HIGH PRODUCTIVITY • ROBUSTNESS • PRECISION • TECHNOLOGY

VERTICAL MACHINING CENTRES - 5-AXIS / 5-FACE

ROMI DCM 620 SERIES

NEW GENERATION

www.romi.com

ROMI

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NEW GENERATION

High productivity with robustness, precision, and technology.

The **ROMI DCM 620 Series - New Generation** features advanced 5-axis / 5-face vertical machining centres designed for machining simple and complex geometries at high speeds. With a 5-axis / 5-face configuration, complex parts can be machined in a single setup, significantly reducing machining time with efficiency, precision, and productivity.

ROMI DCM 620-5F (5 FACES)

Headstock	10,000 or 15,000 rpm
Spindle taper	ISO 40
Motor (regime S6-40% - 10 min)	20 hp / 15 kW (10,000rpm) 22 hp / 16,5 kW (15,000rpm)
Automatic tool changer	30 tools capacity
Rotary table	600 x 600 mm
CNC	Siemens Sinumerik 828D

ROMI DCM 620-5X (5 AXIS)

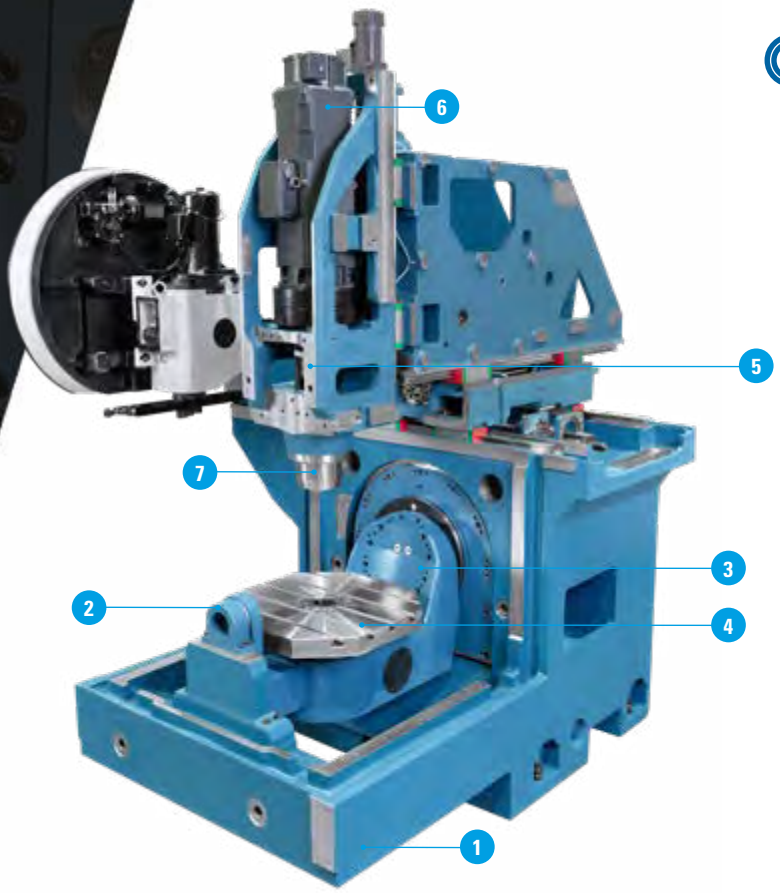
Headstock	15,000 rpm
Spindle taper	ISO 40
Motor (regime S6-40% - 10 min)	22 hp / 16,5 kW
Automatic tool changer	30 tools capacity
Rotary table	600 x 600 mm
CNC	Siemens Sinumerik One

STRUCTURE

ROBUSTNESS AND TECHNOLOGY

The quality of ROMI machines' manufacturing processes ensures reliability and operational effectiveness. All machines are inspected with a laser system for positioning and repeatability measurements. Axis alignment verification is performed using a Ball Bar system, ensuring perfect interpolation of axes B and C.

Designed in a 3D CAD system, the machines in the ROMI DCM line have their entire structure dimensioned by finite element analysis (FEA) software, resulting in structures suitable for each machine.



1 **RIGID AND ROBUST MONOBLOCK BASE:** Supports the table assembly, consisting of axes B and C, as well as the cross slide and spindle assembly. The X, Y, and Z axes are equipped with roller linear guides, offering high rigidity, stability, precise positioning, and high-quality surface finish for machining processes, providing maximum efficiency and productivity to the user.

