



LIGHTWELD 1500 XC

**Handheld Laser
Welding & Cleaning System**

Handheld Laser Welding with Pre and Post Weld Laser Cleaning



High-Speed Laser Welding

- Fast weld time and fast set-up
- Low heat input for low part distortion
- Easy to learn & use – even novices make great welds

Pre-Weld Surface Preparation

- Improve weld quality by removal of contaminants
- Pre-clean allows more consistent and repeatable welds



Post-Weld Polishing

- Remove soot, weld-related debris and heat discoloration
- Accelerate or eliminate further finishing steps
- Eliminates abrasives and toxic chemicals

LightWELD XC

Laser Welding and Cleaning in a Single Tool



LightWELD 1500

- ❑ 1500 W High-brightness beam for thick, thin and reflective metal welding
- ❑ Welding head and 4 nozzles for different joint types
- ❑ CW, Pulsed and Wobble Operating Modes
- ❑ Pre-set welding modes for fast parameter setting
- ❑ Air Cooled – Compact, Single Unit

LightWELD 1500 XC

All the functionality of the LightWELD 1500

PLUS

- ❑ High frequency pulsed laser mode 2500 W pk power
- ❑ Wide (15 mm) scan field for high-speed coverage
- ❑ Weld head nozzle cleaning attachment with 3 tips
- ❑ Pre-set cleaning mode software

LightWELD Laser Source

IPG Custom Designed Fiber Laser Source

- 1500 W average, 2500 W peak output power,
- 50 μm fiber delivery to welding head
 - Spot on target 150 μm dia. ($\sim 8.5 \text{ MW}/\text{cm}^2$)

IPG Custom Laser and Head Controller

- Tightly integrated total system control
 - Laser, Head, Gas Control, Safety
- Simplified front panel interface
- Minimized component count for space and reliability

High-Efficiency Air-Cooled Base Unit

- Eliminates need/cost for water cooling
- Increases overall system reliability
- Increases portability



LightWELD

An Alternative to MIG and TIG Welding



Handheld Laser Welding is:

- Faster – Less prep and shorter weld time
- Higher Quality – Less post weld grind/clean
- Less Heat – Less part distortion and damage
- Easy to Set up – Unbox and assemble in minutes
- Easy to Learn & use – High-quality welds in just a few hours for pros and novices

LightWELD

An Alternative to MIG and TIG Welding

	Traditional Welding Methods	LightWELD Laser Welding
Speed	Average	Up to 4X Faster than TIG
Quality	Depends on user experience	Consistent high-quality results
Learning Curve	Steep	Quick and easy
Material Flexibility	Limited with consumables changes	Wide range with no set up
Distortion & Deformation	High	Very low
Heat Affected Zone	Large	Small
Wobble Welding	NO	Yes- up to 5 mm additional weld width



TIG welding:

- High heat input – part distortion
- Extensive finishing required
- Difficult on thin metals
- Limited on dissimilar thickness

MIG welding:

- Consumable wire
- Cleaning & beveling
- Work angles challenging



LightWELD:

- Dramatically faster
- Easier to learn
- Higher-quality results
 - Less distortion
 - Easier finishing

LightWELD is Faster



LightWELD Speed Advantages (Thin)

- ✓ Shorter “Beam On” Time
- ✓ No gap setting and adjustment time
- ✓ No post weld grinding

Example: 0.134” (3.4 mm) Low Carbon Steel

	Butt weld	Tee Weld
MIG Weld:	24.6 sec	27.9
TIG Weld:	41.4 sec	50.3
Light WELD :	20.8 sec	19.7

Note: TIG process typically used for thinner metals and stainless due to lower heat distortion and increased control

LightWELD Speed Advantages (Thicker)

- ✓ Much shorter “Beam On” Time
- ✓ No edge beveling grinding
- ✓ No cool down time between passes

“ Much faster and easier than TIG ”

