

MX Series

Milling and Turning centre

Performance
Technology
Power
Accuracy



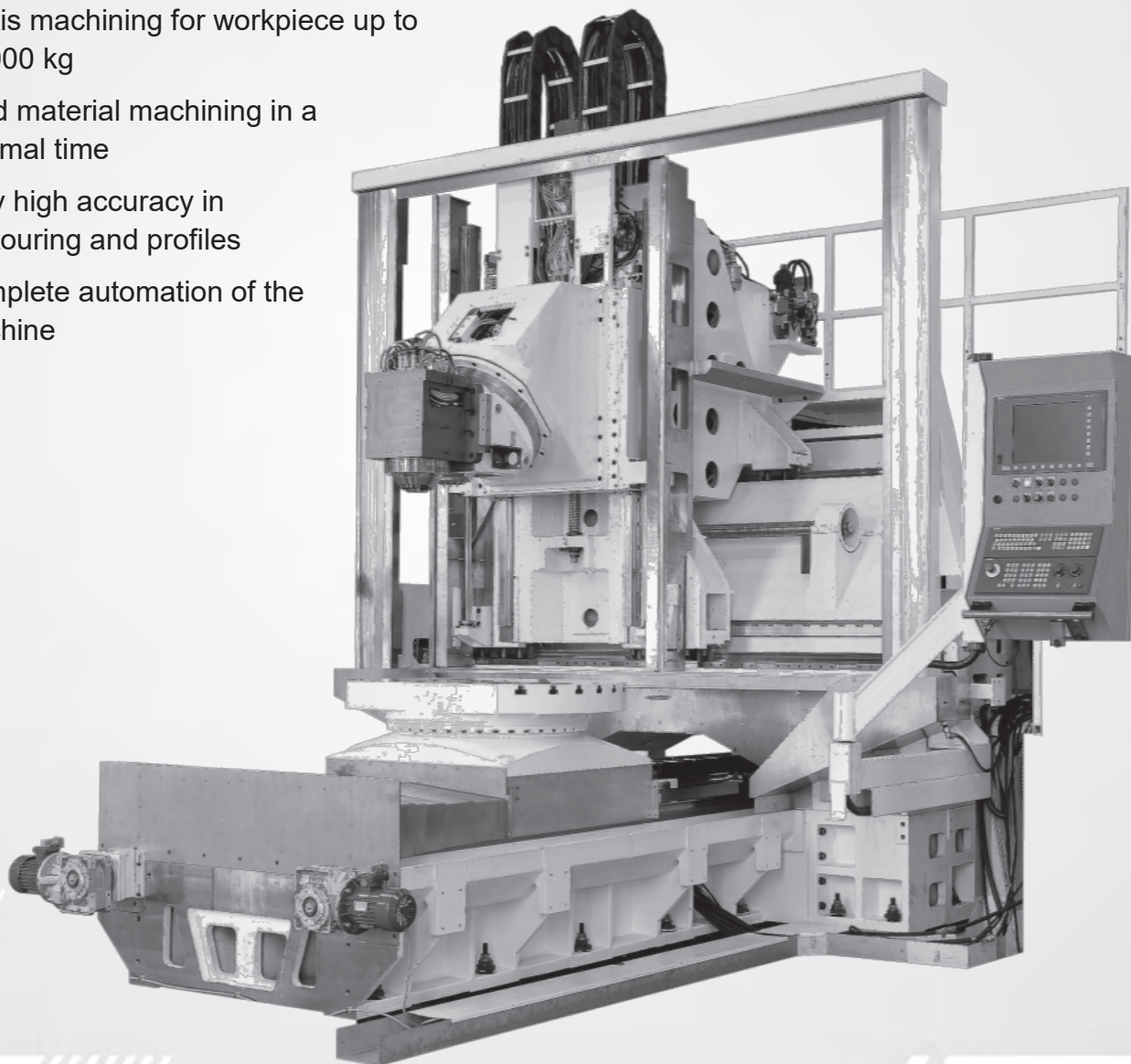


MX *Series*

Powerful, Rapid, Accurate **Milling (M) and Mill/Turn (MT) centre**

The MX multifunction machining centre is a high flexibility machine enabling machining operations in 5 axes and on 5 sides, in one setup part clamping, from roughing to finishing, as well as turning operations.

- 5 axis machining for workpiece up to 12.000 kg
- Hard material machining in a minimal time
- Very high accuracy in contouring and profiles
- Complete automation of the machine





Structure : Rigidity and Accuracy

- Structure with mobile column
- Cast iron with a high mechanical performance which maximises structure rigidity and allows optimum harmonic stability and maximum damping during demanding cutting conditions
- Machine secured on foundation with weight equally distributed over fixing points enabling extreme rigidity and a very high geometrical stability
- Modular design allows maximum flexibility in machine configuration to adapt to the technical requirements of customer
- Electrical cabinet fixed on the rear of the portal and protected IP54

Linear axes

- Ballscrew with integrated system of compensation for expansion
- Recirculating linear roller guide shoes ensuring minimum friction and efficient axis drive
- Automatic grease lubrication of linear roller guides minimising the pollution of coolant
- Absolute linear measurement by optical encoders in conformity with norm VDI/DGQ 3441

Head and Spindle

- Head equipped with integrated torque motor
- Head on a 45° plane allowing tilting from -45° up to +180°
- Spindle orientation : from vertical to horizontal, through all intermediate positions
- Powerful spindle with high torque allowing high metal removal rate
- Monitoring of the machining's vibrations to secure all the elements of the machine, the tool as well as the workpiece

Rotating table

- MX 8 / MX 10 / MX 12 : Table equipped with torque motor
- High rate of rotational and acceleration
- No backlash
- No wear
- Rigidity : high clamping torque enabling high power during roughing
- 2 versions : Milling and Mill/Turn
- MX 16 / MX 20 : Table's driven with wheel and double pignons

Numerical control

- Ergonomic design
- Very high capacity of memory and calculation
- Interactive programming
- Graphic simulation before machining for optimal safety

Environment - Ergonomics

- Chips evacuation channels with washing system and spiral conveyors
- Tool magazine outside of working area
- Complete safeguard ensuring a safety of the machine, the operator and the environment
- Very large accessibility to the table and the workpiece
- Tilting operator panel



MX Series

Standard head and spindle



Standard universal head (A axis)

	MX 8/10/12 M/MT MX 12L M	MX 11 M	MX 16/20 M
Rotating speed	100 rpm	30 rpm	100 rpm
Torque : working / clamping	2.120 / 2.500 Nm	7.000 / -- Nm	1.750 / 7.000 Nm
Measuring on axes	Direct encoder	Direct encoder	Direct encoder
Resolution	0,001°	0,001°	0,001°
Débattement axe A			
Axe broche / plan chariot	+180° / -45°		
Axe broche / plan table	-30° (gauche)		
	0° (vertical)		
	-90° (horizontal droite)		



