

# TECHNICAL SPECIFICATION

**Type designation:** **AMG 0500AA04**  
**Application:** Diesel/Gas engine Industrial Application Series  
**Site criteria:** Land use

## NOTES

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### ENCLOSURES:

Item	Item NO.
Main dimension drawing	5861297
Rotor drawing	5860296

Prep. JE.ZH	29.8.2011	TECHNICAL SPECIFICATION			No. of sh.
Appr. TU.TU	29.8.2011				9
Resp. dept. R&D					
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# 1 PERFORMANCE DATA (Calculated values)

## TYPE

Type designation: AMG 0500AA04

## PERFORMANCE DATA

Main standard	IEC 60034							
Rated power factor	0.8							
Insulation class	H							
Temperature rise	H							
Ambient temperature	40 °C							
Altitude over sea level	≤ 1000 m							
Cooling/Protection	IC0A1/IP23							
Weight	6057Kg							
Inertia	71.8kgm <sup>2</sup>							
Direction of rotation (Facing drive end)	CW							
Maximum overspeed	2250 rpm							
Winding pitch	15/18							
Stator winding resistance	0.0007 Ω per phase at 20°C series star connection							
Rotor winding resistance	0.8316 Ω at 20°C							
Ex. stator winding resistance	13.694Ω at 20°C							
Ex. rotor winding resistance	0.01606 Ω at 20°C							
Total Harmonic Distortion	THD<5% at no load operation or rated Linear balanced load							
Voltage regulation	±1 %							
Speed	1500 rpm				1800 rpm			
Frequency	50 Hz				60 Hz			
Voltage series star 3ph.	380/220	400/231	415/240	440/254	415/240	440/254	460/266	480/277
Rated continuous output(kVA)	2200	2315	2315	2150	2400	2545	2660	2775
Rated efficiency	95.88%	95.93%	95.97%	95.95%	95.88%	95.99%	96.06%	96.1%
Xd(u)	3.211	3.047	2.829	2.34	3.524	3.325	3.179	3.046
Xd(s)	2.792	2.507	2.175	1.595	3.246	2.966	2.737	2.507
Xq(u)	1.351	1.282	1.191	0.985	1.483	1.399	1.338	1.282
X'd(u)	0.222	0.21	0.195	0.162	0.243	0.229	0.219	0.21
X'd(s)	0.201	0.191	0.178	0.147	0.221	0.209	0.199	0.191
X''d(u)	0.171	0.162	0.15	0.124	0.184	0.173	0.166	0.159
X''d(s)	0.155	0.147	0.137	0.113	0.167	0.158	0.151	0.144
X''q(u)	0.209	0.198	0.184	0.152	0.228	0.216	0.206	0.197
X''q(s)	0.209	0.18	0.167	0.138	0.208	0.196	0.187	0.18
X1(u)	0.109	0.103	0.096	0.079	0.119	0.113	0.108	0.103
X2(u)	0.19	0.18	0.167	0.138	0.206	0.194	0.186	0.178
X2(s)	0.172	0.163	0.152	0.126	0.187	0.177	0.169	0.162
X0(u)	0.081	0.077	0.071	0.059	0.087	0.082	0.079	0.076
Xp(s)	0.166	0.158	0.146	0.121	0.182	0.172	0.165	0.158
SCR (short circuit ratio), Ir0/Xd (u)	0.36	0.40	0.46	0.63	0.31	0.34	0.37	0.4
s=saturated value, u=unsaturated value, values are p.u. at rated voltage and power								
Td0'	5.942 s							
Td'	0.41 s							
Td''	0.00453 s							
Ta	0.0438 s							
CE-Marking	Generator fulfills the requirements of Low Voltage Directive (2006/95/EC) Generator supplied to EEA-area will be CE-marked							

