

Operating Instructions



Microflame 140 • 170 • 240 • 300

Hydrogen Soldering Units



• English •

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1

General

The present Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the unit in case of resale.

We reserve the right to carry out technical modifications on the unit due to advanced development.

An operating manual 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 warnings**Instructions for the operator****Carefully read and observe before putting into operation!**

The present unit operates with acid, flammable and – depending on the type of vaporizer liquid – toxic substances. Therefore, a predetermined operating sequence and strict observance of the safety and protection measures described below are prerequisite.

The present operating instructions cannot take each and every specific regulation into consideration which might apply in various countries. The operator of the unit must ensure that all relevant local regulations concerning the prevention of accidents and the use of hazardous substances are known and observed.

Intended use

Microflame soldering and welding units are intended for soldering, welding and melting of metals. Operation is allowed by industrial and commercial businesses only.

Operating staff

The unit must be operated by specialized, trained staff only. The operating instructions must be strictly observed. The unit must not be operated by unauthorized persons or by children.

Mains connection

For reasons of safety, the unit must be connected to a shockproof socket only. The technical data indicated on the nameplate must correspond with the available local connection conditions, particularly with regard to mains voltage and current consumption values.

Risks due to electric current

For maintenance and service works, in case of liquid inside the unit and malfunctions, and when you have finished working with the unit pull the main plug. In case of a malfunctioning please contact your supplier or the manufacturer.

The unit must be opened by authorized and specialized staff only!

Risks caused by electrolyte**Electrolyte solution can cause severe chemical burns!**

Always wear alkaline-resistant gloves and goggles when you work with electrolyte solution! Do not eat or drink while filling electrolyte solution into the unit!

Wash your hands after filling the reactor!

Avoid contact with eyes and skin! In case of contact with the eyes rinse the open eye(s) under running water for several minutes and seek medical advice. In case of contact with the skin wash immediately with soap and rinse thoroughly.

If you have overfilled the unit, do not remove any excess electrolyte by sucking it through a hose by mouth. There is a risk of severe chemical burns! If you have overfilled the unit by mistake, use a suitable alkaline-resistant suction device which is 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. Then the container can be disposed of into the ordinary waste. We recommend to contact the local authorities for information on the use and waste disposal of electrolytes.

**Risks caused by
vaporizer liquid**

Risk of fire and explosion! The vaporizer liquid is a flammable substance! Keep away from ignition sources while filling vaporizer liquid into the unit!

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

MIG-O-MAT vaporizer liquid **BLQ 1800** is not toxic. When using other, methanol-containing vaporizer liquids, take into consideration that these substances may be highly toxic! Read and observe the relevant instructions on the labels of the products used.

**Risks caused by
burnable gas and gas
flame**

Risk of fire and explosion! Do not leave the unit switched on unsupervised. The gas escaping from the unit is highly flammable and explosive. The switched-on unit must be operated with opened valve only until the flame ignites. Any escaping gas which does not burn in a flame causes a high risk of fire and explosion! For refilling the reactor keep away from ignition sources! Even the open pressure-less reactor contains highly explosive burnable gases.

To prevent the creation of electrostatic sparks immediately before opening the reactor (e.g. for checking the filling level or for refilling distilled water), touch the cap nuts on the top part of the unit or the metal screws on the housing with both hands.

Risk of burns and fire! Hang the torch hand piece with burning flame onto the soldering stand for short operating stops. Ensure that there is a sufficient distance between the flame and any flammable items. Ensure that there is sufficient ventilation for all soldering and welding operations!

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 staff.

3 Description of operational process

- Operational principle** Microflame units produce a hydrogen flame with very high temperatures of up to approx. 2850 °C.
- In the integrated reactor, detonating gas is produced through electrolysis from distilled water.
- The detonating gas is guided from the reactor to a condensate separator to dry. Then, the gas is enriched with solvent vapours in a vaporizer tank. The processed detonating gas is then conducted through the gas hose to the burner hand piece via a backfire protection device.
- If the detonating gas ignites, it reacts releasing heat. The remainder of the reaction is water (H₂O).
- Adjustment of the microflame** Temperature and energy of the burner flame can be adjusted to the soldering or welding job by the selection of a suitable nozzle size and the type of vaporizer liquid.
- The fine adjustment of the quantity of delivered gas is carried out by the regulating wheel on the burner hand piece. The operating pressure can also be set at the operating panel depending on the required energy of the flame.
- Stand-by mode** As soon as the valve at the burner hand piece is closed the gas production is automatically interrupted.
- Depending on the temperature of the electrolyte reactor the ventilation device keeps on operating for a certain period of time until the reactor has cooled down to 45 °C. The ventilation device is fitted with 3 speed ranges which are controlled electronically.
- Economic efficiency** The extremely low energy consumption and the low cost of consumption goods (distilled water, vaporizer liquid) ensure extraordinarily low operating costs compared to other procedures.

4

Product description

4.1

Product features Microflame units

The Microflame units comprise the latest soldering and welding technology.

The special top part makes operation, maintenance and functional checks particularly easy. There is almost no condensation inside the unit due to the special gas guiding device. This increases both reliability and service life of the units.

The Microflame units are equipped with a quick analogous pressure control to allow operation of the units on changing jobs or on more than one workplace. The operating pressure is variable and is automatically kept precisely at a constant value even when the ambient conditions change. Additional advantages:

- Very high safety standard in compliance with DIN 32508
- Hydrogen-oxygen mixture burns without residues
- Easy operation
- Integrated leak detector check
- Microprocessor-controlled regulation of the operating pressure
- LED indication for functional check and monitoring of vaporizer liquid filling level
- Almost noiseless operation with temperature-controlled ventilation device („whisper cooling“)
- Single or multi-workplace operation possible
- Low operating costs:
Any losses of liquid due to operational processes are compensated by refilling distilled water.
Exchange of the electrolyte is not required before approx. 1000-1500 operating hours.
No mineral wool padding necessary for drying the gas.

4.2

Safety devices

Microflame units are designed and manufactured in compliance with the latest technology standards. Operation is safe provided that the safety and operating instructions are observed and provided that the units are used only for applications for which they are intended.

Safe operation of the units is ensured by means of the following safety devices.

- Gas pressure monitoring by means of safety pressure switch
- Temperature monitoring of the reactor and of the transformer
- Flame barrier (backfire protection device) integrated in burner hand piece
- Flame barrier (backfire protection device) and temperature activated cut off valve at the gas outlet
- Main filters (EMC)
- Mains fuse

A high operating safety is guaranteed because gas is produced only when it is required (i.e. when the valve at the burner hand piece is open).

4.3

CE conformity

The present MIG-O-MAT microflame hydrogen soldering unit is in compliance with all relevant CE marking criteria.

The declaration of conformity can be obtained from the manufacturer.

4.4

Delivery volume

The delivery volume of the Microflame units comprises:

- Microflame soldering and welding unit
- 5 pieces of burner nozzles depending on type of unit
- gas hose 3.0 m long
- burner hand piece
- holder for burner hand piece
- filling funnel
- glass floating body for checking the electrolyte filling level
- 1 pair of disposable rubber gloves
- goggles
- Operating Instructions

The units are supplied in special packing (reusable, please store for possible future transportation, e.g. for service or repair return shipment)

