



TECHNICAL PROMPTUARY

REFRES

SHARK



Speed and Removal

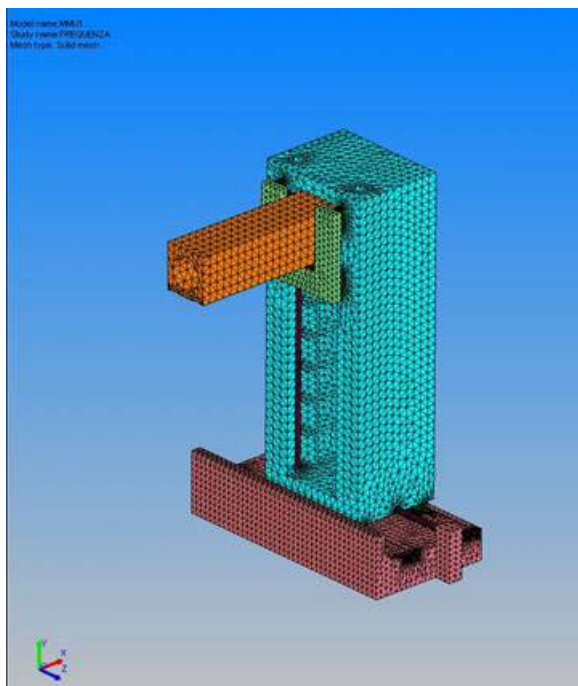
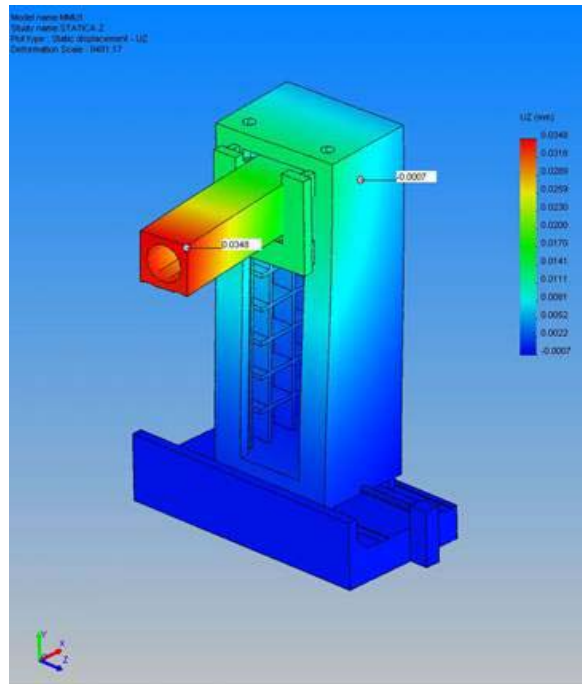
SHARK is a high speed machining centre characterized for his structure to fixed bed and movable column. Gives his particular configuration, allows and wide accessibility and a complete control of the machining by the operator, that is always in frontal position in comparison to the tool.

Concepts for respond to the wide and diversified costumer's requests, can satisfied thanks to his versatility, machining needs to 3, 4 and 5 axes.



Structural Analysis

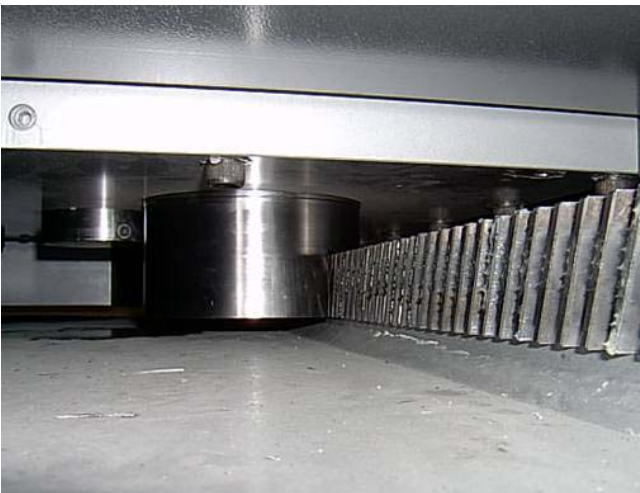
SHARK, projected with the aid of the modern technologies through the finite elements (**FEM**) introduces a good point of meeting between rigidity in the movements and damping of vibrations. If to this are added the low attritions and the elevated accelerations of the axes, are obtain all the characteristics that allow performances particularly bright in finishing, but at the same time very high in roughing. The all to advantage of the economy of the whole cycle of machining.



