

The compact **BRAL** machining centre is designed for surface and shape milling and drilling. The centre is used mainly for the machining of models, moulds and wherever precise and productive **machining of plastics, composites, aluminium alloys** and similar materials is required.

The modular design of the machine makes it possible to adapt the machine to specified products. Its versatility, technical parameters, wide range of equipment and accessories make it possible to cover a wide spectrum of production and enable quick change to different type of products.

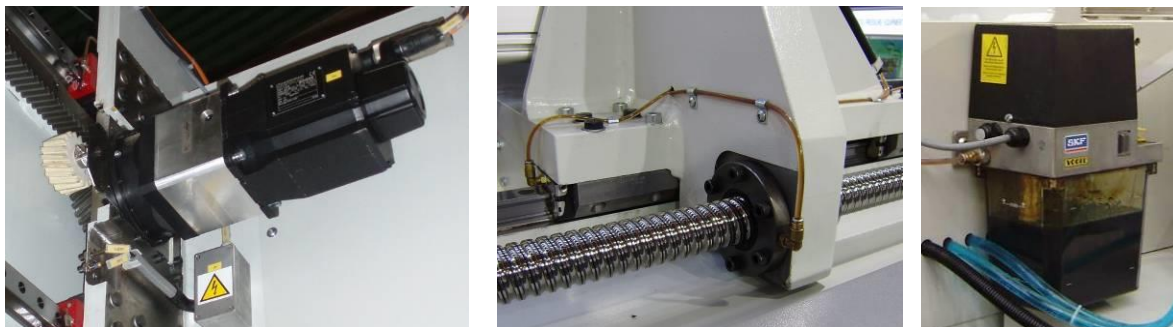


## Machine design description:

**Machine frame** is welded from steel beams. All frame parts are annealed after welding and then machined by modern 5 axes centres and horizontal boring machines. After machining, all parts are checked by a measuring device. This ensures dimensional and geometrical accuracy of individual parts and then of the whole machine.



**Moving parts of the machine** are bound together by a BOSCH REXROTH linear ball-rail system. Perfect mutual sealing of the linear rails and wagons, their significant overrating and automatic central lubrication of all the moving parts ensure high rigidity and long life of the machine. Linear motion in the X axis is realized using hardened, cemented and ground rack with involute gearing. The interface and pinion ridge are also connected to the automatic central lubrication system. Linear motion of the Y and Z axes is realized by the means of a precision ball screw, again with automatic central lubrication of the nut. Central lubrication ensures regular dosage of the lubricant to all the mutually moving parts. Individual intervals are derived from the actual distance covered in each axis. This function is managed by the control system without any interference of the operating personnel.



**The working space** can be divided into two independent working zones. According to the type of production the machine can be fitted with several different types of tables for clamping of the workpiece. Solid Table made of hardened Pertinax with fastening holes M10 in a 100 x 100 mm raster or cast-iron table with T-slots 14H12 for nuts M12 with a pitch of 125 mm is applied mainly in the manufacturing of models, moulds, in the trimming of vacuum stampings and in the machining of composite materials. The work piece can be clamped to these types of tables using clamps or other standard fastening elements. For quick clamping of the work piece by the means of vacuum, the machine can be fitted with a raster table with integrated distribution of vacuum. Individual solutions are possible according to the customer's requirements.



The CNC machining centre BRAL can be equipped with two basic types of **milling heads** - **HB662** and **HB678**. The heads can be delivered with spindles of output range 12-25 kW and torque 15-32 Nm. All spindles are cooled with liquid. Types of tool holders, depending on spindle type - **HSK A63** or **HSK F63**.

The HB678 milling head contains a spindle position encoder and direct measurement in A and C axes in basic design. For HB662 head this equipment is optional.



