RODER

LED Illuminators
BL3 Series

Revision IT2602

2026

INNOVATIVE
SOLUTIONS
PROVIDER

www.rodervision.com

BL3 SERIES

Rugged LED Backlights for High-Speed Vision System Integration

High-Uniformity Illumination : The BL3 Series provides perfectly diffused light, ensuring edge-to-edge consistency for precise dimensional measurements and high-accuracy defect detection in machine vision applications.

High-Intensity LED Technology: Equipped with high-efficiency LEDs, the BL3 series delivers powerful illumination, ensuring high-contrast imaging even in high-speed automated inspection and sorting lines.

Rugged Aluminium Construction: Built with a robust aluminium frame, these illuminators ensure superior heat dissipation and mechanical stability, guaranteeing long-term reliability and performance in harsh industrial settings.

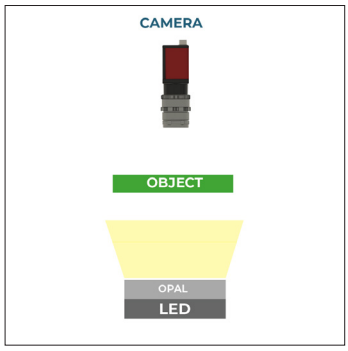
Versatile Integration and Mounting: Featuring flexible mounting channels and multiple color options, the BL3 series adapts seamlessly to various optical setups and diverse industrial automation requirements.

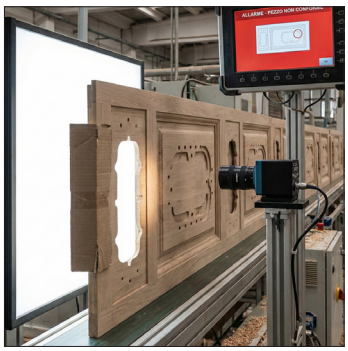
Applications

- Dimensional measurement of mechanical parts
- High-precision edge detection
- Liquid level inspection in bottles
- Logistic applications
- Particle detection in transparent fluids
- Sorting and counting small items
- Pharma blister pack integrity checks
- Optical inspection

Key Features

- Advanced heat dissipation for long-term LED reliability and performance.
- High-intensity LED output optimized for high-speed industrial inspection.
- 24 VDC power supply via industrial-standard 3-pin M8 cable
- Cable with connector, easy assembly and disassembly for maintenance
- Multiple wavelength options including White, Red, Green, Blue, and IR.
- Robust aluminum housing ensuring high mechanical and thermal stability.
- High brightness and long operating life thanks to latest-generation LEDs

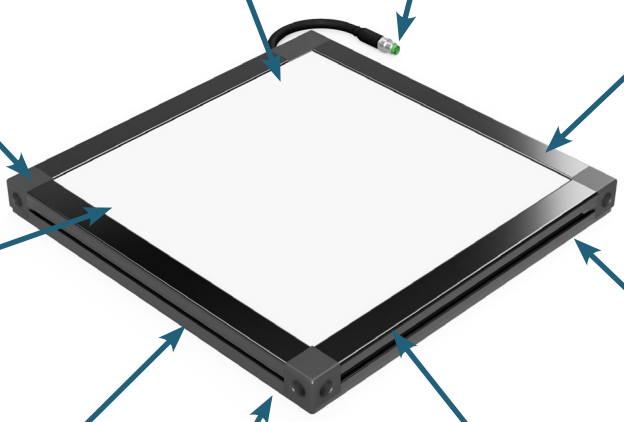




Backlight illuminators for application on large viewing areas !!!

Why choose a BL3 series illuminator ?

Main features of the BL3 series



Industrial connector
Connector with threaded ferrule fastening for easy assembly and quick disconnection in case of maintenance

Replaceable diffuser
The diffusion glass can be replaced in case of damage or deterioration

Aluminum enclosure
The housing is made of anodized aluminium that can ensure high heat dissipation produced by the LEDs and excellent structural rigidity even in larger models

Reverse polarity protection
Internal circuits are protected against possible polarity reversal of the supply voltage

Integrated driver
Integrated LED control driver to enable proper LED current control. Possibility of ON/OFF control with external signal

High efficiency LED
Use of the latest generation of high-brightness, low-power LEDs

Profile with side groove
Profile with side fixing groove for easy, fast and flexible attachment to walls or structures

