

# SIMULTANEOUS MULTI-FIBER **LASER** TECHNOLOGY

THE FUTURE IS NOW



YOUR PARTNER  
IN PLASTIC JOINING

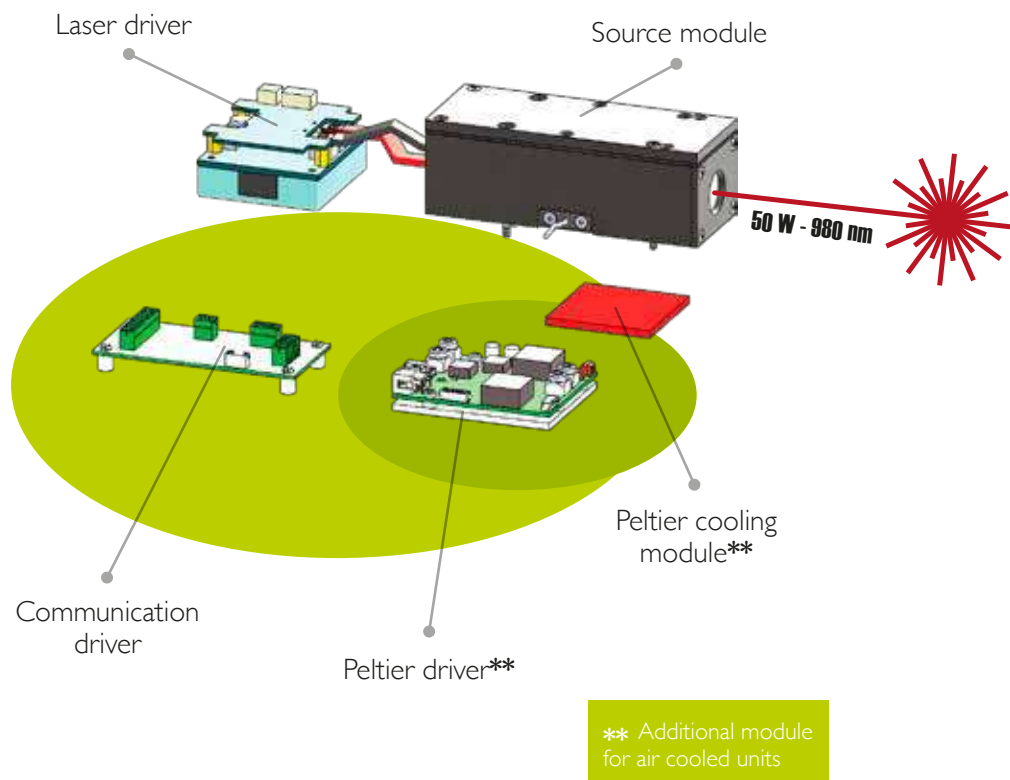
# SIMULTANEOUS LASER WELDING SYSTEM

*CEMAS knows how*

Thanks to our know-how gained in over 30 years of experience in plastic industry, nowadays we are one of the most proficient company in laser welding field. Integrating our machines by using top class materials and components, manufactured by the world leading suppliers, we are able to develop and produce welding machines capable to satisfy every production requirements.

Each machine is entirely conceived and developed by our R&D department and it respects the most stringent qualitative and technical standards. Our laser tools are designed and manufactured entirely in CEMAS main Italian plant, where we also assembly our machines. This production structure allows our engineers and operators to have a complete control over the entire project development.

## LASER SOURCE *The core*



## THE HIGHEST UNMATCHED MODULARITY ON THE MARKET

In order to satisfy even the most stringent and complex requirements, CEMAS laser system has been designed with a fully modular architecture.

Currently our machines are the only one on the market provided with a single modularity system ("one by one" sources architecture),

so as to allow the highest level of customization. This means that, according to the customer production needs, it is possible to equip the machine with a certain number of sources and, later, integrate more of them, one by one, up to reach the required quantity. Indeed, thanks to a careful feasibility

study, we are able to precisely estimate the number of sources necessary to complete the welding process of a specific product. Working in this way, we can always guarantee the best quality-price ratio, allowing our customers to purchase only the components they really need.

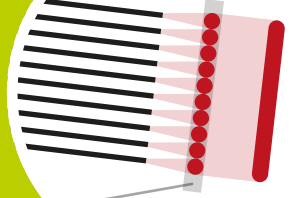


The laser beam is splitted in 5, 10 or 15 ferrules.

