MIG·O·MAT®

Operating Instructions

MIG-O-MAT microflame 80

Hydrogen Soldering Units

CE

• English •

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1 General

These operating instructions are part of the scope of supply. It must be kept in reach and remains with the unit also in case of resale.

We reserve the right for modifications due to further development regarding the version represented in these operating instructions.

Operating instructions cannot take account of every conceivable use. Contact your dealer or the manufacturer for further information or in the event of problems, which are not covered or not sufficiently covered in this operating manual.

2 Important safety notes

Imperative to be observed prior to initial start-up!

Information for the user

This equipment works with caustic, highly flammable and, depending on the type of evaporator with liquid toxic substances. This requires a defined sequence of handling and strict observance of the safety and protective measures depicted in these operating instructions.

The operating instructions however, do not consider all country-specific legal regulations. Therefore, the operator of the equipment is obliged to become informed on the local legal regulations regarding accident prevention and handling of hazardous substances.

Intended use

MIG-O-MAT microflame soldering and welding equipment are intended for soldering, welding and melting of metals. The use is only allowed in the industrial sector.

Operating personnel

The equipment is only to be operated by trained personnel in strict accordance with these operating instructions. Unauthorised persons, in particular children, are not allowed to operate this equipment.

Power connection

For safety reasons, this equipment is only allowed to be connected to an earthed wall socket. The technical data of the type plate must comply with the existing connection conditions. Specifically line voltage and connected load.

Risks due to electric current

Disconnect the main power plug prior to maintaining and servicing the equipment, when suspecting infiltrated liquid, operating troubles, and after use. In case of failures contact the dealer of manufacturer.

The equipment is only allowed to be opened by authorised qualified personnel!

Risks caused by electrolyte

Electrolyte can cause severe chemical burns!

When handling electrolyte do always wear alkali-resistant gloves and goggles! Do not eat or drink while filling!

Wash your hands after filling the reactor!
Avoid that the electrolyte enters in contact with eyes or skin! After contact with the eyes rinse the open eye(s) under running water for several minutes and seek medical advice. After contact with the skin wash immediately with water and soap and rinse thoroughly.

In case of excess filling, do not remove excess electrolyte from the equipment with a hose priming by mouth. There is the imminent danger of severe caustic burns! After overfilling the equipment by mistake, the excess electrolyte has to be removed with an appropriate alkali-resistant suction device not operated by mouth.

Electrolyte containers which are not completely empty must be kept tightly closed and stored out of reach of unauthorized persons, in particular of children. Thoroughly rinse empty electrolyte containers with water. Thereafter, standard disposal of the container is possible. Furthermore it is recommended to obtain the according information from local authorities on special regulations.

Risks due to evaporator liquid

Fire and explosion hazard! The evaporator liquid BLQ 1800 and the flux liquid „Oxidfrei 1.8“ are highly flammable! When filling the booster keep sources of ignition away!

Avoid inhaling the vapours! Do not eat, drink or smoke while handling the evaporator liquid! Wear goggles and gloves!

The MIG-O-MAT evaporator liquid BLQ 1800 is non-toxic, the flux liquid 1:8 is toxic. Observe the relevant information on the labels of the respective product.

Risks due to fuel gas and fuel gas flame

Fire and explosion hazard! Do not leave the equipment unattended when connected. The escaping gas is highly flammable and explosive. The activated equipment must be operated with open valve only until the flame ignites. Every unattended escape of the fuel gas without flame involves the danger of fire and explosions! When refilling the reactor keep sources of ignition away! Also the open reactor without pressure contains highly explosive fuel gas.

For preventing electrostatic sparks directly before opening the reactor (e.g. for checking the filling level or refilling distilled water), simply touch with both hands briefly the cap nuts or tapping screws on the housing cover.

Risk of burns and fire! In case of short-time interruptions of work, hang the burner handle with burning flame into the soldering stand. Pay attention that there is sufficient distance between the flame and flammable objects. Ensure sufficient ventilation during all soldering and welding works!

Exclusion of liability

The manufacturer cannot be held liable for damages on persons, equipment or work pieces caused by improper use. The operator is responsible for the correct instruction of the operating personnel.

3 Description of the operating mode

Functional principle

The MIG-O-MAT microflame 80 produces a hydrogen flame of a very high temperature up to approx. 2850 °C.

In the built-in reactor, oxyhydrogen gas is produced from distilled water through electrolysis.

The oxyhydrogen gas is guided via a flashback protection on the housing outlet, through the gas hose to the external booster tank, and from there through the gas hose to the burner handle.

When igniting oxyhydrogen gas it responds releasing heat. The residue is water (H_2O).

The booster container, which can be shut-off by a valve at the gas input, is filled with a special granulate giving off the evaporator liquid while the gas is flowing through. Temperature and energy of the burner flame can be adjusted by the size of the nozzle and the type of the evaporator liquid.

Adjustment of the microflame

Fine regulation of the gas output quantity is carried out by the user on the control knob of the burner handle.

