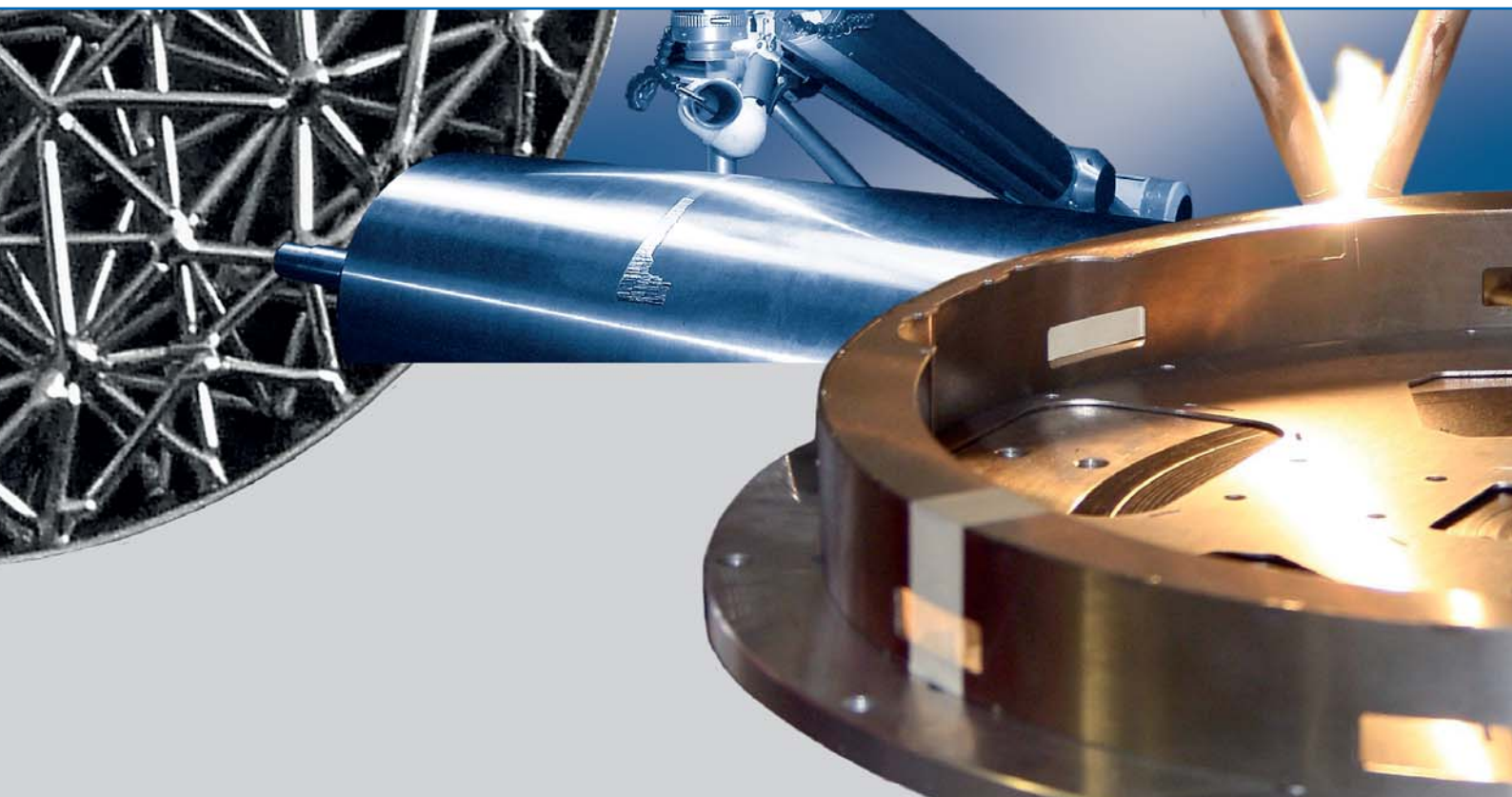


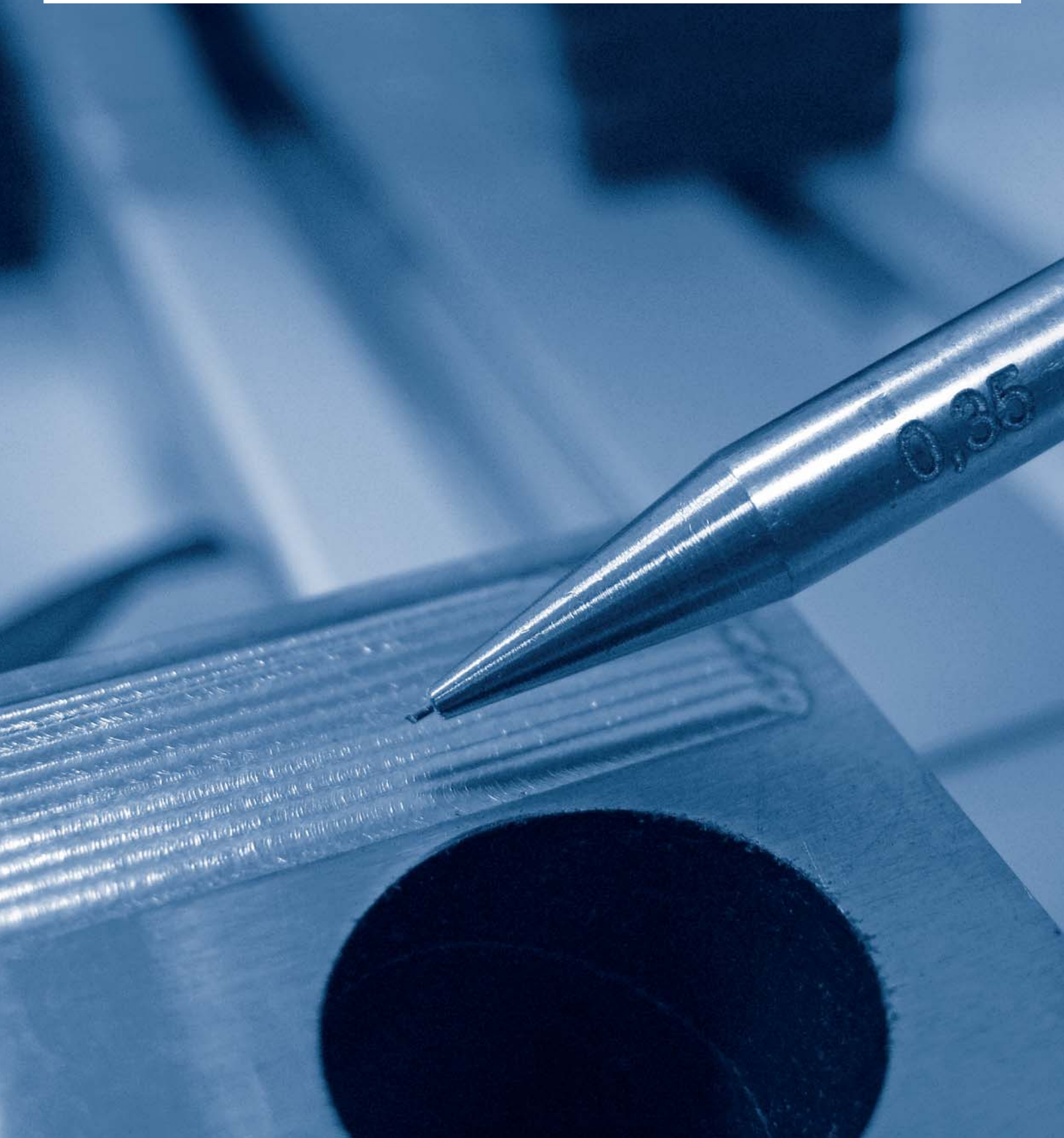


## Laser Welding Systems

*The basis for your welding success*



*Visions become Innovations*







## Visions today – innovations tomorrow

For ALPHA LASER these words are our motto. A vision made visible in our laser machines, which render welding work quicker and more precise. Improving manufacturing quality and increasing process-safety are foreground aspects of our work. With these as goals, ALPHA LASER has become the leading manufacturer of laser welding machines for tradespeople and for industrial production.

Particularly in the field of mobile welding works we have developed and realized extraordinary machine concepts: for manual welding, the systems AL and ALM mobile; for automatic welding applications, the ALFlak.

