

Shibaura Machine

BM series

Horizontal Machining Center



Shibaura Machine

View the Future with You



ISO 9001



GOTEMBA plant

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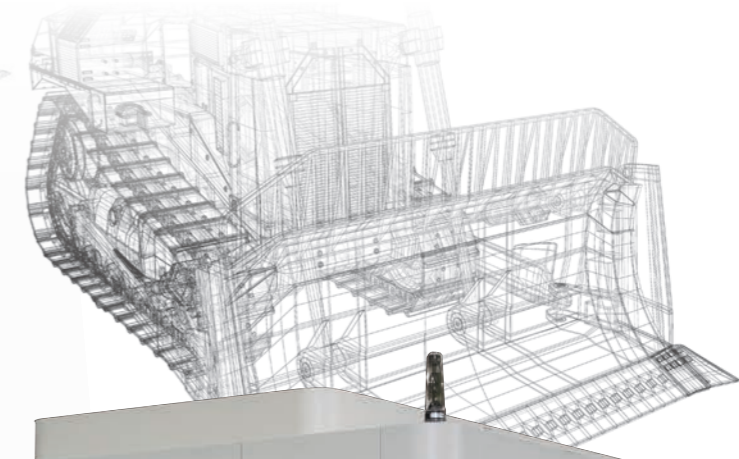
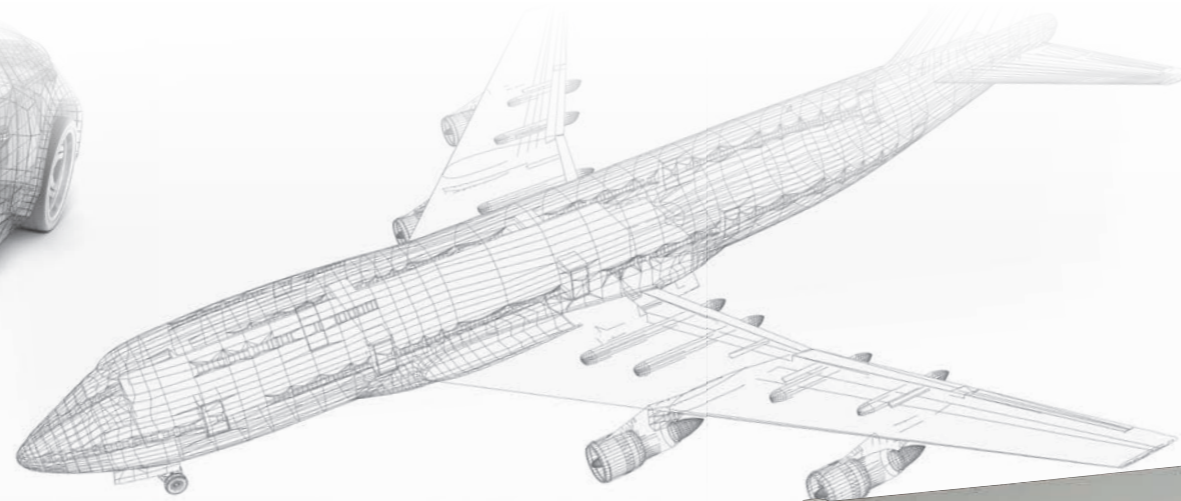
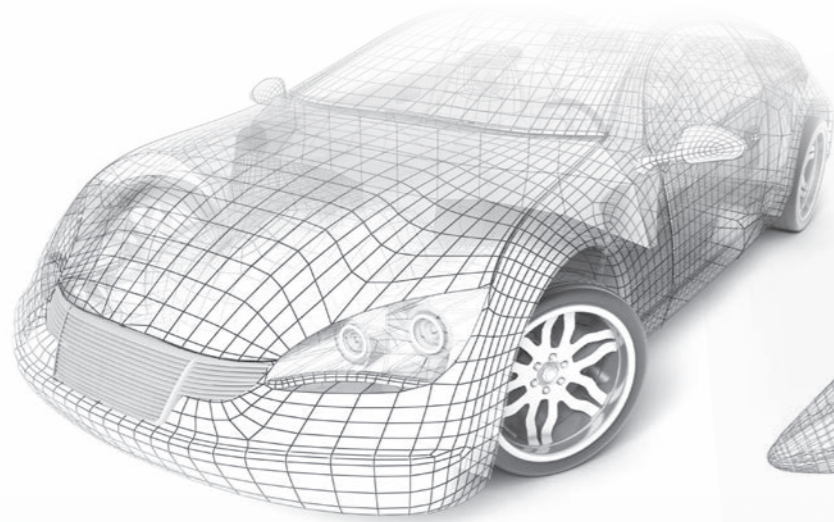
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* We reserve the right to change any of specifications in this catalog without notice in order to effect improvements.

