TECHNICAL SPECIFICATION

Type designation: NMG 0500BB04
Application: Diesel/Gas Engine Industrial Application Series
Site criteria: Industrial Application

NOTES

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*Type definition:

NMG 0500BB04 DAPI

IC/IP combination
Bearing type
Excitation type
Industrial generators

IC/IP: D-Air cooling/ IP23
Bearing type: A-Double bearing, B-Single bearing
Excitation type: A-Auxiliary winding, P-PMG

Prep. PE.YA 24.7.2017
Appr. TU.TU 1.8.2017

ABB Generators Ltd. 8AMG 5903667 en A 1

ABB
# 1 PERFORMANCE DATA (Calculated values)

## PERFORMANCE DATA

<table>
<thead>
<tr>
<th>Main standard</th>
<th>IEC 60034</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power factor</td>
<td>0.8</td>
</tr>
<tr>
<td>Insulation class</td>
<td>H</td>
</tr>
<tr>
<td>Temperature rise</td>
<td>H</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>40 °C</td>
</tr>
<tr>
<td>Altitude over sea level</td>
<td>≤ 1000 m</td>
</tr>
<tr>
<td>Cooling/Protection</td>
<td>ICD01/IP23</td>
</tr>
<tr>
<td>Double bearing</td>
<td></td>
</tr>
<tr>
<td>Mounting arrangement</td>
<td>IM 1001</td>
</tr>
<tr>
<td>Weight without/with PMG</td>
<td>4795/4800 kg</td>
</tr>
<tr>
<td>Inertia without/with PMG</td>
<td>66.6/66.7 kgm²</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>CW (Facing drive end)</td>
</tr>
<tr>
<td>Maximum overspeed</td>
<td>2250 rpm</td>
</tr>
<tr>
<td>Winding pitch</td>
<td>5/6</td>
</tr>
<tr>
<td>Stator winding resistance</td>
<td>0.0006Ω per phase at 20°C, series star connection</td>
</tr>
<tr>
<td>Rotor winding resistance</td>
<td>1.3398 Ω at 20°C</td>
</tr>
<tr>
<td>Ex. Stator winding resistance</td>
<td>11.71 Ω at 20°C</td>
</tr>
<tr>
<td>Ex. Rotor winding resistance</td>
<td>0.0809 Ω at 20°C</td>
</tr>
<tr>
<td>Total Harmonic Distortion</td>
<td>At no load&lt;1.5%, at rated Linear balanced load &lt;4%</td>
</tr>
<tr>
<td>Voltage regulation</td>
<td>±1%</td>
</tr>
<tr>
<td>Telephone Interference</td>
<td>THF&lt;2%, TIF&lt;50</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz, 60 Hz</td>
</tr>
<tr>
<td>Speed</td>
<td>1500 rpm, 1800 rpm</td>
</tr>
<tr>
<td>Cooling Air</td>
<td>1.89 m³/sec, 2.27 m³/sec</td>
</tr>
<tr>
<td>Voltage series star 3ph.</td>
<td>380/220, 400/231, 415/240, 415/240, 440/254, 460/266, 480/277</td>
</tr>
<tr>
<td>Rated continuous output</td>
<td>2420kVA, 2550kVA, 2500kVA, 2645kVA, 2805kVA, 2930kVA, 3060kVA</td>
</tr>
<tr>
<td>Xd(u)</td>
<td>3.065, 2.915, 2.655, 3.371, 3.180, 3.039, 2.915</td>
</tr>
<tr>
<td>Xd(s)</td>
<td>2.691, 2.427, 2.097, 3.124, 2.867, 2.649, 2.427</td>
</tr>
<tr>
<td>Xq(u)</td>
<td>1.623, 1.544, 1.406, 1.785, 1.684, 1.609, 1.544</td>
</tr>
<tr>
<td>Xq(s)</td>
<td>1.211, 0.201, 0.183, 0.232, 0.219, 0.209, 0.201</td>
</tr>
<tr>
<td>Xd(u)</td>
<td>0.192, 0.183, 0.166, 0.211, 0.199, 0.190, 0.183</td>
</tr>
<tr>
<td>Xd(s)</td>
<td>0.129, 0.123, 0.112, 0.141, 0.133, 0.127, 0.122</td>
</tr>
<tr>
<td>X'd(u)</td>
<td>0.117, 0.111, 0.101, 0.128, 0.121, 0.116, 0.111</td>
</tr>
<tr>
<td>X'd(s)</td>
<td>0.168, 0.160, 0.145, 0.185, 0.174, 0.166, 0.160</td>
</tr>
<tr>
<td>X''d(u)</td>
<td>0.153, 0.145, 0.132, 0.168, 0.158, 0.151, 0.145</td>
</tr>
<tr>
<td>X''d(s)</td>
<td>0.077, 0.074, 0.067, 0.085, 0.080, 0.077, 0.074</td>
</tr>
<tr>
<td>X''d(u)</td>
<td>0.148, 0.141, 0.129, 0.163, 0.154, 0.147, 0.141</td>
</tr>
<tr>
<td>X''d(s)</td>
<td>0.135, 0.128, 0.117, 0.148, 0.140, 0.133, 0.128</td>
</tr>
<tr>
<td>X0(u)</td>
<td>0.067, 0.063, 0.058, 0.073, 0.069, 0.066, 0.063</td>
</tr>
<tr>
<td>Xp(u)</td>
<td>0.158, 0.151, 0.137, 0.174, 0.164, 0.157, 0.151</td>
</tr>
<tr>
<td>SCR (short circuit ratio), Ir0/Xd (u)</td>
<td>0.37, 0.41, 0.48, 0.32, 0.35, 0.38, 0.41</td>
</tr>
</tbody>
</table>