We stand in close relationship to our customers, maintaining always an open ear for their wishes and ideas. The intensive cooperation with our customers is mirrored in our development processes. That's how ALPHA LASER realizes new solutions for the changing demands of the market.

### Trust

Since 1995 ALPHA LASER has developed and produced solely laser welding machines

### Reliability

Innovative but mature technology makes ALPHA LASER your reliable working tool

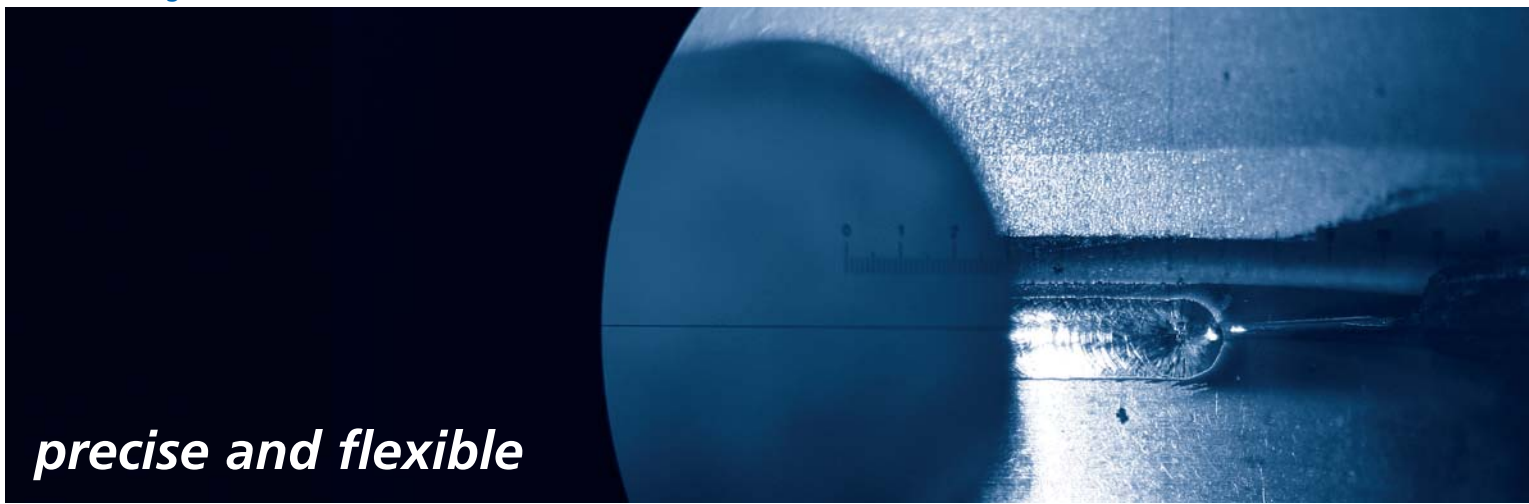
### Presence

ALPHA LASER has a world-wide sales and service network at its disposal

### Competence

Simple operation and powerful technology make best results possible, even for newcomers.





