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Fast delivery for standard configuration from factory  
Quickly complete installation and commissioning on site at customer's factory



**Quick response**  
Within 24 hours  
Experienced engineers sort out the errors at the customer site



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Key components for machines, including spindles, drive modules and transmission components, are stocked at headquarters throughout the years for customers trouble-free



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## 5-AXIS MILLING AND TURNING MACHINING CENTER -HMT SERIES



**Unparalleled Cost Effective  
Cutting-Edge Competitive**

\* The content of this document is for reference only, and the physical products shall prevail



# TOPNC

STRONG COMPOSITE PROCESSING CAPABILITY

## Competent Multi-Tasking Machining



### Complete Turning

- Maximum turning diameter of 300-500 mm with long-stroke moving column
- Maximum spindle torque for turning: 315-700 Nm
- Maximum bar capacity: 50-74 mm



### 5-Axis Milling

- Y-axis travel: 200 mm for required workpiece milling
- Milling spindle speed: 12000 rpm, maximum torque 88.5 Nm
- Swivel axis rotation range: 240° with closed-loop feedback system
- High-performance milling, inclined plane machining, and 5-axis simultaneous machining



### rocOS Control

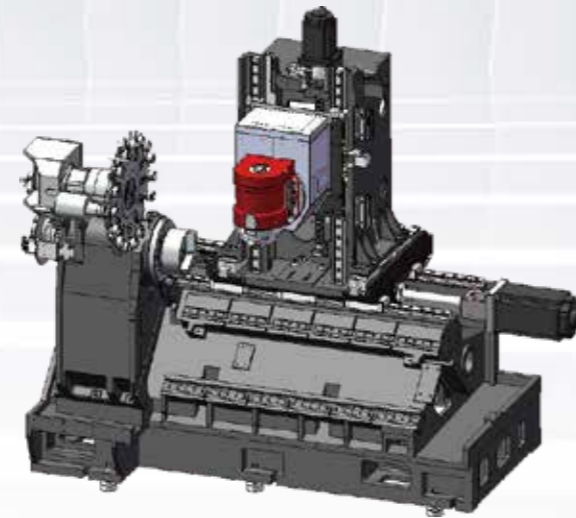
- Comprehensive G-code and auxiliary code functions, supporting multiple tool operations including turning, milling, drilling, boring, reaming, and tapping
- Quickly switching machining modes and flexible combination of turning and milling processes

