FR | FXR | FXX

Heavy-Duty Line

Powerful. Precise.

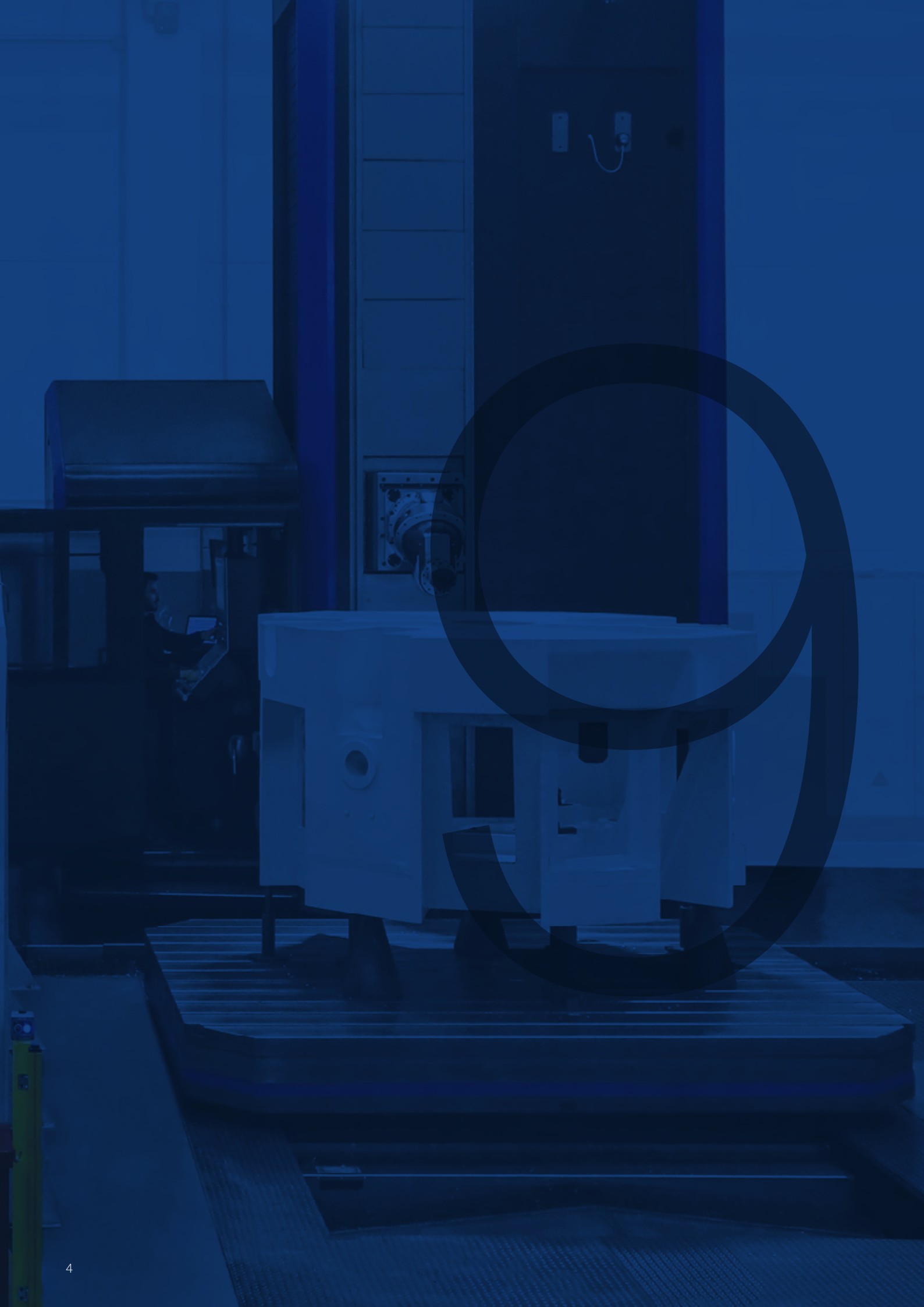
SORALUCE

As part of our premium solutions, the **Heavy-Duty Line** floor type milling machines of Soraluce 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

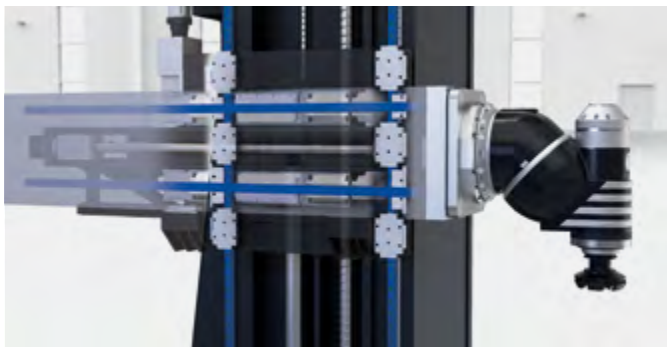


Nine reasons to choose Heavy-Duty Line

01.

A winning combination

The most rigid and dynamic solution on the market

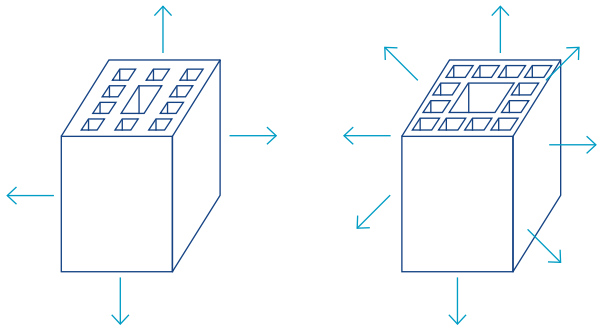


Full cast iron

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.



Cast iron

Fabricated steel

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.

