



Cat[®] Auto-Darkening Welding Helmets

Models: Digital Elite[™]
Digital Performance Series[®]







TABLE OF CONTENTS

SECTIO	N 1 – WELDING HELMET SAFETY PRECAUTIONS –READ BEFORE USING \dots	1	
1-1.	Symbol Usage	1	
1-2.	Arc Welding Hazards	1	
1-3.	Proposition 65 Warnings	3	
1-4.	Lens Shade Selection Table	3	
1-5.	Principal Safety Standards		
SECTIO	N 2 - SPECIFICATIONS	4	
SECTIO	N 3 - OPERATING INSTRUCTIONS	6	
3-1.	Helmet Controls	6	
3-2.	Auto On/Off Button And Low Battery Light	7	
3-3.	Mode Control	8	
3-4.	Variable Shade Control	9	
3-5.	Lens Delay Control	10	
3-6.	Sensitivity Control		
3-7.	Typical Lens Adjustment Procedure	12	
SECTIO	N 4 – ADJUSTING HEADGEAR	13	
SECTIO	N 5 - REPLACING THE LENS COVERS	14	
5-1.	Replacing Outside Lens Covers On Digital Elite And Performance Quick-Release Helmets	14	
5-2.	Replacing Inside Lens Cover – Digital Performance Series Helmets	15	
5-3.	Replacing The Lens Covers On Digital Elite Standard Helmets	16	
SECTIO	N 6 - REPLACING THE BATTERY	17	
SECTIO	N 7 - INSTALLING OPTIONAL MAGNIFYING LENS	18	
SECTIO	N 8 - MAINTENANCE	18	
SECTION 9 - TROUBLESHOOTING			
SECTION 10 - PARTS LIST			
SECTION 11 – LIMITED WARRANTY 23			

SECTION 1 – WELDING HELMET SAFETY PRECAUTIONS – READ BEFORE USING

helmet 2013-09



A Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

Symbol Usage 1-1.



DANGER! - Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

[Indicates special instructions.









Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE – Indicates statements not related to personal injury.

This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. **Arc Welding Hazards**



Only qualified persons should install, operate, maintain, and repair this unit.



ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards). Refer to Lens Shade Selection table in Section 1-4.
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear body protection made from durable, flame-resistant material (leather, heavy cotton, wool). Body protection includes oil-free clothing such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Before welding, adjust the auto-darkening lens sensitivity setting to meet the application.
- Stop welding immediately if the auto-darkening lens does not darken when the arc is struck. See the Owner's Manual for more information.



WELDING HELMETS do not provide unlimited eye, ear, and face protection.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Use impact resistant safety spectacles or goggles and ear protection at all times when using this welding helmet.
- Do not use this helmet while working with or around explosives or corrosive liquids.
- Do not weld in the overhead position while using this helmet.
- Inspect the auto-lens frequently. Immediately replace any scratched, cracked, or pitted cover lenses or auto-lenses.



NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

Wear approved ear protection if noise level is high.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.



FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding
 fumes and gases. The recommended way to determine adequate ventilation is to sample for
 the composition and quantity of fumes and gases to which personnel are exposed.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Safety Data Sheets (SDSs) and the manufacturer's instructions for adhesives, coatings, cleaners, consumables, coolants, degreasers, fluxes, and metals.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator.
 Always have a trained watchperson nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays
 of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the
 coating is removed from the weld area, the area is well ventilated, and while wearing an airsupplied respirator. The coatings and any metals containing these elements can give off toxic
 fumes if welded.

Proposition 65 Warnings 1-3.



Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)



This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. Wash hands after use.

Lens Shade Selection Table 1-4.

