

# **Operating Instructions**

## **Precision Welding Device**

**PUK 2**

**and**

**PUK - Optic Device**



**Lampert Werktechnik**

**230 V**



# PUK 2

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## Operating Instructions

230V



Dear Customer

This handbook is intended to help you with the operation of your PUK 2. It is important to read the instructions carefully and to follow the directions closely in order to avoid disruptions due to operating errors. By following instructions properly, your equipment will always be ready for use and serve you over a long lifespan.

**Operation of the device should only be done by trained professionals and be operated according to the intended purpose of use. The manufacturer is in no way liable for any damage caused by improper use and operation. Before use please be sure to read the manual sections “General Safety Requirements” and “Personal Protection”.**

Please retain these instructions for reference.

Note on Symbol

The equipment manufactured by “Lampert Werktechnik GmbH” fulfil the standard requirements of CE certification and are manufactured according to VDE guidelines.

Use original parts only for maintenance and updating. Our customer service department with expertly trained staff, suitable resources and equipment would be pleased to help you further.

**The device should only be opened or modified by authorized customer service technicians, otherwise all warranties and liability claims will be void.**

LAMPERT WERKTECHNIK GmbH

October 2003

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### SECTION 1 – GENERAL APPLICATION

- the placement of spot welding on precious metal and precious metal alloys, on steel and steel alloys as well as titanium and various NE-metals such as aluminium and brass.
- not authorized for welding teeth fittings (dental techniques)

- Operation in outdoor areas is prohibited. Use in dry room areas only.

**No liability of any kind will be assumed for the durability of welding spots. We recommend that you always check the spots and to solder them in case of doubt.**

### SECTION 2 – INTRODUCTION

PUK 2 provides a long-awaited missing link between difficult joining techniques and laser welding devices. With the help of an intelligent combination of high performance electronics and precision mechanics, we've been able to create a unique spot welding device. It's small size, low weight and minimum energy use are

important factors leading to your advantage. Excellent ignition and welding characteristics allow a broad range of use. With our welding device, you're able to gain access to new dimensions of welding techniques in the area of production and repair.

## **SECTION 3 – GENERAL SAFETY INSTRUCTIONS - READ BEFORE USING**

### **3-1. SAFETY INSTRUCTIONS**

- Opening the device is permitted only by trained experts. Remove the plug before opening the device and make sure that the device is without electrical power. Discharge all device components that may store electricity.
- Please consult an expert should any questions arise. Our customer service team with expertly trained staff, necessary resources and equipment would be pleased to assist you further at any time.
- Always use original cables that are long enough and make sure that the clamp holding the work piece is fastened properly.
- Hazard conditions may be caused by electricity as well as by welding current.
- It is illegal for non-professional electricians to handle parts that are directly connected to the mains power supply, except in cases of pulling the mains plug and/or operating the main power switch.
- The device must be disconnected from the mains as soon as repair or service works is needed. When leaving the place of work even for a short time, make sure that the electrical outlet is blocked clearly.
- Open circuit voltage is the highest and most dangerous voltage for welding current. The highest permitted open circuit voltages are contained in your national and international regulations according to the type of welding current, type of electrical source and the high or low hazard levels at the workplace.
- If you believe that operating the device is not possible without creating hazardous conditions, then shut off the device and secure it against unauthorised use. It is clear that a hazardous conditions are present when:
  - the device shows visible damage, or
  - or when functional errors occur
  - if it no longer functions properly.
- Please follow relevant safety measures when handling gas bottles

**PUK 2 can be operated in series using a mains voltage of 230V~**

Yellow/green electric conductor = grounded terminal (PE)

Other conductors L1 and N are connected to phase and neutral of plug.

**The welding device is set for 230 V ex works!** This means that it also may be operated using 220 volts due to its tolerance of +/- 15%. Devices set to a different voltage than 230 V will be marked with a special sticker.

**If the PUK 2 is switched for a voltage other than 230V, it will have a sticker with the corresponding voltage.**

**the device should only be opened by authorized customer service, otherwise the manufacturer's warrantee is invalid.**

**if the device is setup for a special voltage, technical data contained on the output sticker are valid! Main plugs must correspond to the supply voltage and the current consumption of the welding device (see technical data)**

THE FUSE PROTECTION MUST BE SET TO THE SAME VOLTAGE AS THE CURRENT CONSUMPTION OF THE WELDING DEVICE. ONLY USE THE MAINS CONNECTION DELIVERED WITH THE DEVICE.

