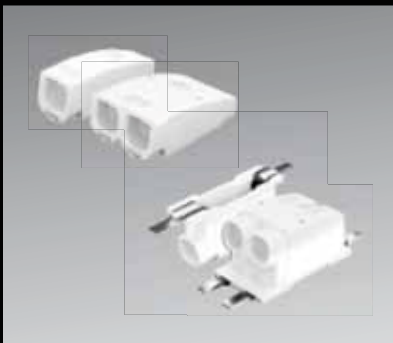


Specific information for LED applications



BJB///OEM-Line
The smartest route to your LED application



Your Connection to Light

BJB///OEM-Line

The smartest route to your LED application

Contents

005	The smartest route to your LED application
006	Product and system over views
012	Light sources and light control
060	Push-to-Fix fixing elements (P2F)
064	Connecting and interconnection elements
086	Automation systems for LED applications
091	ESD protection
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098	Information on product pages
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100	Guarantee conditions
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BJB///OEM-Line

The smartest route to your LED application

BJB///OEM-Line.

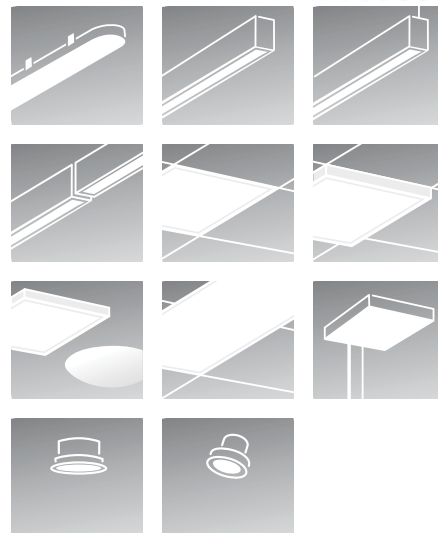
The smartest route to your LED application.

Nowadays everything to do with light is dictated by LED. Long operating life, high efficiency, a variety of options and completely new design opportunities are indisputable advantages. However, the use of LEDs also involves new technologies and processes in luminaire production. Anyone working with limited resources and not wanting to run the risk of failure will definitely not want to carry out a migration to LED technology on a trial-error basis. As marketable products alone are the critical success factor for all innovations, however, investments and resources for new technologies are necessary.

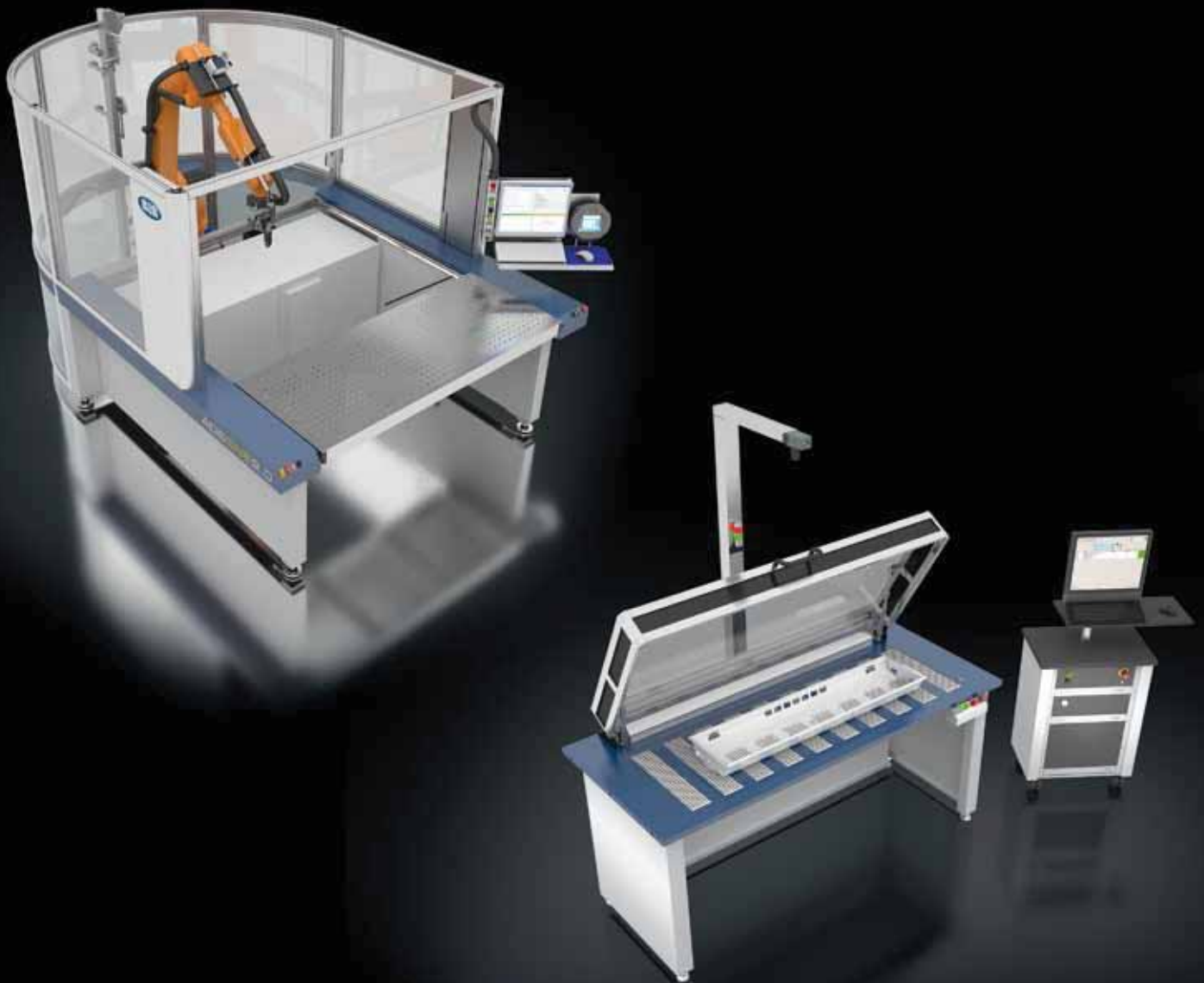
We aim to meet this requirement with our BJB///OEM-Line range. With connecting and fixing components, with LED light sources for panel, linear and Spot-Downlight light, with accessories such as optical holders, optical plates and reflectors – in short: with a comprehensive range which enables LEDs to be implemented safely into all kinds of applications.

There is still more to BJB///OEM-Line, however. Good quality requires production processes which are geared to these new technologies. Here too, BJB has the appropriate solutions in the form of automation systems for assembling, wiring and testing.

The components and production systems of the BJB///OEM-Line, whether individually or as a complete package, provide a universal modular system for the realisation of LED applications.



Interconnected automation systems for assembling,
wiring and testing of LED luminaires



ADS One 2.0 wiring system with comprehensive ESD protection and test bench

You provide the ideas and the design.
We provide the components and processes.

BJB///OEM-Line

The smartest route to your LED application

Connection and interconnection components



Light sources and light control components



Fixing components



Left row, from top:
Board-to-Board (B2B) and Board-to-Cable (B2C) connecting elements
Mini SMD terminal blocks
SMD terminal blocks with rear-entry wiring
Spotlight Connectors

Middle row, from top:
BJB LED boards
Optical plates and optical holders
Linear Flat
GX16t-5 LED tubes
BJB Spot-/ Downlight system with reflector

Right:
Push-to-Fix (P2F) fixing elements

BJB///OEM-Line

The smartest route to your LED application



BJB///OEM-Line

The smartest route to your LED application

AREA LIGHTING APPLICATIONS



SMD Terminal Blocks



P2F - Push-to-Fix
Fixing element



LED modules



B2B - Board-to-Board
B2C - Board-to-Cable
Connecting element



GX16t-5 LED tube



Linear Flat System

LINEAR LIGHTING APPLICATIONS

BJB automation

ADS One 2.0

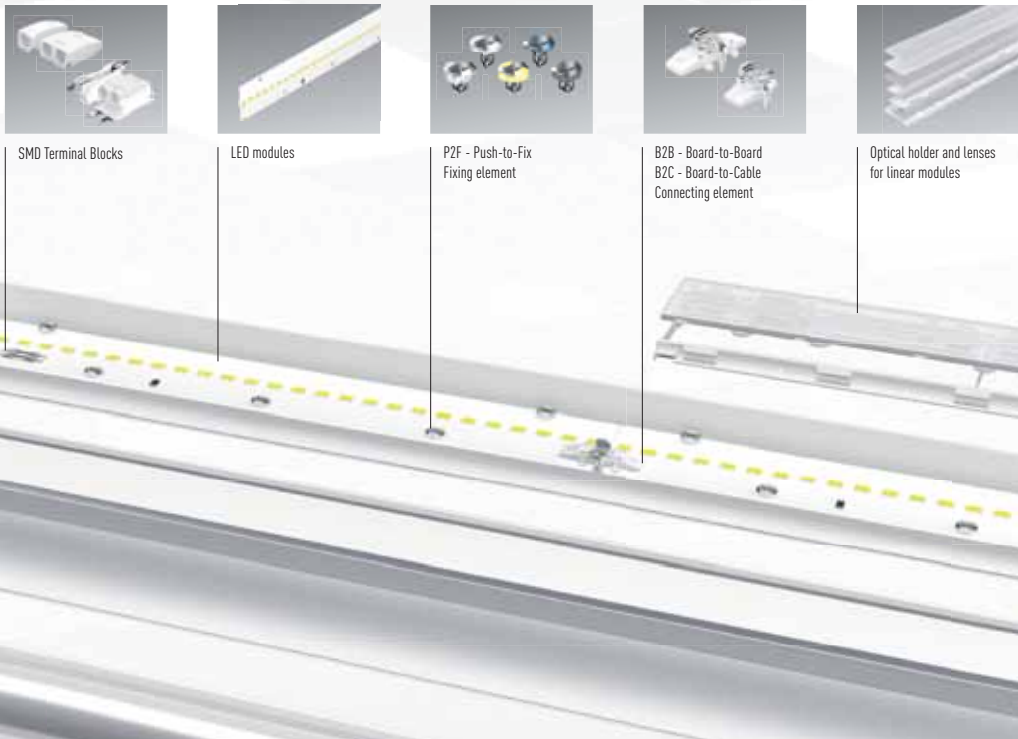


Test station

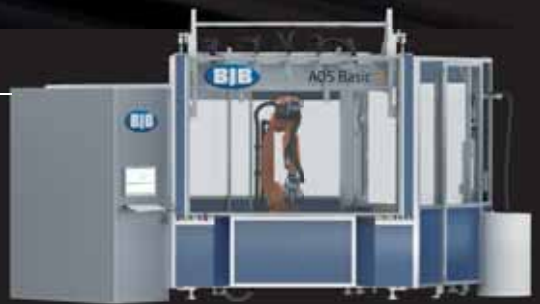


APPLICATIONS

SPOT-/DOWNLIGHTS



ADS Basic



ADS Master L



BJB///OEM-Line

The smartest route to your LED application

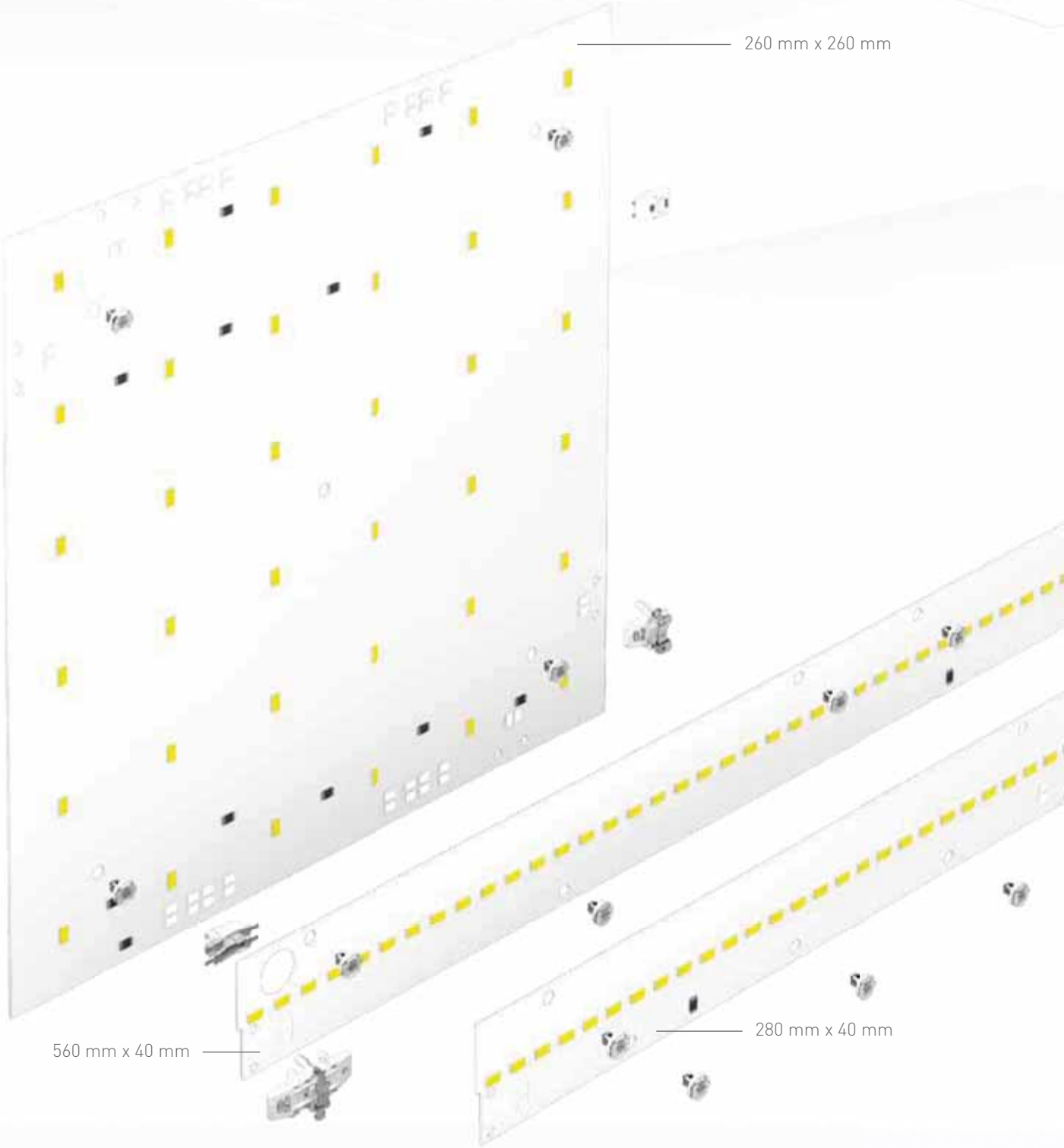
Product overview

Light sources and components

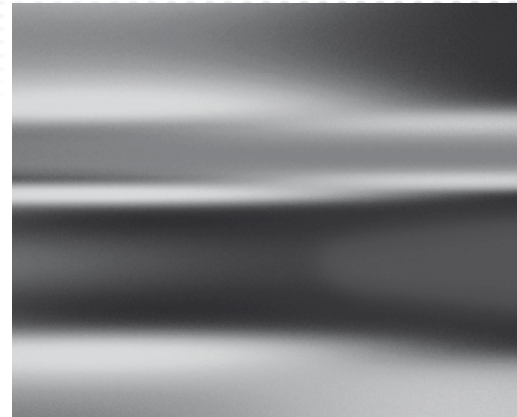
012	LED modules
022	ECGs
024	Optical holders and optical plates
032	GX16t-5 LED tubes
040	Linear Flat System
046	LED Spot-/Downlight system
050	Spotlight Connectors
060	Push-to-Fix fixing elements (P2F)
064	Board-to-Board connecting elements (B2B)
070	Board-to-Cable connecting elements (B2C)
074	SMD terminal blocks for rear-entry wiring
080	Mini SMD terminal blocks
084	Component-finder

BJB///OEM-Line

The modular system for
LED luminaire production



LED modules from BJB. Could not be easier.



