What is an intelligent high beam module



Overview

For existing cars, intelligent headlight control has been widely used. Its main principle is to use photosensitive elements to detect the ambient light around the vehicle and automatically turn...

Key Takeaways

An Intelligent High Beam Module automatically adjusts vehicle high beams using cameras, sensors, and control algorithms to maximize driver visibility while preventing glare for other road users.

Core Principle

The intelligent high beam system relies on real-time detection of ambient light, oncoming vehicles, and traffic ahead. A camera mounted on the windshield captures images of the road and surrounding vehicles, which are processed by an onboard control unit using image-processing algorithms and artificial intelligence methods. Based on this data, the system dynamically switches the high beams on or off and adjusts the light distribution to avoid dazzling other drivers.

Key Components

Camera and Sensors: Detect oncoming traffic, vehicles ahead, and ambient light levels. Some systems also measure road topography to optimize illumination. Control Unit: Processes camera data and executes algorithms to determine which LEDs or light segments should be activated or dimmed.

It communicates with the vehicle's network via CAN bus or OBDII interface.

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D Matrix or Swivel Headlamps: The high beam is divided into multiple segments or LEDs that can be individually controlled. This allows the creation of “glare-free tunnels” around detected vehicles while maintaining full illumination elsewhere. Software Algorithms: Evaluate traffic conditions, vehicle speed, and environmental factors to adjust beam intensity, width, and direction in real time.

Operational Principle

Automatic Activation: The system activates only when the vehicle speed exceeds a threshold, the headlights are on, and the intelligent high beam system is enabled. Dynamic Beam Control: Individual LEDs or segments are dimmed or turned off to shield other vehicles while the remaining high beam continues to illuminate the road. Adaptive Range and Width: The system can extend the low beam range up to 200 meters and adjust the beam width for curves or urban areas, improving visibility without causing glare.

Integration with Vehicle Systems: Communication through OBDII or CAN bus allows the module to operate without additional power or signal conversion devices, simplifying installation and reducing cost.

Benefits

Enhanced Night Visibility: Maintains high beam illumination in areas without traffic while shielding other vehicles. Reduced Driver Fatigue: Eliminates the need for manual high beam switching. Safety Compliance: Prevents glare for oncoming drivers and vehicles ahead, reducing accident risk.

Energy Efficiency: LED matrix systems allow selective illumination, reducing unnecessary power consumption. In summary, the Intelligent High Beam Module combines camera-based detection, adaptive LED control, and real-time processing to provide optimal night-time visibility while ensuring safety for all road users. Its operation is fully automated, responsive to traffic conditions, and integrated with the vehicle's electronic control systems.

Article Content

Intelligent high beam control system

For existing cars, intelligent headlight control has been widely used. Its main principle is to use photosensitive elements to detect the ambient light around the vehicle and automatically turn...

Intelligent headlight control

High beam control improves driver visibility at night by automatically controlling the on/off function of the vehicle high beams through traffic detection. Using video data, the range of the low beam or high

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Intelligent High Beam Assistant

A system that utilizes a camera and photovoltaic sensor to recognize day/night and the taillights and headlights of vehicles in front or oncoming, to allow the utilization of high-beam headlights as much

What is an intelligent high beam?

Automakers typically offer several names for this capability—Intelligent High Beam, High Beam Assist, Auto High Beam, or Adaptive High Beam—though the core idea remains the same: smarter,

High-beam assist – basic principles | HELLA

Using the camera data and intelligent headlamp control, the light distribution adjusts automatically to the traffic situation so that the high beam distribution remains available to the driver, thus significantly

Adaptive Driving Beam｜Honda Technology｜Honda Global

A variable high beam system split into upper and lower sections detects vehicles in front and oncoming vehicles and automatically controls the illumination area accordingly to minimize glare for other drivers.

High Beam Assist

This system automatically switches the headlights setting to low beam from high beam when it detects a vehicle ahead. Frequent usage of high beams allows for

Intelligently controlling headlight beams

The intelligent headlight controller is an electronic control unit (ECU) which intelligently controls the headlight beams of vehicles. The controller is capable to drive a number of high

Auto High-Beam｜Honda Technology｜Honda Global

Auto High-Beam automatically switches between high and low beams, helping to create good visibility for the driver and reducing the frequency of manual beam switching.

Intelligence Light Beam Controller For Vehicles

This system integrates advanced sensors, real-time data processing and intelligent algorithms to automatically control a vehicles high beam headlights based on the surrounding environment, traffic

General Motors IntelliBeam Technology Info | GM Authority

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IntelliBeam is a GM lighting technology that automatically turns the vehicle''s high-beam headlamps on and off according to surrounding traffic conditions.

A review of automotive intelligent and adaptive

In response to these issues, there is a growing demand for adaptive and intelligent headlights that can autonomously adjust beam intensity. The

Smart Headlights | How They Work—and Why We Don''t

Adaptive beam headlight technology is coming, and we explain how it works. When do you think smart headlights will be allowed in the US?

Matrix LED Headlights: Redefine Adaptive Front-lighting With Smart High ...

Matrix LED headlights produce a glare-free high beam through pixel-level digital control of individually addressable LEDs. These adaptive lighting systems interact with driving environment via

Automatic High Beam Assist: How It Works

Night driving can be stressful: low visibility, glare from oncoming traffic, and constant switching between high and low beams. **Automatic High

Intelligent high beam control system

An intelligent high beam control system, comprising a probe assembly (2) and a controller (1). The controller (1) comprises a CAN bus communication module, a control module, a transformer module

High-beam assist – basic principles | HELLA

The high beam optimally lights up the road in the dark. However, this light function is only used rarely so as not to dazzle oncoming road users or vehicles in front. Camera-based high-beam assistants solve

Adaptive High Beam Assistance: Benefits & How It Works

Discover the benefits of Adaptive High Beam Assistance (AHBA), a smart feature that automatically adjust headlights to improve safety and visibility.

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