



Advanced Products and Solutions for
Aerospace & Defense
Manufacturing



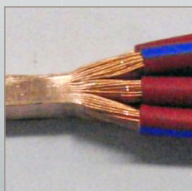
Develop and Manufacture Next Generation Components

Cutting Edge Technologies for Advanced Applications



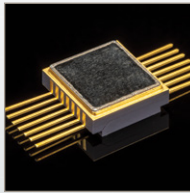
Batteries

- Terminal welding
- Can sealing
- Battery pack welding



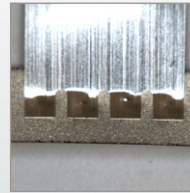
Wiring and Connectors

- Stranded wire compacting
- Hot crimping terminals
- Resistance welding
- Laser welding



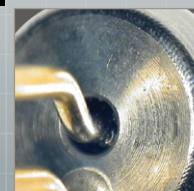
RF & Microwave Devices

- Laser welding and hermetic sealing of
 - TO packages
 - Butterfly packages
 - Aluminum packages



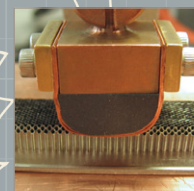
Solar Cells

- Welding ribbons and tabs to cells and busbars
- Joining flex circuits to glass
- Laser marking cells
- Jbox connections



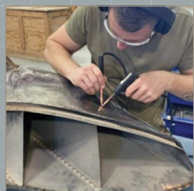
Safety Critical Components

- Sealing canisters
- Squib wires



Honeycomb Assembly

- Tacking and welding
- Resistance welding
- Laser welding



Engines & Blades

- Laser welding
- Resistance welding
- Maintenance & repair



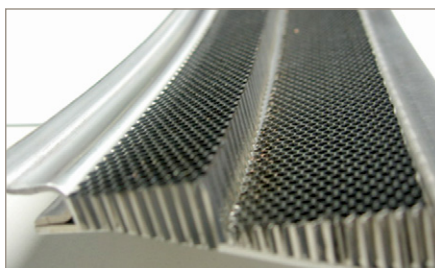
Sensors

- Reflow soldering of flexible circuits of plastic pins
- Heatstaking to PCB
- Laser welding terminals and casings

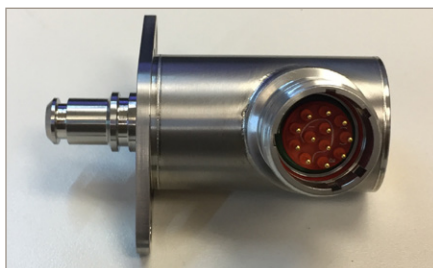
Reliable Connections for Critical Aerospace Parts

Modern aerospace systems are equipped with a vast array of lightweight, high-strength parts, and electronic components and sensors that continuously monitor critical parameters. These advanced parts and systems affect and enable onboard computers to make real-time decisions regarding flight performance, fuel efficiency, avionics, safety and more. Recent years have seen exponential growth in sensor technologies related to aircraft safety and automation collectively known as advanced flight assist systems (AFAS). Ensuring the reliability and integrity of the connections that support these systems is paramount to maintaining operational safety, efficiency and performance.

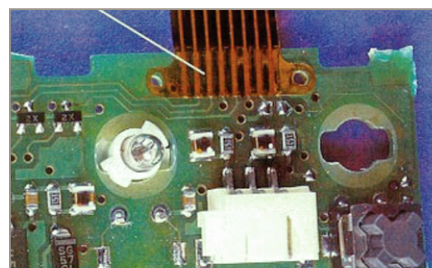
**Pressure & Temperature Sensors • Squib Wires • Wire to Terminals
Honeycomb Assembly • Solar Cell Assembly**



