OPTO ENGINEERING
THE TELECENTRIC COMPANY

LTCLHP series

Product presentation

www.opto-engineering.com

LTCLHP series

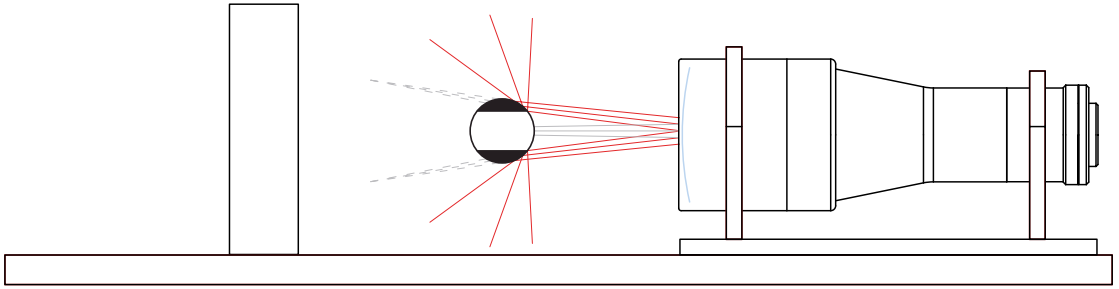
Summary

Introduction

COLLIMATED VS DIFFUSED BACKLIGHT

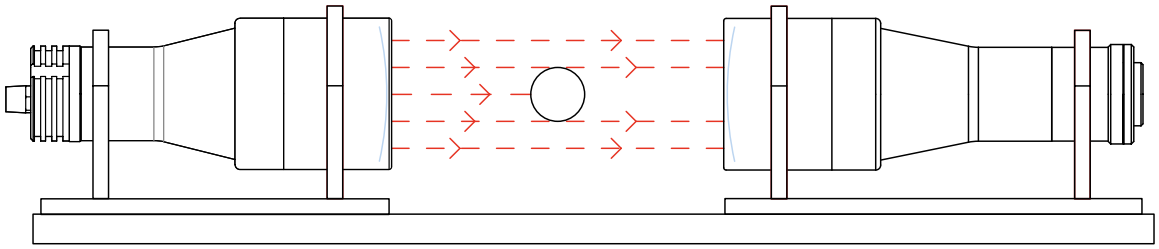
NON-COLLIMATED BACK ILLUMINATION

- Light coming from a variety of angles



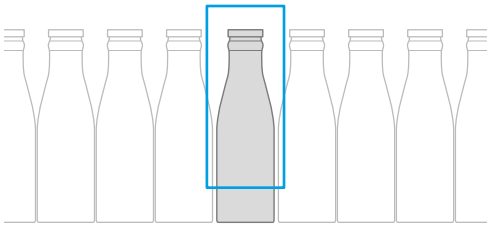
COLLIMATED BACK ILLUMINATION

- Parallel rays



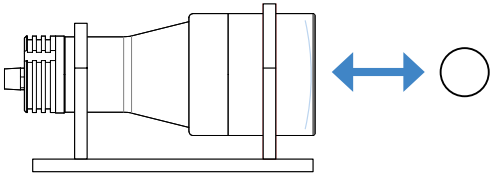
Introduction

WHEN YOU NEED COLLIMATED LIGHT?



- **High speed** production lines
  The high throughput allows for shorter exposure times

- **Silouetting** and for detecting edges and defects
  Elimination of blurred edges caused by diffuse reflections

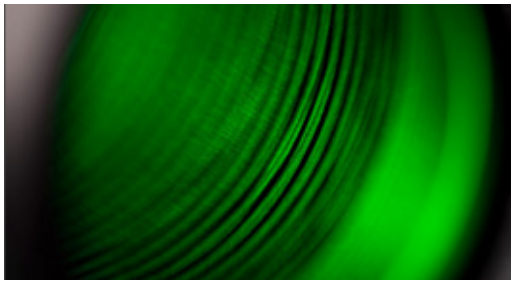


- **Increased distance** between object and illumination source

- **Precision measurements** where accuracy, repeatability, and throughput are key factors

Key advantages

KEY ADVANTAGES OF OPTO-ENGINEERING COLLIMATED LIGHT



Complete light coupling

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

Border effects removal

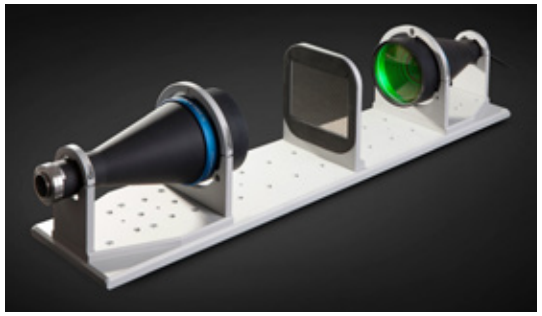
Diffused back-illuminators often make objects seem smaller than their actual size because of light reflections on the object sides, while collimated rays are typically much less reflected.

Field depth and telecentricity improvement

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

Key advantages

KEY ADVANTAGES OF OPTO-ENGINEERING COLLIMATED LIGHT



- **Easy and precise alignment with bi-telecentric lenses**

- **Wide selection of different colors**

R = red, peak at 630 nm
G = green, peak at 520 nm
B = blue, peak at 460 nm
W = white

Key advantages

LTCLHP OVERVIEW

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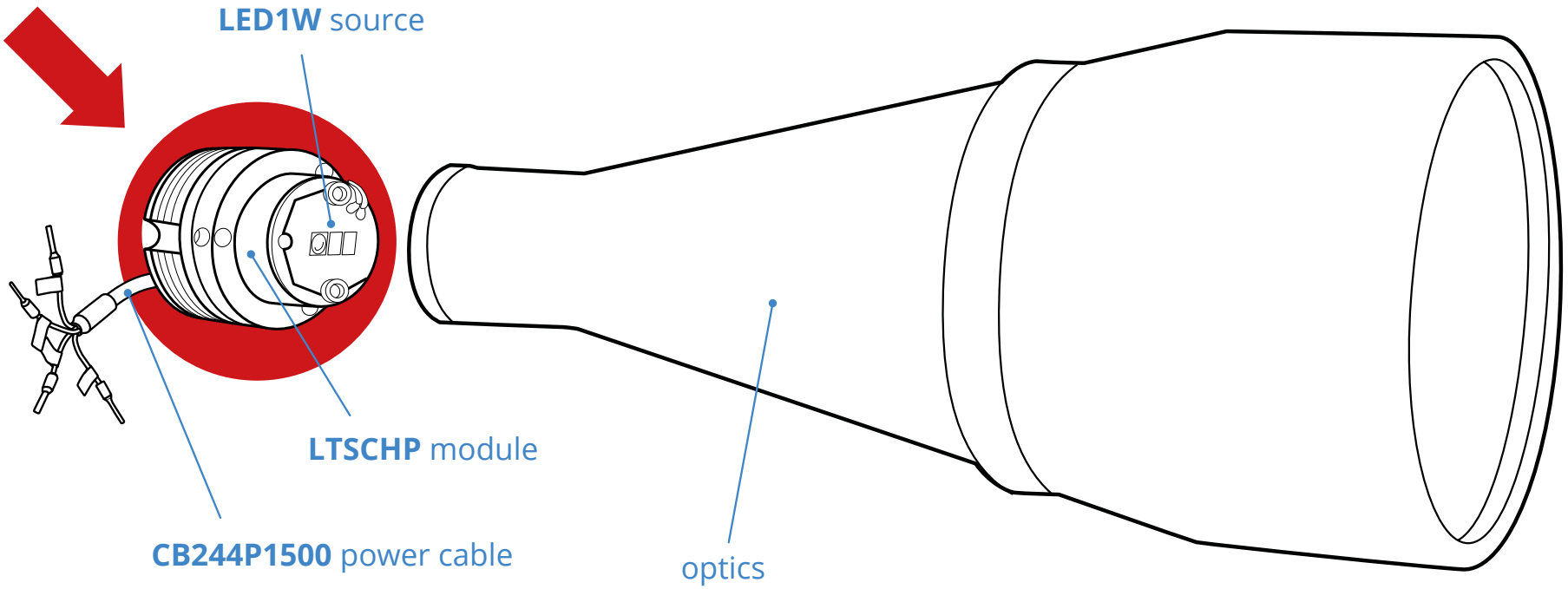
IMPROVED PERFORMANCES AT **LOW CURRENTS**



Key advantages

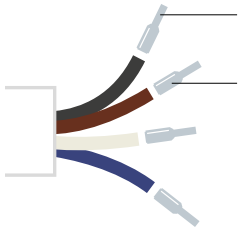
LTCLHP OVERVIEW

	Optical specs			Mechanical specifications		Electrical specifications						Compatibility	
						Device power ratings			LED power ratings				
Part number	Beam diam.	Light color, wavelength peak	Working distance range	Length	Outer diam.	DC voltage		Power cons.	Max LED fwd current	Forward voltage		Max pulse current	
						min	max			typ.	max		
(*)	(mm)		(mm)	(mm)	(mm)	(V)	(V)	(W)	(mA)	(V)	(V)	(mA)	
				1					2	3, 4		5	UPDATED ELECTRICAL SPECS
LTCLHP023-R	16	red, 630 nm	45 ~ 90	96.8	28	12	24	< 2.5	350	2.4	3.00	2000	TC2300x, TC23012, TC4M004, TC4M007, TC4M009
LTCLHP023-G	16	green, 520 nm	45 ~ 90	96.8	28	12	24	< 2.5	350	3.3	4.00	2000	TC2300x, TC23012, TC4M004, TC4M007, TC4M009
LTCLHP023-B	16	blue, 460 nm	45 ~ 90	96.8	28	12	24	< 2.5	350	3.3	4.00	2000	TC2300x, TC23012, TC4M004, TC4M007, TC4M009
LTCLHP023-W	16	white	45 ~ 90	96.8	28	12	24	< 2.5	350	2.78	n.a.	2000	TC2300x, TC23012, TC4M004, TC4M007, TC4M009
LTCLHP016-R	20	red, 630 nm	35 ~ 70	99.9	38	12	24	< 2.5	350	2.4	3.00	2000	TC12016, TC23016, TC4M016-X, TC2M016-X
LTCLHP016-G	20	green, 520 nm	35 ~ 70	99.9	38	12	24	< 2.5	350	3.3	4.00	2000	TC12016, TC23016, TC4M016-X, TC2M016-X
LTCLHP016-B	20	blue, 460 nm	35 ~ 70	99.9	38	12	24	< 2.5	350	3.3	4.00	2000	TC12016, TC23016, TC4M016-X, TC2M016-X
LTCLHP016-W	20	white	35 ~ 70	99.9	38	12	24	< 2.5	350	2.78	n.a.	2000	TC12016, TC23016, TC4M016-X, TC2M016-X
LTCLHP024-R	30	red, 630 nm	45 ~ 90	124.7	44	12	24	< 2.5	350	2.4	3.00	2000	TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
LTCLHP024-G	30	green, 520 nm	45 ~ 90	124.7	44	12	24	< 2.5	350	3.3	4.00	2000	TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
LTCLHP024-B	30	blue, 460 nm	45 ~ 90	124.7	44	12	24	< 2.5	350	3.3	4.00	2000	TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
LTCLHP024-W	30	white	45 ~ 90	124.7	44	12	24	< 2.5	350	2.78	n.a.	2000	TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
LTCLHP036-R	45	red, 630 nm	70 ~ 140	152.1	61	12	24	< 2.5	350	2.4	3.00	2000	TC13036, TC12036, TC23036, TC13036, TC2M036, TC4M036, TC16M036

