



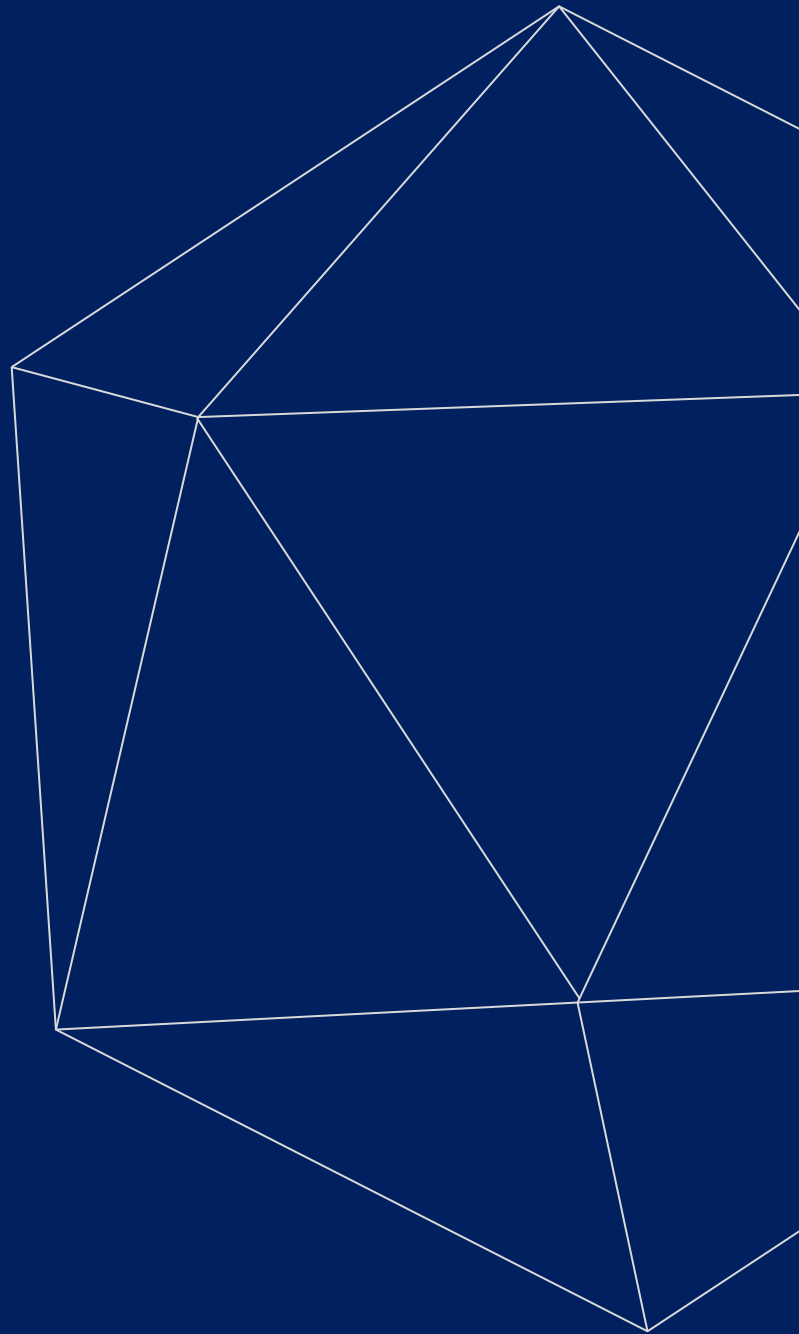
# LABORATORY LINES

## SPECTROPHOTOMETERS



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With more than 25 years growing with our customers, Kalstein's multiformat and modern content, is now present in more than 10 countries and increasing.



## Multi-angle Spectrophotometer with 3 Angles

### Model YR05488 // YR05490



#### Product Description

YR05488 // YR05490 multi-angle spectrophotometer adopts industrial grade MCU and is equipped with 3 measuring angles, under the superior performance of optical measuring system compatible with YR05488 // YR05490 multi-angle spectrophotometer has excellent performance in measuring multi-angle chromatic aberration even on the curved surface , but also has high accuracy and measurement stability.

Kalstein YR05488 // YR05490 multi-angle spectrophotometer is used to measure the color difference of surface paint which is affected by different viewing angles and viewing conditions. It can provide accurate and uniform color measurement for metallic, pearlescent and other finished products with complex special effects.

