VIKING™ 2450D SERIES AUTO-DARKENING HELMETS

4.50 x 5.25 STANDARD REPLACEMENT LENS

IM10131

October 2013

GRAPHICS MAY VARY

OPERATOR'S MANUAL

• World's Leader in Welding and Cutting Products •

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TABLE OF CONTENTS	Page

SAFETY WARNINGS – READ BEFORE USING

⚠ WARNING

ARC Rays can injure eyes and burn skin

- Before welding, always inspect helmet and filter lens to be sure they are fitted properly, in good condition and not damaged.
- Check to see that the clear lens is clean and securely attached to the helmet.
- Always wear safety glasses or goggles under the welding helmet and protective clothing to protect your skin from radiation, burns and spatter.
- Ensure that optical radiation from other welder's arcs in the immediate area does not enter in from behind the helmet and auto-darkening filter.

Note: Auto-darkening filters in Lincoln helmets are designed to protect the user against harmful ultra-violet and infrared rays both in the dark and light states. No matter what shade the filter is set to, the UV/IR protection is always present.

FUMES AND GASES can be dangerous to your health.

- Keep your head out of fumes.
- Use enough ventilation or exhaust at the arc or both to keep fumes and gases from your breathing zone and general area.
- **When welding with electrodes which require special ventilation such as stainless or hard facing (see instructions on container or MSDS) or on lead or cadmium plated steel and other metals or coatings which produce highly toxic fumes, keep exposure as low as possible and within applicable OSHA PEL and ACGIH TLV limits using local exhaust or mechanical ventilation. In confined spaces or in some circumstances, outdoors, a respirator may be required. Additional precautions are also required when welding on galvanized steel.**

Refer to **http://www.lincolnelectric.com/safety**
for additional safety information.

HELMET INFORMATION

This Auto-Darkening Welding Helmet will change from a light state (shade 4) to a dark state (Shade 5-13) when arc welding starts.

The filter automatically returns to a light state when the arc stops.

Match your welding application to the shade indicated on the shade chart. (See Page 8)

- Operating temperature: 14°F ~ 131°F (-10°C ~ 55°C).
- Do not use or open the auto-darkening filter if damaged by shock, vibration or pressure.
- Keep the sensors and solar cell clean. Clean the filter cartridge using a soapy water solution and soft cloth which should be damp but not saturated.

This Auto-Darkening Welding Helmet is designed for use with GMAW, GTAW, MMAW welding, or Plasma Arc and air carbon arc cutting. This helmet also has cutting and grinding modes.

The cartridge provides protection from harmful UV and IR radiation, in both dark and light states.

The cartridge contains four sensors to detect the light from the welding arc, resulting in the lens darkening to a selected welding shade.

- Do not use solvents or abrasive cleaning detergent.
- If cover lens is spattered or covered with dirt, it should be replaced immediately.
- Use only replacement parts specified in this manual.
- Do not use the helmet without inside and outside cover lenses properly installed.

- Do not use helmet if lens does not function as described.

