SI-COLO Series

Color Sensors

SI-COLO2 **(15 colors, 8-bit A/D conversion)**
SI-COLO3 **(15 colors, 12-bit A/D conversion)**
SI-COLO84 **(100 colors, 12-bit A/D conversion)**

The color sensors of SI-COLO Series operate according to the 3-color-range principle, with a white-light LED as a light source.

The color sensors SI-COLO2 and SI-COLO3 (version with integrated optics) as well as SI-COLO2-LWL and SI-COLO3-LWL (optical fiber version) can be parameterized under Windows® through the serial RS232 interface. Up to 15 colors can be taught respectively up to 100 colors with SI-COLO84.

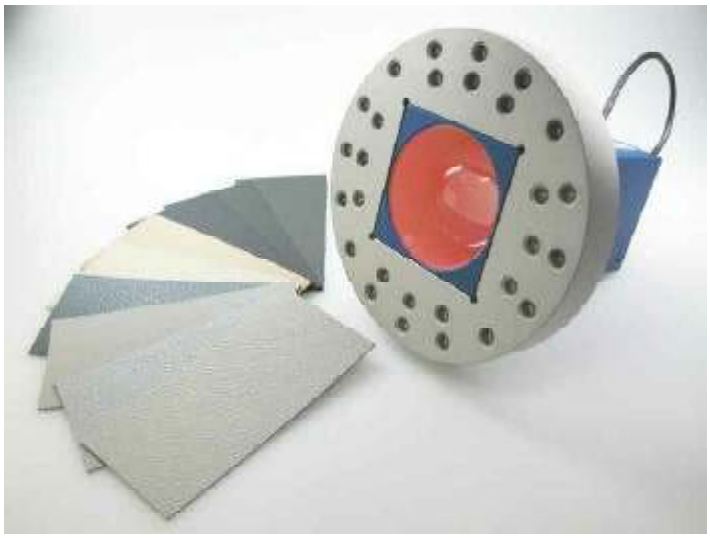
Application Examples

Checking of color of painted components or of imitation leather, plastic, and textiles in the interior of cars with color sensors SI-COLO2-200-DIL

In the assembly of car interior components it happens again and again that parts are mismatched because the human eye is not able to perfectly distinguish individual color nuances. It is therefore very well possible that components of different color shades are integrated in a side door, for example.

SI-COLO2-200-DIL color sensors can considerably reduce the probability of mismatching. For this purpose, all the respective possible components are checked with respect to the reference color (predefined color). What is decisive for reliable color detection here is diffuse white light illumination which, especially with the SI-COLO2-200-DIL, allows a relatively large distance variation range with an average object distance of approx. 200 mm. Up to 15 colors can be stored in the color memory, and the detected color is digitally output in a binary code (4 digital outputs).

Furthermore, the SI-COLO2-200-DIL sensor also is suitable for the detection of different car paints; for example, it can be checked whether the painted side of a rearview mirror matches the paint of the door. This task is made even more difficult by the fact that the door with the rearview mirror can only be positioned with an accuracy of approx. 10 mm. The relatively strong gloss effect is suppressed to a large extent by diffuse illumination.



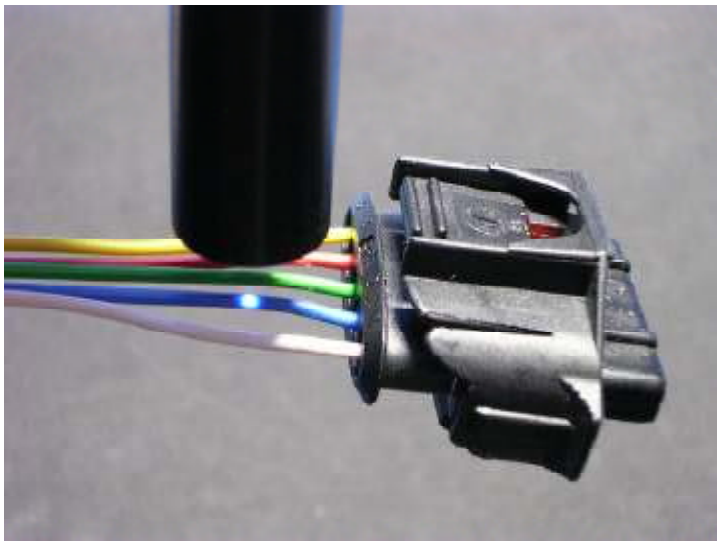
SI-COLO2-200-DIL

Application Examples

Color check of insulated cable strands

In cable processing, for example during connector assembly, the correct cable colors might get mixed up. It must be taken into consideration here that meanwhile cable diameters inclusive of insulation of only a few tenths of a millimeter are absolutely not rare any more today, and it must furthermore be considered that due to the assembly device minimum distance to the object has to be observed (distance > 10 mm).

Two sensors of the SI-COLO family are ideal for such applications: On the one hand, the version with integrated optical unit, **type SI-COLO2-20-d0**, with an object/sensor distance of typ. 20 mm and a light spot of typ. 0.8 mm diameter. On the other hand,
the optical fiber version **type SI-COLO2-LWL-SP** with a reflected light optical fiber **type R-P-A2.0-(2.5)-1200-67°** with supplementary optical unit **type KL-3**. In combination with the mounted optical unit KL-3 an operating distance of typ. 10 mm ... 15 mm can be realised, with a light spot diameter of typ. 1 mm. These sensors of course also feature 15 memory locations for storing the respective cable colors.



