



# TACHYON Series

High Speed Mill-Tap Center



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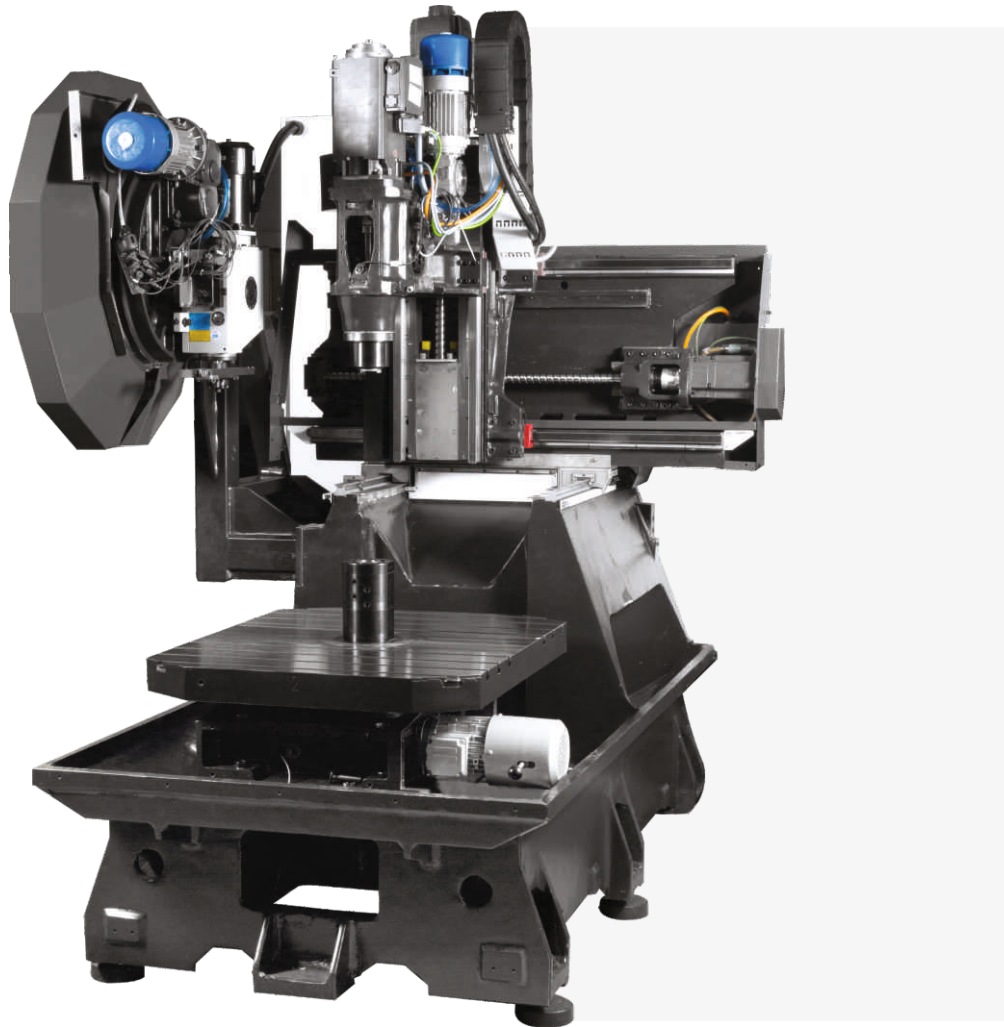
High Speed Mill-Tap Center

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## OVERVIEW

Tachyon word is derived from the Greek word 'tachys', which means swift. Tachyons are theoretically postulated particles that travel faster than light. The strive to match the present challenges of manufacturing world for high reliable and high-speed performance, Jyoti has developed high speed drill tap center known as Tachyon, which symbolizes speed to achieve excellent cycle time with almost nil loading-unloading time. Moving column design with integral pallet changer, high-speed tool changer, high dynamic rapid to meet precise & continuous production line requirement.

Tachyon series offers rapid traverse of **60 m/min.** in all 3 axis with high acceleration up to **15 m/sec<sup>2</sup>** to suit the specific requirement of automobile, surgical equipment and telecommunication sectors.