# Design with Structural Analysis and Monolithic Casting

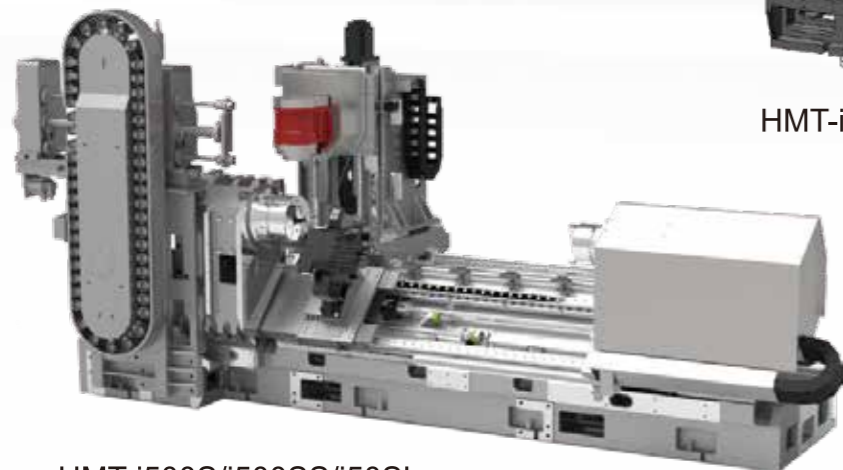
## High Rigidity and High Precision



HMT-i500



HMT-i300

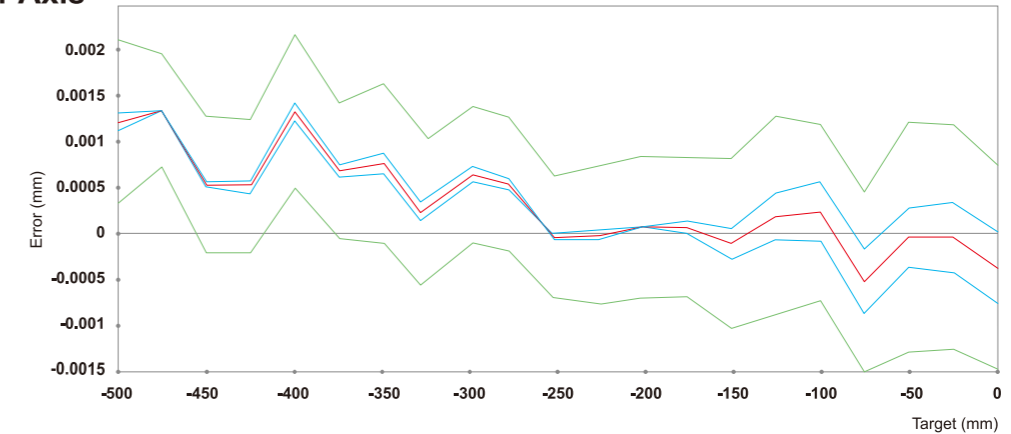


HMT-i500S/i500SS/i50SL

## Closed-Loop Measurement System for High Precision

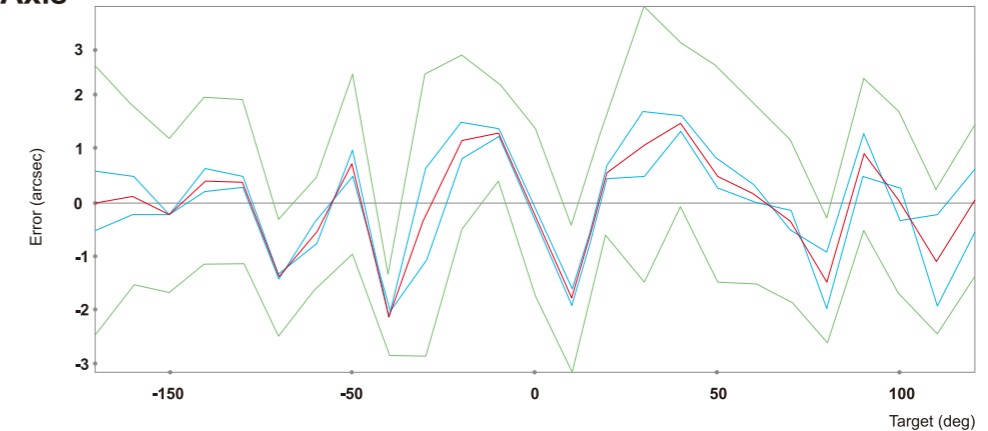
With high-precision, high-rigidity roller guides and imported encoders as the closed-loop position measurement system, the position of each working component can be detected accurately in real time for the high-precision machining requirements of workpieces.

Linear Axis VDI 3441



VDI 3441 Germany - Linear	Axis:	X-	Reversal Difference:	0.000780
	Position:	TOPNC	Positioning Accuracy:	0.003691
	U Average:	0.000292	Repeatability:	0.001871
	Ps Average:	0.001448	Position Deviation:	0.001880

Rotary Axis VDI 3441



VDI 3441 Germany - Rotary	Axis:	B-	Reversal Difference:	1.76
	Position:	TOPNC	Positioning Accuracy:	6.73
	U Average:	0.59	Repeatability:	3.93
	Ps Average:	2.49	Position Deviation:	3.55

