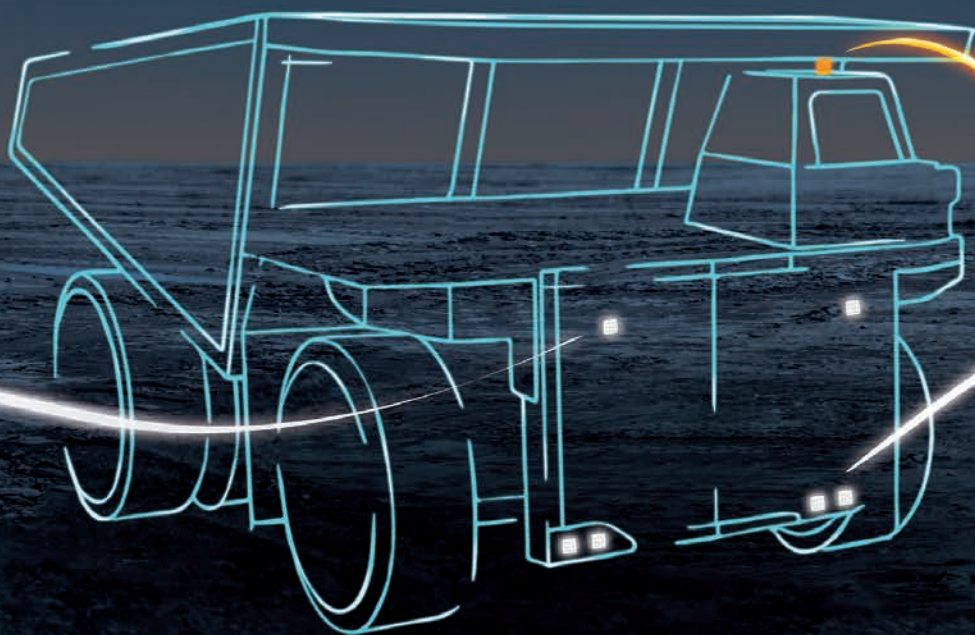




Technology with Vision

PRODUCT OVERVIEW
MINING



Authorized Distributor:



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ABOUT HELLA MINING

The HELLA Mining Centre of Excellence designs, develops and manufactures fixed and mobile lighting products specifically for the Mining industry. HELLA uses its research, engineering and logistic expertise to produce lighting products that are designed to world class standards that can be used in Mining applications all over the world.

The research behind the product selection is based upon data collected from Mining equipment in use in many different regions and applications. This data was utilised to set performance parameters as a baseline criteria for survival in a Mining application. These parameters are used in testing our products in house before we can be confident to release them to Mining field trials and later for general release to the Mining industry.

HELLA Mining offers Mining companies a free of charge engineered application service. This service offers the end user information on the product, aiming angles and actual lighting performance prior to any purchase that includes safety as a key area of concern. This service highlights to the customer that HELLA Mining are the Mining professionals for lighting and assists our customers with another value proposition to their Mining purchase.

An area of concern to Mining companies with global shareholders is safety and environment. Any negative concerns from ongoing environmental or safety issues can clearly affect the share price of these multinational firms and therefore there is a major focus on HSE (Health, Safety and the Environment). HELLA Mining has advanced lighting technology that meets the criteria for enhanced safety as vision plays a vital part in an environment that operates 24 hours a day and has large mobile machinery capable of destruction on a grand scale and a highly mobile road network.

HELLA Mining products meet the needs of Mining companies around the world. The concept of "Technology with Vision" highlights the fact that we exceed our customer's expectations by producing quality products that fulfill the requirements for the harshest industry on earth in an efficient, advanced and professional manner that offers real technology with vision.



HELLA Mining is equipped with highly advanced production and distribution facilities. HELLA Mining has full design and development facilities that include: NATA registered Photometric Laboratory, Chemical Analysis Laboratory Facilities, and some of the most advanced environmental and physical test simulation facilities available anywhere.

HELLA continues to develop, prove and market innovative products based on worldwide leadership in advanced lighting technology – to demonstrably improve end user profitability in Mining applications. This is achieved through products that offer:

- Greater safety
- Lower operating cost
- Greater productivity
- Predictable service
- Better value

HELLA Mining products are backed by the renowned global HELLA quality guarantee, and service and distribution network.

IMPORTANT NOTE

Only products specifically identified as ECE or SAE compliant are approved for use on public roads, when installed and operated as required by local regulation on approved vehicles. The responsibility for correct selection, fitment and operation to meet local regulations is that of the vehicle operator. Please ensure local regulations and requirements are met.



QUALITY STANDARDS

HELLA has set itself the ambitious standard of guaranteeing consistently high product quality in every respect. This is achieved by defining quality criteria and checking every detail using carefully-selected methods throughout the entire manufacturing process.

Production quality is ensured by parallel quality monitoring and testing. Quality products from HELLA are subject to different test procedures in accordance with the HELLA standard 67101. These test procedures are conducted by the HELLA test laboratory in Germany.

First-class quality by conviction: HELLA guarantees the perfect, long-term functioning of its products and stands for satisfied customers in the spare parts, accessories and light sources areas. As the long-established company from Lippstadt is an efficient partner to the automotive industry, HELLA products are manufactured to meet the respective precision, tolerance specifications. Combined with the use of sophisticated test procedures in the product development, you can depend on HELLA products in any situation.



HEAT, MOISTURE AND COLD TEST

In temperature cycle tests, HELLA products are exposed to temperature fluctuations from -40 degrees Celsius to +100 degrees Celsius in climatic chambers which have a volume of 600 – 1,000 liters. In addition, condensation and defogging tests are carried out up to max. 95 % air humidity and up to 80 degrees Celsius. In the so-called „shock chamber“, the temperatures changes within seconds (intervals of max. 6 seconds) between -40 degrees Celsius and +100 degrees Celsius. These tests signify utmost stress on any material, both for lighting as well as for the individual electronics components. The heat and cold tests last up to 48 hours.



DUST TEST

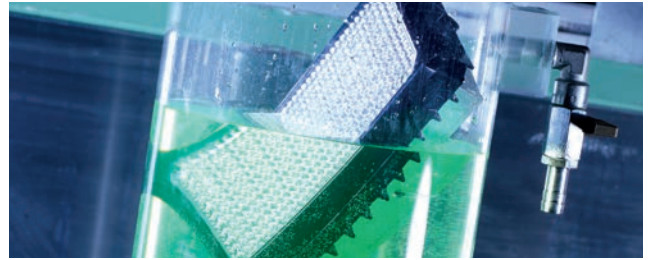
In this test, the products are tested for their dust tightness. Unfired Portland cement is used as a test medium for all products. The test is optionally performed in sample function operation, and with overpressure or under pressure exposure of the device under test.

The tests are evaluated by determining the photometric value before and after the test (IP 6KX). This is the only way that HELLA can ensure that dust will not penetrate the product and can guarantee the long service life of the product.



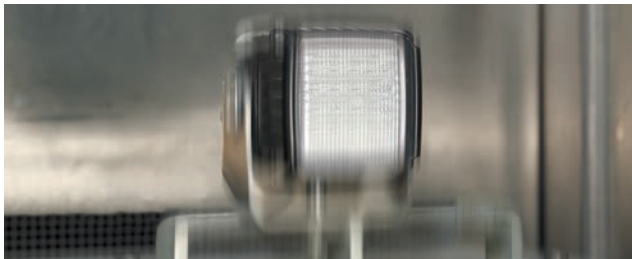
HIGH-PRESSURE CLEANER TEST

In one test system, the products are exposed to a water pressure of up to 120 bar and a water temperature of +85 degrees Celsius. This test simulates cleaning in a carwash or with a pressure cleaner (IP X9K).



IMMERSION AND PRESSURE TIGHTNESS TEST

Depending on requirements, this test is carried out for all lighting technology products. An immersion pipe can be submerged to a depth of 1 m in water. Another test system can reach a depth of 6 meters. Also, an overpressure test up to 1.6 bar is conducted in an immersion pool. All tests are carried out in accordance with the HELLA standard, 67101, as well as the legal requirements (IP X7).



VIBRATION TEST

This test simulates the behavior of the products over a "poor stretch of road" and shows, for example, reactions to potholes, gravel tracks, gravel, stones, fields and dirt roads. Special rally profiles are tested for selected products, such as auxiliary driving lights. The wide band random vibration test is used to test the mechanical endurance strength in the vertical and horizontal axes. Here, the frequency range extends from 10 to 1000 Hertz. Alongside the vibration test, the products are subjected to a temperature overload of -40 degrees Celsius to +80 degrees Celsius. This includes a check on the ageing process of the plastic. All products are tested for function for up to 24 hours. A mechanical shock test is also carried out as part of testing and is designed to simulate behavior on impact (for example, boxed products during shipping) at an acceleration of 300 to 500 meters per second squared.

SHOCK TEST

HELLA Mining products must pass the HELLA 200 G shock test before being certified for use in Mining applications. Products are put through 10,000 cycles at 200 G in various orientations to fully test their resistance to shock and vibration.



LUMEN MEASUREMENT ACCORDING TO LM-79-08

Currently there is no universally recognised standard for measuring the photometric properties of solid state (LED) lighting. This has resulted in many manufacturers and resellers using theoretical data (e.g. Raw lumens) which offers no actual useful comparison data for the purchaser, who is either unaware or unable to calculate the actual light output taking into account optical, electrical and thermal losses. The IES (Illumination Engineers Society) released in 2008 a standard for testing amongst other things, the total luminous flux of LED fixtures. This publication appears to be the front runner in becoming the benchmark standard in testing solid state luminaire photometric, and has been adopted by most top tier manufacturers, including HELLA Mining. In simple terms, the test will determine the effective light output of a Luminaire, ideally using specialised photometric equipment in a NATA accredited laboratory. For the purpose of this comparison, only data obtained using the LM-79-08 standard is utilised.

LIGHTING DESIGN SOLUTIONS

A SCIENTIFIC APPROACH TO LIGHTING

At HELLA Mining, we offer a professional lighting design service to create the optimum lighting solution for your requirements, taking the guesswork out of lighting and maximising safety, productivity and profitability.

As a global leader in lighting for mining applications, our lighting design team has comprehensive expertise in this sector and extensive knowledge of the operational requirements and the challenges faced when working in this environment.

They work in close partnership with our customers throughout the process and the customised solutions that they create can be evaluated, influenced and optimised by the stakeholders prior to implementation.

WHAT IS A LIGHTING DESIGN?

Lighting design is traditionally a field within architecture and interior design that is concerned with the design of lighting systems, including natural light, electric light, or both, to serve human needs.

At HELLA Mining, our lighting design process for mining and quarrying applications uses an engineering-based, application-focused approach that takes into account the following factors for both static and mobile installations:

The ambient light levels of the site, whether a surface mine or underground mine

- The optimum level and distribution of light required to maximise safety and productivity
- The colour of the light and its effect on the user(s)
- Environmental factors, such as dust, moisture or vibration, that may determine the durability of the work lights required
- Cost of ownership and maintenance requirements

The final proposal is provided in a clear and concise document with graphical simulations showing before and after scenarios.

WHAT ARE THE BENEFITS?

Our lighting design team will only propose solutions that they can be confident will deliver clear and measurable results in terms of:

- Increased safety
- Enhanced operator ergonomics
- Higher productivity
- Reduced downtime

WHY CHOOSE HELLA?

Whilst HELLA products are used in a wide range of industries globally, mining is a specific area of focus for HELLA and we are committed to delivering quality, innovation and value for our customers in this sector.

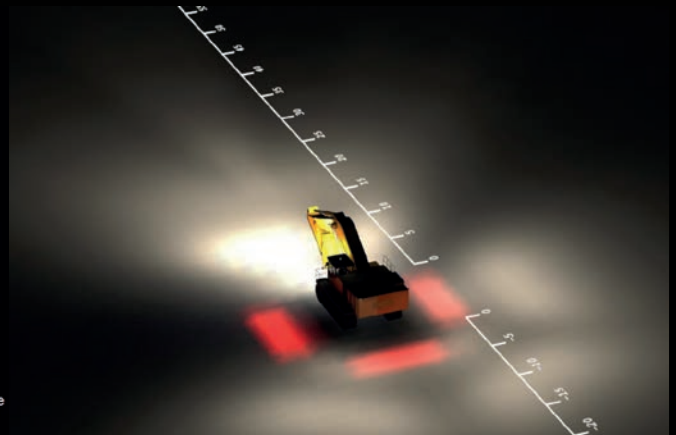
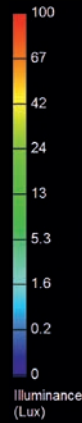
Whether work lights, beacons or signal lamps, all HELLA products for mining applications are designed, manufactured and rigorously tested to offer class-leading performance and reliability.

CUSTOMISED LIGHTING DESIGN SOLUTION FOR EXCAVATORS

HELLA Mining lighting design for excavators are tailored to each specific model, taking into account the size of the machine and whether the boom is configured in shovel or excavator format.

Considering all of these variables results in the optimum lighting solution, ensuring clear and uniform illumination of the work area as well as no-go zones around the vehicle for the safety of site personnel.

In this example, the final lighting scheme utilises three products from the HELLA Mining portfolio: RokLUME 380 N close range work lamps for optimum illumination of the work areas, UltraRAY 2.0 rotating beacons and RokLUME S700 RED red LED warning lights for maximum operational safety.



RokLUME 380 N Close-range



RokLUME S700 RED LED Warning Light



UltraRAY 2.0 Rotating Beacon

ROKLUME 280N SMART INTELLIGENT WORK LAMP WITH SMART FUNCTIONS

For increased Operator Safety, Health and Productivity. The new RokLUME 280N SMART developed by HELLA especially for mining vehicles convinces not only with its many new light functions combined in one work lamp, but also with its easy installation for retrofit or OE customers.

To meet the demand of different weather or driving conditions the work lamp is equipped with the following functions: Dimming function, Colour temperature change function and colour change to green or amber function.

With these functions' operators have the possibility to change the light adapted to different conditions. With this new solution HELLA increases not only operator safety and health, but also

the productivity. In addition, the system is available with a Lifetime function, Anti-Theft Protection and Memory function. With the Memory function the operator can set different lighting setups. The included body control unit (HELLA gateway), which is necessary to communicate with the work lamps uses powerline communication (PLC). This allows clients to offer optional lighting packages without having to change the vehicle architecture.



