Shibaura Machine

BF-130B

Floor-Type Horizontal Milling and Boring Machine

Shibaura Machine
View the Future with You

Floor type horizontal milling and boring machine with a quill-type spindle head and renewed design and performance responding to the users' requirements for high speed and high precision.

Shibaura Machine's horizontal milling and boring machine is provided with versatile functions born from long years of experience and production technologies.

Floor-Type Horizontal Milling & Boring Machine

BF-130B

It is the Operator's platform of normal specifications.

■Vastly enhanced productivity

● A vast array of accessories such as an ATC, AAC, AAI and AATC are available for automatic combined operation.

● Increased spindle speed and feedrates.

● A quill extend function to the boring spindle for vastly improved machining capabilities.

■Greatly improved operability

● Easy changeover from manual to NC mode machining by a combination of manual and automatic operations.

● Specially designed and engineered TOSNUC 999 CNC system with extensive NC functions specific to the horizontal milling and boring machine for improved operability.

■Excellent workability

● Quill-type spindle head allows easy access to the workpiece.

● Extensive cutting operation is made easy by the spindle extension.

● Machining of multiple surfaces is possible in a single setup by using a rotary table (option).

● As a workpiece is secured on the floor plate, no limitation is imposed on the shape and weight of workpiece. Also, machining of a workpiece larger than the machine is also possible.

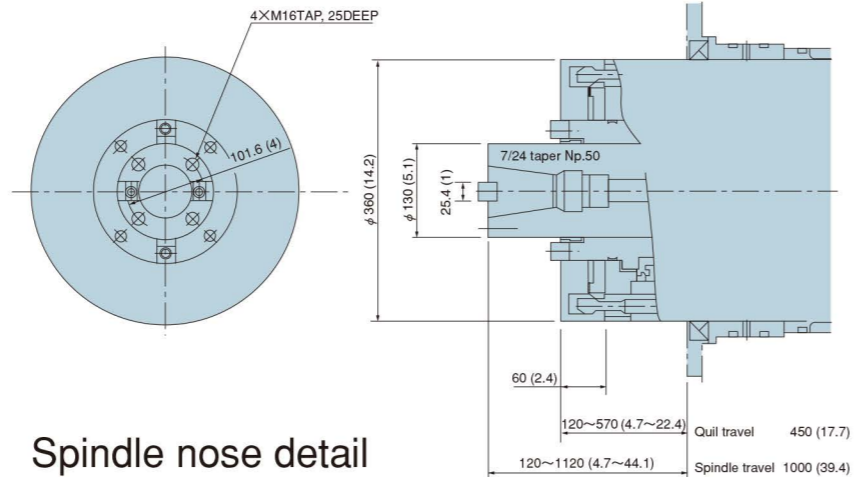● Labor-saving chip disposal for easy unmanned operation.