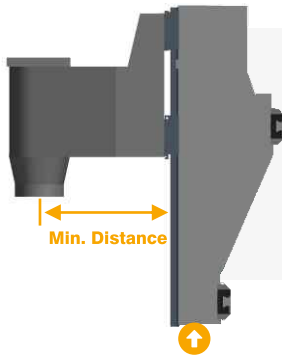


## STRUCTURE

- The structure design with all moving mass on the column helps high dynamics while maintaining high machining accuracies to provide rigidity and optimum harmonic stability.
- Compact and stable design to sustain high cutting load and high rapid traverse.
- Structural design is such that maximum reach of spindle in Y-axis up to **400mm**, to get greater machining envelop.
- Exceptional care is taken in structure to provide efficient chip evacuation with coolant flow.

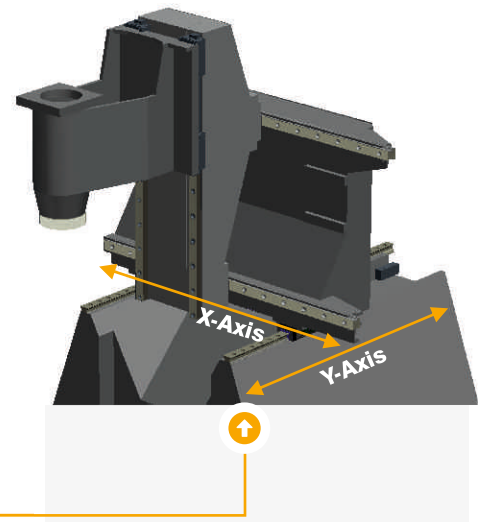


## STRUCTURAL ADVANTAGES



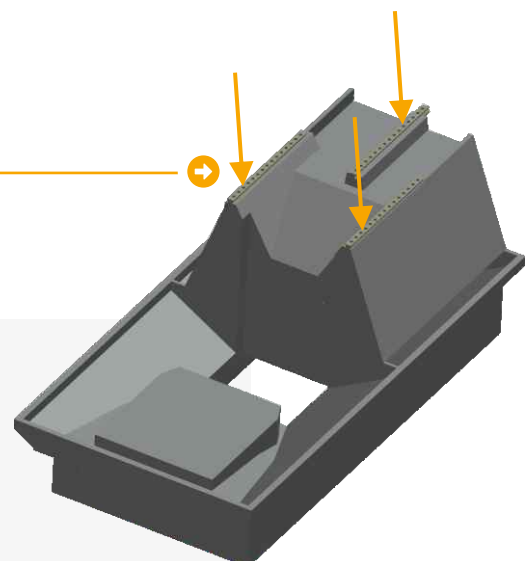
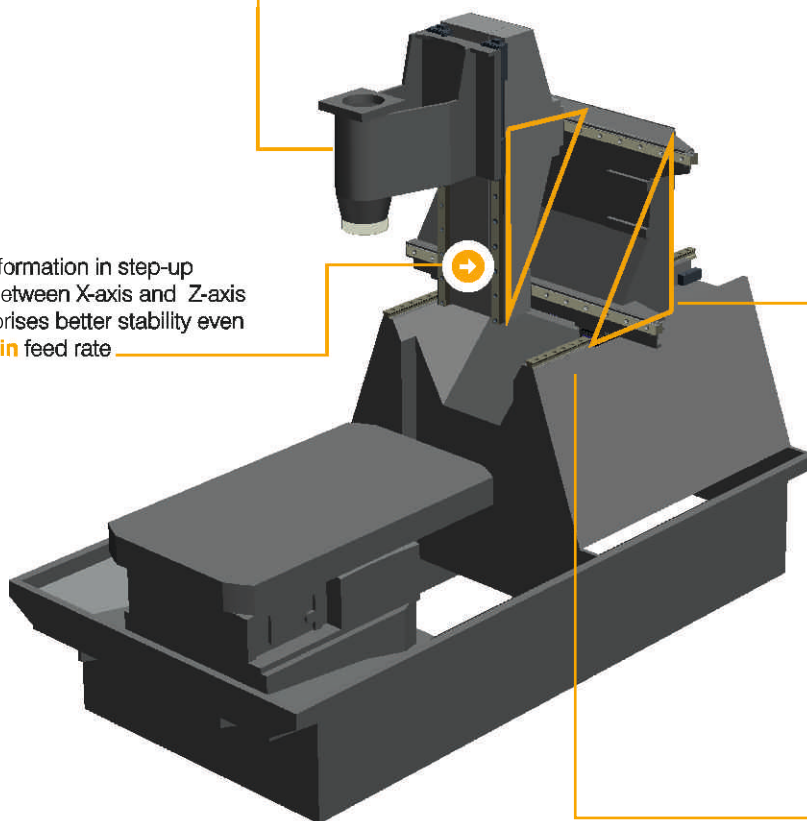
Structure is so well designed that Z-axis slide and spindle headstock have very less distance which prevents **cantilever effect**.

