

# **PUK SM**

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*STEREO-ZOOM-MICROSKOPE*

**OPERATING INSTRUCTIONS**

Lampert Tools USA, Inc.

115 V



# PUK SM

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## *STEREO-ZOOM-MICROSKOPE*

### **OPERATING INSTRUCTIONS**

Dear Customer,

This brochure is intended to help you with the operation of your PUK-SM Stereo Zoom Microscope. The PUK-SM is a microscope developed by the Motic company and modified for the applications described below. Motic stereomicroscopes are precision instruments. They are subject to detailed testing so that you receive them in perfect condition. Their design combines simple handling and outstanding functions with minimal expenses for maintenance.

Please read the operating instructions thoroughly and follow all directions carefully. This will help avoid problems and operating errors. In addition, following instructions will protect your personal safety and ensure that the PUK-SM is always ready to use and provides you with a long service life.

**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 Tools GmbH" fulfil the standard requirements of CE certification and are manufactured according to VDE guidelines.

The arc welding filter is in conformity with the "Practice For Occupational And Educational Eye And Face Protection" standard ANSI Z87.1-1989 (R1998)

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 TOOLS GMBH  
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(LTUS)

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## **SECTION 1 – GENERAL APPLICATION**

### **Proper Use of the PUK Microscope includes:**

- Observation of welding processes through the Microscope Shutter and workspace lighting.
- The PUK Microscope may only be used in combination with PUK precision welding machine
- The PUK Microscope 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!

## **SECTION 2 – INTRODUCTION**

Arc welding without protective equipment is dangerous and can lead to painful inflammation of the cornea and irreversible clouding of the eye lens (cataracts). The PUK-SM 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 from arc welding. The PUK-SM should only be used for welding if the LCD welder view protection filter is mounted and only together when using 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.

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

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

- 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.

### **3-2. 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.

## **SECTION 4 – SAFETY PRECAUTIONS - READ BEFORE USING**

### **4-1. Arc Welding Hazards**

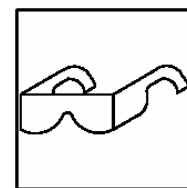
- ▶ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 4.2 Read and follow all Safety Standards.**
- ▶ **Only qualified persons should install, operate, maintain, and repair this unit.**
- ▶ **During operation, keep everybody, especially children, away.**



#### **ARC RAYS can burn eyes and skin.**

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly

off from the weld.



#### **FLYING METAL can injure eyes.**

- \_ Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- \_ Wear approved safety glasses with side shields even under your welding helmet.

## **4-2. Principal Safety Standards**

*Safety in Welding, Cutting, and Allied Processes*, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (phone: 305-443-9353, website: [www.aws.org](http://www.aws.org)).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (phone: 305-443-9353, website: [www.aws.org](http://www.aws.org)).

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org) and [www.sparky.org](http://www.sparky.org)).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102 (phone: 703-412-0900, website: [www.cganet.com](http://www.cganet.com)).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale

Boulevard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800-463-6727 or in Toronto 416-747-4044, website: [www.csa-international.org](http://www.csa-international.org)).

*Practice For Occupational And Educational Eye And Face Protection*,

ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002 (phone: 212-642-4900, website: [www.ansi.org](http://www.ansi.org)).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269-9101 (phone: 617-770-3000, website: [www.nfpa.org](http://www.nfpa.org) and [www.sparky.org](http://www.sparky.org)).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: [www.osha.gov](http://www.osha.gov)).

## **SECTION 5 – OPERATION AND INSTRUCTIONS**

### **5-1. UNPACKING**

All stereo microscope components have been packaged carefully so that you can receive them in perfect condition. We recommend that you keep the packaging material. It may be required again should you have to send in the microscope or wish to store it for a longer period, or whenever the microscope needs to be transported to a technical customer service center for maintenance or repair.

Packaging includes:

- SMZ-140 (binoculars): A base with a tripod column to add a movable, lighted upper component. A binocular top section with eyepieces, eyepiece covers and a protective cover for the microscope

**Please remove and handle all microscope components very carefully.**

Avoid touching the lenses and optical elements. Also avoid contact with dust, water and other dirt-causing substances, as they can smudge or damage the lens surface and affect image quality.

