Trust & Technology

Tongtai

ISO 9001 ISO 14001 CE

A Worldwide Tradition of Quality Products and Customer Service

Table Type
Boring and Milling Machine

TBT-160

High ■Quality ■Precision ■Efficiency ■Economy

Tongtai Machine & Tool Co., Ltd.

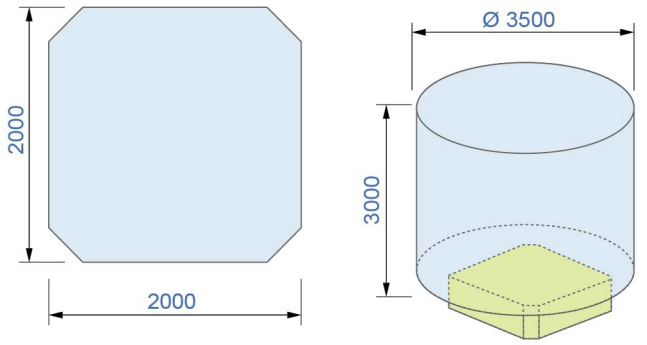
High machining accuracy remained for long-term running.

TBT-160

- Tongtai
- Boring and milling machine
- Table type
- Quill diameter

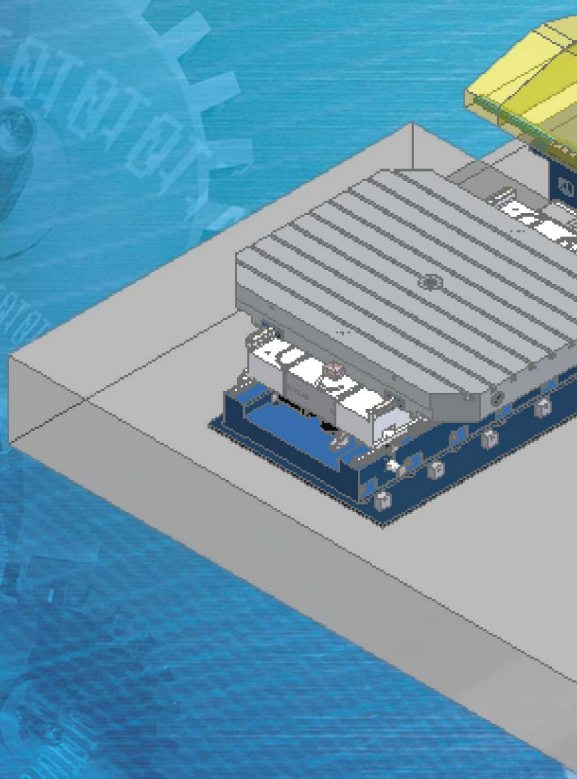
Machining Dimension

● TBT-160



Pallet　　Machining capacity

Unit：mm

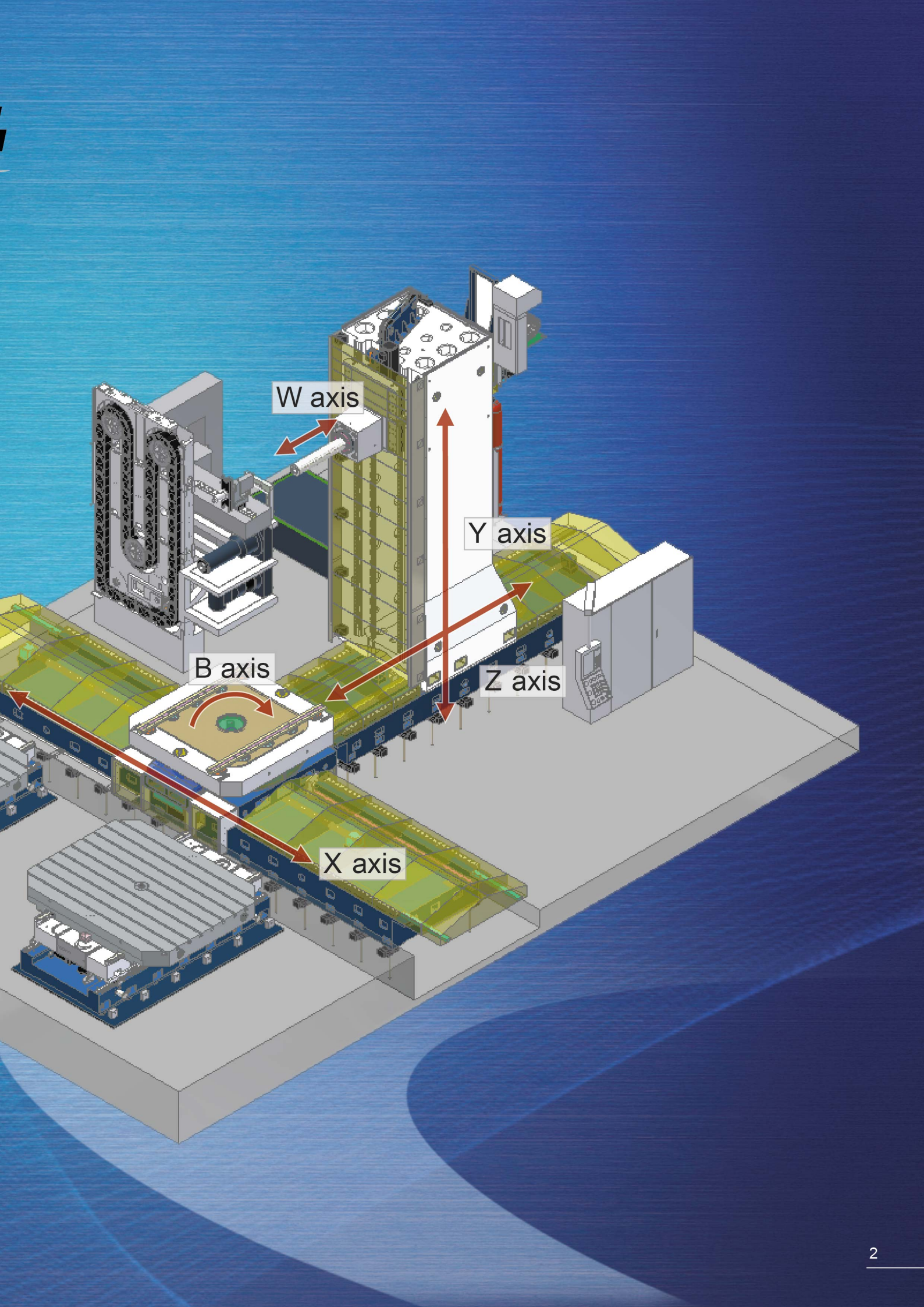


Specification

Item	Unit	TBT-160
X axis travel	mm	3000/4000/5000
Y axis travel	mm	2500/3000
Z axis travel	mm	2200/2700
W axis travel	mm	800
Spindle speed	rpm	3500
Spindle nose		BBT50
Spindle motor	kw	52

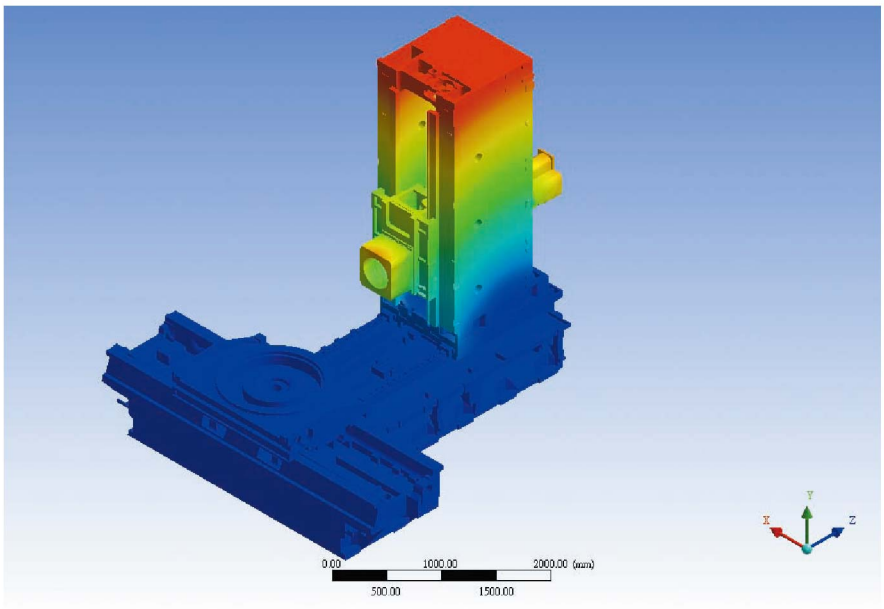
Accuracy