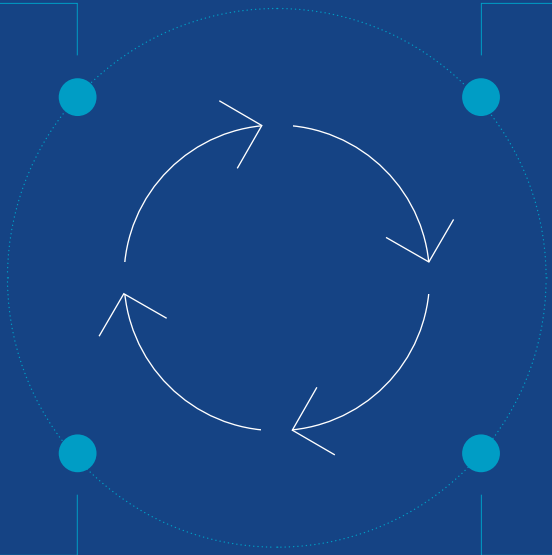
TOP BENEFITS	Linear guiding	Prismatic guiding	Hydrostatic guiding
Precision	↑↑↑	→	↑↑
Dynamics	↑↑↑	↓	↑↑
Maintenance free	↑↑↑	↓	↓
Loading capacity	↑↑↑	↑↑	↑↑
Thermal stability	↑↑↑	→	→
Sustainability	↑↑↑	↑	↓↓↓
Foundation cost saving	↑↑↑	↑↑↑	↓↓

Full cast iron

— Accuracy
— Stiffness
— Productivity

DAS+

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

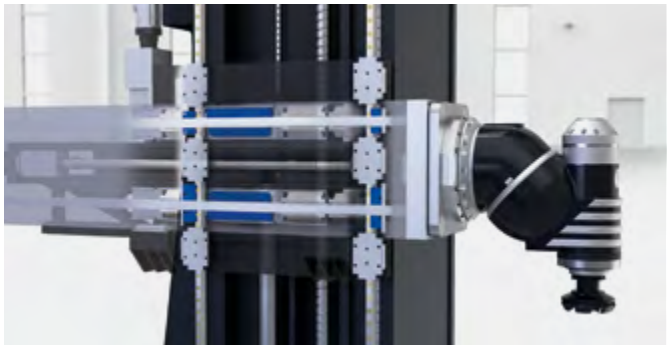


Linear guiding

— Best precision
— High dynamics

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

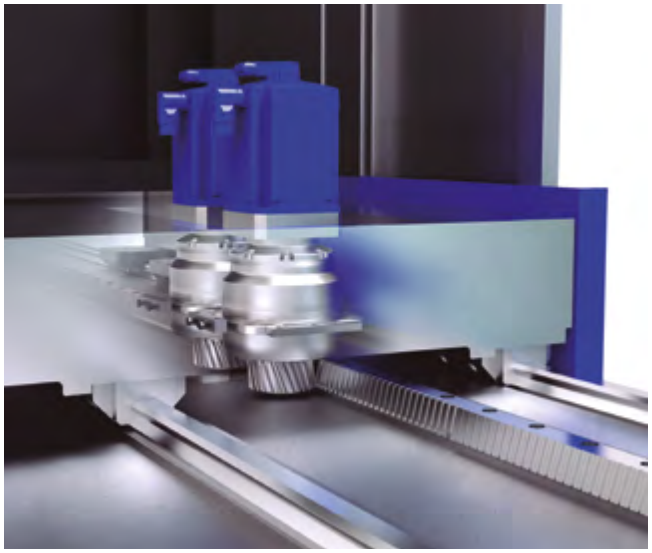
— Best stock removal with extended ram.
— Great cutting capacity through the complete workpiece volume.

Results FR and FXR Z: 1900 mm | 74”

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

Ø 160 mm | 6” face milling tool	Ap= 5 mm | 0.2” Ae= 120 mm | 4.8” F= 2200 mm/min | 86 in/min Q= 1320 cm^3/min | 80 in^3/min Power consumption: 100% (46 kW | 61 HP)

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 | 984 in/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 | 8044 lbf.ft torque

— High power and torque range: From 46 kW | 61 HP up to 101 kW | 135 HP (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.

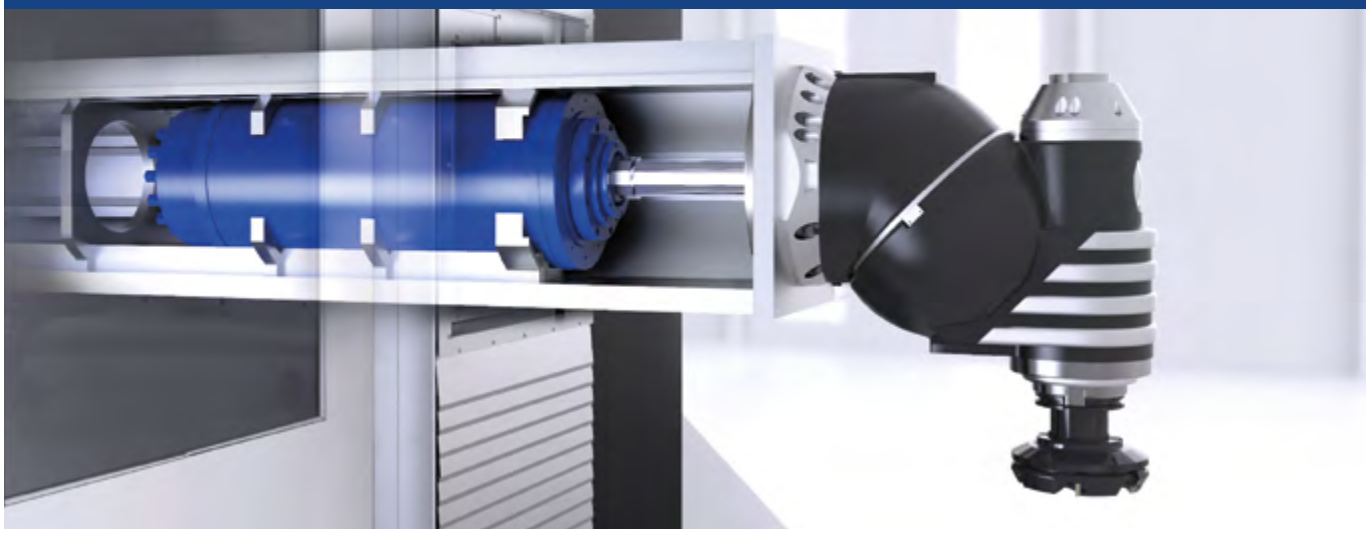
Enhanced rigidity
Frontal assembly, all sides of the ram are solid.

Ease of maintenance
Quick exchange of the main spindle motor.

— Up to 60 kW | 80 HP / 2000 Nm | 1475 lbf.ft.
— 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 | 80 HP



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.

