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**[E[M]CONOMY
means:]**



Maximum Return on Investment. **HYPERTURN 690**

High-performance turning/milling center with Y and B axes for complete machining of complex workpieces in one operation

HYPERTURN 690

[Control]

- Siemens SINUMERIK 840D Powerline
- Pivotal and mobile
- Clear arrangement of function keys
- PC keyboard (optional)

[Main spindle]

- Main drive power 54 kW
- High torque
- Large speed range
- Bar capacity \varnothing 95 mm
- Liquid-cooled headstock
- Stable spindle bearings with constant-temperature oil-cooling

[Lower tool system]

- 12-station tool turret
- VDI40 quick-change system
- 12 driven tool stations
- Servo-controlled – short indexing times
- Both spindles in use

The HYPERTURN 690 is a modern multitasking center for complete machining of complex components on one machine. Maximum flexibility is achieved through the NC controlled machining head and a simple tool changer. Heavy engineering and a highly efficient milling spindle with 21 kW drive power enable tremendous metal-cutting performance even on large workpieces.

[B axis]

- Compact milling head
- Large speed range
- Latest spindle motor technology
- High torque
- Internal coolant supply
- Quick tool change
- Large programmable travel range

[Machine cover]

- All-round protection
- 100% coolant retention
- Optimum accessibility
- Large workspace opening
- Suitable for top-loading
- Chip conveyor as standard

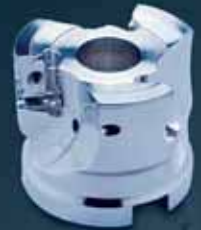
[Counter spindle]

- Powerful drive
- Spindle nose as main spindle
- Large speed range
- High torque
- Partial hollow clamping \varnothing 95 mm
- Liquid-cooled headstock
- Stable spindle bearings with constant-temperature oil-cooling

[Workpieces]



Tool turret disk
(Tempered steel)



Milling cutter with
indexable inserts
(Tempered steel)



Drill bit with
indexable inserts
(Tempered steel)



Hydraulic component
(Steel)

[Hyper-Flexibility]

Machining capabilities

- Milling of surfaces, pockets, islands and grooves
- Cam milling
- Thread milling
- Polygonal milling
- Polygonal turning
- Gear tooth milling
- Turning milling
- Thread turning
- Tapping
- Deep-hole drilling
- Recessing
- Contour turning
- Profile milling



Precise synchronization of the tool drive with the spindle drive enables gear cutting operations on faces and circumferences. Involute gear cutting is also possible.



Machine flexibility is often sacrificed for the sake of productivity. Not with the HYPERTURN. With its high-performance and exceptionally mobile milling spindle and an almost inexhaustible tool magazine, the HYERTURN can do almost anything - and very quickly.



Production of circular pockets, rectangular pockets, drilling patterns, grooves and islands using the Y axis. Also possible on characteristic inclined surfaces with the B axis.



Any contours can be programmed very easily with Transmit software support. The contour is described with X, Y and Z coordinates as in a milling center and automatically converted into C and X axis interpolation. A rigid C axis is the basic prerequisite for accurate contour milling.



Drilling patterns can also be produced with the aid of the Y axis. Standard cycles for centering, boring, rigid tapping, and reaming are available.

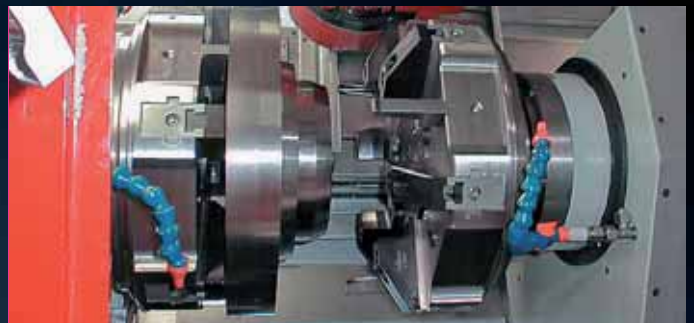
Clamping capabilities



Profile turning of an aluminum workpiece on the counter spindle at high speed



The milling spindle can be synchronized with the main or counter spindle as required for gear-teeth hobbing on workpieces. This enables the production of components with straight or inclined teeth.



Workpiece transfer from spindle 1 to spindle 2 with high positioning accuracy. Workpiece weight: 150 kg



The lower tool turret can be fitted with a live center and can act as a tailstock for machining large workpieces.

