

SPEEDIO

R450Xd2

R650Xd2

Pallet Changing Compact Machining Center



R

Pallet changer model continues machining even during setup time

Equipped with a “QT table,” Brother’s original pallet changer that avoids lift-up motion, new CNC, and tool magazine with up to 40-tool capacity to improve productivity at every production site.

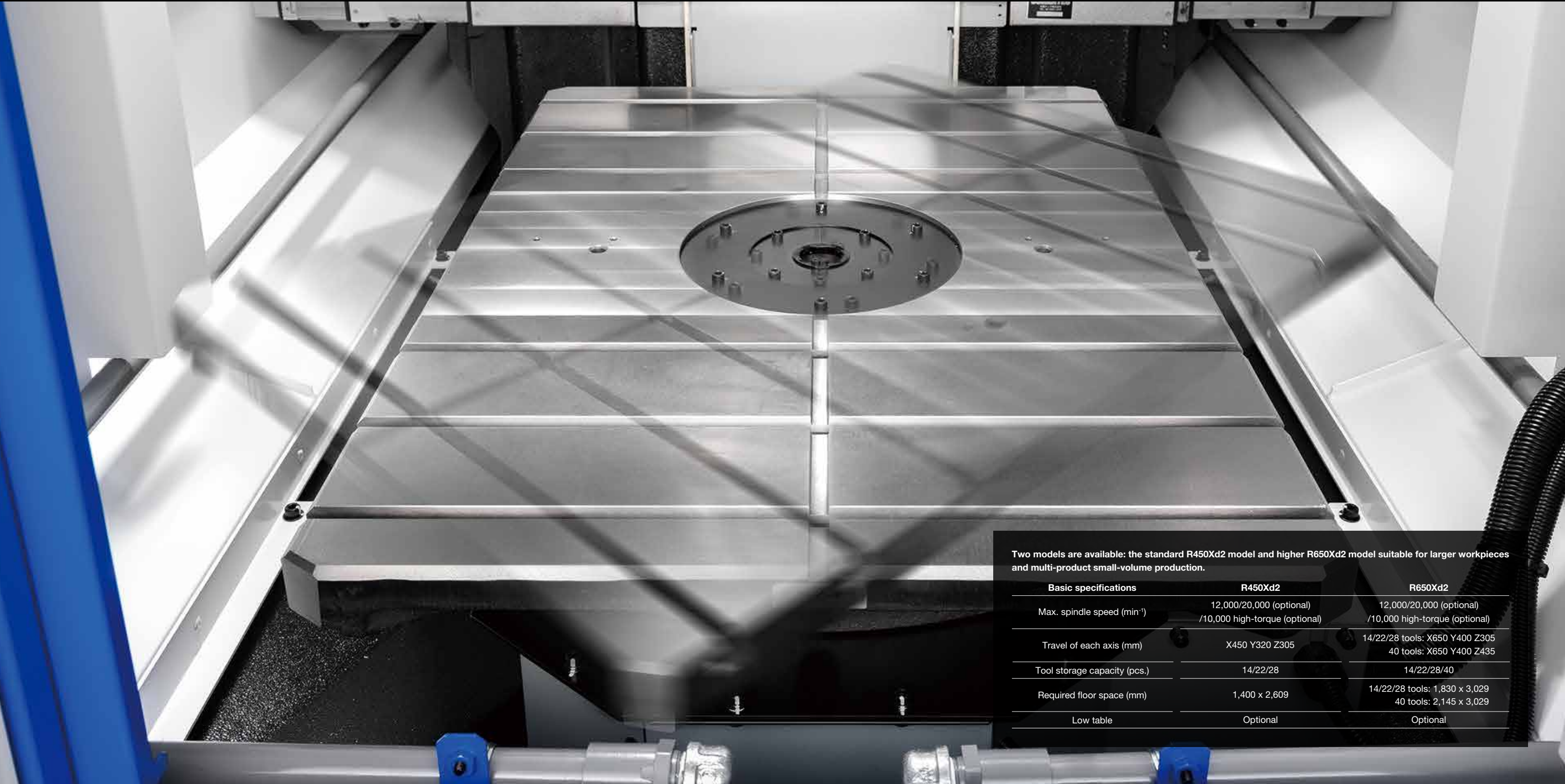
Cutting Out the Waste *SPEEDIO*



R450Xd2



R650Xd2



Two models are available: the standard R450Xd2 model and higher R650Xd2 model suitable for larger workpieces and multi-product small-volume production.

Basic specifications	R450Xd2	R650Xd2
Max. spindle speed (min ⁻¹)	12,000/20,000 (optional) /10,000 high-torque (optional)	12,000/20,000 (optional) /10,000 high-torque (optional)
Travel of each axis (mm)	X450 Y320 Z305	14/22/28 tools: X650 Y400 Z305 40 tools: X650 Y400 Z435
Tool storage capacity (pcs.)	14/22/28	14/22/28/40
Required floor space (mm)	1,400 x 2,609	14/22/28 tools: 1,830 x 3,029 40 tools: 2,145 x 3,029
Low table	Optional	Optional

**Provides high productivity with a broad range of applications
from mass production to multi-product small-volume production**

While maintaining the SPEEDIO's high-speed performance and usability, extensive magazine specifications and a pallet changer provide high productivity for customers in various industries.

Precision equipment



Watch/clock plate
Brass
Size: ø25 x 2.6



L-shaped bracket
Stainless steel
Size: 95 x 85 x 35



Plate
Stainless steel
Size: 65 x 50 x 8

Valve



Gas control valve
Stainless steel
Size: 75 x 35 x 35



Chemical control valve
PFA resin
Size: 200 x 55 x 75



Hot-water supply valve
Brass
Size: 150 x 120 x 90

Automobile



Aluminum wheel
Aluminum alloy
Size: ø550 x 200



EV frame
Aluminum alloy
Size: 430 x 220 x 150



ABS valve housing
Aluminum si<3%
Size: 90 x 70 x 30



Brake caliper
Cast iron
Size: 120 x 65 x 220



Yoke
Carbon steel
Size: 44 x 30 x 69

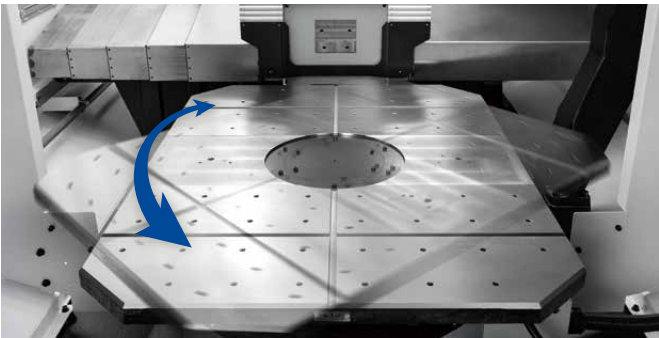
QT table achieves high productivity, eliminating waste in workpiece change time

The QT table is Brother's original high-speed 2-face pallet changer.
With a wide jig area and a high degree of reliability, the QT table enables non-stop machining to achieve high productivity.

High-speed pallet change

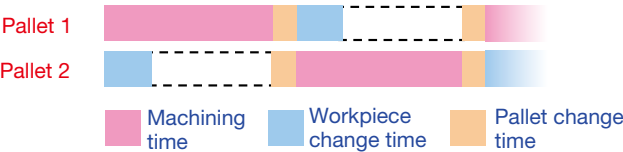
The QT (Quick Turn) table is a turntable type high-speed 2-face pallet changer. Optimized acceleration/deceleration control achieves much faster pallet change. To ensure high reliability, effects by chips etc. are minimized by a turntable that avoids lift-up motion and has a sealed structure, and positioning accuracy is maintained by the stopper mechanism.

Pallet change time	R450Xd2	2.7s
	R650Xd2	3.1s



Non-stop machining

Workpieces on one pallet can be changed while machining workpieces on the other pallet. Waste in workpiece change time is eliminated, enabling non-stop machining.

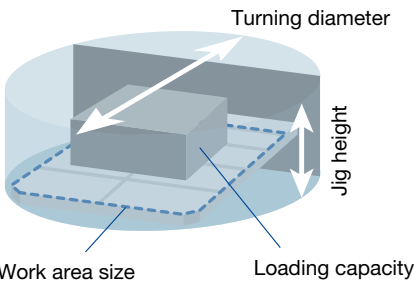
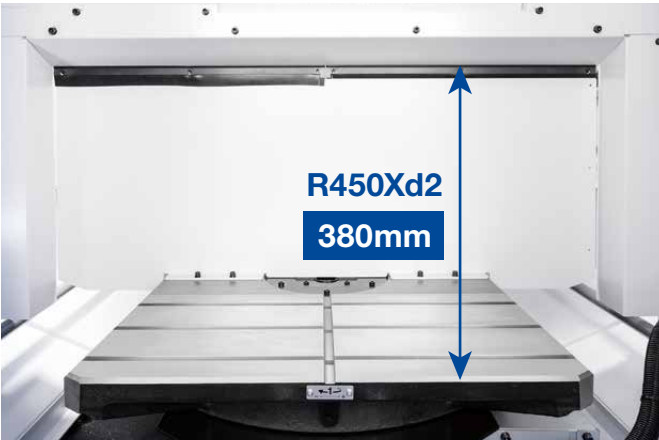


Large jig area

Even if the jig protrudes from the table, it can be mounted as long as it is within the pallet turning diameter. The jig area can be further expanded by selecting a low table option that increases the jig height or a turning diameter enlargement option that increases the jig space.

Low table (optional) jig height

Max. jig height		
R450Xd2	380mm	R650Xd2 450mm



	R450Xd2	R650Xd2
Work area size (mm)	600 x 300	800 x 400
Max. turning diameter (mm) *1	1100(1020)	1300(1250)
Max. jig height (mm) *2	380(300)	450(350)
Max. loading capacity (kg/face) *3	200(120)	300(200)

*1: When a turning diameter enlargement option is selected *2: When a low table option is selected
*3: Parameter needs to be adjusted. *4: Values in brackets () indicate values for standard specifications.

