RODER

LED Illuminators
DL2 Series

Revisione IT2606

2026

INNOVATIVE
SOLUTIONS
PROVIDER

www.rodervision.com

DL2 SERIES

LED Matrix - Direct illuminators for vision systems and optical machines

Compact and Robust Design : The DL2 Series comes in a slim aluminum housing, combining strength, durability, and efficient heat dissipation in a compact form.

Integrated High-Performance Lighting: Each unit includes a 24 V DC driver and a high-brightness LED matrix with lenses, ensuring uniform and powerful illumination.

Advanced Thermal Management: Thanks to HTTM© technology, heat is quickly transferred to the housing, extending LED life and ensuring stable performance.

Reliability and Safety Features: DL2 illuminators feature reverse polarity protection and 48-hour certified testing, guaranteeing reliability in industrial use.

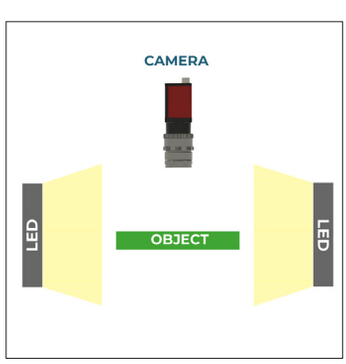
Practical Industrial Connectivity: A 3-pin quick-disconnect connector, fixing mask, and RCCR® driver provide easy installation and consistent chromatic stability.

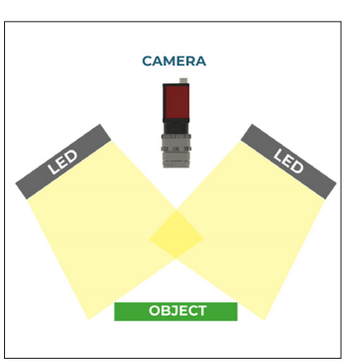
Applications

- Machine Vision applications
- ROBOT guide
- Pick and Place
- Logistic applications
- Video recording
- Ultra-Fast imaging
- Barcode reader
- Optical inspection

Key Features

- Easy installation and very competitive price
- Compact enclosure, suitable for OEMs and SIs for machine integration
- 24 VDC power supply via industrial-standard 3-pin M8 cable
- Cable with connector, easy assembly and disassembly for maintenance
- LED matrix with built-in lens
- Highly directional and homogeneous light beam
- High brightness and long operating life thanks to latest-generation LEDs





Composition of the product identification code

The code in orange are to be filled in according to the desired configuration

PL	—	DL2	—	YYYYYY	—	XXX	—	A	0	0	0	0	0
				Emission area dimensions in mm		Color							

Emission area

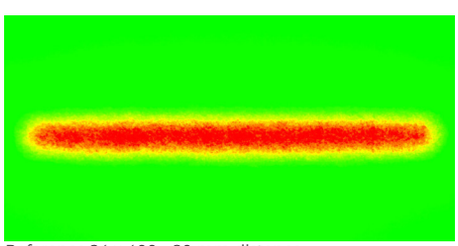
Highlighted models are from normal production - Others are on request and may have longer production times

Active light area (mm)					
25 x 100 (025100)	25 x 200 (025200)	25 x 300 (025300)	25 x 400 (025400)	25 x 500 (025500)	25 x 600 (025600)
25 x 700 (025700)	25 x 800 (025800)	50 x 50 (050050)	50 x 100 (050100)	50 x 200 (050200)	50 x 300 (050300)
100 x 100 (100100)	100 x 200 (100200)	100 x 300 (100300)			

