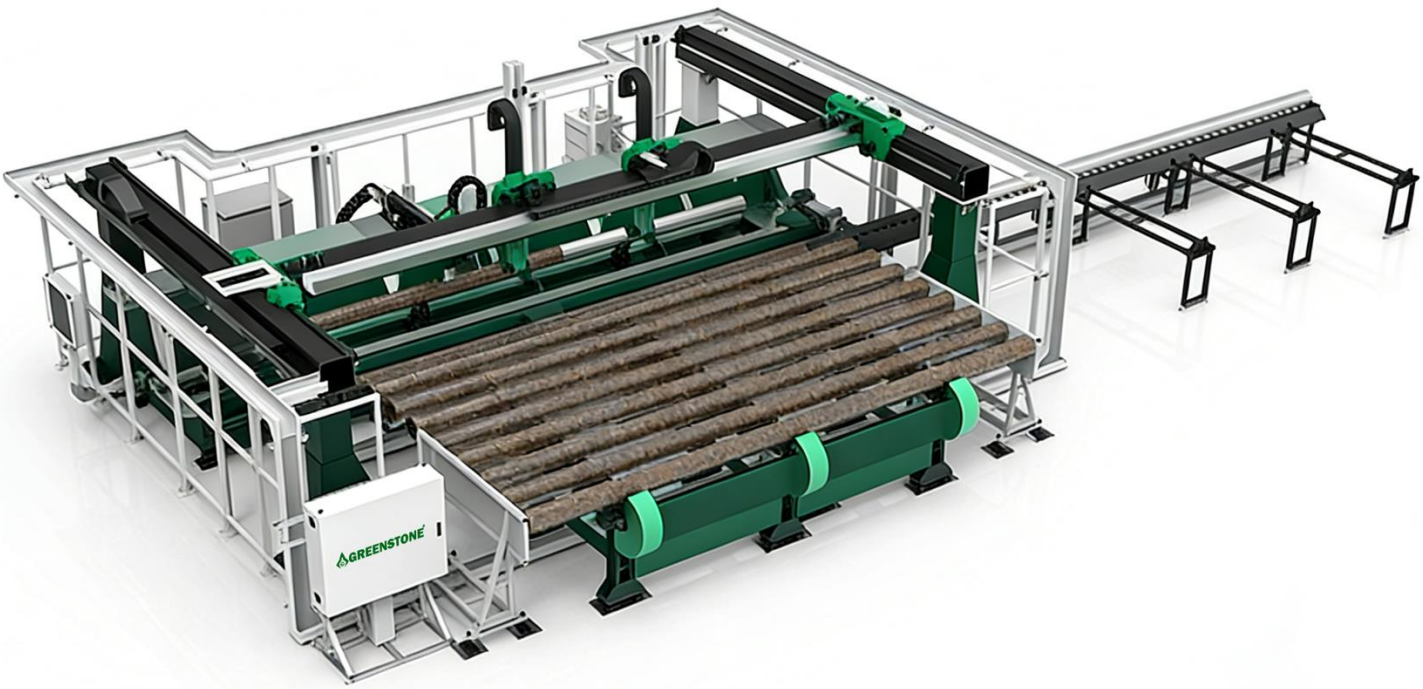
GREENSTONE®

Greenstone - Advanced Metal Surface Solutions Manufacturer and Supplier

GST Series Laser Cleaning, Welding & Integrated Laser Processing Equipment Brochure



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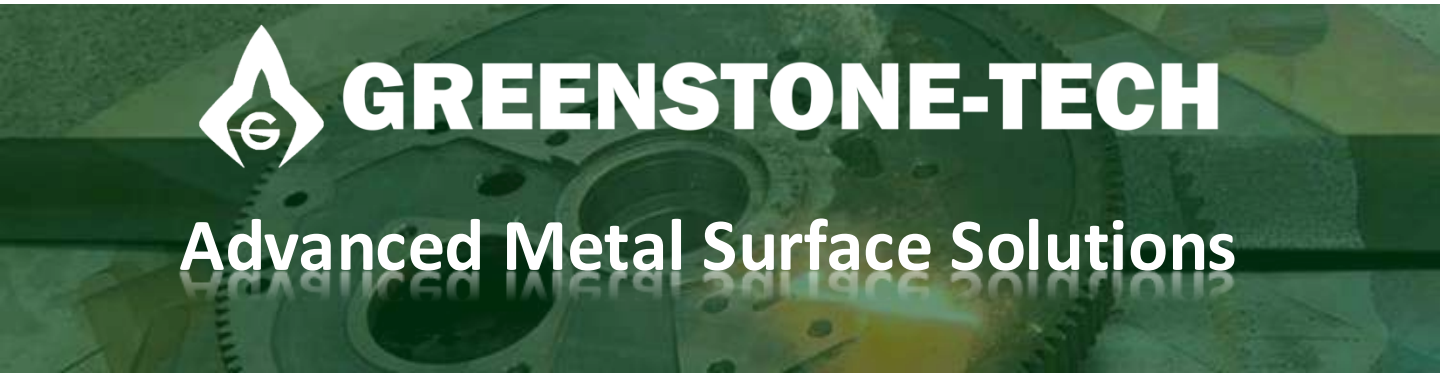
About Greenstone-Tech

Established in 2024, GREENSTONE is a global technology brand specializing in laser cladding, Directed Energy Deposition (DED) metal additive manufacturing, surface engineering, and industrial remanufacturing solutions. Built on the expertise of a core engineering team with laser industry experience since 1999, we provide high-performance equipment, proprietary laser technologies, intelligent manufacturing systems, and integrated engineering solutions for customers worldwide.

Our core technologies include laser cladding, DED metal additive manufacturing, laser hardening, and hybrid laser-arc welding. Through strategic collaboration with specialized engineering teams, we also provide advanced surface engineering, additive manufacturing, and industrial processing solutions for industries including aerospace, energy, oil & gas, mining, railway transportation, marine engineering, and heavy industry.

Driven by continuous innovation, engineering excellence, and long-term customer value, GREENSTONE is committed to advancing advanced manufacturing technologies and delivering one-stop engineering solutions that help manufacturers worldwide improve performance, extend equipment life, and increase production efficiency.



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- Off-Line Intelligent Tire Mold Laser Cleaning Equipment
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- Fully Automatic Laser Cleaning Production Line for Locomotive Brake Discs
- GST-U-Rib Laser Cleaning Automation Line (GST-CBR3000C) for Bridge Deck Welding Preparation
- High-Power Fully Automatic Tube & Pipe Laser Cleaning Production Line
- Picosecond Laser PVD & Ink Removal Equipment
- GST Mini LED Solder Mask Ink Laser Removal Equipment (355 nm UV, 30W, ±20 μm)
- 3-Axis Micro Waterjet-Guided Laser Machining System (532 nm Green Laser)
- 5-Axis Micro Waterjet-Guided Laser Cutting System (RTCP, 532 nm Green Laser)
- Laser Cleaning Robot for Complex Pipe Inner Wall (Blind-Spot-Free Internal Surface Cleaning)
- Handheld Laser Welding Machine (1500W / 2000W / 3000W)

GST-HP 50W/100W/200W Handheld Portable Laser Cleaning Machine

The 50W/100W/200W handheld laser cleaning machine is a compact, portable laser cleaner designed for flexible on-site surface cleaning. It can be used handheld, shoulder/backpack carried, or mounted at a workstation, making it ideal for jobs where mobility and space-saving design matter. To maximize convenience, the unit integrates the safety indicator light with the carry handle, delivering strong safety protection while keeping operation simple. It also supports connection to an external lithium battery, allowing use in locations without fixed power supply—such as outdoor maintenance, elevated work areas, and precision workshops where wiring is inconvenient.

Size & Weight

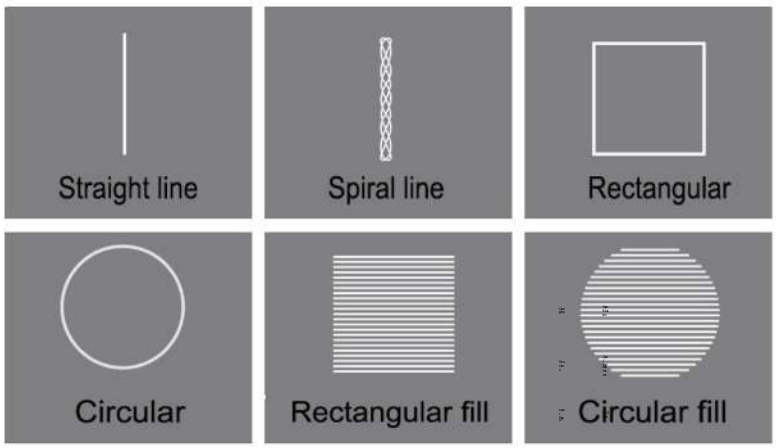
- **50W: 280 × 220 × 122 mm (approx. A4 size), 8 kg**
- **100W: 280 × 380 × 150 mm (slightly larger than A4), 10 kg**
- **200W: 339 × 450 × 163 mm (approx. A3 size), 15.5 kg**

Typical Applications

- **Urban graffiti removal / coating cleaning**
- **Weld seam (weld bead) cleaning**
- **High-altitude / outdoor work**
- **Worksites without direct power access**

Performance Features

Built for efficient mobile cleaning, this handheld laser cleaner combines an A4-class compact body (for 50W) with the option to connect an external lithium battery for true on-site operation. A mini laser head (about 700 g) reduces fatigue during extended use while improving handling in tight spaces. With excellent operating data and high cleaning efficiency, the system remains stable and easy to control, and it's designed for long-term value with a service life up to 50,000 hours, making it an economical, high-performance solution for professional surface preparation and maintenance.



Technical Specifications

Category	Specification
Laser Type	Nanosecond Pulsed Fiber Laser
Max. Output Power (W)	50 / 100 / 200
Central Wavelength (nm)	1064 ± 5
Beam Quality (M^2)	≤ 1.6
Power Adjustment Range (%)	10–100
Output Power Stability (%)	≥ 95
Pulse Repetition Frequency (kHz)	50W: 45–170 / 100W: 20–200 / 200W: 20–200
Pulse Width (ns)	100 / 170
Max. Single Pulse Energy (mJ)	1.1 / 1.6
Delivery Fiber Length (m)	3 / 5 / 10
Laser Safety Class	Class 4
Cooling Method	Air Cooling
Overall Dimensions (mm)	50W: 280×220×122 / 100W: 280×380×150 / 200W: 339×450×163
Total Weight (kg)	50W: 8 / 100W: 10 / 200W: 15.5
Note: Final technical parameters are subject to the manufacturer's official technical proposal.	

