

# BRUSHLESS ASYNCHRONOUS ALTERNATORS

## ETA164 SERIES

(50/60Hz, 4 Pole, 8.1KVA up to 17.5KVA with AVR)



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## Application & 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 various applications.

Alternators are in compliance 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

### 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.

### Overload Acceptance

4 pole alternators can be overloaded according to NEMA.

### Frequency

The standard winding (B31) is suitable both for 50Hz and 60Hz.

### 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...).

### Single-phase Operation

164 series 4 pole alternators can be connected for single phase use.

### Overspeed

The maximum overspeed is 2250rpm for the 4 pole alternator (1.25 times the 60Hz rated speed).

## Electrical Data

Insulation class	H
Wires	3Phase - 6 wires
Excitation system	Brushless
Voltage regulator type	AVR SX460
Voltage regulation accuracy	+/- 1%

Short circuit distortion	300%
Total harmonic distortion	<5% (at no or linear load)
Telephone harmonic factor	<2%
Winding pitch	2/3
Power factor (cose)	0.8 / 1.0

## Mechanical Features

### Bearings

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. Sealed for life bearings.

### Balancing

All the rotors are dynamically balanced according to ISO1940. Double bearing rotors are balanced with a half key.

### Mechanical Structure

Steel frame. Cast iron or steel housing and flanges depending on models.

### Insulation & Protection

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.

### Direction of Rotation

Clockwise, but can operate in both directions.

### Terminal Box & 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.

### Enclosure

Standard enclosure is IP23.

## Ratings & Efficiencies

# ETA164 SERIES

Excitation	Ratings										Efficiency		Inertia
	Cont. 125K/40°C				St. By 163K/27°C				Cont. 125K/40°C		50Hz, 400V at 100% Load	1-Bearing - J	
50Hz / 1500rpm	3 Phase				3 Phase				1 Phase				
Voltage (Y)	380	<b>400</b>	415	440	380	400	415	440	220/230/240				
Voltage (Δ)	220	<b>230</b>	240		220	230	240		cose				
Voltage (YY)				220				220	0.8	1.0			
Type	KVA / kW				KVA / kW				KVA / kW		%	Kgm²	
ETA164A1	8.1	<b>8.1</b>	8.1	7.7	9.1	9.1	9.1	8.5	8.5	1.0	78.8	0.091	
	6.5	6.5	6.5	6.2	7.3	7.3	7.3	6.8	4.4	6.5			
ETA164B1	11.0	<b>11.0</b>	11.0	10.5	12.5	12.5	12.5	11.5	7.5	8.8	80.2	0.102	
	8.8	8.8	8.8	8.4	9.9	9.9	9.9	89.2	6.0	8.8			
ETA164C2	13.5	<b>13.5</b>	13.5	12.8	15.1	15.1	15.1	14.1	9.2	10.8	81.4	0.113	
	10.8	10.8	10.8	10.3	12.1	12.1	12.1	11.3	7.3	10.8			
ETA164D2	16.0	<b>16.0</b>	16.0	15.2	17.9	17.9	17.9	16.7	10.9	16.12.8	82.0	0.120	
	12.8	12.8	12.8	12.2	14.3	14.3	14.3	13.4	8.7	12.8			
ETA164E2	17.5	<b>17.5</b>	17.5	16.6	19.6	19.6	19.6	18.3	11.9	14.0	82.4	0.129	
	14.0	14.0	14.0	13.3	15.7	15.7	15.7	14.6	9.5	14.0			
60Hz / 1800rpm	3 Phase				3 Phase				1 Phase		60Hz, 440V at 100% Load	1-Bearing - J	
Voltage (Y)	416	<b>440</b>	460	480	416	440	460	480	220/230/240				
Voltage (Δ)	240				240				cose				
Voltage (YY)	208	220	230	240	208	220	230	240	0.8	1.0			
Type	KVA / kW				KVA / kW				KVA / kW		%	Kgm²	
ETA164A1	8.7	<b>9.3</b>	9.8	9.8	9.6	10.3	10.7	10.7	6.2	7.3	79.6	0.091	
	7.0	7.5	7.8	7.8	7.7	8.2	8.6	8.6	5.0	7.3			
ETA164B1	11.8	<b>12.7</b>	13.2	13.2	13.0	13.9	14.5	14.5	8.4	9.9	81.5	0.102	
	9.5	10.1	10.6	10.6	10.4	11.1	11.6	11.6	6.7	9.9			
ETA164C2	14.5	<b>15.5</b>	16.2	16.2	16.0	17.1	17.8	17.8	10.3	12.2	82.5	0.113	
	11.6	12.4	13.0	13.0	12.8	13.7	14.3	14.3	8.3	12.2			
ETA164D2	17.2	<b>18.4</b>	19.2	19.2	18.9	20.2	21.1	21.1	12.2	14.4	83.1	0.120	
	13.8	14.7	15.4	15.4	15.1	16.2	16.9	16.9	9.8	14.4			
ETA164E2	18.8	<b>20.1</b>	21.0	21.0	20.7	22.1	23.1	23.1	13.4	15.8	83.4	0.129	
	15.0	16.1	16.8	16.8	16.6	17.7	18.5	18.5	10.7	15.8			

1. Enetra reserve the right to change the specifications of their products without notice as ongoing process of development.
2. Consult Enetra for further information.
3. Only 12 wire alternator can be realized, for other voltages please consult Enetra.
4. **General Parameters:** Cooling method: IC01 | THD=2.5% | TIF=50 | Altitude: 1,000m | Temperature Rise: 125K | Ambient Temperature: 40°C