Item	Description	i300	i500	i500S	i500SS	i500SL
Machining Capacity	Max. Machining Diameter	300 mm	500 mm	500 mm	500 mm	500 mm
	Max. Bar Capacity	50 mm	74 mm	74 mm	74 mm	74 mm
	Max. Turning Length	500 mm	800 mm	1500 mm	1000 mm	2000 mm
Travel	X-Axis	500 mm	500 mm	500 mm	500 mm	500 mm
	Y-Axis	200 mm	200 mm	200 mm	200 mm	200 mm
	Z-Axis	600 mm	850 mm	1500 mm	1120 mm	2120 mm
	B-Axis	240°	240°	240°	240°	240°
Milling Spindle	Max. Torque	88.5 Nm	88.5 Nm	88.5 Nm	88.5 Nm	88.5 Nm
	Rated Torque	45 Nm	45 Nm	45 Nm	45 Nm	45 Nm
	Max. Speed	12000 rpm	12000 rpm	12000 rpm	12000 rpm	12000 rpm
	Max. Power	39.5 kW	39.5 kW	39.5 kW	39.5 kW	39.5 kW
	Rated Power	18.5 kW	18.5 kW	18.5 kW	18.5 kW	18.5 kW
	Tool Holder	HSK-T63	HSK-T63	HSK-T63	HSK-T63	HSK-T63
	Cooling Through-Tool	Standard	Standard	Standard	Standard	Standard
B-axis	Drive Type	Torque Motor	Torque Motor	Torque Motor	Torque Motor	Torque Motor
	Torque (Rated/Max)	360 Nm/685 Nm	360 Nm/685 Nm	360 Nm/685 Nm	360 Nm/685 Nm	360 Nm/685 Nm
	Clamping Torque	1500 Nm	1500 Nm	1500 Nm	1500 Nm	1500 Nm
Turning Spindle	Torque (Rated/Max)	140/315 Nm	286Nm/715Nm	286Nm/715Nm	286Nm/715Nm	286Nm/715Nm
	Max. Speed	4500 rpm	3000 rpm	3000 rpm	3000 rpm	3000 rpm
	Max. Power	40 kW	75 kW	75 kW	75 kW	75 kW
	Positioning and Clamping	Yes	Yes	Yes	Yes	Yes
	Clamping Torque	300 Nm	440 Nm	440 Nm	440 Nm	440 Nm
	Chuck Size	8 inch	10 inch	10 inch	10 inch	10 inch
Max. Feed Rate	X-Axis	30 m/min	30 m/min	30 m/min	30 m/min	30 m/min
	Y-Axis	30 m/min	30 m/min	30 m/min	30 m/min	30 m/min
	Z-Axis	36 m/min	36 m/min	36 m/min	36 m/min	36 m/min
	B-Axis	80 rpm	80 rpm	80 rpm	80 rpm	80 rpm
Closed Loop Control (Resolution)	X/Y/Z-Axis	0.001 mm	0.001 mm	0.001 mm	0.001 mm	0.001 mm
	B/C-Axis	0.001°	0.001°	0.001°	0.001°	0.001°
Tool Magazine	Type	Disc	Disc	Chain	Chain	Chain
	Pocket	12/18	24	48	48	48
	Max. Tool Weight	5 kg	7 kg	7 kg	7 kg	7 kg
	Max. Tool Length	250 mm	300 mm	300 mm	300 mm	300 mm
	Max. Tool Diameter (Full/Empty Adjacent)	75 mm/120 mm	80 mm/120 mm	75 mm/120 mm	75 mm/120 mm	75 mm/120 mm
Tailstock	Max. Thrust Force	1000 N	8000 N	-	-	-
	Internal Taper	MT4	MT5	-	-	-
Counter Spindle	Torque (Rated/Max)	-	-	140 Nm/315 Nm	140 Nm/315 Nm	140 Nm/315 Nm
	Max. Speed	-	-	4500 rpm	4500 rpm	4500 rpm
	Max. Power	-	-	40 kW	40 kW	40 kW
	Positioning and Clamping	-	-	Yes	Yes	Yes
	Chuck Size	-	-	8 inch	8 inch	8 inch
CNC-Systems	Supplier/Model	TOPNC RocOS (Siemens optional)				
	HMI	19-inch Touch Screen				
	Display Resolution	0.0001 mm				
Motion Control	Look Ahead	Up to 1024 blocks				
	Curve Optimization	Yes				
	RTCP	Yes				
	Inclined Plane Machining	Yes				
Dimensions	Length	3200 mm	5700 mm	7000 mm	5750 mm	7750 mm
	Width	2400 mm	2400 mm	2800 mm	2800 mm	2800 mm
	Height	2300 mm	2300 mm	2700 mm	2700 mm	2700 mm
	Weight	6 t	8 t	11 t	10 t	12 t

