

Laser Weld
MONITORING & CONTROL





LASER WELDING

Joining materials has never been easier. Contact-free, high-speed, high-precision laser welding is the process of choice for advanced manufacturing across countless industries.



INLINE WELD MONITORING

Unmatched multi-factor laser welding quality assurance. Non-destructive real-time weld measurements without the associated time and cost of traditional sectioning.

LDD-700

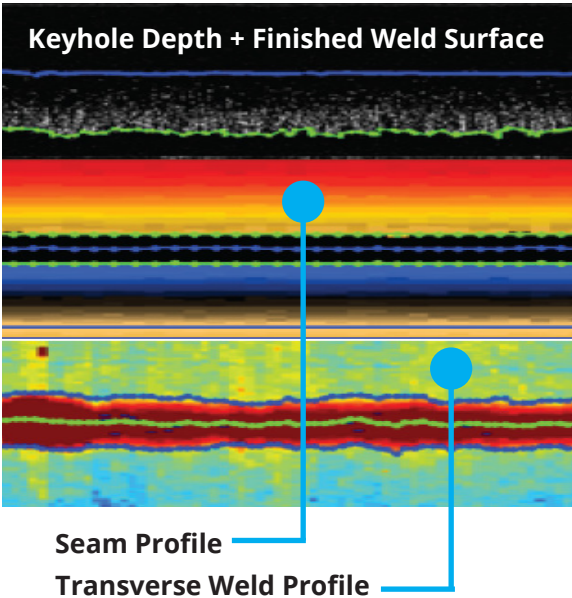
Welcome to the new paradigm in industrial laser welding quality assurance. Utilizing real-time inline coherent imaging (ICI) the LDD-700 weld monitoring system consolidates weld results into concise and actionable quality data from a single system. The system produces a low-power measurement beam through the same optics that deliver the welding laser. LDD sees what the process beam sees, which enables measurements to be rapidly conducted across multiple locations on the part.

Measurements can be taken before welding occurs to prevent bad welds from being made or measurements can be taken during the weld if cycle time is the priority. Every measurement is expressed in calibrated units, which means that results are comparable between different shifts, lines, suppliers, months and factories globally.

Pre-weld monitoring modes include tracking of the seam position, checking the working distance to the material, and looking for gaps, bad fixturing or bad fit-up BEFORE processing begins. In-weld real-time monitoring at the bottom of the keyhole records the penetration and fusion depth of the weld for loss of or over-penetration and process instability. Post-weld inspection measures properties such as the height of the finished weld surface, the width of the weld bead and the presence of surface defects like pits and blowouts.

LDD provides 20+ calibrated measurements of every weld, including:

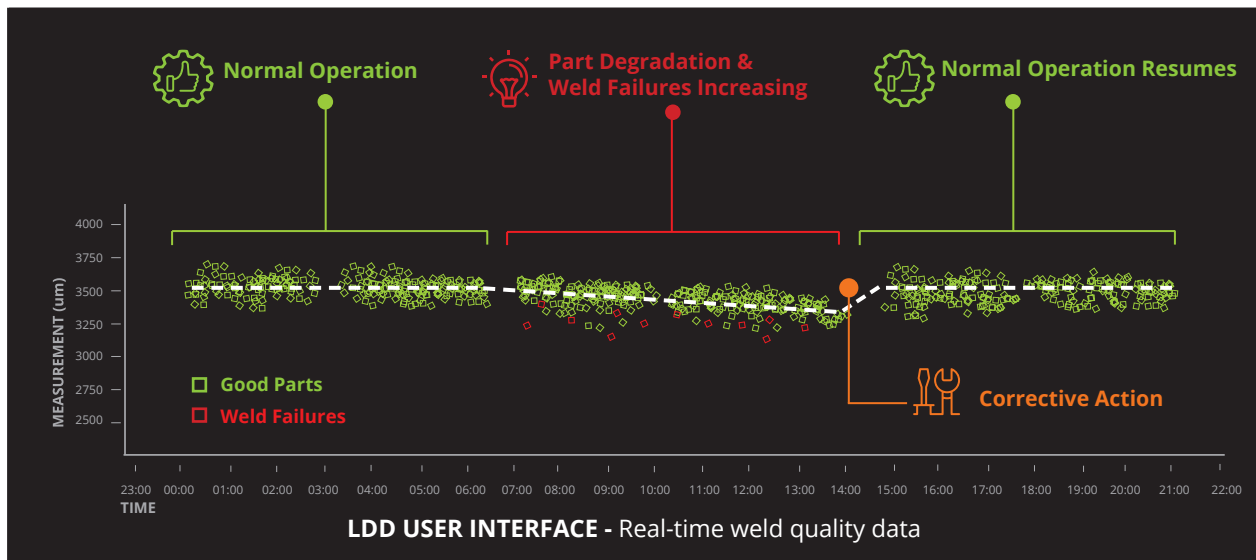
- 20+ weld metrics
- Lateral weld profiles
- Process stability
- Weld penetration depth
- Joint position
- Surface quality and more