Process	Electrode Size in. (mm)	Arc Current in Amperes	Minimum Protective Shade No.	Suggested Shade No. (Comfort)*
Shielded Metal Arc Welding (SMAW)	Less than 3/32 (2.4) 3/32-5/32 (2.4-4.0) 5/32-1/4 (4.0-6.4) More than 1/4 (6.4)	Less than 60 60–160 160–250 250–550	7 8 10 11	 10 12 14
Gas Metal Arc Welding (GMAW) Flux Cored Arc Welding (FCAW)		Less than 60 60–160 160–250 250–500	7 10 10 10	11 12 14
Gas Tungsten Arc Welding (TIG)		Less than 50 50-150 150-500	8 8 10	10 12 14
Air Carbon Arc Cutting (CAC-A)	Light Heavy	Less than 500 500-1000	10 11	12 14
Plasma Arc Cutting (PAC)		Less than 20 20-40 40-60 60-80 80-300 300-400 400-800	4 5 6 8 8 9	4 5 6 8 9 12 14
Plasma Arc Welding (PAW)		Less than 20 20–100 100–400 400–800	6 8 10 11	6–8 10 12 14

Reference: ANSI 749.1:2005

Principal Safety Standards 1-5.

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, is available as a free download from the American Welding Society at http://www.aws.org or purchased from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

^{*} Start with a shade that is too dark to see the weld zone. Then, go to a lighter shade which gives a sufficient view of the weld zone without going below the minimum.

SECTION 2 - SPECIFICATIONS

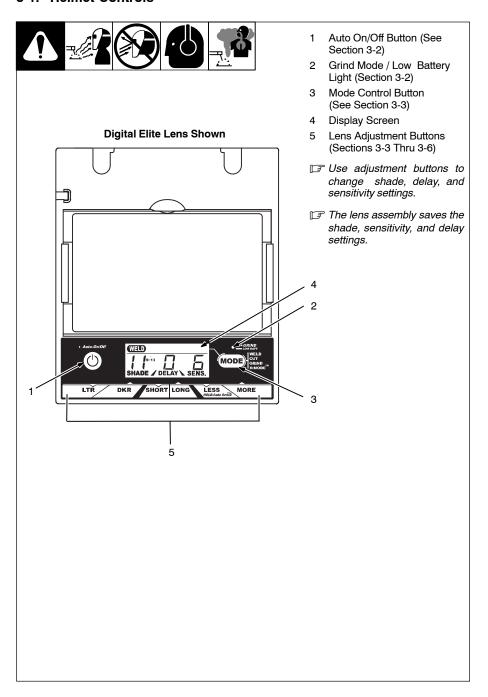
Specification	Digital Performance Helmet	Digital Elite Helmet
Viewing Field	3.81 x 1.85 in. (97 x 47 mm)	3.81 x 2.62 in. (97 x 60mm)
Operating Modes	Three Modes: Weld, Cut, Grind	Four Modes: Weld, Cut, Grind, X-Mode
Reaction Time	0.0000500 sec (1/20,000)	0.0000500 sec (1/20,000)
Available Shades All Shades Provide Continuous UV And IR Protection.	Weld Mode Darkened State: No. 9 - No. 13 Light State: No. 4 Cut Mode	Weld Mode Darkened State: No. 9 – No. 13 Light State: No. 4 Cut Mode
	Darkened State: No. 5 – No. 8 Light State: No. 4 Grind Mode	Darkened State: No. 5 – No. 8 Light State: No. 4 Grind Mode
	Light State: No. 4	Light State: No. 4 X-Mode Darkened State: No. 9 – No. 13 Light State: No. 4
Sensitivity Control	Weld Mode: No. 0 – No. 10	Weld Mode: No. 0 – No. 10
Adjustable For Vary- ing Ambient Light And Welding/Cutting	Cut Mode: No. 0 – No. 10 Grind Mode:	Cut Mode: No. 0 - No. 10 Grind Mode:
Arc. No. 10 Setting Locks Lens In Dark State.	Not Applicable	Not Applicable X-Mode: No. 0 – No. 10
Delay Control	Weld Mode: No. 0 – No. 10	Weld Mode: No. 0 – No. 10
Slows Lens Dark-To- Light State.	Cut Mode: No. 0 – No. 10	Cut Mode: No. 0 – No. 10
	Grind Mode: Not Applicable	Grind Mode: Not Applicable X-Mode No. 0 – No. 10
Automatic Power	Shuts Lens Off 45 Minutes After Last Arc Is Struck. Lens automatically turns on when arc is struck.	
Low Battery Light	Red LED Illuminates To Indicate 2	2-3 Days Remaining Battery Life.
Power Supply	CR2450 Lithium Batteries (Miller Part No. 217 043)	
Sensors	Independent/Redundant (Three)	Independent/Redundant (Four) And Magnetic (In X-Mode)

