RODER

LED Illuminators
DC5 Series

Revisione IT2601

2026

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PROVIDER

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DC5 SERIES

Modular High-Intensity LED Illuminators for OEM and Robot Guidance

Modular Optical Design: Selectable 15°, 30°, 45°, or 120° lenses allow precise beam control for diverse inspection distances.

Integrated MCCD Technology: Multi Constant Current Drivers ensure uniform light intensity across the entire matrix regardless of voltage fluctuations.

Efficient Thermal Management: High Transmission Thermal Material (HTTM) effectively transfers heat to the frame, ensuring long-term LED stability.

Advanced Control Options: Supports continuous operation, external ON/OFF triggering, and PWM dimming via PLC for high-speed synchronization.

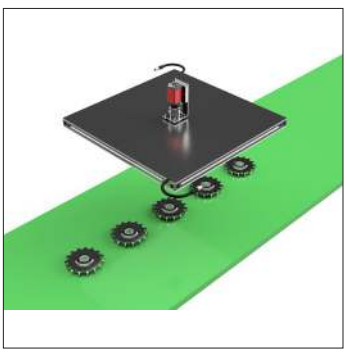
Robust Industrial Protection: Integrated protective glass shields LED circuits from dust while polarity protection prevents electrical connection damage.

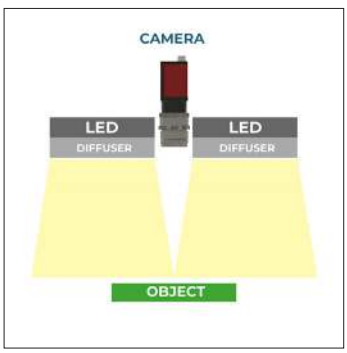
Applications

- Robot-guided picking and placement systems.
- High-speed industrial vision inspection lines.
- Automotive component quality control stations.
- Pharmaceutical packaging and labeling verification.

Key Features

- Modular construction based on 100 mm LED matrix increments.
- Integrated MCCD driver for uniform light output across matrices.
- HTTM technology for superior thermal dissipation and LED longevity.
- Configurable beam angles including 15, 30, and 45 degrees.
- Central aperture design for coaxial camera mounting applications.
- Industrial M8 3-pin connector for rapid maintenance and setup.
- High-intensity LEDs sourced from industry-leading global manufacturers.
- Low-profile mechanical frame optimized for OEM machine integration.
- Reverse polarity protection integrated into every LED module.
- 48-hour reliability testing with individual functional certification provided.





Composition of the product identification code

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

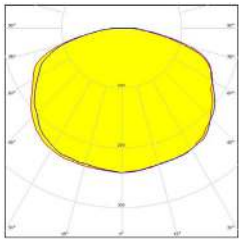
PL	—	DC5	—	YYYYYY	—	XXX	—	A	0	0	0	0	0
				Emission area dimensions in mm		Color							

Emission area

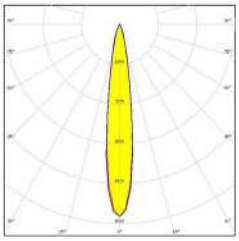
Highlighted models are from normal production - Others are on request and may have longer production times

Active light area (mm)					
300 x 300 (050050)	500 x 500 (050050)				

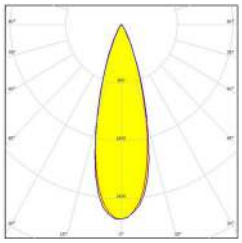
LED emission



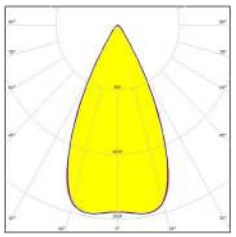
Typical LED output without lens



Typical LED emission with 15° lens



Typical LED emission with 30° lens



Typical LED emission with 45° lens

Lens

Note: the angular value represents the angle of emission referring to 50% of the maximum intensity emitted by the LED

