

# Explosion protected handlamp

## A new innovative generation of portable handlamps

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Figure 1: Handlamp, Series 6144 and L144, with charging unit (L144 = industrial version)

The newly developed handlamps, Series 6144 from R. STAHL combine explosion protection with a wide variety of other advantageous features (Figure 1). Besides the rugged design, the focussing system for the high intensity Xenon lamp, which can be adjusted steplessly from the outside and the microprocessor-controlled circuitry, used to control the measurement and function sequences, it is primarily the charging system for optimising the battery service life which is worthy of mention.

The Series 6144 portable handlamps are

approved for hazardous areas endangered by gas and dust, Category 2G (Zones 1/2) and 2D (Zones 21/22) and are marked II 2G EEx e ib IIC T4 or II 2D, IP 65 T80°C. Besides complying with the explosion protection requirements, the handlamp complies with Fire Brigade German Standard DIN 14642, meets the specific requirements of electromagnetic compatibility (EMC) and has been issued approval for installation in motor vehicles by the Kraftfahrt Bundesamt (German Federal Government Office concerning Motor Vehicles) (e1 marking).

## Handlamp

The broad, easy-grip handle allows the handlamp to be carried safely. Stability when the lamp is set down, is increased by pulling out two lugs and a red-coloured insert on the rear side of the lamp head serves as a "rear light" when using the lamp.

The lamp head, which can be swivelled by 110°, features a high intensity Xenon lamp which can be focussed externally using a rotary knob to a concentrated beam or a wide-angle beam. The lamp switches over automatically to the fitted economy lamp, if the main lamp's filament fails. The pushbutton with functions ON-FLASHING-OFF can be easily reached with the hand carrying the lamp and can be operated "single-handedly", as can lamp focussing.

The Xenon lamp can be powered for at least 3 hours from the integrated, maintenance-free lead-gel battery. Five LEDs arranged on the rear side of the handlamp indicate the current operating and charge state of the battery (Figure 2).

The enclosure of the handlamp is made of an impact-resistant, black moulded plastic and features a pouch for accommodating a diffuser on the front side. If it is intended to use the lamp in Flash mode, the diffuser can be inserted into two guide slots on the front glass of the lamp head. Coloured diffusers for special functions are also available. An insertable label, which can be engraved and fitted on the front side, rounds off the range of →

Table 1: Battery capacity state indicator		
Battery capacity	LED colour / number of LEDs	Note
> 75 %	green % % % %	
> 50 %	green % % %	
> 25 %	green % %	
< 25%	yellow % %	charging required
< 10 %	red %	charging required
=> Deep discharge: LEDs flash repeatedly		

→ accessories for the handlamp. A hook can be fitted on the rear side if necessary. This hook offers the option of fitting the handlamp to a belt or engaging it on a carabiner snap hook (Figure 2).

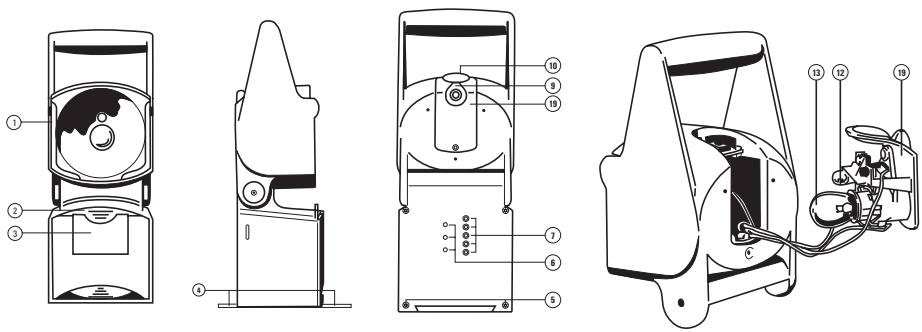
### Charging unit

The charging unit is used to charge and park the portable lamp. It is not an explosion protected design and must thus be mounted outside the hazardous area. The charging unit is designed only as a wall-mounted unit and features strong mounting brackets which reliably hold the handlamp in position even during assembly work or if operated in a motor vehicle. Basically, the charging unit

must be operated in dry rooms. It is designed with safety class II, i.e. totally insulated. The supply voltage can be selected as 12/24 V DC or 230 V AC. Appropriate connection cables are supplied for both input voltages together with the charging unit.

