

TUGE150

Wind turbine technical specification

This document is for potential project developers that plan to include TUGE150 wind turbine in scope of their project. This document contains more detailed description of turbine components and functions, as well as additional information that can be useful for project planning.



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TUGE150 general specification

TUGE150	
Operational data	
IEC WT Class	IIA/IIIA (52,5 m/sec 50 year extreme gust)
Start-up wind speed	3-4 m/s
Rated wind speed	12 m/s
Cut-out wind speed	25 m/s
Rotor	
Rated rotation speed	40 rpm
Rotor diameter / area	29 m / 661 m ²
Rotor type	Fixed angle, upwind, stall control and clockwise rotation
Rotor blades	3 pcs with hydraulic tip-brake, LM Glasfiber
Rotor weight with hub	1450 kg, ductile cast iron hub
Generator	
Manufacturer	ABB / equivalent
Generator type	Asynchronous, dual wound
Nominal power	150 kW / 50 kW
Gearbox	
Type	Helical, 3 stage, ductile cast iron, with oil cooler
Yawing system	
Type	Active, 2 x planetary gear
Brake system	
Type	Mechanical disc brake, hydraulic
Type	Pivotal tip-brakes, passive and hydraulic
Control system	
Manufacturer	Mita-Teknik or Orbital
Grid connection	Direct with reactive power compensation
Grid parameters	EN 50549
Tower height	30, 40 or 50 m tubular or 50 m lattice
Environmental conditions	-25 ... +40 C
Designed lifetime and maintenance interval	25 years / 2 years
Data connection	Scada

Annual Energy Production (AEP) is calculated for different annual mean wind speeds at hub height. A Rayleigh wind speed distribution & 100% availability is assumed in the calculations.

Yearly average wind speed, m/s	Energy, MWh
4,0	127,643
4,5	185,869
5,0	250,407
5,5	317,995
6,0	385,866
6,5	451,837
7,0	514,226
7,5	571,747
8,0	623,451
8,5	668,696

The power curve is valid for standard conditions: 15 deg. air temperature, 1013 Hpa air pressure & 1.225 kg/m³ air density, clean blades & undisturbed horizontal inflow. (In the stall range, at wind speeds above 16 m/sec the power curve may deviate some from the one illustrated.)

Wind speed, m/s	kW
4	3
5	16
6	24,9
7	51,3
8	80,5
9	109,7
10	124,8
11	139,8
12	148,1
13	154,8
14	152,2
15	151,2
16	150,9
17	151,1
18	150,8
19	150,4
20	150,1
21	149,9
22	149,9
23	150,1
24	150,1
25	150,1

The main parts of the wind turbine are foundation, tower and nacelle with rotor, electric panels and cables necessary for energy transfer and turbine control. Electrical yaw gear is used for turbine nacelle rotation. In addition, a mechanical brake of nacelle rotation is used to avoid excessive mechanical forces to the gear. The turbine rotation speed is constant, blade tip-brakes activating during rotor over speed and engaging the mechanical rotor brake to stop the rotor. All these methods allow for safe operation and control of the turbine.

Maintenance

Yearly – visual check of general condition.

2 technicians, 4h

Consumables

Every 2 years – gearbox oil change and filling of the bearing grease pump.

2 technicians, 8h

Consumables + spare parts

Initial cost

Full set price according to the latest price list in EUR EXW Tännasilma, Estonia.

Additional costs:

1. Transport
2. Foundation
3. Installation equipment and machinery
4. Civil and grid works and permissions

Useful resource for wind data assessment: <https://globalwindatlas.info>