F7-1650	50Hz @ 400V	PO900	PO1000	PO1100	PO1250	PO1400	PO1500	PO1650
Kcc	Short circuit ratio	0.26	0.24	0.26	0.27	0.27	0.27	0.24
Xd	Direct axis synchronous unsaturated reactance	386	424	388	369	364	375	415
X'd	Direct Axis Transient Saturation Reactance	23.8	25.2	22.8	21.6	20.5	22.4	24.8
X''d	Direct Axis Subtransient Saturation Reactance	17.5	18.3	16.5	15.5	14.5	16.2	17.9
Xq	Quadrature axis synchronous unsaturated reactance	241	264	242	230	226	234	259
X''q	Quadrature Subtransient Saturation Reactance	24.4	26.0	23.3	21.7	20.7	22.3	24.7
X2	Negative sequence saturation reactance	2.10	2.21	1.99	1.86	1.76	1.92	2.13
X0	Zero sequence unsaturated reactance	1.38	1.39	1.20	1.10	0.95	1.23	1.36
T'd	Short-circuit transient time constant	49	49	41	35	31	31	34
T''d	Subtransient time constant	6	6	5	4	4	4	4
T'do	Open circuit time constant	2213	2283	1958	1664	1535	1433	1570
Ta	Armature time constant	146	181	192	233	255	401	439

Reactance (%) - Time Constant (ms)

F7-1650	60Hz @ 440V	PO900	PO1000	PO1100	PO1250	PO1400	PO1500	PO1650
Kcc	Short circuit ratio	0.23	0.20	0.22	0.23	0.24	0.23	0.21
Xd	Direct axis synchronous unsaturated reactance	443	491	447	427	418	433	481
X'd	Direct Axis Transient Saturation Reactance	27.2	29.2	26.3	24.9	23.6	25.8	28.7
X''d	Direct Axis Subtransient Saturation Reactance	20.0	21.2	19.0	17.9	16.7	18.6	20.7
Xq	Quadrature axis synchronous unsaturated reactance	276	306	278	266	260	270	299
X''q	Quadrature Subtransient Saturation Reactance	28.0	30.1	26.9	25.2	23.9	25.7	28.5
X2	Negative sequence saturation reactance	2.40	2.56	2.29	2.15	2.03	2.22	2.46
X0	Zero sequence unsaturated reactance	1.58	1.61	1.38	1.28	1.09	1.43	1.57
T'd	Short-circuit transient time constant	47	47	40	34	30	30	32
T''d	Subtransient time constant	6	6	5	4	4	4	4
T'do	Open circuit time constant	2537	2645	2258	1925	1766	1653	1817
Ta	Armature time constant	139	175	185	224	245	317	423

Outline Drawing (Single Bearing)


DIMENSION (MM)

Model	LB	*Xg	Weight	Package
	mm	mm	kg	L x W x H (mm)
PO900	1266	545	1767	1590*1000*1250
PO1000	1351	565	1854	1680*1000*1250
PO1100	1351	588	2030	1680*1000*1250
PO1250	1491	630	2105	1820*1000*1250
PO1400	1491	658	2221	1820*1000*1250
PO1500	1586	700	2522	1910*1000*1250
PO1650	1586	705	2612	1910*1000*1250