2 **SUPPORT BEARING:** Ensures total rigidity of the table during operations with high loads.

3 **INCLINED AXIS TABLE (Axis B):** Supports the rotary axis and allows positioning from +110° to -50°.

4 **ROTARY AXIS TABLE (Axis C):** Enables part positioning in any position with a 360° range.

5 **CROSS SLIDE:** Robust structure that supports the entire spindle assembly. Equipped with linear rollerguides, it is supported by shoes with a locking system that provides high rigidity and allows high-speed movements.

6 **MAIN MOTOR:** Directly coupled to the spindle cartridge, offering high efficiency in torque and power transmission.

7 **SPINDLE CARTRIDGE:** Directly coupled to the main motor (direct drive) with high efficiency in power and torque transmission. It has the advantage of low noise, eliminating gaps and vibrations, it provides a significant improvement compared to pulley and belt systems. It offers a maximum rotation speed of 10,000 (*) or 15,000 rpm, ensuring excellent performance under severe cutting conditions at full power.

(*) Only for ROMI DCM 620 - 5F

INCLINED AXIS (AXIS B) AND ROTARY AXIS (AXIS C)

ROMI DCM 620-5F - The NC rotary/inclined table offers high rigidity, ensuring precision in 5-axis machining with angular positioning, resulting in precise positioning of parts.

ROMI DCM 620-5X - The NC rotary/inclined table offers high rigidity. It is equipped with angular encoders, ensuring precision in simultaneous 5-axis machining with angular positioning, resulting in highly precise complex parts.

ANGULAR ENCODER (AXES B AND C) (ROMI DCM 620-5X) (*)

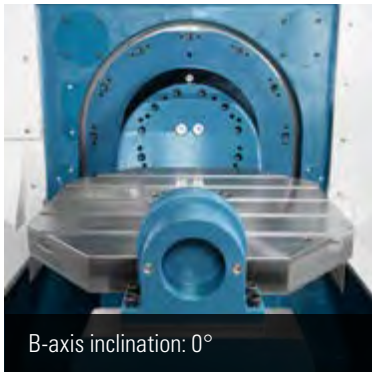
This second measurement system provides the machine with high precision and repeatability in the positioning of the rotary axes, required for machining complex and precision parts. The encoder directly reads the position of the axis it is installed on and sends signals relative to the angular position of the axis to the CNC. The position reading is direct and real, without any interference from the table transmission system errors.

(*) Optional for ROMI DCM 620 - 5F

Characteristics of Axes B and C:

- Inclination range of Axis B: +110° to -50°
- Rotation range of Axis C: 360°
- Axes B and C are driven by independent servo motors.
- Maximum permissible weight on the table for Axes B and C: 500kgf
- Maximum rotation speed of Axes B and C: 25 rpm
- Clamping torque: Axis B = 4,500 N.m
  Axis C = 2,500 N.m

B-axis inclination: -50°



B-axis inclination: 0°

B-axis inclination: +110°

HEADSTOCK

HIGH PERFORMANCE AND PRECISION

Direct drive spindle - directly coupled to the headstock cartridge. The direct drive system is highly efficient, allowing for high performance in acceleration and deceleration. It offers low noise, eliminates backlash, and dampens vibrations. It also provides high quality in operations with rigid tapping.

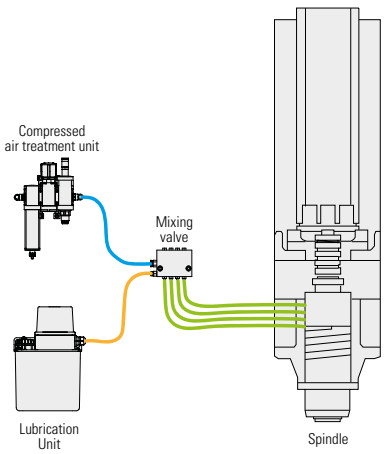
Z-AXIS THERMAL COMPENSATION

Through sensors installed in strategic locations of the equipment, mathematical algorithms correct the position of the Z-axis in real-time. This ensures stable dimensional results, even during long periods of work.

Excellent thermal insulation design, minimizing displacements caused by heating, offering high positioning accuracy of the spindle and long life to the assembly.

