



AMADA WELD TECH

Excellence through superior design, technology and innovation

A detailed photograph of an AMADA laser welding head. The head is a complex assembly of metal components, including a laser source, lenses, and a nozzle. It is mounted on a robotic arm and is positioned over a workpiece. A yellow warning label on the head reads 'AVOID EXPOSURE' and 'WELD BEHAVIOR'. The background is dark, highlighting the metallic surfaces of the machine.

Integrated Systems

- Laser Welding
- Laser Cutting
- Laser Marking
- Micromachining
- Resistance Welding
- Seam Sealing
- Gloveboxes
- Reflow Soldering & Bonding

Table of Contents

About AMADA WELD TECH

- Company profile 3
- Key markets 4-5
- The Customer Journey: Define - Design - Deliver 6
- Facilities 7
- In-house capabilities 8-9

Laser Welding Systems

- Overview and typical applications 10
- Laser welding capabilities 11

Laser Marking Systems

- Overview and typical applications 12
- Laser marking capabilities 13

Resistance Welding, Bonding and Reflow Soldering Systems

- Overview and typical applications 14
- Resistance welding capabilities 15

Laser Tube Cutting

- Overview and typical applications 16
- Laser tube cutting capabilities 17

Laser Micromachining

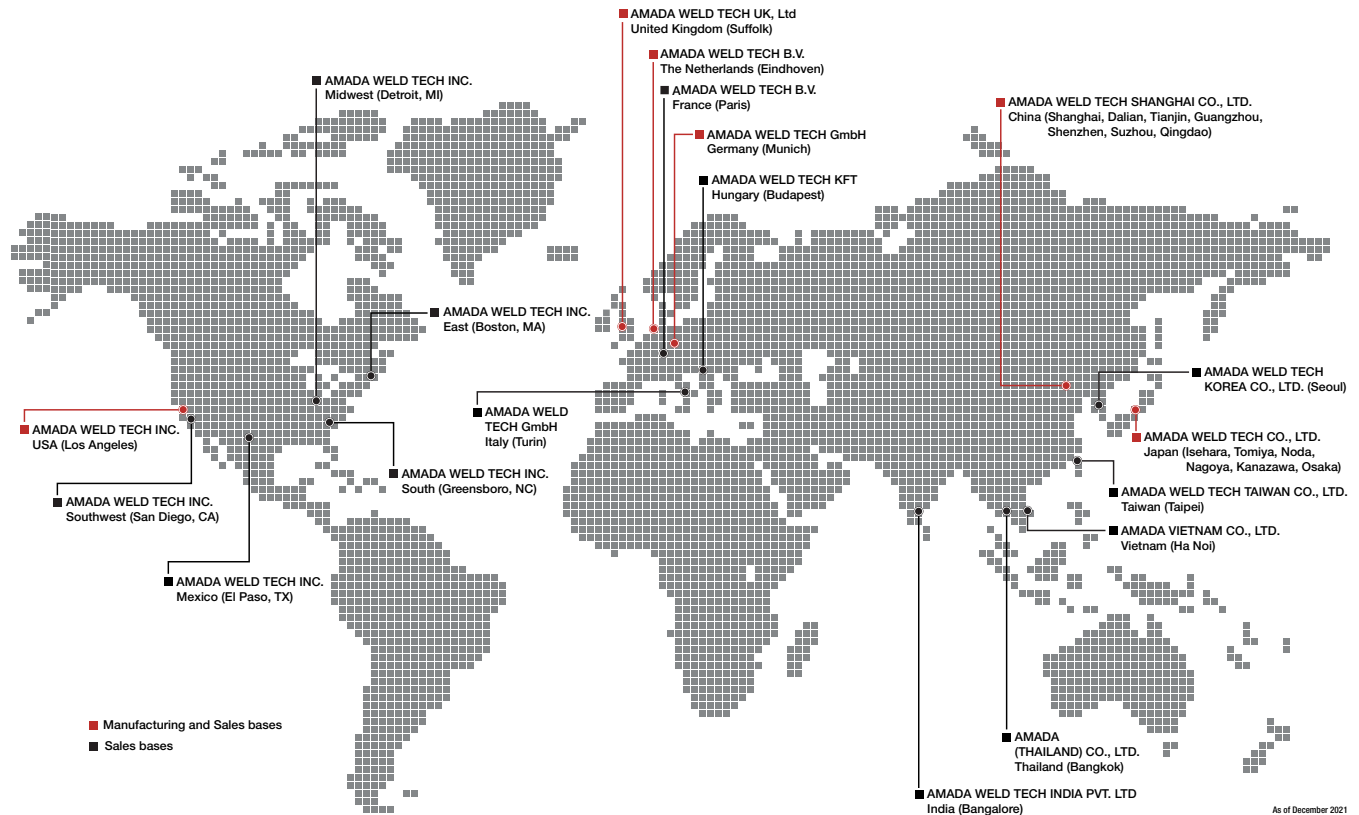
- Overview and typical applications 18
- Laser micromachining capabilities 19

Hermetic Sealing and Glovebox Systems

- Overview and typical applications 20
- Hermetic sealing and glovebox capabilities 21

Additional Systems

- Overview 22



AMADA WELD TECH Company Profile

AMADA WELD TECH is a leading manufacturer of equipment and systems for resistance welding, laser welding, laser marking, laser cutting, laser micromachining, hermetic sealing, projection welding, and hot bar soldering and bonding. The company provides products to a wide range of markets, including the medical device, battery, electric vehicle and solar industries, as well as global electronics, automotive and general industrial markets.

Since 1948, AMADA WELD TECH has worked to achieve one goal: to solve our customer's manufacturing challenges. Knowing there is no one solution that fits all, we strive to provide our customers with innovative and reliable manufacturing technology solutions so that we may be their single source provider.

Our headquarters is located in Monrovia, California with state-of-the-art facilities for developing, producing and servicing the solutions offered to our worldwide customer base. A global company, AMADA WELD TECH also has sales offices and applications laboratories located in Detroit, Michigan; El Paso, Texas; and Sao Paulo, Brazil.

Company timeline

- 1948 Unitek Corporation founded in Pasadena, CA to manufacture orthodontic appliances.
- 1950 Weldmatic Division organized; produced a complete line of electronically operated resistance welders for missile, aircraft, electronics, and metal working industries.

- 1965 Moved into current Headquarters location in Monrovia, CA.
- 1971 Unitek Equipment Division established.
- 1978 Unitek Corporation acquired by Bristol Myers Squibb. Development and patent of force firing systems critical to small parts welding.

- 1987 Unitek Corporation acquired by 3M.
- 1988 Divested from 3M as Unitek Equipment Division of KVA Holdings Corp.