100W/200W/300W Backpack Laser Cleaning Machine

The 100W/200W/300W Backpack Laser Cleaning Machine is a lightweight, wearable laser cleaner engineered for mobile, on-site surface cleaning. With an ultra-compact body size of 150 × 400 × 275 mm and up to 300W power output in an A3-paper footprint, it's a benchmark solution for miniaturized, portable laser cleaning. Built with proven industry experience, the system features EU-style tri-color safety warning lights and a safety lock for clear operational protection. A detachable external power battery design helps reduce potential safety risks and improves jobsite safety management. For easier field operation, the compact smart touch panel is integrated near the laser head, enabling faster control while wearing the unit. An ergonomic flexible backpack harness improves comfort during long shifts, while the modular industrial-grade fiber optical path structure supports stable performance for extended working hours—making it an ideal choice for mobile cleaning, high-altitude tasks, and confined-space operations.

Performance Features

Designed for speed and mobility, this backpack laser cleaner delivers high efficiency in a compact A3-size form factor, with optional external lithium battery connection for flexible work where fixed power is inconvenient. The mini cleaning head (about 700 g) supports comfortable long-duration use and better maneuverability in tight areas. With strong cleaning performance data, high cleaning efficiency, and a stable, easy-to-control system, it is built for reliability and long-term value—offering a service life up to 50,000 hours for economical, professional-grade surface preparation and maintenance.

Technical Specifications

Category	Specification		
Standard Power Supply	AC 220V ±10%, 50/60Hz power adapter (DC 48V output)	AC 220V ±10%, 50/60Hz power adapter (DC 48V output)	AC 220V ±10%, 50/60Hz power adapter (DC 48V output)
Optional Battery (Continuous Working Time)	Yes (optional), 80–90 min	Yes (optional), 60–80 min	Yes (optional), 60–80 min
Laser Average Power	100W	200W	300W
Laser Type	Fiber Laser	Fiber Laser	Fiber Laser
Max. Single Pulse Energy	1.5 mJ	2 mJ	2 mJ
Frequency Adjustment Range	20–200 kHz (stepless adjustable)	1–3000 kHz (stepless adjustable)	1–3000 kHz (stepless adjustable)
Fiber Length	1.5 m	1.5 m	1.5 m
Cooling Method	Air Cooling	Air Cooling	Air Cooling
Scan Width	10–100 mm adjustable; dual-axis, 9 scan modes	10–140 mm adjustable; dual-axis, 9 scan modes	10–140 mm adjustable; dual-axis, 9 scan modes
Scan Speed	12,000 mm/s	30,000 mm/s	30,000 mm/s
Dimensions (mm, without battery)	213 × 123 × 339	268 × 135 × 445	268 × 135 × 445
Dimensions (mm, with battery)	213 × 168 × 339	268 × 191.5 × 445	268 × 191.5 × 445
Weight (kg, without battery)	8.5 kg	12.5 kg	13.5 kg
Weight (kg, with battery)	12 kg	17 kg	18 kg
Cleaning Head Weight	0.75 kg	0.75 kg	0.75 kg
Operation Mode	Handheld	Handheld	Handheld
Note: Final technical parameters are subject to the manufacturer’s official technical proposal.			

100–300W Trolley Case Air-Cooled Laser Cleaning Machine

The 100–300W trolley case air-cooled laser cleaning machine is a handheld nanosecond pulsed fiber laser cleaner built in a flight-case trolley design that balances portability and protection for on-site work. The unit can be easily loaded into a car trunk, taken in a passenger elevator, and carried by one person, making it ideal for frequent jobsite moves.

Designed for tough conditions, the protective case structure improves resistance to harsh environments such as high temperature, humidity, and dust, supporting reliable cleaning in challenging industrial scenarios. The system can also be adapted for automation integration, enabling linkage with equipment such as robotic arms to meet workshop or fixed-station cleaning needs. Typical applications include red rust removal, oil/grease cleaning, and derusting of small parts or low-carbon steel.

Performance Features

This trolley case laser cleaner combines a rugged flight-case mobility design with a stable, easy-to-operate air-cooled nanosecond pulsed fiber system, delivering efficient cleaning without consumables and helping control long-term operating costs. Its high-precision, finely controllable cleaning supports effective rust and contaminant removal while reducing risk to the substrate, and the triple safety protection architecture provides comprehensive operator protection for demanding industrial environments.

- **Trolley Flight-Case Design: The case moves with the operator for flexible, mobile deployment.**
- **Stable System, Easy Control: Reliable operation with user-friendly handling; designed for long service life (50,000–80,000 hours).**
- **Plug-and-Play, No Consumables: Ready to use once powered on; no consumable materials required, helping reduce ongoing operating costs.**
- **High Precision Cleaning: Fine, controllable cleaning accuracy with minimal impact on the base material.**
- **Triple Safety Protection: Three-layer safety safeguards aligned with international standards to enhance operator safety.**

Technical Specifications

Category	Specification
Laser Type	Nanosecond Pulsed Fiber Laser
Max. Output Power (W)	200
Central Wavelength (nm)	1064 ± 5
Beam Quality (M^2)	≤ 1.8
Power Adjustment Range (%)	10–100
Output Power Stability (%)	≥ 95
Pulse Repetition Frequency (kHz)	1–4000
Pulse Width (ns)	10–350
Max. Single Pulse Energy (mJ)	1.5
Delivery Fiber Length (m)	3 / 5
Laser Safety Class	Class 4
Cooling Method	Air Cooling
Overall Dimensions (mm)	430 × 530 × 780
Total Weight (kg)	67
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.	

200–300W Mini & Standard Cabinet-Type Water-Cooled Laser Cleaning Machine

The GST Series 200–300W water-cooled laser cleaning machine combines Mini (portable) and Standard cabinet-type configurations to cover both mobile jobsites and workshop production needs. Built around an integrated water-cooling system, nanosecond fiber laser source, control software, safety system, and laser output module, it delivers high-efficiency, precision cleaning for demanding industrial applications.

The GST-MINI300 features a compact, portable design with a machine size of 720 × 420 × 540 mm and a total weight of 45 kg—less than one-third the volume of traditional water-cooled laser cleaning units. It can be easily placed in a car trunk for convenient transport and is ideal for mold cleaning, cultural relic restoration cleaning, and removal of residual adhesive and paint/coating layers, while maintaining strong laser performance despite the smaller footprint.

For workshop and automation-oriented scenarios, GST-CAB200 / GST-CAB300 adopts a cabinet-type integrated design and can be equipped with PLC control to support digital integrated operation and centralized control. With water-cooling support, it provides higher laser beam quality and improved cleaning efficiency, meeting the cleaning needs of most small parts in production environments—such as mold cleaning, rust/paint removal on structural components, and oxide layer removal on aluminum alloys. Cleaning results can reach Sa 2.5–3.0, effectively removing residual glue, oil contamination, plating/coating layers, and paint/rust, with substrate impact controlled to < 0.0003 mm and without changing the base material's physical or chemical properties.

Performance Features

Engineered for high-performance cleaning, the GST Series delivers powerful water-cooled output in both mini and cabinet formats, offering stable operation, easy control, and a long service life of 50,000–80,000 hours for cost-effective use. The system is plug-and-play and requires no consumables, while maintaining high-precision, nano-level controllable cleaning that helps protect the substrate. For production lines, the cabinet models support automation integration (robotic arm mounting) and can be configured with dust extraction / air-knife assistance, and both configurations incorporate triple-layer safety protection aligned with international safety practices for comprehensive operator protection.

Technical Specifications

Category	Mini Water-Cooled (300W)	Standard Cabinet-Type Water-Cooled (200/300W)
Laser Type	Nanosecond Pulsed Fiber Laser	Nanosecond Pulsed Fiber Laser
Max. Output Power (W)	300	200 / 300
Central Wavelength (nm)	1064 ± 5	1064 ± 5
Beam Quality (M^2)	≤ 15	—
Power Adjustment Range (%)	10–100	10–100
Output Power Stability (%)	≥ 95	≥ 95
Pulse Repetition Frequency (kHz)	1–4000	10–50 / 20–50
Pulse Width (ns)	10–100	130–140
Max. Single Pulse Energy (mJ)	15	10 / 12.5 / 15
Delivery Fiber Length (m)	10	5 / 10
Laser Safety Class	Class 4	Class 4
Cooling Method	Water Cooling	Water Cooling
Overall Dimensions (mm)	785.5 × 420 × 650	640 × 1050 × 1080
Total Weight (kg)	45	169 / 45
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.		

500–1000W Standalone High-Power Laser Cleaning Machine

The 500–1000W standalone high-power laser cleaning machine is an integrated, industrial-grade system designed for continuous production-line surface cleaning. Featuring a standalone cabinet structure, it integrates the water-cooling system, nanosecond pulsed fiber laser source, control software, safety system, and laser output system into one unit. With optional PLC control, it sup ports digital integration and unattended/automated operation for higher throughput and stable processing.

Built for heavy-duty applications, the high-power laser delivers strong cleaning capability and can remove thick contamination layers (approx. 1000–1500 μm), making it suitable for long-duration factory environments. Typical industries include shipbuilding and marine engineering, rail transit, and automotive manufacturing, as well as cleaning tasks on aluminum alloys, titanium alloys, and high-speed rail components. The system can be used for paint removal, rust removal, and oxide layer cleaning, achieving surface cleanliness up to Sa 3.0 while helping preserve substrate integrity, with minimal base material impact (reported substrate lo ss < 0.0005 mm) and no change to the material’ s physical or chemical properties.

Performance Features

Engineered for demanding industrial duty cycles, this high-power nanosecond pulsed laser cleaner delivers strong, stable cleaning performance with automatic cleaning capability, full-process visual monitoring, and nano-level precision control for consistent results. A triple-layer safety protection design improves operator safety across diverse production tasks, while the system’ s robust architecture supports long service life (up to 100,000 hours) and easy operation. Optional dust extraction / air -knife assistance enables cleaner processing without consumables, reducing waste and supporting economical, environmentally friendly industrial cleaning.

Technical Specifications

Category	Specification
Laser Type	Nanosecond Pulsed Fiber Laser
Max. Output Power (W)	500/1000
Central Wavelength (nm)	1064 ± 5
Power Adjustment Range (%)	10%–100%
Output Power Stability (%)	≥ 95
Pulse Repetition Frequency (kHz)	20–50
Pulse Width (ns)	120–160
Max. Single Pulse Energy (mJ)	25
Delivery Fiber Length (m)	10
Laser Safety Class	Class 4
Cooling Method	Water Cooling
Overall Dimensions (mm)	1450 × 1270 × 550
Total Weight (kg)	410
Note: Final technical parameters are subject to the manufacturer’s official technical proposal.	

800W/1200W Handheld Ultra-Wide Continuous Laser Cleaning Machine

The 800W/1200W Handheld Ultra-Wide Continuous Laser Cleaning Machine is a compact, industrial-grade solution designed for high-efficiency, large-area surface cleaning with exceptional portability. With a cabinet size of 495 × 178 × 395 mm and a total machine weight of 30 kg, it stands out among sub-30 kg portable laser cleaners by delivering up to 800 mm ultra-wide laser output width (coverage adjustable to 600–800 mm for broad-area processing). This combination of high power + ultra-wide coverage + lightweight design makes it ideal for fast cleaning on large workpieces where productivity and mobility are critical.