Torsion movement

03 Minimum distance

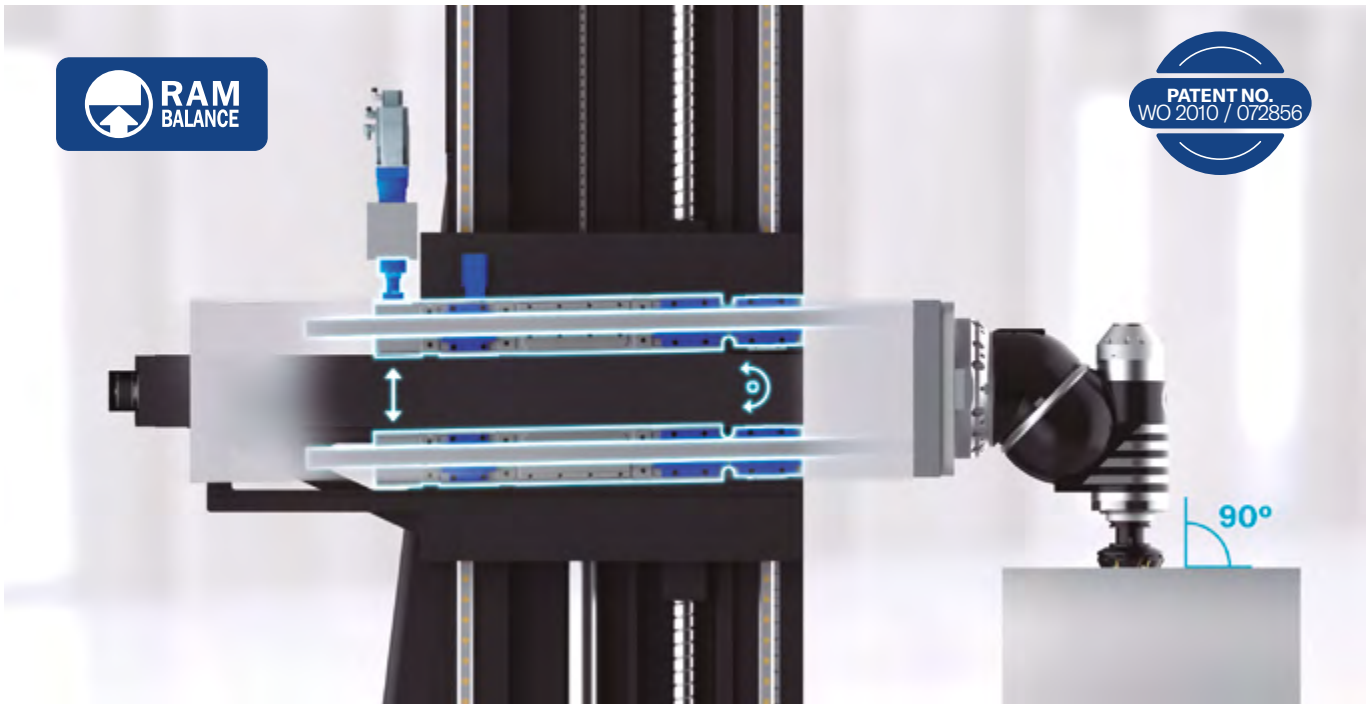
— Short distance from the column to the tool, thanks to the arrangement of the ballscrew and counterweight system.

— Minimum machine overhang.

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 | 0.0011” with 1900 mm | 74” extended ram

04.

Smart Technology

ACCURA HEADS

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

+ ACCURACY

ADAPTIVE CONTROL

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

30% time saved in roughing process!

+ PRODUCTIVITY

DAS+

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

DWS

Eliminates chatter originated on either fixtures or workpieces.

+ PRODUCTIVITY
+ QUALITY

Patent no. EP 2517823 B1

ENERGY SAVE

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

MODULAR QUILL by SORALUCE

Full automatic interchangeability between quill and standard heads.

+ FLEXIBILITY

Patent no. EP 2517823 B1

RAM BALANCE

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

VSET by SORALUCE

Fast and simplified component set-up.

+ PRODUCTIVITY

Patent no. EP 2570236

TBS

Hydrostatic table balancing system to correct distribution of asymmetric loads.