- Better machine stability
- Vibration free machining



Through out support on X & Y-axis to avoid overhanging during machining at extreme end of axis stroke

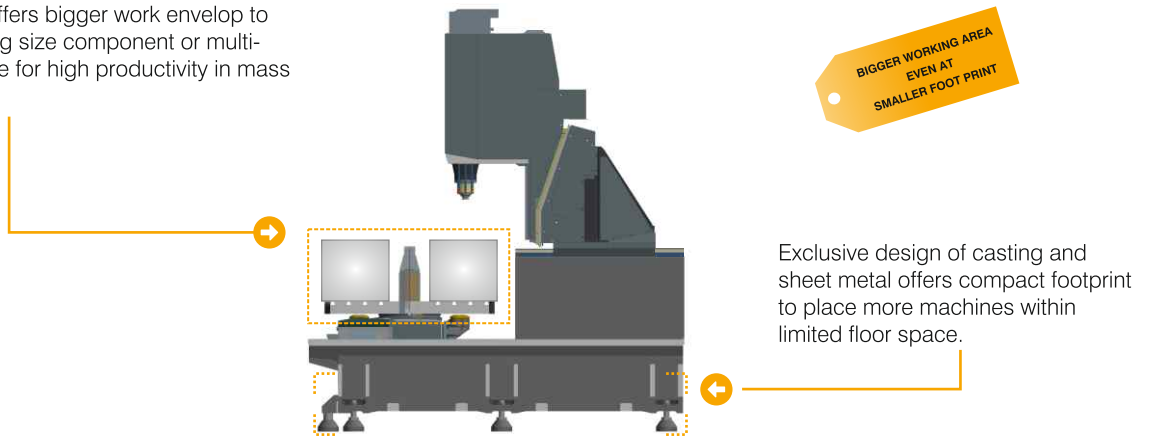
Triangular formation in step-up structure between X-axis and Z-axis slide comprises better stability even at **60 m/min** feed rate



- 3 LM rails on Y-axis makes uniform distribution of load on the structure
- All three LM guideways on Y-axis have roller type guideways which bears load of X and Z-axis
- Arrangement of this three LM helps to counter balance the spindle load

## BIGGER WORK ENVELOPE

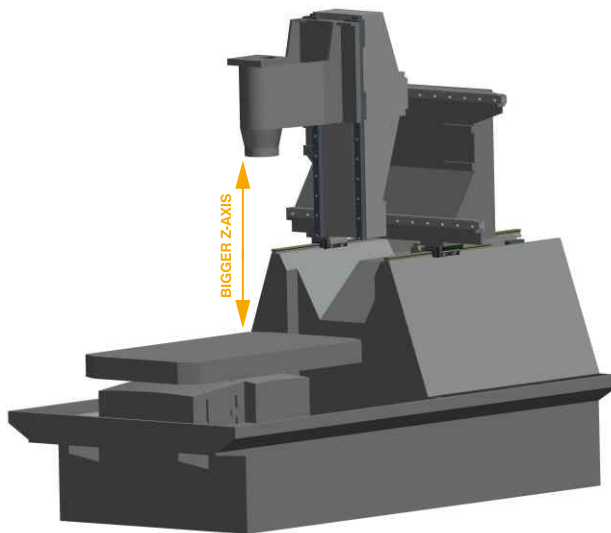
Tachyon series offers bigger work envelope to accommodate big size component or multi-component fixture for high productivity in mass manufacturing.



