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Hantop Intelligence Tech.

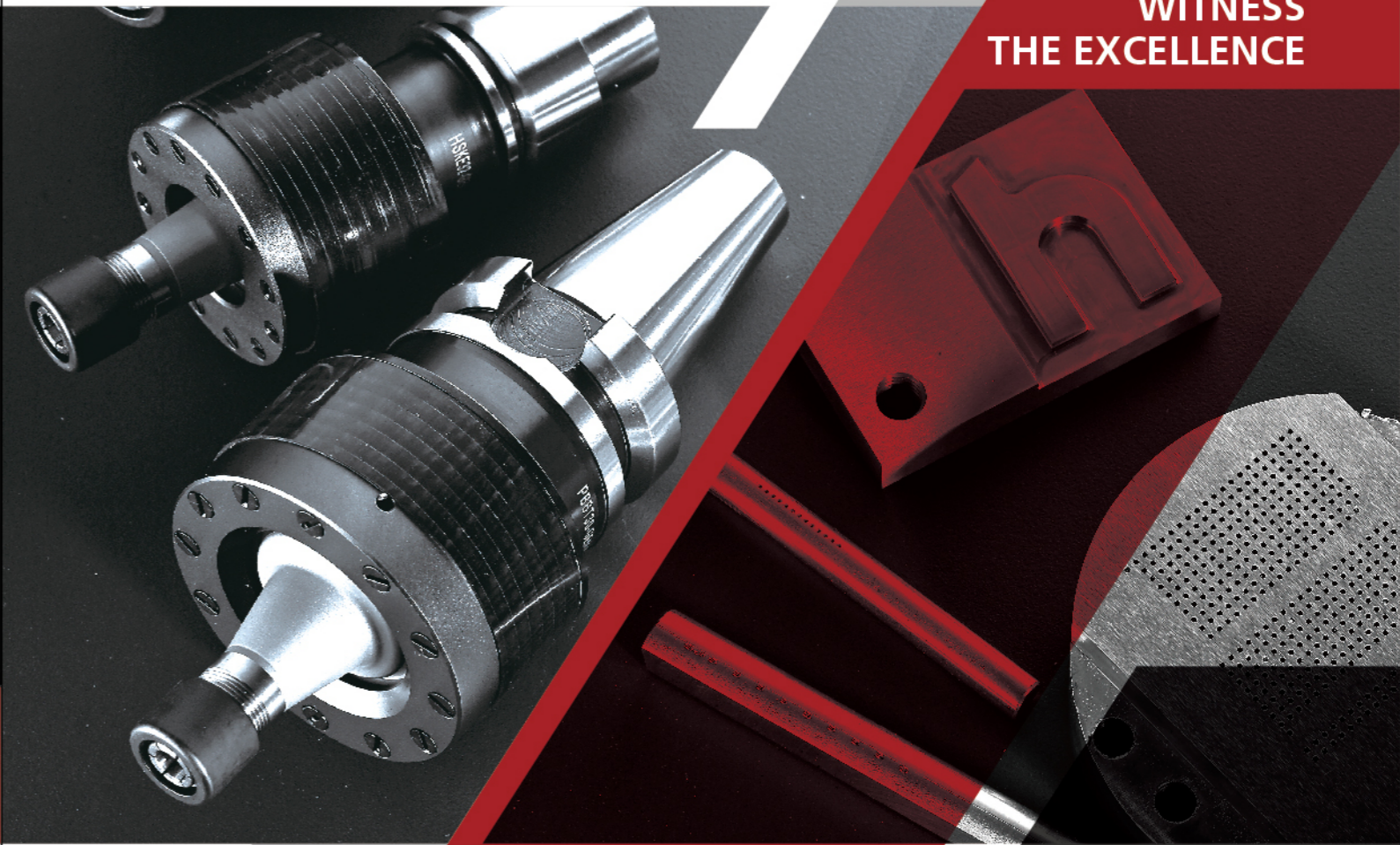
WITNESS  
THE EXCELLENCE

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Hantop Intelligence Tech.

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**HIGH PRECISION**  
**INTELLIGENT CONTROL**  
**HIGH SPEED CAPABILITY**  
**PLUG & PLAY DESIGN**

**ULTRASONIC  
MACHINING  
MODULE**

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# ULTRASONIC MACHINING MODULE

## COMPANY PROFILE

Advanced materials machining and smart manufacturing are foreseen by many major industries as the trends of CNC machining technology. Advanced materials are lightweight, hard/tough and capable of operating at higher temperature. Precision tooling is being used by the industries involved in advanced materials, including semiconductor, optoelectronics, aerospace, medical device, energy equipment, smart electric vehicle, electronic mobile and precision machinery. Nowadays, CNC machining is shifting from traditional metal machining to new smart hybrid CNC machining combining ultrasonic vibration-assisted machining and other new type of machining method.

