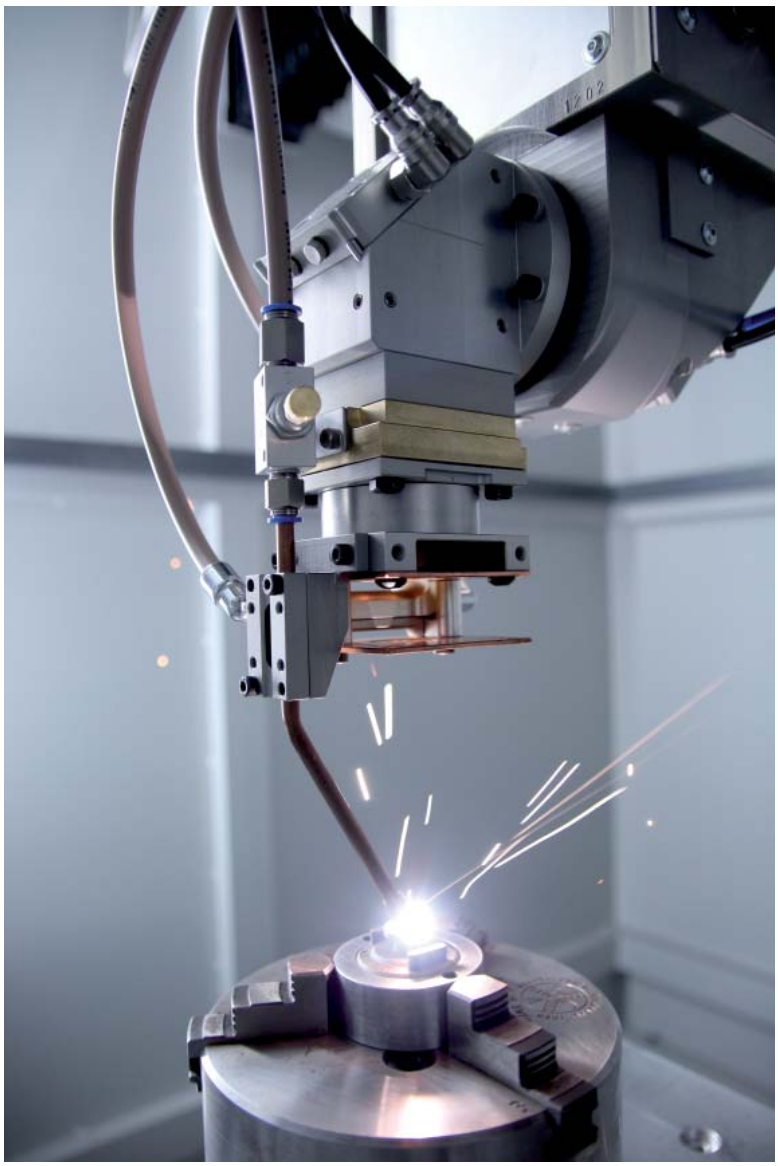
arnold
RAVENSBURG

YOUR PARTNER FOR
LASER SYSTEMS TECHNOLOGY

Product spectrum

for solution-oriented tasks



LASER SYSTEMS TO CUSTOMER SPECIFICATIONS

ABOUT US:
Approx. 80 employees
Approx. 25 machines and systems annually
Priority: laser welding
Location: Ravensburg
Service centers: China, USA
Main customer base: automobile industry (70%)
research facilities and aviation industry.

As a mid-sized family company , we are proud to look back at about 100 years of company history. Anton Arnold laid the foundation of the business in 1919 with a specialist welding shop for cast iron and aluminum.

Today we produce and develop complex laser systems including the required automation components and jig/fixture technology.

Whilst laser welding was the focus of our business to begin with, these days there is increasing demand for complete solutions. This means that we have to provide our customers not only with laser welding systems but also with additional processes such as heating, pressing and quality assurance. Automated material flow using robot technology and a wide range of conveyor and storage systems complete our range.