Horizontal machining centers with the highest level of technical capabilities of Shibaura Machine, and

of precision in a class created by bringing together achieving a further evolution of machining technology



Horizontal Machining Center

BM series

BM-Q Standard Spindle (Quill Spindle)

Improved accessibility to workpieces by quill feeding
High output motor mountable

BM-U Universal Head Spindle

Complex shapes can be machined in one setup by swiveling the A-axis head.

BM-H High Speed Spindle

20,000 min⁻¹ high speed spindle with a built-in motor



BM-1000Q

Note: The picture of the machine above includes special accessories

Spindle Lineup

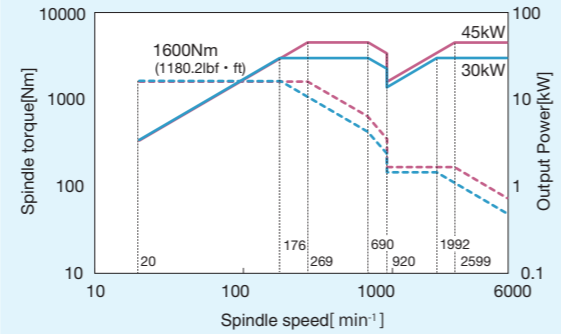
A wide variety of spindles support diversified workpieces

BM-Q Standard Spindle (Quill Spindle)

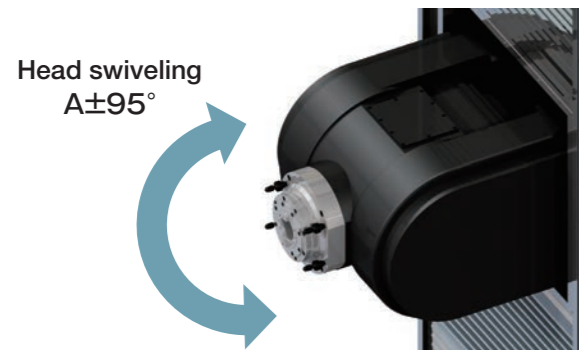


Spindle rotational speed	6 000min ⁻¹
Spindle motor (50% ED/continuous)	AC30/22 kW
Maximum spindle torque	1 600 Nm

Improved accessibility of the spindle to workpieces by strong $\phi 200$ mm quill feeding. Achieved heavy duty cutting with high torque of the best in class.

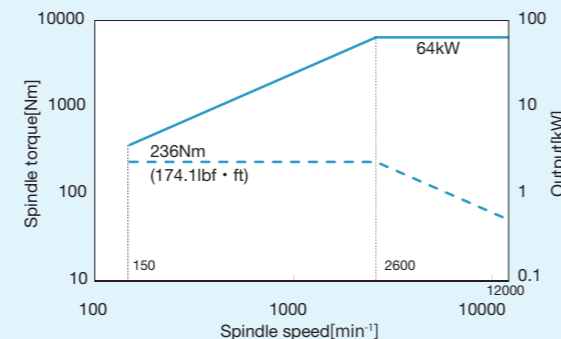


BM-U Universal Head Spindle

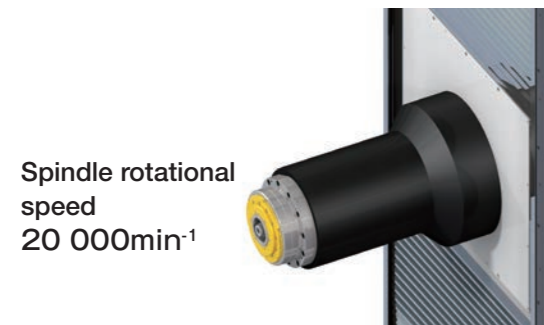


Spindle rotational speed	12 000min ⁻¹
Spindle motor (40% ED/continuous)	AC64/53.4 kW
Maximum spindle torque	236 Nm

By five-axis machining, it is possible to consolidate processes for complicated shapes in one setup and improve the operating ratio.

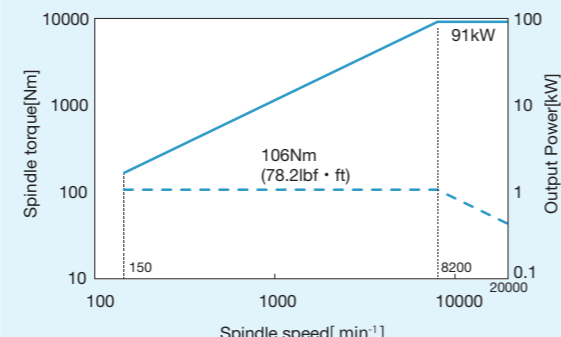


BM-H High Speed Spindle



Spindle rotational speed	20 000min ⁻¹
Spindle motor (40% ED/continuous)	AC91/85 kW
Maximum spindle torque	106 Nm

High speed machining is possible with a built-in motor. Work effectively for high speed finishing of metal molds with a small diameter tool and high speed finish machining of aluminum parts.

