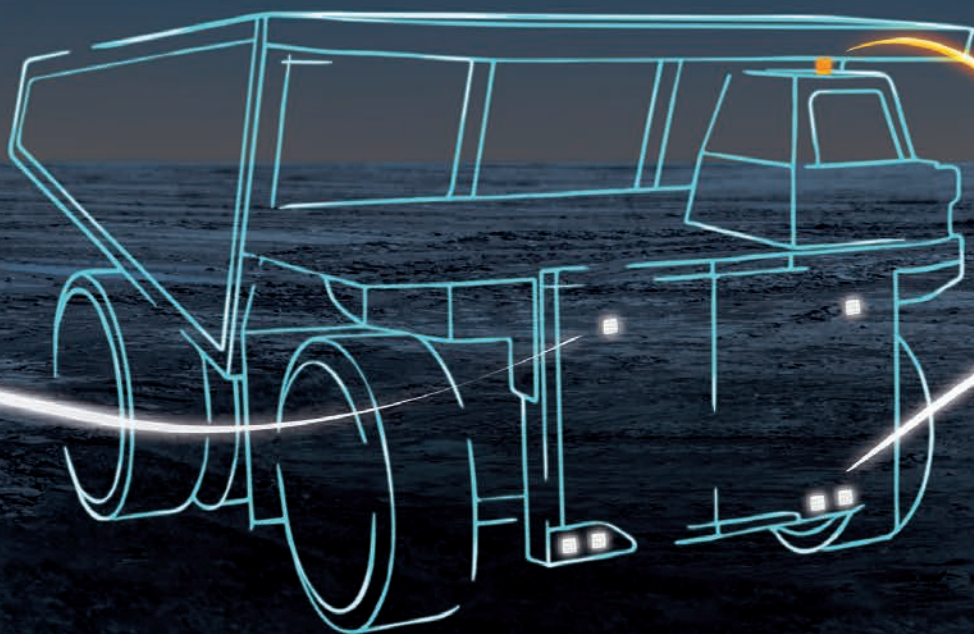




Technology with Vision

**PRODUCT OVERVIEW**  
MINING





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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

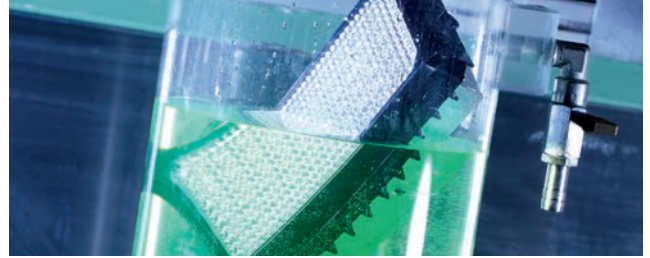
In this test, the products are tested for their dust tightness. Unfired Portland cement is used as a test medium for all products. The test is optionally performed in sample function operation, and with overpressure or under pressure exposure of the device under test.

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.



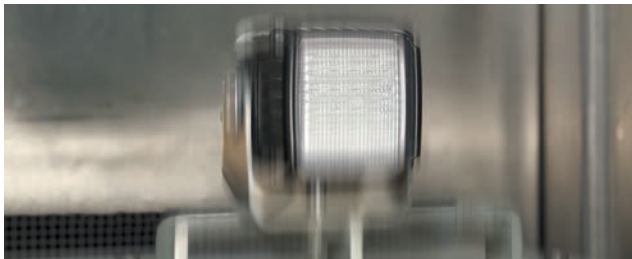
#### HIGH-PRESSURE CLEANER TEST

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.

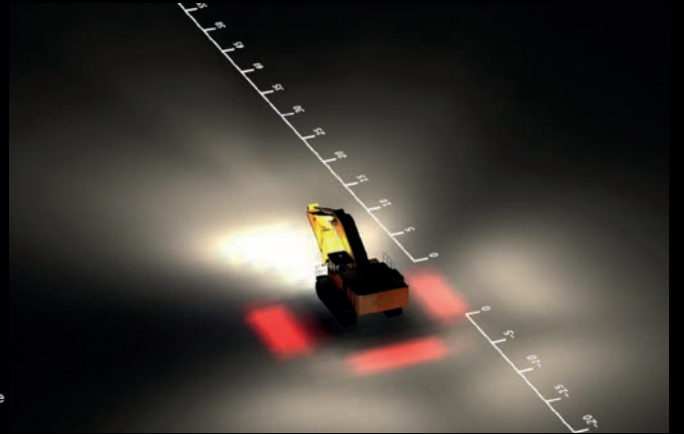


# CUSTOMISED LIGHTING DESIGN SOLUTION FOR EXCAVATORS

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.



