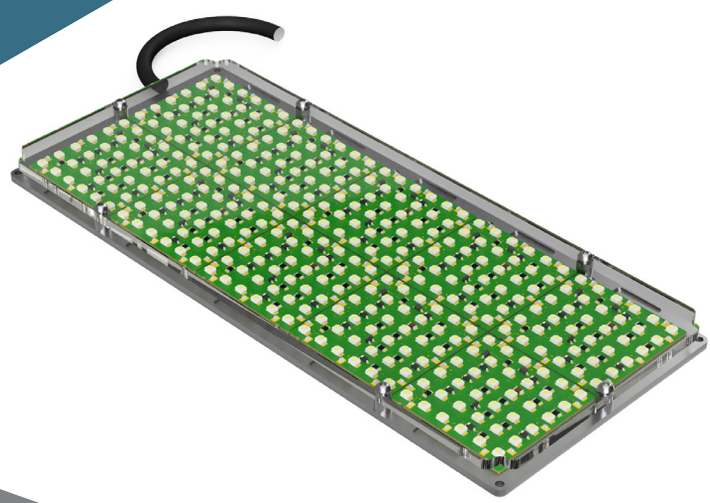
RODER

LED Illuminators
DL8 Series



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DL8 SERIES

High-Density Modular LED Illuminators for Industrial Vision and OEM Systems

Modular Architectural Design : Scalable construction in 50 mm increments enables custom dimensions and shapes for diverse machine vision configurations.

Integrated MCCD© Driver : Built-in Multi Constant Current Driver ensure constant light output and superior homogeneity despite variations in power supply voltage.

Patented HTTM© Technology : High Transmission Thermal Material provides exceptional heat dissipation, maintaining long-term LED stability and operational reliability in industrial environments.

Frameless Compact Housing : The ultra-slim anodized aluminum enclosure without external frames facilitates seamless integration into space-constrained automated machinery and equipment.

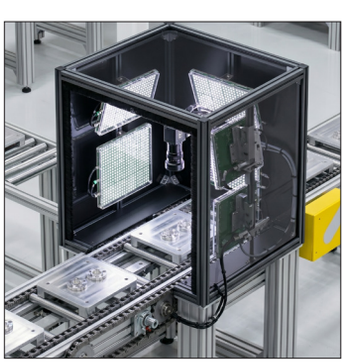
High-Density LED Matrix : Latest generation LEDs provide exceptional brightness and uniformity, specifically engineered for high-speed industrial inspection tasks.

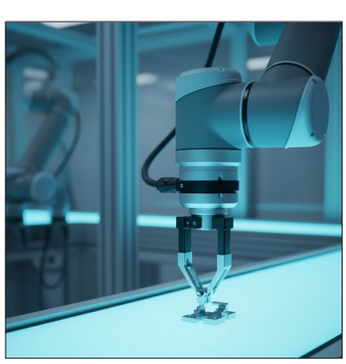
Applications

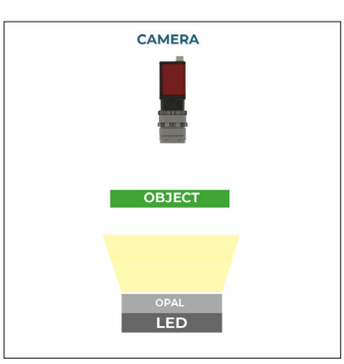
- Conveyor belt material inspection.
- Custom backlight vision systems.
- High-speed product verification.
- Automated assembly line monitoring.
- OEM machine vision integration.
- Packaging and labeling control.
- Industrial robotic guidance systems.
- Precision dimensional measurement tasks.
- Quality control for transparent materials.
- Particle detection in pharmaceutical fluids.

