



**KAL274** Series

**Fujian Kwise Generator Co., Ltd.**

**80kW - 200 kW**

## 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.

Alternators are in compliance with 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 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:** 274 series 4 pole alternators can be connected for single phase use. 274 series alternators can be supplied with a dedicated single phase winding (D51/D61).

**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.



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4 Poles

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**Enclosure:** Standard enclosure is IP23.

**Direction of rotation:** 274 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 with in the box.

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

**Overs peed:** The maximum overspeed 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°C	Temperature rise	125K	Short circuit current multiple	/
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	SX460	THF	<2%	THD	2.5%



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Electrical parameters

50Hz/1500RPM		Standard Winding / Power Factor 0.8							
Dutytype/Temperature rise/Ambient		Cont./125K/40°C				Standby/163K/27°C			
Phase		3-Phases				3-Phases			
Voltage	Y	380V	<b>400V</b>	415V	440V	380V	400V	415V	440V
	Δ	220V	<b>230V</b>	240V		220V	230V	240V	
	YY*				220V				220V
KAL274A1	kVA	100	<b>100</b>	100	95	112	112	112	105
	kW	80	<b>80</b>	80	76	90	90	90	84
KAL274B2	kVA	113	<b>113</b>	113	107	126	126	126	118
	kW	90	<b>90</b>	90	86	101	101	101	94
KAL274C2	kVA	125	<b>125</b>	125	119	140	140	140	131
	kW	100	<b>100</b>	100	95	112	112	112	105
KAL274D3	kVA	140	<b>140</b>	140	133	157	157	157	146
	kW	112	<b>112</b>	112	106	125	125	125	117
KAL274E3	kVA	150	<b>150</b>	150	143	168	168	168	157
	kW	120	<b>120</b>	120	114	134	134	134	125
KAL274F4	kVA	160	<b>160</b>	160	152	179	179	179	167
	kW	128	<b>128</b>	128	122	143	143	143	134
KAL274G4	kVA	175	<b>175</b>	175	166	196	196	196	183
	kW	140	<b>140</b>	140	133	157	157	157	146
KAL274H5	kVA	188	<b>188</b>	188	178	210	210	210	196
	kW	150	<b>150</b>	150	143	168	168	168	157
KAL274K5	kVA	200	<b>200</b>	200	190	224	224	224	209
	kW	160	<b>160</b>	160	152	179	179	179	167
KAL274L6	kVA	225	<b>225</b>	225	214	252	252	252	235
	kW	180	<b>180</b>	180	171	202	202	202	188
KAL274M7	kVA	250	<b>250</b>	250	238	280	280	280	261
	kW	200	<b>200</b>	200	190	224	224	224	209

\* Only 12-wire alternator can be realized, 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°C				Standby/163K/27°C			
Phase		3-Phases				3-Phases			
Voltage	Y	416V	<b>440V</b>	460V	480V	416V	440V	460V	480V
	Δ	240V				240V			
	YY*	208V	<b>220V</b>	230V	240V	208V	220V	230V	240V
KAL274A1	kVA	108	<b>115</b>	120	120	118	127	132	132
	kW	86	<b>92</b>	96	96	95	101	106	106
KAL274B2	kVA	121	<b>129</b>	135	135	133	142	149	149
	kW	97	<b>104</b>	108	108	106	114	119	119
KAL274C2	kVA	134	<b>144</b>	150	150	148	158	165	165
	kW	108	<b>115</b>	120	120	118	127	132	132
KAL274D3	kVA	151	<b>161</b>	168	168	166	177	185	185
	kW	120	<b>129</b>	134	134	132	142	148	148
KAL274E3	kVA	161	<b>173</b>	180	180	177	190	198	198
	kW	129	<b>138</b>	144	144	142	152	158	158
KAL274F4	kVA	172	<b>184</b>	192	192	189	202	211	211
	kW	138	<b>147</b>	154	154	151	162	169	169
KAL274G4	kVA	188	<b>201</b>	210	210	207	221	231	231
	kW	151	<b>161</b>	168	168	166	177	185	185
KAL274H5	kVA	202	<b>216</b>	225	225	222	237	248	248
	kW	161	<b>173</b>	180	180	177	190	198	198
KAL274K5	kVA	215	<b>230</b>	240	240	237	253	264	264
	kW	172	<b>184</b>	192	192	189	202	211	211
KAL274L6	kVA	242	<b>259</b>	270	270	266	285	297	297
	kW	194	<b>207</b>	216	216	213	228	238	238
KAL274M7	kVA	269	<b>288</b>	300	300	296	316	330	330
	kW	215	<b>230</b>	240	240	237	253	264	264