1 RokLUME 380 N Close-range



2 RokLUME S700 RED LED Warning Light



3 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

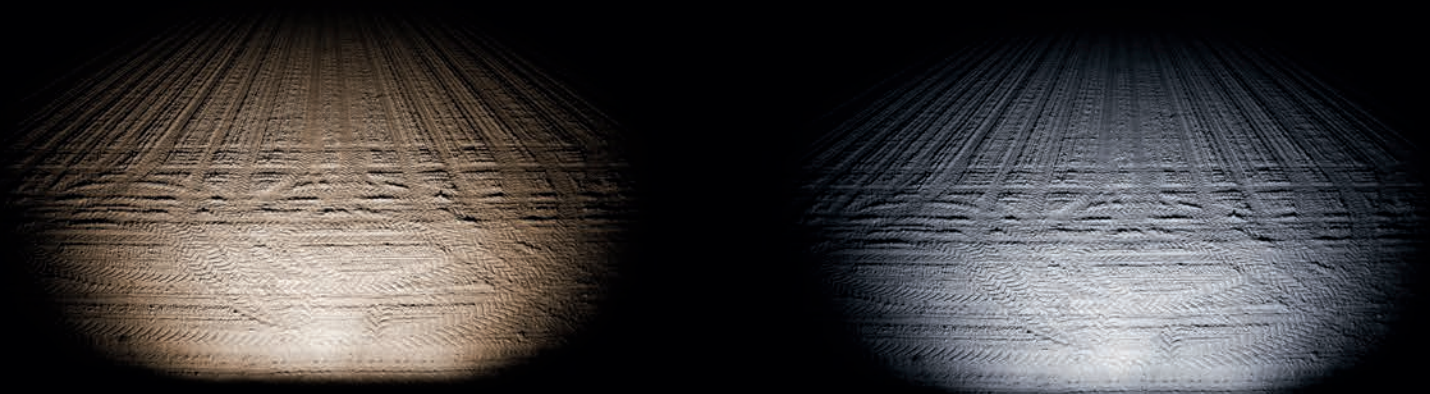
- With Smart functions
- 6 different light distributions available
- For Original Equipment or Retrofit available
- Individual adjustment for increased operator safety, health and productivity
- Easy mount and upgrade from standard versions
- Same dimensions as standard RokLUME 280N
- Communication via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



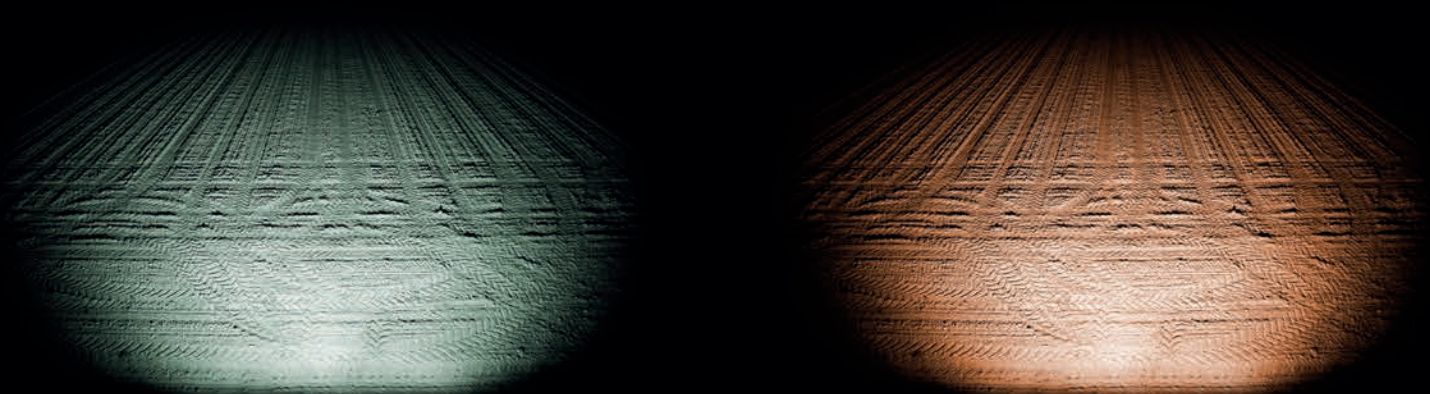
# SMART FUNCTIONS



DIMMING



CHANGE COLOUR TEMPERATURE



CHANGE COLOUR









### RokLUME 380 N

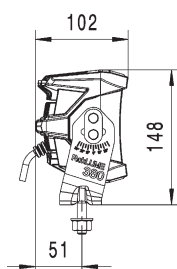
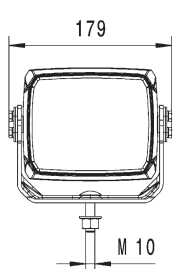
RokLUME 380 N is a high output LED work lamp specifically built for mining with a heavy duty stainless steel bracket and corrosion resistant NanoSafe coating.



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

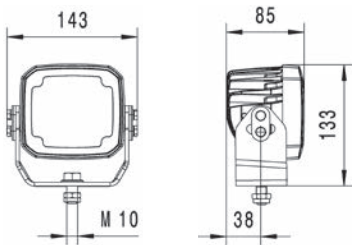
## RokLUME 280 N

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



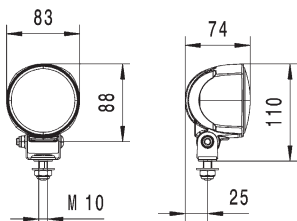
Part number	Illumination	Bracket	Colour
1GA 995 606-501	Close-range	Heavy Duty	□ White
1GA 995 606-511	Long-range	Heavy Duty	■ White
1GA 995 606-521	Pencil beam	Heavy Duty	□ White
1GA 995 606-541	ZEROGLARE	Heavy Duty	■ White
1GA 995 606-551	ZERGOGLARE pendant	Heavy Duty	□ White
1GA 995 606-751	Diffuse 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

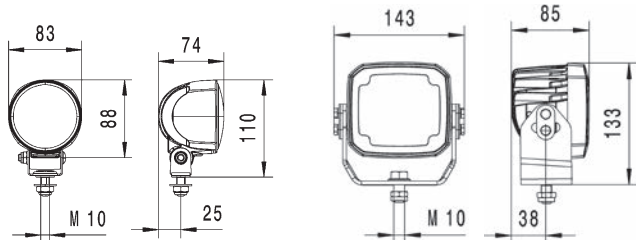
The SMART Cornering Light improves illumination when turning the vehicle left or right. It enables drivers to see obstacles in good time and therefore ensures greater safety and comfort when working in mines.



