DIY274 series

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 to the main domestic and international standards and regulations: GB755, BS5000, IEC60034, VDE 0530, CSA C22.2-100, NEMA MG-1.22. Alternators' manufacturing, design and mark are carried out in the environment of ISO9001.

Electrical features

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

Short circuit capacity: DIY POWER 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: 274 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.

4 poles

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 within the box.
Bearings: Sealed for life bearings up to all DIY 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.

4 poles

General parameters

Ambient temperature	40℃	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	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	1.2%~2.5%

Electrical parameters

50Hz/1500RPM		**Standard winding/ Power Factor 0.8**							
Duty type/ Temperature rise/ Ambient temperature		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	
	YY*				220V				220V
DIY274A1	kVA	100	100	100	95	112	112	112	105
	kW	80	80	80	76	90	90	90	84
DIY274B2	kVA	113	113	113	107	112	112	112	118
	kW	90	90	90	86	90	90	90	94
DIY274C2	kVA	125	125	125	119	126	126	126	131
	kW	100	100	100	95	101	101	101	105
DIY274D3	kVA	140	140	140	133	140	140	140	146
	kW	112	112	112	106	112	112	112	117
DIY274E3	kVA	150	150	150	143	157	157	157	157
	kW	120	120	120	114	125	125	125	125
DIY274F4	kVA	160	160	160	152	168	168	168	167
	kW	128	128	128	122	134	134	134	134
DIY274G4	kVA	175	175	175	166	179	179	179	183
	kW	140	140	140	133	143	143	143	146
DIY274H5	kVA	188	188	188	178	196	196	196	196
	kW	150	150	150	143	157	157	157	157
DIY274K5	kVA	200	200	200	190	210	210	210	209
	kW	160	160	160	152	168	168	168	167

4 poles

DIY274L6	kVA	225	225	225	214	224	224	224	235
	kW	180	180	180	171	179	179	179	188
DIY274M7	kVA	250	250	250	238	252	252	252	252
	kW	200	200	200	190	202	202	202	201

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

60Hz/1800RPM		**Standard winding/ Power Factor 0.8**							
Duty type/ Temperature rise/ Ambient temperature		Cont./125K/40℃				Standby/163K/27℃			
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
DIY274A1	kVA	108	**115**	125	125	118	127	138	138
	kW	86	**92**	100	100	95	101	110	110
DIY274B2	kVA	121	**129**	141	141	133	142	155	155
	kW	97	**104**	113	113	106	114	124	124
DIY274C2	kVA	134	**144**	156	156	148	158	172	172
	kW	108	**115**	125	125	118	127	138	138
DIY274D3	kVA	151	**161**	175	175	166	177	193	193
	kW	120	**129**	140	140	132	142	154	154
DIY274E3	kVA	161	**173**	188	188	177	190	206	206
	kW	129	**138**	150	150	142	152	165	165
DIY274F4	kVA	172	**184**	200	200	189	202	220	220
	kW	138	**147**	160	160	151	162	176	176
DIY274G4	kVA	188	**201**	219	219	207	221	241	241
	kW	151	**161**	175	175	166	177	193	193
DIY274H5	kVA	202	**216**	234	234	222	237	258	258
	kW	161	**173**	188	188	177	190	206	206
DIY274K5	kVA	215	**230**	250	250	237	253	275	275
	kW	172	**184**	200	200	189	202	220	220
DIY274L6	kVA	242	**259**	281	281	266	285	309	309
	kW	194	**207**	225	225	213	228	248	248
DIY274M7	kVA	269	**288**	313	313	296	316	344	344
	kW	215	**230**	250	250	237	253	275	275

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

4 poles

Moment of Inertia & Efficiency

Model	DIY274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Moment of Inertia(single -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
50Hz 400V 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
60Hz 440V 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

Reactance (%) - Time Constant (ms)

50Hz @ 400V	DIY274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Short circuit ratio	Kcc	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	Xd	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	Xq	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	X2	1.78	1.62	1.28	1.61	1.49	1.49	1.24	1.53	1.48	1.38	1.08

4 poles

Zero sequence unsaturated reactance	X0	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
No-load time constant	T'do	2780	2493	2033	2383	2154	2106	1824	2057	1949	1701	1346
Armature time constant	Ta	8	10	8	13	14	15	13	19	20	22	20

