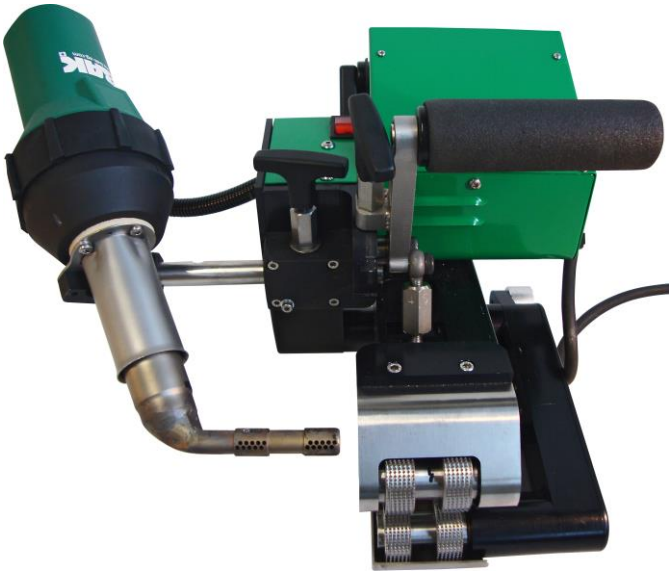
BAK Thermoplastic
Welding Technology AG
Industriestrasse 6
6064 Kerns/Switzerland

E-Mail info@bak-ag.com
Telefon +41 (0)41 661 22 50
Fax +41 (0)41 661 22 51

Combined wedge welding machine type PROTON

OPERATING MANUAL



SAFETY

Danger to life when opening the device as live components and connections are exposed. Unplug the device before opening it.

Danger of fire and explosion if the device is used incorrectly. Demonstrate the necessary caution when using the welding machine near combustible materials. Never use the device in inflammable areas.

Danger of burns
Do not touch the hot air device when it is still hot. Let the device cool down.

Connect the device to a ***socket with protective earth conductor***. Any interruption of the protective earth conductor within or outside the device is dangerous! Only use extension cables with protective earth conductor and a minimum diameter of 2.5 mm².

The ***voltage rating*** stated on the nameplate must correspond to the mains voltage.
Consult your local electricity supply board if necessary.

For personal protection, the device must be connected to a ***residual current circuit breaker*** before using it on construction sites.

Do not leave the device unobserved. Hot air radiation of the hot air device may ignite combustible materials. Heat may reach inflammable materials that are not visible or obvious.

Protect the device from damp and wet!

WARRANTY AND LIABILTY

Warranty and liability apply from the date of purchase (documented by the invoice/delivery note) according to the currently valid general terms of business of BAK. BAK refuses to honour any warranty for devices which are not in their original condition. BAK devices may never be reconfigured and/or modified.
BAK reserves the right to deny any responsibility if this is ignored. No liability can be assumed by BAK for incorrect installation and/or use as well as natural wear and tear of components (e.g. heating elements).

Note:
This operating manual must be available to the installation and operating personnel at all times. Read these operating instructions carefully before installing and using the device.

Copyright:

ITENDED USE

The ProtOn is a combined hot air- and wedge welding machine for overlap welding and prefabrication of membranes for tunnel- and civil engineering applications.

- **Overlap** max. 125mm
- **Type of seam** Welding seams are produced in accordance with DVS 2225 and BAM. Other dimensions of seams are possible on request.

DESCRIPTION OF FUNCTIONS

Heating system:
The hot air temperature is stepless adjustable and electronically controlled. Heat transmission by combination of all advantages of contact- and hot air welding. The flexible combined wedge nozzle has 3 heating areas.

