AUTO DARKENING WELDING HELMET

INTRODUCTION:

KNOB FOR DIN (SHADE) SETTING

Auto darkening welding helmet is designed to protect the eyes and faces of Welders from spark, spatter and harmful infrared light, ultra-violet light radiation under normal welding conditions. In addition to protecting to the eyes, the helmet protects the face from hot metal sparks generated by the arc and from UV (Ultra-Violet) & IR Infra-Red damage.

Auto-darkening filter fitted in it automatically changes from light state to dark state when the welding arc is struck and returns to the light state when welding is stopped.
Correct shade number needs to be selected as per the welding application / process.
The shade number can be set manually between DIN9-DIN13 by referring to the shade guide table to determine the proper shade number for application. Shade number can be selected by turning the knob. The shade goes darker from 9 to 13 gradually by turning knob.
Before welding, the sensitivity shall be correctly set by turning knob to the critical point between bright and dark.
This helmet is most commonly used with arc welding processes such as shielded metal arc welding, gas tungsten arc welding and gas metal arc welding.

Auto-darkening Welding helmets can also prevent retina burns, which can lead to a loss of vision. It is caused by unprotected exposure to the highly-concentrated ultraviolet and infrared rays emitted by the welding arc. Ultraviolet emissions from the welding arc can also damage uncovered skin, causing a sunburn-like condition in a relatively short period of welding.
The Ultra-Violet / Infra-Red protection level is up to Shade DIN16 at all the times; it makes welders feel comfortable during welding process.

Knob for Din (Shade) Setting

SHADE GUIDE TABLE

(as per EN169 and EN 379)

Welding Process	Arc Current (Amperes)																			
	10	20	30	40	60	80	100	125	150	175	200	225	250	275	300	350	400	450	500	600
SMAW		9			10		11				12					13				14
MIG(heavy)						10		11			12					13				14
MIG(light)						10		11			12			13			14			15
TIG,GTAW	9		10		11			12			13			14						
MAG/CO2				10			11		12			13					14			15
SAW									10		11		12		13		14			15
PAC						11				12				13						
PAW	9		10		11		12			13				14						15

NOTE:
- SMAW – Shielded Metal Arc Welding
- MIG(heavy) – MIG on heavy metals
- MIG(light) – MIG on light alloys
- TIG, GTAW – Tungsten Arc Welding (GTAW, TIG)
- SAW – Shielded Semi-Automatic Welding
- PAC – Plasma Arc Cutting
- PAW – Plasma Arc Welding

FOR DIN SETTING

Following two parameter can be set by the welder additionally:

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1) **Sensitivity**: Welder can adjust the light sensor by turning the sensitivity knob left or right. Generally, turning the knob to the highest sensitivity setting is better choice for normal use. When this helmet is used in the presence of excessive ambient light or with another welding machine close by, improved helmet performance can be obtained with a lower sensitivity setting by turning the knob to reduce the sensitivity. It can be adjusted by a knob fitted inside the helmet
2) **Delay Time**: This control is for protecting welder's eyes from the strong residual rays after the welding. Maximum setting is recommended for high amperage applications where the weld puddle is still very bright after the welding arc has ceased.

Knobs for Sensitivity and Delay Time Setting

Technical Data:

Viewing Field	92 x 41 mm
Shade Control	Light States: DIN 4 Dark States: DIN 9-13 Outside Adjustment
Switching Time	Light-Dark: 0.3 ms
Delay Time	Dark-Light: 0.1-0.8 sec
Sensitivity & Delay Time	Internal Adjustment
UV/IR Protection	Up to Shade DIN16
Operating Temperature	-5°C to +55°C
Power Supply	Solar Cells Assist, Inside Lithium Batteries
Lens Control	Auto-On, Auto-Off 15 Minutes (When Not on Welding)
Helmet Material	PP
Total Weight	435g

Benefits:

Personal safety equipment makes a difference in welding efficiency

Auto-darkening provides excellent protection, and also improves welding performance.

Before welding, auto-darkening welding helmet helps welders to see their work at comfortable light levels (DIN 4 state) with constant eye and face protection. It turns dark the instant an arc is struck and become semitransparent again when welding stops. This semi-transparency works while also providing full ultraviolet (UV) and infrared (IR) protection at all times, which are in accordance with various safety regulations for welding safety standards.

Applications that require small, frequent welds can realize significant benefits in both productivity and accuracy with the use of auto-darkening helmets. This gives maximum protection in both low voltage TIG and out of position welding.

Auto-darkening technology also reduces the neck strain associated with "helmet nodding." In theory, this should help to increase the accuracy of electrode placement because the welder does not have to raise the helmet to get a closer look at the weld in progress. This, in turn, possibly reduces the need for grinding and rework.

Without helmet nodding, the welder also can get into tighter, cramped spaces with full protection and a clear view, making awkward welds significantly easier.

A Closer Look

To understand how auto-darkening technology makes these benefits possible, let's look at the pieces of an auto-darkening filter. One filter of an Auto-darkening welding helmet is a laminate of nine layers, a UV/IR filter, three polarizes two liquid crystal display (LCD) elements, and a cover glass. The UV/IR filter continually blocks harmful radiation irrespective of the filter is on, off, or in "light" or "dark" mode (see **Figure 1**).

