

TECHNICAL SPECIFICATION

Type designation: **AMG 0280AA04**
Application: Diesel/Gas engine Industrial Application Series
Site criteria: Land use

NOTES


CONTENTS

SECTION:

1	<i>PERFORMANCE DATA (Calculated values)</i>	2
2	<i>PERFORMANCE CURVES</i>	3
3	<i>CONFIGURATION AND SCOPE OF SUPPLY</i>	7
4	<i>ACCESSORIES</i>	10

ENCLOSURES:

Item	Item NO.
Main dimension drawing	5854050
Rotor drawing	5854866
Main connection diagram	5856490
Connection instruction	5854831

Prep. PE. YA	12.03.2010	TECHNICAL SPECIFICATION			No. of sh.
Appr. AN. QU	15.03.2010				A
Resp. dept. R&D					
 ABB Generators Ltd.	Document identification	Lang.	Rev. ind.	Sheet	
	8AMG 5855432	en	B	1	


1 PERFORMANCE DATA (Calculated values)

TYPE

Type designation: AMG 0280AA04

PERFORMANCE DATA

Main standard	IEC 34							
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							
Mounting arrangement	IM 2105 (IMB34) (one bearing, SAE flange, coupling disc, normal feet)							
Weight without/with PMG	610/620 kg (with SAE 1-14)							
Inertia without/with PMG	3.38/3.40 kgm ²							
Direction of rotation (Facing drive end)	CW							
Maximum overspeed	2250 rpm							
Winding pitch	Two thirds (2/3)							
Stator winding resistance	0.022 Ω per phase at 20°C series star connection							
Rotor winding resistance	1.041 Ω at 20°C							
Ex. stator winding resistance	19.4 Ω at 20°C							
Ex. rotor winding resistance	0.141 Ω at 20°C							
Total Harmonic Distortion	THD<3.5% at no load operation or rated Linear balanced load							
Voltage regulation	±1 %							
Cooling Air	0.34 m ³ /sec							
Telephone Interference	THF<2%				TIF<50			
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
Voltage parallel star 3ph.	190/110	200/115	208/120	220/127	208/120	220/127	230/133	240/138
Voltage series delta 3ph.	220	230	240	254	240	254	266	277
Voltage parallel delta 3ph.	110	115	120	127	120	127	133	138
Rated continuous output	165 kVA	175 kVA	175 kVA	160 kVA	180 kVA	190 kVA	200 kVA	210 kVA
Rated efficiency	91.84%	91.97%	92.15%	92.51%	92.22%	92.45%	92.58%	92.68%
X _d (u)	2.136	2.044	1.899	1.545	2.344	2.201	2.12	2.044
X _d (s)	1.818	1.668	1.484	1.093	2.086	1.914	1.795	1.668
X _q (u)	1.031	0.986	0.916	0.745	1.131	1.062	1.023	0.986
X' _d (u)	0.269	0.258	0.239	0.195	0.296	0.278	0.267	0.258
X' _d (s)	0.245	0.235	0.217	0.177	0.269	0.253	0.243	0.235
X'' _d (u)	0.178	0.170	0.157	0.125	0.197	0.184	0.177	0.170
X'' _d (s)	0.162	0.155	0.143	0.114	0.179	0.167	0.161	0.155
X'' _q (u)	0.169	0.162	0.15	0.122	0.184	0.173	0.167	0.161
X'' _q (s)	0.153	0.147	0.136	0.111	0.168	0.157	0.152	0.146
X ₁ (u)	0.09	0.086	0.08	0.065	0.099	0.093	0.09	0.086
X ₂ (u)	0.162	0.155	0.144	0.117	0.177	0.167	0.16	0.155
X ₂ (s)	0.147	0.141	0.131	0.107	0.161	0.151	0.146	0.141
X ₀ (u)	0.024	0.023	0.021	0.017	0.026	0.025	0.024	0.023
X _p (s)	0.117	0.112	0.104	0.085	0.128	0.12	0.116	0.112
SCR (short circuit ratio), I _{r0} /X _d (u)	0.55	0.60	0.67	0.92	0.48	0.52	0.56	0.60
s=saturated value, u=unsaturated value, values are p.u. at rated voltage and power								
T _{d0} '	1.621 s							
T _d '	0.118 s							
T _d ''	0.0098 s							
T _a	0.0161 s							
CE-Marking	Generator fulfills the requirements of Low Voltage Directive (2006/95/EC) Generator supplied to EEA-area will be CE-marked							

