

CONPROFE TECHNOLOGY GROUP



Converging of Global Resources, Professional as Industry Leader

Conprofe Technology Group Co., Ltd.
Updated Date / Version: 2024.03.21 / VC7.1.8



CONVERGING OF GLOBAL RESOURCES

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01 About Conprofe

02 R&D Capacity

03 Main Products

04 Production & Inspection Equipment

05 CSR

PROFESSIONAL AS INDUSTRY LEADER





01 PART ONE
About Conprofe

汇 全球资源

Converging of Global Resources

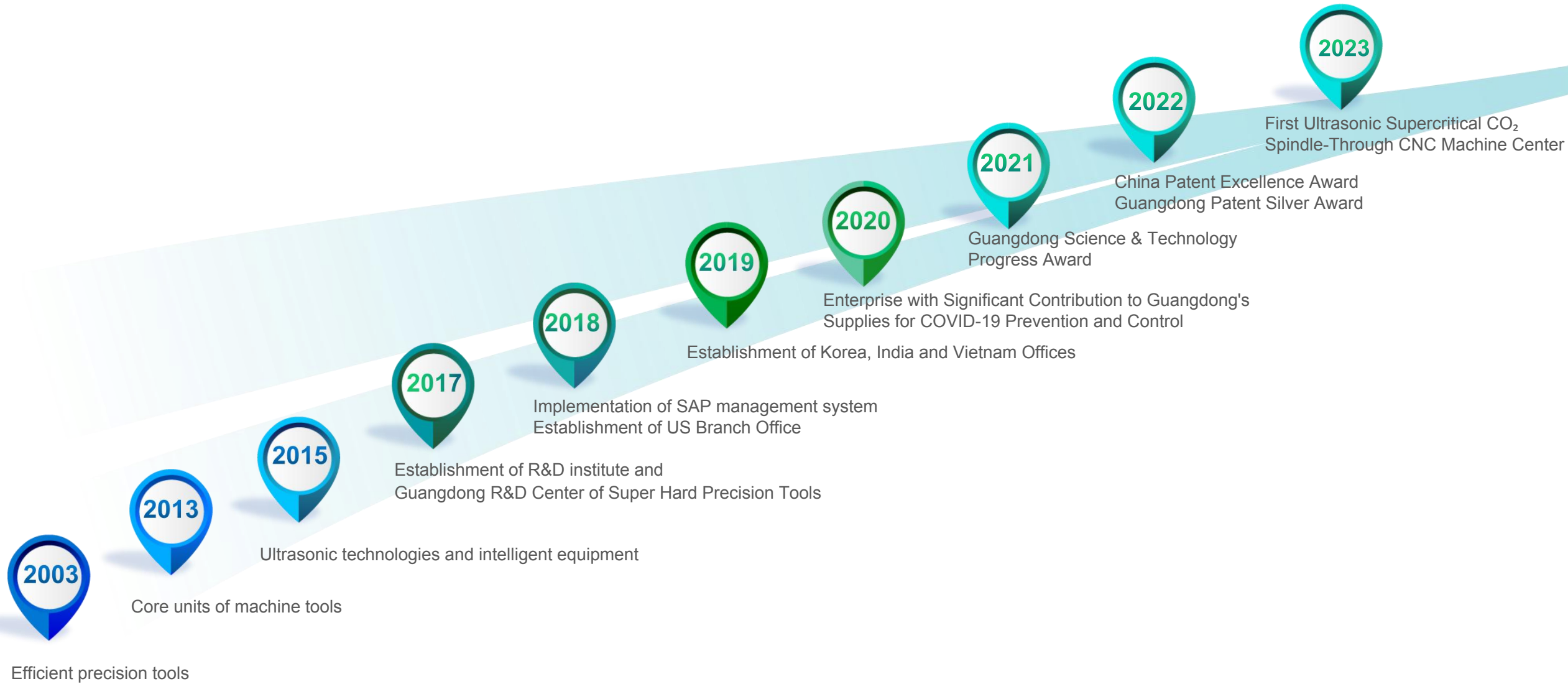
专 行业领先

Professional as Industry Leader

“ CONPROFE ”

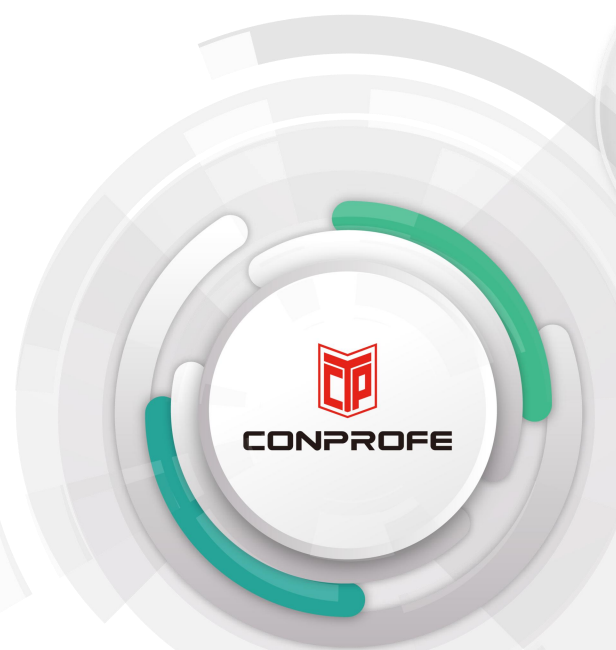
Trademarks successfully registered in  54 countries and regions across the world

Milestones



»» *Efficient* | *Green* | *Intelligent* ««

Provider of Efficient, Green & Intelligent Manufacturing Solutions and Key Units



Conprofe Technology Group Co., Ltd.



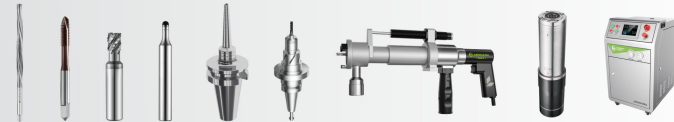
Conprofe Machine Tool Co., Ltd.



SmartGuy Intelligent Equipment Co., Ltd.



AENOASA Precision Tools Co., Ltd.





6 **CONTINENTS**
Sales spread over

70+ **COUNTRIES & REGIONS**
Excellent sales record and customer endorsement

20+ **YEARS**
Dedicated in bringing added value to customers

Domestic Sales and Technical Service

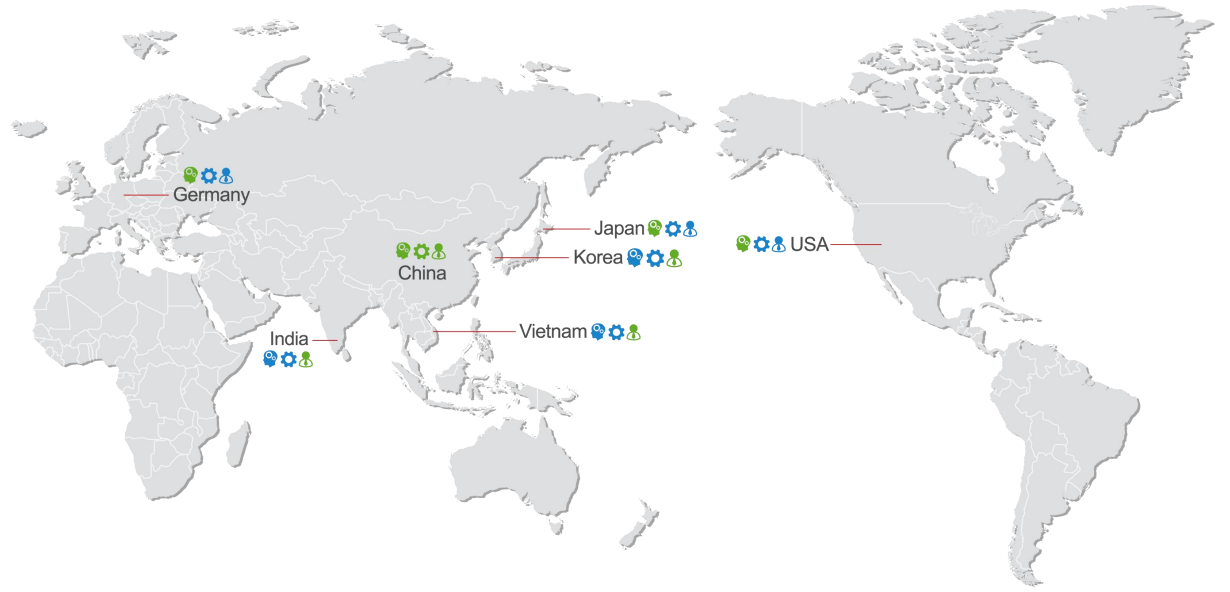


Headquarters:
 Sales and After-Sales Office (24)

- 7 Regions >>>>
- North China
 - Northwest China
 - Southwest China
 - Northeast China
 - East China
 - South China
 - Central China

Figure No. GS(2020)4624 Supervised by Ministry of Natural Resources of the P.R.C
 Image Source: bzdt.ch.mnr.gov.cn

Global Innovation R&D, Marketing and Sales



- R&D Network: In Operation Under Construction
 Production Network: In Operation Under Construction
 Sales Network: In Operation Under Construction

Figure No. GS(2019)1652 Supervised by Ministry of Natural Resources of the P.R.C
 Image Source: bzdt.ch.mnr.gov.cn



02 PART TWO
R&D Capacity





Innovation Platform

- National High-Tech Enterprise
- Guangdong Engineering and R&D Center
- Guangdong Provincial Enterprise Technology Center



R&D System

- Establishment of global innovation R&D centers and labs in China, Germany and USA



IPR

- Trademarks cover 54 countries and regions, selected as Guangdong Key Trademark Protection List
- Core patents

850+



IUR

- In-depth cooperations with famous universities and research institutions
- Undertake or participate in over 10 national/provincial/municipal special projects



China-Germany Industrial Equipment Joint Research Lab

- German Fraunhofer Institute for Structural Durability and System Reliability/LBF

☰ R&D Capacity — Technology Awards



First/Second Prize of Guangdong Scientific and Technological Progress Award



China Patent Excellence Award



Guangdong Province Key Trademark Protection List Inclusion Certificate



National Intellectual Property Advantage Enterprise



Guangdong Patent Silver Award



Guangzhou City Private Leading Enterprise

International Advanced Level

Acknowledged by experts led by members of CAE (Chinese Academy of Engineering)

- ▶▶ **Key ultrasonic-green technologies and equipment for high-efficiency and high-quality machining of hard-to-cut materials**
- ▶▶ **Super-hard Cutting Tools and High-speed Machining Technology and Equipment for Hard-brittle Materials**
- ▶▶ **Critical Technology and Equipment for High-quality Medical Protective Equipment Manufacturing & Industrialized Application**
- ▶▶ **Ultrasonic Welding Key Technology and Equipment for Large-scale Medical Protective Equipment Production**



鉴定委员会认为，项目技术难度大、创新性强，整体技术达到国际同类技术先进水平，其中大规模超声焊接专用智能型自动搜频跟频技术达到国际领先水平。同意通过鉴定。

建议进一步加大推广力度。

鉴定委员会主任： 副主任：

2020 年 5 月 15 日



03 PART THREE
Main Products





Efficient | **Green** | **Intelligent**

Accessory Level

Super-Hard Tools



Tapping Tools



Precision Tool Holders



Parts & Units Level

Ultrasonic Technologies



Green Technologies



Precision Mechanical Units & Parts



★ **Machine Level** ★



Ultrasonic-Green CNC Machine Tools



3.1 PART 3.1
Parts

Technical Strengths:

- Independent IPR with **54** domestic and foreign patent certificates
- Up to **300** cutting edges
- Profile tolerance within **3 μ m** for both milling and grinding

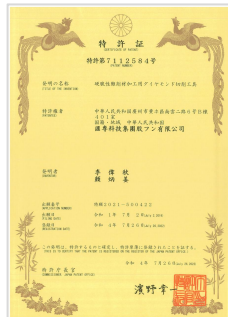
International Patented Product: Solid PCD Micro-Edge Cutting Tools



