



FR | FXR | FXX

Heavy-Duty Line

Powerful. Precise.

 **SORALUCE**

As part of our premium solutions, the **Heavy-Duty Line** floor type milling machines of Soraluze provides high versatility and productivity for large component machining. Its rigid stable design ensures the highest **precision** and **reliability** for heavy duty components and extremely complex machining operations.



Heavy-duty Precise Flexible

TOP BENEFITS	PRODUCTIVITY	PRECISION	RELIABILITY	FLEXIBILITY
Design	■	■	■	■
Full cast iron structure	■	■	■	
Multiple configurations	■			■
Linear guiding & Damping Pads	■	■	■	
DAS+	■	■	■	
Driving system	■	■	■	

FR | FXR | FXX: Floor type milling boring machines

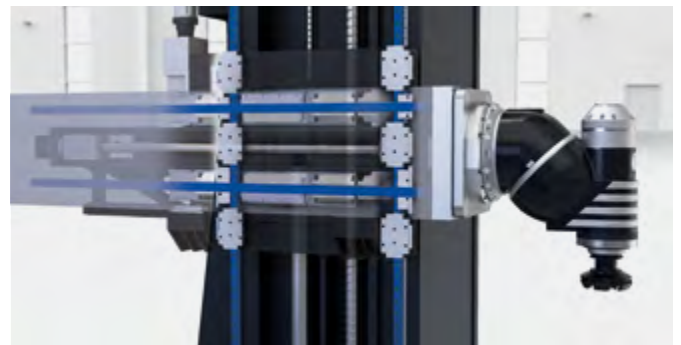


Nine reasons to choose Heavy-Duty Line

01.

A winning combination

The most rigid and dynamic solution on the market



Full cast iron

Long term stability.

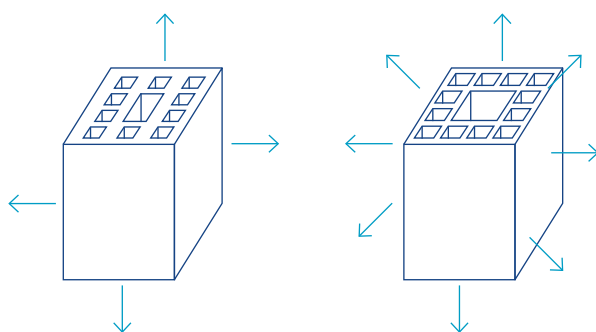
Thermostability

- Expansion under control: quantity, speed, direction.
- Vibrations absorption, damping capacity.
- No need of electronic compensations.
- Best performance against temperature variations.
- Main structure: column, saddle, ram.

Linear guiding

Lifelong durability.

- Soraluce is a pioneer in the use of linear guiding systems in large machines and heavyduty applications.
- Design proven since 1991.
- Lifelong durability > 10 years maintenance free at maximum performance.



Cast iron

Fabricated steel

TOP BENEFITS	Linear guiding	Prismatic guiding	Hydrostatic guiding
Precision	↑↑↑	→	↑↑
Dynamics	↑↑↑	↓	↑↑
Maintenance free	↑↑↑	↓	↓
Loading capacity	↑↑↑	↑↑	↑↑
Thermal stability	↑↑↑	→	→
Sustainability	↑↑↑	↑	↓↓↓
Foundation cost saving	↑↑↑	↑↑↑	↓↓

Full cast iron

- Accuracy
- Stiffness
- Productivity

Linear guiding

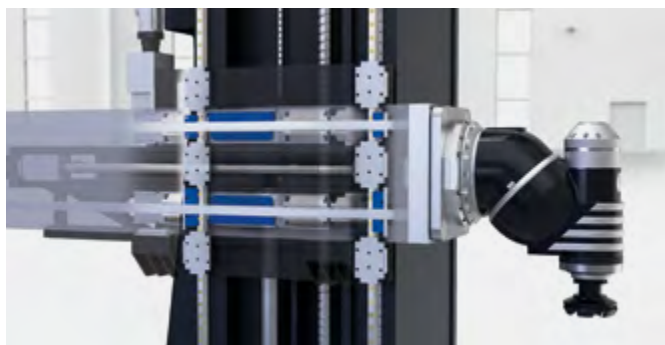
- Best precision
- High dynamics

DAS+

- No chatter, best stock removal rate
- Optimized process thanks to real time vibration surveillance

Damping pads

- Stability during machining process
- Vibration absorption



Damping pads

Great stability.

- Own development of special damping pads combined with linear guides.
- Eliminates any vibration during machining processes.

DAS+

No chatter.

Active damping system

- 100% cutting capacity through the complete workpiece volume.
- Reduced cycle time up to 45%.
- Increased productivity up to 300%.
- Improved surface quality.
- Extended tool life.
- Machine protected: long term precision as reduces machine's key components wear (ballscrew, guideway, gearbox, head), in both roughing and finishing operations.

How does DAS+ work?

DAS+ is a smart system which oversees the machining process and selects the best technological alternative to eliminate chatter:

- Active damping in the ram.
- Spindle speed tuning by automatic selection of optimum speed.
- Harmonic oscillation of spindle speed.

02.

Next level technologies

Best stock removal



- Best stock removal with extended ram.
- Great cutting capacity through the complete workpiece volume.

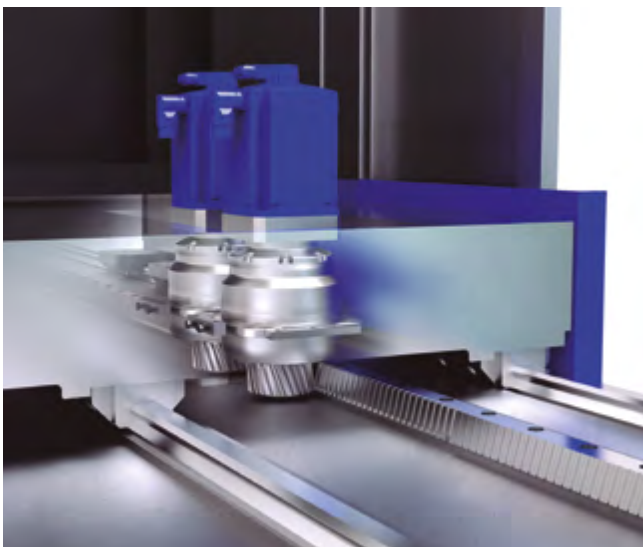
Results FR and FXR Z: 1900 mm

Stable working conditions, material DIN CK45.
DAS+ OFF.

Ø 160 mm face milling
tool

Ap= 5 mm
Ae= 120 mm
F= 2200 mm/min
Q= 1320 cm³/min
Power consumption: 100% (46 kW)

Driving system



Reliable

Double rack and pinion system in the longitudinal axis. The best existing solution for long travel axes.

Dynamic

Up to 25,000 mm/min.

Long term accuracy

- No backlash, no wear.
- Highest surface quality.

Maintenance free

Automatic lubrication of the rack and pinion system.

Main spindle transmission

Two configurations to cover all your needs.

Parallel transmission

Up to 10907 Nm torque

- High power and torque range: From 46 kW up to 101 kW (S1-100%).
- 2 or 3 speed gearboxes.
- Belt or oil lubricated gear chain based secondary transmission.
- Suitable for large size boring operations.
- Low noise.
- High reliability and long life.
- Ease of maintenance.

Inline transmission

Up to 7000 min⁻¹

High torque direct drive spindle motor inside the ram, with a built-in cooling system.

Best reliability

No belts, no reducers, neither long transmission bars.

