

# LASER QUALITY WELDING

## phaser

pulsed micro arc welding unit

the primotec phaser welders based on pulsed micro arc  
technology are optimized for easy, fast and reliable  
welding of all types of dental welding jobs



**R & D keeps going;** by introducing the fourth generation of phaser micro arc welding units since 2003, a new milestone in dental welding technology is set.



Easiest operation for best results – the new phaser welders define the “gold standard” in dental welding – no matter if it is for new restorations or for repairs.



# LASER QUALITY WELDING AT A FRACTION OF THE COST

- **dental world convinced**

originally developed to make dental welding accessible to a wide range of users. Due to its, compared to laser welders, considerably less costly pulsed micro arc technology, phaser welding has meanwhile become **the** dental joining technique of choice worldwide.

- **newly designed platform**

latest developments in electronics and control engineering helped designing a completely new device platform to further optimize phaser welding in all regards. This new device platform virtually allows any manipulation of the electric arc that brings the energy to the workpiece, thus creating the welding spot.

- **even better results**

the impulse modulation could be further refined and combined with a high-frequency overlapping that functions like a micro vibration. Comparable to dental stone on a vibrator,

this high frequency overlapping provides a higher density in the welding spot combined with a smoother welding surface, thus increasing the welding quality. By applying this new technology, micro cracks when welding critical alloys have become a thing of the past.

- **explicitly extended uses**

due to the application of these latest technologies the spectrum of uses could be explicitly extended, pin welding and micro welding for orthodontic applications are some of the key words. In addition now even the electric arc diameter can be constricted in order to obtain the best welding results especially in very tight and hard to get to areas.

- **easiest operation**

the operation concept is designed in a way that only the alloy type that shall be welded and the energy level (fine, medium, strong) need to be chosen. So, even an inexperienced user can weld safely from the start. The phasers naturally still provide a multitude of individual adjustment possibilities, which experienced technicians like to use to bring their welding results to perfection. Still, even with the standard settings very good results can be obtained.



orthodontics



margin extension



hole in crown



contact point



bridge



hybrid welding



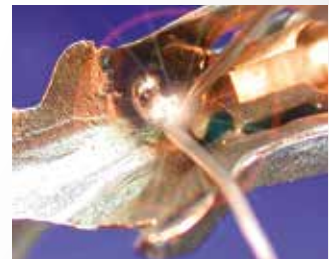
cast bridge element to Captek or electroformed coping



implant cases



secondary crown to partial



attachment to partial



partial extension



repair of broken clasp



repair of broken sublingual bar

## wide spectrum of uses

The primotec phaser pulsed micro arc welding units can weld

- all dental welding jobs, no matter if it is for new restorations or for repairs
- all dental alloys and mono metals such as Titanium
- different alloy combinations such as precious to cobalt-chrome (Hybrid)
- many welding tasks on orthodontic appliances

easily, safely and most reliably.

The 10 preset programs of the new phaser welding units cover all current types of alloys and welding tasks in the dental field. Alloys, commonly known as difficult to weld, such as Palladium-Silver are now perfectly preprogrammed and no longer critical.

## advantages

### Operation and control

easiest operation due to

- turn-push controller with joy-stick function
- just one main menu
- 10 preset welding programs
- three preset energy levels plus micro mode

### This means:

just select the alloy type and energy level and start welding safely and reliably. So, very good welding results can be achieved almost automatically, even with critical alloys.

### For experienced welders:

Power and pulse duration are freely adjustable for a perfect control of the welding spot diameter and penetration depth.



# The primotec phaser is the most sold pulsed micro arc welding unit for dental technology worldwide

## advantages

### phaser-technology

- The only dental welding unit that combines three different welding modes: pulse arc, micro arc and pin welding
- Further improved pulse shaping technology for even stronger and cleaner welds
- First time applied for dental welding: high frequency pulse overlapping for even smoother and denser welds
- Three different ignition modes = soft – normal – deep for optimized welding spot size
- Most reliable ignition in the micro level. At the same time high power reserve at the high end
- A high pulse frequency of 2 Hertz allows fast welding where it makes sense
- Very clean and oxide free welds due to the Argon gas being led precisely to the welding area right through the handpiece
- Maximum flexibility as the handpiece can be either free to move or fixed in the handpiece holding arm
- High power LED light provides a perfect shadow- and glare free illumination without heat development