Standby function

When closing the valve on the burner handle the gas production is automatically stopped.

Efficiency

The extremely low energy consumption and the low costs for consumables (distilled water, evaporator liquid) result in unrivalled low operating costs in comparison with other methods.

4 Product description

4.1 Product features MIG-O-MAT microflame 80

The MIG-O-MAT **microflame 80** corresponds to the latest state of the art in soldering and welding equipment technology.

The compact construction of the small equipment with up to 80 litres/hour of gas output requires only minimum space. The special gas conduct and the external gas preparation in the stainless steel booster generally avoid condensate formation on the inside of the equipment. Thus a higher reliability and service life of the equipment is achieved.

Further advantages:

- Highest safety standard to DIN 32508
- Clean and residue-free combustion of the hydrogen-oxygen mixture
- High reliability because of non-contact circuit of the electrolyte flow
- Use of flux liquids for gas enrichment in the external booster possible without risk of obstructing the main flame arrester at the equipment output
- Low operating costs:
  Loss of liquid during operation is compensated by refilling distilled water. Depending on operating conditions, change of the electrolyte is not required before 1000 - 1500 effective operating hours.

4.2 Safety devices

MIG-O-MAT **microflame 80** is designed and manufactured in compliance with the latest state of the art. The usage is safe when appropriately used and observing the safety and user instructions.

The equipment is fitted with the following safety devices for safe handling.

- Gas pressure control by a safety pressure switch independently working from the work pressure control.
- Temperature control of reactor and transformer
- Flame arrester (flashback protection) of sintered metal in the burner handle
- Flame arrester (flashback protection) and temperature sensitive gas cut-off at the gas outlet of the equipment

High operating safety is also ensured that gas is only produced when required (i.e. when the valve is on the burner handle is open).

4.3 CE conformity

This MIG-O-MAT hydrogen soldering equipment meets the CE marking criteria required for this type of equipment.

The declaration of conformity can be obtained from the manufacturer.

4.4 Scope of supply

The scope of supply for MIG-O-MAT **microflame** equipment consists of:

- **MIG-O-MAT microflame** soldering and welding equipment
- External workplace booster with shut-off valve
- Special granulate for booster
- Burner nozzles each 1 piece of size 0.5 (G 26); 0.6 (G 23); 0.7 (G 22); 0.8 (G 21); 0.9 (G20) ;
- Gas hose 3.0 m long
- Burner handle
- Holder for burner handle
- Filling funnel
- Glass float for controlling the electrolyte filling level
- 1 pair of disposable rubber gloves
- Goggles
- Operating Instructions

The equipment is supplied in special packing (reusable, please store for prospective return for service and repair purposes).

4.5 Description of equipment components

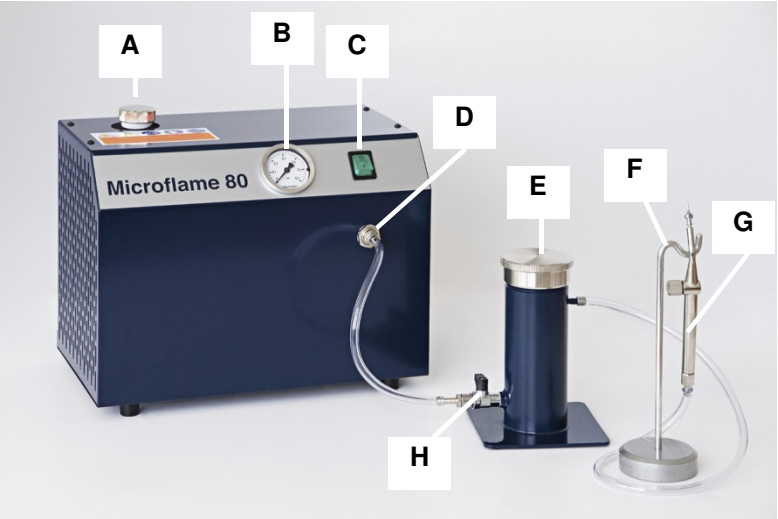

Figure 4.5. Equipment front and side view of MIG-O-MAT microflame 80

A **Filling neck with locking cap** for (electrolyte or dist. water)

B **Manometer pressure indication**

C **Main switch**

D **Gas outlet**

E **External workplace booster**

F **Soldering stand**

G **Micro burner (handle) with changeable integrated flame arrester**

H **Booster shut-off valve**

4.6 Unpacking and placing of the equipment

Check for transport damages

The equipment is shipped in a suitable packing. Check the **MIG-O-MAT microflame** equipment for transport damages prior to initial start-up. In case of visible damages the equipment must not be put into operation. Contact your supplier and the forwarding agent immediately.

Packing

If possible, retain the packing for possible future shipment for maintenance or service purposes.
Or dispose of the packing according to the valid disposal guidelines. You can also return the packing to the manufacturer for disposal (at your expense).