Great precision

Best thermal stability provided by cooled inline motor.

Enhanced rigidity

Frontal assembly, all sides of the ram are solid.

Ease of maintenance

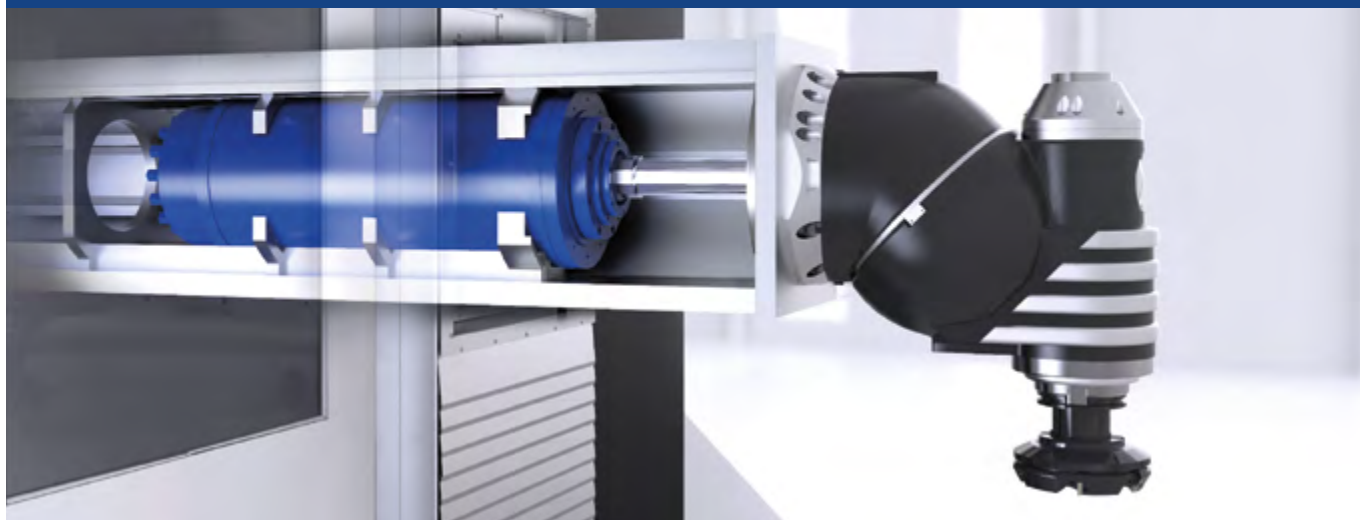
Quick exchange of the main spindle motor.

- Up to 60 kW / 2000 Nm.
- High efficiency.
- Minimum noise level.
- High performance thanks to optimized power-torque curve.
- Full power at low rpm.
- Short distance between main motor and head transmission.

Compact-design transmission shaft.

Placed at the front of the ram close to the head.

Up to
60 kW



03.

Accuracy in the DNA

Increased effective stiffness

Design is conceived to obtain the best precision and rigidity. We keep maximum quality control of manufacturing and assembly until its final verification, using Smart 3D thermal compensation of the machine.

01

Stiffness forces triangle

- Compact saddle for best rigidity.
- The cutting forces are transferred directly from the cross axis roller bearings to the column, minimizing the deformation of the saddle.
- Special Soraluce saddle design with minimum distance between the ram and the column, providing excellent stability, precision and maximum cutting capacity.
- Ram saddle fully guided.

02

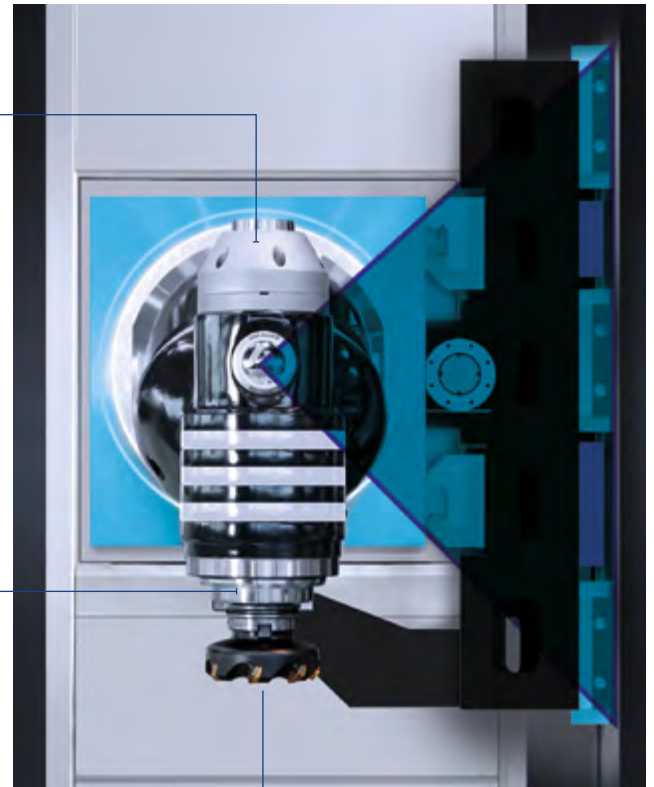
Torsion and deformation under control

- Provided by the best guiding system in the market.
- Straightness ensured through a perfect parallelism between guides supporting surfaces.
- Lateral ram torsion constrained by special ribbed design cast iron ram, all sides being solid.
- Full control over ram drop and flexion.

03

Minimum distance

- Short distance from the column to the tool, thanks to the arrangement of the ballscrew and counterweight system.
- Minimum machine overhang.



