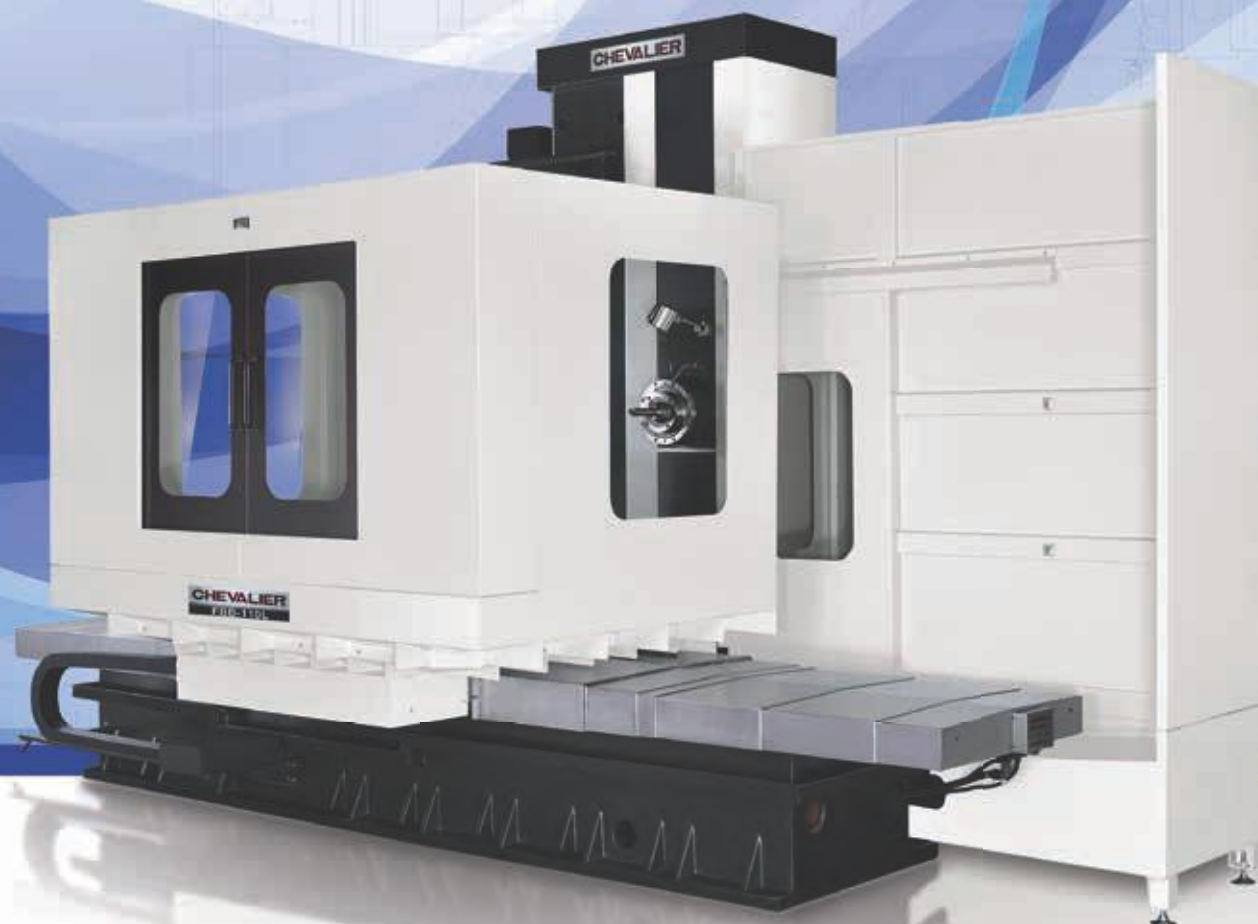


CHEVALIER®

Grinding / Turning / Milling



FBB Series

Horizontal Boring and Milling Machine

FBB-110L

FBB Series

Expansive Solid and Rigid Design Greatly increases Boring and Milling Capability

Wide Range of Machining Applications: With the heavy-duty, high-precision design of this series, the FBB-110L horizontal boring and milling machine with rotary table offers more machining flexibility. Many FBB series users in various markets, including the aerospace, automotive, energy, machining and job-shop, have experienced a dramatic increase in reliability and productivity. The series is designed for machining heavy, long parts and features a deep hole boring capability with high rigidity and superior machining accuracy.

Outstanding Structural Design: The series is perfect for your biggest projects. The extra rigid design of the main machine body and column ensure outstanding structural stability along with the one-piece machine for full table support.

The 26kW (35HP), 50-taper, large-diameter, cartridge-type, air-purged spindle runs with a German made two-speed gearbox that generates a maximum of a 1,500NM (976 ft.-lbs.) at 188rpm to overcome most tough-material cutting conditions.

A spiral-type spindle cooling system provides constant, all-around lubrication, preventing thermal deformation and substantially prolonging the life of the spindle, bearings and gears. Combined with a gearbox, the spindle can be extended (W-axis) for deep-hole boring to provide high-rigidity and superior machining accuracy.

The series not only handles the big jobs but does it with cutting-edge control. The FANUC 0i-MD control comes with an AICC high-speed machining contour control, which has a smooth interpolation contouring control and an optional 200-block look-ahead function.



FBB-110L

Table Size: Up To 1,600mmL x 1,440mmW (63" x 55")
Table Load: Up To 10,000kg (22,000 lbs.)
X / Y / Z Travel: 3,000 x 2,100 x 1,500 (118.1" x 82.6" x 59")
Spindle Speed With Gear Box: Up To 2,500rpm
Spindle Motor: Up to 26 kW (35HP) / Optional 37kW (50HP)
Spindle Taper: #50
Column Moving Type With Full C-Axis Rotary Table
W-Axis Includes: 110mm (4.3") Quill



Note: The machine shown above includes optional semi-high splash guard and other options.

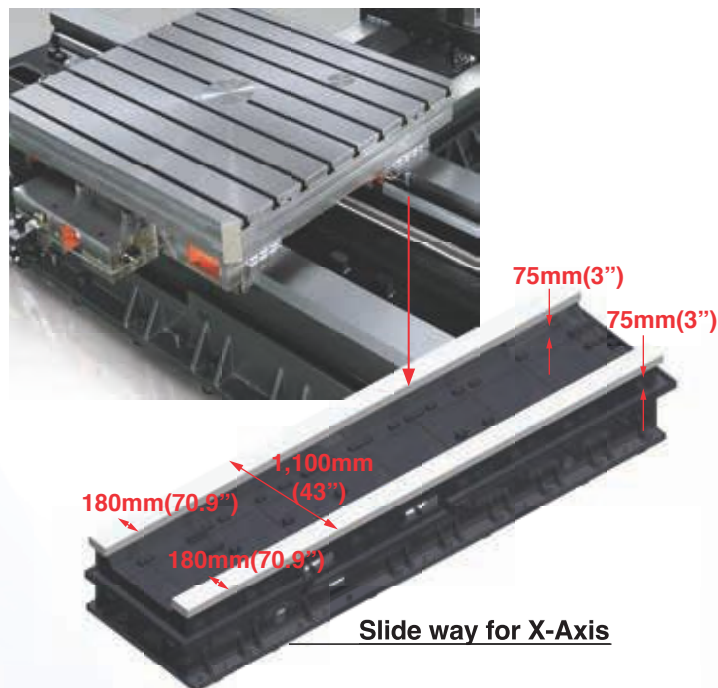
FBB Series

Machine Structure

Extremely Rigid Structure - This machine features a heavy-duty guideway design on X,Y,Z-axis. A one-piece Meehanite cast iron machine base design features two heavy-duty large box ways, which have been hardened and ground before being coated with Trucite.