## Options

Item	Description	Option
Siemens CNC-Systems	Siemens CNC-Systems	Optional
Air Conditioner for Electrical Cabinet	Control cabinet temperature control	Optional
High-Pressure Coolant	40 bar high-pressure coolant pump	Optional
	70 bar high-pressure coolant pump	Optional
Coolant Pistol	Manual coolant pistol	Optional
Air Pistol	Manual air pistol	Optional
Soft Jaws	Soft jaws for chuck	Optional
Hard Jaws	Hard jaws for chuck	Optional
Workpiece Probing	RMP40 (Renishaw)	Optional
	HK-RF40 (Heidenhain)	Optional
	TC60 (Blum)	Optional
Foot Switch	High operational convenience	Optional
Mist Collector	Collects and purifies oil mist	Optional
Steady Rest	Self-centering hydraulic steady rest	Optional for i500S, i500SL
Servo Tailstock	Servo motor-driven tailstock	Optional
Hydraulic Stepless Adjustment	Adjustable within pressure range	Optional
Tool Measurement	Automatic tool setter	Optional
Automatic Door	Electrically controlled door	Optional
Appearance Customization	Customized color	Optional
Packaging	Full wooden packaging	Optional

High-Precision Compensation Package	Parameter	Description
Machining Contour Accuracy: 0.05 mm Surface Roughness: Ra 0.8 Improved Processing Efficiency for identical parts: 40%	High-Precision Turning Spindle	Positioning Accuracy:8 arcsec, Repeatability:4 arcsec, Backlash:2 arcsec
	High-Precision Milling Spindle	Runout at Selected Position ≤2 μm (near end), ≤5 μm (far end)
	High-Precision B-Axis Head Assembly	Positioning Accuracy:4 arcsec
	High Positioning Accuracy Assembly	Repeatability:4μm, Positioning Accuracy:8 μm
	High-Speed and High-Dynamic Electrical Servo Optimization	Acceleration up to 0.6 G by Design
	RTCP Dynamic Accuracy Fine-Tuning	RTCP Accuracy up to 0.02 mm at F1000 Feedrate
	Rotary Axis RTCP In-Machine Calibration Module	Measurement Accuracy Consistent with Calibrated RTCP, Error ≤0.01 mm
	TAS-S Spindle Thermal Displacement Control Module	Thermal Error Reduced by 50% within ±4°C Ambient Variation
	TAS-C Positioning Accuracy Thermal Displacement Control Module	Thermal Positioning Error Reduced by 50% Within ±4°C Ambient Variation
	Real-Time Machining Process and Tool Monitoring System	Sampling Frequency: 5000 Hz Minimum Detectable Tool Diameter: 0.15 mm Minimum Detectable Cutting Depth: 1 μm

# Milling and Turning Spindle for 5-Axis Simultaneous Machining

## Designed for efficiently machining diverse components

- High-efficiency machining with built-in motor spindles and speeds up to 3000 rpm / 12000 rpm / 4500 rpm
- Liquid cooling to minimize thermal deformation and to maintain stable accuracy during lasting machining
- With high-precision encoders for high-accuracy indexing and interpolation machining
- Multi-tasking operations including turning, milling, scraping, and grinding via turning and milling spindles
- HMT-i500S / i500SS / i500SL provides counter spindle in standard: the turning and counter spindle can be controlled independently, and exchange as well synchronization modes

### High-Precision Spindle Control (B/C/U Axes)

Machining operations are primarily performed by the milling spindle, turning spindle, and counter spindle, multi-tasking machining can be performed, including drilling, tapping, and end milling at various angles, while precise cutting angles and contour machining can be ensured.

Turning Spindle Chuck	<b>3000 rpm</b> <b>30 kW</b> <b>10-inch</b>	Milling Spindle Tool Holder	<b>12000 rpm</b> <b>22.2 kW</b> <b>HSK-T63</b>	Counter Spindle Chuck	<b>4500 rpm</b> <b>22 kW</b> <b>8-inch</b>
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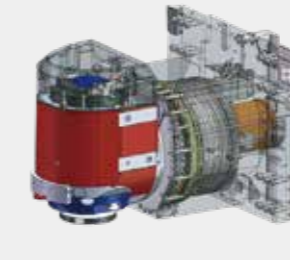
#### C-Axis Control at Position

Position compensation sensors are used to achieve high-precision C-axis fixed-position machining and interpolation machining. The turning spindle can position the C-axis at any angle within 360°.



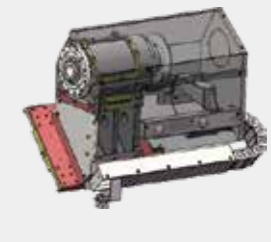
#### B-Axis Control at Position

The B-axis head can be rotated and positioned at any angle within a 240° range, horizontal machining at front and angular machining are supported.

