Brother Earth

Working with you for a better environment
www.brotherearth.com

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

Thailand

BROTHER COMMERCIAL THAILAND LTD.
MACHINE TOOLS TECHNICAL CENTER
1232 Rama 9 Road, Suanluang Sub-District, Suanluang District,
Bangkok 10250, Thailand
PHONE:(66)2-374-6447 FAX:(66)2-374-2706

China

BROTHER MACHINERY (SHANGHAI) LTD.
(MACHINE TOOLS DIV.) SHANGHAI TECHNICAL CENTER
3F, Haiyi Commercial bldg. No.310 TianShan Road, ChangNing District,
Shanghai 200336, China
PHONE:(86)21-3251-9837 FAX:(86)21-3251-9839

China

BROTHER MACHINERY (SHANGHAI) LTD.
CHONGQING BRANCH (MACHINE TOOLS DIV.) CHONGQING TECHNICAL CENTER
Room 29-7,Unit 3,Zhengsheng Bailaohui Building ,
No.3 Xijiao Road ,Yangjiaping, Jiulongpo District, Chongqing
PHONE:(86)23-6865-5600 FAX:(86)23-6865-5560

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, No.45 North Road Lianfeng, Xianxi Village, Chang'an Town, Dongguan,
Guangdong Province, China
PHONE:(86)769-2238-1505 FAX:(86)769-2238-1506

Figures in brackets ( ) are the country codes.

Specifications may be subject to change without any notice.

BROTHER INDUSTRIES, LTD.
MACHINERY & SOLUTION COMPANY
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 January 2014. ver.1401

Compact Machining Center
SPEEDIO

brother
at your side

NEW

R450X1

Quest for “Wasted Time = Zero”

A new model that is standard equipped with a pallet changer has been added to the SPEEDIO series that achieve overwhelming productivity.

The R450X1 is equipped with the “QT table”,
Brother’s original high-speed 2-face pallet changer that has been installed on over 15,000 units.
The “new 22-tool magazine” is also available,
best suited for column traverse machines. The R450X1 will contribute to further improvement of production efficiency in our quest for “Wasted Time = Zero”.

SPEEDIO with Pallet Changer

Achievement of high productivity in our quest for “Wasted Time = Zero”

New 22-tool magazine
Promotes process integration by using this with a 2-face pallet changer

Jig area enlargement
Improves applicability in response to broader application

New NC controller
Enhances usability through machine/controller integrated development

SPEEDIO R450X1

Max. spindle speed (min^{-1})	10,000 / 16,000 (optional) 10,000 high torque (optional)
Stroke of each axis (mm)	X 450 Y 320 Z 305
Tool storage capacity (pcs.)	14／22
Rapid traverse rate (m/min)	X／Y／Z 50／50／50
Required floor space (mm)	1,400 × 2,654
Coolant Through Spindle (CTS)	Optional
BT dual contact spindle (BIG-PLUS)	Optional
Low-floor table	Optional

Brother's original "QT table" pallet changer

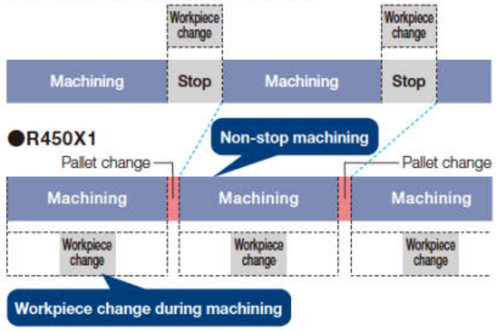
Non-stop machining

The QT(Quick Turn) table is Brother's original turn table type high-speed 2-face pallet changer. High-speed pallet change is enabled by avoiding lift-up operation while achieving high reliability through a sealed structure. Workpieces on one pallet can be changed while machining workpieces on the other pallet. Therefore, waste in workpiece change time is eliminated, enabling nonstop machining.

Pallet change time **2.9s**

* When table loading on one face is 120kg.

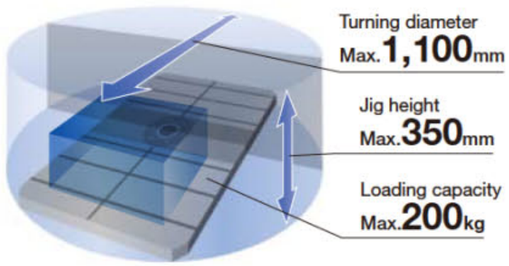
●Machine without pallet changer



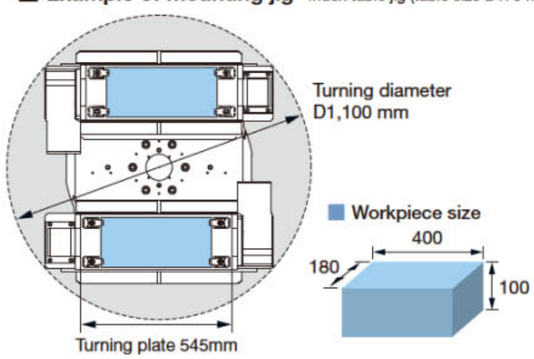
●R450X1

Wide jig area

The jig can be mounted on the table even if it extends over the table as long as it is within the turning diameter. The standard jig area is wide, with a 1,020 mm turning diameter and 300 mm jig height, making mounting the index table jig easier. The jig area can be enlarged optionally so that larger jigs can be mounted.