How to use

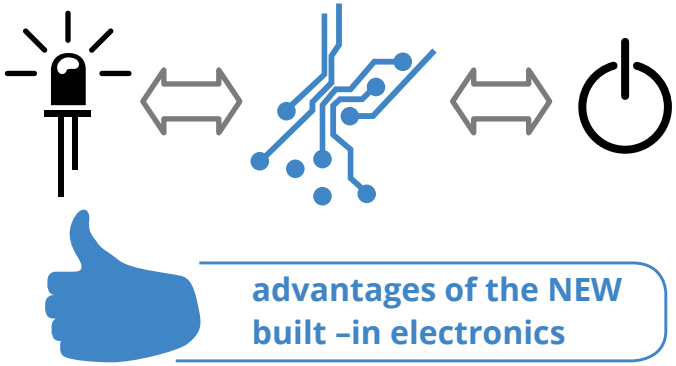
TWO USAGE OPTIONS

STANDARD usage option
(LED control through built-in electronics)

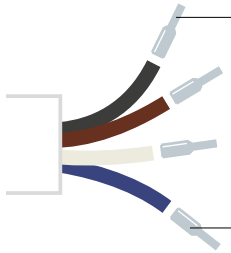


black cable to **ground**

brown cable to **power supply** (+12 / +24 V)

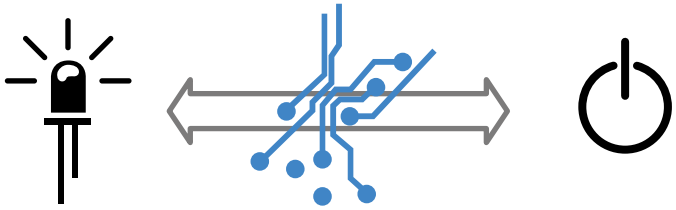


Direct LED control usage option



black cable to **ground**

blue cable (LED anode) to your power supply or external strobe controller



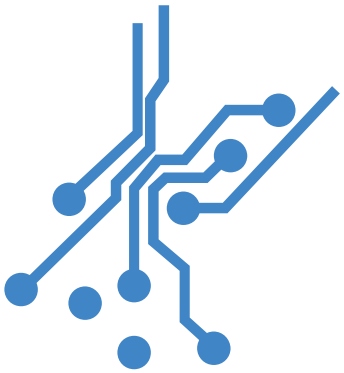
Key advantages

ILLUMINATION STABILITY

- **No light flickering** thanks to
- **Very High current stability** over time even at low currents
- Images with **stable gray-levels background**

achieved through

BETTER BUILT-IN ELECTRONICS



allows for

- **Constant current flow through the LED source**
- **Low noise level**
- **Compatibility with all LED colors**
- **Low warm-up times**

Key advantages

ILLUMINATION STABILITY

IMPROVED ELECTRONICS → **CURRENT STABILITY** → **ILLUMINATION STABILITY**

Less than 1‰ variation in LED forward current intensity*

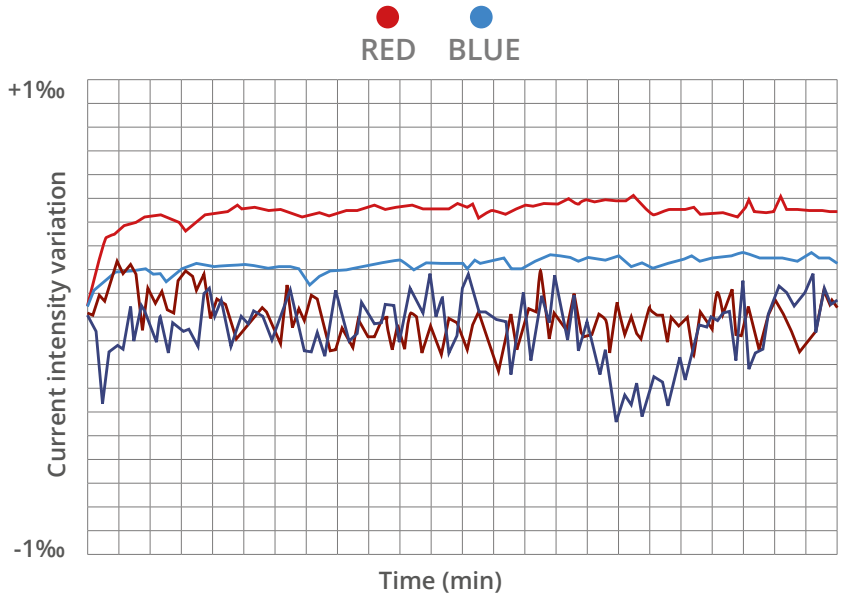
*Both at min and max LED forward current.

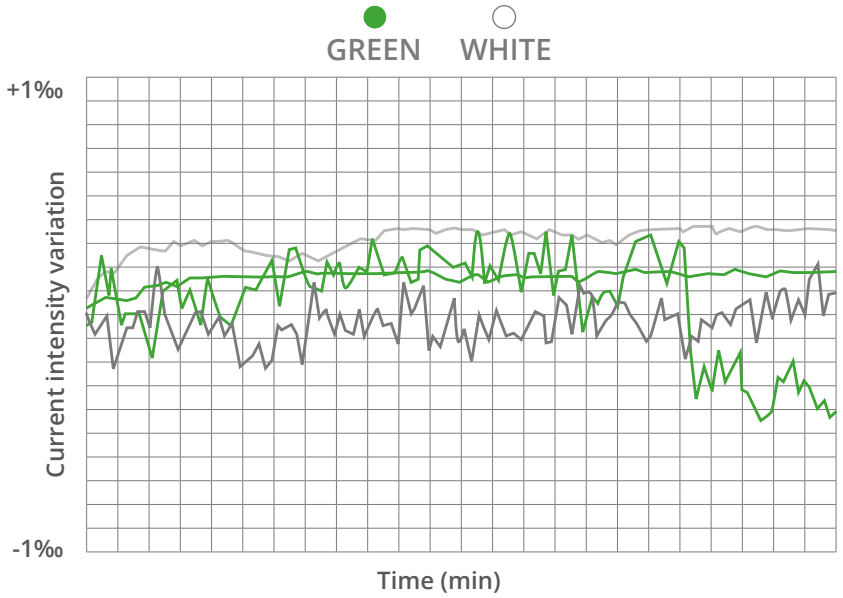
Key advantages

ILLUMINATION STABILITY

IMPROVED ELECTRONICS → **CURRENT STABILITY** → **ILLUMINATION STABILITY**

Less than 1‰ variation in LED forward current intensity*



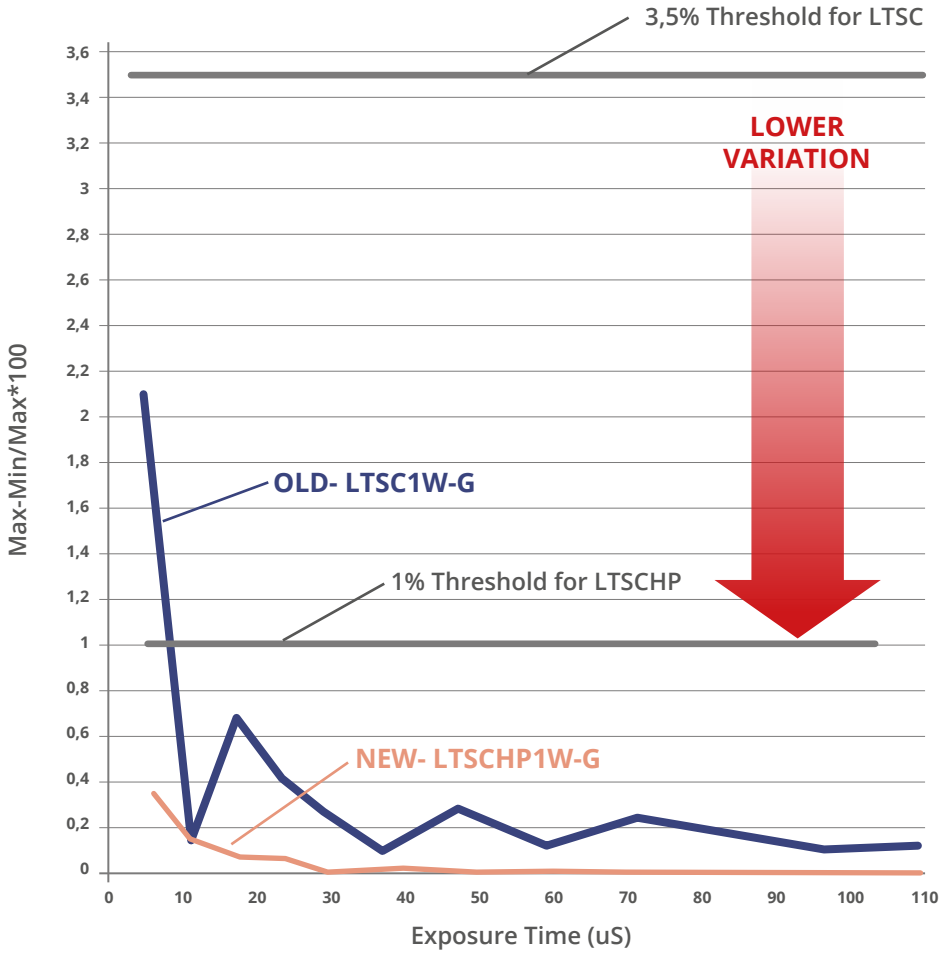


*Both at min and max LED forward current.