*precise and flexible*

## Why Laser?

With our high-power, robust laser welding machines, you have at your disposal a machine that makes complicated joints possible, that would otherwise, with classical joining techniques, be difficult if not impossible to realize. Even in the immediate vicinity of sensitive materials such as plastic or glass, weldings are made possible. The excellent controllability of laser energy and the exposure time to the material allows for welding of metallic materials with high melting points and of high conductivity. Even different metal types can be joined.

## Laser welding: manifold > time-saving > economical

- exact processing, even on the finest structures, with pin-point accuracy and precise energy-input
- The exact geometry of the workpiece remains the same, within the material tolerances. Only extremely slight distortions may take place on the workpiece, which can be disregarded.
- Only very minimal changes of the microstructure take place, due to the limited heat-affected zone
- Welding results without burning grooves. The quality of the adjacent areas of the material remains unaffected
- Process safety and a high degree of reproducibility of laser weldings
- The welding seams are free of shrinkage cavities and binding flaws, so that a high quality result is achieved
- Pre-warming is almost never necessary, even in the case of workpieces which are prone to tears
- The welding material properties can be specifically influenced. The choice of laser parameters and of welding additives affect the mechanical properties of the welding material, such as hardness, tensile strength or elongation.

4



**Lasers can be used in various areas of manufacture and repair. Major areas of application are:**

### Precision engineering

Welding precision metal parts

### Die and mould-making

Repairing surface defects and voids in everything from small moulds to massive dies

### Medical technology

Welding surgical instruments, passive and active implants, and endoscopic component

### Sensor technology

Welding of thermal elements, measuring sensors and pressure membranes

### Sheet metal work

Welding enclosures for electronic equipment, stainless steel parts for domestic appliances, architectural components and sculptures

### Weldable materials

- > High alloy cold- and hot-working steels
- > Bronzes and copper alloys
- > Stainless steels
- > Steel and grey cast-iron alloys
- > High-tensile aluminium alloys
- > Titanium alloys
- > Nickel
- > Precious metals, e.g. platinum, gold and silver

## Fully equipped

Our lasers are pulsed Nd:YAG lasers with wavelength 1064 nm.

All machines are fitted with a powerful integrated cooling system. The 200 W and 300 W machines are to be used, if necessary, in conjunction with an additional external cooling system.

High-quality observation optics provide for fatigue and glare-free working, even with pulsing frequencies of up to 100 Hz. Standard features are a well thought-through protective gas supply, a construction designed to be ergonomic and our pulse-shape function, which has proved successful.

A further plus: the successful Constant Power Control Technology, with which the initial and following pulse behaviour is optimised in a way, that the laser energy is efficiently coupled with the material. Your advantages: no material splatters, vapour bubbles are avoided and seam quality is improved.

Not to be forgotten: generous laser power that really arrives at the workpiece.

The higher pulse frequency of our 300 W lasers provide for continuous melting, thus similar welding characteristics to those of continuous-wave lasers of higher or medium power.

The machines with motion systems offer three processing possibilities:

- > Manual welding per Joystick
- > Semi-automatic welding – direction and speed of the axis movement is set by the user
- > Fully automatic welding by means of WINLaserNC Software.

## Our options

### Micro-welding device

The connectable fine-welding option offers a welding spot diameter of < 0,1 mm for high precision micro-welding

### WINLaserNC Software

Unique comfort is offered by our patented, semi-automatic user-coordinate-control, with which three-dimensional motion-sequences can be put into practice with ease.

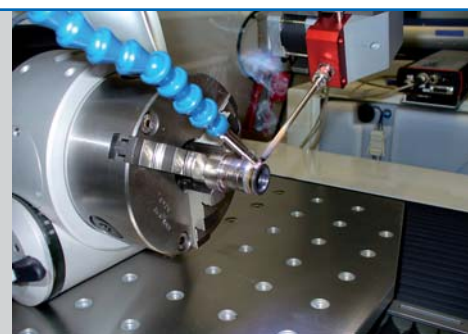
Regardless of how the areas to be welded are geographically positioned, the motion system allows for quick and comfortable setting, so that you, without distractions, can give your whole attention to the welding task at hand.

### Programmable laser-wire-feeding system LAfet®

Laser filaments of Ø 0,25 to 0,5 mm are fed by LAfet® with high precision. The control logistics allow for exact adaption to the laser welding process at hand.

Variable speeds make exact timing of filament motion possible, at the beginning as well as during and after each welding process.

Process-safety and a high level of reproducibility of laser weldings, as well as optimising welding time, are the striking properties that speak for operations with LAfet®.



### Turn-and-tilt optics

Our turn and tilt optics allows for unconstrained working, even on difficult workpiece spots. It is possible, within the entire 360° swivel range of the optic, to steer the laser beam continuously from the vertical up to an angel of 40°. Thus poorly accessible spots are reached, whilst you remain in an ergonomic working position.





# ALM

Whether on the customer site or in your own workshop, the ALM offers you new, universal possibilities of use and greatest flexibility. Particularly large moulds, tools, casings and machine components of any size can be processed in an uncomplicated manner. It is possible to position the laser arm quickly and flexibly with millimetre accuracy. During the welding process, the arm can be steered per joystick, semi-automatically or by remote control. The turn-and-tilt processing head makes working possible at any point of the workpiece, even at deep lying spots. With the optional turn-and-tilt-optics the beam deflection can be set, infinitely variable, up to 40° from the vertical.