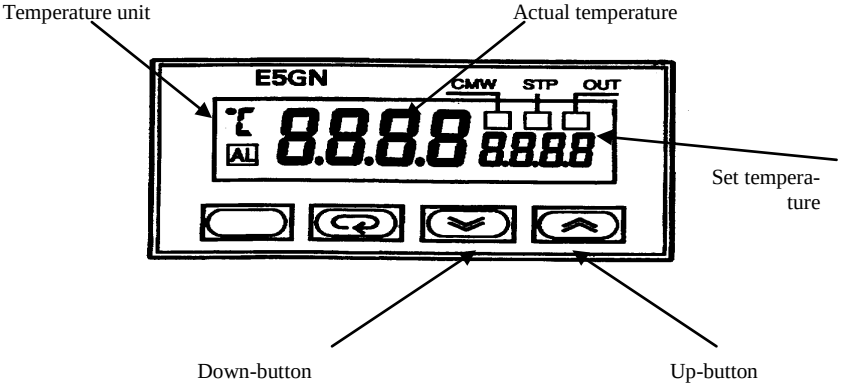
Welding pressure:
The welding pressure is stepless adjustable and transmitted via a toggle lever to the pressure rollers.
The equalisation of the pressure to both welded sections as well as on a welded seam without test channel is guaranteed by the swivel head. This allows T-joints to be welded without problems. During the welding process the pressure adjusts itself linearly to the change in material thickness of the geomembrane liner.

Drive:
The double drive system is stepless adjustabke and electronically controlled. Therefore, the speed always stays constant.

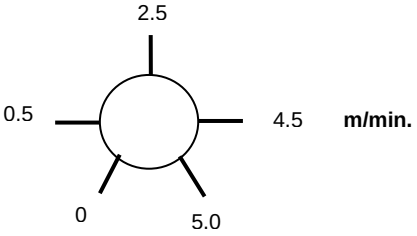
WELDING PARAMETERS

Attention: Always do a test welding before real welding to find out the parameters.

Welding temperature
Set the welding temperature with the up- and down buttons of the temperature controller. The air flow is stepless adjustable with the potentiometer (depending on material). Switch on the heat and let heat up for approx. 5 minutes.



Welding speed
Set the welding speed by the potentiometer on the front panel. The motor can be switched on and off by the switch near the potentiometer.



Welding pressure
Engage and position the welding machine onto the material to be welded.
Pull the toggle lever without engaging the nozzle. By rotating the adjustment screw the drive/pressure rollers will lightly touch the material to be welded, in this way you will define the point zero N of pressure. Open the toggle lever. Set the desired pressure by rotating the adjustment screw, to every single step of rotation you will set 80N of pressure on seam.

➔ **If the maximum welding pressure (1000 N) is exceeded, mechanical damages may occur.**

WELDING

Welding preparation
- Laying of material:
  - Width of overlap from 60 to 125 mm
  - Make sure that the surfaces of geomembrane liners, above and below, are cleaned, as well as between the overlap.

- Mains supply at least 3kW (generator) supplied with an RCCB. (Residual Current Circuit Breaker)

Operating conditions
- Do not run the machine if power cord or plug is damaged- Damaged power cords must be changed by professional staff.
- Connect the tool to the mains
- Start the tool with the main switch/level

Welding procedure

- Adjust the welding parameters (see page no. 4)
- Wait until the hot air tool has reached the adjusted temperature.
- Guide and position the welding machine onto the overlapped geomembrane liner or film.
- Switch on the drive motor with the rocker switch.
- Engage the nozzle onto the overlapped geomembrane liner or film.
- Push down the toggle lever.
- Check the welded seam (wash/seam thickness reduction). Eventually adjust the welding speed with the potentiometer.
- Guide the welding machine along the overlap.
- 1cm before the end of the welded seam, release the pressure lever.
- Engage the nozzle
- Switch off device motor.

ASSEMBLY

ATTENTION
ALWAYS unplug the device before working on it!

Changing the heating element (only when the device has cooled down)

- Swivel out and lock the hot air system
- Loosen four screws at the flange of the nozzle
- Pull off the nozzle
- Pull off the mica tube (careful, fragile)
- Remove the gasket
- Pull off the defective heating element
- Insert the new heating element - observe marking, voltage and power rating
- Slide on the mica tube
- Slide on the gasket and position the boreholes
- Slide on the nozzle and fix with 4 screws
- Readjust the nozzle

MAINTENANCE

- Clean the nozzle with a wire brush at the end of welding.
- Clean the drive/pressure rollers with a wire brush.
- As required, treat the chain with a suitable spray.
- After use, always check that the mains cable and plug are not damaged.