Axes Movement



SHARK allows rapid feedrates up to 30 m/min (**40 m/min for SHARKone**). Cross and vertical axes are equipped with recirculating high precision ball screws with precharged double nut for load adjusting and total backlash elimination. In the vertical axis (Z) the ball screws has 63 mm diameter and 20 mm step (**50 mm diameter for SHARKone**), while in the cross axis (Y) has 50 mm diameter and 25 mm step.



The movement of longitudinal axis (X) happens through 2 pinions, with automatic backlash compensation, driven by one reduction gear group installed in the central area of the column. This solution ensure the maximum rigidity in the translation process of the column group, allows high dynamics without elasticity.

All the movement motors are brushless low inertia digital type can guarantee a prompt reaction during the answer.



SHARK, in order to reduce friction on the linear axes and the reversal error is equipped on all axes of high precision linear guideways with precharged roll runners with low centre of gravity. This to advantage of the quality in the finishing machining.

To allow a greater rigidity and precision in milling, the carriage moves inside the column through 2 front guideways and 1 rear guideway (see under) that slides on 6 front runners and 2 rear runners, producing a unique body between column, carriage and ram.

In the **SHARKone** version, treating of the machine with inferior dimensions, the carriage moves always on 2 front guideways that sliding on 4 runners. Doesn't require the third rear guideway.



Axes Lubrication

All guide ways and recirculating ball screws are automatically grease-lubricated through input dosers and electro-pump. Eventual errors and system failures are detected by a pressure switch which stops immediately the machine.

The Column

The column, consisting of a monolithic bridge-type structure, is directly anchored to 4+4 roller pads of the linear guideways without intermediate structures guaranteeing extremely high rigidity on whole travel and working field and a stable machine behaviour in all directions. The ram slide is “captured” inside the column and is, on its turn, a closed cage where the ram with the milling head is moving back and forth. This peculiar architectural feature called “box in the box” guarantees an extremely high rigidity, high accuracy, a stable machine behaviour during machining with high acceleration rates, independently of the movement direction and axis position due to a constant unloading of created stress to the floor.

The column, saddle and ram have been made in electro-weld steel, in a proper size, strongly ribbed. After the welding and transforming process the parts are stabilized through a double stress relieving treatment. The structure is clearly symmetrical and guarantees constant behaviour independently of heat fluctuations and stress created during machining.



The weight of the vertical saddle is hydraulically counter-balanced through hydraulic cylinders with low friction seals connected in a closed circuit to a nitrogen charged accumulator. The system balances the weight of the slide / head group removing the load from the vertical travel ball screw. This counter balance system is controlled by a pressure switch which, in case of pressure failure, stops the axes movements, creates an error message: EMERGENCY STOP and activates the security brake on the vertical axis ball screw.

The Ram



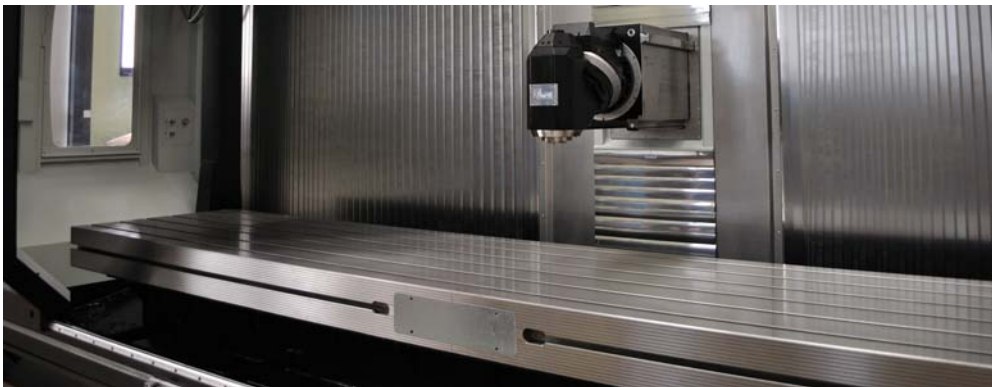
Is constituted by an extremely rigid double wall structure that guarantee high thermal and dynamic stability allows an high removal capacity and accuracy. The 4 guideways (45 and 55 mm size) are opposed and slides on 10 rolls runners. (2 guideways 45 mm size and 4 runners on **SHARKone**)