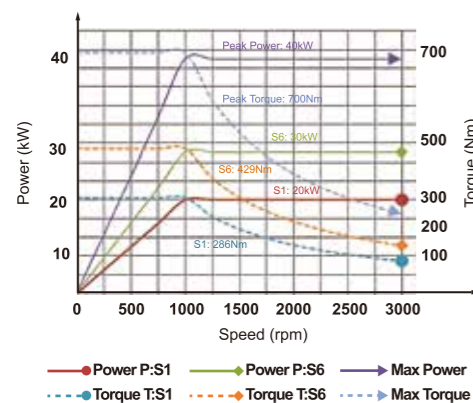


#### Counter Spindle (U-Axis)

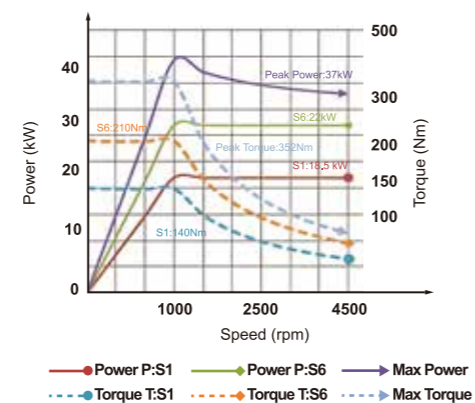
Position compensation sensors are used to achieve high-precision U-axis fixed-position and interpolation machining. The turning and counter spindles support independent control, exchange, synchronization, and other modes.



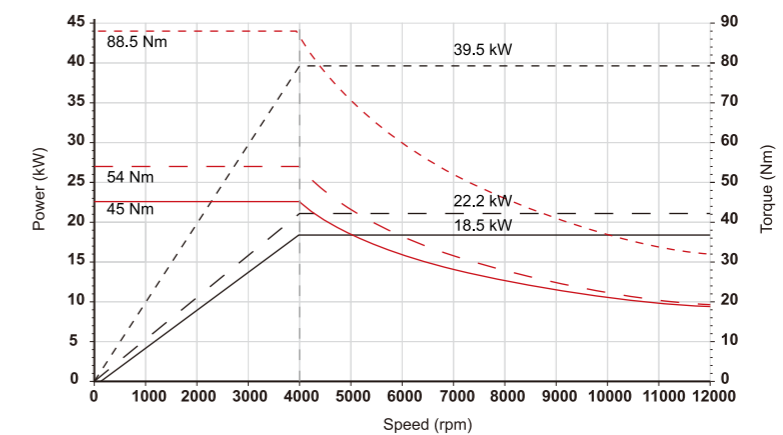
#### Turning Spindle (Power/Torque)



#### Counter Spindle (Power/Torque)



#### Milling Spindle (Power/Torque)



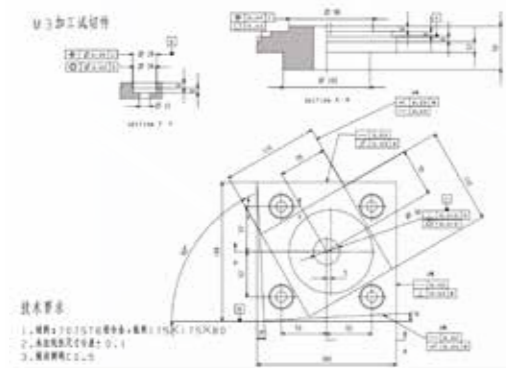
# Cooling System and Measurement System by Encoders Designed for Extremely High Stability and Precision

With rigorous testing, the HMT series has achieved high precision and reliability.

