OPERATING INSTRUCTIONS

"PUK 3s professional" / "PUK 3s professional plus"

Dear Customer

This manual is intended to assist you in operating and maintaining your „PUK 3s“. It is in your best interest to read this manual thoroughly, and to follow the instructions conscientiously. You will avoid malfunctioning as a result of operating errors. The device will thank you with a continuous readiness for use for years to come.

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” and the separately attached Safety Precautions

Please retain these instructions for reference.

Note on Symbol

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

The PUK 3s is certified as “BG-PRÜFZERT” by the Central Professional Association and carries the “GS Sign”

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 warrantees and liability claims will be void.

February 2010

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A SYMBOL USAGE

Warning!

"Warning!" indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word is not used for property damage hazards unless personal injury risk appropriate to this level is also involved.

Caution!

"Caution!" indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

Note!

"Note!" indicates a situation which implies a risk of impaired welding result and damage to the equipment.

Important!

"Important!" indicates practical hints and other useful special-information. It is no signal word for a harmful or dangerous situation.

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.

Not authorized for welding teeth fittings! (dental techniques)

Any usage other than given is prohibited.

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.

2 INTRODUCTION

The PUK® - precision welding devices are compact and versatile TIG impulse welders with which fine and minute welds can be carried out under a welding microscope. The operating principles and spectrum of possible applications are very close to those of laser welding. This similarity means that the exact positioning of small, stable weldings or welds in hard-to-get-to or deep lying positions poses no problem.

3 GENERAL SAFETY INSTRUCTIONS - READ BEFORE USING

BEFORE USING - READ ALSO THE ATTACHED SAFETY PRECAUTIONS

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.

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 3s can be operated in series using a mains voltage of 115V~

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 115 V ex works!

This means that it also may be operated using 110 volts due to its tolerance of +/- 15%. Devices set to a different voltage than 115 V will be marked with a special sticker.

AUTHORIZED SERVICE PERSONNEL ONLY MAY OPEN THE DEVICE! otherwise the manufacturer`s warrantee is invalid.

IF THE DEVICE HAS BEEN MADE FOR A SPECIAL VOLTAGE, THEN SEE THE TECHNICAL DATA INDICATED ON THE DEVICE! THE POWER SWITCH MUST CORRESPOND WITH THE MAIN VOLTAGE AND THE POWER RECEPTACLE OF THE WELDING DEVICE. (See the technical data!)

PLEASE ENSURE THAT THE MAIN POWER BOX CAN SUPPORT THE USE OF THIS DEVICE WITHOUT BLOWING A FUSE

USE ONLY THE PROVIDED POWER CONNECTORS!

3-2 PERSONAL PROTECTION AND DANGER

Wear protective gloves on both hands during welding, since sparks and splashes are unavoidable. The protection gloves may not contain a high portion of easy melting plastic fibers. Gloves will protect from harmful UV rays during welding.

Wear appropriate clothes, with no synthetics.

Workpiece and electrode point can heat up when welding strongly. Burn danger.

The electrode point fixed in the handpiece means an injury risk (pass and scratching injuries by hand, face and eyes...).

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.

DANGER FROM SHIELDING-GAS CYLINDERS

While handling gas bottles the relevant safety regulations are to be considered.

In particular gas bottles are to be secured against falling over and falling down as against heating up (max. 50℃), to protect particularly dur ing longer solar radiation and against severe frost.

4 INSTALLATION

4-1 SET UP RULES

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.