### **3-2. PERSONAL PROTECTION AND DANGER**

- Always wear insulated protective gloves during the welding process to protect yourself from electrical strokes (open circuit voltage) from dangerous rays (heat and UV) and from hot metal and slags.
  - Wear strong and insulated footwear. Footwear also must insulate under wet conditions. Low shoes are not suitable, since falling hot slags may cause burns.
  - Wear suitable clothing - no synthetic fibers.
  - **Do not look into arc without protecting your eyes. Use only a welders' face protection shield with protecting glass that conforms to regulation (minimum protection level 11).** The arc releases not only light and heat causing blindness or burning but also emits UV rays. If insufficient protection is used, the UV beams can cause very painful conjunctivital inflammation only noticeable after several hours.
  - Bystanders close to the arcs also should be made aware of possible dangerous conditions and should wear protective equipment. If necessary protective walls should be set up.
  - If welding in small rooms, ensure that there is sufficient ventilation since smoke and dangerous gases can be generated.
- It is prohibited by law to weld containers that have been used for the storage of gas, fuel, mineral oil etc., even if containers have been standing empty for a long period of time. Explosions may occur during the welding process due to residue.
- Note any special regulations for rooms with high fire or explosion hazards.




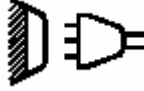


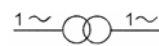
## SECTION 4 – INSTALLATION

### 4-1. TECHNICAL DATA:

- o Device suitable for welding in dry rooms.
- o Mains voltage ~230 V / 50-60 Hz +/-15%
- o Mains fuse T2,5 A
- o Power input 500VA
- o Operating voltage 20-38 V
- o Open circuit voltage 38V
- o Max. loading time 1,7 seconds
- o Protective gas min. Argon 99.9 % (ARGON 4.6)
- o max. gas pressure 10 bar
- o Protection class I
- o Insulation category B
- o Protection type IP20
- o Weight 6,8 kg

### 4-2. TYPE LABEL CHART

Description of symbols:

<b>A</b>	Amperes	<b>V</b>	Volts Spannung	<b>IP</b>	Degree Of Protection
<b>Hz</b>	Hertz		Alternating Current		Gas Tungsten Arc Welding
	Direct Current Gleichstrom	 1 ~ 50-60Hz	Line Connection 1 Phase / Alternating Current / 50-60Hz		Note Manual
<b>U<sub>0</sub></b>	Conventional Load Voltage	<b>U<sub>1</sub></b>	Primary Voltage		Protective Earth (Ground)
<b>U<sub>2</sub></b>	Spannun	<b>I<sub>2</sub></b>	Rated Welding Current		One phase transformer
<b>I<sub>1max</sub></b>	Rated Maximum Supply Current	<b>I<sub>1eff</sub></b>	Maximum Effective Supply Current	<b>X</b>	Duty Cycle

### 4-3. SETTING UP

- Place the device so that cool air can reach the entire outside surface without difficulty
- Do not cover the device!
- Always place the device on a hard non-combustible, insulated material base.
- Do not allow metal dust (e.g. during abrasion work) to directly enter the device.

#### 4-4.DESCRPTION OF THE OPERATING COMPONENTS FRONT SIDE

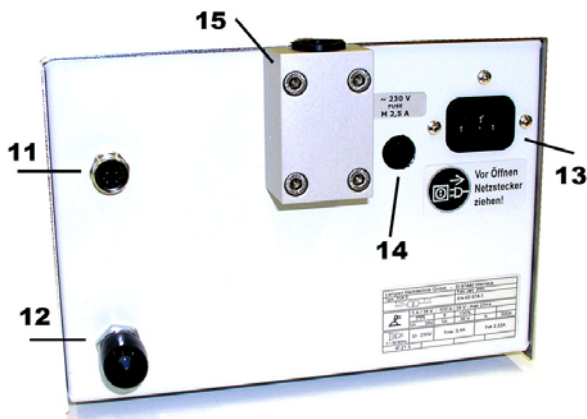
(Figure 1)



