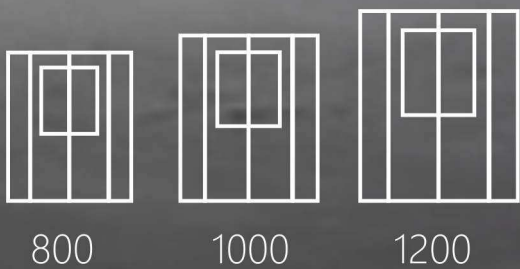
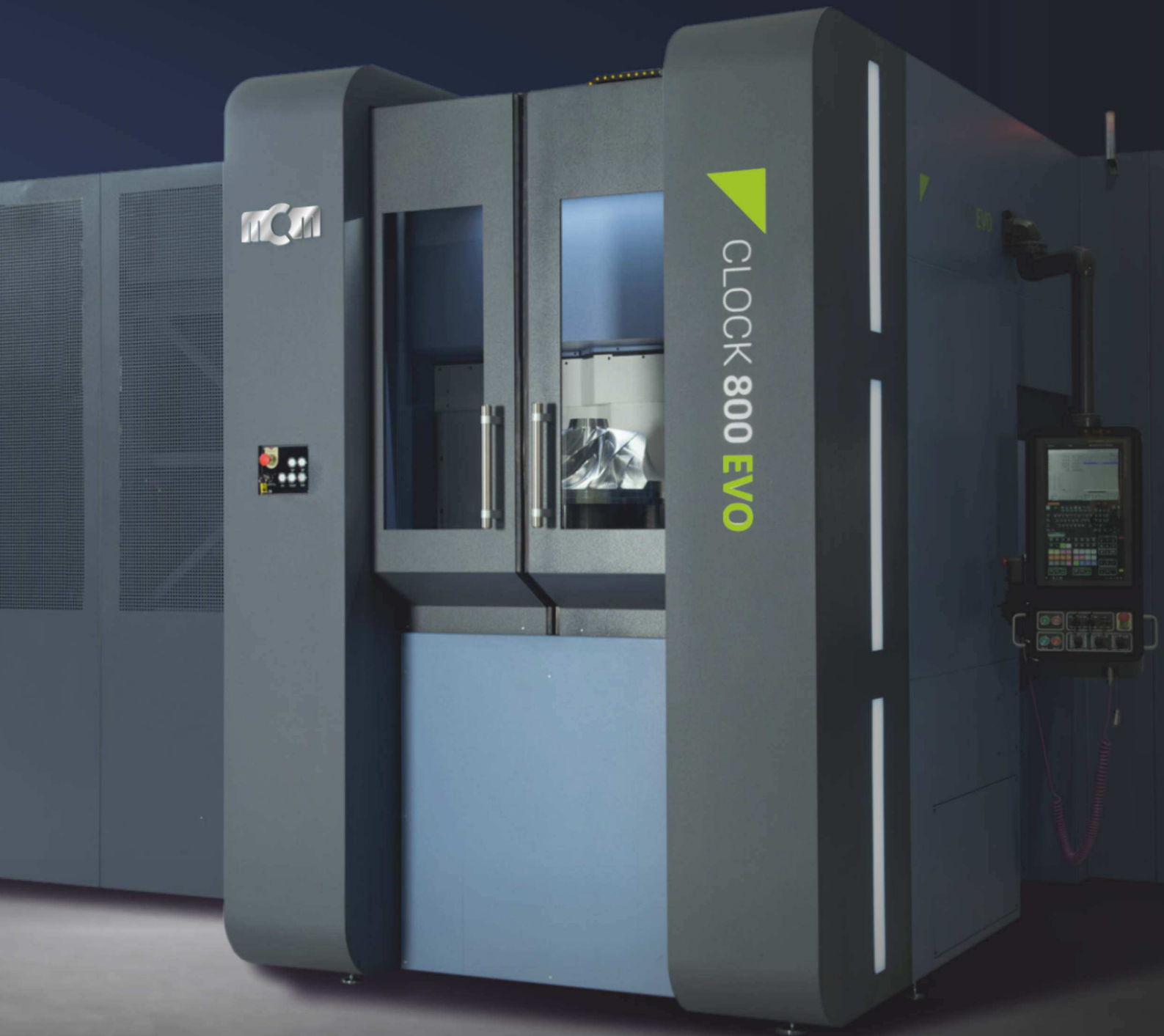


CLOCK **EVO** LINE

THE NEW STANDARD IN HORIZONTAL MACHINING CENTERS



CLOCK >> CLOCK EVO



APPLICATIONS



AEROSPACE



AUTOMOTIVE



HEAVY EQUIPMENT
AGRICULTURAL
MACHINERY



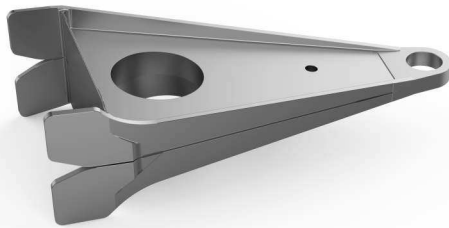
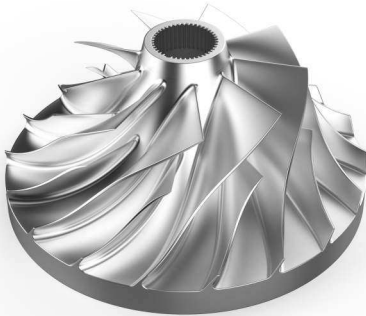
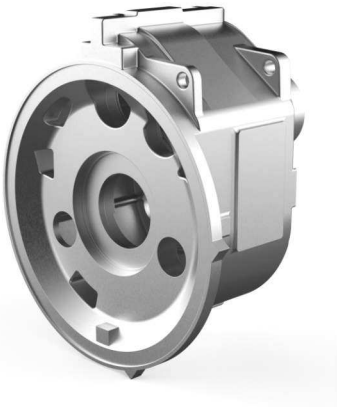
ENERGY
OIL & GAS



MACHINERY,
TOOLING, DEFENCE

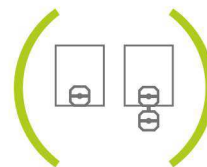


INDUSTRIAL
COMPONENTS



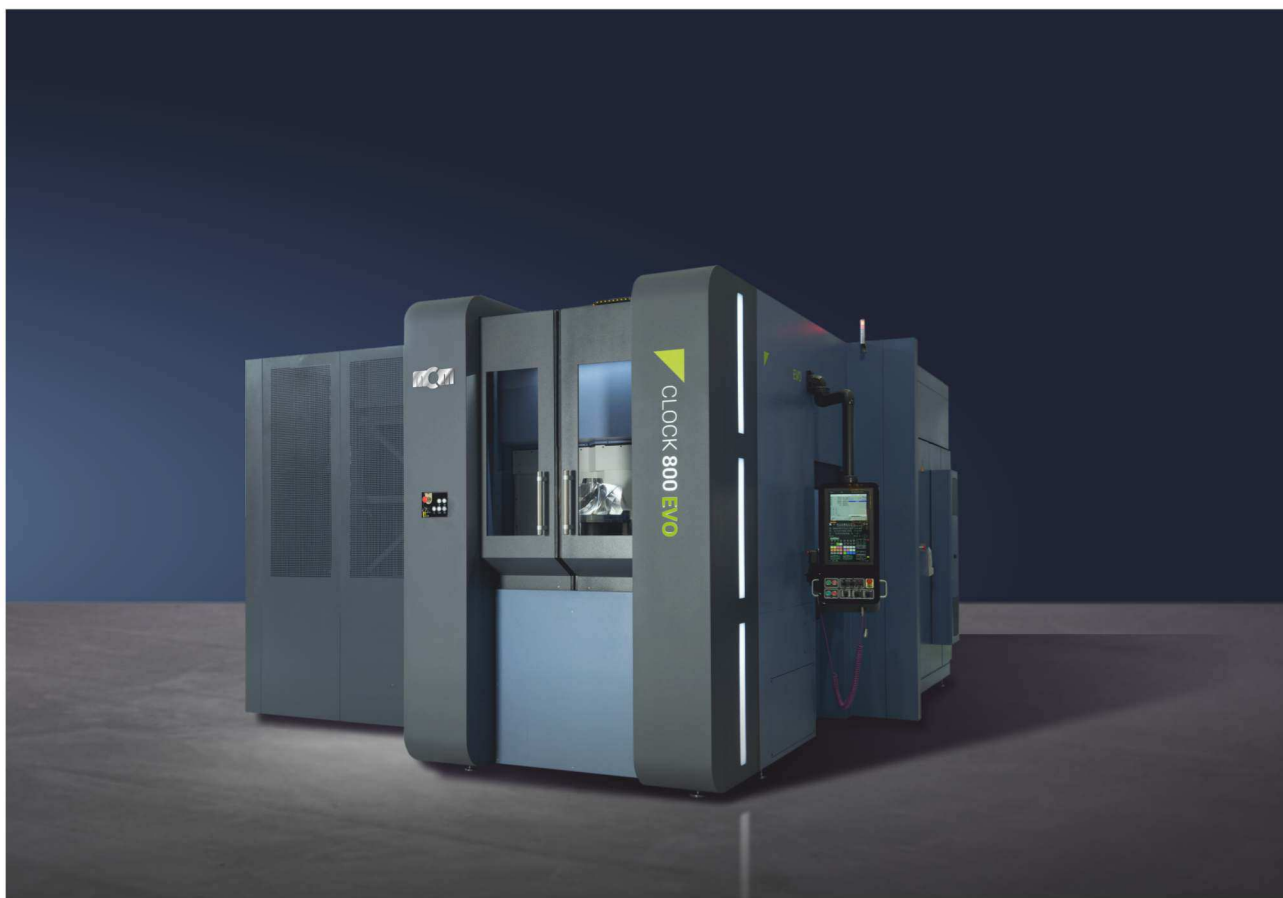
SINGLE / TWIN PALLET

SMART MANUFACTURING GOES COMPACT

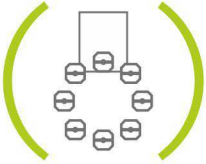


The whole CLOCK EVO family is available starting from single and twin-pallet configurations. Dedicated solutions allow to join compactness with process flexibility, such as specific supervision software availability and ergonomic design. A wide

frontal and roof (for single-pallet configuration) opening system allows to load heavy parts directly from the shopfloor crane. All multitasking and layout flexibility features are now available in a modern and stylish design.



