Specifications may be subject to change without any notice.

brother

BROTHER INDUSTRIES, LTD.
Machinery Business Division

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Compact Machining Center
SPEEDIO
brother at your side

F600X1

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.

New SPEEDIO Model Challenging New Areas of Compact Machining Centers

SPEEDIO
F600X1

Basic specifications

Max. spindle speed (min⁻¹)	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 rigidity : **60%UP** (Other model)

Spindle rigidity : **50%UP** (Other model)

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.
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.

Machine structure that achieves high rigidity

Z-axis
X-axis
Y-axis
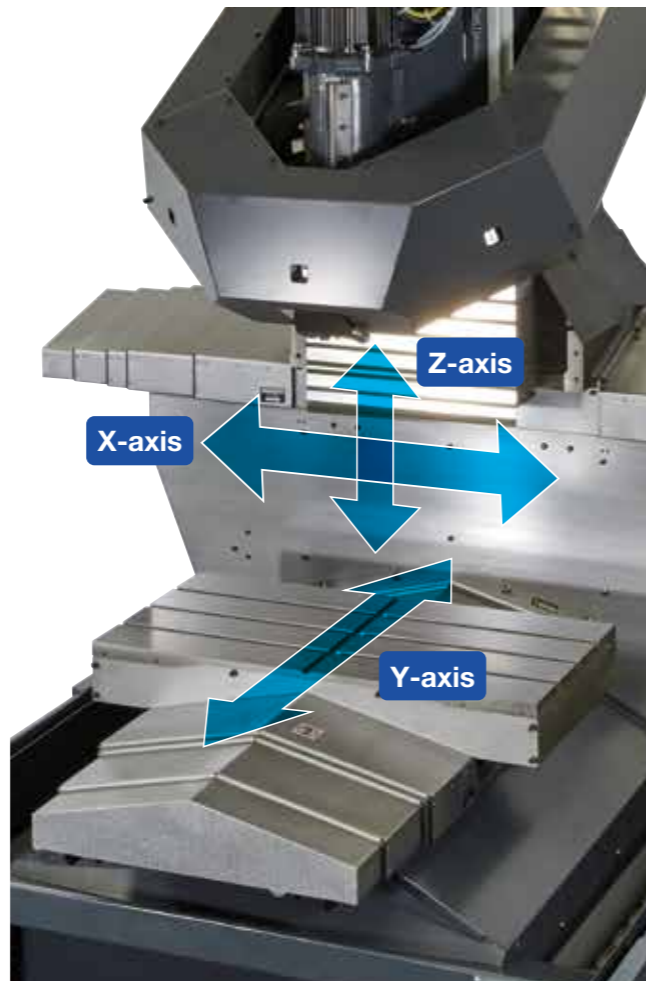
Stability

■ 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

Other model
F600X1

Large — Small (Vibration)
Low — High (Spindle speed)
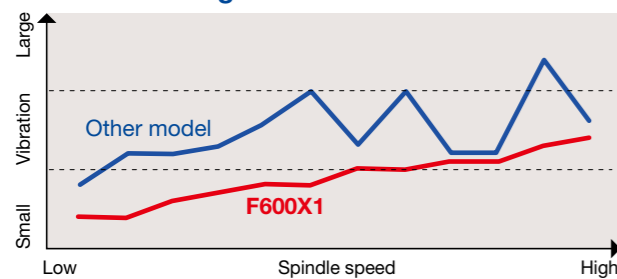
* Example of measurement using tools and machining conditions prepared by Brother

■ 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.
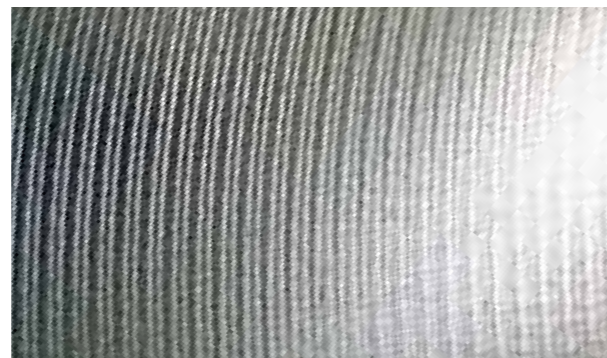
High machining capabilities