HTTM Technology
Use of HTTM technology for high heat dissipation produced by LEDs

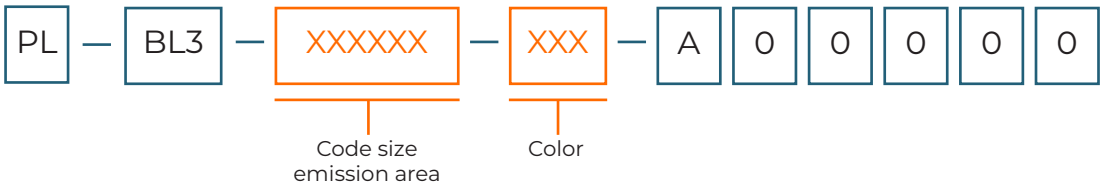
Test Certificate
Each illuminator undergoes a 48-hour test cycle and is issued a test certificate delivered with the product

Main features common to the entire BL3 family

Features	Value
Supply voltage	24 Vdc +/- 10 %
IP rating	IP54
Temperature range	0° - 50° C
Electrical connection	M8 3-pin connector with threaded ring nut
Certifications	CE , RoHS

Composition of the product identification code

The acronyms in orange color are to be filled in according to the desired configuration



Code size emission area

Highlighted models are standard products - Other models are special products and may have longer production times

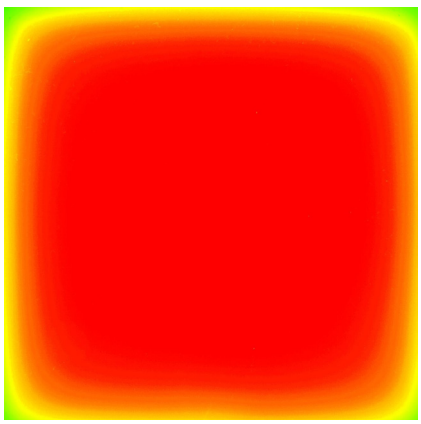
Length emissione area - mm (order code)					
100 x 100 (010010)	100 x 150 (010015)	100 x 200 (010020)	100 x 250 (010025)	100 x 300 (010030)	100 x 350 (010035)
100 x 400 (010040)	100 x 450 (010045)	100 x 500 (010050)			
150 x 150 (015015)	150 x 200 (015020)	150 x 250 (015020)	150 x 300 (015030)	150 x 350 (015035)	150 x 400 (015040)
150 x 450 (015045)	150 x 500 (015050)				
200 x 200 (020020)	200 x 250 (020025)	200 x 300 (020030)	200 x 350 (020035)	200 x 400 (020040)	200 x450 (020045)
200 x500 (020050)					
250 x 250 (025025)	250 x 300 (025030)	250 x 350 (025035)	250 x 400 (025040)	250 x 450 (025045)	250 x 500 (025050)
300 x 300 (030030)	300 x 350 (030035)	300 x 400 (030040)	300 x 450 (030045)	300 x 500 (030050)	
350 x 350 (035035)	350 x 400 (035040)	350 x 450 (035045)	350 x 500 (035050)		
400 x 400 (040040)	400 x 450 (040045)	400 x 500 (040050)			
450 x 450 (045045)	450 x 500 (045050)				
500 x 500 (050050)					

Color

Other LED models on request

WHI : Neutral White 5000K
BLU : Standard Blue - 470 nm
RED : Red - 625 nm
INF : Infrared - 850 nm

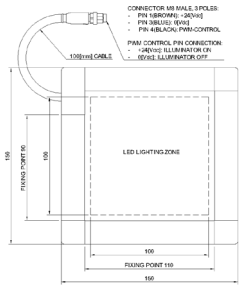
LED emission



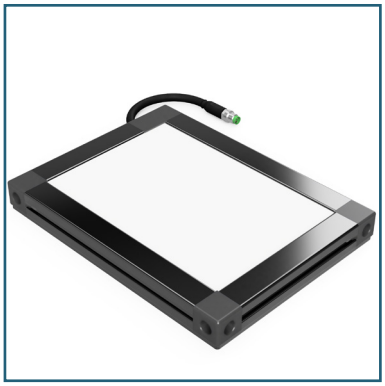
Reference 100 x 100 mm

Models and accessories

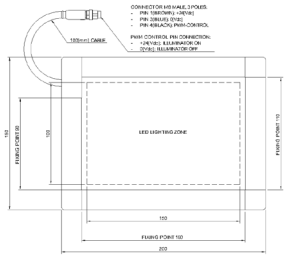
BL3 Series 100 x 100 LED Illuminator



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-10	PL-BL3-010010-WHI-A00000	100 x 100	WHI	0.48A @24vdc	144	1
10-15-04	PL-BL3-010010-INF-A00000	100 x 100	INF	0.72A @24vdc	144	1