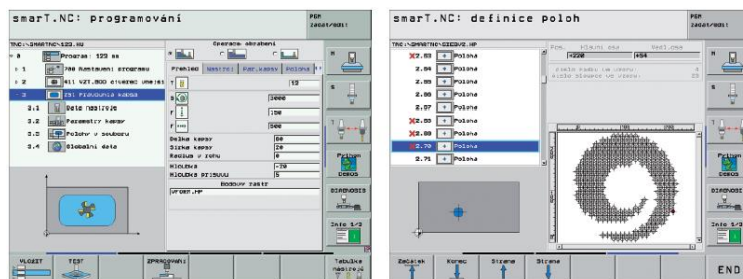
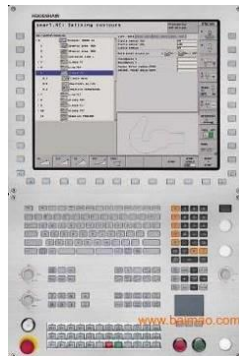
### Zero point:

Zero point of the milling centre in X, Y axes is in the centre of the work table. Zero point in Z axis is in the contact of the spindle face with the work table.

## Control systems:

### HEIDENHAIN iTNC 530 HSCI

Heidenhain iTNC 530 HSCI control system is specialized in the control of machining centres and provides excellent solution for machine control, comfort and simplicity of operation. Digital drives with EnDAT measurement ensure very precise positioning with minimal positioning error. Absolute measurement deprives the operator of the need to go to reference after machine switching on. The iTNC 530 HSCI control system is versatile and can be ideally adapted to the requirements of your firm - either in focus on piece or series production.

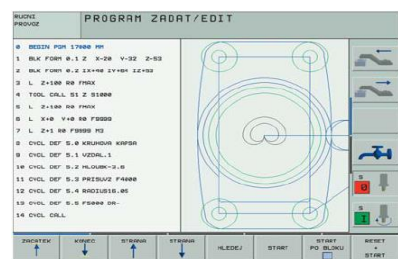
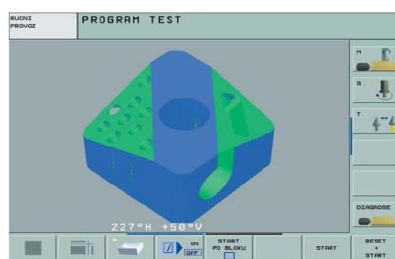
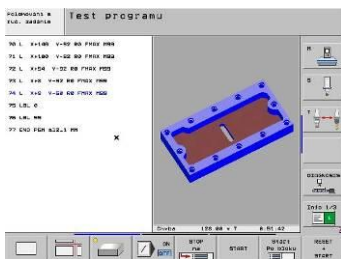


Main operator panel and a hand wheel are available for easy, comfortable and quick control; the hand wheel is standardly delivered in wireless version to increase the comfort of the operator. The Heidenhain iTNC 530 HSCI control system has practical setup functions, which support the user and help him in optimizing machining time. Together with tool probe and 3D work piece contact probe, iTNC 530 HSCI has a lot of preset cycles for automatic setting of work pieces after their clamping, zero point setting, tool measuring, and final inspection of dimensions of the finished part.



"High speed cutting" means fast and productive milling with true contours. The control system is able to read a huge amount of data quickly and to edit long programs effectively. iTNC 530 HSCI combines all these presumptions. iTNC 530 HSCI calculates up to 256 blocks in advance for maximum fidelity of contours. Consequently the control system can adapt feed rates and transitions between the contours in timely manner. For control of axis speed and acceleration, it uses special algorithms, which ensure smooth motions without jerking in change of speed. Integrated filters suppress negative dynamic behaviour or the machine purposefully. Of course, require surface precision is observed. The higher is the surface quality achieved by machining, the lower are the costs of additional finishing.