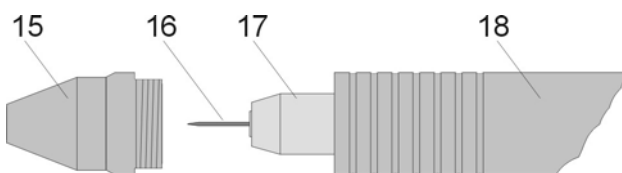
- Main switch (1)**
- Output regulator (2)** Power regulated in 8 steps
- Connecting socket for tool piece (3)**
- Sockets (4)** for connection of contact elements such as welding table, welding clamp, holding pliers.
- Charger signal (5)** (red when charging)
- Ready for use signal (6)** (green when device is ready for welding)
- Switch (7)** to select a quicker welding action
- Switch (8)** to select between two different impulse lengths

#### DESCRIPTION OF OPERATING COMPONENTS BACK SIDE

(Figure 2)



- Connection of optical unit (11)** for filter control
- Connection for inert gas (12)** for  $\varnothing$  6.0mm pressure tube
- Plug (13)** to connect to power supply
- Fuse box (14)**



#### **4-5. STARTING THE WELDING PROCESS:**

The device must be set up on a flat and stable surface, a work table is best suitable.

- Insert cable of tool right straight into socket (3) turn tightly and carefully by hand to the right to fasten
  - Insert plug of welding table and/or clamp or pliers into socket (4)
  - Unscrew extruder die (15) from tool (18)
  - Loosen electrode (17), insert newly grinded wolfram electrode (16) and fasten it (do it manually, do not use a tool) Let electrodes extend past the extruder die by about 5 mm (Fig. 3) (Only use original electrodes)
  - Screw on extruder die (do it manually, not with a tool)
  - Plug the optic unit into the fastening block located on the device, or alternatively fasten it to the work table using the accompanying table clamp
  - Plug the round plug for the shutter into the connection socket (11) marked "Filter" located on the back of the device and secure it with the nut.
  - To connect the microscope, plug in the round plug and fasten it as like the optic unit above.
- Attach the pressure controller to the protective gas container after carefully reading the instructions (if possible, use argon gas with a minimum of 99.8%, e.g. "Argon 4.6")
  - Connect pressure tube, by using the quick connectors, to the pressure controller and to the gas connection (9) of housing backside
  - Open gas bottle valve and set the gas flow to between 3-6 liters per minute - **maximum operating pressure should be 10 bars!**
  - Plug in main plug.
  - Set main switch (1) to ON – the device will perform a self-test.
  - The green control light (6) will indicate that the device is in operational status.
  - Use output regulator (2) to choose energy needed.
  - Start welding process.
  - **Use eye protection**

**Please read the instructions on the connected eye protection devices such as the optic unit or microscope shutter!**

#### **ATTENTION!**

**When welding with PUK 2, the welding base, the clamps and/or the pliers are live as soon as the mains master switch is turned on. Make sure that these parts do not touch any electrically conductive or earthed parts such as housing etc.**

### **SECTION 5 – OPERATION**

#### **5-1. WELDING GUIDELINES**

- Place the work piece on the welding table
- Make sure there is good contact between work piece and table
- Use a clamp or pliers if the work piece only has small contact with the table
- Use the electrode tip to touch the area you want to weld until the welding is complete.  
**"without pressure or only with slight pressure!"**
- The welding process takes place automatically:
  - protective gas floats around welding spot
  - A signal tone indicates the arc
  - the arc sets off
  - protective gas supply stops
- The welding process can be interrupted at any given time by lifting the electrode away from the workpiece.
- Use the switch (7) to select a quicker welding action.
- Use the switch (8) to select between two different impulse lengths. A longer impulse creates a larger penetration depth and higher strength.

