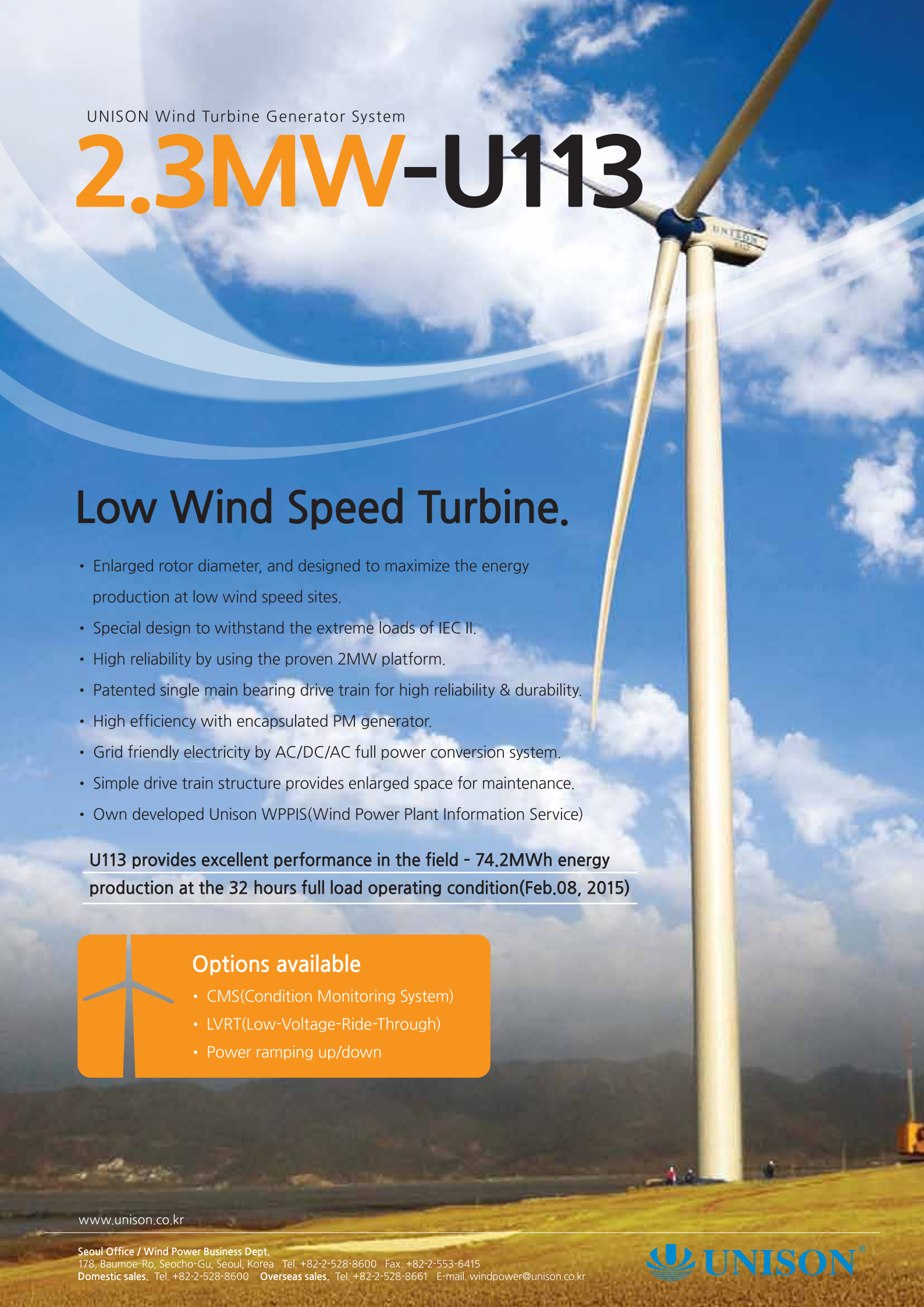
UNISON Wind Turbine Generator System

2.3MW-U113



Low Wind Speed Turbine.