## Test Report

实际值	名义值	上公差	下公差	偏差	实际值	名义值	上公差	下公差	偏差	实际值	名义值	上公差	下公差	偏差
直线度1-c1	0.0059	0.0000	0.0300	0.0059	倾斜度2-b2	0.0076	0.0000	0.0300	0.0076	圆度1-b	0.0145	0.0000	0.0300	0.0145
直线度2-c3	0.0058	0.0000	0.0300	0.0058	直线度7-d4	0.0051	0.0000	0.0300	0.0051	位置度2-e1	0.0024	0.0000	0.0400	0.0024
平行度1-e	0.0075	0.0000	0.0300	0.0075	倾斜度3-g4	0.0058	0.0000	0.0300	0.0058	位置度3-e2	0.0042	0.0000	0.0400	0.0042
直线度3-c2	0.0051	0.0000	0.0300	0.0051	直线度8-f1	0.0079	0.0000	0.0300	0.0079	位置度4-e3	0.0058	0.0000	0.0400	0.0058
垂直度1-d1	0.0054	0.0000	0.0300	0.0054	倾斜度4-g1	0.0085	0.0000	0.0300	0.0085	位置度5-e4	0.0059	0.0000	0.0400	0.0059
直线度4-c4	0.0066	0.0000	0.0300	0.0066	直线度9-f2	0.0076	0.0000	0.0300	0.0076	同心度1-e1	0.0026	0.0000	0.0200	0.0026
垂直度2-d2	0.0076	0.0000	0.0300	0.0076	倾斜度5-g2	0.0088	0.0000	0.0300	0.0088	同心度2-e2	0.0022	0.0000	0.0200	0.0022
直线度5-g2	0.0033	0.0000	0.0300	0.0033	直线度10-f3	0.0039	0.0000	0.0300	0.0039	同心度3-e3	0.0002	0.0000	0.0200	0.0002
倾斜度1-b2	0.0082	0.0000	0.0300	0.0082	倾斜度6-g3	0.0044	0.0000	0.0300	0.0044	同心度4-e4	0.0100	0.0000	0.0200	0.0100
直线度6-f1	0.0051	0.0000	0.0300	0.0051	垂直度3-b	0.0009	0.0000	0.0100	0.0009	圆柱度1-a	0.0021	0.0000	0.0100	0.0021
位置度1-a	0.0098	0.0000	0.0300	0.0098										

## Parts Drawing



## Milling

Material	Aluminum Alloy (7075)
Tool	D20 Carbide Cutter
Cutting Speed	VC = 300 m/min
Cutting Depth	6 mm
Feed Rate	2000 mm/min
Cutting Width	1 mm

Note: The above data are experimental test results. For more reports, please contact 400-820-5993.

## Rotary Feed Axis with Direct-Drive Motor

All rotary feed axes are driven by direct-drive motors for high-precision and high-response.

## High Stability

High-rigidity roller guides in linear axes enable high-speed and high-rigidity machining.

High-precision ball screws are used to ensure transmission accuracy and stability.

## High Precision

All interpolated feed axes are equipped with high-precision closed-loop feedback systems.

## Thermal Stability

All motion axes are all liquid cooled.



Blue: Schematic diagram of cooling for main components

## Ergonomic Design Best User Convenience



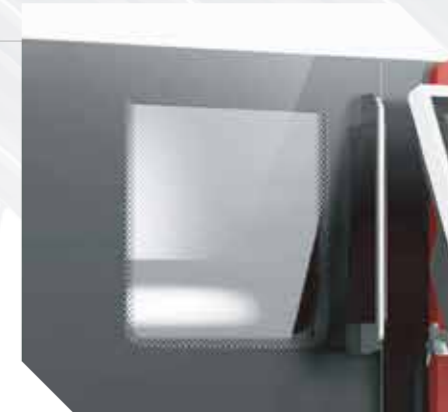
### Excellent Accessibility to the Working Space

- Large door provides optimal accessibility to the machining workspace
- Short distance between the door and spindle facilitates internal operations for faster and easier setup



### Enlarged Front Window

- The large window offers a wider field of view for easy monitoring of machining processes and operations



### Flexible and Adjustable Control Panel

- Fast and user-friendly interface
- The control panel can be swiveled  $\geq 90^\circ$