Operating	14°F to 131°F / –10°C to +55°C		
Temperature	☐ When Stored In Extremely Cold Temperatures, Warm Helmet To Ambient Temperature Before Welding.		
Storage	-4°F to 158°F / -20°C to +70°C		
Temperature	☐ When Stored In Extremely Cold Temperatures, Warm Helmet To Ambient Temperature Before Welding.		
Total Weight	17 oz. (481.9 g)	18oz. (510.3 g)	
Standards	ANSI Z87.1+(2010), CSA, and CE		
Warranty	Three Years From Date Of Purchase (See Section 11)		

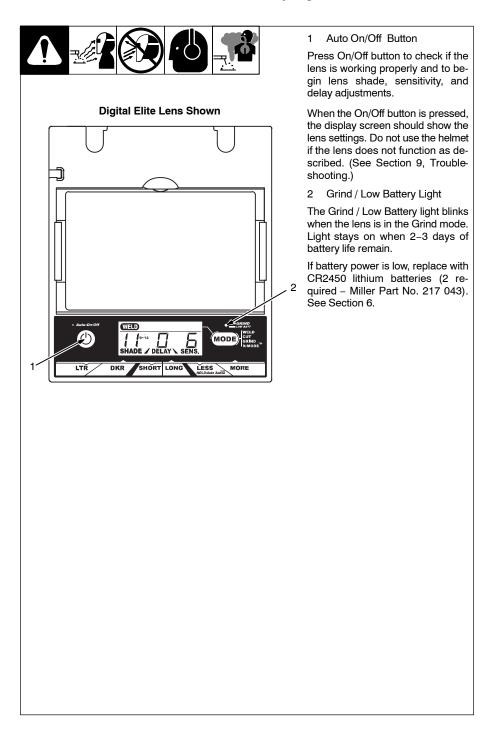
Notes	
	Work like a Pro!
	Pros weld and cut safely. Read the
	safety rules at
	the beginning
	of this manual.

SECTION 3 – OPERATING INSTRUCTIONS

3-1. Helmet Controls



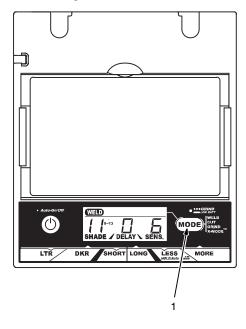
3-2. Auto On/Off Button And Low Battery Light



3-3. Mode Control



Digital Elite Lens Shown



Mode Control Button

Press Mode button to select the mode appropriate for the work activity:

Weld Mode – used for most welding applications. In this mode the lens turns on when it optically senses a welding arc. Adjust shade, sensitivity, and delay settings as needed.

Cut Mode – used for cutting applications. In this mode the lens turns on when it optically senses a cutting arc. Adjust shade, sensitivity, and delay settings as needed.

Grind Mode – used for metal grinding applications. In this mode the shade is fixed shade No. 4. No lens adjustments are possible.