German Utility Model Patent



Korean Industrial Design Patent



Japanese Patent of Invention

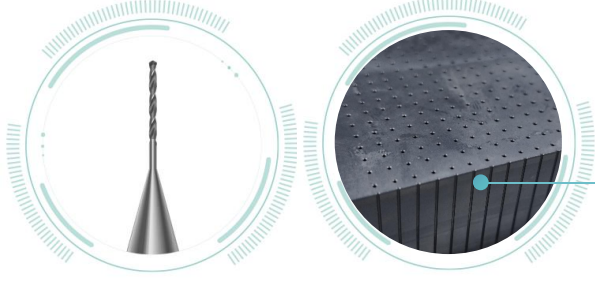
►► Solid PCD Micro-Edge Cutting Tool



SiC Machining
Roughness Sa 5nm

- **Mirror finish** with **Sa 5nm** in machining SiC ceramic mold
- Surface quality up by **3 times** in machining ceramics cavity
- **Ra < 0.08 μ m** in machining sapphire and glass

►► Solid PCD Micro Drill



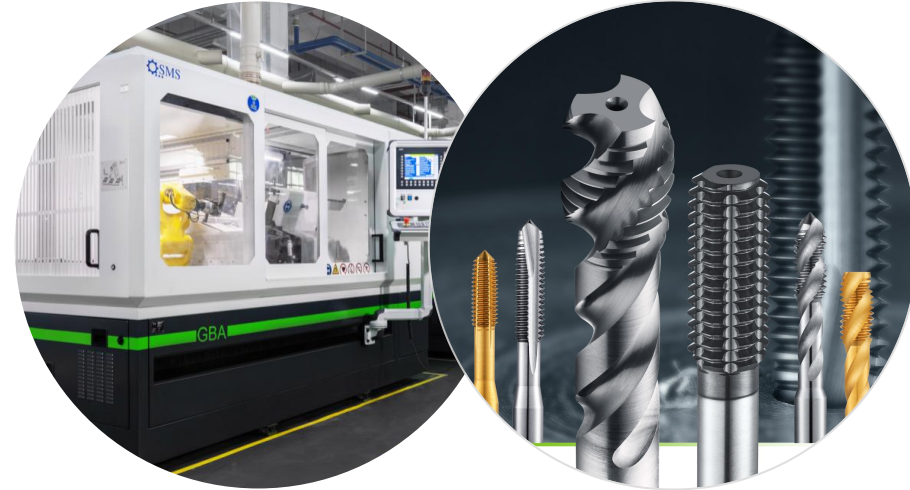
Depth-to-Diameter Ratio: **55.5:1**
Single Crystal Silicon Showerhead

- Suitable for drilling hard-brittle materials, effectively reducing chipping
- Hole quality up by **3+ times** vs. conventional cutters in machining CFRP
- Successful breakthrough in machining ultra-deep micro-hole with Depth-to-Diameter Ratio of **55.5:1** in single crystal silicon workpiece

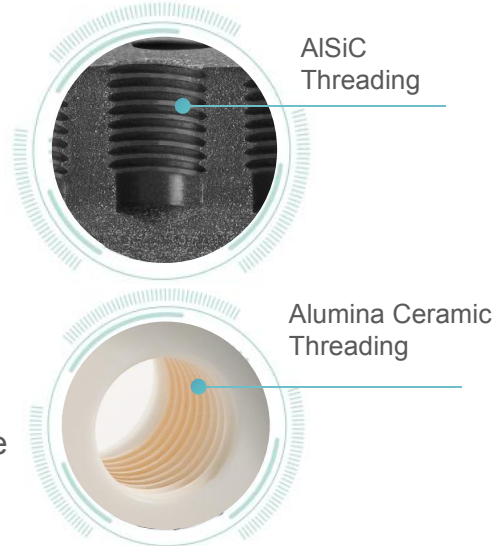
Parts | Tapping Tools

Technical Strengths:

- Independent IPR
- Self-developed unique coating, 30% tool life improvement vs. world-famous brands
- More stable quality with unique heat treatment, grinding and passivation treatment



► Featured Product: Solid PCD Thread Milling Cutter



- 90% shorter cycle time per hole
- Tool life up by 300 times

► Features:

- Work with Conprofe Solid PCD Drill as the best fit for threading hard-brittle materials
- Tapping efficiency up by 100% vs. traditional thread milling cutters, with machining cost per hole reduced by more than 2 times
- Tool life up by 50~100 times vs. traditional thread milling cutters
- Customized specifications of micro-diameter thread milling cutters available

☰ Parts | Precision Tool Holders (Dust/Rust-Proof)

All products are **self-developed** and certified by **national patents**.

Advanced production technologies and world-class equipment such as **Swiss STUDER**, etc.

▶▶ Ultrasonic Shrink-Fit Tool Holders



Air-Cooling Shrink-Fit Machine

Models available for **stainless steel**, **alloy steel** and both

- Assembly accuracy up to **0.003mm**
- **Special stainless steel** or **alloy steel** applied
- Up to **5,000 times** of clamping with stainless steel material
- Ultrasonic-assisted machining with frequency of **18-70kHz**

▶▶ Ultrasonic Press-Fit Tool Holders



- Assembly accuracy up to **0.001mm**
- Easy clamping, **8s** to complete the disassembly
- Ultrasonic-assisted machining with frequency of **18-70kHz**

▶▶ Hydraulic Tool Holders



- Max. clamping force up to **500Nm** ($\phi 20$)
- Runout accuracy at 4xD $\leq 3\mu\text{m}$
- Length as slim as **200mm**

▶▶ Dust-proof Nut



- **Special dust-proof design** to prevent hard-brittle material dust from entering the gap between the tool holder and the nut, thus extending life of tool holders



3.2 PART 3.2
Units

Units | Ultrasonic Machining and Welding Systems

- Global top seller of ultrasonic machining systems with **500,000+** sets in mass application
- Independent IPR **200+**
- Winner of **Ringier Technology Innovation Award 2019** in Metalworking Industry
- Winner of **Ringier Technology Innovation Award 2022** (Ultrasonic Shrink Fit Holder)
- **Special Prize Winner of Progress in Science and Technology 2020** for contributing to anti-COVID prevention supplies
- Intelligent Automatic Frequency Searching and Tracking Technology **achieved international advanced level**



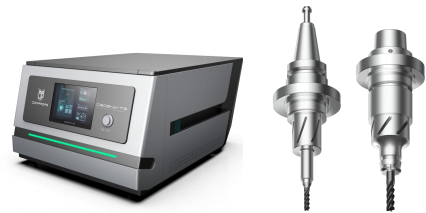
60+

Countries & Regions



4,000+

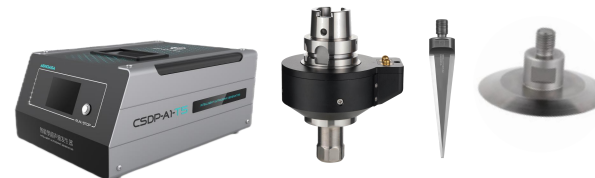
Customers



Ultrasonic Machining System



Ultrasonic Spindle



Ultrasonic Cutting System



Handheld Ultrasonic Pneumatic Drill



Ultrasonic Welding System

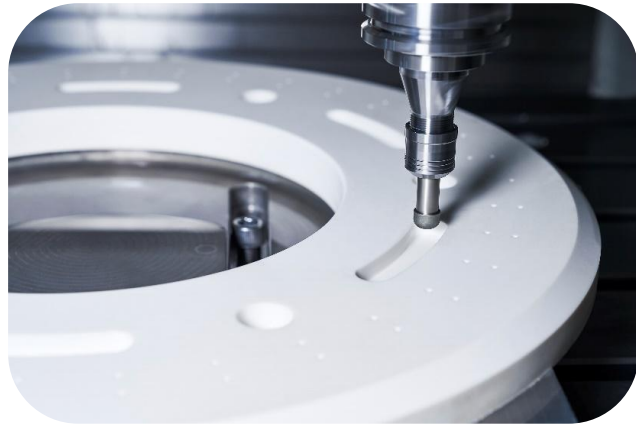


500,000+

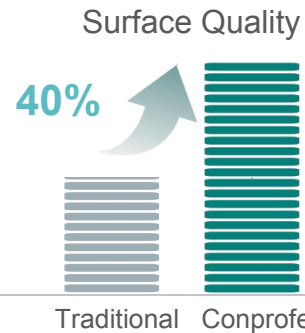
Annual Sales (sets)

Units — Ultrasonic Machining Types

▶▶ Ultrasonic Grinding



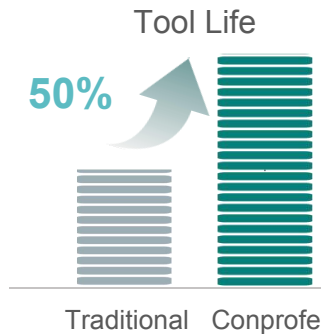
- Smoother chip removal
- Higher machining efficiency
- Less surface micro-cracks on **hard-brittle-material** workpiece
- Surface quality up by over **40%**



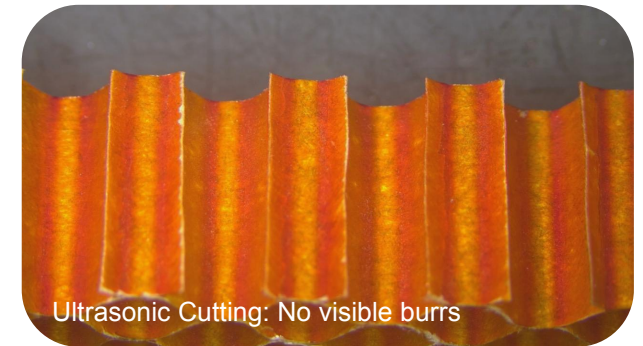
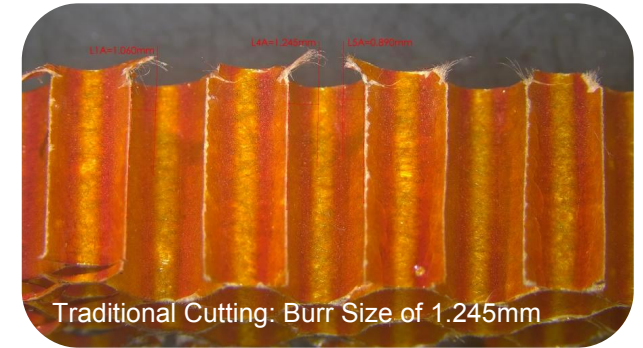
▶▶ Ultrasonic Milling



- Less cutting force
- Less friction between the tool and the workpiece, tool life up by **over 50%**
- Fewer tool marks and better surface quality



▶▶ Ultrasonic Cutting



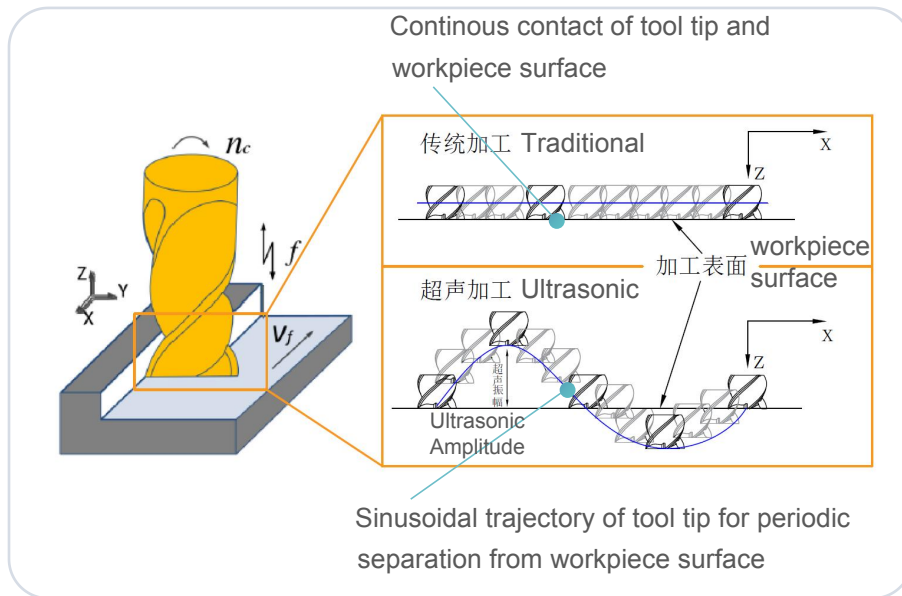
Units | Ultrasonic Machining System

► **Principle:** Based on traditional machining principle that generates high-speed rotation against the workpiece, ultrasonic machining, moreover, generates vibration at a certain amplitude.