Before machining itself, the iTNC 530 HSCI enables graphic simulation of machining. This graphic simulation can be displayed in various ways - in plan view with colour differentiation of cutting depth, in three planes (as on the work piece drawing) or in 3D representation. For better view the image can be enlarged. It is also possible to simulate complex 5-axis programs. Automatic calculation of real time of machining is a matter of course.





iTNC 530 HSCI is adapted not only for programs from CAD/CAM software; it also offers a number of options directly, in workshop programming. Special dialogue language with a high number of integrated cycles enables quick and productive programming of contours, drilling, etc., including programming in inclined planes.

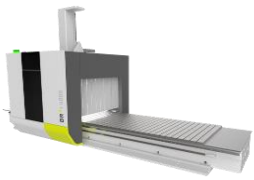













The control system is delivered with standard package of OPTIONS: 8-11, 16-17, 19-27, 29-39, 62, 77. Detailed description can be provided on request.





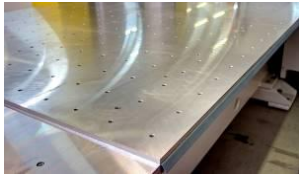

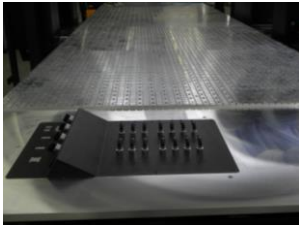

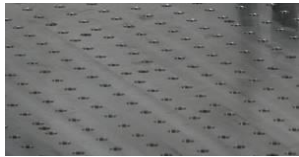

















## Machine specifications:

The following table provides graphic overview of equipment with technical descriptions and accessories.


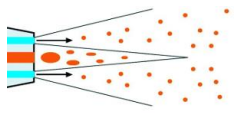
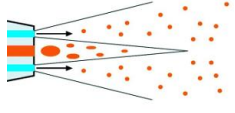
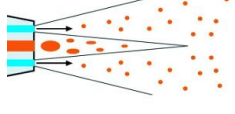
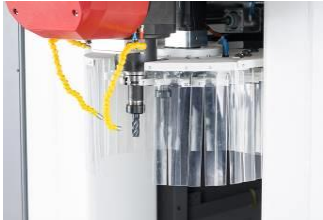



The items marked with  are included in the following price offer; the items marked  are not included in the price offer.
















No.	Description	Picture	
1	<b>BRAL FC6015CNC</b> <ul style="list-style-type: none"> <li>- GANTRY drive of X axis</li> <li>- central lubrication</li> <li>- alternate operation – possibility of machining in 2 working zones,</li> <li>- remote control,</li> <li>- machine fence, operating manuals + tools</li> </ul>		
2	<b>Control system HEIDENHAIN iTNC530 HSCI</b> <ul style="list-style-type: none"> <li>- Monitor (including PC): MC 7222</li> <li>- Control panel: TE 735</li> <li>- Hand wheel: see below</li> </ul>		
3	Control system SIEMENS SINUMERIK 840D SL: <ul style="list-style-type: none"> <li>- Monitor: OP 015AT TCU integrated</li> <li>- Machine panel: MCP 483C PN</li> <li>- Keyboard: KB 483C</li> <li>- Wire hand wheel: SINUMERIK HT2</li> </ul>		
4	Direct measurement in axis X, Y, Z		
5	MASTER-SLAVE Heidenhain X, U <ul style="list-style-type: none"> <li>- double drives on X, U axes</li> <li>- elimination of gearing play</li> </ul>		
6	MASTER-SLAVE Siemens X, U <ul style="list-style-type: none"> <li>- double drives on X, U axes</li> <li>- elimination of gearing play</li> </ul>		
7	Extension of Z axis to 1060 mm – HIGH		
8	Extension of Z axis to 1480 mm - <b>SUPER HIGH</b>		
9	BRAL MAX (extension of working table to 2200 mm)		
10	BRAL SUPER MAX (extension of working table to 2700 mm)		






