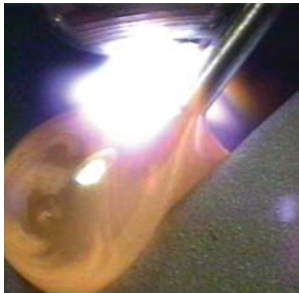
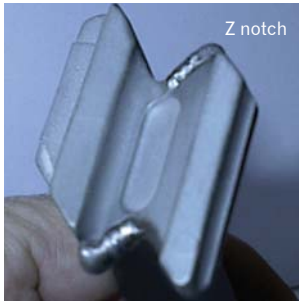


LAWS 1000™

Liburdi Automated Welding Systems



3 - 6 Axis

Multiple Work Station

3 Welding Process Available on 'One System' including Laser, Plasma and GTAW

Multiple Feed Modes:
Wire
Powder
Autogenous

The LAWS 1000 overhead gantry style, with 3-6 axis can accommodate multiple fixture locations.

The Liburdi Vision System™ (LVS) three dimensional imaging and processing obtains torch path and weld parameters. LVS is fully integrated with PC based Liburdi Robotic Controller™ (LRC) for real-time monitoring during the weld process. Internal/External tungsten electrode extension capability to extend the equipment versatility and utility for special applications.

Laser Options

- YAG, fibre laser power supply technology
- LAWS 1000 frame and architecture with class 1 enclosure
- Arm pendant and controller
- Pneumatic break away safety feature
- Working envelope 18" (46 cm) x 32" (81 cm) x 12" (30 cm)
- Typical part size 24" (60cm) x 12" (30cm)

- Through the lens viewing system
- Mass flow controller
- Optional wire feed
- Recirculated powder hopper

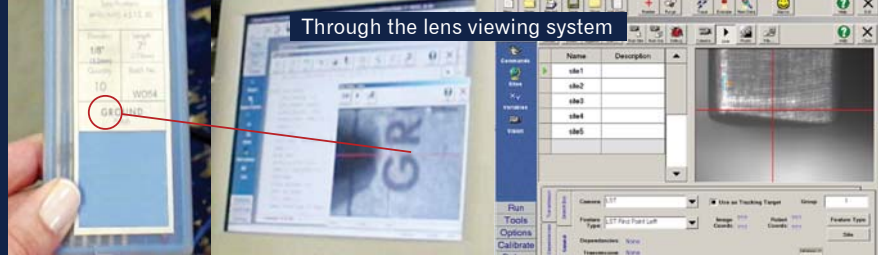
Liburdi Automation provides single source design and support responsibility for all robotic motion systems, vision systems, welding power supplies and advanced controllers. Complete engineering support is also available to develop weld parameters, weld inspection and metallurgical tests to qualify the weld process.

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. Configuration for a variety of aerospace and industrial applications, including HPT blades, shrouded LPT blades, compressor blades and seals.



LAWS 1000™

Liburdi Automated Welding Systems



Physical Characteristics

Design: Overhead Gantry architecture
 Height: 96" (244 cm) when "Z" is in lower limit
 112" (284 cm) when "Z" is in upper limit
 Length: 74" (188 cm)
 Width: 57" (145 cm)
 Weight: 4000 lbs (1815 kg)
 Number of Axes: 4 Standard (X,Y,Z, 'W'rotary) for overhead torch motion.
 Additional synchronized rotary and tilt axis available on table as an option.
 *Also multi position indexer available (shown)

*Laser Physical Characteristics

3 Standard (X,Y,Z) for overhead torch motion.

Utilities

Primary Voltage: 220 VAC - Single phase ± 10%
 Current: 50/60 Hz @ 30 Amp
 Argon: 30 psi (regulated) (200 kPa)
 Air: 80 psi (depending on tooling) (550 kPa)
 Water: 60 psi @ .3 gpm (depending on tooling) (410 kPa @ 1.2 l/min)
 * Multi position indexer available

*LASER Utilities

Primary Voltage: 230 VAC - Single phase (Robot)
 460 VAC - Three phase (Laser)
 Current: 60 Hz @ 30 Amp (Robot)
 60 Hz @ 22 KVA (Laser)
 Argon: 60 psi (400 kPa)

Servo Axis Specifications

| Axis | Travel | Velocity | Repeatability | Accuracy |
|---------------------|-------------|---------------------|---------------------|---------------------|
| X | 24" (61 cm) | 200 IPM (85 mm/sec) | ± .001" (± .025 mm) | ± .002" (± .050 mm) |
| Y | 36" (91 cm) | 200 IPM (85 mm/sec) | ± .001" (± .025 mm) | ± .002" (± .050 mm) |
| Z | 18" (46 cm) | 200 IPM (85 mm/sec) | ± .001" (± .025 mm) | ± .002" (± .050 mm) |
| *W - Rotary (Torch) | 340° | 11.7 RPM | ± .01° | ± .1° |

Optional Table Axis Specifications

| Axis | Travel | Velocity | Repeatability | Accuracy |
|------------|--------|----------|---------------|----------|
| R - Rotary | ∞° | 30 RPM | ± .01° | ± .1° |
| T - Tilt | 120° | 30 RPM | ± .01° | ± .1° |

Accuracy

Operating Environment

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

Gas Console

Gas scrubber cartridge system (*opt on laser)
 Typical gases include Argon, Argon/Helium and Argon/Hydrogen

Welding Power Supply Specifications

Standard: Liburdi Puls weld® LP100 PAW Power Source
 Current: 1 - 50 Amps - < 0.5% peak-to-peak ripple
 Accuracy: Better than 1%
 Power: 0.75 kW max
 Duty: Continuous 100%
 Pulsation: Up to 20 kHz
 Optional: 200 Amp GTAW/PAW current sources in Straight and Variable Polarity.
 100 Amp GTAW/PAW current source

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
 Hand held pendant control with overrides

Arc Voltage Control (AVC)

Constant arc voltage gap is maintained using precision digital filters

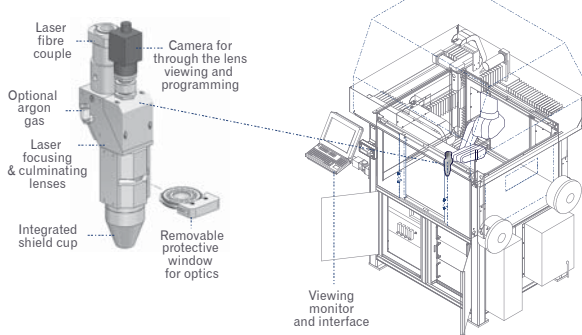
Standard System Includes

Air conditioned cabinet
 Specialized precision GTAW or PAW torches
 *(Specialized precision focusing head)

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

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

- Articulated arm
- Laser specialized precision focusing head
- Real time weld monitoring and video playback
- Mass flow controller for PAW orifice gas
- Printer
- Off-line computer programming
- Dual wire feed
- Service Plus: Bronze, Silver, Gold, and Platinum