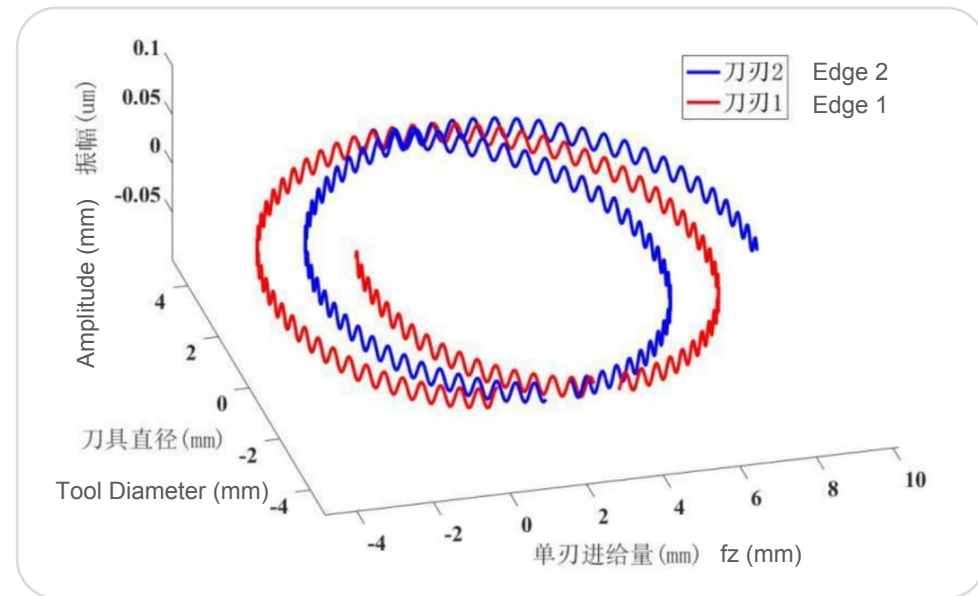
Tool tip trajectory equation is as follows:

$$\begin{cases} x = V_f \cdot t \\ y = 0 \\ z = A \cdot \sin(2\pi ft + \psi) \end{cases}$$

$$\begin{cases} x_i = V_f \cdot t_i + r \cdot \sin[wt_i - (i-1)\varphi] \\ y_i = r \cdot \cos[wt_i - (i-1)\varphi] \\ z_i = A \cdot \sin(2\pi ft_i + \psi) \end{cases}$$

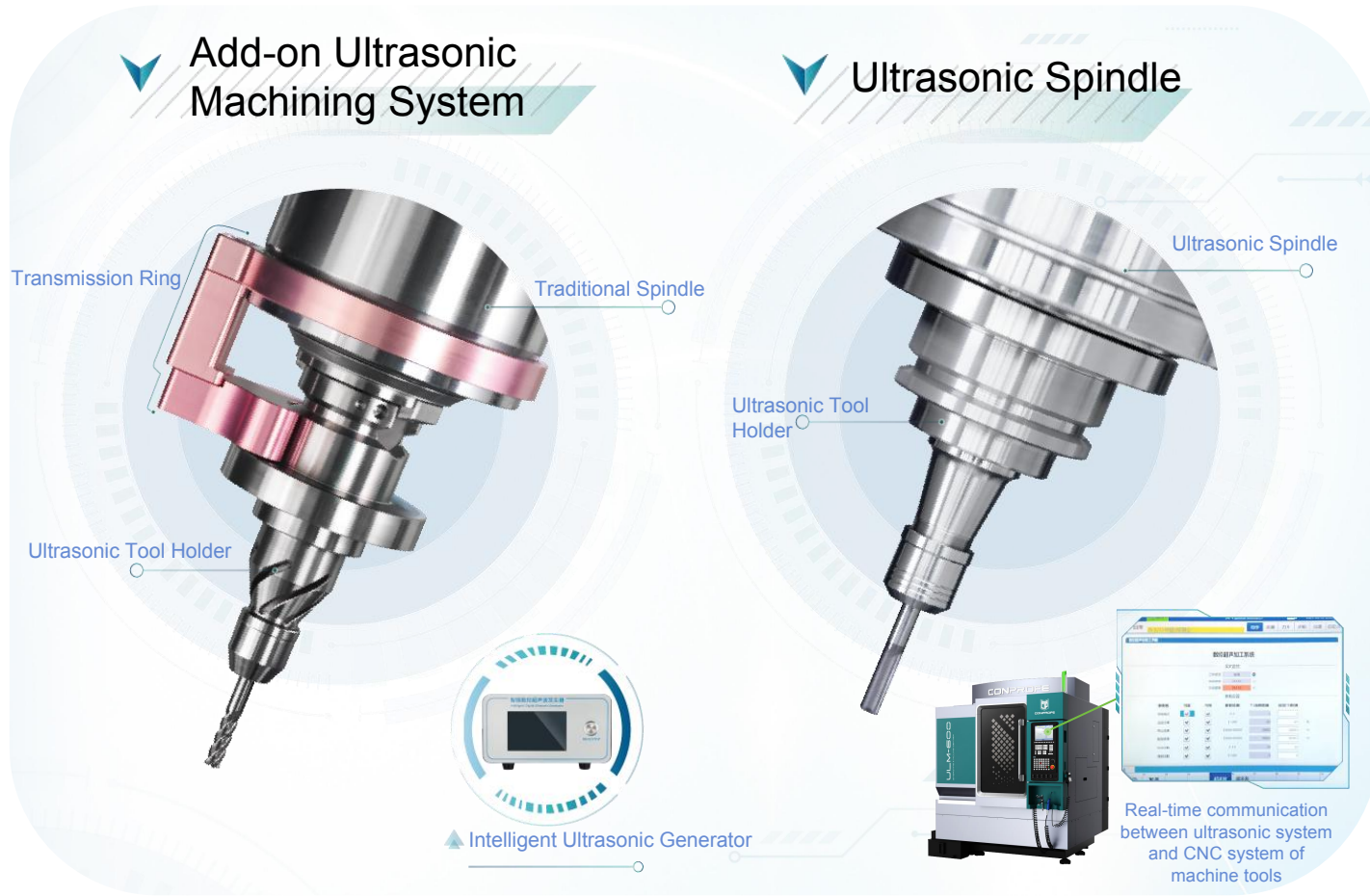


Comparison Diagram (Traditional vs Ultrasonic)

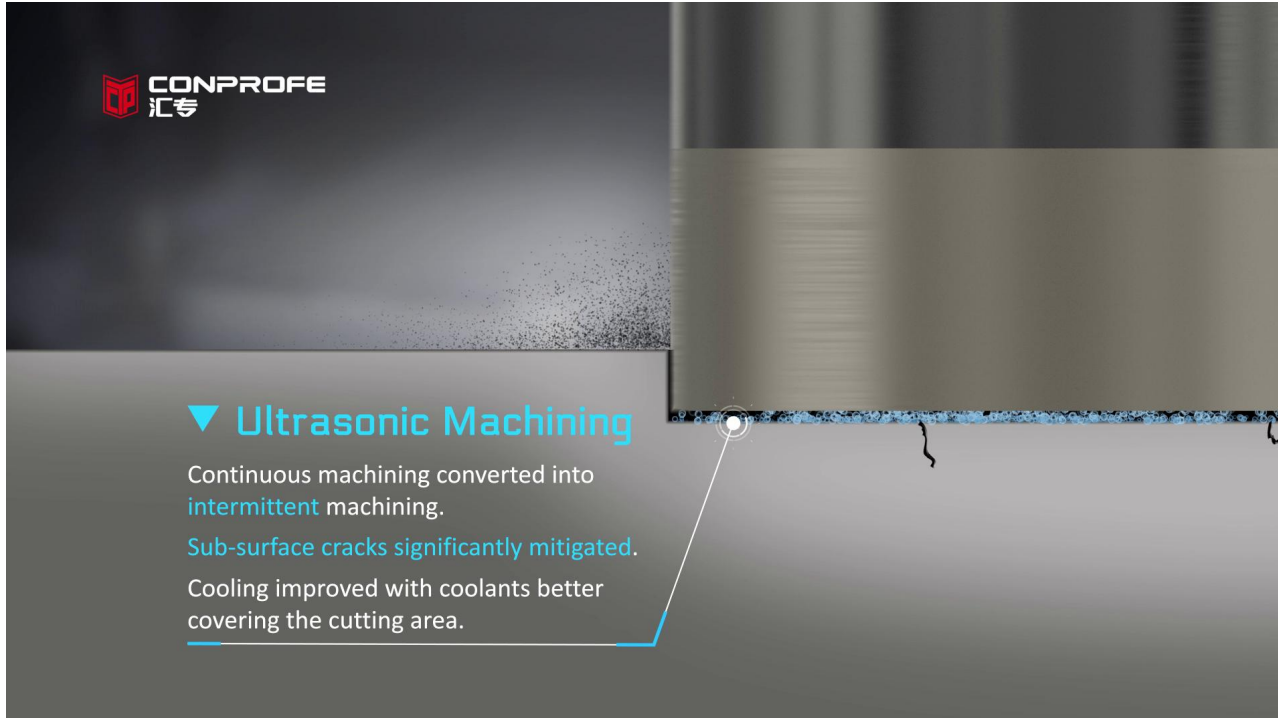


Trajectory of Tool Tip

☰ Ultrasonic Machining Advantages



- ## 5 Strengths of Ultrasonic Machining
- Minimizing generation of micro-cracks
 - Reducing cutting force for efficiency
 - Extending tool life
 - Reducing burr size
 - Improving surface quality



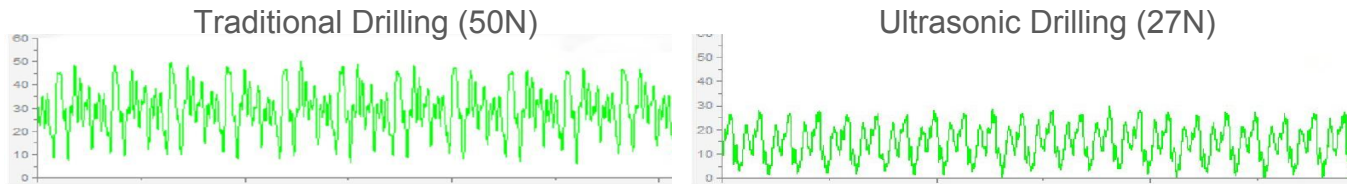
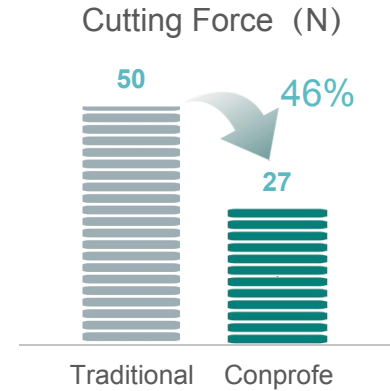
✗ Traditional machining produces obvious micro-cracks with serious sub-surface damage in machining hard-brittle materials.

✓ Ultrasonic machining effectively minimizes micro-cracks generation and sub-surface damage. Cooling improved with coolants better covering the cutting area.

