

Electron beam welding machine

POWERBEAM L8 COMPACT



- Precise micro electron beam welding
- Superb control of beam power
- DC and pulsed welding modes
- Compact footprint without compromising on functionality
- Flexible configuration options

MACHINE

POWERBEAM L8 COMPACT provides best performance for axial, radial and linear electron beam welding with minimum footprint and maximum flexibility. The unique design of the benchtop welding system provides all the features of FOCUS welding systems in a compact and convenient form factor.

- Compact working chamber and turning chuck mounted on a CNC driven x- and z-axis
- 8-litre-working chamber (cylindrical): \varnothing 235 mm, depth 155 mm
- The outer work piece diameter can range from approx. \varnothing 3 mm up to \varnothing 135 mm
- Compact footprint 2 m x 1 m
- Weight – approx. 500 kg
- Pumping time to $5 \cdot 10^{-4}$ mbar < 60 sec
- Suitable for welding of a wide range of similar and dissimilar materials including copper, aluminum, titanium, stainless steel, tantalum, zirconium, niobium, molybdenum, tungsten, Inconel®, Kovar/Havar®, etc

The modular design of the welding machine means that the workpiece chamber can be configured for each specific application. Changing the configuration is done without special tools, requires no special skills and only takes a couple of minutes (depending on the skills of the engineer/operator).

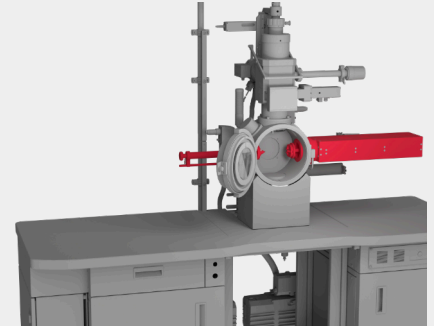
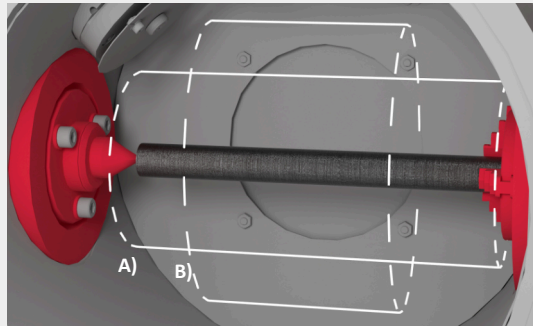
CONFIGURATION FOR RADIAL WELDING

Radial seam welding
[Option to use Tail stock]

Maximum Workpiece Dimension:

A) \varnothing 135 mm x length 100 mm

B) \varnothing 80 mm x length 100 mm



CONFIGURATION FOR AXIAL WELDING

Axial seam welding

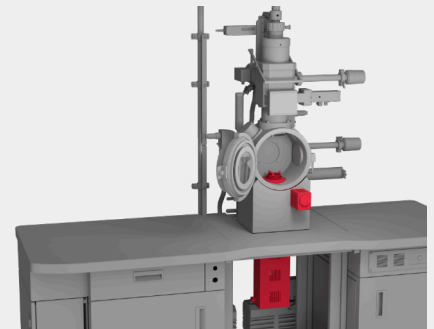
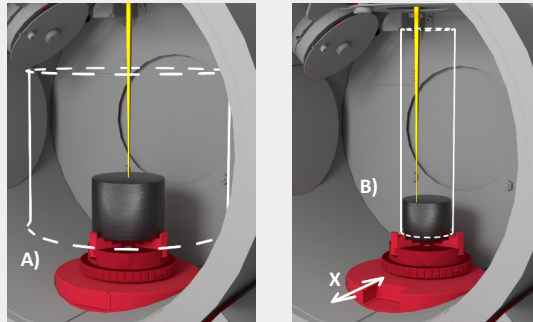
Maximum Workpiece Dimension:

A) \varnothing 135 mm x length 120 mm

Offset X = 0mm

B) \varnothing 135 mm x length 100 mm

Offset X = 30mm

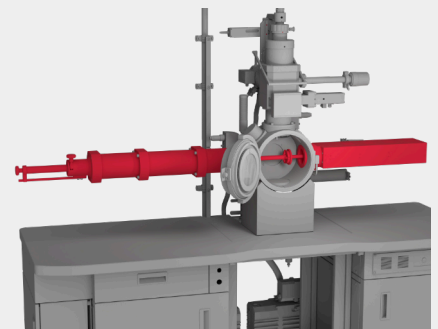


CONFIGURATION FOR LONG PARTS

Radial seam welding depends on the length of the parts and the location of the welding point - modular extensions are installed on both the manipulator side and the tailstock side.

