



OPERATING MANUAL

MOLD & DIE WELDER U6

Gesswein
Fine welding device

Issue US 2024/01

Product : Fine welding device
Type: MOLD & DIE WELDER U6

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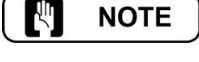
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1 Safety regulations

Before operating the device for the first time or starting any other work on the device, you are required to read these operating instructions carefully.

1.1 Explanation of safety instructions

Signal word	Avoidance of ...	Possible consequences if the warning is not heeded:
 DANGER	Personal injury (imminent danger)	Death or severe injuries!
 WARNING	Personal injury (potentially hazardous situation)	Death or severe injuries!
 CAUTION	Personal injury	Light or minor injuries!
 NOTE	Property damage	Damage to the device or its immediate surroundings!

Tab. 1.1 Warning levels

The warnings are structured as follows:

- Warning sign with signal word in accordance with the warning level (see Tab 1.1)
- Type of hazard (description and symbol of the hazard)
- Consequences of the hazard (description of the consequences of the hazard)
- Hazard prevention (measures to prevent the hazard)



Type of hazard

Consequences of hazard

➤ Hazard prevention

1.2 Safety Precautions – Read Before Using

- The symbols shown below are used to identify possible hazards. Whenever such a symbol is mentioned, watch out, and follow the related instructions to avoid the hazard. Please carefully read and follow all safety precautions.
- Only qualified persons should install, operate, maintain, and repair the welding device (see chapter 2.5).
- Keep other persons not wearing eye-protection, especially children, away during operation.

Electric shock can kill

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Incorrectly installed equipment is a hazard.



Before Use

- 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.
- Properly install this equipment according to its Owner's Manual and national, state, and local codes.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.

During Use

- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Do not touch live electrical parts.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Do not connect more than one electrode or work cable to any single weld output terminal.
- Turn off all equipment when not in use.
- Do not drape cables over your body.

- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Maintenance**
- Do not use worn, damaged, undersized, or poorly spliced cables.
 - 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).
 - Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
 - Keep all panels and covers securely in place.
 - Wear a safety harness for personal safety if working above floor level.

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 inhale the fumes.
 - Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
 - 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.
- Welding Location**
- If ventilation is poor, use an approved air-supplied respirator.
 - If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
 - Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Welding fumes and gases can displace air and lower the oxygen level causing injury or death in the long term. Make sure the breathing air is safe.
 - Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.

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.



- Use a certified and approved welding microscope or any other Gesswein or Gesswein-certified eye protection system to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- 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.



In General

- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to ANSI AWS F4.1:2017.
- Do not use welder to thaw frozen pipes.
- Do not weld where flying sparks can strike flammable material.
- 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.

Before Use

- Remove all flammables within 35ft (10.7m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Remove any combustibles, such as a butane lighter or matches, from your body before doing any welding.
- 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. Always use original contacting tools only.

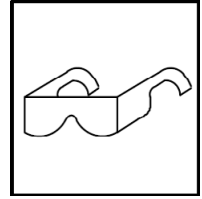
During Use

- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Protect yourself and others from flying sparks and hot metal.

- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.

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 whenever feasible even if you are using an approved and certified eye protection system.



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 touching workpiece after welding.



Electromagnetic fields may impair the function of pacemakers

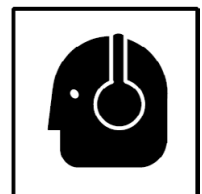
In case you are wearing a pacemaker, check with the implant manufacturer or an authorised medical professional before using the device.



Noise can damage hearing

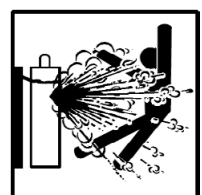
Noise from certain welding modes processes or equipment can potentially impair hearing ability.

- Always wear approved ear protection if noise level is high.



Cylinders can explode if damaged

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



Before Use

- Protect compressed gas cylinders from excessive heat, mechanical 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.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

During Use

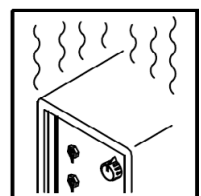
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder – explosion will result.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.

Fire or explosion hazard

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

**Overuse can cause overheating**

- 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.

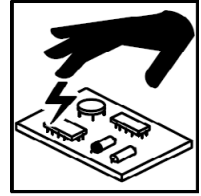
**Falling unit can cause injury**

- Use equipment of adequate capacity to lift and support the welding device.
- Place the device on an even surface.



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.



Welding electrode can cause injury

Do not point the handpiece toward any part of the body, other people, or any metal at any time.



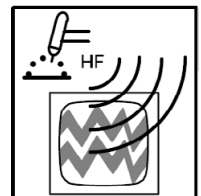
Moving parts can cause injury

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

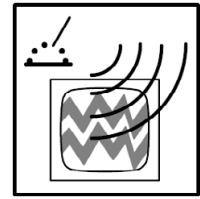


H.F. radiation can cause interference

- 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 promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment immediately.
- 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.

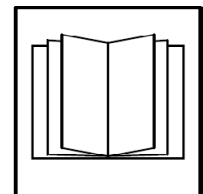


Arc weld can cause interference



- 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 in safe distance from any sensitive electronic equipment.
- Be sure the welding device is installed 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.

Read instructions



- Read and follow all labels and the Owner's Manual carefully before installing, operating or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from manufacturer.
- Perform installation, maintenance and service according to the Owner's Manuals, industry standards, and national, state and local codes





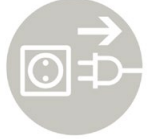

1.3 Safety devices

- The device has a thermal cut-off device that is activated if the heat build-up is too high, preventing the device from overheating.

1.4 Safety signs



Fig. 1.1 Safety signs on the back of the device

Safety sign	Description
	Electromagnetic fields may impair the function of pacemakers.
	Inhaling welding fumes can endanger your health.
	Arcs can damage the eyes and injure the skin.
	Welding sparks may cause an explosion or fire.
	In case a qualified electrician needs to open the device, the main cable always needs to be unplugged before.
	The union nut of the protective gas hose may only be tightened by hand on the protective gas connection. The use of tools (e.g. wrenches) can damage the protective gas connection.

Tab. 1.2 Safety sign

1.5 Safety instructions for installation, usage, transport and maintenance

Preamble

- If the device shows signs of damage, it must be taken out of service.
- If malfunctions occur, the device must be taken out of service.

Personal protective equipment

The personal protective equipment listed below must be worn during every welding operation:

- Gloves
- Eye protection
- Dry clothing (non-synthetic and flame retardant)

Furthermore, the workplace must be sufficiently ventilated. If this cannot be ensured by fresh air supply, an exhaust system must be installed.

Handling protective gas cylinders

Observe the relevant precautions when handling gas cylinders, as well as the safety rules for handling gases.

In particular, gas cylinders must be secured against falling over and down and protected against heating (max. 50 °C), especially during prolonged exposure to sunlight and against severe frost.