[Technical]

Highlights

- All spindles liquid-cooled for optimum thermostability
- Large chip volume due to high drive power of milling spindle
- Large spindle bore Ø 95 mm
- Tool magazine with up to 80 stations (optional)
- Short set-up times due to ease of access to tools and clamps
- Good absorption of high cutting forces due to oversized spindle bearings
- Cast-iron bed with finite-element construction
- Both tool systems can be used on both spindles
- Shaft machining with tailstock and steady rest
- Large swing for flange machining



The automatic swivel measuring probe (optional) is used for tool measurement in the workspace.



The upper turret is replaced by a 21 kW liquid-cooled milling spindle in the B axis version. The B axis travel range is 205°. This is infinitely variable with 0.001° resolution. In addition, the B axis can be clamped in any position with 5° indexing.



There is an integrated, safe, rocker-controlled tool changer for changing tools in the milling spindle. This picks up the tools from the 30/48/80-station magazine. This produces maximum flexibility.



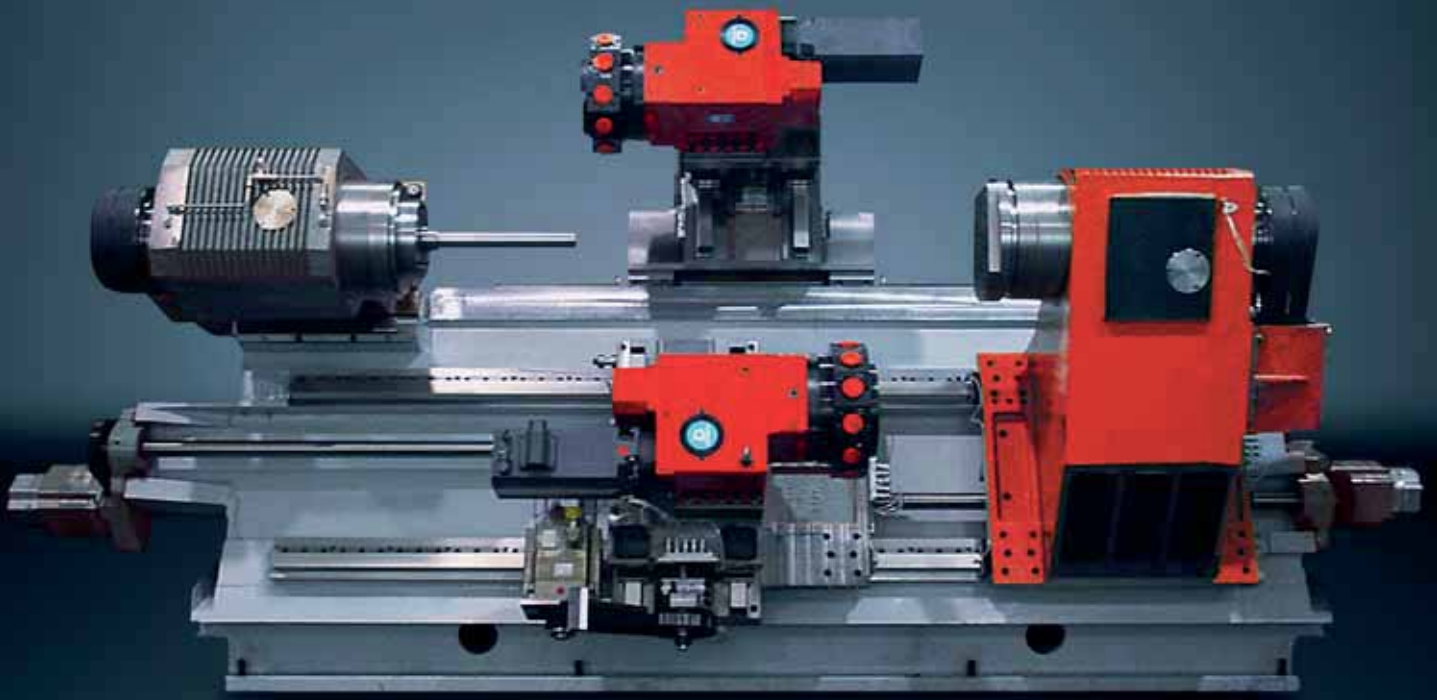
With the modular machine concept it is also possible to have a tailstock in combination with NC controlled steady-rest instead of the lower tool turret, depending on the customer's requirements. The steady-rest can be hydraulically lowered 250 mm as required.



