MULTIMEDIA DISPLAY TESTER



3298F

Multimedia Display Tester



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Safety Standards; EN61010-1 EMC Standards; EN55011 Group 1 Class A EN61326-1 EN61000-3-2 EN61000-3-3

Do you want to measure the luminance, contrast, flicker, and chromaticity of displays? You only need a single...

Slashes the time needed for adjustment and inspection of luminance, contrast, flicker, and chromaticity of displays.

High cost-performance

Lets you measure luminance, contrast, flicker and chromaticity all with just one device. The lowcost design greatly reduces the product's price.

Digital and bar graph indications

Measurements for adjustment or inspection work are displayed both as digital values and bar graphs. User-specified MIN, MAX and other criteria can be entered for GO/NO-GO testing of production line samples.

Light source color calibration coefficients

Color correction coefficients for three light source types (type A standard light source, threewavelength fluorescent lamp and CRT display) ensure accurate chromaticity measurements for each color and light source.

Excellent PC interface

In addition to a built-in memory with capacity to store measurement data for up to 200 displays, an RS-232 interface port included as standard equipment makes data communication and control from a PC simple.

Easy operation with contact-free system

The shading cylinder type optical system lets you make easy measurements just by moving the sensor within range of the specimen.

- Luminance, contrast, flicker and chromaticity measurements
- Digital and bar graph indications
- Shading cylinder type optical system
- Luminance measurement range of 0.01 to 40,000 cd/m²
- Memory for measured data from 200 displays
- GO/NO-GO determination functions
- User-specified color calibration coefficients
- Light source color calibration coefficients
- Easy operation
- Compact and lightweight
- Battery-driven



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Measurement Functions

Luminance Measurement	MemNo.001 · FL3
Displays luminance as a digital value and bar graph in a range of 0.01 to 40,000 cd/m ² . User-specified MIN, MAX and other criteria can be entered for GO/NO-GO testing.	39.08 40.08 35.08 L 35.11 cd/m2 60/N6: 60 ENTER: Mem
Contrast Measurement	MemNo. 881 * FL3
Measures the luminance of the "white" and "black" displays to instantaneously calculate and display the contrast. The calculated contrast is compared with the user- set value for GO/NO-GO testing.	□ 116.0 cd/m2 ■ <u>0.75</u> cd/m2 Min 100.0 Cntrst 154.6 GO/NG: GO ENTER: Mem □ / ■ ◆
Flicker Measurement	MemNo.001 () FL3
Displays flicker ratio (ACrms/DC) as digital values (% and dB) and a bar graph. Useful for flicker adjustment.	2.0% 2.0% Flicker 1.25 % - 19.00 dB L GO/NG:2.31 cd/m2 ENTER: Mem

Chromaticity Measurement	MemNo.001 + FL3
Chromaticity measurement mode Displays GO or NO-GO for the measured value based on the user- specified reference color and range. A different color calibration coefficient can be set for up to 10 different display types and 6 reference colors, enabling more precise chromaticity measurements for each color in each display.	x 0.3067 y 0.5085 L 37.57 cd/m2 Ref PANEL01 %0/NG2 NOGO ENTER: Mem ColorSws‡
Display modes (x, y, L), (u', v', L), (X, Y, Z), (Tc, duv, L)	60 100 148% R 106.6%
White balance measurement mode Displays the difference between the RGBL measured values and the target values in real time.	B B B B B B B B C B C C C C C C C C C C C C C
Display modes	ENTER: Mem ColorSyst

R, G, B, RGB ratio

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Flicker Measurement

Measures the light's average luminance (DC) and effective flicker value (ACrms) to calculate and display the flicker ratio (ACrms/DC). The flicker of base frequencies between 20 and 90 Hz can be measured by varying the programmable low-pass filter's cutoff frequency. The flicker correction function enables conversions to flicker ratios (%, dB) defined by JEITA and VESA standards.



High-Precision Chromaticity Measurement The characteristics of the color filters in

3298F's photodetector approximate the CIE 1931 color matching functions, and the tester performs optimization calculations to minimize error. Each sensor is calibrated with a combination of a type A standard light source/three-wavelength fluorescent lamp and color filters. The optimized coefficient calculated for each light source is used to enable high-precision color measurement.



White Balance Adjustment The 3298F displays RGBL levels for differences between Rm, Gm and Bm values (calculated from measured tristimulus values) and Rs, Gs and Bs values (calculated from the target color temperature/luminance) in real time. Displays can be adjusted to the target color temperature/luminance by adjusting all their RGBL values to 100%.