Note:The photos on the front page and this page show the machine equipped with options including an ATC Operator's lift, rotary tables.
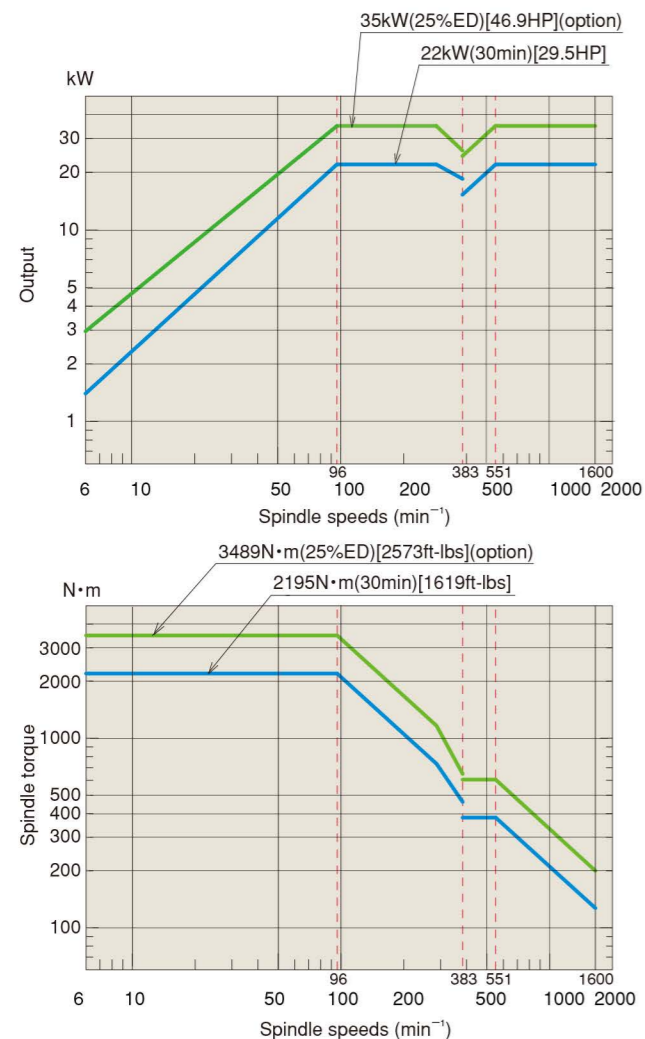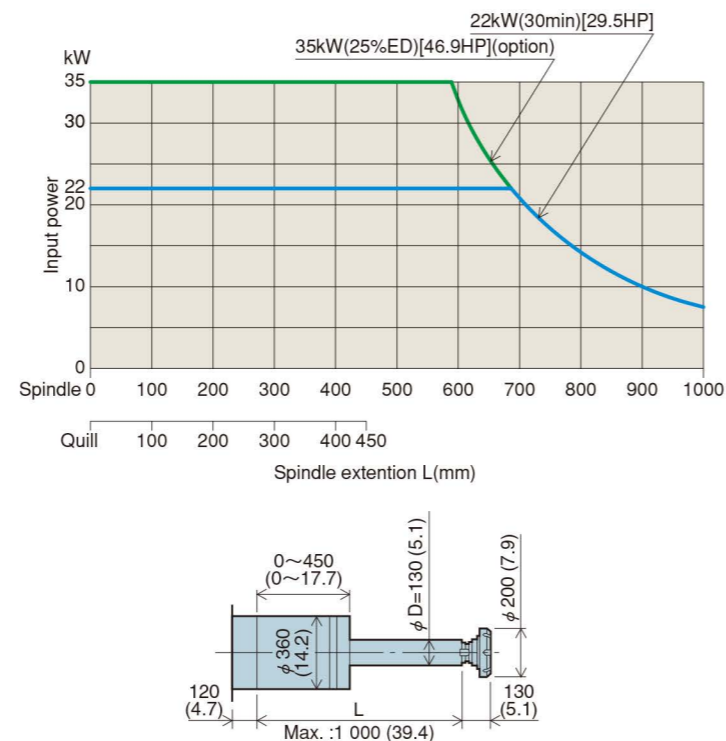
HIGH PRODUCTIVITY

Spindle nose detail

4×M16TAP, 25DEEP

101.6 (4)
φ 360 (14.2)

7/24 taper Np.50
φ 130 (5.1)
25.4 (1)

60 (2.4)

120～570 (4.7～22.4)	Quil travel 450 (17.7)
120～1120 (4.7～44.1)	Spindle travel 1000 (39.4)

The upper photo and figure show AAC type (Option)

■ Spindle speed-torque diagram

35kW(25%ED)[46.9HP](option)
22kW(30min)[29.5HP]

kW

Output
30
20
10
5
4
3
2
1

Spindle speeds (min⁻¹)
6 10 50 96 100 200 383 500 551 1000 1600 2000

3489N・m(25%ED)[2573ft-lbs](option)
2195N・m(30min)[1619ft-lbs]

N・m

Spindle torque
3000
2000
1000
500
400
200
100

Spindle speeds (min⁻¹)
6 10 50 96 100 200 383 500 551 1000 1600 2000

■ Milling capacity in relation to spindle extension

Material	: SS400P (Steel)
Milling cutter	: Tungsten-carbide face milling cutter
Cutting speed	: 100 m/min
Cutting feed	: 500～1 000 m/min
Cutting height	: Within 1 300 mm from lowest position

22kW(30min)[29.5HP]
35kW(25%ED)[46.9HP](option)

kW
Input power
35
30
22
20
10
0

Spindle 0 100 200 300 400 500 600 700 800 900 1000
Quill 100 200 300 400 450

Spindle extention L(mm)

0～450
(0～17.7)
φ D=130 (5.1)
φ 200 (7.9)
φ 360 (14.2)
120 (4.7)
130 (5.1)
L
Max. :1 000 (39.4)

EASY OPERATION

In machining workpieces, higher efficiency and accuracy are always required. Not only machining ability of the machine, but interface controlling the machine according to the operator's commands is also very important.
TOSNUC 999, the easy-to-use and easy-to-learn CNC system born from Toshiba Machine's special NC technologies integrating the machine and control system, provide a number of functions supporting the operator.

Improved operability based on years of experience

● **Independent display and status changeover keys**
Display changeover and selection of edited data can be performed instantly by independent key operation, without using any soft menu keys.

● **Pop-up menus**
A desired menu window can be called on the display by an appropriate function key without changing the current display. List of any desired function can be confirmed on the display without any complex operation of menu hierarchy.