The HYPERTURN 690 can be fitted with a finished parts pick-up system (optional) for automatic removal of finished parts.



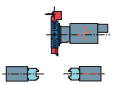
A laser measuring system (optional) can be installed to measure tools in the workspace on the machine variant with milling spindle.



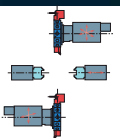
The technology. Preloaded linear guides in all axes ensure maximum precision on the HYPERTURN 690. Built-in linear scales are available as an option. Both spindles are equipped with a direct measuring system. The arrangement of the tool changers enables the use of long tools on both spindles. The very wide distances between the slide ways of the carriages and both headstocks ensure optimum force transfer. Both the oil and the cooling-water systems for the headstocks are electronically monitored and kept at a constant temperature.

EMCO HYPERTURN 690 - typical versions

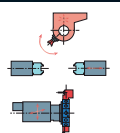
HT 690MC as basic version with or without Y axis



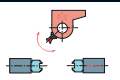
HT 690MC^{plus} version with 4 axes



HT 690MC^{plus} with B axis and milling spindle and second tool turret



HT 690MC only with B axis as milling spindle

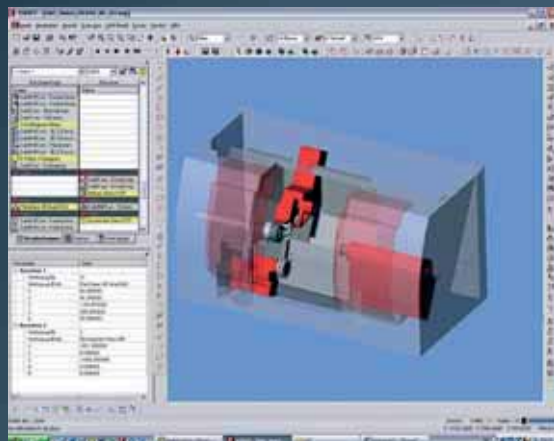


HT 690MC with B axis as milling spindle and tailstock





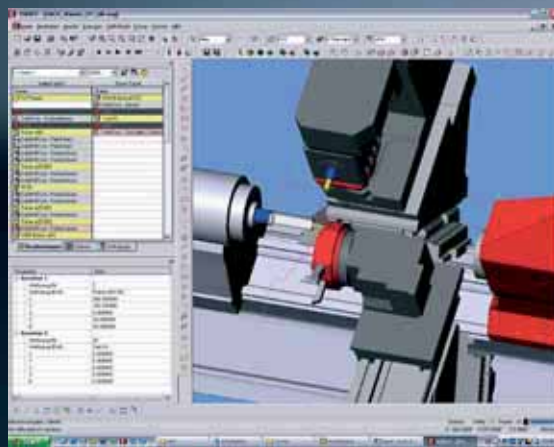
The sensational CAM solution for turning and turning/milling. ESPRIT greatly simplifies the programming of complex machining processes and significantly reduces set-up times.



Fully modeled HYPERTURN 690MC^{plus}

Applications

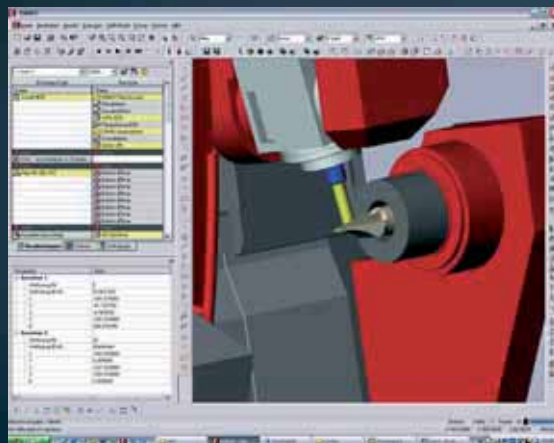
- Complete CNC programming for up to 22-axis turning
- Turning/milling for single-spindle lathes
- Turning/milling for multi-carriage turning centers
- Turning/milling for multitasking machine tools including B axis



Collision monitoring with the HYPERTURN 665MC^{plus} PowerMill with milling spindle and tool turret

Tools

- Parasolid®
- ACIS®
- NURBS-surface-modeling
- STL
- 2-D/3-D-wire-frame modeling
- 2-D-drawing, dimensioning and text



Multi-axis complete machining on the counter spindle on the HYPERTURN 690MC^{plus}

