



OPTO ENGINEERING

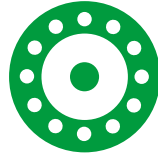
OPTICAL IMAGING TECHNOLOGIES



LIGHTING 

LIGHTING

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* RT Products

In order to meet all of our customers' needs, we have carefully selected a collection of machine vision components from experienced and qualified suppliers to complement our product range. These products are highlighted throughout the catalog with the "RT" symbol and have been identified by our product managers as "the best available within their category": they range from general purpose fixed focal length

lenses to LED illuminators and from high magnification telecentric lenses to resolution targets. These products will be delivered to you with the same level of competence, quality and technical support that you have come to know and expect from Opto Engineering®.

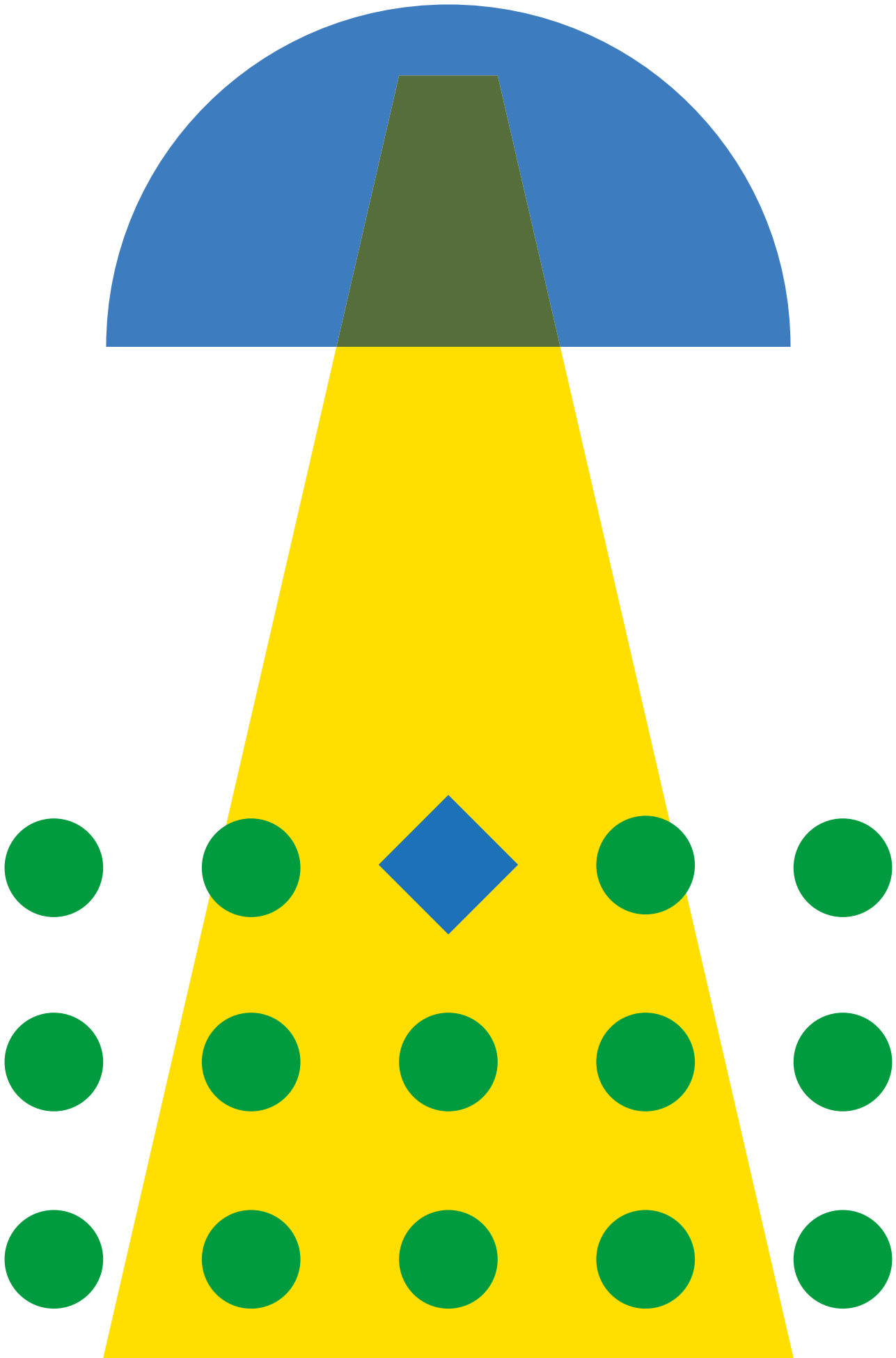
Our goal is to turn our knowledge, experience and passion for machine vision into a broad and comprehensive service for our customers.

TOOLS AND RESOURCES

Extended documentation is available on our website, localized in ten languages. For every part number you will find full specifications, product compatibilities, 2D and 3D models in the most popular CAD formats. Interactive tools such as the **TC selection form** and the **telecentric/entocentric sensor charts** provide an essential aid in navigating our product range. Moreover, we regularly publish papers and video guides about Opto Engineering® products and technologies as well as broader machine vision optics tutorials.



OPTO-E.COM





LIGHTING

Lighting is one of the most critical elements in a vision system and is in fact key to achieve stable and repeatable results. Incorrect illumination may result in extensive and time consuming image processing or, in the worst case, in crucial information loss.

Opto Engineering® lighting solutions, from standard to custom products, are the result of our optical knowledge and are designed with our guiding principle in mind: “simple works better”.

We design and manufacture both lighting and optics. Many of our lighting solutions are conceived to perfectly match our lenses or even to be directly integrated into our optical systems: this approach allows to make the most out of our lighting products and greatly simplifies vision system integration, since our products are truly optimized both optically and mechanically.

Opto Engineering® machine vision lighting products include both LED illuminators and pattern projectors, designed to meet the needs of the most demanding industrial environments. Our innovative products enable reliable inspections in many applications thanks to their flexibility, robustness and ease of use.

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LED ILLUMINATORS

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Advanced lighting solutions.

Illumination is a critical part of every machine vision setup: **proper choice of lighting color and geometry can effectively suppress or reveal specific features of an object**, leading to simple and accurate image processing.

Opto Engineering® offers a wide range of illumination solutions including ringlights, dome illuminators and a unique space-saving lighting system complemented by specific high power/strobe controllers. The Opto Engineering® illuminators family provides innovative and robust lighting units, **designed to deal with fast-moving objects of various sizes and surface finishes**, such as highly reflective or curved samples.



Refer to specific datasheets available at www.opto-e.com for product compliancy with regulations, certifications and safety labels.





LTCLHP series

High-performance telecentric illuminators



KEY ADVANTAGES

Complete light coupling

All the light emitted by a LTCLHP source is collected by a telecentric lens and transferred to the camera detector, ensuring very high signal-to-noise ratios.

Border effects removal

Diffused back-illuminators often make objects seem smaller than their actual size because of light reflections on the object sides, while collimated rays are typically much less reflected.

Field depth and telecentricity improvement




Collimated illumination geometry increases a telecentric lens natural field depth and telecentricity far beyond its nominal specs.

Homogeneity test report with measured values.

LTCLHP series are high-performance telecentric illuminators specifically designed to back illuminate objects imaged by telecentric lenses. This high performance series provides:

- Excellent **illumination stability** featuring no light flickering thanks to very high current stability over time even at low currents.
- Precise **light intensity tuning** thanks to the leadscrew multi-turn trimmer positioned in the back.
- **Easy LED source replacement** and alignment for all the LED colors offered by Opto Engineering®.

SEE ALSO

	TCBENCH series	p. 40
FULL RANGE OF COMPATIBLE ACCESSORIES		
	CMHO series	p. 222
	LTDV1CH-17V strobe controller	p. 250

NEW

LTCLHP series is now also available with new LTSCHP1W-GZ **green** light source, suitable for any kind of sample and specifically tailored for measuring reflective objects and objects with sharp edges.

KEY FEATURES

- **Reduction of edge diffraction effects**
- Enhanced **illumination uniformity**, especially on large FOVs
- Less sensitive to **alignment**



Ordering information

To order a telecentric light with a new green light source, use p/n **LTCLHPxxx-GZ** (i.e. LTCLHP064-GZ).

Part number (*)	Beam diameter (mm)	Available colours				Optical specs	Mechanical specs		Compatibility
		R	G	B	W	Working distance range (mm)	Length (mm)	Outer diameter (mm)	
		1				2			
LTCLHP 023-x	16	x	x	x	x	45 – 90	96.8	28	TC2300y, TC23012, TC4M00y-x
LTCLHP 016-x	20	x	x	x	x	35 – 70	99.9	38	TCxx016, TC12M016-F, TCxMHR016-x, TCLWD series
LTCLHP 024-x	30	x	x	x	x	45 – 90	124.7	44	TCxx024, TCxMHR024-x, TC12M024-F, TC16M009-x, TC16M012-x, TC16M018-x
LTCLHP 036-x	45	x	x	x	x	70 – 140	152.1	61	TCxx036, TC12M036-F, TCxMHR036-x, TC16M036-x
LTCLHP 048-x	60	x	x	x	x	90 – 180	187.2	75	TCxx048, TC12M048-F, TCxMHR048-x, TC16M048-x
LTCLHP 056-x	70	x	x	x	x	100 – 200	210.5	80	TCxx056, TC12M056-F, TCxMHR056-x, TC16M056-x
LTCLHP 064-x	80	x	x	x	x	120 – 240	231.6	100	TCxx064, TCxMHR064-x, TC12M064-F, TC12K064
LTCLHP 080-x	100	x	x	x	x	150 – 300	277.2	116	TCxx064, TCxMHR064-x, TC12M064-F, TC12K064
LTCLHP 096-x	120	x	x	x	x	200 – 350	322.2	143	TC23085, TCxx096, TCxMHR096-x, TC12M096-F, TC16M096-x
LTCLHP 120-x	150	x	x		x	220 – 440	408.2	180	TC23110, TCxx120, TCxMHR120-x, TC16M120-x, TC12M120-F, TC12K121
LTCLHP 144-x	180	x	x			270 – 540	467.2	200	TC23130, TCxx144, TCxMHR144-x, TC16M144-x, TC12M144-F, TC12K144
LTCLHP 192-x	250	x	x		x	350 – 700	608.2	260	TC23172, TCxx192, TCxMHR192-x, TC12K192
LTCLHP 240-x	300	x	x			350 – 700	769.2	322	TC23200, TC23240, TCxMHR240-x, TC12M240-F

(*) The last digit of the part number "-x" defines the source colour.

1 Opto Engineering® recommends green light for high precision measurement applications.

2 Nominal value, with no spacers in place.

LTCLHP telecentric illuminators offer higher edge contrast when compared to diffused back light illuminators and therefore higher measurement accuracy.

This type of illumination is especially recommended for high accuracy measurement of round or cylindrical parts where diffusive back lighting would offer poor performances because of the diffuse reflections coming from the edges of objects under inspection.

Precise light intensity tuning

Easily and precisely tune the light intensity level thanks to the leadscrew multi-turn trimmer positioned in the back.



Direct LED control

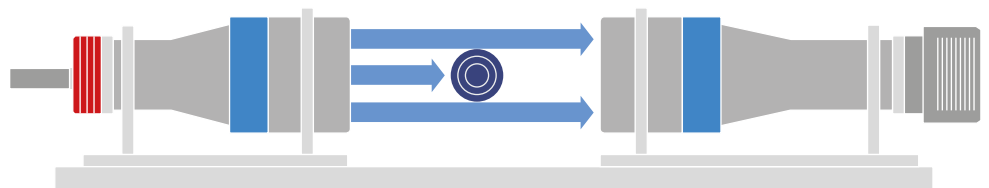
The built-in electronics can be bypassed in order to drive the LED directly for use in continuous or pulsed mode.

When bypassed, the built-in electronics behaves as an open circuit allowing for direct control of the LED source.



Easy and precise alignment with bi-telecentric lenses

Create the perfect optical bench for precision measurement applications by interfacing our bi-telecentric lenses and LTCLHP collimated illuminators using Opto Engineering® precision clamping mechanics CMHO series.



Wide selection of different colors

Part number	Light	Device power ratings			LED power ratings			
	Light color, wavelength peak	DC voltage		Power consumption	Max LED fwd current	Forward voltage		Max pulse current
		min (V)	max (V)	(W)	(mA)	typical (V)	max (V)	(mA)
		1			2	3		4
LTCLHP xxx-R	red, 630 nm	12	24	< 2.5	350	2.4	3.00	2000
LTCLHP xxx-G	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000
LTCLHP xxx-B	blue, 460 nm	12	24	< 2.5	350	3.3	4.00	2000
LTCLHP xxx-W	white	12	24	< 2.5	350	2.78	n.a.	2000

1 Tolerance ± 10%.

2 Used in continuous (not pulsed) mode.

3 At max forward current. Tolerance is ±0.06V on forward voltage measurements.

4 At pulse width ≤ 10 ms, duty cycle ≤ 10% condition.

Built-in electronics board must be bypassed (see tech info online).

LTCLHP CORE series

Ultra compact telecentric illuminators



KEY ADVANTAGES

Deliver excellent performance

LTCLHP CORE telecentric illuminators deliver exactly the same excellent optical performance as other Opto Engineering® telecentric illuminators.

Downsize your vision system

LTCLHP CORE telecentric illuminators are up to 60% smaller than other telecentric illuminators on the market.

Easily fit into existing systems

LTCLHP CORE illuminators can be mounted in different directions in your machine.

Improve your system performance

LTCLHP CORE illuminators may be used instead of flat backlights to improve your system.

Help to spare and sell

A smaller system means less expenses and less space and is preferred by the industry.

Homogeneity test report with measured values.

LTCLHP CORE Series are ultra compact telecentric illuminators. They are up to 60% more compact than other collimated illuminators on the market.

The ultra compact size allows you to greatly reduce the size of your machine and to easily integrate true collimated illumination instead of common flat backlights, thus improving your system's performance.

The smart design also makes them easy to retrofit into existing systems. They can easily be mounted in different directions using any of their 4 sides, with or without clamps.

A smaller system means lower manufacturing, shipping and storage costs, as well as less use of factory space and is the solution preferred by the industry.

LTCLHP CORE illuminators can be used both with classic telecentric lenses and with ultra compact telecentric lenses from CORE family like TC CORE, TC2MHR CORE and TC4MHR CORE series.

NEW

LTCLHP CORE series is now also available with new LTSCHP1W-GZ **green** light source, suitable for any kind of sample and specifically tailored for measuring reflective objects and objects with sharp edges.

KEY FEATURES

- Reduction of edge diffraction effects
- Enhanced illumination uniformity, especially on large FOVs
- Less sensitive to alignment






Ordering information

To order a telecentric light with a new green light source, use p/n **LTCLCRxxx-GZ** (i.e. LTCLCR064-GZ).



LTCLHP CORE telecentric illuminators are up to 60% shorter than other telecentric illuminators on the market.

SEE ALSO		
	TC series	p. 18
FULL RANGE OF COMPATIBLE ACCESSORIES		
	Mounting mechanics CMHO CR and CMPT CR series	p. 222
	LTDV1CH-17V strobe controller	p. 250

Precise light intensity tuning

Easily and precisely tune the light intensity level thanks to the leadscrew multi-turn trimmer positioned in the back.



Direct LED control

The built-in electronics can be bypassed in order to drive the LED directly for use in continuous or pulsed mode. When bypassed, the built-in electronics behaves as an open circuit allowing for direct control of the LED source.



Part number	Light color, wavelength peak	Device power ratings			LED power ratings			
		DC voltage		Power consumption	Max LED fwd current	Forward voltage		Max pulse current
		min (V)	max (V)	(W)	(mA)	typical (V)	max (V)	(mA)
LTCLCR xxx-R	red, 630 nm	12	24	< 2.5	350	2.4	3.00	2000
LTCLCR xxx-G	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000
LTCLCR xxx-W	white	12	24	< 2.5	350	2.78	n.a.	2000

1 Tolerance ± 10%.

2 Used in continuous (not pulsed) mode.

3 At max forward current. Tolerance is ±0.06V on forward voltage measurements.

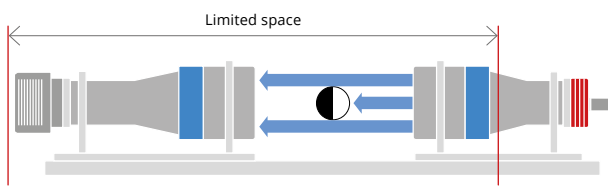
4 At pulse width ≤ 10 ms, duty cycle ≤ 10% condition.

Built-in electronics board must be bypassed (see tech info online).

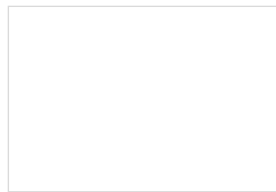
LTCLHP CORE series

Ultra compact telecentric illuminators

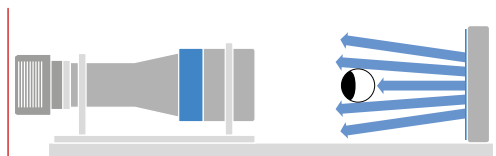
LTCLHP CORE - True collimated illumination in very limited space



Telecentric lens and collimated illuminator.



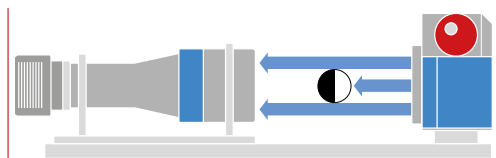
A standard collimated illuminator is impossible to use due to lack of space.



"Classic" telecentric lens and flat backlight.



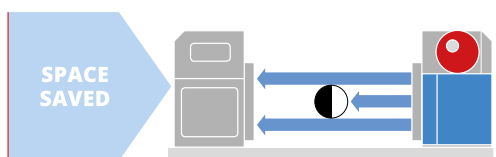
Classic solution with diffuse backlight: less precise measurements due to surface reflections and uncertain edge position.



"Classic" telecentric lens and LTCLHP CORE collimated illuminator.



Smart solution with LTCLHP CORE telecentric illuminator: no edge uncertainty for excellent measurement results.



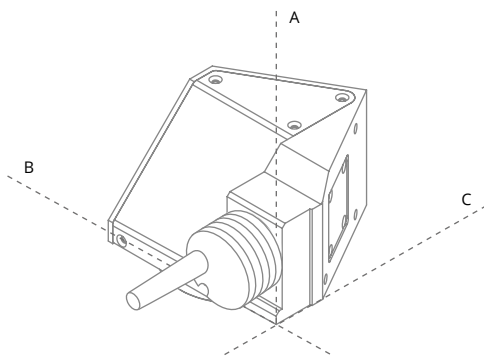
TC CORE telecentric lens and LTCLHP CORE collimated illuminator.



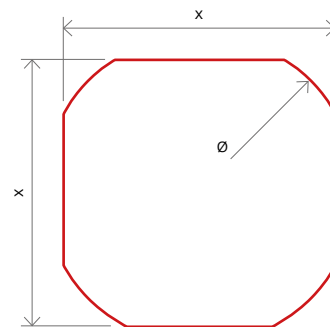
The smartest solution with TC CORE telecentric lens and LTCLHP CORE telecentric illuminator: excellent measurement results in a super compact space.



LTCLHP CORE illuminator dimensions (A, B, C):



Minimum beam shape dimensions:



Part number	Optical specifications			Dimensions			Compatibility
	Light color, wavelength peak	Minimum beam shape dimensions (mm)	Working distance range (mm)	A	B	C 2	
	1						
LTCLCR 048-R	red, 630 nm	Ø = 56; x = 50	90 - 180	77	106	162	TCCRxx048, CMHOCR048, CMPTCR048, TCCRxM048-x, TCxx048, TCxMHR048-x, TC12M048-F, TC16M048, TC16M048-Q
LTCLCR 048-G	green, 520 nm	Ø = 56; x = 50	90 - 180	77	106	162	
LTCLCR 048-W	white	Ø = 56; x = 50	90 - 180	77	106	162	
LTCLCR 056-R	red, 630 nm	Ø = 74; x = 66	100 - 200	94	110	172	TCCRxx056, CMHOCR056, CMPTCR056, TCCRxM056-x, TCxx056, TCxMHR056-x, TC12M056-F, TC16M056, TC16M056-Q
LTCLCR 056-G	green, 520 nm	Ø = 74; x = 66	100 - 200	94	110	172	
LTCLCR 056-W	white	Ø = 74; x = 66	100 - 200	94	110	172	
LTCLCR 064-R	red, 630 nm	Ø = 86; x = 67	120 - 240	101	122	179	TCCRxx064, CMHOCR064, CMPTCR064, TCCRxM064-x, TCxx064, TCxMHR0564-x, TC12M064-F, TC16M064, TC16M064-Q, TC12K064
LTCLCR 064-G	green, 520 nm	Ø = 86; x = 67	120 - 240	101	122	179	
LTCLCR 064-W	white	Ø = 86; x = 67	120 - 240	101	122	179	
LTCLCR 080-R	red, 630 nm	Ø = 98; x = 90	150 - 300	119	145	198	TCCRxx080, CMHOCR080, CMPTCR080, TCCRxM080-x, TCxx080, TCxMHR080x, TC12M080-F, TC16M080, TC16M080-Q, TC12K080, TCZR0725
LTCLCR 080-G	green, 520 nm	Ø = 98; x = 90	150 - 300	119	145	198	
LTCLCR 080-W	white	Ø = 98; x = 90	150 - 300	119	145	198	
LTCLCR 096-R	red, 630 nm	Ø = 120; x = 99	200 - 350	139	172	223	TCCRxx096, CMHOCR096, CMPTCR096, TCCRxM096-x, TCxx096, TCxMHR096x, TC12M096-F, TC16M096, TC16M096-Q, TC12K096
LTCLCR 096-G	green, 520 nm	Ø = 120; x = 99	200 - 350	139	172	223	
LTCLCR 096-W	white	Ø = 120; x = 99	200 - 350	139	172	223	
LTCLCR 120-R	red, 630 nm	Ø = 120; x = 99	220 - 440	182	220	231	TCCRxx0120, TCCRxM0120-x, TCxx0120, TCxMHR0120x, TC12M120-F, TC16M0120, TC16M0120-Q, TC12K0120
LTCLCR 120-G	green, 520 nm	Ø = 120; x = 99	220 - 440	182	220	231	
LTCLCR 120-W	white	Ø = 156; x = 130	220 - 440	182	220	231	

1 Opto Engineering® recommends green light for high precision measurement applications.

2 Nominal value, with no spacers in place.

LTCLHP CORE PLUS series

Space-saving telecentric illuminators for large FOV systems

NEW



INTERNATIONAL
PATENT
PENDING

KEY ADVANTAGES

Large illumination area in a super compact form factor

LTCLHP CORE PLUS are up to 40% shorter than other telecentric lights on the market.

Reduce the size of your vision system

The working distance of LTCLHP CORE PLUS telecentric illuminators has been optimized to reduce the overall system's footprint.

Boost your measurement system's performance

LTCLHP CORE PLUS illuminators may be used in place of flat backlights to improve your system's performance.

Smart integration

LTCLHP CORE PLUS illuminators integrate a mounting flange and standard extruded aluminum T-slot profiles for easy mounting without additional clamps.

System compactness is a competitive advantage

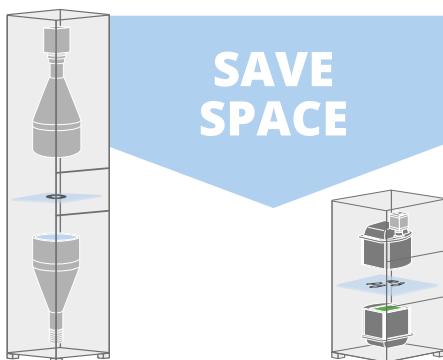
A smaller vision system or measurement machine is preferred by the industry.

LTCLHP CORE PLUS telecentric illuminators are designed to illuminate large areas in a reduced space. They are up to 40% shorter than other telecentric lights on the market.

The length and working distance of a telecentric lens strongly impact the size of a vision system. Their working distance range has been optimized to make a measurement system as compact as possible, allowing to reduce the overall system's dimensions by up to up to half. The super compact form factor allows you to easily integrate CORE PLUS collimated illumination where classic telecentric lights don't fit instead of common diffuse backlights, thus improving your system's performance.

LTCLHP CORE PLUS lights have been designed for smart integration. They feature a built-in mounting flange and standard extruded aluminum T-slot profiles so no additional mounting clamps are required.

System compactness is a competitive advantage



Comparison of precision measurement systems with "classic" telecentric lens and light vs. CORE PLUS telecentric lens and light.

SEE ALSO

	Flat backlights LT2BP, LTBC, LTBP series	p. 162-168
SEE ALSO		
	TC CORE PLUS series telecentric lenses	p. 24
COMPATIBLE ACCESSORIES		
	LTDV1CH-17V strobe controller	p. 250

ADVANTAGES

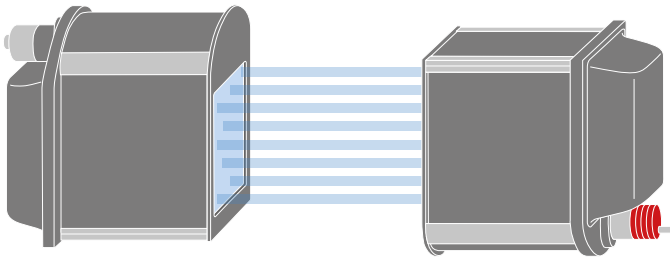


Save more

- Lower manufacturing cost due to less material employed
- Cost of mounting is reduced as no additional clamps are needed
- Less space required for storage and use
- Lower shipment expenses due to smaller size
- Lower transportation risks

Sell more

- A smaller system leads to more sales

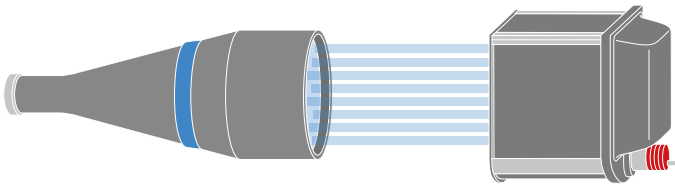


TC CORE PLUS telecentric lens.

LTCLHP CORE PLUS telecentric illuminator.

Setup instructions 1:

To build a telecentric measurement setup it's necessary to position a LTCLHP CORE telecentric illuminator upside down with respect to the TC CORE PLUS telecentric lens.

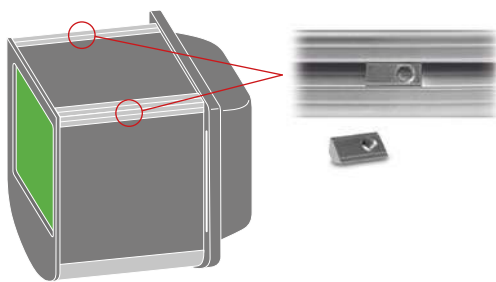


TC telecentric lens.

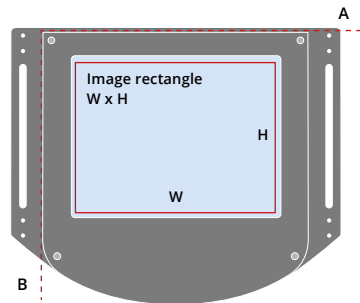
LTCLHP CORE PLUS telecentric illuminator.

Setup instructions 2:

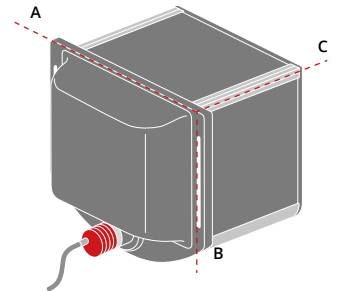
LTCLHP CORE PLUS telecentric illuminator is also a perfect solution when coupled with classic telecentric lenses (e.g. TC series).



Integrated extruded aluminum profiles with M5 T-slot nuts allow for easy and cost-effective mounting.



The width of the beam rectangle is aligned along the A axis. The height of the beam rectangle is aligned along the B axis.



A, B and C indicate the mechanical dimensions of the illuminator.

Part number	Optical specifications			Electrical specifications							Mechanical specifications		
	Light color, wavelength peak	Minimum beam shape dimensions (mm x mm)	Working distance range (mm)	Device power rating			LED power ratings				Dimensions		
				DC voltage		Power cons. (W)	Max LED fwd current (mA)	Forward voltage		Max pulse current (mA)	A	B	C
				min (V)	max (V)			typical (V)	max (V)				
1	2	3	4	5	6	7	8	9	10				
LTCLCP 144-G	green, 520 nm	190 x 150	170 - 350	12	24	< 2.5	350	3.3	4	2000	332.0	302.5	310.5
LTCLCP 192-G	green, 520 nm	245 x 190	230 - 450	12	24	< 2.5	350	3.3	4	2000	410.4	344.1	359.3

- 1 Opto Engineering® recommends green light for high precision measurement applications.
- 2 Beam shape is not circular.
- 3 Working distance: distance between the front end of the mechanics and the object. Set this distance within +/- 5% of the nominal value for maximum resolution and minimum distortion.
- 4 Tolerance ± 10%.
- 5 Used in continuous (not pulsed) mode.

- 6 At max forward current.
- 7 Tolerance is ±0.06V on forward voltage measurements.
- 8 At pulse width ≤ 10 ms, duty cycle ≤ 10% condition. Built-in electronics board must be bypassed (see tech info).
- 9 Maximum dimension of the clamping flange.
- 10 Nominal value, with no spacers in place.

LTCL4K series

Flat telecentric illuminators for linescan cameras



KEY ADVANTAGES

Compact design

"Flat" shape for easy integration.

High optical throughput and enhanced field depth

When coupled with compatible TC4K telecentric lenses.

Dedicated CMMR4K mirrors

Right-angle deflection of the light path for usage in tight spaces.

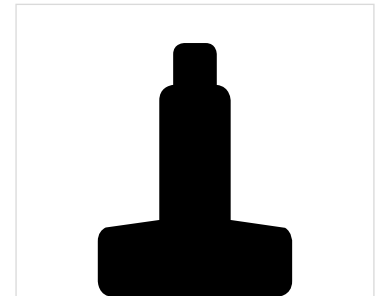
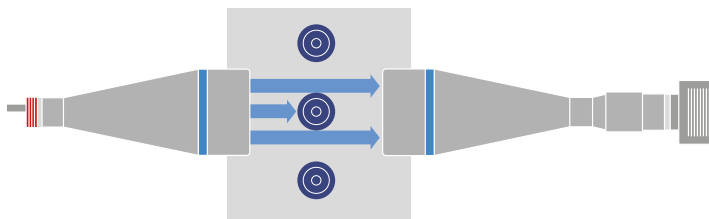
Homogeneity test report with measured values.

LTCL4K telecentric illuminators are specifically designed to be paired with TC4K telecentric lenses, in order to provide the high optical throughput needed for high-speed linescan measurement applications involving for instance steering components, gear and cam shafts, grinding and turning parts. These illuminators are equipped with state-of-the-art LED driving electronics, providing exceptional illumination stability, precise light

intensity tuning and easy replacement of the LED source. The unique "slim" form factor allows these units to be used in constrained spaces, often a critical factor in many industrial environments. Also, CMMR4K right angle mirror attachments can be integrated to quickly assemble different illumination geometries, compatible with most types of inspection configurations.

Application examples

A LTCL4K back-illuminating a mechanical component and interfaced to a TC4K telecentric lens.



NEW

LTCL4K series is now also available with new LTSCHP1W-GZ **green** light source, suitable for any kind of sample and specifically tailored for measuring reflective objects and objects with sharp edges.

KEY FEATURES

- Reduction of edge diffraction effects
- Enhanced illumination uniformity, especially on large FOVs
- Less sensitive to alignment

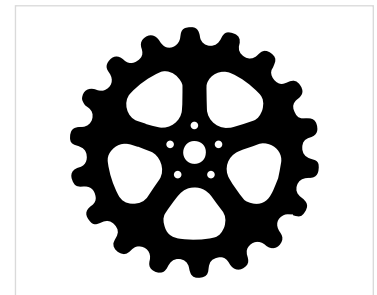
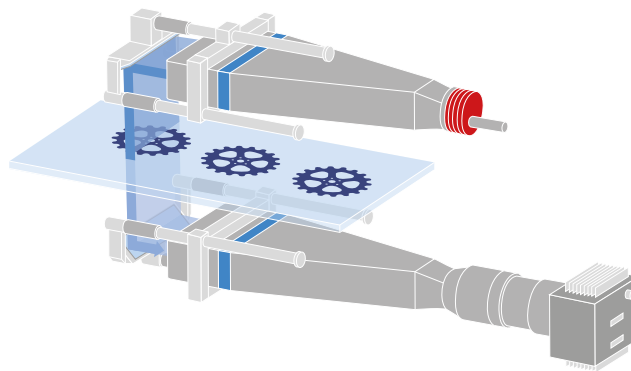


Ordering information

To order a telecentric light with a new green light source, use p/n **LTCL4Kxxx-GZ** (i.e. LTCL4K060-GZ).



A LTCL4K illuminator coupled with a TC4K lens using a CMMR4K deflecting mirrors to scan samples on a glass surface.



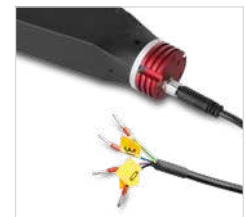
Precise light intensity tuning

Easily and precisely tune the light intensity level thanks to the leadscrew multi-turn trimmer positioned in the back.



Direct LED control

The built-in electronics can be bypassed in order to drive the LED directly for use in continuous or pulsed mode. When bypassed, the built-in electronics behaves as an open circuit allowing for direct control of the LED source.



Electrical specifications

Part number	Light	Device power ratings				LED power ratings			
		Light color, wavelength peak	DC voltage		Power consumption	Max LED fwd current	Forward voltage		Max pulse current
			min (V)	max (V)			typical (V)	max (V)	
			1		2	3		4	
LTCL4K xxx-G	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000	
LTCL4K xxx-W	white	12	24	< 2.5	350	2.78	n.a.	2000	

1 Tolerance ± 10%.

2 Used in continuous (not pulsed) mode.

3 At max forward current. Tolerance is ±0.06V on forward voltage measurements.

4 At pulse width ≤ 10 ms, duty cycle ≤ 10% condition.

Built-in electronics board must be bypassed (see tech info online).

