

# crystal 2.0

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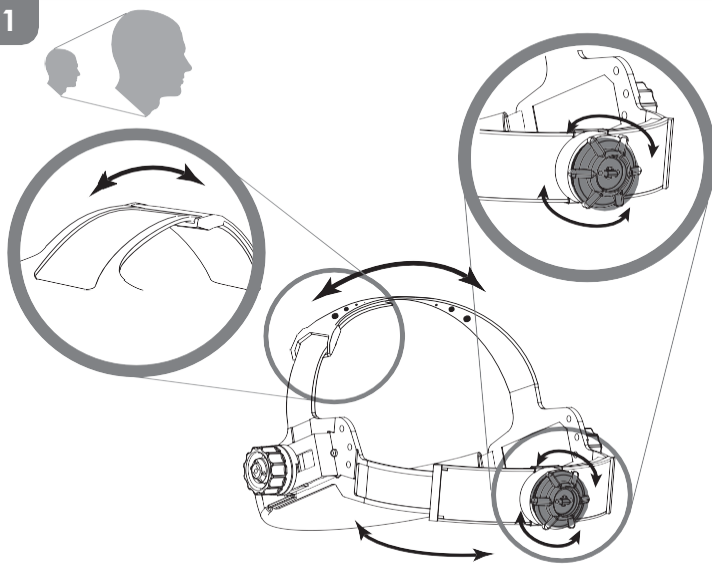
Automatically better welding  
swiss made

### Notes:

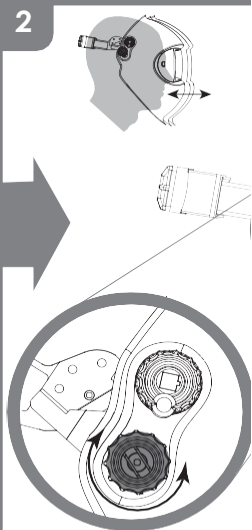
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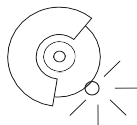
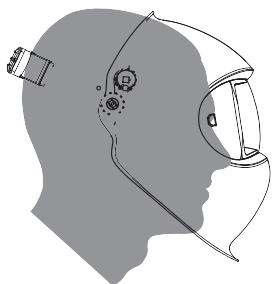
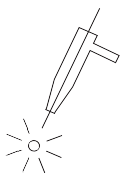
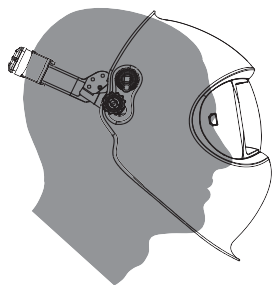
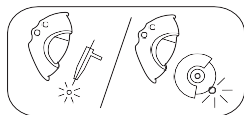
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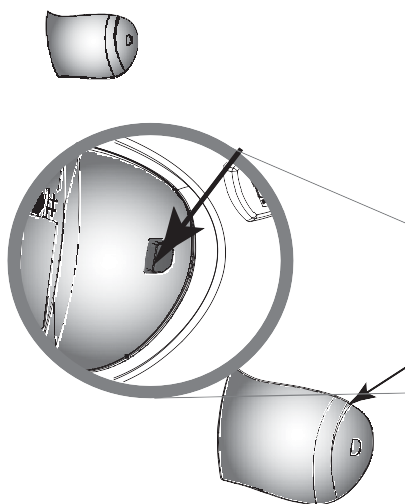
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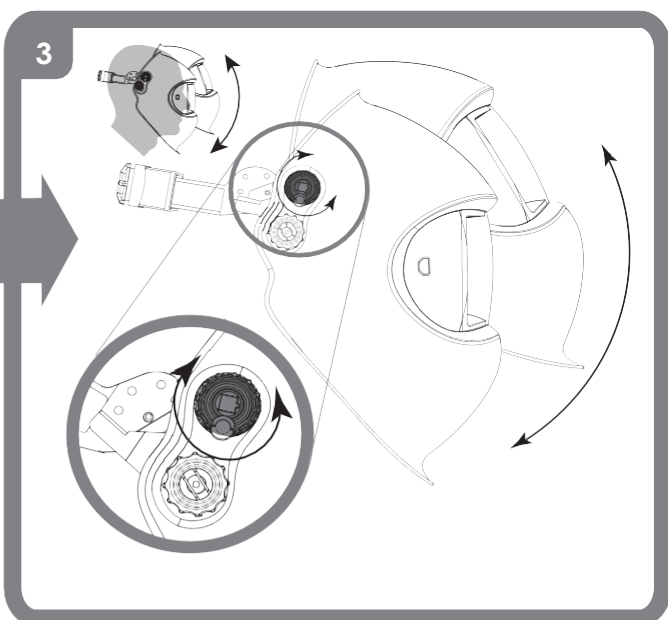
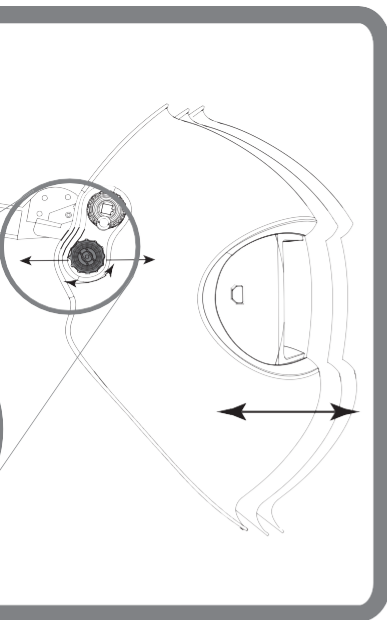


