Global Service Sites

Local dealers are available to provide services in each region, in addition to the sites below.

U. S. A.

BROTHER INTERNATIONAL CORP.
MACHINE TOOLS DIV. TECHNICAL CENTER
2200 North Stonington Avenue, Suite 270, Hoffman Estates, IL 60169, U.S.A.
PHONE:(1)224-653-8415 FAX:(1)224-653-8821

Germany

BROTHER INTERNATIONALE INDUSTRIEMASCHINEN GmbH
MACHINE TOOLS DIVISION FRANKFURT TECHNICAL CENTER
Hoechster Str.94, 65835 Liederbach, Germany
PHONE:(49)69-977-6708-0 FAX:(49)69-977-6708-80

India

BROTHER INTERNATIONAL (INDIA) PVT LTD.
BANGALORE TECHNICAL CENTER
Park Landing, Ground Floor, Municipal No.5AC-709, 2nd Block, HRBR Extension,
Bangalore - 560 043 Karnataka, India
PHONE:(91)80-6405-7999

China

BROTHER MACHINERY (SHANGHAI) LTD.
DONGGUAN BRANCH (MACHINE TOOLS DIV.) DONGGUAN TECHNICAL CENTER
1F, Fuyuan Business Center Building, No.1 Lane 13, Maiyuan Road, Xin'an community,
Chang'an Town, Dongguan City, Guangdong Province, 523008, P.R.China
PHONE:(86)769-2238-1505 FAX:(86)769-2238-1506

Mexico

BROTHER INTERNATIONAL DE MÉXICO, S.A. DE C.V.
División de Maquinaria Industrial Centro Técnico Querétaro
Calle 1 No.310 Int 15, Zona Industrial Jurica, Parque Industrial Jurica,
Queretaro, QRO C.P. 76100 México
PHONE:(52)55-8503-8760 FAX:(52)442-483-2667

Thailand

BROTHER COMMERCIAL (THAILAND) LTD.
MACHINE TOOLS TECHNICAL CENTER
317 Pattanakarn Road, Pravet Sub-District, Pravet District, Bangkok 10250, Thailand
PHONE:(66)2321-5910 FAX:(66)2321-5913

China

BROTHER MACHINERY (SHANGHAI) LTD.
(MACHINE TOOLS DIV.) SHANGHAI TECHNICAL CENTER
Room B, 3/F., No.567, West Tianshan Rd., ChangNing District, Shanghai 200335, P.R.China
PHONE:(86)21-2225-6666 FAX:(86)21-2225-6688

China

BROTHER MACHINERY (SHANGHAI) LTD.
CHONGQING BRANCH (MACHINE TOOLS DIV.) CHONGQING TECHNICAL CENTER
Room 105, No.51 Xuefudadao, Nan' an District, Chongqing Province, 400074, P.R.China
PHONE:(86)23-6865-5600 FAX:(86)23-6865-5560

Figures in brackets ( ) are the country codes.

- For safe use of our products, please read the Instruction Manual and Safety Manual before commencing operation. When using oil-based coolant oil or machining workpieces made of materials that may ignite (e.g. magnesium, resin), take sufficient safety measures to prevent fire. Please consult your local distributor if you have any questions.
- Secure 700 mm between machines as maintenance space.
- When exporting this product, be sure to check the end user and their purpose of use from a security viewpoint.
- A relocation detection device is installed on the machine depending on the destination (machine's nameplate [M140X2 RD]). In this case, the machine is locked when it has been relocated and operation is disabled temporarily. Please apply for relocation through your local distributor in advance as this lock needs to be released.
- This product is deemed to be included in the "applicable listed items" controlled by the Foreign Exchange and Foreign Trade Law of Japan. When exporting this product, please obtain required permissions, including an export license, from the Ministry of Economy, Trade and Industry (METI) prior to export. When re-selling or re-exporting this product, you may need to obtain permissions from METI and the government of the country where the machine is installed.

Specifications may be subject to change without any notice.

BROTHER INDUSTRIES, LTD.
Machinery Business Division
1-5, Kitajizoyama, Noda-cho, Kariya-shi,
Aichi-ken 448-0803, Japan
PHONE: 81-566-95-0075
FAX : 81-566-25-3721
http://www.brother.com

