

### 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.**  
**Machine Tools Bengaluru Technical Center**  
Park Landing, Ground Floor, Municipal No.5AC-709, 2nd Block, HRBR Extension,  
Bengaluru - 560 043 Karnataka, India  
PHONE:(91)80-43721645

#### China

**BROTHER MACHINERY (SHANGHAI) LTD.**  
**(MACHINE TOOLS DIV.) SHANGHAI TECHNICAL CENTER**  
Unit 01, 5/F., No.799, 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

#### 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

#### India

**BROTHER INTERNATIONAL (INDIA) PVT LTD.**  
**Machine Tools Gurugram Technical Center**  
CE SERVICED OFFICES PVT. LTD., DLF CYBER HUB, Building No 10, Tower A, Level 1,  
Phase 3,DLF Cyber City,Gurugram - 122002 Haryana - India  
PHONE:(91)80-43721645

#### 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

Figures in brackets ( ) are the country codes.

- For safe use of our machines, please read the instruction manual and safety manual before commencing operation. When using oil-based coolant or processing workpieces made of materials (e.g. magnesium, resin) that may be ignited, take adequate safety measures to prevent fire. Please consult your local distributor if you have any questions.
- Leave 700 mm between machines as a maintenance space.
- When exporting our machine together with additional 1-axis rotary table or compound rotary table (including case that a rotary table is scheduled to be installed overseas), the machine is deemed to be included in the "applicable listed items" controlled by the Foreign Exchange and Foreign Trade Law of Japan. When exporting the machine, please obtain required permissions, including an export license, from the Ministry of Economy, Trade and Industry (METI) or Regional Bureaus of Economy, Trade and Industry before shipment. When re-selling or re-exporting the machine, you may need to obtain permissions from METI, and the government of the country where the machine is installed.
- When exporting our machine together with compound rotary table (including case that a rotary table is scheduled to be installed overseas), as a machine conforming to Row 2 of Appended Table 1 of Export Trade Control Order, a relocation detection device is installed on the machine depending on the destination country. After relocating the machine with the detection device, the machine is locked and any operation is temporarily impossible. Please inform your local distributor of machine relocation in advance and apply to perform the release operation of relocated machine.
- In order to operate our machine with an additional axis rotary table installed separately overseas after exporting the machine, the procedure to activate the axis of rotary table is needed. Please inform your local distributor of these processes in advance, because the predetermined procedure is required to perform the activation. In addition, for export to "non-white countries (excluding some countries and regions)", it is not possible to install a compound rotary table separately overseas after exporting the machine. Please make sure to obtain the export license of the machine together with compound rotary table before shipment.

Specifications may be subject to change without any notice.

**brother**

**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>





# New SPEEDIO Model Challenging New Areas of Compact Machining Centers



While the applicable range of compact machining centers is spreading, "our enthusiasm to further approach a high-end model machining level " has taken shape. "High machining capabilities" have been achieved, in addition to "high productivity" features of SPEEDIO series.



## **SPEEDIO** **F600X1**

### Basic specifications

Max. spindle speed (min <sup>-1</sup> )	10,000 high-torque
Travels (mm)	X:600、Y:400、Z:350
Tool storage capacity (pcs.)	14 / 22
Rapid traverse rate (m/min)	X / Y / Z 50 / 50 / 50
Required floor space (mm)	1,860×2,654
BT dual contact spindle (BIG-PLUS)	Optional
Coolant Through Spindle (CTS)	Optional



## High rigidity

### Highly rigid machine structure

The machine structure has been reviewed from the basics, utilizing structural analysis techniques. Using optimal element components has enabled the machine to feature the highest rigidity in the SPEEDIO Series.

#### Machine structure

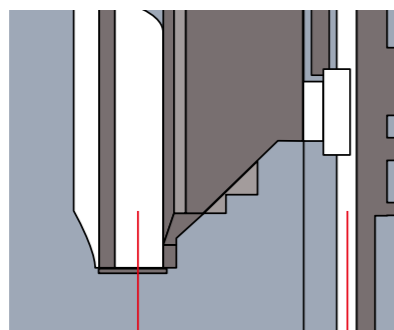
The highest rigidity ever has been achieved by moving the table only by the Y-axis and using column movement for the X- and Z-axes, and reducing the spindle head overhang.

#### Highly rigid spindle

Spindle bearings larger than those of other models are used to improve spindle rigidity.