Positioning accuracy of X/Y/Z axis	0.02 mm/2000 mm
Repeatability of X/Y/Z axis	± 0.004 mm
Positioning accuracy of B axis	5 Sec
Repeatability of B axis	± 2 Sec


W axis
Y axis
B axis
Z axis
X axis

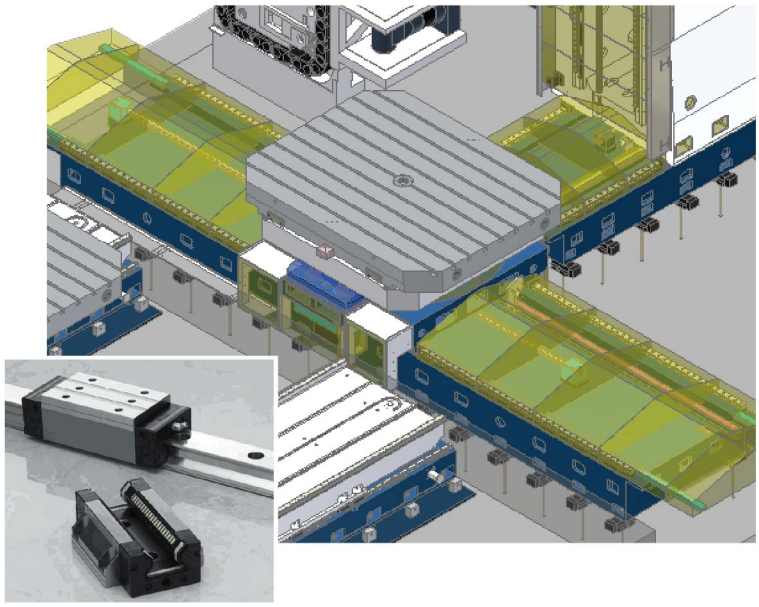
Advantages

FEM Analysis (Finite Element Method)



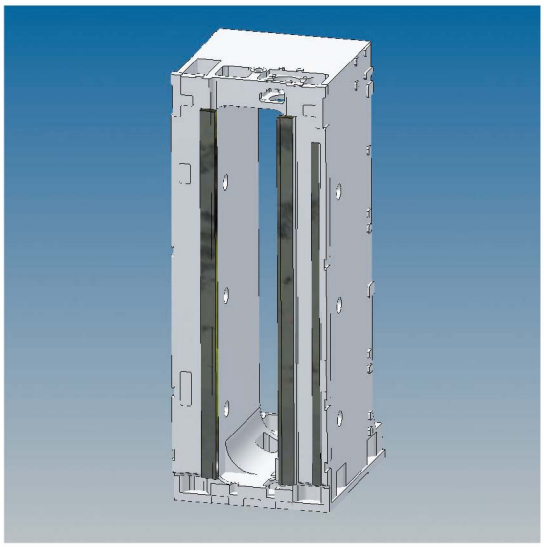
To fit the applications for power generation, shipbuilding, aerospace and general machining, FEM analysis is utilized to ensure the reliability for the target of powerful cutting capability, excellent accuracy and high productivity.
All the casting components are properly heat treated to ensure better structural rigidity for high efficiency machining.

Roller type linear guideways



Roller type L/M system with high rigidity and low friction features to keep accurate positioning and machine accuracy during heavy cutting operations.