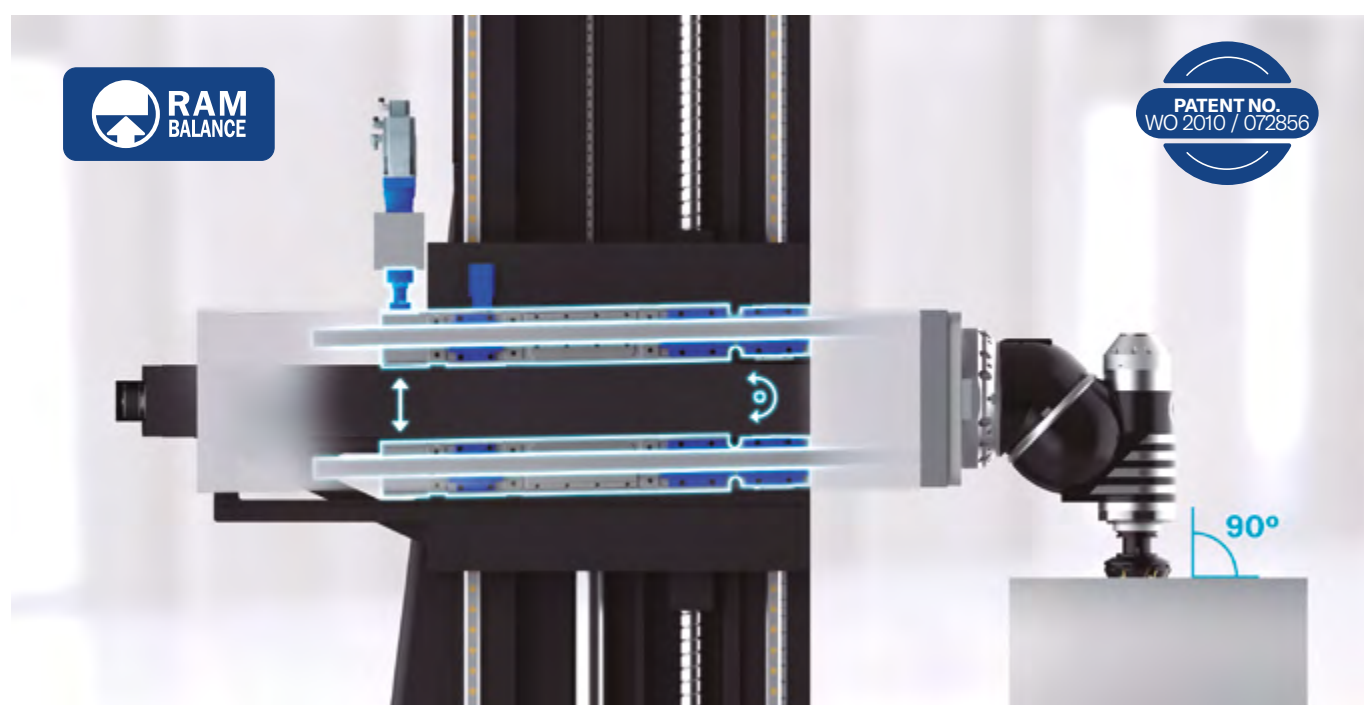
Torsion movement

04

No compensation

- Ram drop under control without electronic compensation.

Superb precision in positioning



The system compensates the angular deflection of the ram caused by the weight of the moving components when they travel along the vertical and cross axes.

Basic system set-up

- NC controlled.
- Direct measuring system.
- Up / down ram movement through electromechanical system in the saddle.

Benefits

- Improves accuracy, straightness and parallelism when vertical and cross axes are moved.
- Real time compensation for different head weights: Maximum guaranteed accuracy, straightness and parallelism for every head in the machine.

**Ram drop less than 0.03 mm
with 1900 mm extended ram**

04.

Smart Technology



Automatic re-setting of head kinematics to increase accuracy. It compensates the head articulation positioning deviation for one particular position of the head.

+ ACCURACY



Smart and automatic setting of defined cutting parameters according to actual machine power consumption.

30% time saved in roughing process!

+ PRODUCTIVITY



Eliminates any chatter that may arise during the machining process.

Machine protected: long term precision as reduces machine's key components wear.

+ PRODUCTIVITY

Patent no. EP 3017911



Eliminates chatter originated on either fixtures or workpieces.

+ PRODUCTIVITY
+ QUALITY

Patent no. EP 2517823 B1



Energy save Package

+30% save
on energy consumption

You decide how and when the different components of the machine are switched on / off!

- Spindle
- Axes
- Machine power
- Control
- Lightning
- Air supply
- Hydraulic parts
- Warm-up program
- Calendar planning



Full automatic interchangeability between quill and standard heads.

+ FLEXIBILITY

Patent no. EP 2517823 B1



NC controlled dynamic correction to improve ram geometrical accuracy, straightness and parallelism when vertical and cross axes are moved.

Ram drop less than 0.03 mm with 1900 mm extended ram

+ ACCURACY

Patent no. WO 2010 / 072856



Fast and simplified component set-up.

+ PRODUCTIVITY

Patent no. EP 2570236



Hydrostatic table balancing system to correct distribution of asymmetric loads.

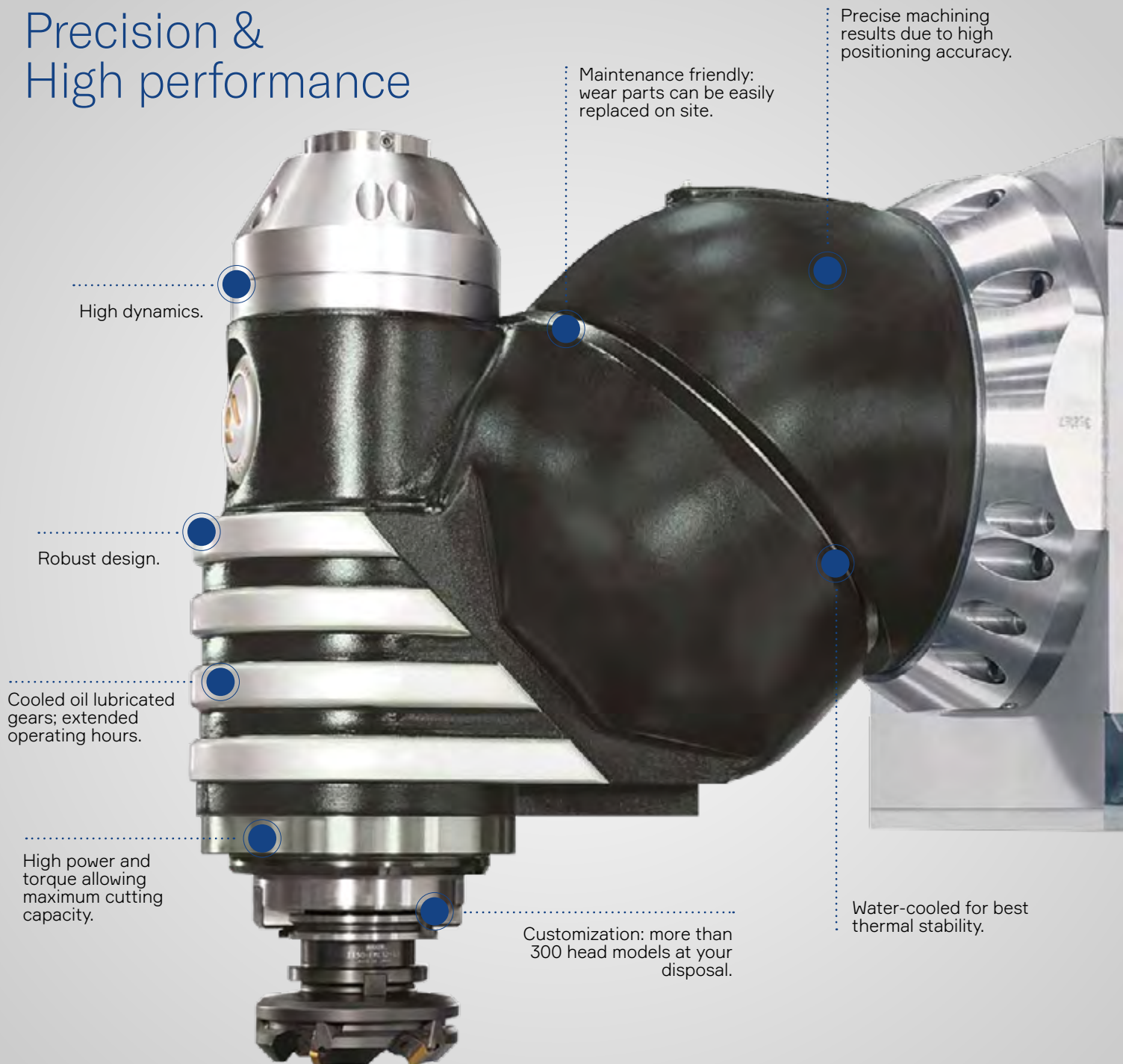
+ ACCURACY

05.

