KAL454 Series

Fujian Kwise Generator Co., Ltd.

1120kW - 2000 kW

Application and Standard

The4-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.

Alternators are incompliance to the main domestic and international standards and regulations: GB755, BS5000, IEC60034, VDE0530, CSAC22.2-100, NEMAMG-1.22. Alternators' manufacturing, design and mark are carried out in the environment of ISO9001.

Electrical features

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

Short circuit capacity: Kwise 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 10seconds.

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: 454 series is only suitable for clockwise operation (Viewed from the drive end).

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 with in the box.

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

Overspeed: The maximum over speed is 2250rpm 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℃	Temperature rise	125K	Short circuit current multiple	≧300%
Altitude	1000m	Voltage regulation	±1%	Cooling method	IC01
Insulation class	Class H	Exciter system	Brushless self-excitation	Direction of rotation	Clockwise
Duty type	S1	Winding pitch	2/3	Maximum speed	2250rpm
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%

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4 Poles

Kwise from the CASIC, to the world

Electrical parameters

50Hz/1500RPM		Standard Winding / Power Factor 0.8							
Duty type/Temperature rise/Ambient		Cont./125K/40℃				Standby/163K/27℃			
Phase		3-Phases				3-Phases			
Voltage	Y	380V	**400V**	415V	440V	380V	400V	415V	440V
	Δ	220V	**230V**	240V		220V	230V	240V	
KAL454A1	kVA	1400	**1400**	1400	1330	1568	1568	1568	1463
	kW	1120	**1120**	1120	1064	1254	1254	1254	1170
KAL454B1	kVA	1563	**1563**	1563	1484	1750	1750	1750	1633
	kW	1250	**1250**	1250	1188	1400	1400	1400	1306
KAL454C2	kVA	1688	**1688**	1688	1603	1890	1890	1890	1763
	kW	1350	**1350**	1350	1283	1512	1512	1512	1411
KAL454D2	kVA	1900	**1900**	1900	1805	2128	2128	2128	1986
	kW	1520	**1520**	1520	1444	1702	1702	1702	1588
KAL454E3	kVA	2063	**2063**	2063	1959	2310	2310	2310	2155
	kW	1650	**1650**	1650	1568	1848	1848	1848	1724
KAL454F4	kVA	2250	**2250**	2250	2138	2520	2520	2520	2351
	kW	1800	**1800**	1800	1710	2016	2016	2016	1881
KAL454G5	kVA	2375	**2375**	2375	2256	2660	2660	2660	2482
	kW	1900	**1900**	1900	1805	2128	2128	2128	1986
KAL454H5	kVA	2500	**2500**	2500	2375	2800	2800	2800	2613
	kW	2000	**2000**	2000	1900	2240	2240	2240	2090

*** Other voltages please consult the factory.**

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4 Poles

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Electrical parameters

60Hz/1800RPM		Standard Winding / Power Factor 0.8							
Duty type/Temperature rise/Ambient		Cont./125K/40℃				Standby/163K/27℃			
Phase		3-Phases				3-Phases			
Voltage	Y	416V	**440V**	460V	480V	416V	440V	460V	480V
	Δ	240V				240V			
KAL454A1	kVA	1505	**1610**	1680	1680	1656	1771	1848	1848
	kW	1204	**1288**	1344	1344	1324	1417	1478	1478
KAL454B1	kVA	1680	**1797**	1875	1875	1848	1977	2063	2063
	kW	1344	**1438**	1500	1500	1478	1581	1650	1650
KAL454C2	kVA	1814	**1941**	2025	2025	1995	2135	2228	2228
	kW	1451	**1553**	1620	1620	1596	1708	1782	1782
KAL454D2	kVA	2043	**2185**	2280	2280	2247	2404	2508	2508
	kW	1634	**1748**	1824	1824	1797	1923	2006	2006
KAL454E3	kVA	2217	**2372**	2475	2475	2439	2609	2723	2723
	kW	1774	**1898**	1980	1980	1951	2087	2178	2178
KAL454F4	kVA	2419	**2588**	2700	2700	2661	2846	2970	2970
	kW	1935	**2070**	2160	2160	2129	2277	2376	2376
KAL454G5	kVA	2553	**2731**	2850	2850	2808	3004	3135	3135
	kW	2043	**2185**	2280	2280	2247	2404	2508	2508
KAL454H5	kVA	2688	**2875**	3000	3000	2956	3163	3300	3300
	kW	2150	**2300**	2400	2400	2365	2530	2640	2640