Standard work lamp
RokLUME 280N

- The classic work lamp with LED technology
- Even higher light output – better than xenon performance
- For universal use



EASY CHANGE
(1:1 CHANGE)

Same dimensions
No additional wiring harness
No change in wiring architecture



SMART work lamp
RokLUME 280N SMART

- The classic work lamp with LED technology
- Even higher light output – better than xenon performance
- For universal use
- **With SMART functions**



ROKLUME 280N SMART

- With Smart functions
- 6 different light distributions available
- For Original Equipment or Retrofit available
- Individual adjustment for increased operator safety, health and productivity
- Easy mount and upgrade from standard versions
- Same dimensions as standard RokLUME 280N
- Communication via Powerline
- No additional wiring harness

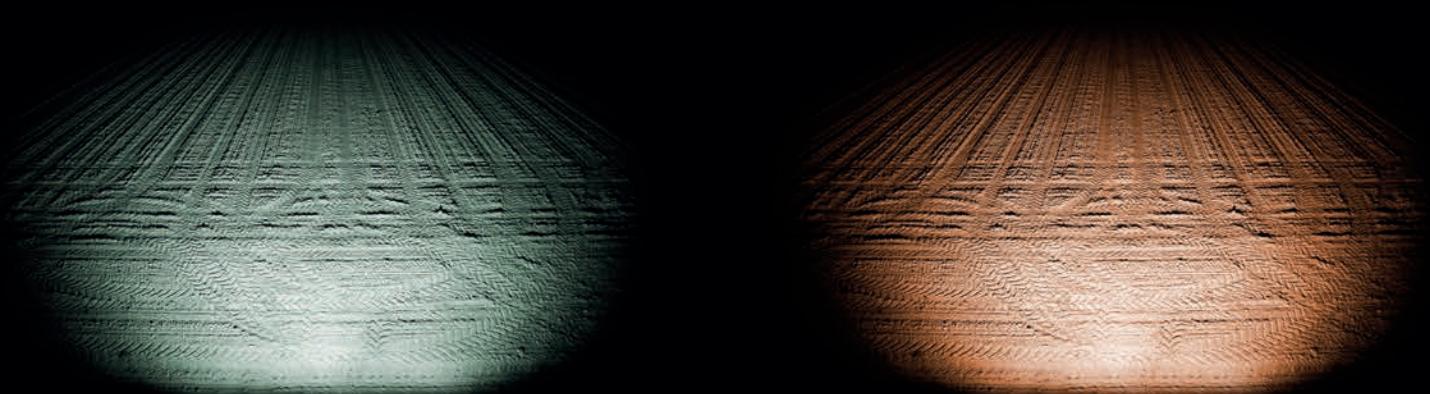
SMART FUNCTIONS



DIMMING



CHANGE COLOUR TEMPERATURE



CHANGE COLOUR





RokLUME 380 N

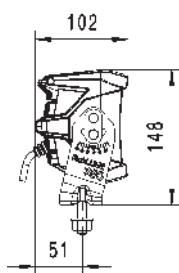
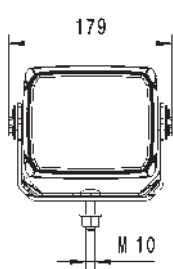
RokLUME 380 N is a high output LED work lamp specifically built for mining with a heavy duty stainless steel bracket and corrosion resistant NanoSafe coating.



ZEROGLARE version



Pencil beam version



| Part number | Illumination | Bracket | Colour |
|-----------------|--------------|------------------|---|
| 1GA 996 197-001 | ZEROGLARE | Heavy Duty | <input type="checkbox"/> White |
| 1GA 996 197-011 | Close-range | Heavy Duty | <input checked="" type="checkbox"/> White |
| 1GA 996 197-021 | Long-range | Heavy Duty | <input type="checkbox"/> White |
| 1GA 996 197-031 | Flood | Heavy Duty | <input checked="" type="checkbox"/> White |
| 1GA 996 197-041 | Pencil beam | Heavy Duty | <input type="checkbox"/> White |
| 1GA 996 197-051 | ZEROGLARE | Heavy Duty | <input checked="" type="checkbox"/> Amber |
| 1GA 996 197-061 | Close-range | Heavy Duty | <input checked="" type="checkbox"/> Amber |
| 1GA 996 197-071 | Long-range | Heavy Duty | <input checked="" type="checkbox"/> Amber |
| 1GA 996 197-081 | Flood | Heavy Duty | <input checked="" type="checkbox"/> Amber |
| 1GA 996 197-091 | Pencil beam | Heavy Duty | <input checked="" type="checkbox"/> Amber |
| 1GA 996 197-191 | ZEROGLARE | Special bracket* | <input type="checkbox"/> White |
| 1GA 996 197-201 | Pencil beam | Special bracket* | <input checked="" type="checkbox"/> White |

* For Komatsu Electric Mining Trucks 730E – 980E

| Auxiliary lamps | | | |
|-----------------|---------|--------------------------|---|
| Part number | Variant | Bracket | Colour |
| 1FA 996 197-151 | 12 V | Heavy Duty, black coated | <input type="checkbox"/> White |
| 1FA 996 197-181 | 24 V | Heavy Duty | <input checked="" type="checkbox"/> White |

| Technical data | Work lamps | Auxiliary lamps |
|--------------------|--------------------------------------|--|
| Operating voltage | Multi-voltage (20–32 V) | Single-voltage (9–16 V) or (20–30 V) |
| Rated voltage | 24 V | 12 V or 24 V |
| Power consumption | Max. 84 W | Max. 85 W |
| Light output | Up to 7,800 lm | – |
| Colour temperature | | 5,000 K |
| Material | | Lens: hard-coated PC Housing: aluminium with NanoSafe coating |
| Temperature range | | -40 °C to +90 °C |
| Protection class | | IP 6K8, IP 6K9K |
| Type approval | ECE-R10, CISPR 25, RCM | ECE-R10, RCM, ECE-R112.01, Class B, High-beam Ref. 40 |
| Mounting | | Upright and pendant |
| Connection | Lead with DEUTSCH DT 2 pin connector | 300 mm cable with DEUTSCH DT 2 pin connector |
| Protection | | Polarity reversal protection, overheating protection |
| Accessories | | DEUTSCH DT 2 pin counterpart included |

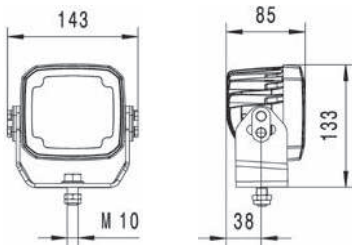
RokLUME 280 N

RokLUME 280 N is a high output LED work lamp specifically built for mining with a heavy duty stainless steel bracket and corrosion resistant NanoSafe coating.



ZEROGLARE version

Long-range version



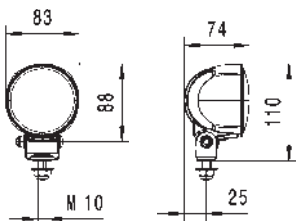
| Part number | Illumination | Bracket | Colour |
|-----------------|--------------------|------------|---------|
| 1GA 995 606-501 | Close-range | Heavy Duty | □ White |
| 1GA 995 606-511 | Long-range | Heavy Duty | ■ White |
| 1GA 995 606-521 | Pencil beam | Heavy Duty | □ White |
| 1GA 995 606-541 | ZEROGLARE | Heavy Duty | ■ White |
| 1GA 995 606-551 | ZERGOGLARE pendant | Heavy Duty | □ White |
| 1GA 995 606-751 | Diffuse flood | Heavy Duty | ■ White |
| 1GA 995 606-601 | Close-range | Heavy Duty | ■ Amber |
| 1GA 995 606-611 | Long-range | Heavy Duty | ■ Amber |
| 1GA 995 606-621 | Pencil beam | Heavy Duty | ■ Amber |
| 1GA 995 606-641 | ZEROGLARE | Heavy Duty | ■ Amber |
| 1GA 995 606-721 | Pencil beam | Heavy Duty | ■ Green |
| 1GA 995 606-731 | Close-range | Heavy Duty | ■ Green |
| 1GA 995 606-741 | ZEROGLARE | Heavy Duty | ■ Green |

Technical data

| | |
|--------------------|--|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Max. 50 W |
| Light output | Up to 4,400 lm |
| Colour temperature | 5,000 K |
| Material | Lens: shock- and UV-resistant lens Housing: aluminium with NanoSafe coating |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K9K, IP 6K8 |
| Type approval | ECE-R10, CISPR 25, RCM |
| Mounting | Upright and pendant |
| Connection | DEUTSCH DT 2 pin connector |
| Protection | Polarity reversal protection, overheating protection |
| Accessories | DEUTSCH DT 2 pin counterpart included |

RokLUME C180

RokLUME C180 is the perfect work lamp for the tough conditions in a Mining business. With its robust and compact design, it can be used in many applications.



| Part number | Illumination | Colour |
|-----------------|--------------|---------|
| 1G0 996 476-701 | Close-range | □ White |

Technical data

| | |
|--------------------|--|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Max. 30 W |
| Light output | 2,700 lm |
| Colour temperature | 5,000 K |
| Material | Lens: glass Housing: die-cast aluminium, NanoSafe coating |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, RCM, CISPR 25 |
| Mounting | Upright and pendant, swivel base |
| Connection | 2,000 mm cable with open end, |
| Protection | Polarity reversal protection, overheating protection |
| Accessories | DEUTSCH DT 2 pin connector set included |



SMART Cornering Light

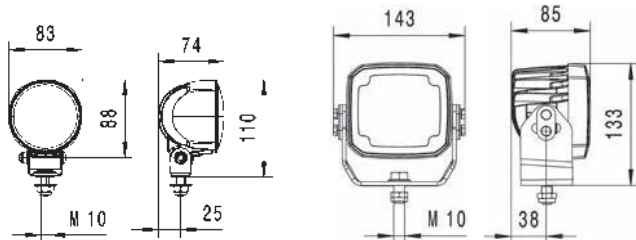
The SMART Cornering Light improves illumination when turning the vehicle left or right. It enables drivers to see obstacles in good time and therefore ensures greater safety and comfort when working in mines.



Set with RokLUME C180

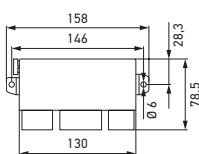


Set with RokLUME 280



RokLUME C180

RokLUME 280



Control unit

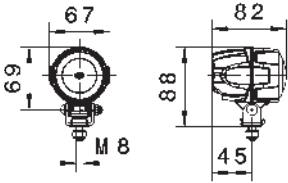
| Part number | Illumination | Version |
|-----------------|--------------|-----------------------|
| 1G0 996 476-801 | Close-range | Set with RokLUME C180 |
| 1GA 995 606-801 | Close-range | Set with RokLUME 280 |

| Technical data | |
|--------------------|---|
| Operating voltage | Multi-voltage (9–32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Set with RokLUME C180: max. 30 W per work lamp Set with RokLUME 280: max. 50 W per work lamp |
| Light output | Set with RokLUME C180: up to 2,700 lm Set with RokLUME 280: up to 4,400 lm |
| Colour temperature | 5,000 K |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K (work lamps) IP 5K4K, IP 5K9K (control unit) |
| Type approval | ECE-R10, RCM, CISPR 25 |
| Mounting | According to mounting instruction |
| Connection | Cable |
| Protection | Polarity reversal protection, overheating protection, transient spike protection |

| Accessories | |
|-----------------|--|
| Part number | Description |
| 8KB 994 246-071 | SMART Cornering Light adapter cable (6 m) and DEUTSCH DT 2 pin connector set |

RokLUME 140

The RokLUME 140 is the smallest work lamp in the HELLA product range and is therefore particularly suitable for setups with little space.



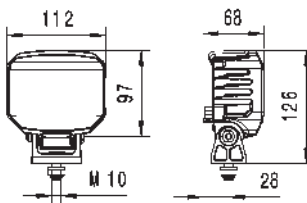
| Part number | Illumination | Mounting | Colour |
|-----------------|--------------|-----------------|---|
| 1G0 995 050-001 | Close-range | Upright | <input type="checkbox"/> White |
| 1G0 995 050-011 | Close-range | Pendant | <input checked="" type="checkbox"/> White |
| 1G0 995 050-021 | Long-range | Upright/pendant | <input type="checkbox"/> White |

Technical data

| | |
|--------------------|--|
| Operating voltage | Multi-voltage (9–48 V DC) |
| Rated voltage | 12 V / 24 V |
| Power consumption | 15 W |
| Light output | 800 lm |
| Colour temperature | 6,500 K |
| Material | Housing: high quality aluminum housing for Heavy Duty use |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K8, IP 6K9K |
| Type approval | ECE-R10, RCM, ADR / GGVSEB, CISPR 25 |
| Mounting | Upright or pendant (close-range) Upright and pendant (long-range) |
| Connection | DEUTSCH DT 2 pin connector |
| Protection | Polarity reversal protection, overheating protection, overvoltage protection, transient spike protection |

RokLUME 190TP

The RokLUME190TP is a robust work lamp designed specifically for mining. The innovative thermo plastic housing reduces weight and offers complete corrosion resistance.



| Part number | Illumination | Colour |
|-----------------|--------------|---|
| 1GA 996 488-501 | Close-range | <input type="checkbox"/> White |
| 1GA 996 488-511 | Long-range | <input checked="" type="checkbox"/> White |

Technical data

| | |
|--------------------|--|
| Operating voltage | Multi-voltage (10.5–32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | 26 W |
| Light output | 1,850 lm |
| Colour temperature | 5,000 K |
| Material | Housing: thermally conductive plastic |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, CISPR 25, RCM, ADR / GGVSEB |
| Mounting | Upright and pendant |
| Connection | DEUTSCH DT 2 pin connector |
| Protection | Polarity reversal protection, overheating protection, overvoltage protection |
| Accessories | DEUTSCH DT 2 pin counterpart included |

Power Beam coloured lenses

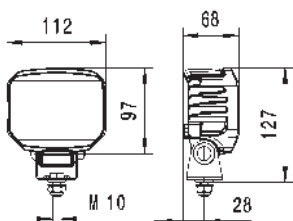
The Power Beam coloured lenses is a series of standard work lamps with coloured lenses for Off-highway use. Available with different lens colours to suit various applications and provide more safety and comfort.