Key advantages

ILLUMINATION STABILITY

STABLE gray-levels background images



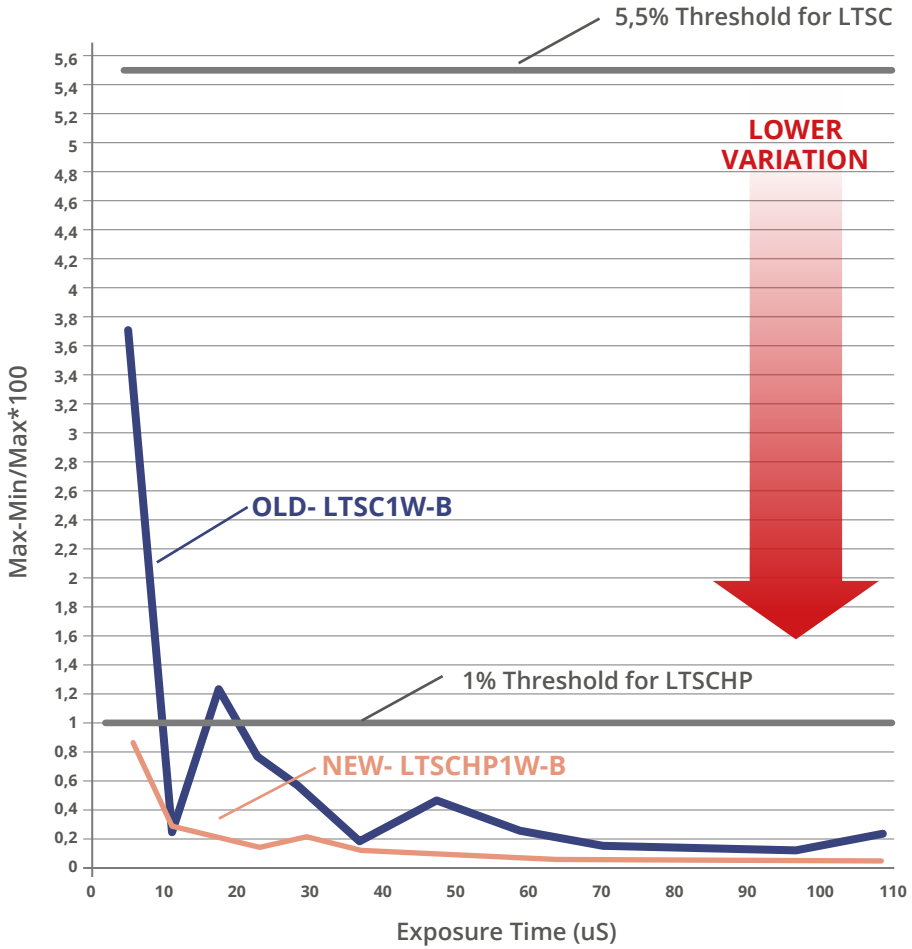
GREEN

Variation of mean gray level between 10 consecutive images acquired with camera Basler ACA640-100GM
< 1% at 5 µs camera exposure time

Key advantages

ILLUMINATION STABILITY

STABLE gray-levels background images



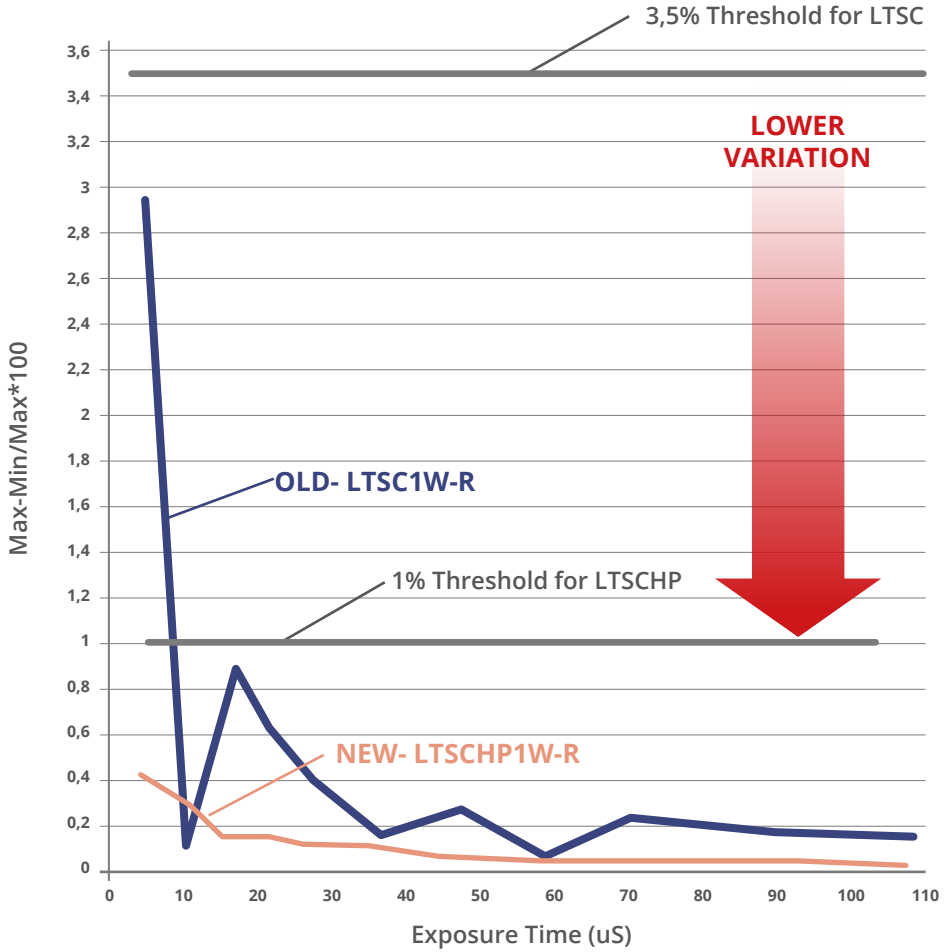
BLUE

Variation of mean gray level between 10 consecutive images acquired with camera Basler ACA640-100GM
< 1% at 5 µs camera exposure time

Key advantages

ILLUMINATION STABILITY

STABLE gray-levels background images



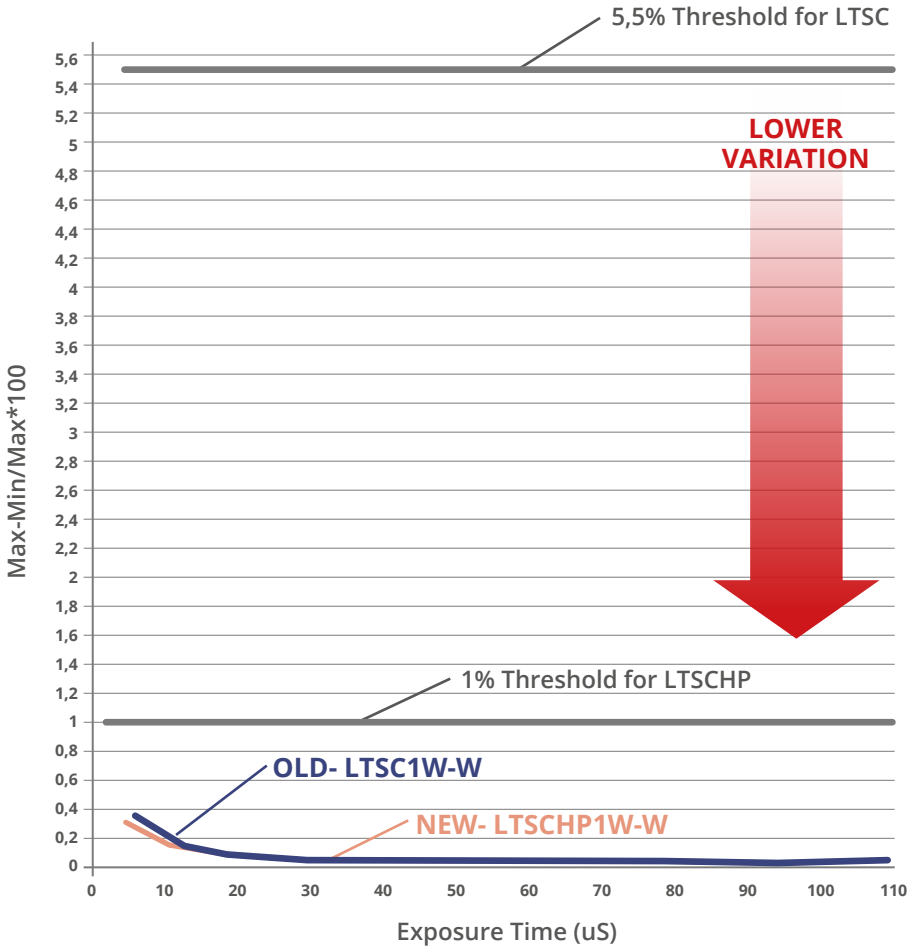
RED

Variation of mean gray level between 10 consecutive images acquired with camera Basler ACA640-100GM
< 1% at 5 µs camera exposure time