Simulationen

- Dry runs in dynamic volume view
- Shaded in the entire working environment: machine tool, clamping devices, blank and workpiece
- Extensive collision detection: tool, blank, workpiece clamping devices and target-actual workpiece comparison

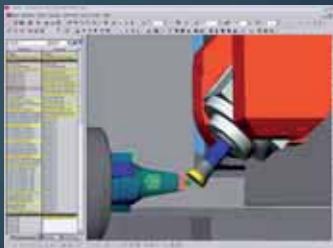
emcoCPS | Pilot

The virtual HYPERTURN

EMCO CPS Pilot (Crash Prevention System) is an innovative offline programming system for the EMCO Hyperturn series. Users work at external programming workstations with an image of the machine in simulation mode. Unlike with most other competitive products, they can plan, program, simulate and optimize the next production run with CPS Pilot whilst the HYPERTURN is producing a series run. Collision and damage to the machine can be completely eliminated with the CPS Pilot due to the virtual test run. The result: 100 % production safety, up to 80 % shorter set-up times and a significant increase in productivity and economic viability.

Your benefits

- Up to 80 % shorter set-up times
- 100 % production safety
- Reduced processing times
- Optimum machine load
- Massive cost-saving



Exact image.
EMCO CPS Pilot illustrates the individually configured machine with all its functions and features 1 : 1 as 3D graphics.



Optimum load.
The CPS Pilot ensures that downtimes are kept to a minimum for optimizations.



Rapid success.
EMCO CPS Pilot provides the same operator surface for two machines – the virtual and the real. Retraining is not necessary. Fast and successful utilization of CPS Pilot is therefore guaranteed.



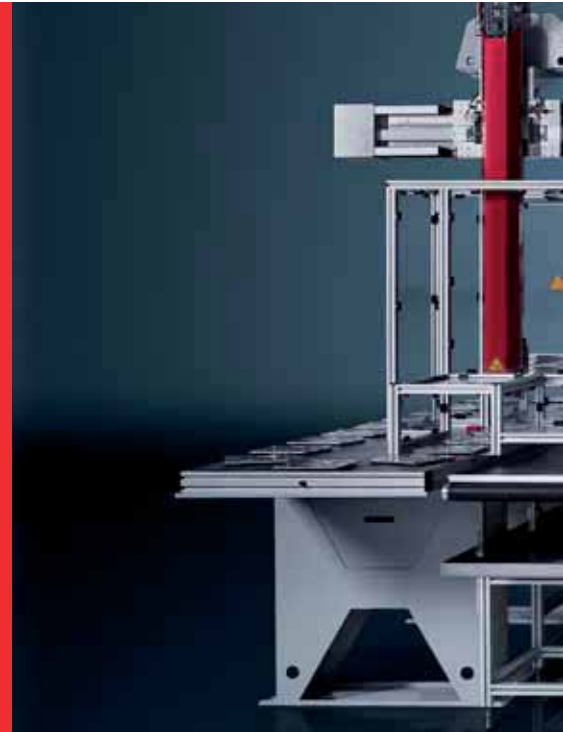
Users work as normal with the SIEMENS control surface.

Simulation takes place exclusively at the PC workstation. Machine production is not interrupted.

CPS Pilot can be easily combined with the ESPRIT CAD/CAM software for programming complex parts.

Automatic Return on Investment

Even at the design stage, the EMCO development engineers were already aware that a highly productive industrial machine such as the EMCO HYPERTURN would need high-performance automation peripherals. Which is why the HYPERTURN gantry was immediately included in the HYPERTURN concept and design to produce a particularly homogenous solution.



Workpiece magazine

Blank-specific pallet attachments enable oriented loading of blanks into the machine and increase the parts stock for unmanned production. Changeover times are reduced or eliminated thanks to the perfect adjustment to the customer's parts.