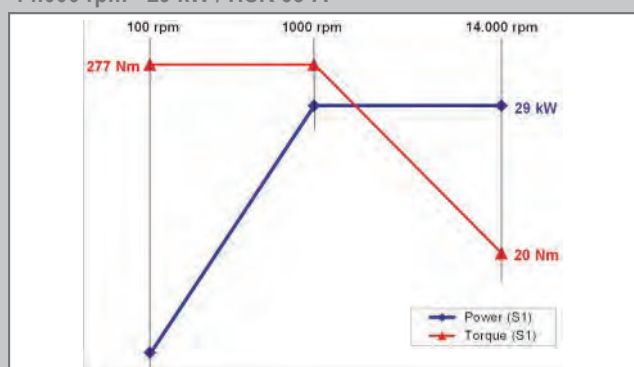
Standard spindle

	MX 8/10/12 M MX 12L M	MX 8/10/12 MT MX 11 M MX 16/20 M
Taper	HSK 63A	HSK 100A
Rotating speed	100 - 14.000 rpm	100 - 10.000 rpm
Power (S6/S1)	29 kW (S1)	43 / 33 kW
Torque (S6/S1)	277 (S1)	415 / 343 Nm
Characteristic speed	1.000 rpm	1.000 rpm

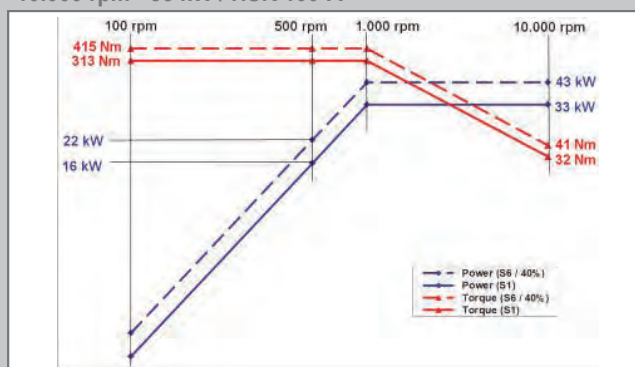
Equipments

- Air wall for spindle protection
- Control captor for angular positioning of the spindle
- Electrospindle cooling system
- Mechanical clamping with spring rings
- Tool release with hydraulic control
- Life greasing of bearings
- Taper cleaning by compressed air
- Vibration monitoring

14.000 rpm - 29 kW / HSK 63-A



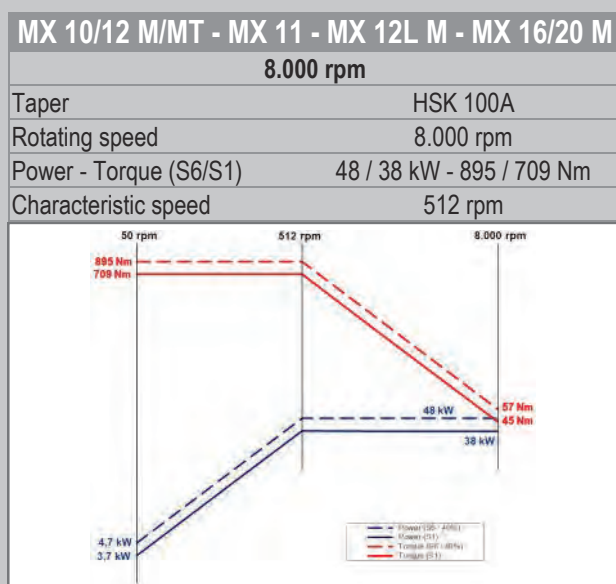
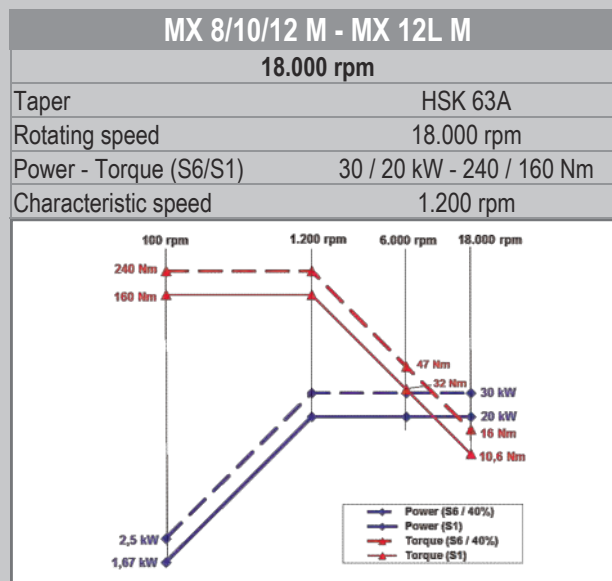
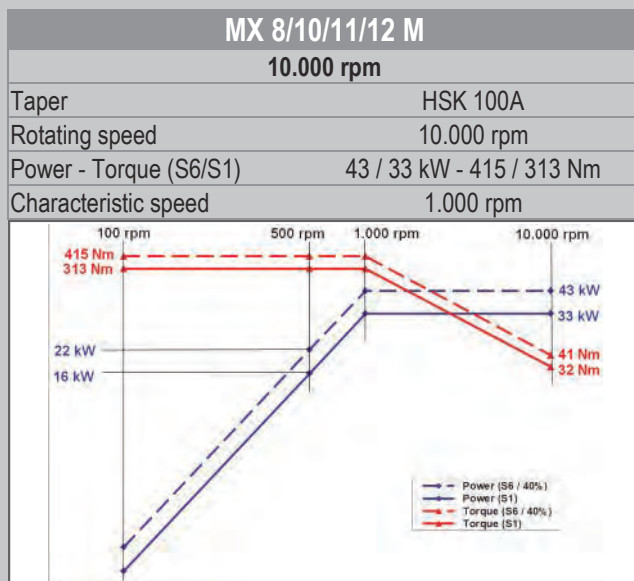
10.000 rpm - 33 kW / HSK 100-A





Alternatives for spindles (universal head of fork head)

