JOHNFORD®

High-Speed Vertical Machining Centers

High-Speed Double Column Machining Centers

JET-1000
DMC-909 / 912 / 915

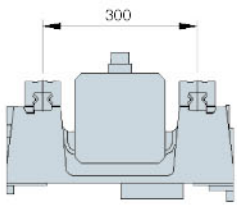
High-Speed Vertical Machining Centers

Adhering to our outstanding quality and development experience on the vertical machining centers for many years, the series of vertical high-speed machining centers can provide you faster processing efficiency and more careful machining quality.

JET-1000

The machine of JET series has the following superior performance different from the traditional machine.

- **Excellent Ergonomics-** The distance between the table and safety door is only 220 mm. It makes users more convenient to carry on the loading and unloading and settlement of the workpiece.
- **Easy Chip Removal-** High-pressure rivers plus twin screw-type conveyors ensure complete chip removal with little manual cleaning.
- **High Rigidity-** Different from the conventional C-type VMCs with a horizontal movable spindle head its center is far from the guide ways, the JET spindle is very close to the guide ways for the best possible rigidity.
- **High-speed Machining-** The Swiss roller-type linear ways used on all 3 axes offer high-loading capacity and accurate displacement for high-speed machining. The overall accuracy is improved over a conventional VMC.



X axis

Advanced Structure

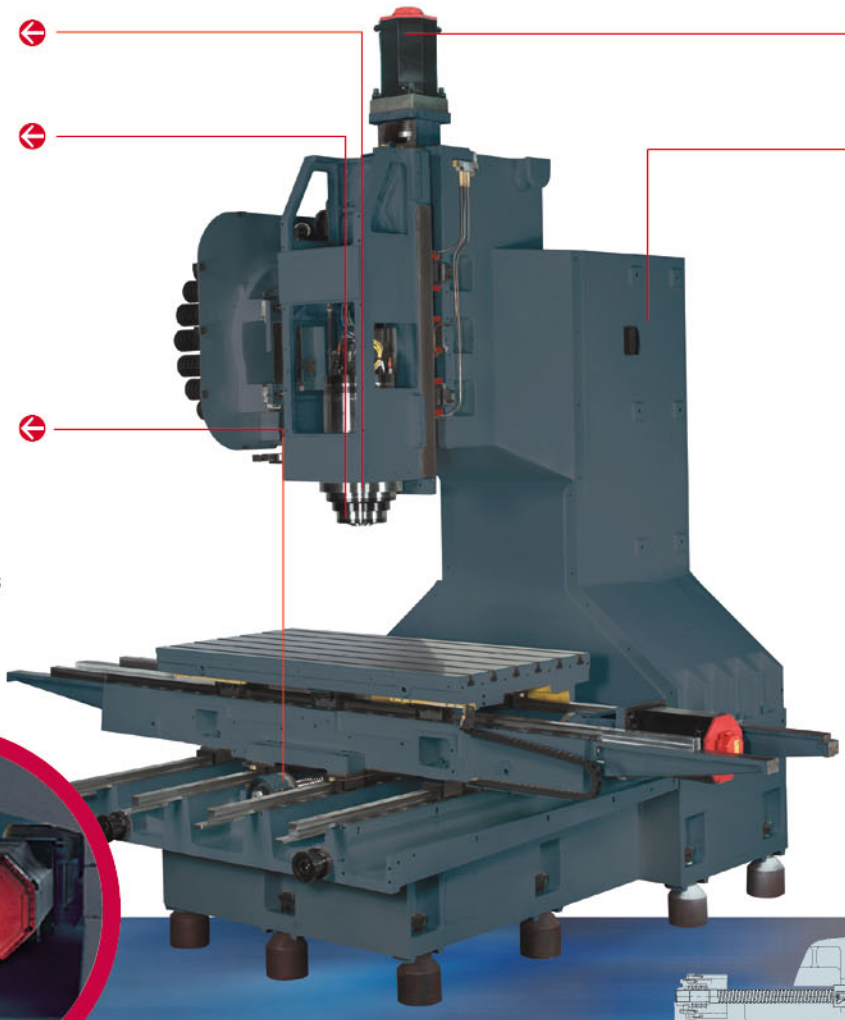
Taper of spindle is BBT-40. HSK A63 is optional.

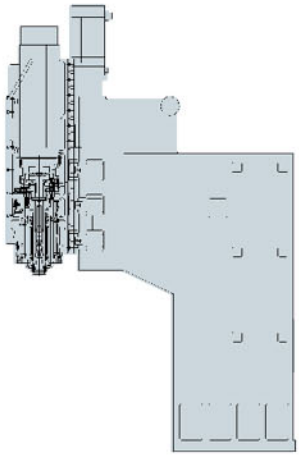
Distance between the spindle center and the Z-axis guide ways is only 180 mm. It provides machine owning much better cutting rigidity and accuracy.

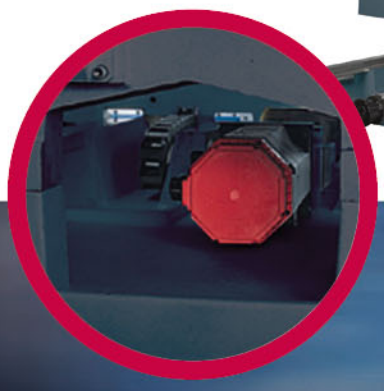
Both of X and Y-axes use the ball-type linear ways and Swiss roller-type linear ways are used on the Z-axis for speed and precision. The rapid traverse for X / Y / Z axes is 40 / 40 / 24 m/min.

Large power and no weight balance used on the Z-axis design can make the Z-axis movement more stable.

One-piece L-type column for maximum rigidity.

