

BTH-110.R18

Shibaura Machine



BTH-110.R18

Table-Type Horizontal Boring and Milling Machine

Shibaura Machine

View the Future with You



ISO 9001



GOTEMBA plant

SHIBAURA MACHINE CO., LTD.

TOKYO MAIN BRANCH
2-2, Uchisaiwaicho 2-Chome, Chiyoda-ku, Tokyo 100-8503, Japan
TEL:+81-3-3509-0271 FAX:+81-3-3509-0335

SHIBAURA MACHINE CO., AMERICA
Chicago Head Office
755 Greenleaf Avenue, Elk Grove Village, IL 60007, U.S.A.
TEL:847-709-7199 FAX:847-593-9741

Canada Branch
6 Shields Court, Suite 101, Markham, Ontario L3R 4S1, CANADA
TEL:905-479-9111 FAX:905-479-8339

SHIBAURA MACHINE UK LTD.
66 Burners Lane, Kiln Farm, Milton Keynes MK11 3HD
UNITED KINGDOM
TEL:+44-(0)1908-562327 FAX:+44-(0)1908-562348

SHIBAURA MACHINE SINGAPORE PTE. LTD.
Head Office
123 Pioneer Road, Singapore 639596, SINGAPORE
TEL:68611455 FAX:68612023

TOSHIBA MACHINE [THAILAND] CO., LTD.
127/28 Panjathanee Tower, 23rd Floor, Nonthree Road, Khwaeng Chong
Nonthree, Khet Yannawa, Bangkok 10120, THAILAND
TEL:02-681-0158 FAX:02-681-0162

TOSHIBA MACHINE [VIETNAM] CO., LTD.
2nd, VIT Tower, No.519, Kim Ma Street,
Ba Dinh District, Hanoi, VIETNAM
TEL:024-2220-8700,8701 FAX:024-2220-8702

TOSHIBA MACHINE (CHENNAI) PRIVATE LIMITED
No. 65 (P.O. Box No. 5), Chennai-Bangalore Highway, Chembarambakkam,
Poonamallee Taluk, Thiruvallur, Chennai-600123, Tamil Nadu, INDIA
TEL:044-2681-2000 FAX:044-2681-0303

SHIBAURA MACHINE TAIWAN CO., LTD.
No.62, Lane 188, Jui-Kuang Road, Nei-Hu District, Taipei, TAIWAN
TEL:02-2659-6558 FAX:02-2659-6381

SHANGHAI TOSHIBA MACHINE CO., LTD.
Head Office
4788, Jin Du Road, Xinzhuang Industry Zone, Shanghai, 201108
PEOPLE'S REPUBLIC OF CHINA
TEL:021-5442-0606 FAX:021-5866-2450

* We reserve the right to change any of specifications in this catalog without notice in order to effect improvements.

Experience with over 8 000 machines with continual technical improvements, the “BTH-110.R18, H³” has been developed to provide horizontal boring operational ability with machining center productivity and flexibility.



BTH-110.R18 H³



Why the **H³**!

High-Rigidity

High-Accuracy

High-Speed

Designed by us to provide you with:

- Floor space saving** Efficient 6m by 6m (20ft by 20ft) “Square floor space”
- Easy chip disposal** High-level side discharge hinge-type chip conveyor
- Protective covers** Operator protection from chip and coolant with easy access
- Workability** Ease of operation with manual pendant box and environmental platform
- Operation capability** Enhanced functions and options from TOSNUC 999

That's why the H³!

Photo shows with options

Why the **H^β**!

High-Rigidity

Solid and rigid cast iron table, bed and column structures

High-Accuracy

Accuracy of feed mechanism with minimal backlash

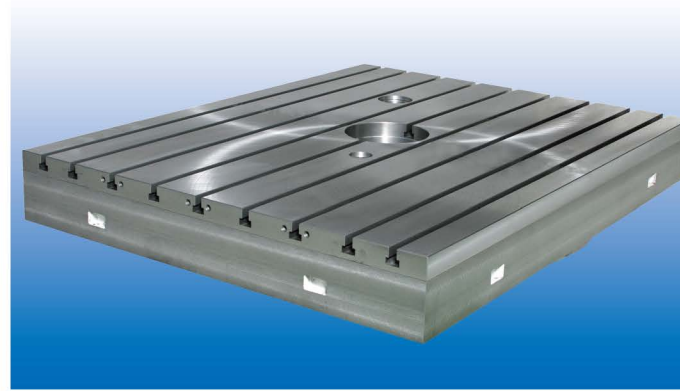
High-Speed

18m/min rapid speed is now available on Box-way guide
High power spindle motor with 4 000min⁻¹ spindle speed