The greatest challenges for the LED market are the enormous number of products and the lack of mandatory standards. With our new LED modules, we are now offering users a way out of this situation:

Ready to install components in a variety of designs.

These are tested systems, which can be used in normal applications and which are coordinated with all the mechanical and electrical peripheral components required for luminaire production. This enables LED technology to be integrated quickly and safely.

We currently supply various standard modules as

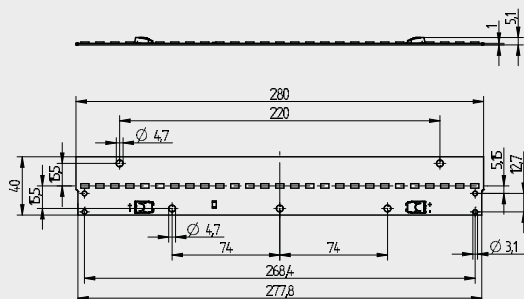
well as customer specific versions. All versions are available in various colour temperatures and lumen outputs, including tuneable white. The linear modules can also be combined with accessories such as optical holders and optical plates for light control and glare reduction.

LED modules from BJB also have other impressive attributes: They are suitable for parallel and series connection as well as a combination of both, are based on the Zhaga standard and can be wired automatically.

In combination with our other components, they provide an all round solution for the efficient and convenient assembly of LED luminaires.

Can be used in linear and panel lighting applications





Linear modules 280 mm x 40 mm

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring
- Module efficiency up to 156 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 1.078 - 1.491 Lumen at Tc = 25 °C
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 70 °C
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**

Specific technical data (typical)

part no.	Colour temperature	Luminous flux at Tc 25 °C	Module efficiency at Tc 25 °C	Luminous flux at Tc 40 °C	Module efficiency at Tc 40 °C	Operational current I _f	Operational voltage U _f	Power consumption	Energie efficiency
31.130.0001.00	3.000 K	1.239 Lumen	130 lm/W	1.215 Lumen	129 lm/W	350 mA	26.9 V DC	9.4 W	A+
31.130.0002.00	4.000 K	1.308 Lumen	138 lm/W	1.282 Lumen	136 lm/W	350 mA	26.9 V DC	9.4 W	A++

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F - Push-to-Fix

B2B - Board-to-Board connecting elements

Optic holder

Optical profiles and plates

B2C - Board-to-Cable Feeder for PCBs - alternative for SMD terminal blocks. Please contact us.



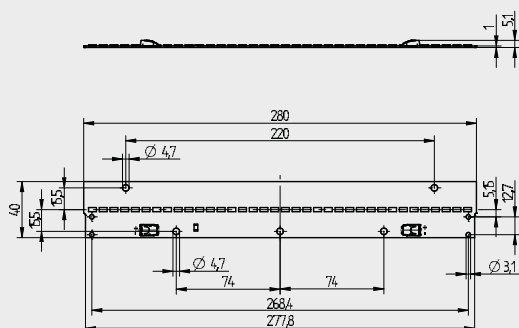
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see page 72



Linear modules 280 mm x 40 mm

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring
- Module efficiency up to 150 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 1.723 - 2.317 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 70 °C
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**

Specific technical data (typical)

part no.	Colour temperature	Luminous flux at Tc 25 °C	Module efficiency at Tc 25 °C	Luminous flux at Tc 53 °C	Module efficiency at Tc 53 °C	Operational current I _f	Operational voltage U _f	Power consumption	Energie efficiency
31.130.0003.00	3.000 K	1.995 Lumen	131 lm/W	1.915 Lumen	126 lm/W	700 mA	21.7 V DC	15.19 W	A+
31.130.0004.00	4.000 K	2.195 Lumen	144 lm/W	2.195 Lumen	138 lm/W	700 mA	21.7 V DC	15.19 W	A+

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F - Push-to-Fix



see page 62

B2B - Board-to-Board connecting elements



see page 66

Optic holder



see page 26

Optical profiles and plates

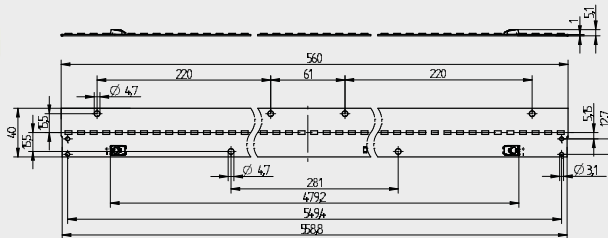


see page 27

B2C - Board-to-Cable Feeder for PCBs - alternative for SMD terminal blocks. Please contact us.



see page 72



Linear modules 560 mm x 40 mm

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring
- Module efficiency up to 156 Lumen/Watt (A++) at $T_c = 25^\circ C$
- Luminous flux: 2.295 - 2.983 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: $-30^\circ C$ bis $+45^\circ C$
- TC: max. $70^\circ C$
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**

Specific technical data (typical)

Part no.	Colour temperature	Luminous flux at $T_c 25^\circ C$	Module efficiency at $T_c 25^\circ C$	Luminous flux at $T_c 40^\circ C$	Module efficiency at $T_c 40^\circ C$	Operational current I_f	Operational voltage U_f	Power consumption	Energie efficiency
31.130.0005.00	3.000 K	2.478 Lumen	130 lm/W	2.429 Lumen	129 lm/W	350 mA	53.7 V DC	18.8 W	A+
31.130.0006.00	4.000 K	2.616 Lumen	138 lm/W	2.564 Lumen	136 lm/W	350 mA	53.7 V DC	18.8 W	A++

Tolerances of optical and electrical data: $\pm 10\%$

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F - Push-to-Fix



see page 62

B2B - Board-to-Board connecting elements



see page 66

Optic holder



see page 26

Optical profiles and plates




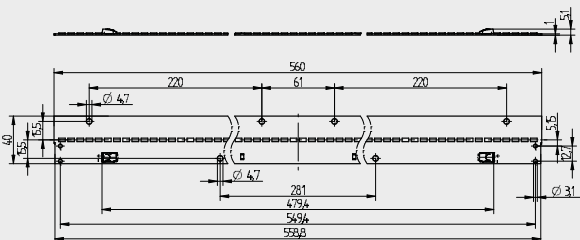
see page 27

B2C - Board-to-Cable Feeder for PCBs - alternative for SMD terminal blocks. Please contact us.



see page 72



Linear modules 560 mm x 40 mm

Range of applications:
Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring






- Module efficiency up to 150 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 3.590 - 4.827 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 70 °C
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**

Specific technical data (typical)

Part no.	Colour temperature	Luminous flux at Tc 25 °C	Module efficiency at Tc 25 °C	Luminous flux at Tc 53 °C	Module efficiency at Tc 53 °C	Operational current I _f	Operational voltage U _f	Power consumption	Energie efficiency
31.130.0007.00	3.000 K	3.989 Lumen	131 lm/W	3.830 Lumen	126 lm/W	700 mA	43.4 V DC	30.4 W	A+
31.130.0008.00	4.000 K	4.389 Lumen	144 lm/W	4.213 Lumen	138 lm/W	700 mA	43.4 V DC	30.4 W	A+

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BIB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with				
P2F - Push-to-Fix	B2B - Board-to-Board connecting elements	Optic holder	Optical profiles and plates	B2C - Board-to-Cable Feeder for PCBs - alternative for SMD terminal blocks. Please contact us.
				
see page 62	see page 66	see page 26	see page 27	see page 72

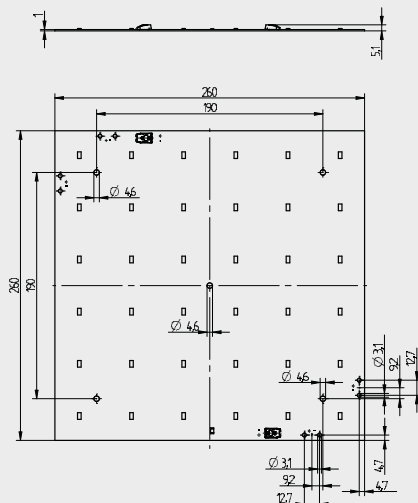


Square modules 260 mm x 260 mm

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring
- Module efficiency up to 164 Lumen/Watt (A++) at $T_c = 25\text{ }^\circ\text{C}$
- Luminous flux: 1.099 - 1.521 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: $RA > 80$
- Beam angle: 120°
- Life span $L_{70} > 50,000\text{ h}$
- Ambient temperature: $-30\text{ }^\circ\text{C}$ bis $+45\text{ }^\circ\text{C}$
- TC: max. $70\text{ }^\circ\text{C}$
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**



Specific technical data (typical)

Part no.	Colour temperature	Luminous flux at $T_c 25\text{ }^\circ\text{C}$	Module efficiency at $T_c 25\text{ }^\circ\text{C}$	Luminous flux at $T_c 30\text{ }^\circ\text{C}$	Module efficiency at $T_c 30\text{ }^\circ\text{C}$	Operational current I_f	Operational voltage U_f	Power consumption	Energie efficiency
31.110.0001.00	3.000 K	1.263 Lumen	136 lm/W	1.251 Lumen	136 lm/W	350 mA	26.3 V DC	9.2 W	A++
31.110.0002.00	4.000 K	1.333 Lumen	144 lm/W	1.320 Lumen	144 lm/W	350 mA	26.3 V DC	9.2 W	A++

Tolerances of optical and electrical data: $\pm 10\%$

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F -
Push-to-Fix

B2B - Board-to-Board
connecting elements

B2C - Board-to-Cable
Feeder for PCBs - alternative for SMD
terminal blocks.
Please contact us.



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see page 66

see page 72



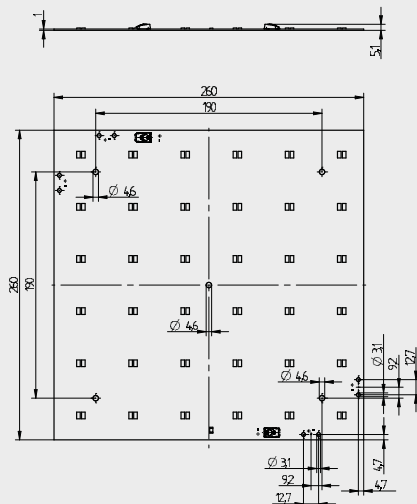
Square modules 260 mm x 260 mm

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring

- Module efficiency up to 164 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 2.199 - 3.042 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50,000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 70 °C
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**



Specific technical data (typical)

Part no.	Colour temperature	Luminous flux at Tc 25 °C	Module efficiency at Tc 25 °C	Luminous flux at Tc 37 °C	Module efficiency at Tc 37 °C	Operational current I _f	Operational voltage U _f	Power consumption	Energie efficiency
31.110.0003.00	3.000 K	2.527 Lumen	136 lm/W	2.489 Lumen	135 lm/W	700 mA	26.3 V DC	18.4 W	A++
31.110.0004.00	4.000 K	2.667 Lumen	144 lm/W	2.628 Lumen	143 lm/W	700 mA	26.3 V DC	18.4 W	A++

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F - Push-to-Fix

B2B - Board-to-Board connecting elements

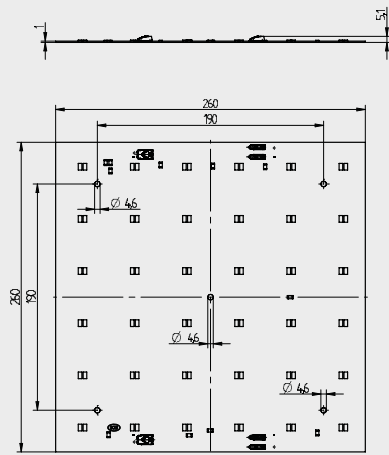
B2C - Board-to-Cable Feeder for PCBs - alternative for SMD terminal blocks. Please contact us.



see page 62

see page 66

see page 72



**Square modules 260 mm x 260 mm
Tunable white**

Range of applications:

Linear- and panel lights for office, commercial and industrial applications

- Suitable for parallel connection or connection in series
- Easy and secure assembly by P2F- Push-to-Fix - fixing elements or screws
- Easy linking / connecting of modules via two SMD terminal blocks
- Optimised for manual- and ADS-wiring
- Module efficiency up to 164 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 1.099 - 1.521 Lumen
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 70 °C
- Risk group: 0
- Guarantee*: 5 years
- Approval marks: **CE RoHS**

Specific technical data (typical)

Part no.	Colour temperature	Luminous flux at Tc 25 °C	Module efficiency at Tc 25 °C	Luminous flux at Tc 30 °C	Module efficiency at Tc 30 °C	Operational current I _f	Operational voltage U _f	Power consumption	Energie efficiency
31.110.0005.00	3.000 K	1.263 Lumen	136 lm/W	1.251 Lumen	136 lm/W	350 mA	26.3 V DC	9.2 W	A++
	6.500 K	1.333 Lumen	144 lm/W	1.320 Lumen	144 lm/W	350 mA	26.3 V DC	9.2 W	A++

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.