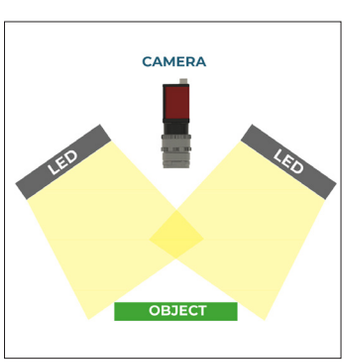
Key Features

- Modular 50x50 mm tiles for customizable industrial lighting geometries.
- Integrated MCCD© technology for superior matrix current regulation.
- High-density LED layout ensures exceptional uniformity and brightness.
- Frameless architecture maximizes the effective light emission area.
- Protective glass shield prevents dust and particulate contamination.
- HTTM© technology provides optimized heat dissipation for industrial use.
- Direct cable connection reduces overall mechanical footprint significantly.
- Fast-response driver enables high-speed synchronized strobe applications.
- Rigorous 48-hour burn-in test with individual quality certification.
- Engineered and manufactured in Italy under ISO9001 standards.









Composition of the product identification code

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

PL	—	DL8	—	YYYYYY	—	XXX	—	A	0	0	0	0	0
				Emission area dimensions in mm		Color							

Emission area

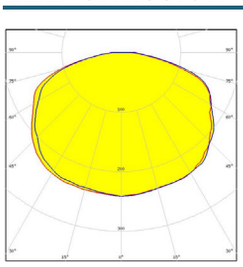
Highlighted models are from normal production - Others are on request and may have longer production times

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 - LED type

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

LED emission



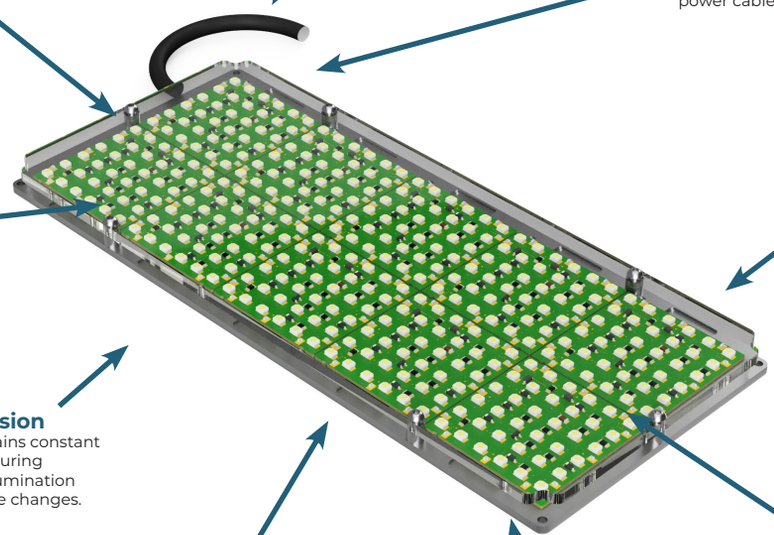
Typical LED output without lens

Why choose a RODER DL8 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.

Rapid Integration
Direct cable soldering simplifies electrical installation and avoids mechanical interference often caused by standard plug-in connectors on the chassis.

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.



Flexible Geometry
Multiples of 50 mm allow for tailored lengths and configurations to meet specific machine vision architectural needs.

Verified Reliability
Every unit undergoes a 48-hour operational test, ensuring that only fully functional and stable products reach the customer.

Uniform Light Emission
MCCD© technology maintains constant current across all LEDs, ensuring perfectly homogeneous illumination regardless of supply voltage changes.

Industrial design
The entire DL8 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.

Reliable Thermal Dissipation
High Transmission Thermal Materials transfer heat effectively, protecting electronic components and maintaining LED output stability over time.

Very high efficiency and high intensity LEDs
Utilizing LEDs from global industry leaders ensures maximum luminous flux and minimal color shifting during the product's life.

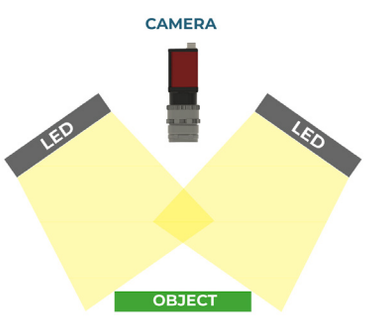
Main features common to the DL8 family

Features	Value
Supply voltage	24 Vdc +/- 10%
IP rating	IP20
Temperature range	0° - 50° C
Electrical connection	3 wire cable - 1200 mm
Certifications	CE - RoHS

The DL8 series represents a significant advancement in modular LED backlighting, engineered specifically for the rigorous demands of industrial vision systems.
Built upon a versatile 50x50 mm tile architecture, this family allows for customizable configurations ranging from 100x100 mm to 500x500 mm.
At its core, the integrated Multi Constant Current Driver (MCCD) technology ensures exceptional luminous uniformity by regulating current across the entire matrix, making the system immune to input voltage fluctuations.