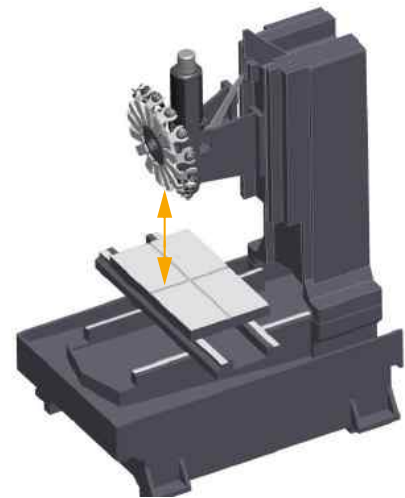
**Compact Foot Print**

## BIGGER Z-AXIS COMPARE TO OTHER DRILL-TAP CENTRES

Machine offers higher Z-axis stroke of **450mm** compare to any other global competitors. This has been achieved by placing ATC outside the machine area and made unique design among drill-tap centres.



**Tachyon Series Design**



**Other Drill-Tap Design**

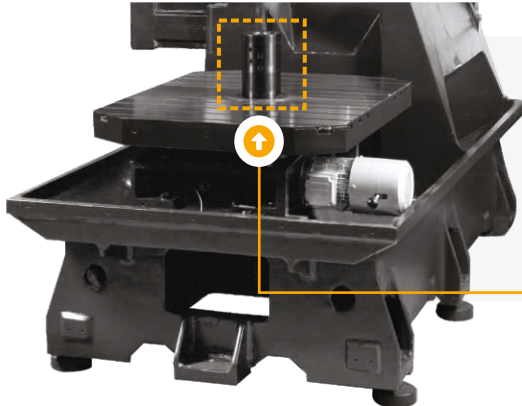
## DIRECTLY COUPLED SPINDLE

Direct coupled BT 30 spindle are manufactured in-house under dedicated world class set-up. Spindles assembly and performance testing done in controlled environment.

Cam type mechanism is developed instead of pneumatic tool de-clamping system which helps in minimizing air consumption and faster tool change.

- The ramp up/down speed is extremely high for Drilling and Tapping operation.
- Faster Tap retraction to reduce non-cutting time
- No stick slip and noise free machining
- Angular contact bearing lubricated with life time grease for longer spindle life
- BBT 30 spindle taper and Coolant Through Spindle (CTS) options available





## INTEGRAL WORK PIECE CHANGER

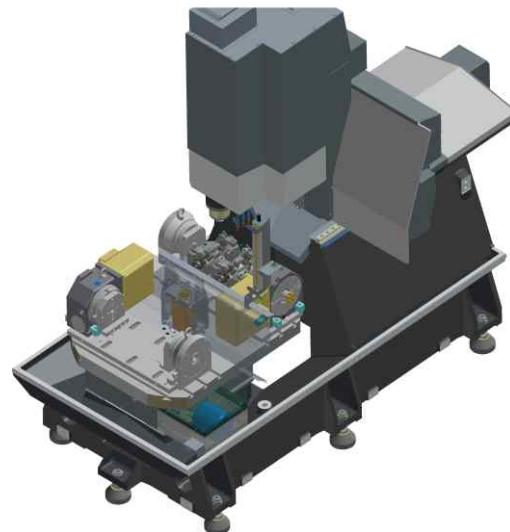
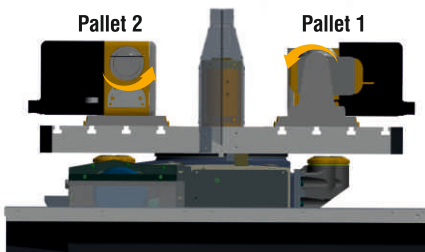
Cam operated electro mechanical work piece changer is a special feature of machine to improve productivity. APC is capable of taking maximum load of **300 kg** on each side with accurate positioning that makes the machine outstanding in it's class.

- Work piece changing time is just **4 sec.** thus reduces the job loading/unloading time
- **NO HYDRAULIC/PNEUMATIC** system makes trouble free pallet changer
- Rotary Union to interface Hydraulic Fixture or Rotary Table on both side
- Easy approach to pallet for loading/unloading

## HIGH PRODUCTIVITY OPTIONS ON PALLET

Wide possibilities for productivity improvement by adopting various combination on pallet.