4-station pallet attachment for T pieces



6-station pallet attachment for articulated brackets



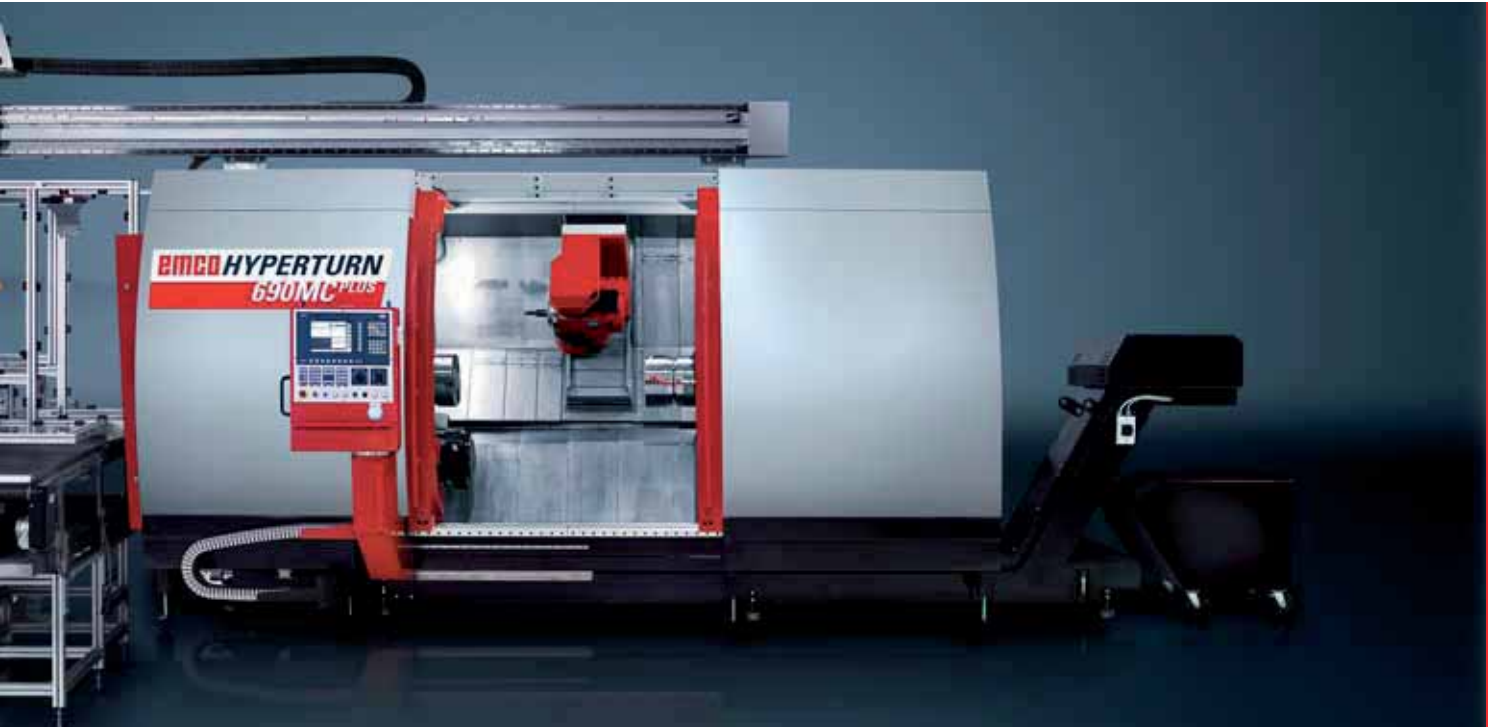
Multi-pallet attachment for a parts family



4-station pallet attachment for valve caps



20-station pallet magazine with customer-specific pallets



EMCO LM 1500 XL

Custom-made for the HYPERTURN – and the perfect solution for automatic feeding and loading of cut-to-length bars.

The bar loader magazine swivel and feed movements provide a particular handling advantage.



Turret steady-rest

A turret steady-rest can be set up on the lower tool turret to support long, thin workpieces.



Robot automation system

EMCO provides turnkey solutions: Parts are loaded and unloaded by the robot and can be linked to other machines or process steps.



EMCO tool breakage monitoring system

Tool breakage is monitored by evaluating the load on the various axis drive motors. Excessive loads point to tool wear or breakage. Too low a load indicates a tool is missing.



Band filter system with high-pressure coolant pumps

A coolant pressure of 25/40/60/80 bar can be set as necessary. This enables coolant-fed drilling and milling tools to be used to their best advantage.