Honeycomb

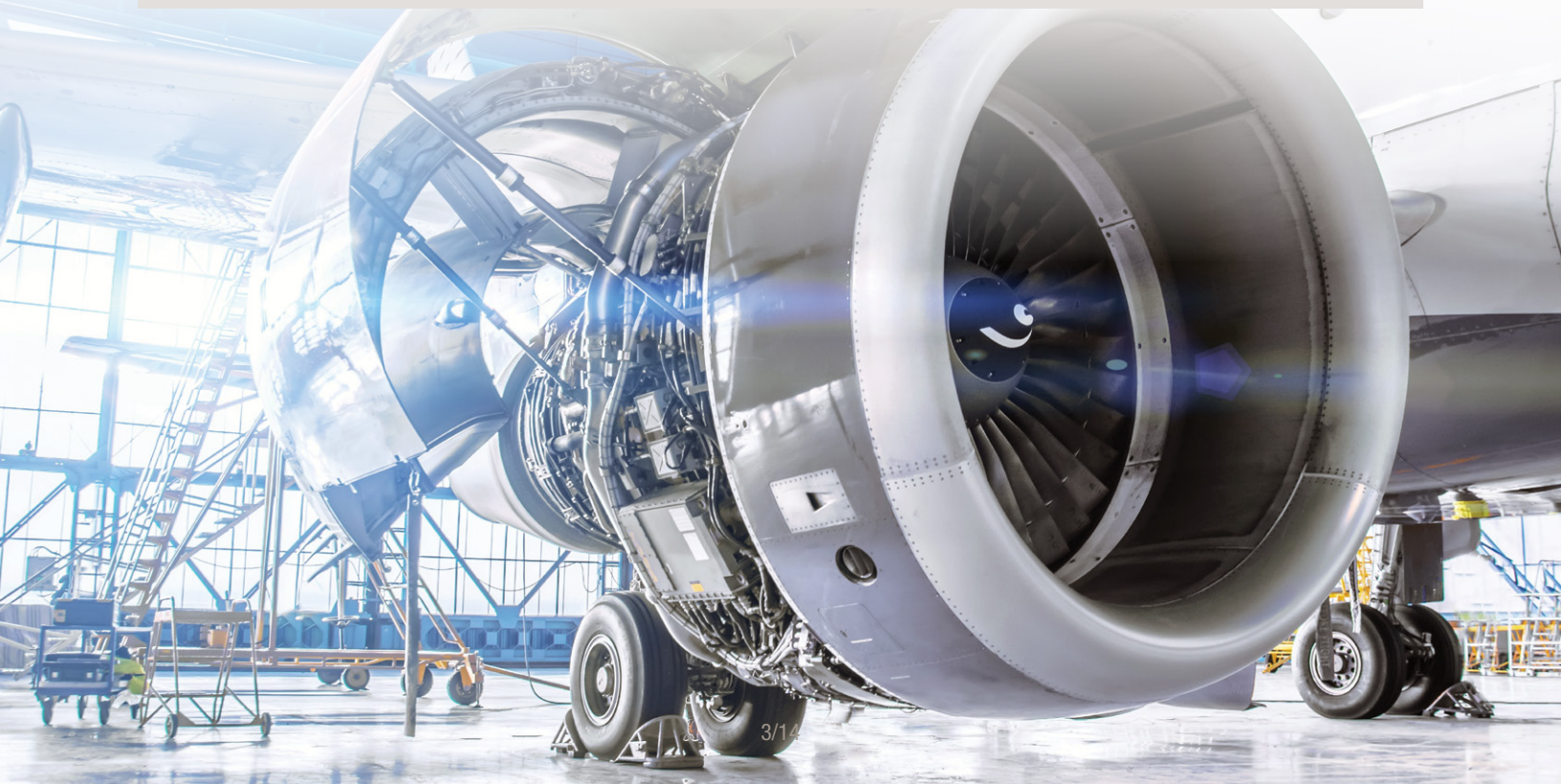


Sensors



Electronic packages

Meeting and Exceeding Industry Standards AMADA WELD TECH's laser and resistance welding equipment ensures precision control through advanced closed-loop processes and real-time process monitoring, enabling manufacturers to achieve consistent, high-quality welds. By maintaining tight control over welding parameters such as current, force, and time, manufacturers may more readily meet the stringent quality requirements outlined in AWS D17.1/D17.1M:2017-AMD1 and AWS D17.2/D17.2M:2019 for aerospace applications. This level of precision not only enhances weld integrity and repeatability but also contributes to meeting the highest safety standards, supporting reliable performance in mission-critical aerospace components.