### **5-2. ASSEMBLY AND START-UP**

**Please perform all work stages involved in assembling the stereo microscope very carefully. The stereo microscope's individual parts and elements should not be assembled too forcefully.**

- Place the base of the microscope (9) upright on a flat, clean and secure surface
- Move the attachment support (17) over the tripod rod (19) and screw it on tightly.
- Mount the adjusting ring (18) under the attachment support
- Move the face protector (25) over the microscope head
- Place the microscope head (10) into the head support and screw it on from both sides
- Screw on the ancillary lens (objective) (6)
- Screw the shutter (7) on to the ancillary lens and secure it into the correct position using the bolt (23)
- Plug the light plug (12) into the socket on the top side of the tripod
- Connect the control line (20) to shutter with the welding device
- Assemble the welding table (8) and mount it on the tripod base (Fig. 2)
- Connect the connective lamp cable to the transformer
- Insert the mains plug into a suitable electrical outlet.

**WARNING: Before connecting the stereo microscope to the electricity supply, check that the electricity supply voltage is compatible with the voltage labelled on the stereo microscope.**

- During a self-test immediately after switching on the welding device, the shutter (7) will quickly turn dark and then light again. Run this test each time prior to beginning your work, to ensure that the view protection filter functions perfectly. If needed, start the self-test again by turning the welding device off and then on again.