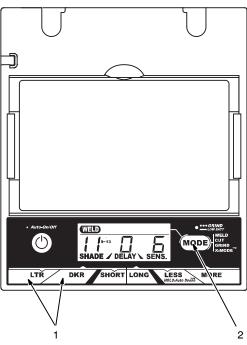
X-Mode– used for outdoor or low current welding applications. In this mode the lens turns on when it senses weld current. Adjust shade, sensitivity, and delay settings as needed.

- IF X-Mode is not present on Performance helmets.
- Nearby welding may affect helmet operation when lens is in X-Mode. Stay at least 12 ft (3.7 m) away from other welding activity.

3-4. Variable Shade Control



Digital Elite Lens Shown



- Variable Shade
 Adjustment Buttons
- 2 Mode Control Button

Use the LTR and DKR adjustment buttons to adjust the lens shade in the darkened state. Use the table in Section 1-4 to select proper shade control setting based on your welding process. The shade ranges for each mode are as follows:

Weld – No. 9 – No. 13 Cut – No. 5 – No. 8 Grind - No. 4 only

X-Mode - No. 9 - No. 13

Start at the highest setting and adjust lighter to suit the application and your personal preference.

Variable Shade Adjustment Procedure

 Press Auto On/Off button to turn lens On. Helmet lens will darken twice and then clear.

- Press Mode Control Button to select desired function: Weld, Cut, Grind, or X-Mode.
- X-Mode is not present on Performance helmets.
- Use LTR and DKR adjustment buttons to select desired shade.
- Begin welding or continue with other lens adjustments.

3-5. Lens Delay Control



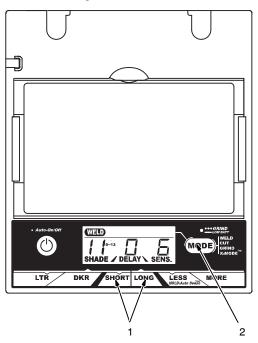








Digital Elite Lens Shown



- 1 Lens Delay Adjustment Buttons
- 2 Mode Control Button

Use the Lens Delay Short and Long buttons to adjust the time for the lens to switch to the clear state after welding or cutting.

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).

The delay ranges for each mode are as follows:

Weld, Cut, And X-Modes – 0 – 10

Grind Mode – No delay adjustment

- There is no lens delay adjustment in the Grind mode, and in the Cut mode (when sensitivity is set to 10).
- S X-Mode is not present on Performance helmets.

Lens Delay Adjustment Procedure

- Press Auto On/Off button to turn helmet On. Helmet lens will darken twice and then clear.
- Press Mode button to select desired function: Weld, Cut, or X-Mode.
- Use Short and Long adjustment buttons to select desired delay.
- Begin welding or continue with other lens adjustments.

3-6. Sensitivity Control

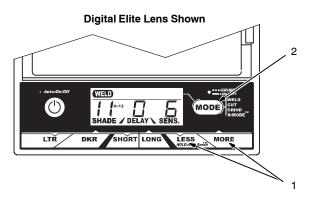












- Sensitivity Adjustment **Buttons**
- Mode Control Button

Use control to make the lens more responsive to different light levels in various welding processes. Use a Mid-Range or 30-50% sensitivity setting for most applications.

It may be necessary to adjust helmet sensitivity to accommodate different lighting conditions or if lens is flashing On and Off.

The sensitivity ranges for each mode are as follows: Weld, Cut, X-Modes - 0 -

Grind Mode - No sensitivity

adjustment

Do not weld in the Grind mode; the lens will not darken. IF X-Mode is not present on Performance mets.

Sensitivity **Adjustment** Procedure

- Adjust helmet sensitivity in lighting conditions helmet will be used in.
- Press Auto On/Off button to turn helmet On. Helmet lens will darken twice and then clear.
- Press Mode button to select desired function: Weld, Cut, or X-Mode.
- Use Sensitivity Less and More buttons to adjust sensitivity control to lowest setting.