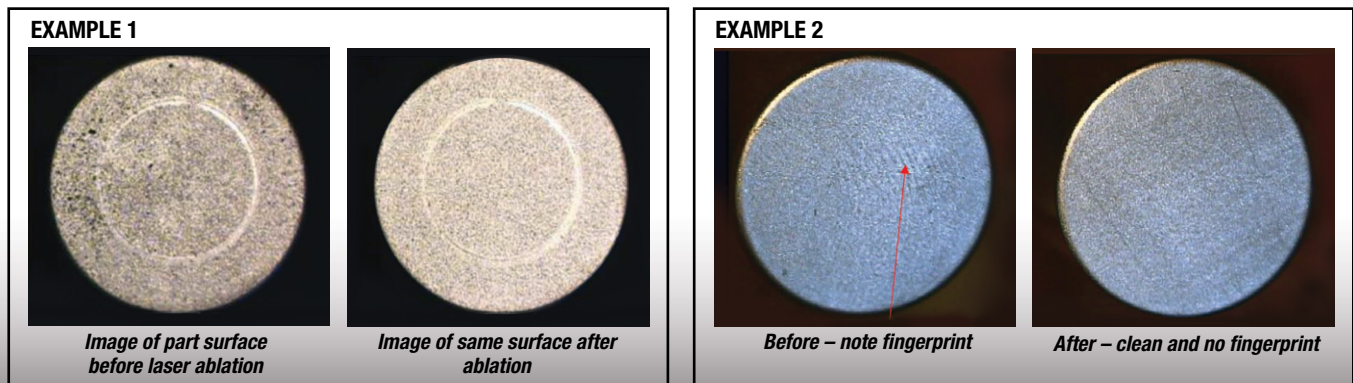


Surface Cleaning Supports High Quality Welds

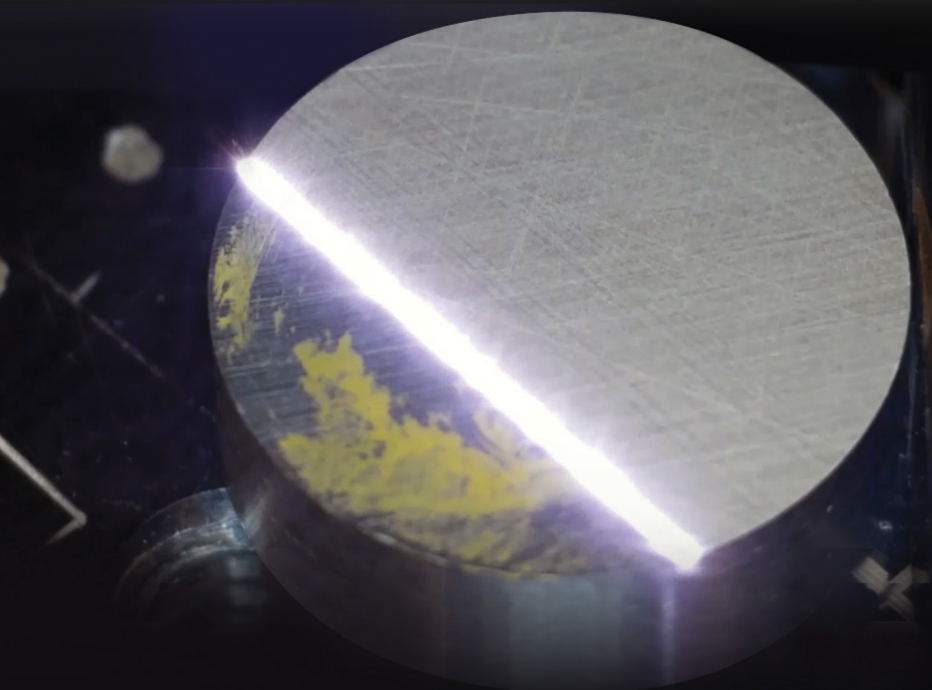
Proper part cleaning plays a critical role in welding success by creating a pristine, repeatable surface for joining. Whether using resistance welding, laser welding, adhesive bonding, or another method, laser cleaning prior to welding can significantly enhance both process consistency and weld quality. Laser cleaning is rapidly replacing sandblasting for many cleaning applications because it reduces the environmental dust hazard for operators and helps prevent the spread of silica dust in adjacent areas.