Advantages of QT table

1. Stable production

As workpieces are changed while machining workpieces on the inner pallet, stable production volume can be secured without being affected by any fluctuation in workpiece change time.

2. Interruptions to operation

Effects on production are minimized even if interruptions to operation occur during production, such as workpiece box replacement and chip cleaning.

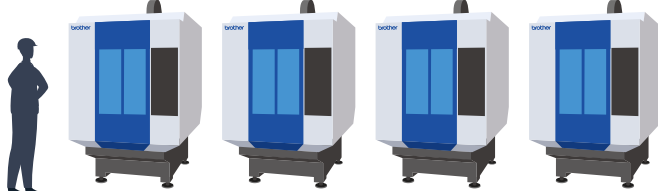
3. Handling multiple machines

One operator can change workpieces for multiple machines without suspending production. This means one operator can handle multiple machines easily, leading to streamlining of production sites.

Not affected by interruptions to operation



Able to easily handle multiple machines



Cases of streamlined production

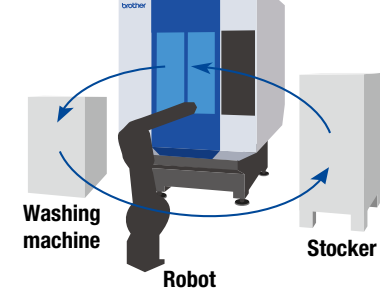
Case 1: Long workpiece change time

High productivity can be maintained even when workpiece change takes time, such as in multi-part machining or when jig washing takes time to minimize effects of chips. Both the productivity and quality can be improved.

Case 2: Automation

Productivity is not affected even if workpiece setting or jig washing takes time. In addition, a flexible robot cycle, including peripheral equipment, can be configured.

Automation



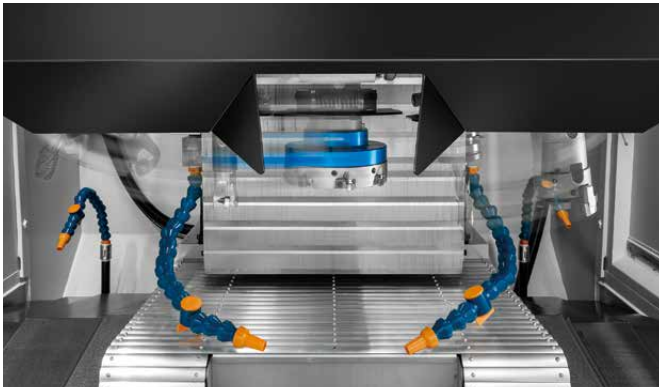
Magazines with extensive variation

Overwhelming high productivity through machine/controller integrated development

The broad range of magazine specifications for 14, 22, 28, or 40 tools supports a variety of machining needs. Overwhelming high productivity is achieved by utilizing advantages of machine/controller integrated development, including optimized and faster simultaneous operation and tool change operation.

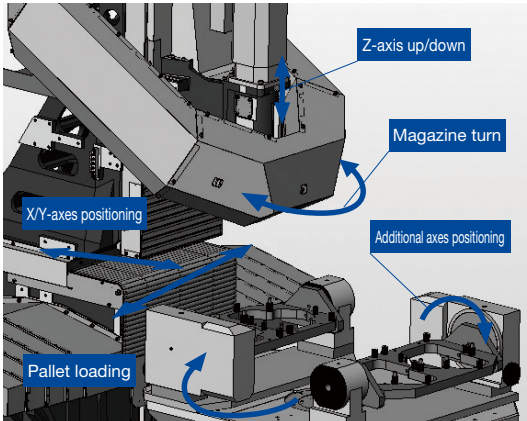
28-tool magazine

A compact turret type 28-tool magazine maintains high-speed tool change performance. This expands the range of target machining parts and promotes process integration.



Simultaneous operation

Equipped with a simultaneous operation control that simultaneously performs tool change, QT table turn, and positioning of X/Y and additional axes. This avoids any wasted pallet change time.

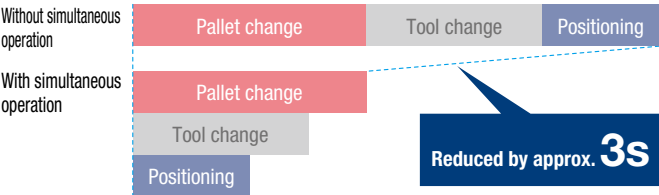


High-speed tool change

Shorter tool change time has been achieved by faster and optimized spindle start/stop, Z-axis up/down, and magazine operation.

Magazine capacity	Chip-Chip	Tool-Tool
14 tools (*1)	1.3s	0.6s
22/28 tools (*1)	1.5s	0.7s
40 tools (*2)	2.5s	0.9s

(*1) Values for R450Xd2 (*2) Values for R650Xd2



40-tool magazine (R650Xd2)

In addition to 14/22/28-tool magazines, a 40-tool magazine is available. This promotes process integration, taking advantage of a 2-face pallet changer, and encourages productivity improvement.



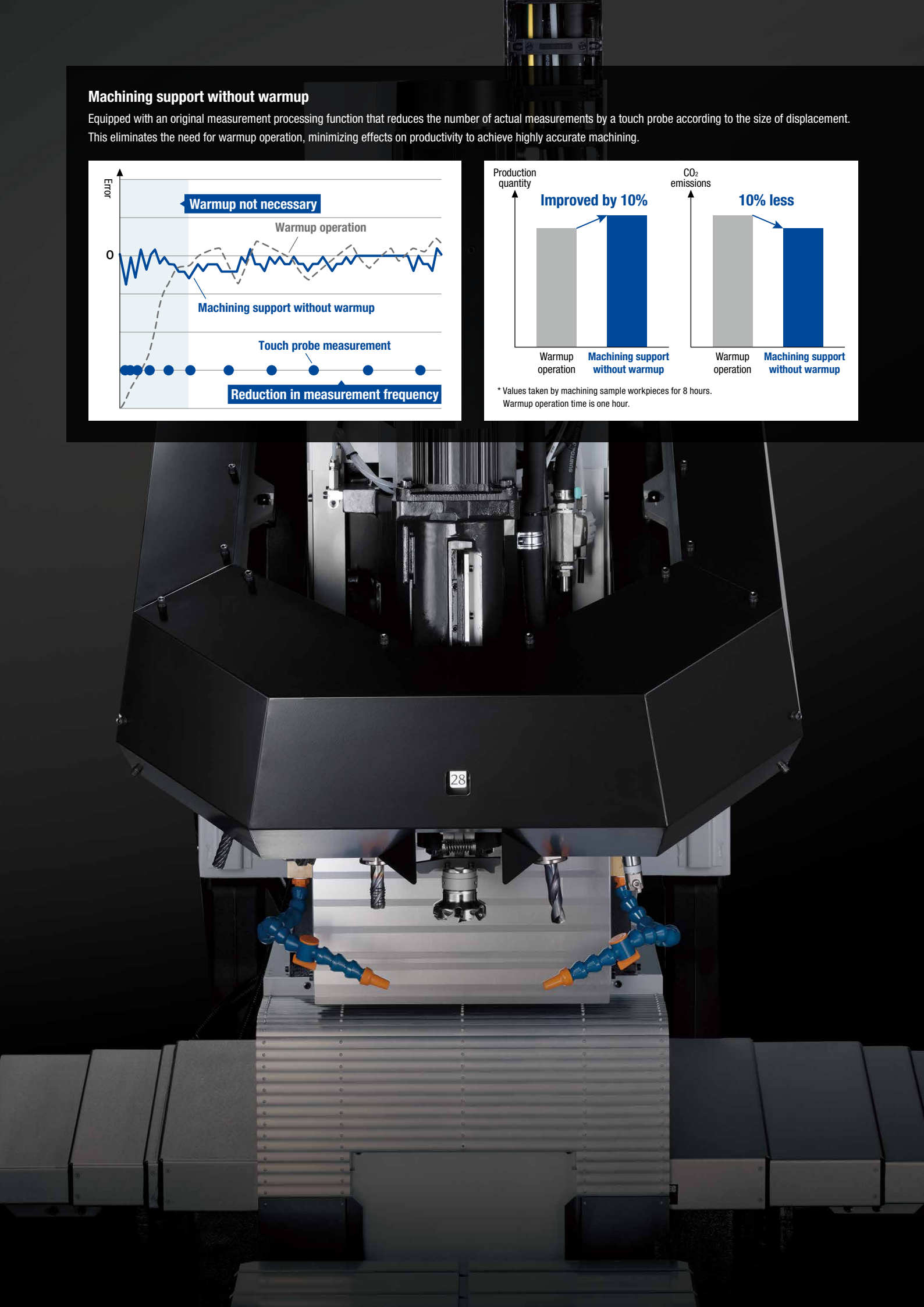
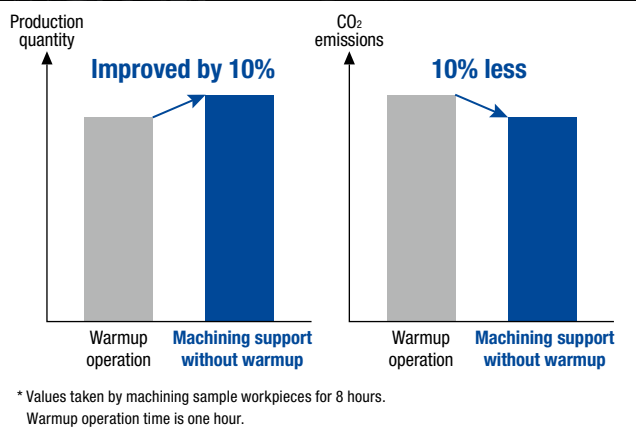
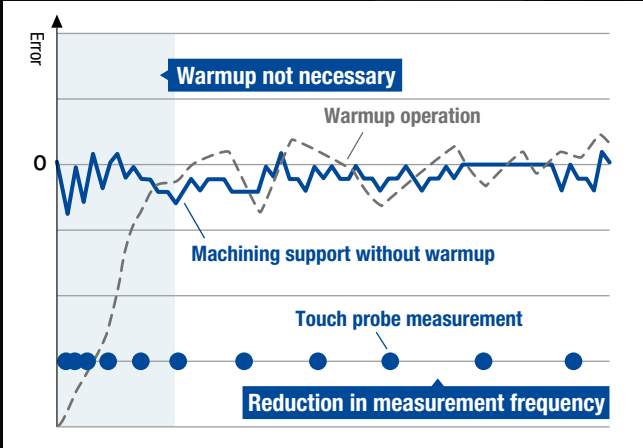
Pot shutter closed



Pot shutter open

Machining support without warmup

Equipped with an original measurement processing function that reduces the number of actual measurements by a touch probe according to the size of displacement. This eliminates the need for warmup operation, minimizing effects on productivity to achieve highly accurate machining.