■ **Example of mounting jig** Index table jig (table size D170 mm)



Jig mounting range and loading capacity

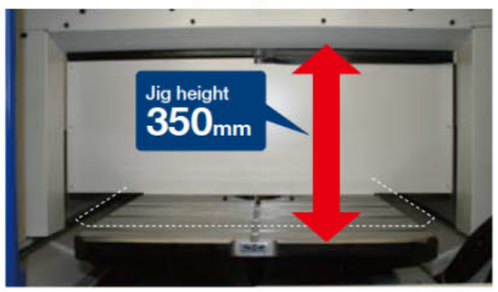
	《 Standard 》	《 Max. 》
Turning diameter	1,020mm	**1,100mm** (*1)
Jig height	300mm	**350mm** (*2)
Loading capacity	120kg	**200kg** (*3)

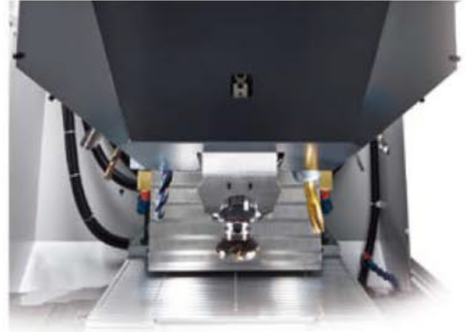
*1:When the "turning diameter enlargement" option is selected *2:When the low-floor table is selected. *3:The parameter must be changed.

■ **Low-floor table (optional)**

The jig height can be increased up to 350 mm.

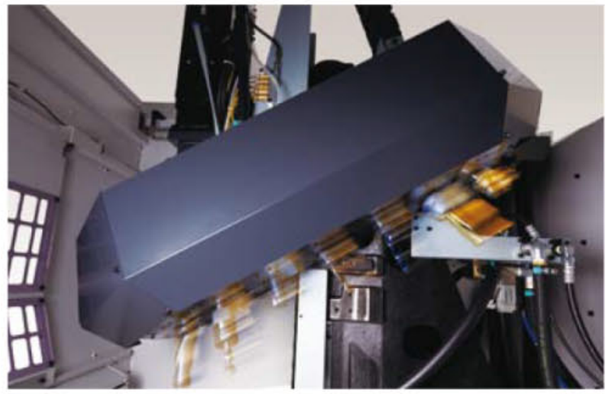
*The distance between the table top and the spindle nose end becomes 250 to 555 mm.





Newly developed magazine that promotes process integration

New 22-tool magazine



In addition to the conventional 14-tool magazine specifications, the new 22-tool magazine specifications have been added. Using both the 22-tool magazine and 2-face pallet changer promotes process integration, contributing to improvement of production efficiency.

Tool storage capacity **22 tools**

Tool - Tool : **0.9s**

Chip - Chip : **1.7s**

The 22-tool magazine model is standard equipped with a side door and side magazine rotation switch, in consideration of operability.

* These are not provided for the 14-tool magazine model.

14-tool magazine

The 14-tool magazine that features high cost performance can also be selected. Tool change time has been reduced even more than before.

Tool-Tool :0.8s
Chip-Chip :1.6s

Process integration using 2-face pallet changer and 22-tool magazine

■ Divided into two machines ■ Two processes on one R450X1

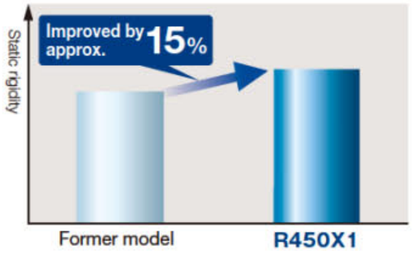
One R450X1 can perform two processes, making use of the 2-face pallet changer and the new 22-tool magazine, leading to process integration.
This improves the line balance and enables optimal equipment investment.

High machining capabilities in response to a variety of applications

Highly rigid structure

Highly rigid machine structure based on the CAE analysis. The structure of the column and QT table has been reviewed to further improve rigidity.

■ Comparison of X-axis static rigidity



High-power spindle motor

In addition to the highly rigid structure, a high-power spindle motor is mounted on the machine, providing high machining capabilities.

