The compact machining center SPEEDIO has been released, achieving overwhelming productivity and excellent environmental performance based on Brother’s original technologies. Our efforts have been focused on releasing a machine that brings about success to users producing mass-production parts, in response to their deep confidence.
### Basic Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>S500X1</th>
<th>S700X1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. spindle speed (min⁻¹)</td>
<td>10,000</td>
<td>10,000 (Optional)</td>
</tr>
<tr>
<td></td>
<td>16,000 (Optional)</td>
<td>27,000 (Optional)</td>
</tr>
<tr>
<td>Stroke of each axis (mm)</td>
<td>S500X1 X500 Y400 Z300</td>
<td>S700X1 X700 Y400 Z300</td>
</tr>
<tr>
<td>Tool storage capacity (pos.)</td>
<td>14/21</td>
<td></td>
</tr>
<tr>
<td>Rapid traverse rate (m/min)</td>
<td>X / Y / Z 50 / 50 / 56</td>
<td></td>
</tr>
<tr>
<td>Required floor space (mm)</td>
<td>S500X1 1,560x2,220</td>
<td>S700X1 2,050x2,220</td>
</tr>
</tbody>
</table>

*BT dual contact spindle (BG-PLUS) Optional
Coolant Through Spindle (CNS) Optional

*CTS option not available for 27,000 min⁻¹ specifications.*
The machine has achieved overwhelming high productivity as a result of achieving high acceleration and quick response. In particular, Z-axis acceleration has been greatly improved, which is highly effective for improvement of productivity.

**Achievement of high acceleration**

As the Z-axis moves most frequently, Z-axis acceleration has been improved to twice the former model.

- Z-axis acceleration: **Former model** 1.1G → **SPEEDIO** 2.2G

Optimal acceleration according to loading capacity (X/Y-axes)*
- (Max. load): **1.4G / 1.1G**
- (150 kg load): **2.0G / 1.3G**

The X/Y-axes optimal acceleration setting function sets the most appropriate acceleration according to the table loading capacity.

*Acceleration for the SS00X1. The loading capacity needs to be set via parameter.

**Highly-responsive servo motor**

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

**Comparison of tapping cycle time Machining details**

- **M20 tapping**
- **Peripheral velocity** 377m/min
- **Material**: Aluminum

Approx. 10% less

*Data taken by running machining program created by Brother
Optimized waste elimination control

Brother’s original NC unit thoroughly eliminates waste motion and waste time, and drives machine performance to the fullest to demonstrate high productivity.

Nonstop ATC

Tool change time is minimized by optimizing the magazine operation and improving the Z-axis acceleration, in addition to the shorter start and stop time of the spindle.

<table>
<thead>
<tr>
<th>Former model</th>
<th>SPEEDIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chip - Chip</td>
<td>1.6s  1.4s</td>
</tr>
<tr>
<td>Tool - Tool</td>
<td>0.9s  0.8s</td>
</tr>
</tbody>
</table>

Simultaneous operation control

Further reduction of waste time achieved by positioning XY and additional axes simultaneously with tool change.

When compared to a general machining center (M/C), the high productivity of the SPEEDIO is outstanding. Brother is constantly pursuing overwhelmingly high productivity.

Conditions for productivity comparison

- D5.1 drilling × 12
- Boring × 2
- M6 tapping × 12
- No. of tools used: 9
- Spot facing × 7

Workpiece change time: 15 s
1day/10hours) × 85% operating rate

Comparison of productivity

* Data taken by running machining program created by Brother

Approx. 60% higher
Technologies accumulated over years to enhance machine rigidity, and use of a high-power spindle motor allow the machine to demonstrate its broad machining capabilities from high-speed, high-efficiency machining to heavy-duty machining.

### Highly rigid structure

Based on accumulated analysis technology data, the machine uses a structure that effectively further improves its rigidity.