*** Other voltages please consult the factory.**

Moment of Inertia & Efficiency

Model	KAL454	A1	B1	C2	D2	E3	F4	G5	H5
Inertia (1-Bearing) J	kgm^2	36.432	37.189	42.541	45.689	50.505	57.478	59.759	62.689
50Hz400V Efficiency (100% load)	%	96	96.1	96.2	96.2	96.3	96.3	96.4	96.4
60Hz440V Efficiency (100% load)	%	96.1	96.2	96.3	95.3	96.4	96.4	96.4	96.4

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4 Poles

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Reactance (%) - Time Constant (ms)

50Hz @ 400V	KAL454	A1	B1	C2	D2	E3	F4	G5	H5
Short circuit ratio	Kcc	0.28	0.25	0.29	0.25	0.27	0.22	0.27	0.24
Direct axis synchronous unsaturated reactance	Xd	354	403	346	394	375	457	377	424
Direct Axis Transient Saturation Reactance	X'd	24.2	26.6	22.8	23.7	22.4	26.9	22.4	25.0
Direct Axis Subtransient Saturation Reactance	X"d	18.0	19.5	16.7	16.9	15.9	18.9	15.8	17.5
Quadrature axis Synchronous Unsaturated Reactance	Xq	216	246	211	240	228	277	229	257
Quadrature Subtransient Saturation Reactance	X"q	24.2	26.6	22.5	23.9	22.4	26.8	22.2	24.7
Negative sequence saturation reactance	X2	2.11	2.31	1.96	2.04	1.91	2.29	1.90	2.11
Zero sequence unsaturated reactance	X0	1.77	1.84	1.56	1.28	1.23	1.43	1.28	1.41
Short-circuit transient time constant	T'd	48	52	39	40	35	39	31	33
Subtransient time constant	T"d	6	7	5	5	4	5	4	4
Open circuit time constant	T'do	1969	2204	1665	1840	1609	1815	1443	1547
Armature time constant	Ta	410	488	487	535	600	745	865	946

60Hz @ 440V	KAL454	A1	B1	C2	D2	E3	F4	G5	H5
Short circuit ratio	Kcc	0.25	0.22	0.26	0.23	0.24	0.20	0.24	0.21
Direct axis synchronous unsaturated reactance	Xd	395	447	386	437	413	503	419	471
Direct Axis Transient Saturation Reactance	X'd	27.0	29.5	25.4	25.7	24.7	29.7	24.9	27.7
Direct Axis Subtransient Saturation Reactance	X"d	20.1	21.7	18.6	18.1	17.5	20.8	17.5	19.4
Quadrature axis Synchronous Unsaturated Reactance	Xq	241	273	235	265	251	306	254	286
Quadrature Subtransient Saturation Reactance	X"q	26.9	29.5	25.2	25.9	24.7	29.6	24.6	27.4
Negative sequence saturation reactance	X2	2.35	2.56	2.19	2.20	2.11	2.52	2.10	2.34
Zero sequence unsaturated reactance	X0	1.97	2.04	1.75	1.44	1.35	1.57	1.41	1.55
Short-circuit transient time constant	T'd	45	48	37	36	32	35	29	30
Subtransient time constant	T"d	6	6	5	5	4	4	4	4
Open circuit time constant	T'do	2196	2447	1859	2041	1770	2000	1604	1718
Armature time constant	Ta	381	452	475	480	571	708	734	851