Set with RokLUME C180

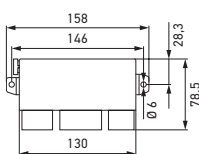


Set with RokLUME 280



RokLUME C180

RokLUME 280



Control unit

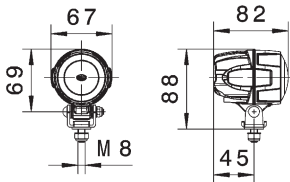
Part number	Illumination	Version
1G0 996 476-801	Close-range	Set with RokLUME C180
1GA 995 606-801	Close-range	Set with RokLUME 280

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.



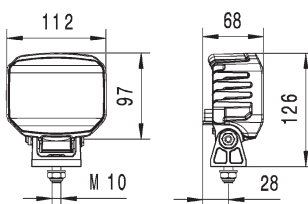
Part number	Illumination	Mounting	Colour
1G0 995 050-001	Close-range	Upright	<input type="checkbox"/> White
1G0 995 050-011	Close-range	Pendant	<input checked="" type="checkbox"/> White
1G0 995 050-021	Long-range	Upright/pendant	<input type="checkbox"/> White

#### 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

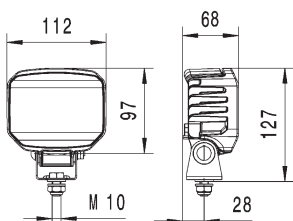
The Power Beam coloured lenses is a series of standard work lamps with coloured lenses for Off-highway use. Available with different lens colours to suit various applications and provide more safety and comfort.



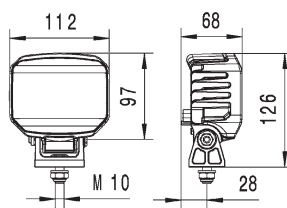
Power Beam 1000 compact coloured lens



Power Beam 1800 compact coloured lens



Power Beam 1000 compact coloured lens



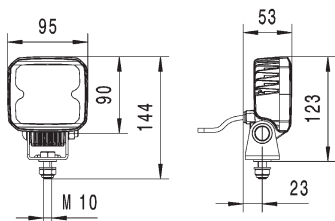
Power Beam 1800 compact coloured lens

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

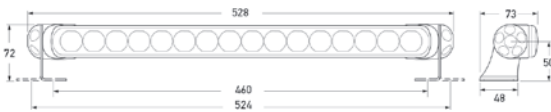
RokLUME S700 work lamp is ideal for illuminating a large area with an ultra-smooth spread. The thermally conductive polymer housing and Grilamid lens ensure corrosion resistance.



Close-range



Long-range



Close and Long-range



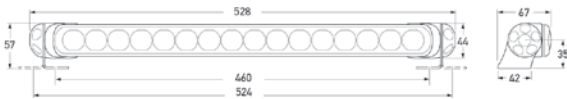
Combi



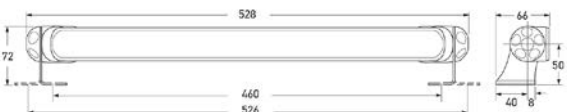
Close-range

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

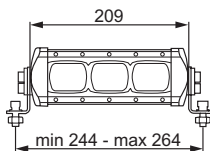
LBX 380 LED



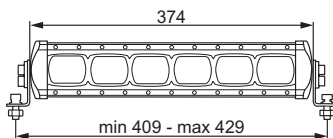
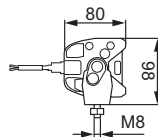
LBX 540 LED



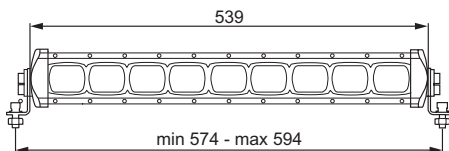
LBX 720 LED



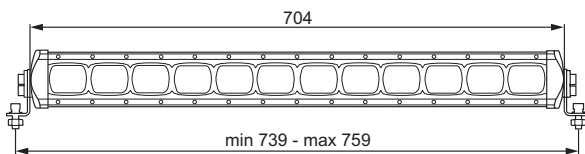
LBX 220 LED



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

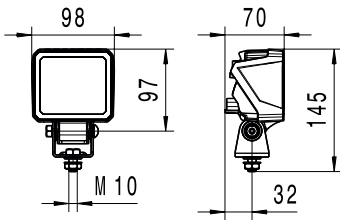
**ECO18 LED / ECO26 LED**

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

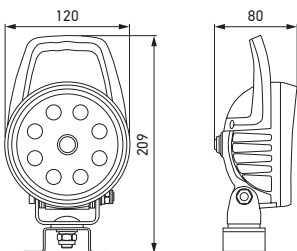


ECO18 LED	ECO26 LED	Illumination	Connection
1GA 996 479-001	1GA 996 579-001	Close-range	500 mm cable
1GA 996 479-011	1GA 996 579-011	Long-range	500 mm cable
1GA 996 479-021	1GA 996 579-021	Close-range	DEUTSCH DT 2 pin connector
1GA 996 479-031	1GA 996 579-031	Long-range	DEUTSCH DT 2 pin connector

