MUNICIPAL VEHICLES AND VEHICLES WITH SPECIAL BODYWORK

www.hella.com/municipal


SO LP 5550

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REDUCED CO_2 EMISSION

QUALITY IS A TRADITION AT HELLA

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 Lippstadt.

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.

HELLA products are subjected to the following tests:

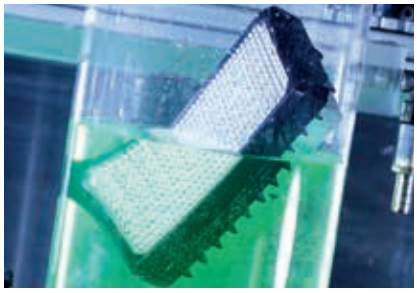
Splash water test
In universal splash water cabins, HELLA products are tested under realistic environmental conditions. The cabins are equipped with devices for rain, splash water, water jets and water mist. Here, the products are tested for tightness by undergoing the intermittent and splash water test at a pressure of up to 5 bar, and the the jet water test at a pressure of up to 10 bar.
(IP XK4K)

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 XK9K).

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 underpressure exposure of the device under test.

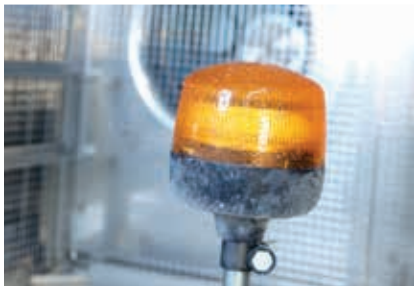
The tests are evaluated by determining the photometric value before and after the test (IP 5K). This is the only way that HELLA can ensure that dust will not penetrate the product and can guarantee the long service life of the product.



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 1m in water. Another test system can reach a depth of 6 metres. 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 67).



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.

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.

You will find further information on the HELLA quality criteria
at: www.hella.com/quality

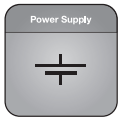
IP PROTECTION CATEGORY

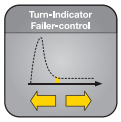
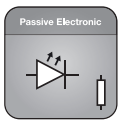
What does IP protection category mean?
IP stands for International Protection. The IP protection categories are determined according to DIN 40 050, Part 9. The purpose of the standard is the exact definition of electrical vehicle equipment against the penetration of solid materials including dust and against water penetration. The different degrees of protection important for signalling systems are explained below.

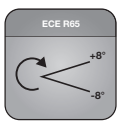
Protective category IP 5K4K
Dust may only penetrate to the extent that function and safety are not impaired. Water that is sprayed from every direction at increased pressure against the housing must not have any damaging effect: water pressure approx. 4 bar.

Protection class IP 9K
Water that is directed from high-pressure / steam-cleaning equipment onto the housing must not have any damaging effect: water pressure approx. 80 – 100 bar.

Protection class IP 6K7
Dust must not penetrate. No water may penetrate, even if the device is submersed for some time. HELLA products meet the highest requirements and are ideally protected against all kinds of weather conditions.

FEATURES	DESCRIPTION	COMMENTS
power consumption of LED lamps	**Advantages of the LED:** Generally, LED lights consume less power than a light with an incandescent lamp. Savings of up to 90 % are possible, which also helps to reduce CO_2.	
Vehicle electrical system voltage 	Defines the voltage supply of the light. This can be 12 V, 24 V or a flexible voltage range for Multivolt (8 – 33 V).	Multivolt is the most flexible: Requires fewer versions, but has more electronic circuit components and is therefore more expensive.
Dust and water protection IP 	International Protection (IP) as per DIN 40050, Part 9. Specific definition for road vehicles. 5K = Dust protected 6K = Dust tight 9K = Protection against water during pressure / steam cleaning.	The higher the protective category, the better the protection against penetrating media. IP 67 maximum value → Completely sealed against dust and water.
  	Resistant to high-pressure jet cleaners	

FEATURES	DESCRIPTION	COMMENTS
Indicator failure check according to ECE-R48 	**Regulation according to ECE-R48:** The driver must be informed if the indicator function fails. To remain legally compliant, this requirement must also be met for LED lights. This requirement is met by an integrated self-diagnostic unit on the PCB of the LED and an electrical pulse. Since the end of 2011, this HELLA failure check with a pulse has been ISO Standard: ISO 13207.	If the indicator failure check is not ensured, the general vehicle type approval becomes void. This means it is illegal to operate vehicles without indicator failure check in countries affiliated to ECE-R48. The indicator failure check is ensured in combination with ballasts, HELLA part no. 5DS 009 552.
Electronic circuit  **Active**  **Passive**	Basically, two different circuits are possible for LED lamps: **Active:** LED current regulation through active electronics **Passive:** A specific voltage range is preset for the LED through input resistance.	**Active:** Higher expenditure during development because of complex circuit and necessary EMC approval. Higher price because of electronic components, but optimal current regulation allows maximum LED design life. **Passive:** Cost-effective solution without complex protection measures. Shorter LED design life in case of failure. No EMC approval required.
Thermal management  **Active**  **Passive**	**Active:** Electronic power control of LEDs in the event of impermissibly high ambient temperatures. This ensures the LEDs are protected against destruction caused by overheating. **Passive:** Optimised layout of the components for even temperature distribution and spread.	**Active:** More development overhead with active thermal management and higher parts prices ensure optimal conditions for maximum design life. **Passive:** The warmer the LED gets through exterior factors or heating caused by its own operation, the shorter the service life.
Overvoltage protection 	Supplement to the electronics for protecting the LED against high voltage / current in the vehicle's electric system as per ISO 7637-2.	Overloading of the LEDs can be caused by voltage peaks in the vehicle because of: → Jump-starting → Faulty control units → Load dump impulse (incorrect battery contact) These can stress or damage the LED, which can lead to a failure or a reduction in the design life. By supplementing the circuit with appropriate components, it can be protected, so that the service life is extended and failures are prevented.

FEATURES	DESCRIPTION	COMMENTS
Bi-polarity of the lamp 	Even if the connecting cable is attached with reverse polarity, the LED is still fully functional.	The semi-conductor in an LED must always be operated with the correct polarity. Inverse polarity damages the LED, so that LED lamps are generally equipped with reverse polarity protection (diode). However this function only works if "+" and "-" are correctly connected. If a lamp has a bi-polar circuit, then it will work independently of the contact connections. This ensures poka-yoke (avoiding faulty installations) in connection with indentation clamping technology, for example. However, the additional components on the PCB also increase the costs.
Reverse polarity protection 	Even if the connecting cable is connected the wrong way round, there is still no danger for the electronics.	The semi-conductor in an LED must always be operated with the correct polarity. Inverse polarity damages the LED, so that LED lamps are generally equipped with reverse polarity protection (diode). However this function only works if "+" and "-" are correctly connected. If a lamp has a bi-polar circuit, then it will work independently of the contact connections. This ensures poka-yoke (avoiding faulty installations) in connection with indentation clamping technology, for example. However, the additional components on the PCB also increase the costs.
ECE 	Product is licensed according to ECE guidelines.	
ECE-R65 	Defines the light values, light distribution and color location of beacons that are to be achieved.	Only beacons that fulfil ECE-R65 can be used on public roads.

FEATURES	DESCRIPTION	COMMENTS
Beacons - failure control (DIN 14630 – blue) 	Beacons for preferential road use.	A function monitoring system must be provided.
Approval for transport of dangerous goods 	Light approved for transport of dangerous goods according to Hazardous Waste Road Directive (GGVS).	Generally required for lorry and trailer lighting. Precondition for approval: damage to the light source must not cause explosive media to ignite.
Electromagnetic compatibility   	Electromagnetic compatibility (EMC) tested and EC type approval issued.	If the light is not constructed according to EMC specifications, and thus is not certified, then interaction between it and other safety-relevant electronic systems may occur. **Examples:** Interference in a radio loudspeaker, impairment of ABS electronics, or failure of the lamp due to sensitivity to interference.
Automotive Electronic Council 	Components qualified according to automotive standard.	Electronic components (LEDs, diodes, ...) are more robust and safer than electronic components for industry thanks to automotive specifications. By using certified suppliers, a more robust design of the circuit is possible - even for longer periods of time with consistent quality. Thus slightly higher costs for components improve the design life of LED lamp functions.


MAN
SO LP 5533

1 **K-LED 2.0**
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2 **Ultra Beam LED**
Page 65

3 **Power Beam 1500**
Page 64

4 **Full LED combination rear light**
Page 89

5 **LED license plate light**
Page 95

WASTE COLLECTION VEHICLES

In recent years, waste disposal vehicles have developed to become highly specialized carriers of technology. Equipped with state-of-the-art safety systems, they ensure on a daily basis that the waste created is disposed of in the quickest, quietest, most environmentally friendly and efficient way possible.

With the development of innovative and high quality technology in the areas of light, electronics and electrical equipment, HELLA is making a small, but important contribution towards this. This allows ultra-modern LED worklights to provide optimal visibility when maneuvering and turns night into day for the disposal team. HELLA LED rotating beacons provide the greatest possible security for employees and road users are warned quite far in advance so that everyone knows that a clean environment is being created here.

Product recommendation


SO LP 5504

1 **Rota LED**
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2 **Module 70 LED IV**
Page 65

3 **Intelligent Battery Sensor**
Page 104

4 **3100 switch series**
Page 110

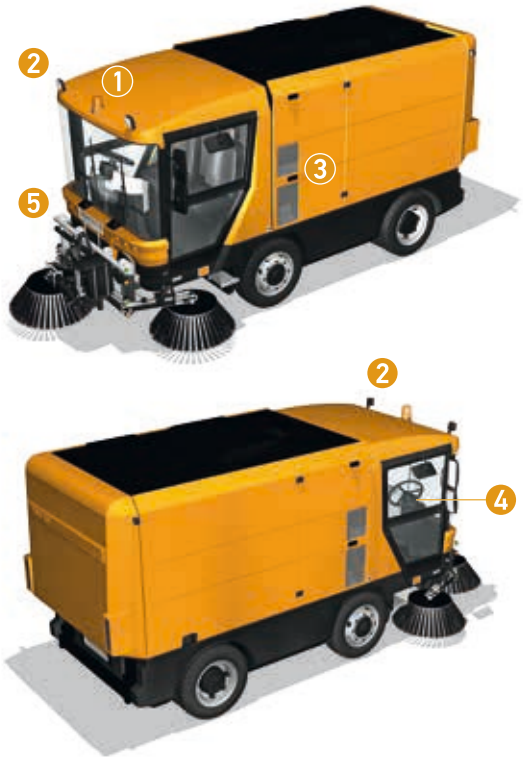
5 **90 mm LED modules**
from page 76

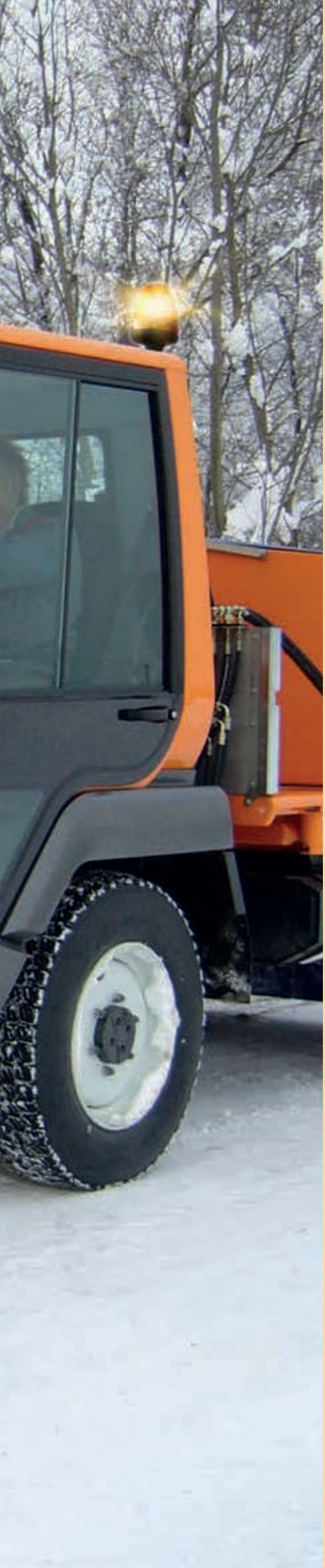
ROAD CLEANING VEHICLES

Their range of applications is versatile. They are used for cleaning pavements, pedestrian zones, roads, runways or even industrial halls. They often appear from nowhere on the road, clean at lightening speed and disappear again just as quickly. They ensure inner cities are kept clean and sweep all sorts of road surfaces from narrow little alleyways to large public spaces or airports.

HELLA lighting technology helps ensure that no piece of waste is missed and the drivers always have optimum visibility, regardless of where they are sweeping. HELLA sensors allow precise measurement of vehicle properties, so that problems can be detected early on and HELLA switches facilitate all functions being quick and easy to operate.

Product recommendation





1 **K-LED 2.0**
Page 32 / 33

2 **Front flashers BST**
Page 54

3 **Power Beam 1500, Orange**
Page 64

4 **LED headlamp C140**
Page 83

5 **Full LED combination rear light**
Page 89

WINTER SERVICE VEHICLES

They don't usually get to enjoy idyllic winter landscapes. When they are on the move, they need to take great care as usually the temperature is below freezing, visibility is poor, there is a high risk of black ice and heavy snowfall. They often start work in the early hours before dawn and often work until late in the evening or night. There is no question that winter service vehicles play an important role in keeping the roads, footpaths and airports safe, as well as many other public and private spaces.

Situations like this are not only stressful for the person involved, but also for the materials used. For many years now, HELLA has been a partner of leading winter service vehicle manufacturers and tries to support this work as effectively as possible with high quality and innovative products. Because there is hardly any other area where reliability, safety and durability play such an important role as they do for winter service vehicles. To this end, HELLA products are thoroughly inspected over the entire manufacturing process and are subjected to exacting demands so that the drivers can be sure they can rely on the HELLA light system.

Product recommendation

1 **OWS**[7]
from page 47

2 **K-LED 2.0**
Page 32 / 33

3 **Front flashers BST**
Page 54

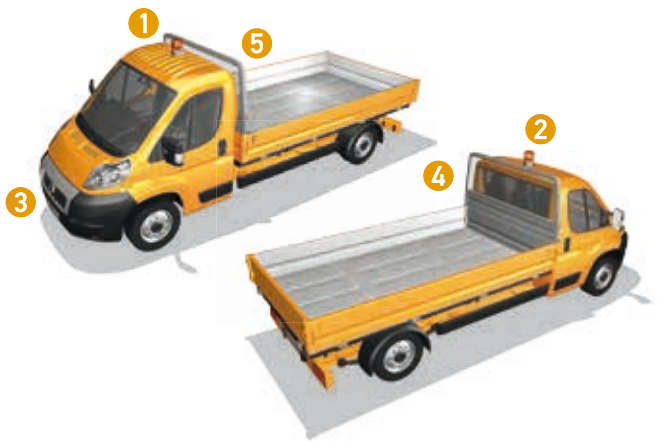
4 **Power Beam 1500**
Page 64

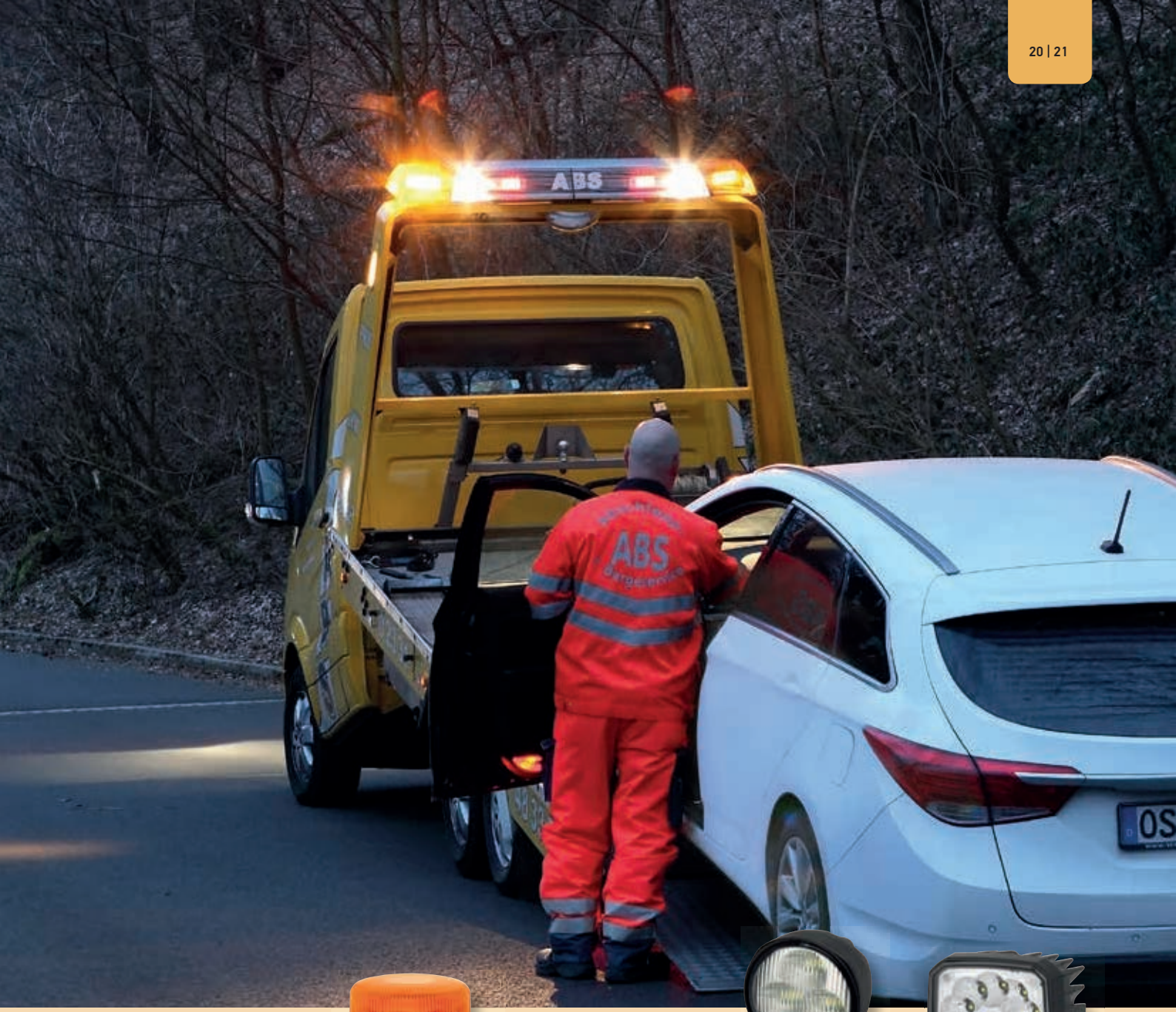
5 **Power Beam 3000**
Page 64

MAINTENANCE VEHICLES

They carry out safety checks, appraise roads, guard railings or paths. Where ever they stop, something needs to be done urgently. Despite usually being painted in a conspicuous vehicle color, drivers approaching too quickly often overlook them. The only way to improve safety here is to use the best warning systems. HELLA has been a reliable partner for roof bars, rotating beacons and other warning systems for many years now. HELLA worklights ensure optimum visibility, even in the darkest hour.

Product recommendation





1 **OWS**[7]
from page 47

2 **K-LED 2.0**
Page 32 / 33

3 **Front flashers BST**
Page 54

4 **Module 70 LED IV**
Page 65

5 **Ultra Beam LED**
Page 65

TOWING VEHICLES

At their place of work, people drive too fast and don't pay enough attention. They recover vehicles on motorways, on blind corners or fast highways. A job which can only be carried out safely with strong nerves, plenty of know-how and optimum materials. HELLA products help attain maximum safety for man and material, because here it is important to be able to rely 100 % on their lighting power.

Product recommendation

1 **K-LED 2.0 Airport**
Page 33

2 **LED tail light modules**
Page 93

3 **Ultra Beam LED**
Page 65

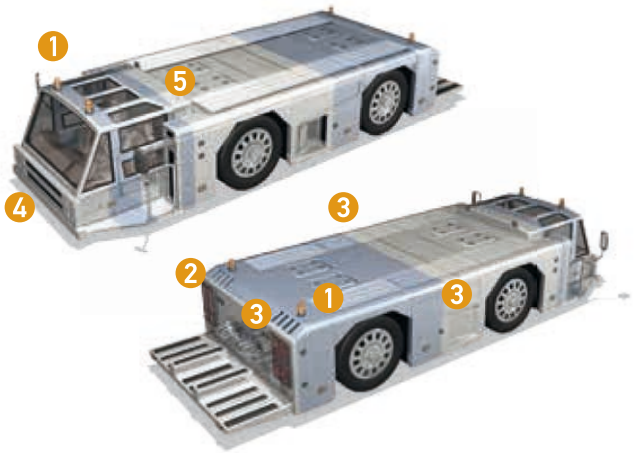
4 **LED headlamp C140**
Page 83

5 **Intelligent Battery Sensor**
Page 104

AIRCRAFT TUGS

They are powerhouses, moving unimaginable masses with great precision and yet often remain undetected. They are operational for thousands of hours per year, which is only possible with top quality products. HELLA lighting technology on airport vehicles makes an important contribution towards safety. It stands for top quality, a high signal effect and minimum energy consumption. HELLA lighting systems mean working at the highest safety level with a reliable partner.

Product recommendation



1 **K-LED 2.0 Airport**
Page 33

2 **LeanLED**
Page 91

3 **LED combination rear light**
Page 90

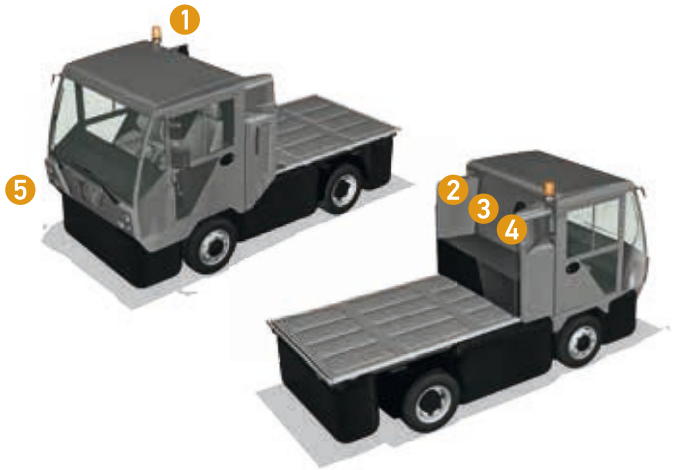
4 **Module 70 LED IV**
Page 65

5 **90 mm LED modules**
from page 76

BAGGAGE TUG

Sturdy, strong and special. This would be a good way of describing baggage tugs which are used all around the world in large numbers at airports and every day, ensuring that baggage is transported to the correct airplane or to the right passenger, while always keeping an eye on the tight schedule. Safety at airports is always given top priority. HELLA warning systems guarantee a maximum warning effect ensuring that vehicles are seen at all times. Front and worklights ensure optimum visibility when driving and working with and on the vehicle.

Product recommendation



1 **OWS**[7]
from page 47

2 **KL 7000 LED**
Page 36 / 37

3 **Flat Beam 500**
Page 67

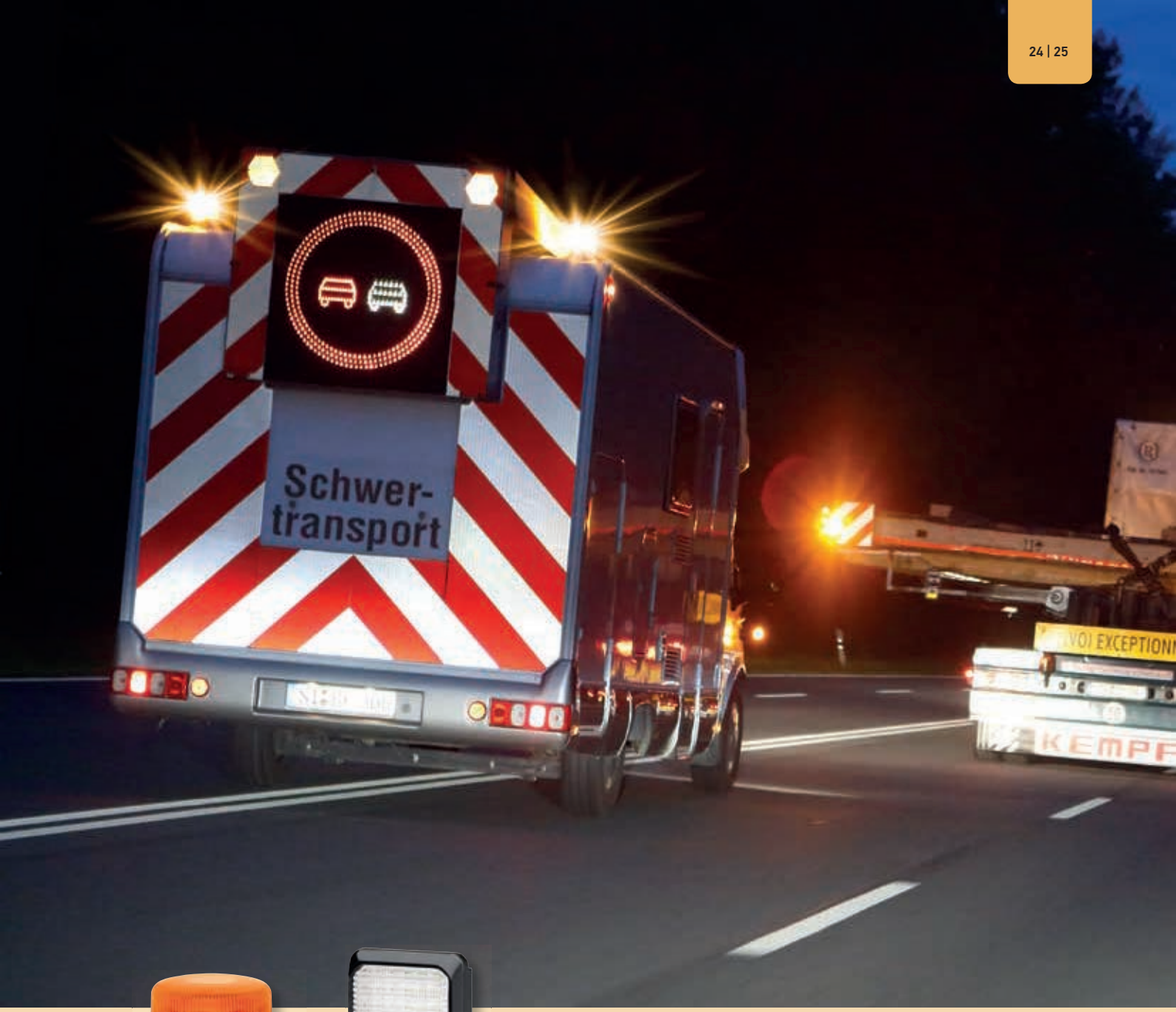
4 **Module 70**
LED reversing spotlight
Page 65

5 **LEDay Flex**
Page 74

TRUCKS

Wider than others, longer, higher, heavier, more powerful, slower. Prescribed routes and driving times. Heavy and wide loads present drivers with a special challenge – often underestimated by other road users. For this reason, the same rules apply for those responsible for equipping the vehicles with warning systems and worklights as for those responsible for the vehicle condition and load securing measures: Only perfect will do. HELLA is happy with this attitude. Because we work according to the very same principle.

Product recommendation



1 **K-LED 2.0**
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2 **Flat Beam 500**
Page 67

3 **Front flashers BST**
Page 54

4 **OWS**[7]
from page 47

5 **LEDay Flex**
Page 74

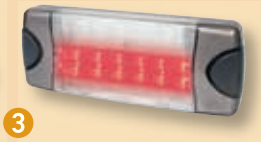
ESCORT VEHICLES

This job is one of the most dangerous in the transport business. A relatively small, light vehicle drives along, right on the tail of a heavy truck as though attached by a rope. The vehicle's driver has to look forwards and in the rear view mirror at the same time. He receives instructions by radio to block the lanes before road works to prevent other vehicles attempting to overtake. His sole purpose: To secure the area behind him, prevent accident risks before they even happen. His best life insurance: State-of-the-art warning systems on the vehicle. Ideally combined with daytime running lights and worklights. These turn the escort vehicle into a mobile light source for work on the transporter and its load.

Product recommendation

1 **Rota LED**
Page 34 / 35

2 **LED headlamp C140**
Page 83



3 **DuraLED Combi**
Page 90

4 **Power Beam 1500**
Page 64

5 **Power Beam 3000**
Page 64

CONSTRUCTION MACHINERY

Construction sites are really tough tests for all kinds of material. But this doesn't frighten HELLA lighting systems. Because they have had to undergo tough tests of their own in the testing laboratory and in field trials. This includes series of tests against water and dust penetration, checks on electromagnetic compatibility, thermal tests, endurance tests, electronic tests and vibration tests, of course. Once they've been through all that, they feel at home on any construction site in the world.

Product recommendation

1 **Rota LED**
Page 34 / 35

2 **Oval 100 LED**
Page 66

3 **LED combination rear light**
Page 90

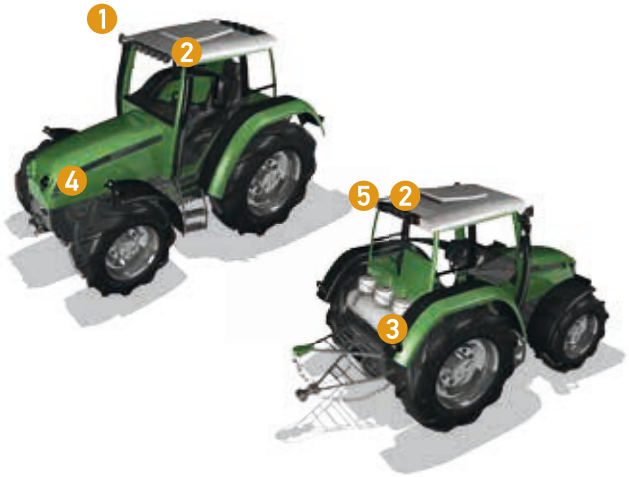
4 **90 mm LED modules**
from page 76

5 **Module 70 LED IV**
Page 65

AGRICULTURE

Tractors and combine harvesters with beacons are a familiar sight on country roads. But tractors are getting larger and larger and combine harvesters faster and faster all the time. So the output and reliability of the beacons has to be right. And what about worklights? In agriculture in particular, selective use of special worklights allows productivity to be increased significantly. This allows modern owner-operators to work at full capacity both at night and at dusk – older machines can be used more efficiently through light optimization.

Product recommendation



HELLA beacons with powerful warning effect signal to the other road users: please take care – work is going on around this vehicle.

They enable maximum own- and third-party safety by means of an intensive warning effect. This safety is achieved by the optimum light bundling and distribution, the resulting high range as well as the very high light intensity.

You can rely 100% on our beacons. HELLA lights are distinguished by their outstanding quality in terms of processing and stability - the long service life is proof of this!