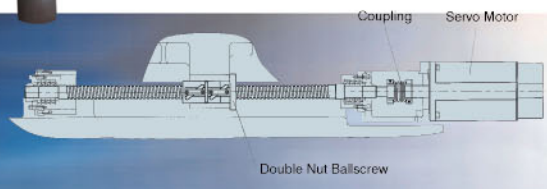






Lightened Direct-Driving Spindle

The spindle is coupled directly on the motor and driven without the gearbox for low thermal growth.



Direct Driving Ballscrews

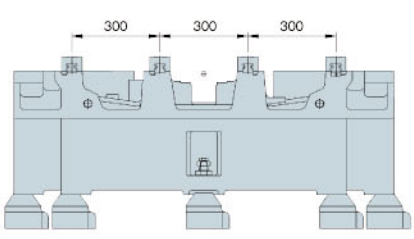
Servo motors couple directly to the ballscrews=Accuracy and precision. Oversized ϕ1.77" (45mm) pretensioned, double nut ballscrews use on all 3 axes=No Thermal Growth and Accuracy.

Optimal Design for Structure

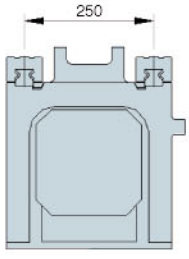
We cast the main parts of machine with the high-class meehanite cast iron for high rigidity and damping.

Zero Table Overhand

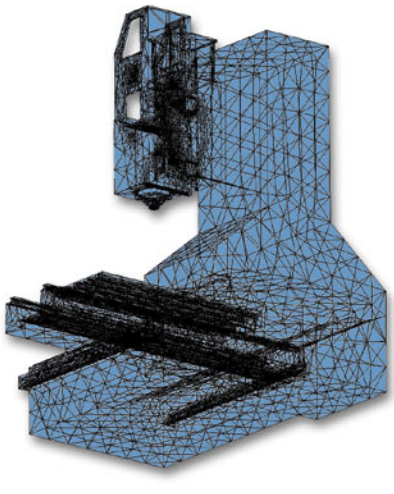
Super wide linear way arrangement allows the weight of the table and the workpiece to be kept in the travel of saddle and provides machine for rigidity and accuracy.



Y axis



Z axis



FEA For Structure

The structures of major components for constructing the machine are designed with the finite element analysis (FEA). By this way, we refine our design and improve the quality of machine. It makes the machines high rigidity and good precision that are for beyond ordinary.

High-Speed Double Column Machining

DMC-909 / 912 / 915

Expanding on our
DMC series of lar
can take the place

These machines offer distinct advantages over conventional VMC's.

- ***Ergonomics***- Much easier to load / unload and set-up.
- ***Chip Removal***- Twin screw type conveyors plus a caterpillar conveyor ensure complete chip removal with little manual cleaning.
- ***Floor Space***- Our double columns consume less floor space then a similar size VMC.
- ***Rigidity***- Opposed to large VMC's with a very large spindle center to column distance, the DMC spindle is very close to the bridge for the best possible rigidity.
- ***Total Accuracy***- Because the Y and Z axes have fixed loads at all times and the X axis carries the only dynamic load, overall accuracy is improved over a conventional VMC.