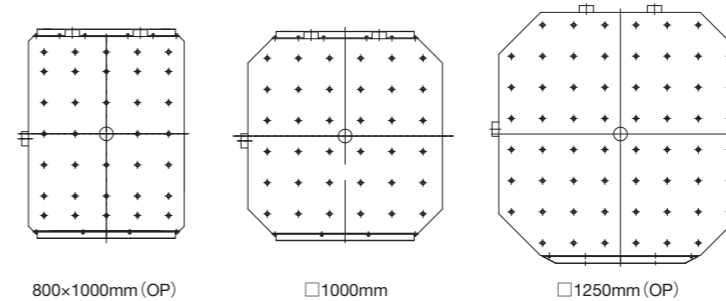


Mechanical Structure

Further optimization with inherited high rigidity and by FEM analysis. Speed increased to fast forward speed of 40 m/min and cutting feed speed of 25 m/min.

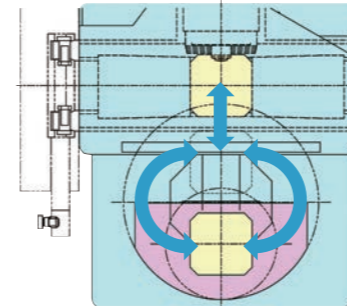
High efficiency machining of large workpieces is realized, promising productivity improvement.

High precision machining is realized with a unique worm mechanism which enables a minimum pallet indexing angle of 0.0001°. Supporting a maximum load mass of 4.5 t (option).



By using a common pallet base structure, a pallet that meets the machining needs can be selected.

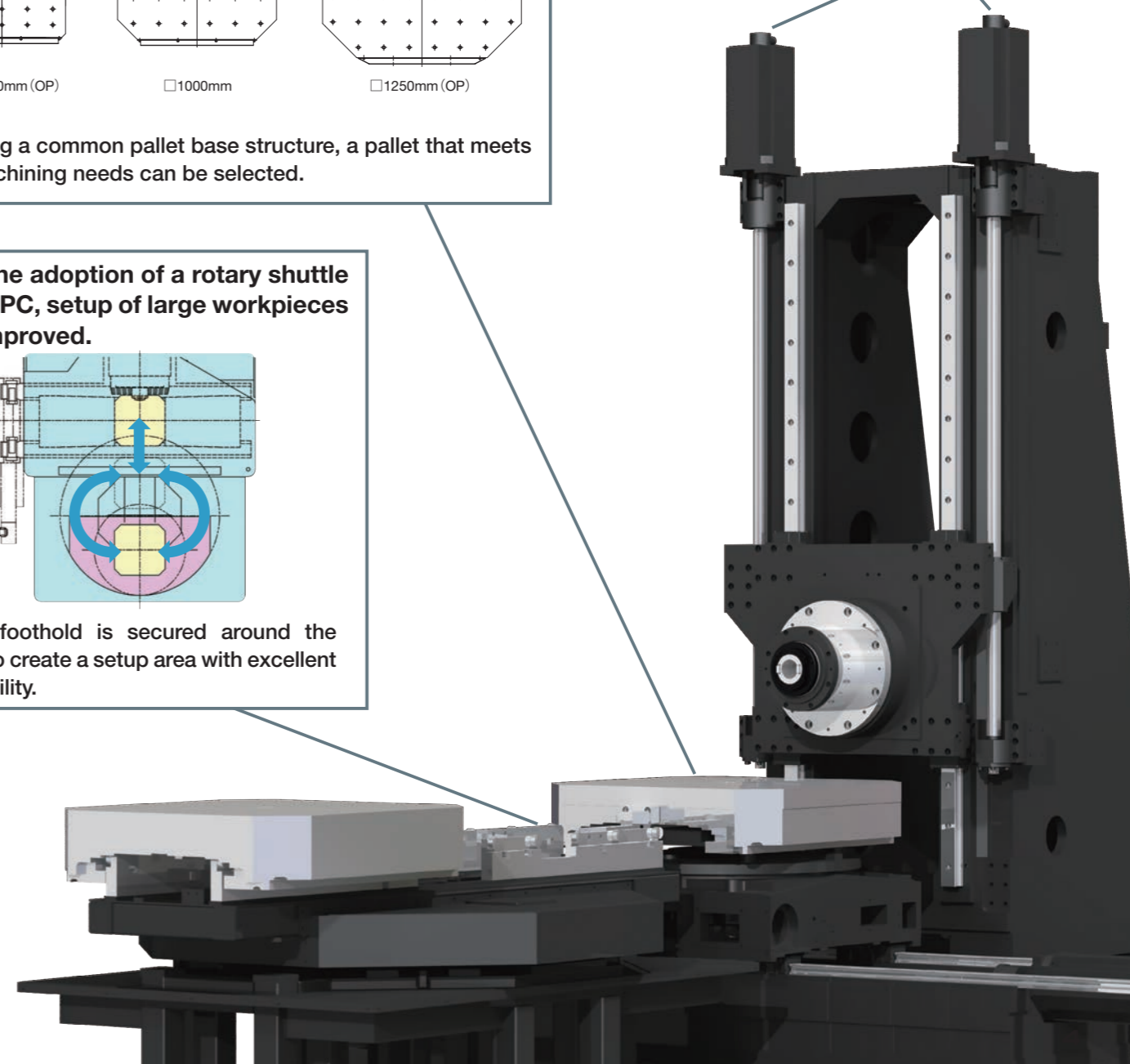
With the adoption of a rotary shuttle type APC, setup of large workpieces has improved.