The ultra-wide cleaning head is engineered to European safety standards and incorporates triple-layer safety protection. Despite its wide coverage capability, the head weighs only about 900 g, reducing operator fatigue during extended use. The system supports two selectable operating modes—continuous and modulated pulse—allowing users to optimize cleaning performance while minimizing the heat-affected zone (HAZ) for better surface protection. Built with a modular all-fiber architecture, key optoelectronic components are fully enclosed in a rugged industrial housing, improving reliability under harsh conditions. The machine is designed to operate stably in demanding environments, supporting a working temperature range of -10 to 50°C and ambient humidity of 10–90%.

Performance Features

This ultra-wide handheld laser cleaner combines high-power 800W/1200W output with 600–800 mm wide-area coverage, enabling rapid cleaning over large surfaces while maintaining stable system performance. A high-performance imported processor supports responsive control, and users can customize 2D cleaning patterns with support for 14 languages for global usability. With continuous and modulated pulse modes, the machine delivers flexible processing while helping reduce thermal impact on substrates, and the lightweight ~900 g cleaning head improves ergonomics for long-duration operation. Designed to European safety standards with triple safety protection and equipped with rich laser-cleaning process data packages, it provides reliable, efficient, and production-ready cleaning even in tough industrial environments.

Technical Specifications

Category	Specification
Laser Type	Modulated Pulsed Fiber Laser
Max. Output Power (W)	800/1200
Laser Output Wavelength (nm)	1080 ± 5
Working Mode	Continuous / Modulated
Output Power Stability (%)	≥ 95
Modulation Frequency (Hz)	20–50k
Power Adjustment Range (%)	10–100
Output Power Instability (%)	≤ 3
Delivery Fiber Length (m)	15
Laser Safety Class	Class 4
Minimum Fiber Bend Radius (mm)	≥ 300 / 400
Operating Temperature (°C)	+10 to +40
Storage Temperature (°C)	-10 to +60
Relative Humidity (%)	≤ 70
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.	

1200W/1500W/2000W Portable Ultra-Wide Laser Cleaning Machine

The 1200W/1500W/2000W Portable Ultra-Wide Laser Cleaning Machine is a high-efficiency continuous-wave laser cleaner engineered for fast, large-area rust and oxide removal. It features an 800 mm ultra-wide cleaning head and a dedicated compact machine design that can reduce overall footprint by up to 80% compared with conventional floor-standing units of similar power. Lightweight and easy to transport, the system is optimized for high-mobility jobsite cleaning where speed and coverage matter.

Compared with pulsed laser cleaning, the continuous laser source delivers stronger thermal cleaning capability, making it esp ecially effective for metal derusting and heavy-duty surface treatment where ultra-fine precision is not required. With flexible operation and wide-area coverage, it significantly expands cleaning range and improves throughput for industrial maintenance and fabrication environments. Typical applications include steel structure derusting, pipeline cleaning, carbon steel rust/oxide layer removal, and large-surface cleaning on ship decks and hulls, as well as jobsite tasks in ports and power plants.

Performance Features

Built for productivity, this portable ultra-wide laser cleaner supports handheld robotic-arm-style operation for derusting, delivering surface cleanliness of Sa 3 or above for demanding industrial standards. It is plug-and-play with a one-time equipment investment, requires no consumables, and offers a strong cost-to-performance advantage for high-volume cleaning. The ultra-wide cleaning width is typically 2–3× that of common market alternatives, enabling rapid processing of large work areas. Designed for stable operation and green, chemical-free cleaning, it is widely used across steel structures, shipbuilding, pipelines, ports, and power generation for fast, efficient surface preparation.

Technical Specifications

Category	Specification
Laser Type	Modulated Pulsed Fiber Laser
Max. Output Power (W)	1200 / 1500 / 2000
Central Wavelength (nm)	1080 ± 5
Power Adjustment Range (%)	10–100
Output Power Stability (%)	≥ 97
Modulation Frequency (kHz)	1–20000 / 1–5000
Delivery Fiber Length (m)	3 / 5
Laser Safety Class	Class 4
Cooling Method	Water Cooling
Overall Dimensions (mm)	830 × 420 × 600
Total Weight (kg)	45
Note: Final technical parameters are subject to the manufacturer's official technical proposal.	

1000–6000W Continuous Laser Cleaning Machine

The 1000–6000W Continuous Laser Cleaning Machine series is engineered for high-speed industrial surface preparation and large-area derusting. The lineup includes handheld continuous laser cleaning models (1000W / 1500W / 2000W) and automated continuous laser cleaning systems (3000W / 4000W / 6000W) to support both flexible field work and high-throughput factory operations.

This series delivers higher thermal output than pulsed laser cleaning, enabling faster removal of rust, oxides, and heavy contamination—especially on large metal surfaces. The 1000–2000W handheld units offer lightweight, portable operation for on-site maintenance, while the 3000–6000W automated units are designed for continuous production use where maximum efficiency is required. It is widely applied in industries such as gold/metal surface derusting, steel structure pipeline cleaning, and large-surface cleaning on ship hulls and ship decks, particularly in tasks that prioritize speed and coverage over ultra-fine precision.

Performance Features

Designed for productivity and ease of use, the system supports portable handheld operation with a simple learning curve, while delivering strong continuous-laser cleaning performance for efficient rust removal—especially on carbon steel and other structural metals. The equipment is plug-and-play, requires no consumables, and offers a cost-effective solution for high-volume cleaning. A triple-layer safety protection design aligned with international practices improves operator safety, and the process supports waste residue recovery for cleaner operation and improved environmental friendliness.

Technical Specifications

Category	Specification
Laser Type	Modulated Pulsed Fiber Laser
Max. Output Power (W)	1000 / 1500 / 2000 / 3000/ 6000
Central Wavelength (nm)	1080 ± 5
Power Adjustment Range (%)	10–100
Output Power Stability (%)	≥ 97
Modulation Frequency (kHz)	1–20000 / 1–5000
Delivery Fiber Length (m)	10 / 20
Laser Safety Class	Class 4
Cooling Method	Water Cooling
Overall Dimensions (mm)	1230 × 1200 × 630
Total Weight (kg)	200
Note: Final technical parameters are subject to the manufacturer's official technical proposal.	

Hybrid Laser Cleaning Machine

The Hybrid Laser Cleaning Machine combines continuous-wave laser heating with high-energy pulsed laser impact to deliver fast, industrial-grade surface cleaning with improved substrate protection. In hybrid mode, the continuous laser provides thermal energy that helps contaminants rapidly oxidize and detach (often forming a removable "plasma cloud"), while the pulsed laser generates a high peak-power shock effect that breaks adhesion and lifts stubborn residues from the base material. By leveraging both mechanisms, the system reduces the typical heat-affected zone of purely thermal cleaning and improves removal efficiency on heavy deposits.

This hybrid solution is especially effective for cleaning thick coatings and heavy oxide layers while minimizing damage to the underlying material, making it a strong choice for demanding industrial applications. It has been applied in scenarios such as wheelset axle cleaning in rail transit, aerospace "junction box" cleaning, and high-value alloy and composite surface preparation, where cleaning performance, stability, and material protection are all critical.

Performance Features

Designed for high productivity, the hybrid laser cleaner enables efficient removal of thick contamination layers without damaging the substrate, and its cleaning efficiency can reach 4–5× that of conventional pulsed laser cleaning systems in comparable applications. It supports automatic cleaning with full-process visual monitoring, delivering a stable system capable of long-duration, non-stop operation. Built to international safety practices with triple-layer safety protection, it improves operator safety on industrial sites. With optional dust extraction / air-knife assistance, the system operates with no consumables, helps reduce secondary pollution, and is engineered for long service life up to 80,000 hours for economical, green industrial cleaning.

Technical Specifications

Category	Specification
Laser Type	Nanosecond Pulsed Laser + Modulated Pulsed Laser
Max. Average Power (W)	500 + 4000
Power Adjustment Range (%)	10–100
Laser Central Wavelength (nm)	1064 + 1080
Pulse Repetition Frequency (kHz)	20–50 / 0
Power Stability (%)	≤ 5 / ≤ 3
Modulation Frequency (Hz)	0 / 1–5000
Delivery Fiber Length (m)	15 / 20
Cooling Method	Water Cooling
Minimum Bend Radius (cm)	30
Overall Dimensions (mm)	1270 × 830 × 1520
Total Weight (kg)	650
Note: Final technical parameters are subject to the manufacturer’s official technical proposal.	

Rubber Flat Mold Laser Cleaning Equipment

The Rubber Flat Mold Laser Cleaning Equipment is a purpose-built industrial system for high-precision, high-efficiency cleaning of rubber flat molds without chemicals or abrasive media. Using laser cleaning technology, it removes rubber residue and contaminants while helping maintain mold surface quality and extending mold service life. The process is green and non-polluting, requiring no chemical cleaning agents (acid/alkali-free) and producing no wastewater discharge, effectively avoiding secondary contamination and reducing total operating cost.

Designed for production environments, the equipment supports both in-line (no disassembly required) and off-line flexible cleaning, eliminating the traditional "cool down → disassemble → clean → reinstall" workflow. A clear, user-friendly interface enables fast onboarding with one-click cleaning and four-point positioning cleaning, making it suitable for both experienced operators and new users. This system is widely applicable in rubber manufacturing lines where consistent mold cleanliness, productivity, and surface integrity are critical.

Performance Features

This mold laser cleaning system delivers strong productivity gains with single-mold cleaning time ≤ 1.5 hours, typically 3–5× faster than manual methods and supporting 30%+ capacity improvement. Cleaning quality is high, achieving ≥ 99% contaminant removal (e.g., rubber residue) with surface roughness maintained at Ra ≥ 4.5 μm, and no obvious color difference or cleaning marks. Substrate impact is minimized with base material loss ≤ 50 nm per cycle, helping avoid issues such as burrs or scrap often caused by sandblasting or dry-ice cleaning. For intelligent safety and automation, it supports vision recognition (camera resolution > 3000 × 3000), automatic path generation (single-image planning < 2 s), and collision detection with 360° dynamic anti-collision simulation. A fully enclosed laser chamber with dust extraction and fire-safety provisions, plus interlocked safety doors (open = stop), protective laser glass, and abnormal alarm systems ensures safe, reliable operation.

Technical Specifications

Category	Specification
Model	GST-FLC200LG
Core Technology	High-Precision Laser Ablation + Intelligent Motion Control
Manual disassembly is time-consuming	Online cleaning: no mold disassembly required; 30%+ productivity improvement
Chemical pollution & high consumable cost	Zero consumables: no chemical solvents; eco-friendly with no secondary pollution
Risk of mold damage	Minimal substrate impact: 1064 nm laser precisely removes contaminants
Uneven cleaning / color difference	Uniform & mark-free: 80 mm wide spot + intelligent path coverage
Safety risks	Fully automated operation: human–machine separation + triple safety protection
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.	

