



Luminance Colorimeter

# **BM-7A**



High speed  
High Accuracy  
Cost reduction

# Delivers improved luminance accuracy and faster measurement speed.

## Luminance Colorimeter **BM-7A**



### ■ Main Applications for BM-7A

Optical property evaluation for flat panel displays, luminance/chromaticity/color temperature measurement for lamps and other light sources



LCD



Organic EL



Signal light, blackout light



Stop lamp



Plasma display



LED



Cold-cathode tube

## Features

### Point.1 Luminance accuracy

Delivers luminance accuracy within  $\pm 2\%$  (for Standard source A, measurement angle  $2^\circ$ , luminance  $5\text{cd/m}^2$  or above, Auto Range)

### Point.2 Delivers high-speed measurement

Measurement speed of just 0.5 seconds. Ideal for inline measurement in mass production settings.

### Point.3 Internal interfaces

Dual interface options:  
USB 1.1 and RS-232C.



### Point.5 Analog output (optional)

Optional three-channel analog output to X2, Y and Z channels for recording and waveform observation using a recorder or oscilloscope.

○Analog output

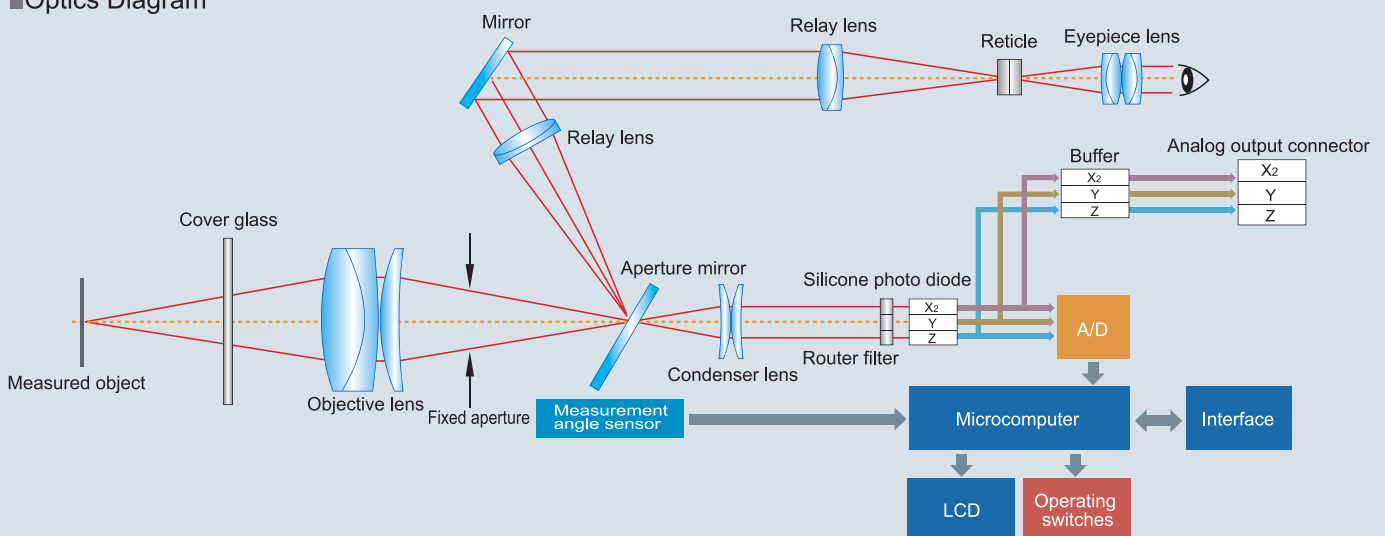
(Unit:ms)

	Range1	Range2	Range3	Range4	Range5
FAST	30	30	30	0.3	0.3

Above response speed indicates time required for BM-7A analog output to reach 90% of peak value, when measuring an LED using a square wave produced by a function generator.

- Output impedance is approximately  $100\Omega$ .
- Recording instrument must have input impedance of  $10\text{ k}\Omega$  or above.
- Output voltage:0-3.0V
- [Note] Customer must specify analog output at time of purchase.