Part number	Optical specifications				Mechanical specifications			Compatibility
	Light color, wavelength peak	Beam width (mm)	Beam height (mm)	Working distance range (mm)	Length (mm)	Width (mm)	Height (mm)	
LTCL4K 060-G	green, 520 nm	71	10	90 - 300	218.3	83	38.5	TC4K060-x
LTCL4K 060-W	white	71	10	90 - 300	218.3	83	38.5	TC4K060-x
LTCL4K 090-G	green, 520 nm	102	10	90 - 300	295.2	114	38.5	TC4K090-x
LTCL4K 090-W	white	102	10	90 - 300	295.2	114	38.5	TC4K090-x
LTCL4K 120-G	green, 520 nm	132	10	90 - 300	306.3	144	38.5	TC4K120-x
LTCL4K 120-W	white	132	10	90 - 300	306.3	144	38.5	TC4K120-x
LTCL4K 180-G	green, 520 nm	187	10	120 - 450	483.5	206	38.5	TC4K180-x
LTCL4K 180-W	white	187	10	120 - 450	483.5	206	38.5	TC4K180-x

LTDM series

High-power strobe LED domes



KEY ADVANTAGES

Ultra-high power light output and strobe mode only operation
For the inspection of fast moving objects and extended LED lifetime.

Rugged industrial design with built-in industrial connector
For easy integration into any machine vision system.

Wide selection
Available in three sizes, three colors and two power intensities.

Compatible LTDV strobe controllers available
For easy and appropriate power, control and synchronization of the illuminator.

LTDM series are high power diffuse LED strobe dome illuminators designed to provide non-directional diffused light and to effectively eliminate glare and shadows.

LTDM series provides ultra-high power light output and can be used to illuminate complex shapes with curved and shiny surfaces.

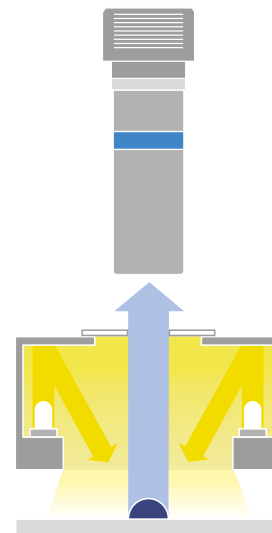
LTDM dome illuminators can be exclusively operated in strobe mode, making them the perfect choice to illuminate very fast moving objects while ensuring extended LED lifetime since no heat is generated.

LTDM series can be easily powered, controlled and synchronized by compatible LTDV strobe controllers and is available in:

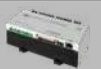
- **three sizes:** small, medium and large, respectively with illumination area of 40 mm, 60 mm and 100 mm in diameter;
- **two power intensities:** medium power with driving current up to 7.5 A and high power with driving current up to 17 A;
- **three different colors:** white, red and green.

LTDM series feature industry standard connection (M8 or M12 four poles connector) and resizable aperture that can be drilled to increase the diameter and accommodate the optics field of view. Additionally they can be easily integrated into any machine vision system by means of M6 screws.

Lighting structure



FULL RANGE OF COMPATIBLE STROBE CONTROLLERS



LTDV series

p. 250

FULL RANGE OF FIXED FOCAL LENGTH LENSES



Megapixel and 5 Megapixel lenses
EN2MP and EN5MP series

p. 108-111

FULL RANGE OF INDUSTRIAL CAMERAS



Area scan cameras

p. 200-205

DESIGNED FOR OEM APPLICATIONS

Compatible LTDV strobe controllers available to easily power, control and synchronize LED illuminators.



Part number		LTDMA1-W	LTDMA1-G	LTDMA1-R	LTDMB2-W	LTDMB2-G	LTDMB2-R	LTDMC1-W	LTDMC2-W	LTDMC2-G	LTDMC2-R	
Optical specifications												
Number of LEDs		15	15	15	40	40	40	40	80	80	80	
Light colour		white, 6000 K	green, 525 nm	red, 625 nm	white, 6500K	green, 525 nm	red, 625 nm	white	white, 6500K	green, 528 nm	red, 625 nm	
Spectral FWHM	(nm)	n.a.	50	25	n.a.	35	20	n.a.	n.a.	35	20	
Illumination area diameter	(mm)	40	40	40	60	60	60	100	100	100	100	
Suggested working distance WD	(mm)	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	
Min estimated illumination ¹	At driving current = 3.5 A	(klux)	100	70	40	50	45	35	25	50	45	35
	At driving current = 7.5 A	(klux)	175	125	70	90	80	65	50	100	90	70
	At driving current = 17.0 A	(klux)	n.a.	n.a.	n.a.	160	145	115	n.a.	140	125	100
Aperture range	(mm)	38 (fixed)	38 (fixed)	38 (fixed)	10 - 50	10 - 50	10 - 50	10 - 60	10 - 60	10 - 60	10 - 60	
Electrical specifications												
Power supply mode		strobe only, constant current driving			strobe only, constant current driving			strobe only, constant current driving				
Driving current	Min	(A)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
	Max	(A)	7.5	7.5	7.5	17.0	17.0	17.0	7.5	17.0	17.0	
Pulse width ²	(ms)	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	
Connection Type ³		M8 industrial male connector			M12 industrial male connector			M12 industrial male connector				
Estimated MTBF ⁴	(hours)	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	
Mechanical specifications												
Dimensions	Length	(mm)	107	107	107	166.5	166.5	166.5	206	206	206	206
	Width	(mm)	84	84	84	133	133	133	206	206	206	206
	Height	(mm)	53	53	53	90	90	90	128	128	128	128
Materials		black anodized aluminum body			black anodized aluminum body			black anodized aluminum body / painted steel reflector				
Clamping system		4 threaded holes for M6 screw			4 holes for M6 screw			4 threaded holes for M6 screw				
Compatibility												
Strobe controllers		LTDV1CH-7, LTDV6CH, LTDV1CH-17V, LTDVExCH-20			LTDV1CH-17, LTDV6CH, LTDV1CH-17V, LTDVExCH-20			LTDV1CH-7, LTDV6CH, LTDV1CH-17V, LTDVExCH-20	LTDV1CH-17, LTDV6CH, LTDV1CH-17V, LTDVExCH-20			
Lenses		TC23007, TC23009, TCLWD series, MC050X, MC033X			TCLWD series, MC033X			TCLWD series, MC4K050X-x, MC4K075X-x				

- ¹ At max Working Distance WD.
- ² At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.
- ³ 5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).
- ⁴ At 25°C.

Ordering information

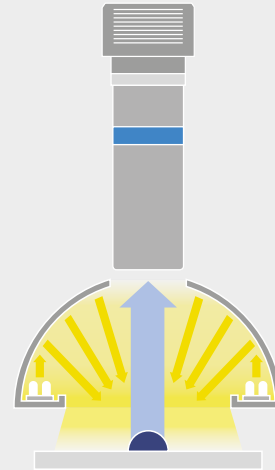
It's easy to select the right illuminator for your application: our part numbers are coded as **LTDm xy-z**, where **x** defines the illuminator size (A = small, B = medium, C = large), **y** refers to the power intensity (1 = medium, 2 = high) and **z** refers to color (W = white, R = red, G = green). For instance LTDm B2-R is a diffuse strobe dome illuminator - medium size high power red.

LTDMC series

Continuous LED domes



Lighting structure



LTDMC series consists of LED dome illuminators designed to provide uniform illumination of complex surfaces. Light comes from all angles effectively eliminating glares and shadows. Suggested usage is continuous mode.

COMPATIBLE STROBE CONTROLLER



LTDV1CH-17V strobe controller

p. 250

COMPATIBLE LIGHT INTENSITY CONTROLLER



LTICGR1000-D1-PS-xx light intensity controller

p. 254

Part number	Optical specifications		Electrical specifications					Dimensions		
	Light colour, wavelength peak	Illumination area diam. (mm)	Continuous mode			Pulsed mode		Outer diam. (mm)	Aperture (mm)	Height (mm)
			Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LT4WRG150-00-1-W-24V	white, 6300K	113	24	240	5.76	36	1	185	40	89.8
LT4WRG150-00-1-R-24V	red, 630nm	113	24	252	6.05	36	2	185	40	89.8
LT4WRG150-00-1-G-24V	green, 525nm	113	24	240	5.76	36	1	185	40	89.8
LT4WRG150-00-1-B-24V	blue, 470nm	113	24	240	5.76	36	1	185	40	89.8
LT4WRG200-00-1-W-24V	white, 6300K	160	24	360	8.64	36	1	232	50	112.8
LT4WRG200-00-1-R-24V	red, 630nm	160	24	378	9.07	36	2	232	50	112.8
LT4WRG200-00-1-G-24V	green, 525nm	160	24	360	8.64	36	1	232	50	112.8
LT4WRG200-00-1-B-24V	blue, 470nm	160	24	360	8.64	36	1	232	50	112.8
LT4WRG250-00-1-W-24V	white, 6300K	212	24	520	12.48	36	1	284	50	139.4
LT4WRG250-00-1-R-24V	red, 630nm	212	24	476	11.42	36	2	284	50	139.4
LT4WRG250-00-1-G-24V	green, 525nm	212	24	520	12.48	36	1	284	50	139.4
LT4WRG250-00-1-B-24V	blue, 470nm	212	24	520	12.48	36	1	284	50	139.4

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

**Did you know that
our lightings are
designed to match
our lenses both optically
and mechanically?**

**They guarantee
the smoothest
integration in your
vision system!**

LTLA series

High-power strobe LED low angle diffused ringlights



KEY ADVANTAGES

Ultra-high power light output and strobe mode only operation
For the inspection of fast moving object and extended LED lifetime.

Rugged industrial design with built-in industrial connector
For easy integration into any machine vision system.

Wide selection
Available in two sizes, three colors and two power intensities.

Compatible LTDV strobe controllers available
For easy and appropriate power, control and synchronization of the illuminator.

Low angle beam shaping diffuser
Highly diffusive material avoids hot spots and ensures uniform light intensity.

LTLA series are high power diffuse LED strobe low-angle ring light illuminators designed to provide darkfield lighting and to effectively enhance minute surface features or textures.

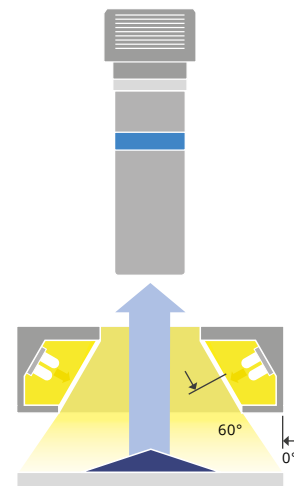
LTLA series features ultra-high power light output and can be used to cast shadows that emphasize surface irregularities, scratches or special characteristics (such as bar codes) from a close distance. LTLA low angle ring illuminators can be exclusively operated in strobe mode, making them the perfect choice to illuminate very fast moving objects while ensuring extended LED lifetime since no heat is generated.

LTLA series can be easily powered, controlled and synchronized by compatible LTDV strobe controllers and is available in:

- **two sizes:** medium and large, respectively with illumination area of 60 mm and 100 mm in diameter;
- **two power intensities:** medium power with driving current up to 7.5 A and high power with driving current up to 17 A;
- **three different colors:** white, red and green.

LTLA series feature industry standard connection (M12 four poles connector) and can be easily integrated into any machine vision system by means of M6 screws.

Lighting structure



FULL RANGE OF COMPATIBLE STROBE CONTROLLERS	
	LTDV series p. 250
FULL RANGE OF FIXED FOCAL LENGTH LENSES	
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series p. 108-111
COMPATIBLE HOLE INSPECTION OPTICS	
	PCHI series p. 80

DESIGNED FOR OEM APPLICATIONS

Compatible LTDV strobe controllers available to easily power, control and synchronize LED illuminators.



Part number		LTLAB2-W	LTLAB2-G	LTLAB2-R	LTLAC1-W	LTLAC2-W	LTLAC2-G	LTLAC2-R		
Optical specifications										
Number of LEDs		40	40	40	40	80	80	80		
Light colour		white, 6000 K	green, 525 nm	red, 625 nm	white, 6500 K	white, 6500 K	green, 528 nm	red, 625 nm		
Spectral FWHM	(nm)	n.a.	35	20	n.a.	n.a.	35	20		
Diffusive ring		yes	yes	yes	yes	yes	yes	yes		
Illumination area diameter	(mm)	60	60	60	100	100	100	100		
Suggested working distance WD	(mm)	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50	5 - 50		
Emission angle α	(deg)	60	60	60	60	60	60	60		
Min estimated illumination ¹	At driving current = 3.5 A	(klux)	55	50	40	35	70	60	45	
	At driving current = 7.5 A	(klux)	105	90	70	70	140	120	90	
	At driving current = 17.0 A	(klux)	210	180	150	125	250	220	170	
Aperture range	(mm)	64 (fixed)	64 (fixed)	64 (fixed)	102 (fixed)	102 (fixed)	102 (fixed)	102 (fixed)		
Electrical specifications										
Power supply mode		strobe only, constant current driving			strobe only, constant current driving					
Driving current	Min	(A)	3.5	3.5	3.5	3.5	3.5	3.5		
	Max	(A)	17.0	17.0	17.0	7.5	17.0	17.0		
Pulse width ²	(ms)	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1		
Connection Type ³		M12 industrial male connector			M12 industrial male connector					
Estimated MTBF ⁴	(hours)	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000	> 50000		
Mechanical specifications										
Dimensions	Length	(mm)	166.5	166.5	166.5	206	206	206		
	Width	(mm)	133	133	133	206	206	206		
	Height	(mm)	38	38	38	76	76	76		
Materials		black anodized aluminum body			black anodized aluminum body					
Clamping system		4 holes for M6 screw			8 threaded holes for M6 screw					
Compatibility										
Strobe controllers		LTDV1CH-17, LTDV6CH, LTDV1CH-17V, LTDVExCH-20			LTDV1CH-7, LTDV6CH, LTDV1CH-17V, LTDVExCH-20	LTDV1CH-17, LTDV6CH, LTDV1CH-17V, LTDVExCH-20				
Lenses		TC2300y, TC23012, TC12016, TC23016, TC12024, TC23024, TCxx036, TC1MHR016-C, TC1MHR024-C, TC1MHR036-C, TC2MHR016-x, TC2MHR024-x, TC2MHR036-x, TC3MHR016-C, TC3MHR024-C, TC3MHR036-C, TC4M004-x, TC4M007-x, TC4M009-x, TC4MHR016-x, TC4MHR024-x, TC4MHR036-x, TC12M016-F, TC12M024-F, TC12M036-F, TC16M009-x, TC16M012-x, TC16M018-x, TC16M036-x, TCLWD series, TCZR036S, MCZR033-008, MCZR025-006, MCZR018-004, MCZR014-003, MC150X, MC100X, MC075X, MC050X, MC033X, RT series, MC4K050X-x, MC4K075X-x, MC4K100X-x, MC4K125X-x, MC4K150X-x			TCxx036, TCxx048, TC12056, TC23056, TC13064, TCxx064, TC1MHR036-C, TC1MHR048-C, TC1MHR056-C, TC1MHR064-C, TC2MHR036-x, TC2MHR048-x, TC2MHR056-x, TC2MHR064-x, TC3MHR036-C, TC3MHR048-C, TC3MHR056-C, TC3MHR064-C, TC2MHR036-x, TC4MHR036-x, TC4MHR048-x, TC4MHR056-x, TC4MHR064-x, TC12M036-F, TC12M048-F, TC12M056-F, TC12M064-F, TC16M036-x, TC16M048-x, TC16M056-x, TC16M064-x, TC12K064, TCLWD series, TC4K060-x, TCZR072S, MCZR025-006, MCZR018-004, MCZR014-003, MC033X, MC12K200X-x, MC12K150X-x, MC12K100X-x, MC12K067X-x, RT series, MC4K050X-x, MC4K075X-x, MC4K100X-x, MC4K125X-x, MC4K150X-x					

- 1 At max Working Distance WD.
- 2 At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.
- 3 5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).
- 4 At 25°C.

Ordering information

It's easy to select the right illuminator for your application: our part numbers are coded as **LTLA xy-z**, where **x** defines the illuminator size (B = medium, C = large), **y** refers to the power intensity (1 = medium, 2 = high) and **z** refers to color (W = white, R = red, G = green). For instance LTLA B2-R is a diffuse strobe low angle ring light illuminator - medium size high power red.

LTRNST series

LED ring illuminators - straight type



KEY ADVANTAGES

Mechanically fitting Opto Engineering® optics

Each lens integrates specific mechanical interfaces.

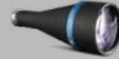
Specific illumination geometry

Illumination path matches Opto Engineering® lenses viewing angle and numerical aperture.

High performance to price ratio

Cost-effective, without quality compromises.

FULL RANGE OF COMPATIBLE PRODUCTS



Telecentric lenses

p. 16-71

COMPATIBLE STROBE CONTROLLER



LTDV1CH-17V strobe controller

p. 250

COMPATIBLE LIGHT INTENSITY CONTROLLER



LTICGR1000-D1-PS-xx light intensity controller

p. 254

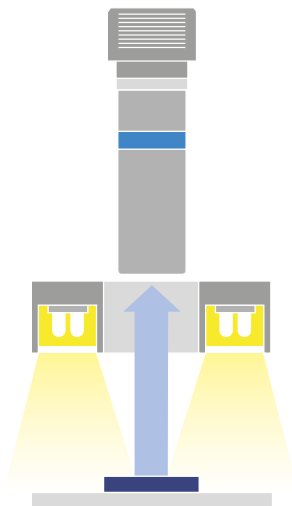
LTRNST series are LED ring illuminators specifically designed for a wide range of Opto Engineering® products. Especially the straight type models perfectly fit Opto Engineering® telecentric lenses.

Every illuminator is equipped with a mechanical interface which makes it very easy to mount it on different lens types. These products enable the optimal illumination geometry for the most common applications of their matching lens.



LTRN illuminator coupled with TC23064

Lighting structure



LTRNST - Ringlights / straight illumination

Product overview



LTRN 016 NW



LTRN 120 NW

Part number	Optical specifications				Electrical specifications					Dimensions			Compatibility
	Light colour, peak wavelength	Optimal WD (mm)	Lighting area diam.		Continuous mode 1			Pulsed mode		Outer diam. (mm)	Inner diam. (mm)	Height (mm)	Compatible OE products
			inner (mm)	outer (mm)	Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V) 2	Max pulse current (mA) 3				
Straight illumination													
LTRN 023 RD	red, 630 nm	55-85	32	90	24	200	4.8	24 - 48	600	104	28	40	TC2300y, TC23012, TC4M00y-x
LTRN 023 GR	green, 525 nm	55-85	32	90	24	220	5.28	24 - 48	660	104	28	40	TC2300y, TC23012, TC4M00y-x
LTRN 023 BL	blue, 470 nm	55-85	32	90	24	220	5.28	24 - 48	660	104	28	40	TC2300y, TC23012, TC4M00y-x
LTRN 023 NW	white, 6300 K	55-85	32	90	24	480	11.52	24 - 48	1440	104	28	40	TC2300y, TC23012, TC4M00y-x
LTRN 016 RD	red, 630 nm	85-150	48	107	24	300	7.2	24 - 48	900	120.6	37.7	40	TCxx016, TCxMHR016-x, TC5M016, TCLWD series
LTRN 016 GR	green, 525 nm	85-150	48	107	24	275	6.6	24 - 48	825	120.6	37.7	40	TCxx016, TCxMHR016-x, TC5M016, TCLWD series
LTRN 016 BL	blue, 470 nm	85-150	48	107	24	315	7.56	24 - 48	945	120.6	37.7	40	TCxx016, TCxMHR016-x, TC5M016, TCLWD series
LTRN 016 NW	white, 6300 K	85-150	48	107	24	650	15.6	24 - 48	1950	120.6	37.7	40	TCxx016, TCxMHR016-x, TC5M016, TCLWD series
LTRN 024 RD	red, 630 nm	85-150	48	107	24	300	7.2	24 - 48	900	120.6	44	40	TCxx024, TCxMHR024-x, TC5M024
LTRN 024 GR	green, 525 nm	85-150	48	107	24	275	6.6	24 - 48	825	120.6	44	40	TCxx024, TCxMHR024-x, TC5M024
LTRN 024 BL	blue, 470 nm	85-150	48	107	24	315	7.56	24 - 48	945	120.6	44	40	TCxx024, TCxMHR024-x, TC5M024
LTRN 024 NW	white, 6300 K	85-150	48	107	24	650	15.6	24 - 48	1950	120.6	44	40	TCxx024, TCxMHR024-x, TC5M024
LTRN 032 RD	red, 630 nm	65-240	84	143	24	400	9.6	24 - 48	1200	157	56	40	TCZR036S
LTRN 032 GR	green, 525 nm	65-240	84	143	24	385	9.24	24 - 48	1155	157	56	40	TCZR036S
LTRN 032 BL	blue, 470 nm	65-240	84	143	24	434	10.416	24 - 48	1302	157	56	40	TCZR036S
LTRN 032 NW	white, 6300 K	65-240	84	143	24	840	20.16	24 - 48	2000	157	56	40	TCZR036S
LTRN 036 RD	red, 630 nm	65-240	84	143	24	400	9.6	24 - 48	1200	157	61	40	TCxx036, TCxMHR036-x, TC12M036-F, TC16M036-x, TC5M036, MCZRxxx-yyy
LTRN 036 GR	green, 525 nm	65-240	84	143	24	385	9.24	24 - 48	1155	157	61	40	TCxx036, TCxMHR036-x, TC12M036-F, TC16M036-x, TC5M036, MCZRxxx-yyy
LTRN 036 BL	blue, 470 nm	65-240	84	143	24	434	10.416	24 - 48	1302	157	61	40	TCxx036, TCxMHR036-x, TC12M036-F, TC16M036-x, TC5M036, MCZRxxx-yyy
LTRN 036 NW	white, 6300 K	65-240	84	143	24	840	20.16	24 - 48	2000	157	61	40	TCxx036, TCxMHR036-x, TC12M036-F, TC16M036-x, TC5M036, MCZRxxx-yyy
LTRN 048 RD	red, 630 nm	65-240	84	143	24	400	9.6	24 - 48	1200	157	75	40	TCxx048, TCxMHR048-x, TC12M048-F, TC16M048-x, TC5M048
LTRN 048 GR	green, 525 nm	65-240	84	143	24	385	9.24	24 - 48	1155	157	75	40	TCxx048, TCxMHR048-x, TC12M048-F, TC16M048-x, TC5M048
LTRN 048 BL	blue, 470 nm	65-240	84	143	24	434	10.416	24 - 48	1302	157	75	40	TCxx048, TCxMHR048-x, TC12M048-F, TC16M048-x, TC5M048
LTRN 048 NW	white, 6300 K	65-240	84	143	24	840	20.16	24 - 48	2000	157	75	40	TCxx048, TCxMHR048-x, TC12M048-F, TC16M048-x, TC5M048
LTRN 056 RD	red, 630 nm	65-240	84	143	24	400	9.6	24 - 48	1200	157	80	40	TCxx056, TCxMHR056-x, TC12M056-F, TC16M056-x, TC5M056
LTRN 056 GR	green, 525 nm	65-240	84	143	24	385	9.24	24 - 48	1155	157	80	40	TCxx056, TCxMHR056-x, TC12M056-F, TC16M056-x, TC5M056
LTRN 056 BL	blue, 470 nm	65-240	84	143	24	434	10.416	24 - 48	1302	157	80	40	TCxx056, TCxMHR056-x, TC12M056-F, TC16M056-x, TC5M056
LTRN 056 NW	white, 6300K	65-240	84	143	24	840	20.16	24 - 48	2000	157	80	40	TCxx056, TCxMHR056-x, TC12M056-F, TC16M056-x, TC5M056
LTRN 064 RD	red, 630 nm	280-365	120	178	24	500	12	24 - 48	1500	192	100	40	TCxx064, TCxMHR064-x, TC12M064-F, TC16M064-x, TC12K064, TC5M064, TCZR072S
LTRN 064 GR	green, 525 nm	280-365	120	178	24	522	12.528	24 - 48	1566	192	100	40	TCxx064, TCxMHR064-x, TC12M064-F, TC16M064-x, TC12K064, TC5M064, TCZR072S
LTRN 064 BL	blue, 470 nm	280-365	120	178	24	567	13.608	24 - 48	1701	192	100	40	TCxx064, TCxMHR064-x, TC12M064-F, TC16M064-x, TC12K064, TC5M064, TCZR072S
LTRN 064 NW	white, 6300 K	280-365	120	178	24	960	23.04	24 - 48	2000	192	100	40	TCxx064, TCxMHR064-x, TC12M064-F, TC16M064-x, TC12K064, TC5M064, TCZR072S
LTRN 080 RD	red, 630 nm	280-365	120	178	24	500	12	24 - 48	1500	192	116	40	TCxx080, TC23072, TCxMHR080-x, TC12M080-F, TC16M080-x, TC12K080, TC5M080
LTRN 080 GR	green, 525 nm	280-365	120	178	24	522	12.528	24 - 48	1566	192	116	40	TCxx080, TC23072, TCxMHR080-x, TC12M080-F, TC16M080-x, TC12K080, TC5M080
LTRN 080 BL	blue, 470 nm	280-365	120	178	24	567	13.608	24 - 48	1701	192	116	40	TCxx080, TC23072, TCxMHR080-x, TC12M080-F, TC16M080-x, TC12K080, TC5M080
LTRN 080 NW	white, 6300 K	280-365	120	178	24	1170	28.08	24 - 48	2000	192	116	40	TCxx080, TC23072, TCxMHR080-x, TC12M080-F, TC16M080-x, TC12K080, TC5M080
LTRN 096 RD	red, 630 nm	350-450	148	207	24	600	14.4	24 - 48	1800	221	143	40	TCxx096, TC23085, TCxMHR096-x, TC12M096-F, TC16M096-x, TC5M096
LTRN 096 GR	green, 525 nm	350-450	148	207	24	550	13.2	24 - 48	1650	221	143	40	TCxx096, TC23085, TCxMHR096-x, TC12M096-F, TC16M096-x, TC5M096
LTRN 096 BL	blue, 470 nm	350-450	148	207	24	650	15.6	24 - 48	1950	221	143	40	TCxx096, TC23085, TCxMHR096-x, TC12M096-F, TC16M096-x, TC5M096
LTRN 096 NW	white, 6300 K	350-450	148	207	24	1200	28.8	24 - 48	2000	221	143	40	TCxx096, TC23085, TCxMHR096-x, TC12M096-F, TC16M096-x, TC5M096
LTRN 120 RD	red, 630 nm	450-580	204	276	24	875	21	24 - 48	2000	290	180	40	TCxx120, TC23110, TCxMHR120-x, TC12M120-F, TC16M120-x, TC12K120
LTRN 120 GR	green, 525 nm	450-580	204	276	24	1118	26.832	24 - 48	2000	290	180	40	TCxx120, TC23110, TCxMHR120-x, TC12M120-F, TC16M120-x, TC12K120
LTRN 120 BL	blue, 470 nm	450-580	204	276	24	1118	26.832	24 - 48	2000	290	180	40	TCxx120, TC23110, TCxMHR120-x, TC12M120-F, TC16M120-x, TC12K120
LTRN 120 NW	white, 6300 K	450-580	204	276	24	1690	40.56	24 - 48	2000	290	180	40	TCxx120, TC23110, TCxMHR120-x, TC12M120-F, TC16M120-x, TC12K120
LTRN 144 RD	red, 630 nm	450-580	204	276	24	875	21	24 - 48	2000	290	200	40	TCxx144, TC23130, TCxMHR144-x, TC12M144-F, TC16M144-x, TC12K144
LTRN 144 GR	green, 525 nm	450-580	204	276	24	1118	26.832	24 - 48	2000	290	200	40	TCxx144, TC23130, TCxMHR144-x, TC12M144-F, TC16M144-x, TC12K144
LTRN 144 BL	blue, 470 nm	450-580	204	276	24	1118	26.832	24 - 48	2000	290	200	40	TCxx144, TC23130, TCxMHR144-x, TC12M144-F, TC16M144-x, TC12K144
LTRN 144 NW	white, 6300 K	450-580	204	276	24	1690	40.56	24 - 48	2000	290	200	40	TCxx144, TC23130, TCxMHR144-x, TC12M144-F, TC16M144-x, TC12K144

1 Lifespan: 20.000 hours (drop to 50% intensity) at 25 °C.

2 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

3 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTRNOB series

LED ring illuminators - oblique type



KEY ADVANTAGES

Mechanically fitting Opto Engineering® optics
Each lens integrates specific mechanical interfaces.

Specific illumination geometry
Illumination path matches Opto Engineering® lenses viewing angle and numerical aperture.

High performance to price ratio
Cost-effective, without quality compromises.

LTRNOB series are LED ring illuminators specifically designed for a wide range of Opto Engineering® products. Especially the oblique type models perfectly fit Opto Engineering 360° view optics.

Every illuminator is equipped with a mechanical interface which makes it very easy to mount it on different lens types.

These products enable the optimal illumination geometry for the most common applications of their matching lens.

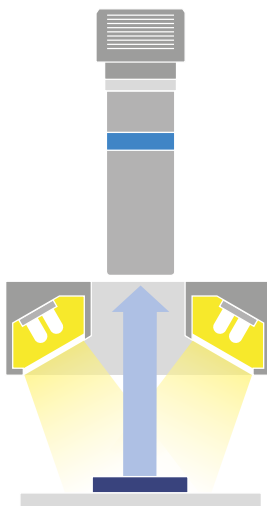


LTRN 245 W45



LTRN 050 W45

Lighting structure



LTRNOB - Ringlights / oblique illumination

Combination examples of LTRNOB and 360° view optics



PC23030XS + compatible LTRN210x20 ringlight and CMHO080 clamping mechanics.






PCCD013 + compatible LTRN165x45 ringlight.



PCHI023 + compatible LTRN075x45 ringlight.



LTRN 050 W 45 mounted on PCPW series.

FULL RANGE OF COMPATIBLE PRODUCTS		
	360° view optics	p. 72-89
COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTICGR1000-D1-PS-xx light intensity controller	p. 254



Part number	Optical specifications				Electrical specifications					Dimensions			Compatibility
	Light colour, peak wavelength	Optimal WD (mm)	Lighting area diam.		Continuous mode ¹			Pulsed mode		Outer diam. (mm)	Inner diam. (mm)	Height (mm)	Compatible OE products
			inner (mm)	outer (mm)	Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V) ²	Max pulse current (mA) ³				
Oblique illumination													
LTRN 050 R45	red, 630 nm	20-80	19	49	24	60	1.44	24-48	180	53.5	15.2	22	PCPW0xx, MCxxxX, TCCAGExx048
LTRN 050 G45	green, 525 nm	20-80	19	49	24	70	1.68	24-48	210	53.5	15.2	22	PCPW0xx, MCxxxX, TCCAGExx048
LTRN 050 B45	blue, 470 nm	20-80	19	49	24	105	2.52	24-48	315	53.5	15.2	22	PCPW0xx, MCxxxX, TCCAGExx048
LTRN 050 W45	white, 6300 K	20-80	19	49	24	105	2.52	24-48	700	53.5	15.2	22	PCPW0xx, MCxxxX, TCCAGExx048
LTRN 075 R45	red, 630 nm	20-50	43.8	65.4	24	75	1.8	24-48	225	75.4	28	32	TC2300y, TC23012, TC4M00y-x, PCH10xx, TCCAGExx096, MC3-03X
LTRN 075 G45	green, 525 nm	20-50	43.8	65.4	24	60	1.44	24-48	180	75.4	28	32	TC2300y, TC23012, TC4M00y-x, PCH10xx, TCCAGExx096, MC3-03X
LTRN 075 B45	blue, 470 nm	20-50	43.8	65.4	24	60	1.44	24-48	180	75.4	28	32	TC2300y, TC23012, TC4M00y-x, PCH10xx, TCCAGExx096, MC3-03X
LTRN 075 W45	white, 6300 K	20-50	43.8	65.4	24	90	2.16	24-48	270	75.4	28	32	TC2300y, TC23012, TC4M00y-x, PCH10xx, TCCAGExx096, MC3-03X
LTRN 165 R45	red, 630 nm	30-50	134.5	164.5	24	500	12	24-48	1500	175	132.5	36.5	PCCD0xx
LTRN 165 G45	green, 525 nm	30-50	134.5	164.5	24	400	9.6	24-48	1200	175	132.5	36.5	PCCD0xx
LTRN 165 B45	blue, 470 nm	30-50	134.5	164.5	24	480	11.52	24-48	1440	175	132.5	36.5	PCCD0xx
LTRN 165 W45	white, 6300 K	30-50	134.5	164.5	24	800	19.2	24-48	2400	175	132	36.5	PCCD0xx
LTRN 210 R20	red, 630 nm	55-95	195.6	116.5	24	600	14.4	24-48	1800	210	116.5	40	PCxx030XS
LTRN 210 G20	green, 525 nm	55-95	195.6	116.5	24	560	13.44	24-48	1580	210	116.5	40	PCxx030XS
LTRN 210 B20	blue, 470 nm	55-95	195.6	116.5	24	630	15.12	24-48	1890	210	116.5	40	PCxx030XS
LTRN 210 W20	white, 6300 K	55-95	195.6	116.5	24	840	20.16	24-48	2000	210	116.5	40	PCxx030XS
LTRN 245 R25	red, 630 nm	20-80	160	225	24	750	18	24-48	2000	245	157	48	PCxx030HP
LTRN 245 G25	green, 525 nm	20-80	160	225	24	850	20.4	24-48	2000	245	157	48	PCxx030HP
LTRN 245 B25	blue, 470 nm	20-80	160	225	24	650	15.6	24-48	1950	245	157	48	PCxx030HP
LTRN 245 W25	white, 6300 K	20-80	160	225	24	1120	26.88	24-48	2000	245	157	48	PCxx030HP
LTRN 245 R35	red, 630 nm	20-80	160	225	24	750	18	24-48	2000	245	143	48	PCCD0xx
LTRN 245 G35	green, 525 nm	20-80	160	225	24	850	20.4	24-48	2000	245	143	48	PCCD0xx
LTRN 245 B35	blue, 470 nm	20-80	160	225	24	650	15.6	24-48	1950	245	143	48	PCCD0xx
LTRN 245 W35	white, 6300 K	20-80	160	225	24	1120	26.88	24-48	2000	245	143	48	PCCD0xx
LTRN 245 R45	red, 630 nm	20-80	160	225	24	750	18	24-48	2000	245	117	48	PCPW0xx
LTRN 245 G45	green, 525 nm	20-80	160	225	24	850	20.4	24-48	2000	245	117	48	PCPW0xx
LTRN 245 B45	blue, 470 nm	20-80	160	225	24	650	15.6	24-48	1950	245	117	48	PCPW0xx
LTRN 245 W45	white, 6300 K	20-80	160	225	24	1120	26.88	24-48	2000	245	117	48	PCPW0xx

¹ Lifespan: 20.000 hours (drop to 50% intensity) at 25 °C.