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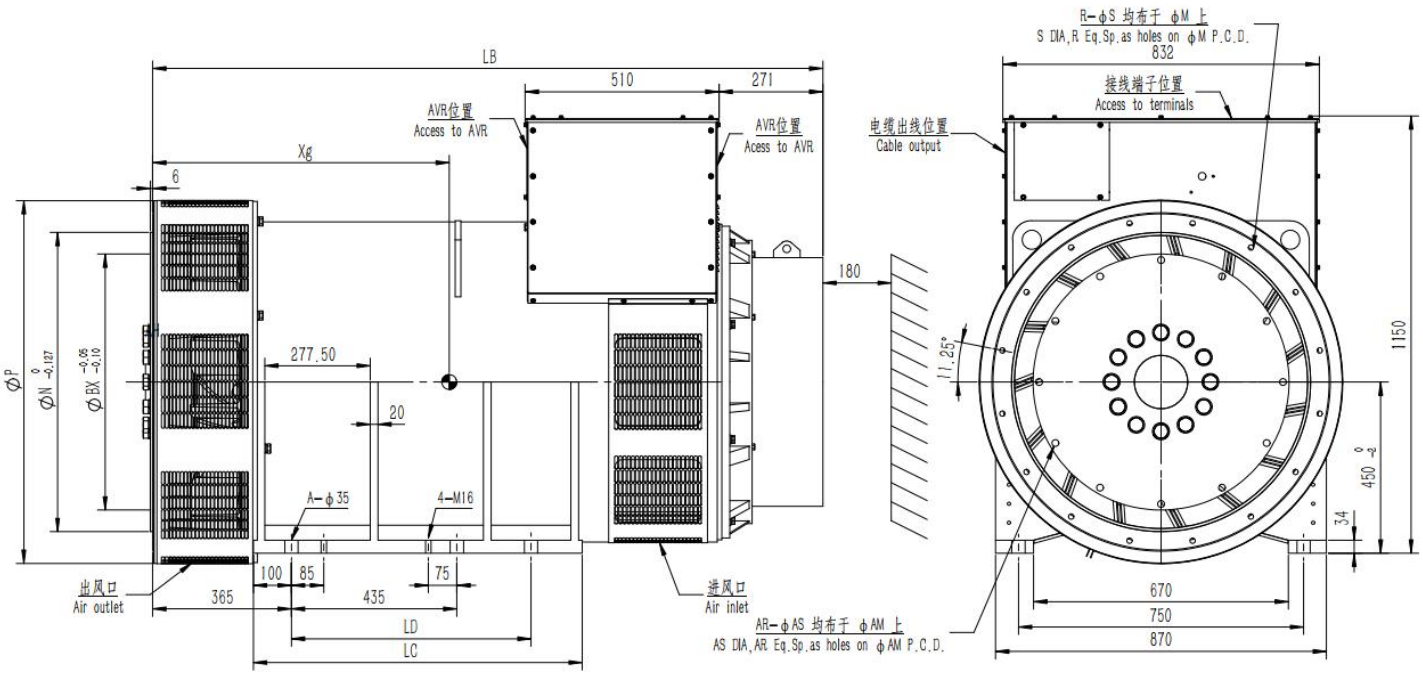
4 Poles

Kwise from the CASIC, to the world

Outline Drawing (Single Bearing)



尺寸(mm)	LB	LC	LD	A	*Xg	重量	包装
型号	mm	mm	mm		mm	kg	L x W x H(mm)
KAL454A1	1497	635	/	6	623	2668	1730*1050*1370
KAL454B1	1497	635	/	6	645	2854	1730*1050*1370
KAL454C2	1607	635	/	6	683	3085	1800*1050*1370
KAL454D2	1607	635	/	6	700	3140	1800*1050*1370
KAL454E3	1687	635	/	6	740	3471	1950*1050*1370
KAL454F4	1767	865	630	8	780	3804	2030*1050*1370
KAL454G5	1862	865	630	8	800	3825	2150*1050*1370
KAL454H5	1862	865	630	8	828	4566	2150*1050*1370

Flange (mm)						
S.A.E	P	N	M	R-øS	W	a°
#00	954	787.3	850.9	16-ø14	6	11.25°
#0	954	647.7	679.45	16-ø14	6	11.25°