- 1991 Name changed to Unitek Equipment Inc.
- 1994 Acquired by Miyachi Technos and reorganized as Unitek Miyachi Corporation with merger of Miyachi America Company.
- 1994 Established Integrated Systems division
- 1995 Acquired Weld-Equip companies in Holland, Germany and France, and Miyachi Technos Europe in Germany.
- 1995 Received ISO 9001 Certification.

- 2000 Acquired Peco Welding Systems, GmbH.
- 2001 Acquired Benchmark International, Inc.
- 2005 Renamed Miyachi Unitek Corporation, consolidated Benchmark International to California.
- 2008 Reorganized European companies into single entity: Miyachi Europe Corporation.

- 2010 Opened applications lab in Detroit, MI.
- 2011 Opened sales office and applications lab in Brazil.
- 2013 Miyachi Corporation acquired by AMADA CO., LTD.
- 2014 Renamed Miyachi America Corporation.
- 2015 Reorganized as Amada Miyachi America, Inc.

- 2020 Renamed AMADA WELD TECH INC.



Automotive



Automotive applications require across-the-board manufacturing technologies including resistance and laser welding, projection welding, hermetic sealing, and hot bar reflow soldering. AMADA WELD TECH's best in class products provide process stability with power feedback and monitoring options, as well as industrially proven reliability.

Part tracking and traceability has become a reality of modern manufacturing. AMADA WELD TECH also offers a range of laser marking, engraving products, including integrated systems, for direct part marking with text, graphics, bar codes and data matrix codes.

Our technologies are used in a wide variety of automotive applications including sensors, switches, dashboard electronics, lighting components, brake shoes, and more.

Medical



The challenges of today's medical device manufacturing applications - small, single-use devices in high demand with ever-increasing reliability requirements - are pushing the need for more sophisticated manufacturing technologies, and AMADA WELD TECH, in consult with medical device industry expert customers, is leading the way with our comprehensive range of technologies. Our equipment is used in medical device manufacturing facilities around the world to build medical device components for cardiology, neurology, laparoscopy, arthroscopy, oncology, wound closure, and more.

Electronic Components



The fine control featured in AMADA WELD TECH's resistance and laser welding technologies is well suited to electronic component manufacturing applications requiring precision, low heat input, and low (or no) force welding solutions.

The high speed, non-contact clean laser marking or laser engraving process is well suited to high quality direct part marking on ever decreasing component sizes.

Common applications include hard drive read/write armatures, hard disk assemblies, electrical connectors, lead frame assemblies, relay terminal connections, batteries, and more.

Batteries



There are many process requirements in battery manufacturing. Depending on the size, type, and capacity, these requirements include both internal and tab-to-terminal connections, can and fill plug sealing, and external connections. Several joining options may be considered including both resistance spot and laser welding. The decision to use one technology or the other is determined both by the type of weld required and production requirements.

Laser marking is also used for branding and serialization. AMADA WELD TECH has extensive experience welding and marking batteries including Lithium Ion, Nickel-Metal Hydride, Lead Acid, Nickel-Cadmium and Alkaline in all sizes.

Aerospace



Our aerospace manufacturing customers produce a variety of high technology parts for aircraft/aircraft engines, guided missiles, spacecrafts, propulsion units, and more including batteries, sensors, hybrid packages displays, and jet engine honeycomb manufacture and repair.

AMADA WELD TECH's laser welding, laser marking, resistance welding, hermetic sealing and hot bar reflow soldering equipment is uniquely suited to these applications and has been used in the manufacture of aerospace parts for more than 60 years. Precision control, closed-loop feedback, and weld quality tools ensure reliable and durable welds and marks for these demanding applications.

.. and more



- Automation
- Consumer Electronics
- Contract Manufacturing
- Defense
- Energy/Utilities
- Heating Elements
- Home Appliance
- Lighting
- Motors & Coils
- Photonics
- Semiconductors
- Sensors
- Solar
- Tools
- Universities/Research

Standard Equipment and Integrated Systems Solutions by Technology

Resistance Welding



- Weld most metals
- Thermocompression bonding
- Fine wire welding
- Coil and stud welding
- Sheet metal welding
- Implantable medical device assembly
- Battery assembly
- Electronics assembly

Laser Welding



- Weld metals and plastics, dissimilar materials and thin foils
- Implantable device seam sealing
- Tool assembly
- Catheter assembly
- Battery manufacture
- Automotive sensors and assemblies

Integrated Systems



- Turn-key semiautomated systems
- Laser welding
- Laser marking
- Laser cutting
- Laser ablation
- Resistance welding
- Hot bar reflow soldering and bonding
- Hermetic sealing
- Gloveboxes

Laser Marking



- Marking of metals, plastics, and ceramics
- Engrave, ablate, anneal, bleach/foam
- Cutting or welding of thin metals
- Direct part marking
- Corrosion resistant marking
- **UDI marking** to comply with FDA regulations
- Wire stripping
- Surface cleaning or roughening

Laser Cutting and Micromachining



- Cut Nitinol, CoCr, stainless steels and polymers
- Burr free cuts with femtosecond laser
- Tube diameters from 0.01 - 1 in (0.254 - 25.4 mm)
- Wall thickness up to 0.039 in (1 mm)
- Metal and polymer stents
- Cannula and micro cannula
- Needles, biopsy devices
- Flexible tubing

Hermetic Seam Sealing & Gloveboxes



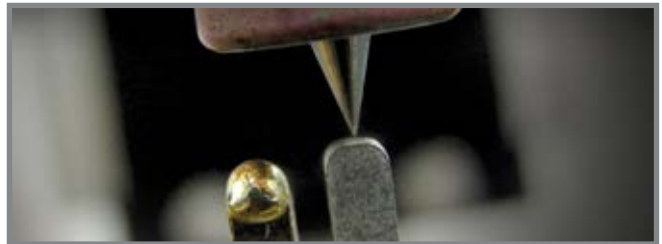
- Weld Kovar, stainless steel, mild steel and more
- Parallel seam sealing
- Lid handling, placement, alignment and welding
- Controlled atmosphere welding
- Transistor outline (TO) packages
- Rectangular hybrid modules
- Gas and pressure sensors
- RF and photonic devices

Hot Bar Reflow Soldering & Bonding



- Hot bar reflow soldering
- ACF bonding
- Heat staking
- Flat panel to LCD
- Battery tab to PCB
- Flat panel to PCB
- Flexible circuit to PCB
- Heat staking plastic on PCB

Micro TIG Welding



- Weld conductive metals - up to 0.197 in x 0.197 in (5 mm x 5 mm) area
- Weld dissimilar metals
- Bus bar welding
- Coil and terminal welding
- Coated wire welding
- Thin magnet wires
- Medical device: endoscope parts, catheter, guide wire, dental pipe

