brother
at your side

SPEEDIO

DG-1

Deburring Center

Deburring Center

Deburring Center

DG-1

Mechanizes manual deburring of die casting material in variable-type variable-volume production

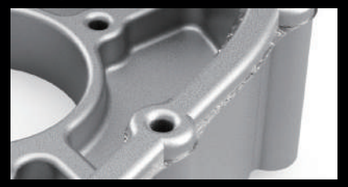
Deburring of die casting material in variable-type variable-volume production is currently performed manually, since using a robot system for this operation is inefficient.
Due to problems such as operator shortages and difficult work environments, the need for mechanization has increased.
The DG-1 Deburring Center has deburring setup functions achieved by Brother's original technology to enable mechanization of manual deburring.

Die casting parts manufacturing processes

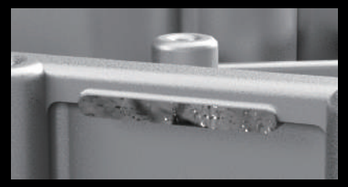
Material molding → **Material deburring** → Machining → Deburring after machining → Cleaning → Inspection

Target burrs

Parting line (Flash)

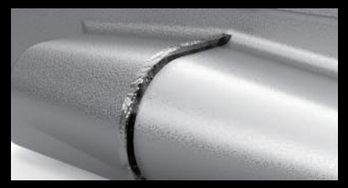


Gate/Overflow



Ejector pin mark

Gap in slide



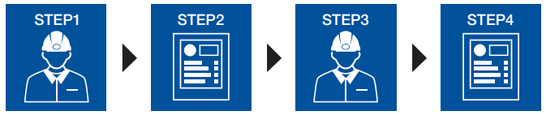
Brother's original functions greatly improve deburring efficiency

Brother's original deburring setup functions greatly improve deburring efficiency in variable-type variable-volume production, which is currently performed manually.

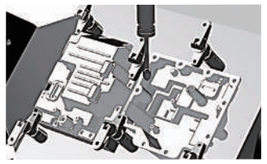
Three features that encourage mechanization of manual deburring

The DG-1 Deburring Center has Brother's original deburring functions. Simple teaching and correction, and automatic path creation enable fast deburring setup. Optimal machine configuration supports a variety of burr types, and achieves high chip evacuation for dry machining, which encourages mechanization of manual deburring.

(1) Fast machining path creation or correction (Brother's original deburring setup functions)



(2) Supports a wide range of deburring operations

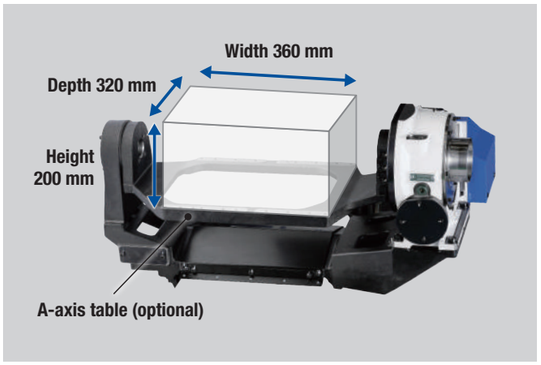


(3) High chip evacuation for dry machining

Jig area

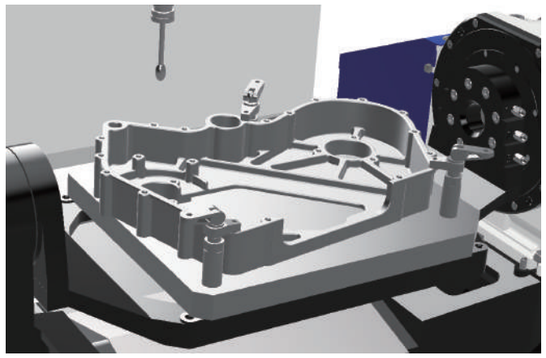
Controlled by four axes, including the tilt axis (A axis) of the roller gear cam structure. Ample jig area is secured, enabling highly flexible jig design.
An A-axis table (optional) is available to configure the trunnion jig between the faceplate of the tilt axis and the support.