For use with

P2F -
Push-to-Fix

B2B - Board-to-Board
connecting elements

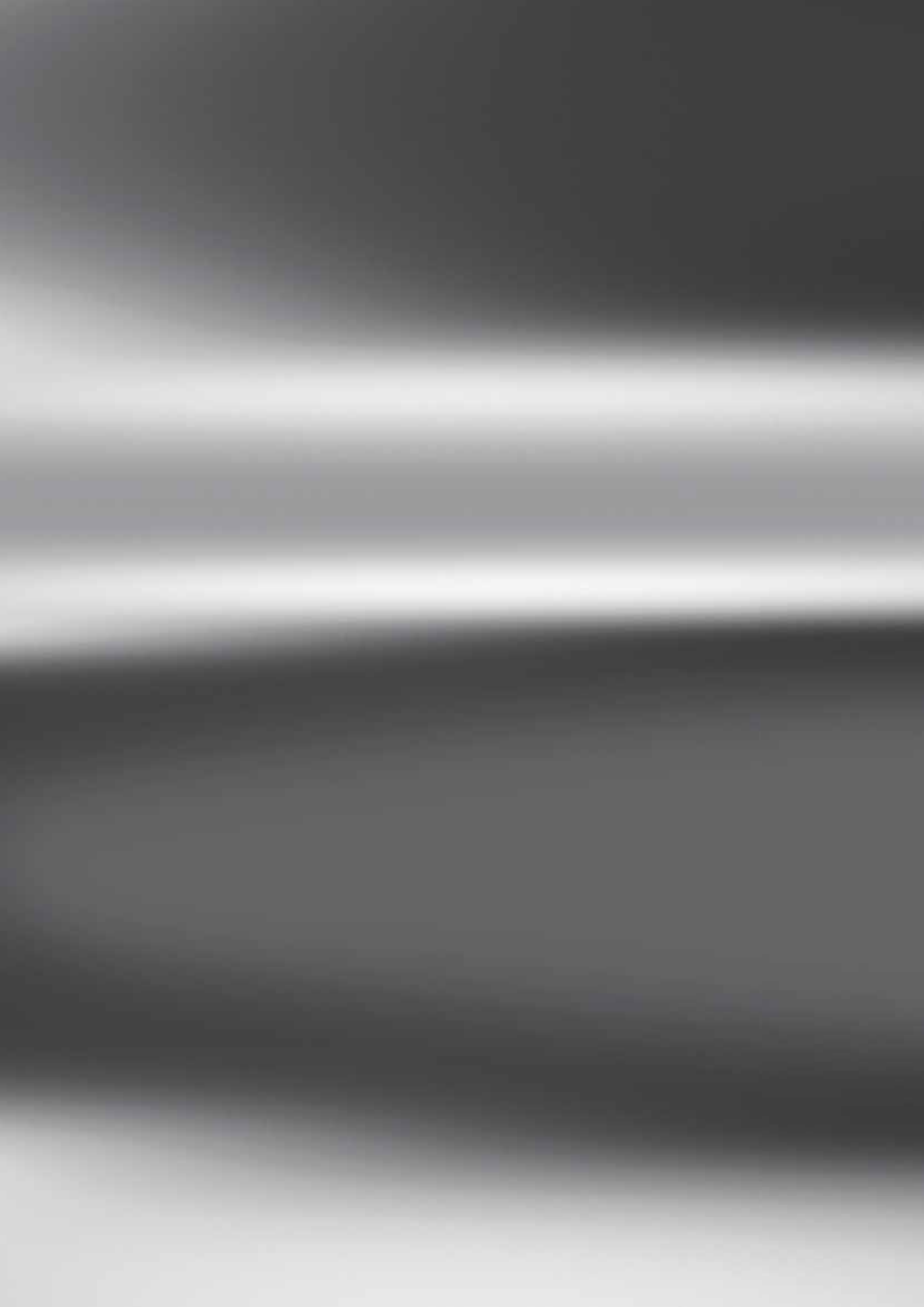
B2C - Board-to-Cable
Feeder for PCBs - alternative for SMD
terminal blocks.
Please contact us.



see page 62

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see page 72



Any remaining questions
regarding the use of a suitable driver?

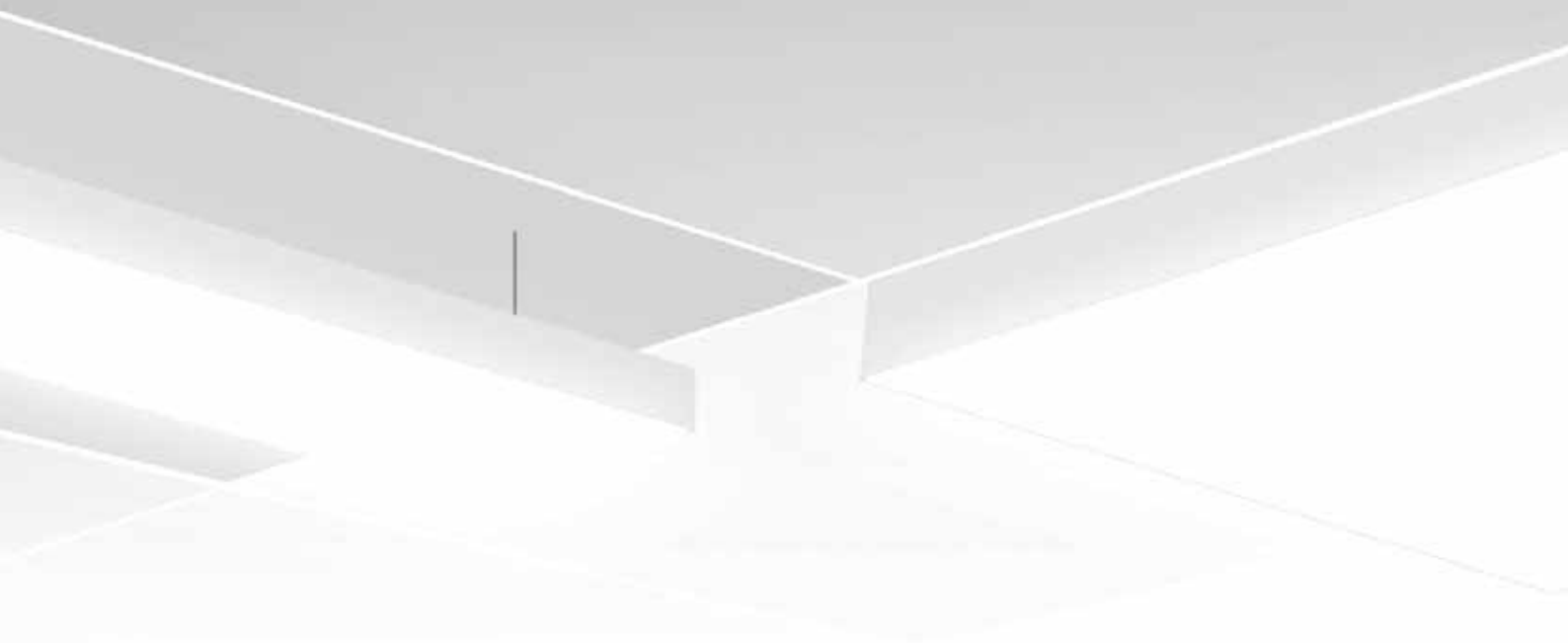


BJB///OEM-Line

The modular system for
LED luminaire production

BJB Light-Engines, such as the GX16t-5 LED tube, the Spot-/Downlight system or the Linear Flat System require drivers to operate. With the high number of different products offered by the market, in many cases a well thought through decision is necessary. If required, we are more than happy to offer advice regarding the choice of a suitable solution for your LED-application. Please just ask.

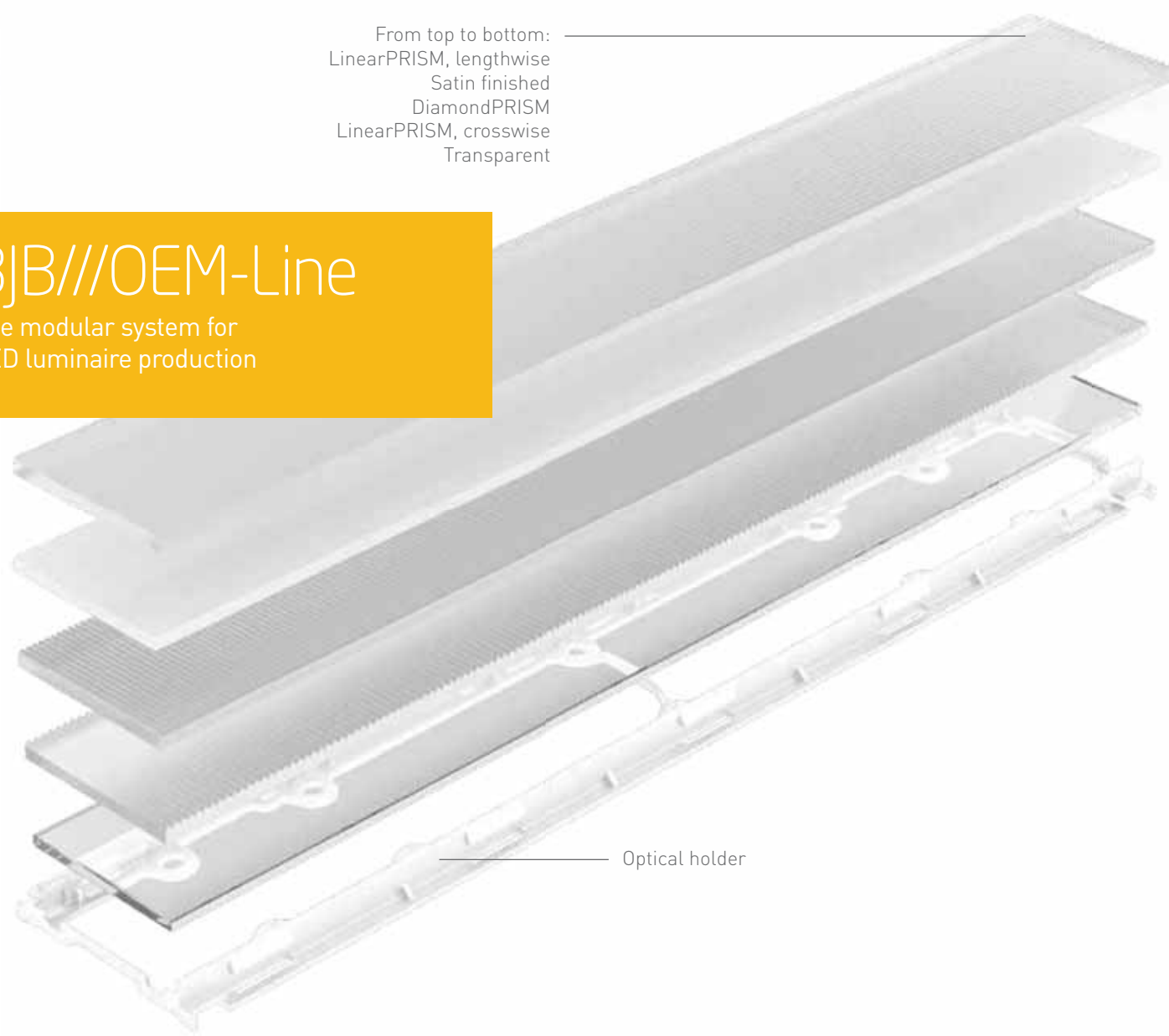




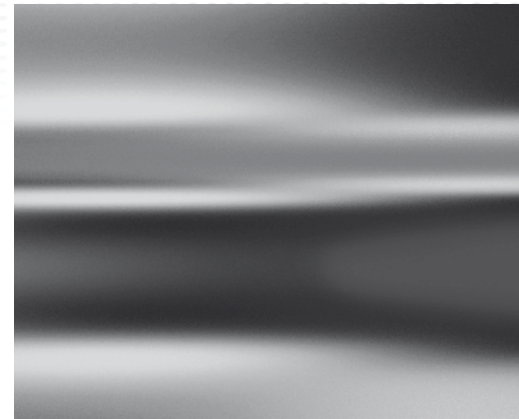
From top to bottom:
LinearPRISM, lengthwise
Satin finished
DiamondPRISM
LinearPRISM, crosswise
Transparent

BJB///OEM-Line

The modular system for
LED luminaire production



Optical holder with optical plates for light control and glare reduction. Light at its best.



Our new light control elements provide the necessary light dispersion and glare reduction in LED luminaires. To enable these components to be attached securely, we have developed a suitable optical holder for linear modules. This has a mirror image hole pattern and is compatible with the LED modules according to Zhaga Book 7. This considerably facilitates handling during luminaire production. The holder is designed to ensure that the plates used are securely fixed, even in case of shocks, vibrations or temperature fluctuations.

The optical plates which we supply with the holder can be used in a wide range of applications. In order to meet the demanding lighting requirements in monitor and display screen workstations, we supply versions of the PRISM range. These have surface structures which provide excellent glare reduction and light dispersion. These inserts are available in convex or flat designs. Optional holder end caps reduce stray light even further.

Can be used in linear and panel lighting applications





part no.

31.930.-301.85

Holder for optical profiles and plates for glare suppression and guidance of light

Material: PC

Push in fixing with P2F - Push-to-Fix - fixing element or screw fixing

Pre assembly via P2F

When using P2F overall thickness of package has to be considered
Material thickness of the holder near fixing holes: 1 mm

Hole pattern according to Zhaga Book 7

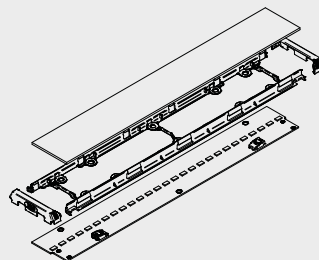
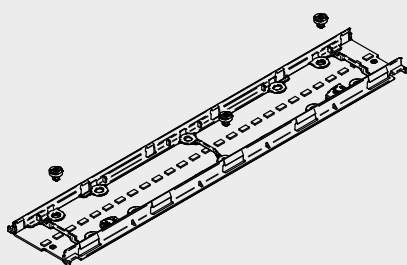
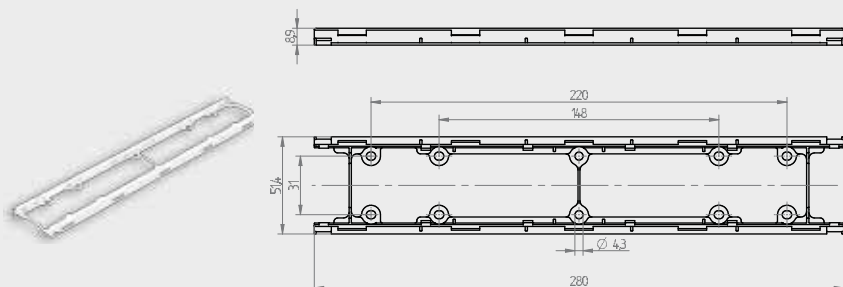
Different mounting options for optical systems, diffusers and covers

- internal: mounting option for cover plates (2mm)
- external: mounting option for profiles
- mounting by snap in or slide in fixing

Also for Seamless applications

We recommend the use of original BJB components like modules, plastic profiles and plates and end caps for proper use.

If using NON BJB components the dimension of modules, plastic profiles and plates and end caps has to be considered



T 110

3 A
250 V



CAD

i
98...

For use with

P2F

linear modules

optical profiles and plates



see page 62



see page 14



see page 27

LED - Lighting and connection technology

31.130

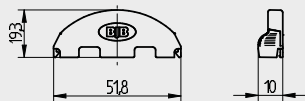
Holder for optical profiles and plates for glare suppression and guidance of light
End caps and optical profile



part no.
31.930.-311.50

Curved end cap

Snap in fixing onto optic holder



CAD

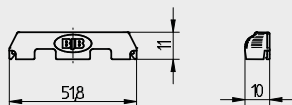
i

98...

part no.
31.930.-312.50

Flat end cap

Snap in fixing onto optic holder



CAD

i

98...

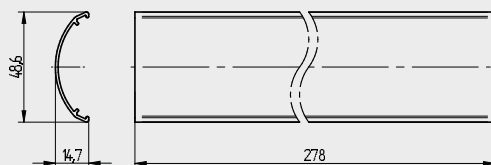
part no.
31.930.-401.85

Optical profile for external fixing

PMMA Colour LED No. 2

Material: PMMA, diffuse transmission
Transmission: approx. 76%
Material thickness: 1.2 mm
Width: 48.6 mm
Length: 278 mm

- Perfect as protection against contact



CAD

i

98...

LED - Lighting and connection technology

31.130

Holder for optical profiles and plates for glare suppression and guidance of light
Optical plates



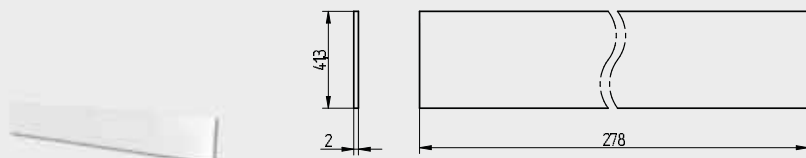
part no.
31.930.-402.85

Optical plate - Cover plate for internal fixing

PMMA transparent

Material: PMMA, crystal clear
Transmission: approx. 92%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

- Perfect as protection against contact



CAD

i

98...