4-2 DESCRIPTION OF THE OPERATING COMPONENTS (FRONT)

(Figure. 1)

(1) STAND BY - SWITCH

(2) LCD - DISPLAY

(3) PROGRAM KEY

(only "PUK 3s professional plus")

(4) MODE - CHANGE-OVER

(5) IMPULSE LENGTH / WELDINGTIME

(6) WELD POWER DIAL

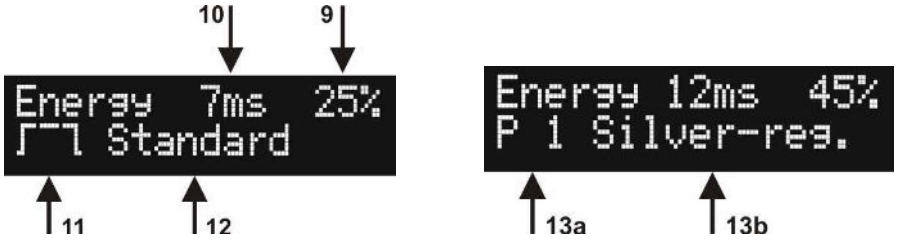
ADJUSTABLE WELDING DIAL

(7) CONNECTOR SOCKET FOR HAND PIECE (-)

(8) SOCKETS (+)

for connection of contact elements such as welding table, welding clamp, holding pliers.

(2) LCD - DISPLAY



(9) Power in percent (%)

(10) Impulse length (welding time) in Milliseconds (ms)

(11) Impulse form

(12) Current mode setting: Standard mode / HF - Pulse welding mode / Gap mode / Micro mode

(13a) Program indicator P1 - P10 (P1 - P5 are pre-programmed at the factory)

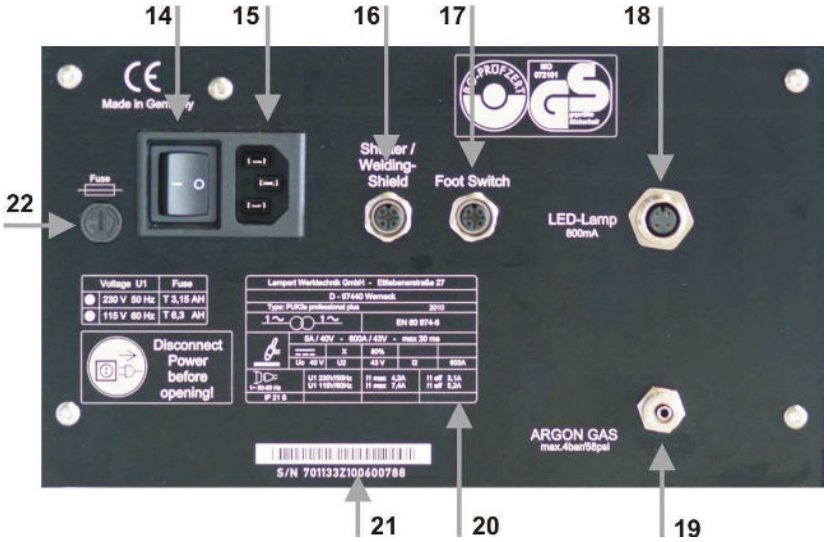
(13b) Name of Program

(only "PUK 3s professional plus")

The foot switch function can be recognised by this symbol ↓. The foot switch itself is an optional accessory.

4-3 DESCRIPTION OF OPERATING COMPONENTS (REVERSE SIDE)

(Figure 2)



(14) MAINS POWER SWITCH

(15) RECEPTACLE

For connecting the power cable

(16) CONNECTION SOCKET FOR WELDING SHIELD („Shutter / Welding Shield“)

(17) CONNECTION SOCKET FOR FOOT SWITCH (optional extra) („Foot Switch“)

(18) CONNECTION SOCKET FOR MICROSCOPE LIGHTING („LED-Lamp 800 mA“)

(19) INERT GAS CONNECTOR

For a ∅ 6,0 mm pressure hose

(20) IDENTIFICATION PLATE

(21) SERIAL NUMBER

(22) FUSE BOX

Fuse box with space for spare fuses

4-4 STARTING THE WELDING PROCESS:

Setting up:

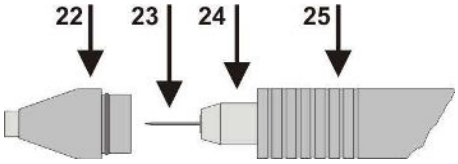
The device must be set up on a flat and stable surface, a work table is best suitable.