### High-power spindle motor

- **Medium-and high-speed range enabling high-efficiency machining**
  - **Grooving using standard specs**
    - Machining details: Cutting amount: 1000c/min Material: Carbon steel (for ø16 end mill)
  - **Large hole drilling using high-torque specs**
    - Machining details: Hole diameter: ø40mm Material: Carbon steel

- **Low-speed range suitable for heavy-duty machining**

### Spindle motor torque

- **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 machining through machine/controller integrated development

High-accuracy machining has been achieved by improving machine rigidity, renewing the control system using a new NC unit, and adding new functions. Stable accuracy for circular machining and three-dimensional machining has also been achieved.

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 pitch machining. The machine structure used is not easily affected by heat expansion due to coolant.

High-speed three-dimensional machining

High-speed and highly accurate three-dimensional machining has been achieved by high-speed spindle specifications and Brother’s original three-dimensional machining control, such as the 200-block look-ahead function and smooth path offset function.

- High-speed spindle specs: Max. spindle speed 27,000 min⁻¹ (Optional)
- Look-ahead function
  - High accuracy mode BI (Standard): 30 blocks
  - High accuracy mode BII (Optional): 200 blocks

* This accuracy may not be obtained under some machining conditions, machine installation conditions etc.
Equipped with new CNC-C00 control unit

The machine is equipped with the CNC-C00 series next generation NC unit with greatly improved processing capabilities and functions, and enhanced usability.

**Operability**

Equipped with "shortcut" keys to quickly open the desired screen and "sub folder" to make program management easier, in addition to the USB memory interface, menu programming and tap return function.

**Machining support functions**

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

**Network function**

High capacity program data can be transferred via Ethernet at high speed. The simple production monitoring function is also available allowing you to monitor the machine’s status.

**Maintenance functions**

Equipped with motor insulation resistance measurement, operation log, and maintenance notice function.

**System capacity**

Standard equipped with PLC. Input and output points can be extended to up to 1024 points each (Optional).
Lower power and air consumption ensures high environmental performance. A power regeneration system that effectively lowers power consumption is used for all models.

Low power consumption is achieved by using an energy saving pump etc. in addition to a low-inertia spindle and high-efficiency motor.

The SPEEDIO is an 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.

**Reliable functions that enhance productivity, minimizing defects and preventing failure**

Productivity can also be enhanced from the following viewpoints: "prevent dimensional defects" and "prevent machine failure with minimal maintenance to minimize machine down time". The SPEEDIO is equipped with functions to achieve these.

- **Air-assisted tool washing (Optional)**
  - High discharge pressure prevents chips becoming attached to the holder.
- **Top cover (Optional)**
  - Separates the machining area from the machine room.
- **Motor insulation resistance measurement function**
  - Detects motor failure in advance.
- **Maintenance notice function**
  - Notifies operators of when greasing is required etc.
Optional Specifications

Coolant unit
Can be selected from 50L, 100L, or 150L, depending on the purpose.
(Photo: Tank with 150L chip shower)

Coolant Through Spindle (CTS)
1.5 MPa CTS used for BT spindle.
* Please consult Brother for use of 3 MPa CTS.
* CTS option is not available for 27,000min¹ specifications.

Back washing system (for CTS)
This prevents the filter from clogging, enabling long continuous operation without filter replacement.

Tool washing (air-assisted type)
High discharge pressure and flow rate efficiently remove chips attached to the holder. Equipped with a filter clog warning function.

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.

Top cover
Shutting the opening on the top prevents coolant or chips splashing outside of the machine, and reduces the effect of there on the spindle motor.

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

LED type work light (for 2 lamps)
LED lamps are used to extend lamp life and save energy.

Indicator light (1, 2, or 3 lamps)
LED lamps are used. There are no bulbs to burn out, making it completely maintenance free.

Side cover (transparent board type)
External light is drawn in to make the inside of the machine brighter and improve visibility.

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

Automatic grease lubricator
Regularly greases all greasing points on the three axes.
* Manual greasing applies to the standard specification model.
High accuracy mode (look-ahead 200 blocks)
The 200-block look-ahead function enables high-speed and highly accurate three-dimensional machining. Also equipped with a smooth path offset function to improve machining quality.

Tool breakage detector (touch type)
A touch switch type tool breakage detector is used.

