



# U136 - 4.2MW

The new onshore benchmark

# A Quantum Leap U4 -The new onshore Platform

A brand-new 4MW+ onshore wind turbine platform developed from scratch, UNISON's U4 platform is a work of art tailored towards the rapidly changing renewable energy market of the future.

Innovative solutions combined with proven, reliable technology in the 4MW class is a game-changer in the onshore wind energy business. Ensuring maximum return on investment, the U4 platform with its ingeniously modularized Nacelle can be transported and installed with existing equipment serving 2MW class turbines. The first of a series of onshore 4MW turbines will be the U136-4.2MW with a class leading rotor swept area of 14,470m<sup>2</sup> for high wind. The U4 Platform will be supplemented in the near future with models optimized for medium and low wind sites.

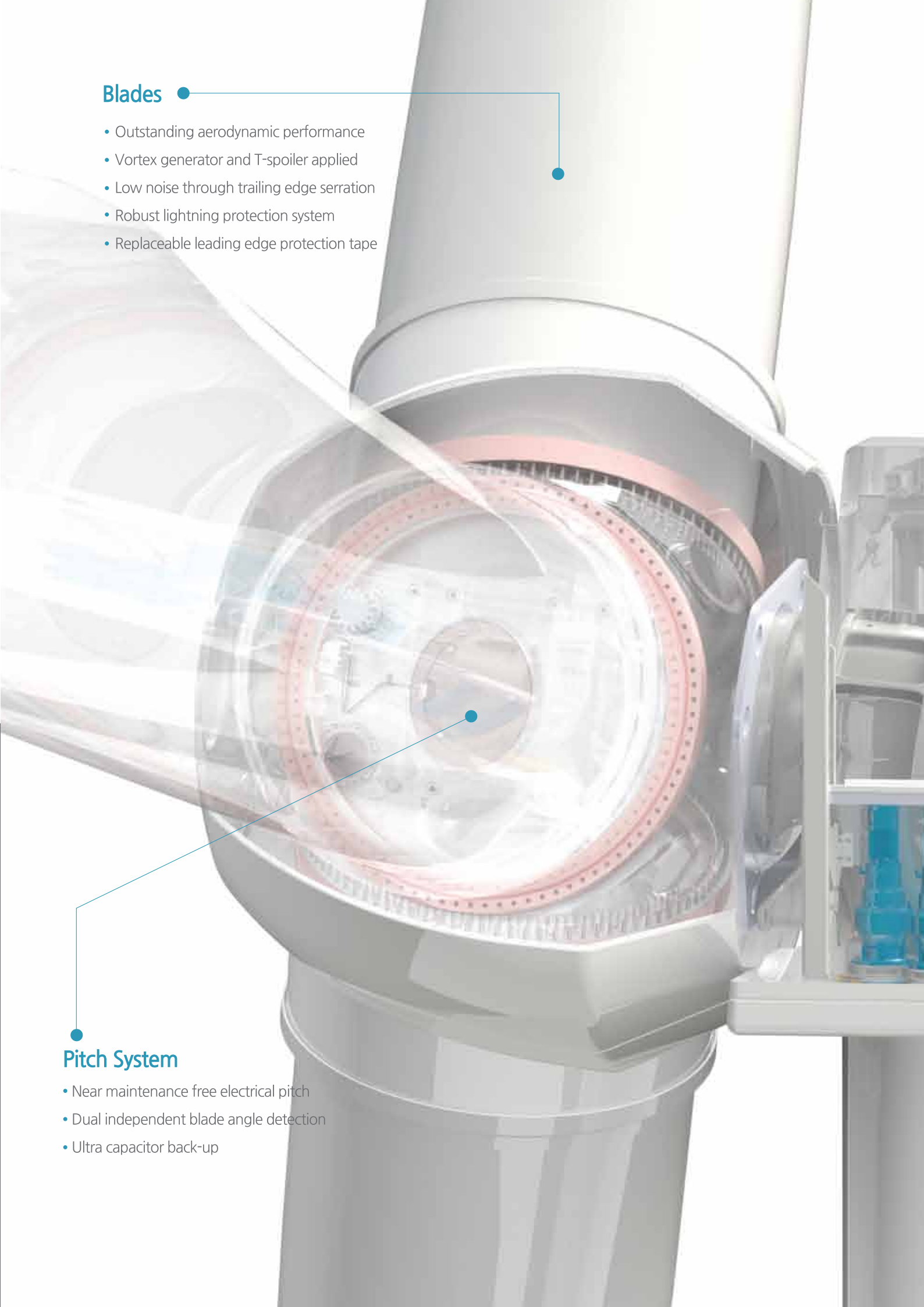


## Blades

- Outstanding aerodynamic performance
- Vortex generator and T-spoiler applied
- Low noise through trailing edge serration
- Robust lightning protection system
- Replaceable leading edge protection tape

## Pitch System

- Near maintenance free electrical pitch
- Dual independent blade angle detection
- Ultra capacitor back-up



## ● Dual Main Bearing System

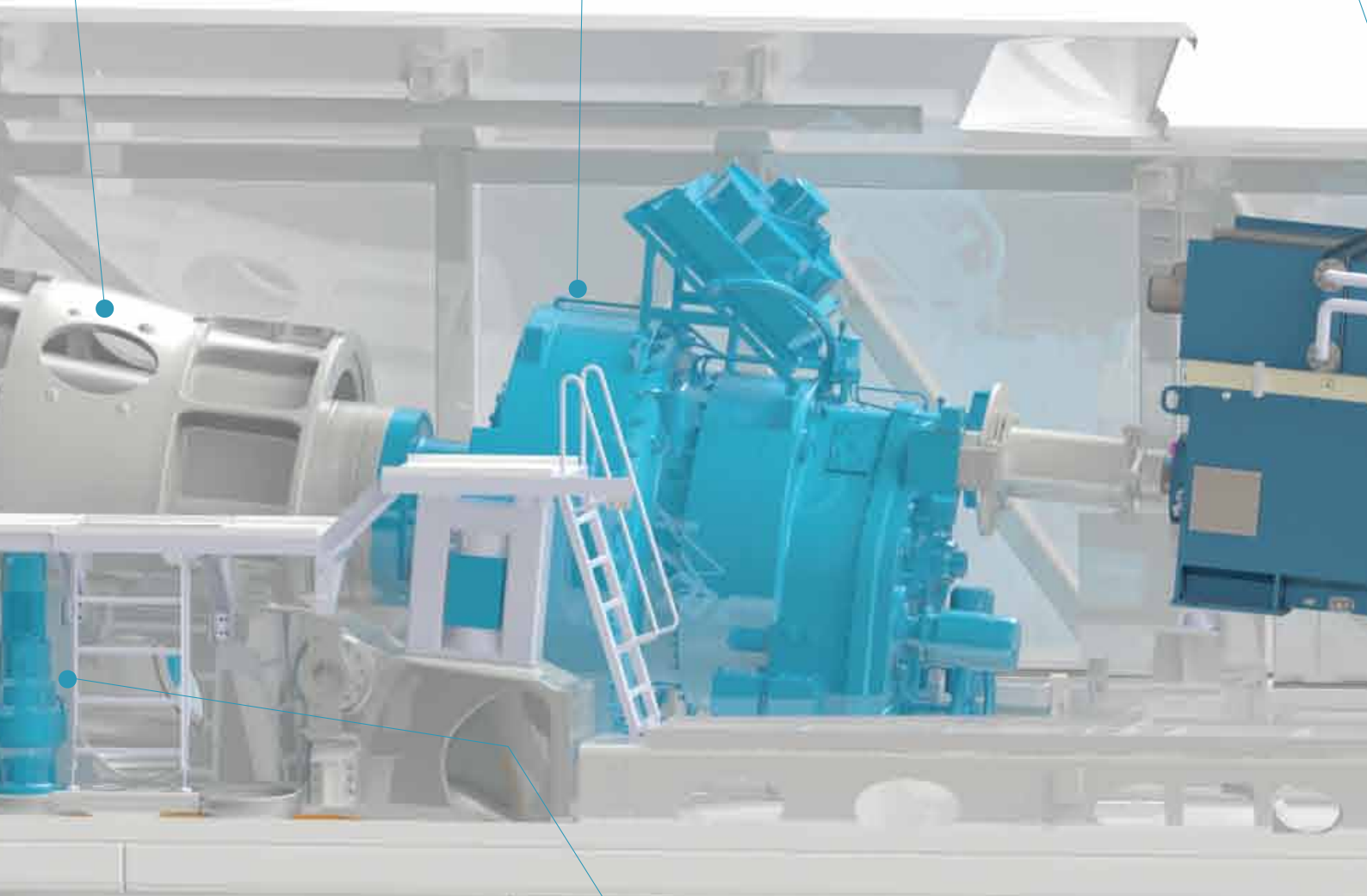
- Zero-play rigid structure
- 4 point drivetrain support
- Minimal non-torque bending moment
- transfer to GB

