

DUGARD

Machine Tools Since 1939

Dugard HSM 600 5 Axis Vertical Machining Centres



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Dugard HSM600

- Dugard's newest universal milling centre HSM600 for 5 available with a standard B axis swivel milling head and (HSM600-A) or a built in integrated C axis rotary table
- It provides state-of-the-art and efficient machining for with inclined tools, complete machining with 5 sided / are required



- HSM600 series is the newest machine for universal for CNC 5 axis and 5 face machining, and with the provides a vast range of applications for the

5 Axis Machining Centre

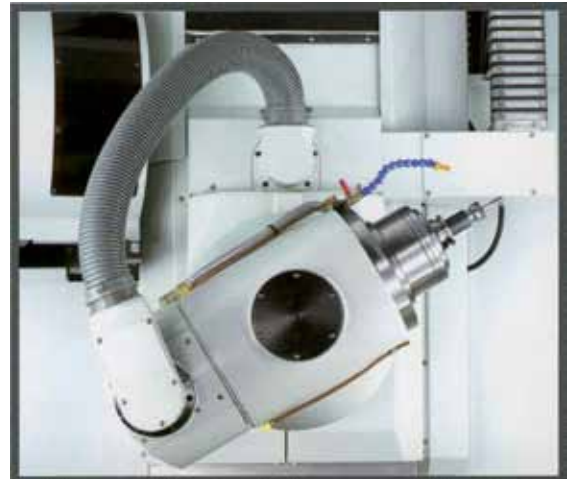
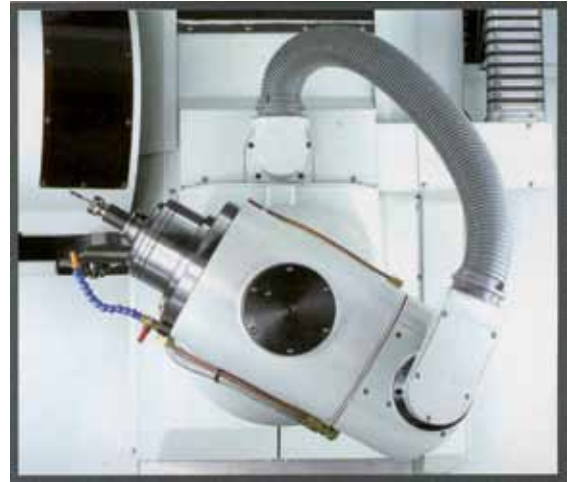
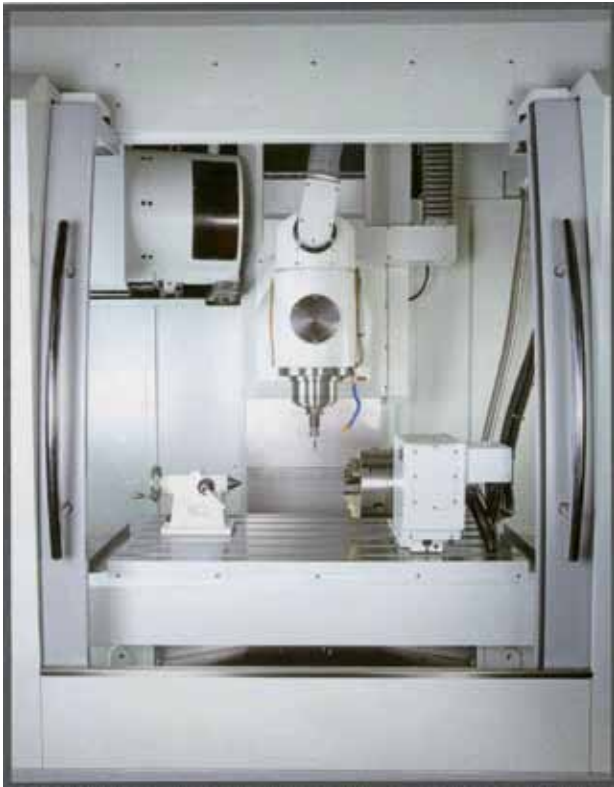
axis simultaneous operations. Besides 3 linear axis, it is either an add on type A axis rotary table and tailstock (HSM600-C)

traditional universal operations, tool and mould making 5 axis machining, or wherever negative angles ($\pm 120^\circ$)