Available in 4 and 5-axis configuration with multitasking functions of turning, grinding and power skiving

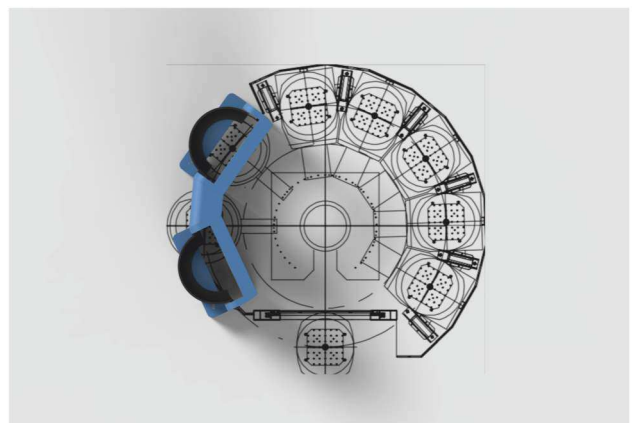
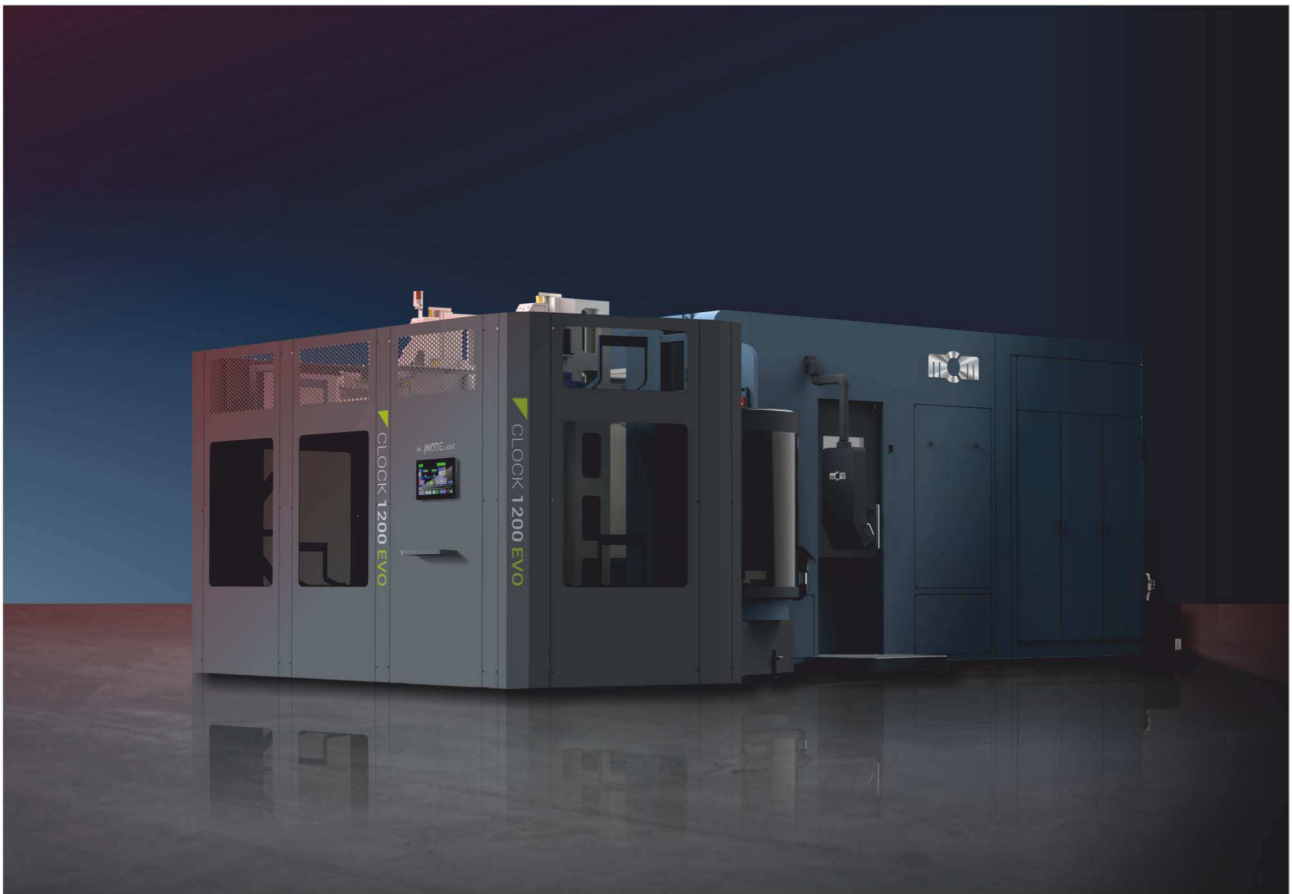


MULTIPALLET

AUTONOMY FIRST

Multipallet solutions are part of MCM DNA, representing the best compromise between flexibility, autonomy and easy-to-use system. Up to 15 pallets can be managed by one machine thanks to jFMX supervision software and to an innovative

smart design that optimizes the pallet storage unit overall dimensions. A new pallet changer structure improves pallet manipulation times as well as the new operator loading and unloading station.



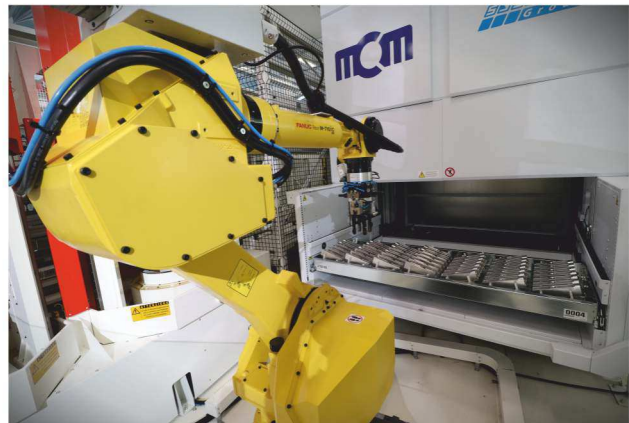
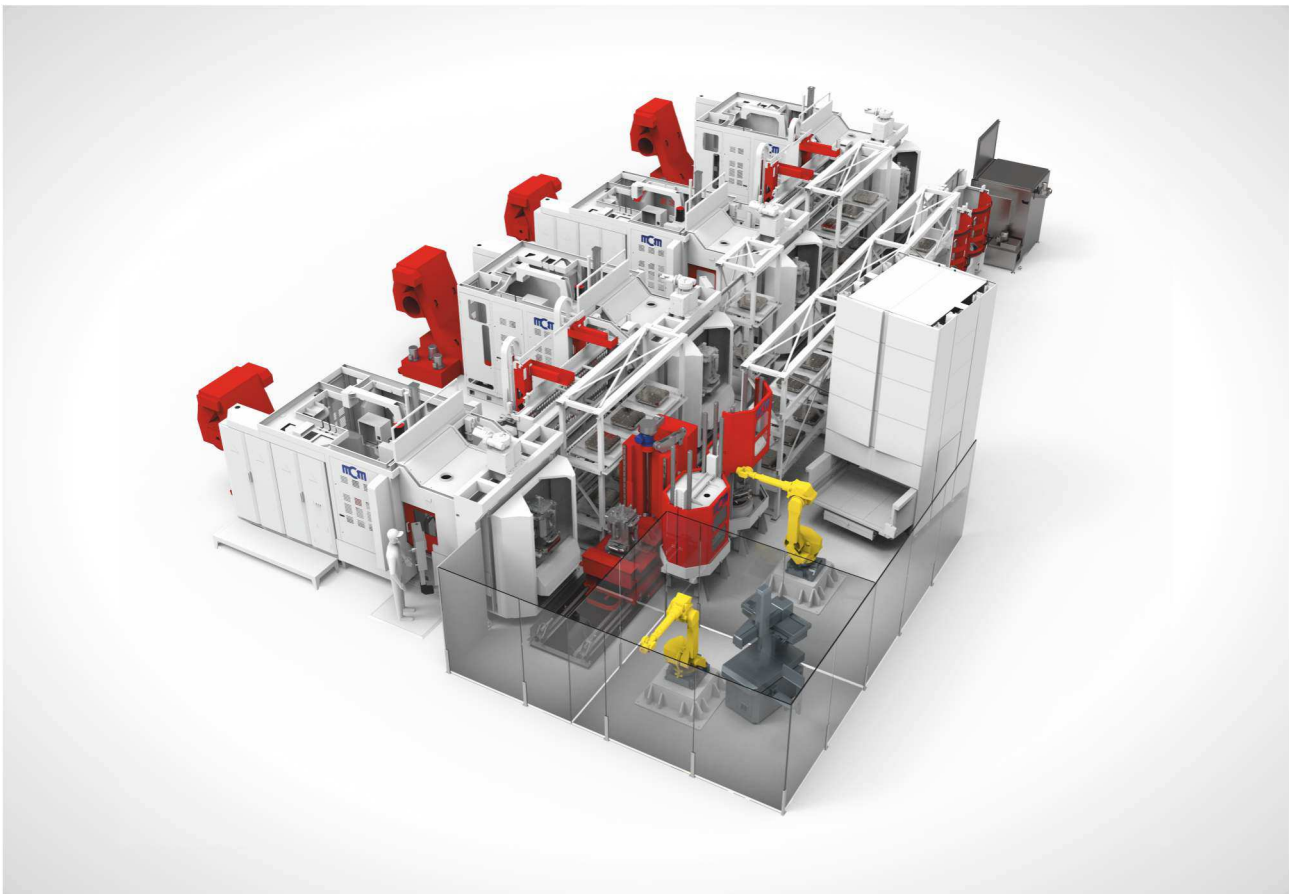