 ABB Generators Ltd.	Document identification	Lang.	Rev. ind.	Sheet
	8AMG 5855432	en	B	2

2 PERFORMANCE CURVES

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

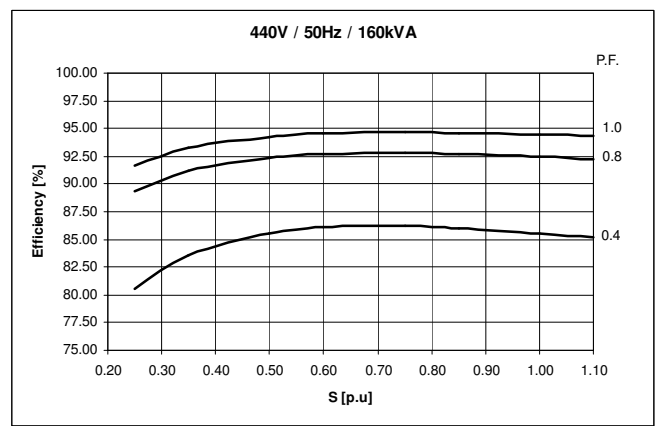
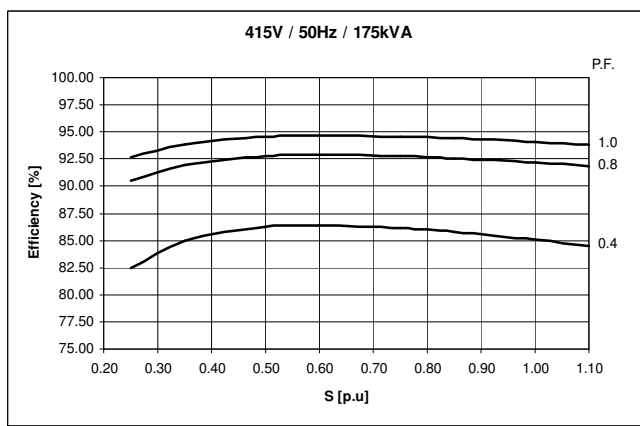
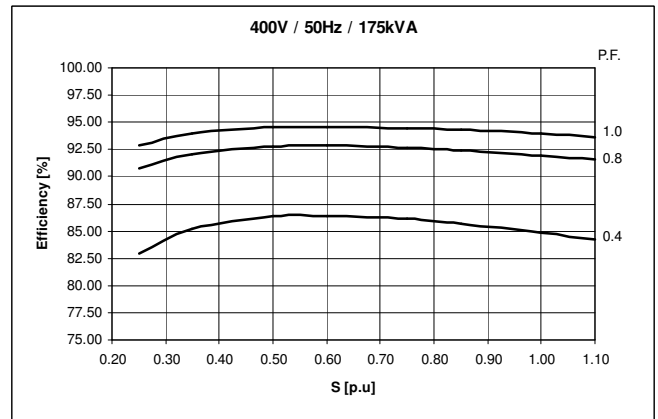
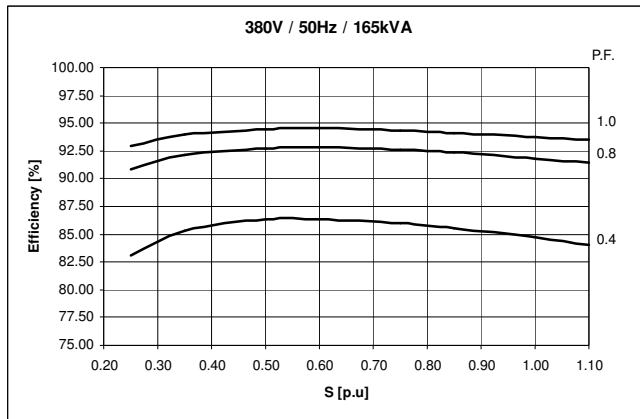


ABB Generators Ltd.

Document identification

8AMG 5855432

Lang.

en

Rev. ind.