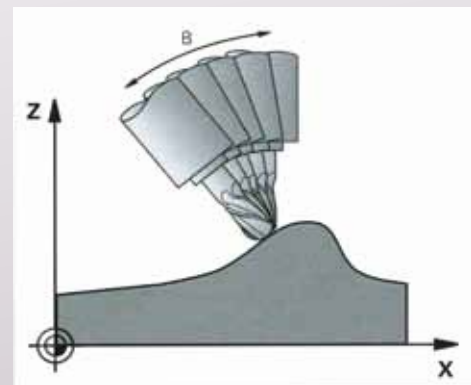


applications, a perfect response to the increasing demand orientation of the work piece in relation to the tool axis machining of complex parts

B Axis Swivel Milling Head



B axis - torque driven swivel head with $\pm 120^\circ$ movement. The built in torque motor has the advantage of no mechanical parts, offering greater accuracy, exceptional stiffness and shorter cutting distances.



5 axis machining

Tool Centre Point Management (TCPM)

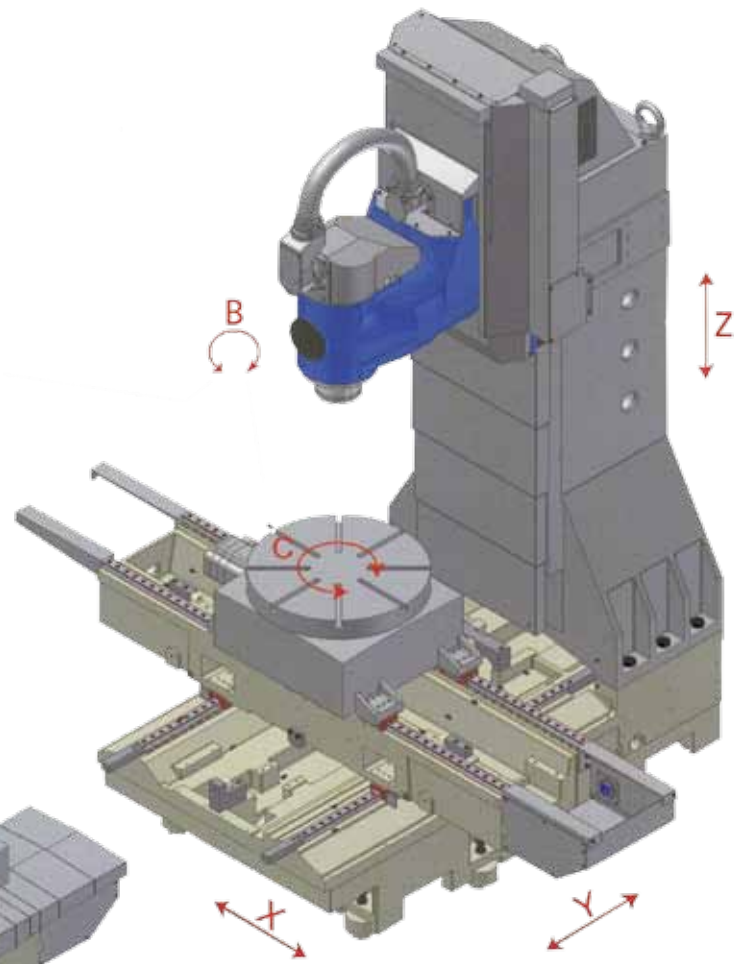
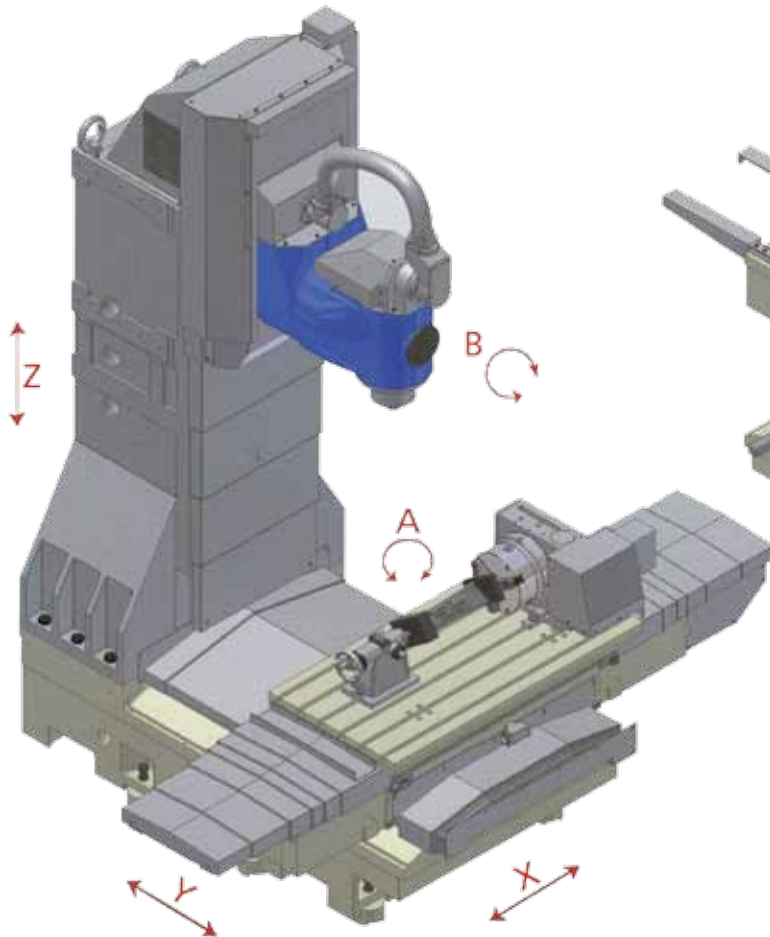
The offset of the swivel axes is compensated so that the tool tip remains on the contour.

