Component	Description
Hub	The hub is made of cast iron and is connected directly to the gearbox. In this solution there is no main shaft. The hub and the planetary carrier are supported by the main bearing.
Pitch motors	The pitch system consists of electric independent pitch actuators located in the hub and connected to the blades. These actuators position the blade at the optimum pitch angle. The pitch actuators are also equipped with long lifetime back-up capacitors.
Blades	Utilizing energy optimized blades with large rotor diameters maximizes power energy capture. The blades are made of epoxy resin reinforced glass fiber and are equipped with lightning conductors.
Nacelle	The nacelle cover is made of glass fiber material.
Power unit	The integrated power unit consists of the main bearing, gearbox, generator and mechanical brake system
Main bearing	The rotor hub is connected to the gearbox casing using a play-free two-row tapered roller bearing. The bearing transfers the rotor loads through the gear casing to the mainframe. The main bearing is integrated with the gearbox.
Gearbox	The planetary gearbox transfers the torque to the low speed permanent magnet generator. Planetary gears are more efficient and also reduce stress compared with parallel gears.
Generator	A variable speed, permanent magnet synchronous generator converts the torque into electrical power. Being permanently excited it does not require energy for excitation, providing the highest efficiency at partial and rated power.
Aerodynamic brake	The blades act as aerodynamic brakes. Normally the blades are synchronized but in case of an emergency, each blade can be controlled individually and are equipped with long lifetime back-up capacitors.
Mechanical brake	The mechanical brake system works alongside the aerodynamic brakes and consists of a disc brake with two brake calipers. The mechanical brakes are hydraulically operated.
Frequency converter	A liquid cooled IGBT frequency converter is used for connecting the variable speed generator to the grid. Due to the effective grid side filters, the total harmonic distortion of the grid side current is very low.
Yaw motors	When the direction of the wind changes, geared yaw motors on top of the tower turn the nacelle so the rotor faces into the wind. The hydraulic brakes are loosened automatically to a reduced pressure for the time of yawing.
Fan intakes	Fans provide forced air flow to cool down heated cooling liquid during operation in increased temperatures.
Cooling system	A cooling liquid (water-glycol) system inside the nacelle is used to cool down heated equipment e.g. generator, frequency converter.

Component	Description
Lubrication	The lubrication oil tank is equipped with an off-line filter, heating elements and radiators, for continual operation in changing weather extremes.
Wind sensors	The anemometer and wind vane monitor the changes in the wind and start and stop the turbine according to the conditions. The wind sensors are equipped with an ice-prevention system.
Smoke detectors and fire detection / extinguishing system	An automatic fire detection system and fire extinguishing system are available to meet local requirements or for peace of mind.
Turbine control, remote monitoring and reporting	Each turbine has its own PLC. PLC`s of the wind park are connected into the network. Turbine operator is able to control the wind park remotely. Production data; actual and cumulative, alarms and stops are recorded. The customer has access to the information over the internet. The turbine control software has several state-of the art features, which allows optimization of the production based on the needs of the customer. WinWinD 3 MW turbine can be fully remote controlled and all functions can be executed remotely.
Alarms and self-diagnosis of the wind turbine	In case of malfunction the system alarms the turbine operator of the reason for failure. The operator can remotely control the turbine to find a solution in order to restart the turbine. Control system continuously protects and controls the turbine and adjusts the settings according to wind and weather conditions. This way the power production can be optimized. For example during freezing conditions the optional control system analyses the need of heating the power unit and lubrication oil ensuring a safe start. In case of grid drop the wind turbine has an uninterruptible power system which ensures control of turbine for 60 minutes.
Lightning protection	Lightning protection is designed according to IEC 61400-24. Lightning protection technology is the most advanced in the field used. Lightning protection based on next basic principles: • Lightning conductor in each blade • Varistors and fuses protecting critical components • Shielded sensor cables • Earthing of the tower according to VDE 0185 standard • Overvoltage protection