**WARNING: Keep a minimum 50 mm distance between the light and the workpiece and/or the welding table.**

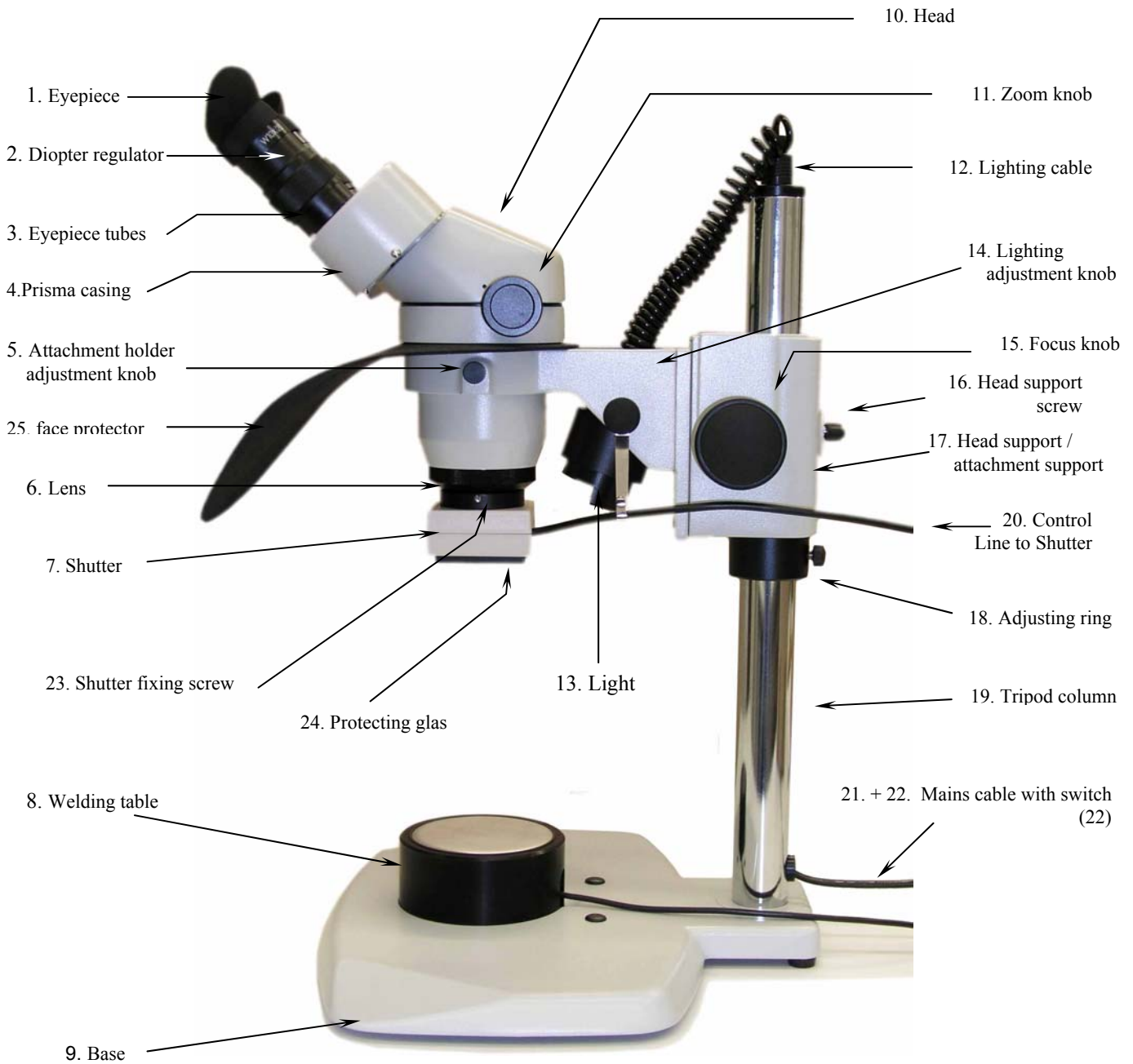
### **ATTENTION!**

**Before welding, always check that the protective filter (shutter) functions properly.**



### 5-3. DESCRIPTION OF THE OPERATING ELEMENTS

(Figure 1)



(Figure 2)



#### **5-4. Operation**

##### A. First steps

The lighting switch is located on the microscope cable.

1. Turn on the main switch (22).
2. The angle of the lighting can be set using the adjustment knob (14) which can be used to change the lens direction.

##### B. Setting the eye viewing distance

1. Look through the eyepiece (1) and move the eyepiece tubes (3) by holding the prisma casing (4) tightly and moving it to the left or the right.
2. The eye distance is correct once the field of view can be completely seen through both eyepieces and both views combine into one field of view.
3. The eye viewing distance should be adjusted individually for each user.

##### C. Focussing

1. Use the zoom button (11) to set the lowest enlargement setting (1x).
2. Place a flat object in the middle of the welding table (8).
3. Turn the focus knob (15) to a middle focus range.
4. The attachment support (17), located on the tripod column (19), can be moved up or down depending on the size of the object of focus.
  - a. Hold the attachment support (17) with one hand without touching a lens and loosen the knob (16) on the attachment support (17) with the other hand. The attachment support can now be moved all the way down to the base (9).
  - b. Look through the eyepiece and move the attachment support upwards or downwards until the object comes into focus.
  - c. Pull the attachment support's adjustment knob (5) tightly once more. Do not release the attachment yet.

- d. Slide the adjusting ring (18) back up towards the attachment support and fasten the ring tightly. Now the attachment can be released.
  - e. It is not necessary to reset the attachment each time an object is changed, unless the object extends beyond the focus range.
5. Bring the image into sharp focus using the focus knob (15).

D. Setting the diopters

The rings for diopter setting (2) are located on the eyepiece tubes. In a normal position, the lower section of the case is adjusted to the marking on the eyepiece.

For different vision abilities:

1. Open the right eye only, look through the right eyepiece (1) and set the focus using the focus knob (15).
2. Then use the left eye to look through the left eyepiece and adjust the focus by turning the diopter regulator (2) on the left tube (3) until the image comes into focus.

D. Changing the zoom.

1. Use the zoom button (11) to set the lowest enlargement setting (4x).
2. Although the stereo microscope comes with a parfocal setting, the focus must be adjusted since lenses with lower zooms offer larger field depths. Field depth is the ability to focus on single points on various levels.
3. Once the image is in focus using the highest enlargement lens, it is not necessary to set the focus when using lower enlargement lens.

## **SECTION 6 – CARE AND MAINTENANCE**

### **6-1. Routine Maintenance**

The PUK-SM requires a minimum of care and maintenance when used under normal working conditions. However, several points must be observed in order to guarantee functioning and to keep the device in proper working order for many years to come.