11	<p>Working table made from Pertinax with threads M10 in a 100 x 100 mm raster</p> <ul style="list-style-type: none"> <li>-set of clamps</li> </ul>		
12	<p>Vacuum table from Pertinax:</p> <ul style="list-style-type: none"> <li>- integrated vacuum distribution</li> <li>- threads M8 in a 50x50 mm raster</li> <li>- pneumatically controlled reference stops (6 pcs)</li> </ul>		
13	<p><b>Aluminium table</b> with threads M10 in a raster 100 x 100 mm</p> <ul style="list-style-type: none"> <li>- material quality: EN AW 5083</li> <li>- set of clamps</li> </ul>		
14	<p>Aluminium vacuum table:</p> <ul style="list-style-type: none"> <li>-integrated vacuum distribution</li> <li>- threads M8 in a 50 x 50 mm raster</li> <li>- material quality: EN AW 5083</li> <li>- set of clamps</li> <li>- pneumatically controlled reference stops (6 pcs)</li> </ul>		
15	<p>Steel table:</p> <ul style="list-style-type: none"> <li>- threads M8 in a 50x50 mm raster</li> <li>- material quality: S355</li> <li>- set of clamps</li> </ul>		
16	<p>Cast iron table:</p> <ul style="list-style-type: none"> <li>- T slots 14H12</li> <li>- material quality: GGG 40</li> <li>- set of clamps</li> <li>- T-slot pitch 125 mm</li> </ul>		
17	<p><b>Head HB662 + electric spindle ES779:</b></p> <ul style="list-style-type: none"> <li>- output 10/12 kW (S1/S6)</li> <li>- Mk max. 12.7/15.3 Nm (S1/S6)</li> <li>- 0-24000 rpm</li> <li>- A-axis = +/- 110°</li> <li>- C-axis = +/- 400°</li> <li>- tool holder HSK F63</li> <li>- pneumatic tool release</li> <li>- ceramic bearings</li> <li>- 1 tool holder HSKF63 with collet ER32 (d=10 mm)</li> <li>- 1 tool holder HSKF63 with collet ER40 (d=25 mm)</li> <li>- nut tightening fixture</li> <li>- external tool cooling</li> </ul>		






18	<p>Head HB662 + electric spindle ES789:</p> <ul style="list-style-type: none"> <li>- output 15/18 kW (S1/S6)</li> <li>- Mk max 19.1/20.9 Nm (S1/S6)</li> <li>- 0-24000 rpm</li> <li>- A-axis = +/- 110°</li> <li>- C-axis = +/- 400°</li> <li>- tool holder HSK F63</li> <li>- pneumatic tool release</li> <li>- ceramic bearings</li> <li>- 1 tool holder HSKF63 with collet ER32 (d=12 mm)</li> <li>- 1 tool holder HSKF63 with collet ER40 (d=25 mm)</li> <li>- nut tightening fixture</li> <li>- external tool cooling</li> </ul>		
19	Direct measurement for HB662 (axis A and C)		
20	<b>Positioning of spindle for cutting of threads</b> (thread cutting cycles)		
21	<p>Head HB678 + electric spindle ES798:</p> <ul style="list-style-type: none"> <li>- output 22/25 kW (S1/S6),</li> <li>- Mk max 28/32 Nm (S1/S6),</li> <li>- 0-20000 rpm</li> <li>- A-axis = +/- 120°</li> <li>- C-axis = +/- 245°</li> <li>- tool holder HSK A63</li> <li>- pneumatic tool release</li> <li>- direct measurement of A, C axes</li> <li>- pneumatic brakes</li> <li>- 1 tool holder HSKA63 with collet ER32 (d=12 mm)</li> <li>- 1 tool holder HSKA63 with collet ER40 (d=25 mm)</li> <li>- nut tightening fixture</li> <li>- spindle encoder for thread cutting</li> <li>- air cooling through the tool centre, 10 bar</li> </ul>		
22	<b>Wireless hand wheel Heidenhain HR550FS</b> + docking charging station HRA551FS		