6



Mobile repair welding within the machine on a die-casting mould (Image: Jutz Lasertechnik)



Repair welding

Technical data	ALM 150	ALM 200
<b>Laser</b>		
Average power	150 W	200 W
Peak pulse power	10 kW	9 kW
Pulse energy	100 J	90 J
Pulse duration	0,5 – 20 ms	
Pulse frequency	Single pulse up to 20 Hz	
Welding spot diameter	0,2 – 2,0 mm	
Focusing optics	150 mm	
Pulse shaping	Adjustable power-shaping within a laser pulse	
Control	User-specific operation with up to 128 data records	
<b>Viewing system</b>	Leica binoculars with oculars suitable for wearers of glasses, turn-and-tiltable	
<b>Working range</b>	Open system Motorised motion system Movement of the arm/processing head can be carried out manually or motor driven under joystick control	
X, Y, Z in mm	145 x 120 x 1300	
Lowest working point in mm	450	
Highest working point in mm	1500	
Arm travel in mm	1300	
<b>Mechanical dimensions</b>		
LxWxH in mm	1400 x 730 x 1505	
Weight	345 kg	
<b>Electrical connection</b>	3 x 400 V / 50–60 Hz / 3 x 16 A	
<b>Options</b>	> Turn-and-tilt optics > Tilttable turntable with chuck for horizontal to vertical rotation > Remote control > TV system for demonstrating and observing the welding process	



## ALFlak

With our flexible laser for deposit and contour welding – ALFlak – we offer you even more possibilities for mobile laser repair welding.

Scope of motion and reach have been considerably extended, so that even welding spots in deep, complex moulds can be reached without problems, using the long laser arm. Welding seams of up to 500 mm length can be performed without a break. The ALFlak is available with a self-driving caterpillar track or as a manually transportable model. A unique comfort is provided by our patented, semi-automatic user-coordinate-control via WINLaserNC Software.



Technical data	ALFlak 200	ALFlak 300
<b>Laser</b>		
Average power	200 W	300 W
Peak pulse power	9 kW	9 kW
Pulse energy	90 J	90 J
Pulse frequency	Single pulse –100 Hz (in automatic mode and under observation)	
Pulse duration	0,5 ms – 20 ms	
Welding spot diameter	0,2 – 2,0 mm	
Focusing optics	150 mm	
Pulse shaping	Adjustable power-shaping within a laser pulse	
Control	User-specific operation with up to 39 data records	
<b>Viewing system</b>	Leica binoculars with oculars suitable for wearers of glasses	
<b>Working range</b>		
X, Y, Z in mm	1500 x 1000 x 1000	
Scope of Motion (X, Y, Z) in mm	340 x 320 x 420	
Lowest working point in mm	200	
Highest working point in mm	1500	
Arm travel in mm	1500	
<b>Mechanical dimensions</b>		
LxWxH of base unit in mm	approx. 1200 x 1200 x 1100	
Weight	with caterpillar track 850 kg – without caterpillar track 550 kg	
<b>Electrical connection</b>	3 x 400 V / 50–60 Hz / 3 x 16 A	
<b>Options</b>	<ul style="list-style-type: none"><li>&gt; Micro-welding appliance for welding spot-Ø &lt; 100µm</li><li>&gt; Turn-and-tilt-optics</li><li>&gt; Tiltable turntable with chuck for horizontal to vertical rotation</li><li>&gt; TV system for demonstrating and observing the welding process</li><li>&gt; LAfet® – programmable laser-filler-wire-feeder</li></ul>	

