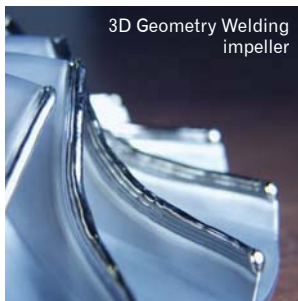
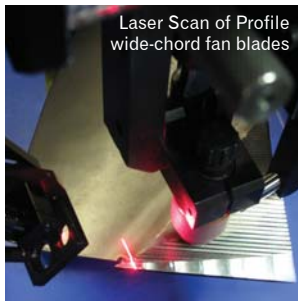


LAWS 4000™

Liburdi Automated Welding Systems



5-7 Axis Coordinated
Multi-Axis Welding System

Max Diameter of Part
40" (1000 mm)

Max Length Parts
30" (750 mm)

Max Weight 1500 lbs @ 6" ϕ

System Capability

Accessory Assembly Bosses

Fuel Flange Nozzle Bosses

LPT & HPT Parts

Boss Welding

Cases

The LAWS 4000 unique open architecture provides a large working envelope, ergonomically designed for safety and ease of operation. The X and Z axis are positioned overhead for accuracy and operating convenience. The LAWS-4000™ offers computer synchronized pulsing of the wire and current to yield exceptional heat management at the torch. This unequalled heat management feature allows the LAWS-4000™ to process critical aerospace parts like thin knife edge seals, turbine cases and combustor liners with superior results.

Liburdi Robotic Controller™ (LRC)

Powerful PC based controller for high reliability and ease of maintenance, graphic display features for critical weld parameters, easy to use English language programming and multi feature pendant designed specifically for welding.

Liburdi Seam Tracker™ (LST)

The latest in innovative laser line scanning technology designed especially for the LAWS™ system. This is a flexible structured light sensory system using high resolution 3-D laser system and multiple cameras for superior imaging and feature recognition. The information is processed by the PC based Liburdi Robotic Controller™ (LRC) for precise telemetry feedback to the motion system. Even the most difficult geometry can be welded automatically with the vision technology.

With the option of Liburdi's "Turn-Key" systems, we can provide development of the weld process, NDT examination, metallurgical certification, training and start-up.



LAWS 4000™

Liburdi Automated Welding Systems



Physical Characteristics

Design:	Multi Axis Circumferential
Height:	97" (250 cm)
	115" (300 cm) when Z axis is in upper limit
Length:	135" (350 cm)
Width:	59" (150 cm)
Weight:	4500 lbs (2050 kg) without tooling
Number of Axes:	5 standard (X, Y, Z, Rotary, Tilt) additional W axis available

*** Laser Design:** Circumferential welding
Height: 125" (318 cm)
Length: 84" (213 cm)
Width: 78" (198 cm)

Utilities

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

*LASER Utilities

Primary Voltage:	400-800 VAC, three phase $\pm 10\%$
Current:	50/60 Hz @ 40 Amp
Argon:	30 psi (regulated) (200 kPa)
Air:	80 psi (depending on tooling) (550 kpa) 60 psi @ .3 gpm (depending on tooling) (410 kPa @ 1.2 LPM)

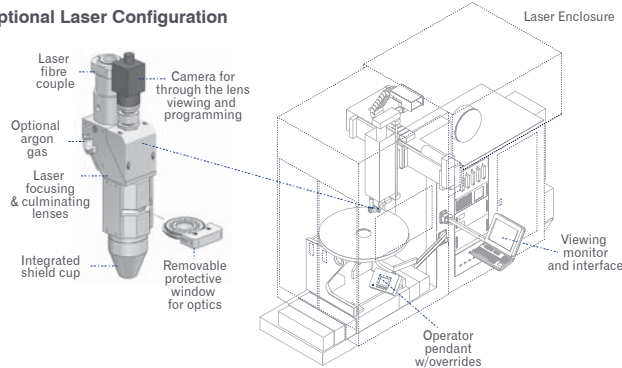
Servo Axis Specifications

Axis	Travel	Velocity	Repeatability	Accuracy
X	30" (1.1m)	100 IPM (42 mm/s)	$\pm .001"$ ($\pm .025$ mm)	$\pm .005"$ ($\pm .050$ mm)
Y	18" (.72m)	100 IPM (42 mm/s)	$\pm .001"$ ($\pm .025$ mm)	$\pm .005"$ ($\pm .050$ mm)
Z	18" (.77m)	100 IPM (42 mm/s)	$\pm .001"$ ($\pm .025$ mm)	$\pm .005"$ ($\pm .050$ mm)
R - Rotary (Table)	∞°	5 RPM	$\pm .01^\circ$	$\pm .05^\circ$
T - Tilt (Table)	110°	2 RPM	$\pm .01^\circ$	$\pm .05^\circ$

Optional Table Axis Specifications

Axis	Travel	Velocity	Repeatability	Accuracy
R - Rotary	∞°	30 RPM	$\pm .01^\circ$	$\pm .1^\circ$
T - Tilt	120°	30 RPM	$\pm .01^\circ$	$\pm .1^\circ$

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

- Liburdi Vision System™ (LVS), latest 3-D version 3.0
- Vision Seam Tracking™
- Real time weld monitoring
- Printer
- Off-line computer programming
- Operator Pendant
- Service Plus: Bronze, Silver, Gold, and Platinum

LCD touch screen and
 Closed circuit water cooler for torch
 Laser Seam Tracker
 Mass flow controllers for Plasma gas systems
 Tooling design and weld development

Operating Environment

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

Welding Power Supply Specifications

Standard:	Liburdi Pulsaweld® P200 GTAW Power Source
Current:	0.1 - 200 Amps - < 0.5% peak-to-peak ripple
Accuracy:	1% of full scale
Power:	3 kW average
Duty:	Continuous 100%
Pulsation:	up to 20 KHz
Optional:	200 Amp GTAW/PAW current sources in Straight and Variable Polarity and LASER

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

Standard Features

WinLAWS software
 Liburdi DSP I/O with up to 20 KHz pulsing
 Coordinated Motion
 Three solenoid controlled gas lines with flow sensors
 standard keyboard interface