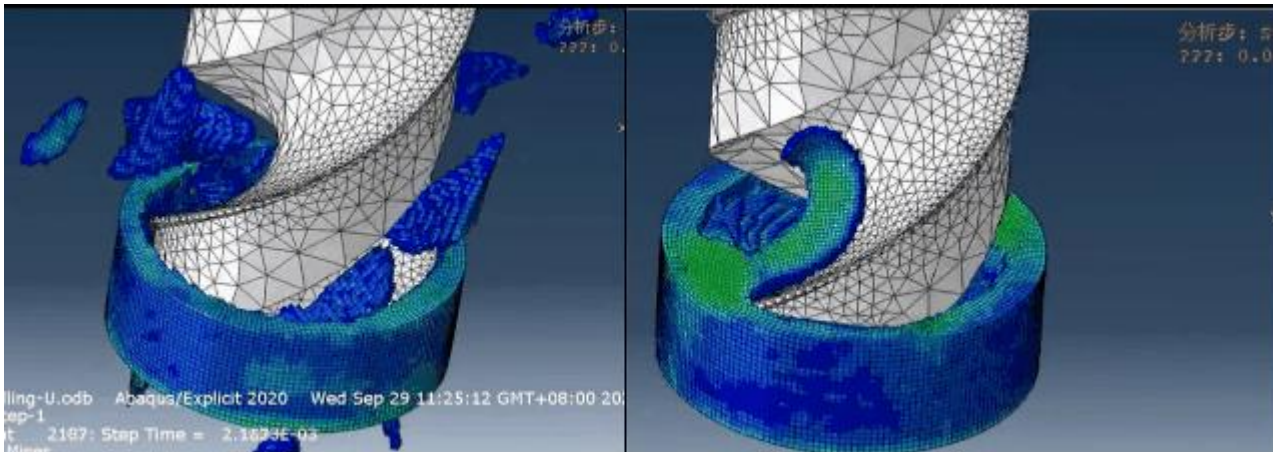
☰ Ultrasonic Machining Advantages | Reducing Cutting Force for Higher Efficiency

▶ Comparison of Cutting Force between Ultrasonic Drilling and Traditional Drilling

- Max. cutting force **down by 46%** from 50N to 27N
- Reduced tool wear rate allows for higher feeds and improved machining efficiency



▶ Comparison of Chip Evacuation Performance between Ultrasonic Drilling and Traditional Drilling

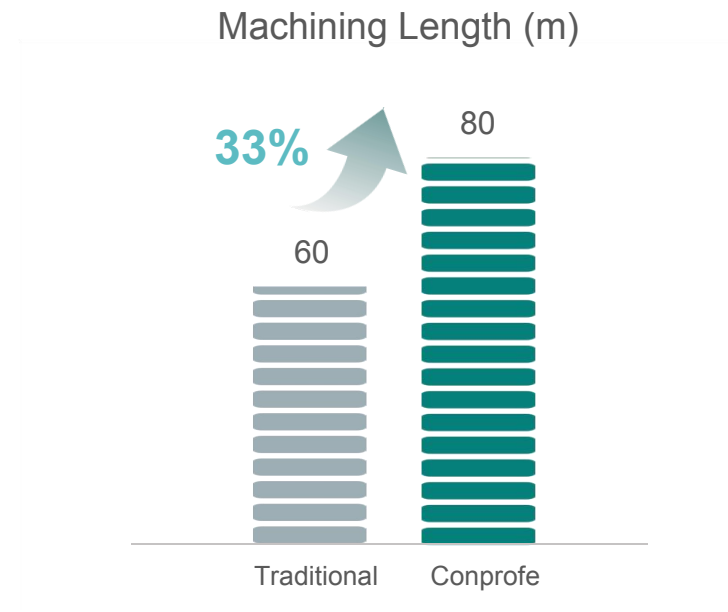
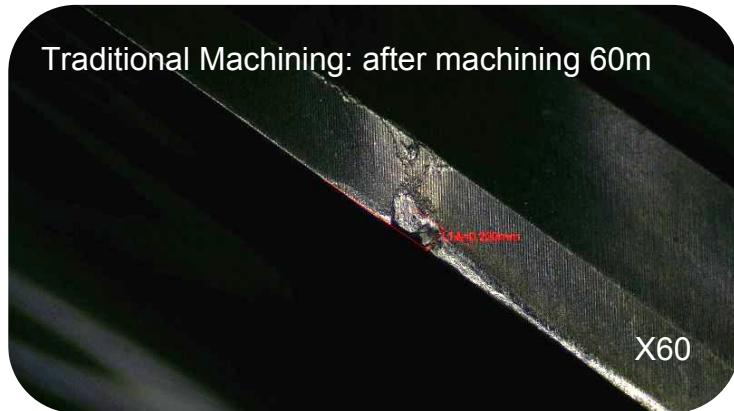


Ultrasonic machining enables better chip **breakage** and **chip removal**

☰ Ultrasonic Machining Advantages | Extending Tool Life

▶▶ Superalloy (GH4169) Milling:

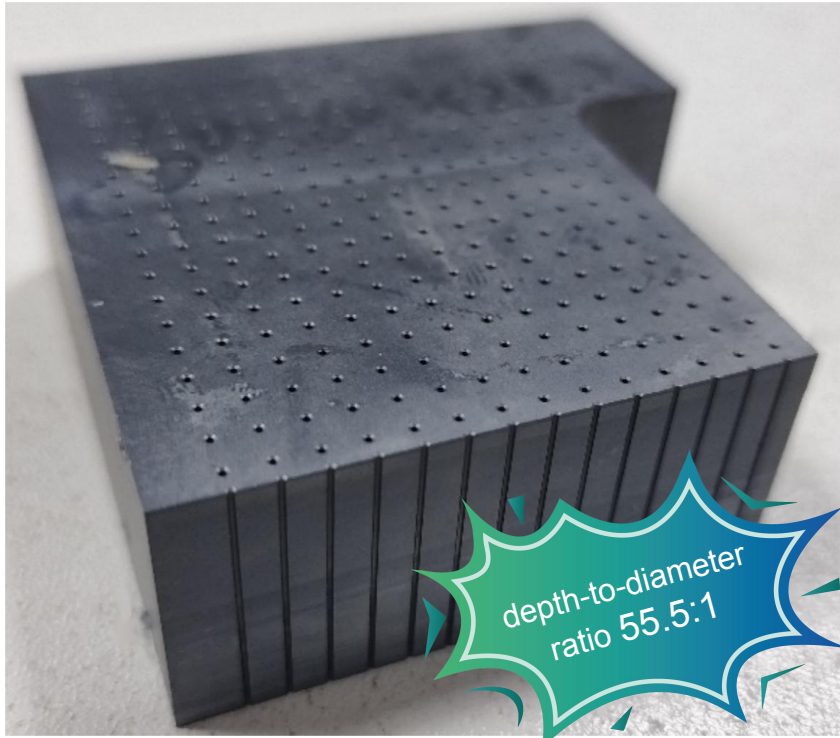
- Ultrasonic machining reduces cutting force and tool wear
- Ultrasonic machining extends tool life by **33%** under the same machining conditions



☰ Ultrasonic Machining Advantages | Improving Surface Quality

▶▶ Deep Hold Drilling on Single Crystal Silicon Showerhead:

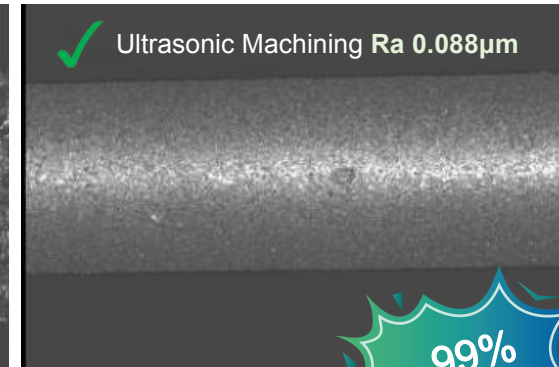
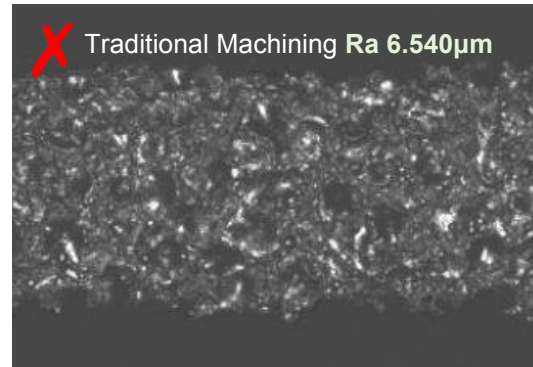
- No obvious chipping in hole entry; hole roundness up to 0.003mm
- Ra in Ultrasonic Machining down by **99%** from 6.54μm to 0.088μm



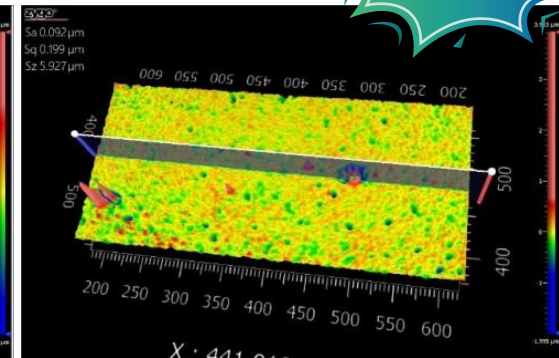
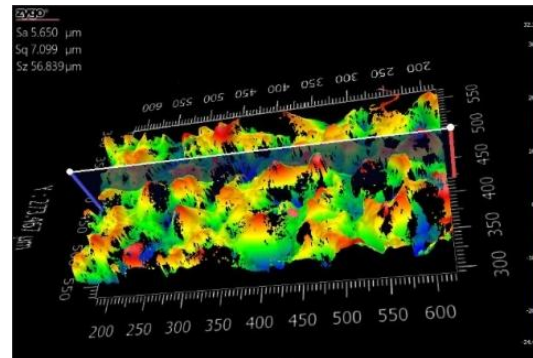
Workpiece Name: Single crystal silicon showerhead
(depth-to-diameter ratio: **55.5:1**)

Workpiece Size: 50X60X26.5mm

Requirements: Finishing of evenly distributed D0.45X25mm blind holes



-99%



Units | Hand-held Ultrasonic Pneumatic Drills

► Features:

- Ultrasonic-assisted machining **reduces cutting force** and labor intensity, improving machining efficiency
- Ultrasonic-assisted machining **effectively inhibits delamination and tearing**, producing better drilling quality
- Applicable to wide range of materials with ultrasonic amplitude of **0.5~18μm**

► **Applications:** Holemaking for carbon fiber composite materials, glass fiber composite materials, superalloy and other composites and difficult-to-cut metals in aviation industry.

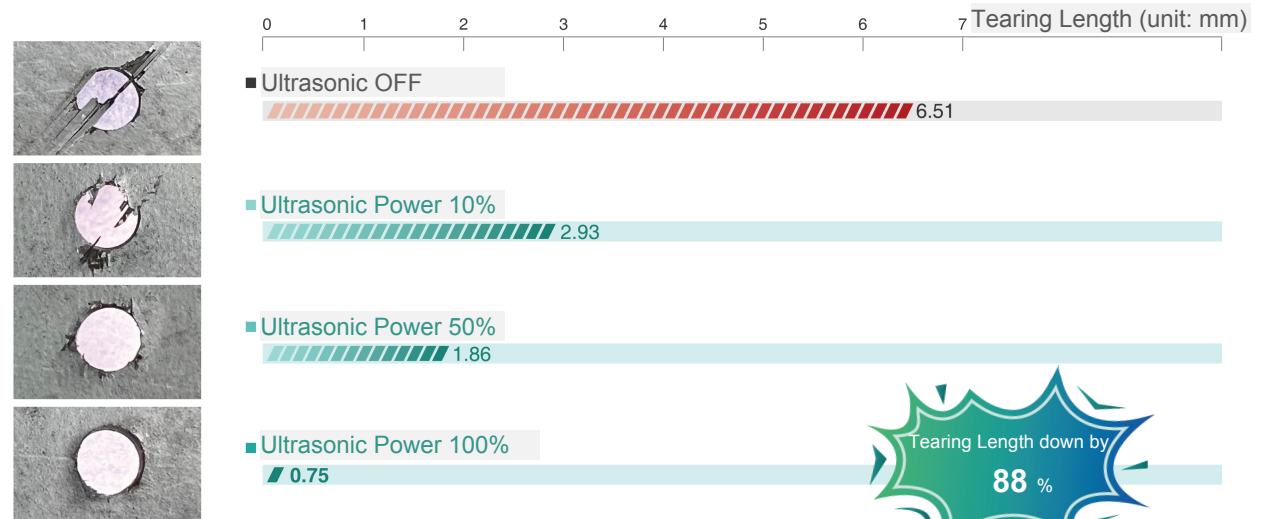


Conprofe Handheld Ultrasonic Pneumatic Drill



Intelligent Digital Ultrasonic Generator

Comparison of tearing length under different ultrasonic power outputs in Drilling CFRP



Units | Supercritical CO₂ Cryogenic Cooling System

Technical Strengths:

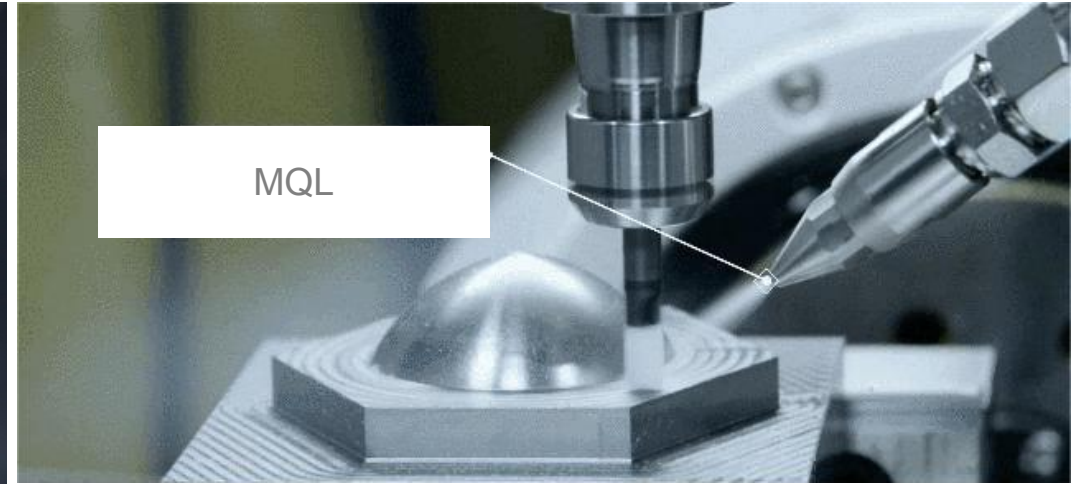
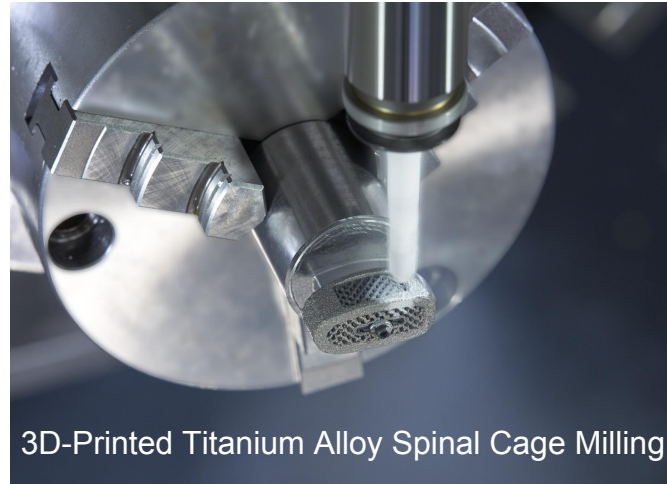
- Self-developed patented products
- Guangdong Top Famous High-tech Product
- Project Support Product Regarding **Key Generic Technologies for Clean Machining** in National Key R&D Plan

► Features:

- **-78°C Low temperature CO₂** (gaseous/dry ice particles) cooling, addressing challenges in machining hard-to-cut materials with efficiency **up by 50%~100%**

► Benefits:

- ✘ Higher machining efficiency
- ✘ Better Quality
- ✘ Longer tool life
- ✘ Eco-Friendly



Units | Through-Spindle MQL Systems

Technical Strengths:

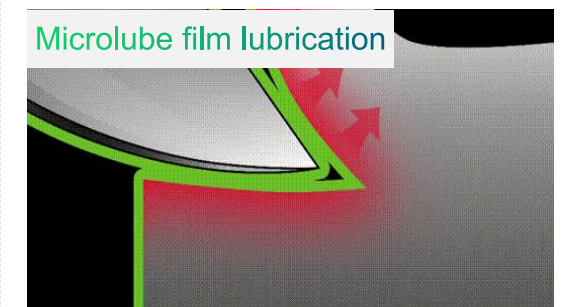
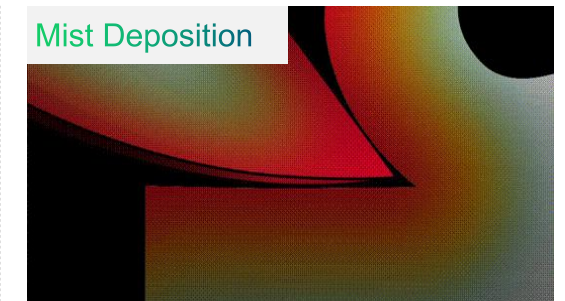
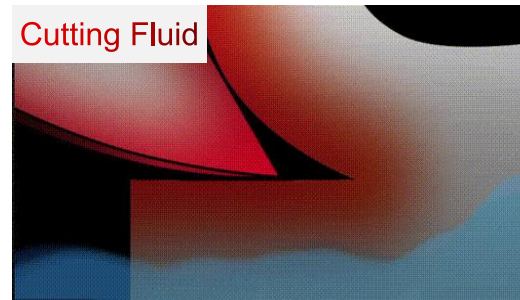
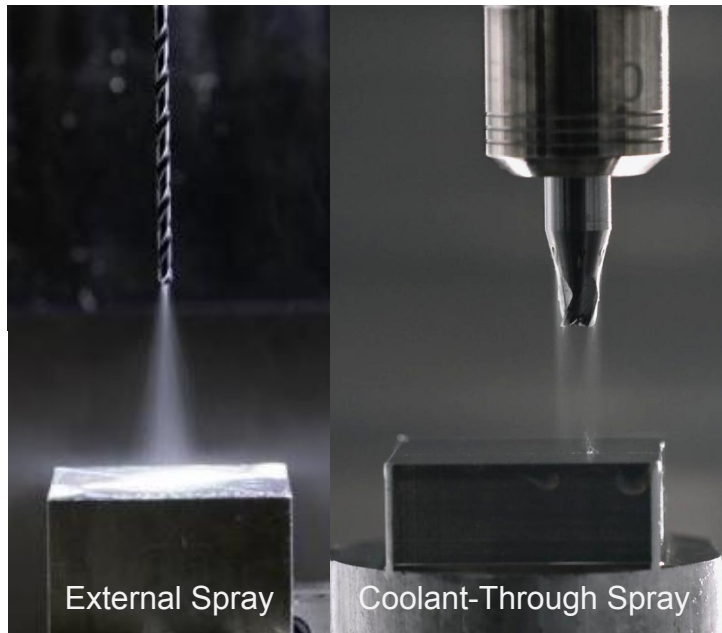
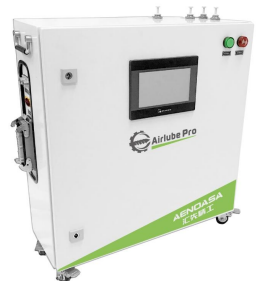
- Self-developed patented products
- Project Support Product Regarding **Key Generic Technologies for Clean Machining** in National Key R&D Plan

► Features:

- Aerosolization of **minute lubricating oil particles (5-30µm in size)** by using compressed air and specialized nozzles, which are then injected into the cutting area through nozzles or internally cooled cutting tools to achieve minimum quantity lubrication.
- Suitable for through-spindle cooling and fast spraying of oil mist particles
- **Automatic adjustment of oil mist amount (5-20mL/h)** for different tools

► Benefits:

- ※ Higher efficiency
- ※ Energy-Saving
- ※ Lower cost
- ※ Eco-Friendly



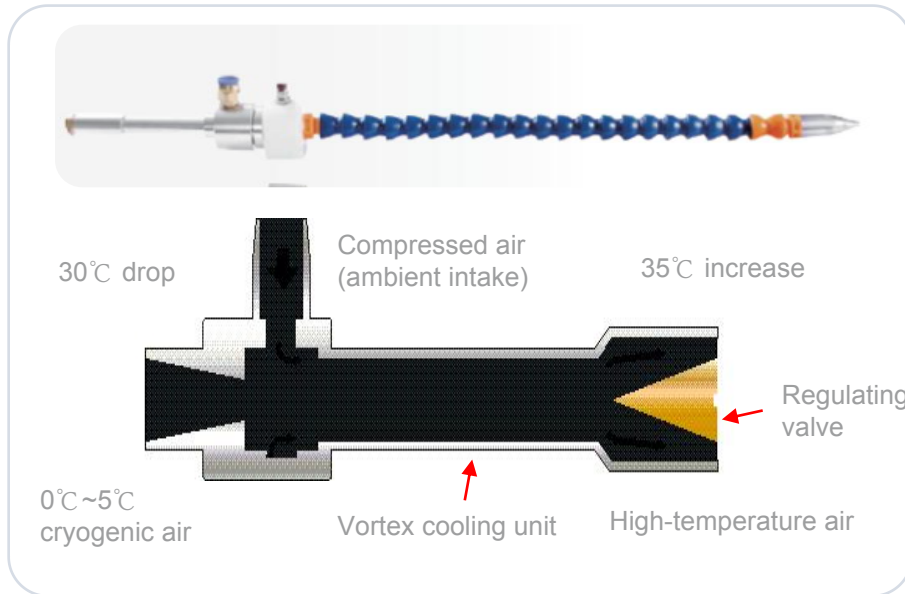
Units | Cryogenic Air Cooling System

Technical Strengths:

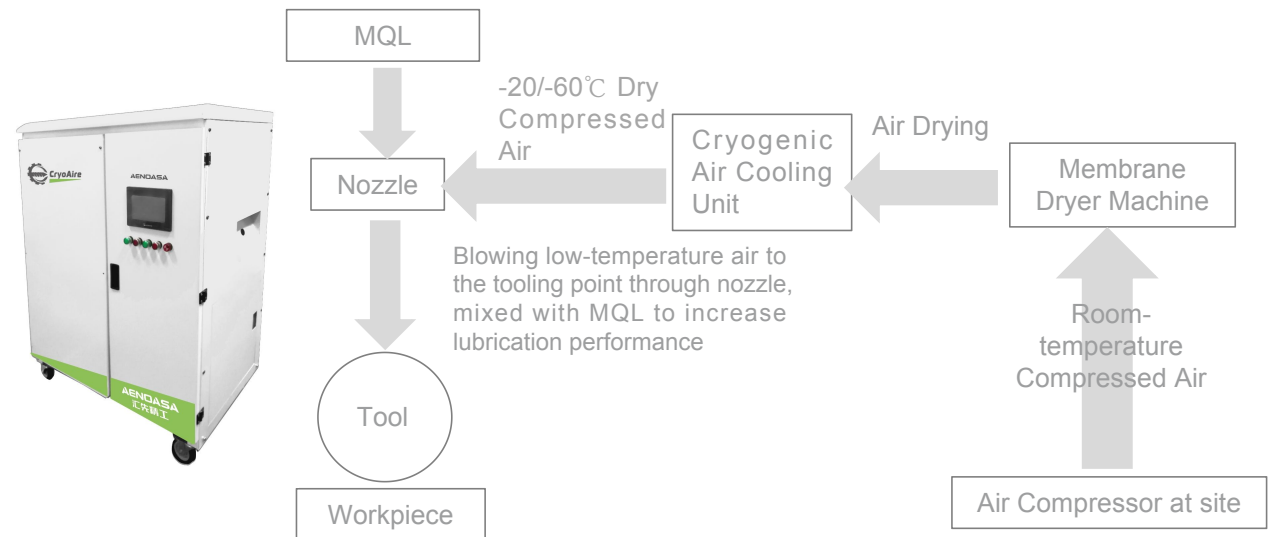
- Self-developed patented products
- Guangdong Top Famous High-tech Product
- Project Support Product Regarding **Key Generic Technologies for Clean Machining** in National Key R&D Plan

- ▶ **Features:**
 - ✓ To cool cutting with **low-temperature cooling air (cooling air)** generated by vortex or compressor refrigeration for higher dry cut efficiency
 - ✓ Cooling medium (**Cryogenic minimum quantity lubrication**) is available with minimum quantity lubrication (cooling air + MQL)
- ▶ **Application Scenarios:** Suitable for green machining and machine tool key components in medical, aviation, automotive, energy equipment, etc.