FMS

FLEXIBLE PRODUCTION AND SYSTEM INTEGRATION

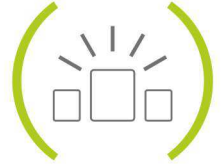
MCM has been building its own FMS systems since the 80's. As per all MCM machining centers, CLOCK EVO can be integrated in flexible systems for the most advanced applications of manufacturing. On the side of CLOCK EVO machines auxiliary

technologies can be integrated (i.e. CMM, washing stations, robots, EDM, storage units), coordinated by jFMX supervision software. Moreover, advanced tool-sharing technologies (SuperTool) are built by MCM for the maximum level of flexibility.



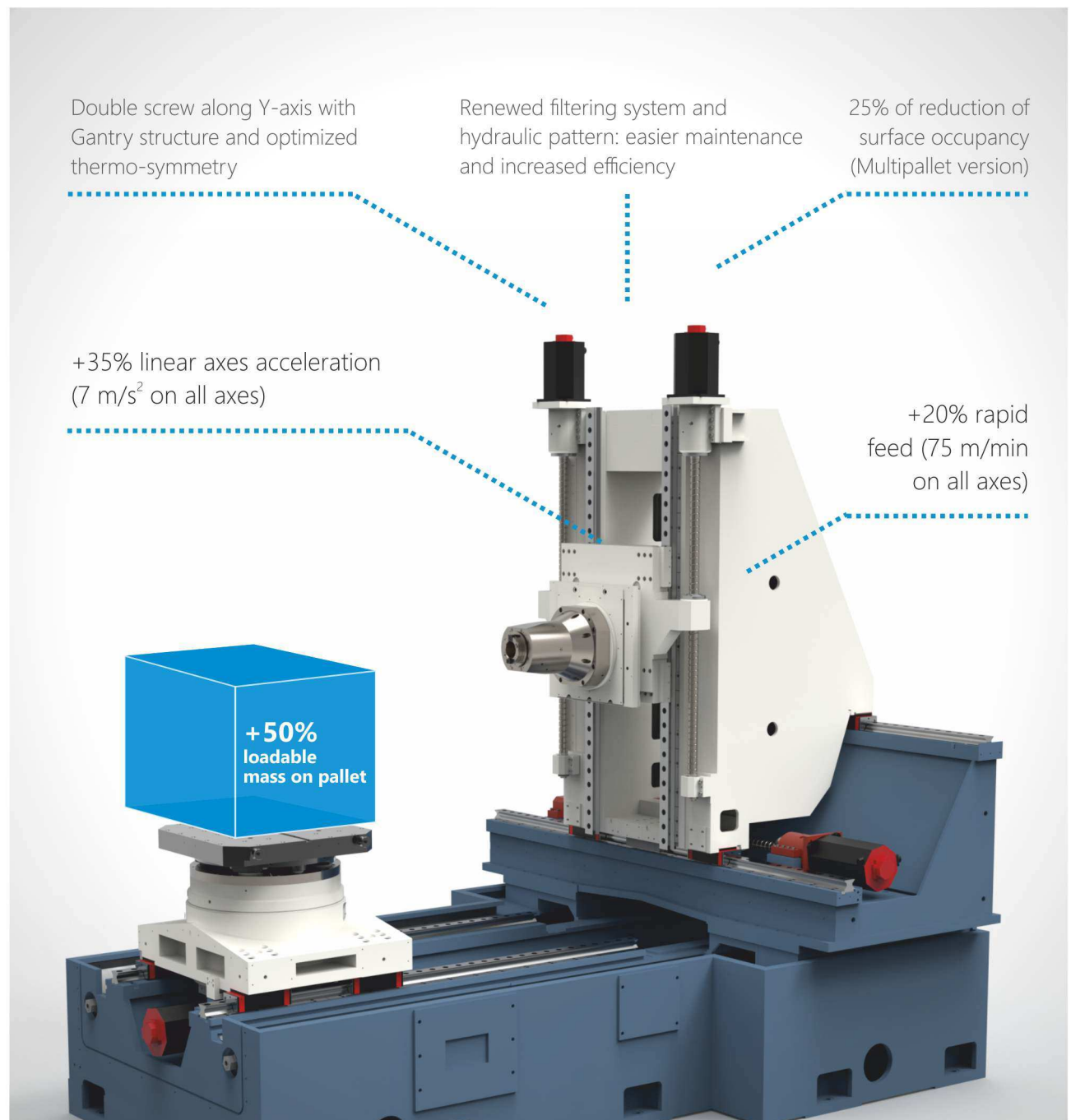
HIGHLIGHTS

IMPROVING THE BEST



The new CLOCK EVO encloses more than 40 years of continuous improvement by MCM. The solid, reliable structure has been further improved and the overall machine dimensions and height reduced of about 25% even if the working volume

has been enhanced. A new ergonomic construction scheme, more efficient machining and dynamic performance and a green-friendly design make CLOCK EVO the new state of the art for small-medium size machining centers.



4-axis Clock EVO

Highlights



CLOCK EVO has been designed to match flexibility, high dynamics, rigidity and accuracy. The machine structure is T-shaped with mobile column in the transversal direction and table with longitudinal movement. Horizontal axis spindle. The structure is engineered to have the maximal rigidity with a constant accuracy in geometry. The design of the axes

guarantees guides and screws in an optimal position to obtain high dynamic qualities. The double layer position of the X-axis guides represents the state of the art in stiffness and thrust resistance in heavy duty machining. The table rotation axis (B) is driven by a Torque Motor and is equipped with a measurement detection made with an absolute encoders.

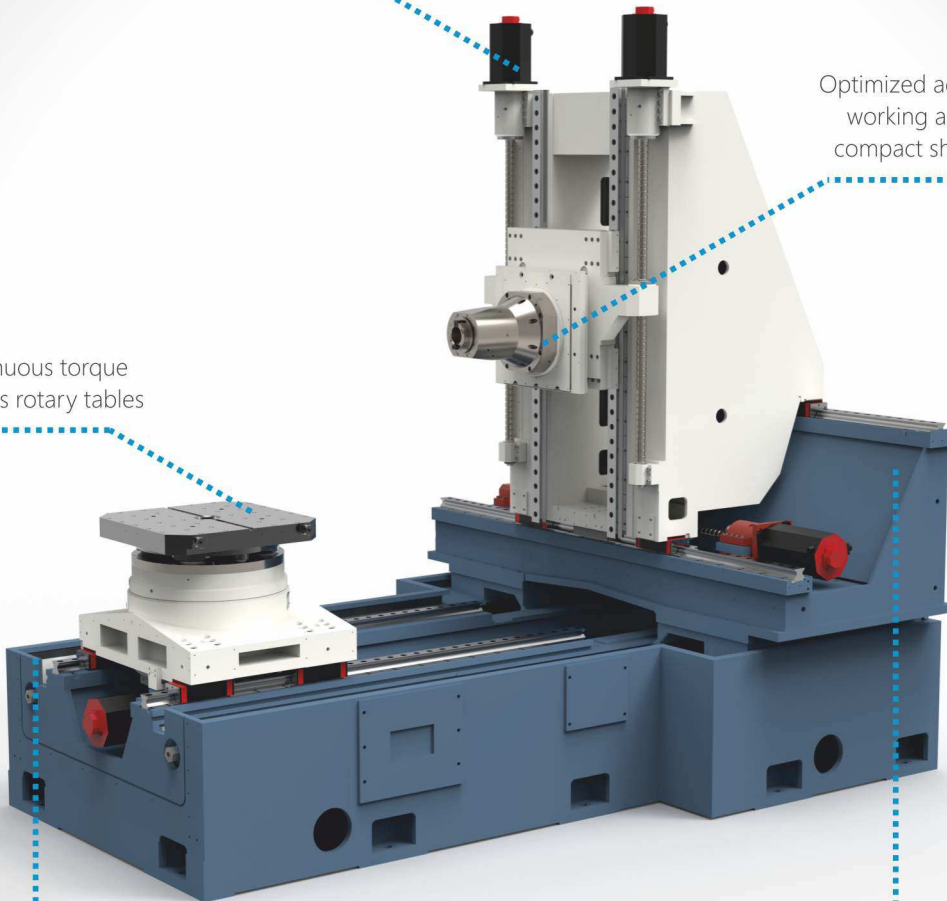
High dynamic performances thanks to double motors on Y-axis