Choice of location

The equipment is only allowed to be operated under supervision.

The location must be freely accessible and in the supervising range of the operator, possible warning signals must be perceptible.

Set-up

For operation install the equipment on a dry and solid base. Ensure sufficient ventilation! The cooling air must freely circulate through the ventilation slots on both sides of the equipment.

WARNING

Risk of electrocution in case of moisture infiltrating the inside of the equipment!

Protect the equipment against infiltrating moisture!

Keep set-up location and housing dry to prevent electrical accidents and damages to the equipment.

Ambient conditions

- Admissible ambient temperature during operation: +5 °C to +40 °C
- Admissible relative moisture during operation: max. 80%
- Only indoor operation (not outdoors)
- Protect against direct or indirect heat sources (e.g. heating, strong direct sunlight) to prevent overheating.

4.7 Installation of the workplace booster

For most of the work tasks the temperature of the pure oxyhydrogen flame is too high. The oxyhydrogen gas therefore is passed through the MIG-O-MAT evaporator liquid BLQ 1800 **or** through the MIG-O-MAT flux liquid „Oxidfrei 1.8“. These substances are not included in the scope of supply and have to be purchased separately.

1 litre bottle MIG-O-MAT flux liquid „Oxidfrei 1:8,
Order No. 50.2501612) alternative
1 litre bottle MIG-O-MAT evaporator liquid BLQ 1800,
Order No. 50.2501631).

Evaporator liquids are highly flammable and combustible! The flux liquid „Oxidfrei 1:8“ additionally is toxic. Therefore, prior to filling observe the following safety notes.

CAUTION!

Danger due to toxic solvents when using evaporator liquids containing methanol!

Do not inhale vapours!

Prevent contact of evaporator liquid with skin or eyes!

Wear safety gloves and goggles when filling consumables! Do not eat, drink or smoke!

Do also observe the specific hazard notes on the label of the according evaporator liquid used. Some types of evaporator liquid might be toxic!

Securely close containers of evaporator liquid not completely empty and store inaccessibly for unauthorised persons, in particular children.

Fire and explosion hazard due to ignition sources and electrostatic charge!

WARNING!

Risk of ignition of the flammable liquids used for filling due to ignition sources in the proximity!

Keep ignition sources away if the evaporator glass is open, and when handling evaporator liquid!

Risk of ignition of the flammable evaporator liquids used for filling due to electrostatic discharge!

Prior to handling evaporator liquid briefly touch with both hands the screws on the housing cover. This will bleed a possible electrostatic charge of the user beforehand off to ground!

Ensure good ventilation!

Proceeding Connection booster and equipment

1. According to Figure 4.5 connect the workplace booster 4.5.E with a gas hose of approx. 1.0 m length with the gas outlet 4.5.D of the MIG-O-MAT microflame equipment.
2. The remaining gas hose is used for connecting the booster outlet (on top of the booster) with the micro burner 4.5.G.

4.8 Filling the workplace booster

Proceeding for filling the booster

1. Pour 50 ml of booster liquid (evaporator liquid BLQ 1800 or flux liquid „Oxidfrei 1:8) into the bottle with the special granulate. Then close the bottle with the lid and shake it a little bit. Thereafter replenish with a maximum of 50 ml of booster liquid, and shake it again.
2. Close the valve at the bottom of the workplace booster.
3. The saturated granulate is now poured into the booster. Then tightly close the booster with the lid (pay attention to correct seat of the seal in the locking lid).

4.9 Filling the reactor with electrolyte

For gas production is required an appropriate electrolyte salt solution. For safety reasons the equipment is not filled with electrolyte when delivered.

Electrolyte is not included in the scope of supply and has to be purchased separately. (MIG-O-MAT Order No. 50.2501623, 1 litre of ready to use electrolyte salt solution).

WARNING!

Electrolyte is a strongly caustic solution!

Risk of immediately strong chemical burns in case of contact with skin, mucosa and eyes!

Risk of chemical burns of the mucosa when inhaling the vapours!

When handling electrolyte protective gloves and goggles are always to be used to prevent dangerous caustic burns! Do not inhale vapours!

Securely close containers of electrolyte not completely empty and store inaccessibly for unauthorised persons, in particular for children.

NOTE

Please observe! Allowed for use are only appropriate electrolyte and solely distilled water to prevent damages to the equipment!

In any case of doubt ask your dealer or supplier.