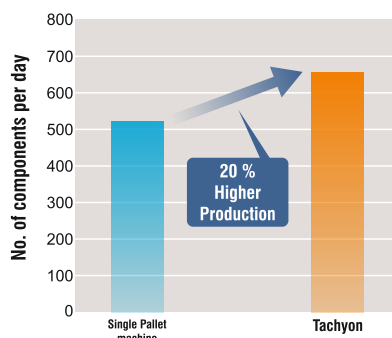
- Rotary Table on Both Pallet
- Rotary Production System + Online Hydraulic Fixture
- Tilting Table + Online Hydraulic Fixture
- Air seat sensing for job clamping confirmation



## ADVANTAGES OF PALLET CHANGER

### SHORT MACHINING TIME

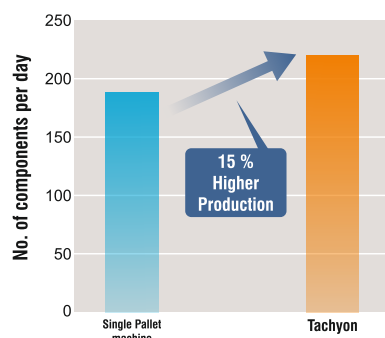
Tachyon eliminates idle time for components with smaller machining time and proportionally higher component change-over time in single table machine because of quick pallet changer.



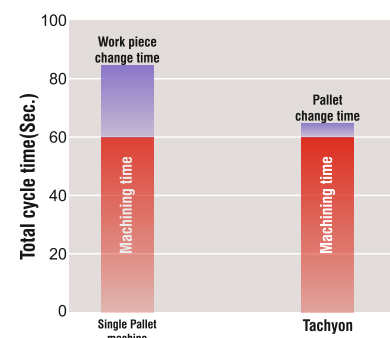
Machining time :45sec  
Workpiece change time : 15sec  
Per shift (10hours) x 85% performance rate

### LONG WORKPIECE CHANGE TIME

Tachyon offers higher productivity compare to single table machine when multiple components loaded on special jigs/fixtures which consumes higher time for cleaning.



Machining time :120sec  
Workpiece change time : 30sec  
Per shift (10hours) x 85% performance rate



Machining time :60sec  
Workpiece change time : 25sec  
Pallet change time 5sec. maximum

Tachyon offers  
20% higher productivity  
than single pallet machine

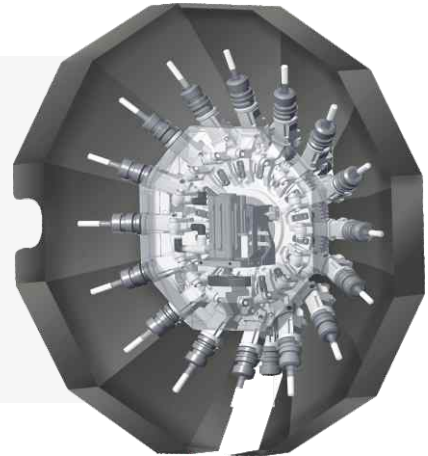


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## AUTOMATIC TOOL CHANGER

ATC has been designed with special mechanism for tool de-clamping and shorter tool change arm to achieve faster tool changing.

- Motorized tool de-clamping system
- Simultaneously tool changing and work piece changing is possible
- Tool Change time is just **1 sec.**
- Magazine located outside working area to get minimum interference among component
- 24 tool ATC options also available



## CHIP EVACUATION SYSTEMS



### CHIP EVACUATION

- Gravity fall of chips with funnel shape design in machine bed for effective chip evacuation through rear side of machine
- Slope in bed is designed to avoid chip clogging during pallet changing for maintenance free machining
- Easy chip removal from rear side of the machine helps without disturbing production

## CHIP TRAY

Rear side chiptray is provided for easy chip evacuation from center of machine with coolant tank capacity of **110 litre.** Chip conveyor option is available with coolant tank capacity of **400 litre.** This helps uninterrupted machining and reduced human effort.