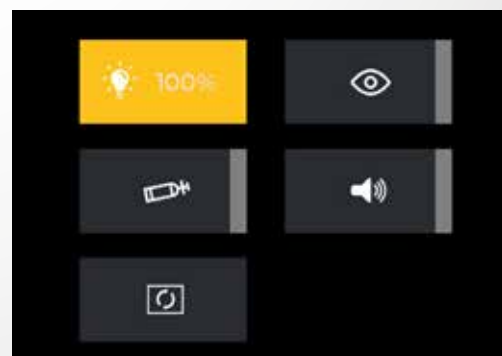
### phaser-characteristics

- maintenance free
- super low running costs (just Argon gas and tungsten electrodes)
- very low gas consumption of only 2 L/min
- compact dimensions, small space requirements, low weight
- no audible noise during operation (no fan or pump)
- fast analysis – the service menu permanently
- checks all phaser functions
- extremely reliable
- Made in Germany
- two years full warranty

### economical aspects

phaser welding helps to:

- increase quality and profits
- generate new business
- speed up turnaround time





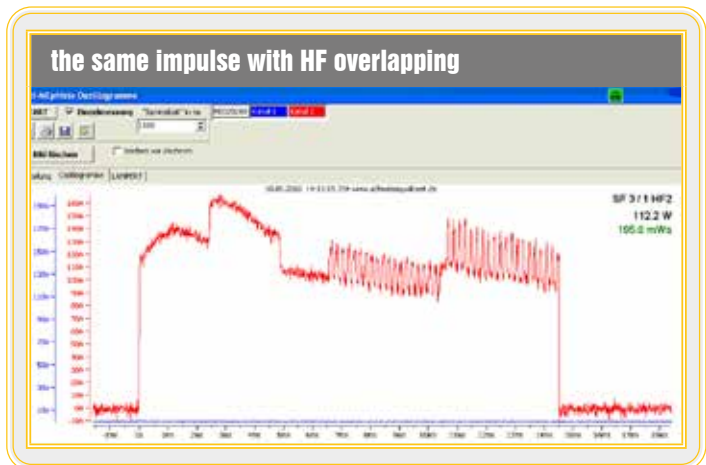
## innovations for a perfect workflow

- **The welding energy quality - pulse shape and HF overlapping**

With the greatly improved, new phaser pulse shaping technology the operational sequence of the welding impulse can be modified in steps as small as one millisecond. This way the welding power can be adjusted i.e. to slowly increase, to softly fade, or to sharply increase or decrease in defined steps during the set impulse duration.

The high-frequency overlapping of the welding impulse functions like a micro vibration. Comparable to dental stone on a vibrator, this high frequency overlapping provides a higher density in the welding spot combined with a smoother spot surface, thus increasing the welding quality.

**The result:** The combination of individually modulated pulse shape with high frequent overlapping vibrations guarantees gentle welding in accordance with the specific requirements of each alloy type. The welding energy no longer strikes the alloy abruptly and with full force, but just right. Critical alloys like Palladium-Silver, Cobalt-Chrome (depending on the carbon content) and other eutectic alloys, are now easy to weld, even for beginners. Solidification (micro) cracks inside the welding spot can easily be avoided. At the same time an even better penetration of the welding energy into the alloy is achieved.



**Down to the smallest detail.** The high precision 10 x stereo microscope ensures the best possible viewing for every welding task.



- **Pin welding**

Typical cases for pin welding are i.e. to directly weld a retention wire to a partial for an extension of one tooth, or to position a holder pin for the connecting clamp, if it can't be fixed to the case otherwise. For pin welding the handpiece is modified in a way that the pin can be shot right onto the case.

**The result:** pin welding is a very expedient completion of dental welding techniques, which is, at present, not available in any other kind of dental welding apparatus..

- **Power and time**

Due to the latest energy storage technology applied, the maximum power of the phaser could be increased by 30%. At the same time the new machine is even more accurately adjustable not only over the full power range, but especially in the lower power regions. The time (impulse duration) can be adjusted very precisely in half a millisecond steps.

**The result:** Both main energy parameters "power" and "time" can now be adjusted even more accurately. The effort to finish the welding area is further reduced.

- **The micro range**

The advanced electronics of the phaser mx3 makes sure that the arc is reliably ignited in the micro range even if minimal power and time settings are chosen.

**The result:** Even in the lowest energy areas, needed i.e. for thin crown margin extensions, small holes or orthodontic wires, continuously identical, fine spot welds can be created. At the same time the tungsten electrode lasts longer as, due to the refined power control, an accidental pre-ignition with too much energy is no longer possible.





### • The pulse frequency

... or also called "welding speed", can be preselected in three stages – slow, medium and fast. The "fast" setting allows maximum welding speed depending on the set energy parameters, where it is appropriate.

The "slow" setting is useful if only a few selected "shots" are to be made on advanced and/or complicated cases.