Insert the hand piece connector as straight as possible into the socket (7) and by turning to the right carefully bolt on (hand-tight)

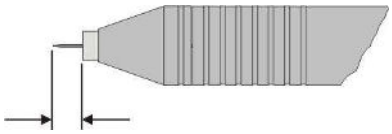
Insert the connector of the clamp or pliers into one of the sockets (8)

Insert electrode:

Before changing the electrode, please check and make sure that the machine is switched off. The uncontrolled triggering of a welding impulse can hereby be avoided.



(Figure 3)



(Figure 4)

Remove the argon nozzle (22) from the hand-piece (25) by twisting it in opposite (alternate) directions, and gently pulling.

Loosen the electrode thread (24), insert the newly sharpened tungsten electrode (23) and screw on tightly **(per hand - do not use a wrench)** with the electrode projecting ca.4 – 6 mm out of the nozzle (Fig. 4)

(Only use original electrodes - Thorium dioxide - free)

mount the nozzle

PLEASE NOTE!

Nozzle (22), electrode screw connection (24), electrodes (23) and pliers devices are wearing parts and are not subject of warranty.

Connect eye protection:

Plug the round plug for the welding shield i.e. eye protection system (Mezzo / Optic unit) into the connection socket (16) marked “Shutter – Welding Shield” located on the back of the device and secure it with the nut.

Warning!

Only the Lampert - eye protection systems "MEZZO welding microscope" or "PUK optics unit" may be attached.

Other eye protection systems are not permissible and may lead to health damage

Note!

Always test that the eye protection system (shutter) is in correct functioning order before you start welding.

Through a press on the welding output regulator (6) you switch the eye protection filter from bright to dark.

If the eye protection filter (Shutter) does not switch from bright to dark, it must immediately be replaced.

Connect inert gas supply:

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 (19) located on the back of the unit.

It is important to use the provided original - pressure hose only.

Examine the hose conclusions to make sure that they are all gas-tight.

Open gas bottle valve and set the gas flow to about **2** litres per minute

For the micro-adjustment of the correct flow rate you consider section 5

maximum operating pressure should be 4 bars!

Note!

The PUK 3s will only work when hooked up to a supply of inert gas and only when the machine is receiving enough pressure (ca. 2 litres / min).

If inert gas is not hooked up, not flowing or if the pressure is too low, the display will show the following reading: "Gas error!! Check pressure".

Connect power supply:

Connect mains lead to the back of the unit (15) and plug into the mains outlet.

Switch the mains power switch (11) to "ON". The display will show the following important safety warning **"Warning ! Protect your eyes Read and follow the manual"**. Confirm the compliance with these safety instructions, by pressing any button. Following this, the machine will run a self-test.

Note!

Please read the instructions on the connected eye protection devices such as the PUK - optic unit (welding shield) or MEZZO microscope with (welding shield)!

Caution!

As soon as the mains power switch is switched to "ON", the terminal clamp (i.e. crocodile clip) and cables receive electrical current. Please see to it that these items cannot come into contact with any electrically conducting or earthed materials. For the user / operator there is no danger, but unwanted operating errors can occur.

Standby Switch (1)

By pressing the "Standby Switch" button, the machine is returned to its „standby" setting.

When the PUK is in the „standby" setting, the display, and the LED-lighting of the microscope will go out. Only the red control lamp above the "Standby Switch" will remain on.

The machine can be returned to its „ready to weld" setting by pressing any button on the front panel or by adjusting either of the rotary knobs (Time / Power).

In addition, PUK will also return to its „ready to weld" setting again, as soon as the electrode in the hand piece touches any work piece which is connected to the machine (e.g. contacted with the crocodile clip).

If the display is showing an error message, or a safety warning, it cannot be switched to its "standby" setting.