Multi-angle spectrophotometer YR05488 // YR05490 adopts industrial grade MCU and is equipped with 3 measuring angles, under the superior performance of optical measuring system compatible with multi-angle spectrophotometer YR05488 // YR05490 has excellent performance in multi-angle chromatic aberration measurement, even on the curved surface , but also has high accuracy and measurement stability.



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## Multi-angle Spectrophotometer with 3 Angles

Model YR05488 // YR05490



### Technical Characteristics

1. Multi-angle measurement
2. Adopt 3 light sources, 1 receiver to measure 3 measuring angles at the same time.
3. More intuitive display The touch screen can display all angle measurement results, a more intuitive view of the complete data.
4. touch screen can display all angle measurement results, more intuitive view of complete data.
5. 256" dual-matrix CMOS imaging element image sensor
6. Higher optical resolution ensures the measurement speed, accuracy, stability and consistency of the instrument. Core technology makes it the same platform with international standards and full compatibility.
7. Adopt full-spectrum LED light source with blue enhancement
8. The blue-enhanced full-spectrum LED light source ensures sufficient spectral distribution in the visible light range, avoids LED spectral loss in a specific band, and guarantees the accuracy of the instrument's measurement results and low maintenance cost.
9. Spectrophotometric concave grating technology
10. The use of concave grating spectrophotometric technology, with higher resolution, makes color measurement more accurate.
11. Professional-quality whiteboard Professional-quality whiteboard
12. professional, high surface hardness, stable optical performance
13. Higher quality industrial grade real-time processing MCU , WIFI compatible, Bluetooth 5.0 transfer more stable and reliable.
14. Ergonomics Novel and modern appearance design.
15. The appearance design of the instrument is easy to operate, and the manual clamping different position and measuring button are well designed, which can satisfy clamping habits, smooth and fine surface, from the treatment process of high precision appearance.
16. Color camera preview, can clearly observe the measured area.
17. Built-in color camera positioning, can accurately judge the measured position of the object and improve the measurement efficiency and accuracy.
18. Multiple color measurement space, multiple observation light sources
19. Offer CIE LAB, XYZ, Yxy, LCh,  $\beta$  XY, DIN Lab99 and D65 color space, A, C, D50, D55, D75, F1, F2 (CWF), F3, F4 and F5, F6 and F7 (DLF), F8, F9, F10 (TPL5) and F11 (TL84), F12 (TL83/U30) A variety of light sources that can meet the special measurement demand in different measurement conditions.
20. Easily analyze data
21. The display can intuitively show spectrum/data, sample chromaticity value, color difference value/figure, pass/fail results, color simulation, sample effect value, effect difference value and other data, convenient to view and greatly improve the user's. work efficiently.



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## Multi-angle Spectrophotometer with 3 Angles