## ERGONOMICS:



- Complete safeguard ensuring safety of the machine, operator and environment
- Optimized outer guarding for **compact foot print**



- Easy approach to pallet for loading-unloading thus providing fatigue free operating condition



- Ergonomically designed **90° tilting** operating panel, aiming operator's comfort and better visual control on machining

## TPM FRIENDLY DESIGN



Maintenance Platform



Tool Loading Window

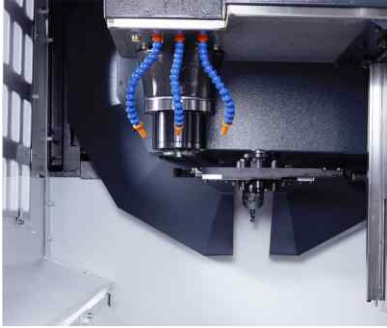
- For maintenance purpose platform is provided on coolant tank for easy access of electric panel
- TPM features are considered for easy approach of coolant pumps and other gauges
- Manual alteration of tools can be possible as separate see through window is available

## SEE THROUGH MAINTENANCE PANEL

- Grease pack is provided in front of the machine for automatic grease lubrication in axis which is easily visible
- Provision for Hydraulic power pack is also available in maintenance panel so no extra space is needed
- All pneumatic valves and lines are provided in same maintenance panel

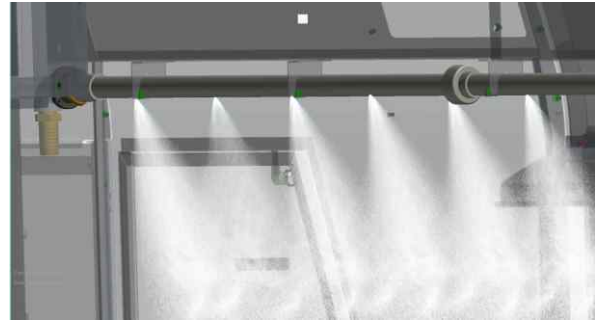


## EFFICIENT FLUSH COOLANT SYSTEM:



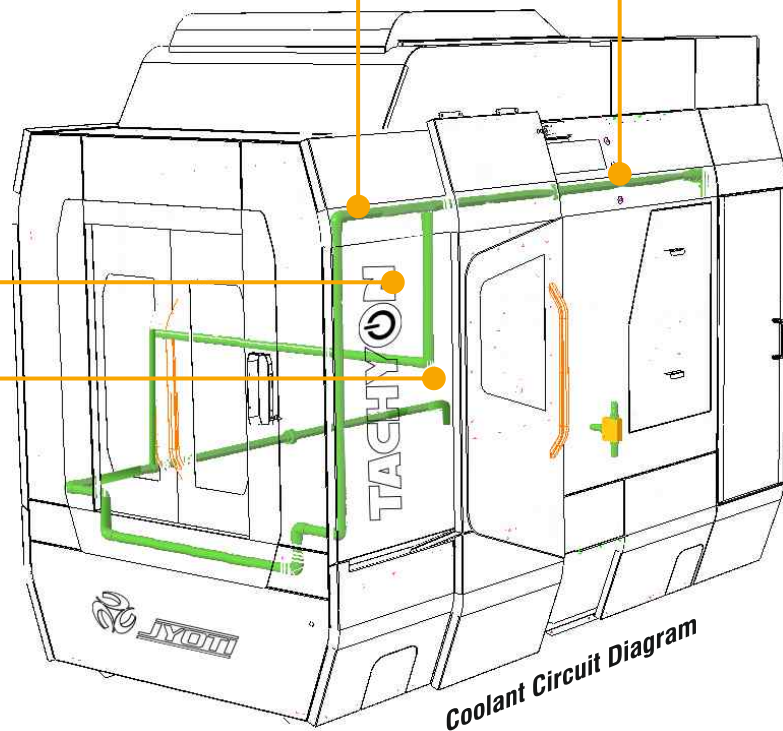
### HEAD COOLANT

Manually adjusted flexible coolant nozzles around spindle facilitates focused high pressure coolant flow on tool tip for washing away chips easily during machining.



### GANGA COOLANT

Ganga coolant system is available with high flow & high pressure shower coolant which helps in evacuating chips around machine area.



### COOLANT THROUGH SPINDLE (CTS)

The option of CTS with high pressure filtered coolant can reach directly to the cutting edge which maintain the temperature at cutting surface. High pressure coolant flow through tool wash away chips from machined hole and maintain drilling quality.

- Effective chip removal and better control on tool over heating
- Faster feed rates yet improved tool life and surface finish
- Lowered operating cost and higher productivity





## PRODUCTIVITY IMPROVING OPTIONS

This series can be efficiently interfaced with productivity improving options such as Coolant Through Spindle, Tool Probe, Job Probe, Linear Glass Scale and other work holding options to improve process capabilities and maximum utilization of machine.