Soraluce heads

More than
300
head models

Precision & High performance



The most advanced head manufacturing center



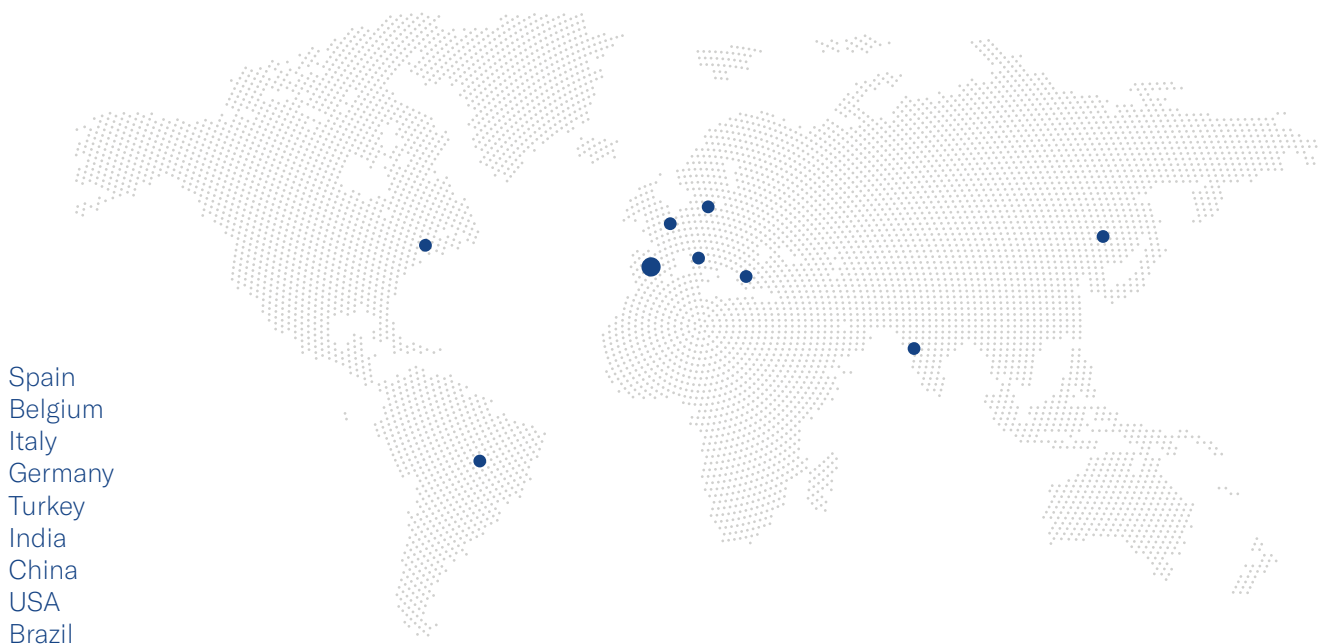
In-house made



Head service hubs

- Your trusted service partner.
- Know-how directly from the manufacturer.
- Maintenance & repair.
- Spare head service available.

150
Spare heads available





Heavy-duty heads Cooled oil lubrication

- Up to 46 / 60 kW (S1-100%).
- Robust performance.
- Highest reliability.
- Long-life design (wear-free gears and bearings).
- Maintenance free.
- Maximum thermal stability.
- Quick change of head for maintenance purposes.

Modular Quill

Compared to traditional quill solutions, the exclusive Soraluce Modular Quill spindle allows the same distance between the RAM and the spindle nose for the quill and the rest of the milling heads, making 5-sided machining possible in the same set-up. The C axis is located inside the head, so the overhang of the milling heads is reduced, increasing overall stiffness.

Best boring & milling combination:
For modular quill at 3000 min⁻¹,
universal head can go up to 4500 min⁻¹

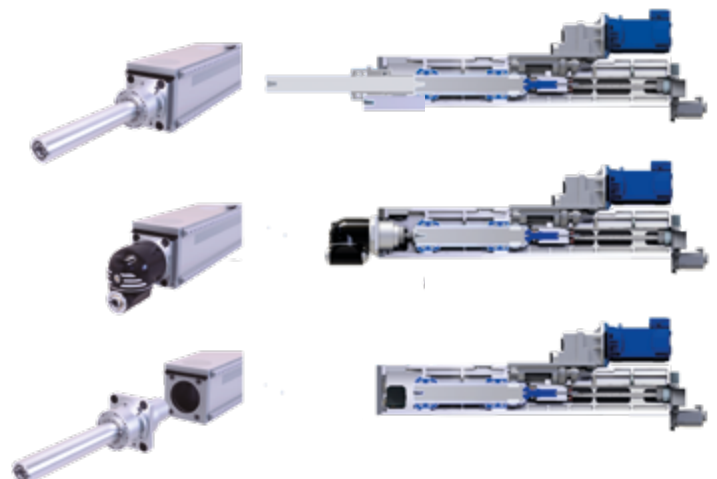


Full interchangeability

- Compact solution
- Different heads and quills in a single machine
- No machine downtime for quill repairation

Great cutting capacity

- Up to 101 kW
- Quill Ø 130 / 150 / 180 / 200 mm
- Quill traverse: 700 / 1000 / 1400 mm



Thousands of possibilities

Universal head

Up to 60 kW (S1)
 2.5° x 2.5° / 1° x 2.5° / 0.001° x 0.001°
 4000 / 6000 / 7000 min⁻¹

Orthogonal head

Up to 46 kW (S1)
 1° x 1° / 0.001° x 0.001°
 4000 / 6000 min⁻¹

5-axis continuous head

Up to 60 kW (S1)
 0.001° x 0.001°
 Up to 7000 min⁻¹ (mechanical) /
 Up to 30000 min⁻¹ (electrospindle)

Fixed Horizontal Boring Head

46 / 70 kW (S1)
 3000 / 4000 / 5000 min⁻¹

Quill

Ø 130 mm | W: 700 mm | 53 kW (S1) | 3000 min⁻¹
 Ø 150 mm | W: 1000 mm | 53-82 kW (S1) | 3000 min⁻¹
 Ø 180 mm | W: 1000 mm | 53-101 kW (S1) | 3000 min⁻¹
 Ø 200 mm | W: 1400 mm | 101 kW (S1) | 2000 min⁻¹

Head changing system

- Rapid.
- Accurate.
- Applicable to any head.
- Universal system: heads are fully standard.
- No downtimes: head's pick-up fully covered to protect inductive detectors from chips and coolant.

Fully modular system through adapter flanges.





06.

Multitasking

All in one: milling, turning, grinding and gear cutting in a single machine



- Improved machining accuracy and overall part quality.
- Significant reduction in production lead time.
- Cost benefits: fewer fixtures, tools and labor requirements.
- Single machine investment for multiple processes.
- Optimized use of floor space.
- Machining of several morphologies, sizes and complexities.
- Improved precision due to minimum workpiece set-ups.
- Fewer operators involved in the machining process.

Milling & Turning Tables

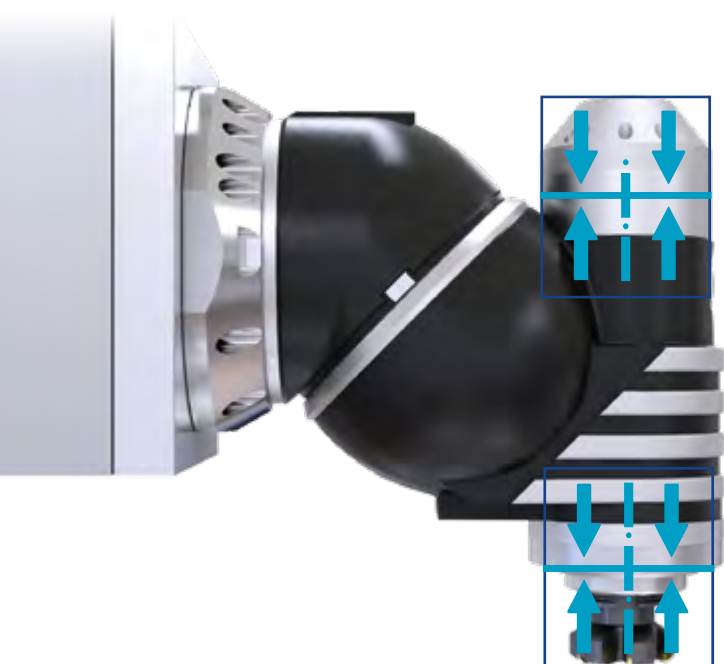
Ø 2000 ÷ 3500 mm	> Ø 3500 mm
up to 40 Tn	up to 200 Tn
up to 150 min ⁻¹	up to 60 - 100 min ⁻¹
Roller bearing	Hydrostatic bearing
Double pinion and crown system, high precision, no backlash	
	TBS available

Home Made

High Torque Multitasking Head

Head and spindle orientation at any angle.

