

Laser Welding of Otoscopes and Other Reusable Medical Instruments

Challenge

The production of specialized medical instruments such as otoscopes often involves only small to medium batch sizes that frequently incorporate a large number of optional variations. The fabrication is often performed at contract welding companies. These contract shops therefore require machines that are particularly flexible with short set-up times and that support a wide range of welds - from μm to mm welds.

Solution

Laser welding is now the accepted standard for welding medical instruments. It is particularly important to utilize laser machines where the workflow, the handling, and the man-machine interfaces are all optimized for small batch operation. As a result, manual production is still very common, and manual welding systems such as the Coherent Performance family are an excellent match, because they are specifically configured for simple production in low (e.g., single piece) quantities. The workpiece is handheld by the operator, positioned via a microscope viewer, and the laser is then triggered using a foot switch. This approach is extremely flexible and can also be used for complex weld seam contours. However, the quality of the weld depends somewhat on the manual skills of the individual operator. To make the quality of the weld operator-independent while simultaneously increasing throughput, Coherent also offers semi-automatic systems. These Select welding systems combine manual and semi-automatic welding in one system, in an innovative setup that offers a particularly high degree of flexibility and bandwidth for the optimal design of workflows:

- Manual welding for small quantities and/or shape complexity
- Joystick-guided welding for small quantities with high accuracy requirements
- Repeated execution of a stored joystick-guided weld sequence for medium quantities
- CNC controlled execution of welds with a workpiece holder for higher quantities

Benefit

These easy-to-use laser welding systems cover the complete range of volume and performance requirements in terms of flexibility, applications range and reliability for manufacturers of medical instruments. Moreover, the simplicity and cost of ownership characteristics of these systems enables both small workshops and large contract manufacturers to implement this versatile technology.



Figure 1. Challenging weld seam geometries such as on an otoscope.



Figure 2. The "Select" laser system supports up to three levels of automation: manual, joystick-driven and semi-automated with 4 axis motion control.

Application Field

Welding of medical instruments, i.e., fabricated from medical-grade steels or titanium.

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