### ■ Optics Diagram

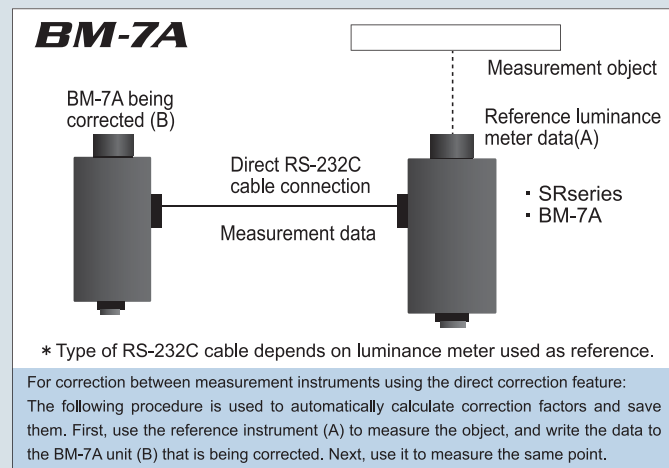


# Connects directly to standard instruments for direct color correction.

## Point.5 Delivers two methods for simplifying instrument correction

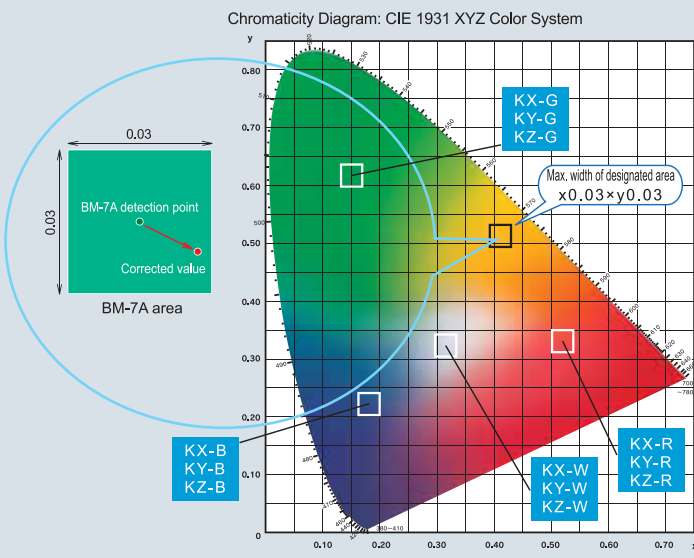
### ● Direct Correction

Color correction factors can now be directly entered into the BM-7A Luminance Colorimeter without relying on a PC, through direction connection to an SRseries Spectroradiometer or another BM-7A unit. RS-232C cable is required for correction. Corrections are automatically calculated and entered based on reference luminance meter data, and data from the BM-7A unit being corrected.



### ● Area Correction (CS-900A Software)

Automatically applies specified color correction factors (KX, KY, KZ) when the BM-7A Luminance Colorimeter detects light within the designated area. Significantly reduces extra work to select color correction factors for multiple measurement samples.