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

Moment of Inertia & Efficiency

Model	KAL274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Inertia (1-Bearing) J	kgm^2	0.969	1.147	1.265	1.281	1.379	1.439	1.662	1.704	1.712	2.277	2.318
50Hz400V Efficiency (100% load)	%	91.6	91.8	92.9	92.7	93.0	93.1	93.1	93.4	93.7	93.9	94.3
60Hz440V Efficiency (100% load)	%	92.5	92.6	93.6	93.3	93.6	93.6	93.7	93.9	94.2	94.5	94.8



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4 Poles

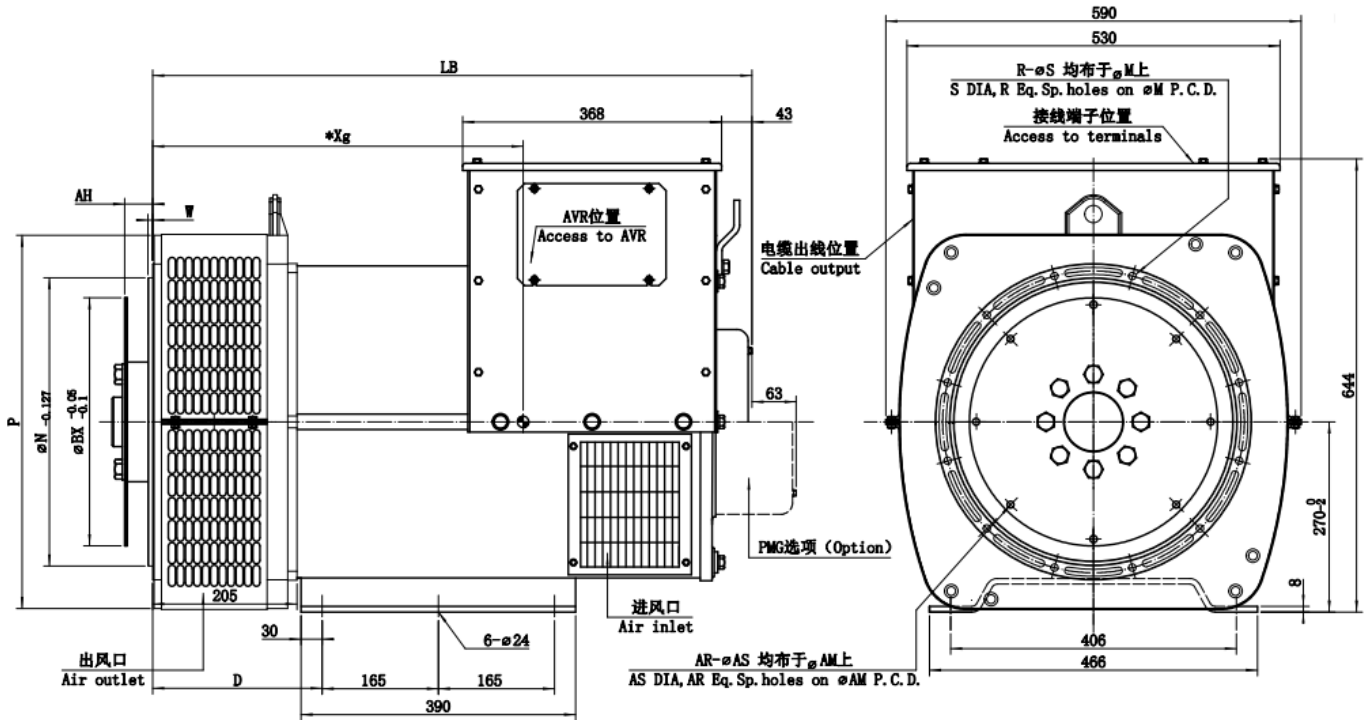
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Reactance (%) - Time Constant (ms)