B

Sheet

3

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

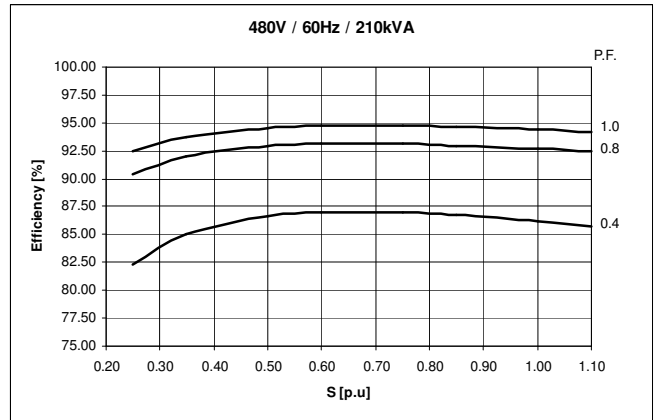
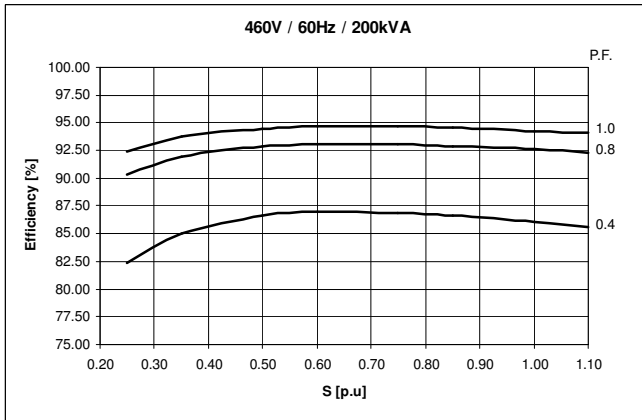
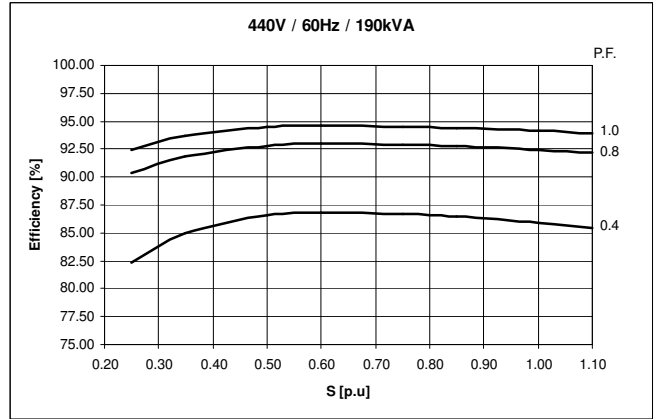
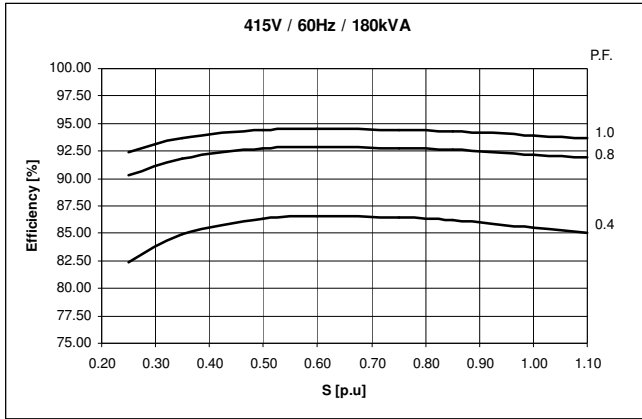


ABB Generators Ltd.

Document identification

8AMG 5855432

Lang.

en

Rev. ind.