- Cover the PUK-SM with the dust cover when finished
- Regularly check the mains plug, mains cable and connective plug and cable to the welding device for damage
- Clean the device occasionally using a soft cloth or pressed air

CONTACT YOUR DEALER WHENEVER MAINTENANCE OR REPAIRS ARE NEEDED THAT ARE NOT DESCRIBED IN THESE OPERATING INSTRUCTIONS.

## **6-2. Maintenance of optic components**

Do not disassemble optic components. Please contact your local customer technical service to handle repairs not covered by these instructions.

Before cleaning the lens surface, first remove dust using a special brush or pressurized air. Suitable cleaning tools may be purchased from any camera shop.

1. Cleaning the eyepieces
  - a. Do not remove the eyepieces (1) from the eyepiece tubes (3).
  - b. Clean the outer surfaces and breathe on them while doing so.
  - c. Then dry the lens using special paper. Dry the lens using circular motions from the center to the outside edges. Do not wipe lenses that are already dry since lenses are very easily scratched.
2. Cleaning the lens.
  - a. Do not remove the lens from the microscope.
  - b. Clean the surfaces only. To clean, use a soft cotton cloth moistened with xylol / xylene. Then use the same cloth to dry the lens.

## **6-3. Maintenance of electrical components**

1. Changing the lamp units
  - a. Unscrew the protective tube and the lamp shade of the lighting unit (13) by turning in a counter-clockwise direction and removing it from the lamp frame.
  - b. Carefully use a cloth to pull the lamp from the holder and insert a new lamp.
  - c. Replace the lampshade by turning in a clockwise direction and screwing it into the lamp holder.
  - d. The lamp must be cleaned if accidentally touched with bare hands, otherwise the illuminative power and life span of the lamp will be affected.

## **6-4. Maintenance of mechanical components**

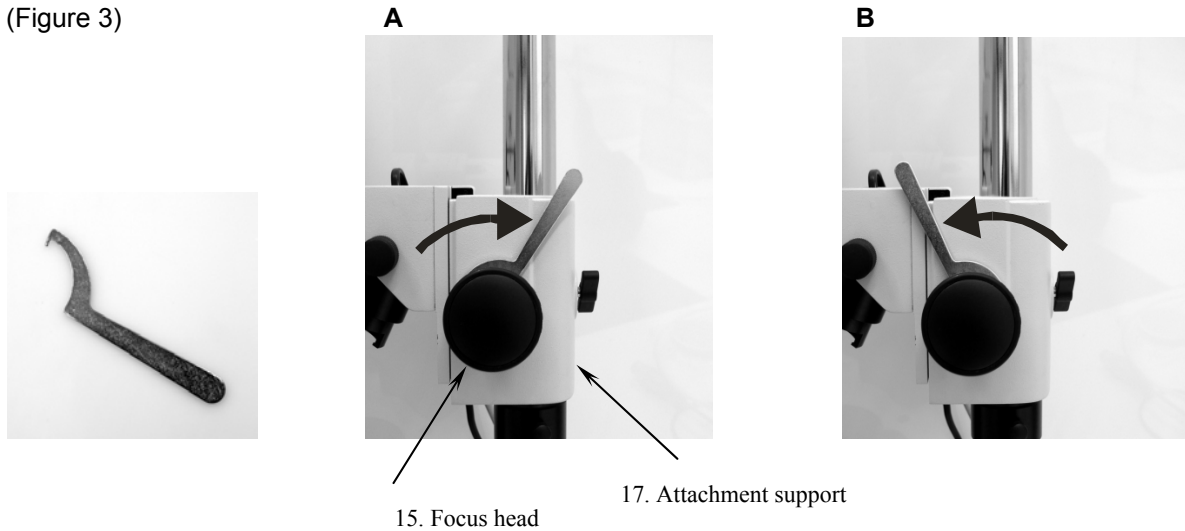
1. Adjusting the focus tension.

The tension is pre-adjusted by the manufacturer. At an optimal tension point, the focus head moves easily without the attachment sliding downwards due to its own weight.