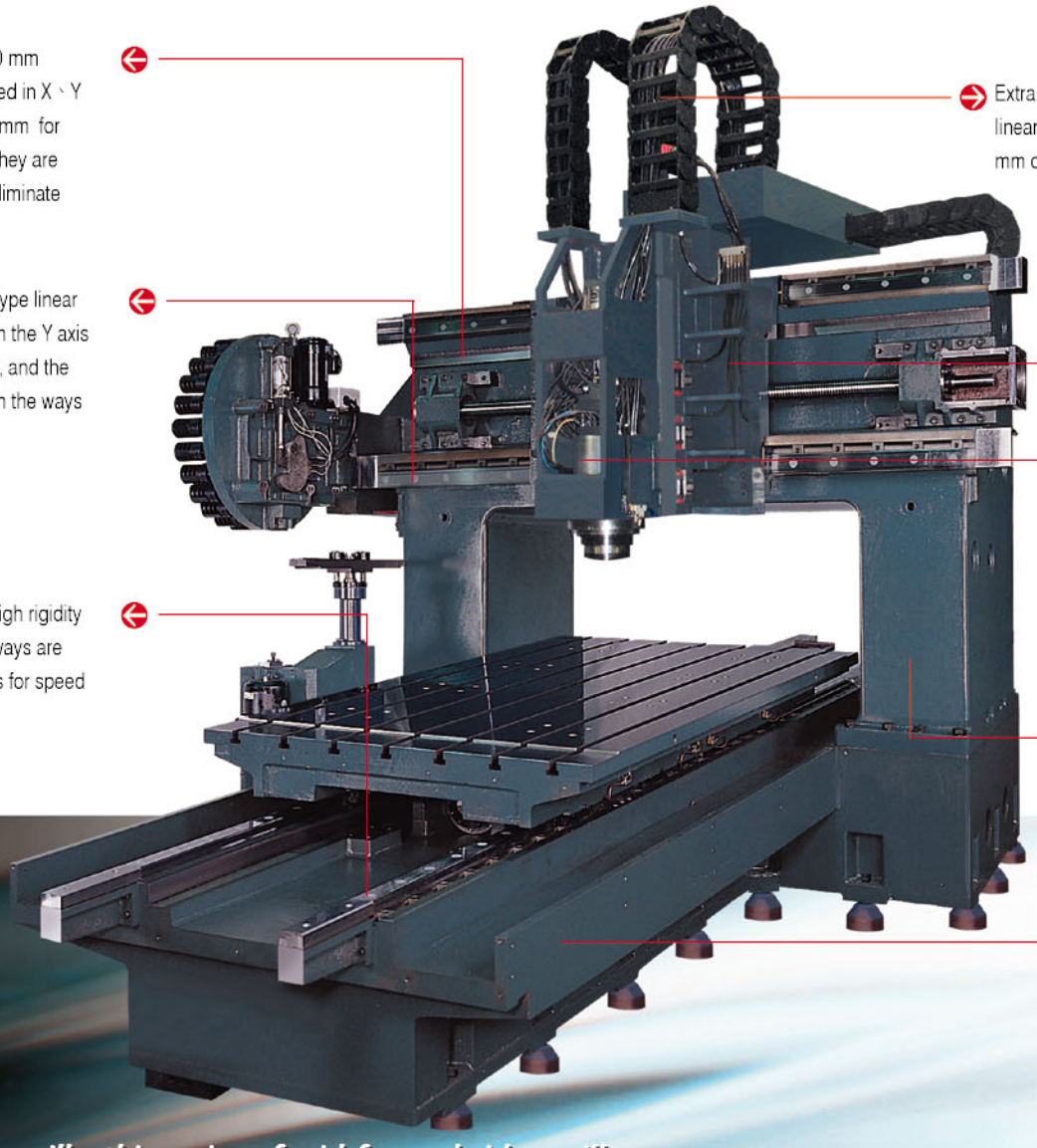
Centers

Setting the Standard..... With Solid Construction

Large diameter 50 mm ballscrews are used in X、Y axes, Z axis is 45 mm for DMC-909~915. They are pretensioned to eliminate thermal growth.

High-rigid roller-type linear ways are used on the Y axis for heavy cutting, and the distance between the ways is 580 mm

Heavy duty and high rigidity roller-type linear ways are used on the X-axis for speed and precision.



Extra large milling head is with rigid linear ways. The head is held by 480 mm of the saddle.

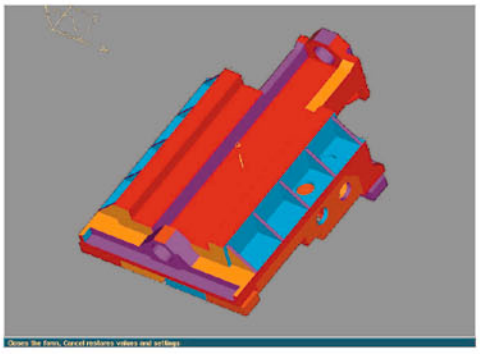
Huge saddle has a size of 800 mm x 722 mm

17/24 kW spindle motor with 15000 rpm standard is used on the 40 Taper machines. It comes with a spindle water cooler, too.

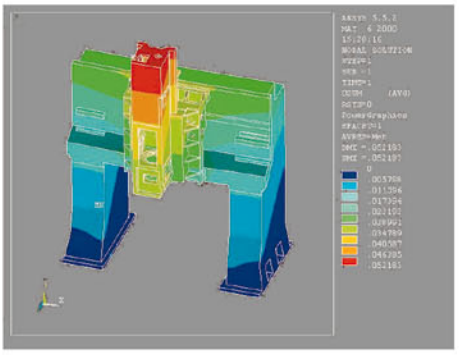
One-piece columns and bridge casting for maximum rigidity.

One-piece meehanite cast iron base.

popular
ge frame bridge mills, this series of mid-frame bridge mills
of large C-Frame type mills while still offering value pricing.



3D Optimal Design

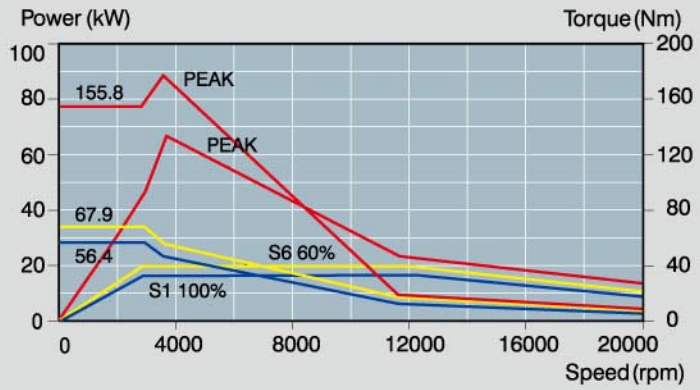


Main Structure FEA

Spindle Power & Torque Chart

Technical Data (Built-in Spindle)

Drive Layout	
Tool system	HSK A63
Power	17 kW
Nominal speed	2880 rpm
Max. Torque	56.4 Nm
Max. Speed	20,000 rpm
Control	Fanuc / Siemens / Heidenhain
Voltage	220V / 380V
Max. Current	90A / 54A
Driver	-
Clamping system	Spring-mechanical + Power-mechanical
Clamping Force	18 kN
Tool cleaning	Central+Surrounding
Spindle bearings	2 x ϕ 70 hybird
Bearing rigidity	Sr 310.2 N/μm
Bearing lubrication	Grease
Spindle cooling	Water glycol
Cooling performance	> 5 kW
Cooling temperature	The same as machine
Cooling volume approx	12 ℓ/min
Tool Cooling	
Internal coolant flow	Optional
Max. Pressure	70 bar
Suitable for dry operation	Yes
Air	Possible
Min. quantities of cooling lubricant	Optional