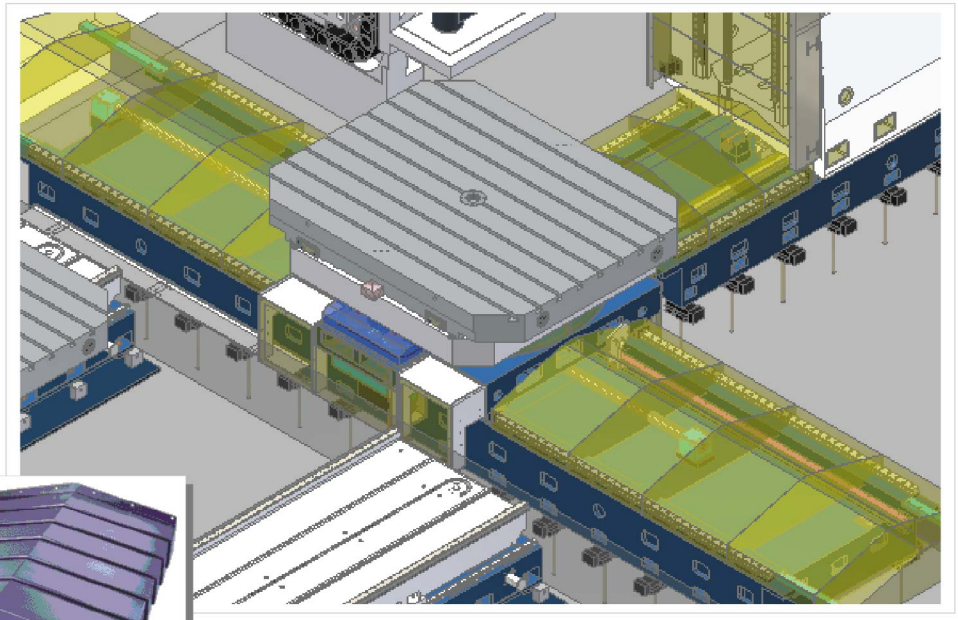
Symmetrical column structure

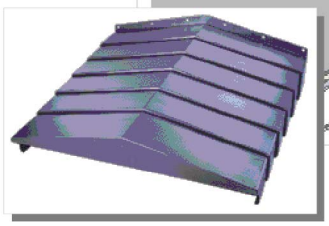


With symmetrical box structure and the inner wall with double layers, the column has excellent rigidity to minimize the deformation caused by heat expansion.

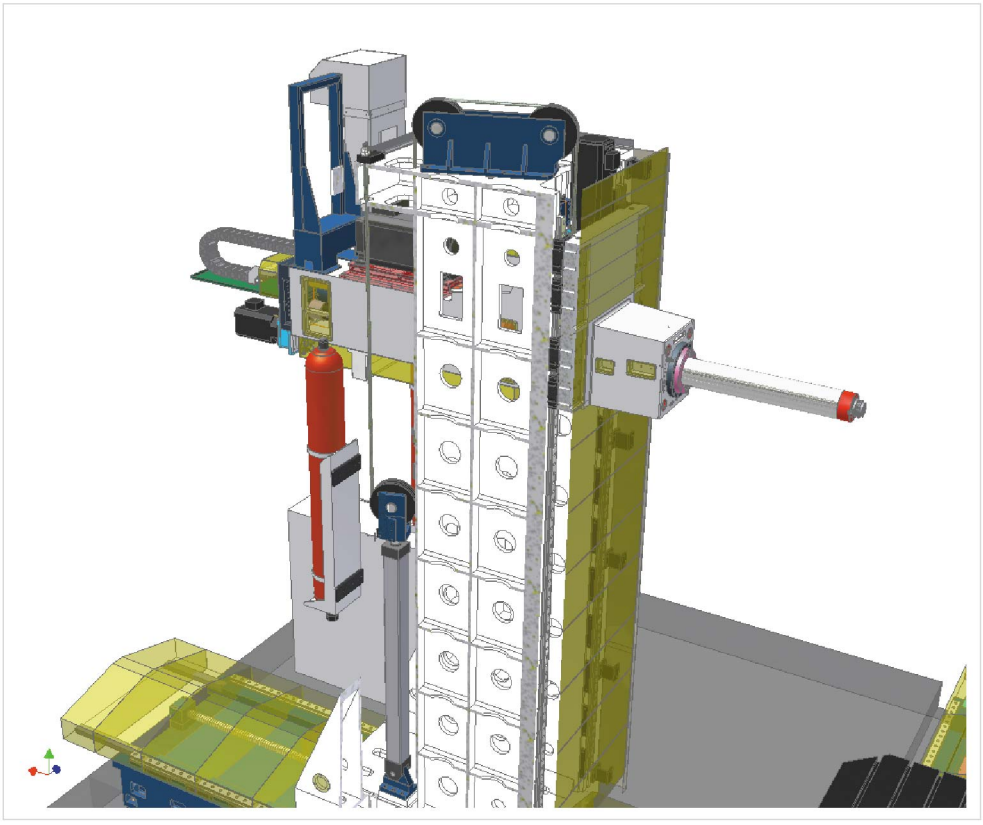
Chip-proof function

Metal telescopic covers are provided in all linear axes to prevent guideways and ball screws from chips.





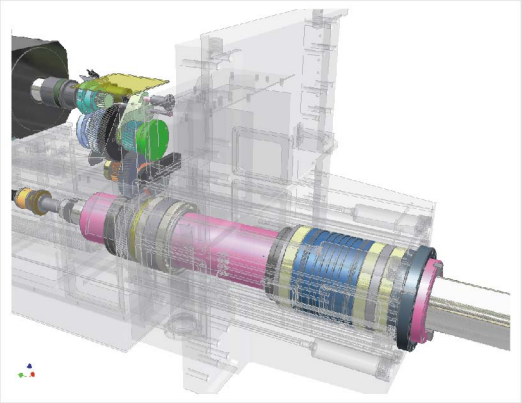
Accuracy compensation system



There are four sliding blocks, in the both sides of the Y-axis linear guide way, to support the spindle head. This improves the rigidity of the Y-axis moving.