SPINDLE WITH AIR-OIL LUBRICATION (15,000 rpm version) *

The system consists of a dedicated oil unit and an air treatment unit. Through separate pipelines, oil and air enter a mixing valve, and this lubricating mixture is directed to the spindle bearings.
In addition to serving as a conduit for the oil, the air also assists in cooling the bearings, resulting in lower heat generation and improved machining performance.



Headstock cooling system (15,000 rpm version)**

The headstock and the flange seat between the motor and the cartridge are cooled by a fluid recirculation system specifically designed for the headstock, which ensures thermal and geometric stability of the assembly. The headstock housing has a chamber that surrounds the cartridge housing for the circulation of the cooling liquid.

The cooling system consists of a cooling unit (air-fluid heat exchanger), which circulates the cooling liquid in the headstock housing, removing all the heat generated by the spindle bearings. The system reduces the temperature variation between the headstock and the environment, where the headstock temperature remains very close to the ambient temperature. It brings the great benefit of minimizing possible thermal distortions of the housing, ensuring the perfect alignment of the spindle centerline in machining operations that require high Z-axis positioning accuracy.

(*) Air-oil lubrication is applied only in the 15,000 rpm version. For the 10,000 rpm version, the bearing is lubricated with permanent grease.
(**) 10,000 rpm version - headstock cooling system is optional.

ROLLER LINEAR GUIDES

Offer high load capacity, high rigidity, and stability even in severe machining operations. They allow for rapid, precise displacement and high acceleration due to the low friction coefficient between rails and shoes.

Advantages of linear guides:

- High rigidity, high load capacity, long durability;
- Rapid positioning of axes, minimizing idle times, increasing productivity;
- Low lubricating oil consumption;
- Maintenance convenience.

OPTICAL SCALE (Optional)

This option provides the machine with high precision and repeatability in positioning of linear axes, required in the machining processes of complex and precision parts. The scale directly reads the position of the axis it is installed on and sends position-related signals to the CNC. The position reading is direct and real, so there is no interference from any ball screw step error caused by heating.

CALIBRATION SPHERE (Optional) *

It is a cost-effective solution for verifying the performance in alignment and positioning of rotary axes. In just a few minutes, the machine can identify and notify deficient alignments and geometries that can cause non-conformity of parts.

PROBE AND OPTICAL RECEIVER (Optional)

The use of this system allows the user to reduce part setup times on the machine, as well as inspection processes, leaving more time for the machine to effectively machine parts.

After measuring a workpiece or fixture, the machine itself performs self-alignment, as the machining program references can be rotated based on the positioning information read by the probe and provided to the CNC.

It also enables in-process inspection to monitor dimensional and positional accuracy of the workpiece, making automatic corrections if necessary.

(*) Includes kinematic measurement software.

Technical Specifications		ROMI DCM 620-5F	ROMI DCM 620-5X
Vertical Headstock			
Spindle taper	ISO	40	40
Speed ranges (version 10.000 rpm)	rpm	10 to 10,000	-
Speed ranges (version 15.000 rpm)	rpm	15 to 15,000	15 to 15,000
Feeds			
Rapid traverse (X / Y / Z axes)	m/min	36	36
Max. Programmable cutting feed	m/min	36	36
Maximum rotation (B and C axes)	rpm	25	25
Travels			
X axis travel	mm	620	620
Y axis travel	mm	520	520
Z axis travel	mm	470	470
Distance between spindle and table	mm	150 ~ 620	150 ~ 620
Rotation angle - B axis	degrees	+110° ~ -50°	+110° ~ -50°
Rotation angle - C axis	degrees	360°	360°
Rotary table			
Table surface	mm	600 x 600	600 x 600
Number of Slots ("T" slots)	mm	5	5
T-slot width x distance	mm	18 x 100	18 x 100
Central guide hole	mm	Ø 60 H7	Ø 60 H7
Max. piece dimension on table (*)	mm	Ø675 x 430 height or Ø520 x 330 height	Ø675 x 430 height or Ø520 x 330 height
Allowed weight (evenly distributed)	kg	500	500
Automatic tool changer			
Tool capacity		30	30
Tool max. diameter	mm	75	75
Max. tool diameter when adjacent stations are empty	mm	Up to 10,000 rpm = 127 Above 10,000 rpm = 117	Up to 10,000 rpm = 127 Above 10,000 rpm = 117
Max. tool length	mm	250	250
Max. tool weight	kg	7	7
Max. Weight on magazine	kg	150	150
Tool holdertype	type	BT or DIN / CAT (**)	BT or DIN / CAT (**)
Power (10.000 rpm)			
Motor principal ca (regime S6 - 40% - 10 min.)	hp/kW	20 / 15	-
Main motor AC (continuous rating)	hp/kW	13.5 / 10	-
Total installed power	kVA	50	-
Power (15.000 rpm)			
Main motor AC (rating S6 - 40% - 10 min.)	hp/kW	22 / 16.5	22 / 16.5
Main motor AC (continuous rating)	hp/kW	15 / 11	15 / 11
Total installed power	kVA	50	50
Dimensions and weight (***)			
Height (max. travel)	mm	2,963	-
Floor space required (front x side)	mm	Version 10,000rpm = 3,595 x 3,642 Version 15,000rpm = 3,595 x 4,476	-
Net weight	kg	9,000	-