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

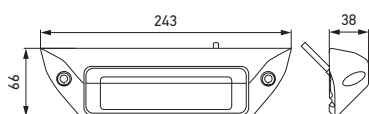
Technical data	
Operating voltage	Multi-voltage (10–30 V)
Rated voltage	12 V / 24 V
Power consumption	23 W
Light output	1,500 lm
Colour temperature	6,500 K
Material	Housing: robust aluminium die cast housing
Temperature range	-40 °C to +50 °C
Protection class	IP 6K7, IP 6K9K
Type approval	ECE-R10
Mounting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

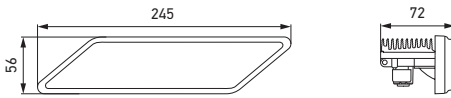


Modular Worklight Style left

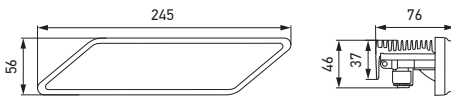
Modular Worklight Style right



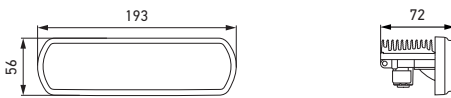
Modular Worklight Tech



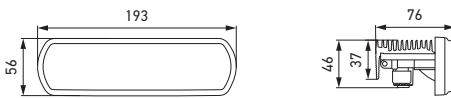
Modular Worklight Style Base



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

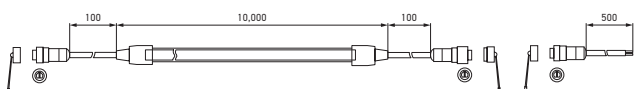
Operating voltage	Multi-voltage (9 – 32 V)
Rated voltage	12 V / 24 V
Power consumption	Base: 14 W Prime: 28 W
Light output	Base: 1,250 lm Prime: 2,350 lm
Colour temperature	6,500 K
Temperature range	-40 °C to +50 °C
Protection class	IP 6K8, IP 6K9K
Type approval	ECE-R10, RCM, CE, CISPR 25
Mounting	Integrated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



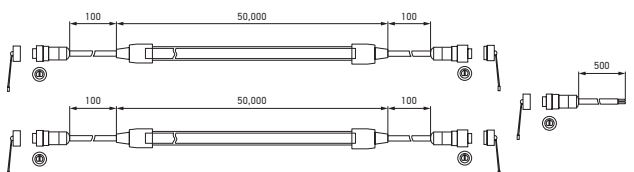


### FlexaTec

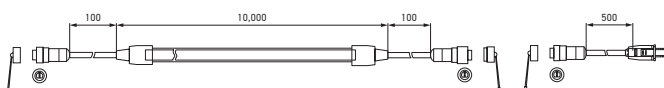
The new flexible LED light strip from HELLA for industrial applications ensures homogenous illumination of the working environment. Installation is easy, thanks to the specially designed clips. FlexaTec can be combined to a length of up to 80 or 100 metres depending on the country.



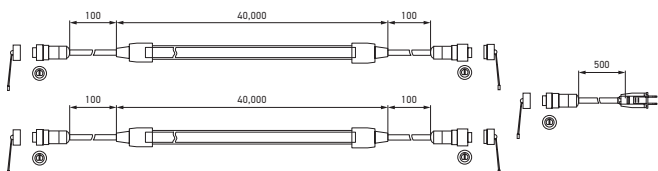
10 m version



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.

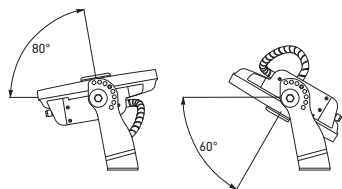
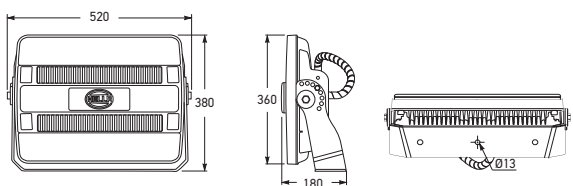


### HypaLUME 110/230V AC

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

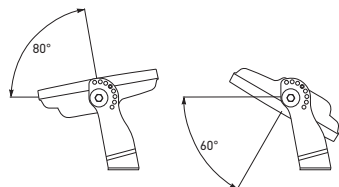
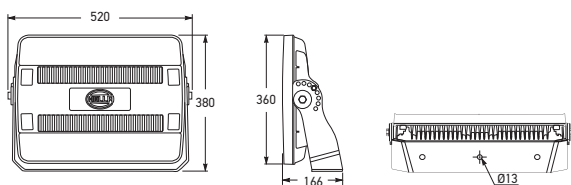
Technical data	
Operating voltage	Multi-voltage (100 – 240 V AC)
Rated voltage	110 V AC / 230 V AC
Power consumption	Max. 300 W
Light output	28,000 lm 19,000 lm (amber)
Colour temperature	5,700 K
Material	Lens: high impact and chemical resistant Grilamid Housing: aluminium with non-stick coating
Temperature 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





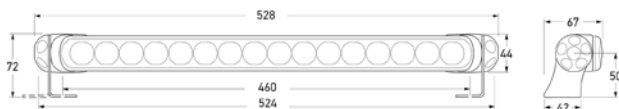


## RokLUME S700 RED

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



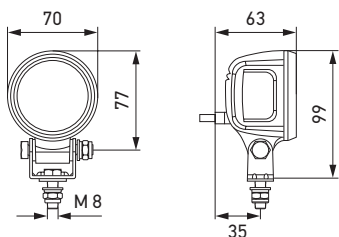
Part number	Projected Symbol	Colour
2XD 958 130-661	Wide marking	■ Red