BEACONS – OVERVIEW

Product line	F (Fixed attachment)	FL (Flexible pipe-socket attachment)	R (Pipe-socket attachment)	M (Magnetic attachment)
LED				
K-LED 2.0 Page 32		–		
Rota LED Page 34			–	
KL 7000 LED Page 36		–		
Xenon				
KLX 7000 Page 38			–	
Halogen				
KL7000 Page 38				
KL Rotaflex / Rotafix Page 40			–	
KL Rota Compact Page 41				

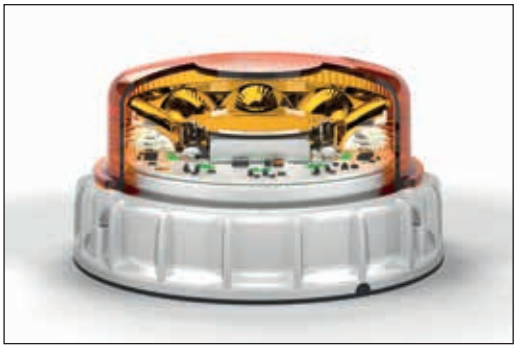
Other domes (blue, red and green) are available on request.

WHICH BEACONS ARE APPROVED FOR USE ON THE ROADS ? – DIRECTIVE ECE-R65

A beacon may only be used on public roads if it meets Directive ECE-R65.

ECE-R65 is the European directive for beacons. It specifies the required light values, light distribution and fitting specifications, etc.

Can also be viewed at www.unece.org (United Nations Economic Commission for Europe)



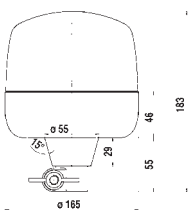
The large E-approval mark (here E1) shows whether the beacon meets the ECE-R65 directive and has therefore approval.

e1	EMC test number
E1	Type approval
CE	CE marking
Pmax.	9 W = 9 watt power consumption
10 03 6194	ECE-R10 approval
65 00 3397	ECE-R65 approval

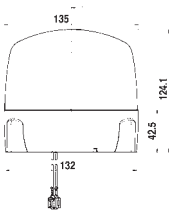
TA1	ECE-R65
T	360°
A	Amber; B = Blue
1	1 = night; 2 = day and night
TA1	amber beacon with night level according to ECE-R65
TA2	amber beacon with day and night level according to ECE-R65

Fixing

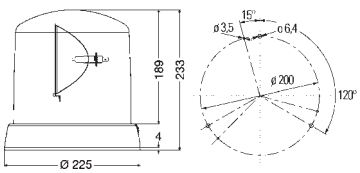
The beacon [warning light] shall be designed in such a way that it cannot be adjusted after it has been fitted correctly to the vehicle (ECE-R65 5.2). The design and fixing method must conform to DIN14620. The beacon itself can have the following designs: A, B1, B2 or C.



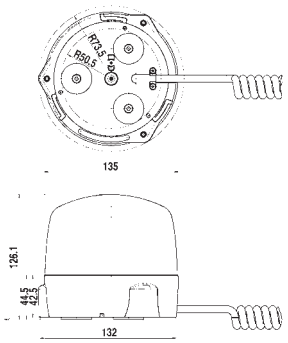
Design A



Design B1



Design B2



Design C

ECE-R65

Light values according to ECE-R65

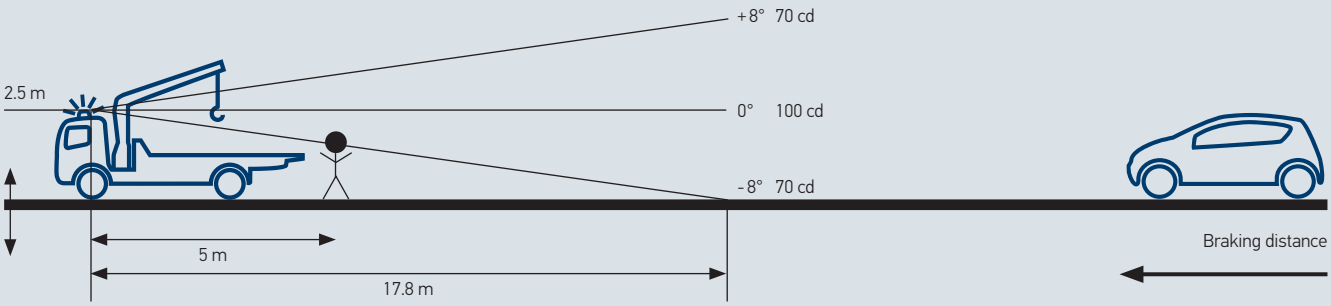
The light values to be obtained are indicated by the effective luminous intensity. An amber beacon must, for example, reach an luminous intensity of 70 cd (effective candela) at night at a vertical angle of + 8°.

A blue beacon in contrast must reach 25 cd at night at a vertical angle of + 4°.

effective luminous intensity (candela)	Blue	Amber	Red
0°	50 (Night) 120 (Day)	100 (Night) 230 (Day)	50 (Night) 120 (Day)
4°	25 (Night) 60 (Day)	–	25 (Night) 60 (Day)
8°	–	70 (Night) 170 (Day)	–

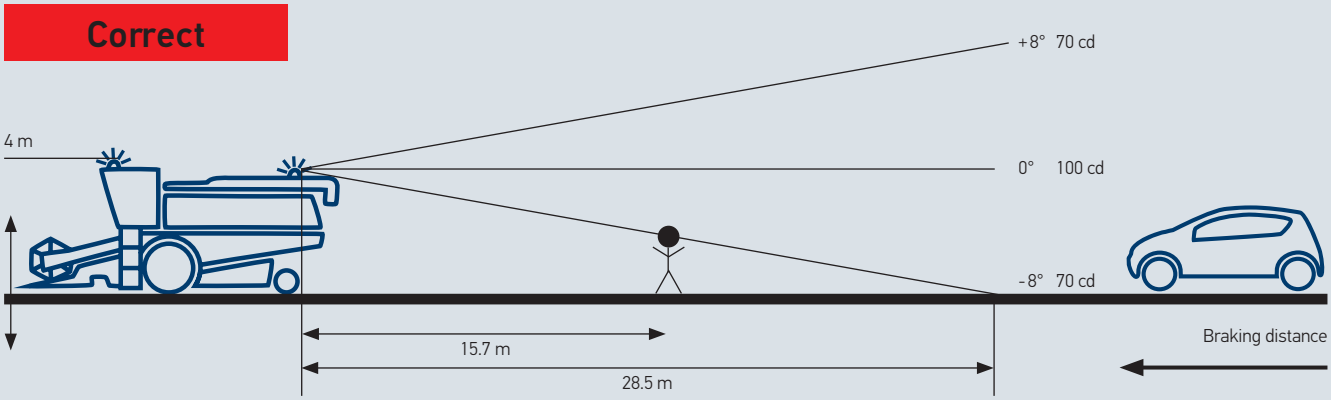
Example distribution (180 cm height)

Incorrect



Negative example: The warning signal cannot be seen from all directions in a 25 meter radius - in the area of the tow hook, the warning signal is interrupted. In this case, another warning light needs to be attached to the rear of the vehicle or two beacons attached to the cabin.

Correct



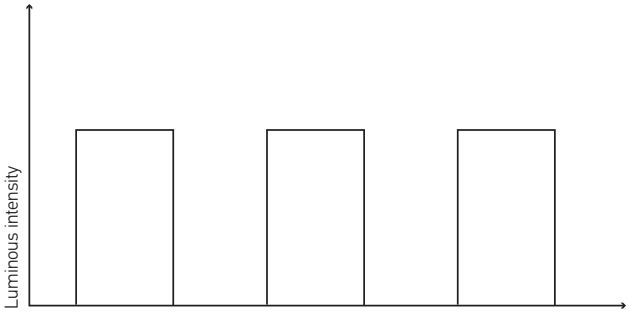
Positive example: The warning signal can be seen from all directions in a 25 meter radius.

K-LED 2.0 BEACON

The K-LED 2.0 is the innovative successor to the widely used K-LED F0 beacon

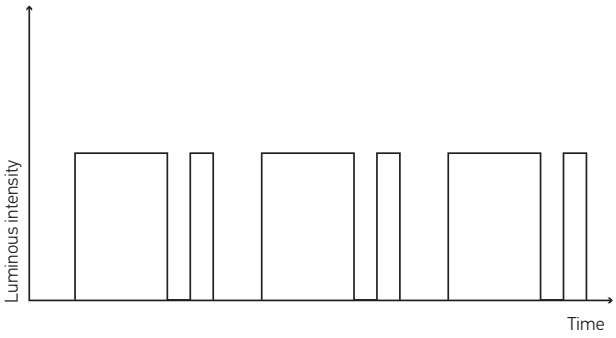
- → **Two types of warning signal**
  First HELLA beacons where you can choose between rotating or flashing warning signals.
- → **Two levels of brightness**
  Thanks to the integrated light sensor, it automatically switches between day and night mode. This guarantees the best possible warning effectiveness.
- → **Functional safety**
  First HELLA beacon to meet the requirements of IP 67. The beacon is dust-tight and will withstand a brief immersion in water.
- → **Vibration resistance**
  Without any moving parts, the beacon is protected from strong vibrations and shocks.
- → **Compact design**
  Extremely flat design and impact-resistant dome.
- → **Low lifecycle costs**
  Maintenance-free beacon with a very long design life. Reduced maintenance costs and downtime kept to a minimum.
- → **ECE-R65**
  Approved according to ECE-R65.

Rotating light function:



Homogenous illumination with rapid increase in the light values, signal can be seen immediately.

Flashing function:



Intensive perception thanks to double-flash signal,

360° warning effect, rapid increase in light values, signal can be seen immediately.

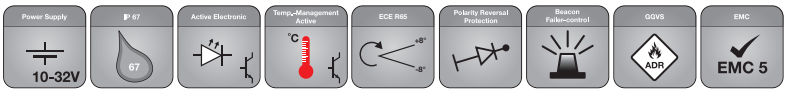
TECHNICAL SPECIFICATIONS	
Nominal voltage (U_N)	**Multi-voltage**
Operating voltage (U_B)	10 – 32 V
Interference suppression (CISPR25)	Power-controlled class 5
Total current consumption	0.45 A to 2.5 A
Power consumption	max. 30 W
Operating temperature range	-40°C to +60°C
Dome	Polycarbonate
Installation	from the bottom
Reverse polarity protection	Yes
Position of use	upright
Protection category	IP 67

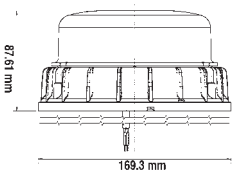
TYPE APPROVAL	
Approval	GGVSE / ADR
Technical light homologation	TA2 E1 003555* TB2 E1 003555 TR1 E1 003468
EMC protection	e1 036816 ECE-R10: 036816

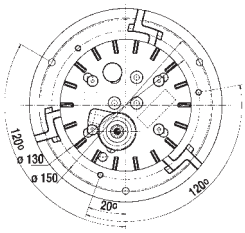
* TA2 as of 3/2014 quarter, previously TA1 E1 003468

TIP:
On Youtube, apart from product videos, you can also see how our K-LED 2.0 proved its worth in six hard test situations.

The products on this page have the following features:



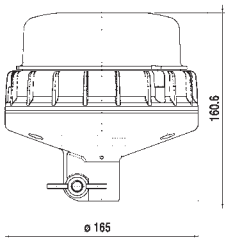




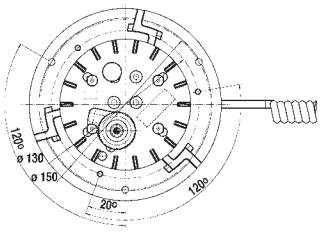
BEACON K-LED 2.0 F*	
Multi-voltage, amber	**2XD 011 557-101**
Multi-voltage, blue	**2XD 011 557-111**
Multi-voltage, red	**2XD 011 557-121**

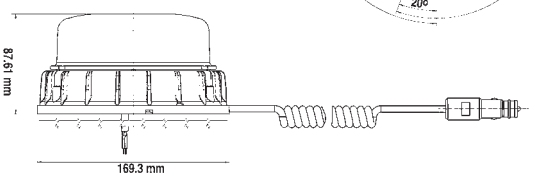
K-LED 2.0 AIRPORT **	
Multi-voltage, amber (fixed attachment)	**2XD 011 557-701**
Pipe-socket attachment (to be ordered separately)	**8HG 005 436-041**

** tested according to ICAO Annex 14 (Low Intensity, Type C)



BEACON K-LED 2.0 R *	
Multi-voltage, amber	**2XD 011 557-201**
Multi-voltage, blue	**2XD 011 557-211**
Multi-voltage, red	**2XD 011 557-221**





BEACON K-LED 2.0 M *	
Multi-voltage, amber	**2XD 011 557-301**
Multi-voltage, blue	**2XD 011 557-311**
Multi-voltage, red	**2XD 011 557-321**

Predecessor of K-LED 2.0

BEACON K-LED FO*	
Multi-voltage, amber Fixed attachment	**2XD 010 311-001**
Multi-voltage, amber Flexible pipe-socket attachment	**2XD 010 311-011**
Multi-voltage, amber Magnetic attachment	**2XD 010 311-021**

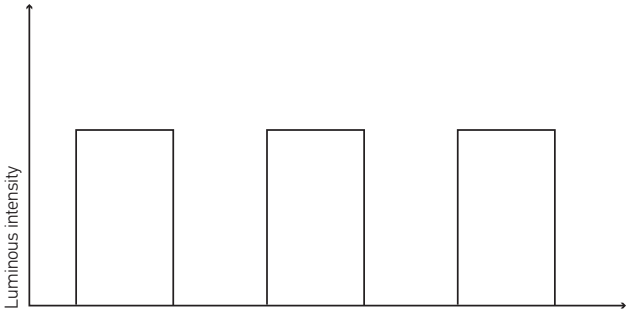
* Other colors available on request.

ROTA LED BEACON

- → **Long service life**
  No moving parts, no wear and maximum reliability.
- → **Cost saving**
  As LEDs are maintenance-free, they do not incur any additional costs for spare parts or maintenance. Downtime is reduced to a minimum.
- → **Vibration resistance**
  Especially insensitive towards vibration and jolting due to the use of LED technology.
- → **Rotating light function**
  Innovative electronics concept makes a rotary function possible without moving parts.
- → **Compact and sturdy design**
  Flat compact design and impact-resistant dome made of polycarbonate protect the light from impact caused for example by branches.
- → **Installation**
  Three different variants guarantee add-on solutions for every application.
- → **ECE-R65**
  Approved according to ECE-R65.

Note:
This beacon will be available as of 3 / 2014 quarter, with a flashing warning signal as well.

Rotating light function:



Homogenous illumination with rapid increase in the light values, signal can be seen immediately.

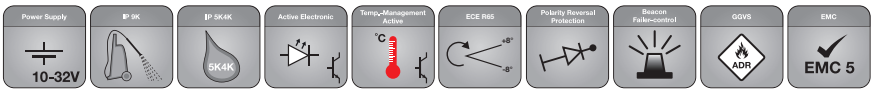
TECHNICAL SPECIFICATIONS	
Nominal voltage (U_N)	**Multi-voltage**
Operating voltage (U_B)	10 – 32 V
Total current consumption	approx. 0.8 A (12 V), ca. 0.4 A (24 V)
Power consumption	approx. 10 W
Dome	Polycarbonate
Position of use	Upright
Protection category	IP 5KX, IP X4K and IP X9K

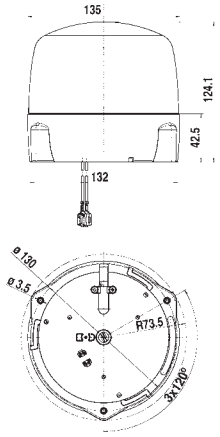
TYPE APPROVAL	
Lighting technology homologation, amber	TA1 E1 003109
Lighting technology homologation, blue	TB1 E1 003109
Interference suppression (CISPR25)	Power-controlled class 5
Approval	GGVSE / ADR
EMC compatibility	e1 035517

TIP:
Due to development updates, the Rota LED now provides you with 20 % more light!

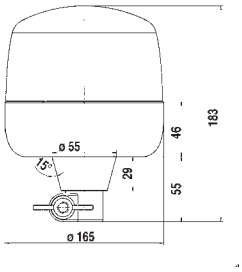
Apart from the product videos on YouTube, you will also find four comic clips which show you why a beacon is so important.

The products on this page have the following features:

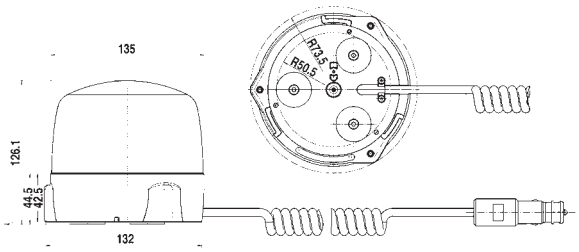




BEACON ROTA LED F*	
Multi-voltage 10 – 32 V, amber	**2RL 010 979-001**
Multi-voltage 10 – 32 V, blue	**2RL 010 979-101**



BEACON ROTA LED FL*	
Multi-voltage 10 – 32 V, amber	**2RL 010 979-011**
Multi-voltage 10 – 32 V, blue	**2RL 010 979-111**



BEACON ROTA LED M*	
Multi-voltage 10 – 32 V, amber	**2RL 010 979-021**
Multi-voltage 10 – 32 V, blue	**2RL 010 979-121**

* Other colors available on request.

KL 7000 LED BEACON

→ **Long service life**
State-of-the-art LED technology enables an optimum signal pattern with less power consumption.

→ **Rotating light function**
Innovative electronics concept makes a rotary function possible without moving parts.

→ **Installation**
Three different attachment variants compliant with DIN 14620 guarantee add-on solutions for every application. The fixed installation versions can be attached from above and from below.

→ **Cost saving**
Since LEDs are maintenance-free, they do not cause any additional costs for spare parts or maintenance. Downtime is reduced to a minimum.

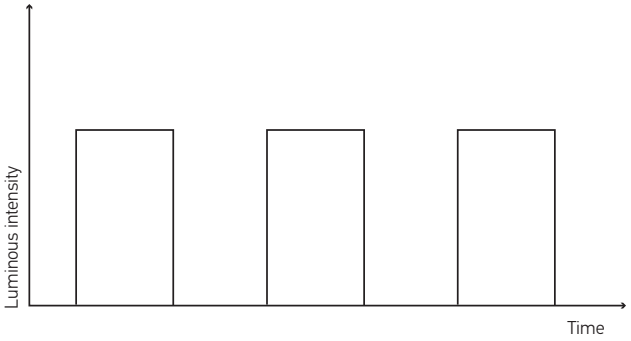
→ **Compact design**
The combination of thermal management and optics in one module makes a remarkably compact design possible.

→ **Lower overall height**
Even trucks with bunks stay below the maximum permissible vehicle height on public roads of 4m.

→ **ECE-R65**
Approved according to ECE-R65.

Note:
This beacon will be available as of 3 / 2014 quarter, with a flashing warning signal as well.

Rotating light function:



Homogenous illumination with rapid increase in the light values, signal can be seen immediately.

→ **Thermal management**
LEDs are heat-sensitive. If the LEDs become too hot, the diodes can lose their luminous intensity and even be destroyed completely in the worst case. HELLA´s selection of heat-conducting materials and arrangement of components ensure effective heat flow: the thermal management directs heat away from the LED.

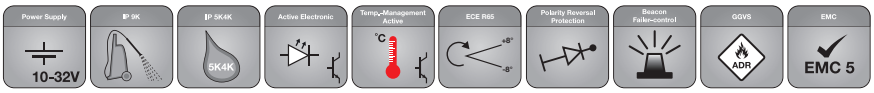
→ **Scratch-proof, smooth dome**
The scratch-proof and dirt-resistant, smooth dome guarantees the optimum warning effect.

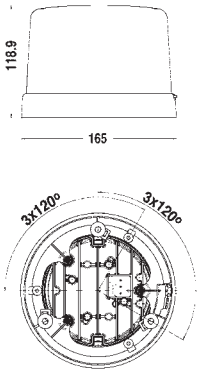
TECHNICAL SPECIFICATIONS		
Nominal voltage (U_N)	**Multi-voltage**	
Operating voltage (U_B)	10 – 32 V	
Total current consumption	0.8 A	0.4 A
Power consumption	10 W	
Dome	PMMA	
Position of use	Upright	
Protection category	IP 5K4K, IP X9K	

TYPE APPROVAL		
Lighting technology homologation, amber	TA1 E1	65 00 3397 10 03 6194
Interference suppression (CISPR25)	Power-controlled class 5	
Approval	GGVSE / ADR	
EMC protection	e1 036194 ECE-R10 036194	

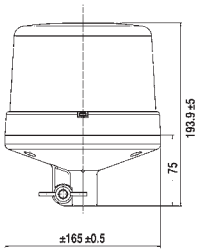
TIP:
On YouTube you will find our retrofit video to replace the Halogen KL 7000 with the new KL 7000 LED.

The products on this page have the following features:

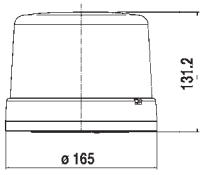


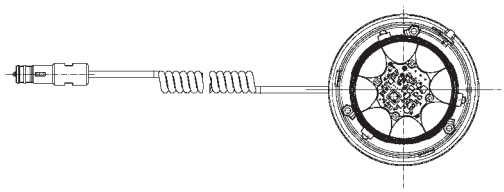


KL 7000 LED F *	
Multi-voltage 10 – 32 V, amber	**2RL 011 484-001**
Multi-voltage 10 – 32 V, blue	**2RL 011 484-101**



KL 7000 LED FL *	
Multi-voltage 10 – 32 V, amber	**2RL 011 484-011**
Multi-voltage 10 – 32 V, blue	**2RL 011 484-111**





KL 7000 LED M *	
Multi-voltage 10 – 32 V, amber	**2RL 011 484-021**
Multi-voltage 10 – 32 V, blue	**2RL 011 484-121**

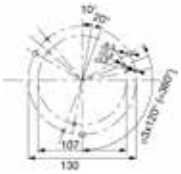
* Other colors available on request.

KLX 7000 BEACON

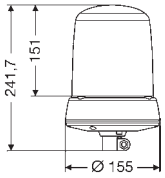
High quality double flash technology – extremely high warning effect

- → Excellent lighting values on account of high-quality electronics and efficient internal lens system
- → Integrated personal protection cut-off of the live components guarantees safe handling
- → Powerful electronics with self-diagnosis function, polarity reversal protection, undervoltage cut-off and function control output (e.g. for relays or bulbs)
- → Replaceable standard flash tube X1 with practical pin base and replaceable electronics with a holder make servicing really easy
- → Highest EMC protection class
- → Excellent cooling system
- → Smooth, easy-to-clean dome made of polycarbonate
- → Bayonet closure system with waterproof pressure mechanism
- → Approved according to ECE-R65

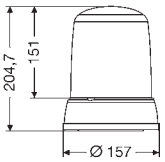
The products on this page have the following features:



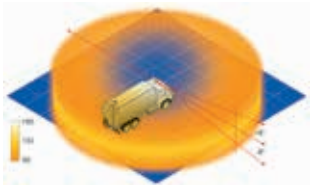
BEACON KLX 7000 F *	
12 V, amber	**2RL 008 181-101**
24 V, amber	**2RL 008 181-111**
12 V, blue	**2RL 008 181-001**
24 V, blue	**2RL 008 181-011**



BEACON KLX 7000 FL *	
12 V, amber	**2RL 008 183-101**
24 V, amber	**2RL 008 183-111**
12 V, blue	**2RL 008 183-001**
24 V, blue	**2RL 008 183-011**



BEACON KLX 7000 M *	
12 V, amber	**2RL 008 182-101**
24 V, amber	**2RL 008 182-111**
12 V, blue	**2RL 008 182-001**
24 V, blue	**2RL 008 182-011**



Luminous intensity in candela (cd)

TECHNICAL SPECIFICATIONS		
Nominal voltage (U_N)	**12 V**	**24 V**
Operating voltage (U_B)	10 – 15 V	20 – 30 V
Interference suppression	Conducted class 5 (CISPR 25)	
Total current consumption	3.3 A	1.6 A
Undervoltage cut-off	8 V	12 V
Function control output	Capable of bearing loads up to 0.5 A	
Operating temperature range	-40°C to +60°C	
Installation (KLX 7000 F)	From above and below	
Position of use	Upright	
Reverse polarity protection	Fuses	
Protection category	IP 5K4K, IP X9K (resistant to dust and high-pressure jet cleaners)	

TYPE APPROVAL	
Lighting technology homologation, amber	E1 001399 (ECE-R65)
Lighting technology homologation, blue	E1 001399 (ECE-R65)
EMC compatibility	e1 031889

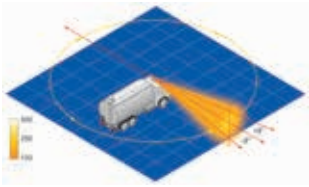
* Other colors available on request.

KL 7000 BEACON

The products on this page have the following features:

Maximum light values – optimum signalling effect

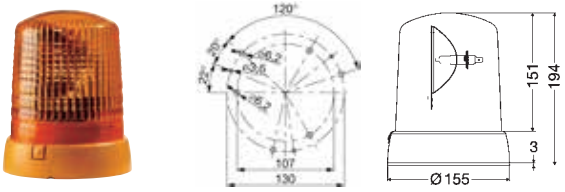
- → Extremely high light values for optimum warning effectiveness
- → Full light power, focusing and distribution through the rotating unit made up of a high-sheen metallised parabolic reflector and bulb
- → Maximum running smoothness by means of maintenance-free drive bearings and double-belt technology
- → Electronic motor control with multi-voltage function for a constant rotating frequency even in the event of fluctuations in the vehicle electric system
- → Excellent EMC protection, integrated polarity reversal protection
- → Operation with 12 or 24 V possible by replacing the bulbs
- → Smooth, easy-to-clean dome with a handy pressure point closure
- → Approved according to ECE-R65
- → LED successor is the KL 7000 LED



Luminous intensity in candela (cd)

TECHNICAL SPECIFICATIONS			
Nominal voltage (U_N)	**12 V**	**24 V**	**230 V**
Operating voltage (U_B)	10.8 – 13.8 V	21.6 – 27.6 V	–
Interference suppression	Power-controlled class 5 (CISPR 25)		
Power consumption of bulb	55 W	70 W	25 W
Total current consumption	5.5 A	3.5 A	0.2 A
Operating temperature range	-40°C to +60°C		-30°C to +60°C
Installation (KL 7000 F)	From above or below		From above or below
Position of use	Upright		
Protection category	IP 5K4K, IP X9K (resistant to dust and high-pressure jet cleaners)		

TYPE APPROVAL	
Lighting technology homologation, amber	E1 001241, (ECE-R65)
Lighting technology homologation, blue	E1 001240, (ECE-R65)
EMC compatibility	e1 031740
230 V protective mark	CE VdS



BEACON KL 7000 F *	
12 V, amber	**2RL 008 061-101**
24 V, amber	**2RL 008 061-111**
230 V, amber	**2RL 008 064-101***
12 V, blue	**2RL 008 061-001**
24 V, blue	**2RL 008 061-011**

BEACON KL 7000 R *	
12 V, amber	**2RL 008 060-101**
24 V, amber	**2RL 008 060-111**
12 V, blue	**2RL 008 060-001**
24 V, blue	**2RL 008 060-011**

BEACON KL 7000 FL *	
12 V, amber	**2RL 008 063-101**
24 V, amber	**2RL 008 063-111**
12 V, blue	**2RL 008 063-001**
24 V, blue	**2RL 008 063-011**

BEACON KL 7000 M *	
12 V, amber	**2RL 008 062-101**
24 V, amber	**2RL 008 062-111**
12 V, blue	**2RL 008 062-001**
24 V, blue	**2RL 008 062-011**

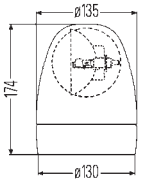
* Other colors available on request.

BEACON KL ROTAFLEX / ROTAFIX

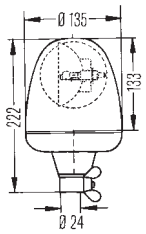
The products on this page have the following features:

Standard solution for robust applications

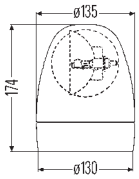
- → Tough rotary beacons
- → Optimum light power, focusing and distribution through the rotating unit made up of a high-sheen metallised parabolic reflector and bulb
- → Compact design shape and unmistakeable look
- → Drive from motor with plastic worm gear
- → Sturdy domes with smooth, easy-to-clean surface
- → Approved according to ECE-R65
- → LED successor is the RotaLED



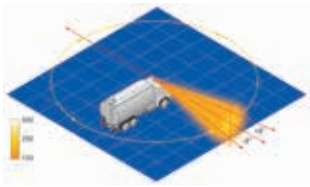
BEACON KL ROTAFIX F*	
12 V, amber	**2RL 007 337-001**
24 V, amber	**2RL 007 337-011**
12 V / 24 V, amber (twin-belt drive)	**2RL 007 337-041**
12 V, blue	**2RL 007 337-101**
24 V, blue	**2RL 007 337-111**



BEACON KL ROTAFLEX FL*	
12 V, amber	**2RL 006 846-001**
24 V, amber	**2RL 006 846-011**
12 V, blue	**2RL 006 846-101**
24 V, blue	**2RL 006 846-111**



BEACON KL ROTAFIX M*	
12 V, amber	**2RL 007 337-021**
24 V, amber	**2RL 007 337-031**
12 V, blue	**2RL 007 337-121**
24 V, blue	**2RL 007 337-131**



Luminous intensity in candela (cd)

TECHNICAL SPECIFICATIONS		
Nominal voltage (U_N)	**12 V**	**24 V**
Operating voltage (U_B)	10.8 – 13.8 V	21.6 – 27.6 V
Interference suppression	Power-controlled class 3 (CISPR 25)	
Engine speed	160 rpm	
Power consumption of bulb	55 W	70 W
Total current consumption	5.5 A	3.5 A
Operating temperature range	-40°C to +60°C	
Installation	From above and below	
Position of use	Upright	
Protection category	IP 5K4K, IP X9K (resistant to dust and high-pressure jet cleaners)	

TYPE APPROVAL	
Lighting technology homologation, amber	E4 006509, (ECE-R65)
Lighting technology homologation, blue	E4 006513, (ECE-R65)
EMC compatibility	e1 032181

* Other colors available on request.