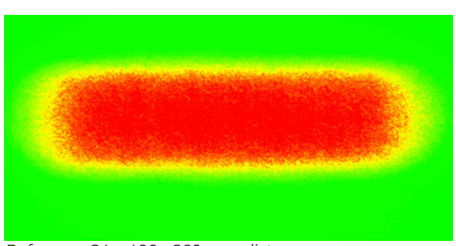
Color - LED type

WHI : Neutral White
BLU : Standard Blue 465 nm
RED : Standard Red 630 nm

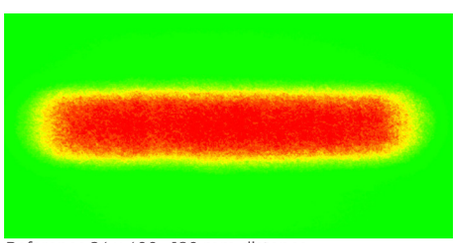
LED emission



Reference 24 x 400 - 80 mm distance

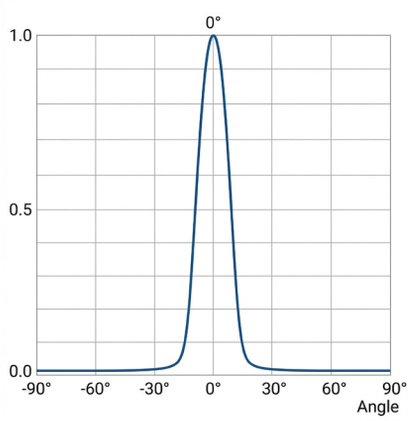


Reference 24 x 400 - 260 mm distance



Reference 24 x 400 - 180 mm distance

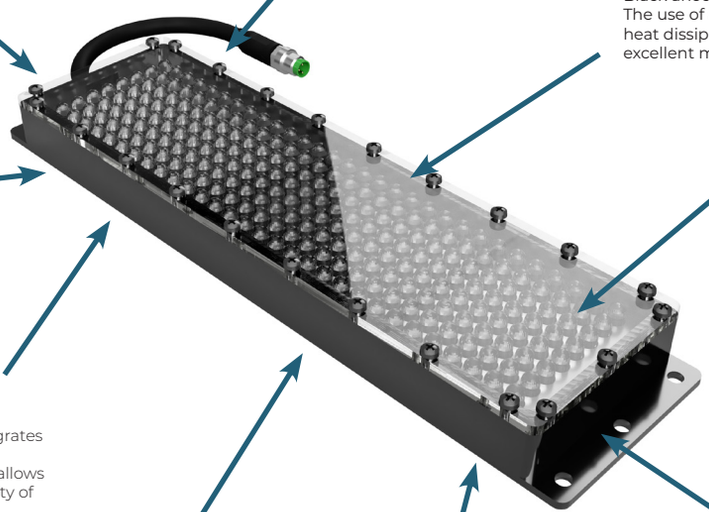
LED emission



Why choose a RODER DL2 series illuminator ?

High density LED matrix
High density LED matrix with integrated lens for creating a direct and homogeneous light beam. The LED array is kept regular through a special fixturing mask that ensures its uniformity of LED mounting spacing.

Industrial connector
Connector with threaded fastening for easy assembly and quick disconnection in case of maintenance. The cable is fixed through a flexible grommet to ensure a small bending radius.



Aluminium enclosure
Black anodised aluminium enclosure. The use of aluminium ensures high heat dissipation from the LEDs and excellent mechanical robustness.

48H-Test certificate
Each illuminator undergoes a 48-hour test cycle and a test certificate is issued with the product. This procedure ensures high quality of the product delivered to the client.

Reverse polarity protection
The internal circuits are protected against reverse polarity of the supply voltage. Protection takes action in case of incorrect connection of power cables.

RDM© Internal current source driver
The DL2 series of illuminators integrates the LED current regulators. The automatic current control system allows for a high homogeneity and stability of the light emission.

Industrial design
The entire DL2 family is designed for industrial use on vision systems or optical test benches. The target customer for this product family is either the industrial machine manufacturer or the vision system integrator.

HTTM© Technology
Use of HTTM technology for high heat dissipation produced by LEDs. A special material layer is used inside the illuminator for contact between the LEDs and the housing.

Very high efficiency and high intensity LEDs
Use of the latest generation of high-brightness, low-power LEDs. The LEDs used in the DL2 series have a built-in lens, have state-of-the-art features, and are produced by the world's largest LED manufacturer.