■ SPEEDIO's highest level machining capabilities

Cutting amount has significantly increased.
• Machining example : End mill ø16, Workpiece : Carbon steel

1.7 times

Cutting amount (cm³/min)

Other model   F600X1
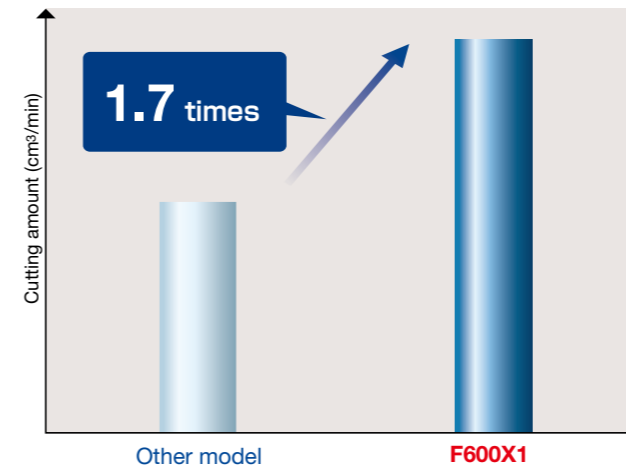
*Data varies depending on the tools and machining conditions.

■ 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
Drilling Tool diameter mm(inch) × Feed mm(inch)/rev		D40×0.2 (D1.57×0.008)	D34×0.15 (D1.34×0.006)	D30×0.15 (1.18×0.006)
Tapping 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)
Facing 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.
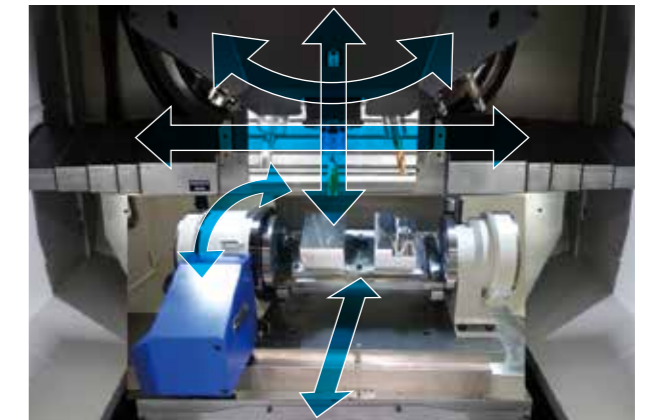
Table size and loading capacity

■ 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 (Standard : 400kg)

*The parameter must be changed.

Y:400
X:600
Z:350
Depth 400
Width 800
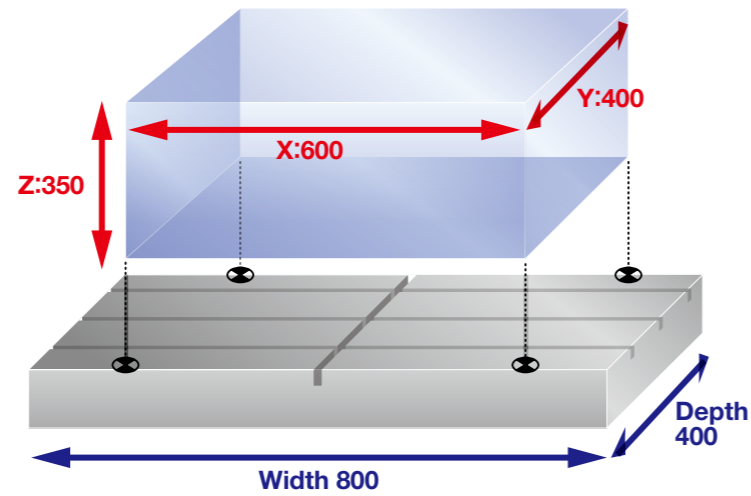
■ Improved table rigidity

