Speedglas™ Auto-Darkening Welding Helmets

User Instructions for:

- *Utility*
- *9000XF*
- *9002D*
- *9002V*
- *9002X*

Important: Keep these *User Instructions* for reference.

3M Adflo 16-0905-SGXX Powered Air Purifying Respirator
3M 26-5802-30SW Speedglas Fresh Air III Supplied Air Welding Respirator

List of Warnings within these *User Instructions*

⚠WARNING

These products are designed to help protect the wearer's eyes from harmful radiation including visible light, ultra-violet radiation (UV) and infra-red radiation (IR) resulting from certain arc and gas welding processes when used in accordance with these *User Instructions*. Use of this product in any other application such as laser welding or welding processes that require shade 14 or higher filters **may result in permanent eye injury and vision loss**. Do not use any welding product without appropriate training. For proper use, see supervisor, or *User Instructions*.

Always wear ANSI Z87.1-2003 compliant safety spectacles in addition to any welding helmet. Failure to do so **may result in permanent eye injury and vision loss.** In Canada, follow CSA Z94.3 and/or the requirements of the authority having jurisdiction in your region.

Before each use, perform the inspection described in these *User Instructions* to ensure that all components are installed and functioning as intended. Use of 3M™ welding helmet assemblies that do not meet these inspection requirements or failure to use genuine 3M™ Speedglas™ replacement parts **may result in permanent eye injury and vision loss**.

Do not use welding filters that are cracked, pitted or otherwise damaged as these conditions may compromise eye/face impact protection and may allow harmful UV and IR radiation to pass through **causing permanent eye injury and vision loss**.

Should the 3M™ Speedglas™ Auto Darkening Filter (ADF) fail to switch to dark mode upon striking an arc, stop welding immediately and inspect the ADF as described in these *User Instructions*. Continued use of an ADF that fails to switch to the dark state **may result in permanent eye injury and vision loss**. If the problem cannot be identified and corrected, do not use the ADF; contact your supervisor or 3M for assistance.

Severe burn injuries may result if these welding helmets are used for heavy-duty overhead welding applications where there is a potential for falling molten metal.

Only operate these ADFs at temperatures between 23°F (–5°C) and 131°F (+55°C). If used outside of this range, the filter may not perform as designed and **may result in permanent eye injury and vision loss**.

GENERAL SAFETY INFORMATION

This product contains no components made from natural rubber latex.

Intended Use

The 3M™ Speedglas™ Auto-Darkening Welding Helmets are designed to help protect the wearer's eyes from harmful radiation including visible light, ultra-violet radiation (UV) and infrared radiation (IR) resulting from certain arc and gas welding processes when used in accordance with these *User Instructions*. Two eye-level sensors on the front of 3M™ Speedglas™ Auto-darkening filters (ADFs) react independently at the moment the welding arc is struck and cause the filter to darken. The ADF switches back to the light shade (shade 3) as soon as the welding arc has stopped. ADFs can also be used for gas welding (oxy-acetylene) when the filter is in the "OFF" state, shade 5-6. Two lithium batteries are used as the power source. The ADF will switch off automatically 30 to 60 minutes after the last arc is detected. Protection from ultra-violet radiation (UV) and infrared radiation (IR) is continuous, whether the ADF is in the light or the dark state. In the event of battery or electronic failure, the welder remains protected against UV and IR radiation according to the darkest shade (shade 13).

3M™ Speedglas™ ADFs allow the welder to view their work clearly and safely during set-up, during the weld and after without interruption and without the burden or delay of manually lifting the shield or filter. ADFs allow manual arc welding to be performed more quickly and accurately in comparison to traditional passive welding filter plates.

3M™ Speedglas™ 9000 Series Helmets feature patented aerodynamically-designed vents to help exhaust exhaled air and reduce stuffiness inside the welding helmet. The 3M™ Speedglas™ Utility Helmet is not equipped with exhaust vents.

3M™ Speedglas™ FlexView Helmets have an additional mechanism that allows the ADF to be lifted, exposing a 4.75" x 3.6" (120 x 92 mm) clear polycarbonate lens. The clear lens meets ANSI Z87.1-2003 requirements for eye and face impact protection, making it ideal for chipping, grinding and precision weld preparation. A spring holds the ADF securely on top of the helmet while not in use.

USE INSTRUCTIONS AND LIMITATIONS

Important Use Limitations:

These products do not provide any protection from respiratory hazards that may result from welding processes or from other sources. 3M™ Speedglas™ Welding Helmets may be worn in conjunction with certain respirator models.

3M™ Speedglas™ ADFs are not suitable for laser welding or welding processes that require shade 14 or higher filters. Use of this product for these applications **may result in permanent eye injury and vision loss**.

Only operate the ADF at temperatures between 23°F (–5°C) and 131°F (+55°C). If used outside of this range, the filter may not perform as designed and **may result in permanent eye injury and vision loss**.

SPECIFICATIONS

ADF Switching time	Less than 0.15 milliseconds (9002 V and X) 0.4 milliseconds (9002D) 0.65 milliseconds (Utility, 9000F and XF)
ADF Light state	Shade 3
ADF Off state	Shade 5-6
ADF Ultraviolet/Infrared	Protection at all times - non-switching

Dark Shades:	Utility: 10 or 11	
	9002D: 10 and 11	
	9000XF: 10, 11 or 12	
	9002V & X: 9, 10, 11, 12 and 13	
Viewing Area:	Utility, 9002D, 9002V: 3.57" x 1.68" (91 x 43mm)	
	9002X, 9000XF: 4.09" x 2.13" (104 x 54mm)	

Weight of Helmets - No ADF

Utility / 9000	327 g	0.7 lbs.
9000 FV	447 g	1.0 lbs.
9000 HWR	611 g	1.3 lbs.
9000 HWR FV	768 g	1.7 lbs.
ProTop	717 g	1.6 lbs.
ProTop FV	837 g	1.8 lbs.

