



COLOR SENSORS ***"TRUE COLOR"***

See colors like a human does



IPF ELECTRONIC

High-End in High-Tech.



←
**SCAN QR CODE
AND READ FLYER DIGITALLY**

When it comes to color recognition and evaluation, very few can match with us, because the color sensor series from ipf electronic has been especially developed for "True-Color" detection ("seeing colors like a human does"). The color sensors integrate all necessary components and are parameterized simply by mouse click with the extremely powerful and, above all, free software included in the scope of delivery. Devices with digital outputs are available, which make the identification or differentiation of up to 31 colors possible without any problems and this with a switching frequency of up to 35kHz. For maximum flexibility, sensors with analog outputs complete the portfolio.

Typical areas of application:

- / Color control of anodized surfaces
- / Differentiation between brushed and unbrushed stainless steel surfaces
- / Differentiation of materials such as steel, aluminum, brass and copper
- / Monitoring the application of activators
- / Color and brightness control of LEDs
- / Quality control for painting processes
- / Monitoring of filling processes
- / Assembly check of sealing rings
- / Sorting of empties
- / And much more

Due to the use of fiber optics, the color sensors are even suitable for hazardous areas. Last, but not least, our color sensors also convince with operating distances ranging from nearly 0mm to 1,000mm in detection areas with a diameter of 0.5mm to 100mm.

You have not yet found the right sensor solution for your application? Then one of the color sensors, in combination with the extremely powerful parameterizing and evaluation software from ipf electronic, can possibly solve your problems. Convince yourself of the versatile application potential or ask one of our specialists.

SENSORS FOR "TRUE COLOR" DETECTION

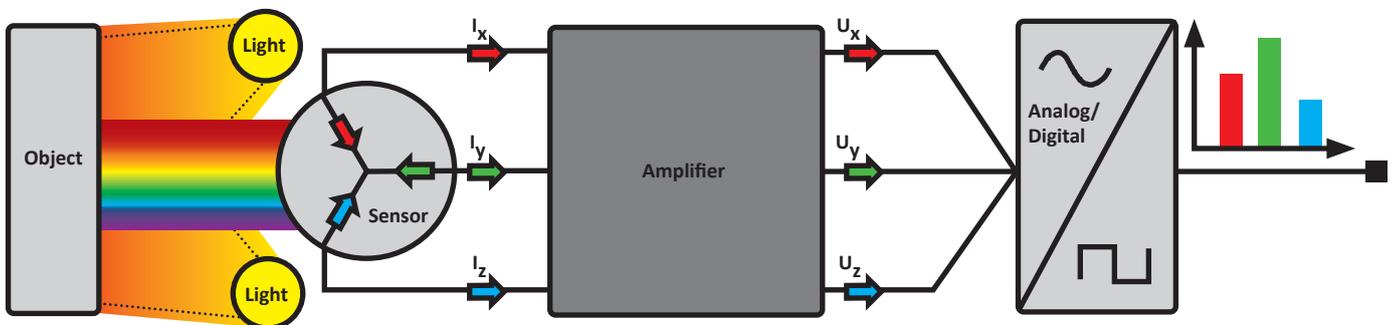
SEE COLORS LIKE A HUMAN DOES

The color sensors of the OF50 / OF51 and OF65 series have been specially developed for "True Color" detection (see colors like a human does).

The color sensors have a light source with one or more clocked white light LEDs for illuminating objects. It is ensured that the influence of ambient light (e.g. hall lighting etc.) has no influence on the test results. The light reflected from an object is detected by the sensor's receiver. The individual color components red, green and blue are separately amplified and evaluated. The necessary amplification is provided by hardware and software and thus also includes a temperature compensation.

The analog values are then digitized in the device, whereby the sensor recognizes the detected colors of an object as well as the human eye. The color perception of the human eye is thus simulated to a certain extent by the devices, but with the advantage that their evaluation speed is much higher and the results are reproducible.

For parameterization and evaluation, a very powerful software was developed especially for the color sensors. For more information on the performance of color sensors, see pages 10 and 11.



