LTCLHP series
Product presentation

www.opto-engineering.com
Summary

Introduction: when you need collimated light

Key advantages

- Key advantages of collimated light

- LTCLHP key features

- Accessories / Spare parts

- Pricing / availability

Application examples
Introduction

COLLIMATED VS DIFFUSED BACKLIGHT

- Light coming from a variety of angles

- Parallel rays

NON-COLLIMATED BACK ILLUMINATION

COLLIMATED BACK ILLUMINATION
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

IMPROVED PERFORMANCES AT **LOW CURRENTS**

- LED1W source
- LTSCHP module
- CB244P1500 power cable
- optics

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# Key advantages

## LTCLHP OVERVIEW

### LTCLHP series

- **Part number**: Beam diam.  |  Length  |  DC voltage  |  Power cons.  |  Max LED fwd current  |  Forward voltage  |  Max pulse current  |  Compatibility
- **LTCLHP023-R**: 16 | 96.8 | 12 | 2.4 | 350 | 2.4 | 3.00 | TC23004, TC23012, TC4M004, TC4M007, TC4M009
- **LTCLHP023-G**: 16 | 96.8 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC23004, TC23012, TC4M004, TC4M007, TC4M009
- **LTCLHP023-B**: 16 | 96.8 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC23004, TC23012, TC4M004, TC4M007, TC4M009
- **LTCLHP023-W**: 16 | 96.8 | 12 | 2.4 | 350 | 2.78 | n.a. | TC23004, TC23012, TC4M004, TC4M007, TC4M009
- **LTCLHP016-R**: 20 | 99.9 | 12 | 2.4 | 350 | 2.4 | 3.00 | TC12016, TC23016, TC4M016-X, TC2M016-X
- **LTCLHP016-G**: 20 | 99.9 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC12016, TC23016, TC4M016-X, TC2M016-X
- **LTCLHP016-B**: 20 | 99.9 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC12016, TC23016, TC4M016-X, TC2M016-X
- **LTCLHP016-W**: 20 | 99.9 | 12 | 2.4 | 350 | 2.78 | n.a. | TC12016, TC23016, TC4M016-X, TC2M016-X
- **LTCLHP024-R**: 30 | 124.7 | 12 | 2.4 | 350 | 2.4 | 3.00 | TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
- **LTCLHP024-G**: 30 | 124.7 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
- **LTCLHP024-B**: 30 | 124.7 | 12 | 2.4 | 350 | 3.3 | 4.00 | TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
- **LTCLHP024-W**: 30 | 124.7 | 12 | 2.4 | 350 | 2.78 | n.a. | TC12024, TC23024, TC4M024-X, TC2M024-X, TC16M009, TC16M012, TC16M018
- **LTCLHP036-R**: 45 | 152.1 | 12 | 2.4 | 350 | 2.4 | 3.00 | TC13036, TC13036, TC4M036, TC2M036, TC4M036, TC2M036

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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

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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

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

![Graph showing stability of gray-levels]

**STABLE** gray-levels

background images

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

**NEW- LTSCHP1W-B**

**OLD- LTSC1W-B**

5.5% Threshold for LTSC

1% Threshold for LTSCHP

Max-Min/Max*100 vs. Exposure Time (μS)
Key advantages

ILLUMINATION STABILITY

STABLE gray-levels
background images

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

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

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Key advantages
EASY LED REPLACEMENT

OLD

NEW

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

NOT AVAILABLE
Key advantages
IMPROVED LED CENTERING ACCURACY

OLD

LED source positioned with no precision centering

NEW

Dowel pins centering

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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

Detailed TECH INFO section
Key advantages

COMPREHENSIVE PRODUCT DOCUMENTATION

Layout drawings / 3D models

CE conformity

PDF  DXF  STEP
Accessories / Spare parts

- LTSCHP module
- LED1W source
- CMHO Clamping mechanics
- CB244P1500 Power cable

NEW

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Accessories / Spare parts

LTSCHP module

- Delivered not assembled
- Detailed assembling instructions
- Possibility to adjust the spacers configuration
**Accessories / Spare parts**

**LTCHSP module**

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

- **LED support** (gray color)
- **Power cable**
- **Rear part** (red color)
- **LED1W: LED** source component
- **LED centering tool** to easily position and center LED1W-x light source
- **Spacers kit**: includes the spacers and screws you need to correctly configure LTCHSP1W for your specific LTCLHP model
Accessories / Spare parts

LTCHP module

- Delivered not assembled
- **Detailed assembling instructions**
- POSSIBILITY TO ADJUST THE SPACERS CONFIGURATION

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Accessories / Spare parts

LTSCHP module

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

<table>
<thead>
<tr>
<th>Part number</th>
<th>Light cover, wavelength peak</th>
<th>Theoretical LCD position</th>
<th>Number of spacers</th>
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</tbody>
</table>
Accessories / Spare parts

LED1W source

- 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

- 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

LED centering tool
to easily position and center LED1W-x light source
Accessories / Spare parts

LED1W source

- 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
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

- 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
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