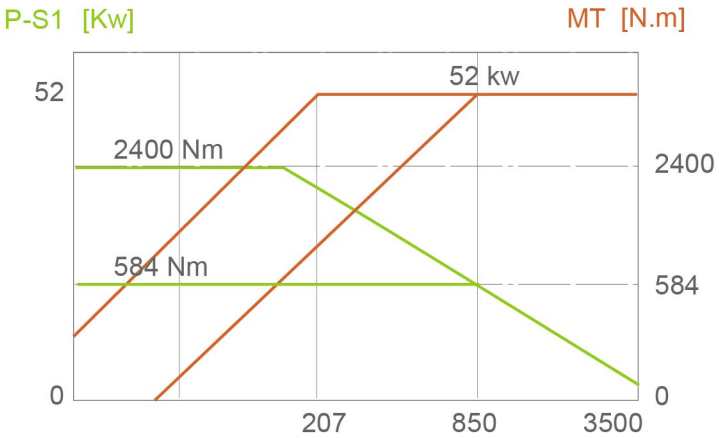
Spindle head moves up and down on the Y-axis. Use pressure balance cylinder with pressure tank to reduce the power output requirement of axial motor.

High Rigidity Spindle



The 2-step gear box, for increasing the output torque is integrated by high precision gears to create the combined advantages of high rigidity and efficiency.

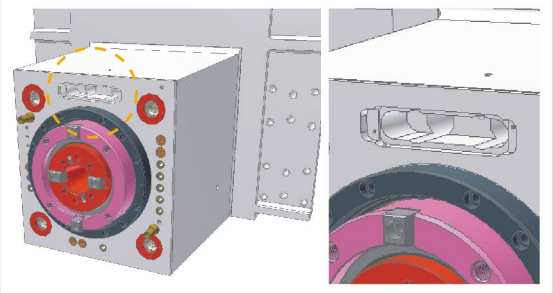
Spindle Output and Torque Chart



High precision spindle

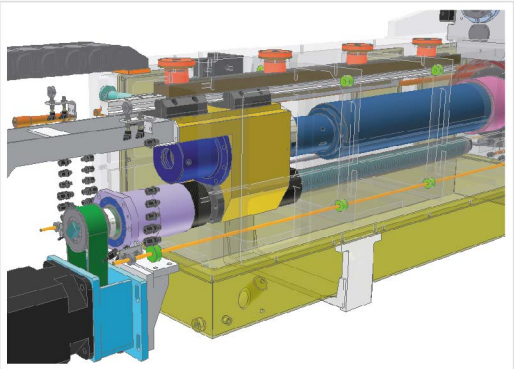
High precision and high speed angular ball bearing for spindle with oil-air lubrication can keep the spindle accuracy and ensure the spindle life.

Interface of automatic milling head changing(Opt.)



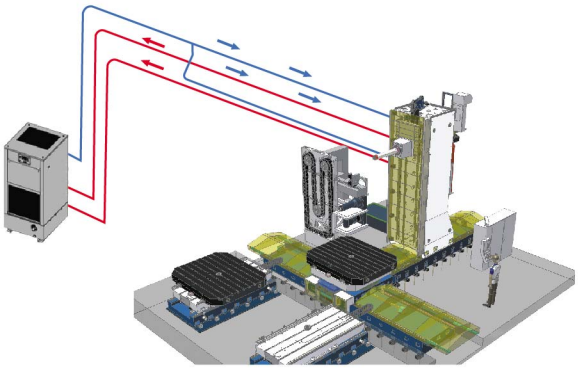
The components of automatic milling head changing system includes four pull-studs, two positioning pins and one electrical connector.

W axis feeding system



The boring quill is driven by the high precision ball screw and supported by the self-lubricated sleeves to ensure the rigidity with the movement of W axis.

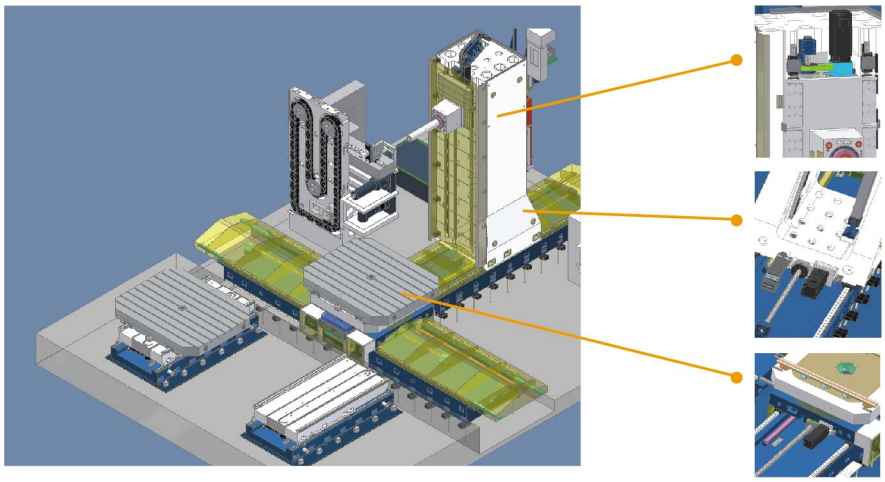
Spindle cooling unit



The temperature of cooling oil recirculated for the gear box is stably controlled by the cooling system to avoid overheating.