KL ROTA COMPACT BEACON

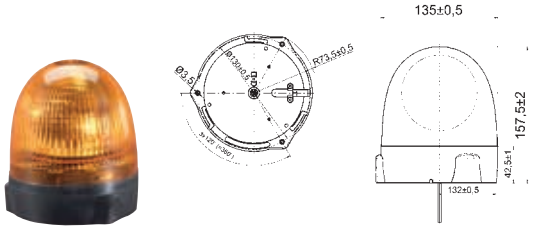
The products on this page have the following features:

Compact Beacon for tough applications

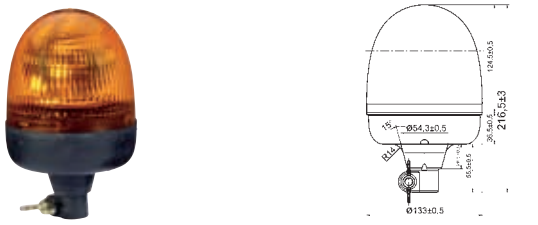
- → Specially impact-resistant
- → Low-noise belt drive
- → Polycarbonate dome is impact and shock-resistant
- → Different attachment versions for every application

Rota Compact FL:

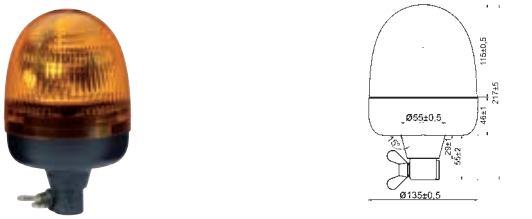
- → Elastic, impact-absorbing base minimises the danger of damage; the light always returns to the optimum position (maximum inclination: 90°)
- → At the same time, the elastic base serves as a vibration damper
- → Approved according to ECE-R65
- → LED successor is the RotaLED



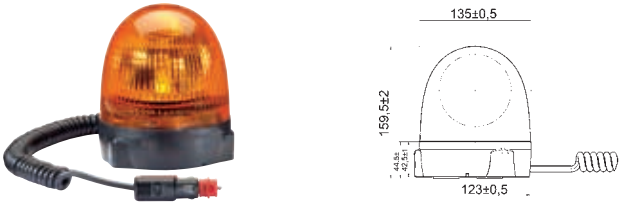
BEACON KL ROTA COMPACT F*	
12 V, amber	**2RL 009 506-201**
24 V, amber	**2RL 009 506-211**



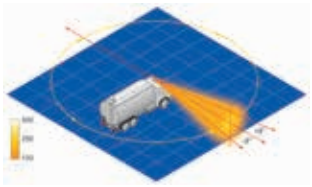
BEACON KL ROTA COMPACT FL*	
12 V, amber	**2RL 009 506-001**
24 V, amber	**2RL 009 506-011**



BEACON KL ROTA COMPACT R*	
12 V, amber	**2RL 009 506-101**
24 V, amber	**2RL 009 506-111**



BEACON KL ROTA COMPACT M*	
12 V, amber	**2RL 009 506-301**
24 V, amber	**2RL 009 506-311**



Luminous intensity in candela (cd)

TECHNICAL SPECIFICATIONS		
Nominal voltage (U_N)	**12 V**	**24 V**
Operating voltage (U_B)	10.8 – 13.8 V	21.6 – 27.6 V
Engine speed	180 rpm	
Power consumption of bulb	55 W	70 W
Total current consumption	5 A	3 A
Operating temperature range	-40°C to +60°C	
Dome	Polycarbonate	
Position of use	Upright	
Protection category	IP 5K4K, IP X9K (resistant to dust and high-pressure jet cleaners)	
EMC interference immunity	VDE 0879 Part 3 Class 3	

TYPE APPROVAL	
Lighting technology homologation, amber	E1 002076, (ECE-R65)
EMC compatibility	e1 034277

* Other colors available on request.

ACCESSORIES

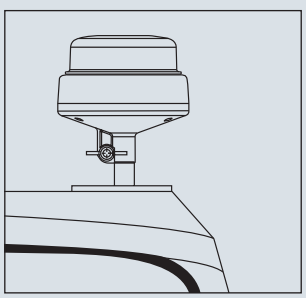
Product photo	Description	Part number	PU
	Socket pipe to weld on, straight, 100 mm long, with rubber stopper and socket according to DIN 14620	1-pin **8HG 002 365-001** 2-pole **8HG 006 294-101**	1
	Socket pipe with base to screw on, total height 126 mm long, with rubber stopper and socket according to DIN 14620	1-pin **8HG 006 294-011** 2-pole **possible on request**	1
	Angled socket pipe with base to screw on side, clearance 90 mm, height 100 mm incl rubber stopper, socket , 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers according to DIN 14620	1-pin **8HG 006 294-021** 2-pole **possible on request**	1
	Angled socket pipe with base to screw on side, clearance 50 mm, height 100 mm incl rubber stopper, socket , 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers according to DIN 14620	1-pin **8HG 006 294-111** 2-pole **possible on request**	1
	Rotatable socket pipe, height approx. 105 mm incl rubber stopper, socket , 2 x hexagon screws M8 x 35, 2 x hexagon nuts M8, 2 x spring washers according to DIN 14620	1-pin **8HG 006 294-031** 2-pole **8HG 006 294-141**	1
	Socket pipe with screw attachment, height approx. 100 mm, with rubber stopper and socket according to DIN 14620	1-pin **8HG 006 294-051** 2-pole **8HG 006 294-091**	1
	Socket pipe with 2 screw holes for attaching it to the rear of the cab, with telescope holder, total height approx. 1000 mm, Can be shifted up to 700 mm, with rubber stopper and socket according to DIN 14620	1-pin **8HG 006 294-041** 2-pole **possible on request**	1
	Socket pipe to weld on, straight, height 100 mm Compatible with 8HG 002 365-001 / -8HG 006 294-101	**8HG 096 531-007**	2
	Socket pipe, straight, black with M8 thread, approx. 220 mm long Compatible with 8HG 990 368-001 / -007	**8HG 331 470-007**	2
	Socket pipe, straight with base, to screw on, total height 126 mm Compatible with 8HG 006 294-011 / -121	**8HG 096 531-107**	2
	Angled socket pipe, with base to screw on side, clearance 90 mm Compatible with 8HG 006 294-021 and -221	**8HG 096 531-117**	2
	Angled socket pipe, with base to screw on side, clearance 50 mm Compatible with 8HG 006 294-111 and -211	**8HG 096 531-127**	2
	Rotatable socket pipe, height approx. 105 mm Compatible with 8HG 06 294-031 / -141	**8HG 096 531-137**	2

ACCESSORIES

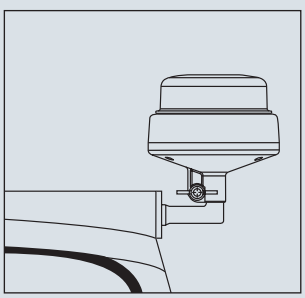
Product photo	Description	Part number	PU
	2-pin socket with cap, With 2 male spade connectors 6.3 mm	**9JB 004 777-001*** **9JB 004 777-002***	5 1
	2-pin round socket with ground contact, with 2 male spade connectors 6.3 mm	**8JB 862 757-001*** **8JB 862 757-007***	1 24
	2-pin 6-edge SW20 socket with ground contact, with 2 male spade connectors 6.3 mm	**8JB 862 757-021*** **8JB 862 757-027***	1 24
	2-pin socket with cap, with 300 mm cable 2.5 mm² and 2 male spade connectors 6.3 mm	**8JB 001 946-101***	1
	2-pin aluminum alloy socket with cap and 1 screw connection ground on housing	**8JB 001 946-021***	10
	2-pin socket with cap and 2 male spade connectors 6.3 mm	**8JB 004 123-031***	1
	1-pin round socket with fillister head screw M4 x 8	**8JB 850 434-011***	10
	1-pin socket with cap	**8JB 001 946-011***	10
	12 V, test equipment to monitor the function of rotating beacons and flashing beacons, indicates the failure of a beacon.	**5KG 011 630-101**	1
	24 V, test equipment to monitor the function of rotating beacons and flashing beacons, indicates the failure of a beacon.	**5KG 011 630-111**	1
	Rubber stopper /cap according to DIN 14620	**9GH 096 532-001** **9GH 096 532-007**	10 200

* Sockets comply with DIN ISO 4165; installation opening: ø 18.5 mm, control panel thickness max. 7 mm

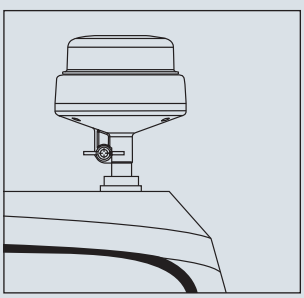
Installation examples



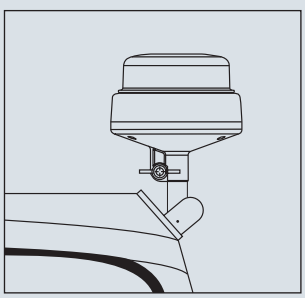
Bracket to screw on



Angle bracket



Bracket with thread



Variable bracket

ACCESSORIES FOR LED AND XENON BEACONS

Page 32

K-LED 2.0 BEACON	
Rubber base, wedge-shaped	9GD 856 863-001
Pipe socket mounting	8HG 005 436-041

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ROTA LED BEACON	
Dome, amber (polycarbonate)	9EL 181 506-001
Dome, blue (polycarbonate)	9EL 181 506-011

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KL 7000 LED BEACON	
Dome, amber (polycarbonate)	9EL 190 025-001
Dome, blue (polycarbonate)	9EL 190 025-011
Dome, red (polycarbonate)	9EL 190 025-021
Rubber base, wedge-shaped	9GD 856 863-001
Rubber base, flat	9GD 856 562-001

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KLX 7000 BEACON	
Dome, amber (polycarbonate)	9EL 862 140-031
Dome, blue (polycarbonate)	9EL 862 140-021
Dome, red (polycarbonate)	9EL 862 140-041*
Fresnel lens on the inside	9EL 862 678-001
PCB with socket, 12 V	9MK 862 863-001
PCB with socket, 24 V	9MK 862 862-001
Dome seal	9GD 862 679-001
Flash tube	8GS 859 634-001
EMC shield cage for flash tube	9HB 862 864-001
Xenon standard flash tube X1 with pin base	8GS 859 634-001
Rubber base, flat, for KLX 7000 F (5 units)	9GD 862 164-001
Rubber base, wedge-shaped, for KLX 7000 F (1 unit)	9GD 863 033-001
Wing nut (with screw and washer as a fixing option for KLX 7000 FL)	9NM 863 332-001

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KL 7000 BEACON	
Dome, amber (polycarbonate)	9EL 862 141-021
Dome, amber (PMMA)	9EL 862 141-001
Dome, blue (PMMA)	9EL 862 140-001
Dome, red (PMMA)	9EL 862 141-011*
Drive belt, 2 pcs.	9XR 854 840-001
Motor (inc. PCB)	9MN 862 741-001
Reflector (inc. base plate and drive belt)	9DX 862 740-001
Bulb 12 V / 55 W	8GH 002 089-133
Bulb 24 V / 70 W	8GH 002 089-251
Rubber base, flat (5 pcs.)	9GD 862 164-001
Rubber base, wedge-shaped (1 pce.)	9GD 863 033-001
Wing nut (with screw and washer as a fixing option for KL 7000 R and FL)	9NM 863 332-001

ACCESSORIES FOR HALOGEN BEACONS

◀ Page 40

KL ROTAFIX F AND M BEACON	
Dome, amber (polycarbonate)	**9EL 859 020-001**
Dome, blue (PMMA)	**9EL 859 020-101**
Drive belts (2 pcs)	**9XR 854 840-001**
Motor 12 V (inc. worm gear)	**9MN 858 114-001**
Motor 24 V (inc. worm gear)	**9MN 858 114-011**
Motor 12 / 24 V (inc. PCB)	**9MN 862 741-001**
Bulb 12 V / 55 W	**8GH 002 089-133**
Bulb 24 V / 70 W	**8GH 002 089-251**
Reflector (inc. worm wheel)	**9DX 860 271-001**
Reflector assembly (inc. drive belt)	**9DX 862 844-001**
Rubber base, wedge-shaped	**9GD 860 396-001**

◀ Page 40

KL ROTAFLEX FL BEACON	
Dome, amber (PMMA)	**9EL 859 020-001**
Dome, blue (PMMA)	**9EL 859 020-101**
Motor 12 V (inc. worm gear)	**9MN 858 114-001**
Motor 24 V (inc. worm gear)	**9MN 858 114-011**
Reflector (inc. worm wheel)	**9DX 860 438-001**
Bulb 12 V / 55 W	**8GH 002 089-133**
Bulb 24 V / 70 W	**8GH 002 089-251**
Rubber housing with integrated plug socket	**9GP 859 115-001**

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KL ROTA COMPACT BEACON	
Dome, amber	**9EL 864 074-001**
Drive belts (2 pcs)	**9XR 855 975-001**
Motor assembly	**9MN 863 026-001**
Bulb 12 V / 55 W	**8GH 002 089-133**
Bulb 24 V / 70 W	**8GH 002 089-251**

Sometimes, single beacons do not provide sufficient optical warning. By positioning two or four beacons on the outside edges of the vehicle roof, HELLA OWS can offer optimum signalling.

If professionals have to rely on technology, the first choice is warning systems from HELLA. Our OWS guarantees maximum safety.
You can rely on them. Always!

Choose different installation heights and widths for differing roof beams. The lighting technology can be chosen from four different optical systems. Also, depending on the system, you can opt for various auxiliary lighting systems, such as worklights, additional flashing lights or alley lights.

The OWS 7 is our "highlight"
The modular based system concept provides individual configuration options; from the basic through to the high-end version - all requirements are covered!

MODULES OWS7

Fully modular from the basic version to maximum features.

1 Main beacons
→ **LED KL-LM 2:** 360 ° module, flashing warning signal, high-power LEDs arranged in a semi-circle
→ **LED KL-LM 4:** like LED KL-LM 2 module, rotating warning signal
→ **LED KL-LR 2:** flash module, reflector in trough formation, option to use front and rear signal separately
→ **KL-ER:** classic halogen rotating-mirror module

2 Alley lights
→ with 4 LEDs
→ Intensive close-range illumination along the side

3 Worklights (ASW)
→ 12 V-Version with H9 light sources
→ 24 V-Version with H3 light sources
→ Also available in LED technology
→ Multiple light assembly possible

4 Hazard warning lights
→ To the front, to the front and rear, or to the rear
→ LED module with powerful light intensity
→ Synchronization with the vehicle indicators is possible if a central processing unit (CPU) is used
→ For installation under the light dome

5 Chaser signal: LED Signal Bar (LSB)
→ Integrated amber chaser signal for rearward warning and security
→ Traffic control possible thanks to different signal directions
→ Daytime / night-time mode switchable via control unit
→ Please observe country-specific regulations during use

6 Light domes (depending on light module)
→ Transparent
→ Amber

7 Panels
→ Milky white
→ Transparent amber
→ Transparent clear
For widths greater than 1,200 mm, partitions are installed to cascade the panels.

Configure your individual OWS7 here: **www.hella.com/ows7**

OPTICAL WARNING SYSTEMS (OWS) – OVERVIEW

PRODUCT PHOTOS	DESCRIPTION	LENGTHS	RATED VOLTAGE
OWS[7]			
	**Single reflector (KL-ER)**	from 900 mm to 2,000 mm (in steps of 100)	12 / 24 V
	**LED trough parabolic (KL-LR2)**	from 900 mm to 2,000 mm (in steps of 100)	12 / 24 V
	**360° LED module KL-LM2, flash function**	from 900 mm to 2,000 mm (in steps of 100)	12 / 24 V
	**360° LED module KL-LM4, Rotating light function**	from 900 mm to 2,000 mm (in steps of 100)	12 / 24 V
OWS			
	**OWS Single reflector**	540 mm 1,000 mm 1,400 mm 1,600 mm	12 / 24 V
	**OWS-MR Multiple reflector**	1,424 mm	12 / 24 V
	**OWS-X Xenon double flash**	1,000 mm 1,400 mm 1,600 mm	12 / 24 V
RAPTOR +			
	**RAPTOR +**	598 mm 1,118 mm 1,248 mm	12 V

You will find further information on the product lines OWS and Raptor + in the "Beacons and OPTICAL WARNING SYSTEMS (OWS)" brochure, 2013.

OWS 7 TECHNICAL DETAILS

Lighting technologies:

Description	Abbreviation	
Halogen single-reflector system	KL-ER	
LED parabolic trough system	KL-LR2	
360° LED module, Flash function, High-power LEDs arranged in a semi-circle	KL-LM2	
360° LED module, Rotating light function, High-power LEDs arranged in a semi-circle	KL-LM4	

Technical specifications	KL-ER	KL-LR2	KL-LM2	KL-LM4
Operating temperature range	-40°C to +60°C	-40°C to +60°C	-40°C to +60°C	-40°C to +60°C
Interference suppression	Conducted class 5 (CISPR 25)	Conducted class 5 (CISPR 25)	Conducted class 5 (CISPR 25)	Conducted class 5 (CISPR 25)
Light source	H1 / 55 W	LED	LED	LED
Nominal voltage (U_N)	12 V / 24 V	12 V / 24 V	12 V / 24 V	12 V / 24 V
Current consumption	2 x 5 A / 2 x 3 A	2 x 3.0 A / 2 x 1.5 A	2 x 3 A / 2 x 1.5 A	2 A / 1 A
Approvals	DIN 14620 e1 035717	DIN 14620 e1 035717	DIN 14620 e1 035717	DIN 14620 e1 035717
Type approval				
Technical light homologation	TA1 E1 002 380 (ECE-R65)	TA1 E1 002 379 (ECE-R65)	TA1 E1 003232 (ECE-R65)	TA1 E1 003232 (ECE-R65)
EMC compatibility	e1 035 717	e1 035 717	e1 035717	e1 035717

ACCESSORIES AND SPARE PARTS OWS[7]

SPARE PARTS FOR...	Description	Part number
ER module	Dome, amber without cut-out	**9EL 172 563-221**
ER module	Dome, amber with cut out	**9EL 172 563-321**
LED modules	Dome, amber without cut-out	**9EL 172 563-351**
LED modules	Dome, amber with cut out	**9EL 172 563-251**
KL-ER	Halogen module	**2RL 864 233-001**
	12 V. alley lights, white	**2XD 176 235-001**
	12 V, worklights (halogen)	**1GA 010 467-001**
	Rubber base 900 mm, cambered	**9GD 175 947-001**
	Rubber base 1,000 mm, cambered	**9GD 175 947-011**
	Rubber base 1,100 mm, cambered	**9GD 175 947-021**
	Rubber base 1,200 mm, cambered	**9GD 175 947-031**
	Rubber base 1,300 mm, cambered	**9GD 175 947-041**
	Rubber base 1,400 mm, cambered	**9GD 175 947-051**
	Rubber base 1,500 mm, cambered	**9GD 175 947-061**
	Rubber base 1,600 mm, cambered	**9GD 175 947-071**
	Rubber base, flat	**9GD 176 514-871**
	LSB operating unit for OWS7 (inc. cable)	**9SX 178 258-001**
	KL-ER H1 bulb, 12 V / 55 W	**8GH 002 089-131**

OWS 7 ORDER GUIDE

1. Select the width

Available widths

From 900 mm to 2,000 mm (in steps of 100 mm)

2. Select the correct voltage

Available variants

☐ **12 V** ☐ **24 V**

3. Choose a lighting system

☐ **Single reflector module (KL-ER)**
Colour: amber

☐ **LED trough parabolic module (KL-LR2)**
Colour: amber

☐ **LED module, flashing (KL-LM2)**
Colour: amber

☐ **LED module, rotating (KL-LM4)**
Colour: amber

On request, there are also modules available in the colours blue and red.

4. Do you need additional light modules under the dome?

☐ **Alley lights**

Using LED technology for close-range illumination along the side.

☐ **Amber indicators (2 x 110 mm)**

→ In LED technology
→ to the front
→ to the rear
→ to the front and rear

☐ **Worklights**

Please note that in one installation position either just one indicator or one LED worklight can be installed, not both.

5. Choose elements for the central section

☐ **LED signal bar (LSB)**

→ 5 LED flash modules
→ 6 LED flash modules
→ 8 LED flash modules

The number depends on the width! ECE regulations must be heeded!

☐ **Worklight (halogen)**

→ Worklight with halogen technology
→ Close-range illumination, 5,000 cd

6. Custom-made design possibilities for the central cover

Choose a colour for the central cover

☐ **Milky white** ☐ **Transparent amber**

☐ **Transparent blue** ☐ **Transparent clear**

Selecting a clear central panel allows further light modules and functions to be integrated in the central section. Selecting a white central panel allows additional backlighting, and offers you the option of printing.

Do you need the white central panel to be illuminated?

Illumination of the advertising space

☐ **Yes** ☐ **No**

Use only possible in connection with a white cover, no further elements (see item 4) can be installed in the central section!
(Use only in as far as permitted by legislation – not approved for use on public roads in Germany, Austria and Switzerland.)

7. Choose the system control

☐ **Analogue control**

When analogue control is chosen, individual switches can be used. The LED signal bar can only be triggered via a special control unit.

☐ **Digital control**

The OWS is digitally controlled using CANopen according to CiA 447.
The control units HA 112 (German) or HA 115 (international) are available for this type of control.

8. What kind of attachment do you need?

☐ **Mounting system for permanent attachment on straight roofs and roof attachments**

Comprising 2 strips each 2,000 mm long to be cut down to system width and 2 pieces of cellular rubber as side-screens.

☐ **Permanent attachment on curved roofs**

Standard rubber base for slightly curved roofs, lengths according to the OWS lengths 1,000 to 2,000 mm.

☐ **Installation systems for fastening the roof railing**

Assembly for upright railing

Configure your individual OWS 7 here: **www.hella.com/ows7**

CONFIGURATION EXAMPLES

OWS[7] with KL-ER single-reflector system, 24 volts

Part number	Width	Alley lights	Worklights Halogen	Worklights LED	Illuminated panel
2RL 010 710-741	1,400 mm	–	–	–	–
2RL 010 710-791	1,600 mm	–	–	–	–
2RL 010 710-841	1,800 mm	–	–	–	–
2RL 010 711-321	2,000 mm	–	–	–	–

OWS[7] with KL-ER single-reflector system, 12 volts

2RL 010 710-101	900 mm	–	–	–	–
2RL 010 710-471	900 mm	–	–	–	front / rear
2RL 010 710-111	1,000 mm	–	–	–	–
2RL 010 710-201	1,000 mm	X	–	–	–
2RL 010 710-901	1,000 mm	–	–	–	front / rear
2RL 010 710-121	1,100 mm	–	–	–	–
2RL 010 710-211	1,100 mm	X	–	–	–
2RL 010 710-131	1,400 mm	–	–	–	–
2RL 010 710-221	1,400 mm	X	–	–	–
2RL 010 711-551	1,400 mm	X	2 rear	–	–
2RL 010 710-141	1,600 mm	–	–	–	–

OWS[7] with KL-LM2 module, 24 volts

Part number	Width	Alley lights	Worklights Halogen	Worklights LED	LSB	Backlighting module
2RL 010 711-401	1,400 mm	–	–	–	–	–
2RL 010 711-291	1,400 mm	–	2 rear	–	–	–
2RL 010 711-271	1,600 mm	–	–	–	–	–
2RL 010 711-281	1,600 mm	X	2 rear	–	–	–
2RL 010 711-341	1,700 mm	X	4 rear	–	–	–
2RL 010 711-201	1,800 mm	–	–	–	–	–
2RL 010 711-211	1,800 mm	X	2 rear	–	–	–
2RL 010 711-221	1,800 mm	X	2 rear, 2 front	–	–	–
2RL 010 711-541	1,800 mm	X	2 rear	–	8 modules, amber	–
2RL 010 711-351	2,000 mm	–	–	–	–	–

Further versions on request.

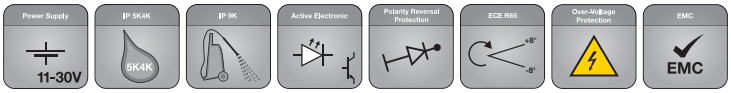
CONFIGURATION EXAMPLES

OWS[7] with KL-LM2 module, 12 volts

Part number	Width	Alley lights	Worklights Halogen	Worklights LED	LSB	Warning lights	Backlighting module
2RL 010 710-951	900 mm	–	–	–	–	–	–
2RL 010 710-961	900 mm	X	–	–	–	–	–
2RL 010 710-971	1,000 mm	–	–	–	–	–	–
2RL 010 710-981	1,000 mm	X	–	–	–	–	–
2RL 010 710-991	1,000 mm	X	–	–	5 modules, amber	–	–
2RL 010 711-331	1,000 mm	X	–	–	–	rear + front	front / rear
2RL 010 711-501	1,000 mm	–	2 rear	–	5 modules, amber	–	–
2RL 010 711-001	1,100 mm	–	–	–	–	–	–
2RL 010 711-011	1,100 mm	X	–	–	–	–	–
2RL 010 711-021	1,100 mm	X	–	–	6 modules, amber	–	–
2RL 010 711-381	1,100 mm	–	–	–	–	–	front / rear
2RL 010 711-391	1,100 mm	X	2 rear	2 front	6 modules, amber	–	–
2RL 010 711-511	1,100 mm	–	2 rear	–	6 modules, amber	–	–
2RL 010 711-641	1,100 mm	X	2 rear, 2 front	–	6 modules, amber	–	–
2RL 010 711-031	1,200 mm	–	–	–	–	–	–
2RL 010 711-041	1,200 mm	X	–	–	–	–	–
2RL 010 711-051	1,200 mm	X	1 rear	–	–	–	–
2RL 010 711-061	1,200 mm	X	2 rear	–	–	–	–
2RL 010 711-071	1,200 mm	X	1 rear, 1 front	–	–	–	–
2RL 010 711-081	1,200 mm	X	2 rear, 2 front	–	–	–	–
2RL 010 711-481	1,200 mm	–	2 rear	–	6 modules, amber	–	–
2RL 010 711-561	1,200 mm	X	2 front	–	–	–	–
2RL 010 711-491	1,300 mm	–	–	–	–	–	front / rear
2RL 010 711-601	1,300 mm	–	–	–	–	–	–
2RL 010 711-631	1,300 mm	–	2 rear	–	6 modules, amber	–	–
2RL 010 711-091	1,400 mm	–	1 rear	–	–	–	–
2RL 010 711-101	1,400 mm	–	2 rear	–	–	–	–
2RL 010 711-111	1,400 mm	X	–	–	–	–	–
2RL 010 711-121	1,400 mm	X	2 rear	–	–	–	–
2RL 010 711-131	1,400 mm	X	–	–	8 modules, amber	–	–
2RL 010 711-301	1,400 mm	–	–	–	–	–	–
2RL 010 711-581	1,400 mm	X	–	2 rear	8 modules, amber	–	–
2RL 010 711-611	1,400 mm	–	–	–	–	–	front / rear
2RL 010 711-621	1,400 mm	–	2 rear	–	8 modules, amber	rear	–
2RL 010 711-141	1,600 mm	–	–	–	–	–	–
2RL 010 711-151	1,600 mm	X	1 rear	–	–	–	–
2RL 010 711-161	1,600 mm	X	2 rear	–	–	–	–
2RL 010 711-171	1,600 mm	X	1 rear, 1 front	–	–	–	–
2RL 010 711-181	1,600 mm	X	2 rear, 2 front	–	–	–	–
2RL 010 711-191	1,600 mm	X	2 rear, 2 front	–	8 modules, amber	–	–

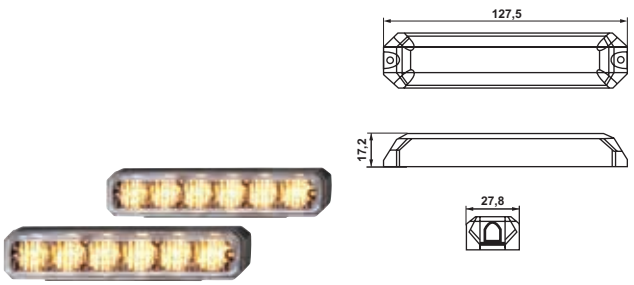
ADDITIONAL WARNING SYSTEM: FRONT FLASHER BST

The products on this page have the following features:

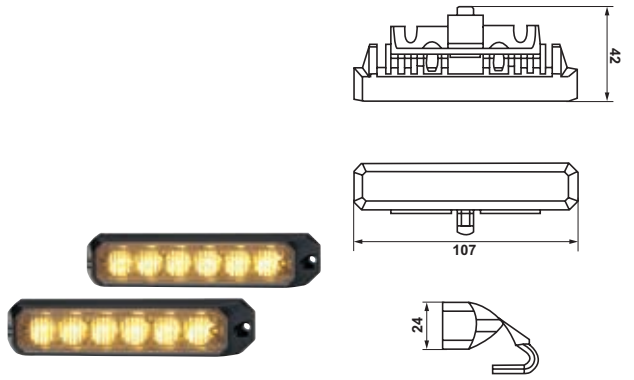


High-performance front flasher BST

- → **Intensive warning signal**
  Optimum signalling effect thanks to the combination of 6 Power-LEDs and a high quality precision lens
- → **Various flashing sequences and patterns**
  The flashing sequences can be set as a synchronous or alternating signal. There are five flashing patterns available: Single flash / Double flash / Triple flash (ECE-R65 approved) / Quadruple flash or continuous flash
- → **Simple to install**
  The BST strobe headlights feature a flat and compact design. The two different housing versions allows straightforward and flexible mounting in almost any installation situation.
- → **ECE-R65** type approved, incl. approved 3x flash
- → **ECE-R10** approved
- → BST can be synchronized with 2 or more units
- → **Approved as a rear warning light system (K-approval in Germany)**



FRONT FLASHER BST, FIXED ATTACHMENT	
Multivolt 11 – 30 V, amber	**2XD 012 160-851**
Multivolt 11 – 30 V, blue	**2XD 012 160-801**



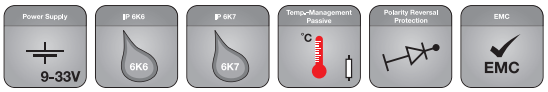
FRONT FLASHER BST, MOUNTING BRACKET	
Multivolt 11 – 30 V, amber	**2XD 012 160-861**
Multivolt 11 – 30 V, blue	**2XD 012 160-811**

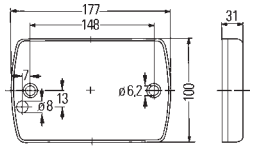
TECHNICAL SPECIFICATIONS	
Nominal voltage (U_N)	**Multi-voltage**
Operating voltage (U_B)	11 – 30 V
Operating temperature	-40 °C to +60 °C
Protection category	IP 5K4K, IP 9K
Overvoltage protection	Yes
Power consumption	7 – 14 W
CURRENT CONSUMPTION	
Amber	0.39 A at 12 V
Amber	0.20 A at 24 V
Blue	0.43 A at 12 V
Blue	0.29 A at 24 V
TYPE APPROVAL	
Technical light homologation	E6 XA1 000078 E6 XB1 000079
EMC protection	ECE-10R: 04071
K-approval (§53a, German Road Traffic Licensing Regulations - StVZO)	K 1039

ADDITIONAL WARNING SYSTEM: DuraLED AND WL-LED

This product features the following properties:

- → 36 high-power LEDs each
- → A total of ten flash sequences can be coded
- → Synchronization of two, three or four warning lights is possible
- → Vibration and impact-resistant
- → Extremely long design life
- → Very low current consumption
- → Flat design, compact dimensions
- → Simple to install with concealed screw attachment