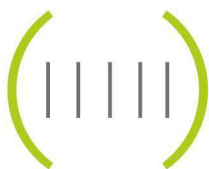
Optimized accessibility to working area thanks to compact shape spindles

Continuous torque motors rotary tables

Double lateral chip evacuation channels

Maximum machinable work-piece mass up to 2500 kg (single pallet version)



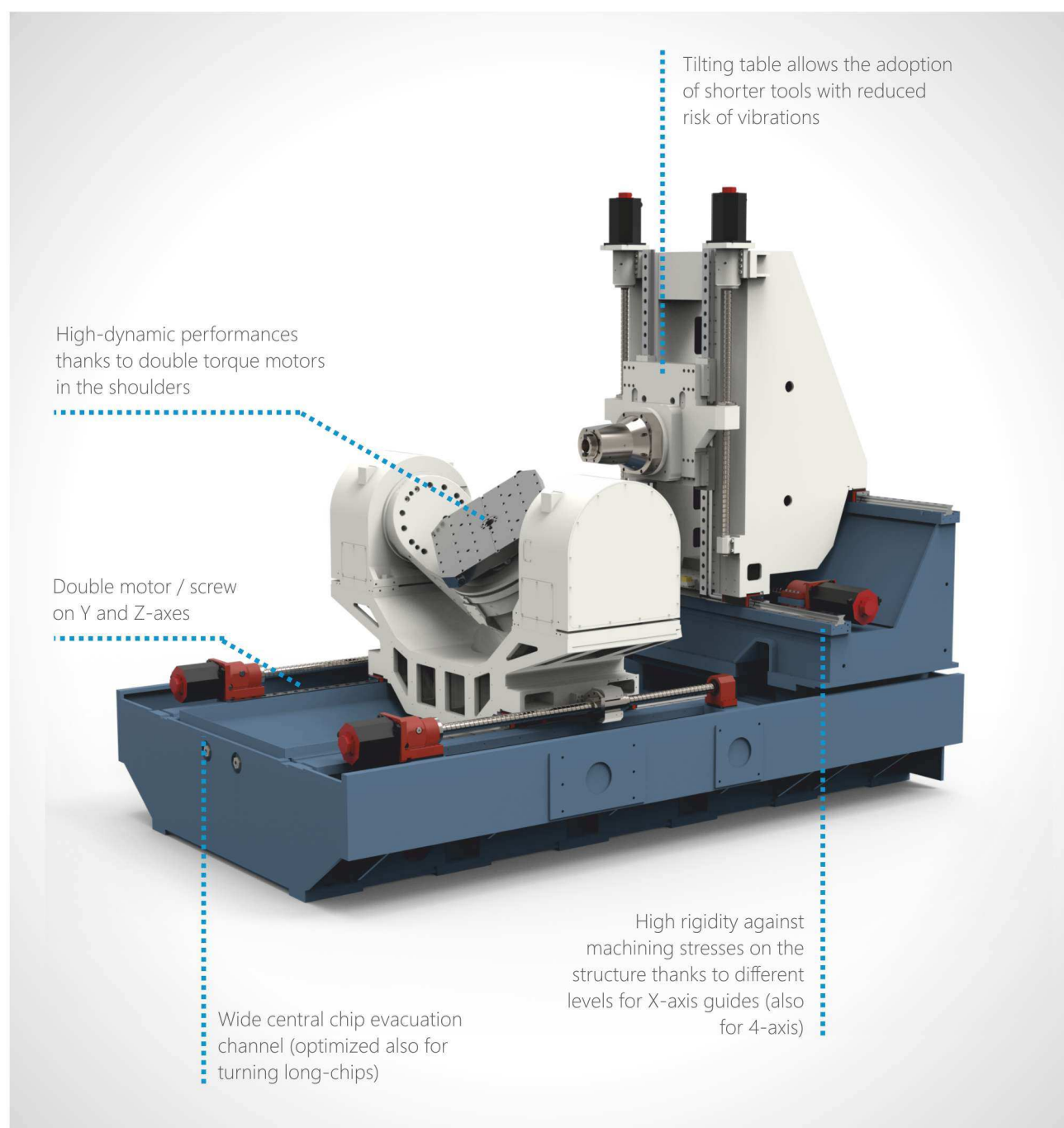


5-axis Clock EVO

Highlights

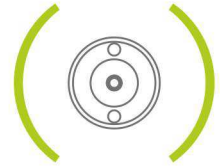
The 5-axis cinematic is obtained by a Tilting Table made of 2 NC controlled rotating axes carrying a bridge NC table with heavy loading capacity. All axes are equipped with direct drives made through torque motors fully integrated into the 5-axis table

structure. The tilting axis (A) is equipped with two opposed torque motors while the table rotation axis (B) has a single torque motor. Both axes are equipped with a hydraulic clamping and measuring system by absolute encoders.



SPINDLES

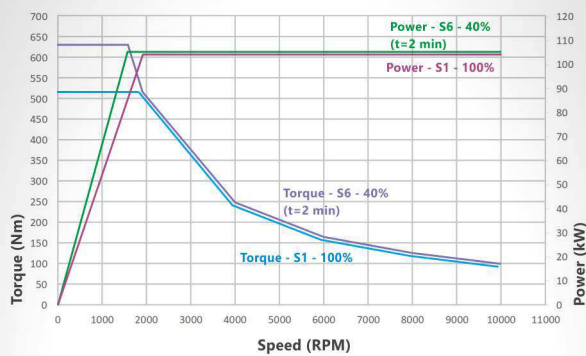
BUILT TO EXCEL



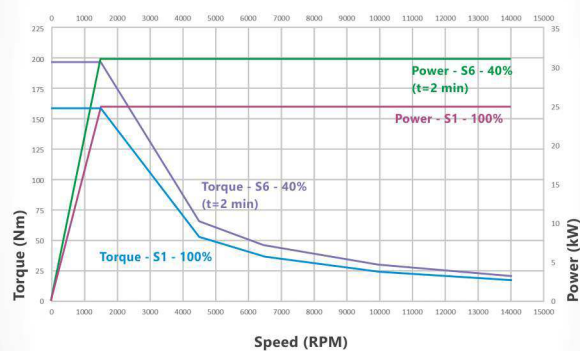
MCM electrospindles can boost an average life length of 500% more with respect to other builders. The exclusive MCM design, the hand-made building process, the attention for details and reliability allow to offer a wide range of MCM designed spindles for CLOCK EVO model. All this allows to cover efficiently a wide range of machined materials with

powers up to 120 kW and ISO 40 – 50, HSK A63 – 100, CAPTO C6 – C8 tool-tapers. MCM-designed spindles present advanced solutions such as the variable pre-loading level on the bearings depending on the heaviness of the ongoing machining operation.