[Technical data]



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HYPERTURN 690MC^{PLUS}

Work area	
Swing over bed	700 mm (27.6")
Max. turning diameter	520 mm (20.5")
Distance between spindle noses	1500 mm (59.1")
Max. bar diameter	95 mm (3.8")
Travel	
Travel X(B)/X2	490/280 mm (19.3/11")
Travel Z/Z2/Z3	1055/1090/1100 mm (41.5/42.9/43.3")
Travel Y	200 mm (+/- 100mm) (7.9" (+/- 3.9"))
Main spindle	
Speed range	0 – 3200 rpm
Spindle nose (DIN 55026)	A2 – 8
Spindle front bearing (inside diameter)	160 mm (6.3")
Max. spindle torque	687 Nm (506.3 ft/lbs)
Spindle bore	106 mm (4.2")
Counter spindle	
Speed range	0 – 3200 rpm
Spindle nose (DIN 55026)	A2 – 8
Spindle front bearing (inside diameter)	160 mm (6.3")
Max. spindle torque S1/S6 40%	324/478 Nm (238.8/352.2 ft/lbs)
C axes	
Circular axis resolution	0.001°
Rapid traverse	1000 rpm
Drive power	
Main spindle S1/S6	37/54 kW (49.5/72 hp)
Counter spindle S1/S6	17/25 kW (23/33.5 hp)
Tool turret top and bottom	
Number of tool stations	2 x 12
VDI shaft (DIN 69880)	40 mm (1.6")
Square tool cross-section	25 x 25 mm (0.99 x 0.99")
Shank diameter for boring bars	40 mm (1.6")
Turret indexing time	0.2 sec

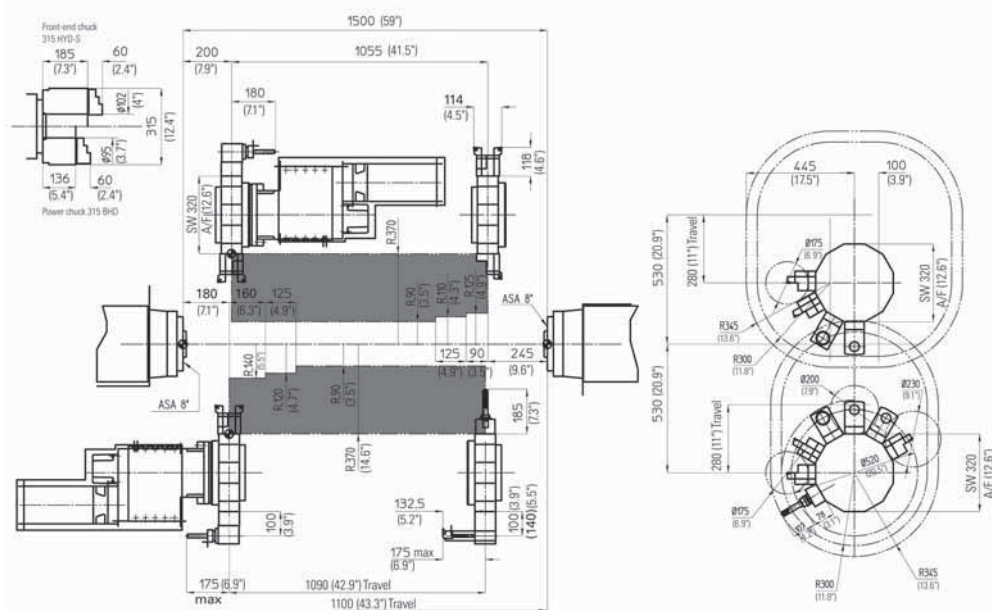
Driven tools	
Speed range	0 – 3000 rpm
Torque S1/S3 40% duty cycle	27/40 Nm (20/29.5 ft/lbs)
Drive power S1/S3 40% duty cycle	5.8/10.5 kW (7.8/14.1 hp)
Driven tools	2 x 12
B PowerMill	
Travel range	205°
Holding torque for indexing (5°)/clamping (0.1")	3500/1000 Nm (2579/737 ft/lbs)
Number of tools	30 (48/80)
Tool holder	CAPTO C5 (HSK-63A)
Torque S1/S6 40% duty cycle	100/128 Nm (73.7/94 ft/lbs)
Drive power S1/S6 40% duty cycle	17/21.5 kW (22.8/28.8 hp)
Speed range	0 – 7000 (12000) rpm
Tool changing time (tool to tool)	2.2 sec
Feed drives	
Rapid traverse X/Z/counter spindle	30 m/min (1181 ipm)
Rapid traverse Y	15 m/min (590.5 ipm)
Coolant system	
Tank capacity	420 l (111 gal)
Pump capacity	14 bar/10 l/min (203 PSI/37.8 gal/min)
Power consumption	
Connected load/with B axis	78/86 kVA
Dimensions	
Height of center above floor	1292 mm (50.9")
Overall height/with B axis	2650/2754 mm (104.3/108.4")
Footprint B x W/with B axis	7200 x 3124/4324 mm (283.5 x 123/170.2")
Total weight/with B axis	15000/15500 kg (33069/34171.3 lb)
Safety devices	CE compliant



