BLADE MAJOR CORRECTIVES SERVICES

Blade Major Correctives Services

The current situation in which larger blades experience **higher structural loads and stresses during operation** has led to increased wear and tear, not only on the blades themselves, but also on the interfaces and connections to the hub; on top of this, some quality problems are being detected on the blades after they have been assembled and the turbines are on a production stage, leading to big losses.

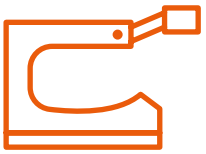
Once a quality problem is detected and before a big issue is experienced, maintaining the structural integrity of blades and other components becomes crucial **to ensure their safety and longevity** and therefore, it is necessary to take quick action, have the right piece of equipment and count on a very experienced team in order to proceed and repair the blade roots effectively on-site.

For all these reasons, two well known companies in the industry, **Kimua** and **Air Ron**, have combined their extensive experience to offer **a comprehensive range of on-site services** that address the most pressing issues affecting wind turbine blades.

By leveraging Kimua's expertise in handling equipment and Air Ron's specialization in large blade repairs, this collaboration brings together cutting-edge technology and know-how to deliver faster, safer, and more **effective solutions** for wind turbine maintenance.

BLADE FLANGE-FACING

ROTOR LOCKING SYSTEM



BLADE CLAMP

BLADE BEARING EXCHANGE

BLADE FLANGE-FACING SERVICES

This solution is designed for when the **blades need to be removed temporarily**, allowing it to perform operations *in situ* on the geometry of their flanges.

The flange-facing process is simple and effective, the solution comes with its own verification templates and a facing auto-adjustment system included.

Likewise, this tool is considered to be not only a tool for **performing corrective actions** on the blades' flanges, but also a tool for **preventing** in advance that blade and other components get damaged when a misalignment and poor contact between hub and blade flanges is experienced.

When to use it	Additional features +
When the blades' flanges are wrongly manufactured and it can affect the bolted joint integrity	Customizable to any blade diameter needed
When a readjustment of the blade geometry is needed	Easy to handle in remote areas, only a forklift is needed
When the blade root shows signs of chipping	Easy to assemble and use
Planitude assessment with laser	Conveniently transported and stored inside a commercial 8 feet container

ROTOR LOCKING

This **rotor locking system** is designed to secure the wind turbine blades in a fixed position, preventing it from rotating, providing control of the turbine during certain operational situations and ensuring they can be performed safely, especially when maintenance personnel need to work on the turbine or perform repairs upwind.

BLADE BEARING EXCHANGE SERVICES

Performing a blade bearing exchange on a wind turbine involves multiple steps and strict adherence to safety protocols. Due to the complexity of the process, **Kimua Air** provides the specialized expertise and equipment needed to complete the task efficiently.

Our technicians are fully certified and highly experienced, enabling them to do the replacement quickly, reducing the turbine's downtime.

Aditional features +
Powered by two motors
Exchangeable main frames according to the turbine model
The design is customized so it can be used on several gear models
Convenient packaging for transport and handling
The whole set is prepared to be lifted up to the nacelle´s space restrictions (600 mm x 1,30 0mm)

BLADE EXCHANGE SERVICES

Kimua's **blade clamp** is a scalable unit designed to allow blade dismantling and re-installation when maintenance or repair works on a wind turbine are needed. This solution holds the blades in place to ensure the safety of maintenance personnel who may be working on or near the wind turbines.

This solution is also designed to fit securely around the blade's geometry; once the clamp is in place, it tightly holds the blade in a fixed position, preventing it from rotating or responding to wind conditions.

When using Kimua's blade clamp, the whole operation is performed without causing any damage or permanent mark on the blades' surface.

Advantages of this solution	Additional features +
It allows using only one crane for disassembling and assembling back the blade.	Self-powered
Operations are made easier & faster, allowing cost optimization	Stored in a commercial 40 feet container
Avoids exposure of the personnel to operations hazards, like blade root choking	Custom & exchangeable blade cradles
Overall safer working conditions	Multipurpose: it can be used for assembling and disassembling different blade models

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