LASER SEAM STEPPER
LSS1/ C-GUN

The Power to Transform® with IPG's Laser Seam Stepper

Seamless Integratation: Perform Laser Welding Applications with Ease

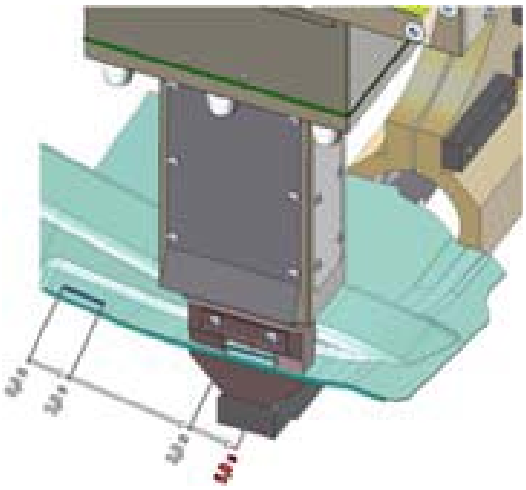
Main Features:

- Cost-effective – No Expensive Clamping Tools Needed
- Twice the Processing Speeds of Resistance Spot Welding
- Higher Component Strength and Rigidity due to Joint Quality
- Considerable Reduction of Flange Size in Comparison to Resistance Spot Welding
- Safe Joining Process with Critical Material Combinations

Technology:

IPG's Laser Seam Stepper LSS1 is ideal for laser welding and as a replacement for resistance spot welding. The LSS1 can also be utilized for fiber laser applications.

Resistance spot welding technology is a well-known joining technique and has been used in the automotive industry for a wide range of applications.

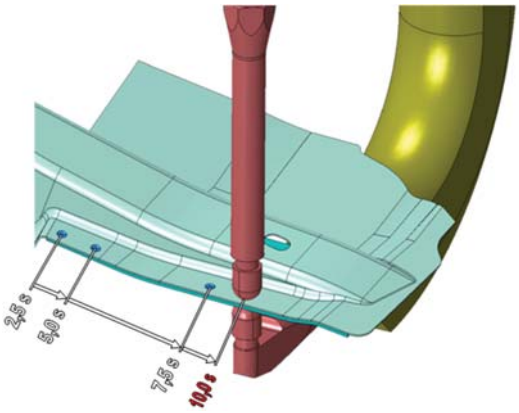


According to existing engineering standards, resistance spots should be placed at a distance of 30-50 mm with a defined edge distance. Robot driven resistance spot welding systems average 2.5-3 seconds for placing one spot.

The positioning of the laser welding gun and the realization of the laser seam can be done in the same time as a spot weld. Replacing two spots with one laser seam reduces processing time by 50%.

A further advantage of the LSS1 System is based in the design of the gripper. Equipped with a servo-controlled-force-system, the laser gripper pushes the element into position with the required clearance. The investment costs for expensive clamping devices can be dramatically reduced. A special laser safety cell is not required for the operation of the laser welding gun.

By oscillating the laser beam, the seam can be extended and the joint length increased by a factor of three.



The Laser Seam Stepper replaces two welding spots with one laser seam 30-40 mm in length.

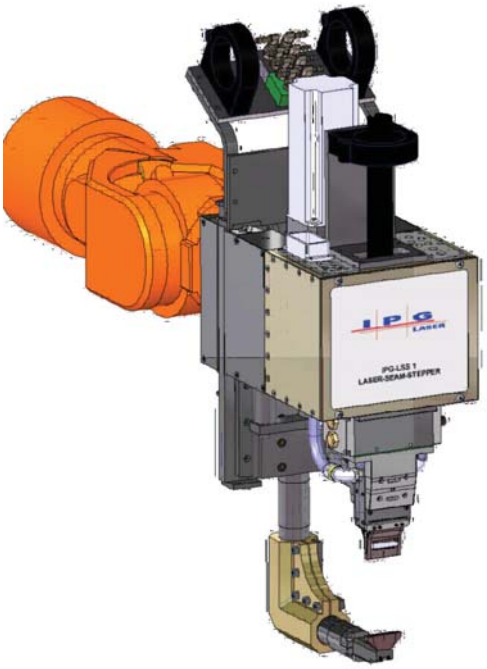
Laser Safety:

The LSS1-system is equipped with certified safety functions and multiple sensor systems. These safety functions will be checked before the laser starts to emit.

IPG's Laser Seam Stepper LSSI/ C-Gun is classified as a Class 1 laser.

Technical Design:

The LSS1-system is similar in design to the resistance spot welding gun in the C-form. It contains an active, servo-motor driven power shaft and a bottom mold. The shaft and the mold are balance-controlled to avoid distortion of the part. The welding optics can be moved through a programmable linear drive. Oscillation (optional) can also be programmed LSS1's optics are protected by an integrated Cross-jet and cover slide with pollution control.