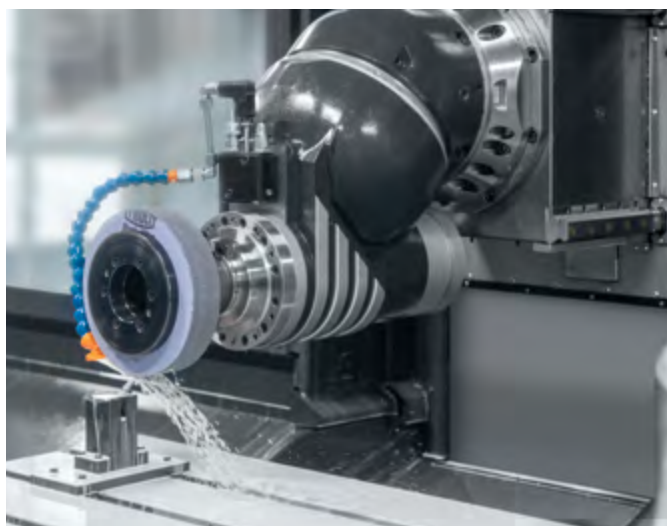
- Standard tools, no adapter needed.
- Automatic tool changing system.
- Standard range, availability of spare parts.
- Ease of use thanks to specific positioning cycle.
- Up to 60 kW
- Up to 1531 Nm
- 4000 / 5000 / 6000 / 7000 min⁻¹
- 2.5° x 2.5° / 0.001° x 0.001°



Mechanical transmission head with spindle clamping system: includes a clutch to clamp the spindle at any angle during turning operation.

The clamping system prevents bearing damage thanks to an internal retractable support ring.

Grinding capability



- Table mounted dressing unit.
- Wheel holder with integrated nozzle.
- Balancing unit.
- Full splash guarding.
- Fume extraction.
- Specific cooling system.
- Double protection for guideways and telescopics.
- Grinding cycles and functionalities by Soraluca Software Factory.

07.

Soraluce Software Factory

Smart HMI, Intelligent interface.

- Ergonomic and intuitive workspace.
- Soraluce's APPS available.
- Parallel work during NC program running.
- Minimized downtimes.
- Real time machine status.
- Energy consumption monitoring.
- Simplification of repetitive tasks.



01

Modular and robust;
configurable according
to customer's
requirements.

02

Own methodology;
complete integration,
approved in Soraluce.

03

Development of specific
custom cycles.

04

Capability for automated
system, flexibles
lines, centralized tool
magazines.



Softkeys &
Customized
masks



Manufacturing
cycles



Dynamic collision
monitoring



Advanced tool
management

08.

Digital services



Advanced Digital Services, based on the Soraluce Data System comprehensive monitoring platform:

Reportya

Regular customized reports.

FactoryConnect

Machine park monitoring and integrations with corporate management systems (ERP, MES, etc.).

Autocheck

Self-Assessment using Fingerprint benchmark parameters.

JobManager

Traceability of manufacturing orders, programs, tools and process incidences.

Emaintenance

Digital management of maintenance tasks.

OEEMonitor

Availability & Performance & Quality parameters calculation.

09.

Ergonomic & Safe

Tool changing system

Tool loading
non-stop machining

- Simple and ergonomics.
- Allows tool loading/unloading with machine in operation.
- Full safety for the operator.
- No downtimes:
 - Tool storage is protected from chips and coolant.
 - Inductive detectors protected.
- Advanced tool management options available on request.

Totally reliable

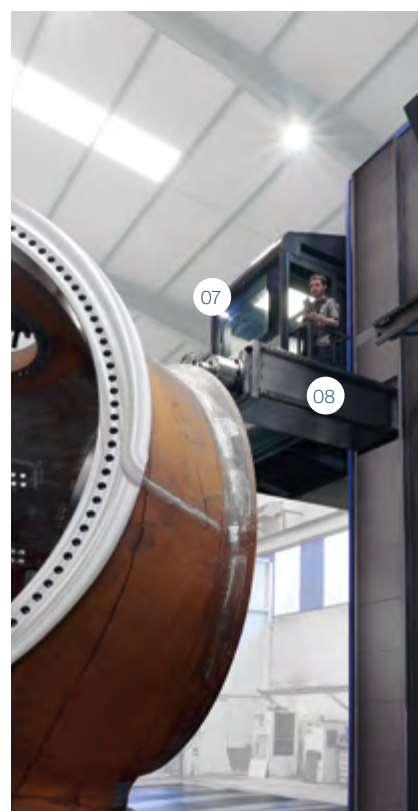
- NC controlled.
- No impacts with head.
- Tool control.

Non-stop machining

Robotized tool
changer available



Easy maintenance and accessibility



- 01 Accessible intervention areas.
- 02 Protection of the critical areas of the equipment.
- 03 Sliding shutters and doors to avoid the disassembly of panels.
- 04 Visible gauges and levels.
- 05 Specific signals to indicate maintenance and service points.
- 06 Ample areas to ease maintenance tasks.
- 07 Operator platform with vertical and cross movement.
- 08 Sliding door with a window that gives the possibility of manually unfold a balcony to approach to the head in any position.
- 09 Machine grease lubrication; consumption is kept to the minimum necessary.

Comfort pack

Focused to increase operator's comfort and productivity.

- Folding seat.
- Sound system.
- Extra space.
- Air conditioning (optional).
- Workbench with a panel (optional)
- Tool cabinet (optional)