In the case of the error message, the cause of the error must first be fixed before the machine can be returned to "standby".

If a safety warning is shown, the operator must first confirm the compliance with these safety instructions, by pressing any button, then the machine can be returned to "standby".

As an alternative, the machine can be switched off entirely by pressing the Mains Power Switch (14) on the back of the device.

4-5 CHANGING LANGUAGE DISPLAYED:

Languages available: ENGLISH – ITALIAN – SPANISH –FRENCH - GERMAN

The machine can be changed from English, to run in any of the 4 other languages mentioned above.

Switch the machine on and confirm the safety notice displayed, so that the device starts and is ready for work.

Now, press both the „Mode“ button (4) and the rotary-knob „Power“ (6), holding them pressed for 2 seconds.

The language setting has now been changed to the next language in sequence. By repeating this process, the various languages available can be selected one after the other.

5 SET UP OF THE PARAMETERS AND OPERATION

After being switched on and running the self-test, the machine will start from its initial settings:

Standard impulse, welding time 7ms and low output

The initial settings for mode, welding time and power, correspond to the blue LEDs in the display. The display also has blue LEDs to mark the entire parameter range.

Important!

At the outset, until a basic proficiency is reached, we recommend to only change the parameter welding power, leaving the welding time constant. After a short time, when you have become more confident with the technique and have gained more experience, then you can naturally also change the welding time to suit your needs.

The machine automatically saves the last three sets of welding parameters that have been used.

By pressing in the rotary knob “Impulse length / welding time” (3), these previous settings can be recalled one after another.

Even when the machine is switched on, or after accidentally changing the parameters, the settings that were last used are there to be recalled again.

Note!

Make sure that only with correctly adjusted gas flow rate good welding results are obtained.

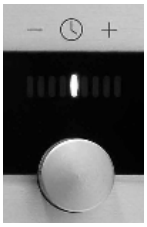
to adjust the quantity of gas keep the output regulator (6) pressed (the gas valve in the machine opens) and adjust the correct flow rate (2 litres/min) using the pressure control valve.

5-1 SETTING THE WELDING PARAMETER

Output:

Using the output regulator (6) the welding achievement and/or the strength of the welding energy is set.

The size and intensity of the spot welds are controlled in such a way



Welding time:

The automatic controller for the pulse time/welding time (5) regulates how many milliseconds the welding energy affects.

Dependent on the angle of the electrode to the workpiece the penetration depth and direction of the melted Metals change.

If the electrode is led vertically to the workpiece, the penetration depth is largest.

A description of the welding modes:

Standard mode

Welding time 4-30ms, Power 20-100%
Our all-round program for many different applications.

HF - Pulse

The mode "HF-Pulse" has been developed principally for the welding of the most common silver alloys. When used in conjunction with longer welding times, it is also well suited for avoiding heat cracks.

Gap (Joint-Mode)

This pulse shape is recommended for applications, in which it is essential to weld in deep joints or angles.

Micro (Micro-Mode)

This setting makes precise welds possible at very thin materials.

This particularly fine output gradation, as well as a special pulse shape in the micro mode, is suitable particularly for material thicknesses smaller than 0,4mm and for fine build-up welds (e.g. at claw settings).

5-2 Programming

(Only "PUK 3s professional plus")

RECALLING STORED SETTINGS (Program slot 1 – 10)

Apart from the 5 pre-programmed memory slots, this feature brings the possibility to personalise and store the users own welding parameter settings, into 5 additionally available memory slots. These settings can then be recalled at a moments notice.

Please note: The preset parameters represent a recommended guideline for work. When working on especially thin or intricate constructions, we advise using the following method to avoid damage to the work piece: Start welding with a lower power and then readjust the power if necessary, gradually increasing it until the correct setting is achieved.

By pressing (short) the button – program memory (3) and then releasing it, the individual memory slots can be accessed.