Model YR05488 // YR05490



Model	YR05488	YR05489
Measurement Geometry	3 measurement angles (3 illumination sources, 1 receivers)	5 measurement angles (5 illumination sources, 1 receivers)
Measure Angle	45° Receiver : 45as25°,45as45°,45as110°	45° Receiver :
	Conform to the standards : ASTM D 2244,E 308,E 1164,E 2194, E2539,DIN 5033,5036,6174,6175-1,6175-2;ISO 7724, 11664-4 SAE J 1545	Conform to the standards : ASTM D 2244,E 308,E 1164,E 2194, E2539,DIN 5033,5036,6174,6175-1,6175-2;ISO 7724, 11664-4 SAE J 1545
Application	Provide accurate and consistent color measurement for metallic, pearlescent and other complex special effect color products	Provide accurate and consistent color measurement for metallic , pearlescent and other complex special effect color products
Light Source	Full spectrum LED light source with blue enhancement	Full spectrum LED light source with blue enhancement
Lamp Life	5 years, 3 million times measurements	5 years, 3 million times measurements
Spectrophotometric Mode	Concave Grating	Concave Grating
Sensor	256 Image Element Double Array CMOS Image Sensor	256 Image Element Double Array CMOS Image Sensor
Wavelength Range	400nm-700nm	400nm-700nm
Wavelength Interval	10nm	10nm
Measurement Range	0~600%	0~600%
Semiband Width	10nm	10nm
Measuring Aperture	Φ12mm	Φ12mm
Color Space	CIE LAB,XYZ,Yxy,LCh,βxy,DIN Lab99	CIE LAB,XYZ,Yxy,LCh,βxy,DIN Lab99
Color Difference Formula	ΔE*ab,ΔE*94,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE*00, DINΔE99,ΔE DIN6175	ΔE*ab,ΔE*94,ΔE*cmc(2:1),ΔE*cmc(1:1),ΔE*00, DINΔE99,ΔE DIN6175
Other Colorimetric Index	Flop Index	Flop Index
Observer Angle	2°/10°	2°/10°
Illuminant	D65,A,C,D50,D55,D75,F1,F2(CWF),F3,F4,F5,F6, F7(DLF),F8,F9,F10(TPL5),F11(TL84),F12(TL83/U30)	D65,A,C,D50,D55,D75,F1,F2(CWF),F3,F4,F5,F6,F7(DLF), F8,F9,F10(TPL5),F11(TL84),F12(TL83/U30)
Display	Spectrogram/Values, Samples Chromaticity Values, Color Difference Values/Graph, PASS/FAIL Result, Color Offset	Spectrogram/Values, Samples Chromaticity Values, Color Difference Values/Graph, PASS/FAIL Result, Color Offset
Measuring Time	Approx. 1 second for one angle	Approx. 1 second for one angle
	Approx. 3 seconds for all angles	Approx. 5 seconds for all angles
Repeatability	Spectral reflectance: Standard deviation within 0.08%	Spectral reflectance: Standard deviation within 0.08%
	Chromaticity value: ΔE*ab 0.04 ( When a white calibration plate is measured 30 times at 5 second intervals after white calibration)	Chromaticity value: ΔE*ab 0.03 ( When a white calibration plate is measured 30 times at 5 second intervals after white calibration)



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## Multi-angle Spectrophotometer with 3 Angles Model YR05488 // YR05490



Model	YR05488	YR05489
Reproducibility	$\Delta E^* < 0.10$ , avg on the gray tile of BCRA tile set $\Delta E^* < 0.25$ , avg on the color BCRA tile set	$\Delta E^* < 0.10$ , avg on the gray tile of BCRA tile set $\Delta E^* < 0.25$ , avg on the color BCRA tile set
Inter-instrument Error	$0.2\Delta E^*00$ (avg on reference Series II BCRA tile set)	$0.2\Delta E^*00$ (avg on reference Series II BCRA tile set)
Effect Parameters	/	/
Effect Measurement	/	/
Effect Repeatability	/	/
Effect Reproducibility	/	/
Trigger mode	Pressure sensing trigger, button trigger, software trigger	Pressure sensing trigger, button trigger, software trigger
Measuring Mode	Single measurement, average measurement (1-99), continuous measurement (1-99)	Single measurement, average measurement (1-99), continuous measurement (1-99)
Locating Mode	Color camera preview	Color camera preview
Dimension	L*W*H=195X83X128mm	L*W*H=195X83X128mm
Weight	About 1Kg	About 1Kg
Power	lithium-ion battery, 3.7V,3200mAh, Continuous test 6000 times within 8 hours of full charge	lithium-ion battery, 3.7V,3200mAh, Continuous test 6000 times within 8 hours of full charge
Display	3.5-inch TFT color LCD, Capacitive Touch Screen	3.5-inch TFT color LCD, Capacitive Touch Screen
Interface	USB	USB, Bluetooth 5.0
Data Storage	1000 pcs Standards, 4000 pcs Samples	1000 pcs Standards, 4000 pcs Samples
Language	Simplified Chinese, Traditional Chinese, English	Simplified Chinese, Traditional Chinese, English
Operating Environment	10°C to 50°C, humidity does not exceed 85%, no condensation	10°C to 50°C, humidity does not exceed 85%, no condensation
Storage Environment	-20°C to 50°C, humidity does not exceed 85%, no condensation	-20°C to 50°C, humidity does not exceed 85%, no condensation
Calibration	Built-in white board parameters, external white board, black light trap	Built-in white board parameters, external white board, black light trap
Calibration Interval	4 hours, 8 hours, 24 hours, Startup calibration	4 hours, 8 hours, 24 hours, Startup calibration
Standard accessories	Power Adapter, USB Cable, User Guide, PC Software (download from the official website), Calibration Board, black light trap, Protective cap, wristband	Power Adapter, USB Cable, User Guide, PC Software (download from the official website), Calibration Board, black light trap, Protective cap, wristband
Optional Accessory	Micro-printer	Micro-printer
Notes	Technical parameters are for reference only, subject to actual sales products.	Technical parameters are for reference only, subject to actual sales products.