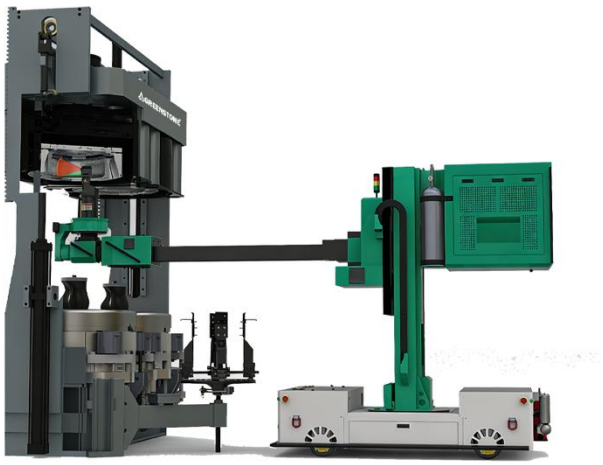
Tire Inner Liner Laser Cleaning System

The Tire Inner Liner Laser Cleaning System is designed for semi-steel low-noise tire and self-sealing tire production processes. The system can automatically recognize tire barcodes and connect directly with factory MES systems for streamlined digital manufacturing. Equipped with a self-developed dedicated laser cleaning head for the tire inner liner (airtight layer), it supports pitch-angle (up/down) oscillation, enabling effective cleaning of hard-to-reach inner corners and dead angles inside the tire—improving consistency and reducing manual intervention in high-throughput tire manufacturing lines.

Performance Features

This system is engineered to enhance inner liner surface performance by increasing the friction coefficient and raising surface tension to ≥ 40 mN/m (≥ 38 dyne/cm), helping improve downstream process stability and production consistency. With a fast cleaning cycle time of CT ≤ 60 seconds for 21-inch tires, it significantly boosts line efficiency and supports scalable, automated production. (Note: the above data is based on internal process testing; actual results are subject to customer on-site trials and sample validation.)

Automated In-Line & Off-Line Laser Cleaning Equipment for the Rubber Tire Industry



This in-line & off-line integrated automated laser cleaning system is engineered for the rubber tire industry to enable efficient, standardized cleaning of tire molds and related tooling with minimal manual intervention. It supports online (in-line) cleaning for both PCR and TBR vulcanizing presses, including hydraulic curing presses and mobile/transfer-type curing machines, helping manufacturers reduce downtime and improve process stability.

To fit different press openings and mold positions, the system uses a multi-joint telescopic robotic arm with adjustable lift travel and a dedicated cleaning head with retractable capability, improving access inside complex mold structures. The platform is designed for clean, safe production environments and can be used for one-button automated operation in either line-integrated or standalone (off-line) cleaning setups, making it suitable for a wide range of tire sizes, patterns, and mold designs.

Performance Features

Built for flexibility and productivity, the system supports in-line cleaning for PCR/TBR curing equipment, and its multi-axis telescopic arm adapts to different machine openings for reliable coverage. The special retractable cleaning head and adjustable scan width of 50–500 mm enable efficient cleaning across various mold geometries and surface areas. An integrated air-blowing system provides blow-off and fire-extinguishing functions, enhancing operational safety, while the built-in dust extraction helps prevent secondary contamination and keeps the workspace cleaner. Designed for simple operation, it offers one-click fully automatic cleaning, improving usability and helping increase overall production efficiency for semi-steel and all-steel tire mold maintenance.

Fully Automatic Online Tire Mold Laser Cleaning Station

The Fully Automatic Online Tire Mold Laser Cleaning Station is a mobile, electric-transfer laser cleaning platform engineered for tire manufacturing plants that need fast, standardized mold cleaning with minimal manual labor. The station integrates a laser cle aning unit onto a movable trolley base, allowing it to circulate among multiple curing/vulcanizing presses to reduce equipment inve stment and operating cost.

Designed for in-line (online) cleaning during the production process, the system enables mold cleaning without mold removal or disassembly. It can automatically recognize tire mold parameters, compare them with a process/recipe database, and then gener ate the optimal cleaning path automatically, improving repeatability and significantly boosting overall production efficiency—ideal for high-throughput tire plants seeking reduced downtime and consistent mold surface condition.

Performance Features

This online laser cleaning station delivers faster turnaround and safer mold maintenance compared with traditional methods: downtime & mold unloading can be reduced to ~25 minutes (online laser cleaning) versus ~220 minutes with sandblasting, while maintaining a consistent ~25-minute cleaning cycle. The laser process can also reduce or eliminate preheating requirements, saving up to ~195 minutes in typical workflows, and provides effective cleaning with no mold damage. The platform supports both onli ne and offline operation modes, offers strong process consistency through automatic mold parameter recognition + database matchi ng + auto path planning, and helps plants increase productivity while lowering labor dependency. (Data based on internal process testing; actual results depend on customer samples and on-site trials.)

Dual-Station Off-Line Fully Automatic Tire Mold Laser Cleaning Station

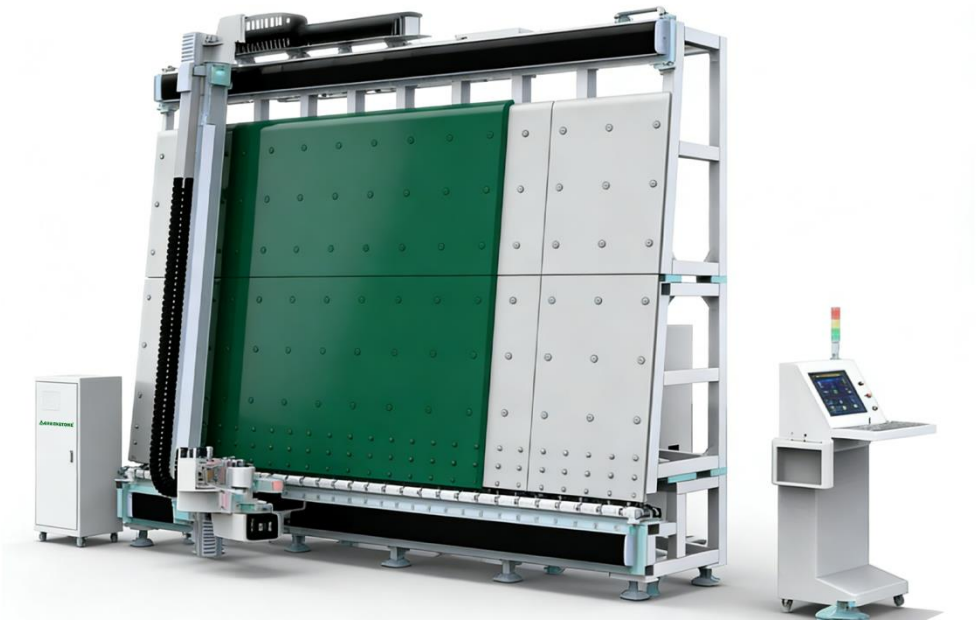
The Dual-Station Off-Line Fully Automatic Tire Mold Laser Cleaning Station is purpose-built for tire mold cleaning and maintenance with a high level of automation and throughput. Featuring a dual-station in/out (loading & unloading) workflow, it enables continuous operation and helps avoid production delays caused by waiting for molds to be cleaned. By separating cleaning from the curing press area, it also reduces the need to occupy valuable production space and shortens total turnaround time for mold servicing.

Equipped with a laser cleaning head and an integrated vision camera system, the station can automatically recognize tire mold parameters, compare them with a process database, and generate the cleaning path automatically, ensuring stable, repeatable cleaning quality across different mold patterns and sizes. The system is designed for efficient off-line operation and supports green manufacturing goals with a laser process that eliminates chemical solvents and reduces waste.

Performance Features

Designed for speed and consistency, the dual-station configuration supports simultaneous material flow (one station loading/unloading while the other cleans) to maximize utilization and minimize idle time. With vision-based mold parameter recognition + database matching + automatic path planning, the station adapts quickly to multiple tire mold specifications and delivers effective cleaning typically within 30–45 minutes, improving maintenance efficiency and supporting higher plant productivity. The laser process is consumable-free and environmentally friendly, helping reduce operating cost while maintaining reliable, automated, factory-ready performance.

Large-Format Glass Laser Film Removal Machine



The Large-Format Glass Laser Film Removal Machine is designed for fast, non-contact removal of surface films on LOW-E glass, including silver layers and cover/protective films. Using a high-energy, high-peak-power laser, the system precisely acts on the target coating/film so the laser energy is absorbed and converted into heat, causing rapid micro-fracture and separation of the film layer. This process minimizes impact on the glass substrate, helping maintain glass quality after stripping while delivering stable, repeatable results.

The equipment integrates the laser emission unit, optical system, control system, and an automatic working platform into one production-ready solution, ensuring stripping accuracy and high efficiency for large-area processing. It is well-suited for manufacturing environments that require consistent, high-throughput film removal on architectural or industrial glass.

Performance Features

Built for industrial productivity, the system uses an XY rack-and-pinion drive module for accurate positioning, supports a film-removal speed of 8 m/min (based on 30 mm width), and processes large panels up to 2500 × 3000 mm while maintaining high optical quality with 91% transmittance. The platform includes a high negative-pressure dust extraction system to capture debris and keep the workspace clean, and employs water cooling for stable long-duration operation. With required 0.5–0.8 MPa air supply and a 3-phase 380V / 15 kW power configuration, the machine is engineered for continuous factory use, offering precise, efficient, and environmentally friendly laser stripping without chemical solvents.

- **Drive: XY rack-and-pinion module (high positioning accuracy)**
- **Film removal speed: 8 m/min (30 mm width)**
- **Max. processing area: 2500 × 3000 mm**
- **Transmittance: 91%**
- **Air supply: 0.5–0.8 MPa**
- **Machine size: 4500 × 3800 × 3800 mm**
- **Weight: ~3500 kg**
- **Dust removal: high negative-pressure extraction system**
- **Cooling: water cooling**
- **Power: 3-phase 380V, 15 kW**

High-Speed Rail Transmission Gearbox Laser Cleaning System

The High-Speed Rail Transmission Gearbox Laser Cleaning System is a high-performance industrial solution developed for deep, efficient cleaning of high-speed rail gearbox assemblies and complex transmission structures. Positioned as an advanced composite high-power laser cleaning platform, it integrates a higher-level safety architecture with an imported UR collaborative robot to improve protection and process consistency in automated operations.

To meet the challenges of gearbox geometries, the system features a custom high-power composite laser cleaning head optimized for intricate surfaces and hard-to-reach areas. A dedicated fume extraction and filtration system is engineered to capture the smoke and particulates generated during laser ablation, helping maintain a cleaner working environment and more stable processing. For operator safety and equipment protection, the system adopts a triple interlock safety design: when personnel enter the enclosure, the laser source and motion/drive components automatically cut power to prevent unintended operation.