LightWELD is Higher Quality

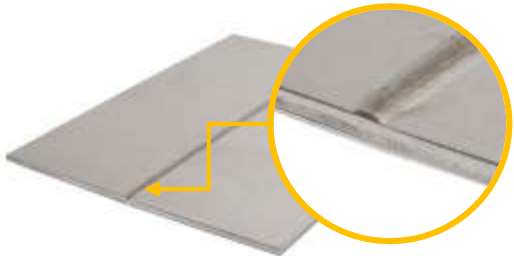
LightWELD

TIG Weld

Bead



Root

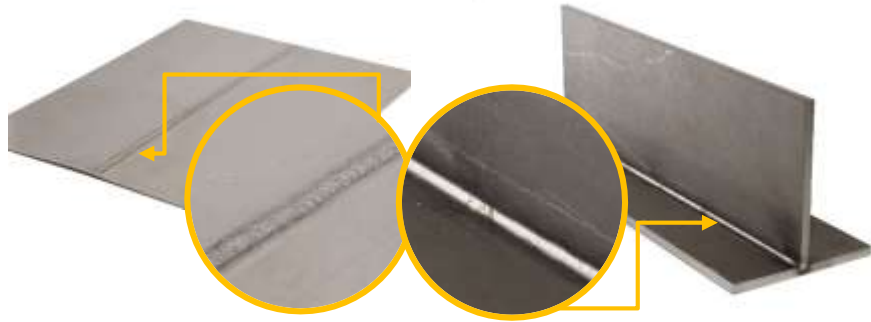


Better / Cleaner Weld

“We had been turning down jobs for thin copper and aluminum – with this we could do them”

LightWELD is Higher Quality

LightWELD



Better / Cleaner Weld

“We had been turning down jobs for thin copper and aluminum – with this we could do them”

Less Heat Related Defects

“The low distortion is unbelievable”

Traditional Weld



LightWELD is Higher Quality



Better / Cleaner Weld

“We had been turning down jobs for thin copper and aluminum – with this we could do them

Less Heat Related Defects

“The low distortion is unbelievable”

Requires Zero, or Little Finishing

“...a quick kiss on both sides [weld edges] and its done”

LIGHTWELD is Easy to Use



Part Preparation (Up to 4 mm single side)

- Position parts with zero gap

System Setup

- Pre-defined material/thickness process modes
- Ready to go

Welding Process

- Draw head along seam in smooth motion

Save Parameters

- Create new stored mode for rapid recall

Does Not Require Years of Skilled Craftsman Training

Unique Laser Welding Applications

**Overlap
Thick to Thin**



Thin-to-thick
Thick material acts as heatsink for MIG & TIG



**Dissimilar
Metals**



10 mm Mild Steel
Dual-side weld, one pass each
side, no bevel preparation

Thin Copper



LIGHTWELD Examples

Mild Steel ¼" (6 mm) Tee Joint

.120" deep (3mm) weld at 45° Angle
Locking plate to eye hook



Aluminum Tee Joint

.120" (3 mm) base to .080" (2 mm) Back Plate

Tacking spot weld followed by seam weld

Single Button Recipe Selection to Switch Between Materials

LIGHTWELD Welding Examples

Stainless Steel Flange Weld

.120" deep (3mm) flange welded to stainless steel tube



Aluminum Lap Joint Spot Weld

.080" (2 mm) Top Plate, to .040" (1 mm) Base Plate

Shooting through thick piece and stopping within thinner bottom piece

Laser controls ensure uniformity of each weld

Single Button Recipe Selection to Switch Between Materials

LightWELD XC

Pre and Post Weld Cleaning

LightWELD XC Laser Cleaning:

- ❑ Uses high frequency pulsed laser capability
- ❑ Laser pulses evaporate lighter elements and/or melt metal
 - Precise parameter control allows fine-tuning of surface effect
- ❑ Evaporated materials swept away by process gas stream
 - Fume extraction collects all debris
- ❑ Cleaned area can be tightly defined
 - Adjustable scan width maximizes throughput while limiting affected area
- ❑ Very low heat input – **NO** distortion effects
- ❑ Parts immediately available for next process step