Designed for seamless OEM integration, the DL8 features an ultra-low profile and a frameless design that maximizes the active emission area while minimizing the overall footprint.
The use of High Transmission Thermal Material (HTTM) ensures superior heat dissipation, preserving the lifespan of the latest-generation high-intensity LEDs.
Each unit is protected by a dedicated glass cover, safeguarding the electronics from industrial contaminants.
With support for continuous, ON/OFF, and PWM control, the DL8 series offers a high-performance, cost-effective solution for high-speed inspection, robot guidance, and precision dimensional measurement.

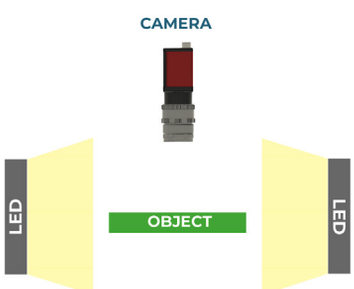
Typical configuration



Direct illumination
The DL8 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.

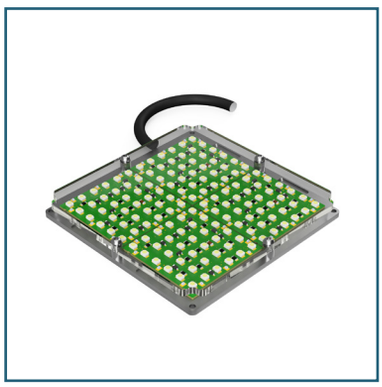
Low cost backlight
The DL8 series of illuminators can be used to make very economical backlights. By placing a diffuser glass, it is possible to realise economical backlights with high luminosity.

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 DL8 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

Models and accessories



DL8 100 x 100

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-44	PL-DL8-010010-WHI-A00000	100 x 100	WHI	0.48A @24vdc	144	1	403 cd**
10-14-45	PL-DL8-010010-RED-A00000	100 x 100	RED	0.48A @24vdc	144	1	161 cd**
10-14-46	PL-DL8-010010-BLU-A00000	100 x 100	BLU	0.48A @24vdc	144	1	100 cd**
10-14-47	PL-DL8-010010-INF-A00000	100 x 100	INF	0.36A @24vdc	144	1	2.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
** Luminous intensity data are to be considered minimum reference values. They can be increased with overdrive control techniques.

DL8 100 x 150

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-48	PL-DL8-010015-WHI-A00000	100 x 150	WHI	0.72A @24vdc	216	1	604 cd**
10-14-49	PL-DL8-010015-RED-A00000	100 x 150	RED	0.72A @24vdc	216	1	241 cd**
10-14-50	PL-DL8-010015-BLU-A00000	100 x 150	BLU	0.72A @24vdc	216	1	151 cd**
10-14-51	PL-DL8-010015-INF-A00000	100 x 150	INF	0.54A @24vdc	216	1	3.0 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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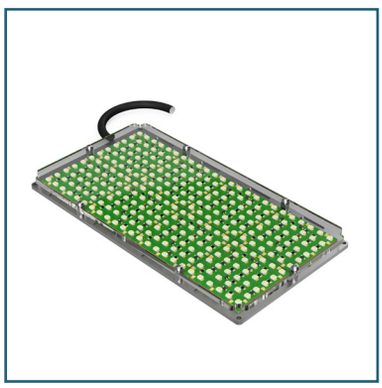