Handwheel commands can also be superimposed during machining without the tool tip being moved from the programmed contour

Rotary Tables

- Two type CNC rotary tables for fitting various applications

HSM600-A



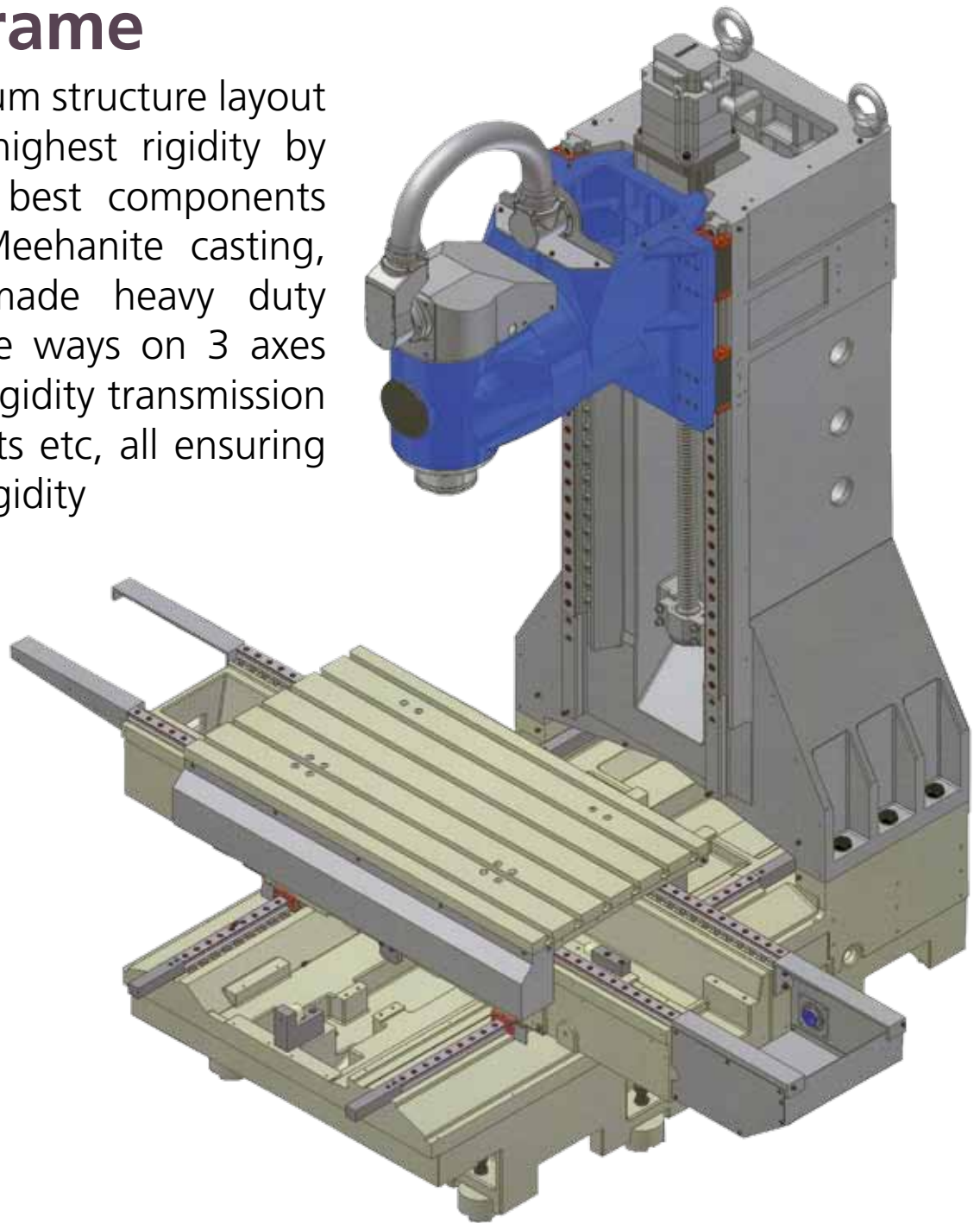
HSM600-C

Rotary tables and specifications

Model	HSM600-A	HSM600-C
Type	add on main plain table	integrated built in saddle
Diameter	Ø255mm (320mm)	Ø610mm
Centre bore diameter	Ø40mmH7	Ø50mmH7
Centre height	160mm (210mm)	xxx
T slots size	12mm (14mm)H7	18mmH7
Rotation speed	16.6rpm	10rpm
Hydraulic pressure	50kg/cm ²	
Positioning accuracy	8" with encoder	
Repeatability	4" with encoder	
Maximum load	250kg (350kg) with tailstock support	500kg
Accessories	3 jaw chuck & manual tailstock	none
Servo motor & torque	1FK7063 (7083), 11(16)Nm	1FK7083, 16Nm

Rigid Frame

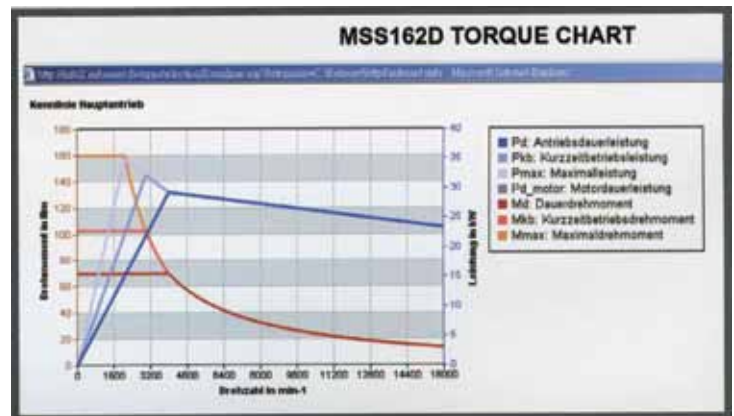
- The optimum structure layout with the highest rigidity by using the best components such as Meehanite casting, German made heavy duty roller guide ways on 3 axes and high rigidity transmission components etc, all ensuring machine rigidity