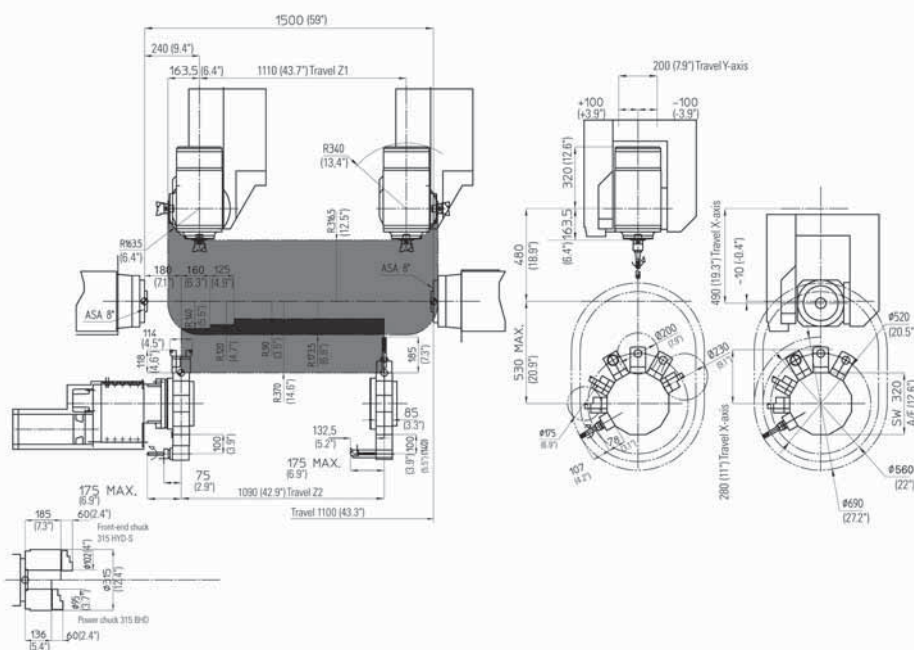
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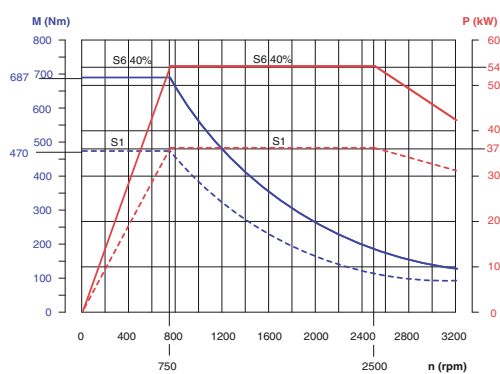
Workspace HYPERTURN 690MCY^{plus}



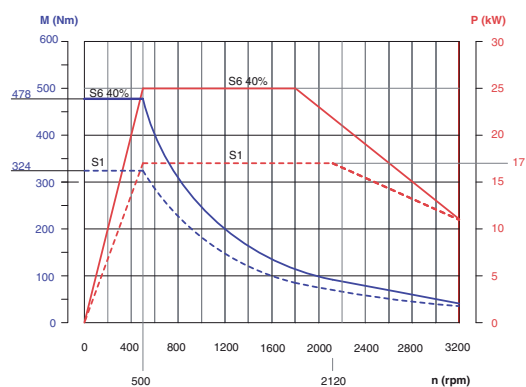
Workspace HYPERTURN 690MC^{plus} with B axis



