MICRO-EPSILON

More Precision

colorCONTROL ACS7000 // Inline Photospectrometer

colorCONTROL ACS7000

- *Inline color measurement: 25Hz – 2,000Hz*
- *Measurement without touching the sample*
- *Measurement precision ΔE ≤ 0.08*
- *Inline color measurement: 25Hz – 2,000Hz*
- *Ethernet/EtherCAT, RS 422, digital I/O*
- *Web browser operation*

- Light source: Adjustable “standard illuminant” and “standard observers”
- Color space: XYZ; L*a*b*; L* u* v*; L*c*h°; adjustable
- Color recognition from a taught reference list
- White/black reference comparison (via browser and buttons on the device)
- Inline quality assurance and continuous monitoring
- Options: measuring head geometries for different technical surfaces

The colorCONTROL ACS7000 inline color measurement system not only recognises reference colors by comparison, but identifies individual colors clearly from their coordinates in the color space. With its very high measurement speeds, the colorCONTROL ACS7000 is suitable for applications where colors and shades have to be examined on-the-fly and to very high accuracies. Because of its high measurement accuracy, the system is also used in laboratory tasks.

Measuring principle

The spectral procedure is the most accurate method of color measurement. First, the sample is illuminated with a homogeneous white LED light. The spectrum of the reflected light is then calculated with a white reference. Then the coordinates in the CIE-XYZ color system are determined for all wavelengths of visible light (390 to 780nm) and output in the desired color space.The controller takes into account different observation conditions such as the type of light (illuminant) and standard observer.

Function

Three operating modes are possible with the colorCONTROL ACS7000: In the first mode, the color distance ΔE is measured for reference. The system operates with up to 15 taught values. In the second mode, the reflectivity spectrum of the sample is determined and output. In the third mode, color coordinates are determined and displayed in the desired color space. For quality inspection purposes, a trend analysis can be carried out over any time period via the L*a*b*; XYZ or L*c*h° color values.Measurements can be performed in all modes at speeds of up to 2kHz. Operation and display is via a Web interface. Light/dark correction can also be carried out using buttons on the controller or the user interface. Ethernet/ EtherCAT, RS422 and digital I/Os are available for data output.

Controller colorCONTROL ACS7000	
Article number	11104174
Spectral measuring range	390 - 780 nm
Measuring range reflectivity	0 - 200 %R
Output values	L*a*b*, L*u*v*, L*c*h°, XYZ, ΔE, spectrum
Illuminant	A, C, D65, D50, D75, E, F4, F7, F11, Off
Standard observer	2°, 10°
Distance models for color recognition	Sphere (ΔE), cylinder (ΔL*, Δa*b*), box (ΔL*, Δa*, Δb*), with individual tolerance parameters for every color taught
Color resolution	0.01 ΔE
Spectral resolution	5nm
Measuring frequency	25 - 2,000Hz (internal spectrum, signal averaging and data reduction are possible)
Temperature stability	<0.1 ΔE/°C
Light source	LED, 390 - 780nm
Reproducibility of the measurements of a device [1)]	<0.03 (mean); <0.08 (max) ΔE
Housing dimensions	210x120x90mm (WxHxD)
Weight	1.8kg
Protection class	IP40
Operating temperature	0°C to 45°C
Storage temperature	-20°C to 70°C
Inputs / Outputs	Four color detection switching outputs (4 individual colors or 15 colors binary or {ΔE, ΔL* Δa*, Δb*} for one color) 1 Switching output, synchronisation 1 Switching input, synchronisation 1 Switching output, measurement error
Interfaces	Ethernet/EtherCAT (DHCP-enabled) RS422 (USB via RS422 adapter is possible)
Connection for fiber optics	Illumination: 7mm ferrule with M18 cap (union) nut (analogous to MICRO-EPSILON Eltrotec Fasop system) Measuring: DIN fiber connector
Connection cables	To power supply: Art. No. 11234222 / to PLC: Art. No. 11234223 / to synchronisation: Art. No. 11234091 / to PC: Art. No. 11294232 (Ethernet/EtherCAT); 11234224 or 11234230 (RS422)
Additional data processing	Internal calculation of spectral characteristics, color valence calculations, color space transformations, ΔE calculations, and tolerance settings of the upper and lower thresholds for the color values
Connection to software	Control and configuration via integrated Web server or via terminal with commands Visualisation of spectral characteristics and temporal sequence of the color values and color differences
Power supply	24VDC +/- 15% 1000mA
Service life of the light source	>20,000h when operated at 25°C

[1)] Medium or maximum color distance ΔE of 1000 successive measurements of the color value (mean) of a light grey reference tile (R = 61%), measured with sensor FCS-T-ACS1-30/0-50-1200 at 200Hz and maximum illumination brightness