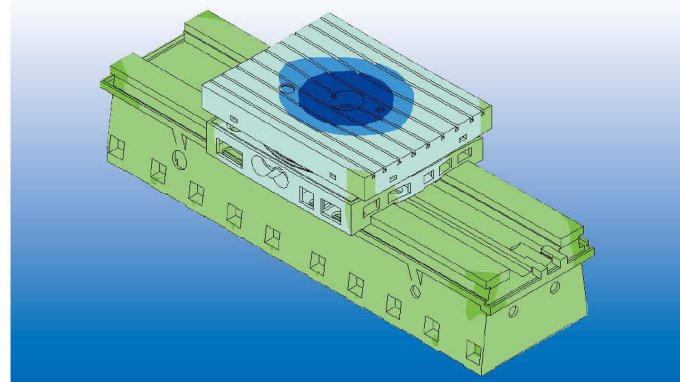


Table bed and Column bed

Rotary table



Structure analysis



Column

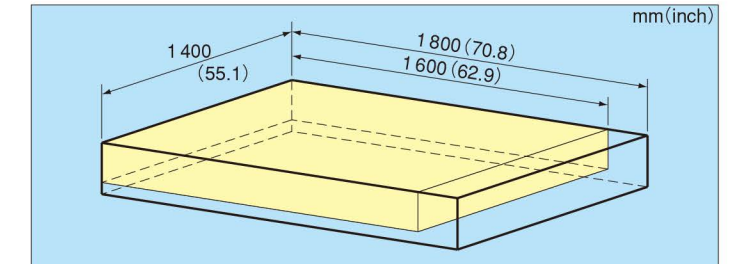


Spindle head



The extreme thick table which withstands heavy loads

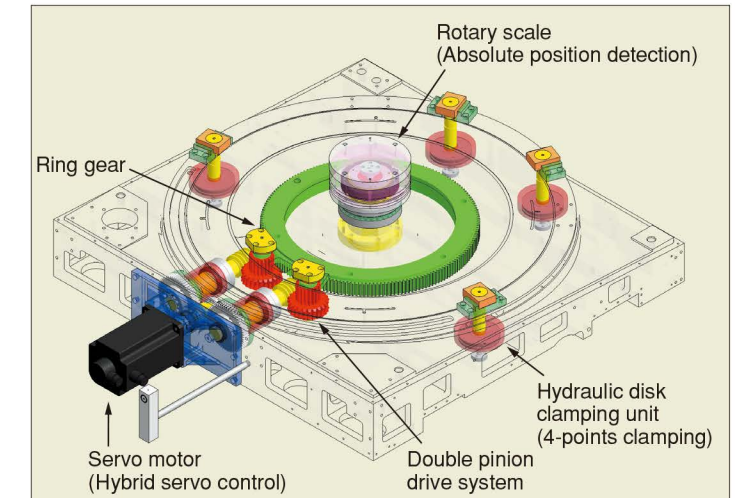
Expanded area of B axis slideway which takes heavy loads (1.4 times area of conventional machines), and increased thickness of the area.



High speed precision machining is achieved through the use of a new B-axis drive mechanism (pat. pending).

B-axis positioning time : 15sec (0°~90°)

The revolutionary type of clamp is standard with a highly rigid double pinion-type drive system and rotary scale for stabilized precision table indexing.

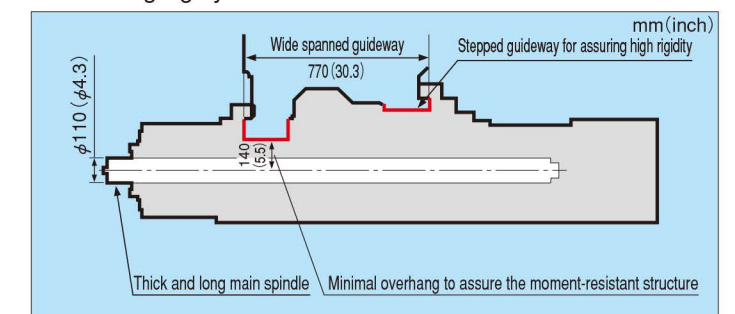


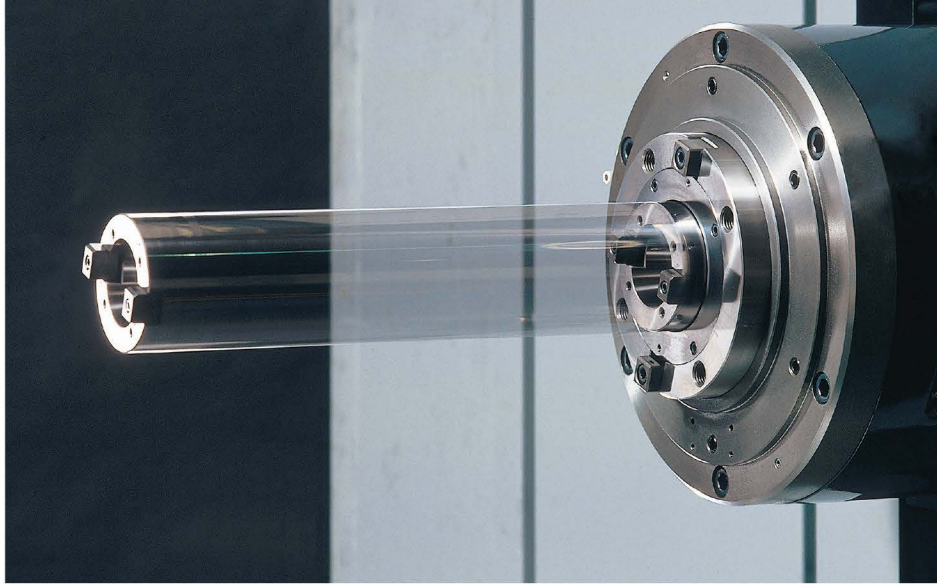
Minimal spindle overhang with stepped guideways on the column

Extra wide spanned guideways that withstand heavy-duty cutting forces, thus improving the overall performance.

Hardened and ground spindle

Main spindle completely nitrided, hardened and ground for maintaining highly accurate condition over the life of the machine.





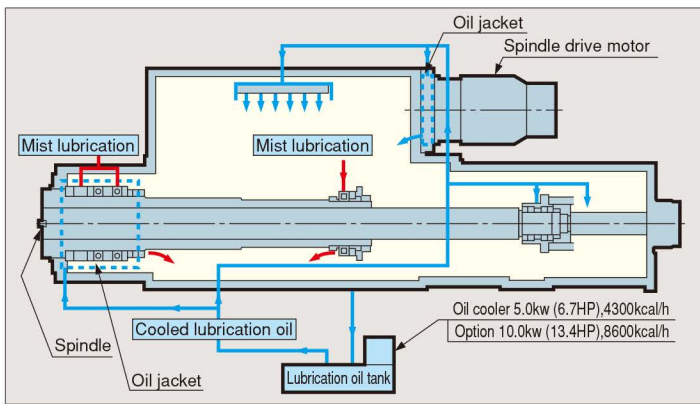
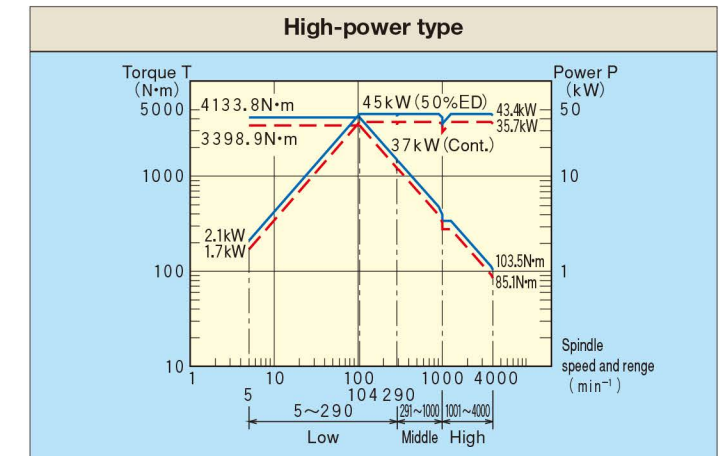
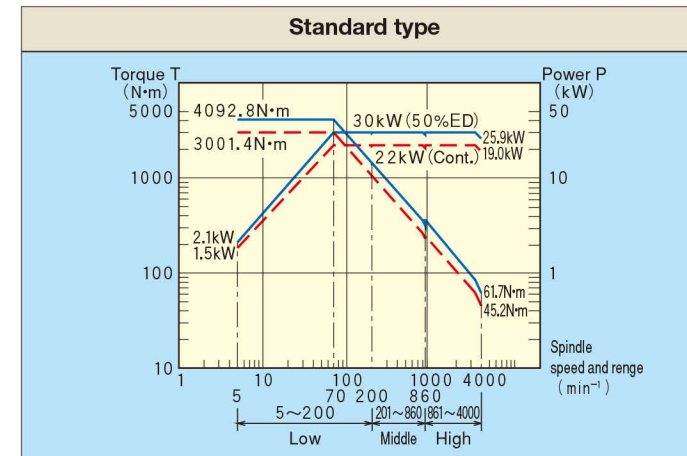
A newly developed spindle for optimum high speeds, accuracy and heavy duty machining.