FROM STANDARD TO HIGH-END TO SPECIAL DEVICE

SERIES OF50

I for simple applications for the evaluation of up to 3 color states



SERIES OF51 OR OF65

I high-end solution for the evaluation of up to 31 color states



SPECIAL DEVICES

I for the evaluation of whole color spaces like L*a*b*



FIBER OPTIC VERSIONS

I in order to use the sensors even under confined space conditions or in Ex-areas



Our offer for you, with a variety of possibilities and even more potential. No matter what task you have to master, we are sure to have the right solution.

You do not know exactly which color sensor is the ideal solution for your application? Then give us a call and let us advise you without obligation: **TELEPHONE +49 2351 9365-65**

Would you like further information and technical details? Please visit our website: **www.ipf-electronic.com**

COLOR SENSORS

TRUE COLOR

ADVANTAGES AND HIGHLIGHTS

- / Color-, contrast and grayscale detection
- / Print mark detection
- / Color / brightness inspection of self-luminous objects (LED, halogen lamps, displays, ...)
- / Differentiation of similar colors
- / Fluorescence evaluation
- / Insensitive to ambient light
- / Up to 35kHz switching frequency
- / True Color technology
- / Compact aluminum housing with integrated transmitting and receiving optics
- / Several TEACH options via PC, OLC or button
- / Connection via standard industrial connector
- / Control of up to 31 colors
- / Status display via yellow LED
- / Recording of measured data is possible
- / External triggering is possible
- / Operating distances up to 1,000mm
- / Fiber optic version for constricted room and explosion-hazardous areas



COLOR RECOGNITION:

I of structured and inhomogeneous surfaces

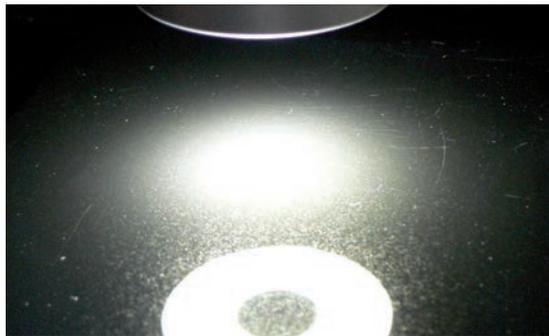


COLOR CONTROL:

I of color shades



I of glossy objects

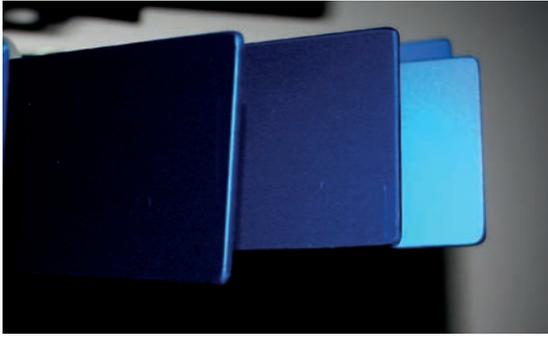


I of plastic closures



I of varnishes



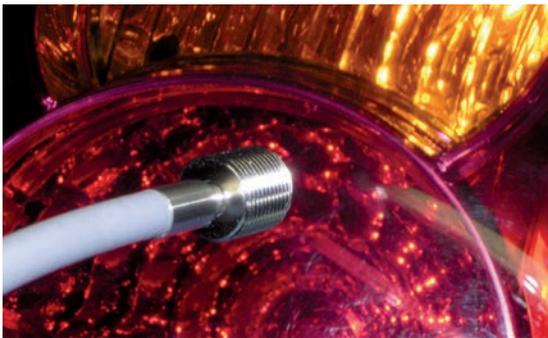


CHECK

/ for color deviation with anodized parts

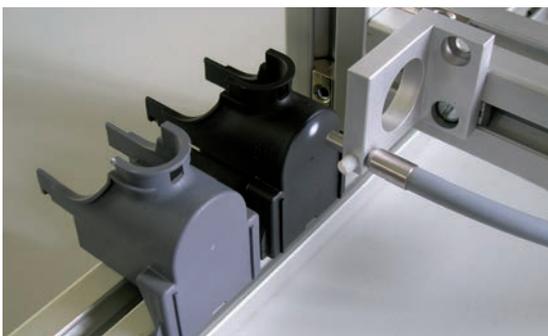


/ for correct content



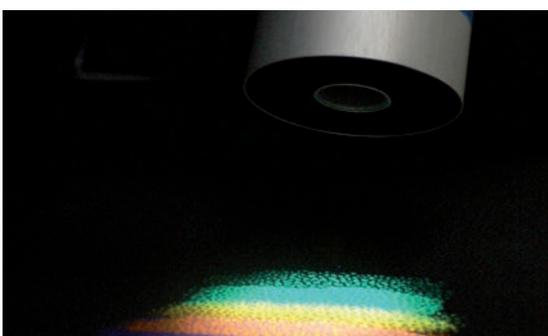
CONTROL:

/ in front of light sources such as built-in LEDs, ambient lighting



DIFFERENTIATION:

/ of differently colored surfaces



/ of fluorescent objects

CONVINCING PRACTICAL EXAMPLES

SORTED SELECTION OF BOTTLES AT MINIMUM COLOR DIFFERENCE

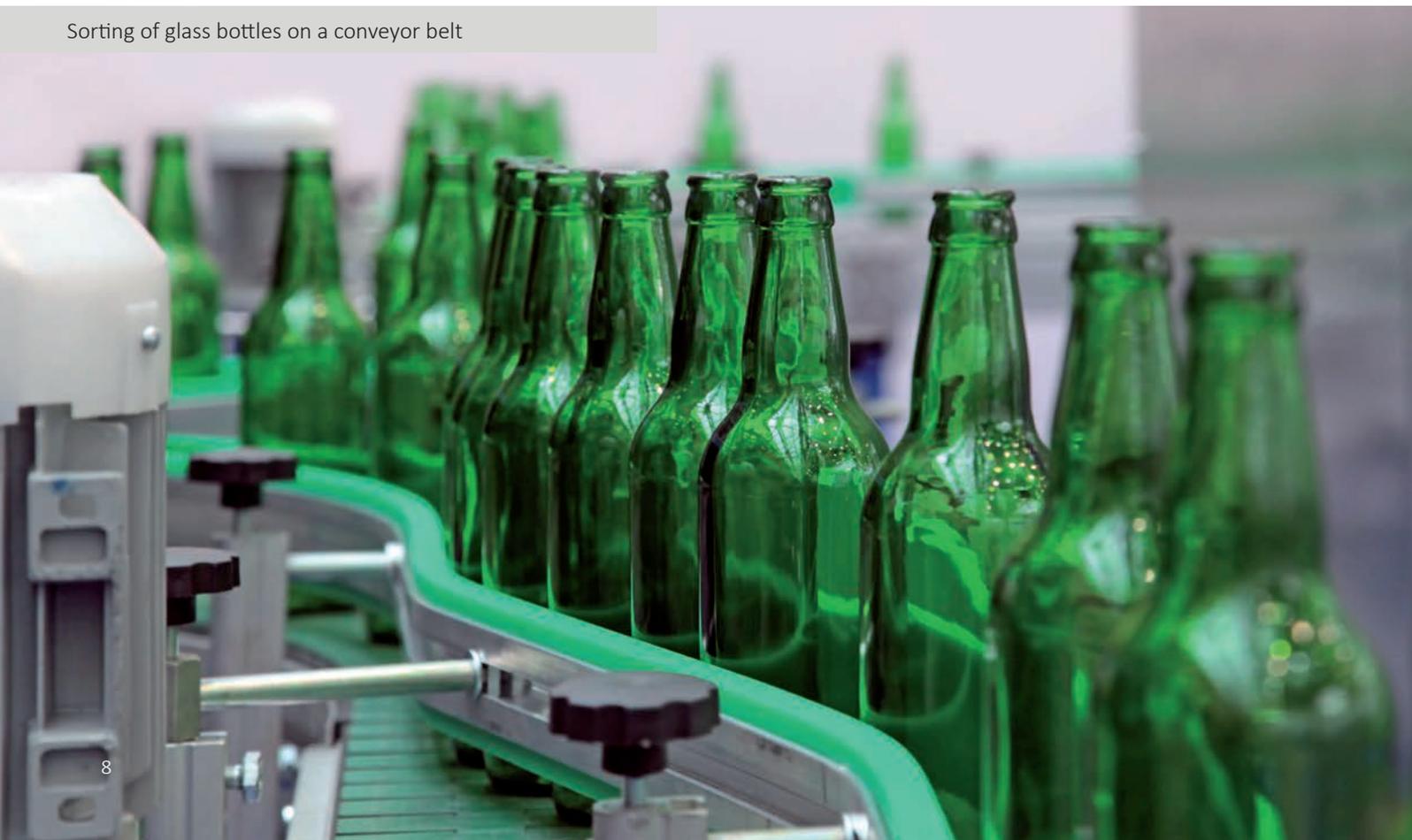
An efficient sensor solution for the sorted selection of bottles in a bottle washing plant was in demand. This should identify clear bottle colors such as brown, blue and transparent, but also three similar color shades of green. A particular challenge: Pressed seams in the glass, different glass thicknesses and more or less wetted with water droplets bottles, which provide light refraction effects and make the detection of the bottle color considerably more difficult.