50Hz @ 400V	KAL274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Short circuit ratio	$K_{cc}$	0.27	0.28	0.32	0.27	0.28	0.28	0.31	0.26	0.27	0.28	0.32
Direct axis synchronous unsaturated reactance	$X_d$	371	355	311	374	354	358	326	384	374	358	310
Direct Axis Transient Saturation Reactance	$X'_d$	28.5	26.6	22.0	27.2	25.5	25.6	22.2	26.9	26.1	24.7	20.2
Direct Axis Subtransient Saturation Reactance	$X''_d$	17.1	15.6	12.3	15.6	14.4	14.3	12.0	14.8	14.3	13.3	10.4
Quadrature axis Synchronous Unsaturated Reactance	$X_q$	210	201	175	211	200	202	183	216	211	202	174
Quadrature Subtransient Saturation Reactance	$X''_q$	18.4	16.8	13.3	16.7	15.4	15.4	12.9	15.9	15.3	14.2	11.3
Negative sequence saturation reactance	$X_2$	1.78	1.62	1.28	1.61	1.49	1.49	1.24	1.53	1.48	1.38	1.08
Zero sequence unsaturated reactance	$X_0$	1.48	1.29	0.94	1.21	1.09	1.07	0.83	1.06	1.01	0.90	0.63
Short-circuit transient time constant	$T'_d$	77	67	52	62	56	54	45	52	49	42	32
Subtransient time constant	$T''_d$	10	8	6	8	7	7	6	6	6	5	4
Open circuit time constant	$T'_{do}$	2780	2493	2033	2383	2154	2106	1824	2057	1949	1701	1346
Armature time constant	$T_a$	8	10	8	13	14	15	13	19	20	22	20

60Hz @ 440V	KAL274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Short circuit ratio	$K_{cc}$	0.23	0.24	0.27	0.22	0.24	0.23	0.26	0.22	0.22	0.23	0.27
Direct axis synchronous unsaturated reactance	$X_d$	441	423	370	446	422	426	388	457	445	426	368
Direct Axis Transient Saturation Reactance	$X'_d$	33.9	31.7	26.2	32.4	30.3	30.4	26.4	32.0	31.1	29.3	24.1
Direct Axis Subtransient Saturation Reactance	$X''_d$	20.4	18.6	14.7	18.5	17.2	17.1	14.2	17.6	17.0	15.9	12.4
Quadrature axis Synchronous Unsaturated Reactance	$X_q$	250	239	209	252	238	240	218	257	251	240	207
Quadrature Subtransient Saturation Reactance	$X''_q$	21.9	20.0	15.9	19.9	18.4	18.3	15.4	18.9	18.2	16.9	13.4
Negative sequence saturation reactance	$X_2$	2.11	1.93	1.53	1.92	1.78	1.77	1.48	1.83	1.76	1.64	1.29
Zero sequence unsaturated reactance	$X_0$	1.76	1.54	1.12	1.44	1.30	1.27	15.36	12.56	18.22	1.07	0.75
Short-circuit transient time constant	$T'_d$	76	67	51	62	55	54	44	51	49	42	31
Subtransient time constant	$T''_d$	10	8	6	8	7	7	6	6	6	5	4
Open circuit time constant	$T'_{do}$	3309	2967	2420	2836	2563	2506	2171	2448	2319	2025	1601
Armature time constant	$T_a$	8	10	8	13	14	14	13	18	20	22	20

Outline Drawing (Single Bearing)