During transport

- Ensure that all connecting cables have been removed from the device to prevent the operator from tripping and damaging the device.
- When transporting the device, ensure that it is always securely packed and not dropped or knocked over.

During installation

- The device must be placed in a stable and non-slip position at the workplace.

- The device must be placed on a non-combustible surface.

During commissioning

- The device must not be connected to a circuit in which devices (e.g. TIG welders) that work with high frequency are operated at the same time. This may cause irreparable damage to the device. In the case of simultaneous operation with equipment that operates at high frequency, always ensure that the device is operated on a separate, individually fused circuit that is shielded and protected from high frequency input from other equipment. In addition, physical separation and a minimum distance of at least 5 meters from devices that work with high frequency must always be maintained.
- The eye protection must be checked for correct fit and proper function. Follow the instructions in the operating manual of the respective eye protection system.
- Before each start-up of the device, make sure that the gas connection on the back of the device as well as the connection on the flow regulator have been hand-tightened without tools.
- If there are indications of leaks in the gas hose or gas connection (e.g. audible hissing or whistling noise or unusually rapid loss of pressure in the gas container), the device must be taken out of operation and defective components replaced.

During operation

- Always wear gloves when welding. Do not touch the workpiece without gloves during or immediately after the welding process.
- During the welding process, parts of the skin must never be directly exposed to the UV radiation that is generated by the welding process.
- An extraction system must be installed at the workplace. In addition, the workplace should be sufficiently ventilated without creating draughts.
- The flow rate at the flow regulator must be between 2 - 3 litres/minute.

Maintenance and inspection work

- Disconnect the device from the power supply before carrying out maintenance, inspection and cleaning work.
- The clamping nut on the handpiece must be hand-tightened after replacing the electrodes.

- When regrinding electrodes, wear protective gloves and do not touch the rotating grinding wheel.
- When regrinding electrodes, make sure that the resulting grinding dust is not inhaled.
- The device fuse may only be replaced by a qualified electrician and only the fuse approved by the manufacturer for the respective mains voltage may be used.

During disassembly

- The valve on the gas cylinder must always be closed during decommissioning and dismantling.
- When dismantling the device, disconnect it from the power supply.
- When dismantling, remove the electrode from the handpiece to avoid puncture injuries.

2 General information

2.1 Introduction

These operating instructions are intended to help you to get to know the device and use it as intended. They contain important information on how to operate the device safely and properly.

The operating instructions must

- be fully read and applied by any person assigned to work on the device.
- be stored in such a way that they are accessible at all times to all users at the place of use of the device.
- be handed over to third parties together with all necessary documents when the device is passed on.

Observance of the operating instructions helps

- avoiding dangers.
- reducing repair costs and downtime.
- increasing the reliability and service life of the device.

In addition to the operating instructions, the accident prevention and environmental protection regulations applicable in the country of use and at the place of use must also be observed.

Safety and danger notices on the device must be kept in legible condition and must not be removed, covered or damaged.

The device shall be used only when in flawless condition and is intended exclusively for work in accordance with the intended use.

2.2 Intended use

The device is intended for welding on all metals and alloys that are suitable for arc welding.

Intended use also includes

- the complete reading and following of all instructions in the operating manual.
- the complete reading and following of all safety and hazard instructions.
- compliance with maintenance and servicing work.

The device is designed for use in industrial and commercial applications. The manufacturer is not liable for damage resulting from use outside this area of application.

Temperature range of the ambient air:

- during operation: 14 °F to 104 °F (-10 °C to + 40 °C)
- during transport and storage: -4 °F to 131 °F (-20 °C to +55 °C)

Relative humidity:

- - up to 50 % at 104 °F (40 °C)
- - up to 90 % at 68 °F (20 °C)

The ambient air should be free of dust, acids or corrosive gases.

2.3 Foreseeable misuse

The hardware and software of the device is designed in such a way that misuse is largely avoided or reduced to a minimum by safety features. Nevertheless, in exceptional cases, misuse by the user is possible and must be avoided when operating the device:

- Welding of non-weldable metals or alloys
- Use of an inappropriate shielding gas
- Exerting too much pressure on the electrode
- Use of the device without personal protective equipment

2.4 Residual risks for device operation

In principle, it is not possible to exclude the following hazards:

- Puncture injury from electrode due to improper handling of the hand-piece
- Danger from leaking or improperly connected protective gas cylinders
- Eye and skin damaging arc radiation on uncovered skin areas

2.5 Selection and qualification of personnel

The operator undertakes to only allow persons to work on the device who

- are familiar with the basic regulations on occupational safety and accident prevention and have been instructed in the handling of the device.
- have read and understood this operating manual, in particular the "General safety regulations" chapter.
- are trained with regard to the requirements for the work results.

The safety-conscious working of the personnel must be checked at regular intervals.

2.6 Presentation of information

Handling instructions

The instructions explain step by step which activities have to be carried out and how to proceed.

In these operating instructions, handling instructions are marked with the following symbols:

- The steps marked with this activity symbol may be carried out in any order.
- 1) Numbered steps **must be** carried out exactly in the given order.
- ✓ The result symbol describes the result or intermediate result of an action.

Application tip

The "**TIP**" indicates additional information for easy and safe use of the device.

TIP: Note on the optimal use of the device.

3 Structure and function

3.1 Functional description

The MOLD & DIE WELDER U6 is a micro-pulse TIG welder. The welding process is controlled by the central control and regulation unit of the MOLD & DIE WELDER U6. For a precise welding process and a perfect result, the welding process is continuously monitored and the target parameters are adjusted as required using control algorithms. The energy pulses generated by the power source are transferred to the workpiece via the handpiece included in the scope of delivery and its electrode, thereby carrying out the welding process.

Scope of delivery

The scope of delivery of the MOLD & DIE WELDER U6 includes:

- Welding handpiece with connection cable
- Mains cable
- 5 m gas hose
- Contact cable with contact clamp and safety plug
- Magnet contact cable with safety plug
- Set of electrodes with electrodes in different specifications
- Diamond grinding wheel
- Electrode grinding motor
- Cleaning pen

3.2 General overview



Fig. 3.1 Overview of MOLD & DIE WELDER U6 with handpiece

1. MOLD & DIE WELDER U6
2. Handpiece with connection cable

3.3 MOLD & DIE WELDER U6



Fig. 3.2 MOLD & DIE WELDER U6 Front

1. Display
2. Turn-push controller with tilt function
3. Socket (+) for contacting tools
4. Handpiece connection socket (-) for the welding handpiece
5. Socket (+) for contacting tools

Display Displays the user interface of the operating software.

Turn-push controller The Turn-push controller can be turned, tilted and pressed. Depending on the software dialogue, the following actions can be triggered:

- Turn: Changing the welding parameters or the operating mode
- Tilt: Navigating the user interface

- Press: Confirm the selected choice
- Handpiece socket (-)** For connecting the handpiece.
- Socket (+) for contacting tools** For connecting contact elements such as welding table, contact terminals or clamps.