² With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

³ With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTRNOBHP series

High power LED ring illuminators, oblique type

NEW



KEY ADVANTAGES

High power working both in continuous and strobe mode.

Brighter than LTRNOB series also in continuous mode.

Mechanically fitting Opto Engineering® optics

Each lens integrates specific mechanical interfaces.

Specific illumination geometry

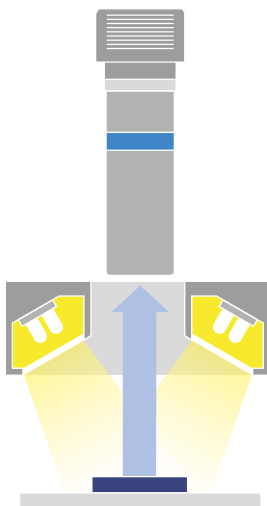
Illumination path matches Opto Engineering® lenses viewing angle and numerical aperture.

LTRNOBHP series are the high power version of LTRNOB series LED ring illuminators and are specifically designed to match Opto Engineering® 360° view Optics.

Every illuminator is equipped with a clamping system which makes it very easy to mount it on Opto Engineering® 360° view Optics.

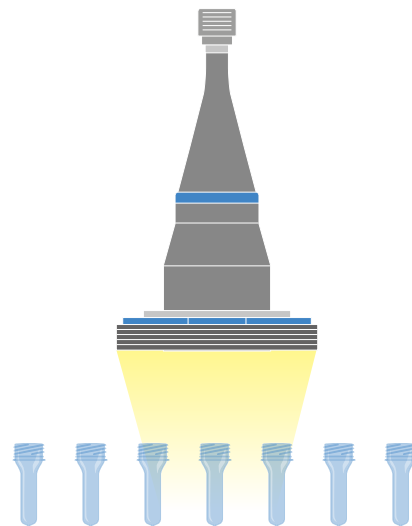
These LED ring lights are designed to work both in continuous and strobe mode for high speed inspection and provide the best illumination geometry for the most common applications of the matching lenses in the beverage, pharma and automotive industries.

Lighting structure






LTRNOBHP - Ringlights / oblique illumination

Application example



Check for defects in bottle preforms

FULL RANGE OF COMPATIBLE PRODUCTS		
	360° view optics	p. 72-89
COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	light intensity controller	p. 254

Part number	Optical specifications				Electrical specifications				Dimensions			Compatibility			
	Light colour, peak wavelength	Optimal WD (mm)	Lighting area diam. (mm)		Supply voltage (V)	Current (mA)	Max power cons. (W)	Max pulse current (mA)	Peak power (W)	Outer diam. (mm)	Inner diam. (mm)	Height (mm)	Lenses	Controllers	Cables
Oblique illumination															
LTRNHP 075 R45	red, 625 nm	20-50	43,5	65	24 ± 2%	420	10	2800	79	86	28	38	TC2300y, TC23012, TC4M00y-x, PCHI0xx, TCCAGExx096	LTDV1CH-17V, LTDVExCH-20, LTDV6CH	CBLT010
LTRNHP 075 G45	green, 525 nm	20-50	43,5	65	24 ± 2%	420	10	6000	163	86	28	38			
LTRNHP 075 B45	blue, 475 nm	20-50	43,5	65	24 ± 2%	420	10	6000	163	86	28	38			
LTRNHP 075 W45	white, 6200 K	20-50	43,5	65	24 ± 2%	420	10	7200	178	86	28	38			
LTRNHP 165 R45	red, 625 nm	30-50	133,5	162	24 ± 2%	1670	40	7000	169	190	132,5	42	PCCD0xx		
LTRNHP 165 G45	green, 525 nm	30-50	133,5	162	24 ± 2%	1670	40	9000	239	190	132,5	42			
LTRNHP 165 B45	blue, 475 nm	30-50	133,5	162	24 ± 2%	1670	40	9000	221	190	132,5	42			
LTRNHP 165 W45	white, 6200 K	30-50	133,5	162	24 ± 2%	1670	40	13500	293	190	132,5	42			
LTRNHP 210 R20	red, 625 nm	50-100	117,5	182	24 ± 2%	2090	50	9000	217	210	116,5	42	PCxx030XS		
LTRNHP 210 G20	green, 525 nm	50-100	117,5	182	24 ± 2%	2090	50	12000	319	210	116,5	42			
LTRNHP 210 B20	blue, 475 nm	50-100	117,5	182	24 ± 2%	2090	50	12000	294	210	116,5	42			
LTRNHP 210 W20	white, 6200 K	50-100	117,5	182	24 ± 2%	2090	50	18000	391	210	116,5	42			
LTRNHP 245 R25	red, 625 nm	20-80	160	215	24 ± 2%	2710	65	10000	241	245	157	50	PCxx030HP		
LTRNHP 245 G25	green, 525 nm	20-80	160	215	24 ± 2%	2710	65	14000	372	245	157	50			
LTRNHP 245 B25	blue, 475 nm	20-80	160	215	24 ± 2%	2710	65	14000	343	245	157	50			
LTRNHP 245 W25	white, 6200 K	20-80	160	215	24 ± 2%	2710	65	20000	434	245	157	50			

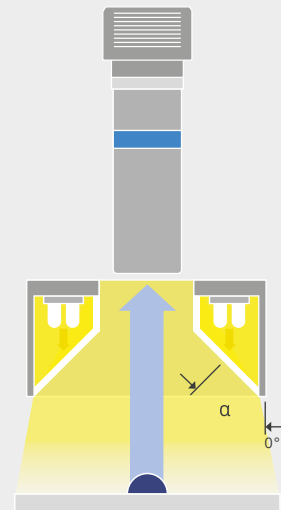
- 1 With constant driving voltage.
- 2 With constant driving current. At max pulse width (1 ms), max pulse frequency = 15Hz. Contact us to check other allowable combinations of duty cycle-frequency.

LTLAIC series


Continuous LED low angle diffused ringlights



Lighting structure



LTLAIC series consists of LED low angle diffused ringlights that provide diffused even illumination, effectively preventing glare when inspecting shiny surfaces. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTICGR1000-D1-PS-xx light intensity controller	p. 254
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Part number	Optical specifications					Electrical specifications					Dimensions		
	Light colour, wavelength peak	Optimal WD (mm)	Lighting area		Emission angle α (deg)	Continuous mode			Pulsed mode		Outer diam. (mm)	Inner diam. (mm)	Height (mm)
			inner diam. (mm)	outer diam. (mm)		Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LT3RZF050-60-1-W-24V	white	5	12	44	60	24	120	2,90	36	360	56.4	10	35
LT3RZF050-60-1-R-24V	red, 620 nm	5	12	44	60	24	120	2,90	36	360	56.4	10	35
LT3RZF050-60-1-G-24V	green, 525 nm	5	12	44	60	24	120	2,90	36	360	56.4	10	35
LT3RZF050-60-1-B-24V	blue, 450 nm	5	12	44	60	24	120	2,90	36	360	56.4	10	35
LT3RZF080-60-1-W-24V	white	5 - 15	38.2	69	60	24	180	4,30	36	540	81	36.2	35
LT3RZF080-60-1-R-24V	red, 620 nm	5 - 15	38.2	69	60	24	180	4,30	36	540	81	36.2	35
LT3RZF080-60-1-G-24V	green, 525 nm	5 - 15	38.2	69	60	24	180	4,30	36	540	81	36.2	35
LT3RZF080-60-1-B-24V	blue, 450 nm	5 - 15	38.2	69	60	24	180	4,30	36	540	81	36.2	35
LT3RZF100-60-1-W-24V	white	5 - 20	59	93.2	60	24	270	6,50	36	810	105.2	57	35
LT3RZF100-60-1-R-24V	red, 620 nm	5 - 20	59	93.2	60	24	270	6,50	36	810	105.2	57	35
LT3RZF100-60-1-G-24V	green, 525 nm	5 - 20	59	93.2	60	24	270	6,50	36	810	105.2	57	35
LT3RZF100-60-1-B-24V	blue, 450 nm	5 - 20	59	93.2	60	24	270	6,50	36	810	105.2	57	35
LT3RZF130-60-1-W-24V	white	7 - 26	86	119.5	60	24	360	8,60	36	1080	131.5	84	35
LT3RZF130-60-1-R-24V	red, 620 nm	7 - 26	86	119.5	60	24	360	8,60	36	1080	131.5	84	35
LT3RZF130-60-1-G-24V	green, 525 nm	7 - 26	86	119.5	60	24	360	8,60	36	1080	131.5	84	35
LT3RZF130-60-1-B-24V	blue, 450 nm	7 - 26	86	119.5	60	24	360	8,60	36	1080	131.5	84	35

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

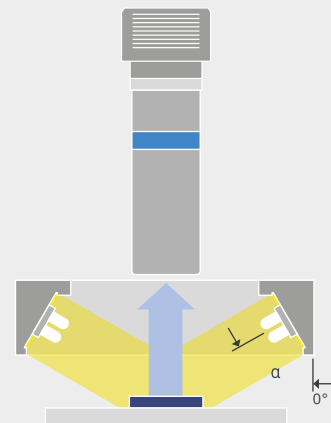
2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTLADC series

Continuous LED low angle direct ringlights



Lighting structure



LTLADC series consists of low angle direct ringlights that provide direct side illumination to emphasize the surface features of the workpiece, such as scratches or texture. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTICGR1000-D1-PS-xx light intensity controller	p. 254
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and ENSMP series	p. 108-111

Part number	Optical specifications					Electrical specifications					Dimensions		
	Light colour, wavelength peak	Optimal WD (mm)	Lighting area		Emission angle α (deg)	Continuous mode			Pulsed mode		Outer diam. (mm)	Inner diam. (mm)	Height (mm)
			inner diam. (mm)	outer diam. (mm)		Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LTZZO130-75-3-W-24V	white, 6300 K	5 - 15	111	126	75	24	540	12.96	36	225	131	94	24.5
LTZZO130-75-3-R-24V	red, 630 nm	5 - 15	111	126	75	24	420	10.08	36	180	131	94	24.5
LTZZO130-75-3-G-24V	green, 525 nm	5 - 15	111	126	75	24	540	12.96	36	225	131	94	24.5
LTZZO130-75-3-B-24V	blue, 470 nm	5 - 15	111	126	75	24	540	12.96	36	225	131	94	24.5
LTZZO170-75-3-W24V	white, 6300 K	5 - 15	154	170	75	24	735	17.64	36	450	175	136	24.5
LTZZO170-75-3-R-24V	red, 630 nm	5 - 15	154	170	75	24	570	13.68	36	360	175	136	24.5
LTZZO170-75-3-G-24V	green, 525 nm	5 - 15	154	170	75	24	735	17.64	36	450	175	136	24.5
LTZZO170-75-3-B-24V	blue, 470 nm	5 - 15	154	170	75	24	735	17.64	36	450	175	136	24.5

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

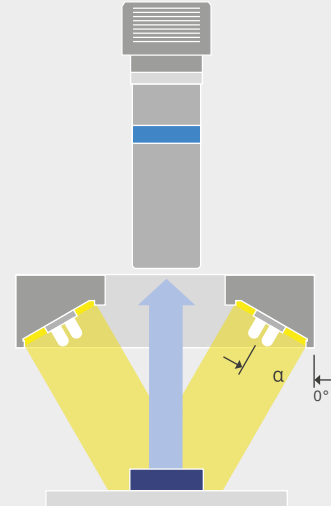
2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTRNDC series




Continuous LED direct ringlights



Lighting structure



LTRNDC series consists of LED direct ringlights that provide direct side illumination from different angles. These ringlights reduce shadows and can effectively illuminate non-reflective objects. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTICGR1000-D1-PS-xx light intensity controller	p. 254
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Part number	Optical specifications					Electrical specifications					Dimensions		
	Light colour, wavelength peak	Optimal WD (mm)	Lighting area inner diam. (mm)	outer diam. (mm)	Emission angle α (deg)	Continuous mode			Pulsed mode		Outer diam. (mm)	Inner diam. (mm)	Height (mm)
						Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LTZGK050-15-2-W-24V	white, 6300 K	64	30	49.6	15	24	105	2.52	36	315	50	28	16
LTZGK050-15-2-R-24V	red, 630 nm	64	30	49.6	15	24	90	2.16	36	270	50	28	16
LTZGK050-15-2-G-24V	green, 525 nm	64	30	49.6	15	24	105	2.52	36	315	50	28	16
LTZGK050-15-2-B-24V	blue, 470 nm	64	30	49.6	15	24	105	2.52	36	315	50	28	16
LTZGK070-15-3-W-24V	white, 6300 K	85	37	67	15	24	240	5.76	36	720	70	32	20.5
LTZGK070-15-3-R-24V	red, 630 nm	85	37	67	15	24	180	4.32	36	540	70	32	20.5
LTZGK070-15-3-G-24V	green, 525 nm	85	37	67	15	24	240	5.76	36	720	70	32	20.5
LTZGK070-15-3-B-24V	blue, 470 nm	85	37	67	15	24	240	5.76	36	720	70	32	20.5
LTZGK100-15-5-W-24V	white, 6300 K	128	53	99	15	24	570	13.68	36	1710	103	48	24
LTZGK100-15-5-R-24V	red, 630 nm	128	53	99	15	24	450	10.80	36	1350	103	48	24
LTZGK100-15-5-G-24V	green, 525 nm	128	53	99	15	24	570	13.68	36	1710	103	48	24
LTZGK100-15-5-B-24V	blue, 470 nm	128	53	99	15	24	570	13.68	36	1710	103	48	24
LTZGK070-45-3-W-24V	white, 6300 K	18	40.5	62.5	45	24	240	5.76	36	720	70	35	21
LTZGK070-45-3-R-24V	red, 630 nm	18	40.5	62.5	45	24	195	4.68	36	585	70	35	21
LTZGK070-45-3-G-24V	green, 525 nm	18	40.5	62.5	45	24	240	5.76	36	720	70	35	21
LTZGK070-45-3-B-24V	blue, 470 nm	18	40.5	62.5	45	24	240	5.76	36	720	70	35	21
LTZGK100-45-5-W-24V	white, 6300 K	24	58	95	45	24	600	14.40	36	1800	100	48	30
LTZGK100-45-5-R-24V	red, 630 nm	24	58	95	45	24	465	11.16	36	1395	100	48	30
LTZGK100-45-5-G-24V	green, 525 nm	24	58	95	45	24	600	14.40	36	1800	100	48	30
LTZGK100-45-5-B-24V	blue, 470 nm	24	58	95	45	24	600	14.40	36	1800	100	48	30

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

Did you know that we ensure a perfect match between our cameras and our optics?

No more issues related to incorrect flange distances or image circles.

Did you know that with FabImage you can choose from more than 1000 features for image processing?

Moreover our machine vision software does not require any programming skills!

LTDMLA series

High power strobe dome + low angle illumination systems



KEY ADVANTAGES

Two independent illumination units in one solution

Dome unit for homogeneous illuminations and low angle unit for dark field lightning can be independently operated.

Ultra-high power light output and strobe mode only operation

For the inspection of fast moving object and extended LED lifetime.

Rugged industrial design with built-in industrial connector

For easy integration into any machine vision system.

Multiple configurations

Available in two sizes and two power intensities.

Compatible LTDV strobe controllers available

For easy and appropriate power, control and synchronization of the illuminator.

LTDMLA series are ultra-high power diffuse LED strobe illuminators combining a dome light and a low angle ring light.

This solution provides two different illumination types in a single, compact, easy-to-integrate system: the dome unit provides non-directional diffused light that can be used to homogeneously illuminate complex shapes with curved and shiny surfaces, effectively eliminating glare and shadows. The low angle ring light unit provides darkfield lightning that can be used to cast shadows, greatly emphasizing surface irregularities, scratches and other details.

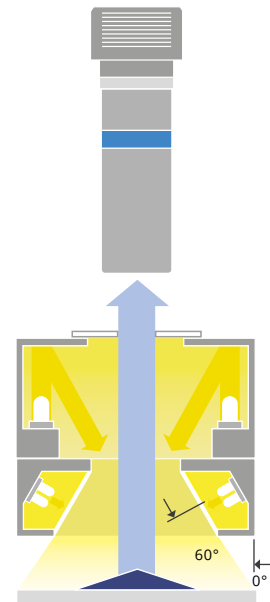
LTDMLA illuminators operate exclusively in strobe mode: the reduced heat generation guarantees extended LED lifetime and makes LTDMLA the perfect choice to illuminate very fast moving objects.

The two illumination units can be operated independently and easily powered, controlled and synchronized by compatible LTDV strobe controllers. LTDMLA series is available in:

- **two sizes:** medium and large, respectively with illumination area of 60 mm and 100 mm in diameter;
- **two power intensities:** medium power with driving current up to 7.5 A and high power with driving current up to 17 A.

LTDMLA series features industry standard connection (M12 four poles connector), resizable aperture for the dome unit that can be drilled to increase the diameter and accommodate the optics field of view and effective diffuser for the ring light unit to avoid hot spots formation. Additionally LTDMLA series can be easily mounted and integrated into any machine vision system by means of M6 screws.

Lighting structure



DESIGNED FOR OEM APPLICATIONS

Compatible LTDV strobe controllers available to easily power, control and synchronize LED illuminators.



FULL RANGE OF COMPATIBLE STROBE CONTROLLERS		
	LTDV series	p. 250
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Part number			LTDMLAB2-WW	LTDMLAC1-WW	LTDMLAC2-WW
Optical specifications					
Dome unit					
Number of LEDs			40	40	80
Light colour			white, 6500 K	white	white, 6500 K
Spectral FWHM		(nm)	n.a.	n.a.	n.a.
Illumination area diameter		(mm)	60	100	100
Suggested working distance WD		(mm)	5 - 50	5 - 50	5 - 50
Min estimated illumination ¹	At driving current = 3.5 A	(klux)	50	15	35
	At driving current = 7.5 A	(klux)	90	30	65
	At driving current = 17.0 A	(klux)	160	50	100
Aperture range		(mm)	10 - 50	10 - 60	10 - 60
Low angle ringlight unit					
Number of LEDs			40	40	80
Light colour			white, 6000 K	white, 6500 K	white, 6500 K
Spectral FWHM		(nm)	n.a.	n.a.	n.a.
Diffuse ring			yes	yes	yes
Illumination area diameter		(mm)	60	100	100
Suggested working distance WD		(mm)	5 - 50	5 - 50	5 - 50
Min estimated illumination ¹	At driving current = 3.5 A	(klux)	55	35	70
	At driving current = 7.5 A	(klux)	105	70	140
	At driving current = 17.0 A	(klux)	210	125	250
Electrical specifications					
Power supply mode			strobe only, constant current driving	strobe only, constant current driving	strobe only, constant current driving
Driving current	Min	(A)	3.5	3.5	3.5
	Max	(A)	17.0	7.5	17.0
Pulse width ²		(ms)	≤ 1	≤ 1	≤ 1
Connection Type ³			M12 industrial male connector	M12 industrial male connector	M12 industrial male connector
Estimated MTBF ⁴		(hours)	> 50000	> 50000	> 50000
Mechanical specifications					
Dimensions	Length	(mm)	166.5	206	206
	Width	(mm)	133	206	206
	Height	(mm)	104	147	147
Materials			black anodized aluminum body	black anodized aluminum body / Painted steel reflector	black anodized aluminum body / Painted steel reflector
Clamping system			4 holes for M6 screw	8 threaded holes for M6 screw	8 threaded holes for M6 screw
Compatibility					
Strobe controllers			LTDV1CH-17V (2 units), LTDVExCH-20, LTDV6CH	LTDV1CH-17V (2 units), LTDVExCH-20, LTDV6CH	LTDV1CH-17V (2 units), LTDVExCH-20, LTDV6CH
Lenses			TCLWD series		MC4K050X

- ¹ At max Working Distance WD.
- ² At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.
- ³ PIN 1 and PIN 2 for the dome unit, PIN 3 and PIN 4 for the ringlight unit.
5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).
- ⁴ At 25 °C.

Ordering information

It's easy to select the right illuminator for your application: our part numbers are coded as **LTDMLA xy-WW** where **x** defines the illuminator size (B = medium, C = large), **y** refers to the power intensity (1 = medium, 2 = high). For instance LTDMLA B2-WW is a diffuse strobe dome + low angle illumination system - medium size, high power, dome white, ringlight white.

View-through system

Space saving illumination system for double-side object inspection

KEY ADVANTAGES

Compact space-saving solution for inspection of fast moving object

Illuminates two sides of an object almost simultaneously.

Ultra-high power light output and strobe mode only operation

For the inspection of fast moving object and extended LED lifetime.

Rugged industrial design with built-in industrial connector

For easy integration with any machine vision system.

Modular configuration.



The **View-through system** is a unique space-saving illumination solution designed to illuminate two sides of an object. It consists of two symmetrical modules, each one made of two illumination units:

- A diffuse strobe dome illuminator (white color)
- A special active “view-through” backlight unit (white color)

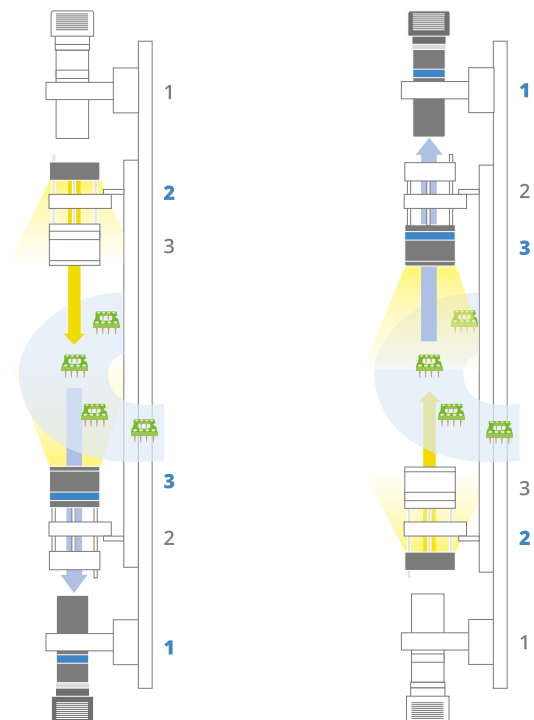
View-through system is designed to create very compact inline inspection solutions that illuminate and image both sides of fast-moving objects. While one camera acquires the image of one side of an object, the corresponding dome and special backlight units emit light simultaneously so that one side of the object can be inspected. Subsequently, the dome and the backlight units are turned off so that the second camera can acquire the image of the other side of the object while its corresponding dome and special backlight units are now switched on.

Such innovative approach can be achieved thanks to the special backlight units which act either as transparent windows (when turned off) or as backlights (when turned on), enabling to quickly and accurately inspect fast-moving objects almost simultaneously, in a very compact solution.

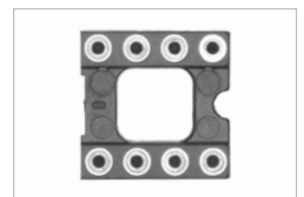
The View-through system can be used for many different inspections, especially for identification of surface defects/features in applications spanning from automotive to pharmaceutical.

The View-through system is available as LTVT A1-W, which consists of two dome units and two active backlight “view-through” units (white color) or as LTVT BENCH, a complete bench solution which additionally includes a base plate with two right-angle brackets, the LTDV6CH compatible strobe controller (programmable) and the ADPT001 RS485-USB adapter.

Lighting structure



DIL socket, bottom side.



DIL socket, top side.

DESIGNED FOR OEM APPLICATIONS

Compatible LTDV6CH strobe controllers available to easily power, control and synchronize the View-through system.



FULL RANGE OF COMPATIBLE TELECENTRIC LENSES

	TCLWD series	p. 32
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FULL RANGE OF FIXED FOCAL LENGTH LENSES

	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111
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COMPATIBLE STROBE CONTROLLER AVAILABLE

	LTDV6CH	p. 252
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Part number			LTVTA1-W	LTVTBENCH
Optical specifications				
Dome unit				
Number of LEDs				15
Light colour				white, 6000 K
Spectral FWHM		(nm)		n.a.
Illumination area diameter		(mm)		40
Suggested working distance WD		(mm)		5 - 25
Min estimated illumination ¹	At driving current = 3.5 A	(klux)		290
	At driving current = 7.5 A	(klux)		490
Aperture range		(mm)		48 (fixed)
Active backlight view-through unit				
Number of LEDs				18
Light colour				white, 6000 K
Spectral FWHM		(nm)		n.a.
Diffusive material				yes
Illumination area diameter		(mm)		40
Suggested working distance WD		(mm)		n.a.
Min estimated illumination ¹	At driving current = 17.0 A	(klux)		5
Electrical specifications				
Power supply mode				strobe only, constant current driving
Pulse width ²		(ms)		≤ 1
Connection Type ³				M8 industrial male connector
Dome unit				
Driving current	Min - Max	(A)		3.5 - 7.5
Active backlight view-through unit				
Driving current	Min - Max	(A)		3.5 - 17.0
Estimated MTBF ⁴		(hours)		> 50000
Mechanical specifications				
Dimensions	Length	(mm)	107	600
	Width	(mm)	84	100
	Height	(mm)	125	155.5
Materials			black anodized aluminum body	
Clamping system			4 threaded holes for M6 screw	
Compatibility				
Lenses			TCLWD series	

Items included	LTVTA1-W		LTVTBENCH	
	Description	Qty	Description	Qty
	Dome unit ⁵	2	Dome unit ⁵	2
	Active backlight view-through unit ⁵	2	Active backlight view-through unit ⁵	2
			Base plate with two right-angle brackets	1
			LTDV6CH strobe controller	1
			ADPT001 adapter RS485-USB	1

¹ At max Working Distance WD.

² At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.

³ PIN 1 and PIN 2 for the dome unit, PIN 3 and PIN 4 for the ringlight unit.

⁴ At 25 °C.

⁵ Cables included.

LT2BC series

High uniformity continuous LED backlights

NEW



KEY ADVANTAGES

Excellent uniformity.

Test report with measured uniformity.

Suitable for frequent cleaning

Thanks to the optical grade and scratch resistant protective cover.

Wide selection and modular design.

Size options with an active area ranging from 48 x 36 to 288 x 216 mm.

Available in red, white, green and blue.

Compact design with reduced thickness (26 mm).

LT2BC series are high intensity LED backlights designed to provide exceptional illumination performances and excellent uniformity. Their special design provides both homogeneous lighting that perfectly fits confined spaces thanks to a special beam shaping diffuser, new high efficiency LEDs and reduced thickness.

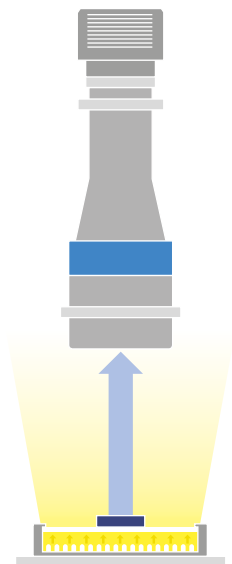
LT2BC series innovative optical layout has been designed to emit a directional light beams and achieve accurate results even when used in combination with telecentric lenses for measurement applications.

When positioned behind the objects to be inspected, LT2BC series highlight the silhouette of the objects providing excellent image contrast.

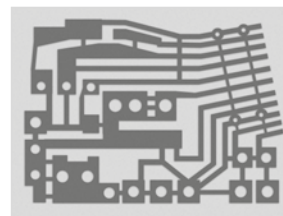
These backlights work in continuous mode but they can also be overdriven.

Their robust and modular design featuring M8 connector and scratch resistant protective cover is conceived for demanding industrial automation environments and to provide you a great choice of sizes, colors and aspect ratios for many diverse applications (from 4:3 to 16:9 and bar lights). Furthermore, LT2BC series can be easily installed into any machine vision system thanks to the lateral M6 threads and their slick design, suitable for environments with space constrains.

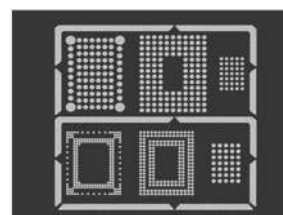
Lighting structure



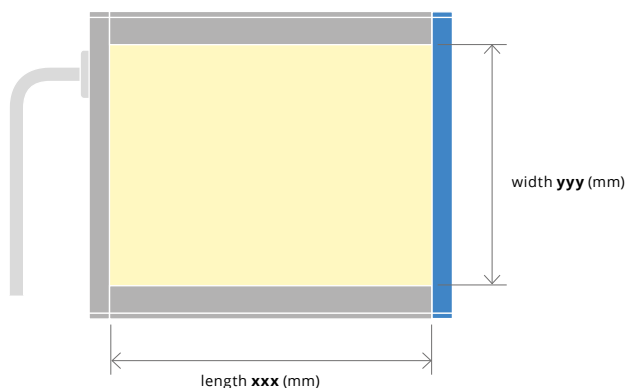
Application examples







Shape inspection.



Detection of patterns/holes.



COMPATIBLE LIGHT INTENSITY CONTROLLER		
	Light intensity controller	p. 254
FULL RANGE OF COMPATIBLE STROBE CONTROLLERS		
	LTDV series	p. 250
FULL RANGE OF COMPATIBLE TELECENTRIC LENSES		
	Telecentric lenses	p. 16-71
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Light colour		-R (red)	-G (green)	-B (blue)	-W (white)
Wavelength	(nm)	620	525	470	cool white, > 4500 K
Spectral FWHM	(nm)	20	33	25	cool white, > 4500 K

Part number 1	Modules	Optical specifications				Electrical specifications							Mechanical specifications				
		Number of LEDs	Lighting area dim.		Illuminance				Continuous mode			Pulsed mode		Dimensions			Clamping system
			Width xxx (mm)	Height yyy (mm)	-R (red)	-G (green)	-B (blue)	-W (white)	Supply voltage (V)	Current (mA)	Power cons (W)	Max pulse current 3 (mA)	Connection type 4	Width (mm)	Height (mm)	Thickness (mm)	
LT2BC 048 036-z	1x1	48	48	36	28	50	12	46	24	210	5.04	500	M8	60	56	26	4x M6 threaded holes
LT2BC 096 036-z	2x1	96	96	36	21	39	8	31	24	310	7.44	700	M8	108	56	26	4x M6 threaded holes
LT2BC 144 036-z	3x1	144	144	36	21	39	8	31	24	310	7.44	700	M8	156	56	26	4x M6 threaded holes
LT2BC 192 036-z	4x1	192	192	36	17	30	7	25	24	370	8.88	850	M8	204	56	26	8x M6 threaded holes
LT2BC 240 036-z	5x1	240	240	36	17	30	7	25	24	370	8.88	850	M8	252	56	26	8x M6 threaded holes
LT2BC 288 036-z	6x1	288	288	36	15	29	6	24	24	460	11.04	1000	M8	300	56	26	8x M6 threaded holes
LT2BC 048 072-z	1x2	96	48	72	15	29	6	24	24	460	11.04	1000	M8	60	92	26	4x M6 threaded holes
LT2BC 096 072-z	2x2	192	96	72	15	29	6	24	24	460	11.04	1000	M8	108	92	26	4x M6 threaded holes
LT2BC 144 072-z	3x2	288	144	72	14	26	6	22	24	530	12.72	1200	M8	156	92	26	4x M6 threaded holes
LT2BC 192 072-z	4x2	384	192	72	14	26	6	22	24	530	12.72	1200	M8	204	92	26	8x M6 threaded holes
LT2BC 240 072-z	5x2	480	240	72	14	26	6	22	24	640	15.36	1400	M8	252	92	26	8x M6 threaded holes
LT2BC 288 072-z	6x2	576	288	72	14	26	6	22	24	640	15.36	1400	M8	300	92	26	8x M6 threaded holes
LT2BC 048 108-z	1x3	144	48	108	14	26	6	22	24	640	15.36	1400	M8	60	128	26	4x M6 threaded holes
LT2BC 096 108-z	2x3	288	96	108	14	26	6	22	24	640	15.36	1400	M8	108	128	26	4x M6 threaded holes
LT2BC 144 108-z	3x3	432	144	108	13	23	5	20	24	760	18.24	1700	M8	156	128	26	4x M6 threaded holes
LT2BC 192 108-z	4x3	576	192	108	13	24	5	20	24	770	18.48	1700	M8	204	128	26	8x M6 threaded holes
LT2BC 240 108-z	5x3	720	240	108	13	22	5	18	24	840	20.16	1800	M8	252	128	26	8x M6 threaded holes
LT2BC 288 108-z	6x3	864	288	108	12	24	5	18	24	900	21.6	1900	M8	300	128	26	8x M6 threaded holes
LT2BC 048 144-z	1x4	192	48	144	12	22	5	18	24	890	21.36	1900	M8	60	164	26	4x M6 threaded holes
LT2BC 096 144-z	2x4	384	96	144	12	21	5	18	24	1050	25.2	2250	M8	108	164	26	4x M6 threaded holes
LT2BC 144 144-z	3x4	576	144	144	12	21	5	18	24	1050	25.2	2250	M8	156	164	26	4x M6 threaded holes
LT2BC 192 144-z	4x4	768	192	144	12	21	5	18	24	1050	25.2	2250	M8	204	164	26	8x M6 threaded holes
LT2BC 240 144-z	5x4	960	240	144	12	21	5	18	24	1050	25.2	2250	M8	252	164	26	8x M6 threaded holes
LT2BC 288 144-z	6x4	1152	288	144	11	19	4	16	24	1160	27.84	2500	M8	300	164	26	8x M6 threaded holes
LT2BC 048 180-z	1x5	240	48	180	11	19	4	16	24	1160	27.84	2500	M8	60	200	26	4x M6 threaded holes
LT2BC 096 180-z	2x5	480	96	180	10	19	4	16	24	1210	29.04	2550	M8	108	200	26	4x M6 threaded holes
LT2BC 144 180-z	3x5	720	144	180	9	17	4	15	24	1260	30.24	2650	M8	156	200	26	4x M6 threaded holes
LT2BC 192 180-z	4x5	960	192	180	9	17	4	15	24	1260	30.24	2650	M8	204	200	26	8x M6 threaded holes
LT2BC 240 180-z 3	5x5	1200	240	180	9	17	4	15	24	1390	33.36	2900	M8	252	200	26	8x M6 threaded holes
LT2BC 288 180-z 3	6x5	1440	288	180	9	17	4	15	24	1390	33.36	2900	M8	300	200	26	8x M6 threaded holes
LT2BC 048 216-z	1x6	288	48	216	11	19	4	16	24	1860	44.64	4000	M8	60	236	26	4x M6 threaded holes
LT2BC 096 216-z	2x6	576	96	216	11	19	4	16	24	1860	44.64	4000	M8	108	236	26	4x M6 threaded holes
LT2BC 144 216-z	3x6	864	144	216	11	19	4	16	24	1940	46.56	4100	M8	156	236	26	4x M6 threaded holes
LT2BC 192 216-z	4x6	1152	192	216	9	16	3	13	24	1970	47.28	4100	M8	204	236	26	8x M6 threaded holes
LT2BC 240 216-z 3	5x6	1440	240	216	9	16	3	13	24	1970	47.28	4100	M8	252	236	26	8x M6 threaded holes
LT2BC 288 216-z 3	6x6	1728	288	216	8	14	3	12	24	2160	51.84	4500	M8	300	236	26	8x M6 threaded holes

1 The last digit of the part number (-z) refers to the color (R = red, G = green, B = blue, W = white).

2 At emitting surface.

3 At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.

4 5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).