23	Mobile control panel		✗
24	<b>Lubrication set for tool blowing by oil mist:</b> - external blowing - less demanding machining of aluminium alloys, etc.		✓
25	Air blowing of the tool (external blowing of the tool/cutting zone)		✗
26	Tool cooling by Ethanol: - external blowing - two nozzles		✗
27	Extra CNC controlled rotary axis B		✗
28	<b>Tool changer ATC12 for 12 tools:</b> - 10 x tool holder HSK A/F with collet ER32 (2x8 mm, 2x10 mm, 12mm, 14 mm, 2x16 mm, 18 mm, 20 mm)		✓
29	Vacuum pump 100 m <sup>3</sup> /h		✗
30	Vacuum pump 250 m <sup>3</sup> /h		✗
31	<b>HEIDENHAIN TS 460 - workpiece probe:</b> - radio/infra-red transmission - for workpiece setting and measurement - transmitter/receiver SE660 - setting ring - installation accessories		✓

32	<b>HEIDENHAIN TT 160 - tool probe:</b> <ul style="list-style-type: none"> <li>- for measurement of tool length and diameter</li> <li>- setting mandrel</li> </ul>		
33	<b>BLUM TL Micro 200 - tool probe:</b> <ul style="list-style-type: none"> <li>- for measurement of the tool length and radius</li> <li>- max. tool diameter 80 mm (tangentially up to 122 mm)</li> <li>- contactless measurement by laser beam</li> <li>- high sensitivity to tool cleanness (blowing required before measuring)</li> <li>- any material of the tool</li> <li>- measuring cycles</li> <li>- repeatability +/-1 um</li> </ul>		
34	<b>BLUM MicroCompact NT A3 - tool probe:</b> <ul style="list-style-type: none"> <li>- for measurement of the tool length and radius</li> <li>- max. tool diameter 150 mm</li> <li>- contactless measurement by laser beam</li> <li>- measurement at working speed of the tool</li> <li>- repeatability +/-1 um</li> <li>- including accessories</li> </ul>		
35	<b>RENISHAW OMP60/HSKF63 - Workpiece probe:</b> <ul style="list-style-type: none"> <li>- optical probe for control system Siemens 840D SL/Heidenhain iTNC 530 HSCI</li> <li>- infrared transmission with range up to 6m</li> <li>- measuring cycles - SW Inspection Plus</li> <li>- compact size</li> <li>- compatible with existing Renishaw receivers</li> <li>- repeatability 1 um</li> </ul>		
36	<b>RENISHAW RMP60/HSKF63 - Workpiece probe:</b> <ul style="list-style-type: none"> <li>- radio probe for control system Siemens 840D SL/Heidenhain iTNC 530 HSCI</li> <li>- works at 2.4 GHz without interference</li> <li>- measuring cycles - SW Inspection Plus</li> <li>- compact size</li> <li>- compatible with existing Renishaw receivers</li> <li>- repeatability 1 um</li> </ul>		
37	<b>Kinematics Opt (Heidenhain)</b> <ul style="list-style-type: none"> <li>- including calibration ball KKH 250</li> <li>- contact probe cycles for automatic measurement of rotary axes</li> </ul>		
38	<b>DCM (Heidenhain) - Dynamic Collision Monitoring</b>		
39	<b>Reduction HSK F63 for the tools for machining of polystyrene</b> + flange including suction nozzle		