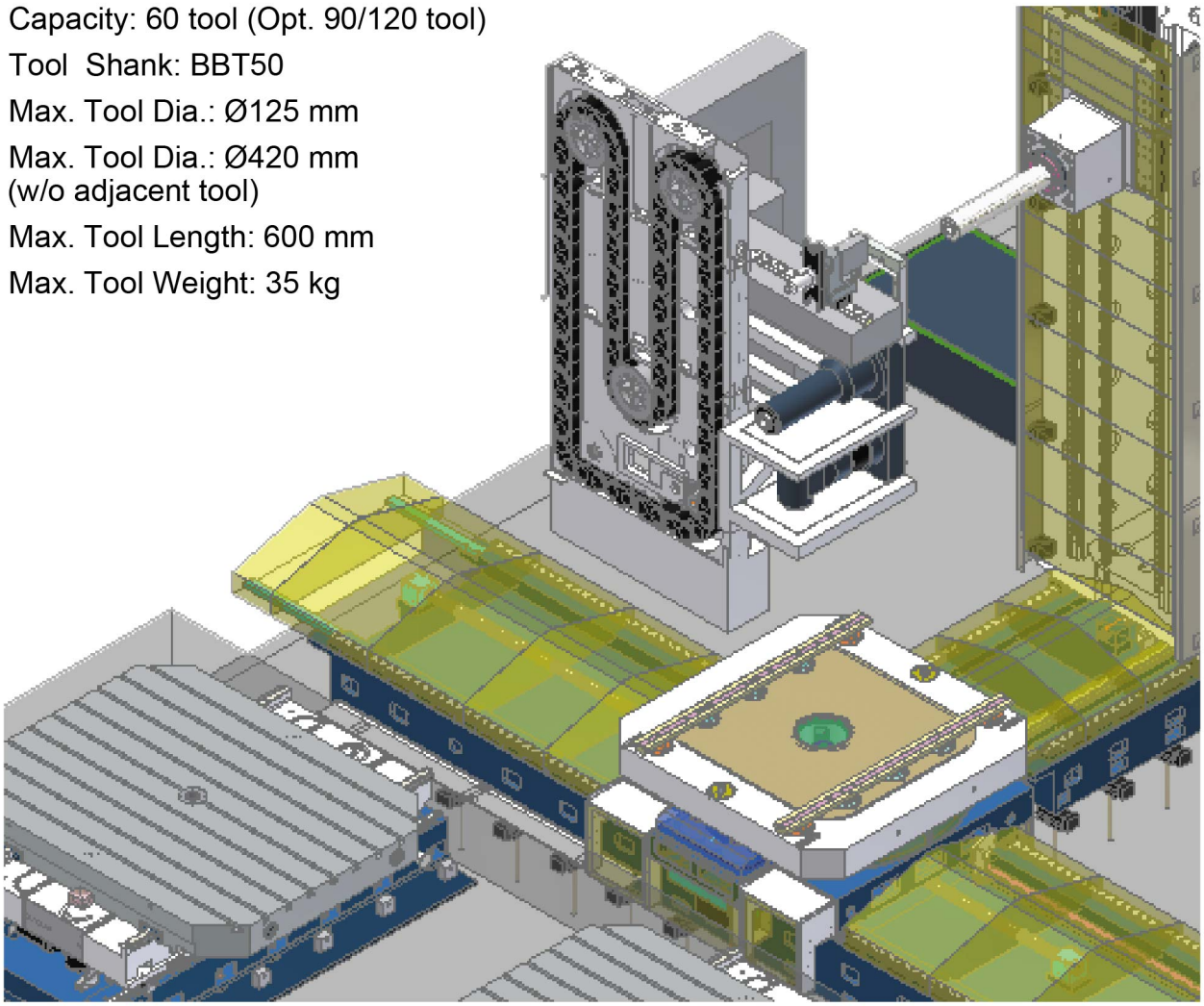
Servo feeding systems

Fixed and preloaded ball screws with rotating nuts are used for X/Y/Z axis to increase the axes rigidity, the machining efficiency and accuracy.

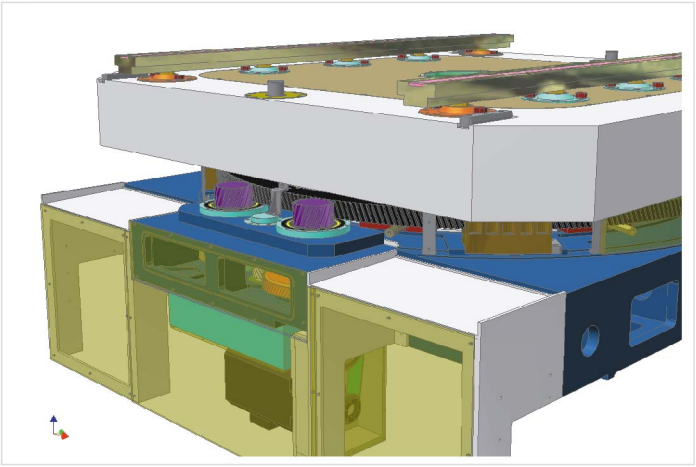


ATC system

- Capacity: 60 tool (Opt. 90/120 tool)
- Tool Shank: BBT50
- Max. Tool Dia.: Ø125 mm
- Max. Tool Dia.: Ø420 mm (w/o adjacent tool)
- Max. Tool Length: 600 mm
- Max. Tool Weight: 35 kg



B axis system



In addition to the high rigidity, high damping and low friction hydrostatic bearing, the rotary table is driven by an oblique gear with double pinions anti-backlash gear box to guarantee high accuracy and high efficiency.

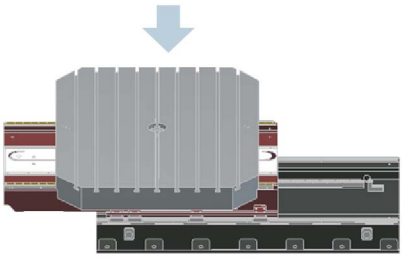
The high resolution encoder is installed directly on the table center to ensure high positioning accuracy of B axis and a hydraulic brake disc system is provided to guarantee the high rigidity.

Max. machining capacity:

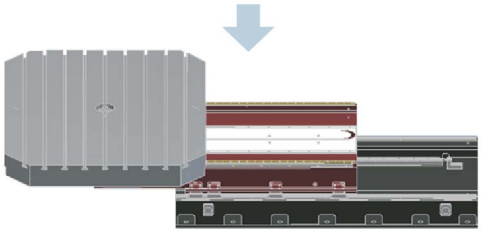
- TBT-160：Ø 3200 mm × H 3000 mm (25 ton)

APC system (Opt.)