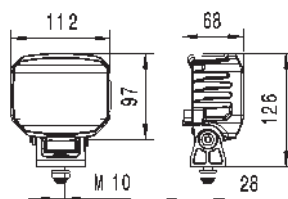
Power Beam 1000 compact coloured lens



Power Beam 1800 compact coloured lens



Power Beam 1000 compact coloured lens



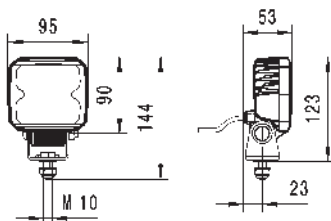
Power Beam 1800 compact coloured lens

| Part number | Version | Possible applications | Colour |
|------------------|-------------------------|-----------------------|--------|
| 1GA 996 188-617 | Power Beam 1000 compact | Indicator light | Amber |
| 1GA 996 188-627 | Power Beam 1000 compact | Tail light | Red |
| 1GA 996 188-637 | Power Beam 1000 compact | Status light | Green |
| 1 GA 996 488-167 | Power Beam 1800 compact | Stop light | Red |

| Technical data | |
|-------------------|--|
| Operating voltage | Multi-voltage (10.5 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Power Beam 1000 compact: 12 W Power Beam 1800 compact: 26 W |
| Material | Housing: plastic |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K9, IP 6K9K |
| Type approval | ECE-R10, RCM, CISPR 25 |
| Mounting | Upright and pendant |
| Connection | DEUTSCH DT 2 pin connector |
| Protection | Polarity reversal protection, overheating protection |

RokLUME 155 TP

The RokLUME 155 TP is a robust work lamp designed specifically for mining. The innovative Thermo plastic housing reduces weight and offers complete corrosion resistance.



| Part number | Illumination | Colour |
|-----------------|--------------|--------|
| 1GA 996 284-051 | Close-range | White |
| 1GA 996 284-061 | Long-range | White |
| 1GA 996 284-071 | Close-range | Amber |

| Technical data | |
|--------------------|--|
| Operating voltage | 9 – 32 V |
| Rated voltage | 12 V / 24 V |
| Power consumption | 15 W |
| Light output | 1,200 lm |
| Colour temperature | 5,000 K |
| Material | Housing: thermally conductive plastic |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, CISPR 25, RCM |
| Mounting | Upright and pendant |
| Connection | Cable with DEUTSCH DT 2 pin connector |
| Protection | Polarity reversal protection, overheating protection, overvoltage protection |

RokLUME S700

RokLUME S700 work lamp is ideal for illuminating a large area with an ultra-smooth spread. The thermally conductive polymer housing and Grilamid lens ensure corrosion resistance.



Close-range



Long-range



Close and Long-range



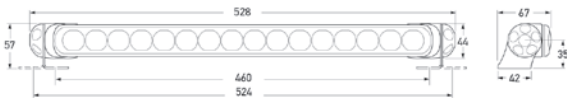
Combi



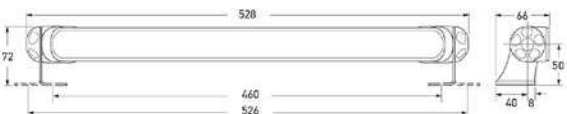
Close-range

Long-range

Combined



Combi



Diffuse flood

| Part number | Illumination | Power consumption | Light output | Colour |
|-----------------|------------------------------|---|---------------|---------|
| 1GJ 958 130-621 | Close-range | 36 W | max. 2,800 lm | □ White |
| 1GJ 958 130-651 | Long-range | 36 W | max. 2,800 lm | ■ White |
| 1GJ 958 130-461 | Combi (Close and Long-range) | Close-range: 18 W Long-range: 18 W Combined: 36 W | max. 2,200 lm | □ White |
| 1GJ 958 130-521 | Diffuse flood | 36 W | max. 3,600 lm | ■ White |

Technical data

| | |
|--------------------|---|
| Operating voltage | Multi-voltage (9 – 33 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Max. 36 W |
| Light output | ≤ 3,600 lm (depending on version) |
| Colour temperature | 5,000 K |
| Material | Lens: high impact and chemical resistant Grilamid Housing: innovative thermally conductive polymer |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, CE, RCM, CISPR 25 |
| Mounting | Upright or pendant |
| Connection | Pre-wired 2.5 m tinned multi-core cable |
| Protection | Polarity reversal protection, transient spike protection |

Accessories and spare parts

| Part number | Description |
|-----------------|------------------------|
| 8XS 958 337-031 | Amber protective Cover |

LBX Lightbars

The LBX Lightbars are LED work lamps featuring an elongated design. With a low mounting height, the work lamp provides extensive and homogenous illumination of the working area.



LBX 220 LED

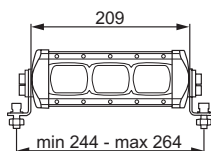
LBX 380 LED



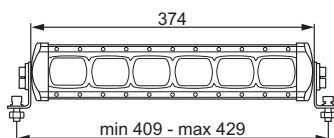
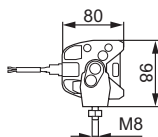
LBX 540 LED



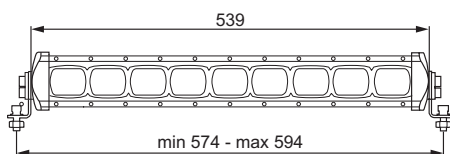
LBX 720 LED



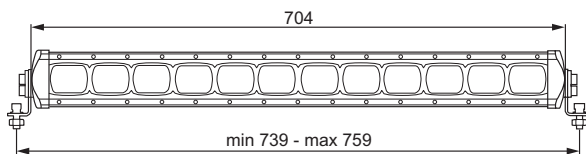
LBX 220 LED



LBX 380 LED



LBX 540 LED



LBX 720 LED

| Part number | Version | Illumination | Power consumption | Light output |
|-----------------|-------------|---------------------------------------|-------------------|--------------|
| 1GE 360 100-007 | LBX 220 LED | Close-range | 22 W | 1,000 lm |
| 1GE 360 101-007 | LBX 380 LED | Close-range | 44 W | 2,000 lm |
| 1GE 360 102-007 | LBX 540 LED | Long-range (combination illumination) | 66 W | 3,500 lm |
| 1GE 360 103-007 | LBX 720 LED | Long-range (combination illumination) | 88 W | 5,500 lm |

Technical data

| | |
|--------------------|-----------------------------------|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | ≤ 88 W (depending on version) |
| Light output | ≤ 5,500 lm (depending on version) |
| Colour temperature | 6,500 K |
| Material | Housing: aluminium |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7 |
| Type approval | ECE-R10 |
| Mounting | Upright and pendant |
| Connection | 2,000 mm adapter cable |
| Protection | Polarity reversal protection |

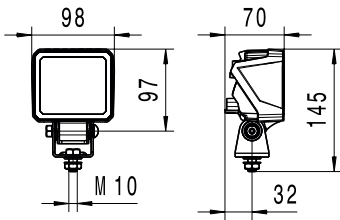
ECO18 LED / ECO26 LED

ECO18 LED and ECO26 LED are work lamps with a compact size and universal shape, that enable an easy conversion from halogen to LED technology. The ECO work lamp series is therefore the perfect entry-level model into the HELLA premium segment.



ECO18 LED

ECO26 LED

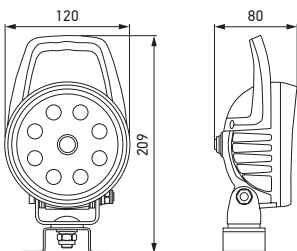


| ECO18 LED | ECO26 LED | Illumination | Connection |
|-----------------|-----------------|--------------|----------------------------|
| 1GA 996 479-001 | 1GA 996 579-001 | Close-range | 500 mm cable |
| 1GA 996 479-011 | 1GA 996 579-011 | Long-range | 500 mm cable |
| 1GA 996 479-021 | 1GA 996 579-021 | Close-range | DEUTSCH DT 2 pin connector |
| 1GA 996 479-031 | 1GA 996 579-031 | Long-range | DEUTSCH DT 2 pin connector |

| Technical data | |
|--------------------|--|
| Operating voltage | Multi-voltage (10.5–32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | ECO18 LED: 18 W ECO26 LED: 26 W |
| Light output | ECO18 LED: 1,350 lm ECO26 LED: 2,000 lm |
| Colour temperature | 6,500 K |
| Material | Housing: die-cast aluminium |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, CISPR 25 |
| Mounting | Upright and pendant |
| Protection | Polarity reversal protection, overheating protection |

R120S

The LED work lamp R120S has a practical handle to get the work lamp in optimal position and a switch for easy switching on and off. This work lamp ensures optimal illumination for operations around the vehicle.



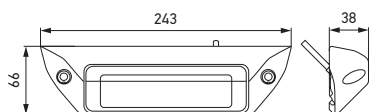
| Part number | Illumination |
|-----------------|--------------|
| 1G2 996 220-007 | Close-range |

| Technical data | |
|--------------------|--|
| Operating voltage | Multi-voltage (10–30 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | 23 W |
| Light output | 1,500 lm |
| Colour temperature | 6,500 K |
| Material | Housing: robust aluminium die cast housing |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10 |
| Mounting | Swivel base mounting |
| Connection | 3,000 mm cable |
| Protection | Reversal polarity protection, overheating protection |



FMS

The FMS is the ideal work lamp for flat mounting on the vehicle wall and integrates itself perfectly into the appearance of the vehicle. The special design of this work lamp ensures a great ground illumination, even with a vertical wall mounting.



| Base | Prime | Illumination | Housing colour |
|-----------------|-----------------|--------------|----------------|
| 1GB 996 098-001 | 1GB 996 098-011 | Close-range | Black |

| Technical data | |
|--------------------|--|
| Operating voltage | Multi-voltage (9–32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Base: 14 W Prime: 28 W |
| Light output | Base: 1,200 lm Prime: 2,500 lm |
| Colour temperature | 6,500 K |
| Material | Housing: die-cast aluminium, CoroSafe coating |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K8, IP 6K9K |
| Type approval | ECE-R10, RCM, ADR / GGVSEB, CISPR 25 |
| Mounting | Flat surface mounting on the vehicle |
| Connection | 500 mm cable |
| Protection | Polarity reversal protection, overheating protection |

Modular Worklight

The modular LED work lamp series Modular Worklight is available as Style (dynamically curved) and Tech (classic straight lines) version with different luminous intensities. The work lamp is fully integrated in the cabin roof and therefore better protected from external influences. The work lamp series can be combined with the HELLA Shapeline series to give the vehicle an individual and consistent light signature.

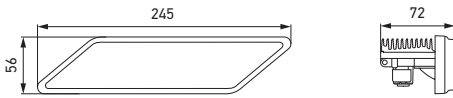


Modular Worklight Style left

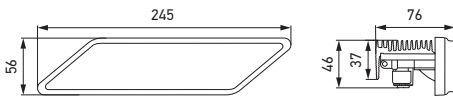
Modular Worklight Style right



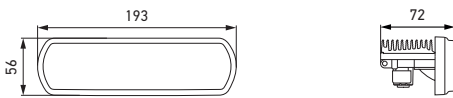
Modular Worklight Tech



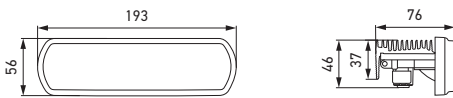
Modular Worklight Style Base



Modular Worklight Style Prime



Modular Worklight Tech Base



Modular Worklight Tech Prime

| Base | Prime | Illumination | Design | Connection |
|-----------------|-----------------|--------------|-------------|----------------------|
| 1GE 996 198-311 | 1GE 996 298-311 | Close-range | Style left | DEUTSCH DT connector |
| 1GE 996 198-321 | 1GE 996 298-321 | Close-range | Style right | DEUTSCH DT connector |
| 1GE 996 198-331 | 1GE 996 298-331 | Long-range | Style left | DEUTSCH DT connector |
| 1GE 996 198-341 | 1GE 996 298-341 | Long-range | Style right | DEUTSCH DT connector |
| 1GE 996 198-351 | 1GE 996 298-351 | ZEROGLARE | Style left | DEUTSCH DT connector |
| 1GE 996 198-361 | 1GE 996 298-361 | ZEROGLARE | Style right | DEUTSCH DT connector |
| 1GE 996 198-371 | 1GE 996 298-371 | Close-range | Style left | 2,000 mm cable |
| 1GE 996 198-381 | 1GE 996 298-381 | Close-range | Style right | 2,000 mm cable |
| 1GE 996 198-391 | 1GE 996 298-391 | Long-range | Style left | 2,000 mm cable |
| 1GE 996 198-401 | 1GE 996 298-401 | Long-range | Style right | 2,000 mm cable |
| 1GE 996 198-411 | 1GE 996 298-411 | ZEROGLARE | Style left | 2,000 mm cable |
| 1GE 996 198-421 | 1GE 996 298-421 | ZEROGLARE | Style right | 2,000 mm cable |
| 1GE 996 198-001 | 1GE 996 298-001 | Close-range | Tech | DEUTSCH DT connector |
| 1GE 996 198-011 | 1GE 996 298-011 | Long-range | Tech | DEUTSCH DT connector |
| 1GE 996 198-021 | 1GE 996 298-021 | ZEROGLARE | Tech | DEUTSCH DT connector |
| 1GE 996 198-031 | 1GE 996 298-031 | Close-range | Tech | 2,000 mm cable |
| 1GE 996 198-041 | 1GE 996 298-041 | Long-range | Tech | 2,000 mm cable |
| 1GE 996 198-051 | 1GE 996 298-051 | ZEROGLARE | Tech | 2,000 mm cable |

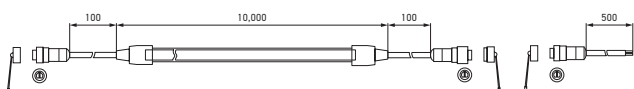
Technical data

| | |
|--------------------|--|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | Base: 14 W Prime: 28 W |
| Light output | Base: 1,250 lm Prime: 2,350 lm |
| Colour temperature | 6,500 K |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K8, IP 6K9K |
| Type approval | ECE-R10, RCM, CE, CISPR 25 |
| Mounting | Integrated in the cabin roof |
| Protection | Polarity reversal protection, overheating protection |

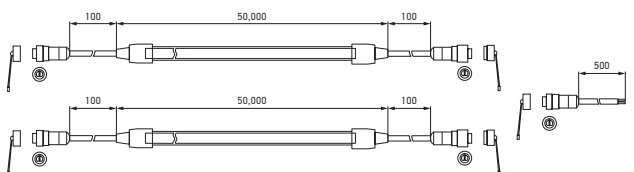


FlexaTec

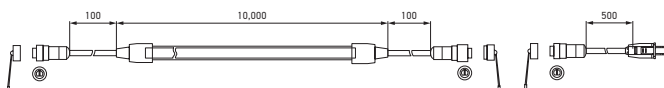
The new flexible LED light strip from HELLA for industrial applications ensures homogenous illumination of the working environment. Installation is easy, thanks to the specially designed clips. FlexaTec can be combined to a length of up to 80 or 100 metres depending on the country.