5×10 W  
10×5 W  
15×3,3 W



The waveguide directs the laser energy for its homogeneous distribution along the welding line



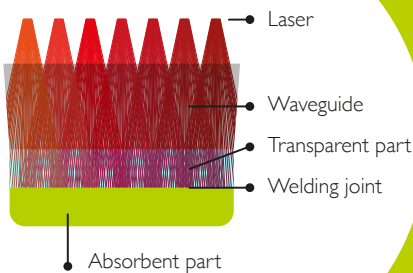
FIBER BUNDLE



## LASER WELDING TECHNOLOGY

The term "**laser**" is an acronym for Light Amplification by Stimulated Emission of Radiation, and describes a physical process: an amplified concentration of light energy at a specific wavelength, capable of focusing on a specific point or on a narrow beam spread over a long distance.

Using the "diode laser system" (usually at **980 nm**, but other wavelengths are possible) the welding process with laser irradiation allows to join a plastic **absorbent component with a transparent one** (so called as it is transparent to the infrared wavelength used). The infrared radiation, driven by **waveguides**, passes through the transparent part and heats the absorbent component. Reached the melting point, the absorbent component, according to the principle of conduction, heats the transparent one, allowing the real welding. Finally, to ensure a perfect welding and sealing quality, the two components are pressed together by a mechanical press.



## ACCURATE TOOL FOR PERFECT WELDING

*We take care of our tooling*

No detail is overlooked: our machines are designed to optimally manage all the welding process variables, in order to ensure high

standards of efficiency and reliability, with a low energy consumption.

To realize machines capable to respond to any production expectations, the tool manufacturing is preceded by a careful virtual modelling and prototyping process. The beam tracing process, using CAD finite element analysis software, allows our engineers to simulate how the light acts in the waveguide. This process is fundamental to design efficient tools without wasting time and economic resources.



# W A T E R C O O L E D

## MF240 - MF480 - MF960

The largest of their range, these machines are developed to weld medium-big size components and they are particularly suitable for rear lamps.




The MF 240, MF 480 and the MF 960 are structured on two levels of modularity:

### LEVEL 1

In the head of the machines it is possible to install up to 3 rack (for the MF 240 and MF 480) and up to 6 rack (for the MF 960);

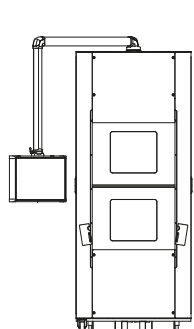
### LEVEL 2

Each rack can be equipped up to 16 laser sources, 8 per side (up to 8 laser sources, 4 per side for the MF 240); the modularity is of one source by one (up to 24 sources for MF 240, up to 48 sources for the MF 480 and up to 96 ones for MF 960).

	<b>MF240</b>	<b>MF480</b>	<b>MF960</b>
<b>LASER OUTPUT</b>	Up to 24×50 W (1.200 W)	Up to 48×50 W (2.400 W)	Up to 96×50 W (4.800 W)
<b>CHILLING SYSTEM</b>	Liquid cooling	Liquid cooling	Liquid cooling
<b>SAFETY SYSTEM</b>	Optical safety double shutter	Optical safety double shutter	Optical safety double shutter
<b>FIBER COUPLING</b>	Up to 24 bundle 10×5 W 15×3,3 W	Up to 48 bundle 10×5 W 15×3,3 W	Up to 96 bundle 10×5 W 15×3,3 W
<b>UPPER TOOL</b>	720×600	900×500	1400×900
<b>LOWER TOOL</b>	700×500	900×500	1400×900
<b>LIFTING TABLE MAX SPEED [MM/S]</b>	500	550	550
<b>PRESS OPENING MIN / MAX [MM]</b>	300 / 1230	250 / 1350	250 / 1350
<b>MAX WELDING FORCE (GROSS) [KN]</b>	8	18 (23)	25 (30)
<b>DRIVING SYSTEM</b>			
<b>PLC CONTROL</b>	PLC Siemens S7 series	PLC Siemens S7 series	PLC Siemens S7 series
<b>WELDING STEPS (PRESSURE)</b>	4	4	4
<b>AUT. TOOLS IDENTIFICATION SYSTEM</b>	up to 15 (+8 manuals)	up to 15 (+8 manuals)	up to 15 (+8 manuals)
<b>COMMUNICATION</b>	Serial communication bus	Serial communication bus	Serial communication bus
<b>POWER SUPPLY</b>	3×400 V a.c.	3×400 V a.c.	3×400 V a.c.

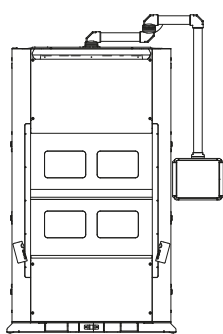
## MF240 COMPACT AND VERSATILE

Despite its dimensions, this machine assures enough power to allow the welding of small parts in double cavity or medium components in single cavity (such as small rear lamps, internal hi-tech electronic components, bezel for headlamp and cluster).