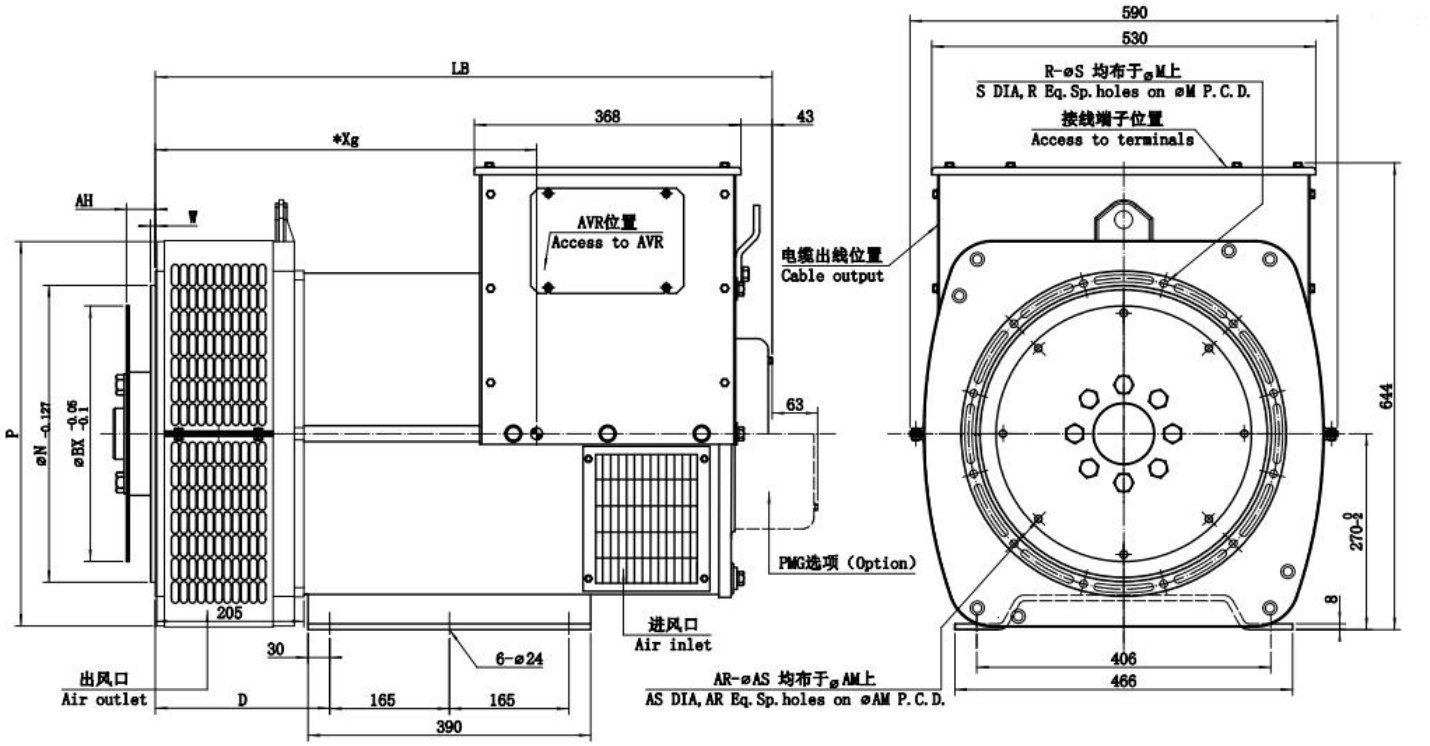
60Hz @ 440V	DIY274	A1	B2	C2	D3	E3	F4	G4	H5	K5	L6	M7
Short circuit ratio	Kcc	0.23	0.24	0.27	0.22	0.24	0.23	0.26	0.22	0.22	0.23	0.27
Direct axis synchronous unsaturated reactance	Xd	441	423	370	446	422	426	388	457	445	426	368
Direct Axis Transient Saturation Reactance	X'd	33.9	31.7	26.2	32.4	30.3	30.4	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	Xq	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	X2	2.11	1.93	1.53	1.92	1.78	1.77	1.48	1.83	1.76	1.64	1.29

4 poles

Zero sequence unsaturated reactance	X0	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
No-load time constant	T'do	3309	2967	2420	2836	2563	2506	2171	2448	2319	2025	1601
Armature time constant	Ta	8	10	8	13	14	14	130	18	20	22	20

4 poles

Outline Drawing (Single Bearing)