40	<b>Preparation for exhaust from the tool in 5X:</b> <ul style="list-style-type: none"> <li>- accessories and distribution on the machine with preparation for connection of external exhauster</li> <li>- suitable for exhaustion of composites and other dust-producing materials</li> </ul>		
41	Filtration unit for exhaust from the tool: <ul style="list-style-type: none"> <li>- exhausted volume up to 2000 m<sup>3</sup>/hour</li> <li>- fan 3.0 kW, noise 72 dB</li> <li>- filtration area 35 m<sup>2</sup> (2 cartridges)</li> <li>- flow control</li> <li>- additional HEPA filter</li> <li>- suitable also for outdoor application</li> <li>- control via M-codes of the control system</li> <li>- including accessories (flanges, hoses, pipes to the exhauster installed next to the machine)</li> </ul> <p>* the customer is responsible for the specification of explosiveness of the machined materials or their combinations for exhaust</p>		
42	ATEX filtration unit for exhaust from the tool: <ul style="list-style-type: none"> <li>- exhausted volume up to 2000 m<sup>3</sup>/hour</li> <li>- fan 3.0 kW, noise 72 dB</li> <li>- filtration area 35 m<sup>2</sup> (2 cartridges)</li> <li>- flow control</li> <li>- additional HEPA filter</li> <li>- suitable also for outdoor application</li> <li>- control via M-codes of the control system</li> <li>- including accessories (flanges, hoses, pipes to the exhauster installed next to the machine)</li> </ul> <p>* the customer is responsible for the specification of explosiveness of the machined materials or their combinations for exhaust</p>		
43	Filtration unit for exhaust from the working space: <ul style="list-style-type: none"> <li>- optionally ATEX design</li> <li>- optionally HEPA filter at the outlet</li> <li>- optionally outdoor design</li> <li>- control via M-codes of the control system</li> <li>- including accessories (flanges and pipes, the exhauster installed next to the machine)</li> <li>- it is recommended to combine it with a transfer system</li> <li>- not possible to combine exhaust of dust-producing material and emulsion mist (for various machine sizes exhausted volume from 3500 to 13300 m<sup>3</sup>/hour)</li> </ul>		
44	Transfer system (nozzles): <ul style="list-style-type: none"> <li>- deflects fine air-borne dust to the exhaust</li> <li>- increases exhaust efficiency</li> <li>- it must be combined with workspace exhaust</li> <li>- recommended installation with subsequent connection of the machine to central exhaust</li> <li>- control via M-codes or synchronously with the</li> </ul>		

	exhaust unit		
45	Complete machine coverage		
46	<b>Putting into operation:</b> <ul style="list-style-type: none"> <li>- installation</li> <li>- setting of the machine</li> <li>- technical test</li> <li>- operator training</li> </ul>		
47	<b>Service package for 1 year</b> (cooling liquid for spindle LONG LIFE COOLANT - 10 l, grease for central lubrication MULTIS 000 - 5 l, spindle spray Metall ANTI-SEIZE B7082 - 3 pcs, tool magazine fork HSK F 63 - 3 pcs)		
48	<b>DAP</b> Via di Nugolaio, 56121 Darsena Navicelli (PI), Italy (INCOTERMS 2010)		

All used pictures have illustration character only.