Light**WELD XC** Pre Weld Cleaning

Pre-Weld Cleaning reduces spatter, reduces potential for weld voids, gives higher weld strength and quality, with greater consistency and repeatability

Pre-Weld Cleaning Typical Examples:

- **Stainless Steel – Removal of grease & oil**
- **Aluminum – Removal of excess oxide**
- **Mild Steel – Removal of rust**
- **Galvanized Steel – Removal of zinc**



LightWELD XC Full Welding Cycle

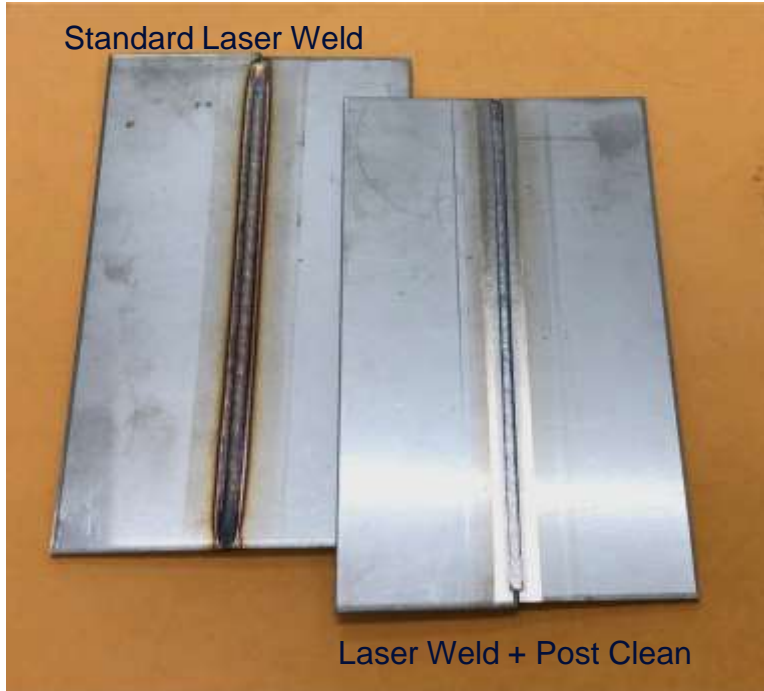
Start the work by checking essential tools for welding and necessary related related parts