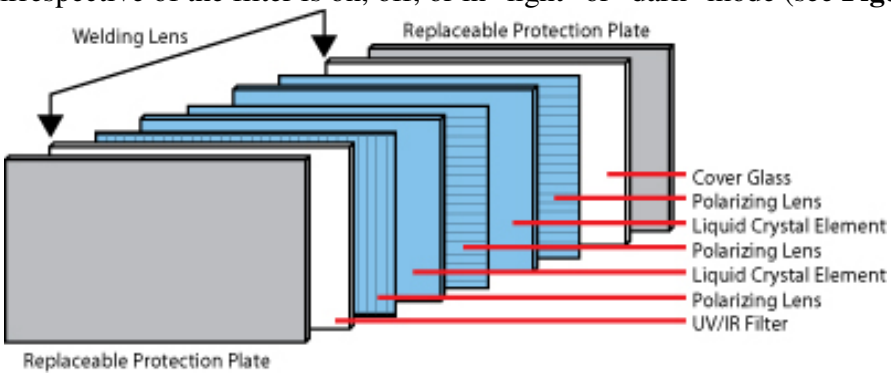

Figure 1

An auto-darkening lens provides several layers of protection from welding arcs.

The first layer after the replaceable protection plate is the UV/IR filter. This filter effectively blocks all but the specified visible light. UV and IR wave lengths on either side of the visible spectrum are blocked at all times.

Aided by surface-mounted electronics, the liquid crystal elements in this proprietary lens detect and orient light from the welding arc by twisting it to facilitate filtering by the three polarizing layers. In the case of about 80 percent of all auto-darkening filters, twisted nematic (threadlike chains of molecules in liquid) LCDs assist in the filtering.

The discovery of the twisted nematic effect was a breakthrough in the field of liquid crystals in the early 1970s. Researchers discovered that, during their nematic phase, the liquid crystals' molecules, which are shaped like sausages, tend to line up in a specific orientation without any sort of corresponding specific positional movement taking place. Researchers then found that the positional order could be influenced by the application of a weak energy field.

So when voltage is applied to the twisted nematic layers in the LCDs, the necessary alignment with polarizes takes place. The amount of voltage applied determines the shade level.

The polarizes are oriented to block the light based on the orientation achieved by the LCD layers. Most auto-darkening filter units use two sets of polarizes. Some auto-darkening filters incorporate three for increased effectiveness. Darkening in those types of helmets takes place in about 0.3 millisecond.

An un-energized filter is almost always in an intermediate dark shade and must be turned on to activate the light state. If anything catastrophic should happen to the filter while in use, it typically defaults to the darker intermediate off shade (Shade 6 – DIN 16). As mentioned, UV/IR protection is always present in helmets that meet the ANSI standard.

How does all of this translate into a better Auto-darkening welding helmet? From a safety standpoint, these types of Auto-darkening welding helmets provide constant UV and IR protection and come with a heat-reflecting front panel. From a welding perspective, the narrow helmets can fit into tight spaces and don't require the extra room needed to flip them up to check welds. The helmets are lightweight.

IMPORTANT:

- Welding Helmets do not provide unlimited eye, ear and face protection.
- Auto –Darkening Helmet not suitable for laser welding & Oxy-Acetylene.
- Do not use welding helmet while working with or around explosive or corrosive liquids.
- Never place Auto –Darkening Helmet on a hot surface.
- Ensure that Auto –Darkening Helmet is always fitted with an outer and inner protection glasses.
- These protection glasses must be replaced if broken, damaged or covered with welding spatter to the extent that vision is impaired.
- Outer and inner protection glasses are consumables and must be replaced regularly with genuine certified spare.
- The filter lens should be cleaned when the inner and outer protection glass are replaced.
- Auto Darkening Helmets are not suitable for Laser Welding & Oxy-Acetylene Gas Cutting.

To get the most out of your auto darkening filter unit, here are some useful tips:

- If the auto-darkening filter unit is not detecting an arc, or if it is reacting to other arcs in a group-welding situation, set the sensitivity rating to an appropriate level based on the conditions or the welding process being used.
- Be certain that the sensors are not blocked either by obstructions in the workplace or dirt and grime on the outer protection glass.
- Because electronics are involved, always keep the units dry and stored in a dry place.

Advantages of Solar Powered over Chargeable Battery:

Every kind of helmet will do the exact same task however most people feel that the solar powered style has a couple of slight advantages over the battery powered model. One of the most obvious advantages is that you will not need to charge or replace batteries in a solar powered helmet. One more benefit is that the solar powered helmet is constantly "on", with no an "on-off" switch. Each of these advantages can also be deemed a safety feature as there is small possibility for unexpected factors, such as low battery or forgetting to turn the helmet on. Depending on how typically you will be employing your auto darkening welding helmet, or exactly where you will be working with it, at times a battery powered unit can be additional efficient.

Hence, some Auto Darkening Helmets have combined Battery & solar operated system, in which there is no “ON/OFF” switch, helmet turns immediately Dark when the welding ARC strikes and becomes OFF if not used for 15 minutes.