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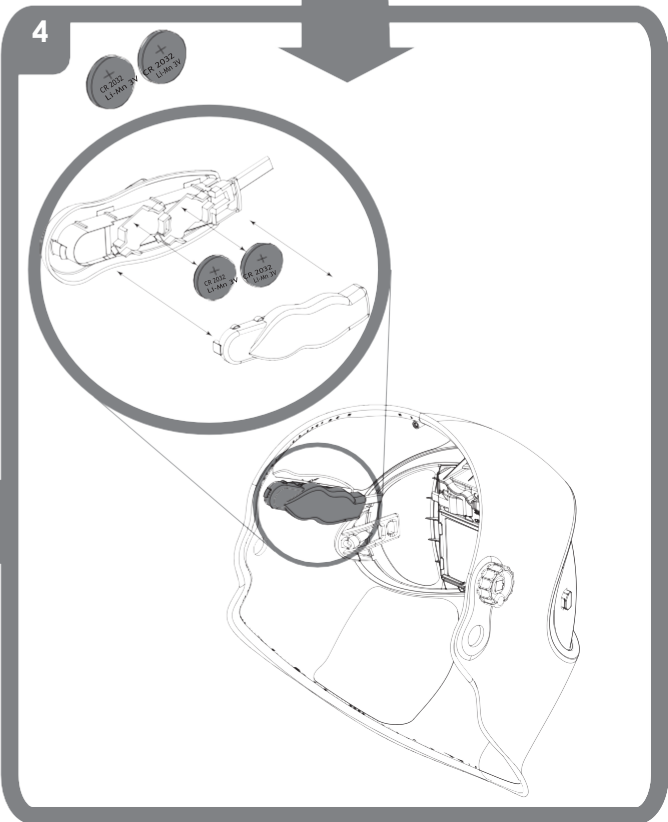
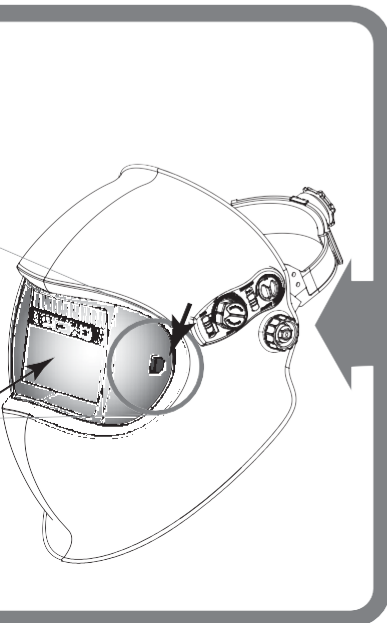