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## Multi-angle Spectrophotometer with 3 Angles

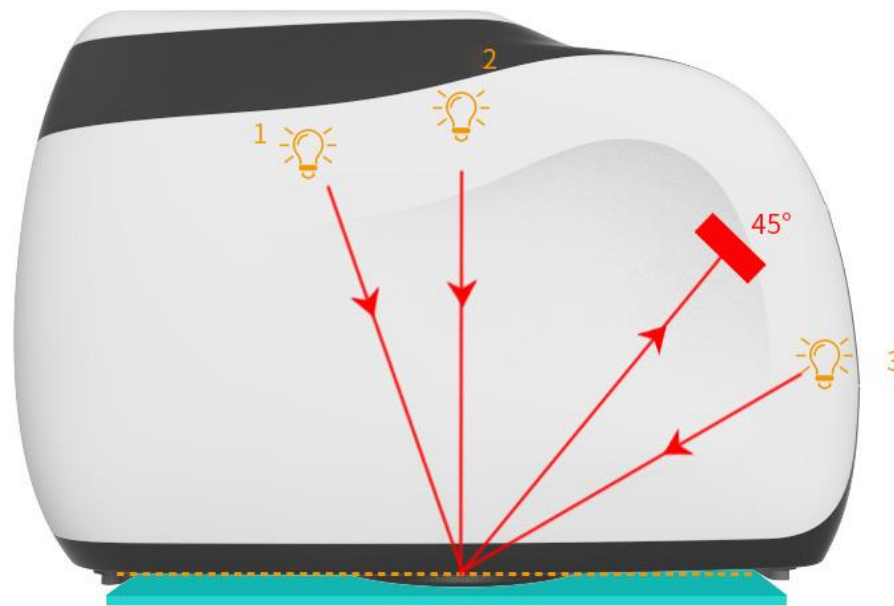
Model YR05488 // YR05490



### Technical characteristics

#### 1. Multi-angle measurement

Adopt 3 illumination sources, 1 receivers to measure 3 measurement angles at the same time



Light source 1~3

1 receivers



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## Multi-angle Spectrophotometer with 3 Angles

Model YR05488 // YR05490



### 2. More intuitive display

Touch screen can display all Angle measurement results, more intuitive view of the comprehensive data.



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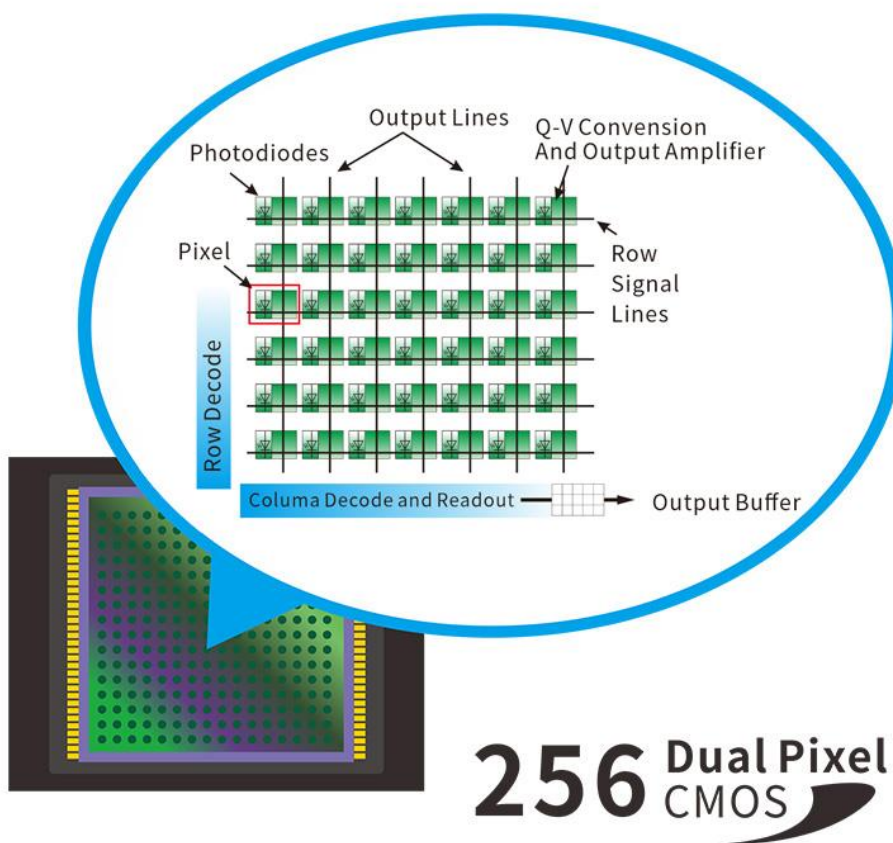