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.
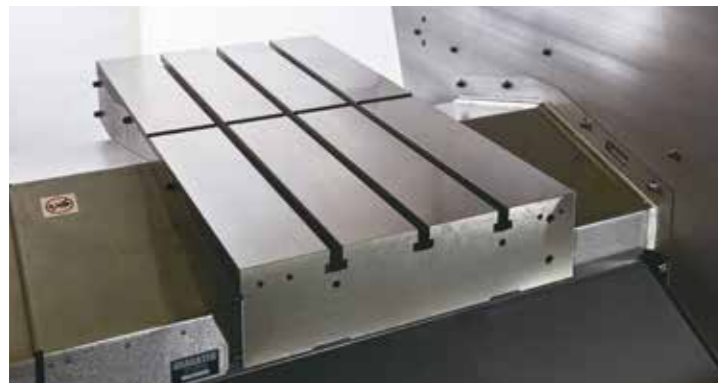
■ Door opening width

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

845

1800

■ Additional axis (optional)

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

Rotary table T-200A

| 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

Output shaft
Cam follower
Preload
Preload
Input shaft

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.
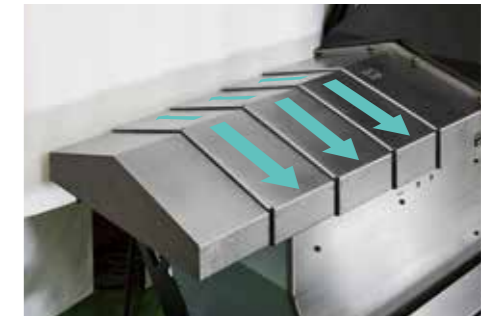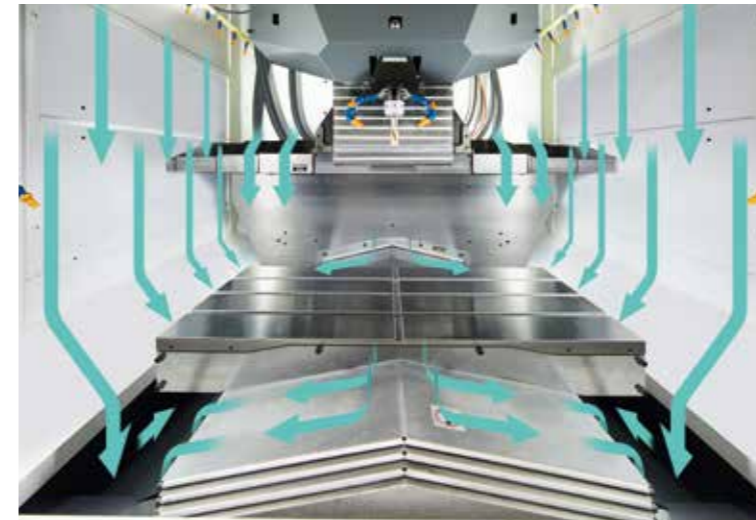
■ Roof-shape telescopic cover

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.
＊ A chip conveyor is required when selecting a coil conveyor.

■ 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.