(*) See options in the work layout (page 21)
(**) Optional
(***) Machine without options

Standard Equipment

- Headstock with ISO-40 spindle taper, BT/BBT-40 or DIN-40 tool interface
- Rapid traverse on X, Y, and Z axes of 36000 mm/min
- Siemens Sinumerik 828D CNC with 15.6" color LCD monitor (ROMI DCM 620-5F)
- Siemens Sinumerik One CNC with 24" color LCD monitor (ROMI DCM 620-5X)
- Swarf and splash guard
- Thermal compensation for Z-axis
- X-axis longitudinal travel of 620 mm, Y-axis transversal travel of 520 mm, and Z-axis vertical travel of 470 mm
- Complete ROMI product documentation on a USB drive
- B-axis with positioning from +110° to -50°
- C-axis with full 360° positioning
- Angular encoder for B-axis and C-axis (ROMI DCM 620-5X)
- Spindle speed range of 10 to 10000 rpm, with maximum torque of 82 Nm (S6 40% duty cycle) (ROMI DCM 620-5F)
- Spindle speed range of 15 to 15000 rpm, with maximum torque of 82 Nm (S6 40% duty cycle)
- 20 hp (15 kW) AC main motor in S6-40% duty cycle - 10 min (10,000 rpm version)
- 22 hp (16.5 kW) AC main motor in S6-40% duty cycle - 10 min (15,000 rpm version)
- Roller-type linear guides on X, Y, and Z axes
- Electrical installation available for 380 Vac 50/60 Hz voltage/frequency
- Set of key tools for machine operation
- Set of leveling pads, screws, and nuts
- Rotary joint for internal cooling through the spindle center
- LED work light
- Support bearing for the table
- Rotary table measuring 600 x 600 mm with evenly distributed weight capacity of 500 kg
- Manual auxiliary control panel (handwheel) with jog and crank functions for X, Y, Z, B, and C axes
- Electrical panel with centrifugal air conditioning and positive pressure
- Single main door with electric safety lock
- B-axis and C-axis rotation at 25 rpm (with table unloaded)
- Spindle housing cooling system (15,000 rpm version)
- Centralized lubrication system with line filter and oil level sensor for guides and ball screws
- External cutting coolant system for the headstock (via eyelet) with exclusive 5 bar pump
- Pneumatic system for spindle taper cleaning and tool unclamping
- Complete hydraulic and pneumatic systems
- Removable 545-liter coolant tank for incorporating an external swarf conveyor
- Machine hours counter
- Automatic tool changer (ATC) with 30-tool magazine BT/BBT40 or DIN40
- Standard paint: textured epoxy enamel in Munsell blue 10B-3/4 and textured epoxy paint in RAL 7035 gray.