Medium-and high-speed range enabling high-efficiency machining

■ Grooving using standard specs

Machining details: Cutting amount : 110 cc/min
Material : Carbon steel (using D16 end mill)

Low-speed range suitable for heavy-duty machining

■ Large hole drilling using high-torque specs

Machining details: Hole diameter: D40 mm
Material: Carbon steel

Spindle motor characteristic value

Standard specs

Max. torque (momentary) : **40 Nm**

Max. output : **18.9 kW**

High-torque specs (optional)

Max. torque (momentary) : **92 Nm**

Max. output : **26.2 kW**

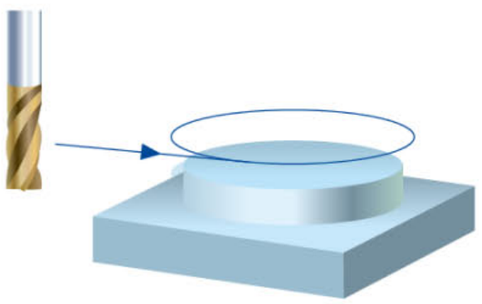
Pursuit of high accuracy

Resolution of the encoder has greatly improved and various offset functions have been added. These improvements achieve high accuracy for circular machining and other operations. The machine is also equipped with Brother's original high accuracy mode B that looks ahead up to 200 blocks.

Circular machining Roundness : **30% better** (compared to former model)

* This accuracy may not be obtained under some machining conditions, machine installation conditions etc.

Look-ahead blocks: Max. **200 blocks**



Diameter : D80mm Material : Aluminum

* Data taken using optional high accuracy mode BII * 30-block look-ahead is standard.

Examples of target workpieces

Automobile parts

Bearing support 1
Flywheel
Balance shaft
Alternator 2
Starter housing 3
Air conditioner cover 4
Air conditioner cam plate 5
Cylinder block
Wiper housing
Pump housing 6
Oil pump body 7
Water pump 8
Water pump cover
Throttle body 9
Lower body
Valve housing 10
Lower ball
Support shaft
Clutch piston

Motorcycle parts

Brake master cylinder 11
Cylinder head 12
Crankcase 13
Crankcase cover
Cylinder
Shift fork
Cam shaft
Crankshaft

General machinery parts

Hydraulic transmission joint
Camera parts
Optical element housing
Mobile phone
Camera case

Machining capability

Machining	Material	ADC	Cast iron	Carbon steel
Drilling Tool diameter mm(inch) × Feed mm(inch)/rev	10,000min⁻¹	D32(1.26) × 0.2(0.008)	D28(1.1) × 0.15(0.006)	D25(0.98) × 0.1(0.004)
	16,000min⁻¹	D24(0.94) × 0.2(0.008)	D22(0.87) × 0.15(0.006)	D18(0.71) × 0.1(0.004)
	10,000min⁻¹ high-torque	D40(1.57) × 0.2(0.008) D30(1.18) × 0.7(0.03)	D34(1.34) × 0.15(0.006) D26(1.02) × 0.4(0.02)	D30(1.18) × 0.15(0.006) D26(1.02) × 0.25(0.01)
Tapping Tool diameter mm(inch) × Pitch mm(inch)	10,000min⁻¹	M27 × 3.0(1-8UNC)	M24 × 3.0(7/8-9UNC)	M16 × 2.0(5/8-11UNC)
	16,000min⁻¹	M22 × 2.5(7/8 9UNC)	M18 × 2.5(5/8 11UNC)	M14 × 2.0(1/2 13UNC)
	10,000min⁻¹ high-torque	M39 × 4.0(1 1/2-6UNC)	M33 × 3.5(1 1/4-7UNC)	M27 × 3.0(1-8UNC)
Facing Cutting amount cm³/min(inch³/min): Cutting width mm(inch) × Cutting depth mm(inch) × Feed rate mm/min(inch/min)	10,000min⁻¹	960 : 100 × 3.2 × 3,000 (58.6 : 3.94 × 0.13 × 118.1)	128 : 40 × 5.6 × 573 (7.8 : 1.57 × 0.22 × 22.6)	81 : 40 × 4.2 × 484 (5.0 : 1.57 × 0.17 × 19.1)
	16,000min⁻¹	660 : 100 × 2.2 × 3,000 (40.3 : 3.94 × 0.09 × 118.1)	73 : 40 × 3.2 × 573 (4.5 : 1.57 × 0.13 × 22.6)	48 : 40 × 2.5 × 484 (2.9 : 1.57 × 0.1 × 19.1)
	10,000min⁻¹ high-torque	1700 : 100 × 5.7 × 3,000 (102.4 : 3.94 × 0.22 × 118.1)	128 : 40 × 5.6 × 573 (7.8 : 1.57 × 0.22 × 22.6)	81 : 40 × 4.2 × 484 (5.0 : 1.57 × 0.17 × 19.1)

*The data is Brother's actual test data.

Environmental performance contributing to global environment

High environmental performance

Power and air consumption has been reduced by installing various energy saving functions, including a power regeneration system, providing high environmental performance.

Power regeneration system*

*Energy saving system that reuses energy generated when decelerating

High-efficiency motor

Energy saving pump

LED work light

Various energy saving NC functions

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

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

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

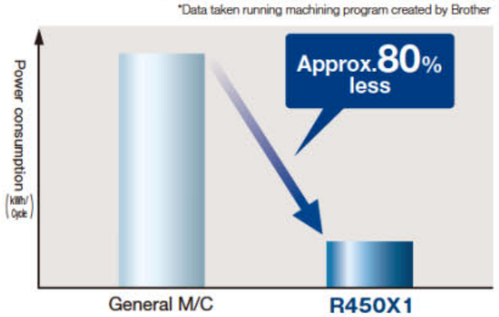
Automatic power off
Turns off the power at the preset time.