4.5

Description of unit components

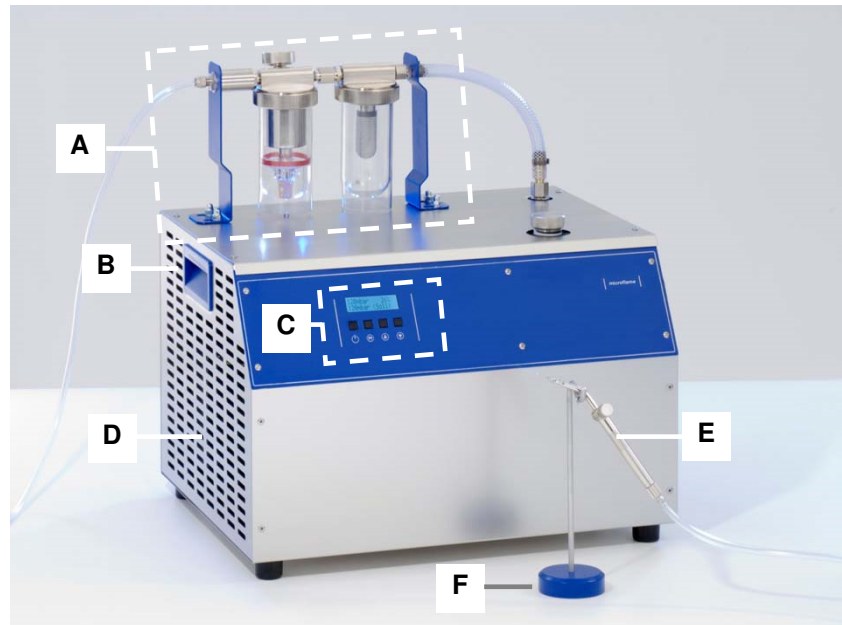


Illustration 4.5. Unit front and side view (here Microflame 300)

- A Unit top part** with glasses for vaporizer liquid and condensate separator. Moveable for an easy removal of the glasses.
- B Handles** (on both sides)
- C Operating panel** with display and operating keys
- D Ventilation openings** (on both sides)
- E Burner hand piece**
- F Holder** for burner hand piece

4.6

Description of unit top part

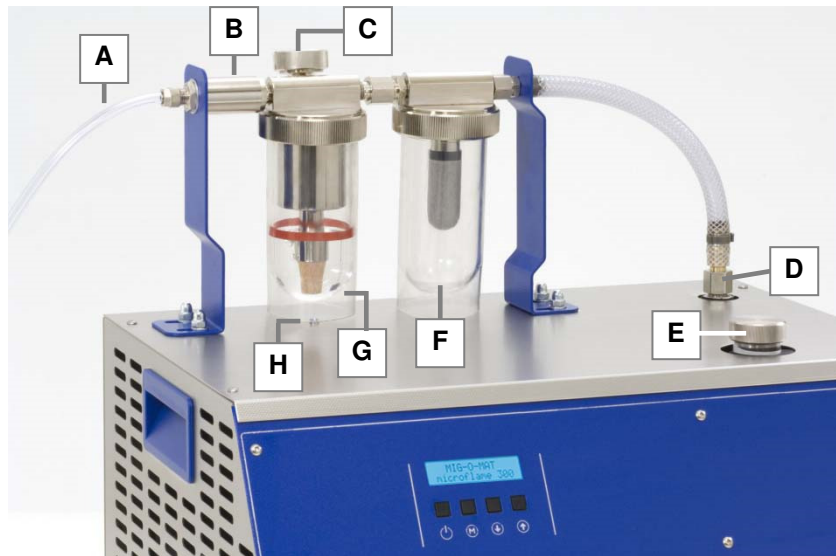


Illustration 4.6. Unit top part of Microflame

- A Gas hose (PVC) to burner hand piece** with connection to gas outlet on the unit top part.
- B Check valve** as protection against the flame backfiring into the unit (flame barrier and temperature-sensitive gas cut-off).
- C Screw cap on filling duct** for vaporizer liquid.
- D Screw connection** for the gas hose at the reactor outlet.
- E Screw cap of filling duct**
for electrolyte (for initial filling) or
for distilled water (for refilling in case of low reactor filling level).
- F Glass container for condensate separator** (also termed dryer glass) with filter piece.
- G Glass container for vaporizer liquid** (also termed vaporizer glass) with gas distributor (sintered cone).
- H LED lighting** of vaporizer liquid, for checking the gas flow.

4.7

Description of unit back

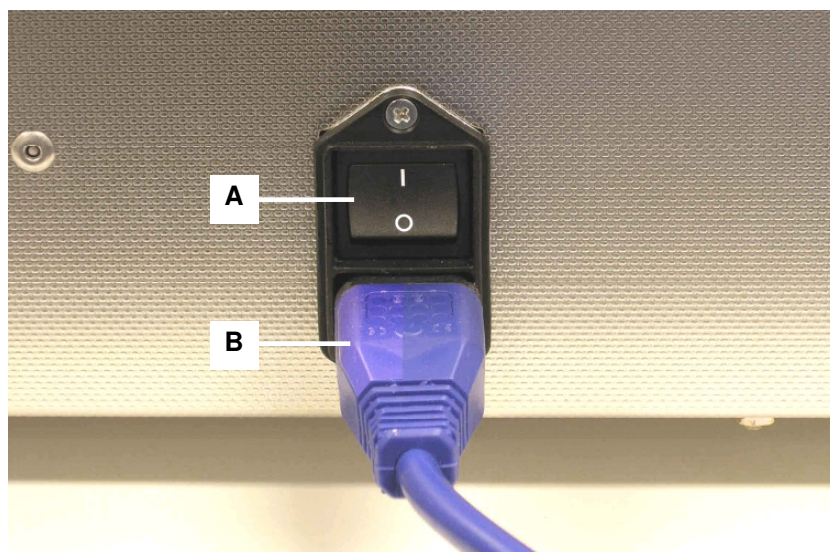


Illustration 4.7. Mains socket with mains switch

- A Mains switch** as main switch for switching off the unit during longer operating stops, e.g. overnight, over the weekend, etc.
- B Plug-in mains cable** connected with the mains socket.

4.8

Description of operating panel



Illustration 4.8. Operating panel with display and operating keys

- A Display**
 - Top line** – section on the left: indicates the actual value (mbar) inside the unit.
 - Top line** – section on the right: indicates the actual reactor power which is required to produce the set gas pressure.

Indication range between 10% and 100% depending on the actual state of the unit.

Bottom line: indicates the set pressure value (mbar) inside the unit.

The display also shows service indications, operating hours, display language, etc.

B Key on/off for switching the gas reactor on and off.

C Menu selector key to call the following settings and display indications:

Operating language: The operating language can be selected, available languages are German, English or French.

Operating hour meter: The operating hour meter shows the hours during which the unit has produced gas.

Display service mode: The service mode of the display shows the actual service status of the unit. The optimum on new or newly serviced units is 100%. At 0% the Microflame must be serviced by an authorized service company.

D / E Selector keys for changing and indicating the unit settings.

5 Preparatory measures for initial operation

5.1 Unpacking and placement of unit

Check for transport damages The unit is shipped in a suitable packing. Check the Microflame unit for possible transport damages before initial operation. In case of visible damages do not operate the unit and contact your supplier and the forwarding agent immediately.

Packing If possible, keep the original transport packing in store for possible later shipment for maintenance or repair purposes. Or dispose of the packing material according to the relevant local regulations on waste disposal. You can also return the packing material to the manufacturer for disposal (shipment charges to be paid by the customer).

Choice of workplace The unit must be operated under permanent supervision only. The workplace must allow free access to the unit. The operator must be able to supervise the unit at all times. Possible warning signals of the unit must be audible/visible.

Placement For operation, place the unit on a dry and solid surface. Ensure that the workplace is sufficiently ventilated! The cooling air must circulate through the cooling openings on both sides of the unit.



WARNING

Risk of electrocution due to humidity inside the unit!

Protect the unit from entering humidity!

Keep workplace and housing dry in order to prevent electrical accidents and damages from the unit.

- Ambient conditions**
- Allowed ambient temperature during operation: +5 °C up to +40 °C
 - Allowed relative humidity of air during operation: max. 80 %
 - Indoor operation only (no operation in the open)
 - Protect the unit from direct or indirect heat sources (e.g. heating elements, direct sunlight) to avoid overheating.

5.2

Mounting of the unit top part

The preassembled unit top part is packed separately and must be mounted onto the Microflame base unit. The protecting foil remain around the glass containers (serves as fracture protection).



Risk of injury splintering glass!

Combustion of gas inside the glasses due to gross disregard of the safety instructions can cause the glasses to burst.

Do not operate the unit without protective the hood (*illustration 5.2.E.*) over the glasses.