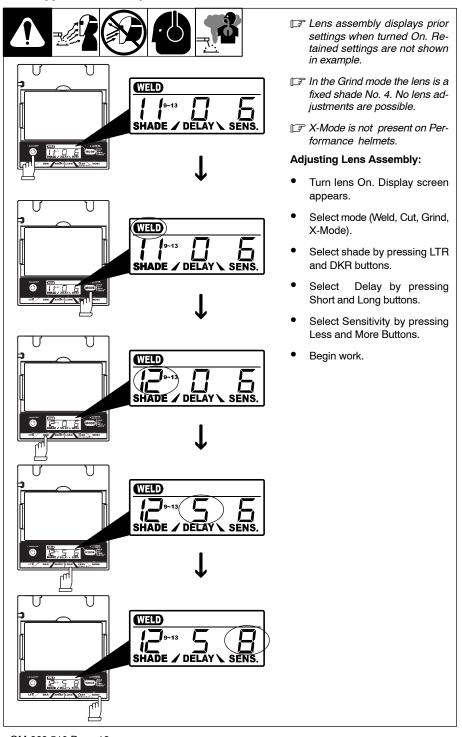
- Face the helmet in the direction of use, exposing it to the surrounding light conditions.
- Press sensitivity More button until the lens darkens, then press Less button until lens clears. An alternative method is to press and hold the Less button until the lens clears.

Helmet is ready for use. Slight readjustment may be necessary for certain applications or if lens is flashing on and off.

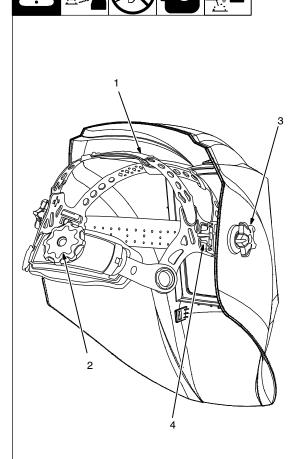
F Reduce Sensitivity setting if lens stavs dark longer than Delay setting.

Recommended Sensitivity Settings		
Stick Electrode	Mid-Range	
Short Circuiting (MIG)	Low/Mid-Range	
Pulsed & Spray (MIG)	Mid-Range	
Gas Tungsten Arc (TIG)	Mid/High-Range	
Plasma Arc Cutting/Welding	Low/Mid-Range	

3-7. Typical Lens Adjustment Procedure



SECTION 4 - ADJUSTING HEADGEAR



- There are four headgear adjustments: headgear top, tightness, angle adjustment, and distance adjustment.
- 1 Headgear Top Straps

Adjusts headgear for proper depth on the head to ensure correct balance and stability.

2 Headgear Tightness

To adjust, turn the adjusting knob located on the back of the headgear left or right to desired tightness.

3 Angle Adjustment (Not Shown)

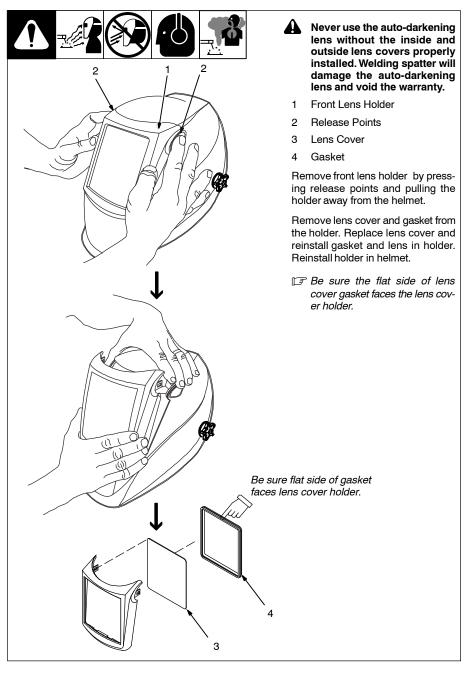
Seven slots on the right side of the headband provide adjustment for the forward tilt of the helmet. To adjust, lift and reposition the control arm to the desired position.