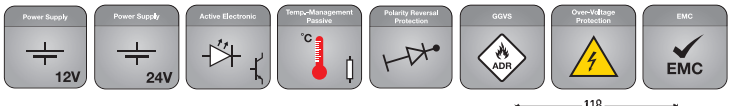


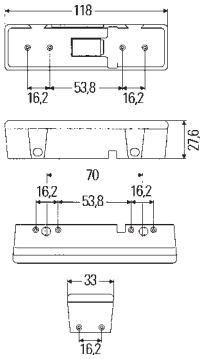
TECHNICAL SPECIFICATIONS	
Nominal voltage (U_N)	**Multi-voltage**
Operating voltage (U_B)	9 – 33 V
Operating temperature	-30 °C to +50 °C
Protection category	IP 6K6, IP 6K7
CURRENT CONSUMPTION	
Amber	500 mA (12 V), 265 mA (24 V)
Blue	580 mA (12 V), 310 mA (24 V)
TYPE APPROVAL	
EMC protection	e4 035517

FRONT FLASHER DuraLED	
Multivolt 9 – 33 V, amber	**2XD 965 429-021**
Multivolt 9 – 33 V, blue	**2XD 965 429-001**

This product features the following properties:

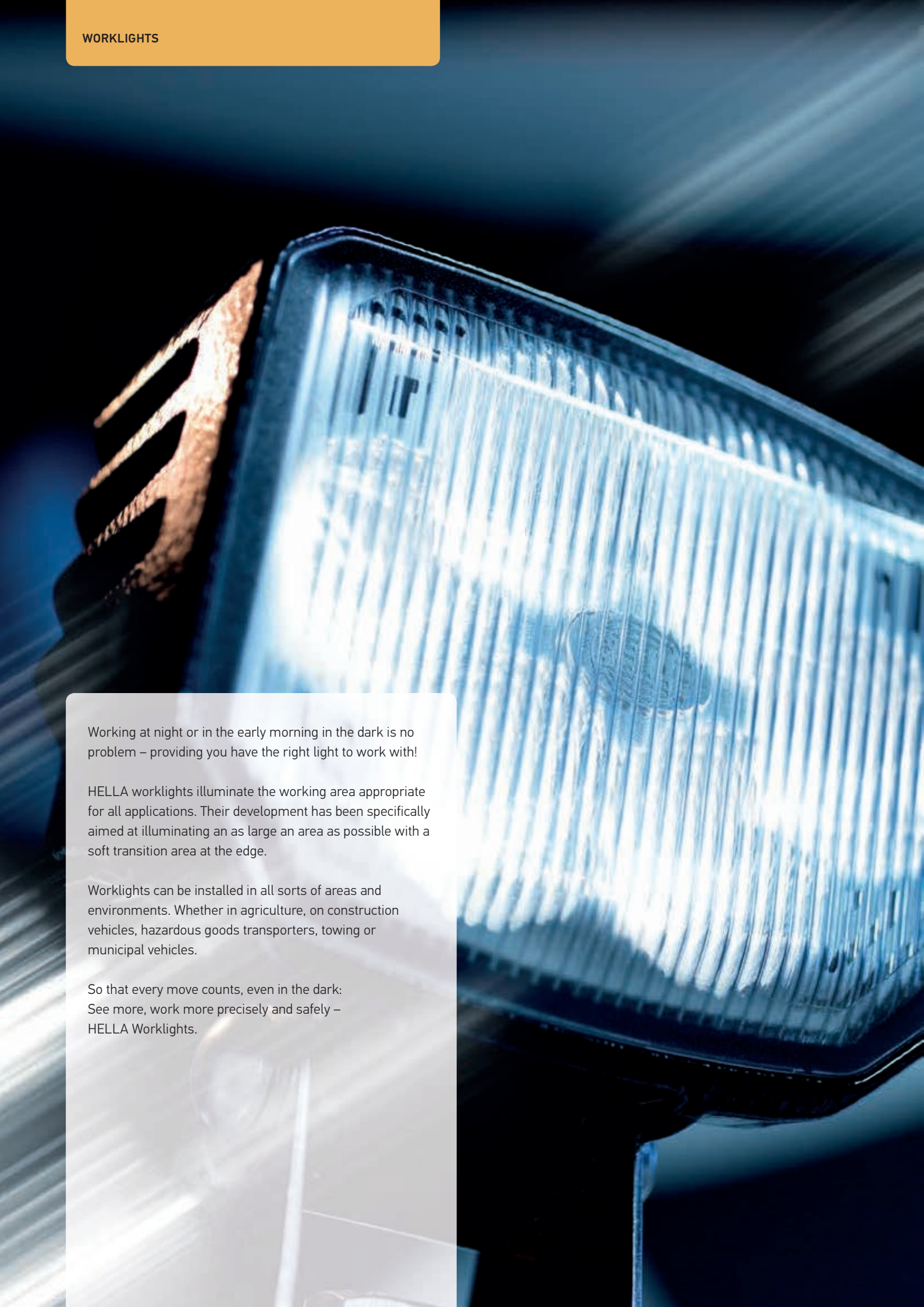
- → Twelve high-power LEDs each
- → Eight flashing frequencies can be coded
- → Synchronization of up to four lights
- → Vibration-proof
- → Resistant to high-pressure jet cleaners
- → Extremely low current consumption, high efficiency
- → Available in amber or red as well as in 12 V or 24 V
- → Extremely compact dimensions and low weight
- → Multitude of mounting possibilities





TECHNICAL SPECIFICATIONS		
Nominal voltage (U_N)	12 V	24 V
Operating voltage (U_B)	10 – 15 V	24 – 30 V
Current consumption	0.70 A	0.35 A
Interference suppression	Conducted class 5 (CISPR 25)	
Flashing frequency	2 Hz	
Operating temperature	-40 °C to +60 °C	
Reverse polarity protection	Fuses	
Protection category	IP 5K4K, IP 9K	
TYPE APPROVAL		
EMC protection	e1 023686	

FRONT FLASHER WL-LED	
12 V, amber, without installation frame	**2XD 008 997-011**
12 V, amber, with installation frame	**2XD 008 997-211**
24 V, amber, without installation frame	**2XD 009 048-011**
24 V, amber, with installation frame	**2XD 009 048-211**
ACCESSORIES	
Angled brackets, 2 pieces, incl. 4 screws optional for mounting at the side or rear	**9XD 863 533-001**
Installation frame made of black coated aluminum, angle can be adjusted, incl. 4 screws	**9XD 863 828-001**



Working at night or in the early morning in the dark is no problem – providing you have the right light to work with!

HELLA worklights illuminate the working area appropriate for all applications. Their development has been specifically aimed at illuminating an as large an area as possible with a soft transition area at the edge.

Worklights can be installed in all sorts of areas and environments. Whether in agriculture, on construction vehicles, hazardous goods transporters, towing or municipal vehicles.

So that every move counts, even in the dark:
See more, work more precisely and safely –
HELLA Worklights.

THIS IS WHAT HELLA QUALITY MEANS

HELLA is the market leader for worklights in Europe and supplies all leading manufacturers as the original equipment manufacturer. The expectations of the quality of the products made by the family-owned company are correspondingly high. HELLA is continually investing in advanced technologies to continue to meet these expectations in the future as well.

Innovative ability
In order to develop worklights of the highest quality, HELLA has been cooperating for many years with L-LAB, the research institute for lighting technology and mechatronics at Paderborn University. Together we have developed the HELIOS software which simulates the light distribution of planned lights.

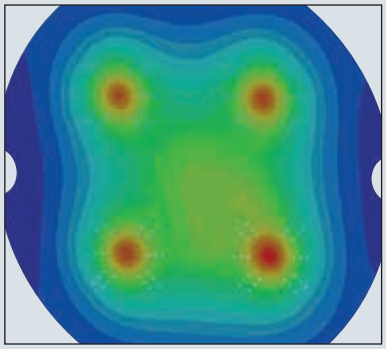
Our customers benefit directly from the development results and the investments that HELLA is making in research and development. For example, through innovative LED worklights that produce brighter, more pleasant light while consuming less electricity, and which last significantly longer.

Durability
LED worklights last up to 60,000 hours. They are a good example of the extreme durability shown by HELLA products. This quality factor not only results from using high quality materials and components, but also from a well-thought-out production process which reliably prevents errors. Apart from this immediate functional value however, there are other aspects of quality that HELLA attaches great importance to. This includes first-class equipment and exceptional product reliability.

The requirements
It is also a matter of course at HELLA that all products not only meet legal standards, but also meet the requirements that municipal vehicle manufacturers make of original parts.

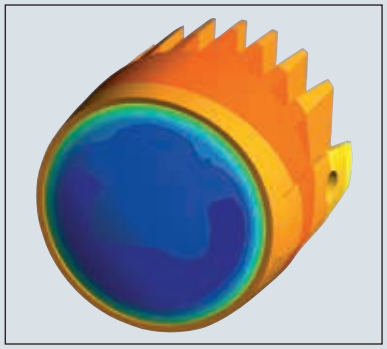
Service
Ultimately, comprehensive product service is also a part of the HELLA pledge of quality. This is why HELLA offers excellent customer service, ranging from user guides and maintenance through to the availability of service parts for older product lines.

THIS IS HOW OPTIMAL THERMAL MANAGEMENT AT HELLA WORKS



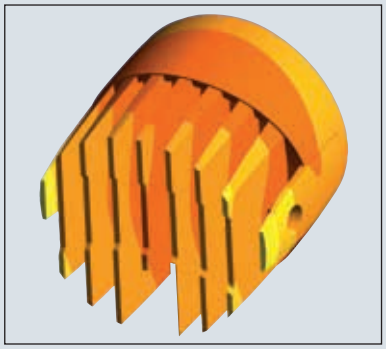
The perfect balance for particular durability

The stronger the light from an LED, the higher the operating temperature. LEDs that are too hot provide less light and have a shorter design life. The art of development is therefore key to finding the mean value for all requirements.



Heat and light are separated. The simulation of the heat distribution clearly illustrates how HELLA Thermal Management works:

Even though light is being emitted from the front of the light, it remains cool there (blue). Instead, the heat (orange) is dissipated to the rear over the heat sink.

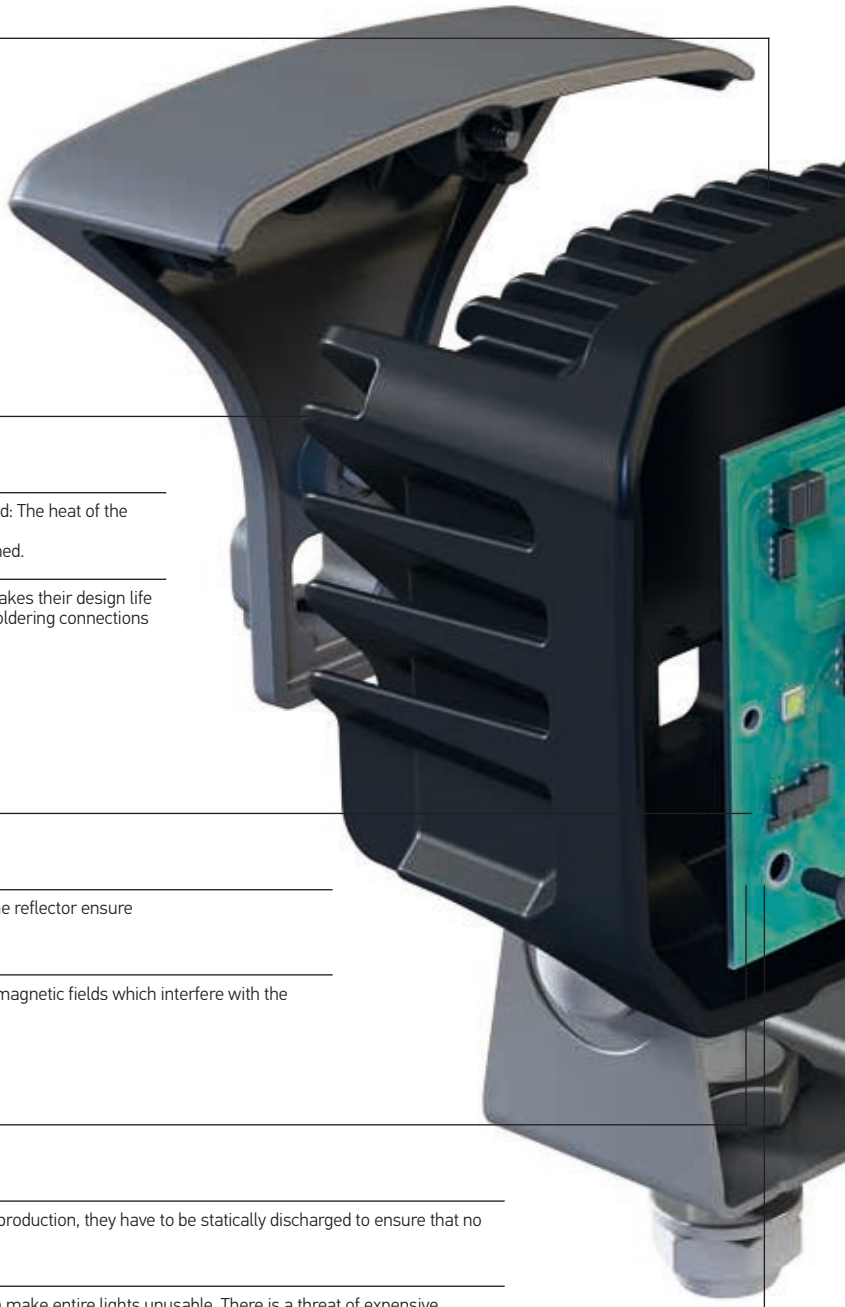


High temperatures reduce the power and the design life of LEDs.

This is why the thermal discharge of the LEDs is quickly dissipated to the rear in HELLA worklights. There the heat is discharged to the air via the aluminum housing. The cooling fins accelerate this process as they enlarge the surface of the housing.

HELLA QUALITY: A COMPARISON

Where others are cutting back, HELLA is investing in best quality. Here you can see in detail why supposedly cheap offers from discounters can become expensive.



Surface coating

⊕ High quality coatings protect the aluminum components of HELLA worklights from salt and chemicals and therefore from corrosion.

⊖ Corrosion can ruin the seal on lights. In the worst case, water can penetrate and destroy the electronics.

Thermal management

⊕ The thermal management of HELLA worklights is thoroughly calculated: The heat of the LEDs is evenly distributed and dissipated via the housing.
If there is a risk of overheating, individual LEDs are automatically dimmed.

⊖ Without thermal management, LEDs can very quickly overheat. This makes their design life drop dramatically. Hot spots can deform the entire electronics board, soldering connections can break, causing the complete light to fail.

Electromagnetic compatibility (EMC)

⊕ The LED arrangement in HELLA's worklights and the construction of the reflector ensure that no interference occurs from magnetic fields.

⊖ LED worklights that are not correctly shielded, produce strong electro-magnetic fields which interfere with the vehicle's electronics, radio and GPS.

Electro-static discharge (ESD)

⊕ Before HELLA employees are allowed to enter the LED production, they have to be statically discharged to ensure that no components can be damaged by charging.

⊖ Electronic components damaged by static discharge can make entire lights unusable. There is a threat of expensive downtime.

Reverse polarity

⊕ HELLA worklights are protected against reverse polarity. If they are wrongly connected, they will not be damaged.

⊖ If a wrongly connected worklight is not protected against reverse polarity, the electronics will be completed destroyed when it is switched on.

⊕ **HELLA quality advantages**

⊖ **Where others save**

Attempting to save in the wrong place, costs more in the end, as inferior lights provide less power and often fail.

Quality of the LEDs

Only LEDs that have been subjected to strict tests are used in HELLA's worklights. The selection guarantees the extremely long design life of the LEDs of up to 60,000 hours.

Resorting to untested, cheap LEDs is risking a shortened design life and malfunctions. Then LED technology cannot be used to its full advantage.

Adhesion

The worklights at HELLA are hermetically sealed by high-accuracy glue-dispensing robots. This guarantees that the lens is glued at an optimal angle for the optimum luminous efficiency which has been precisely calculated.

Inferior worklights are often glued manually. However, an irregular adhesive bed can lead to the lens angle, and thus the luminous efficiency, not being ideal. If the lens is no longer tight or becomes detached, water can penetrate and make the light unusable.

Light distribution via the reflector system

The reflectors of HELLA worklights are calculated in such a way to ensure that the working area is evenly illuminated and the light optimally used.

Worklights with an unsuitable light control system illuminate the working area unevenly and waste most of the light. Brighter spots distract your eyes, making others details difficult to see.

Lens material

The lens of HELLA worklights, which is 100% suitable for daily use, is made of high quality, impact and scratch-proof plastic. The light emitted remains homogeneous, even after colliding with a branch or anything similar.

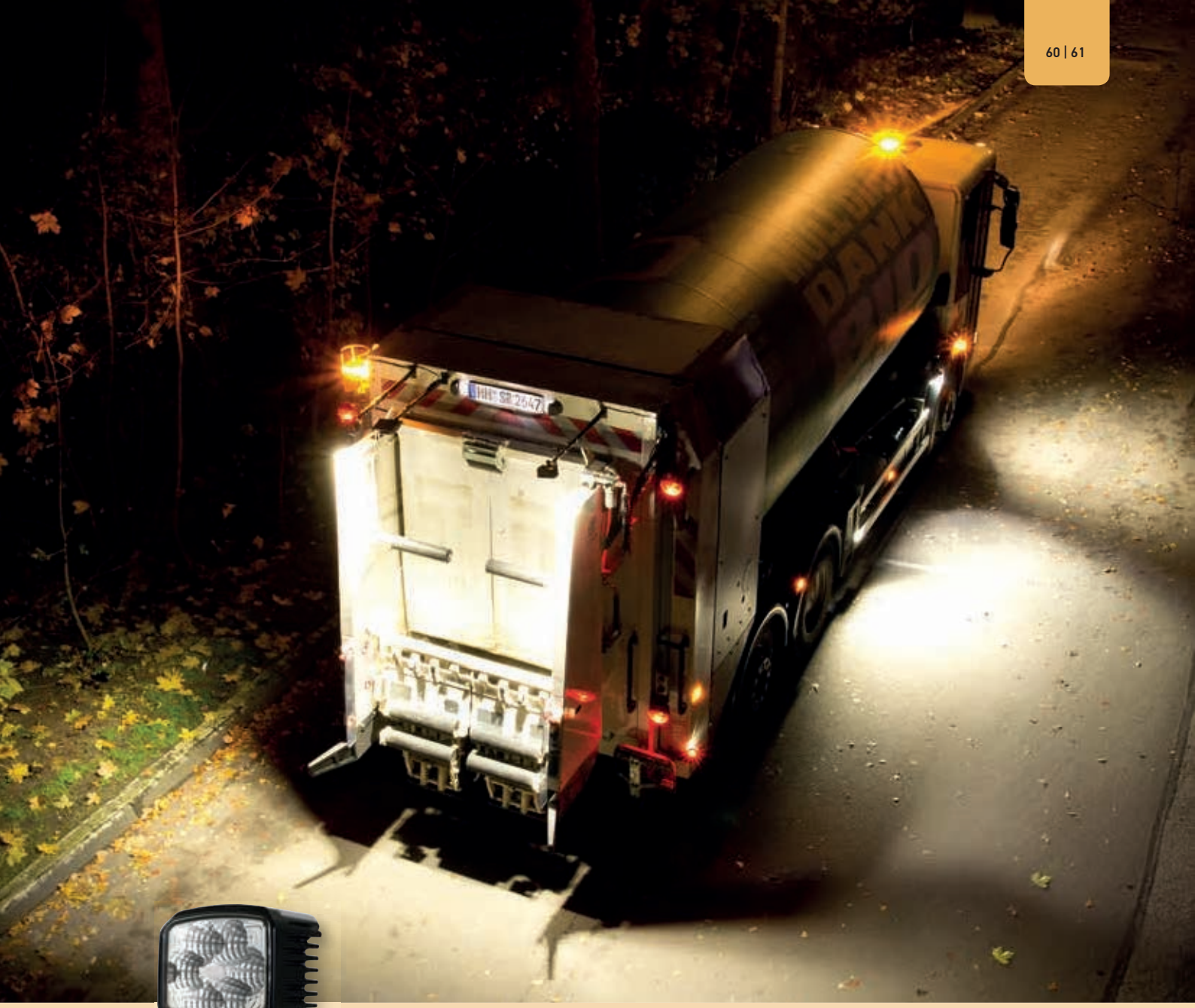
Lenses made of inferior plastic can break and scratch easily. Each scratch leads to undesired light refraction - the more scratches there are, the more irregular the illumination is.

5 x Halogen worklights Ultra Beam H3
Page 69

HALOGEN LIGHTING

Waste collection vehicle with halogen lights.
The vehicle is equipped with three Ultra Beam H3 worklights to light up the area to the right side of the vehicle. This lighting helps the driver and the passengers identify obstacles and hazardous places in the work area. In addition to that, two Ultra Beam H3 worklights are mounted on a telescopic pole (see accessories) at the rear of the vehicle to light up the tipping area.

The Ultra Beam is extremely sturdy and features high light output and homogeneous illumination. However, if you compare the two images, you can clearly see the difference between halogen and LED worklights - the light color.
Halogen bulbs tend to generate less bright light with an obvious yellow cast. With a halogen light, it is quite difficult to detect the cut-off line due to the color temperature (2,500° Kelvin) . The energy consumption of a halogen worklight is around 70 watts. A comparable LED worklight (e.g. Power Beam 1500) at 22 watt.



5 x LED worklights Power Beam 1500
Page 64

LED LIGHTING

The same waste collection vehicle, however equipped with HELLA LED worklights.
During the refit, a total of five Power Beam 1500 were installed, three to illuminate the side and two more to illuminate the tipping area. The worklight is pressure-cleaner proof (IP 6K9K / IP 67), has an extremely robust housing and has innovative thermal management. This ensures that the LEDs do not overheat, thus allowing a longer design life to be attained.

HELLA has a specifically developed and calculated reflector concept for every LED worklight to homogenously distribute the light beams in the work area.

This is often more important that a high lumen number because only homogenous illumination ensures that you have light where you really need it. As described in the image before, you can clearly distinguish between the brightness of halogen and LED. Due to the daylight-like color temperature of LED light at 5,700° Kelvin, it is significantly more pleasant for the human eye and therefore leads to better quality work at night. Furthermore, the image nicely demonstrates the greatly optimized illumination of the work area thanks to HELLA LED worklights.

INSTALLATION STORY

The HELLA Ultra Beam H3 are to be replaced by new Power Beam 1500 and module 70 so as to be able to enjoy the advantages of HELLA LED technology.

After removing the halogen worklights, it is now possible to install the Power Beam 1500 in the same place without any extra effort.
HELLA tip: Do not screw on too tightly so that the worklights can still be aligned.

By using the HELLA SUPERSEAL product range you can ensure that the cable ends are connected tightly sealed from water and dust.

The heat-shrinkable tubing makes the plug connection 100 % tight and ensures that no unwanted damage occurs in this area. It is often not the products themselves but poor cabling which is the reason for unwanted malfunctions.
HELLA tip: Always ensure that the plug connections are well sealed. This will ensure a long design life and less malfunctions.

After ensuring the wiring is correct, complete mounting. The worklights are now aligned in the required position and are fixed in this position. Afterwards the cables are fixed with HELLA cable straps.
HELLA Tip: Align it first and then fix it in place with cable straps. Then you will not have the problem later on of the cable already having been mounted too tightly.

To finish off, replace, attach and wire in the third worklight, finishing the modification of the side lighting.

The first impression is great already. Now the lights can prove, in use on the roads that they deliver on HELLA's promises.

HELLA WORKLIGHTS – SO THAT YOU CAN ALWAYS WORK IN THE RIGHT LIGHT

1. Why HELLA LED worklights?

HELLA combines innovative technologies and know-how from the automotive industry with the high requirements made of commercial vehicles (robustness, durability, etc.). Our LED worklights are already subjected to the hardest endurance testing in the development phase to ensure that they work reliably in the rough and tumble of everyday life and so that an extremely long design life can be attained.

2. Which worklight is the right one for me? To be able to make this decision, you should ask yourself 3 questions first of all:

- → What needs to be illuminated? (an object, a surface, a enclosed space, etc.)
- → Where would I like to / am I able to attach the worklight? (available space, attachment options, etc.)
- → What height is the worklight to be attached at?

Answering these questions will help you to choose the right one from the wide range of HELLA worklights on offer. We recommend using the Isolux diagrams to compare the various illumination options provided by the worklights. These diagrams show the illumination provided by various worklights at an installation height of 2.5 meters and a tilt angle of 8°. If you have thought about these 3 questions, then you can use the sketches and technical data which you will find with every worklight to select the right product for your application. If not, then we recommend you use our worklight tool Eliver. Here you can sit at your computer and conveniently see the different illumination options our worklights have to offer.

3. How long is the design life of a HELLA LED worklight?

The design life of a worklight depends greatly on external influences, such as vibration, salt contamination or the ambient temperature. The design life of the LED is usually very long, however it is reduced by high temperatures. Worklights are often maxed out to their limits which leads to the LEDs overheating quite quickly, reducing the luminous efficiency and also the design life. HELLA worklights in contrast are equipped with active thermal management which prevents the lights from overheating. Thanks to this active monitoring, the HELLA LED worklights often attain an unsurpassed design life of up to 60,000 operating hours.

4. How many lumen does a good LED worklight have?

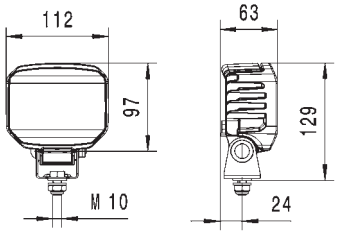
When selecting your worklight, the lumen should not necessarily play the most important role, because a high lumen value alone provides no guarantee that the illumination will be good, not to mention a good distribution of the light in your work area. The "lumen" value only tells you how much light a light source (e.g. LED) gives out. The challenge the manufacturer is faced with is to capture the light beams, concentrate or scatter them and to make them shine on the ground in the required work area. When selecting the right LED worklight, you should not only rely on the lumen data on the datasheets. Many manufacturers only state the calculated lumen, which may differ considerably from the actual lumen measured. Make sure you look to see if the light datasheets states "Lumen measured".

5. What is thermal management and why is it so important?

Depending on the type of LED, with operating temperatures of more than 120°C the design life is significantly reduced. To dissipate the heat from the sealed light requires a sophisticated thermal management concept.

- → **Passive thermal management:** Here, the heat from the LEDs is dissipated by the worklight. This effect is generated by using high quality heat conductive materials, such as aluminum or special plastics, and also using heat conductive film and cooling fins on the housing.
- → **Active thermal management:** Here, temperature sensors are used which control the temperature range of the LEDs. If they get too hot, then the electronics on the worklight actively intervenes and lowers the power of the device until the optimal operating range is reached again. This effect is virtually invisible to the naked eye, but is of essential importance to the design life.

LED WORKLIGHTS



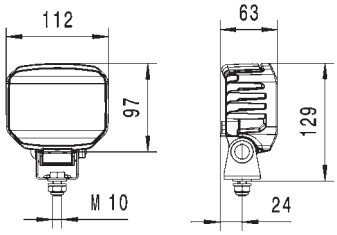
Power Beam 1500

Light output (measured): 1,300 lumen, power requirement: 22 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing, ADR approved

Also available with an orange lens - optimal for use in areas where normal LED worklights could dazzle.