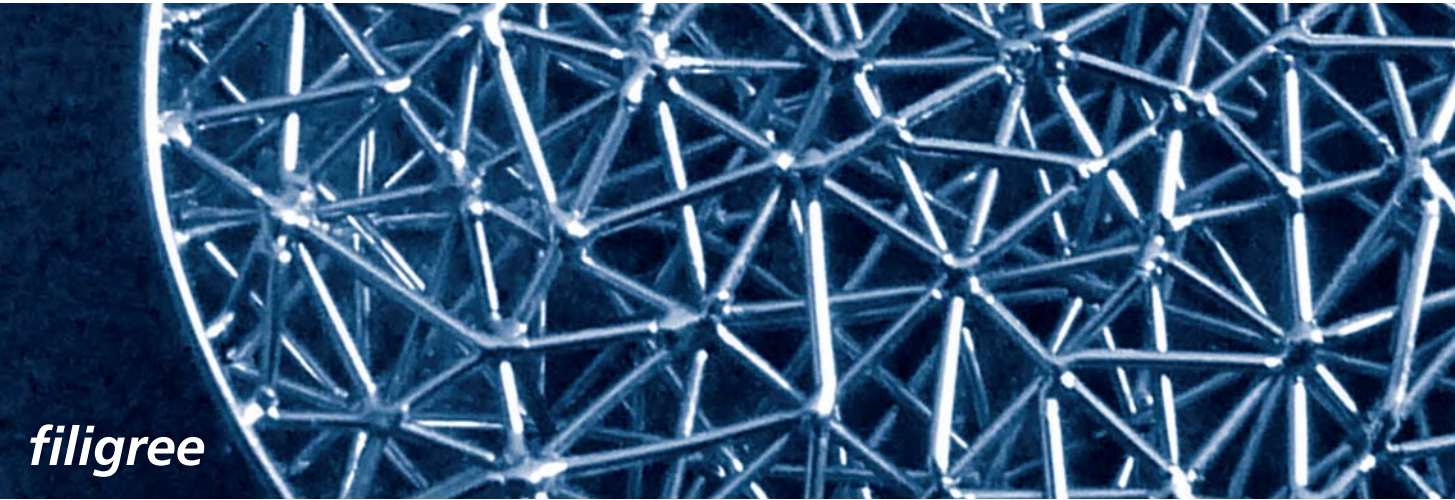


Repair welding on roller



Loading the ALFlak





# AL 50

Particularly sensor technology applications demand special solutions, when it comes to weld-joining of fine wires and jacket tubes. Here the AL 50 demonstrates its outstanding beam quality. With the built-in, electric micro-welding appliance which can be turned on and off, the welding spot diameter can be reduced to 0,05 – 0,1 mm. This renders ultra-fine and exact welding on all kinds of sensor parts possible. The 55X magnification allows for welding on structures with dimensions < 50 µm.



8



Pressure-sensor for brake system



Load cell

Technical data	AL 50
<b>Laser</b>	
Average power	50 W
Peak pulse power	5 kW
Pulse energy	50 J
Pulse duration	0,5 – 20 ms
Pulse frequency	Single pulse, 50 Hz
Welding spot diameter	0,2 mm – 2,0 mm (with micro welding device 0,05 – 1 mm)
Focusing optics	90 mm
Pulse shaping	3 pre-set pulse shapes, 3 freely programmable
Control	User-specific operable, interface for external controls
<b>Viewing system</b>	Leica binoculars with oculars suitable for wearers of glasses
<b>Supply unit</b>	
Dimensions LxWxH in mm	820 x 400 x 910
Weight	approx. 100 kg
<b>Laser beam source</b>	
With focusing unit (length x Ø)	610 x 120 mm
Weight	approx. 14 kg
<b>Electrical connection</b>	200–240 V / 50–60 Hz / 16 A
<b>Options</b>	<div><div>&gt; Coaxial lighting</div><div>&gt; Turn-and-tilt optics</div><div>&gt; Variety of lenses and optics</div><div>&gt; Programmable rotational axis</div><div>&gt; Ergo Wedge</div><div>&gt; TV system for demonstrating and observing the welding process</div><div>&gt; Adjustable motoric Z-support with display</div><div>&gt; Micromanipulator</div></div>





## AL

The laser-series AL offers the appropriate laser power for each and every application. The laser is an optimum fit for the workbench AL-T, can however also be simply integrated into existing machine constructions. Diverse processing optics aid you in guiding the laser beam to the position you want to have it in. That makes for quick setting and adjustment of the laser to the workpiece in question. Thanks to many options, you can configure the optimum machine for your area of work.

Technical data	AL 75	AL 120	AL 150	AL 200	AL 300
<b>Laser</b>					
Average power	75 W	120 W	150 W	200 W	300 W
Peak pulse power	5 kW	9 kW	10 kW	9 kW	9 kW
Pulse energy	50 J	75 J	100 J	90 J	90 J
Pulse duration	0,5 – 20 ms	0,5 – 20 ms	0,5 – 20 ms	0,1 – 20 ms	0,1 – 20 ms
Pulse frequency	–15 Hz	–15 Hz	–20 Hz	–100 Hz	–100Hz
				(under observation)	
Welding spot diameter	0,2 – 2,0 mm				
Focusing optics	150 mm				
Pulse shaping	Adjustable power-shaping within a laser pulse				
Control	user-specific operation with up to 128 data records			with up to 39 data records Interface for external control system	
<b>Viewing system</b>					
	Leica binoculars with oculars suitable for wearers of glasses				
<b>Supply unit</b>					
Dimensions LxWxH in mm	820 x 400 x 910				
Weight	120 kg	120 kg	120 kg	120 kg	120 kg
<b>Laser beam source</b>					
With focusing unit (length x Ø)	900 x 120 mm			1100 x 120 mm	
Weight	approx. 18 kg	approx. 18 kg	approx. 18 kg	approx. 20 kg	approx. 20 kg
<b>Electrical connection</b>					
	200–240 V / 50–60 Hz / 16 A		3 x 400 V / 50–60 Hz / 3 x 16 A N		
<b>Options</b>					
	> Micro-welding appliance for welding spot-Ø < 100µm				
	> Turn-and-tilt optics				
	> Rotational welding optics				
	> Tilttable turntable with chuck for horizontal to vertical rotation				
	> TV system for demonstrating and observing the welding process				
	> LAfet® – programmable laser-filler-wire-feeder				



Joint welding: Pipe with compensator, stainless steel



Deposit welding on worn waterproof edges



*flexible*

## AL-TBasis

The AL-TBasic is for use in situations in which very different types of workpiece are to be processed flexibly, and if programmed welding or high precision isn't necessary.

The resonator clamp can be rotated 360° and fixed in any position within the swivel range. The resonator can be moved lengthways along a rail system.

The steering is carried out with the Joy-stick, on 3 axes (x, y, z), with the rotational axis optionally available.



10



Restoration of worn waterproof edges of a mould element of Ampco-Bronze



Copper-Berillium-welding

### Technical data

#### Mechanical dimensions

WxDxH in mm	950 x 1250 x 850
Working plate surface (WxD) in mm	800 x 740 (Height above the floor 830 mm)
Max. workpiece weight	100 kg
Workpiece motion	motorized
Scope of motion	x 400, y 210, z 300 mm
Speed of motion	x, y, z – max. 25 mm/s
Weight	230 kg

#### Electrical connection

200–240 V / 50–60 Hz / 16 A or 3 x 400 V / 50 Hz / 16 A (depending on laser)

#### Options

- > Tiltable turntable with chuck for horizontal to vertical rotation
- > Magnetic workpiece bracket for free positioning of workpieces
- > Tiltable joint – can be tilted up to 30° downwards and up to 10° upwards







*stable*



## AL-T

The laser workbench AL-T, combined with the laser AL, makes laser welding without limitations of working space possible. Even large, voluminous workpieces are easy to process. When welding, the workpieces allow themselves to be precisely steered on 3 axes (x, y, z). An optional rotary axis for round weldings is also available.