❶Dirty coolant
❷Clean coolant
❸Drainage
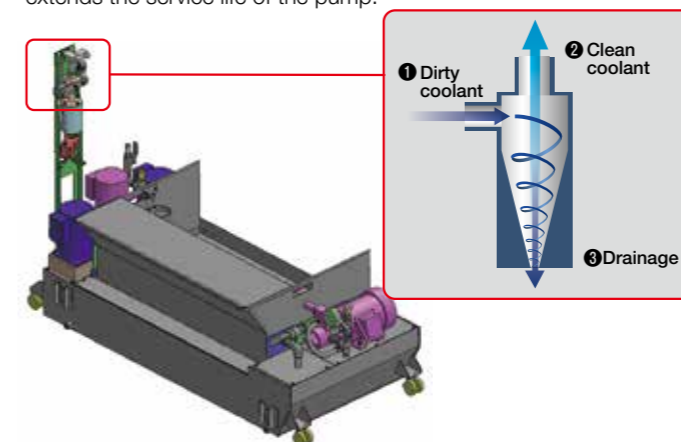
■ Measure for chips entering

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

Covering
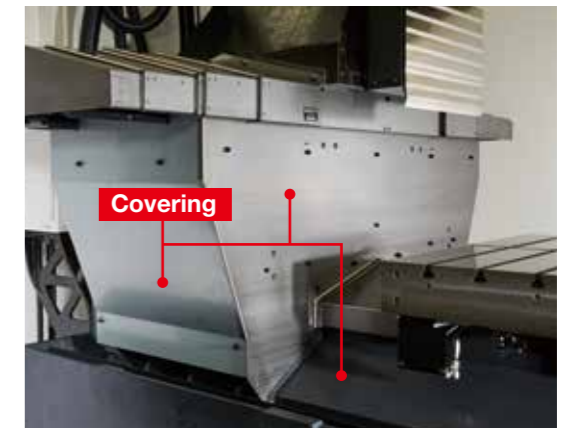
NC unit

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 (look-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
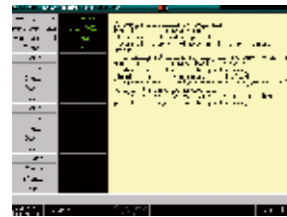
■ Screenshot

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).
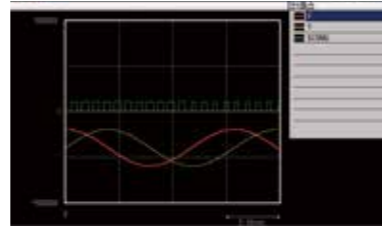
■ PLC function

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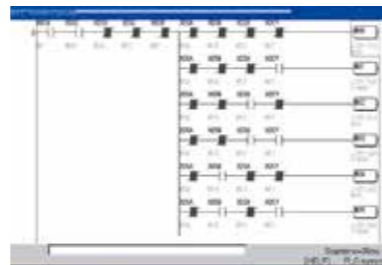
■ Control box size

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

Approx. **80** % less

Power consumption (kWh/cycle)

General M/C   **F600X1**

LED work light (optional)   Energy saving pump

* Data taken running machining program created by Brother

■ 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.

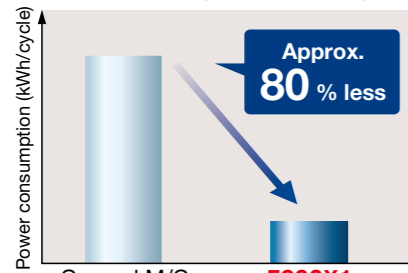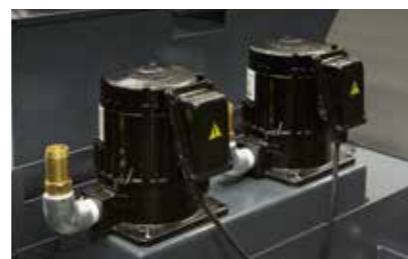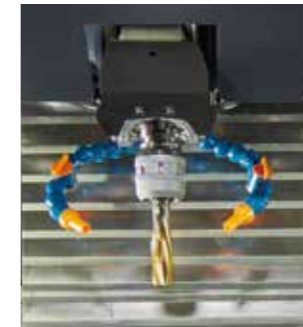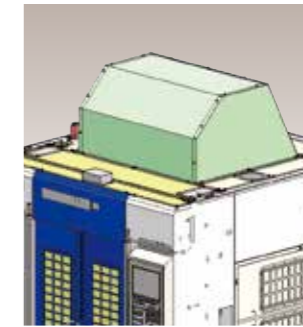**Coolant tank**
Various tanks are available depending on the purpose. (Photo: Chip conveyor tank.)