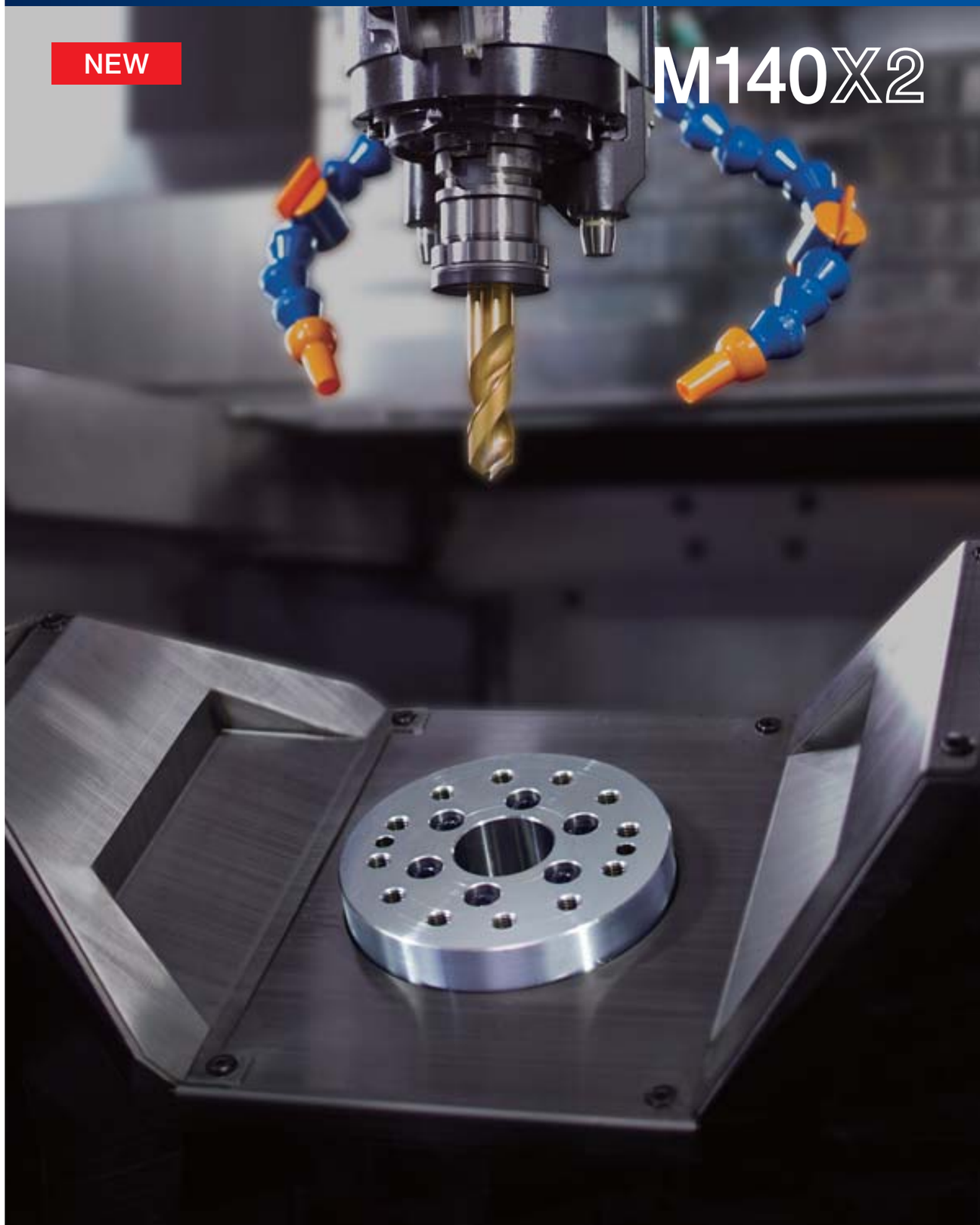
The information in this catalogue is current as of June 2016. ver.1606