The extra-large, extra-high column construction greatly increases machining flexibility. The heavy-duty, high-precision rotary table offers a wide range of machining applications. The series is designed for high-performance, production-batch machining of large workpieces for long-cycle production with minimum non-cutting time.

The minimum indexing angle for this servo controlled table is 0.001 degree. A Fagor rotary encoder has been installed for better positioning accuracy.



Column and Base - This machine has an over-sized box way-type column, bed and saddle that features outstanding structural rigidity during heavy-duty boring and milling.



8,930mm(L) x 6,024mm(W) x 5,000mm(H)
352" x 237" x 197"

Advanced High-Performance Spindle Design -

Spiral- type spindle cooling system provides constant, all-around lubrication, preventing thermal deformation and substantially prolonging the life of the spindle, bearings and gears. Combined with a gear box, the spindle can be extended (W-axis) for deep-hole boring with high rigidity and superior machining accuracy.



Coolant System - The coolant nozzles positioned around the spindle features side cooling, which greatly increases the cooling effect for cutting tools and work-pieces. The process prevents a build-up on the edge of the tool and thermal deformation of the workpiece. The coolant-through-spindle feature (optional) feature shoots coolant directly to the cutting edge. This feature prolongs tool life, allows higher cutting speeds and flushes chips out during deep drilling.

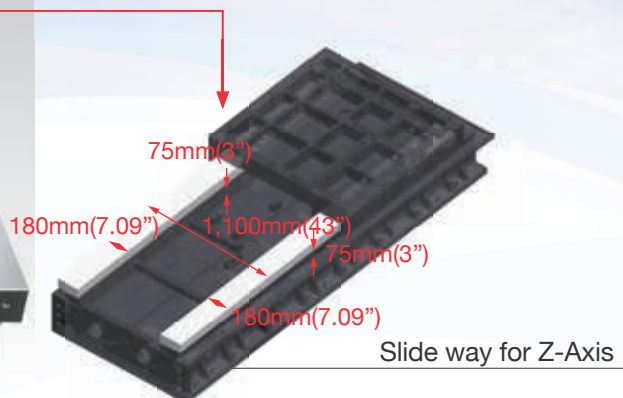
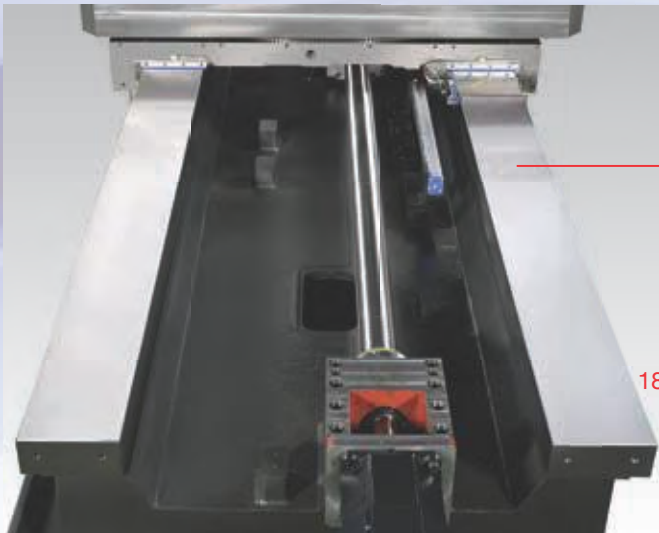


Rotary Table - A fully programmable rotary table with a Fagor scale that indexes at a minimum 0.001°. The combination of worm shaft and worm gear design ensures excellent machining accuracy. A large box way, hardened, ground and coated with Turcite, allows for heavy loading on the rotary table up to 10,000kg (22,000 lbs.).

To ensure the rigidity of the table, the machine has a hydraulic brake that locks the table in any position, plus a locking pin every 90°.



Ball screws - Large Ø63mm (Ø2.4") / Ø63mm (Ø2.4") Ø63mm (Ø2.4") C3-class ballscrew equipped on X / Y / Z axes for precision and heavy-duty cutting operation. During ballscrew assembly of the ballscrews, the laser unit is applied for calibration to ensure geometric accuracy.

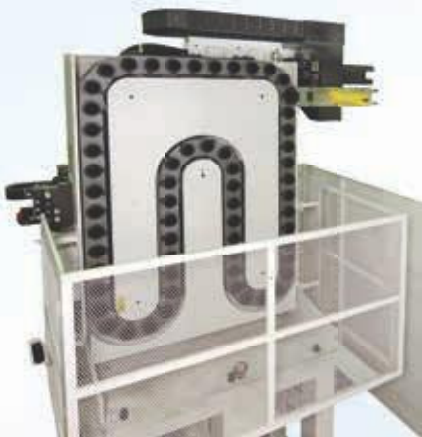
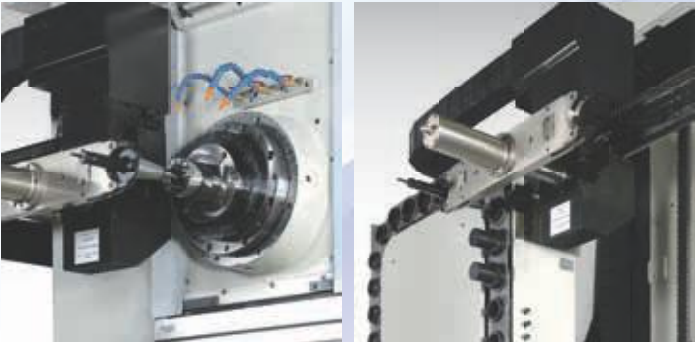


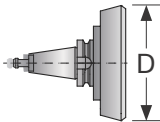
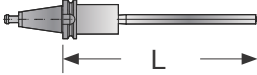
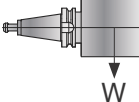
FBB Series