Welding tasks can be carried out by joystick, in semi-automatic mode, or fully automatically by means of WINLaserNC Software.

### Technical data

#### AL-T 250

#### AL-T 500

### Mechanical dimensions

WxDxH in mm	900 x 1200 x 1500	1200 x 1360 x 1260
Working plate surface (WxD) in mm	700 x 600	600 x 475
Max. Workpiece weight	350 kg	400 kg
Workpiece motion	motorized	motorized
Scope of motion	x 250, y 200, z 360 mm extendable to 500 mm	x 490, y 400, z 350 mm extendable to 500 mm
Speed of motion	x, y – max. 25 mm/s, z – max. 5 mm/s	x, y, z – max. 25 mm/s
Weight	350 kg	550 kg

### Electrical connection

200–240 V / 50–60 Hz / 16 A

3 x 400 V / 50–60 Hz / 3 x 16 A

### Options

- > CNC control for automatic manufacture of parts in series (WINLaserNC)
- > Guide rail for resonator
- > Rotational table with chuck, tiltable for horizontal to vertical rotational motion
- > Magnetic workpiece bracket for free positioning of workpieces



AL-T 250  
with Laser AL

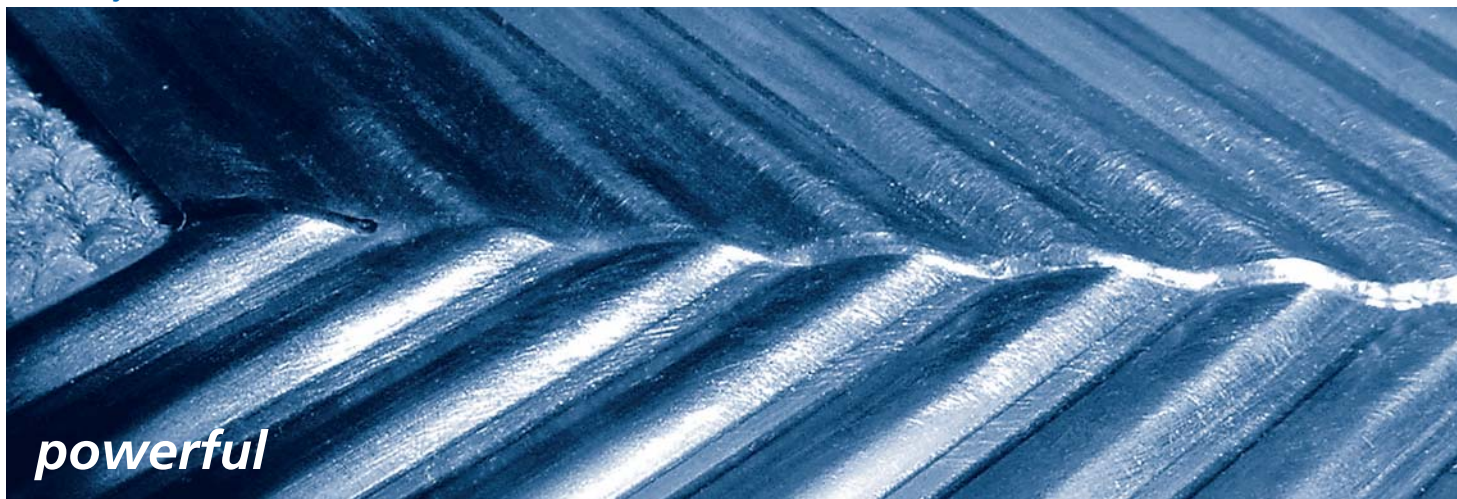


Radiusing the edges of a lamination tool



Changing the radius on the matrix of a punching tool  
of 1.2379



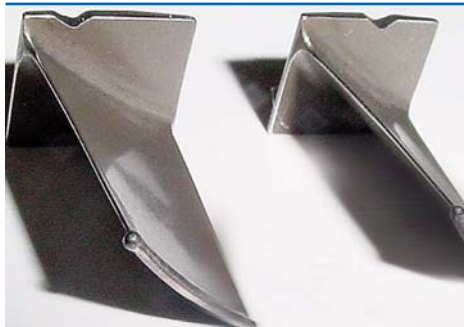


## ALW

The spacious working chamber of the ALW allows workpieces of up to 350 kg to be processed, e.g. in tool and mould construction. With the 4-axis-motion system, the parts get precisely positioned underneath the laser beam, either with the joystick or automatically. With the tilt-able optics, workpieces can be welded at a variable angle whereby the laser beam remains optimally aligned to the joint