Ordering information

Our part numbers are coded as **LT2BC xxx yyy - z**, where **xxx** defines the illumination area length (in mm), **yyy** defines the illumination area width (in mm) and **z** refers to the color.

LTBP series

High-power strobe LED backlights



KEY ADVANTAGES

Excellent uniformity (down to $\pm 10\%$).

Test report with measured uniformity.

Ultra high-power light output and strobe mode operation

For inspection and measurement of fast moving objects and an extended LED lifetime.

Suitable for frequent cleaning

Thanks to the optical grade and scratch resistant protective cover.

Wide selection and modular design

Size options range from 48 x 36 to 288 x 216 mm available in red, white, green and blue.

Compact design with reduced thickness (26 mm).

Special continuous alignment mode.

Compatible LTDV1CH-17V strobe controller.

LTBP series are high power LED backlights designed to provide exceptional illumination performance and excellent uniformity. Their special design provides both powerful and homogeneous lighting that perfectly fits confined spaces thanks to a special beam shaping diffuser, new high efficiency LEDs and reduced thickness.

LTBP series innovative optical layout has been designed to emit directional light beams and achieve accurate results even when used in combination with telecentric lenses for measurement applications.

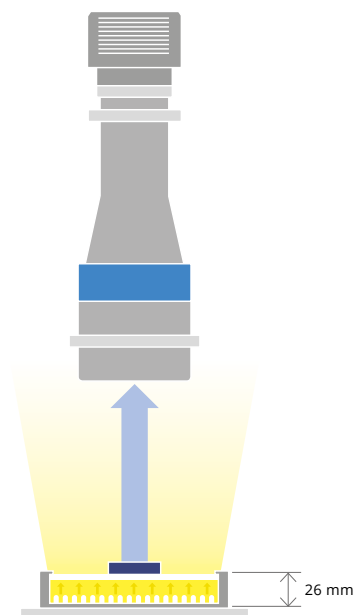
When positioned behind the objects to be inspected, LTBP series highlight the silhouette of the objects providing excellent image contrast and high illuminance for the most demanding high speed applications (down to exposure times of tens of μs).

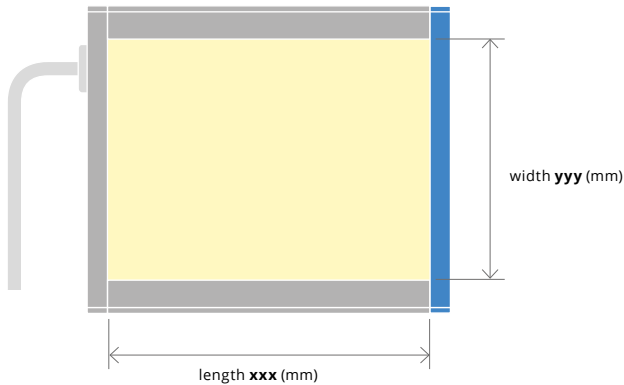
These backlights work in strobe mode only but they also feature a special continuous mode to be used for alignment/setting purpose (when used with LTDV1CH-17V controller).

Their robust and modular design featuring M8/M12 connectors and scratch resistant protective cover is conceived for demanding industrial automation environments and to provide you with a great choice of sizes, colors and aspect ratios for many diverse applications (from 4:3 to 16:9 and bar lights).

Furthermore, LTBP series can be easily installed into any machine vision system thanks to the lateral M6 threads and their slick design, suitable for environments with space constrains.

Lighting structure





Optical specifications

Available light colours	red, green, blue, white
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Electrical specifications

Power supply mode	strobe only, constant current driving	
Pulse width 1	(ms)	≤ 1
Estimated MTBF 2	(h)	> 50000

Mechanical specification

Materials	Black&Blue anodized Aluminum
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- 1 At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz.
- 2 At 25°C.

Part number 1	Modules	Optical specifications			Electrical specifications				Connection type 2	Mechanical specifications			Clamping system
		Number of LEDs	Lighting area dim.		Driving Current / Peak power consumption					Dimensions			
			Length xxx (mm)	Width yyy (mm)	-R (red)	-G (green)	-B (blue)	-W (white)		Width (mm)	Height (mm)	Thickness (mm)	
LTBP 048 036-z	1 x 1	48	48	36	1.8 / 43.2	1.8 / 48.6	1.8 / 54.8	1.8 / 50.4	M8	60	56	26	4x M6 threaded holes
LTBP 096 036-z	2 x 1	96	96	36	3.6 / 86.4	3.6 / 97.2	3.6 / 109.4	3.6 / 100.8	M8	108	56	26	4x M6 threaded holes
LTBP 144 036-z	3 x 1	144	144	36	5.4 / 129.6	5.4 / 145.8	5.4 / 164.2	5.4 / 151.2	M8	156	56	26	4x M6 threaded holes
LTBP 192 036-z	4 x 1	192	192	36	7.2 / 172.8	7.2 / 194.4	7.2 / 218.9	7.2 / 201.6	M8	204	56	26	8x M6 threaded holes
LTBP 240 036-z	5 x 1	240	240	36	9 / 216.0	9 / 243.0	9 / 273.6	9 / 252.0	M8	252	56	26	8x M6 threaded holes
LTBP 288 036-z	6 x 1	288	288	36	10.8 / 259.2	10.8 / 291.6	10.8 / 328.3	10.8 / 302.4	M8	300	56	26	8x M6 threaded holes
LTBP 048 072-z	1 x 2	96	48	72	3.6 / 86.4	3.6 / 97.2	3.6 / 109.4	3.6 / 100.8	M8	60	92	26	4x M6 threaded holes
LTBP 096 072-z	2 x 2	192	96	72	7.2 / 172.8	7.2 / 194.4	7.2 / 218.8	7.2 / 201.6	M8	108	92	26	4x M6 threaded holes
LTBP 144 072-z	3 x 2	288	144	72	10.8 / 259.2	10.8 / 291.6	10.8 / 328.3	10.8 / 302.4	M8	156	92	26	4x M6 threaded holes
LTBP 192 072-z	4 x 2	384	192	72	14.4 / 345.6	14.4 / 388.8	14.4 / 437.8	14.4 / 403.2	M8	204	92	26	8x M6 threaded holes
LTBP 240 072-z	5 x 2	480	240	72	8.4 / 201.6	8.4 / 226.8	4.9 / 149.0	4.8 / 134.4	M8	252	92	26	8x M6 threaded holes
LTBP 288 072-z	6 x 2	576	288	72	10.1 / 242.2	10.1 / 272.7	5.8 / 176.3	5.8 / 162.4	M8	300	92	26	8x M6 threaded holes
LTBP 048 108-z	1 x 3	144	48	108	5.4 / 129.6	5.4 / 145.8	5.4 / 164.2	5.4 / 151.2	M8	60	128	26	4x M6 threaded holes
LTBP 096 108-z	2 x 3	288	96	108	10.8 / 259.2	10.8 / 291.6	10.8 / 328.3	10.8 / 302.4	M8	108	128	26	4x M6 threaded holes
LTBP 144 108-z	3 x 3	432	144	108	16.2 / 388.8	16.2 / 437.4	16.2 / 492.5	16.2 / 453.6	M8	156	128	26	4x M6 threaded holes
LTBP 192 108-z	4 x 3	576	192	108	10.1 / 242.2	10.1 / 272.7	5.8 / 176.3	5.8 / 162.4	M8	204	128	26	8x M6 threaded holes
LTBP 240 108-z	5 x 3	720	240	108	12.6 / 302.4	12.6 / 340.2	7.3 / 221.9	7.2 / 201.6	M8	252	128	26	8x M6 threaded holes
LTBP 288 108-z	6 x 3	864	288	108	15.1 / 362.4	15.1 / 407.7	8.7 / 264.5	8.6 / 240.8	M8	300	128	26	8x M6 threaded holes
LTBP 048 144-z	1 x 4	192	48	144	7.2 / 172.8	7.2 / 194.4	7.2 / 218.9	7.2 / 201.6	M8	60	164	26	4x M6 threaded holes
LTBP 096 144-z	2 x 4	384	96	144	14.4 / 345.6	14.4 / 388.8	14.4 / 437.8	14.4 / 403.2	M8	108	164	26	4x M6 threaded holes
LTBP 144 144-z	3 x 4	576	144	144	10.1 / 242.4	10.1 / 272.7	5.8 / 176.3	5.8 / 162.4	M8	156	164	26	4x M6 threaded holes
LTBP 192 144-z	4 x 4	768	192	144	13.4 / 321.6	13.4 / 361.8	7.8 / 237.1	7.7 / 215.6	M8	204	164	26	8x M6 threaded holes
LTBP 240 144-z	5 x 4	960	240	144	16.8 / 403.2	16.8 / 453.6	9.7 / 294.9	9.6 / 268.8	M8	252	164	26	8x M6 threaded holes
LTBP 288 144-z	6 x 4	1152	288	144	20.2 / 484.8	20.2 / 545.4	11.7 / 355.7	11.5 / 322.0	M8	300	164	26	8x M6 threaded holes
LTBP 048 180-z	1 x 5	240	48	180	9 / 216.0	9 / 243.0	9 / 273.6	9 / 252.0	M8	60	200	26	4x M6 threaded holes
LTBP 096 180-z	2 x 5	480	96	180	8.4 / 201.6	8.4 / 226.8	4.9 / 149.0	4.8 / 134.4	M8	108	200	26	4x M6 threaded holes
LTBP 144 180-z	3 x 5	720	144	180	12.6 / 302.4	12.6 / 340.2	7.3 / 221.9	7.2 / 201.6	M8	156	200	26	4x M6 threaded holes
LTBP 192 180-z	4 x 5	960	192	180	16.8 / 403.2	16.8 / 453.6	9.7 / 294.9	9.6 / 268.8	M8	204	200	26	8x M6 threaded holes
LTBP 240 180-z 3	5 x 5	1200	240	180	10.5 + 10.5 / 264.0	10.5 + 10.5 / 567.0	12.2 / 370.9	12 / 336.0	M12	252	200	26	8x M6 threaded holes
LTBP 288 180-z 3	6 x 5	1440	288	180	12.6 + 12.6 / 604.8	12.6 + 12.6 / 680.4	14.6 / 443.8	14.4 / 403.2	M12	300	200	26	8x M6 threaded holes
LTBP 048 216-z	1 x 6	288	48	216	10.8 / 259.2	10.8 / 291.6	10.8 / 328.3	10.8 / 302.4	M8	60	236	26	4x M6 threaded holes
LTBP 096 216-z	2 x 6	576	96	216	10.1 / 242.4	10.1 / 272.7	5.8 / 176.3	5.8 / 162.4	M8	108	236	26	4x M6 threaded holes
LTBP 144 216-z	3 x 6	864	144	216	15.1 / 362.4	15.1 / 407.7	8.7 / 264.5	8.6 / 240.8	M8	156	236	26	4x M6 threaded holes
LTBP 192 216-z	4 x 6	1152	192	216	20.2 / 484.8	20.2 / 545.4	11.7 / 355.7	11.5 / 322.0	M8	204	236	26	8x M6 threaded holes
LTBP 240 216-z 3	5 x 6	1440	240	216	12.6 + 12.6 / 604.8	12.6 + 12.6 / 680.4	14.6 / 443.8	14.4 / 403.2	M12	252	236	26	8x M6 threaded holes
LTBP 288 216-z 3	6 x 6	1728	288	216	15.1 + 15.1 / 724.8	15.1 + 15.1 / 812.7	17.5 / 532.0	17.3 / 484.4	M12	300	236	26	8x M6 threaded holes

- 1 The last digit of the part number (-z) refers to the color (R = red, G = green, B = blue, W = white).
- 2 5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).
- 3 Red and Green versions of these models feature 2 separate channels.

Ordering information

Our part numbers are coded as **LTBP xxx yyy - z**, where **xxx** defines the illumination area length (in mm), **yyy** defines the illumination area width (in mm) and **z** refers to the color (W = white, R = red, G = green, B = blue). For instance LTBP096-R is a diffusive strobed dome illuminator - medium size high power red.

LTBP series




High-power strobe LED backlights



LTBP096072-W



LTBP048036-G

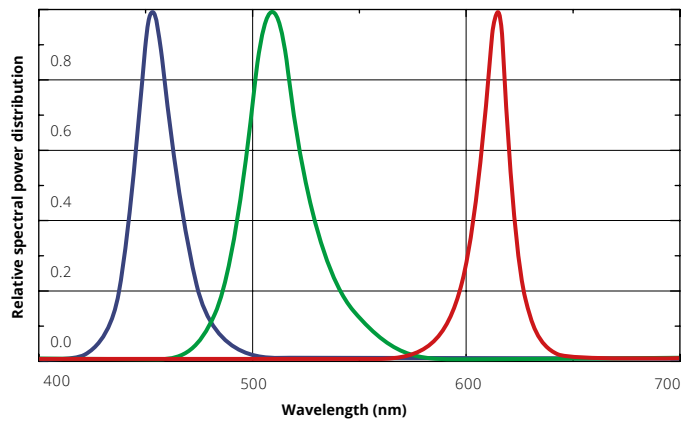
FULL RANGE OF COMPATIBLE STROBE CONTROLLERS		
	LTDV series	p. 250
FULL RANGE OF COMPATIBLE TELECENTRIC LENSES		
	Telecentric lenses	p. 16-71
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Light colour			-R (red)	-G (green)	-B (blue)	-W (white)
		LED Type				
Wavelength	(nm)	A	620	522	465	cool white, > 4500 K
		B	625	525	470	cool white, > 4500 K
Spectral FWHM	(nm)	A	20	30	20	cool white, > 4500 K
		B	20	30	25	cool white, > 4500 K
Min estimated illumination	(klux)	A ¹	70	150	30	200
		B ²	n.a.	n.a.	n.a.	n.a.

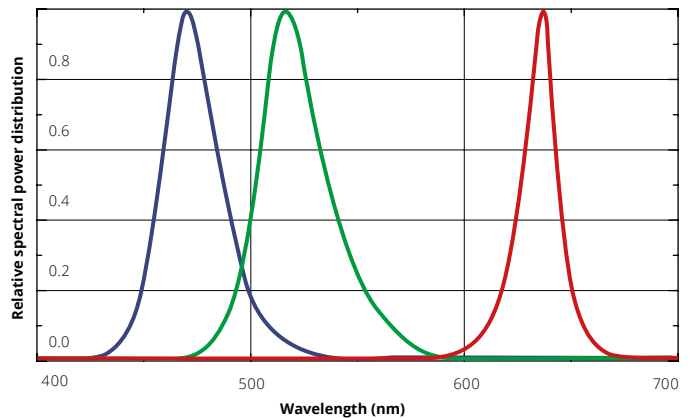
- 1 At max driving current, on emitting surface.
- 2 Available upon request.

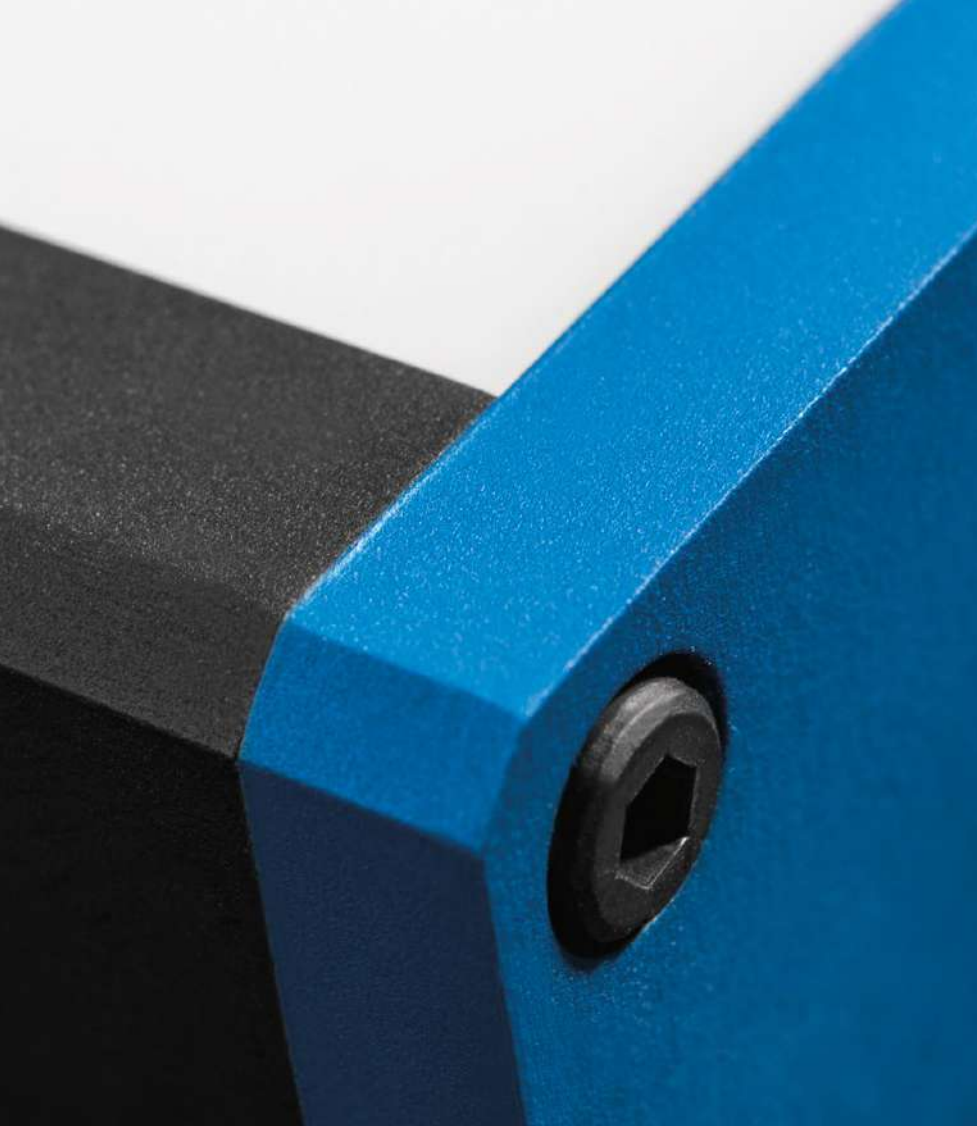
Part number	Module	LED type
LTBP 048036-z	1 x 1	A
LTBP 096036-z	2 x 1	A
LTBP 144036-z	3 x 1	A
LTBP 192036-z	4 x 1	A
LTBP 240036-z	5 x 1	A
LTBP 288036-z	6 x 1	A
LTBP 048072-z	1 x 2	A
LTBP 096072-z	2 x 2	A
LTBP 144072-z	3 x 2	A
LTBP 192072-z	4 x 2	A
LTBP 240072-z	5 x 2	B
LTBP 288072-z	6 x 2	B
LTBP 048108-z	1 x 3	A
LTBP 096108-z	2 x 3	A
LTBP 144108-z	3 x 3	A
LTBP192108-z	4 x 3	B
LTBP 240108-z	5 x 3	B
LTBP 288108-z	6 x 3	B
LTBP 048144-z	1 x 4	A
LTBP 096144-z	2 x 4	A
LTBP 144144-z	3 x 4	B
LTBP 192144-z	4 x 4	B
LTBP 240144-z	5 x 4	B
LTBP 288144-z	6 x 4	B
LTBP 048180-z	1 x 5	A
LTBP 096180-z	2 x 5	B
LTBP 144180-z	3 x 5	B
LTBP 192180-z	4 x 5	B
LTBP 240180-z	5 x 5	B
LTBP 288180-z	6 x 5	B
LTBP 048216-z	1 x 6	A
LTBP 096216-z	2 x 6	B
LTBP 144216-z	3 x 6	B
LTBP 192216-z	4 x 6	B
LTBP 240216-z	5 x 6	B
LTBP 288216-z	6 x 6	B

Typical emission spectrum of type A LEDs (R, G, B)

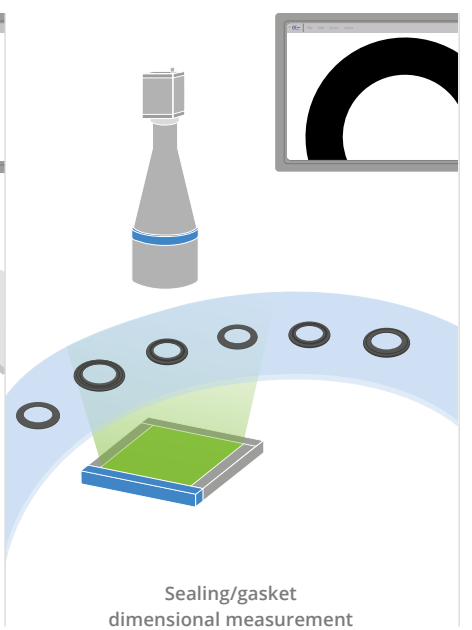
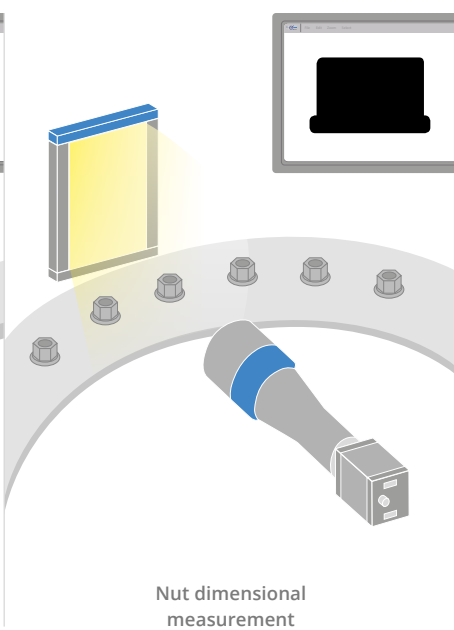
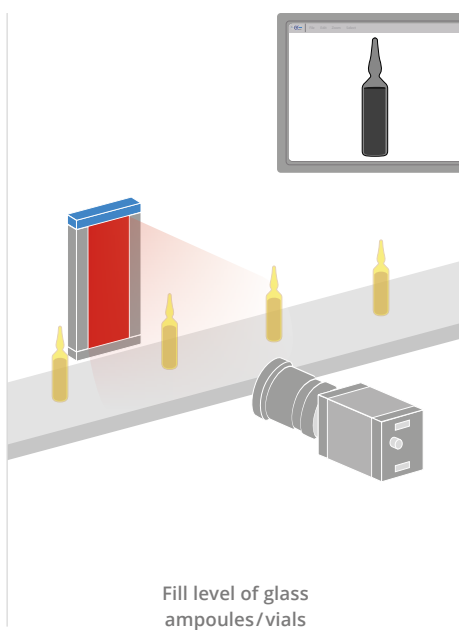


Typical emission spectrum of type B LEDs (R, G, B)





Application examples



LTBC series

Continuous LED backlights



KEY ADVANTAGES

Cost-effective homogeneous illumination

Densely packed LED arrays with matte diffuser eliminating hot spots and glare.

Robust industrial Design

M8 connector for easy connection to power supplies.

Easy integration

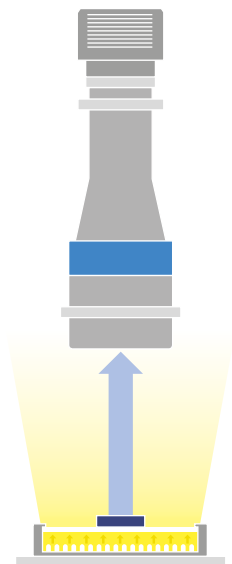
M6 nut channels for easy mounting.



LTBC series are LED backlights designed to be employed in a wide variety of applications such as shape and size inspection of workpieces.

These backlights are a cost-effective solution with no compromise on quality: they feature a robust design and provide diffuse even illumination without hotspots.

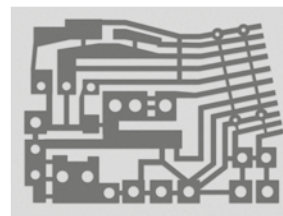
LTBC series backlights effectively emphasize the silhouette of a workpiece, providing excellent optical contrast in combination with many different lenses.

Lighting structure

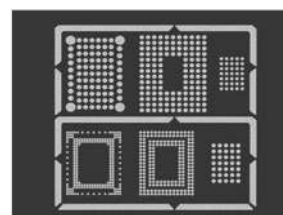


COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTICGR1000-D1-PS-xx light intensity controller	p. 254

Application examples



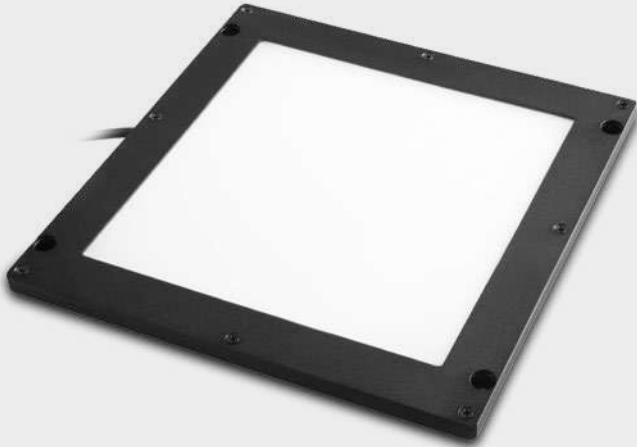
Shape inspection.



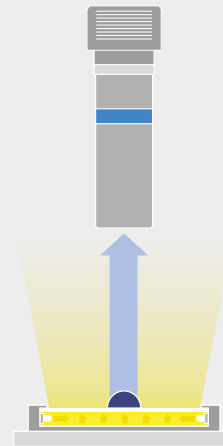
Detection of patterns/holes.

LTBFC series

Continuous flat side-emitting LED backlights



Lighting structure



LTBFC series consists of flat side-emitting LED backlights: two types are available either with four borders or with three borders and one side flush. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER



LTDV1CH-17V strobe controller

p. 250

COMPATIBLE LIGHT INTENSITY CONTROLLER



LTCGR1000-D1-PS-xx light intensity controller

p. 254

Part number	Optical specifications				Electrical specifications					Dimensions		
	Light colour, wavelength peak	Lighting area		Sides type	Continuous mode			Pulsed mode		Length (mm)	Width (mm)	Height (mm)
		Width (mm)	Length (mm)		Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LTPVR070-00-1-W-24V	white, 6300 K	70	70	4 borders	24	120	2.88	36	360	98.5	98.5	5.30
LTPVR070-00-1-R-24V	red, 630 nm	70	70	4 borders	24	120	2.88	36	360	98.5	98.5	5.30
LTPVR070-00-1-G-24V	green, 525 nm	70	70	4 borders	24	120	2.88	36	360	98.5	98.5	5.30
LTPVR070-00-1-B-24V	blue, 470 nm	70	70	4 borders	24	120	2.88	36	360	98.5	98.5	5.30
LTPVR100-00-1-W-24V	white, 6300 K	100	100	4 borders	24	160	3.84	36	480	128.5	128.5	5.30
LTPVR100-00-1-R-24V	red, 630 nm	100	100	4 borders	24	180	4.32	36	540	128.5	128.5	5.30
LTPVR100-00-1-G-24V	green, 525 nm	100	100	4 borders	24	160	3.84	36	480	128.5	128.5	5.30
LTPVR100-00-1-B-24V	blue, 470 nm	100	100	4 borders	24	160	3.84	36	480	128.5	128.5	5.30
LTPVRG25X36-00-1-W-24V	white, 6300 K	25	36	3 borders and 1 edge to edge	24	20	0.48	36	60	38.5	43.5	5.30
LTPVRG25X36-00-1-R-24V	red, 630 nm	25	36	3 borders and 1 edge to edge	24	15	0.36	36	45	38.5	43.5	5.30
LTPVRG25X36-00-1-G-24V	green, 525 nm	25	36	3 borders and 1 edge to edge	24	20	0.48	36	60	38.5	43.5	5.30
LTPVRG25X36-00-1-B-24V	blue, 470 nm	25	36	3 borders and 1 edge to edge	24	20	0.48	36	60	38.5	43.5	5.30
LTPVRG31X58-00-1-W-24V	white, 6300 K	31	58	3 borders and 1 edge to edge	24	30	0.72	36	90	60	43.5	5.30
LTPVRG31X58-00-1-R-24V	red, 630 nm	31	58	3 borders and 1 edge to edge	24	30	0.72	36	90	60	43.5	5.30
LTPVRG31X58-00-1-G-24V	green, 525 nm	31	58	3 borders and 1 edge to edge	24	30	0.72	36	90	60	43.5	5.30
LTPVRG31X58-00-1-B-24V	blue, 470 nm	31	58	3 borders and 1 edge to edge	24	30	0.72	36	90	60	43.5	5.30
LTPVRG070-00-1-W-24V	white, 6300 K	70	70	3 borders and 1 edge to edge	24	90	2.16	36	270	98.5	84.5	4.30
LTPVRG070-00-1-R-24V	red, 630 nm	70	70	3 borders and 1 edge to edge	24	90	2.16	36	270	98.5	84.5	4.30
LTPVRG070-00-1-G-24V	green, 525 nm	70	70	3 borders and 1 edge to edge	24	90	2.16	36	270	98.5	84.5	4.30
LTPVRG070-00-1-B-24V	blue, 470 nm	70	70	3 borders and 1 edge to edge	24	90	2.16	36	270	98.5	84.5	4.30

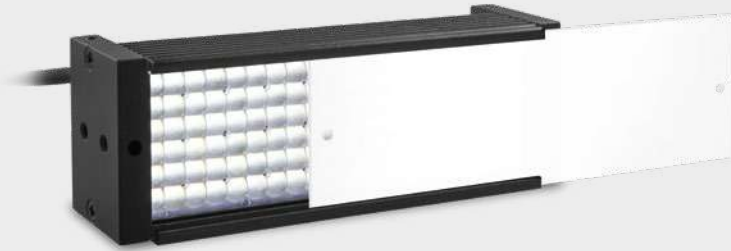
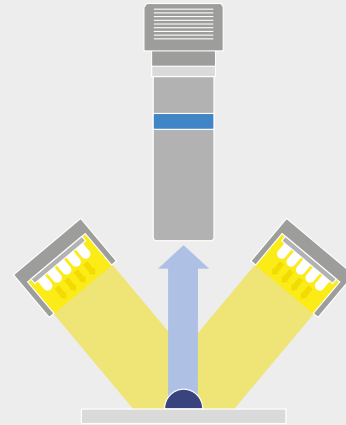
1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTBRDC series

Continuous LED bar lights

Lighting structure



LTBRDC series LTBRDC series consists of LED bar lights that can be used in a wide variety of applications such as text reading on flat surfaces.