## ● Gearbox

- Wet-sump lubrication
- Active oil cooler
- Hydraulic damper support minimizes bending forces
- Electric inching drive for rotor maintenance

## ● Permanent Magnet Generator

- Compact & Lightweight
- Highly efficient at all load regimes
- Fully encapsulated in bondal steel for minimum noise
- Air to Water cooling system

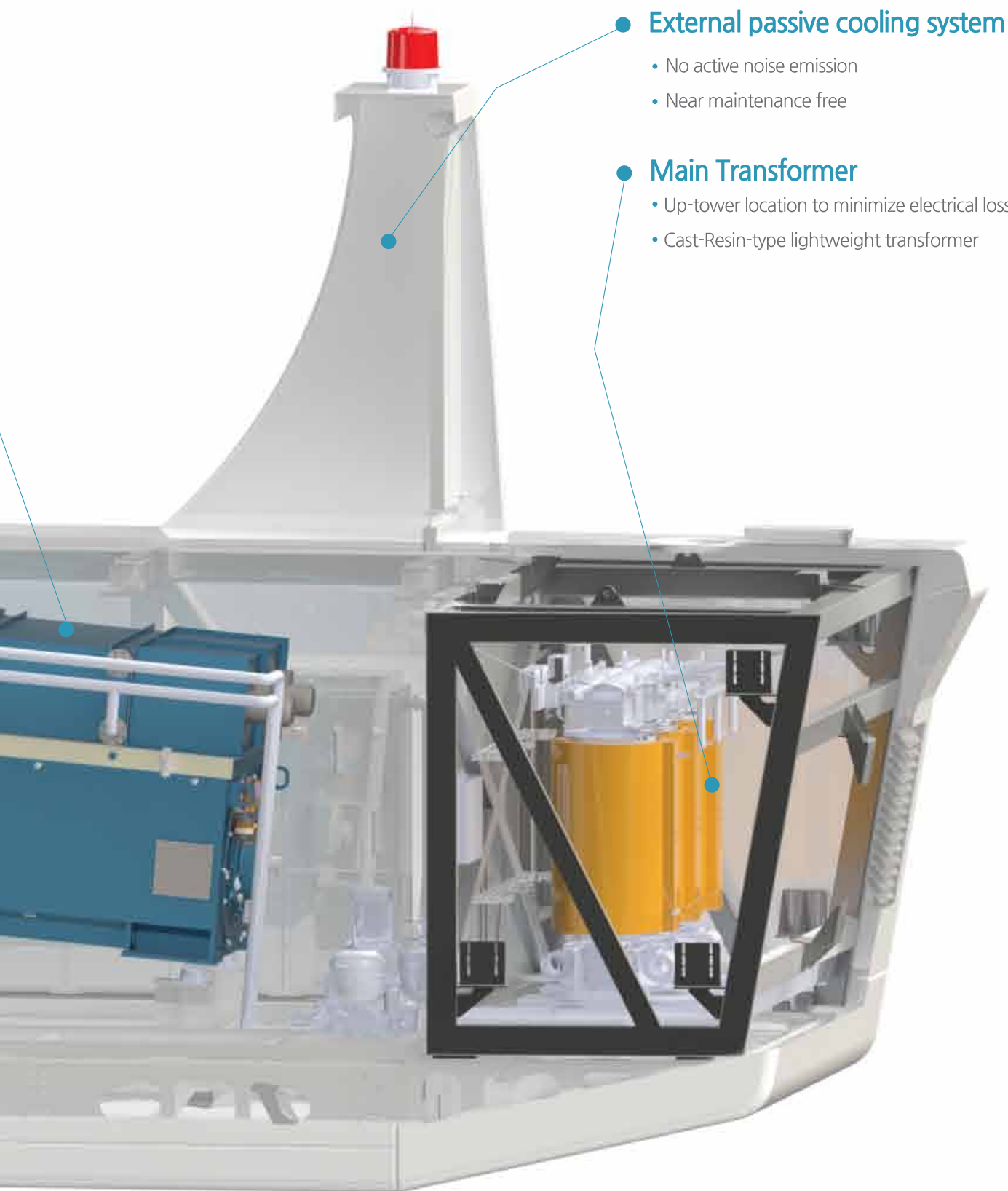


## ● Yaw System

- Pressure accumulator for fail safe function
- Lubricant leakage protection

## ● Tower

- Tubular Steel construction
- Corrosion protection



### ● External passive cooling system

- No active noise emission
- Near maintenance free

### ● Main Transformer

- Up-tower location to minimize electrical losses
- Cast-Resin-type lightweight transformer

## Electrical System

- Full AC/DC/AC conversion decoupled from grid
- Compliant to various international grid code requirements
- Optimal grid integration through support features
- Low voltage ride through and Droop control available

## Auto lubrication system

- Proven & Maintenance friendly pitch, yaw and generator
- bearing lubrication

# The Modular Approach

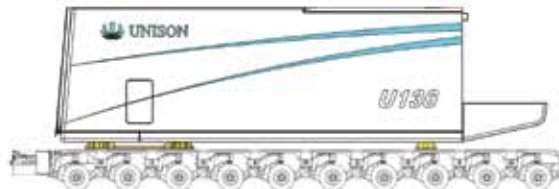
The innovative modular platform enables easy transport and installation without costly special equipment. Each module is transported separately with its transport-ready weight and dimensions designed not to exceed 80 tons in weight, 4.5m in width and 4m in height. Upon arrival on site, standard cranes used for 2MW-class turbine installation can handle the lifting and up-tower final assembly of the