Laser cleaning works by focusing a laser onto a substrate to remove material on its surface. The amount of material removed depends on the intensity, pulse width and wavelength of the laser, as well as the material itself which absorbs the laser light and breaks down the chemical bonds in the area. It can be achieved with either a pulsed nanosecond (fiber) laser or a continuous wave laser, although the former is more commonly used due to the high level of laser intensity.

Fast • Safe • Cost-effective



AMADA WELD TECH offers a range of fiber lasers and workstations for laser cleaning applications. The exact products selected will depend on many factors including materials, size of parts, and factory space. OSHA has several advisories about silica dust inhalation during sandblasting operations. Using laser ablation reduces this concern.



Part Identification: Product Tracking & Tracing

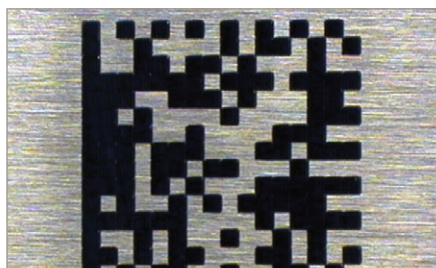
Today's aerospace manufacturers recognize that part identification and traceability are critical for ensuring safety, compliance, and operational efficiency. Every component must be marked with human and machine-readable identifiers, such as alphanumeric serial numbers, data matrix codes, or both, to enable rapid identification throughout the supply chain and lifecycle of the aircraft. This is especially crucial for safety-critical components, including avionics, flight control systems, turbine blades, sensors, and structural elements.

Laser marking is an ideal solution for aerospace applications, offering direct part marking with precise energy delivery that produces high contrast, durable markings with a minimal heat-affected zone (HAZ). This results in high throughput while reducing the need for rework and post-processing. Additionally, lasers can mark both metal and composite materials, making them highly versatile for engine components, landing gear, wiring harnesses and electronic enclosures where durability and traceability are paramount.

High Contrast Marks • High Throughput • Traceability



Metal parts



Electronic packaging



Labels

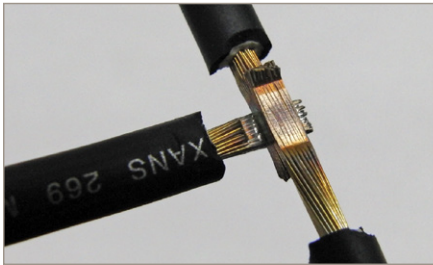
AMADA WELD TECH provides laser engines for automation, desktop and floor standing Class I systems for low volume production and R&D manufacturing, and fully automated bespoke systems. Every laser is delivered with a process developed by our experienced applications engineers, informed by your requirements. Enhance your productivity with: barcode job loading, tie to ERP/MRP, Industry 4.0 ready, vision and fixtureless marking.



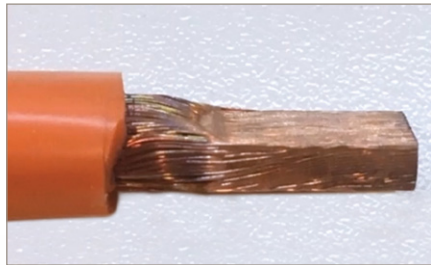
Robust Connections for Wiring Assemblies

Today's aerospace systems require avionics that can operate reliably under extreme conditions. From planes to next-generation spacecraft and satellites, electrical connections must be fault-free and robust to ensure optimal performance throughout their serviceable life. For flexibility and durability, stranded wire is commonly used in cable harnesses to support avionics, flight controls, and power distribution. However, stranded wire can be prone to fraying and short circuits, compromising reliability. Wire compacting is a crucial process in aerospace manufacturing, creating a solid, uniform surface that enhances contact integrity, reduces resistance, and improves long-term reliability in mission-critical electrical connections.

