PORTAL AND GANTRY MULTITASK MACHINES › PM | PMG | PRG | PXG

PRECISION AND VERSATILITY AT A LARGE SCALE
PRECISION AND VERSATILITY AT A LARGE SCALE

The new generation of SORALUCE PM - PMG - PRG - PXG is the expression of SORALUCE’s values: reliability, precision and competitiveness.

The SORALUCE PM - PMG - PRG - PXG portal and gantry multitask machines stand out for:

› High capacity machine
› Enhanced precision
› Multitask: milling and turning capability
› Working area adapted to customer’s requirements
› High stock removal
› Customised milling and turning heads

The SORALUCE PM - PMG - PRG - PXG range is ideal for the machining of prismatic and cylindrical parts in a single set-up.

This highly versatile range is designed to meet the machining requirements for a range of highly demanding parts used in the construction of machinery for the energy industry, the machining of marine and CHP motors and general machining of large and complex workpieces.
DESIGN
The design of the machine structure and dimensions have been optimised by an analysis based on “Finite Element Method” (FEM) simulation technique, optimising:
› Static stiffness
› Dynamic stiffness
› Residual stress analysis
› Complete mechanical stability

LONG LASTING PRECISION
Full cast iron structure, enabling:
› Accuracy: long lasting precision
› Stiffness: proven physical stability
› Productivity: high cutting capacity

Thanks to the unique mechanical features of the cast iron and the optimised design, the precision and robustness of the machine are ensured for all the machine’s life.

PROVEN STABILITY
The general performance of the machine is deeply analysed to correct the different characteristic deformations caused by the displacement of the moving parts of the system.

SORALUCE applies a number of devices that largely offset the natural deformations caused by the weight of those moving parts.

› Thermal compensation algorithms developed by SORALUCE, applied to all structural components
› Compensation of the characteristic deflection generated by the moving mass of the saddle and the ram
› Compensation of the deflection of the cross beam

HIGH PERFORMANCE
High torque direct drive spindle motor inside the ram, with a built-in cooling system, providing:

› Great precision
› High efficiency
› Low heat
› Reduced noise
› No maintenance
› No losses in the power transmission
› Stable working conditions

It ensures high stock removal thanks to the high main spindle power and torque in combination with the full cast iron structure of the machine.
COMBINED GUIDING AND DAMPING SYSTEM

SORALUCE is a pioneer in the use of linear guiding systems in large machines and heavy duty applications.

› The system combines our own specially developed damping pads with INA guiding systems on each axis

› The system guarantees immense stability eliminating any vibration during machining processes

› Using heavy duty linear guiding systems since 1992

› More than 1500 references in the market working with this system

› It guarantees high precision and dynamics, low friction, low heat levels, minimum maintenance and reduced grease consumption

HIGH ACCURACY

Optimised machine structure and guiding system that guarantee the precision throughout the machine’s life.

INCREASED PRODUCTIVITY

High dynamics on the axes and the machine’s stability provide the right features to ensure stable machining on demanding applications which enables the high performance tools to give their best.

ENERGETIC EFFICIENCY

› Low maintenance costs
› Low heat levels
› Reduced grease consumption
THE NEXT LEVEL OF INNOVATION

DAS SYSTEM (DYNAMICS ACTIVE STABILISER)

› CHALLENGE TO OVERCOME ‹

Chatter causing:

› Reduced cutting capability (especially when ram is extended)
› Possible tool breakage and risk for machine components
› Poor finishing and ripple marks on the workpiece
› Noise

› SOLUTION ‹

DAS®

The DAS® system measures the vibrations during the machining process and generates, in real time, by means of built-in actuators located in the ram, an oscillation force that opposes the vibration.

DAS+®

As an evolution of the DAS® system, DAS+® includes new functionalities such as:

› New user interface to control process evolution:
   › Vibration level monitoring
   › Detection of chatter
› Two different strategies to suppress chatter:
   › New spindle speed tuning: selects automatically the optimal spindle speed
   › Introduction of a continuous harmonic oscillation in the spindle speed

› BENEFITS ‹

› Intelligent system
› Works in real time
› 100% cutting capacity through the complete workpiece volume
› Reduced cycle times (up to 45% in the tested milling processes)
› Increased productivity up to 300%
› Improved workpiece surface quality
› Extended the tool life
› Increased robustness of the process
› Reduced machine wear

Patented EP 3 017 911
Awarded with Quality Innovation of the Year 2015 and Best of Industry 2016
VERTICAL RAM BALANCE

› CHALLENGE TO OVERCOME ‹

Reduction of machine accuracy due to the deformation of the cross beam of large portal machines.