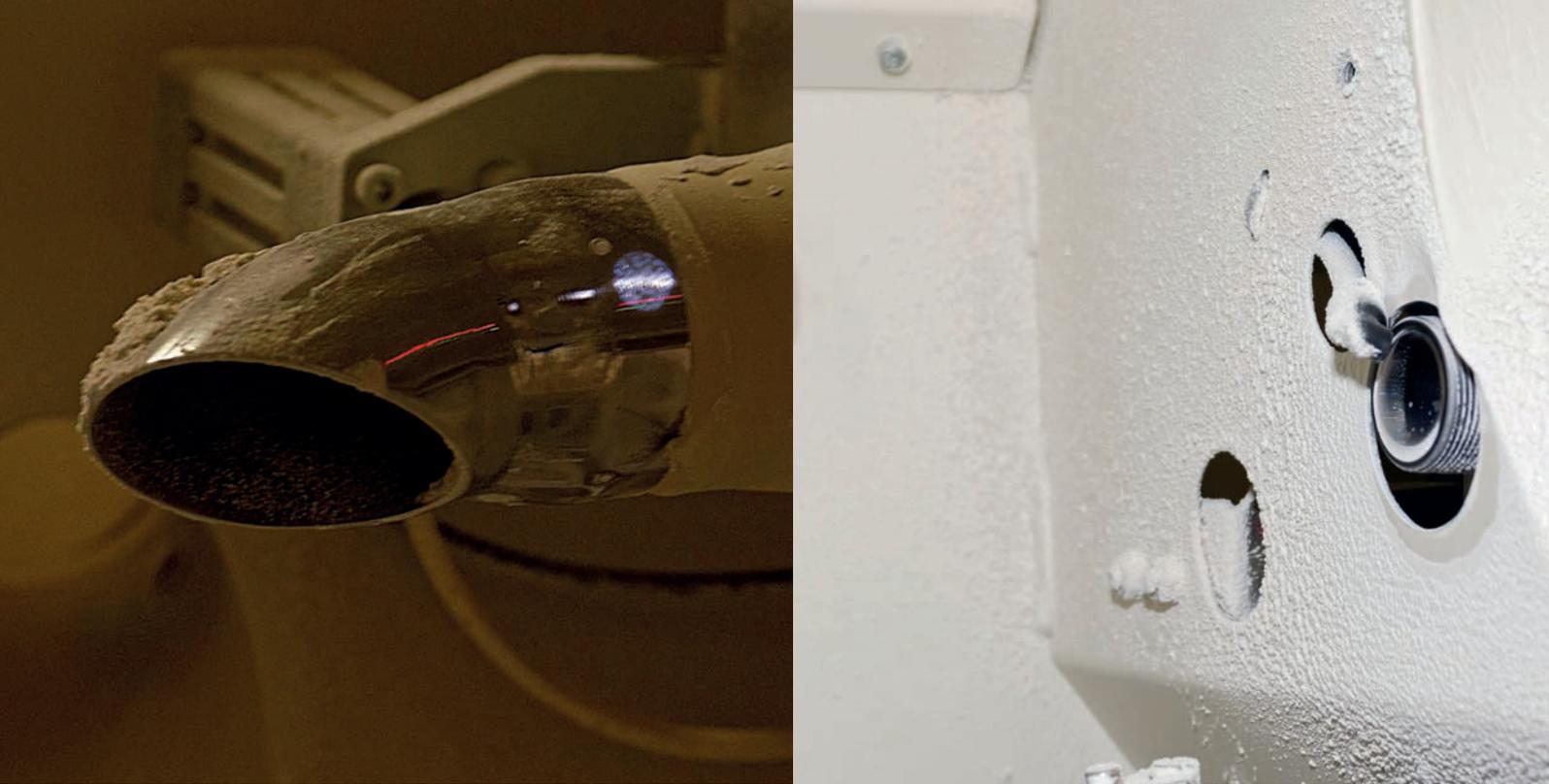
As a sensor solution, ipf electronic recommended a device of the **OF65** series with glass fiber optic light barrier. The light source of the sensor is a very bright, clocked white light LED. Ambient light influences are eliminated by comparing the transmitter clock frequency with the receiver signal frequency (evaluation only of signals of the same frequency). For reliable triggering of the sensor system one chose the bottleneck as a control point.