## BRAL SUPER HIGH FC6015CNC 5X

Description		Quantity	Total
<b>BRAL FC6015CNC</b> <ul style="list-style-type: none"> <li>- GANTRY drive of X axis</li> <li>- central lubrication</li> <li>- alternate operation – possibility of machining in 2 working zones,</li> <li>- remote control,</li> <li>- machine fence, operating manuals + tools</li> </ul>		1	
<b>Control system HEIDENHAIN iTNC530 HSCI</b> Monitor (incl. PC): MC 7222, Control panel: TE 735		1	
<b>Wireless hand wheel Heidenhain HR550FS +</b> docking charging station HRA551FS		1	
<b>Extension of Z axis to 1480 mm - SUPER HIGH</b>		1	
<b>Aluminium table</b> with threads M10 in a raster 100 x 100 mm, material quality: EN AW 5083, set of clamps		1	
<b>Head HB662 + electric spindle ES779:</b> <ul style="list-style-type: none"> <li>- output 10/12 kW (S1/S6)</li> <li>- Mk max. 12.7/15.3 Nm (S1/S6)</li> <li>- 0-24000 rpm</li> <li>- A-axis = +/- 110°, C-axis = +/- 400°</li> <li>- tool holder HSK F63, pneumatic tool release</li> <li>- ceramic bearings</li> <li>- 1 tool holder HSKF63 with collet ER32 (d=10 mm), 1 tool holder HSKF63 with collet ER40 (d=25 mm), tightening fixture</li> <li>- external tool cooling</li> </ul>		1	
<b>Positioning of spindle for cutting of threads</b> (thread cutting cycles)		1	
<b>Tool changer ATC12 for 12 tools:</b> <ul style="list-style-type: none"> <li>- 10 x tool holder HSK A/F with collet ER32 (2x8 mm, 2x10 mm, 12mm, 14 mm, 2x16 mm, 18 mm, 20 mm)</li> </ul>		1	
<b>HEIDENHAIN TS 460 - workpiece probe</b>		1	
<b>HEIDENHAIN TT 160 - tool probe</b>		1	
<b>Lubrication set for tool blowing by oil mist:</b> <ul style="list-style-type: none"> <li>- external blowing</li> <li>- less demanding machining of aluminium alloys, etc.</li> </ul>		1	
<b>Reduction HSK F63 for the tools for machining of polystyrene + flange including suction nozzle</b>		1	
<b>Preparation for exhaust from the tool in 5X:</b> <ul style="list-style-type: none"> <li>- accessories and distribution on the machine with preparation for connection of external exhauster</li> <li>- suitable for exhaustion of composites and other dust-producing materials</li> </ul>		1	



## Technical parameters

(Subject to change depending on final configuration of the machine)

Technical parameters of BRAL SUPER HIGH FC6015CNC 5X (Pertinax or Aluminium table, Head HB662, 12 kW)		
<b>Working space X/Y/Z*</b>	mm	6000 x 1500 x 1480
<b>Max. dimensions of the workpiece X/Y/Z*</b> (in 3 axes) approx. (length/tool diameter L=150mm / d=16mm)	mm	5974 x 1654 x 1325
<b>Max. dimensions of the workpiece X/Y/Z*</b> (in 5 axes) approx. (length/tool diameter L=150mm / d=16mm)	mm	5420 x 1100 x 1217
<b>Machine dimensions*</b> X (+ control panel/switch box)/Y/ Z	mm	9030 (+ ca 650) x 4670 x 4810
<b>Max. speed in X/Y/Z</b>	m/min	60/30/30
<b>Weight of the machine*</b>	kg	11600

\* The values are only informative, and depend on particular final specification of the machine.

Two-axis milling head + spindle				
		HB662+ES779	HB662+ES789	HB678+ES798
Working range in A-axis	°	±110	±110	±120
Working range in C-axis	°	±400	±400	±245
Max. speed in A/C axis	°/min	9000/10000	9000/10000	7200/12000
Tool holder		HSK F63 (A63)	HSK F63 (A63)	HSK A63
Operating speed	min <sup>-1</sup>	0 – 24000	0 – 24000	0-20000
Spindle output S6 (S1)	kW	12 (10)	18 (15)	25 (22)
Torque S6 (S1)	Nm	15.3 (12.7)	20.9 (19.1)	32 (28)
Spindle encoder		Option	Option	YES
Direct measurement A/C axis		Option	Option	YES

Additional technical parameters		
Connector protection	A	50*
Voltage	V	400
Rated input power	kW	27*
Connecting conductor cross section	mm <sup>2</sup>	10*
Frequency	Hz	50 / 60
Compressed air connection	MPa	0,6
Air connection diameter		1/4"
Compressed air consumption	l/min	250*

\* This value is only informative, and depends on particular final specification of the machine.

Technical parameters		ATC 12
Changer type		Rotating disk-type
Number of positions		12*
Max. tool diameter	mm	190*
Max. tool weight	kg	5
Max. weight of all tools	kg	30

\*Tool of diameter higher than 90 mm can block adjacent positions in the tool changer.