A flat foothold is secured around the pallet to create a setup area with excellent workability.

Powerfully supporting high speed, high precision, responsiveness and high rigidity machining with a twin drive mechanism.

Ball screw axial center cooling (option) can suppress thermal displacement and maintain high accuracy.



Simple & Smart CNC TOSNUC PX200

- 1 Electro-mechanical integrated CNC for professional use (field) made by a machinery manufacturer.
- 2 CNC that supports operation with a simple & smart operation.
- 3 CNC that responds to a wide range of applications from manual machining to automatic machining in a production control system.
- 4 CNC to quickly detect abnormalities in the machine with an enhanced diagnostic function to improve the operating ratio.



Features of the Operation Panel

Flush Surface

Simple and timeless design



HMI

- Adopted 19-inch vertical touch panel type
- Smartphone-like intuitive operation
- Enabling input while wearing gloves

Keyboard

- Adopted mechanical keys with a sense of luxury
- Adopted QWERTY keyboard layout to improve operability

Operation Switches

- Easy-to-see operation is realized with HMI and mechanical switches.

New Machining Assist Functions

Operator Support



Machining Screen

Information necessary for machining is consolidated on one screen. Expanded coordinates and detailed factors at the time of alarm occurrence are displayed with one touch.



Manual Viewer

Browsing of manuals for machines and NCs. Keyword search is possible for all manuals.



Machining Support



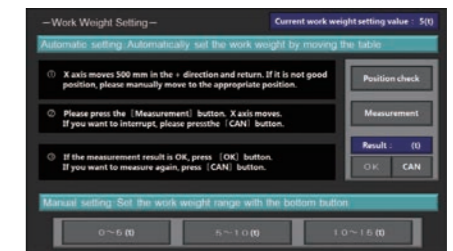
Sensorless Cutting Force Detection

Real time monitoring of cutting forces during machining. Detection of machining abnormalities and protection of workpieces and tools.



Work Weight Setting

Simply follow the instructions on the screen and set the weight of the workpiece. Machining suitable for workpiece weight is realized.

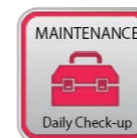


Preventive Maintenance and Monitoring



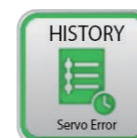
Operation Status List

The machine operation status and the operating ratio are displayed in graphs and with numerical values. The list can be displayed on a weekly or monthly basis.



Daily Inspection

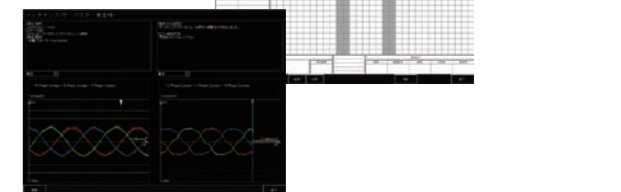
Daily inspection can be performed on the screen. Results can be saved in pdf format by easy operation.



Maintenance

Detailed data when some malfunction occurs in the mechanical system is saved. Factor analysis is possible with graphs and other data at a later time.

DATE	OPERATION TIME	OPERATION RATIO	UPPER %	LOWER %
18/07/20	[Bar Chart]	[Bar Chart]	38	25
18/07/21	[Bar Chart]	[Bar Chart]	34	25
18/07/22	[Bar Chart]	[Bar Chart]	38	25
18/07/23	[Bar Chart]	[Bar Chart]	42	25
18/07/24	[Bar Chart]	[Bar Chart]	46	25
18/07/25	[Bar Chart]	[Bar Chart]	58	25
18/07/26	[Bar Chart]	[Bar Chart]	55	25
18/07/27	[Bar Chart]	[Bar Chart]	59	25
18/07/28	[Bar Chart]	[Bar Chart]	63	25
18/07/29	[Bar Chart]	[Bar Chart]	67	25
18/07/30	[Bar Chart]	[Bar Chart]	71	25



New Design Pursuing Workability

Operation Panel and Diagonal Door



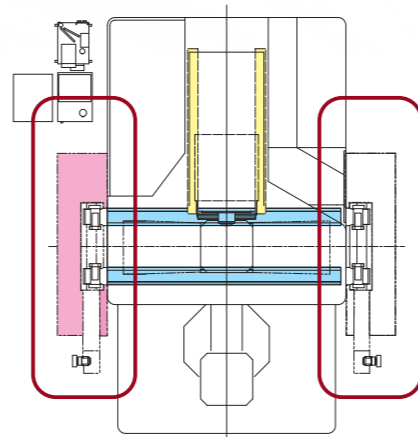
Improved operability and visibility achieved with the operation panel that can rotate from 0 to 90 degrees and the diagonal door.