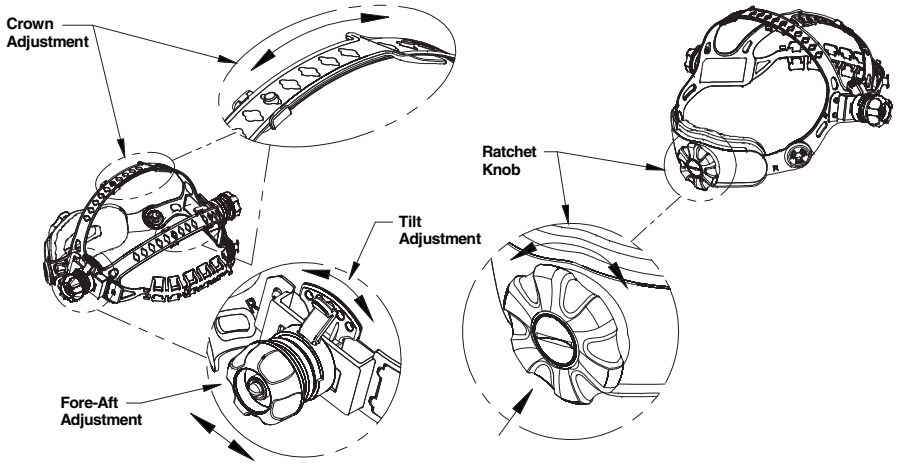
SPECIFICATIONS

Optical Class	1/1/1/1
LCD Viewing Area	97 x 62mm (3.82 x 2.44in.)
Cartridge Size	114 x 133mm (4.50 x 5.25in.)
Arc Sensor	4
Light State	DIN 4
Grind State	DIN 4
Cutting Shades	5 to 8
Variable Welding Shades	9 to 13
Shade Control	Variable Shade, Digital Display Control
Power On/Off	Auto-ON, Auto-OFF
Sensitivity Control	Variable 0 to 10, Digital Display Control
UV/IR Protection:	Up to Shade DIN16 at all times
Power Supply:	Solar cell with battery assist
Battery	2×CR2450 lithium batteries
Light to Dark Switching Time	0.00004 sec. (1/25,000sec.)
Dark to Light Switching Time	Variable 0 to 10, Digital Display Control (0.1 sec. to 1.0 sec.)
Oxyfuel Gas Welding	Yes
Oxygen Cutting	Yes
Grinding:	Yes
TIG Rating	DC ≥ 2 amps AC ≥ 2 amps
Operating Temperature	14°F ~ 131° F (-10°C ~ +55°C)
Storage Temperature	-4°F ~ 158° F (-20°C ~ +70°C)
Compliance[1]	ANSI Z87.1-2010/CSA Z94.3/CE EN379

[1)] Headgear compliance with ANSI Z87.1 is without sweatband installed.

OPERATING INSTRUCTIONS

Headgear Adjustment



HEAD SIZE ADJUSTMENT: HEADGEAR TIGHTNESS is adjusted by pushing in the Ratchet Knob and turning to adjust for the desired head size. This knob is located at the back of the helmet. **HEADGEAR CROWN ADJUSTMENT** is made by adjusting for comfort and snapping the pins into the holes to lock securely in place.

TILT: Tilt adjustment is located on the right side of the helmet. Loosen the right headgear tension knob and push the top end of the adjustment lever outward until the lever's Stop Tab clears the notches. Then rotate the lever forward or back to the desired tilt position. The Stop will automatically engage again when released locking the helmet into position.

FORE / AFT ADJUSTMENT: Adjusts the distance between the user's face and lens. To adjust, loosen the outside tension knobs and slide forward or back to desired position and retighten. **NOTE:** Make sure both sides are equally positioned for proper operation.

CARTRIDGE OPERATION/FEATURES

ON/MODE BUTTON AND BATTERY INDICATOR (See Fig-1 and Fig-2)

• **ON-OFF** (Lens will automatically darken when arc is present)
The Shade Cartridge will automatically turn on, the digital display control will activate and helmet will be ready for use. It is recommended that the user review helmet settings prior to use. The welding helmet will automatically turn off after one half hour of no use.

• **MODE CONTROL**
Short press of the **ON/MODE** button to select the mode appropriate for the work activity (See Item **A**):
Weld Mode – used for most welding applications. Push **"FUNC"** button to adjust shade number, sensitivity, and delay settings before welding (See Item **C**).In this mode, the lens turns to dark immediately when you start welding.

Cutting Mode – used for cutting applications. Push **"FUNC"** button to adjust shade number, sensitivity, and delay settings before cutting (See Item **C**).In this mode the lens turns to dark immediately when you start cutting (See Item **C**).

Grind Mode – used for grinding applications. In this mode the lens shade is fixed shade No. 4. Shade number, sensitivity, and delay settings cannot be adjusted when in grind mode (See Item **C**).

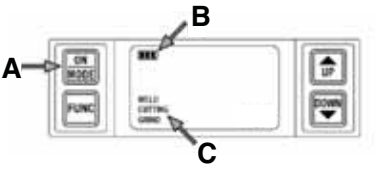


FIG-1


FIG-2

• **BATTERY INDICATOR**
The symbol **"▮▮▮"** shows the current state of the battery (See Item **B**). The volume of batteries has four level symbols (See Fig-2). The symbol **"▭"** appears on the display screen before 1 to 2 days of battery life remains, CR2450 lithium batteries should be replaced at this time. The symbol of the Battery Indicator is not real-time and is updated shortly after pushing the **ON/MODE** button.