After replacing either one or both of the glasses, pull the protective hood(s) over the new glass(es).

Required tools

- 1 fork wrench size 10 mm (or comparable, suitable tool).
- 1 fork wrench size 19 mm (or comparable, suitable tool).

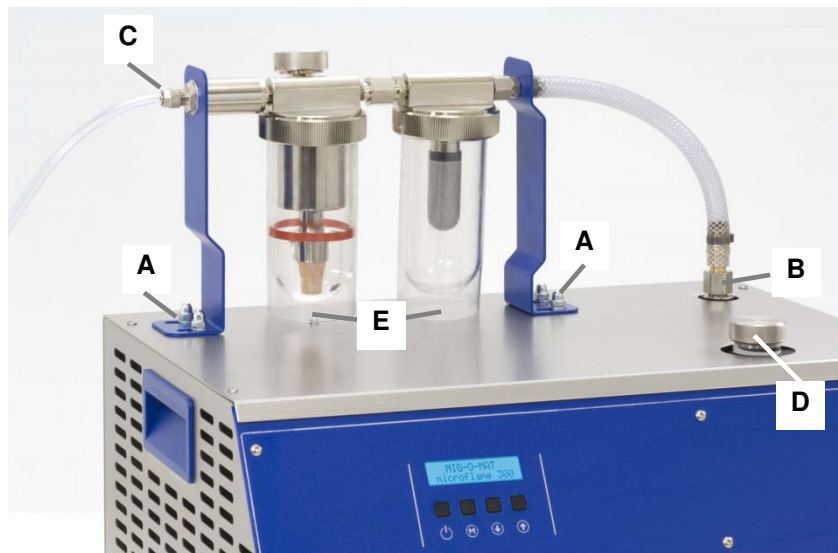


Illustration 5.2. Correctly mounted and connected unit top part

How to proceed

1. Use the 4 cap nuts (A) to screw the unit top part to the 4 threaded bolts on the Microflame unit top (fork wrench 10 mm).
2. Remove the yellow screw cap (transport safety device) on the reactor outlet (B). Please keep the yellow screw cap for possible future service purposes.

3. Connect the gas hose to the reactor outlet by means of the union nut (fork wrench 19 mm). **Caution!** Do not jam the connection nut.

Then tighten the connecting nut by means of the fork wrench. For this, hold the reactor at the filling duct with one hand. A slight movement of the reactor is possible and harmless because the reactor connection is elastic. Tighten the screw connection fast to avoid leaks in the pressure system.

4. Connect the gas hose of the burner hand piece to the outlet on the top part (C).



The unit top part is movable to facilitate the removal of the glass containers.

5.3

Filling of the reactor with electrolyte

For the production of gas a certain amount of electrolyte solution is required. When delivered, the unit is not filled with electrolyte for reasons of safety.

The electrolyte is not included in the delivery volume and must be purchased separately (MIG-O-MAT order no. 50.2501623, 1 litre ready-for-use solution).

**CAUTION!**

Electrolyte is a strong caustic solution!

Risk of severe chemical burns on skin, mucous membranes and eyes!



Risk of chemical burns of the mucous membrane caused by inhaling of vapours!

Always wear protective gloves and goggles when handling electrolytes to prevent chemical burns! Do not inhale the vapours!

Store open containers with electrolyte at a safe place and keep them out of reach of unauthorized persons, in particular of children.

**NOTE**

Please note! In order to avoid damages on the unit, use suitable electrolyte and distilled water only!

If in doubt contact the manufacturer or your supplier for information.

**Filling quantities
Electrolyte solution**

Microflame 140	Microflame 170/240/300
1.8 litre electrolyte solution	4.0 litre electrolyte solution
--	+
	0.1 litre distilled water

**How to produce
electrolyte solution**

If the electrolyte solution must be produced from solid potassium hydroxide (KOH) by the customer, proceed as follows.

**Prescription on the
production of
electrolyte**

Use the following substances only:

- Potassium hydroxide (cookies or flakes – free of water): KOH quality: KOH must not contain more than 1.5% potassium carbonate.
- Distilled water

Microflame 140	Microflame 170/240/300
815 g solid KOH electrolyte solution + 1580 g = 1.58 litre distilled water	1855 g solid KOH electrolyte solution + 3600 g = 3.6 litre distilled water

How to produce electrolyte solution

1. Fill the correct amount of distilled water into a temperature-resistant and alkaline-resistant container.
2. Add the correctly measured quantity of potassium hydroxide carefully and slowly, keep stirring the mixture.
Caution! The liquid may splash. Strong reactions due to self-activated heating and the forming of vapours are possible. Observe the safety warnings indicated in this section!
3. Keep stirring the liquid until the potassium hydroxide has completely dissolved.
4. Let the heated alkaline solution cool down.

How to fill electrolyte solution

1. Unscrew the closing cap from the filling duct (*see illustration 5.2.D.*) at the electrolyte reactor.
2. Place the clean funnel (included in the delivery volume) onto the filling duct.
3. Carefully pour approx. 4/5 of the electrolyte (total quantity see table in this section) into the filling duct of the reactor.
4. Carefully insert the glass float into the filling duct of the reactor, with the thin end up. The tip of the float must be flush with the edge of the duct. If necessary refill liquid. The glass floating body must not stand out from the edge of the duct by more than 5 mm.
Caution! In case of an overfilling there is a risk of damage to the unit. If the reactor has been overfilled the excess electrolyte must be removed from the reactor (for this carefully read and observe the relevant safety and procedure instructions in *section 8.7.!*).
The glass float remains in the filling duct for future filling level checks.
5. Screw the closing cap back onto the filling duct and tighten it.
6. The filling process is now finished.

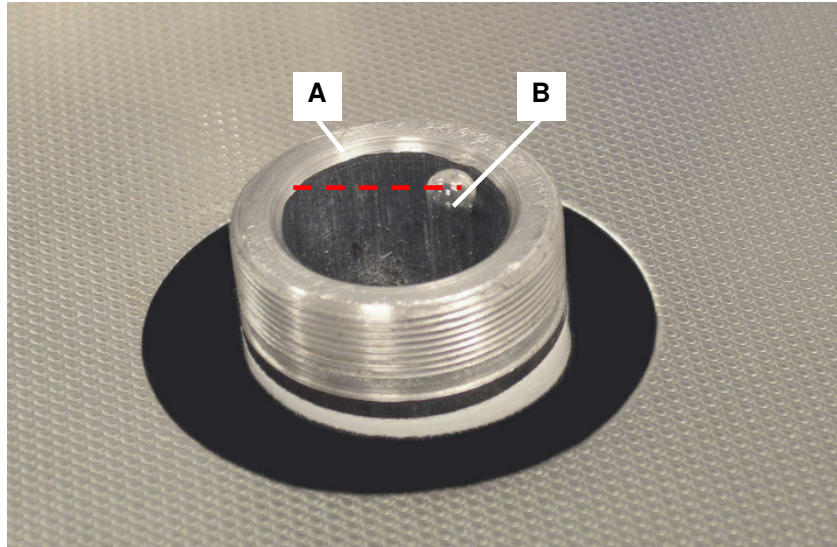


Illustration 5.3. Filling duct with glass float at maximum filling level

5.4

Filling of the vaporizer glass with vaporizer liquid



The use of vaporizer liquid is necessary for the soldering of metals (except platinum). The flowing gas is enriched and thereby produces a flame which is adjusted to the individual properties of the metal.

We recommend the use of MIG-O-MAT vaporizer liquid BLQ 1800 (MIG-O-MAT Order No. 50.2501631, 1 litre). Unlike other methanol-containing liquids MIG-O-MAT BLQ 1800 is not toxic. Another advantage is that the burner hand piece cannot be blocked by residues which may be contained in other media (borax). In these cases the hand piece must be replaced.

Vaporizer liquids are flammable! Therefore, please observe the following safety instructions before filling.



CAUTION!

Risk of fire and explosion due to ignition sources and electrostatic charging!