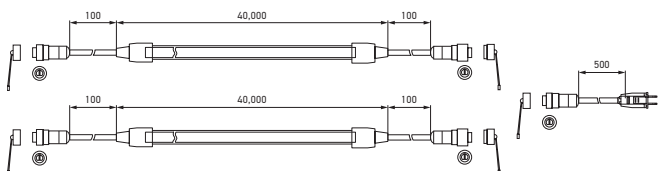
10 m version



100 m version



10 m version (US/Canada)



80 m version (US/Canada)

| Part number | Length | Type Approval | Rated voltage |
|-----------------|--------|--|---------------|
| 1GJ 995 180-201 | 10 m | ETL (US/ Canada) | 110 V AC |
| 1GJ 995 180-211 | 10 m | CRS (India) | 110 V AC |
| 1GJ 995 180-601 | 80 m | ETL (US/ Canada) | 110 V AC |
| 1GJ 995 180-701 | 100 m | CRS (India) | 110 V AC |
| 1GJ 995 181-201 | 10 m | CB (Europe), CB + SAA (Australia), CB (South Africa) | 230 V AC |
| 1GJ 995 181-601 | 100 m | CB (Europe), CB + SAA (Australia), CB (South Africa) | 230 V AC |

Technical data

| | |
|--------------------|---|
| Rated voltage | 110 V AC or 230 V AC |
| Power consumption | 11 W/m (110 V AC) 15 W/m (230 V AC) |
| Light output | 1,200 lm/m (110 V AC) 1,500 lm/m (230 V AC) |
| Colour temperature | 5,000 K |
| Material | PVC (flammability class V0) |
| Temperature range | -20 °C to +40 °C |
| Protection class | IP 6K7 |
| Mounting | Quick fastening via specially designed clips (included in the delivery) |
| Connection | Cable with open ends or cable with connector (US/ Canada) |

Spare parts*

| Part number | Version |
|-----------------|---|
| 9XD 990 181-001 | Spare parts set 110 V AC version (US/ Canada) |
| 9XD 990 181-021 | Spare parts set 110 V AC version (India) |
| 9XD 990 181-011 | Spare parts set 230 V AC version |

* Spare parts sets include fastening clips, end cap and connecting cable.

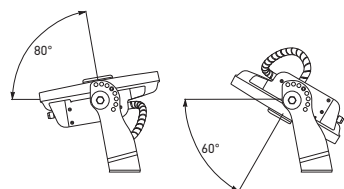
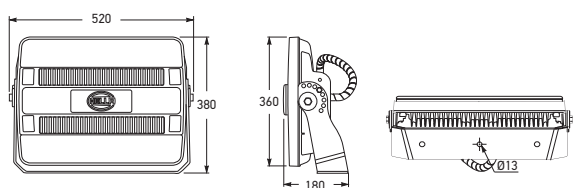


HypaLUME 110/230V AC

HypaLUME LED flood light range is available in both AC and DC variants. Designed specifically for Mining and Lighting Tower application and for applications where high output lighting in extreme environments is required. Highly efficient light distribution. Suitable for energy saving lighting installations.



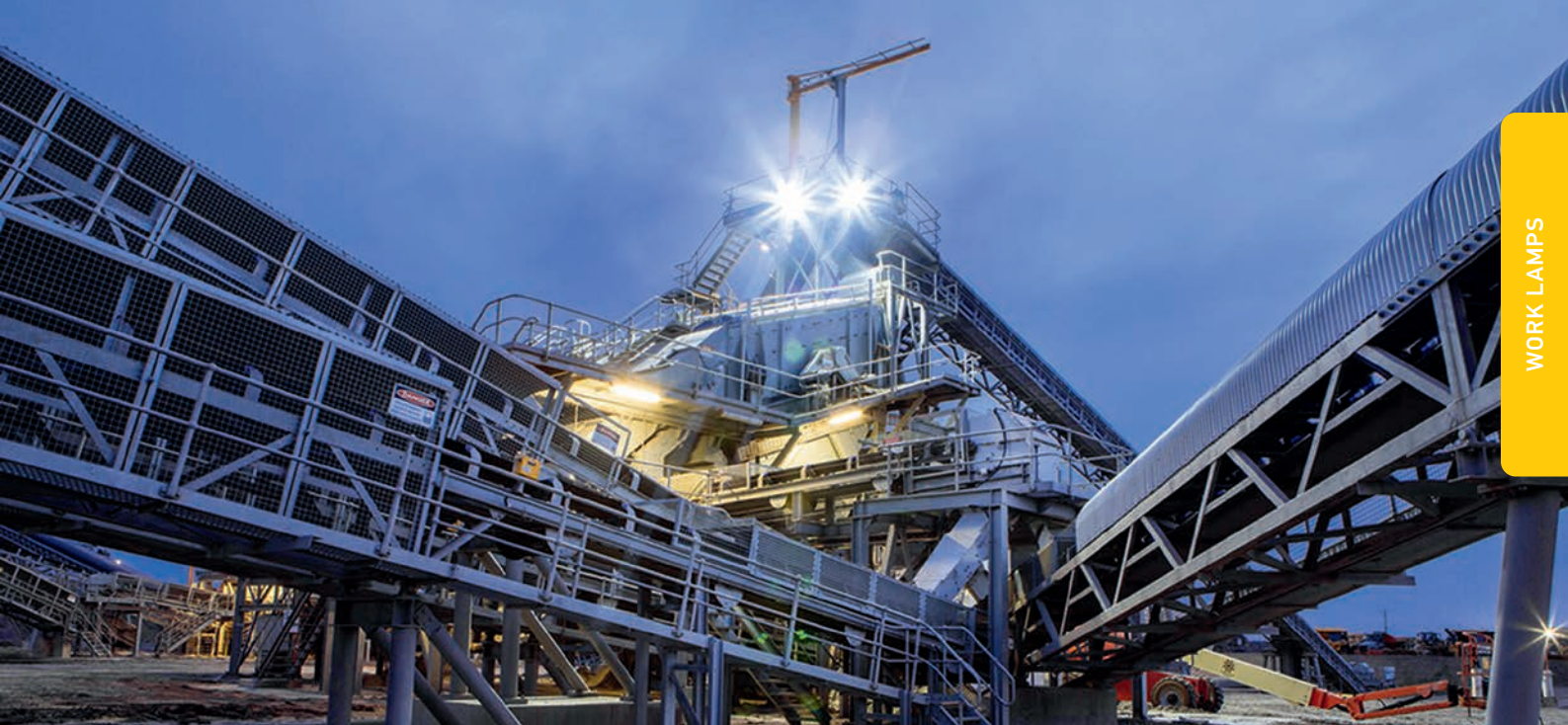
Amber version



Lamp can be rotated 140°

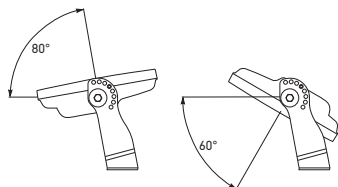
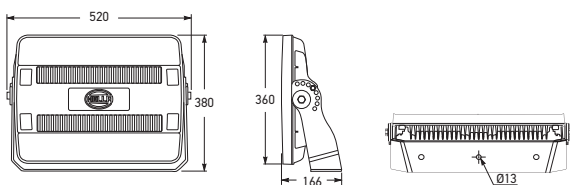
| Part number | Illumination | Colour |
|-----------------|--------------|---------|
| 1GJ 958 334-011 | Close-range | □ White |
| 1GJ 958 334-021 | Long-range | ■ White |
| 1GJ 958 334-031 | Extra wide | □ White |
| 1GJ 958 334-111 | Close-range | ■ Amber |
| 1GJ 958 334-121 | Long-range | ■ Amber |
| 1GJ 958 334-131 | Extra wide | ■ Amber |

| Technical data | |
|--------------------|--|
| Operating voltage | Multi-voltage (100 – 240 V AC) |
| Rated voltage | 110 V AC / 230 V AC |
| Power consumption | Max. 300 W |
| Light output | 28,000 lm 19,000 lm (amber) |
| Colour temperature | 5,700 K |
| Material | Lens: high impact and chemical resistant Grilamid Housing: aluminium with non-stick coating |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 66, IP 67, IP 6K9K |
| Type approval | RCM, CE, FCC |
| Mounting | Upright and pendant |
| Connection | Wieland RST Mini – 16 A |
| Protection | Overheating protection, overvoltage protection, short circuit protection |



HypaLUME 24 / 48V DC

HypaLUME LED flood light range is available in both AC and DC variants. Designed for applications where high output lighting in extreme environments is required.



Lamp can be rotated 140°

| Part number | Illumination | Colour |
|-----------------|--------------|---|
| 1GJ 011 872-501 | Close-range | <input type="checkbox"/> White |
| 1GJ 011 872-511 | Long-range | <input checked="" type="checkbox"/> White |
| 1GJ 011 872-521 | Extra wide | <input type="checkbox"/> White |

| Technical data | |
|--------------------|--|
| Operating voltage | Multi-voltage (22–52 V DC) |
| Rated voltage | 24 V / 48 V |
| Power consumption | Max. 260 W |
| Light output | 25,000 lm 19,000 lm (amber) |
| Colour temperature | 5,700 K |
| Material | Lens: Grilamid nylon PA12 Housing: aluminium with non-stick coating |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, RCM, CE, FCC |
| Mounting | Upright and pendant |
| Connection | DEUTSCH DT 4 pin connector |
| Protection | Polarity reversal protection, overvoltage protection, transient spike protection |

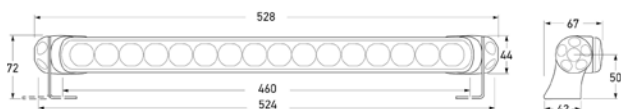


RokLUME S700 RED

The RokLUME S700 RED with VISIOTECH technology projects a wide red marking on the ground to indicate danger or hazard zones. It is suitable for vehicles with high mounting positions, particularly for mining vehicles.



Optic appears clear until illuminated

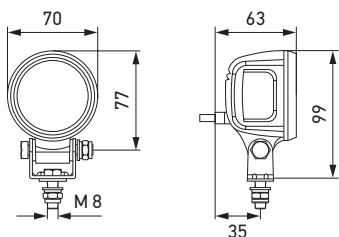


| Part number | Projected Symbol | Colour |
|-----------------|------------------|--------|
| 2XD 958 130-661 | Wide marking | ■ Red |

| Technical data | |
|-------------------|---------------------------------|
| Operating voltage | Multi-voltage (9–33 V DC) |
| Rated voltage | 12 V / 24 V |
| Power consumption | 25 W |
| Material | Lens: high impact Grilamid lens |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, RCM, CISPR 25 |
| Mounting | Upright and pendant |
| Connection | 2,500 mm cable |
| Protection | Polarity reversal protection |

SL60 LED

With the SL60 LED, featuring VISIOTECH technology, a warning line can be projected on the ground to warn other drivers or passers-by but also to simplify vehicle navigation.



| Part number | Projected Symbol | Colour |
|-----------------|------------------|--------|
| 1G0 996 210-001 | Light strip | ■ Blue |
| 1G0 996 210-011 | Light strip | ■ Red |

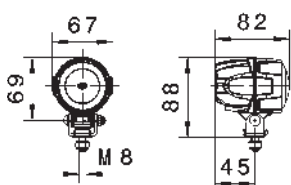
| Technical data | |
|-------------------|---|
| Operating voltage | Multi-voltage (10–80 V) |
| Rated voltage | 12 V / 24 V / 48 V |
| Power consumption | Red: 5.5 W Blue: 7 W |
| Material | Lens: polycarbonate Housing: die-cast aluminium |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10 |
| Mounting | Horizontal or vertical (direction of strip) as required |
| Connection | 500 mm cable |
| Protection | Polarity reversal protection |

RokLUME 140 Spot

The VISIOTECH technology enables the RokLUME 140 Spot to warn other drivers or pedestrians by projecting a warning spot. It is particularly suitable for mounting positions with limited space.



Illuminated



| Part number | Projected Symbol | Colour |
|-----------------|------------------|---------|
| 1G0 995 050-091 | Spot | ■ Green |
| 1G0 995 050-101 | Spot | ■ Red |

| Technical data | |
|-------------------|--|
| Operating voltage | Multi-voltage (9–48 V) |
| Rated voltage | 12 V / 24 V |
| Power consumption | 15 W |
| Material | Housing: high quality aluminum housing for Heavy Duty use |
| Temperature range | -40 °C to +50 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R10, RCM, ADR / GGVSSE, CISPR 25 |
| Mounting | Upright and pendant |
| Connection | DEUTSCH DT connector |
| Protection | Polarity reversal protection, overvoltage protection, transient spike protection |



DuraRAY 4.0

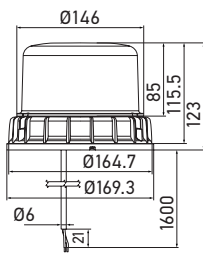
Flashing | Rotating

DuraRAY 4.0 is a powerful heavy duty beacon made for mining with an automatically controlled day time / night time sensor and 16 rotating and flashing patterns.