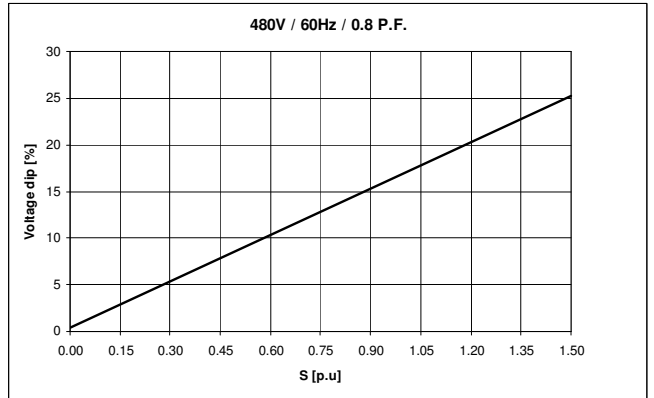
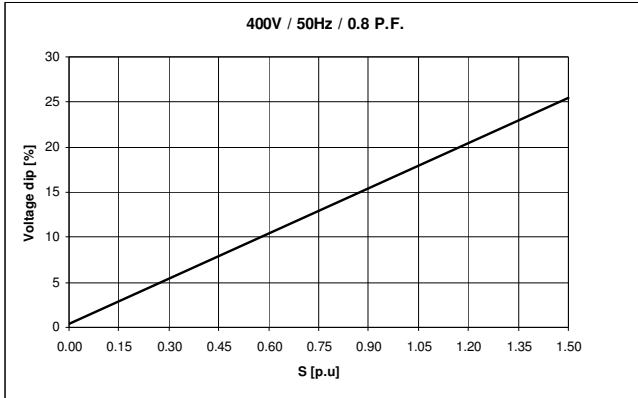
B

Sheet

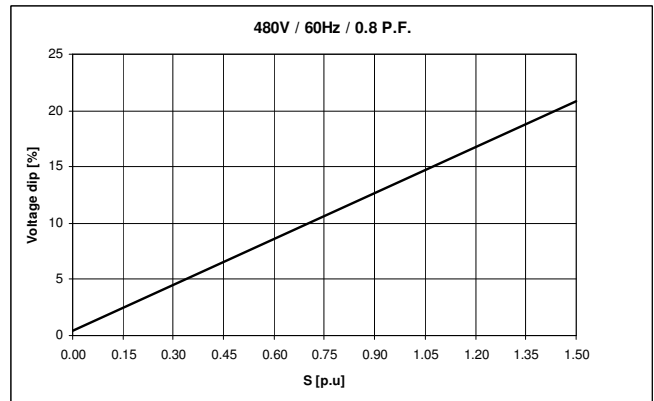
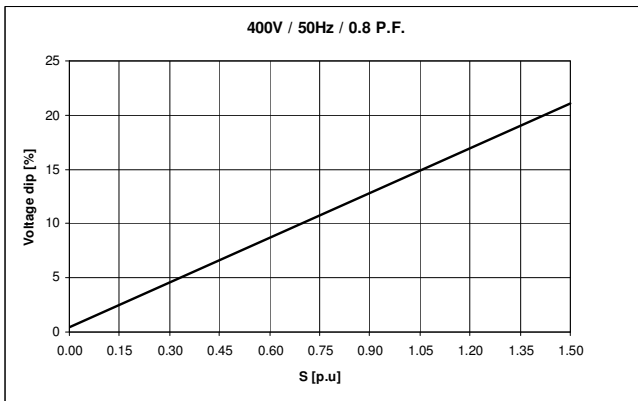
4

TRANSIENT VOLTAGE REGULATION CURVES

Load application (Shunt excitation):



Load application (Auxiliary winding or PMG excitation):



Load rejection (Shunt excitation):

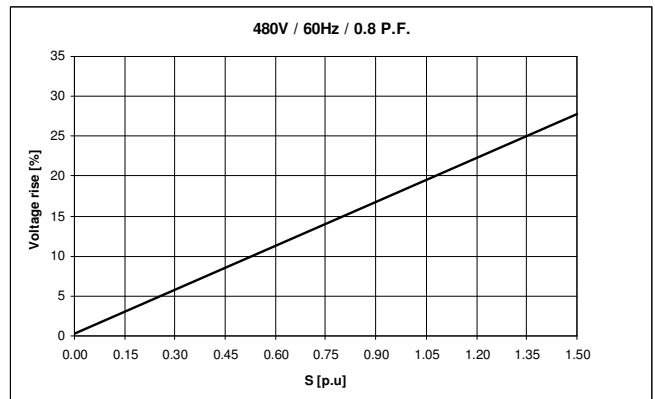
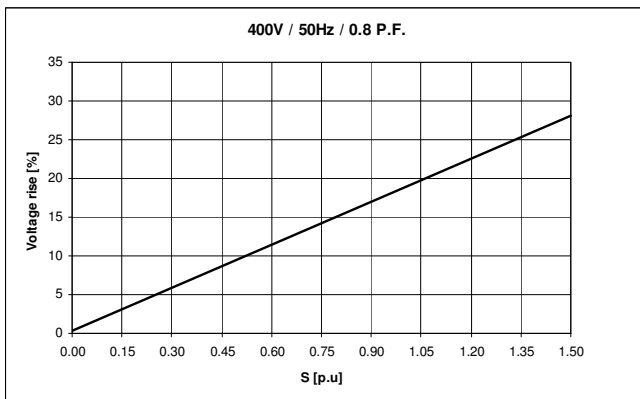