The Customer Journey

Define - Design - Deliver



Integrated Systems at a Glance

- First system built in 1994
- More than 1,000 systems sold (standard and custom)
- Large team of dedicated system engineers, and system assemblers
- Mechanical, electrical and software engineers
- Project manager assigned to every system
- Concept 3D renderings
- Clear acceptance criteria determined at start of project – no surprises
- Project timelines with major milestones
- Conveyor systems
- Robotic, pick and place, load/upload
- Single operator, semi-automated, fully automated
- Process commitment
- Detailed compliance response documents
- Applications engineers run customer samples before PO and shipment in ensure quality
- Optional real-time laser weld monitoring to inspect the weld and ensure quality, throughput and traceability

State-of-the-Art Facilities



Main entrance and lobby



Product showroom



Technical center (application & sample evaluation)



Product endurance lab



Customer-specific acceptance labs



Standard product assembly



In-house machine shop



System engineering



Integrated system assembly

In-House Capabilities

1 Safety Enclosures

Multi-axis **4** Motion



2 Laser/Resistance Processing

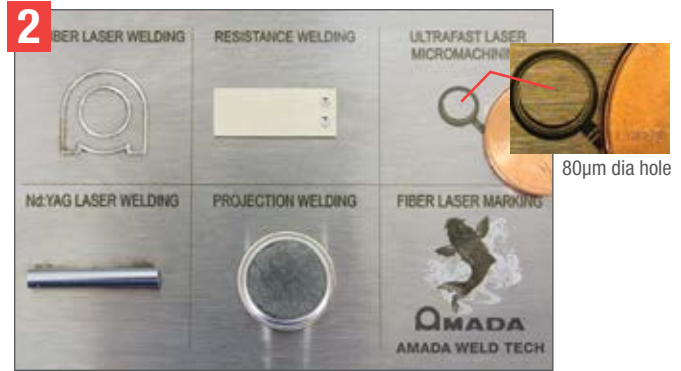
Custom **3** Tooling

System/Process **5** Monitoring



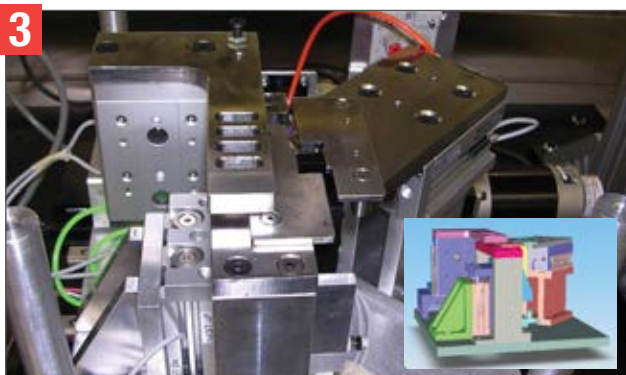
1 Safety Enclosures

- Standard or custom
- Glovebox/atmospheric
- CDRH Class 1
- Dual channel safety interlocks



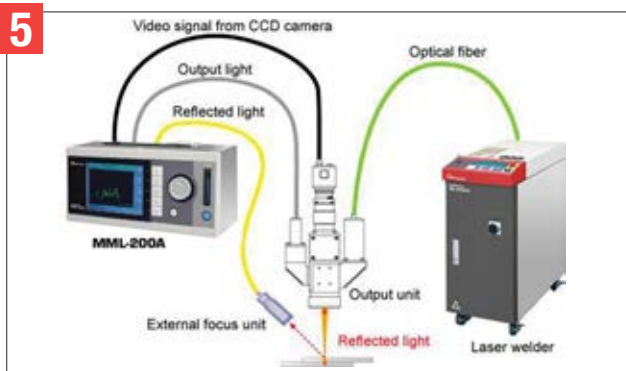
2 Laser/Resistance Processing

- Fiber/YAG lasers
- Resistance welding power supplies
- Nano, pico and femtosecond lasers
- Hot bar power supplies & thermodes
- Inverter, linear DC, AC and cap discharge



3 Custom Tooling

- Standard or custom
- Designed for process and production
- Fully integrated
- Manual/pneumatic/servo



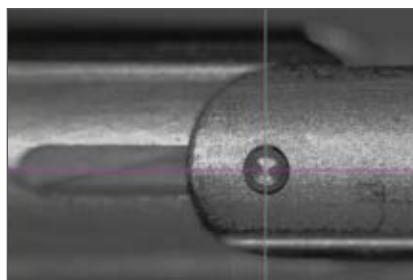
5 System/Process Monitoring

- Parameter collection
- GO/NO GO



4 Multi-axis Motion

- Linear XYZ
- Rotary
- Compact work area
- Custom path
- Coordinated motion
- Additional axes as required