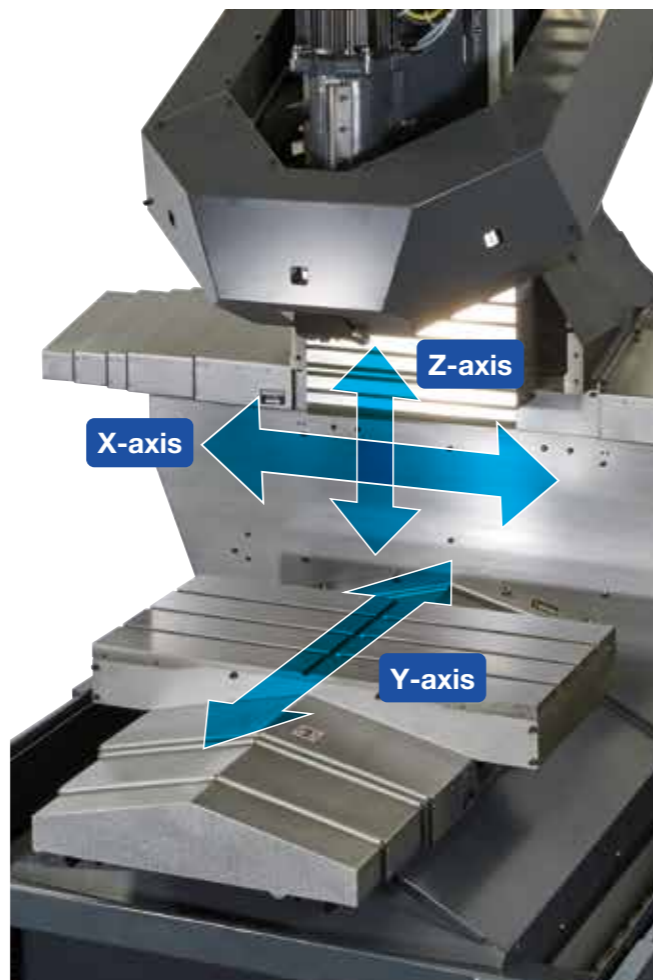
#### Highly rigid guide

Larger guides are used to improve the guide rigidity of each axis.



Reduction in overhang

### Machine structure that achieves high rigidity

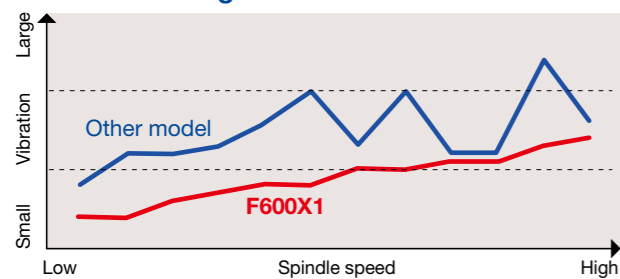


## Stability

### Wide stable range

Minimizing vibration makes it possible to set a wide range of machining conditions, enabling machining under higher conditions. This leads to a reduction in machining time.

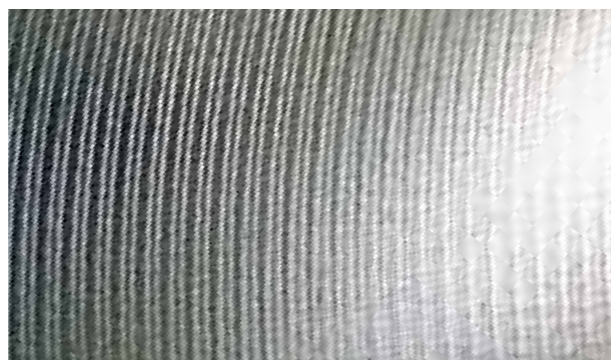
#### Vibration image



\* Example of measurement using tools and machining conditions prepared by Brother

### Stable machining

Minimizing vibration makes it possible to obtain stable machined surface quality even when machining over long lengths. This leads to extended service life of tools.

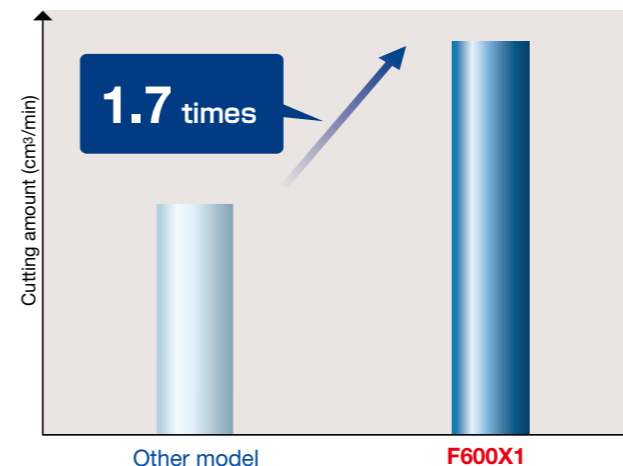


## High machining capabilities

### SPEEDIO's highest level machining capabilities

Cutting amount has significantly increased.