Low power consumption

As various energy saving functions are included, power consumption has been reduced by approximately 15% compared to the former model, and substantially reduced compared to general machining centers.

■ **Power consumption for one cycle**

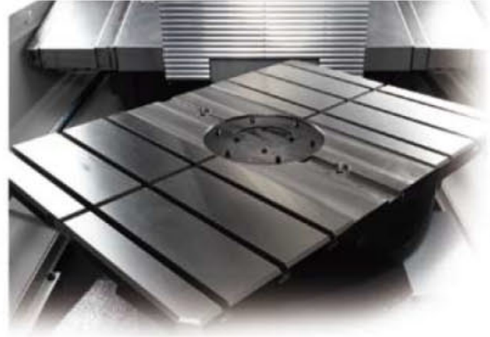
*Data taken running machining program created by Brother



Low air consumption

Low air consumption has been achieved through a spindle covering that minimizes air purge and optimized spindle air blow timing.

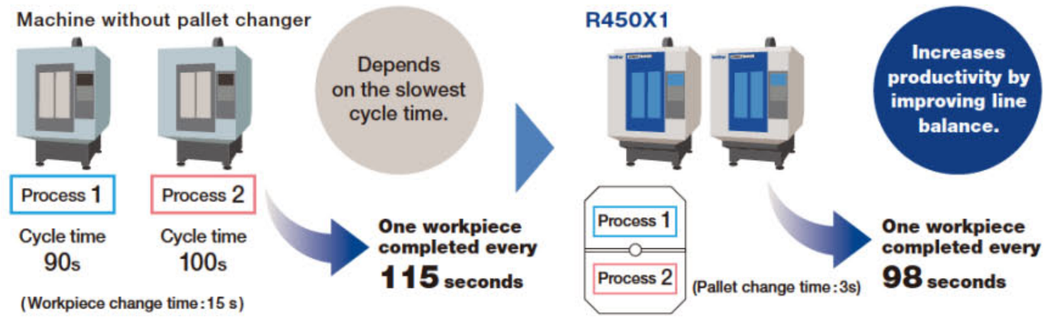
■ Spindle air purge with air consumption minimized



Examples of highly productive machining using QT table

Example 1 Process integration ～ Two processes on one machine ～

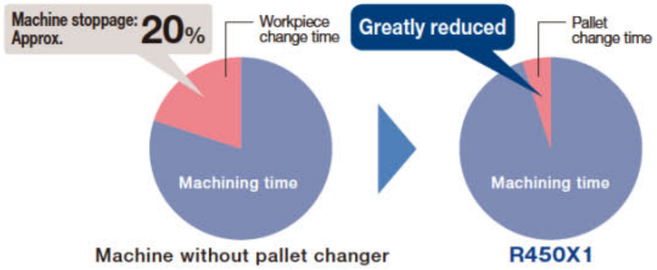
Processes divided between two machines can be performed on one machine, making use of the 2-face pallet changer. Process integration improves the line balance and enables optimal equipment investment.



Example 2 When machining time is short ～ Reference machining time:90 s or shorter ～

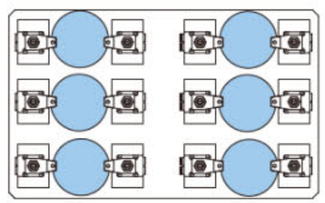
When machining time is short, the percentage of workpiece change time increases. Therefore, productivity lowers when machines are not equipped with a pallet changer. The R450X1 eliminates waste in workpiece change time to provide high productivity.

Machining time ratio
E.g.) Machining time: 60 s, workpiece change time: 15 s



Example 3 When workpiece change time is long ～ Multiple parts machining ～

Ample time is taken for workpiece change when the number of workpieces to be changed is large, such as when performing multiple parts machining. Time may also be taken for sufficient jig washing to reduce the influence of chips. Even in these situations, the R450X1 can provide high productivity.



Example 4 Handling multiple machines ～ Promotion of manpower saving ～

As workpieces on one pallet can be changed while machining workpieces on the other pallet, multiple machines can be handled by one operator, contributing to manpower savings.

Brother's original high productivity technology

Simultaneous operation

The machine is equipped with a simultaneous operation function where the XY and additional axes are positioned and tools are changed simultaneously when the QT table turns. This does not waste any pallet change time, enabling non-stop machining in our quest for "Wasted time = Zero".

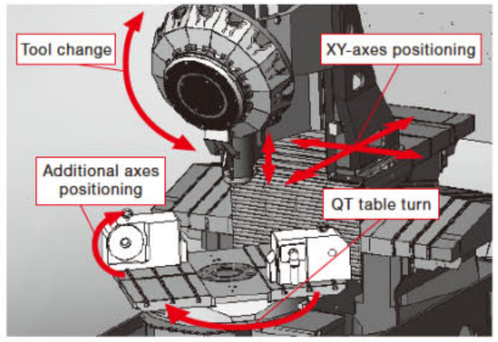
Without simultaneous operation

Pallet change | Tool change | Positioning

With simultaneous operation

Pallet change
Tool change
Positioning

Reduced by approx.3s



Spindle start / stop

Using a fast acceleration/deceleration spindle motor achieves quicker starting and stopping of the spindle. Tool change is completed without stopping the Z-axis.