Mounting range when A-axis table (optional) is selected (reference dimensions)

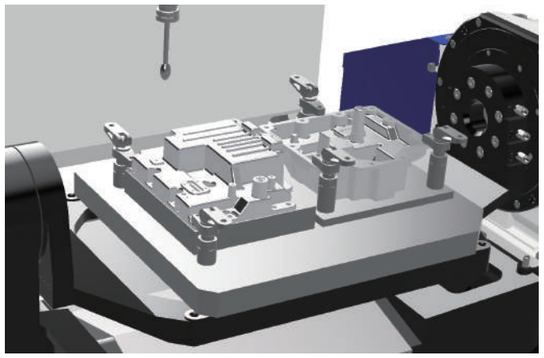


Jig mounting example

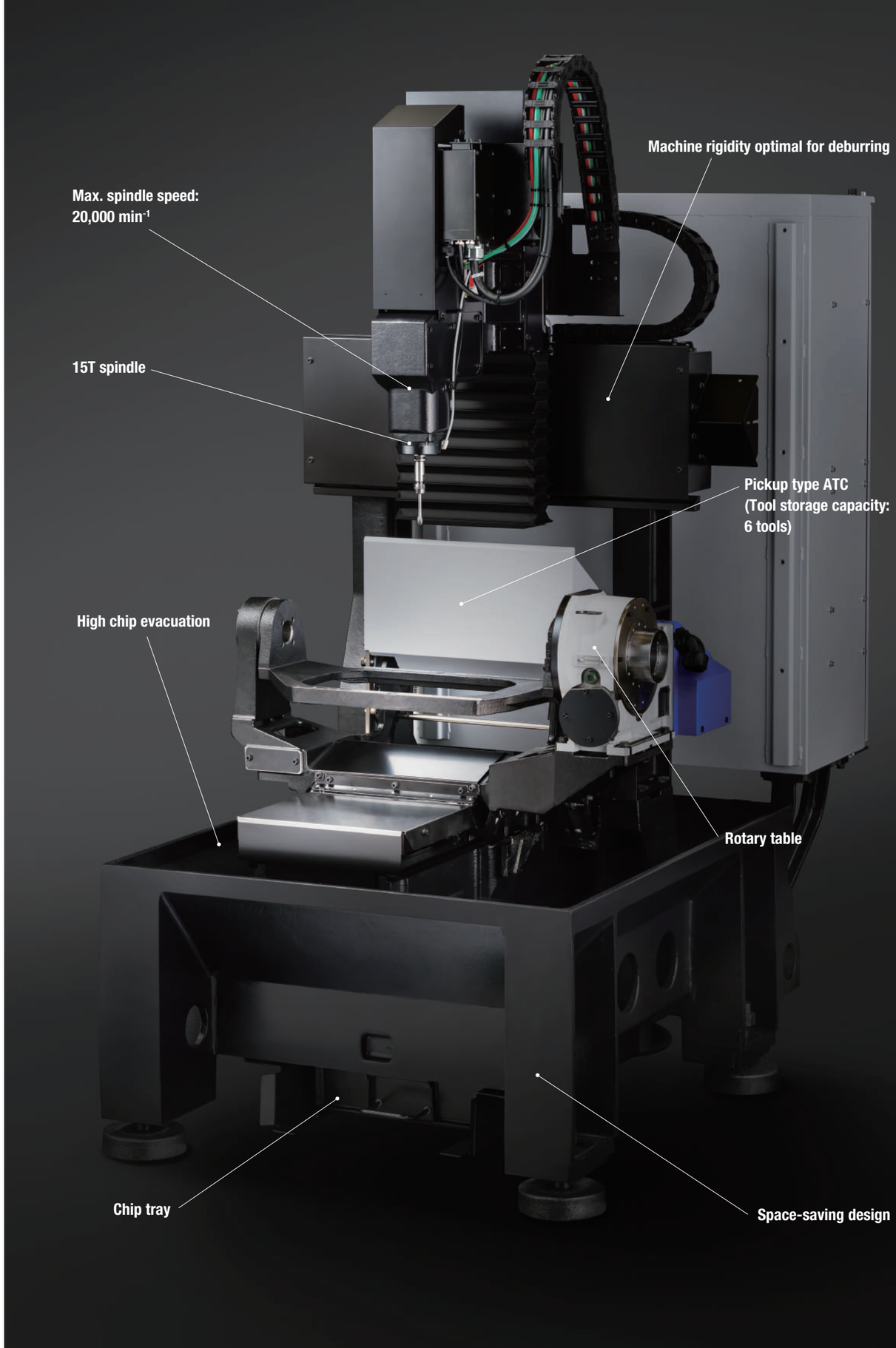
Waste-free machine configuration enables highly flexible jig design, making it easier to mount jigs for large workpieces or jigs for multi-part machining.