They provide rectangular illumination on the workpiece and the installation angle can be set freely. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER



LTDV1CH-17V strobe controller

p. 250

COMPATIBLE LIGHT INTENSITY CONTROLLER



LTCGR1000-D1-PS-xx light intensity controller

p. 254

Part number	Optical specifications			Electrical specifications					Dimensions			
	Light colour, wavelength peak	Lighting area		Supply voltage (V)	Continuous mode			Pulsed mode		Length (mm)	Width (mm)	Height (mm)
		Width (mm)	Length (mm)		Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)				
LTZPFL040-00-6-W-24V	white, 6300 K	26.3	40	24	72	1.73	36	216	52	31.5	22	
LTZPFL040-00-6-R-24V	red, 630 nm	26.3	40	24	78	1.87	36	234	52	31.5	22	
LTZPFL040-00-6-G-24V	green, 525 nm	26.3	40	24	72	1.73	36	216	52	31.5	22	
LTZPFL040-00-6-B-24V	blue, 470 nm	26.3	40	24	72	1.73	36	216	52	31.5	22	
LTZPFL080-00-6-R-24V	white, 6300 K	26.3	80	24	144	3.46	36	432	92	31.5	22	
LTZPFL080-00-6-R-24V	red, 630 nm	26.3	80	24	156	3.74	36	468	92	31.5	22	
LTZPFL080-00-6-R-24V	green, 525 nm	26.3	80	24	144	3.46	36	432	92	31.5	22	
LTZPFL080-00-6-R-24V	blue, 470 nm	26.3	80	24	144	3.46	36	432	92	31.5	22	
LTZPFL120-00-6-W-24V	white, 6300 K	26.3	120	24	216	5.18	36	648	132	31.5	22	
LTZPFL120-00-6-R-24V	red, 630 nm	26.3	120	24	234	5.62	36	702	132	31.5	22	
LTZPFL120-00-6-G-24V	green, 525 nm	26.3	120	24	216	5.18	36	648	132	31.5	22	
LTZPFL120-00-6-B-24V	blue, 470 nm	26.3	120	24	216	5.18	36	648	132	31.5	22	
LTZPFL160-00-6-W-24V	white, 6300 K	26.3	160	24	288	6.91	36	864	172	31.5	22	
LTZPFL160-00-6-R-24V	red, 630 nm	26.3	160	24	312	7.49	36	936	172	31.5	22	
LTZPFL160-00-6-G-24V	green, 525 nm	26.3	160	24	288	6.91	36	864	172	31.5	22	
LTZPFL160-00-6-B-24V	blue, 470 nm	26.3	160	24	288	6.91	36	864	172	31.5	22	
LTZPFL200-00-6-W-24V	white, 6300 K	26.3	200	24	360	8.64	36	1080	212	31.5	22	
LTZPFL200-00-6-R-24V	red, 630 nm	26.3	200	24	390	9.36	36	1170	212	31.5	22	
LTZPFL200-00-6-G-24V	green, 525 nm	26.3	200	24	360	8.64	36	1080	212	31.5	22	
LTZPFL200-00-6-B-24V	blue, 470 nm	26.3	200	24	360	8.64	36	1080	212	31.5	22	

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTLNC series

Continuous LED line lights



KEY ADVANTAGES

Ultra high power.

Color matched white models.

Condenser lens for a perfectly focused beam of light.

Rugged industrial design with built in industrial connector for easy integration into any machine vision system.

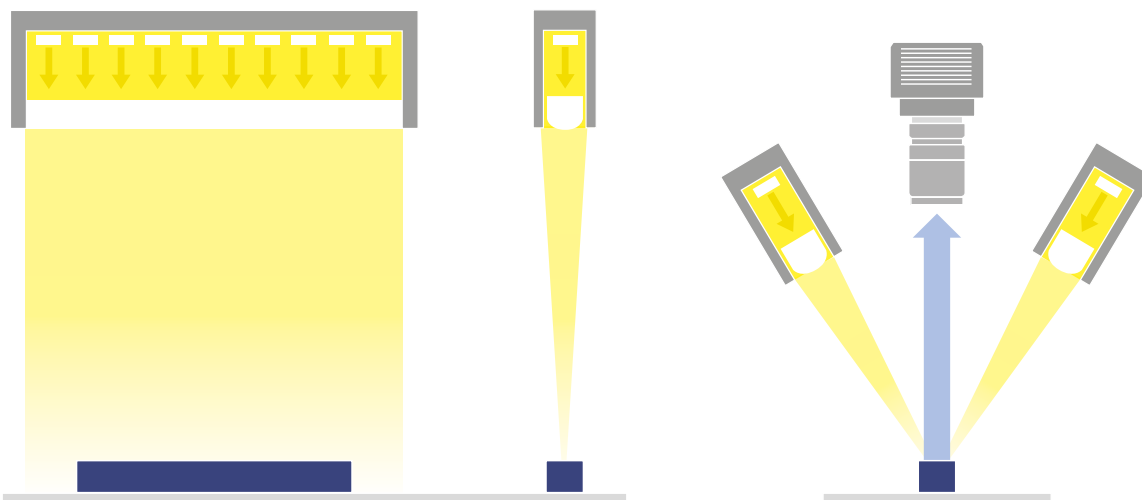
Forced air cooling option.

LTLNC series are ultra-high power LED line illuminators designed for linescan applications. Their special design provides both a powerful and homogeneous beam of light that is sharply focused onto the object that must be inspected, by means of a condenser lens.

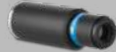

LTLNC series can efficiently dissipate the generated heat thanks to the fins machined in the aluminum housing and the air cooling ports designed to inject compressed air into the illuminator.

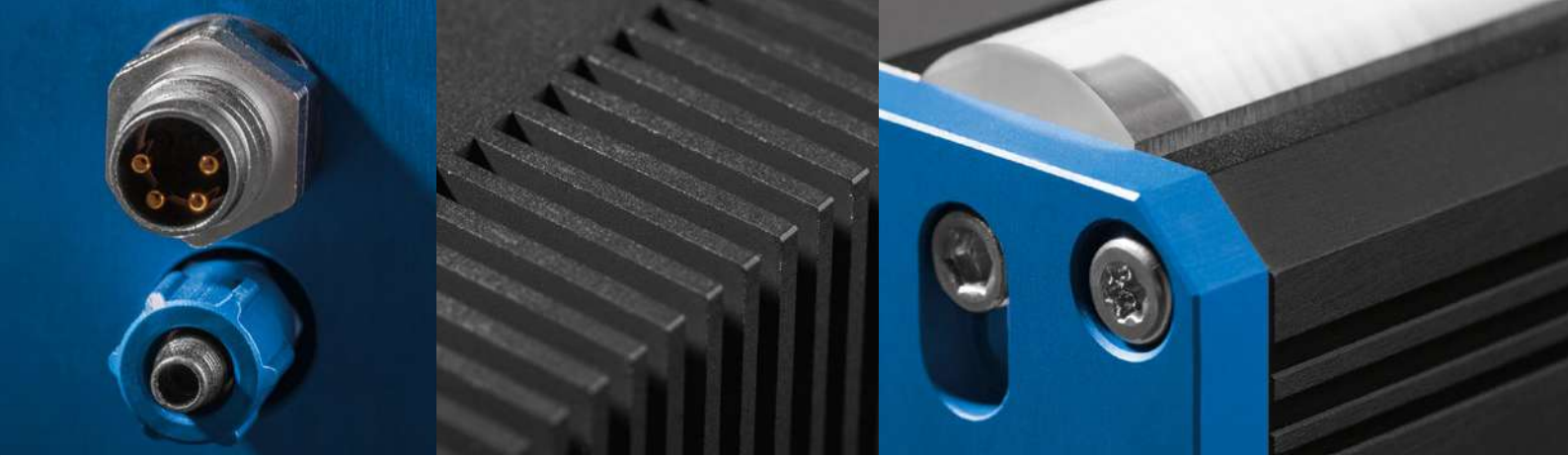
Furthermore LTLNC series features industrial M8 connectors and can be easily installed into any machine vision system thanks to the four M3 threads in the rear part of the aluminum housing.

Lighting structure

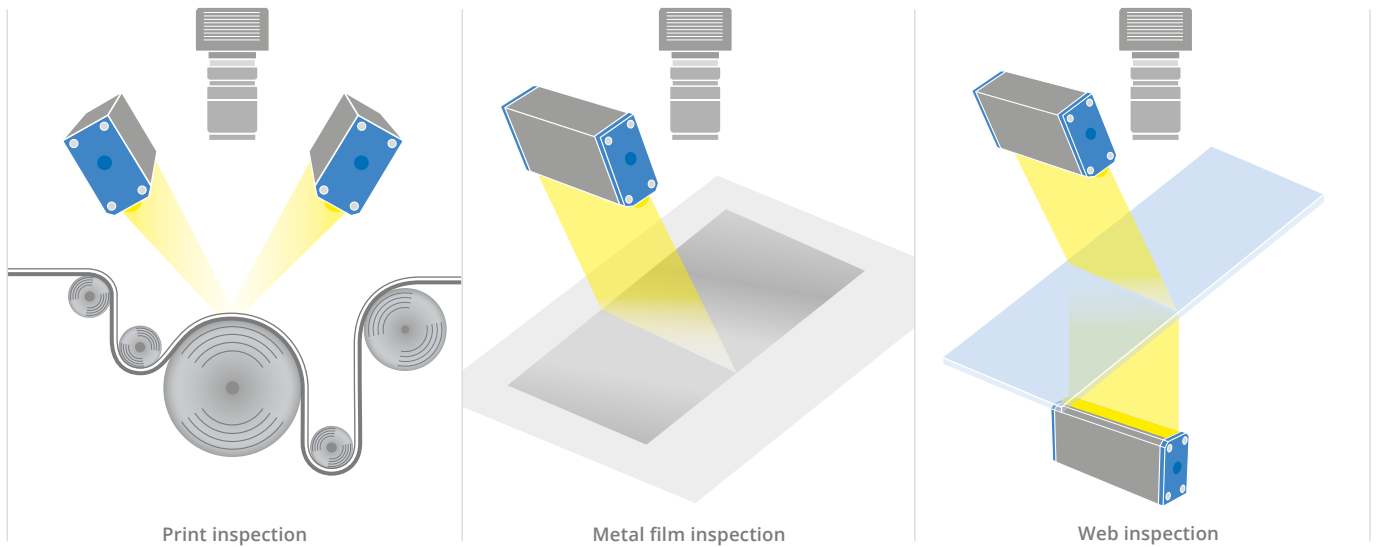


SEE ALSO FULL RANGE OF LINESCAN LENSES

	MC4K, MC12K series	p. 102-105
	TC4K, TC12K series	p. 68-71



Application examples



Part number		LTLNC100-W	LTLNC150-W	LTLNC200-W	LTLNC300-W
Optical specifications					
Number of LEDs		21	28	28	42
Light color		white, 6500 K	white, 6500 K	white, 6500 K	white, 6500 K
Spectral FWHM	(nm)	n.a.	n.a.	n.a.	n.a.
Illumination area	(mm)	100 x 15	150 x 15	200 x 15	300 x 15
Suggested working distance WD	(mm)	20 - 100	20 - 100	20 - 100	20 - 100
Electrical specifications					
Continuous mode					
Supply voltage	(V)	24 ± 2%	24 ± 2%	24 ± 2%	24 ± 2%
Continuous driving current, max	(mA)	1050	1400	1800	2700
Power consumption	(W)	25	32	43	65
Connection type ¹		M8 industrial male connector			
Estimated MTBF ²	(hours)	>20000	>20000	>20000	>20000
Mechanical specifications					
Length	(mm)	150	200	250	350
Width	(mm)	32	32	32	32
Height	(mm)	60	60	60	60
Material		black anodized aluminum body			
Cooling method		compressed air cooling or passive (attached to machine frame for better heat dissipation)			
Clamping system		4 threaded holes for M3 screw			
Compatibility					
Lenses		TC4K060-x TC4K090-x TC4K120-x, TC4K180-x TC12K064, TC12K080, TC12K120, TC12K144, TC12K192, TC12K240, MC4K series, MC12K200X-x, MC12K150X-x, MC12K100X-x, MC12K067X-x, MC12K050X-x, MC12K025X-x			
Cable		CBLT003, CBLT004			

¹ 5 m cable with straight female connector included. Optional cable with right angled connector is also available and must be ordered separately (refer to our website for further info and ordering codes).

² Drop to 50% intensity @ 25°C.

LTLNM series

Flicker free high power focused modular LED line lights

NEW



KEY ADVANTAGES

Emitting surface up 2 meters in 200 mm increments.

Flicker free for linescan applications.

3 types of projection lenses

Near field focusing (N), far field focusing (F), collimated (C).

Homogeneous beam for uniform illumination.

Dimmable.

Enable signal.

Optional diffusive sheet (D) for superior illumination uniformity.

LTLNM series are high power LED line illuminators designed for linescan applications. These lights are flicker-free and meet the needs of demanding applications with reduced exposure times (tens of μ s) ensuring very constant illumination and repeatable acquisition. Their modular design provides size flexibility without any compromise in terms of light uniformity.

LTLNM are available with an emitting surface up 2 meters in 200 mm increments (custom sizes and colors can be requested).

LTLNM series can be supplied with three different light angles/ focusing distances: near field focused (N) with converging rays (10 - 100 mm), far field focused (F) with converging rays (100 - 200 mm) and collimated (C) working at a distance between 10 and 200 mm.

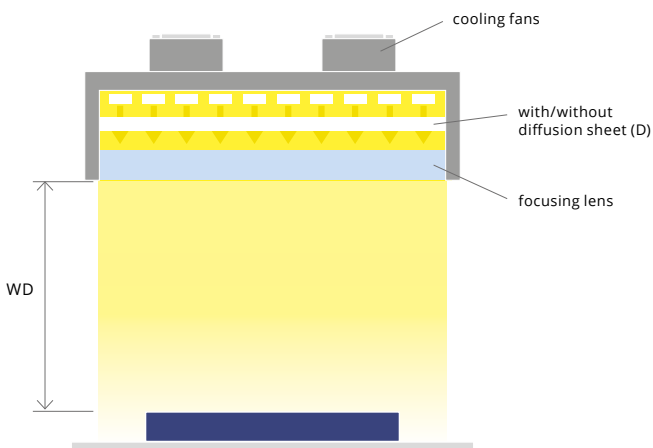
An optional diffusive sheet (D) can be integrated in any model to obtain the best illumination uniformity.

These lights feature 24V supply voltage and can be easily dimmed through an analogue signal.

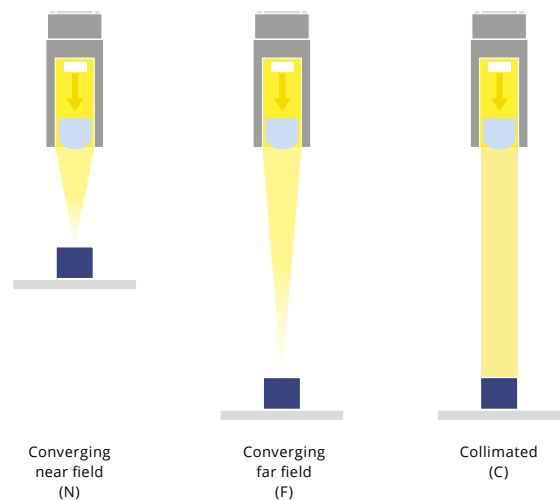
LTLNM series can efficiently dissipate the generated heat thanks an efficient forced-air cooling system (fans). The on-board electronics constantly monitor the LED temperature and drives the fans only if needed, in order to minimize noise and increase fan life.

These line lights are perfect for applications that require high speed image processing such as fabrics and web inspection.

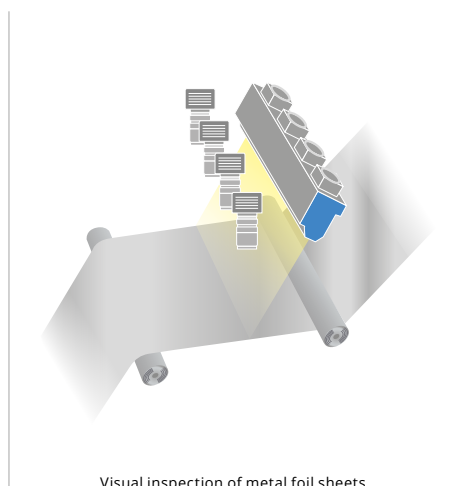
Lighting structure



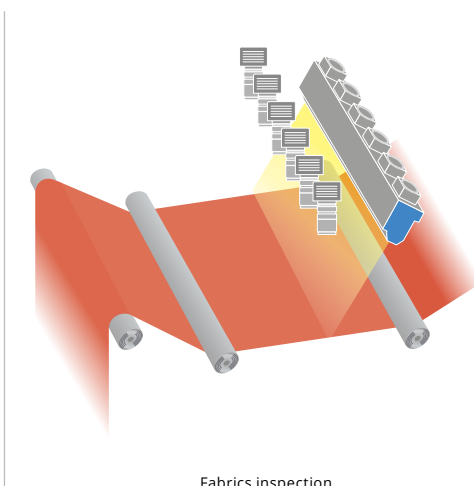
Projection lenses and focusing distances



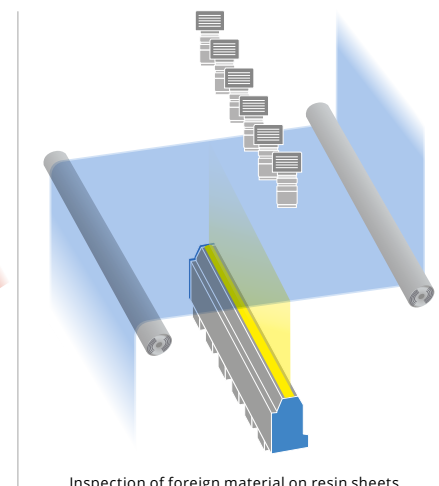
Application examples



Visual inspection of metal foil sheets.



Fabrics inspection.



Inspection of foreign material on resin sheets.

Part number	Modules	Optical specifications				Electrical specifications				Mechanical specifications				Compatibility		
		Emitting length aaaa (mm)	Projection lens and suggested WD b (mm)	Diffuser c	Light color d	Supply voltage (V)	Current consumption (A)	Power consumption (W)	Connection type 1	Length (mm)	Width (mm)	Height (mm)	Cooling method	Clamping system	Light intensity controllers	Lenses
LTLNM-0200-b-c-FC-W	1	200			White	24V ± 2%	3	72	2 pigtaills terminated with industrial connectors 1	250	80	130	fan (FC)			
LTLNM-0400-b-c-FC-W	2	400			White	24V ± 2%	6	144	2 pigtaills terminated with industrial connectors 1	450	80	130	fan (FC)			
LTLNM-0600-b-c-FC-W	3	600			White	24V ± 2%	9	216	2 pigtaills terminated with industrial connectors 1	650	80	130	fan (FC)			
LTLNM-800-b-c-FC-W	4	800			White	24V ± 2%	12	288	2 pigtaills terminated with industrial connectors 1	850	80	130	fan (FC)			
LTLNM-1000-b-c-FC-W	5	1000	N = near field focusing (10- 100 mm), F = far field focusing (100- 200 mm), C = collimated (10 - 200 mm)	c = D, with diffuser, c = empty, no diffuser	White	24V ± 2%	15	360	2 pigtaills terminated with industrial connectors 1	1050	80	130	fan (FC)	4 threaded holes for M10 screw	embedded	TC4K060-x, TC4K090-x, TC4K120-x, TC4K180-x, TC12K064, TC12K080, TC12K120, TC12K144, TC12K144, TC12K192, TC12K240, MC4K series, MC12K200X-x, MC12K150X-x, MC12K100X-x, MC12K067X-x, MC12K050X-x, MC12K025X-x
LTLNM-1200-b-c-FC-W	6	1200			White	24V ± 2%	18	432	2 pigtaills terminated with industrial connectors 1	1250	80	130	fan (FC)			
LTLNM-1400-b-c-FC-W	7	1400			White	24V ± 2%	21	504	3 pigtaills terminated with industrial connectors 2	1450	80	130	fan (FC)			
LTLNM-1600-b-c-FC-W	8	1600			White	24V ± 2%	24	576	3 pigtaills terminated with industrial connectors 2	1650	80	130	fan (FC)			
LTLNM-1800-b-c-FC-W	9	1800			White	24V ± 2%	27	648	3 pigtaills terminated with industrial connectors 2	1850	80	130	fan (FC)			
LTLNM-2000-b-c-FC-W	10	2000			White	24V ± 2%	30	720	3 pigtaills terminated with industrial connectors 2	2050	80	130	fan (FC)			

1 1 pigtail terminated with industrial circular male connector for power supply,
1 pigtail terminated with industrial circular male connector for i/o signals.

2 2 pigtaills terminated with industrial circular male connector for power supply,
1 pigtail terminated with industrial circular male connector for i/o signals.

Ordering information

Our part numbers are coded as **LTLNE-aaaa-b-c-FC-d** where:

- **aaaa** defines the illumination active area length (in mm)

- **b** defines the focusing distance, N = near field focusing, L = far field focusing, C = collimated

- **c** defines the presence of a diffusing sheet. Leave empty if no diffuser is required or D = with diffuser mounted in front of the LEDs

- **d** defines the color -W = White.

LTLNE series

High power enhanced LED line lights

NEW



KEY ADVANTAGES

High density LEDs.

3 types of projection lenses

Near field focusing (N), far field focusing (F), collimated (C).

3 opto-mechanical configurations

Lens only, coaxial illumination (CX) or with 45° mirror (MR).

2 cooling methods and power intensities

Passive or active with fans.

Optional diffusive sheet (D) for illumination uniformity.

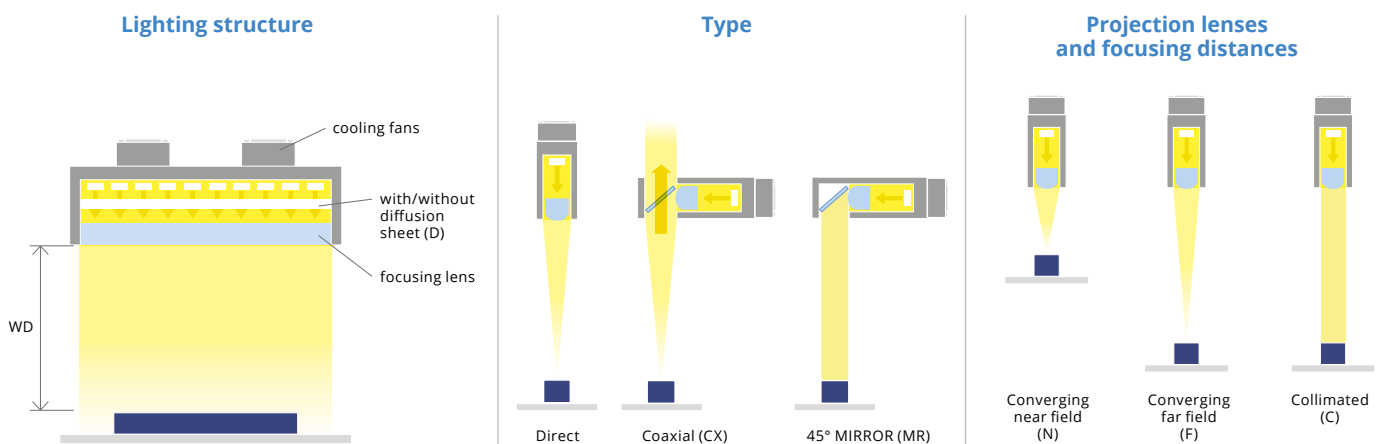
LTLNE series are high power LED line illuminators designed for linescan applications. LTLNE series are available in three opto-mechanical versions: basic configuration with condensing lens, as coaxial line lights (CX) or integrating a 45° mirror (MR).

LTLNE series can be supplied with three different light angles/ focusing distances: near field focused (N) with converging rays (10 – 100 mm), far field focused (F) with converging rays (100 - 200 mm) and collimated (C) focusing at a distance between 10 and 200 mm. An optional diffusive sheet (D) can be integrated in any model to obtain the best illumination uniformity.

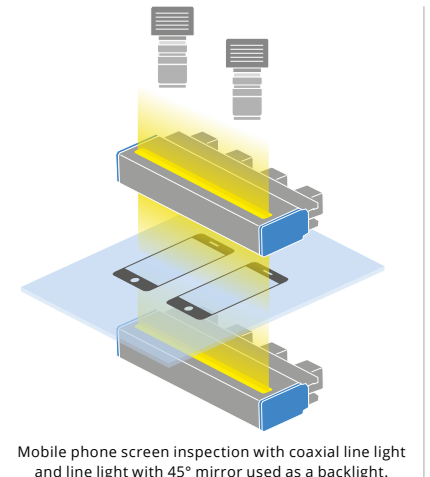
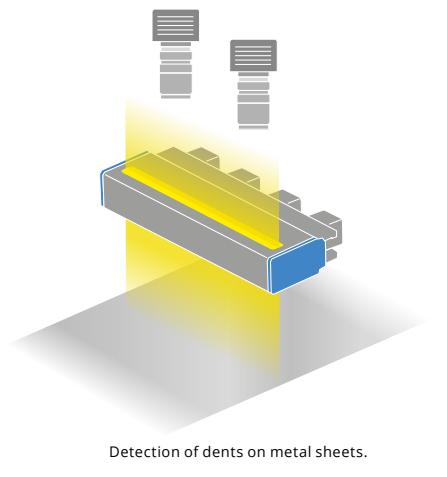
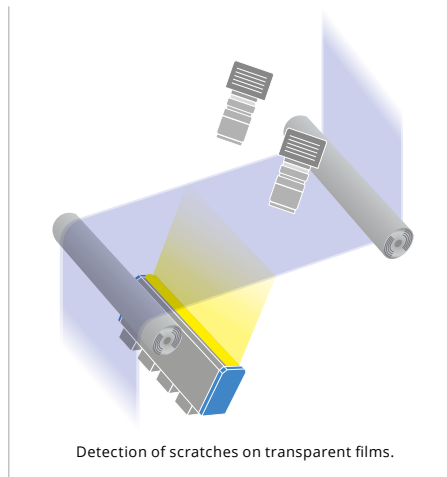
These LED line lights are available with an emitting surface of 300mm (custom sizes and colors can be requested) and feature 24V supply voltage.

The whole family can efficiently dissipate the generated heat featuring two cooling options: passive cooling (PC) and fan cooling (FC).

Furthermore LTLNE series features industrial threaded connectors and can be easily installed into any machine vision system thanks to the threaded holes conveniently located on the aluminum housing. These line lights are perfect for applications that require high speed image processing such as transparent films or glass inspection and detection of dents on metal sheets.



Application examples



	Optical specifications					Electrical specifications				Mechanical specifications					Compatibility	
	Type	Emitting length	Light color	Projection lens and suggested WD	Diffuser	Supply voltage	Nominal driving current	Power consumption at nominal driving current ¹	Connection type	Length	Width	Height	Cooling method	Clamping system	Light intensity controllers	Lenses
	bb	aaa (mm)	f	c (mm)	d	(V)	(mA)	(W)		(mm)	(mm)	(mm)	ee			
LTLNE-300-N-PC-W					no		2000	50			110		passive			
LTLNE-300-N-FC-W					no		4000	100			150	40	fan		LTIC1CH-A1-4	
LTLNE-300-N-D-PC-W	direct	300	White	10 - 100 near field focusing	no	24V ± 2%	2000	50		340	110		passive			
LTLNE-300-N-D-FC-W					yes		4000	100			150		fan			
LTLNE-300-F-PC-W					no		2000	50			110		passive			
LTLNE-300-F-FC-W					no		4000	100			150	40	fan			
LTLNE-300-F-D-PC-W	direct	300	White	100 - 200 far field focusing	no	24V ± 2%	2000	50	20 cm pigtail terminated with industrial circular male connector	340	110		passive	8 threaded holes for M4 screw	LTIC1CH-A1-4	
LTLNE-300-F-D-FC-W					yes		4000	100			150		fan			
LTLNE-300-C-PC-W					no		2000	50			110		passive			
LTLNE-300-C-FC-W					no		4000	100			150	40	fan			
LTLNE-300-C-D-PC-W	direct	300	White	10 - 200 collimated	no	24V ± 2%	2000	50		340	110		passive		LTIC1CH-A1-4	
LTLNE-300-C-D-FC-W					yes		4000	100			150		fan			
LTLNE-300-CX-N-PC-W					no		2000	50			150		passive			
LTLNE-300-CX-N-FC-W					no		4000	100			190	54	fan		LTIC1CH-A1-4	TC4K060-x TC4K090-x TC4K120-x TC4K180-x TC12K054- TC12K080- TC12K120- TC12K144- TC12K144- TC12K192- TC12K240- MC4K series, MC12K200X-x, MC12K150X-x, MC12K100X-x, MC12K067X-x, MC12K050X-x, MC12K025X-x
LTLNE-300-CX-N-D-PC-W	coaxial	300	White	10 - 100 near field focusing	no	24V ± 2%	2000	50		340	150		passive			
LTLNE-300-CX-N-D-FC-W					yes		4000	100			190		fan			
LTLNE-300-CX-F-PC-W					no		2000	50			150		passive			
LTLNE-300-CX-F-FC-W					no		4000	100			190	54	fan			
LTLNE-300-CX-F-D-PC-W	coaxial	300	White	100 - 200 far field focusing	no	24V ± 2%	2000	50	20 cm pigtail terminated with industrial circular male connector	340	150		passive	8 threaded holes for M4 screw	LTIC1CH-A1-4	
LTLNE-300-CX-F-D-FC-W					yes		4000	100			190		fan			
LTLNE-300-CX-C-PC-W					no		2000	50			150		passive			
LTLNE-300-CX-C-FC-W					no		4000	100			190	54	fan			
LTLNE-300-CX-C-D-PC-W	coaxial	300	White	10 - 200 collimated	no	24V ± 2%	2000	50		340	150		passive		LTIC1CH-A1-4	
LTLNE-300-CX-C-D-FC-W					yes		4000	100			190		fan			
LTLNE-300-MR-N-PC-W					no		2000	50			150		passive			
LTLNE-300-MR-N-FC-W					no		4000	100			190	54	fan		LTIC1CH-A1-4	
LTLNE-300-MR-N-D-PC-W	with 45° mirror	300	White	10 - 100 near field focusing	no	24V ± 2%	2000	50		340	150		passive			
LTLNE-300-MR-N-D-FC-W					yes		4000	100			190		fan			
LTLNE-300-MR-F-PC-W					no		2000	50			150		passive			
LTLNE-300-MR-F-FC-W					no		4000	100			190	54	fan			
LTLNE-300-MR-F-D-PC-W	with 45° mirror	300	White	100 - 200 far field focusing	no	24V ± 2%	2000	50	20 cm pigtail terminated with industrial circular male connector	340	150		passive	8 threaded holes for M4 screw	LTIC1CH-A1-4	
LTLNE-300-MR-F-D-FC-W					yes		4000	100			190		fan			
LTLNE-300-MR-C-PC-W					no		2000	50			150		passive			
LTLNE-300-MR-C-FC-W					no		4000	100			190	54	fan			
LTLNE-300-MR-C-D-PC-W	with 45° mirror	300	White	10 - 200 collimated	no	24V ± 2%	2000	50		340	150		passive		LTIC1CH-A1-4	
LTLNE-300-MR-C-D-FC-W					yes		4000	100			190		fan			

1 Models with fan cooling are capable of more power. Ask technical support for details.
Other colours are available on request.

Ordering information

Our part numbers are coded as **LTLNE-aaa-bb-c-d-ee-f** where:

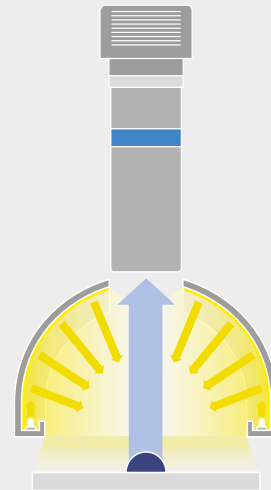
- **aaa** defines the illumination active area length (in mm)
- **bb** defines the presence of a beam splitter or a mirror. Leave empty for direct illumination (lens only) - CX = coaxial illumination (50T-50R Beam splitter), -MR = 90° mirror
- **c** defines the focusing distance, N = near field focusing, L = far field focusing, C = collimated
- **d** defines the presence of a diffusing sheet. Leave empty if no diffuser is required or D = with diffuser mounted in front of the LEDs
- **ee** defines the cooling options PC = passive cooling, FC = fan cooling
- **f** defines the color -W = White.

LTTNC series




Continuous LED tunnel lights



Lighting structure



LTTNC series consists of LED tunnel lights designed to provide even illumination on long cylindrical surfaces or shafts. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER		
	LTDV1CH-17V strobe controller	p. 250
COMPATIBLE LIGHT INTENSITY CONTROLLER		
	LTCGR1000-D1-PS-xx light intensity controller	p. 254
FULL RANGE OF FIXED FOCAL LENGTH LENSES		
	Megapixel and 5 Megapixel lenses EN2MP and EN5MP series	p. 108-111

Part number	Optical specifications				Electrical specifications					Dimensions		
	Light colour, wavelength peak	Optimal WD (mm)	Lighting area		Continuous mode			Pulsed mode		Width x length (mm)	Aperture (mm)	Height (mm)
			inner diam. (mm)	Width (mm)	Supply voltage (V)	Current (mA)	Power cons. (W)	Supply voltage (V)	Max pulse current (mA)			
LT3WRH150-00-1-W-24V	white, 6300 K	40 - 60	74	147	24	400	9.60	36	1200	177.6 x 163	25	106.5
LT3WRH150-00-1-R-24V	red, 630 nm	40 - 60	74	147	24	450	10.80	36	1350	177.6 x 163	25	106.5
LT3WRH150-00-1-G-24V	green, 525 nm	40 - 60	74	147	24	400	9.60	36	1200	177.6 x 163	25	106.5
LT3WRH150-00-1-B-24V	blue, 470 nm	40 - 60	74	147	24	400	9.60	36	1200	177.6 x 163	25	106.5
LT3WRH200-00-1-W-24V	white, 6300 K	40 - 60	124	147	24	400	9.60	36	1200	227 x 163	25	131.5
LT3WRH200-00-1-R-24V	red, 630 nm	40 - 60	124	147	24	450	10.80	36	1350	227 x 163	25	131.5
LT3WRH200-00-1-G-24V	green, 525 nm	40 - 60	124	147	24	400	9.60	36	1200	227 x 163	25	131.5
LT3WRH200-00-1-B-24V	blue, 470 nm	40 - 60	124	147	24	400	9.60	36	1200	227 x 163	25	131.5

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

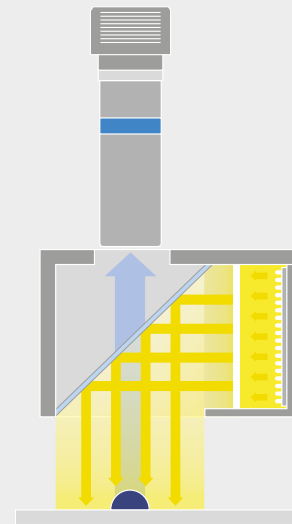
2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LTCXC series

Continuous LED coaxial lights



Lighting structure



LTCXC series consists of LED coaxial lights that provide coaxial illumination ideal for inspection of scratches/dents on glossy surfaces or pattern inspection on PCB to be used in combination with telecentric lenses.