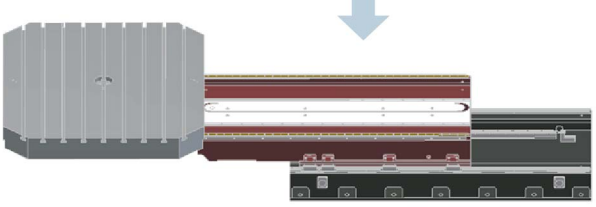
The slide moves to B-axis by rack
(Travel distance is 1339mm)



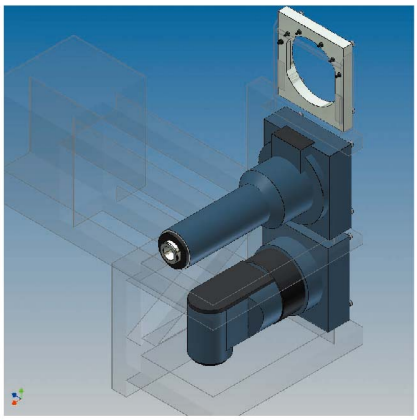
The pallet rotates clockwise
and moves to the top of
B-axis by slide rack system.

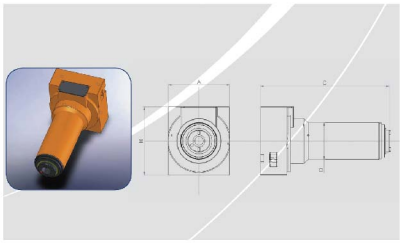


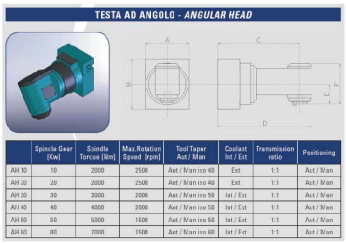
B-axis processes pallet's
actions of clamping and
unclamping. Then, slide
moves back to orientation
point and finishes APC
switch.



Attachments (automatic changing milling heads) (Opt.)



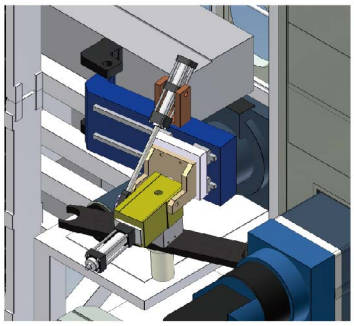


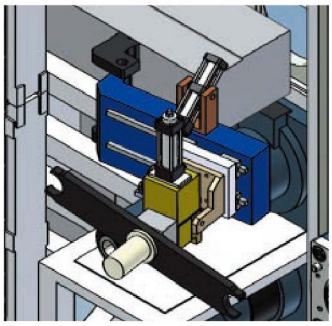


The versatility of TBT-160 is enhanced by the variety of attachments which includes 90 degree milling head available with 2.5 degree indexing around C axis, extension head and others upon request.

Miscellaneous (Opt.)

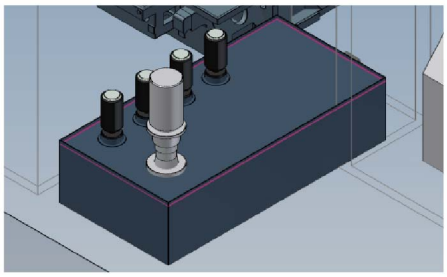
Vertical and horizontal tool changing system



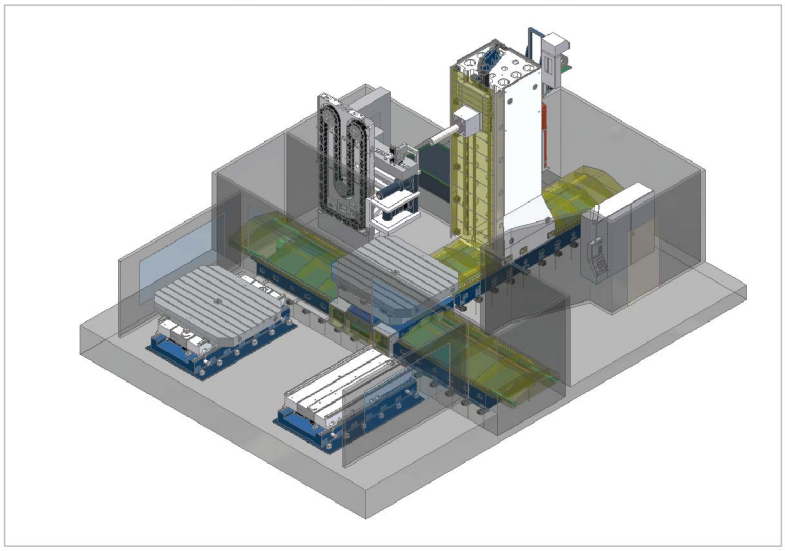


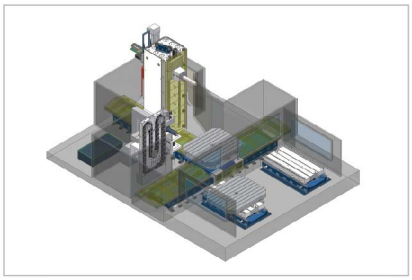
High pressure coolant through spindle

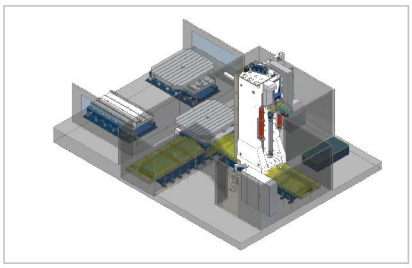
Coolant through spindle 15/35/70 Bar



Flexible splash guard design







2 sets of chip conveyor are aligned with X axis to deliver chips away from the working area to eliminate cleaning time.