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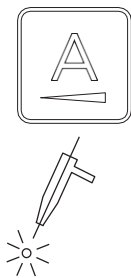




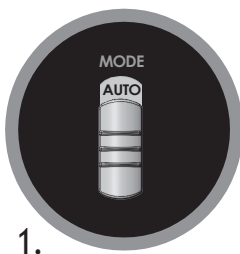
## Quick Start Guide



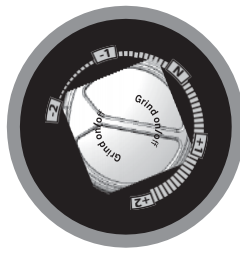
## AUTO MODE



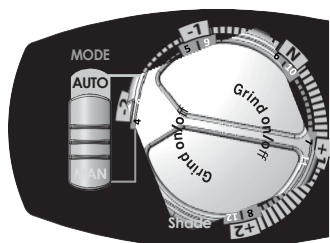
Choose Auto Mode



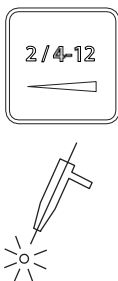
Pe +/- 2 Shade No.



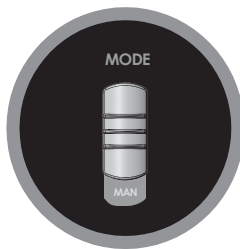
# functions



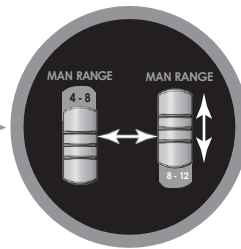
## MANUAL MODE



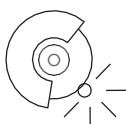
Choose Manual Mode



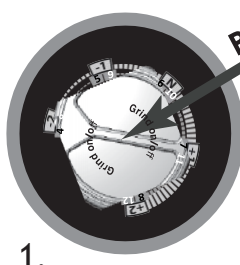
Manual Range 4-8/8-12



## GRIND MODE

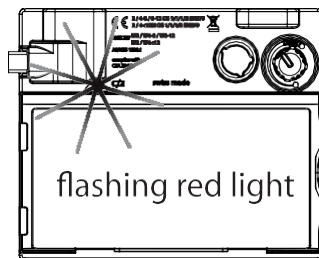


GRIND ON / OFF

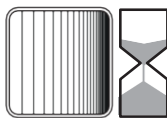
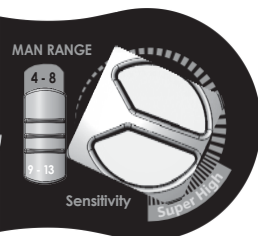
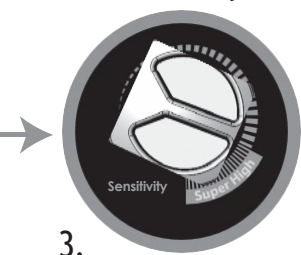


PUSH  
GRIND

2.