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 with switch panel 10 holes
A motor-driven door is used, achieving smooth operation.

Coolant Through Spindle
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.

To spindle

When back washing

General coolant flow
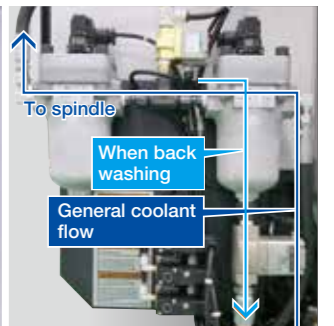
Cleaning gun
Helps clean the workpiece or chips inside the machine after machining.

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.

＊Depending on the type of coolant, it may have a significant influence on the machine lifecycle. It is recommended to use the coolant which is commercially designated as high lubricity, for example Emulsion type. Especially, the coolant of chemical solution type (ex. Synthetic type) is prohibited to use, because it may cause machine damages.
＊When using CTS (Coolant Through Spindle) function, usage of the coolant of combustible type (ex. Oil-based type) is prohibited.

Optional Specifications

● Coolant tank	● Tool washing, air-assisted type	● Additional axis cable for 1 axis	● High accuracy mode BII, look-ahead 200
① Coolant tank, 250L	● Tool breakage detector, touch type	● Spindle override	blocks, with smooth path offset
② Coolant tank, 250L for CTS 1.5MPa	● Chip shower	● Grip cover for tool magazine	● Breaker handle cover
③ Coolant tank, 250L for CTS 1.5MPa with	● Cleaning gun	● Top cover	● CC-Link, master station
cyclone filter	● Fixture shower valve unit	● Side cover with transparent window	● CC-link, remote device station
④ Chip conveyor tank, 400L	● Back washing system	(single side, both sides)	● PROFIBUS DP, slave
⑤ Chip conveyor tank, 400L for CTS	● Rotary Table T-200A	● RS232C 25pin connector at control box	● DeviceNet, slave
1.5MPa	● Automatic oil lubricator	● Master on circuit	● PLC programming software for Windows®
⑥ Chip conveyor tank, 400L for CTS	● Automatic grease lubricator	● 100V outlet in control box	Vista, 7, and 8.1
1.5MPa with cyclone filter	● Work light, 1 or 2 lamps	● Power supply expansion 50A	
● Coolant Through Spindle (CTS) 1.5Mpa	● Signal light, 1, 2, or 3 lamps	● EXIO board assembly	＊Windows® is a trademark or registered trademark of
● Chip auger	● Automatic door with switch panel 10 holes	EXIO board, input32/output32, additional #1	Microsoft Corporation in the United States and/or other
● Mesh basket for collecting chips	● Area sensor	EXIO board, input32/output32, additional #2	countries.
● Head coolant nozzle	● Specified color	● Switch panel 8 or 10 holes	
● Column coolant nozzle	● Manual pulse generator	● Memory expansion 500 Mbytes	

External dimensions

F600X1

Details of A | Details of B

Jig mountable range (Depends on jig height)