Key advantages

ILLUMINATION STABILITY

STABLE gray-levels background images



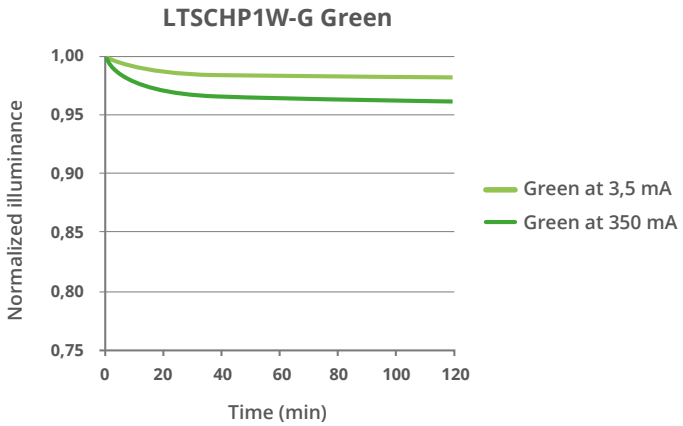
WHITE

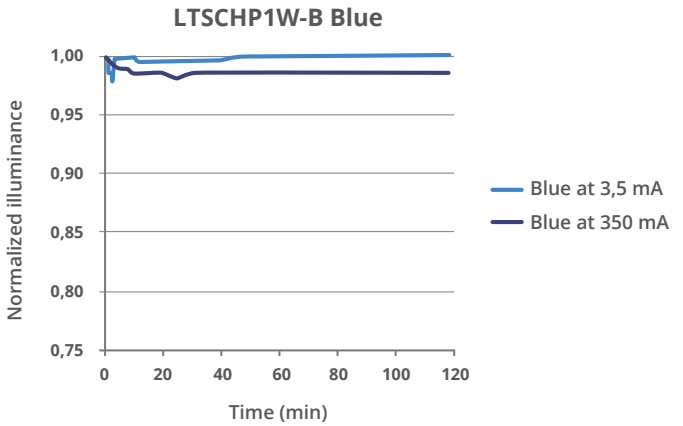
Variation of mean gray level between 10 consecutive images acquired with camera Basler ACA640-100GM
< 1% at 5 µs camera exposure time

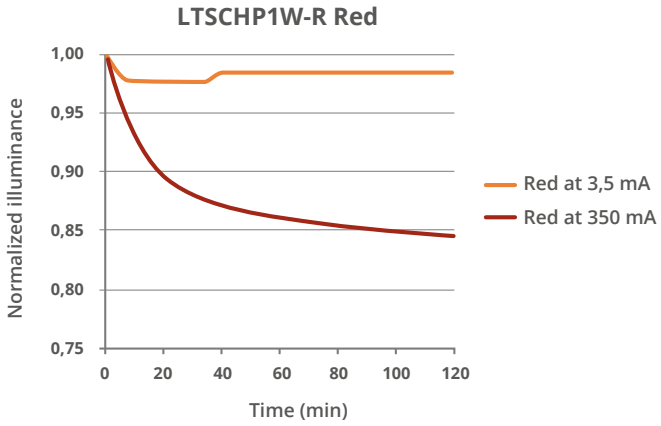
Key advantages

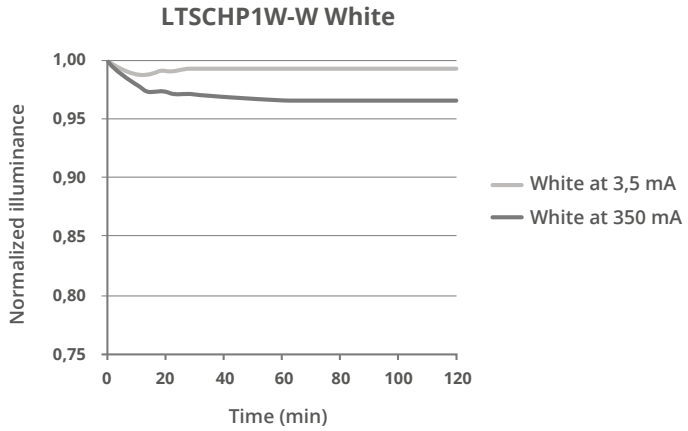
ILLUMINATION STABILITY

Very low
warm-up time







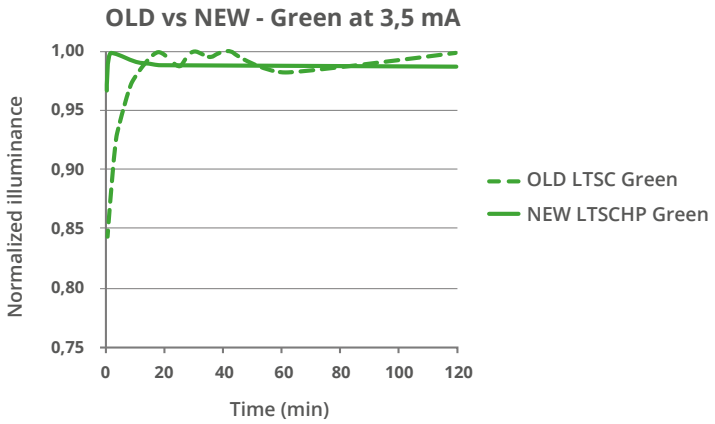


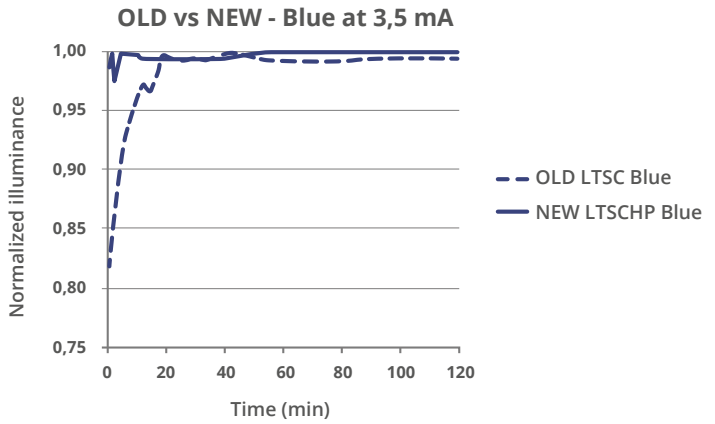
Normalized Illuminance graphs indicate **typical** warm-up times for green, blue, red and white light sources at min and max LED forward current

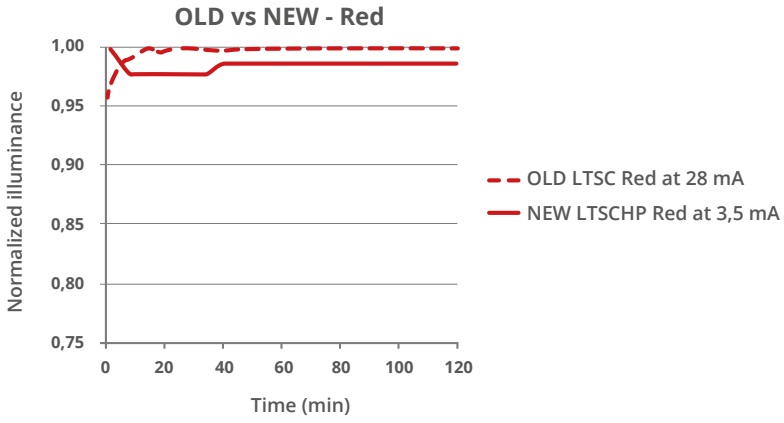
Key advantages

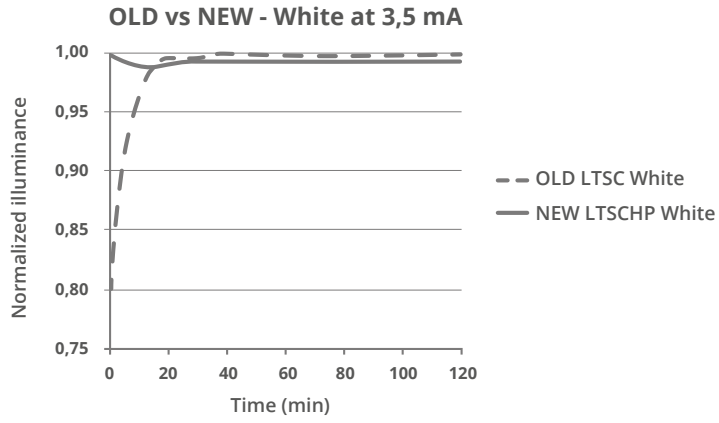
ILLUMINATION STABILITY: **OLD vs NEW**

Shorter
warm-up time
Less variation









Normalized Illuminance graphs indicate **typical** warm-up times for green, blue, red and white light sources at min and max LED forward current