Daily Inspection Devices



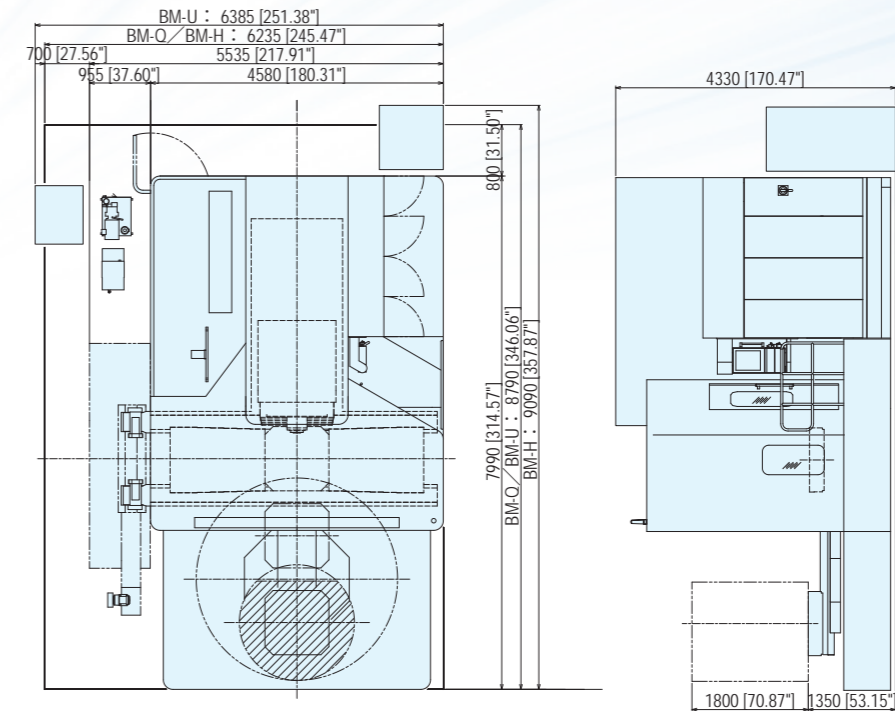
Easy maintenance achieved by placing the devices that require daily inspection together on the back panel of the machine.

Placement Layout



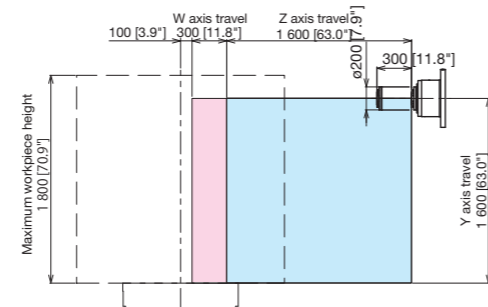
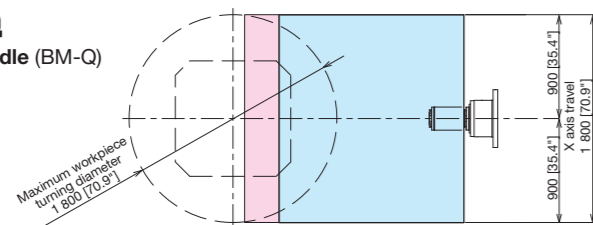
The chip conveyor and the coolant unit can be installed on either the left or the right depending on the layout. (Supported as an option)

Machine general view

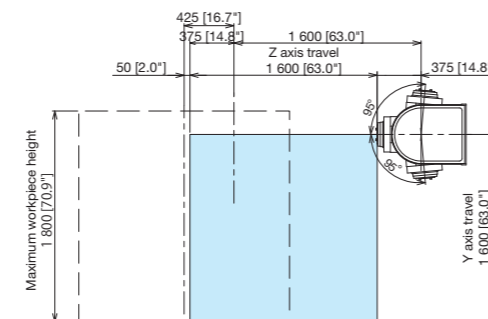
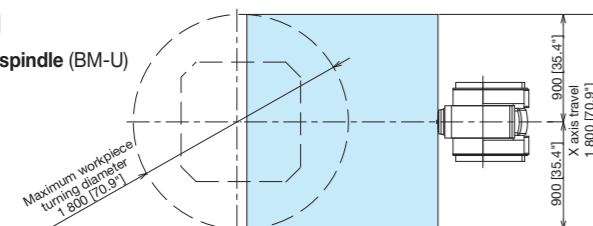