Large workpiece (size: 365 x 270 x 45 mm)



Two small workpieces



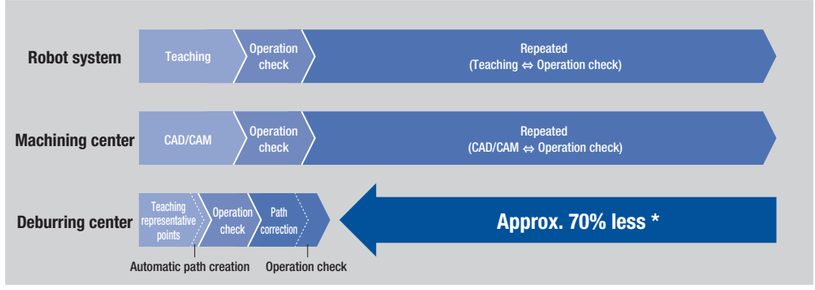
Great reduction in deburring setup manhours

Create simple machining paths in a short time

The machine has Brother's original deburring setup functions, including easy teaching of representative points, intuitive path correction, automatic machining path creation, and automatic machining program conversion.
Fast deburring setup has been achieved, enabling mechanization of deburring in variable-type variable-volume production that is currently performed manually.

Comparison of deburring setup processes

Teaching representative points, automatic path creation, and easy path correction significantly reduce deburring setup time. The machining path can be easily created by profiling the material, eliminating the need for repeated reteaching or CAD/CAM data correction as is required for robots or machining centers.



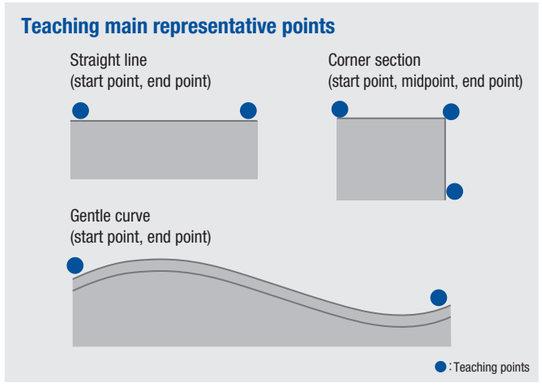
* Comparison of setup time using a sample workpiece

STEP1 Teaching representative points

Operator

Teaching representative points is conducted by allowing the tool to contact the master workpiece*1. The number of teaching points is less than robots, and there is no need to define straight lines or arcs. For a gentle curve, a machining path can be created automatically by teaching only the start and end points.

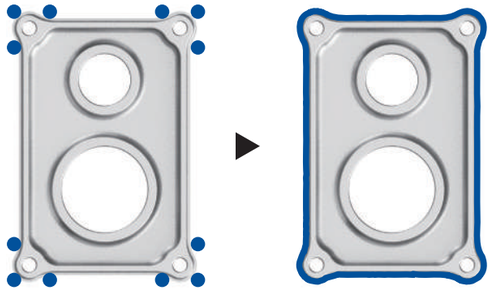
*1. Please prepare a cleanly deburred workpiece as a master workpiece.



STEP2 Automatic machining path creation

DG-1

The machining path is created automatically by profiling the master workpiece based on the representative points that have been taught. This requires less correction of the path than robots or machining centers.