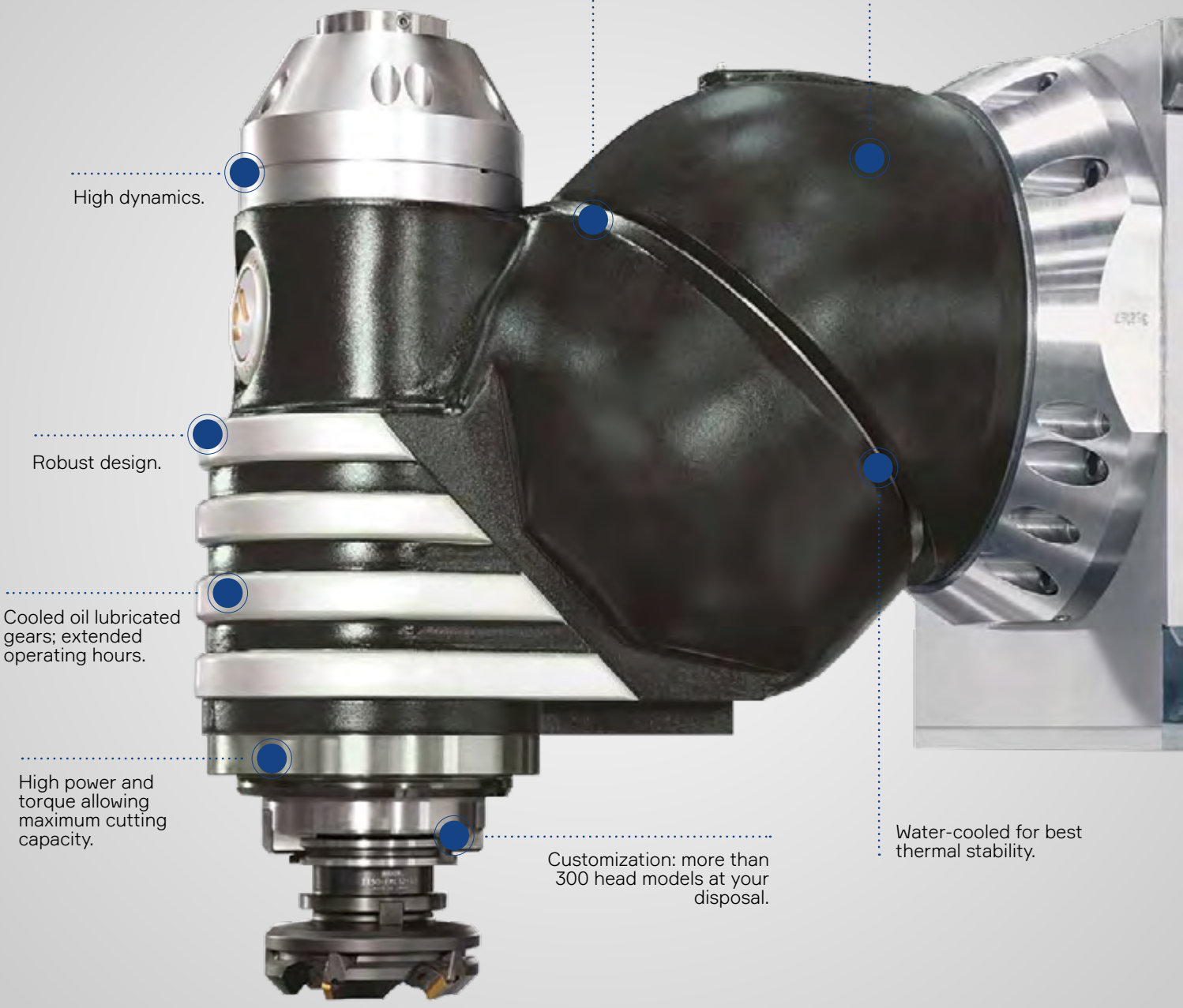
+ ACCURACY

05.

Soraluce heads

More than 300 head models

Precision & High performance



The most advanced head manufacturing center

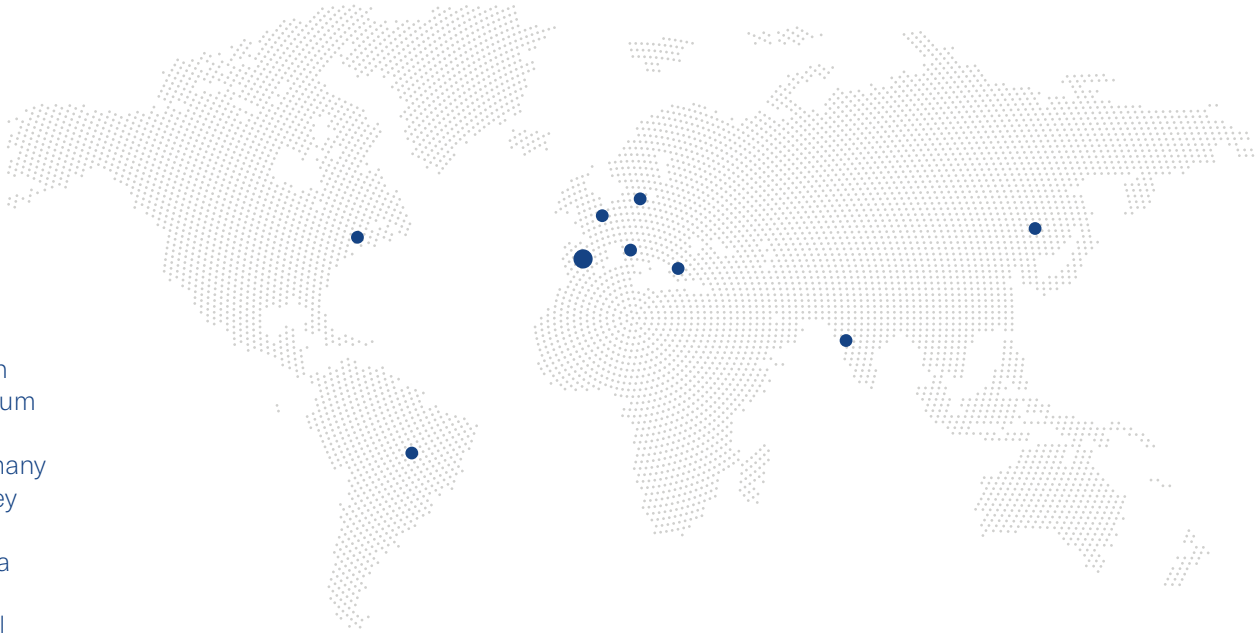
In-house made

Design — Machining — Assembly — Verification — Running-in

Head service hubs

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

150
Spare heads available



Spain
Belgium
Italy
Germany
Turkey
India
China
USA
Brazil

Heavy-duty heads
Cooled oil lubrication

— Up to 46 / 60 kW | 61 / 80 HP (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.

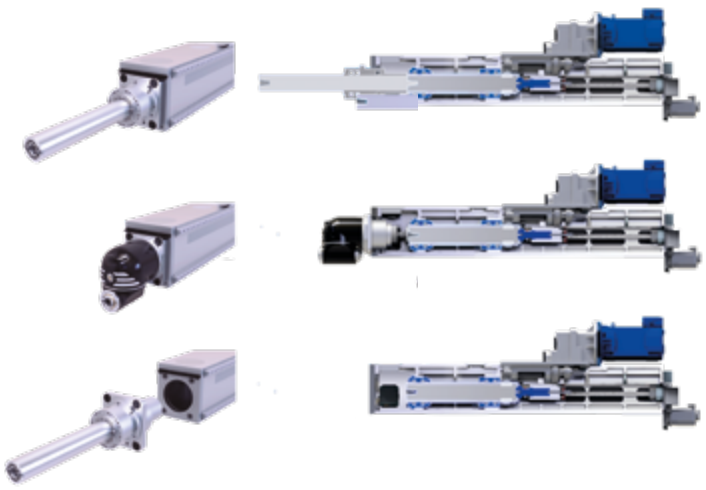
Best boring & milling combination: For modular quill at 3000 min^{-1}, universal head can go up to 4500 min^{-1}

Full interchangeability

— Compact solution
— Different heads and quills in a single machine
— No machine downtime for quill reparation

Great cutting capacity

— Up to 101 kW | 135 HP
— Quill Ø 130 | 150 | 180 | 200 mm / 5” | 6” | 7” | 8”
— Quill traverse: 700 | 1000 | 1400 mm / 27” | 39” | 55”



Thousands of possibilities

Universal head

Up to 60 kW | 80 HP (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 | 61 HP (S1)
1° x 1° / 0.001° x 0.001°
4000 / 6000 min^{-1}

5-axis continuous head

Up to 60 kW | 80 HP (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 | 61 / 94 HP (S1)
3000 / 4000 / 5000 min^{-1}

Quill

Ø 130 mm | 5" | W: 700 mm | 27" | 53 kW | 71 HP (S1) | 3000 min^{-1}
Ø 150 mm | 6" | W: 1000 mm | 39" | 53 - 82 kW | 71 - 110 HP (S1) | 3000 min^{-1}
Ø 180 mm | 7" | W: 1000 mm | 39" | 53 - 101 kW | 71 - 135 HP (S1) | 3000 min^{-1}
Ø 200 mm | 8" | W: 1400 mm | 55" | 101 kW | 135 HP (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 I 78" ÷ 137"	> Ø 3500 mm I 78"
up to 40 Tn I 88184 lb	up to 200 Tn I 440924 lb
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