#### **5-2. BASIC INFORMATION AND TIPS:**

#### **Important!**

- **Always work with a sharp edge electrode to get optimal results.**
- **Always make sure that there is enough contact between work piece and welding table. In case of problems use a clamp and/or pliers.**
- **Never weld "free hand". That is, always support both hands on the base (work table). Trembling hands will distort the parameter of the device.**
- **Use only very light pressure on the electrode tip.**
- **Weld only using low gas pressure! 3 to 4 litres per minute is often enough.**



## Tips

- Take the time to familiarize yourself with our device
- Test the various energy steps of the device.
- Remember that materials may react differently
- When choosing the energy step pay attention to the thickness of the material.
- Touch the work piece exactly at the point to welded.
- Once you are more familiar with the device you will notice that angle you use to touch the needle to the work piece will influence the “flow direction” of the welding spot. An angle of touch of 90° will result in the deepest welding spot possible.
- A saw or file with serrated edges is also very suitable as additional welding material
- Allow the needle to clamp in longer for deep-lying welding spots.
- It may be helpful to punch out material by chisel and weld them on.
- With a little experience you will be able to use wire to close holes or to add support.
- If you problems igniting, it may be helpful to **lightly press the needle sideways**. Using this technique you will be able to push welding spot in a certain direction.

### 5-3. GRINDING THE ELECTRODES

Figure 4



The electrodes must be ground on a fine or medium diamond wheel. The angle should be about 25°. (Figure 4)

## SECTION 6 – MAINTENANCE AND TROUBLESHOOTING

### 6-1. ROUTINE MAINTENANCE

PUK111 requires a minimum amount of care and maintenance when used under normal operating conditions. Please take note of some important points that will ensure a smooth functioning of your device and guarantee good service in the years to come.

- Occasionally check mains plug and cables and welding cable for damage.

#### Attention

**If fuses have to be replaced, Only replace them with fuses of the same kind. if overly powerful fuses are used, the warranty against any possible damage will no longer be Valid.**

**The device should only be opened by trained personnel!**

- Check the movable parts of the hand piece for easy movement.
- Occasionally clean the electrode screw connection on the hand piece to guarantee good contact with the electrode.

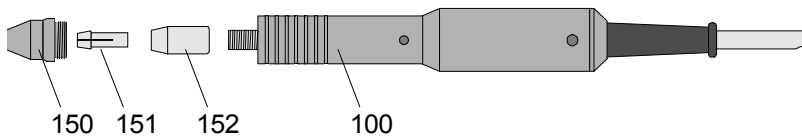
## 6-2. TROUBLESHOOTING CHECK LIST

ERROR	CAUSE	SOLUTION
<b>1. No welding power</b> Mains switch turned on Operation signal does not light up	Interrupted cable	Check cable and Mains
<b>2. No welding power</b> Mains switch turned on Operation signal green	Welding cable connection interrupted. Bad mass or no mass	Check connections Connect work piece Fasten contact clamp directly to work piece.
<b>3. No welding power</b> Mains switch turned on Operation signal constant (red)	Error by fault current	Press reset button or switch device off and on If malfunction continues, send device to be serviced
<b>4. Poor ignition</b>	poor contact with mass  dirty electrode  Tip of electrode burnt off	Connect work piece  Grind electrode  Grind electrode
<b>5. Mains Fuse and/or safety cut-out has tripped</b>	Mains fuse too weak, Incorrect safety cut out  Mains fuse is tripped under no-load conditions	Insert correct fuse  Send device to service
<b>6. Poor welding characteristics</b>	wrong protective gas  no protective gas	Use inert protective gas (ARGON 4.6)
<b>7. Oxidation and rust formation</b>	Heavy gas pressure sufficient	Reduce flow through amount – 3-4 l/min. are
<b>8. Strong oxidation of welding spots</b>	wrong protective gas  no protective gas	Use inert protective gas (ARGON 4.6)
<b>9. Tungsten contamination in basic material</b>	Electrode with too high pressure onto work piece	Touch work piece with very slight pressure so that it manages to ignite
<b>10. Tungsten Electrode sticks to work piece</b>	Electrode with too high pressure onto work piece	Touch work piece with very slight pressure so that it manages to ignite
<b>11. Tungsten Electrode fuses immediately</b>	Grinding too sharp	Grind in recommended angle (25°)
<b>12. Static discharge onto the device surface</b>	Special situation at your location	Use special foot mat for the work area
<b>13. Workpiece sticks to welding table</b>	Bad contact to welding table	Use clamp or pliers

**ATTENTION: The device should be opened by trained personnel only!**

Text and figures at the time of printing. Subject to change.

