A342
Color sensors
colorSENSOR

Color measurement of RAL colors (K1/K5 color fans)

RAL colors are standardized colors with each one assigned to an unambiguous number. They help to precisely determine colors. RAL colors are used in almost every field where surfaces are painted or colored products are manufactured. These color samples serve as reference values at the end of the manufacturing process during quality control, as well as for comparison purposes. For example, in this application, two shades of red, green and white of the RAL K1 and RAL K5 color fans are distinguished.

colorSENSOR CFO sensors from Micro-Epsilon are ideally suited to this kind of precise color comparison measurement as they reliably recognize different colors while enabling 100% quality control. Before the inspection starts, the sensor is calibrated to a 1.25 inch zenith white standard.

As well as the controller, a reflex sensor combined with a 45° distance ferrule is used for the inspection. The sensor head is placed on the RAL color chart (tactile). This ensures that all measurements are performed at the same distance and at the same angle. A corresponding measurement setup also enables a non-contact measurement.

Via the web-based interface, one of the two color shades is taught per color (red, green or white). Once the RAL colors are taught in via the color fans, the measurement can be directly performed on the painted surface. After the RAL colors are assigned to color groups, the sensor recognizes and evaluates the colors. Digital outputs (0 V or 24 V) enable this evaluation to be output to a control system.

The colorSENSOR CFO100 and CFO200 color sensors from Micro-Epsilon impress with their high color accuracy and repeatability.

The multi-teach function enables teach-in of up to 320 colors in 254 color groups. The colorSENSOR CFO achieves extremely high recognition performance and process reliability. The web-based interface enables intuitive operation.

Requirements for the measurement system
- Measuring rate: 1 kHz
- Color distance: $\Delta E \leq 0.5$
- Working distance: 10 mm
- Measurement spot diameter: 10 mm
- Color inspection of components in RAL color

Ambient conditions
- Constant ambient light
- Room temperature 20 - 23 °C
- Constant distance and angle

System design
- Controller: colorSENSOR CFO100
- Reflex sensor: CFS4-C20
- Spacer 45° for C20 sensor head

Advantages
- Multi-teach function and color grouping
- Modern, user-friendly web interface
- High color accuracy and repeatability
- Currently brightest illumination in this class