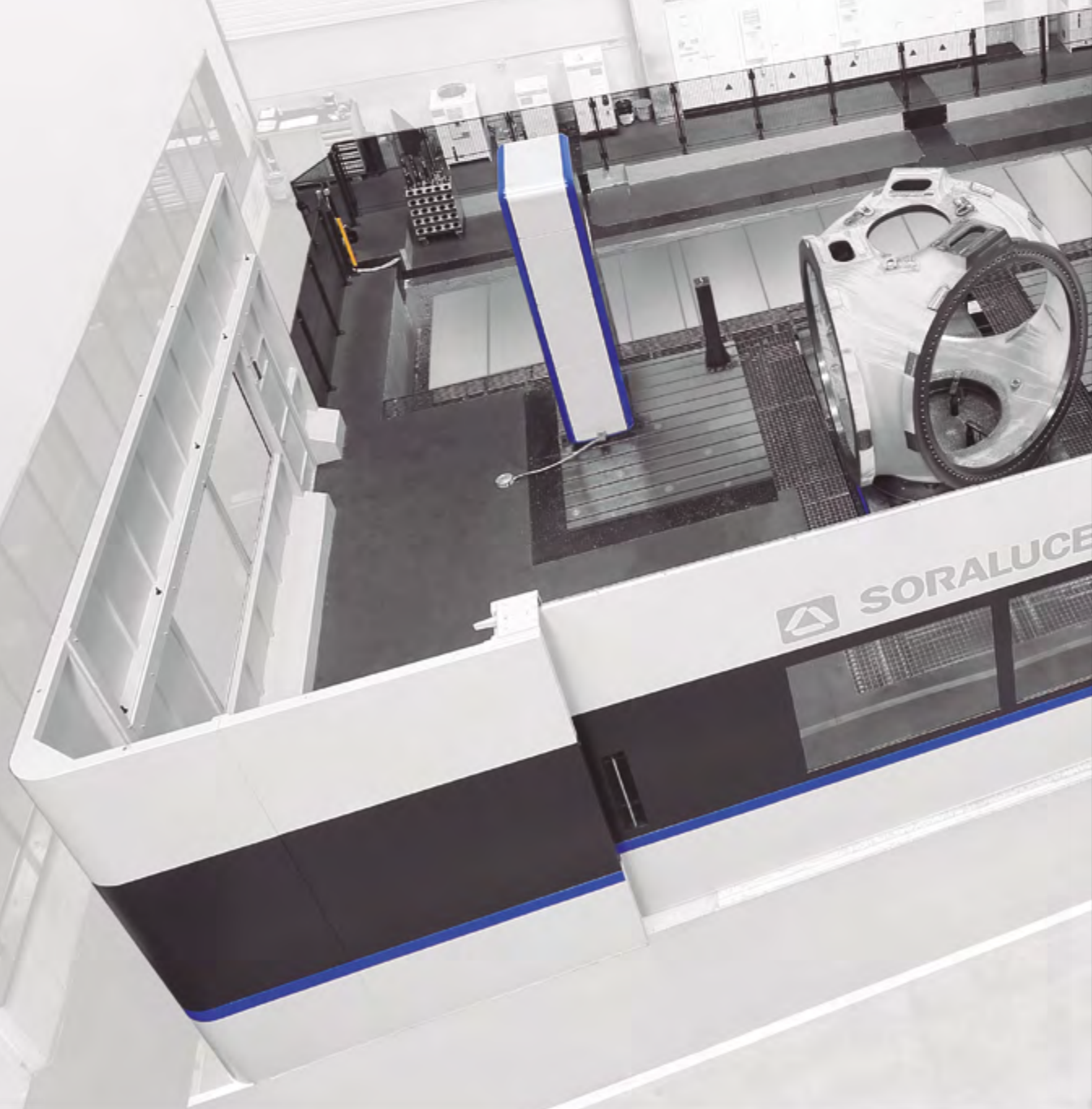


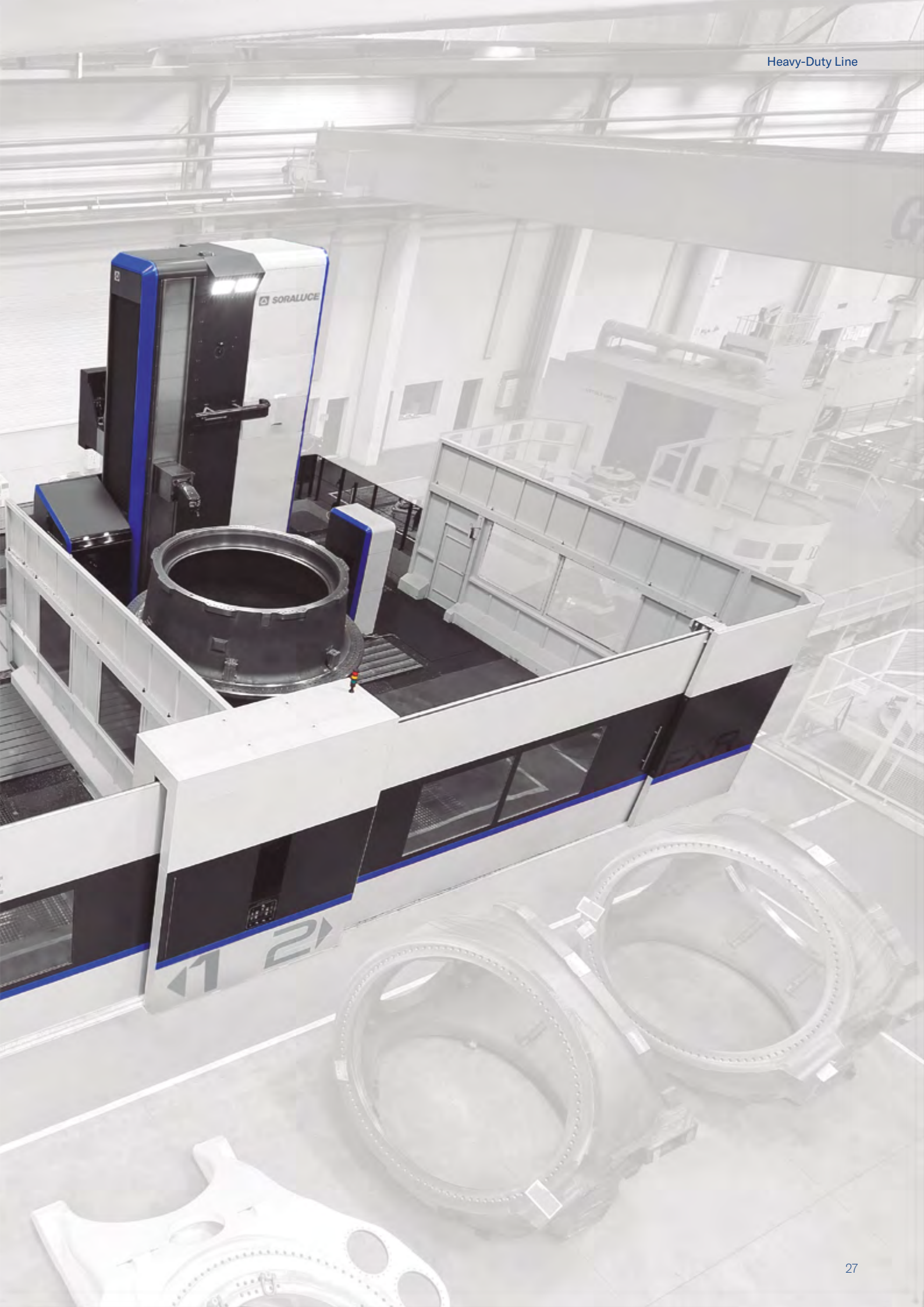


Meet
the machines

Heavy-Duty Line

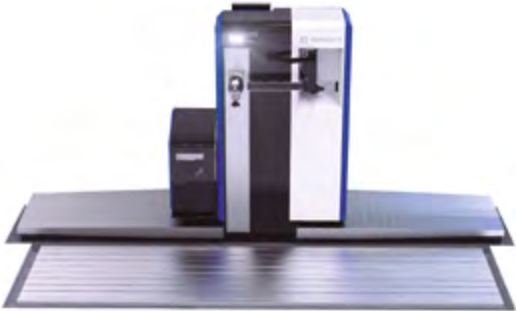
Powerful machining capacity





Choose the configuration of your machine

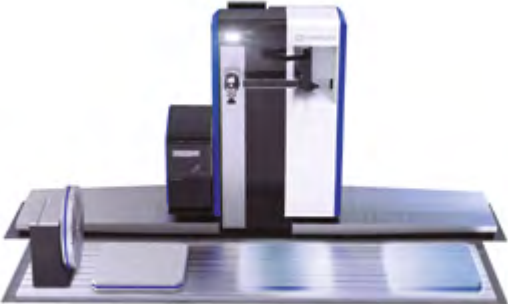
A versatile range



Basic configuration
Floor type



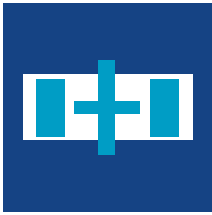
Flexible configuration
Minimum workpiece set-ups