Machine Structure

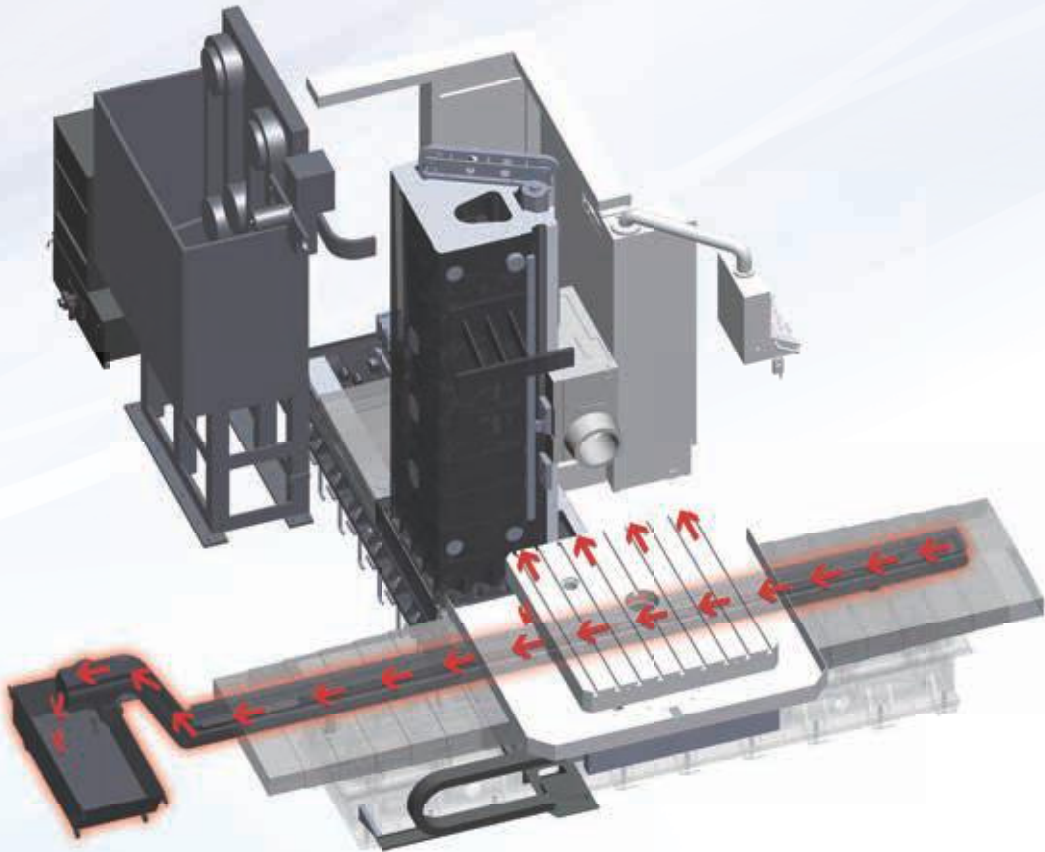
Tool Changer and Chain-type Magazine -

The double-arm-type ATC features random access, bidirectional tool indexing. The easy-access design offers safe fast loading and unloading. The tool-to-tool changing time is 15 seconds, standard 60 magazine capacity, optional 80/100/120 tools.



Max. Tool Diameter		D: Maximum tool diameter with adjacent tool: 125mm (4.9") D: Maximum tool diameter without adjacent tool: 215mm (8.5")
Max. Tool Length		L: 400mm (15.7")
Max. Tool Weight		W: 25Kg (55 lbs.)

Chip Removal - A dual-chip channel with auger conveyor, located on the left and right sides of the machine base, moves the chips to a chain-type chip conveyor for removal into a cart at the front side of the machine.



FBB Series

Control

User-friendly Control - The FANUC Oi-MD control's 10.4" color LCD is standard.

The control is designed to swing for optimum positioning and convenience of operation. The control is equipped with a M.P.G. handwheel to make the set-up more convenient.

Standard FBB Oi-MD Control Features

Control Axes

Controlled X / Y / Z -Axis
Simultaneously Controllable Axes
Maximum Simultaneously Controllable four Axes

Programmable Methods

Absolute/Incremental Programming
Decimal Point Programming
Inch/Metric Conversion

Interpolation

Positioning
Linear Interpolation
Circular Interpolation
Cylindrical Interpolation
Helical Interpolation
Circular Interpolation Plus Maximum Two Linear Axes

Feed

Manual Handle Feed: 1 Unit
Manual Handle Feed Rate: x1, x10, x100
Rapid Traverse Rate Override: F0/25/100%
Feedrate Override: 0~150%

Program Storage and Editing

Part Program Storage: 1,280m (512KB)
Numbered of Stored Programs: 400

Operation and Display

Display Section 10.4" TFT LCD
Running Time Display/
Number Of Parts Display
Clock Function
I/O Interface: RS-232 and USB/
Memory Card Interface/PCMCIA
Ethernet
DNC Operation with Memory Card
(Front Card Slot/Data Server)

STN Function

Spindle Feed Function: 5 Digit S Code
Spindle Speed Override: 50~120%
Tool Function: 4 Digit T Code
M Function: 3 Digit M Code

Tool Offset

Tool Length Compensation
Number Of Tool Offsets: 400 Sets
Cutter Compensation C
Tool Offset

Coordinate System

Manual Reference Position Return
Automatic Reference Position Return
2nd Reference Position Return
3rd and 4th Reference Position Return
Reference Position Return Check

Operation Support System

Single Block
Dry Run
Machine Lock
Mirror Image
Extended-part Program Editing
Background Editing
Load Meter Display
Control Axis Detach
Tool Length Measurement
Program Restart
Sequence Number
Comparison and Stop
Manual Handle Interruption

Programming Support Function

Operation Manual in CD
Canned Cycles for Drilling
Sub-program
Custom Macro B
Exact Stop
Exact Stop Mode
Data Server
Programmable Data Input
Rigid Tapping
Programmable Mirror Image
Scaling
Polar Coordinate Command

Mechanical Accuracy

Compensatio

Backlash Compensation
Pitch Error Compensation
Rapid Traverse/Cutting Feed
Backlash Compensation

Automatic Support Function

Skip
High-speed Skip
Multi-step Skip
Tool Life Management
Extended Tool Life Management
Safety And Maintenance
Over Travel
Stored Stroke Check 1
Self-diagnosis Function
Alarm History Display
Help Function
Operation History Display
Stored Stroke Check 2

Setting and Display

Servo Setting Screen
Graphic Function
Dynamic Graphic Display

Operation Guidance

Function for Milling
Manual Guide Oi



Optional FBB Oi-MD Control Features

Program Storage and Editing

Part Program Storage:
5,120m (2MB)

Operation Support System

Machining Condition
Selecting Screen
Manual Handle I/F For I/O Link B
AI Contour Control: 200 Block
Data Servo Editing
Nano Smoothing
Jerk Control