### 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

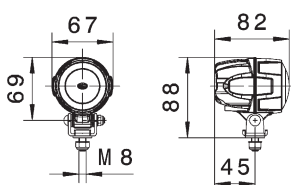
Operating voltage	Multi-voltage (10–80 V)
Rated voltage	12 V / 24 V / 48 V
Power consumption	Red: 5.5 W Blue: 7 W
Material	Lens: polycarbonate Housing: die-cast aluminium
Temperature range	-40 °C to +50 °C
Protection class	IP 6K7, IP 6K9K
Type approval	ECE-R10
Mounting	Horizontal or vertical (direction 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 / GGVSEB, CISPR 25
Mounting	Upright and pendant
Connection	DEUTSCH DT connector
Protection	Polarity reversal protection, overvoltage protection, transient spike protection



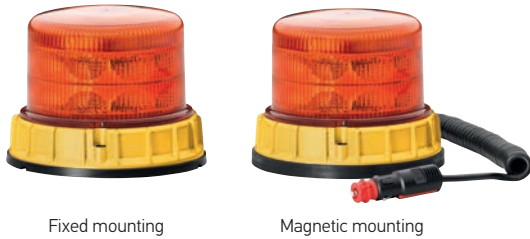




## DuraRAY 4.0

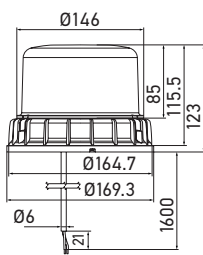
Flashing | Rotating

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.

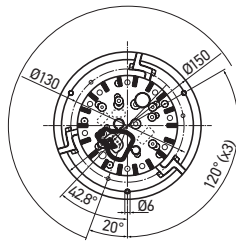


Fixed mounting

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

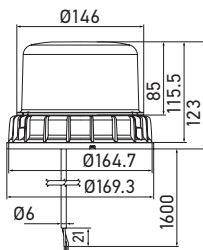
Flashing | Rotating

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.

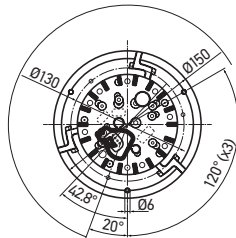


Fixed mounting

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

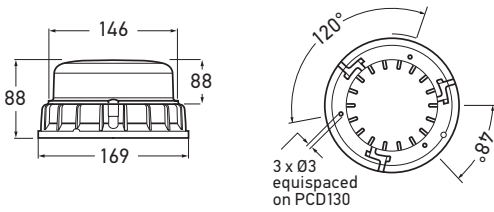
### K-LED Mining

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

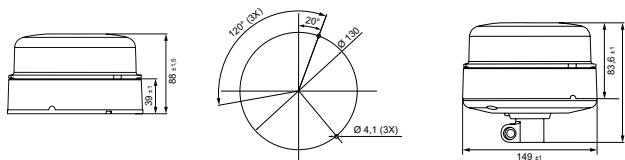
### K-LED Blizzard

Flashing

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

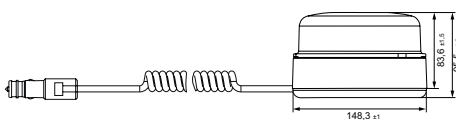


Fixed mounting | Pipe socket mounting | Magnet mounting



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



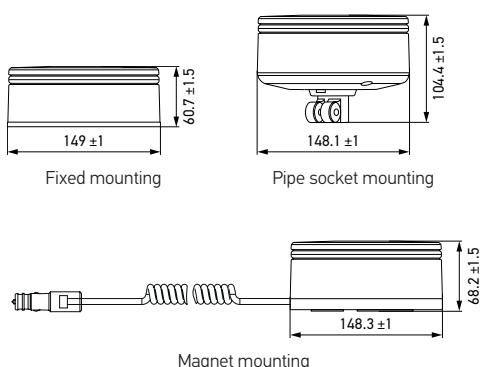
### K-LED Rebelution

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.



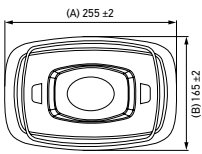
Amber light output, clear lens



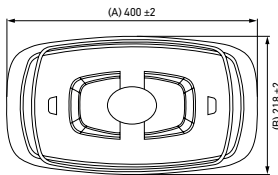
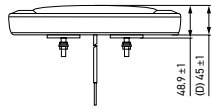
Amber light output, amber lens



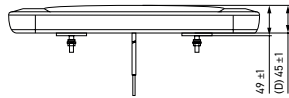
Dual colour light output, clear lens



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

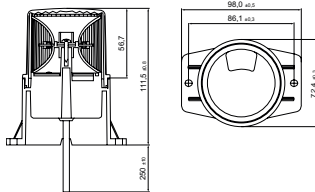
Technical data	
Operating voltage	Multi-voltage (10–30 V)
Rated voltage	12 V / 24 V
Current consumption	Micro Lightbar: 6.2 A @ 12 V, 2.9 A @ 24 V Mini Lightbar: 6.1 A @ 12 V, 2.8 A @ 24 V
Power consumption	Micro Lightbar: 66–72 W Mini Lightbar: max. 70 W
Material	Polycarbonate
Temperature range	-40 °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

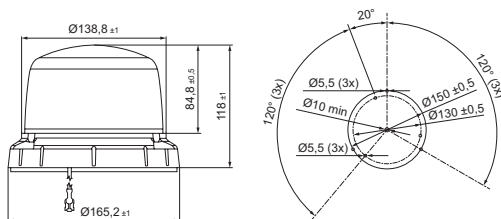
The LED beacon MiniRAY 2.1 with flashing light function and impact-resistant polycarbonate dome is specially designed for mining service vehicles.