- Machining example : End mill  $\phi 16$ , Workpiece : Carbon steel



\*Data varies depending on the tools and machining conditions.

### High-power spindle motor

The highest class high-torque motor among spindle motors used for #30 spindle machines is standard equipped.

#### Spindle motor characteristics

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

Max. output : **26.2kW**



### Machining capabilities

	ADC	Cast iron	Carbon steel
<b>Drilling</b> Tool diameter mm(inch) × Feed mm(inch)/rev	D40×0.2 (D1.57×0.008)	D34×0.15 (D1.34×0.006)	D30×0.1 (1.18×0.004)
<b>Tapping</b> Tool diameter mm(inch) × Pitch mm(inch)	M39×4.0 (1 1/2-6UNC)	M33×3.5 (1 1/4-7UNC)	M27×3.0 (1-8UNC)
<b>Facing</b> Cutting amount cm³/min (inch³/min)	1,800 (109.8)	300 (18.3)	255 (15.5)

\*Date obtained from tests conducted by Brother.

## Optimal operation control

### Non-stop ATC

Fastest tool change has been achieved by optimizing and increasing the speed of the spindle start/stop, Z-axis up/down, and magazine operation.

#### 22- tool magazine

Tool-Tool : **0.8s**

Chip-Chip : **1.7s**

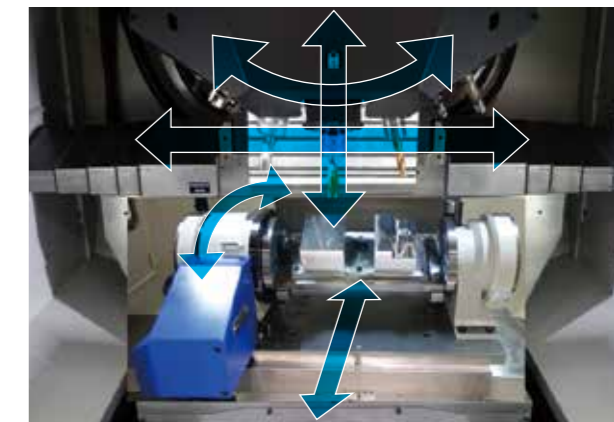
#### 14- tool magazine

Tool-Tool : **0.7s**

Chip-Chip : **1.6s**

### Simultaneous operation control

Further reduction in wasted time has been achieved by simultaneously performing tool change and positioning X/Y and additional axes.



## Table size and loading capacity

### Size and loading capacity equivalent to high-end models

Travels

**X: 600 Y: 400**

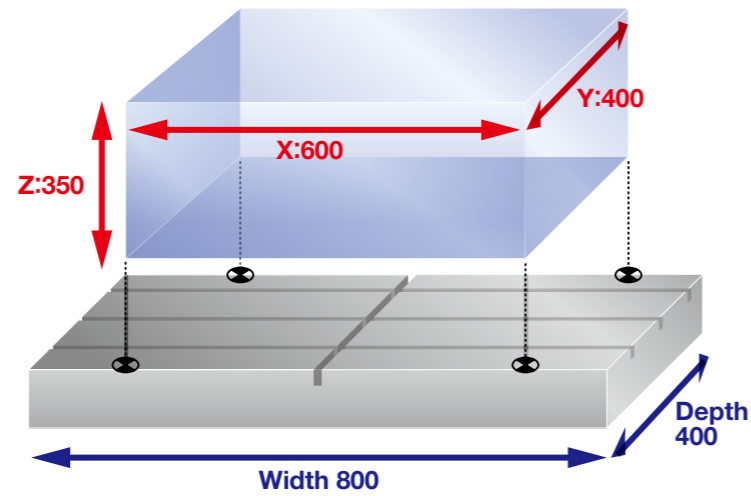
Work area size

**X: 800 Y: 400**

Max. loading capacity

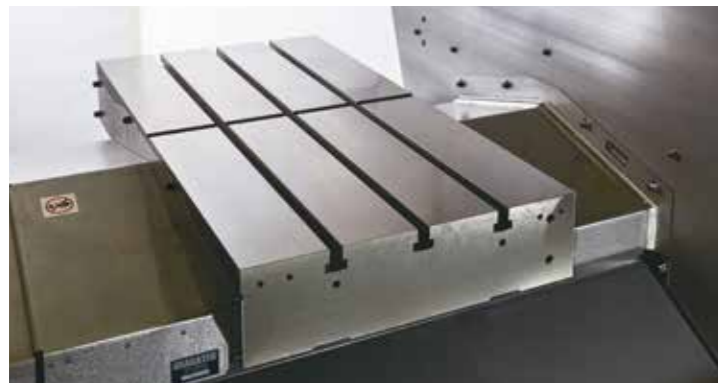
**500kg**

\*The parameter must be changed.