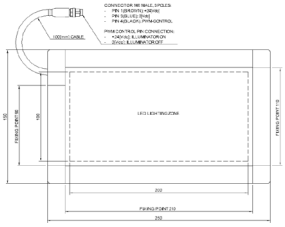


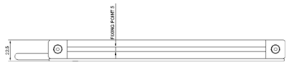
BL3 Series 100 x 150 LED Illuminator



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-11	PL-BL3-010015-WHI-A00000	100 x 150	WHI	0.72A @24vdc	216	1
10-15-05	PL-BL3-010015-INF-A00000	100 x 150	INF	1.08A @24vdc	216	1

BL3 Series 100 x 200 LED Illuminator

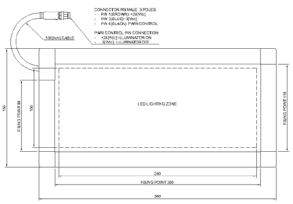




Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-12	PL-BL3-010020-WHI-A00000	100 x 200	WHI	0.96A @24vdc	288	1
10-15-06	PL-BL3-010020-INF-A00000	100 x 200	INF	1.44A @24vdc	288	1

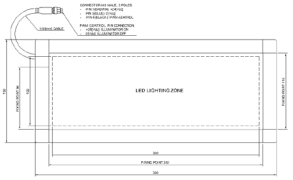
Modelli e accessori

BL3 Series 100 x 250 LED Illuminator



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-13	PL-BL3-010025-WHI-A00000	100 x 250	WHI	1.2A @24vdc	360	1
10-15-07	PL-BL3-010025-INF-A00000	100 x 250	INF	1.8A @24vdc	360	1

BL3 Series 100 x 300 LED Illuminator



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-14	PL-BL3-010030-WHI-A00000	100 x 300	WHI	1.44A @24vdc	432	1
10-15-08	PL-BL3-010030-INF-A00000	100 x 300	INF	2.16A @24vdc	432	1

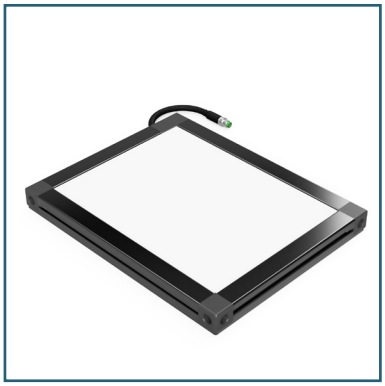
BL3 Series 100 x 400 LED Illuminator

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-15	PL-BL3-010040-WHI-A00000	100 x 400	WHI	1.92A @24vdc	512	1
10-15-09	PL-BL3-010040-INF-A00000	100 x 400	INF	2.88A @24vdc	512	1

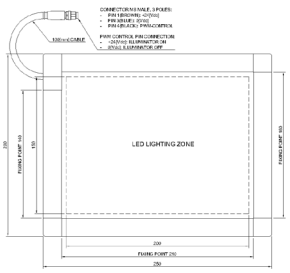
Modelli e accessori

BL3 Series 100 x 500 LED Illuminator

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-16	PL-BL3-010050-WHI-A00000	100 x 500	WHI	2.40A @24vdc	720	1
10-15-10	PL-BL3-010050-INF-A00000	100 x 500	INF	3.60A @24vdc	720	1