Our **laser welding cell M800** and the **double station** are perfectly suited for welding processes with additional processing of rotationally symmetric components. Both are able to cover all common production volumes and component sizes.

The **Flex cell** and the **Gantry system** are our our most universal systems and particularly suited for 3-D laser material processing. Both systems can be used to handle series processes as well as one-off orders. Other **laser applications** such as cutting, powder build-up welding, laser polishing and hardening can be easily carried out with these systems by simply changing the optical assembly.

Reference systems are installed worldwide. Leading manufacturers of the automotive and aircraft industries are among our main customers.

MODULAR CONSTRUCTION INTERNATIONAL

The laser welding cell M800 concentrates all the components necessary for the series production laser welding of round components into a minimal space of 800 x 1200 mm.

Thanks to its flexible set-up, the M800 is particularly suited to meeting the increasing demand for complete laser welding solutions with additional secondary processes.

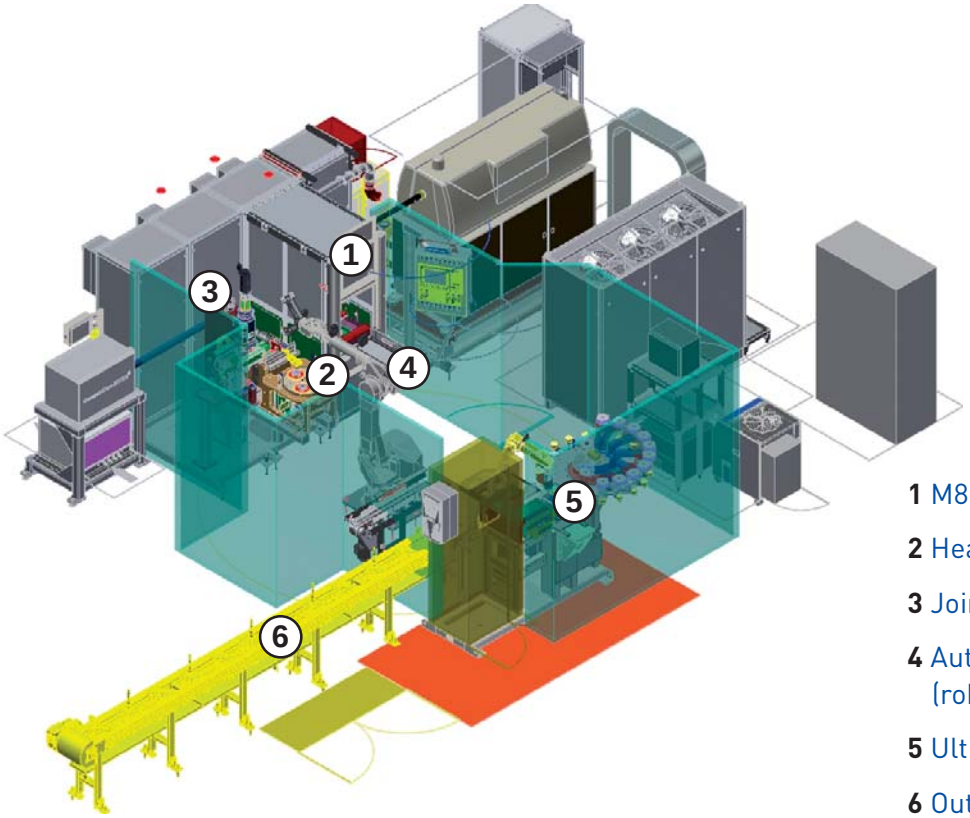
Laser welding cell M800

TECHNICAL DATA:		
Dimensions: approx. 800 x 2000 x 2240 mm (L x W x H) (welding cell without laser and cooler) Beam source: solid-state and CO_2 laser, 1–6 kW (standard) Control system: Siemens 840 D SL	Travel paths: X = 150 mm (optical assembly) Z = 150 mm (optical assembly) C = n x 360° (component)	Max. component size: Ø 200 mm x 70 mm (height) Cycle time: approx. 20 seconds