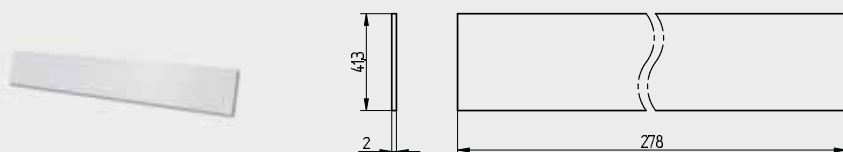
part no.
31.930.-403.85

Optical plate - Diffusor for internal fixing

PMMA Colour LED No. 1

Material: PMMA, diffuse transmission
Transmission: approx. 85%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

- No visible LED hot spots



CAD

i

98...

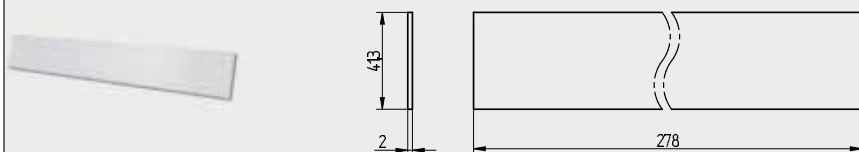
part no.
31.930.-404.85

Optical plate - Diffusor for internal fixing

PMMA Colour LED No. 2

Material: PMMA, diffuse transmission
Transmission: approx. 76%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

- No visible LED hot spots



CAD


i

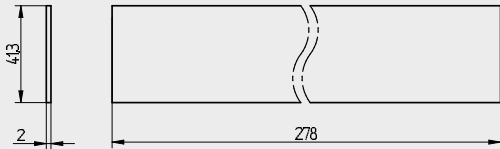
98...

Holder for optical profiles and plates for glare suppression and guidance of light
Optical plates



part no.
31.930.-405.85





Optical plate - Prismatic cover for internal fixing

PMMA DiamondPRISM


Material: PMMA, crystal clear
Transmission: approx. 94%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

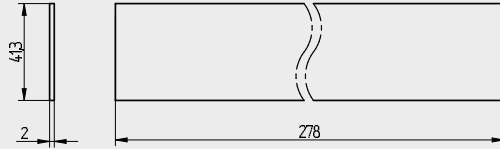
- For illumination purposes UGR < 19 (glare suppression)
- Suitable for PC workstations
- Smooth glare suppression in all C-levels
- No direct lamp image visible
- Perfect to combine with clear or frosted concave covers

CAD

i
98...

part no.
31.930.-406.85





Optical plate - Prismatic cover for internal fixing

PMMA LinearPRISM, lengthwise


Material: PMMA, crystal clear
Transmission: approx. 94%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

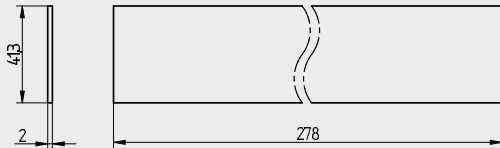
- For illumination purposes UGR < 16 (glare suppression)
- Suitable for PC workstations
- Excellent glare suppression and light distribution
- Perfect to combine with clear or frosted concave covers

CAD

i
98...

part no.
31.930.-407.85





Optical plate - Prismatic cover for internal fixing

PMMA LinearPRISM, crosswise

Material: PMMA, crystal clear
Transmission: approx. 94%
Material thickness: 2 mm - 0.15 mm
Width: 41.3 mm
Length: 278 mm

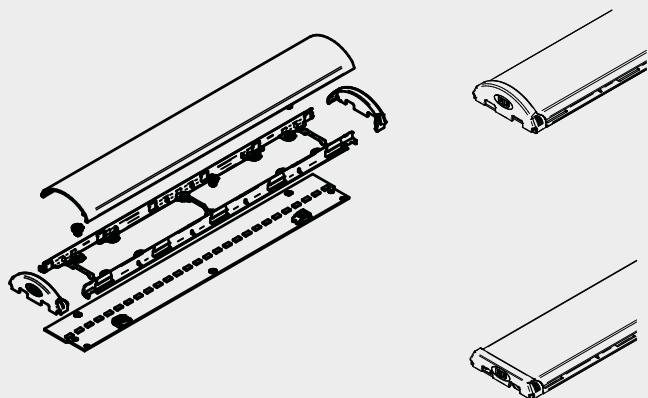
- For illumination purposes UGR < 16 (glare suppression)
- Suitable for PC workstations
- Excellent glare suppression and light distribution
- Perfect to combine with clear or frosted convex cover

CAD

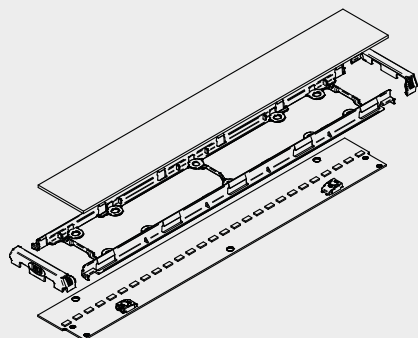
i
98...

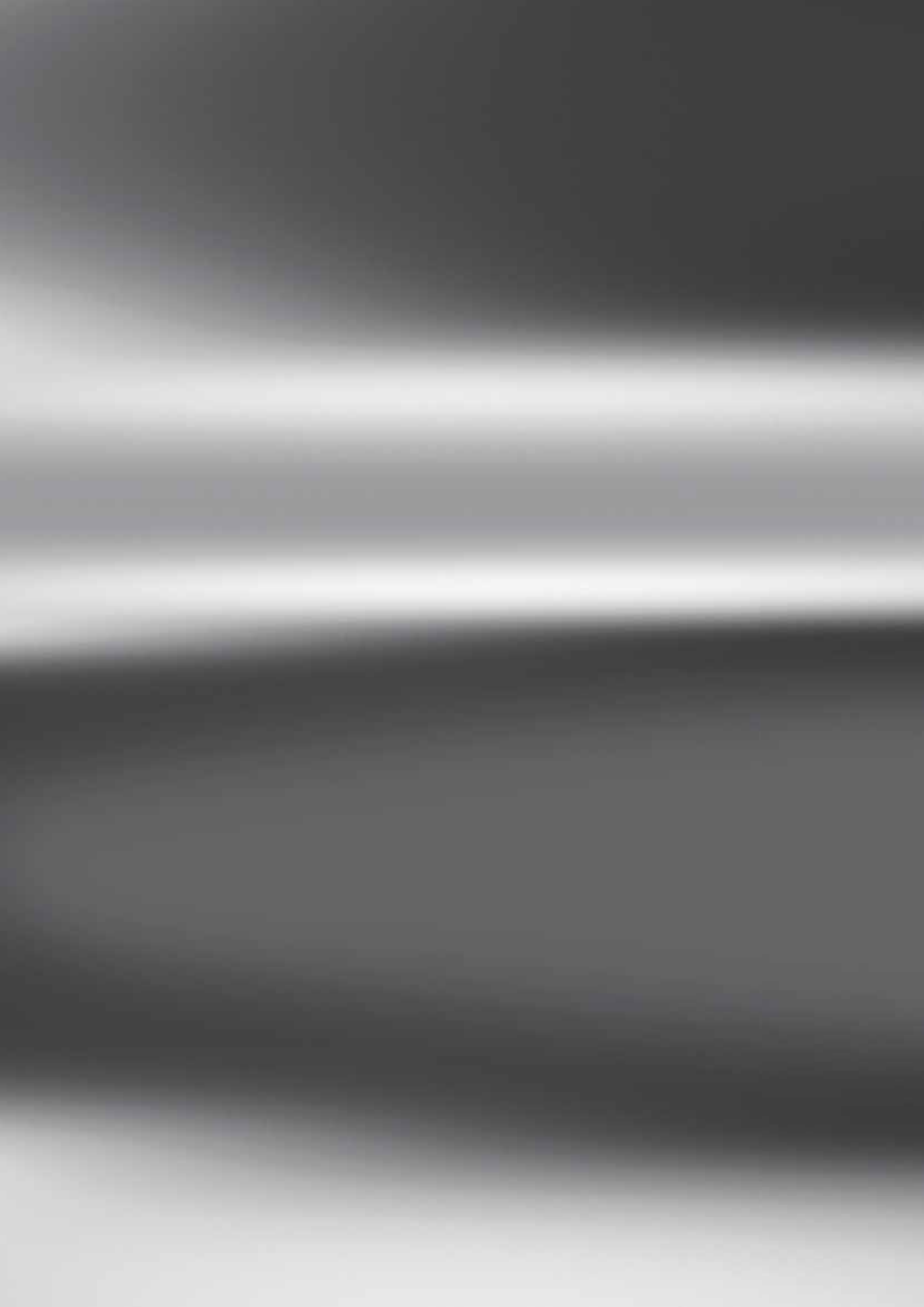


Example of application with optical profiles



Example of application with optical plates





BJB///OEM-Line

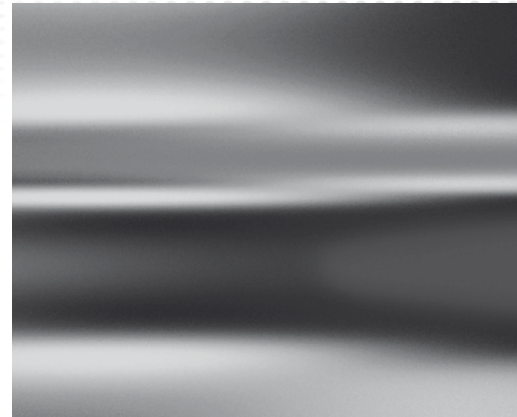
The modular system for
LED luminaire production

Functional
earth side

Power
input side

BJB///
Light Engine

GX16t-5, the non-retrofit LED tube from BJB. Changeover made easy.



Our socket-lampholder system L16/GX16t-5 for LED tubes starts where previous solutions are already reaching their limits. Retrofits may be suitable for the rapid changeover of existing systems to LED, but not for the development of new LED luminaire series.

Conversion lamps are just as unsuitable as there is no prospect at all of an appropriate standard for them. Only a certified standard can offer safety in LED tubes, and this system has such a standard (JELMA/JEL 801, also submitted to the IEC).

The major advantage: Existing luminaire designs can be largely retained. In addition, due to the ease with which the light source can be replaced, this only has to be fitted shortly before delivery (Late Stage Finishing*).

Other features are: Secure fit, external ECG and one-sided power supply, no danger of mix-up with conventional fluorescent lamps, identical lamp lengths to T8 tubes.

Altogether, the GX16t-5 system offers one of the simplest possibilities of changing over existing luminaire ranges to LED. And this with the security of a recognised standard and increasing acceptance among manufacturers and users.

*Late Stage Finishing is the term used to describe the fitting of the luminaire with a light source shortly before it goes into operation

Can be used in linear and panel lighting applications





LED tube with GX16t-5 lamp base

Cover: PC
Tube: PC

Packaging:1
Weight: 150g

- Life span L70 > 40.000 h
- Guarantee*: 3 years



IP 20	CAD	i
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Electrical specification

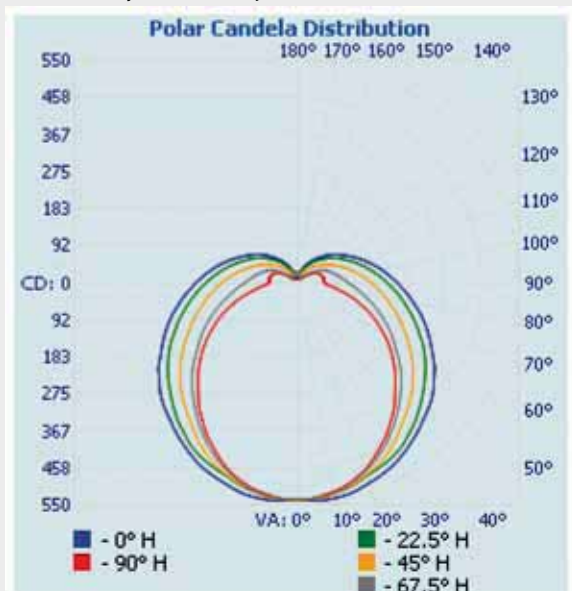
part no.	Colour temperature*1	Luminous flux*2	Lamp length (A)	Typical operational voltage*3	Power consumption	CRI
32.201.8101.00	3.000 K	1.450 lm	600 mm	42 V	14.5 W	> 80
32.201.8102.00	4.000 K	1.600 lm	600 mm	42 V	14.5 W	> 80
32.201.8103.00	6.500 K	1.600 lm	600 mm	42 V	14.5 W	> 80
32.201.8301.00	3.000 K	2.900 lm	1200 mm	83 V	29 W	> 80
32.201.8302.00	4.000 K	3.200 lm	1200 mm	83 V	29 W	> 80
32.201.8303.00	6.500 K	3.200 lm	1200 mm	83 V	29 W	> 80
32.201.8401.00	3.000 K	3.800 lm	1500 mm	103 V	36 W	> 80
32.201.8402.00	4.000 K	4.000 lm	1500 mm	103 V	36 W	> 80
32.201.8403.00	6.500 K	4.000 lm	1500 mm	103 V	36 W	> 80

*1 The flux is measured with input current DC 0.35 A

*2 Colour coordinate range. Min. -8%

*3 Steady state lamp voltage at Ta=25 °C

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.



Electrical characteristics

Parameter	Unit	Min.	Typical	Max.
Rated current	A	---	0.35	0.385
Ambient temp. range	°C	-30	---	40

Environmental characteristics

Operating temperature	Storage temperature
-30 °C – 40 °C	-30 °C – 85 °C

After lighting on 40.000 hrs, tubes keep 70% of initial luminous flux. (Ta=40 °C)



pkg. wt. part no.
500 5 g **28.220.1024.50**

Power input side
Lamp centre: 24.5 mm
Push fixing
Housing: PBT

- For enclosed cut-outs 25.5 mm x 13.3 mm
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

LED-LINE	T 110			$0.5 - 1.0 \text{ mm}^2$	$0.4 - 1.5$	2 A 250 V		CAD	i
98...									

pkg. wt. part no.
500 5 g **28.220.5024.50**

Functional earth side
Lamp centre: 24.5 mm
Push fixing
Housing: PBT

- For enclosed cut-outs 25.5 mm x 13.3 mm
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

LED-LINE	T 110			$0.5 - 1.0 \text{ mm}^2$	$0.4 - 1.5$	2 A 250 V		CAD	i
98...									

pkg. wt. part no.
500 5 g **28.220.1124.50**


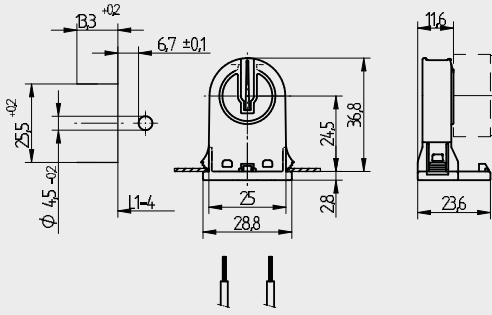
Power input side
Lamp centre: 24.5 mm
Push fixing
Housing: PBT

- With locating pin: For cut-outs open at the rear or enclosed cut-outs with 4.5 mm dia. locating hole
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

LED-LINE	T 110			$0.5 - 1.0 \text{ mm}^2$	$0.4 - 2.0$	2 A 250 V		CAD	i
98...									