Performance Features

Built for productivity on heavy-duty maintenance tasks, the system can remove coating layers up to 600 μm, and a complete cleaning cycle for a single gearbox housing can be finished in approximately 75 minutes. The combination of robot-assisted automation, a complex-structure optimized composite laser head, and high-efficiency smoke/dust filtration delivers stable, repeatable cleaning while supporting safer industrial workflows. The three-level interlock safety mechanism further enhances operational security by automatically disabling laser and motion power during access events, making it well-suited for high-speed rail depots and professional transmission component overhaul lines.

High-Speed Rail Wheelset Hybrid Laser Cleaning System

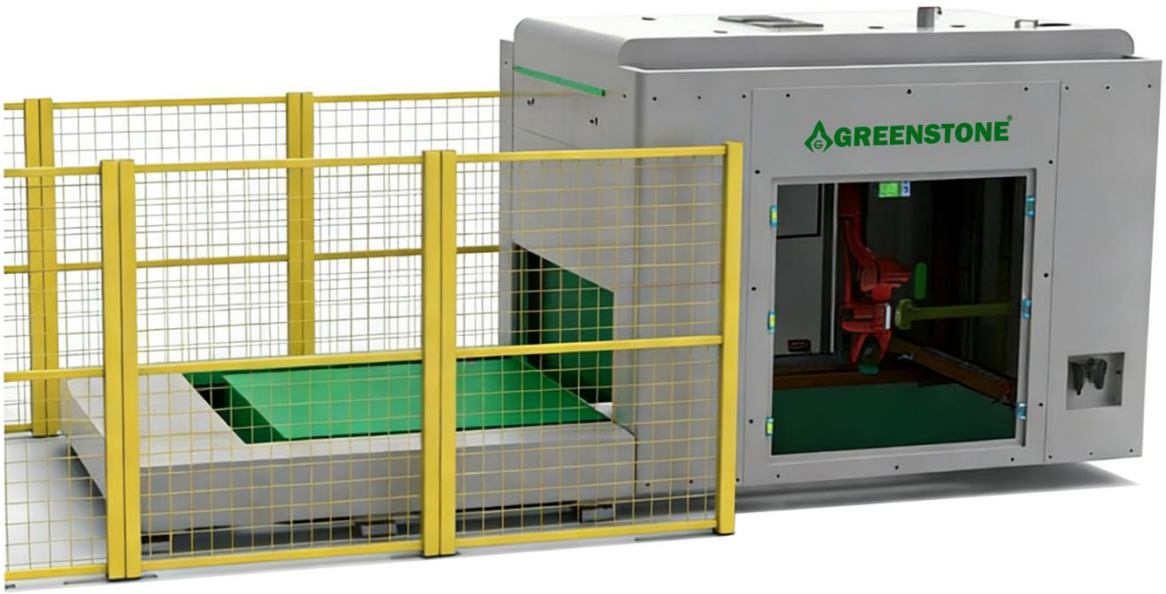
The High-Speed Rail Wheelset Hybrid Laser Cleaning System is an industrial-grade solution for fast, large-area cleaning of high-speed rail wheelsets, using a hybrid process that combines 6 kW continuous laser with 1 kW pulsed laser. This “water-droplet hybrid” laser cleaning approach is optimized to overcome power limitations of conventional single-mode systems, delivering significantly higher throughput for rail maintenance and overhaul operations.

Designed for automated, heavy-duty depots and production environments, the system targets common wheelset contaminants such as oil/grease, dirt, oxide scale, rust, paint/coating residues, and carbon deposits, restoring metal surfaces to a clean, uniform finish. Compared with traditional cleaning methods that suffer from low efficiency, harsh jobsite conditions, high pollution, and heavy labor requirements, this hybrid laser system provides a cleaner, safer, and more economical alternative—well-suited for modern rail transit maintenance lines.

Performance Features

By combining 6 kW continuous output + 1 kW pulse impact, the system achieves extremely high cleaning productivity—reported at ~500% of a conventional 1 kW single-pulse laser cleaner under comparable conditions. It can deliver cleaning results up to Sa 3, leaving surfaces free of visible grease, contaminants, oxide skin, rust, coating residue, and carbon buildup, with a consistent metallic appearance. For wheelset maintenance efficiency, a typical comparison shows traditional cleaning ~50 minutes per wheelset, while the hybrid laser process can complete the same task in ~8 minutes, dramatically improving throughput while reducing environmental pollution and labor intensity.

Automatic Mold Laser Cleaning Machine



The Automatic Mold Laser Cleaning Machine is a production-ready system designed for efficient, automated mold cleaning with stable quality and low environmental impact. During cleaning, dust and debris can be automatically collected, helping keep th e workspace clean and reducing secondary pollution. With automated operation, the system can clean complex structural areas tha t are difficult for conventional methods to reach, while keeping mold surfaces clean and consistent.

Engineered for industrial reliability, the machine supports high cleaning efficiency without damaging the mold substrate and can be used across a wide range of mold types and industries. Although the initial investment may be higher than traditional cleanin g, it is designed for long-term, high-frequency use, offering a service life of 10+ years with low operating cost. By improving cleaning speed, reducing labor, and lowering consumable use, it helps manufacturers recover investment faster and achieve a lower total cost of ownership over time.

Typical Applications

- Tire molds
- Glass-edge molds
- Seal/airtight layer molds
- Composite material molds
- Food molds
- Injection molds (removing carbon deposits and release agent residues)

Performance Features

This automated laser system delivers fast, stable, and repeatable cleaning with automatic dust collection to reduce environme ntal contamination and improve shop-floor conditions. It believes in-place, non-contact cleaning that helps protect mold surfaces while effectively removing carbon buildup, release agent residues, and surface deposits, including in complex geometry zones. Desig ned for continuous factory use, it provides high speed and high efficiency while reducing labor dependence and consumables—supporting a long service life (10+ years) and a cost structure that can be more economical than traditional methods over extended operati on.

Aircraft Turbine Blade Laser Cleaning System

The Aircraft Turbine Blade Laser Cleaning System is an advanced automation solution developed for high-precision laser cleaning of aero-engine turbine blades. Designed as an industry-oriented intelligent manufacturing platform, the system integrates next-generation digital technologies—including self-developed smart “hybrid suite” material handling technology, high-accuracy recognition and positioning, and a digital twin framework—to enable standardized, data-driven blade cleaning processes.

Engineered for aerospace production and MRO environments, the system supports automated cleaning of multiple turbine blade types and models, helping ensure consistent quality while reducing manual workload. The production line can be configured with multiple functional modules such as blade cleaning flow, product inspection flow, NG (non-conforming) product rework flow, and rack/fixture loading & unloading channels. Key system components typically include digital twin integration, laser cleaning, laser positioning, laser/visual inspection, vision-based localization, and MES connectivity, forming a complete intelligent cleaning and traceability solution.

Performance Features

Built for precision and repeatability, this turbine blade laser cleaning system combines high-accuracy recognition + positioning with laser process control to deliver stable cleaning results across different blade geometries. The modular line design supports end-to-end automation, including inspection and rework routing, while digital twin monitoring improves process transparency and optimization. With integrated vision localization, laser positioning, and MES connection, the system enables consistent production-level cleaning, better traceability, and scalable deployment—supporting aerospace-grade quality requirements with reduced manual intervention.

Aircraft Turbine Blade Laser Cleaning System

The EMC High-Efficiency Large-Roll Cleaning Equipment is an intelligent production system developed specifically for lithium battery electrode (electrode sheet/foil) cleaning. It integrates automatic loading & unloading, high-precision laser cleaning, and in-line inspection into one platform, enabling stable, repeatable cleaning for high-speed electrode manufacturing lines while reducing manual labor and operating cost.

Designed for roll-based electrode production, the system supports wide process flexibility and fast changeover. It combines multiple key processes in one machine—including web guiding (alignment correction), inspection, laser cleaning, and marking—to improve overall line efficiency and support consistent product quality. The equipment is optimized for both productivity and precision, helping manufacturers enhance yield and reduce downtime in continuous operation environments.

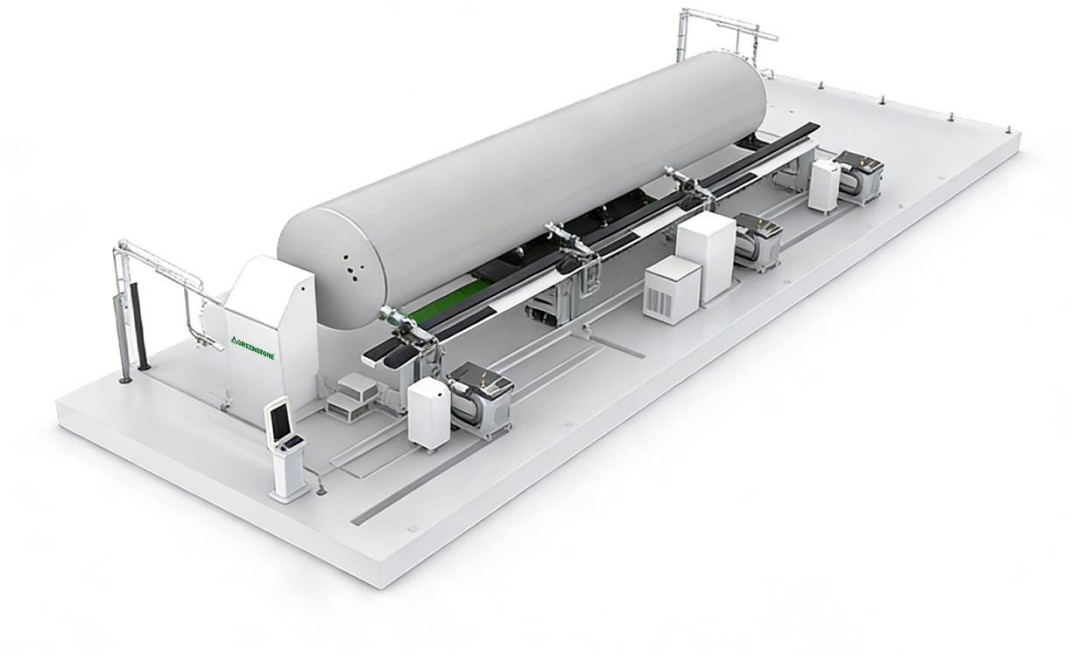
Performance Features

This system is built to match high-speed production with fast cleaning (as low as 4 seconds per piece for single-side cathode/aluminum-foil cleaning at 20 × 10 mm) and high positional accuracy (±0.5 mm) for precise target-area processing. A single galvanometer can clean two zones for higher throughput, and the platform supports double-sided cleaning for efficient processing. With proven manufacturing targets of yield ≥ 99.5% and failure rate ≤ 2%, plus fast model changeover and broad width compatibility, the EMC system helps improve electrode consistency and safety from the source and supports reliable, cost-effective 24/7 production.