Vortex tube cooling (0~5°C)



Compressor Cooling (-10 °C ~ -60°C)



Units | Ultra-Low Temperature Liquid Nitrogen Cooling System

Technical Strengths:

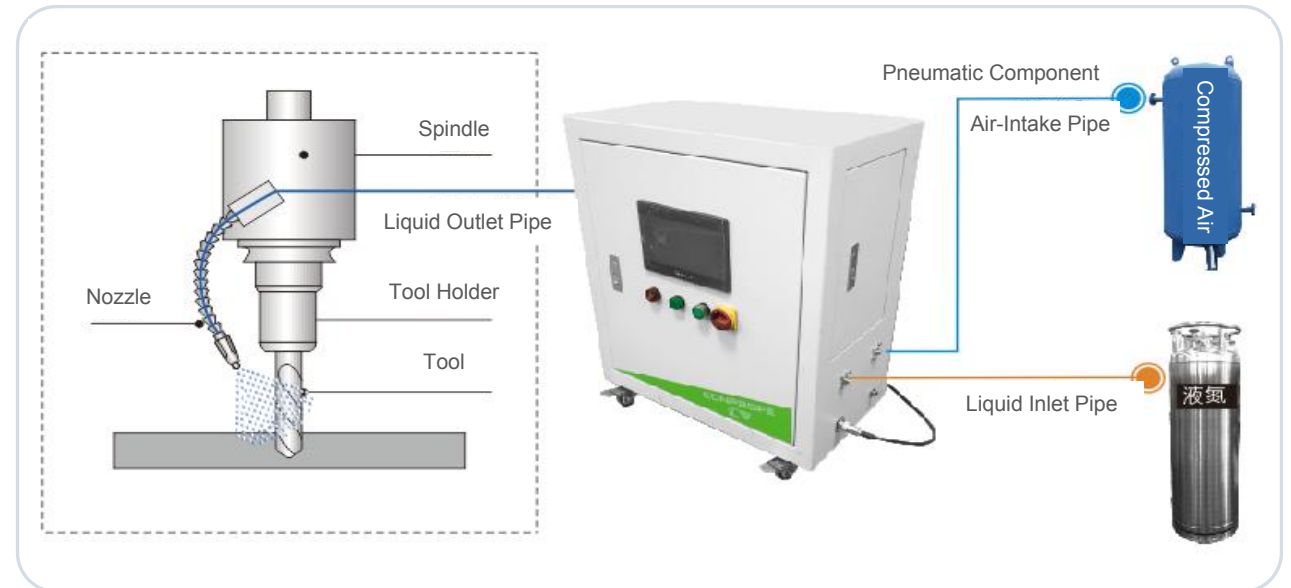
- Self-developed patented products
- Guangdong Top Famous High-tech Product
- Project Support Product Regarding **Key Generic Technologies for Clean Machining** in National Key R&D Plan

► Features:

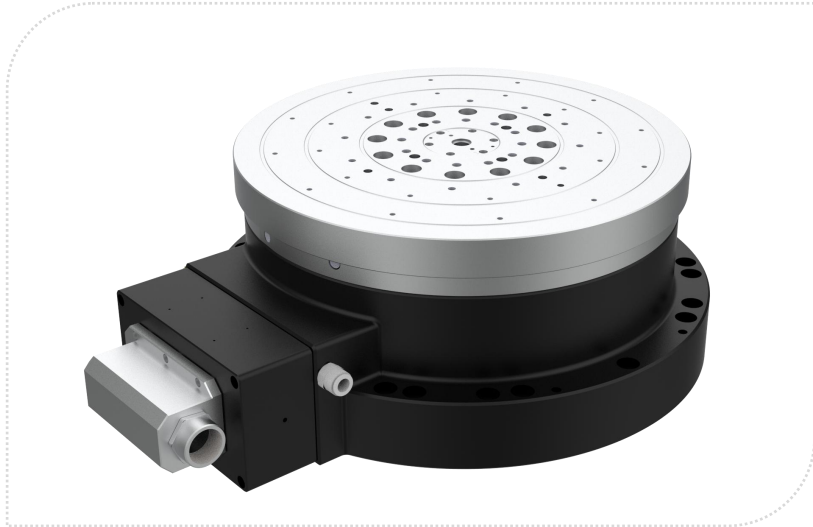
- ✓ Liquid nitrogen or low temperature liquid nitrogen (Minimum Cooling Temperature: **-196°C**) as spray medium for **ultra-low temperature cutting**
- ✓ Much **higher material removal rate** or **longer tool life** with less tool wear and adhesion

► **Application Scenarios:** Suitable for green machining and machine tool key components in medical, aviation, automotive, energy equipment, etc.

-196°C

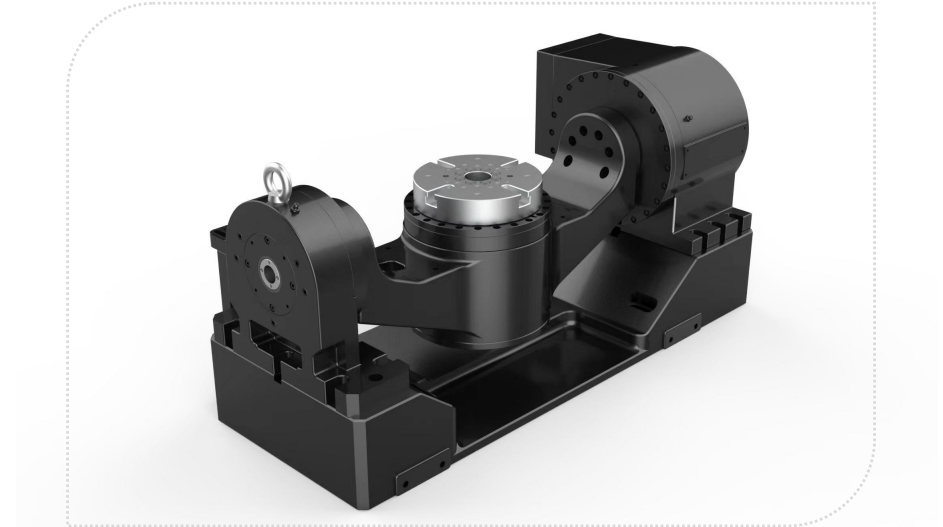


▶▶ Vertical High-Speed Rotary Table



- High Speed: Up to **1,500rpm**
- High Precision: **No backlash**, standard 26-bit encoder
- Mill-Turn: Both **positioning milling** and **high-speed turning** available
- Large Load: Max. load of **80KG**
- Built-in Air Path: Built-in **positive labyrinth, fixture positive pressure and vacuum air paths**, with aesthetic look that avoids tube folding or air holding during high-speed rotation.
- Compatible with Fanuc, Siemens, Mitsubishi, Brother and other CNC controllers

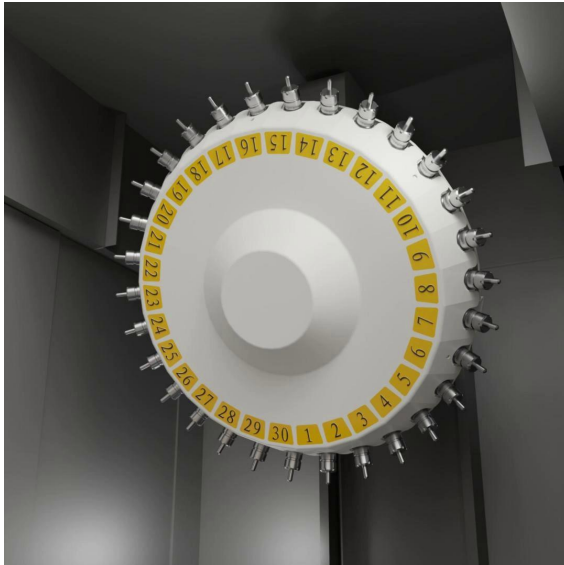
▶▶ Tilting 5-Axis Rotary Table



- High accuracy with repeatability of **$\pm 4''$**
- Quick servo response and rated speed of **200rpm** with direct motor drive
- **5-Axis simultaneous** machining and **RTCP** function for intensive production
- Easy wiring and piping with mesopores
- Large travel with B-axis swivel radius up to **450mm**

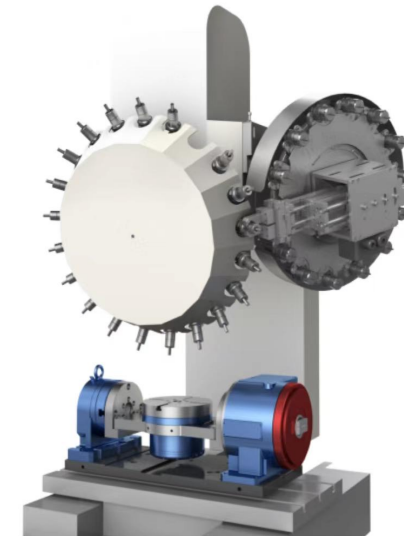
► Disc-type Tool Magazine (DTM)

- Replacing tool magazine of the existing machine tools (FANUC/Brother) through retrofits
- Compatible with the original CNC controllers
- Maximum 36T
- Quick tool changes
- Stable structure



► Add-on Tool Magazine (ATM)

- Add-on of an extra T-14 tool magazine
- Quick tool changes
- Easy, safe and reliable operation



Units | Unattended Material Supply System

- ▶ The self-developed **UMS Unattended Material Supply System** is applicable to various manual loading and unloading scenarios, effectively cutting customers' production costs and enhancing competitiveness of enterprises. In addition, with high-cost performance and simple and user-friendly operation, it can quickly realize large-scale application and accelerate the unmanned process of the entire workshop.

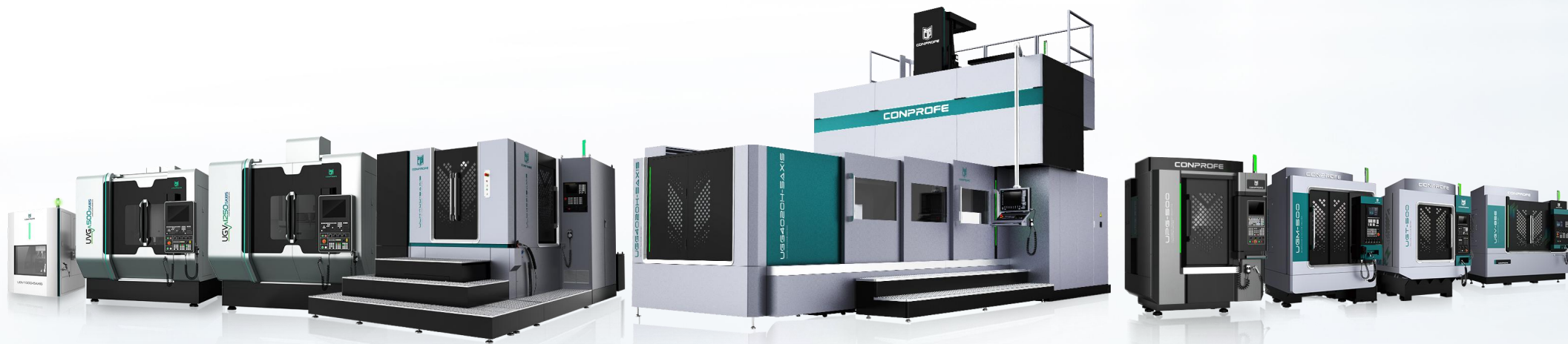
- **UCS communication system** highly compatible with various CNC controllers (FANUC, SIEMENS, Brother, Mitsubishi, etc.)
- Quick, precise and stable workpiece loading/unloading through German **zero-point positioning** technologies
- Easy setup and operation
- Highly stable
- Spacious workpiece storage
- Highly cost-effective





3.3 PART 3.3
Machines

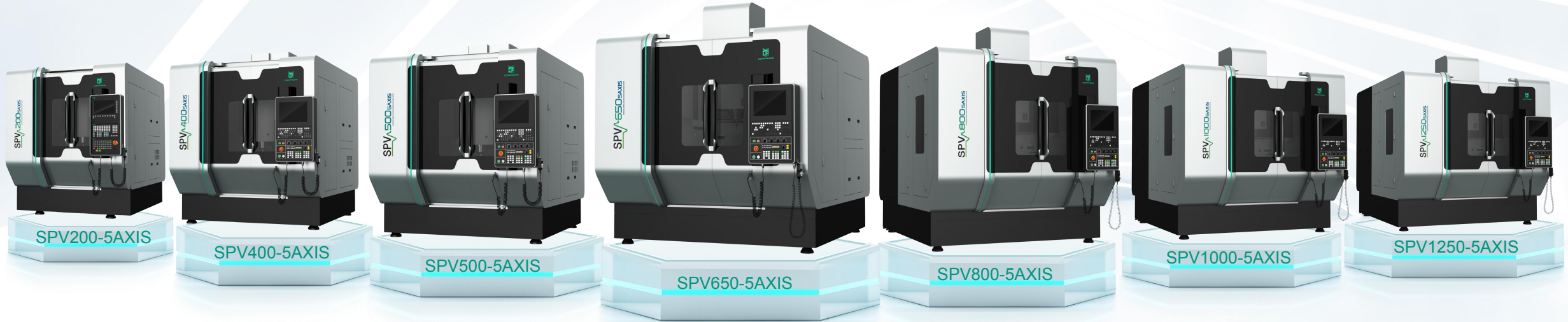
Conprofe Ultrasonic-Green Machine Tools



10 Models 32 Series 188 Specifications

Machines | Ultrasonic-Green Vertical 5-Axis Machining Centers

4 Series: 28 Specifications



► Features

- **Ultrasonic spindle independently developed** by Conprofe to reduce cutting force for efficient machining of difficult-to-cut materials
- **Supercritical CO₂ Cryogenic Cooling System** and **MQL Cooling System** available for clean machining
- Fully closed loop control with linear encoders
- **4μm** of linear-axis repeatability and **5 arc seconds** of rotation-axis repeatability
- Standard Siemens 840D sl CNC system with **5-axis simultaneous machining** and **RTCP functions**
- Latest SINUMERIK ONE control system available