Main features common to the DL2 family

Features	Value
Supply voltage	24 Vdc +/- 10%
IP rating	IP40
Temperature range	10° - 50° C
Electrical connection	M8 3-pin connector with threaded ring nut
Certifications	CE - RoHS

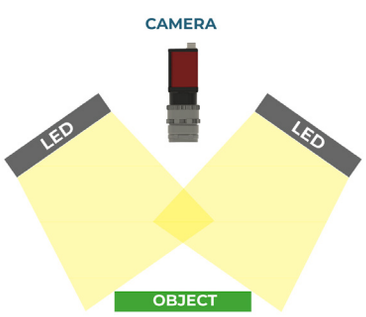
The DL2 series illuminators are designed to be easily integrated into various vision systems and to offer a low-cost, highly customizable lighting solution.

High brightness in a small space : the DL2 series consists of a matrix of high-density, high-brightness LEDs. The DL2 series illuminators are used in confined spaces, where direct, high-intensity illumination is required. The DL2 series is designed for system integrators and OEMs who need to integrate the illuminator into a machine or custom devices.

RMD© Technology : The DL2 series of illuminators integrates the RMD© technology (RODER Multi Driver). The automatic current control system allows for a high homogeneity and stability of the light emission

HTTM© Technology : use of HTTM© technology (High Thermal Transmission Material) to dissipate the heat generated by LEDs. Proper heat dissipation enables the light sources and control electronics to maintain optimum working conditions. A special material layer is used inside the illuminator for contact between the LEDs and the housing. In this way, the temperature of the LEDs is kept constant, the brightness is stable over time, and the LED has a longer service life.

Typical configuration



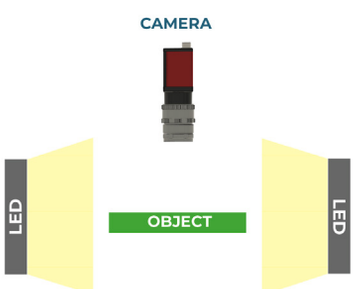
Direct illumination

The DL2 series of illuminators can be used for direct illumination of the object to be inspected. The angle of incidence of the light can be chosen according to the characteristics of the object, the degree of detail to be highlighted or the type of inspection to be carried out.

Low cost backlight

The DL2 series of illuminators can be used to make very economical backlights. By placing a diffuser glass, it is possible to realise economical backlights with high luminosity.

Note:
The diffuser must be positioned at the optimal distance from the illuminator to ensure optimal uniformity. The diffuser is not available as a standard product.

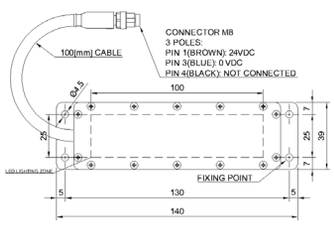


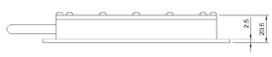
Direct illumination

The DL2 series of illuminators can be used for low-angle lighting systems. Installing the illuminators in low-angle mode makes it possible to highlight defects or features that would not be visible or hardly noticeable in other lighting modes

DL2 series - standard models

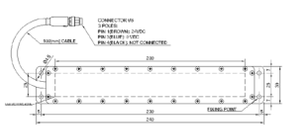
DL2 25 x 100





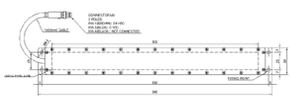
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-20	PL-DL2-025100-RED-A00000	25 x 100	RED - 630 nm	0.12A @24vdc	60	Transparent
10-00-24	PL-DL2-025100-WHI-A00000	25 x 100	WHITE - 5500K	0.12A @24vdc	60	Transparent
10-00-23	PL-DL2-025100-BLU-A00000	25 x 100	BLUE - 465 nm	0.12A @24vdc	60	Transparent
14-07-22	PL-DL2-025100-RED-A10000	25 x 100	RED - 630 nm	0.12A @24vdc	60	Semi-transparent
14-06-51	PL-DL2-025100-WHI-A10000	25 x 100	WHITE - 5500K	0.12A @24vdc	60	Semi-transparent
14-06-17	PL-DL2-025100-BLU-A10000	25 x 100	BLUE - 465 nm	0.12A @24vdc	60	Semi-transparent