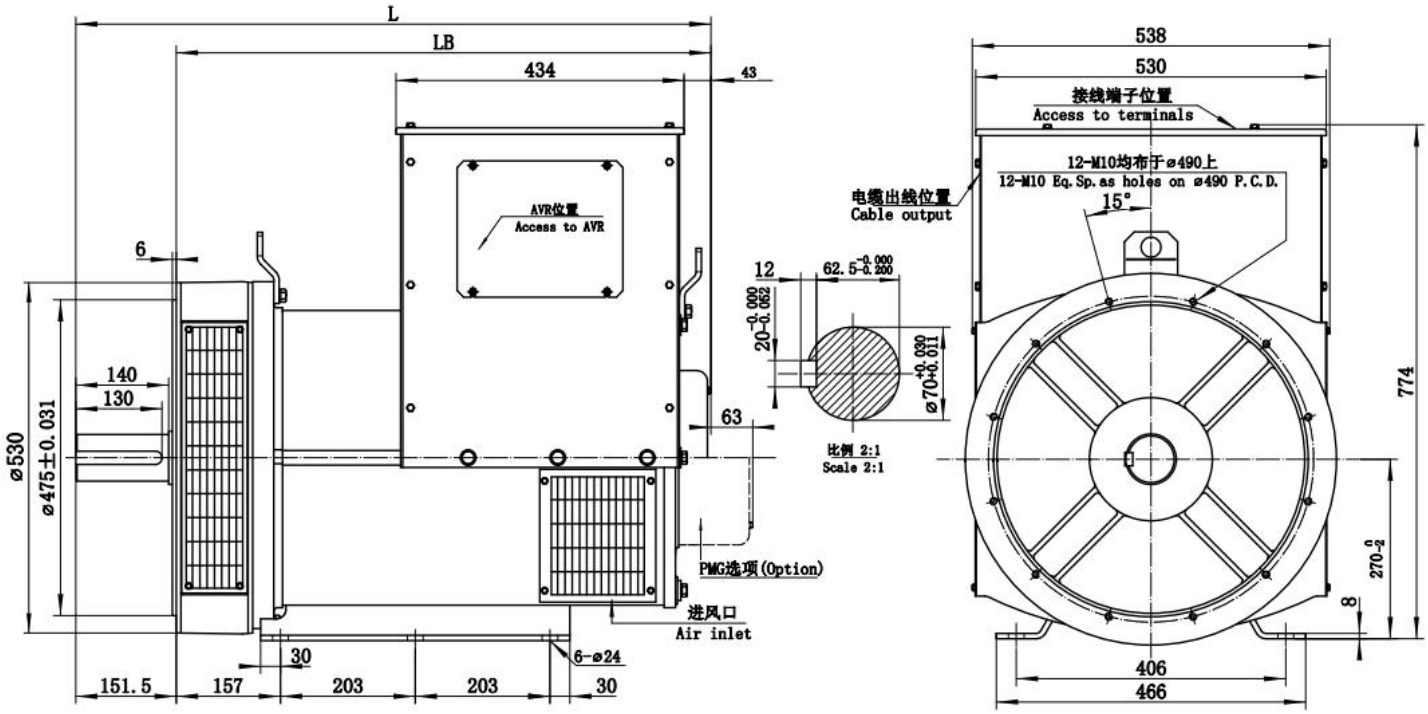
Dimension (mm)					
Model	LB		*Xg	Weight	Package
	SAE1	SAE2&3			
	mm	mm	mm	kg	L x W x H(mm)
DIY274A1	690	675	323	366	840*650*830
DIY274B2	730	715	335	384	880*650*830
DIY274C2	730	715	350	412	880*650*830
DIY274D3	770	756	355	445	970*650*830
DIY274E3	770	756	365	460	970*650*830
DIY274F4	810	796	373	476	970*650*830
DIY274G4	810	796	385	503	970*650*830
DIY274H5	850	836	395	518	1010*650*830
DIY274K5	850	836	403	531	1010*650*830
DIY274L6	910	896	428	588	1070*650*830
DIY274M7	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

4 poles

Outline Drawing (Double Bearing)



Dimension (mm)						
Model	L	LB	D	*Xg	Weight	Package
	mm	mm	mm	mm	kg	L x W x H(mm)
DIY274A1	842	690.5	319.5	294	381	970*650*880
DIY2274B2	842	690.5	319.5	304	399	1010*650*880
DIY2274C2	842	690.5	319.5	312	427	1010*650*880
DIY2274D3	957	805.5	359.5	319	460	1100*650*880
DIY2274E3	957	805.5	359.5	335	475	1100*650*880
DIY2274F4	957	805.5	359.5	350	491	1100*650*880
DIY2274G4	957	805.5	359.5	359	518	1100*650*880
DIY2274H5	1007	855.5	359.5	368	533	1140*650*880
DIY2274K5	1007	855.5	359.5	384	546	1140*650*880
DIY2274L6	1092	940.5	370.3	405	603	1200*650*880
DIY2274M7	1092	940.5	370.3	425	655	1250*650*880