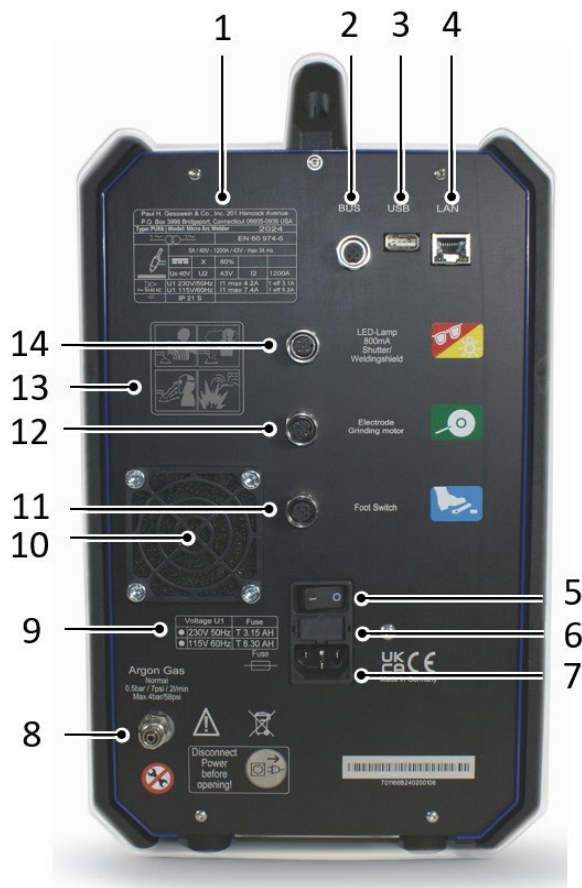


Fig. 3.3 MOLD & DIE WELDER U6 / rear view

1. Type plate
2. Bus connection
3. USB connection
4. LAN connection
5. Mains switch
6. Fuse compartment
7. IEC-60320 C14 socket
8. Protective gas connection
9. Mains voltage approved for this device
10. Ventilation opening
11. Connection socket for foot switch
12. Connection socket for electrode grinding motor
13. Hazard warnings
14. Connection socket for eye protection system

Type plate	The type plate shows the most important technical data for the device.
Bus connection	The bus connection enables external control of the device via bus control.
USB connection	The USB port is used to update the device software via USB data carrier.
LAN connection	The LAN connection is used for device diagnostics. This can be done by a technician.
Mains switch	The mains switch can be used to disconnect the device from the power supply.
Fuse compartment	The device fuse is located in the fuse compartment.
IEC-60320 C14 socket	The mains cable supplied is connected to the mains socket.
Gas connection	The gas connection allows the connection of argon inert gas. The gas hose must have a diameter of 0.236 in (6.0 mm) and may carry a maximum pressure of 58 psi (4 bar).
Ventilation opening	The ventilation opening is used for air circulation and cooling of heat-sensitive electronic components inside the device.
Mains voltage approved for this device	The permissible mains voltage for the device is marked with a red dot-shaped marking and must not be exceeded.
Connection socket for foot switch	A foot switch with M12 connection can be connected to this socket (optional accessory).
Connection socket for electrode grinding motor	The electrode grinding motor from the regular scope of delivery can be connected to this socket.
Connection socket for eye protection system	An approved and certified eye protection system can be connected to this socket.
Hazard warnings	The hazard warnings indicate the hazards that can potentially arise from the device.

3.4 Handpiece with connection cable



Fig. 3.4 Handpiece with connection cable

1. Handpiece with argon nozzle
2. Connection cable
3. Handpiece plug

Handpiece with argon nozzle

The handpiece holds the welding electrode and enables the user to move the welding electrode to the workpiece in a targeted manner. The handpiece can be guided freely (appropriate eye protection required) or clamped in a corresponding device (e.g. handpiece holding arm of a belonging welding microscope). The nozzle with ceramic insert ensures the targeted gas supply at the welding location.

Connection cable

The connection cable contains both the cable guide for the power transmission and the hose for the gas supply to the handpiece.

Handpiece plug

The handpiece connector connects the handpiece firmly and gas-tight to the MOLD & DIE WELDER U6.

3.5 Electrode grinding motor



Fig. 3.5 Electrode grinding motor

1. Electrode grinding motor housing
2. Diamond grinding wheel with flange
3. Connection cable with plug

Diamond grinding wheel with flange

The diamond grinding wheel is used for grinding the electrodes and can be replaced if it shows signs of wear after prolonged use.

Electrode grinding motor - housing

The electrode grinding motor housing consists of a housing with guide holes (15° angle each):

- Ø 0.5 mm (0.020 in)
- Ø 0.6 mm (0.024 in)
- Ø 0.8 mm (0.031 in)
- Ø 1.0 mm (0.039 in)

and an on/off switch.

Connection cable with plug

The connection cable is screwed with the M12 plug to the corresponding socket on the rear of the welding device housing.

3.6 Optional foot switch (SKU: 8300993)

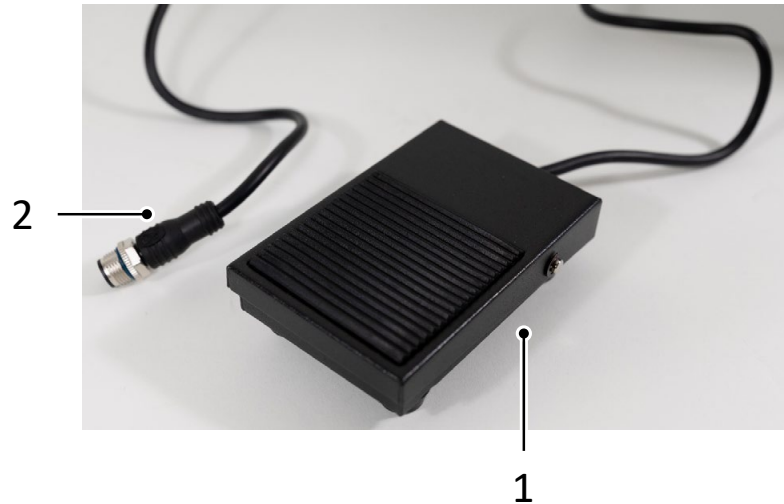


Fig. 3.6 Foot switch

1. Foot switch
2. Connection cable with M12 plug

Foot switch

The welding process can alternatively be triggered by pressing the foot switch. When the foot switch is active, automatic triggering by electrical contact (workpiece contact) is deactivated.

Connection cable with M12 plug

The foot switch connection cable with M12 plug is screwed to the back of the welding device.