The Basement



Has been designed by an monolithic structure and is made in electro-weld steel, in a proper size, in order to guarantee for guarantee a strong self-supporting machine structure. On basement are anchored 2 guideways where slide 8 rolls runners to low center of barycenter clamped to the base of the column. The basement rest on special clamping and levelling devices.

The Table Plan



Is made in GBC350 cast iron in a proper size and is anchored to the basement. On table are machined 6 "T" slots to 22 mm with distance between centers of 160 mm. The distance of the table plan from floor is 900 mm.

The Heads

SHARK in the standard configuration is equipped with one milling head indexed every 2.5° on two axes (optional with positioning every 0,001°). The organs of transmission are constituted by bevel gears lubricated with grease, hardened, ground and which go through a special treatment in order to guarantee max performance over time. All spindles are cooled with a special system for maintain an constant temperature independently by the rpm. For mechanical spindle are available various versions (4000 ÷ 7000). For the orthogonal, or vertical only, is available a wide line of electrospindles and motorspindles with various power and rpm.



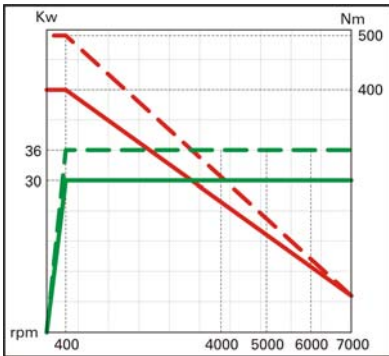
TUC / TUI - Mechanical Head



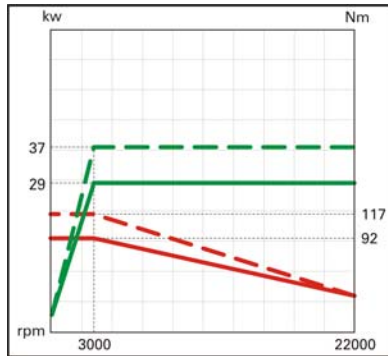
TVC - Rotative Torque Axis



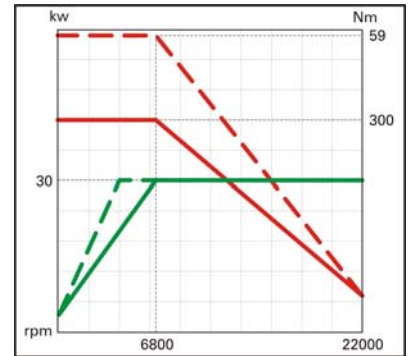
TSUB - Rotative Torque Axes



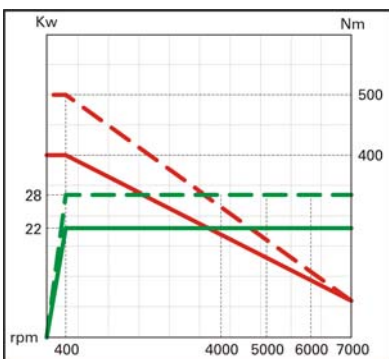
SHARK



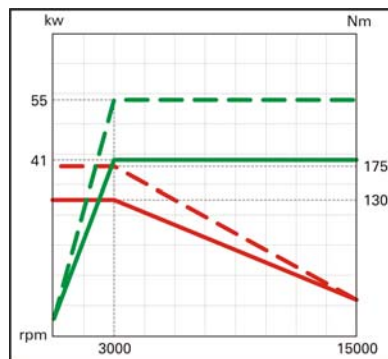
MTS-29.92



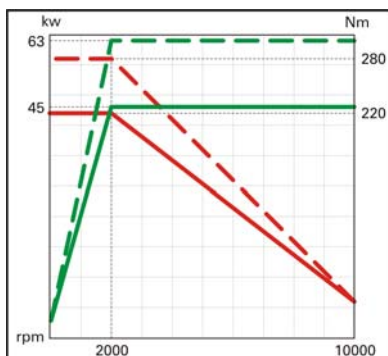
MTS-30.42



SHARKone



MTS-41.130



MTS-45.220

The Fairing



All external lines are carefully considered and designed, with fairing endowed of external sliding doors which guarantee a complete access to the working area in way to facilitate the loading/unloading pieces operations. Thank also to the wide glazed surfaces on front and upper zones allow an optimal view and lightning of the working area.