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

Spindle override
Spindle speed can be changed without changing the program.

B-axis cord (for 1 axis, 2 axis)
Multi-face machining is possible by adding one or two axes.

RS232C (25 pin)
Conventional 25-pin connector can be attached to the side of the control box.

Optional

Memory expansion
Memory can be expanded to up to 500 Mbytes.

Switch panel (6 holes, 10 holes)
The position of the manual pulse generator can be changed using the switch hole, avoiding the generator being positioned behind the roller conveyor or similar.

High column (150mm, 250mm)
High column of 150mm and 250mm used in response to customers’ needs.

Optional Specifications
- Coolant unit
  - 50L (with valve and 180W pump)
  - 100L (with chip shower, valve and 250W + 350W pumps)
  - 150L (with chip shower, valve and 250W + 400W pumps)
  - 150L (with chip shower, CTS, valve and 250W + 400W + 650W pumps)
- Coolant Through Spindle (CTS)
- Mesh basket for chips
- Tool washing (air-assisted type)
- Tool breakage detector (touch type)
- Chip shower
- Cleaning gun

- Jig shower valve unit
- Back washing system (for CTS)
- Automatic oil lubricator
- Automatic grease lubricator
- LED type 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 (1 axis, 2 axes)
- Spindle override
- High column (150 mm, 250 mm)
- Grip cover
- Top cover
- Slide cover (transparent board type)
- RS232C (25 pin) for control box
- Expansion I/O board (EXO board)
  - EXO board assembly
  - Additional EXO board assembly
- Switch panel (6 holes, 10 holes)
- Memory expansion (approx. 500 Mbytes)
- High accuracy mode B II
  - Look-ahead 200 blocks, smooth path offset
- Substitution command *
- Interrupt type macro
- PLC programming software
  - For Windows®/XP, Vista, and 7

* When the substitution command is used, changing to the conversation program is disabled.
* Please contact your Brother dealer for details.
## Machine Specifications and NC Unit Specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>S500X1</th>
<th>CNC-000</th>
<th>S700X1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CNC Unit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X axis</td>
<td>mm (inch)</td>
<td>500 (19.7)</td>
<td></td>
</tr>
<tr>
<td>Y axis</td>
<td>mm (inch)</td>
<td>400 (15.7)</td>
<td>700 (27.6)</td>
</tr>
<tr>
<td>Z axis</td>
<td>mm (inch)</td>
<td>300 (11.8)</td>
<td></td>
</tr>
<tr>
<td>Distance between table top and spindle nose end</td>
<td>mm (inch)</td>
<td>190 (7.5)</td>
<td>190 (7.5)</td>
</tr>
<tr>
<td><strong>Table</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work area size</td>
<td>mm (inch)</td>
<td>600 x 460 (23.6 x 18.1)</td>
<td>800 x 400 (31.5 x 15.7)</td>
</tr>
<tr>
<td>Max. load capacity (uniform load)</td>
<td>kg (lbs)</td>
<td>250 (550)</td>
<td>600 (1,320)</td>
</tr>
<tr>
<td><strong>Spindle</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spindle speed</td>
<td>r/min</td>
<td>10,000 (Variable)</td>
<td>10,000 (Variable)</td>
</tr>
<tr>
<td>Spindle power</td>
<td>kW</td>
<td>10,000 (Variable)</td>
<td>10,000 (Variable)</td>
</tr>
<tr>
<td>Spindle diameter</td>
<td>mm (inch)</td>
<td>50.0 (2.0)</td>
<td>50.0 (2.0)</td>
</tr>
<tr>
<td>Spindle taper</td>
<td></td>
<td>MT4</td>
<td>MT4</td>
</tr>
<tr>
<td><strong>Feed rate</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid traverse rate (X/Y/Z-axis)</td>
<td>m/min (in/min)</td>
<td>50.0 (2.0)</td>
<td>50.0 (2.0)</td>
</tr>
<tr>
<td>Cutting feed rate</td>
<td>m/min (in/min)</td>
<td>X, Y, Z</td>
<td>0.009 (0.00079)</td>
</tr>
<tr>
<td><strong>ATC unit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tool shank type</td>
<td></td>
<td>MT30</td>
<td>MT30</td>
</tr>
<tr>
<td>Tool holder</td>
<td></td>
<td>M5</td>
<td>M5</td>
</tr>
<tr>
<td>Tool stretch</td>
<td></td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Tool no.</td>
<td></td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Tool selection method</td>
<td></td>
<td>Random</td>
<td>Random</td>
</tr>
<tr>
<td><strong>Electric motor</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main spindle motor (1000/min/continuous)</td>
<td>kW</td>
<td>10,000 (Variable)</td>
<td>10,000 (Variable)</td>
</tr>
<tr>
<td>Axis feed motor</td>
<td>kW</td>
<td>10,000 (Variable)</td>
<td>10,000 (Variable)</td>
</tr>
<tr>
<td><strong>Power source</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power supply</td>
<td>AC 200V, 50/60Hz</td>
<td>1000 (Variable)</td>
<td>1000 (Variable)</td>
</tr>
<tr>
<td>Power capacity (continuous)</td>
<td>kW</td>
<td>10,000 (Variable)</td>
<td>10,000 (Variable)</td>
</tr>
<tr>
<td>Air supply</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular air pressure</td>
<td>MPA</td>
<td>0.4 - 0.6</td>
<td>0.4 - 0.6</td>
</tr>
<tr>
<td>Required flow</td>
<td>L/min</td>
<td>40 (27,000 (Variable))</td>
<td></td>
</tr>
<tr>
<td><strong>Machining dimensions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>mm (inch)</td>
<td>2400 (94.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accuracy of bidirectional axis positioning (ISO 2006-2:2000)</td>
<td>mm (inch)</td>
<td>0.006 (0.0002)</td>
<td>0.006 (0.0002)</td>
</tr>
<tr>
<td>Reproducibility of bidirectional axis positioning (ISO 2006-2:2000)</td>
<td>mm (inch)</td>
<td>Less than 0.004 (0.00016)</td>
<td></td>
</tr>
</tbody>
</table>