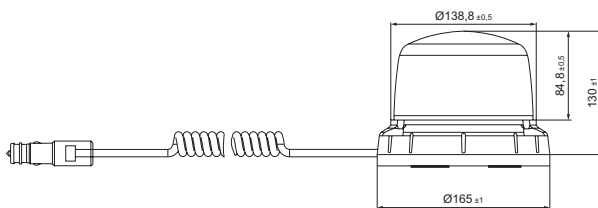
Fixed mounting



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

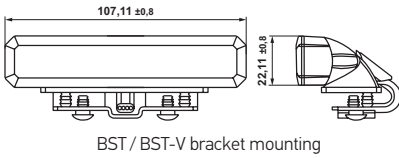
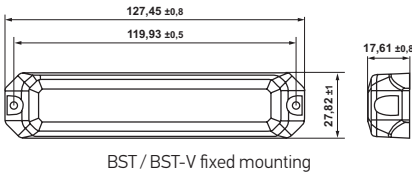
Technical data	
Operating voltage	Multi-voltage (9–30 V DC)
Rated voltage	12 V / 24 V
Current consumption	Approx. 0.2 A
Power consumption	Max. 4 W
Material	Dome lens: impact resistant polycarbonate lens Housing: polycarbonate and ABS
Temperature range	-40 °C to +60 °C
Protection class	IP 6K7, IP 6K9K
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

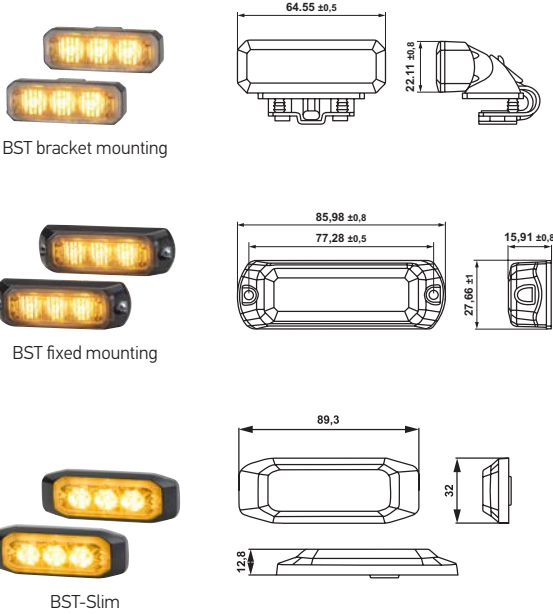
Technical data	
Operating voltage	Multi-voltage (11 – 30 V)
Rated voltage	12 V / 24 V
Current consumption	Amber: 1.4 A @ 12 V, 0.7 A @ 24 V Blue: 1.4 A @ 12 V, 0.7 A @ 24 V Red: 1.1 A @ 12 V, 0.55 A @ 24 V White: 1.4 A @ 12 V, 0.7 A @ 24 V
Power consumption	13 – 17 W
Temperature range	-40 °C to +60 °C
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 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

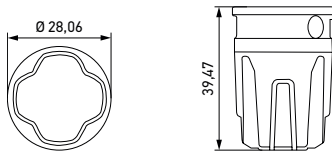
BST-Slim warning light		
Fixed mounting	Type approval	Colour
2XD 014 563-201	ECE	Amber
2XD 014 563-401	SAE	Amber
2XD 014 563-001	ECE	Blue
2XD 014 563-101	SAE	Blue
2XD 014 563-601	ECE	Red
2XD 014 563-701	SAE	Red
2XD 014 563-901	SAE	White

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

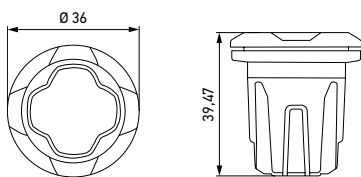
## BST-Round warning light

Flashing

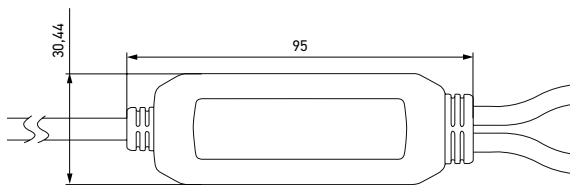
The BST-Round warning lights allow flexible installation in different areas of the vehicle and generate an intensive warning signal with minimum power consumption.



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

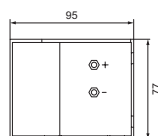
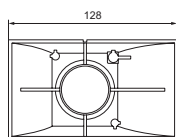
Operating voltage	Multi-voltage (11 – 30 V)
Rated voltage	12 V / 24 V
Current consumption	2.27 – 2.75 A @ 12 V, 1.27 – 1.37 A @ 24 V
Power consumption	27 – 33 W
Material	Housing: high-quality aluminium housing
Temperature range	-40 °C to +80 °C
Protection class	Lighthouse: IP 6X, IP X4K, IP X9K Controller: 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.



