



Spectrophotometer PS401

From silk-screen patterns to precision injection-molded parts — one instrument for micro-aperture color measurement.

- 1mm micro-aperture: color deviations of micro objects can't escape detection

Handheld / probe dual-use design

High repeatability: $\Delta E^*_{ab} \leq 0.02$

- Built-in electronic color card — matches standard color numbers in one second

- 40+ observation light sources — meets global industry standards



Own the core tech: Top performance, budget price.



ISO9001



PS401 is a handheld / probe dual-use spectrophotometer. Equipped with a 1 mm ultra-small aperture, it is specifically designed for measurement of extremely small objects and precision color difference detection. Based on D/8 optical geometry, a dual-channel silicon photodiode array sensor, and a combined full-spectrum LED light source, the instrument delivers measurement repeatability $\Delta E^*_{ab} \leq 0.02$, ensuring accurate and reliable data. It supports SCI mode, and incorporates 32 observation light sources, 13 colorimetric indices, and multiple built-in electronic color cards, enabling fast matching of similar color card numbers. Compared with the PS301, the PS401 offers comprehensive upgrades in data stability, hardware performance, color spaces, colorimetric analysis capabilities, observation light source coverage, and visual display.



The PS401 features a dual-use design: it can be used as a complete “host + probe” integrated instrument for handheld measurement, or the probe can be used independently for flexible integration into industrial automation equipment. Equipped with USB, Bluetooth, RS485 and other mainstream industrial interfaces, it supports multi-device communication and coordinated work, enabling rapid integration into various automated production lines and the construction of distributed color measurement systems to meet the requirements of synchronous color monitoring at multiple points on complex production lines. It is widely used for color difference quality control in industries such as plastics & electronics, paints & inks, textile & apparel dyeing, printing, and ceramics.



Handheld + Probe Dual-Use Design

Can be operated as a complete instrument for laboratory or on-site sampling, or the probe can be used independently for integration into automation equipment, adapting to different work scenarios.



Micro-Aperture Measurement Capability

1 mm measurement aperture, suitable for precise color measurement of micro samples, fine areas, curved surfaces, or narrow spaces.



Lightweight Structure

Host only 250 g, probe (including calibration case) 240 g, compact dimensions, easy to hold or embed into equipment.



Handheld + probe



Measurement aperture is only 1mm



Main unit weighs only 250g

Built-in Electronic Color Cards — Intelligent Color Management



Built-in Electronic Color Card Library: Pre-loaded standard electronic color cards inside the device, eliminating the need to carry physical color card books for quick comparison between target colors and standard color samples.



One-Click Matching and Filtering: After measuring a sample, the instrument automatically identifies the closest electronic color card number and color difference data, helping users quickly determine color matching and deviation.



Efficient Quality Control: In incoming inspection, batch comparison, and finished product sampling for industries such as plastics & electronics, paints & inks, and textile printing, it greatly improves color judgment efficiency and reduces human error.



Expandability: Supports custom import or update of electronic color card libraries, enabling digital management and application of company-specific standard color libraries.



Industrial Interfaces and Coordination Capability



Multiple Interfaces: Equipped with USB, Bluetooth, RS485 (probe side), RS232, RJ45, etc., facilitating connection with PLCs, computers, printers, industrial controllers, etc., for high-speed data transmission and system integration.

Multi-Device Communication and Coordination: Supports networking of multiple devices, suitable for synchronous color monitoring at multiple points on automated production lines, building distributed color measurement systems.

External Trigger and Real-Time Feedback: Supports external trigger measurement, can work with production line sensors, robotic arms, etc., for automated, synchronized data acquisition, aiding closed-loop control.

High Precision and High Stability

400-700nm

Wavelength Range

≤0.02

Repeatability

≤0.3

Inter-Instrument Agreement

0.01

Display Resolution

Optical Core: Dual-channel silicon photodiode array sensor (dual-row 32 sets) and nano-integrated spectral device, wavelength range 400–700 nm, wavelength interval 10 nm, high spectral precision.