Lampholders GX16t-5 for LED tubes


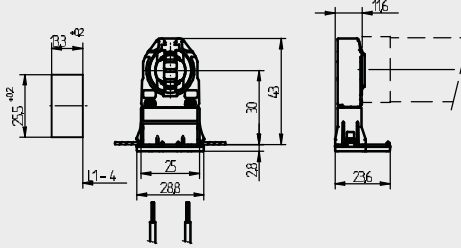
L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

pkg. wt. part no.
500 5 g **28.220.5124.50**

Functional earth side
Lamp center: 24.5 mm
Push fixing
Housing: PBT

- For cut-outs open at the rear or enclosed cut-outs with 4.5 mm dia. locating hole
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

LED-LINE	T 110		2 A 250 V	CAD	i	98...
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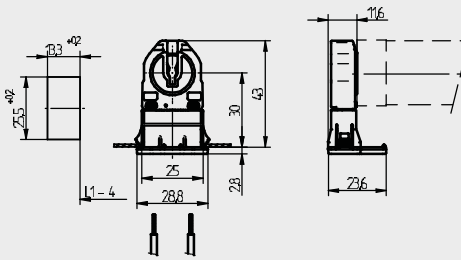
L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

pkg. wt. part no.
500 5 g **28.202.2030.50**

Power input side
Lamp centre: 30 mm
Push in fixing
Housing: PBT

- For enclosed cut-outs 25.5 mm x 13.3 mm
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

LED-LINE	T 110		2 A 250 V	CAD	i	98...
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L1-4: Recommended dimension - The distance between the cut-outs and the tolerance should be governed by the dimensions of the respective lamps and luminaires.

pkg. wt. part no.
500 5 g **28.201.2030.50**

Functional earth side
Lamp centre: 30 mm
Push in fixing
Housing: PBT
Rating: 0.5A/120V DC (PSE Jet)

- For enclosed cut-outs 25.5 mm x 13.3 mm
- A pair of lampholders provides a lamp length tolerance compensation of 3 mm
- VDE-REG.-Nr. E246

LED-LINE	T 110		2 A 250 V	CAD	i	98...
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	<table border="0"> <tr> <td>pkg.</td> <td>wt.</td> <td>part no.</td> </tr> <tr> <td>500</td> <td>5 g</td> <td>28.202.1001.50</td> </tr> </table> <p>Power input side Snap in pins Housing: PBT Rotor: PBT Lampholder thickness: 10.5 mm Wiring: through the body</p> <ul style="list-style-type: none"> • VDE-REG.-Nr. E246 	pkg.	wt.	part no.	500	5 g	28.202.1001.50
pkg.	wt.	part no.					
500	5 g	28.202.1001.50					

*L1 +22mm: *L1 +22mm: Recommended dimension is based on use of one lampholder with spring and one lampholder without spring. The final distance should be governed by the dimensions of the respective lamps and luminaires.

LED-O-LINE	T 110			2 A 250 V	CAD	i	98...
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	<table border="0"> <tr> <td>pkg.</td> <td>wt.</td> <td>part no.</td> </tr> <tr> <td>500</td> <td>5 g</td> <td>28.201.1001.50</td> </tr> </table> <p>Functional earth side Snap in pins with spring Housing: PBT Rating: 0.5A/120V DC (PSE Jet) Lampholder thickness: 10.5 mm Wiring: through the body</p> <ul style="list-style-type: none"> • VDE-REG.-Nr. E246 	pkg.	wt.	part no.	500	5 g	28.201.1001.50
pkg.	wt.	part no.					
500	5 g	28.201.1001.50					

L1 + 22: *: Recommended dimension is based on use of one lampholder with spring and one lampholder without spring. The final distance should be governed by the dimensions of the respective lamps and luminaires.

LED-O-LINE	T 110			2 A 250 V	CAD	i	98...
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	<table border="0"> <tr> <td>pkg.</td> <td>wt.</td> <td>part no.</td> </tr> <tr> <td>500</td> <td>5 g</td> <td>28.202.1002.50</td> </tr> </table> <p>Power input side Snap in pins with spring Housing: PBT Rotor: PBT Lampholder thickness: 10.5 mm Wiring: through the body</p> <ul style="list-style-type: none"> • VDE-REG.-Nr. E246 	pkg.	wt.	part no.	500	5 g	28.202.1002.50
pkg.	wt.	part no.					
500	5 g	28.202.1002.50					

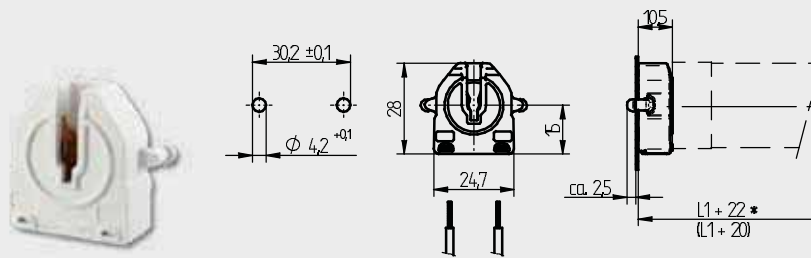
*L1 +22mm: Recommended dimension is based on use of one lampholder with spring and one lampholder without spring
*L1 +24mm: Recommended dimension is based on use of both lampholders without spring. The final distance should be governed by the dimensions of the respective lamps and luminaires.

LED-O-LINE	T 110			2 A 250 V		CAD	i	98...
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Lampholders GX16t-5 for LED tubes



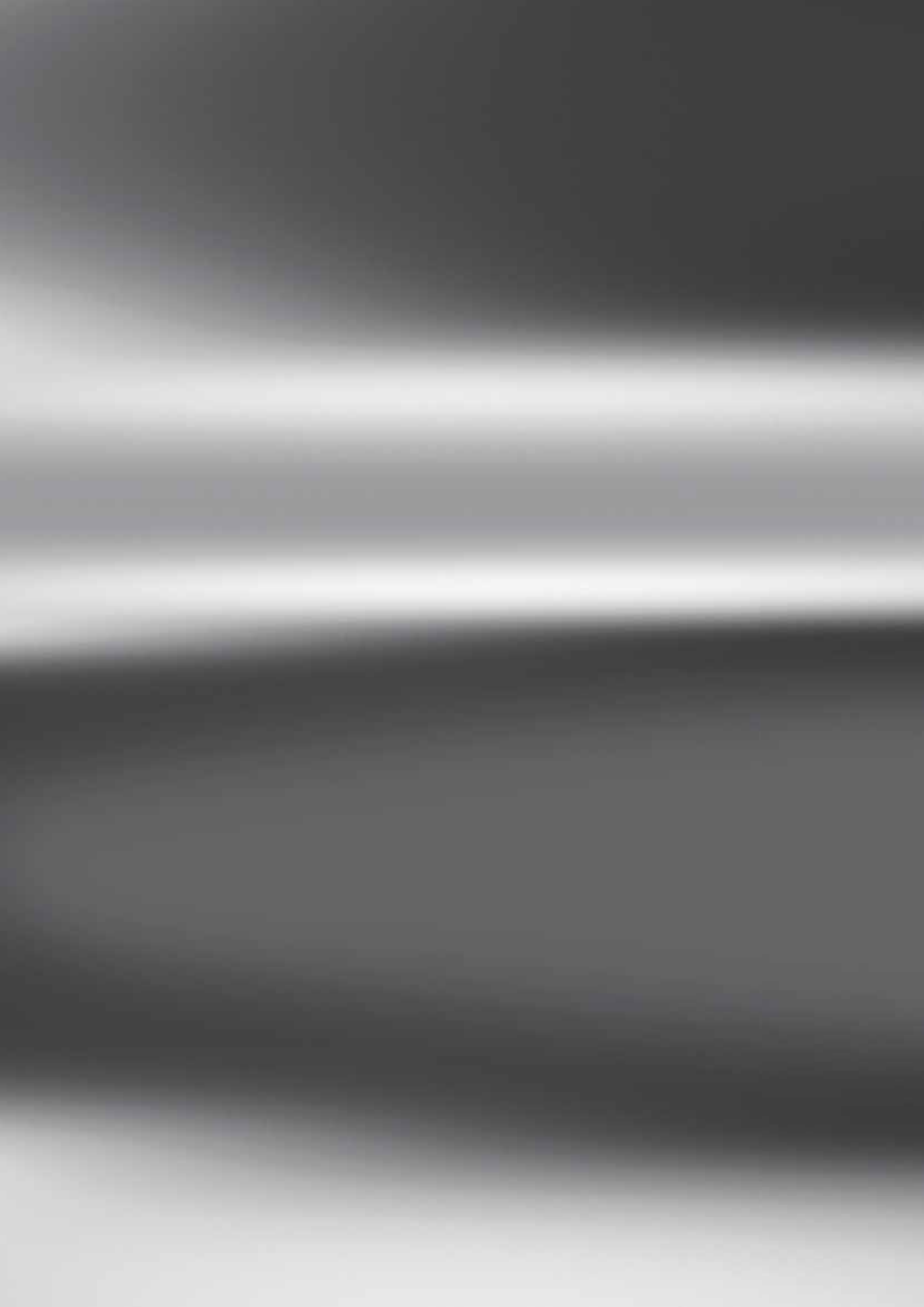
pkg. 500
 wt. 5 g
 part no. **28.201.1002.50**



Functional earth side
 Snap in pins
 Housing: PBT
 Rating: 0.5A/120V DC (PSE Jet)
 Lampholder thickness: 10.5 mm
 Wiring: through the body
 • VDE-REG.-Nr. E246

*L1 +22mm: Recommended dimension is based on use of one lampholder with spring and one lampholder without spring
 *L1 +24mm: Recommended dimension is based on use of both lampholders without spring. The final distance should be governed by the dimensions of the respective lamps and luminaires.

LED-LINE	T 110				0.5 - 1.0 mm ²	0.5 - 1.1	2 A 250 V	CAD	i	98...
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BJB///OEM-Line

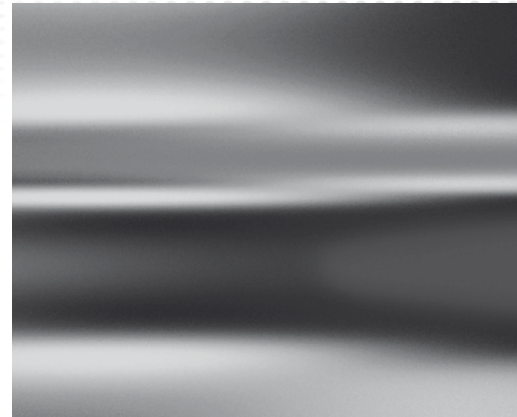
The modular system for
LED luminaire production

BJB///
Light Engine



Linear Flat.

The plug & play system from BJB.



With our Linear Flat System, we are, for the first time, offering a complete lighting module consisting of a light source, socket, lampholder and lamp support. The design objectives included being smaller than the T5 luminaire applications possible at present, while achieving comparable or better operational parameters and a clear stylistic design. At just 37 mm wide, the Linear Flat System is positively predestined for use in lighting channels.

The Linear Flat System consists of an extruded aluminium profile with an LED board inserted and a diffusing PMMA cover. Clicked into the pre-assembled lampholders, with this solution, several LED applications can be realised in a very simple manner.

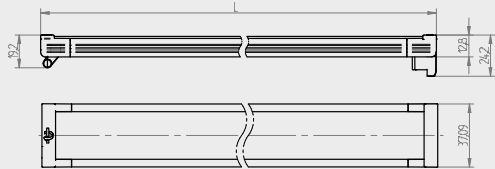
Main advantage: Luminaire manufacturers can continue to work with familiar assembly technologies because, unlike production methods for conventional LED solutions, no ESD-protected work area is required. The luminaire can be wired automatically and the light source can be installed at a later stage.

This so called „Late Stage Finishing“ reduces storage costs on one hand and enables on the other hand upgrades, which with already installed LEDs is only possible with high operational expenses.

Users benefit from the long operating life and ease with which the light source can be replaced. The Linear Flat System is suitable for different lighting requirements, for example in shop lighting applications with varying ranges of goods. It also meets the demands of designers who require delicate, uncomplicated components.

Can be used in linear and panel lighting applications





LED-Module Lampholder-lamp base system (Plug & Play)

Exchangeable LED-lamp - No additional tools required
Length: 568 mm
CRI >80
Small overall height: approx. 13 mm

Quick and easy installation even in very narrow luminaires (slot light channels)

Audible and tactile feedback during mounting process
„Click-Fit“

Straight and pure design, genuine high grade materials

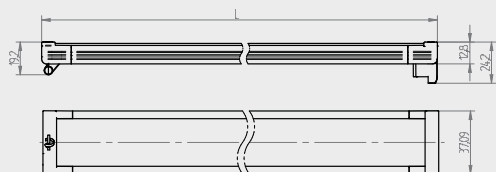
- Module efficiency up to 140 Lumen/Watt (A++) at $T_c = 25^\circ\text{C}$
- Luminous flux: 1.010 - 2.400 Lumen at $T_c = 25^\circ\text{C}$
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30°C bis $+45^\circ\text{C}$
- TC: max. 65°C
- Risk group: 0
- Protection class: IP20
- Guarantee*: 5 years
- Approval marks:

Specific technical data

part no.	Colour temperature	Luminous flux	Module efficiency Lumen/Watt	Operational current I_f	Operational voltage U_f	Power consumption
32.130.0001.00	3.000 K	1.160 Lumen	123 lm/W	350 mA	approx. 27 V	9.4 W
32.130.0002.00	3.000 K	2.036 Lumen	119 lm/W	350 mA	approx. 47 V	17.1 W
32.130.0005.00	4.000 K	1.203 Lumen	128 lm/W	350 mA	approx. 27 V	9.4 W
32.130.0006.00	4.000 K	2.105 Lumen	123 lm/W	350 mA	approx. 47 V	17.1 W

Tolerances of optical and electrical data: $\pm 10\%$

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.


**LED-Module
Lampholder- lamp base system (Plug & Play)**

Exchangeable LED-lamp - No additional tools required

Length: 1.168 mm

CRI >80

Small overall height: approx. 13 mm

Quick and easy installation even in very narrow luminaires (slot light channels)

Audible and tactile feedback during mounting process
„Click-Fit“

Straight and pure design, genuine high grade materials

- Module efficiency up to 140 Lumen/Watt (A++) at Tc = 25 °C
- Luminous flux: 2.020 - 4.800 Lumen at Tc = 25 °C
- Tight colour tolerance: McAdams 3.5 SDCM
- High colour rendering: RA > 80
- Beam angle: 120°
- Life span L70 > 50.000 h
- Ambient temperature: -30 °C bis + 45 °C
- TC: max. 65° C
- Risk group: 0
- Protection class: IP20
- Guarantee*: 5 years
- Approval marks:

Specific technical data

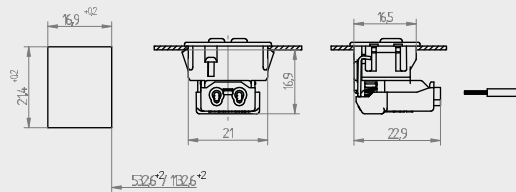
part no.	Colour temperature	Luminous flux	Module efficiency Lumen/Watt	Operational current I _f	Operational voltage U _f	Power consumption
32.130.0003.00	3.000 K	2.319 Lumen	123 lm/W	700 mA	approx. 27 V	18.8 W
32.130.0004.00	3.000 K	4.071 Lumen	119 lm/W	700 mA	approx. 47 V	34.2 W
32.130.0007.00	4.000 K	2.407 Lumen	128 lm/W	700 mA	approx. 27 V	18.8 W
32.130.0008.00	4.000 K	4.209 Lumen	123 lm/W	700 mA	approx. 47 V	34.2 W

Tolerances of optical and electrical data: ± 10%

* Warranty conditions of BJB GmbH & Co. KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.



part no.