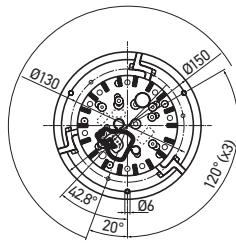


Fixed mounting

Magnetic mounting



Fixed mounting



| Fixed mounting | Magnetic mounting | Colour |
|-----------------|-------------------|--------|
| 2XD 012 985-001 | 2XD 012 985-101 | Amber |
| 2XD 012 985-011 | 2XD 012 985-111 | Blue |
| 2XD 012 985-021 | 2XD 012 985-121 | Red |
| 2XD 012 985-031 | 2XD 012 985-131 | Green |
| 2XD 012 985-041 | 2XD 012 985-141 | White |

| Technical data | |
|---------------------|---|
| Operating voltage | Multi-voltage (10–30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | 2.6 A @ 12 V, 1.3 A @ 24 V |
| Power consumption | 32 W |
| Material | Dome lens: polycarbonate Housing: Powder-coated die-cast aluminium |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | SAE J845 class 1, ECE-R65, ADR / GGVS |
| EMC protection | ECE-R10, CISPR 25 Class 5, RCM |
| Protection | Polarity reversal protection, overheating protection |

UltraRAY 2.0 / 2.1

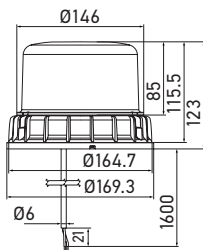
Flashing | Rotating

UltraRAY 2.0 / 2.1 is a powerful heavy duty beacon made for mining, available either as a rotating 2.0 or flashing 2.1 beacon with interference free EMC properties.

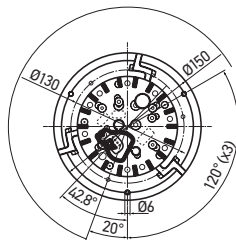


Fixed mounting

Magnetic mounting



Fixed mounting



| Rotating 2.0 | | |
|-----------------|-------------------|--------|
| Fixed mounting | Magnetic mounting | Colour |
| 2RL 012 983-001 | 2RL 012 983-101 | Amber |
| 2RL 012 983-011 | 2RL 012 983-111 | Blue |
| 2RL 012 983-021 | 2RL 012 983-121 | Red |
| 2RL 012 983-031 | 2RL 012 983-131 | Green |
| 2RL 012 983-041 | 2RL 012 983-141 | White |

| Flashing 2.1 | | |
|-----------------|-------------------|--------|
| Fixed mounting | Magnetic mounting | Colour |
| 2XD 012 984-001 | 2XD 012 984-101 | Amber |
| 2XD 012 984-011 | 2XD 012 984-111 | Blue |
| 2XD 012 984-021 | 2XD 012 984-121 | Red |
| 2XD 012 984-031 | 2XD 012 984-131 | Green |
| 2XD 012 984-041 | 2XD 012 984-141 | White |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (10–30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Rotating: 1.6 A @ 12 V, 0.8 A @ 24 V Flashing: 1.8 A @ 12 V, 0.9 A @ 24 V |
| Power consumption | Rotating: 20 W Flashing: 22 W |
| Material | Dome lens: polycarbonate |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | SAE J845 class 1, ECE-R65, ADR / GGVS |
| EMC protection | ECE-R10, CISPR 25 Class 5, RCM |
| Protection | Polarity reversal protection, overheating protection |

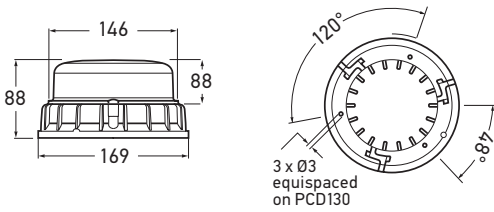
K-LED Mining

Flashing | Rotating

K-LED is a powerful heavy duty low profile beacon made for mining with an automatically controlled day time / night time sensor and 16 rotating and flashing patterns.



Fixed mounting



Fixed mounting

| Part number | Mounting | Colour |
|-----------------|----------------------|--------|
| 2XD 011 557-001 | Fixed mounting | Amber |
| 2XD 011 557-021 | Fixed mounting | Red |
| 2XD 011 557-031 | Fixed mounting | Green |
| 2XD 011 557-041 | Pipe socket mounting | Amber |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Approx. 0.45 A to 2.5 A |
| Power consumption | Max. 33 W |
| Material | Dome lens: polycarbonate Housing: powder-coated die-cast aluminium |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | Rotating: ADR / GGVSEB Amber and red: ECE-R65 TA1, ECE-R65 TR1 Amber: SAE J845 Class 1 Flashing: ADR / GGVSEB Amber: ECE-R65 TA2, SAE J845 Class 1 |
| EMC protection | ECE-R10, CISPR 25 Class 5, RCM |
| Protection | Polarity reversal protection, overheating protection, transient spike protection |

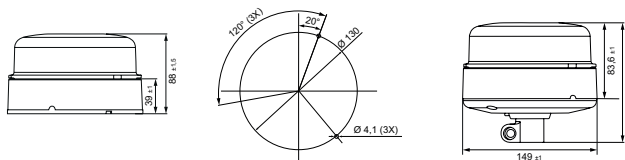
K-LED Blizzard

Flashing

The K-LED Blizzard is an LED beacon in a modern design with flashing light function, which has a very high warning effectiveness.

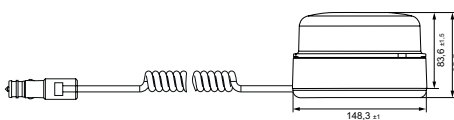


Fixed mounting | Pipe socket mounting | Magnet mounting



Fixed mounting

Pipe socket mounting



Magnet mounting

| Part number | Mounting | Colour |
|-----------------|----------------------|--------|
| 2XD 012 980-001 | Fixed mounting | Amber |
| 2XD 012 980-011 | Pipe socket mounting | Amber |
| 2XD 012 980-021 | Magnet mounting | Amber |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (10 – 30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Approx. 1.3 A @ 12 V, approx. 0.7 A @ 24 V |
| Power consumption | 16 W |
| Material | Dome lens: polycarbonate Housing: aluminium |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R65, ADR / GGVSE |
| EMC protection | ECE-R10, CISPR 25 class 5 |
| Protection | Polarity reversal protection, overheating protection |

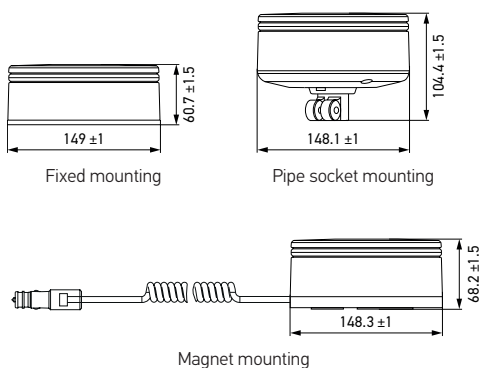


K-LED Rebelution Flashing | Rotating

The K-LED Rebelution is a revolutionary beacon featuring the latest LED technology. It provides maximum performance in a minimalist and highly innovative, dome-free design. Instead, the light is visible through a circumferential, ring-shaped light band. Despite light exit area being smaller than a conventional domed beacon the K-LED Rebelution emits a highly visible warning signal.



Fixed mounting | Pipe socket mounting | Magnet mounting



| Part number | Light function | Mounting | Colour |
|-----------------|----------------|----------------------|--------|
| 2XD 455 255-001 | Flashing | Fixed mounting | Amber |
| 2RL 455 256-001 | Rotating | Fixed mounting | Amber |
| 2XD 455 255-011 | Flashing | Pipe socket mounting | Amber |
| 2RL 455 256-011 | Rotating | Pipe socket mounting | Amber |
| 2XD 455 255-021 | Flashing | Magnet mounting | Amber |
| 2RL 455 256-021 | Rotating | Magnet mounting | Amber |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Rotating: 1.08 A @ 12 V, 0.54 A @ 24 V Flashing: @ 3.16 A @ 12 V, 1.58 A @ 24 V |
| Power consumption | Rotating: max. 13 W Flashing: max. 38 W |
| Material | Dome lens: polycarbonate Housing: aluminium |
| Temperature range | - 40 °C to + 60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ECE-R65, ADR / GGVSEB |
| EMC protection | ECE-R10, RCM Rotating: CISPR 25 Class 3 Flashing: CISPR 25 Class 5 |
| Protection | Polarity reversal protection, overheating protection, overvoltage protection |

Micro / Mini Lightbar

Flashing | Rotating

The Micro and Mini Lightbars combine a flashing and rotating signal in one product and generate an intense 360°-degree warning signal. Both warning lights are optimally protected against strong vibrations and therefore suitable for various applications.



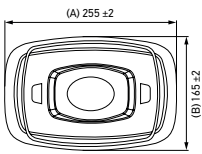
Amber light output, clear lens



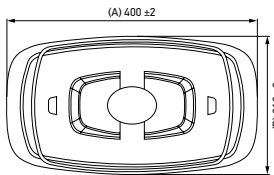
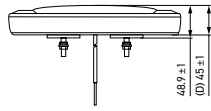
Amber light output, amber lens



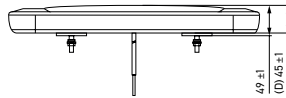
Dual colour light output, clear lens



Micro Lightbar



Mini Lightbar



| Micro Lightbar | | | | |
|-----------------|----------------------|---------------|-------------|-------------|
| Part number | Mounting | Type approval | Lens colour | Colour |
| 2RL 014 566-001 | Screw fixed mounting | ECE | Clear | Amber |
| 2RL 014 566-101 | Screw fixed mounting | SAE | Clear | Amber |
| 2RL 014 566-011 | Bracket mounting | ECE | Clear | Amber |
| 2RL 014 566-111 | Bracket mounting | SAE | Clear | Amber |
| 2RL 014 566-021 | Magnet mounting | ECE | Clear | Amber |
| 2RL 014 566-121 | Magnet mounting | SAE | Clear | Amber |
| 2RL 014 566-201 | Screw fixed mounting | ECE | Amber | Amber |
| 2RL 014 566-301 | Screw fixed mounting | SAE | Amber | Amber |
| 2RL 014 566-211 | Bracket mounting | ECE | Amber | Amber |
| 2RL 014 566-311 | Bracket mounting | SAE | Amber | Amber |
| 2RL 014 566-221 | Magnet mounting | ECE | Amber | Amber |
| 2RL 014 566-321 | Magnet mounting | SAE | Amber | Amber |
| 2RL 014 566-401 | Screw fixed mounting | SAE | Clear | Dual colour |
| 2RL 014 566-411 | Bracket mounting | SAE | Clear | Dual colour |
| 2RL 014 566-421 | Magnet mounting | SAE | Clear | Dual colour |

| Mini Lightbar | | | | |
|-----------------|----------------------|---------------|-------------|-------------|
| Part number | Mounting | Type approval | Lens colour | Colour |
| 2RL 014 565-001 | Screw fixed mounting | ECE | Clear | Amber |
| 2RL 014 565-101 | Screw fixed mounting | SAE | Clear | Amber |
| 2RL 014 565-011 | Bracket mounting | ECE | Clear | Amber |
| 2RL 014 565-111 | Bracket mounting | SAE | Clear | Amber |
| 2RL 014 565-021 | Magnet mounting | ECE | Clear | Amber |
| 2RL 014 565-121 | Magnet mounting | SAE | Clear | Amber |
| 2RL 014 565-201 | Screw fixed mounting | ECE | Amber | Amber |
| 2RL 014 565-301 | Screw fixed mounting | SAE | Amber | Amber |
| 2RL 014 565-211 | Bracket mounting | ECE | Amber | Amber |
| 2RL 014 565-311 | Bracket mounting | SAE | Amber | Amber |
| 2RL 014 565-221 | Magnet mounting | ECE | Amber | Amber |
| 2RL 014 565-321 | Magnet mounting | SAE | Amber | Amber |
| 2RL 014 565-401 | Screw fixed mounting | SAE | Clear | Dual colour |
| 2RL 014 565-411 | Bracket mounting | SAE | Clear | Dual colour |
| 2RL 014 565-421 | Magnet mounting | SAE | Clear | Dual colour |

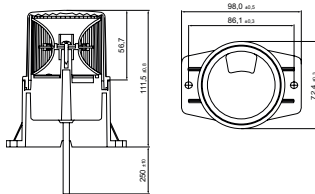
| Technical data | |
|---------------------|---|
| Operating voltage | Multi-voltage (10–30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Micro Lightbar: 6.2 A @ 12 V, 2.9 A @ 24 V Mini Lightbar: 6.1 A @ 12 V, 2.8 A @ 24 V |
| Power consumption | Micro Lightbar: 66–72 W Mini Lightbar: max. 70 W |
| Material | Polycarbonate |
| Temperature range | -40 °C to +65 °C |
| Protection class | IP 6X, IP X4K, IP X9K |
| Type approval | SAE J845 Class 1, ECE-R65 TA1* |
| EMC protection | ECE-R10, CISPR 25 class 3 |
| Connection | 500 mm cable (fixed version) 2,500 mm cable (magnet version) |
| Protection | Polarity reversal protection |

* The dual colour variant of this product is only homologated for SAE.

FL Mini

Flashing

The FL Mini is a very compact LED beacon with flashing light function and high warning effectiveness.



| Part number | Mounting | Colour |
|-----------------|----------------|--------|
| 2XD 014 959-111 | Fixed mounting | Amber |

| Technical data | |
|---------------------|---|
| Operating voltage | Multi-voltage (10–80 V) |
| Rated voltage | 12 V / 24 V / 48 V |
| Current consumption | 0.67 A @ 12 V, 0.3 A @ 24 V, 0.1 A @ 48 V |
| Power consumption | 8 W |
| Material | Dome lens: impact resistant polycarbonate |
| Temperature range | -40 °C to +65 °C |
| Protection class | IP 6K7, IP 9K |
| Type approval | SAE J845 Class 3, UL-approval |
| EMC protection | ECE-R10 |
| Protection | Polarity reversal protection |

MiniRAY 2.1

Flashing

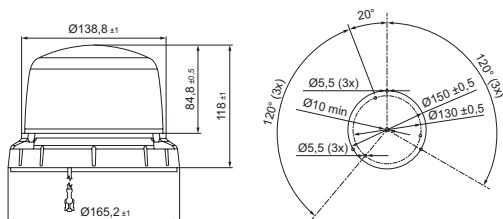
The LED beacon MiniRAY 2.1 with flashing light function and impact-resistant polycarbonate dome is specially designed for mining service vehicles.