Numerical Controls

The operator console, that slide on front of the machine through guideway, is climbed on a articulated arm for guaranteeing the maximum practicality in the movement, facilitating so the different activities of the operator.

Some installation is not blocked respect the type of NC.

The control of the movements of the machine's axes happen through direct reading optical transducers Heidenhain.



How option can be had a operator platform complete of console.

Devices and Accessories

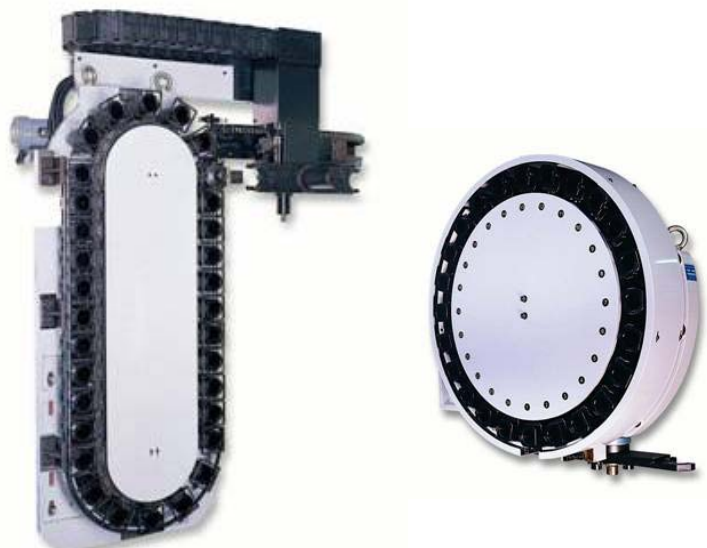
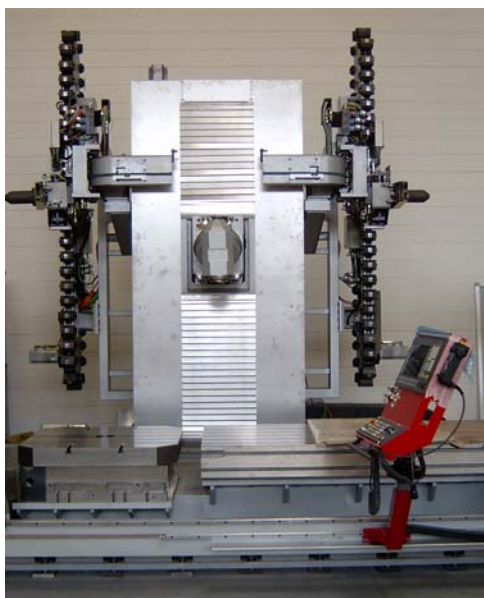


Wide is the availability of optional devices and equipments that enrich the performances and the characteristics of **SHARK**, for example measuring tool and piece devices, remote hand wheels, etc.

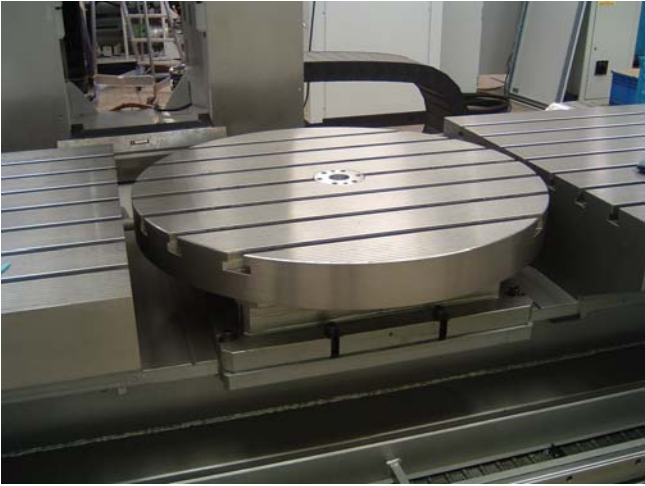
Tools Magazines

SHARK can be equipped with wheel type tools magazines (24/48 places) or chain type with exchanging arm (max 120 places - not scheduled for **SHARKone**). The manual loading of the tools is scheduled through special access.