• **VARIABLE SHADE CONTROL**
After turning on the lens, press the **"FUNC"** button to choose **"SHADE"**, adjust lens shade number (See Fig-3,-4,-5, Items **A** and **B**). Use the shade control **UP** and **DOWN** buttons to select the lens darkened state (See Fig-3,-4,-5, Items **C** and **D**). The shade range for each mode is as follows:

Weld Mode – No. 9 ~ No. 13 (See Fig-**3**)

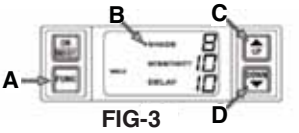


FIG-3

Cutting Mode – No. 5 ~ No. 8 (See Fig-**4**)

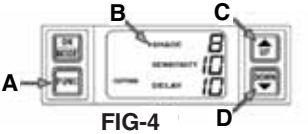


FIG-4

Grind Mode - No. 4 only (See Fig-**5**)

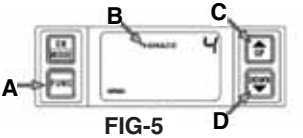


FIG-5

• **SENSITIVITY CONTROL**

Press **"FUNC"** button to choose **"SENSITIVITY"** (See Fig-6,-7, Items **A** and **B**). Use Sensitivity Control **"UP"** and **"DOWN"** buttons to make the lens more or less sensitive to arc light for different welding processes (See Fig-6,-7, Items **C** and **D**). Sensitivity settings 5 through 9 are the normal settings for everyday use. The sensitivity ranges for each mode are as follows:

Weld Mode – No.0 ~ No. 10 (See Fig-**6**)

FIG-6

Cutting Mode - No.0 ~ No. 10 (See Fig-**7**)

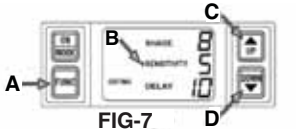


FIG-7

Grind Mode – No sensitivity adjustment

It may be necessary to adjust helmet sensitivity to accommodate different lighting conditions or if lens is flashing On and Off. Adjust helmet sensitivity in lighting conditions helmet will be used in. Adjust helmet sensitivity as follows:

- Press the **"DOWN"** button to lower setting to 0.
- Face the helmet in the direction of use, exposing it to the surrounding light conditions.
- Press the **"UP"** button repeatedly until the lens darkens, then press the **"DOWN"** button until lens clears. Helmet is ready for use. Slight readjustment may be necessary for certain applications or if lens is flashing on and off.

• DELAY CONTROL

Press **"FUNC"** button to choose **"DELAY"**, begin lens delay adjustments (See Fig-8, -9, Items **A** and **B**). Use the Lens Delay Control **"UP"** and **"DOWN"** buttons to adjust the time for the lens to switch to the clear state after welding or cutting. (See Fig-8,-9, Items **C** and **D**).

Weld Mode – No.0 ~ No. 10 (See Fig-**8**)

FIG-8

Cutting Mode - No.0 ~ No. 10 (See Fig-**9**)

FIG-9

Grind Mode – No delay adjustment

The delay is particularly useful in eliminating bright after-rays present in higher amperage applications where the molten puddle remains bright momentarily after welding. Use the Lens Delay Control buttons to adjust delay from 0 to 10 (0.1 to 1.0 second). When welding ceases, the viewing window automatically changes from the darkened state back to light state but with a pre-set delay to compensate for any bright afterglow on the work piece. The delay time/response can be set from Level 0 to level 10. It is recommended to use a shorter delay with spot welding applications and a longer delay with applications using higher currents. Longer delays can also be used for low current TIG welding in order to avoid the filter opening when the light path to the sensors is temporarily obstructed by a hand, torch, etc.

HELMET CARE AND MAINTENANCE

Cleaning: Clean helmet by wiping with a soft cloth. Clean cartridge surfaces regularly. Do not use strong cleaning solutions. Clean sensors and solar cells with soapy water solution and a clean cloth and wipe dry with a lint-free cloth. Do **NOT** submerge shade cartridge in water or other solution.

Storage: Store in a clean, dry location.