M800 with additional processes

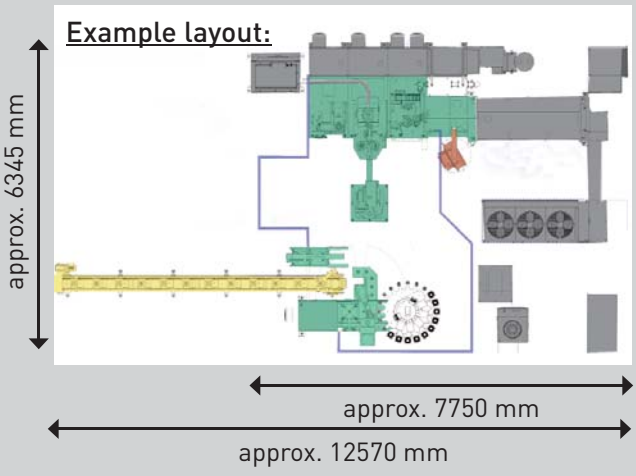
Our modular construction technology permits a variable layout depending on cycle time and process requirements.
We are constantly improving and expanding our system technology.

Laser welding is complemented by other **key processes**:
Joining station with a range of press modules and evaluation software (e.g. force-path monitoring).
Heating station to improve the welding process for hardened components.
Ultrasonic station for quality control of the welded seams.
Automation technology and conveyor systems for materials handling.



1 M800 Welding
2 Heating station
3 Joining station
4 Automation (robot)
5 Ultrasound
6 Output/input conveyor

Small footprint
Mass production and small series
Various laser sources
Proven clamping fixtures
Flexible layout design
Easy to service – Low maintenance
Fast component change



Our double welding cell is the classic two-station system.

It is flexible enough for solid state and CO_2 laser and for rotationally-symmetric and other geometries, for axial and for radial weld seams. In addition to laser material processing, there is also an integrated pressing function. Using automatic-opening lift gates, the workpieces can be loaded automatically or by hand.

2-station laser cell

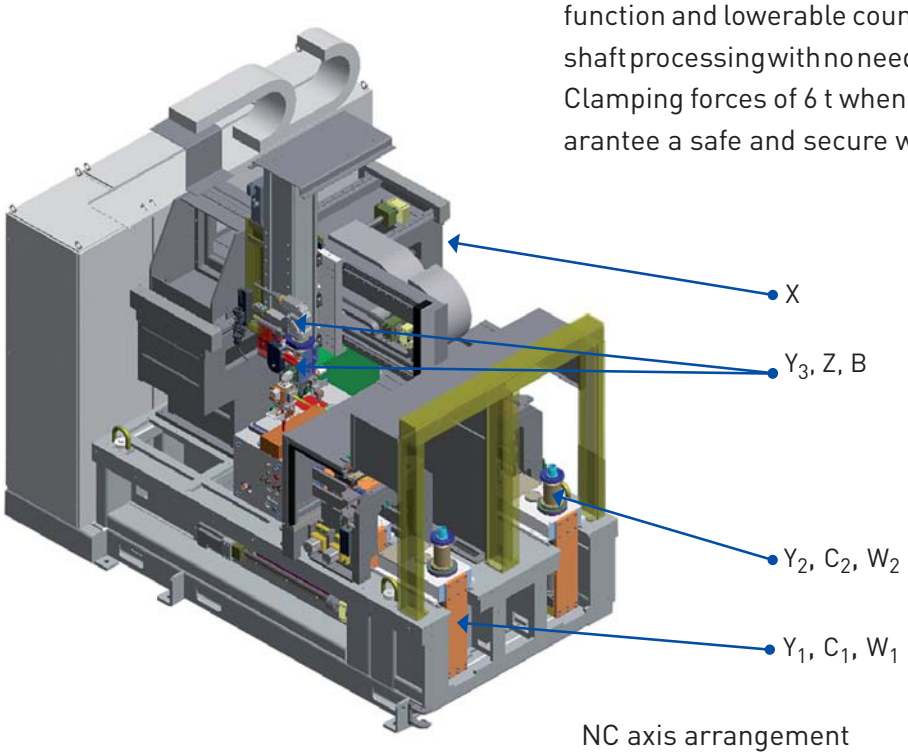
TECHNICAL DATA:		
Dimensions: 3500 x 2450 x 3200 mm (L x W x H) Beam source: CO_2 or solid state laser, 1–6 kW (standard) Control system: Siemens 840 D SL	Travel paths: X = 1000 mm, Y_3 = 600 mm, Z = 500 mm (optical assembly) B: ±100° (optical assembly) Y_1, Y_2: 650 mm (component) C_1, C_2: n x 360° (component) W_1, W_2: 110 mm / 60kN (joining components)	Max. component size Ø: 250 mm Max. component height above fixture: 200 mm