Lampholder

For panel thickness: 0.4 - 1.0 mm **28.701.1001.50**

For panel thickness: 1.0 - 2.0 mm **28.701.1005.50**

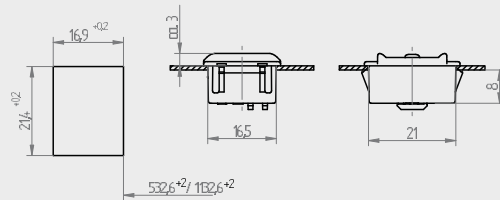
Push in fixing

Also suitable for automatic wiring

Spring connection "Click-Fit"

CAD i
98...

Part no.



Lamp support

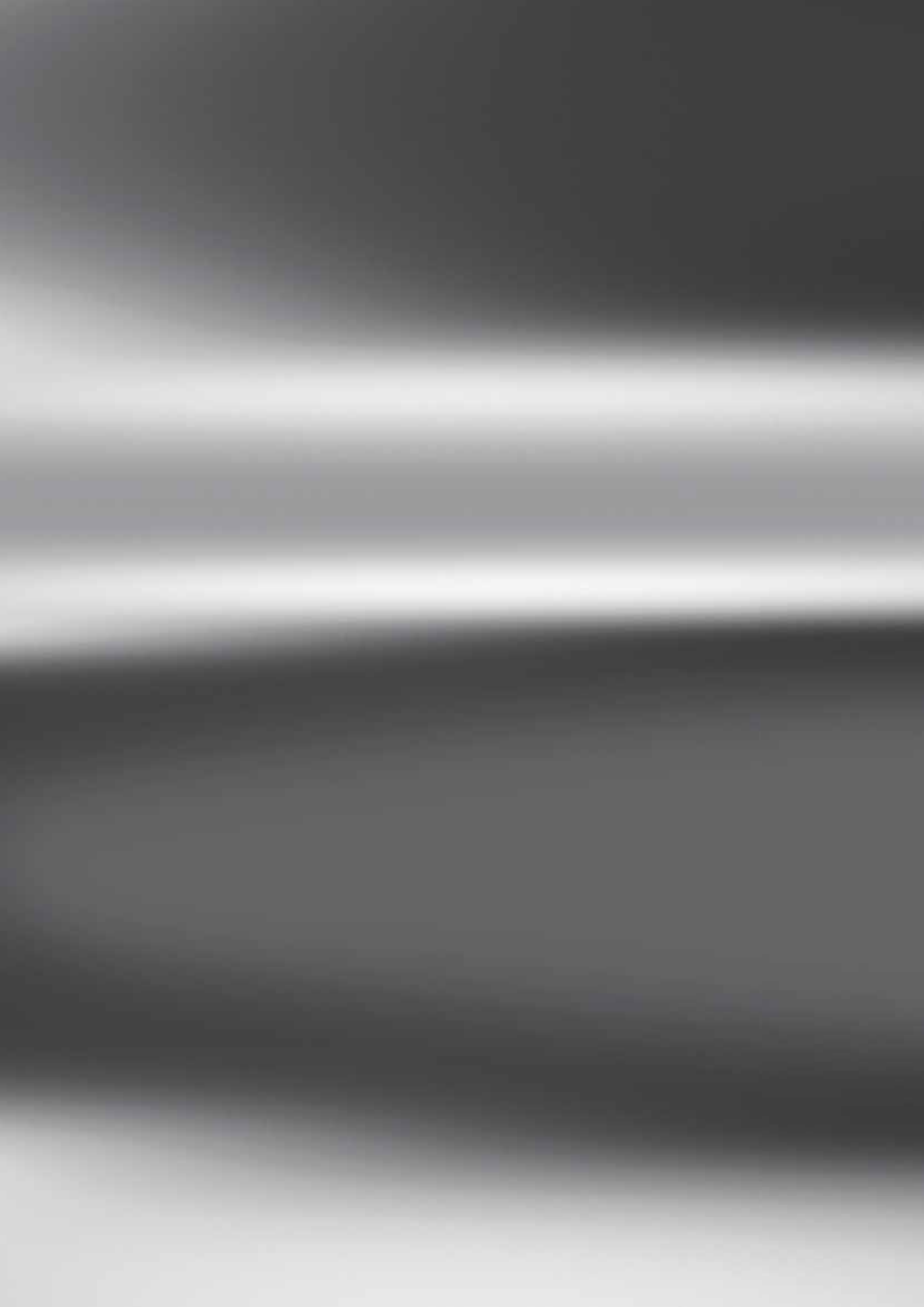
For panel thickness: 0.4 - 1.0 mm **28.701.U301.50**

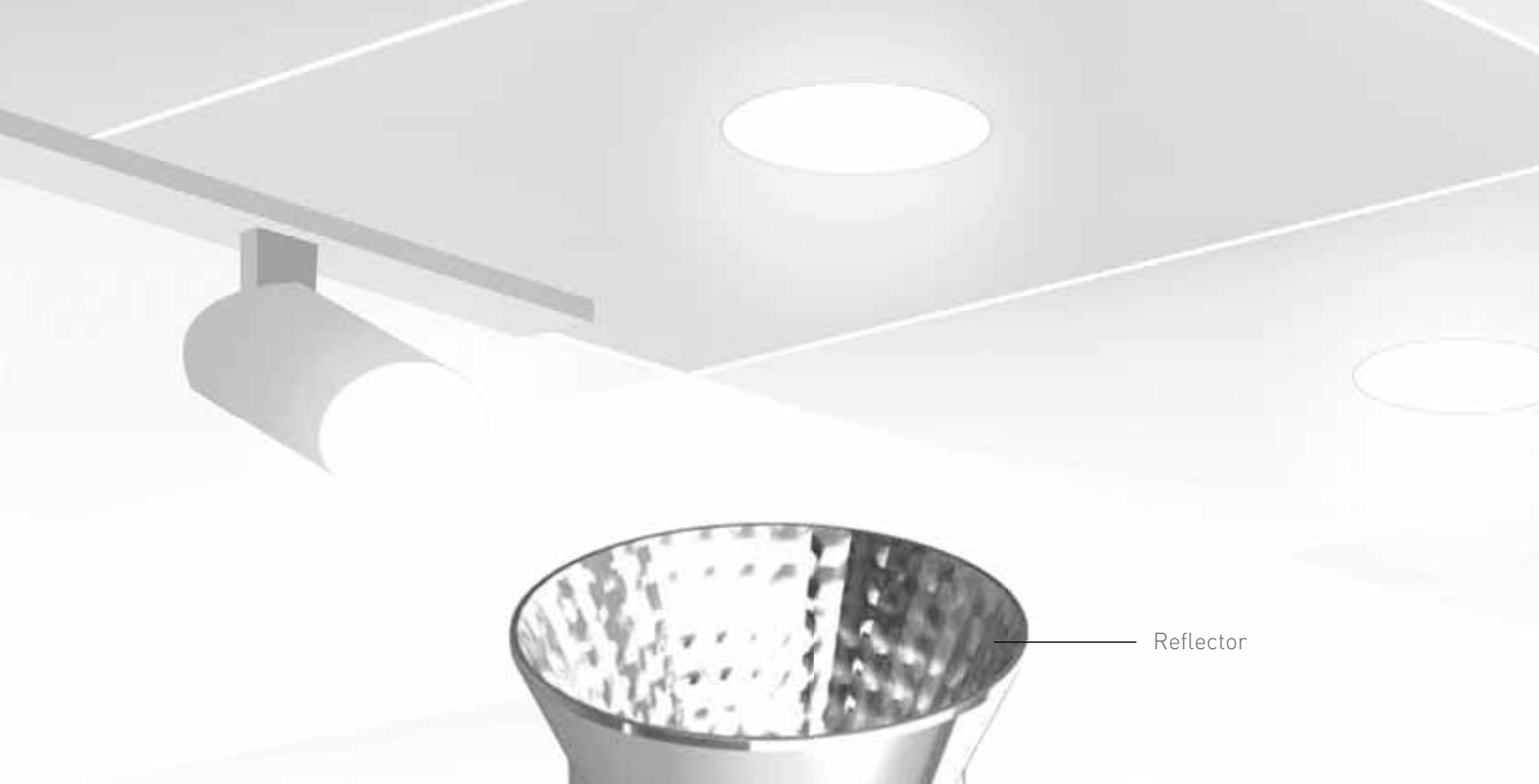
For panel thickness: 1.0 - 2.0 mm **28.701.U302.50**

Push in fixing

Thermal extension: Axial movement will be compensated

CAD i
98...





BJB///OEM-Line

The modular system for
LED luminaire production

Reflector

Lamp

BJB///
Light Engine

Lampholder

Heat sink

LED Spot-/Downlight system from BJB. If you want to make an impression.



The compact module comprises a socketed and encapsulated LED lamp, together with a suitable lampholder incorporating a twist & lock fixing. The lampholder gets easily assembled with two standard screws. With the support of two preloaded leaf springs, a defined contact pressure of the light source to the heat sink ensures a reliable heat dissipation.

Fully automated wiring processes are just as possible as the pre-assembly of your light fitting without the relevant light source. Those "platforms" can be produced in a very rational

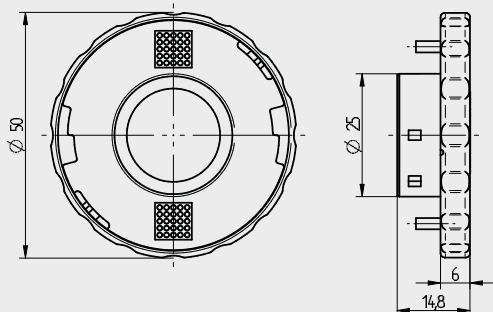
manner and then later be equipped with the preferred light source (Late Stage Finishing). This option eliminates costly small batch sizes and equally minimizes storage risks.

To enhance your production processes even further, the LED lamp incorporates a reflector interface. Whilst this is suitable for standard reflectors available, it also allows for your own designs being used.

Available with divergent light outputs and colour temperatures, the new BJB LED module replaces conventional CFL or MR16 lamps within spotlight and downlight applications. For new fittings, this system offers a smart entry into low maintenance, flexible LED solutions for shops, offices and hospitality areas.

Can be used in Spot- and Downlight applications

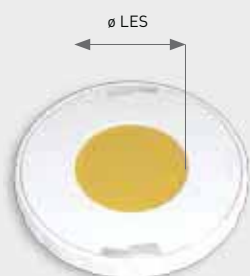




Spot-/Downlight Module for applications in Shop, Office and Hospitality-areas

Twist and Lock System
Body of aluminium works as heatsink
Not suitable for power supply voltage, power supply by external ballast
Specifications for luminous flux, colour temperature and Colour rendering index (CRI): see chart
Tc-point (Marking at rim of aluminium base): max. 65 ° C

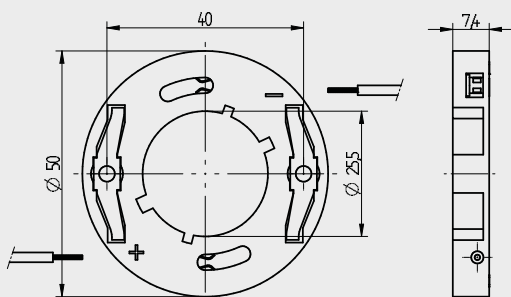
- Flat Design
- More flexibility with reflector design
- With integrated reflector-interface for easy insertion of reflector
- Fasten and release aid: grip pins and recessed grip
- Guided insertion of LED module
- Glass lens as protection against contact



part no.	Luminous flux	Colour temperature	CRI*	Ø LES**
32.120.0002.50	1.200 Lumen	3.000 Kelvin	CRI 80	13,5 mm
32.120.0003.50	1.200 Lumen	4.000 Kelvin	CRI 80	13,5 mm
32.120.0005.50	2.000 Lumen	3.000 Kelvin	CRI 80	19 mm
32.120.0006.50	2.000 Lumen	4.000 Kelvin	CRI 80	19 mm
32.120.0008.50	3.000 Lumen	3.000 Kelvin	CRI 80	19 mm
32.120.0009.50	3.000 Lumen	4.000 Kelvin	CRI 80	19 mm

*CRI - Colour Rendering Index
** LES Light Emitting Surface

* Warranty conditions of BJB GmbH & Co KG as stated on page 100 of the LED Applications catalogue (Issue No.1 - 2014) and as available via the Internet under www.bjb.com/warranty-conditions.html are valid.