Hantop Intelligence Technology, an innovative, young and visionary team, includes more than 60% of the members having master degree and PhD in engineering, focusing on reliability engineering, advanced material machining technology and system solutions. Our mission is to provide the best economical products and the best customer experience. Join us to build strong business partnership.



# Ultrasonic Machining Technology

## Increased Productivity

The **ULTRASONIC technology from HIT** enables the economical machining of complex workpiece geometries in demanding Advanced Materials like e.g. ceramics, quartz glass, tungsten carbide or even composites.

The kinematic overlapping of the tool rotation with an additional oscillation greatly reduces frictions between tools and workpieces, and facilitates chip removal. It lowers the cutting forces, enhances machining efficiency and tool life, and reduces edge-cracks and burrs while reaching better surface finishes to  $Ra < 0.1 \mu m$ .

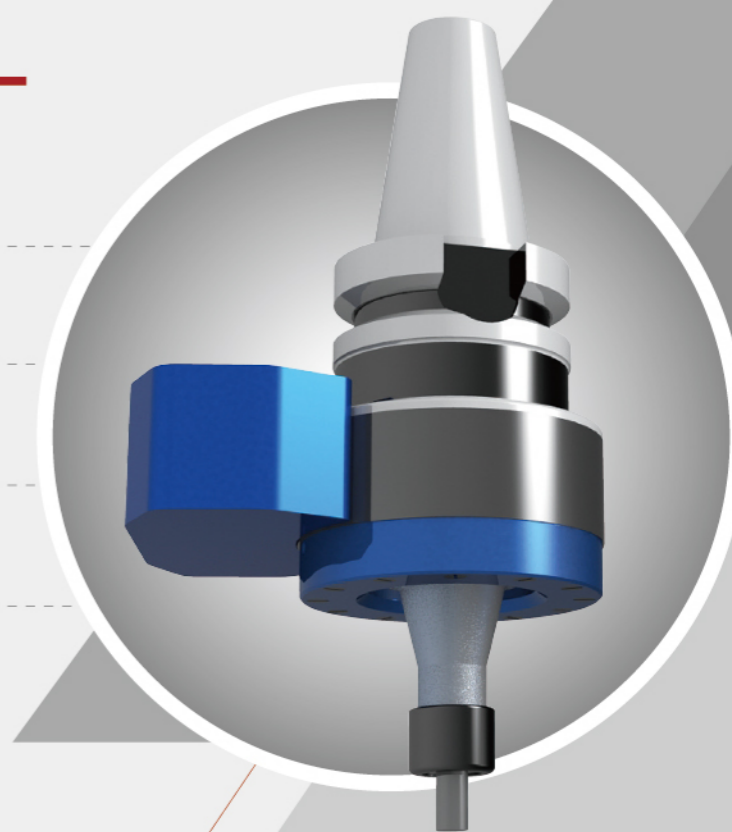
Based on numerous customers' feedback, HIT's **ULTRASONIC technology** has proved to greatly exceed relevant products within the market, regarding its features, quality and reliability. **HIT** will continue to improve and refine its technology, offering an advanced solution upon integration and intelligence technology with fine services to the customers.

## Advanced Materials

- 1 TUNGSTEN CARBIDE**  
Characterized by its high strength, toughness and hardness
- 2 CERAMIC**  
High elastic modulus and hardness, high melting points, low thermal expansion, and good chemical resistance
- 3 QUARTZ GLASS**  
Transparency, heat resistance, pressure and breakage resistance, and chemical stability
- 4 INCONEL**  
High resistance to corrosion, pressure and oxidation
- 5 FIBERGLASS**  
High strength, high elasticity, light weight

## Ultrasonic Toolholder

- **Plug & Play Transmitter**  
Compatible for variable CNC machine tools
- **Non-contact Ultrasonic**  
Optimized inductive transmission
- **Reinforced Actuator**  
To achieve high stiffness
- **Oscillation-amplitude**  
0 - 15  $\mu m$  (depending on tool settings)
- **Tools**  
With defined and undefined cutting edge