Power

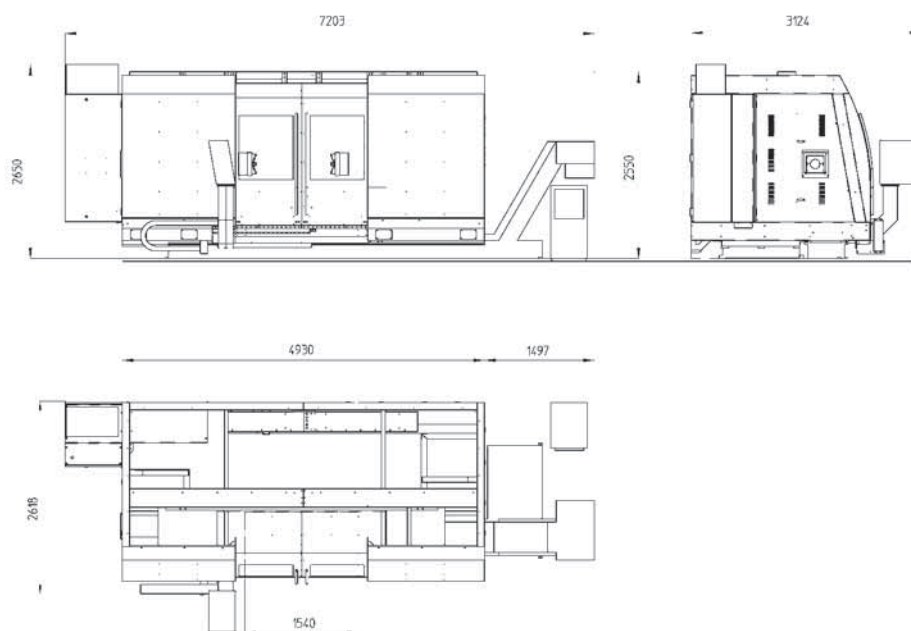


Main spindle

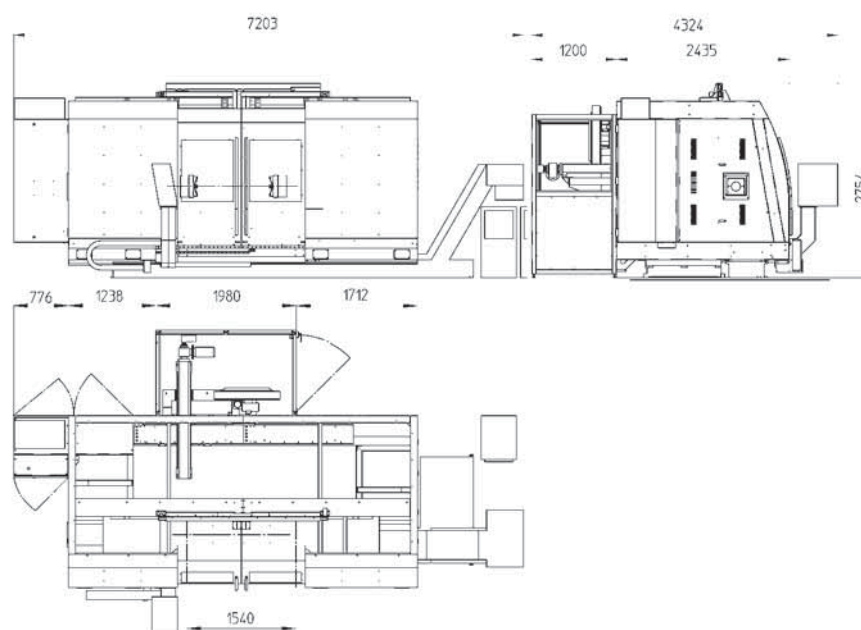


Counter spindle

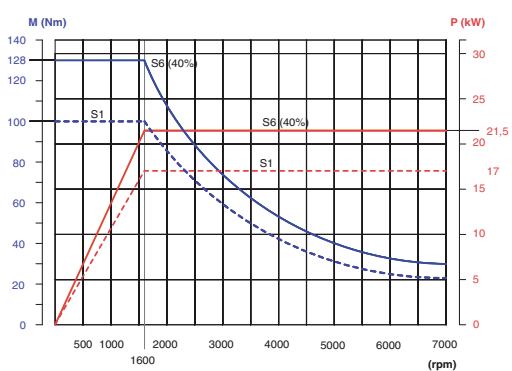
Installation plan HYPERTURN 690MC without B axis (all variants)



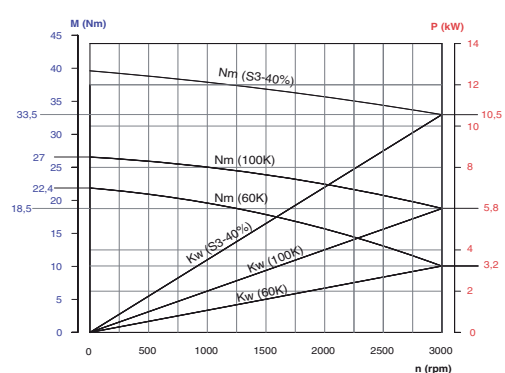
Installation plan HYPERTURN 690 PowerMill with B axis (all variants)



Power



PowerMill Spindle



VDI 40 spindle