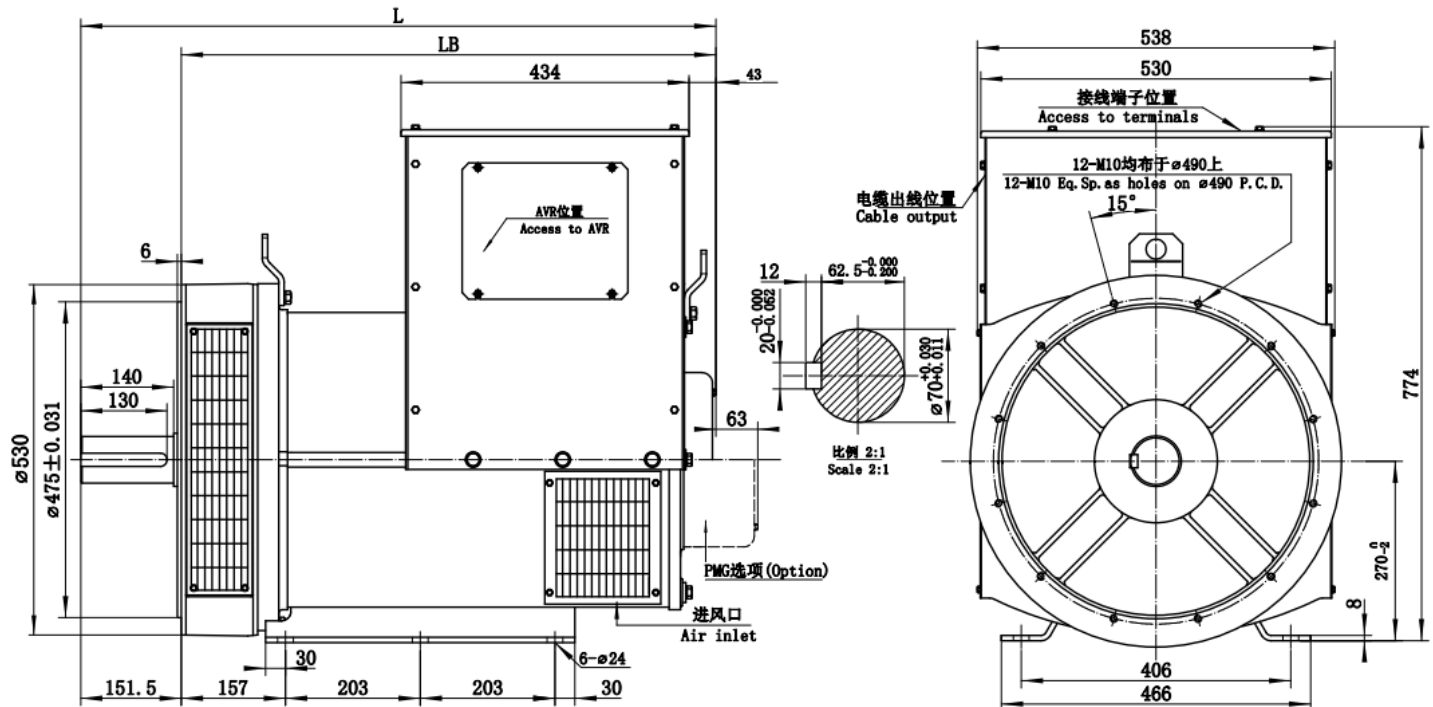


Dimension(mm)

TYPE	LB		*Xg	Weight	Package
	SAE1	SAE2&3			
	mm	mm			
KAL274A1	690	675	323	340	840*650*830
KAL274B2	730	715	335	376	880*650*830
KAL274C2	730	715	350	394	880*650*830
KAL274D3	770	756	355	421	970*650*830
KAL274E3	770	756	365	432	970*650*830
KAL274F4	810	796	373	460	970*650*830
KAL274G4	810	796	385	472	970*650*830
KAL274H5	850	836	395	491	1010*650*830
KAL274K5	850	836	403	512	1010*650*830
KAL274L6	910	896	428	563	1070*650*830
KAL274M7	965	951	455	631	1120*650*830

Flange (mm)								Coupling Disc (mm)				
S.A.E	P	N	M	R-φS	W	D	a°	S.A.E	BX	AM	AR-φAS	AH
#1	560	511.175	530.225	12-φ12	6.5	255	15°	#10	314.325	295.3	8-φ11	53.8
#2	530	447.675	466.725	12-φ12	6.5	241	15°	#11.5	352.425	333.38	8-φ11	39.6
#3	530	409.575	428.625	12-φ12	6.5	241	15°	#14	466.725	438.15	8-φ14	25.4

Outline Drawing (Double Bearing)



Dimension (mm)						
TYPE	L	LB	D	*Xg	Weight	Package
	mm	mm	mm	mm	kg	L x W x H(mm)
KAL274A1	842	690.5	319.5	294	381	970*650*880
KAL274B2	842	690.5	319.5	304	399	1010*650*880
KAL274C2	842	690.5	319.5	312	427	1010*650*880
KAL274D3	957	805.5	359.5	319	460	1100*650*880
KAL274E3	957	805.5	359.5	335	475	1100*650*880
KAL274F4	957	805.5	359.5	350	491	1100*650*880
KAL274G4	957	805.5	359.5	359	518	1100*650*880
KAL274H5	1007	855.5	359.5	368	533	1140*650*880
KAL274K5	1007	855.5	359.5	384	546	1140*650*880
KAL274L6	1092	940.5	370.3	405	603	1200*650*880
KAL274M7	1092	940.5	370.3	425	655	1250*650*880