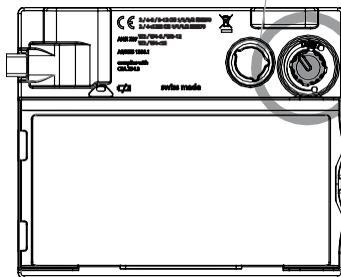
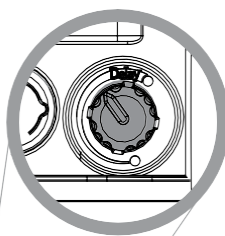


## Sensitivity

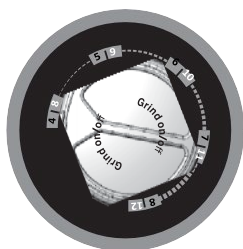


Delay switch with  
Twilight function

## Choose Delay



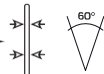
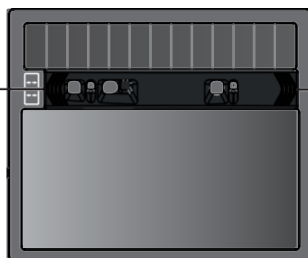
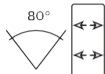
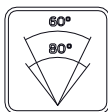
## Choose Shade Number

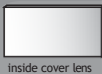


## Sensitivity



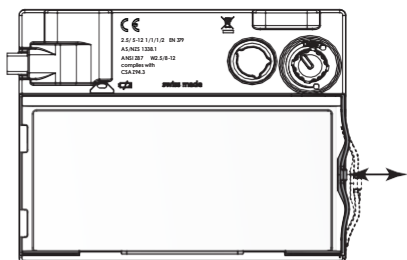
## SENSOR SLIDE





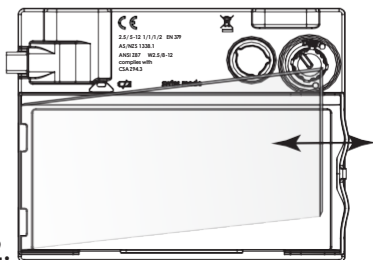
inside cover lens

1.



SP05

2.



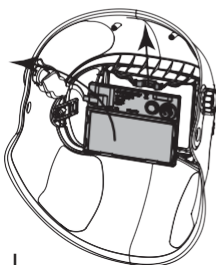
front cover lens

SP03

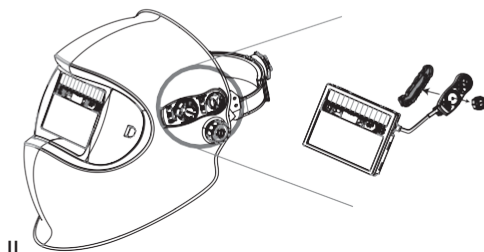
# spare parts



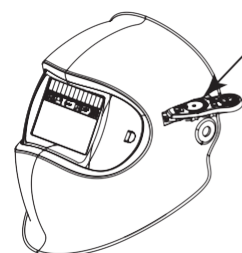
cartridge



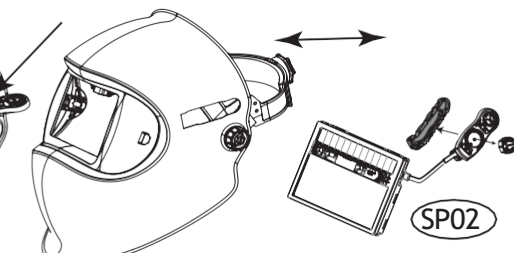
I.



II.



III.

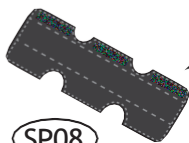


IV.

