

LED-test system

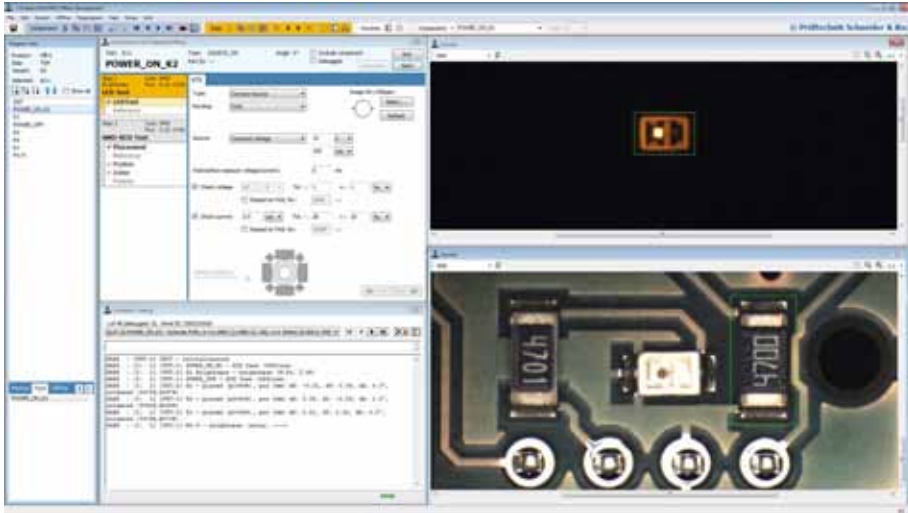
AOI and function test

LaserVision LED

LED TEST SYSTEM

INLINE AUTOMATED AOI AND FUNCTION TEST

With the new test system „LaserVision LED“ LED units can be tested in the production line to 100% in the cycle time. This includes the AOI inspection as well as the complete electrical test, and as a result of the combination also the optical measurements of the operated LEDs. Therefore, a 100% inspection in the Inline process can be reached.



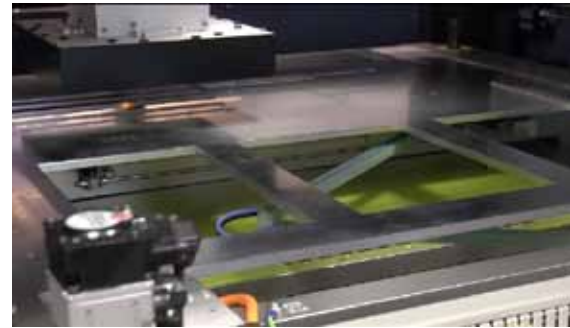
With the LaserVision LED by Schneider & Koch complete LED assemblies, including the components, can be checked automatically for placement, solder joints shorts, polarities etc.. In addition, photometric tests are possible. The unique combination of photometric measurement and camera inspection is used under requirements of inline production. LED lights can be tested completely as final products and/or in different production levels. Covered are therefore typical ceiling light panels, but the target markets are also manufacturing service providers (EMS), as well as the automotive industry. The test is done on the level of single LED. It is possible to use the system as an AOI system only.

THE SOFTWARE

carries out a board correction first. With the help of a special test routine the brightness of the LED switched on is determined within a defined test region. The test region is always located on the same position of the UUT and is carried along in case of misalignment. The brightness values within this region become averaged. It is also possible to define that only pixels within a certain brightness area are evaluated (the dark edges are faded out). The process with determination of the defined variables is carried out in different steps (see table below).

INLINE CONTACTING

The electric contacting during inline mode is carried out by a contacting unit that is powered parallel by servomotors. This unit can be constructed to work from either the bottom or the top. A special holding-down device was developed to work with large forces while still able to meet the requirements of the optical inspection.



COMBINATION OF PHOTOMETRIC MEASUREMENT AND CAMERA INSPECTION

During the testing process the LED on the unit under test is supplied with the necessary power signal. Previous to the testing the set points are taken by means of a photometric measurement of a LED with typical values. This calibration can occur automatically directly in the test system while the measured values are put down as parameters in the test program. This process can be repeated at any time (e.g. at the beginning of a shift or at product change). A calibrated system like this is able to supervise the compliance of the running production and indicate LED of bad quality at a repair station or sort them out directly. The measurement by means of a camera allows test times according to line speed.