Large portal machines suffer certain deformations because of the moving weight of the saddle and ram along the cross beam.

Roll error derived from the deformation of the structure induces a perpendicularity error as well as a Z axis dependant position deviation of the tool.

› SOLUTION ‹

The innovative VERTICAL RAM BALANCE compensates this effect by a CNC-controlled electromechanical system assembled within the saddle. It works as an additional CNC axis and it is closed-loop-controlled with its own direct position measuring system.

The system ensures maximum accuracy in the perpendicularity of the X-Z axes, whatever the working position.

› BENEFITS ‹

› Available for portal and gantry machines
› It increases the machine precision
› Improved finishing results
› The system is 100% controlled at any time, in any position
› Configurable compensation values
› Real-time compensation
› Works both in positive and negative directions
SORALUCE DIGITAL

Data system

REAL-TIME INFORMATION OF MACHINE AND PROCESS STATUS

SORALUCE Data System is a machine data-driven analytics tool that extracts valuable insights from the machine-generated data and that monitors its status and condition to ensure that the running performance of the machining process is as high as possible.

- Maximised productivity
- Optimal efficiency
- Specialised reports
- Eases decision-making
- Multi-device interfaces adaptable to each user, such as a PC, Smartphone or Tablet
- Wide fleet of connected machines
- Connectivity with MES, ERP and other logistics management software
- Own technology
- Under secure connection
REAL TIME STATUS

Display of the machine status in real time providing relevant information about the situation of the machining in progress.

The tool generates reports regarding sensitive issues for the user and helps to optimise the machining process

Machine status:
› Name of Current Program/Current Block Number
› Tool Number/Index/Lifetime
› Position of Spindle/Axes/Rotary Table
› Position of Head Joints
› Cycle ON/OFF
› Cycle Time
› Alarm YES/NO
› Temperature of the Head/Column/Ram
› Operation Mode: AUTO/MAN/MDI/Handwheel
› Spindle/Axes Override
› Programmed/Current Spindle Speed
› Programmed/Current Axes Feed
› Other custom information under request

Alarms:
› E-mail notifications
› A real-time list of the alarms displayed
› Record of alarms
› Help texts for alarm recovery are included

variables through the diagnosis of key warning signs, thus increasing the machine’s productivity and avoiding unnecessary consumption.

Machine utilisation:
› Machine activity in a historical basis
› Displays the time the machine has been under production, stopped or not connected

Energy consumption:
› Real-time electricity consumption of relevant components of the machine-tool, such as the spindle, axes, hydraulic and pneumatic units, cooler, etc.
› Electricity consumption of each component over time

REPORTING

A complete suite of reports that summarise the activity of the machine in order to inform about trends in its performance, enabling analysis and improvements to be implemented on the machine and/or production process.

Alarms
Alarm log history for analysis.

Power consumption and temperature
Electric consumption over time of each relevant component.

Use of the machine
Activity of the machine based upon its track record.

Preventive maintenance
› Preventive plan management
› E-mail notifications
› Allows the creation of specifics plans

Optimisation of the process
Based upon the data analysis from the machine-tool such as programs, time, speed and alarms.
The new SORALUCE PM - PMG - PRG - PXG Generation is based on a complete revision of the machine from the user's point of view focusing on improving operation efficiency and developing a Total Machine Concept.

The Total Machine Concept takes into account not only the machine but also the complete working area. All the interactions of the operator with the different machine elements are analysed for an optimal implementation.

Not only the machine, but the work area and its surroundings are analysed as a whole in order to guarantee an optimal final result. All of the interactions are studied from the clamping and loading of the workpiece to its removal once machined and its subsequent cleaning. The environment and its processes must be linked to the machine's own work, making all parts of the entire process as simple, safe and ergonomic as possible.