When fork head, clearance of B axis is limited from -105° up to $+10^{\circ}$





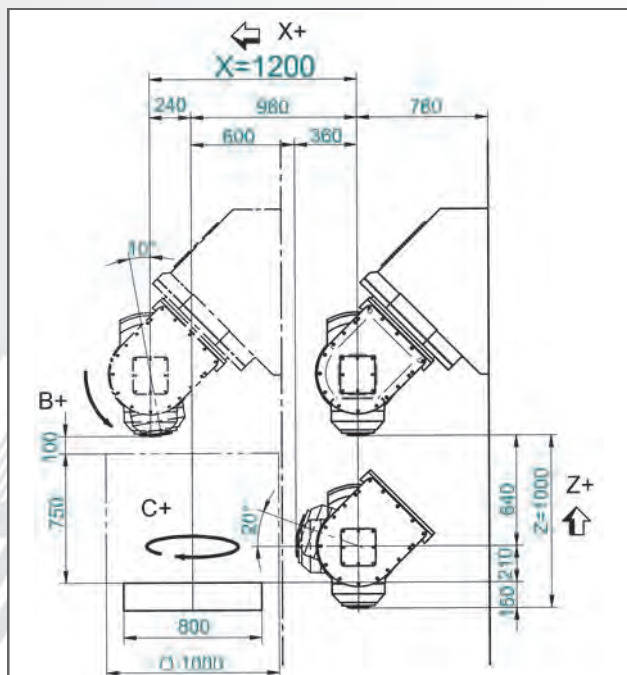
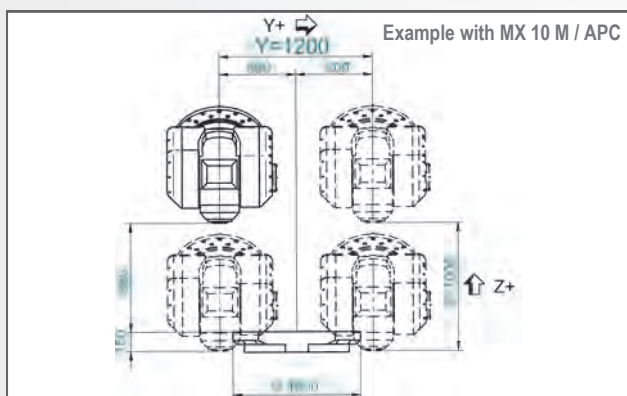
MX Series

Fork head / Alternative

MX 10/12 M

B axis clearance	-110° / +10°
Resolution	0,001°
Rotating speed	30 rpm
Torque : working / clamping	1.150 / 7.000 Nm

- B axis, parallel to the Y axis allows the evolution of the spindle around the horizontal axis
- The axis has a torque motor directly connected to the rotating parts ensuring a movement without backlash and a very accurate positioning

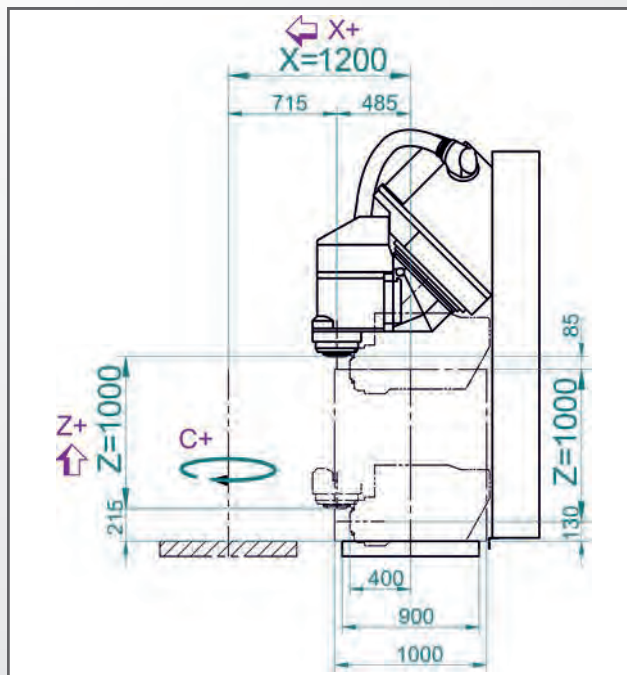
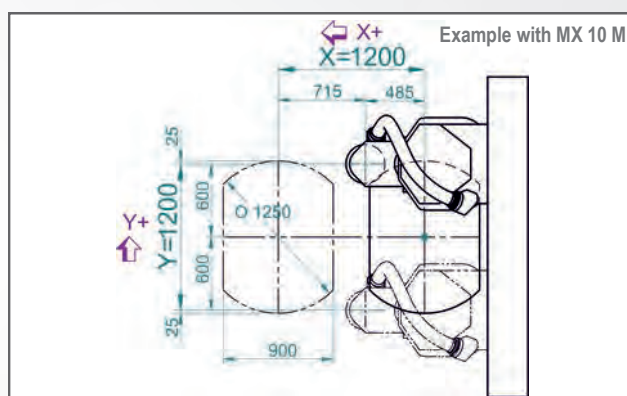


Universal head for Mechanical head / Alternative

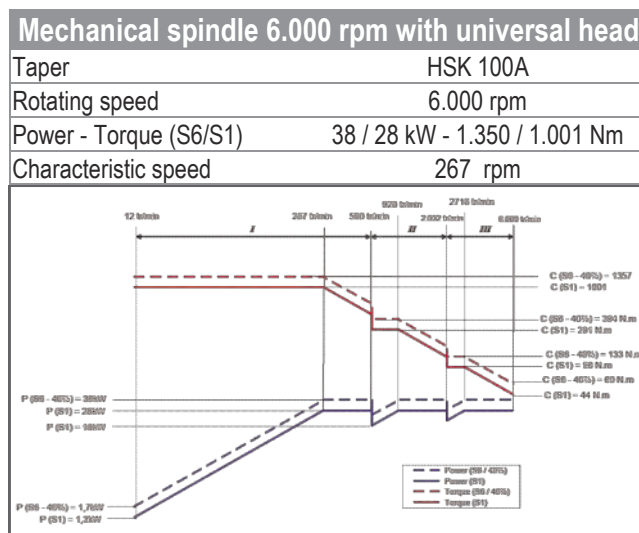
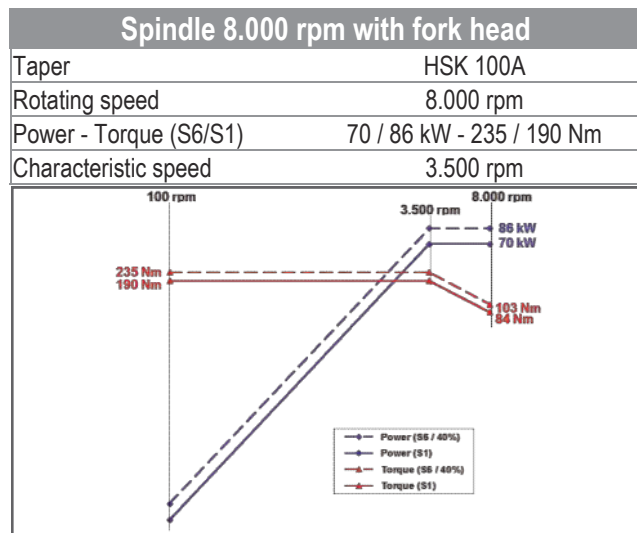
MX 10/12 M/MT - MX 12L M

A axis clearance	-45° / +180°
Resolution	0,001°
Rotating speed	30 rpm
Torque : working / clamping	1.750 / 7.000 Nm

- Universal milling head with 1 rotating axis, on a 45° plane
- Very well suited for the hard material machining
- Allow an important roughing with an high chips removal rate, thanks to the high clamping torque
- Torque motor drive ensuring a movement without backlash and a very accurate positioning