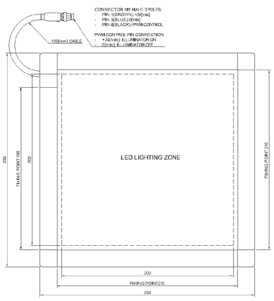


BL3 Series 150 x 200 LED Illuminator



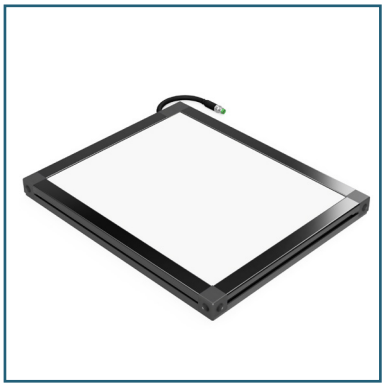
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-15-19	PL-BL3-015020-WHI-A00000	150 x 200	WHI	1.44A @24vdc	432	1
10-15-11	PL-BL3-015020-INF-A00000	150 x 200	INF	2.16A @24vdc	432	1

BL3 Series 200 x 200 LED Illuminator

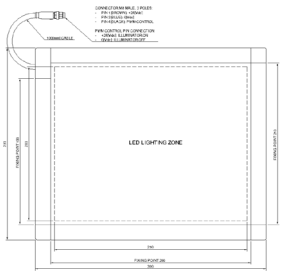


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-18	PL-BL3-020020-WHI-A00000	200 x 200	WHI	1.92A @24vdc	576	1
10-15-12	PL-BL3-020020-INF-A00000	200 x 200	INF	2.88A @24vdc	576	1

Modelli e accessori

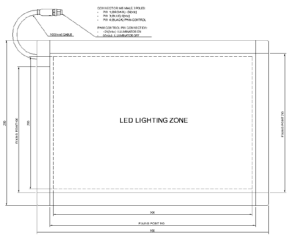


BL3 Series 200 x 250 LED Illuminator



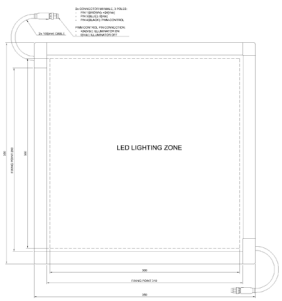
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-19	PL-BL3-020025-WHI-A00000	200 x 250	WHI	2.40A @24vdc	720	1
10-15-13	PL-BL3-020025-INF-A00000	200 x 250	INF	3.60A @24vdc	720	1

BL3 Series 200 x 300 LED Illuminator



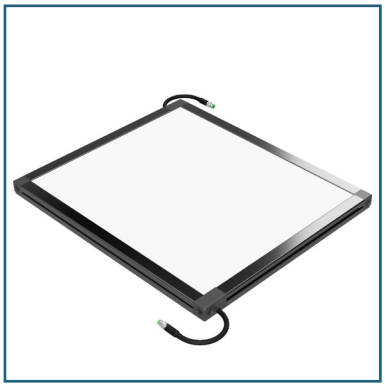
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-20	PL-BL3-020030-WHI-A00000	200 x 300	WHI	2.88A @24vdc	864	1
10-15-14	PL-BL3-020030-INF-A00000	200 x 300	INF	4.32A @24vdc	864	1

BL3 Series 300 x 300 LED Illuminator

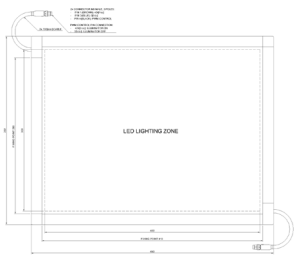


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-21	PL-BL3-030030-WHI-A00000	300 x 300	WHI	4.32A @24vdc	1296	2
10-15-15	PL-BL3-030030-INF-A00000	300 x 300	INF	6.48A @24vdc	1296	2