4 Distance Adjustment

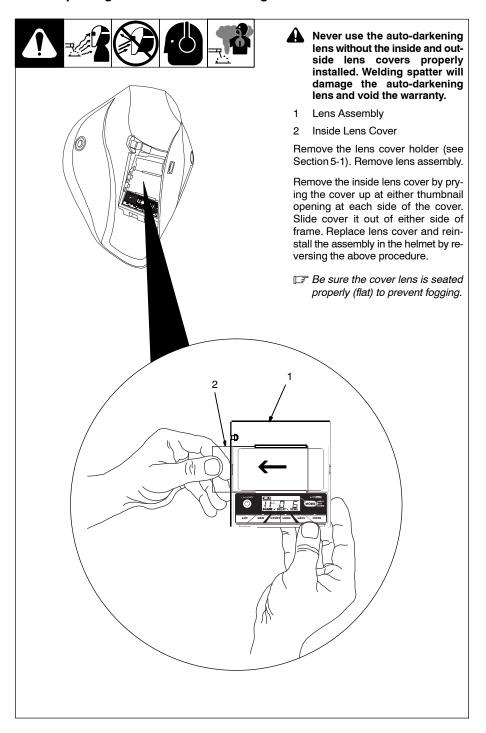
Adjusts the distance between the face and the lens. To adjust, press black tabs on the top and bottom of the pivot point and use other hand to slide headgear forward or backward. Release tabs. (Both sides must be equally positioned for proper vision.)

Mumbers on the adjustment slides indicate set position so both sides can be adjusted equally.

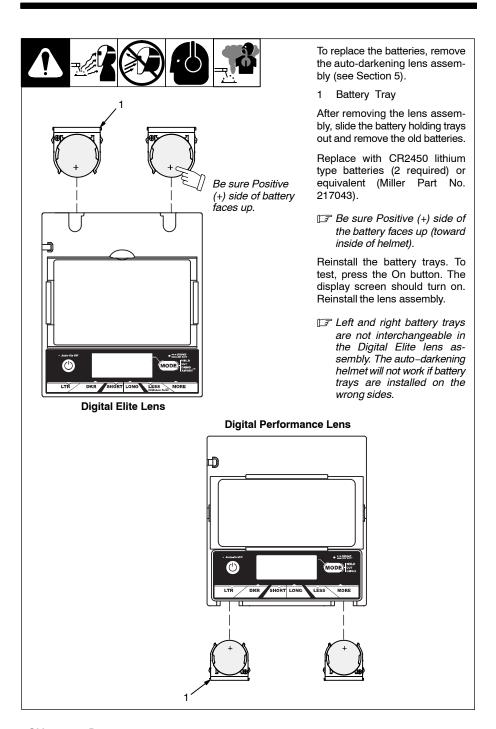
5-1. Replacing Outside Lens Covers On Digital Elite And Performance Quick-Release Helmets



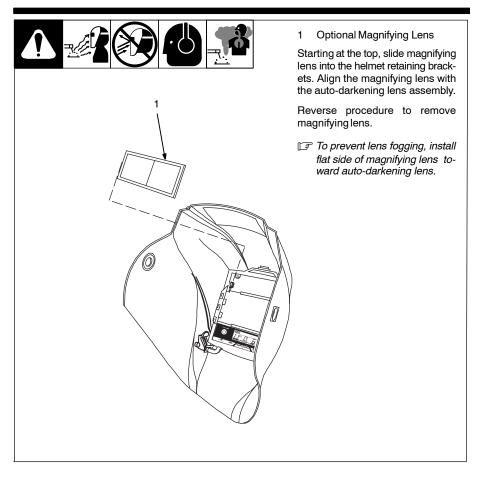
5-2. Replacing Inside Lens Cover - Digital Performance Series Helmets



SECTION 6 - REPLACING THE BATTERY



SECTION 7 - INSTALLING OPTIONAL MAGNIFYING LENS



SECTION 8 - MAINTENANCE

NOTICE - Never use solvents or abrasive cleaning detergents.