**The result:** the new phasers offer the adequate speed for every welding job.



### • The ignition mode

Changing the ignition mode to "soft" makes the arc slightly wider. When mode is set on "deep", the arc is tied up and the arc pressure is increased.



soft



deep

**The result:** The ignition mode "soft" makes sure that the electrode stays pointed and lasts longer. At the same time "soft" is gentler to the alloy. The setting "deep" is the best for welding in deep areas such as between two crown margins from below. The ignition of the arc is placed directly in the depth and doesn't revolve to the outer banks of the crowns on the left and right side.

### • The handpiece

The handpiece has been newly designed to react even faster than before. As a result possible differences in the welding spot diameters are virtually eliminated. The chance of the electrode clinging to the work piece is almost none.

In addition the hand piece nozzle is now equipped with a special ceramic insert. This insert allows an even more precise and pointed gas jet to the welding area and helps reducing the Argon gas consumption to only 2 litres/minute.

**The result:** The handpiece reacts even faster and more precise, the Argon gas jet to the welding spot is optimized and the gas consumption could be further reduced.



# phaser

## publications

- **Lightning in a bottle - Soldering and welding are not the same**

by Joachim Mosch CDT,  
Andreas Hoffmann MDT  
and Dr. Michael Hopp  
published in dental dialogue USA

- **Plasma vs. Laser - Comparison of the material quality of welded dental alloys**

by Prof. Dr Wolfgang Lindemann,  
Tübingen/Germany  
published in dental dialogue USA

Find these and more publications under  
[www.primotecusa.com](http://www.primotecusa.com) or call primotec  
USA at 203-682-6429 for your free printed  
copy



## training courses

- **Advanced phaser welding course**

On a regular basis, various phaser welding training courses are organized in primotec's teaching facilities in Germany and in the USA. In addition, many primotec distribution partners worldwide offer different phaser courses with their domestic specialists.

For more information, please contact primotec USA.



**Mark Stueck  
CDT**

Drake Dental Lab  
Charlotte, NC

"We have been using the phaser mx everyday for many years now. It sits right next to our laser welder. Both machines are great but we find that the phaser gives us better welds on our partials and also for bridge work. Not to mention that it's maintenance free!"

## technical tips

Especially Palladium-Silver alloys and Cobalt-Chrome alloys with relatively high carbon content are said to be difficult to weld. Because of the almost eutectic behavior of these alloy types, micro cracks in the welding spot tend to appear easily.

Due to the specially developed pulse shapes with HF overlapping for these alloy types this problem can now be considered as solved. However, if material needs to be added, the welding wire for Palladium-Silver alloys has to be of high gold content. As for Cobalt-Chrome alloys, it is a must to use machined carbon free wires only.

Titanium can only be welded to Titanium.

Always remember that the weld or arc comes from the work back to the hand piece. The hand piece does not “shoot” a weld. When adding metal back always keep the welding wire between you and the electrode.

## background

Only the latest high-performance electronics are used in the manufacture of primotec phaser micro-pulse welders. Combined with precise and reliable precision mechanics, this results in welding equipment of the highest durability.

The phaser welded connection is also extremely durable and biocompatible, as only the same type of alloy is used when adding material. By avoiding problematic solders, material mixes and the associated potential differences and crevice corrosion, as well as the resulting health hazards for the patient, are avoided from the outset.

Any further technical questions – please call **203-682-6429**

## working procedures

One of the great advantages of phaser welding over soldering is the very small heat affected zone which allows welding right next to porcelain or acrylic.