DL8 100 x 200

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-52	PL-DL8-010020-WHI-A00000	100 x 200	WHI	0.96A @24vdc	288	1	806 cd**
10-14-53	PL-DL8-010020-RED-A00000	100 x 200	RED	0.96A @24vdc	288	1	322 cd**
10-14-54	PL-DL8-010020-BLU-A00000	100 x 200	BLU	0.96A @24vdc	288	1	201 cd**
10-14-55	PL-DL8-010020-INF-A00000	100 x 200	INF	0.72A @24vdc	288	1	4.03 W/sr**

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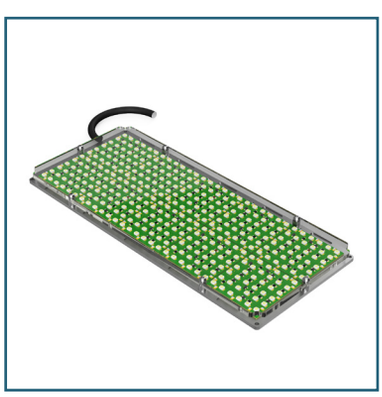

DL8 100 x 250

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-56	PL-DL8-010025-WHI-A00000	100 x 250	WHI	1.2A @24vdc	360	1	1008 cd**
10-14-57	PL-DL8-010025-RED-A00000	100 x 250	RED	1.2A @24vdc	360	1	403 cd**
10-14-58	PL-DL8-010025-BLU-A00000	100 x 250	BLU	1.2A @24vdc	360	1	252 cd**
10-14-59	PL-DL8-010025-INF-A00000	100 x 250	INF	0.9A @24vdc	360	1	5.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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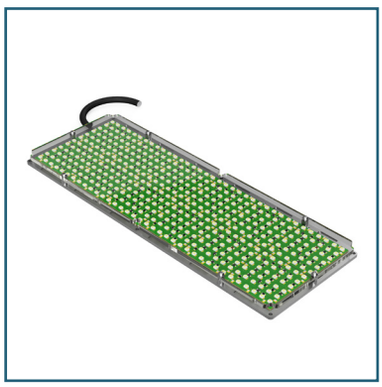
DL8 series - standard models



DL8 100 x 300

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-60	PL-DL8-010030-WHI-A00000	100 x 300	WHI	1.44A @24vdc	432	1	1209 cd**
10-14-61	PL-DL8-010030-RED-A00000	100 x 300	RED	1.44A @24vdc	432	1	483 cd**
10-14-62	PL-DL8-010030-BLU-A00000	100 x 300	BLU	1.44A @24vdc	432	1	302 cd**
10-14-63	PL-DL8-010030-INF-A00000	100 x 300	INF	1.08A @24vdc	432	1	6.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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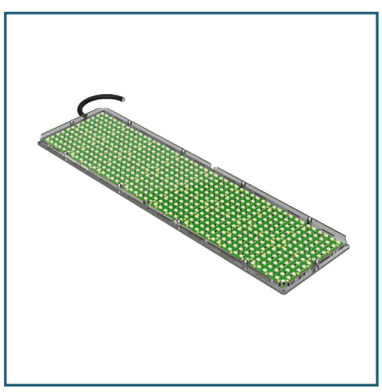

DL8 100 x 400

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity*
10-14-64	PL-DL8-010040-WHI-A00000	100 x 400	WHI	1.92A @24vdc	576	1	1612 cd**
10-14-65	PL-DL8-010040-RED-A00000	100 x 400	RED	1.92A @24vdc	576	1	645 cd**
10-14-66	PL-DL8-010040-BLU-A00000	100 x 400	BLU	1.92A @24vdc	576	1	403 cd**
10-14-67	PL-DL8-010040-INF-A00000	100 x 400	INF	1.44A @24vdc	576	1	8.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
** Luminous intensity data are to be considered minimum reference values. They can be increased with overdrive control techniques.