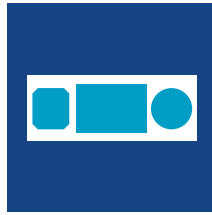
In & out
Portable rotary table



Boring capability
Combined boring and milling



Pendulum machining



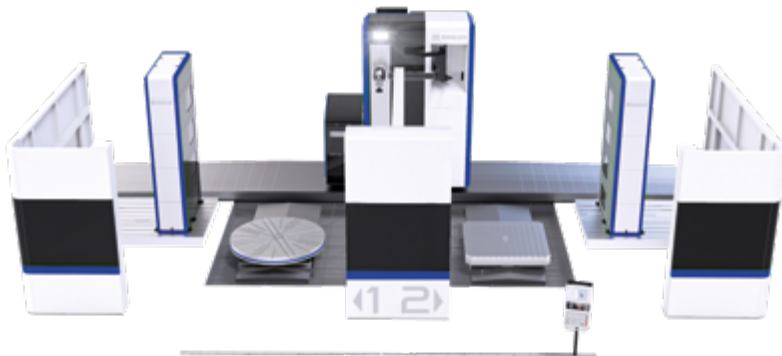
Several workstations



Palletized and flexible manufacturing systems

Automated Solutions

- Maximum efficiency.
- Reduction of set-up times.
- Downtime are minimized.
- Avoid human errors.



Multitasking configuration

Milling and turning workspaces



Duplex Machine

- Double production.
- Improvements in part precision; machining of the part in one single setup.
- One sole operator can control both machines.
- Reduced space.
- Fastest ROI due to high productivity.
- Different configurations available:
 - Single working area
 - Pendulum working areas
 - Pallet changing system
- Duplex Pack by Soraluze Software Factory.



Duplex machine

Working with two simultaneous spindles

Features FR | FX | FXX

Technical characteristics

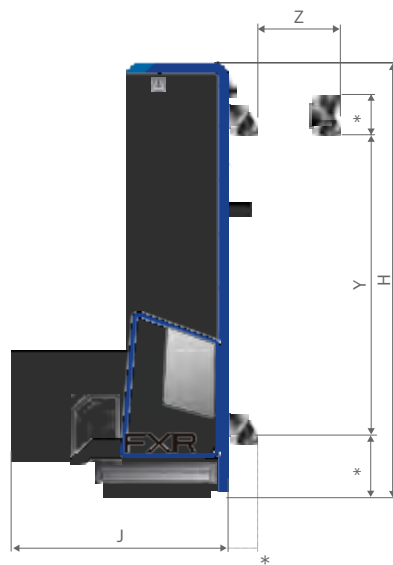
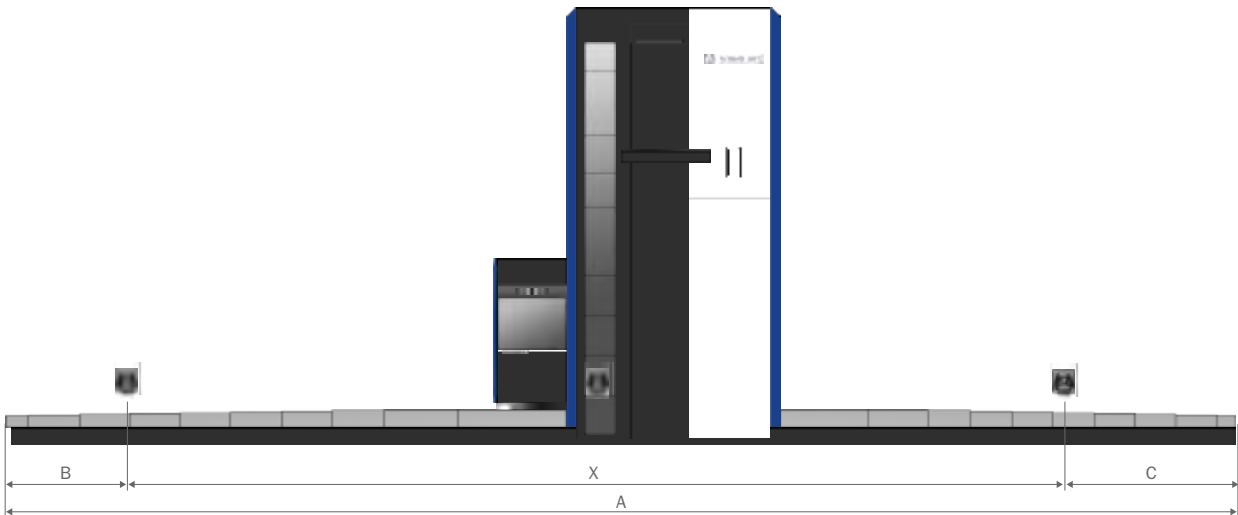
		FR	FRW	FXR	FXRW	FXX	FXXW
Longitudinal traverse "X" axis	mm	4000 ÷ as per request (n x 2000)		6000 ÷ as per request (n x 2000)		8000 ÷ as per request (n x 2000)	
Vertical traverse "Y" axis	mm	3600 / 4000 / 4500		5000 / 6000 / 7000 / 8000		6000 / 7000 / 8000	
Cross traverse "Z" axis	mm	1600 / 1900				2200	
Quill diameter	mm	-	130 / 150 / 180	-	130 / 150 / 180	-	130 / 150 / 180
Quill cross traverse "W" axis	mm	-	700 (Quill Ø 130) / 1000 (Quill Ø 150-180)	-	700 (Quill Ø 130) / 1000 (Quill Ø 150-180)	-	700 (Quill Ø 130) / 1000 (Quill Ø 150-180)
Spindle power	kW	53 / 60 / 70	53 / 74 / 101	53 / 60 / 70	53 / 74 / 101	53 / 60 / 70	53 / 74 / 101
Spindle speed range	min ⁻¹	4000 / 5000 / 6000 / 7000	3000	4000 / 5000 / 6000 / 7000	3000	4000 / 5000 / 6000 / 7000	3000
Rapid traverse	mm/min	25000		20000			
Tool magazine	No. Tools	66 / 80 / 100 / 120 / 150					

Technology at your disposal

■ Basic machine ■ Optional

	FR	FRW	FXR	FXRW	FXX	FXXW
Full cast iron	■	■	■	■	■	■
Linear guiding & Damping Pads	■	■	■	■	■	■
Double pinion and rack	■	■	■	■	■	■
DAS+	■	■	■	■	■	■
Heads with cooled oil lubrication	■	■	■	■	■	■
Heads with air oil lubrication	■	■	■	■	■	■
5-axis continuous head	■	■	■	■	■	■
Modular Quill		■		■		■
Automatic head changing system	■	■	■	■	■	■
Ram Balance	■	■	■	■	■	■
Multitasking	■	■	■	■	■	■
Comfort pack	■	■	■	■	■	■
Soraluce Smart HMI	■	■	■	■	■	■