NOTICE - Do not immerse the lens assembly in water.

The helmet requires little maintenance. However, for best performance clean after each use. Using a soft cloth dampened with a mild soap and water solution, wipe the cover lenses clean. Allow to air dry. Occasionally, the filter lens and sensors should be cleaned by gently wiping with a soft, dry cloth.

SECTION 9 - TROUBLESHOOTING











Trouble	Remedy
Auto lens not On – auto- lens does not darken mo-	Check batteries and verify they are in good condition and installed properly.
mentarily when the On button is pressed.	Check battery surfaces and contacts, and clean if necessary.
button to proceed.	Check battery for proper contact and gently adjust contact points if necessary. This is particularly important if the helmet has been dropped. Verify left and right battery trays are installed on the correct sides.
Not switching – auto-lens stays light and does not	Stop welding or cutting immediately: Make sure the lens is turned On.
darken when welding or cutting.	If power is On, check the mode settings. Also review sensitivity recommendations and adjust sensitivity if possible.
	Clean lens cover and sensors of any obstructions. Make sure the sensors are facing the arc; angles of 45° or more may not allow the arc light to reach the sensors.
Not Switching – auto-lens stays dark after the arc is	Reduce Sensitivity setting (see Section 3-6). In extreme light conditions, it may be necessary to reduce the surrounding light levels.
extinguished, or the autolens stays dark when no arc is present.	IF If the lens remains dark, press the Auto On/Off button to return lens to the clear state.
Sections of the auto-lens are not going dark, distinct lines separate the light and	Stop welding or cutting immediately: The auto-lens may be cracked which can be caused by the impact of dropping the helmet.
dark areas.	Weld spatter on the auto lens may also cause cracking. (The lens may need to be replaced; most cracked lenses are not covered by warranty).
Switching or Flickering – the auto-lens darkens then lightens while the welding	Review the sensitivity setting recommendations and increase the sensitivity if possible. Be sure the arc sensors are not being blocked from direct access to the arc light.
or cutting arc is present.	Check the lens cover for dirt and spatter that may be blocking the arc sensors. Increasing Lens Delay 0.1 – 0.3 second may also reduce switching.
Inconsistent or lighter auto-lens shading in the	Referred to as an angle of view effect, auto-darkening lenses have an optimum viewing angle.
dark-state, noticeable on the outside edges and cor- ners.	The optimum viewing angle is perpendicular or 90° to the surface of the auto-lens. When that angle of view varies in the dark-state, welders may notice slightly lighter areas at the outside edges and the corners of the lens. This is normal and does not represent any health or safety hazard.
	This effect may also be more noticeable in applications where magnifying lenses are used.