12



Repair of damaged contours on turbine flaps



Multi-layer welding to re-shape an 8-cavity mould

Technical data	ALW 100	ALW 150
<b>Laser</b>		
Average power	100 W	150 W
Pulse energy	75 J	100 J
Peak pulse power	9 kW	10 kW
Pulse duration	0,5 – 20 ms	
Pulse frequency	Single pulse –15 Hz	
Welding spot diameter	0,2 – 2,0 mm, can be continuously set	
Focusing optics	150 mm	
Pulse shaping	Adjustable power-shaping within a laser pulse	
Control	User-specific operation with up to 128 data records	
<b>Viewing system</b>	Leica Trinocular with ocular for wearers of glasses, connection for CCD-camera	
<b>Working chamber</b>		
LxWxH in mm	800 x 850 x 500	
Working surface (WxD) in mm	600 x 600	
Max. workpiece weight	350 kg, centrally positioned	
Workpiece motion	motorized via joystick	
Scope of motion	X, Y: 180 x 180 mm, Z: 380 mm	
<b>Mechanical dimensions</b>		
LxWxH in mm	1220 x 920 x 1570	
Weight	380 kg	
<b>Electrical connection</b>	3 x 400 V / 50–60 Hz / 3 x 16 A	3 x 400 V / 50–60 Hz / 3 x 16 A
<b>Options</b>	> CNC control with CAD data input for automatic operation for manufacturing serial parts (WINLaserNC) > Micro-welding appliance for welding spot-Ø < 100µm > Tilttable turntable with chuck for horizontal to vertical rotation > Coaxial lighting for optimal illumination of cavities in the workpiece > Magnetic workpiece bracket for free positioning of workpieces > TV system for demonstrating and observing the welding process	



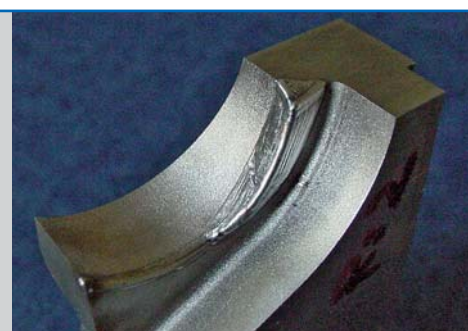


Until now the ALW has been used mainly for repair and deposit welding on tools and moulds. The new ALW 200/300 meets the increased demands of industries and trades-people to carry out ambitious welding jobs on materials such as Aluminium, precious metals, Titanium and sensitive alloys. Such jobs are in increasing demand, and in such areas the advantages of Alpha Laser's new resonator concept are becoming visible.

The new, stable steel construction of the ALW allows for high precision of the motion system, thus for extremely exact movement of the work-piece. The ALW is predestined for automatic applications. If several weldings of the same type are to be carried out in series, then programming by means of the WINLaserNC software realizes exact repetition with simplicity. We have placed great value, with the ALW, on creating a seated workstation with plenty of legroom, allowing the user to work in a relaxed and ergonomic position. This means that work can be carried out over longer periods of time without the user becoming tired, providing thus for full concentration on the welding task at hand.



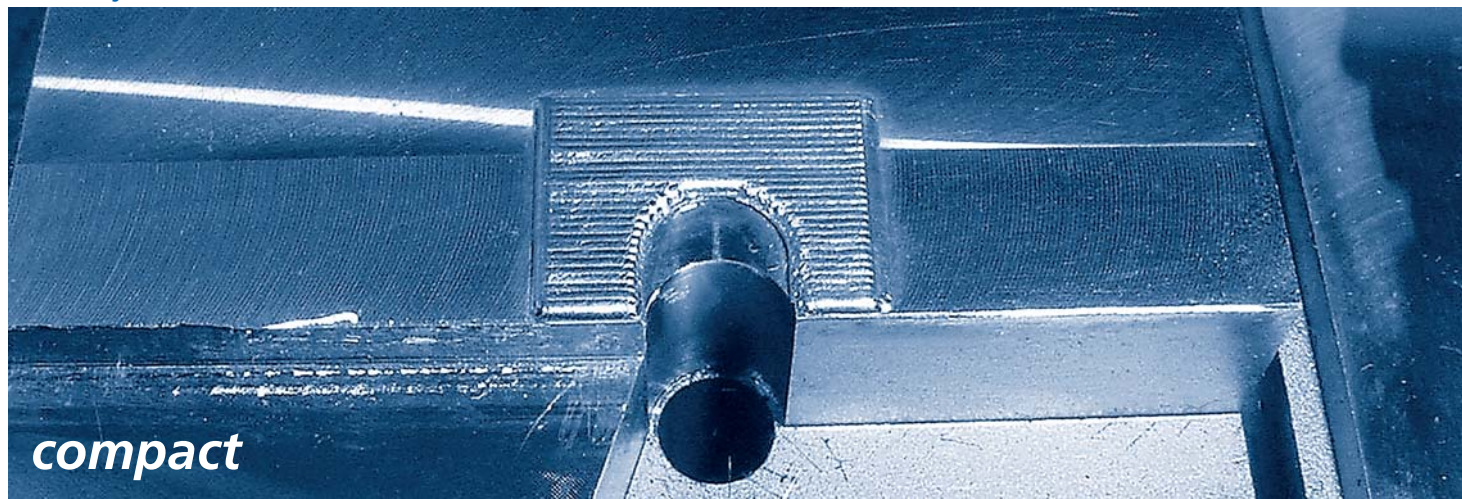
Technical data	ALW 200	ALW 300
<b>Laser</b>		
Average power	200 W	300 W
Pulse energy	90 J (max. pulse energy limited by the software)	90 J (max. pulse energy ltd. by the software)
Peak pulse power	9 kW	9 kW
Pulse duration	0,5 – 20 ms	
Pulse frequency	Single pulse –100 Hz (in automatic mode and under observation)	
Welding spot diameter	0,2 – 2,0 mm, can be continuously set	
Focusing optics	150 mm	
Pulse shaping	Adjustable power-shaping within the laser pulse	
Control	User specific operation with up to 39 parameter sets	
<b>Viewing system</b>	Leica Trinocular with ocular for wearers of glasses, connection for CCD-camera	
<b>Working chamber</b>		
LxWxH in mm	850 x 1080 x 450	
Working surface (WxD) in mm	600 x 475	
Max. workpiece weight	400 kg, centrally positioned	
Workpiece motion	motorized via joystick	
Scope of motion	X, Y: 490 x 400 mm, Z: 350 mm	
<b>Mechanical dimensions</b>		
LxWxH in mm	approx. 1400 x 1190 x 1500	
Weight	approx. 870	
<b>Electrical connection</b>	3 x 400 V / 50/60 Hz / 3 x 16 A	
<b>Options</b>	<ul style="list-style-type: none"><li>&gt; Turn-and-tilt optics</li><li>&gt; Micro-welding appliance for welding spot-Ø &lt; 100µm</li><li>&gt; Tilttable turntable with chuck for horizontal to vertical rotation</li><li>&gt; Magnetic workpiece bracket for free positioning of workpieces</li><li>&gt; Ergo Wedge</li><li>&gt; TV system for demonstrating and observing the welding process</li><li>&gt; Connection for regulated external cooling</li></ul>	