Automatic calibration by means of a photometric measurement

- light intensity
- color temperature / dominant wavelength
- light density

LED control in line speed by means of a camera (AOI)

- luminosity
- color temperature / dominant wavelength
- saturation

Possibility of additional testing by means of a camera (AOI)

- examination for presence and polarity of LED and SMD components
- solder joint examination on LED and SMD components
- short-circuit test (solder bridges)

Electric functiontest

- Parallel onboard programming
- Source 0-300V AC/DC / 8A

spectrometer color angle saturation functional test
polarity power consumption photometric measurement luminance intensity
LED test lumen light density **line speed** solder joints
assembly monitoring luminosity color temperature **short-circuit**



LV 6 LED Inline



LVC LED (tabletop unit)

LaserVision LED test system (inline)

- | LV6 camera head with 1 color sensor module (GigEthernet-SMD-technology)
- | mega pixel camera 20 μm / Pixel and LED lighting unit
- | controlling computer with LCD monitor, operating system Windows 10
- | pneumatic contacting unit (automatic) from above (bed-of-nails) and / or below
- | typical working area 600 mm x 600 mm
- | Digital multimeter (DMM) with four-wire resistance, capacitance and diode measurement
- | Matrix 2 x (64 x 2) (extendable)
- | Source Measurement Unit (SMU) 60V / 1A 1 channel (extendable)
- | pneumatic pressure plate as UUT support from below or above
- | System self test including self test adapter
- | data processing software for fixture construction
- | statistics module for graphical evaluation of the production quality (incl. process monitor for supervising the production in real-time)

LaserVision LED table top device with drawer

- | Bed-of-nails test fixtures or cable-contacting
- | Working range 300 x 400 mm

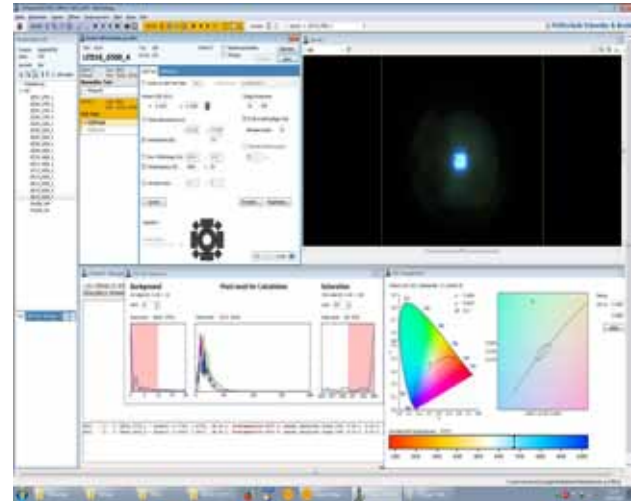
Options:

- | Angled-view module, in addition to the main camera four lateral cameras
- | basic module change cassette with interface, 64 contacts
- | Matrix extension 128 x 2 or 64 x 4 total up to 1536 pins
- | Source Measurement Unit (SMU) 60V / 1A (up to 10 units)
- | Source 0-300V AC/DC / 8A
- | spectrometer for photometric measurement integrated into test system (only available in the inline version)
- | additional software license for repair station (operational on a separate PC)
- | Offline Programming
- | programmable keyboard to ease work at the repair station, one-hand operation with all functions
- | Sliding carriage for interchangeable cassette

Application

RELEVANT OPTICAL CHARACTERISTICS

The measuring technology for LED is based on the determination of certain optical characteristics. However, the perception of the human eye and with it the photometry also plays an important role, especially regarding LED based end products. The human color perception is determined by the color metrics and the directional characteristic of every single LED. To recognize defects as early as possible in the production process the optical characteristics of an LED should be checked in all phases of the production. This covers the inspection of the ready LED itself as well as in her position as a contacted element on a LED circuit board up to the test of the final LED based end product.



Entire LED boards with all their SMD components can be checked automatically in terms of assembly, solder joints, short circuits, polarities etc. Under application of an electrical voltage photometrical measurements are also possible. On this occasion, a unique combination of photometrical measurement and camera inspection is used to follow line speed.

LED lights can be checked as end products and /or during the manufacturing process. It is feasible to inspect LED lights with physical dimensions up to 600 x 600 mm. Therefore also long-run louvred luminaires can be checked.

On inquiry even larger dimensions are possible, e.g. 600 x 1800 mm for long lights. The photometrical inspection is carried out under application of an electrical voltage. The exact calibration of the test system occurs by means of a photometer. The following supervision of the production by means of a camera allows testing in line speed. The examination is carried out on individual LED level.



Flexible LED boards with customer-specific supply (SMD components included) can be checked automatically regarding assembly, solder joints, short circuits as well as polarities etc. Under electric tension photometrical measurements are also possible. In doing so photometric measurement and camera inspection are combined under line speed conditions. Integration into reel to reel production is possible.

Individual solutions based on the standard test system can be offered for special LED applications such as for the automotive industry (as vehicle headlights or rear lights frequently lie in different assembly levels). A flexible integration into customer-specific production flow and environment is also possible.

The applications shown represent only a choice.





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