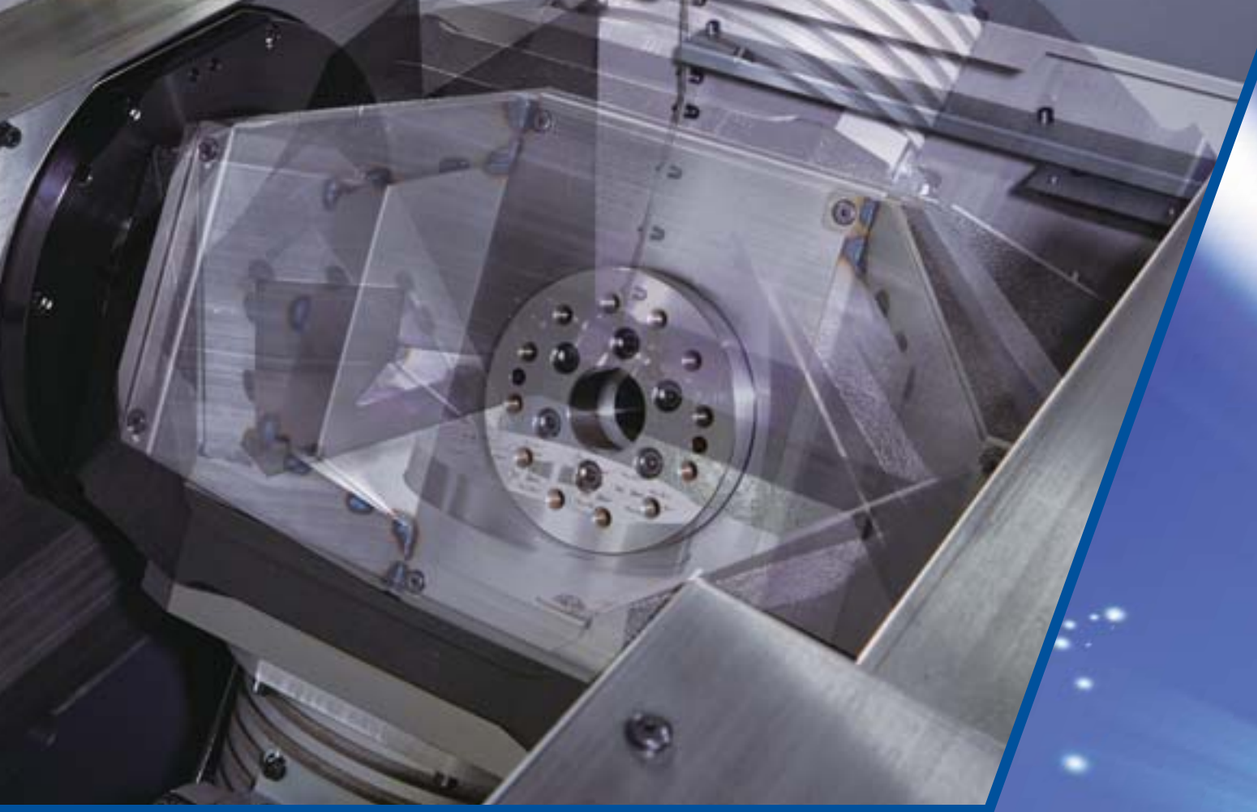
Compact Machining Center
SPEEDIO

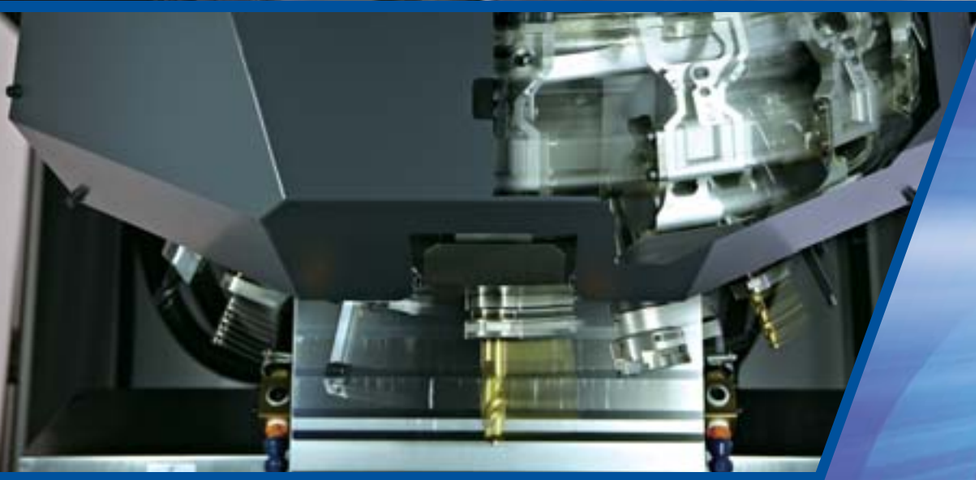
brother
at your side

NEW

M140X2







Evolving Process Integration Machine

The structure has been reviewed to allow more flexibility for jig design, leading to the expansion of target machining applications and the improvement of machining capabilities. While successfully realizing the concept of "enabling one machine to perform both turning and milling," the new multi-tasking machine of the SPEEDIO series is now available to enable more advanced complex machining.

Basic specifications

Max. spindle speed (min^{-1})	10,000／16,000 (Optional)
Max. turning spindle speed (min^{-1})	2,000
Travels (X, Y, Z) (mm)	X 200　Y 440　Z 305
Travels (A, C) (deg.)	A 120～–30、　C 360
Tool storage capacity (pcs.)	22
Rapid traverse rate (X, Y, Z) (m/min)	X 50　Y 50　Z 50
Indexing feedrate (A, C) (min^{-1})	A 60　C 200
Required floor space (mm)	1,280 × 3,829
Coolant Through Spindle (CTS)	Optional
BT dual contact spindle (BIG-PLUS)	Optional

SPEEDIO

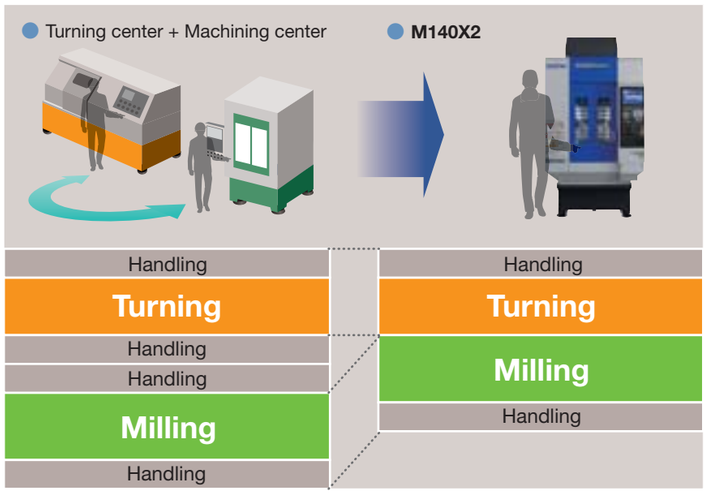
M140X2

Effects of Mass Production Type Complex Machining

Features and effects

Process integration in one machine

Workpieces previously machined using a turning center and a machining center can now be machined on one machine with machining processes integrated. This reduces handling time between machines.