► Case Sharing



Ceramic Impeller Machining

Machining effect: Longer tool life and higher contour accuracy; Reduced SSD and chippings



Superalloy Bearing Thread Hole Machining

Machining effect: Thread size inspected by go-no-go gauge in line with GJB requirements



Machines | Ultrasonic Gantry Machining Centers

2 Series: 4 Specifications



► Features

- Available for **ultrasonic machining system** and **minimum quantity lubrication (MQL) system**, no need for traditional cutting fluid, green and eco-friendly
- Made of **premium gray cast iron** for good rigidity, shock resistance and machining accuracy
- Standard 24T disc-type tool magazine
- Standard BT mechanical spindle
- **Fully closed loop control** with linear encoders
- Optional **fully enclosed protection**
- Optional devices against fire and explosion

► Applications

- Machining parts and components in the fields of new energy, automobiles, aerospace, ships, molds, metallurgy, petrochemicals, mining machinery, electric energy, plastic machinery, engineering machinery, etc.



Machines | Ultrasonic-Green Gantry Machining Centers

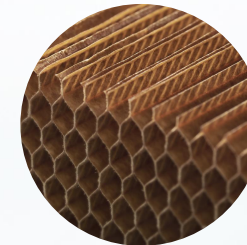
2 Series: 4 Specifications



► Features

- A/C swivel heads with high-speed and high-torque electric spindle for a Max. speed of 24,000rpm
- **Supercritical CO₂ Cryogenic Cooling System** and **MQL Cooling System** available for clean machining
- Made of **premium gray cast iron** for good rigidity, shock resistance and machining accuracy
- **A high-rigidity ram and a four-linear rail** for Z-axis to achieve high-rigidity machining and precision stability. Motor direct-drive screws and high-rigidity roller linear guides for three-axes to acquire high-speed dynamic response
- **Fully closed loop control** with linear encoders
- **Optional fully enclosed protective cover**

► Case Sharing



Ultrasonic machining of Nomex Honeycomb Material

Machining effect: No visible burrs; Less force on the surface, no collapse



CFRP Aircraft Wing Plate Machining

Machining effect: Machining efficiency up by 50% and burrs reduced by 40%

Machines | Ultrasonic-Green 5-Axis Simultaneous Horizontal Machining Centers

2 Series: 12 Specifications



► Features

- **Ultrasonic spindle independently developed** by Conprofe to reduce cutting force for efficient machining of difficult-to-cut materials
- **Supercritical CO₂ Cryogenic Cooling System** and **MQL Cooling System** available for clean machining
- Y-axis equipped with a hydraulic balance system to reduce the precision displacement of the Y-axis caused by the unbalanced movement
- Optional coolant-through or non-coolant-through electric spindle
- Optional dimensions of **Φ500mm/Φ630mm/Φ800mm** for A/C-axis worktable
- Standard **40T** chain-type tool magazine and optional 60T/100T/120T with **4.5s** of tool changing

► Case Sharing

Aircraft engine core components



Machines | Ultrasonic-Green Engraving and Milling Centers

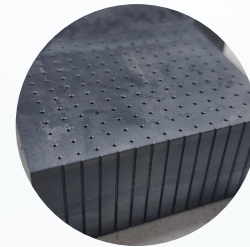
6 Series: 82 Specifications



► Features

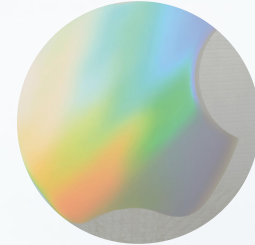
- Intelligent **Ultrasonic machining system** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- **Supercritical CO₂ Cryogenic Cooling System** and **MQL Cooling System** available for clean machining
- Single tool magazine / extended tool magazine / 40T chain-type tool magazine available
- Fully closed loop control with high-precision linear encoders, positioning accuracy of **3μm**, repeatability of **2μm**
- **High Precision Probe** for On-machine measurement function
- With centrifugal filtration, bag and other multi-stage filtration systems and filtration accuracy **less than 0.005mm**
- Large-size machine tools with auger chip conveyor for smooth and thorough chip removal

► Case Sharing



Single Crystal Silicon Showerhead Drilling (Depth-to-Diameter **55.5:1**)

Machining effect: Depth-to-Diameter 55.5:1; Hole wall Ra 0.088μm; Hole roundness 0.003mm



Aluminum Alloy Colorful Pattern Machining

Machining effect: No tool marks and surface roughness as low as 0.1μm



Machines | Ultrasonic Graphite Machining Centers

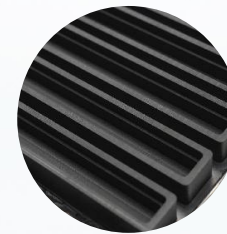
3 Series: 15 Specifications



► Features

- Intelligent **Ultrasonic machining system** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- **Multi-layered protection** with labyrinth design, positive pressure sealing and special dust collector design
- Superior performance in vibration damping, accuracy retention, dynamic characteristics and thermal stability due to its high-rigidity bed casting and symmetrical gantry structure
- **Fully closed loop control** with high-precision linear encoders
- Optional handheld vacuum cleaner with mobile operation for more thorough vacuuming

► Case Sharing



Graphite Crucible Milling

Machining effect: C/T shortened by 0.5 hours in ultrasonic machining, down by 12.5%

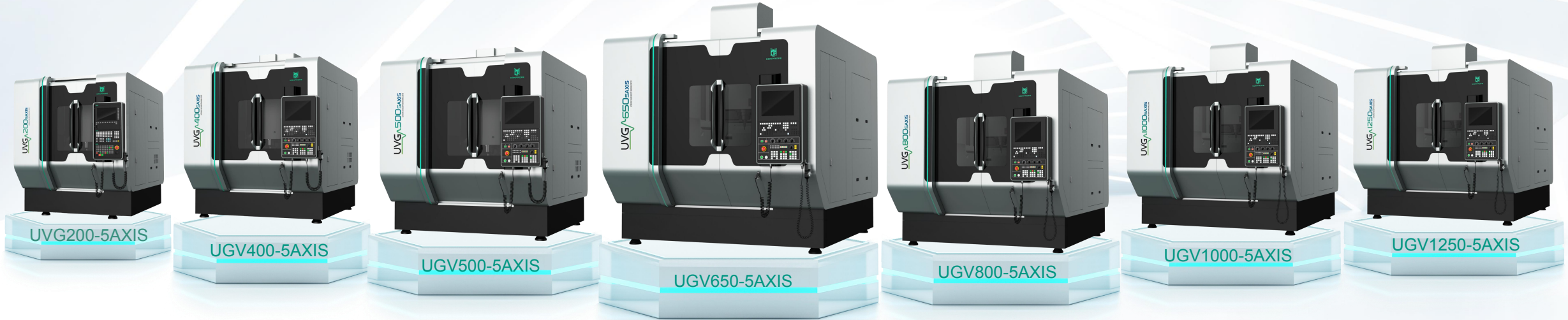


Greenware Ceramics Milling

Machining effect: tool adhesion mitigated; even surface texture without chipping and longer tool life, ensuring stable mass production and a 22.6% surge of yield

Machines | Ultrasonic Vertical 5-Axis Simultaneous Graphite Machining Centers

2 Series: 14 Specifications



► Features

- Three-axis screws and guide rails with **three-layer protective cover** for high protection level
- **Special dust-proof design** for tool magazine, electric cabinet and protective door
- **Ultra-powerful** dust collection and dust removal system
- Standard Siemens 5-axis simultaneous CNC system
- Ultrasonic spindle **developed independently** by Conprofe to reduce cutting force and tackle the challenges in machining hard-to-cut materials
- Various chain-type tool magazine options: 24~120T
- **Fully closed loop control** with high-precision linear encoders

► Applications

- Applicable to the machining of graphite, ceramic embryo and other materials in the aerospace industry; the machining of graphite electrode materials in the mold industry; and the dry cutting of materials in other industries.



Machines | Ultrasonic-Green Drilling and Tapping Centers

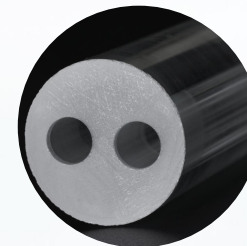
4 Series: 10 Specification



►► Features

- Intelligent **Ultrasonic machining system** developed by Conprofe to tackle the challenges in machining hard-to-cut materials
- Available for **ultrasonic machining system** and **minimum quantity lubrication (MQL) system**, no need for traditional cutting fluid, green and eco-friendly
- BBT-30 Coolant-Through Ultrasonic Electric Spindle with Max. speed of **30,000rpm** available
- Various tool magazine capacity options: 21T/26T/30T/36T/30T+14T
- Positioning accuracy of **5μm**, repeatability of **3μm**
- Optional Fanuc, Mitsubishi, Siemens and other system configurations

►► Case Sharing



Quartz Glass Optical Fibers Deep Hole Drilling

Machined Features: D7.8x250mm (Depth-to-Diameter 32:1)
 Machining effect: Hole wall Sa 0.122-0.232μm;
 Parallelism between two holes <0.0385mm



Titanium Alloy TC4 Cervical Spine Plate Machining

Machining effect: Combination of ultrasonic technology and MQL cooling technology improves tool life by 50% and shortens C/T by 30%



Machines | Ultrasonic-Green Vertical Machining Centers

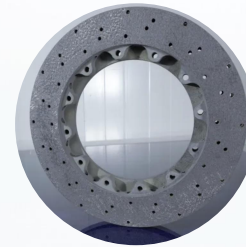
4 Series: 16 Specifications



►► Features

- With machining methods of **milling, drilling, boring, expanding, reaming, countersinking, tapping, etc**
- Optional high-torque and high-power ultrasonic spindle to meet **large cutting volume** machining requirements
- Available for **minimum quantity lubrication (MQL) system** to ensure clean cutting, lower cost and higher efficiency
- High-rigidity tool structure and high dynamic response to enable high-speed cutting
- **Fully closed loop control** with high-precision linear encoders
- Standard Mitsubishi M80 system and optional Siemens, Fanuc and HNC control systems

►► Case Sharing



Carbon-Ceramic Composite New Energy Brake Disc Machining

Machining effect: C/T shortened by 47% from 120 min to 64 min in ultrasonic machining



Titanium Alloy Special Vehicle Steering Shock Absorber Bracket Machining

Machining effect: Tool life up by 66.7% and C/T down by 50%

Units | Ultrasonic-Green Lightweight Vertical 5-Axis Machining Centers

3 Series: 3 Specifications



► Features

- **Ultrasonic spindle** developed by Conprofe to reduce cutting force and tackle the challenges in machining dental materials
- **Minimum Quantity Lubrication (MQL) System** available for clean machining
- Premium gray cast iron bed with excellent rigidity and anti-vibration properties, ensuring high-precision machining
- Positioning accuracy of 5 μ m, repeatability of 3 μ m
- **High-precision A/B Axis**, hollow stainless steel body to reduce cable entanglement, with repeatability of 8 arc seconds
- Built-in workpiece storage system for automated cyclic production on a single machine

► Case Sharing



Titanium Alloy Abutment

Machining effect: Subgingival surface roughness of Sa 0.08 μ m, no need for polishing, reducing costs and improving efficiency