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## 2 PERFORMANCE CURVES

### THREE PHASE EFFICIENCY CURVES, 50 Hz/380–440 V

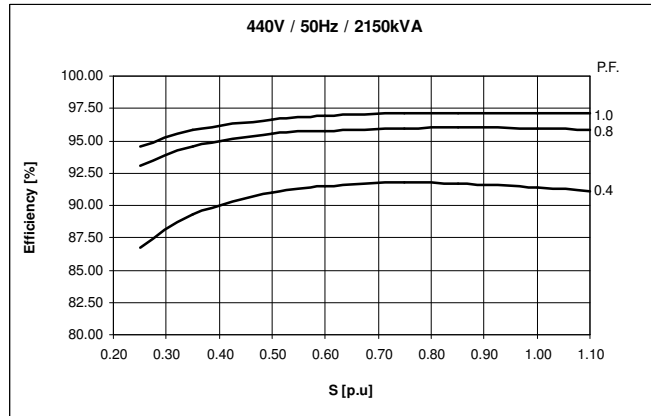
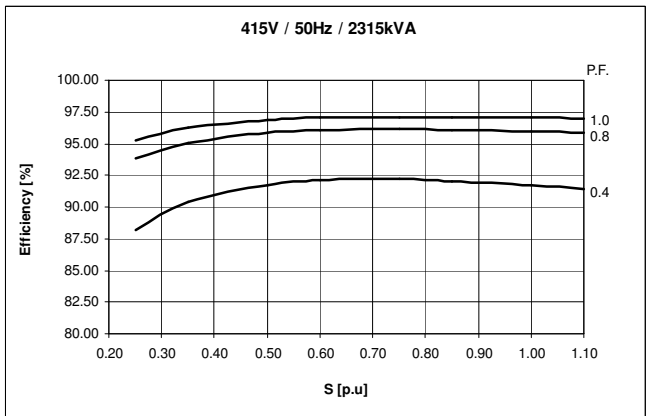
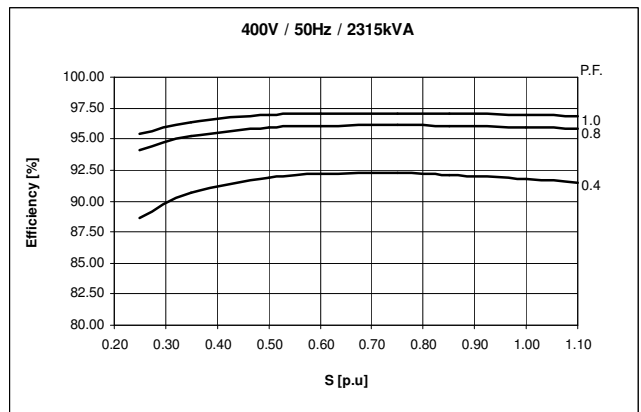
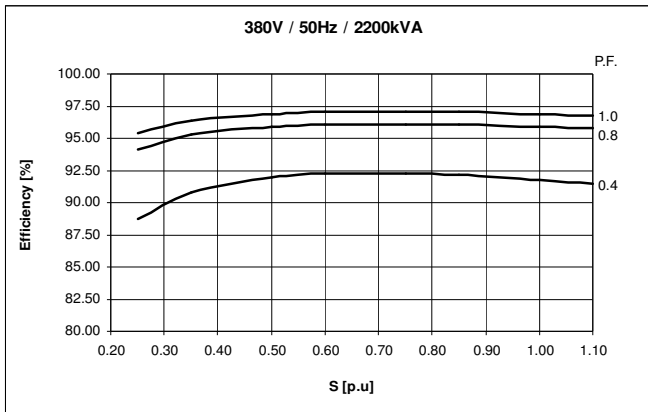