● **Multi-editing operation**
Simultaneous display of two programs and data such as compensation values are also possible on the same TFT (thin film transistor) screen which is divided into three sections. Each display can be edited separately, and a new program can be created easily as if you were operating a word processor, while referring to an existing program in memory.

Easy-to-operate centralized operation stand

● Dials and switches required for manual operation are arranged from operator's standpoint, thus enhancing the workability.
● Handwheel feed which is very convenient for moving X-, Y-, Z-, W-, V- and B-axes is standardly equipped on handy box.
● Machine coordinates and work coordinates of X-, Y-, Z- and W-axes can be identified on a display. Display of V- and B-axes coordinates, S and F values is on other page of screen by a changeover switch.
● The S/F change and spindle rotation lock help improve the machine operability.

Part program storage and editing

Operation support function
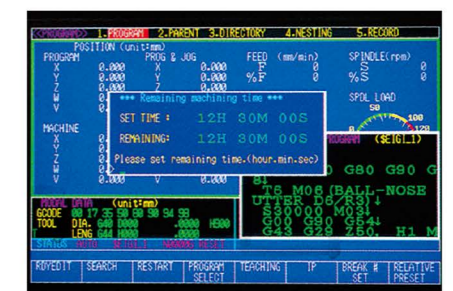
Programming support function

Machine configuration

■A combination of floor plates, suited for general-purpose machining

This type floor plan imposes no restrictions on the shape, size and weight of workpiece and can be planned according to customer's specific machining requirement. This figure shows the arrangement of t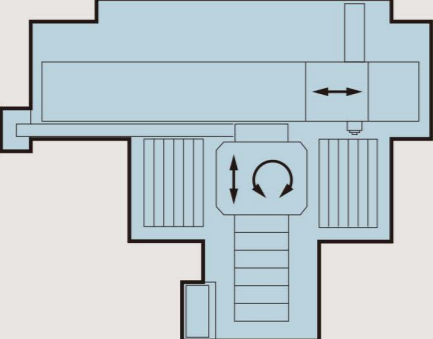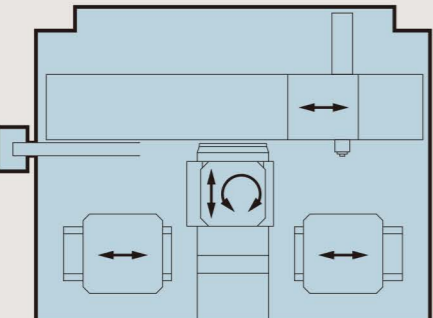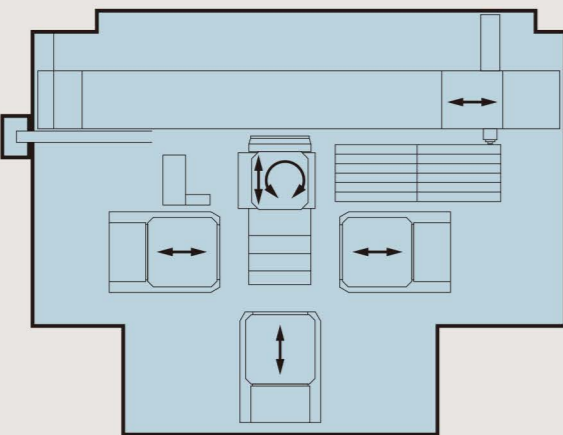hree floor plates placed side by side according to X-axis travel. It is also possible to line them up in a row or in parallel.

■A combination of a rotary table and floor plates, best suited for combined machining

A high-performance rotary table and floor plates realizes combined machining including precision machining of multiple surface, boring by 180° table index and rotary milling, in addition to normal machining operation using a floor plate. Thus, productivity can be significantly enhanced.

■A pallet changer type rotary table suited for unmanned operation

A pallet changer type rotary table not only improves productivity of combined machining, but allows unattended operation.
Normally, the time for workpiece setup is said to amount to 15 % of the total machining time. Only a few minutes is required for pallet change, when this rotary table is used. Idle time for changing set-up of workpiece is producing a variety kinds of workpiece will be minimized and real cutting time can be increased sharply.

■A combination of a pallet changer type rotary table and floor plates

Another pallets can be added to the standard two pallets and arranged along a star. Also, an attachment stocker can be provided. This type floor plan is very useful for more advanced combined machining operation and for further improvement of productivity.

Note: In addition to the above floor plans, a diversity of floor plans such as installation of opposing two machines are also available. Please consult us for details.