X travel limited to 1.075 mm with a workpiece Ø 1.250 mm



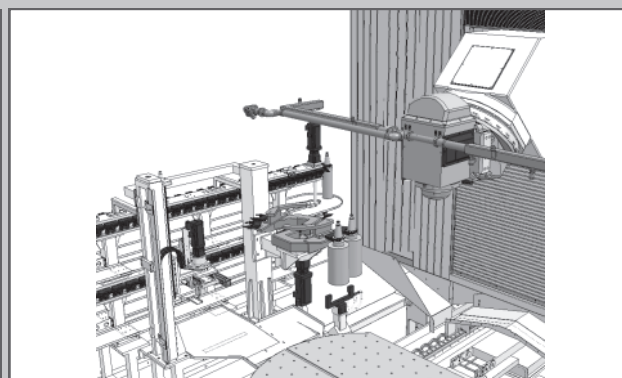
Tools changers

	MX 8/10/11/12 M	MX 8/10/12 MT
- Tool magazine is an horizontal chain type		
- Automatic load/unload of the tool is made in vertical position		
Pockets quantity / Taper	60 / HSK 63A	60 / HSK 100A
Max. length	400 mm	MX 8 : 500 mm MX 10 / MX 12 : 650 mm
Max. Ø contiguous / non contiguous	95 / 120 mm	125 / 250 mm
Max. weight : tool / in magazine	8 / 240 kg	25 / 300 kg
Tool changing time : tool / tool - chip / chip	6 - 12 sec	6 - 12 sec



Alternatives : Tools changers

	MX 8/10/11/12 M MX 12L M	MX 8/10/11/12 M/MT MX 12L M
- Magazine with 2 superposed tool chains		
- Automatic load/unload is made in vertical position		
Pockets quantity / Taper	120 / HSK 63A	120 / HSK 100A
Max. length	400 mm	MX 8 : 500 mm MX 10 / MX 12 : 650 mm
Max. Ø contiguous / non contiguous	95 / 120 mm	125 / 250 mm
Max. weight : tool / in magazine	8 / 480 kg	25 / 480 kg
Tool changing time : tool / tool - chip / chip	6 - 12 sec	6 - 12 sec





MX Series

The table

M version

MT version

			Standard	Palletized (alternative)	Standard	Palletized (alternative)
MX 8	Table dimension	mm	Ø 1.000 x 800	Ø 800 x 630	Ø 800	Ø 800
	Max. machining volume (ØxH)	mm	Ø 1.000 x 1.035 (*)	Ø 800 x 900 (*)	Ø 800 x 1.035 (*)	Ø 800 x 900 mm(*)
	Admissible load	kg	2.000	1.200	2.000	1.200 kg
	Rotating speed	rpm	50	50	500	500
	Torque : working / clamping	Nm	1.210 / 10.000	1.210 / 10.000	1.580 / 10.000	1.580 / 10.000
	Clamping system		7 slots 22H7	7 slots 22H7	8 radial slots	8 radial slots
	T slots	mm	H12 - 100 mm	H12 - 100 mm	22H7 / H12 - 45°	22H7 / H12 - 45°
	Central boring		Ø 63H7	Ø 63H7	Ø 63H7	Ø 63H7
MX 10	Table dimension	mm	Ø 1.250 x 900	Ø 1.000 x 800	Ø 1.000	Ø 1.000
	Max. machining volume (ØxH)	mm	Ø 1.250 x 1.130 (*)	Ø 1.200 x 1.000 (*)	Ø 1.250 x 1.130 (*)	Ø 1.200 x 1.000 (*)
	Admissible load	kg	2.500	1.500	2.000	1.500
	Rotating speed	rpm	65	65	500	500
	Torque : working / clamping	Nm	2.700 / 10.000	2.700 / 10.000	3.270 / 10.000	3.270 / 10.000
	Clamping system		7 slots 22H7	7 slots 22H7	8 radial slots	8 radial slots
	T slots	mm	H12 - 100 mm	H12 - 100 mm	22H7 / H12 - 45°	22H7 / H12 - 45°
	Central boring		Ø 63H7	Ø 63H7	Ø 63H7	Ø 63H7
MX 11	Table dimension	mm	Ø 1.250 x 1.100	Ø 1.000 x 800		
	Max. machining volume (ØxH)	mm	Ø 1.250 x 1.120 (*)	Ø 1.250 x 1.000 (*)		
	Admissible load	kg	2.500	2.000		
	Rotating speed	rpm	30	30		
	Torque : working / clamping	Nm	10.000	10.000		
	Clamping system		7 slots 22H7	7 slots 22H7		
	T slots	mm	H12 - 100 mm	H12 - 100 mm		
	Central boring		Ø 63H7	Ø 63H7		
MX 12	Table dimension	mm	Ø 1.600 x 1.250	Ø 1.400	Ø 1.400	Ø 1.400
	Max. machining volume (ØxH)	mm	Ø 1.600 x 1.130 (*)	Ø 1.600 x 1.000 (*)	1.600 x 1.130 (*)	1.600 x 1.000 (*)
	Admissible load	kg	4.000	2.500	4.000	2.500
	Rotating speed	rpm	50	50	250	250
	Torque : working / clamping	Nm	4.590 / 12.000	4.590 / 12.000	5.670 / 12.000	5.670 / 12.000
	Clamping system		10 slots 22H7	10 slots 22H7	8 radial slots	8 radial slots
	T slots	mm	H12 - 125 mm	H12 - 125 mm	22H7 / H12 - 45°	22H7 / H12 - 45°
	Central boring		Ø 100H7	100H7	Ø 100H7	100H7