The high pressure coolant is pumped from the main coolant tank to the clean tank and filtered through a paper filter, and 2 cartridge fine filters are used to enhance the cleanliness for the coolant through spindle.

Specification

Item	Specification	Unit	TBT-160
Table	Table size	mm	2000×2000(Opt. 2000×2500)
	Max. loading capacity	kg	25000
	Min. index positioning	deg	0.001°
	Table locking		90°×4 positions by lock pin
Spindle	Quill diameter	mm	Ø160
	Spindle speed	rpm	3500
	Spindle motor	kw	52
	Spindle transmission		2 step
	Spindle max. torque	Nm	2400
	Spindle taper		BBT50
	Pull stud		MAS403P50T-1(45°)
Stroke	X axis stroke	mm	3000/4000/5000
	Y axis stroke	mm	2500/3000
	Z axis stroke	mm	2200/2700
	W axis stroke	mm	80
Feed	X/Y/Z/W axis rapid traverse	m/min	25/25/25/25
	V axis rapid traverse	m/min	-
ATC	Tool capacity	pc	60(Opt. 90/120)
	Max. tool diameter	mm	Ø125
		mm	Ø420
	Max. tool length	mm	600
	Max. tool weight	kg	35
Accuracy	Positioning accuracy	mm	0.02/2000
	Repeatability	mm	0.004
Controller			Siemens 840D (Opt. FANUC 31i/Heidenhain iTNC 530)

◎SPECIFICATIONS MAY BE CHANGED WITHOUT PRIOR NOTICE

Standard accessories

- SIEMENS 840D
- Hydraulic unit
- Coolant system
- Air blow
- Automatic lubrication system
- Rigid tapping
- Telescopic covers
- Linear scales
- Work light
- Three color warning light
- Tool box
- Leveling pads
- B axis rotary table (0.001°)

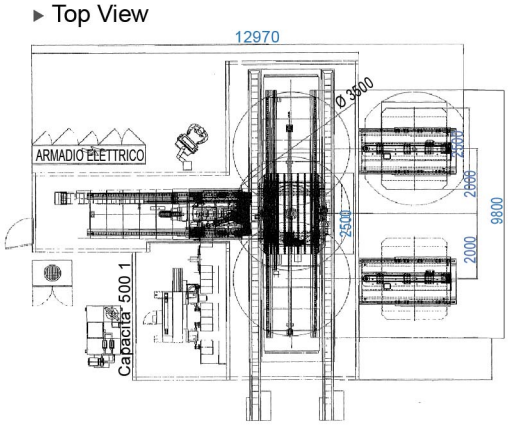
Optional accessories

- Fanuc 31 or Heidenhain iTNC530
- Coolant through spindle (15/35/70 bar)
- Chip conveyor
- Oil skimmer
- Coolant chilling system
- Paper filter
- Transformer / Stabilizer
- Scraper type chip conveyor
- Door interlock
- CE mark
- 90° milling head
- Extension milling head

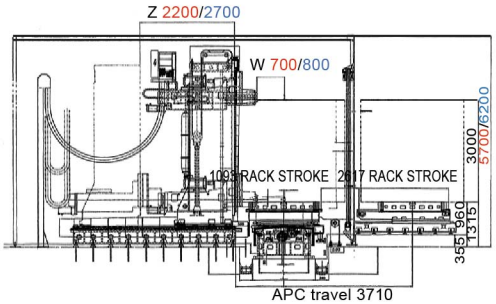
Machine Dimensions

● TBT-160

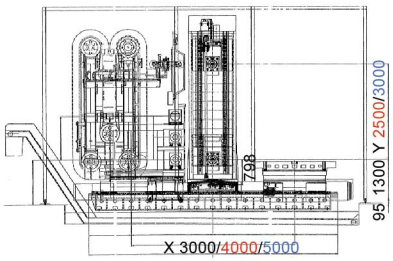
▸ Top View



▸ Side View



▸ Front View



SIEMENS 840D

Optimum, digital complete solution with SINAMICS S120

- Optimum, digital complete solution with SINAMICS S120
- Up to 10 operating mode groups, 10 channels and 31 axes/spindles (Opt.)
- Channel structure: Simultaneous, asynchronous processing of parts program

Axis Functions

- Programmable acceleration
- Pair of synchronized axes (gantry axes) (Opt.)
- Setpoint exchange (Opt.)
- Tangential control (Opt.)
- Trailing axes (TRAIL)

Interpolations

- Linear interpolating axes (4 axes)
- Circle via certer point and end point
- Circle via interpolation point
- Helical interpolation
- Univeral interpolator NURBS (non-uniform rational B-splines)
- Continuous-path mode with programmable rounding clearance
- Multi-axis interpolation (4 axes)

Measurement functions/measurement cycles

- Measurement level 1:
  Two measurement inputs (switching with/without deletion of distance-to-go)
- Measurement level 2 (Opt.):
  Logging of measurement results, measurement functions from
  synchronized actions, cyclic measurement
  Measurement cycles for drilling/milling and turning: Calibrate workpiece probe, workpiece measurement, tool measurement

Technologies

- More than one feed in block (e.g. forcalipers)
- Handwheel override
- Contour handwheel (Opt.)
- Electronic transfer (Opt.)
- Processing package for five axes: Contains the multi-axis interpolation option

Motion-synchronous actions

- High-speed CNC inputs/outputs
- Synchronized action (max.16) and high-speed auxiliary funtion output including 3 synchronous functions
- Synchronized action, stage 2 (Opt.)
- Positoning axes and spindles via synchronized actions (command axes)
- Evaluation of internal drive variables (Opt.) (prerequisite for Adaptive Control)
- Continuous dressing (paralles dressing, online modifiction of the tool offset)
- Asynchronous subroutine ASUP
- Multiple mode actions (ASUPs and synchronized actions in all operating modes) (Opt.)