Technical Specifications

Item	Category	Specification
Material & Roll / Electrode Specs	Typical Aluminum Foil Thickness	9–10 μm
	Max. Roll Outer Diameter (OD)	650 mm
	Roll Inner Diameter (Core ID)	76.2 mm
	Electrode Sheet Width	200–550 mm
	Electrode Sheet Length	300–2000 mm
Process Requirements	Cleaning Side	Double-sided cleaning
	Cleaning Area Size	Length: 10–35 mm; Width: 5–25 mm
	Cleaning Area Accuracy	±0.5 mm
	Misalignment Accuracy	±1 mm
	Residual Limit	≤ 0.3 mm
	Pinholes	Diameter < 0.25 mm; Quantity per slot < 5
	Positioning Accuracy	±1 mm
Operating Environment & Utilities	Ambient Humidity	60% ± 10%
	Ambient Temperature	10–50°C
	Cleanliness Requirement	≥ Class 100,000
	Floor Load Requirement	1.0 t/m²
	Overall Machine Size (Excluding dust collector & water chiller)	L × W × H = 11.5 m × 3.1 m × 3.0 m
	Power Supply	3-phase 380V ±10%, 50Hz ±1Hz
	Compressed Air Pressure	0.5–0.7 MPa
	Operating Noise	≤ 75 dB (measured at 1 m distance, 1 m height)
	Duty Cycle	Suitable for 7×24 continuous operation
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.		

GST-CTC500P Intelligent Laser Cleaning System for Pressure Vessels (LNG Tank Outer Surface)



The GST-CTC500P Pressure Vessel Intelligent Laser Cleaning Equipment is purpose-built for high-efficiency laser cleaning of LNG pressure vessel outer surfaces, covering the entire exterior—including the cylindrical body section and both end heads (end caps). Developed for industrial production and refurbishment lines, the system focuses on high automation, strong compatibility with different vessel structures, and simple operation, enabling standardized surface preparation with reduced labor intensity and improved process consistency.

Compared with conventional abrasive or chemical methods, the GST-CTC500P supports a cleaner, more controllable process for large-area pressure vessel treatment, helping improve site cleanliness and operational efficiency. It is well-suited for applications where stable cleaning quality, safe operation, and substrate protection are critical in LNG equipment manufacturing and maintenance.

Performance Features

Designed for industrial reliability, the GST-CTC500P delivers efficient, stable cleaning performance while helping avoid issues associated with excessive heat buildup during operation. Its laser process is precisely controllable, enabling effective cont aminant removal while supporting no damage to the base material for pressure vessel surface preparation. With user-friendly operation, green and environmentally friendly processing, and strong adaptability for cleaning both straight vessel sections and end hea ds, the system supports safer workflows and consistent results in LNG tank exterior cleaning tasks.

IGBT/MCU Copper Busbar Laser Cleaning Equipment (200–500W MOPA Pulsed Fiber Laser, Dual-Station & In-Line)

The GST-IGBT/MCU Copper Busbar Laser Cleaning Equipment is engineered for removing oxide layers, stains, and micro-impurities from copper busbar surfaces used in IGBT/MCU power electronics manufacturing—helping improve downstream process yield and consistency. The system integrates a complete intelligent cleaning line, typically consisting of a fiber laser cleaning module, main control cabinet, dual-station work platform (two stations), in-line conveyor platform, electric drive module, galvanometer scanning optics, vision positioning/inspection, fume purification, and integrated air-blow & suction dust collection.
Designed for production environments, it focuses on high automation, stable operation, and simple use, delivering repeatable surface preparation without chemical solvents and with reduced labor demand.

Performance Features

This system is designed to achieve cleaning grade 0 for copper oxide removal with precise laser control, supported by vision-based positioning and height measurement/compensation for stable results across varying part conditions. It delivers high cleanliness after cleaning (Ra < 3, Rz < 15), and high throughput—typically ~1–1.3 s per 15 × 15 mm cleaning area—making it well-suited for high-speed production lines. With dual-station workflow and integrated smoke/dust purification, it supports efficient, cleaner, and more consistent copper busbar surface preparation for IGBT/MCU applications.

Technical Specifications

Category	Parameter	Specification
Laser System	Laser Source	MOPA Laser
	Laser Power	200–500 W
	Laser Type	MOPA Pulsed Fiber Laser
	Scan Range	110–200 mm
Equipment Performance	Cleaning Area	15 mm × 20 mm
	Cleaning Time	≤ 1.5 s
	Cleaning Speed	10–30 mm/s
Operating Environment	Power Supply	220 V / 50 Hz
	Ambient Requirement	Temperature: 10–30°C; Humidity: < 50%
	Platform Size	1500 mm (L) × 1400 mm (W) × 1800 mm (H)
	Equipment Weight	600 kg + 60 kg
Note: Final technical parameters are subject to the manufacturer's official technical proposal.		

Off-Line Intelligent Tire Mold Laser Cleaning Equipment

The Off-Line Intelligent Tire Mold Laser Cleaning Equipment is designed for automated, high-coverage cleaning of tire molds using an independent cleaning workstation concept. It adopts a dual-station mobile transfer platform, enabling molds to be moved between dedicated work areas while keeping molds fully assembled (no disassembly required). This design supports full-surface cleaning of both internal cavities and external mold surfaces, improving consistency while reducing manual labor and downtime.

The system integrates 2D/3D machine vision to automatically identify mold types, and a five-axis motion cleaning mechanism that can automatically locate the mold center and execute multi-direction, corner-free cleaning for complex mold geometries. Built for industrial production environments, it emphasizes production safety, smoke/dust handling, and real-time monitoring, making it suitable for modern tire plants seeking standardized off-line mold maintenance with improved environmental control.

Performance Features

This equipment supports full-process real-time monitoring of laser cleaning operations for better traceability and process stability. A high-flow industrial dust collector synchronously captures and processes the smoke and dust generated during laser cleaning, helping keep the cleaning zone environment clean and reducing secondary pollution. For safer shop-floor operation, the system can be equipped with protective guardrails/fencing to protect nearby personnel and enhance production safety, while the dual-station workflow and automated vision + five-axis control enable efficient, repeatable tire mold cleaning without blind spots.

Battery Cell PET Film Intelligent Laser Cleaning Equipment

The Battery Cell PET Film Intelligent Laser Cleaning Equipment is designed for automated removal/cleaning of blue protective PET film on returned (rework) battery cells, replacing manual peeling and cleaning to improve efficiency and consistency. The system enables fully automated “blue-film” cleaning by placing the cell at a dedicated cleaning position using a mechanical structure or robotic handling, and then performing 360° laser cleaning coverage through a combination of cell rotation and a moving galvanometer scanning system.

Built for modern battery manufacturing and rework lines, it emphasizes simple operation, automatic cleaning, and reduced dust/powder generation, helping improve workshop cleanliness and reduce labor intensity while standardizing the film-cleaning process.

Performance Features

This equipment uses a scanning laser process to clean the blue PET film while synchronously capturing organic powder/dust generated during cleaning, supporting better dust control and helping reduce secondary contamination. The system is designed for safe and reliable operation, featuring a touchscreen interface for clear status visualization and parameter setting, plus integrated safety protections such as safety interlocked doors, protective light shielding, and safety plug/stop mechanisms. With automated handling compatibility and full-coverage laser processing, it delivers efficient, repeatable PET film cleaning for battery cell rework applications with improved shop-floor cleanliness.

Fully Automatic Laser Cleaning Production Line for Locomotive Brake Discs

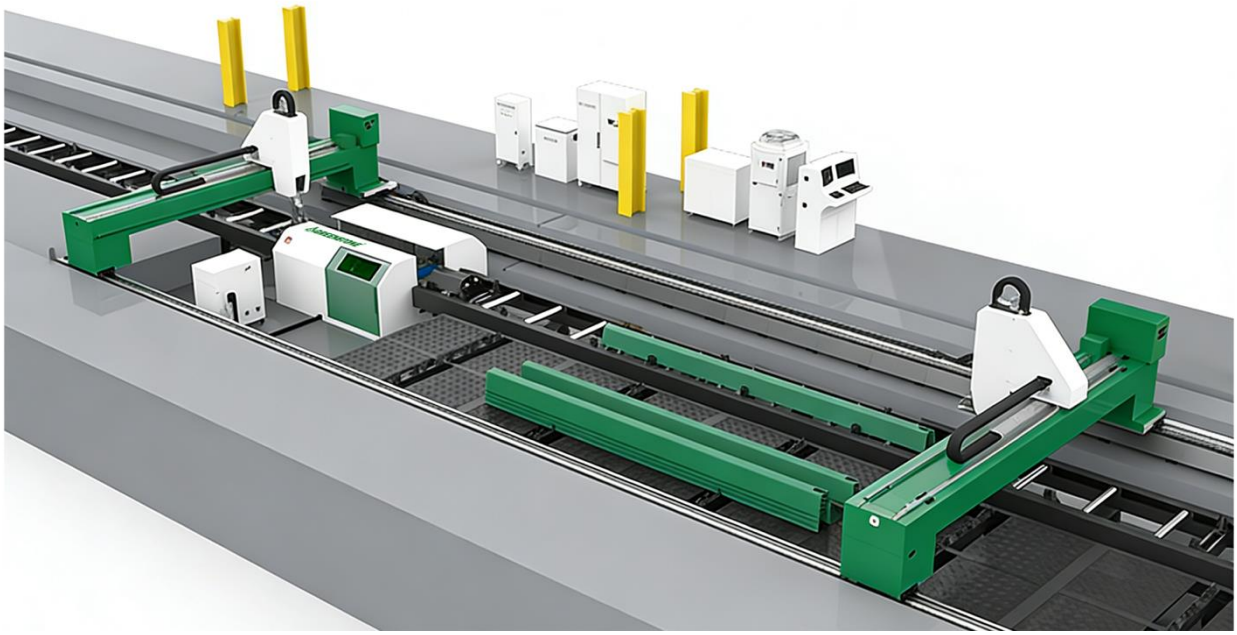
The Fully Automatic Laser Cleaning Production Line for Locomotive Brake Discs is engineered to meet the industrial cleaning requirements of railway/locomotive brake discs. Using laser technology, the line performs automated removal of surface contamination (such as rust/oxides and deposits) to support stable downstream assembly and performance. Built as a factory-ready production solution, it emphasizes high efficiency, stable reliability, and high precision, making it suitable for standardized, high-throughput brake disc processing.

The system is designed for end-to-end automation and can integrate key processes around brake disc handling and surface treatment. In addition to laser cleaning, it can support automated operations for internal features such as installation-hole deburring and polishing, helping improve overall product consistency and manufacturing quality. The line is developed for modern rail maintenance and manufacturing environments where process repeatability, safety, and environmental control are essential.