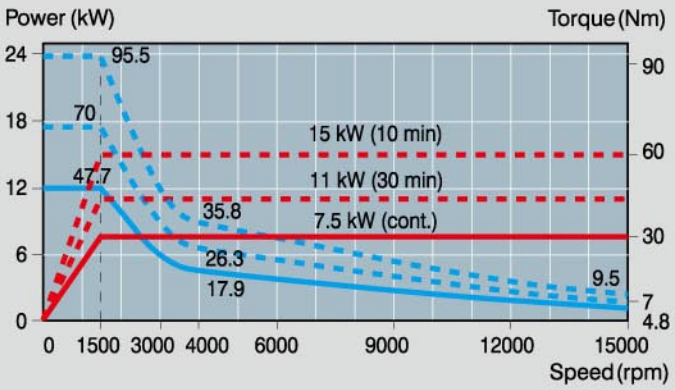
HSK A63 24,000 rpm (Oil-air)
15,000 / 18,000 / 20,000 rpm (Grease)

Metal Removal Rate	Milling	Milling	Drilling	Threading
Tool system	HSK A63	HSK A63	HSK A63	HSK A63
Power	17 kW	17 kW	17 kW	17 kW
Material	Steel 60-70 kg/mm^2	Aluminum 7075	Steel 60-70 kg/mm^2	Steel 60-70 kg/mm^2
Machining volume (cm^3/min)	300	1382	259	-
Tool/edges (ϕ mm)	ϕ 50 / 4	ϕ 80 / 7	ϕ 30	M24
Rotational speed (min^{-1})	2300	6400	2440	500
Cutting speed (m/min)	360	1615	230	37
Cutting Width x Depth (mm)	40 x 4	60 x 3	-	-
Feed (mm/min)	1840	7680	366	500

Technical Data (Direct Drive Spindle)

Drive Layout	
Tool system	BBT-40
Power	7.5 / 11 kW
Nominal speed	1,500 rpm
Max. Torque	95.5 Nm
Max. Speed	15,000 rpm
Control	Fanuc / Siemens
Voltage	220V
Max. Current	56A
Driver	-
Clamping system	Hydro-mechanical
Clamping Force	10 kN
Tool cleaning	Central+Surrounding
Spindle Specification	
Spindle bearings	4 x ϕ 65 Ceramic Balls
Bearing rigidity	350 N/μm
Bearing lubrication	Grease
Spindle cooling	Oil
Cooling performance	2 kW
Cooling temperature	22~25°
Cooling volume approx	10 ℓ/min
Tool Cooling	
Internal coolant flow	Optional
Max. Pressure	70 bar
Air	Possible
Min. quantities of cooling lubricant	Optional

There are many kinds of spindle speed for your choice.



BBT-40 15,000 rpm

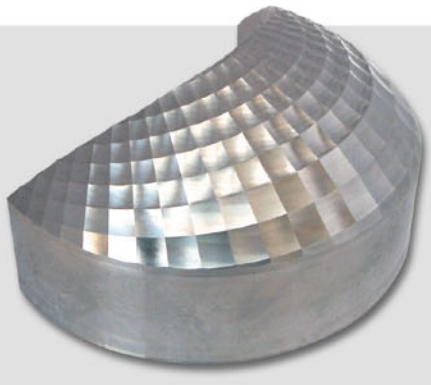
Metal Removal Rate	Milling	Milling	Drilling	Threading
Tool system	BBT-40	BBT-40	BBT-40	BBT-40
Power	17 kW	17 kW	17 kW	17 kW
Material	Steel 60-70 kg/mm²	Aluminum 7075	Steel 60-70 kg/mm²	Steel 60-70 kg/mm²
Machining volume (cm³/min)	300	1382	259	-
Tool/edges (ϕ mm)	ϕ 50 / 4	ϕ 80 / 7	ϕ 30	M24
Rotational speed (min⁻¹)	2300	6400	2440	500
Cutting speed (m/min)	360	1615	230	37
Cutting Width x Depth (mm)	40 x 4	60 x 3	-	-
Feed (mm/min)	1840	7680	366	500

Machining Samples for Mold & Die

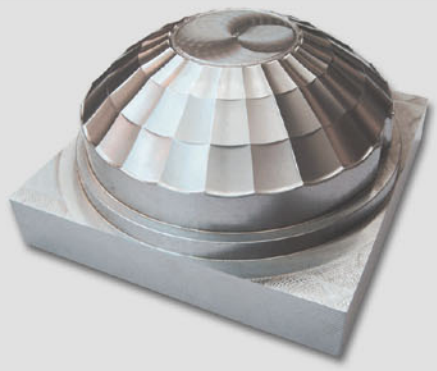
Feed Rate	3000 mm/min
Spindle Speed	12000 rpm
Machining Time	52 min
Material	Al Alloy
Workpiece	Cell Shell
Characteristic	High-Speed 3D Machining

Feed Rate	4000 mm/min
Spindle Speed	8000 rpm
Machining Time	1 hr 23 min
Material	Al Alloy (6061)
Workpiece	Standard Test Workpiece of SST
Characteristic	High-Speed 3D Machining

Feed Rate	1000 mm/min
Spindle Speed	13000 rpm
Machining Time	1 hr 38 min
Material	S45C
Workpiece	Lampshade of Car
Characteristic	Excellent Gloss on Surface