Key advantages

PRECISE LIGHT INTENSITY TUNING

OLD

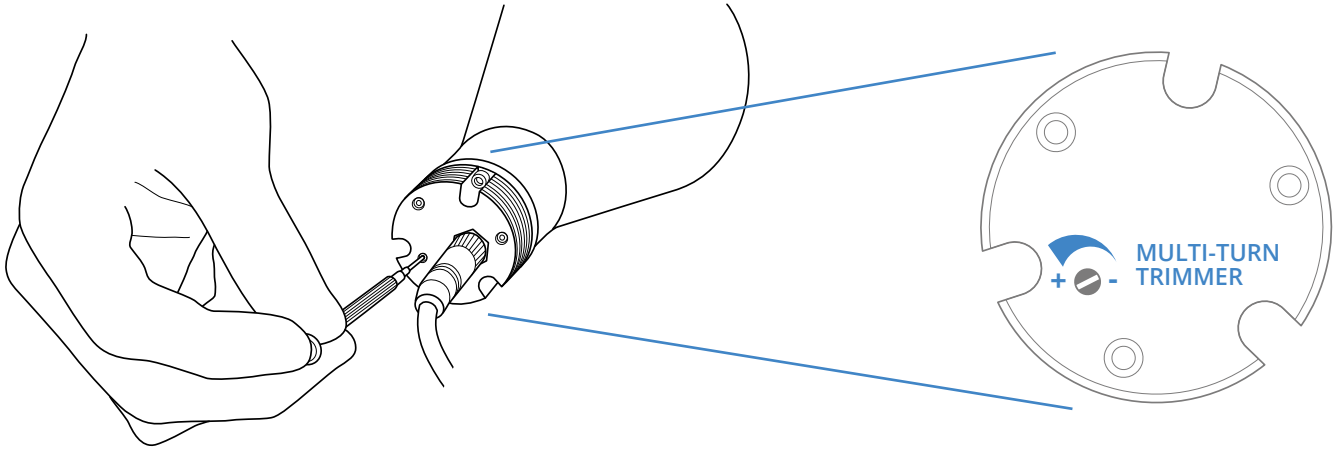
SINGLE-TURN TRIMMER

1 LIGHT INTENSITY TUNING: ONLY 1 TURN
2 WHEN TRIMMER AT MINIMUM, LIGHT STILL ON

NEW

MULTI-TURN TRIMMER

1 **MORE PRECISE** LIGHT INTENSITY TUNING: 21 FULL TURNS
2 WORKS **FROM ZERO TO MAX LIGHT**



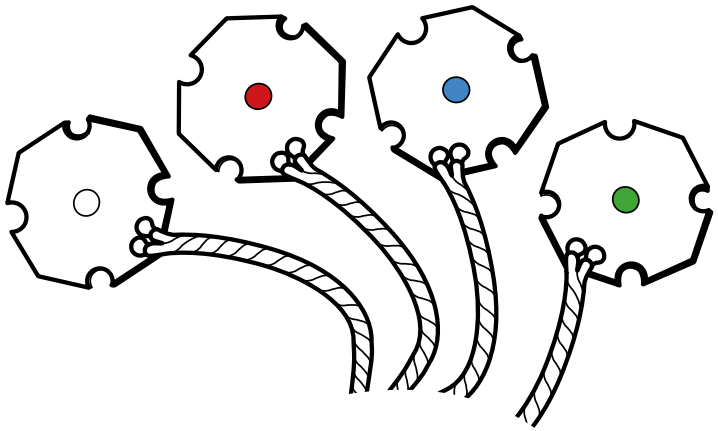
Key advantages

EASY LED REPLACEMENT

OLD

NOT AVAILABLE

NEW



- LEDs can be replaced and positioned by the user
- No need for soldering
- No need to realign the imaging lens with the illuminator

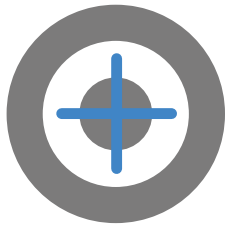
Key advantages

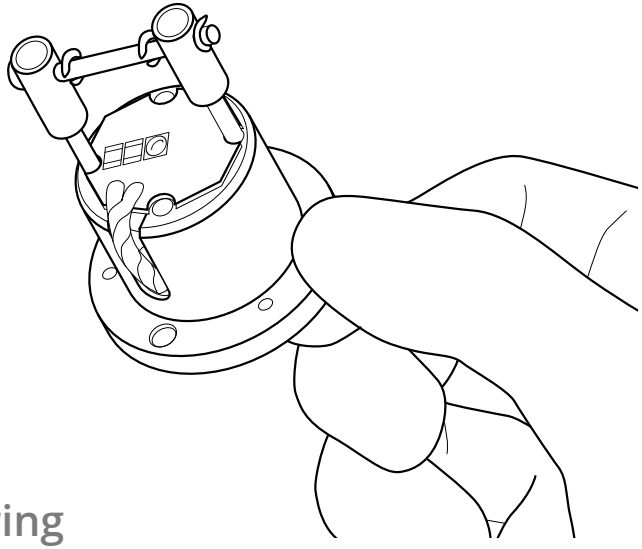
IMPROVED LED CENTERING ACCURACY

OLD

LED source positioned with no precision centering

NEW

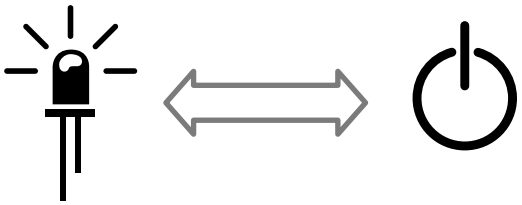




Dowel pins centering

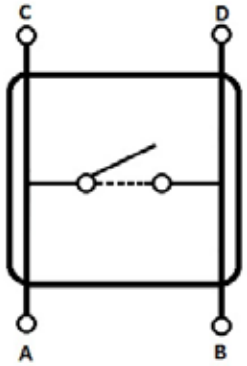
Key advantages

DIRECT LED CONTROL OPTION



Possibility to control the LED with customer own electronics

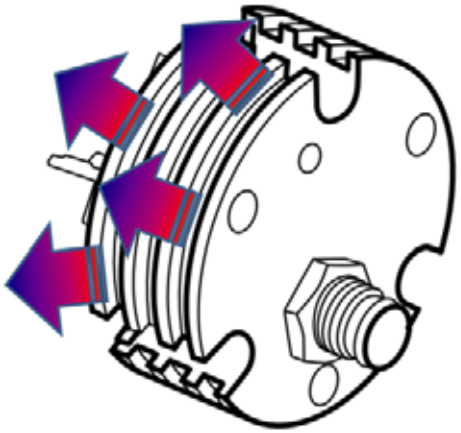
ADVANTAGE over LTSC



When bypassed, built-in electronics behaves as an **open circuit** allowing direct control of the LED source *with no influences from the built-in electronics*

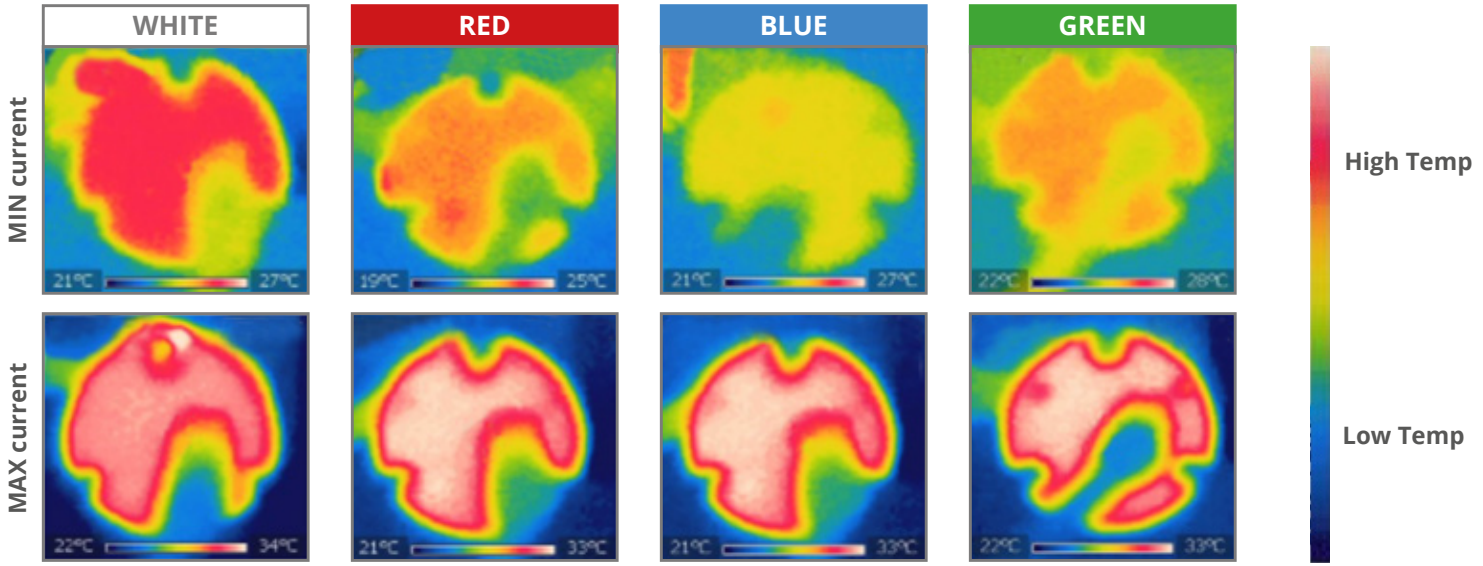
Key advantages

EXCELLENT THERMAL MANAGEMENT



- Stable illumination because LTCLHP
- Efficiently dissipate the heat generated by the built-in electronics and the LED source
- Thanks to a suitable heat sink directly in contact with the inner circuitry
- Low LED junction temperature is maintained ensuring
- Optimal optical output performances

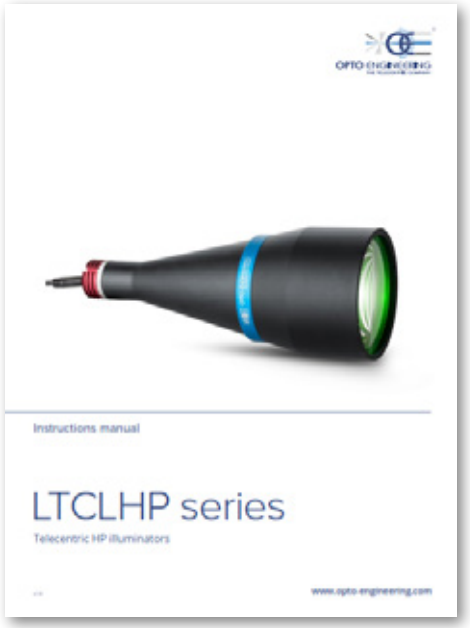
UNIFORM
heat dissipation
after 60 minutes



Key advantages

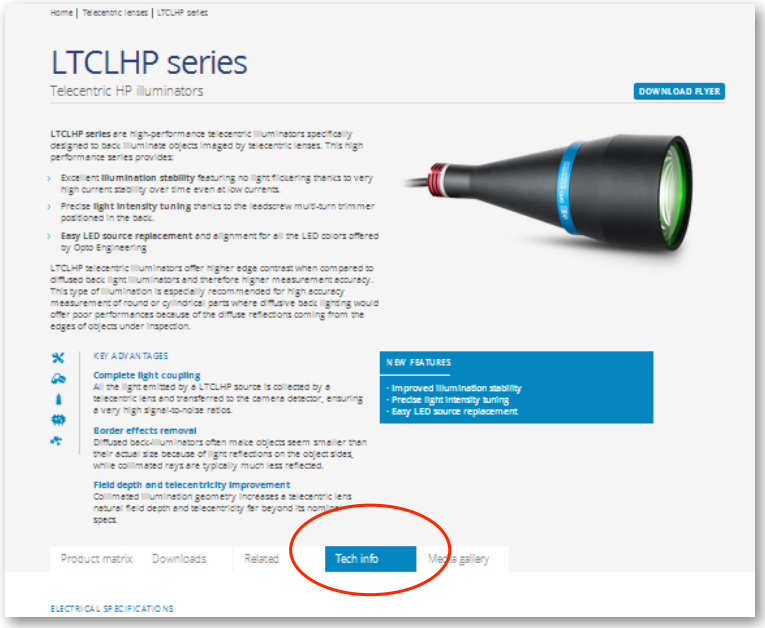
COMPREHENSIVE PRODUCT DOCUMENTATION

Downloadable instructions manual



PDF

Detailed TECH INFO section



Key advantages

COMPREHENSIVE PRODUCT DOCUMENTATION

Layout drawings / 3D models

CE conformity

3. CE Conformity

Opto Engineering declares the products of the LTSCHP series compliant with the provisions of the Community Directive 2004/108/CE (EMC) according to EN 61326-1 (Measuring Devices and Control Laboratory), including all applicable amendments.
All standards and/or technical specifications mentioned below have been applied:

Method	Title
CEI EN 61326-1:2007-03	Electrical equipment for measurement, control and laboratory use EMC requirements Part1: General requirements
CEI EN 61000-4-2:2011-04	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
CEI EN 61000-4-3:2007-04 CEI EN 61000-4-3/A1:2009-01 CEI EN 61000-4-3/A2:2011-01	Electromagnetic compatibility (EMC) Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity Test
CEI EN 61000-4-8:1997-06 CEI EN 61000-4-8/A1:2001-10	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 8: Power frequency magnetic field immunity test - Basic EMC Publication

Tests were carried at a certified laboratory.