Mechanical Accuracy

Compensation

Bi-directional Pitch Error
Compensation

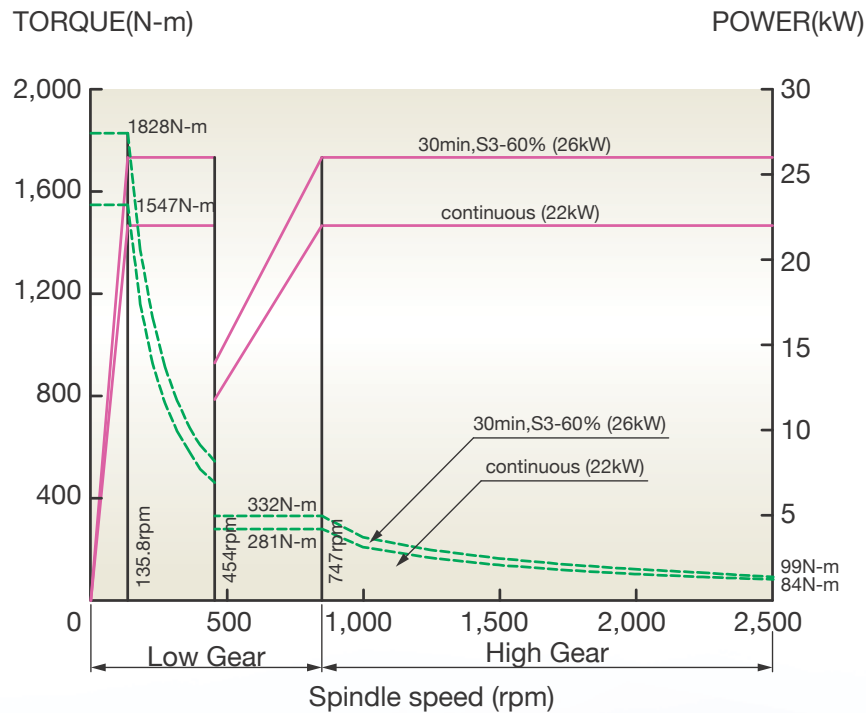
Operation Guidance Function For Milling

Manual Guide i

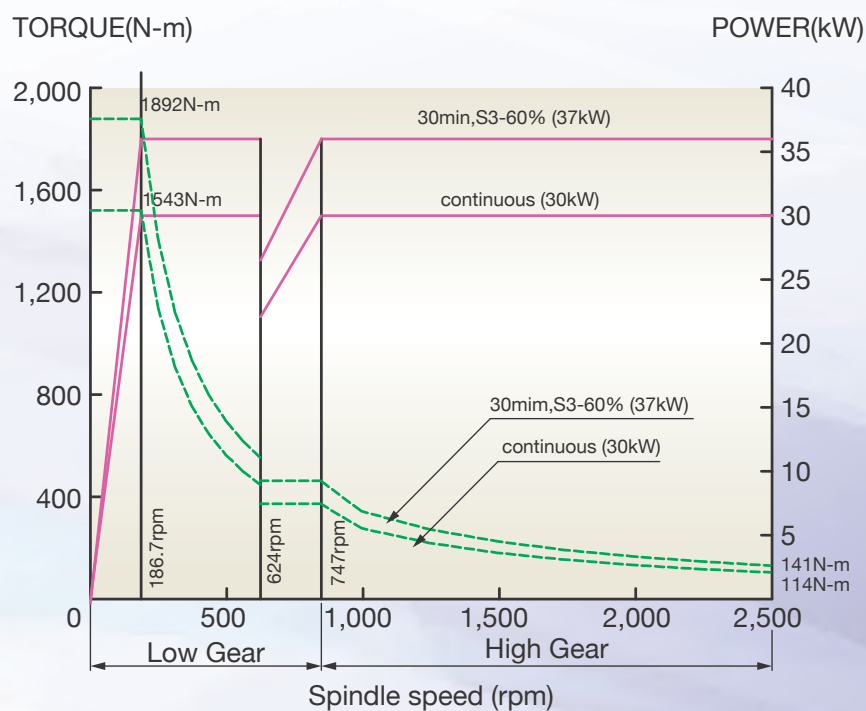
FBB Series

Spindle Torque Charts

2,500RPM SPINDLE (α22/7000i)-ZF250



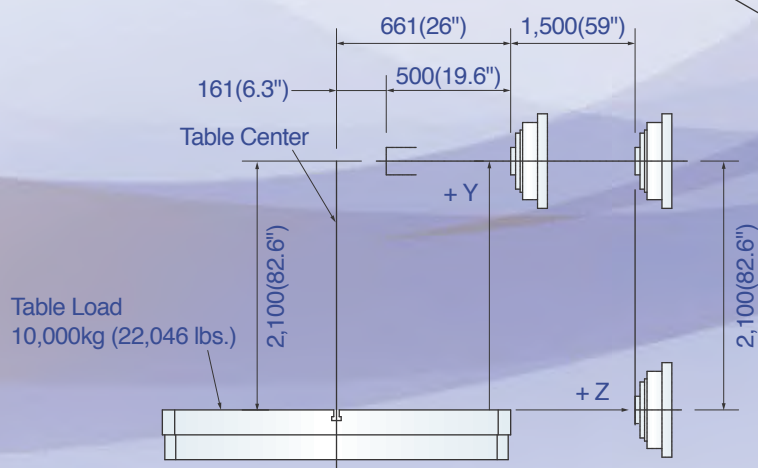
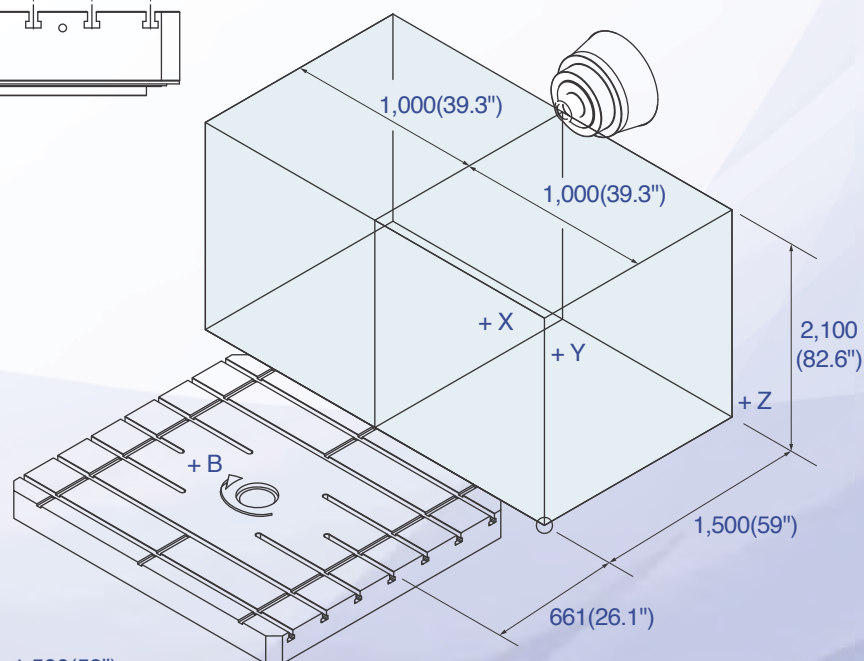
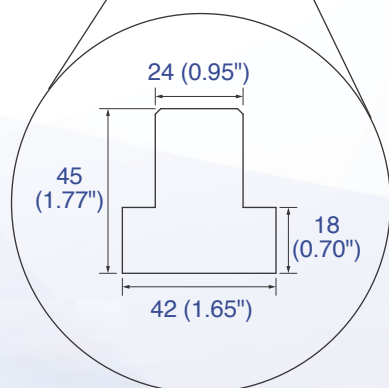
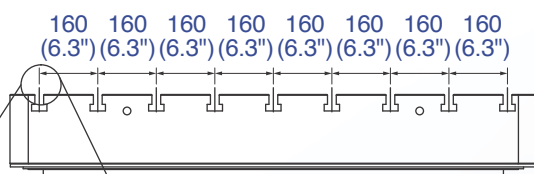