### MEASURING PROBES

- Workpiece measurement can be offered with radio/optical probes
- Tool setting with offset management can be easily done
- Increased spindle utilization and reduce non productive time

### 4<sup>th</sup> / 5<sup>th</sup> AXIS TABLES

- Numerous 4<sup>th</sup> axis options are available to avoid set-up time and increase productivity
- Rotary Tilting Table is also possible for complex components to be machined



BBT 30 Taper



BT 30 Taper

### BIG PLUS SPINDLE (BBT 30 OPTIONAL)

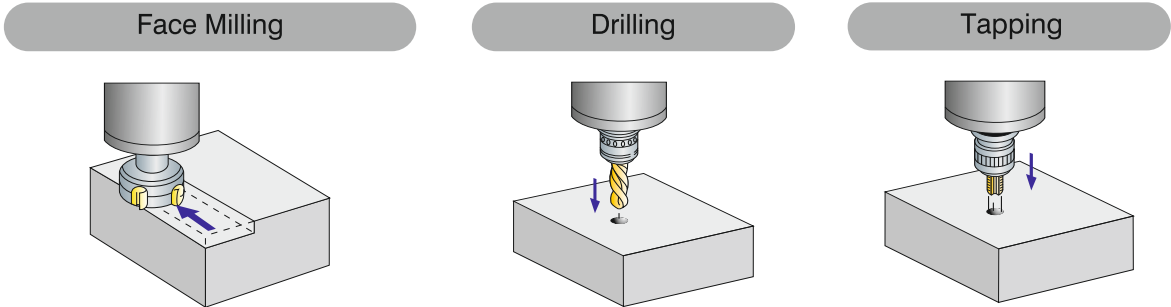
- Taper as well as face contacting simultaneously in BBT 30
- Minimized axial & radial play in tool holder due to higher gripping force from all sides
- Improved tool rigidity reducing vibration while machining
- Increasing tool life and finishing of components

## CONTROLLER FEATURES (SIEMENS 828D)

- M Dynamics Feed Forward Control
- Option of High Resolution 15.6" Color Screen with Dynamic Graphic Display
- Integrated QWERTY keyboard & Multi Functional Display
- SINUMERIK Integrate to access machine and diagnosis from anywhere in the world
- High Speed Rigid Tapping
- 5 MB User Memory
- 300 Block Look Ahead
- Linear, Circle, Helical & Universal NURBS Interpolation
- Powerful Servo Axis Motors with Super Precision Absolute Encoder
- Advanced Surface Finishing
- Inch/Metric Conversion
- Technology Cycles for Drilling/Milling Operations
- Tool Management for Monitoring of Tool life
- Tool Display Unit
- MPG Unit for Operator Easiness
- High Speed Fast Ethernet for Data Communication
- Communication & Data Management Via USB, CF Card & RS 232C
- User Friendly Built-in Calculator



CUTTING CAPABILITIES



Siemens 20.4/4.8 kW Motor Power

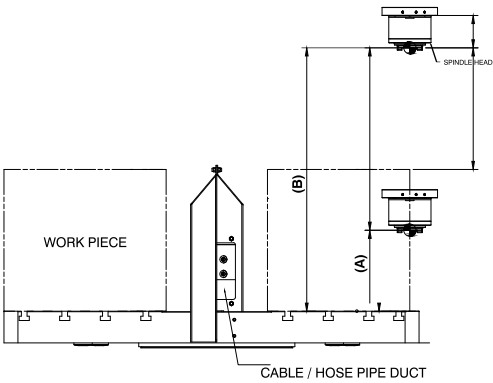
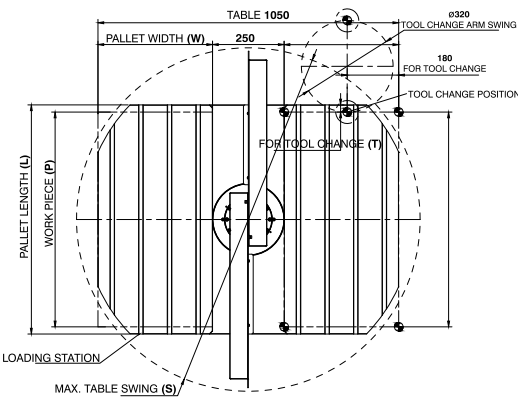
Material	(Cutter Dia., Dept of Cut X MRR)	(Dia X Feed)	(Size X Pitch)
Aluminum	Ø50mm, 5mm x 150cu cm/min	Ø 32mm x 0.5mm	M20 x 2.5mm
Cast Iron	Ø50mm, 3mm x 107cu cm/min	Ø 25mm x 0.12mm	M16 x 2.0mm
Steel	Ø50mm, 2.5mm x 89cu cm/min	Ø 25mm x 0.1mm	M16 x 2.0mm