DL8 100 x 500

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-68	PL-DL8-010050-WHI-A00000	100 x 500	WHI	2.4A @24vdc	720	2	2020 cd**
10-14-69	PL-DL8-010050-RED-A00000	100 x 500	RED	2.4A @24vdc	720	2	806 cd**
10-14-70	PL-DL8-010050-BLU-A00000	100 x 500	BLU	2.4A @24vdc	720	2	504 cd**
10-14-71	PL-DL8-010050-INF-A00000	100 x 500	INF	1.8A @24vdc	720	2	10.0 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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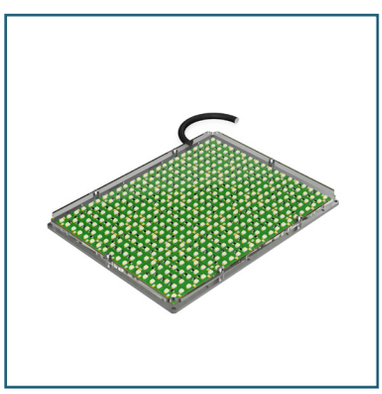

DL8 150 x 200

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-72	PL-DL8-015020-WHI-A00000	150 X 200	WHI	1.44A @24vdc	432	1	1210 cd**
10-14-73	PL-DL8-015020-RED-A00000	150 X 200	RED	1.44A @24vdc	432	1	483 cd**
10-14-74	PL-DL8-015020-BLU-A00000	150 X 200	BLU	1.44A @24vdc	432	1	302 cd**
10-14-75	PL-DL8-015020-INF-A00000	150 X 200	INF	1.08A @24vdc	432	1	6.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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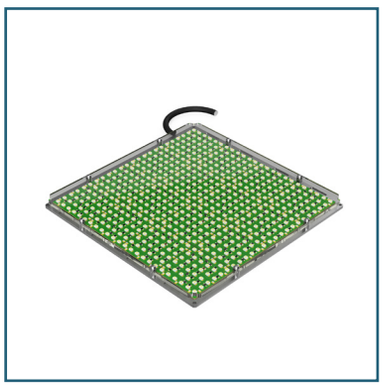
DL8 series - standard models



DL8 200 x 200

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-76	PL-DL8-020020-WHI-A00000	200 x 200	WHI	1.92A @24vdc	576	1	1612 cd**
10-14-77	PL-DL8-020020-RED-A00000	200 x 200	RED	1.92A @24vdc	576	1	645 cd**
10-14-78	PL-DL8-020020-BLU-A00000	200 x 200	BLU	1.92A @24vdc	576	1	403 cd**
10-14-79	PL-DL8-020020-INF-A00000	200 x 200	INF	1.44A @24vdc	576	1	8.0 W/sr**

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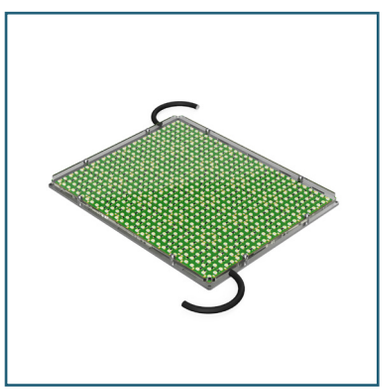

DL8 200 x 250

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-80	PL-DL8-020025-WHI-A00000	200 x 250	WHI	2.4A @24vdc	720	2	2016 cd**
10-14-81	PL-DL8-020025-RED-A00000	200 x 250	RED	2.4A @24vdc	720	2	806 cd**
10-14-82	PL-DL8-020025-BLU-A00000	200 x 250	BLU	2.4A @24vdc	720	2	504 cd**
10-14-83	PL-DL8-020025-INF-A00000	200 x 250	INF	1.8A @24vdc	720	2	10.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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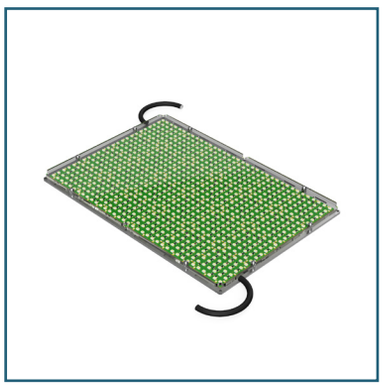