WARNING

- If the power supply cable gets damaged, it has to be replaced by the manufacturer, its customer service or by a qualified person in order to avoid danger.
- The machine must not be used by personnel (including children) with limited physical, sensory or mental capabilities or lack of experience and/or knowledge, except when supervised by a person who is responsible for their safety or when advised how to use the device by that person.
- Children must be supervised in order to ensure that they do not play with the machine.
- Because of the enormous fire danger, the operating personnel must be specially briefed and regularly instructed.
- Fire can occur if the machine is not used carefully.
- Do not leave the machine unobserved while it is in operation.
- Demonstrate the necessary caution when operating the device near inflammable materials. Do not operate on the same surface for longer periods of time.
- A fire extinguisher must always be within reach in the work area.
- The machine must not be used in explosive atmospheres.
- Heat may reach inflammable materials that are not readily visible.
- There is a very significant risk of fire when the machine stops because of any disturbance and the hot air device is still running (max. temperature of the air flow 550 °C). Therefore, special attention should be placed on the subsurface and the material to be processed.
- The welding machine must not be used on inflammable surfaces (e. g. wooden roofs and floors made of wood)
- The machine bears the protection mark IP20 and must therefore be protected from damp and rain.
- When using the machine on roofs and tables, it could fall down due to its automatic drive system. In order to avoid a fall, necessary precautions must be taken.

SAFETY SYMBOLS AND STANDARDS

Existing risks are pointed out with the following warning symbols:

Risk of crushing

Risk of burns

The operator is responsible for the compliance with safety related standards.

Before the machine is commissioned, the operating personnel must be instructed with respect to these standards.

OPERATIONAL SAFETY

The welding machine is manufactured in accordance with the recognised rules of technology.
The latest safety standards have been observed to eliminate work related risks to the life and health of the operating personnel when the machine is used in accordance with its intended use.

DANGER ZONE

The main danger zone of the welding machine is the nozzle which can heat up to temperatures of 550 °C. It is recommended to wear heat protective gloves.
There is a risk of crushing when swivelling the nozzle.

ASSISTANCE AND SUPPORT

The BAK group and its authorised service centres offer free support and assistance in the area of applications technology.
Our specialists will be pleased to help you.

Customer service and orders:
BAK Thermoplastic Welding Technology AG
Industriestrasse 6
CH-6064 Kerns/Switzerland
Telefon: (0041) 041 661 22 50
Telefax: (0041) 041 661 22 51
E-Mail: info@bak-ag.com

ACCESSORIES

Get the best results by using BAK-accessories and spare parts. Please refer to our brochures for additional information.

SERVICE AND REPAIR

Repairs have to be carried out exclusively by BAK authorised service centres.

SHIPPING

For repairs, please return the machine appropriately packed for transport to your next BAK service centre.

Shipping to CUSTOMER ACCOUNT

Technical modifications reserved. In case of doubt, consultation with BAK is required. Images and drawings may deviate from the original. Changes reserved.

TRANSPORT – HANDLING – STORAGE

Transport:
The welding machine is packed appropriately and must be protected from moisture. We recommend the usage of the suitable tool box.
Handling:
The shipment must be checked if complete and for transport damage. In the event of transport damage, the defect must be confirmed in writing at the time of the delivery by the carrier. The seller must be promptly informed in writing!
Storage:
In the case of temporary storage, the welding machine should be kept packed and must be protected from moisture. In the case of damage resulting from improper storage, no warranty claim will be honoured.

DISPOSAL

Power tools, accessories and packaging should be sorted for environmental friendly recycling.
Do not dispose power tools together with household waste!
Only EU countries: According to the European Directive 2002/96/EC on waste electrical and electronic equipment and its incorporation into national law, power tools that are no longer operational must be separately collected and sent to be environmental friendly recycled.

TECHNICAL DATA

Technical Data		**ProtOn**
Voltage	**V**	230
Frequency	**Hz**	50/60
Power consumption	**W**	2200
Max. power input	**A**	10
Temperature	**°C**	20 – 550
Drive	**m/min**	0 – 5.0
Max. air flow (20 °C)	**l/min**	ca. 300
Dimensions	**mm (L x W x H)**	370x340x330
Weight with 5 m cable	**kg**	9
Conformity symbol		
Protection type I		
Other voltages on request.		