### Improved table rigidity

As the structure below the table has been simplified due to the axes configuration, the table thickness was increased to improve rigidity. A maximum loading capacity of 500 kg has been achieved, and table deformation minimized.



### Door opening width

Wide door opening width secured to make workpiece removal and attachment easier



### Additional axis (optional)

Even a heavy jig using the T-200 exclusively for the SPEEDIO can easily be loaded.

### Rotary table T-200



#### Feature 1 High productivity

High acceleration and fast rotation ensure smooth operation even for jigs with a large unbalanced load.

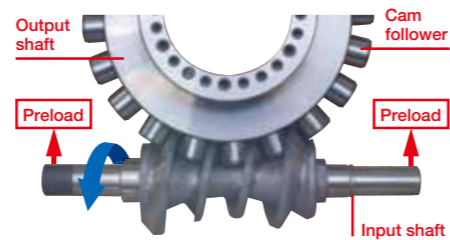
#### Feature 2 High accuracy

Preload applied between the input shaft and the output shaft achieves zero-backlash.

#### Feature 3 Extended service life

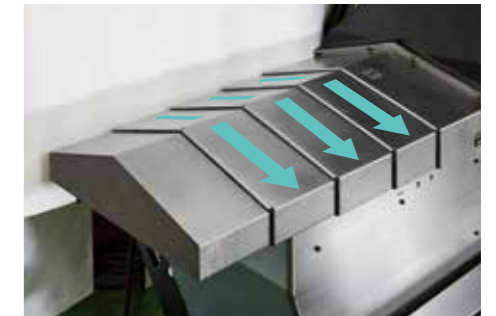
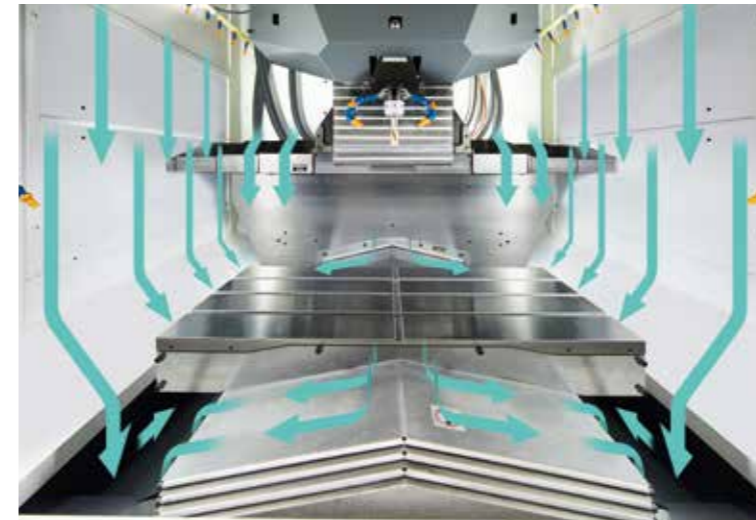
As very little abrasion on the input shaft and output shaft occurs due to rolling contact, adjustment is unnecessary for long periods.

#### Use of roller gear cam mechanism



## High reliability

Chip discharge performance has been improved along with the expansion of the machining area. In addition, the machine is equipped with a variety of functions, such as air-assisted tool washing, to improve reliability.



### Roof-shape telescopic cover

Roof-shape telescopic covers are used for the X- and Y-axes to discharge chips rapidly.

### Coil conveyor (optional)

Long and difficult-to-flow chips can be discharged smoothly, and steel chips can also be discharged reliably, avoiding accumulation.



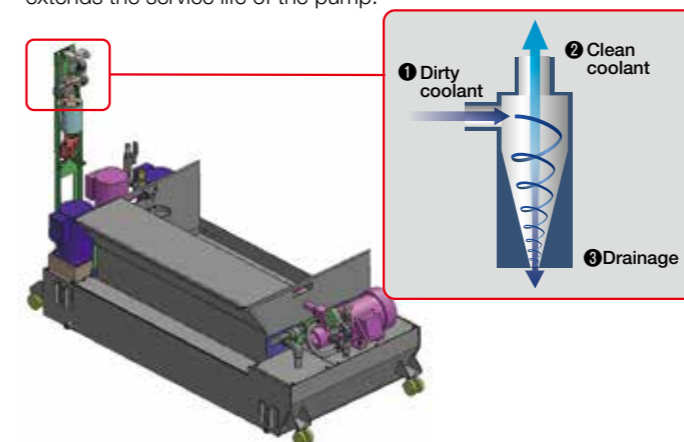
### Chip conveyor (optional)

Used with a coil conveyor. Any chips can be discharged reliably.