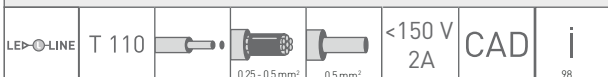
part no.
28.720.1001.90

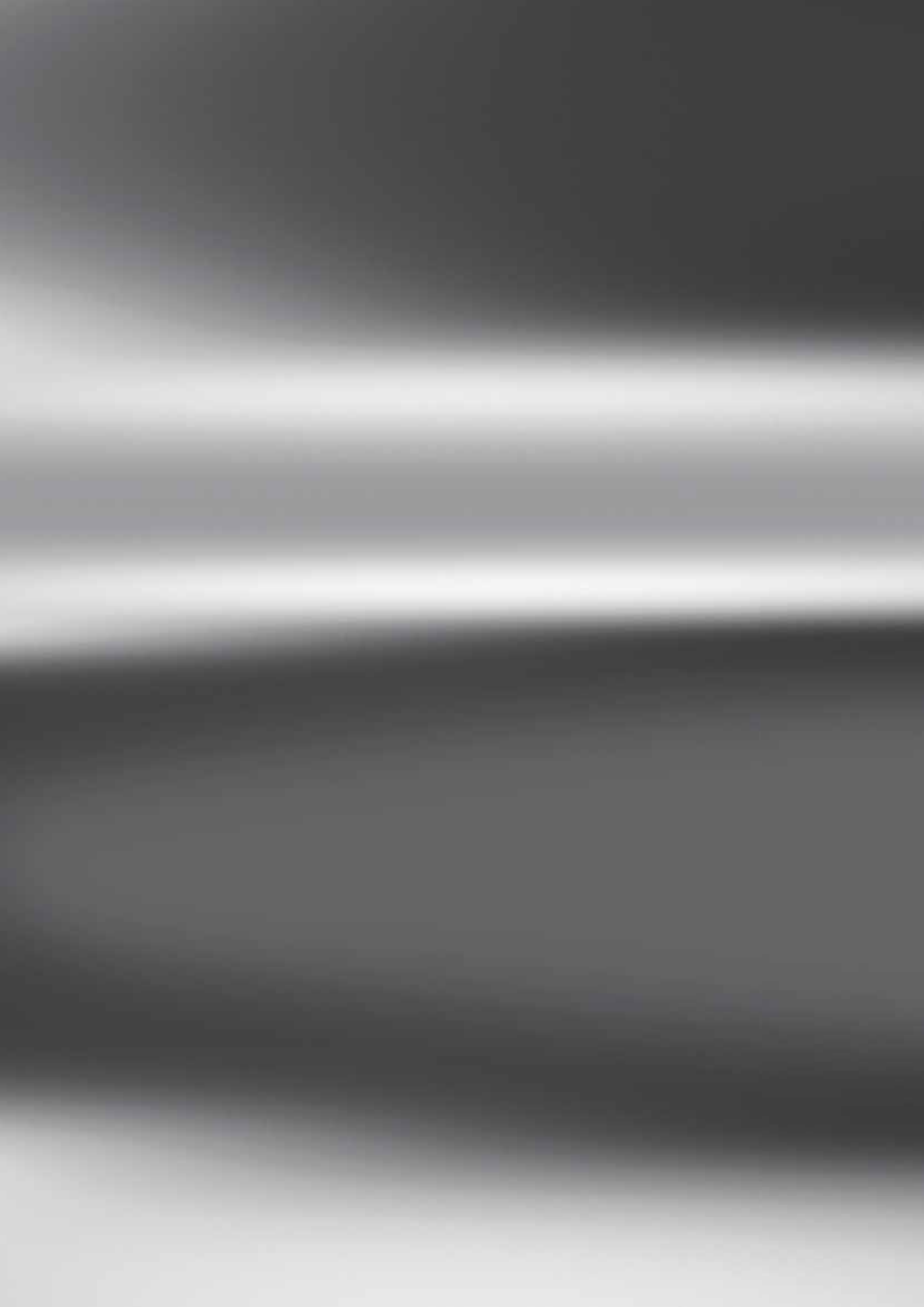
Lampholder for Spot-/Downlight Module

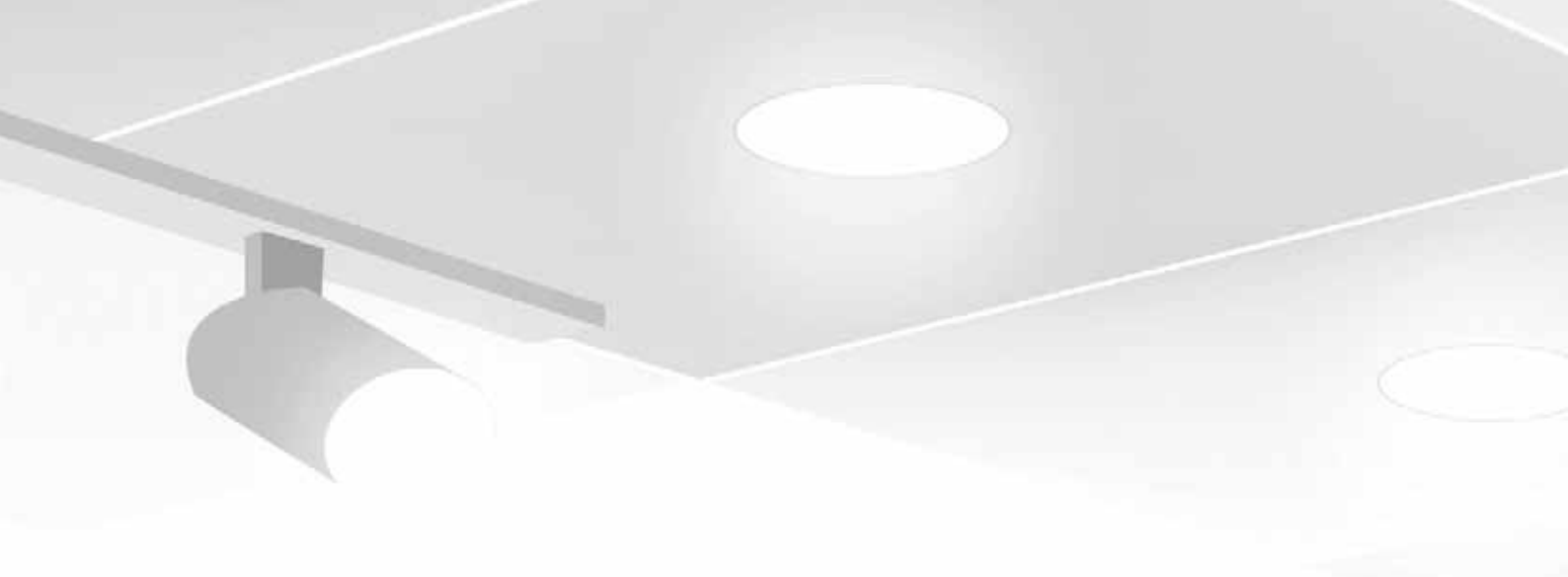
Screw fixing: for standard M3 screws

Housing: solid PPS for constant force transmission

- Twist and Lock System
- Optimised heat management: CrNi leaf springs provide permanent contact pressure between LED module and heat sink

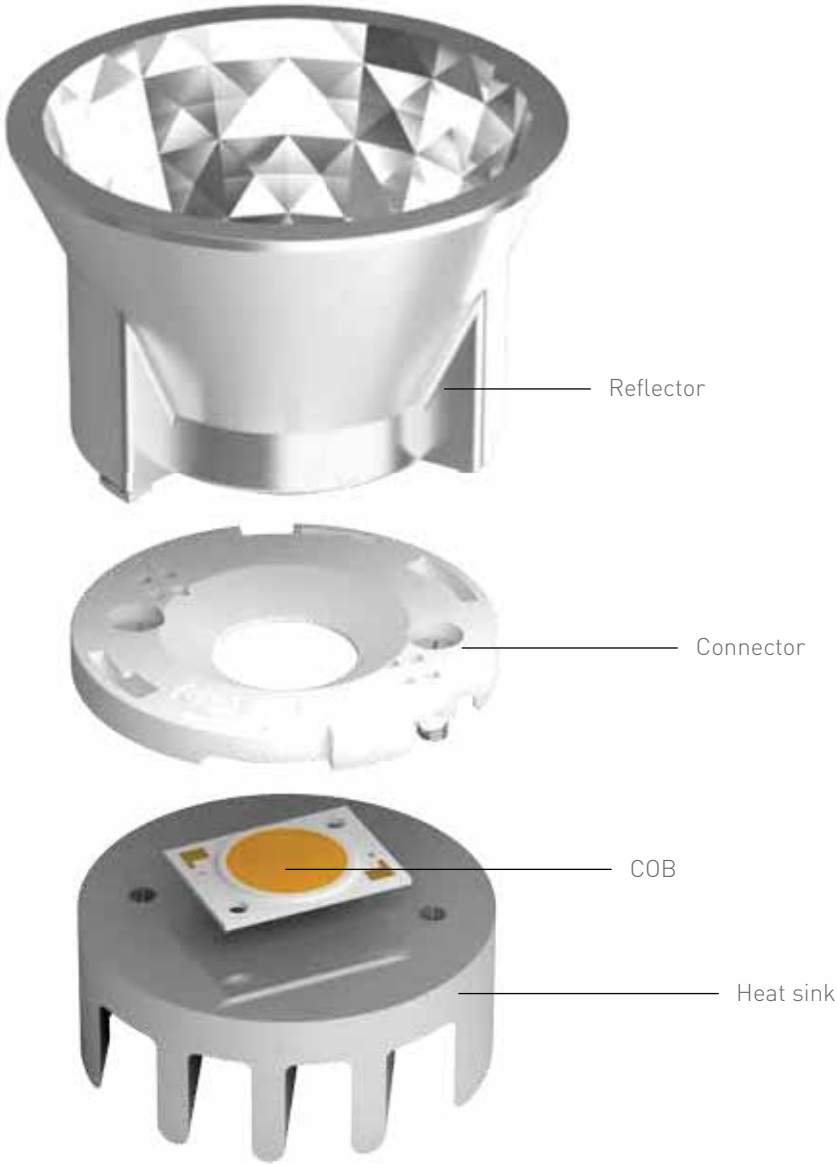






BJB///OEM-Line

The modular system for LED luminaire production



BJB Spotlight Connectors. Connection found.



BJB Spotlight Connectors join up the components of an LED luminaire.

The PCB is attached to the underside and fixed to the heat sink. The conductors can be inserted at the sides. A reflector can be placed on the upper side and screwed in. In order to minimise performance losses and shadow formation, we produce them from especially reflective material and equip them as standard with at least one reflector interface, LED fixing lugs and clear markings for the connection points. They


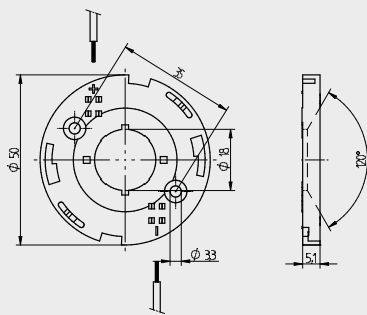
are available in three sizes. They now cover a range of over 30 different COB-LEDs and have been adapted to the specifications of the most important manufacturers worldwide.

BJB Spotlight Connectors are suitable for LEDs from approx. 1,000 to 15,000 lumen and can be used in downlights, spots and hall lighting applications.

Can be used in Spot- and Downlight applications





pkg. wt. part no.
504 6 g **47.319.2011.50**




Spotlight connectors for COB LEDs. Suitable for the following LED types


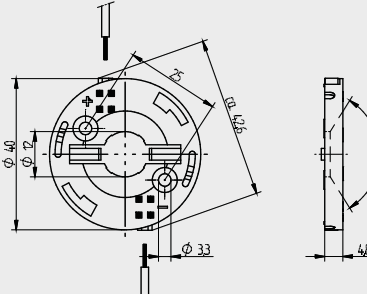
Manufacturer
Sharp
Philips Lumileds

LED-Type
MegaZeni
Luxeon 1204/1205/1208

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE	T 110				CAD	i	98...
			0.25 - 0.5 mm ²	0.5 mm ²			

pkg. wt. part no.
504 6 g **47.319.6060.50**




Spotlight connectors for COB LEDs. Suitable for the following LED types


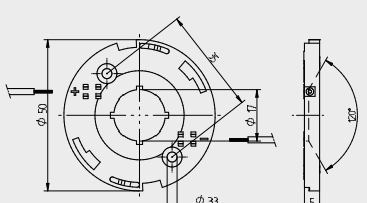
Manufacturer
Citizen
Edison
Prolight Opto
Tridonic

LED-Type
CLL020 and CLL022
Opto HM05 and HM09
PACB 022
LES 10

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by fixing lugs
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE	T 110				CAD	i	98...
			0.25 - 0.5 mm ²	0.5 mm ²			

pkg. wt. part no.
504 6 g **47.319.2021.50**




Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer
Citizen
Edison Opto
Prolight Opto
Seoul Semiconductor
Tridonic

LED-Type
CLL030 and CLL032
HM16 and HM30
PACB 032
ZC12 and ZC18
LES 17

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE	T 110				CAD	i	98...
			0.25 - 0.5 mm ²	0.5 mm ²			



pkg. wt. part no.
504 6 g **47.319.2030.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer	LED-Type
Citizen	CLL040 and CLL042
Lextar	Nimbus 2000 and Nimbus 3.000
Seoul Semiconductor	ZC25 and ZC40
Sunpu	G7

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm² 0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2040.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer	LED-Type
Bridgelux	ES-Serie
Prolight Opto	PABA RS

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm² 0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2051.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer	LED-Type
Sharp	TigerZenigata

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm² 0.5 mm²

CAD

i

98...



pkg. wt. part no.
504 6 g **47.319.2070.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer Philips Lumileds **LED-Type** K12 and K16

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²

0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2080.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer LG **LED-Type** MCP 10-24W

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²

0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2090.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer Osram **LED-Type** Soleriq E30

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by fixing lugs
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²


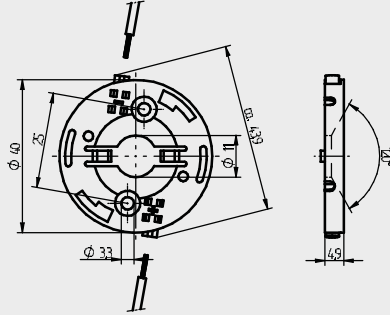
0.5 mm²

CAD

i

98...



pkg. wt. part no.
504 5 g **47.319.6101.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types


Manufacturer Cree **LED-Type** CXA 1507 and CXA 1512


Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC


- With integrated reflector interface
- Easy pre-assembly of LED by fixing lugs
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-O-LINE

T 110




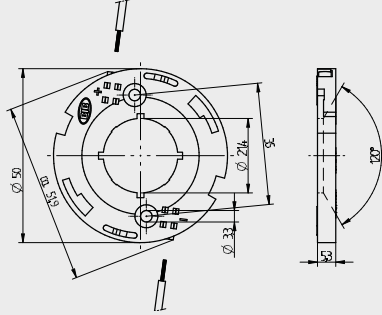




CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2141.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types


Manufacturer Cree **LED-Type** CXA 25xx


Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC


- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-O-LINE

T 110




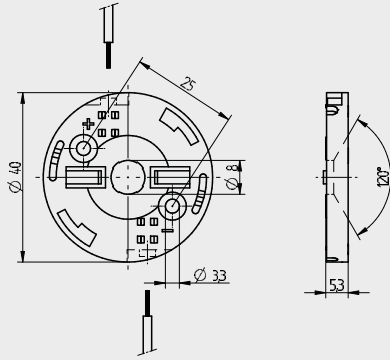




CAD

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98...

pkg. wt. part no.
504 5 g **47.319.6120.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types


Manufacturer Cree **LED-Type** CXA 13xx


Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC


- With integrated reflector interface
- Easy pre-assembly of LED by fixing lugs
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-O-LINE

T 110







CAD

i

98...



pkg. wt. part no.
504 5 g **47.319.2131.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer **LED-Type**
Cree CXA 1816 and CXA 1820

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²

0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 6 g **47.319.2151.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer **LED-Type**
Cree CXA 30xx

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²

0.5 mm²

CAD

i

98...

pkg. wt. part no.
504 5 g **47.319.2060.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer **LED-Type**
Samsung LC026B and LC040A

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by fixing lugs
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-LINE

T 110

0.25 - 0.5 mm²

0.5 mm²

CAD

i

98...



pkg. wt. part no.
504 6 g **47.319.6111.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer
Lextar
Osram

LED-Type
Nimbus 1500
Soleriq S13 and X13

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- For suitable reflectors see page 58
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-O-LINE

T 110

0.25 - 0.5 mm² 0.5 mm²

CAD

i

98...

pkg. wt. part no.
240 7,4g **47.319.4160.50**

Spotlight connectors for COB LEDs. Suitable for the following LED types

Manufacturer
Citizen
Sunpu

LED-Type
CLL050 and CLL052
G9

Screw fixing
Housing: PBT
Contacts: CuSn
Rating: 3A / 150 V DC

- With integrated reflector interface
- Easy pre-assembly of LED by press fixing pins on the rear side
- Screw fixing: for screws M3 and locking washer
- Max. torque for screw fixing 0.5 Nm
- Strip length: 6+1 mm
- Polarity of LED must be observed
- Specifications of LED manufacturer must be observed
- In a series connection of LED modules, the air gap and creepage distances has to be sized that each module covers the total voltage of the series connection
- VDE-Reg. Nr. E289

LED-O-LINE

T 110

0.25 - 0.5 mm² 0.5 mm²

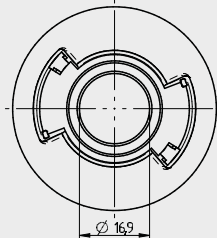
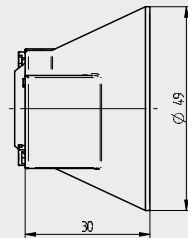
CAD