## Multi-angle Spectrophotometer with 3 Angles Model YR05488 // YR05490



### 3. 256 Image Element Double Array CMOS Image Sensor

The higher optical resolution ensures the measuring speed, accuracy, stability and consistency of the instrument. The core technology makes it as the same platform with international standards and complete compatibility.



## 256 Dual Pixel CMOS



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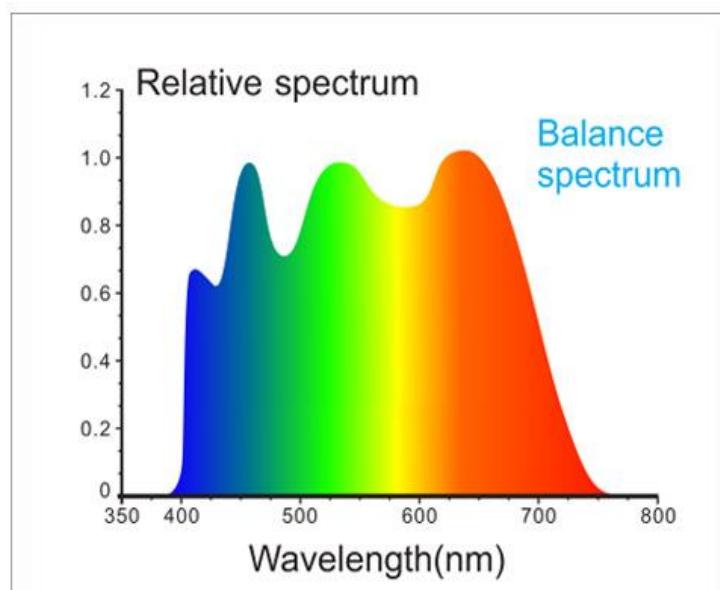
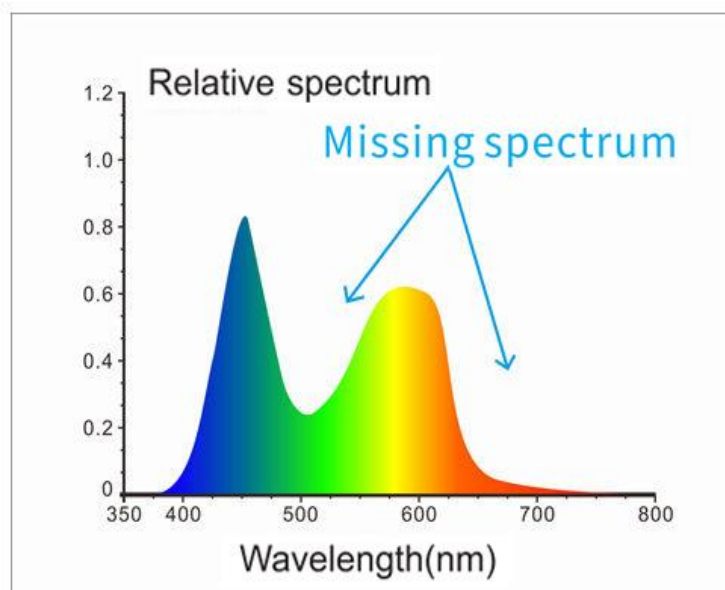
## Multi-angle Spectrophotometer with 3 Angles

### Model YR05488 // YR05490



#### 4. Adopt Full spectrum LED light source with blue enhancement

The Full spectrum LED light source with blue enhancement ensures sufficient spectral distribution in the visible light range, avoids the spectral loss of LED in a specific band, and ensures the accuracy of instrument measurement results and low cost maintenance.