Performance Features

This production line delivers excellent cleaning results by applying laser derusting/oxide removal on brake disc surfaces, while achieving high production efficiency through automated processing (including optional automated deburring/polishing inside disc mounting holes). It supports environmentally safe operation by synchronously collecting and treating smoke and dust generated during laser cleaning and polishing. A visual software management system enables automated, closed-loop control of the full process to ensure high accuracy and repeatability, while comprehensive safety protection helps prevent personnel injury and protects equipment—resulting in a stable, reliable, and highly automated brake disc laser cleaning solution.

GST-U-Rib Laser Cleaning Automation Line (GST-CBR3000C) for Bridge Deck Welding Preparation



The GST-U-Rib Laser Cleaning Automation Line is designed for bridge and steel-structure manufacturing to solve key surface-preparation challenges on U-ribs (U-shaped stiffeners)—especially primer removal at welding positions and inter-weld seam cleaning. As U-ribs are widely used in road, railway, and bridge construction due to their convenient installation, uniform load-bearing, and resistance to deformation, stable and repeatable cleaning before welding is critical to ensure weld quality.

This automated system delivers an efficient, production-ready solution for preparing U-rib welding areas so that subsequent welding with deck plates can be performed with improved consistency. With automated motion control and integrated dust handling, it supports standardized cleaning results, reduces manual workload, and improves workshop cleanliness—making it ideal for modern bridge fabrication lines.

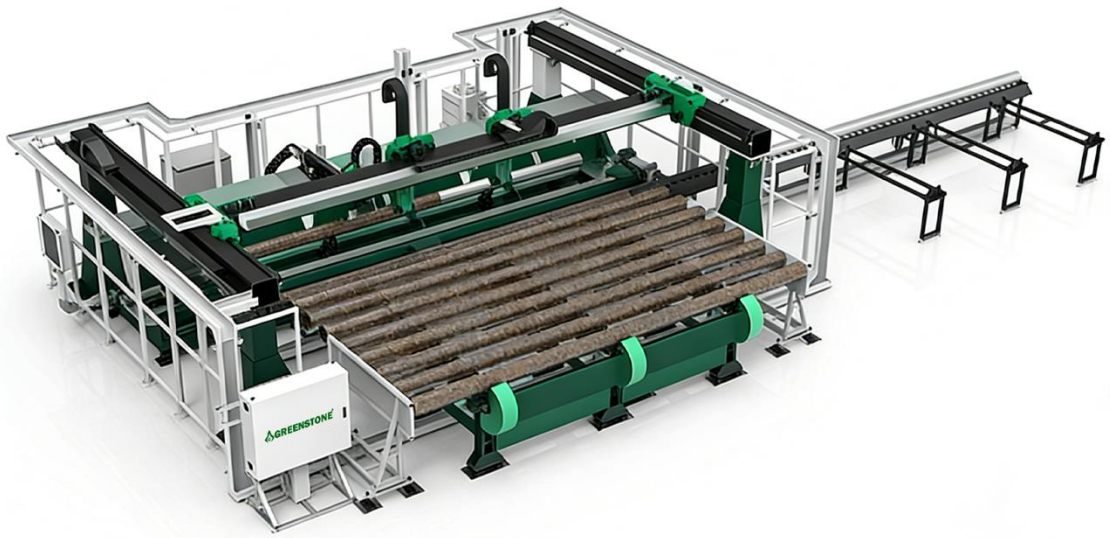
Performance Features

The system delivers SA 3-level surface cleanliness with a bright, uniform finish while helping ensure no damage to the substrate, improving surface consistency and weld quality. Designed for a cleaner shop-floor environment, it provides quiet, eco-friendly operation with dust capture efficiency up to 99.9%, significantly reducing smoke/dust during processing. With a focus on cost efficiency, the line supports lower maintenance cost, can reduce labor demand by ~20% (one operator can manage one system), and helps cut overall energy consumption by ~57%, delivering strong long-term ROI for high-throughput bridge manufacturing.

Technical Specifications

Category	Specification
Model	GST-CBR3000C
U-Rib Height	260–300 mm
U-Rib Width	300–550 mm
U-Rib Thickness	6–12 mm
U-Rib Length	4–20 m
Applicable Steel Grades	Q345 / Q370 / Q420 / Q500
Main Structure	Travelling gantry type (VFD stepless speed control)
Gantry Travel Speed	2–10 m/min
Single-Pass Cleaning/Grinding Width	> 30 mm
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.	

High-Power Fully Automatic Tube & Pipe Laser Cleaning Production Line



The High-Power Fully Automatic Tube & Pipe Laser Cleaning Production Line is developed for metal tube/pipe processing and energy-related industries, providing automated, high-throughput laser cleaning for a wide range of tube geometries. It supports laser cleaning of round tubes, square tubes, rectangular tubes, oval tubes, and special-shaped pipes, enabling stable and standardized surface preparation for downstream welding, coating, bonding, or assembly processes.

Engineered for industrial production environments, the line emphasizes stability, high standards, and high efficiency. It is built for heavy-duty derusting/oxide removal while helping protect the substrate, making it suitable for long workpieces and continuous processing requirements. The design targets reliable transmission structures and automated operation to reduce manual labor and improve overall processing consistency.

Performance Features

This system delivers strong processing capability, supporting pipe derusting/oxide removal for diameters 20–220 mm and workpiece lengths up to 6 m, with effective cleaning and no substrate damage. It features high dynamic performance with maximum positio ning speed up to 90 m/min, enabling fast cycle times for production lines. The mechanical structure is designed for stability, usi ng a suspension-style structure and motor-driven rack-and-pinion transmission for reliable motion and consistent results. Manufactured to export-grade standards, the line can achieve high productivity—one operator can complete cleaning of a 6 m-long, 60 mm diameter pipe in about 10 minutes, delivering up to 10× efficiency improvement compared with traditional manual/mechanical cleaning methods.

Picosecond Laser PVD & Ink Removal Equipment

The Picosecond Laser PVD & Ink Removal Equipment is designed for selective removal of PVD coatings and ink layers with minimal thermal impact. Using a picosecond laser source, the system enables high-precision stripping that helps keep edges clean and smooth while reducing the heat-affected zone—making it well-suited for applications where substrate protection and appearance quality are critical.

To ensure stable industrial performance, the machine integrates a high-quality laser and optical chain for consistent energy delivery and repeatable processing. The platform is engineered for precision motion and production efficiency, supporting automated workflows that reduce manual handling time and improve overall throughput.

Performance Features

The system adopts an imported picosecond laser with strong beam quality, small focused spot, and stable power output, delivering reliable coating/ink removal with low thermal influence. An optical system using imported lenses supports high-quality beam transmission, while an imported high-speed galvanometer scanner enables high-accuracy, stable processing. The machine base utilizes a marble platform with excellent flatness and strong vibration damping to improve machining stability and repeatability. To maximize productivity, the equipment supports a DD direct-drive stage to reduce loading/unloading time and can be equipped with an automatic loading & unloading system, saving labor and increasing processing efficiency.

GST Mini LED Solder Mask Ink Laser Removal Equipment (355 nm UV, 30W, ±20 μm)

The GST Mini LED Solder Mask Ink Laser Removal Equipment is purpose-built for Mini LED PCB solder mask (ink) opening and selective ink removal, using laser technology to replace traditional exposure + development processes. It is designed to solve common production pain points in small-size, fine-pitch solder mask processing—such as ink residue, excess ink thickness, and undercut out-of-tolerance issues—helping improve yield while simplifying the workflow.

To support high-volume manufacturing, the system integrates laser + galvanometer scanning with an optimized UV optical path, enabling stable, efficient material removal with fine feature capability. A large-format upper/lower dual-station turntable platform reduces loading/unloading time and supports higher throughput, while high-precision scanning and automatic correction functions help ensure consistent processing accuracy across panels.

Performance Features

Powered by a 355 nm UV nanosecond laser with 30 W average output, the system delivers high-efficiency ink removal with excellent controllability for Mini LED PCB applications. It supports high production efficiency through a 4-laser + galvanometer integrated architecture and optimized UV beam delivery, and reduces cycle time with a dual-station (top/bottom) turntable platform that minimizes handling delays. With high-precision galvanometer scanning and automatic precision correction, it achieves overall processing accuracy of ±20 μm and supports a maximum panel size up to 24.5 × 28.5 inches, making it ideal for high-throughput, high-precision solder mask opening and ink removal.

Technical Specifications

Category	Item	Specification
Laser System	Laser Source	Nanosecond UV Laser
	Wavelength	355 nm
	Average Output Power	30 W
	Galvo Scan Field	370 × 370 mm
Core Configuration	Work Platform	High-precision direct-drive motor lifting/turntable platform
	Vision System	Industrial high-precision CCD vision positioning system
	Power Monitoring	Laser energy monitoring system
Processing Capability	Max. Processing Size	24.5 × 28.5 inch
	Compatible Board Thickness	0.1–5.0 mm
	Overall Processing Accuracy	±20 μm
	Supported File Format	DXF
Utilities & Environment	Power Supply	380 V, 50 Hz
	Environmental Requirement	Temperature: 15–30°C; Humidity: < 50%
Machine Size	Main Machine Dimensions	2800 (L) × 3500 (W) × 2260 (H) mm

Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.

3-Axis Micro Waterjet-Guided Laser Machining System (532 nm Green Laser)

The 3-Axis Micro Waterjet-Guided Laser Machining System combines a precision motion platform with waterjet-guided laser technology to deliver high-quality micromachining for 2D parts. Built on a granite/marble machine structure with direct-drive linear motor modules, it provides high rigidity and stable accuracy for demanding industrial production.

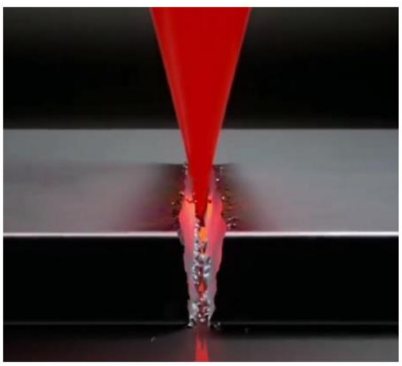
Unlike conventional laser machining, this system outputs the laser beam coaxially through a micro waterjet nozzle. The waterjet acts as a natural “optical waveguide,” helping keep the beam tightly confined and focused on the workpiece to achieve high-precision processing with minimal thermal effect. The result is high accuracy, smooth edges/end faces, and low heat-affected impact, making it suitable for processing difficult materials and fine-feature components.