Filling quantity of electrolyte salt solution

The filling quantity for the **MIG-O-MAT microflame 80** amounts to 1.8 litres of electrolyte

Filling procedure electrolyte salt solution

1. Unscrew the cap from the filler tube (*see Figure 4.5.A*) of the electrolyte reactor.
2. Place clean funnel included in the delivery into the filler tube.
3. Carefully fill about 4/5 of the electrolyte (approx. 1.5 bottles) into the filler tube of the reactor.
4. Place the glass float included in the delivery, with the thin end up into the filler tube of the reactor. The tip of the float rod should finish flush with the edge of the neck.
5. Carefully fill little by little the remaining electrolyte until the tip of the float is flush with the edge of the neck *(Figure .4.7.B)*
   The float must definitely not project more than 5 mm beyond the edge of the neck.
   Attention! In case of overfilling there is the risk of damages to the equipment. In such a case, excess electrolyte has to be removed from the reactor (to do so it is imperative to observe the according safety notes and procedures depicted in chapter 7.5!).
6. The glass float remains in the filler tube of the electrolyte reactor for the regular future filling level checks.
7. Screw the locking cap onto the filler tube and tighten by hand.
8. With this the filling process is finished.

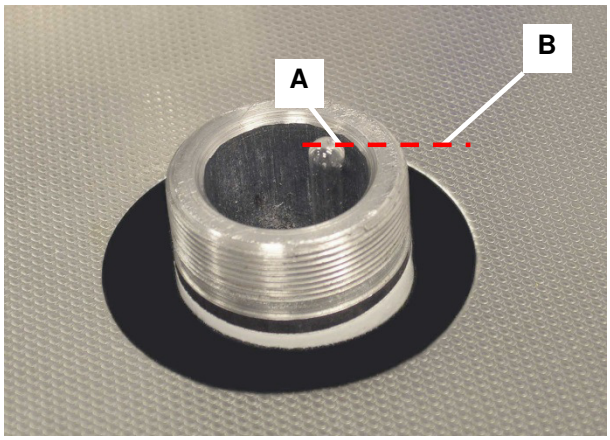

Figure 4.7. Filler tube with glass float at maximum filling level

4.10 Connecting the equipment to electric supply mains

Required mains conditions

The equipment is only allowed to be connected to an earthed wall socket. The socket should be protected with a 10A fuse.

Leak test

A leak test should be carried out prior to initial start-up, after every maintenance and in case of noticeably low gas output.

This requires turning the equipment off with the main switch (*Figure 4.5.C.*) after reaching the switch-off pressure of approx. 200 mbar, with the valve on the booster input open and the valve of the micro burner closed. The equipment is tight if within the next minute the pressure on the manometer (*Figure 4.5.B.)* does not change.

The equipment leaks if the pressure drops. Do start to work only after the cause of the leak is removed and the equipment has passed the leak test.

Turning the equipment off

Turn the equipment off with the main switch, *Figure 4.5.C.*

5 Start-up

NOTE

A correct filling level of the electrolyte is coercive for flawless functioning and the service life of the equipment. For this reason check the filling level of the reactor every working day.

Checking the filling levels

Check the correct filling level of the electrolyte before starting to work (also see *chapter 7.1.1.* and *Figure 4.7.*).

5.1 Turning on the equipment - Starting gas production

Ensure that the valve on the micro burner *(Figure 4.5.G)* is closed by turning it clockwise.

Open the valve at the gas inlet of the booster container *(Figure 4.5.H).*

Turn the mains switch on

Turn the MIG-O-MAT microflame 80 on with the main switch *(see Figure 4.5.C).* The mains control light in the switch shines.

The gas reactor starts gas production immediately. The pressure on the manometer *(Figure 4.5.B)* rises until the equipment automatically interrupts gas production at a pressure of approx. 200 mbar.

5.2 Leak test

Leak test

A leak test should be carried out prior to initial start-up, after every maintenance and in case of noticeably low gas output.

This requires turning the equipment off with the main switch *(Figure 4.5.C)* after reaching the switch-off pressure of approx. 200 mbar, with the valve on the booster input open and the valve of the micro burner closed. The equipment is tight if within the next minute the pressure on the manometer does not change.

In case of a leak

The equipment leaks if the pressure drops. Do start to work only after the cause of the leak is removed and the equipment has passed the leak test. In any case of doubt contact the dealer or manufacturer of the equipment.

5.3 Selection of the burner nozzle

Supplied nozzle sizes

MIG-O-MAT microflame-80 is supplied with a selection of suitable nozzle sizes 0.5 (G25) – 0.9 (G20).

Use of larger size nozzles is not allowed.

Depending on the work task a suitable nozzle is to be selected from the set of nozzles, and to be put onto the conical tip of the handle.

5.4 Regulating the flame at the burner handle

Size and energy of the burner flame can be adjusted with the valve of the burner handle (*see Figure 5.4*.). Prevent to regulate the burner flame down until it enters in contact with the tip of the nozzle, which might damage the nozzle.