0 = no lens (natural emission LED 120°)
1 = lens 15°
2 = lens 30°
3 = lens 45°

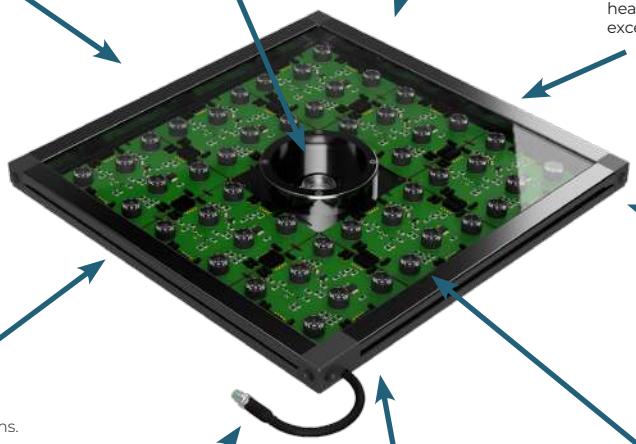
Color

Other LED models on request

WH1 : Neutral White 5500K *
WH2 : Warm White 2700K
WH3 : Cold White 6200K
BL1 : Deep Blue 450 nm
BL2 : Standard Blue 465 nm *
GR1 : Green 520 nm
RD1 : Red 620 nm *
RD2 : Photo Red 650 nm
RD3 : Deep Red 720 nm
IN1 : Infrared 850 nm
IN2 : Infrared 940 nm

* standard products

Why choose a RODER DC5 series illuminator ?



Industrial design
The entire DC5 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.

Central camera mounting hole
The central hole allows for mounting a camera with a standard lens. The illuminator has a rigid and robust structure and also allows the camera to be held centrally.

Optical Versatility
Interchangeable lenses provide precise control over light projection for long-distance or wide-angle tasks

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.

Stable Light Output
Immune to power supply voltage variations, providing flicker-free illumination for sensitive vision systems.

Modern LED Technology
Utilizes latest-generation high-intensity LEDs for maximum brightness and superior energy efficiency.

Rapid Maintenance
Standard M8 connectors allow for quick replacement, reducing downtime in critical production environments

Enhanced Durability
HTTM materials and 48-hour burn-in tests guarantee reliable operation in demanding industrial environments.

Main features common to the DC5 family

Features	Value
Supply voltage	24 Vdc +/- 10 %
IP rating	IP40
Temperature range	0° - 50° C
Electrical connection	M8 3-pin connector with threaded ring nut
Certifications	CE

The DC5 series represents a versatile range of modular LED illuminators engineered specifically for the demands of industrial machine vision and robot guidance.

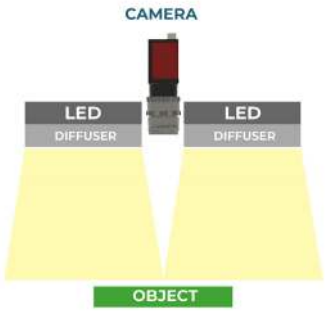
Constructed with high-intensity, latest-generation LEDs, these units offer exceptional brightness and stability. The core of the system is the Multi Constant Current Driver (MCCD) technology. This ensures uniform illumination across the entire matrix by stabilizing current regardless of voltage fluctuations.

Thermal management is handled by High Transmission Thermal Material (HTTM), effectively dissipating heat to maintain LED efficiency.

The modular design, based on 100mm increments, allows for diverse shapes and sizes, including ring configurations with central apertures for coaxial camera placement. Optical flexibility is provided through selectable beam angles of 15°, 30°, 45°, or a natural 120° spread.

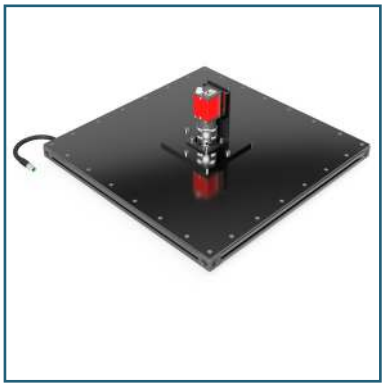
With a compact, low-profile frame and M8 industrial connectors, the DC5 series provides a professional, cost-effective lighting solution for OEMs and system integrators seeking high performance without mechanical complexity.

Typical configuration



Direct illumination
The DC5 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.

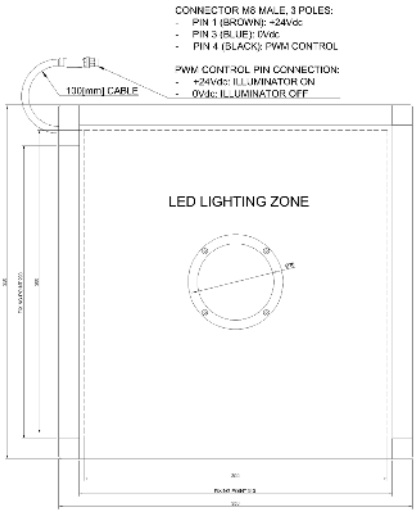
DC5 series - standard models (other models available on request)



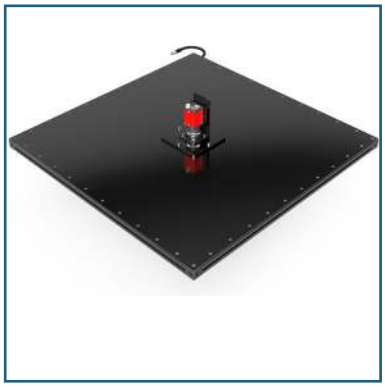
DC5 300 x 300

Note: the camera fixing bracket is not included.