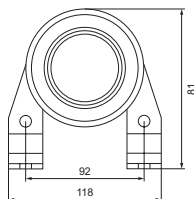
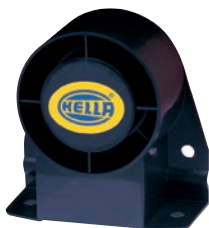
Part number	Global part number	Type
HMF312P	3TA 910 156-021	12–24 V DC, bare wire connection

#### 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.



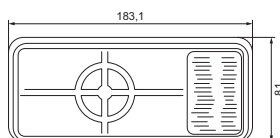
Part number	Global part number	Type
HMFH107P	3TA 910 156-001	12–24 V DC, bare wire connection

#### 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

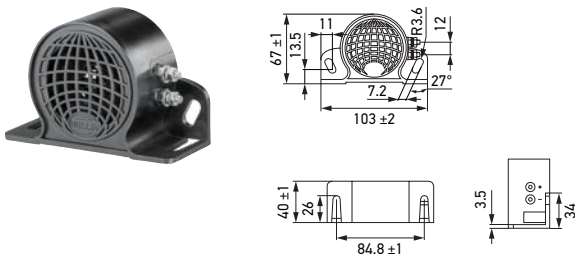
#### Technical data

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.



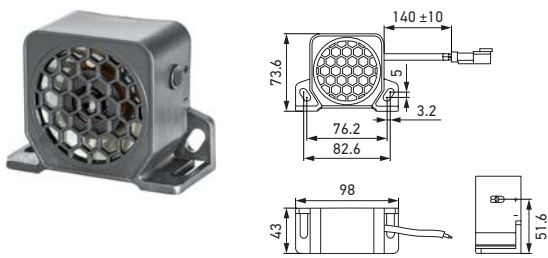
Part number	Sound	Sound pressure level @ 1.2 m	Connection
3SL 009 148-177	Standard	97 dB(A)	With 2 bolt
3SL 009 148-187	Standard	107 dB(A)	With 2 bolt
3SL 009 148-197	Standard	97 dB(A)	140 mm cable with DEUTSCH DT connector
3SL 009 148-207	Standard	107 dB(A)	140 mm cable with DEUTSCH DT connector

### 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.



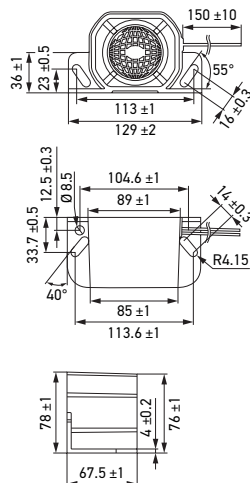
Part number	Sound	Sound pressure level @ 1.2 m	Connection
3SL 996 139-507	White noise	92 dB(A)	140 mm cable with DEUTSCH DT connector
3SL 996 139-517	White noise	97 dB(A)	140 mm cable with DEUTSCH DT connector
3SL 996 139-527	White noise	102 dB(A)	140 mm cable with DEUTSCH DT connector
3SL 996 139-537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



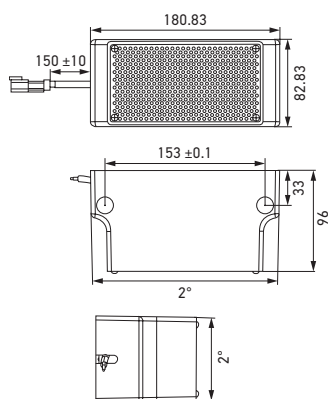
Part number	Sound	Sound pressure level @ 1.2 m	Connection
3SL 996 139-217	Standard	97 dB(A)	150 mm cable
3SL 996 139-227	Standard	107 dB(A)	150 mm cable
3SL 996 139-237	Standard	112 dB(A)	150 mm cable
3SL 996 139-247	Standard	107 dB(A)	140 mm cable with DEUTSCH DT connector
3SL 996 139-257	Standard	112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

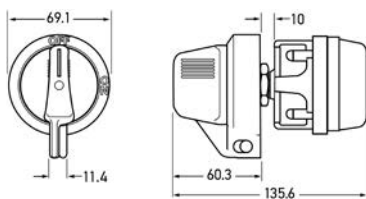
Operating voltage	Multi-voltage
Rated voltage	12 V / 24 V
Current consumption	Max. 1.6 A
Power consumption	10 W
Material	Housing: Glass-filled nylon
Protection class	IP 6K7
Type approval	ECE-R10, SAE J994





### 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.

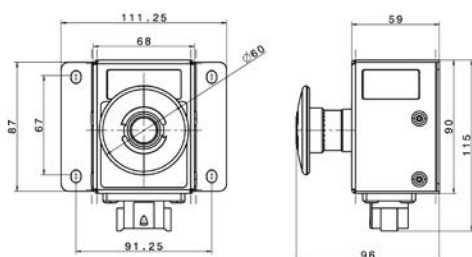


Part number	Colour
9MK 910 109-001	Red handle
9MK 910 109-011	Yellow handle

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

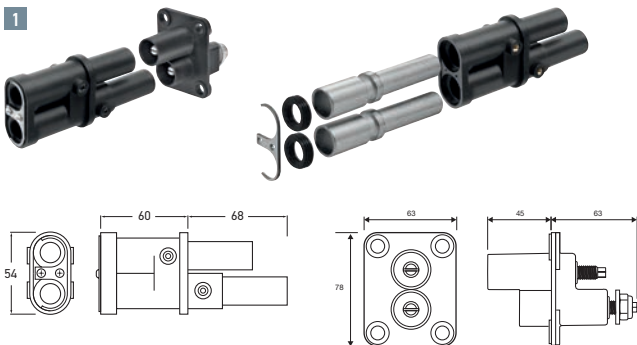
Technical data	
Operating voltage	Multi-voltage (9 – 32 V)
Rated voltage	12 V / 24 V
EMC protection	RCM
Connection	DEUTSCH DT 2 pin connector
Mounting	Integrated mounting bolt on base with snap on / off quick-release shaft for quick and easy installation