STORING OF INDIVIDUAL SETTINGS (memory slots 6 - 10)

Press the button – program memory (3) **(long – ca. 1 sec.)** and then releasing it, the process for storing the current user settings is initiated.

Press the button – program memory (3) **(short)** and then releasing it, the memory slot can be selected in which the settings are to be saved. (Program slot 6 – 10)

Press the button – program memory (3) **(long – ca. 3 sec.)** and then releasing it, the settings are saved into the selected slot. The display will show the notice “Settings stored. Please enter the name of the program”.

Now the memory slot can be given a name (up to 10 characters).
By turning the rotary knob – welding power (6), the icon (number, letter), in the selected character, can be changed.
To select the next character in the row, press and release the rotary knob – welding power (6)

Finally, to store the settings and name into the selected memory slot, press and release the rotary knob – Impulse length / welding time (5). The display will show the notice “Your text was stored” the programming process is now completed.

!

Please note: If the user tries to save a set of parameters that is identical to one that is already stored (or identical to one of the pre-programmed settings), the display will show the following error notice. “Settings identical to program – X Settings not stored!”. This is to avoid the “blocking” of a memory slot with a duplication of already stored information.
In this case the memory slot, where the original setting is stored, will blink. The process can then be cancelled by pressing the rotary knob – welding power (6).

6 INSTRUCTIONS

6-1 WELDING INSTRUCTIONS (Standard-/ HF-Pulse-/ Gap-/ Micro-mode)

(For instructions regarding the foot switch, please refer to chapter 6 - 2 where this subject is handled separately).

Connect the clamp to a blank metal location on the work piece

Touch the electrode tip to the spot to be welded until the welding is done

without, or with minimum pressure to the electrode tip!

The welding procedure is automatically done:

- Safety gas encases the welding spot
- A signal announces the arc
- The light arc appears
- Safety gas supply ceases

The welding procedure may be stopped anytime by removing the electrode from the work piece

6-2 WELDING WITH THE FOOT SWITCH (optional accessory)

Make sure that the PUK is switched off. Attach the foot switch cable to the socket “Foot Switch” on the back of the machine.

Next switch the machine back on,the display will show the following important safety warning “Warning! Protect your eyes! Read the manual! Follow the advice!”. Confirm the compliance with these safety instructions, by pressing any button. Following this, the machine will run a self-test.

The foot switch can be activated, by pressing and holding it for ca. 1 second. The display will show the symbol ↓.

Attach one of the terminal clamps (i.e. crocodile clip) to a part of the work piece where the bare metal is exposed.

If the work piece is brought into contact with the electrode, the glare protection system (shutter) inside the microscope “mezzo” will flicker in a clearly visible manner.

Whilst in this operating status, if the foot switch is pressed, the welding process will run automatically, just as described in chapter 6-1.

By again holding the footswitch pressed for ca. 1 second, (without contacting the work piece) the footswitch function can be deactivated. The symbol ↓ will disappear from the display.

6-3 IN GENERAL AND POINTERS

Important!

Always work with sharpened electrodes!

This is the best way to achieve maximum results.

Make sure the work piece has enough contact to the clamp. If contact problems occur, make sure the clamp is in contact with a metallic blank location.

Never weld „hands free“, this means; support both hands i.e. on the workbench during welding. Shaking hands falsify the parameters of the device. .

Apply only minimum pressure onto the electrode tip.

Weld only with minimum gas pressure!

Under 2 l/min are often sufficient

TIPS

Take enough time to get to know your device.

Try out various power levels of the device.

Bear in mind that every material reacts differently when welded, according to its heat-conductivity.

Consider the thickness of the material when you choose the power level.

Try to touch the work piece to be welded as precisely as possible.

With just a little experience you will discover how the angle in which you touch the electrode to the work piece will effect the flow direction of the welding point.

Touching the work piece in an angle of 90°will give you the deepest welding point.

A saw or file burr can serve well as a „welding addition“.

