

Operating Manual

MINI ECO MAXI ECO

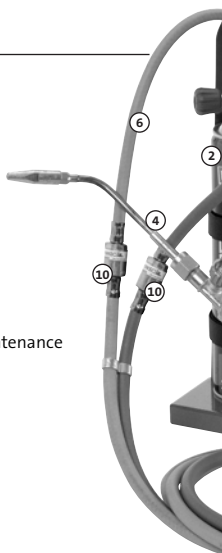
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Made in Germany

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1. Description

We congratulate you for purchasing a PERKEO brand product. By purchasing the Powergas brazing device MINI ECO or MAXI ECO you have acquired a PERKEO quality product. This device was carefully designed and manufactured. The Operating Manual shall enable you to use the device properly and safely. Please observe this Operating Manual as well as notes on the M-gas cartridge in order to avoid accidents and to increase the economic viability and service life of the devices.

2. Proper use

The Powergas brazing device is small welding device operated with oxygen and the special gas mixture of methyl, acetylene and propane (M-gas) and it attains flame temperature of 3,050°C! You can therefore do brazing, heating up, annealing, and melting all metals and weld non-ferrous metals (e.g. brass, copper, lead, etc.).



- (1) Carrying rack
- (2) M-gas cartridge
- (3) 1-Liter oxygen cylinder
- (4) Brazing torch
- (5) Handle
- (6) Orange gas hose
- (7) Blue oxygen hose
- (8) Gas cartridge valve
- (9) Oxygen pressure reducer
- (10) Single-cylinder check valve

3. Scope of delivery

You will receive the Powergas brazing device inside a welded foil. Cut the packaging at the top on the handle side carefully and remove the device.

These parts must be included in the delivery:

Carrying rack (1) with the M-gas cartridge (2) and the oxygen cylinder (3).

Hoses, torch, gas cartridge valve and pressure reducer are bundled and tied together. Cut the cable binder carefully and take the parts apart.

The bundle includes:

Brazing torch (4) with the handle (5)

Orange gas hose (6) with gas cartridge valve (8)

Blue oxygen hose (7) with oxygen pressure reducer (9)

Each hose is 3 m long and is equipped with a single-cylinder check valve with flame arrestor according to DIN EN 730 (10) to ensure user's safety.

4. Assembly

Remove the valve protection cap from the M-gas cartridge.

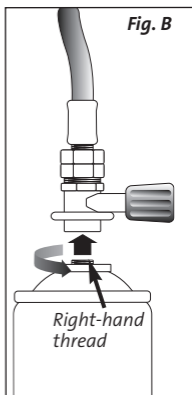
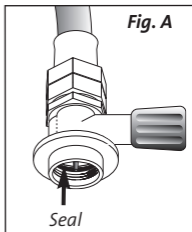
Ensure that the gas cartridge valve is closed.

In the gas cartridge valve there is a seal (**Fig. A**). The seal should not be brittle.

The M-gas cartridge is fastened with two Velcro bands on the carrying rack. Pull the flap of the Velcro bands off and remove the M-gas cartridge. Screw the M-gas cartridge in clockwise sense in the gas cartridge valve with a gas hose (**Fig. B**). The M-gas cartridge has a 7/16" right-hand thread. There should be no more gaps between the M-gas cartridge and gas cartridge valve.

Insert the M-gas cartridge from top through the two Velcro loops and rotate the cartridge such that the regulating screw of the gas cartridge valves point leftwards.

Tighten the Velcro straps again and press the flaps firmly.



5. Attention - oxygen!

Oils and fats of all kinds can ignite explosively in the presence of pure oxygen. Therefore, the following applies to oxygen: keeping cylinder valves, pressure reducers, hoses, and torch free of oil and fat. However, also oily rags and clothe or oily fingers can be dangerous.

Ensure that on the connection nozzles of the oxygen pressure reduce (9) an intact seal is provided.

Remove the valve protection cap from the oxygen cylinder by rotating it in counter clockwise sense (right-hand thread). Lift up the protective cap.

Screw the oxygen pressure reducer (9) in clockwise sense on the oxygen cylinder (3) (SW 32, right-hand thread).

6. Starting operation

Put the Powergas brazing device upright in place. The device cannot function properly in the horizontal state, since liquid M-gas penetrates into gas cartridge valve and into the torch nozzle - which leads to troubles.

Close both valves on the handle (5) by turning in clockwise direction. The red-marked hand-wheel regulates the gas supply, the blue-marked hand-wheel is for oxygen supply.

Loosen the union nut between the torch (4) and handle (5) a bit (SW 17, right-hand thread), and rotate the torch nozzle in, such that you have a comfortable working posture.

Tighten the union nut, again in clockwise direction.

Open the valve of the oxygen cylinder by rotating in counter-clockwise direction.

The left manometer on the oxygen pressure reducer is the working manometer. It indicates the pressure inside the oxygen hose and torch (working pressure). The right manometer is the content manometer. It indicates the pressure and thus also the content inside the cylinder.