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-13-59	PL-DC5-030030-WH1-A00000	300 x 300	WHITE - 5500K	2.8A @24vdc	48	1
10-13-60	PL-DC5-030030-BL2-A00000	300 x 300	BLUE - 465 nm	2.8A @24vdc	48	1
10-13-61	PL-DC5-030030-RD1-A00000	300 x 300	RED - 620 nm	2.8A @24vdc	48	1
10-13-62	PL-DC5-030030-IN1-A00000	300 x 300	INFRARED - 850 nm	2.8A @24vdc	48	1
10-13-63	PL-DC5-030030-WH1-A01000	300 x 300	WHITE - 5500K	2.8A @24vdc	48	1
10-13-64	PL-DC5-030030-BL2-A01000	300 x 300	BLUE - 465 nm	2.8A @24vdc	48	1
10-13-65	PL-DC5-030030-RD1-A01000	300 x 300	RED - 620 nm	2.8A @24vdc	48	1
10-13-66	PL-DC5-030030-IN1-A01000	300 x 300	INFRARED - 850 nm	2.8A @24vdc	48	1
10-13-67	PL-DC5-030030-WH1-A02000	300 x 300	WHITE - 5500K	2.8A @24vdc	48	1
10-13-68	PL-DC5-030030-BL2-A02000	300 x 300	BLUE - 465 nm	2.8A @24vdc	48	1
10-13-69	PL-DC5-030030-RD1-A02000	300 x 300	RED - 620 nm	2.8A @24vdc	48	1
10-13-70	PL-DC5-030030-IN1-A02000	300 x 300	INFRARED - 850 nm	2.8A @24vdc	48	1
10-13-71	PL-DC5-030030-WH1-A03000	300 x 300	WHITE - 5500K	2.8A @24vdc	48	1
10-13-72	PL-DC5-030030-BL2-A03000	300 x 300	BLUE - 465 nm	2.8A @24vdc	48	1
10-13-73	PL-DC5-030030-RD1-A03000	300 x 300	RED - 620 nm	2.8A @24vdc	48	1
10-13-71	PL-DC5-030030-IN1-A03000	300 x 300	INFRARED - 850 nm	2.8A @24vdc	48	1



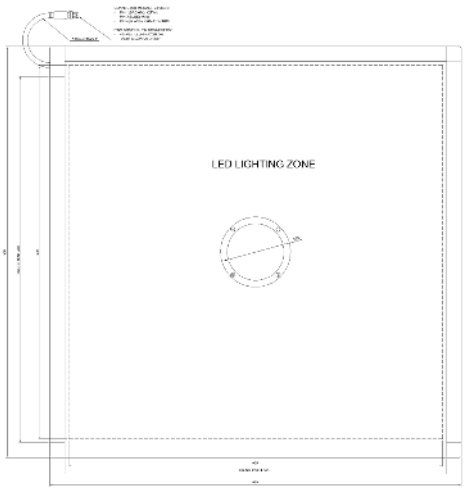
DC5 series - standard models (other models available on request)

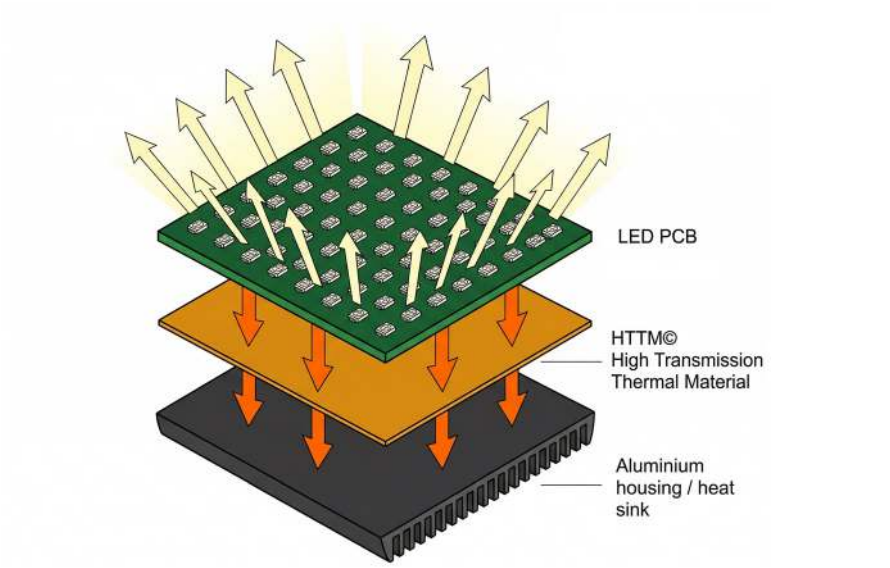


DC5 500 x 500

Note: the camera fixing bracket is not included.