## **SECTION 7 – LIST OF SPARE PARTS**



### **Hand piece**

100 100 complete hand piece  
100 150 extrusion die  
100 151 pliers  
100 152 tension nut

### **Welding table**

100 300 Welding table complete with 500mm cable

### **Electrodes**

100 400 10 electrodes in display box (thoriumoxide-free)

### **Solder Cross Tweezers**

100 750 Solder cross tweezers with 900mm cable

### **Pliers**

100 500 Flat-point pliers with 900mm cable

### **Clamp**

100 702 Electro clamp

### **Cable**

100 306 Cable with 2 plugs 4mm, 500mm  
100 307 Cable with 2 plugs 4mm, 1000mm

### **Grinding wheel**

100 701 Diamond grinding wheel

## **SECTION 8 – EG Conformity Declaration**

- According to machine guidelines 98/37/EG, Appendix II A
- According to low voltage guidelines 73/23/EWG
- According to EMV (electro-magnetic compatibility) guidelines 89/336/EWG

### **The Manufacturer,**

Lampert Werktechnik GmbH.....  
Julius-Echter-Str. 4, 97440 Werneck, Germany,.....

### **declares that the product**

“PUK 2” Precision Welding Device

conforms to the conditions set forth in the above-named guidelines, including any changes made up to the time of declaration.

### **The following harmonised standards were used:**

Welding current sources for arc hand welding in limited operation: DIN VDE 0543 (VDE 0543)

Protective housing type (IP Code): DIN EN 60529 (VDE 0470-1)

Electro-magnetic compatibility (EMV): EN50199

Werneck, September 5th, 2002

Lampert Werktechnik GmbH

Andrea Bauer – Lampert (President and CEO)

A handwritten signature in black ink that reads 'F. Bauer-Lampert'.

# PUK

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## OPTIC DEVICE

230V

### Operating Instructions



Dear Customer,

This handbook is intended to help you with the operation of your PUK Optic Device. It is important to read the instructions carefully and to follow the directions closely in order to avoid disruptions due to operating errors. By following instructions properly, your equipment will always be ready for use and serve you over a long lifespan.

**Operation of the device should only be done by trained professionals and be operated according to the intended purpose of use. The manufacturer is in no way responsible for any damage caused by improper use and operation. Please be sure to read the chapters “General Safety Requirements” and “Personal Protection” before use.**

**Note on Symbols**

The equipment manufactured by “Lampert Werktechnik GmbH” fulfil the standard requirements of CE certification and are manufactured according to VDE guidelines. The used LCD-Shutter is DIN-CERTCO (DIN-Authority of eye protection) proofed and admitted.

Use original parts only for maintenance and updating. Our customer service department with expertly trained staff, suitable resources and equipment would be pleased to help you further.

**The device should only be opened or modified by authorized customer service technicians, otherwise all warranties and liability claims will be void.**

**LAMPERT WERKTECHNIK GMBH**

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### Proper Use of the PUK OPTIC DEVICE includes:

- Observation of welding processes through the optic device's viewing window and workspace lighting.
- The PUK Optic Device may only be used in combination with PUK- precision welding equipment.
- The PUK Optic Device may only be used when properly connected.
- Use for other than the proper purpose describe is not permitted.
- Use in outdoor areas is not permitted. Use only in dry room areas!

## INTRODUCTION

Arc welding without protective equipment is dangerous and can lead to painful inflammation of the cornea and to irreversible clouding of the eye lens (cataracts). The PUK Optic Device with its integrated LCD – welder view protection filter offers reliable protection against these dangers and **permanently protects** against UV/IR rays, sparks and splashes at both light and dark levels. The

filter's protection levels are defined to avoid blinding by the arc welding. The PUK Optic Device should only be used in combination with a PUK spot welding device. Shortly prior to lighting an arc, the electronic component of the PUK spot welding device switches the filter from the DIN 3 level to the safer DIN 11 dark level. As soon as the arc is turned off, the filter is switched back to the light setting.