Example of process integration

Turning and multi-face milling are performed on one M140X2 (automotive parts).

Turning location

Milling location

Workpiece reattachment not necessary between turning center and machining center

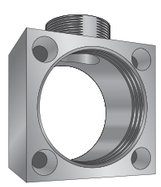
- Reduction of handling time between machines
- Reduction of operators
- Improvement of machining accuracy through one-time chucking

Target machining parts

Alternator

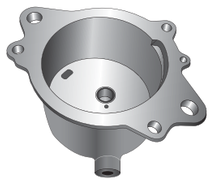
Turbocharger

Manifold (precision machinery parts)

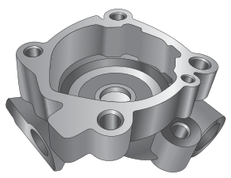


Camera lens tube (optical parts)

Vacuum pump

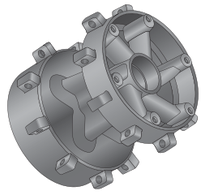


Steering pump



Oil pump

Motorcycle hub



Machine Structure that Achieves Complex Machining

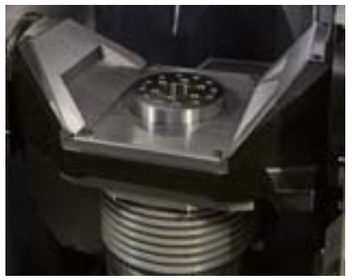
Machine structure

Machining capabilities and accuracy have been improved by increasing the rigidity of the tilt axis and turning spindle, and improving the balance of rigidity over the previous model. A double plunger lock, with a reputation for stable machining, is used to secure the turning tool.

Tilt axis (A-axis)

A roller gear is used for the tilt axis (A-axis). This backlashless gear achieves high-accuracy machining and the clampless structure enables high-speed indexing.

Turning spindle (C-axis)



A high-speed and high-output built-in DD motor is used for the turning spindle (C-axis). The turning spindle is applied in three modes: indexing table, turning and cutting feed.

Double plunger lock

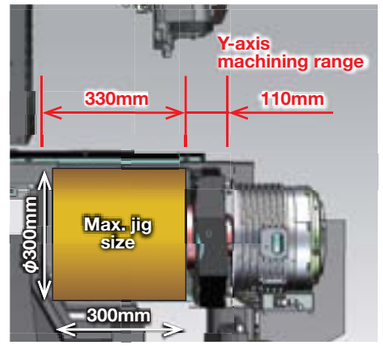
An original double plunger lock is used to achieve excellent tool change repeatability and high machining capabilities when turning tools are attached.

Optimizing machining area

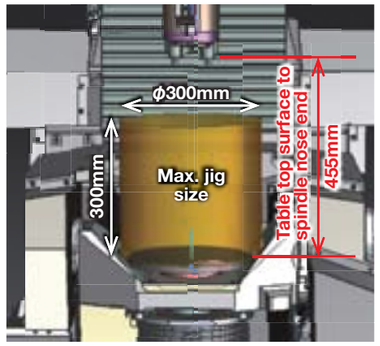
The structure has been reviewed to allow more flexibility for jig design. Target machining applications are expanded accordingly.

- The distance between the table top surface and the spindle nose end is increased to 455 mm to secure sufficient area for the jig, workpiece and tool in the Z-axis direction.
- The machining area when the tilt axis tilts is expanded by shifting the Y-axis travel range relative to the turning center of the tilt axis. In addition, contact between the spindle unit and workpiece or jig is minimized by tilting the axis toward the column (rear of machine).
- The turning range of the tilt axis (A-axis) has been expanded to +120° to -30°, enabling a broad range of machining.
- Tilting the axis up to 120° enables machining of oil holes etc. from the rear of the workpiece.
- Tilting the axis toward the operator by 30° makes workpiece attachment and removal easier from the front of the machine.

Optimized Y-axis machining range



Expansion between table top surface and spindle nose end



Expansion of turning range of tilt axis (A-axis)

Productivity

Fast acceleration/deceleration spindle

Using a fast acceleration / deceleration spindle motor and highly-responsive servo control achieves quicker starting and stopping of the spindle and turning spindle.