The receiver signals are evaluated by the sensor in the "Best Hit Mode" via the parameterization software, whereby the measured values are compared with the entries in a reference / teach value table and the "best result" is output as the result. Since this evaluation alone cannot capture the possible variations of a bottle type in a way that is reliable in production, in addition, different states of each bottle design were taught-in as possible references and summarized in color groups. As long as there is a match of the measured value with a reference value of a color group, the same color match is always output from the sensor. Deviations of a bottle type are thus compensated and a reliable detection of the glass color is ensured.



Sorting of glass bottles on a conveyor belt





Query of the filling nozzle with flour deposit, (right) color sensor **OF650180** with a blow-off unit, that removes all flour dust from the optics.

CONVINCING PRACTICAL EXAMPLES

HIGHLY AUTOMATED, RELIABLE FILLING PROCESS

Around 250 flour sacks are filled in a fully automatic rye and wheat mill per hour. The intelligent sensor solution from ipf electronic always keeps the "perspective" and enables a very reliable filling process, which ensures that there is always a flour sack above the filling hopper when filling.

For this special application, the application specialists from ipf electronic recommended a color sensor of the **OF65** series, more precisely the **OF650180**, with a fiber optic connection and a special lens. In order to achieve the highest possible illuminance at the required working distance, a so-called XXL lens of type M34 was used instead of a standard zoom lens, which makes it possible to focus very strongly on the projection of the light spot on the filling hopper.

Since the individual paper sacks vary considerably in color and gloss level, to teach-in all sorts of sacks was out of question. Instead, they decided to query the metallic filling nozzle. That means that if this is recognized by the color sensor, there is no paper bag over the filling nozzle. Decisive for the release of the filling process is thus the signal change from "teached filling nozzle detected" and "undefined state" (sack present). However, a particular challenge were the flour deposits that built up after each filling on the filling hopper. Due to the varying deposits, the color sensor repeatedly received different color and intensity values during the detection, so that it was not possible to work with a constant parameterization. The problem could be solved by the choice of the optical system, and above all by the special parameterization software for the color sensors developed by ipf electronic.