Depends on the length of the parts and the location of the welding position. Modular extensions are installed on both sides, the manipulator side and the tailstock side.

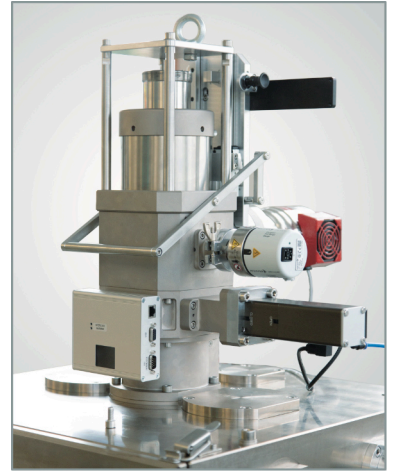
A diameter of up to 70 mm and a length of up to 1000 mm is supported.



ELECTRON BEAM GENERATOR

The heart of the electron beam welding machine is the MICROBEAM: a unique 2 kW electron beam generator with precise beam control. The high precision control of beam size, position and power allows to address a very narrow process window, using a spot size which can be adjusted between 25 μm and beyond 1 mm.

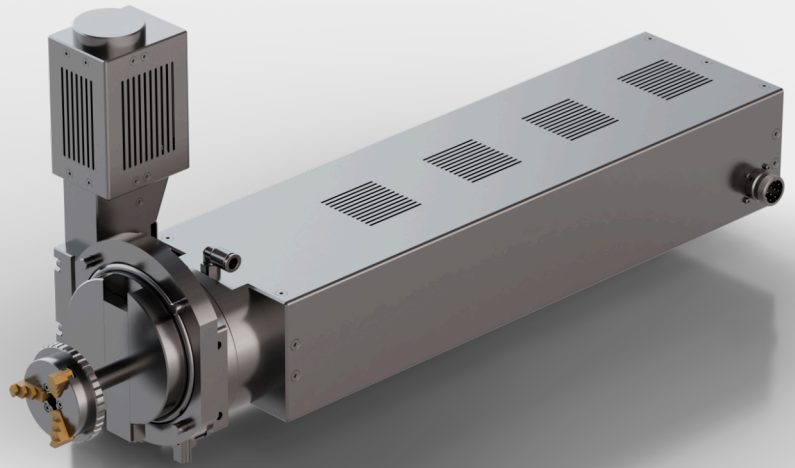
- The MICROBEAM is a triode electron beam generator for particularly precise beam control. Equipped with a direct heated tungsten hair pin, ribbon-type or LaB6 cathode to form an axisymmetric electron beam with a small crossover.
- The high voltage power supply delivers a continuously adjustable beam voltage from 5 to 60 kV (minimum step size is 20 V) and beam current from 15 μA to 33 mA (minimum step size 10 μA). In combination with the pulse mode, most demanding process windows are addressed.



WORKPIECE MANIPULATION:

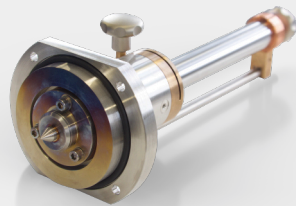
The 3-axis CNC manipulator can be mounted both horizontally or vertically

- The work piece handling system is a CNC programmable 360° vacuum turn table with a three-jaw chuck.
- Unlimited 360° rotation
- Angular resolution: 0.1°
- Angular speed: 0...100 rpm
- Radial runout: < 50 μm (0.05 mm)
- Z-shift: maximum shift of 200 mm and an accuracy of better than 30 μm
- X-shift: maximum shift of 30 mm and an accuracy of better than 30 μm
- The movement speed is continuously adjustable in the range of 0.1 up to 100 mm/s (6 m/min)
- The maximum weight of the workpiece ranges from 1.5 kg to 3 kg



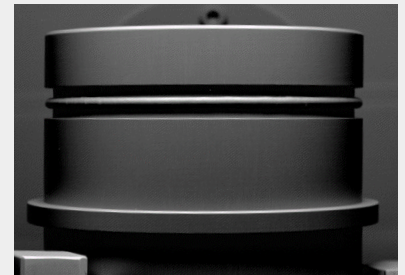
TAILSTOCK

Is mounted on the side wall and supports the workpieces during radial welding.