Start / stop time
Spindle : 0.2s
Turning spindle : 0.3s

High-speed tool change

Using a compact 22-tool magazine with excellent weight balance and optimal control achieves high-speed tool change, with any wasted operation eliminated.

Chip-Chip : 1.4s
Tool-Tool : 0.9s

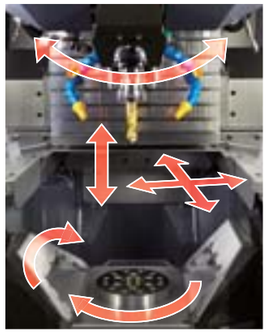
High-speed synchronized tapping

Original synchronized tapping control enables high-accuracy tapping at the fastest level in the world.

Peripheral speed 377m/min

* M20, spindle speed 6,000 min^{-1}

Simultaneous operation

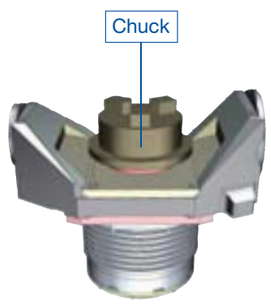
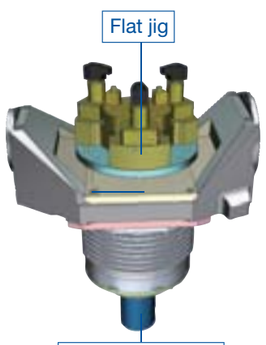


Wasted time is further reduced by positioning the X/Y/Z axes and A/C axes simultaneously with tool changes.

Reduction in non-cutting time

Example of jig configuration

Applicable to a variety of jigs from manual clamping to automatic clamping

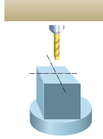
Hand chuck	Flat jig + Rotary joint	Chuck + Hydraulic rotary cylinder
		

* General or special options are included in figures. Please contact your local distributor for chucks that can be mounted.

Milling capabilities

As the spindle can provide high torque even in the medium- and high-speed range, the machine fully demonstrates its capabilities in high-speed, high-efficiency machining of aluminum or steel.

Max. torque : 40Nm Max. output : 18.9kW

		Drilling Tool diameter mm (inch) × Feed mm (inch)/rev	Tapping Tool diameter mm (inch) × Pitch mm (inch)
	ADC	D28×0.2 (1.1×0.008)	M22×2.5 (7/8×9UNC)
	S45C	D23×0.1 (0.9×0.004)	M16×2.0 (5/8×11UNC)

* Data taken using a 10,000 min^{-1} model when the A-axis is at 0 degrees and X/Y-axes are at their travel center.
* The above performance may not be achieved under some conditions, depending on usage environment, tools in use and coolant.

Turning capabilities

High-efficiency machining is achieved by the high-output turning spindle with a maximum speed of 2,000 min^{-1}, and the turning tool secured by the double plunger lock.

Max. torque : 55Nm Max. output : 8.7kW

A-axis clamp (optional)

The A-axis clamp (optional) has been added. Using this option contributes to the reduction of vibration while the turning spindle is rotating, and the improvement of machining accuracy and machining capabilities even when a load is applied to the tilt axis (A-axis).

A-axis clamp

A-axis clamp force : 400Nm

Improves machining accuracy and capabilities when the A-axis is tilted or machining is performed in a full machining range.

Provides more stable rotation of the turning spindle and reduces vibration, which minimizes the decrease in machining accuracy attributable to jig imbalance.

Environmental Performance and NC Unit

Environmental performance

Various energy saving functions reduce power consumption, achieving high environmental performance.

Power regeneration system

Equipped with a power regeneration system that reuses energy generated when the spindle motor decelerates. Low power consumption is achieved in combination with a highly efficient spindle motor.

LED type work light

LED type work light is used to achieve low power consumption and long service life.

Energy saving pump

Energy saving coolant pump reduces power consumption of the coolant unit.

Various energy saving NC functions

Automatic coolant off
Turns off the coolant pump when the preset time elapses.

Standby mode
Turns off the servomotor when the machine is not operated for the preset time.

Automatic work light off
Turns off the work light when the preset time elapses.

Automatic power off
Turns off the power at the preset time.

Highly efficient spindle motor

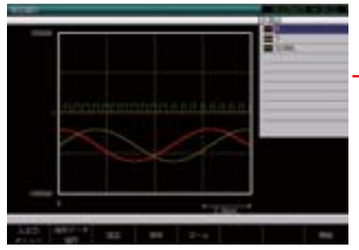
Highly efficient motor is used for the spindle motor to increase acceleration and save energy.

NC unit

The machine is equipped with our original NC unit created through machine/controller integrated development. Usability has been further improved by expanding operation and maintenance functions and enhancing the system capacity.

Machining support functions

Equipped with machining support functions, such as torque waveform display, high accuracy mode, and automatic heat expansion compensation.



System capacity

Standard equipped with PLC. Input and output points can be expanded to up to 1,024 points each (optional).