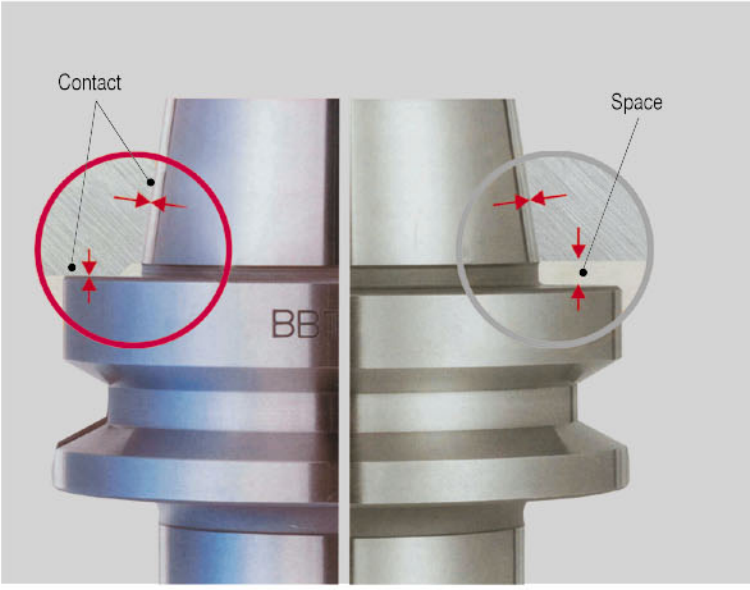
Feed Rate	1000 mm/min
Spindle Speed	13000 rpm
Machining Time	3 hr 46 min
Material	P5
Workpiece	Lampshade of Car
Characteristic	Excellent Gloss on Surface



Feed Rate	1000 mm/min
Spindle Speed	13000 rpm
Machining Time	3 hr 03 min
Material	T4 , HRC 32
Workpiece	Lampshade of Projector
Characteristic	Excellent Gloss on Surface

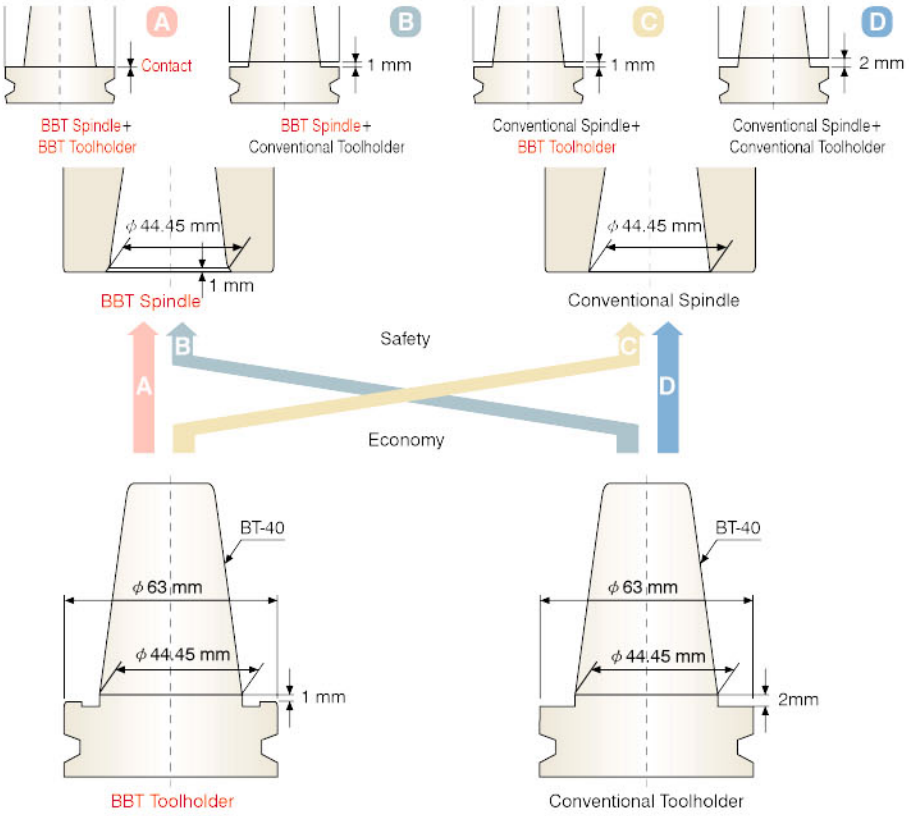
Tool System (Std.)

Advantages of BBT Spindle System



Perfect Interchangeability -

The BBT spindle system has the perfect interchangeability with the conventional toolholders and machines. The conventional toolholders, such as these specifications of JIS-BT, DIN-69871, ISO, CAT-V, and so on, can be used on the BBT spindle system. Alternatively, the BBT toolholders also can be equipped with the conventional spindles.

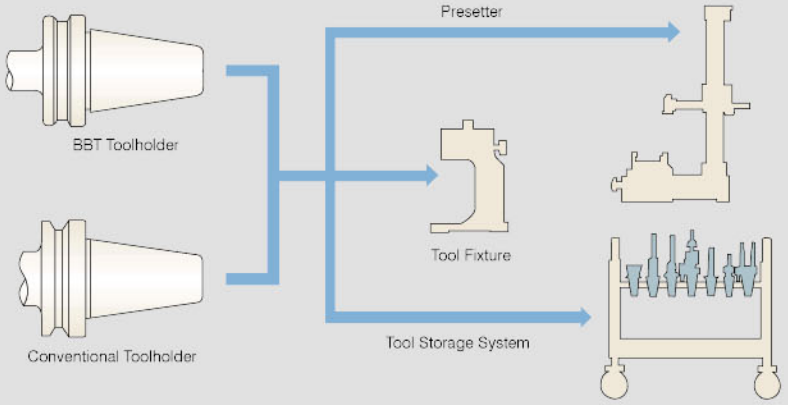


Existing Accessories Utilized -

You don't need prepare new accessories for the BBT spindle system. The existing accessories, such as presetters, tool fixtures and tool storage systems, can be used with the BBT toolholders. And further, it is not necessary to modify the tool magazines and ATC devices of existing machines.

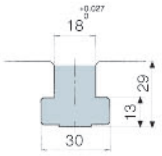
Eliminating the Z-axial Movement -

In the high rotary spindle speeds, the mouth of spindle can expand slightly due to the centrifugal force. It will cause the conventional toolholders pulled back into the spindle and make the Z-axial movement. This slight pull back of the cutter can affect dimensional accuracy of the Z-axis. The face contact of BBT spindle system can prevent the toolholder from being drawn back into the spindle.

