

Hella: Matrix LED technology makes its debut

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With the recent launch of the new AUDI A8, AUDI and HELLA are celebrating a double world premiere: for the latest model of the AUDI flagship will now be on the road boasting the world's first ever Matrix LED headlight with a glare-free high beam. Yet another fascinating feature of this innovative lighting technology is the dynamic indicator light.

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But the very heart of the Matrix LED headlights is the glare-free high beam. This allows the driver to travel in his vehicle with a permanent high beam without risk of dazzling oncoming traffic or any preceding vehicles. Such a function is technically possible thanks to the splitting up of the high beam into five reflectors, each one having a chip containing 5 LEDs. For the first time ever, the lighting expert, HELLA, has now succeeded in operating every LED on the 5-segment chip singly, whereby a total of 25 LEDs per headlight can be operated on full power or lowered as and when required. In this way the light cone can be controlled to a tremendously precise degree without the need for any pivoting mechanism. The result is that a huge number of variations in light distribution can be effortlessly achieved.

The system kicks in as soon as the driver has selected the automatic setting on the rotary light switch. By means of a camera, oncoming and preceding traffic are detected and then, by the shutting down or dimming of individual LEDs, these vehicles are blanked out of the field of high beam light distribution in real time. The implementation of Matrix technology allows, for the first time, several tunnels to open simultaneously. One example of this is the scenario where several oncoming vehicles are driving one behind the other. While these are “masked out”, the high beam continues to illuminate all the areas between the vehicles and to the right and left of them at full power. As soon as no vehicle is any longer in the driver’s field of vision, the system once again reverts to full high beam lighting. In addition to the specific masking out of other vehicles, the light cone of the Matrix high beam also adapts to the driving situation, for instance in the case of negotiating bends when the dynamic bending light function is required. In such a situation, the intensity of the light cone can be varied on the sides or it can be focused on the middle of the road as the LEDs are individually and suitably controlled in a bespoke way. Consequently the driver’s visibility at night improves dramatically while, at the same time, the risk of dazzling oncoming traffic is eliminated.

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It is not only the safety-enhancing functions that make the headlights of the AUDI
flagship stand out in the crowd - it is also their attractive design. Below the designer
grille, which optically divides the headlamp into segments, can be found the world’s
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first dynamic indicator light. As soon as the driver switches on the indicator, a strip of seven blocks lying one next to the other starts to light up sequentially at intervals of 20 milliseconds. After 150 milliseconds all the LED segments are bright and illuminate with full intensity although the impression of “a dynamic indicator” is given. As was the case in the predecessor model, AUDI and HELLA have combined the functions of indicator, daytime running lights and position lights in one optical system this time, too. The end product is a vehicle with an impressive and distinctive look that is typical of its make, a striking look which is thrown into sharp relief both day and night.

Hand in hand with their work on the Matrix LED headlights, AUDI and HELLA have also developed for the new A8 a Xenon variation and an LED headlamp with a static high beam, which fulfills the requirements of the US market. As early as 2010 both companies had successfully begun to introduce new trends: the AUDI A8 that had come on the market at that time won everyone over with the first full LED headlamp having the AFS functions (Adaptive Front Lighting System). But it was not only that. Also the distinctive stylization and the use of new materials such as plastic lenses meant that this form of lighting was here to stay.

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