Shortcut keys

Equipped with a "shortcut" function so you can quickly open the screen you want to view.

Thread cutting function

Straight thread cutting and tapered-thread cutting are possible.

USB interface

In addition to high-speed file transfer, programs in the USB memory can be run directly or data, such as data measured by the touch probe, can be output.

Optional Specifications

Chip conveyor

A two-step structure (hinged plate and scrapper) is used, enabling discharge of chips in a variety of sizes and shapes. An oil skimmer can be added.

Coolant tank with chute

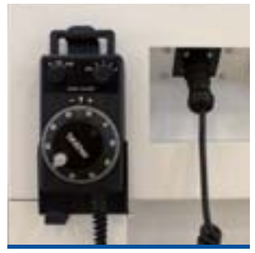
Coolant flows through the chute to discharge chips. The chute can be separated from the coolant tank, making maintenance easier. ✻1

Chip shower

Chip shower pipes are located at the upper section inside the machine for more efficient flow, and flexible shower nozzles can be directed to the side of the machine cover or sections where chips tend to accumulate.

Coolant Through Spindle (CTS)

1.5 MPa CTS used for BT spindle.
✻Please consult your local distributor for use of 3 MPa CTS.



Manual pulse generator

A cable is provided for the manual pulse generator, making setup easier.

Automatic door (motor-driven)

A motor-driven door is used, achieving smooth operation and reducing opening/closing time.

Side cover (transparent board type)

External light is drawn in to make the inside of the machine brighter and improve visibility.

Side door (with transparent window)

This makes setup from the side easier. It is possible to check the machining room through the transparent window and operate the manual pulse generator through the side door.

Automatic oil lubricator / Automatic grease lubricator

Regularly applies oil or grease to all lubricating points on the three axes.
✻Manual greasing is required for the standard specification model.

Tool breakage detector (touch type)

A touch switch type tool breakage detector is used.

Rotary joint

A rotary joint with four ports (two hydraulic, one pneumatic, and one common for hydraulic, coolant, and pneumatic) has been prepared, which is attached to the bottom of the turning spindle motor. ✻2

✻1 Chips may not be discharged correctly depending on the shape of chips. When you select the coolant tank with chute, you must also select the chip shower. Please contact your local distributor for details.
✻2 The rotary joint must be used with hydraulic oil supplied. If hydraulic oil is not supplied, only conduct indexing operation or remove the rotary joint from the turning spindle motor.

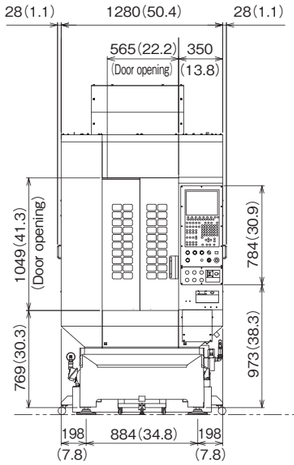
特別仕様

- Coolant unit
  ①Two-step chip conveyor
  ②Coolant tank with chute
- Coolant Through Spindle (CTS)+ Back washing system
- Tool washing (air-assisted type)
- Rotary joint (4P)
- Tool breakage detector (touch type)
- Chip shower
- Cleaning gun
- Jig shower valve unit
- A-axis clamp
- Automatic oil lubricator
- Automatic grease lubricator
- LED work light (1 or 2 lamps)
- LED indicator light (1, 2 or 3 lamps)
- Area sensor
- Automatic door (motor-driven)
- Specified color
- Manual pulse generator
- Spindle override
- Grip cover
- Side cover (transparent board type)
  Side door (with transparent window, right side only)
- Switch panel (6 holes, 10 holes)
- RS232C (25 pin) for control box
- Memory expansion (approx. 500 Mbytes)
- High accuracy mode BII
  (look-ahead 200 blocks, smooth path offset)
- Submicron command
- High-speed processing
- Rotary fixture offset
- Interrupt type macro
- Expansion I/O board (EXIO board)
  ①EXIO board assembly
  ②Additional EXIO board assembly
- Fieldbus ✻1
  ①CC-Link (remote device station)
  ②PROFIBUS DP (slave)
  ③DeviceNet (slave)
- PLC programming software
  (for Windows® Vista and 7)

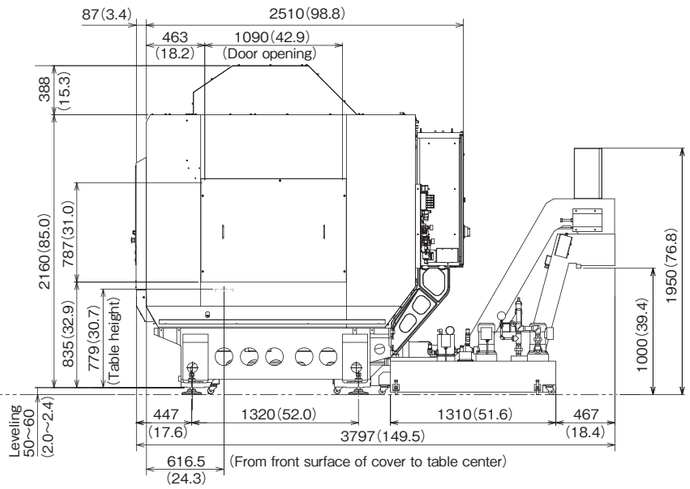
✻1 When the fieldbus is selected, the EXIO board assembly cannot be selected.