SI-COLO2-20
SI-COLO2-LWL-SP

Detection of painted components in the ex-area with the SI-COLO2-LWL-HAMP-COL4 and mounted optical unit KL-14

In a spraying system, components must be checked with respect to color and grey content; a distinction has to be made between 3 states: Raw part (no paint applied yet), primed parts (1st layer of paint applied), and completely painted parts (2nd layer of paint applied).

The task is made more difficult by the fact that the parts have to be checked in the ex-area and therefore with the help of an optical fiber front-end, with a minimum distance from front-end to object of approx. 100 mm.

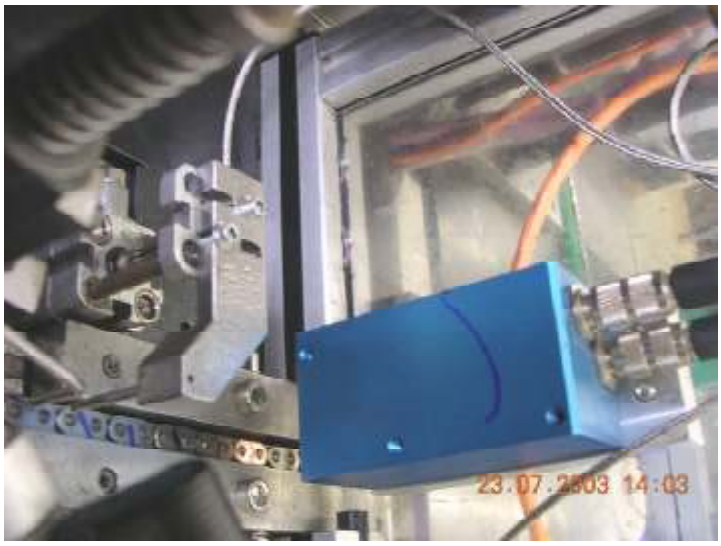
An external teach-box, which is connected to the color sensor by way of a 3 m cable, is used to facilitate the teach process; during the teach process the teach-box can therefore be positioned in the ex-area. A special software indicates whether the sensor is in its dynamic range (red/green/red LEDs).

SI-COLO2-LWL-HAMP-COL4

Application Examples

Detection of defective parts

At an automobile sub-supplier's plant, defective chains must be separated out. Such defective chains are marked with a color (e.g. blue or red), detected by the SI-COLO2-30 color sensor, and reliably sorted out from the system. Furthermore, the copper-colored chain links must also be detected.



SI-COLO2-30

Checking of luminous objects (LEDs)

With the special optical fiber head, the color sensor SI-COLO2-LWL-ACL-4X makes it possible to check up to 4 LEDs that are arranged at different locations. It must be taken into consideration, however, that only one LED may be operating at the same time.

It is also possible to check bi-color or tri-color LEDs, because up to 15 color values can be stored in the control unit of the color sensor.

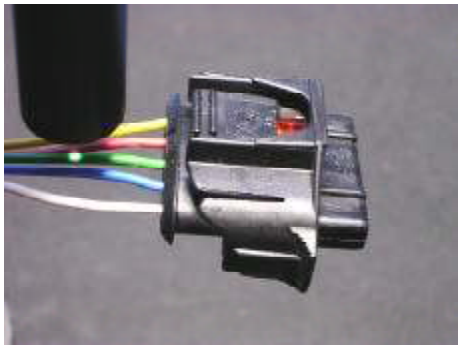
SI-COLO2-LWL-ACL-4X

R-P-AP1.0-800-4X-Ms

Application Examples

Checking of the color sequence of the cables at a connector assembly machine. A reflex optical fiber in combination with a mounted optical unit KL-3 in linearly moved across the cables.

The mounted optical unit KL-3 makes it possible to generate a light spot with a diameter < 1 mm at a distance of approx. 15 mm from the mounted optical unit. Up to 15 colors can be stored in the color memory of the color sensor.
Because of the coaxial arrangement of transmitter and receiver fibers, a distance fluctuation of up to several mm is tolerated; furthermore, this sensor type is to a large extent insensitive to angular changes of the object (cable).



SI-COLO2-LWL-SP

Detection of a color mark on cosmetics pencils during rotation (alignment aid) with rectangularly shaped optical fiber front-end.

SI-COLO2-LWL-SP

Checking the color of packings. Differently printed packings must be reliably detected in this application.

SI-COLO2-LWL-SP

Checking whether the correct plain bearing half shell type is inserted during engine assembly. The parts are identified by different colors. A reflex optical fiber with a front area of 6 mm x 1 mm is used in this application.

SI-COLO2-LWL-SP

Application Examples

Checking of color of painted components or of imitation leather, plastic, and textiles in the interior of cars with color sensor SI-COLO2-30-DIL (or SI-COLO2-200-DIL)

In the assembly of car interior components it happens again and again that parts are mismatched because the human eye is not able to perfectly distinguish individual color nuances. It is therefore very well possible that components of different color shades are integrated in a side door, for example.

SI-COLO2-...-DIL color sensors can considerably reduce the probability of mismatching. For this purpose, all the respective possible components are checked with respect to the reference color (predefined color). What is decisive for reliable color detection here is diffuse white light illumination which, especially with the SI-COLO2-200-DIL, allows a relatively large distance variation range with an average object distance of approx. 200 mm. Up to 15 colors can be stored in the color memory, and the detected color is digitally output in a binary code (4 digital outputs).



SI-COLO2-30-DIL