Axis travel

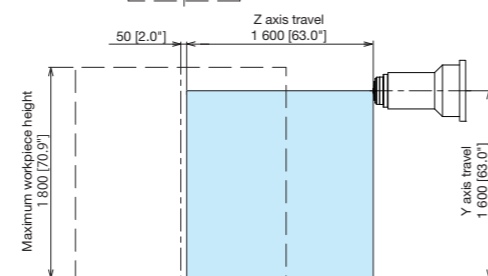
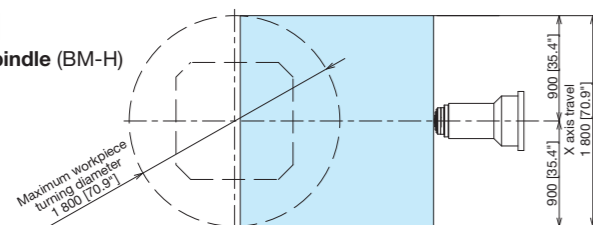
BM-Q Standard spindle (BM-Q)



BM-U Universal head spindle (BM-U)



BM-H High speed spindle (BM-H)



Machine specifications			BM-Q Standard Spindle	BM-U Universal Head Spindle	BM-H High Speed Spindle	
Travel	X-axis travel (Cross movement of pallet)	mm [in]	1 800 [70.9]			
	Y-axis travel (Vertical movement of spindle head)	mm [in]	1 600 [63.0]			
	Z-axis travel (Longitudinal movement of column)	mm [in]	1 600 [63.0]			
	W-axis travel (Quill extension)	mm [in]	300 [11.8]			
	A-axis travel (Spindle rotation)	deg		±95		
Pallet	Pallet working surface	mm [in]	1 000×1 000 [39.4×39.4] [1 250×1 250] [49.2×49.2] [800×1 000] [31.5×39.4]			
	Pallet loading capacity	kg [lb]	3 000 [6 615.0] [4 500] [9 920.8]			
	Pallet table surface		1 000×1 000: 36×M20 [T slot 22 mm [0.9"] 6 pieces] 1 250×1 250: [60×M20] [T slot 22 mm [0.9"] 8 pieces] 800×1 000: [34×M16] [T slot 18 mm [0.7"] 5 pieces]			
	Minimum indexing angle	deg	0.0001			
Spindle	Spindle speed range	min ⁻¹	20~6 000	150~12 000	150~20 000	
	Maximum spindle torque	N·m [lbf·ft]	1 600 [1 180.2]	236 [174.1]	106 [78.2]	
Feedrate	Rapid traverse rate	X,Y,Z	40 [1574.8]			
		B	1 600			
		W	6			
	Feedrate	A	3 600			
		X,Y,Z	1~25 000			
Jogging feed	A	3 600				
Automatic tool changer	Type of tool shank		MAS BT50	MAS BT50	HSK A100	
	Type of retention knob		MAS P50T-1 (45°)	MAS P50T-1 (45°)		
	Tool storage capacity		60 [90, 120] tools			
	Maximum tool diameter	When pots are full:	mm [in]	ø125 [4.9]		
		When adjacent pots are empty:	mm [in]	ø240 [9.8]		
	Maximum tool length	mm [in]	550 [21.7]			
	Maximum tool mass	kg [lb]	25 [55.1]			
Method of tool selection		Pot address random short-cut				
Power sources	Electric power supply		AC 200/220V ±10%, 50/60Hz ±1Hz			
	Power capacity	kVA	130	175	260	
	Compressed air source		0.5~0.8MPa (5~8kgf/cm ²), 550Nℓ/min			
Machine size	Machine height	mm [in]	4 330 [170.5]			
	Floor space (Including maintenance area)	mm [in]	6 235×8 790[245.5×346.0]	6 385×8 790[251.4×346.0]	6 235×9 090[245.5×357.9]	
	Mass of machine	kg [lb]	35 000 [77 161.8]			

Values in brackets [] are optional

Specifications

Spindle specifications (Please select the spindle specifications)

- 1 Standard spindle (BM-Q)
- 2 Universal head spindle (BM-U)
- 3 High speed spindle (BM-H)

Standard spindle (BM-Q) Accessories

- 1 Mist unit for spindle gear

Optional Accessories for standard spindle (BM-Q)

- 1 High-Power 45kW (60.3HP) spindle

Universal head spindle (BM-U) accessories

- 1 A-axis rotary scale
- 2 Step-up transformer

High speed spindle (BM-H) accessories

- 1 Step-up transformer

Pallet Specifications

- | | |
|---|--|
| 1 1 000 x 1 000mm [39.4 x 39.4in] 36xM20 (Standard pallet specifications) | 4 1 000 x 1 000mm [39.4 x 39.4in] T slot 22mm [0.9in] (JIS3 Grade) 6 pieces (Optional pallet specifications) |
| 2 1 250 x 1 250mm [49.2 x 49.2in] 60xM20 (Optional pallet specifications) | 5 1 250 x 1 250mm [49.2 x 49.2in] T slot 22mm [0.9in] (JIS3 Grade) 8 pieces (Optional pallet specifications) |
| 3 800 x 1 000mm [31.5 x 39.4in] 34xM16 (Optional pallet specifications) | 6 800 x 1 000mm [31.5 x 49.2in] T slot 18mm [0.7in] (JIS3 Grade) 5 pieces (Optional pallet specifications) |