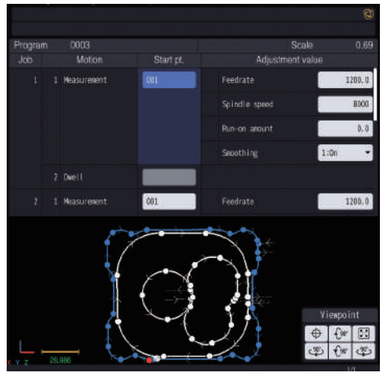
Teaching representative points

Automatic machining path creation

STEP3 Path correction by intuitive operation

Operator

The touch panel can be used to instruct correction points, and the machining path and conditions can be corrected by intuitive operation.
Since correction is possible for each teaching point or area, reteaching, such as required for robots, is not necessary.

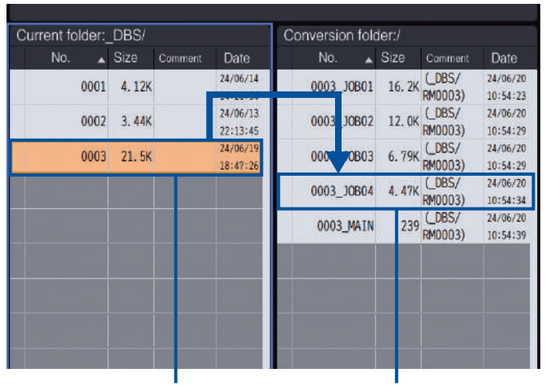


Correction screen

STEP4 Automatic machining program conversion

DG-1

Automatically converts the machining path and condition data into a machining program. No programming expertise is required, enabling easy creation of machining programs. Furthermore, advanced programming with macro programs is also possible by editing the automatically created machining program.



Machining path and condition data

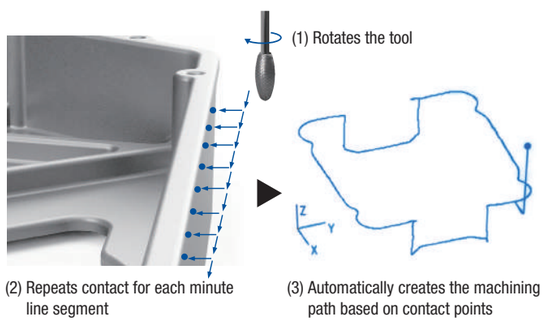
Machining program

Teaching controller (optional)

Moving direction and speed can be intuitively manipulated to improve the efficiency of teaching representative points.

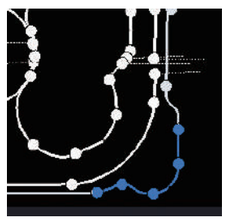
Machining path creation image

Based on the representative points that have been taught, the machining path is created automatically by rotating the tool and repeating contact with the master workpiece.



(2) Repeats contact for each minute line segment

(3) Automatically creates the machining path based on contact points



Select teaching points/area (blue)

Correction procedure
(1) Select teaching points/area you want to correct.
(2) Input correction.

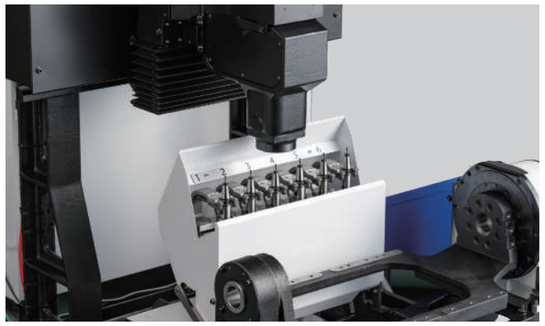
Deburring setup video

Scan or Click

Equipped with pickup type ATC

The pickup type ATC can store six tools, and various types of deburring tools can be used. The open/close magazine cover minimizes the impact of chips.

Pickup type ATC	
Tool storage capacity : 6 tools	Tool To Tool : 3.0s

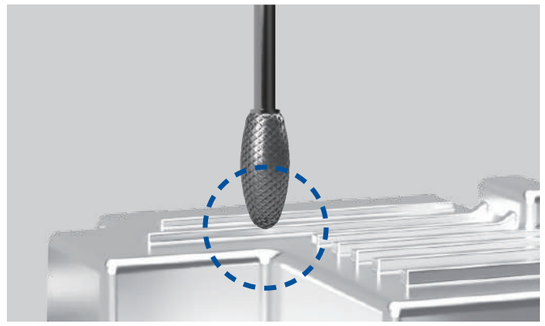


Pickup type ATC

Function that reduces risks of machine breakage in the event of teaching mistakes*1

A low torque function is provided to reduce the machine's travel speed and force. Even if teaching mistakes are made during teaching of representative points or automatic path creation is affected by teaching mistakes, the machine detects abnormal contact and stops.
This function is enabled by pressing the Low Torque key on the operation panel.