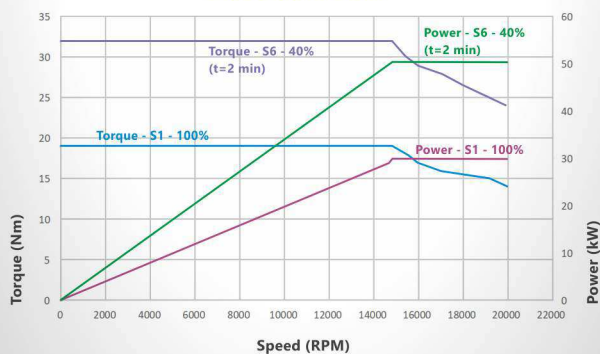
10.000 RPM

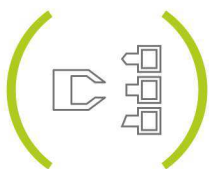


14.000 RPM



20.000 RPM



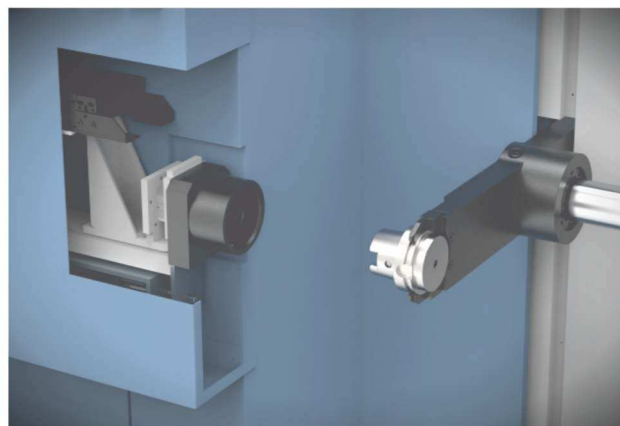
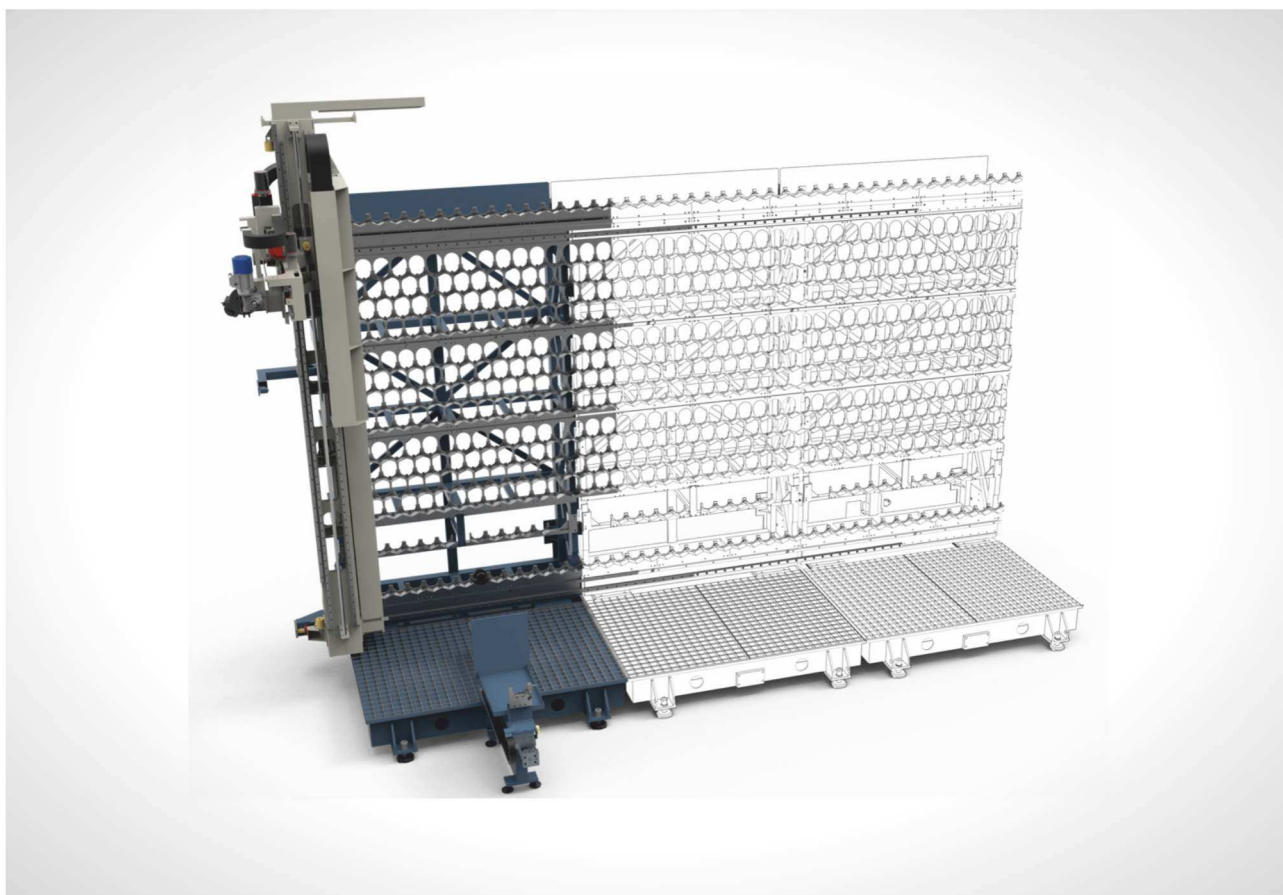


TOOL MANAGEMENT

HIGH CAPACITY, HIGHLY CONFIGURABLE, QUICK

CLOCK EVO tool-magazine has been renewed maintaining the consolidate features of flexibility and reliability and improving the tool regeneration and the tool-changing time. Mirror solutions (one tool-magazine serving two machines in a FMS system) are possible and tool-magazine orientation can

be adapted even to particular shopfloor layout conditions. MCM tool-magazines are modular, the size and the capacity can be easily increased even after the first installation. Thus, following the needs of future change of production scenarios.



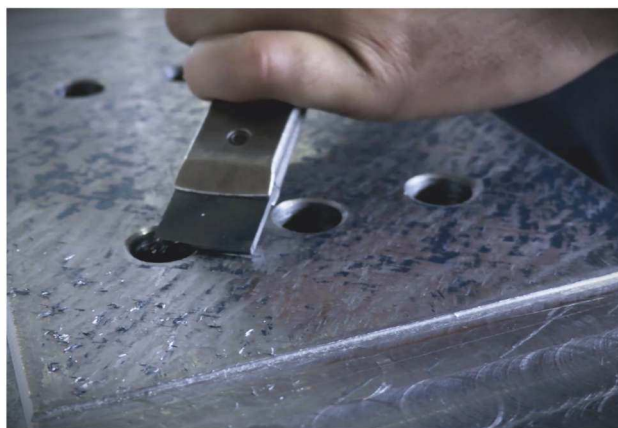
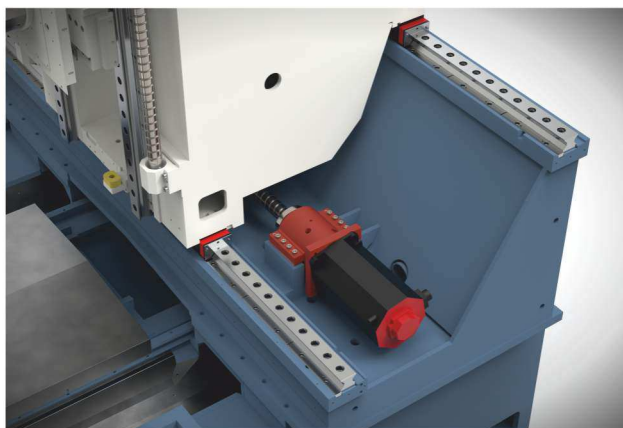


ACCURACY

NO COMPROMISES ABOUT PRECISION

More than 200 hours of manual scraping on the structure, the adoption of pressurized optical scales and encoders, an excellent thermo-symmetrical structure and refrigeration system, designed to avoid any disharmonic deformation due

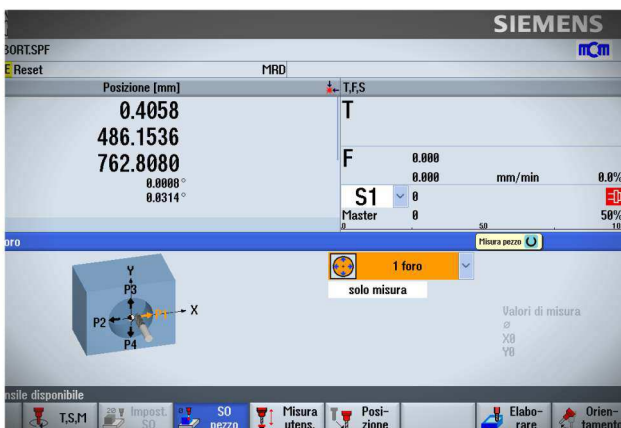
to heat, and the use of best class screw, are some of the key points that make MCM machines extremely reliable under the accuracy aspects. CLOCK EVO maintains all the winning features of the bigger MCM models in a new compact shape.





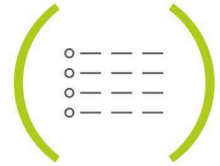
CNC Siemens / Fanuc

A NEW, SMART HUMAN-MACHINE INTERACTION



TECHNICAL DATA

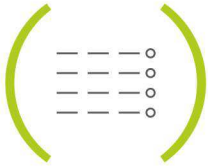
Clock 800



		4-AXIS	5-AXIS	Multitasking
Working Area				
X-Axis Stroke	[mm]	800	800	800
Y-Axis Stroke	[mm]	800	800	800
Z-Axis Stroke	[mm]	800	800	800
X/Y/Z Axis Thrust	[kN]	8	8	8
X/Y/Z Axis Rapid Feed	[m/min]	75	75	75
Pallet				
Option 1	[mm]	500 x 500	500 x 500	500 x 500
Option 2	[mm]	500 x 630	500 x 630	500 x 630
Option 3 ²	[mm]	-	-	Ø 630
Rotary Table (B-Axis)				
Max. Rotation Speed	[RPM]	100	100	100 / 1.200 ³
5th Axis (A-Axis)				
Type		-	Tilting Table	Tilting Table
Max. Tilting Speed	[RPM]	-	40	40
Tilting Angle	[degrees]	-	140 (+35/-105)	140 (+35/-105)
Accuracy				
Linear Axes				
A/M/R as per ISO 230-2	[µm]	4 / 2 / 3	4 / 2 / 3	4 / 2 / 3
Circular Axes				
A/M/R as per ISO 230-2	[arcsec]	4 / 2 / 3	4 / 2 / 3	4 / 2 / 3
Spindle Unit				
Tool-Taper		HSK-A / ISO	HSK-A / ISO	HSK-T / CAPTO
Speed Range	[RPM]	from 10.000 to 30.000	from 10.000 to 30.000	from 10.000 to 30.000
Max. Power (up to)	[kW]	120	120	120
Max. Torque (up to)	[Nm]	320	320	320
Tool-Magazine				
Capacity (up to)	[n.]	80 (500+)	80 (500+)	80 (500+)
Tool Mass (up to)	[kg]	25	25	25
Max. Length (up to)	[mm]	500	500	500
Max. Diameter (up to) ⁴	[mm]	300	300	300
Machine Data				
Indicative Footprint Area	[m ²]	20 ⁵	20 ⁵	20 ⁵
Indicative Weight	[kg]	14.500 ⁵	14.500 ⁵	14.500 ⁵
Available Configurations		Single-Pallet / Twin-Pallet / Multi-Pallet / FMS		