Vision

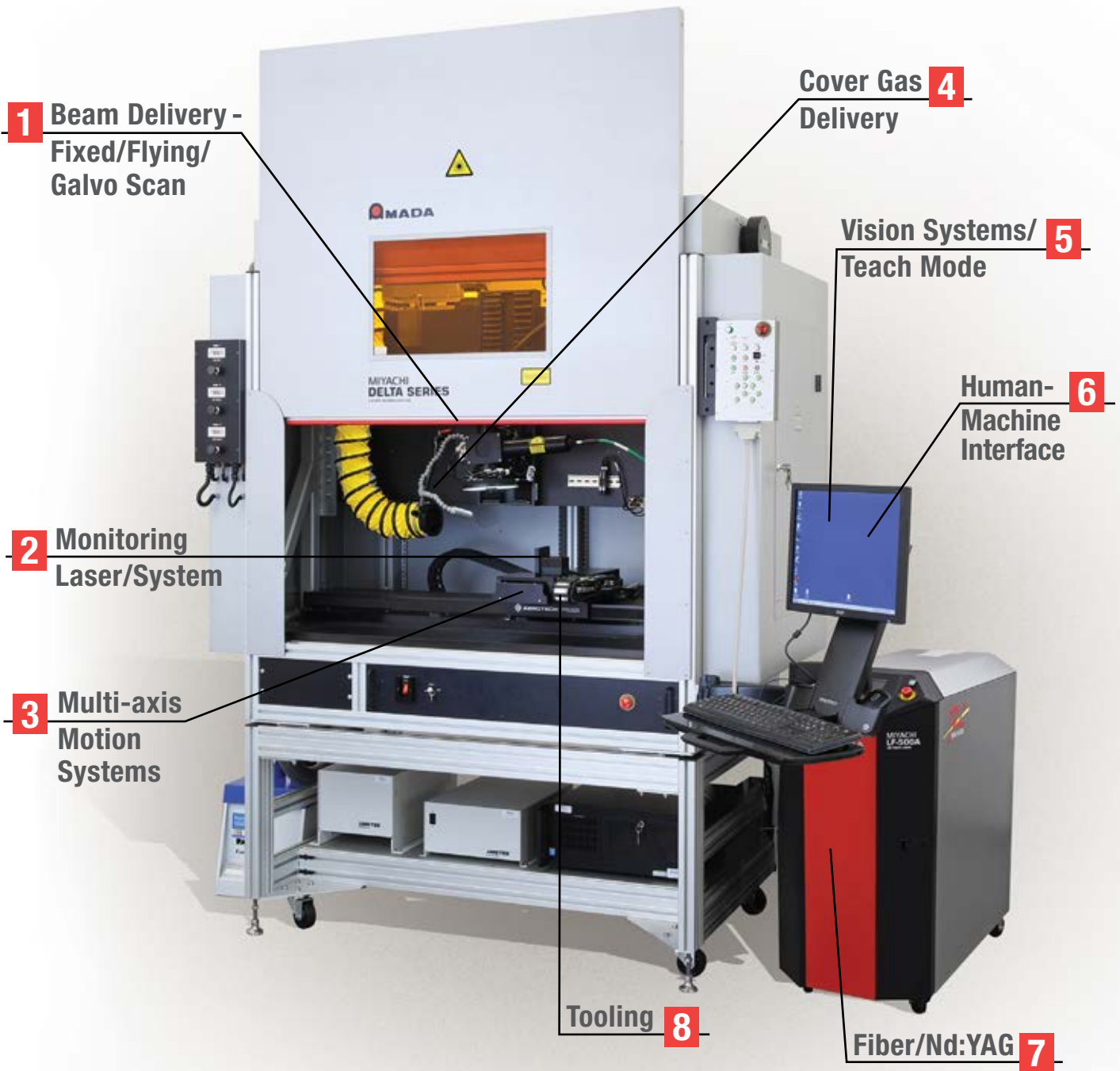


Robotics and Other Material Handling Options



Custom Software Development

Laser Welding Systems



TYPICAL APPLICATIONS

Medical



Laser seam welding pacemakers

Automotive



Laser welding device assembly

Battery

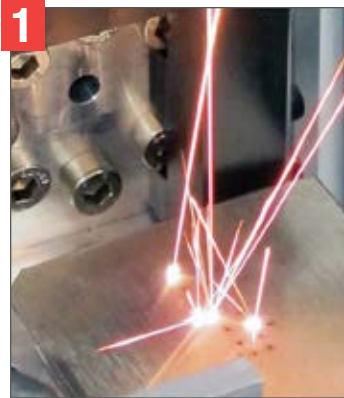


Battery pack manufacture

Electronics/Aerospace



Laser spot welding



1 Beam Delivery - Fixed/Flying/Galvo Scan

- Quick and precise positioning
- Multi-spot, seam welding for pulsed Nd:YAG or fiber lasers
- Modular designed focus heads
- On/off axis lighting
- Vision/cameras systems



2 Monitoring Laser/System

- Laser/process – power, energy, shot count, pulse duration
- Through lens viewing on axis
- Post weld verification
- Customer settable frequency of power verification
- GO/NO GO based on set levels



3 Multi-axis Motion Systems

- High speed, precision motion
- Linear and rotary stages, coordinated motion
- Galvo beam delivery options



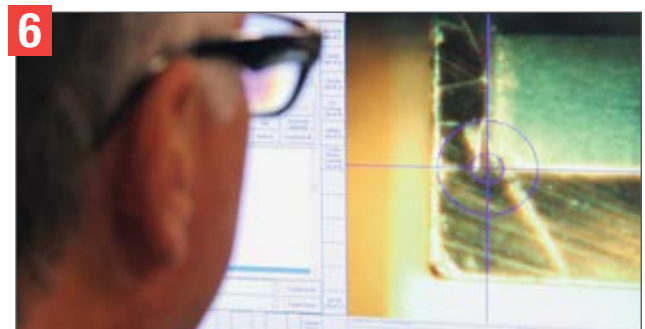
4 Cover Gas Delivery

- Inert cover gas delivery
- Laminar flow nozzles
- On or off axis options
- Flexible delivery options
- Multi-gas options



5 Vision Systems Teach Mode

- Locates weld location
- Identifies part fit up issues prior to welding
- Adjusts for manufacturing tolerances
- Point and click positioning
- Allows for part to part variation



6 Human-Machine Interface

- Intuitive operations
- Simple screen designs
- Security operator/enter move
- Multi-level passwords



7 Fiber/Nd:YAG

- Position based firing
 - ◆ Proprietary process for laser seam welding
 - ◆ Even spacing of pulsed laser even around 2D/3D corners or curves
 - ◆ Fastest processing speeds accounting for stage motion



8 Tooling

- Critical to successful welding
- Custom design integrated with workstation
- Collaboration between mechanical, electrical, and application engineer

Laser Marking Systems



TYPICAL APPLICATIONS

Medical



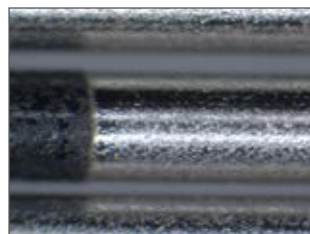
Medical tools & instruments

Automotive



Aluminum castings

Aerospace



Ablation PTFE Coating/Stainless Steel

Electronics

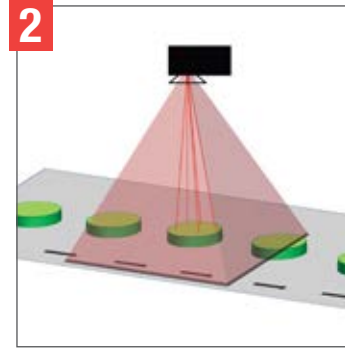


Bleaching of 14% glass filled nylon



1 MARKER MOTION®

- Integrated marker motion controls up to 4 axes
- Step and repeat jobs
- Circumferential marking around cylinder
- Adjustable focus position for multi-level marking



2 Mark on the Fly

- Marking while part is moving for highest part throughput
- Speeds up to 750 ft/min



3 Bar Code Readers

- 1 and 2D barcode reading for job select, and information upload
- Read verification
- Full network communications
- Router bar code determines the marking schedule



4 Integration

- Ethernet, RS-232, Direct, I/O
- TCP/IP, Ethernet IP
- Proven record to integrate into production lines



5 Production Handling Software

- Serialization via data base
- Custom strings
- VDI compliant



6 Vision

- Optical character recognition
- Part presence and orientation
- Machine path offset
- Fixture allowance
- Precise mark location