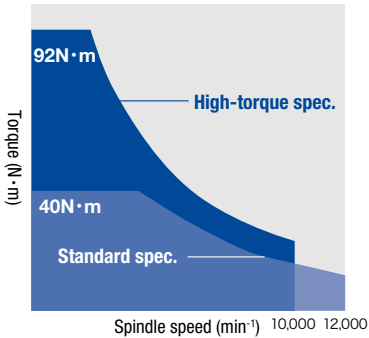
Provides broad cutting performance from high-speed and highly efficient machining to heavy-duty machining

High rigidity based on a special design and use of a high-torque spindle motor achieves stable machining while demonstrating high machining capability.

Newly developed and highly efficient 20,000 min⁻¹ spindle motor

A new 20,000 min⁻¹ spindle motor has been developed. Compatible with the Coolant Through Spindle (CTS), this motor further improves productivity of small-diameter drilling. A variety of spindle specifications are available, including the standard 12,000 min⁻¹ spec. and high-torque spec.

Motor torque characteristics



High-torque spec. (optional)
Max. torque 92N·m
Max. output 26.2kW
20,000min ⁻¹ spec. (optional)
Max. torque 27N·m
Max. output 15.4kW
12,000 min ⁻¹ spec. (standard)
Max. torque 40N·m
Max. output 18.9kW

7 MPa Coolant Through Spindle (CTS) (optional)

The CTS option can be selected from 3 MPa or 7 MPa. With this option, the machine can operate to its fullest potential in high-speed drilling or peck drilling.



Improved spindle rigidity and highly rigid machine structure

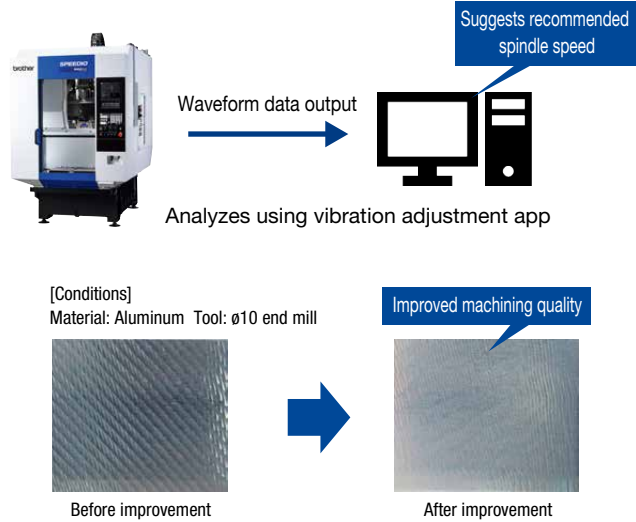
For 10,000 min⁻¹ high-torque specifications (optional), the spindle bearing diameter has been enlarged to enhance rigidity. Accumulated technical analysis data has been used to achieve a highly rigid machine structure with minimal vibration. This enables the machine to demonstrate its capabilities across a wide range of machining applications, including heavy-duty steel machining.



Spindle clamp force
Improved by 15%
Spindle bearing diameter (high-torque spec.)
Larger by 10%

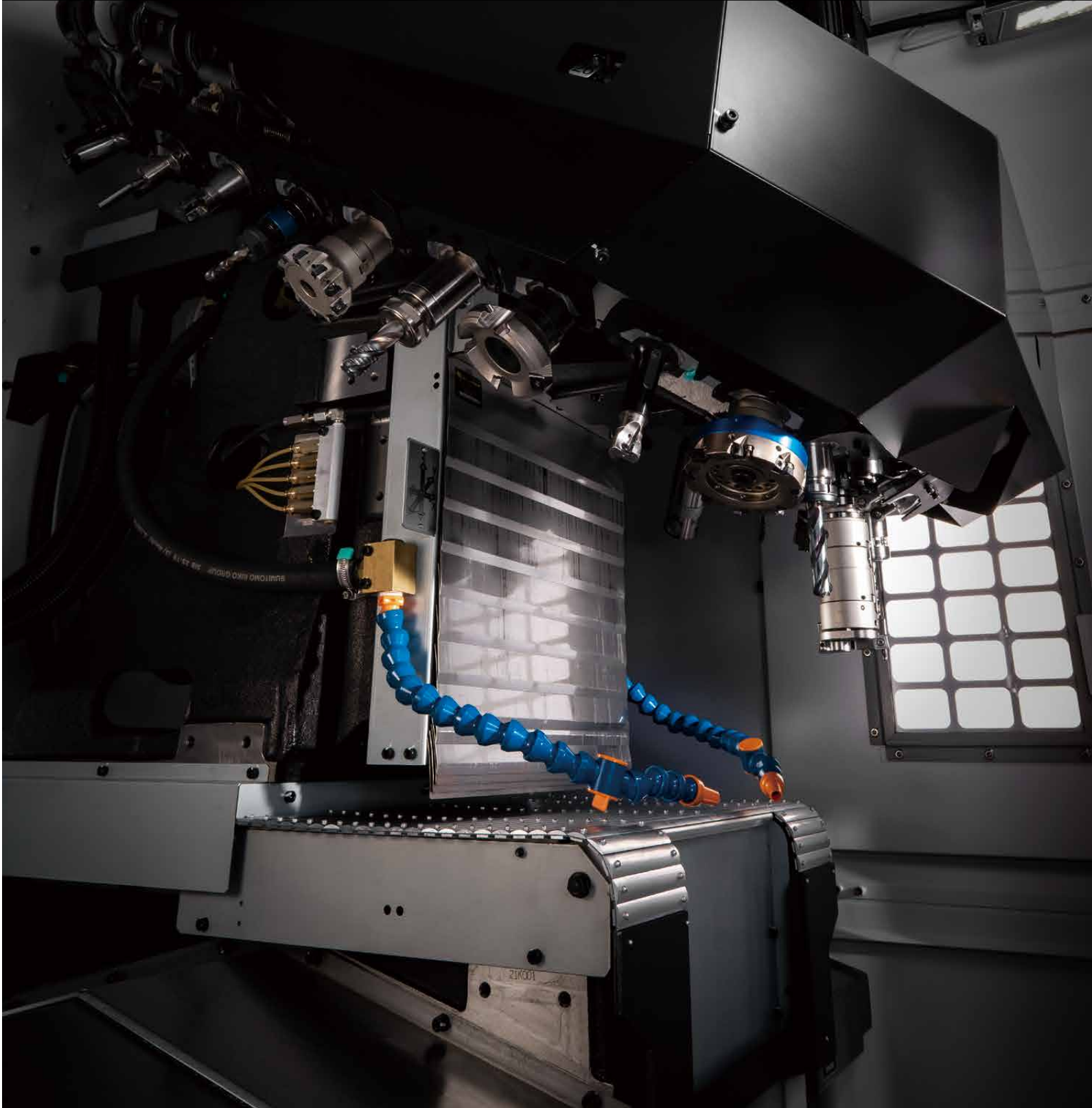
Vibration adjustment (optional)

Vibration adjustment analyzes waveform data using a PC app to suggest the recommended spindle speed. Optimal machining conditions drive machining performance to the fullest.



Machining capability		ADC	Cast iron	Carbon steel
Drilling	12,000min ⁻¹	D32 × 0.2 (1.26 × 0.008)	D28 × 0.15 (1.1 × 0.006)	D25 × 0.1 (0.98 × 0.004)
	10,000 min ⁻¹ high-torque	D40 × 0.2 (1.57 × 0.008) D30 × 0.7 (1.18 × 0.03)	D34 × 0.15 (1.34 × 0.006) D26 × 0.4 (1.02 × 0.02)	D30 × 0.15 (1.18 × 0.006) D26 × 0.25 (1.02 × 0.01)
	20,000min ⁻¹	D24 × 0.2 (0.94 × 0.008)	D22 × 0.15 (0.87 × 0.006)	D18 × 0.1 (0.71 × 0.004)
Tapping	12,000min ⁻¹	M27 × 3.0 (1-8UNC)	M24 × 3.0 (7/8-9UNC)	M16 × 2.0 (5/8-11UNC)
	10,000 min ⁻¹ high-torque	M39 × 4.0 (1 1/2-6UNC)	M33 × 3.5 (1 1/4-7UNC)	M27 × 3.0 (1-8UNC)
	20,000min ⁻¹	M22 × 2.5 (7/8-9UNC)	M18 × 2.5 (5/8-11UNC)	M14 × 2.0 (1/2-13UNC)
Facing	12,000min ⁻¹	960 : 100 × 3.2 × 3,000 (58.6 : 3.94 × 0.13 × 118.1)	137 : 40 × 6.0 × 573 (8.4 : 1.57 × 0.24 × 22.6)	81 : 40 × 4.2 × 484 (5.0 : 1.57 × 0.17 × 19.1)
	10,000 min ⁻¹ high-torque	1,700 : 100 × 5.7 × 3,000 (102.4 : 3.94 × 0.22 × 118.1)	255 : 40 × 6.0 × 1,067 (15.6 : 1.57 × 0.24 × 42.0)	186 : 40 × 4.4 × 1,067 (11.4 : 1.57 × 0.17 × 42.0)
	20,000min ⁻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)

* Data obtained from tests conducted by Brother.