Risk of ignition of the flammable liquids used for filling due to ignition sources around the workplace!

Keep away from ignition sources when the vaporizer glass is open or when you handle vaporizer liquid!

Risk of ignition of the flammable vaporizer liquids used for filling due to electrostatic discharging!

Touch the cap nuts on the holding angle pieces of the top part with both hands for a short period of time before you handle the vaporizer liquid. This will branch off any possible electrostatic charge of the operator without any risk!

Ensure that the workplace is sufficiently ventilated!

**CAUTION!**

Risk of poisoning by toxic solvents when methanol-containing vaporizer liquids are used!

Do not inhale the vapours!

Avoid contact with eyes and skin!

Wear protective gloves and goggles when handling hazardous substances! Do not eat, drink or smoke!

Observe the specific safety warnings given on the label of the vaporizer liquid used. Some types of vaporizer liquids may be toxic!

Store open containers of vaporizer liquid that are not yet empty at a safe place and keep out of reach of unauthorized persons, in particular of children.



The maximum temperature of the hydrogen-oxygen flame is approx. 2850 °C. It is typical that the pure detonating gas flame is almost invisible and the flame temperature is too high for many applications. Therefore, the gas is guided through a vaporizer liquid to reduce the energy density (flame temperature). With Redux the temperature of the flame is reduced to approx. 1800°C. In the same process the flame becomes coloured which is desirable with a view to labour protection.

For melting or soldering e.g. of platinum the flame does not have to be enriched by vaporizer liquid. For these applications, the vaporizer liquid can be removed from the vaporizer glass. The high flame temperature which is necessary for the soldering of platinum can also be reached by the use of water in the vaporizer glass. The cleanness of the gas is improved through the filtering effect of the distilled water which allows the fast and high-energy burning of pure hydrogen-oxygen mixture.

How to proceed

1. Open the closing cap of the vaporizer glass (*see illustration 5.4.A.*).
2. Place the clean funnel (delivered with the unit) into the filling opening of the vaporizer glass.
3. Carefully fill vaporizer liquid into the vaporizer glass up to the red maximum filling level marking (*see illustration 5.4.B.*).
4. Screw the closing cap back onto the filling opening and tighten.
5. The filling process is now finished.

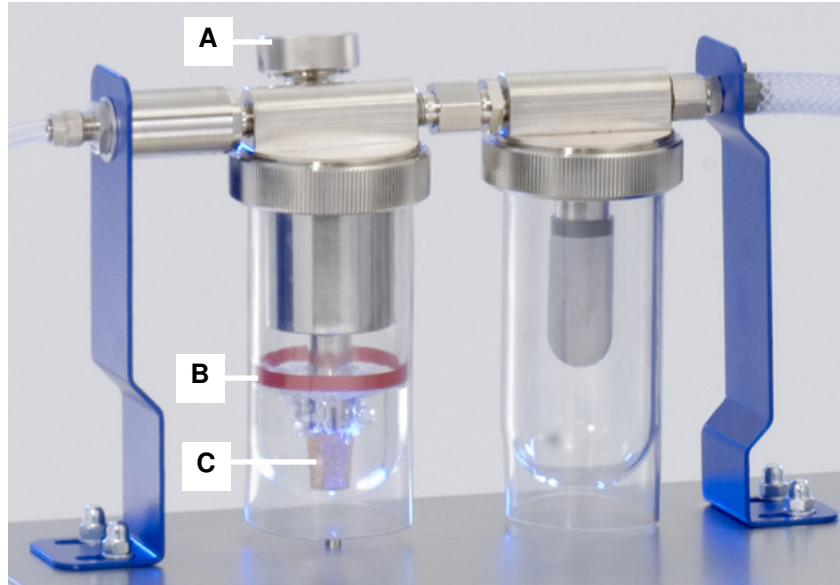


Illustration 5.4. Vaporizer glass ready for operation

5.5

Connecting the unit to the mains

Mains requirements

The unit must be connected to a shockproof socket only.

Ensure that the values indicated on the nameplate of the unit correspond with the available local connection conditions.

Use the mains cable delivered with the unit. Plug the cable into the mains socket at the Microflame unit as shown in *illustration 4.7*. Then plug the mains plug into a freely accessible mains socket.

Instructions for Microflame units EF 240 and EF 300 in 120 V mains

Shockproof socket:

2 phases (120 V); 1 N; 1 PE protective conductor

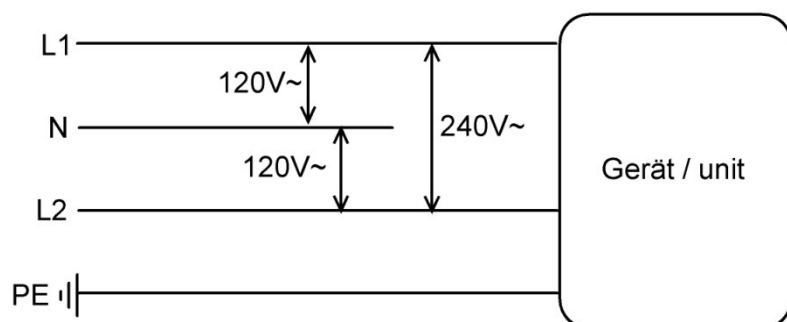


Illustration 5.5. Mains requirements for MIG-O-MAT microflame units EF 240 and EF 300 in 120 V mains.

5.6


Setting of operating language in the display

Switch on the Microflame unit at the mains switch on the back of the unit (see illustration 4.7.).

The display is activated and shows the following indication:


Microflame

Switch the unit into operating mode


Switch the unit into operating mode by pressing the *on/off* key  at the operating panel for a short period.

The gas reactor is now switched on. The blue LED for lighting the vaporizer liquid is activated, the display is lighted.

Interrupt / stop the leak check

The programme offers to carry out a leak check. Press the key  (*No*) at the operating panel to stop the check.

Select a display language



Press the key  at the operating panel twice.

Depending on the basic setting the display shows the following options:


**Sprache:
Deutsch**

**Language:
English**

**Langue:
Français**

Select the requested operating language with the key  at the operating panel and enter the setting by pressing the key . Now the operating language has been set.

Switch off the unit

Switch off the unit by pressing the *on/off* key  at the operating panel*.



*The unit programme offers to carry out the required leak check only after restart of the unit.

6 Initial operation

Check filling levels Before you operate the unit check if the filling levels of the electrolyte solution (see also section 8.1.1. and illustration 5.3. in section 5.3) and of the vaporizer liquid (see also section 8.1.2.) are correct.

6.1 Switch on the unit


Switch on the mains switch Switch on the Microflame unit with the mains switch on the back of the unit (*see illustration 4.7.*).

When the unit is switched on with the mains switch, it is automatically put into „stand-by operating mode“.

The display is now activated and shows the type of unit, for example indication:

MIG-O-MAT
Microflame 300

6.2 Switch on the operating mode

Switch the unit into operating mode Switch the unit into operating mode by pressing the *on/off* key  at the operating panel for a short period.

The gas reactor is now switched on. The blue LED for lighting the vaporizer liquid is activated (*illustration 4.6.H.*) and the display is lighted.

6.3 Electrolyte filling level check

The operator is asked to check the filling level of electrolyte solution in the reactor.



The electrolysis process reduces the quantity of electrolyte solution in the reactor. When using a nozzle of size 0.9, at a gas pressure of approx. 100mbar a MIG-O-MAT microflame 140 for example consumes about 55 ml/h of water.





NOTE

A correct filling level is indispensable for proper functioning and a long service life of the unit. Therefore, check the filling level of the electrolyte solution in the reactor every day.


Filling OK?


No Yes

Filling level is known to be correct If the filling level has been checked recently and is known to be correct, press the key  (Yes) on the operating panel to acknowledge the correct filling level.

Filling level unknown If the filling level has not been checked recently, press the key  (No) in the operating panel. The unit is now switched off to allow the filling level check.

Follow the instructions given in *Section 8.1.1. Check and refill distilled water in the reactor*. When the glass floating body in the filling duct (see *illustration 8.1.1.A.*) goes down by more than 1 cm, refill distilled water.