Coupling Disc (mm)				
S.A.E	BX	AM	AR-øAS	AH
#18	571.5	542.9	6-ø17	15.7
#21	673.1	641.35	12-ø17	0
#24	733.3	692	12-ø21	0

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4 Poles

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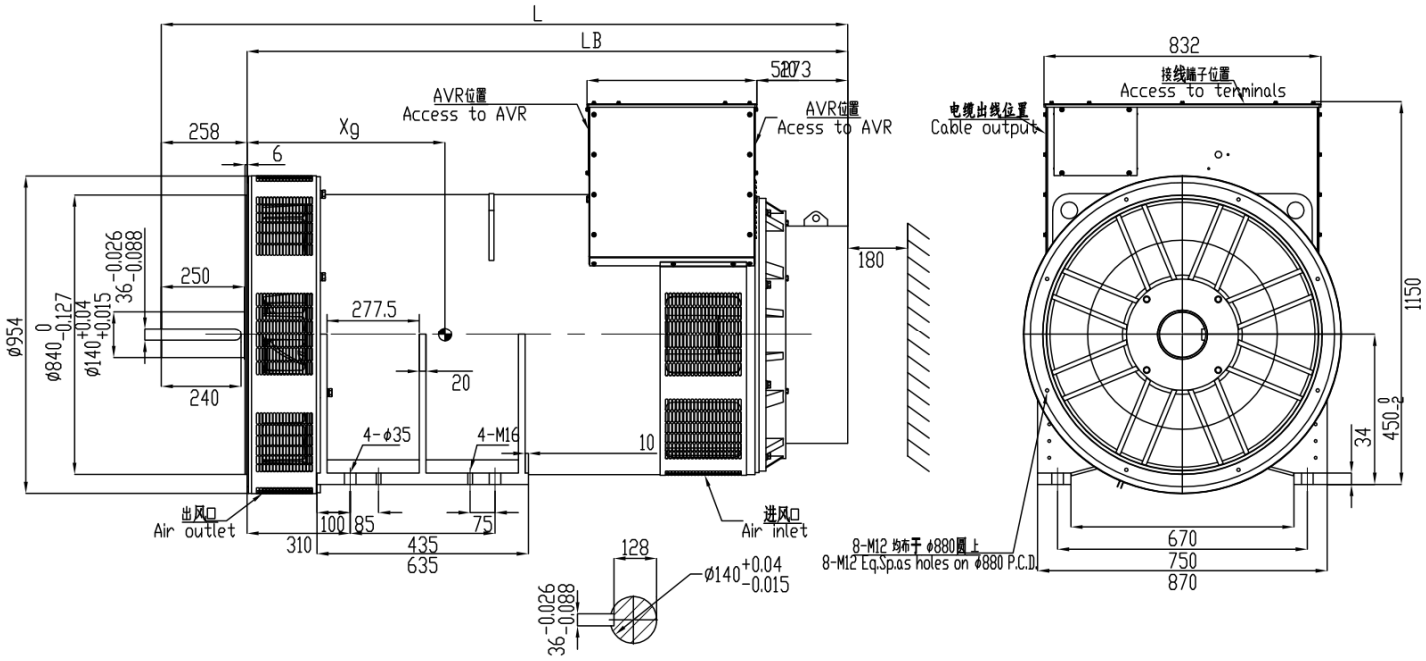
Outline Drawing (Double Bearing)



Dimension (mm)	L	LB	*Xg	Weight	Package
Type	mm	mm	mm	kg	L x W x H(mm)
KAL454A1	1700	1442	600	2693	1930*1050*1350
KAL454B1	1700	1442	620	2879	1930*1050*1350
KAL454C2	1810	1552	658	3110	2000*1050*1350
KAL454D2	1810	1552	675	3165	2000*1050*1350
KAL454E3	1890	1632	715	3496	2150*1050*1350
KAL454F4	1970	1712	765	3829	2230*1050*1350
KAL454G5	2062	1804	775	3850	2350*1050*1350
KAL454H5	2062	1804	803	4591	2350*1050*1350