Improved ease of setup and workpiece change

Improved operability using “CNC-D00” controller equipped with support functions

Enhanced accessibility and operability from the front and side allow operators to easily perform setup tasks like switching workpieces or tools. Various support functions improve work efficiency and overall productivity.

Front setup accessibility

An access-friendly table is used so that operators can easily perform setup, including workpiece change.



Front wide opening width

A wide door opening width is secured to make workpiece change easier.



Opening width	
R650Xd2:	845mm
R450Xd2:	655mm

Side door for easy setup

The R450Xd2 (22/28 tools) and R650Xd2 are standard equipped with a side door.



Column movement when changing tools

Equipped with a function that moves the column to a position where tools can be changed easily.



Outside rotary table switch

The outside rotary table can be operated by this switch.



Setup support

Equipped with functions to easily perform setup, such as an ATC tool app that enables all magazine tool settings to be performed on one screen, menu programming that enables you to create NC programs by following instructions on the screen, and an on-screen help function.



ATC tool app

Machining adjustment support

Equipped with functions to easily perform optimal machining adjustment to improve productivity, such as a machining parameter adjustment app that enables you to easily adjust parameters according to machining details and a machining load waveform display/saving function.



Waveform display app

Production support

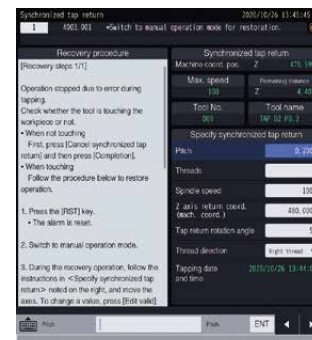
Equipped with functions to improve the operating rate, such as real time tool monitoring to eliminate defects, displaying production performance, power consumption etc. as a graph, and PLC/network functions to meet peripheral equipment and automation requirements.



Production performance app

Recovery support

Equipped with functions to prevent failure or ensure quick recovery, such as maintenance time notice, displaying details when an alarm occurs, and guidance for recovery/check work.



Recovery support app



Scan or Click

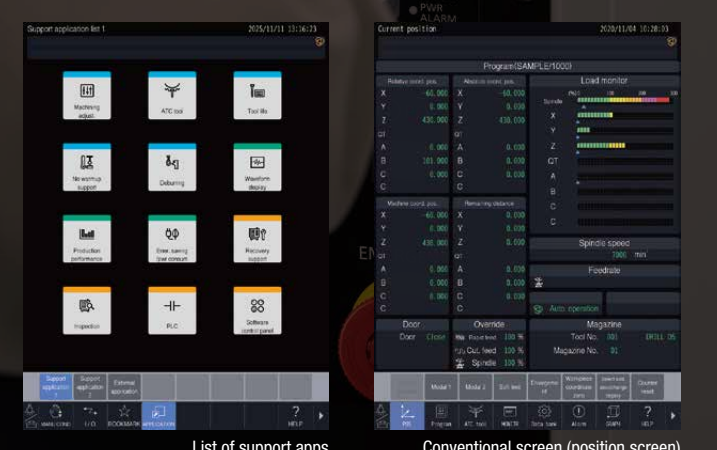
Home screen

Information required for production, such as workpiece counter and tool life, is collected on the home screen. Shortcut keys are provided for screens frequently used so you can open them by one touch.



User interface

Equipped with support apps with improved operability and visibility by grouping relevant functions and an easy-to-view display, in addition to several useful accessories (calculator, notebook, file viewer etc.). Operation on conventional screen is possible on the touch panel. With these, usability has been greatly improved.



Reliability maintains high productivity

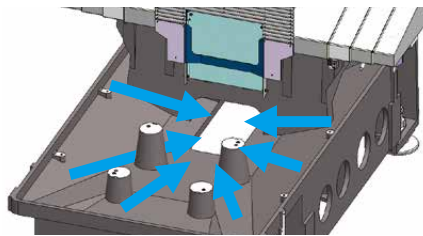
Measures for chips, including a center trough structure, and enhanced maintenance functions prevent machine failure. Problem-free operation is ensured by reducing machining defects. Avoiding machine stoppage maintains high productivity at production sites.

Prevention of chip related problems

In response to increase in chips due to process integration, problems possibly caused by chips are prevented by thoroughly evacuating/removing chips, leading to improved reliability.

Center trough structure

A center trough structure is deployed under the QT table. Chips slide down the inclined base and are discharged to the outside of the machine. Chip evacuation performance has been dramatically improved.



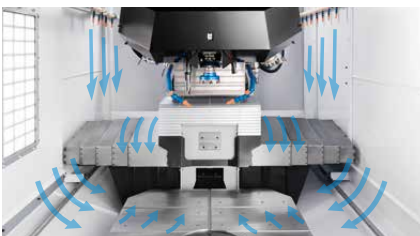
Chip conveyor (optional)

A hinge + scraper type chip conveyor is available. Using this tank can reduce chip cleaning frequency.



Chip shower (optional)

In response to a wide machining area, the R650Xd2 is equipped with two chip shower pumps to greatly increase the flow rate. Piping is added to the top face to improve chip evacuation performance.



Reliable maintenance functions

Equipped with a variety of maintenance functions to prevent defects that may occur at production sites or to assist recovery from problems.

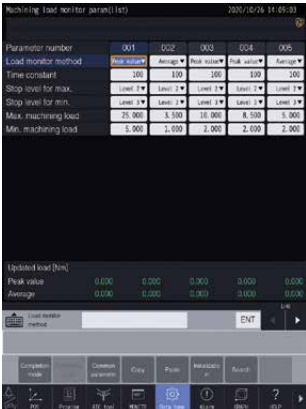
ATC tool monitoring

The presence of a spindle tool, tool holder mis-clamp, tool key position deviation etc. are checked before and after tool change without using a sensor.



Machining load monitoring

Machining load applied to the spindle is monitored to issue an alarm when the load is not within the preset range.



Maintenance notice

Issues maintenance related notices in advance, such as greasing time.



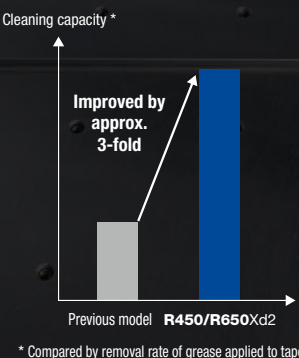
Alarm log

Displays alarm log details to help identify the cause.



Tool cleaning system (optional)

The number of discharge holes and the angle of these holes have been optimized to significantly increase the discharge flowrate. This has resulted in a threefold increase in cleaning capability, compared to the previous model. CTS specifications allow the direct pump type where coolant is discharged from the CTS pump to be selected, consuming less air than the air-assisted type. * When CTS is not selected, air-assisted tool cleaning is used.



Stuck chips detection function

Chips caught between the spindle and the holder during ATC are detected without using a sensor. Detecting any stuck chips during ATC prevents the outflow of defects. A retry function is also provided.

A screenshot of the machine's control interface showing the 'Stuck chips detection' screen. It displays a table with columns for 'Tool No.', 'Tool Name', 'Status', 'Alarm', and 'Value acquired'.

SPEEDIO

Blue Technology

Eliminating waste elements at production sites leads to reduction in greenhouse gas emissions, such as carbon dioxide and methane. Brother's optimal and compact design reduces wasted time, resources, and energy during parts machining.

We are striving to reduce environmental impact by conducting product life cycle assessment, which quantitatively evaluates environmental impact at each stage of production, transportation, use, disposal, and recycling.

SPEEDIO Blue Technology Solves Four Waste Elements at Production Sites

Wasted time reduction



Wasted time is reduced by minimizing non-cutting time in the machining cycle time and reducing setup time and downtime.

Wasted resource reduction



Wasted resources are reduced by using machining adjustment support that prevents cutting defects and production support such as real-time monitoring.

Wasted energy reduction



Optimal design eliminates all waste, including excessive power consumption and air flowrate, achieving industry-leading energy-saving performance.

Wasted installation space reduction



Compact design reduces wasted space with less restrictions on installation locations.

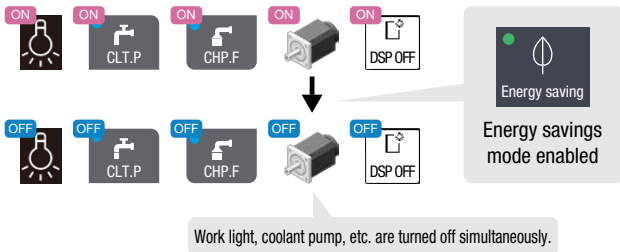
Wasted energy reduction

Saving power

New functions, including chip shower energy savings operation, energy savings mode, and machining support without warmup, have been incorporated to significantly reduce power consumption, compared to the previous model. Together with various energy-saving technologies, such as power regeneration and highly efficient spindle motors, power consumption is overwhelmingly low.

Energy savings mode

Added a function to turn on/off energy-saving functions simultaneously. Items to be turned on/off can be customized.

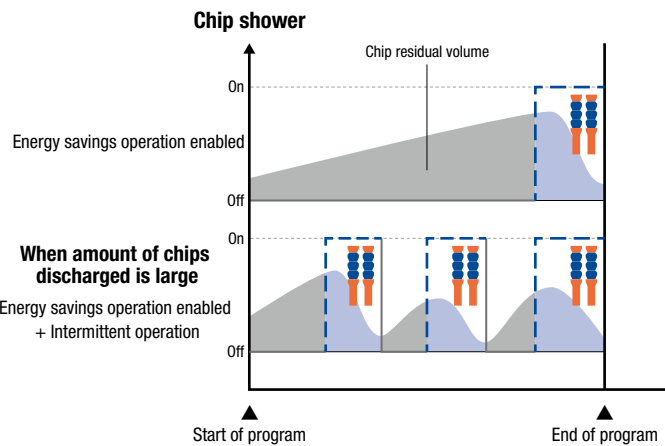


- Standby mode
- Coolant pump
- Chip shower
- Work light
- Display off

Can be customized

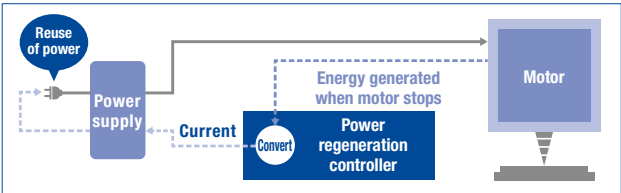
Chip shower energy savings operation

This function controls the on/off timing of the chip shower pump. Operation is switched via parameters according to the amount of chips discharged, contributing to energy saving for chip shower pumps that consume significant amounts of power.