Improved Electrical Connection • Reduced Weight • Directly Weldable



Wire compacting and welding



Stranded wire compacting



Hot crimping terminals to wire

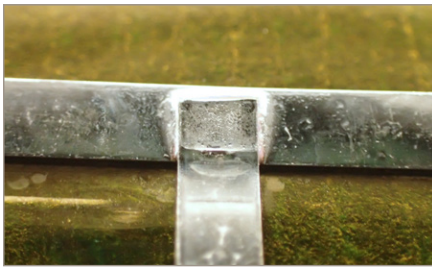
AMADA WELD TECH offers a range of equipment and systems for wire compacting applications of various sizes up to 90 mm². The exact products selected will depend on many things including the wire / cable material, the size/gauge of the wire to be compacted, the degree of compaction required, and your anticipated duty cycle.



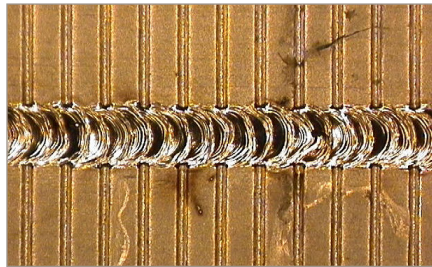
The Road to Successful Solar Cell Manufacturing

As the demand for lower cost energy and satellite internet technology continues to grow, so will the demand for high performance photovoltaic devices to power them. The challenges encountered in bringing these devices to market include the demand for a higher volume of greater performance panels at a lower cost. Translated into manufacturing goals, the panels must deliver long-term performance and reliability even in extreme conditions—such as extraterrestrial solar—be compatible with batteries or grid solutions to address intermittency, and be more cost-effective. Some of these goals can be achieved by considering the joint quality of the various connections and between the panels and the junction boxes (JBox). That's where AMADA WELD TECH comes in!

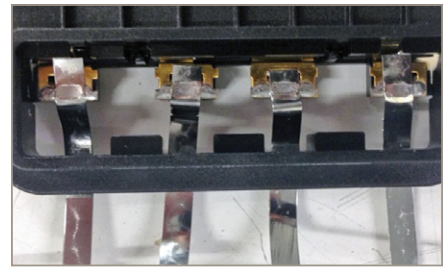
Ribbon to Cell • Flex Circuit to Glass • Lead to Terminal • JBox Connections



Reflow soldering ribbon to busbar



Laser welding lead to terminal



Resistance welding JBox connection

AMADA WELD TECH offers a range of welding technology solutions for solar cell manufacturing including resistance welding, laser welding, laser marking and hot bar reflow soldering. The right solution for your specific application will depend on factors like materials, part accessibility and desired throughput.



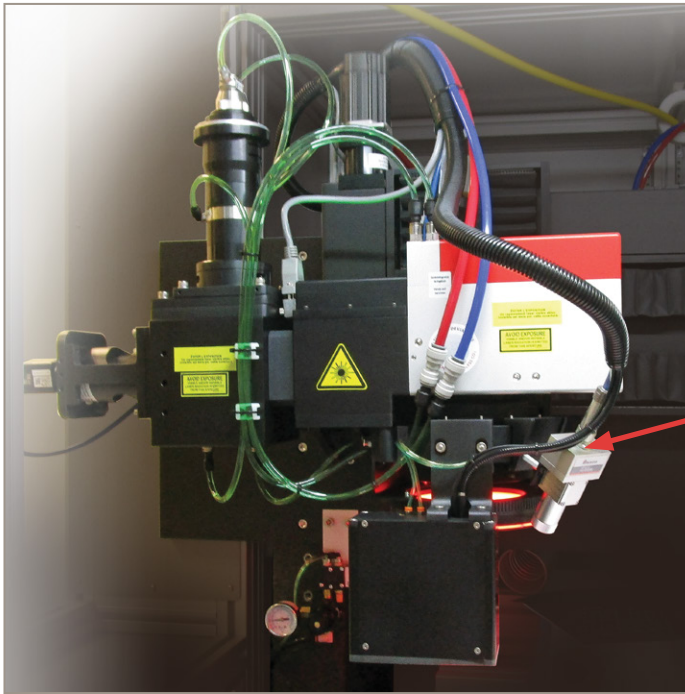
Driving Manufacturing Success with Process Monitoring

As a process manufacturing engineer, what is a worst-case scenario? Product failure, upset customers, and product on stop shipment may be a few examples that come to mind. When these types of instances occur, they require swift attention and accurate resolution: do you know the fundamental underlying issue? Can you calmly and expertly identify the source of the problem and what to do to get back on track? This is where process monitoring comes in. By observing and measuring the process, it is possible to discern good from bad product and, when bad occurs, specify defect signatures. In fact, process monitoring may help manufacturers avoid this situation altogether.