### NC unit specifications

- **CNC model**: CNC-000
- **Control axes**: 5 (X, Y, Z, two additional axes)
- **Simultaneously controlled axes**: 5 (X, Y, Z, A, B)
- **Linear axes feed rate**: 1000 mm/min, 0.001 mm/sec
- **Circular axes feed rate**: 1000 mm/min, 0.001 mm/sec
- **Memory capacity**: Approx. 100 MB (Total capacity of program and data bank)
- **External communication**: USB memory interface, Ethernet, RS232C 1ch
- **Program format**: NC language, conversation (changed by parameter)
- **Conversion from conversation program to NC program language**: Available

*When program size is bigger than 2 MB, 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
- Conical C / Conical R
- Rotational transformation
- Background setting
- Synchronized tap
- Coordinate system setting
- HP power supply
- Restart
- Backlash compensation
- Tool indexing
- Friction torque compensation
- Interpolation
- Cutting tool override
- Alarm history (1,000 pieces)
- Status log
- Machine tool
- Computer remote
- Automatic workplace measurement
- Voltage insulation resistance measurement
- Operation log
- High accuracy mode BI

### Optional NC functions

- Memory expansion (Approx. 500 MB)
- High accuracy mode BI (look-ahead 200 blocks, smooth path offset)
- Spindle override
- Subcommand command 2
- Interrupt type macro