Optional equipment*

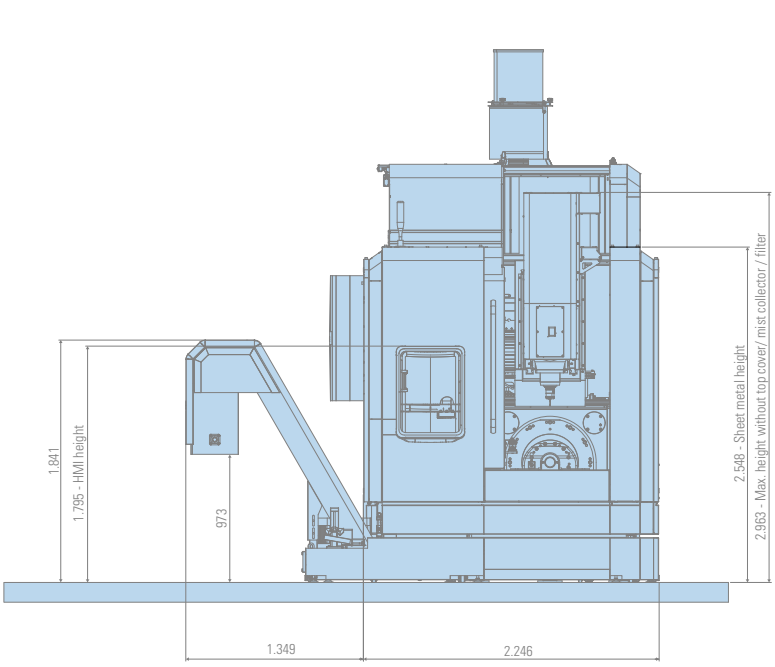
- Longitudinal swarf conveyor with articulated metal belt (TCE) (A)
- Longitudinal swarf conveyor with drag chain (TCA) (A)
- Longitudinal swarf conveyor with filter (TCL) (A)
- Air conditioning for electrical panel
- Autotransformer for 200 to 250VAC / 50-60Hz or 360 to 480VAC / 50-60Hz power supply
- Spindle cooling system through the center with high-pressure pump (7 bar or15 bar) (B)
- Spindle cooling system through the center with external unit and high-pressure pump (20 bar or 70 bar) (B)
- Blade filter for 20-bar high-pressure external unit (G)
- Automatic machine shutdown after shift end (auto power off)
- Calibration sphere (D)
- Upper enclosure for machining area - fixed (C)
- Upper enclosure for machining area - movable (C)
- Interface for remote diagnostics via cable
- Smoke filter (E)
- Right side automatic door (I)
- Electro-electronic interface (10,000 rpm version)
- Interface for Romi Connect
- Interface for remotediagnostics via 3G
- External M-code interface (H)
- Profinet interface for automation
- Interface for 2-way hydraulic fixture device
- Special paint (H)
- Oil/coolant separator (Oil Skimmer)
- Interface for tool presetting (optical) and part measurement/inspection (H)
- Tool breakage detection system - laser (H)
- Mist exhaust system (B)
- Part measurement/inspection system with probe (F)
- Laser tool presetting system (F)
- Mechanical tool presetting system (base or table-mounted option) (F)
- Pneumatic cleaning system during machining
- Linear transducer for X/Y/Z axes position (optical scale)
- Angular encoder for B-axis and C-axis (ROMI DCM 620-5F)
- Status indicator lamp (3 colors)
- Spindle housing cooling system (10,000 rpm version)
- Automatic tool changer (ATC) with robotic arm + 30-tool magazine CAT-40, as replacement for standard
- Workspace cleaning system with 5 bar pump
- Individual washing gun with pump (wash gun) (H)
- Magnetic filter for coolant tank
- Additional set of ROMI product manuals in electronic media
- Additional set of ROMI product manuals in paper format.

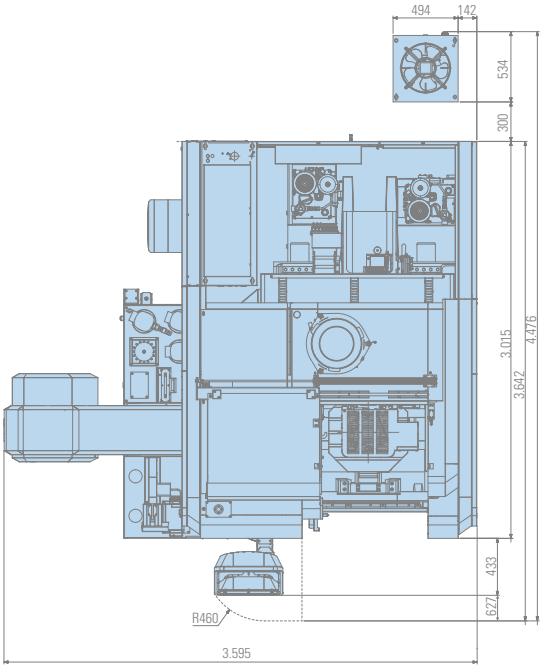
Notes:
(A) Mandatory optional choice
(B) Requires the purchase of "Upper enclosure for machining area" - fixed or movable
(C) The purchase of "Mist exhaust system" is recommended
(D) Requires the purchase of "Part measurement/inspection system"
(E) Requires the purchase of "Mist exhaust system"
(F) Interface for tool presetting (optical) and part measurement/inspection
(G) Requires the purchase of "Spindle cooling system through the center with external unit and high-pressure pump 20 bar"
(H) Requires the purchase of "Electro-electronic interface (10,000 rpm version)"
(I) Requires the purchase of "Interface for automation"