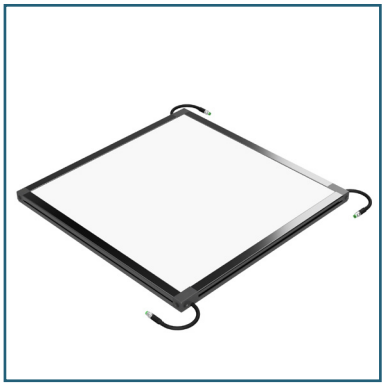
Modelli e accessori



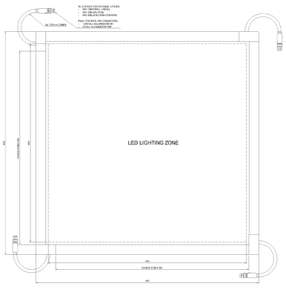
BL3 Series 300 x 400 LED Illuminator



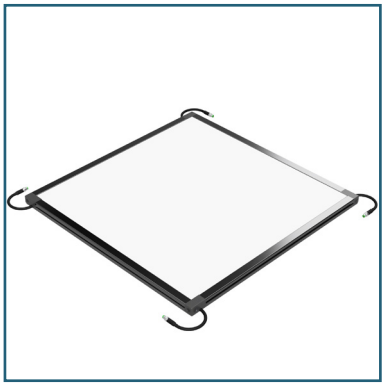
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-22	PL-BL3-030040-WHI-A00000	300 x 400	WHI	5.76A @24vdc	1728	2
10-15-16	PL-BL3-030040-INF-A00000	300 x 400	INF	8.64A @24vdc	1728	2



BL3 Series 400 x 400 LED Illuminator

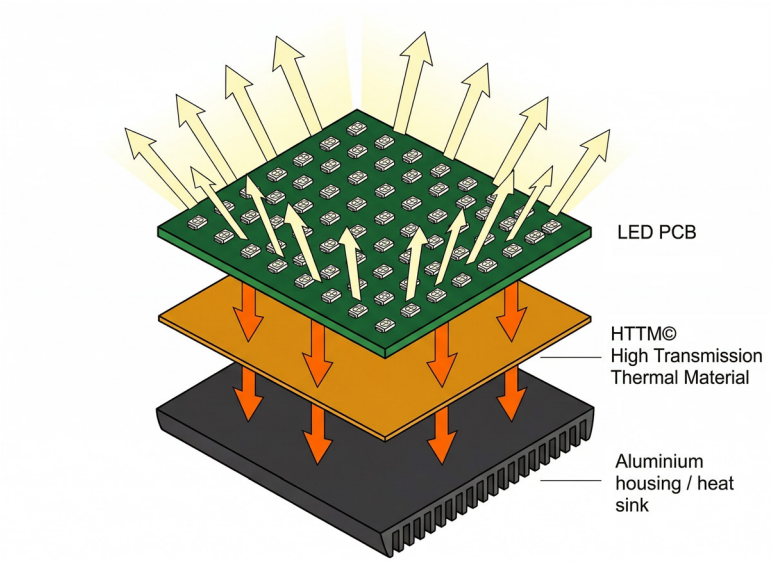


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-23	PL-BL3-040040-WHI-A00000	400 x 400	WHI	7.68A @24vdc	2304	4
10-15-17	PL-BL3-040040-INF-A00000	400 x 400	INF	11.52A @24vdc	2304	4



BL3 Series 500 x 500 LED Illuminator

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-14-24	PL-BL3-050050-WHI-A00000	500 x 500	WHI	12A @24vdc	3600	4
10-15-18	PL-BL3-050050-INF-A00000	500 x 500	INF	18A @24vdc	3600	4



HTTM© Technology — High Transmission Thermal Material

Thermal management is one of the most critical factors determining the long-term performance of an LED illuminator.

Excessive or uneven junction temperature is the primary cause of luminous flux degradation, chromatic shift, and reduced LED service life in industrial lighting systems.

RODER addresses this challenge with HTTM© technology, a purpose-engineered thermal interface solution integrated into every next-generation illuminator.

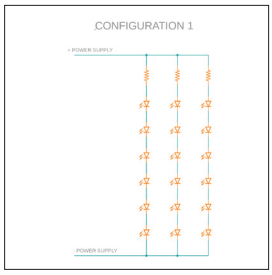
A layer of electrically insulating, high-thermal-conductivity material is precisely interposed between the LED printed circuit board and the aluminium housing.

This material acts as a highly efficient thermal bridge: it prevents any electrical contact between the PCB and the enclosure while channelling the heat generated by both the LED array and the driver electronics directly and uniformly into the aluminium frame, which acts as the primary heat sink.

Compared to conventional air-gap or standard thermal pad solutions, HTTM© achieves a substantially lower and more uniform steady-state LED junction temperature.

The direct consequences are: extended LED service life, stable luminous flux output over tens of thousands of operating hours, and consistent chromatic coordinates throughout the product lifetime — all critical requirements for reliable, long-term photometric calibration in machine vision systems.