DL2 25 x 200



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-30	PL-DL2-025200-RED-A00000	25 x 200	RED - 630 nm	0.24A @24vdc	120	Transparent
10-00-34	PL-DL2-025200-WHI-A00000	25 x 200	WHITE - 5500K	0.24A @24vdc	120	Transparent
10-00-33	PL-DL2-025200-BLU-A00000	25 x 200	BLUE - 465 nm	0.24A @24vdc	120	Transparent
14-06-68	PL-DL2-025200-RED-A10000	25 x 200	RED - 630 nm	0.24A @24vdc	120	Semi-transparent
14-06-92	PL-DL2-025200-WHI-A10000	25 x 200	WHITE - 5500K	0.24A @24vdc	120	Semi-transparent
14-07-33	PL-DL2-025200-BLU-A10000	25 x 200	BLUE - 465 nm	0.24A @24vdc	120	Semi-transparent

DL2 25 x 300



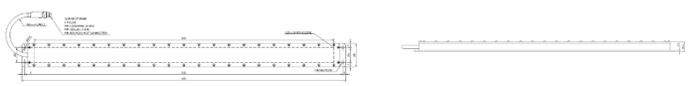
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-90	PL-DL2-025300-RED-A00000	25 x 300	RED - 630 nm	0.36A @24vdc	180	Transparent
10-00-94	PL-DL2-025300-WHI-A00000	25 x 300	WHITE - 5500K	0.36A @24vdc	180	Transparent
10-00-93	PL-DL2-025300-BLU-A00000	25 x 300	BLUE - 465 nm	0.36A @24vdc	180	Transparent
14-06-48	PL-DL2-025300-RED-A10000	25 x 300	RED - 630 nm	0.36A @24vdc	180	Semi-transparent
14-06-74	PL-DL2-025300-WHI-A10000	25 x 300	WHITE - 5500K	0.36A @24vdc	180	Semi-transparent
14-06-33	PL-DL2-025300-BLU-A10000	25 x 300	BLUE - 465 nm	0.36A @24vdc	180	Semi-transparent

DL2 25 x 400

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-01-40	PL-DL2-025400-RED-A00000	25 x 400	RED - 630 nm	0.48A @24vdc	240	Transparent
10-01-44	PL-DL2-025400-WHI-A00000	25 x 400	WHITE - 5500K	0.48A @24vdc	240	Transparent
10-01-43	PL-DL2-025400-BLU-A00000	25 x 400	BLUE - 465 nm	0.48A @24vdc	240	Transparent
14-06-31	PL-DL2-025400-RED-A10000	25 x 400	RED - 630 nm	0.48A @24vdc	240	Semi-transparent
14-07-38	PL-DL2-025400-WHI-A10000	25 x 400	WHITE - 5500K	0.48A @24vdc	240	Semi-transparent
14-07-25	PL-DL2-025400-BLU-A10000	25 x 400	BLUE - 465 nm	0.48A @24vdc	240	Semi-transparent