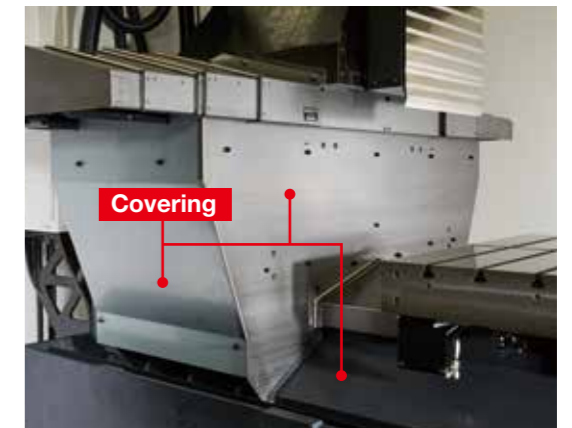
### Tank with cyclone filter (special option for CTS)

Coolant is returned to a clean tank through a tank with a cyclone filter with fine chips removed. This reduces the filter change frequency and extends the service life of the pump.



### Measure for chips entering

The cast metal section is fully covered to prevent chips entering.



## NC unit

The machine is equipped with our original "CNC-C00 Series" controller, created through machine/controller integrated development.

### Equipped with tool monitoring functions

#### ■ ATC monitoring

The presence of a spindle tool is detected without using a sensor.

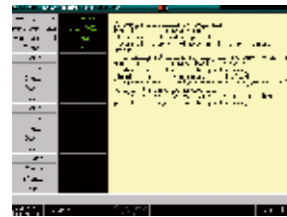
#### ■ High-accuracy mode BII (read-ahead 200 blocks)

High-speed and highly accurate three-dimensional machining is performed by looking 200 blocks ahead. A smooth path offset function that improves machining quality is also available.



#### ■ Motor insulation resistance measurement function

Detects motor failure in advance

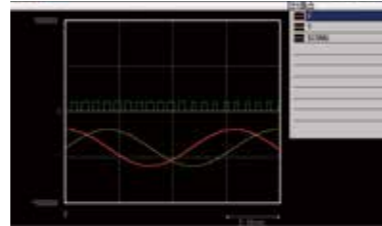


#### ■ Screenshot

The screen currently displayed on the NC unit can be captured. This helps to quickly create operational procedures, etc.

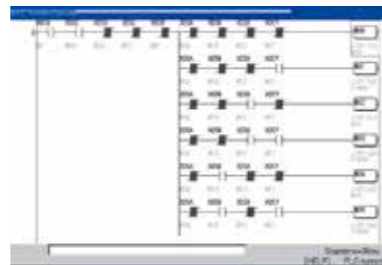
#### ■ Waveform output to memory card

Torque waveform data can be output to a memory card (CSV format).



#### ■ PLC function

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



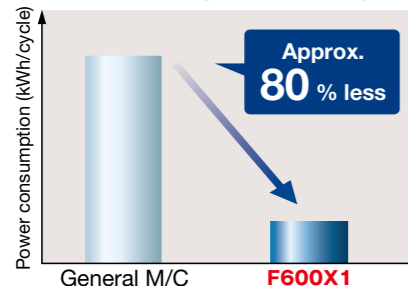
#### ■ Control box size

Space has been increased for system expansion in case of automation etc.

## High environmental performance

In addition to low power and air consumption, the machine is equipped with a power regeneration system and a variety of energy saving functions, achieving high environmental performance.

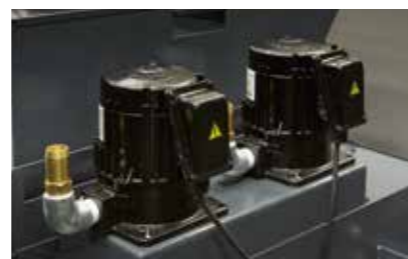
### Power consumption for one cycle



\* Data taken running machining program created by Brother



LED work light (optional)



Energy saving pump

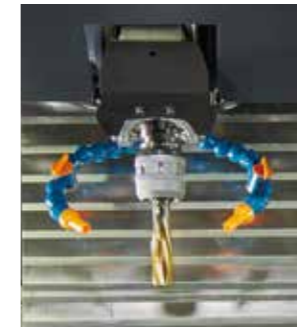
### ■ Earth-friendly machine equipped with a variety of energy-saving functions

- **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.