External Dimensions

Outline drawing



■ Chip conveyor type



■ Chute type

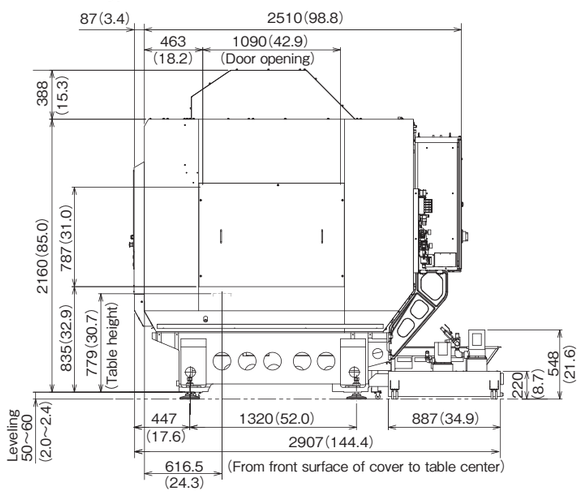
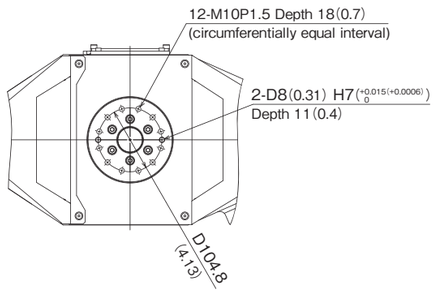
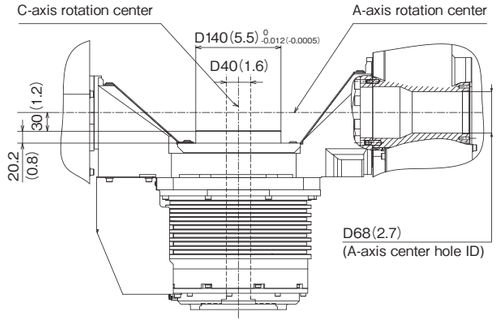


Table details





Secure 700 mm (27.6 inch) between machines as maintenance space.

Specifications

Item			M140X2
CNC Unit			CNC-C00
Travels	X axis	mm(inch)	200(7.9)
	Y axis	mm(inch)	440(17.3)
	Z axis	mm(inch)	305(12.0)
	A axis	(deg.)	120 ～ –30
	C axis	(deg.)	360
	Distance between table top and spindle nose end	mm(inch)	150 ～ 455(5.9 ～ 17.9)
Table	Work area size	mm(inch)	D140(D5.5)
	Shape of table top		In compliance with table nose No.5 of ISO702-4(JISB6109-2)
	Max. loading capacity(uniform load)	kg(lbs)	Table side 40(88.2) ／ Tale side 11(24.3)
	Max. table load inertia	kg・m²(lb・inch²)	Table side 0.29(991) ／ Tale side 0.03(103)
Spindle	Spindle speed	min^{-1}	10,000min^{-1} specifications : 10～10,000 16,000min^{-1} specifications(Optional) : 16～16,000
	Speed during tapping	min^{-1}	MAX. 6,000
	Tapered hole		7/24 tapered No.30
	BT dual contact spindle(BIG-PLUS)		Optional
	Coolant Through Spindle(CTS)		Optional
Turning spindle	Max. spindle speed	min^{-1}	2,000
Feed rate	Rapid traverse rate(XYZ-area)	m/min(inch/min)	50 × 50 × 50(1,969 × 1,969 × 1,969)
	Cutting feed rate	mm/min(inch/min)	X, Y, Z axis : 1 ～ 30,000(0.04 ～ 1,181) ＊7
	Indexing feedrate(A and C)	min^{-1}	A axis : 60 C axis : 200
ATC unit	Tool shank type		MAS-BT30
	Pull stad type ＊4		MAS-P30T-2
	Tool storage capacity	pcs.	22
	Max. tool length	mm(inch)	200(7.9)
	Max. tool diameter	mm(inch)	80(3.1)
	Max. tool weight ＊1	kg(lbs)	3(6.6)
	Tool selection method		Random shortcut method
Tool change time ＊5	Tool To Tool	sec.	0.9
	Chip To Chip	sec.	1.4
Electric motor	Main spindle motor(10min/continuous) ＊2	kW	10,000min^{-1} specifications : 10.1/6.7 16,000min^{-1} specifications(Optional) : 7.4/4.9
	Axis feed motor	kW	X, Y axis : 1.0 Z axis : 1.8 A axis : 1.8
	Turning spindle motor	kW	4.2
Power source	Power supply		AC V±10%, 50/60Hz±1Hz
	Power capacity(continuous)	kVA	10,000min^{-1} specifications : 9.5 16,000min^{-1} specifications(Optional) : 9.5
	Air supply Regular air pressure	MPa	0.4～0.6(recommended value : 0.5MPa) ＊6
	Air supply Required flow	L/min	165
Machining dimensions	Height	mm(inch)	2,603 (102.5)
	Required floor space	mm(inch)	1,280 × 3,829(50.4 × 150.7) [including chip conveyor]
	Weight	kg(lbs)	2,712 (5,979)
Accuracy ＊3	Accuracy of bidirectional axis positioning(ISO230-2:2006)	mm(inch)	X, Y, Z axis : 0.006～0.020(0.00024～0.00079) A, C axis : 28 sec or less
	Repeatability of bidirectional axis positioning(ISO230-2:2006)	mm(inch)	X, Y, Z axis : Less than 0.004(0.00016) A, C axis : 16 sec or less
Standard accessories			Instruction Manual(1 set), anchor bolts(4 pcs.), leveling bolts(4 pcs.)