Switch the unit back into operating mode at the *on/on* key  in the operating panel.

Acknowledge the filling level check with key  (Yes) in the operating panel.

6.4

Leak check


Leak check The programme offers to carry out a leak check. You are asked to decide if you wish to have an automatic leak check carried out. We recommend to carry out the leak check on a daily basis.



The leak check can only be carried out with cold electrolyte reactor (below 45 °C).

Check for leaks?


No Yes

Confirm the request with the key  (Yes) at the operating panel.

Shut the valve at the burner hand piece and shut the reactor closing caps

You are now asked to check and confirm that the valve at the burner hand piece and the filling ducts at the reactor and the vaporizer glass are shut.

Close the burner valve!

Confirm with the key  (OK) at the operating panel.

The Microflame unit now starts carrying out an automatic leak check. Please wait until the display indicates the result of the leak check. This takes approx. 25 to 30 seconds!

If the unit is leaky

If there is a leak, the display shows:

**Unit is leaking!
Repair the leak!**


The leak must be found and repaired before the unit is operated.

Check if the screw connections between gas hose and reactor outlet and between gas hose and outlet at the top part are correctly tightened; also check the screw connections at the burner hand piece and at the filling ducts for electrolyte and vaporizer liquid. When in doubt contact your supplier or the manufacturer of the unit.

If the unit is leakproof

If there is no leak, the display shows:

**No leak
Continue**

Confirm this programme step by pressing the key  (*Continue*) at the operating panel.

The unit is now ready for operation.

6.5

Select the burner nozzle

The Microflame units are delivered with a selection of nozzles of different sizes.

Delivered nozzle sizes

Microflame 140: 0.6 mm (G23) – 1.0 mm (G19)

Microflame 170: 0.7 mm (G22) – 1.2 mm (G18)

Microflame 240: 0.8 mm (G21) – 1.5 mm (G17)

Microflame 300: 0.8 mm (G21) – 1.8 mm (G15)

The use of larger nozzles is not allowed.

The use of smaller nozzles is possible without problem. Select the suitable nozzle from the nozzle set depending on the required soldering job and fasten it onto the conical tip of the hand piece.

6.6

Adjustment of the gas pressure at the operating panel



Size and energy of the burner flame can be adjusted at the valve of the burner hand piece (see illustration 6.6.) or set at the operating panel by pre-selecting the gas pressure.

When the unit is ready for operation the display shows 2 different operating pressure values:

Display top line First part of display top line: shows the actual value (mbar) measured in the unit.

Second part of display top line: shows the actual reactor power required to produce the set gas pressure. The display shows a value between 0% and 100%.

Display bottom line Shows the actual set pressure value (mbar) in the unit.

The set pressure value can be changed during operation by the keys  or .

The actual pressure is adjusted to the set value within a very short time.

Adjustable operating pressure range The maximum operating pressure is limited to 200 mbar, the minimum gas pressure is limited to 50 mbar.

Example The display shows the actual operating pressure in the top line, e.g. 120 mbar. If the set pressure value is changed, e.g. to 140 mbar, the reactor will go on full power immediately (100%) power to reach this value.

120 mbar	100%
140 mbar	(set)



As soon as the gas pressure has reached the set value, the gas output is reduced to the value, which is required for keeping the gas pressure stable at level of the set gas pressure, e.g. at 75%. The required gas output depends on the applied nozzle size and the set gas pressure.

140 mbar	75%
140 mbar	(set)

The gas pressure should be between 50 and 150 mbar depending on the soldering or welding job. It may be necessary to reduce the number of burners used at the same time or to reduce the nozzle size.

The flame becomes „harder“ with increasing gas pressure, and „softer“ with decreasing gas pressure. The Microflame unit allows the perfect adjustment of the flame to each soldering or welding job.



NOTE

Please note! If the set gas pressure value is too low for the selected nozzle size, so that the gas burning speed is higher than the gas escaping speed, the flame backfires into the nozzle. In most cases, this will destroy the nozzle. The backfire of the flame is stopped by the backfire protection device inside the handle. In the process the backfire protection device is contaminated and the gas flow-through capacity of the handle piece is reduced. If this process is repeated several times the handle piece can be choked.

6.7

Regulation of the burner flame at the burner hand piece

Size and energy of the burner flame can be adjusted at the valve of the burner hand piece (see *illustration 6.6.*) or set at the operating panel by pre-selecting the gas pressure.

Do not control the burner flame down until the flame touches the nozzle tip, as this may damage the nozzle.

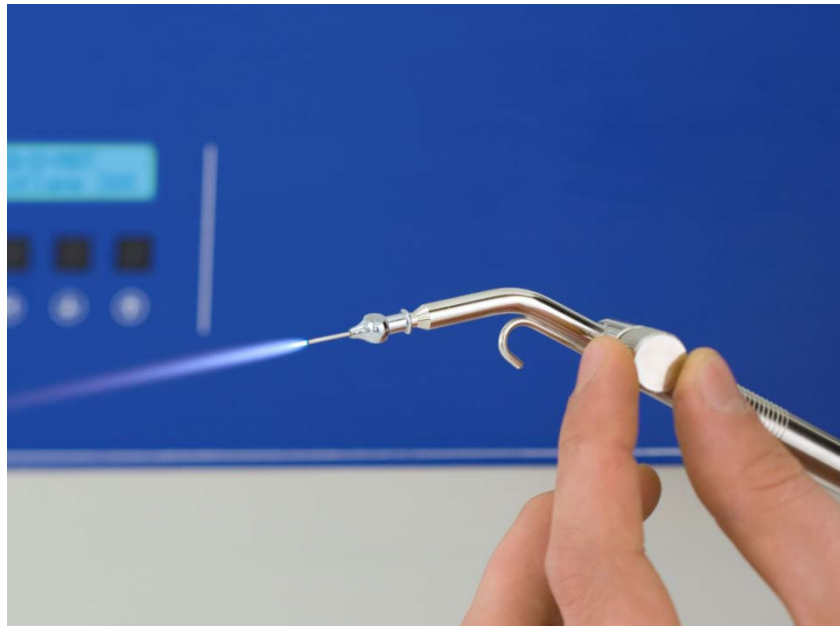



Illustration 6.6. Regulation of the flame size at the burner hand piece valve

6.8 Operating stops

Short operating stop If operation of the Microflame is stopped for a short period of time the burner hand piece can be hooked into the holder (delivered with the unit) with burning flame. Ensure that the burner flame cannot ignite any flammable substances even if the position of the burner tip changes. It may be safer to extinguish the flame and to shut the burner valve at the hand piece.

Prolonged operating stop Always extinguish the flame and shut the burner hand piece valve for prolonged operating stops. Switch off the gas production at the key  at the operating panel. The unit now automatically switches into stand-by mode. In this operating mode, the ventilation device cools down the principal components reactor, rectifier and main transformer at reduced speed, so that there is no risk of overheating. When the unit has sufficiently cooled down, the control system automatically switches off the ventilation device.



In stand-by operating mode with cooled-down unit the current consumption is reduced to a minimum.

6.9 After operation

After operation The unit must be switched off at the mains switch only for prolonged operating stops (overnight, over the weekend, over holiday periods).

Depending on how long the unit had been operated, the reactor inside the unit can be very hot. Therefore, switch off the unit only at the operating panel. When the ventilator for cooling the reactor has stopped running (delayed shut-off) switch off the unit at the mains switch on the back of the unit.



NOTE

If the unit is switched off at the mains switch after a prolonged operating period, damages to the unit due to overheating are possible.

6.10 Extinction of the flame at the burner hand piece

When the gas pressure is adjusted correctly, the burner flame does not touch the nozzle, there is a distance of several tenths of millimetres between nozzle and flame. The nozzle tip remains cold and in perfect condition.

When extinguishing the burner flame ensure that the flame does not touch the nozzle. This may burn out and damage the nozzle.

Procedure A Stop the flame e.g. with a compressed air pulse. The higher the gas pressure of the flame, the easier this works.