MUCH FLEXIBILITY FOR PRACTICE

THE PARAMETER SOFTWARE FOR OUR COLOR SENSOR

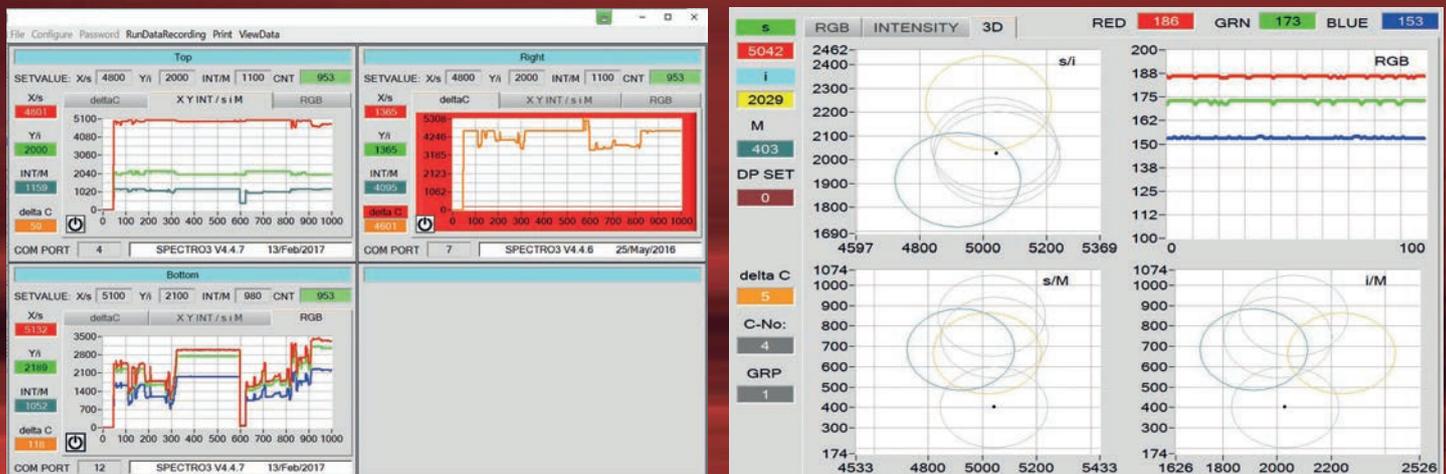
The color sensors from ipf electronic include a free software that can be used to implement complex applications thanks to powerful features.

The software enables the control of the light source at the sensor and also offers numerous methods for the calculation and evaluation of colors. In addition, it shows the user in a graphical representation how much the colors to be evaluated differ from each other.

More detailed information: See the white paper „True Color Sensors- See colors like a human does, which is available for free download on the ipf electronic website under the heading "Know How".



Target or reference values of sample parts entered in a table.



MORE SAFETY FOR YOUR PRODUCTION

WHAT COLOR SENSORS CAN DO

Reliable color evaluation in the field of production is influenced by different product characteristics. Among other things, problems can arise as a result of inhomogeneous object surfaces. For example, surface structure contributes to variations in the gloss which give conventional color sensors difficulties when it comes to evaluating colors. This is due to the direct reflection which, in turn, depends on the respective level of gloss that the surface produces. This is where color sensors are applied, that have a diffuse, widespread light which significantly reduces variation in terms of the gloss effect.

So-called confocal sensors are suitable for very small test objects. These generate a white light spot with a diameter starting with approx. 1mm. This can be projected onto small test objects (e.g. litz wires or strands) via a transmitting lens which is attached in a central position with respect to the receiver lens.

The evaluation of glossy surfaces is also extremely difficult in practice, because the actual color information is mixed with the direct reflection due to the gloss effect. Strong colorations then become "soft" or "dull" colors. Color sensors with integrated polarisation filter, on the other hand, suppress direct reflection and thus enable a reliable color statement.

Devices with integrated UV light source can evaluate the colored glow of fluorescent objects. The object-dependent characteristic colored luminance is caused by the irradiation with UV light. UV light sensors allow, for example, the control of oil application on components / seals or the detection of activators.

Further decisive advantages of our solutions: In addition to the high switching frequency of max. 35kHz, the "True Color" color detector ("See colors like a human does") and the evaluation software ("Evaluate colors like a human does") ensure that even the smallest color differences can be reliably detected even from moving objects.



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