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Large inspection objects in the right light

Historical 2019 technical statements are translated as published, including the source's aperture / sharpness wording and its claim of a rated current 300% higher. Original artwork and source image credits remain unchanged. Original publisher artwork, logos and advertisements are retained in their original language.

Large inspection objects in the right light

The operational reliability and flexibility of vision applications are always directly linked to the quality of the installed lighting and its intelligent control. Optimum illumination under changing conditions plays an important role.

For vision applications involving small test parts, external influences can be prevented relatively easily through mechanical measures such as covers or high light intensity. Large inspection objects, however, require extensive expertise in lighting hardware and software. Otherwise, the flexibility of inspecting different components would be severely limited. A solution for demanding industrial machine-vision applications combines powerful LED lighting

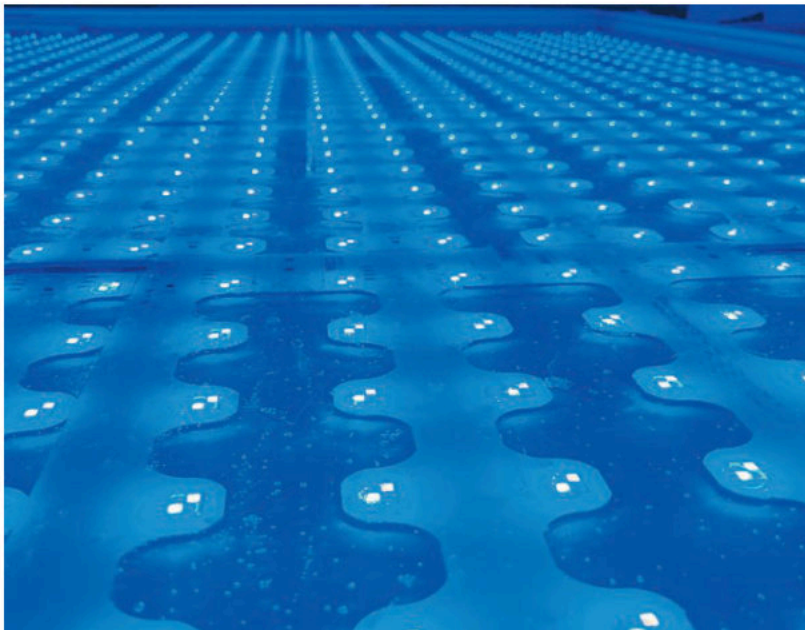
systems with intelligent light control.

Homogeneous large-area illumination

For large test parts or extended inspection fields, Cretec offers a broad portfolio of large-area, modular, intelligently controlled LED lighting systems. Available in variable and customised sizes, these modules provide economically and technologically efficient vision

solutions, from backlighting that extends to the edges through to front lighting, even for highly complex fully automated quality-control requirements.

Test objects must be illuminated so that critical features can be detected precisely with clear image contrast. This requires lighting expertise and practical experience in how light travels from its source to the object, is reflected or scattered, and is ultimately captured as an image through the lens on the camera sensor.

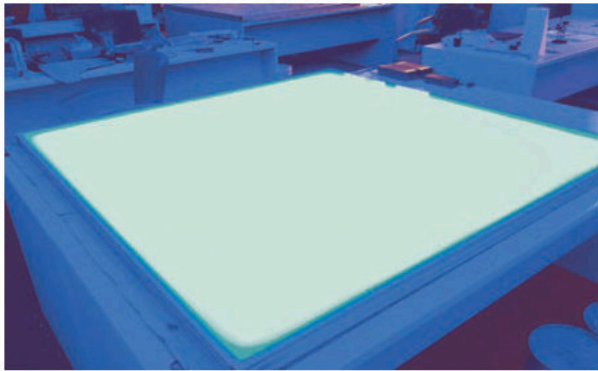


Large-area lighting modules with four-colour LEDs in strobe, colour-change or daylight mode enable an enormous range of industrial machine-vision applications.

As in professional photography, Cretec bases illumination on the definition of luminance, which describes the brightness of light from emitting surfaces. This approach precisely describes homogeneous light emission across the entire illuminated area. It is particularly important for difficult measurement objects whose shape and reflective properties present special challenges, for example rapidly moving objects in production lines that require intense illumination without overexposing the centre. Maximum homogeneity right to the edges is essential for consistent results in a vision application.

Wide spectral range for feature extraction

The modules are designed for industrial use, including harsh environments and hygienic



Maximum homogeneity right to the edges of the lighting module enables consistent results in a vision application.

requirements. The basic LED modules can be combined into any geometric format, as bar lights for conveyor applications or as large-area lights. Available illuminated areas range from 50 × 50 mm to 6,000 × 6,000 mm. All light colours are available in continuous or strobe mode. The LED boards are developed in-house and fitted with white, red, green, blue, infrared, ultraviolet, RGB or RGBW LEDs.

In the backlighting module, the spacing between the dimmable LEDs and their distance from the cover - a special diffuser - are selected to create an optimised, homogeneous illuminated field extending to the edges. Openings for optics can be incorporated where required, allowing a camera behind the light to look through it. The large-area LED lights are factory-adjusted and require no further manual adjustment when the application changes.

Growing demand for large lighting systems affects many sectors, including the automotive, surface-engineering and coating industries, as well as packaging and food production. The protection rating of lights and connectors is at least IP65 (water jets), optionally up to IP67 (temporary immersion). A hygienic module design is also available as an option.

Broad-based intelligence

For each application, users can make a broad range of individual adjustments through external control of the LED modules. Multicoloured test objects can be imaged with greater contrast by separating brightness values in the greyscale image. Intelligent control of coloured LED light (RGB/RGBW), combined with image processing using tone mapping, can considerably improve reliable recognition of structures. Four-colour LEDs allow successive exposures of a product in different colours, precisely detecting complex product features with just one camera.

Homogeneous large-area light also helps minimise the adverse effects of reflective surfaces. All lighting parameters for product variants are stored as ready-to-use recipes in the vision software. White light with a controllable colour temperature opens up further application areas.



The homogeneous light of a 1,500 × 1,500 mm LED light enables precise surface inspection with reliable detection at a resolution of 0.3 mm.

Operating LEDs in strobe mode offers many advantages for demanding vision tasks. Synchronised in the microsecond range, the light effectively freezes test objects and captures them with high image sharpness. Compared with continuous light at larger aperture values, potentially accompanied by image noise, strobe lighting can use smaller aperture values with greater sharpness. An extremely short flash duration permits operation at a rated current 300% higher, enormously increasing the available illuminance. External influences such as ambient light are also largely eliminated. Changes in LED light intensity over the service life or with temperature can be taken into account and compensated by the control system.