Standard Accessories

- | | |
|---|--|
| 1 Numerical control system TOSNUC PX200 | 11 Coil conveyor (Z-axis, 2 set) |
| 2 Auto power OFF unit | 12 Splash cover |
| 3 Plug socket for connecting an external device (AC 100 V, 5 A) | 13 Automatic tool changer (60 tools) |
| 4 Pallet edge locators (3 pieces / 1 pallet) | 14 Automatic pallet changer (2 pallets) |
| 5 Table bed cover (X-axis cover, Telescopic steel cover, Horizontal) | 15 APC stage for setup (Checkered plate) |
| 6 Column cover (Y-axis cover, bellows cover, Longitudinal) | 16 Hydraulic unit (*) |
| 7 Column bed cover (Z-axis cover, Telescopic steel cover, Horizontal) | 17 Oil cooler (*) |
| 8 Lubrication unit (for B-axis) | 18 Installation parts |
| 9 Operator call lamp (3 colors: red, yellow and green) | 19 Assembly and reassembly tools for maintenance |
| 10 Hinged plate conveyor (X-axis, 2 set) | |
- *: Specifications differ by the spindle specification.

Optional accesories

- | | |
|---|---|
| 1 Flood coolant set | 18 Test bar |
| 2 Through-spindle coolant set | •tool diameter: 60 mm [2.4 in] |
| •Pump source pressure 1.0 MPa [145.0 psi] | •tool length: 310 mm [12.2 in] |
| •Pump source pressure 2.0 MPa [290.1 psi] | 19 Earth leakage protection device |
| 3 Through-tool coolant set (only BM-Q) | 20 Linear scale feedback: X, Y, Z-axis |
| •Pump source pressure 1.0 MPa [145.0 psi] | 21 Rotary scale feedback: B-axis |
| •Pump source pressure 2.0 MPa [290.1 psi] | 22 Chip bucket (C) |
| 4 Chip blow air unit (only BM-Q) | Bucket capacity: Approx. 0.18 m ³ [180 L] [47.6 gal] |
| 5 Mist coolant system | 23 Customer's designated machine exterior painting color |
| 6 Coolant / air blow unit (only BM-Q) | 24 External M-code output. |
| 7 Shower coolant set | 25 Multi-pallet magazine system |
| 8 APC cover | The number of pallets will be changed for your choice from basic 2 pallets. Choose one type from "6, 8, 10 pieces". |
| 9 APC fence | 26 Collet MAS-II (BM-Q, BM-U) |
| 10 X, Y, Z-axis Ball Screw Cooling System | Collet is changed from MAS-TYPE I to MAS-TYPE II. |
| 11 The maximum loading 4 500 kg [9 920.8 lb] | 27 Through-spindle air blow |
| 12 Automatic tool changer (ATC) | 28 Through-spindle coolant / air blow |
| Tool storage capacity: Choose one type from "90, 120 tools". | 29 Change scaffolding to grating for APC |
| 13 Optional pull stud | 30 APC step for APC cover |
| 14 Automatic measuring function | 31 APC step for APC fence |
| 15 Calibration block (for automatic measuring function) | 32 Operator call lamp addition |
| 16 Automatic tool length measuring function | 33 Safety specification conformity with CSA (CANADA). |
| 17 Master tool (for automatic tool length measuring function) | |