DL8 200 x 300

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-84	PL-DL8-020030-WHI-A00000	200 x 300	WHI	2.88A @24vdc	864	2	2420 cd**
10-14-85	PL-DL8-020030-RED-A00000	200 x 300	RED	2.88A @24vdc	864	2	967 cd**
10-14-86	PL-DL8-020030-BLU-A00000	200 x 300	BLU	2.88A @24vdc	864	2	604 cd**
10-14-87	PL-DL8-020030-INF-A00000	200 x 300	INF	2.16A @24vdc	864	2	12.1 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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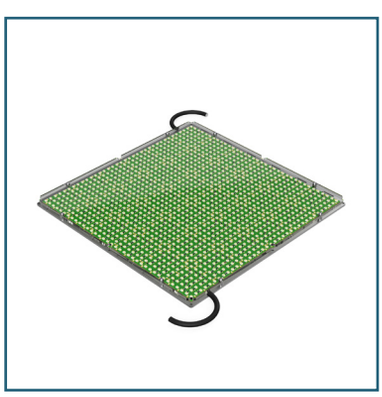

DL8 300 x 300

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-88	PL-DL8-030030-WHI-A00000	300 x 300	WHI	4.32A @24vdc	1296	4	3630 cd**
10-14-89	PL-DL8-030030-RED-A00000	300 x 300	RED	4.32A @24vdc	1296	4	1450 cd**
10-14-90	PL-DL8-030030-BLU-A00000	300 x 300	BLU	4.32A @24vdc	1296	4	907 cd**
10-14-91	PL-DL8-030030-INF-A00000	300 x 300	INF	3.24A @24vdc	1296	4	18.2 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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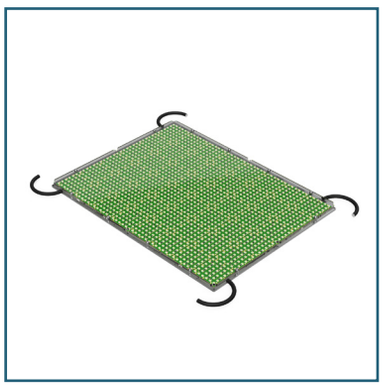

DL8 300 x 400

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-14-92	PL-DL8-030040-WHI-A00000	300 x 400	WHI	5.76A @24vdc	1728	4	4838 cd**
10-14-93	PL-DL8-030040-RED-A00000	300 x 400	RED	5.76A @24vdc	1728	4	1935 cd**
10-14-94	PL-DL8-030040-BLU-A00000	300 x 400	BLU	5.76A @24vdc	1728	4	1210 cd**
10-14-95	PL-DL8-030040-INF-A00000	300 x 400	INF	4.32A @24vdc	1728	4	24.2 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
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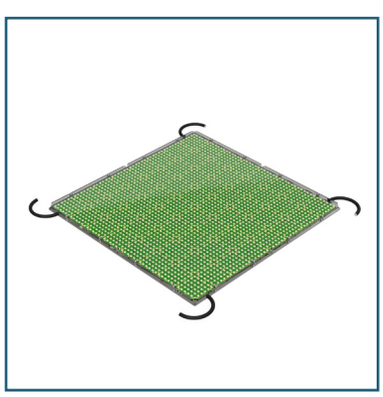
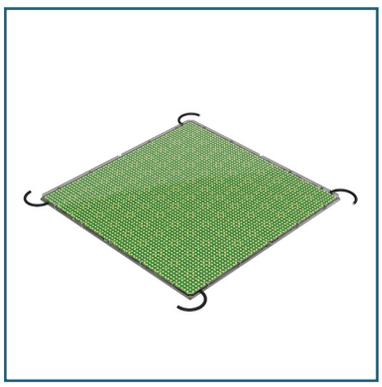


DL8 400 x 400

Item Code	Product Code	Light area	Color	Consumption*	LEDs	Cables	Light Intensity**
10-14-96	PL-DL8-040040-WHI-A00000	400 x 400	WHI	7.68A @24vdc	2304	4	6451 cd**
10-14-97	PL-DL8-040040-RED-A00000	400 x 400	RED	7.68A @24vdc	2304	4	2580 cd**
10-14-98	PL-DL8-040040-BLU-A00000	400 x 400	BLU	7.68A @24vdc	2304	4	1612 cd**
10-14-99	PL-DL8-040040-INF-A00000	400 x 400	INF	5.76A @24vdc	2304	4	32.3 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
** Luminous intensity data are to be considered minimum reference values. They can be increased with overdrive control techniques.