Traditional circuit configurations

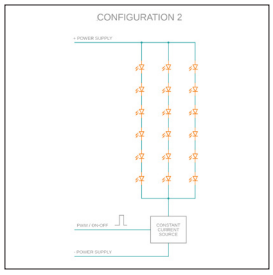


Configuration 1

This basic configuration powers LED columns through current-limiting resistors without active control.

Disadvantages:
- Variations in forward voltage cause visible luminance non-uniformity.
- Lack of thermal compensation leads to temperature-dependent brightness.
- Parasitic capacitance slows switching dynamics.
- No dedicated PWM input; requires external supply modulation.

Machine vision: Low uniformity , current instability and lack of active control prevent reproducible photometric measurements.

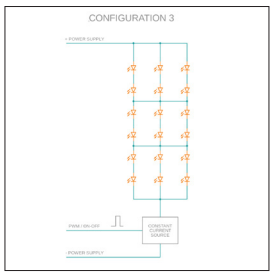


Configuration 2

A single constant current source powers columns in parallel, enabling PWM digital modulation.

Disadvantages:
- Vf variations cause uneven current distribution and lateral luminance gradients.
- Differential aging amplifies Vf mismatch, worsening uniformity over time.
- Lack of per-column balancing limits spatial consistency.

Machine vision: Acceptable for non-critical tasks. Better than Configuration 1 due to PWM and thermal stability, but lacks precision due to non-uniformity.



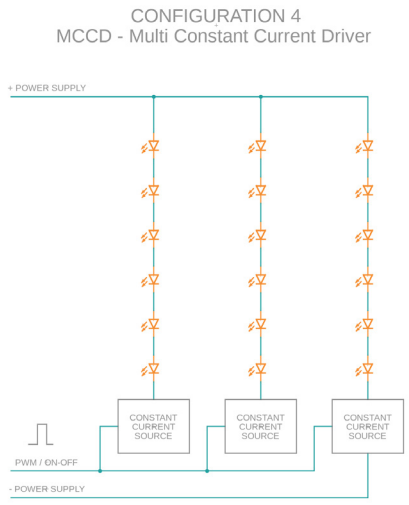
Configuration 3

Configuration 3 is architecturally identical to Configuration 2: a single constant current driver with PWM input feeds the entire matrix with the columns connected in parallel. The same technical considerations apply in their entirety.

In some implementations this variant differs in the number of LEDs per string or the supply voltage, without however resolving the fundamental problem of unbalanced current distribution between columns.

Machine vision assessment: Identical to Configuration 2. Same strengths and same intrinsic limitations of the single-driver architecture.

MCCD - Multi Contant Current Driver by RODER SRL



This is the MCCD architecture implemented by RODER.

Each column of the LED matrix is powered by its own dedicated, independent constant current source. The three sources share a single PWM/ON-OFF input that guarantees simultaneous switching of all columns.

Advantages

- **Independent Column Balancing**: Each driver delivers nominal current regardless of LEDs, eliminating lateral luminance gradients at the source.
- **Spatial Uniformity:** Consistent luminance across the matrix, independent of Vf variability between batches, devices, or over time.
- **Thermal Compensation:** Drivers autonomously offset thermal drift per string, maintaining stable current even under non-uniform heat gradients.
- **Strobe Synchronization:** Shared PWM ensures simultaneous switching, eliminating inter-column jitter—critical for global shutter cameras.
- **Lifetime Stability:** Column-specific compensation for differential LED ageing preserves photometric uniformity throughout the product's life.
- **Calibration Repeatability:** Fixed luminance over temperature and time ensures vision system calibration remains valid without periodic adjustments.

Parameter	Configuration 1 - Resistors	Configuration 2 - Single CC	Configuration 3 -Single CC	Configuration 4 - MCCD RODER
Constant current	No	Yes — global	Yes — global	Yes — per column
Current uniformity	Poor	Moderate	Moderate	Excellent
Spatial uniformity	Low	Good	Good	Excellent
PWM / strobe dynamics	Slow	Excellent	Excellent	Outstanding
Thermal stability	None	Yes — global	Yes — global	Per column
Machine vision suitability	Not suitable	Acceptable	Acceptable	Optimal
Global efficiency	♦ ♦ ♦ ♦ ♦	♦ ♦ ♦ ♦ ♦	♦ ♦ ♦ ♦ ♦	♦ ♦ ♦ ♦ ♦

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