One pressurized air jet effects the cleaning of the tapers for guarantee the perfect clamp in the spindle.

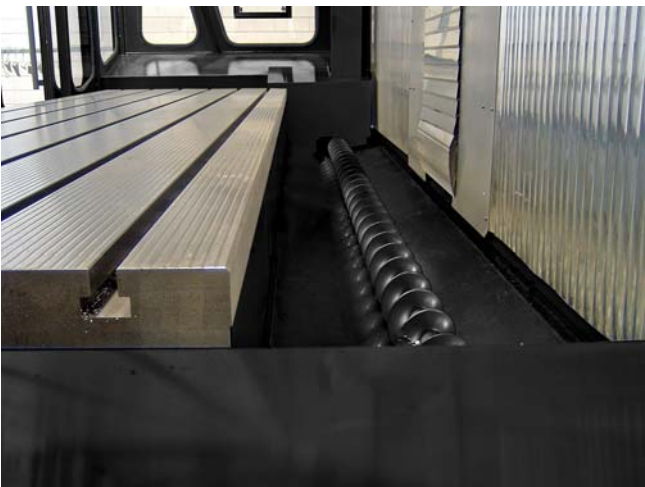


Rotary Tables



Different are the type of the rotary tables available for **SHARK**. Can varying for dimensions and capacity and the diameter of the table plan varying from a minimum of 480 mm to the maximum of 1000 mm. In some versions can be integrated in the working plan to the center or to the sides and are endowed of various usings or clamping piece systems.

Chips Scavenging



Happens through auger placed between the table plan and the column. The same transports the shavings on the side slides where, through water jets, are unloaded on the conveyor to catenary positioned on the front of machine with side exit.

SHARK is equipped of a coolant tool system composed by one electropump with 25 lt/min flow rate - 6 bar pressure complete with filtering unit. Through orientable nozzles is possible to address the coolant directly on tool on piece to machining. Optional is scheduled the outflux of the high pressure coolant inside the spindle (up to 50 bar).