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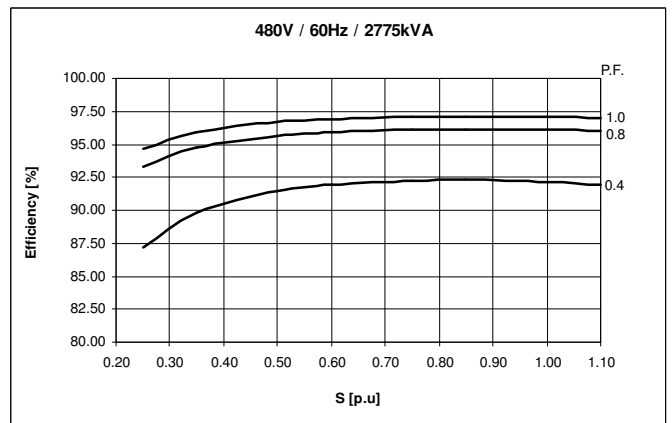
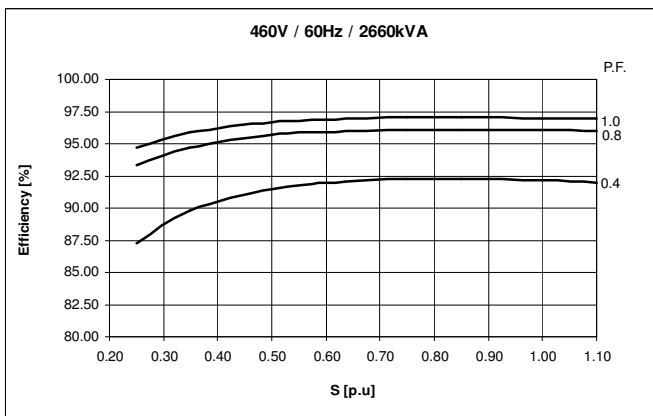
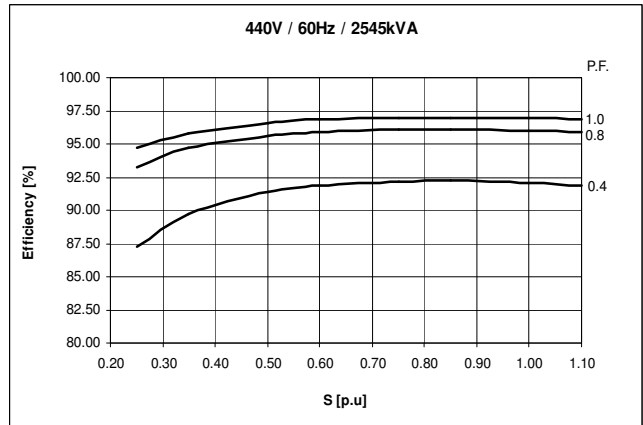
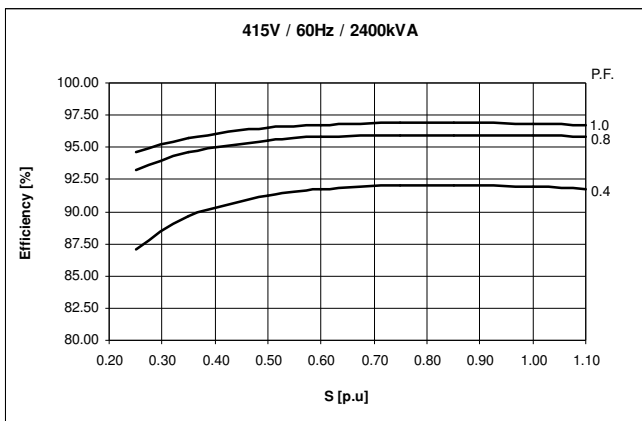
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# THREE PHASE EFFICIENCY CURVES, 60 Hz/415–480 V



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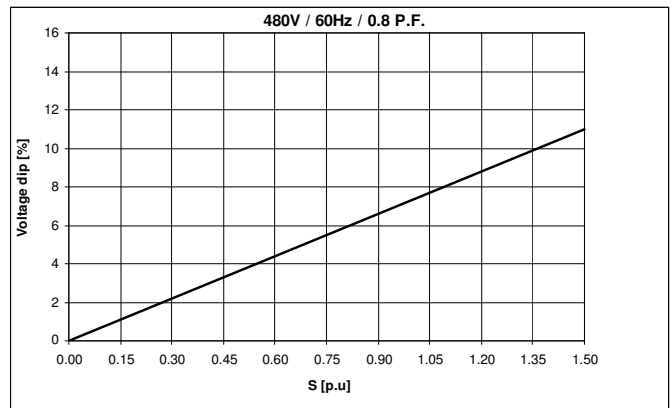
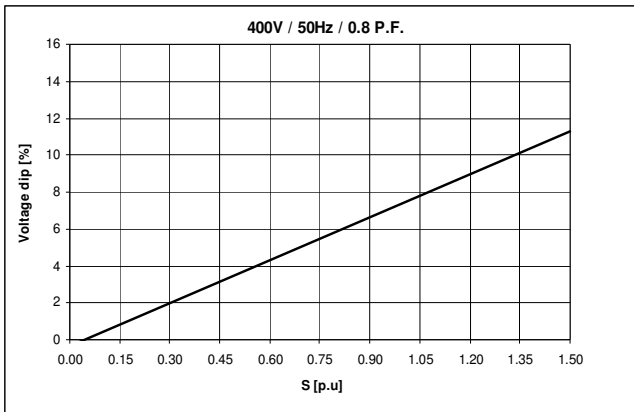
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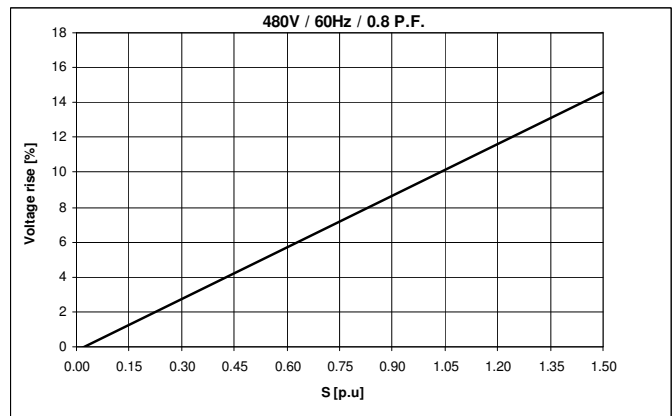
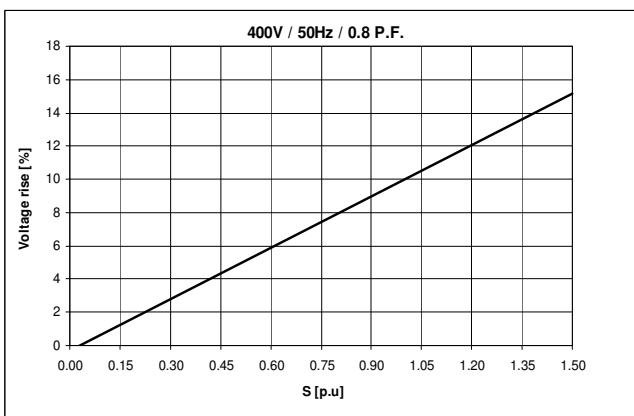
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## TRANSIENT VOLTAGE REGULATION CURVES