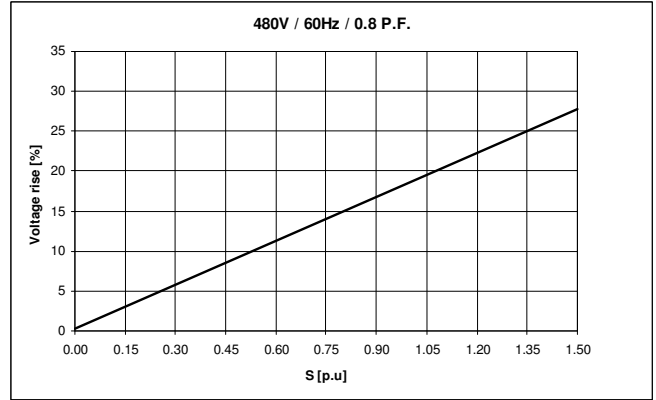
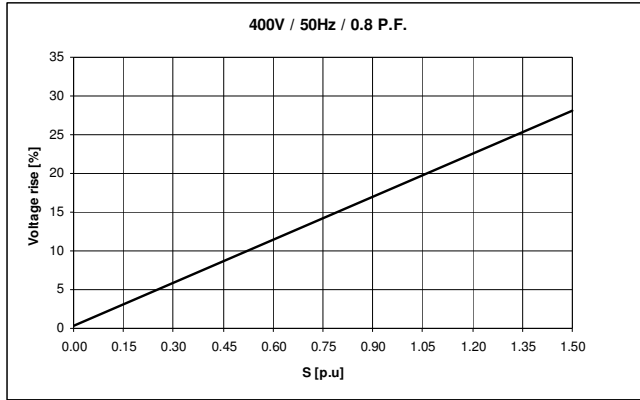
ABB Generators Ltd.

Document identification
8AMG 5855432

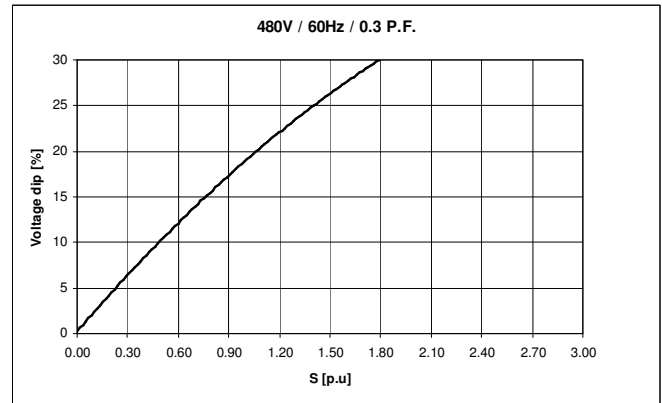
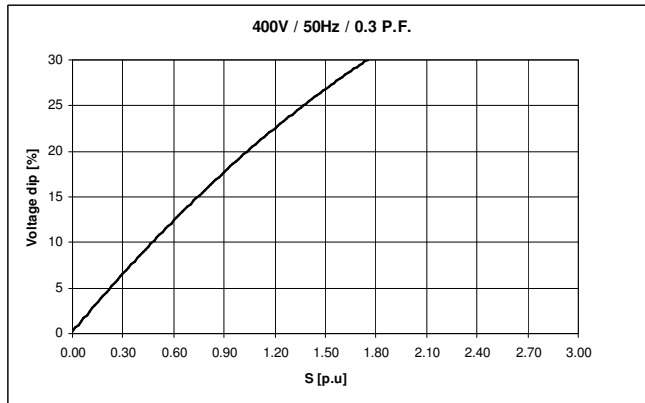
Lang.	Rev. ind.	Sheet
en	B	5