With this new design concept, SORALUCE has added to its equipment a large number of innovations not only with the aim of facilitating workers and making them a safer environment, but also to simplify maintenance and to minimise stoppage times, thus increasing the productivity and profitability of the machine.
### PORTAL MOVING TABLE MILLING MACHINE PM

<table>
<thead>
<tr>
<th></th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table length</strong> mm</td>
<td>5000 / 6000 / 7000</td>
</tr>
<tr>
<td><strong>Table width</strong> mm</td>
<td>2500 / 3000</td>
</tr>
<tr>
<td><strong>Longitudinal traverse &quot;X&quot; axis</strong> mm</td>
<td>5600 / 6600 / 7600</td>
</tr>
<tr>
<td><strong>Cross traverse &quot;Y&quot; axis</strong> mm</td>
<td>4500 / 5000</td>
</tr>
<tr>
<td><strong>Vertical traverse, Ram &quot;Z axis&quot;</strong> mm</td>
<td>1500 / 2000</td>
</tr>
<tr>
<td><strong>Vertical traverse, Cross beam &quot;W&quot;</strong> mm</td>
<td>1000 / 1500 / 2000</td>
</tr>
<tr>
<td><strong>Clearance between columns</strong> mm</td>
<td>3500 / 4000</td>
</tr>
<tr>
<td><strong>Clearance height</strong> mm</td>
<td>2100 / 2600 / Up to 4100 (Machine with &quot;W&quot; axis)</td>
</tr>
<tr>
<td><strong>Spindle power</strong> kW</td>
<td>43 / 60</td>
</tr>
<tr>
<td><strong>Spindle speed range</strong> min⁻¹</td>
<td>4000 / 5000 / 6000 / 7000</td>
</tr>
<tr>
<td><strong>Spindle nose taper</strong></td>
<td>ISO-50 / HSK-100</td>
</tr>
<tr>
<td><strong>Rapid traverse</strong> mm/min⁻¹</td>
<td>X = 30000, Y/Z = 35000</td>
</tr>
<tr>
<td><strong>CNC control system</strong></td>
<td>Heidenhain TNC 640 / Siemens 840 D SL</td>
</tr>
<tr>
<td><strong>Coolant system</strong></td>
<td>External coolant system via spray rose ring / Internal coolant system of up to 70 bar</td>
</tr>
<tr>
<td><strong>Tool magazine</strong> No. tools</td>
<td>40 / 60 / 80 / 100 / 120</td>
</tr>
<tr>
<td><em>Optional</em></td>
<td></td>
</tr>
</tbody>
</table>

### GANTRY MULTITASKING MACHINE PMG

<table>
<thead>
<tr>
<th></th>
<th>PMG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Longitudinal traverse &quot;X&quot; axis</strong> mm</td>
<td>6000 / 8000 / 10000 / n x 2000</td>
</tr>
<tr>
<td><strong>Cross traverse &quot;Y&quot; axis</strong> mm</td>
<td>4000 / 4500 / 5000 / 5500</td>
</tr>
<tr>
<td><strong>Vertical traverse, Ram &quot;Z axis&quot;</strong> mm</td>
<td>1500 / 2000</td>
</tr>
<tr>
<td><strong>Vertical traverse, Cross beam &quot;W&quot;</strong> mm</td>
<td>1000 / 1500 / 2000</td>
</tr>
<tr>
<td><strong>Clearance between columns</strong> mm</td>
<td>3000 / 3500 / 4000 / 4500</td>
</tr>
<tr>
<td><strong>Clearance height</strong> mm</td>
<td>2100 / 2600 / Up to 4100 (Machine with “W” axis)</td>
</tr>
<tr>
<td><strong>Floor plate width</strong> mm</td>
<td>2000 / 2500 / 3000 / 3500</td>
</tr>
<tr>
<td><strong>Spindle power</strong> kW</td>
<td>43 / 60</td>
</tr>
<tr>
<td><strong>Spindle speed range</strong> min⁻¹</td>
<td>Up to 7000</td>
</tr>
<tr>
<td><strong>Spindle nose taper</strong></td>
<td>ISO-50 / HSK-100</td>
</tr>
<tr>
<td><strong>Rapid traverse</strong> mm/min⁻¹</td>
<td>X = 30000 (without W), Y/Z = 35000</td>
</tr>
<tr>
<td><strong>CNC control system</strong></td>
<td>Heidenhain TNC 640 / Siemens 840 D SL</td>
</tr>
<tr>
<td><strong>Coolant system</strong></td>
<td>External coolant system via spray rose ring / Internal coolant system of up to 70 bar</td>
</tr>
<tr>
<td><strong>Tool magazine</strong> No. tools</td>
<td>40 / 60 / 80 / 100 / 120</td>
</tr>
<tr>
<td><em>Optional</em></td>
<td></td>
</tr>
</tbody>
</table>
PORTAL AND GANTRY
MILLING BORING
MACHINES › PM | PMG | PRG | PXG
**GANTRY MULTITASKING MACHINE PRG**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PRG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal traverse &quot;X&quot; axis</td>
<td>mm 6000 / 8000 / 10000 / n x 2000</td>
</tr>
<tr>
<td>Cross traverse &quot;Y&quot; axis</td>
<td>mm 5500 / 6000 / 6500 / 7000</td>
</tr>
<tr>
<td>Vertical traverse, Ram &quot;Z axis&quot;</td>
<td>mm 2000</td>
</tr>
<tr>
<td>*Vertical traverse, Cross beam &quot;W axis&quot;</td>
<td>mm 1000 / 1500 / 2000</td>
</tr>
<tr>
<td>Clearance between columns</td>
<td>mm 4500 / 5000 / 5500 / 6000</td>
</tr>
<tr>
<td>Clearance height</td>
<td>mm Up to 5000</td>
</tr>
<tr>
<td>Floor plate width</td>
<td>mm 3500 / 4000 / 4500 / 5000</td>
</tr>
<tr>
<td>Spindle power</td>
<td>kW 43 / 60</td>
</tr>
<tr>
<td>Spindle speed range</td>
<td>min⁻¹ Up to 7000</td>
</tr>
<tr>
<td>Spindle nose taper</td>
<td>ISO-50 / HSK-100</td>
</tr>
<tr>
<td>Rapid traverse</td>
<td>mm/min⁻¹ X = 20000, Y/Z = 25000</td>
</tr>
<tr>
<td>CNC control system</td>
<td>Heidenhain TNC 640 / Siemens 840 D SL</td>
</tr>
<tr>
<td>Coolant system</td>
<td>External coolant system via spray rose ring / Internal coolant system of up to 70 bar</td>
</tr>
<tr>
<td>Tool magazine</td>
<td>No. tools 60 / 80 / 120 / 180</td>
</tr>
</tbody>
</table>