7 Material Handling

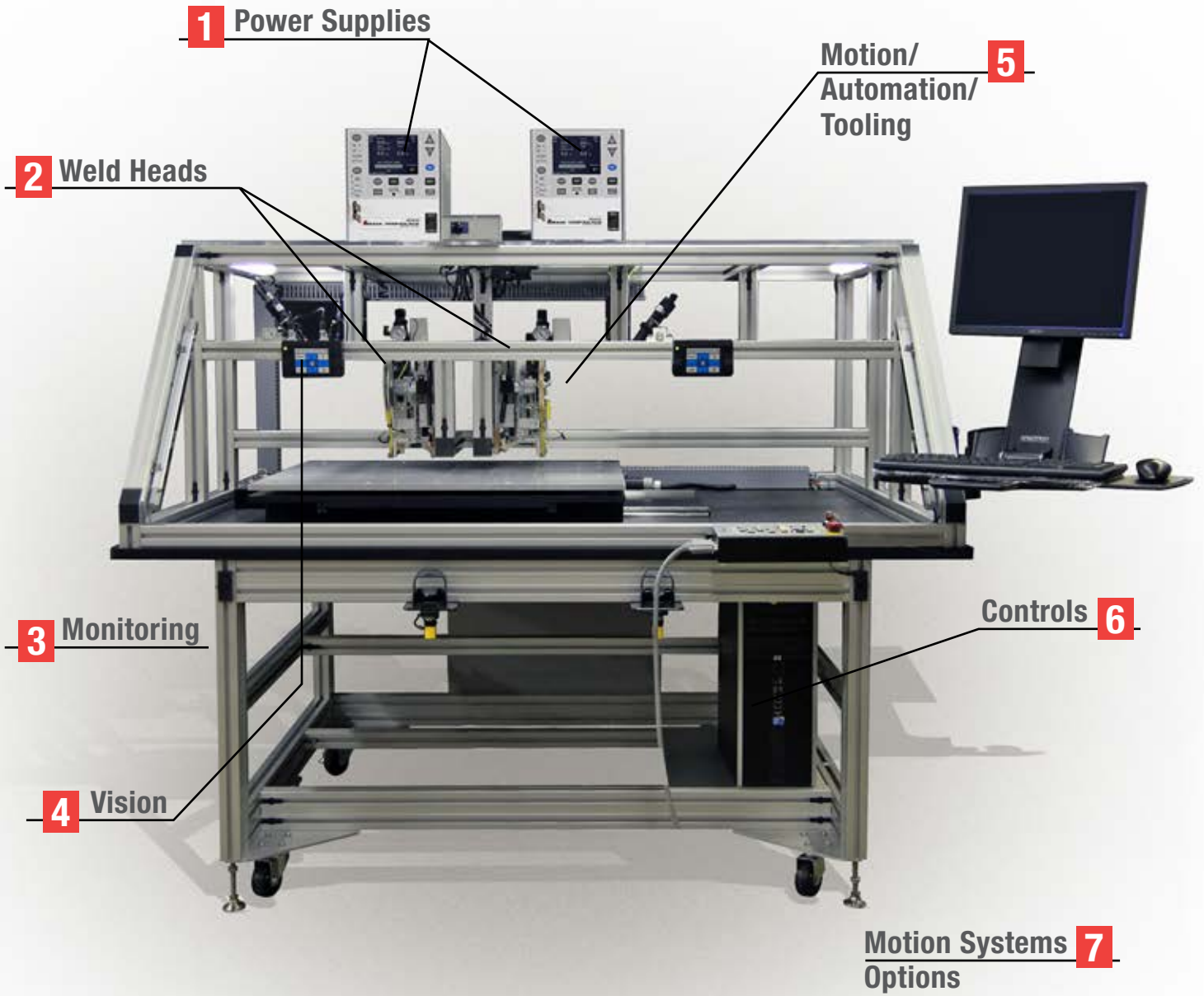
- Shuttle moves part into and out of enclosure
- Single and dual stations
- Through conveyor
- Robotic load



8 Material Handling

- Multi-station rotary dial
- 2 station shuttle
- Flow through conveyor
- Reduce cycle time
- Process part during next part load

Resistance Welding, Bonding and Reflow Soldering Systems



TYPICAL APPLICATIONS

Medical



Spot welding pacemaker

Automotive



Projection welding radiator connector

Battery



Battery pack assembly

Electronics



Thermocompression bonding coil wire to terminal

1



Power Supplies

- Energy: 5A-200kA
- Built-in process monitoring
- Data export features
- Closed loop control
- High/mid frequency inverters
- Linear DC
- AC weld controls
- Capacitive discharge welder

2



Weld Heads

- **Servo Controlled**
 - ◆ Precise force and position
 - ◆ 0.5-100lbs
- **Pneumatic Controlled**
 - ◆ Low inertia-Force fired
 - ◆ 0.5-1500lbs
- **Opposed/Series Configuration**
- Force and displacement options

3



Monitoring

- Process development
- Process optimization
- Production control
- Monitor process trends
- Data logging/traceability
- Set process limits
- SPC and Run charts
- Track: current, voltage, power, resistance, force, displacement

4



Vision

- Part location & orientation
- Electrode to part detection
- Electrode condition check
- Weld quality check
- Barcode reading
- Dimensional inspection
- Character recognition

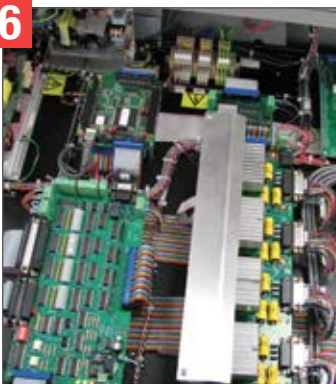
5



Motion/Automation/Tooling

- Multi-axis systems
- Parts handling
- Custom tooling
- Up to 5 axes of programmable motion
- Stages: 6"-24"

6



Controls

- CNC motion
- GBM code programming
- Ethernet TCP/IP
- Profibus/Modbus
- RS232/RS485
- Digital I/O
- PLC/computer HMI interface

7



Motion Systems Options

- Rotary dial systems
- 2 station index
- Through conveyor feed
- Manual load/unload
- Lift & carry
- Robotic load/unload

Laser Tube Cutting



TYPICAL APPLICATIONS

Medical



Laser cutting cannula tubing



Stents



Laser cutting flexible tubing



Hypo tube



1

High Precision Stages

- 2-4 axes of motion
- Rapid acceleration linear stages
- Axes configuration options
- XY cutting option