SHADE GUIDE SETTINGS

GUIDE FOR SHADE NUMBERS				
OPERATION	**ELECTRODE SIZE 1/32 in. (mm)**	**ARC CURRENT (A)**	**MINIMUM PROTECTIVE SHADE**	**SUGGESTED(1) SHADE NO. (COMFORT)**
Shielded metal arc welding	Less than 3 (2.5) 3-5 (2.5–4) 5-8 (4–6.4) More than 8 (6.4)	Less than 60 60-160 160-250 250-550	7 8 10 11	– 10 12 14
Gas metal arc welding and flux cored arc welding		Less than 60 60-160 160-250 250-500	7 10 10 10	– 11 12 14
Gas tungsten arc welding		Less than 50 50-150 150-500	8 8 10	10 12 14
Air carbon Arc cutting	(Light) (Heavy)	Less than 500 500-1000	10 11	12 14
Plasma arc welding		Less than 20 20-100 100-400 400-800	6 8 10 11	6 to 8 10 12 14
Plasma arc cutting	(Light)(2) (Medium)(2) (Heavy)(2)	Less than 300 300-400 400-800	8 9 10	9 12 14
Torch brazing		–	–	3 or 4
Torch soldering		–	–	2
Carbon arc welding		–	–	14
	PLATE THICKNESS			
	in.	**mm**		
Gas welding				
Light	Under 1/8	Under 3.2		4 or 5
Medium	1/8 to 1/2	3.2 to 12.7		5 or 6
Heavy	Over 1/2	Over 12.7		6 or 8
Oxygen cutting				
Light	Under 1	Under 25		3 or 4
Medium	1 to 6	25 to 150		4 or 5
Heavy	Over 6	Over 150		5 or 6

(1) As a rule of thumb, start with a shade that is too dark, then go to a lighter shade which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line the visible light of the (spectrum) operation.

(2) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.

Data from ANSI Z49.1-2005

If your helmet does not include any one of the shades referenced above, it is recommended you use the next darker shade.

CARTRIDGE AND LENS REPLACEMENT

Replacing Front Clear Cover Lens: Replace the front cover lens if it is damaged. Remove ADF holder assembly per Figure 1. Remove front cover lens from helmet assembly. Carefully remove gasket from cover lens. Install new cover lens into gasket and assemble to helmet shell. Make sure to assemble cover lens and gasket into helmet shell the same way as it was removed.

Replacing Inside Clear Lens: Replace the inside clear lens if it is damaged. Place your fingernail in recess below cartridge view window and flex lens upwards until it releases from edges of cartridge view window.

Change the Shade Cartridge: Remove ADF holder assembly from helmet shell. See figure 1 for removal. Flex top end of the ADF holder to allow for ADF cartridge to be removed from frame. Install new ADF cartridge into frame per figure 2 below. Make sure that the ADF cartridge is inserted in ADF holder correctly as shown. Install ADF holder assembly into helmet shell.

INSTALLING AN AFTERMARKET MAGNIFYING LENS:
Simply slide the magnifying lens into the short rail located on the sides of ADF holder per Figure 3.