The gear transmission and the winding switching control type spindle motor adapted for the main-spindle drive system realize the wide speed range, high rigidity and high torque performance. BTH-110.R18 complies with various machining needs for horizontal boring & milling machine, such as milling, boring, drilling, tapping, etc., wherefore highly accurate and efficient machining can be performed.

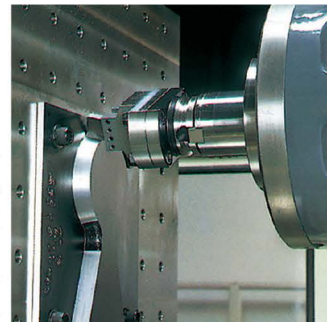
Spindle variations

Spindle-torque-output diagram



Spindle normal direction control ((spring necked turning)) (option)

Composite machining of any shape such as cutoff and hale type finishing on an arc or along a straight line on any plane is possible with this C axis spindle control. Simple-type programs and tooling available for the machining of complex seal surfaces on the slots of such workpieces as vacuum devices.



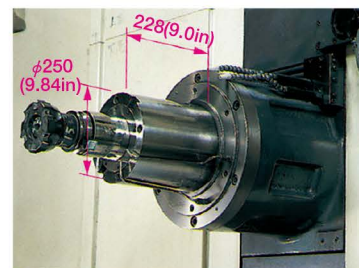
Minimal thermal displacement of spindle head

Use of an oil jacket and constant lubrication air mist volume for stabilized high accuracy cutting operations.

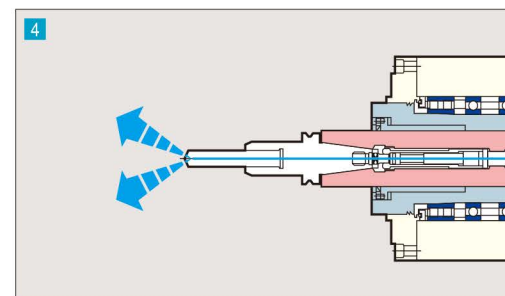
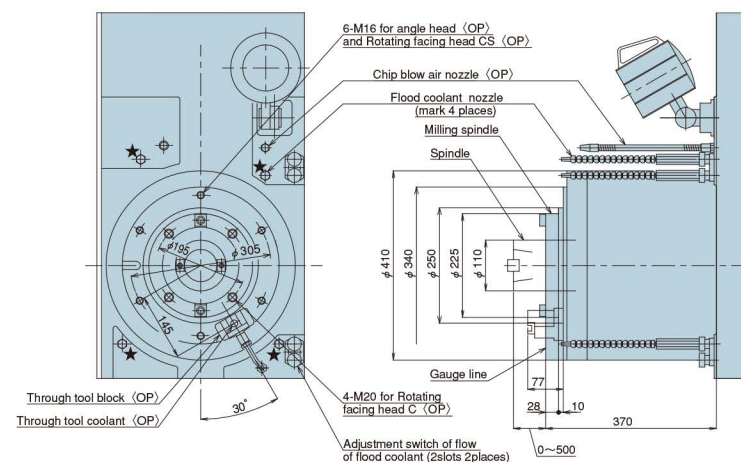
- Spindle bearings constant mist lubrication

Long nose type spindle head (option)

A long spindle head nose allows easy access to the workpiece, assuring stabilized accuracy even during heavy-duty machining operations. (The spindle extension is 500 mm (19.7 in) same as standard.)
Note : Detailed of option specifications to be decided at a separate meeting.

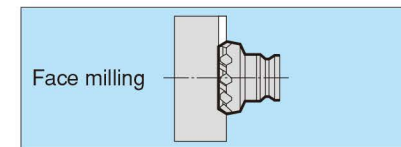


Spindle detailed drawings

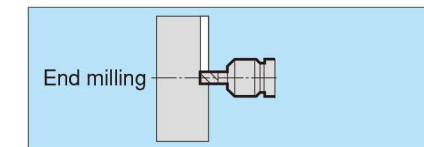


■ Through-spindle type coolant (option)

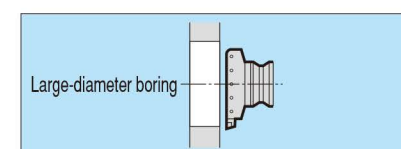
Examples of cutting capacity (Test-piece material: S55C[AISI 1055])



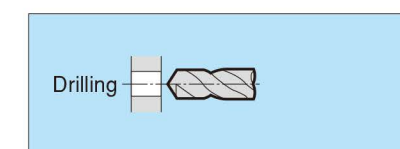
Tool diameter	160mm (6.3in)
No. of flutes	8
W axis extension	0mm (0in)
Y position	1060mm (41.7in)
Cutting depth	7mm (0.3in)
Wide of cut	120mm (4.7in)
Cutting speed	150m/min (492fpm)
Spindle speed	300min ⁻¹
Feedrate	1000mm/min (39.3ipm)
Volume of cutting	843cm ³ /min (51.4in ³ /min)