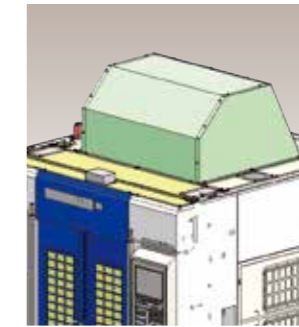
#### Coolant unit

Various tanks are available depending on the purpose. (Photo: Chip conveyor tank.)



#### Head coolant nozzle

Synchronized with the head to reliably discharge coolant to the cutting tool.



#### Top cover

This cover prevents the mist leaking from the top of the machining room. There is also a hole for a mist collector.



#### Manual pulse generator

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



#### 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.



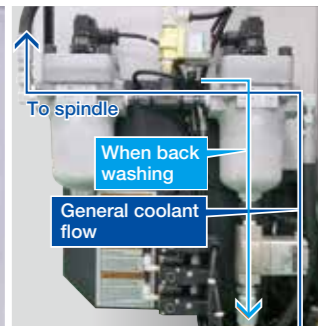
#### Automatic door (motor-driven)

A motor-driven door is used, achieving smooth operation.



#### Coolant Through Spindle (CTS)

1.5 MPa CTS is ideal 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 separately for 3 MPa CTS.



#### Cleaning gun

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



#### Tool breakage detector (touch type)

A touch switch type tool breakage detector is used.



#### 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.



### Optional Specifications

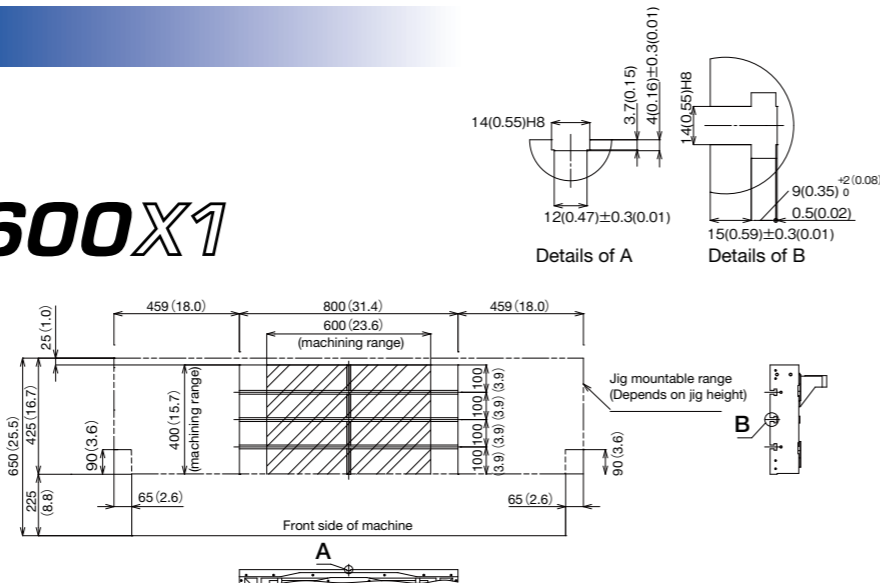
- Coolant unit
  - 250L tank
  - 250L (CTS) tank
  - 250L (CTS with cyclone) tank
  - Chip conveyor tank
  - Chip conveyor (CTS) tank
  - Chip conveyor (CTS with cyclone) tank
- Mesh basket for chips
- Head coolant nozzle
- Column coolant nozzle
- Tool washing (air-assisted type)
- Tool breakage detector (touch type)
- Chip shower
- Cleaning gun
- Jig shower valve unit
- Back washing system (for CTS)
- Rotary table T-200
- Automatic oil lubricator
- Automatic grease lubricator
- LED work light (1 or 2 lamps)
- Indicator light (1, 2, or 3 lamps)
- Automatic door (motor-driven)
- Area sensor
- Specified color
- Manual pulse generator
- B-axis cord
- Spindle override
- Grip cover
- Top cover
- Side cover (transparent board type)
- RS232C (25 pin) for control box
- Operation preparation circuit
- 100V outlet (in control box)
- Power supply expansion
- Expansion I/O board (EXIO board)
- ① EXIO board assembly
- ② Additional EXIO board assembly
- Switch pane (8 holes, 10 holes)
- Memory expansion (approx. 500 Mbytes)
- High accuracy mode BII (look-ahead 200 blocks, smooth path offset)
- Anchor plate (anti-vibration rubber)
- Fieldbus
  - ① CC-Link (remote device station)
  - ② PROFIBUS DP (slave)
  - ③ DeviceNet (slave)
- PLC programming software (For Windows® XP, Vista, 7, and 8.1)

\*Please contact your Brother dealer for details.

