TD Engineering

Type Certificate

KVA 10_10kW

Approval class:
A

Type Certificate number	Date of issue
TD-TA-117-0-1	**2022-11-01**

Wind turbine specification:
IEC WTGS class: IIIA *(see Appendix 1 of this certificate)*
Manufacturer:
KVA Wind Int
Borrisvej 10, Astrup, 6900 Skjern, DK
Issued to:
KVA Wind Int
Borrisvej 10, Astrup, 6900 Skjern, DK

Valid until
2027-11-01

Type certification has been carried out according to and attest compliance with ***Executive Order no. 1773 of 30 November 2020*** *"Bekendtgørelse om teknisk certificeringsordning for vindmøller" and* ***IEC 61400-22:2010 Wind Turbines – Part 22 "Conformity testing and certification"***

Reference documents:

Final Evaluation Report:	**TD-TA-114-1-1**
Design Evaluation Conformity Statement	**TD-DE-117-0-0**
Type Test Conformity Statement	**TD-TT-117-0-0**
Manufacturing Conformity Statement	**TD-MC-117-0-0**
Type Characteristics Measurement Conformity Statement	**N/A**

Date: 2022-11-01

Thomas Dalgaard
TD Engineering ApS

Appendix 1. Wind Turbine Specification

General	
Wind turbine Manufacturer:	KVA Vind A/S
IEC WT class:	III
Rotor diameter:	9.3 m
Rated power:	10 kW
Rated wind speed V_r:	10 m/s
Hub height(s):	20.25 m
Operating wind speed range V_{in}-V_{out}:	3 – 25 m/s
Design life time:	20 years
Wind conditions	
V_{ref} (hub height):	37.5 m/s
V_{ave} (hub height):	7.5 m/s
I_{15}	0.18
Mean flow inclination:	8°
Other environmental conditions	
Air density:	1.225 kg/m^3
Normal and extreme temperature ranges:	Normal -10ºC to +40ºC Extreme -20ºC to +50ºC
Relative humidity:	95 %
Solar radiation:	1000 W/m^2
Salinity:	Danish, Near Costal
Design conditions in case of offshore WT (water depth, wave conditions etc.)	Not relevant
Description of lightning protection system	Ground protection
Earthquake model and parameters:	Not relevant
Electrical network conditions	
Voltage range of grid side converter:	313-470 VAC (3 phase)
Normal supply frequency and range:	50 Hz ±1%

Rotor	
Cone angle	3º
Tilt angle	3º
Tip angle	Pitch regulated
Blades	
Manufacturer	ANE
Version	ANE 4.2 (AHBJ95-1103)

Material	Fiberglass EWR 400 Polyester (Aropol M 300 TD)
Blade length	4.2 m
Air brake	N/A

Pitch system

Type	KVA design
Electrical/hydraulic unit	Hydraulic PLC controlled pitch servo

Hub

Type	Fixed
Material	Hot rolled – ASTM A536, QT 400-18 (China) standard/norm Symbol number: 60-40-18

Main shaft

Type	Double bearing support
Material	Hot Wrought – ASTM A29 42CrMo standard/norm Symbol number: 4140

Main bearing

Type	SKF
Manufacturer	SYNT 80L, SYJ 100 TF

Generator

Manufacturer	Ginlong
Type	Permanent magnet – GL PMG 15K.
Nominal power	15 kW
Voltage, rated	420V
Rpm, rated	125 rpm
Insulation class	H
Protection class	IP65

Mechanical brakes

Manufacturer	Brembo/HydraComp
Type	Hydraulic Passive brake on S235 brakedisc

Yaw system

Type	Slew drive, Active electrical
Drive	BEVI drive and gear

Tower(s)

Type	Tubular steel
Material	Welded – S235
Height(s)	19,7 m

Foundation

Type	N/A (Project Specific)
Material	N/A (Project specific)

Control system/Converter

Manufacturer	Control system UNI-EL (WAGO PLC) Inverter: Ginlong GCI 3x400/230 V

Type	Three phase
Voltage rated	400 V
Current	36A
Protection Class	IP67 (Controller) /IP21 Converter
Manuals	
O&M/Install	KVA-C-0-0001 KVA VIND 10 User Manual

Appendix 2. Noise conditions

Noise measurements:

Report reference: 13526.0001-2017-01 (ArbejdsmiljøEksperten) inkl BEK 135 statement

Noise measurement results (BEK 1736 and BEK 135) :

Windspeed	6 m/s	8 m/s
L_{WA}	84,8 dB	87,0 dB

Appendix 3. Outstanding issues

- No issues