Item Code	Product Code	Light emitting area	Color	Consumption	N. LEDs	N. Cables
10-13-75	PL-DC5-050050-WH1-A00000	500 x 500	WHITE - 5500K	8.4A @24vdc	144	1
10-13-76	PL-DC5-050050-BL2-A00000	500 x 500	BLUE - 465 nm	8.4A @24vdc	144	1
10-13-77	PL-DC5-050050-RD1-A00000	500 x 500	RED - 620 nm	8.4A @24vdc	144	1
10-13-78	PL-DC5-050050-IN1-A00000	500 x 500	INFRARED - 850 nm	8.4A @24vdc	144	1
10-13-79	PL-DC5-050050-WH1-A01000	500 x 500	WHITE - 5500K	8.4A @24vdc	144	1
10-13-80	PL-DC5-050050-BL2-A01000	500 x 500	BLUE - 465 nm	8.4A @24vdc	144	1
10-13-81	PL-DC5-050050-RD1-A01000	500 x 500	RED - 620 nm	8.4A @24vdc	144	1
10-13-82	PL-DC5-050050-IN1-A01000	500 x 500	INFRARED - 850 nm	8.4A @24vdc	144	1
10-13-83	PL-DC5-050050-WH1-A02000	500 x 500	WHITE - 5500K	8.4A @24vdc	144	1
10-13-84	PL-DC5-050050-BL2-A02000	500 x 500	BLUE - 465 nm	8.4A @24vdc	144	1
10-13-85	PL-DC5-050050-RD1-A02000	500 x 500	RED - 620 nm	8.4A @24vdc	144	1
10-13-86	PL-DC5-050050-IN1-A02000	500 x 500	INFRARED - 850 nm	8.4A @24vdc	144	1
10-13-87	PL-DC5-050050-WH1-A03000	500 x 500	WHITE - 5500K	8.4A @24vdc	144	1
10-13-88	PL-DC5-050050-BL2-A03000	500 x 500	BLUE - 465 nm	8.4A @24vdc	144	1
10-13-89	PL-DC5-050050-RD1-A03000	500 x 500	RED - 620 nm	8.4A @24vdc	144	1
10-13-90	PL-DC5-050050-IN1-A03000	500 x 500	INFRARED - 850 nm	8.4A @24vdc	144	1





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.

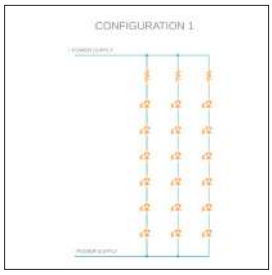
A layer of electrically insulating, high-thermal-conductivity material is precisely interposed between the LED printed circuit board and the aluminium housing.

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

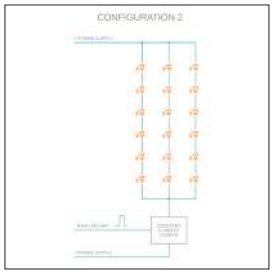


Configuration 1

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.

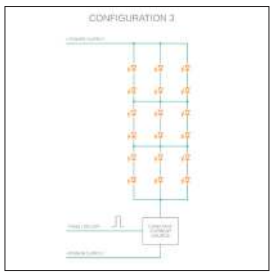


Configuration 2

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.



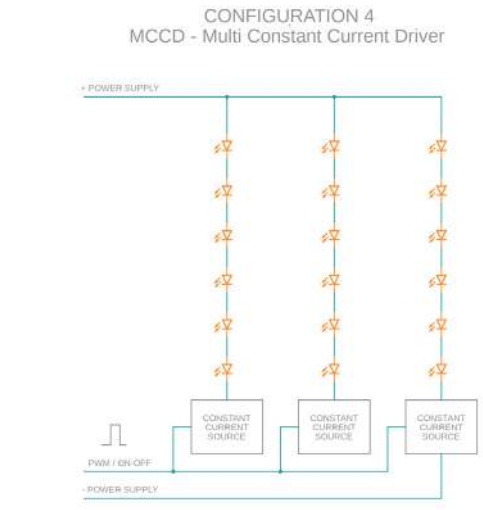
Configuration 3

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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CONTATTI

RODER SRL
Via Aldo Moro 15/A
10080 Oglianico (TO) - Italia

+39 0124 34301

info@roder.it

www.roder.it

RODER VISION è una divisione di

RODER