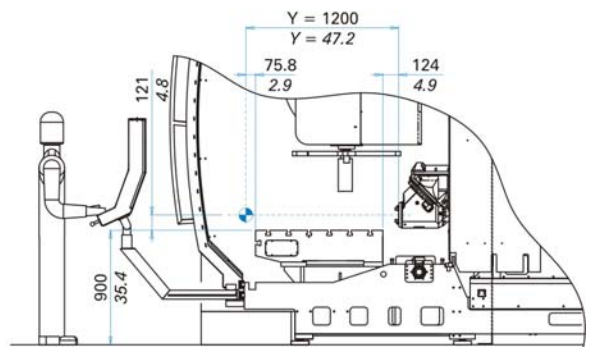
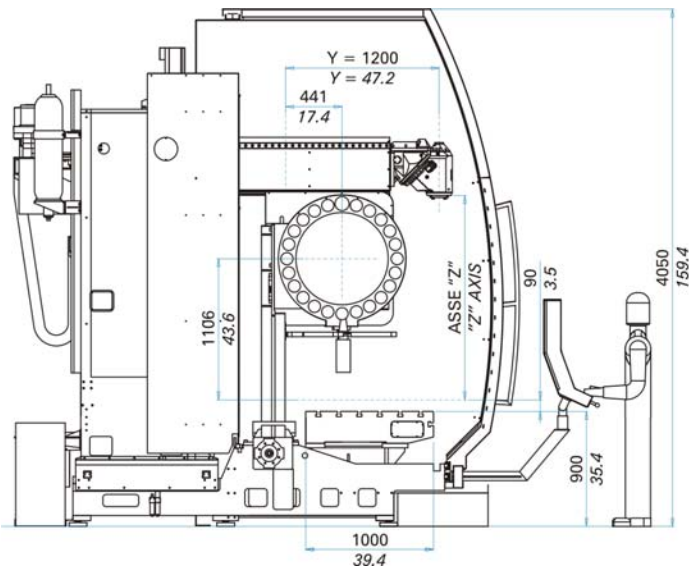
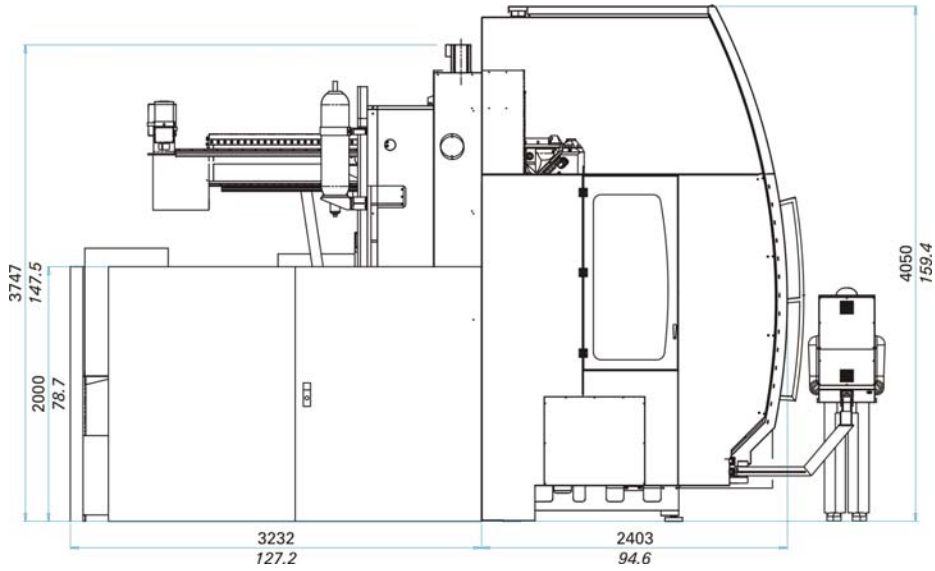
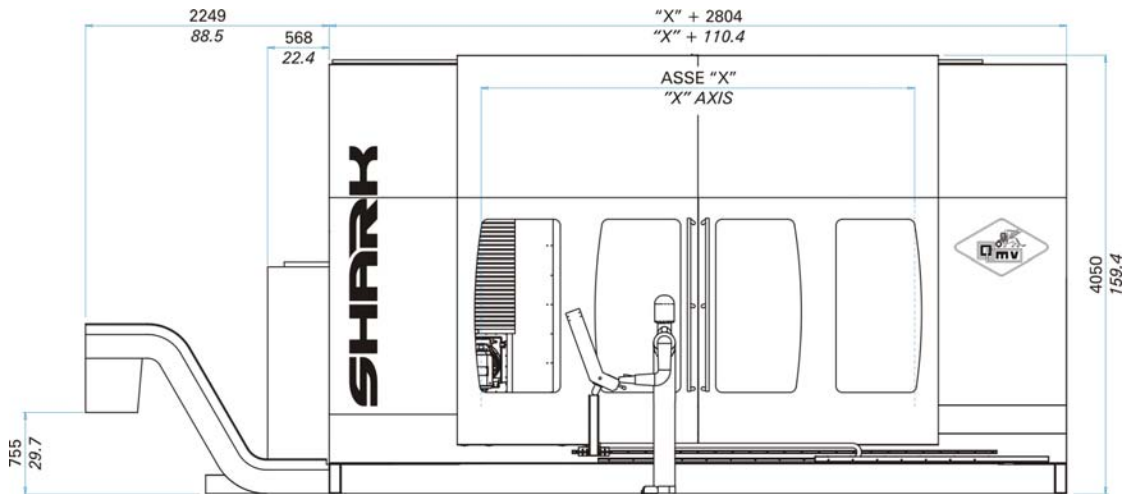
TECHNICAL SPECIFICATIONS