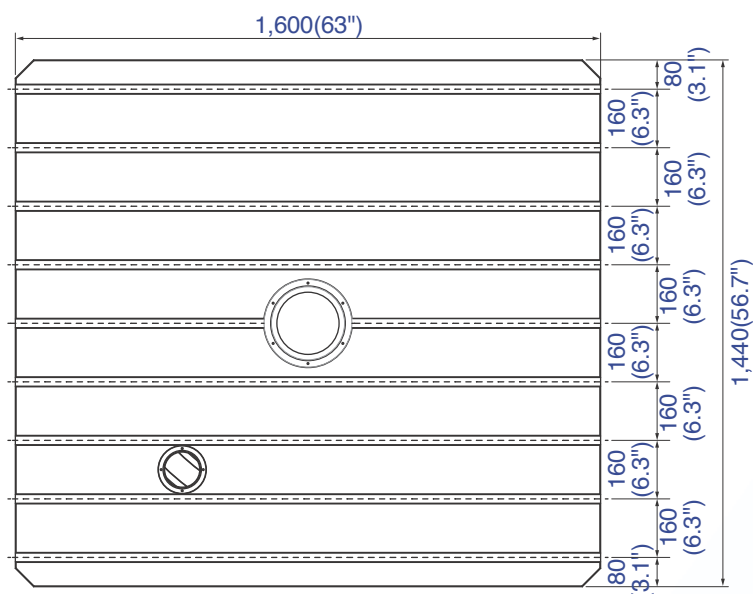
2,500RPM SPINDLE (α30/6000i)-ZF300



FBB Series

Table and loading capacity

UNIT: mm (")

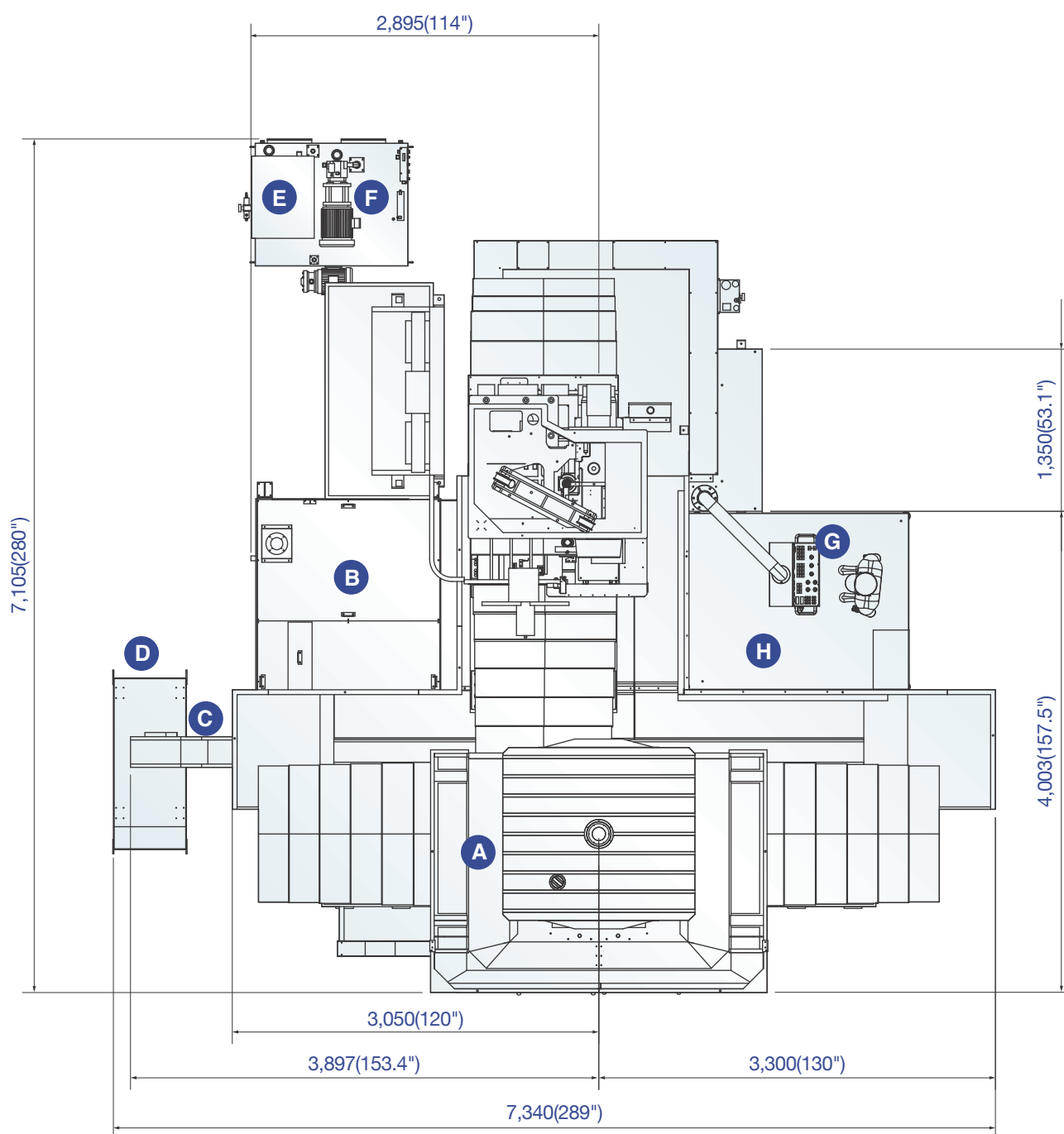


FBB Series

Machine Configuration and Dimensional Drawings

- A. Machine Body
- B. Coolant Tank
- C. Chain Type Chip Conveyor
- D. Chip Cart
- E. Spindle Cooler and Lubrication Unit
- F. Hydraulic System
- G. Control Panel
- H. Foot Pad