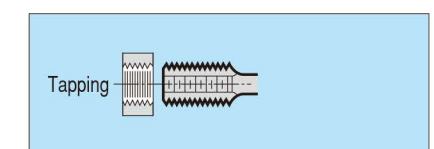
Tool diameter	80mm (3.1in)
W axis extension	150mm (5.9in)
Y position	1250mm (49.2in)
Cutting depth	25mm (1.0in)
Wide of cut	50mm (2.0in)
Cutting speed	100m/min (328fpm)
Spindle speed	400min ⁻¹
Feedrate	480mm/min (18.8ipm)
Volume of cutting	597cm ³ /min (36.4in ³ /min)



Tool diameter	600mm (23.6in)
Cutting depth	7mm (0.3in)
Cutting speed	100m/min (328fpm)
Feedrate	28mm/min (1.11ipm)
Volume of cutting	355cm ³ /min (21.6in ³ /min)



Tool diameter	69.5mm (2.7in)
W axis extension	0mm (0in)
Y position	1250mm (49.2in)
Cutting speed	22m/min (72.1fpm)
Spindle speed	100min ⁻¹
Feedrate	0.5mm/rev (0.02in/rev)



Tool diameter	M60×P5.5
W axis extension	0mm (0in)
Y position	350mm (13.8in)
Cutting speed	10m/min (32.8fpm)
Spindle speed	53min ⁻¹
Feedrate	291.5mm/min (11.5ipm)

These cutting results may differ depending on the fixturing and machining criteria, such as cutters tool-holders, etc.

TOSNUC 999 (Triple nine) permits quick switching between manual, MDI and Automatic operation modes.



Automatic mode

Manual mode

MDI mode

Full teaching



USB flash drive



Compact flash

● Customizing keys

1. Memorize a series of input operations beforehand in one of the special keys (□, ▢, ▣, ▤, ▥, ▦) and press these keys to execute operations continuously.
2. Memorize a combination of NC standard displays such as main, sub and window displays in one of the special keys (♠, ♥, ♦, ♣). By pressing these keys it displays the combination memorized.

● Supporting both USB flash drive and compact flash (CF)

TOSNUC 999 is standard equipped with USB port and CF card slot in response to capacity enlargement of NC programs.

Full screen program editing function helps create an NC program easily.

● Multi-window triple display

The display of TOSNUC 999 can be divided into three separate screens where simultaneous display of two different programs and offset data necessary for machining is possible. Also, data entry and editing can be done separately on each screen.

● Multi-editing function

A new program can be easily created by referring to and utilizing a previously made program on the multi-window display.

Visual program check function (option)

During programmed operation (i.e., background operation), an NC tape image of another program can be checked graphically. After program check, relevant tool path is drawn.

Triple teaching function for simultaneous machining and NC programming (option)

TOSNUC 999 stores in its memory all data created by the operator as NC programs. Programming is very easy by combining these programs, using various teaching functions.

● Manual teaching function

All machining data such as tool path, spindle speed and feedrate as obtained in the manual mode are stored automatically as an NC program.

● MDI teaching function

When machining processes are executed one by one consecutively in the MDI mode, all such data are stored automatically as an NC program.

● Auto teaching function

In the AUTO or DNC mode, any data which has been modified can be fed back to the memory automatically.



Multi-window triple display



NC drawing function



Manual measurement

Various functions shown above significantly improve operability

● Manual alignment (centering) function

The touch sensor or master tool comes into contact with the measured surface of a workpiece according to the interactive screen, inner and outer diameters and angle of inclination of the specific workpiece that automatically calculates set-up.

MACHINE SPECIFICATIONS

[OP: North-America version]

Machine Specifications				BTH-IIO.R18
Travel	X-axis travel (Cross movement of table)	mm (in)	2 500 [100]	
	Y-axis travel (Vertical movement of spindle head)	mm (in)	2 000 [80]	
	Z-axis travel (Longitudinal movement of column)	mm (in)	1 500 [60]	
	W-axis travel (Spindle extension)	mm (in)	500 [20]	
	Distance from table surface to spindle center	mm (in)	0 to 2 000 [0 to 80]	
	Distance from table center to milling spindle gauge plane	mm (in)	650~2 150 [25.6~85.6]	
Table	Table working surface	mm (in)	1 400 x 1 800 (55.1 x 70.8)	
	Table loading capacity	kg (lbs)	10 000 (22 000)	
	Table surface configuration	mm (in)	9 T-slot, size 22, pitch 160 (size 0.86, pitch 6.2)	
	Minimum table indexing angle (B-axis)	Degree	0.0001	
Spindle	Spindle diameter	mm (in)	110 (4.3)	
	Spindle speed range	min ⁻¹	5 to 4 000	
	Milling spindle nose diameter	mm (in)	225 (8.8)	
	Type of spindle taper		7/24 tape NO.50	
Feedrate	Rapid traverse rate	X, Y, Z	mm/min (ipm)	18 000 (708.7)
		W	mm/min (ipm)	6 000 (236.2)
		B	deg/min	720
	Feedrate	X, Y, Z	mm/min (ipm)	1 to 10 000 (0.04 to 393.7)
Automatic tool changer (ATC)	Type of tool shank		MAS BT50 (CAT 50V)	
	Type of retention knob		MAS P50T-1 (45 degree)	
	Tool storage capacity		38 [60, 90, 120] tools	
	Maximum tool diameter	When adjacent pots are occupied	mm (in)	125 (4.92)
		When adjacent pots are empty	mm (in)	240 (9.44)
	Maximum tool length		mm (in)	400 (15.74)
	Maximum tool mass		kg (lbs)	25 (55)
Tool selection			Pot address random short-cut	
Spindle drive motor	(30 min./cont. rating)		kW (HP)	AC30/22 (AC40/30)
Power source	Electric power supply		AC200/220V +/- 10%, 50/60Hz +/- 2%	
	Power capacity		kVA	80
	Compressed air supply	Pressure	MPa (psi)	0.5 to 0.8 (72.5 to 116)
		Flowrate	NI/min	900
Machine size	Machine height		mm (in)	4 600 (181)
	Floor space		mm (in)	6 100 x 6 100 (240 x 240)
	Mass of machine (including NC equipment)		kg (lbs)	30 000 (66 000)
Accuracy	Positioning accuracy	X, Y, Z	mm (in)	Without linear scale: +/-0.008/full length (+/-0.00032/full length) With linear scale: +/-0.004/full length (+/-0.00016/full length)
		W	mm (in)	+/-0.010/full length (+/-0.00040/full length)
	Repeatability	X, Y, Z	mm (in)	Without linear scale: +/-0.004 (+/-0.00016) With linear scale: +/-0.002 (+/-0.00008)
		W	mm (in)	+/-0.006 (+/-0.00024)
	Table indexing accuracy (arbitrary angle)		sec	+/-3
Table indexing repeatability (arbitrary angle)		sec	+/-1.5	
Machine colour				R4-383 (Munsell 5Y8.4/0.5) and N2.5 For the NC system, servo motors and cooler, each maker's standard colors shall apply