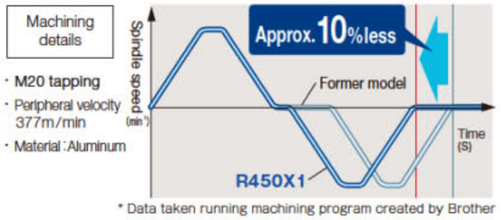
Spindle start / stop time **0.15s**

* Data taken using high-torque specifications

Highly-responsive servo motor

Delay in response has been reduced to almost "zero" by increasing the responsiveness of the servo motor. For example, synchronized tapping, the fastest in the world, is completed within much shorter time.

Comparison of tapping cycle time



* Data taken running machining program created by Brother

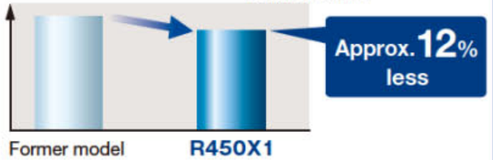
Reduction in non-cutting time

Non-cutting time is further reduced by increasing the responsiveness of the servo motor and eliminating wasted time in a variety of areas.

* Non-cutting time: Period of no cutting, such as during positioning or tool change

Non-cutting time

* Data taken running machining program created by Brother



Usability through machine/ controller integrated development

Next generation CNC controller

The machine is equipped with the new "CNC-C00" user-friendly NC controller created through machine/controller integrated development. In addition to shortcut keys, waveform display, operation log and network function, the controller includes functions that make operation of pallet changer machines easier.

Shortcut keys

Open the screen you want to view quickly.

USB interface

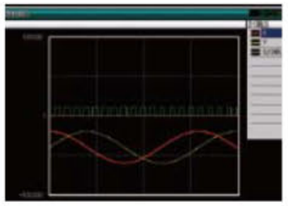
Input or output data easily.

Network function

High capacity program data can be transferred via Ethernet at high speed. The standard memory capacity is 100 Mbytes (max. 500 Mbytes).

Waveform display

Check the torque of the spindle motor etc. as a waveform.



Tap return function

Releases the tool caught in the workpiece due to a power failure during tapping.

PLC function

Standard equipped with PLC. Input and output points can be extended to up to 1024 points each (Optional).

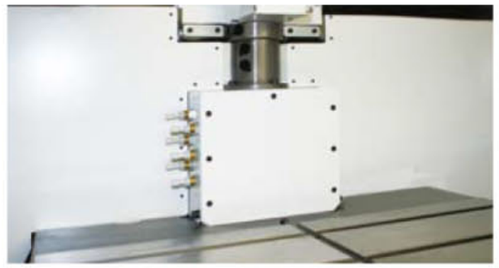
Column movement when changing tools

When changing tools manually, the column can be moved to a position tools can be removed easily.

Outside index rotation switch (Optional)

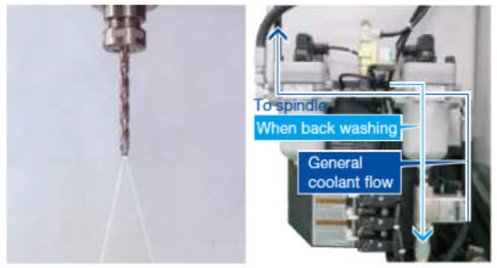
The index table on the outer pallet can be operated. This makes workpiece removal and attachment easier when workpieces are attached to multiple positions.

Optional attachments



Hydraulic rotary joint (4P) / Pneumatic relay box (12P)

12 pneumatic ports and 4 hydraulic ports have been prepared so that jigs that use pneumatic or hydraulic pressure can be mounted easily.
* When using the hydraulic rotary joint, the Y-axis travel becomes 290 mm.



Coolant Through Spindle (CTS)

1.5 Mpa CTS is effective for deep drilling and high-speed machining.The back washing system automatically washes the filter to prevent it from clogging, enabling longer continuous operation without filter replacement.
* Please consult Brother for use of 3 MPa CTS.

Work light (1 or 2 lamps) / Table light (LED)

LED lamps are used for the work light and table light,providing longer life and saving energy.

Tool washing (air-assisted type)

New air-assisted type tool washing with higher discharge pressure provides higher chip removal capacity. Stable washing power is achieved, without being affected by filter clogging.

Side door (with transparent window)

This makes setup or tool change from the side easier. It is possible to operate the manual pulse generator through the side door and check the machining room through the lighting window.
* Standardly equipped with 22 tool magazine model.