General view

General view
mm (in)
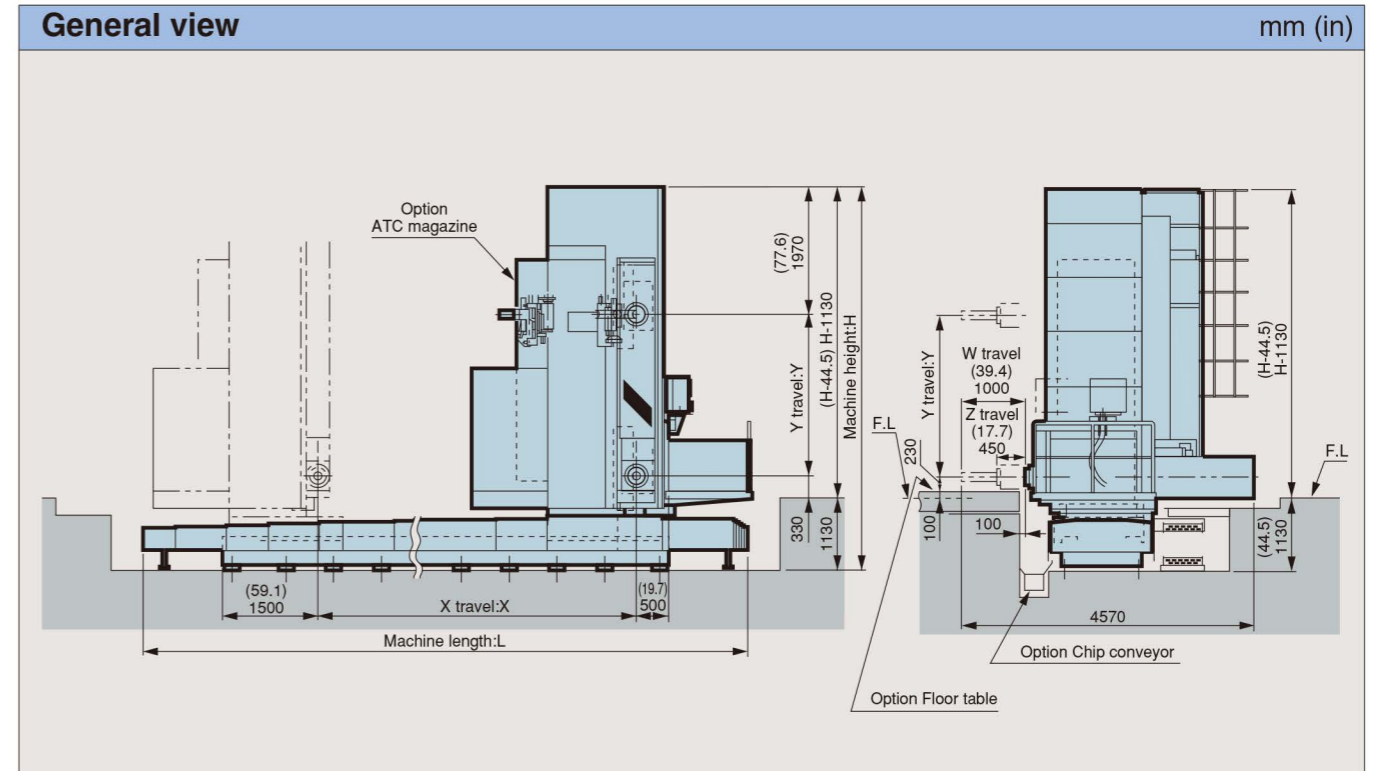
X-axis travel	X	mm	4 500	6 000	7 500	9 000	10 500	12 000	13 500	15 000	18 000
Machine length	L	mm	9 370	10 870	12 370	13 870	15 770	17 270	18 770	20 270	23 400

Y-axis travel	Y	mm	2 500	3 000	3 500	4 000
Machine height	H	mm	5 930	6 430	6 930	7 430

For the dimensions X,L,YandH, refer to the general view drawing above.

When chose the Operator-call lamp (Opt.), machine height extend 350 mm.
When chose the Motorized pendant arm for control box (Opt.), machine height extend 850 mm.
When chose the Operator-call lamp (Opt.) and Motorized pendant arm (Opt.), machine height extend 850 mm.