cut







weld



finished workpiece

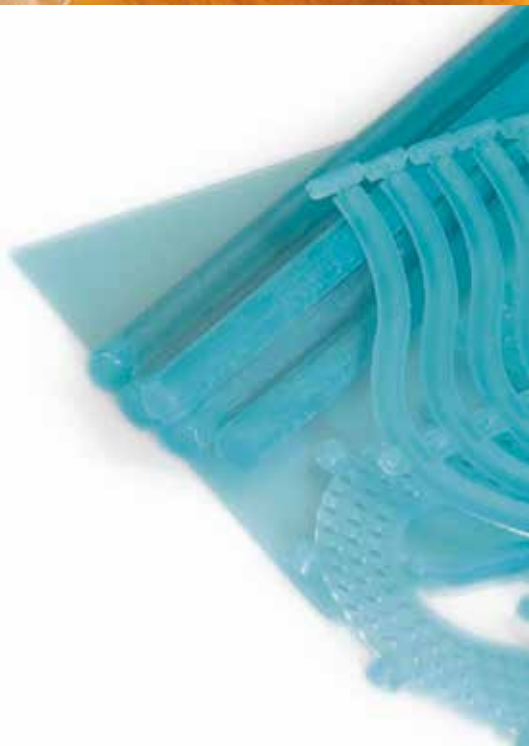
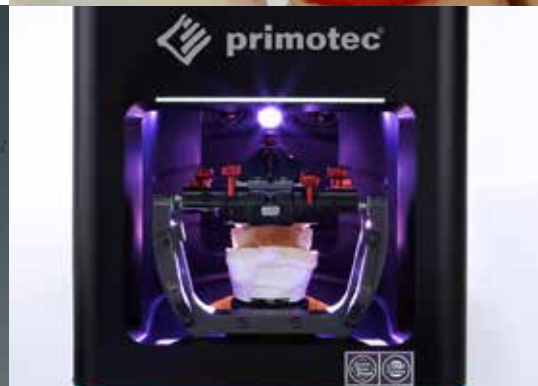
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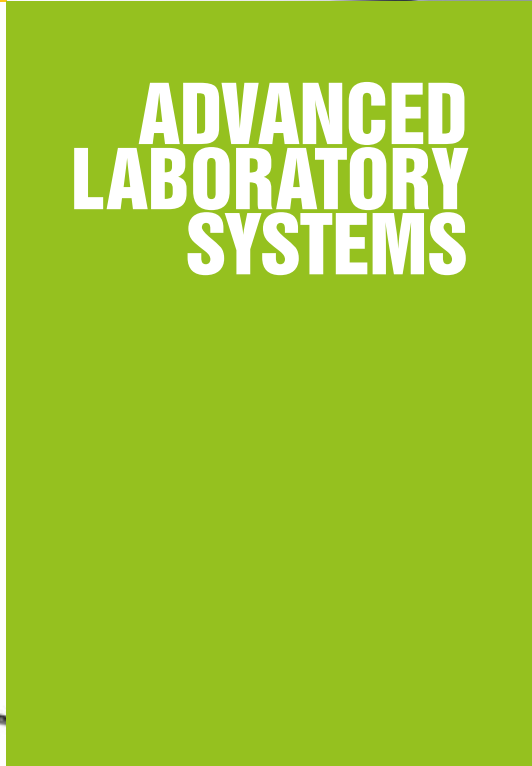
## micro arc welding units & welding accessories

Item #	Item	Price
mx3-1151	 <p><b>primotec phaser mx3</b>  <b>main controller unit</b> with power cable 230/115 Volt, integrated operating panel with turn and push controller with joy-stick function, handpiece with integrated gas flow and ceramic insert, gas hose (300cm), 10 pieces special tungsten electrodes, diamond disc with mandrel, brass brush, connecting cable with „alligator“ clamp, black 100cm, pin welding adapter set</p> <p><b>Stereo microscope</b>  with 10x magnification, fully automatic LCD-Shutter, with table stand and front support, handpiece holding arm with high power LED lighting, protective pane for shutter, cover</p>	\$ 8,995.00
mx0-0905	 <p><b>Gas connecting set</b>  pressure reducer for Argon Grade 5 including pressure gauge and gas flow meter (l/min.), quick coupling for gas hose connection  --&gt; absolutely necessary accessory</p>	\$ 275.00
fs0-0600	 <p><b>Foot pedal</b>  cable length: 185cm  --&gt; recommended accessory</p>	\$ 165.00
mx0-0100	 <p><b>Special tungsten electrodes</b>  10 pieces (0.6mm in diameter)</p>	\$ 69.00

# ORDERING INFO

welding accessories		
Item #	Item	Price
mx0-0330 	<b>Joker welding assistant</b> Precision tool for distortion-free welding  Includes: <ul style="list-style-type: none"> <li>• two cast Co-Cr tips</li> <li>• 12 plastic tips</li> <li>• phaser connection cable with plug</li> <li>• User manual</li> </ul>	\$ 219.00
mx0-0152 	<b>Diamond-Drive</b> Diamond disc grinding motor including diamond disc for sharpening the tungsten electrodes for phaser model mx1 and mx2 (115V/230V)	\$ 329.00
mx0-0153 	<b>Diamond-Drive</b> Diamond disc grinding motor including diamond disc for sharpening the tungsten electrodes for phaser model mx3 (115V/230V)	\$ 329.00
mx0-0244 	<b>Pin welding set</b> Includes: <ul style="list-style-type: none"> <li>• 1x mx0-0249 pin welding adapter</li> <li>• 1x mx0-0247 10 welding pins (1,3 mm in diameter)</li> </ul>	\$ 119.00
mx0-0247 	<b>Pin welding pins</b> 10 pieces (1,3mm in diameter)	\$ 19.00
mx0-0210 	<b>Flexcontact connecting cable</b> black, cable length 100cm	\$ 32.00
mx0-0250 	<b>Solder cross tweezers</b> cable length 70cm	\$ 43.00
mx0-0300 	<b>Flat pointed pliers</b> cable length 70cm	\$ 65.00





# laser quality welding at a fraction of the cost

able to weld ALL dental alloys, including Palladium-Silver,  
even easier, even more gentle and even more versatile.



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