JURONG SHIPYARD PTE LTD	TYPE OF DOC.: DS	JSPL DOC. NO.: NSG-VCD5-E-001-ABB-DS-100	
	JOB: 71-3068 NS Guarapari	SHEET: 1 of 8	
	DOC TITLE: 11kV Generator, Technical Specification		
	FILE NO.: NSG-VCD5-E-001-ABB-DS-100_A.pdf		
ABB	VENDOR'S DOC. NO. 3AJM002246-100		
	PURCHASE ORDER NO.: 12091949DP / 12091950DP / 12091883DP		
	PACKAGE ID: NGS-VCD5-E-001	PACKAGE DESCRIPTION: GENERATORS, 11K/440V SWBDS/MCCS/VFDS, AND TRANSFORMERS	
	EQUIPMENT TAG(S): 861EG001 to 006		

REVISION INDEX

REV	DESCRIPTION AND / OR REVISED SHEETS
A	For Comment

THE REVIEW OF THIS DOCUMENT DOES NOT RELIEVE OF THE SUPPLIER'S RESPONSIBILITY FOR THE DESIGN, FABRICATION AND PERFORMANCE OF THE EQUIPMENT OR ANY CONTRACTUAL OBLIGATIONS

A	NO COMMENTS. Send certified drawings.
B	WITH COMMENTS. Revise and re-submit for comments.
C	WITH MINOR COMMENTS. Send certified drawings with comments incorporated.
D	REJECTED. Reissue for comments.
E	CERTIFIED DOCUMENT. Accepted.
F	FOR INFORMATION.

Name: Signature:

Date:

	REV. A	REV. B	REV. C	REV. 0	REV. 1	REV. 2	REV. 3	REV. 4
DATE	2012-10-04							
PREPARE	LyOn							
CHECKER	BjHa							
APPROVAL	HaAa							

Jurong Shipyard Pte. Ltd.
71-3068 NS GUARAPARI

Technical Specification
9100KVA Generator

			External doc. no.	VCD5-E-001-ABB-DS-100		
Based on			Project	71-3068 NS GUARAPARI		
Prep.	MP / Bjørn Hafstad	2012-09-03	Customer	Jurong Shipyard Pte. Ltd.		
Appr.	MP / Bjørn Hafstad	2012-10-04	Proj. no.			
Doc. kind	Technical Specification		Doc. des.		Ref. des.	
Title	9100KVA Generator		Resp. dept	MP	Status	Approved
ABB	ABB AS		Doc. no.	3AJM002246-100	Lang. en / Rev. ind. A	Page 1 / No. of p. 7

1 FORMANCE DATA (Calculated values)

TYPE

Machine type: AMG 0900XU 10 LSE
ABB FIDRI reference number: 2681HG401-406

RATINGS

Output:	9100	kVA	Direction of rotation		
Duty:	S1		(Facing drive end):	CCW	
Voltage:	11000	V	Stored energy constant		
Current:	478	A	(Rotative energy divided		
Power factor:	0,80		by rated effect):	0,56	s
Frequency:	60	Hz	Weight:	26000	kg
Speed:	720	rpm	Inertia:	1775	kgm^2
Overspeed:	864	rpm	Protection by enclosure:	IP54	
			Cooling method:	IC8A1W7	
			Mounting arrangement:	IM1101	

STANDARDS

Applicable standard:	IEC 60034
Marine classification:	ABS
Hazardous area classification:	None
Temperature rise stator / rotor:	B/B
Insulation class:	F

ENVIRONMENTAL CONDITIONS

Ambient temperature:	50	°C	Altitude:	1000	masl
Coolant temperature:	38	°C	Location:		

ASSUMED DATA

Driving equipment:	Wartsila 18V32	
Appr. mec. power:	7485	kW

EFFICIENCY in %

load:		110 %	100 %	75 %	50 %	25 %
Efficiency @ power factor	0,80	97,20	97,21	97,04	96,33	93,82
Efficiency @ power factor	1,00	98,01	97,98	97,79	97,21	95,15