Accessories (Machine)



STANDARD ACCESSORIES

- 1 Numerical control system TOSNUC 999 1 set
- 2 Machine operation box (Pendant type) 1 set
- 3 Spindle orientation stop function 1 set
- 4 Spindle speed drop monitoring function 1 set
- 5 Constant volume mist unit for spindle bearing lubrication 1 set
- 6 Spindle head cooling unit (main bearing, motor flange oil jacket) 1 set
- 7 Hand wheel feed unit (portable) for X, Y, Z, W and B axes 1 set
- 8 Automatic table random angle indexing unit, every 0.0001 degree (with B-axis rotary scales feedback) 1 set
- 9 Automatic table clamping unit (hydraulic) 1 set
- 10 Table oil pan 1 set
- 11 High type Chip cover (with operator door) at table side 1 set
- 12 Table-bed slideway cover on X-axis (both right and left side) 1 set
- 13 Column-bed slideway cover on Z axis (front side) 1 set
- 14 Column-front slideway cover: Y axis (column vertical) 1 set
- 15 ATC rail cover 1 set
- 16 Chip disposal chute for Z-axis (both sides of column-bed) 1 set
- 17 Spindle head cooling unit and hydraulic unit 1 set
- 18 Inverter controlled oil cooler
Cooling capacity: 2.8/3.2kW [3.7/4.3 HP] (50/60 Hz): 2400/2750 kcal/h
- 19 Assembly and reassemble tools for maintenance 1 set
- 20 Installation parts 1 set
- 21 Operator call lamp: one color (Yellow) 1 set
- 22 Automatic power OFF device 1 set

MECHANICAL ACCESSORIES

- 1 Flood coolant set
 - X-axis chip conveyor combined with Lift-up type chip conveyor (incorporating coolant tank)
Mainly used for cast and steel milling chips.
Processing capability: liters/min
 - Flood coolant unit (13.2 gal/min., head 16.4 ft)
Pump capacity: 50 liters/min., head 5 m
Tank capacity: 400 liters (105 gal)
 - 2 Through-tool type coolant set
 - Flood coolant set
 - Through-tool coolant set
 - Pump capacity: 1.2 MPa (12 kgf/cm²) (170 psi)
 - 3 Coolant/Air blow set
 - It is necessary to attach air-compressor of 1 200/1 300 normal liters/min (50/60 Hz) (Recommend type: IDF11E (11kW) made by SMC)
 - Flood coolant set
 - Through-tool coolant set
 - Coolant/air blow unit
 - 4 Through spindle type coolant set
 - It is necessary to attach air-compressor of 1200/1300 normal liters/min (50/60 Hz) (Recommend type: IDF11E (11kW) made by SMC)
 - Flood coolant set
 - Through-spindle type coolant unit (including sub-tank)
1.2 MPa (12 kgf/cm²) or 2.0 MPa (20 kgf/cm²) (170 or 290 psi)
 - Through-spindle type air blow unit
 - 5 Through-spindle type mist coolant set
 - It is necessary to attach air-compressor of 1 200/1 300 normal liters/min (50/60 Hz) (Recommend type: IDF11E (11kW) made by SMC)
 - Flood coolant set
 - Through-spindle type coolant unit (including sub-tank)
1.2 MPa (12 kgf/cm²) or 2.0 MPa (20 kgf/cm²) (170 or 290 psi)
 - Through-spindle type air blow unit
 - Fine particle oil mist unit
- ***Coolant set cannot be selected at the same time. Please select either one from Item No. 1 to 5.
- ***Caution: To avoid serious case of fire, we recommend the followings.
- Must provide fire extinguisher near machine in case of using inflammable type coolant material(s), which may cause fire. And also must observe machine during using coolant by machine operator(s).
 - Regarding the ignition point of coolant material, there are two kinds of Open-type and Closed-type features.
- If your facility has a Closed-type splash cover, you must obtain details of