SHARK			
Table surface	1000 x (travel + 500 mm)		
Max load admitted	5500 kg/m ²		
"T" slots	n° 6 to 22 mm		
Distance between "T" slots centers	160 mm		
Distance from table surface to floor line	900 mm		
Longitudinal travel	X	2500 ÷ 6000 mm (500 mm)	
Cross travel	Y	1200 mm	
Vertical travel	Z	1600 • 2100 mm	
Working • rapid feedrates	1 ÷ 15000 mm/1' • 0 ÷ 30000 mm/1'		
Axes acceleration	2000 mm/sec ²		
Max axial force	X = 12000 N • YZ = 10000 N		
Mechanical Spindle (TUC / TUI)			
Max speed	4000 • 5000 • 6000 • 7000 rpm		
Rated output	30 kW from 400 rpm		
Max torque	500 Nm		
Spindle taper available	ISO 40 (HSK A63) • ISO 50 (HSK A100)		
Motorspindles (TVC)			
	MTS-29.92	MTS-41.130	MTS-45.220
Max speed	22000 rpm	15000 rpm	10000 rpm
Rated output	29 kW	41 kW	45 kW
Max torque	117 Nm	175 Nm	280 Nm
Spindle taper available	HSK A63 • ISO 40	HSK A63 • ISO 40	HSK A100 • ISO 50
Motorspindles (TSUB)			
	MTS-30.42		
Max speed	22000 rpm		
Rated output	30 kW		
Max torque	59 Nm		
Spindle taper available	HSK A63 • ISO 40		
Milling Heads			
TUI (mechanical spindle)	Universal indexed resol. = 2,5°		
TUC (mechanical spindle)	Universal in continuous resol. = 0,001°		
TVC (motorspindle)	Vertical in continuous resol. = 0,001°		
TSUB (motorspindle)	Orthogonal in continuous resol. = 0,001°		
Tools Magazine			
	Wheel type	Chain type	
Tools number	24 ÷ 120		
Max tool length	350 mm	350 mm	
Max tool diameter (with adjacent tools)	Ø 124 mm	Ø 130 mm	
Max tool weight	15 kg	15 kg	

TECHNICAL SPECIFICATIONS

SHARKone			
Table surface	1000 x (travel + 500 mm)		
Max load admitted	5500 kg/m ²		
"T" slots	n° 6 to 22 mm		
Distance between "T" slots centers	160 mm		
Distance from table surface to floor line	900 mm		
Longitudinal travel	X	2000 ÷ 6000 mm (500 mm)	
Cross travel	Y	1050 mm	
Vertical travel	Z	1200 mm	
Working • rapid feedrates	1 ÷ 20000 mm/1' • 0 ÷ 40000 mm/1'		
Axes acceleration	2000 mm/sec ²		
Max axial force	X = 12000 N • YZ = 10000 N		
Mechanical Spindle (TUC / TUI)			
Max speed	4000 • 5000 • 6000 • 7000 rpm		
Rated output	22 kW from 400 rpm		
Max torque	400 Nm		
Spindle taper available	ISO 40 (HSK A63) • ISO 50 (HSK A100)		
Motorspindles (TVC)			
	MTS-29.92	MTS-41.130	MTS-45.220
Max speed	22000 rpm	15000 rpm	10000 rpm
Rated output	29 kW	41 kW	45 kW
Max torque	117 Nm	175 Nm	280 Nm
Spindle taper available	HSK A63 • ISO 40	HSK A63 • ISO 40	HSK A100 • ISO 50
Motorspindles (TSUB)			
	MTS-30.42		
Max speed	22000 rpm		
Rated output	30 kW		
Max torque	59 Nm		
Spindle taper available	HSK A63 • ISO 40		
Milling Heads			
TUI (mechanical spindle)	Universal indexed resol. = 2,5°		
TUC (mechanical spindle)	Universal in continuous resol. = 0,001°		
TVC (motorspindle)	Vertical in continuous resol. = 0,001°		
TSUB (motorspindle)	Orthogonal in continuous resol. = 0,001°		
Tools Magazine			
	Wheel type	Chain type	
Tools number	24 ÷ 48		
Max tool length	350 mm	350 mm	
Max tool diameter (with adjacent tools)	Ø 124 mm	Ø 130 mm	
Max tool weight	15 kg	15 kg	

OVERALL DIMENSIONS SHARK



OVERALL DIMENSIONS SHARKone