2

Fiber or Femtosecond Laser

- 200 W fiber laser
- Up to 40 W femtosecond laser
- Multiple wavelengths
- Wet and dry cutting



3

Automated Tube Loader

- Auto loading of tube diameters from 0.01"
- Automatic wet connect on tube diameters > 0.07"
- Up to 12 ft length



4

Easy Maintenance

- Water system, fiber laser and electronics mounted on pull out drawers from front of system
- System can be accessed remotely for factory support



5

Single Screen User Interface

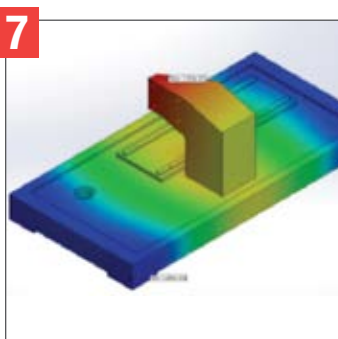
- All user information and functionality on a single screen
- 3 level password protection



6

Open Access to Workspace

- Main swing door provides complete access to entire workspace



7

Engineered Composite Base

- Superior isolation damping over granite
- 3D-load modeling allows design optimization
- Integrated water/debris drains

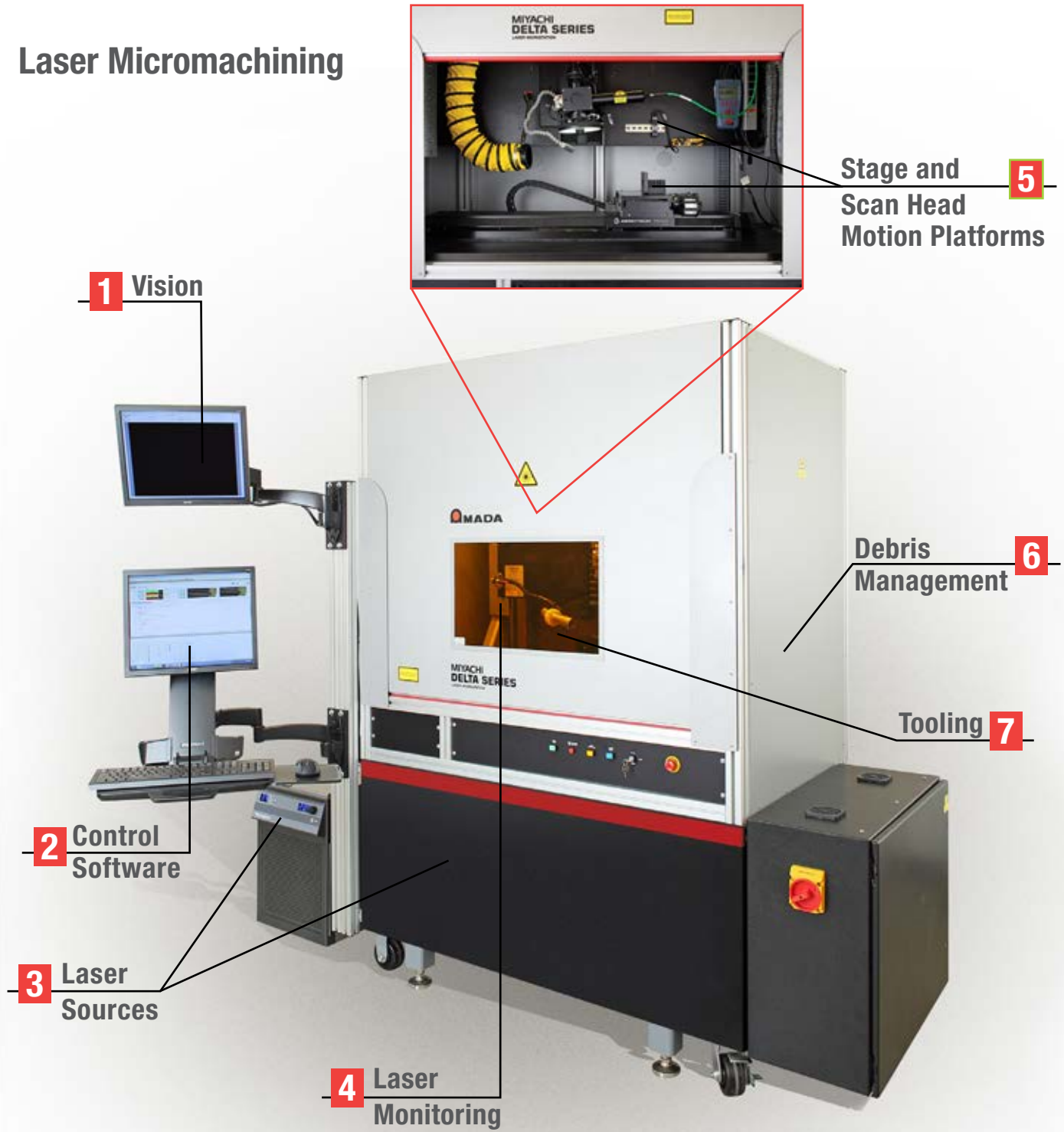


8

Compact Footprint

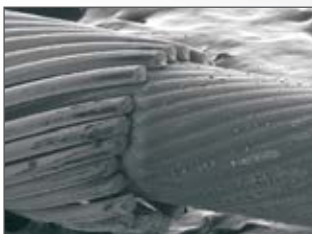
- System measures: 1956 mm (77") width x 787 mm (31") depth x 1524 mm (60") height

Laser Micromachining



TYPICAL APPLICATIONS

Medical



Micro coax wire stripping



Cannula drilling



Thin material machining



Catheter drilling



1

Vision

- Off axis and through the lens
- Fiducial or feature recognition
- High resolution camera for minimal correction error



2

Control Software

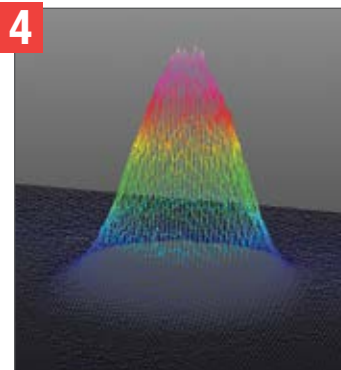
- Simple graphical interface for machine path generation
- Import vector and bitmap files



3

Laser Sources

- Nanosecond
- Picosecond
- Femtosecond
- Any laser source can be integrated



4

Laser Monitoring

- Average power monitored
- GO/NO GO limits
- Beam profile verification



5

Stage and Scan Head Motion Platforms

- Stages or gantry options according to production needs
- Drive linear and rotary stages
- Galvo steered laser



6

Debris Management

- Localized airborne particulate extraction
- Femto/nano-second particulate capable
- Clean room options