Automatic oil lubricator / Automatic grease lubricator

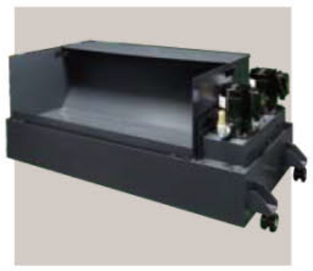
Regularly applies oil or grease to all lubricating points on the three axes.
* Manual greasing applies to the standard specification model.

Turning diameter enlargement (D1,100mm)

A wider jig area can be secured by enlarging the QT table turning diameter.
* The column moves to a safe position before the QT table turns.

Automatic door (motor-driven)

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



Coolant unit

Can be selected from 100L or 150L, depending on the purpose.

Indicator light (1,2, or 3 lamps)

LED lamps are used. There are no bulbs to burn out, making it completely maintenance free.

Manual pulse generator

Manual pulse generator with a cable makes operation through the maintenance window easier.

Cleaning gun

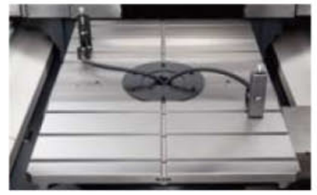
Helps clean the workpiece or chips inside the machine after machining.

Spindle override

Spindle speed can be changed without changing the program.

Outer index switch

This switch enables operation of the outer index table.

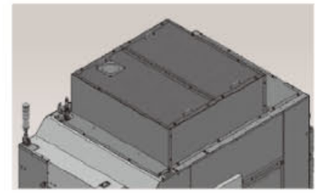


Tool breakage detector(tough type)

A touch switch type tool breakage detector is used. Installed on each pallet.

Side cover (transparent board type)

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

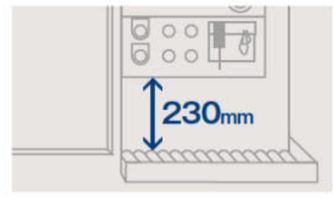


Top cover

This cover prevents the mist from getting out of the machine. There is also a hole a mist collector.

RS232C (25 pin) for control box

A 25-pin RS232C connector can be connected to the side of the control box.

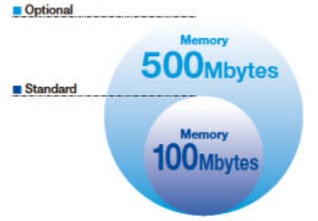


Switch panel (6 holes,10 holes)

The position of the USB memory interface or manual pulse generator can be changed together with the switch hole. This allows more freedom to set-up a roller conveyor.

B-axis cord

Multi-face machining is possible by adding additional axes.



Memory expansion

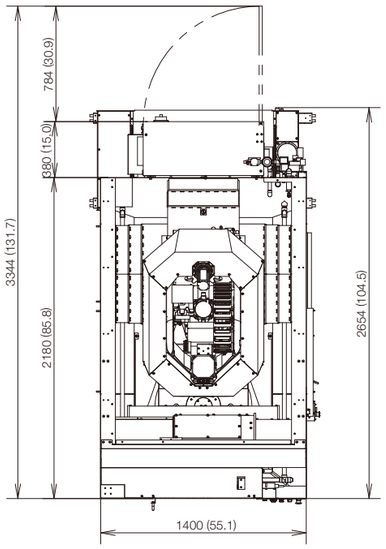
Memory can be expanded to up to 500 Mbytes.