With the blue button on the oxygen pressure reducer, you will adjust the working pressure. Rotating in clockwise sense increases the pressure, rotating in counter-clockwise sense reduces the pressure.

Set a working pressure of 1 bar for oxygen.

Open the gas cartridge valve on the M-gas cartridge by rotating it in counter-clockwise sense.

7. Igniting the torch

Experienced users ignite the torch by first opening the blue-marked hand-wheel handle for the oxygen by carefully rotating it in counter-clockwise direction until a faint hiss is audible. Subsequently open the red-marked hand-wheel for gas supply by rotating it in counter-clockwise direction a bit. Ignite the gas oxygen mixture with the help of a suitable gas-igniting device or on the copper burner nozzle.

Inexperienced users can first ignite the gas and then open the oxygen. Nonetheless, black soot emerges first.

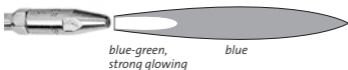
8. Adjusting the flame

Using the red-marked hand-wheel on the handle piece, you regulate the size and appearance of the flame. When the flame cannot be ignited or when it goes off, the pressure of gas is too high. In this case, throttle the gas cartridge valve on the cartridge by rotating in clockwise sense.

The oxygen valve (blue-marked hand-wheel) on the torch handle must be fully open.

When flame is yellow, it has excessive amount of gas. Throttle the gas valve carefully (red-marked hand-wheel) on the torch handle by rotating it in the clockwise direction.

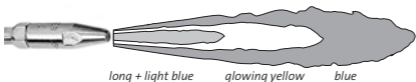
When the flame is narrow and short and appears glassy violet, it has excess amount of oxygen. Open the gas valve carefully (red-marked hand-wheel) on the torch handle by rotating it in the in counter-clockwise direction.



Correct adjustment



Excess amount of oxygen



Excess amount of gas

Then adjust a neutral flame. That means that the strong glowing blue-green flame core must be sharply surrounded by a dark blue flame edge (secondary flame).

9. Extinguishing the flame

To extinguish the flame, first close the gas valve (red-marked hand-wheel) and then the oxygen valve (blue-marked hand-wheel) on the torch handle by rotating it in the clockwise direction.

Close the gas cartridge valve and the valve on the oxygen cylinder by rotating in clockwise direction. Close the valves even during longer pauses.

After completing the brazing task: Open the gas and oxygen valves on the handle briefly whilst the gas cartridge and oxygen cylinder valves are closed, and allow the rest amount of gas to escape. In this manner, you relieve the hoses and the pressure reducer.

Wrap the hoses around the Powergas brazing device and stick the torch handle inside the holder meant for it on the side of the carrying rack.

10. Exchanging the gas cartridge

Close the gas cartridge valve by rotating it in clockwise direction.

The M-gas cartridge is fastened with two Velcro straps on the carrying rack. Pull off the flaps of the Velcro straps and remove the empty M-gas cartridge with the gas cartridge valve and the hose upwards.

Unscrew the M-gas cartridge by rotating it in counter-clockwise sense from the gas cartridge valve.

Pay attention that the seal (**Fig. A**) in the gas cartridge valve is present and intact.

Only original PERKEO M-gas cartridges may be used. Mount a full M-gas cartridge by rotating it in clockwise sense on the gas cartridge valve.

Insert the full M-gas cartridge with a mounted gas cartridge valve and the hose line through the two Velcro loops and rotate the cartridge such that the regulating screw of the gas cartridge valves point towards the left.

Tighten the Velcro straps again and press the flap firmly.

11. Exchanging the oxygen cylinder

Close the valve of the oxygen cylinder by rotating in clockwise direction.

Unscrew the oxygen pressure reducer in counter-clockwise sense.

The oxygen cylinder is fastened with a holder on the carrying rack. Loosen the holder with a cross-recess screwdriver in counter-clockwise sense (cross recess size 3).

Replace the empty oxygen cylinder with a full one, or refill the oxygen cylinder with a suitable refill device.

Position the oxygen cylinder such that the cylinder valve points forward. Screw again the holder for the oxygen cylinder with the cross recess screwdriver in clockwise sense.

Screw the oxygen pressure reducer in clockwise sense on the oxygen cylinder (SW 32, right-hand thread).

12. Behaviour in case of trouble and maintenance

<i>Fault</i>	<i>Cause/remedy</i>
The flame becomes yellow.	Then either the oxygen cylinder valve is closed or the oxygen cylinder is empty. Open the oxygen cylinder valve. Replace the empty oxygen cylinder with a full one, or refill the oxygen cylinder with a suitable refill device.
The flame becomes smaller or lifts off the torch.	Either the gas cartridge valve is closed or not sufficiently opened, or the gas cartridge is empty. Open the gas cartridge valve by rotating it in clockwise sense (further) or replace the gas cartridge. When you still hear liquid sound whilst shaking the gas cartridge, the ambient temperature is too low for you to draw out the gas in the gaseous phase. But, for this, it must already be below -20°C .

Regularly check the hoses for cracks and leakage (visual test).

Exchange the supply pipe with individual cylinder safety elements, when individual elements become loose after a flame flashback.