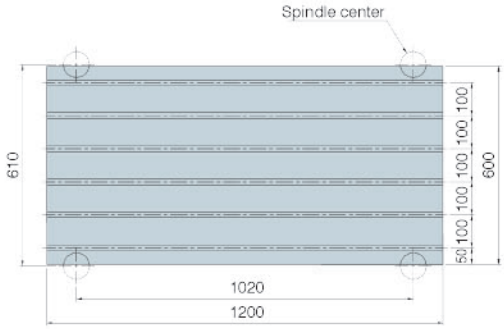


Dimensions

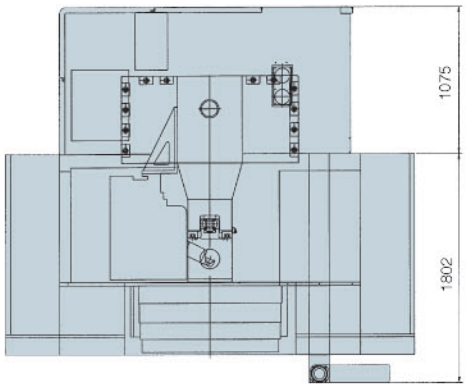
JET-1000



T - Slot



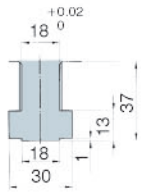
Table



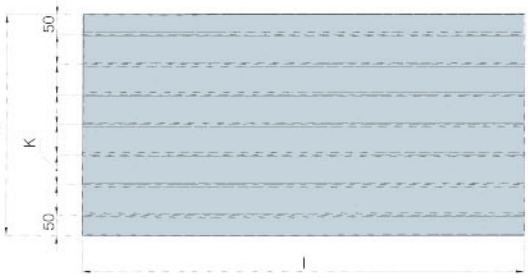
Top View (floor space required)

DMC-909 / 912 / 915

Model / Size	A	B	C	D	E	F	G	H	I	J	K
DMC-909	780	600	450	1845	3130	4235	2920	1060	1000	850	125
DMC-912	780	600	450	1845	3130	4235	2920	1060	1300	850	125
DMC-915	780	600	450	1845	3130	4755	2920	1060	1600	850	125



T - Slot



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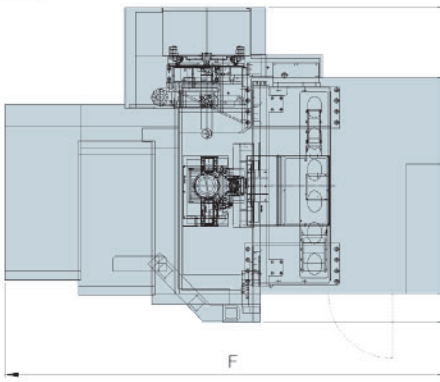
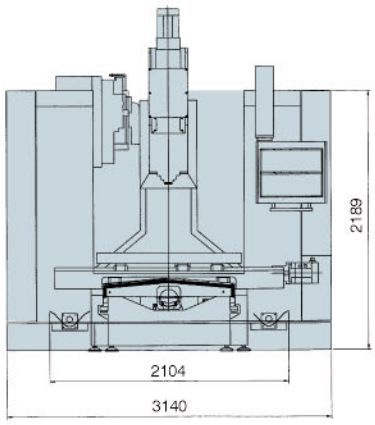
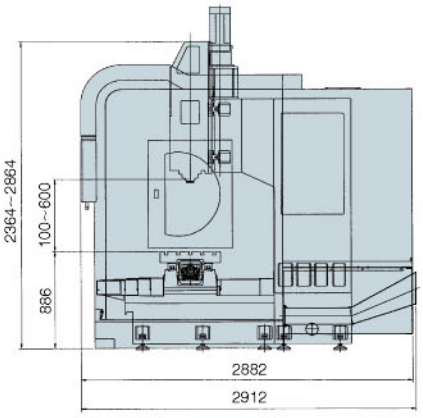


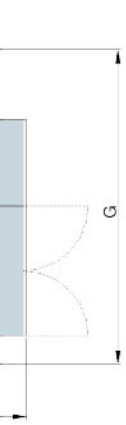
Top View (floor space required)