modules, where bolt connections make the assembly a matter of plug-and-play. A hydraulic inching device is temporarily attached to the gearbox which enables high torque inching of the hub for single blade installation. All in all, UNISON's 4.2MW U4 platform offers a solution where transport and installation is straightforward even in space restricted adverse site conditions.

## Drivetrain Module



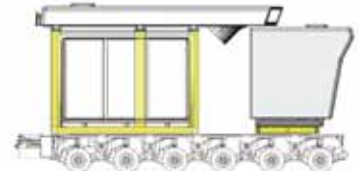
Weight : 78 ton  
Dimension : 7.2m x 3.5m x 3.8m

## Nacelle Module



Weight: 73 ton  
Dimension: 14.7m x 4.5m x 4.2m

## Transformer Module



Weight : 16.5 ton  
Dimension : 10.0m x 4.5m x 4.0

# Maximizing value for the customer

## Serviceability

was a prime criteria in determining the Nacelle layout. Sufficient workspace for service personnel to execute up-tower repair and maintenance has been designed into the Nacelle structure. An internal single-girder overhead crane enables the replacement of yaw and pitch drives and other components, while the generator can be replaced through a bottom opening without external crane usage.

## Controller

software has been upgraded to reflect the latest technology with regards to load & power optimization. Safety related algorithms are enhanced and supplemented with proven top notch hardware.

## SCADA

Web-based, all information is on-line accessible, while real time data analysis, production review, event views, alerts, alarms and more is incorporated into UNISON's SCADA system. User friendliness and flexibility to meet customer demand adds further value.

