TECHNICAL SPECIFICATION

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

NOTES

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ENCLOSURES:

<table>
<thead>
<tr>
<th>Item</th>
<th>Item NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main dimension drawing</td>
<td>5861297</td>
</tr>
<tr>
<td>Rotor drawing</td>
<td>5860296</td>
</tr>
</tbody>
</table>

Prep.    JE.ZH  29.8.2011  ABB Generators Ltd.
Appr.    TU.TU  29.8.2011
Resp. dept. R&D

TECHNICAL SPECIFICATION 9

8AMG 5860508 en A 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            | 6057 Kg           |
| Inertia           | 71.8 kg m²        |
| Direction of rotation | CW               |
| Maximum overspeed | 2250 rpm          |
| Winding pitch     | 15/18             |

<table>
<thead>
<tr>
<th>Stator winding resistance</th>
<th>0.0007 Ω per phase at 20 °C series star connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor winding resistance</td>
<td>0.8316 Ω at 20 °C</td>
</tr>
<tr>
<td>Ex. stator winding resistance</td>
<td>13.694Ω at 20 °C</td>
</tr>
<tr>
<td>Ex. rotor winding resistance</td>
<td>0.01606 Ω at 20 °C</td>
</tr>
</tbody>
</table>

#### 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%

#### Voltage regulation
- ±1%

#### 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
2 PERFORMANCE CURVES

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

380V / 50Hz / 2200kVA

400V / 50Hz / 2315kVA

415V / 50Hz / 2315kVA

440V / 50Hz / 2150kVA
THREE PHASE EFFICIENCY CURVES, 60 Hz/415–480 V

415V / 60Hz / 2400kVA

440V / 60Hz / 2545kVA

460V / 60Hz / 2660kVA

480V / 60Hz / 2775kVA
TRANSIENT VOLTAGE REGULATION CURVES

Load application:

![Graph of 400V / 50Hz / 0.8 P.F.](image)

![Graph of 480V / 60Hz / 0.8 P.F.](image)

Load rejection:

![Graph of 400V / 50Hz / 0.8 P.F.](image)

![Graph of 480V / 60Hz / 0.8 P.F.](image)

Locked Rotor Motor Starting Curve (Auxiliary winding excitation)

![Graph of 400V / 50Hz / 0.3 P.F.](image)

![Graph of 480V / 60Hz / 0.3 P.F.](image)

Note1

$S \text{ [P.U]} = S / S(\text{Rated})$, $S$ means the actual operation capacity, $S(\text{Rated})$ means the generator rated output capacity.
3 CONFIGURATION AND SCOPE OF SUPPLY

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

CONSTRUCTION
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
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
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
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 %.
Voltage recovery time after transient < 1.5 s, +/- 3.0 % (acc. to IEC 60034).
Nominal Um, range: < 63VDC and maximum 103VDC for 10s
Nominal Im, range: continuous 7ADC and maximum 12 ADC for 10 s.

**BEARINGS**

<table>
<thead>
<tr>
<th>Non Drive-end: Rolling, w/grease, free.</th>
<th>Drive-end: Rolling, w/grease, locked.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life time: L_{10} \geq 30 000 h.</td>
<td></td>
</tr>
<tr>
<td>Not electrically insulated.</td>
<td></td>
</tr>
<tr>
<td>Calculated maximum bearing temperature 95 °C at ambient 40°C.</td>
<td></td>
</tr>
</tbody>
</table>

**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 \( I_2/IN \) value for continuous operation is 8 %.

Maximum \( (I_2/IN)^2 \times t \) 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) \(-15 \% of (1-\eta).\)
Machines above 150 kW (or kVA) $-10\% \cdot (1-\eta)$
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

Grade: C2, Standard color

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

### Standard accessories

<table>
<thead>
<tr>
<th>No pc/pcs</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>PT100 for stator winding</td>
</tr>
</tbody>
</table>

### Optional accessories

<table>
<thead>
<tr>
<th>No pc/pcs</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Anticondensation heater</td>
</tr>
<tr>
<td>1</td>
<td>Current transformer for parallel operation</td>
</tr>
<tr>
<td>2</td>
<td>PT100 element for antifriction bearing</td>
</tr>
</tbody>
</table>