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 288- ...	-001	-011	-041
Supply voltage	9 – 33 V	9 – 33 V	9 – 33 V
Close-range illumination	–	■	–
Long-range illumination	■	–	■
Electrical connection	DT connector	DT connector	DT connector
More features	–	–	orange cover lens



Power Beam 1800

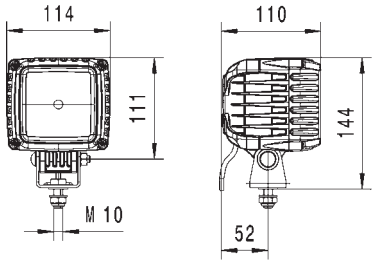
Light output (measured): 1,850 lumen, power requirement: 32 watt, color temperature: 5,700° Kelvin, can only be operated with 24 V operating voltage, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing

SPECIAL: This light can be dimmed using the adjustable duty cycle of the pulse width modulated signal (PWM). This can be facilitated by interconnecting a conventional LED PWM dimmer in the supply line. (max. input voltage for light 1.5 A ; frequency 100 – 1,000 Hz)

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 388-...	-011	-031
Supply voltage	22 – 32 V	22 – 32 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	DT connector	DT connector
More features	Dimming function	Dimming function

Availability: From autumn 2014



Power Beam 3000

Light output (measured): 3,000 lumen, power requirement: 43 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing for heavy duty use

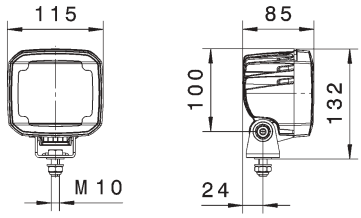
Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 192-...	-001	-181
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	■
Long-range illumination	–	–
Electrical connection	2,000 mm cable	2,000 mm cable
More features		Pipe-socket attachment

LED WORKLIGHTS

Ultra Beam LED

Light output (measured): 2,200 lumen, power requirement: 30 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing for heavy duty use

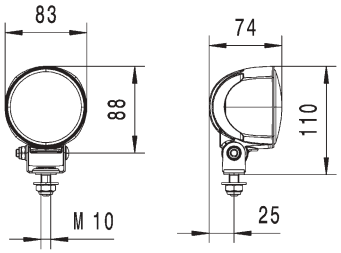


Recommended tilt angle: close-range: 12° long range: 5°

1GA 995 506-...	-001	-011	-031
Supply voltage	9 – 33 V	9 – 33 V	9 – 33 V
Close-range illumination	■	■	–
Long-range illumination	–	–	■
Upright mounting	■	–	■
Suspended mounting	–	■	■
Electrical connection	DT connector	DT connector	DT connector

Module 70 LED Generation IV

Light output (measured): 2,500 lumen, power requirement: 30 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing



Recommended tilt angle: close-range: 12° long range: 5°

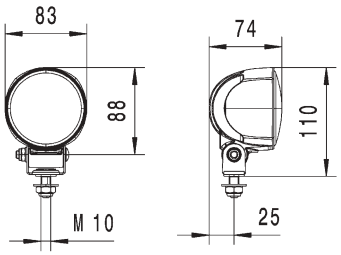
1G0 996 476-...	-001	-011
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	
Long-range illumination		■
Electrical connection	2,000 mm cable	2,000 mm cable

Availability: From autumn 2014

Module 70 LED Generation III

Light output (measured): 800 lumen, power requirement: 13 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing

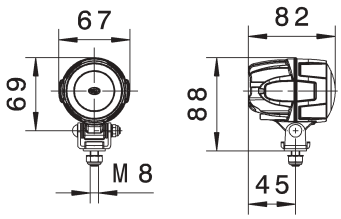
Now also available as a reversing spotlight (ECE-R23)



Recommended inclination angle: close-range: 12°

1G0 996 276-...	-451	-481	2ZR 996 376-091
Supply voltage	9 – 33 V	9 – 33 V	9 – 33 V
Close-range illumination	■	■	–
Reversing spotlight	–	–	■
Electrical connection	2,000 mm cable	190 mm cable + DT plug	2,000 mm cable
More features	–	Ultra-broad illumination	ECE-R23 approval

LED WORKLIGHTS

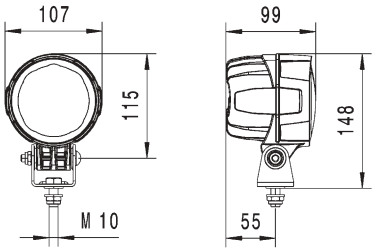


MODULE 50 LED

Light output (measured): 800 lumen, power requirement: 15 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing

Recommended tilt angle: close-range: 12° long range: 5°

1G0 995 050-...	-001	-011	-021
Supply voltage	9 – 33 V	9 – 33 V	9 – 33 V
Close-range illumination	■	■	–
Long-range illumination	–	–	■
Upright mounting	■	–	■
Suspended mounting	–	■	■
Electrical connection	DT connector	DT connector	DT connector



Module 90 LED

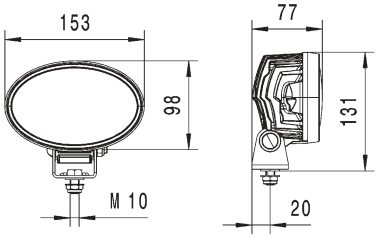
Light output (measured): 3,400 lumen, power requirement: 36 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing

Module 90 LED installation version also available with external ballast and DT plug:
Close-up: 1G0 996 263-001 or long-range illumination: 1G0 996 263-011

Recommended tilt angle: close-range: 12° long range: 5°

1G0 996 263-...	-031	-051
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	DT connector	DT connector

Availability: From autumn 2014



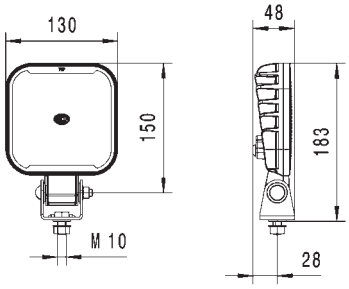
Oval 100 LED

Light output (measured): 1,700 lumen, power requirement: 25 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved, high quality aluminum housing

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 661-...	-001	-011
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	DT connector	DT connector
More features	1:1 replacement with xenon and halogen possible	

LED WORKLIGHTS

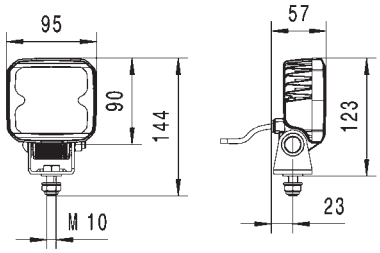


AP 1200 LED

Light output (measured): 1,200 lumen, power requirement: 22 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), ECE-R10 approved

Recommended inclination angle: close-range: 12°

1GA 011 720-...	-041
Supply voltage	9 – 33 V
Close-range illumination	■
Long-range illumination	–
Electrical connection	300 mm cable



Q90 LED

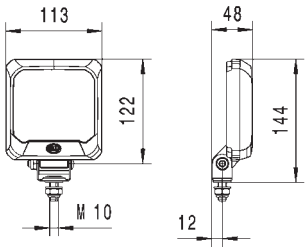
Light output (measured): 1,200 lumen, power requirement: 25 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 68 (pressure cleaner-proof/ immersible), ECE-R10 approved

SPECIAL: glass fiber reinforced heat conducting plastic housing, super robust plastic bracket, corrosion-resistant

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 283-...	-001	-011
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	500 mm cable	500 mm cable
More features	Plastic housing	Plastic housing

Availability: From autumn 2014



Flat Beam 500

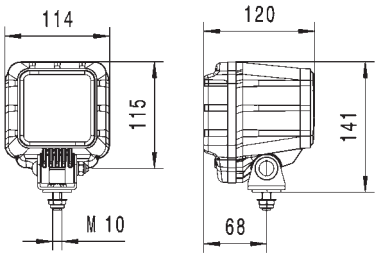
Light output (measured): 550 lumen, power requirement: 7 watt, color temperature: 5,700° Kelvin, Multivolt, reverse polarity protection, overvoltage protection, thermal management, IP 6K9K / IP 67 (pressure cleaner-proof/ immersible), overheating protection, impact-resistant plastic housing, ECE approved

Good close-range illumination possible even mounted flat to the wall.

Standard 45° illumination

1GA 995 193-...	-001	-021
Supply voltage	9 – 33 V	9 – 33 V
Close-range illumination	■	■
Long-range illumination	–	–
Electrical connection	2,000 mm cable	2,000 mm cable
More features	Standard bracket	Wall-mounted

XENON WORKLIGHTS

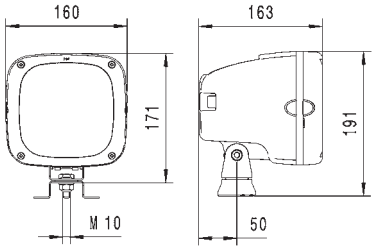


PowerXen

Light output (measured): 2,400 lumen, power requirement: 42 watt, color temperature: 4,150° Kelvin, reverse polarity protection, overvoltage protection, IP 6K9K (pressure cleaner-proof), ECE-R10 approved

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 196-...	-031	-051
Supply voltage	24 V	24 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	500 mm cable	500 mm cable
More features	D1S bulb	D1S bulb

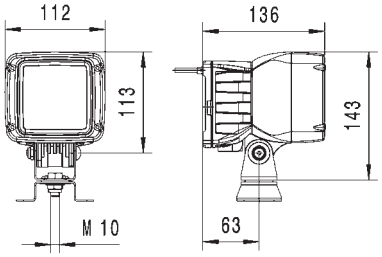


AS 200 Xenon

Light output (measured): 2,800 lumen, power requirement: 42 watt, color temperature: 4,150° Kelvin, reverse polarity protection, overvoltage protection, IP 6K9K (pressure cleaner-proof), ECE-R10 approved

Recommended tilt angle: close-range: 12° long range: 5°

1GA 996 142-...	-011	-071
Supply voltage	24 V	24 V
Close-range illumination	■	–
Long-range illumination	–	■
Electrical connection	AMP connector	AMP connector
More features	D1S bulb	D1S bulb



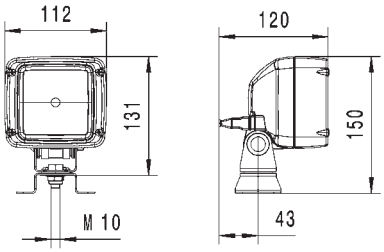
Ultra Beam X-PowerPack

Light output (measured): 2,800 lumen, power requirement: 42 watt, color temperature: 4,150° Kelvin, reverse polarity protection, overvoltage protection, IP 6K9K (pressure cleaner-proof), ECE-R10 approved

Recommended inclination angle: close-range: 12°

1GA 998 534-...	-451	-461
Supply voltage	24 V	24 V
Close-range illumination	■	■
Upright mounting	■	–
Suspended mounting	–	■
Electrical connection	AMP connector	AMP connector
More features	D1S bulb	D1S bulb

HALOGEN WORKLIGHTS



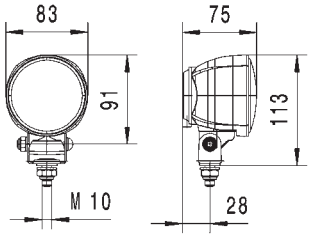
Ultra Beam H3

Light output (measured): 1,150 lumen, power requirement: 55/70 watt, color temperature: 2,500° Kelvin, impact-resistant glass fiber reinforced plastic housing, IP 5K9K (pressure cleaner-proof)

The classic among worklights.

Recommended inclination angle: close-range: 12°

1GA 007 506-...	-001	-081	2ZR 997 506-391
Supply voltage	12 / 24 V	12 / 24 V	24 V
Close-range illumination	■	■	■
Upright mounting	■	■	■
Suspended mounting	–	–	–
Electrical connection	AMP connector	Cable inlet with grommet	150 mm cable + AMP plug
More features	–	–	ECE-R23

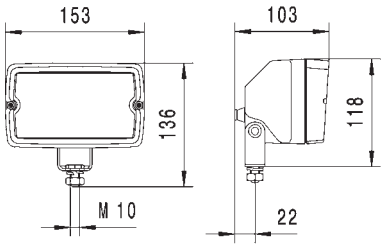


Module 70 H3

Light output (measured): 1,150 lumen, power requirement: 55/70 watt, color temperature: 2,500° Kelvin, impact-resistant glass fiber reinforced plastic housing, IP 5K9K (pressure cleaner-proof), compact worklight

Recommended inclination angle: close-range: 12°

1G0 996 176-...	-001	-111
Supply voltage	12 / 24 V	12 / 24 V
Close-range illumination	■	■
Upright mounting	■	–
Suspended mounting	–	■
Electrical connection	Cable inlet with grommet	Cable inlet with grommet



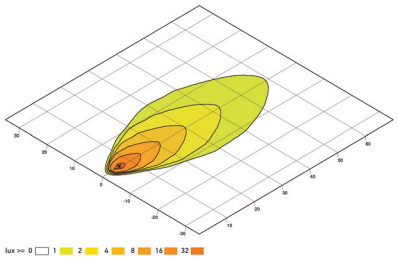
Master H3

Light output (measured): 1,150 lumen, power requirement: 55/70 watt, color temperature: 2,500° Kelvin, impact-resistant glass fiber reinforced plastic housing, IP 5K9K (pressure cleaner-proof)

Recommended inclination angle: close-range: 12°

1GA 005 060-...	-001	-041
Supply voltage	12 / 24 V	12 / 24 V
Close-range illumination	–	■
Long-range illumination	■	–
Upright mounting	■	■
Suspended mounting	■	■
Electrical connection	Cable inlet with grommet	Cable inlet with grommet

WORKLIGHTS – ISOLUX DIAGRAMS



Power Beam 1500

Close-range

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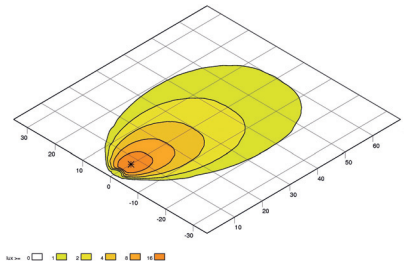

Power Beam 1800

Close-range

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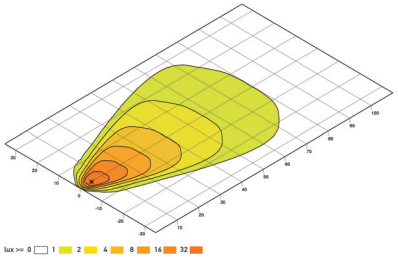

Power Beam 3000

Close-range

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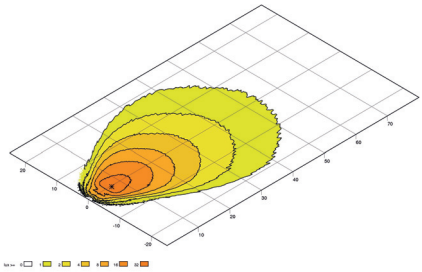

Ultra Beam LED

Close-range

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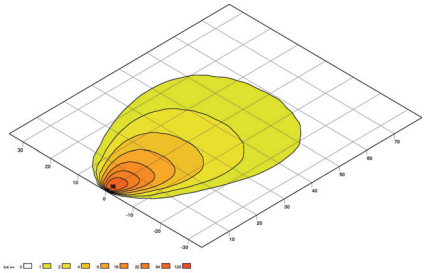

Module 70 LED Generation IV

Close-range

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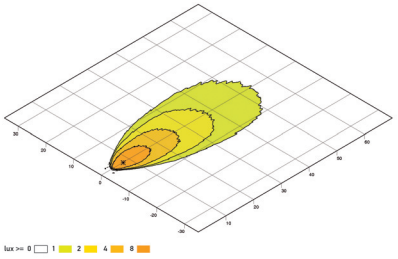

Module 70 LED Generation III

Close-range

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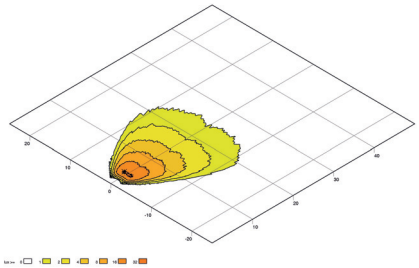

MODULE 50 LED

Close-range

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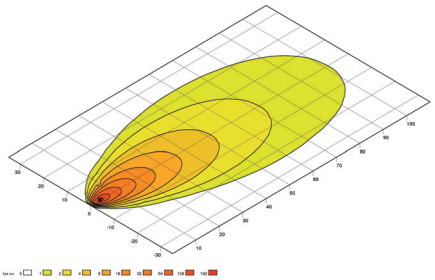

Module 90 LED

Close-range

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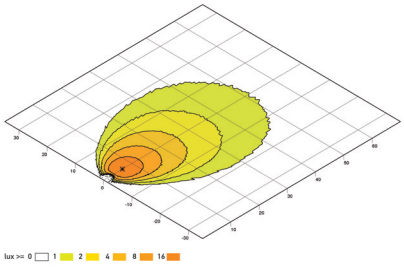

Oval 100 LED

Close-range

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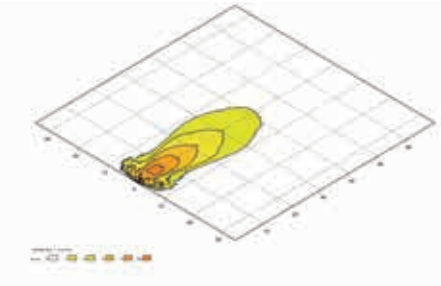
lux >= 0 1 2 4 8 16 32

LED



AP 1200 LED

Close-range

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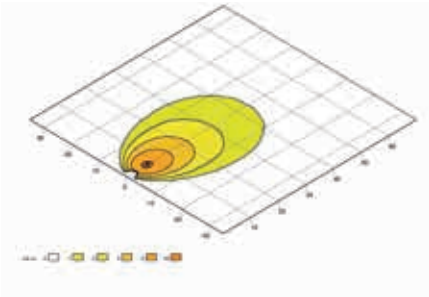

Q90 LED

Close-range

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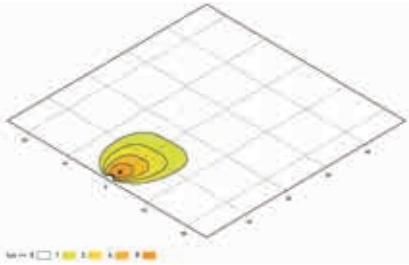

Flat Beam 500

Close-range

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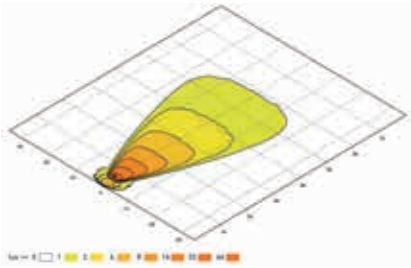
Xenon



PowerXen

Close-range

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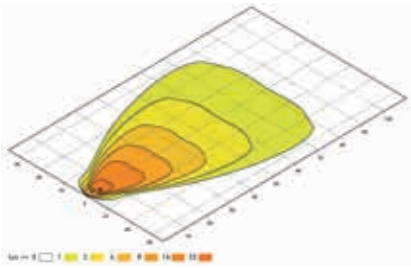

AS200 Xenon

Close-range

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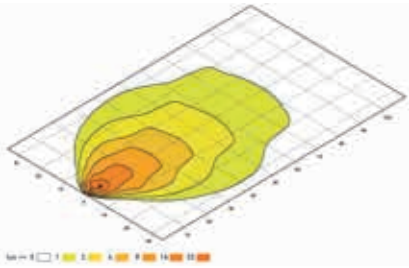

Ultra Beam X-PowerPack

Close-range

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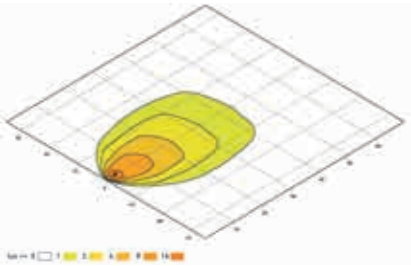
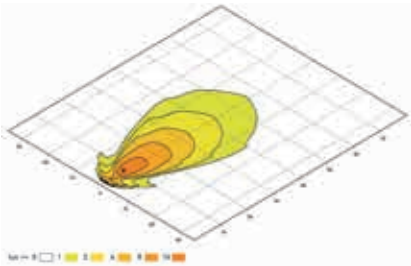
Halogen



Ultra Beam H3 Halogen

Close-range

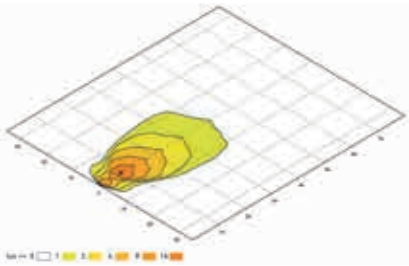
→ Page 69



Module 70 H3

Close-range

→ Page 69



Master H3

Close-range

→ Page 69

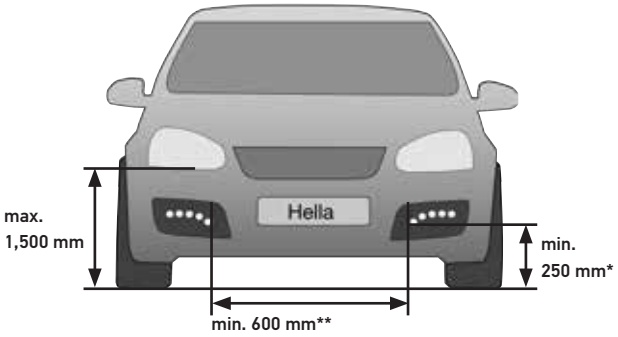
LED daytime running light: safe and economical

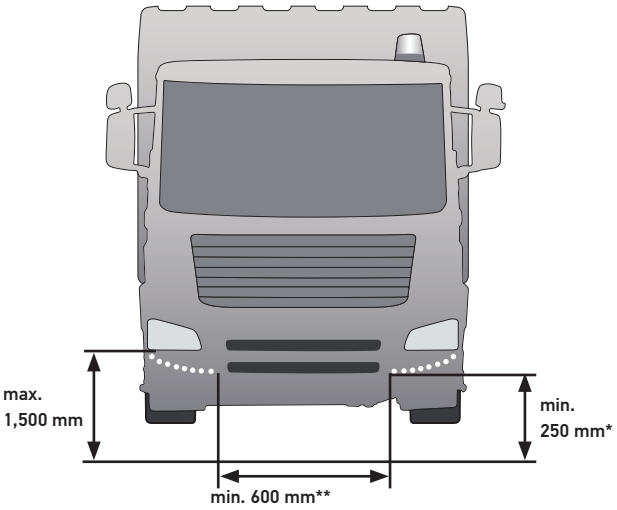
Daytime running lights make driving on the roads safer and are becoming mandatory in more and more European countries. Save money now by converting your municipal commercial vehicles, thus ensuring you have the advantage when it comes to safety.

Compared to a low beam, daytime running lights reduce the risk of accidents because they are much easier to see. They immediately and permanently increase the visibility of your vehicle on the roads - other road-users will see you in plenty of time. In hazardous situations, daytime running lights can mean important extra seconds of response time. In addition to that, thanks to daytime running lights, you no longer need to drive with low beam. You can make considerable savings on fuel consumption without compromising on safety.

Daytime running light do it: They switch on and off automatically, they are safe and economical.

DAYTIME RUNNING LIGHTS





→ Daytime running lights provide a decisive safety advantage on the roads and help prevent approx. 58% of accidents which result in serious injuries.
→ It is much easier to see than normal low beam.
→ A vehicle's own visibility is significantly increased.
→ The vehicle can be seen earlier on, which provides a few more seconds of vital reaction time.
→ Fuel consumption significantly reduced compared to driving with low beam

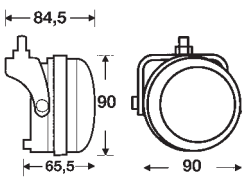
Required by law:
The law has recognized the advantages of daytime running lights: From 2012 onwards, daytime running lights are obligatory for all new commercial vehicles licensed to use the roads in EU countries. Various installation options are allowed. However, distances and reflected beam angles are specified.

→ * When used as a position light, the minimum permitted installation height is 350 mm and the lights must not be more than 400 mm from the outer edge of the vehicle.
→ ** For vehicles with a width of < 1,300 mm, the spacing distance must be at least 400 mm.
→ When a daytime running light is used as a position light, the standard position light must be permanently disabled in accordance with ECE-R 48.
→ For more information on legal stipulations and attachment regulations, please refer to the Internet or a qualified garage.
→ See the relevant assembly instructions for more detailed information.

min. = minimum distance
max. = maximum distance

This product features the following properties:

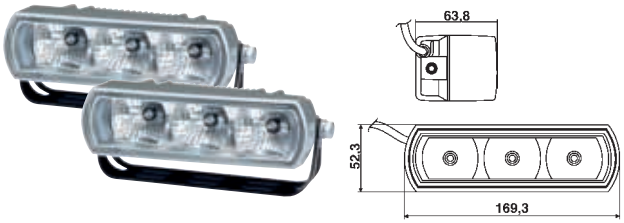
LED daytime running light Ø 90 mm



LED daytime running light Ø 90 mm	
Daytime running lights, set	**2PT 009 599-811**
Daytime running light, left	**2PT 009 599-111**
Daytime running light, right	**2PT 009 599-121**
Daytime running light with position light, left	**2PT 009 599-131**
Daytime running light with position light, right	**2PT 009 599-141**

Type approval: ECE

→ Multivolt 9–33 V
→ Three LEDs per light
→ With a black aluminum housing
→ With an integrated relay
→ Harness with AMP SUPERSEAL plug
→ For upright and suspended mounting in/on the front apron
→ Set complete with hoop bracket and professional harness



- → Multivolt 9 – 33 V
- → Three LEDs per light
- → With silver-gray aluminum housing
- → Integrated relay
- → Harness with AMP-SUPERSEAL plug, hoop bracket
- → For upright and suspended mounting in/on the front apron

This product features the following properties:

LED DAYTIME RUNNING LIGHT, RECTANGULAR	
Daytime running lights, set	**2PT 009 496-801**

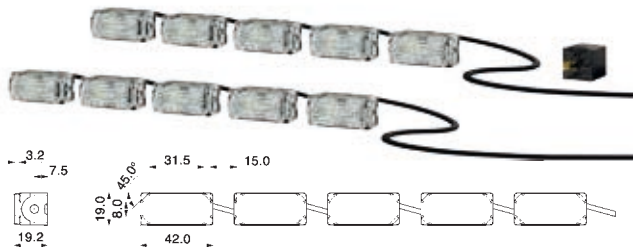
Type approval: ECE and SAE

- → 83 mm LED 3-function lights: direction indicator, position light, daytime running lights
- → The integrated electronics are set so that the daytime running lights dim when indicating, and are pre-wired with a 2.5 m-long sheathed four-conductor cable.

This product features the following properties:

LED MULTI-FUNCTION LIGHT	
Individual lights	
12 V, 83 mm-LED-3 functional luminaire	**2BE 980 691-101**
24 V, 83 mm-LED-3 functional luminaire	**2BE 980 690-101**
Optional accessories	
Adapter ring 90 mm	**9GD 980 696-001**

Type approval: ECE



- → Light source: high-performance LEDs for optimum lighting power, power consumption of approx. 3.6 W (6 modules)
- → Cable length: approx. 80 mm between the individual modules
- → Mounting: using separate brackets (1 bracket per lighting module, each bracket being mounted with 2 retaining screws, individual modules plug into position)

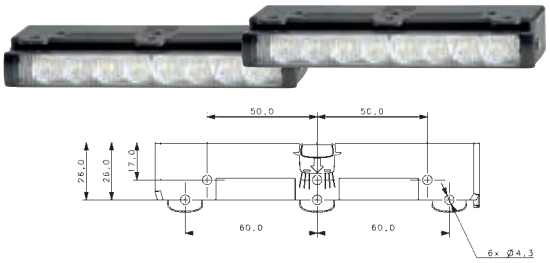
This product features the following properties:

LEDayFlex II rectangular	
Module chain with 5 light modules	
12 V, daytime running light / position light	**2PT 980 789-051**
24 V, daytime running light / position light	**2PT 980 789-051*** **2PT 980 789-061***
Module chain with 6 light modules	
12 V, daytime running light / position light	**2PT 980 789-251**
24 V, daytime running light / position light	**2PT 980 789-251*** **2PT 980 789-261***
Accessories	
12 V, control unit with connecting cables	**8KA 959 186-901**
24 V, control unit with connecting cables	**8KA 959 186-911**

Type approval: ECE (24) / SAE

* For 24 V operation, please observe the requirements as per the installation guide: The lamps are wired in series. You must order both items for this!

This product features the following properties:

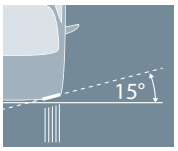


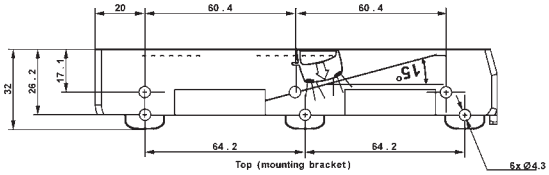
- For horizontal installation
- 8 high-performance LEDs per daytime running light
- Suitable for vehicles with no angle at installation location
- Power consumption 2 W
- IP 6K7 / IP 6K9K
- High vibration resistance
- Reverse polarity protection

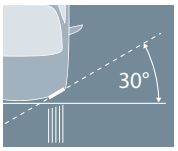
LEDayLine Zero	
12 V, daytime running light set	**2PT 980 970-821**
24 V, daytime running light set	**2PT 980 970-871**

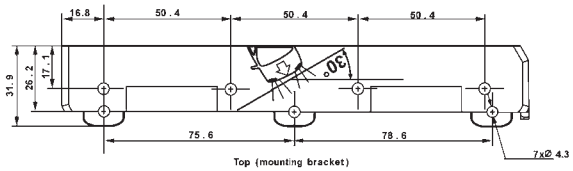
Type approval: ECE approved and SAE pending

This product features the following properties:









- For horizontal installation
- 8 LEDs per daytime running light
- Power consumption: 2 W
- 2 versions for horizontal installation in different vehicle fronts:
  LEDayLine 15:
  suitable for vehicles with a 15° angle at the installation location
  LEDayLine 30:
  suitable for vehicles with a 30° angle at the installation location.

LEDayLine 15 and LEDayLine 30 with position light	
LEDayLine 15 suitable for vehicles with a 15° angle at the installation location	
12 V, light module daytime running light/position light	**2PT 980 860-001**
24 V, light module daytime running light/position light	**2PT 980 860-501**
Brackets (set right/left)	**8HG 980 864-101**
LEDayLine 30 suitable for vehicles with a 30° angle at the installation location	
12 V, light module daytime running light/position light	**2PT 980 850-001**
24 V, light module daytime running light/position light	**2PT 980 850-501**
Brackets (set right/left)	**8HG 980 854-101**
Control units	
12 V, with connecting cables	**8KA 959 186-801**
24 V, with connecting cables	**8KA 959 186-811**

Type approval: ECE and SAE

90 MM MODULES - PRODUCT OVERVIEW

	LED	HALOGEN (conventional lighting technology)	XENON
Main light functions	→ Low beam → High beam → Low beam and high beam → High beam, daytime running light and position light → Dipped beam and indicator	→ Low beam → High beam → Low beam and high beam → High beam and daytime running light	→ Low beam → High beam → Dipped beam and high beam
Auxiliary light functions	→ Fog light → Fog light and cornering light → Fog light, daytime running light and position light → Daytime running lights	→ Fog light → Fog light and cornering light → Fog and daytime running light → Daytime running light and position light → Position light → Indicator and position light → Direction indicator → Indicator, daytime running light and position light	

90 MM BROCHURE AND CONFIGURATOR WWW.HELLA.COM/90MM-MODULES

90 mm modules are used in almost all vehicles. They are small, but powerful. They stand for quality, practicality, safety and cost-efficiency. Their modular design allows individual front design. This tool is aimed at original equipment fitters, vehicle fleet operators and end customers in the community sector, agriculture, sports vehicles, electric cars, mobile homes, and bus companies.

It offers the following benefits:

→ Original Equipment

In our 90 mm configurator, you can design and put together your own front lighting. This process is aided by a simple menu guide. This results in a parts list, which you can then send to HELLA directly from the tool.

→ Upgrade to LED

HELLA is currently the only provider that can offer you conversion to LED light technology for all 90 mm single and multifunctional modules in halogen and xenon. Existing halogen versions can easily be converted to LED modules! Based on the halogen modules currently used, the tool can be used to show which adaptations are necessary to convert to LED products whilst retaining the same lighting functions. This is simple with the compatible assembly solutions.

→ Illumination comparison

You can compare the lighting technologies for selected main light functions. See the difference between halogen and LED with realistic images from Europe's largest light testing facility! Compare light distribution to make the right decision for your application. You will also receive all the relevant information on the technical data. The complete range is clearly described in a PDF.

Note: You will find additional information on the 90 mm modules in our separate brochure.

90 MM: L 4060 HIGH BEAM

High-end illumination. High beam, daytime running and position lights in one module or as a separate high beam module.

40 x 60 mm PC lens with new design. Pattern-free and hardened plastic cover lens. Spotlight with either pre-mounted carrier frame or as a 90 mm performance module mount for 1:1 conversion.
Integrated FEP plug and control electronics.