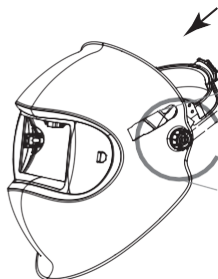
SP02



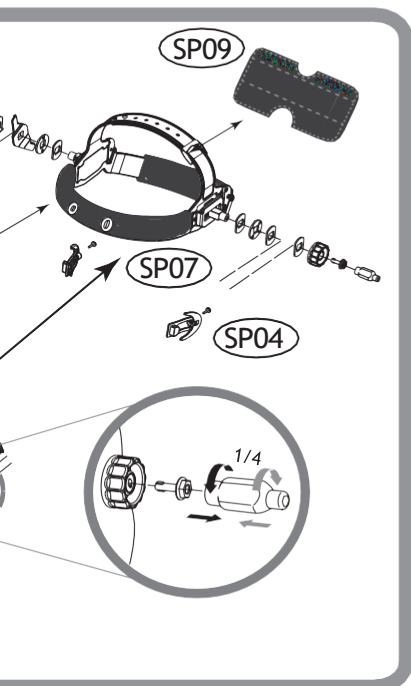
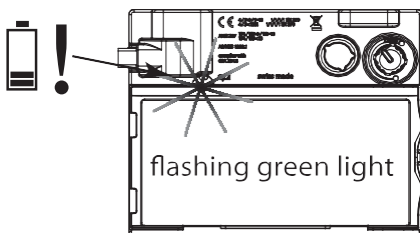
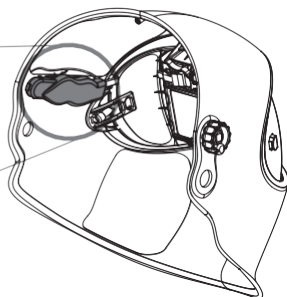
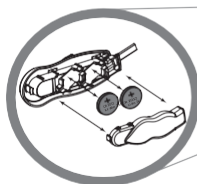
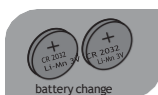
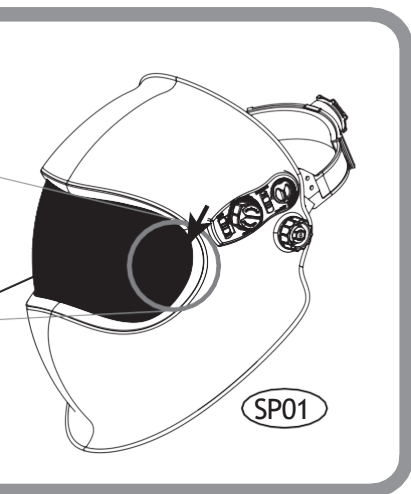
adjust headband



SP08














## spare parts list

	SP01
	SP02
	SP03
	SP04
	SP05
	SP06
	SP07
	SP08
	SP09

Schutzstufentabelle EN169  
Shade level chart EN169

Tableau des niveaux de protection EN169  
Tabella dei livelli di protezione EN169

	Ampere																				
Process	1.5	6	10	15	30	40	60	70	100	125	150	175	200	225	250	300	350	400	450	500	600
	8							9		10		11		12		13			14		
								9		10		11		12		13			14		
										10		11		12		13		14			
				8		9		10		11			12		13						
	8							9		10		11		12			13				
								9		10	11	12			13						
		4	5	6		7	8		9	10		11		12							

Die auf dem Schweißerschutzfilter  
angebrachte Kennzeichnung bedeutet:

OS / 1 / 1 / 1 / 1 / 1 / 2 EN379 CE  
OS / 1 / 1 / 1 / 1 / 2 EN379 CE  
Hersteller  
Optische Klasse  
Strahlungskategorie  
Blowbackstrahlung  
Nummer der Norm

The marking on the welding filter  
indicates:

OS / 1 / 1 / 1 / 1 / 1 / 2 EN379 CE  
OS / 1 / 1 / 1 / 1 / 2 EN379 CE  
Light shade  
Dark Shade range  
Manufacturer  
Optical Class  
Diffusion of light class  
Homogeneity  
Angular dependence  
Number of the standard

Le marquage apposé sur le filtre de  
protection pour soudeur signifie :

OS / 1 / 1 / 1 / 1 / 1 / 2 EN379 CE  
OS / 1 / 1 / 1 / 1 / 2 EN379 CE  
Echelon de protection à l'état clair  
Echelon de protection à l'état foncé  
Identification du fabricant  
Classe optique  
Classe de la diffusion de la lumière  
Homogénéité  
Angulaire dépendance  
Marque de certification

Il contrassegno riportato sul filtro di  
protezione per saldatore contiene i  
seguenti dati:

OS / 1 / 1 / 1 / 1 / 1 / 2 EN379 CE  
OS / 1 / 1 / 1 / 1 / 2 EN379 CE  
Grado di protezione in stato chiaro  
Grado di protezione in stato scuro  
Identificazione del fabbricante  
Classe ottica  
Classe della diffusione della luce  
Omogeneità  
Angolare dipendenza  
Numero della norma

Kennzeichnung Helmschale:

OS 175 B CE  
Hersteller  
Nummer der Helmschale  
Mittlere Strahlungsenergie

Marking helmet shell:

OS 175 B CE  
Manufacturer  
Number of helmet shell  
Medium energy input

Marquages masque :

OS 175 B CE  
Identification du fabricant  
Marque de certification  
Impact moyen énergie

Marcaggi maschera:

OS 175 B CE  
Identificazione del fabbricante  
Classe ottica  
Numero della norma  
Impatto medio energia

Kennzeichnung  
Vorsatzscheibe (EN166):

OS 1 B CE  
Hersteller  
Optische Klasse  
Mittlere Strahlungsenergie

Marking safety cover plate (EN166):

OS 1 B CE  
Manufacturer  
Optical class  
Medium energy input

Marquages  
écran de protection extérieur (EN166)

OS 1 B CE  
Identification du fabricant  
Classe optique  
Impact moyen énergie

Marcaggi  
vetro di protezione esterno (EN166):

OS 1 B CE  
Identificazione del fabbricante  
Classe ottica  
Impatto medio energia

Kennzeichnung  
Innere Schutzscheibe (EN166):

OS F CE  
Hersteller  
Niedrige Strahlungsenergie

Marking inside cover lens (EN166):

OS F CE  
Manufacturer  
Low energy input

Marquages  
écran de protection intérieur (EN166)

OS F CE  
Identification du fabricant  
Classe optique  
Impact basse énergie

Marcaggi  
vetro di protezione interno (EN166):

OS F CE  
Identificazione del fabbricante  
Impatto bassa energia

# English

## Introduction

A welding helmet is an item of headgear used to protect the eyes, face and neck from burns, UV light, sparks, infrared light and heat during certain welding operations. The helmet consists of several parts (see spare parts list). An automatic welding filter combines a passive UV filter and a passive IR filter with an active filter whose light transmittance in the visible range of the spectrum varies depending on the luminosity of the welding arc. The light transmittance of the automatic welding filter has a high initial value (light condition). After switching on the welding arc and within a defined response time, the light transmittance of the filter changes to a low value (dark condition). Depending on the model, the helmet can be combined with a protective helmet and/or a PAPR system (Powered Air Purifying Respirator).

### Safety instructions

Read the instruction manual before using the helmet. Make sure the finisher is mounted correctly. If faults cannot be remedied, the ADF must no longer be used.

### Precautions & protection restrictions/risks

During the welding process, heat and radiation are released; this can cause eye and skin injuries. This product provides protection for the eyes and face. Your eyes are always protected against ultraviolet and infrared radiation when wearing the helmet, regardless of the shade level selected. Appropriate protective clothing must also be worn to protect the rest of your body. Particles and substances released during the welding process can trigger allergic skin reactions in persons with this disposition. With sensitive persons, skin contact with the head part can lead to allergic reactions. The welding helmet may only be used for welding and grinding and not for other applications. The manufacturer accepts no liability if the welding helmet is not used as intended or not used in accordance with the instructions for use. The helmet is suitable for all common welding processes, **except gas and laser welding**. Please note the shade level recommendation according to EN169 on the wrapper.

The helmet does not replace a safety helmet. Depending on the model, the helmet can be combined with a safety helmet. The design features of the helmet may affect the field of vision (no peripheral vision without turning the head) and the light transmittance of the automatic darkening filter may affect colour perception. As a result, signal lamps or warning indicators may not be seen. Furthermore, there is a risk of impact due to the larger circumference (head with helmet). The helmet also reduces the hearing and heat sensation.