- coolant material(s) and make cross check to avoid unfavourable situation of fire. Before to use machine, must provide Prevention of fire or equivalent facility, just in case.
- Must use anti-inflammable coolant material for un-manned operation.
- 6 Chip blow air unit
 - It is necessary to attach air-compressor of 1 200/1 300 normal liters/min (50/60 Hz) (Recommend type: IDF11E (11kW) made by SMC)
 - 7 Intermittent coolant unit
 - 8 Type of retention knob MAS P50T-2 (30 degree)
 - 9 Attached retention knob MAS P50T-1 (45 degree)
 - 10 Automatic tool changer (ATC) Tool storage capacity 60, 90, 120 tools
In case of ATC-60, 90 and 120, required floor space will be larger than standard
 - 11 Maximum tool length up to 600 mm [23.6 in]
 - 12 Z-axis Coil type chip conveyors for both sides of column-bed (AC 0.4 kW x 2) [AC 0.53 HP x 2]
 - 13 Chip cover-A (Simple and detachable)
 - 14 Chip bucket C (Capacity: 0.18m³ [6.3 ft³])
 - 15 Box type cover, totally closed, for Standard type machine
 - 16 Automatic pallet changer (APC) two (2) pallets
Pallet loading capacity: 7 000 kg (15 400 lb)
Note that some of machine specifications will be changed when APC selected.
 - 17 Automatic measuring function and dedicated touch probe (Renishaw made) (FM wave type and part program storage capacity reduces approximately 50 m [164 ft])
 - 18 Calibration block (for Automatic measuring function)
 - 19 Automatic tool length measurement (Part program storage capacity reduces approximately 30 m [98.4 ft])
 - 20 Reference tool for Automatic tool measurement function
 - 21 Test bar: diameter 60 x 310 mm length (diameter 2.36 x 12.2 in length)
 - 22 Table reference piece
 - 23 B-axis set-up compensation function
Shift workpiece setup position in B-axis direction is automatically measured and compensated.
Automatic measuring function option is required.
 - 24 Continuous table indexing device: 0.0001-degree NC rotary milling operation
 - 25 Automatic table indexing unit, every 90 degree Locator pin at every 90 degree
 - 26 High power output type spindle drive motor: AC 45/37 kW [60/50HP] (30min/cont.)
 - 27 Spindle lock device (at random angle)
 - 28 High rigid type X-axis feed system
Ball-screw diameter: 80 mm and Feed-motor: AC 15 kW (Ball-screw diameter: 3.14 in and Feed-motor: AC 20 HP)
 - 29 High rigid type Z-axis feed system
Ball-screw diameter: 80 mm and Feed-motor: AC 15kW (Ball-screw diameter: 3.14 in and Feed-motor: AC 20 HP)
 - 30 Linear scale feedback for X, Y and Z-axes
 - 31 Z axis thermal displacement compensation
 - 32 External M-code: 8 types
 - 33 Operator call lamp: three (3) colours
 - 34 Residual current operated protective device
 - 35 Customer's specified painting colour
Submit a colour samples to us
For internal painting colour, however, our standard colour shall govern.
- Note) Air source to be supplied by the customer
Screw type air compressor: 1 100 N-litre/min. AC200V, 7.5kW
Screw type air compressor: 1 600 N-litre/min. AC200V, 11kW
When conventional type air compressor is used, must prepare Air dryer.

CNC system specifications TOSNUC 99 9



User media (option set B)

Very useful device for managing long programs.

Pendant operation box



Manual operations relating to machine movements are separated from the NC operation unit and centrally arranged on the pendant operation box. Thus, combined NC and manual machining operations can be performed smoothly.

CNC System Specifications TOSNUC 999

Standard Specifications

●Controlled Axes

Controlled axes 5 axes : X,Y,Z,W,B
Simultaneously controlled axes

3 axes (X, Y, Z) for positioning (G00) and linear interpolation (G01)
2 axes (any two axes excluding W- and B-axes) for circular interpolation (G02, G03)

●Programmable Methods

Programming resolution Linear axis : 0.001 mm
Rotating axis : 0.0001°

Maximum programmable dimension Linear axis : ±9999.999mm
Rotating axis : ±9999.9999°

Data code Automatic recognition of ISO/EIA code

Data format Variable block with a decimal point word address format

Absolute/incremental programming G90/G91

Decimal point input Calculator type/Programming resolution type

●Interpolation

Positioning G00

Linear interpolation G01

Circular interpolation G02/G03: CW/CCW

●Feed

Feedrate F5-digit programming in mm/min

Dwell G04 (0 ~ 999.99 sec)

Handwheel feed (portable)

Linear axis : 0.001/0.01/0.1 mm (per division)

Rotary axis : 0.0001/0.001/0.01° (per division)

Continuous jog feed

Rapid traverse rate override 0 ~ 100 % in 10 % increments

Feedrate override 0 ~ 200 % in 10 % increments

Override cancel M48/M49

Automatic acceleration/deceleration

Linear acceleration or deceleration is effected on rapid traverse rate and jog feedrate.

Automatic acceleration/deceleration for feed G08/G09 G50/G51

●Part Program Storage and Edit

Program storage 150 m equivalent punched tape
(To be reduced as per the attached functions.)

No. of registrable programs

128 (To be reduced as per the attached functions.)

Program edit Various editing operations are possible for stored programs.

Background edit

Program deletion, insertion and modification are possible in the background edit mode.

Program name \$ (or O) 8-digit programming (alphanumeric characters)

Program comment No. of displayed characters max. 32
(max. 197 for input)

Control in/out

Sequence number N5-digit programming

Sequence number search Bidirectional search is possible.

Program nesting list

Fixture offset list

T-code list

Calendar timer

Program creation date management, time display

●Operation and Display

Operation panel

Display section: 10.4 inch color TFT liquid crystal display

Operation section: Keyboard with membrane switches

Customizing keys

A series of key input operations (key pattern) can be registered. (6 types)

A combination of screens can be registered. (4 types)

Tool file

Tool information such as tool offset and tool name can be batch-displayed and edited.

Automatic operation Memory operation and DNC operation

MDI operation Entry of multiple blocks and restart of an already executed block are possible.

Manual numerical input command

S.F manual setting Setting of S and F codes in manual mode.

S.F auto setting

Automatic setting of S and F codes in manual mode.

Spindle drive motor load factor display

Load imposed on spindle drive motor is displayed.

Run hour display The NC working time is displayed.

Program record A record of programs already executed is displayed.
(Date of program execution, actual time, etc.)

User's name registration

A user's name is displayed at system startup.

Customized display color tone

●I/O functions and Devices

RS232C interface port A

Operation via external device, loading and dumping of programs and data are possible.

●S, T and M Functions

Spindle speed function S5-digit programming

Spindle speed override 50 ~ 200 % (in 10 % increments)

Tool function T4-digit programming

Miscellaneous function M4-digit programming

●Tool Offset

Tool length offset G43/G44/(G49)

Tool offset G45/G46/G47/G48

Cutter compensation C G40/G41/G42, point of intersection calculation

No. of tool offsets 60 sets (tool length offset, cutter compensation)

●Coordinate System

Coordinate system setting G92

Machine coordinate system positioning command G73

Plane selection G17/G18/G19

Fixture offset G53/G57, 9 sets

(This function cannot be used together with fixture offset 2.)

Fixture offset 2 G53/G54/G55/G56, 3 sets

●Operation Support Function

Single block A program can be executed block by block.

Optional stop

Optional block skip

A block containing a "/" code at the head is ignored.

Dry run

Machine lock

Auxiliary function lock

Z-axis feed cancel

Manual absolute ON/OFF

All clear

Reset

Feed hold

Cycle stop

Program restart Program restart, block restart

Sequence number collation and stop

Manual interruption

Handwheel feed interruption

●Programming Support Function

Circular interpolation by radius R designation

Radius of a circle can be specified directly, using R code.