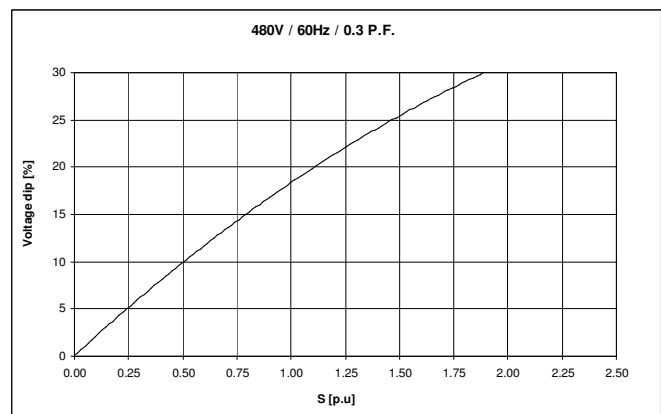
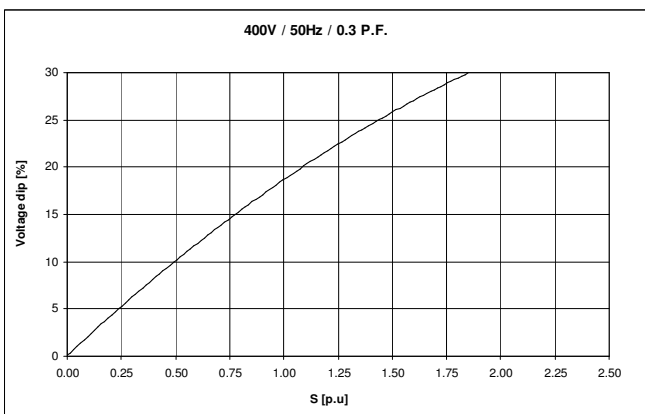
Load application:



Load rejection:



Locked Rotor Motor Starting Curve (Auxiliary winding excitation)



Note1

S [P.U] =S/S(Rated), S means the actual operation capacity, S(Rated) means the generator rated output capacity.



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### 3 CONFIGURATION AND SCOPE OF SUPPLY

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#### GENERAL

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The generator is designed to operate together with a diesel or gas engine.

#### CONSTRUCTION

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The stator frame is a rigid cast steel structure construction. The stator core is built of thin electric sheet steel laminations which are insulated on both sides with heat-resistant inorganic resin.

The rotor consists of a shaft and a star shape rotor core. The shaft is machined of rolled steel. Special heat treatment is used if shaft operates under heavy conditions. The poles are manufactured of 0.5 mm sheet steel. The pole laminations are pressed and welded together with steel bars. These bars are then welded to the end plates. Rotor balancing is done acc. to ISO 1940/1. The standard balancing quality grade is G2,5.

All windings are completely vacuum pressure impregnated with high quality resin. The windings are provided with very strong bracing which withstands all expected mechanical and electrical shocks and vibrations as well as chemicals.

The stator frame, core support and end-shields are made of cast steel. They are welded and bolted together.