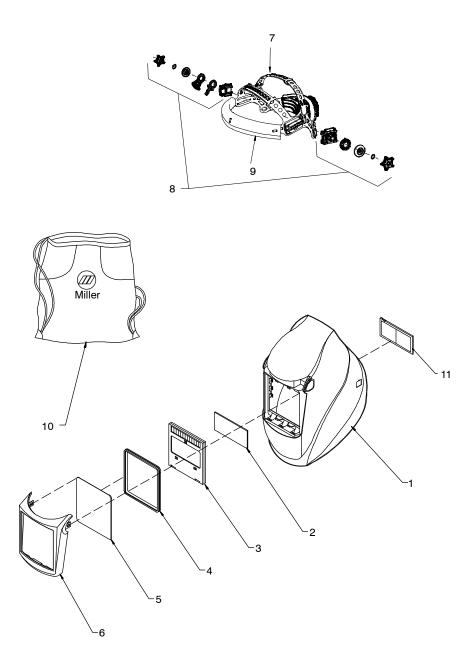


Figure 10-1. Digital Performance Auto-Darkening Welding Helmet

OM-269 510 Page 19

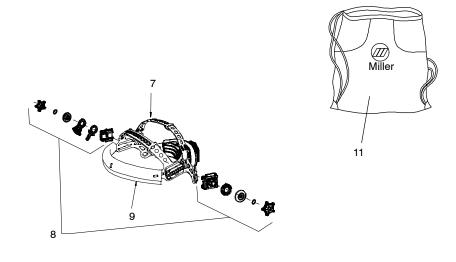
Item	Part		
No.	No.	Description	Quantity

Figure 10-1. Digital Performance Auto-Darkening Welding Helmet

1	1
2	
3 269 505 Auto-Darkening Lens Assy 1	
256 730 Battery Tray Kit (Left/Right) 1	
4	
5	
6	
7	
8	
9	
10	
♦079 975 O-Rings, Replacement (For Item 8) (5 Per Pkg.) 1	ĺ
♦222 003 Adapters, Hard Hat (Not Shown)	ĺ
11 ♦212 235 Lens, 0.75 Magnification	1
11	1
11 ♦212 237 Lens, 1.25 Magnification	1
11 ♦212 238 Lens, 1.50 Magnification	
11	
11	
11 Lens, 2.25 Magnification	
11 Lens, 2.50 Magnification	

^{*} Adjustment Hardware Kit With O-rings

[♦] Optional



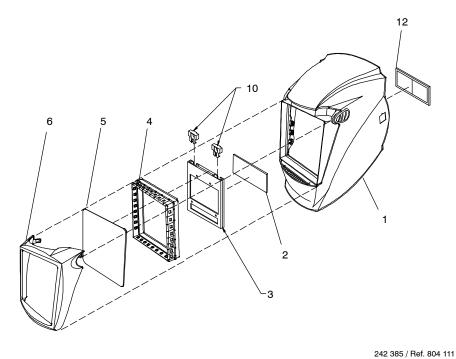


Figure 10-2. Digital Elite Series Auto-Darkening Welding Helmet – Quick Release Models

Figure 10-2. Digital Elite Auto-Darkening Welding Helmet – Quick Release Models

1
2 216 327 Inside Lens Cover (4-1/4 X 2-1/2) (5 Per Pkg.) 1
3 269 504 Auto-darkening Lens Assembly
4
5 Outside Lens Cover (4-11/16 X 5-5/8) (5 Per Pkg.) 1
6
7 Ratchet Headgear Assembly (Includes Items 8 And 9) . 1
8 *256 178 Adjustment Angle/Stop Hardware Kit 1
9 770 249 Fabric Headband
079 975 Replacement O-rings For Kit 256 178 (5 Per Pkg.) 1
10
11
12

^{*} Adjustment Hardware Kit With O-rings

SECTION 11 – LIMITED WARRANTY

LIMITED WARRANTY – Subject to the terms and conditions below. Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that the new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OR MERCHANTABILITY AND FITNESS.

Miller Digital Series auto-darkening lens helmets are warranted for 3 years from the date of purchase. Proof of purchase is required for warranty transactions so it is imperative that a copy of the original invoice or sales receipt be retained.

For warranty transactions, contact your Miller Distributor.

Effective January 1, 2014

[◆] Optional

Notes

Notes

Notes



Miller Electric Mfg. Co.

An Illinois Tool Works Company 1635 West Spencer Street Appleton, WI 54914 USA



Visit our website at

www.MillerWelds.com



www.cat.com / www.caterpillar.com © 2014 Caterpillar.

All Rights Reserved. CAT, CATERPILLAR, BUILT FOR IT, their respective logos, "Caterpillar Yellow," the "Power Edge" trade dress as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission. Miller Electric Mfg. Co., a licensee of Caterpillar Inc.