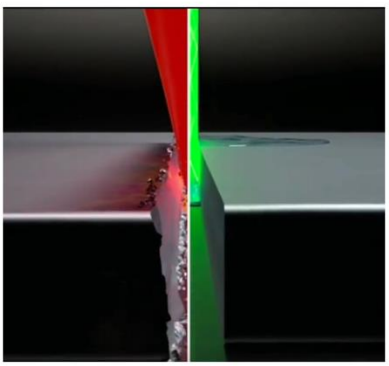
Typical Applications

- Metals and hard materials
- Superhard materials and silicon carbide (SiC)
- Watchmaking and precision small parts
- Aerospace components
- Precision mold processing

Performance Features

By guiding the laser beam inside a micro waterjet, this system reduces beam divergence and enables stable, concentrated energy delivery for high-difficulty micromachining with clean, smooth edges and minimal thermal influence. The 3-axis interpolated motion platform with X/Y linear motors supports accurate contouring and repeatable production performance, while optional high-precision contact probing and CCD visual positioning enhance alignment and process consistency for tight-tolerance manufacturing.

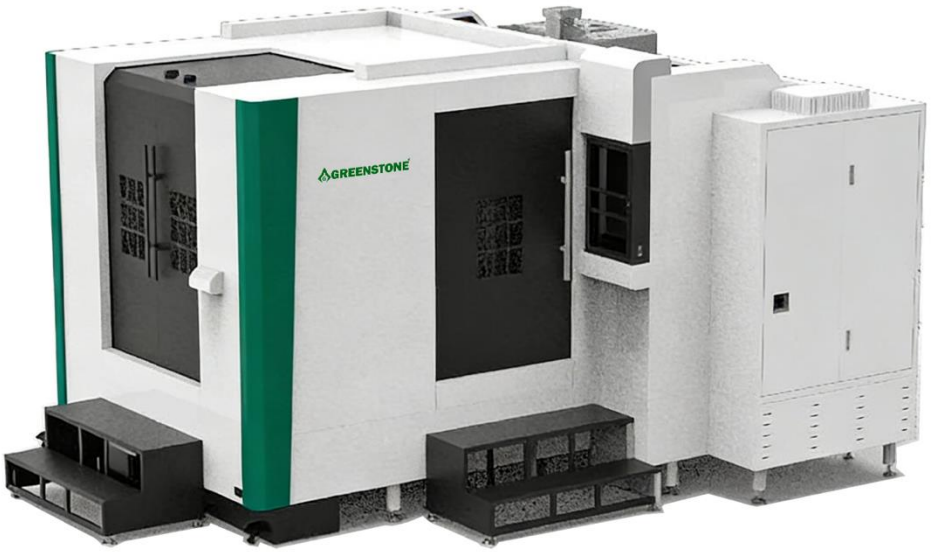




Technical Specifications

Category	Item	Specification
Machine Configuration	Control System	Custom-developed CNC control system
	Machining Mode	3-axis simultaneous (interpolated) motion
	Laser Type	Green laser
	Processing Head	Waterjet-guided laser machining head
	Drive System	X/Y linear motors; Z rotary motor
	Probe (Optional)	High-precision contact probe
	Vision Positioning (Optional)	CCD positioning camera
	Cooling Method	Water cooling
	Enclosure Type	Fully enclosed safety enclosure
Technical Indicators	Laser Power Options	60 W / 100 W / 200 W / 400 W
	Laser Wavelength	532 nm
	Travel (X, Y, Z)	X/Y: 500 × 350 mm; Z: 200 mm
	Repeatability	X/Y: ±1.5 μm; Z: ±5 μm
	Nozzle Size	50–150 μm
	Power Supply	220 V, 50 Hz
	Machine Dimensions	2400 × 2200 × 2600 mm
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.		

5-Axis Micro Waterjet-Guided Laser Cutting System (RTCP, 532 nm Green Laser)



The 5-Axis Micro Waterjet-Guided Laser Cutting System combines a high-precision 5-axis CNC machine tool (with RTCP kinematics) and micro waterjet-guided laser technology to deliver accurate cutting and micromachining of complex 3D parts. Built for high-end manufacturing, the system uses a stable motion platform and a water-guided laser processing head to achieve high machining accuracy, smooth edge quality, and minimal thermal influence, making it ideal for precision cutting where surface integrity i s critical.

In this process, the laser beam is delivered coaxially through a micro waterjet nozzle. The waterjet acts as a “natural waveguide,” constraining the laser and keeping it tightly focused on the workpiece. This enables stable energy delivery, reduced beam divergence, and cleaner processing on challenging geometries. The system is widely applicable for machining metals, hard materials, super hard materials, and silicon carbide (SiC), and is well-suited for industries such as watchmaking precision parts, aerospace components, and precision mold manufacturing.

Performance Features

With 5-axis simultaneous motion (RTCP) and a water-guided laser head, the system supports flexible multi-angle cutting of complex 3D structures while maintaining stable spot control and excellent edge consistency. The waterjet-guided beam helps reduce heat-affected impact and supports cleaner, smoother cut surfaces, while direct-drive axes (including B/C rotary axes) enhance dynamic response and positioning stability. Optional high-precision touch probing and CCD visual positioning further improve setup repeatability and process consistency—making this solution suitable for high-difficulty laser cutting tasks that demand accuracy, surface quality, and production reliability.

Technical Specifications

Category	Item	Specification
Machine Configuration	CNC Control System	New-generation CNC
	Machining Mode	5-axis simultaneous (RTCP)
	Laser Type	Green laser
	Processing Head	Waterjet-guided laser processing head
	Drive System	X/Y linear motors; Z rotary motor; B-axis rotary (DD direct-drive); C-axis rotary (DD direct-drive)
	Probe (Optional)	High-precision contact probe
	Vision Positioning (Optional)	CCD positioning camera
	Cooling Method	Water cooling
	Enclosure Type	Full safety enclosure
Technical Indicators	Laser Power Options	60 W / 100 W / 200 W / 400 W
	Laser Wavelength	532 nm
	Travel / Working Range	X/Y: 1400 × 1100 mm; Z: 1200 mm
	Rotary Axes	B-axis travel: ±110°; C-axis travel: 360°
	C-Axis Table Face Diameter	Ø 800 mm
	Repeatability	X/Y: ±6 μm; Z: ±6 μm; B-axis: ±8″; C-axis: ±8″
	Nozzle Size	50–150 μm
	Power Supply	380 V, 50 Hz
	Machine Dimensions	4300 × 4800 × 3400 mm
Note: Final technical parameters are subject to the manufacturer’ s official technical proposal.		

Laser Cleaning Robot for Complex Pipe Inner Wall (Blind-Spot-Free Internal Surface Cleaning)

The Laser Cleaning Robot for Complex Pipe Inner Wall is engineered for internal laser cleaning of complex pipelines and non-standard inner-wall geometries, especially where step features, grooves, and blind corners exist. Traditional internal cleaning tools often struggle to reach these hard-to-access areas, leaving residues that affect downstream inspection, coating, welding, or service life. This robot addresses that problem with an internal laser cleaning approach optimized for full-coverage access inside pipes.

The system uses a specialized optical/beam delivery design that directs the laser to the required internal surface while maintaining stable processing. It is built to remove typical inner-wall contaminants such as rust, scale, oxide layers, deposits, and adhered impurities, supporting consistent cleaning quality throughout the pipe's interior. With customizable configuration for different pipe types, it is suitable for industrial users who need reliable internal-surface preparation on complex pipe structures.

Performance Features

The robot is designed to minimize internal "blind zones" by enabling effective laser access to challenging regions such as steps and internal grooves, improving coverage where conventional equipment cannot reach. It supports cleaning for inner diameters of 100–1000 mm, and the working length can be configured (no fixed length limit) depending on the application, making it adaptable to multiple pipeline types and project requirements. By combining targeted laser energy delivery with controlled internal movement, it delivers efficient contaminant removal while improving process consistency for complex inner-wall cleaning tasks.

Handheld Laser Welding Machine (1500W / 2000W / 3000W)

The Handheld Laser Welding Machine (1500W/2000W/3000W) is a compact, high-power fiber laser welding solution designed for fast, clean, and efficient metal joining in fabrication shops and industrial production. With a mobile cabinet design and a handheld welding gun, it supports flexible on-site operation for a wide range of welding tasks—helping reduce reliance on highly specialized manual welding skills while improving overall productivity and weld consistency.

This system is built to deliver stable performance in daily production environments, combining high welding speed with controlled heat input to help reduce deformation and post-processing work. The machine footprint is optimized for workshop mobility, with an overall size of 1100 × 500 × 900 mm, making it suitable for factories, job shops, maintenance teams, and integration into flexible manufacturing workflows.

Performance Features

Available in 1500W, 2000W, and 3000W power configurations, the machine supports high-efficiency welding with strong penetration capability and stable output for common industrial metals. The handheld operation improves accessibility for complex parts and different welding positions, enabling faster setup and better flexibility than fixed welding stations. Controlled thermal input helps reduce burn-through, warping, and excessive spatter, improving appearance and lowering the need for grinding or rework—making it a practical high-throughput welding solution for modern metal fabrication.

Comparison of Laser Cleaning vs. Traditional Industrial Cleaning Methods

Item	Laser Cleaning	Chemical Cleaning	Mechanical Grinding	Dry Ice Cleaning	Ultrasonic Cleaning
Cleaning Method	Laser, non-contact	Chemical cleaner, contact	Sandpaper, contact	Dry ice, non-contact	Cleaning agent, contact
Workpiece Damage	None	Yes	Yes	None	None
Cleaning Efficiency	High	Low	Low	Medium	Medium
Consumables	Electricity only	Chemical cleaning agents	Sandpaper, grinding wheels	Dry ice	Dedicated cleaning agents
Cleaning Result	High cleanliness	Average, uneven	Average, uneven	Excellent, uneven	Excellent, limited coverage
Safety / Environmental Impact	Pollution-free	Pollutes the environment	Pollutes the environment	Pollution-free	Pollution-free
Labor / Operation	Easy to operate; handheld or automated	Complex process; higher operator skill required	Labor-intensive; requires protective measures	Easy to operate; handheld or automated	Easy to operate; requires manual addition of consumables
Cost Investment	High initial cost; no consumables; low maintenance cost	Low initial cost; high consumable cost	High initial cost; high consumable & labor cost	Medium initial cost; high consumable & labor cost	Low initial cost; medium consumable cost

Laser Cleaning Application Cases

Application Category	Application Case
Paint Removal on Metal	Transmission paint removal
	Vehicle paint removal
	Wheel hub cleaning
	Multi-layer paint removal
	Ship paint removal
	Aircraft skin paint removal
Oxide Removal	Combustion chamber cleaning
	Brake pad cleaning
	Copper foil cleaning
	Galvanized sheet cleaning
	Aluminum alloy cleaning
	Weld seam cleaning
Oil & Rust Removal	Gear oil stain removal
	Solidified oil stain removal
	Mold rust removal
	Mold oil stain removal
	Inner wall rust removal
	Carbon steel rust removal
Coating / Plating Layer Removal	Electrode sheet coating removal
	PCB board cleaning
	Battery blue film removal
	Tire inner wall cleaning
	Painted wire rubber removal
	Graphite coating removal