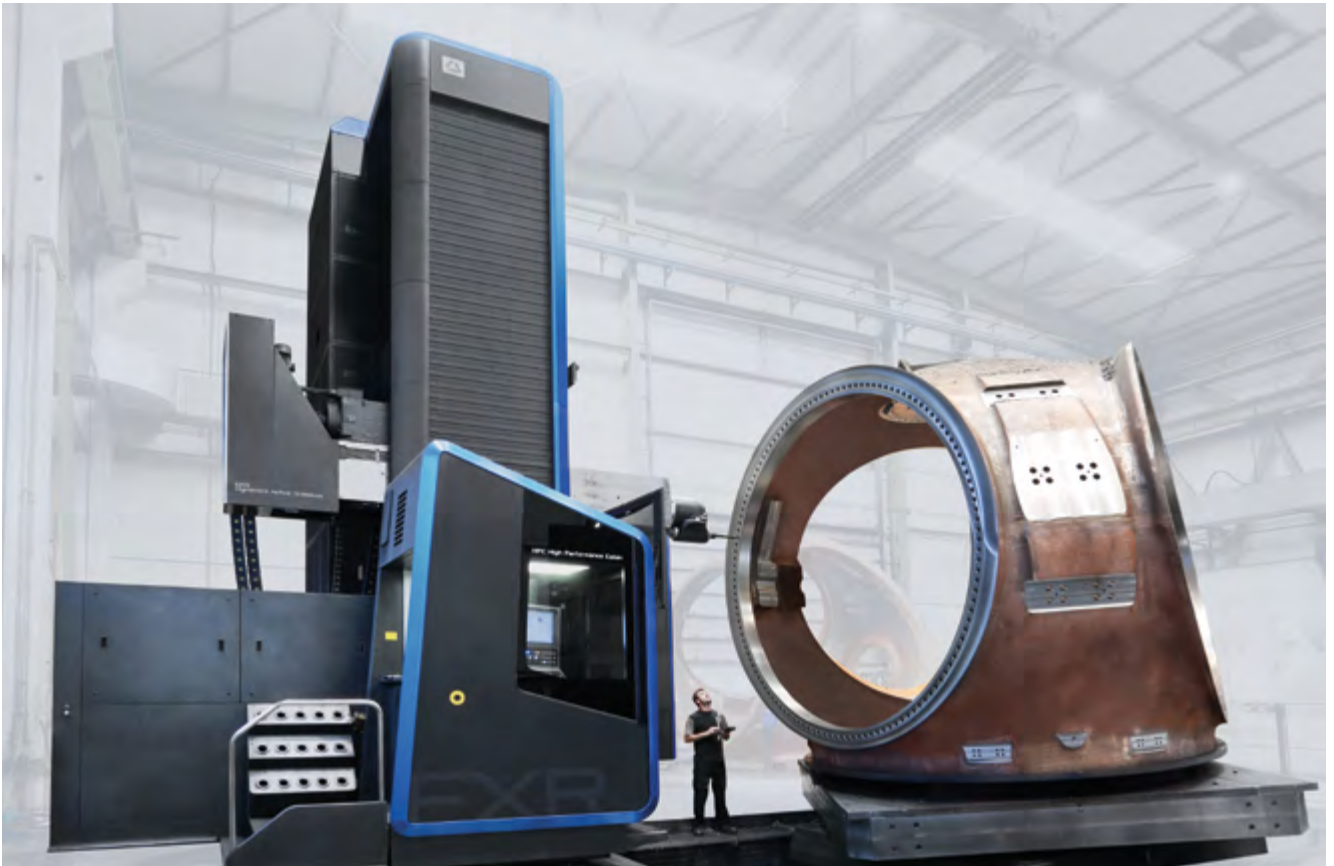
Layout



Layout	X	Y	Z	A	B	C	H	J
FR40	4000	3600 / 4000 / 4500	1600 / 1900	9340	1860	3480	6900 / 7300 / 7800	3950 / 4300 - 4600*
FR140	14000			20165	2310	3855		
FXR60	6000	5000 / 6000 / 7000 / 8000	1600 / 1900	12260	2320	3940	8100 / 9100 / 10100 / 11100	4330 / 4630
FXR140	14000			20400	2390	4010		
FXX80	8000	6000 / 7000 / 8000	2200	14400	2390	4010	9300 / 10300 / 11300	5180
FXX140	14000			20400				

*Machine with quill and Z: 1900 mm.
 Dimensions vary upon selected head.
 Dimensions in mm.

Applications



FXR
Energy / Hub



FXR
General Engineering



FXRW
Capital Goods / Press



FXRW
Energy / Gaz



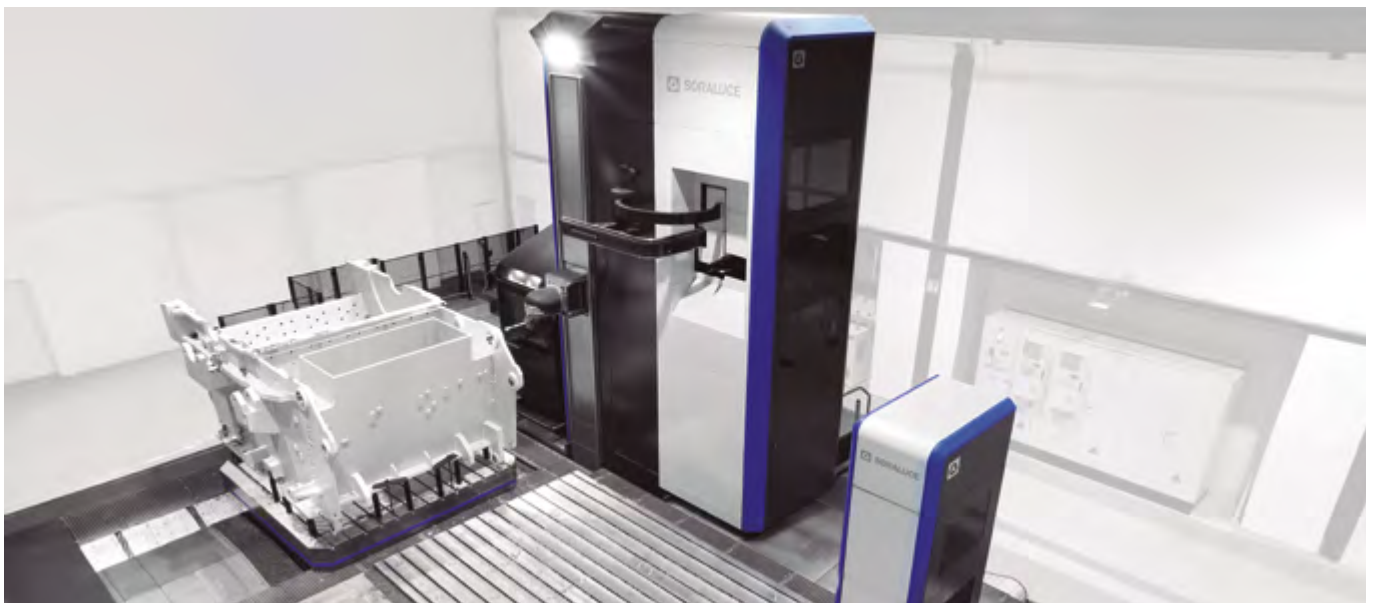
FXRW
Energy / Gaz



FXR
Energy



FXR
Capital Goods / Tables



FR
General Engineering / Press Head



FR
General Engineering



FR
General Engineering



FR
Capital Goods



There is only one first

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DANOBATGROUP