Low Torque key
on operation panel

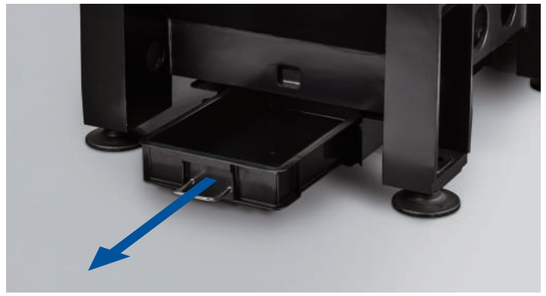


*1. This function does not prevent breakage in all collision modes.

Chip evacuation for dry machining

The direct evacuation structure evacuates chips outside the machine. Chips can be easily disposed of by drawing the chip tray from the front of the machine.

Direct evacuation structure



Chip tray (front draw type) *2

*2. Can be changed to rear draw type.

- Please read the instruction manuals and safety manuals before using Brother products for your own safety.
- This machine is exclusively for dry machining of aluminum alloy. Do not use the machine for other materials.
- Dust collectors, vacuum cleaners, and air blowers must not be used due to the risk of fire or explosion. Take adequate safety measures against fire and explosion.
- Machine life may be affected, depending on machining materials, tools, etc. For further questions, please contact our sales representative.
- Leave 700 mm between machines as maintenance space.
- When exporting our machine, 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.

Teaching controller

Controller with a cable, used for moving axes or teaching representative points of a deburring shape. Equipped with emergency stop and enable switches.

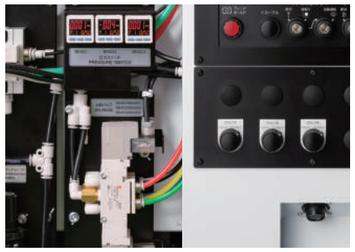
* A manual pulse generator option is not available.

A-axis table

Used to configure the trunnion jig between the faceplate of the tilt axis and the support. Positioning pin holes are provided.

Rotary joint

Pneumatic 6-port rotary joint built into the tilt axis. Pneumatic piping to the rear of the machine is included with this option.



Jig control valve unit

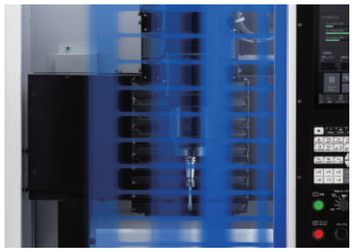
Valve set for jig control, composed of 3 valves, 3 pressure switches, and 3 select switches. Please prepare piping separately.

* The switch panel (10 holes) is not included.

Side cover with transparent window, single side

Allows external light into the inside of the machine to make it brighter, making the machining chamber easier to see.

* When needed for both sides of the machine, please order two covers.



Automatic door with switch panel (10 holes)

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

Work light (1 or 2 lamps)

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

* The 1st lamp is installed on the front and the 2nd lamp is installed on the left inside the machine.

Signal light (1, 2, or 3 lamps)

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

Tool breakage detector, touch type

A touch switch type tool breakage detector is available.

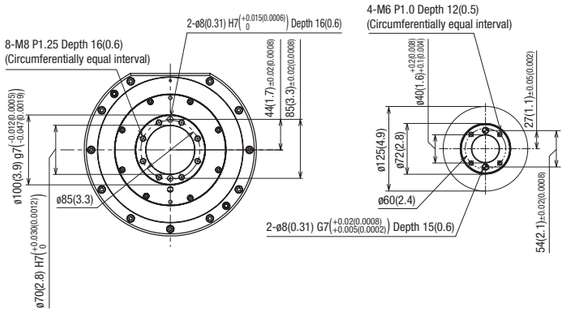
- Teaching controller
- A-axis table
- Rotary joint 6 ports
- Jig control valve unit (3-row)
- Side cover with transparent window, single side
- Work light (1 or 2 lamps)
- Signal light (1, 2, or 3 lamps)
- Automatic door with switch panel (10 holes)
- Switch panel (10 holes)
- Tool breakage detector, touch type
- Spindle override
- Specified color