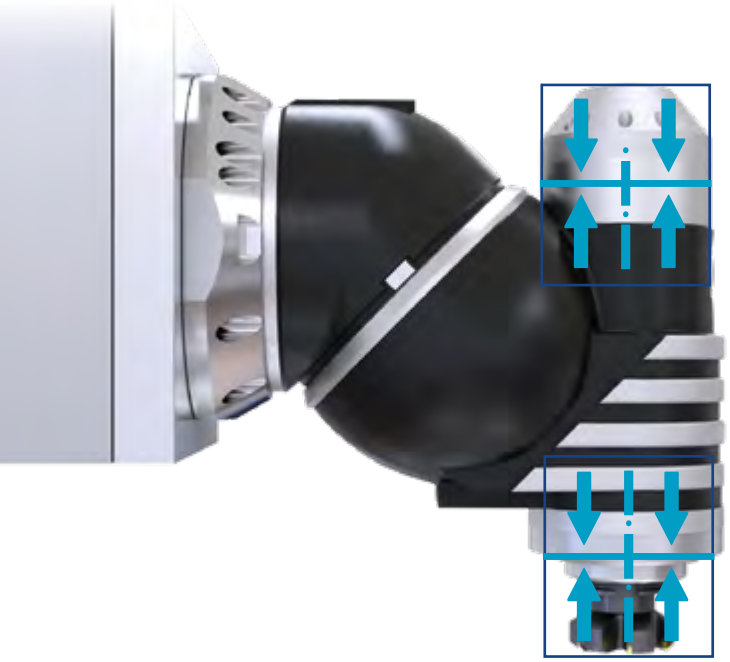
Home Made

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.

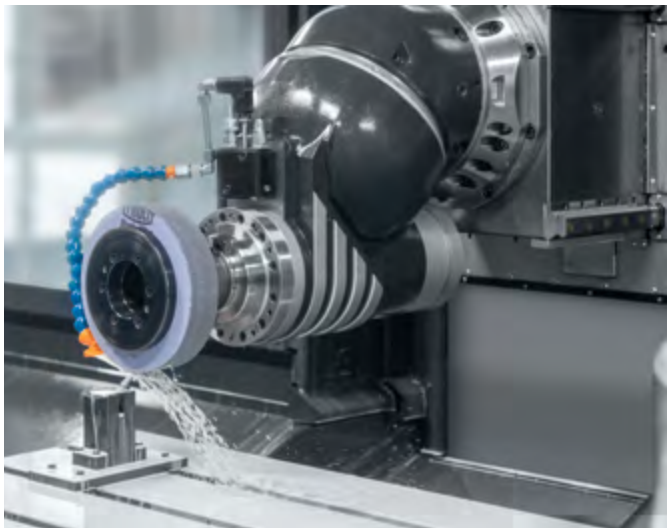
— Up to 60 kW | 80 HP
— Up to 1531 Nm | 1129 lbf.ft.
— 4000 / 5000 / 6000 / 7000 min^{-1}
— 2.5º x 2.5º / 0.001º x 0.001º



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 Soraluce 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.

Home Made

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).

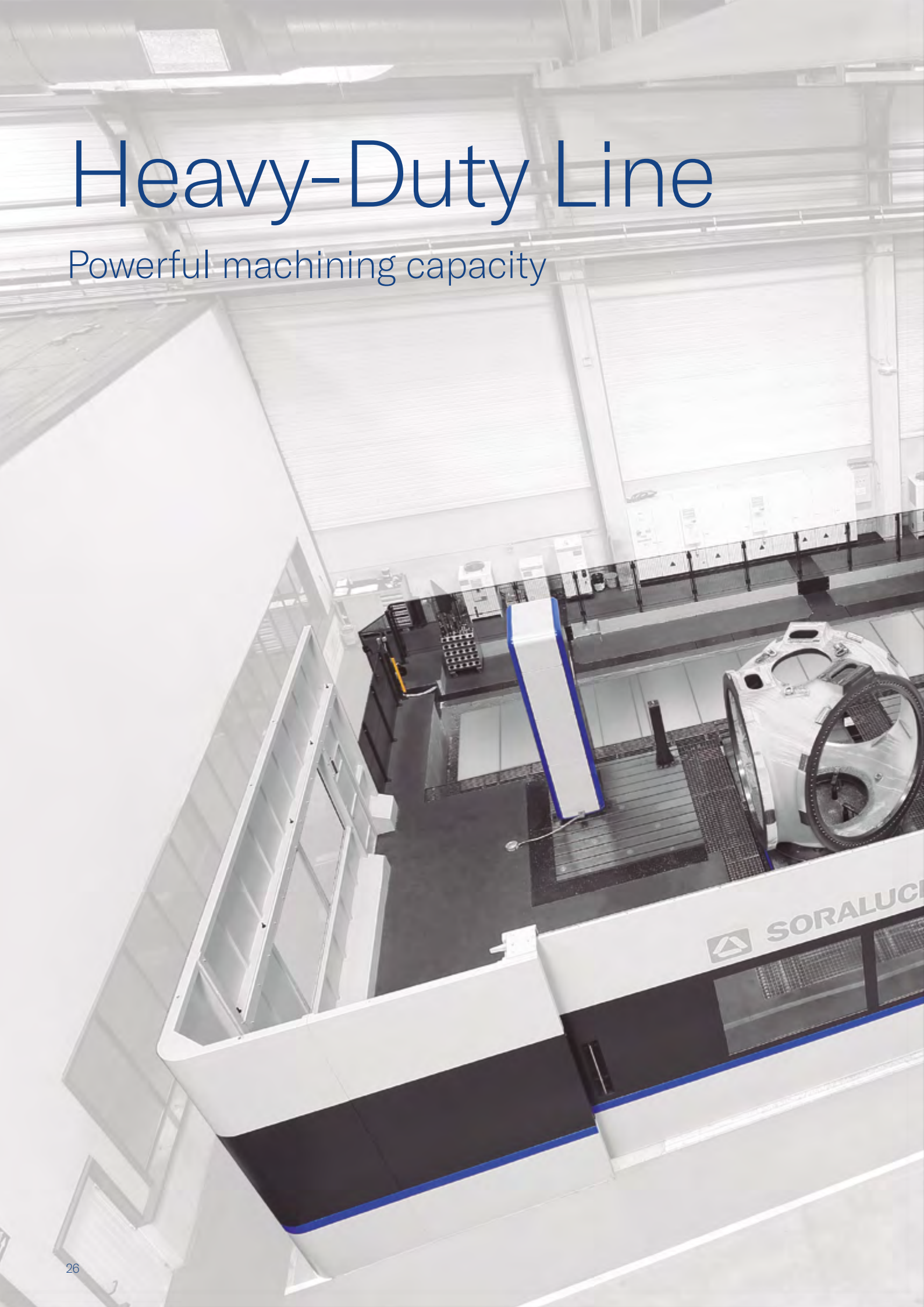
— Workbench with a panel (optional)