### ■ colorimetry software CS-900A (standard accessory)

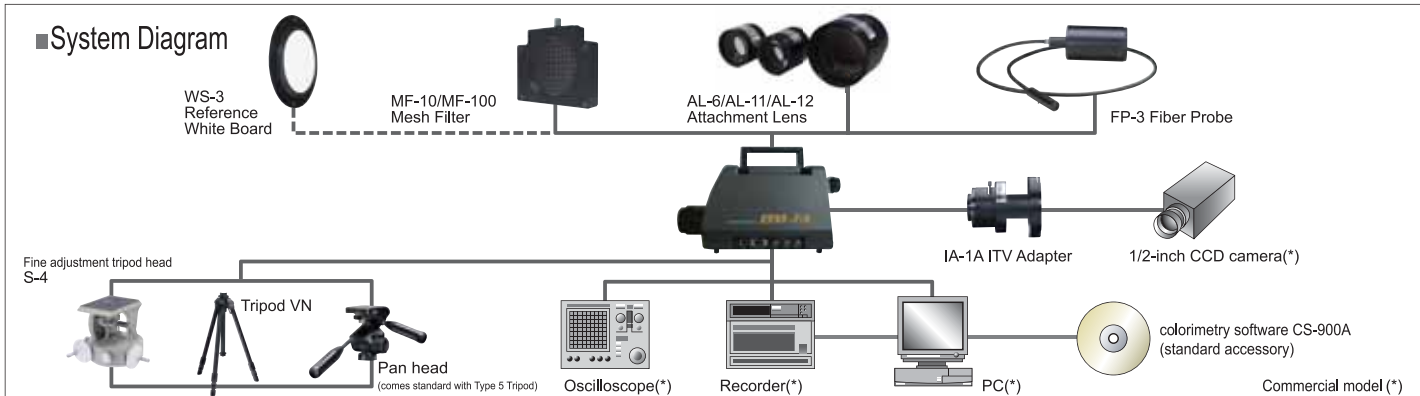
Application software CS-900A for Windows supports BM-7A. You can control BM-7A using by the CS-900A, and collect, save, plot on a graph and calculate of the measured data and, use them for many purpose.

On the Colorimetry mode, it can shorten the communication time between the instrument and PC due to omitting spectral data transmission.

OS	Windows XP Professional / Home Service Pack2 or more Windows Vista Ultimate(32bit), Windows 7 Ultimate/Professional(32bit)
CPU	PentiumIV2.8GHz or more
Memory	1GB or more
HDD	1GB or more
Ports	USB2.0 (One port) or RS-232C serial port (One port)

\*The RS-232C cable (interlink cable for DOS/V PC) must be purchased separately.