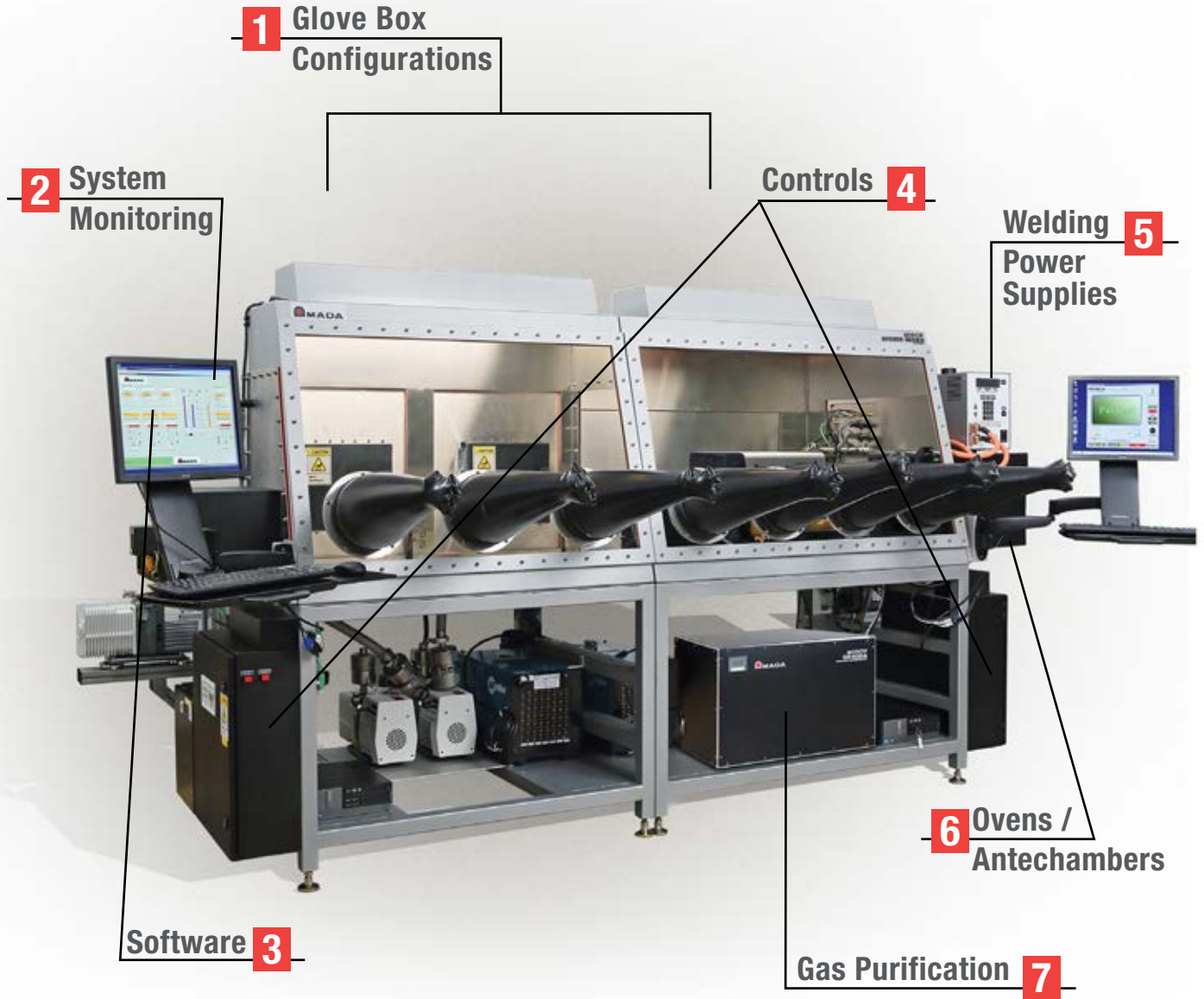


7

Tooling

- Vacuum chucks
- Custom work holding

Hermetic Sealing and Glovebox Systems



TYPICAL APPLICATIONS

Medical



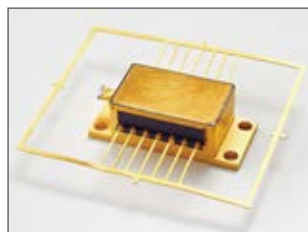
Laser seam welding pacemakers

Automotive



Projection welding small TO devices

Aerospace



Resistance welding seam seal

Electronics

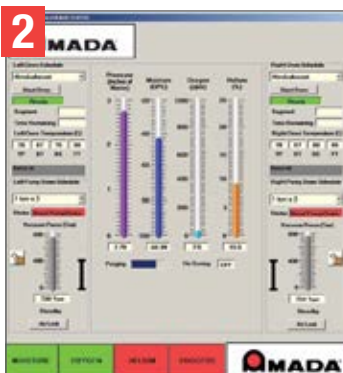


Laser seam sealing



Glovebox Configurations

- 2 and 4 glove sizes (std)
- Custom configurations
- Eye-safe laser front glass available
- Aluminum or steel base
- Add-on extensions for storage or part preparation
- Stainless steel chamber



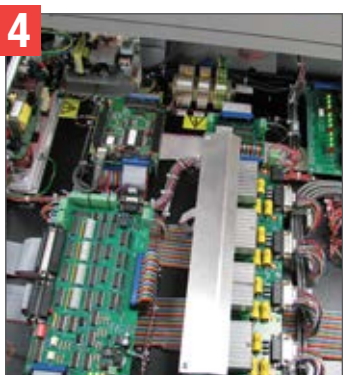
Monitoring

- Moisture monitor
- Helium sensor
- Oxygen sensor
- All glovebox data saved every 5 secs
- Settable sensor limits
- Exportable data
- Batch/lot reports



Software

- High/Low setting for sensors
- Error messages
- Weld interlock for environment outside of limits



Controls

- Computer controlled
- PLC controlled
- Manually controlled
- Custom software
- Glovebox communicates with:
 - ◆ Laser
 - ◆ Sealer
 - ◆ Projection welder



Welding Power Supplies

- Seam sealers
- Fiber lasers
- Nd:YAG lasers
- 25Khz high frequency Inverter
- Pulsar Series (CD projection welders)
 - ◆ 1K, 2K, 6K, 9K, joules



Ovens/ Antechambers

- Wall heated
- Heated shelves (2-3 level)
- Interlocks
- Optional
 - ◆ Sliding shelves
 - ◆ Extra long ovens
 - ◆ Rear loading



Gas Purification

- Single column
- Dual column
- Automated column change over
- Enables glovebox to reach ≤ 1 ppm of moisture and oxygen