The products on this page have the following features:

LED SPOTLIGHT L 4060

Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

Pre-mounted carrier frame	**1F0 011 988-021**
Performance mount	**1F0 011 988-121**

LED SPOTLIGHT L 4060
WITH DAYTIME RUNNING LIGHT / POSITION LIGHT

Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

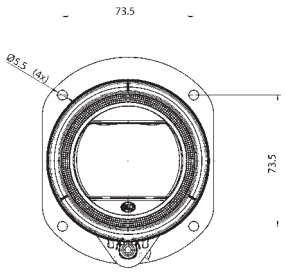
Pre-mounted carrier frame	**1F0 011 988-031**
Performance mount	**1F0 011 988-131**

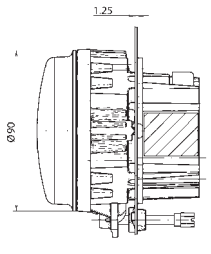
LED SPOTLIGHT L 4060
WITH INDICATOR

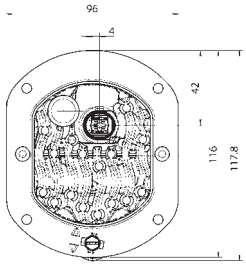
Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

Pre-mounted carrier frame, with control unit	**1F0 011 988-081**
Performance mount, with control unit	**1F0 011 988-181**
Pre-mounted carrier frame, without control unit	**1F0 011 988-071**
Performance mount, without control unit	**1F0 011 988-171**

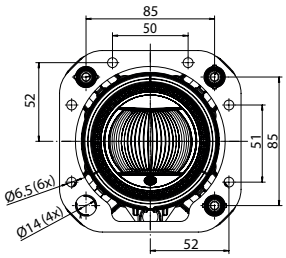
With pre-mounted carrier frame

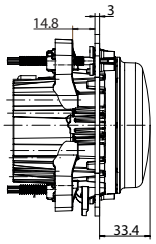


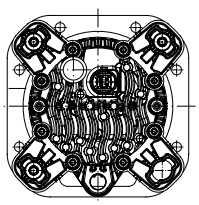




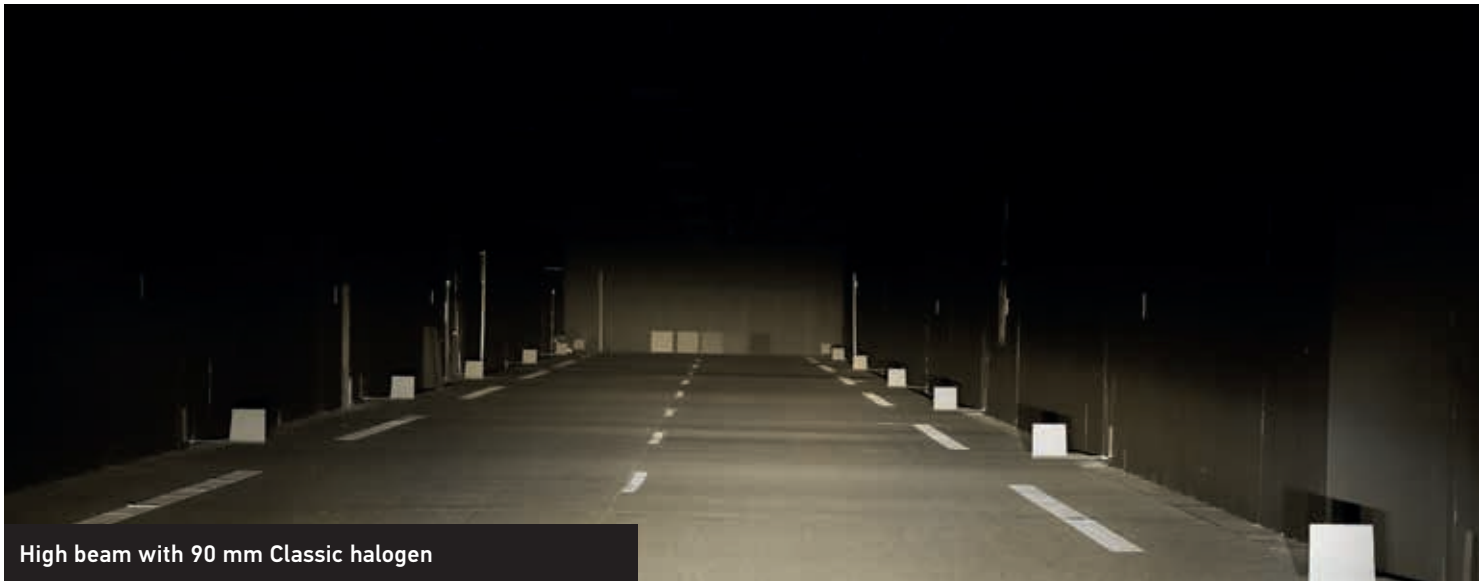
Performance module mount for 1:1 conversion of existing halogen versions





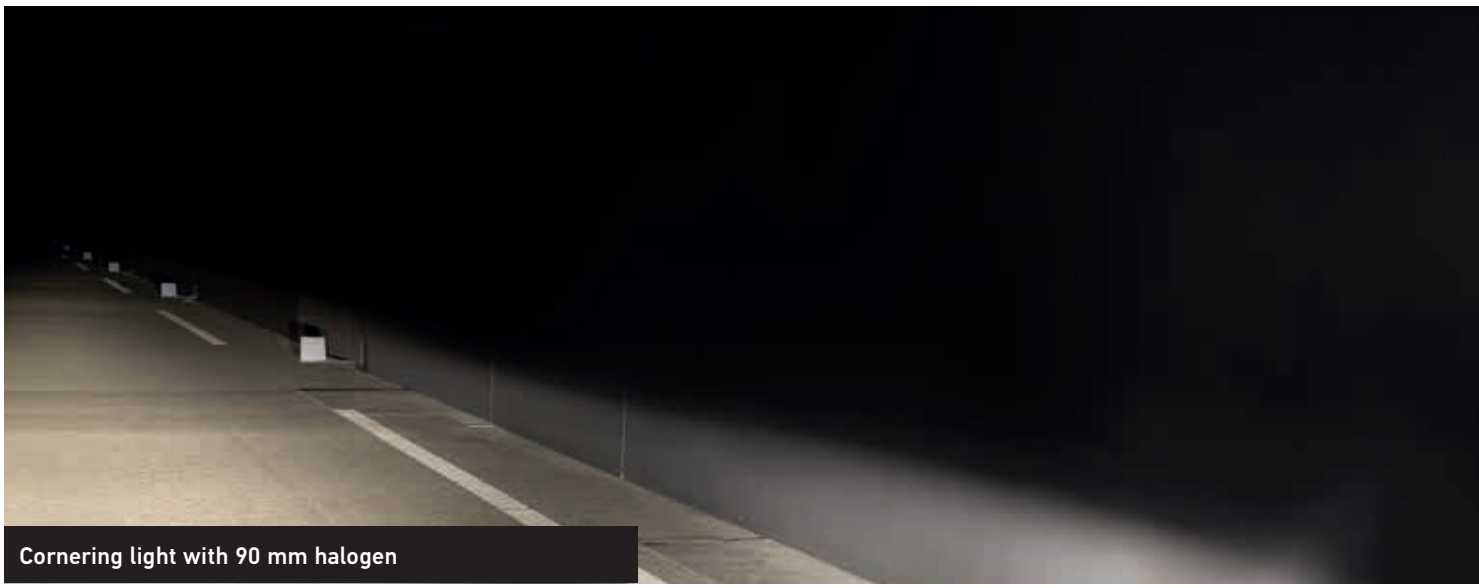


90 MM: ILLUMINATION COMPARISONS



High beam with 90 mm Classic halogen

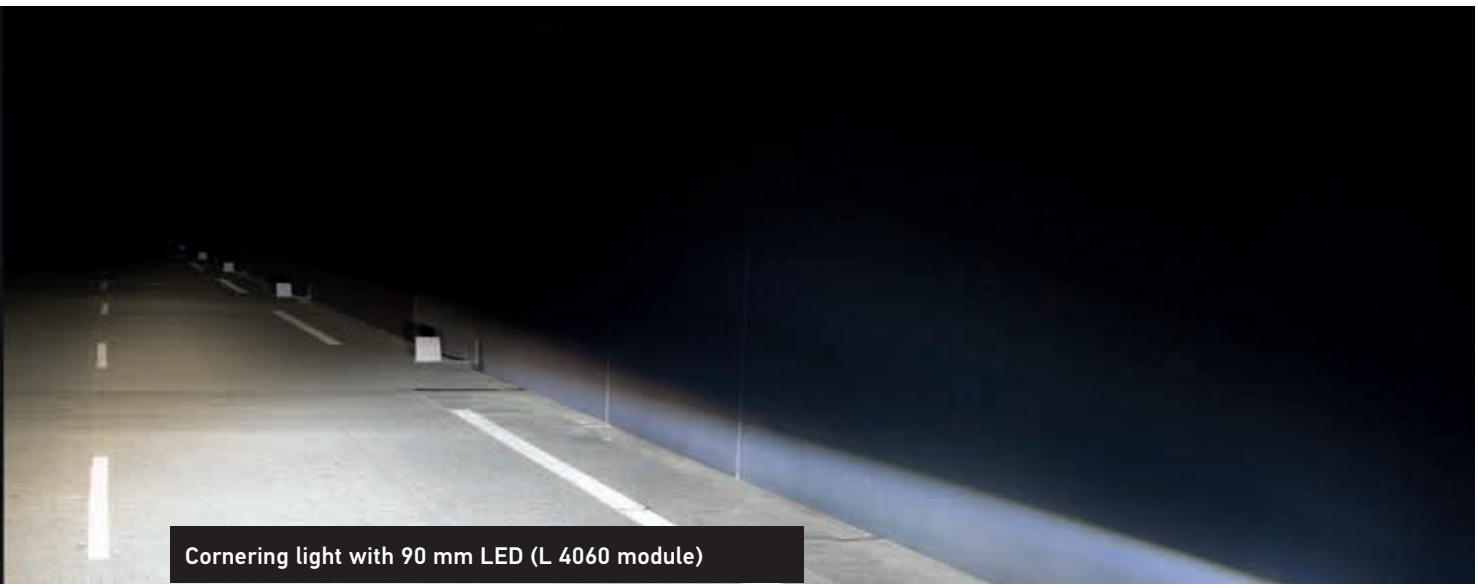
Fog light with 90mm halogen



Cornering light with 90 mm halogen

High beam with 90 mm LED (L 4060 module)

Fog light with 90 mm LED (L 4060 module)



Cornering light with 90 mm LED (L 4060 module)

90 MM: L 4060 FOG LIGHT

Uniform illumination similar to daylight.

Fog light in various combinations as a separate module, with daytime running light, position light and cornering light. 40 x 60 mm PC lens, pattern-free hardened plastic cover lens, integrated FEP plug.

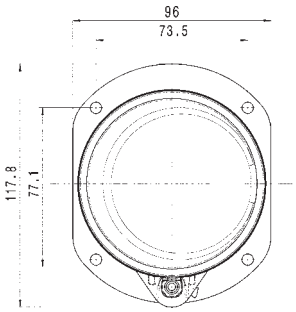
The products on this page have the following features:

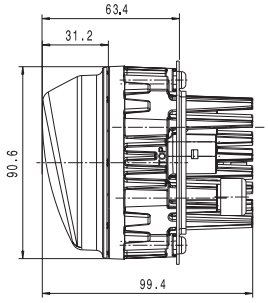
LED FOG LIGHT L 4060

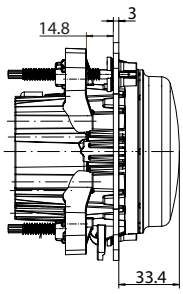
Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

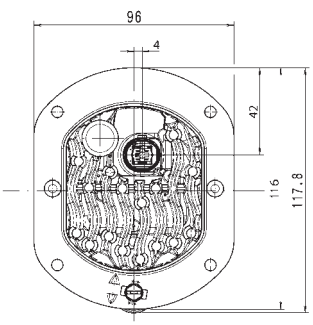
1N0 011 988-001

With pre-mounted carrier frame









**LED FOG LIGHT L 4060,
WITH DAYLIGHT RUNNING LIGHT AND POSITION LIGHT**

Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

1N0 011 988-011

**LED FOG LIGHT L 4060,
WITH CORNERING LIGHT**

Modular headlight with 40 x 60 mm polycarbonate lens, sturdy die-cast aluminum housing, silver design cover (black design cover on request)
Multivolt 9 – 33 V

On the right	**1N0 011 988-061**
On the left	**1N0 011 988-051**

90 MM: L 70 LOW BEAM AND HIGH BEAM

The products on this page have the following features:

The light color, which is similar to daylight, offers more safety and comfortable, fatigue-free driving. Three white high-power LEDs provide the light source for each light function. The light is homogeneously projected through the 70 mm DE lens on the street. The design life of the headlamp, normally more than 15,000* real operating hours, allows huge cost savings when it comes to maintenance and repair costs compared to other lighting systems**.

Exclusive automobiles distinguish themselves through their cutting-edge technology.

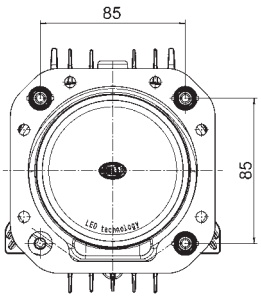
The HELLA LED low beam or low beam/high beam module is so high-tech that it shows its obvious technological advancement every time it is switched on, creating visible distance from the mass market.

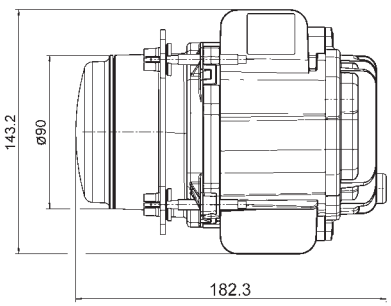
90 MM PREMIUM LED MODULE	
Maintenance-free module normally for more than 15,000 operating hours, very homogeneous light and rapid start time, 35 watt power consumption, no movable parts, passive cooling system, plastic cover lens, vehicle security system: 5 A, Multivolt	
Mono LED, traffic driving on the right	**1BL 010 820-001**
Mono LED, traffic driving on the left	**1ML 010 820-011**
Bi-LED, traffic driving on the right	**1AL 010 820-021**
Bi-LED, traffic driving on the left	**1LL 010 820-031**

Type approval: Mono-LED E1 ES 3159 and LES 3160,
Bi-LED E1 ES 3351 und LES 3352

Set packaging (One headlamp and one 12 V control unit for functional monitoring)	
Mono LED, traffic driving on the right	**1BL 010 820-801**
Mono LED, traffic driving on the left	**1ML 010 820-821**
Bi-LED, traffic driving on the right	**1AL 010 820-841**
Bi-LED, traffic driving on the left	**1LL 010 820-861**

Accessories	
12 V, for failure check - function monitoring device	**5DS 011 630-001**
Carrier frame	**9AH 169 580-011**

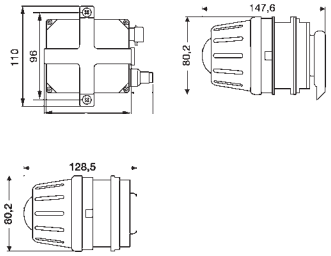




* at an ambient temperature of around 50°C

** In the ECE R48 area of application, under current law, it is necessary to implement failure check for a LED headlamp in the vehicle's electrical system by taking suitable measures. failure check is no longer necessary from 06 / 2014 onwards for vehicles in accordance with ECE-R48 Series 06 Supplement 3.

50 MM PREMIUM

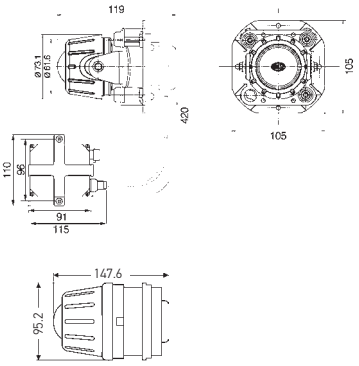


LOW BEAM HEADLAMP, 12 V

Installation frame for 3-point attachment, adjustable from the front and rear

Xenon Traffic driving on the right D2S including D2S xenon bulb and separate xenon electronic ballast	**1BL 009 071-047**
Halogen Traffic driving on the right, H7 Traffic driving on the left, H7	**1BL 009 071-007** **1ML 009 071-017**

Type approval: E1 1903 and E1 1904



SPOTLIGHT, 12 V

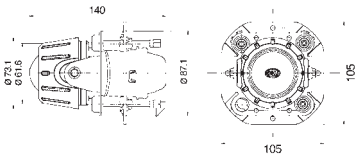
3-point holder, adjustable using setting screw

Xenon including D2S xenon bulb and separate xenon electronic ballast rear carrier frame is not included in the scope of supply (see accessories), D2S	**1F0 008 390-317**

Type approval: E1 1120

Halogen H9	**1KL 009 486-001**

Type approval: E1 2198

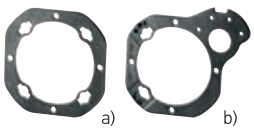


FOG LIGHT, 12 V

3-point holder, adjustable using setting screw, rear carrier frame is not included in the scope of supply (see accessories)

H7	**1NL 008 090-317**

Type approval: E1 877, ECE-R19 B series 02, B series 03



Accessories

Carrier frame
(not for H9 halogen spotlights)

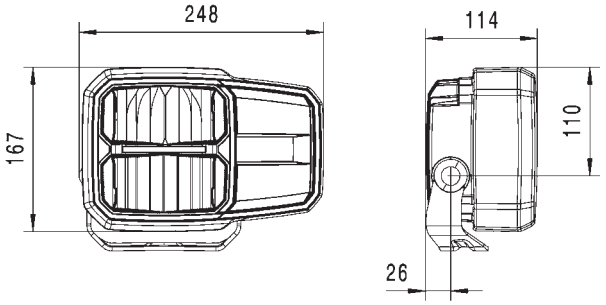
a) without headlamp leveling system holder	**9AH 161 786-017**
b) with headlamp leveling system holder	**9AH 161 784-017**

Stepping motors for headlamp beam adjustment

for 12 V xenon	**6NM 007 282-231**

LED HEADLIGHT C140

The products on this page have the following features:



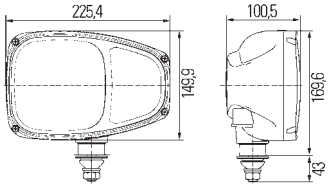
LED HEADLIGHT C140

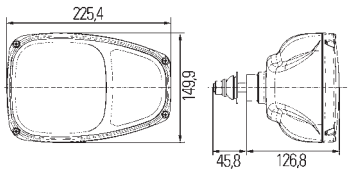
Combination headlamp with all functions in LED technology. For horizontal or vertical mounting, with die-cast aluminum housing, lens made of scratch-resistant polycarbonate, with 6-pin DEUTSCH connector, light functions: low and high beam, position light and indicator

Vertical mounting	**1EE 996 374-001**
Horizontal mounting on the left	**1EE 996 374-011**
Horizontal mounting on the right	**1EE 996 374-021**

Type approval: ECE / SAE

HEADLAMP C220





HEADLAMP C220

for mounting with H7 low beam, H3 high beam, position light with integrated indicator to front and rear (category 1, 1a and 5), with 6-pin DEUTSCH connector, light exit 120 mm x 120 mm.

upright mounted	
12 V, left	**1EE 996 174-251**
12 V, right	**1EE 996 174-261**
24 V	**on request**
mounted in the center	
12 V, left	**1LE 996 174-211**
12 V, right	**1EE 996 174-221**

Type approval: E9 6556, 11372 und 11373

Side marker lamps in LED technology

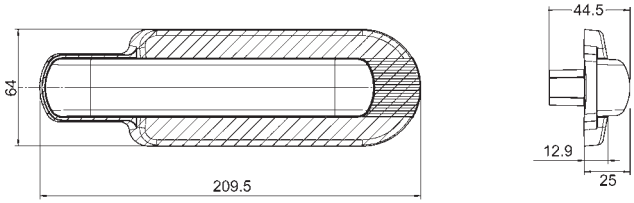
Side marker lamps contribute towards safety on the roads. As it is only these markings that make the entire vehicle easy to see - even in the dark.

The side marker lamps
from HELLA offer you durability, a high luminance and quick installation.

LED auxiliary indicator category 6, with frame

This product features the following properties:

Direction of travel



Frame version

LED auxiliary indicator category 6	
12 V, direct screw coupling AMP-SUPERSEAL with black frame	**2BM 011 788-011**
12 V, direct screw coupling 500 mm cable, with exposed cable end with black frame	**2BM 011 788-031**
24 V, direct screw coupling AMP-SUPERSEAL with black frame	**2BM 011 788-001**
24 V, direct screw coupling 500 mm cable, with exposed cable end with black frame	**2BM 011 788-021**

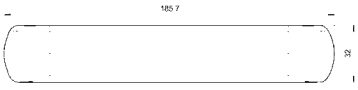
Spare parts / Accessories	
Black frame	**9AB 194 559-007**
AMP-SUPERSEAL mating connector (AMP No. 282080-1)	**8JA 746 184-022**

Type approval: ECE

LED auxiliary indicator category 6, self-adhesive

This product features the following properties:

Direction of travel



Self-adhesive version

LED auxiliary indicator category 6	
12 V, self-adhesive AMP-SUPERSEAL	**2BM 011 788-051**
12 V, self-adhesive 500 mm cable, exposed cable end	**2BM 011 788-071**
24 V, self-adhesive AMP-SUPERSEAL	**2BM 011 788-041**
24 V, self-adhesive 500 mm cable, exposed cable end	**2BM 011 788-061**

Spare parts / Accessories	
AMP-SUPERSEAL mating connector (AMP No. 282080-1)	**8JA 746 184-022**

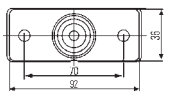
Type approval: ECE

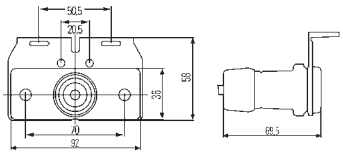
LED side marker light

This product features the following properties:

a)

b)





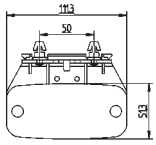
LED side marker light	
for horizontal installation, with 4 amber LEDs, amber lens, amber light, without reflector, ADR / GGVS approved	
a) without bracket 24 V/1.0 W, current consumption = approx. 0.04 A (can be combined with reflector 9EL 154 637-001)	**2PS 008 382-001***
	2PS 008 382-007*
b) Side marker lamp set without bracket, with separate reflex reflector	**2PS 008 382-801***
	2PS 008 382-807*
Side marker lamp set with angled bracket, angled forwards, mounting	**2PS 008 382-811***
	2PS 008 382-817*

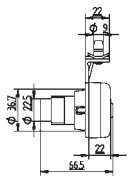
Type approval: E4 3169 and E4 9111

LED side marker light with reflex reflector

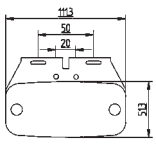
This product features the following properties:

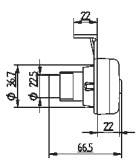
a)





b)





LED side marker light with reflex reflector	
for horizontal mounting, with 2 amber LEDs, amber lens and amber light. 24 V/1.3 W, current consumption = approx. 0.05 A	
a) mounted on a bracket, with clip angle across towards front	**2PS 340 001-001***
b) mounted on a universal bracket, with angle towards rear	**2PS 340 001-011***

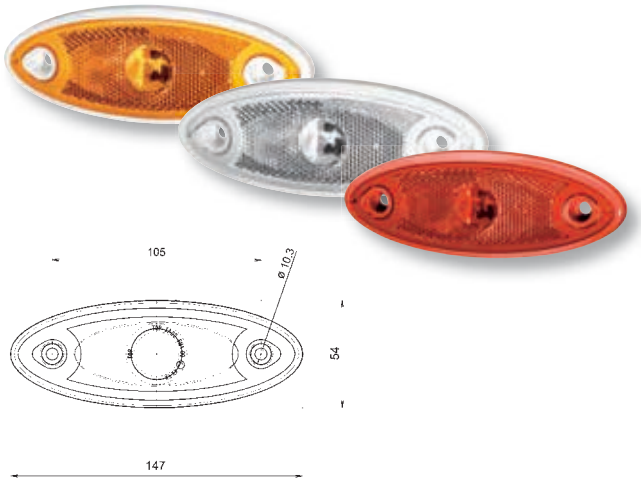
Accessories (please order separately) Suitable cables and connection sets	
2-pin connection set	**9XX 340 220-011***
2-pin connection set fittings (for 10 lights)	**9XX 340 220-801***

Type approval: E17 9605

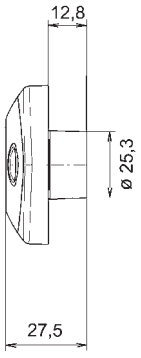
* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

This product features the following properties:

Innovative side marker, position and clearance light

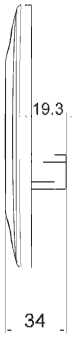


with 6.3 mm contact



with cable

AMP-SUPERSEAL

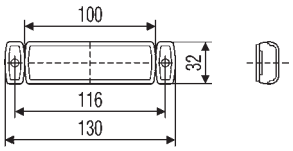


Innovative side marker, position and clearance light	
with 500 mm cable for horizontal mounting	
12 V, white housing	**2PG 344 690-307**
12 V, red housing	**2TM 344 690-357**
with 6.3 mm contacts for horizontal and vertical installation	
12 V, white housing	**2PS 344 690-007**
12 V, grey housing	**2PS 344 690-027**
12 V, black housing	**2PS 344 690-067**
24 V, black housing	**2PS 344 690-037**
with AMP-SUPERSEAL for horizontal and vertical installation	
12 V, white housing	**2PS 344 690-607**
12 V, black housing	**2PS 344 690-617**
24 V, orange housing	**2PS 344 690-687**
24 V, black housing	**2PS 344 690-627**
Accessories	
Rubber seal	**9GD 343 697-007**
Grommet	**9GT 343 367-002**

Type approval: E24 5853 and e17 03 0227

This product features the following properties:

LED side marker light with reflex reflector



Side marker light with reflex reflector	
with 1 amber LED, for vertical installation, amber lens, black housing, ADR approved	
12 V, 1,500 mm cable	**2PS 008 645-981***
24 V, 1,500 mm cable	**2PS 008 645-991***

Type approval: E1 1395

* Please see the note on pages 96 and 97 regarding LED indicators and LED indicator failure check.

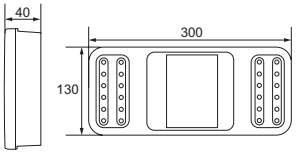
More than a combination of 5 functions

LEDs are not only taking the automotive industry by storm thanks to their energy-saving potential, they also offer a design versatility that plays a decisive role in developing the typical appearance of a car. With respect to the combination rear lights in particular, the many possibilities offered by combining the LEDs with optical systems are being utilized to underscore the specific vehicle design by means of an attractive styling.

Through the HELLA-patented system for monitoring the indicators, HELLA lights can be used together with the HELLA ballast in accordance with ECE-R48. The lights are designed so that currently no error message is displayed in the vehicle's electrical system. Inverse-polarity protection ensures that the light is not damaged due to accidental contact of the pins. To extend the design life, all components in HELLA lights have been matched optimally in terms of temperature in order to avoid overloading the LEDs at high ambient temperatures. The lights are designed for the design life of a vehicle. therefore providing an impressive, economical and environmentally-friendly solution.

This product features the following properties:

Full LED combination rear light



- → Innovative and patented surface LED light guide; combined with a reflex reflector
- → Can be installed vertically and horizontally
- → Long design life, low life cycle costs as well as extremely robust
- → 12 V or 24 V
- → Other frame colors available on request

Tail light, stop light, indicator, rear fog light, reversing light with a square reflex reflector

Full LED combination rear light for horizontal and vertical assembly, with an impact-resistant lens and highly vibration-resistant; can be attached from the front using fixing screws or from the back using fixing bolts, with and without a pulse to monitor indicator failure. The tail light is also available in other frame colors upon request and also with a triangular reflex reflector.

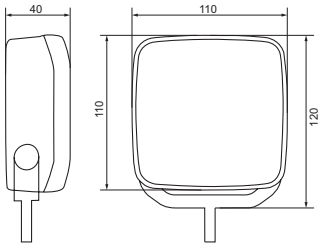
with pulse, front attachment, 500 mm cable	
12 V	**2VP 345 900-401**
24 V	**2VP 345 900-201**
without pulse, front attachment, 500 mm cable	
12 V	**2VP 345 900-411**
24 V	**2VP 345 900-211**
with pulse, rear attachment, 500 mm cable	
12 V	**2VP 345 900-421**
24 V	**2VP 345 900-221**
with pulse, rear attachment, 500 mm cable	
12 V	**2VP 345 900-431**
24 V	**2VP 345 900-231**
with pulse, front attachment, 3,000 mm cable with 6.3 mm female spade connectors	
12 V	**2VP 345 900-441**
24 V	**2VP 345 900-241**
without pulse, front attachment, 3,000 mm cable with 6.3 mm female spade connectors	
12 V	**2VP 345 900-451**
24 V	**2VP 345 900-251**
with pulse, rear attachment, 3,000 mm cable with 6.3 mm female spade connectors	
12 V	**2VP 345 900-461**
24 V	**2VP 345 900-261**
without pulse, rear attachment, 3,000 mm cable with 6.3 mm female spade connectors	
12 V	**2VP 345 900-471**
24 V	**2VP 345 900-271**

Type approval: ECE E24 5879, EMC 10-R 045880

This product features the following properties:

LED reversing spotlight

For illustrative purposes only



- → Approved in accordance with ECE-R23
- → Multivolt (10 – 33 V)
- → Can be mounted upright, suspended or from the rear

1 LED

2,000 mm cable with SUPERSEAL plug	**2ZR 012 456-001**
3,500 mm cable with 6.3 mm female spade connector	**2ZR 012 456-021**

Type approval: ECE / EMC

Available from November 2014

3 LEDs

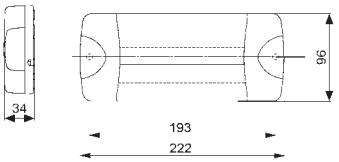
2,000 mm cable with SUPERSEAL plug	**2ZR 012 456-201**
3,500 mm cable with 6.3 mm female spade connector	**2ZR 012 456-221**

Type approval: ECE / EMC

Available from November 2014

* Please see the note on pages 96 and 97 regarding LED indicators and LED indicator failure check.