Machine specifications

Machine specifications

Machine specifications			BF-130B
Capacity	Maximum spindle torque	N・m (ft-lbs)	2 195 (1 619) [3 489 (2 573)]
Travel	X-axis travel (Column cross wise)	mm (in)	4 500~ (177.2~) available in 1 500 increments (59.0)
	Y-axis travel (Spindle head vertical)	mm (in)	2 500 (98.4), 3 000 (118.1), 3 500 (137.8), 4 000 (157.5)
	Z-axis travel (Quill extension)	mm (in)	450 (17.7)
	W-axis travel (Boring spindle extension)	mm (in)	1 000 (39.4)
	Total travel of quill and spindle (Z+W)	mm (in)	1 000 (39.4)
Spindle	Boring spindle diameter	mm (in)	130 (5.1)
	Quill diameter	mm (in)	360 (14.2)
	Milling spindle nose diameter	mm (in)	250 (9.8)
	Type of spindle taper		7/24 taper No.50
	Spindle speeds (2 ranges)	min⁻¹	6~1 600 (cont)
Feedrate	Rapid traverse of X-axis	mm/min (ipm)	10 000 (394)
	Rapid traverse of Y-axis	mm/min (ipm)	10 000 (394)
	Rapid traverse of Z- and W-axes	mm/min (ipm)	6 000 (236)
	Automatic feed of each axis	mm/min (ipm)	1~4 000 (0.1~157)
	Manual feed of each axis	mm/min (ipm)	1~4 000 (0.1~157)
Spindle drive motor (30 min/cont.)		kW (HP)	22/18.5 (30/25) [35/26/22 (47/35/30)]
Automatic tool changer (ATC, AATC)	Type of tool shank		MAS BT50
	Type of retention knob		MAS P50T-1 (45°)
	Tool storage capacity		60 [90, 120]
	Maximum tool diameter — When pots are full	mm (in)	125 (4.9)
	Maximum tool diameter — When adjacent pots are empty	mm (in)	240 (9.4)
	Maximum tool diameter — Single-point boring tool	mm (in)	330 (13.0)
	Maximum tool length	mm (in)	500 (19.7)
	Maximum tool weight	kg (lbs)	25 (55)
	Allowable moment around gauge plane	N・m (ft-lbs)	29.4 (21.7)
	Method of tool selection		Pot address random short cut
Accuracy	Positioning accuracy of X- and Y-axes	mm (in)	±0.007/1 000 (±0.00028/39.4)
	Positioning accuracy of Z-axis	mm (in)	±0.007/400 (±0.00028/15.7)
	Positioning accuracy of W-axis	mm (in)	±0.007/500 (±0.00028/19.7)
	Repeatability of X-, Y-, Z- and W-axes	mm (in)	±0.005 (±0.0002)
Painting color	Outside / Inside		R4-383 (Muunsell 5Y8.4/0.5) / Muunsell 10YR 8/4 Servo motors and cooler are painted with manufacturer's standard color

*Dimensions in brackets [ ] are optional.

Standard accessories

❶	Standard electrical equipment	1 set	❼ Lubricant and hydraulic unit	1 set
❷	CNC unit (stand and specification)	1 set	❽ Cover for column slideways	1 set
❸	Automatic tool clamp device (pull stud type)	1 set	❾ Telescopic steel cover for bed slideways	1 set
	Type of pull stud MAS-I		❿ Cable drag chain for electrical wiring	1 set
	Type of the tool shank BT-50		⓫ Wiring from control cabinet to the machine	1 set
❹	Spindle orientation stop function	1 set	⓬ Piping from hydraulic unit in the pit to the machine	1 set
❺	Air blow function through spindle at time of tool change	1 set	⓭ Special tools for operation, assembling and disassembling the machine	1 set
❻	Mist lubricating unit	1 set		

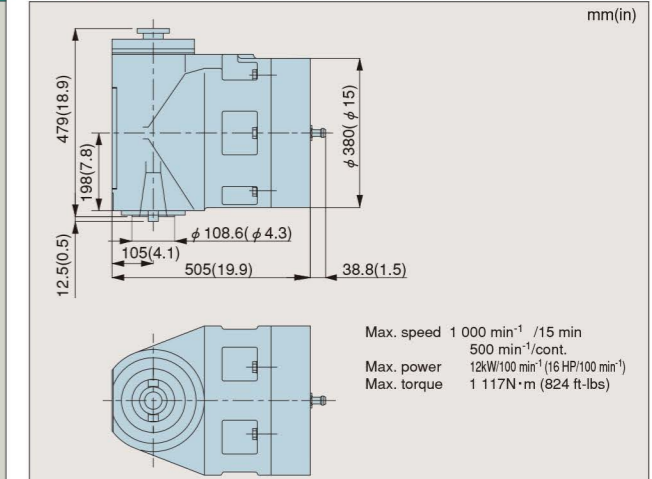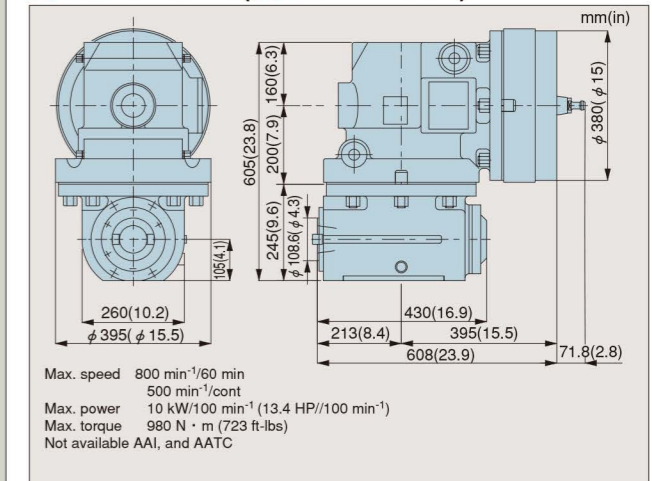# Various peripheral equipment for greater (production) efficiency.

