correa

WIND POWER SECTOR

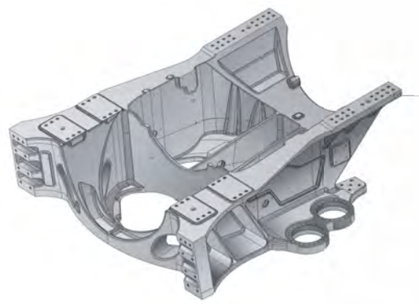
correa SOLUTIONS

WARRANTY 5 YEARS

EN

WIND POWER SECTOR

HUB

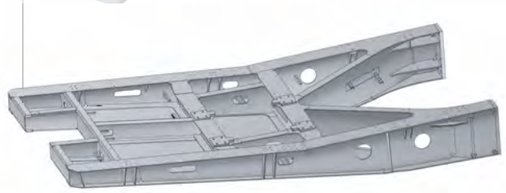


MAIN FRAME

GEARBOX

The drawing below represents a section of a typical Wind Power Generator. The parts indicated in the drawing are those in which Nicolás Correa has developed specific solutions. Nicolás Correa is always looking for the optimum solution in these applications (productivity vs investment cost). We have installed 30 large milling machines in the last 15 years covering these applications, making Nicolás Correa, one of the most reliable suppliers on this sector.

GENERATOR FRAME



HUB

MATERIAL

Grey Cast Iron. Soft material, easy to be machined. The stiffness of the part itself permits the use of high power values while roughing.

SET-UPS & FIXTURE

2 Set-ups normally. Mechanical fixture. The weight of the part (10-40 Tm) helps for part clamping.

MACHINING OPERATIONS

Face milling Boring Drilling Tapping

TOLERANCES & CRITICAL OPERATIONS

Hub usually does not require tight tolerances. However, it is a large component so machine geometry has to be properly adjusted in all its volume.

CRITICAL DETAILS

Difficult accessibility to machine some areas which are located in complex angular positions.

In some Hubs, back boring operations are needed.

HUB

correa RECOMMENDED SOLUTION

OPTION 1

MAGNA + OAD

Right angle head attached to **OAD**

Rotary table with lineal movement W

OPTION 2

MAGNA + OAD + FCT

Right angle head attached to **OAD**

Rotary table with lineal movement W

Angular mechanical fixture

OPTION 3

MAGNA + OAD + FCT

Right angle head attached to **OAD**

Rotary table with lineal movement W and tilting axis

OPTION 4

AXIA + OAD

Right angle head attached to **OAD**

Rotary table with lineal movement W

OPTION 5

AXIA + OAD + FCT

Right angle head attached to **OAD**

Rotary table with lineal movement W

Angular mechanical fixture

OPTION 6

AXIA + OAD + FCT

Right angle head attached to **OAD**

Rotary table with lineal movement W and tilting axis

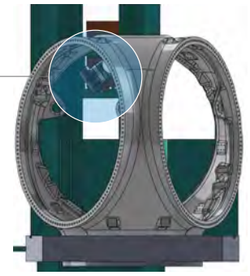
	OPTION 1 & 4	OPTION 2 & 5	OPTION 3 & 6
Productivity	Medium	High	High
Automation	High	Medium	High
Cost	Low	Medium	High
Flexibility	Medium	Medium	High

OAD

Robustness and flexibility 52 kW – 1350 Nm, rotation every 0,02° in both bodies. (243 million of positions)