For laser welding, detect and record thermal signals that can indicate weld failure by identifying errors such as gaps between parts, missing parts, over-penetration, incorrect focus and cover gas absence. For resistance welding, monitor parameters like weld current, voltage drop across the electrodes, workpiece expansion and deformation, electrode force, electrode movement (displacement) and more.

The monitor data can also be used to develop better manual or automated workstations that can avoid weld inconsistencies. Plus, data collected with monitors can provide value *after* a product is sold in case of a recall or similar situation, as weld data can be correlated with serial numbers.

Improve Quality • Reduce Downtime • Reduce Scrap



Laser weld monitoring

AMADA WELD TECH offers real-time process monitors for **laser welding, resistance welding, micro TIG welding and hot bar reflow soldering**. These stand-alone monitors are invaluable tools for product development, improving quality and throughput in production, and storing data for traceability.

Off-axis laser weld monitor



Portable resistance weld monitor with a touchscreen interface



Screenshot of laser monitoring software

Innovative Products for Manufacturing

Founded as Unitek in 1948 and now part of the AMADA Group, AMADA WELD TECH has worked to achieve one goal: to solve customers' manufacturing challenges. Knowing there is no one solution that fits all, we strive to provide customers with innovative and reliable manufacturing technology solutions in an effort to be their single source provider.

At the heart of every system we build is one or more of our industry-leading products for advanced manufacturing. The technology selected will depend on your specific application and factors like materials, part accessibility and desired throughput. AMADA WELD TECH has expertise in a number of core technologies ensuring you get the right product for your application, floorspace, and budget.



AMADA WELD TECH Core Technologies

Resistance Welding

- High frequency DC power supplies
- Mid frequency DC power supplies
- Linear DC power supplies
- Capacitive discharge power supplies
- Alternating current power supplies
- Motorized electromagnetic weld heads
- Motorized servo weld heads
- Pneumatic weld heads
- Manual weld heads
- Resistance weld process monitors

Laser Welding

- Fiber lasers
- Nd:YAG lasers
- Blue diode lasers
- Laser weld process monitors

Laser Marking

- Fiber lasers
- UV nanosecond lasers
- Picosecond lasers

Laser Cutting

- Femtosecond lasers
- Fiber lasers

Laser Micro Machining

- Femtosecond lasers
- Picosecond lasers
- UV nanosecond lasers
- IR fiber lasers

Laser Soldering

- Direct diode lasers

Hot Bar Reflow Soldering

- Power supplies
- Hot bar reflow soldering heads
- Hot bar reflow soldering process monitors

Hermetic Sealing

- Projection welders
- Parallel seam sealers
- Gloveboxes

Micro TIG Welding

- Power supplies
- Torches
- Micro TIG weld process monitors

Solutions Overview

AMADA WELD TECH provides several different system configurations tailored to meet your manufacturing and budget requirements: components and subsystems that can be integrated into a production line, standard, semi-automated workstations that are built to specifications, and custom systems that perform a defined application or range of applications. Equipment may be built to CE, CSA, NFPA79 and other requirements upon request.

Components, Subsystems, and Integrator Packages

Select from a range of components and subsystems to incorporate into your own workcell. Built to specification with a range of possible applications, these products are designed to ease the integration onto production lines or minimize cost in an R&D laboratory.



Laser power supplies and focus heads



Resistance welding power supplies, heads, and monitors for battery welding integrator kit



Sigma®LS femtosecond laser subsystem

Standard Systems

Our standard systems are built for specific technologies (laser welding, laser marking, resistance welding, etc.) and applications providing consistent and reliable results for high volume processing.