Power regeneration system

Equipped with a power regeneration system that recycles energy generated when a servo motor decelerates.



Power consumption app

Servomotors, pumps, and other equipment are grouped and displayed according to purpose. Calculation is possible for each cycle.



Highly efficient spindle motor

Energy-saving pump

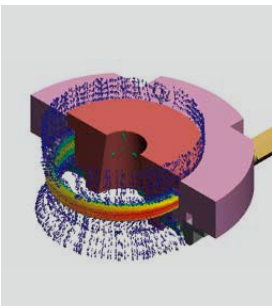
LED work light

Saving air

Air purge, spindle air blow, and other air-related functions have been reviewed and optimized to eliminate any waste. Compared to the previous model, air consumption is significantly reduced while maintaining reliability.

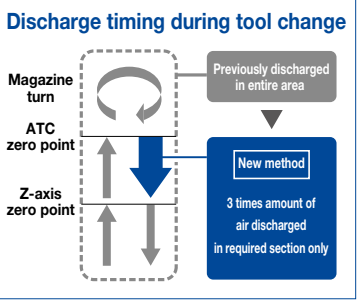
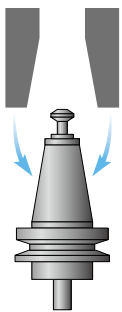
Air purge

Repeated flowrate analysis has achieved a highly airtight structure that prevents coolant from entering the spindle even with less air purge. Amount of air used is significantly reduced.



Spindle air blow

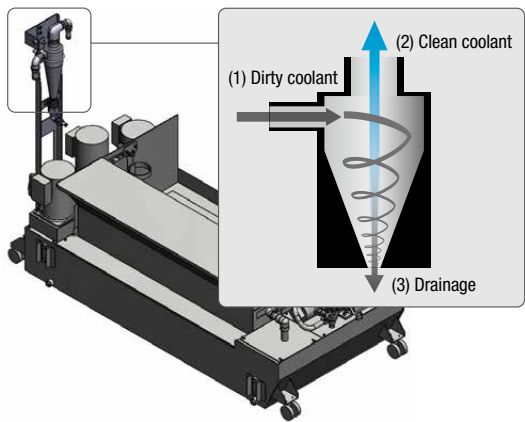
Amount of air used is reduced by discharging three times the conventional volume of air only when required.



Wasted resource reduction

Tank with cyclone filter and no consumables (special option for CTS)

Clean coolant is returned to the clean tank through another tank with a cyclone filter that removes fine chips. Coolant is kept clean this way to reduce the filter change frequency and extend the service life of the pump.



Automatic oil/grease lubricator that optimizes consumption (optional)

Consumption amount and timing are optimized by the automatic oil/grease lubricator. Oil mixing with coolant can be minimized.

Automatic oil lubricator



Automatic grease lubricator





Coolant tank

Two types are available: coolant tank with chute and hinge + scraper type chip conveyor tank. (The photo shows coolant tank with chute, 250L)



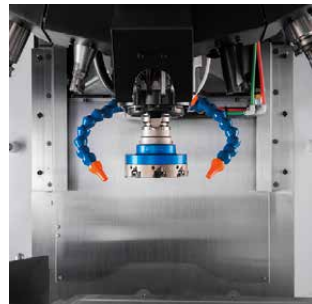
Coolant Through Spindle (CTS)

Can be selected from 3.0 MPa or 7.0 MPa. Pump and tank are not included.



Column coolant nozzle

Powerfully removes chips on and around the workpiece to prevent chips building up. * Cannot be selected for the 40-tool magazine spec.



Head coolant nozzle

Coolant can reliably be applied to the machining section as the tool and nozzles are set in place.



Automatic oil lubricator

Regularly applies oil to all lubricating points on the tree axes



Automatic grease lubricator

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



Automatic door with switch panel 10 holes

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



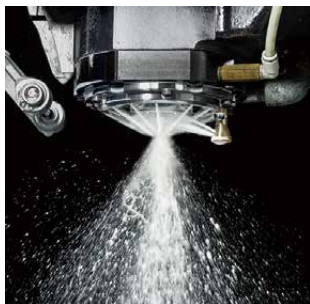
Area sensor

Optical area sensors are used. Use area sensors to prevent operators being caught in the automatic door.



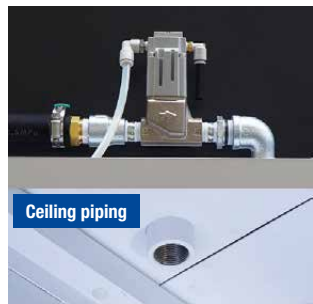
Chip shower

The chip shower piping in the R650Xd2 is located in the upper section inside the machine for more efficient flow. * The R450Xd2 has no piping in the upper section.



Tool cleaning system

High discharge pressure and flowrate powerfully removes chips stuck to the holder. Two types are available: air-assisted type and direct pump type where coolant is discharged directly from the CTS pump. * The direct pump type can only be selected for CTS specifications.



Fixture shower valve unit

Consists of jig washing valves and pipes to the ceiling of the machine. Pipes from the machine to the required location must be prepared by customers.



Cleaning gun

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



Switch panel (8 holes or 10 holes)

Various switches, such as automatic door open/close switches, are set in specific locations. The switch panel (8 holes) is also available so that the position of the manual pulse connector can be changed.



Manual pulse generator

A cable is provided for the manual pulse generator, making setup easier. Equipped with emergency stop and enable switches.



Tool breakage detector, touch type

A touch switch type tool breakage detector is available.



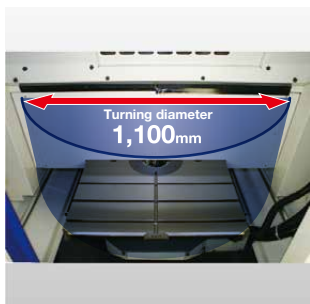
Rotary table T-200Ad

Reduction in the body width secures a wider jig area. Use of the roller gear cam mechanism achieves high productivity, high accuracy, and extended service life.



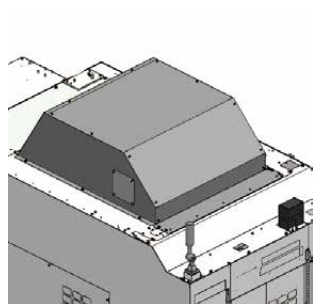
Hydraulic rotary joint (4 ports) Pneumatic relay box (12 ports)

12 pneumatic ports and 4 hydraulic ports have been prepared so that jigs that use pneumatic or hydraulic pressure can be mounted easily. * For the R450Xd2, the Y-axis travel decreases when a hydraulic rotary joint is used.



Turning diameter enlargement (R450Xd2: ø1,100, R650Xd2: ø1,300)

A wider jig area can be secured by enlarging the QT table turning diameter.



Top cover

Shutting the opening on the top prevents coolant or chips splashing outside of the machine. A hole for the mist collector is provided.



Side door with transparent window

Makes setup or tool change from the side easier. The machining room can be checked through the window. * Standard for the R450Xd2 with 22/28-tool magazine and the R650Xd2.



Spindle override

Spindle speed can be changed without changing the program.



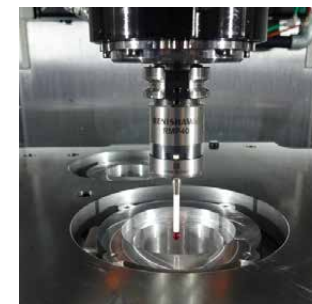
Outside rotary table switch

The outside rotary table can be operated by this switch. * A switch panel (8 holes or 10 holes) is required separately.



Mist collector

Achieves a safe and hygienic work environment by capturing mist. Installed on the top of the control box.



Touch probe

Zero-point measurements and similar operations can be performed using the probe. Measurement software and an optional datum sphere for measurement are available.



Side cover with transparent window

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

* For the R650Xd2, this option is installed on the right side when viewed from the front of the machine.



Work light (1 or 2 lamps)

LED lamps are used to extend lamp life and save energy.

* For the R450Xd2, the 1st lamp is installed on the right side, and the 2nd lamp on the left side. For the R650Xd2, the 1st and 2nd lamps are both installed on the left side.



Table light

Brightens the setup room. LED lamps are used to extend lamp life and save energy.



Signal light (1, 2, or 3 lamps)

LED lamps are used. No maintenance required. Can be tilted to improve visibility.