Notes_ The data indicated in this table are referred to a twin-pallet configuration

¹ Available as an option / ² Further Options Available / ³ Available for Multitasking machining centers only, turning max. speed depends on mass of component+fixture / ⁴ Free contiguous tool places / ⁵ Depending on configuration



TECHNICAL DATA

Clock 1000

		4-AXIS	5-AXIS	Multitasking
Working Area				
X-Axis Stroke	[mm]	1.000	1.000	1.000
Y-Axis Stroke	[mm]	1.000	1.000	1.000
Z-Axis Stroke	[mm]	1.100	1.000	1.000
X/Y/Z Axis Thrust	[kN]	10	10	10
X/Y/Z Axis Rapid Feed	[m/min]	75	75	75
Pallet				
Option 1	[mm]	630 x 630	630 x 630	630 x 630
Option 2	[mm]	630 x 800	630 x 800	630 x 800
Option 3 ²	[mm]	-	-	Ø 800
Rotary Table (B-Axis)				
Max. Rotation Speed	[RPM]	100	100	100 / 800 ³
5th Axis (A-Axis)				
Type		-	Tilting Table	Tilting Table
Max. Tilting Speed	[RPM]	-	40	40
Tilting Angle	[degrees]	-	145 (+25/-120)	145 (+25/-120)
Accuracy				
Linear Axes				
A/M/R as per ISO 230-2	[µm]	4 / 3 / 3	4 / 3 / 3	4 / 3 / 3
Circular Axes				
A/M/R as per ISO 230-2	[arcsec]	4 / 2 / 3	4 / 2 / 3	4 / 2 / 3
Spindle Unit				
Tool-Taper		HSK-A / ISO	HSK-A / ISO	HSK-T / CAPTO
Speed Range	[RPM]	from 8.000 to 30.000	from 8.000 to 30.000	from 8.000 to 30.000
Max. Power (up to)	[kW]	120	120	120
Max. Torque (up to)	[Nm]	541	541	541
Tool-Magazine				
Capacity (up to)	[n.]	80 (500+)	80 (500+)	80 (500+)
Tool Mass (up to)	[kg]	25	25	25
Max. Length (up to)	[mm]	600	600	600
Max. Diameter (up to) ⁴	[mm]	320	320	320
Machine Data				
Indicative Footprint Area	[m ²]	23 ⁵	23 ⁵	23 ⁵
Indicative Weight	[kg]	24.000 ⁵	24.000 ⁵	24.000 ⁵
Available Configurations		Single-Pallet / Twin-Pallet / Multi-Pallet / FMS		

Notes_ The data indicated in this table are referred to a twin-pallet configuration

¹ Available as an option / ² Further Options Available / ³ Available for Multitasking machining centers only, turning max. speed depends on mass of component+fixture / ⁴ Free contiguous tool places / ⁵ Depending on configuration



TECHNICAL DATA

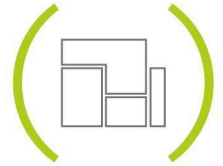
Clock 1200

		4-AXIS	5-AXIS	Multitasking
Working Area				
X-Axis Stroke	[mm]	1.200	1.200	1.200
Y-Axis Stroke	[mm]	1.000	1.000	1.000
Z-Axis Stroke	[mm]	1.100	1.000	1.000
X/Y/Z Axis Thrust	[kN]	12	12	12
X/Y/Z Axis Rapid Feed	[m/min]	75	75	75
Pallet				
Option 1	[mm]	630 x 630	630 x 630	630 x 630
Option 2	[mm]	630 x 800	630 x 800	630 x 800
Option 3 ²	[mm]	-	-	Ø 800
Rotary Table (B-Axis)				
Max. Rotation Speed	[RPM]	100	100	100 / 800 ³
5th Axis (A-Axis)				
Type		-	Tilting Table	Tilting Table
Max. Tilting Speed	[RPM]	-	40	40
Tilting Angle	[degrees]	-	145 (+25/-120)	145 (+25/-120)
Accuracy				
Linear Axes				
A/M/R as per ISO 230-2	[µm]	4 / 3 / 3	4 / 3 / 3	4 / 3 / 3
Circular Axes				
A/M/R as per ISO 230-2	[arcsec]	4 / 2 / 3	4 / 2 / 3	4 / 2 / 3
Spindle Unit				
Tool-Taper		HSK-A / ISO	HSK-A / ISO	HSK-T / CAPTO
Speed Range	[RPM]	from 8.000 to 30.000	from 8.000 to 30.000	from 8.000 to 30.000
Max. Power (up to)	[kW]	120	120	120
Max. Torque (up to)	[Nm]	541	541	541
Tool-Magazine				
Capacity (up to)	[n.]	80 (500+)	80 (500+)	80 (500+)
Tool Mass (up to)	[kg]	25	25	25
Max. Length (up to)	[mm]	600	600	600
Max. Diameter (up to) ⁴	[mm]	320	320	320
Machine Data				
Indicative Footprint Area	[m ²]	33 ⁵	33 ⁵	33 ⁵
Indicative Weight	[kg]	29.500 ⁵	29.500 ⁵	29.500 ⁵
Available Configurations		Single-Pallet / Twin-Pallet / Multi-Pallet / FMS		

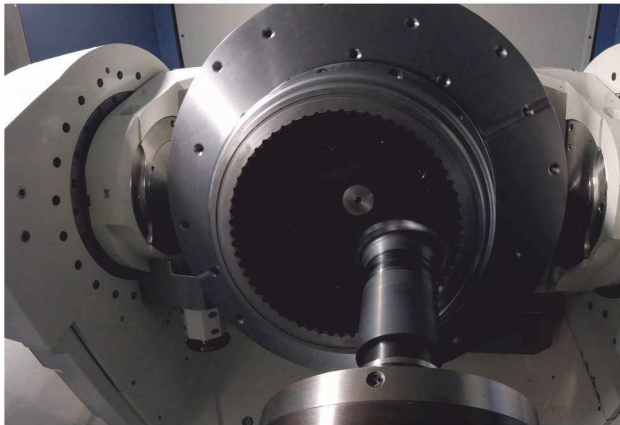
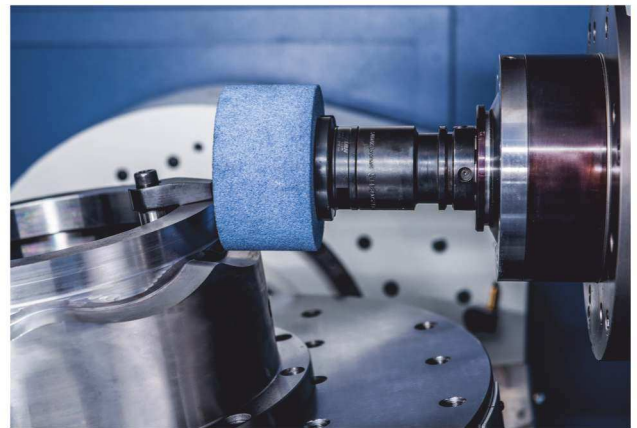
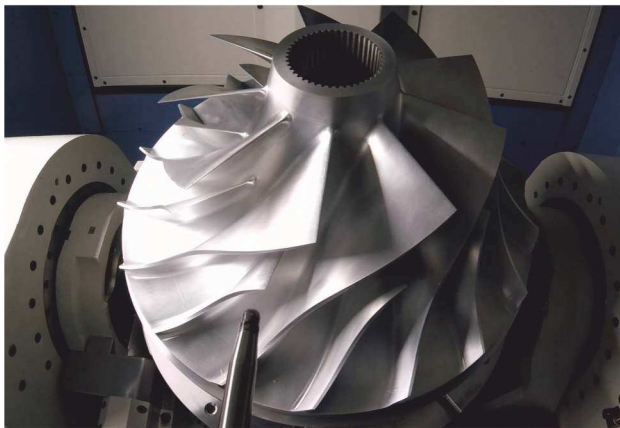
Notes_ The data indicated in this table are referred to a twin-pallet configuration

¹Available as an option / ² Further Options Available / ³ Available for Multitasking machining centers only, turning max. speed depends on mass of component+fixture / ⁴Free contiguous tool places / ⁵Depending on configuration