Light is reflected by a 45° beam splitter so that it is projected on the same axis as the camera. Suggested use is continuous mode.

COMPATIBLE STROBE CONTROLLER



LTDV1CH-17V strobe controller

p. 250

COMPATIBLE LIGHT INTENSITY CONTROLLER



LTICGR1000-D1-PS-xx light intensity controller

p. 254

Part number	Optical specifications			Electrical specifications					Dimensions			
	Light colour, wavelength peak	Lighting area		Supply voltage (V)	Continuous mode			Pulsed mode		Length (mm)	Width (mm)	Height (mm)
		Width (mm)	Length (mm)		Current (mA)	Power cons. (W)	Supply voltage (V) 1	Max pulse current (mA) 2				
LT2QOG025-00-X-W-24V	white, 6300 K	27	27	24	160	3,84	36	480	54	33	33	
LT2QOG025-00-X-R-24V	red, 630 nm	27	27	24	150	3,60	36	450	54	33	33	
LT2QOG025-00-X-G-24V	green, 525 nm	27	27	24	160	3,84	36	480	54	33	33	
LT2QOG025-00-X-B-24V	blue, 470 nm	27	27	24	160	3,84	36	480	54	33	33	
LT2QOG040-00-X-W-24V	white, 6300 K	48	48	24	350	8,40	36	1050	107,5	60	66	
LT2QOG040-00-X-R-24V	red, 630 nm	48	48	24	146	3,50	36	438	107,5	60	66	
LT2QOG040-00-X-G-24V	green, 525 nm	48	48	24	350	8,40	36	1050	107,5	60	66	
LT2QOG040-00-X-B-24V	blue, 470 nm	48	48	24	350	8,40	36	1050	107,5	60	66	
LT2QOG040-00-X-W-24V	white, 6300 K	70	70	24	560	13,44	36	1680	139,6	89	95	
LT2QOG070-00-X-R-24V	red, 630 nm	70	70	24	525	12,60	36	1575	139,6	89	95	
LT2QOG040-00-X-G-24V	green, 525 nm	70	70	24	560	13,44	36	1680	139,6	89	95	
LT2QOG040-00-X-B-24V	blue, 470 nm	70	70	24	560	13,44	36	1680	139,6	89	95	
LT2QOG100-00-X-W-24V	white, 6300 K	100	100	24	781	18,74	36	2000	166,5	120	123,8	
LT2QOG100-00-X-R-24V	red, 630 nm	100	100	24	450	10,80	36	1350	166,5	120	123,8	
LT2QOG100-00-X-G-24V	green, 525 nm	100	100	24	781	18,74	36	2000	166,5	120	123,8	
LT2QOG100-00-X-B-24V	blue, 470 nm	100	100	24	781	18,74	36	2000	166,5	120	123,8	

1 With constant driving voltage (36V recommended, 48V max). Duty cycle = 0-10 %. Max pulse width = 10 ms.

2 With constant driving current. Duty cycle = 0-10 %. Max pulse width = 10 ms.

LED PATTERN PROJECTORS

Advanced structured lighting.

Opto Engineering® LED pattern projectors have been designed for 3D profiling/reconstruction and for the measurement of objects with complex structures or inclined planes.

They are successfully used in a variety of applications like quality control in food and packaging to check for correct volume, reverse engineering, dimensional measurement of electronic components, planarity control of products, robot guidance for pick and place and alignment applications.

When compared to laser emitters, LED technology ensures more homogeneous illumination in addition to sharp edges and no speckle effect.

Many 3D machine vision applications require structured light to be projected onto inclined surfaces, i.e. at a certain angle from the vertical axis. In such cases, the focus is maintained only within a small area close to the center of the field of view and the rest of the image shows relevant defocusing, thus making 3D measurement inaccurate.

For this reason, our family of pattern projectors includes special projectors equipped with a highprecision tilting mechanism that allows the pattern of the light source to meet the Scheimpflug condition so that the projected light is properly and evenly focused across the entire sample surface.

All Opto Engineering® LED projectors feature a wide selection of interchangeable patterns. Furthermore, the size of the projection area can be easily modified by interchanging different 2/3" C-mount lenses. To achieve the best results we suggest to use bi-telecentric lenses or zero distortion macro lenses.



Refer to specific datasheets available at www.opto-e.com for product compliancy with regulations, certifications and safety labels.





LTPR series

LED pattern projectors



KEY ADVANTAGES

LED technology for perfectly sharp edge

LTPR series ensures thinner lines, sharper edges and more homogeneous illumination than lasers.

With laser emitters the illumination decays both across the line cross section and along the line width.

Laser emitters lines are thicker and show blurred edges; diffraction and speckle effects are also present.

3W, 10W or 90W strobe options.

Wide selection of projection patterns available (custom made upon request).

Compatible with any C-mount optics.

LTPR series consists of different LED pattern projectors available with three power intensities and four wavelengths designed for the most demanding structured light applications including 3D profilometry, stereovision, and alignment.

LTPR series consists of LTPRHP3W models featuring = 3W power intensity, LTPRXP models featuring = 10W power intensity designed for continuous mode operation and LTPRUP models designed for strobe-only operation with peak power intensity of = 90W.

Unlike laser sources, our LED pattern projectors ensure sharp edges and homogeneous light without scattering and diffraction effects.

Several projections patterns can be easily interchanged to project any kind of shape. Additionally LTPR features built in phase-adjustment for easy alignment of the pattern. Any C-mount optics can be interfaced with LTPR series to project areas with different sizes.

Part number	Optical specifications			Electrical specifications							
	Light color	Spectral FWHM (nm)	Illuminance ¹ (klux)	Operation mode	Supply voltage (V)	LED driving current, max (mA)		Power consumption	Pulse width	Estimated MTBF ⁴	Connection Type
LTPRHP3W											
LTPRHP3W-W	White	n.a.	30	continuous and pulsed mode ²	12 - 24 ³	720 ⁴	2000 ⁵ ⁶	<4.5	≤10 ⁷	> 100.000 ⁹	M8 industrial male connector ¹²
LTPRHP3W-R	Red, 630 nm	15	9								
LTPRHP3W-G	Green, 520 nm	40	14								
LTPRHP3W-B	Blue, 460 nm	20	3								
LTPRXP											
LTPRXP-W	White	n.a.	85	continuous mode only	24 ³	700 ⁴	n.a.	<13	n.a.	> 65.000 ¹⁰	M8 industrial male connector ¹³
LTPRXP-R	Red, 630 nm	20	40								
LTPRXP-G	Green, 520 nm	40	68								
LTPRXP-B	Blue, 460 nm	25	9								
LTPRUP											
LTPRUP-W	White	n.a.	170	strobe only, constant current driving	n.a.	n.a.	17000 ⁶	≈90 (strobe peak LED source power)	≤1 ⁸	> 50000 ¹¹	M12 industrial male connector ¹⁴
LTPRUP-R	Red, 618 nm	20	65								
LTPRUP-G	Green, 525 nm	40	220								
LTPRUP-B	Blue, 460 nm	30	20								

- With a 35 mm lens, F/N 1.4 at 100 mm working distance without projection pattern at maximum driving current. Estimated value.
- To pulse LTRHP3W, models built-in electronics must be bypassed in order to drive the LED directly.
- Tolerance ± 10%.
- Max continuous LED driving current is supplied through the built-in electronics. No external controller is required.
- At max LED pulsed current, max LED forward voltage (V) = 3.00 for LTRHP3W-R, 4.00 for LTRHP3W-G/B, 3.4 for LTRHP3W-W.

- To directly drive the LED, current control is necessary. External compatible controller from LTDV series must be used.
- At pulse width ≤ 10 ms, duty cycle ≤ 10% condition. Built-in electronics must be bypassed.
- At 25°C. At max pulse width (1 ms), max pulse frequency = 15 Hz. Contact us to check other allowable combinations of duty cycle-frequency-temperature.



LTPRHP3W-x models featuring built in electronics with multi-turn trimmer for light intensity dimming and ≈ 3W power intensity.

LTPRHP3W and LTPRXP models are designed for continuous mode and integrate built-in electronics that control the current flow through the LED.

LTPRHP3W models integrate a multi-turn trimmer for light intensity dimming while LTPRXP models have fixed current and cannot be dimmed. For LTPRHP3W models, the built-in electronics can be bypassed in order to directly drive the LED through an external controller.



LTPRXP-x models featuring built in electronics, fixed current output and ≈ 10W power intensity

LTPRUP series are the most powerful LED pattern projectors available from Opto Engineering®. These models are used in high speed applications where camera exposure time must be set to the minimum, including planarity control of opaque products and 3D profiling. LTPRUP models are designed for strobe-mode only and can be precisely controlled using compatible LTDV strobe controllers series. LTDV controllers are designed to drive the LED of LTPRUP pattern projectors with perfectly constant current, ensuring repeatable results even when low exposure time is required.



LTPRUP-x models for strobe-only operation featuring ≈ 90W peak power intensity. These models are compatible with CMHO016 clamping mechanics, alternatively three M4 and one M6 threads are available as fixing options.

Mechanical specifications				Compatibility				
External	Length ¹⁵	Width	Height	Strobe controllers	Lenses	Cable	Clamping mechanics	Projection patterns
Ø (mm)	(mm)	(mm)	(mm)					
37.5	130.4	-	-	LTDV1CH-17V, LTDVE8CH-20, LTDVE4CH-20	EN2MP series, EN5MP series, TC series, TCLWD series, TCHM series	CB244P1500, CB244P1500L	-	PTPR series
105	158.8	-	-		EN2MP series, EN5MP series	CB244P1501, CB244P1501L	-	PTPR series
37.7	108.9	46	93	LTDV1CH-17V, LTDV6CH, LTDVE8CH-20, LTDVE4CH-20	EN2MP series, EN5MP series, ENVF series, TC series, TCLWD series, TCHM series	CBLT001, CBLT002	CMHO016	PTPR series

⁹ At 55 °C, 720mA.

¹⁰ At 110 °C.

¹¹ At 25° C.

¹² 2 m cable with straight female connector included (CB244P1500). Optional cable with right angled connector (CB244P1500L) is also available and must be ordered separately

¹³ 2 m cable with straight female connector included (CB244P1501). Optional cable with right angled connector (CB244P1501L) is also available and must be ordered separately

¹⁴ 5 m cable with straight female connector included (CBLT001).

Optional cable with right angled connector (CBLT002) is also available and must be ordered separately

¹⁵ Including connector.

LTPR series

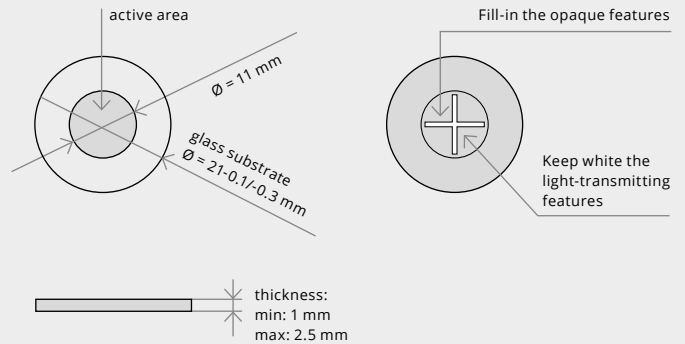
LED pattern projectors

Pattern selection



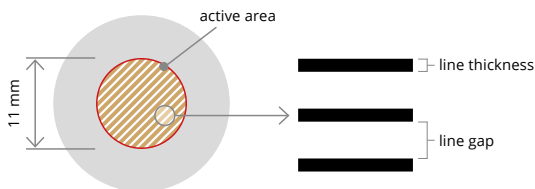
Custom-made pattern

Custom-made patterns can be supplied on request. A drawing with accurate geometrical information must be submitted (please refer to the instructions here below).



The projection pattern can be easily interchanged by unscrewing the retaining ring that holds the pattern.

The pattern outer diameter is 21 mm, while the active projection area is a circle of \varnothing 11 mm.



The pattern drawing could either cover the entire 11 mm diameter area or be of any shape inscribed within this area (such as a square whose side is 7.78mm or a 8.8x6.6mm rectangle).

The projection accuracy depends both on the pattern manufacturing accuracy and the distortion of the projection optics mounted on LTPR models.

The edge sharpness of the projected pattern depends on both the lens resolution and the engraving technique: laser-engraved patterns (part numbers ending in "L") or photolithography-engraved patterns (part numbers ending in "P") can be chosen depending on the type of application.

Every kind of shape can be projected

Standard patterns



Stripe 0.5 mm line thickness.



Edge.



Grid 0.05 mm line thickness.



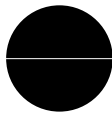
Line 0.5 mm line thickness.

Custom patterns



3D profilometry

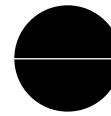
Line & stripes



PT 0000 0100 P
format: line
line thickness 0.05 mm



PT 0000 0300 P
8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm



PT 0000 0100 L
format: line
line thickness 0.5 mm



PTST 050 450 P
16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm



PTST 050 200 P
32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm



PT 0000 0300 L
format: stripe
line gap 0.5 mm
line thickness 0.5 mm
line length 7.78 mm



PTST 050 100 P
53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm



PTST 050 050 P
80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm



PTST 010 010 P
550 lines in projection area
line gap 0.01 mm
line thickness 0.01 mm



PTST 020 020 P
275 lines in projection area
line gap 0.02 mm
line thickness 0.02 mm

Stereovision

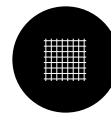
Grids



PT 0000 0400 P
8 x 8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm



PTGR 050 450 P
16 x 16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm



PT 0000 0400 L
format: grid
line gap 0.8 mm
line thickness 0.2 mm
line length 7.78 mm



PTGR 050 200 P
32 x 32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm

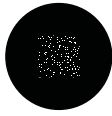


PTGR 050 100 P
53 x 53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm



PTGR 050 050 P
80 x 80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm

Cloud of dots



PTCD 010 P
Format:
Cloud of dots pattern,
density 10.5%



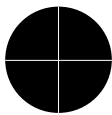
PTCD 020 P
Format:
Cloud of dots pattern,
density 20%



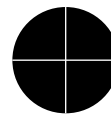
PTCD 035 P
Format:
Cloud of dots pattern,
density 35%

Alignment

Cross

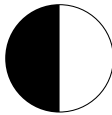


PT 0000 0200 P
format: cross
line thickness 0.05 mm

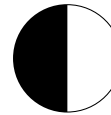


PT 0000 0200 L
format: cross
line thickness 0.5 mm

Edge



PT 0000 0500 P
format: edge
line gap 0.10 mm
line thickness 0.05 mm



PT 0000 0500 L
format: edge
line gap 0.10 mm
line thickness 0.5 mm

Pattern specifications

	Photolithography	Laser engraved
Substrate	Soda lime glass	Borofloat glass
Coating	Chrome	Dichroic mirror
Geometrical accuracy	2 µm	50 µm
Edge sharpness	1.4 µm	50 µm

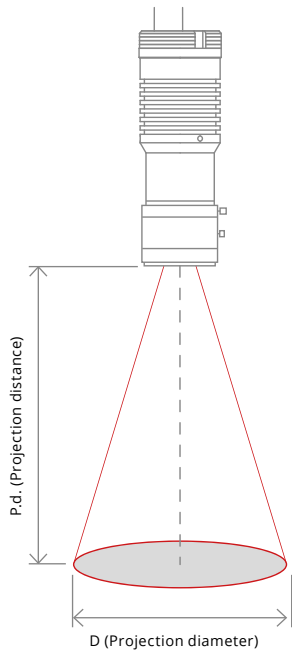
LTPR series

LED pattern projectors

Projection lens selection

Any C-mount optics for 2/3" detectors (11 mm image diagonal) can be interfaced with LTPR series to project areas with different sizes by means of the mount adaptor included.

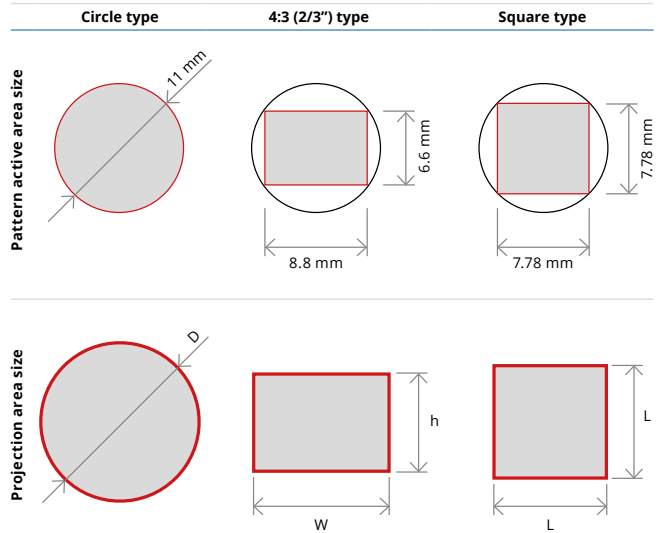
Unless the projection optics introduces significant distortion, the shape of the projected pattern will preserve the features and aspect ratio of the engraved pattern.



The projected area dimensions will be "M" times the original dimensions of the pattern, where M is the optical magnification at which the selected projection lens is operating.

Telecentric lenses for 2/3" detectors can also be interfaced with LTPRHP3W and LTPRUP models, thus providing telecentric projection of the pattern and enabling unparalleled performance in 3D measurement applications.

Pattern drawing and projection area



Below follows a list of the projection diameters (D) and the recommended projection distances (P.d.) achieved with different types of optics.

2 / 3" C-mount lenses

P.d.	D (Projection diameter)								
	@50 mm	@75 mm	@100 mm	@150 mm	@200 mm	@250 mm	@300 mm	@400 mm	@500 mm
6 mm	81	127	172	264					
8 mm	58 (*)	92	127	195	264	333			
12 mm	35 (*)	58 (*)	81	127	172	218	264		
16 mm		41 (*)	58 (*)	92 (*)	127	161	195	264	333
25 mm				55 (*)	77 (*)	99 (*)	121 (*)	165	209 (*)
35 mm						68 (*)	83 (*)	115	146

(*) = spacers may be needed to compensate back focal length.

LTPRHP3W



Standard C-mount lenses.

LTPRXP 1



Standard C-mount lenses.

LTPRUP



Standard C-mount lenses.

Telecentric lenses

P.d. (mm)	TC 23 004	TC 23 007	TC 23 009	TC 23 016	TC 23 024	TC 23 036
	D (mm)	5.5	8.3	11.0	20.8	31.4
P.d. (mm)	TC 23 048	TC 23 056	TC 23 064	TC 23 072	TC 23 080	TC 23 096
	D (mm)	59.8	70.0	80.0	89.9	99.7

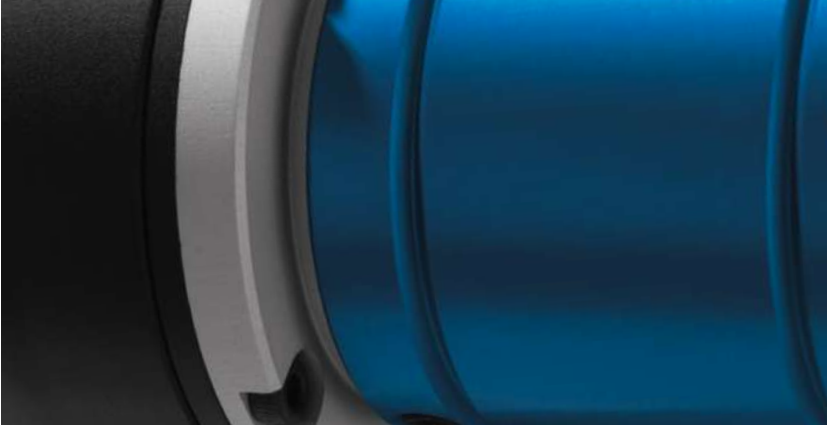






Bi-telecentric lenses.



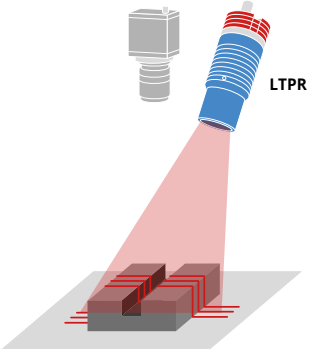
Bi-telecentric lenses.

1 Use of LTPRXP in combination with telecentric lenses is not suggested due to non-homogeneous projection (the light source is a multi-die LED). Contact us to discuss your application and find the most suitable pattern projector.



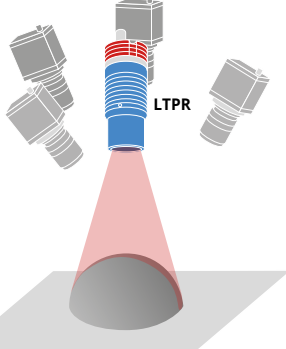
FULL RANGE OF COMPATIBLE PROJECTION OPTICS		
	EN5MP series	p. 110
FULL RANGE OF COMPATIBLE ACCESSORIES		
	Projection patterns PTPR series	p. 246
	Strobe controllers LTDV series	p. 250
	Clamping mechanics CMH0016	p. 222

Application examples



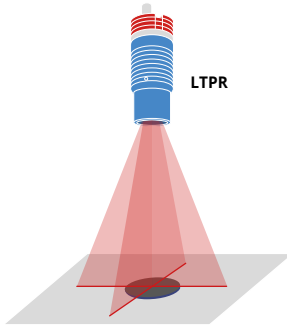
LTPR

3D profilometry



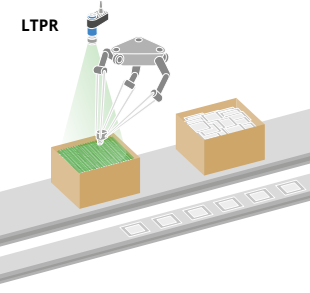
LTPR

Stereovision



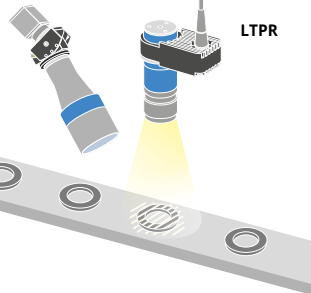
LTPR

Alignment



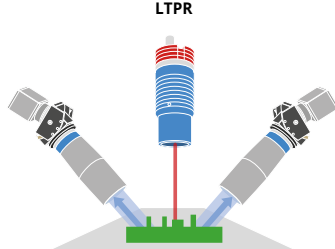
LTPR

Bin picking
(robot guidance for fast pick and place)



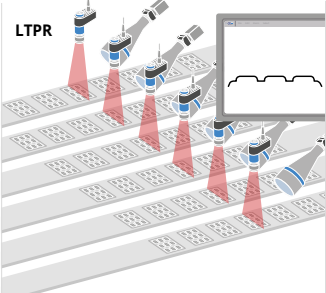
LTPR

Planarity control of black products
(LTPRUP strobe projector suggested)



LTPR

3D inspection of the height
of connector pins



LTPR

Pharmaceutical blister volume
vision control

LTPRSMHP3W series

3W tilting LED pattern projectors



KEY ADVANTAGES

Scheimpflug tilt adjustment compatible with C-mount optics

Focus is maintained even when the pattern is tilted.

Light condenser focusing mechanism

For excellent optical coupling and light throughput.

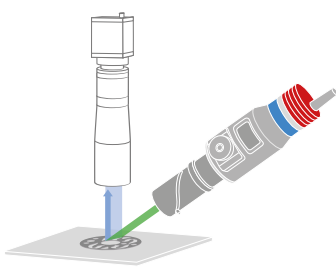
Enhanced optical power

High numerical aperture condenser lens.

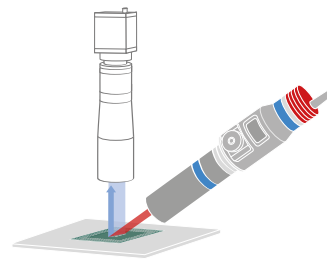
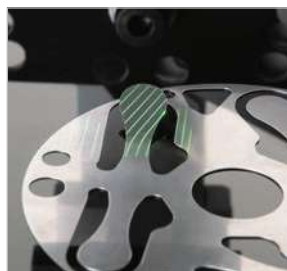
LTPRSMHP3W series are LED pattern projectors specifically designed for the most demanding 3D profiling and measurement applications. Triangulation techniques require that structured light is directed onto a sample at a considerable angle from vertical. Tilting the light source pattern becomes essential to ensure that the patterned light is properly focused across the entire sample surface.

LTPRSMHP3W pattern projectors integrate a precision tilting mechanism based on the Scheimpflug condition. This ensures that focus is maintained across the entire part, and reconstruction of the 3D surface is as accurate as possible. Moreover, the internal focus mechanism offers the maximum optical throughput.

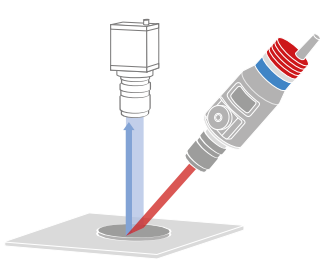
Examples of setup and applications



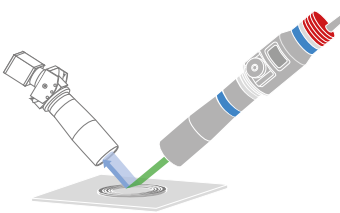
Configuration with zero distortion macro lenses.



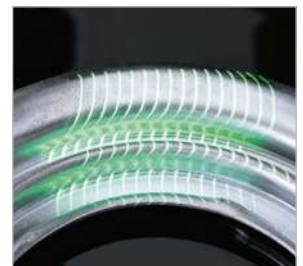
Configuration with bi-telecentric lenses.



LTPRSM pattern projector with a standard C-mount lens.

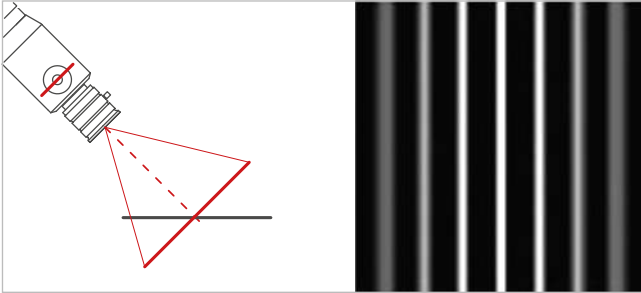


Scheimpflug telecentric optics for both projection and imaging at 90°.

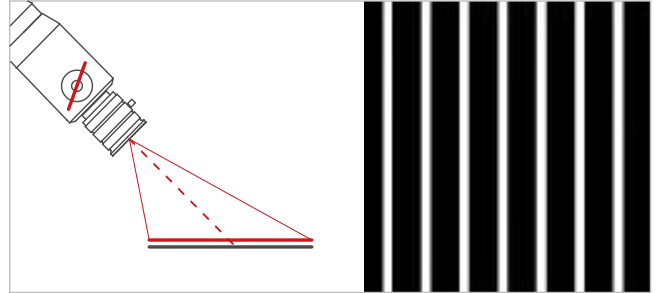


LIGHT SOURCE

- Higher efficiency
- Precise light intensity adjustment
- Easy LED source replacement



Without tilt adjustment the pattern features are only partly focused.



With the Scheimpflug adjustment focus is maintained across the entire plane.

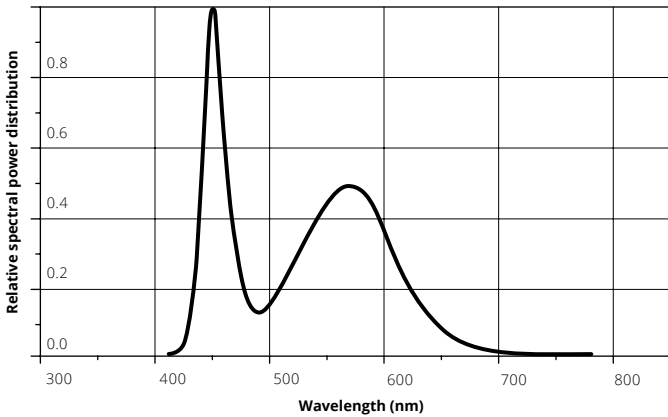


Electrical features

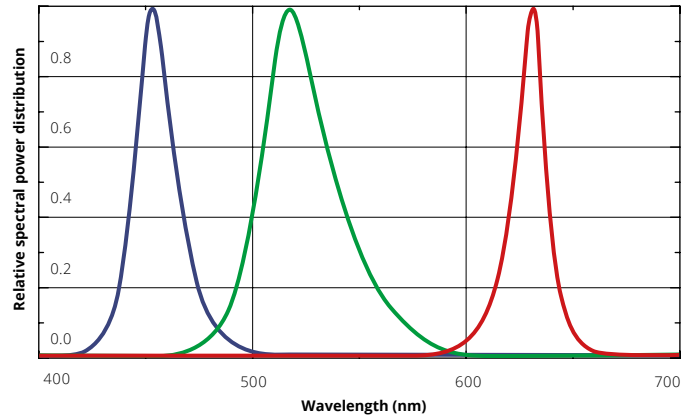
These LED devices integrate built-in switching electronics that control the current flow through the LED and which can be easily tuned by the user. This ensures both light stability and longer lifetime of the product.

The inner circuitry can be bypassed to directly drive the LED. Simply connect the black and blue wires to your power supply instead of the black and brown ones, ensuring that maximum rates are not exceeded.

Typical emission spectrum of white LEDs



Typical emission spectrum of R,G,B LEDs



Part number	Light Light color, wavelength peak	Device power ratings			LED power ratings			
		DC Voltage		Power consumption (W)	Max LED forward current (mA)	Forward voltage		Max pulse current (mA)
		Minimum (V)	Maximum (V)			Typical (V)	Maximum (V)	
LTPRSMHP 3W-R	red, 630 nm	12	24	< 4.5	720	2.4	3.00	2000
LTPRSMHP 3W-G	green, 520 nm	12	24	< 4.5	720	3.3	4.00	2000
LTPRSMHP 3W-B	blue, 460 nm	12	24	< 4.5	720	3.3	4.00	2000
LTPRSMHP 3W-W	white	12	24	< 4.5	720	2.78	n.a.	2000

- 1 Tolerance $\pm 10\%$.
- 2 Used in continuous (not pulsed) mode.
- 3 At max forward current.

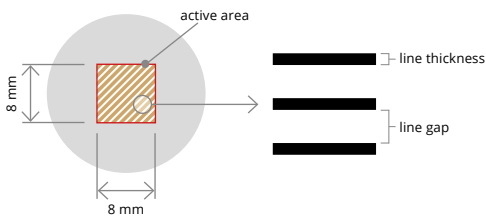
- 4 Tolerance is $\pm 0.06V$ on forward voltage measurements.
- 5 At pulse width ≤ 10 ms, duty cycle $\leq 10\%$ condition.
Built-in electronics board must be bypassed (see tech info online).

LTPRSMHP3W series

Product insight



Pattern selection



The projection pattern placed inside the unit can be changed with ease: just remove the C-mount adaptor by loosening the set-screws and fix the pattern by securing the retaining ring.

Different types of stripe and grid patterns are available; the chart shows the line thickness (0.05 mm) and the gap between neighboring lines for each pattern type.

When these features are projected, they become 1/M times larger, with "M" being the magnification of the projection lens. The number of lines mentioned after each part number indicates the number of features on the active area of the pattern.

Photolithography stripe patterns

- PT 0000 0300 P**
8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm
- PTST 050 450 P**
16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm
- PTST 050 200 P**
32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm
- PTST 050 100 P**
53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm
- PTST 050 050 P**
80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm

Photolithography grid patterns

- PT 0000 0400 P**
8 x 8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm
- PTGR 050 450 P**
16 x 16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm
- PTGR 050 200 P**
32 x 32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm
- PTGR 050 100 P**
53 x 53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm
- PTGR 050 050 P**
80 x 80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm

Pattern specifications

Photolithography patterns	
Substrate	Soda lime glass
Coating	Chrome
Geometrical accuracy	2 μm
Edge sharpness	1.4 μm

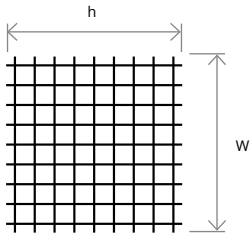
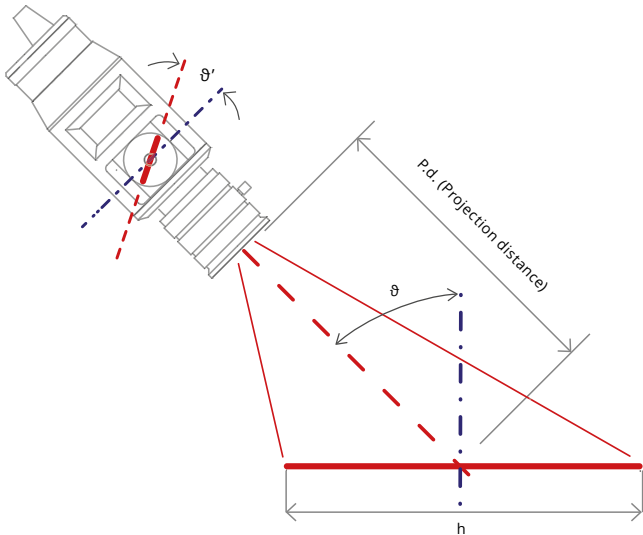
FULL RANGE OF COMPATIBLE PROJECTION OPTICS

	TC series	p. 16
	MC series	p. 92

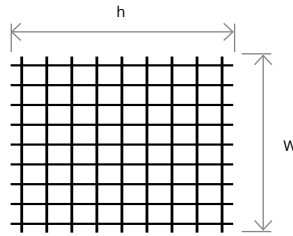
FULL RANGE OF PROJECTION PATTERNS

	PTPR series	p. 246
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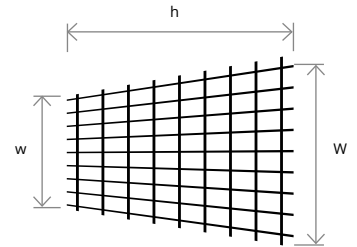
Projection lens selection



Original pattern features



Projection area with a bi-telecentric lens



Projection area with a macro lens

LTPRSMHP3W series units can be interfaced with any type of optics, but the best results are achieved with bi-telecentric lenses. The projection area is undistorted since tilting the pattern causes a linear extension along only one direction.