Accessories / Spare parts

LTSCHP module

NEW

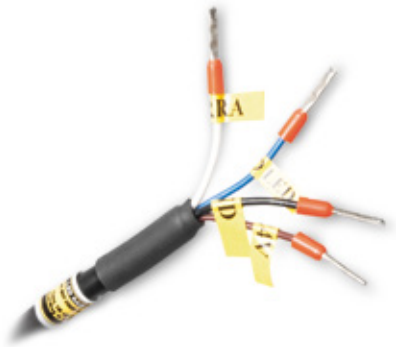
LED1W source

NEW

CMHO Clamping mechanics

CB244P1500 Power cable

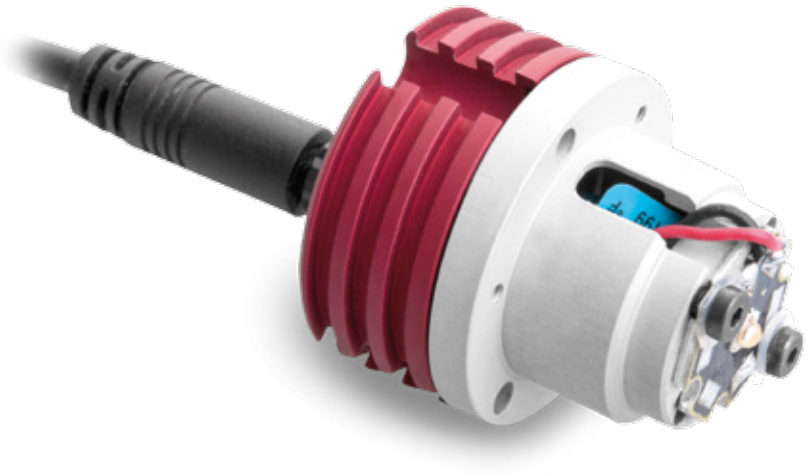
NEW



Accessories / Spare parts

LTSCHP module

NEW

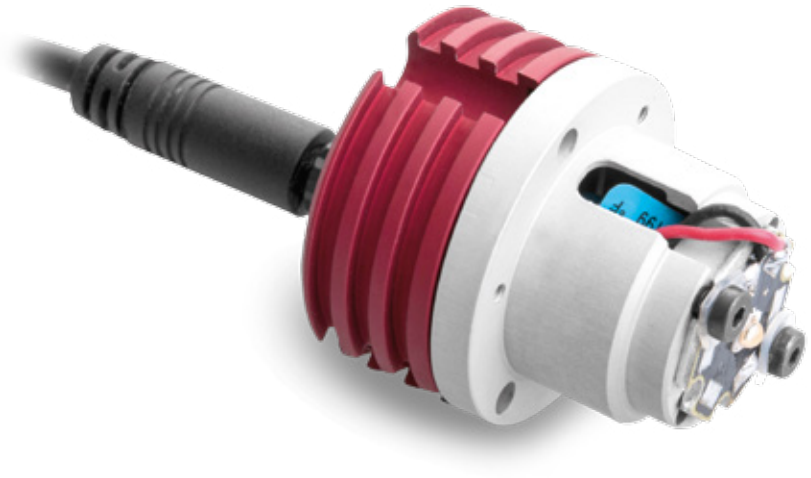


- Delivered not assembled
- Detailed assembling instructions
- Possibility to adjust the spacers configuration

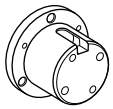
Accessories / Spare parts

LTSCHP module

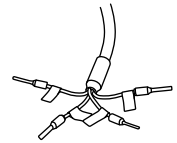
NEW



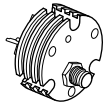
- **Delivered not assembled**
- Detailed assembling instructions
- Possibility to adjust the spacers configuration



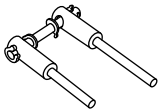
LED support (gray color)



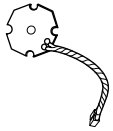
Power cable



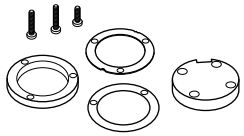
Rear part (red color)



LED centering tool to easily position and center LED1W-x light source



LED1W: LED source component

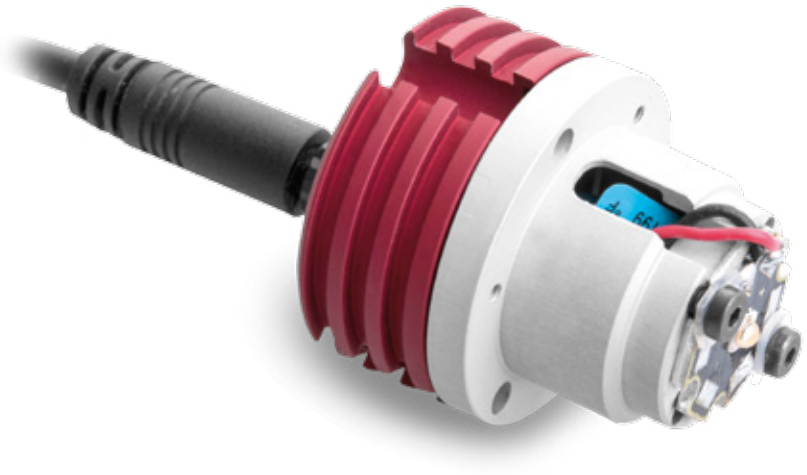


Spacers kit: includes the spacers and screws you need to correctly configure LTSCHP1W for your specific LTCLHP model

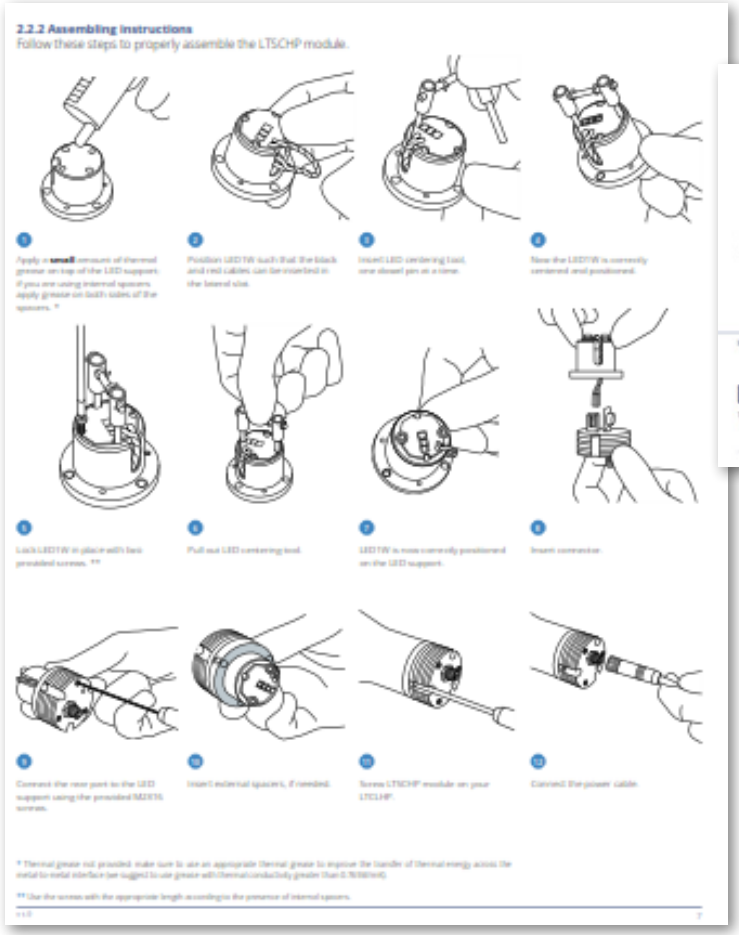
Accessories / Spare parts

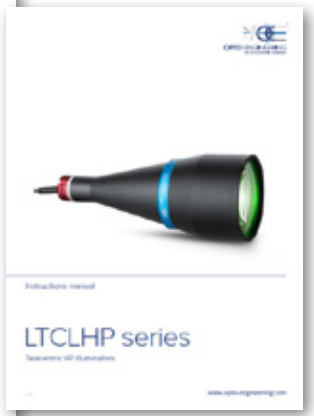
LTSCHP module

NEW



- Delivered not assembled
- **Detailed assembling instructions**
- Possibility to adjust the spacers configuration