3.7 Type plate

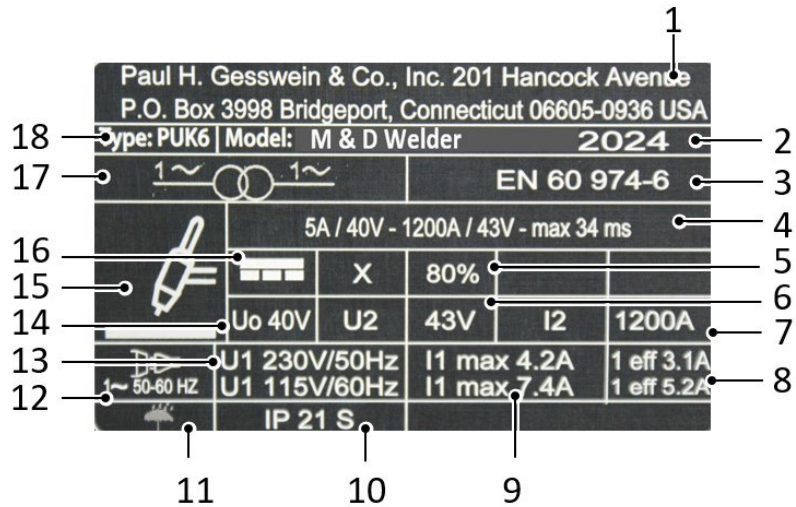


Fig. 3.7 Type plate

1. Distributor
2. Date of manufacture
3. Product standard
4. Minimum welding current and maximum welding current with corresponding standardised working voltage as well as maximum pulse duration.
5. Duty cycle in percent
6. Standardised working voltage
7. Standardised operating current
8. Maximum rated value of the mains current
9. RMS value of the largest mains current
10. Protection type
11. Keep away from precipitation
12. Mains circuit, rated frequency
13. Maximum rated welding current at 68 °F (20 °C) ambient temperature
14. No-load peak value
15. Symbol for the welding process: Tungsten inert gas welding here
16. Symbol for the welding current: DC here
17. Welding current source symbol: Single-phase transformer here
18. Manufacturer's type designation

4 Transport and storage

4.1 Transport

In principle, the welder can be carried and transported by hand without any special precautions. For longer transport distances, however, we expressly recommend packing the device in the original box or a similar suitable container. To avoid scratches or damage to the surface, it is also advisable to line transport containers with soft, dry and scratch-free materials (e.g. foam).

4.2 Storage

For longer storage, disconnect the mains plug and cut off the gas supply.

The storage location of the device must be dry and dust-free and must not be subject to extreme temperatures (colder than -4 °F (-20 °C) or hotter than $+133\text{ °F}$ ($+55\text{ °C}$)).

5 Commissioning

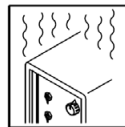
5.1 Setting up the device



Falling unit can cause injury

Risk of injury

- Place the unit on a suitable surface.
- Never lift unit above personnel.
- Remove all connections before moving



Overuse can cause overheating

Risk of fire and injury

- The device must be free-standing and not covered with other objects.
- The ventilation openings of the device must be kept free.

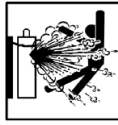
Requirements for the location where being used

- The device shall not be used outdoors.
- The device shall be used in dry rooms only.
- The device shall be used in a well-ventilated location.
- There shall be no direct draughts at the welding site.
- The device must be placed on a non-combustible surface.
- The device must be placed on a level (maximum angle of inclination 10°), stable and insulated surface.

5.2 Establishing supplies

Electrical supply

Plug the mains cable with the mains plug into the mains socket on the back of the device. Then plug the mains plug into a socket with a suitable mains voltage.

Inert gas supply**Pressurised containers**

Fire and explosion hazard

- Check the tightness of gas cylinders and supply lines.
-

- Fasten the appropriate flow regulator to the shielding gas cylinder with the corresponding tool. ATTENTION: In doing so, observe the separate operating instructions provided by the manufacturer.
- Use only inert gases as shielding gas, e.g. argon 4.6

5.3 Connect eye protection

**Arc rays can burn eyes and skin**

Risk of eye injury

- Only use original or certificated and approved eye protection systems
-

Only suitable original and certified eye protection systems may be connected to the welding system! Other eye protection systems can lead to permanent health damage or damage to the welding device. The operating instructions of the respective personal protective equipment (microscope) must be observed.

The eye protection must be checked for correct function each time it is put into operation. The performance of this functional test is explained in more detail in chapter 7.3.

5.4 Insert the electrode into the handpiece



Welding electrode can cause injury

Risk of cut and puncture injuries

- Do not point the handpiece toward any part of the body or other people.

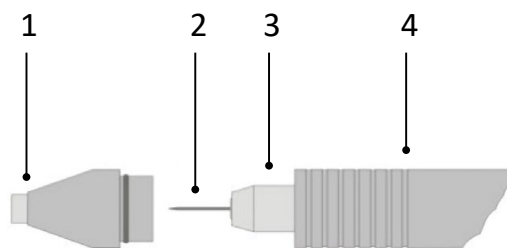


Fig. 5.1 Handpiece components

1. Argon nozzle
2. Tungsten electrode
3. Clamping nut with collet
4. Handpiece housing

Argon nozzle The argon nozzle with ceramic insert ensures the targeted gas supply at the welding location.

Tungsten electrode The tungsten electrode is used to make electrical contact with the workpiece. Since the arc created during the welding process is generated directly at the tungsten electrode, a well ground tungsten electrode must always be used to ensure an optimum welding result

Clamping nut with collet The clamping nut inside the handpiece ensures the tungsten electrode fit snugly in the collet by hand-tightening. The collet chuck and clamping nut in the handpiece hold the electrode firmly in the handpiece.

Handpiece housing The handpiece housing is used to attach, grip or guide the handpiece.

5.5 Changing / inserting the electrode

 **NOTE**

Only thoriumoxide-free original electrodes may be used as electrodes.

When changing or inserting a new electrode, the following steps must be carried out:

- 1) Wait until the electrode has cooled down.
- 2) Gently rotate the argon nozzle back and forth while pulling it off the handpiece. The argon nozzle is plugged into place, not screwed on.
- 3) Loosen the clamping nut counter-clockwise and remove the used tungsten electrode if necessary.
- 4) If a different electrode diameter is to be used, the collet chuck might also have to be changed accordingly. To do this, completely loosen and remove the clamping nut and then pull the collet out and insert a new collet. Screw the clamping nut back on.
 - Insert the new tungsten electrode into the collet and adjust it to the correct length, i.e. clamp the tungsten electrode in the handpiece so that it protrudes approx. 0.16 – 0.24 in (4 - 6 mm) beyond the nozzle. (See Fig. 5.2)
- 5) Welding can now be resumed with the new electrode.

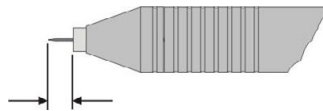


Fig. 5.2 Electrode length adjustment

5.6 Connecting the handpiece

Screw the connector plug of the handpiece into the handpiece socket on the front of the device. To do this, screw the nut on the handpiece connector hand-tight as far as the thread will allow. This is important to ensure proper electrical contact and that no gas can escape from the system.

5.7 Connecting the contact clamp

Insert the black contact clamp supplied into one of the sockets marked with + see fig. 3.2, p. 23).