MULTITASKING



- Milling
- Turning
- Grinding
- Power Skiving



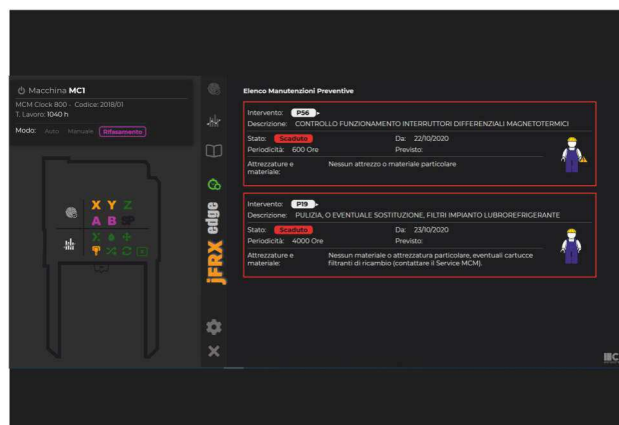
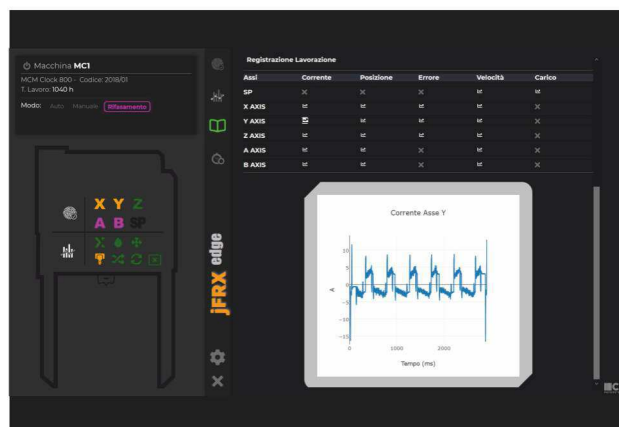
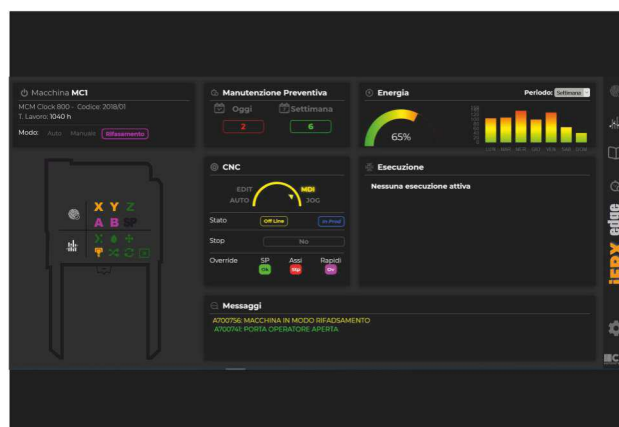
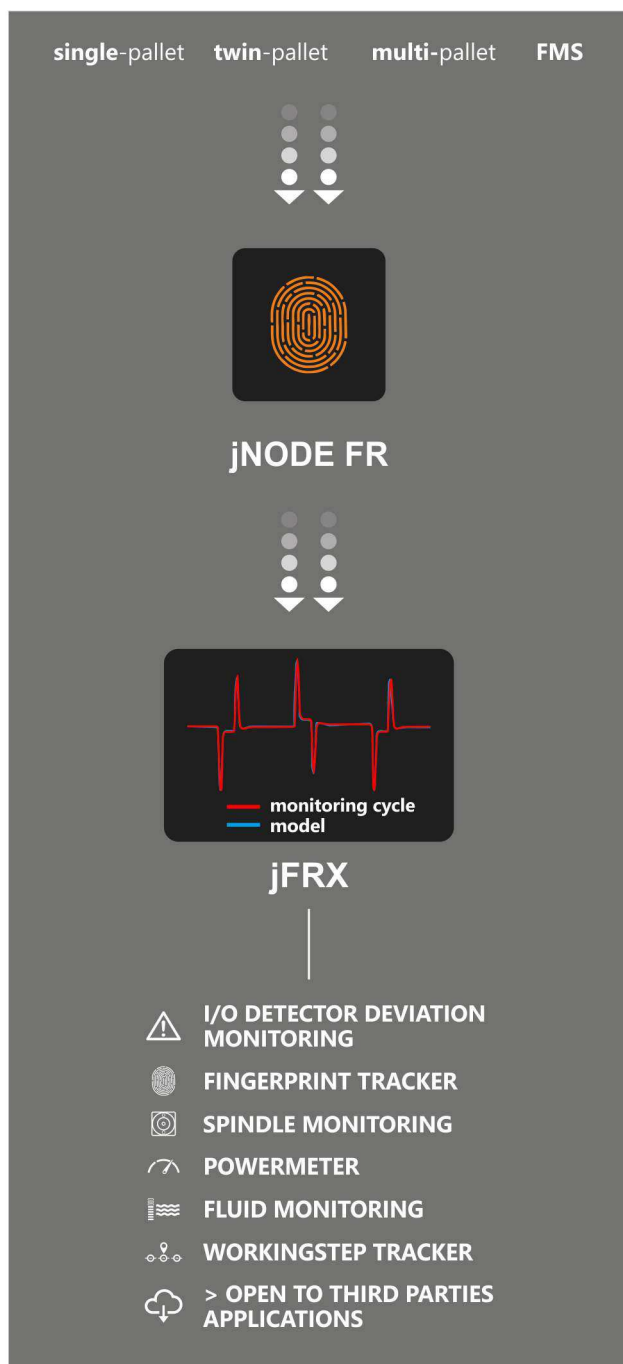
jFRX

ENABLING PREDICTIVE MAINTENANCE



jFRX is the new software by MCM which enables predictive maintenance concepts. Based on Industry 4.0 principles, jFRX records and analyzes a large number of outputs coming from the process and the machine. Thanks to the comparison of these data between a reference optimal status and the current

machine status, it is possible to discover potential functional drift trends, avoiding unexpected breakdowns. Cloud connectivity and MCM Service remote assistance strength up the reliability of the machine and the user satisfaction.





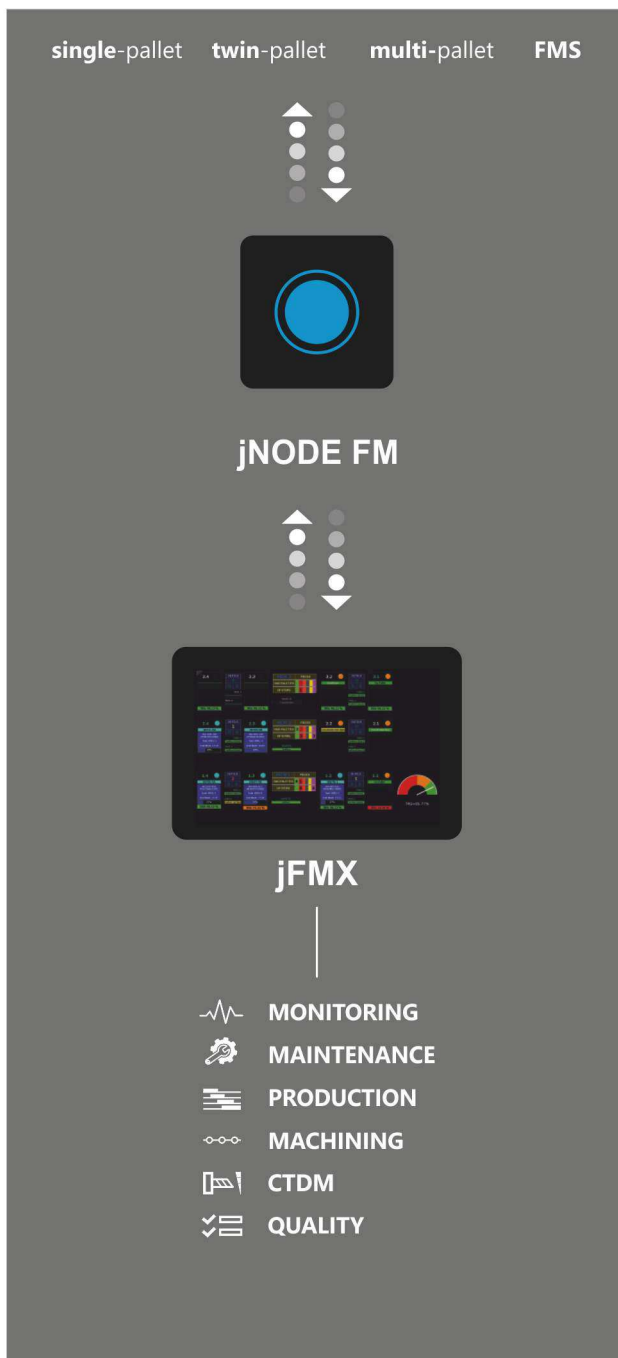
jFMX

SUPERVISION SOFTWARE

jFMX can supervise all the aspects of the ongoing process and of the machine. jFMX architecture can be scaled from a simple single-pallet machine to a complex FMS.

jFMX can manage in an efficient way: tools, pallets, workpieces,

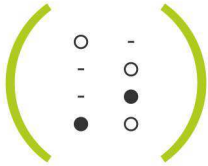
programs, sequences, priorities, resources, inputs / outputs, etc.. Moreover, it can be interfaced with other customer's management softwares always ensuring a high level of cyber-security.