Excellent results can also be obtained with zero distortion macro lenses; here, the magnification changes along both axes, but image resolution and distortion still easily allows for 3D reconstruction.

With non bi-telecentric lenses, a square pattern becomes a trapezoid in the projection plane, whose parallel sides are indicated as “w” and “W” in the drawings below.

The projection area shown in the chart are also a good approximation for standard C-mount lenses used as macro lenses.

Projection area with bi-telecentric lenses (TC series)

Part number	Projection distance P.d. (mm)	$\vartheta = 0^\circ$			$\vartheta = 15^\circ$			$\vartheta = 30^\circ$			$\vartheta = 45^\circ$		
		Projection area W x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area W x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area W x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area W x h (mm x mm)	Pattern tilt ϑ' (deg)	
TC 23 009	63.3	8.0 x 8.0	0	8.0 x 8.0	15.0	8.0 x 8.0	30.0	8.0 x 8.0	45.0				
TC 23 016	45.3	15.2 x 15.2	0	15.2 x 15.4	8.1	15.2 x 16.8	17.0	15.2 x 20.0	27.8				
TC 23 024	69.2	22.9 x 22.9	0	22.9 x 23.6	5.4	22.9 x 26.0	11.4	22.9 x 30.5	19.3				
TC 23 036	103.5	32.9 x 32.9	0	32.9 x 34.0	3.7	32.9 x 37.7	8.0	32.9 x 45.3	13.6				
TC 23 048	134.6	43.3 x 43.3	0	43.3 x 44.7	2.8	43.3 x 49.8	6.1	43.3 x 60.3	10.5				
TC 23 056	159.3	51.0 x 51.0	0	51.0 x 52.8	2.4	51.0 x 58.6	5.1	51.0 x 71.3	8.8				
TC 23 064	182.0	58.2 x 58.2	0	58.2 x 60.3	2.1	58.2 x 67.1	4.5	58.2 x 81.7	7.8				
TC 23 080	227.0	72.7 x 72.7	0	72.7 x 73.8	1.7	72.7 x 83.6	3.6	72.7 x 102.0	6.3				
TC 23 096	279.0	85.6 x 85.6	0	85.6 x 88.6	1.4	85.6 x 98.7	3.1	85.6 x 120.9	5.3				



Bi-telecentric lenses.

Projection area with macro (MC3-03x and MC series) and standard lenses

Mag. (x)	Projection distance P.d. (mm)	$\vartheta = 0^\circ$				$\vartheta = 15^\circ$				$\vartheta = 30^\circ$				$\vartheta = 45^\circ$				
		Projection area w (mm)	(W) x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area w (mm)	(W) x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area w (mm)	(W) x h (mm x mm)	Pattern tilt ϑ' (deg)		Projection area w (mm)	(W) x h (mm x mm)	Pattern tilt ϑ' (deg)		
1	46.0	8.0	(8.0) x 8.0	0	7.7	(8.3) x 8.0	15.0		7.5	(8.6) x 8.1	30.0		7.3	(8.9) x 8.1	45.0			
0.75	48.0	10.7	(10.7) x 10.7	0	10.3	(11.1) x 10.9	11.4		10.0	(11.6) x 11.4	23.5		9.6	(12.1) x 12.3	37.0			
0.5	60.0	16.1	(16.1) x 16.1	0	15.5	(16.7) x 16.5	7.6		14.9	(17.5) x 17.9	16.2		14.3	(18.4) x 20.7	26.7			
0.33	92.0	24.3	(24.3) x 24.3	0	23.4	(25.3) x 25.1	5.1		22.5	(26.5) x 27.8	10.8		21.4	(28.1) x 33.3	18.3			
0.2	136.0	40.1	(40.1) x 40.1	0	38.6	(41.6) x 42.1	3.1		37.0	(43.6) x 46.2	6.6		35.1	(46.6) x 56.8	11.4			
0.1	275.0	79.5	(79.5) x 79.5	0	76.6	(82.6) x 82.4	1.6		73.5	(86.6) x 92.3	3.4		69.6	(92.6) x 114.2	5.8			



Standard C-mount lenses.



Macro lenses.








LTPKIT case

High power lighting kit



The **LTPKIT** is a selection of some of the Opto Engineering® high-power LED lighting solutions, including three different strobe illuminators and an ultra-bright strobe LED pattern projector. The case also includes a 6 channel strobe controller, designed to precisely control the lights and easily manage the trigger signals, in addition to a DIN rail industrial power supply.

This versatile and portable light kit is ideal for system integrators dealing with machine vision applications that require high power strobe illumination. The LTPKIT also benefits from our special educational price: you should seriously consider buying one for your laboratory to discover the advantages of our strobe lights!

Part number	Products included	Description
LTPKIT	 LTLAB2-W	Diffuse strobe low angle ring light illuminator - medium size high power white
	 LTDLAB2-W	Diffuse strobe dome + low angle illumination system - medium size high power white
	 LTBP096072-W	High power strobe LED backlight, 96 x 72 mm lighting area, white
	 LTPRUP-W	90W strobe LED pattern projector white
	 LTDV6CH	Strobe controller 6 channels
	 RT-SDR-120-24	24VDC DIN rail power supply
	 ADPT001	Adapter RS485-USB + cable with 3 elements for LTDV6CH connection

LTKITRY-FH-OR-V1

Continuous lighting kit











NEW

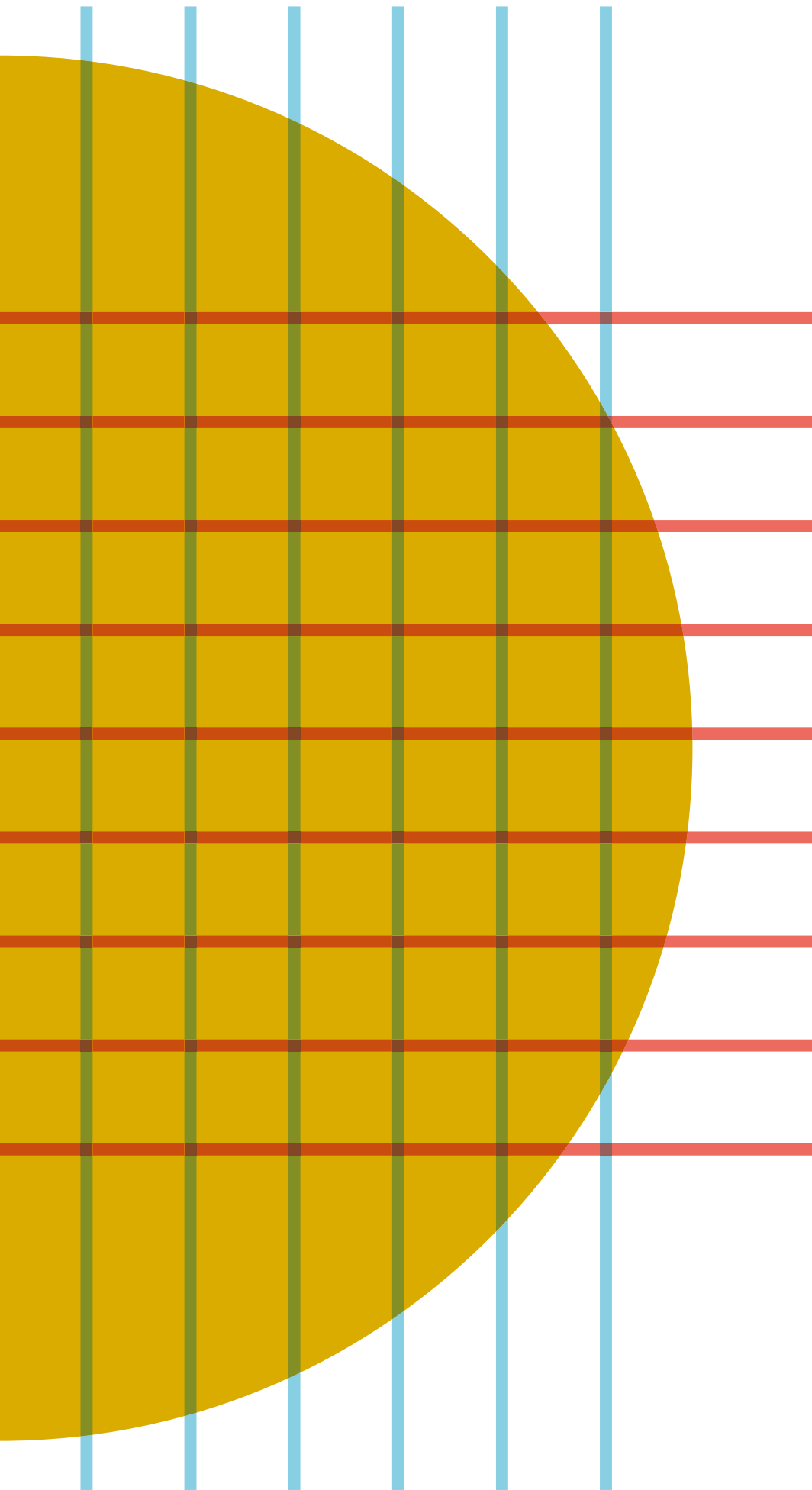


Opto Engineering® **LTKITRY-FH-OR-V1** case includes a selection of some of our commonly used LED illuminators working in continuous mode, including two lighting controllers for dimming, brackets and diffusers.

The continuous lighting kit case is a very helpful tool for system integrators that are frequently dealing with new machine vision applications requiring different type of lights.

The LTKITRY-FH-OR-V1 case also benefits from our special educational price: you should seriously consider to buy this kit for your laboratory in order to be able to perform feasibility tests with many different types of lights!

Part number	Products included	Description
LTKITRY-FH-OR-V1	 LTICGR1000-D1-PS-EU	Analogue lighting controller unit, 1 channel, 24V, 2A, constant mode, EU power cord, power adaptor 24V plug
	 LT4WRG100-00-1-W-24V	LED dome light, 118 mm outer diameter, white, 24V
	 LT2QOG040-00-X-W-24V	LED coaxial light, 48x48 mm light emitting area, white, 24V
	 LTZPFL160-00-6-W-24V	LED bar light, 6 LED rows, 160X26.3 illumination area, white, 24V
	 LTZGK070-15-3-W-24V	LED ringlight, 3 LED rows, outer diameter 70 mm, 15°, white, 24V
	 LTZGK070-45-3-W-24V	LED ringlight, 3 LED rows, outer diameter 70 mm, 45°, white, 24V
	 LTZZO130-75-3-W-24V	LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°, white, 24V
	 LTPVRG070-00-1-W-24V	Flat side-emitting LED backlight, thin borders, 70X70 mm illumination area, white, 24V
	 LTPVR070-00-1-W-24V	Flat side-emitting LED backlight, 70X70 mm illumination area, white, 24V
	 LT2RZF100-60-2-W-24V	LED ringlight, 2 LED rows, 100 mm outer diameter, 60°, white, 24V
	Diffusers	Diffuser for LTZGK070-15-3, LTZGK070-45-3, LTZZO170-75-3
	Brackets	Brackets for LT4WRG100-00-1, LT2QOG040-00-X, LTZPFL160-00-6
	Polarizer	Polarizer for LTZPFL160-00-6





ACCESSORIES

Although accessories are often considered optional, they are in fact essential in many applications to efficiently use a product or even to enhance its performance.

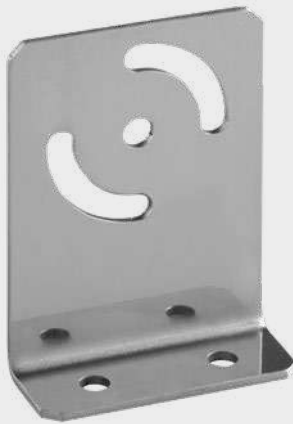
Opto Engineering® extensive range of accessories has been designed and selected to ensure hassle-free and quick integration of our imaging components into your vision system. Our accessories perfectly complement our product range and have been specifically tested in combination with our products to maximize performance. Our selection includes mounting mechanics, filters, protective windows, first surface mirrors and beam splitters, calibration patterns, projection patterns, in addition to strobe controllers and stepper motor controllers. Please check our website to view the entire range and get the most updated information.

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CONTROLLERS & POWER SUPPLIES	250
CABLES & ELECTRONIC COMPONENTS	260

CMLT series

Mounting brackets for lighting

NEW



To simplify the mounting process of LED illuminators within any machine vision system, Opto Engineering® offers a series of brackets designed for positioning lights below, above or around the optics.

Part numbers	N of brackets included	Description	Fixing holes diameter (mm)	Mechanical specifications			Compatible PNs
				Length (mm)	Width (mm)	Height (mm)	
CMLT2PFL	2X	L-bracket, 40x30x12 mm	2X Ø 3.20	30	12	40	LTBRDC series (LTZPFL040-00-6-x-24V, LTZPFL080-00-6-x-24V, LTZPFL120-00-6-x-24V, LTZPFL160-00-6-x-24V, LTZPFL200-00-6-x-24V)
CMLT2QOG040	1X	Bracket 84x53x35 mm	4X Ø 3.20	84	35	53	LT2QOG040-00-X-x-24V
CMLT4WRG150-00-1	1X	Bracket, internal diameter 167 mm	3X Ø 3.50, 4X M4	200	190	25	LT4WRG150-00-1-x-24V
CMLT4WRG200-00-1	1X	Bracket, internal diameter 214 mm	3X Ø 5.50, 4X M5	250	240	30	LT4WRG200-00-1-x-24V
CMLT4WRG250-00-1	1X	Bracket, internal diameter 266 mm	3X Ø 6.50, 4X M6	302	290	25	LT4WRG250-00-1-x-24V
CMLTJA-M6-01	2X	L-bracket for vertical mounting	3X Ø 6.50	51	27	51	
CMLTVA-M6-01	2X	L-bracket for horizontal mounting	3X Ø 6.50	51	40	51	LTBC series (LTBC054054-W, LTBC054054-G, LTBC114114-W, LTBC114114-G, LTBC174174-W, LTBC174174-G, LTBC234234-W, LTBC234234-G)
CMLTOA-M6-00	1X	Join bracket	1X Ø 8.70	-	40	-	

Did you know that we have all the accessories that can be used to complete your vision system?

Our strobe controllers feature dedicated synchronization outputs that allow to directly filter the trigger signals getting rid of unwanted noise... This function is not commonly available on the market!

DFLT series

Diffusion plates for lighting

NEW



Opto Engineering® offers a series of diffusion plates available as accessories to be positioned between the LED sources of our illuminators and the workpieces to be inspected.

Diffusers can help avoid hot spots formation, especially on glossy workpieces and provide better light uniformity.

Part number	Description	Thickness (mm)	Compatible products
For ringlights			
DFLTZZO130-75-3	Diffuser for LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°	2	LTZZO130-75-3-x-24V
DFLTZZO170-75-3	Diffuser for LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°	2	LTZZO170-75-3-x-24V
DFLTZGK050-15-2	Diffuser for LED ringlight, 2 LED rows, outer diameter 50 mm, 15°	2	LTZGK050-15-2-x-24V
DFLTZGK070-15-3	Diffuser for LED ringlight, 3 LED rows, outer diameter 70 mm, 15°	2	LTZGK070-15-3-x-24V
DFLTZGK100-15-5	Diffuser for LED ringlight, 5 LED rows, outer diameter 103 mm, 15°	2	LTZGK100-15-5-x-24V
For bar lights			
DFLTZPFL040-00-6	Diffuser for LED bar light, 6 LED rows, 40X26.3 illumination area	2	LTZPFL040-00-6-x-24V
DFLTZPFL080-00-6	Diffuser for LED bar light, 6 LED rows, 80X26.3 illumination area	2	LTZPFL080-00-6-x-24V
DFLTZPFL120-00-6	Diffuser for LED bar light, 6 LED rows, 120X26.3 illumination area	2	LTZPFL120-00-6-x-24V
DFLTZPFL160-00-6	Diffuser for LED bar light, 6 LED rows, 160X26.3 illumination area	2	LTZPFL160-00-6-x-24V
DFLTZPFL200-00-6	Diffuser for LED bar light, 6 LED rows, 200X26.3 illumination area	2	LTZPFL200-00-6-x-24V

PLLT series

Polarizing plates for lighting

NEW



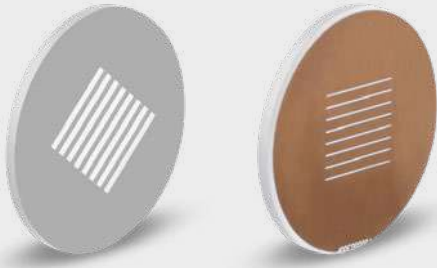
Opto Engineering® offers a series of polarizers available as accessories to be positioned between the LED sources of our illuminators and the workpieces to be inspected.

Polarizers can help reduce reflections when use in combination with a polarizing filter on the camera, especially on glossy workpieces. Polarizer can be very useful in applications inspecting workpieces packed in transparent plastic bags.

Part number	Description	Thickness (mm)	Compatible products
For ringlights			
PLLTZO130-75-3	Polarizer for LED low angle ringlight, 3 LED rows, outer diameter 131 mm, 75°	0.8	LTZZO130-75-3-x-24V
PLLTZO170-75-3	Polarizer for LED low angle ringlight, 3 LED rows, outer diameter 175 mm, 75°	0.8	LTZZO170-75-3-x-24V
PLLTZGK050-15-2	Polarizer for LED ringlight, 2 LED rows, outer diameter 50 mm, 15°	0.8	LTZGK050-15-2-x-24V
PLLTZGK070-15-3	Polarizer for LED ringlight, 3 LED rows, outer diameter 70 mm, 15°	0.8	LTZGK070-15-3-x-24V
PLLTZGK100-15-5	Polarizer for LED ringlight, 5 LED rows, outer diameter 103 mm, 15°	0.8	LTZGK100-15-5-x-24V
For bar lights			
PLLTZPFL040-00-6-H	Horizontal polarizer for LED bar light, 6 LED rows, 40X26.3 illumination area	0.8	LTZPFL040-00-6-x-24V
PLLTZPFL040-00-6-V	Vertical polarizer for LED bar light, 6 LED rows, 40X26.3 illumination area	0.8	LTZPFL040-00-6-x-24V
PLLTZPFL080-00-6-H	Horizontal polarizer for LED bar light, 6 LED rows, 80X26.3 illumination area	0.8	LTZPFL080-00-6-x-24V
PLLTZPFL080-00-6-V	Vertical polarizer for LED bar light, 6 LED rows, 80X26.3 illumination area	0.8	LTZPFL080-00-6-x-24V
PLLTZPFL120-00-6-H	Horizontal polarizer for LED bar light, 6 LED rows, 120X26.3 illumination area	0.8	LTZPFL120-00-6-x-24V
PLLTZPFL120-00-6-V	Vertical polarizer for LED bar light, 6 LED rows, 120X26.3 illumination area	0.8	LTZPFL120-00-6-x-24V
PLLTZPFL160-00-6-H	Horizontal polarizer for LED bar light, 6 LED rows, 160X26.3 illumination area	0.8	LTZPFL160-00-6-x-24V
PLLTZPFL160-00-6-V	Vertical polarizer for LED bar light, 6 LED rows, 160X26.3 illumination area	0.8	LTZPFL160-00-6-x-24V
PLLTZPFL200-00-6-H	Horizontal polarizer for LED bar light, 6 LED rows, 200X26.3 illumination area	0.8	LTZPFL200-00-6-x-24V
PLLTZPFL200-00-6-V	Vertical polarizer for LED bar light, 6 LED rows, 200X26.3 illumination area	0.8	LTZPFL200-00-6-x-24V

PTPR series

Projection patterns for machine vision



Opto Engineering® supplies a comprehensive range of projection patterns compatible with our LED pattern projectors. PT projection patterns can be either laser-engraved, with 50 µm geometrical accuracy, or photolithography-engraved for more demanding applications (2 µm accuracy). Custom geometry patterns can also be provided upon request.

Part number	Format	Process	Substrate (mm)	Coating (mm)	Line spacing (mm)	Thickness (mm)	Geometrical accuracy (µm)	Edge sharpness (µm)	With LTPRHP, LTPRXP and LTPRUP projectors (circular aperture)			With LTPRSMHP projectors (square aperture)		
									Active area (mm)	Number of lines	Max line length (mm)	Active area (mm)	Number of lines	Line length (mm)
PT 0000 0100 P	Line	Photolithography	Soda lime glass	Chrome	-	0.05	2	1.4	11	1	11	8 x 8	1	8
PT 0000 0100 L	Line	Laser engraving	Borofloat glass	Dichroic mirror	-	0.5	50	50	11	1	11	8 x 8	1	8
PT 0000 0200 P	Line	Photolithography	Soda lime glass	Chrome	-	0.05	2	1.4	11	-	11	8 x 8	-	8
PT 0000 0200 L	Line	Laser engraving	Borofloat glass	Dichroic mirror	-	0.5	50	50	11	-	11	8 x 8	-	8
PT 0000 0300 P	Stripes	Photolithography	Soda lime glass	Chrome	0.95	0.05	2	1.4	11	8	7.78	8 x 8	8	7.78
PT 0000 0300 L	Stripes	Laser engraving	Borofloat glass	Dichroic mirror	0.5	0.5	50	50	11	8	7.78	8 x 8	8	7.78
PT 0000 0400 P	Grid	Photolithography	Soda lime glass	Chrome	0.95	0.05	2	1.4	11	8 x 8	7.78	8 x 8	8 x 8	7.78
PT 0000 0400 L	Grid	Laser engraving	Borofloat glass	Dichroic mirror	0.8	0.2	50	50	11	8 x 8	7.78	8 x 8	8 x 8	7.78
PT 0000 0500 P	Edge	Photolithography	Soda lime glass	Chrome	-	-	2	1.4	11	-	-	8 x 8	-	-
PT 0000 0500 L	Edge	Laser engraving	Borofloat glass	Dichroic mirror	-	-	50	50	11	-	-	8 x 8	-	-
PTST 050 450 P	Stripes	Photolithography	Soda lime glass	Chrome	0.45	0.05	2	1.4	11	22	11	8 x 8	16	8
PTST 050 200 P	Stripes	Photolithography	Soda lime glass	Chrome	0.2	0.05	2	1.4	11	44	11	8 x 8	32	8
PTST 050 100 P	Stripes	Photolithography	Soda lime glass	Chrome	0.1	0.05	2	1.4	11	73	11	8 x 8	53	8
PTST 050 050 P	Stripes	Photolithography	Soda lime glass	Chrome	0.05	0.05	2	1.4	11	110	11	8 x 8	80	8
PTST 010 010 P	Stripes	Photolithography	Soda lime glass	Chrome	0.01	0.01	2	1.4	11	550	11	8 x 8	400	8
PTST 020 020 P	Stripes	Photolithography	Soda lime glass	Chrome	0.02	0.02	2	1.4	11	275	11	8 x 8	200	8
PTGR 050 450 P	Grid	Photolithography	Soda lime glass	Chrome	0.45	0.05	2	1.4	11	22 x 22	11	8 x 8	16 x 16	8
PTGR 050 200 P	Grid	Photolithography	Soda lime glass	Chrome	0.2	0.05	2	1.4	11	44 x 44	11	8 x 8	32 x 32	8
PTGR 050 100 P	Grid	Photolithography	Soda lime glass	Chrome	0.1	0.05	2	1.4	11	73 x 73	11	8 x 8	53 x 53	8
PTGR 050 050 P	Grid	Photolithography	Soda lime glass	Chrome	0.05	0.05	2	1.4	11	110 x 110	11	8 x 8	80 x 80	8
PTCD 010 P	Grid	Cloud of dots pattern density 10.5%	Soda lime glass	Chrome	-	0.05	2	1.4	-	-	-	8 x 8	-	-
PTCD 020 P	Grid	Cloud of dots pattern density 20%	Soda lime glass	Chrome	-	0.05	2	1.4	-	-	-	8 x 8	-	-
PTCD 035 P	Grid	Cloud of dots pattern density 35%	Soda lime glass	Chrome	-	0.05	2	1.4	-	-	-	8 x 8	-	-



Grid 0.05 mm line thickness.



Stripe 0.5 mm line thickness.



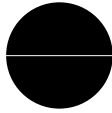
Edge.



Line 0.5 mm line thickness.

3D profilometry

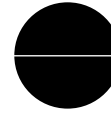
Line & stripes



PT 0000 0100 P
format: line
line thickness 0.05 mm



PT 0000 0300 P
8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm



PT 0000 0100 L
format: line
line thickness 0.5 mm



PTST 050 450 P
16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm



PTST 050 200 P
32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm



PT 0000 0300 L
format: stripe
line gap 0.5 mm
line thickness 0.5 mm
line length 7.78 mm



PTST 050 100 P
53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm



PTST 050 050 P
80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm



PTST 010 010 P
550 lines in projection area
line gap 0.01 mm
line thickness 0.01 mm



PTST 020 020 P
275 lines in projection area
line gap 0.02 mm
line thickness 0.02 mm

Stereovision

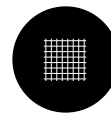
Grids



PT 0000 0400 P
8 x 8 lines in projection area
line gap 0.95 mm
line thickness 0.05 mm
line length 7.78 mm



PTGR 050 450 P
16 x 16 lines in projection area
line gap 0.45 mm
line thickness 0.05 mm



PT 0000 0400 L
format: grid
line gap 0.8 mm
line thickness 0.2 mm
line length 7.78 mm



PTGR 050 200 P
32 x 32 lines in projection area
line gap 0.20 mm
line thickness 0.05 mm



PTGR 050 100 P
53 x 53 lines in projection area
line gap 0.10 mm
line thickness 0.05 mm



PTGR 050 050 P
80 x 80 lines in projection area
line gap 0.05 mm
line thickness 0.05 mm

Cloud of dots



PTCD 010 P
Format:
Cloud of dots pattern,
density 10.5%



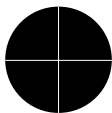
PTCD 020 P
Format:
Cloud of dots pattern,
density 20%



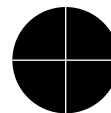
PTCD 035 P
Format:
Cloud of dots pattern,
density 35%

Alignment

Cross

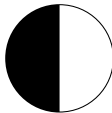


PT 0000 0200 P
format: cross
line thickness 0.05 mm

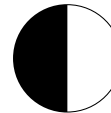


PT 0000 0200 L
format: cross
line thickness 0.5 mm

Edge



PT 0000 0500 P
format: edge
line gap 0.10 mm
line thickness 0.05 mm



PT 0000 0500 L
format: edge
line gap 0.10 mm
line thickness 0.5 mm

Pattern specifications

	Photolithography	Laser engraved
Substrate	Soda lime glass	Borofloat glass
Coating	Chrome	Dichroic mirror
Geometrical accuracy	2 µm	50 µm
Edge sharpness	1.4 µm	50 µm

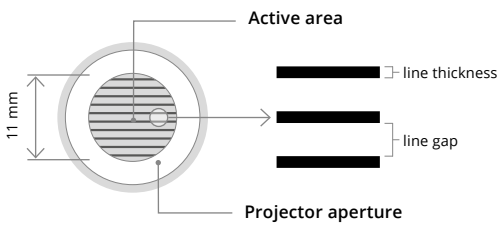
PTPR series - Projection patterns for machine vision

Compatible pattern projectors

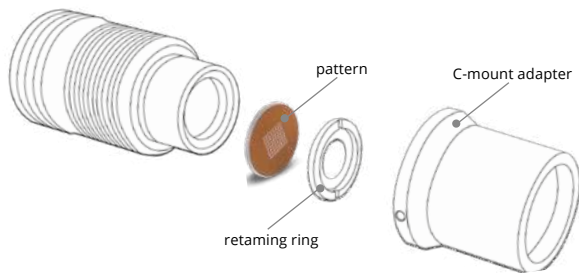
Circular aperture



LTPRHP3W, LTPRXP, LTPRUP pattern projectors.



Pattern mounted on projector with circular aperture and active area.

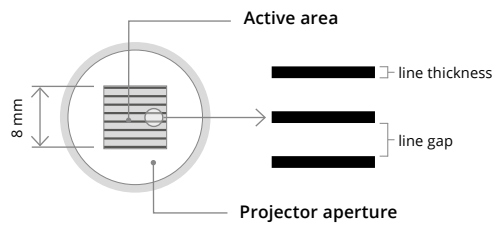


Pattern projector with circular aperture disassembled.

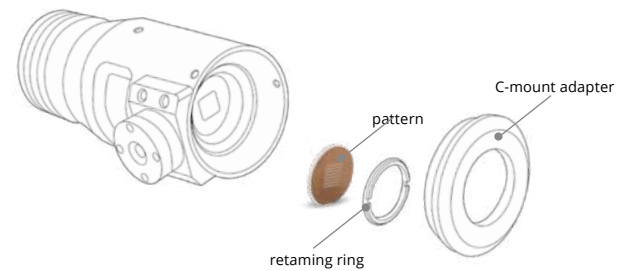
Square aperture



LTPRSMHP3W pattern projectors.



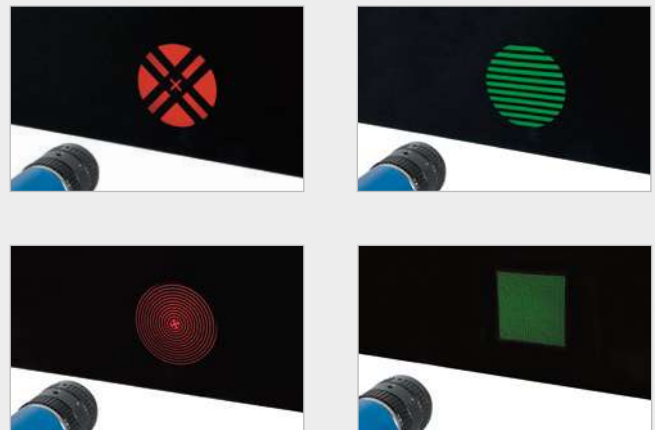
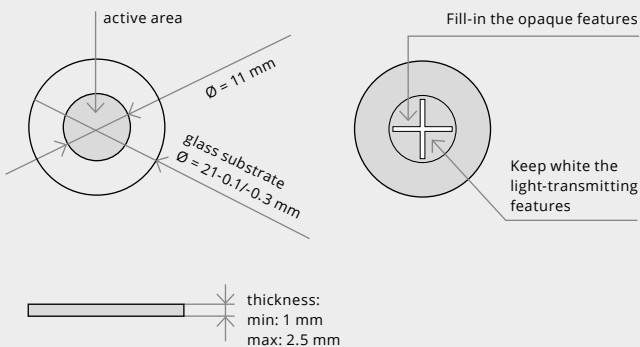
Pattern mounted on projector with square aperture and active area.



Pattern projector with square aperture disassembled.

Custom-made pattern

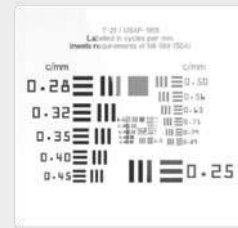
Custom-made patterns can be supplied on request. A drawing with accurate geometrical information must be submitted (please refer to the instructions here below).



Every kind of shape can be projected.

RC series

Resolution and calibration targets



*** RT**

Part number	Description
RT-T-20-P-CG	USAF 1951 Resolution test chart
RT-T-21-P-CG	USAF 1951 Resolution test chart (inches)
RT-T-50-2-P-TM	Star sector test target
RT-T-62-1-P-CG	Linear test pattern
RT-AP-D50-P-CG	Calibration dot grid
RT-AP-DD100-P-CG	Multi-zone calibration dot grid

LTDV series

Strobe controllers

NEW MODELS



KEY ADVANTAGES

Compatible with most of the LED lighting solutions available.

Ethernet, RS485 interface.

Up to 8 independently controlled output channels.

Max output current up 20A pulsed.

Easy configuration.

Small, compact units with DIN rail mounting.

NEW LTDVE MODELS

8 and 4 channels ethernet strobe controllers with max pulsed current of 20A.

Opto Engineering® range of strobe controllers offer repeatable fast pulsing for quick and accurate strobing of a wide variety of LED lightings available today.

LTDV series comprises models with up to eight channels either with Ethernet and/or R485 interfaces and a single channel controller with analogue interface.

Opto Engineering® strobe controllers include LTDVE8CH-20 and LTDVE4CH-20 with Ethernet and RS485 interfaces featuring respectively eight and four output channels driving lights with currents up to 20A (pulsed) and 2A (continuous), LTDV6CH featuring six channels and RS485 interface to drive lights up to 17A (pulsed)

and LTDV1CH featuring one single channel, simple DIP switch interface and designed to drive lights with currents from 5mA up to 17A.

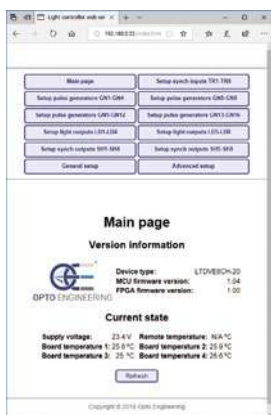
LTDV controllers accurately set current intensity, pulse duration and delay of LED illuminators, offer filtering options for trigger signals and easily synchronize the strobe pulses with the camera exposure to meet today's machine vision high speed demands.

These controllers are designed to get the very best out of Opto Engineering® LED lighting solutions, in terms of both brightness stability and precise control.

Easy configuration

Easily configure and manage strobe, trigger and camera signals.

LTDVExCH-20



Main page of LTDVE configuration software via web browser.

Opto Engineering® LTDVE series of controllers can be configured via Ethernet or RS485.

With the Ethernet interface, you can configure the controller with either the Modbus/TCP slave protocol or the internal web browser. The second option allows for a very easy configuration of the controller using a common web browser to visually change the parameters and/or inspect the device status.

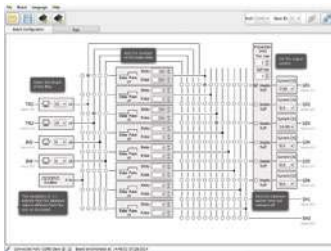
- Easily set the output current intensity of each connected illuminator in small steps (0.2mA, 4mA or 20mA depending on current range)
- Set the pulse duration and pulse delay of each illuminator in small steps as low as 1µs
- Control the connected illuminators with up to 8 synchronization inputs
- Control up to 8 synchronization outputs (e.g. up to 8 cameras)
- Write and save different configurations depending on your application

The LTDVE series can also be configured via the RS485 communication port interface that implements the Modbus/RTU slave protocol.