Procedure B Immerse the flame up to the burner tip short-time into a glass of water.

After the flame is extinguished, in case of method A and B, shut the burner hand piece valve!

Alternative: Close the valve of the hand piece with a quick turn. The flame does backfire however, will only minimally deteriorate the tip of the nozzle.

7 Technical details

	MIG-O-MAT microflame 140	MIG-O-MAT microflame 170	MIG-O-MAT microflame 240	MIG-O-MAT microflame 300
Mains voltage (V)	230	230	230	230
Power consumption (W)	900	1200	1800	2000
Mains fuse (A)	10	16	16	16
Max. gas production (l/h)	140	170	240	300
Max. nozzle size	1.0 (G19)	1,2 (G18)	1.5 (G17)	1.8 (G15)
Workplaces	1x (G19 / 1,0) – 6x (G25 / 0.5)	1x (G18/ 1,2)- 10x (G25 / 0.5)	1x (G17 / 1,5) – 16x (G25 / 0.5)	1x (G15 / 1,8) – 18x (G25 / 0.5)
Unit outer dimensions W / D / H (mm)	395 / 275 / 460	490/ 375 / 520	490 / 375 / 520	490 / 375 / 520
Weight (kg)	25	48	48	49

8 Maintenance and repair

8.1 Maintenance

Caution! For any maintenance or repair works related directly or indirectly to electrolyte or vaporizer liquid carefully read and observe the following safety warnings.



WARNING!

Caution when handling electrolytes! Risk of chemical burns! Strong acid alkaline!

Risk of chemical burns due to spilling alkaline or splashes of alkaline from the filling duct during filling!



Always wear protective gloves and goggles when handling hazardous substances!



WARNING!

Caution with open filling duct of the electrolyte reactor!
Risk of fire and explosion due to ignition sources!

Risk of ignition of the detonating gas in the electrolyte reactor due to ignition sources!

Keep unit away from ignition sources! Do not light the filling duct with the burner flame!



WARNING!

Caution with open filling duct of the electrolyte reactor!
Risk of fire and explosion due to electrostatic discharging!

Risk of ignition of the detonating gas in the electrolyte reactor due to electrostatic discharging!

Touch the cap nuts on the holding angle pieces of the top part with both hands for a short period of time before you open the glass containers. This will branch off any possible electrostatic charging of the operator without any risk!



WARNING!

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

Risk of ignition of the flammable liquids contained in the unit, and of the flammable liquids used for filling, due to ignition sources in the vicinity of the unit!

Keep the open vaporizer glass container and the vaporizer liquid away from ignition sources!

**WARNING!**

Caution when handling vaporizer liquid! Risk of explosion due to electrostatic discharging!

Risk of ignition of the flammable liquids contained in the unit top part, and of the flammable liquids used for filling, due to electrostatic discharging!

Touch the cap nuts on the holding angle pieces of the top part with both hands for a short period of time before you open the glass containers. This will branch off any possible electrostatic charging of the operator without any risk!

8.1.1

Check and refill distilled water in the reactor



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

The level volume in the reactor is reduced by the electrolytic process. Therefore, check the filling level in the reactor daily.


Checking the filling level by means of the glass floating body is possible only when the floating body has been placed inside the filling duct for initial operation.

**WARNING!**

For this maintenance work read and observe the safety warnings given in section 8.1. (e.g. protective goggles and gloves)!

Check the filling level by means of the glass floating body only. Do not light the filling duct with the burner flame for better vision. Risk of explosion!

Check of filling level of electrolyte

1. Extinguish the flame at the burner hand piece.
2. Press the *on/off* key  at the operating panel to switch off the gas production.
3. Shortly open the burner hand piece valve (release the residual pressure).
4. Open the screw cap of the filling duct (*see illustration 5.2.D.*) of the electrolyte reactor.
5. Check the glass floating body in the filling duct:
The maximum filling level of the reactor is reached when the upper edge of the glass floating body is level with the upper edge of the filling duct (*see illustration 8.1.1.B.*). When the glass floating body in the filling duct (*see illustration 8.1.1.A.*) goes down by more than 1 cm, refill distilled water.



6. For this put the funnel (delivered with the unit) onto the filling duct and carefully fill distilled water until the upper edge of the glass floating body is level with the upper edge of the filling duct (see illustration 8.1.1.B).



NOTE

Please note! When a large quantity of distilled water is refilled, the floating body does not immediately indicate the correct filling level as the specific density of distilled water is lower than that of the electrolyte. Immediately after filling of a large quantity of distilled water the floating body indicates a filling level which is lower than the actual level. Therefore, refilling of distilled water must be done step by step. The unit must be switched on and the gas production started for approx. 30 to 60 seconds between each refilling step.

How to proceed: refilling of distilled water

1. If the floating body in the filling duct is no longer visible, refill max. 0.2 litre distilled water.
2. Switch on the unit at the *on/off* key  at the operating panel to start the gas production. The filling duct can remain open.
Caution! Risk of fire and explosion! Keep away from ignition sources!
3. Switch off the gas production after approx. 30 seconds at the *on/off* key  at the operating panel.
4. Check the filling level again:
 - a. If the floating body in the filling duct is still not visible, repeat steps 1. to 3.
 - b. If the floating body in the filling duct is now visible refill only a small quantity of distilled water until the floating body is level with the filling duct edge.
5. Screw the closing cap back onto the filling duct and tighten it.

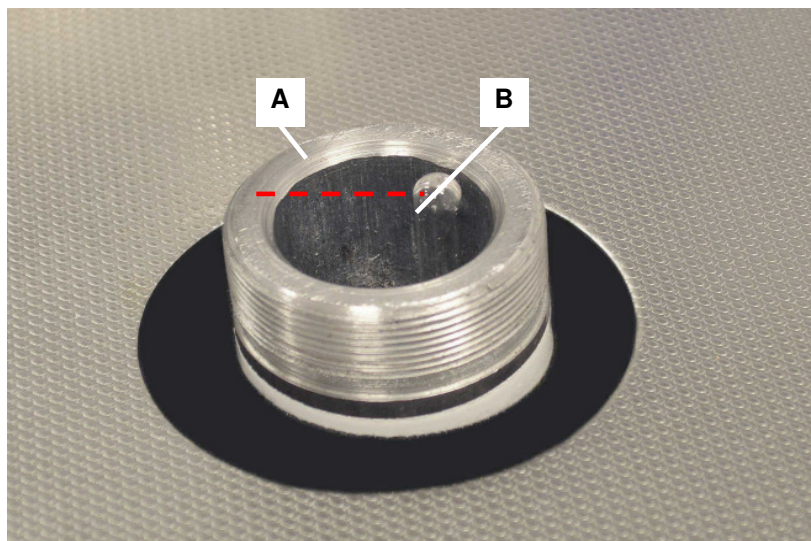


Illustration 8.1.1. Filling duct with glass floating body at maximum filling level

8.1.2

Refilling of vaporizer liquid**Check of filling level of vaporizer liquid**

During operation of the unit, the vaporizer liquid is consumed. It may be necessary to refill the vaporizer liquid.

When the level of the liquid in the vaporizer glass has gone down to the sintered gas distributor (*see illustration 5.4.C.*) refill vaporizer liquid.

The filling level of the vaporizer liquid can only be checked with switched-on unit and built-up operating pressure.




After the unit has been switched off, there is a negative pressure in the electrolyte reactor. This may lead to the suction of vaporizer liquid into the compensation tank in the vaporizer glass (*illustration 8.1.3.G.*). After switch-on and build-up of the operating pressure the vaporizer liquid that has been sucked into the compensation tank is pressed back into the vaporizer glass.

**WARNING!**

Carefully read and observe the safety instructions before you carry out this maintenance work!