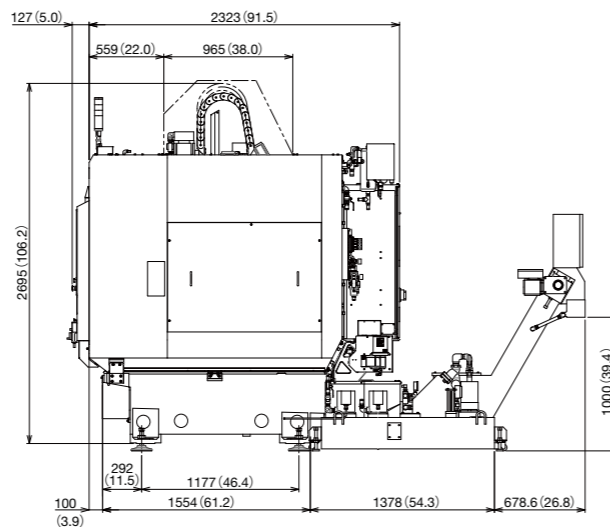
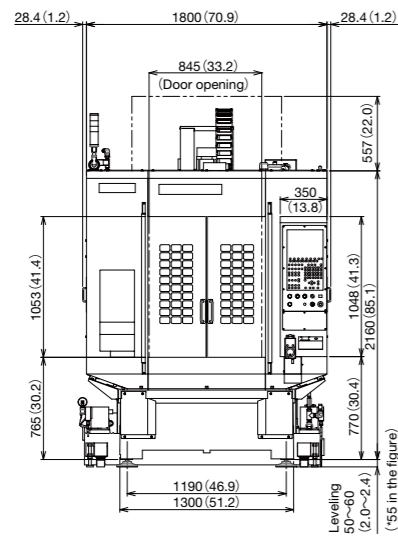
## External dimensions



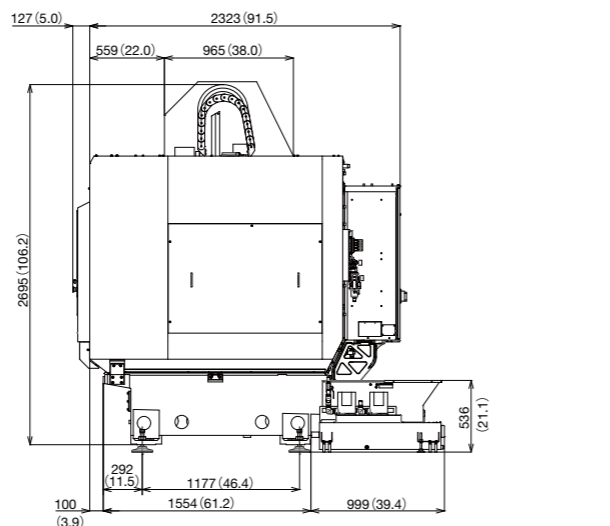
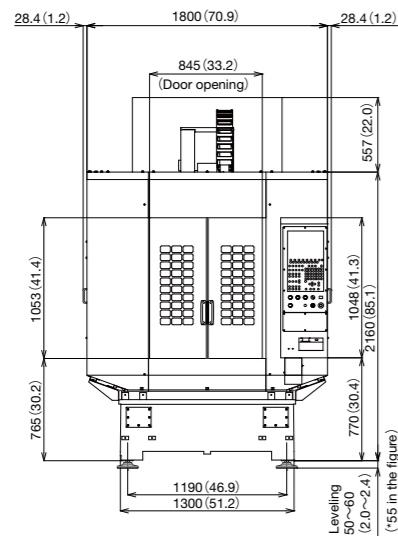
# F600X1