The main lamp blinks briefly as a visual indication of the filament check when the handlamp is docked and undocked. Two LEDs on the front side of the charging unit serve the purpose of function monitoring. LED 1 serves to monitor the voltage and lights as soon as the voltage is in the permitted ranges. LED 2 lights up as soon as

the presence of the handlamp has been detected and charging current is flowing. If the handlamp has an internal fault, this LED blinks. This communication between



- (1) Front glass with guide slots for diffuser
- (2) Diffuser in pouch
- (3) Label suitable for engraving
- (4) Slide-out lugs to enhance stability

- (6) Contact pins
- (7) LEDs for battery capacity indication
- (9) Rotary knob for focussing
- (10) Pushbutton

- (12) Economy lamp
- (13) Xenon bulb lamp
- (19) Mounting component – designed as red “rear light”

Figure 2: Handlamp 6144 – detailed drawing

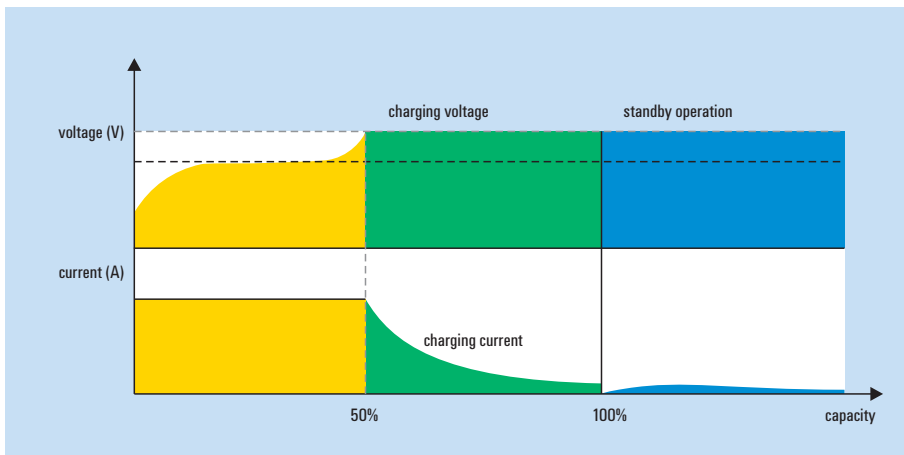


Figure 3: Charging diagram

handlamp and charging unit is analogue and bidirectional, i.e. the charging unit detects whether the handlamp is in the charging unit and whether the handlamp is signalling a fault. Conversely, the charging unit signals a mains voltage failure to the handlamp so that the handlamp can revert to Emergency Lighting mode. This means that the handlamp lights up when parked.

This Emergency Light function in "parked state" of the handlamp is, of course, not desirable, if the handlamp is mounted in a motor vehicle and is being powered by the car battery. This is why, if you wish to switch to 12/24 V power supply, you must re-position a plug-in jumper on the handlamp's circuitry board to suppress this function. This automatically deactivates the charging function for the handlamp, if the car battery voltage drops. This prevents unintentional discharge of the car battery.

The electrical connection is made automatically via contact pins, when the handlamp is inserted into the charging unit. The lead-gel battery is charged on the basis of a corresponding I/U charging characteristic. This charging method is the most suitable for lead-cell batteries (Figure 3).

The service life and the charging capacity of the batteries are essentially dependent on the charging method. With the I/U charging characteristic, the charger initially starts in constant charging current mode. The charging

current has constant amperage and maximum magnitude, until the maximum permissible charge voltage is applied to the battery. The charging voltage is then stabilised while the charging current drops. When the battery is charged, the charging current drops to "zero" and the system switches to Standby mode.

The new explosion protected handlamps, Series 6144 from R. STAHL presented in this article have a high utility value for the user, essentially covering many innovative ideas, diverse functions and practical handling.

A non-explosion protected version of the handlamp is also available as an industrial handlamp to round off the product range.