5.8 Connecting optional accessories

The optional accessories (e.g. grinding motor or foot switch) are connected via the M12 plug attached to the connection cable. The respective sockets on the back of the device are colour-coded for this. Always tighten the [Graphical user interface](#)

The graphical user interface has the following basic functions:

- Setting the welding parameters
- Displaying recommended welding parameters
- Selecting different operating levels or functions
- Performing test functions
- Showing error messages

5.9 Main menu

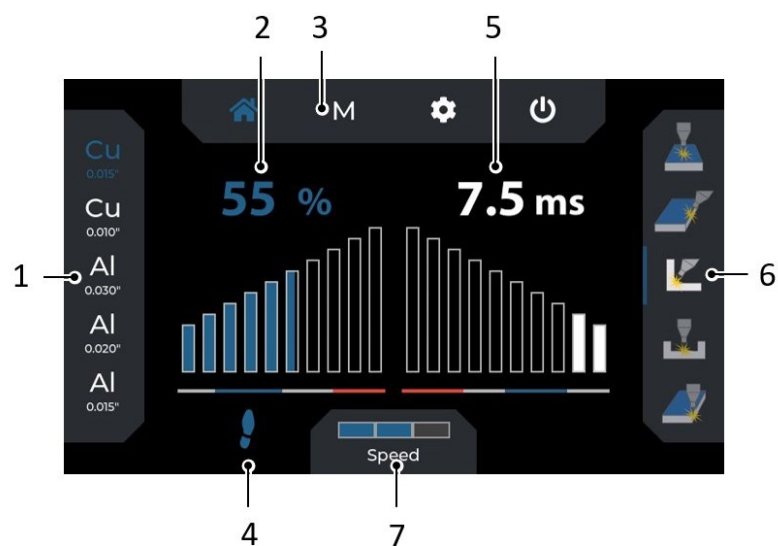


Fig. 6.2 Main menu

1. Material selection
2. Welding power (in percent)

3. Menu bar
4. Foot switch activated (optional accessory)
5. Pulse duration (in milliseconds)
6. Geometry selection
7. Speed levels

Material selection

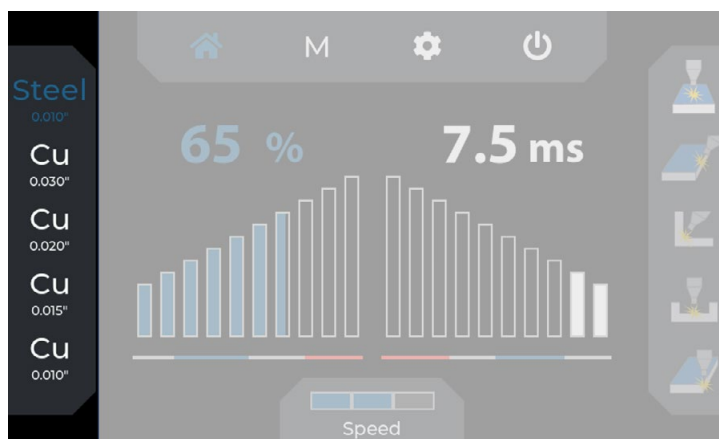


Fig. 6.3 Material selection

Here you can select the material to be processed.
The following materials are available for selection:

Abbreviation	Material designation
Steel 0.030"	Steel alloys, 0.030 inch
Steel 0.020"	Steel alloys, 0.020 inch
Steel 0.015"	Steel alloys, 0.015 inch
Steel 0.010"	Steel alloys, 0.010 inch
Cu 0.030"	Copper alloys, 0.030 inch
Cu 0.020"	Copper alloys, 0.020 inch
Cu 0.015"	Copper alloys, 0.015 inch
Cu 0.010"	Copper alloys, 0.010 inch
Al 0.030"	Aluminum alloys, 0.030 inch
Al 0.020"	Aluminum alloys, 0.020 inch
Al 0.015"	Aluminum alloys, 0.015 inch
Al 0.010"	Aluminum alloys, 0.010 inch

Tab. 6.1 Material selection

Welding power and pulse duration

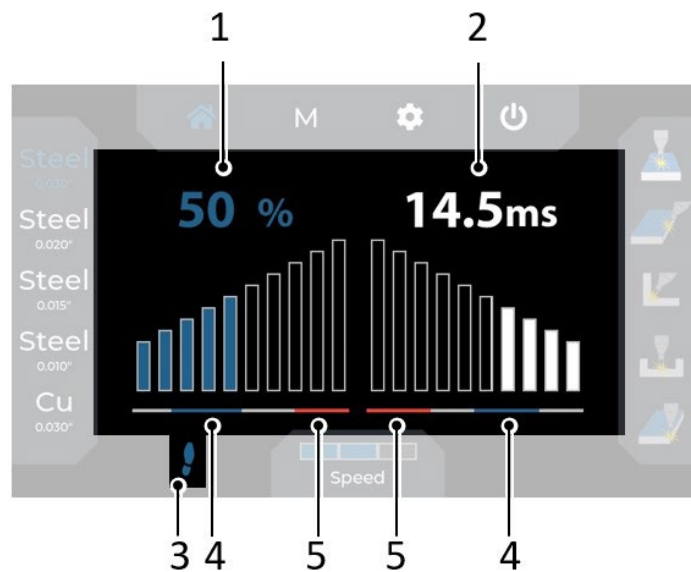


Fig. 6.4 Welding energy and pulse duration

1. Welding power
2. Pulse duration
3. Foot switch activated (optional accessory)
4. Blue range
5. Red range

Blue range To make welding with the MOLD & DIE WELDER U6 easier, a value range for the welding power and pulse duration is marked blue in the display as a recommendation for each material-geometry combination.

Foot switch (optional accessory, SKU: 8300993)

The foot switch is activated by pressing the connected foot switch for a longer time (approx. 3 seconds). The blue foot symbol on the display indicates that the foot switch is ready for operation. The welding process can now be triggered directly via the foot switch. In foot switch mode, the contact of the workpiece with the tungsten electrode is signalled by periodic dimming of the eye protection system.

Red range The red range indicates the parameter range in which damage to the material to be welded may occur. The use of welding parameters in the red range is therefore only recommended for experienced users.

Welding power The welding power controls the size and intensity of the welding spots. The greater the power selected, the more energy the device uses for welding and the larger the weld spot. With very thin materials an excessive power level can damage the workpiece. If the material behaviour is unknown, it is therefore recommended to start with a welding power of 20 % and slowly work up to higher powers. To make welding with the MOLD & DIE WELDER U6 easier, a value range for the welding power is marked blue in the display as a recommendation for each material-geometry combination.

TIP: Welding power of more than 70 % is only recommended in special material and geometry-related applications. Otherwise, there is a risk of inhomogeneous welds. The use of higher welding powers in the red range is therefore only recommended for experienced users.

TIP: For fine welding, it is recommended to start with a lower welding power of approx. 20 % with a very short pulse duration and to work up to the correct value by small changes of the welding parameters.