## GENERAL SAFETY REQUIREMENTS

- Opening the device is permitted only by trained experts. Before opening the device, remove the plug and make sure that there is no electrical current in the device. If you are uncertain, always first ask an expert.
- Remove the plug before exchanging the energy saving light and only touch the light when it has cooled down sufficiently. Only use energy saving lights with a maximum output of 9 W.
- It is illegal for non-electrical professionals to handle parts which are directly connected to the mains voltage, except in cases of using the mains plug or the mains central switch.
- During maintenance or repair work of the electrical source, first separate the device from the mains. In the case of more complex activity where you must leave the work area – even for a short time – you are also required to clearly block the plug outlet.
- If it is clear that there is some danger involved in your activities, you must take the device out of operation and also prevent unintentional operation. It is clear that a dangerous situation is at hand when:
  - the device shows visible damage, or
  - or when functional errors occur
  - the device no longer works properly.

## EYE PROTECTION WHILE WELDING

- **Do not look into the arc without eye protection; only use welding protection visors which are made from regulation-approved protective glass.**

In addition to light and heat rays causing blinding or burning, the arc also emits UV rays. Without sufficient protection, these invisible

ultraviolet rays cause very painful conjunctival inflammation noticeable after several hours.

- Any persons or helpers who are working near the arc should also be made aware of the dangers and be equipped with the proper required protection. If necessary, protective walls should be set up.

## OPERATION AND INSTRUCTIONS

- Plug the optic device into the holder (3)
- Insert lights into the holder with a maximum of 9W
- Insert the lamp's connective plug (4) into the socket (5) on the back of the welding device and screw it tightly by carefully turning to the right. (as tight as possible by hand)
- Plug the optic device's mains plug (6) into the correct mains plug socket with ~230 V(220V) / 50-60 Hz .
- **Keep a minimum 15 cm distance between the light and the workpiece and/or the welding table.**
- Turn the mains switch (1) to "ON"
- During a self-test right after switching on the welding device, the view protection filter (2) will quickly turn dark and then light. Test the device in this manner each time prior to beginning your work, to ensure that the view protection filter functions perfectly. If necessary, start the self-test gain by switching off the device; switch it on again after several seconds of waiting.

### WARNING!

**Before welding, always check that the PUK Optic Device functions properly. If the welder view protection filter (shutter) does not switch from light to dark, it must be changed immediately.**

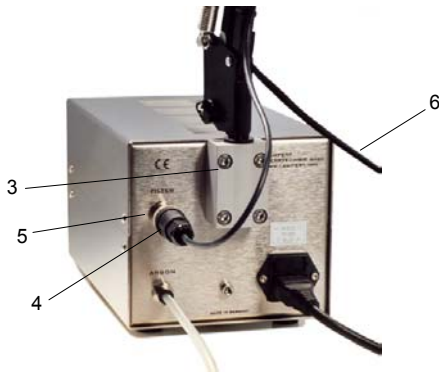
## DESCRIPTION OF THE OPERATING ELEMENTS

(Fig. 1)



**MAINS CENTRAL SWITCH (1)  
WELDER VIEW PROTECTION FILTER  
(Shutter 2)**

(Fig . 2)



**LAMP HOLDER (3)**  
**CONNECTIVE PLUG (4)**  
**SOCKET (5)**  
**MAINS CABLE (6)**

Text and diagrams correspond to the technical level at time of printing. We reserve the right to change.

## CARE AND MAINTENANCE

The PUK Optic Device does not require much care or maintenance when used at normal levels. However, several points must be observed in order to guarantee functioning and to keep the device working properly for many years to come.

- Regularly check the mains plug, mains cable and connective plug and cable for the welding device for damage
- Occasionally clean the view window with a soft cloth

## TECHNICAL DATA

- Optical view protection and lighting unit for the exclusive use with PUK precision welding devices
- Use only in dry indoor areas
- Operating temperature +5°C to +40°C
- Mains voltage +/-15%  
~230 V / 50-60 Hz
- Lighting material = energy saving lamps with max. 9 W
- Protective class II
- Isolations class B
- Type of protection IP 20
- Weight 1.75 Kg

## TECHNICAL DATA – LCD-SHUTTER

- Light state DIN 3
- Dark state DIN 11
- Switching time <50ms
- UV protection >UV 15
- IR protection >IR 14

**WARNING:** The device should only be opened by authorized customer service, otherwise the manufacturer's warranty is invalid.