BF-130B

Optional accessories

1 Installing parts
  leveling blocks, anchor bolts and bearing plates
2 High-speed type headstock
  Spindle speed 6~2 000 min⁻¹
3 High-torque type headstock
  Spindle motor   35/26/22kW (47/35/30 HP)
  Spindle torque   3 489 N.m {at 35kW (47 HP)}
4 MAS P50T-2 (30°) type pull-bolt
5 Automatic tool change function ATC
  Tool storage capacity
    60, 90, 120
6 Tool shank type ANSI
  Be replaced with standard specification of the
  ATC and spindle key
7 Attachment automatic tool change function
  AATC (angle head tools can be changed)
8 Automatic attachment change function (AAC)
9 Automatic attachment indexer (AAI)
  at Every 90 degree
10 Work light mounted on spindle head
11 Operator-call lamp (LED, 3 colors)
12 Mist coolant system (DUALUBE, oil type)
  Tank capacity   5.1 ℓ (1.34 gal)
13 Flood coolant system
  Water-soluble type coolant
  Coolant unit tank capacity   1 000 ℓ (264 gal)
  Standard delivery pressure   1.0 MPa
  ※Tankage 2 000 are necessary
    for more than x 10.5 m.
  Spindle head-end delivery   10 ℓ /min
  Note 1: Use a non-flammable water-soluble
    coolant
  Note 2: A splash guard cover is not included
14 Through-spindle coolant delivery
  Delivery   10 ℓ /min (2.6 gal/min)
15 Spindle air blow function
16 Air connection port for maintenance
  (A coupler is attached to the spindle head)
17 Air compressor
  11 kW with automatic water draining, filter and
  dryer
18 100 volt power outlet socket on electrical control
  box
19 Automatic power shutdown (with NC power)
20 X-axis linear scale feedback
21 Y-axis linear scale feedback
22 Angle head
  7/24 taper (No.50)
  To be mounted manually on quill
  Tool should be mounted to the spindle
  manually
23 Angle head (AAC)
  7/24 taper No.50
  Available AAC, AAI, and AATC

24 Universal head
  7/24 taper No.50
  To be mounted manually on quill
  Tool should be mounted to the spindle
  manually
25 Universal head (AAC)
  7/24 taper No.50
  Available AAC
  Not available AAI, and AATC
26 Facing head CS
  To be mounted manually on quill
  Providing auto, feed by spindle feed.
27 Facing head CS
  Available AAC
  Providing auto, feed by spindle feed.
28 Tool holder for facing head
29 Telescopic tool holder for facing head
30 Extension sleeve (Not available AAC)
31 Snout (Available AAC)
32 Attachment stocker Rack type
  All the attachments can be stored, providing
  the open/ close cover and attachment
  identifying function.
33 Attachment stocker Pallet type
  A required attachment set on the pallet base
  manually, is stored without identifying function
  no open/close cover.
34 Automatic measuring function
  This unit consists of a touch probe made by
  Renishow, a standard measuring software
  designed by Toshiba Machine and a calibration
  block for checking compensation values of
  touch probe.
  A printer is not included.
35 Automatic tool length measurement function
36 Small diameter tool (tap, drill) breakage detector
  When tool number "T80***" is commanded,
  tool lengths before and after tool change are
  measured and compared to detect any
  breakage on the floor plate.
37 Operator's lift with control box
38 Operator's platform fixed on fix the headstock
39 Motorized pendant arm for control box
40 Rotary Table
  To be selected from our various model.
41 Floor plate with its leveling device
  1600 x 2400 x 300 mm (63 x 94.5 x 11.8 in)
42 Chip conveyor
43 Parts list
44 Transformer
  Power source is different with our standard
  mentioned before
45 Custom painting color

■ Angle head (23 Available AAC, AAI, and AATC)

mm(in)

Max. speed 1 000 min⁻¹ /15 min
        500 min⁻¹/cont.
Max. power 12kW/100 min⁻¹ (16 HP/100 min⁻¹)
Max. torque 1 117N・m (824 ft-lbs)

■ Universal head (25 Available AAC)

mm(in)

Max. speed 800 min⁻¹/60 min
        500 min⁻¹/cont
Max. power 10 kW/100 min⁻¹ (13.4 HP//100 min⁻¹)
Max. torque 980 N・m (723 ft-lbs)
Not available AAI, and AATC

■ Facing head CS (27 Available AAC)

mm(in)

MAX. speed 200 min⁻¹
Not available coolant
Maximum allowable torque 3 724 N・m (2 747 ft-lbs)

*Other optional accessories can be available according to customer's requirements.