- Transformer box
- 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
- Interrupt type macro
- Rotary fixture offset

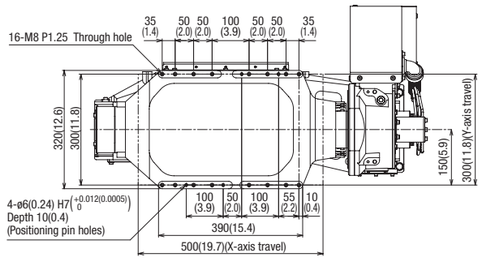
■Table details

Driving side

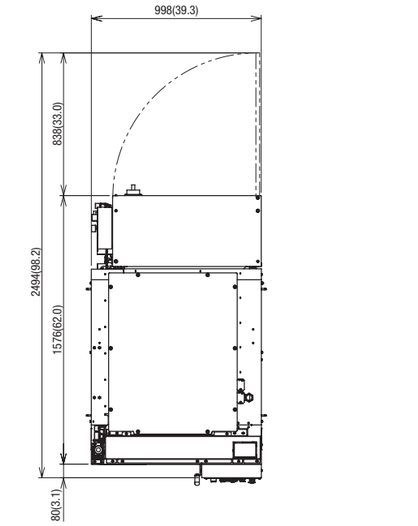


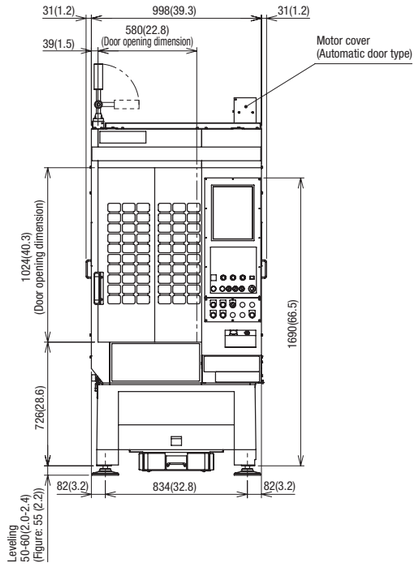
Driven side

■A-axis table (optional)

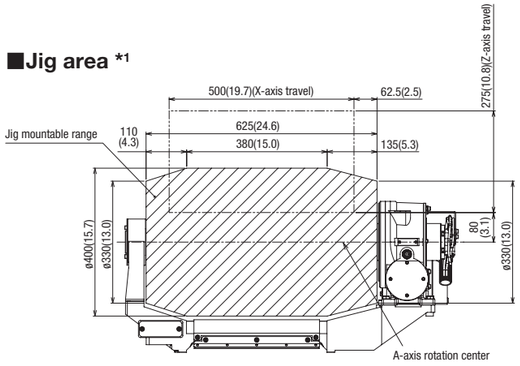


■External dimensions

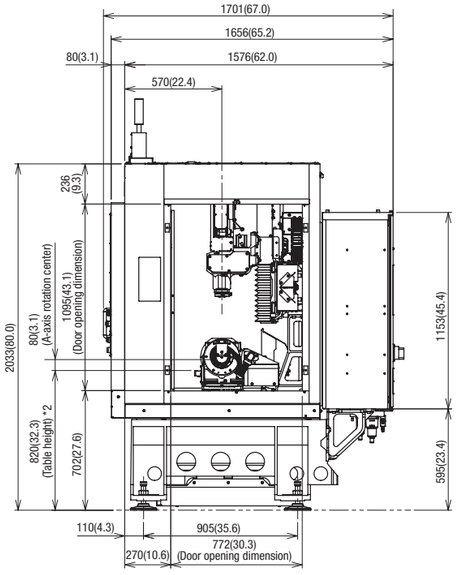




■Jig area *1



*1. Jig area when the A-axis table and tool breakage detector are not mounted.
Please check the external views or interference diagrams provided by Brother when designing jigs or checking for interference.