Pulse duration The pulse duration determines how long (in milliseconds) the welding energy acts. The longer the pulse duration selected, the longer and deeper the energy impact on the workpiece. At the same time, this also results in a higher heat input.

TIP: With very thin materials or wires, it is advisable to select a shorter pulse duration.

TIP: When working close to precious stones, pearls or other heat-sensitive materials, a pulse duration of less than 4 ms is recommended.

TIP: With many highly conductive metals a longer pulse duration can be advantageous in order to avoid heat cracks.

TIP: For successful work with the welding device, it is important to consider the power and pulse duration in a close context with

each other in every case. The total energy introduced into the workpiece is always made up of both set parameters - these must be selected before a weld after a detailed analysis of the welding task, the material and the workpiece geometry.

Menu bar

The menu bar can be used to switch to the various menu and setting levels.

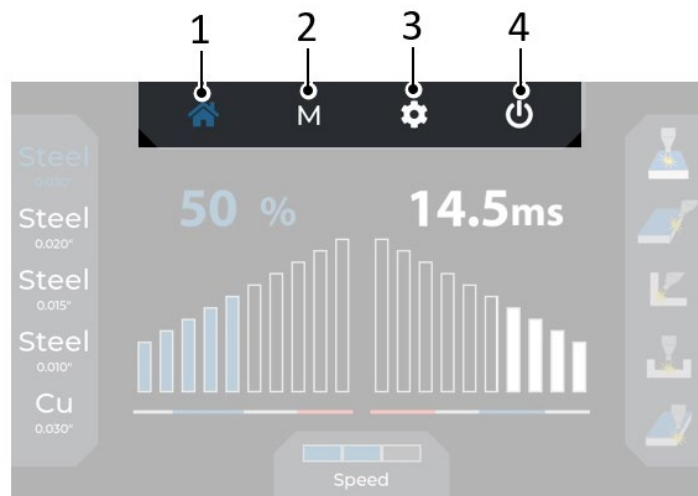


Fig. 6.5 Menu bar

The menu bar consists of the following menu levels:

1. Main menu
2. Micro mode
3. Settings menu
4. Standby mode

Geometry selection

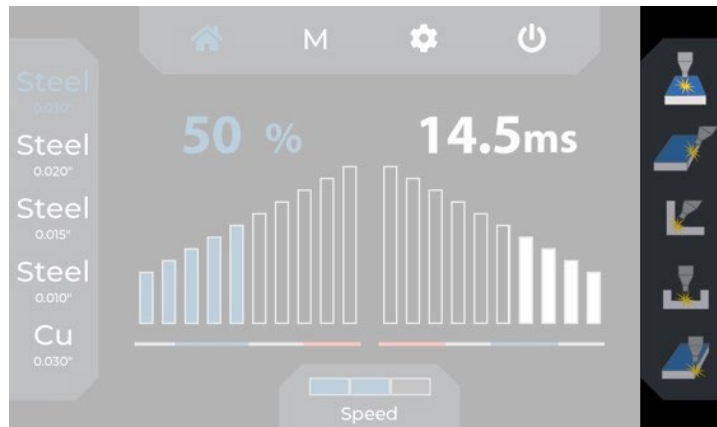
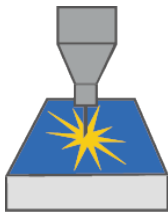


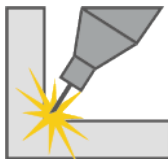
Fig. 6.6 Geometry selection



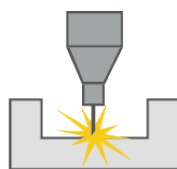
Universal surface welding up to 0.8 mm.
Overlap the welding points.



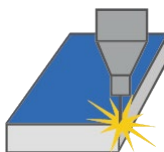
Setting for edge welding of 0.3 mm welding wire.



Welding at an acute angle.
Welding time low (ms). Energy high (%).



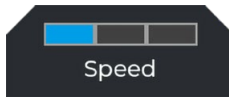
Filling grooves up to 1.0 mm welding wire.
Potentially use a long ceramic argon nozzle.



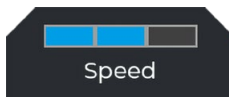
Wire: \varnothing 0.4 mm. Weld from 3 sides.
More argon gas – about 3 litres per minute.

Speed levels

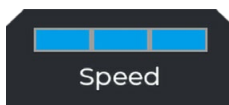
With the speed selection, the welding cycle can be set in 3 speed levels



A reduced welding cycle allows longer cooling times between the welding spots and thus results in a lower heat input into the workpiece.



The standard welding cycle setting is universally suitable for numerous applications and is automatically preselected in most welding functions.



The fast-welding cycle (speed mode) enables faster work and prevents excessive cooling of the workpiece between the welding points. A faster welding cycle therefore results in a higher heat input into the workpiece.

5.10 Micro mode

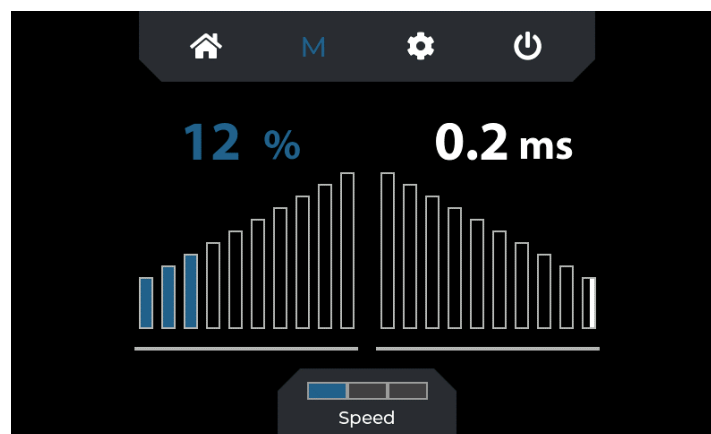


Fig. 6.7 Micro mode

Micro mode is suitable for particularly sensitive materials and thin material thicknesses. In micro mode, the pulse duration is always preselected as the focus because it is critical for the introduction of heat into the workpiece. In micro mode, the pulse duration can be selected in even smaller steps of 0.1 ms. The shortest possible pulse duration is 0.1 ms.

