



4-Axis Laser Welding Cell in a High Purity Glove Box

Plasma | Tig | Laser | Mig | Sub-Arc



▶ SEE IT IN ACTION



Engineering Challenge

CHALLENGE ▼

Design a 4-axis CNC-controlled laser welding cell capable of performing hermetic seal welding on a proprietary nuclear assembly composed of Kovar, ceramics, and titanium.

This heat-sensitive component required welding within a 100% helium atmosphere, maintaining less than 3 parts per million (PPM) of oxygen and moisture.

Each assembly required over 50 precision laser welds, demanding custom tooling and extremely accurate positioning to ensure consistent, high-reliability results.

To support this process, the system required:

- A large antechamber to achieve a hard vacuum and transfer long assemblies into a high-purity glove box
- A second antechamber for post-weld vacuum leak testing and safe removal of completed assemblies

All finished components were required to meet strict hermeticity standards of 1×10^{-9} or better.

SOLUTION ▼

Weldlogic Engineering delivered a turnkey 4-axis laser welding system built on the PWL-15-72 Precision Welding Lathe, providing high-accuracy positioning and repeatable results across complex assemblies.

Powered by a 2kW laser with wobble head and the AWS Advanced Welding System, this platform enables fast setup, precise control, and consistent weld quality—even on heat-sensitive materials.

A double-wide, high-purity glove box with integrated gas purification maintains a 100% helium environment, while dual vacuum antechambers streamline part transfer and leak testing.

The result: reliable hermetic welds to 1×10^{-9} , reduced operator dependency, and a scalable production solution built for the most demanding nuclear applications.

WELDLOGIC USA

2651 Lavery Court
Newbury Park, CA 91320

Tel. 805.498.4004 | Fax. 805.498.1761

Contact us Today for your Welding Solutions!

WELDLOGIC.COM

WELDLOGIC EUROPE

Blackstone Road, Huntingdon
Cambridgeshire, PE29 6EF, UK

Tel. 01480 437478 | Fax. 01480 437479



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