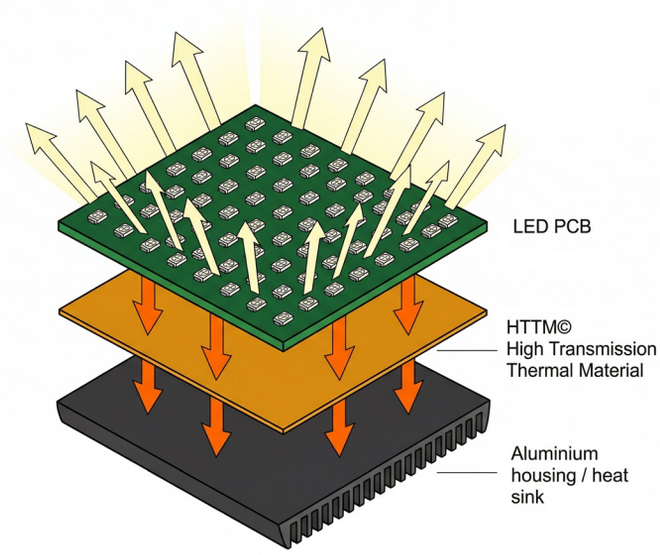
DL8 series - standard models



DL8 500 x 500

Item Code	Product Code	Light area	Color	Consumption*	LED	Cables	Light Intensity**
10-15-00	PL-DL8-050050-WHI-A00000	500 x 500	WHI	12A @24vdc	3600	4	10100 cd**
10-15-01	PL-DL8-050050-RED-A00000	500 x 500	RED	12A @24vdc	3600	4	4040 cd**
10-15-02	PL-DL8-050050-BLU-A00000	500 x 500	BLU	12A @24vdc	3600	4	2520 cd**
10-15-03	PL-DL8-050050-INF-A00000	500 x 500	INF	9A @24vdc	3600	4	50.5 W/sr**

* Consumption data are nominal values obtained under test conditions according to internal testing procedures.
** Luminous intensity data are to be considered minimum reference values. They can be increased with overdrive control techniques.



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.

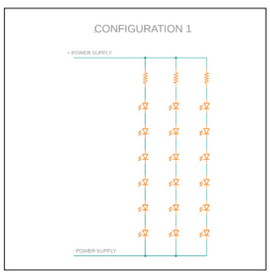
A layer of electrically insulating, high-thermal-conductivity material is precisely interposed between the LED printed circuit board and the aluminium housing.

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

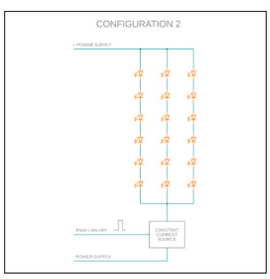


Configuration 1

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.

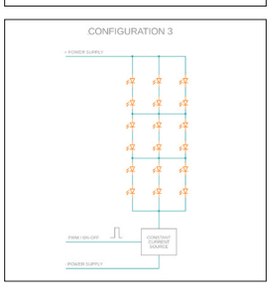


Configuration 2

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.



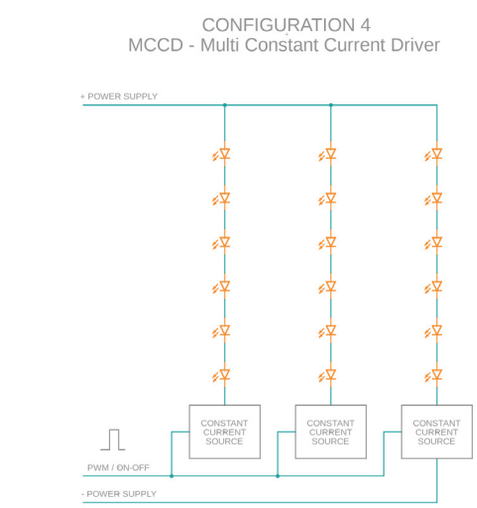
Configuration 3

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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