5.11 Settings menu

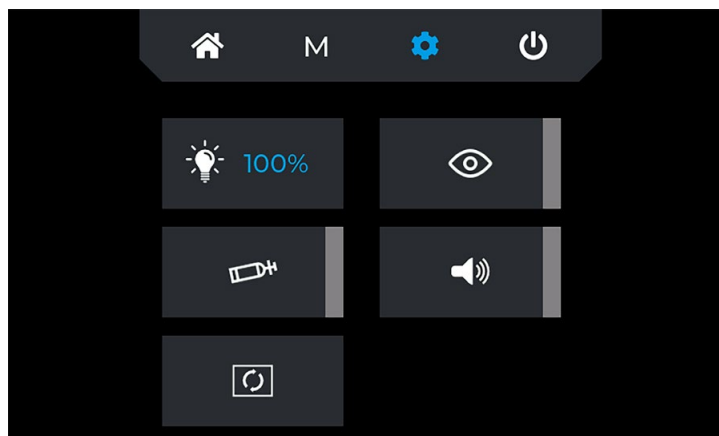
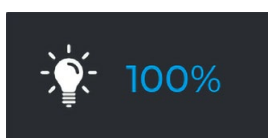
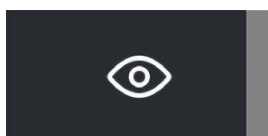


Fig. 6.8 Settings menu



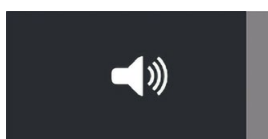
Here the brightness of the LED illumination in the microscope can be selected in the steps 0%, 25%, 50%, 75% and 100% by pressing the rotary-push control.



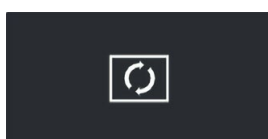
Here the eye protection filter is activated and thus darkened. With this function, the connected eye protection system can be checked for correct function.



Here the gas valve in the device is opened. This function is used to be able to set the gas flow correctly on the flow controller (recommended gas flow 2 – 3 l/min).



Here the welding tone to announce the start of the welding process is activated or deactivated.



This opens the update menu.

5.12 Update menu

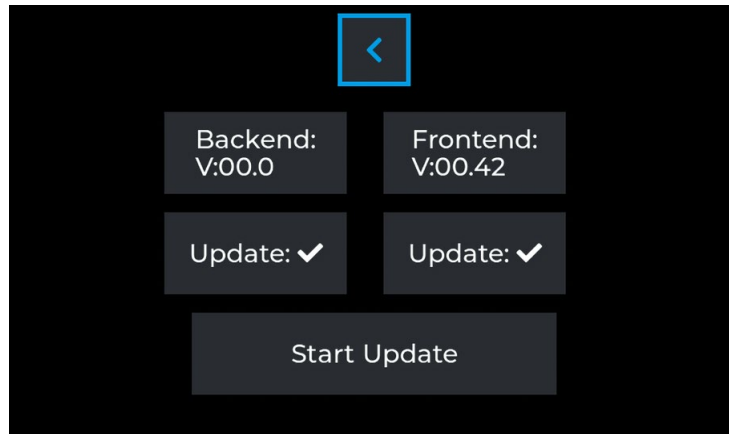


Fig. 6.9 Update menu

Proceed as follows to update the device software:

- 1) Transfer the update file to a USB data carrier. This should have a maximum of 16 GB memory capacity and be formatted in FAT32 format.
- 2) Switch off the welding device on the back of the device.
- 3) Insert the USB data carrier into the USB port on the back of the device.
- 4) Switch on the welding device on the back of the device.
- 5) In the settings menu, select the update button with the rotary-push control and confirm.
- 6) An update window opens as shown in Fig. 6.9. The update can be started with the "Start Update" button. The progress of the update is shown in percent on the display.
- 7) The device restarts after the update.
- 8) You can check whether the software version has been updated correctly in the update menu.
- 9) If the correct software version is installed, remove the USB data carrier.
 - ✓ The device software is now updated.

If the update was not successful, the above steps must be repeated. If the update did not work even after repeated attempts, please contact customer service.

5.13 Standby mode



Fig. 6.10 Standby mode

Standby mode saves energy when the device is not used for welding for a short period. The settings are saved and no uncontrolled welds are possible. This means you do not have to switch off the device between two consecutive applications.

If you do not use the device for more than one hour between two applications, we always recommend you to switch off the device completely using the mains switch for optimum energy consumption.

6 Using the MOLD & DIE WELDER U6

6.1 Adjusting the gas flow

 **NOTE**

Before the welding process can be started, the flow must be set correctly on the flow controller.

Proceed as follows:

- 1) Close the flow regulator.
 - 2) Carefully open the valve of the gas cylinder counter-clockwise with two hands.
 - 3) In the settings menu, select the button for opening the gas valve of the welding device and open the gas valve by pressing the control dial. Now the gas flow can be set to 2 - 3 litres/minute on the flow regulator. Please also refer to the separate operating instructions for the flow regulator. After setting the correct flow rate, close the gas valve by pressing the control knob again.
- ✓ The gas flow is now set correctly.

6.2 Switching on the MOLD & DIE WELDER U6

 **DANGER**



Electromagnetic fields may impair the function of pacemakers

Pacemakers and other medical implants can be damaged due to electromagnetic radiation. Cables carrying welding current must also not be wrapped around the body. Both can lead to the complete failure of medical implants.

- The device generates a strong electromagnetic field during operation. If you are a medical implant user, check with the implant manufacturer or an authorised medical professional before using the device. If use is possible, clarify the required minimum distance in advance and do not infringe upon this distance at any time when working with the device.



Danger due to operating errors

As soon as the device is switched on at the mains master switch, voltage is applied to the contact tools. If these come into contact with electrically conductive or earthed parts such as the casing this can lead to undesired erroneous welding.

- Keep electrically conductive parts and earthed housings away from the welding equipment.

Proceed as follows:

- 1) Make sure that the mains cable is connected to the device and the socket.
 - 2) Check the gas connection and carefully open the gas cylinder valve.
 - 3) Set the power switch to "I".
 - 4) Read the safety instruction on the display and confirm it by pressing the rotary-push control.
- ✓ The device is now ready for operation

6.3 Welding with the MOLD & DIE WELDER U6



Arc rays can burn eyes and skin

Danger of eye damage

- Suitable eye protection must always be worn during welding.



Hot parts can cause severe burns

Danger of burns to the skin

- It is absolutely essential to wear gloves when welding

Proceed as follows:

- 1) Check the function of the eye protection filter. To do this, connect the eye protection system to the welding device. Press the button for the eye protection test in the settings menu of the welding device. This must darken the field of vision. This can be checked by looking through the oculars. If the button for the eye protection test is pressed again, the LED illumination must be visible again when looking through the oculars.
- 2) Check the flow rate of the gas. The optimal flow rate is 2 - 3 litres/minute.
- 3) Select the welding parameters.
- 4) Free the workpiece from any contamination with a suitable cleaner.
- 5) Connect a metallic blank section of the workpiece with the contact clamp.
- 6) Move the workpiece towards the electrode in the handpiece holding arm.
- 7) Apply light pressure to establish contact between the workpiece and the electrode. The welding process now starts automatically.
- 8) Do not release the contact between the workpiece and the electrode until the welding process is finished.
- 9) By touching the workpiece again, you can trigger the next welding process.

The fine welding device is equipped with a function to prevent the electrode becoming welded to the workpiece by incorrectly pressing or pressing too hard. If a welding point has already been set and too much pressure has been exerted with the workpiece on the electrode when it comes into contact again, the welding process is not triggered; instead, a signal tone will indicate that no welding can be performed without contact interruption. The electrode's contact to the workpiece must be stopped and the welding process must be started again. The welding process can be interrupted at any time by lifting the electrode away from the workpiece.

