HELLA ACE

ACTIVE CONCEALED EMERGENCY LIGHTHEAD

HELLA ACE Best Practices

Causes of Failure in Automotive LED Exterior Lamps (with flash Function)

1. Electrical Causes			
Cause	**Description**	**Symptoms**	**Classification**
LED Chip Degradation	Over time, the luminous efficiency of the LED chip decreases, accelerated by high operating temperatures.	Gradual brightness drop, color shift (e.g., white → yellowish).	Field / Environment
Power Surge / Overvoltage	Caused by alternator spikes, battery replacement, or jump-starting.	Several LEDs fail simultaneously or complete lamp blackout.	Design / Environment
Driver Circuit Failure	Damage to MOSFETs, regulators, or capacitors that control LED current.	Power present but flicker/flash function stops working.	Design / Quality
Contact Failure	Connector oxidation, bent pins, or solder cracks.	Flickering during vibration, partial LED outage.	Manufacturing / Quality
2. Mechanical / Environmental Causes			
Cause	**Description**	**Symptoms**	**Classification**
Water/Dust Ingress	Sealant defects or hardened gaskets allow moisture or dust inside.	Fogging inside the lens, short circuits.	Design / Manufacturing / Environment
Vibration / Impact Damage	Road vibration or mechanical shocks (e.g., car wash).	Intermittent flicker in certain sections.	Environment / Field
Poor Thermal Management	Improper heatsink contact or degraded thermal paste.	Overheating leads to premature LED and circuit degradation.	Design / Manufacturing / Environment
3. Control / Firmware-Related Causes (Especially relevant for lamps with flash functions)			
Cause	**Description**	**Symptoms**	**Classification**
MCU Malfunction	Microcontroller controlling flash patterns malfunctions due to ESD or unstable power supply.	Unable to enter flash mode, incorrect flash speed/pattern.	Design / Quality / Environment
Firmware Corruption	Failed update during power-on or memory errors.	Lamp freezes in a certain pattern, keeps rebooting.	Quality / Field
Communication Failure	CAN/LIN bus issues with the Body Control Module (BCM).	Flash signal not received, dashboard warning light turns on.	Environment / Field / Design
4. Flash Function-Specific Failures			
Cause	**Description**	**Classification**	
Current Spike Issues in Flash Circuit	Rapid flashing increases peak current, stressing driver components.	Design / Quality	
PWM Control Malfunction	Irregular flash speed or brightness changes.	Design / Quality	
Synchronization Failure	Left/right lamps flash out of sync.	Design / Quality	

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1. Warranty coverage does not apply if the HELLA ACE system is operated outside its specified voltage parameters. Specifically, the product is not designed for 24V applications, and any damage resulting from such use will void the warranty.

2. Due to the unique design of HELLA ACE, which integrates OE bulb and strobe functions in parallel, we recommend operating at a maximum of **90 flashes per minute** to ensure optimal performance and product longevity. While HELLA ACE is capable of operating beyond this threshold, exceeding the recommended limit may impact overall performance and durability.

3. The ground pin on the connector must remain undamaged. Any damage to this pin can cause malfunction of the HELLA ACE and may lead to severe vehicle damage.

4. Hella ACE Resistor box has been designed for heat dissipation and a proper performance of the Hideaway. **For a maximum performance and avoid any malfunction, the resistor box needs to be installed in a metallic surface. It cannot remain hanging off the vehicle or tied to other wires.**

5. Our T20 connector has been designed for a universal fitment/installation.
   Vehicle and bulb sockets may differ by Make and Model. Therefore, Hella ACE T20 connector may not fit perfectly in some applications. In case you can't insert the connector into the OE bulb sockets, cut off the tabs on the side. The connector will still grab the socket and will sit tight.

Before beginning installation, please read all safety instructions carefully. It is the responsibility of the installatior technician to make sure that the installation and operation of this product will not interfere with or compromise the operation or efficiency of any vehicle equipment! Failure to follow these guidelines may result in injury, equipment damage, or voiding of warranty.

This product contains high-intensity LEDs or a combination of these lights. Do not stare directly into these lights. Momentary blindness and/or eye damage could result.

Use of chemicals to clean the lens could result in premature lens cracking and discoloration. Lenses in this condition have significantly reduced effectiveness and should be replaced immediately. Emergency vehicle warning devices should be tested daily to ensure that they operate properly.

Warnings to Users:
HELLA's emergency vehicle warning devices are intended to alert other operators and pedestrians to the presence
and operation of emergency vehicles and personnel. However, the use of this or any other HELLA emergency
warning device does not guarantee that you will have the right-of-way or that other drivers and pedestrians
will properly heed an emergency warning signal. Never assume you have the right-of-way. It is your responsibility to proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed or walking on or around traffic lanes. It is the user's responsibility to understand and obey all laws regarding emergency warning devices.

Failure to adhere to the following precautions and instructions may result in severe product or vehicle damage and could cause serious injury to occupants. Any misuse or operation outside the specified parameters will immediately void the warranty (3 Yrs).

HELLA ACE TEAM
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