SideWindows add 13 g or 0.03 lbs to the above

Weight of ADFs including protection plates

X size (9002X, 9000X, 9000XF)	191 g	0.42 lbs.
Regular size (Utility, 9002D, 9000V)	166 g	0.37 lbs.

Operating Temperature: 23°F to 131°F (-5°C to +55°C)

Battery Type: Two CR-2032 lithium 3V batteries

Battery Life:	Utility, 9000F, 9002D & 9002V:	2000 hours
	9000XF:	1000 hours
	9002X:	3000 hours
ADF Use temperature	-5°C (23°F) to +55°C (+131°F)	
Head sizes	Fits hat sizes 6.5 (20.25 inches) through 7.8 (24.5 inches)	
Shield and Retainer Material	Polyamide nylon	
ADF Housings	Polyamide nylon	

REPLACEMENT PARTS AND ASSEMBLIES

Replacement ADFs

04-0000-15	9002D ADF only
04-0000-(shade 10, 11 or 12)X	9000XF ADF only
04-0000-31	9002V ADF only
04-0000-21	9002X ADF only

ADF Replacement Parts

04-0270-00	3M™ Speedglas™ Outside Protection Plate 9000, 10 per case
04-0270-10X100	3M™ Speedglas™ Outside Protection Plate 9000, Standard-package of 100
04-0290-00	3M™ Speedglas™ Inside Protection Plate, 9000 & 9002 F & V size (small), 5 per case
04-0280-00	3M™ Speedglas™ Inside Protection Plate, 9000 & 9002 Series X size (large), 5 per case
02-0645-00	3M™ Speedglas™ Headcover, FR cotton, 1/Case
04-0480-00	3M™ Speedglas™ Accessory Kit 9000 X/XF, 5 Inside Plates and 2 Batteries
04-0490-00	3M™ Speedglas™ Accessory Kit 9000V/F, 5 Inside Plates and 2 Batteries
04-0320-00	3M™ Speedglas™ Battery, type CR-2032, package of 2
04-0380-00	3M™ Speedglas™ Battery Holders, Blue, 2 per case

ADF Accessories

04-0290-01	3M™ Speedglas™ Inside Protection Plate, Shade 1*, for Utility and 9002D models, 5 pack

04-0290-02 3M™ Speedglas™ Inside Protection Plate, Shade 2*, for Utility and 9002D models, 5 pack
04-0280-01 3M™ Speedglas™ Inside Protection Plate, Shade 1* for 9000XF & 9002X, 5 pack
04-0280-02 3M™ Speedglas™ Inside Protection Plate, Shade 2* for 9000XF & 9002X, 5 pack
04-0270-03 3M™ Speedglas™ Outside Protection Plate, High Density, Scratch Resistant, 5 pack
04-0270-04 3M™ Speedglas™ Outside Protection Plate 9000, High Temperature 5 pack

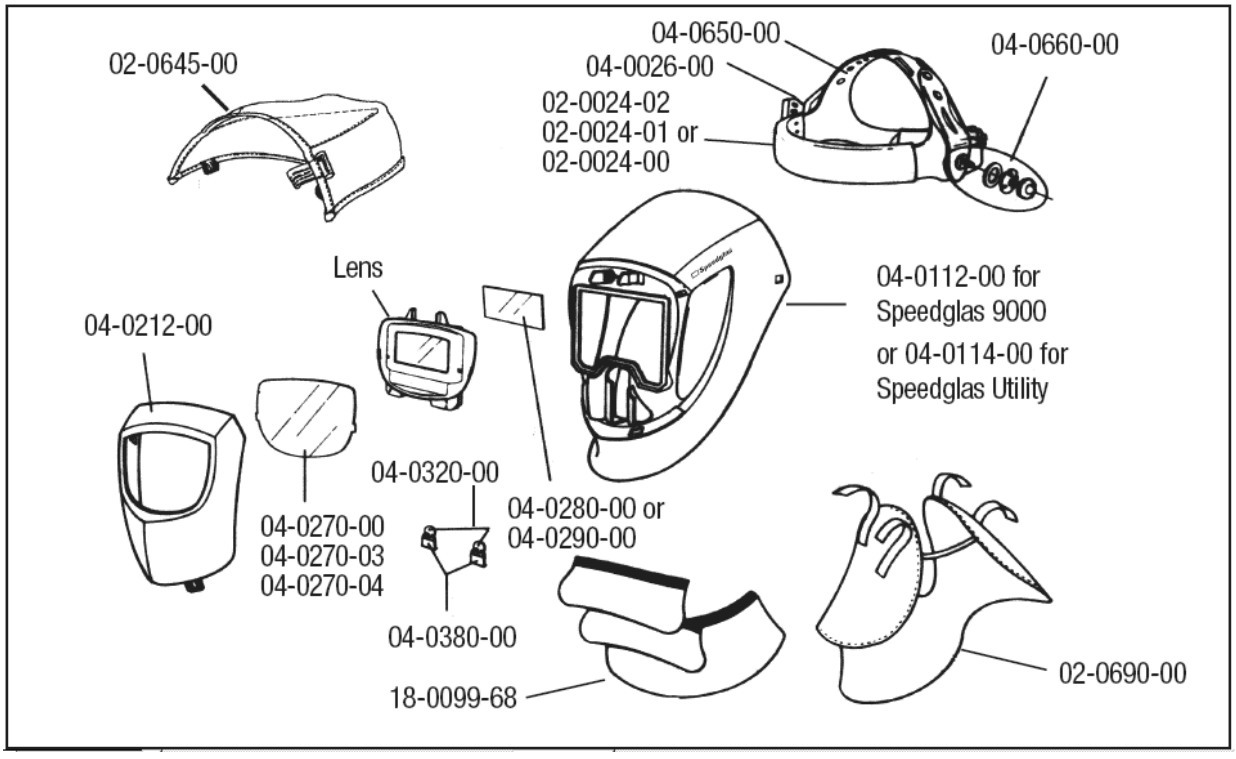
* Total shade level must not exceed shade #13. Do not use Shaded Inside Protection Plates for either 9002V or 9002X ADFs.

Helmet Replacement Parts

04-0012-00 3M™ Speedglas™ Helmet 9000 Assembly, with Headband
04-0112-00 3M™ Speedglas™ Helmet Inner Shell 9000, Shield only
04-0014-00 3M™ Speedglas™ Utility Helmet with Headband
04-0114-00 3M™ Speedglas™ Utility Helmet Inner Shell
04-0212-00 3M™ Speedglas™ Silver Front Panel
04-0650-00 3M™ Speedglas™ Headband and Mounting Hardware
04-0660-00 3M™ Speedglas™ Headband Mounting Hardware 9000
04-0026-00 3M™ Speedglas™ Headband Pivot "S" Stop (Right), package of 10
04-0126-00 3M™ Speedglas™ FlexView Headband Pivot "S" Stop (Left), package of 10
02-0024-02 3M™ Speedglas™ Replacement Sweatband, Cloth
02-0024-01 3M™ Speedglas™ Replacement Sweatband, Leather
02-0024-00 3M™ Speedglas™ Sweatband, Plastic

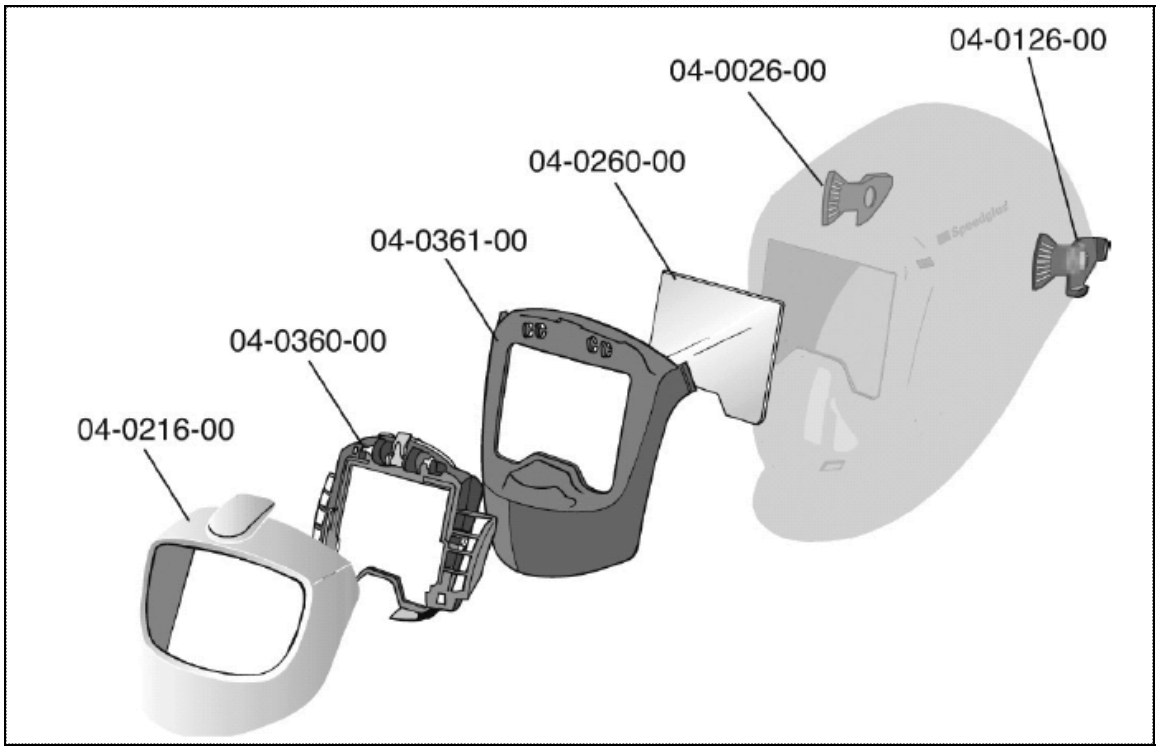
3M™ Speedglas™ Helmet Accessories

02-0645-00 3M™ Speedglas™ Headcover
18-0099-68 3M™ Speedglas™ Throat and Side Protector, Leather
02-0690-00 3M™ Speedglas™ Throat Protector, FR Cotton
02-0014-00NR 3M™ Speedglas Hard Hat Adapter
02-0023-00 3M™ Speedglas™ Hard Hat with Mounting Hardware



3M™ Speedglas ™ FlexView Replacement Parts

04-0026-00	3M™ Speedglas™ Headband Pivot "S" Stop (Right), package of 10
04-0126-00	3M™ Speedglas™ FlexView Headband Pivot "S" Stop (Left), package of 10
04-0116-00	3M™ Speedglas™ FlexView Inner Shell
04-0116-00SW	3M™ Speedglas™ FlexView Inner Shell with SideWindows
04-0260-00	3M™ Speedglas™ FlexView Protection Plate, package of 10
04-0361-00	3M™ Speedglas™ FlexView Middle Headgear Panel
04-0360-00	3M™ FlexView Welding Auto-Darkening Filter Holder
04-0216-00	3M™ Speedglas™ FlexView Front Panel



ADJUSTMENT OF HELMET & VIEWING POSITION

1) Adjust the overhead band to one of the custom fit positions for proper shield depth and to ensure balance and stability (Figure 1). The headband also has a ratcheted knob to increase or decrease its circumference.

2) Check for proper viewing position. The recommended viewing angle between the face and shield is 10° to 12° (Figure 2). To adjust the viewing angle, follow step 3.

3) Position the headband pivot stop so the peg on the side of the welding helmet (Figure 3) goes through one of the slots in the stop to obtain the desired viewing angle.

ADF FUNCTION

ON/OFF Operation

To turn the ADF on, simply press the ON button. The ADF automatically turns off 60 minutes after the last arc (30 minutes for the Utility and 9000XF models). The ADF can also be turned off manually by pressing the ON

button for two seconds. The 9002D, 9002V and 9002X ADFs have an extra feature: After each short press of the ON button, the current settings (shade, sensitivity and delay) are displayed by flashing LED's.

Dark Shade Selection (9002D, 9002V and 9002X only)

Up to five different dark shade levels are available to the user: 9, 10, 11, 12 and 13, depending on the ADF model. Check with the Shade Guide below to determine the proper dark shade setting for your application. In order to see which shade the welding filter is currently set to, momentarily press the shade button. To select another shade, keep pressing the shade button while the LED is flashing until the LED indicates the desired setting.

Sensitivity Selection (9002D, V and X ADFs)

The photo-sensor system detects the welding arc and triggers the ADF to switch to the dark state. The sensors are designed to respond welding arcs and not to normal ambient lighting or sunlight. To change the sensitivity setting, press the sensitivity button repeatedly until the LED indicates the desired setting.

9002V and X:

Position 1	Low sensitivity - for welding in groups.
Position 2	Normal sensitivity - for typical SMAW, MIG and TIG welding indoors and outdoors.
Position 3	High sensitivity - for low current or stable arcs (e.g. TIG welding at low amps)
Position 4	Very high sensitivity - for very low current, stable arcs and partially blocked arcs

9002D:

Low:	Normal sensitivity - for typical SMAW, MIG and TIG welding indoors and outdoors.
High:	High sensitivity - for low current or stable arcs (e.g. TIG welding at low amps)

Finding the right sensitivity setting (9002V and X ADFs)

In order to find a suitable sensitivity setting, start with setting 2. This is the correct setting for most applications. If the filter does not darken reliably while welding, change to setting 3 or 4 until reliable switching is achieved. If the sensitivity is set too high, the filter might switch to the dark state in response to ambient lighting. If the ADF is being used in close proximity to other welding arcs, it may be necessary to switch to position 1 to avoid interference or "false triggering."

Setting the Delay

The delay setting controls the speed at which the filter returns to the light state after welding has stopped. In order to see which position it is currently set to, momentarily press the delay button. To select another setting, keep pressing the delay button while the LED is flashing until the LED indicates the desired setting.

Position ─ Fast recovery to light state - for spot or tack welding where the welder needs to have a clear view quickly after finishing the weld.

Position │ Normal position.

Position + Delayed recovery to light state - for high amperage applications where bright weld pools must cool briefly before viewing.

Gas Welding and Cutting

3M™ Speedglas™ ADFs can be used for gas welding and cutting when in the OFF state. The ADF is shade 5-6 when OFF.

Replacing the Outer Protection Plate

1) Remove the silver front panel by pulling one of its upper corners away from the shield (Figure 4). Lift out the old ADF protection plate.
2) Remove the protective film from both sides of the new protection plate, if applicable. Place the new plate into position, sliding its tabs into the ADF's two slots (Figure 5).
3) Place the silver front panel back into position by inserting its two bottom tabs into the openings in the shield shell (Figure 6). "Hook" one of the upper corners of the panel onto the shield. Then, using your thumb, push the opposite corner until it snaps into place (Figure 7).

Replacing the Inner Protection Plate

1) To replace the inner protection plate, first lift out the old plate (Figure 8).

2) Remove the protective film from both sides of the new plate. Insert the two corners of one side of the plate into the corner "pockets" of the ADF. Flex the protection plate so you can insert the other two corners into the opposite end pockets (Figure 9).

Installing Magnification Plates

A standard 4.25 x 2 inch magnification plate, available from your local welding distributor, can be used with all 3M™ Speedglas™ welding helmets.* Simply remove the silver front panel and outer protection plate, place the magnifying plate in front of the ADF cassette, and then re-install the outer protection plate and silver front panel. No special adapter or retainer is needed.

*Note: Do NOT use magnifying plates that do not fit under the outer protection plate. The outer protection plate MUST be fully seated with its two tabs inserted into the ADF's two slots (Figure 5).

Removing the ADF Cassette/Changing The Batteries

Batteries should be replaced when the ADF does not turn noticeably lighter (shade 5 to 3) when switched on. In addition, all 9002 models have a low battery indicator that will flash repeatedly when the battery should be replaced. To change batteries, remove the silver front panel and then remove the ADF cassette from the helmet by squeezing the two tabs at the top of the ADF cassette (Figure 10). At the bottom of the ADF cassette, there are two battery compartments. Carefully pry open the compartments using a small flathead screwdriver. The battery holders slide straight out; do not use excessive force nor insert the screwdriver farther than necessary when opening the compartments. Remove the two batteries and dispose of them according to local regulations. Insert the new batteries (type CR-2032, Speedglas part no. 04-0320-00) into the battery holders (Figure 11). Push the holders into the ADF cassette until they snap into position. NOTE: always replace both batteries at the same time. Reassemble as described under "Replacing the Outer Protection Plate."

Installing the ADF Cassette (except FlexView - see special instructions below)

1) Insert the ADF cassette bottom first so that the two retaining tabs fit over the edge of the opening in the shell (Figure 12)
2) Push the upper part of the ADF cassette towards the shell until the tabs at the top lock into the clips on the shell (figure 13).
3) Use a bright light to check for light leaks around the ADF cassette. Re-instll as necessary. Do not begin welding until all light leaks are corrected.

Instructions for FlexView Assemblies (equipped models only)

Disassembly

- To remove the lens assembly (consisting of the silver front panel, the 9000 lens, and the ADF holder), first lift it into the up position so it rests on top of the helmet. Then slide the entire spring assembly to your left

until it snaps into the unlocked position (Fig 14). Remove the silver front panel assembly from the middle helmet panel.

- To remove the FlexView welding ADF holder, remove the rubber locking wedges from the inside of the four retention tabs (Fig 15). Squeeze the two top and the two side tabs together (Fig 16). The ADF holder can then be separated from the FlexView silver front panel.
- To replace the ADF cover plate or batteries, the ADF must be removed from the ADF holder. To do so, gently pull on the top of the ADF holder while pulling the ADF in the opposite direction (Fig 17). The ADF and holder will snap apart.
- To remove the FlexView middle helmet panel, pull one of its upper corners away from the helmet (Fig 18). The FlexView protection plate can then be removed for replacement (Fig 19).

Assembly

- To install the lens into the lens holder, first align the lens's two bottom tabs with the two corresponding ridges at the bottom of the lens holder opening (Fig 20). Once both of the slots are seated on the ridges, slowly press together the top of the lens holder with the top of the lens; they will snap together securely.
- Remove the protective film from both sides of the new FlexView protection plate (Fig 21) prior to its installation.
- Lay the new FlexView protection plate into the opening on the FlexView inner shell so the plate rests in the opening.
- Reinstall the FlexView middle helmet panel by first inserting its two bottom tabs into the inner shell (Fig 22). Next, push the middle helmet panel's two top corners until they snap-lock onto the inner shell.
- Reinstall the ADF holder with ADF into the FlexView silver front panel by aligning the four holes on the lens holder with the four tabs on the black side of the silver front panel. Secure one corner at a time by pushing together the lens holder and silver panel so each tab snap-locks (Fig 23). From the inside, reinstall the rubber locking wedges in the slot at the tip of the retention tabs.
- Place the lens assembly on top of the helmet. Align the four oval slots on the spring assembly with the four knobs on the middle helmet panel (Fig 24). Recheck the alignment prior to sliding the spring assembly to your right. If properly aligned, the assembly will snap securely onto the middle helmet panel.
- Use a bright light to check for light leaks around the ADF cassette and FlexView assembly. Re-install as necessary. Do not begin welding until all light leaks are corrected.

Note: Standard (non-FlexView) Speedglas helmets can be converted to FlexView systems by using the components supplied with the FlexView Replacement Kit 04-0460-00. To accommodate the FlexView Middle Helmet Panel 04-0361-00, the two ADF retainer clips must be removed from the Inner Shell using a diagonal cutting pliers or similar tool.

INSPECTION

Carefully inspect welding filters before each use. Cracked, pitted or scratched filter glass or protection plates can seriously impair protection and reduce vision. The sensors on the ADF must be kept clean and uncovered at all times to provide correct function. Check for cracks in the shield and look for light leaks. All damaged components should be replaced immediately.

⚠WARNING

Before each use, perform the inspection described in these *User Instructions* to ensure that all components are installed and functioning as intended. Use of 3M™ welding helmet assemblies that do not meet these inspection requirements or failure to use genuine 3M™ Speedglas™ replacement parts **may result in permanent eye injury and vision loss**.

Do not use welding filters that are cracked, pitted or otherwise damaged as these conditions may compromise eye/face impact protection and may allow harmful UV and IR radiation to pass through **causing permanent eye injury and vision loss.**

Checking for Proper ADF Operation:

Under normal lighting conditions (not welding), look through the ADF and press the ON button. The ADF should change from the off state of shade 5-6 to the ON / light state of 3. If the ADF does not turn light, replace the batteries and re-test. Optionally, the ADF can be observed switching between light and dark states by pointing any television or VCR remote control device at the ADF sensors. The infrared signal produced by these remote controls is a safe substitute for a welding arc.

NOTE: If the ADF does not function as described above, immediately contact your supervisor or 3M representative.

CLEANING AND STORAGE

Clean the welding helmet with mild soap and lukewarm water. Do not use solvents. Clean the welding filter with a clean, lint-free tissue or cloth. Do not immerse ADFs in water or spray directly with liquids. Store equipment in a clean dry and dust-free environment at room temperature.

Table 1. Recommended Guide for Shade Numbers (Adapted from ANSI Z49.1-2003)

Operation	Electrode diameter inches	Arc current, amps	Minimum Protective Shade	Recommended Shade Number
Shielded metal arc	< 3	< 60	7	---
	3-5	60-160	8	10
	5-8	160-250	10	12
	> 8	250-550	11	14
Gas-metal-arc welding		< 60	7	---
		60-160	10	11
		160-250	10	12
		250-500	10	14
Gas-tungsten-arc		< 50	8	10
		50-150	8	12
		150-500	10	14
Air-carbon-arc cutting		< 500	10	12
		500-1000	11	14
Plasma-arc welding		< 20	6	6-8
		20-100	8	10
		100-400	10	12
		400-800	11	14
Plasma-arc cutting		< 300	8	9
		300-400	9	12
		400-800	10	14
Torch brazing				3-4
Torch soldering				2

Carbon arc welding				14
Plate thickness, inches				
Gas welding	< 1/8			4-5
	1/8-1/2			5-6
	> 1/2			6-8
Oxygen cutting	< 1			3-4
	1-6			4-5
	> 6			5-6

TROUBLESHOOTING

Condition	Possible Solutions
ADF will not turn ON	Make sure the batteries are installed properly
	Make sure the correct batteries are being used (CR2032)
	Try replacing both batteries with new batteries, then checked the Low Battery indicator
ADF shuts OFF and won't turn back on	Try replacing both batteries with new batteries, then checked the Low Battery indicator
ADF does not trigger reliably or turns light intermittently while welding	Check that the protective film has been removed from both sides (if applicable) of the outer protection plate
	Verify that the two sensors on the front of the ADF are not blocked by weld spatter, hands, pipes or object being welded
	Are you using the right 3M™ Speedglas™ ADF model? The 3M™ Speedglas™ Utility ADF is not recommended for welding processes other than MIG (GMAW) and Stick (SMAW).
	Review the sensitivity adjustment instructions and confirm that you are using the appropriate setting for your type of welding process
ADF turns dark when others are welding nearby	Reduce sensitivity. If this is still occurring at setting 1, use curtains or other methods to block light from other welder's arcs.
ADF steadily pulsing light/dark with no arc present.	Check surrounding area for process or safety strobe lights. Strobe lights can trigger ADFs from a long distance or by reflecting off ceilings. Reflected light from strobes not visible to the eye may be strong enough to trigger the ADF.
ADF is "blurry"	Check that the protective film has been removed from both sides (if applicable) of the outer protection plate
ADF has spatter bonded to the outside and/or inside glass surface	ADF is permanently damaged and not covered by warranty. Always use outside and inside protection plates.

NetZeroTools
800-577-6389
www.netzerotools.com

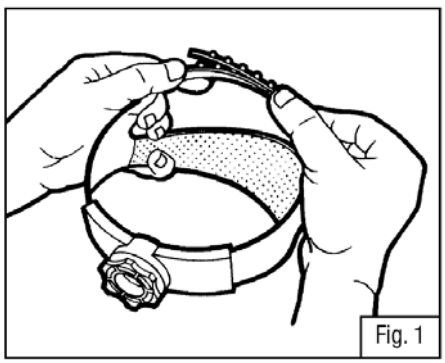


Fig. 1

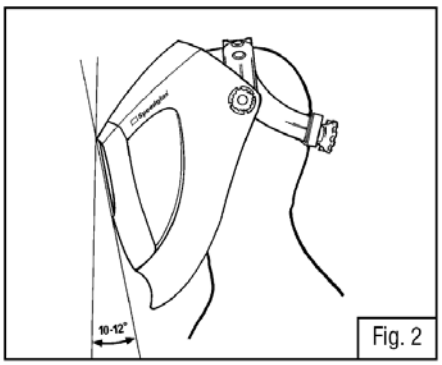
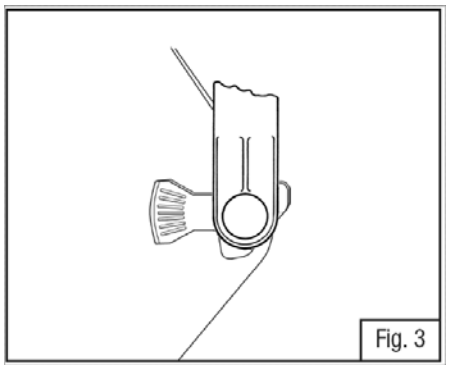


Fig. 2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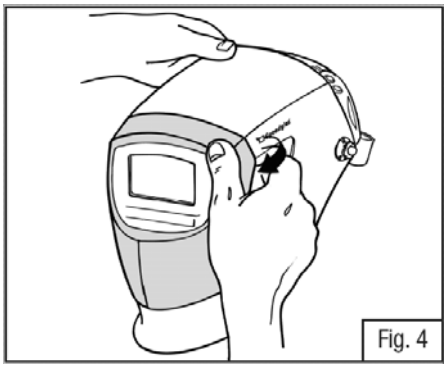
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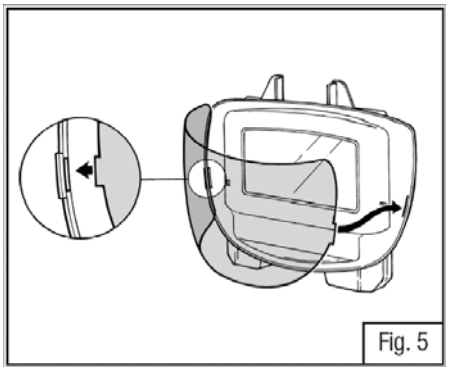
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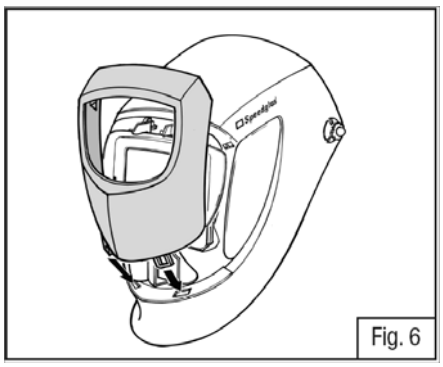
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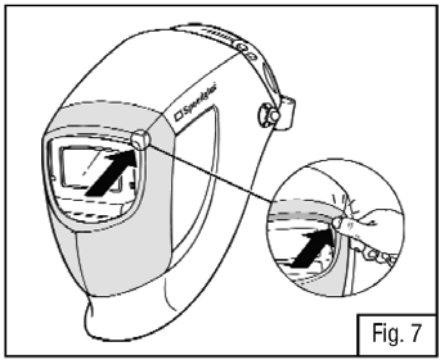
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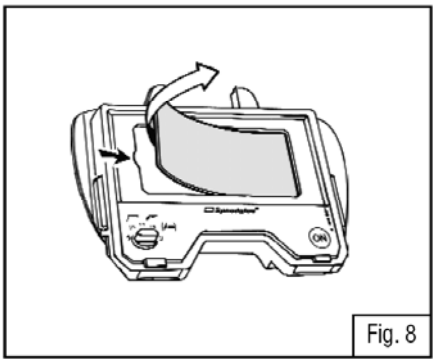
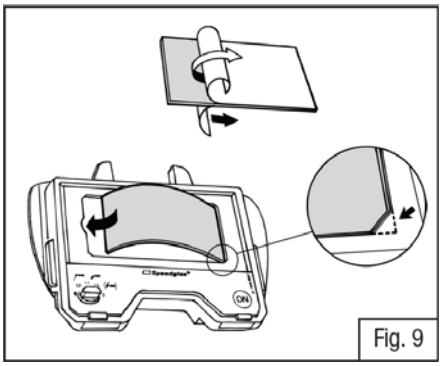


Fig. 8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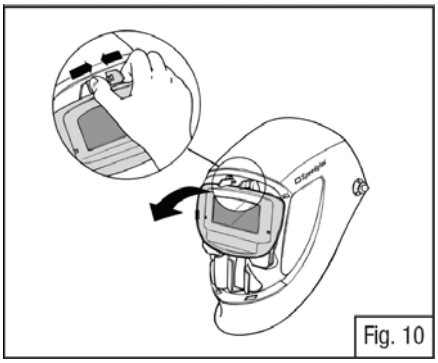
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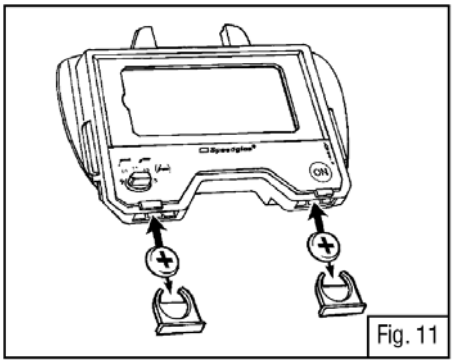
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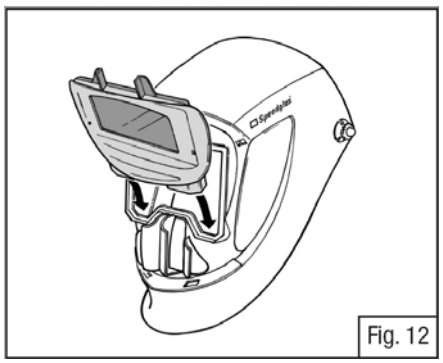
Fig. 12

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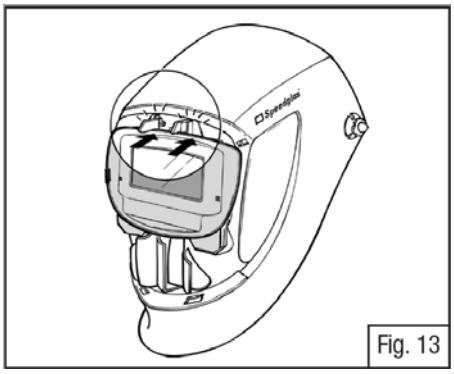
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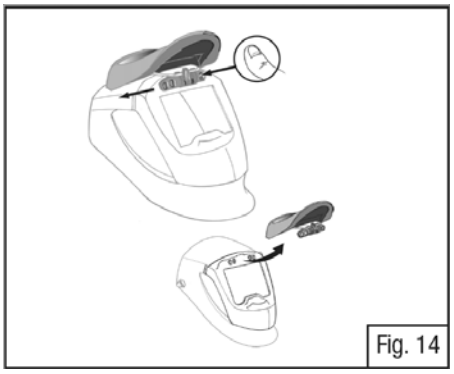
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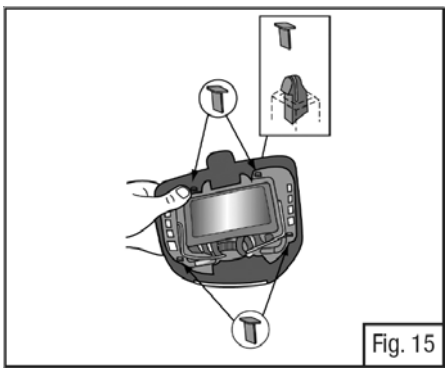
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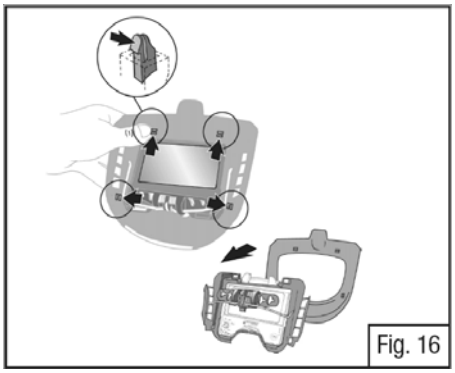
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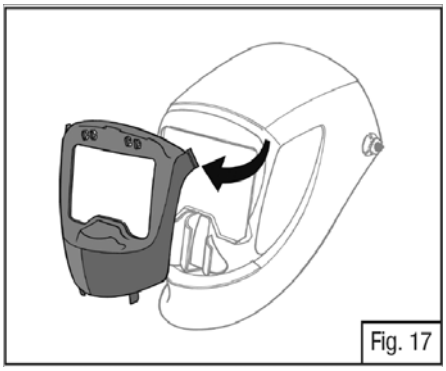
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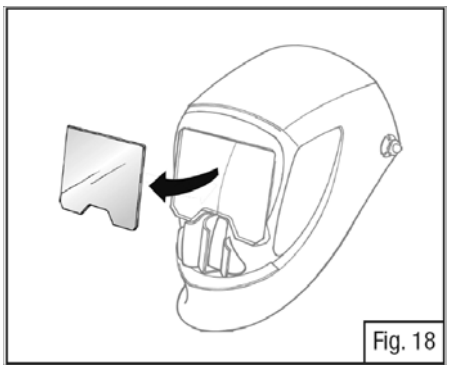
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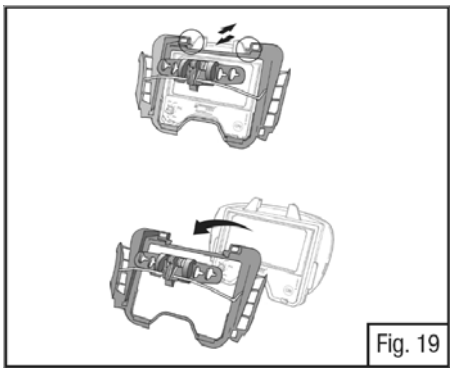
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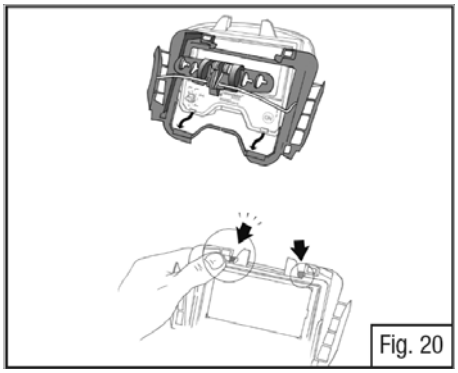
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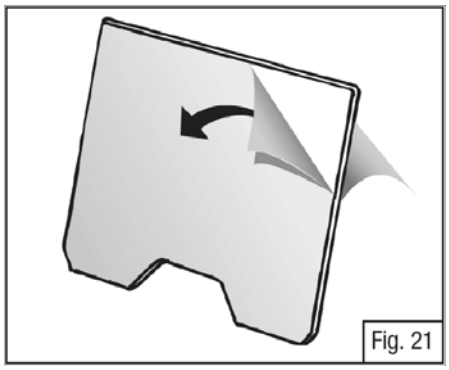
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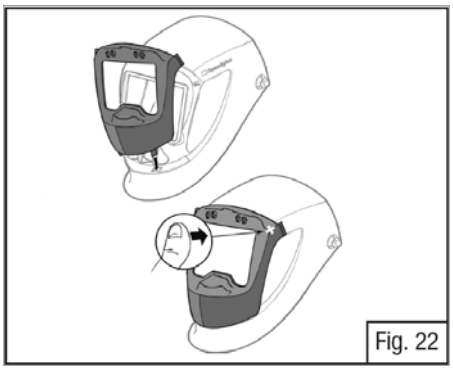
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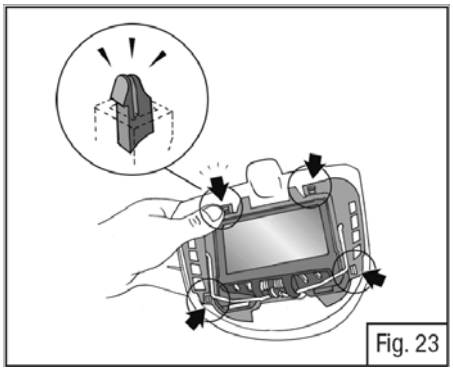
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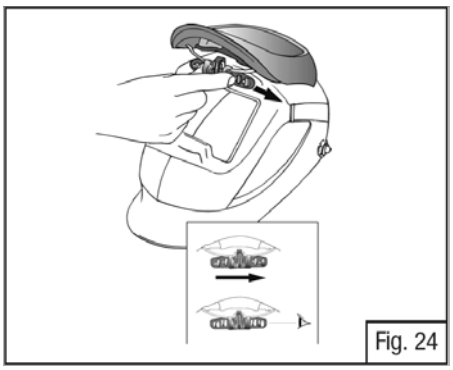
Fig. 24

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