- Coolant tank
 - Coolant tank with chute, 150L *1
 - Coolant tank with chute, 150L for 1.5 MPa CTS pump with cyclone filter *1
 - Coolant tank with chute, 200L *2
 - Coolant tank with chute, 200L for 1.5 MPa CTS pump with cyclone filter
 - Coolant tank with chute, 250L *2
 - Coolant tank with chute, 250L for 1.5 MPa CTS pump with cyclone filter
- Coolant through spindle (CTS) piping, Max. 3.0 MPa
- Coolant through spindle (CTS) piping, Max. 7.0 MPa
- Column coolant nozzle
- Head coolant nozzle
- Chip shower
- Tool cleaning system
- Fixture shower valve unit
- Cleaning gun
- Mesh basket for collecting chips
- Mist collector
- Hydraulic rotary joint (4 ports)
- Pneumatic relay box (12 ports)
- Turning diameter enlargement (R450Xd2: ø1,100, R650Xd2: ø1,300)
- Top cover
- Side door with transparent window, right side *1
- Side cover with transparent window (R450Xd2: Left side, R650Xd2: Right side)
- Work light (1 or 2 lamps)
- Table light

- Signal light (1, 2, or 3 lamps)
- Automatic oil lubricator
- Automatic grease lubricator
- Automatic door with switch panel 10 holes
- Area sensor
- Switch panel (8 holes or 10 holes)
- Front switch panel (10 holes) *2
- Manual pulse generator with enable switch
- Connector and hook for manual pulse generator with enable switch
- Tool breakage detector, touch type
- Touch probe with basic measurement software
- Touch probe with rotary center measurement software for additional axes
- Datum sphere for measurement
- Rotary table T-200Ad
- Additional axis cable (for 1 axis, 2 axes, 3 axes, or 4 axes)
- RS232C 25-pin connector at control box
- Spindle override
- Outside rotary table switch (for 1 axis or 2 axes)
- Side magazine switch *1
- Outside start switch on the side *2
- Master on circuit
- Data protection switch, key type
- Grip cover for 14/22/28-tool magazine
- Folding door (two-door)
- Parts name sticker set
- Origin alignment mark
- Outlet in control box (100V)

- Power supply expansion 50A
 - Transformer box
 - Specified color
 - EXIO board assembly
 - 1) EXIO board, input 32/output 32, additional #1
 - 2) EXIO board, input 32/output 32, additional #2
 - PLC programming software for D00
 - Industrial network
 - 1) CC-Link, master station
 - 2) CC-Link, remote device station
 - 3) PROFIBUS DP, slave
 - 4) DeviceNet, slave
 - 5) PROFINET, slave
 - 6) EtherNet/IP, slave
 - Memory expansion 3 Gbytes
 - High accuracy mode BII (Look-ahead 1,000 blocks, smooth path offset)
 - Submicron command *3
 - Interrupt type macro
 - Rotary fixture offset
 - Feature coordinates setting *4
 - Involute interpolation
 - Vibration adjustment
- *1. Can only be selected for the R450Xd2.
*2. Can only be selected for the R650Xd2
*3. When the submicron command is used, changing to the conversation language program is disabled.
*4. There are restrictions on the axis configuration.

Machine Specifications

Item		R450Xd2/R450Xd2 RD *12	R650Xd2/R650Xd2 RD *12	
			14/22/28 tool magazine	40-tool magazine
CNC Unit		CNC-D00	CNC-D00	
Travels	X axis	mm(inch)	450 (17.7)	650 (25.6)
	Y axis	mm(inch)	320 (12.6) *7	400 (15.7)
	Z axis	mm(inch)	305 (12.0)	435 (17.1)
	Distance between table top and spindle nose end	mm(inch)	200~505 (7.9~19.9)[280~585 (11.0~23.0) *8]	250~555 (9.8~21.8) [350~655 (13.8~25.8) *8] 250~685 (9.8~27.0) [350~785 (13.8~30.9) *8]
Table	Work area size	mm(inch)	One face 600 x 300 (23.6 x 11.8)	One face 800 x 400 (31.5 x 15.7)
	Max.loading capacity(uniform load)	kg(lbs)	One face 120 (265) [200(441) *6]	One face 200 (441) [300 (661) *6]
	Position time	sec.	2.7 *11	3.1 *11
Spindle	Spindle speed	min ⁻¹	12,000min ⁻¹ spec.: 1~12,000 10,000min ⁻¹ high-torque spec. (optional): 1~10,000 20,000min ⁻¹ spec. (optional): 1~20,000	12,000min ⁻¹ spec.: 1~12,000 10,000min ⁻¹ high-torque spec. (optional): 1~10,000 20,000min ⁻¹ spec. (optional): 1~20,000
	Speed during tapping	min ⁻¹	MAX. 6,000	MAX. 6,000
	Tapered hole		7/24 tapered No.30	7/24 tapered No.30
	BT dual contact system(BIG-PLUS)		Optional	Optional
	Coolant Through Spindle(CTS)		Optional	Optional
Feed rate	Rapid traverse rate(XYZ axes)	m/min(inch/min)	50 x 50 x 50 (1,969 x 1,969 x 1,969)	50 x 50 x 50 (1,969 x 1,969 x 1,969)
	Cutting feed rate	mm/min(inch/min)	X, Y, Z axis : 1~30,000 (0.04~1,181) *9	X, Y, Z axis: 1~30,000 (0.04~1,181) *9
ATC unit	Tool shank type		MAS-BT30	MAS-BT30
	Pull stud type *4		MAS-P30T-2	MAS-P30T-2
	Tool storage capacity	pcs.	14 / 22 / 28	40
	Max. tool length *1	mm(inch)	200 (7.9)	250 (9.8)
	Max. tool diameter *1	mm(inch)	80 (3.1)	55 (2.1) / 125 (4.9) No adjacent tool
	Max. tool weight *1	kg(lbs)	3.0 (6.6) <total tool weight: 25 (55.1) for 14-tool, 40 (88.2) for 22/28 tool>	4.0 (8.8) <total tool weight: 80 (176.3) >
	Tool selection method		Random shortcut method	Double arm method (random closet path)
Tool change time	Tool To Chip	sec.	0.6 / 0.7 (14-tool / 22 or 28 tool)	0.6 / 0.8 (14-tool / 22 or 28 tool)
	Tool To Chip	sec.	1.3 / 1.5 (14-tool / 22 or 28 tool)	1.4 / 1.5 (14-tool / 22 or 28 tool)
Electric motor	Main spindle motor (10min/continuous) *2	kW	12,000min ⁻¹ spec.: 10.1/7.0 10,000min ⁻¹ high-torque spec. (optional): 12.8/9.2 20,000min ⁻¹ spec. (optional): 7.4/5.1	12,000min ⁻¹ spec.: 10.1/7.0 10,000min ⁻¹ high-torque spec. (optional): 12.8/9.2 20,000min ⁻¹ spec. (optional): 7.4/5.1
	Axis feed motor	kW	X, Y axis: 1.0 Z axis: 1.8	X, Y axis: 1.0 Z axis: 1.8
Power source	Power supply		200 to 230 VAC ±10%, 3phase, 50/60Hz±2%	200 to 230 VAC ±10%, 3phase, 50/60Hz±2%
	Power capacity (continuous)	kVA	10.4	10.4
	Air supply	Regular air pressure MPa	0.4~0.6 (recommended value : 0.5MPa *10)	0.4~0.6 (recommended value: 0.5MPa *10)
		Required flow L/min	40	40 65
Machine dimensions	Height	mm(inch)	2,584 (101.7)	2,704 (106.5)
	Required floor space *13 (with control unit door open)	mm(inch)	1,400 x 2,609 [3,448] (55.1 x 102.7 [135.7])	1,830 x 3,029 [3,868] (72.0 x 119.3 [152.3]) 2,145 x 3,029 [3,868] (84.4 x 119.3 [152.3])
Accuracy *3		kg(lbs)	2,750 (6,063)	3,550 (7,826) 4,150 (9,149)
	Accuracy of bidirectional axis positioning(ISO230-2: 1988)	mm(inch)	0.006~0.020 (0.00024~0.00079)	0.006~0.020 (0.00024~0.00079)
Front door	Repeatability of bidirectional axis positioning(ISO230-2: 2014)	mm(inch)	Less than 0.004 (0.00016)	Less than 0.004 (0.00016)
			2doors	2doors
Standard accessories			Instruction Manual (DVD 1 set), leveling bolts (4 pcs.) [R650Xd2: 5 pcs.], leveling plates (4 pcs.) [R650Xd2: 5 pcs.]	

*1 The maximum tool length, maximum diameter, and maximum weight are limited depending on the spindle speed in use, configuration, center of gravity, etc. The figures shown here are for reference only. Please contact your local distributor for details. *2 Spindle motor output differs depending on the spindle speed. *3 Measured in compliance with ISO standards and Brother standards. Please contact your local distributor for details. *4 Brother specifications apply to the pull studs for CTS. *5 Measured in compliance with JIS B6336-9 and MAS011-1987. *6 Can be increased up to R450Xd2: 200kg, R650Xd2: 300kg (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 recommend value. *11 When table loading on one face is R450Xd2: 120kg, R650Xd2: 200kg. *12 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. *13 The value does not include the coolant tank or chip conveyor. *14 When the turning diameter enlargement option is selected.

Quick turn table specifications

Item		R450Xd2	R650Xd2
Type		0 deg./180 deg. turntable system	0 deg./180 deg. turntable system
Table dimension	mm(inch)	One face 600 x 420 (23.6 x 16.5)	One face 800 x 535 (31.5 x 21.1)
Max. turning diameter	mm(inch)	ø1,020 (40.2) [ø1,100 (43.3)] *14	ø1,250 (49.2) [ø1,300 (51.2)] *14
Max. jig height	mm(inch)	300 (11.8) [380 (15.0)] *8	350 (13.8) [450 (17.7)] *8
Table work area size	mm(inch)	One face 600 x 300 (23.6 x 11.8)	One face 800 x 400 (31.5 x 15.7)
Max. loading capacity	kg (lbs)	One face 120 (265) [200 (441)] *6	One face 200 (441) [300 (661)] *6
Rated table load inertia for turning axis	kg・m ²	One face 14.2 [23.5] *6	One face 35.8 [53.7] *6
Table turning system		AC servo motor(1kW) Worm gear(total speed reduction ratio:1/50)	AC servo motor(0.82kW) Worm gear(total speed reduction ratio:1/60)
Table position time	sec	2.7 *11	3.1 *11
Table change repeatability	mm(inch)	0.005 (0.0002)	0.005 (0.0002)
		(in the X,Y, and Z axes directions 270(10.6) from the center of rotation)	(in the X,Y, and Z axes directions 335(13.2) from the center of rotation)

*Quick Turn table is a turntable type 2-face pallet changer.