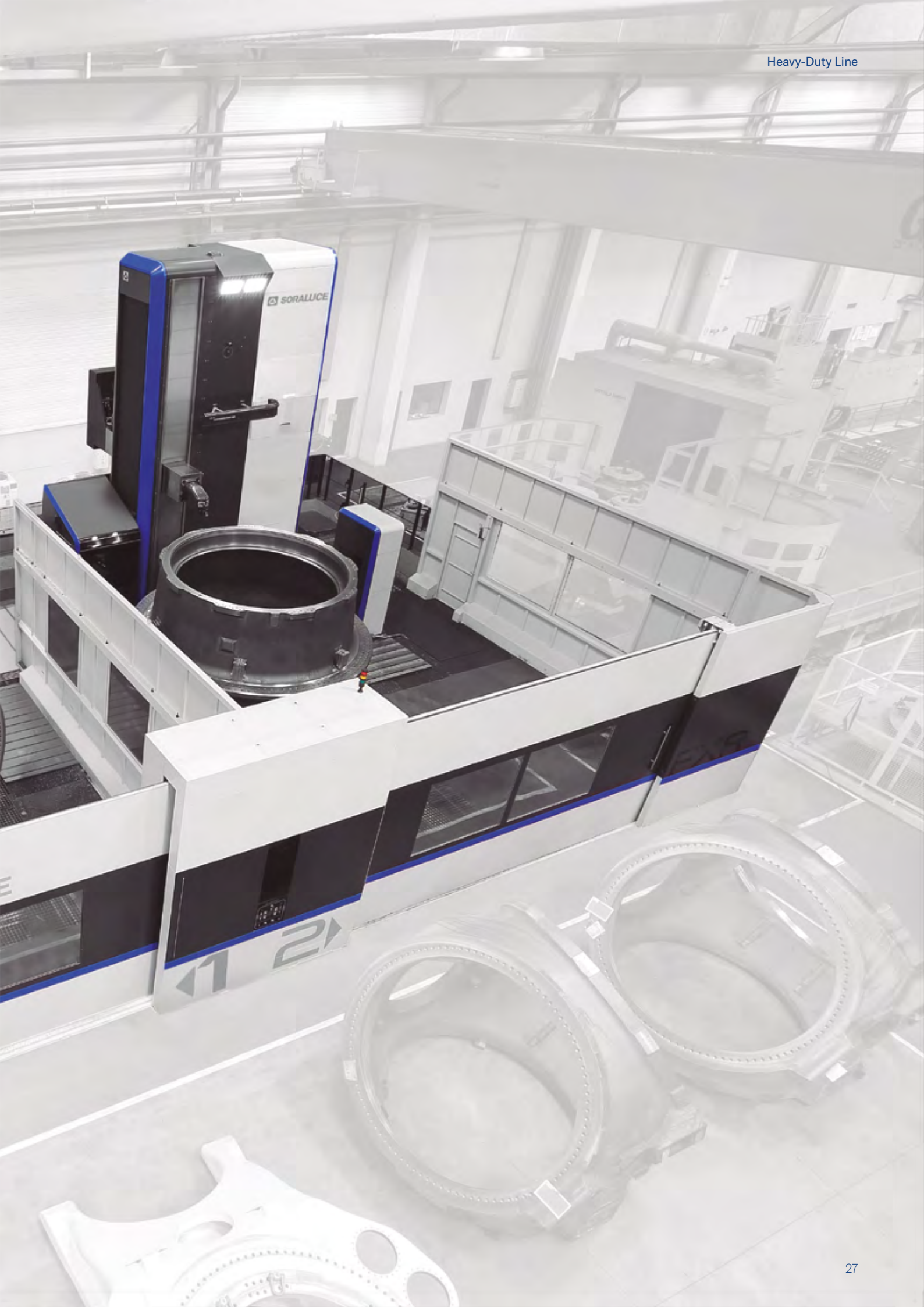
— Tool cabinet (optional)

Meet the machines

Heavy-Duty Line

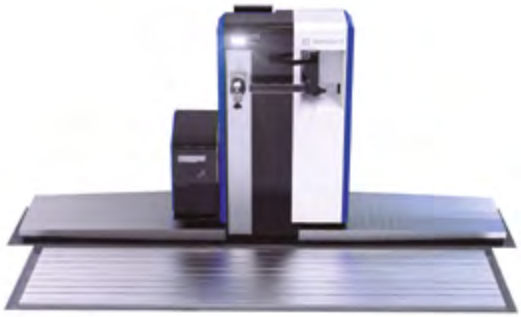
Powerful machining capacity




SORALUCE

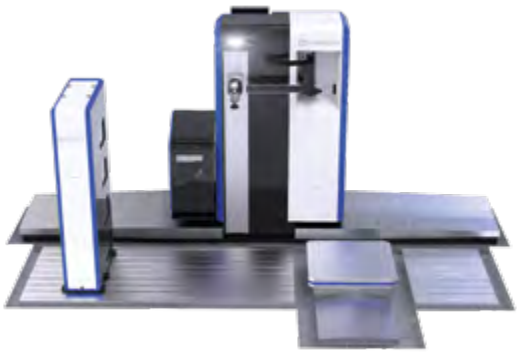
Choose the configuration of your machine