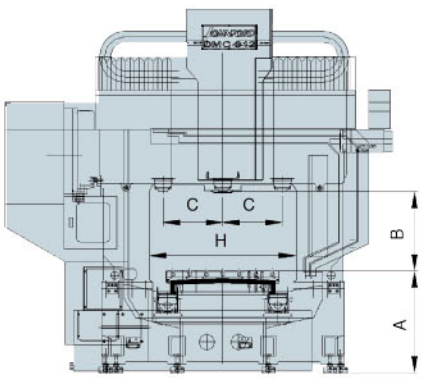


Front View

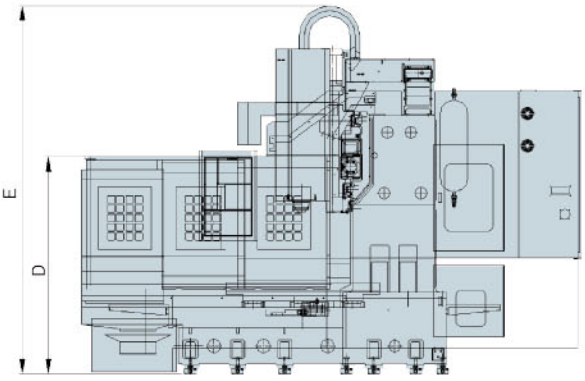


Side View





Front View



Side View

Accessories

Standard Features-Great Equipment

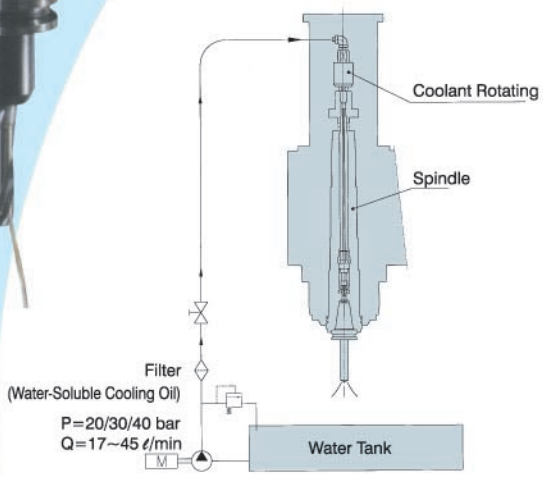
Rigid Tapping

High Pressure Coolant
(P:3.5 kg/cm², Q:100 ℓ/min)

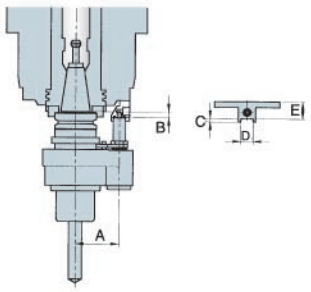
Automatic Chip Removal
(Screw Type Chip Conveyor)

Remote Handwheel

Coolant Thru Spindle

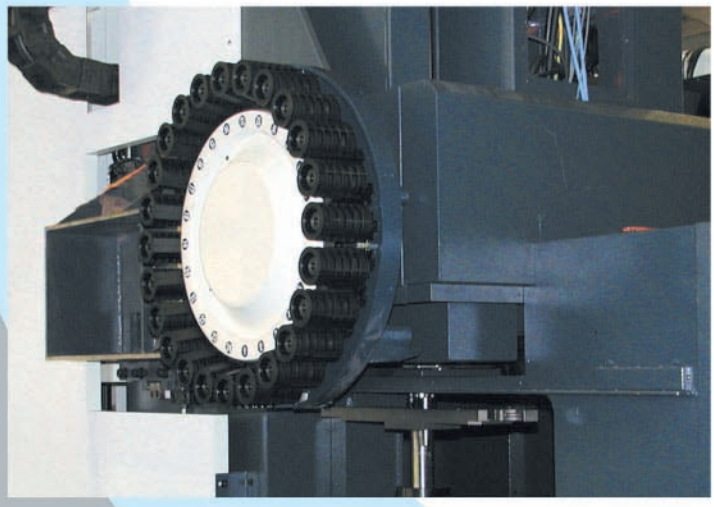


Coolant Thru Tool Tip

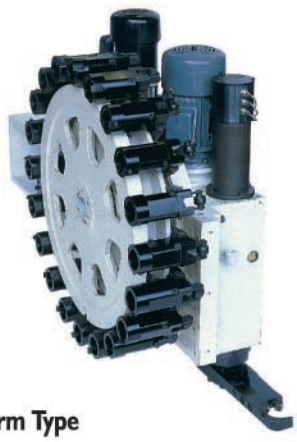


Model / Item	Taper No.	A	B	C	D	E
JET-1000	No.40	65	9	5	18	25.5
DMC-909 / 912 / 915	No.40	80	7.5	5	18	36.5

Tool Magazine - Arm Type



Tool change time: (Std.)
No. 40: 2.5 sec
(for DMC-909 / 912 / 915)



Arm Type
BBT / CAT-40 24 tools
(for JET-1000)

CNC System-Fanuc 31*i*-MB

We use the FANUC CNC system for reliability, performance, and FANUC's excellent worldwide service. It is up to the machine tool builder that options are resident in the control and we load it up. Others call them options, but we call them standard. Features such as 10.4" color LCD display, Custom Macro B, Helical, 1280m (512KB) of memory, Canned Cycles, Full MDI keyboard, and AI Contour Control II (high speed machining with 200 blocks look ahead) are all standard. Not to mentioned Fanuc's state-of-the-art AC digital servo and spindle systems.

Conversational

If ease of programming at the machine is your need, the optional Manual Guide i software is what you have been looking for. 10.4" color LCD, tool and material libraries, solid modeling animation, automatic graphical prompt driven programming and simple question and answer format make programming at the machine in a breeze.

Do You Want to Fly ?

With the optional Data Server (up to the maximum capacity of 8 GB for your choice) and High speed processing with 1000 block look ahead, you can fly through 3-axis simultaneous movements at 60,000 blocks per minute (0.4 ms/block). Or take it one step further by adding the Nano Smoothing and NURBS option for even faster contouring with better finishes. Call us for the fastest CNC system on the planet.