The hose eventually become porous with time. Therefore, replace the supply pipe as soon as small cracks appear on the hoses.

13. Transport and storage

For transport, the valve of the oxygen cylinder and that of the gas cartridge must be closed. Dismount the oxygen pressure reducer. Unscrew the gas cartridge valve of the M-gas cartridge. The hoses may be connected on the oxygen pressure reducer and on the gas cartridge valve.

Secure the Powergas brazing device against toppling and slipping on the loading surface. For transport in a car, leave a gap in the window wide open. The small van must have a ventilation system.

Do not store the Powergas brazing device in drawers, cupboards, or containers with lid (danger of explosion).

Do not keep empty cylinders in cellars, garages, or passages.

14. PERKEO craftsman tips

For Germany: This Powergas brazing device makes you independent from gas suppliers. The oxygen cylinder can be refilled by you using an appropriate refill adapter in your own premises. The provisions in other countries can be different and must be checked in advance.

According to the pressure tank ordinance (4. Section § 29), you can refill the oxygen cylinder in your own premises. For this there is the PERKEO refill bend made of copper - Article No. 607 or the flexible PERKEO refill hose Article No. 607/10. At best, you should use an oxygen cylinder with at least 10 l content. The provisions of TRG 280, 400, 402 must be observed.

You can operate the Powergas brazing device also with a torch nozzle size 3 for 2 – 4 mm material thickness (**Art. No. 820/P**).

It is technically possible to operate the Powergas brazing device with original PERKEO propane/butane cartridges **Article No. 794/04**. For this, you must set the oxygen pressure at 2 bar. However, the oxygen cylinder will be empty more quickly and the flame is less powerful and less hot.

15. PERKEO safety notes

M-gas is highly flammable, colourless, heavier than air, and has remarkable smell.

Cartridges and oxygen cylinders may not be left at children disposal.

Keep store cartridges and oxygen cylinders in a good well-ventilated place.

Do not smoke when working on the cylinders.

Keep cartridges and oxygen cylinders away from ignition sources.

Check the leakage of screw connections with leather-forming media (e.g. soap water, leakage detection spray).

Close the cylinder valves in case of faults and after work.

Do not use the Powergas brazing device in horizontal position. In a horizontal cartridge, liquid M-gas penetrates into the gas cartridge valve and torch nozzle and leads to malfunction.

16. Safety regulations and standards

Legal safety regulations and technical guidelines must be observed. Repairs may be performed only by PERKEO or by an authorised specialist workshop.

- ➔ Do not leave the Powergas brazing device without monitoring during application. An acute danger of fire exists.
- ➔ Keep the device free of oil and fat.
- ➔ Oils and fats of all kinds can ignite explosively in the presence of pure oxygen.
- ➔ Wear a pair of welding protective goggles.
- ➔ Wear hardly inflammable cloth.
- ➔ Cater for adequate ventilation.
- ➔ Ensure that the manometer on the oxygen pressure reducer is firmly seated. Replace damaged manometer only by original spare parts.

Standards and regulations: BGR 500, EN 417, DIN EN 559, EN 730-1, EN 730-2, ÖNORM EN 730, BGV B7, DIN EN ISO 2503, ISO 5175, AS 4603, SABS, TRG, TRF, devices safety law

17. Notes

You recognise PERKEO devices in the robust engineering, insusceptibility to pain malfunction and repair, service life and in such things worked out to the smallest detail. We are always grateful about suggestions from our customers, to design our products in a better, more practical and thoughtful manner. Every PERKEO device is thoroughly tested prior to leaving the factory. Nonetheless, should a reasons for complaint emerge, please return the device unchanged.

18. Technical data and spare parts

799/16/01/5/G	MINI ECO sheet metal rack with quick release connection
799/16/01/6/G	MAXI ECO sheet metal rack with quick-release connection
794/04/2015	M-gas cartridge: 600 ml / 330-360 g
444/1L	MINI ECO oxygen cylinder 1 l / 0.2 m ³
444/2L	MINI ECO oxygen cylinder 2 l / 0.4 m ³
381/K/01	Oxygen-pressure reducer MINI 0 – 4/6 bar
570/01/T	Gas cartridge valve with thread G 3/8" LH AG
828/T6	KLEIN RISTA handle with fine regulating valves
819/P	KLEIN RISTA brazing nozzle, size 2 for 1 – 2 mm material thickness
415/02/99	3 m rubber supply hose with individual cylinders, non-return valves und flame arrester according to BGR 500
Flame temperature:	3,050°C
Operating duration M-gas:	4 h. 30 min.
Operating duration of oxygen	
- with 1-litre oxygen bottle:	1 h. 40 min. (MINI ECO)
- with 2-litre oxygen cylinder:	3 h. 20 min. (MAXI ECO)
Dimensions:	420 x 220 x 120 mm
Weight:	6 kg (MINI ECO) 10 kg (MAXI ECO)

MINI ECO

MAXI ECO



M-gas

UN 2037, Class 2, Item 5F ADR



Oxygen

UN 1072, Class 2, Item 10 ADR