HIGH SPEED TAPPING IN ALUMINUM



Tap Size	Spindle Speed Rpm	Feed rate (mm/min)	Cutting speed (m/min)	Depth (mm)
M6	4000(3520)	3520	66.0	12
M4	4000(3433)	2403	43.1	8.0
M3	4000(3633)	1816	34.2	6.0
M2	4000(3520)	1408	22.1	4.0

MACHINING RANGE AND INTERFERENCE DIAGRAM



Model	Size	A	B	L	W	P	S	T
TACHYON 4	mm	200	650	560	400	400	1175	80
TACHYON 5	mm	200	650	600	400	550	1200	25
TACHYON 7	mm	200	650	800	400	750	1200	25



TECHNICAL SPECIFICATION

Table		TACHYON 4	TACHYON 5	TACHYON 7
Table Size	mm	560 X 400	600 X 400	800 X 400
T-Slot Dimension	mm	4 X 14 X 100	4 X 14 X 100	4 X 14 X 100
Distance from Floor to Table	mm	804	804	804
Max. Load on Table	kgf	200 x 2	250 x 2	300 x 2
Capacity				
X - Axis Travel	mm	400	550	750
Y - Axis Travel	mm	400	400	400
Z - Axis Travel	mm	450	450	450
Dis. From Spindle Face to Table Top (Min.-Max.)	mm	200 - 650	200 - 650	200 - 650
Feed				
Rapid Traverse (X, Y & Z-Axis)	m/min	60	60	60
Cutting Feed	m/min	30	30	30
Main Spindle				
Spindle Speed	rpm	10000	10000	10000
Spindle Motor Power (Max./Cont.)	kW	20.4 / 4.8	20.4 / 4.8	20.4 / 4.8
Spindle Nose		BT 30 (BBT 30)	BT 30 (BBT 30)	BT 30 (BBT 30)
Automatic Tool Changer				
Number of Tool		16	16	16
Max. Tool Dia.	mm	80	80	80
Max. Tool Weight	kg	2	2	2
Max. Tool Length	mm	200	200	200
Accuracy (as per VDI/DGQ 3441)				
Positioning Uncertainty (P)*	mm	0.010	0.010	0.010
Repeatability (Ps Medium)*	mm	0.005	0.005	0.005
Other Data				
Machine Weight # (Approx)	kg	4200	4500	4800
Machine Dimension # (Approx) :Length	mm	2850	2850	2850
Width	mm	1400	1540	1740
Height	mm	2500	2500	2500

Note:- \*Above mentioned accuracies are available with glass scale only. # Refer Machine Detailed Layout for overall machine dimensions & space requirements.

STANDARD FEATURES

- AC Servo Axis Drive
- L.M. Guideways Roller Type\*
- Auto & Manual Coolant System
- Life Long Grease Lubrication
- Quick Turn Pallet Changer
- Laser Calibrated Axis for High Precise Positioning Accuracy
- Electricals with Quality Devices & Panel A.C.
- Head Coolant System
- Work Light

PRODUCTIVITY IMPROVING OPTIONS

- Chip Conveyor
- 24 Tool ATC
- 4th Axis Rotary Table on Both Pallet
- Hydraulic Fixture Interfacing
- Coolant Through Spindle
- Ganga Coolant System
- Tool Probe
- Job Probe
- Linear Glass Scale
- BBT 30 or SK 30 Taper
- Coolant Gun
- Air Gun
- Oil Skimmer
- Fully Tooled up Solutions to Meet the Customer Needs

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Download the  
App



Note: Specified information are subject to change arising out of continuous product improvement without notice. The description standard accessories/feature conforms to its list; not the photo of machine show in the catalogue. Other controller will have different configuration. Machine images are shown with option.