*2. Dimensions when the A-axis of the A-axis table (optional) is at 0 deg.

mm(inch)

Machine specifications

Item			Deburring Center DG-1
CNC Unit			CNC-D00
Travels	X axis	mm(inch)	500 (19.7)
	Y axis	mm(inch)	300 (11.8)
	Z axis	mm(inch)	275 (10.8)
	A axis	deg.	360
	Distance between A -axis rotation center and spindle nose end	mm(inch)	80~355 (3.1~14.0)
Table	Max. loading capacity	kg(lbs)	50 (110)
	Max. table load inertia	kg·m²(lb·inch²)	0.7 (2,392)
Spindle	Spindle speed	min⁻¹	1~20,000
	Tapered hole		7/24 tapered No.15
Feed rate	Rapid traverse rate (XYZ-area)	m/min(inch/min)	40 x 40 x 40 (1,575 x 1,575 x 1,575)
	Cutting feed rate	mm/min(inch/min)	X, Y, Z axis: 1~30,000 (0.04~1,181) *6
	Indexing feedrate (A)	min⁻¹	100
ATC unit	Tool shank type		JBS4002-15T
	Pull stud type *3		JBS4002-15P (45°)
	Tool storage capacity	pcs.	6
	Max. tool length	mm(inch)	150 (5.9)
	Max. tool diameter	mm(inch)	32 (1.2)
	Max. tool weight *1	kg(lbs)	0.4 (0.9)
	Tool selection method		Pickup method
Tool change time *4	Tool To Tool	sec.	3.0
	Chip To Chip	sec.	4.3
Electric motor	Main spindle motor (continuous) *2	kW	2.1
	Axis feed motor	kW	X, Y, Z axis: 0.32 A axis: 0.9
Power source	Power supply		AC 200 to 230 V±10%, 3-phase, 50/60Hz±2%
	Power capacity (continuous)	kVA	3.8
	Air supply: Regular air pressure	MPa	0.4~0.6 (recommended value 0.5MPa *5)
	Air supply: Required flow	L/min	20
Machine dimensions	Height	mm(inch)	2,033 (80.0)
	Required floor space [with control unit door open]	mm(inch)	998 x 1,656 [2,494] (39.3 x 65.2 [98.2])
	Weight	kg(lbs)	1,200 (2,646)
Standard accessories			Instruction Manual (DVD 1 set), leveling bolts (4 pcs.), leveling plate (4 pcs.) , Chip tray, Top cover

*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. Brother specifications apply to the pull studs. *4. Measured in compliance with JIS B6336-9 and MAS011-1987. *5. 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. *6. Value when using high accuracy mode B and tool center point control.

NC unit specifications

CNC model	CNC-D00	
Control axes	4 axes (X, Y, Z, A)	
Simultaneously controlled axes	Positioning	4 axes (X, Y, Z, A)
	Interpolation	Linear: 4 axes (X, Y, Z, A)
		Circular: 2 axes
		Helical/Conical: 3 axes (X, Y, Z)
Least input increment	0.0001 mm, 0.00001 inch, 0.0001 deg.	
Max. programmable dimension	±999999.9999 mm, ±99999.99999 inch	

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
No. of registrable programs	4,000 (Total capacity of program and data bank)
Program format	NC language

* “Control axes” and “Simultaneously controlled axes” indicate the maximum number of axes.
* Ethernet is a registered trademark of Xerox Corporation in the United States.