- The 3 axis linear guide rails have recirculating roller bearings enabling feed rates up to 30/30/24 m/min, the measurement feedback uses linear scales; the heaviest in its range of the Z axis with parallel piped guides 45mm enables very good machining with vibration damping in its 810mm Z axis travel

Powerful Motor Spindle

- The standard spindle with BT40 / 12,000rpm / 22kW (14,000rpm / 35kW opt) 70Nm (160Nm opt) satisfy most applications, from roughing to finishing even in very tough materials such as tool steels



Latest Advanced Digital CNC Controls



Heidenhain smart iTNC-530

- MC422C main computer with CC424 6 axis controller loop
- 15.1" TFT colour screen
- Workshop or DIN-ISO programming
- 3D workpiece representation
- Graphic programming
- Coordinate transformation
- Wide range of available cycles
- TCPM (Tool Centre Point Management)
- 1024 blocks look ahead



Siemens 840D power line

- NCU 573.5 system software
- PCU 50 hard disk 4.3GB
- 10.4" TFT colour screen & OP010C
- Shopmill with Windows XP
- 3D simulation
- Fast network access
- Job processing directly from HD
- Quick editing of large programmes
- Multi axis interpolation
- NURBS interpolation

Powerful Motor Spindle

- The milling centre can be used for all typical stream blade industries and also for servicing, aerospace aviation, automotive, medical and communication etc.