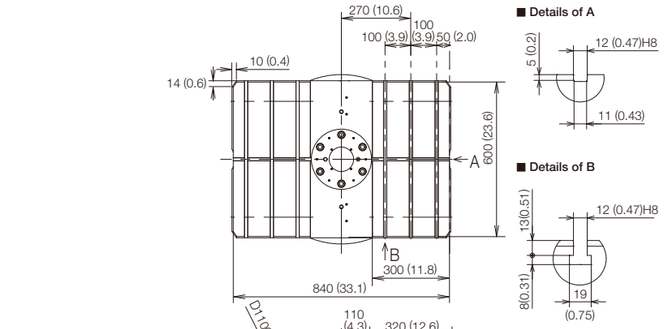
Optional Specifications

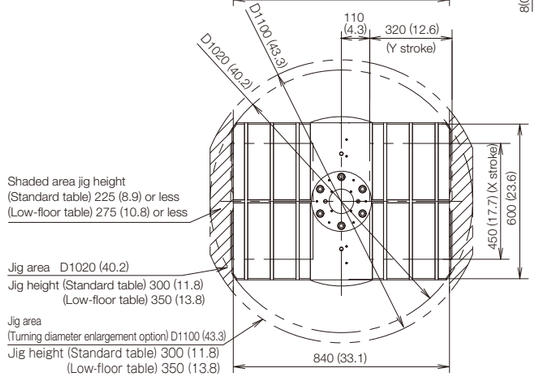
- Coolant unit
  ①100L (with valve and 250W pump)
  ②150L (with chip shower, valve and 250W + 400W pumps)
  ③150L (with chip shower, CTS, valve and 250W + 400W + 650W pumps)
- Coolant Through Spindle (CTS) + Back washing system
- Tool washing (air-assisted type)
- Tool breakage detector (touch type)
- Hydraulic rotary joint (4P) + Pneumatic relay box (12P)
- Pneumatic relay box (12P)
- Cleaning gun
- Automatic oil lubricator
- Automatic grease lubricator
- LED type work light (1 or 2 lamps)
- Table light
- Indicator light (1, 2, or 3 lamps)
- Automatic door (motor-driven)
- Area sensor
- Specified color
- Manual pulse generator
- B-axis cord
- Spindle override
- Outside index rotation switch
- Turning diameter enlargement (D1,100mm)
- Top cover
- Side door (with transparent window)
- Side cover (transparent board type)
- Memory expansion (approx. 500 Mbytes)
- RS232C (25 pin) for control box
- Expansion I/O board (EXIO board)
  ① EXIO board assembly
  ② Additional EXIO board assembly
- High accuracy mode B II (look-ahead 200 blocks, smooth path offset)
- Submicron command
- Interrupt type macro
- Switch panel (6 holes, 10 holes)
- Fieldbus
  ① CC-Link (remote device station)
  ② PROFIBUS DP (slave)
  ③ DeviceNet (slave)
- PLC programming software (for Windows XP, Vista, and 7)
- Jig shower valve unit
- Grip cover
- Mesh basket for chips

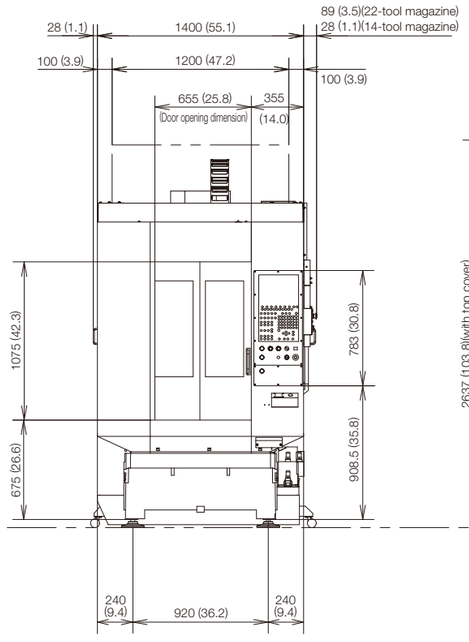
External Dimension

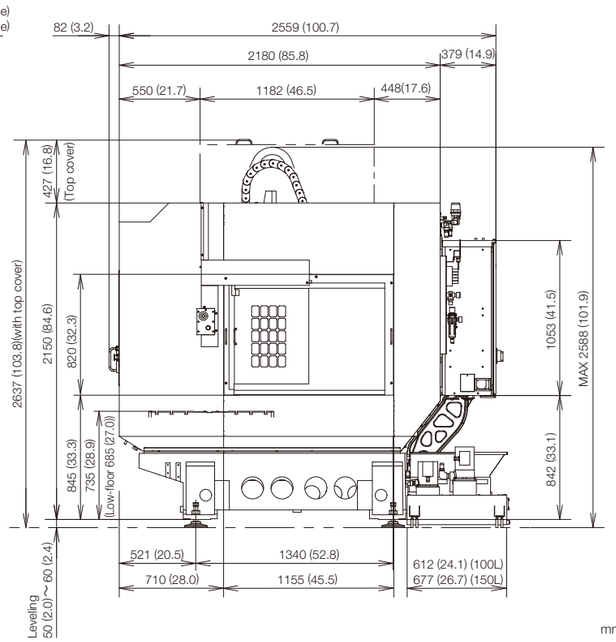
SPEEDIO
R450X1











mm(inch)