## 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 <sup>2</sup> cable, connection via crimping and soldering process <b>1</b>

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 <b>2</b>
8HG 177 305-031	Terminal Kit: Kit of jump start terminal, bracket and cap <b>3</b>
8HG 177 305-021	Terminal Bracket: Bracket for mounting jump start terminal to vehicle body <b>4</b>
9HD 177 305-011	Terminal Cap: Cap to protect terminal from external environment when not in use <b>5</b>



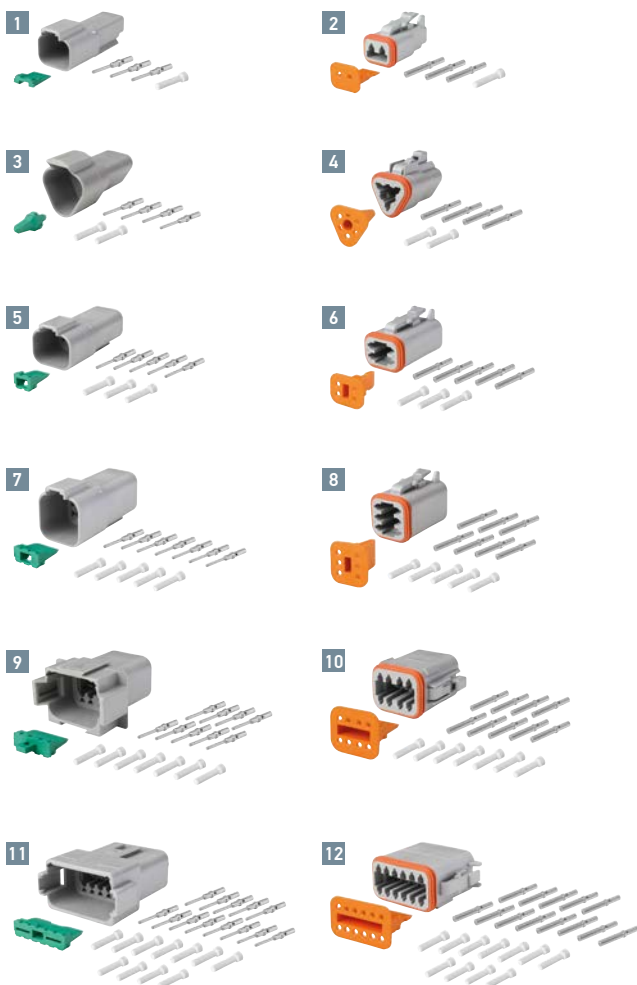
## Crimping Tools



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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , 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 <sup>2</sup> , A 67
	20 x M5, 0,5–1,5 mm <sup>2</sup> , A 69
	20 x 6,3 mm, 0,5–1,0 mm <sup>2</sup> , A 52
	20 x 6,3 mm, 0,5–1,0 mm <sup>2</sup> , A 59
	20 x 4 mm, 0,5–1,0 mm <sup>2</sup> , A 61
	20 x M5, 1,5–2,5 mm <sup>2</sup> , A 78
	20 x 6,3mm, 1,5–2,5 mm <sup>2</sup> , A 53
	20 x M4, 1,5–2,5 mm <sup>2</sup> , A 68
	20 x M5, 1,5–2,5 mm <sup>2</sup> , A 70
	20 x M6, 1,5–2,5 mm <sup>2</sup> , A 72
	20 x 1,5–2,5 mm <sup>2</sup> , A 80
	20 x 6,3mm, 1,5–2,5 mm <sup>2</sup> , A 58
	20 x 6,3 mm, 1,5–2,5 mm <sup>2</sup> , A 60
	20 x 4 mm, 0,5–1,0 mm <sup>2</sup> , A 63
	20 x 2,8 mm, 0,5–1,0 mm <sup>2</sup> , A 50
	20 x 6,3 mm, 0,5–1,0 mm <sup>2</sup> , A 82
	20 x M5, 4,0–6,0 mm <sup>2</sup> , A 71
	20 x M6, 4,0–6,0 mm <sup>2</sup> , 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



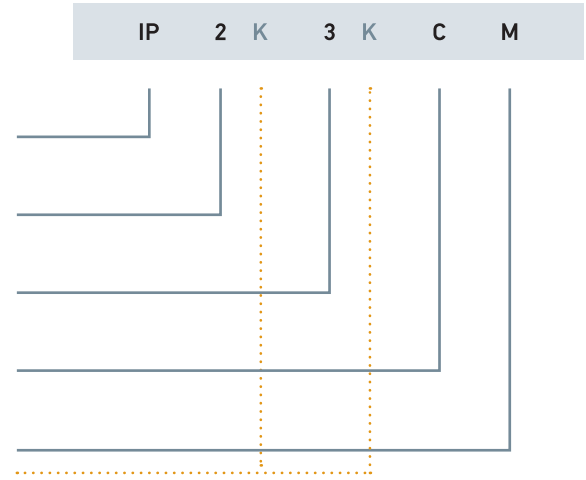
# CONSTRUCTION AND MEANING OF THE IP (INGRESS PROTECTION) CODE

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
<b>First characteristic numeral / supplementary letter</b>		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
<b>Second characteristic numeral / supplementary letter</b>		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	
<b>Additional letter (optional)</b>			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
<b>Supplementary letter (optional)</b>		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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