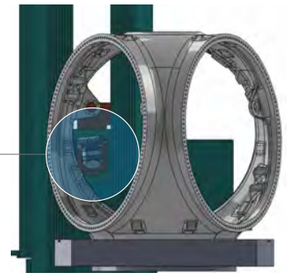
VIEW FROM FRONT

C1 = 99.60°
C2 = 140.98°



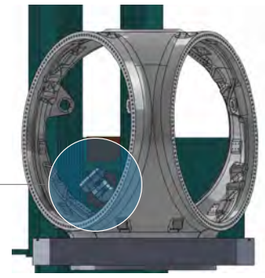
VIEW FROM FRONT

C1 = 164.18°
C2 = 85°



VIEW FROM FRONT

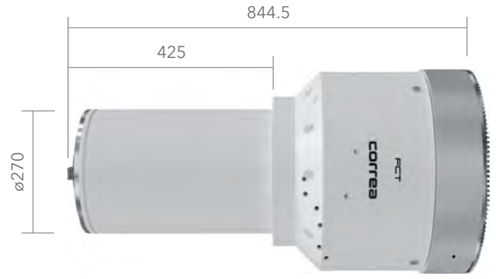
C1 = 137.72°
C2 = 139°



correa patented system permits the **OAD** to rotate every 0,02° using fixed hirth couplings. So all the positions can be reached keeping a high level of productivity in facing, drilling and tapping operations. Our **OAD** head permits **correa** offering solution 1-4, a really simple and cost effective solution.

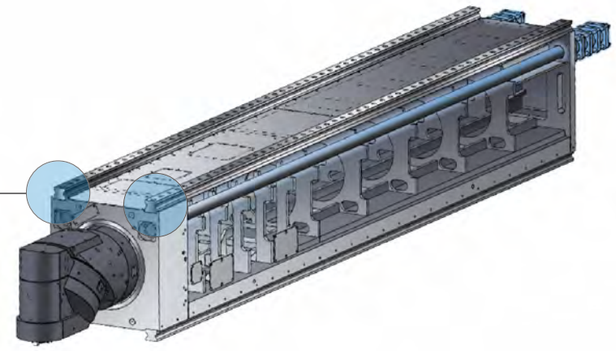
FCT

Front spindle high torque. 52 kW and 2005 Nm in S1 with ISO-50 or BT-50 Big Plus taper



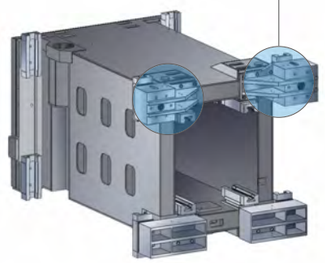
correa FCT head permits to maintain the highest levels of productivity avoiding the use of a boring quill. We can produce between 2600–3000 cm^3/min of chips cutting Cast Iron GG25 or similar. **correa** keeps all mechanical systems in every head so the system is much more reliable. In case one head is broken, machine can take another head and keep working properly. Moreover, all heads use same taper so customer can utilize same cutting tools and holders in all heads.

The **MAGNA** represents the pure box-in-box concept, also incorporating two mechanical systems dynamically compensating for both ram droop and frame tipping. The result: tremendous chip removal capacity, maintaining very high levels of precision throughout the machine's volume.

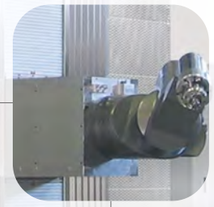


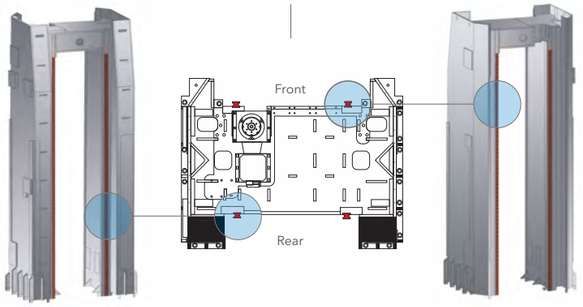
DYNAMIC COMPENSATION SYSTEM

- Dynamic ram droop correction system
- Dynamic frame tipping compensation system



MORE ABOUT THE **MAGNA**





BOX IN **BOX**

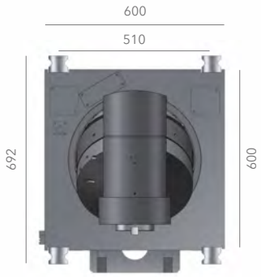
Rear part of the column

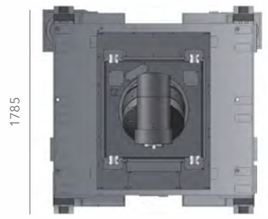
Front part of the column

Great cross sections •
Great roughing capacity •
Geometric stability in time •

OVERSIZED STRUCTURAL ELEMENTS

HIGH GEOMETRICAL PRECISION





Dynamic performance parametrizable in accordance with:

- ROUGHING OPERATION
- FINISHING OPERATION

MACHINE DYNAMIC ADJUSTMENT

MACHINING SETTINGS

ROUGHING

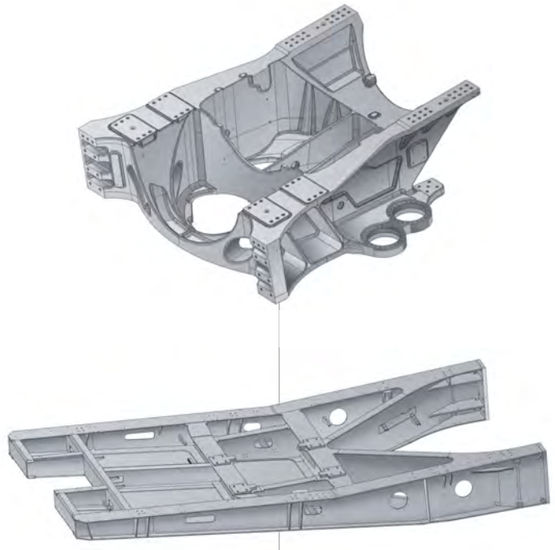
FINISHING

30 m/min in X, Y and Z axes, thanks to its V-Shaped linear guide-ways in all axes

HIGH FEED RATES

ECO DESIGN

Stand-by function and Auto Switch off function, saving 20% of the total energy machine consumption



MATERIAL

Low alloy fabricated steel and Grey Cast Iron. Soft material, easy to be machined. The stiffness of the part itself permits the use of medium-high power values while roughing. In generator frame we need to be more careful when doing heavy cutting. Main frame is similar to the Hub.

MACHINING OPERATIONS

Face milling & pocketing

Boring

Drilling

Tapping

TOLERANCES & CRITICAL OPERATIONS

Both frames usually do not require tight tolerances. However, those are large components so machine geometry has to be properly adjusted in all its volume.

SET-UPS & FIXTURE

2 Set-ups normally. Mechanical fixture. The weight of the part (5-40 Tm) helps for part clamping.

CRITICAL DETAILS

Difficult accessibility to machine some areas which are located in angular positions.

Vibrations may appear when clamping those parts in angle plates if the fixture and the angle plate is not rigid enough.

GENERATOR & MAIN FRAME

correa RECOMMENDED SOLUTION

OPTION 1

MAGNA / AXIA

OAD + FC

Right angle head attached to **OAD**

Angle plates

OPTION 2

FOX M / VERXA

OAD + FC

Right angle head attached to **OAD**

OPTION 3

VERXA MW

OAD + FC

Right angle head attached to **OAD**

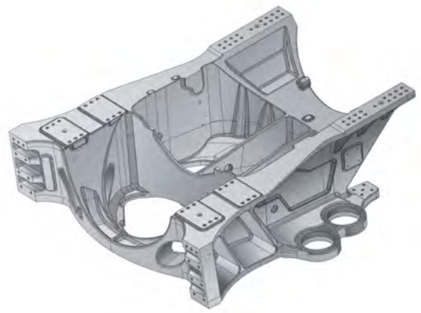
	OPTION 1	OPTION 2	OPTION 3
Productivity	High	High	High
Automation	Medium	High	High
Cost	Medium	Medium	High
Flexibility	High	Medium	Medium / High