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

Machine Specifications and NC Unit Specifications

Machine specifications

Item			SPEEDIO R450X1
CNC Unit			CNC-C00
Travels	X axis	mm(inch)	450(17.7)
	Y axis	mm(inch)	320(12.6) *7
	Z axis	mm(inch)	305(12.0)
	Distance between table top and spindle nose end	mm(inch)	200～505(7.9～19.9) ［250～555(9.8～21.9)］*8
Table	Work area size	mm(inch)	One face 600×300(23.6×11.8)
	Max.loading capacity (uniform load)	kg(lbs)	One face 120(265) ［200(441)］*6
Spindle	Spindle speed	min⁻¹	10,000min⁻¹specifications:10～10,000 16,000min⁻¹specifications(optional):16～16,000 10,000min⁻¹high-torque specifications(optional):10～10,000
	Speed during tapping	min⁻¹	MAX. 6,000
	Tapered hole		7／24 tapered No.30
	BT dual contact system(BIG-PLUS)		Optional
	Coolant Through Spindle(CTS)		Optional
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 1～30,000 (0.04～ 1,181)*9
ATC unit	Tool shank type		MAS-BT30
	Pull stad type *4		MAS-P30T-2
	Tool storage capacity	pcs.	14／22
	Max. tool length	mm(inch)	200 (7.9)
	Max. tool diameter	mm(inch)	80 (3.1)
	Max. tool weight *1	kg(lbs)	3.0 (6.6) 〈total tool weight : 25 (55.1) for 14 tools, 40 (88.2) for 22 tools〉
	Tool selection method		Random shortcut method
Tool change time *5	Tool To Tool	sec.	0.8／0.9 (14 tool / 22 tool)
	Chip To Chip	sec.	1.6／1.7 (14 tool / 22 tool)
	Cut To Cut	sec.	1.3／1.4 (14 tool / 22 tool)
Electric motor	Main spindle motor (10min / continuous)*2	kW	10,000min⁻¹specifications:10.1／6.7 16,000min⁻¹specifications:7.4／4.9 10,000min⁻¹high-torque specifications :12.8／8.8
	Axis feed motor	kW	1.0 (X,Y)、1.8 (Z)
Power source	Power supply		AC V±10%、50/60Hz±1Hz
	Power capacity (continuous)	kVA	10,000min⁻¹specifications:9.5 16,000min⁻¹specifications:9.5 10,000min⁻¹high-torque specifications :10.4
	Air supply — Regular air pressure	MPa	0.4～0.6 (recommended value : 0.5MPa) *10
	Air supply — Required flow	L/min	50
Machining dimensions	Height	mm(inch)	2,588 (101.9)
	Required floor space[with control unit door open]	mm(inch)	1,400×2,654 ［3,344］ (55.1×104.5 ［131.7］)
	Weight	kg(lbs)	2,700 (5,954)
Accuracy *3	Accuracy of bidirectional axis positioning(ISO230-2:2006)	mm(inch)	0.006～0.020 (0.00024～0.00079)
	Repeatability of bidirectional axis positioning(ISO230-2:2006)	mm(inch)	Less than 0.004 (0.00016)
Standard accessories			Instruction Manual (1 set), anchor bolts (4 pcs.), leveling bolts (4 pcs.)

*1. Actual 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 Brother for details.*4. Brother specifications apply to the pull studs for CTS. *5. Measured in compliance with JIS B6336-9 and MAS011-1987. *6/ Can be increased up to 200 kg (one face) by changing the parameter. Please consult us separately.*7/ When using the hydraulic rotary joint, the Y-axis travel becomes 290 mm.*8/ Values when the low-floor table is selected *9. When using high accuracy mode B. *10. 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 *11/ When the turning diameter enlargement option is selected.

NC unit specifications

Item	
CNC model	CNC-C00
Control axes	7axes(X,Y,Z, 4 additional axes)
Simultaneously controlled axes	Positioning 5 axes(X,Y,Z,A,B)
	Interpolation — Linear:4 axes(X,Y,Z one additional axis)
	Interpolation — 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
No.of registrable programs	4,000 (Total capacity of program and data bank)
Program format	NC language, conversation (changed by parameter) conversion from conversation program to NC language program 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.

Quick turn table specifications

Type		0 deg./180 deg. turntable system
Table dimension	mm(inch)	One face 600 x 420 (23.6 x 16.5)
Max. turning diameter	mm(inch)	D1,020(40.2) [D1,100 (43.3)] *11
Max. jig height	mm(inch)	300(11.8) [350(13.8)] *8
Table work area size	mm(inch)	One face 600 x 300 (23.6 x 11.8)
Max. loading capacity	kg(lbs)	One face 120 (265) [200(441)] *6
Rated table load inertia for turning axis	kg·m²	One face 14.2 [23.5] *6
Table turning system		AC servo motor (1kW) Worm gear (total speed reduction ratio:1/50)
Table position time	sec	2.9 *12
Table change repeatability	mm(inch)	0.01 (0.0004) (in the X,Y, and Z axes directions 270(10.6) from the center of rotation)

*12/ When table loading on one face is 120kg
* Quick turn table is a turntable type 2-face pallet changer

Standard NC functions

- Absolute / incremental
- Inch / metric
- Corner C / Corner R
- Rotational transformation
- Synchronized tap
- Coordinate system setting
- Dry run
- Restart
- Backlash compensation
- Pitch error 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
- Standby mode (energy saving function)
- Chip shower off delay
- Tap return function
- Automatic work light off (energy saving function)
- Automatic workpiece measurement *1
- Heat expansion compensation systemII (X,Y,Z axes)
- Automatic power off (energy saving function)
- Automatic coolant off (energy saving function)
- Tool washing filter with filter clogging detection
- Waveform display
- Operation level
- External input signal key
- High accuracy mode BI (look-ahead 30blocks)

NC

- 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

Conversation

- Operation program
- Schedule program
- Automatic tool selection
- Automatic cutting condition setting
- Automatic tool length compensation setting
- Automatic cutter compensation setting
- Autma ic calculation of unknown number input
- Machining order control

Optional NC functions

- Memory expansion (Approx. 500 Mbytes)
- High accuracy mode BII (look-ahead 200 blocks, smooth path offset)
- Spindle override

NC

- Submicron command *2
- Interrupt type macro

*1. Measuring instrument needs to be prepared by users.
*2.When the submicron command is used, changing to the conversation program is disabled.
*Functions listed under (NC) and (Conversation) are available only for NC programs and conversation programs respectively.