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

<table>
<thead>
<tr>
<th>Tool diameter (mm) × Feed (mm/rev)</th>
<th>ADC</th>
<th>FC200</th>
<th>S45C</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td>D32 (1.26) × 0.2 (0.008)</td>
<td>D28 (1.1) × 0.15 (0.006)</td>
<td>D25 (0.98) × 0.1 (0.004)</td>
</tr>
<tr>
<td>10,000 high-torque</td>
<td>D40 (1.57) × 0.2 (0.008)</td>
<td>D34 (1.34) × 0.15 (0.006)</td>
<td>D30 (1.18) × 0.15 (0.006)</td>
</tr>
<tr>
<td>16,000</td>
<td>D24 (0.94) × 0.2 (0.008)</td>
<td>D22 (0.87) × 0.15 (0.006)</td>
<td>D18 (0.71) × 0.1 (0.004)</td>
</tr>
<tr>
<td>27,000</td>
<td>D20 (0.79) × 0.2 (0.008)</td>
<td>D19 (0.75) × 0.15 (0.006)</td>
<td>D17 (0.67) × 0.1 (0.004)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tool diameter (mm) × Pitch (mm/rev)</th>
<th>M27 × 3.0 (1-8UNC)</th>
<th>M24 × 3.0 (7-8-9UNC)</th>
<th>M16 × 2.0 (5-8-11 UNC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000 high-torque</td>
<td>M39 × 4.0 (1/2-6UNC)</td>
<td>M33 × 3.5 (1/4-7UNC)</td>
<td>M27 × 3.0 (1-8UNC)</td>
</tr>
<tr>
<td>16,000</td>
<td>M22 × 2.5 (7-8-9UNC)</td>
<td>M18 × 2.5 (5-8-11 UNC)</td>
<td>M14 × 2.0 (1/2-13UNC)</td>
</tr>
<tr>
<td>27,000</td>
<td>M22 × 2.5 (7-8-9UNC)</td>
<td>M18 × 2.5 (5-8-11 UNC)</td>
<td>M12 × 1.75 (7-16-14UNC)</td>
</tr>
</tbody>
</table>

**Examples of target workpieces**

1. Automotive and motorcycle parts
   - CVT intermediate housing
   - Clutch case
   - Cylinder head cover
   - Cylinder block
   - EPS housing
   - Throttle body
   - Alternator
   - Starter housing
   - Crankcase
   - Cylinder head
   - Brake master cylinder

2. Information technology and general machinery parts
   - Mobile phone
   - Personal computer case
   - Watch parts
   - Medical implants

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*Be sure to read the instruction manual and safety manual before using the product safely. If you use oil-based coolant or machine materials that may ignite, such as magnesium and resin, take thorough safety measures to prevent fire. Please contact the sales personnel for any inquiries.*

*When exporting this product, carefully check the customer and their purpose of use from the viewpoint of security assurance. You may have to obtain permission from the supervisory authorities prior to export due to revisions of laws and regulations etc. Please contact Brother before exporting the machine.*

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

*When exporting our product with tilting rotary table, “tilt control” is applicable, according to view of Ministry of Economy, Trade and Industry (METI) in Japan. Therefore, please apply for export license in advance of export. If necessary, please contact METI.*
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 Storinngton Avenue, Suite 270, Hoffman Estates, IL 60169, U.S.A.
PHONE:(1)224-603-8415  FAX:(1)224-633-8821

**Thailand**

BROTHER COMMERCIAL THAILAND LTD.
MACHINE TOOLS TECHNICAL CENTER
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Bangkok 10250, Thailand
PHONE:(66)2-374-6447  FAX:(66)2-374-2706

**China**

BROTHER MACHINERY (SHANGHAI) LTD.
(MACHINE TOOLS DIV.) SHANGHAI TECHNICAL CENTER
36F, Haiyi Commercial bldg, No.310 TianShan Road, ChangNing District,
Shanghai 200038, China
PHONE:(86)21-3251-9837  FAX:(86)21-3251-9839

**Germany**

BROTHER INTERNATIONALE INDUSTRIEMASCHINEN GmbH
MACHINE TOOLS DIVISION FRANKFURT TECHNICAL CENTER
Haechter Str.34, 65835 Liederbach, Germany
PHONE:(49)69-977-6199-0  FAX:(49)69-977-6199-80

**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)80-4405-7999

**China**

BROTHER MACHINERY (SHANGHAI) LTD.
DONGGUAN BRANCH (MACHINE TOOLS DIV.) DONGGUAN TECHNICAL CENTER
1F, No.45 North Road Lianfeng, Xiarui 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 notices.

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