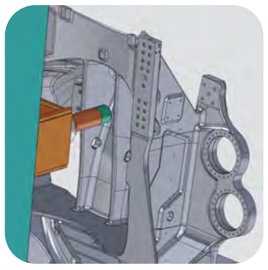
MAIN FRAME

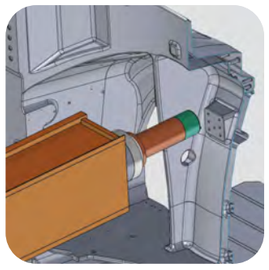
correa TECHNOLOGICAL ADVANTAGES

FC

Accessibility and reliability







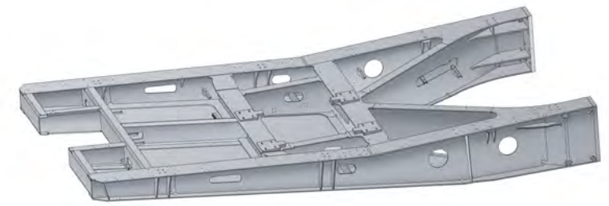
correa FC head permits to reach all areas in the main frame using short cutting tools and avoiding the use of a boring quill. **correa** keeps all mechanical systems in every head so this system is much more reliable. In case one head is broken, machine can take another head and keep working properly.

GENERATOR FRAME

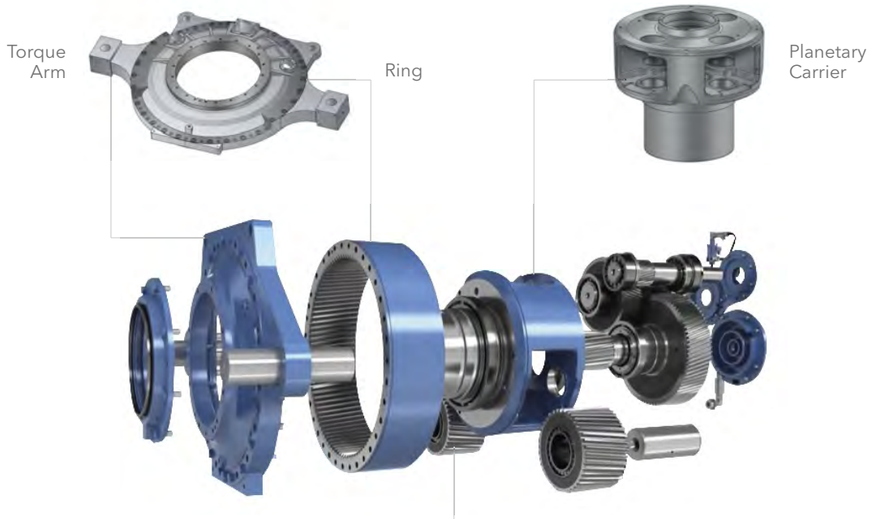
correa TECHNOLOGICAL ADVANTAGES

OAD

Robustness and flexibility 52 kW – 1350 Nm, rotation every 0,02° in both bodies. (243 million of positions)



correa OAD head permits to access to all angular pads easily. See example above, all drills located in an angle of 172,50° can be reached perfectly with **OAD** head (0,02° rotation in both bodies).



MATERIAL

Grey Cast Iron. Soft material, easy to be machined. Roughing is not critical in these parts.

SET-UPS & FIXTURE

2 Set-ups normally. Mechanical fixture. Normally the part has to be elevated when using vertical ram machines.

MACHINING OPERATIONS

Face milling

Boring / Reaming

Drilling

Tapping

TOLERANCES & CRITICAL OPERATIONS

Torque Arm and Ring have some critical tolerances in the pins positioning all around the diameter. There are, basically, two critical tolerances:

Positioning tolerance of each pin respect the centre hole.

Tolerance of the diameter generated by a circle passing through all pin centres.

In order to achieve those tolerances in a continuous and sustainable way, we need to take into consideration 3 factors:

Machine selection: Machine must guarantee a perfect positioning and repeatability in its 3 axes; X-Y-Z. Machine geometry must be set perfectly, always using mechanical systems in order to keep this geometry in the long term.

Environmental conditions: The temperature in the shop around the machine as well as the heat generated by the machine must be under control. Small variations in the temperature of the shop may affect machine repeatability.

Measurement method: Suitable CMM has to be used as well as a proper measurement process and method have to be applied.