A versatile range



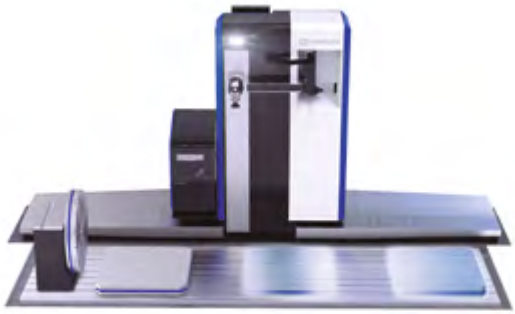
Basic configuration

Floor type



Flexible configuration

Minimum workpiece set-ups

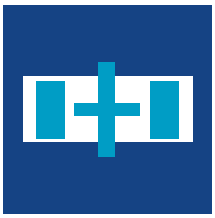


In & out

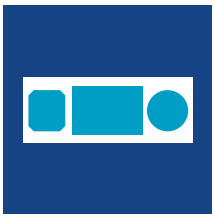
Portable rotary table

Boring capability

Combined boring and milling



Pendulum machining

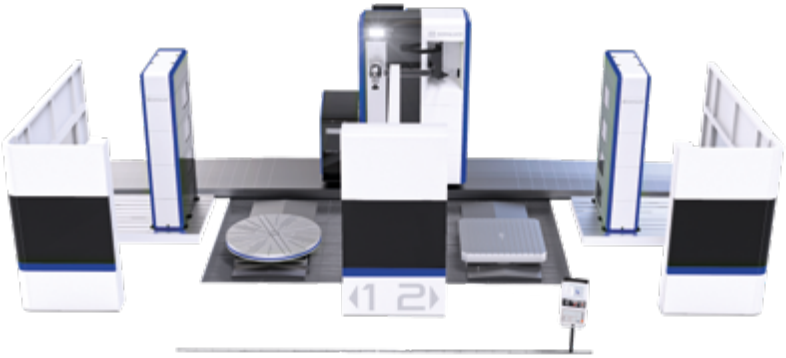


Several workstations

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 Soraluce Software Factory.

Duplex machine

Working with two simultaneous spindles

Features FR | FX | FXX

Technical characteristics

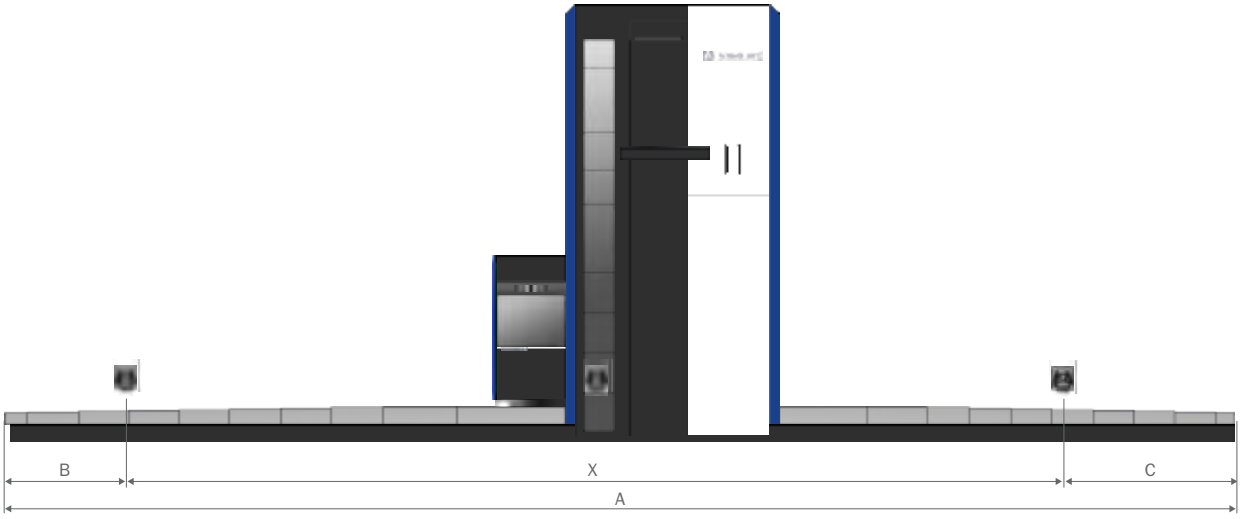
		FR	FRW	FXR	FXRW	FXX	FXXW
Longitudinal traverse "X" axis	mm | in	4000 | 157" ÷ as per request (n x 2000 | 78")		6000 | 236" ÷ as per request (n x 2000 | 78")		8000 | 315" ÷ as per request (n x 2000 | 78")	
Vertical traverse "Y" axis	mm | in	3600 / 4000 / 4500 | 141" / 157" / 177"		5000 / 6000 / 7000 / 8000 | 196" / 236" / 275" / 315"		6000 / 7000 / 8000 | 236" / 275" / 315"	
Cross traverse "Z" axis	mm | in	1600 / 1900 | 63" / 74"				2200 | 86"	
Quill diameter	mm | in	-	130 / 150 / 180 | 5" / 6" / 7"	-	130 / 150 / 180 | 5" / 6" / 7"	-	130 / 150 / 180 | 5" / 6" / 7"
Quill cross traverse "W" axis	mm | in	-	700 | 27" (Quill Ø 130 | 5") / 1000 | 39" (Quill Ø 150-180 | 6"-7")	-	700 | 27" (Quill Ø 130 | 5") / 1000 | 39" (Quill Ø 150-180 | 6"-7")	-	700 | 27" (Quill Ø 130 | 5") / 1000 | 39" (Quill Ø 150-180 | 6"-7")
Spindle power	kW | HP	53 / 60 / 70 | 71 / 80 / 94	53 / 74 / 101 | 71 / 99 / 135	53 / 60 / 70 | 71 / 80 / 94	53 / 74 / 101 | 71 / 99 / 135	53 / 60 / 70 | 71 / 80 / 94	53 / 74 / 101 | 71 / 99 / 135
Spindle speed range	min^{-1}	4000 / 5000 6000 / 7000	3000	4000 / 5000 6000 / 7000	3000	4000 / 5000 6000 / 7000	3000
Rapid traverse	mm/min | in/min	25000 | 984		20000 | 787			
Tool magazine	No. Tools	66 / 80 / 100 / 120 / 150					