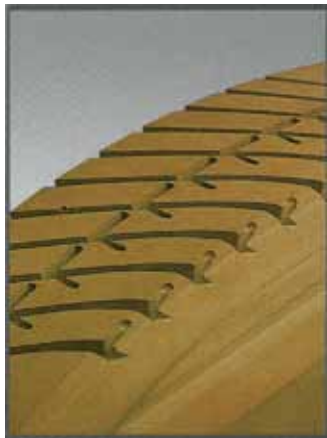
Fuel Pump Inducer



Strip Milling
of Jet Blade



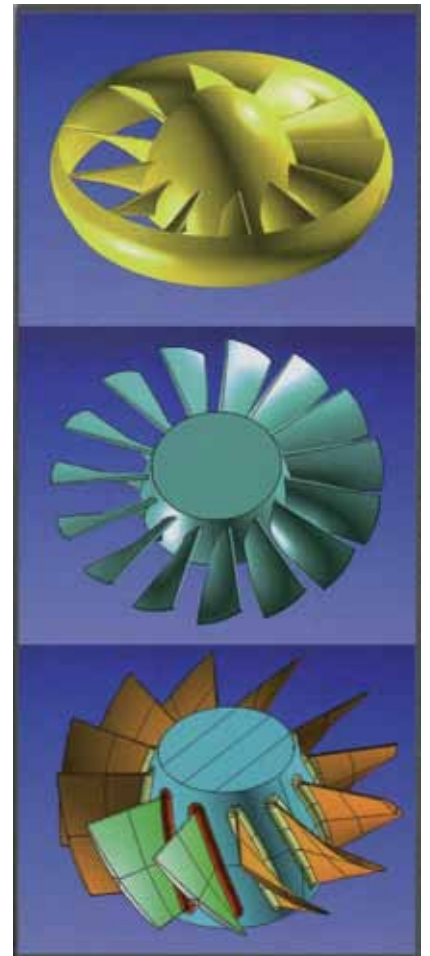
Heart Valve



Tyre Mould



Steam Turbine Blade



Blisk



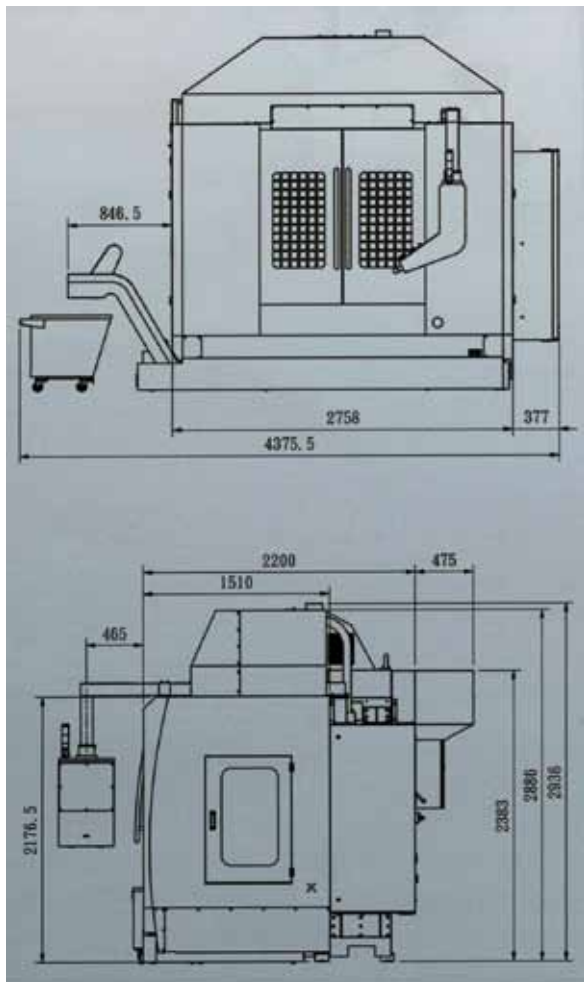
Turbo Charger Impeller

Guarding

- The machine complies fully with all CE requirements, when through spindle coolant is fitted a roof type guard stops coolant splash back. Full attention has been paid to ensure the most ergonomic layout whilst allowing ease of access for loading and machine maintenance. The compact footprint is also the best in it's class.