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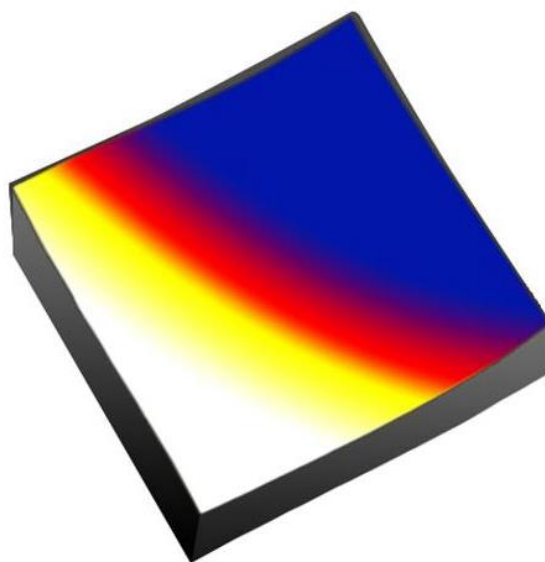


## Multi-angle Spectrophotometer with 3 Angles Model YR05488 // YR05490



### 5. Concave grating spectrophotometric technology

Using concave grating spectrophotometric technology, with higher resolution, makes color measurement more accurate.



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## Multi-angle Spectrophotometer with 3 Angles

Model YR05488 // YR05490



### 6. Professional-grade white board

Professional-grade white board, high hardness in the surface, stable optical performance



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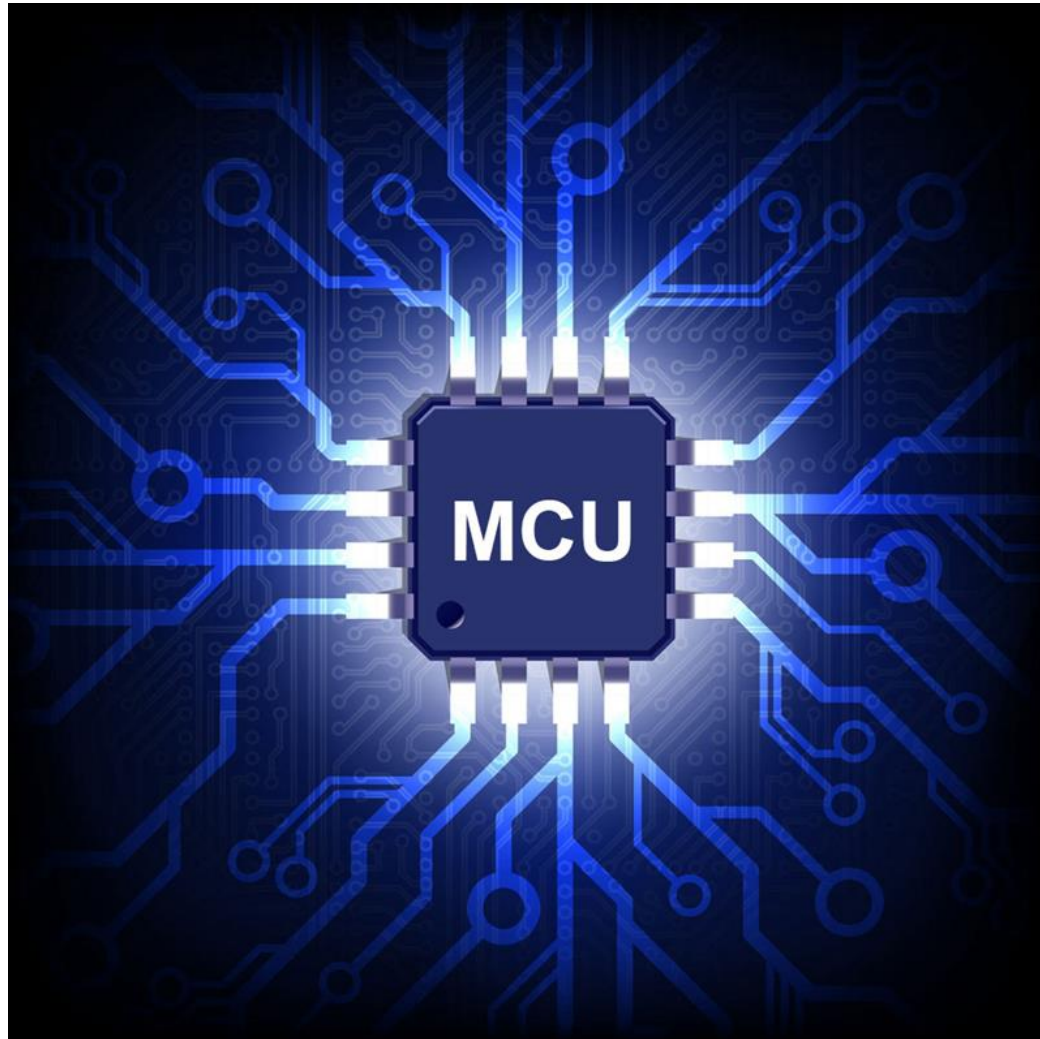