*Optional
**Machine customised according to customer’s requirements

**GANTRY MULTITASKING MACHINE PXG**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PXG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal traverse &quot;X&quot; axis</td>
<td>mm 6000 / 8000 / 10000 / n x 2000</td>
</tr>
<tr>
<td>Cross traverse &quot;Y&quot; axis</td>
<td>mm 7500 / 8500 / 9500 / 10500</td>
</tr>
<tr>
<td>Vertical traverse, Ram &quot;Z axis&quot;</td>
<td>mm 2500 / 3000</td>
</tr>
<tr>
<td>Vertical traverse, Bridge &quot;W axis&quot;</td>
<td>mm 2000 / 3000 / 4000</td>
</tr>
<tr>
<td>Clearance between columns</td>
<td>mm 6000 / 7000 / 8000 / 9000</td>
</tr>
<tr>
<td>Clearance height</td>
<td>mm Up to 7100</td>
</tr>
<tr>
<td>Floor plate width</td>
<td>mm 5000 / 6000 / 7000 / 8000</td>
</tr>
<tr>
<td>Spindle power</td>
<td>kW 60 / 81</td>
</tr>
<tr>
<td>Spindle speed range</td>
<td>min⁻¹ Up to 7000</td>
</tr>
<tr>
<td>Spindle nose taper</td>
<td>ISO-50 / ISO-60 / HSK-100</td>
</tr>
<tr>
<td>Rapid traverse</td>
<td>mm/min⁻¹ X = 12000, Y/Z = 20000</td>
</tr>
<tr>
<td>CNC control system</td>
<td>Heidenhain TNC 640 / Siemens 840 D SL</td>
</tr>
<tr>
<td>Coolant system</td>
<td>External coolant system via spray rose ring / Internal coolant system of up to 70 bar</td>
</tr>
<tr>
<td>Tool magazine</td>
<td>No. tools 80 / 120 / 180</td>
</tr>
</tbody>
</table>

*Machine customised according to customer’s requirements
In order to cater to the diverse needs of each customer, SORALUCE’s advanced head technology is fundamental and provides the necessary customisation for an optimal configuration, with the possibility of including a large variety of standard heads and special solutions.
SORALUCE has developed an automatic head changing system with adapter flanges. The system consists of a specially prepared machine ram and a specific head adapter flange for each head.