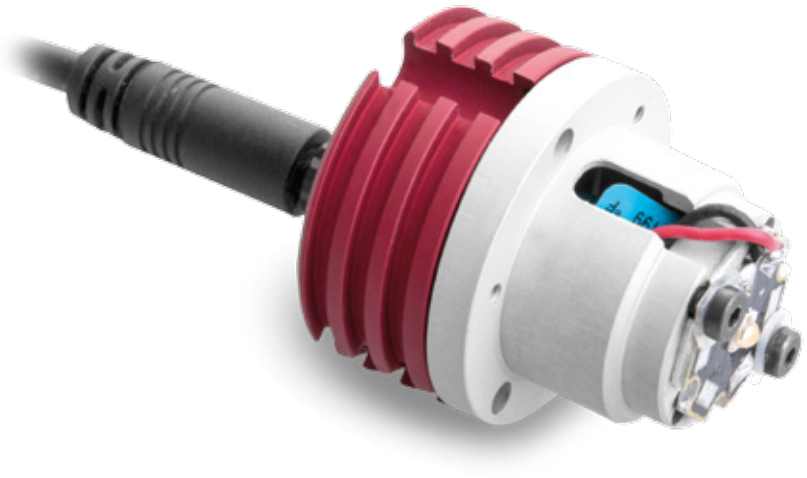


PDF

Accessories / Spare parts

LTSCHP module

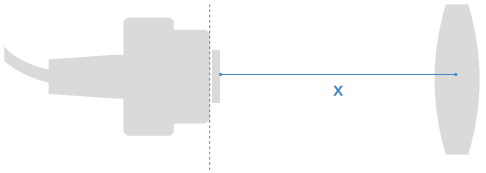
NEW



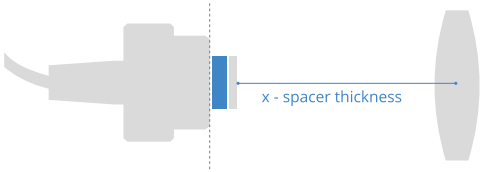
- Delivered not assembled
- Detailed assembling instructions
- **Possibility to adjust the spacers configuration**

Using spacers to adjust LED axial position

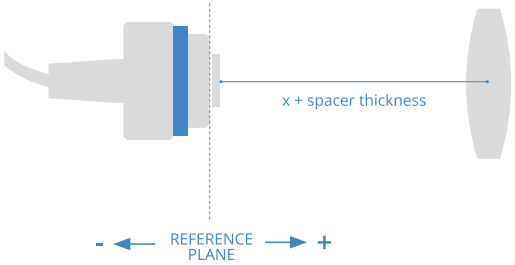
Without spacers

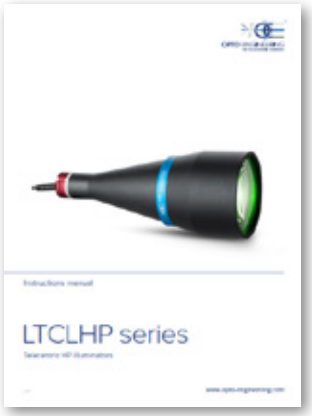


Use **internal** spacers to decrease the distance between LED and lens.



Use **external** spacers to offset the mechanical support, pushing the lens away from the LED.



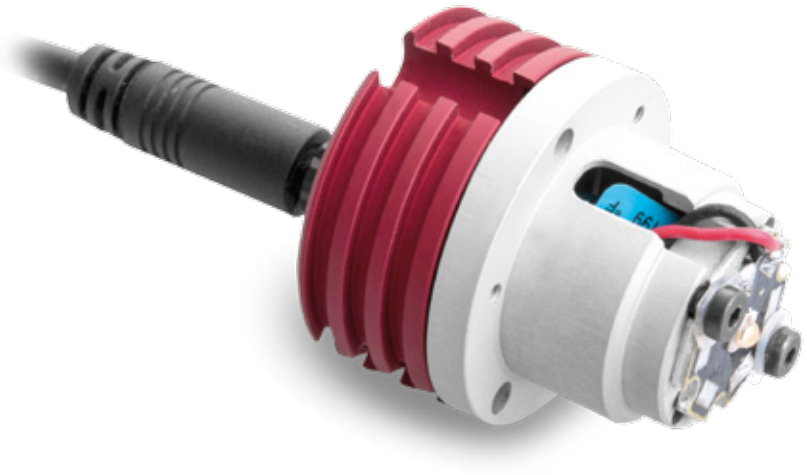


PDF

Accessories / Spare parts

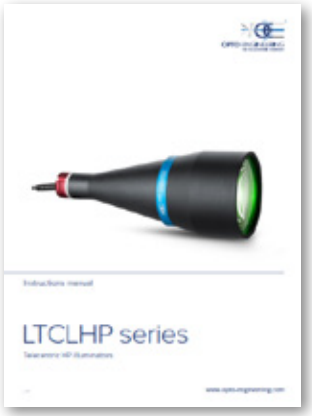
LTSCHP module

NEW



- Delivered not assembled
- Detailed assembling instructions
- **Possibility to adjust the spacers configuration**

Part number	Light color, wavelength peak	Theoretical LED position	Number of spacers				
			Internal	External			
			+5	-0,5	-1	-4	-5
		mm	mm	mm	mm	mm	mm
LTCLHP023-R	red, 630 nm	-					
LTCLHP023-G	green, 520 nm	-					
LTCLHP023-B	blue, 460 nm	-					
LTCLHP023-W	white	-					
LTCLHP016-R	red, 630 nm	-1.5		1	1		
LTCLHP016-G	green, 520 nm	-1.0			1		
LTCLHP016-B	blue, 460 nm	-1.0			1		
LTCLHP016-W	white	-1.5		1	1		
LTCLHP024-R	red, 630 nm	-1.5		1	1		
LTCLHP024-G	green, 520 nm	-1.0			1		
LTCLHP024-B	blue, 460 nm	-0.5		1			
LTCLHP024-W	white	-1.0			1		
LTCLHP036-R	red, 630 nm	-1.5		1	1		
LTCLHP036-G	green, 520 nm	-0.5		1			
LTCLHP036-B	blue, 460 nm	0.0					
LTCLHP036-W	white	-0.5		1			
LTCLHP048-R	red, 630 nm	-1.5		1	1		
LTCLHP048-G	green, 520 nm	0.0					
LTCLHP048-B	blue, 460 nm	+1.0	1		4		
LTCLHP048-W	white	+0.5	1	1	4		
LTCLHP056-R	red, 630 nm	-2.0			2		
LTCLHP056-G	green, 520 nm	-0.5		1			
LTCLHP056-B	blue, 460 nm	+1.0	1		4		
LTCLHP056-W	white	+0.5	1	1	4		
LTCLHP064-R	red, 630 nm	-2.0			2		
LTCLHP064-G	green, 520 nm	0.0					
LTCLHP064-B	blue, 460 nm	+1.5	1	1	3		
LTCLHP064-W	white	+1.0	1		4		
LTCLHP080-R	red, 630 nm	-2.0			2		
LTCLHP080-G	green, 520 nm	0.0					
LTCLHP080-B	blue, 460 nm	+2	1		3		
LTCLHP080-W	white	+1.5	1	1	3		
LTCLHP096-R	red, 630 nm	-2.5		1	2		
LTCLHP096-G	green, 520 nm	0.0					
LTCLHP096-B	blue, 460 nm	+2.0	1		3		
LTCLHP096-W	white	+1.5	1	1	3		
LTCLHP120-R	red, 630 nm	-2.5		1	2		
LTCLHP120-G	green, 520 nm	+1.0	1		4		
LTCLHP120-W	white	+4.0	1		1		
LTCLHP144-R	red, 630 nm	-2.5		1	2		
LTCLHP144-G	green, 520 nm	+1.5	1	1	3		
LTCLHP192-R	red, 630 nm	-3.0			3		
LTCLHP192-G	green, 520 nm	+2.5	1	1	2		
LTCLHP192-W	white	+7	2		3		
LTCLHP240-R	red, 630 nm	-3			3		
LTCLHP240-G	green, 520 nm	+3.5	1	1	1		



PDF

Accessories / Spare parts

LED1W source

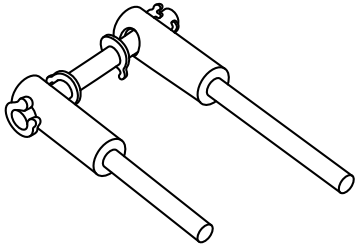
NEW

- Includes LED centering tool
- No need for soldering when replacing LED1W
- All LED colors are compatible with the built-in electronics
- Downloadable detailed assembling instructions

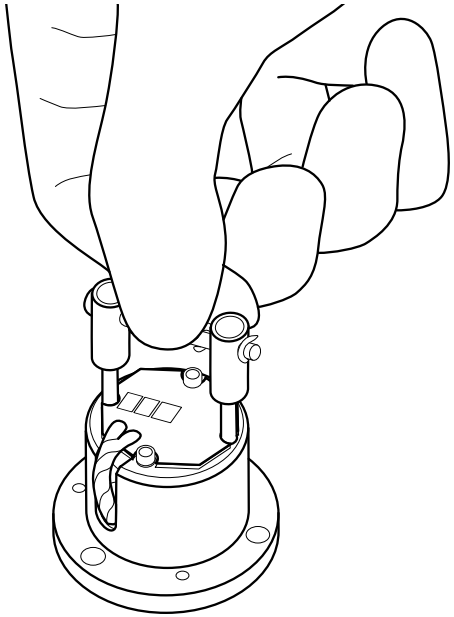
Accessories / Spare parts

LED1W source

NEW



LED centering tool
to easily position
and center
LED1W-x light source



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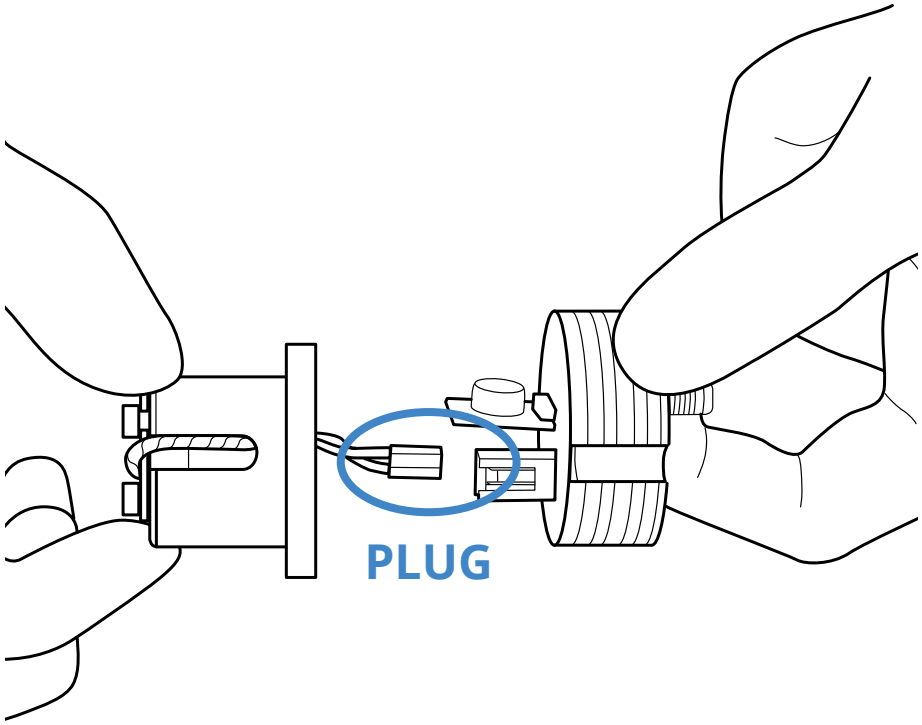
Accessories / Spare parts