OPTIONS



	CLOCK 800 EVO		CLOCK 1000 EVO		CLOCK 1200 EVO	
	4AX	5AX	4AX	5AX	4AX	5AX
AVAILABLE STRUCTURES						
Continuous rotary table (B-Axis) with Torque motor transmission	●	-	●	-	●	-
Tilting table for milling operation with dual-Torque motor transmission	-	●	-	●	-	●
Tilting table for milling and turning operation with dualTorque motor transmission	-	○	-	○	-	○
Grinding function with dressing wheel inside the workarea	○	○	○	○	○	○
ELECTROSPINDLE						
Electrospindle HSK-A63, 14.000rpm, 25kw (S1), 159Nm (S1)	●	●	○	○	○	○
Electrospindle HSK-A100 14.000rpm, 45kw (S1), 276Nm (S1)	○	○	●	●	●	●
Other tool-tapers available: ISO40 - ISO50 - CAPTO C6 - CAPTO C8	○	○	○	○	○	○
ELECTROSPINDLE OPTIONS						
Spindle cooling	●	●	●	●	●	●
Spindle extension compensation	●	●	●	●	●	●
Variable preloading bearings	●	●	●	●	●	●
Spindle vibration verification system (VIBROCONTROL)	●	●	●	●	●	●
STOP-BLOCK MCM for angular heads	○	○	○	○	○	○
TOOL-MAGAZINE						
Side tool-magazine 1 module 3 levels: 176 tools HSK100 / 343 tools HSK63	●	●	●	●	●	●
Additional modules and levels up to 692 tools HSK100 / 1354 tools HSK63	○	○	○	○	○	○
Front loading / unloading tool station	○	○	○	○	○	○
Rear loading / unloading tool station	○	○	○	○	○	○
RFID Balluf reading/writing system type "M"	○	○	○	○	○	○
jTERM 2.0 terminal for loading / unloading tool	○	○	○	○	○	○
AUTOMATION						
Twin-Pallet machine structure	●	●	●	●	●	●
Single-Pallet / FMS machine structure	○	○	○	○	○	○
Multipallet MP7 with two pallets manipulator - 1 loading/unloading station	○	○	○	○	○	○
Multipallet MP9 with two pallets manipulator - 1 loading/unloading station	○	○	○	○	○	○
Multipallet MP15 with two pallets manipulator - 1 loading/unloading station	○	○	○	○	○	○
Additional workpiece loading/unloading station	○	○	○	○	○	○
Additional motorized workpiece loading/unloading station	○	○	○	○	○	○
High precision (20 μ) additional motorized workpiece loading/unloading station	○	○	○	○	○	○
CLAMPING SYSTEMS (HYDRAULIC / DEPRESSION)						
Hydraulic connection on rotary table - 2 / 4 Lines	○	○	○	○	○	○
Pre-arrangement for vacuum clamping system on the Rotary Table	○	○	○	○	○	○
SYSTEMS						
Unit for coolant filtering and chip conveyor with rear outlet	●	●	●	●	●	●
Unit for coolant filtering and chip conveyor with side outlet	○	○	○	○	○	○
High pressure 20 bar - 28 l/min through the center of the tool	●	●	●	●	●	●
High pressure 80 bar - 37 l/min through the center of the tool	○	○	○	○	○	○
High pressure 120 bar - 37 l/min through the center of the tool and 2000 lt external tank	○	○	○	○	○	○
Filtration 40 μ for the tool - 250 μ general use	●	●	●	●	●	●
Filtration 20 μ for the tool - 250 μ general use	○	○	○	○	○	○



OPTIONS

	CLOCK 800 EVO		CLOCK 1000 EVO		CLOCK 1200 EVO	
	4AX	5AX	4AX	5AX	4AX	5AX
Automatic programmable chip separation system	○	○	○	○	○	○
Tool taper washing/blowing	●	●	●	●	●	●
CNC side washing gun	○	○	○	○	○	○
Blowing gun	○	○	○	○	○	○
Minimal lubrication through the center of the tool	○	○	○	○	○	○
PROBES						
Tool integrity control by laser	○	○	○	○	○	○
Milling tool laser measuring system in workarea for tilting table	-	○	-	○	-	○
Tool measurement with high precision probe	-	○	-	○	-	○
Workpiece measurement with high precision probe	○	○	○	○	○	○
Workpiece temperature sensor	○	○	○	○	○	○
DIGITAL SOLUTIONS						
jNODE-Light with jFMX Supervisor System (standard for Multi-Pallet versions)	○	○	○	○	○	○
jNODE 2.0 with jFMX Supervisor System	○	○	○	○	○	○
jNODE FR with jFRX MONITORING	●	●	●	●	●	●
jFRX ADVANCED MONITORING	○	○	○	○	○	○
jFRX PREDICTIVE MAINTENANCE	○	○	○	○	○	○
jFRX FLUID MONITORING with additional sensors	○	○	○	○	○	○
MCM Tool Monitor	●	●	●	●	●	●
Auto Power Off	○	○	○	○	○	○
Standby Mode	○	○	○	○	○	○
Advanced Standby Mode	○	○	○	○	○	○
Machine Preheating Cycle	○	○	○	○	○	○
Workarea camera	○	○	○	○	○	○
Workarea 3D model	○	○	○	○	○	○
3D PROGRAMMING SYSTEMS						
CNC FANUC iSeries 31-iB5	●	●	●	●	●	●
CNC Siemens 840D Solution Line	○	○	○	○	○	○
CNC Heidenhain TNC 640	-	○	-	○	-	○

● basic ○ optional - unavailable

SERVICE, SPARE PARTS & UPGRADE



Headquartered in Italy, MCM operates all over the world with service subsidiaries located in France, Germany, USA, China and a constantly growing network of local partners.

A global managing network guarantees the sharing of technical documents, information and experiences, allowing the real effectiveness of the assistance service.

MCM guarantees an efficient service with a global presence and teams of skilled engineers

MCM worldwide subsidiaries and partners are available to support and serve all the reference markets, offering a direct after-sales assistance. All the services are conceived around the idea that the true value of the manufacturing systems is based on their full availability and efficiency during the entire life-cycle. Teams of qualified engineers can perform a quick and effective

problem solving by using a wide range of operating tools: remote diagnostic, preventive and extraordinary maintenance service, system efficiency inspections and spare-parts full availability. MCM offers complete and individually designed training courses that significantly enhance a higher productivity of installed machines.





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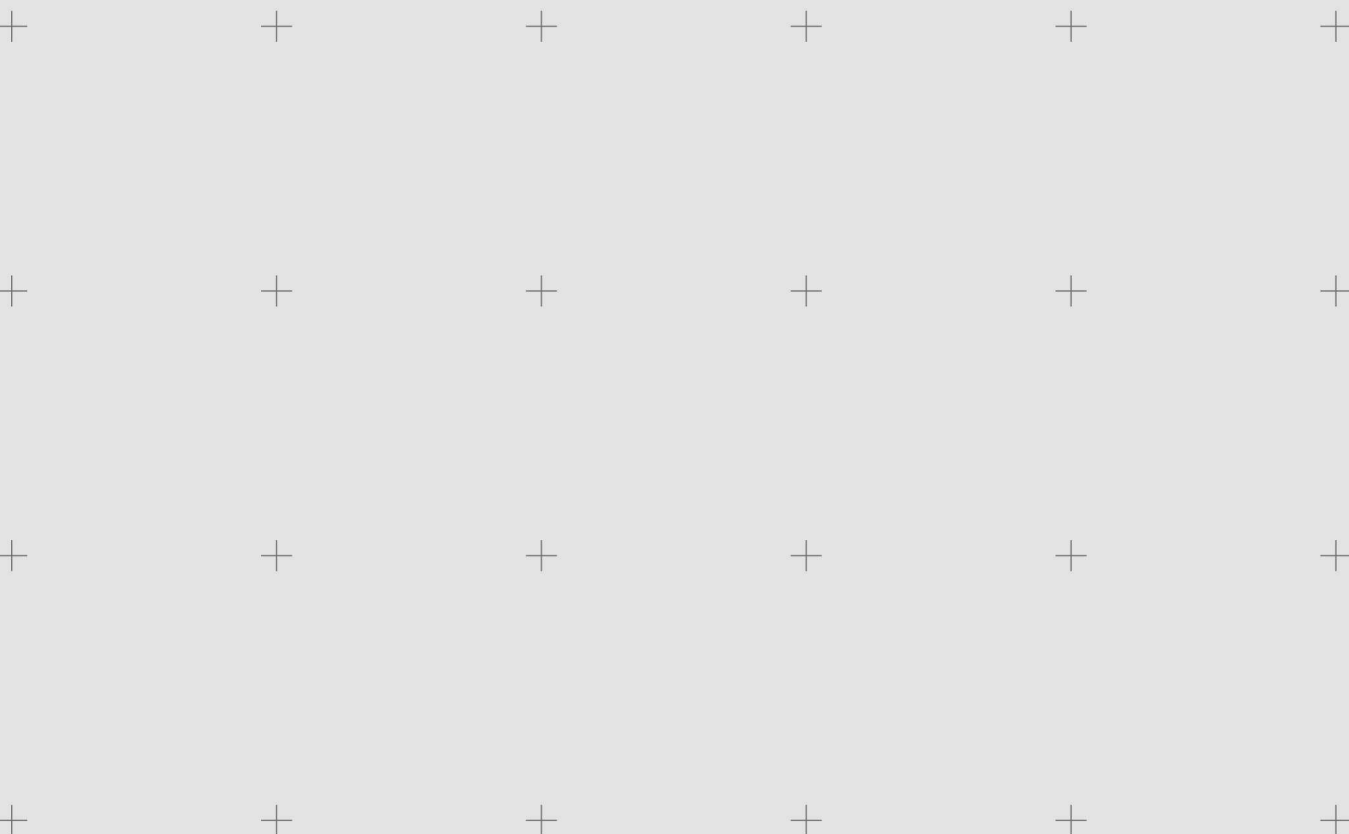
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