(*) with restriction on X travel

L version

MX 12L M

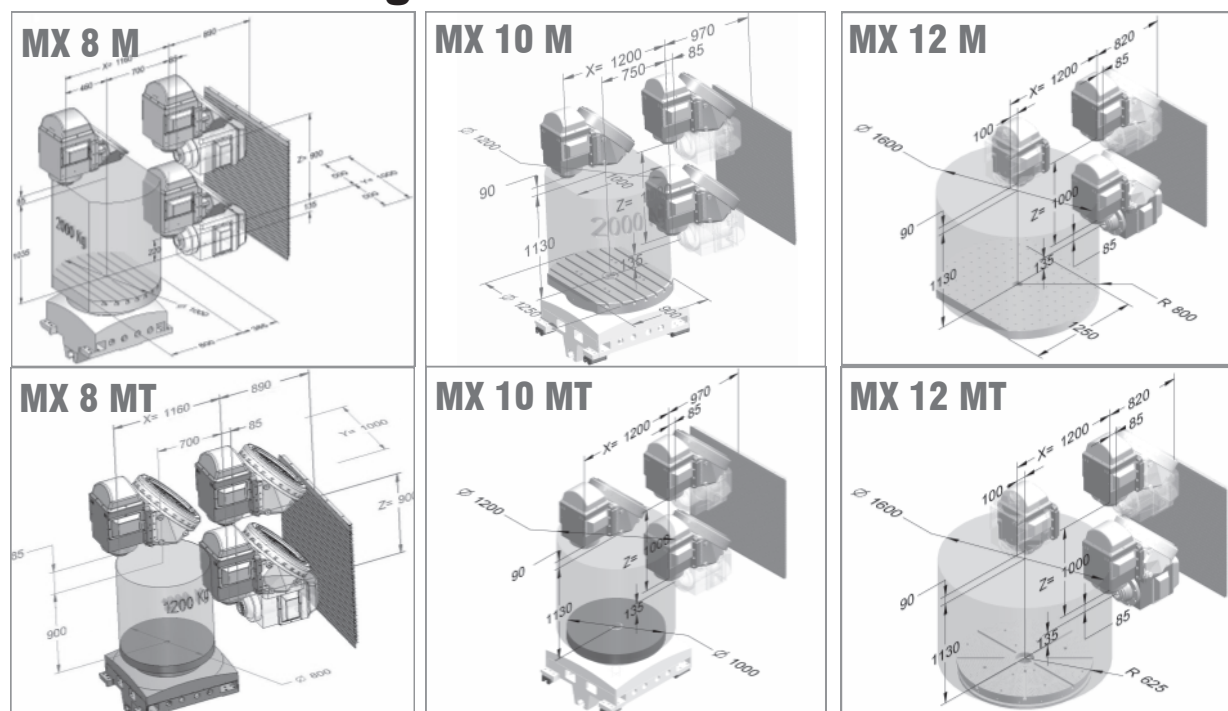


MX 12

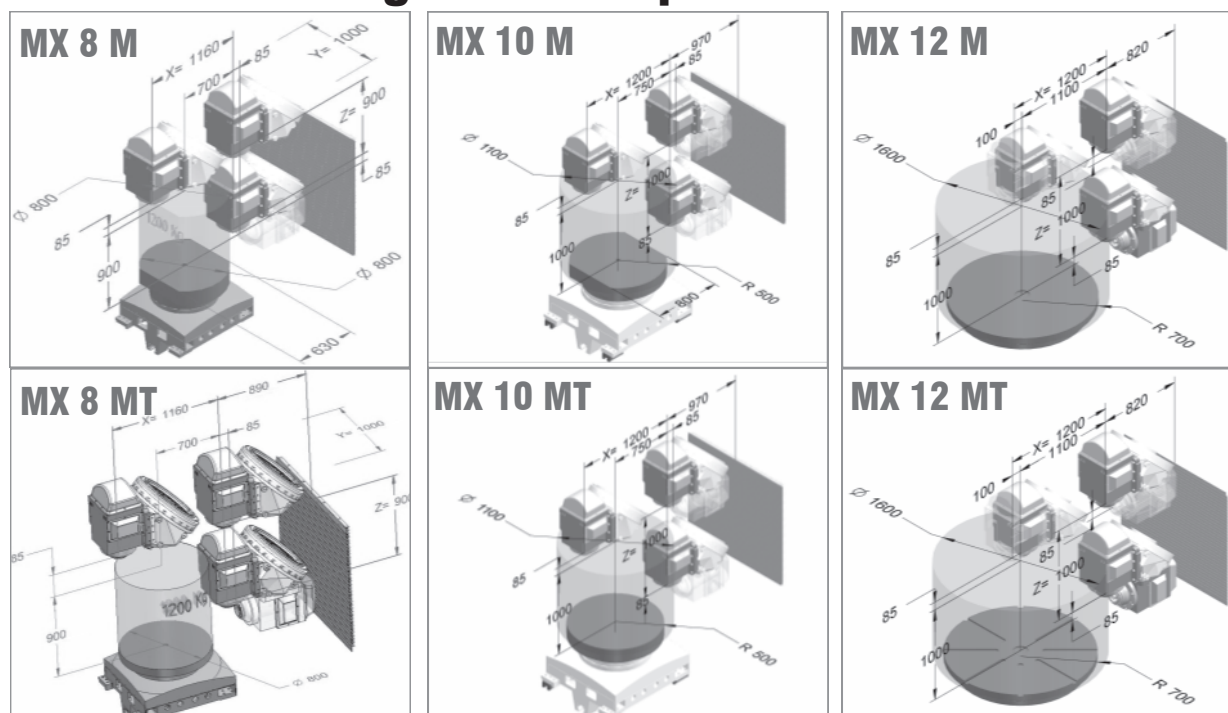
Travels	X 2.000 mm Y 1.600 mm Z 1.000 mm
Table dimension	Ø 1.600 x 1.250 mm
Max. machining volume (ØxH)	1.600 x 1.130 mm (*)
Admissible load	4.000 kg
Rotating speed	50 rpm
Torque : working / clamping	4.590 / 12.000 Nm
Clamping system	10 slots
T slots	22H7 / H12 - 125 mm
Central boring	Ø 100H7
Overall measurements	6.990 x 9.100 x 4.800 mm
Weight of the machine	45.000 kg



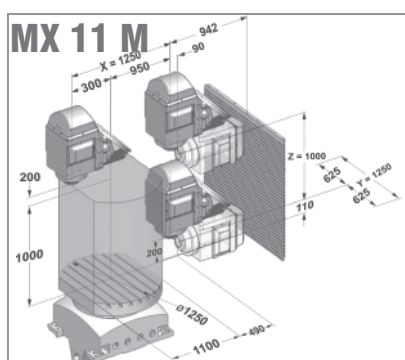
Interference diagrams with standard table



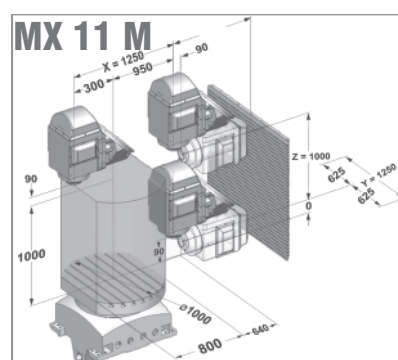
Interference diagrams with palletized table