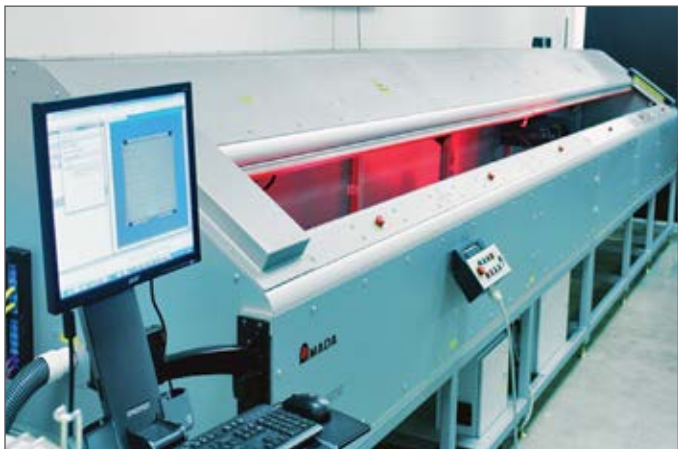
Additional Systems

Conveyor Fed Laser Welding Systems

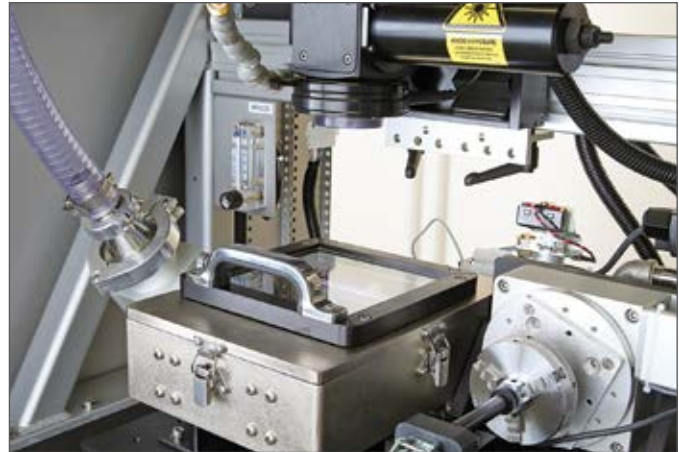
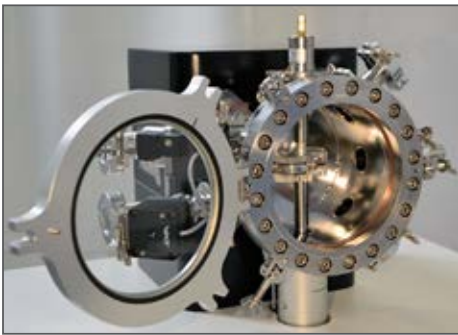


Robotic Welding Systems

Cap/Tube Laser Welding



Mini Atmospheric Chamber Laser Welding



Hot Bar Reflow Soldering and Bonding Systems

newhorizon
desktop
system

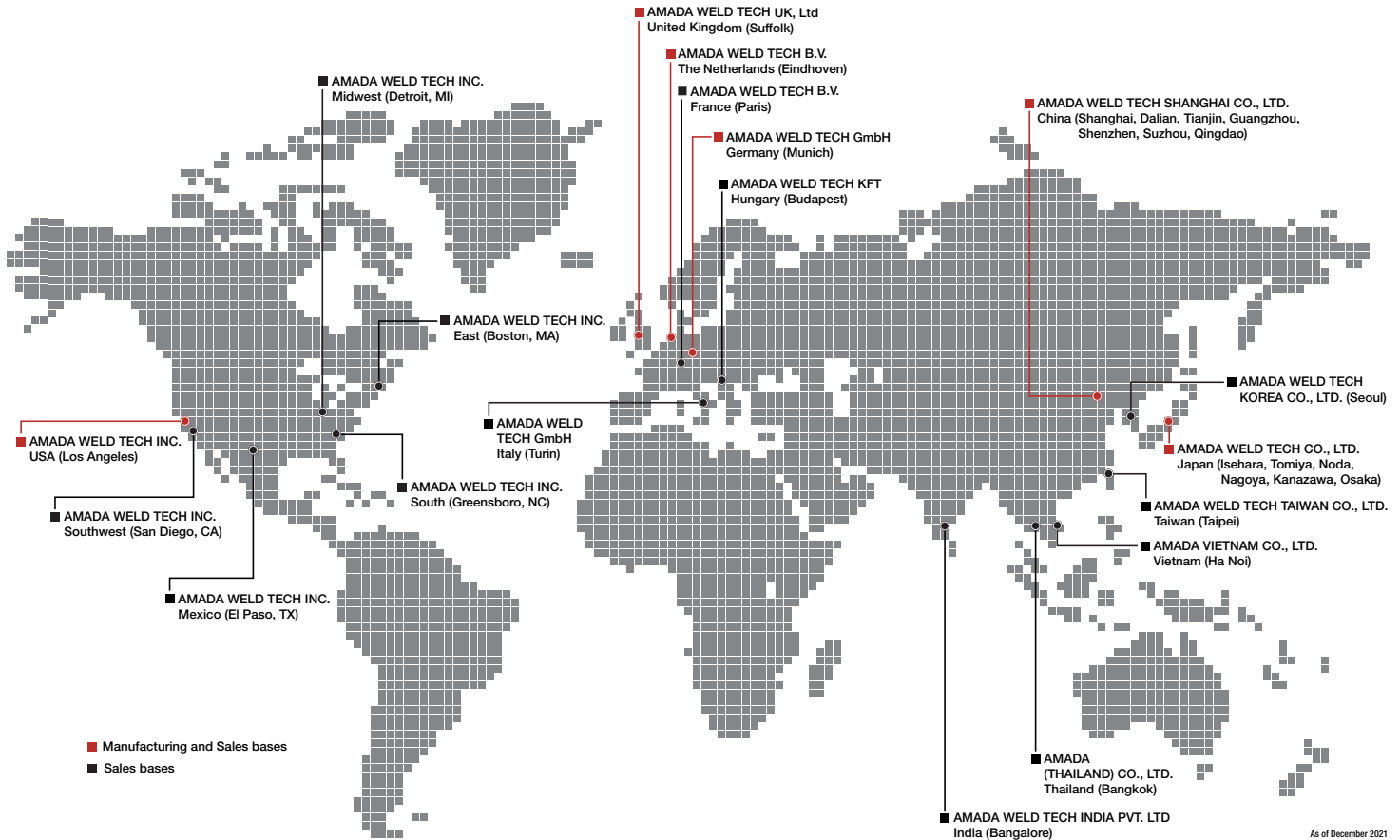


Jupiter custom
bonding system



5 Axis Laser Welding Workstation





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