CNC system specifications

BF-130B
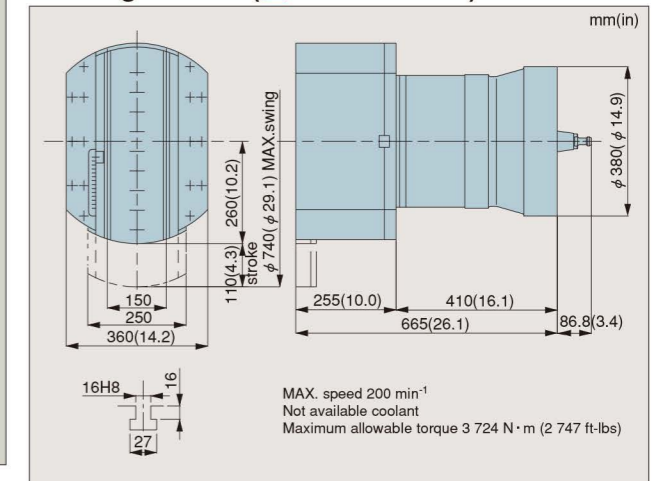
TOSNUC 999

CNC System Specifications

Standard Specifications

Controlled Axes
Number of controlled axes
4 axes: X, Y, Z and W
Simultaneously controllable axes
3 axes for positioning (G00) and
linear interpolation (G01)
2 axes for circular interpolation
(G02, G03) X-Y, Y-Z, Z-X

Programming Methods
Programming resolution
Linear axes: 0.001 mm (0.0001 inch)
Rotary axis: 0.0001 deg
Maximum programmable dimension ±9digits
Data code
Automatic recognition of ISO/EIA code
Data format
Variable blocks with Decimal point programming
Word address format
Decimal point input Calculator type
Programming resolution type

Interpolation
Positioning G00
Linear interpolation G01
Circular interpolation G02/G03; CW/CCW

Feed
Rapid traverse rate
Feedrate
F4-digit direct programming in mm (inch)
per min
Dwell G04 (0 ~ 999.99 sec.)
Manual jog feed
Rapid traverse rate override
0 ~ 100% in 10% increments
Feedrate override 0 ~ 200% in 10% increments
Automatic acceleration/deceleration
Linear acceleration/deceleration
G08/G09, G50, G51
S-shaped acceleration/ deceleration for rapid
traverse
Thread cutting G33
Feed per minute/revolution G94/G95
Dwell per revolution G05
Tapping range selection G63
Spindle inertial thread cutting G84
Hand wheel feed No.1 MPG, portable
Hand wheel spindle jog operation

Part Program Storage and Edit
Part program storage
600 m (1970')(No. of programs: 512)
〔approximately 150 m (590') is reduced to
keep it as the maker area according to
optional functions.〕
Part program edit function
Program name
A desired program name can be specified
by up to eight (8) alphanumeric characters
following address $ or O.
Program comment can consist of up to 32
characters
Sequence number N5-digit programming
Sequence number search
Bi-directional search possible
Program nesting list List indication
Program offset list List indication
Background edit function

Operation and Display
Operation panel 10.4"color TFT display
Customized keys
Tool file Tool length, tool diameter
Operation
Automatic operation, MDI operation,
Manual numerical command
SF manual setting
SF automatic setting
Spindle drive motor load factor display
Run hour display
The NC working time is displayed
Calendar timer
Program creation date management, time
display.
Program record
A record of programs already executed is
displayed. (date of program execution,
actual machining time, etc.)
Customer name display
Customized display color tone

I/O Functions and Devices
RS-232-C interface (port A) I/O interface
User medium

S, T and M Functions
Spindle speed function 4-digit programming
Spindle speed override
50 ~ 200% in 10% increments
Tool function T6-digit programming
Miscellaneous function M4-digit programming

Tool Offset
Tool length offset G43/ G44, G49
Tool radius offset G45/ G46/ G47/ G48
Cutter compensation C G40/ G41, G42
Number of tool offsets
Tool length offsets: 60 sets
Cutter compensation: 60 sets
Additional number of tool offsets
Additional number of tool length offsets:
839 sets (total 899 sets)
Additional number of cutter compensations:
839 sets (total 899 sets)