WARNING - LASER RADIATION
AVOID EXPOSURE TO BEAM
CLASS 3B LASER PRODUCT

Manufacturing has become **SMARTER**

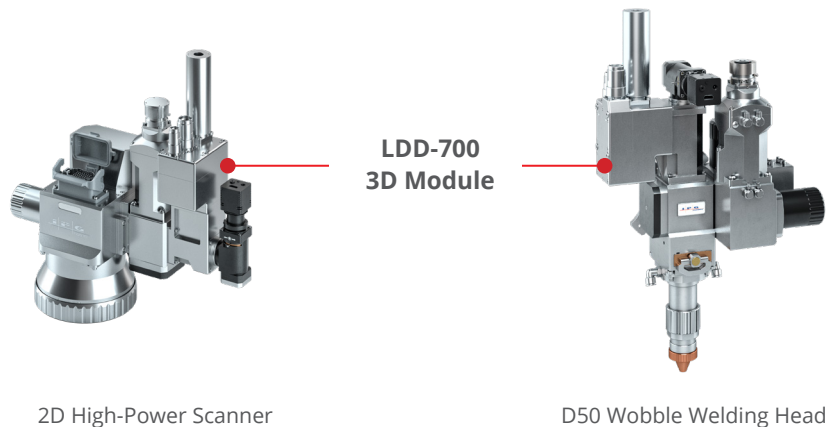
LDD-700 records and communicates real-time data for every part: before, during and after each weld. When degradation and weld failures occur, LDD-700 alerts operators and systems to take corrective action ensuring that normal operations resume quickly and only good parts are sent to customers.



Real-time automation and interconnectivity enables more flexibility, better quality, increased speed and productivity. LDD-700 seamlessly integrates into connected systems to provide:

- High-accuracy and high-speed processing
- Data driven welding and historical logging
- Reduced waste and increased throughput
- Unmatched versatility and resource efficiency