TIP: Always work with a well ground electrode.

TIP: Never weld "freehand", i.e. use the hand rests on the microscope. Even a slight trembling of the hands can impair the welding results.

6.4 Switching off the MOLD & DIE WELDER U6

Proceed as follows:

- 1) Set the contact clamp down such that no accidental contact can take place.

- 2) Switch off the device at the main switch on the back of the device
 - 3) Close the valve on the gas cylinder
- ✓ The device is switched off.

6.5 Basic information and tips

- The quality of the welding result depends essentially on the quality of the grinding of the electrode.
- Perfect electrical contact of the workpiece to the contact terminal must always be ensured, i.e. the workpiece should be connected to the terminal of the connecting cable or via a contacting tool at a metallicly bright point.
- Free-hand welding leads to poorer welding results due to uncontrollable movements of the hands.
- The pressure on the electrode tip should only be light.
- A gas flow rate of approx. 2-3 litres/minute is recommended. The gas flow should be checked regularly at the flow controller and readjusted if necessary.
- The angle at which the workpiece touches the electrode tip significantly influences the flow direction of the spot weld.
- For welding tasks at deeper spots, the electrode can be clamped in such a way that it protrudes slightly longer from the nozzle. The gas flow rate can be slightly increased in this case.
- In many cases, it is helpful to work with welding wire as a welding filler. The use of solder is not permitted.

7 Help with faults

No.	Fault	Possible cause	Fault rectification / solution
1	Main power switch on, but device does not start.	Mains cable interrupted	Check mains cable and mains voltage
		Device fuse blown	Replace device fuse with identical fuse
2	Device switched on, but welding process does not start	Cable connection interrupted	Check all cable connections
		Connection with the workpiece interrupted	Check connection to the workpiece
		Fault due to leakage current	Switch device off and on again. If the fault is not corrected, please contact customer service
3	Mains protection trips	Mains fuse rating too low	Fuse mains properly
		Mains protection trips while the device is in standby	Contact customer service
4	Poor welding characteristics	Incorrect shielding gas	Use inert shielding gas (e.g. Argon 4.6)
5	Poor ignition characteristics	Electrode clamped loosely in hand piece	Tighten the clamping nut on the hand-piece by hand
6	Oxidation and rusting	Excessive gas pressure	Reduce flow rate – ca. 2 l/min
7	Severe oxidation of the welding points	Incorrect shielding gas	Use inert shielding gas (e.g. Argon 4.6)
8	Tungsten embedded in base material	Excessive pressure of the electrodes on the workpiece	Touch workpiece with extremely light pressure
9	Tungsten electrode welds to workpiece	Excessive pressure of the electrodes on the workpiece	Touch workpiece with extremely light pressure
10	Tungsten electrode melts off immediately	Electrode abraded ground too steeply	Use the recommended angle of abrasion grinding (approx. 15°)
11	Static discharge over the surface of the device	Special local conditions	Use special foot mat for the workspace
12	Device begins to weld immediately when touching the workpiece (no gas pre-flow)	Malfunction	Immediately put the device out of operation and contact customer service

Tab. 8.1 Causes of errors and fault rectification

8 Care and inspection work



Electric shock can kill

Risk of injury or death

- The device must always be switched off before care and inspection work.

8.1 Care and inspection schedule

Interval	Care and inspection work	Comments
Daily	Check working environment	Clean if necessary
	Check the condition and cleanliness of the device	Clean if necessary
	Check the gas hose for leaks	
As required	Clean the screw connection of the electrode in the handpiece to ensure electrical contact.	
	The electrode can be reground.	Replace electrode when worn out.

Tab. 9.1 Care and inspection schedule

8.2 Carry out care and inspection work

Cleaning the MOLD & DIE WELDER U6

- Use a dry / slightly damp cloth to remove dust and carefully clean the surfaces of the device.
- A non-abrasive glass cleaner (e.g. spectacles cleaner) can be used for the screen on the front of the display.

Regrinding electrodes

- 1) Switch off the device.
- 2) Remove the electrode from the handpiece.
- 3) Use the electrode grinding motor with a fine or medium-fine grinding wheel to grind the electrode.

- 4) Grind the electrode at a 15° angle. With the grinding motor from the MOLD & DIE WELDER U6 original accessories, this angle is predetermined by the guide holes.
- ✓ Now the electrode can be reinserted into the handpiece.

9 Disposal and recycling



Render discarded devices unusable by removing the mains cable. Do not discard product with general waste. Reuse or recycle waste electrical and electronic equipment by disposing at a designated collection facility.

Observe the local regulations regarding disposal.

10 Dimensions and technical data

10.1 Device dimensions

Name		Value	Unit
Weight		24.03 (10.9)	lbs (kg)
Dimensions	Length	15.35 (390)	in (mm)
	Width	7.87 (200)	in (mm)
	Height	14.76 (375)	in (mm)

Tab. 11.1 Machine dimensions

10.2 Technical data for the device

Name		Value	Unit
Electrical connection			
Voltage (supply)	L+N+PE	115 / 230	V AC
Frequency		50-60	Hz
Fuse/breaker protection provided by the operator Tripping characteristics:		B	
Power consumption		1000	W
Max. current strength		8.7	A
Breaking capacity		6	kA
Protection class per EN 61140:2016		Protection class I	
General data			
Max. operating temperature		140 (60)	°F (°C)
Max. outside temperature	Transport/storage	-4 - +131 (-20 - +55)	°F (°C)
	Operation	14 - 104 (-10 - +40)	°F (°C)
Relative humidity		Up to 50 % at 104°F (40 °C) Up to 90 % at 68°F (20 °C)	

Name	Value	Unit
Max. location altitude (above sea level)	3280.84 (1000)	ft (m)
Protection type per EN 60529:2014	IP21S	
Shielding gas	Argon	

Tab. 11.2 Technical data for the machine

11 Appendix

11.1 Service address

If you have any problems with your Gesswein fine welding device, please contact directly Gesswein or your Gesswein partner company from whom you purchased the device.

In the event that you have not purchased the device via an authorised Gesswein partner company or are unable to locate one, please contact the distributor directly:

Paul H. Gesswein & Co., Inc.
201 Hancock Avenue
PO Box 3998
Bridgeport, Connecticut
06605-0936 USA

phone: 1-203-366-5400
technical support: 1-800-544-2043
www.gesswein.com
info@gesswein.com

11.2 Spare and wear parts

Only original spare and wear parts may be used for your MOLD & DIE WELDER U6. These are listed in the Gesswein spare parts catalogue and on the manufacturer's website.



PCS Company
34500 Doreka Dr. Fraser, MI 48026
Toll Free: 800-521-0546 Fax: 800-505-3299
www.pcs-company.com
sales@pcs-company.com

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