MX 11
Standard table



MX 11
Palettised table



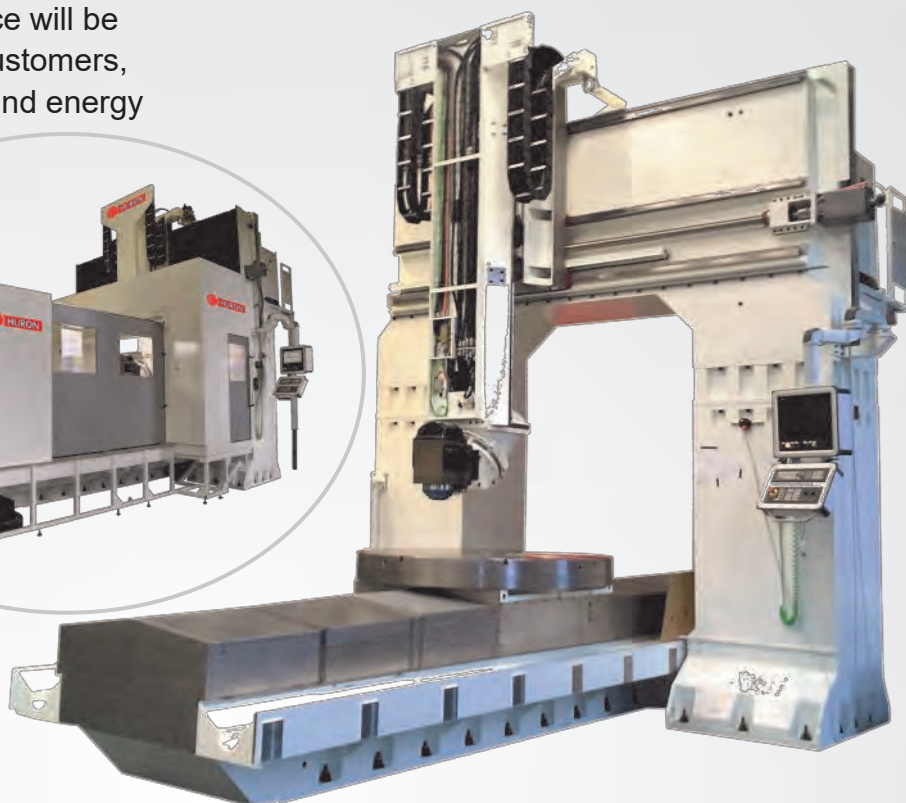


MX Series

Extension of the range - MX 16, MX 20 M

In order to allow our customers to machine extremely large parts, the MX range has been extended to include extra-large models, with MX 16 and MX 20.

The larger workpiece clearance will be appreciated by some of our customers, particularly in the aeronautic and energy industries.



Heads and spindles

Offer identical to other machines in the range

Tool changers

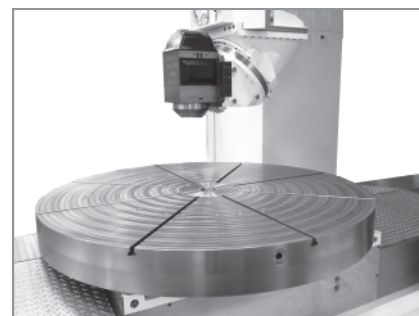
Automatic loading/unloading of tools is made in vertical position

	Standard	Alternative
Qty of housings	60	120
Type	Chain	Chain
Taper	HSK 100-A	HSK 100-A
Tool dimension		
Max. Ø tool	120 mm	125 mm
Max. length	400 mm	650 mm
Max. weight of tool	10 kg	25 kg
Max. weight in magazine	300 kg	480 kg
Tool changing time		
tool/tool - chip/chip	6 - 20 sec	6 - 12 sec

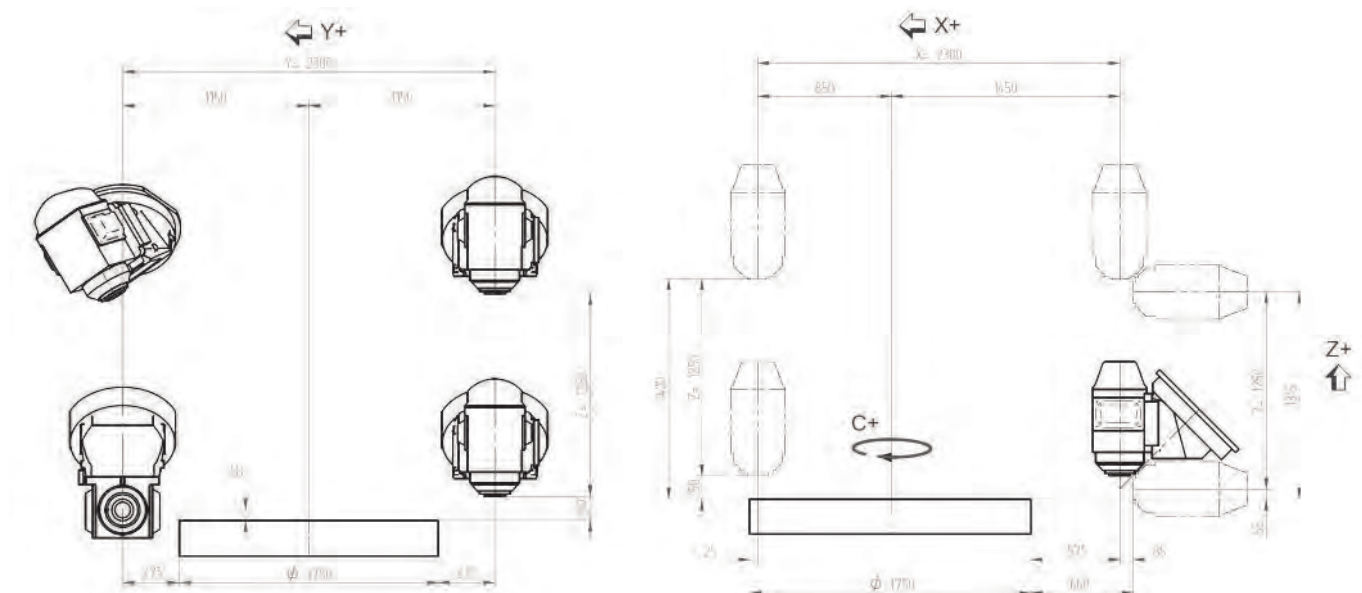


The table - M version

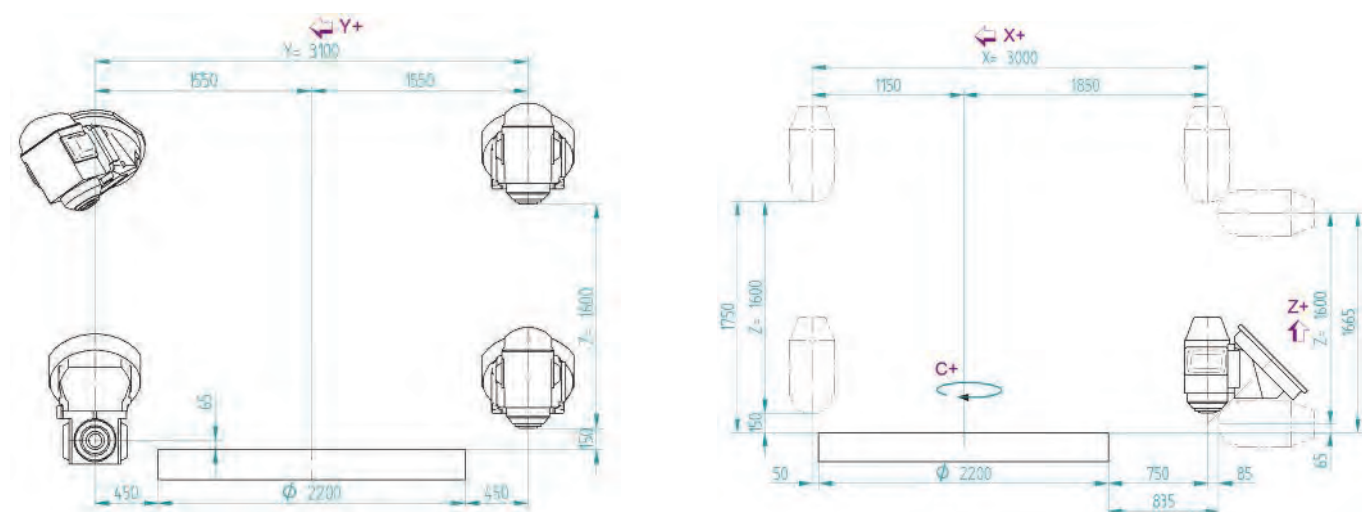
		MX 16 M	MX 20 M
Table dimension	mm	Ø 1.750	Ø 2.200
Max. machining volume (ØxH)	mm	Ø 2.000 x 1.300	Ø 2.500 x 1.650
Admissible load	kg	10.000	12.000
Distance between column	mm	2.000	2.500
Rotating speed (S6)	rpm	9	7
Torque : Working (S6) / Clamping	Nm	12.000 / 35.000	18.000 / 38.000
Clamping type	mm	8 T slots 22H12 - 100 mm	8 T slots 22H12 - 100 mm
Central boring		Ø 100H7	Ø 100H7