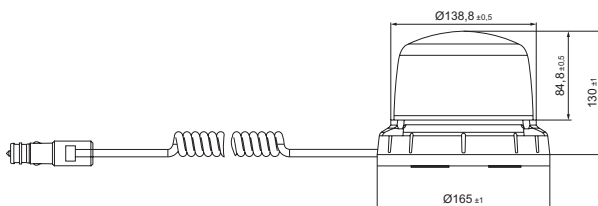
Fixed mounting



Magnet mounting



Fixed mounting



Magnet mounting

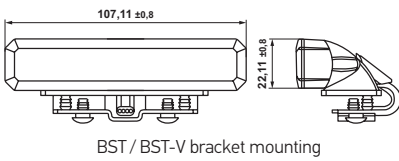
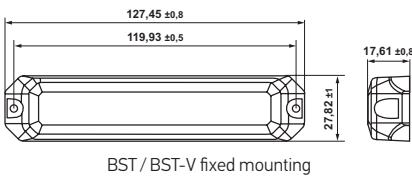
| Part number | Mounting | Colour |
|-----------------|-----------------|--------|
| 2XD 012 480-301 | Fixed mounting | Amber |
| 2XD 012 480-341 | Fixed mounting | Green |
| 2XD 012 480-401 | Magnet mounting | Amber |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (9–30 V DC) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Approx. 0.2 A |
| Power consumption | Max. 4 W |
| Material | Dome lens: impact resistant polycarbonate lens Housing: polycarbonate and ABS |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 6K7, IP 6K9K |
| Type approval | ADR / GGVSEB Amber: SAE J845 class 3 |
| EMC protection | ECE-R10, RCM |
| Protection | Polarity reversal protection, transient spike protection |

BST / BST-V warning light (6 LED)

Flashing

BST and BST-V warning lights feature a flat, compact design. The BST is suitable for horizontal surface mounting and the BST-V for vertical mounting. By combining 6 power LEDs and a high-grade precision lens, an optimum signalling effect is assured. Versions with control of day-time / night-time level are available for the BST warning light.



| BST warning light | | | |
|-------------------|------------------|-----------------------------|--------|
| Fixed mounting | Bracket mounting | Version | Colour |
| 2XD 012 160-851 | 2XD 012 160-861 | Standard | Amber |
| 2XD 014 560-201 | 2XD 014 560-401 | Day-time / night-time level | Amber |
| 2XD 012 160-801 | 2XD 012 160-811 | Standard | Blue |
| 2XD 014 560-001 | 2XD 014 560-101 | Day-time / night-time level | Blue |
| 2XD 012 160-821 | 2XD 012 160-831 | Standard | Red |
| 2XD 012 160-871 | 2XD 012 160-881 | Standard | White |

| BST-V warning light | | | |
|---------------------|------------------|----------|--------|
| Fixed mounting | Bracket mounting | Version | Colour |
| 2XD 012 160-951 | 2XD 012 160-961 | Standard | Amber |
| 2XD 012 160-901 | 2XD 012 160-911 | Standard | Blue |
| 2XD 012 160-971 | 2XD 012 160-981 | Standard | White |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (11 – 30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Amber (standard): 0.78 A @ 12 V, 0.40 A @ 24 V Amber (day / night mode): 1.1 A @ 12 V, 0.55 A @ 24 V Blue (standard): 0.87 A @ 12 V, 0.58 A @ 24 V Blue (day / night mode): 1.1 A @ 12 V, 0.55 A @ 24 V Red: 0.80 A @ 12 V, 0.40 A @ 24 V White: 1.15 A @ 12 V, 0.58 A @ 24 V |
| Power consumption | 7 – 14 W |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP 5K4K, IP 6K9K, IP 9K |
| Type approval | Standard: ECE-R65 XA1, XB1, XR1 Day / night mode: ECE-R65 XA2, XB2 |
| EMC protection | Standard: ECE-R10, CISPR 25 Class 5 Day / night mode: ECE-R10, CISPR 25 Class 3 |
| Protection | Overvoltage protection |

BST-Slim / BST-V-Slim warning light (6 LED)

Flashing

BST-Slim and BST-V-Slim warning lights are the super-flat "Slim" variants of the classic BST warning lights. With the lower height, of only 12.8 mm, these lights blend in optimally with a vehicle's shape. The BST-Slim is suitable for horizontal surface mounting and the BST-V-Slim for vertical mounting.



| BST-Slim warning light | | | |
|------------------------|-----------------------------|---------------|--------|
| Part number | Version | Type approval | Colour |
| 2XD 014 562-201 | Day-time / night-time level | ECE | Amber |
| 2XD 014 562-401 | Day-time / night-time level | SAE | Amber |
| 2XD 014 562-001 | Day-time / night-time level | ECE | Blue |
| 2XD 014 562-101 | Day-time / night-time level | SAE | Blue |
| 2XD 014 562-601 | Day-time / night-time level | ECE | Red |
| 2XD 014 562-701 | Day-time / night-time level | SAE | Red |
| 2XD 014 562-901 | Day-time / night-time level | SAE | White |

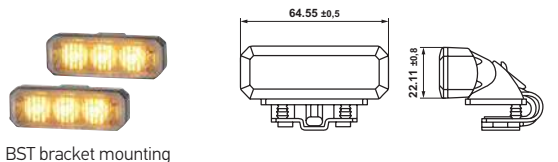
| BST-V-Slim warning light | | | |
|--------------------------|-----------------------------|---------------|--------|
| Part number | Version | Type approval | Colour |
| 2XD 014 592-201 | Day-time / night-time level | ECE | Amber |
| 2XD 014 592-401 | Day-time / night-time level | SAE | Amber |
| 2XD 014 592-001 | Day-time / night-time level | ECE | Blue |
| 2XD 014 592-101 | Day-time / night-time level | SAE | Blue |
| 2XD 014 592-601 | Day-time / night-time level | ECE | Red |
| 2XD 014 592-701 | Day-time / night-time level | SAE | Red |
| 2XD 014 592-901 | Day-time / night-time level | SAE | White |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (11 – 30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | Amber: 1.4 A @ 12 V, 0.7 A @ 24 V Blue: 1.4 A @ 12 V, 0.7 A @ 24 V Red: 1.1 A @ 12 V, 0.55 A @ 24 V White: 1.4 A @ 12 V, 0.7 A @ 24 V |
| Power consumption | 13 – 17 W |
| Temperature range | -40 °C to +60 °C |
| Protection class | IP X7, IP X9K |
| Type approval | ECE-R65 XA2, XB2, XR2 |
| EMC protection | ECE-R10, CISPR 25 Class 5 |
| Mounting | Fixed mounting |
| Protection | Overvoltage protection |

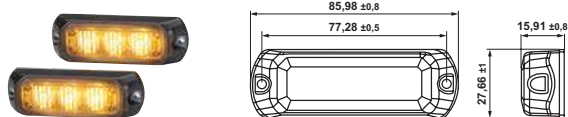
BST / BST-Slim warning light (3 LED)

Flashing

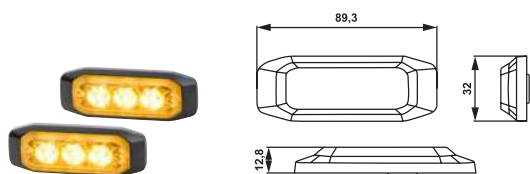
BST and BST-Slim warning lights with 3 LEDs provide an intense warning signal, despite the flat and very compact design. All variants are suitable for horizontal surface mounting, the BST warning lights are also available as bracket mounting version.



BST bracket mounting



BST fixed mounting



BST-Slim

| BST warning light | | | |
|-------------------|------------------|---------------|--------|
| Fixed mounting | Bracket mounting | Type approval | Colour |
| 2XD 014 561-201 | 2XD 014 561-401 | ECE | Amber |
| 2XD 014 561-001 | 2XD 014 561-101 | ECE | Blue |
| 2XD 014 561-601 | 2XD 014 561-701 | ECE | Red |
| 2XD 014 561-801 | 2XD 014 561-901 | SAE | White |

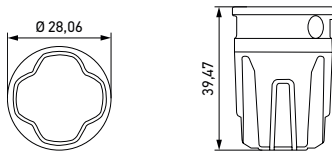
| BST-Slim warning light | | |
|------------------------|---------------|--------|
| Fixed mounting | Type approval | Colour |
| 2XD 014 563-201 | ECE | Amber |
| 2XD 014 563-401 | SAE | Amber |
| 2XD 014 563-001 | ECE | Blue |
| 2XD 014 563-101 | SAE | Blue |
| 2XD 014 563-601 | ECE | Red |
| 2XD 014 563-701 | SAE | Red |
| 2XD 014 563-901 | SAE | White |

| Technical data | |
|---------------------|--|
| Operating voltage | Multi-voltage (11 – 30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | BST: Amber: 0.68 A @ 12 V, 0.34 A @ 24 V Blue: 0.68 A @ 12 V, 0.34 A @ 24 V Red: 0.51 A @ 12 V, 0.26 A @ 24 V White: 0.68 A @ 12 V, 0.34 A @ 24 V BST-Slim: Amber: 0.7 A @ 12 V, 0.35 A @ 24 V Blue: 0.7 A @ 12 V, 0.35 A @ 24 V Red: 0.54 A @ 12 V, 0.27 A @ 24 V White: 0.7 A @ 12 V, 0.35 A @ 24 V |
| Power consumption | 7 – 14 W |
| Temperature range | BST: -40 °C to +60 °C BST-Slim: -40 °C to +80 °C |
| Protection class | IP X7, IP X9K |
| Type approval | ECE-R65 XA1, XB1, XR1 |
| EMC protection | ECE-R10 BST: CISPR 25 Class 3 BST-Slim: CISPR 25 Class 5 |
| Protection | Overvoltage protection |

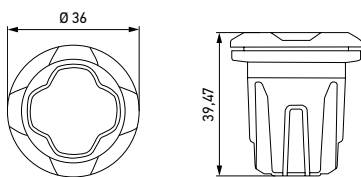
BST-Round warning light

Flashing

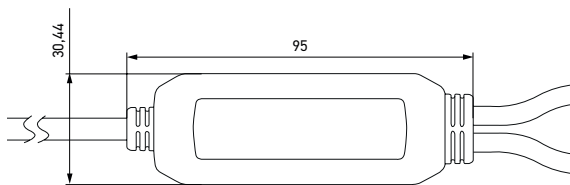
The BST-Round warning lights allow flexible installation in different areas of the vehicle and generate an intensive warning signal with minimum power consumption.



BST-Round



BST-Round with mounting ring (grommet)



BST-Round – Controller

| Part number | Description | Type approval | Lens colour | Colour |
|-----------------|--|---------------|-------------|-------------|
| 2XD 014 564-001 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Blue |
| 2XD 014 564-101 | 1 controller, 2 flasherheads, 2 grommets | SAE | Clear | Blue |
| 2XD 014 564-211 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Amber |
| 2XD 014 564-401 | 1 controller, 2 flasherheads, 2 grommets | SAE | Clear | Amber |
| 2XD 014 564-601 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Red |
| 2XD 014 564-701 | 1 controller, 2 flasherheads, 2 grommets | SAE | Clear | Red |
| 2XD 014 564-801 | 1 controller, 2 flasherheads, 2 grommets | SAE | Clear | White |
| On request | dark lens, especially for hidden use, 1 controller, 2 flasherheads, 2 grommets | ECE | Dark | Blue |
| On request | dark lens, especially for hidden use, 1 controller, 2 flasherheads, 2 grommets | SAE | Dark | Blue |
| 2XD 014 564-011 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Blue/Amber |
| 2XD 014 564-021 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Blue / Red |
| 2XD 014 564-611 | 1 controller, 2 flasherheads, 2 grommets | ECE | Clear | Red / Amber |

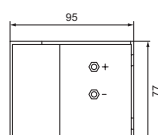
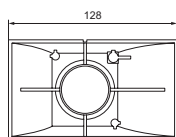
Technical data

| | |
|---------------------|--|
| Operating voltage | Multi-voltage (11 – 30 V) |
| Rated voltage | 12 V / 24 V |
| Current consumption | 2.27 – 2.75 A @ 12 V, 1.27 – 1.37 A @ 24 V |
| Power consumption | 27 – 33 W |
| Material | Housing: high-quality aluminium housing |
| Temperature range | -40 °C to +80 °C |
| Protection class | Lighthouse: IP 6X, IP X4K, IP X9K Controller: IP X7 |
| Type approval | ECE-R65 |
| EMC protection | ECE-R10, SAE J845 Class 1, CISPR 25 Class 3 |
| Protection | Polarity reversal protection |



MotoVox Compact 112 dB Horn

Solid state electronic horn designed for extremely long life and to replace high maintenance electromechanical horns. This model is designed to meet or exceed all applicable SAE specifications. Used by major OEMs.

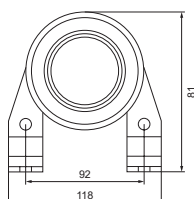
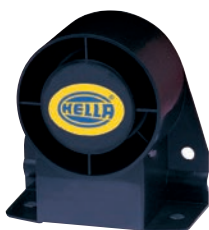


| Part number | Global part number | Type |
|-------------|--------------------|-------------------------------------|
| HMF312P | 3TA 910 156-021 | 12–24 V DC, bare wire connection |

| Technical data | |
|----------------------|--|
| Sound pressure level | 112 db @ 1.2 m |
| Type approval | SAE J1105 Sept 89, Type K. U.L. recognised for electric vehicles and fork lifts |

MotoVox Compact 107 dB Horn

Solid state electronic horn designed for extremely long life and to replace high maintenance electromechanical horns. This model is designed to meet or exceed all applicable SAE specifications. Used by major OEMs.

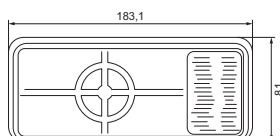


| Part number | Global part number | Type |
|-------------|--------------------|-------------------------------------|
| HMFH107P | 3TA 910 156-001 | 12–24 V DC, bare wire connection |

| Technical data | |
|----------------------|---------------------------|
| Sound pressure level | 107 db @ 1.2 m |
| Type approval | SAE J1105 Sept 89, Type L |

MotoVox Forward 117 dB Horn

Electronic forward horn is designed to be used where a high-decibel rugged horn is necessary.