CE/ProtOn

D EG – Konformitätserklärung
F Déclaration CE de conformité
I Dichiarazione CE di conformità
GB EC Declaration of conformity
E Declaratión CE de conformidad

D EG – Konformitätserklärung

BAK Thermoplastic Welding Technology, CH-6056 Kägiswil/Schweiz
bestätigt, dass das nachfolgend bezeichnete Gerät in der von uns in Verkehr gebrachten Ausführung die Anforderungen der folgenden EG-Richtlinie(n) erfüllt.

Bezeichnung des Gerätes:	Heizkeil-Schweissautomat
Typ:	ProtOn
Richtlinien:	2006/42/EC 2004/108/EC 2006/95/EG 2011/65/EU
Harmonisierte Normen:	EN55014-1:2006+A1:2009+A2:2011, EN55014-2:1997+A1:2001+A2:2008, EN61300-3-2:2006, EN61300-3-3:2008

Kägiswil, 20.01.2016

Bruno Zurmühle, CEO

F Déclaration CE de conformité

BAK Thermoplastic Welding Technology, CH-6056 Kägiswil/Suisse
déclare qu'á la sortie de ses usines l'appareil désigné ci-dessous était conforme aux dispositions de(s) la directive(s) CEE suivante(s).

Discription de l'appareil:	Automatic wedge welding machine
Modéle:	ProtOn
Directive(s) CEE:	2006/42/EC 2004/108/EC 2006/95/EG 2011/65/EU
Normes harmonisées:	EN55014-1:2006+A1:2009+A2:2011, EN55014-2:1997+A1:2001+A2:2008, EN61300-3-2:2006, EN61300-3-3:2008

Kägiswil, 20.01.2016

Bruno Zurmühle, CEO

I Dichiarazione CE di conformità

BAK Thermoplastic Welding Technology, CH-6056 Kägiswil/Svizzera
dichiara che l'apparecchio qui di seguito descritto nei modelli commercializzati risulta conforme alle direttive di armonizzazione comunitarie imparatite dalla CEE.

Descrizione del'apparecchio:	Automatic wedge welding machine
Modello:	ProtOn
Direttive CEE:	2006/42/EC 2004/108/EC 2006/95/EG 2011/65/EU
Norme armonizzate:	EN55014-1:2006+A1:2009+A2:2011, EN55014-2:1997+A1:2001+A2:2008, EN61300-3-2:2006, EN61300-3-3:2008

Kägiswil, 20.01.2016

Bruno Zurmühle, CEO

GB Declaration of conformity

BAK Thermoplastic Welding Technology, CH-6056 Kägiswil/Switzerland
declares that the tool described below, released by us fulfils the provisions of the following EC directive(s).

Description of tool:	Automatic wedge welding machine
Type:	ProtOn
EC directives:	2006/42/EC 2004/108/EC 2006/95/EG 2011/65/EU
Harmonized standards:	EN55014-1:2006+A1:2009+A2:2011, EN55014-2:1997+A1:2001+A2:2008, EN61300-3-2:2006, EN61300-3-3:2008

Kägiswil, 20.01.2016

Bruno Zurmühle, CEO

E Declaración CE de conformidad

BAK Thermoplastic Welding Technology, CH-6056 Kägiswil/Suiza
certifica que el aparato que a confinuación se describe cumple con la ejecución que hemos puesto en circulatión, con las exigencias de las directrices armonizadas de la CE.

Denominación del aparato:	Automatic wedge welding machine
Modelo:	ProtOn
Directrice(s) de la CE:	2006/42/EC 2004/108/EC 2006/95/EG 2011/65/EU
Normas armonizadas:	EN55014-1:2006+A1:2009+A2:2011, EN55014-2:1997+A1:2001+A2:2008, EN61300-3-2:2006, EN61300-3-3:2008

Kägiswil, 20.01.2016

Bruno Zurmühle, CEO