LED multi-function light – DuraLED Combi



- Rectangular LED light for horizontal mounting
- Multivolt from 8 – 28 V, as well as 12 / 24 V
- Long design life with low current consumption
- Clear lens

This product features the following properties:

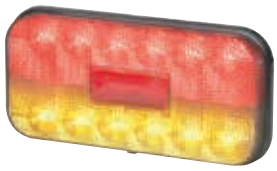
DuraLED Combi	
Multivolt 8 – 28 V, tail light/stop light/indicator which can also be mounted vertically, 2,500 mm cable with stripped ends, 40 LEDs	**2SD 959 050-401**

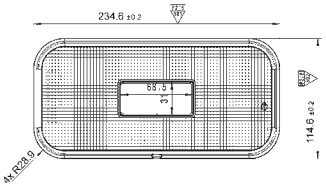
Type approval: ECE E24 10176, e4 03 1586, GGVS / ADR, EMC

DuraLED	
12 / 24 V, tail light/stop light/indicator/reversing light, painted gray, DEUTSCH connector, 30 LEDs	**2SK 980 615-001**
12 / 24 V, tail light/stop light/indicator/reversing light, painted grey, 2,500 mm cable, 30 LEDs	**2SK 980 603-503**

Type approval: ECE E24 5870, ECE E24 10 R – 04 0958, GGVS / ADR, EMC

LED combination rear light





- 12 or 24 V
- ECE / SAE versions
- Can be installed horizontally
- Maintenance-free, fully sealed LED light
- Highly impact-resistant lens

This product features the following properties:

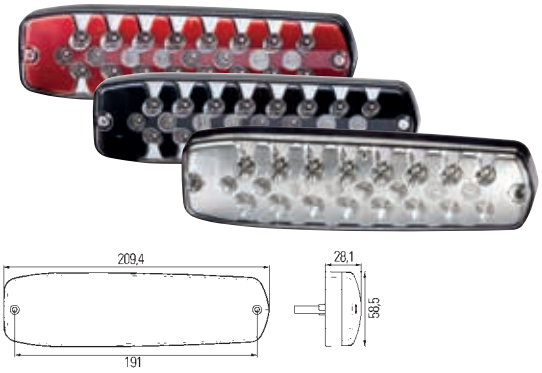
LED COMBINATION REAR LIGHT	
Tail light/stop light/indicator with reflex reflector with integrated 4-pin DEUTSCH connector DT 04-4P, can be screwed on through the lens from the front with 2 x M6 screws at 45 mm hole spacing.	
12 V, with indicator failure check	**2VA 011 900-001**
12 V, without indicator failure check	**2VA 011 900-011**
24 V, with indicator failure check	**2VA 011 900-021**
24 V, without indicator failure check	**2VA 011 900-031**
12 V, without indicator failure check (SAE)	**2VA 011 900-041**

Type approval: ECE E24 5874 / SAE for vehicles > 2,031 mm
EMC E1 036317

* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

This product features the following properties:

LeanLED combination rear light

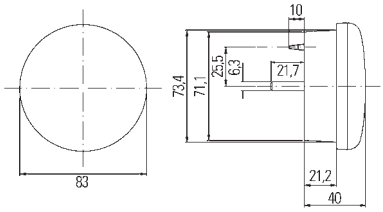


- → Low-profile and compact tail light/stop light/indicator in LED form
- → Multivolt from 9 to 32 Volt
- → Long service life
- → Other frame colors available on request

LeanLED COMBINATION REAR LIGHT	
Tail light/stop light/indicator for horizontal and vertical mounting, with 24 LEDs, clear lens, with pulse for indicator failure check, Multivolt 9 – 32 V, part-metallized, other frame colors available upon request.	
silver, with 500 mm cable and exposed ends	**2SD 343 910-001***
silver, with integrated 4-pin AMP plug	**2SD 343 910-027***
silver, with 100 mm cable and 4-pin DEUTSCH connector	**2SD 343 910-057***
Type approval: ECE E4 12393	
Without type approval and without pulse for indicator failure check	
with 500 mm cable and exposed ends	**2SD 343 910-037**

This product features the following properties:

LED multi-function light

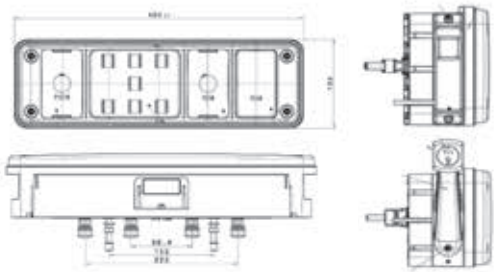


LED MULTI-FUNCTION LIGHT	
for installation, with 2,500 cable and pulse for indicator failure check, protection class IP 6K6, IP 6K7.	
a) LED tail light/stop light/indicator	
with clear cover lens, 16 LEDs.	**2SD 959 010-401***
Type approval: E9 1538	
b) LED tail light/stop light	
with red lens, 12 LEDs	**2SB 959 010-301***
Type approval: E4 12373	
c) LED reversing light	
with clear lens, 24 LEDs	**2ZR 959 010-501***
Type approval: E4 11391	
d) LED rear fog lamp	
with clear lens, 24 LEDs	**2NE 959 011-501***
Type approval: E4 11391	
e) LED indicator	
with amber lens, 12 LEDs	**2BA 959 011-301***
Type approval: E4 12373 / EMC	

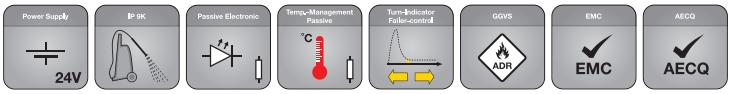
* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

This product features the following properties:

LED hybrid trailer light



→ Note:
The stop light/tail light/side marker and clearance light functions include passive electronics with series resistances. As thing currently stand, no error message is displayed in the vehicle's electrical system.

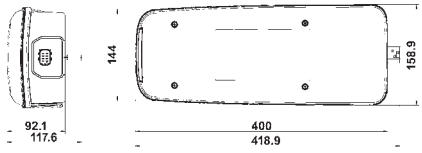


LED HYBRID TRAILER LIGHT	
Modular multi-function combination rear light 24 V for horizontal mounting, clear lens, 7-pin EasyConn plug connection and 4 x 2-pin plug to connect various functions, with pulse to check indicator failure. Tail light/stop light with 7 red LEDs, indicator with 7 amber LEDs, reversing light with 6 white LEDs, rear fog light with 7 red LEDs. Light: IP 5K4K, LED modules: IP 6K9K.	
Full-LED tail lamp/triangular reflex reflector/stop light, indicator, rear fog light, reversing light	
On the left	**2VP 340 960-011***
On the right	**2VP 340 960-021***
Full-LED rear light/triangular light/reflex reflector/stop light, indicator, rear fog light, reversing light, clearance light in the rubber arm	
On the left	**2VP 340 960-111***
On the right	**2VP 340 960-121***

Type approval: E24 5855 and E24 5856

This product features the following properties:

Multifunctional lamp in filament bulbs and LED hybrid technology



→ Economically attractive use of LED technology for permanent lighting functions
→ Homogeneous appearance due to horizontal reflex reflector and clearly structured lighting function
→ Curved outer lens shape for optimum tightness

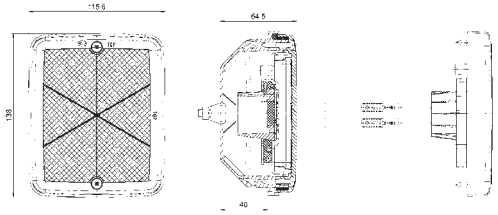
HYBRID MULTIFUNCTIONAL LAMP	
with 152 mm screw spacing, with HDSCS plug side, with LED tail light, reflex reflector (bulb), stop light (bulb), indicator (bulb), reversing light (bulb), rear fog light (bulb) and LED clearance side marker light with reflex reflector	
On the left	**2VD 011 511-231**
On the right	**2VD 011 511-241**

Type approval: ECE GL = E1 3443 / Hybrid = E1 3444

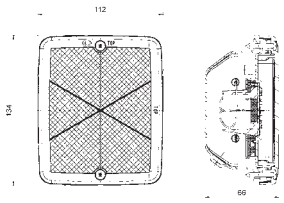
* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

Modular LED light series

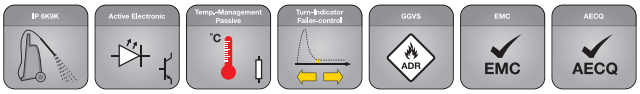
With plastic housing



With rubber housing



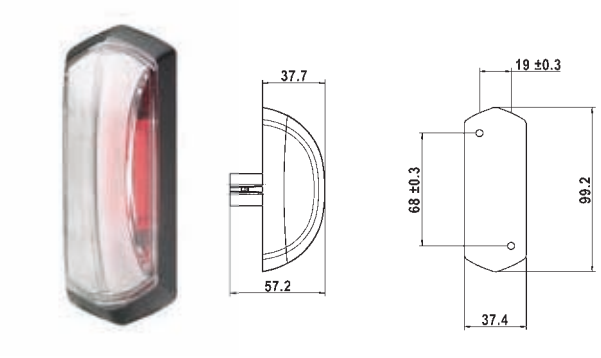
This product features the following properties:



Modular LED light series	
Modular LED light for for horizontal and vertical mounting, with plastic housing, 1:1 replacement with bulb version 003 236, indicator functions with the system patented by HELLA for indicator failure check in accordance with the requirements of ECE-R48, also available in 12 V	
Rear fog lamp, horizontal / vertical	**2NE 013 236-201**
Indicator without pulse for indicator failure check, horizontal / vertical	**2BA 013 236-211**
Indicator with pulse for indicator failure check, horizontal/ vertical	**2BA 013 236-221**
Stop light, horizontal/vertical	**2DA 013 236-231**
Tail light, horizontal/vertical	**2SA 013 236-241**
Reversing light	**2ZR 013 236-251**
Reversing light, only horizontal	**2ZR 013 236-261**
Tail light /stop light, only vertical	**2SB 013 236-271**

Type approval: ECE / EMC

LED clearance light



- → Clear alignment and no visible external attachment
- → Error-free contacting thanks to bipolarity (+ / – can be inverted)
- → Universal attachment frame – same light can be installed left and right.
- → Theft protection thanks to the "fit and forget" system
- → 1:1 replacement of bulb version 2XS 008 497 and 2XS 005 020

This product features the following properties:

LED CLEARANCE LIGHT	
red / clear lens, with direct screw coupling and AMP SS black Black frame for direct screw coupling	
12 V	**2XS 205 020-001**
24 V	**2XS 205 020-011**

Type approval: ECE / CCC

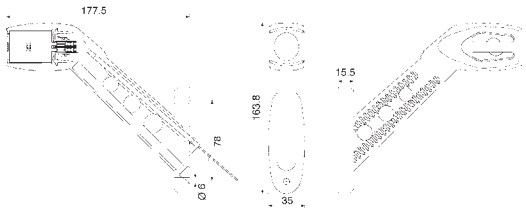
rot / clear lens, with direct screw coupling and 500 mm cable, welded, without male connector housing, black frame for direction connection	
12 V	**2XS 205 020-041**
24 V	**2XS 205 020-051**

Type approval: ECE / CCC

* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

The products feature the following properties:

LED clearance lights



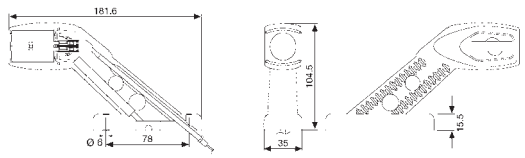
LED CLEARANCE LIGHT

with integrated side marker light in long rubber arm, for side, upright installation on vertical surfaces, clear lens, on side with interior amber cover lens, 2 white LEDs for position light, 1 red LED for clearance light and 2 amber LEDs for side marker light.

with 500 mm cable and 2-pin EasyConn female connector housing	
On the left	**2XS 340 418-031***
On the right	**2XS 340 418-021***

with 3,000 mm cable and female spade connectors	
On the left	**2XS 340 418-091***
On the right	**2XS 340 418-081***

Type approval: ECE E4 10211 and ECE E4 11392

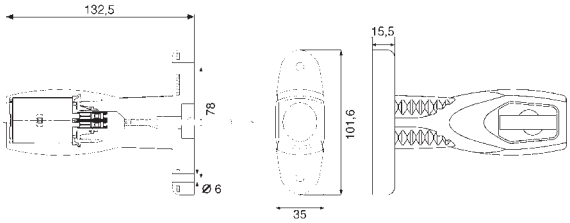


LED CLEARANCE LIGHT

with integrated side marker light in long rubber arm, for side, upright installation on horizontal surfaces, clear lens, on side with interior amber cover lens, 2 white LEDs for position light, 1 red LED for clearance light and 2 amber LEDs for side marker light.

with 500 mm cable and 2-pin EasyConn female connector housing	
On the left	**2XS 340 448-011***
On the right	**2XS 340 448-001***

Type approval: ECE E4 10211 and ECE E4 11392



LED CLEARANCE LIGHT

with integrated side marker light in short rubber arm, can be used on left and right side, for side mounting on vertical surfaces, clear lens, on side with interior amber cover lens, 2 white LEDs for position light, 1 red LED for clearance light and 2 amber LEDs for side marker light.

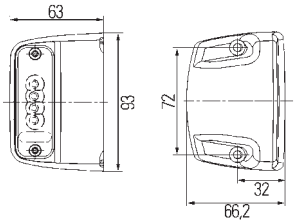
with 500 mm cable and 2-pin EasyConn female connector housing	
left/right	**2XS 340 447-021***

with female spade connector 6.3 mm	
right, with 3,000 mm cable	**2XS 011 768-061**
left, with 2,000 mm cable	**2XS 011 768-071**

Type approval: ECE E4 10211 and ECE E4 11392

* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

LED license plate lights



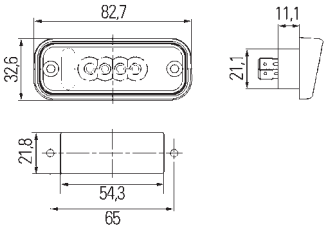
This product features the following properties:

LED LICENSE PLATE LIGHT

for surface-mounting on the right or left next to the license plate, only 1 light needed for illumination. Clear lens, with 4 LEDs, black plastic housing.

License plate 520 x 120 mm	
12 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-321***
12 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-327***
24 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-021***
24 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-027***
24 V, with 500 mm cable and 2-pin EasyConn plug	**2KA 010 278-051***
24 V, with 500 mm cable and Quick Link connector	**2KA 010 278-041***
24 V, with 2,000 mm cable and blade terminal 6.3 x 0.8 mm	**2KA 010 278-031***
License plate 340 x 240 mm or 280 x 200 mm	
12 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-421***
24 V, with blade terminal 6.3 x 0.8 mm	**2KA 010 278-121***

Type approval: ECE E1 2609



This product features the following properties:

LED LICENSE PLATE LIGHT

for installation above the license plate, 2 lights required to illuminate the license plate.

License plate 520 x 120 mm, with blade terminal 6.3 x 0.8 mm	
12 V	**2KA 010 278-311***
24 V	**2KA 010 278-011***
License plate 520 x 120 mm, Light contacts firmly bonded, with 1,000 mm cable with exposed cable ends	
12 V	**2KA 010 278-617***
24 V	**2KA 010 278-607***
License plate 340 x 240 mm or 280 x 200 mm, with blade terminal 6.3 x 0.8 mm 1 light required for illuminating the license plate	
12 V	**2KA 010 278-411***
24 V	**2KA 010 278-111***

Type approval: ECE E1 2609

* Please see the note on pages 96 and 97 regarding LED indicators and the LED indicator failure check.

The right solution for your vehicle electronics

VEHICLE

Start

Is a flasher relay installed in the vehicle? **Yes**

No → Turn on the vehicle ignition and remove the bulb of a direction indicator without pressing the signal switch.

Any failure of the flasher unit is displayed. **Yes**

No → Press the signal switch

Any failure of the flasher unit is displayed. **Yes**

No → Vehicle not ECE-compliant

UNIVERSAL TRAILER SOLUTION
independent of vehicle

ISO 13207-1 TRAILER SOLUTION

Solution 1:
LED flasher unit

	12 V	24 V
Operating voltage	10 – 15 V	18 – 32 V
Functional voltage	11 – 14 V	20 – 28 V
Operating temperature	– 40 °C to + 85 °C	– 40 °C to + 85 °C
Protection category	P 53 (contacts below)	P 53 (contacts below)
LED flasher unit 3 + 1		
3 Indicators on the vehicle / tractor vehicle 1 Indicator on optional trailer	**4DW 009 492-111**	**4DW 009 492-011**
LED flasher unit 2 + 1 | 2 + 1 + 1+1		
2 indicators on the vehicle / tractor vehicle 1 flasher light on max. two optional trailers	**4DM 009 492-101 (2 + 1 +1)**	**4DM 009 492-001 (2 + 1)**

Solution 2:
Simulation device for cold checking

	12 V	24 V
Operating voltage	9 – 16 V	18 – 32 V
Rated current	1.5 A	1.5 A
Operating temperature	– 40 °C to + 85 °C	– 40 °C to + 85 °C
Protection category	IP 54 (contacts underneath)	IP 54 (contacts underneath)
Simulation device		
for cold checking	**5DS 009 602-101**	**5DS 009 602-001**

Solution 1:
Replace the existing indicator unit with an
LED indicator unit from HELLA with an ISO pin basis

One flasher unit per vehicle required. Any possible combination of bulbs and HELLA LED direction indicators is permitted: from a full package with bulbs through mixed versions to a full package with LED lights. Bulbs or HELLA LED direction indicators are also permitted on trailers.

Solution 2:
Through simulation unit for cold check

One simulation device is required per LED light.

Solution 3:
By LED indicator control unit

Two LED indicators can be monitored per vehicle using one simulation device.

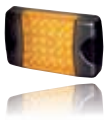
(Only one simulation device per vehicle can be used.)

Solution 3:
By LED indicator control unit

Solution 4:
By monitoring in compliance with ISO 13207-1 in the vehicle manufacturer's vehicle electric system.

Failure pulse in accordance with ISO 13207-1

2BA 959 070-631



2BA 959 050-401

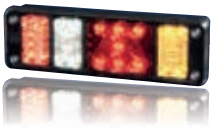
2BA 959 822-601

2BA 344.200-...

2BA 343 390-...

2SD 343 910-...

2VP 340 961-...



Solution 3:
Indicator control unit
Universal trailer solution, independent from the truck

Solution 4:
Light control unit with integrated check of the failure pulse in accordance with ISO 13207-1

	24 V
Operating voltage	18 – 32 V
Reverse-polarity protection voltage	- 28 V
On-board voltage input Flasher unit left / right	24 V
Operating temperature	-40 to +50 °C
Extended operating temperature*	– 40 °C to 80 °C
Storage temperature	– 40 °C to 90 °C
With female blade connectors	**5DS 009 552-011**
For EasyConn connectors	**5DS 009 552-001**

* Above 50°C, simulation of the bulb is deactivated for thermal reasons.

In future, vehicle manufacturers' light control units will be able to check the failure pulse in a standardized and unified manner in accordance with ISO 13207-1.

Therefore interim solutions 1 - 3 will not be necessary as communication will take place directly with the indicators. HELLA recommends this solution.

As trailers do not currently have their own vehicle electric system, this solution must be integrated in the tractor vehicle.

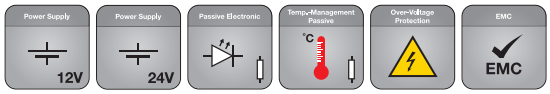
HELLA offers a comprehensive range of interior lighting for various vehicle applications and vehicle types.

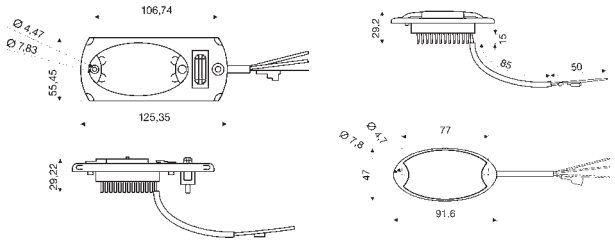
Among other things, the range cover ambient lighting in the shape of light hues and LED modules, continuous lighting systems/modules for ceiling systems, service sets (operating units) and stair lighting.

If you have any questions, please contact our field staff or our Customer Service Centre.

Mini Oval LED

This product features the following properties:





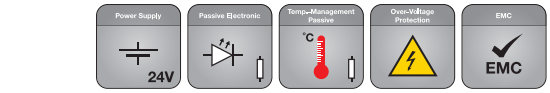
MINI OVAL LED	
Number of LEDs	4 white LEDs, 1 ambient LED
Illumination angle	50°
Illuminance at 1 m	Standard = 14.5 lux, Power = 54 lux
IP Class (Protection)	6K9K (without frame/switch), 40 (with frame/switch)
Power consumption	Standard = 1.7 Watt (0.14 A at 12 V) Power = 3.6 Watt (0.30 A at 12 V)
Voltage	12 V or 24 V

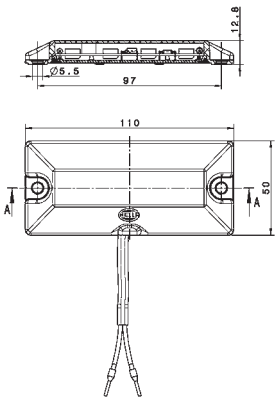
LED equipment	without frame and switch	with frame and switch
4 white power LEDs, 12 V, blue	**2JA 343 570-117**	**2JA 343 570-157**
4 white power LEDs, 24 V, blue	–	**2JA 343 570-141**

Other versions are available on request

LED light

This product features the following properties:

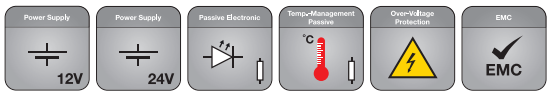


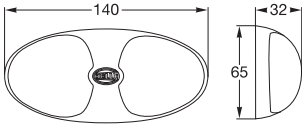


LED light	
Number of LEDs	4 white LEDs
LED angle of radiation	40°
Illuminance at 2.5 m	8 lux (average value/ measuring points: floor)
IP Class (Protection)	6K9K
Power consumption	1.5 W (0.06 A at 24 V)
Voltage	24 V
	2JA 010 838-017

DuraLED oval

This product features the following properties:

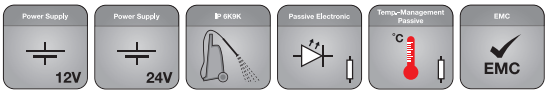


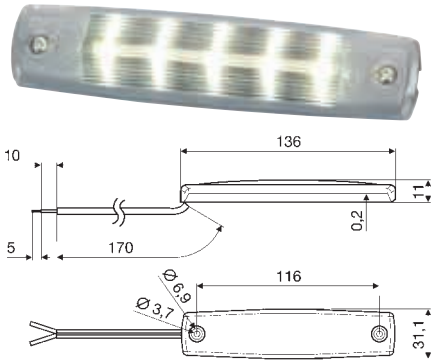


DuraLED OVAL	
Number of LEDs	4 white LEDs
LED angle of radiation	120°
Illuminance at 1 m	60 lux
IP Class (Protection)	6K6 6K7
Power consumption	3 W (0.25 A at 12 V)
Voltage	Dualvolt 12 and 24 V
	2JA 959 700-102

Flat LED surface-mounted light

This product features the following properties:

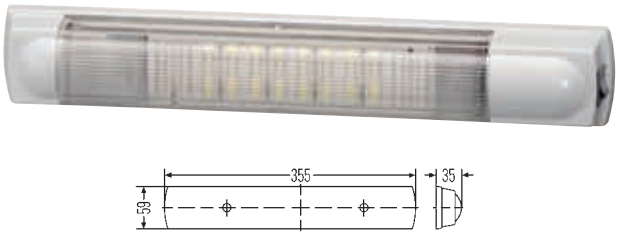




MINI THINLED	
Number of LEDs	5 white or 3 blue LEDs
Electrical connection	electrical connection through a cable 170 mm long
Illumination angle	34°
Illuminance at 1 m	7,2 lux
IP Class (Protection)	6K9K
Power consumption	2.8 W (0.23 A at 12 V) 2.8 W (0.11 A at 24 V)
Voltage	12 V or 24 V
12 V	**2JA 343 660-101**
24 V	**2JA 343 660-117**

LED surface-mounted lamp

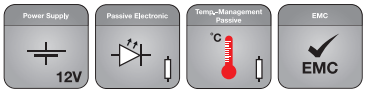
This product features the following properties:



LED SURFACE-MOUNTED LAMP		
Number of LEDs	12	24
Illuminance at 1 m	approx. 100 lux	approx. 200 lux
Light color	4,000 K (Neutral white)	4,000 K (Neutral white)
Nominal output	3.5 W	7 W
Voltage	Multivolt 10 – 30 V	Multivolt 10 – 30 V
Current consumption	ca. 0.30 A at 12 V ca. 0.15 A at 24 V	ca. 0.58 A at 12 V ca. 0.29 A at 24 V
	2JA 007 373-151	**2JA 007 373-161**

Ambient LED-Spot

This product features the following properties:



AMBIENT LED-SPOT	
Number of LEDs	1 LED
Illuminance at 1 m	5 lux
IP Class (Protection)	20
Power consumption	0.3 W (0.02 A at 12 V)
Lens	Clear
Scope of supply	3 frames (white, gray and black)
Installation	Surface-mounting via attachment element
LED red	**2JA 344 170-001**
LED blue	**2JA 344 170-011**
LED white	**2JA 344 170-021**
LED, amber	**2JA 344 170-031**

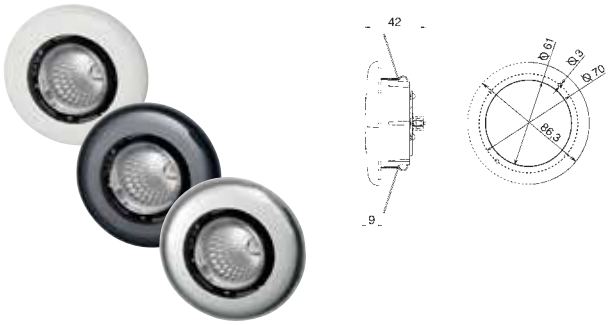
This product features the following properties:

Standard LED spotlights, fixed

LED SPOTS STANDARD	
Number of LEDs	1 LED
Illumination angle	40°
Illuminance at 1 m	65 lux
IP Class (Protection)	3 x
Power consumption	2 W (0.16 A at 12 V)
Lens	Clear
Installation	choice between screw or spring-assisted mounting

installation, fixed, wide illumination	
Panel color*:	
white	**2JA 344 040-701**
black	**2JA 344 040-711**
silver	**2JA 344 040-721**

Standard LED spotlights, adjustable



installation, adjustable, wide illumination	
Panel color*:	
white	**2JA 343 790-301**
black	**2JA 343 790-311**
silver	**2JA 343 790-341**

* further panel colors (e.g. real-wood look) or ambient CELIS® light guide ring (e.g. blue, red) on request

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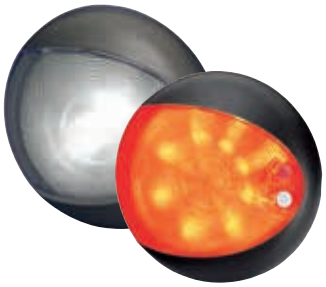
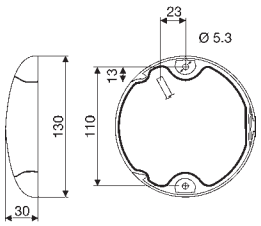
This product features the following properties:

EuroLED TOUCH





EuroLED TOUCH	
Number of LEDs	1 white and 8 red
Electrical connection	electrical, using a 2,500 mm long cable
Function	with sensitive switch, for ON/OFF and dimming as well as switching between red and white light
Lens	white
Power consumption	white 4 W (0.33 A at 12 V) red <2.5 W (0.20 A at 12 V)
Installation	Surface-mounting, permanently bonded with base plate
black panel trim	**2JA 959 950-031**

Electronic components – benefit from our unique experience and innovative power.

HELLA is one of the first ports of call for the international supplier industry not just in lighting technology but also in electronic components.

One thing all our products have in common is that their quality and performance are carefully optimized to match our customers' special requirements.

For more information visit www.hella.de/sensors-actuators

PRODUCT RANGES, SPECIAL OE ELECTRONICS

Energy Management

Careful use of energy by appropriately influencing the consumer:

These electronic systems make it possible to monitor and plan the energy budget and maintain the power supply.

Intelligent battery sensor

Voltage stabilizer

Drive train

Increasing safety and efficiency of the overall system and preventing failures:

These electronic systems make it possible to precisely measure and record measured value in the engine compartment and drive train.

Oil level switch

Oil pressure sensor

Oil level sensor

Accelerator pedal sensors

Accelerator pedal sensors

Components

Provide added convenience with compact solutions in a variety of areas:

These electronic systems are generally invisible little helpers for the various automatic processes within the vehicle.