Ceramic Crown

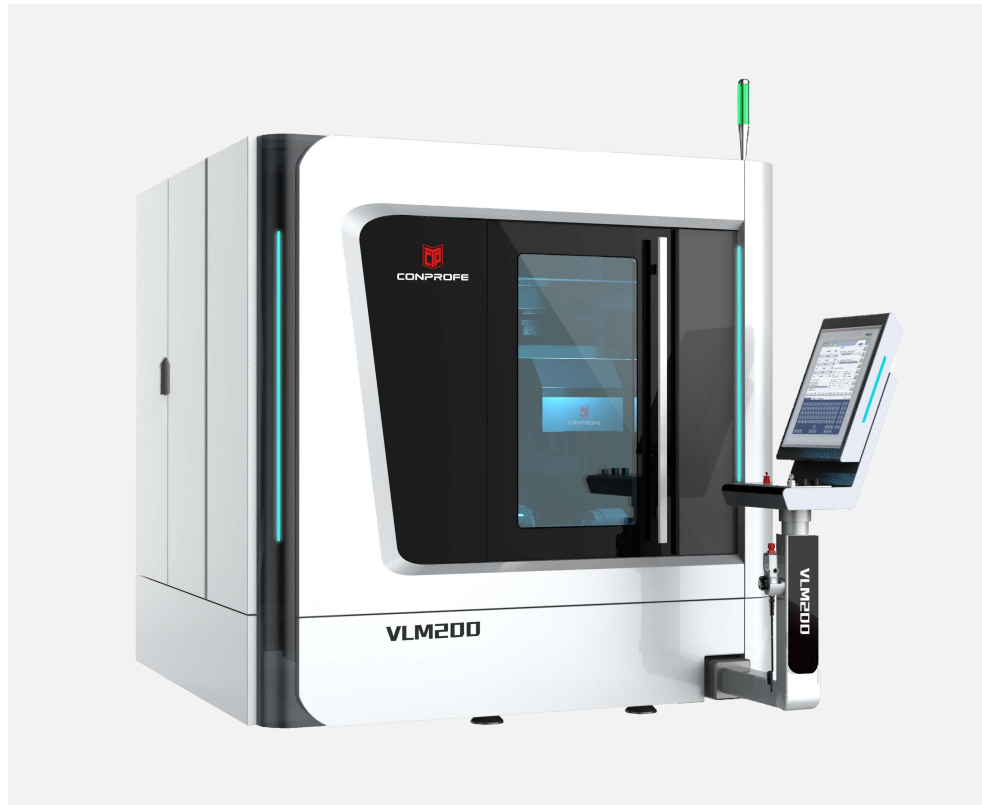
Machining effect: Reducing sub-surface micro-cracking and improving back-end sintering yields



04 PART FOUR
**Production & Inspection
Equipment**



CONPROFE | CONPROFE Laser Machine Tool



STUDER | 5-Axis Universal Precision Grinding Machine



☰ Major Equipment (2/15)

DMG | 5-Axis Laser Machining Center



DMG | 5-Axis Turning and Milling Center



☰ Major Equipment (3/15)

VOLLMER | CNC Electrolytic Grinding Machine



VOLLMER | Wire EDM Machine



COBORN | CNC Ultra-Precision Grinding Machine



COBORN | CNC Ultra-Precision Grinding Machine



☰ Major Equipment (5/15)

SMS | 7-Axis CNC Grinding Machine



ROLLOMATIC | 6-Axis CNC Grinding Machine



MAKINO | Horizontal 5-Axis Machining Center



MAZAK | Horizontal Machining Center



CEMECON | Coating System



CEMECON | Coating System



ZEISS | Coordinate Measuring Machine



Measurement of length, width, diameter, position accuracy, profile, etc. of the machined workpiece

HEXAGON | Coordinate Measuring Machine



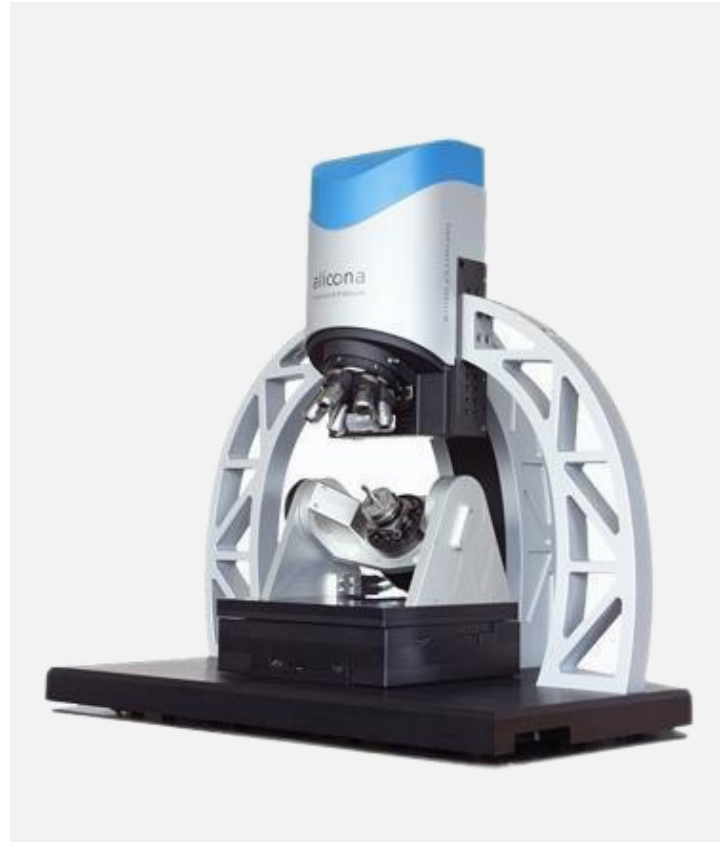
Measurement of length, width, diameter, position accuracy, profile, etc. of the machined workpiece

ZOLLER | Universal Measuring Machine



Measurement of tool profile, runout, diameter, etc.

ALICONA | 3D Surface Profiler



Measurement of three-dimensional structural parameters of tools, surface roughness, etc.

HAIMER | Tool Dynamic Balancing Machine



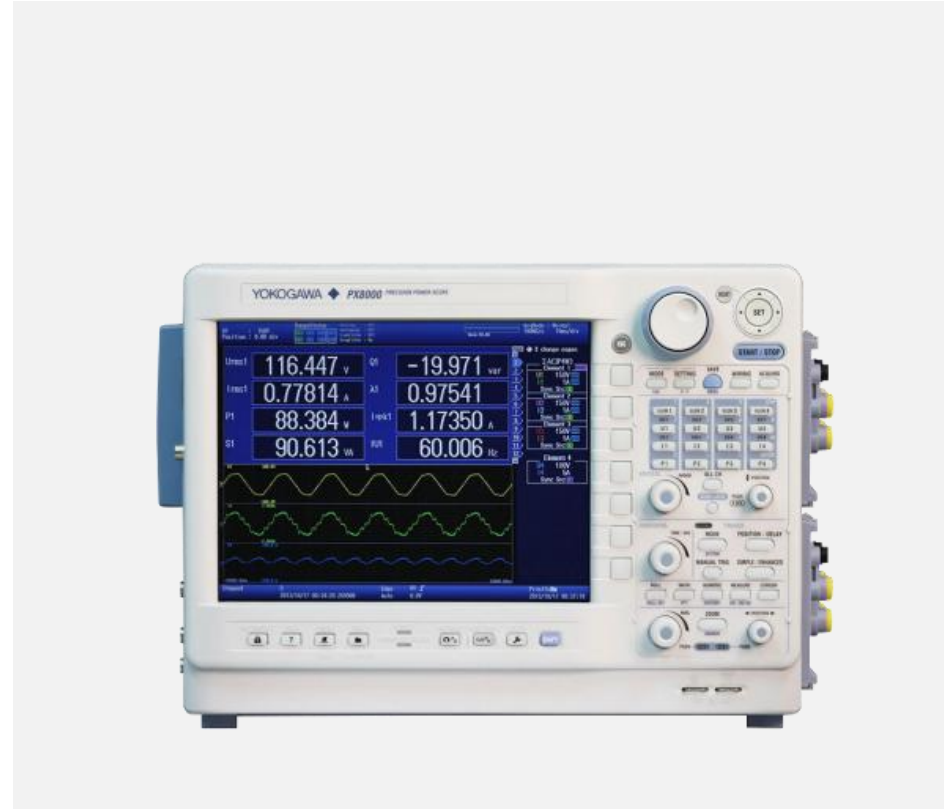
Correction of single-plane and double-plane dynamic balancing of the tool holder

POLYTEC | Scanning Vibrometer



Detection of ultrasonic vibration modal, amplitude, frequency, etc.

YOKOGAWA | Precision Power Scope



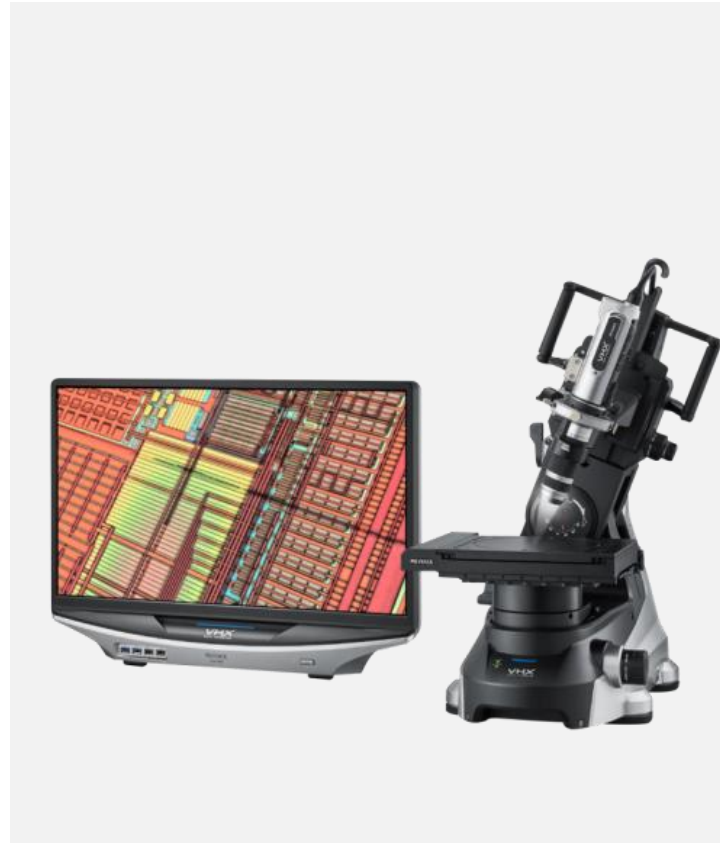
Measurement and analysis of ultrasonic power parameters

HITACHI | Scanning Electron Microscope



Observation of the microscopic morphology of the workpiece and detection of the element content (Max. magnification 100,000 times)

KEYENCE | Digital Microscope



Observation and measurement of the workpiece dimensions and surface quality

ZYGO | 3D Optical Profiler



Detection of workpiece roughness, sub-surface damage, etc.

SIEMENS | LMS Vibration & Noise Tester



For tests on vibration frequency, inherent frequency and structural part dynamic rigidity, etc.

RENISHAW | XM-60 Multi Axis Calibrator



For accuracy calibration with the ability of delivering 6 DOF error tests in any direction at once

Silent Laboratory

G-TECH | Horizontal Dynamic Balancing Instrument

SUST | Universal Testing Machine



For tests on spindle noise, spectrum, etc.



For dynamic balancing testing of the spindle core



For tests on various forces of the spindle

NAC ACS-3 M16 | High-Speed Camera



Record of the cutting process

FLIR A655SC | Thermal Infrared Imager



Measurement of the real-time temperature changes on the machining area during operation

KISTLER | Dynamometers



Measurement of real-time changes in cutting forces during machining online

ANTON PAAR | Nanoindentation Tester



Tests on mechanical properties of surface and subsurface layers of samples

INSTRON | Tensile Testing System



Tests of macroscopic mechanical properties of materials (tensile, compressive, bending, etc.)

SHIMADZU | Micro Vickers Hardness Tester



Tests of sample Vickers hardness (< 5000HV)



05 PART FIVE
CSR

➤ Over **15 MRMB** donation to support COVID-19 fight, education development, etc.



CONPROFE

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