LED1W source

NEW



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Accessories / Spare parts

LED1W source

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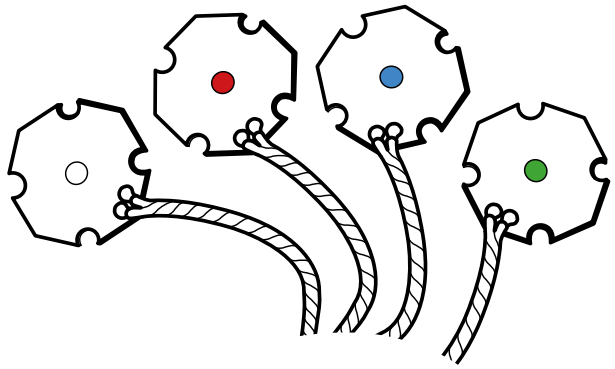

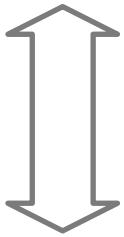

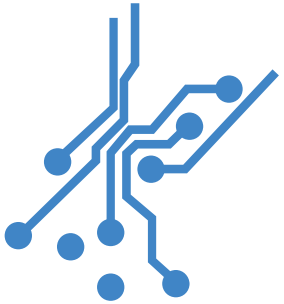

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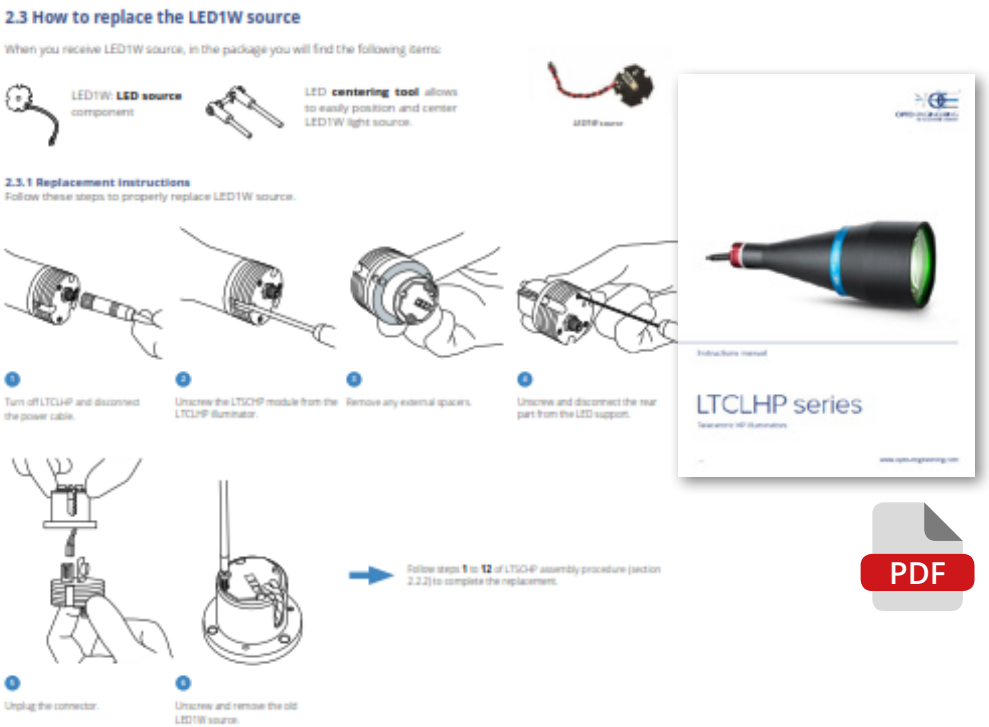
Accessories / Spare parts

LED1W source

NEW



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- No need for soldering when replacing LED1W
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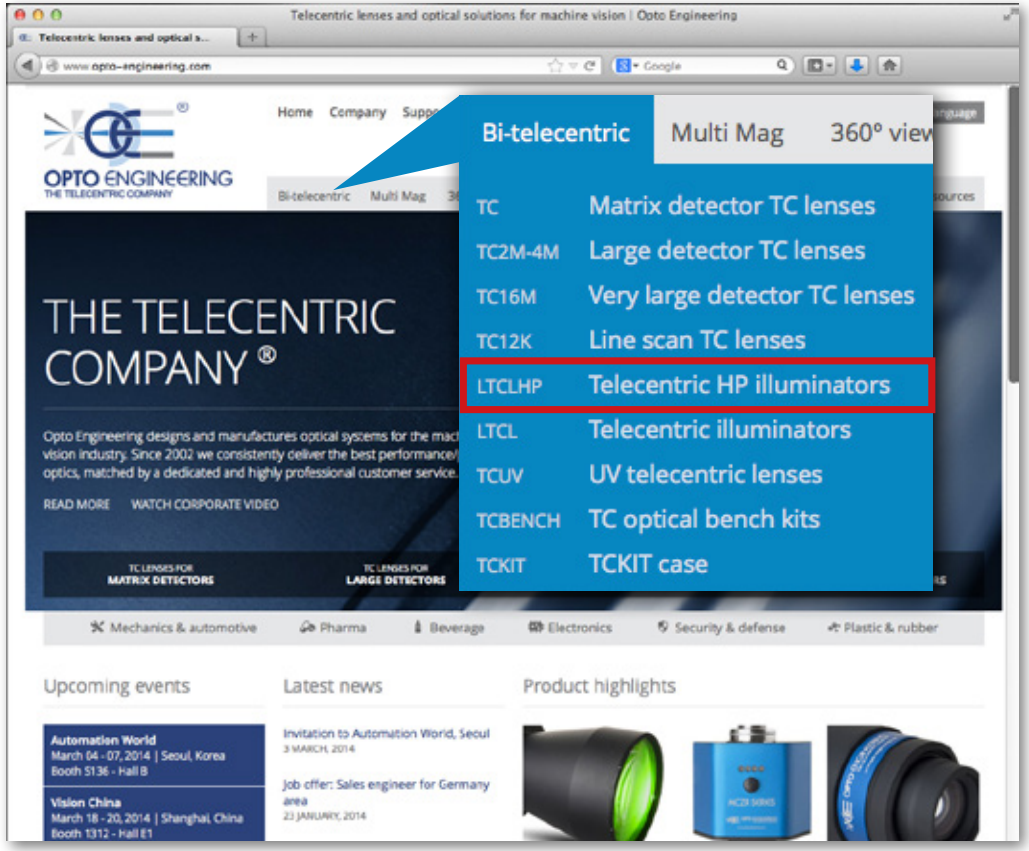
Pricing & availability

- Low price increase

between 18% - 4%

- Already on-line

- Same delivery times as LTCL series



Key features

SUMMARY

- ENHANCED ILLUMINATION STABILITY
- VERY SHORT WARM UP TIMES
- PRECISE LIGHT INTENSITY TUNING
- IMPROVED LED CENTERING ACCURACY
- EASY LED REPLACEMENT
- DIRECT LED CONTROL OPTION
- EXCELLENT THERMAL MANAGEMENT
- COMPREHENSIVE PRODUCT DOCUMENTATION
- ACCESSORIES / SPARE PARTS
- LOW PRICE INCREASE

Application examples

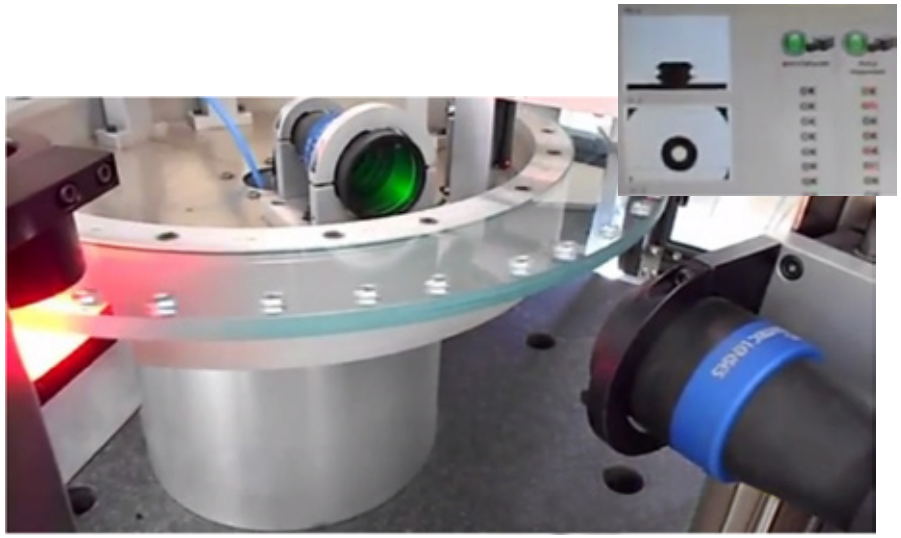
PRECISE SIZE MEASUREMENT OF AUTOMOTIVE PARTS, ELECTRONIC COMPONENTS OR PHARMACEUTICAL PACKAGES.

Pharmaceutical packages

Automotive parts

Electronic components

FASTENER INSPECTION MACHINE



INSPECTION SYSTEM

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