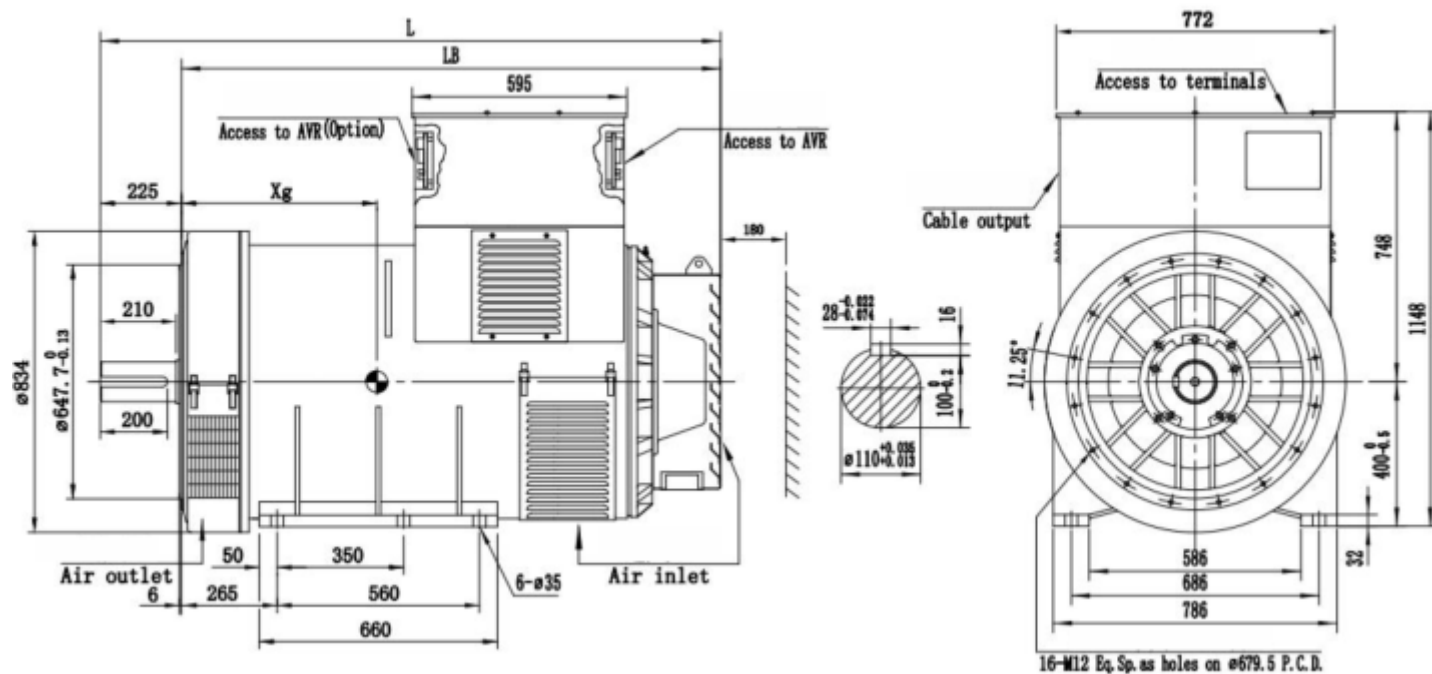
FRONT COVER (MM)

S.A.E	P	N	M	R-øS	W	a°
#00	914	787.4	850.9	16 - ø14	6	11.25°
#0	846	647.7	679.45	12 - ø14	6	11.25°
#1/2	846	584.2	619.1	12 - ø14	6	15°
#1	846	511.2	530.2	12 - ø14	6	15°

COUPLING (MM)

S.A.E	BX	AM	AR-øAS	AH
#14	466.7	438.15	8 - ø14	25.4
#18	571.5	542.925	12 - ø17	15.7
#21	673.1	641.35	12 - ø17	0
#24	733.3	692	12 - ø21	0

Outline Drawing (Double Bearing)



DIMENSION (MM)

Model	L	LB	*Xg	Weight	Package
	mm	mm	mm	kg	L x W x H (mm)
PO900	1718	1493	591	1787	1760*1000*1230
PO1000	1718	1493	597	1874	1850*1000*1230
PO1100	1718	1493	607	2050	1850*1000*1230
PO1250	1718	1493	625	2125	1990*1000*1230
PO1400	1904	1679	753	2241	1990*1000*1230
PO1500	1904	1679	788	2542	2080*1000*1230
PO1650	1904	1679	808	2632	2080*1000*1230