**How to proceed:
refilling of vaporizer
liquid**

1. Extinguish the burner flame at the burner hand piece.
2. Switch off the gas production at the *on/off* key  at the operating panel.
3. Open the closing cap of the vaporizer glass (*see illustration 5.4.A.*).
4. Put the funnel (delivered with the unit) onto the filling opening of the vaporizer glass (the funnel must be clean).
5. Carefully fill vaporizer liquid not higher than up to the red filling level marking on the vaporizer glass (*see illustration 5.4.B*
6. Screw the closing cap back on the filling opening and tighten it.
7. Now the filling process is finished.

After prolonged idle periods of the unit, the filling level of the vaporizer glass can only be determined exactly after the unit has been operated with correct operating pressure for a short period of time.

**NOTE**

Ensure that the filling level of the vaporizer liquid in the vaporizer glass does exceed the level marked on the glass.

8.1.3

Cleaning of the vaporizer glass




WARNING!

Carefully read and observe the safety instructions in section 8.1. before you carry out this maintenance work!

We recommend to empty the vaporizer glass regularly (approx. once per month, depending on the operating hours) (see *illustration 8.1.3.A.*) and to clean it with hot water before you refill it again.

Dispose of the residual vaporizer liquid according to the instructions given on the label of the container. Read and observe the instructions given in *section 9.3.*

How to proceed

1. Switch off the gas production at the *on/off* key  at the operating panel.
2. Unscrew the fastening ring by turning it to the left (see *illustration 8.1.3.D.*).
3. Remove the vaporizer glass. Move the complete top part sideways to facilitate removal of the vaporizer glass.
4. Clean the glass as described above.
5. Remount the vaporizer glass by screwing the fastening ring back to the right (see *illustration 8.1.3.E.*).
6. Fill the glass with vaporizer liquid as described in *section 8.1.2.*

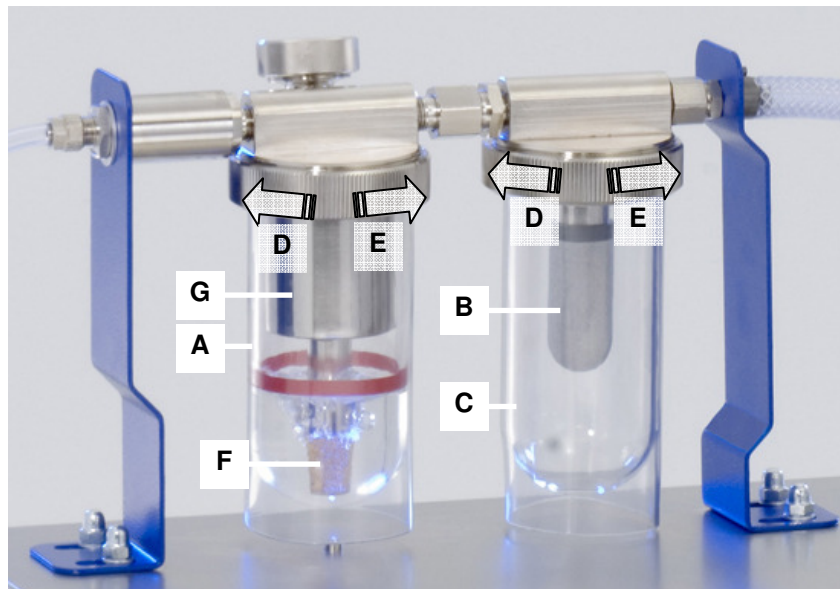


Illustration 8.1.3. Vaporizer glass (A) with sintered piece (F) and compensation tank (G) / dryer glass (C) with filter cartridge (B)

8.1.4


Cleaning of the dryer glass**WARNING!**

Carefully read and observe the safety instructions in section 8.1. (e.g. protection goggles and gloves) before you carry out this maintenance work!



During operation, condensation water and entrained electrolyte are separated in the dryer glass (*see illustration 8.1.3.C.*). If there is more than 1 cm of condensate in the glass, remove the condensate and rinse the glass with hot water subsequently. For the disposal of electrolyte *see section 9.2.*

How to proceed

1. Switch off the gas production at the *on/off* key  at the operating panel.
2. Unscrew the fastening ring by turning it to the left (*see illustration 8.1.3.D.*).
3. Remove the dryer glass. Move the complete top part sideways to facilitate removal of the dryer glass.
4. Clean the glass as described above.
5. Remount the dryer glass by screwing the fastening ring back to the right (*see illustration 8.1.3.E.*).

8.1.5


Exchange of the filter cartridge in the dryer glass

During operation of the unit, the gas flowing through the unit is dried in the filter cartridge (*see illustration 8.1.3.C.*). After a certain period of time the filter cartridge is saturated with liquid and must be exchanged. We recommend to exchange the filter cartridge approx. once per year depending on the operating hours.

**WARNING!**

Carefully read and observe the safety instructions in section 8.1. (e.g. protection goggles and gloves) before you carry out this maintenance work!

How to proceed


1. Switch off the gas production at the *on/off* key  at the operating panel.
2. Unscrew the fastening ring of the dryer glass by turning it to the left (*see illustration 8.1.3.D.*).
3. Remove the dryer glass. Move the complete top part sideways to facilitate removal of the dryer glass.
4. Unscrew the filter cartridge, remove and replace it.
5. Remount the dryer glass by screwing the fastening ring back to the right (*see illustration 8.1.3.E.*).

8.2 Service indications (display)



During operation of a soldering unit the anodes and cathodes wear out. Therefore, the gas drawing hours are measured by the control of the unit to ensure safe operation.

Show service level The service level can be called by switching over the display.

Press the key  at the operating panel to indicate the gas drawing hours and the service level:

„100 %“ service level is the standard status of the unit when delivered or when the unit has been serviced. The reactor requires to be serviced and inspected every two years, or when the service level „0 %“ is indicated.

When the unit must be serviced, this is indicated by a signal tone and by the display:

**Service interval
has run down!**

The signal tone can be silenced by pressing any key. Operation of the unit may continue for a limited period of time.

Please contact your supplier or the manufacturer.

Caution: The manufacturer cannot be held liable for any damage on persons, or for damage on the equipment caused by operation of the unit after the service interval has run down!

8.3 Malfunctions and warnings

In case of malfunctions of the unit caused by thermal overcharging or overpressure, the gas production is automatically stopped: the unit changes the set value to zero. A signal tone indicates the malfunction. The valve at the handle piece can be closed easily. The signal tone can be silenced by pressing any key.

If the main transformer is overloaded, the display shows the following malfunction:


**Transf. overload!
Let cool down!**

Operation can be continued only after the transformer has cooled down. For this, change the set value back to the required value.

If the allowed reactor temperature is exceeded, the display shows the following malfunction:

Excess temp.!
Let cool down!

Operation can be continued after the unit has cooled down. For this, change the set pressure value back to the required value.

In case of malfunctions due to overheating it is important not to switch off the unit at the mains switch, as the ventilating device stops operating, too. If you feel uncomfortable due to a too noisy operating sound of the ventilating device, switch the unit into stand-by operating mode by pressing the *on/off* key . This reduces the speed of the ventilating device. In this mode, cooling down will take considerably longer!


If the pressure control device has broken down the unit automatically switches off and the display shows the following malfunction:

Faulty pressure control!

Switch off the unit at the mains switch and restart it. If the malfunction is repeated please contact your supplier or the manufacturer of the unit.

8.4 Troubleshooting

Malfunction / Fault	Possible cause	Remedy
The unit does not produce any gas, the display shows no malfunction.	The unit is not connected to the mains.	Plug the mains cable into a suitable socket.
	The unit has not been switched on at the mains switch.	Switch on the unit at the mains switch on the back – the display shows the designation of the unit.
The unit does not produce any gas. The gas pressure is set at approx. 150 mbar, the valve at the burner hand piece is closed. The actual gas pressure value does not correspond with the set value!	The unit is leaky -(closing cap at the reactor (<i>illustration 4.6.E.</i>) and/or the gas route between gas outlet (<i>illustration 5.2.C.</i>) and hand piece are leaky).	Switch off the unit at the mains switch, retighten the screw connections, replace washers if necessary, check the glasses for leaks – check if the O rings are mounted correctly.
	The hose system inside the unit is leaky.	Switch off the unit, pull the mains plug, open the unit, check if the hose connections sit tightly, retighten loose connections (if necessary contact the Technical Support).
The unit does not produce any gas although the actual pressure corresponds with the set pressure value.	The gas route in one or more components is choked: <ul style="list-style-type: none"> • burner nozzle and/or • filter cartridge (<i>illustration 8.1.3.B.</i>) and/or • sintered cone in vaporizer glass (<i>illustration 5.4.C.</i>) and/or • backfire protection (<i>illustration 4.6.B.</i>) and/or • handle of burner hand piece 	Exchange the choked components.