- Enlarged rotor diameter, and designed to maximize the energy production at low wind speed sites.
- Special design to withstand the extreme loads of IEC II.
- High reliability by using the proven 2MW platform.
- Patented single main bearing drive train for high reliability & durability.
- High efficiency with encapsulated PM generator.
- Grid friendly electricity by AC/DC/AC full power conversion system.
- Simple drive train structure provides enlarged space for maintenance.
- Own developed Unison WPPIS(Wind Power Plant Information Service)

U113 provides excellent performance in the field - 74.2MWh energy production at the 32 hours full load operating condition(Feb.08, 2015)

Options available

- CMS(Condition Monitoring System)
- LVRT(Low-Voltage-Ride-Through)
- Power ramping up/down

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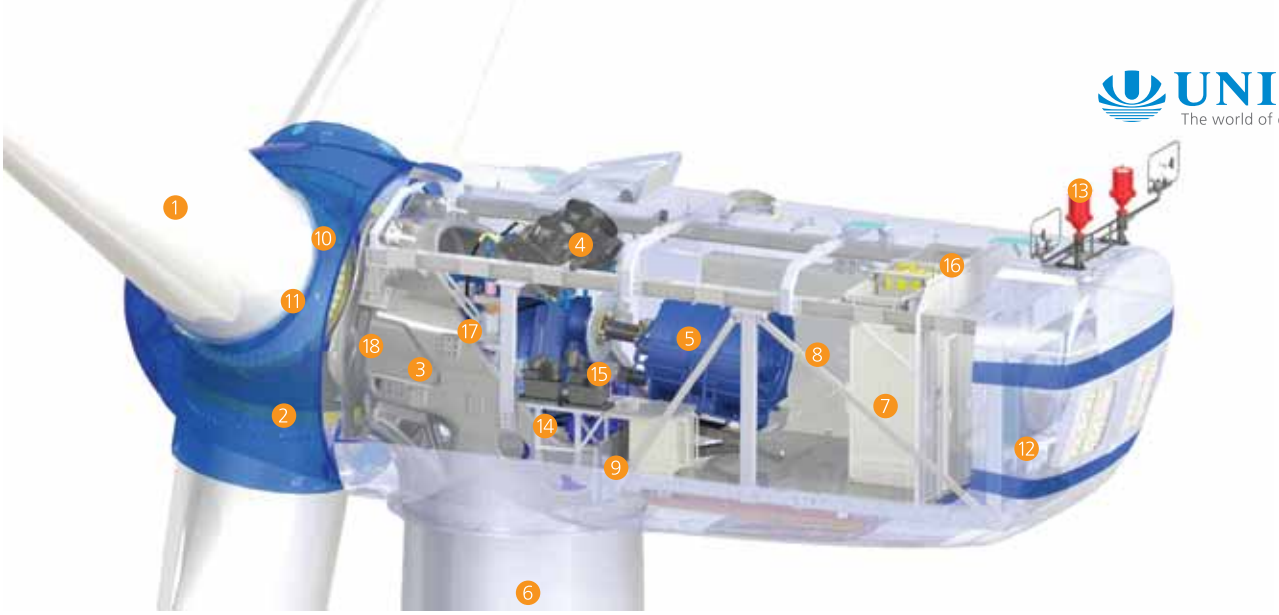

1. Blade 2. Rotor Hub 3. Machine Frame 4. Gearbox 5. PM Generator 6. Conical Steel Tower 7. Power Converter 8. Controller 9. Yaw Drive 10. Pitch Drive 11. Pitch Control Box 12. Cooler 13. Wind Sensor 14. Hydraulic Unit 15. Coupling 16. Service Crane 17. Auto Lubrication system 18. Lightning system

2.3MW		U113
Type		Horizontal axis, Upwind, Variable speed
Rated power		2,300kW
Rotor diameter		112.8m
Hub height		80m, 100m, Tubular steel tower/ 140m, Hybrid tower
Power regulation		Pitch control
Rotational speed		6~15.4rpm
Cut-in / Cut-out wind speed		3m/s / 20m/s
Rated wind speed		10.5m/s
Extreme wind speed(V_e50)		59.5m/s
Design type class		IEC S(7.5m/s(avg.), TI:17%)
Design life time		20years
Temperature range		Operation: -10 ℃ to 40℃, Standstill: -20℃ to 50℃
Drive train	Main bearing	Single double-row tapered roller bearing
	Gearbox	Two planetary stages and one helical stage, Ratio 1 : 86
	Generator	Radial flux with permanent magnet, Synchronous
Power converter		Full capacity AC / DC / AC Grid connection, IGBT Type
Brake systems		Aerodynamic brake with pitch battery back up, mechanical rotor brake
Control system		PLC with embedded software based on RTOS(real time operating system)
Pitch system		Independent blade pitch via electric motor drive
Yaw system		Active yaw control

Power curve