When working on “deep laying” or recessed welds, the electrode can allowed to protrude slightly further out of the nozzle. In this case, the gas-flow rate should be slightly increased.

It may be helpful to use a graver to broach grains to later weld them on.

It may be helpful to use wire as a welding addition to close holes or as reinforcement.

6-4 SHARPENING THE ELECTRODES

Please switch off the machine before changing the electrode. Uncontrolled releasing of a weld is avoided in such a way.

The electrodes should be sharpened with a diamond grinder with fine or medium grain.

The angle should be ca. 15°(Fig.)

6-5 CARE AND MAINTENENCE

The PUK 3s needs, under ordinary working conditions, only minimum care and maintenance. Remembering a couple of points is crucial, though, to ensure proper functioning and a long life for your welding device.

Regularly check the power plug and power cables, as well as welding cables for damage.

Ensure that the hand piece parts are easy to operate.

If necessary, clean the electrode thread of the hand piece to ensure an optimal contact with the electrode

Warning!

IF FUSES NEED TO BE REPLACED, REPLACE ONLY WITH THE SAME VALUES. IF DAMAGES OCCUR AFTER INSTALLING INAPPROPRIATE FUSES (I.E. TOO STRONG) THE WARRANTY BECOMES INVALID.

AUTHORIZED PERSONNEL MAY ONLY OPEN THE DEVICE!

7 TECHNICAL DATA

7-1 TECHNICAL DATA

- Device is suitable for spot and precision welding in dry environments

Main Voltage	~115 V / 50-60 Hz +/-15%
Mains fuse	T 6,3 A
Power input "PUK 3s professional plus"	400 VA
Power input "PUK 3s professional"	350 VA
Operating voltage	30 – 43 V
No l- load voltage	43 V
Duty cycle	80%
max. charging time	0,8 sek
Inert gas	min. ARGON 99,9% (ARGON 4.6)
Maximum gas pressure	4 bar
Inert class	I
Insulation class	B
Protection Method	IP 21S
Weight "PUK 3s professional plus"	8,8 kg
Weight "PUK 3s professional"	8,4 kg

7-2 Identification Plate

Symbol explanations:

A	Amperage	V	Voltage	IP	Protection Method
Hz	Hertz		Alternating Current (AC)		Tungsten-Inert Gas-Welding
	Direct Current	 1 ~ 50-60Hz	Power plug single phase / Alternating Current / 50-60Hz		Read the manual
U_0	Idling Voltage	U_1	Mains Voltage		Ground
U_2	Nominal Voltage	I_2	Nominal welding current		Single phase transformer
I_{1max}	Amperage input	I_{1eff}	Rated Amperage input	X	Duty cycle

8 TROUBLE SHOOTING

	ERROR	CAUSE	SOLUTION
1	**No welding power**		
	Power main switch on. Display stays off	Power connection interrupted	Check power connection and main voltage
		or machine's internal fuse defective	or replace fuse with a suitable fuse of the same type and value.
2	**No welding power**		
	Power main switch on.	Welding cable connection interrupted	Check connectors
		Bad or no grounding	Connect to work piece. Attach contact clamps directly to the work piece
3	**No welding power**		
	Power main switch on.	Interruption due to power error	turn device on and off
			If still error, take device to be serviced
			Equipment to technical service
4	**Power fuse and/or automatic safety blows**	Not enough power protection	Install proper power protection
		Wrong automat	
		Mains fuse releases in the no-load operation	Send device to be serviced