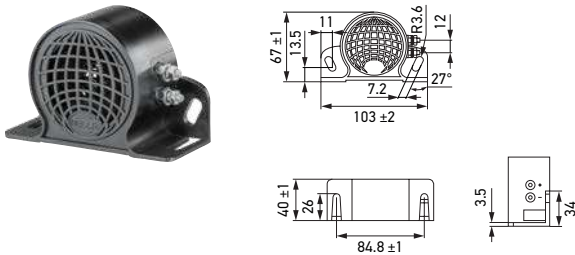


| Part number | Global part number | Type |
|-------------|--------------------|-------------------------------------|
| HMFH117P | 3TA 910 156-011 | 12–24 V DC, bare wire connection |

| Technical data | |
|----------------------|--|
| Sound pressure level | 117 db @ 1.2 m |
| Type approval | SAE J1105 Sept 89, Type J @ 24 V systems SAE J1105 Sept 89, Type K @ 12 V systems |

BM10

The BM10 reverse and warning alarm is a high frequency alarm and an indispensable element in high-risk working environments. With its traditional warning sound, the BM10 can prevent accidents when reversing.



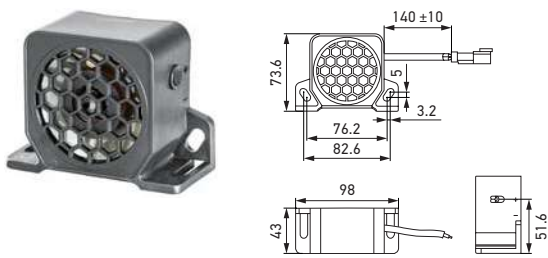
| Part number | Sound | Sound pressure level @ 1.2 m | Connection |
|-----------------|----------|------------------------------|--|
| 3SL 009 148-177 | Standard | 97 dB(A) | With 2 bolt |
| 3SL 009 148-187 | Standard | 107 dB(A) | With 2 bolt |
| 3SL 009 148-197 | Standard | 97 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 009 148-207 | Standard | 107 dB(A) | 140 mm cable with DEUTSCH DT connector |

Technical data

| | |
|---------------------|--------------------|
| Operating voltage | Multi-voltage |
| Rated voltage | 12 V / 24 V / 48 V |
| Current consumption | Max. 0.6 A |
| Power consumption | 12 W |
| Material | Housing: ABS |
| Temperature range | -40 °C to +85 °C |
| Protection class | IP 6K7 |
| Type approval | ECE-R10, SAE J994 |

BM20

The BM20 is a reverse and warning alarm with white noise technology, which reduces noise pollution. For signals with white noise technology, it is easier to determine from which direction the signal is coming.



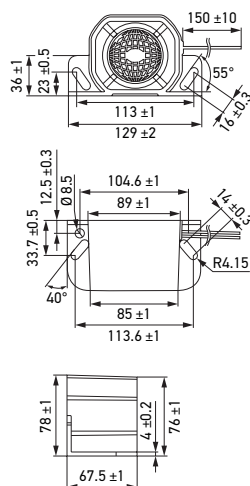
| Part number | Sound | Sound pressure level @ 1.2 m | Connection |
|-----------------|-------------|------------------------------|--|
| 3SL 996 139-507 | White noise | 92 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 996 139-517 | White noise | 97 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 996 139-527 | White noise | 102 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 996 139-537 | White noise | 92 – 102 dB(A) | 140 mm cable with DEUTSCH DT connector |

Technical data

| | |
|---------------------|-----------------------------|
| Operating voltage | Multi-voltage |
| Rated voltage | 12 V / 24 V |
| Current consumption | Max. 1.6 A |
| Power consumption | 9 W |
| Material | Housing: Glass-filled nylon |
| Protection class | IP 6K7 |
| Type approval | ECE-R10, SAE J994 |

BM30

The BM30 reverse and warning alarm is the ideal high frequency alarm for heavy duty vehicles. Besides the standard version, the BM30 is also available as a smart version with automatic adjustment to environments with changing sound levels.



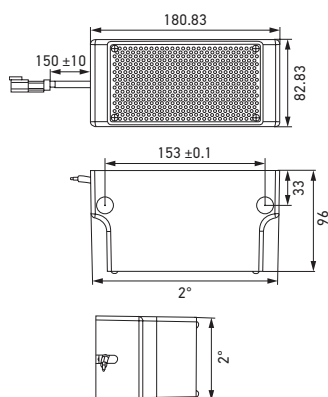
| Part number | Sound | Sound pressure level @ 1.2 m | Connection |
|-----------------|----------|------------------------------|--|
| 3SL 996 139-217 | Standard | 97 dB(A) | 150 mm cable |
| 3SL 996 139-227 | Standard | 107 dB(A) | 150 mm cable |
| 3SL 996 139-237 | Standard | 112 dB(A) | 150 mm cable |
| 3SL 996 139-247 | Standard | 107 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 996 139-257 | Standard | 112 dB(A) | 140 mm cable with DEUTSCH DT connector |
| 3SL 996 139-267 | Smart | 87 – 112 dB(A) | 150 mm cable |
| 3SL 996 139-277 | Smart | 87 – 112 dB(A) | 140 mm cable with DEUTSCH DT connector |

Technical data

| | |
|---------------------|-----------------------------|
| Operating voltage | Multi-voltage |
| Rated voltage | 12 V / 24 V / 48 V |
| Current consumption | Max. 0.6 A |
| Power consumption | 12 W |
| Material | Housing: Glass-filled nylon |
| Temperature range | -40 °C to +85 °C |
| Protection class | IP 6K7 |
| Type approval | ECE-R10, SAE J994 |

BM40

The BM40 is a reverse and warning alarm for heavy duty use. The BM40 is available as standard version, as version with white noise technology, for reduced noise pollution and as a version with smart sound, which adjusts automatically to environments with changing sound levels.



| Part number | Sound | Sound pressure level @ 1.2 m | Connection |
|-----------------|------------------------|--------------------------------|--|
| 3SL 996 139-557 | Standard | 97 dB(A), 107 dB(A), 112 dB(A) | 150 mm cable with DEUTSCH DT connector |
| 3SL 996 139-567 | White noise + standard | 92 dB(A), 102 dB(A), 107 dB(A) | 150 mm cable with DEUTSCH DT connector |
| 3SL 996 139-577 | Smart | 112 dB(A) | 150 mm cable with DEUTSCH DT connector |
| 3SL 996 139-587 | Smart + white noise | 92 – 107 dB(A) | 150 mm cable with DEUTSCH DT connector |

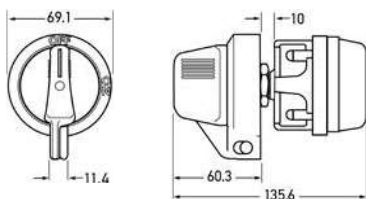
Technical data

| | |
|---------------------|-----------------------------|
| Operating voltage | Multi-voltage |
| Rated voltage | 12 V / 24 V |
| Current consumption | Max. 1.6 A |
| Power consumption | 10 W |
| Material | Housing: Glass-filled nylon |
| Protection class | IP 6K7 |
| Type approval | ECE-R10, SAE J994 |



Battery Master Lockout Switches – 2 Pole

Heavy-duty 2-pole lockable battery lockout switch. The Battery lockout switch provides a reliable power disconnection and safety cut-off that protects the vehicle against tampering, theft and battery drain. It also protects service personnel from electrical hazards during service operations. Divider on base prevents accidental shorting of battery cables. Easy to read designations on bezel and 90° switch travel make it easy to identify switch position.

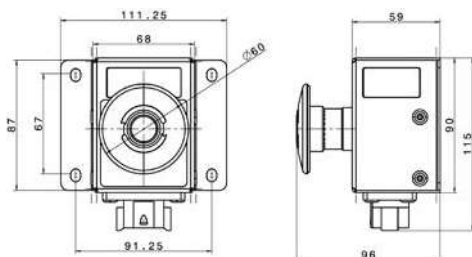


| Part number | Colour |
|-----------------|---------------|
| 9MK 910 109-001 | Red handle |
| 9MK 910 109-011 | Yellow handle |

| Technical data | |
|---------------------|--|
| Current consumption | 300 A @ 12 V, 250 A @ 24 V |
| Material | Housing: Composite-engineered polymer housing that will not corrode |
| Temperature range | -40 °C to +85 °C |
| Protection class | IP 67 |
| Mounting | Sealed design allows switch to be mounted in the best location regardless of environment |

Mining E-Stop

The Mining E-Stop offer versatility, safety and fast installation. This Heavy Duty unit features LED illumination visible from 3 sides for added safety, a user-friendly 60 mm push button, DEUTSCH DT connector and direct mount capability. It is a fully-sealed, pressure tested unit.



| Part number | Description |
|-----------------|-------------|
| 6HF 012 416-001 | E-Stop |

| Technical data | |
|------------------|--|
| Material | High visibility yellow powder-coated 304 stainless steel |
| Protection class | IP 6K8, IP 6K9 |
| Mounting | "Plug and Play", supplied with mating DEUTSCH DT connector, two normally closed and one normally open contacts (each rated 10 A) |

LED Buggy Whip

Light source: quality bright LED, Multi-voltage, low power requirement.

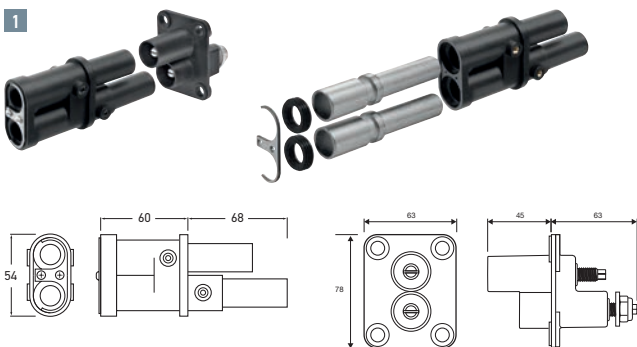


| Part number | Description |
|-----------------|--|
| 2AA 910 084-211 | Red flag – "X" reflective tape, whip colour orange, 1.2 m long |
| 2AA 910 084-221 | Red flag – "X" reflective tape, whip colour orange, 1.8 m long |
| 2AA 910 084-231 | Red flag – "X" reflective tape, whip colour orange, 2.4 m long |
| 8XX 910 084-251 | Red flag - "X" reflective tape |
| 2AA 910 084-201 | Buggy Whip Mounting Kit |

| Technical data | |
|-------------------|---|
| Operating voltage | Multi-voltage (9 – 32 V) |
| Rated voltage | 12 V / 24 V |
| EMC protection | RCM |
| Connection | DEUTSCH DT 2 pin connector |
| Mounting | Integrated mounting bolt on base with snap on / off quick-release shaft for quick and easy installation |

Jump Start System

Heavy duty, high capacity jump-start connectors for vehicles and equipment, ideal for use where access to terminals is restricted or dangerous. Eliminates chance of cross polarity connections through the specially shaped plug and reduces chance of sparking and possible ignition of flammable materials. Mounting bracket, protective cap, and kit containing the terminal, bracket and cap are also available.



| Jump Start Plug | |
|-----------------|--|
| Part number | Description |
| 8JA 177 305-101 | High impact ABS plastic, copper (silver brass coated) terminals, suitable for 70 mm ² cable, connection via crimping and soldering process 1 |

| Jump Start Terminal | |
|---------------------|---|
| Part number | Description |
| 8JB 177 305-001 | Jump start Terminal: Removes risk of terminal crossing, high impact ABS plastic, zinc coated terminals 2 |
| 8HG 177 305-031 | Terminal Kit: Kit of jump start terminal, bracket and cap 3 |
| 8HG 177 305-021 | Terminal Bracket: Bracket for mounting jump start terminal to vehicle body 4 |
| 9HD 177 305-011 | Terminal Cap: Cap to protect terminal from external environment when not in use 5 |



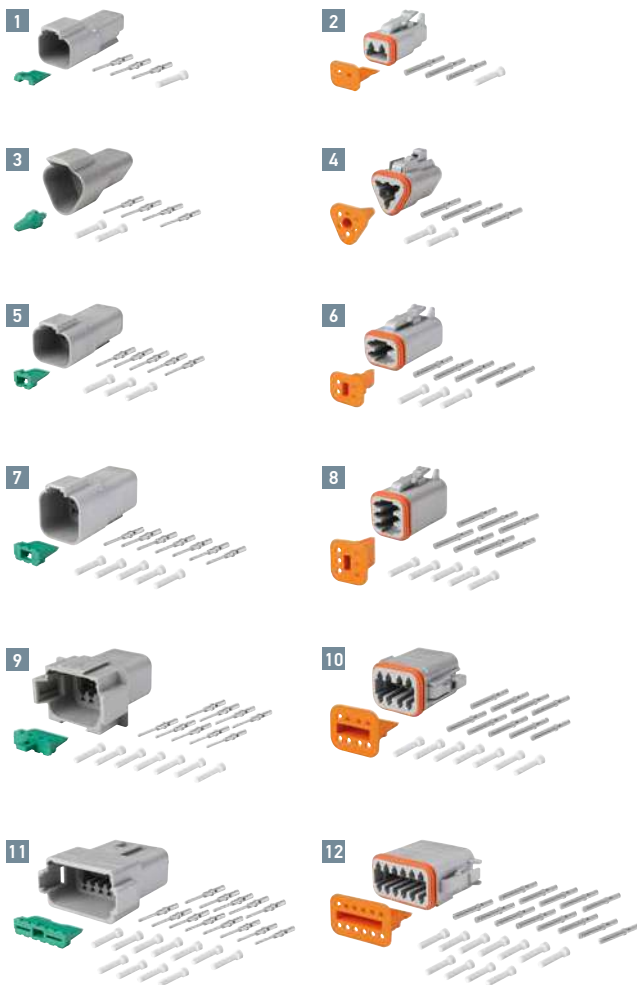
Crimping Tools



| Part number | Description | |
|-----------------|-----------------------------------|---|
| 8PE 910 118-011 | DT contact Crimping Tool 0.5–4 mm | 1 |
| 8PE 980 838-001 | SUPERSEAL connector Crimping Tool | 2 |
| 8PE 980 837-001 | DT connector Crimping Tool | 3 |

DT type connectors

DT type connectors are characterised by high-quality materials as well as reliability and easy handling. This makes DT type connectors particularly suitable for applications in tough environmental conditions.