Circle cutting Inner circle cutting: G12/G13, G22/G23
Outer circle cutting: G222/G223

Canned cycle

G77 ~ G89, G98, G99, G100, G186

Subprogram call G72 (Nesting of up to five levels is possible.)

Macro programming Single call: G72

Modal call 1: G74/G76

Modal call 2: G75/G76

Automatic corner override

Inside corner automatic override and inside corner cutting speed change.

Pattern cycle G109 ~ G119 (Drilling pattern)
G121 ~ G132 (Milling pattern)

Programming format check function Program format check

Tapping range selection G63

Single block suppression G990/G991

Feed hold suppression G992/G993

Override suppression G994/G995

Handwheel feed interruption suppression G996/G997

●Mechanical Error Compensation

Backlash compensation

Pitch error compensation

Pitch error gradient compensation

Origin correction

X-axis shift from table center is corrected.

Unidirectional positioning G60

Straightness compensation

Non-linear type compensation control

●Automatic Support Function

Tool life management

- Counting of tool working time
- Tool wear coefficient function Tool life and working time are counted by multiplying a specified coefficient.
- Spare tool selection

●Machine Control Support Function

Integrated PLC TC200

Axis feed interlock

●Safety and Maintenance

Emergency stop

Stored stroke limit

Axis interference area setting and axis interference check
G24/G25, G26/G27

Self-diagnosis function

Door interlock

●Servo System

Servo motor AC servo motors

Position detectors

Absolute encoders (All axes: Absolute position detection)
Rotary scale (B-axis)

Special Specifications (Options)

Options - Set B

(1) Helical interpolation G02/G03 (arc + linear)

(2) Synchronous tapping M843, M844, M845

(3) Part program storage
300 m equivalent punched tape (No. of registrable programs: 256)

(4) User media

(USB port and compact flash slot)

For loading and dumping of NC programs and tool offset data.

(5) No. of fixture offsets
99 sets (including the standard sets)

(6) Random angle chamfering & corner R

(7) Manual alignment function

Including manual tool length/diameter measurement and coordinate conversion (G10/G11).

(8) Teaching function

Automatic program creation by MDI and manual operations.

(9) W-axis offset function

W-axis extended position is compensated with Z-axis fixture offset.

Other Options

●Controlled Axes

(1) One additional controlled axis

●Programming Methods

(2) Inch/metric selection G70/G71

●Interpolation

(3) Parabolic interpolation G06

Note: It is not compatible with NURBS interpolation.

(4) Hypothetical axis interpolation (i.e., interpolation with sine curve) G07

(5) Cylindrical interpolation G67

(6) Involute interpolation G105

(7) Spindle normal direction control
(Spring necked turning) G140/G141/G142

(8) Archimedes interpolation (Spiral interpolation)
G102/G103

●Feed

(9) Synchronous thread-cutting

(10) Per-revolution feed G95

(11) Per-revolution dwell G05

●Part Program Storage and Edit

(12) Part program storage

600 m equivalent punched tape (No. of registrable programs: 512)

1,200 m equivalent punched tape (No. of registrable programs: 1024)

3,000 m equivalent punched tape (No. of registrable programs: 1024)

5,400 m equivalent punched tape (No. of registrable programs: 1024)

7,800 m equivalent punched tape (No. of registrable programs: 1536)

10,200 m equivalent punched tape (No. of registrable programs: 1536)

* (13) Mass memory 2GB

●I/O Functions and Devices

(14) Remote buffer operation (including port C connection)

* (15) High-speed LAN linkage

File transfer by connecting CNC and LAN.

●Tool Offset

(16) No. of tool offsets

No. of tool length offsets: 499 sets (including the standard sets)

No. of cutter compensations: 499 sets (including the standard sets)

(17) Three-dimensional tool compensation G30/G31

●Operation Support Function

(18) Foreground plotting function

A tool locus of active program is plotted.

(19) Additional number of optional block skips Max. 9

●Programming Support Function

(20) Programmable mirror image G62/G66

(21) Programmable data input

Updating of offsets by G58/G59.

(22) Scaling G64/G65

(23) Plane conversion G35~G39

(24) Three-dimensional coordinate conversion G14

(25) Figure copy function G721/G722

(26) Circle cutting compensation

(27) Machining time estimate & NC plotting function

Machining time estimate and tool path plotting for non-active program on the background.

(28) Pattern cycle division into NC statements

(29) W axis travel distance Conversion function

●Automatic Support Function

(30) Faulty cut detection & feedrate regulation function

Tool breakage and wear detection

Feedrate regulation

Note) Counting of tool working time and spare tool selection are included in the standard specifications.

(31) Program check & used tool list creation

Check of a program to be executed next and creation of a slated tool list.

(32) Cutting start detection Used for spot facing, etc.