MX 16 M - Head/table positioning



MX 20 M - Head/table positioning





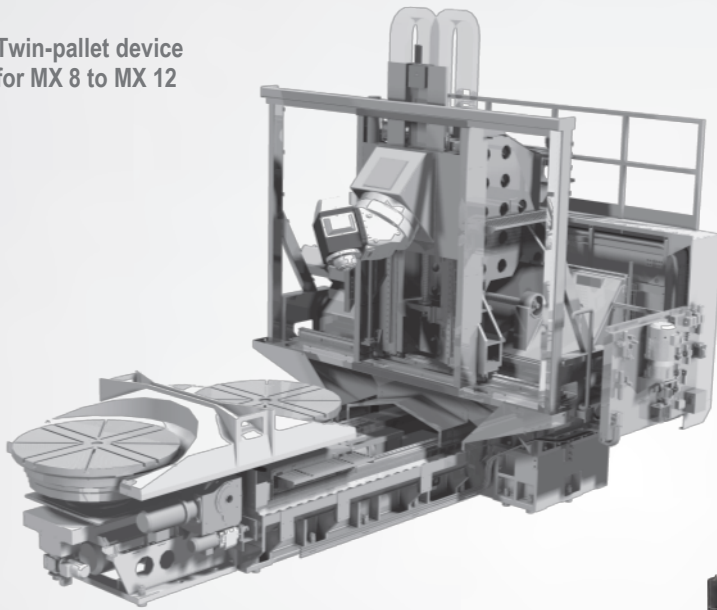
MX Series

Automation

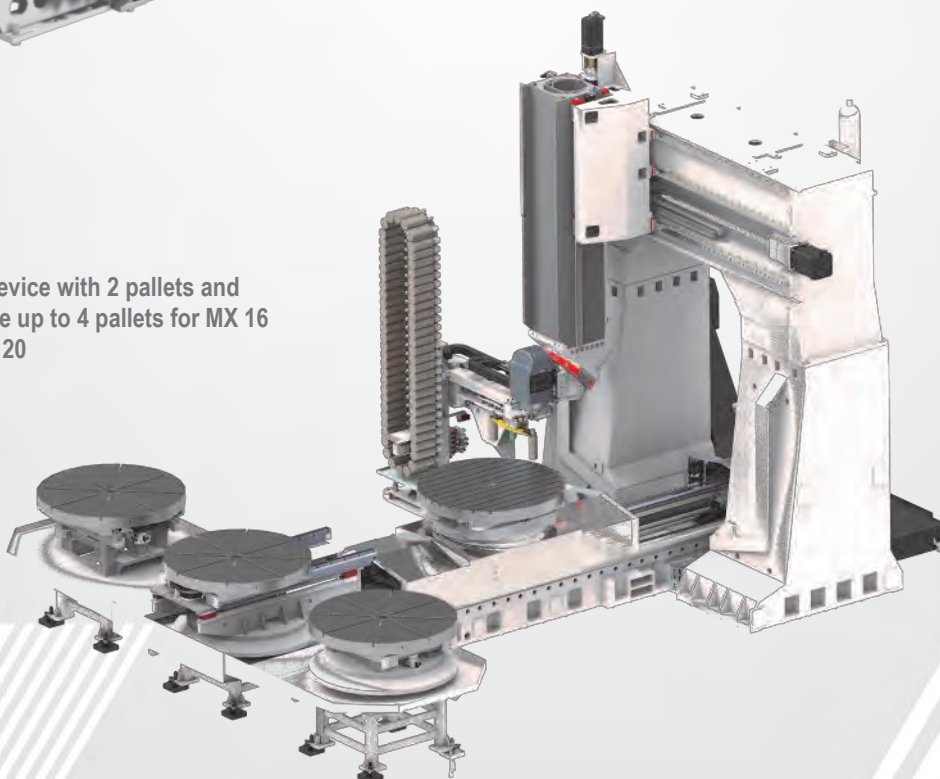
For higher productivity, increase production speeds and optimise machining cycles, we offer a variety of palletizing configurations. The processes are independent, safe and reliable.

- Palletizer attached to the front of the machine
- Optimal operator access to the machine
- Constant visibility over the working area
- Safeguard for easy, ergonomic pallet loading/unloading from above and from the front of the machine

Twin-pallet device
for MX 8 to MX 12



Pallet device with 2 pallets and
available up to 4 pallets for MX 16
and MX 20





Cycles CN HURON

PRECILIFE or how to manage tool life automatically ? (*)

This cycle provides automatic tool checking during machining or at tool change. If critical wear or a broken tool is detected, the system automatically triggers the replacement of the tool at the most appropriate time. It therefore safeguards the integrity of the workpiece and the cutting tools and optimizes tool use. The profitability of the machine is increased by reducing downtime and tooling costs.

MAIN FEATURES

- Automated tool measurement, inspection and replacement done in the machining process
- No change to the NC program
- Implemented by HURON
- Configurable wear and breakage detection tolerance for each tool
- Automatic replacement of tools

(*) Only with 3 axes machines, spindle in vertical position

PRECIPOWER or how to optimise roughing operations ?

It takes care of optimizing the roughing operation by automatically modulating and adapting the feedrate, in real time, to the value that result in peak material removal.

MAIN FEATURES

- Full use of available spindle power
- Automatic feedrate modulation
- Maximize material removal rate
- Spindle and rotating axes overload protection during roughing

PRECIFIVE or how to get an accurate and automatic calibration of the machine kinematic ?

Automate the calibration of the kinematics by carrying out the measurement of the position and the orientation of the rotation axes. The calibration can be executed directly in an NC program to ensure optimum accuracy during critical machining operations.