WL-P100A Laser Processing System



WL-300A Laser Processing Workstation



WR Resistance Welding System

Custom Systems

We design and build custom systems engineered to meet your manufacturing specifications. These systems are fully tested and ready to manufacture product immediately after installation. Custom systems can be designed as standalone, single-operator workstations, or integrated into an automated production line.



Laser micromachining system with conveyORIZED load/unload



AX-5000 Glovebox System



Laser system with robotic handling

Our Philosophy: Define - Design - Deliver

Developing a unique solution geared for advanced manufacturing is complicated. Our approach? Define-Design-Deliver. This methodology helps us design the ideal system to meet your manufacturing needs and budget while maximizing your equipment ROI and meeting your production goals.



Process Assessment

- Determine part usage and success
- Optimize part designs
- Select material

Sample Qualification

- Process sample parts
- Determine optimal production settings



Equipment Specification

- Meets production, quality, and budget criteria
- Product flow
- Customer requirements

Product Assembly

- Engineer oversees project
- Work with customer & technicians



Test and Verification

- Rigorous testing
- System acceptance
- Customer directed

Installation and Support

- Install system and verify functionality
- Train engineers and operators
- Provide continual, ongoing support



Value Added Services

Training

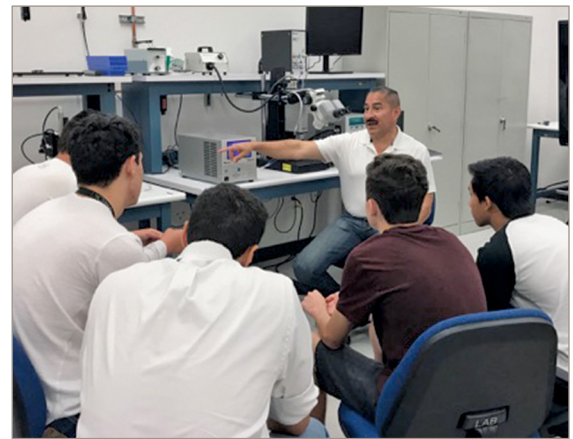
We offer application support and process development services at our Technical Centers in Monrovia, California; Wixom, Michigan; High Point, North Carolina, or on-site at your facility. These services can be tailored to meet your specific needs and may include hands-on equipment training.

Topics

- Technology fundamentals
- Developing process success
- Equipment troubleshooting

Location Options

- On-demand webinars
- Live webinars with Q&A
- Factory hands-on
- On-site training (specific to your equipment)



Around the Clock Service Support to Minimize Downtime

Inevitably something may go wrong. This can be caused by a multitude of reasons, but ultimately the longer that the product is out of order, the larger the impact to your business.

We are there when you need us.

24/7 Field Service

- +1-866-751-7378
- service@amadaweldtech.com



Our Resources, Your Success

Understanding the product and the process - ensuring success! Not sure your application is feasible? Want to know which technology is best suited to your process? Does your existing process require some modification or re-optimization? Our experienced team of Application Engineers are ready to provide assistance!

Technical Centers

- Western Technical Center
- Monrovia, CA
- Midwest Technical Center
- Wixom, MI
- Eastern Technical Center
- High Point, NC

- **Range of Beam Delivery Options** - Fixed, 2D and 3D galvo-scanning, wobble head, trepanning head, multi-axis taper-free cutting head
- **Range of Resistance Welding Power Supplies** - Linear DC, High Frequency, Cap Discharge, and AC Resistance Spot Welding Controls (5 A – 80,000 A)
- **4 and 5 Axis Laser Welding and Laser Micromachining Workstations**
- **Gloveboxes for Processing in an Inert Atmosphere**

Experienced Application and Process Engineers

- 12 full-time application engineers and technicians

Dedicated Development Resources

- **Core Technologies** - Laser welding, resistance welding, laser marking, laser micromachining, laser tube cutting, micro TIG welding, reflow soldering, hermetic seam sealing
- **Facilities** - 10 state-of-the-art application labs for all core technologies
- **Range of Lasers** - CW, QCW and dual beam fiber lasers, diode-pumped solid-state (DPSS) lasers, Nd:YAG lasers, picosecond lasers and femtosecond lasers



Western Technical Center