＊1. The maximum tool weight differs depending on the configuration and center of gravity. The figures shown here are for reference only. ＊2. Spindle motor output differs depending on the spindle speed. ＊3. Measured in compliance with ISO standards and Brother standards. Please contact your local distributor for details. ＊4. Brother specifications apply to the pull studs for CTS. ＊5. Measured in compliance with JIS B6336-9 and MAS011-1987. ＊6. Regular air pressure varies depending on the machine specifications, machining program details, or use of peripheral equipment. Set the pressure higher than the recommended value. ＊7. When high accuracy mode B is used (When not used, 1 ~ 10,000 mm/min for X/Y axes and 1 ~ 20,000 mm/min for Z axis)

NC unit specifications

CNC model	CNC-C00	
Control axes	5 axes(X,Y,Z,A,C)	
Simultaneously controlled axes	Positioning	5 axes(X,Y,Z,A,C)
	Interpolation	Linear : 4 axes (X, Y, Z, one additional axis)
		Circular : 2 axes Helical/conical : 3 axes(X,Y,Z)
Least input increment	0.001mm, 0.0001inch, 0.001 deg.	
Max.programmable dimension	±9999.999mm, ±999.9999inch	
Display	12.1-inch color LCD	
Memory capacity	Approx.100 Mbytes (Total capacity of program and data bank)	
External communication	USB memory interface, Ethernet, RS232C 1ch	
No.of registrable programs	4,000 (Total capacity of program and data bank)	
Program format	NC language ＊Conversation language not available.	

＊When program size is bigger than 2 Mbytes. machine works with extended memory operation.
＊Ethernet is a trademark or registered trademark of XEROX in the United States.

Standard NC functions

- Absolute / incremental
- Inch / metric
- Corner C / Corner R
- Rotational transformation
- Synchronized tap
- Coordinate system setting
- Dry run
- Restart
- Backlash compensation
- Rapid traverse override
- Cutting feed override
- Alarm history(1,000 pieces)
- Startus log
- Machine lock
- Computer remote
- Built-in PLC
- Motor insulation resistance measurement
- Operation log
- High accuracy mode AⅢ
- Tool length measurement
- Tool life management / spare tool
- Background editing
- Graphic display
- Subprogram
- Herical / conical interpolation
- Tool washing filter with filter clogging detection
- Automatic power off (energy saving function)
- Servomotor off standby mode (energy saving function)
- Chip shower off delay
- Automatic coolant off (energy saving function)
- Automatic work light off (energy saving function)
- Heat expansion compensation systemⅡ (X, Y ,Z axes)
- Tap return function
- Automatic workpiece measurement ＊1
- Waveform display
- Operation level
- External input signal key
- High accuracy mode BⅡ (look-ahead 30 blocks)
- Expanded workpice coordinate system
- Scaling
- Mirror image
- Menu programming
- Program compensation
- Tool length compensation
- Cutter compensation
- Macro function
- Local coordinate system
- One-way positioning
- Opeation in tape mode (Turning function)
- Constant peripheral speed control
- Feed per revolution control
- Tool position compensation XYZ
- Nose R compensation
- Thread cutting function

＊1. Measuring instrument needs to be prepared by users.

Optional NC functions

- Memory expansion (Approx. 500 Mbytes)
- High accuracy mode BⅡ (look-ahead 200 blocks, smooth path offset)
- Interrupt type macro
- Submicron command ＊When the submicron command is used, changing to the conversation program is disabled.
- High-speed processing ＊2
- Rotary fixture offset

＊2. Minute block processing time can be changed. As there are some restrictions, please contact your local distributor for details.