UNIT: mm (")



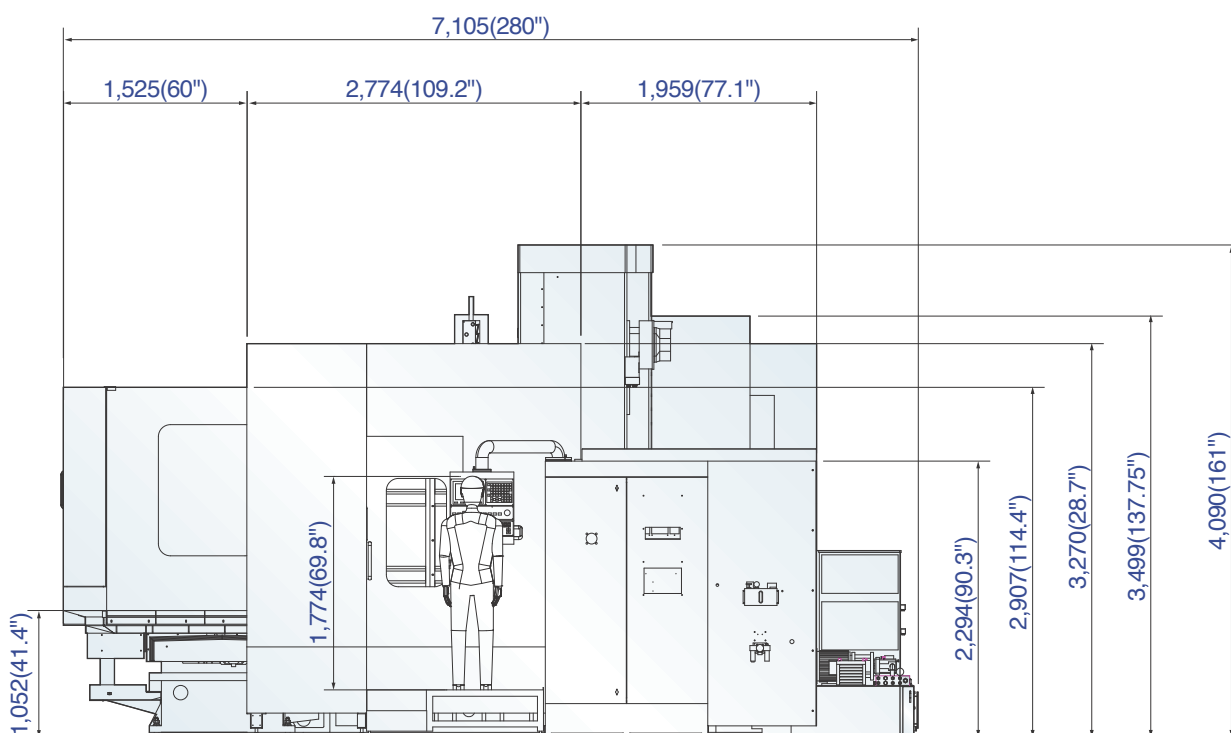
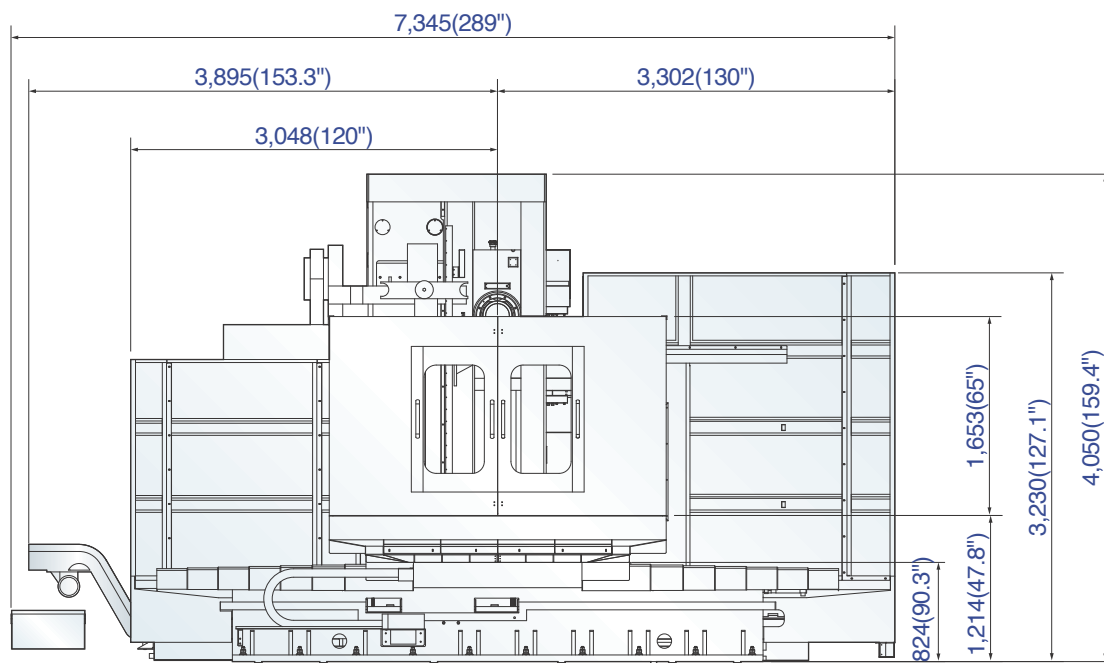
FBB Series

Dimensional Drawings

UNIT: mm (")

Spindle quill: Ø110mm

Standard Table, and Optional Semi-Enclosed Type Splash Guard Dimensional Drawings