#### MAIN TERMINAL SPACE

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Protection class IP44, Integrated into the top module of the generator.

Supply cable entries: Closed terminal box. Cable inlet to the main terminal box to be done by the customer.

Six (6) terminals: U1, V1, W1 and U2, V2, W2 brought to the main terminal box. Neutral point (N) made inside the terminal box by separate copper bar connecting U2, V2, W2 together. Main terminals U, V, W and neutral point N in the main terminal box for external connection.

Terminal marking acc. to IEC.

Max. internal air temperature 60 °C.

Designed for continuous current load.

#### FOUNDATION

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The machine can be mounted using shimming, machined blocks, chock fast or on grouted sole plates or bed plate. Before using other mountings, contact us.

#### CONTROL SYSTEMS

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##### General

Brushless excitation. The excitation power to the AVR is supplied by an auxiliary winding wound into the stator slots.

##### Automatic Voltage Regulator System


Standard voltage regulation system based on AEC63-7AVR.

Mounted inside the main terminal box.

Analog type AVR functions:

- a) 1-channel AVR.
- b) Excitation power from auxiliary winding.
- c) Voltage set-point adjustment (local) .
- d) U/f limiter.
- e) Paralleling operation.

Static voltage regulation accuracy +/- 1.0 %.

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Voltage recovery time after transient < 1.5 s, +/- 3.0 % (acc. to IEC 60034).

Nominal  $U_m$ , range: < 63VDC and maximum 103VDC for 10s

Nominal  $I_m$ , range: continuous 7ADC and maximum 12 ADC for 10 s.

## BEARINGS

Non Drive-end: Rolling, w/grease, free.

Drive-end: Rolling, w/grease, locked.

Life time:  $L_{10} \geq 30\,000$  h.

Not electrically insulated.

Calculated maximum bearing temperature 95 °C at ambient 40 °C.

## TESTING

Testing is according to IEC and ABB internal requirements. The test may be observed by the customer without extra charges. The test procedures are described in the following documents which are available on request:

-Routine tests: MDD 8006327 (for all machines)

-Type tests: MDD 8006328 (optional, to be agreed separately).

-Special tests: MDD 8006329 (optional, to be agreed separately).

## PERFORMANCE CHARACTERISTICS AND OPERATIONAL LIMITS

Rating for continuous running duty:

Duty type S1.

Rating for short-time duty:

10 % overload at nominal power factor for one hour at twelve hour intervals.

50 % overload at nominal power factor for two minutes at twelve hour intervals.

Overcurrent withstand capability:

3 times nominal current for 10 s.

Generator shall be suitable for supplying circuits which, when supplied by a system of balanced and sinusoidal voltages:

Result in currents not exceeding a harmonic current factor of 0,05 and

Result in a system of currents where neither the negative-sequence component nor the zero-sequence component exceed 5% of the positive-sequence component.

Maximum voltage unbalance is 0,5 %.

Maximum  $I_2/I_N$  value for continuous operation is 8 %.

Maximum  $(I_2/I_N)^2 \times t$  in seconds for operation under fault conditions is 20

Maximum continuous voltage variation with rated output is  $\pm 5$  %.

Maximum continuous frequency variation with rated output is  $\pm 2$  %.

Maximum combined voltage and frequency variation and maximum short-time limits are acc. to IEC 60034-1:2004, Section 7.3.

Electromagnetic Compatibility (EMC)

Radiated and conducted emissions comply with the requirements of CISPR 11, Class B, Group 1, Table B.1. (IEC 60034-1, Annex B).

## TOLERANCES

Efficiency  $\eta$

Machines up to and including 150 kW (or kVA)

-15 % of  $(1-\eta)$ .



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Machines above 150 kW (or kVA)	-10 % of (1- $\eta$ )
Total losses (applicable to machines with ratings >150 kW or kVA)	+10 % of the total losses.
Peak value of short-circuit current under specified conditions	$\pm 30$ % of the value in the technical specification.
Steady short-circuit current at specified excitation	$\pm 15$ % of the value in the technical specification.
Moment of inertia	$\pm 10$ % of the value in the technical specification.

## **SURFACE TREATMENT**

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Grade: C2, Standard color

Surface treatment C2 according to the ISO 12944 standard, for standard industrial environment.

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## 4 ACCESSORIES

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### Standard accessories

No pc/pcs	Item
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6	PT100 for stator winding
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### Optional accessories

No pc/pcs	Item
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1	Anticondensation heater
1	Current transformer for parallel operation
2	PT100 element for antifriction bearing

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