Good Repeatability: Colorimetric values ΔE^*ab standard deviation ≤ 0.02 (after white plate calibration, 30 measurements at 5 s intervals); spectral reflectance standard deviation $\leq 0.1\%$ ($\leq 0.2\%$ within 400–700 nm).

Small Inter-Instrument Agreement: $\Delta E^*ab \leq 0.3$ (average of BCRA Series II 12 color tiles), ensuring data consistency across multiple devices.

High Display Resolution: 0.01 display resolution, 0.01% reflectance resolution, reflectance measurement range 0–200%, meeting high-precision quality control requirements.

Comprehensive Colorimetric Indices and Software Ecosystem

Rich Colorimetric Indices

Supports CIE LAB, XYZ, Yxy, LCh, CIE LUV, s-RGB, HunterLab, βxy , DIN Lab99 and other color spaces; covers ΔE_{ab} , ΔE_{94} , ΔE_{cmc} , ΔE_{00} , $DIN\Delta E_{99}$ and other color difference formulas.

Diverse Colorimetric Indicators

Includes spectral reflectance, whiteness (ASTM E313, CIE/ISO, ISO2470/R457, etc.), yellowness (ASTM D1925, ASTM 313), metamerism index MI, staining/color change fastness, strength, hiding power, 555 hue classification, Munsell (C/2), blackness (My, dM), color density CMYK, Tint, etc.

Multiple Light Sources and Observer Angles

Supports over 40 observation light sources including D65, A, B, C, D50, F-series, LED-series, etc., and 2°/10° observer angles, meeting international standards.

Complete Software Ecosystem

Supports Android, iOS, Windows, WeChat Mini Program, HarmonyOS; quality management software available (downloadwebsite:http://www.3nh.com/en/client_en_14.html) for data storage, analysis, export, and traceability.

Durable and Stable – Adapts to Complex Environments

Long-Life Light Source: Combined full-spectrum LED light source, life up to 10 years or >3 million measurements, reducing maintenance costs.

Large Capacity Battery: 3200 mAh lithium battery, supports approx. 9 hours or 15,000 measurements per charge, meeting long working hour requirements.

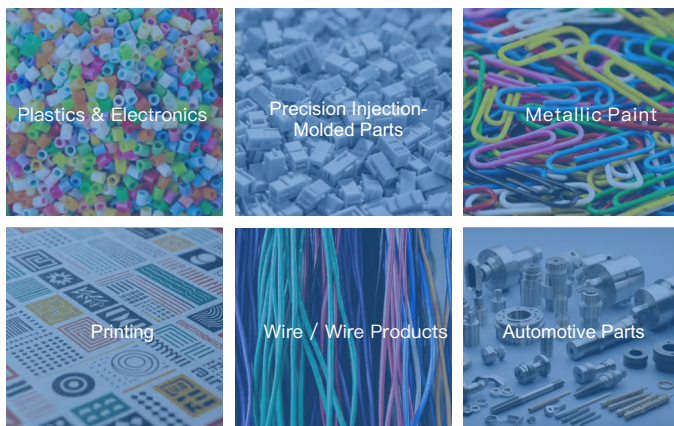
Strong Environmental Adaptability: Operating temperature 0–40°C, storage temperature –20 to 50°C, humidity ≤85% RH (non-condensing), suitable for industrial field environments.

Metrology Compliance Assurance: Factory-verified for metrology compliance, ensuring traceability and reliability of measurement results.



Application Fields

Ps401 is suitable for color difference quality control in industries such as plastics & electronics, paints & inks, textile & apparel dyeing, printing, ceramics, food packaging, cosmetics, automotive parts, etc. The 1 mm micro-aperture is suitable for color control of extremely small samples, precision injection-molded parts, silk-screen patterns, wires, and micro areas. The dual-use design and rich interfaces enable efficient, accurate, and stable color measurement in automated production lines, robotic arm integration, laboratory testing, mobile inspection, and other scenarios.