Angle position sensor

Air quality sensor

Remote control

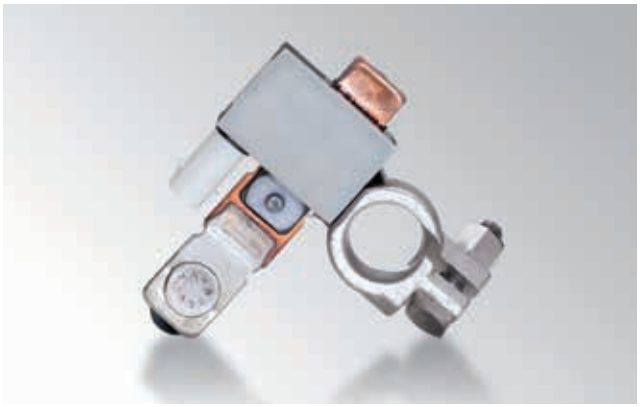
Rain / Light sensor

Actuator

Micro actuator

ENERGY MANAGEMENT

Intelligent battery sensors 12 V / 24 V



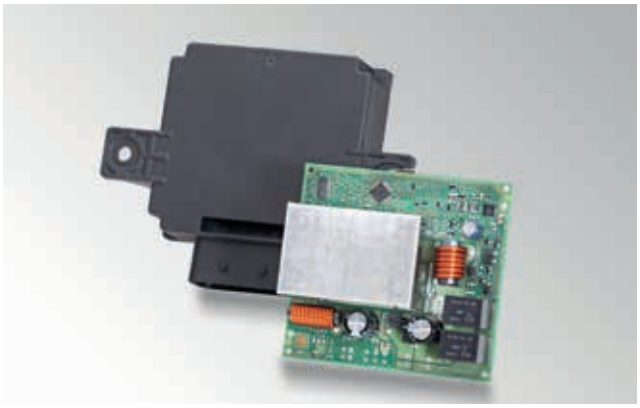
Product description

- → Precise shunt-based measurement of battery current, voltage and temperature
- → Battery monitoring of State of Charge (SoC), State of Health (SoH) and State of Function (SoF)

Advantages:

- → The starting ability of the engine can be guaranteed at all times
- → Highest precision for current, voltage and temperature measurement
- → Advanced battery algorithm for SoC, SoH and SoF
- → Provides cost effective integration
- → Worldwide production footprint

Voltage Stabilizer



Product description

- → Stability of the vehicle voltage at 12 V while starting
- → Full functional capability of infotainment system and other functions relevant for the driver when starting the engine

Advantages:

- → More than a decade of DC / DC development expertise
- → Global market leader for voltage stabilizers in motor vehicles (> 1.5 million units per year)
- → First to market with voltage stabilizers in 2007
- → Global development and production footprint

DRIVE TRAIN

Oil Sensors

Product description

- Oil level switch for automatic warning when oil level reaches minimum
- Packaged Ultrasonic Level Sensor (PULS) for continuous measurement of oil level and temperature
- Oil pressure measurement with integrated temperature measurement function (OPS+T)

Advantages:

- Ultrasonic level measurement replaces oil dipstick
- Measurement of oil level in static and dynamic range
- Oil pressure sensor allows oil pump to be controlled as required
- Many years of serial production experience since 1996
- Worldwide system development and application support

Pedal sensors

Product description

- Pedal sensors transmit the driver's intent to the engine electronics
- Available with potentiometer or non-contact inductive technology
- Floor-mounted and suspended versions
- Customer-specific design, adaptable touch

Advantages:

- Technological and market leader for pedal sensors worldwide
- Extensive application know-how guarantees fulfillment of our customers' individual needs
- High reliability and accuracy
- Many years of experience (since 1996) ensures a high level of quality in all production and development locations worldwide

COMPONENTS

Angle of rotation sensors

Product description

- → Single or redundant sensors
- → Standard and customer specific characteristic curves
- → Analog and digital output (PWM) available

Advantages:

- → High precision due to internal 14 bit resolution
- → High thermal stability and linearity
- → Highly insensitive to magnetic fields
- → Redundant output signals according to functional safety
- → Zero position can be individually programmed
- → Various connection elements available

Air quality sensor

Product description

- → Detects NO_2 and CO which are indicators for exhaust gas outside the vehicle
- → Data transmitted to air conditioning system
  - Control of the circulation function of the air conditioning system
  - Prevents loss of air quality inside the vehicle

Advantages:

- → Using metal oxide gas sensing technology
- → PWM output signal for flexible application
- → Output of 5 different levels of contamination
- → Intelligent software distinguishes between ambient conditions (e. g. city, countryside, motorway)
- → Increased driving comfort by air quality inside the vehicle constantly being optimized

COMPONENTS

Remote control

Product description

- → Allows remote control of vehicle central locking system
- → Activation of interior / exterior light
- → Activation / Deactivation of immobilizer possible as an option

Advantages:

- → Reliable and robust design
- → All functions in one microcontroller
- → Compact form factor (key integration)
- → Battery driven (3 V), long service time
- → Modular approach with customizable key fob housing

Rain light sensors

Product description

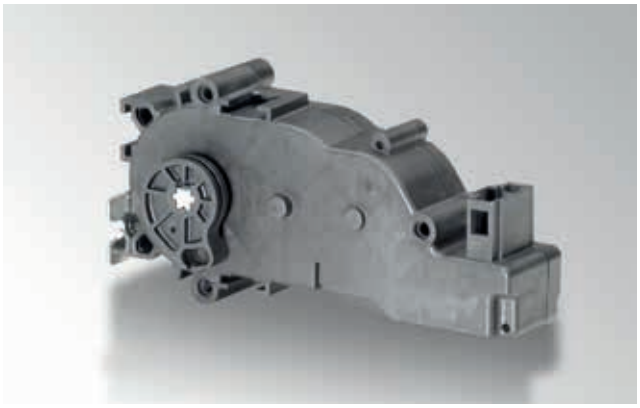
- → Detection of up to five environmental conditions:
  - Rain (control of wiper system)
  - Ambient light (control of headlamps and tail lamps)
  - Front light (tunnel function)
  - Sun load (information for air conditioning system control unit)
  - Humidity (information for air conditioning system control unit)

Advantages:

- → Modular concept allows flexible integration and compact design
- → Reduced housing size and less weight
- → Cost savings by integrating all functions into one part
- → Simple to install without additional installation tools
- → Air conditioning system know-how from HELLA
- → Leading market position since 1999

COMPONENTS

Actuators



Product description

→ Applications for body actuators (rotary and linear actuators) are among other things locking or unlocking and control of:
- Central locking
- Boot lock
- Window lock
- Radiator grill flap control
- Toolbox lock

Advantages:

→ Compact design and standard interfaces
→ Wide range of customized and system-specific tool solutions
→ Many years of experience – R&D and production since 1996
→ Global development and production locations

Micro Actuator

Product description

→ Locking or unlocking of fuel filler cap in 3 variations:
- by central locking depending on the state of the central locking system
- by remote control initiated from the vehicle interior
- by soft touch on the fuel filler cap

Advantages:

→ Very small dimensions
→ Electromotor-controlled return or automatic spring return (without current)
→ Easy snap-fit installation
→ Independently of car-body tolerances, custom-fit integration in the fuel filler neck
→ Water protection
→ Commonly used electrical standard connector

THE NEW HELLA SWITCH CONFIGURATOR

HELLA module switch configuration tool

Configure your switches yourself! First, choose between the new waterproof 3100 series (interior and exterior applications) or the 4100 series (interior applications).

You can select any switch functions as well as the operating voltage, combinations of symbols and the corresponding accessories with only a few clicks. They can easily be transferred to a favorites list, printed out or sent as an online request.

Your request will be processed individually with the desired symbol configuration and customer-specific article number on a project-specific basis.

www.hella.com/switch

3100 SWITCH SERIES

The new waterproof series of rocker switches for electrical systems. It meets the requirements of protection class IP 68. The lasered symbols are lit by integrated LEDs.

Variety of lasered symbol discs

- → IP 68 according to test standard IEC EN 60529
- → Extremely reliable in extreme conditions
- → Ideal for use in agricultural and construction machinery
- → Most diverse switch functions in 12/24 V
  - NO contact/changeover contact
  - Momentary-contact switch / Maintained-contact switch
  - Locking functions
  - Hazard warning light switch
- → Wide range of standard and customer-specific laser symbols
- → Up to two LED light sources enable direct symbol illumination
- → Simple to install, directly in the mounting hole or using a modular mounting frame
- → Display lights in the same design for safety-related feedback

The HELLA switch configurator
Configure your custom switch at www.hella.com/switch.

Select switching functions, symbol combinations and accessories with just a few clicks.

TECHNICAL SPECIFICATIONS	
Mounting opening	21.1 mm x 37.0 mm
Material rocker	PC transparent, painted
Base plate material	PBT
Connecting contacts	6.3 mm x 0.8 mm
Coating of switch contacts	CuZn silver-plated
Light source	max. 2 LEDs 1 x orientation lighting, green 1 x function light, red Warning lights available in amber and green
Symbol type	lasered
Service life	6 A / 24 V at 150,000 switching cycles
Leak tightness	IP 66 terminal side, IP 68
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +85 °C
Dashboard thickness	for directly installed switches, 2 mm

ACCESSORIES	
Installation frame	
Modular	
End piece left, right	**9AR 169 209-102/-107**
Center piece	**9AR 169 208-102/-107**
Dummy panel	**9HB 172 229-102/-107**
Receptacle housing	
Type I	**8JD 010 076-102/-107**
Type II	**8JD 010 076-112/-117**
Type III	**8JD 010 076-122/-127**
Female spade connector, 6.3 mm	
0.5 mm^2 – 1 mm^2	**8KW 744 882-003**
1.5 mm^2 – 2.5 mm^2	**8KW 744 820-003**
Dismantling tool	**8PE 197 631-001**

4100 SWITCH SERIES

The modular switch series with self-cleaning microswitches is suitable for modern electrical and electronic systems. This ensures reliable switching of small currents as well without contaminating the contacts. The series features a timeless design, with lasered symbols lit by integrated LEDs.

The strength of the product range:

- → Modular design of the switch
- → Realization of a wide variety of 12 V and 24 V switching functions:
  - Contact/changeover contact
  - Momentary-contact switch / maintained-contact switch
  - Locking function
  - Hazard warning light switch
- → Wide range of standard and customer-specific symbols
- → Selective, reliable and durable illumination of the symbols by using up to 4 LED light sources
- → Simple to install, directly in the mounting hole or using a modular mounting frame
- → Display lights in the same design for safety-related feedback
- → Modern and timeless design
- → Pleasant to the touch

The HELLA switch configurator
You can configure your own switches individually at www.hella.com/switch.

Select switching functions, symbol combinations and accessories with just a few clicks.

TECHNICAL SPECIFICATIONS	
Mounting opening	19.8 mm x 41.8 mm
Material rocker	PC transparent, painted
Base plate material	PA white, housing PA black
Connecting contacts	3 mm Junior Power Timer
Coating of switch contacts	AgNi
Light source	max. 4 LEDs 2 x orientation lighting, green 2 x function lighting, red Warning lights also available in blue and amber
Symbol type	lasered
Service life	5 mA / 450,000 cycles 5 A / 24 V inductive / 270,000 cycles 4 A / 24 V lamp (75 W) / 90,000 cycles 10 A / 24 V resistive/80,000 cycles
Leak tightness	IP 54
Operating temperature	-40 °C to +85 °C
Storage temperature	-40 °C to +100 °C
Dashboard thickness	For directly installed switches, 2 mm

ACCESSORIES	
Installation frame	
1 times	**9AR 168 396-002/-007**
Modular	
End piece, left	**9AR 169 209-002/-007**
End piece, right	**9AR 169 210-002/-007**
Center piece	**9AR 169 208-002/-007**
Dummy panel	**9HB 172 229-002/-007**
Cable sachet housing, 10-pin	**8JD 010 076-002/-007**
Female spade connector, 2.8 mm	
Junior Power Timer 0.5 mm^2 – 1 mm^2	**8KW 863 934-003**
Junior Power Timer 1.5 mm^2 – 2.5 mm^2	**8KW 863 934-023/-024**

Wide electrics range that has grown over the years

As a worldwide partner to the automotive industry, HELLA offers system know-how, experience with large volume production and also process know-how for fast implementation of innovative concepts in efficient and reliable serial products.

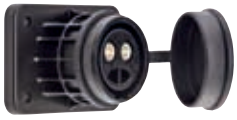
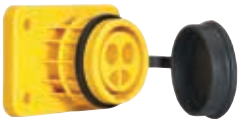
This is why the HELLA electrics range is particularly broad: from A as in "Acoustic signal unit" to W as in "Washer pumps". By continuously expanding and optimizing, we offer a wide range of electrical plug connectors.

At HELLA you will find everything that connects: short or super-short, made of plastic or metal. HELLA makes something special even out of standard parts, simple to install or retrofit, in certified quality, in all variations, and suited to almost every special case.

PLUG CONNECTORS

2-pin socket according to VG 96 917
The 2-pin sockets according to VG 96 917 are designed to withstand large currents and to ensure high levels of security while being simple to use. The system is used to charge the battery and assist starting. During this process, high to extremely high currents are transmitted. The 2-pin 24 V system can be used for brief currents of up to a maximum of 2,500 A (brief load up to 10 s).

Range advantages
- → Permissible operating temperature: -40°C to +85°C
- → Protection class: IP X4
- → Contacts: CuZn, silver-plated

PRODUCT PHOTO	DESCRIPTION	PART NUMBER	PU IN UNITS
	**Socket, aluminum** 2-pin with green screw-on cap (VG 96 917-3 Form A). Seal in the screw-on cap, additional sealing ring between thread and screw-type cover.		
	2 crimped/solder socket contacts for cables up to 50 mm²	**8JB 001 935-031**	1
	2 crimped/solder socket contacts for cables up to 35 mm²	**8JB 001 935-051**	1
	**Socket, metal** yellow, 2-pole with black rubber cap (insertion compatible with VT 96 917) 2 crimped/solder socket contacts for cables up to 50 mm²	**8JB 010 806-001**	1
	**Socket, plastic** 2-pin with rubber cap (insertion compatible with VT 96 917) 2 crimped/solder socket contacts for cables up to 35 mm²		
	Black	**8JB 001 935-041**	1
	Amber	**8JB 001 935-061**	1
	**Accessory grommet** for 2-pin sockets: 8JB 001 935-031 8JB 001 935-041 8JB 001 935-051 8JB 001 935-061	**9GD 735 641-062**	1

PLUG CONNECTORS

2-pole plug system in accordance with DIN 14 690

This plug system is mainly used for charging batteries.

- → Permissible operating temperature: -40°C to +100°C
- → Rated capacity: 6 – 42 V
- → Current intensity: max. 16 A

Range advantages:

- → Complete range comprising connector, socket and coupling box
- → Socket and coupling box with captive cap

PRODUCT PHOTO	DESCRIPTION	PART NUMBER	PU IN UNITS
	**socket, light alloy** with captive screw-on cap Form A with seal in the screw-on cap, with rubber base for cables Ø 6...8 mm	**8JB 002 281-001**	1
	**coupling box, light alloy** with screw-on cap Form B Seal in the screw-on cap with cable protection sleeve for cables Ø 6 – 10 mm	**8JB 002 281-011**	1
	**Connector, light alloy** with union nut, Form C for cables Ø 6 – 10 mm	**8JA 001 925-001**	1

13-pin plug system in accordance with ISO 11446

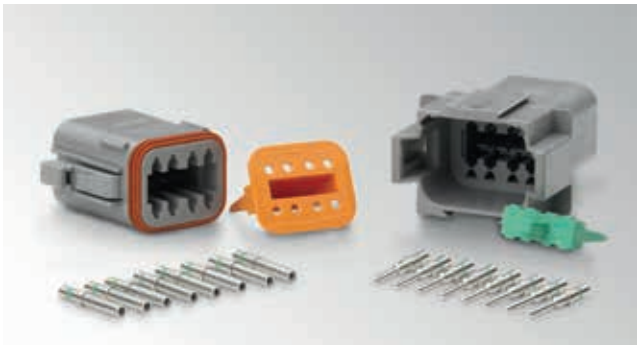
The 13-pin socket systems according to ISO 11446 allow all the lighting and auxiliary functions to be transferred using only one plug. The system is continually replacing the older generation of plug-type connectors on account of its advantages, particularly with regard to waterproofness, stability, contact reliability and easy handling thanks to the bayonet closure.

- → Permissible operating temperature: -40°C to +85°C
- → Tightness in accordance with protection class IP 54K
- → Sockets with rear fog light switch-off available

PRODUCT PHOTO	DESCRIPTION	PART NUMBER	PU IN UNITS
	**Socket** 13 Screw connections with rubber base	**8JB 005 949-001**	1
	Socket 13 Screw connections with rubber base, with switch-off contact for the rear fog light on the motor vehicle	**8JB 005 949-011**	1
	Socket 13 Screw connections with rubber base, with microswitch, changeover contact left	**8JB 005 949-041**	1

DEUTSCH "DT SERIES" PLUG CONNECTORS

The concept combines high quality materials with a connecting system characterized by both reliability and easy handling. Thanks to these properties, the product range is particularly suited to applications where maximum performance is required with a minimum number of disruptions, despite tough environmental conditions.
The symmetrical star crimp process allows a gas-tight connection which is characterized by high resistance to temperature and oxidation-based fluctuations in resistance. The housing locking mechanism with integrated click-in function guarantees a quick and secure connection with a strong grip. The "wedgelocks" used for secondary locking facilitate precise, strain-resistant alignment of the contacts and are "clicked" into position on the contact side of the DT housing.



Range advantages

- → environmental sealing – maximum protection from external influences
- → high quality housing material
- → Strong, gas-tight crimp connections

DESCRIPTION	PIN	PART NUMBER	PU IN UNITS
DT housing	2-pole	**8JA 201 021-022**	10
DT connector	2-pole	**8JA 201 022-022**	10
DT "wedgelock" for housing	2-pole	**9NB 201 023-022**	10
DT "wedgelock" for plug	2-pole	**9NB 201 024-022**	10
DT housing	3-pin	**8JA 201 021-032**	10
DT connector	3-pin	**8JA 201 022-032**	10
DT "wedgelock" for housing	3-pin	**9NB 201 023-032**	10
DT "wedgelock" for plug	3-pin	**9NB 201 024-032**	10
DT housing	4-pin	**8JA 201 021-042**	10
DT connector	4-pin	**8JA 201 022-042**	10
DT "wedgelock" for housing	4-pin	**9NB 201 023-042**	10
DT "wedgelock" for plug	4-pin	**9NB 201 024-042**	10
DT housing	6-pin	**8JA 201 021-062**	10
DT connector	6-pin	**8JA 201 022-062**	10
DT "wedgelock" for housing	6-pin	**9NB 201 023-062**	10
DT "wedgelock" for plug	6-pin	**9NB 201 024-062**	10
DT housing, coding "A"	8-pin	**8JA 201 021-082**	10
DT plug, coding "A"	8-pin	**8JA 201 022-082**	10
DT "wedgelock" for housing	8-pin	**8JA 201 023-082**	10
DT "wedgelock" for plug	8-pin	**8JA 201 024-082**	10
DT housing, coding "A"	12-pin	**8JA 201 021-122**	10
DT plug, coding "A"	12-pin	**8JA 201 022-122**	10
DT "wedgelock" for housing	12-pin	**8JA 201 023-122**	10
DT "wedgelock" for plug	12-pin	**8JA 201 024-122**	10
Contact sleeve	2 mm²	**9NB 201 025-012**	50
Contact pin	2 mm²	**9NB 201 025-022**	50
Contact sleeve	0.5 – 1.5 mm2	**9NB 201 025-112**	50
Contact pin	0.5 – 1.5 mm2	**9NB 201 025-122**	50
Blind plug	–	**9NB 201 026-012**	50

SUPERSEAL CONNECTORS

Comply with the guidelines in IEC 529 as well as DIN ISO 40050 and have been given protection rating IP class 67, which guarantees maximum protection from water and dust penetration. The quality of the SUPERSEALS makes them ideal wherever other interconnection systems reach their limits due to adverse pressure or humidity conditions.

Range advantages

- → OEM quality
- → Reliable electrical connection
- → Maximum protection from external influences

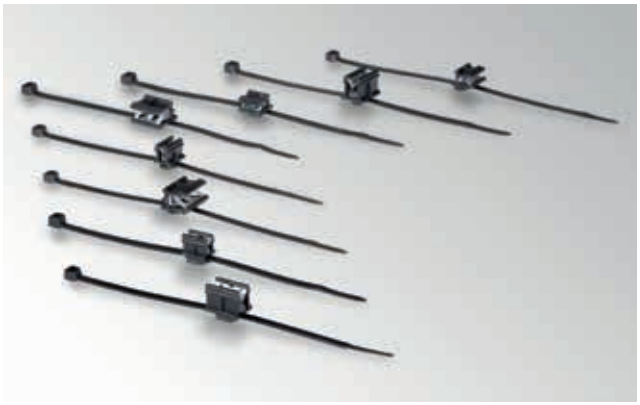
DESCRIPTION	PIN	PART NUMBER	PU IN UNITS
SUPERSEAL pin housing	1-pin	**8JA 746 183-012**	10
SUPERSEAL socket housing	1-pin	**8JA 746 184-012**	10
SUPERSEAL pin housing	2-pole	**8JA 746 183-022**	10
SUPERSEAL socket housing	2-pole	**8JA 746 184-022**	10
SUPERSEAL pin housing	3-pin	**8JA 746 183-032**	10
SUPERSEAL socket housing	3-pin	**8JA 746 184-032**	10
SUPERSEAL pin housing	4-pin	**8JA 746 183-042**	10
SUPERSEAL socket housing	4-pin	**8JA 746 184-042**	10
SUPERSEAL pin housing	5-pin	**8JA 746 183-052**	10
SUPERSEAL socket housing	5-pin	**8JA 746 184-052**	10
SUPERSEAL pin housing	6-pin	**8JA 746 183-062**	10
SUPERSEAL socket housing	6-pin	**8JA 746 184-062**	10
Male pin contact, B 143	1.0 – 1.5 mm^2	**8KW 744 836-002**	50
Female contact, B 144	1.0 – 1.5 mm^2	**8KW 744 837-002**	50
Strand insulation, B 145	Ø 1.8–2.4 mm	**9GD 746 185-002**	50
Strand insulation, B 146	Ø 2.6 – 3.3 mm	**9GD 746 186-002**	50
Blind plug, B 147	–	**9GD 746 187-002**	50

CABLE STRAPS WITH EDGE CLIPS

To cleanly attach a cable bundle, then this often required more than the cable strap itself. Our cable straps with integrated edge clips offer a quick and easy to use complete solution with strong holding power. They are weatherproof, flame retardant and resistant to dilute organic acids, oils, petrol, salt water, solvents and greases. They offer perfect purchase even for bundles with the tiniest cross-section, so there is no need for additional padding.

Range advantages

- → Complete attachment solution in a single product
- → Suitable for numerous different positions and edge thicknesses
- → High-performance specification with original equipment references



DESCRIPTION	PROFILE THICKNESS	CAPACITY	PART NUMBER	PU IN UNITS
Cable strap, black 200 x 4,8 mm	0,7 – 3,0 mm	ø 48 mm	**8HL 185 549-001**	100
Cable strap, black 200 x 4,8 mm	0,7 – 3,0 mm	ø 48 mm	**8HL 185 549-011**	100
Cable strap, black 200 x 4,8 mm	0,7 – 3,0 mm	ø 48 mm	**8HL 185 549-021**	100
Cable strap, black 200 x 4,8 mm	0,7 – 3,0 mm	ø 48 mm	**8HL 185 549-031**	100
Cable strap, black 200 x 4,8 mm	3,0 – 6,0 mm	ø 48 mm	**8HL 185 549-041**	100
Cable strap, black 200 x 4,8 mm	3,0 – 6,0 mm	ø 48 mm	**8HL 185 549-051**	100
Cable strap, black 200 x 4,8 mm	3,0 – 6,0 mm	ø 48 mm	**8HL 185 549-061**	100
Cable strap, black 200 x 4,8 mm	3,0 – 6,0 mm	ø 48 mm	**8HL 185 549-071**	100

Good product ideas are the answer to real problems that occur in practice. Quality, practicability, safety and cost effectiveness are the aims of every new development. These are criteria HELLA's comprehensive range of products already meets today.

You can save costs on a reliable and long-term basis with LED products from HELLA. Fleet managers and drivers expect functional safety at all times - and no buts. In other words, vehicle components with a high quality standard and long design life. HELLA LED lights meet these requirements. They have been developed and produced according to the strictest quality standards.

Using sample calculations drawn from practice, on the following pages we would like to demonstrate the the vast potential for achieving cost savings in your vehicle fleet in respect of material costs, labor costs, and repair hours spent on maintenance work through the systematic and consistent use of LED lighting units from HELLA. For design reasons, the light sources installed are specified with their max. expected design life. Malfunctions of light sources are therefore correspondingly low when you change over to LED lighting and this in turn means that maintenance work can be reduced to a minimum. The use of LED products from HELLA also considerably reduces energy consumption: Consequently, fuel consumption and exhaust emissions drop.

MUNICIPAL FLEET

Enjoy the benefits of HELLA LED technology in your vehicle fleet! Save time and money, and be ahead of the pack in CO_2 reduction. See for yourself:

The sample calculations below show the potential savings that can be achieved for the worklight and beacon product groups over various time periods. You'll be amazed by the savings available even to small fleets!

1. Sample calculation

The sample calculations are based on the following data:

- → Garage labor costs per hour: 40 € / 40 £
- → Repair times worklights and beacons:
  Replacement time worklights / beacons: 30 minutes (0.5 h),
  Changing light source on worklights/beacons: 15 minutes (0.25 h)
- → Average replacement rates worklights/beacons per vehicle (p.a.)

Experience has shown that light sources and products have the following replacement rates on an annual basis:
Light sources: 2 x per year
Worklights: 0.5 x per year,
beacons: 1 x per year
(assuming an average duration of use of 6 hours per day and without mechanical damage)

- → Number of worklights /beacons per vehicle:
  worklights: 3, beacons: 2
- → Average product costs:

	Halogen	LED
Worklights	20 € / 20 £	120 € / 120 £
Beacons	80 € / 80 £	160 € / 160 £
Bulb	3 € / 3 £	–

2. Sample calculation (halogen)

for 1 vehicle with halogen worklights/beacons

Labor costs (per vehicle)	
Replacement costs worklight (1.5 worklights x 0.5h x € 40 / h)	**30 €**
Replacement costs beacons (2 beacons x 0.5h x € 40 / h)	**40 €**
Light source change on worklights (3 worklights x 0.25h x 2 changes per year x € 40 / h)	**60 €**
Light source change on beacons (2 beacons x 0.25h x 2 changes per year x € 40 / h)	**40 €**
Total annual labor costs (per vehicle)	**170 €**

Material costs (per vehicle)	
Worklight costs (€ 30 product costs + € 18 light source costs)	**48 €**
Beacons costs (€ 160 product costs + € 12 light source costs)	**172 €**
Total annual material costs (per vehicle)	**220 €**

Total costs:	
wage costs	**170 €**
material costs	**220 €**
Halogen worklights/beacons (recurring, annual costs per vehicle)	**390 €**

3. Sample calculation (LED)

for 1 vehicle with LED worklights/beacons

Labor costs (per vehicle)	
In the case of LED worklights and beacons, labor costs are incurred only when converting the existing vehicle fleet. You should specify the direct installation of HELLA LED products in new vehicles in order to benefit from the potential savings in full from the outset.	
Replacement costs worklight (3 worklights x 0.5 h x € 40 / h)	**60 €**
Replacement costs beacons (2 beacons x 0.5h x € 40 / h)	**40 €**
Total labor costs (per vehicle)	**100 €**

Procurement costs (per vehicle)	
LED worklights (3 worklights x € 120)	**360 €**
LED beacons (2 beacons x € 160)	**320 €**
One off procurement costs (per vehicle)	**680 €**

Total costs:	
wage costs	**100 €**
procurement costs	**680 €**
LED worklights/beacons (one-off costs per vehicle)	**780 €**

Comparison of total costs for halogen compared to LED over a vehicle service life of 8 years.

	1.	2.	3.	4.	5.	6.	7.	8.	Total
Halogen costs (€) per year	390	390	390	390	390	390	390	390	**3,120**
LED costs (€) per year	780	0	0	0	0	0	0	0	**780**
Maintenance cost savings per vehicle (€) per year	-390	390	390	390	390	390	390	390	**2,340**

The higher acquisition costs for LED products have paid dividends after just 24 months.

4. Fuel savings through the use of LED technology

Savings per vehicle per year Light functions are activated on 200 days a year, 5 hours a day.	Halogen	LED
2 x beacons consumption	**140 Watt**	**40 Watt**
3 x worklights consumption	**210 Watt**	**54 Watt**
Total consumption	**350 Watt**	**94 Watt**
kWh per vehicle per year – savings (350 W - 94 W) x 5 x 200 / 1,000	**256 kWh**	
Possible savings with a diesel engine		
Degree of efficiency of a diesel engine	**45 %**	
Degree of efficiency of generator	**75 %**	
Fuel value diesel 1 liter of diesel generates 3.375 kWh electrical energy	**10 kWh / liter**	
Diesel in liters 256 kWh / 3,375 kWh	**75 liters**	

5. Savings potential for a fleet of 100 vehicles over 8 years

The following table applies the potential savings calculated above to a fleet of 100 vehicles over an 8 year period and shows just how much can be saved by choosing the right lighting from the right manufacturer.
The average vehicle is assumed to be driven for 200 days.

	1.	2.	3.	4.	5.	6.	7.	8.	Total
Costs for halogen (€)	39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	**312,000 (€)**
Costs for LED (€)	78,000	0	0	0	0	0	0	0	**78,000 (€)**
Maintenance cost savings (€)	-39,000	39,000	39,000	39,000	39,000	39,000	39,000	39,000	**234,000 (€)**
Fuel savings (l)	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	**60.000 (l)**
CO_2 savings (kg)	19,500	19,500	19,500	19,500	19,500	19,500	19,500	19,500	**156,000 (kg)**

These non-binding figures are based on average values and general technical assumptions; they are provided purely as information for your support.
We accept no liability for the correctness of this data.

Conclusion:
The results speak for LED by HELLA:
Maintenance cost savings = € 234,000
Fuel savings = 60,000 liters
Reduction of CO_2 emissions by 156 t

These calculations can, of course, be applied to fleets of other sizes. If you are not convinced by these figures, just carry out the test and see for yourself, or contact us directly.

ECE-R10

What is EMC (ECE-R10)?

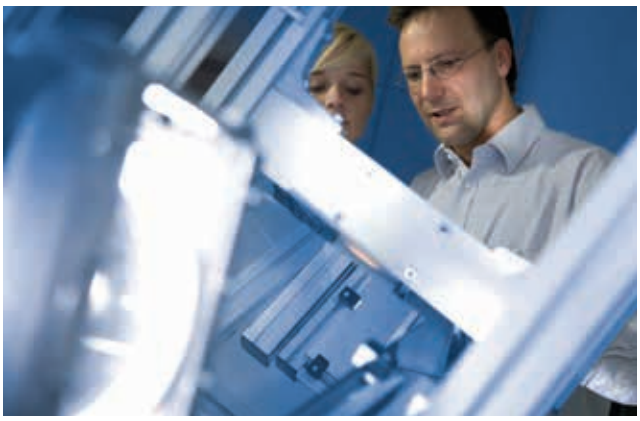
Electromagnetic compatibility (EMC) is a major quality feature for optical signalling systems and describes two factors:

- **Radiated interference:** the limitation of radiated electromagnetic interference to a level that guarantees the interference-free operation of other devices in the environment.
- **Immunity to interference:** guaranteeing sufficiently high resistance to electro-magnetic interference acting from the outside

The legal foundations for this are the CISPR 25 as well as the ISO 7637 and 11452.

1 ECE-R65
2 ECE-R10

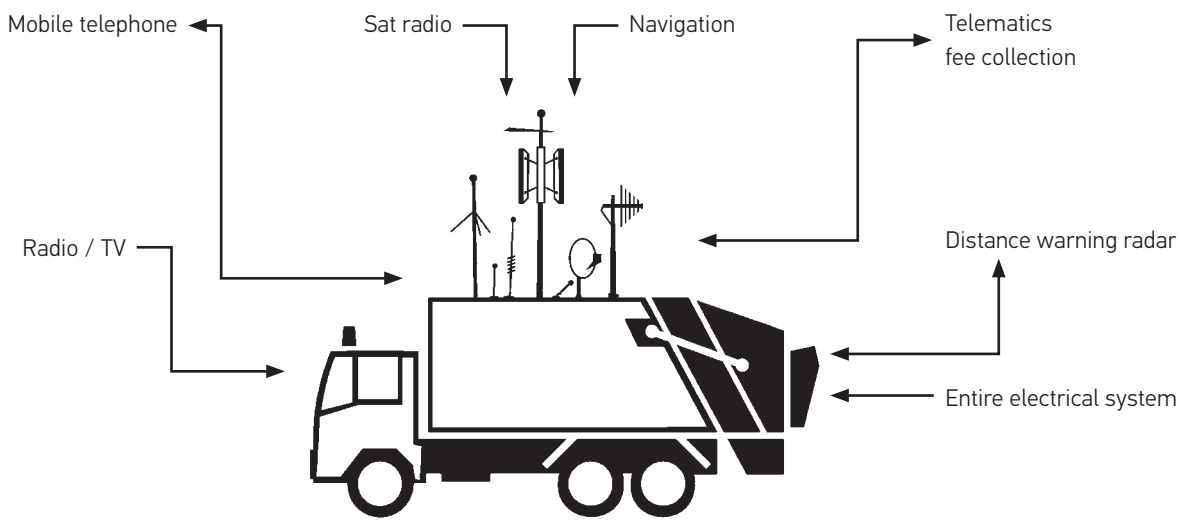
Only beacons, which can have both of these test numbers, possess the authorisation for use on public roads.



Protective categories standard CISPR 25:

CISPR 25 is the standard for emitted interference which applies a classification of 1 - 5. In doing so, category 5 products must satisfy the most demanding requirements and are even suitable for installation situations directly next to an aerial. The statutory standards are met by category 3, which guarantees adequate protection in standard practice. (HELLA lighting systems fulfil at least category 3, many even category 5, and guarantee absolute functional safety in all application situations).

Electromagnetic interactions



HELLA WORLDS

Welcome to our Original Equipment worlds.

Visit these websites to find out more about technology, new products and possibilities of equipping your vehicle:

www.hella.com/municipal

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9Z2 999 135-122 J00763/AA/04.14/1.4
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Printed in Germany