Malfunction / Fault	Possible cause	Remedy
The unit produces too little gas, the actual value goes down to a value which does not produce a flame size which is ordinarily produced by the selected nozzle size.	The gas route is leaky (carry out a leak check as described in <i>section 6.3.</i>).	Find the leaks at the connections (daub with foam-building media) and retighten connections or replace the washers. If you cannot find any leak contact your supplier or the manufacturer.
	Filling level in the reactor is too low.	Refill distilled water until the glass floating body is level with the edge of the filling duct.
The flame is instable.	The nozzle is choked.	Clean or replace the nozzle.
	The vaporizer liquid has been consumed.	Completely exchange the vaporizer liquid, clean the glass.
The unit switches off and stops the gas production. A warning buzzer is audible, the display shows: <i>Excess temperature</i>	Unit overheated	Close the burner valve. By pressing the on/off key  put the unit in stand-by, and wait until the ventilator has cooled the unit.
The unit switches off and stops the gas production. A warning buzzer is audible, the display shows: <i>pressure regulation defect</i>	Technical defect	Immediately switch off the unit and contact your supplier or the manufacturer.
The pressure rises above 300 mbar.	Faulty pressure control and safety pressure monitor.	Immediately switch off the unit and contact your supplier or the manufacturer.

8.5

Repair

**Opening of the unit
by authorized
specialized staff only**

Repair and maintenance works that require the unit to be connected and opened must be carried out by authorized specialized staff only.



WARNING!

Risk of electrocution due to live parts inside the unit!

Pull the mains plug before you open the unit!

The manufacturer cannot be held liable for any damage caused by unauthorized repair works on the unit.

In case of a breakdown of the unit please contact your supplier or the manufacturer.

8.6

Transportation of the unit

CAUTION!

For reasons of safety the unit must be shipped only when empty! Electrolyte and vaporizer liquid are hazardous substances!

**Prepare the unit for
shipment**

1. Remove the electrolyte (*see section 8.7.*).
2. Remove the vaporizer liquid (*see section 8.8.*).
3. To avoid transport damages:
 - a. Remove the unit top part.
 - b. Cover the reactor outlet with the original yellow plastic cap.

Pack and ship the unit in the original packing box.

**Transportation to or
from the workplace**

When filled the unit must be transported in upright position only. When the filled unit is tilted, it may be damaged considerably!

8.7

Removal of electrolyte

For shipment of the Microflame unit, and for particular maintenance works, remove all electrolyte from the unit.



For emptying the electrolyte reactor use a suitable alkaline-resistant suction device. If in doubt please contact your supplier or the manufacturer of the unit.

**WARNING!**

Caution! Strong acid alkaline!

Risk of heavy causticization on skin, mucous membranes and eyes!



Do not suck any electrolyte through a hose by mouth!

To prevent dangerous causticization when handling electrolyte always wear protective gloves and goggles!

How to proceed

1. Switch off the Microflame at the mains switch at the back of the unit.
2. Open the screw cap of the filling duct for electrolyte.
3. Remove the glass floating body. Caution! The glass floating body is covered with alkaline! Rinse the floating body with water.
4. Completely remove the electrolyte from the reactor by means of a suitable suction device.
5. Fill the electrolyte into a specially marked and alkaline-resistant tank and store out of reach of unauthorized persons, in particular of children. Or dispose of the electrolyte as described in *section 9.2*.

8.8

Removal of vaporizer liquid

For shipment of the Microflame unit, and for particular maintenance works, remove all vaporizer liquid from the unit.

Dispose of the residual vaporizer liquid as described in *section 9.3*.



WARNING!


Caution when handling vaporizer liquid! Risk of fire and explosion due to ignition sources and electrostatic charging!

When handling vaporizer liquid keep away from any ignition sources!

Avoid electrostatic discharging!

Touch the cap nuts on the holding angle pieces of the top part with both hands for a short period of time before you open the vaporizer glass container. This will branch off any possible electrostatic charging of the operator without any risk!

How to proceed

1. Switch off the gas production at the *on/off* key  at the operating panel.
2. Unscrew the fastening ring by turning it to the left (*see illustration 8.1.3.D.*).
3. Remove the vaporizer glass. Move the complete top part sideways to facilitate removal of the vaporizer glass.
4. Remove the vaporizer liquid.
6. Fill the vaporizer liquid into a specially marked tank and store out of reach of unauthorized persons, in particular of children. Or dispose of the vaporizer liquid as described in *section 9.3*.
5. Remount the vaporizer glass by screwing the fastening ring back to the right (*see illustration 8.1.3.E.*).

8.9

Spare Parts

Spare part	MIG-O-MAT Order No.
Nozzle (5 pcs.) 0.5 x 10mm (G 25)	50.25019050
Nozzle (5 pcs.) 0.6 x 10mm (G 24)	50.25019060
Nozzle (5 pcs.) 0.7 x 10mm (G 23)	50.25019070
Nozzle (5 pcs.) 0.8 x 10mm (G 22)	50.25019080
Nozzle (5 pcs.) 0.9 x 10mm (G 21)	50.25019090
Nozzle (5 pcs.) 1.0 x 10mm (G 20)	50.25019100
Nozzle (5 pcs.) 1.2 x 10mm (G 18)	50.25019120
Nozzle (5 pcs.) 1.5 x 10mm (G 17)	50.25019150
Nozzle (5 pcs.) 1.8 x 10mm (G 15)	50.25019180
Electrolytic salt solution 1 litre	50.2501623
MIG-O-MAT vaporizer liquid BLQ 1800 1 litre	50.2501631
Dryer glass, with sealing ring	50.26164140
Vaporizer glass, with sealing ring	50.25164200
Glass jacket, small	50.2516415
Sinter cone	50.2520211
Filter element	50.2520208
Glass float	50.2520820
Micro torch, cranked	50.2502410
Micro torch with changeable flame arrester	50.2502415
Flame arrester with seals for micro torch	50.2502425

9 Putting out of operation and waste disposal

9.1 Waste disposal of Microflame unit



After removal of the operating substances (see sections 8.7 and 8.8.) the components of the Microflame can be taken to electronics and metal recycling stations. You can also return the components to the manufacturer for disposal.

9.2 Waste disposal of electrolyte



WARNING!

When handling electrolyte always read and observe the safety warnings given in section 8.1. (e.g. wear protective goggles and gloves)!

After neutralization*, both electrolyte and electrolyte solution can be disposed of into the sewerage system in compliance with the regulations of the local authorities, or they can be disposed of through specialized waste disposal companies.

Waste number 20 01 15*, „Alkalines“.

Containers can also be returned free of charge when they are completely empty. Rinse the containers with water before you return them for waste disposal.

*Neutralization with acid, e.g. acetic acid: For this pour the acetic acid into a suitable tank first, then add the electrolyte step by step.

Caution! The liquid can heat up considerably.

9.3 Waste disposal of vaporizer liquid



WARNING!

When handling vapourizer liquid / flux always read and observe the safety warnings given in section 8.1.!

Recommendation: 1. disposal by specialized waste disposal companies: waste number: 14 06 03*; „Other solvents and solvent mixtures“. 2. burning in suitable combustion facility in compliance with the regulations of the local authorities.

Do not let escape into the sewerage system / surface water / groundwater. Do not let escape into the soil. Do not let escape into the environment uncontrolled.

Containers can also be returned free of charge when they are completely empty.

10

Manufacturer's contact address

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