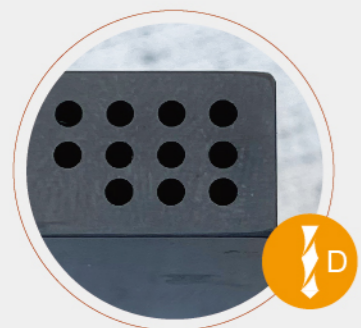
## Plug & Play Design



- Customized fixture
- Transmitter (Cable Ignored)
- Ultrasonic toolholder

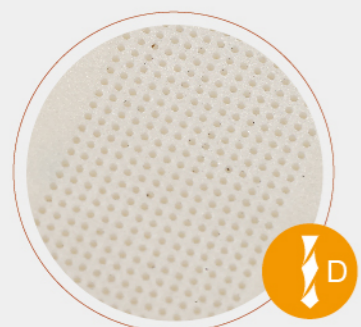


Increased Productivity



**SILICON CARBIDE DEEP DRILLING Ø1.7mm x h27mm**

1. Quality : Edge-crack  $\leq 0.04\text{mm}$
2. Efficiency + 25%
3. Tool life + 33%



**ALUMINUM OXIDE MICRO-DRILLING Ø0.2mm x h1.48mm**

1. Quality : Edge-crack  $\leq 0.04\text{mm}$
2. Efficiency + 25%
3. Tool life + 33%



**ALUMINUM OXIDE DEEP DRILLING Ø4mm x h5mm**

1. Quality : Hole diameter tolerance  $\leq 0.015\text{mm}$
2. Efficiency + 30%



**ZIRCONIUM DIOXIDE THREADING**

1. Efficiency + 46%
2. Tool life + 50%

\*Actual results depending on user's machining parameters.



**QUARTZ MICRO-DRILLING Ø0.5mm x h5mm**

1. Quality : Chipping  $\leq 0.1\text{mm}$ , Hole diameter tolerance  $\leq 0.05\text{mm}$
2. Efficiency + 400%



**OPTICAL GLASS DEEP DRILLING Ø3mm x h65mm**

1. Quality : Average diameter tolerance  $< 0.034\text{mm}$
2. Efficiency x 8 times



**DIFFICULT-TO-CUT METALS APPLICATIONS**

1. 316 Stainless steel drilling Ø3-6mm Efficiency + 25%
2. Titanium alloy micro-drilling Ø0.5mm Cutting force - 39%



**TUNGSTEN CARBIDE THREADING & MOLD**

1. Quality : Ra  $< 0.1\mu\text{m}$
2. Efficiency + 166%, compared to conventional machining Efficiency + 400%, compared to EDM
3. Tool life + 400%

# HSK-E25

- Balance Quality Grade G1.0
- High Precision runout <math><3\mu\text{m}</math>
- Applied to micro-drilling process in ceramics, stainless steel, metals, and engineering plastics
- Applied to micro-machining processes in semiconductor, electronics, and timepiece industries

Applied to Advanced Semiconductor Materials



## Specification

Model	HSK-E25
Runout (4D)	<math><5\mu\text{m}^*</math>
Operating Freq.	35 kHz ~ 47 kHz
Max. Spindle Speed	48,000rpm
Collet Types	ER08 / Shrink Fit
Weight	0.2 kg
ATC	YES
CTS	NO

\*Measured with high-precision collet

\*Optional <math><3\mu\text{m}</math>

## Application



SIC



ALUMINUM OXIDE



STAINLESS STEEL

# R30 SERIES

- Balance Quality Grade G2.5
- High Precision runout <math><5\mu\text{m}</math>
- Extended toolholder
- Slim design prevents interference and maintains precision
- Applied to deep drilling process

Applied to Advanced Semiconductor Materials



## Specification

Model	R30 SERIES
Runout (4D)	<math><5\mu\text{m}^*</math>
Operating Freq.	20 kHz ~ 32 kHz
Max. Spindle Speed	24,000rpm
Collet Types	SK06
Taper	HSK-A63、BBT-40
Weight	2.2 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



+ Side Wall Machining



+ Cavity

# UD2

## Ultrasonic Driver

### Features :

1. Immediate ultrasonic data output
2. Multiple control modes (Manual/PLC/Ethernet)



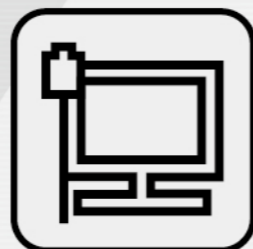
**Transmitter**  
Non-contact power transmission design allows high spindle speed options