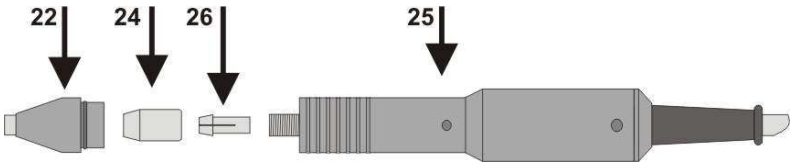
5	**Welding unsatisfactory**	Wrong safety gas	Use inert gas (Argon 4.6)
6	**Oxidation and soot development**	Gas pressure too high	Reduce flow to ca. 2 l/min
7	**Heavy oxidation development on the welding spot**	Wrong safety gas	Use inert gas (Argon 4.6)
8	**Tungsten in basic material**	Too much electrode pressure on the work piece	Lightly touch work piece so that it barely ignites enough
9	**Tungsten electrode adheres to work piece**	Too much electrode pressure on the work piece	Lightly touch work piece so that it barely ignites enough
10	**Tungsten electrode melts off**	Tip sharpened too much	Sharpen to the recommended angle (ca. 15°)
11	**Static discharge over the device surface**	Special location	Use special floor mat for the work area
12	**Work piece adheres to the welding table**	Bad connection to welding table	Use clamps or pliers
13	**Eye protection system (Shutter) does not work**	Plug wrongly instaled	Install plug into the socket marked with "Shutter"
14	**Equipment welds immediately when affecting the workpiece (no gas before flowing time)**	Operational disturbance	Immediately take machine out of operation. Take the equipment to service

Warning!

Authorized personnel may only open the device!

Text and images correspond to the technical version during print of this manual. We reserve the right to change components.

9 REPLACEMENT PARTS LIST



- **Hand piece:**

25	Complete Hand piece	100 100
22	nozzle	100 150
26	Spread pliers	100 151
24	Nut	100 152

- **Electrodes:**

Electrodes 10 pcs. In display can (Thorium dioxide - free) incl. Diamond wheel	100 400

- **Grindingwheel:**

Diamond wheel	100 701

- **Gas hose:**

3m gas hose 6x4mm (max. 10bar)	100 153

10 CONTACT

Lampert Tools USA, Inc.
67 East Madison, #512
Chicago, IL 60603
Phone: 1-866-478-5111
Fax: 1-312-641-2678
info@lampertusa.com
www.lampertusa.com

"PUK 3s professional" / "PUK 3s professional plus"

SECTION B – SAFETY PRECAUTIONS - READ BEFORE USING

B-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 1-4. Read and follow all Safety Standards.**
► **Only qualified persons should install, operate, maintain, and repair this unit.**
► **During operation, keep everybody, especially children, away.**

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

_ Do not touch live electrical parts.
_ Wear dry, hole-free insulating gloves and body protection.
_ Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
_ Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
_ Use AC output ONLY if required for the welding process.
_ If AC output is required, use remote output control if present on unit.
_ Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
_ Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
_ Always verify the supply ground – check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
_ When making input connections, attach proper grounding conduc-tor first – double-check connections.
_ Frequently inspect input power cord for damage or bare wiring –replace cord immediately if damaged – bare wiring can kill.
_ Turn off all equipment when not in use.
_ Do not use worn, damaged, undersized, or poorly spliced cables.
_ Do not drape cables over your body.
_ If earth grounding of the workpiece is required, ground it directly with a separate cable.
_ Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
_ Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
_ Wear a safety harness if working above floor level.
_ Keep all panels and covers securely in place.
_ Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
_ Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
_ Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

_ Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

_ Keep your head out of the fumes. Do not breathe the fumes.
_ If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
_ If ventilation is poor, use an approved air-supplied respirator.
_ Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
_ Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breath-ing air is safe.
_ Do not weld in locations near degreasing, cleaning, or spraying op-erations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
_ Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

ARC RAYS can burn eyes and skin.

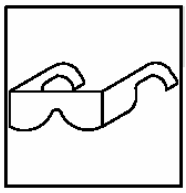
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

_ Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
_ Wear approved safety glasses with side shields under your helmet.
_ Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
_ Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

_ Protect yourself and others from flying sparks and hot metal.
_ Do not weld where flying sparks can strike flammable material.
_ Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
_ Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
_ Watch for fire, and keep a fire extinguisher nearby.
_ Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
_ Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
_ Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
_ Do not use welder to thaw frozen pipes.
_ Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
_ Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
_ Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



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.