## Multi-angle Spectrophotometer with 3 Angles Model YR05488 // YR05490



### 7. Higher quality

Industrial grade real-time processing MCU, Bluetooth 5.0 transferring more stable and reliable.



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## Multi-angle Spectrophotometer with 3 Angles

### Model YR05488 // YR05490



#### 8. Ergonomics Novel and fashionable appearance design

The instrument appearance design is easy to operate, and the hand holding position and the measurement button are well-designed, which can meet different holding habits. smooth and fine surface. from the high-precision appearance treatment



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## Multi-angle Spectrophotometer with 3 Angles

Model YR05488 // YR05490



### 9. Color camera preview, can clearly observe the measured area

Built-in color camera positioning, can accurately judge the object measured position, and improve the measurement efficiency and accuracy.



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## Multi-angle Spectrophotometer with 3 Angles

### Model YR05488 // YR05490



#### 10. Multiple color measurement space, multiple observation light sources

Offer CIE LAB,XYZ,Yxy,LCh, $\beta$  XY,DIN Lab99 color space, And D65, A, C, D50, D55, D75, F1, F2 (CWF), F3, F4 and F5, F6 and F7 (DLF), F8, F9, F10 (TPL5), and F11 (TL84), F12 (TL83/U30) A variety of light source, which can meet the special measurement demand under different measurement conditions.



ColorSpace



Illuminant



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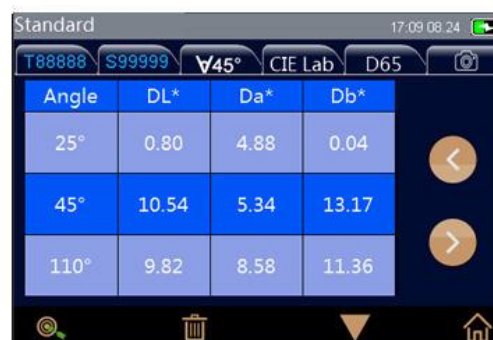


### 11. Easily analyze data

The screen can intuitively display spectrum/data, sample chromaticity value, color difference value/figure, pass/fail results, color simulation, sample effect value, effect difference value and other data, convenient to view while also greatly improve the user's work efficiency.



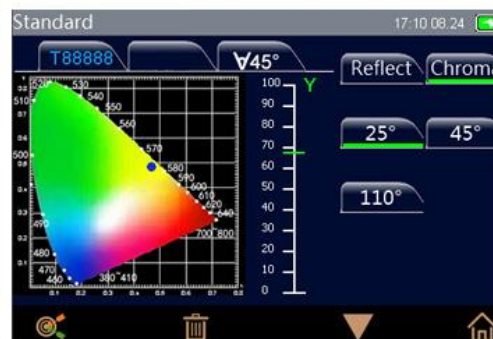
Color data



Color difference value



Color difference graph



Samples Chromaticity values



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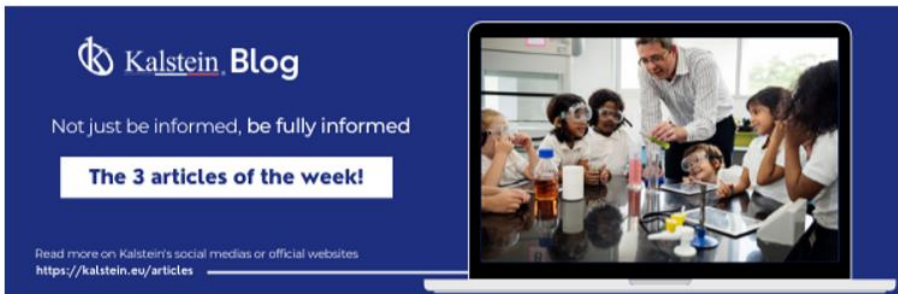
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