CNC system specifications TOSNUC PX200 standard specifications

- | | | |
|--|--|--|
| 1 Controlled axes | 5-9.Program check | 11-10.Mirror image |
| 1-1.Controlled axes | 6 Operation and display | 11-11.All clear |
| X,Y,Z,B,W 5 axis (BM-Q) | 6-1.Customized keys | 11-12.Command Reset |
| X,Y,Z,B,A 5 axis (BM-U) | 6-2.Parameter editing | 11-13.Feed hold |
| X,Y,Z,B, 4 axis (BM-H) | 6-3.Tool file | 11-14.Cycle stop |
| 1-2.Simultaneously controllable axes | 6-4.Display function | 11-15.Restart |
| 5 axis (X,Y,Z,B,W) (BM-Q) | 6-5.Display clear function | 11-16.Sequence number collation and stop |
| 5 axis (X,Y,Z,B,A) (BM-U) | 6-6.S.F. manual setting | 11-17.Manual numerical command |
| 4 axis (X,Y,Z,B) (BM-H) | 6-7.S.F. auto setting | 11-18.Single block control |
| Positioning(G00),Linear interpolation (G01) | 6-8.Spindle drive motor load display | 11-19.Feed hold control |
| 2 axes for circular interpolation (G02,G03) X-Y,Z-Z-X | 6-9.Working time display | 11-20.Override control |
| 2 Programming methods | 6-10.Counting of lot number | 11-21.Handwheel feed interruption control |
| 2-1.Programming resolution | 6-11.Calendar timer | 11-22.Manual interruption and manual return |
| Linear axis: 0.001mm | 6-12.Machining record | 11-23.Program command alarm detailed display |
| Rotary axis:B-axis:0.0001 deg | 6-13.Register of users' names | |
| A-axis:0.0001 deg (BM-U) | 6-14.Memory operation | 12 Programming support function |
| 2-2.Maximum programmable dimension | 6-15.MDI operation | 12-1.Plane selection |
| Linear axis: ±99999.999mm | 6-16.PC HMI | 12-2.Circular interpolation by radius Programming |
| Rotary axis: ±9999.9999deg | 6-17.Machining display | 12-3.Circle cutting |
| 2-3.Data code | 6-18.Home display | 12-4.Machine coordinate system positioning command |
| Automatic recognition of ISO/EIA code | 6-19.Instruction manual viewer | 12-5.Subprogram call |
| 2-4.Data format | | 12-6.Random angle chamfering and corner R programming |
| Variable blocks with Decimal point programming Word address format | 7 I/O function and devices | 12-7.Canned cycle |
| 2-5.Decimal point input | 7-1.RS232C interface port A | 12-8Automatic acceleration / deceleration for feed |
| Calculator type/Programming resolution type | 7-2.USB memory | 12-9.Automatic corner override |
| 3 Interpolation | 8 S,T and M functions | 13 Mechanical error compensation |
| 3-1.Positioning | 8-1.Spindle speed function (S-function) | 13-1.Backlash compensation |
| 3-2.Linear interpolation | 8-2.Spindle speed override | 13-2.Pitch error compensation |
| 3-3.Circular interpolation | 8-3.Tool function (T-function) | 13-3.Zero point correction function |
| 4 Feed | 8-4.Miscellaneous function (M-function) | 13-4.Non-linear compensation control |
| 4-1.Rapid traverse rate | 9 Tool offset | 13-5.Preview positioning control + feed forward |
| 4-2.Feedrate | 9-1.Tool length offset | 13-6.Uni-directional positioning |
| 4-3.Dwell | 9-2.Tool offset | 14 Machine control support function |
| 4-4.Manual continuous feed | 9-3.Cutter compensation C | 14-1.Integrated PLC |
| 4-5.Rapid traverse rate override | 9-4.Number of tool offsets | 14-2.Feed interlock |
| 4-6.Feedrate override | 10 Coordinate system | 15 Safety and maintenance |
| 4-7.Automatic acceleration / deceleration | 10-1.Coordinate system setting | 15-1.Emergency stop |
| 4-8.S type acceleration / deceleration for rapid traverse rate | 10-2.Fixture offset | 15-2.Overtravel check |
| 4-9.High quality mode function | 10-3.Fixture offset 2 | 15-3.Stored stroke check |
| 4-10.Feedrate clamp | 10-4.Return to 2nd, 3rd or 4th reference point | 15-4.Interference check II |
| 5 Part program storage and edit | 11 Operation support function | 15-5.Self-diagnosis |
| 5-1.Part program storage 2GB | 11-1.Control in/out | 15-6.Software configuration display |
| 5-2.Part program edit function | 11-2.Single block | 15-7.Alarm display and alarm history |
| 5-3.Background edit function | 11-3.Optional block skip | 15-8.History of key operation, alarm and operating condition |
| 5-4.Program name | 11-4.Dry run | 15-9.Display copy |
| 5-5.Sequence number | 11-5.Machine lock | 15-10.Machine operating status |
| 5-6.Sequence number search | 11-6.Auxiliary function lock | 15-11.Dairy inspection |
| 5-7.Program nesting list | 11-7.Axis feed cancel | 15-12.Fault diagnosis |
| 5-8.Program offset list | 11-8.Manual absolute ON/OFF | 15-13.Life management |
| | 11-9.Override cancel | 15-14.Motor load |

CNC system specifications TOSNUC PX200 pack specification

Q BM-Q *Items marked are included in the pack specification U BM-U *Items marked are included in the pack specification H BM-H *Items marked are included in the pack specification

- | | | |
|---|---|--|
| 1 Controlled axes | 7-5.High-speed LAN-linkage | 13 Machine control support function |
| 1-1.Synchronously controlled axes | 8 S,T and M functions | 13-1.External deceleration |
| 1-2.Additional controlled axes | 8-1.Constant surface speed control | |
| 2 Programming methods | 9 Tool offset | 14 Automation support function |
| 2-1.Inch/metric selection | 9-1.Additional number of tool offsets | 14-1.Tool breakage and tool wear detection |
| 3 Interpolation | 9-2.Tool wear compensation memory | 14-2.Counting of tool working time |
| 3-1.Helical circle interpolation | 9-3.Three (3)-dimensional tool compensation | 14-3.Feedrate regulation |
| 3-2.Hypothetical axis interpolation | 9-4.Tool length offset in tool axial direction | 14-4.Spare tool selection |
| 3-3.Cylindrical interpolation | 10 Operation support function | 14-5.Pallet retract function |
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