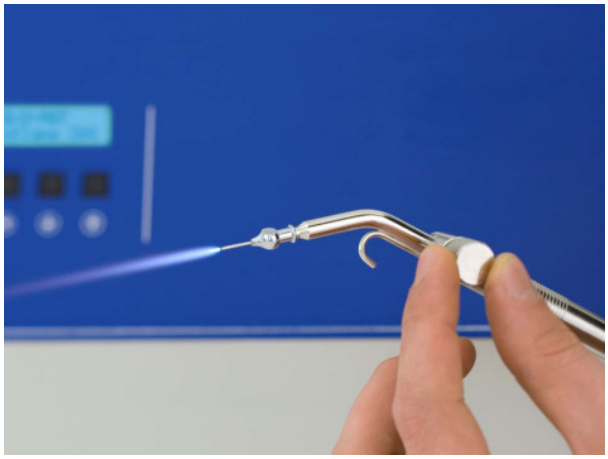

Figure 5.4. Regulation of the flame size with the valve on the burner handle

5.5 Interruption of work

Short interruption of work

When interrupting work only for a short time, the burner handle with burning flame can be hooked into the previewed holder (from scope of supply). However, pay attention that the flame of the burner cannot ignite flammable materials also if the tip changes position. In any case of doubt it is safer to extinguish the flame and to close the valve on the handle.

Longer interruption of work

During longer non-working times the flame has to be extinguished and the valve of the burner closed.

As soon as the equipment has reached the shut-off pressure of 200 mbar the gas production stops. When opening the valve of the burner again work can continue immediately.

5.6 After end of work

After end of work

Turning the equipment off with the mains switch is only required for longer interruptions of work (over night, weekend or holidays).

NOTE

Do never turn the equipment off with the main switch while the flame is still burning!

The gas still remaining in the system would continue to burn with decreasing pressure. The decreasing outflow velocity of the gas would flash back into the micro burner. This destroys the nozzle. A flashback additionally could damage the flashback arrester in the handle.

5.7 Extinguishing the flame on the burner handle

If the gas setting is optimal, the burner flame does not touch the nozzle, there is a distance of several tenths of millimetres. The tip of the nozzle remains cold and in perfect state.

Also when extinguishing the burner flame it should preferably be prevented that the flame touches nozzle. This might cause overheating and thus damage to the nozzle.

Procedure A Extinguish the flame e.g. with a compressed air pulse. This is the easier the higher the gas pressure of the flame.

Procedure B Dip the flame briefly up to the burner tip into a glass of water.

After extinguishing the flame with method A and B close the valve of the burner handle!

Alternative: Close the valve of the handle with a quick turn. There will be a flashback but the tip of the nozzle will deteriorate only minimally.

5.8 Pressure discharge of the equipment

NOTE

When finishing work, extinguish the flame and turn the equipment off with the main switch. Then open the valve on the micro burner until the pressure is zero on the manometer.

Then close the valve of the gas inlet of the booster container and of the valve on the burner handle.

6 Technical Data

	MIG-O-MAT microflame 80
Supply voltage (V)	230
Power consumption (W)	560
Mains fuse (A)	10
Max. gas production (l/h)	80
Max. nozzle size Ø (mm)	0.9 (G20)
Equipment overall size W / D / H (mm)	340 x 250 x 280
Weight (kg)	19

7 Servicing and repairs

7.1 Servicing / maintenance

Attention! Do unconditionally observe the following safety notes during servicing and repair works, which are directly and indirectly connected with electrolyte or evaporator liquid.

WARNING!

Caution when handling electrolyte! Risk of chemical burns! Strong caustic solution!

Risk of chemical burns by overflowing solution or solution splatters from the filler tube while filling!

Wear safety gloves and goggles when handling consumables!

WARNING!

Caution when the filler tube of the electrolyte reactor is open! Risk of fire and explosion due to ignition sources!

Risk of an ignitions source igniting the oxyhydrogen gas in the electrolyte reactor!

Keep sources of ignition away! Do not shine with the burner flame into the filler tube!

WARNING!

Caution when handling evaporator liquid! Risk of fire and explosion due to ignition sources!

Risk of ignition of the flammable liquids in the equipment and of the flammable liquids used for filling due to ignition sources in the proximity!

Keep ignition sources away if booster or canister are open, and when handling evaporator liquid /flux liquid!

WARNING!

Caution when handling evaporator liquid! Risk of fire and explosion due to electrostatic discharge!

Risk of ignition of the flammable liquids in the booster and of the flammable liquids used for filling due to electrostatic discharge!

Prior to opening the booster briefly touch with both hands the tapping screws on the housing cover of the soldering equipment. This will bleed a possible electrostatic charge of the **user** beforehand safely off to ground!

7.1.1 Checking and refilling distilled water in the reactor

The reactivity of the electrolyte is dimensioned for approx. 1500 operating hours (flame).

The electrolysis however reduces the electrolyte quantity in the reactor. This requires checking the filling level of the reactor on a daily basis.

Checking the filling level by the glass float requires that is was installed in the filler tube during the initial star-up.

WARNING!

Before this servicing measure unconditionally observe the safety notes (e.g. wear goggles and gloves) in chapter 8.1! Check the filling level exclusively by the position of the glass float! Do never shine with the burner flame into the filler tube: Risk of explosion!