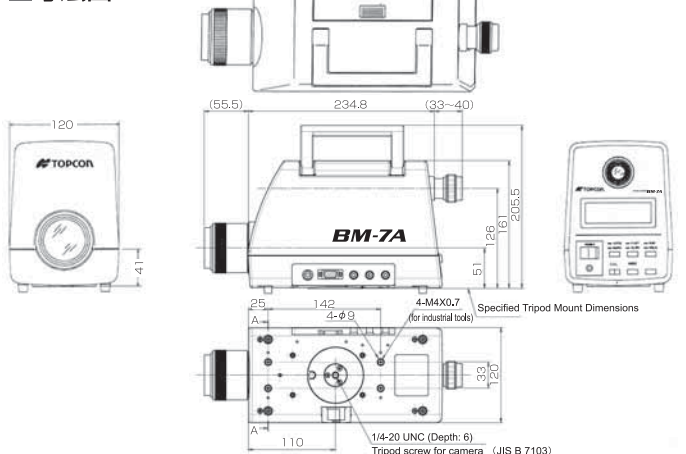
### ■ System Diagram



### ■ Hardware Features



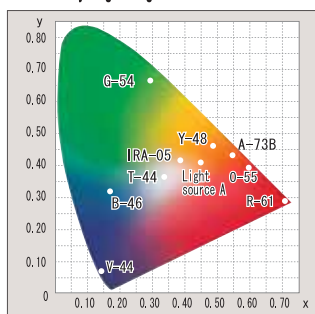
### ■ 寸法図



## ■Specifications, Performance

Optics	Objective lens: Focal distance $f = 80\text{mm}$ , F2.5 Eyepiece lens: $5^\circ$ view field, $\pm 5$ diopter adjustment range					
Spectral response characteristic	Similar to CIE1931 color matching functions					
Photo cell	3-element silicon photodiode (X <sub>s</sub> , Y, Z)					
Measurement angle	Selectable aperture of $2^\circ$ , $1^\circ$ , $0.2^\circ$ and $0.1^\circ$					
Measurement distance	350 mm to $\infty$ (from front of objective lens)					
Measurement diameter (mm $\phi$ )	Measurement angle	Measurement distance (mm)				
		350	500	1000	5000	10000
	$2^\circ$	10	15.4	32.8	169	341
	$1^\circ$	5	7.7	16.4	85	170
	$0.2^\circ$	1	1.5	3.3	17	34
	$0.1^\circ$	0.5	0.8	1.6	8	17
Measurement functions	x, y, L (x, y: chromaticity coordinates, L: luminance) $\pm \Delta$ , $u', v', L (u', v', L: chromaticity coordinates, L: luminance) \pm \Delta$					
	X, Y, Z (X, Y, Z: tristimulus values) $\pm \Delta$ , T <sub>c</sub> , duv, L (T <sub>c</sub> : correlated color temperature, duv: deviation) $\pm \Delta$ , CIE 1976 L*a*b* $\Delta E_{ab}^*$ $\pm \Delta$ , CIE 1976 L*u*v* $\Delta E_{uv}^*$ $\pm \Delta$ , CIE 1976 L*a*b* $\Delta E_{ab}^*$ $\pm \Delta$ , CIE 1976 L*u*v* $\Delta E_{uv}^*$ $\pm \Delta$					
Measurement range	Auto, Manual (5-step selectable)					
Measurement range (not a guaranteed accuracy range)	0.01 ~ 12,000,000 cd/m <sup>2</sup>					
		Measurement angle				
		2	1	0.2	0.1	
	Range 1	0.01 ~ 30	0.04 ~ 120	1 ~ 3,000	4 ~ 12,000	
	Range 2	0.03 ~ 90	0.12 ~ 360	3 ~ 9,000	12 ~ 36,000	
	Range 3	0.1 ~ 300	0.4 ~ 1,200	10 ~ 30,000	40 ~ 120,000	
Range 4	1 ~ 3,000	4 ~ 12,000	100 ~ 300,000	400 ~ 1,200,000		
Range 5	10 ~ 30,000	40 ~ 120,000	1,000 ~ 3,000,000	4,000 ~ 12,000,000		
Accuracy (for standard source A)	<ul style="list-style-type: none"> <li>Luminance 1: 1-5 cd/m<sup>2</sup> within <math>\pm 4\%</math> (measurement angle <math>2^\circ</math> Auto Range)</li> <li>Luminance 2: 5 cd/m<sup>2</sup> or above within <math>\pm 2\%</math> (measurement angle <math>2^\circ</math> Auto Range)</li> <li>Chromaticity 1: dx, dy within <math>\pm 0.002</math> (10 cd/m<sup>2</sup> or above)</li> <li>Chromaticity 2: dx, dy within <math>\pm 0.01</math> (O-55, Y-48, A-73B, IRA-05, T-44)</li> <li>dx, dy within <math>\pm 0.03</math> (R-61, B-46, V-44, G-54)</li> </ul>					
	*For combined standard source A (100 cd/m <sup>2</sup> ) and color glass filter					
Repeatability (for standard source A)	<ul style="list-style-type: none"> <li>Luminance 1: 1-5 cd/m<sup>2</sup>: 1% or less (measurement angle <math>2^\circ</math>, 2<math>\sigma</math>, SLOW mode, Auto Range)</li> <li>Luminance 2: 5 cd/m<sup>2</sup> or above: 0.5% or less (measurement angle <math>2^\circ</math>, 2<math>\sigma</math>, SLOW mode, Auto Range)</li> <li>Chromaticity 1: 1-5 cd/m<sup>2</sup> chromaticity x, y: within 0.005 (measurement angle <math>2^\circ</math> SLOW mode, Auto Range)</li> <li>Chromaticity 2: 5 cd/m<sup>2</sup> or above, chromaticity x, y: within 0.002 (measurement angle <math>2^\circ</math> SLOW mode, Auto Range)</li> </ul>					
	<ul style="list-style-type: none"> <li>Measurement time: Approx. 0.5 sec (FAST or SLOW)</li> <li>Display: Dot matrix LCD: 20 digits x 4 lines with illumination function</li> <li>Minimum luminance display: 0.01 cd/m<sup>2</sup></li> <li>Interface: Selectable USB 1.1 or RS-232C</li> <li>Power supply: Dedicated AC adapter (AC 100V to 240V, 50/60 Hz)</li> <li>Power consumption: Approx. 2.5W</li> <li>Operating requirements: Temperature: 0-40°C Humidity: Below 85% RH (must be condensation free)</li> <li>Storage requirements: Temperature: -20 to 60°C Humidity: Below 85% RH (must be condensation free)</li> <li>External dimensions: Approx. 325 x 120 x 162 mm (L x W x H)</li> <li>Weight: Approx. 3 kg (main unit only)</li> </ul>					

