Multiple Color Sensors for Accurate and Fast In-Line Color Measurement

With the principle of a multiple color sensor, MAZeT is pursuing a strategy that bridges the gap between the three-range sensors and spectral measurement devices for sensor applications. The new MMCS6 product family is based on the proven technologies of the compact and price-to-performance ratio-optimized semiconductor sensors with integrated interference filters. With the MMCS6, a color measurement with seven spectral characteristics in the range of 380 to 780 nm can be taken on the basis of spectral estimation.

The evaluation of a color in this sensor is based not on the colorimetric but on the radiometric level. The initial result is not the chromaticity coordinate but the spectrum of a color, which can be then used to calculate the chromaticity coordinate. The advantages of such measurements lie in the much higher information density in terms of color measurement.

With RGB and true color sensors, MAZeT offers semiconductor-based sensors with RGB or XYZ interference filters for fast and long-term stable color detection and absolute color measurement to the CIE/DIN5033 standard. For these sensors, in connection with white-light LEDs, accuracies in the color space that exceed the capacity of the human eye are possible. The accuracy is very heavily determined by the type of light source and the calibration of the sensors. In applications with non-standard light sources and / or higher standards for color accuracy, the principle of the 3-element color sensors runs up against natural limitations. For such applications, spectral sensor technologies that use a spectral resolution are recommended. Typical examples of these include spectrometers at resolutions such as those used in laboratory measuring instruments but also to some extent as an OEM spectrometer in in-line measurements. For sensor applications, however, such spectrometers are too slow, too expensive and usually too big.

The MMCS6 sensor confers the advantage that the recognition and measurement of metamerism effects can be filtered out, which cannot be done with RGB or XYZ sensors. Metamerism in the optical sense means various spectra that for a defined type of light produce the same impression on the human eye.

The spectral characteristics of the MMCS sensors are arranged in such a way that their border areas overlap. It follows that only as few gaps as possible exist in the visible spectrum. Misleading interpretation of the colors is thus minimized and the measurement accuracy increased. The sensor operates largely independent of the quality of the light sources. Through the spectral approximation of the measured color using MMCS sensors, color differences to which the human eye does not respond can be determined even there.