Open Architecture

- Expand user interface
- SINUMERIK HMI programming package (OEM contract required)
- OA-open NCK software(OEM contract required)

Programming

- CNC programming language
  Programming in parallel with machining
  Dimensions can be specified as metric, in inch or mixed
  Work offsets, programmabel (frames)
  Reference point approach by program
  Look Ahead
  Inclined-surface machining with frames
  Program preprocessing
  Dynamic preprocessing memory (FIFO)
  Online ISO dialect interpreter
  Program/workpiece management
  NC user memore (RAM) 3 to 15 MB for parts programs, tool compensation, offsets
  256 MB HMI user memory on the NCU
- Programming support system
  User-friendly program editor
  Machining step programming
  Multi-channel sequence programming
  Programming support for geometry inputs and cycles
  Process-oriented cycles for drilling/milling and turning
  Programming and operating support for turning and milling machines with ShopTurn HMI and ShopMill HMI
  contours and drilling templates (Opt.)
  SinuTrain for PC, training software (Opt.)

Simulation

- 10 Channels (Opt.)
- HMI Advanced
- Simulation for turning and milling

Tools

- Tool types for turning, drilling/milling
- Configurable number of intermediate blocks for tool radius compensation
- Tool radius compensations with approach and retract strategies
- Tool management functions

Operation

- Clear operation by means of operating areas each with eight horizontal/vertical softkeys
  Control Unit management:
  Operator panel lock
  User oriented, hierarchical access protection
  Screen texts in several languages
  (English, German, Spanich, French, Italian, Chinese (simplified))
  Program window for block display

Communication/data management

- Data storage to memory medium on USB and on the CF card of the NCU
- Data backup on hard disk
- Data backup to network via Ethernet

Monitoring functions

- Working area limitation
- Software and hardware limit switch monitoring
- Position monitoring
- Downtimes monitoring
- Clamping monitoring
- 2D/3D protection zones
- Contour monitoring
- Axis limitation from the PLC
- Spindle speed limitation
- Contour monitoring with tunnel function (Opt.)
- Path length evaluation (Opt.)
- PROFIBUS tool and process monitoring (Opt.)
- Safety routines continuously active for overtemperature, battery, voltage, memory, fan monitor (Opt.)

Compensation

- Feedforward control, speed-dependent
- Temperature compensation
- Quadrant error compensation per operation
  Interpolation lead screw and measurement system error compensation
- Backlash compensation
- Space error compensation (SEC)for kinematic transformations (Opt.)
- Precontrol, acceleration-dependent

Motors

- Synchronous motors, permanently-excited 1 FT6, 1FK, Static torque of between 0.4 and 300 Nm, Rated speeds 1500 rpm to 6000rpm
  Depending on the design, air or water-cooled
- asynchronous motors in the power range from about 5 kW to 100kW are available as 1PH with drilled shaft
  from material feeding, clamping and cooling as well as a series of water-cooled built-in motors

Commissioning

- Commissioning software integrated in HMI advanced:
- Parameterizing and optimizing (Opt.)
- Commissioning software on PC/PG
- SinuCom NC (Opt.)

Safety functions

"Safe standstill" and "Safe brake control" integrated in drive Safety Integrated (Opt.)

Diagnostic functions

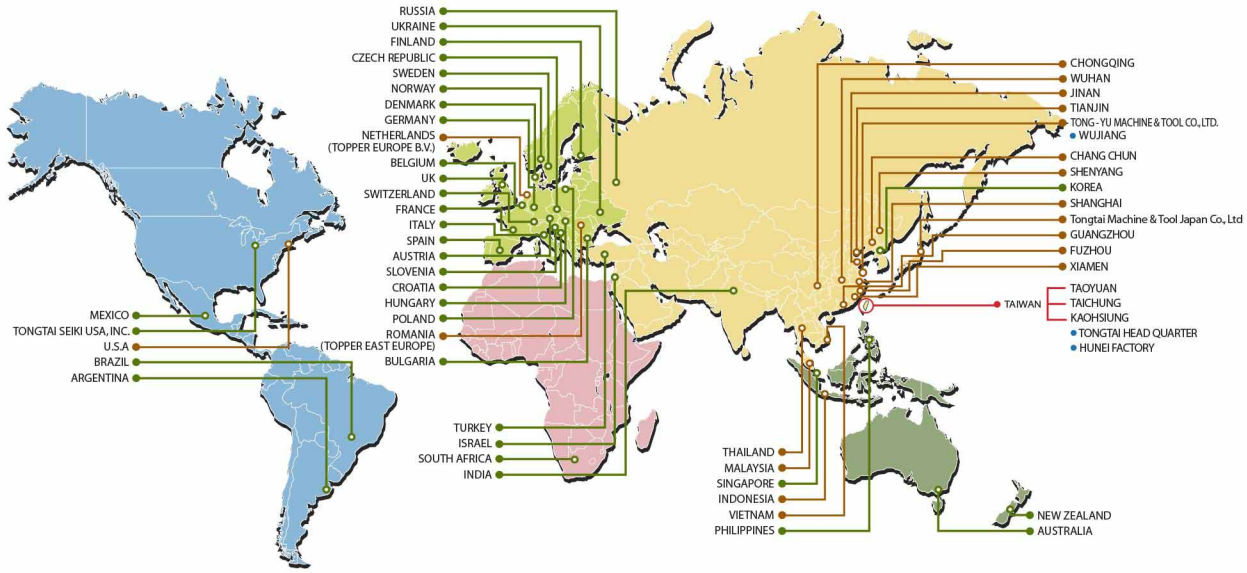
- Alarms and messages
  Trip recorder can be activated for diagnostic purposes
- PLC status (Opt.)
  Remote Control System (RCS)

Transformations

- Cartesian point-to-point (PTP) traveling
- Concatenated transformations
- Generic transformation

Global Sales & Service Network

★Head Office ●Branch ●Foreign Agency ●Factory



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- CHONGQING OFFICE TEL：86-23-67865925 FAX：86-23-67867717
- GUANGZHOU OFFICE TEL：86-755-27222119 FAX：86-755-27222115
- TIANJIN OFFICE TEL：86-22-24417640 FAX：86-22-24416738

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