Boom system with travelling processing optics.

The processing optics assembly travels on a boom to the individual station and can process radial and axial welded seams using the swiveling optical head with no need to change parts. The swivel axis follows the direction of the workpiece (Y) meaning that stations can be built closely together, meeting customers' requirements for a compact system. The system is designed as a single block machine with a common base frame for all system components.

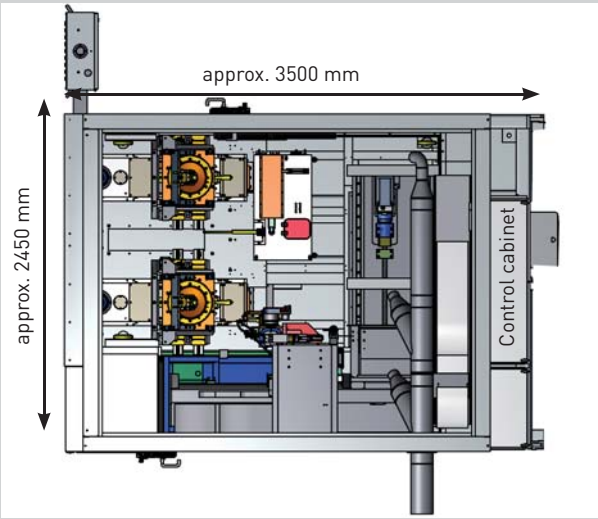
Modular clamping equipment

for round components with integrated pressing function and lowerable counterpressure bearing for shaft processing with no need to change components. Clamping forces of 6 t when joining and welding guarantee a safe and secure welding process.



NC axis arrangement

- Very good accessibility
- 2 stations means short cycle times
- Travelling boom with 4 NC axes
- Automated and manual loading
- Additional heating station can be integrated
- Free beam laser for swiveling the optical assembly for minimum fibre load