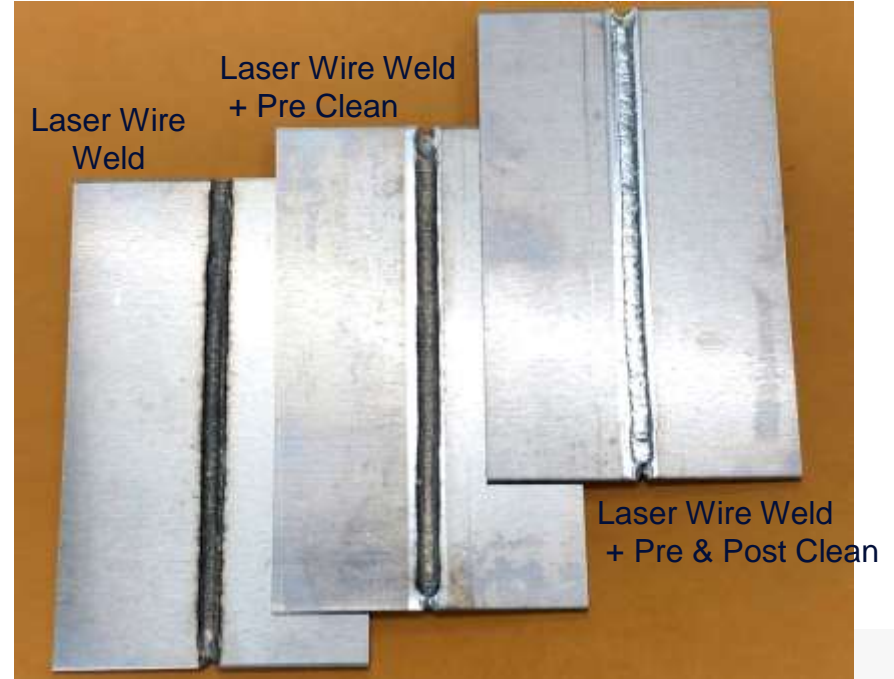
LightWELD XC Post Weld Cleaning

Remove soot, weld-related debris and discoloration

Stainless Steel, 2 mm



Aluminum 5000, 2 mm



Key Features of the LIGHTWELD 1500

Maximize Welding Performance

- Powerful laser with flexibility across material types and thickness
- Multiple operating modes for maximum welding capability
- Cleaning modes for enhanced weld quality and finishing
- Simple controls for ease of use
- Compact packaging for portability
- Safety designed in



Handheld Laser Welding & Cleaning

LightWeld Key Benefits

- Faster (Setup & Weld)
- Higher quality weld (Less finishing)
- Lower heat input
- Less part distortion
- Less part stress
- Better dimension control
- Greater material flexibility
- Easy to use (less training)



**Significantly lower
cost per welded part**

LightWELD – Next Generation Welding

Become a leader in next-generation welding technology, and add your experience to these early users:

“Welding with clean outside corners is huge. This gives us almost-finished product with almost no follow on process”

“Can’t believe the travel speed - phenomenal”

“Gave a great weld... Perfect penetration”

“Travel speed and diversity of materials that can be welded is unbelievable”

“Set up is minimal – the set up time unbelievable – we don’t get paid for setup”

“Once a process is dialed in even a lower skilled worker can get results – Great looking welds”



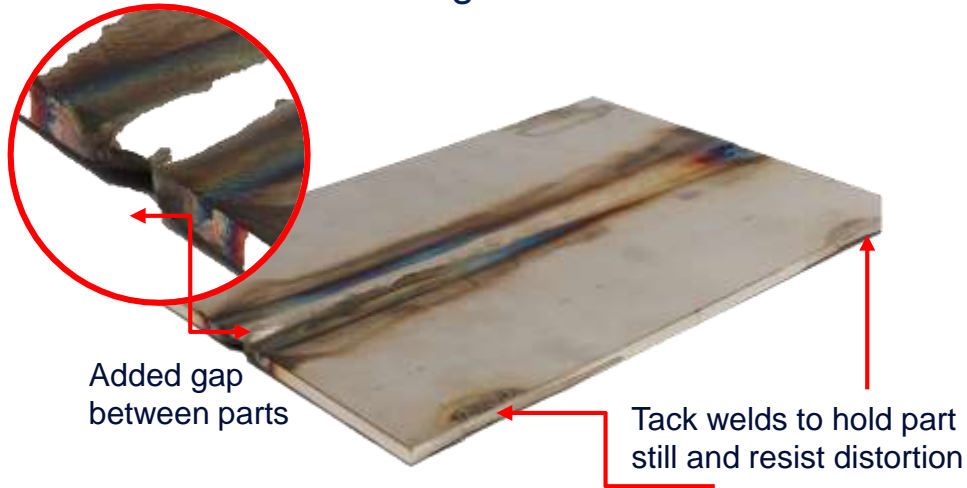


THANK YOU

Improved Dimensional Control

Example: 3 mm Aluminum

TIG Welding



LightWELD



Clean, Strong, Easy setup
Lower stress

Improved Dimensional Control

TIG Welding

Also Simplifies Setup

Laser Welding



Added gap between parts
2X speed shown



LightWELD Welding Head



Integrated Head Design

- Beam forming optics (40 / 120 mm)
- Wobble (scan) function (5 mm)
- Gas delivery
- Part-present sensing circuits
- Focus adjustment via nozzle selection

IPG Weld Head Features

- 2- Position Trigger (Safety/Gas – Weld)
- High-brightness guide beam on first trigger position
- Laser-On indicator
- 5 m (16 ft) single wrapped umbilical
 - 10m (32 ft) Optional

Air-Cooled Compact Base Unit

- ✓ Less power consumption and operating cost
- ✓ Higher welding performance
- ✓ Small floor space
- ✓ Greater portability