NC functions

Operation	Dry run
	Machine lock
	Program restart
	Rapid traverse override
	Cutting feed override
	Background editing
	Screen shot
	Operation level
	External input signal key
	Shortcut key
	<Optional>
	Spindle override
Programming	Absolute / Incremental
	Inch / Metric
	Coordinate system setting
	Corner C / Corner R
	Rotational transformation
	Subprogram
	Graphic display
High speed and high accuracy	High-accuracy mode AIII
	High-accuracy mode BI (Look-ahead 160 blocks)
	Tool center point control (Look-ahead 1,000 blocks)
Monitoring	Low torque function
	Overload prediction
	Waveform display / Waveform output to memory card
	Production performance display
	Tool life / Spare tool
Maintenance	Status log
	Alarm log
	Operation log
	Maintenance notice
	Motor insulation resistance measurement
	Battery-free encoder
	Brake load test
Automatic / Network	Computer remote
	OPC UA
	Auto notification
	Built-in PLC (LD/ST/FBD)
	<Optional>
	CC-Link, master station
	CC-Link, remote device station
	PROFIBUS DP, slave
	DeviceNet, slave
	PROFINET, slave
	EtherNet/IP, slave
Energy saving	Automatic power off
	Standby mode
	Automatic work light off
Support apps	Deburring program
	Adjust machine parameters
	ATC tool
	Tool life
	Waveform display
	Production performance
	Power consumption
	Recovery support
	Inspection
	PLC
Accessories	File viewer
	Notebook
	Calculator
	Register shortcut
	Display off
NC language functions	Menu programming
	Local coordinate system
	Expanded workpiece coordinate system
	One-way positioning
	Inverse time feed
	Programmable data input
	Tool length compensation
	Cutter compensation
	Scaling
	Mirror image
	External sub program call
	Macro
	Tape operation / FTP load operation
	Multiple skip function
	<Optional>
	Interrupt type macro
	Rotary fixture offset

Global Service Sites

Brother Technology Center Chicago
BROTHER INTERNATIONAL CORP.
2200 North Stonington Avenue, Suite 270, Hoffman Estates, IL 60169, U.S.A.
PHONE:(1)224-653-8415 FAX:(1)224-653-8821

Brother Technology Center Frankfurt
BROTHER INTERNATIONALE INDUSTRIEMASCHINEN GmbH
Hoechster Str.94, 65835 Liederbach, Germany
PHONE:(49)69-977-6708-0 FAX:(49)69-977-6708-80

Brother Technology Center Bengaluru
BROTHER MACHINERY INDIA PVT LTD.
SB-111-112, 1st Stage, 2nd Cross, Peenya Indl Estate, Bengaluru - 560058 Karnataka, India
PHONE:(91)80-4705-3355

Brother Technology Center Shanghai
BROTHER MACHINERY SHANGHAI LTD.
Unit 01, 5/F., No.799, West Tianshan Rd., ChangNing District Shanghai 200335, China
PHONE:(86)21-2225-6666 FAX:(86)21-2225-6688

Brother Technology Center Chongqing
BROTHER MACHINERY SHANGHAI LTD.
Room 30, 31, NO.104 Cuibai Road, Dadukou District, Chongqing Province, 400084, China
PHONE:(86)23-6865-5600 FAX:(86)23-6865-5560

Brother Technology Center Nanjing
BROTHER MACHINERY SHANGHAI LTD.
Room 106, Building 02, Tian An Cyber Park, No.36, Yongfeng Avenue, Qinhuai District,
Nanjing City, Jiangsu Province, China
PHONE:(86)25-87185503 FAX:(86)25-8718-5503

Brother Technology Center Queretaro
BROTHER INTERNATIONAL DE MÉXICO, S.A. DE C.V.
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

Brother Technology Center Bangkok
BROTHER COMMERCIAL (THAILAND) LTD.
317 Pattanakarn Road, Pravet Sub-District, Pravet District, Bangkok 10250, Thailand
PHONE:(66)2321-5910 FAX:(66)2321-5913

Brother Technology Center Gurugram
BROTHER MACHINERY INDIA PVT LTD.
Plot No. 60, Sector 34, HSIIDC, Gurugram, Haryana 122001, India
PHONE:(91)0124-4449900

Brother Technology Center Dongguan
BROTHER MACHINERY SHANGHAI LTD.
Room 103, Building 1, No.2 Nanbo Road,
Songshan Lake District, Dongguan City, Guangdong Province, China
PHONE:(86)769-2238-1505 FAX:(86)769-2238-1506

Brother Technology Center Ningbo
BROTHER MACHINERY SHANGHAI LTD.
1F, Building 1, No. 102, Hongtang South Road West Section, Jiangbei District, Ningbo City,
Zhejiang Province, China
PHONE:(86)574-87781232 FAX:(86)574-88139792

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BROTHER INDUSTRIES, LTD.

Machinery Business Division

1-5, Kitajizoyama, Noda-cho, Kariya-shi, Aichi-ken 448-0803, Japan
https://www.brother.co.jp

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