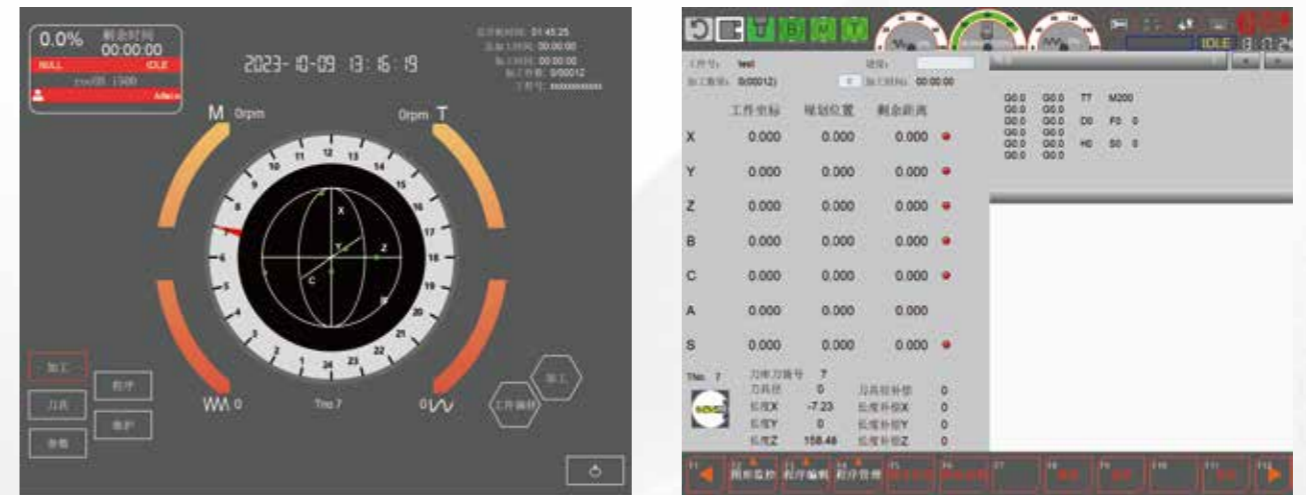
# High-Performance Operating System Based on User Experience

**rocOS CNC-Systems** not only enables high-precision and high-efficiency milling and turning machining functions but also supports 5-axis simultaneous machining in milling mode. Furthermore, the user experience-oriented human-machine interface design ensures convenient operation during workpiece machining, comprehensively enhancing the overall performance of the machine tool.



## 19" multi-touch screen

- Excellent user operation experience
- Clear and rational panel layout
- New user-friendly screen design
- Interface design consistent with machine tool appearance



- + Control with a 32 GB solid-state drive (SSD), allowing users to store more files
- + 19-inch touch screen with color LCD and with Chinese support
- + The operation panel is optimized for machine tool operation with data interfaces such as USB
- + Various machining modes including turning, milling, drilling, boring, tapping, and measurement
- + Supports dual-spindle and dual-side (X-/Y-/Z-/B-/C-) 5-axis simultaneous machining and bidirectional tool center point control (RTCP)
- + Supports bidirectional screw pitch compensation and closed-loop servo control for all axes
- + Bidirectional screw pitch compensation and closed-loop servo control for all axes
- + Tool path recording and self-diagnosis of hardware faults
- + Gear machining such as gear hobbing, gear milling, and gear shaping
- + Handwheel guidance, tool inspection, and workpiece inspection
- + Automatically exchanging workpiece between turning and counter spindle and with steady rest

Optional Siemens system with Siemens operation panel

## 5-Axis Simultaneous Machining Covering Wider Range of Applications

## HMT Series A single machine for diverse machining needs



### Inclined Plane Machining

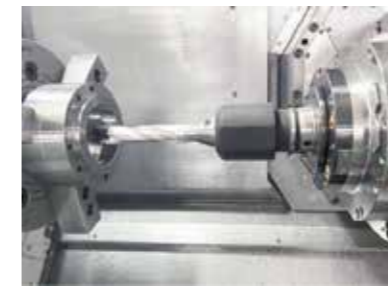
- Inclined plane coordinate systems to simplify machining commands

### RTCP Function on Both Sides

- Dual spindles support 5-axis simultaneous machining on both sides, each with Tool Center Point Control (RTCP)

### Workpiece Measurement

- Workpiece measurement such as datum, center, outer diameter, inner diameter, and width



## Powerful machining capabilities in various operation modes such as turning, milling, drilling, and tapping

### High Cutting Performance

#### External Diameter Cutting (Steel/Aluminum Alloy)

Roughing Tool (mm)	Cutting Speed (mm/min)	Feed Rate (mm/rev)	Radial Depth of Cut (mm)	Chip Removal Rate (cm <sup>3</sup> /min)
Ø65/Ø65	250/350	0.3/0.3	1.5/2.5	109.9/254.2

#### U-Drill Milling

Tool (mm)	Milling Spindle Speed (r/min)	Feed Rate (mm/min)	Chip Removal Rate (cm <sup>3</sup> /min)
Ø25	800	120	88.36