Conversion of tristimulus XYZ values to RGB values



Measurement Example

Displaying difference between target color temperature/ luminance and measured values



After adjusting RGBL values to 100%





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Main Specifications [Tester Specifications]

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Model	3298 02 (tester) + 3298 11 (sensor)	3298 02 (tester) + 3298 21 (sensor)		
Sensor type	Black and white	Color		
Optical system	Enclosed cylinder type (minimum optical bore diameter: 10 mm; viewing angle: approximately. 30°)			
Photodetector unit	Silicon photodiode			
Measurement field of view	Distance to specimen In contact 10	mm 20 mm 50 mm 100 mm		
	Visual bore in measurement 10 mm 19	mm 25 mm 42 mm 73 mm		
Luminance measurement range	0.01 to 40,000 cd/m ²			
Luminance measurement range settings	40.00/400.0/4,000/40,000 cd/m ² 400.0/4,000/40,000 cd/m ²			
Luminance measurement precision	\pm 4% of indicated value + \pm 0.035% of full-scale value (at 23 \pm 3°C,	\pm 4% of indicated value + \pm 0.035% of full-scale value (at 23 \pm 3°C,		
	70% RH or less, with type A standard light source, when the indication	70% RH or less, with type A standard light source, when the indication		
	is at least 2% and 2 come of the set range's full-scale value)	is at least 2% of the set range's full-scale value)		
Flicker measurement range settings	2%/4%/8%	6/20% rms		
Flicker measurement precision	±1% (Reference value; For sine wave of 200 cd/m ²	² , 10% rms and 30 Hz at 23 ± 3°C, 70% RH or less)		
Flicker measurement luminance range	5 to 40,000 cd/m ²	25 to 40,000 cd/m ²		
	(for sine wave of 10% rms and 30 Hz at $23 \pm 3^{\circ}$ C, 70% RH or less)	(for sine wave of 10% rms and 30 Hz at 23 \pm 3°C, 70% RH or less)		
Flicker measurement filter	Programmable low-pass filter, flicker base frequency can be selected from among 20, 30, 40, 50, 60, 70, 80 or 90 Hz			
Spectral responsivity	Approximates CIE 1931 standard spectral luminous efficiency response	Approximates CIE 1931 color matching functions		
Color system		Chromaticity coordinates: (x, y, L) or (u', v', L)		
	Tristimulus values: (X, Y, Z) or (R, G, B) or (RGB ratio)			
		Correlated color temperatures: (Ic, duv, L)		
Chromaticity precision	• ±0.002 or less, for type A standard light source (at 23 ± 3°C,			
(deviation in x and y values)	70% RH or less, and luminance of at least 2% of the set ran			
	_	 ±0.03 or less, for combination of type A standard light 		
	source/three-wavelength fluorescent lamp + color filters (at 2			
		3°C, 70% RH or less, and luminance of at least 1% of the set		
		range's tull-scale value)		
User-defined luminance calibration coefficients	Linear correction of measured luminance values	_		
User-defined color calibration coefficients	 — 6 colors × 10 displays; XYZ measured values and entered values 			
Data memory	Up to 200 data for each measured item			
Input	Trigger input (contact)			
Output	Monitor output (0 to 2 V), DC luminance output (0 to 2 V), GO/NO-GO output (open collector)			
Communication port	RS-232 (9,600 to 38,400 bps)			
Operating temperature and humidity range	5 to 40°C, 70% RH or less			
Dimensions and weight	Sensor dimensions: approx. 67 (W) × 150 (H) ×40 (D) mm; tester dimensions: approximately. 107 (W) × 176 (H) × 55 (D) mm; weight: approximately. 1 kg			
Display	128 ×128-pixel dot matrix LCD			
Power supply	Four AA batteries or optional AC adapter			
Battery life	Approximately. 6 hours (for the alkaline batteries provided)			

Model and Suffix Codes

Model	Suffix Code	Specification
329802		Multimedia display tester* with 1.5 meter long extension cable
Language	-E	English display and user's manual
	-J	Japanese display and user's manual
329811		Black and white sensor, with rubber bumper
329821		Color sensor, with rubber bumper

* Excluding an AC adapter; order the proper adapter with the correct input voltage separately if necessary.

Optional Accessories and Software –

Product	Part Number	Specification		
AC adapter	A1020UP	100 V AC adapter		
AC adapter	A1022UP	120 V AC adapter		
AC adapter	B9108WB	220-240 V AC adapter		
Sensor cable	B8300LA	1.5 m long		
Sensor cable	B8300LB	3.0 m long		
Sensor cable	B8300LG	5.0 m long		
RS-232 cable (for PC connection)	B8300LC	For 9-pin D-Sub connector on PC		
RS-232 cable (for PC connection)	B8300LD	For 25-pin D-Sub connector on PC		
Carrying case	329891	Case for storing tester		
Recorder output plugs	B8300LJ	Four plugs		
Rubber Bumper	B8300LH			
Product	Part Number	Suffix Code	Specification	
	220921			
Light measurement data	000001	-J		
	329831	-E	English Version	

Block Diagram



Dimensions

	Unit: mm
NOTICE Before operating the product, read the user's manual thoroug proper and safe operation.	ghly for

 If this product is for use with a system requiring safeguards that directly involve personnel safety, please contact the Yokogawa sales offices.