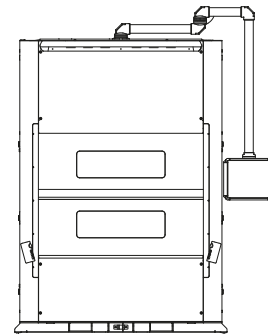
## MF480 MEDIUM-SIZE, BIG RESULTS

Thanks to its "wide but not huge" dimensions, combined with the power of its 48 laser sources, MF240 is the perfect machine for the Companies that need to weld rear lamps in "single cavity".



## MF960 ONE MACHINE, ALL APPLICATIONS

Currently MF960 is the most complete simultaneous laser welding machine currently on the market since it allows the welding of all-size components (small, medium and big ones).



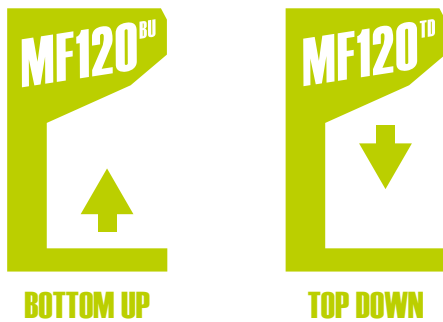
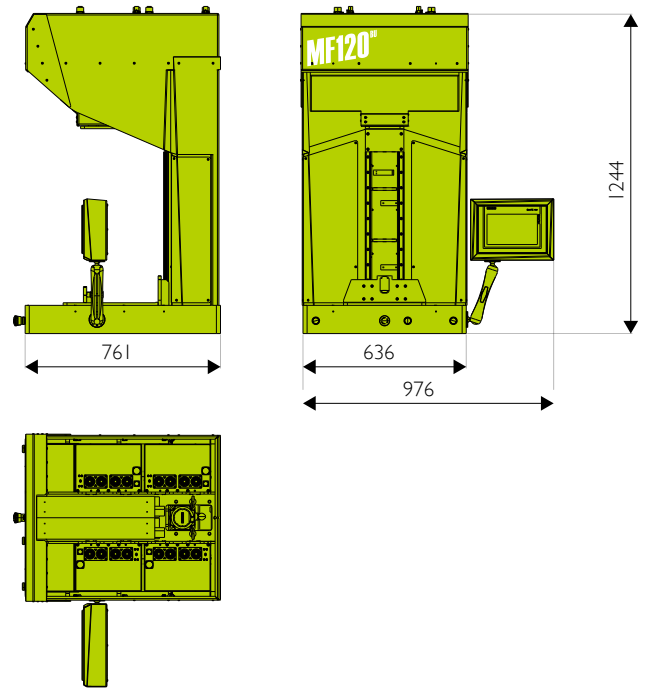
# A I R C O O L E D

## MF120 / TINY MACHINE, BIG CAPABILITIES

MF120 is a simultaneous multi-fiber laser welding machine ideal to realize both laboratory welding tests or mass-production of small parts. It can be equipped up to 12 laser sources and it is available with different power sizes: 150, 300, 450 and 600 W. The air cooling system of the machine allows a precise control of the temperature (in the order of 0.2° C) and it is able to reach high levels of efficiency.

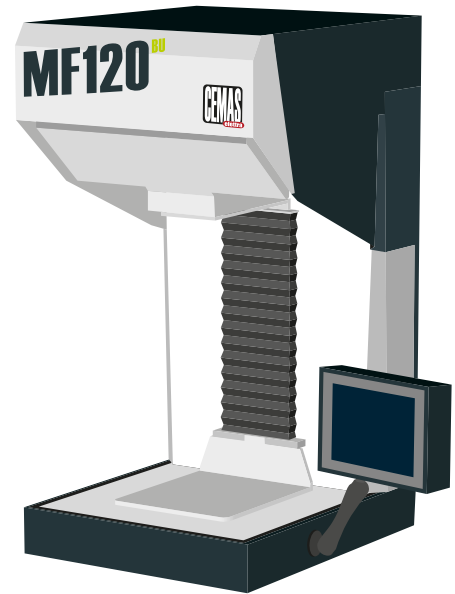
The press is servo controlled so as to assure an absolute precision and dynamic and, despite its dimensions, it is able to exert maximum clamping force up to 400 kg.

The brand-new version of MF120 has been designed with two possible press movement systems: ascending or descending. Thanks to this feature, this stand-alone machine can meet any production requirement.



