INSTRUCTION MANUAL

VIKING™ 3350 SERIES



For use with Product/Code Numbers:

K3034-4, K3039-4, K3100-4, K3101-4, K3175-4, K3248-4, K3255-4, K3428-4, K3616-4, K3683-4, K4034-4, K4158-4, K4181-4, K4412-4, K4440-4, K4671-4

Save for future reference

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THE LINCOLN ELECTRIC COMPANY
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SAFETY INFORMATION

SAFETY DEPENDS ON YOU

Lincoln welding, cutting, and heating equipment is designed and built with safety in mind. However, your overall safety can be increased by proper installation and thoughtful operation on your part. DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT WITHOUT READING THIS MANUAL AND THE SAFETY PRECAUTIONS CONTAINED THROUGHOUT. And, most importantly, think before you act and be careful.

⚠ DANGER

This statement indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

This statement indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

This statement indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice: This statement indicates the possibility of damage to equipment if the potential risk is not avoided.

PLEASE EXAMINE CARTON AND EQUIPMENT FOR DAMAGE IMMEDIATELY

When this equipment is shipped, title passes to the purchaser upon receipt by the carrier. Consequently, claims for material damaged in shipment must be made by the purchaser against the transportation company at the time the shipment is received.

KEEP YOUR HEAD OUT OF THE FUMES



- **DON'T** get too close to the weld. Use corrective lenses if necessary to stay a reasonable distance away from the weld.
- **USE ENOUGH VENTILATION** or exhaust at the weld, or both, to keep the fumes and gases from your breathing zone and the general area.
- **IN A LARGE ROOM OR OUTDOORS** , natural ventilation may be adequate if you keep your head out of the fumes.
- **USE NATURAL DRAFTS** or fans to keep the fumes away from your face.
- **READ** and obey the Safety Data Sheet (SDS) and the warning label that appears on all containers of welding materials.

If you develop unusual symptoms, see your supervisor. Perhaps the welding atmosphere and ventilation system should be checked.

WEAR CORRECT EYE, EAR AND BODY PROTECTION



- **PROTECT** your eyes and face with properly fitted and with proper grade of filter plate (See ANSI Z49.1).
- **PROTECT** your body from welding spatter and arc flash with protective clothing including woolen clothing, flame-proof apron and gloves, leather leggings, and high boots.
- **PROTECT** others from spatter, flash, and glare with protective screens or barriers.
- **PROTECT** your eyes and face with welding helmet
- **IN SOME AREAS**, protection from noise may be appropriate.
- **BE SURE** protective equipment is in good condition.



- **AT ALL TIMES**, wear safety glasses in work area.
- **DO NOT WELD, CUT, OR HEAT** containers or materials which previously had been in contact with hazardous substances unless they are properly cleaned. This is extremely dangerous.

- **DO NOT WELD, CUT, OR HEAT** painted or plated parts unless special precautions with ventilation have been taken. They can release highly toxic fumes or gases.
- **PROTECT** compressed gas cylinders from excessive heat, mechanical shocks, and arcs; fasten cylinders so they cannot fall.
- **BE SURE** cylinders are never grounded or part of an electrical circuit.
- **REMOVE** all potential fire hazards from welding area.



- **ALWAYS HAVE FIRE FIGHTING EQUIPMENT READY FOR IMMEDIATE USE AND KNOW HOW TO USE IT.**

CALIFORNIA PROPOSITION 65 WARNINGS

⚠ WARNING



Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects, or other reproductive harm.

Always start and operate the engine in a well-ventilated area.

If in an exposed area, vent the exhaust to the outside.

Do not modify or tamper with the exhaust system.

Do not idle the engine except as necessary.

⚠ WARNING



This product, when used for welding or cutting, 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 § 25249.5 et seq.)

For more information go to https://www.p65warnings.ca.gov

ARC WELDING CAN BE HAZARDOUS

PROTECT YOURSELF AND OTHERS FROM POSSIBLE SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. PACEMAKER WEARERS SHOULD CONSULT WITH THEIR DOCTOR BEFORE OPERATING.

Read and understand the following safety highlights. For additional safety information, it is strongly recommended that you purchase a copy of "Safety in Welding & Cutting - ANSI Standard Z49.1" from the American Welding Society, P.O. Box 351040, Miami, Florida 33135 or CSA Standard W117.2. A Free copy of "Arc Welding Safety" booklet E205 is available from the Lincoln Electric Company, 22801 St. Clair Avenue, Cleveland, Ohio 44117-1199.

BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.

FOR ENGINE POWERED EQUIPMENT



- Turn the engine off before troubleshooting and maintenance work unless the maintenance work requires it to be running.
- Do not add the fuel near an open flame welding arc or when the engine is running. Stop the engine and allow it to cool before refueling to prevent spilled fuel from vaporizing on contact with hot engine parts and igniting. Do not spill fuel when filling tank. If fuel is spilled, wipe it up and do not start engine until fumes have been eliminated.



- Keep all equipment safety guards, covers and devices in position and in good repair. Keep hands, hair, clothing and tools away from V-belts, gears, fans and all other moving parts when starting, operating or repairing equipment.



- In some cases it may be necessary to remove safety guards to perform required maintenance. **REMOVE GUARDS ONLY** when necessary and replace them when the maintenance requiring their removal is complete. Always use the greatest care when working near moving parts.
- **DO NOT** put your hands near the engine fan. Do not attempt to override the governor or idler by pushing on the throttle control rods while the engine is running.
- To prevent accidentally starting gasoline engines while turning the engine or welding generator during maintenance work, disconnect the spark plug wires, distributor cap or magneto wire as appropriate.



- To avoid scalding, do not remove the radiator pressure cap when the engine is hot.
- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.



- Using a generator indoors **CAN KILL YOU IN MINUTES**.
- **NEVER** use inside a home or garage, EVEN IF doors and windows are open.



- **ONLY** use **OUTSIDE** and far away from windows, doors and vents.
- Avoid other generator hazards. **READ MANUAL BEFORE USE**.

ELECTRIC AND MAGNETIC FIELDS MAY BE DANGEROUS



- Electric current flowing through any conductor causes localized Electric and Magnetic Fields (EMF). Welding and heating current creates EMF fields around cables and equipment.
- EMF fields may interfere with some pacemakers, and welders having a pacemaker should consult their physician before welding.
- Exposure to EMF fields in welding may have other health effects which are now not known.

All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

- Route the electrode and work cables together - Secure them with tape when possible.
- Never coil the electrode lead around your body.
- Do not place your body between the electrode and work cables. If the electrode cable is on your right side, the work cable should also be on your right side.
- Connect the work cable to the workpiece as close as possible to the area being welded.
- Do not work next to welding power source.

ELECTRIC SHOCK CAN KILL



- The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.
- Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

In addition to the normal safety precautions, if welding must be performed under electrically hazardous conditions (in damp locations or while wearing wet clothing; on metal structures such as floors, gratings or scaffolds; when in cramped positions such as sitting, kneeling or lying, if there is a high risk of unavoidable or accidental contact with the workpiece or ground) use the following equipment:

- Semiautomatic DC Constant Voltage (Wire) Welder.
- DC Manual (Stick) Welder.
- AC Welder with Reduced Voltage Control.
- In semiautomatic or automatic wire welding, the electrode, electrode reel, welding head, nozzle or semiautomatic welding gun are also electrically “hot”.
- Always be sure the work cable makes a good electrical connection with the metal being welded. The connection should be as close as possible to the area being welded.
- Ground the work or metal to be welded to a good electrical (earth) ground.
- Maintain the electrode holder, work clamp, welding cable and welding machine in good, safe operating condition. Replace damaged insulation.
- Never dip the electrode in water for cooling.

- Never simultaneously touch electrically “hot” parts of electrode holders connected to two welders because voltage between the two can be the total of the open circuit voltage of both welders.
- When working above floor level, use a safety belt to protect yourself from a fall should you get a shock.
- **Also see** WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION **and** FOR ELECTRICALLY POWERED EQUIPMENT

ARC RAYS CAN BURN



- Use a shield with the proper filter and cover plates to protect your eyes from sparks and the rays of the arc when welding or observing open arc welding. Headshield and filter lens should conform to ANSI Z87.1 standards.
- Use suitable clothing made from durable flame-resistant material to protect your skin and that of your helpers from the arc rays.
- Protect other nearby personnel with suitable, non-flammable screening and/or warn them not to watch the arc nor expose themselves to the arc rays or to hot spatter or metal.

FUMES AND GASES CAN BE DANGEROUS



Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. When welding, keep your head out of the fume. Use enough ventilation and/or exhaust at the arc to keep fumes and gases away from the breathing zone.

- **When welding hardfacing (see instructions on container or SDS) 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 unless exposure assessments indicate otherwise. In confined spaces or in some circumstances, outdoors, a respirator may also be required. Additional precautions are also required when welding on galvanized steel.**
- The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.
- Do not weld in locations near chlorinated hydrocarbon vapors coming from degreasing, cleaning or spraying operations. The heat and rays of the arc can react with solvent vapors to form phosgene, a highly toxic gas, and other irritating products.
- Shielding gases used for welding can displace air and cause injury or death. Always use enough ventilation, especially in confined areas, to insure breathing air is safe.
- Read and understand the manufacturer’s instructions for this equipment and the consumables to be used, including the Safety Data Sheet (SDS) and follow your employer’s safety practices. SDS forms are available from your welding distributor or from the manufacturer.
- Also see FOR ENGINE POWERED EQUIPMENT

WELDING AND CUTTING SPARKS CAN CAUSE FIRE OR EXPLOSION



- Remove fire hazards from the welding area. If this is not possible, cover them to prevent the welding sparks from starting a fire. Remember that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas. Avoid welding near hydraulic lines. Have a fire extinguisher readily available.
- Where compressed gases are to be used at the job site, special precautions should be used to prevent hazardous situations. Refer to **“Safety in Welding and Cutting” (ANSI Standard Z49.1)** and the operating information for the equipment being used.

- When not welding, make certain no part of the electrode circuit is touching the work or ground. Accidental contact can cause overheating and create a fire hazard.
- Do not heat, cut or weld tanks, drums or containers until the proper steps have been taken to ensure that such procedures will not cause flammable or toxic vapors from substances inside. They can cause an explosion even though they have been “cleaned”. For information, purchase “Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances”, **AWS F4.1** from the American Welding Society.
- Vent hollow castings or containers before heating, cutting or welding. They may explode.
- Sparks and spatter are thrown from the welding arc. Wear oil free protective garments such as leather gloves, heavy shirt, cuff-less trousers, high shoes and a cap over your hair. Wear ear plugs when welding out of position or in confined places. Always wear safety glasses with side shields when in a welding area.
- Connect the work cable to the work as close to the welding area as practical. Work cables connected to the building framework or other locations away from the welding area increase the possibility of the welding current passing through lifting chains, crane cables or other alternate circuits. This can create fire hazards or overheat lifting chains or cables until they fail.
- **Read and follow NFPA 51B** “Standard for Fire Prevention During Welding, Cutting and Other Hot Work”, available from NFPA, 1 Batterymarch Park, PO box 9101, Quincy, MA 022690-9101.
- **DO NOT** use a welding power source for pipe thawing.

CYLINDER MAY EXPLODE IF DAMAGED



- Use only compressed gas cylinders containing the correct shielding gas for the process used and properly operating regulators designed for the gas and pressure used. All hoses, fittings, etc. should be suitable for the application and maintained in good condition.
- Always keep cylinders in an upright position securely chained to an undercarriage or fixed support.

Cylinders should be located:

- Away from areas where they may be struck or subjected to physical damage.
- A safe distance from arc welding or cutting operations and any other source of heat, sparks, or flame.
- Never allow the electrode, electrode holder or any other electrically “hot” parts to touch a cylinder.
- Keep your head and face away from the cylinder valve outlet when opening the cylinder valve.
- Valve protection caps should always be in place and hand tight except when the cylinder is in use or connected for use.
- Read and follow the instructions on compressed gas cylinders, associated equipment, and CGA publication P-l, “Precautions for Safe Handling of Compressed Gases in Cylinders,” available from the Compressed Gas Association, 14501 George Carter Way Chantilly, VA 20151.

FOR ELECTRICALLY POWERED EQUIPMENT



- Turn off input power using the disconnect switch at the fuse box before working on the equipment.
- Install equipment in accordance with the U.S. National Electrical Code, all local codes and the manufacturer’s recommendations.
- Ground the equipment in accordance with the U.S. National Electrical Code and the manufacturer’s recommendations.

BATTERY HANDLING, STORAGE, AND DISPOSAL



Batteries can be flammable substances such as lithium or other organic solvents, which may result in overheating, rupture, or combustion. Failure to follow the battery manufactures instructions may result in fire, personal injury, and damage to property if used improperly.

- DO NOT short circuit, disassemble, deform, or heat batteries.
- DO NOT attempt to recharge batteries unless they are specifically marked as "rechargeable".
- DO NOT use or charge the battery if it appears to be leaking, deformed or damaged in any way.
- Store in a cool location. Keep batteries away from direct sunlight, high temperature, and high humidity.
- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color, changes shape, or appears abnormal in any other way.
- Keep batteries out of reach of children, should a child swallow a battery, consult a physician immediately.
- Recycle or dispose of batteries in accordance with local and federal laws.

FOR LASER EMITTING EQUIPMENT



- Hazardous Class 4 (IV) laser products emit invisible, infrared laser radiation which can permanently damage the eye's retina and/or cornea, burn skin, and pose a fire risk. End users shall assign a qualified Laser Safety Officer (LSO) who has the certifications required by applicable law/standards, have a documented Laser Safety Program and have a Laser Controlled Area (LCA) that confirms to ANSI Z136.1 & Z136.9.
- Do not operate laser before end user's LSO has completed a risk assessment and all the prescribed Risk Mitigations measures have been fully implemented. Ensure the laser is operated/ demonstrated safely by trained personnel and that the environment surrounding the laser welding cell or laser-controlled area is safe for people nearby when the laser is in operation.
- Never point the laser at yourself or others. Never look directly into a laser aperture, even if wearing full eye protection.
- All persons inside LCA must wear proper PPE to avoid eye or skin exposure to laser radiation. The end user's LSO shall select proper PPE including, but not limited to, heat-resistant gloves, flame-resistant clothing, laser safety eye wear and laser-safe helmets that conform to ANSI Z136.1 Optical Density requirements for the wavelength and output power of the laser in use. Standard safety glasses and welding helmets DO NOT provide adequate protection from laser beam hazards. Always inspect PPE for damage or improper fit before use.
- Only qualified persons shall install, operate or service this unit per ANSI Z136.1 standards and your LSO's instruction. Read and follow all labels and manuals before installing, operating, or servicing hand held any laser welding equipment.
- Do not operate outside of a LCA, or if the laser protective housing is modified or damaged, or if safety interlocks have been bypassed or otherwise defeated. Inspect all equipment and LCA for damage or tampering prior to use.
- Reflected beams from the laser can damage eyes and skin and can pose a fire risk. Prior to use, the LCA should be assessed by the LSO to understand the surfaces where hazardous reflected beams can exist. Never position yourself or flammable material in the anticipated laser beam path and take extra precautions when working on reflective materials like aluminum and stainless steel.
- Follow all standards, individual facility or building regulations, and national, state, and local codes.

DEALER LOCATOR & PRODUCT REGISTRATION

Register your machine:

https://www.lincolnelectric.com/register

Authorized Service and Distributor Locator:

https://www.lincolnelectric.com/locator

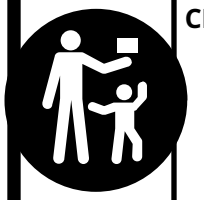
ADDITIONAL SAFETY INFORMATION

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

OPERATION

LITHIUM BATTERY WARNING

⚠ WARNING



CR2450 Battery (3V Li/MnO2)

INGESTION HAZARD: This product contains a button cell or coin battery.
DEATH or serious injury can occur if ingested.
A swallowed button cell or coin battery can cause Internal **Chemical Burns** in as little as 2 hours.
KEEP new and used batteries **OUT OF REACH OF CHILDREN**
Seek immediate medical attention if a battery is suspected to be swallowed or inserted inside any part of the body.

- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, or incinerate. Doing so may result in injury due to venting, leakage, or explosion resulting in chemical burns.
- Ensure the batteries are installed correctly according to polarity (+ and -).
- Do not mix old and new batteries, different brands or types of batteries, such as alkaline, carbon-zinc, or rechargeable batteries.
- Remove and immediately recycle or dispose of batteries from equipment not used for an extended period of time according to local regulations.
- Always completely secure the battery compartment. If the battery compartment does not close securely, stop using the product, remove the batteries, and keep them away from children.

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

HELMET INFORMATION

This Auto-Darkening Welding Helmet will automatically change from a light state (shade DIN2.5) 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 SHADE SETTINGS GUIDE on page A-5)

- 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.

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.

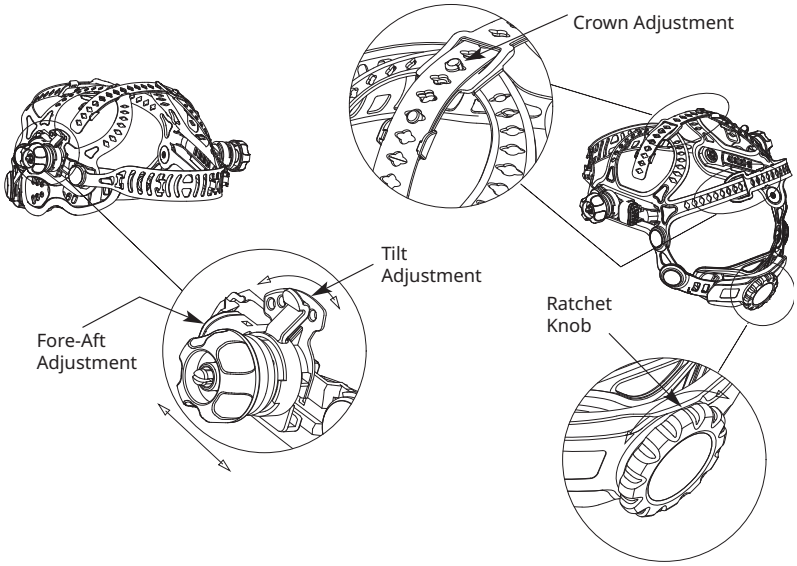
- Do not use solvents or abrasive cleaning detergent.
- If cover lens is spattered or covered with dirt, it should be replaced immediately.
- Use only replacement parts specified in this manual.
- Do not use the helmet without inside and outside cover lenses properly installed.

SPECIFICATIONS

SPECIFICATIONS	
Optical Class	1/1/1/1
LCD Viewing Area	95 x 85mm (3.74 x 3.34in.)
Cartridge size	114 x 133mm (4.50 x 5.25in.)
UV/IR Protection	Up to Shade DIN 16 at all times
Arc Sensors	4
Light State Shade	DIN 2.5
Variable Welding Shades	DIN 5 to 13
Shade Control	Dial knob - full adjustment
Power Supply	Solar cell with battery assist
Low Battery Warning	Red Light
Grind Warning	Green Light
Battery	CR2450 Lithium battery (1 Required)
Power On/Off	Fully automatic
Light to Dark Switching Time	0.00004 sec. (1/25,000 sec.)
Dark to Light Switching Time	0.1 sec. (Short) to 1.0 sec. (Long)
Sensitivity Control	Variable
TIG Rating	DC≥ 2 amps; AC≥ 2 amps
Operating Temperature	14°F ~ 131°F (-10°C ~ 55°C)
Storage Temperature	-4° ~ 158°F (-20°C ~ 70°C)
Total Weight	Black 606g (21.37 Oz.) Graphic 613g (21.62 Oz.)
Compliance[(1)]	ANSI Z87.1, CSA 94.3, EN 379, AS/NZS 1338.1

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

HEADGEAR ADJUSTMENT



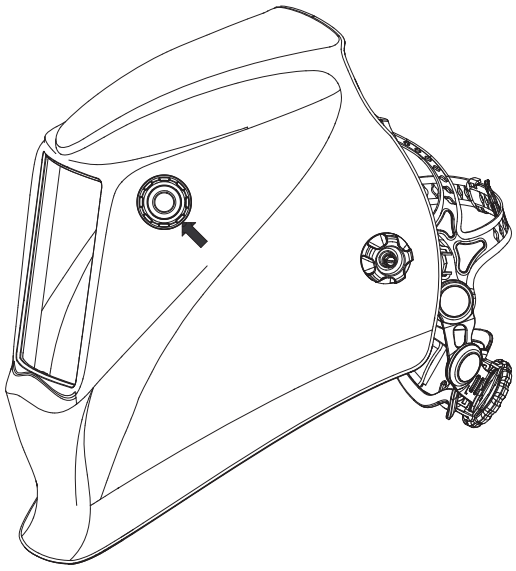
HEAD SIZE ADJUSTMENT: HEADGEAR TIGHTNESS is adjusted by pushing in the Ratchet Knob and turning to adjust for the desired head size. This knob is located at the back of the helmet. **HEADGEAR CROWN ADJUSTMENT** is made by adjusting for comfort and snapping the pin into the hole to lock securely in place.

TILT: Tilt adjustment is located on right side of 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 up or down 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, slide and hold the spring loaded caps upward while moving the headgear into one of four slotted locations. Once the desired distance has been achieved let go of the cap and it will return to its resting position once the adapter is secured in one of the four slots.

Note: Make sure both sides are equally positioned for proper operation.

GRIND BUTTON



In order to switch the Auto Darkening Filter from a Welding Shade into Grind Mode first locate the silicone button on the left side of the helmet. After the button has been located press and hold it for 3 seconds. A green LED on the cartridge should blink every 3 seconds after the button is pressed to indicate you are in Grind Mode. To switch back to the previous Welding shade setting simply press and hold the button for 3 seconds. Grind mode is intended for grinding only not for welding. Grind mode can also be selected by pressing the MODE button on the ADF cartridge to toggle between Weld and Grind Mode.

ADF CARTRIDGE OPERATION

Variable Shade Control

The shade can be adjusted from shade 5 to 8 and 9 to 13 based upon welding process or application (refer to SHADE SETTINGS GUIDE on page A-5). Shade is adjusted by pressing the Mode button to toggle between welding shades and cutting shades, then use the shade dual scale dial to set the desired shade. The mode button and dual scale dial are located on the ADF cartridge see Figure 1 : ADF Orientation on page A-5 .

Test Button

Press and hold test to preview shade selection before welding. When released the viewing window will automatically return to the light state (2.5 Shade).

Sensitivity Knob

Adjust the light sensitivity by turning the **SENSITIVITY** knob to the left or right as shown in the figure below. Turning the knob to the left increases sensitivity which makes the ADF cartridge more sensitive to light. When helmet is used in the presence of excess ambient light or with another welding machine close by, improved helmet performance can be obtained with a lower setting by turning the knob to the right to reduce the sensitivity.

Delay Time Knob

This control is designed to protect the welder's eyes from the strong residual rays after welding. Changing the **DELAY** knob will vary the dark to light time between 0.1 second (**S**) to 1.0 second (**L**). The **L** setting is recommended for high amperage applications where the weld puddle is still very bright after the welding arc has ceased and for situations where the filter may be temporarily blocked from seeing the welding arc.

Power

This ADF is powered by a replaceable battery and solar power. The battery is located at the bottom corner of the ADF cartridge. Replace battery when **LOW BATTERY** light is lit. See SPECIFICATIONS on page A-2 for type of battery required.

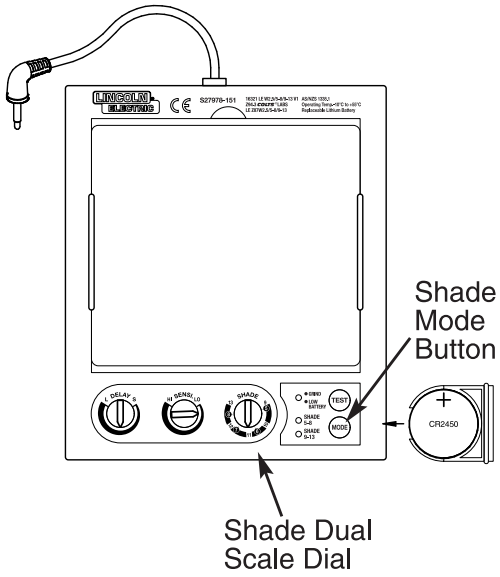


Figure 1 : ADF Orientation

SHADE SETTINGS GUIDE

Table 1 :GUIDE FOR SHADE NUMBERS

OPERATION	ELECTRODE SIZE 1/32in (mm)	ARC CURRENT (A)	MINIMUM PROTECTIVE SHADE	SUGGESTED[1] SHADE NO. (COMFORT)
Shielded metal arc welding	Less than 3 (2.5)	Less than 60	7	-
	3-5 (2.5-4)	60-160	8	10
	5-8 (4-6.4)	160-250	10	12
	More than 8 (6.4)	250-550	11	14
Gas metal arc welding and flux cored arc welding		Less than 60	7	-
		60-160	10	11
		160-250	10	12
		250-500	10	14

OPERATION	ELECTRODE SIZE 1/32in (mm)	ARC CURRENT (A)	MINIMUM PROTECTIVE SHADE	SUGGESTED[1] SHADE NO. (COMFORT)
Gas tungsten arc welding		Less than 50	8	10
		50-150	8	12
		150-500	10	14
Air carbon arc cutting	(Light)	Less than 50	10	12
	(Heavy)	500-1000	11	14
Plasma arc welding		Less than 20	6	6 to 8
		20-100	8	10
		100-400	10	12
		400-800	11	14
Plasma arc cutting	(Light)[2]	Less than 300	8	9
	(Medium)[2]	300-400	9	12
	(Heavy)[2]	400-800	10	14
Torch brazing		-	-	3 or 4
Torch soldering		-	-	2
Carbon arc welding		-	-	14

OPERATION	PLATE THICKNESS in. / (mm)	SUGGESTED[1] SHADE NO. (COMFORT)
Gas Welding:		
Light	Under 1/8 (3.2)	4 or 5
Medium	1/8 to ½ (3.2 to 12.7)	5 or 6
Heavy	Over ½ (12.7)	6 or 8
Oxygen Cutting:		
Light	Under 1 (25)	3 or 4
Medium	1 to 6 (25 to 250)	4 or 5
Heavy	Over 6 (150)	5 or 6

Note: [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.

Note: [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 2 : Cartridge Holder on page A-7 . 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. Remove ADF holder assembly per Figure 2 : Cartridge Holder on page A-7 . Remove shade cartridge from ADF holder. Place your fingernail in recess above 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 2 : Cartridge Holder on page A-7 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 3 : ADF Cartridge on page A-7 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 4 : Lens Cover on page A-7 . Shade cartridge must be removed from ADF holder to install magnifying lens.

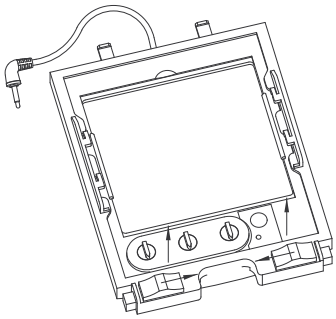


Figure 2 : Cartridge Holder

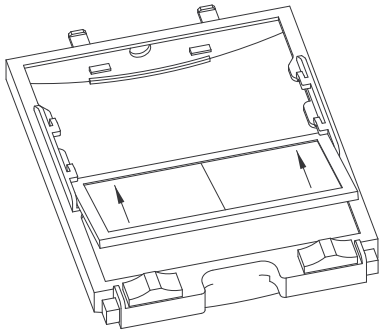


Figure 3 : ADF Cartridge

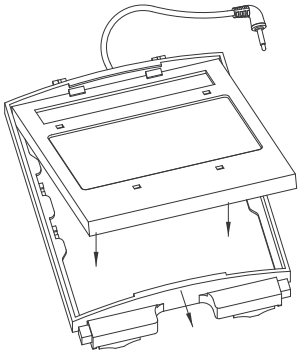


Figure 4 : Lens Cover

ACCESSORIES AND OPTIONS

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
KP3047-2	HALO HARD HAT ADAPTER	1
KP3486-2	SLOTTED HARD HAT ADAPTER	1

MAINTENANCE

HELMET CARE & 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.

TROUBLESHOOTING

BASIC TROUBLESHOOTING

⚠ WARNING



Cracked ADF Lens.

Cease (**STOP**) using this product, UV/IR protection may be compromised resulting in burns to the eyes and skin.

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.

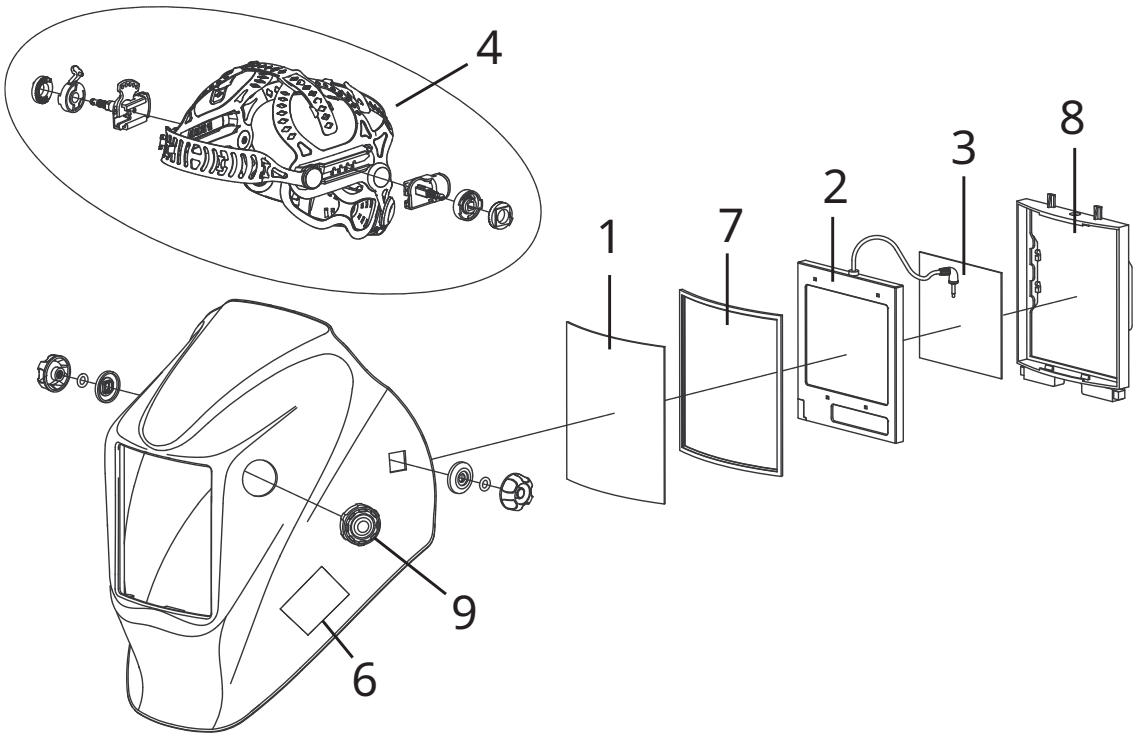
PROBLEM	POSSIBLE CAUSE	SOLUTION
Filter does not darken when TEST button is pushed	**1.** Low Battery **2.** Front cover lens dirty.	**1.** Replace Battery **2.** Clean or replace front cover lens.
Difficult to see through filter.	Cartridge dirty.	Clean the Auto-Darkening cartridge with soapy water solution and soft cloth.
Filter does not darken when arc is struck.	**1.** Sensitivity is set too low. **2.** Front cover lens dirty. **3.** Front cover lens is damaged. **4.** Sensors are blocked or Solar panel is blocked. **5.** Grind Mode Selected	**1.** Adjust sensitivity to required level. **2.** Clean or replace front cover lens. **3.** Check for cracked or pitted front cover lens and replace as required. **4.** 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. **5.** 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.
Helmet will not switch to grind mode after pressing button.	**1.** Button was not held for 3 seconds. **2.** Plug-in jack from filter is not completely inserted in the button port.	**1.** Press and hold button for 3 seconds. **2.** Remove plug-in jack from the button port and re-insert it into the port.

REPLACEMENT PARTS

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.



ITEM	PART No.	DESCRIPTION	QTY.
1	KP2898-1	OUTSIDE CLEAR LENS (PKG. QTY: 5)	1
2	KP3045-4	ADF CARTRIDGE	1
3	KP3044-1	INSIDE CLEAR LENS (PKG. QTY: 5)	1
4	KP4470-1	HEADGEAR ASSEMBLY (INCLUDING SWEATBAND)	1
5(*)	KP2930-1	SWEATBAND (PKG. QTY: 2)	1
6	KP4561-1	MATTE BLACK REPLACEMENT SHELL	1
7	S27978-32	OUTSIDE CLEAR LENS SEAL	1
8	S27978-153	ADF HOLDER	1
9	KP4562-1	GRIND BUTTON ASSEMBLY	1
10(*)	KP4491-1	CR2450 BATTERY	1
11(*)	KP4541-1	HEADGEAR CUSHION BACK PAD (PKG. QTY. 2)	1

Note: (*) Not illustrated

CUSTOMER ASSISTANCE POLICY

CUSTOMER ASSISTANCE POLICY

The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation or application. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

Lincoln Electric is a responsive manufacturer, but the definition of specifications, and the selection and use of specific products sold by Lincoln Electric is solely within the control of, and remains the sole responsibility of the customer. Many variables beyond the control of Lincoln Electric affect the results obtained in applying these types of fabrication methods and service requirements.

WELD FUME CONTROL EQUIPMENT

The operation of welding fume control equipment is affected by various factors including proper use and positioning of the equipment, maintenance of the equipment and the specific welding procedure and application involved. Worker exposure level should be checked upon installation and periodically thereafter to be certain it is within applicable OSHA PEL and ACGIH TLV limits.

PARTS LIST

Content/Details may be changed or updated without notice. For most current Instruction Manuals, go to PARTS.LINCOLNELECTRIC.COM.