Changing a contour 1.2767



Repairing a water cooled cylinder head of Aluminium



**compact**

## ALV

The compact laser machine ALV with the laser proof casing is used for fine welding work and for deposit welding. Its advantages become visible in tool and mould construction, in sensor manufacturing and in medical technology. The ALV offers three possibilities for processing: manual welding by joystick, semi-automatic welding and fully automatic welding by means of WINLaserNC-Software.

In addition, the worktable's large vertical scope enables processing of larger tools and moulds.



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Welding in the membrane of a pressure sensor



Joint welding of casing components

Technical data	ALV 100	ALV 150
<b>Laser</b>		
Average power	100 W	150 W
Pulse energy	75 J	75 J
Peak pulse power	9 kW	9 kW
Pulse duration	0,5 – 20 ms	
Pulse frequency	Single pulse –15 Hz	– 20 Hz
Welding spot diameter	0,2 – 2,0 mm, infinitely variable settings	
Focusing lens	150 mm	
Pulse shaping	Adjustable power-shaping within a laser pulse	
Control	User-specific operation with up to 128 data records	
<b>Viewing system</b>	Leica binoculars with oculars suitable for wearers of glasses	
<b>Working chamber</b>		
LxWxH in mm	590 x 450 x 550	
Working surface (WxD) in mm	360 x 335	
Max. workpiece weight	50 kg, centrally positioned	
Workpiece motion	motorized via joystick	
Scope of motion	z: 250 mm            x, y: 100 x 100 mm	
<b>Mechanical dimensions</b>		
LxWxH in mm	1010 x 650 x 1350	
Weight	330 kg	
<b>Electrical connection</b>	200–240 V / 50–60 Hz / 16 A	3 x 400 V / 50–60 Hz / 3 x 16 A
<b>Options</b>	> digital version for fully automatic CNC-welding with programming, Teach-in or CAD-data input > Micro-welding appliance for welding spot-Ø < 100µm > Multi functional foot pedal for setting of the laser parameters > Tilttable turntable with chuck for horizontal to vertical rotation > Coaxial lights for optimum lighting of workpiece cavities > TV system for demonstrating and observing the welding process	





# ALS

State of the art technology combined with an attractive design. The ALS 100 is a distinguished and individual device.

This laser is just as suitable for skill-demanding welding tasks as it is in industrial production of small batches.

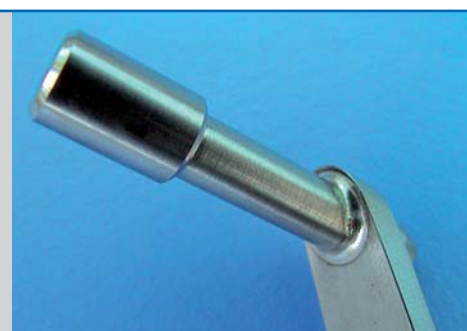
The large working chamber offers a very brightly illuminated working area, loaded via 2 side doors. For work with larger pieces, part of the floor can be dismantled.

The average power of 100 W makes a quick pulsing rate possible (up to 25 Hz), even if high energy settings are used. Thus work can be done quickly and excellent welding results will be achieved, through the homogenous amalgamation of the working materials.

The ALS 100S sets the benchmark in the class of compact welding lasers. With 95 J and 10 kW it offers a high power potential, which proves itself when welding demanding materials such as silver and copper.



Technical data	ALS 100	ALS 100S
<b>Laser</b>		
Average power	100 W	100 W
Pulse energy	60 J	95 J
Peak pulse power	7 kW	10 kW
Pulse duration	0,5 – 20 ms	
Pulse frequency	Single pulse 25 Hz	
Welding spot diameter	0,2 – 2,0 mm, infinitely variable settings	
Pulse shaping	3 pre-set pulse shapes	
Program memory	39 parameter data records can be stores	
<b>Viewing system</b>	Leica binoculars with oculars suitable for wearers of glasses	
<b>Mechanical dimensions</b>		
LxWxH in mm	800 x 570 x 1260	
Weight	approx. 70 kg	
<b>Electrical connection</b>	200–240 V / 50–60 Hz / 16 A	
<b>Options</b>	<ul style="list-style-type: none"><li>&gt; Ergo Wedge</li><li>&gt; Camera system</li><li>&gt; Micro-welding appliance for welding spot-Ø &lt; 100µm</li></ul>	



Positioning instrument



Hip joint grate



## *Your success in focus*

We are looking forward to your inquiry



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Germany

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