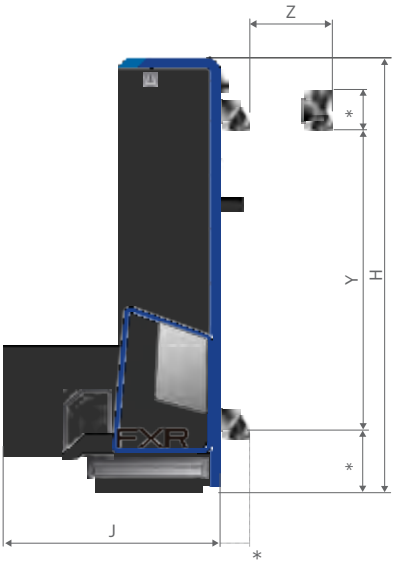
Technology at your disposal

■ 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 | 157”	3600 / 4000 / 4500 | 141” / 157”/ 177”	1600 / 1900 | 63” / 74”	9340 | 367”	1860 | 73”	3480 | 137”	6900 / 7300 / 7800 | 271” / 287” / 307”	3950 / 4300 - 4600 | 155” / 169” - 181” *
FR140	14000 | 551”			20165 | 794”	2310 | 91”	3855 | 152”		
FXR60	6000 | 236”	5000 / 6000 / 7000 / 8000 | 196” / 236”/ 275” / 315”		12260 | 482”	2320 | 91”	3940 | 155”	8100 / 9100 / 10100 / 11100 | 319” / 358” / 397”/ 437”	4330 / 4630 | 170” / 182”
FXR140	14000 | 551”			20400 | 803”	2390 | 94”	4010 | 158”		
FXX80	8000 | 315”	6000 / 7000 / 8000 | 236” / 275”/ 315”	2200 | 86”	14400 | 567”	2390 | 94”	4010 | 158”	9300 / 10300 / 11300 | 366” / 405” / 445”	5180 | 204”
FXX140	14000 | 551”			20400 | 803”				

*Machine with quill and Z: 1900 mm | 74”.
Dimensions vary upon selected head.
Dimensions in mm.

Applications

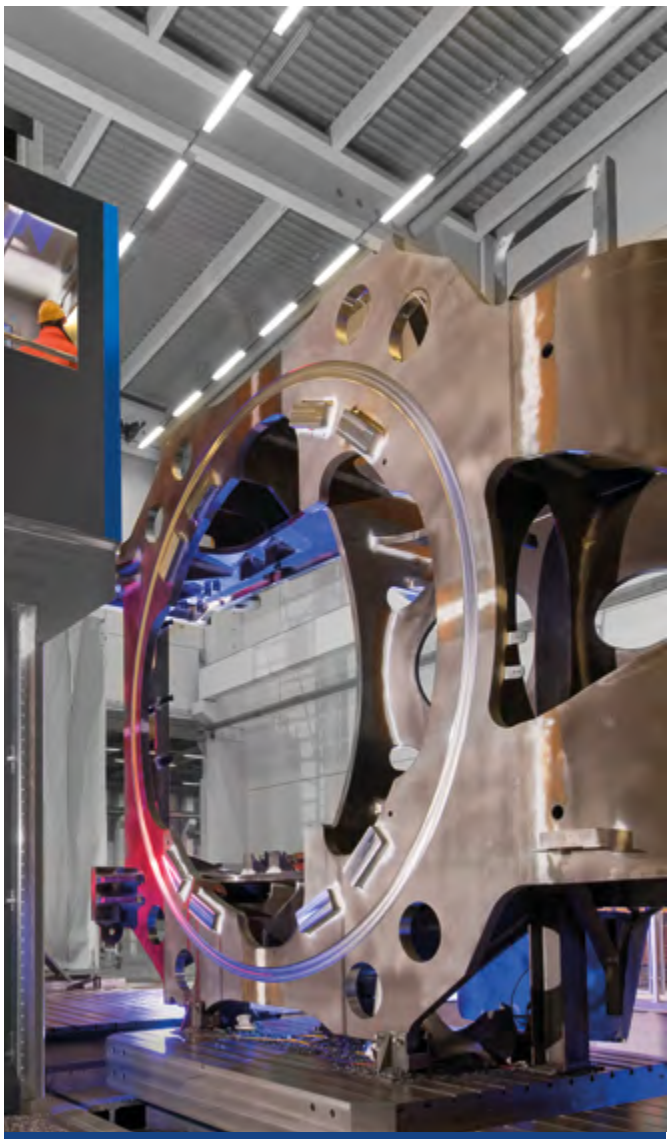
FXR
Energy / Hub

FXR
General Engineering

FXRW
Capital Goods / Press

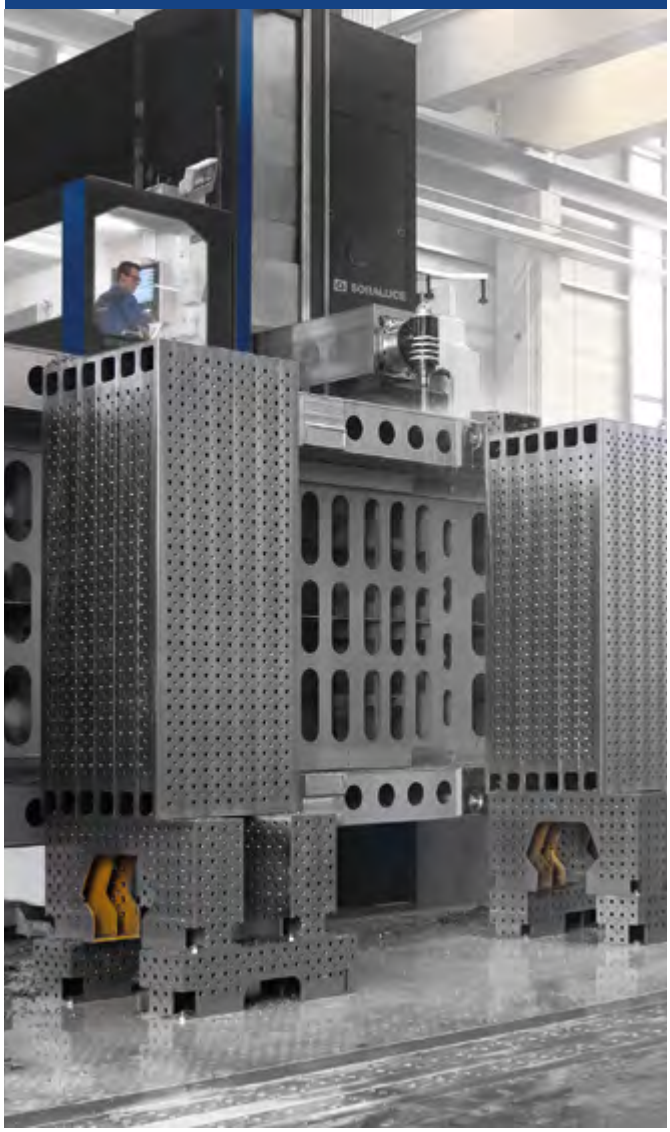
FXRW
Energy / Gaz

FXRW
Energy / Gaz



FXR
Energy

FXR
Capital Goods / Tables



FR
General Engineering / Press Head

FR
General Engineering

FR
General Engineering

FR
Capital Goods

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