<b>LASER OUTPUT</b>	12×50 W - 980 nm
<b>LIFTING TABLE STROKE</b>	500 mm
<b>CHILLING SYSTEM</b>	Air cooling tech
<b>SAFETY SYSTEM</b>	Optical safety double shutter

<b>COMMUNICATION</b>	Serial comm. bus
<b>FIBER COUPLING</b>	Up to 12 bundles 5×10 W 10×5 W 15×3,3 W
<b>POWER SUPPLY</b>	Integrated 230 V a.c.



## MF30 / AIR COOLED LASER BANK

Equipped with three laser sources, it is ideal for small welding machines where it is not possible, or it is not convenient, to have a liquid chiller system. Each laser bank, it provides up to 150 W on the component to be welded.

<b>LASER OUTPUT</b>	3×50 W - 980 nm
<b>CHILLING SYSTEM</b>	Air cooling tech
<b>SAFETY SYSTEM</b>	Optical safety double shutter
<b>COMMUNICATION</b>	Serial comm. bus

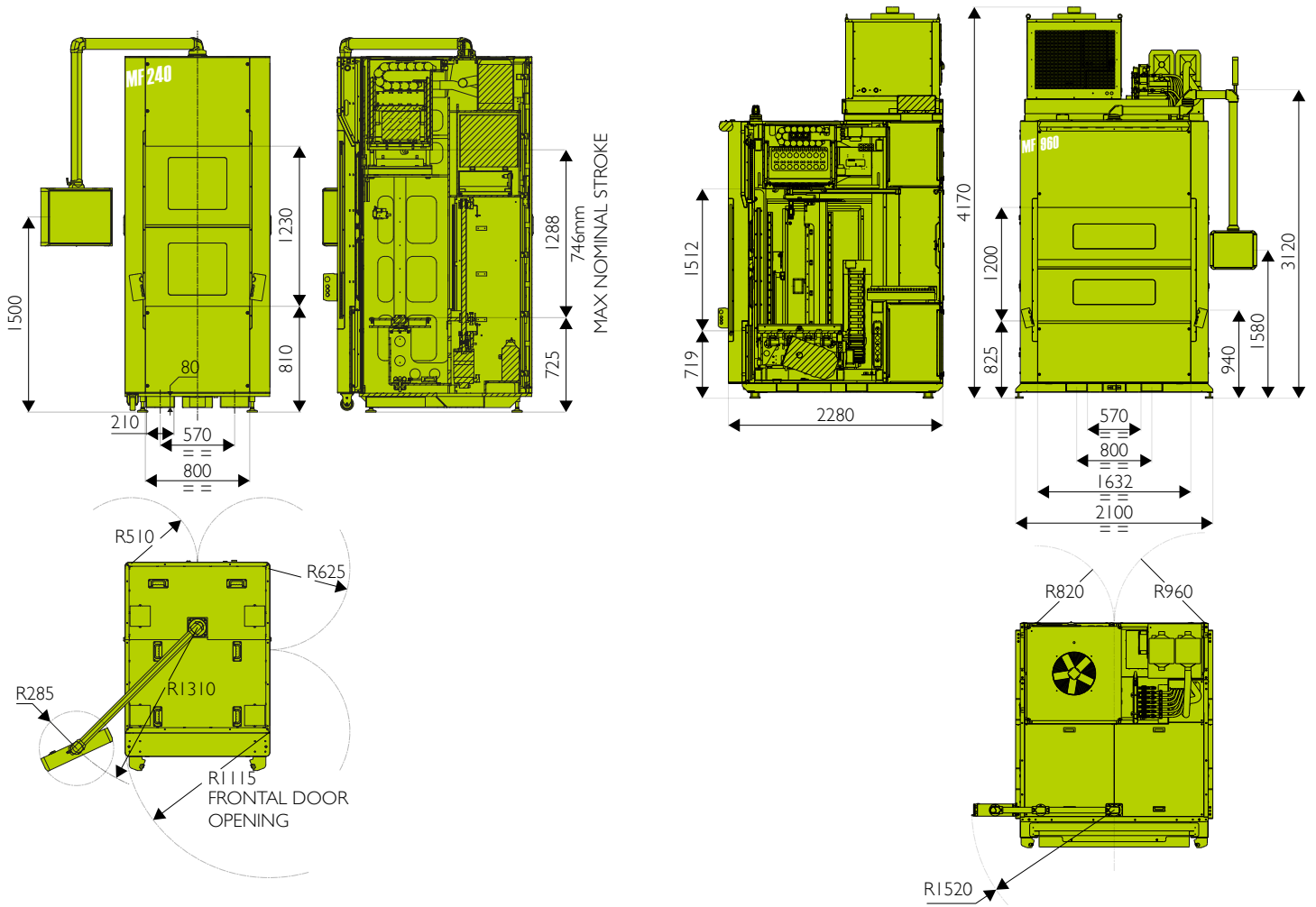
<b>FIBER COUPLING</b>	3 Bundles 10×5 W 15×3,3 W
<b>POWER SUPPLY</b>	24 V d.c.