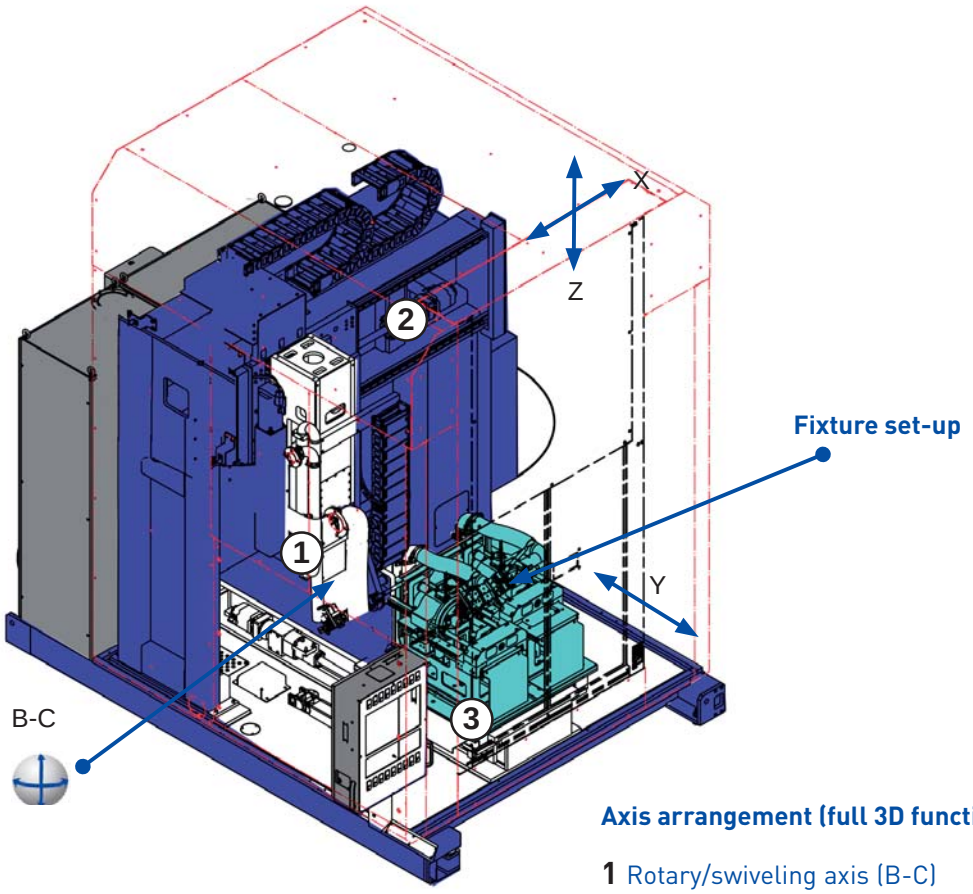
The 3D Flex cell is suitable for use with a wide range of component geometries and laser processes.
Variable add-ons and axis arrangements of the processing optics mean the machine can accomplish a broad spectrum of tasks from simple 2D cutting through to machining complex 3D cut/welded components.
Also easy to integrate are niche processes such as laser hardening and powder build-up welding. Our modular design allows you to use solid-state as well as CO_2 lasers.

3D flexible laser cell

TECHNICAL DATA:		
Dimensions: 3400 x 2450 x 3800 mm (L x W x H) Beam source: Solid state laser (standard) Control system: Sinumerik 840 D SL	Travel paths: X = 1000 mm (optical assembly) (60 m/min) Y = 1200 mm (component) (60 m/min) Z = 500 mm (optical assembly) (30 m/min) C = n x 400° (component or optical assembly) (300°/s) B = ± 100° (optical assembly) (300°/s)	Max. component size: 600 x 400 x 200 mm (3D functionality) (L x W x H) Processes: All laser applications in the 2D and 3D range Laser power >1 kW Positioning accuracy: X, Y, Z +/- 0.01 mm (VDI 3441)

All load-bearing components of the Flex cell are designed as robust welded constructions. All the linear axes are spindle drives with ball screw units. The linear axes are scanned and compensated.

Clearance-free harmonic drives guarantee high accuracy and low backlash of the rotary and swiveling axes.



Axis arrangement (full 3D functionality)

1	Rotary/swiveling axis (B-C)	(processing optics)
2	X, Z axis	(processing optics)
3	Y axis	(workpiece)

Clamping equipment
Rotary/swiveling axes
Cutting/welding table
Automated component loading
Quality monitoring systems
Wire feed

Our gantry series provides a 3D laser processing center for large-volume components. All load-bearing parts are designed as welded constructions. The bridge construction is guided and driven on sturdy prop stands with synchronized servo axes (gantry design).