### Sleep mode

The ADF has an automatic switch-off function that increases the battery life. If less than 1 lux of light reaches the ADF for approx. 10 minutes, the ADF switches off automatically. To switch the cassette back on, the solar cells must be briefly exposed to daylight. If the ADF can no longer be activated or does not darken when the welding arc is ignited, the batteries must be replaced.

### Warranty & liability

The warranty conditions can be found in the instructions of the manufacturer's national sales organisation. Contact your authorised specialist retailer for more details. A warranty is only given for material and manufacturing defects. In the event of damage due to improper use, unauthorised intervention or use not provided for by the manufacturer, the warranty and liability are void. Liability and warranty are also void if spare parts other than original spare parts are used.

### Expected service life

The welding helmet does not have an end-of-life date. The product can be used as long as no visible or invisible damage or malfunctions occur.

### Application (Quick Start Guide)

- Head strap.** Adjust the upper adjustment strap (p.4) to your head size. Push in the ratchet knob (p.4) and turn until the headgear fits well but does not exert pressure.
- Eye distance and helmet tilt.** Loosen the locking buttons (p. 4-5) to adjust the distance between the cassette and the eyes. Adjust both sides equally and avoid skewing. Then tighten the locking buttons again. The helmet tilt can be adjusted by turning the knob (p.5).
- Operating mode automatic/manual.** Use the slide switch (p.6) to select the shade level adjustment mode. In automatic mode, the shade level is automatically adjusted to the intensity of the arc by means of sensors (standard EN 379:2003). In manual mode, the shade level can be adjusted by turning the knob (p.6-7).
- Shade level.** In "manual" mode, you can choose between the SL4 - SL8 and SL8 - SL12 shade level ranges by moving the range switch. Fine adjustments are made by turning the potentiometer knob (p.6-7) (grey lettering). In "automatic" mode, the shade level (SL4- SL12) complies with EN 379 if the rotary knob (p.6-7) is set to position "N". By turning the knob, the automatically set shade level can be corrected upwards or downwards by up to two shade levels (green lettering), depending on your personal preferences.
- Grind mode.** Press the Grind button (p. 4) to set the ADF to grind mode. In this mode, the cassette is deactivated and remains bright with shade level SL 2.0. The activated grinding mode is indicated by the red flashing LED (p.6) inside the helmet. To switch off grinding mode, press the Grind button again. Grind mode is switched off automatically after 10 minutes.
- Sensitivity.** With the sensitivity button the light sensitivity is adjusted according to the welding arc and the ambient light (p.7). The border to "Super High" is the standard setting. This can be individually adjusted by turning the rotary knob. In the "Super High" range, a very high level of light sensitivity is achieved.
- Sensor slide.** The sensor slide can be set to two different positions. Depending on the position, the angle for detecting ambient light is reduced (p.7) or increased (p.7).
- Opening time controller.** The opening time controller (Delay) (p. 7) lets you select the opening time delay from dark to light. The rotary knob supports continuous adjustment from dark to light between 0.1 and 2.0 s.
- Twilight mode.** When the opening time control is set to a high delay, a fading effect (twilight mode) can be activated to protect the eyes from the very bright afterglow after finishing welding. However, it is not recommended to use twilight mode for short cycle tack welding applications. Set the delay for tack welding to the minimum.

### Cleaning and disinfection

The finisher must be cleaned regularly with a soft cloth. Do not use strong cleaning agents, solvents, alcohol or cleaning agents containing abrasives. Scratched or damaged lenses should be replaced. The ADF should only be cleaned if dirty with a cloth suitable for optics (for example glasses cleaning cloth), dust has to blow away with clean air before.

## Storage

The welding helmet must be stored at room temperature and low humidity. To extend the life of the batteries, store the helmet in its original packaging.

## Replacing the finisher (p. 4-5)

A side clip is pressed in, thus loosening the finisher and allowing it to be removed. Hook the new finisher into one side clip. Pull the finisher across to the second side clip and lock it in place. This manual action requires some application of pressure so that the seal on the finisher exhibits the desired effect.