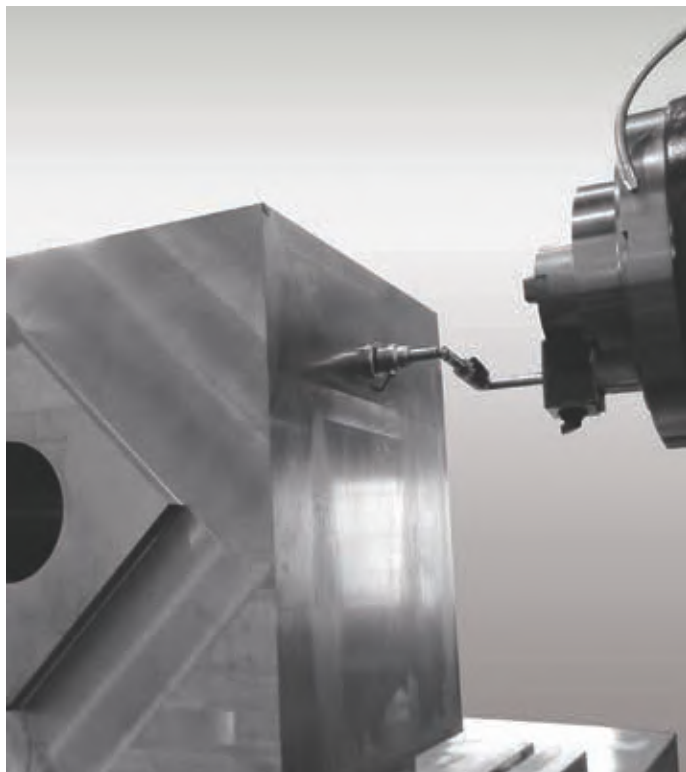


FBB Series

Laser Measurement And Ball Bar Diagnosis System

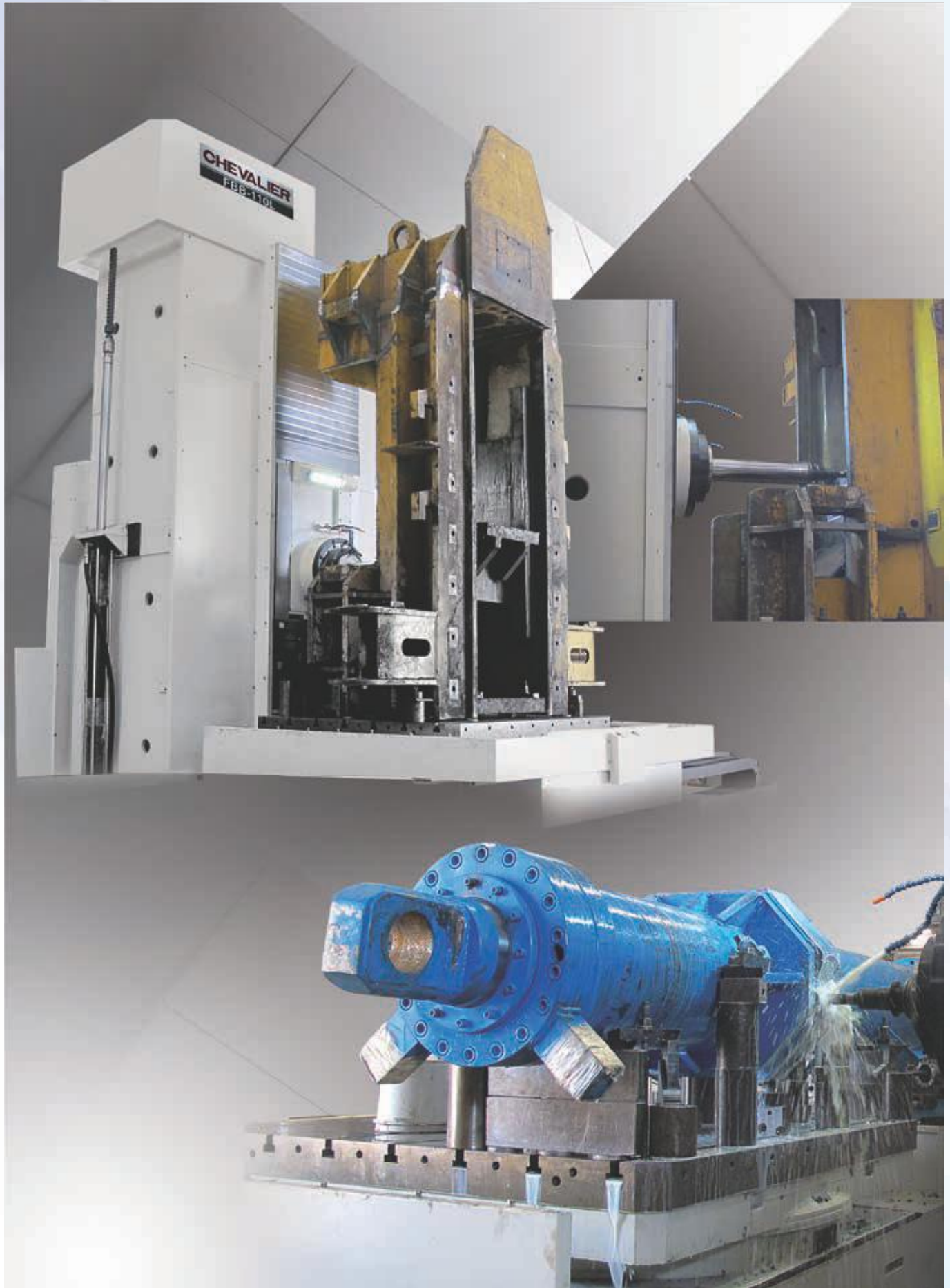


Ball Bar Test



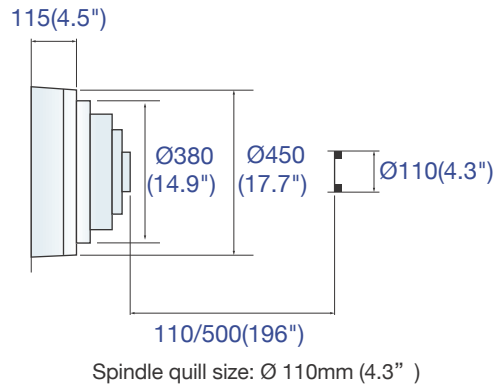
FBB Series

Application Workpiece



FBB Series

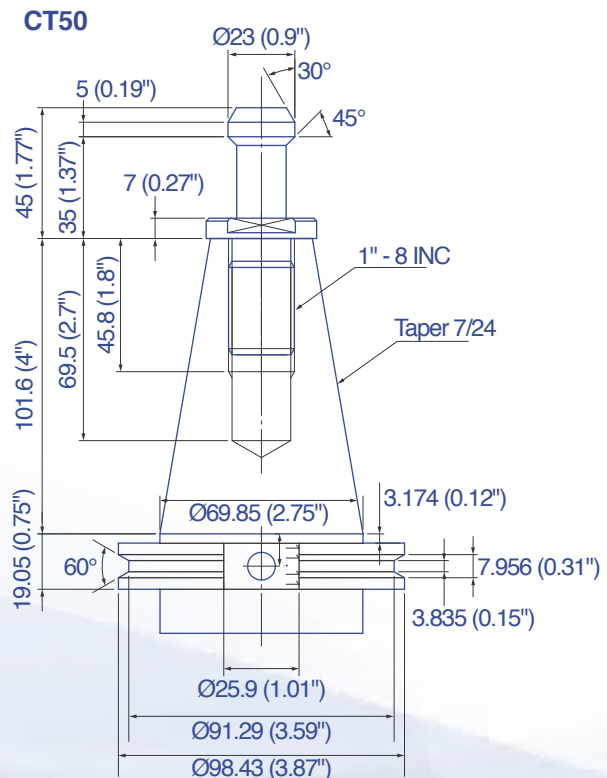
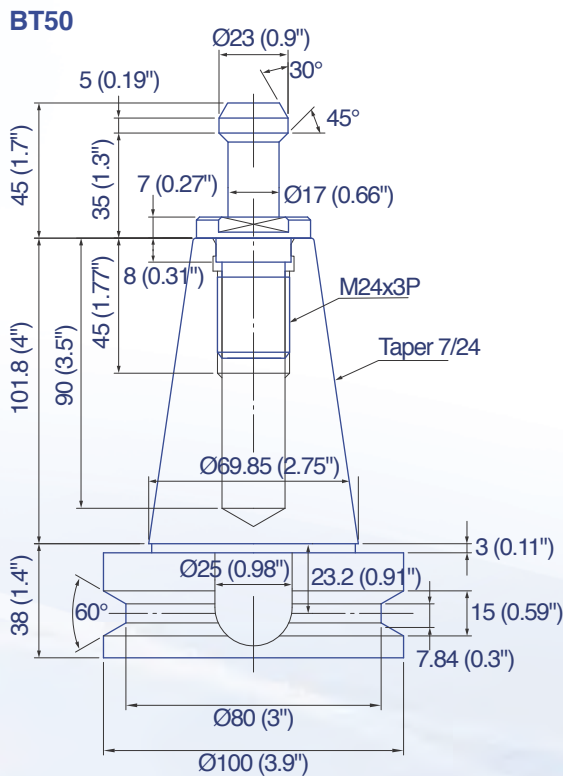
Spindle Extension (W-Axis)



UNIT: mm (")

Pull Studs and Tool Shanks

UNIT: mm (")



Standard and Optional Accessories

Standard Accessory

- Automatic air blast
- Automatic power shutoff
- Rigid tapping
- Automatic lubrication system
- RS232C interface
- Air conditioned electric cabinet
- B axis rotary table
- 3 axis ballscrew
- Spindle oil chiller
- Pilot lamp & machine lamp
- Coolant system
- Tool box and tools
- German ZF gear box
- Chain type chip conveyor (without cart)
- Leveling bolts and pads
- X/Y/Z axis linear scales (FAGOR)
- Operation manual
- Spindle support sleeve 250mm(9.84")
- B axis with FAGOR rotary encoder
- Auto tool magazine 60
- Spindle motor α 22i/35HP
- Table guard

Optional Accessory

- Renishaw OMP60 work piece measuring system
- Renishaw TS27R tool length measurement
- BLUM NT-A2 laser tool measurement
- Oil skimmer
- Cartridge type filter system, 30bar,50/60Hz,for throughspindlecoolant (must order Fully enclosed splash guard together)
- Cartridge type filter system,70bar, 50/60Hz,for through spindle coolant (must order fully enclosed splash guard together)
- Through tool coolant device & M code
- 90 degree angle head
- α 30/7K (50HP) spindle motor instead of α 22/35HP,10.4" LCD
- Semi enclosed high splash guard
- Fully enclosed splash guard

Specifications

UNIT: mm (")

Item	Description	Unit	FBB-110L
Capacity	Max. workpiece weight	kg(lbs.)	10,000 (22,000)
	Machining capacity(X / Y / Z / W)	mm(")	3,000 (118) / 1,500 (59) 2,100 (82.7) / 500 (19.7)
	Height from the table surface to ground	mm(")	1,200 (56.8)
Table	Table size	mm(")	1,600 (63) x 1,400 (55)
	Table rotation speed	rpm	1 rpm
	T-slots (wid. x dis. x no.)	mm(")	24 (0.94) x 160 (6.3) x 9
Travel	X-axis stroke	mm(")	3,000 (78.7)