The accurate fitting of the heads onto the ram is achieved by hirth couplings, with each milling head being clamped onto the ram by several hydraulic clamping cylinders. Fluid and electricity supplies are provided via quick release couplings and connectors.

Fully enclosed pick-up stations for milling heads are provided to protect heads from pollution from the machining processes and workshop environment when not in use.

Pick-up station for turning holders attached to the cross beam in order to minimise the head changing system cycle in any position of the longitudinal axis.

- Experience since 1996
- Fully modular system
- More than 400 machines working with this system
The working height in PM, PMG, PRG and PWG models is configurable thanks to the vertical travel of the cross beam.

This makes the machine very flexible in terms of working volume.

The movement of the system is driven by means of two ballscrews working in gantry mode, and it is equipped with the corresponding security devices like safety brakes and the friction safety nut it each ballscrew.

The positioning of the axis is fully automatic and the accuracy is ensured thanks to a laser interferometer-based calibration.
VERSATILITY
HIGHLY
CONFIGURABLE

WORKSTATIONS

The working area can be configured according to the specific needs of each customer, with one or several work stations, which makes it possible to carry out simultaneous machining and part preparation operations.

In the work stations you can integrate floor plates, angle plates, auxiliary tables, rotary or rotary-travelling milling tables and turning tables.
MULTITASKING

SORALUCE P range is a versatile multitasking solution oriented to maximize productivity. It integrates several cutting processes including turning, milling, boring, drilling and tapping in one machine, offering increased capability and functionality.

It provides the highest parameters of profitability in the machining of pieces of big size and high technical complexity, allowing the machining of several morphologies and sizes.

Full complement of multi-tasking capabilities by SORALUCE design turning heads, tables and customer cycles.

Turning table

The rotary table is directly mounted on a high precision crossed roller bearing. The SORALUCE design enables highest accuracy and rigidity for heavy duty vertical turning operations. The main crossed roller bearing is assembled one by one based on SORALUCE expertise in this field.

Thanks to the hydrostatic circuit of rotary tables, the load unbalance can be measured and the operator can be assisted in balancing the system using additional external loads. This functionality is fully integrated in the CNC.

<table>
<thead>
<tr>
<th>Turning table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
</tr>
<tr>
<td>Load capacity</td>
</tr>
<tr>
<td>Power</td>
</tr>
</tbody>
</table>
TOOL MAGAZINE

SORALUCE offers a wide range of standard tool magazines as ad-hoc systems responding to customer requirements.

Tool management features:
Length, diameter, tool wear, coolant section

CNC UNITS

Heidenhain TNC 640
The TNC 640 NC system by Heidenhain boasts the qualities demanded by highly technological machines now including multitasking capabilities.
› Wide variety of milling and turning cycles
› Time and cost saving
› HEIDENHAIN conversational or DIN/ISO programming with the simple Klartext dialogue

Siemens 840 D SL
The SINUMERIK 840D SL is a premium class CNC, with a superior system flexibility. It is the CNC of choice when opening up completely new technology fields.
› Modular and scalable
› Benchmark in open architecture
› Communicative at all levels
COMFORT, SAFE AND ERGONOMIC

SORALUCE has created a new range of machines that will revolutionise the market thanks to the creation of a more human and ergonomic environment, while also significantly increasing the safety and ergonomics parameters.

OPERATOR’S PLATFORM

- One or two operator’s platforms with their respective control panels, thus allowing the best position for the operator during each operation
- Operator platform vertical and cross movements
- Complete work bench with a panel to hang drawings and documents
- Folding seat
- Soundproofed cabin
- Sound system (option)
- Generous interior lighting integrated in the ceiling
- Air conditioning (option)
- Sliding door with a window that gives the possibility to manually unfold a balcony to approach to the head in any position
- Enhanced visibility, large glass windows
- Support for special tools in the external platform
- Uncontrolled descent prevention system
- Floor with special anti-slip painted floor plating
TOOL MAGAZINE
- Full visibility of the tool magazine
- Storage area’s closure protecting sensitive items inside it against chips and coolant
- Sliding shutter to ease tool loading / unloading

MAINTENANCE
- The intervention areas are now more accessible
- Sliding shutters and doors to avoid the disassembly of panels
- Improved protection of the critical areas of the equipment
- Gauges and levels sights from the outside without having to remove panels
- Spacious areas to ease the maintenance tasks
- Specific signals to indicate maintenance and service points