Applications/ Configurations:

The laser gripper has been developed as a replacement for conventional resistance spot welding guns in the automotive and consumer markets. This system can also be used for applications in material combinations which cannot be processed with the resistance spot welding device (e.g. resistance spot welding isn't applicable to Aluminium).

The LSS1-system can be delivered in different configurations with the C-gripper and the Stepper. A high degree of utilization can be reached in a configuration of 2 or more laser grippers supported by one laser source and an advanced beam management system.

Control Systems:

The LSS1 System operates with an integrated Controller System. It contains interfaces according to industry standards. With those interfaces it can communicate with multiple higher-ranking control systems.

The LSS1 System's compact design allows it to be integrated into different plant designs and can replace existing resistance spot welding devices 1:1.

IPG's Fiber Laser System supports fiber lasers in the output power range of 1-4 kW. Automotive applications, such as Body-in-white typically use 2 kW fiber lasers.

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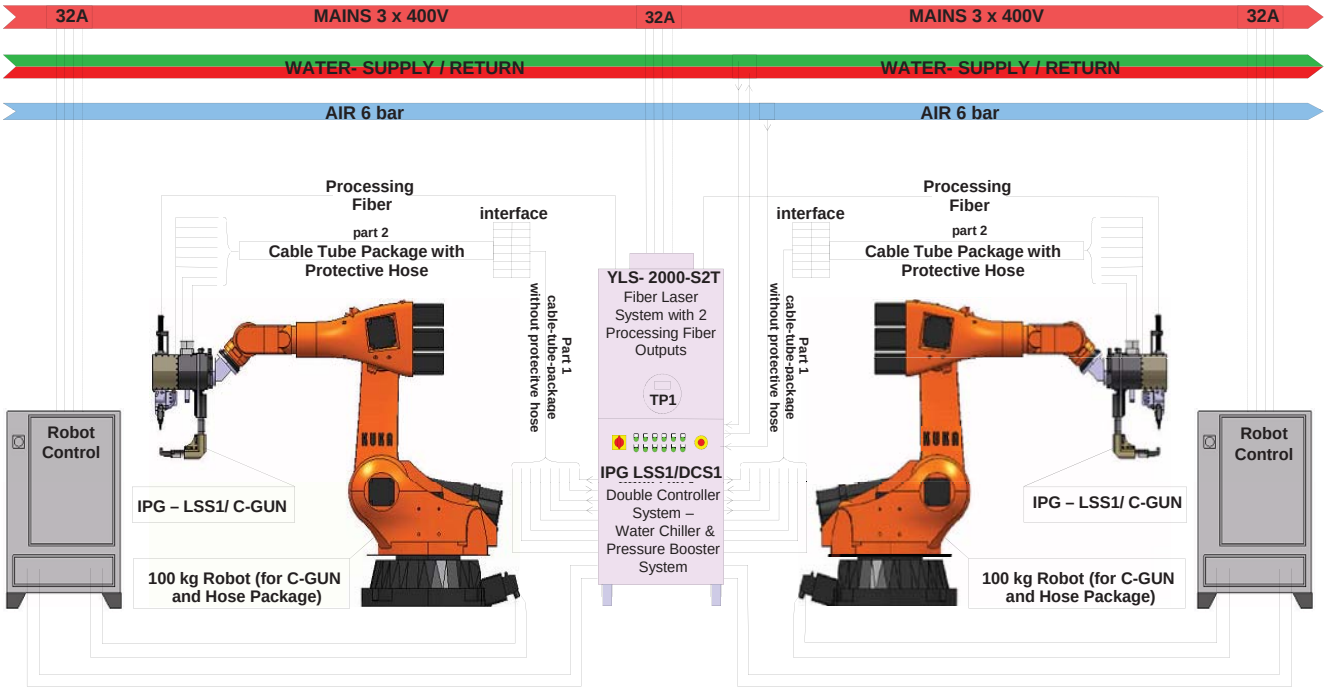

Figure 1 (above):
Two robots each with IPG's LSS1/ C-GUN share a compact, double fiber laser system, consisting of the YLS-2000-S2T with 2 processing fibers, a double controller system, a combined water-cooled chiller and a pressure booster system.

The two robots coordinate access to the laser according to the FIFO principle with double controller system responsible for both IPG LSS1/ C-GUNS by means of a beam switch.

Technical Specifications:

- Press Capacity Servomotor (Z-axis): 0.5-3.0 kN
- Traverse Path Z-axis: 130 mm
- Traverse Path Welding Head (Join Length): 40 mm max.
- Wobble Amplitude: ±1 mm
- Frequency (Oscillation Frequency): 3-30 Hz
- Welding Speed Max.: 80 mm/s
- Focusing Optics: 250 mm
- Weight: <80 kg

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