REACTANCES IN %

XD (U):	153,1	XD' (S):	24,5	XQ'' (S):	17,6	X0 (U):	7,7
XQ (U):	80,8	XD'' (S):	13,9	X2 (S):	15,8	XP (S):	20,3
X1 (U):	12,2	(S) = Saturated value, (U) = Unsaturated value					

TIME CONSTANTS (SEC.) AT 75 °C

TD0':	6,039	TD':	1,121	TQ0'':	0,0937	TA:	0,088
TD0'':	0,02082	TD'':	0,01259	TQ'':	0,0224		

RESISTANCES AT 20 °C

Stator winding:	0,0561	Ω	Field winding:	0,8357	Ω
Excitation winding:	7,9	Ω			

SHORT CIRCUIT

Short circuit ratio:	0,75	
Sustained short circuit current:	1,8	p.u. (rated excitation)
	> 3.0	p.u. (voltage regulator)
Sudden short circuit current:	3450	A (symmetric RMS)
	8750	A (peak value)

VOLTAGE VARIATION

Maximum allowed amount of starting load:

Maximum voltage drop	Power factor	Load	
15 %	0.1	5200	kVA
15 %	0.4	5650	kVA
15 %	0.8	9150	kVA
20 %	0.1	7300	kVA
20 %	0.4	7900	kVA

Voltage drop at sudden increase of rated load:	15	%
Voltage rise at sudden drop of rated load:	20	%

REACTIVE LOADING

Steady state reactive loading at rated excitation:	7400	kVAr
Steady state reactive loading at zero excitation:	4600	kVAr

TORQUE

Rated load torque (Calculated of rated output in kVA): 120700 Nm

The peak values of sudden short circuit air gap torques:

2-phase short circuit:	915	%	3-phase short circuit:	625	%

BEARINGS

D-end:	Sleeve, flood lubricated, locked	N.D-end:	Sleeve, self lubricated, free
Lubrication system:	Lubrication unit		

Inclination

Fore-Aft static:	5	Degrees	Fore-Aft static:	7.5	Degrees
Athwards static:	15	Degrees	Athwards static:	22.5	Degrees
Oil viscosity:	ISO VG 46				

HEAT EXCHANGER

Mounting:	Top		Coolant inlet direction:	See GA	
Coolant flow:	34	m^3/hour	Heat dissipation in air:	10	kW
Coolant temperature rise:	6	K	Heat dissipation in coolant:	198	kW

TERMINAL CONNECTIONS

Direction of main connection: Reefer to Main Dimensions drawing (GA)
Direction of zero connection: Reefer to Main Dimensions drawing (GA)

EXCITATION

	Exciter field			
No load:	4.2	A	42,0	V
Rated load:	9,1	A	91,3	V

2 CONFIGURATION AND SCOPE OF SUPPLY

GENERAL

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

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 radial cooling ducts in the stator core insure uniform and effective cooling of the stator.

The rotor consists of a shaft poles fixed on the shaft, exciter and a fan(s). The shaft is machined of steel forging. The poles are manufactured of 2 mm sheet steel and bolted from the top to the shaft. The pole laminations are pressed together with steel bars which are welded to the end plates. The exciter rotor and the fan are shrink fitted onto the shaft and secured with a key.

All windings are completely vacuum pressure impregnated with high quality epoxy resin. The windings are provided with very strong bracing which withstands all expected mechanical and electrical shocks and vibrations as well as chemicals. For more information ask for brochure "MICADUR-Compact Industry Insulation System"

The stator frame, core support and end shields are made of fabricated steel and welded together. The stator frame is closed with steel panels that guide the ventilation air and provide the degree of protection required. The flange mounted bearings are bolted to the end shields

According to IM1101 the machine has 2 bearings The feet are raised. The Shaft end is cylindrical

FOUNDATION

The generator can be mounted rigidly on a common base frame designed by the engine manufacturer. Maximum allowed vibrations in the bearings and feet of the coupled generator are according to ISO 8528-9, according to value 2. The machine can be mounted using shimming, machined blocks, chock fast or vibration elements as long as relevant mounting instructions and the requirements of the classification society are followed.