### Replacing the batteries (p. 9)

The ADF has replaceable lithium button cell batteries. If you are using a welding helmet with fresh air connection, remove the face seal before replacing the batteries. The batteries must be replaced when the cassette LED flashes green.

- Carefully remove the battery cover.
- Remove the batteries and dispose of them in accordance with local regulations for hazardous waste.
- Insert type CR2032 batteries as shown.
- Carefully install the battery cover.

If the ADF does not darken when the welding arc is ignited, please check the correct polarity of the batteries. To check whether the batteries still have enough energy, hold the ADF up to a bright lamp. If the green LED now flashes, the batteries are discharged and must be replaced immediately. If the ADF does not function correctly despite the batteries being replaced correctly, it is must be assessed as no longer usable and must be replaced.

### Removing/installing the ADF (p. 8)

- Pull out the shade level knob
- Carefully remove the battery cover
- Unlock the cassette retaining spring as shown
- Carefully tilt the cassette out
- Unlock the satellite as shown
- Pull out the satellite through recess in helmet
- Rotate the satellite through 90° and push it through the helmet recess
- Removing/replacing the ADF  
The ADF is installed in reverse order.

## Troubleshooting

### ADF fails to darken

- Adjust the sensitivity (p. 7) → Change the sensor slide position (p. 7)
- Adjust the sensitivity (p. 7) → Change the sensor slide position (p. 7)
- Check the light flow to the sensor → Replace the batteries (p. 9)

### Shade level too bright

→ Set higher shade level or use coloured inner lenses (p. 6-7)

### Shade level too dark

→ Select lower shade level (p. 6-7) → Clean or replace the finisher (p. 6-5)

### ADF flickers

- Adjust the position of the opening time controller (p. 7) to suit the welding process
- Replace the batteries (p. 9)

### Poor visibility

- Clean the finisher screen or ADF → Adjust the shade level to the welding process
- Increase the ambient light

### Welding helmet slips

→ Adjust/tighten the head strap again (p.4)

## Specifications

(We reserve the right to make technical changes)

Shade level	Automatic: 2.0 (light state) 4 < 12 (dark state) Manual: 2.0 (light state) 4 < 12 (dark state)
UV/IR protection	Maximum protection in light and dark conditions
Switching time from light to dark	100 µs (23 °C/73 °F) / 70 µs (55 °C/131 °F)
Switching time from dark to light	0.1 - 2.0 s with "twilight" effect
Dimensions ADF	90 x 110 x 7mm / 3.55 x 4.33 x 0.28"
Dimensions field of view	50 x 100mm / 1.97 x 3.94"
Power supply	Solar cells, 2 pcs. Li batteries 3 V replaceable (CR2032)
Weight	482 g / 17.002 oz
Operating temperature	-10°C - 70°C / 14°F - 157°F
Storage temperature	-20°C - 80°C / -4°F - 176°F
Classification according to EN379	Optical class = 1      Scattered light = 1 Homogeneity = 1      Dependence on angle of view = 2
Approvals	CE, ANSI, EAC, compliance with CSA
Additional markings for PAPR version (notified body CE1024)	EN12491 (TH3 in combination with e3000, TH2 for versions with hardhat and e3000)

## Spare parts (Page 8-9)

- Helmet without cassette (SP01) - Repair kit 1 (SP06) (Sensitivity knob, potentiometer knob and battery cover)
- ADF incl. satellite (SP02)
- Finisher (SP03) - Head strap with fasteners (SP07)
- Repair set 2 (side clips) (SP04) - Sweatbands (SP08/SP09)
- Internal protective lens (SP05)

The exact article number can be found on the inside cover of this manual (second to last page).

## Declaration of Conformity

See the Internet address on the last page.

## Legal information

This document complies with the requirements of EU Regulation 2016/425 section 1.4 of Annex II.

## Notified body

For detailed information see last page.