Geometrical accuracy of the machine		Value	
Positioning accuracy XYZ	mm/m	$\pm 0.02$ ( $\pm 0.035$ )**	
Repeatability XYZ	mm	$\pm 0.01$ ( $\pm 0.015$ )**	
		HB662	HB678
Positioning accuracy A/C	arcsec	40 (50)**	30
Repeatability A/C	arcsec	20 (30)**	10

\* According to VDI/DGQ 3441 standards.

\*\* Without direct measurement.

## **General conditions for installation of the machine:**

### **1) Foundation under the machine:**

- Base plate under the machine is a plate made from concrete of grade of at least B20 with steel reinforcement of type KH20. The base plate thickness is 400mm. Plan dimensions of the base plate correspond with the machine specification. The base plate must meet the manufacturer's requirements and documentation, otherwise the declared characteristics and precision of the machine cannot be guaranteed.

### **2) Machine installation site:**

- The machine configuration with safety fencing and dimensions are governed by the supplier's drawing.
- The machine must be placed in the manufacturing premises of the customer with regard to the EU regulations and standards.
- The customer shall provide the supplier with documentation of presupposed location of the machine, specify access areas and available handling equipment.
- The customer shall specify its internal safety regulations to the supplier and possibly shall arrange for the training of the supplier's staff in this area before the beginning of the installation work.
- On the basis of delivered documentation, the supplier shall specify a method for handling parts of the machine, place of installation of the machine, including recommendations on eventual adaptation of adjacent areas.
- The supplier shall specify requirements for labour safety and for availability of media for its personnel in installation at the customer.

### **3) Power supply connection:**

- According to the IEC60439-1 standard
- Voltage 400 V, 3 phases, neutral conductor and grounding
- Frequency 50 Hz
- Protection 40 A, char. C BRAL (the exact value corresponds to the selected configuration of the machine)
- The cross section of the conductors corresponds to the particular specification and equipment of the machine.

### **4) Pneumatic circuit connection:**

- Min. operating pressure 6 bar, optimum operating pressure 10 bar.
- Typical consumption of pressure air 250 l/min BRAL (the exact value corresponds to the selected configuration of the machine)
- Inlet air quality meets the standard ISO 8573-1:2010 [7:4:4]
- Relative humidity of air in the hall within the range of 40 to 75% (related to the ambient temperature of 20 °C)

### **5) Ambient temperature of working environment:**

- In installation of the machine at the customer, ambient temperature must correspond to typical temperature in machine operation.
- A trouble-free function of the machine is guaranteed at an ambient temperature from 15 to 40 °C
- To achieve the announced geometric accuracy of the machine, the ambient temperature must be in the range 15-25 °C.
- Ambient temperature difference must not be higher than 5 °C in 24 hours.
- Temperature gradient must not be higher than 1 °C per 5 m of height.
- Neither the machine nor its part can be exposed to direct thermal radiation, draught or unilateral temperature fluctuations.

### **6) CE marking:**

- Through the CE marking and by issuing the Declaration of Conformity the machine manufacturer declares fulfilment of all applicable regulations of corresponding EU standards and directives.
- In the case of a customer requirement for modifications of the machine which do not correspond to these regulations, the supplier cannot issue the Declaration of
- Conformity and provide the machine with the CE marking. The machine cannot be operated in such a condition.

### **7) Optional accessories:**

- The position of optional accessories shall comply with manufacturer's recommendations with regard to the purpose, properties and safety of the machine.

### **8) To ensure high quality of the machined surface and to maintain the accuracy of the machine, the set of the tool holder with the tool must be balanced in accuracy class of min. G2,5 according to ISO1940.**

The machine equipment with the elements for operation safety assurance corresponds to the EU regulations. The standard location of the switchboard is on the left from the machine and the switchboard is equipped with an air conditioning unit with automatic regulation system. The box switchboard has a double door, and sufficient access must be provided in front of the switchboard according to EU regulations.