| Part number | Description | |
|-----------------|--|----|
| 8JA 201 021-801 | 1 DT housing each, 2-pin, DT "wedglock" for housing, 2-pin, 3 contact pins, 0.5–1.5 mm ² , 1 blind plug | 1 |
| 8JA 201 022-801 | 1 DT connector each, 2-pin, DT "wedglock" for connector, 2-pin, 3 contact sleeves, 0.5–1.5 mm ² , 1 blind plug | 2 |
| 8JA 201 021-801 | 1 DT housing each, 3-pin, DT "wedglock" for housing, 3-pin, 4 contact pins, 0.5–1.5 mm ² , 2 blind plugs | 3 |
| 8JA 201 022-811 | 1 DT connector each, 3-pin, DT "wedglock" for connector, 3-pin, 4 contact sleeves, 0.5–1.5 mm ² , 2 blind plugs | 4 |
| 8JA 201 021-821 | 1 DT housing each, 4-pin, DT "wedglock" for housing, 4-pin, 5 contact pins, 0.5–1.5 mm ² , 3 blind plugs | 5 |
| 8JA 201 022-821 | 1 DT connector each, 4-pin, DT "wedglock" for connector, 4-pin, 5 contact sleeves, 0.5–1.5 mm ² , 3 blind plugs | 6 |
| 8JA 201 021-831 | 1 DT housing each, 6-pin, DT "wedglock" for housing, 6-pin, 7 contact pins, 0.5–1.5 mm ² , 5 blind plugs | 7 |
| 8JA 201 022-831 | 1 DT connector each, 6-pin, DT "wedglock" for connector, 6-pin, 7 contact sleeves, 0.5–1.5 mm ² , 5 blind plugs | 8 |
| 8JA 201 021-841 | 1 DT housing each, 8-pin, coding "A", DT "wedglock" for housing, 8-pin, 9 contact pins, 0.5–1.5 mm ² , 7 blind plugs | 9 |
| 8JA 201 022-841 | 1 DT connector each, 8 pin, coding "A", DT "wedglock" for connector, 8-pin, 9 contact sleeves, 0.5–1.5 mm ² , 7 blind plugs | 10 |
| 8JA 201 021-851 | 1 DT housing each, 12-pin, coding "A", DT "wedglock" for housing, 12-pin, 13 contact pins, 0.5–1.5 mm ² , 11 blind plugs | 11 |
| 8JA 201 022-851 | 1 DT connector each, 12-pin, coding "A", DT "wedglock" for connector, 12-pin, 13 contact sleeves, 0.5–1.5 mm ² , 11 blind plugs | 12 |

Handy Box



| Part number | Description |
|-----------------|--|
| 9XX 910 121-101 | Complete set: Carry case complete with all four Handy Box kits – DEUTSCH DT connector kit, blade fuse kit, heat shrink kit and crimp terminal kit |
| 9XX 011 959-001 | Carry Case (empty) Storage room for four assortment kits |

Handy Box Heat Shrink Kit



| Part number | Description |
|-----------------|--|
| | Heat Shrink Kit (Heat Shrink not adhesive lined) |
| | Content: 20 x red, shrinking 2.4 (-1.2), length 50 mm 20 x yellow shrinking 2.4 (-1.2), length 50 mm 20 x blue shrinking 2.4 (-1.2), length 50 mm 30 x transparent shrinking 2.4 (-1.2), length 50 mm 30 x black shrinking 2.4 (-1.2), length 50 mm 20 x red shrinking 3.2 (-1.6), length 50 mm 20 x yellow 3.2 (-1.6), length 50 mm 20 x blue 3.2 (-1.6), length 50 mm 30 x transparent 3.2 (-1.6), length 50 mm 30 x black 3.2 (-1.6), length 50 mm 20 x red shrinking 4.8 (-2.4), length 50 mm 20 x yellow 4.8 (-2.4), length 50 mm 20 x blue 4.8 (-2.4), length 50 mm 30 x transparent 4.8 (-2.4), length 50 mm 30 x black 4.8 (-2.4), length 50 mm 20 x red shrinking 6.4 (-3.2), length 50 mm 20 x yellow shrinking 6.4 (-3.2), length 50 mm 20 x blue shrinking 6.4 (-3.2), length 50 mm 30 x transparent shrinking 6.4 (-3.2), length 50 mm 30 x black shrinking 6.4 (-3.2), length 50 mm 4 x black shrinking 9.5 (-4.8), length 100 mm 4 x transparent shrinking 9.5 (-4.8), length 100 mm 4 x red shrinking 9.5 (-4.8), length 100 mm 4 x yellow shrinking 9.5 (-4.8), length 100 mm 4 x blue shrinking 9.5 (-4.8), length 100 mm 4 x black shrinking 12.5 (-6.2), length 100 mm 4 x transparent shrinking 12.5 (-6.2), length 100 mm 4 x red shrinking 12.5 (-6.2), length 100 mm 4 x yellow shrinking 12.5 (-6.2), length 100 mm 4 x blue shrinking 12.5 (-6.2), length 100 mm 10 x black shrinking 19.1 (-9.5), length 100 mm 10 x transparent shrinking 19.1 (-9.5), length 100 mm 5 x black shrinking 9.5 (-4.8), length 200 mm 5 x transparent shrinking 9.5 (-4.8), length 200 mm 5 x red shrinking 9.5 (-4.8), length 200 mm 5 x yellow shrinking 9.5 (-4.8), length 200 mm 5 x blue shrinking 9.5 (-4.8), length 200 mm 5 x black shrinking 25.4 (-12.7), length 200 mm 5 x black shrinking 19.1 (-9.5), length 200 mm |
| 9MJ 178 458-821 | |
| 9MJ 178 458-002 | Heat Shrink Tubing, 3 colours, 1.2...50 |
| 9MJ 178 458-012 | Heat Shrink Tubing, BK/TR, 1.2...50 |
| 9MJ 178 458-022 | Heat Shrink Tubing, 3-colour, 1.6...50 |
| 9MJ 178 458-032 | Heat Shrink Tubing, BK/TR, 1.6...50 |
| 9MJ 178 458-042 | Heat Shrink Tubing, 3-colour, 2.4...50 |
| 9MJ 178 458-052 | Heat Shrink Tubing, BK/TR, 2.4...50 |
| 9MJ 178 458-062 | Heat Shrink Tubing, 3-colour, 3.2...50 |
| 9MJ 178 458-072 | Heat Shrink Tubing, BK/TR, 3.2...50 |
| 9MJ 178 458-082 | Heat Shrink Tubing, 5-colour, 4.8...100 |
| 9MJ 178 458-092 | Heat Shrink Tubing, 5-colour, 6.2...100 |
| 9MJ 178 458-102 | Heat Shrink Tubing, BK/TR, 9.5...100 |
| 9MJ 178 458-112 | Heat Shrink Tubing, 5-colour, 4.8...200 |
| 9MJ 178 458-122 | Heat Shrink Tubing, BK, 9.5/12.7...200 |

Handy Box DT Type Connector Kit

The Handy Box DT Connector Kit (incl. Crimping Tool 8PE 910 118-011) contains 258 of the most popular DT Type connectors including tools. All parts in the kit are available as spares.



| Part number | Description |
|-----------------|--|
| | Handy Box DT Type Connector Kit |
| | Content: 10 x 2-way male DT connector incl. wedge 10 x 3-way male DT connector incl. wedge 8 x 6-way male DT connector incl. wedge 10 x 2-way female DT connector incl. wedge 10 x 3-way female DT connector incl. wedge 8 x 6-way male DT connector incl. wedge 100 x Male DT connector socket 100 x Female DT connector socket 1 x Crimping Tool 1 x DT wedge removal tool |
| 8PE 910 118-011 | Crimping Tool |
| 8KW 905 683-101 | 2 pin DEUTSCH DT connector set |
| 8KW 905 684-101 | 2 pin DEUTSCH DT connector receptacle set |
| 8KW 905 683-111 | 3 pin DEUTSCH DT connector set |
| 8KW 905 684-111 | 3 pin DEUTSCH DT connector receptacle set |
| 8KW 905 683-131 | 6 pin DEUTSCH DT connector set |
| 8KW 905 684-131 | 6 pin DEUTSCH DT connector receptacle set |

Handy Box Blade Fuse Kit



| Part number | Description |
|-----------------|--|
| | Handy Box Blade Fuse Kit |
| | Content: 1 x 8PE 713 576-011, A 96 20 x Mini 2 A, D138 20 x Mini 3 A, D139 20 x Mini 4 A, D140 20 x Mini 5 A, D141 20 x Mini 7,5 A, D142 20 x Mini 10 A, D143 20 x Mini 15 A, D144 20 x Mini 20 A, D145 20 x Mini 25 A, D146 20 x Mini 30 A, D147 25 x ATO 2 A, D129 25 x ATO 3 A, D69 25 x ATO 4 A, D188 25 x ATO 5 A, D70 25 x ATO 7,5 A, D71 25 x ATO 10 A, D72 25 x ATO 15 A, D73 25 x ATO 20 A, D74 25 x ATO 25 A, D75 25 x ATO 30 A, D76 25 x ATO 40 A, D130 |
| 8JS 009 257-831 | |

Handy Box Crimp Terminal Kit



| Part number | Description |
|-------------|---|
| | Handy Box Crimp Terminal Kit |
| | Content: |
| | 20 x M4, 0,5–1,5 mm ² , A 67 |
| | 20 x M5, 0,5–1,5 mm ² , A 69 |
| | 20 x 6,3 mm, 0,5–1,0 mm ² , A 52 |
| | 20 x 6,3 mm, 0,5–1,0 mm ² , A 59 |
| | 20 x 4 mm, 0,5–1,0 mm ² , A 61 |
| | 20 x M5, 1,5–2,5 mm ² , A 78 |
| | 20 x 6,3mm, 1,5–2,5 mm ² , A 53 |
| | 20 x M4, 1,5–2,5 mm ² , A 68 |
| | 20 x M5, 1,5–2,5 mm ² , A 70 |
| | 20 x M6, 1,5–2,5 mm ² , A 72 |
| | 20 x 1,5–2,5 mm ² , A 80 |
| | 20 x 6,3mm, 1,5–2,5 mm ² , A 58 |
| | 20 x 6,3 mm, 1,5–2,5 mm ² , A 60 |
| | 20 x 4 mm, 0,5–1,0 mm ² , A 63 |
| | 20 x 2,8 mm, 0,5–1,0 mm ² , A 50 |
| | 20 x 6,3 mm, 0,5–1,0 mm ² , A 82 |
| | 20 x M5, 4,0–6,0 mm ² , A 71 |
| | 20 x M6, 4,0–6,0 mm ² , A 73 |
| | 20 x A 84 |
| | 20 x I 50 |
| | 1 x Crimping Tool |

8KW 009 254-841

SUPERSEAL Connector Kit



| Part number | Description |
|-------------|---|
| | SUPERSEAL Connector Kit |
| | Content: |
| | 5 of each SUPERSEAL connector plug and socket |
| | 100 x Plug terminals |
| | 100 x Socket terminals |
| | 100 x Yellow conductor seals |
| | 100 x Red cavity plugs |

8JA 009 256-801

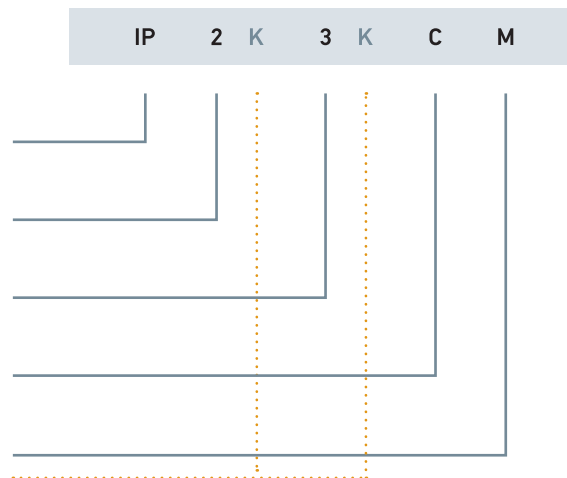
CONSTRUCTION AND MEANING OF THE IP (INGRESS PROTECTION) CODE

The specification of a degree of protection for protection against access and foreign object includes all lower degrees of protection.

The degrees of protection 1 to 6K for protection against water include all the lower degrees of protection.

Due to different physical affects, this does not automatically have to apply to water protection grades 7, 8 and 9K.

- Code letters**
(Ingress Protection)
- First characteristic numeral**
(Numerals 0 to 6 or letter X)
- Second characteristic numeral**
(Numerals 0 to 8 or letter X)
- Additional letter (optional)**
(Letters A, B, C, D)
- Supplementary letter (optional)**
(Letters M, S)
(Letter K)



| Element | Numeral / letter | Meaning for the protection of electrical equipment | Meaning for the protection of persons |
|---|------------------|--|---|
| First characteristic numeral / supplementary letter | | Against the ingress of solid foreign objects (including dust): | Against access to hazardous parts (unless described by extra letters): |
| | 0 | Not protected | Not protected |
| | 1 | With $\varnothing \geq 50$ mm | With back of hand |
| | 2 | With $\varnothing \geq 12.5$ mm | With finger |
| | 3 | With $\varnothing \geq 2.5$ mm | With tool |
| | 4 | With $\varnothing \geq 1$ mm | With wire |
| | 5K | Dust-protected | With wire |
| | 6K | Dust-tight | With wire |
| Second characteristic numeral / supplementary letter | | Against the ingress of water: | |
| | 0 | Not protected | |
| | 1 | Vertical dripping | |
| | 2 | Dripping (inclined 15°) | |
| | 3 | Spraying | |
| | 4 | Splashing | |
| | 4K | Same with increased pressure | |
| | 5 | Jetting | |
| | 6 | Powerful jetting | |
| | 6K | Same at increased pressure | |
| | 7 | Temporary immersion | |
| | 8 | Continuous immersion | |
| | 9K | High-pressure / steam jet cleaning | |
| Additional letter (optional) | | | Against access to hazardous parts (unless described by first characteristic numeral): |
| | A | | With back of hand |
| | B | | With finger |
| | C | | With tool |
| | D | | With wire |
| Supplementary letter (optional) | | Meaning for the protection of electrical equipment: | |
| | M | Movement of moving parts during water test | |
| | S | Standstill of moving parts during water test | |
| | K | Specifically for the electrical equipment in road vehicles | |

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