TRANSIENT VOLTAGE REGULATION CURVES

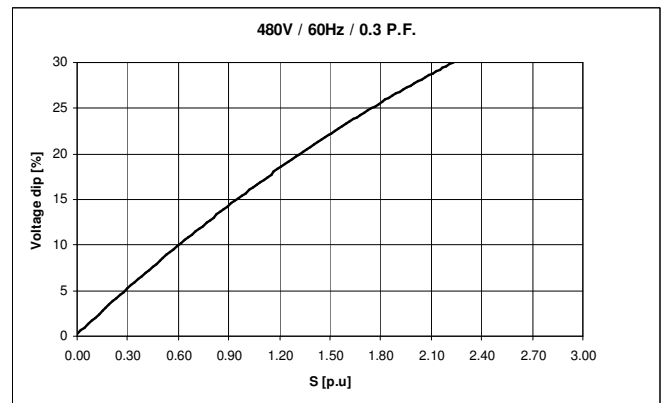
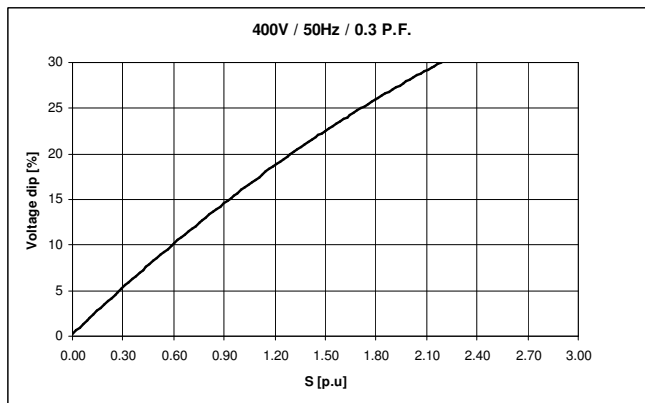
Load rejection (Auxiliary winding or PMG excitation):



Locked Rotor Motor Starting Curve (Shunt 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.



ABB Generators Ltd.

Document identification

8AMG 5855432

Lang.

en

Rev. ind.

B

Sheet

6

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.

Twelve (12) leads T1 – T12 brought into the terminal box to enable internal series star, parallel star, series delta and parallel delta connection. 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 EA 63-5 AVR.

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.

	ABB Generators Ltd.	Document identification	Lang.	Rev. ind.	Sheet
		8AMG 5855432	en	B	7

Static voltage regulation accuracy +/- 1.0 %.

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

Nominal Um, range: < 90 VDC at 110 VAC input, 170 VDC at 220 VAC input.

Nominal Im, range: continuous 5 ADC and maximum 40 ADC for 60 s.

BEARINGS

Sealed bearing.

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

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 5 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 ± 5 %.

Maximum continuous frequency variation with rated output is ± 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 η

Machines up to and including 150 kW (or kVA) -15 % of $(1-\eta)$.

	ABB Generators Ltd.	Document identification	Lang.	Rev. ind.	Sheet
		8AMG 5855432	en	B	8

Machines above 150 kW (or kVA)	-10 % of (1- η)
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	± 30 % of the value in the technical specification.
Steady short-circuit current at specified excitation	± 15 % of the value in the technical specification.
Moment of inertia	± 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.

ORDER CONFIRMATION DOCUMENTATION

Main dimension drawing.	Documentation language is English.
Rotor drawing.	Units in drawings [mm].
Main Connection diagram.	
Connection instruction.	
User's manual.	



ABB Generators Ltd.

Document identification

8AMG 5855432

Lang.

en

Rev. ind.

B

Sheet

9

4 ACCESSORIES

OPTIONAL ACCESSORIES

No pc/pcs	Item	Note
1	Anti-condensation heater	
1	Current transformer	For parallel operation with other generators
6	PT100 for stator winding	
1	PTC sensor (triple)	
1	PMG	



ABB Generators Ltd.

Document identification

8AMG 5855432

Lang.

en

Rev. ind.

B

Sheet

10