PRODUCT SPECIFICATIONS

Product Model	PS301 Spectrophotometer
Illumination Geometry	D/8° (diffuse illumination, 8° viewing), SCI (specular component included); complies with CIE No.15, GB/T 3978, GB 2893, GB/T 18833, ISO 7724-1, ASTM E1164, DIN 5033 Teil 7
Features	Dual-channel silicon photodiode array sensor, built-in electronic color cards. For color difference quality control in plastics & electronics, paints & inks, textile & apparel dyeing, printing, ceramics, and other industries.
Illumination Light Source	Combined full-spectrum LED
Integrating Sphere Size	Φ20 mm
Spectrophotometry Method	Nano-integrated spectral device
Sensor	Silicon photodiode array (dual-row 32 sets)
Measurement Wavelength Range	400–700 nm
Wavelength Interval	10 nm
Measurement Aperture	1 mm
Specular Component	SCI
Color Spaces	CIE LAB,XYZ,Yxy,LCh,CIE LUV,s-RGB,HunterLab,βxy,DIN Lab99
Color Difference Formula	ΔE^*_{ab} , ΔE^*_{uv} , ΔE^*_{94} , $\Delta E^*_{cmc}(2:1)$, $\Delta E^*_{cmc}(1:1)$, ΔE^*_{00} , $DIN\Delta E_{99}$, ΔE (Hunter)
Other Colorimetric Indices	Spectral reflectance, WI (ASTM E313, CIE/ISO, ISO2470/R457, AATCC, Hunter, Taube, Berger, Stensby), YI (ASTM D1925, ASTM 313), Metamerism Index MI, Staining fastness, Color change fastness, Strength, Hiding power, 555 Hue Classification, Munsell (C/2), Blackness (My, dM), Color density CMYK, Tint
Observer Angle	2°/10°
Observation Light Sources	D65,A,B,C,D50,D55,D75,F1,F2(CWF),F3,F4,F5,F6,F7(DLF),F8,F9,F10(TPL5),F11(TL84),F12(TL83/U30),U35,NBF,D50,D65,LED-B1,LED-B2,LED-B3,LED-B4,LED-B5,LED-BH1,LED-RGB1,LED-V1,LED-V2
Display	Spectral graph/data, sample colorimetric values, color difference values/graph, pass/fail results, color simulation, color deviation
Measurement Time	Approx. 1 s
Repeatability	Colorimetric values: standard deviation $\Delta E^*_{ab} \leq 0.02$ (after warm-up and calibration, 30 measurements of white plate at 5 s intervals); Spectral reflectance: standard deviation $\leq 0.1\%$ ($\leq 0.2\%$ for 400–700 nm)
Inter-Instrument Agreement	$\Delta E^*_{ab} \leq 0.3$ (average of measurements on 12 BCRA Series II color tiles)
Display Resolution	0.01
Reflectance Measurement Range	0–200%
Reflectance Resolution	0.01%
Measurement Modes	Single measurement, average measurement (2–99 times)
Positioning Method	Alignment guide lines
White Calibration Method	Contact white calibration
Dimensions	Host: 80 × 132 × 20 mm; Probe: $\phi 43 \times 73.5$ mm
Weight	Host: 250 g; Probe (including calibration case): 240 g
Battery	Lithium battery, 3.7 V, 3200 mAh, supports 15,000 measurements within 9 hours
Light Source Lifespan	10 years or >3 million measurements
Display Screen	TFT true color, 3.5-inch, capacitive touchscreen
Interfaces	USB, Bluetooth, RS485 (probe)
Data Storage	500 standard samples, 10,000 test samples; mass storage via app/PC
Software Support	Android, iOS, Windows, WeChat Mini Program, HarmonyOS
Languages	Simplified Chinese, English, Traditional Chinese, Russian
Operating Temperature Range	0–40°C, 0–85% RH (non-condensing), altitude below 2000 m
Storage Temperature Range	–20 to 50°C, 0–85% RH (non-condensing)
Accuracy Assurance	Certified metrology compliance
Standard Accessories	Power adapter, USB cable, user manual, quality management software (download from official website), white calibration case, positioning plate, Bluetooth adapter, RS485 adapter
Optional Accessories	Micro printer