Floor Space



Standard accessories and features

1. Full splash guard without roof
2. 12,000rpm motor spindle with water cooling
3. Programmable coolant 6 bar
4. 32 station twin arm automatic tool changer
5. Ø255mm rotary table + 3 jaw chuck + manual tail stock (600A), Ø610mm rotary table (600C)
6. Chain type chip conveyor & bin

Optional accessories and features

1. 20 bar through spindle coolant with roof cover
2. 3 axis linear scales + 2 axis rotary encoders
3. 24000rpm HSK-A63 spindle
4. Other specs. Motor spindle
5. Ø320mm rotary table (600A)
6. 40 station automatic tool changer
7. BLUM laser tool probe
8. Work piece probe
9. Z axis thermo compensation device

Specification	Unit	Dugard HSM600-A	Dugard HSM600-C
T slotted plain table			
Size / T slot / maximum load	mm/kg	1200 x 610 / 18 x 6 x 100 / 800kg	
Spindle to plain table	mm	0 - 940	xxx
Rotary tables			
Type		add on plain table	built in saddle
Size	mm	Ø255	Ø610
Details		see page 3	
Distances			
Spindle to rotary table centre	mm	0 - 780	0 - 715
Tail stock height to plain table	mm	160	xxx
Spindle nose to rotary table top	mm	xxx	105 - 715
Maximum load	kg	250 with tail stock	500
Travel			
X / Y / Z linear axis	mm	1020 / 610 / 810	1020 / 610 / 610
B - rotary head axis	°	±120°	
A or C - rotary table axis	°	0.001° x 360,000	
Distances			
Spindle to column cover	mm	629	
Spindle to plain table	mm	130 - 940	xxx
Floor to table	mm	882	947
Spindle			
Taper	BT#	40	
Speed	rpm	12,000 (14,000, 24,000 opt)	
Front bearing diameter	mm	§ 70 ceramic bearings	
Motor power	kW	22 (29.3 / 35 opt)	
Torque	Nm	70 (160 opt)	
Axis motors			
X / Y / Z axis motor & static torque	model & Nm	1FK7100 / 1FK7100 / 1FK7101 & 18 / 18 / 27	
B axis motor model & max torque	model & Nm	1FW6130 & 1320	
A or C axis motor model & static torque	model & Nm	1FK7063 & 11	1FK7083 & 16
Feedrate (X / Y / Z linear axis)			
Rapid feed rate	m/min	30/30/24	
Cutting feed rate	mm/min	1 - 7500	
Minimum setting	mm	0.001	
Automatic tool changer			
Type of ATC		Twin arm with 430mm travel	
Number of ATC	tools	32 (opt 40)	
Maximum tool (diameter / length)	mm	150/300	
Maximum tool weight	kg	7	
Tool to tool	sec	3	
Chip to chip	sec	7	
Ballscrews on 3 Axes			
Diameter x pitch (XY)	mm x mm	40 x 16	
Diameter x pitch (Z)	mm x mm	50 x 12	
Precision class	mm/300mm	C3, 0.008	
Coolant & lubrication & hydraulic			
Coolant motor power	kW	0.86	
Coolant tank volume	l	120	
Coolant motor capacity	l/min	20	
Lubrication motor / tank volume	watt/l	25 / 2	
Hydraulic tank capacity & volume	kg/cm ²	50	
Accuracy			
Positioning (XYZ linear axis)	mm	JIS 6338:±0.005mm/300mm VDI 3441:P0.012mm	
(B & A or C rotary)	sec	with Heidenhain RCN226 8"	
Repeatability (XYZ linear)	mm	JIS 6338:±0.003mm VDI 3441:PS0.008mm	
(B & A or C rotary)	sec	with Heidenhain RCN226 4"	
Roundness (XYZ linear axis)	mm	JIS 6338:±0.01mm/300mm diameter	
Miscellaneous			
Machine net weight	kg	9000	
Total power requirement	KVA	75	

*Specifications are subject to change without prior notice

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