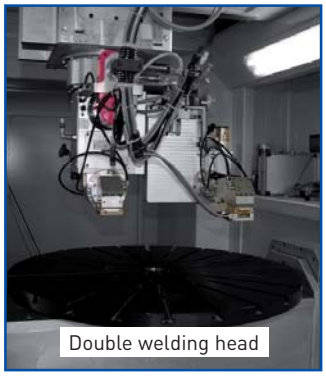
The processing optics are navigated as full-floating optics in the 5-axis transformation. The material flow can be flexibly configured with automatic shuttle tables. Vertical lifting gates on the front and back (optional) enable component feed from both sides.

Laser Center 3D Gantry

TECHNICAL DATA:		
Dimensions: 5725 x 5150 x 4200 mm (L x W x H) Beam source: Solid state laser (standard) Control system: Sinumerik 840 D SL	Travel paths: X = 2500 mm (optical assembly) (30 m/min) Y1/2 = 3000 mm (optical assembly) (30 m/min) Z = 750 / 1000 mm (optical assembly) (30 m/min) C = n x 360° (component) (300°/s) B = ± 100° (component) (300°/s)	Max. Component size: 2000 x 2500 x 250 mm (L x W x H) (3D functionality) Processes: All laser applications in the 2D and 3D range Laser power >1 kW Positioning accuracy: X, Y, Z +/- 0.02 mm (VDI 3441)

Examples of expansion options:

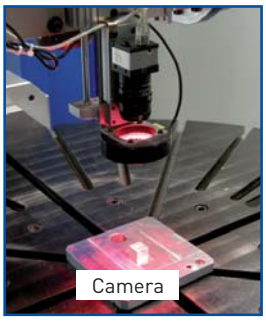
Rotary/Swiveling axis
Powder feeder, protective gas chamber
Double welding head, beam splitter
Work tables (also movable)
Tube processing
Wire feed system
Measuring probe
Quality monitoring systems
Rear rolling gate


Double welding head


Coating heads

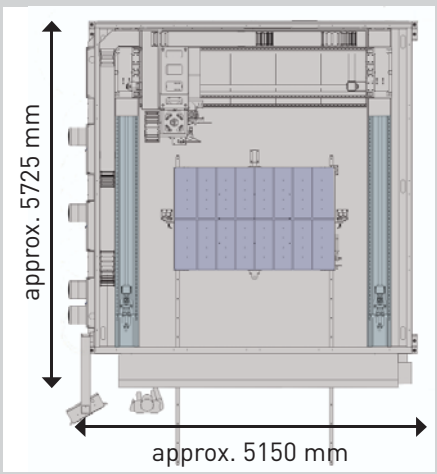

Protective gas chamber

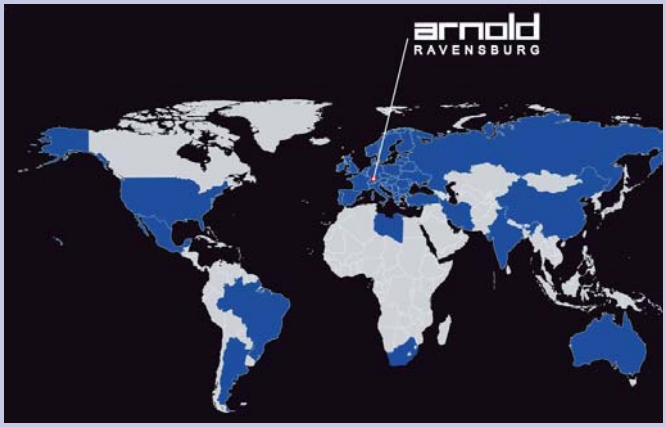

Measuring probe


Camera


Powder feeder

- Large volume components
- Optimal accessibility
- Suitable for research institutes
- Fast rolling gate
- Standard processes - laser welding and cutting
- One-off and serial production with additional processing boxes





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