Check of electrolyte filling level

1. Extinguish the flame on the burner handle.
2. Turn the equipment off with the main switch *see Figure 4.5.C*.
3. Briefly open the valve of the burner handle (discharge of residual pressure),
4. Open the screw cap of the filler tube (*see Figure 4.5.A*) of the electrolyte reactor.
5. Check of the glass float in the filler tube:
   The reactor has maximum filling if the upper edge of the glass float is level with the upper edge of the filler tube (*see Figure 7.1.A).* Distilled water must be refilled as soon as the glass float in the filler tube has sunken by more than 1 centimetre.
6. To do so, place the funnel (from scope of supply) into the filler tube and carefully fill in distilled water until the upper edge of the glass float is level with the upper edge of the filler tube (*see Figure 7.1.A)*
7.

NOTE

Please observe! When refilling larger quantities of distilled water, the float does not always show at once the correct filling level, because the specific gravity of the distilled water is lower than that of the electrolyte. Immediately after filling a larger quantity of distilled water the float shows a lower filling level than actually present. Therefore it is required to refill distilled water step by step. Between the individual refilling processes, the equipment has to be activated and the gas production started for approx. 30 to 60 seconds.

Procedure when refilling distilled water

1. If the float is no longer visible in the filler tube, refill first a maximum of 2.2 litres of distilled water.
2. Turn the equipment on with the main switch, (*Figure 4.5.C*).
   The filler tube can be kept open.
   Caution fire and explosion hazard! Keep ignition sources away!
3. After about 30 seconds turn the equipment off again with the main switch (*Figure 4.5.C*).
4. Check the filling level again:
   a. If the float is still not visible in the filler tube, repeat the process starting from point 1.
   b. After the float is visible in the filler tube, refill only a little more of distilled water until the float is flush with the edge of the neck.
5. Then screw the locking cap onto the filler tube and tighten by hand.

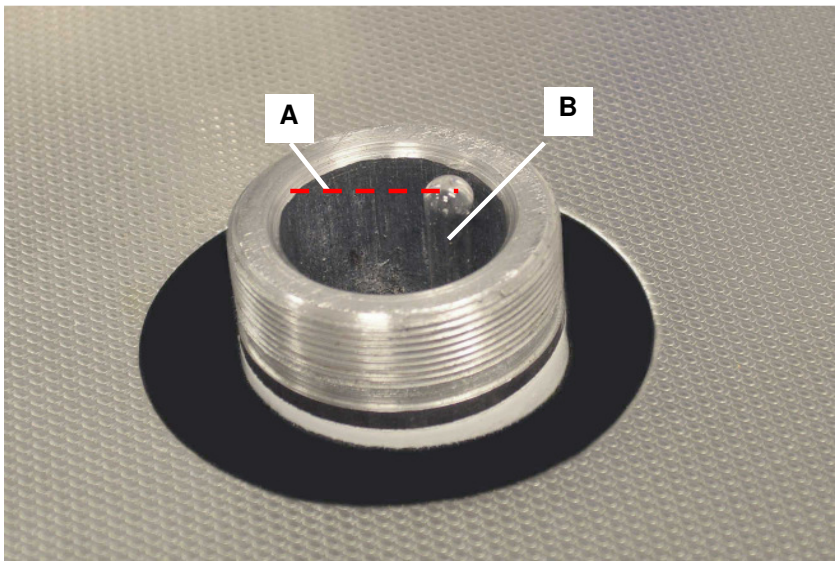

Figure 7.1. Filler tube with glass float at maximum filling level

7.1.2 Refilling evaporator liquid

During operation of the equipment, evaporator liquid and flux liquid are consumed at the same time.

A deficiency of these liquids can only be identified by the flame losing its colour (bluish in case of BLQ 1800 or methanol, green in case of flux liquid „Oxidfrei 1:8“)

WARNING!

Before this servicing measure unconditionally observe the safety notes in chapter 7.1!

Procedure when refilling evaporator liquid

1. Extinguish the flame on the burner handle.
2. Close the shut-off valve of the workplace booster *(Figure 4.5.H.).*
3. Open the locking cap of the workplace booster (*see Figure 4.5.E.*).
4. Refill a small quantity (max. 30 ml) of flux liquid or evaporator liquid.
5. Screw the locking cap onto the filling hole and tighten by hand.
6. With this the filling process is finished. Now, the valve on the booster inlet (*Figure 4.5.H.*) can be opened again.

7.1.3 Cleaning the booster container

The booster must be completely emptied and cleaned with hot water in larger intervals, depending on duration and intensity of utilization. Thereafter new booster granulate is to be filled in.

WARNING!

Before this servicing measure unconditionally observe the safety notes in chapter 7.1!

Procedure

1. Turn the soldering equipment off with the main switch, *(Figure 4.5.C).*
2. Close the shut-off valve of the booster *(Figure 4.5.H)*
3. Remove the gas hoses from the booster.
4. Clean the booster as described above.
5. Reconnect the gas hoses to the booster.
6. Perform the other work steps as described in section 4.8

C

F

7.1.4 Cleaning the micro burner

In the course of time, flux liquids in the booster clog the flame arrester in the micro burner. With the MIG-O-MAT microflame 80 a micro burner is supplied, which has a replaceable flame arrester. Under circumstances also ultrasonic bath cleaning can be enough for the flame arrester to work normal again. Otherwise it is to be replaced together with the seals.