NC unit specifications

CNC model	CNC-D00
Control axes	7 axes (X, Y, Z, four 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	0.001 mm, 0.0001 inch, 0.001 deg. 0.0001 mm, 0.00001 inch, 0.0001 deg. (optional)
Max. programmable dimension	±999999.999 mm, ±99999.9999 inch ±999999.9999 mm, ±99999.99999 inch (optional)

Display	15-inch color LCD touch display
Memory capacity	500 Mbytes, 3 Gbytes (optional) (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, which will differ depending on the shipping destination or machine specifications.
* Ethernet is a registered trademark of Xerox Corporation in the United States.

NC functions

Operation	Dry run	Monitoring	Machining load monitoring	Energy saving	Automatic power off	Cutter compensation
	Machine lock		ATC tool monitoring *4	Standby mode	Scaling	
	Program restart		Overload prediction	Automatic coolant off	Mirror image	
	Rapid traverse override		Waveform display /	Automatic work light off	External sub program call	
	Cutting feed override		Waveform output to memory card	Chip shower off delay	Macro	
	Background editing		Automatic thermal distortion compensation (X, Y, and Z axes)	Chip shower energy savings operation	Tape operation / FTP load operation	
	Screen shot		Production performance display	Energy savings mode	Multiple skip function	
	Operation level		Tool life / Spare tool	Support apps	<Optional>	
	External input signal key		Stuck chips detection function	Adjust machine parameters	Submicron command *2	
	Shortcut key		Maintenance	Tap return function	ATC tool	
<Optional>	Status log	Tool life		Rotary fixture offset		
Spindle override	Alarm log	Waveform display		Feature coordinates setting *3		
Programming	Absolute / Incremental	Operation log		Production performance	Involute interpolation	
	Inch / Metric	Maintenance notice		Energy saving/Power consumption	Vibration adjustment	
	Coordinate system setting	Motor insulation resistance measurement		Recovery support	Functions limited to conversation language	Operation program
	Corner C / Corner R	Tool cleaning filter with filter clogging detection		Inspection		Schedule program
	Rotational transformation	Battery-free encoder		PLC		Automatic tool selection
	Synchronized tap	Brake load test		Machining support without warmup		Automatic cutting condition setting
	Subprogram	Accessories		Software control panel		Automatic tool length compensation setting
	Graphic display		File viewer	Automatic cutter compensation setting		
	Automatic workpiece measurement *1		Notebook	Automatic calculation of unknown number input		
	Tool length measurement		Calculator	Machining order control		
High speed and high accuracy	Automatic / Network		OPC UA	Register shortcut		
			Auto notification	Display off		
			Built-in PLC (LD/ST/FBD)	Functions limited to NC language	Menu programming	
			<Optional>		Local coordinate system	
			CC-Link, master station		Expanded workpiece coordinate system	
			CC-Link, remote device station		One-way positioning	
		PROFIBUS DP, slave	Inverse time feed			
		DeviceNet, slave	Programmable data input			
		PROFINET, slave	Tool length compensation			
		EtherNet/IP, slave				

*1. For the measuring instrument, please select an optional touch probe or provide one yourself. *2. When the submicron command is used, changing to the conversation language program is disabled. *3. There are restrictions on the axis configuration. *4. ATC tool monitoring cannot be available for the 40-tool magazine specifications.

- * For the 20,000min⁻¹ coolant through spindle specifications, dry machining may not possible depending on workpiece material.
For further details, please contact your local distributor.
* The type of coolant may have a significant influence on the machine's lifecycle. It is recommended to use high-lubricity (emulsion type) coolant.
Do not use chemical solution type (synthetic type) coolant, as it may cause damage to the machine.
* When using CTS (Coolant Through Spindle) function, do not use flammable coolant (ex. oil-based type).

- Please read the instruction manuals and safety manuals before using Brother products for your own safety.
When using oil-based coolant or when machining the materials which can cause a fire (ex. Magnesium, resin), customers are requested to take thorough safety measures against fire.
The types of cutting material, cutting tools, coolant, or lubrication oil may have an influence on the machine's lifecycle.
For further questions, please contact your local distributor.

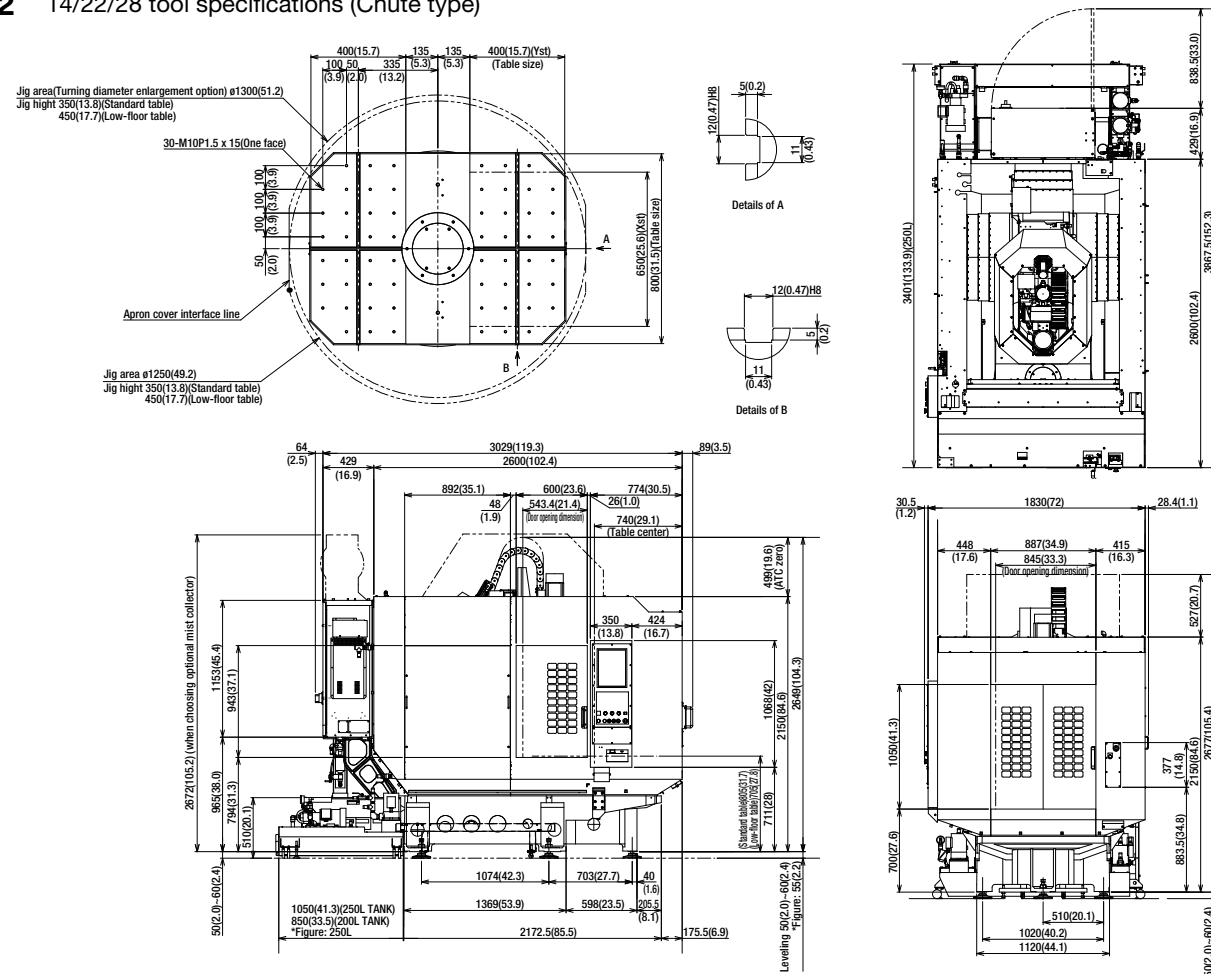
- Leave 700 mm between machines as maintenance space.

- When exporting our machine together with additional 1-axis rotary table or compound rotary table (including case where 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 Act 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.

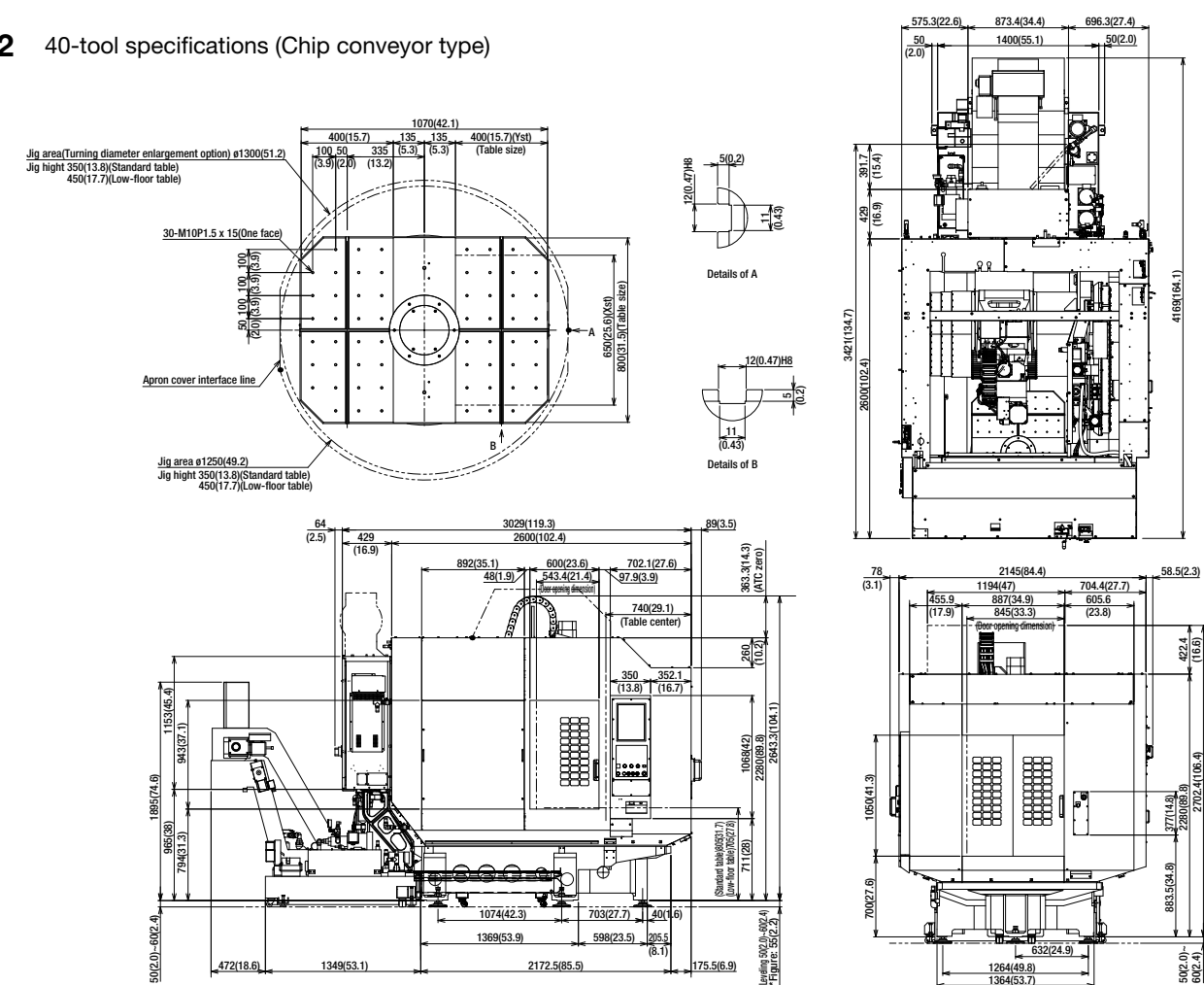
- When exporting our machine together with compound rotary table (including cases where a rotary table is scheduled to be installed overseas), as a machine conforming to Row 2 of Appended Table 1 of Export Trade Control Order, a relocation detection device is installed on the machine depending on the 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, a 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 some countries and regions other than “Group A countries”, it is not possible to install a compound rotary table separately overseas after exporting the machine. Please make sure you obtain an export license for the machine together with compound rotary table before shipment.

