

# Japan Display Inc.

#### LumiFree New Light Distribution Control Technology

LumiFree Business Development Office



### LumiFree Basic Information - Combination with LCD Technology-



#### Freedom for Light, Beauty for the World

JDI has developed a new Liquid Crystal Technology LumiFree, for use in combination with LED lighting



A voltage is applied to the liquid crystal to control the amount of light transmitted and used as a display. The liquid crystal does not emit light, but the light source is controlled by the liquid crystal.



When voltage is applied to a liquid crystal panel, the liquid crystal molecules have the property of rising gradually as the voltage increases. The characteristics of the liquid crystal change depending on the degree of this rise.



#### Control of Light Distribution by Controlling Liquid Crystal Molecules

Liquid crystal molecules have different refractive indices in different molecular directions. By controlling these characteristics and the liquid crystal molecules, LumiFree controls the light distribution characteristics of the luminaire.





We developed LumiFree using LCD technology





### What LumiFree can do?

LumiFree enables light distribution control with 8-bit resolution (256 steps) on both the X & Y axes





## **Characteristic Information**

Below is optical data from a LumiFree-equipped light fixture. It shows 1/2 and 1/10 Illuminance angle measurements at different step values.



#### Illuminance Angle Measurements at Different Step Values (2)

LumiFree allows control of light distribution angle in 256 steps from 0-255. LumiFree can be used at any illuminance angle.



1/2 illuminance angle(deg.)

LumiFree generates a luminous flux reduction of approximately 20%. However, no efficiency loss by diffusing light occurs.





Data measured using LumiFree in combination with high color-rendering light fixtures A slight decrease in Ra was observed.

Please confirm the exact characteristics with your light source of choice.

	Ra	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
only LED module	94.1	94.5	97.4	99.1	95.4	94.9	97.1	92.1	82.0	58.8	93.7	97.4	87.2	95.4	99.3	89.6
with LumiFree (OFF : 0 step)	93.3	93.3	96.6	99.5	94.6	93.6	97.2	91.7	80.2	55.1	92.2	96.9	87.0	94.3	99.2	87.8
with LumiFree (ON : 255 step)	93.2	93.2	96.8	99.5	94.4	93/5	97.5	91.2	79.4	54.3	92.5	96.9	87.9	94.2	99.3	87.5

LumiFree is usable if you can place it in front of the light source. There are no restrictions.





### **Other Useful Info**

	φ50mm	φ105mm					
<b>Outline size</b>	61.2mm x 61.2mm (w/o FPC)	116.2mm x 116.2mm (w/o FPC)					
Active area	φ50.0mm Circle	φ105.0mm Circle					
Thickness	4.5mm						
Weight	30g	118g					
Transmittance (Total luminous flux)	approx. 80%						
Maximum variable angle (1/2 Beam angle)	approx. 80°						

Product Promotion video https://www.youtube.com/watch?v=1nq1GF\_Bq94

Product Demonstration with BLE Control https://youtu.be/rl U5ih38Wc

Product Demonstration with DMX Control https://youtu.be/j-ArfANg-I4

Product Demonstration with DMX program @ Japan Lighting Fair 2023 https://www.youtube.com/watch?v=Dcg9sUqjnYQ



## Thank you so much

- This measurement data is from JDI's tests and is for reference only.
- This measurement data is not representative for all light sources.
- Since the optical characteristics of LumiFree depend on the light source it is paired with, please evaluate LumiFree with your light source of choice.
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