MAIN FEATURES

- Quick, accurate, repeatable measuring system
- Optimized machining accuracy
- Compensation of the thermal expansion of the machine
- Reduces rejected parts
- Rapid evaluation following a machine collision
- Control report

PRECIPROTECT or how to save time while protecting the machine and the workpieces ?

This cycle allows real-time monitoring of toolpaths and machine movements in order to anticipate any form of collision. The machine and the part are thus preserved.

MAIN FEATURES

- Conserve machine accuracy
- Save time : no simulation required, control is done in real-time
- Save money : No more repair or machine stop due to a collision
- Increase profitability : preserve integrity of the machine and workpiece ; no more delivery delays to customers
- Reliability : detection of an imminent collision triggers an immediate and automatic stop of the movements of the machine
- Peace of mind : let the machine work unsupervised



MX Series

Technical characteristics

Linear axes X / Y / Z		MX 8 M	MX 8 MT	MX 10 M	MX 10 MT	MX 11 M	MX 12 M	MX 12 MT
Travels	mm	1.160x1.000x900		1.200x1.200x1.000		1.250x1.250x1.000		1.200x1.600x1.000
Rapid feedrates	m/min	42		42		40		42
Acceleration per axis	m/s²	4		4		4		4
Rotating A axis - Universal head		MX 8		MX 10		MX 11		MX 12
Rotating speed	rpm	100		100		30		100
Torque : Work / Clamping	Nm	2.120 / 2.500		2.120 / 2.500		7.000 / --		2.120 / 2.500
Rotating C axis - Table		MX 8 M	MX 8 MT	MX 10 M	MX 10 MT	MX 11 M	MX 12 M	MX 12 MT
Rotating speed	rpm	50	500	65	500	30	50	250
Table dimension	mm	1.000x800	Ø 800	1.250x900	Ø 1.000	1.250x1.100	1.600x1.250	Ø 1.400
Admissible load	kg	2.000	2.000	2.500	2.500	2.500	4.000	4.000
Accuracies (VDI DGQ 3441)								
Uncertainty : P				Axes linéaires : 7 µ - Axes rotatifs : 10 sec				
Repeatability : Ps medium				Axes linéaires : 4 µ - Axes rotatifs : 5 sec				
Tools magazines		MX 8/10/11/12 M				MX 8/10/12 MT		
Qty of housings		60				60		
Taper		HSK 63A				HSK 100A		
Tool dimension :								
Length	mm	400				MX 8 : 500 - MX 10/12 : 650		
Ø	mm	95 / 120				125 / 250		
Weight	kg	8 / 240				25 / 300		
Coolant		MX 8 M/MT				MX 10/11/12 M/MT		
Flow - Pressure	l/min - bar	25 - 5				60 - 5		
Tank	litres	750				1.500		
Overall measurements (Doors opened + conveyor)		MX standard without pallet device				MX standard with pallet device		
		MX 8 M/MT	MX 10 M/MT	MX 12 M/MT	MX 8 M/MT	MX 10 M/MT	MX 11	MX 12 M/MT
Width	mm	6.250	6.360	6.460	6.250	7.220	5.900	6.140
Depth	mm	6.150	7.970	8.360	7.450	10.300	8.500	10.950
Height	mm	3.930	4.200	4.800	3.930	4.385	3.600	4.880
Weight of the machine	kg	22.000	35.000	37.000	25.000	40.000	28.000	43.000

Spindles

Standard spindle		MX 8/10/11/12 M			MX 8/10/12 MT MX 16/20	
Rotating speed	rpm	14.000			10.000	
Taper		HSK 63A			HSK 100A	
Power	kW - Nm	29			43	
Torque		277			415	
Characteristic speed	rpm	1.000			1.000	
Alternatives		MX 10/12 M/MT MX 11/16/20 M		MX 10/12 M MX 11/16/20 M		MX 8/10/12 M MX 12L M
Rotating speed	rpm	8.000		10.000		18.000
Taper		HSK 100A		HSK 100A		HSK 100A
Power (S6/S1)	kW - Nm	48		43		30
Torque (S6/S1)		895		415		240
Characteristic speed	rpm	512		1.000		1.200



Technical characteristics

Linear axes X / Y / Z		MX 16 M	MX 20 M
Travels	mm	2.300 x 2.300 x 1.250	3.000 x 3.100 x 1.600
Rapid feedrates	m/min	40	20
Acceleration per axis	m/s ²	X / Y / Z = 3	X = 1,8 - Y / Z = 2
Rotating A axis - Universal head		MX 16 M	MX 20 M
Rotating speed	rpm	100	100
Torque : Work / Clamping	Nm	1.750 / 7.000	1.750 / 7.000
Rotating C axis - Table		MX 16 M	MX 20 M
Rotating speed	rpm	9	7
Table dimension	mm	Ø 1.750	Ø 2.200
Admissible load	kg	10.000	12.000
Accuracies (VDI DGQ 3441)			
Uncertainty : P		Linear axes : 7 µ - Rotating axes : 10 sec	
Repeatability : Ps medium		Linear axes : 4 µ - Rotating axes : 5 sec	
Tools magazines		MX 16/20 M	
Qty of housings		60	
Taper		HSK 100A	
Tool dimension :			
Length - Ø - Weight	mm - mm - kg	400 - 120 - 10	
Coolant		MX 16 M	MX 20 M
Flow - Pressure	l/min - bar	30 - 5	30 - 5
Tank	litres	1.000	1.000
Overall measurements (Doors opened + conveyor)		MX 16 M	MX 20 M
Width	mm	8.420	8.900
Depth	mm	10.000	9.480
Height	mm	6.650	6.620
Weight of the machine	kg	90.000	90.000

Alternatives

Travels		MX 12 L M						
Travels	mm	2.000 x 1.600 x 1.000						
Rotating axis - Head		Forked head			Head for mechanical spindle			
Swivelling angle		-110° / +10°			-0° / 180°			
Rotating C axis - Palletized table		MX 8 M	MX 8 MT	MX 10 M	MX 10 MT	MX 11 M	MX 12 M	MX 12 MT
Rotating speed	rpm	50	500	65	500	30	50	250
Dimension	mm	800 x 630	Ø 800	1.000 x 800	Ø 1.000	1.000 x 800	Ø 1.400	Ø 1.400
Admissible load	kg	1.200	1.200	1.500	1.500	2.000	2.500	2.500
Tools magazines		MX 8/10/11/12 M - MX 12L M			MX 8/10/12 M /MT- MX 11 M - MX 12L M			
Qty of housings		120			120			
Taper		HSK 63A			HSK 100A			
Tool dimension :								
Length	mm	400			MX 8 : 500 - MX 10/12 : 650			
Ø	mm	95 / 120			125 / 250			
Weight	kg	8 / 480			25 / 480			

Optional equipments

Various spindles - Various tools magazines - Pallet device - High pressure coolant 70 bar - Microspraying coolant - Air blast - Workpiece probe - Tool probe - Oil extraction device - Oil skimmer - Sight glass - Air conditioning of electrical cabinet - Pressurization of measuring scales



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