## MF10 / SINGLE STAND ALONE UNIT

This small laser welding machine is equipped with one laser source and one laser fiber. Its size is similar to a "shoe box", has been designed to be easily integrated in other machines of the same production line, where individual and small joints are necessary, even distant one from each other (e.g. for the bumper parking sensors).

<b>LASER OUTPUT</b>	1×50 W - 980 nm
<b>CHILLING SYSTEM</b>	Air cooling tech
<b>SAFETY SYSTEM</b>	Optical safety double shutter
<b>COMMUNICATION</b>	Serial comm. bus

<b>FIBER COUPLING</b>	1 Bundle 10×5 W 15×3,3 W
<b>POWER SUPPLY</b>	Integrated 230 V a.c.



**WATER COOLED  
8 SOURCES RACK**



**WATER COOLED  
16 SOURCES RACK**



Ⓢ R&D is the heart of our Company: we constantly work to improve our technologies and to find new technical solutions. For this reason, the information reported in this brochure may not be upgraded. Check our website [www.cemaselettra.com](http://www.cemaselettra.com) in order to be always aware of our projects.

# APPLICATIONS

*Aesthetic in first place*

Laser welding technology does not produce smokes, dusts, and particulate and it is totally wear-free. Moreover, during the welding process the components are placed in "soft contact" and are not stressed (as it happens, for example, for the vibration welding).

For this reason, laser welding is currently the most suitable welding process for component with internal hi-tech electronic components that must not be strained in any way.



Cover for electrical battery



Rear lamps



Parking sensors



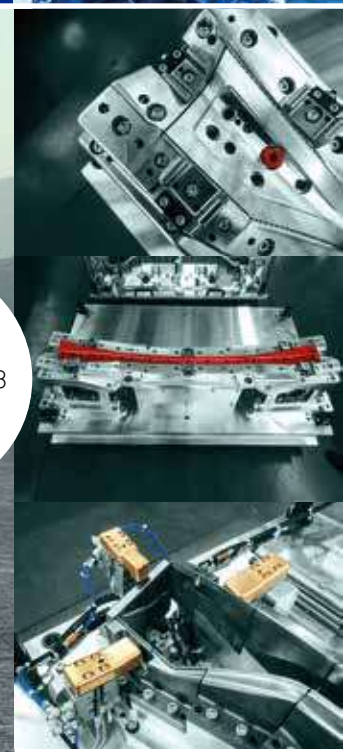
Bezel for headlamp



  
Renault Alpine  
MY 2018  
(rear lamps)



  
Audi A7 MY 2018  
(Fender and applique lamp)



# STRONG POINTS



## ADAPTABLE

Simultaneous multi-fiber laser welding guarantees a superior welding depth than the other laser applications. Indeed, is able to optimally weld, both on the aesthetic side and on the strength one, also components "not totally perfect", with some shape imperfections.



## EFFICIENT

The simultaneous multi-fiber system allows to heat instantly and concurrently the entire weld path, resulting in an extremely constant welding depth. In addition, the zone to be melted is small and local, so there is no energy dispersion.



## FAST

Thanks to the simultaneous welding process, it is possible both to significantly reduce the machine cycle time and to ensure exceptional quality, cleanliness and flexibility (geometrical joint limitations are yet to be discovered!) of the welding process.



## MODULAR AND FLEXIBLE

This technology fits, like no other, to all production requirements, since it is possible to increase or decrease the number of laser sources according to the needs.



## HIGHLY REPRODUCIBLE PROCESS

The precision clamping with no relative motion of parts during the welding cycle assures a highly repeatable welding process and consistent joint quality.



## AESTHETIC IN FIRST PLACE

This technology is dedicated in particular to the welding of rear lamps (in single or double cavity) and of all those components for which aesthetic side of the joining is simply essential. The flash is minimal.



## EXTREMELY CLEAN

This is a non-contact welding technology. For this reason does not produce smokes, dusts, and particulate and it is totally wear-free. Indeed, in laser welding, the components to be welded are placed in "soft contact" and are not stressed during the production cycle (as it happens, for example, for the vibration welding).



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