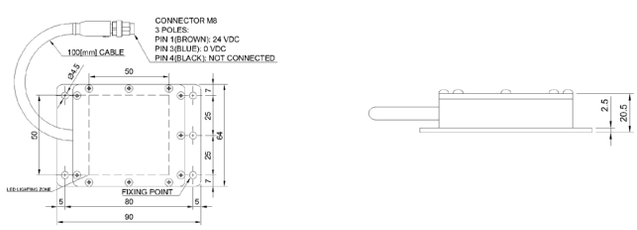
DL2 series - standard models

DL2 25 x 500

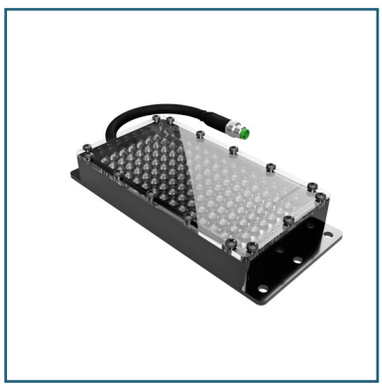


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-01-50	PL-DL2-025500-RED-A00000	25 x 500	RED - 630 nm	0.6A @24vdc	300	Transparent
10-01-54	PL-DL2-025500-WHI-A00000	25 x 500	WHITE - 5500K	0.6A @24vdc	300	Transparent
10-01-53	PL-DL2-025500-BLU-A00000	25 x 500	BLUE - 465 nm	0.6A @24vdc	300	Transparent
14-05-81	PL-DL2-025500-RED-A10000	25 x 500	RED - 630 nm	0.6A @24vdc	300	Semi-transparent
14-06-50	PL-DL2-025500-WHI-A10000	25 x 500	WHITE - 5500K	0.6A @24vdc	300	Semi-transparent
14-05-87	PL-DL2-025500-BLU-A10000	25 x 500	BLUE - 465 nm	0.6A @24vdc	300	Semi-transparent

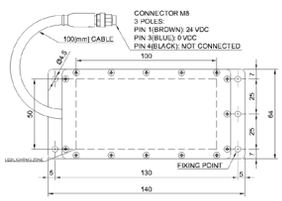
DL2 50 x 50

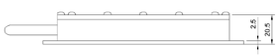


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-60	PL-DL2-050050-RED-A00000	50 x 50	RED - 630 nm	0.12A @24vdc	60	Transparent
10-00-64	PL-DL2-050050-WHI-A00000	50 x 50	WHITE - 5500K	0.12A @24vdc	60	Transparent
10-00-63	PL-DL2-050050-BLU-A00000	50 x 50	BLUE - 465 nm	0.12A @24vdc	60	Transparent
14-06-93	PL-DL2-050050-RED-A10000	50 x 50	RED - 630 nm	0.12A @24vdc	60	Semi-transparent
14-05-97	PL-DL2-050050-WHI-A10000	50 x 50	WHITE - 5500K	0.12A @24vdc	60	Semi-transparent
14-06-00	PL-DL2-050050-BLU-A10000	50 x 50	BLUE - 465 nm	0.12A @24vdc	60	Semi-transparent



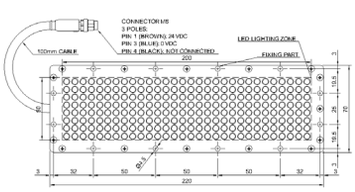
DL2 50 x 100





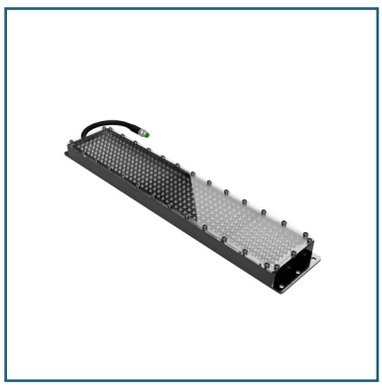
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-40	PL-DL2-050100-RED-A00000	50 x 100	RED - 630 nm	0.24A @24vdc	120	Transparent
10-00-44	PL-DL2-050100-WHI-A00000	50 x 100	WHITE - 5500K	0.24A @24vdc	120	Transparent
10-00-43	PL-DL2-050100-BLU-A00000	50 x 100	BLUE - 465 nm	0.24A @24vdc	120	Transparent
14-04-62	PL-DL2-050100-RED-A10000	50 x 100	RED - 630 nm	0.24A @24vdc	120	Semi-transparent
14-06-87	PL-DL2-050100-WHI-A10000	50 x 100	WHITE - 5500K	0.24A @24vdc	120	Semi-transparent
14-07-13	PL-DL2-050100-BLU-A10000	50 x 100	BLUE - 465 nm	0.24A @24vdc	120	Semi-transparent

DL2 50 x 200

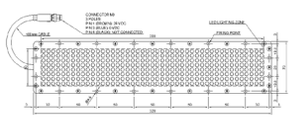


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-50	PL-DL2-050200-RED-A00000	50 x 200	RED - 630 nm	0.48A @24vdc	240	Transparent
10-00-54	PL-DL2-050200-WHI-A00000	50 x 200	WHITE - 5500K	0.48A @24vdc	240	Transparent
10-00-53	PL-DL2-050200-BLU-A00000	50 x 200	BLUE - 465 nm	0.48A @24vdc	240	Transparent
14-06-73	PL-DL2-050200-RED-A10000	50 x 200	RED - 630 nm	0.48A @24vdc	240	Semi-transparent
14-05-99	PL-DL2-050200-WHI-A10000	50 x 200	WHITE - 5500K	0.48A @24vdc	240	Semi-transparent
14-06-27	PL-DL2-050200-BLU-A10000	50 x 200	BLUE - 465 nm	0.48A @24vdc	240	Semi-transparent