The focus tension ring (Fig. 1) is located between the focus knob (15) and the head support (17).

- a. To increase tension, turn the tension ring by using the tool included (Fig. 3) and turning in a clockwise direction (A); to reduce tension turn in a counter-clockwise direction (B).
- b. If the tool is not included, a suitable metal pin may be used.

(Figure 3)



## **SECTION 7 – PROBLEM CORRECTION**

### **7-1. PROBLEMS WITH ELECTRICAL COMPONENTS**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
The lamp does not work.	Electrical socket not working.	Have professionally repaired.
	Cable not connected.	Plug mains cable into socket.
	Lamp burnt out.	Replace lamp.
	Wrong lamp.	Replace with suitable lamp.
Lamp burns out immediately.	Wrong lamp.	Replace with suitable lamp.
Lamp flickers.	Lamp is not placed in socket holder correctly.	Insert lamp properly.
	Lamp burns out quickly.	Replace lamp.
	Bad connection to electrical supply.	Have professionally repaired.

### **7-2. IMAGE QUALITY**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Poor resolution.	Eyepiece is dirty. Lens is dirty.	Clean eyepiece. Clean lens.
Spots or smudges in field of view.	Eyepiece is dirty.	Clean eyepiece.

\* Note: Spots appearing in the field of view may also be the result of dirt on the inside of the eyepiece. It is therefore recommended to have the lenses cleaned by an authorized customer service technician.

### **7-3. PROBLEMS WITH MECHANICAL COMPONENTS**

<b>PROBLEM</b>	<b>CAUSE</b>	<b>SOLUTION</b>
Does not remain focussed.	The attachment slides downwards.	Re-adjust the focus knob tension.

## **SECTION 8 – TRANSPORTING THE MICROSCOPE AND REPAIRS**

### **8-1. Transporting the microscope**

- Avoid moving the stereo microscope as much as possible.
- Carry the microscope with both hands. Hold the tripod column (19) with one hand and use the other hand to hold the base (9).
- Always hold the stereo microscope upright.

### **8-2. Repairs**

In case the stereo microscope needs to be repaired or checked by authorized professionals, we recommend returning it to the dealer in its original packaging. Please remember to include a description of the problem or the requested procedure to be performed.

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

## **SECTION 9 – TECHNICAL DATA:**

### **9-1. Microscope technical data**

- The microscope is equipped with an optical visor and lighting to use with the PUK Spot Welding Device
- Use only in dry indoor areas
- Mains voltage +/-15%  
~230 V / 50-60 Hz
- Lighting = Halogen lamps max. 20 W with protective glass and reduced heat emission
- Protective class III
- Insulation category B
- Type of protection IP 20
- Weight 5.55 Kg

### **9-2. Microscope optical data:**

Lens	Eyepiece	Work distance in mm	Level	Enlargement factor	Field of view in mm
None	10x	80	1	10x	20
			2	20x	10
			3	30x	6.7
			4	40x	5
0.5	10x	135	1	5x	40
			2	10x	20
			3	15x	13.5
			4	20x	10
0.35	10x	200	1	3.5x	57
			2	7.0x	28
			3	10.5x	19
			4	14.5x	14.5

### **9-3. LCD Shutter technical data**

- Low light level DIN 3
- Dark level DIN 11
- Response time <50ms
- UV protection >UV 15
- IR protection >IR 14

## **SECTION 10 – WARRANTY**

There is a 2 year warranty for defective manufacturing on the microscope and its accessories. Damages due to non-authorized repairs, misuse or improper modifications are not included under warranty. Lamps and fuses are also not included under warranty.

Warranty servicing must be performed by authorized dealers only. Defective products are repaired free of charge if returned to an authorized dealer. The Purchaser shall assume all transport costs.

**DUE TO POSSIBLE MODIFICATIONS OR IMPROVEMENTS DURING PRODUCTION, STEREO MICROSCOPES MAY BE CHANGED WITHOUT NOTICE.**

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

## **SECTION 11 – CONTACT**

### **Lampert Tools USA, Inc.**

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