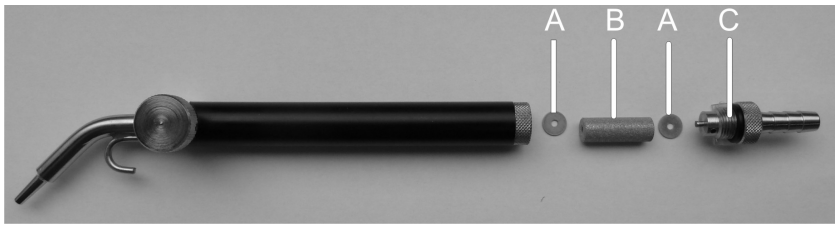

Figure 7.1.4

7.1.5 Fault and warning messages

The gas production is automatically stopped in case of equipment failures due to thermal overload (reactor temperature or core temperature of the transformer), or when failing the service pressure regulation. This requires to quickly close the valve on the handle.

Do not turn the equipment off with the main switch because this also stops the ventilator. After the equipment has cooled work can continue normally.

If there is a warning signal at the same time of gas production cut-off, then the service pressure regulation is defective. After the equipment is turned off with the main switch no restart is possible. The buzzer sounds immediately again when activating the equipment. No gas is produced.

Contact the supplier or the manufacturer of the equipment.

7.2 Trouble shooting

Finding	Possible cause	Removal
Equipment does not produce gas Mains pilot light in the main switch *(Figure 4.5.C)* does not shine	Equipment not connected to mains	Connect mains cable with appropriate socket
	Equipment not turned on with mains switch	Turn equipment on with the main switch *(Figure 4.5.C)*
Equipment does not produce gas, mains pilot light *(Figure 4.5.C)* shines, pressure gauge (Figure 4.5.B) does not rise not even if the valve of the burner is closed	Insufficient electrolyte filling level in the reactor Equipment leaky - (screw cap on the reactor (*Figure 4.5.A.*) or on the booster leaky (Figure 4.5.E.). Hose connections at gas outlet, booster or micro burner leaky	Refill with distilled water according to section Turn equipment off with the mains switch, firmly tighten screw connections; replace seals if necessary Check hose connections, cut hose a little bit or replace
	Hose system inside the equipment leaky	Turn equipment off, pull mains plug, open the equipment, check tight seat of hose connections, tighten leaky connections (if necessary, inform dealer or manufacturer)
Equipment does not produce gas, mains control light *(Figure 4.5.C.)* shines, pressure gauge *(Figure 4.5.B.)* rises up to shut-off pressure of 200 bar.	Clogging in the gas path of individual or several components - burner nozzle, - flame arrester in burner, - gas passage in the booster, - flame arrester at gas outlet of the equipment *(Figure 4.5.D)*	Clean or replace the clogged parts
Equipment produces insufficient gas; pressure drops under 50 mbar	Insufficient electrolyte filling level in the reactor Leak in the gas path (perform leak test according to *chapter 5.2.*)	Check filling level, if necessary refill with distilled water according to *chapter 7.1.1* Remove leaky point (perhaps use foaming agent for leak detection). If required, contact supplier or manufacturer

Finding	Possible cause	Removal
Equipment does not produce gas although the manometer *(Figure 4.5.B.)* shows normal pressure	Clogging in the gas path of individual or several components: • burner nozzle and /or • micro burner, • booster, • flame arrester at gas outlet	Clean or replace the clogged parts
Flame is unstable	nozzle clogged	clean or replace nozzle
	Flux liquid / evaporator liquid in booster depleted	Refill liquids or if necessary replace completely with the special granulate; clean booster beforehand (see *chapter 7.1.2 and 7.1.3*)
Pressure rises to approx. 300 mbar, equipment automatically disconnects and stops gas production. buzzer sounds	Work pressure switch or load switching relay defective.	Put equipment out of service and contact dealer or manufacturer.
Equipment automatically disconnects and stops gas production. Mains pilot light *(Figure 4.5.C)* shines.	Excess temperature of the reactor due to non-stop operation or excessive ambient temperature	Close the valve of the micro burner! Do not turn the equipment off with the main switch! When hearing the noise of the ventilator, wait until the equipment has cooled. After cooling the equipment automatically starts to produce gas again. Perceivable by the pressure on the manometer rising again to approx 200 mbar.
	Excess temperature due to failure of the ventilator	Ventilator noise cannot be heard! Put equipment out of service and contact dealer or manufacturer.
Pressure rises to over 300 mbar	Pressure regulation and safety pressure controller defective	Put equipment immediately out of service and contact dealer or manufacturer.