Manual Control



PLC Control



Ethernet Control



**Control Panel**  
Supports external control and monitors ultrasonic driver



Transparent Parameter Information



Adjustable Power Level



Automatic Freq-Lock



Tool Adaptive Scanning



Multiple Control Mode



One Driver for all Toolholders

## UD2 Specification



Max. Power	60 W	Driver UD2 Size & Weight	Size(mm) - H162 x W215 x D370 *1 Weight(kg) -4.2
Frequency Range	14 kHz ~ 56 kHz		
Operating Temperature	-20°C to 50°C		
Operating Humidity	5 % RH -95 % RH (No Coden.)	Control Panel 2HEC Size & Weight	Size(mm) - H110 x W173 x D54 *2 Weight(g) -600
Transportation/ Storage Temp.	-25°C to 60°C		
Transportation/ Storage Humidity	5 % RH -95 % RH (No Coden.)		
Power Supply	AC 110~220 Vrms±10 % 50/60 Hz, 1 φ		

\*1.Without mounting plates(mm) : H162 x W 215 x D280

\*2.With signal cable & connector(mm) : H110 x W273 x D54

# HSK-A63

- Balance Quality Grade G2.5
- High Precision runout <5μm

## Specification

Model	HSK-A63
Runout (4D)	<5μm*
Operating Freq.	20 kHz ~ 32 kHz(*52kHz)
Max. Spindle Speed	24,000rpm
Collet Types	SK06 / SK10
Weight	2 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



# HSK-E32

- Balance Quality Grade G2.5
- High Precision runout <5μm

## Specification

Model	HSK-E32
Runout (4D)	<5μm*
Operating Freq.	20 kHz ~ 32 kHz(*52kHz)
Max. Spindle Speed	38,000rpm
Collet Types	SK06
Weight	0.5 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



# HSK-E40

- Balance Quality Grade G2.5
- High Precision runout <5μm

## Specification

Model	HSK-E40
Runout (4D)	<5μm*
Operating Freq.	20 kHz ~ 32 kHz(*52kHz)
Max. Spindle Speed	30,000rpm
Collet Types	SK06 / SK10
Weight	0.8 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



# HSK-E25

- Balance Quality Grade G1.0
- High Precision runout <3μm
- Applied to micro-drilling process in ceramics, stainless steel, metals, and engineering plastics
- Applied to micro-machining processes in semiconductor, electronics, and timepiece industries

## Specification

Model	HSK-E25
Runout (4D)	<5μm*
Operating Freq.	35 kHz ~ 47 kHz
Max. Spindle Speed	48,000rpm
Collet Types	ER08 / Shrink fit
Weight	0.2 kg
ATC	YES
CTS	NO

\*Measured with high-precision collet \*Optional <3μm



# BBT-30

- Balance Quality Grade G2.5
- High Precision runout <math><5\mu\text{m}</math>

## Specification

Model	BBT-30
Runout (4D)	<math><5\mu\text{m}^*</math>
Operating Freq.	20 kHz ~ 32 kHz(*52kHz)
Max. Spindle Speed	30,000rpm
Collet Types	SK06 / SK10
Weight	0.9 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



# BBT-40/CAT-40

- Balance Quality Grade G2.5
- High Precision runout <math><5\mu\text{m}</math>

## Specification

Model	BBT-40 / CAT-40
Runout (4D)	<math><5\mu\text{m}^*</math>
Operating Freq.	20 kHz ~ 32 kHz(*52kHz)
Max. Spindle Speed	24,000rpm
Collet Types	SK06 / SK10
Weight	2 kg
ATC	YES
CTS	70 bar

\*Measured with high-precision collet



## Product Specification Sheet

Description Model	Runout (4D)	Operating Freq.	Max. Spindle Speed	Collet Types	Weight	ATC	CTS
BBT-30	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	30,000 rpm	SK06 SK10	0.9 kg	YES	$\leq 70$ bar
BBT-40/CAT-40	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	24,000 rpm	SK06 SK10	2.0 kg	YES	$\leq 70$ bar
BBT-40-R30	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	24,000 rpm	SK06	2 kg	YES	$\leq 70$ bar
HSK-E25	<math><5\mu\text{m}^*</math>	35 kHz   47 kHz	48,000 rpm	ER08 Shrink Fit*1	0.2 kg	YES	NO
HSK-E32	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	38,000 rpm	SK06	0.5 kg	YES	$\leq 70$ bar
HSK-E40	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	30,000 rpm	SK06 SK10	0.8 kg	YES	$\leq 70$ bar
HSK-A63	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz (*52kHz)	24,000 rpm	SK06 SK10	2.0 kg	YES	$\leq 70$ bar
HSK-A63-R30	<math><5\mu\text{m}^*</math>	20 kHz   32 kHz	24,000 rpm	SK06	2.2 kg	YES	$\leq 70$ bar

\*Measured with high-precision collet

\*1Optional <math><3\mu\text{m}</math>