Front side of machine
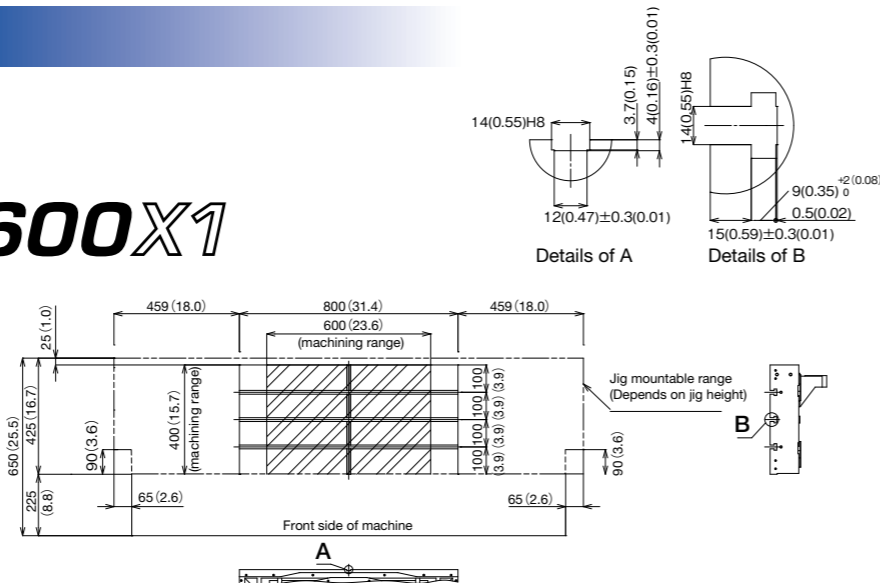
Chip conveyor specifications
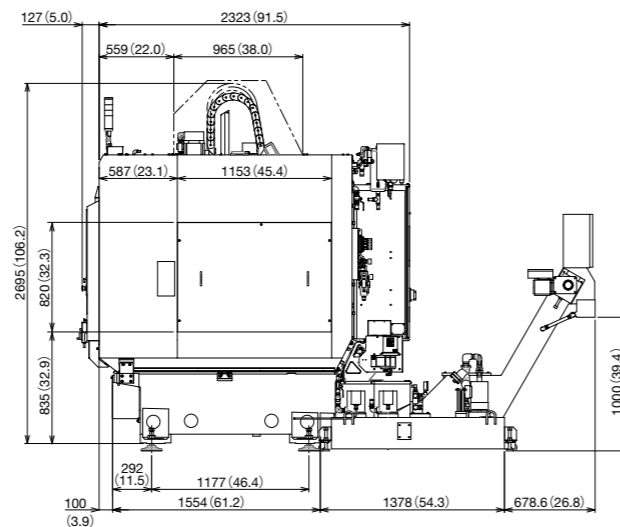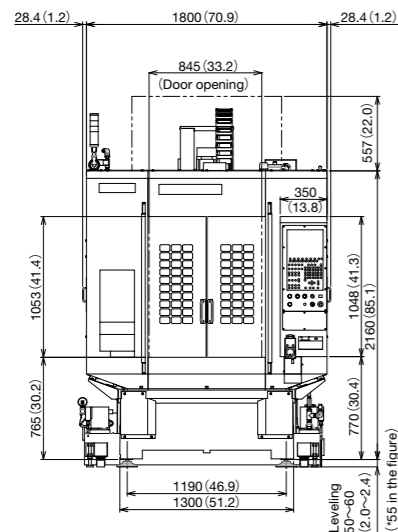
Standard tank specifications
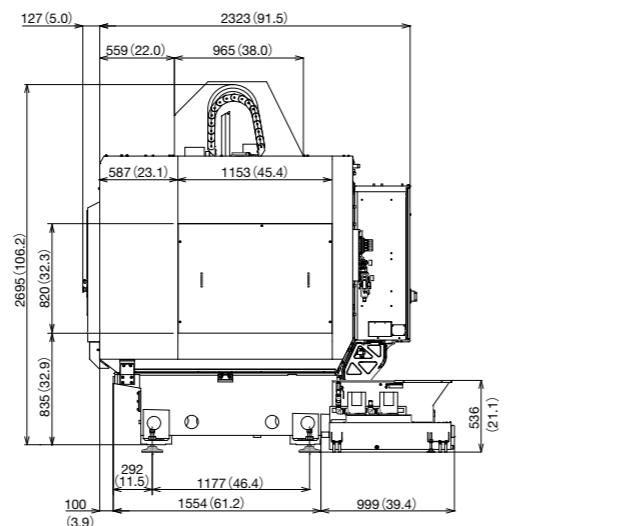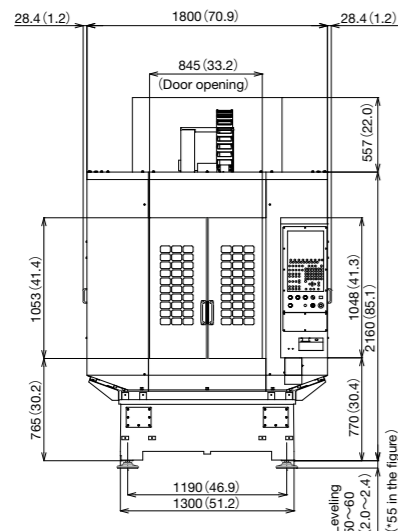
mm(inchi)