#### Face Milling

Tool (mm)	Milling Spindle Speed (r/min)	Radial Depth of Cut (mm)	Feed Rate (mm/min)	Chip Removal Rate (cm <sup>3</sup> /min)
Ø50 Face Mill	1200	1.2	800	120

#### End Milling

Tool (mm)	Milling Spindle Speed (r/min)	Axial Depth of Cut (mm)	Feed Rate (mm/min)	Chip Removal Rate (cm <sup>3</sup> /min)
Ø20 End Mill	5000	1.5	2600	78

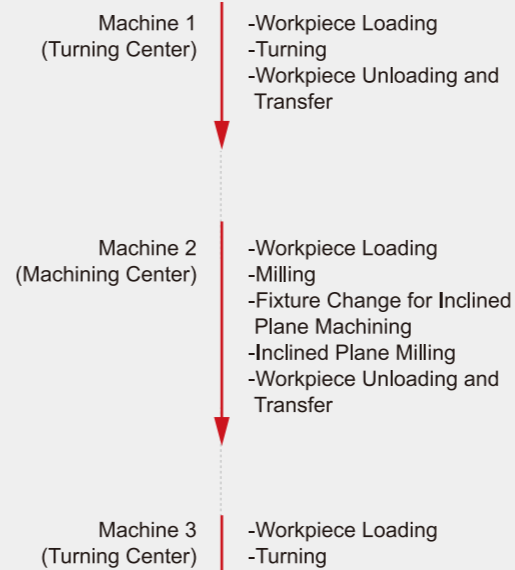
#### Tapping

Tool (mm)	Milling Spindle Speed (r/min)	Feed Rate (mm/min)
M5 Tap	300	240

The results in this table are for information only. Actual results may vary due to different cutting conditions and environmental conditions during measurement.

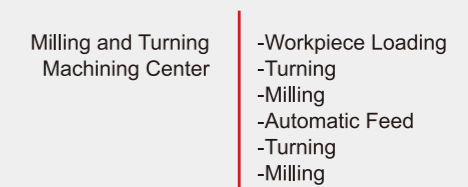


#### Traditional Machining



**Multiple Machine Tools,  
Multiple Setups**

#### Multi-Tasking with the HMT Series



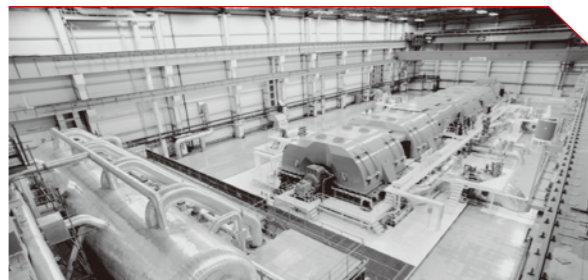
**Only One Setup on a  
Single Machine**



PRODUCTION TIME REDUCED BY

**50%**

# HMT Series Technological Strength Across Various Industries



Pump, Valve and Energy



Vacuum Pump Rotor Valve Body Drive Shaft



Automotive and Construction Machinery



Motor Shaft Valve Sleeve



Optics and Semiconductors



Lense Housing for screw drive



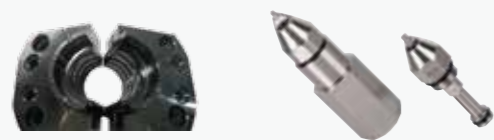
Tooling and Equipment Manufacturing



Tool Holder Cage Cutter Positioning Sleeve



Consumer Goods



Lip Thread on Bottle Mold Nozzle Flange



Humanoid Robotics



Harmonic Reducer



Medical Device



Femoral Stem Transducer Disc Femoral Head



Aerospace



Impeller Blade

# Customer-Centric High-Quality, Comprehensive and Timely Services for You



## FAST DELIVERY



Fast delivery for standard configuration from factory  
Quickly complete installation and commissioning on site at customer's factory



## QUICK RESPONSE



Within 24 hours  
Experienced engineers sort out the errors at the customer site



## WELL STOCKED SPARE PARTS



Key components for machines, including spindles, drive modules and transmission components, are stocked at headquarters throughout the years for customers trouble-free



## EXPERT SUPPORT



Providing machine operation and programming training  
All-round improving productivity and expertise



EEW-PROTEC  
R&D center  
in Hamburg, Germany



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