	Y-axis stroke	mm(")	2,100 (70.8)
	Z-axis stroke	mm(")	1,500 (59)
	W-axis (spindle quill dia. & quill extension length)	mm(")	Ø110 (4.3) / 500 (19.6)
Spindle	Spindle speed	rpm	2,500rpm
	Transmission type	-	Gear box
	Spindle taper	-	#50
Feed Rate	X-axis rapid traverse	m/min(")	10 (393.7)
	Y-axis rapid traverse	m/min(")	10 (393.7)
	Z-axis rapid traverse	m/min(")	10 (393.7)
	Cutting feed (X / Y / Z)	m/min(")	1-7 (39.3~275.5)
	Vertical axis equalizer	-	Hydraulic balance
	X / Y / Z / W axes ball screw diameter	mm(")	Ø63 (2.4) / Ø63 (2.4) / Ø63 (3.1) / Ø40 (1.5)
Automatic Tool Changer	Tool shank	-	BT / CAT / DIN50
	Pull stud	-	P50T-1
	Tool change system	-	Tools changer (Arm)
	Tool storage capacity (chain type optional)	pcs	60 (Optional: 80 / 100 / 120)
	Max. tool diameter distance (with adjacent tool)	mm(")	Ø120 (4.72)
	Max. tool diameter distance (without adjacent tool)	mm(")	Ø250 (9.84)
	Max. tool length	mm(")	400 (15.7)
	Max. tool weight	kg(lbs.)	25 (55)
	Tool selection system	-	Random tool selection mode
	Tool change time (tool-to-tool)	sec.	16 sec.
Guide Way	Width of X-axis box way	mm(")	180 (7.09)
	Width of Y-axis box way (2 pcs.)	mm(")	150 (5.91)
	Width of Z-axis box way (4 pcs.)	mm(")	180 (7.09)
Motors	Spindle motor (30min)	kW(HP)	26 kW (35HP) / Optional 37kW (50HP)
	Drive motors (X / Y / Z / W)	kW(HP)	7 / 6 / 7 / 8 (9 / 7.5 / 9 / 10.5)
	Rotary table motor	kW(HP)	4 (5)
	Hydraulic motor	kW(HP)	7.5 (10)
Power Requirement	Power required	kva	55kva
	Voltage	V	220V
Tank Capacity	Hydraulic tank capacity	L(gals.)	300 (79)
	Spindle/gear head coolant tank capacity	L(gals.)	45 (11.8)
	Coolant tank capacity	L(gals.)	500 (132)
Machine Dimensions	Machine height (H)	mm(")	4,100 (196.8)
	Required floor space (WxL) (splash guard type)	mm(")	8,500 (237) x 7,800 (332.6)
	Required floor space (WxL) (semi-closed guard type)	mm(")	7,335 (288.7) x 7,840 (308.6)
	Machine weight	kg(lbs.)	26,000 (57,200)



Grinding Machines

Grinding Machines

Turning Machines

Milling Machines

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