SEM MODE

Built-In SEM for beam positioning, observation quality control.



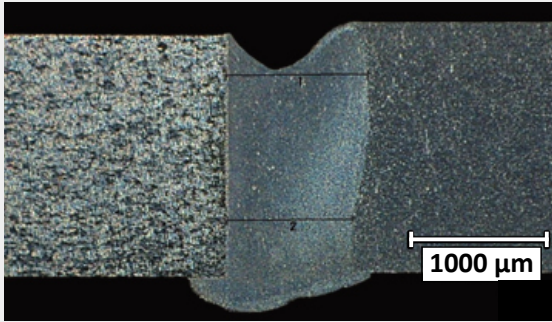
MOVABILITY

the system is equipped with wheels for easy transport. The floor load does not exceed 250 kg/m².

FLEXIBLE SOFTWARE

Extensive ability to program process control recipes using G-code software. All basic operations are accessible from the quick access remote control panel (RCP). CNC control is based on Mach4 and beam control is based on DacPath.

APPLICATIONS

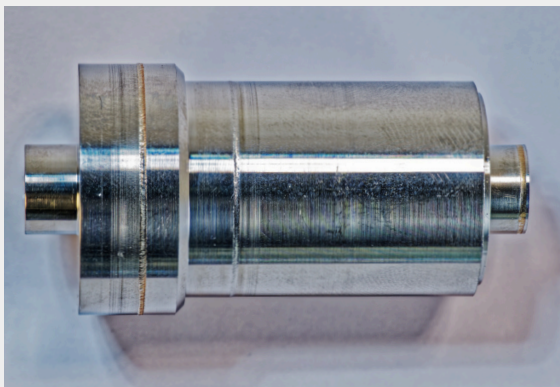
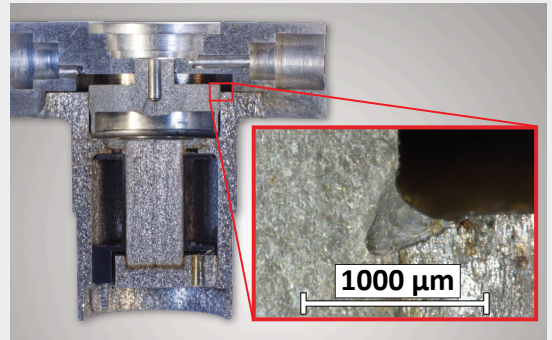


R&D

- Open system architecture for innovative ideas
- Compact size, laboratory & clean room compatible
- Possibility to easily add measurement instruments
- Very flexible in terms of parameter range and workpiece size
- Generation of almost arbitrary heat fields, heat gradients on a sample or local modifications of the surface

Aerospace Industry

- The aerospace industry is using precise electron beam welding for the production of aviation components, spacecraft (such as rockets and satellites), and defense systems
- strong, reliable, vacuum-tight connection of light-alloy metals
- various sensors, accelerometers, turbine blades, fuel injectors

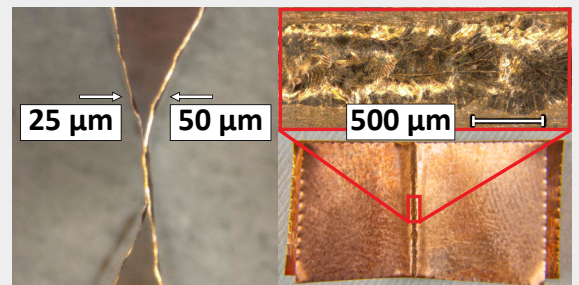


Sensor Housing

- High welding precision in terms of beam focus and beam power is a prerequisite for fine manufacturing of sensors, where small variations in welding have a significant impact on the final product's performance
- Vacuum welding allows to provide vacuum-tight seams and does not require further pumping of the sensor

Battery and e-mobility

- Joining within very small process window: thin copper foils of 25 µm and 50 µm thickness
- Feasibility studies for battery research and production
- Components for electromobility



For more information please visit
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