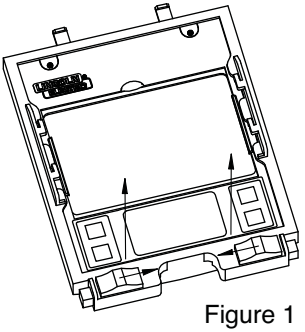


Figure 1

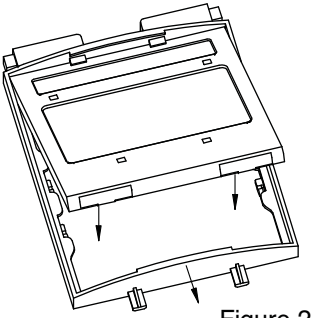


Figure 2

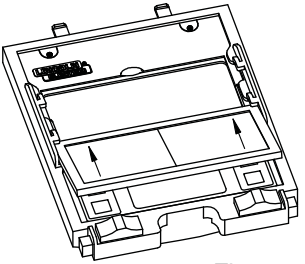


Figure 3

TROUBLESHOOTING GUIDE

Test your shade cartridge prior to welding by directing the front of the cartridge toward a bright source of light. Then, using your fingers, rapidly cover and uncover the sensors. The cartridge should darken momentarily as the sensor is exposed. A torch striker can also be used.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Difficult to see through filter.	Front cover lens dirty.	Clean or replace front cover lens.
	Cartridge dirty.	Clean the Auto-Darkening cartridge with soapy water solution and soft cloth.
Filter does not darken when arc is struck.	Sensitivity is set too low.	Adjust sensitivity to required level.
	Front cover lens dirty.	Clean or replace front cover lens.
	Front cover lens is damaged.	Check for cracked or pitted front cover lens and replace as required.
	Sensors are blocked or Solar panel is blocked.	Make sure you are not blocking the sensors or solar panels with your arm or other obstacle while welding. Adjust your position so that the sensors can see the weld arc.
	Grind Mode Selected	Make sure proper shade is selected.
Filter darkening without arc being struck.	Sensitivity set too high.	Adjust sensitivity to required level.
Filter remains dark after completing a weld.	Delay time set too high.	Adjust delay time to required level.

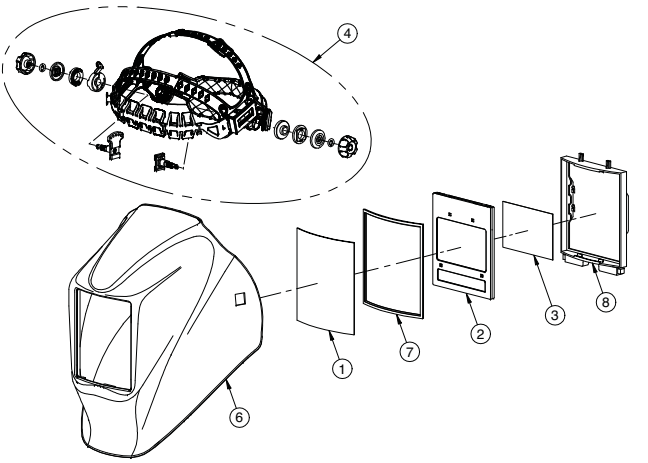
⚠ WARNING

	**ADF is cracked.**	**Cease (STOP) using this product if this problem exists. UV/IR protection may be compromised resulting in burns to the eyes and skin.**	
	Weld spatter is damaging the filter.	**Missing, damaged, broken, cracked or distorted front cover lens.**	**Replace front cover lens as needed.**

WARRANTY INFORMATION

WARRANTY INFORMATION: Reference IMWS1 included in Literature.
SPATTER DAMAGE IS NOT COVERED BY WARRANTY:
Do not use this product without the correct protective clear lenses installed properly on both sides of the Auto-Darkening Filter cartridge (ADF). The clear lenses supplied with this helmet are properly sized to work with this product and substitutions from other suppliers should be avoided.

REPLACEMENT PARTS



ITEM	PART NO.	DESCRIPTION	QTY
1	KP2898-1	OUTSIDE CLEAR LENS (PKG. QTY: 5)	1
2	KP3243-2	ADF CARTRIDGE	1
3	KP2931-1	INSIDE CLEAR LENS (PKG. QTY: 5)	1
4	KP3908-1	HEADGEAR ASSEMBLY (INCLUDING SWEATBAND)	1
5*	KP2930-1	SWEATBAND (PKG. QTY: 2)	1
6	S27978-31	REPLACEMENT SHELL	1
7	S27978-32	OUTSIDE CLEAR LENS SEAL	1
8	S27978-33	ADF HOLDER	1

OPTIONAL ACCESSORIES		
PART NO.	DESCRIPTION	QTY
KP3046-100	CHEATER LENS 1.00 MAGNIFICATION	1
KP3046-125	CHEATER LENS 1.25 MAGNIFICATION	1
KP3046-150	CHEATER LENS 1.50 MAGNIFICATION	1
KP3046-175	CHEATER LENS 1.75 MAGNIFICATION	1
KP3046-200	CHEATER LENS 2.00 MAGNIFICATION	1
KP3046-225	CHEATER LENS 2.25 MAGNIFICATION	1
KP3046-250	CHEATER LENS 2.50 MAGNIFICATION	1
KP3047-1	HARD HAT ADAPTER	1

*Not illustrated

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