BEAM DELIVERY INTEGRATION



OmniWELD

MEASURE MONITOR CONTROL

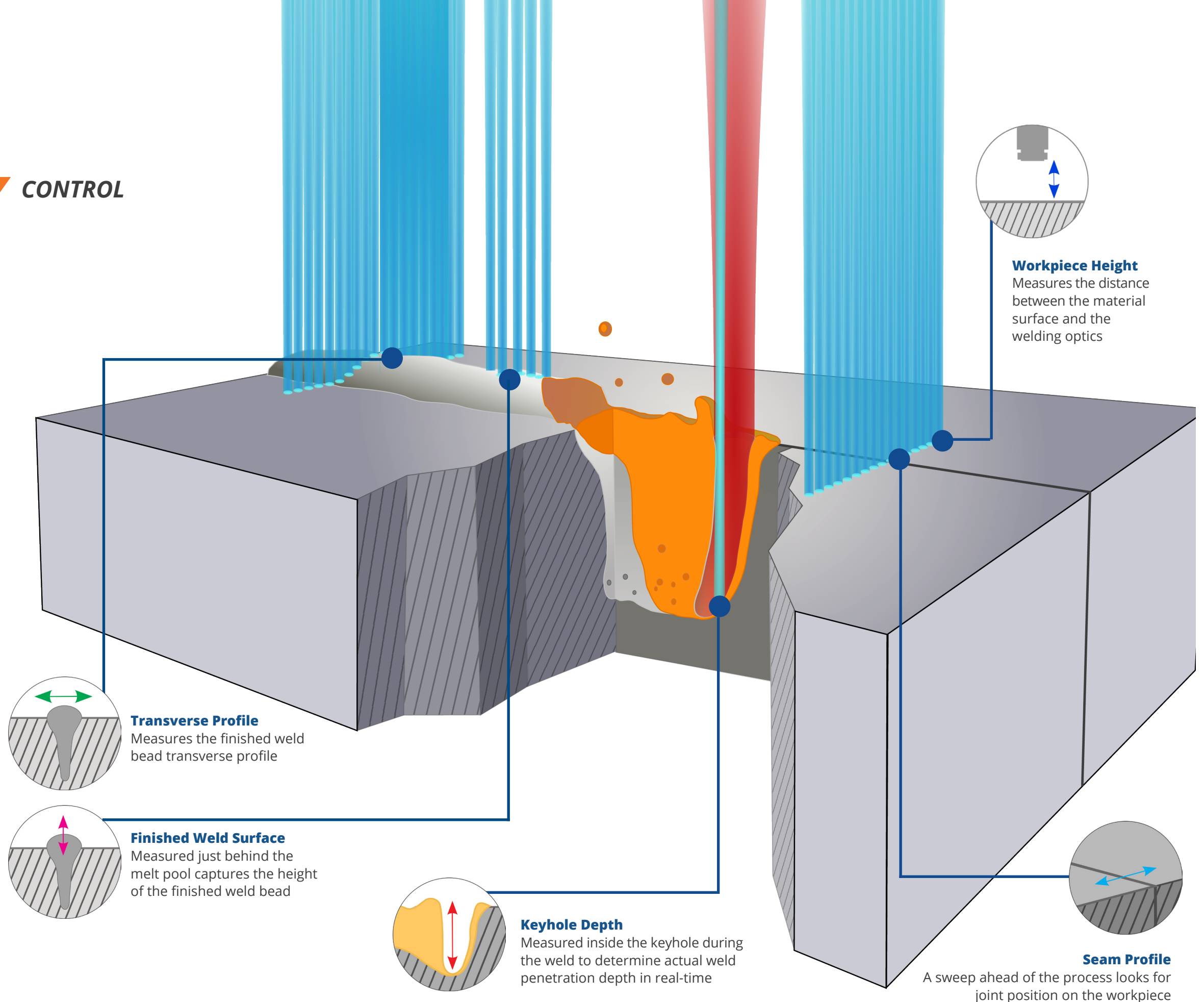


WELDING APPLICATIONS

- Automotive Powertrain
- Automotive Fueling
- Automotive Seating
- E-Mobility Components
- Batteries
- Medical Devices
- Pressure Vessels
- Turbines
- Academic R&D

Weld monitoring with

LDD-700 enables manufacturers to reduce scrap and facilitates early detection of defective sub-assemblies by providing more complete and accurate records for safety-critical applications than was previously possible. By allowing QA procedures to be streamlined, manufacturers can respond immediately to quality issues, saving time and lowering overall operating costs.



Workpiece Height
Measures the distance between the material surface and the welding optics

Transverse Profile
Measures the finished weld bead transverse profile

Finished Weld Surface
Measured just behind the melt pool captures the height of the finished weld bead

Keyhole Depth
Measured inside the keyhole during the weld to determine actual weld penetration depth in real-time

Seam Profile
A sweep ahead of the process looks for joint position on the workpiece

LEARN MORE: www.ipgphotonics.com/ldd



THE WORLD LEADER IN FIBER LASERS

IPG Photonics is the inventor and world's leading producer of high-power fiber lasers, which enable greater precision, higher-speed processing, more flexible production methods and enhanced productivity. IPG fiber lasers combine the advantages of semiconductor diodes, with the high amplification and precise beam qualities of unique optical fibers to deliver superior performance, reliability and usability.

IPG has continually pioneered the development and commercial production of numerous unique technologies related to fiber lasers combining deep materials science expertise and process know-how with a vertically-integrated business model. All key components of its fiber laser technology are produced in-house, enabling:

- **Faster product development**
- **More efficient production methods**
- **Industry-low product delivery times**
- **Better performing, higher quality solutions**
- **Rapid ongoing cost reduction with an industry-best margin profile**



IPG PHOTONICS
WWW.IPGPHOTONICS.COM/LDD

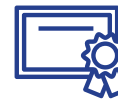


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FOUNDED
1990

43,000
DEVICES SHIPPED
IN 2018



350
PATENTS
450 PENDING

+100K
INSTALL BASE



13M LESS TONNES OF
GLOBAL CO₂ EMISSION WHEN OPERATING
IPG LASERS COMPARED TO OTHERS



+66% OF FIBER LASERS
MANUFACTURED WORLDWIDE