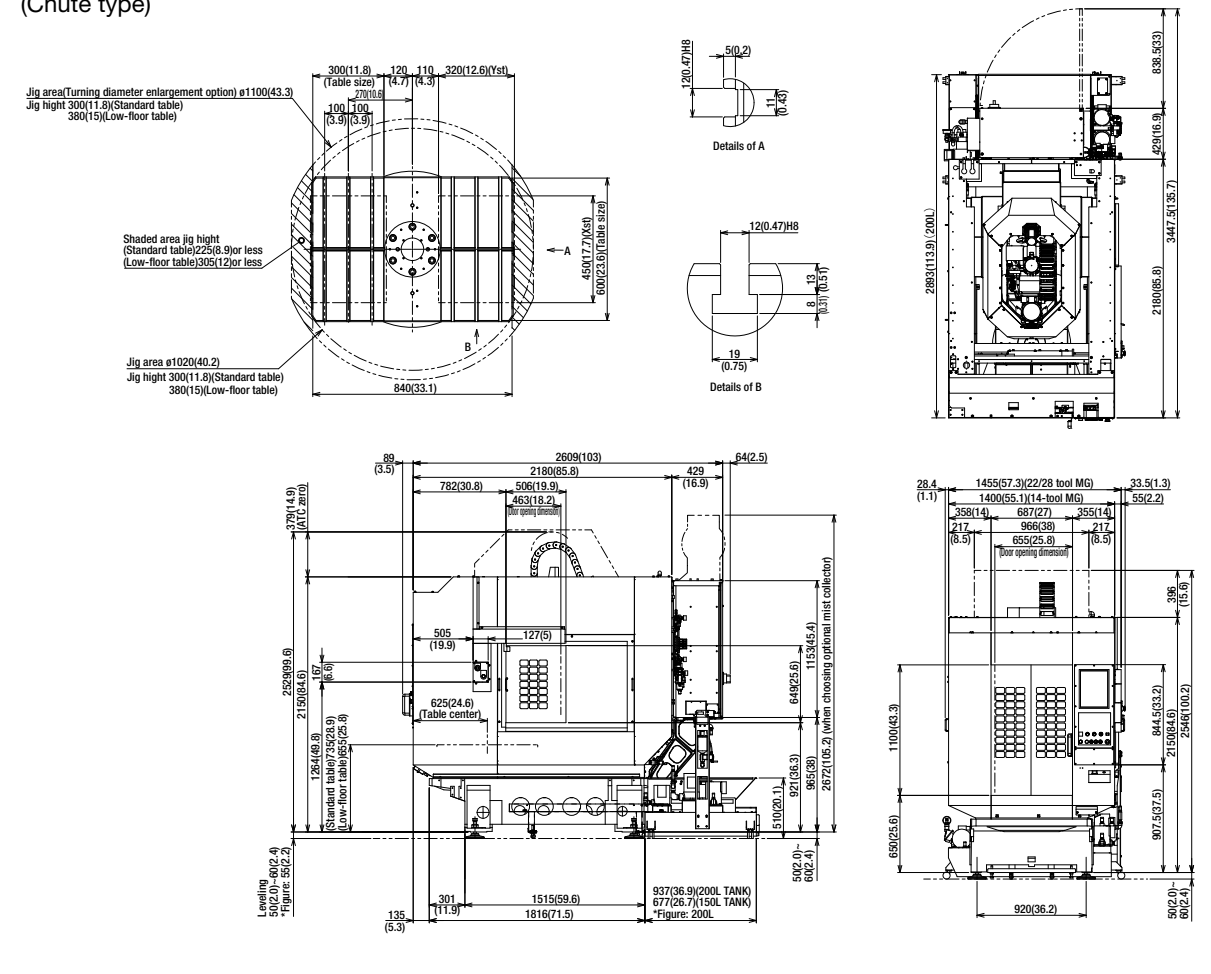
R650Xd2 14/22/28 tool specifications (Chute type)



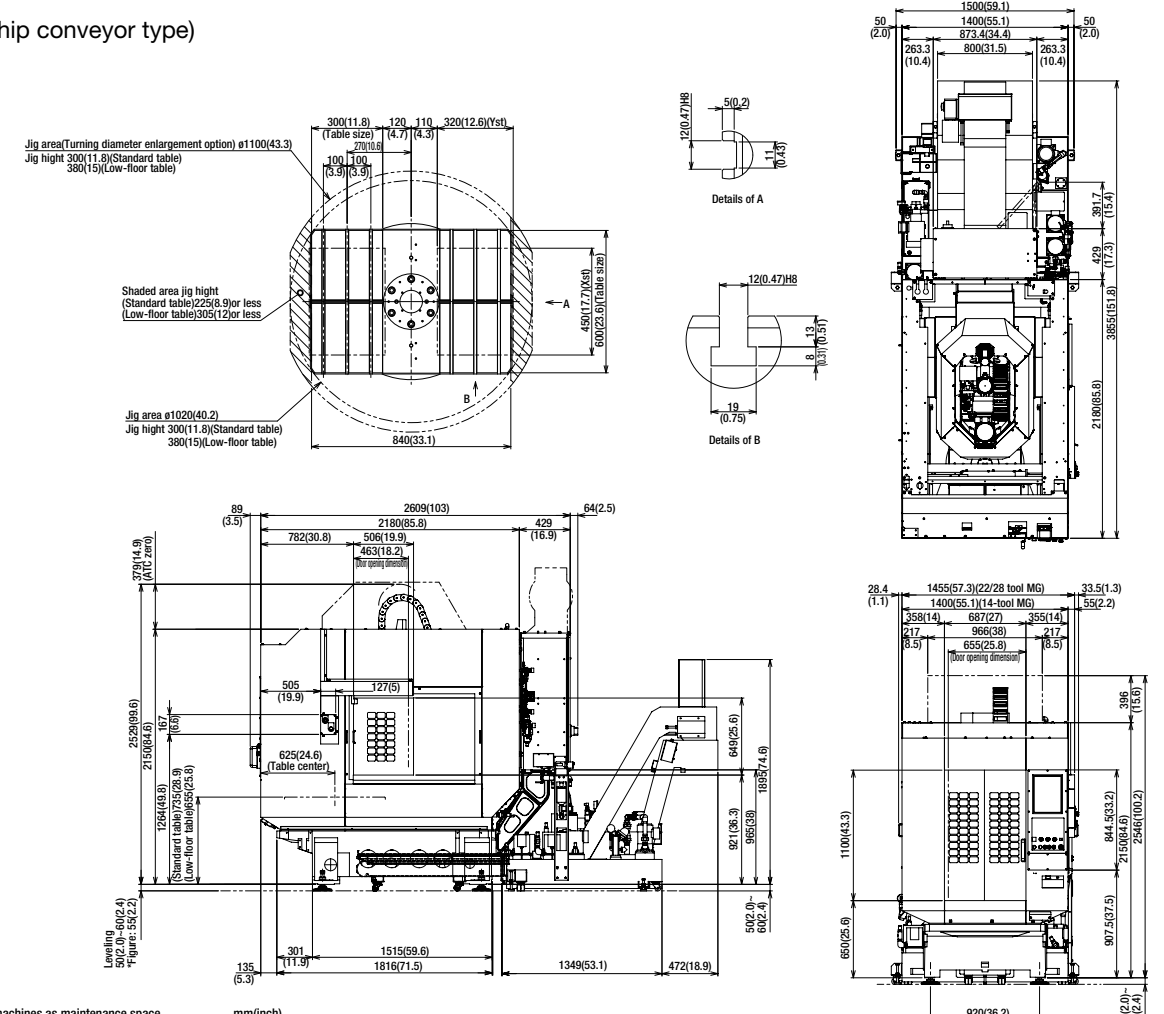
R650Xd2 40-tool specifications (Chip conveyor type)



R450Xd2 (Chute type)



R450Xd2 (Chip conveyor type)



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Figures in brackets () are the country codes.

Specifications may be subject to change without any notice.

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Please check here for detailed information
and the latest information of the base.

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