BUILDUP OF GAS can injure or kill.

_ Shut off shielding gas supply when not in use.
_ Always ventilate confined spaces or use approved air-supplied respirator.

HOT PARTS can cause severe burns.

_ Do not touch hot parts bare handed.
_ Allow cooling period before working on gun or torch.

MAGNETIC FIELDS can affect pacemakers.

_ Pacemaker wearers keep away.
_ Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.
_ Wear approved ear protection if noise level is high.

CYLINDERS can explode if damaged.

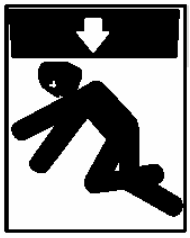
Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

_ Protect compressed gas cylinders from excessive heat, mechani-cal shocks, slag, open flames, sparks, and arcs.
_ Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
_ Keep cylinders away from any welding or other electrical circuits.
_ Never drape a welding torch over a gas cylinder.
_ Never allow a welding electrode to touch any cylinder.
_ Never weld on a pressurized cylinder – explosion will result.
_ Use only correct shielding gas cylinders, regulators, hoses, and fit-tings designed for the specific application; maintain them and associated parts in good condition.
_ Turn face away from valve outlet when opening cylinder valve.
_ Keep protective cap in place over valve except when cylinder is in use or connected for use.
_ Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

B-2. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

_ Do not install or place unit on, over, or near combustible surfaces.
_ Do not install unit near flammables.
_ Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

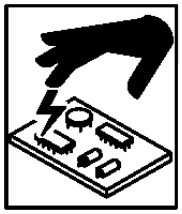


FALLING UNIT can cause injury.

_ Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
_ Use equipment of adequate capacity to lift and support unit.
_ If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.

OVERUSE can cause OVER-HEATING

_ Allow cooling period; follow rated duty cycle.
_ Reduce current or reduce duty cycle before starting to weld again.
_ Do not block or filter airflow to unit.



STATIC (ESD) can damage PC boards.

_ Put on grounded wrist strap BEFORE handling boards or parts.
_ Use proper static-proof bags and boxes to store, move, or ship PC boards.

MOVING PARTS can cause injury.

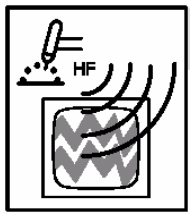
_ Keep away from moving parts.
_ Keep away from pinch points such as drive rolls.

WELDING WIRE can cause injury.

_ Do not press gun trigger until instructed to do so.
_ Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

MOVING PARTS can cause injury.

_ Keep away from moving parts such as fans.
_ Keep all doors, panels, covers, and guards closed and securely in place.



H.F. RADIATION can cause interference.

_ High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
_ Have only qualified persons familiar with electronic equipment perform this installation.
_ The user is responsible for having a qualified electrician prompt-ly correct any interference problem resulting from the installation.
_ If notified by the FCC about interference, stop using the equipment at once.
_ Have the installation regularly checked and maintained.
_ Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference

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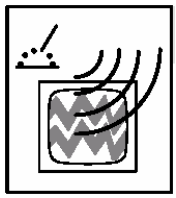

ARC WELDING can cause interference.

_ Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
_ Be sure all equipment in the welding area is electromagnetically compatible.
_ To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
_ Locate welding operation 100 meters from any sensitive elec-tronic equipment.
_ Be sure this welding machine is installed and grounded according to this manual.
_ If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

B-3. 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).

Recommended Safe Practices for the Preparation for Welding and Cut-ting 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).

National Electrical Code, NFPA Standard 70, from National Fire Protec-tion Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269–9101 (phone: 617–770–3000, website: www.nfpa.org and 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, web-site: 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–in-ternational.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).

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 and www. sparky.org).

OSHA, Occupational Safety and Health Standards for General Indus-try, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Super-intendent 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).

B-4. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields Welding current, as it flows through welding cables, will cause electro-magnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possi-ble.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommend