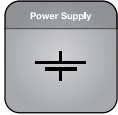


ICON EXPLANATION

Vehicle electrical system voltage



Defines the voltage supply of the light.

Multivolt is the most flexible: Requires fewer versions, but has more electronic circuit components and is therefore more expensive.



Dust and water protection IP

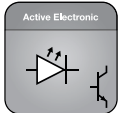


International Protection (IP) as per DIN 40050, Part 9. Specific definition for road vehicles.
 5K = Dust protected
 6K = Dust tight
 9K = Protection against water during pressure / steam cleaning.



The higher the protective category, the better the protection against penetrating media. IP 67 maximum value.
 → Completely sealed against dust and water.

Electronic circuit

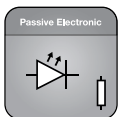


Basically, two different circuits are possible for LED lamps:

Active:
 LED current regulation by means of active electronics.

Higher expenditure during development because of complex circuit and necessary EMC approval. Higher price because of electronic components, but electronic current regulation allows for maximum LED service life.

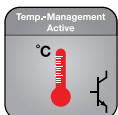
Active



Passive:
 Setting a specific voltage range for the LED by means of a series resistor. Inexpensive solution without complex protection measures. No EMC approval required.

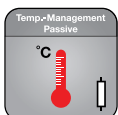
Passive

Thermal management



Active:
 Electronic power control of the LED in case of impermissibly high ambient temperatures. This ensures the protection of the LED against destruction by overheating. More development overhead with active thermal management and higher parts prices ensure optimal conditions for maximum design life.

Active



Passive
 Optimised layout of the components for even temperature distribution and spread. The warmer the LED gets through exterior factors or heating caused by its own operation, the shorter the service life.

Passive

Rated shock resistance



Operational duty cycles in Mining are some of the most demanding, and field research by HELLA has measured shock and vibration levels of remarkable magnitudes. Equipment designed for less demanding environments will fail rapidly when used in Mining, and often when most needed. Our design aim is to produce equipment that will function reliably in a continuously shock and vibration laden environment.

Approval for transport of dangerous goods



Light approved for transport of dangerous goods according to Hazardous Waste Road Directive (GGVS).

Generally required for lorry and trailer lighting. Pre-conditioned for approval: damage to the light source must not cause explosive media to ignite.

Transient spike protection



In some circumstances, the electrical system of Mining vehicles can experience sudden high voltage spikes which have the potential to destroy sensitive electronic equipment, such as lighting. Products marked with this symbol ensures there is adequate protection from these instances.

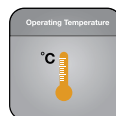
Supplement to the electronics for protecting the LEDs against high voltages / currents in the vehicle electrical system as per ISO 7637-2.

Overloading of the LEDs can be caused by voltage peaks in the vehicle because of:

- Jump-starting
- Deventive control units
- Load-Dump Impulse (incorrect battery contact)

They stress / damage the LEDs, which can cause the function to fail or the service life to be reduced. Adding additional components to the circuit protects the circuit and can extend the service life or even prevent an outage.

Operating Temperature



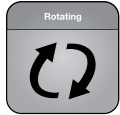
Whether it's in cold or warm climates, our products have to perform every time. Thermal management and a well designed housing allows full function of our products in all operating conditions. To ensure this performance we test our products from -40°C up to 100°C.

ICON EXPLANATION

Signal light beacons



Flashing signal light



Rotating signal light



Steady On signal light

Polarity reversal protection



Even if the connecting cable is connected the wrong way round, there is still no danger for the electronics. The semiconductor in an LED must always be operated with the correct polarity. Inverse polarity damages the LED, so that LED lamps are always equipped with a reverse polarity protection (diode).

This function only works when "+" and "-" are correctly connected, however. If a lamp has a bi-polar circuit, the functioning is independent of the contact connections. This ensures Poka-yoke (avoiding faulty installations) in connection with the indentation clamping technology, for instance.

Electromagnetic compatibility



Electromagnetic compatibility (EMC) tested.

If the lamp has not been built to EMC specifications, and is thus not certified, interactions that impair other safety-relevant electronic systems may occur.

Examples:
Interference in the radio loudspeaker, impairment of ABS electronics, or failure of the lamp due to sensitivity to interference.

Corrosion Proof Housing



Corrosion Proof Housing means new extreme corrosion resistant worklights with a special housing to improve the resistance of our Mining worklights in harsh conditions.

Approval



Product is licensed according to ECE guidelines.



Product is licensed according to RCM guidelines.

From 2013, Products marketed in Australia and New Zealand will share a common electrical safety standard. As part of the registration process, suppliers must make a declaration that all the equipment they sell meets relevant standards and is electrically safe. The RCM mark will eventually supersede the C-Tick and A-Tick marks.



Product is licensed according to SABS guidelines.



Product is licensed according to SAE guidelines.

RFCommSafe Electromagnetic Compatibility (EMC)



Every LED lamp contains electronic circuitry. It is essential that this circuitry does not cause harmful interference to other devices and at the same time is not susceptible to radiation from other devices.

RFCommSafe products were developed in recognition that some radio communication equipment can self-tune to be very sensitive in remote areas. In these situations the limits prescribed by regulatory requirements and as defined in international standards such as CISPR15 or relevant UNECE Standards may not be sufficient to ensure there is no interference with very sensitive radio communication equipment.

ZEROGLARE



The **ZEROGLARE** light distribution is designed specifically for low beam applications to completely remove glare for oncoming traffic. **ZEROGLARE** brings on-road lighting safety and technology to the mine site.

Sea turtle friendly product



Turtles' vision is in a higher frequency range than that of humans. It extends from about 580 nm up into the ultraviolet, peaking in the blue-green. So light at 590 nm and below. Amber is invisible to the turtles.

Sea turtle friendly lights will be used to avoid that hatchlings will walk toward civilisation instead of toward the ocean.