COOLING

The totally enclosed machine has a shaft mounted fan inside that move air through the cooling circuit. The removable heat exchanger is made of corrosion resistant materials. Emergency cooling without water is possible.

CONTROL SYSTEMS

Brushless excitation. The excitation requires following components: Current transformers for booster excitation and actual value measurement. 3-core voltage transformer for measurement and excitation power supply.

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 files: MDD 8006327, MDD 8006328. These are available upon request.

SURFACE TREATMENT

Colour: MUNSELL8B Grade: C3 – Standard color

Surface treatment C3 according to the ISO 12944 standard, for standard industrial environment.
Standard top coat colour is ABB blue:
- Munsell : 8B 4.5/3.25)

3 ACCESSORIES

ACCESSORIES (for each generator)

No pc/pcs	Item
9	PT100 for stator winding, extended set - PYR PT100LG10/3
1	PT100 for cold cooling air - PYR PT100RC0/4 (L=50mm)
1	PT100 for warm cooling air - PYR PT100RC0/4 (L=50mm)
2	PT100 for sleeve bearings DE/NDE (radial bearing surface) - PYR PT100R0/4
1	Varistor - SXV 40K550 C
3	Diode – LNM 260A/2000V (ABB Stock code: 987791)
1	Automatic Voltage Regulator system – AVR-UN1020-NOIN Unitrol 1020 with plate (ABB Marine NOINA standard) Wall mounted cabinet for AVR plate - Color: RAL7035
1	1PT Voltage transformer for exc.power & actual value measurement –KSG3PU11000 60 3 11000/110/110/110 V Secondary 1: 110 V 3200VA for excitation Secondary 2: 110 V 300VA Secondary 3: 110V 300VA
3	3CT -Current transformer for short circuit exc.power –KSG KOKM 1EF 500 500/7,0A, Class PX
1	2CT -Current transformer for actual value measurement KSG 0500T2 500/1A, 5 VA, CL 0.5, 60 Hz
3	Current transformer for differential protection (ABB marine supply) TPU 40.13 600/1A , 5VA5P25 60 Hz
1	Water-to-Air Cooler Unit - Double tube fresh water cooler
1	Leakage detector for double tube water cooler, - OXA FLOAT 1
1	Anti condensation heater Power 2x800 W, Voltage 220-250 V
1	MCT frame fro main cables (Roxtec) without inserts
2	Aux. Terminal box (B3A & B3B)

3 Earthing balls for temporary earthing - NW D25/M12

1 Drive-end sleeve bearing - ZLM EFZLE22-225
Side flange mounted sleeve bearing for AMG/Z 0900 in marine application.
D-end. Max. axial force 6,6 kN.

1 Non-drive-end sleeve bearing - ZLM EFZLQ22-225EP
Side flange mounted sleeve bearing for marine applications. Insulation between bearing housing and shell.

1 Shield mounted lubrication unit
For unit details see General arrangement and hydraulic circuit diagram

1 Tag Plate
861EG001 to 006

1 IR Windows on incoming main cable termination

1 Testing
In addition to routine test following type test is performed on one (1) machine
1. Moment of inertia (IEC6034-2)
2. No-Load curve (IEC6034-4)
3. Short circuit curve (IEC6034-4)
4. Heat run test (temp rise) (IEC6034-1, IEEE115)
5. Zero power factor test (IEC6034-2)
6. Losses and Efficiency (IEC6034-2)

REVISION

Rev. ind.	Page (P) Chapt. (C)	Description	Date Dept./Init.
A		New Document	2012-08-23/ MP/ BjHa