(33) NEXUS Schedule operation function

●Safety and Maintenance

(34) Memory lock

●High-Accuracy Machining & Servo System

(35) Shape recognition preview positioning control

(36) NURBS interpolation

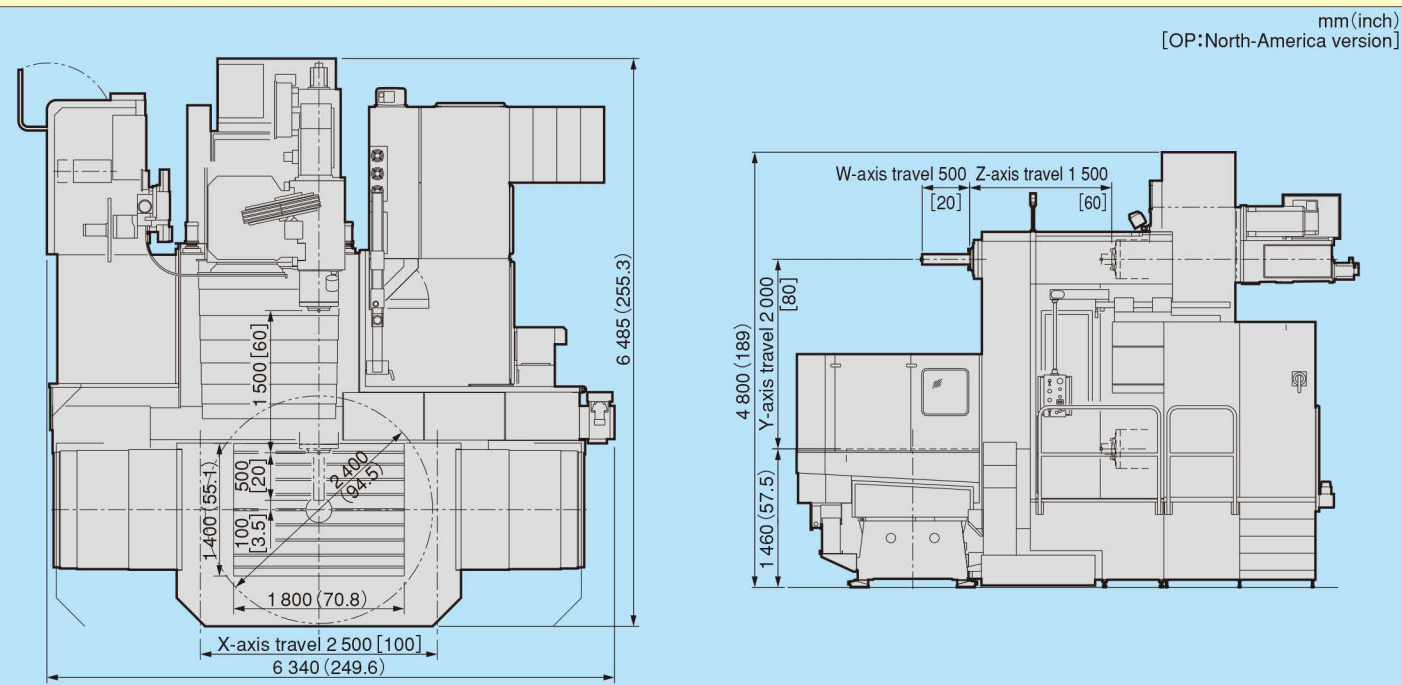
Note: Shape recognition preview control function is required.

●Cable

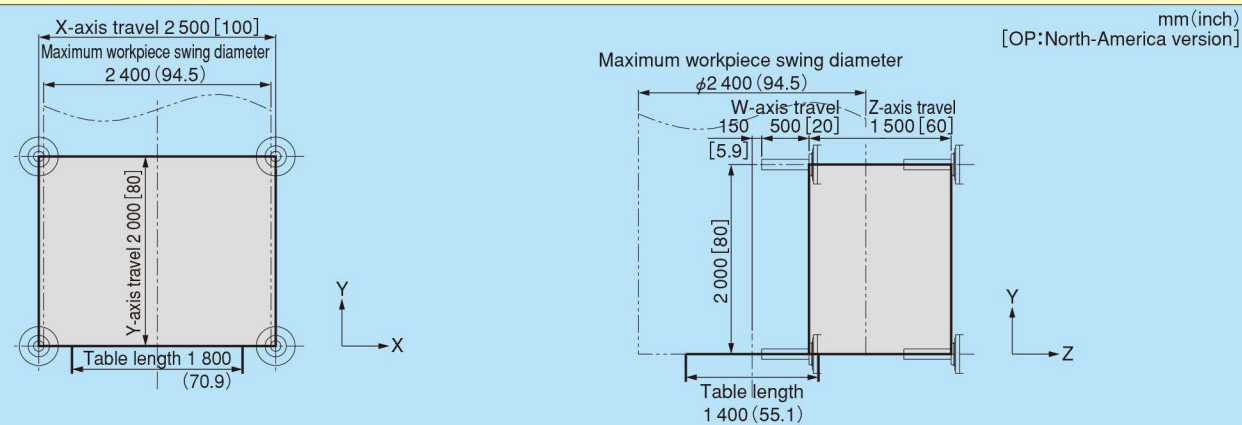
(37) RS232C cable 10 m-long

Note) Marked with *, selectable between two options.

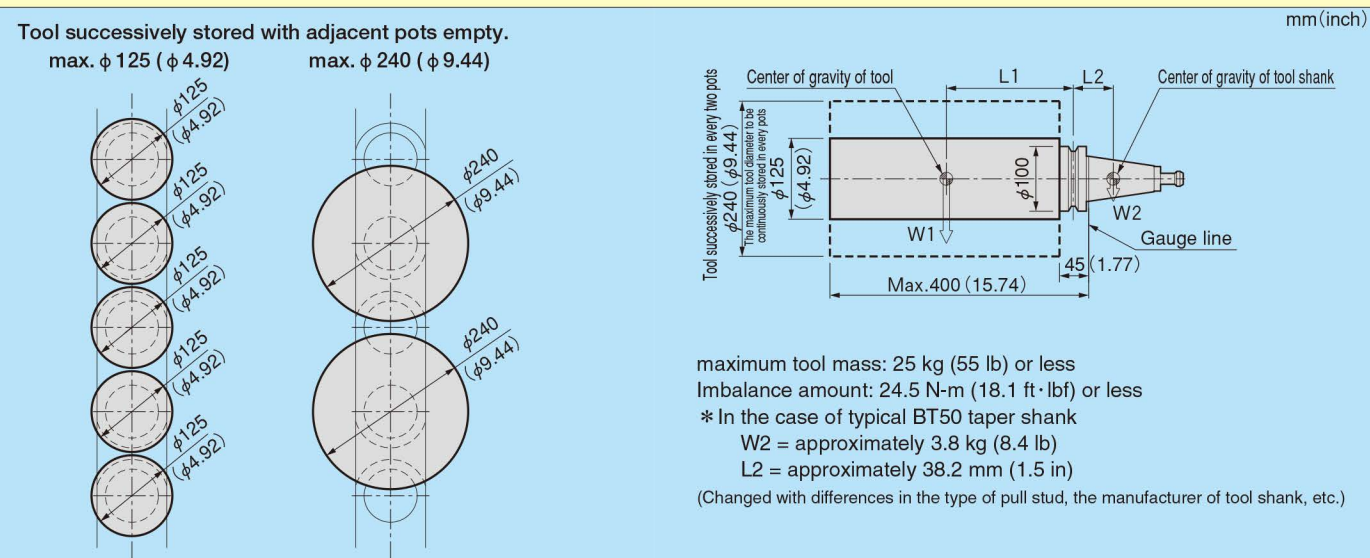
General View



The maximum work-piece range and travel for each axis



The maximum tool size



From Die and Mold Machining to Forming Shibaura Machine Group Value-Chain