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)
	Distance between table top and spindle nose end	mm(inch)	200〜550(7.8〜21.6)
Table	Work area size	mm(inch)	800×400(31.4×15.7)
	Max.loading capacity (uniform load)	kg(lbs)	400〔881〕〔500〔1,102〕*6〕
Spindle	Spindle speed	min⁻¹	10,000min-1 high-torque specifications：1〜10,000
	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 axis：1〜30,000(0.04 〜1,181) *7
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)	250(9.8)
	Max. tool diameter	mm(inch)	110(4.3)／125(4.9) No adjacent tool
	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
Tool change time *5	Tool To Tool	sec.	0.7／0.8(14 tools／22 tools)
	Chip To Chip	sec.	1.6／1.7(14 tools／22 tools)
Electric motor	Main spindle motor (10min／continuous)*2	kW	10,000min-1 high-torque specifications：12.8／8.8
	Axis feed motor	kW	X, Y axis：1.0 Z axis：1.8
Power source	Power supply		AC 200V±10%, 50/60Hz±1Hz
	Power capacity(continuous)	kVA	10,000min-1 high-torque specifications：10.4
	Air supply / Regular air pressure	MPa	0.4〜0.6(recommended value：0.5MPa *8)
	Required flow	L/min	45
Machining dimensions	Height	mm(inch)	2,750(108.2)
	Required floor space〔with control unit door open〕	mm(inch)	1,800×2,654〔3,162〕(70.9×104.5〔124.5〕)
	Machine weight (including control unit and machine cover)	kg(lbs)	3,480〔7,672〕〔14tools〕／3,520〔7,760〕〔22tools〕
Accuracy *3	Accuracy of bidirectional axis positioning (ISO230-2:1988)	mm(inch)	0.006〜0.020 (0.00024 〜0.00079)
	Repeatability of bidirectional axis positioning (ISO230-2:2014)	mm(inch)	Less than 0.004 (0.00016)
Front door			2doors
Standard accessories			Instruction Manual (1 set), leveling bolts (4 pcs.), leveling plates (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. *4. 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, ±999.9999 inch
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 laguage 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 500 Mbytes
● High accuracy mode BⅡ, look-ahead 200 blocks, with smooth path offset
● Spindle override
● High-speed processing *2

（NC）
● Submicron command *3
● Interrupt type macro
● Rotary fixture offset

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
● ATC 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
● 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 BⅠ（look-ahead 40blocks）
● Machining load monitoring
（NC）
● Expanded workpice coordinate system
● Scaling
● Mirror image
● Menu programming
● Programmable data input
● Tool length compensation
● Cutter compensation
● Macro function
● Local coordinate system
● One-way positioning
● Opeation in tape mode
● Inverse time feed
（Conversation）
● Operation program
● Schedule program
● Automatic tool selection
● Automatic cutting condition setting
● Autmatic tool length compensation setting
● Autmatic cutter compensation setting
● Autmatic calculation of unknown number input
● Machining order control

*1. Measuring instrument needs to be prepared by users. *2. Minute block processing time can be changed.
*3. 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.