7.3 Repairs

To be opened by authorised qualified personnel only

Only authorised qualified personnel is allowed to carry out repair and servicing works where the equipment has to be connected and open.

WARNING!

Risk of electrocution by live parts in the equipment!

Without fail pull the mains plug before opening the equipment!

The manufacturer does not assume any liability for damages caused by unauthorised interventions in the equipment.

Contact the supplier or the manufacturer in case of equipment failure.

7.4 Transport of the equipment

ATTENTION!

For safety reasons the equipment is to be shipped in empty state only! Electrolyte and flux liquid / evaporator liquid are hazardous substances!

Preparation for shipment

1. Discharge the electrolyte (*see chapter 7.5)*
2. Discharge the evaporator liquid (*see chapter 7.6)*
3. For preventing shipping damages:

Pack and ship the equipment in the original shipping box.

Transport in the working area

Transporting the filled equipment in the working area is only allowed in upright position. Tilting the equipment would result in serious damages to the equipment!

7.5 Discharge of the electrolyte

For shipping the microflame equipment and for defined servicing purposes it is required to remove the electrolyte from the equipment.

For emptying the electrolyte reactor use a suitable alkali-resistant suction equipment (waterlock). In any case of doubt contact the supplier or manufacturer of this equipment.

WARNING!

Attention! Strong caustic solution!

Risk of immediately strong chemical burns in case of contact with skin, mucosa and eyes!

Never remove electrolyte with hose priming by mouth!

When handling electrolyte protective gloves and goggles are always to be used to prevent dangerous caustic burns!

Procedure

1. Turn the equipment off with the mains switch of the micro-flame equipment.
2. Unscrew the screw cap of the electrolyte filler tube.
3. Remove the glass float. Attention! The glass float is wetted with leach! Rinse the leach off with water.
4. Evacuate the electrolyte completely using a suitable suction equipment.
5. Fill the electrolyte into a alkali-resistant and specially marked container, which is to be stored inaccessible to un-authorised persons, and in particular to children. Or dispose of the electrolyte as described in *chapter 8.2*.

7.6 Discharge of the evaporator liquid

For shipping the booster and for special servicing purposes it is required to remove the special granulate soaked with flux/ evaporator liquid from the equipment.

Dispose of the residues according to the notes in *chapter 8.3.*

WARNING!

Caution when handling flux liquid / evaporator liquid! Fire and explosion hazard by open flames and other ignition sources.

When handling flux liquids / evaporator liquid keep ignition sources away!

7.7 Spare parts

Spare part	Order number
Nozzle set (5 pcs. nozzles) 0.5 x 10mm (G 25)	50.25019050
Nozzle set (5 pcs. nozzles) 0.6 x 10mm (G 24)	50.25019060
Nozzle set (5 pcs. nozzles) 0.7 x 10mm (G 23)	50.25019070
Nozzle set (5 pcs. nozzles) 0.8 x 10 mm (G 22)	50.25019080
Nozzle set (5 pcs. nozzles) 0.9 x 10 mm (G 21)	50.25019090
Electrolyte salt solution 1 litre bottle	50.2501623
1 litre bottle evaporator liquid BLQ 1800	50.2501631
1 litre bottle flux liquid „Oxidfrei 1:8“	50.2501612
Seal for booster container	50.2504030
Glass float	50.2520820
Micro burner with valve and replaceable flame arrester	50.2502415
Flame arrester with seals for micro burner	50.2502425
Seal for reactor locking cap	50.2501406

8 Taking out of service and disposal

8.1 Disposal of the MIG-O-MAT microflame equipment

After evacuation, the equipment components of the microflame equipment (*see chapter 8.7. and 8.8.*) can be delivered to the electronic and metal recycling for disposal. In addition the manufacturer accepts used equipment for disposal.

8.2 Disposal of electrolyte

WARNING!

When handling electrolyte unconditionally observe the safety notes (e.g. wear goggles and gloves) in chapter 8.1!

After neutralisation*, the product and the prepared liquid can be disposed of into the waste water, or disposed of by disposal specialist companies, according to the local authority regulations.

Waste code: 20 01 15*, „alkalines“.

Packaging emptied of residues can be returned free of charge. Beforehand rinse containers with water and empty.

*Neutralisation with acid, e.g. acetic acid: For this the acetic acid is filled into an appropriate container, then adding step by step the electrolyte.

Attention! In the process the liquid can heat very much.

8.3 Disposal of evaporator liquid

WARNING!

When handling evaporator liquid unconditionally observe the safety notes in chapter 8.1!

Recommendation: 1. Disposal by disposal specialist companies: Waste code: 14 06 03*; „other solvents and solvent mixtures“. 2. Incineration in a suitable incineration plant in accordance with local authority regulations.

Do not empty into drains / surface water / ground water. Prevent penetration into the subsurface / soil. Prevent uncontrolled discharge into the environment.

Packaging emptied of residues can be returned to the manufacturer free of charge.

9 Manufacturer address / Contact address

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