GEARBOX

correa RECOMMENDED SOLUTION

Planetary Carrier

OPTION 1

ORIX

UAD + FC

Torque Arm

OPTION 2

FOX / VERXA

UAD + FC

OPTION 3

VERXA W

UAD + FC

Necessary for large planet carrier due to the vertical capacity requirement

** Facing Head D´Andrea may be considered for planet carrier.*

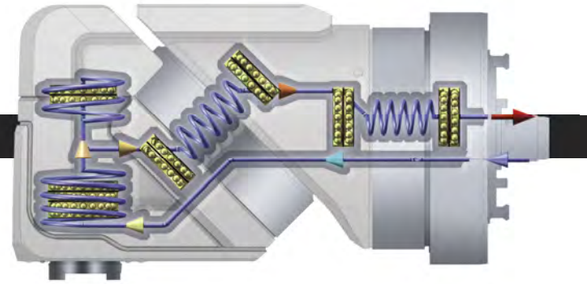
	OPTION 1	OPTION 2	OPTION 3
Productivity	High	High	High
Accuracy	Super High	High	High
Cost	High	Medium	High
Work in pendular	Yes	No	No
X-Y working capacity	High	Medium	Medium / High
Z working capacity	Medium	Medium	High

correa TECHNOLOGICAL ADVANTAGES

HIGH GEOMETRICAL ACCURACIES

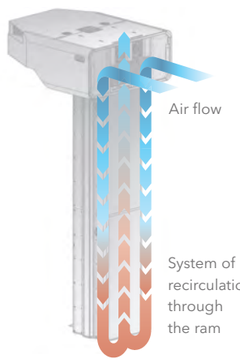
In all families
VERXA, FOX,
ORIX and
XPIDER

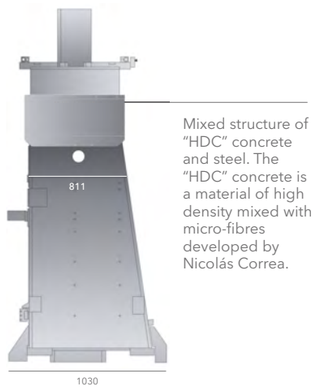
- Steel torsion bars in the crossbeam.
- Minimising the deformation due to crossbeam flexion and torsion.
- Enhancing the geometry of the machine.
- Increasing the roughing capacity.



100% ROBUST

100% RELIABLE





Mixed structure of "HDC" concrete and steel. The "HDC" concrete is a material of high density mixed with micro-fibres developed by Nicolás Correa.

correa machines always use mechanical systems to adjust machine geometry. In this way we can guarantee high level of precision in the long term. Moreover all mechanical milling heads are fully cooled with water controlling inaccuracies due to spindle rotation.

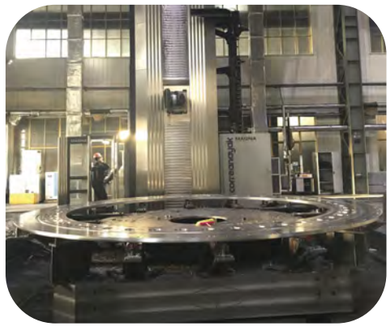
CUSTOMER REFERENCE LIST

We have 30 large milling machines producing these parts, installed in the last 15 years

Customer Name	correa Machines	Country	Machine Type	Logotype
CIMTAS CELIK, A.S.	1	TURKEY	MAGNA	cimtas
NGC GEARS	5	CHINA	ORIX	NGC
SCHÜTZ GMBH	2	GERMANY	FOX	SCHÜTZ
JIANGYIN WILSON MACHINERY CO., LTD.	6	CHINA	AXIA FOX VERSA M VERSA MW	HEX
KIRLOSKAR EBARA PUMPS LTD.	1	INDIA	VERXA W	Enriching Lives
WILSON MACHINERY (TAIXING) CO. LTD.	6	CHINA	AXIA MAGNA	HEX
MECANIZADOS TAR, S.L.	2	SPAIN	AXIA	mekatar
NINGBO RIXING FOUNDRY CO., LTD.	2	CHINA	MAGNA	RIYUE
GUANGDONG JINZHILI TECHNOLOGY CO.,LTD.	5	CHINA	AXIA MAGNA	

Hub

Brake



Main Shaft

Main Axis

Main Frame

Stator Portion

correa

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