

W9x					
Technical data W80					
Doc. No.	W0402-G01-DASH-304-W2E-004-3-E				
Dok. Nr.					
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Datum		Überabtg.			



### Operating data

Design wind class	GL / IEC 1a
Nominal power	2.500 kW
Cut-in wind speed	4 m/s
Nominal wind speed	14.5 m/s
Cut-out wind speed	25 m/s
Survival wind speed at hub height (3-sec-mean)	70.0 m/s
Operation temperature range (ambient)	-20 bis +40 °C
Noise prediction	104.5 dB(A)

### Rotor

Number of blades	3
Rotor blade	LM 38.8
Rotor orientation	up-wind
Rotor diameter	80 m
Swept area	5,027 m <sup>2</sup>
Speed range	11.7 to 20.4 rpm
Tilt	5°
Blade coning	5°

### Brake system

Pitch	electric, triple-redundant, fail-safe
Pitch backup power supply	Lithium-Ion Battery
Mechanical brake	Disk brake, hydraulic, active

### Drive train

Main bearing	Rigid moment bearing, three-row roller
Gearbox	Two-stage planetary gear, one spur gear stage
Gearbox support	Circular torque bracket
Nominal power gearbox	2,671 kW
Gearbox cooling	Oil-water heat exchanger
Gearbox ratio	1 : 64.3
Generator coupling	Steel disc coupling w/ overload protection

### Generator

Type	asynchronous w/ slipring
Type of protection	IP 54
Nominal power	2,560 kW
Nominal voltage	690 V 3~
Frequency	50 Hz
Power factor	0.95 capacitive to 0.95 inductive
Cooling	Mounted air-water heat exchanger
IEC-size	560

### Inverter

Typ	Indirect DC link converter
IGBT class	1,700 V
Degree of protection	IP 54
Max. current grid side	ca. 650 A 3~
Max. current generator side	ca. 1.000 A 3~
Nominal voltage	690 V 3~
Frequency (grid side)	50 / 60 Hz
Cooling	Water
Arrangement	Nacelle

### Transformer

Type	Silicone-oil immersed
Nominal power	2,700 kVA
Nominal voltage	690 V 3~ / 20 kV 3~
Vector group	Dyn 5
Nominal impedance voltage	6%
Cooling	Air
Arrangement	Nacelle

### Medium voltage unit

Insulation- and switch medium	SF6
Nominal voltage	24 kV
Nominal current	400 A
Rated peak withstand current	40 kA
Protective relay	Overcurrent protection with DEFT characteristics
Arrangement	Tower base (tubular tower) / compact station (lattice tower)

### Yaw system

Bearing	Ball bearing
Motor	Three-phase asynchronous motors w/ short-circuit rotor
Gearbox	4-step planetary gear
Number of drives	4
Yawing speed	0.5 °/s
Brake	Hydraulic disc brake
Material brake lining	organic
Number of brake calipers	4

### Towers

Classes	GL/IEC 2a[1] , DIBt 3a[2] , GL/IEC 3a[3] , DIBt 2a[4] , GL/IEC 1a[5]
Tubular	65 m[2,5] , 85 m[2,5]
Lattice	-

### Condition monitoring

Monitored components	Main bearing, main gearbox, generator, tower
Evaluation method	Envelope spektra, amplitude spektra, and others

### Control

Typ of control	WP4000
Ambient temperature	-20°C to 60°C
Speed control	active torque control, variable pitch
Communication between I/O-modules	CAN (close range), Ethernet (remote)
Data interfaces	RS 232, RS 485, Ethernet
Protocols	M-Net, T.C. 88, smtp, http
Bus coupling	CANOpen

### Power curve\*

\* Prediction, based on simulation data

Blade type	LM 38.8
Simulation software	Flex5
Nominal speed	17.9 rpm
Air density	1.225 kg/m <sup>3</sup>
Terrain slope	5°
Turbulence intensity	10%
Wind gradient	0,16
Calculation standard	IEC 61400-12

Wind speed in hub height in m/s	Electrical power in kW
4,0	28,5
5,0	124,9
6,0	262,1
7,0	437,5
8,0	665,5
9,0	959,5
10,0	1.321,0
11,0	1.713,5
12,0	2.074,5
13,0	2.365,0
14,0	2.486,8
15,0	2.500,0
25,0	2.500,0

### Calculated annual energy output\*\*

\*\* Norm conditions acc. to IEC 61400-12

Wind speed in hub height (annual average) in m/s	Calculated annual production in MWh
5,00	2.502
5,50	3.295
6,00	4.154
6,50	5.052
7,00	5.964
7,50	6.868
8,00	7.745
8,50	8.580
9,00	9.363
9,50	10.083
10,00	10.733