## Chip conveyor specifications



## Standard tank specifications



## Machine Specifications

		F600X1 / F600X1 RD *9	
CNC Unit			CNC-C00
Travels	X axis	mm (inch)	600(23.6)
	Y axis	mm (inch)	400(15.7)
	Z axis	mm (inch)	350(13.7)
Table	Distance between table top and spindle nose end	mm (inch)	200~550(7.8~21.6)
	Work area size	mm (inch)	800x400(31.4x15.7)
Table	Max. loading capacity (uniform load)	kg (lbs)	400(881) [500(1,102) *6]
	Spindle speed	min <sup>-1</sup>	10,000min <sup>-1</sup> high-torque specifications : 1~10,000
Spindle	Speed during tapping	min <sup>-1</sup>	MAX. 6,000
	Tapered hole		7/24 tapered No.30
	BT dual contact system (BIG-PLUS)		Optional
Feed rate	Coolant Through Spindle (CTS)		Optional
	Rapid traverse rate (XYZ-area)	m/min (inch/min)	50x50x50(1,969 x 1,969 x 1,969)
ATC unit	Cutting feed rate	mm/min (inch/min)	X, Y, Z axis : 1~30,000(0.04~1,181) *7
	Tool shank type		MAS-BT30
	Pull stad type *4		MAS-P30T-2
	Tool storage capacity	pcs.	14 / 22
	Max. tool length	mm (inch)	250(9.8)
	Max. tool diameter	mm (inch)	110(4.3) / 125(4.9) No adjacent tool
Tool change time *5	Max. tool weight *1	kg (lbs)	3.0(6.6) / Tool (TOTAL TOOL WEIGHT : 25(55.1) for 14 tools, 40(88.1) for 22 tools)
	Tool selection method		Random shortcut method
Electric motor	Tool To Tool	sec.	0.7 / 0.8 (14 tools / 22 tools)
	Chip To Chip	sec.	1.6 / 1.7 (14 tools / 22 tools)
Power source	Main spindle motor (10min / continuous) *2	kW	10,000min <sup>-1</sup> high-torque specifications : 12.8 / 9.2
	Axis feed motor	kW	X, Y axis : 1.0 Z axis : 1.8
Machining dimensions	Power supply		AC V±10%, 50/60Hz±1Hz
	Power capacity (continuous)	kVA	10,000min <sup>-1</sup> high-torque specifications : 10.4
	Air supply	Regular air pressure	MPa
Accuracy *3	Required flow	L/min	45
	Height	mm (inch)	2,750(108.2)
	Required floor space [with control unit door open]	mm (inch)	1,800x2,465 [3,162] (70.9x97.0 [124.5])
Front door	Machine weight (including control unit and machine cover)	kg (lbs)	3,600 (7,937)
	Accuracy of bidirectional axis positioning (ISO230-2:2006)	mm (inch)	0.006~0.020 (0.00024~0.00079)
Standard accessories	Repeatability of bidirectional axis positioning (ISO230-2:2006)	mm (inch)	Less than 0.004 (0.00016)
			2doors
Standard accessories		Instruction Manual (1 set), anchor bolts (4 pcs.), leveling plates (4 pcs.), machine cover (manual door)	

\*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. \*4. Brother specifications apply to the pull studs for CTS. \*5. Measured in compliance with JIS B6336-9 and MAS011-1987. \*6. Acceleration must be adjusted for Y axis. \*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) \*8. 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. \*9. The machine needs to be equipped with a relocation detection device depending on the destination. Machines equipped with a relocation detection device come with "RD" at the end of the model name.

## NC unit specifications

CNC model	CNC-C00
Control axes	5 axes (X,Y,Z, two additional axes)
Simultaneously controlled axes	Positioning 5 axes (X,Y,Z,A,B)
	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 (Optional)
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

\* "Control axes" and "Simultaneously controlled axes" indicate the maximum number of axes. These are different depending on the destination or specifications.  
\* Ethernet is a trademark or registered trademark of XEROX in the United States.

## 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
  - Rotary fixture offset
  - High-speed processing \*3
  - Feature coordinates setting

## 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)
- Start log
- Machine lock
- Computer remote
- Built-in PLC
- Motor insulation resistance measurement
- Operation log
- Tool monitoring
- Screen shot
- Waveform output to memory card
- Auto notification
- High-accuracy mode AIII
- Tool length measurement
- Tool life management / spare tool
- Background editing
- Graphic display
- Subprogram
- Helical / 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 system II (X,Y,Z axes)
- Tap return function
- Automatic workpiece measurement \*1
- Waveform display
- Operation level
- External input signal key
- High accuracy mode BI (look-ahead 40blocks) (NC)
- Expanded workpiece coordinate system
- Scaling
- Mirror image
- Menu programming
- Programmable data input
- Program compensation
- Tool length compensation
- Cutter compensation
- Macro function
- Local coordinate system
- One-way positioning
- Operation in tape mode (Conversation)
- Operation program
- Schedule program
- Automatic tool selection
- Automatic cutting condition setting
- Automatic tool length compensation setting
- Automatic cutter compensation setting
- Automatic calculation of unknown number input
- Machining order control

\*1. Measuring instrument needs to be prepared by users. \*2. When the submicron command is used, changing to the conversation program is disabled.  
\*3. Minute block processing time can be changed. As there are some restrictions, please contact your local distributor for details.  
\*Functions listed under (NC) and (Conversation) are available only for NC programs and conversation programs respectively.

mm (inch)