Specifications

Item \ Model		JET-1000	DMC-909	DMC-912	DMC-915
Table working surface (mm)		1200 x 600 (47.2" x 23.6")	1000 x 850 (39.4" x 33.5")	1300 x 850 (51.2" x 33.5")	1600 x 850 (63" x 33.5")
Longitudinal travel (X) (mm)		1020 (40.2")	900 (35.4")	1200 (47.2")	1500 (59.1")
Cross travel (Y) (mm)		610 (24")	900 (35.4")		
Vertical travel (Z) (mm)		500 (19.7")			
Spindle nose to table (mm)		100~600 (3.9"~23.6")			
Spindle center to slideway (mm)		180 (7.1")			
Spindle taper		BBT-40 (Std.) / HSK A63 (Opt.)			
Spindle speed (rpm)		60~15000 direct drive spindle (Std.) 15000 / 18000 / 20000 built-in spindle (Opt.)			
Spindle motor (kW)		7.5 / 11 direct drive spindle (Std.) 17 / 21 built-in spindle (Opt.)			
X-Y-Z Rapid traverse (m/min)		40 / 40 / 24	24 / 24 / 24		
Cutting feed rate (mm/min)		1~12000			
Tool selection		Bi-direction, Change tools in the shortest distance.			
No.of tools		24 tools for Arm type (Std.) 32 tools or more for Arm type (Opt.)			
Adjacent pockets Max. tool dia.		75 (ϕ 3")			
Max. tool diameter (mm)		100 (ϕ 4")			
Max. tool length (mm)		300 (11.8")	320 (12.6")		
Max. tool weight (kg)		10 (22 lb)			
Table load capacity (kg)		800 (1760 lb)	3000 (6600 lb)		
Machine weight (kg)		8000 (17600 lb)	9000 (19800lb)	11000 (24200 lb)	14000 (30800 lb)
Machine dimensions (LxWxH) (mm)		3140 x 2912 x 2910 (123.6" x 114.6" x 114.6")	4235 x 2920 x 3130 (166.7" x 115" x 123.2")		4755 x 2920 x 3130 (187.2" x 115" x 123.2")
Cutting capacity (S45C)	Milling	240 cc/min			
	Drilling	ϕ 30 mm			
	Tapping	M30 x P3.5			

- All data subject to change without notice.
- All the specifications are listed with the FANUC CNC system.

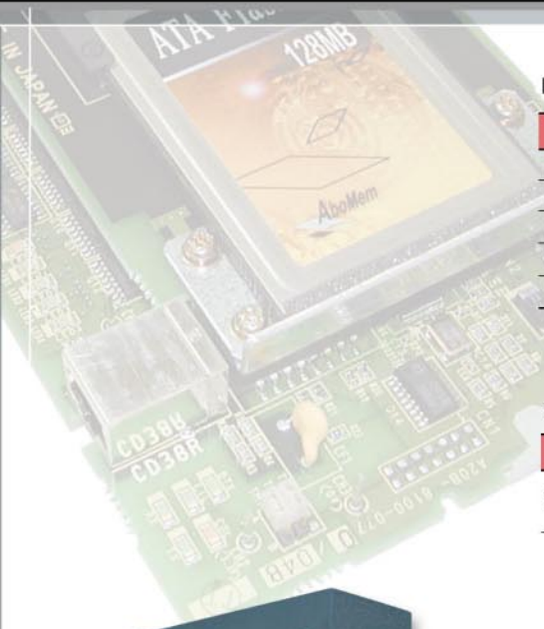
Standard Accessories:

1.Coolant system
2.Spindle air blast
3.Auto lubrication with alarm
4.Tools, tool box and various manuals
5.Halogen working lamp
6.Screw type chip conveyor
7.Spindle cooler
8.Full enclosure splash guard
9.FANUC 0*i*-MD controller

Optional Accessories:

1.Contact tool setting system (Renishaw TS-27R or BULM NT-A2 / NT-A3)
2.CNC Rotary table
3.High pressure coolant thru tool tip
4.High pressure coolant thru spindle (20 / 30 bar or more)
5.Arm type ATC 32 tools or more (BBT-40, HSK A63)
6.Chain type chip conveyor
7.Built-in spindle (15000/18000/20000 rpm for HSK A63)
8.Internal cooling ballscrew
9.Electronic compensation of thermal expansion
10.Workpiece measuring system (OMP-60)

CNC Control Specs



■ CNC system type

O: Std. △: Opt. -: Nil

Type / Model	JET-1000	DMC-909	DMC-912	DMC-915
FANUC 0*i*MD	○			
FANUC 31*i*MB	△			
Heidenhain *i*TNC530 HSCI	△			
Siemens 840D	△			
Siemens 828D	△			

■ Fanuc specifications

O: Std. △: Opt. -: Nil

	Item	Specifications		0iMD	31iMB
Display unit	8.4" color LCD			○	–
	10.4" color LCD			△	○
Function	Data Server with 2GB CF card			△	△
	AICC II			△	○
	High speed processing			–	△
	Conversational programming with graphic function	Manual guide 0*i*	0*i*MD	○	–
		Manual guide *i*	31*i*MB 0*i*MD (10.4" LCD)	△	○
	NC program memory	1280 meter (about 512 KB)		○	○

■ Siemens specifications

O: Std. △: Opt. -: Nil

	Item	Specifications	828D	840D
Operation Panel	10.4" color LCD		○	○
	15.1" color LCD		–	△
	Machine panel MCP483C		○	○
	TCU without hard disk	CF card	○	○
	PCU 50 with hard disk		–	△
	Ethernet		○	○
Function	ShopMill programming		△	△
	Automatic residual material detection		△	△
	Universal interpolator NURBS		○	○
	Spline interpolation for 3 - axes		△	△

■ Heidenhain specifications

O: Std. △: Opt. -: Nil

	Item	Specifications	iTNC530 HSCI
Display unit	Visual display unit 15" TFT display		○
Function	NC programming memory	21GB on SSDR	○
Software option 1	● Cylindrical surface interpolation ● Feed rate in mm/min ● Tilting the working plane ● Circular interpolation in 3 axes with tilted working plane ● HSC path control with special nominal-position value filters		△
Software option 2	**3-D machining** ● Motion control with minimum jerk ● 3-D tool compensation through surface normal vectors ● TCPM: Tool center point management ● Keeping the tool normal to the contour ● Tool radius compensation normal to the tool direction ● Manual traverse in the active tool-axis system **Interpolation** ● Linear in 5 axes (Subject to export permit) ● Spline: execution of splines (3rd degree polynomial)		△

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