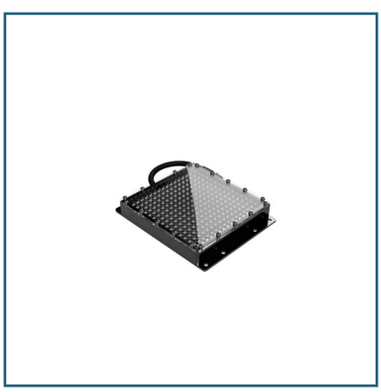
DL2 series - standard models



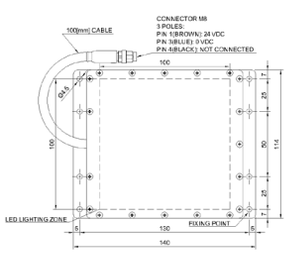
DL2 50 x 300



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-01-00	PL-DL2-050300-RED-A00000	50 x 300	RED - 630 nm	0.72A @24vdc	360	Transparent
10-01-04	PL-DL2-050300-WHI-A00000	50 x 300	WHITE - 5500K	0.72A @24vdc	360	Transparent
10-01-03	PL-DL2-050300-BLU-A00000	50 x 300	BLUE - 465 nm	0.72A @24vdc	360	Transparent
14-06-23	PL-DL2-050300-RED-A10000	50 x 300	RED - 630 nm	0.72A @24vdc	360	Semi-transparent
14-07-29	PL-DL2-050300-WHI-A10000	50 x 300	WHITE - 5500K	0.72A @24vdc	360	Semi-transparent
14-06-44	PL-DL2-050300-BLU-A10000	50 x 300	BLUE - 465 nm	0.72A @24vdc	360	Semi-transparent

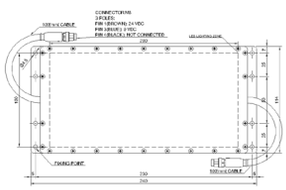


DL2 100 x 100



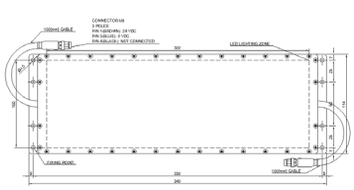
Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-00-70	PL-DL2-100100-RED-A00000	100 x 100	RED - 630 nm	0.48A @24vdc	240	Transparent
10-00-74	PL-DL2-100100-WHI-A00000	100 x 100	WHITE - 5500K	0.48A @24vdc	240	Transparent
10-00-73	PL-DL2-100100-BLU-A00000	100 x 100	BLUE - 465 nm	0.48A @24vdc	240	Transparent
14-07-32	PL-DL2-100100-RED-A10000	100 x 100	RED - 630 nm	0.48A @24vdc	240	Semi-transparent
14-06-57	PL-DL2-100100-WHI-A10000	100 x 100	WHITE - 5500K	0.48A @24vdc	240	Semi-transparent
14-07-20	PL-DL2-100100-BLU-A10000	100 x 100	BLUE - 465 nm	0.48A @24vdc	240	Semi-transparent