High-efficiency IPG fiber laser technology enables highest output power air-cooled laser welding system on the market

- No additional water chiller requiring power and floor space
- Improved availability by eliminating chiller unit pipes, components, controls and maintenance

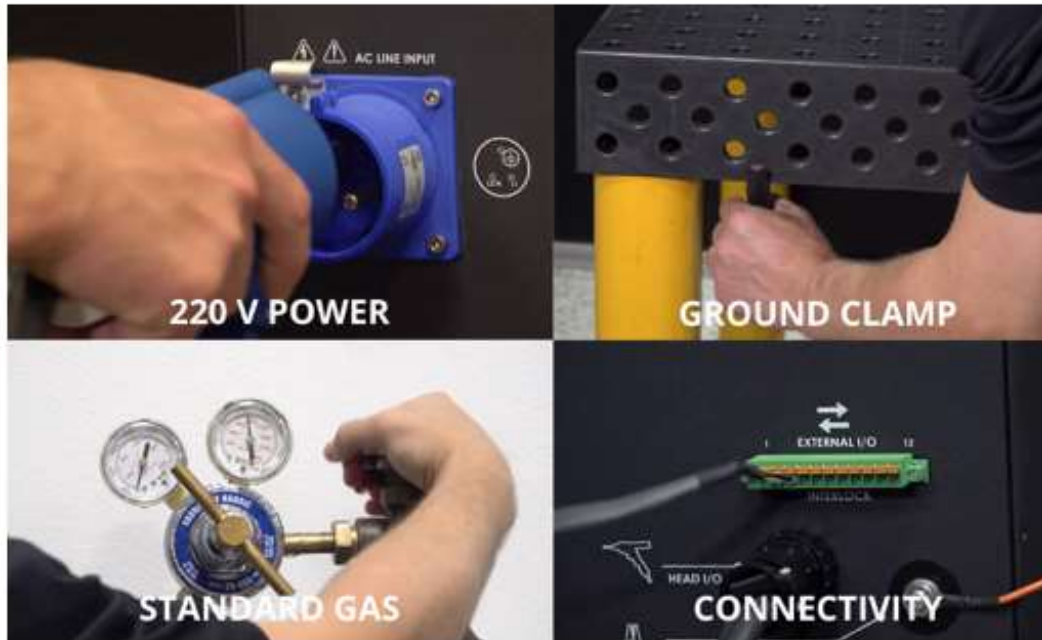
Dedicated system controller optimizes performance and reduces size

- Integrated custom controller ensures maximum matching of laser generator and intelligent weld head performance

LightWELD Simple Installation

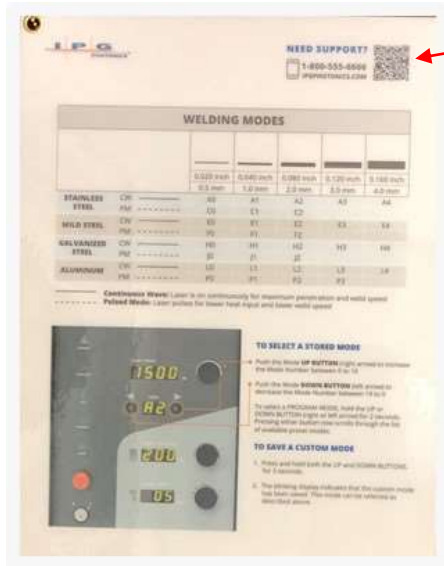
Simple Installation and Operation

- 220 V, 20 A, single phase power
- Standard welding gas bottle
- Compact, portable welding unit:
 - (LxWxH) 641x316 x534 mm, 53 kg (25.2"x12.4"x21", 118 lbs)
- No consumable electrodes required



LightWELD Operator Support Videos

Laminated Process Mode Chart



QR Code opens
Support Web Page

Serial number login

Access to support
downloads and videos

- Initial Set Up and System Overview
- Program Modes and Control Adjustments
- Laser Welding Basics and Parameter Settings
- Computer Control for Customized Settings
- Safety Information and Procedures for Safe Operation