(*) Contact us for machine layout with optional equipment

Machine Dimensions - dimensions in mm*

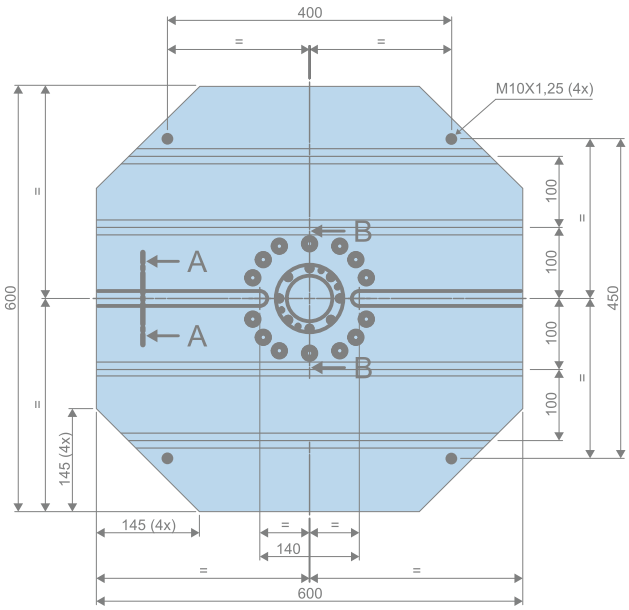
ROMI DCM 620-5F

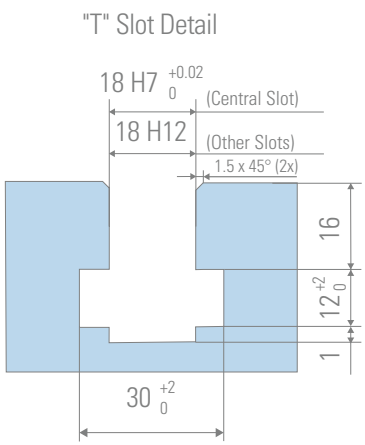




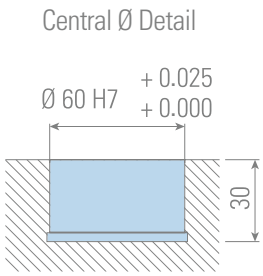
* Contact us for machine layout with optional features