# Technical Specifications<sup>1</sup>

## Operational Data

	U136	U146 <sup>2</sup>
Rated power	4,200kW	4,200kW
Rotational speed	6.3~12.2rpm	TBD
Cut-in wind speed	3m/s	3m/s
Cut-out wind speed	22m/s	22m/s
Temperature range	Operational : -15℃ ~ 40℃ Survival : -20℃ ~ 50℃	Operational : -15℃ ~ 40℃ Survival : -20℃ ~ 50℃
Sound Power	105 dB(A)	TBD
Design Life	20 years	20 years
Wind Class	IA	IIB+

## Dimensions

Rotor Diameter	135.7m	146.3m
Swept Area	14,470m <sup>2</sup>	16,812m <sup>2</sup>
Nacelle	4m × 4.5m × 14m	4m × 4.5m × 14m
Hub	4m × 4m	4m × 4m
Blade	66.5m Max. Chord 4.5m	71.8m Max. Chord 4.5m
Hub Height	95m(Site Specific)	95m(Site Specific)

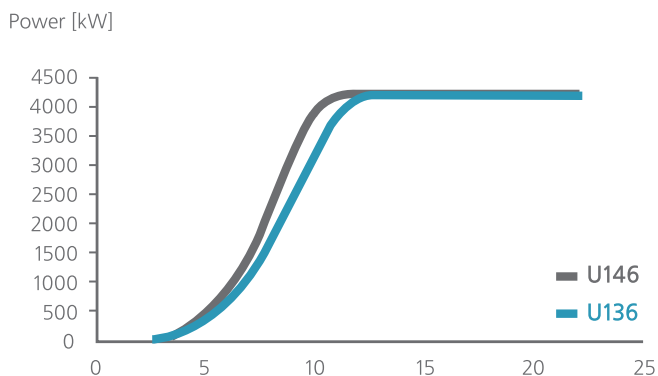
## Electrical

Generator type	Permanent Magnet, Synchronous	Permanent Magnet, Synchronous
Converter	Full Capacity AC/DC/AC, IGBT	Full Capacity AC/DC/AC, IGBT
Frequency	50 Hz/ 60 Hz	50 Hz/ 60 Hz
Pitch System	Independent/Electric Motor Drive	Independent/Electric Motor Drive
Pitch Back-up	Ultra - Capacitor	Ultra - Capacitor

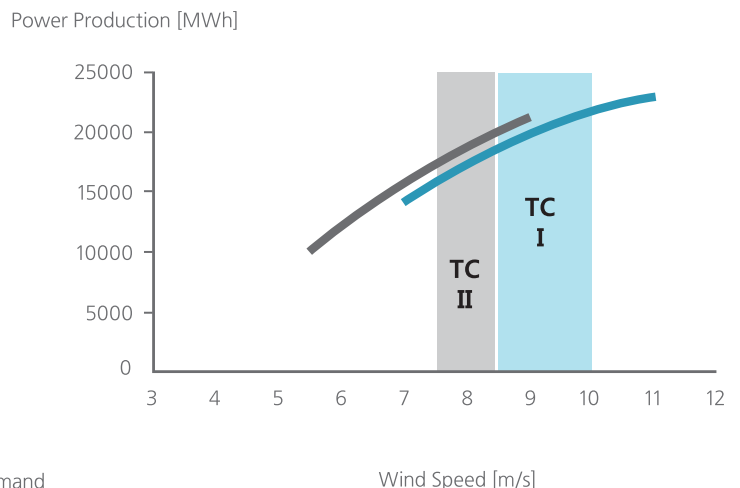
## Drivetrain

Gearbox	Two Planetary and One Helical Stage	Two Planetary and One Helical Stage
Main Bearing	Dual, Cylindrical and Tapered Roller	Dual, Cylindrical and Tapered Roller

### Power curve



### AEP



<sup>1</sup> Specifications can change without prior notice

<sup>2</sup> Final Development & Type certificate planned upon customer demand

Wind Speed [m/s]

# Affordable Wind Power. Striving for a Cleaner Future.

Making wind power affordable - this is our ultimate goal.

Global climate change can only be effectively counteracted through clean and affordable renewable energy. Pioneering wind energy development in KOREA, UNISON's wind park development was seminal in spreading awareness of wind energy in KOREA.

Through the development of 7 wind turbines across 2 platforms of 750kW and 2MW +, type certified by internationally accredited institutions, UNISON has an accumulative market share of 48% of the Korean market.

- **750kW** U50(IA), U54(IIA), U57(IIIA)
- **2MW** U88(IA,IIA), U93(IIIA)
- **2.3MW** U113(S)



\* Disclaimer: The contents of this Brochure is for information only and can change without prior notice

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