The configuration is stored in a non-volatile memory to maintain your settings even when the Ethernet or RS485 connection is removed.

Opto Engineering® produces custom controller features for specific applications. Contact us to discuss your needs.

LTDV6CH



Main page of LTSW configuration software.

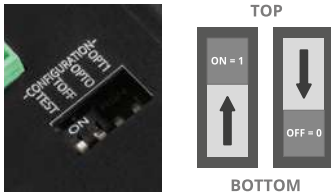
LTDV6CH can be configured via RS485. You can either download and use our free LTSW software to configure the controller from your PC or directly send low-level commands from a PC using the Modbus/RTU slave protocol (all the Modbus function codes supported by the controller are listed in the manual available online).

The LTSW software offers a very intuitive and graphical user interface where you can:

- Set the output current intensity of each connected illuminator in steps of 98 mA
- Set the pulse duration and pulse delay of each illuminator in steps of 1 µs
- Control the connected illuminators with up to 4 synchronization inputs
- Control up to 2 synchronization outputs (e.g. up to 2 cameras)
- Write and save different configurations depending on your application

To use LTSW configuration software your PC must have a native RS485 communication interface or a suitable RS485/USB converter must be used (PN: ADPT001).

LTDV1CH



DIP switches interface for simple and fast configuration.

LTDV1CH is simply configured from the front panel via DIP switches. You can easily set the intensity of the LED lights driving current (from 5mA to 17A), filtering option for the trigger signal (select between 10 µs or 100 µs time constant) and delay for synchronization output (select between 0 or 100 µs).

Part number		LTDVE8CH-20	LTDVE4CH-20	LTDV6CH	LTDV1CH-17V
Electrical specifications					
Status LEDs		Yes (for all I/Os)			Yes (for power on and trigger)
User interface		Ethernet 100 Mbps (using a Web browser or Modbus/TCP slave) RS485 (via Modbus/RTU slave)		RS485 (via Modbus/RTU slave)	12-way DIP switch
Configuration software		-	-	LTSW included	-
Output channels n°		8 independent constant current outputs	4 independent constant current outputs	6 independent constant current outputs	1 constant current output
Output current range	(A)	Up to 20A pulsed or 2A continuous (in steps of 0.2mA from zero to 200mA, 4mA from 201mA to 4000mA and 20mA from 4001mA to 20A)		3.5A - 17.0 pulsed (in steps of 98 mA)	5 mA-160 mA (in steps of 5 mA) pulsed or continuous 100 mA-3.2 A pulsed (in steps of 100 mA) 1.5 A-17 A pulsed (in steps of 500 mA)
Max dissipable thermal power per channel	(W)	4	8	5	8
Synchronization inputs n°		8 opto-isolated independent digital inputs ¹	4 opto-isolated independent digital inputs ¹	4 opto-isolated independent digital inputs ¹	1 opto-isolated digital input
Synchronization outputs n°		8 opto-isolated independent digital inputs	4 opto-isolated independent digital inputs	2 opto-isolated independent digital outputs	1 opto-isolated digital output
Lighting pulse delay	(µs)	0 - 1.000.000 ²	0 - 1.000.000 ²	0 - 65535 ³	-
Lighting pulse width	(µs)	10 - 1.000.000 ²	10 - 1.000.000 ²	10 - 65535 ³	-
Timing repeatability for pulse delay	(µs)	0.1 ⁴	0.1 ⁴	0.1 ⁴	-
Timing repeatability for pulse width	(µs)	0.1 ⁴	0.1 ⁴	0.1 ⁴	-
Supply voltage	(V, DC)	24 - 48			24 ⁵
Output voltage	(V)	0 - 36		0 - 36	0 - 12 (with step-up disabled) or 0 - 36 (with step-up enabled)
Max startup/inrush current	(A)				
Mechanical specifications					
Dimensions ⁶	Length (mm)	255	195	205	70
	Height (mm)	75	75	84	82
	Width (mm)	135	135	123	119
Mounting		DIN rail			
Accessories		ADPT001 ⁷			-
Compatible products		Compatible with most LED lightings available		LTD series, LTLA series, LTDMLA series, View through system, LTSW	Compatible with most LED lightings available

¹ Operate from 3.3V to 24V.

² In variable resolution depending on selected value.

³ In steps of 1 µs.

⁴ Digital processing.

⁵ Regulated ± 10%.

⁶ Including DIN fixing.

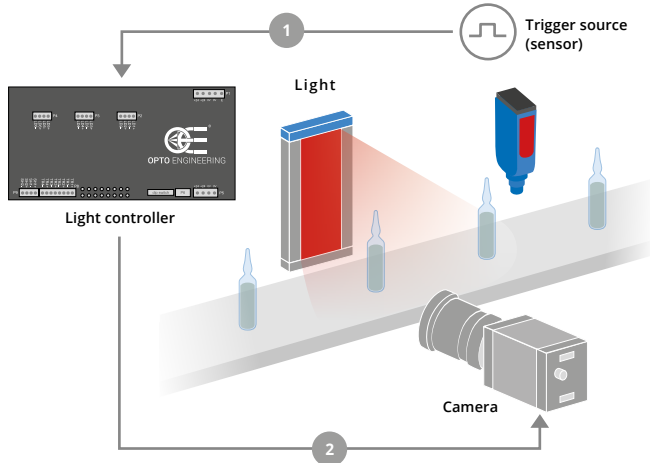
⁷ To be ordered separately. ADPT001 consists of - one RS485-USB adapter and - one cable for connection with LTDV6CH. In order to configure LTDV6CH via software a RS485 port must be provided.

LTDV series - Strobe controllers

Triggering options and wiring diagrams

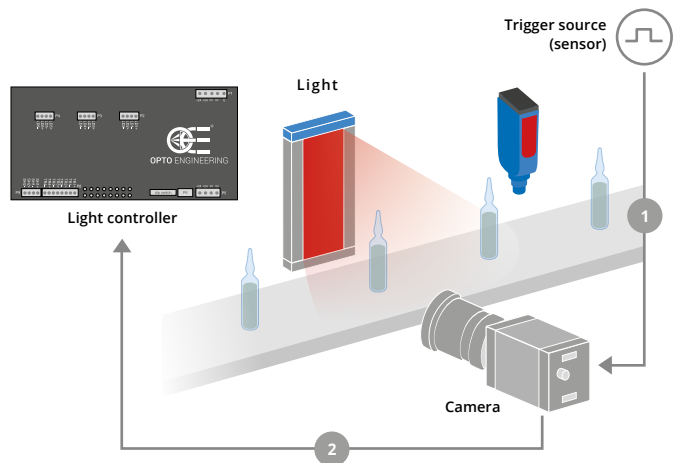
Two typical camera triggering arrangement (Option A and B) are illustrated for each controller model. Triggering Option A) is preferred because the controller directly filters the trigger signals getting rid of unwanted noise. This configuration is possible because Opto Engineering® controllers feature dedicated synchronization outputs which are not commonly available from other manufacturers.

A • Controller triggers camera



Option A - shows a triggering arrangement where the light controller is triggered by trigger source(s) (sensor positioned on the manufacturing line) and the lighting controller then triggers the camera(s). This arrangement has the advantage that the controller can filter the trigger signals before passing the command to the camera and the light.

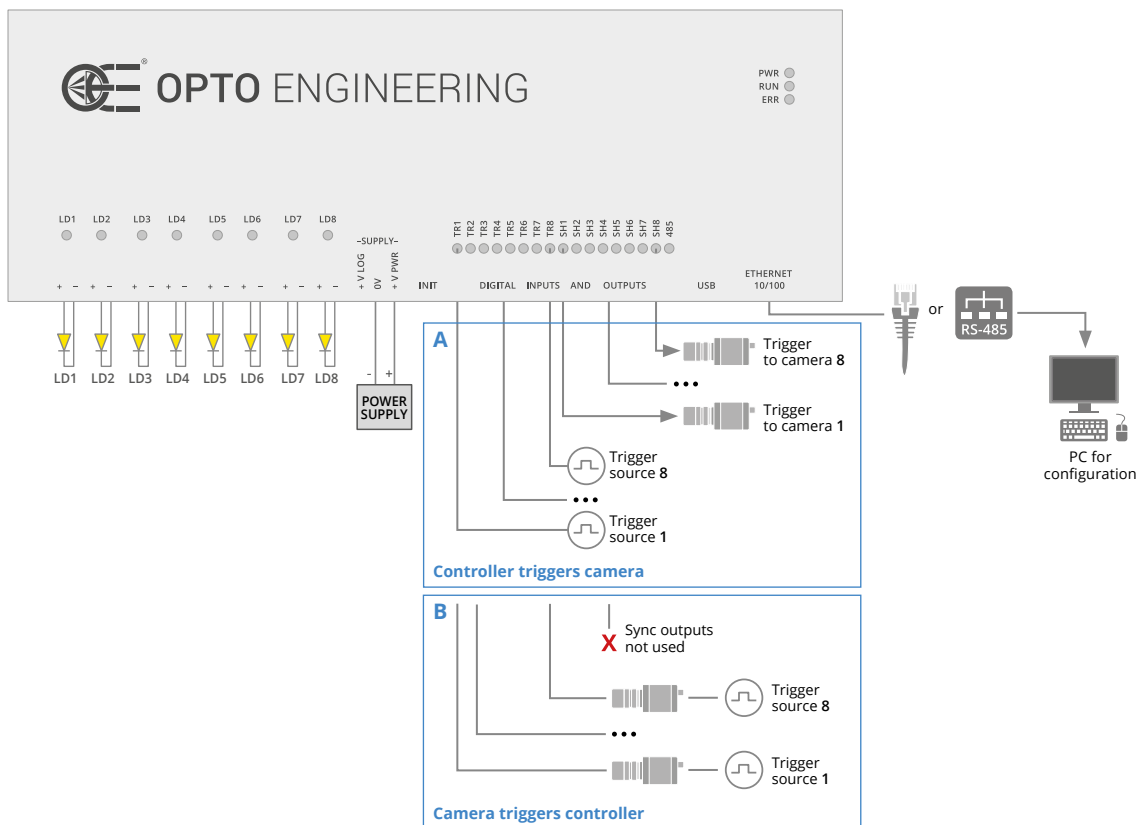
B • Camera triggers controller



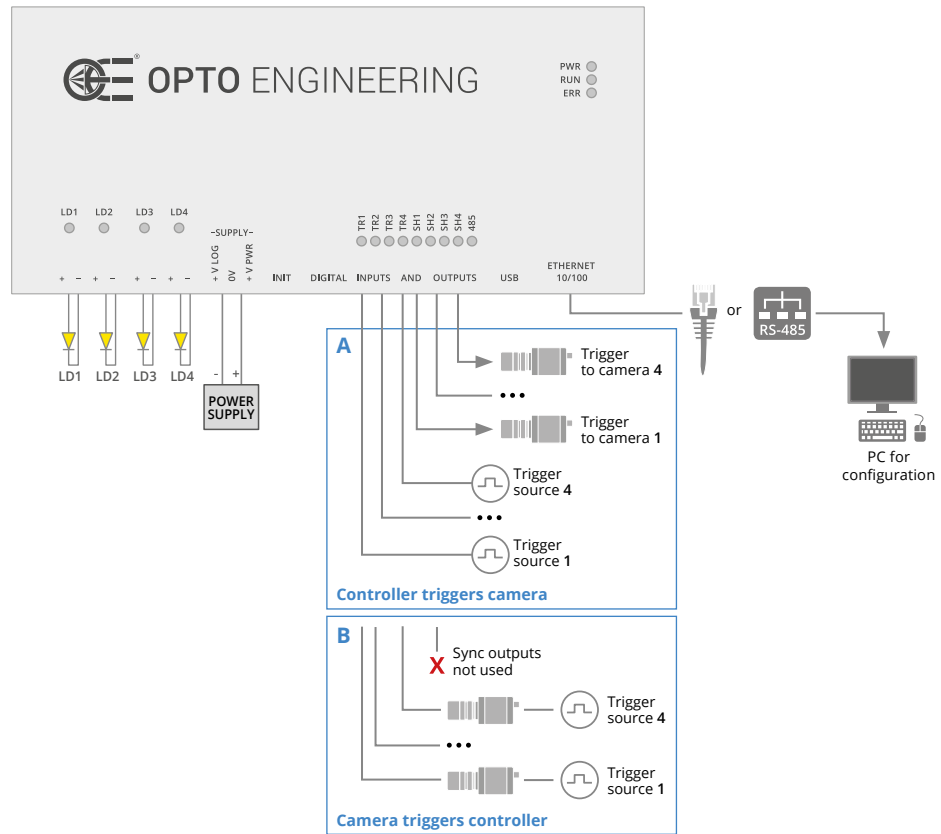
Option B - shows an arrangement where each camera is triggered by a trigger source (sensor), the camera then triggers the light controller and starts its exposure.

The following diagrams explain how to connect Opto Engineering® strobe controllers with the other machine vision components: LED lights, cameras, power supply and PC (for the configuration of all the parameters).

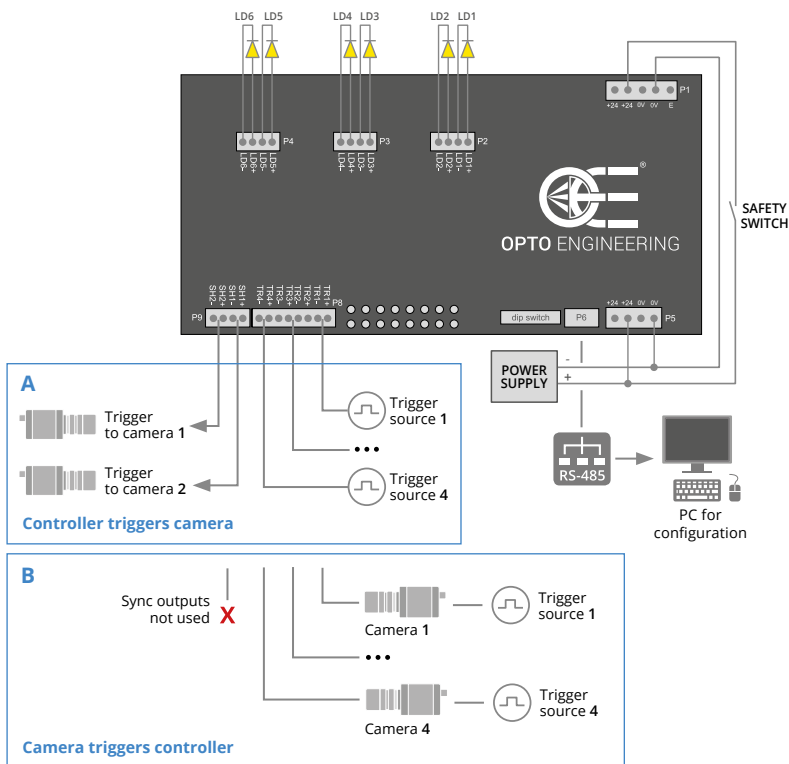
LTDVE8CH-20



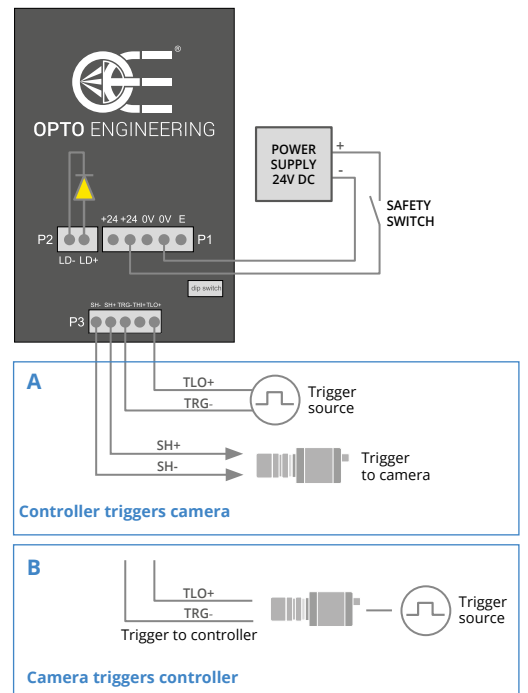
LTDVE4CH-20



LTDV6CH



LTDV1CH-17V










LTIC series

Light intensity controllers

NEW



Opto Engineering® offers light intensity controllers available as accessories to precisely adjust the light intensity of our wide range of lights.

Part number	Description	Light control type	Mode	Electrical specifications	
				Supply voltage (V)	Power cord xx
DIN RAIL					
 LTIC1CH-A1-4	Analogue lighting controller unit, 4A, 24V	Analogue	Continuous	24-48	not included
 LTICGR1000-D1	Analogue lighting controller unit, 1 channel, 24V, 2A, constant mode, power adaptor 24V plug	Analogue	Continuous	24	not included
 LTICGR1000-D1-PS-xx ³	Analogue lighting controller unit, 1 channel, 24V, 2A, constant mode, power cord, power adaptor 24V plug	Analogue	Continuous	24	included (EU, UK or US)
 LTICGR1000-D1-PS-xx-TB ³	Analogue lighting controller unit, 1 channel, 24V, 2A, constant mode, power cord, power adaptor 24V plug, illumination cable side A SM 3 way male connector, side B terminal blocks connector, 24V - 3m	Analogue	Continuous	24	included (EU, UK or US)
BENCHTOP					
 LTICOBUL1000CH1-24VxxTB ³	24VDC analog lighting controller 1 channel, power cord, illumination cable side A SM 3 way male connector, side B terminal blocks connector, 24V - 3m	Analogue	Continuous	100 - 240	included (EU, UK or US)
 LTICOBU2000CH1-24V-A1xxTB ³	24VDC analog lighting controller 2 channels, power cord, illumination cable side A SM 3 way male connector, side B terminal blocks connector, 24V - 3m	Analogue	Continuous	100 - 240	included (EU, UK or US)
 RT-PSP-12122-LV-xx ³	12VDC analog power supply for LVx-00614 LED spot light	Analogue	Continuous	100 - 240	included (EU, UK or US)

¹ Do not exceed lighting maximum ratings specified in the product datasheet. Refer to specific product documentation for detailed instructions
² Within each product series, only lights that require continuous driving current ≤ max output current of the light controller are considered compatible.

³ xx = UK (240VAC) / EU (220VAC) / US (110VAC).











Electrical specifications				Dimensions			Compatibility 1, 2		
Channels	Output			Length (mm)	Width (mm)	Height (mm)	LED illuminators ²	LED pattern projectors	LED sources/modules
	Voltage (V, DC)	Max current (A)	Power (W)						
1	24-48	4	100	86	54	117	LED illuminators with continuous driving current ≤ 4A, LTRNOBHP (LTRNHP210-x20 LTRNHP075-x45, LTRNHP165-x45, LTRNHP245-x25) LT2BC, LTLNC, LTLNE	-	-
1	24	2	48	55	24	90	LED illuminators with continuous driving current ≤ 2A, LTDMC, LTLAIC, LTLADC, LTRNDC, LTBC, LTBFC, LT2BC, LTBRC, LTTNC, LTCXC, LTLNC, LTLNE	-	-
1	24	2	48	55	24	90	LED illuminators with continuous driving current ≤ 2A, LTDMC, LTLAIC, LTLADC, LTRNDC, LTBC, LTBFC, LT2BC, LTBRC, LTTNC, LTCXC, LTLNC, LTLNE	-	-
1	24	2	48	55	24	90	LED illuminators with continuous driving current ≤ 2A, LTDMC, LTLAIC, LTLADC, LTRNDC, LTBC, LTBFC, LT2BC, LTBRC, LTTNC, LTCXC, LTLNC, LTLNE	-	-
1	24	5	120	330	93	123	LTCLHP, LTCLHP CORE, LTCLHP CORE PLUS, LTCL4K, TCCX, TCCXQ, TCBENCH, TCBENCH CORE, LTDMC, LTRNST, LTRNOB, LTLAIC, LTLADC, LTRNDC, LTBC, LTBFC, LTBDC, LTTNC, LTCXC	LTPRHP3W, LTPRSMHP3W, LTPRXP	LTSCHP
2	24	1	500 mA @ 12V	154	91	48	LED illuminators with continuous driving current <1 A	-	-
2	12	1	12	118	83	38	-	-	LDSC (RT-LWW-00614 RT-LVG-00614)

PS series

Power supplies

Opto Engineering® offers a variety of power supplies available as accessories to power our wide range of machine vision products.

Part number	Description	Electrical specifications						Dimensions		
		Input Supply voltage (V, AC)	Power cord	Channels	Output Voltage (V, DC)	Max current (A)	Power (W)	Length (mm)	Width (mm)	Height (mm)
 RT-SDR-120-24	24VDC DIN rail power supply	88 - 264	not included	1	24	5	120	113.5	40	125.2
 RT-SDR-240-48	48VDC DIN rail power supply	88 - 264	not included	1	48	5	240	113.5	63	125.2
 RT-DRP-240-24	DIN rail power supply 240V ac - 24V dc 240 W	85 - 264VAC 120 - 370VDC	not included	1	24	10	240	125.5	100	125.2
 RT-DRP-480-24	DIN rail power supply 240V ac - 24V dc 480 W	180 - 264 VAC 250 - 370 VDC	not included	1	24	20	480	227	100	125.2
 RT-DRT-240-24	DIN rail power supply 400V ac three phase - 24V dc 240 W	Three-Phase 340 - 550VAC (Dual phase operation possible) 480 - 780VDC	not included	1	24	10	240	125.5	100	125.2
 RT-DRT-480-24	DIN rail power supply 400V ac three phase - 24V dc 480 W	Three-Phase 340 - 550VAC 480 - 780VDC	not included	1	24	20	240	227	100	125.2
 RT-MV-DC1201-BCSXIO-REV2	Power Supply 12V with digital I/O on separate cable	100, 240	Included (EU)	1	12	2.5		100, 240	Included (EU)	
 COE-PS-UNIVERSAL	Power Supply for all COE cameras	90 - 264	not included	1	12	5	60	151,90	107	47

- 1 Do not exceed the maximum ratings specified in the each product datasheet. Refer to specific product documentation for detailed instructions
- 2 Additional wires (not supplied) are required to connect the controllers with the power supply units.

- 3 Select a power supply with output voltage, maximum output current and maximum output power compatible with the controller and the lights used in the application. Refer to the datasheets of controllers and lights for data about power consumption, voltage and current.



*** RT**

Compatibility 1


Controllers 2		Optics	Lights			Cameras	AI vision units
Light controllers 3	Motion controllers		LED illuminators	LED pattern projectors	LED sources/modules		
LTDVE8CH-20, LTDVE4CH-20, LTDV6CH, LTDV1CH-17V, LTIC1CH-A1-4, LTICGR1000-D1	MTDVxCH-22A2	AOL0223A, AOL0223B	LTCLHP, LTCLHP CORE, LTCLHP CORE PLUS, LTCL4K, TCCX, TCCXQ, TCBENCH, TCBENCH CORE, LTDMC, LTRNST, LTRNOB, LTLAIC, LTLADC, LTRNDC, LTBC, LTBFC, LTBRC, LTTNC, LTCXC, LTLNC, LTLNM, LTLNE, LT2BC	LTPRHP3W, LTPRSMHP3W, LTPRXP	LTSCHP		
LTDVE8CH-20, LTDVE4CH-20, LTDV1CH-7, LTDV1CH-17, LTIC1CH-A1-4			-	-	-		
LTDVE8CH-20, LTDVE4CH-20, LTIC1CH-A1-4, LTICGR1000-D1							PENSO, ALBERT-01
LTDVE8CH-20, LTDVE4CH-20, LTIC1CH-A1-4, LTICGR1000-D1							ALBERT-01
							PENSO, ALBERT-01
							ALBERT-01
							mvBlueCOUGAR-X, mvBlueCOUGAR-XD
							COE series

CB series - Cables

Part number	Description	Compatibility
Power cables		
CBLT001	Illumination cable, side 1 M12 connector straight, side 2 cable end - 5 m - for single stage systems	LTDMB2-x, LTMDCX-x, LTLAB2-x, LTLACx-x, LTPRUP-x, LTBP240180-B/W, LTBP288180-B/W, LTBP240216-B/W, LTBP288216-B/W
CBLT002	Illumination cable, side 1 M12 connector right angled, side 2 cable end - 5 m - for single stage systems	LTDMB2-x, LTMDCX-x, LTLAB2-x, LTLACx-x, LTPRUP-x, LTBP240180-B/W, LTBP288180-B/W, LTBP240216-B/W, LTBP288216-B/W
CBLT003	Illumination cable, side 1 M8 connector straight, side 2 cable end - 5 m - for single stage systems	LTDMA1-x, LT2BC serie, LTBP series 1, LTLNCxxx-x
CBLT004	Illumination cable, side 1 M8 connector right angled, side 2 cable end - 5 m - for single stage systems	LTDMA1-x, LTBP series 1, LTLNCxxx-x
CBLT005	Illumination cable, side 1 M12 connector straight, side 2 cable end - 5 m - for double stage systems	LTDMLAB2-WW, LTDMLACx-WW, LTBP240180-R/G, LTBP288180-R/G, LTBP240216-R/G, LTBP288216-R/G
CBLT006	Illumination cable, side 1 M12 connector right angled, side 2 cable end - 5 m - for double stage systems	LTDMLAB2-WW, LTDMLACx-WW, LTBP240180-R/G, LTBP288180-R/G, LTBP240216-R/G, LTBP288216-R/G
CBLT007	Illumination cable PVC grey, side 1 industrial circular connector straight, side 2 cable end - 5 m	LTLNE series
CBLT008	Illumination cable, side 1 industrial circular connector straight, side 2 cable end - 5 m - power supply	LTLNM series
CBLT010	Illumination cable, side 1 industrial circular connector straight, side 2 cable end - 5 m	LTRNOBHP series
CB244P1500	Power cable, side 1 M8 connector straight, side 2 cable end - 2 m - type 1 labels	LTCLHP series, LTCLHP CORE series, LTCL4K series, TCCX series, LTPR series, LTPRHP3W series, LTPRSMHP3W series, LTSCHP series
CB244P1500L	Power cable, side 1 M8 connector angled, side 2 cable end - 2 m - type 1 labels	LTCLHP series, LTCLHP CORE series, LTCL4K series, TCCX series, LTPR series, LTPRHP3W series, LTPRSMHP3W series, LTSCHP series
CB244P1501	Power cable, side 1 M8 connector straight, side 2 cable end - 2 m - type 2 labels	LTPRXP series, TCCAGExx096
CB244P1501L	Power cable, side 1 M8 connector angled, side 2 cable end - 2 m - type 2 labels	LTPRXP series, TCCAGExx096
CBSLH-24V-F-3M-TB	Illumination cable, side A SM 3 way male connector, side B terminal blocks connector, 24V - 3m	LTRNST series, LTRNOB series, RT-ANGX1000CH1-24V-xx-TB, RT-ANG2000CH2-24VA1-xx-TB
CBSLH-24V-F-3M	Illumination cable, side A flying leads, side B SM 3 way female connector, 24V - 3m	RT-SD-1000-D1-PS-xx, LTDMC series, LTLAIC series, LTLADC series, LTRNDC series, LTBFC series, LTBRC series, LTTNC series, LTCXC series
COCB243P0600	Power cable for TCZRS and MCZR products, 0.6 m	TCZRS series
CBPWALB01	ALBERT power cable, 5 m, IP65	ALBERT-01
RT-70261132	Power cord with schuko plug - open end cable, 3 m 10A 250V, single-phase	RT-SDR-120-24, RT-SDR-120-48, RT-DRP-240-24, RT-DRP-480-24, RT-DRT-240-24, RT-DRT-480-24
CBMT002	15 wires cable, DB15HD Male to DB15HD Female connector, 2 m	MTDVxCH-22Ax, TCZRS series
CBMT003	8 wires cable, 2x DB15HD Male to DIN EN 60529 12 Pin Female connector, 2 m	MTDVxCH-22Ax, MZMT12X series, ENMT series
USB cables		
COCBUSB20	Passive USB 2.0, standard A plug mini-B plug cable, 2 m	TCZRS series, MTDVxCH-22Ax
CBUSB20ACT01	Active USB 2.0 cable, industrial level, screw locking, 10 m	STLTCM01
CBUSB3005	Passive USB 3.0 cable, industrial level, horizontal screw locking, 3m	mvBlueFOX3-2
Ethernet cables		
CBETH001	Ethernet cable for Panel PC, 5 m, IP65	ALBERT-01, RT-KWP5170
CBETH002	Ethernet cable, general purpose, 5 m, IP65	ALBERT-01
CBETH003	Ethernet cable, CAT6, industrial level, high flexible cable with screw, 5m	mvBlueCOUGAR-X, mvBlueCOUGAR-XD, MTDVxCH-22Ax, AO series
Cables for control and I/O		
CBLT009	Illumination cable, side 1 industrial circular connector straight, side 2 cable end - 5 m - I/O signals	LTLNM series
CBGPO001	Output cable, 5 m, IP65	ALBERT-01
CBGPI0001	I/O cable, side 1 HIROSE 12 pin, side 2 cable end, 3 m	mvBlueFOX3-2, mvBlueCOUGAR-X, mvBlueCOUGAR-XD, AO series
CBPH001	Photoelectric sensor cable with M12 connector, 5 m, IP65	RT-WTB9-3P2461, ALBERT-01
CBPH002	Photoelectric sensor cable with flying leads, 5 m, IP65	ALBERT-01
CBTL001	Tower light cable with M12 connector, 5 m, IP68	RT-69942075, ALBERT-01
CBTL002	Tower light cable with flying leads, 5 m, IP68	ALBERT-01
COE cables		
COE-6P-FEMALE	6 pin Female cable for COE Line Scan cameras, 2 meters	COE HR AS series, COE HR LS series, COE-PS-UNIVERSAL
COE-6P-MALE	6 pin Male cable for all COE Area Scan cameras, 2 meters	COE HR AS series, COE HR LS series, COE-PS-UNIVERSAL
Other		
ADPT001	Adapter RS485-USB + cable with 3 elements for LTDV6CH connection	LTDV6CH

1 Except LTBP240180-z, LTBP288180-z, LTBP240216-z, LTBP288216-z

ADPT001

Part number	Description	Compatibility
 ADPT001	Adapter RS485-USB + cable with 3 elements for LTDV6CH connection	LTDV6CH, MTDV3CH-00A1

Product combination example



LTSCHP series

High-performance replacement LED modules



LTSCHP modules power several Opto Engineering® LED illuminators and feature excellent current stability. They are available in various colors and can be ordered as spare parts:

1W power sources:

- LTSCHP1W modules are compatible with LTCLHP, LTLCHP CORE (only red, green and white), LTCL4K, TCCXQ, TCCX, TCBENCH series, TCBENCH CORE, MZMT12X series and TCKIT case.
- The new LTSCCP1W-G green light source is compatible with the LTCLHP CORE PLUS series.
- The new LTSCHP1W-GZ green light source is now also available: suitable for any kind of sample, it is specifically tailored for measuring reflective objects and objects with sharp edges. In fact, it reduces edge diffraction effects, also ensuring superior illumination uniformity (especially on large FOVs) and making the whole system less sensitive to alignment. It is compatible with LTCLHP, TCBENCH, LTCL4K, LTCLHP CORE, TCBENCH CORE series and TCKIT case.

3W power sources:

- LTSCHP3W modules are compatible with LTPRHP3W and LTPRSMHP3W pattern projectors.

Part number	Light color, Wavelength peak	Device power ratings				LED power ratings			Compatibility
		DC voltage ¹		Power consumption (W)	Max LED forward current (mA) ²	Forward voltage		Max pulse current (mA) ⁵	
		Minimum (V)	Maximum (V)			Typical (V) ³	Maximum (V) ⁴		
1W power sources ⁶									
LTSCHP 1W-R	red, 630 nm	12	24	< 2.5	350	2.4	3.00	2000	LTCLHP, TCBENCH, LTCL4K, TCCX, TCCXQ, LTCLHP CORE, TCBENCH CORE, TCKIT, MZMT12X ⁷
LTSCHP 1W-G	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000	
LTSCHP 1W-B	blue, 460 nm	12	24	< 2.5	350	3.3	4.00	2000	
LTSCHP 1W-W	white	12	24	< 2.5	350	2.78	-	2000	
LTSCCP 1W-G • NEW	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000	
LTSCHP 1W-GZ • NEW	green, 520 nm	12	24	< 2.5	350	3.3	4.00	2000	LTCLHP CORE PLUS
3W power sources									
LTSCHP 3W-R	red, 630 nm	12	24	< 4.5	720	2.4	3.00	2000	LTPRHP3W, LTPRSMHP3W
LTSCHP 3W-G	green, 520 nm	12	24	< 4.5	720	3.3	4.00	2000	
LTSCHP 3W-B	blue, 460 nm	12	24	< 4.5	720	3.3	4.00	2000	
LTSCHP 3W-W	white	12	24	< 4.5	720	2.78	-	2000	

¹ Tolerance ± 10%.
² Used in continuous (not pulsed) mode.
³ At max forward current.
⁴ Tolerance is ±0.06V on forward voltage measurements.
⁵ At pulse width ≤ 10 ms, duty cycle ≤ 10% condition.
 Built-in electronics board must be bypassed (see tech info).
⁶ Shipped not assembled. See LTCLHP instructions manual.
⁷ Some part numbers are not available in all color options (-R, -G, -B and -W). See page of each product series for available colors.

LDSC series

LED sources



*** RT**

Part number	Description	Compatibility
RT-LVW-00614	Light source for Optart telecentric lenses with built-in coaxial illumination, white	RT-PSP-12122-LV-xx
RT-LVG-00614	Light source for Optart telecentric lenses with built-in coaxial illumination, green	RT-PSP-12122-LV-xx

FULL RANGE OF COMPATIBLE PRODUCTS		
	TCCXHM series	p. 47
	TCCXLM series	p. 47
	TCCX2M series	p. 62

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