## ■Chromaticity Diagram: Light Source A+Color Glass Filter



## ■BM-7A Standard Package

- BM-7A Luminance Colorimeter ..... 1ea.
- AC adapter ..... 1ea.
- Objective lens cap ..... 1ea.
- Eyepiece lens cap ..... 1ea.
- CD-ROM (colorimetry software CS-900A/Instruction manual)... 1ea.
- Quick Manual ..... 1ea.

\*Carrying case is separate.

## ■Optional Accessories



### ●AL-6/AL-11/AL-12 Attachment Lens

Attaches to the objective lens on the BM-7A unit. Shortens the focal distance and shrinks the minimum measurement area for measurement of small objects.

(Specifications for Measuring Small Objects)

Measurement diameter (mm $\phi$ )	Measurement angle	AL-6 (measurement distance: 43 to 57mm)	AL-11 (measurement distance: 20.4 to 24.8mm)	AL-12 (measurement distance: 165 to 197mm)
		$2^\circ$	1.98 to 2.75	1.22 to 1.49
$1^\circ$	0.99 to 1.37	0.61 to 0.74	1.56 to 1.99	
$0.2^\circ$	0.20 to 0.27	0.12 to 0.15	0.31 to 0.40	
$0.1^\circ$	0.10 to 0.13	0.06 to 0.07	0.16 to 0.20	

\*Measurement distance may differ slightly depending on aperture mirror machining accuracy.

\*Measurement distance is from metal tip of attachment lens.



### ●WS-3 Reference White Board

Used for measurement of object color or light source with directionality.

- Luminance factor: 90% or above (for measurement parameters of  $0^\circ$  incidence and 45 $^\circ$  observation)
- Material: Barium sulfate (BaSO<sub>4</sub>)
- Dimensions: 78 mm  $\phi$ , t = 12.5 mm ●Effective white surface: 40 mm  $\phi$  (at center)



### ●FP-3 Fiber Probe

Light guide used for remote detection of light from measurement object.

- Effective measurement angle:  $2^\circ$  ●Measurement diameter: 3-10 mm  $\phi$
- Measurement distance: 31.0-84.9 mm ●Fiber length: Approx. 1m



### ●IA-1A ITV Adapter

Adapter for connecting BM-7A to CCD camera.



### ●MF-10/MF-100 Mesh Filter

Mesh type filter for measuring objects with brightness exceeding measurement range of BM-7A.



### ●Tripod VN

Simplifies collimation of measurement object.

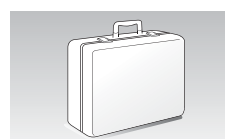
- Max. height: 1835 mm ●Min. height: 585 mm
- Folded length: 810 mm ●Leg sections: 3
- Weight: 4.8 kg (with pan head)



### ●Fine Adjustment Stand S-4

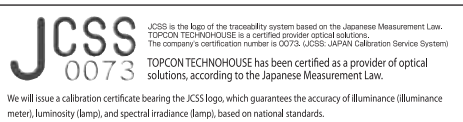
Simplifies vertical and lateral collimation when attaching BM-7A. (Unit must be removed from pan head of type 5 tripod.)

- Elevation angle:  $40^\circ$  ●Depression angle:  $80^\circ$
- Rotation:  $360^\circ$  ●Weight: Approx. 1.7 kg



### ●Carrying Case

Convenient carrying case for transport or storage when not in use.



\*The specifications and external appearances of product in this catalogue may be changed without prior notice due to improvements.  
\*The catalogue includes products that are sold separately.  
\*The actual color of products may differ slightly from the catalogue due to lighting and printing conditions.

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**Note** Make sure to carefully read the "User's Manual" to ensure that you use the product properly and safely.

<http://www.topcon-techno.co.jp>