Reference Point Return・Coordinate System
Manual reference point return
Auto return to reference point return
G20/ G28/ G29
Coordinate system setting G92
Fixture offset G53/ G57 (9 sets)
(Effective on X, Y and Z axes)
Fixture offset 2 G54/ G55/ G56
2nd, 3rd and 4th reference points return G21
Additional number of fixture offsets
90 sets (99 sets in total including the standard
ones :H901~H999)

Operation Support Function
Control IN/OUT
Single block
Optional block skip
1 ; a block containing a "/" code at the top is
ignored.
Dry run
Machine lock
Auxiliary function lock
Z-axis feed cancel
Manual absolute ON/OFF
Override cancel M48/ M49
Mirror image
All clear
Reset
Feed hold
Cycle stop
Restart
Sequence number collation and stop
Manual numerical command
Single block control G990/ G991
Feed hold control G992/ G993
Override control G994/ G995
Handwheel feed interruption control
G996/ G997
Manual interruption and manual return
Manual tool length/diameter measurement

Programming Support Functions
Plane select G17/ G18/ G19
Circular interpolation by radius programming
Circle cutting
Inner circle cutting: G12/ G13 (CW),
G22/ G23 (CCW)
Outer circle cutting: G222 (CW),
G223 (CCW)
Machine coordinate system positioning
command G73
Subprogram call G72 (nesting: 5 levels)
Random angle Chamfering, and corner R
programming
Canned cycle
Canned cycle G77~G89, G98, G99, G100
Automatic acceleration/deceleration for feed
G08, G09, G50, G51
Automatic corner override
Inside corner automatic override;
Inner circle cutting speed change
Programmable mirror image G62/ G66
Programmable parameter input G58/ G59
Plane conversion G35~G39
Macro programming G72/ G74/ G75/ G76
Pattern cycle G109~G119, G121~G132
Coordinate conversion G10/ G11

Mechanical Error Compensation
Backlash compensation
Pitch error compensation
Non-linear compensation
Uni-directional positioning G60
Pitch error gradient compensation

Machine Control Support Function
Integrated PC
Axes interlock
External deceleration

Safety and Maintenance
Emergency stop
Overtravel check
Stored stroke check
Axis interference check 1
Self-diagnosis function
Axis interference check 2 G24/ G25

Enclosure and Installation
Power supply
AC 200/220 V +10%~ −15%,
50/60 Hz ±1 Hz, 3 phases
Environmental conditions
・Ambient temperature: 5 ~ 40℃ (41〜104°F)
・Relative humidity: 75% or less (non-condensing)

Servo System
Servo motors AC servo motors
Position detectors Absolute encoders

Optional Specifications

Controlled Axes
(1) Additional controlled axes
(2) Parallel axes
(3) Hybrid control

Programming Methods
(1) Inch/metric selection G70/ G71

Interpolation
(1) Helical interpolation G02/ G03
(2) Hypothetical axis interpolation G07a0/ 1
(3) Cylindrical interpolation G67
(4) Spindle normal direction interpolation

Feed
(1) Synchronous tapping
(2) Synchronous thread cutting
(3) Random angle thread cutting

Part Program Storage and Edit
(1) Part program storage
1 200 m (3 900') equivalent punched tape
(No. of programs: 1 024)
3 000 m (9 800') equivalent punched tape
(No. of programs: 1 024)
5 400 m (17 700') equivalent punched tape
(No. of programs: 1 536)
7 800 m (25 600') equivalent punched tape
(No. of programs: 1 536)
10 200 m (33 400') equivalent punched tape
(No. of programs: 1 536)

Operation and Display
(1) Display specification English
(2) External position display

I/O Function and Devices
(1) DNC I/F DNC interface function pursuant
to EIA SP1292.
・Level 3 protocol
(2) Remote buffer operation
・Protocol A (Hand-shake system)
・Protocol B (DC control code system)
(3) Binary operation
(4) External data input
(5) High-speed LAN linkage

Tool offset
(1) Wear compensation value memory
G143/ G149

Operation Support Functions
(1) Manual alignment
(2) Foreground plotting

Programming Support Functions
(1) Teaching
(2) Programmable dater input
(3) Scaling G64/ G65
(4) Three-dimensional coordinate conversion
G14
(5) Figure copy function G721/ G722
(6) Circle cutting by compensation
(7) Estimation of machining time and NC
plotting function

Machine Control Support Function
(1) Straightness compensation
(2) Thermal displacement compensation

Automation Support Function
(1) Skip function
(2) Tool breakage and wear detection
(3) Counting of tool working time
(4) Feed rate regulation
(5) Automatic measuring function
To be combined with (1)
(6) Spare tool selection
To be combined with (2) and (3)
(7) Retract function
(8) Schedule operation
(9) Pallet schedule operation
(10) External M code M192, M193