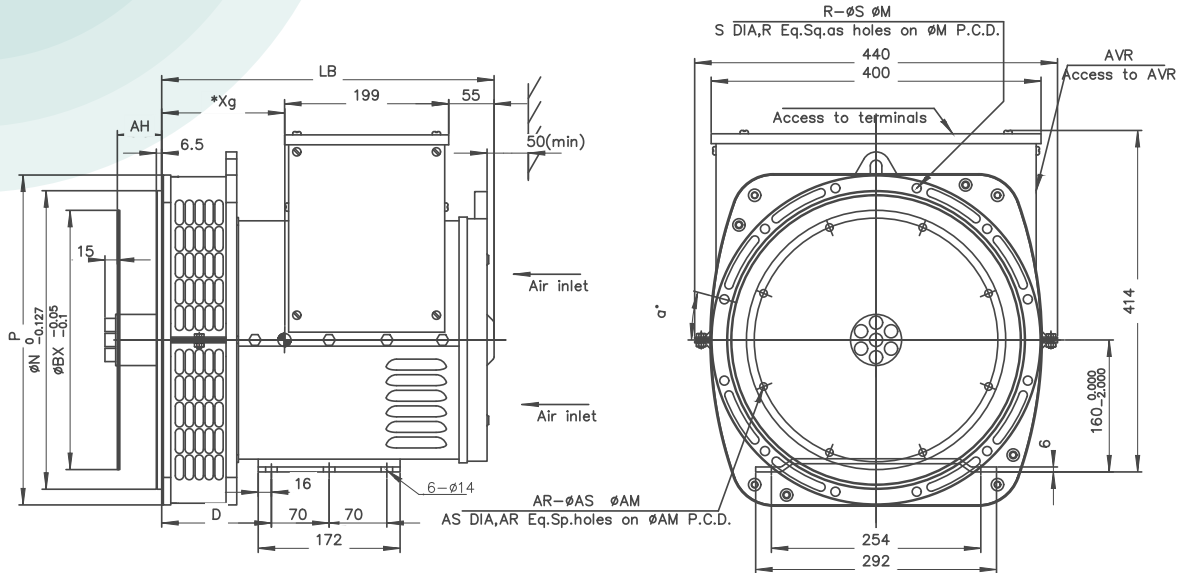
## Reactance & Time Constant

Type	Rating (50Hz) Cont./125K/ 40°C/0.8/400V	Reactance								Time Constant			
		Kcc	Xd	X'd	X''d	Xq	X''q	X2	X0	T'd	T''d	T'do	Ta
	KVA	%	%	%	%	%	%	%	%	ms	ms	ms	ms
ETA164A1	8.1	0.49	205.0	18.6	12.7	118.0	13.6	1.32	1.16	15.0	19.0	700.0	4.2
ETA164B1	11.0	0.44	226.0	19.4	12.7	130.0	13.6	1.31	1.06	15.0	18.3	713.0	6.1
ETA164C2	13.5	0.45	222.0	18.3	11.6	127.0	12.4	1.20	0.90	13.0	16.0	649.0	7.2
ETA164D2	16.0	0.44	229.0	18.5	11.6	131.0	12.4	1.20	0.87	12.0	15.5	642.0	9.2
ETA164E2	17.5	0.43	231.0	18.4	11.3	132.0	12.1	1.17	0.82	12.0	14.7	618.0	11.0

Type	Rating (60Hz) Cont./125K/ 40°C/0.8/440V	Reactance								Time Constant			
		Kcc	Xd	X'd	X''d	Xq	X''q	X2	X0	T'd	T''d	T'do	Ta
	KVA	%	%	%	%	%	%	%	%	ms	ms	ms	ms
ETA164A1	9.3	0.40	251.0	22.8	15.6	145.0	16.7	1.61	1.42	16.0	19.4	857.0	4.0
ETA164B1	12.7	0.37	269.0	23.1	15.1	154.0	16.2	1.57	1.27	15.0	18.2	848.0	6.1
ETA164C2	15.5	0.38	264.0	21.7	13.9	151.0	14.8	1.43	1.08	13.0	15.9	773.0	7.7
ETA164D2	18.4	0.36	281.0	22.7	14.2	160.0	15.2	1.47	1.06	13.0	15.9	786.0	9.6
ETA164E2	20.1	0.38	266.0	21.2	13.1	152.0	13.9	1.35	0.94	11.0	14.1	715.0	10.6

## Dimensions & Weights

# ETA164 SERIES



Dimensions & Weights							
Type	LB		Xg mm	Weight Kg	Package		
	SAE3	SAE4&5			Length (mm)	Width (mm)	Height (mm)
ETA164A1	376.0	364.0	145.0	76.0	542.0	504.0	620.0
ETA164B1	376.0	364.0	152.0	83.0	542.0	504.0	620.0
ETA164C2	416.0	404.0	160.0	93.0	597.0	504.0	620.0
ETA164D2	416.0	404.0	165.0	97.0	597.0	504.0	620.0
ETA164E2	416.0	404.0	170.0	102.0	597.0	504.0	620.0

Flange (mm)							
SAE #	P	N	M	R-øS	W	D	α°
3	451.0	409.575	428.625	12-ø12	5.0	145.0	15.0°
4	402.0	361.950	381.000	12-ø12	5.0	133.0	15.0°
5	356.0	314.325	333.375	8-ø12	5.0	133.0	22.5°

Coupling Disc (mm)				
SAE #	BX	AM	AR-øAS	AH
6.5	215.900	200.025	6-ø9	30.2
7.5	241.300	222.250	8-ø9	30.2
8	263.525	244.475	6-ø11	62.0
10	314.325	295.300	8-ø11	53.8
11.5	352.425	333.380	8-ø11	39.6