DL2 100 x 200

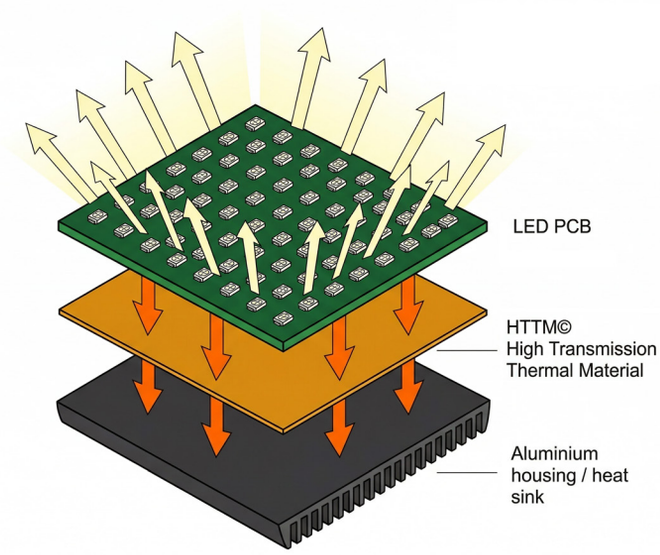


Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-02-10	PL-DL2-100200-RED-A00000	100 x 200	RED - 630 nm	0.96A @24vdc	480	Transparent
10-02-14	PL-DL2-100200-WHI-A00000	100 x 200	WHITE - 5500K	0.96A @24vdc	480	Transparent
10-02-13	PL-DL2-100200-BLU-A00000	100 x 200	BLUE - 465 nm	0.96A @24vdc	480	Transparent
14-07-17	PL-DL2-100200-RED-A10000	100 x 200	RED - 630 nm	0.96A @24vdc	480	Semi-transparent
14-06-98	PL-DL2-100200-WHI-A10000	100 x 200	WHITE - 5500K	0.96A @24vdc	480	Semi-transparent
14-06-13	PL-DL2-100200-BLU-A10000	100 x 200	BLUE - 465 nm	0.96A @24vdc	480	Semi-transparent

DL2 100 x 300



Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	Glass
10-01-10	PL-DL2-100300-RED-A00000	100 x 300	RED - 630 nm	1.44A @24vdc	720	Transparent
10-01-14	PL-DL2-100300-WHI-A00000	100 x 300	WHITE - 5500K	1.44A @24vdc	720	Transparent
10-01-13	PL-DL2-100300-BLU-A00000	100 x 300	BLUE - 465 nm	1.44A @24vdc	720	Transparent
14-06-56	PL-DL2-100300-RED-A10000	100 x 300	RED - 630 nm	1.44A @24vdc	720	Semi-transparent
14-06-58	PL-DL2-100300-WHI-A10000	100 x 300	WHITE - 5500K	1.44A @24vdc	720	Semi-transparent
14-06-14	PL-DL2-100300-BLU-A10000	100 x 300	BLUE - 465 nm	1.44A @24vdc	720	Semi-transparent



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.

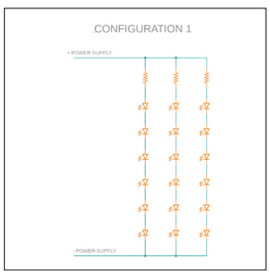
A layer of electrically insulating, high-thermal-conductivity material is precisely interposed between the LED printed circuit board and the aluminium housing.

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

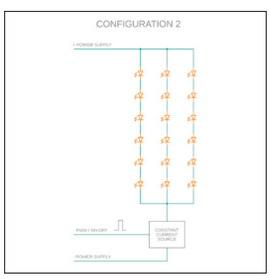


Configuration 1

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.

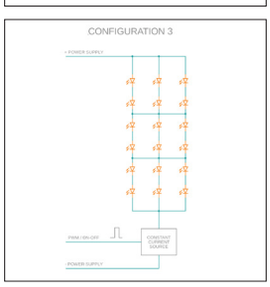


Configuration 2

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.



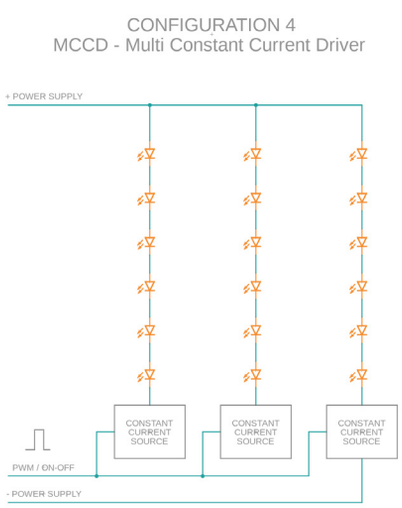
Configuration 3

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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