s=saturated value, u=unsaturated value, values are p.u. at rated voltage and power

| Td0' | 2.806 s |
| Td' | 0.193 s |
| Td | 0.0116 s |
| Ta | 0.0375 s |

**CE-Marking**
Generator fulfills the requirements of Low Voltage Directive (2014/35/EU)
Generator supplied to EEA-area will be CE-marked
2 PERFORMANCE CURVES

THREE PHASE EFFICIENCY CURVES, 50 Hz/380–415 V

- **380V / 50Hz / 2420kVA**
  - P.F. 1.0
  - P.F. 0.8

- **400V / 50Hz / 2550kVA**
  - P.F. 1.0
  - P.F. 0.8

- **415V / 50Hz / 2500kVA**
  - P.F. 1.0
  - P.F. 0.8
THREE PHASE EFFICIENCY CURVES, 60 Hz/415–480 V

415V / 60Hz / 2645kVA

440V / 60Hz / 2805kVA

460V / 60Hz / 2930kVA

480V / 60Hz / 3060kVA
TRANSIENT VOLTAGE REGULATION CURVES

Load application (Auxiliary winding or PMG excitation):

Load rejection (Auxiliary winding or PMG excitation):

Locked Rotor Motor Starting Curve (Auxiliary winding or PMG excitation):

Note1
S [P.U] = S/S(Rated), S stands for the actual operation capacity, S(Rated) stands for the generator rated output capacity.
THREE PHASE SHORT-CIRCUIT CURVES (At no-load and rated speed, based on star connection)

**50Hz**

![Graph showing 50Hz three phase short-circuit curves for symmetrical and asymmetrical conditions.](image)

**60Hz**

![Graph showing 60Hz three phase short-circuit curves for symmetrical and asymmetrical conditions.](image)

**Note2**

Curves are for 3-phase short-circuit. For other types of short-circuit, please use the following multiplication factors:

<table>
<thead>
<tr>
<th>Type</th>
<th>Instantaneous</th>
<th>Continuous</th>
<th>Maximum duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-phase</td>
<td>1</td>
<td>1</td>
<td>10 sec.</td>
</tr>
<tr>
<td>2-phase L/L</td>
<td>0.87</td>
<td>1.5</td>
<td>5 sec.</td>
</tr>
<tr>
<td>1-phase L/N</td>
<td>1.3</td>
<td>2.2</td>
<td>2 sec.</td>
</tr>
</tbody>
</table>
3 CONFIGURATION AND SCOPE OF SUPPLY

GENERAL
The generator is designed to operate together with a diesel or gas engine. Compliance with the maximum vibration level of the genset to be verified by the genset manufacturer who is responsible for the fully compatibility of all components of the genset according to ISO 8528-5:2005, §15.10. ABB generators vibration are comply with ISO 8528-9 Annex C: value 2 in table C.1. if the vibration of RIC engine is comply with ISO 8528-9.

CONSTRUCTION
The stator frame is a rigid welded 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.

End shields are made of casted steel. The stator frame and stator core are welded together, and bolted with end shields

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.
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.

BEARINGS
Non Drive-end: Rolling, w/ grease, free. Drive-end: Rolling, w/ grease, locked.(Double bearing)
Maximum bearing temperature 90 °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: for all machines.
-Type tests: optional, to be agreed separately.
-Special tests: optional, to be agreed separately.

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 element for stator winding</td>
</tr>
<tr>
<td>1</td>
<td>Automatic Voltage Regulator system DECS 150, mounted inside the generator</td>
</tr>
<tr>
<td>1</td>
<td>1PT - Voltage transformer for actual value measurement</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>2CT-Current transformer for parallel operation</td>
</tr>
<tr>
<td>6</td>
<td>4CT-Current transformer for differential protection</td>
</tr>
<tr>
<td></td>
<td>3pcs mounted in machine, 3pcs loosely supply</td>
</tr>
<tr>
<td>2</td>
<td>Anticondensation heater</td>
</tr>
<tr>
<td>1</td>
<td>PTC sensor (triple)</td>
</tr>
<tr>
<td>2</td>
<td>PT100 element for antifriction bearing,1pc/bearing</td>
</tr>
</tbody>
</table>