Table Dimensions - dimensions in mm



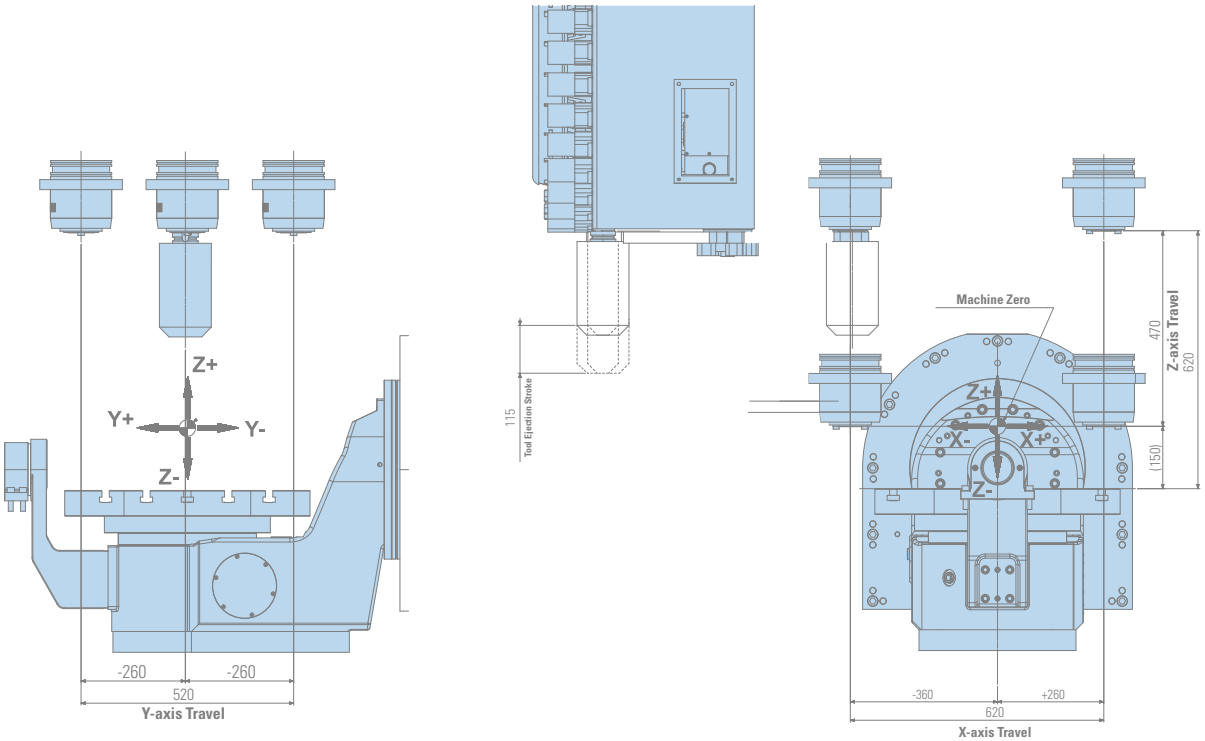


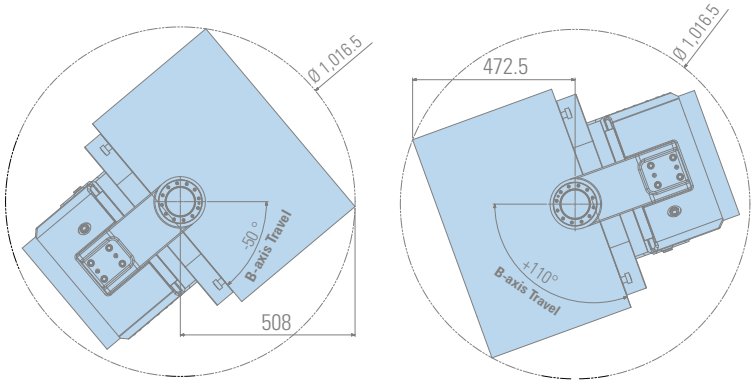
Section A-A



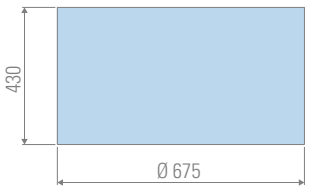
Section B-B

Work Layout - dimensions in mm



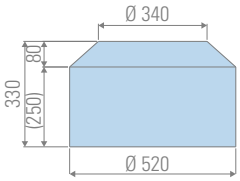


Maximum Allowable Workpiece Dimensions on the Table



Maximum Allowable Workpiece Dimensions on the Table

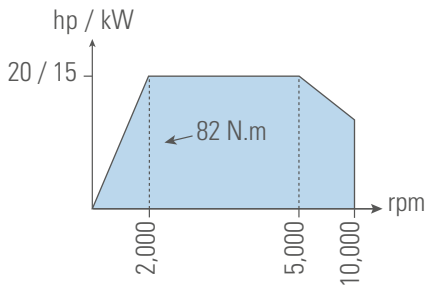
(With "Laser Tool Presetter" and "Optical Presetter fixed to the base" options)



Power Charts

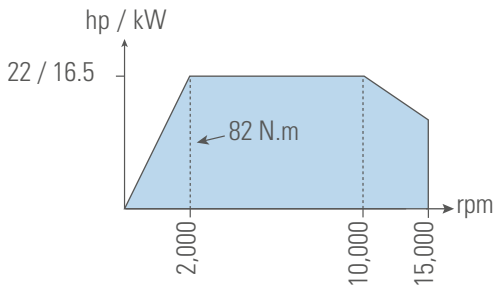
ROMI DCM 620-5F (10,000 rpm version)

S6 Regime - 40% - 10 min



ROMI DCM 620-5F/ROMI DCM 620-5X (15,000 rpm version)

S6 Regime - 40% - 10 min



The charts are not to scale.