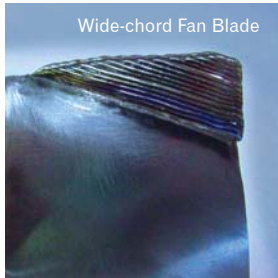


LAWS 500™

Liburdi Automated Welding Systems



3 - 5 Axis

High Volume Small Part Production or Repair Welding Systems

Best Suited for HPC tip Lead Edge / Trail Edge Weld Repairs

Optical Recognition of Part Configurations Types and Programs

Available for PAW, GTAW and Laser process

Optionally Automated Part Handling

The LAWS 500 automated welding system is ideal for small parts, compressor HPC, LPT and HPT blade weld repairs.

This multi-axis robotic system offers fully coordinated motion for welding complex geometric components. The optional capability of integrating a robotic arm for part manipulation, loading and unloading of components.

The LAWS 500 is in service globally as a stand alone system for single part flow or as a fully integrated system in an automated production cell.

To accomplish the necessary motion and vision operations a high end, latest generation "digital signal processor" DSP I/O is coupled with a state of the art computer controller. Available 3D vision optics for part characterization and motion control.

Graphical user interface with English block by block text program.

Ease of use with accurate, repeatable performance.

We also offer the option of Liburdi's "Turn-Key" systems, which include the development of the weld process, NDT examination, metallurgical certification, training and start-up.

Smallest shop foot print 40"(102cm) x 36"(91 cm) x 95"(241 cm) for an automated welding system.

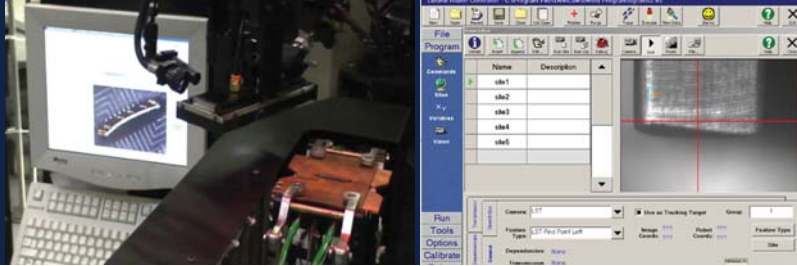
Automated Part Handling

Rack mounted trays are inserted into the loading cell with 40-70 blades depending on size for batch processing. The robot picks and places each blade one by one in sequence for weld tip restoration. Blades are then placed back in their rack for the next batch after each weld. Please consult factory for compatible blade types and batch processing solutions that will increase your productivity.



LAWS 500™

Liburdi Automated Welding Systems



Physical Characteristics

Design: Compact Multit-Axis Architecture
 Height: 95" (242 cm); 107" (272 cm) with "Z" axis fully extended
 Length: 40" (102 cm)
 Width: 36" (91 cm)
 Weight: 1800 lbs (818 kg)
 Number of Axes: 4 Standard (X,Y,Z,W)
 Optional synchronized axis available.
 Optional multi station indexer on tooling.

*** Laser Design: Compact Rectilinear Architecture**
 Height: 73" (185 cm)
 Length: 43" (109 cm)
 Width: 37" (93 cm)

Servo Axis Specifications

Axis	Travel	Velocity
X	18" (46 cm)	200 IPM (85 mm/sec)
Y	18" (46 cm)	200 IPM (85 mm/sec)
Z	12" (30 cm)	200 IPM (85 mm/sec)
W - Rotary (Torch)	340°	11.7 RPM

Utilities

Primary Voltage: 230 VAC - Single phase
 Current: 50/60 Hz @ 30 Amp
 Argon: 30 psi (regulated) (200 kPa)
 Air: 80 psi (depending on tooling) (550 kPa)

*LASER Utilities

Primary Voltage: 460 VAC - Three phase
 Water: 60 psi @ .3 gpm (depending on tooling)
 (410 kPa @ 1.2 l/min)

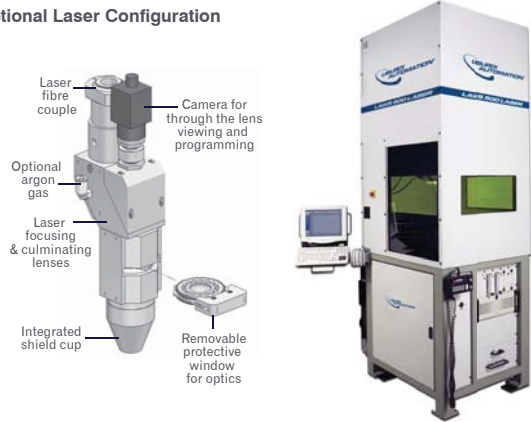
Operating Environment

Temperature: 50°F to 100°F (10°C to 38°C)
 Relative Humidity: 10% to 80% (Non-Condensing)

Repeatability	Accuracy
± .001" (± .025 mm)	± .002" (± .050 mm)
± .001" (± .025 mm)	± .002" (± .050 mm)
± .001" (± .025 mm)	± .002" (± .050 mm)
± .01°	± .1°

Optional Table Axis Specifications

Optional Laser Configuration



Optional Laser Power Supply Specifications

Standard: 500 watt CW (Continuous Wave) ND:YAG
 Duty: Continuous 100%
 Pulsation: 100 Hz to 500 Hz
 Optional: System can be configured to use other lasers, types & powers

Optional Powderfeed Assembly (Laser)

Program controlled powder delivery
 Fast response rate (1.5 seconds)
 Feed rate of 1 to 5 grams per second

Options

- Real time weld monitoring
- Off-line computer programming
- Service Plus: Bronze, Silver, Gold, and Platinum
- High Precision Axis
- Standard keyboard interface
- Closed circuit water cooler for torch
- Laser Seam Tracker
- Mass flow controllers for gas systems
- Tooling design and weld development
- LCD touch screen
- Printer
- Operator Pendant

Welding Power Supply Specifications

Standard: Liburdi Puls weld® LP100 PAW Power Source
 Current: 1 - 50 Amps - <0.5 % peak-to-peak ripple
 Accuracy: 1 % of full scale
 Power: 0.75 kW mix
 Duty: Continuous 100%
 Pulsation: Up to 20 KHz
 Optional: GTAW/PAW current sources in Straight and Variable Polarity and LASER

Standard System Includes

- Air conditioned cabinet and integral fixture cooling system
- High Precision Axis
- LCD touch screen and standard keyboard interface
- Blade Pendant
- Closed circuit water cooler for torch
- WinLaws software
- Liburdi DSP I/O with up to 20 KHz pulsing
- Coordinated Motion
- Mass Flow Controller for Plasma gas systems

Wirefeed Assembly

- Micrometer adjustment for torch/wire position
- Compact motor drives located at the weld head near the torch
- Precision feed and retract under computer control

Gas Console

- Gas scrubber cartridge system
- Typical gases include Argon, Argon/Helium and Argon/Hydrogen

Liburdi Vision System™ (LVS)

- Latest 3-D version 3.0 software proven reliable in all installations

Liburdi Robotic Controller™ (LRC)

- English language programming, designed for welding
- PC based, high performance, easily upgradable
- Fully integrated with vision system, graphical user interface
- Weld parameter generator and data logging capability
- Articulated pendant control with overrides

Weld Head Assembly

- Features precision wire motion and pulsing technology
- Micrometer adjustment for torch centering and wire positioning
- Single or dual wirefeed available (up to 100 ipm feed rate)
- Compact reliable design