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part no
47.940.-351.56

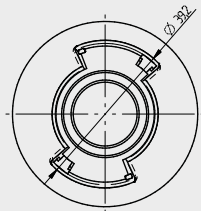
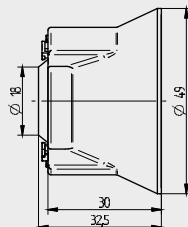


Reflector
for use with Spotlight connector 47.319.6111.50

- Reflector can only be used by screw fixing the spotlight connector with dome headed screws and locking washer
- Beam angle 24°

CAD i
98...

part no
47.940.-352.56



Reflector
for use with Spotlight connector 47.319.6111.50

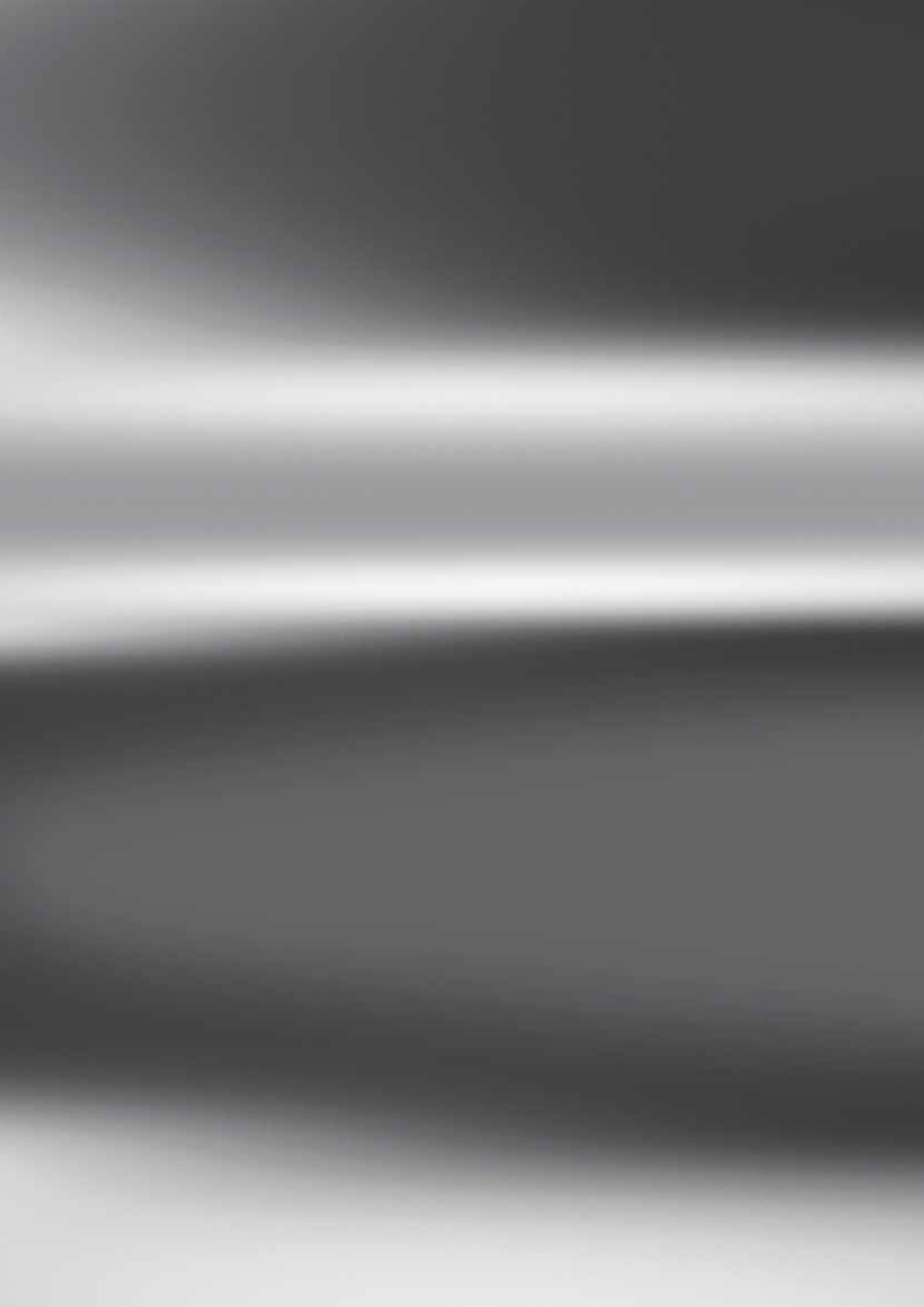
- Reflector can only be used by screw fixing the spotlight connector with dome headed screws and locking washer
- Beam angle 36°

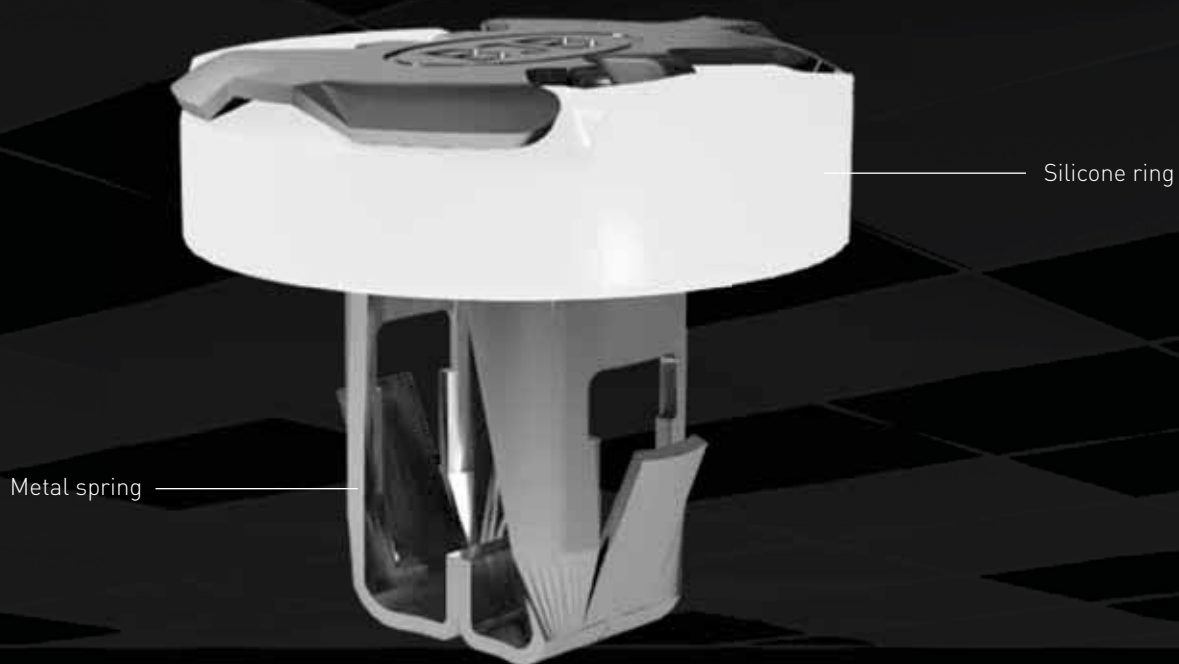
CAD i
98...

For use with
Spotlight connector 47.319.6111.50



see page 52

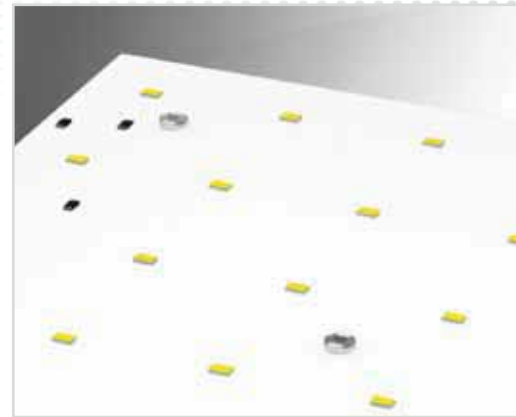
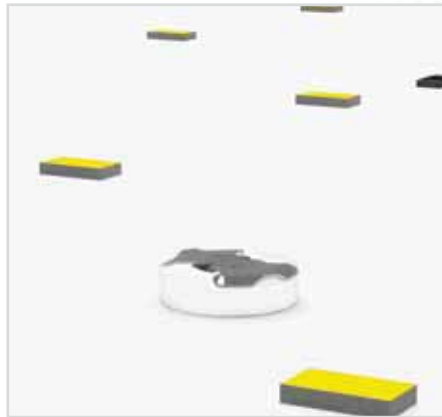




BJB///OEM-Line

The modular system for
LED luminaire production

Push-to-Fix fixing element (P2F). Simply attach PCBs better.



Push-to-Fix, or P2F for short, is a fixing element for fixing LED boards into a luminaire housing. It consists of a metal spring and a silicone ring, which, due to its material properties, ensures a permanent optimum contact pressure of at least 10 N, while remaining dimensionally stable, elastic and temperature resistant.

Advantage: Due to the virtually "floating" method of connection, a component fixed in this way can compensate for thermal length variations and offset tolerances. The forces exerted during automatic wiring can also be effectively absorbed.

The electrically insulating connection to the PCB is shock and vibration resistant. There is no need for a torque screwdriver system which has to be calibrated. The P2F can be installed quickly and securely with the aid of a (manual) installation tool. A semi- and fully automatic feeder system for the elements is under development.

All in all, therefore, we regard Push-to-Fix as a considerably better alternative to the screw.

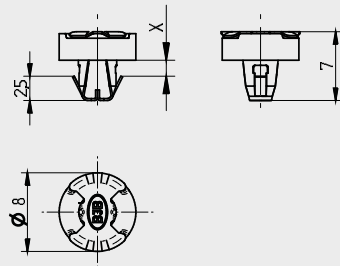
In order to cover as wide a range of applications as possible, we supply various P2F fixing elements for package thicknesses of between 1.5 and 3.6 mm.

Can be used in linear and panel lighting applications

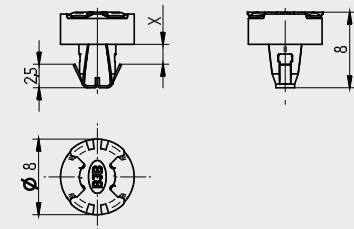




28.901.U162 - 28.901.U164



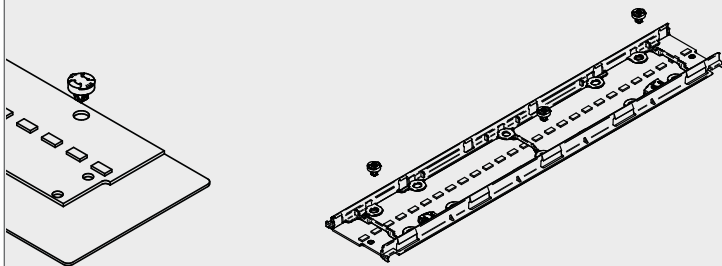
28.901.U165 - 28.901.U166



part no.	Thickness of PCB and panel: X	Ring-Colour-Code
28.901.U162.10	1.5 - 2.0 mm	transparent natural
28.901.U163.10	2.0 - 2.4 mm	transparent yellow
28.901.U164.10	2.4 - 2.7 mm	grey
28.901.U165.10	2.7 - 3.2 mm	white
28.901.U166.10	3.2 - 3.6 mm	blue

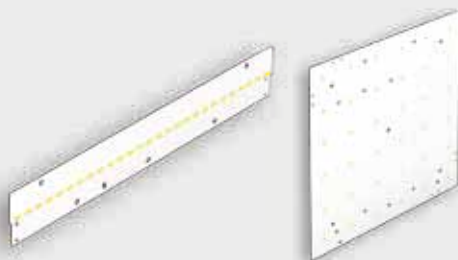
P2F - Push-to-Fix - Fixing element
 Push in fixing for mounting modules and BJB optic holder into light fitting housing
 Material: CrNi with silicon insulating ring
 Provides consistent and constant contact pressure
 Contact pressure: min. 10 N
 Push in fixing: for hole pattern \varnothing 4.2 mm

- Quick assembly process improves production efficiency and reduces production costs
- Eliminates potential damage from screw fixing due to low insertion force
- CrNi and silicone materials ensure long life reliability
- Reliable heat dissipation due to a constant pressure
- Suitable for Zhaga standardised hole sizes of \varnothing 4.7 mm in LED board to ensure future proofed designs
- Assembly without any additional tools
- Solutions for Automation upon request
- Removable connection



80°C CAD i 98...

For use with
 linear and square modules



see page 14

see page 18

Optic holder



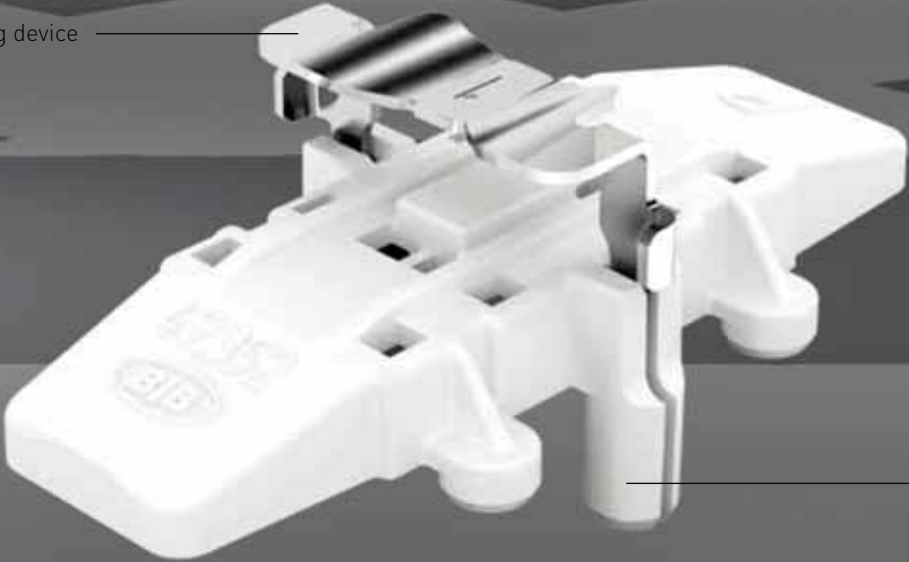
see page 27



BJB///OEM-Line

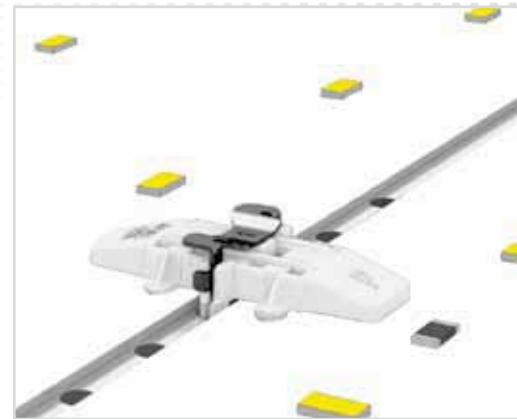
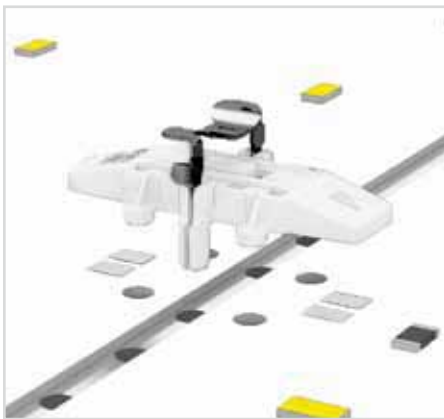
The modular system for
LED luminaire production

Locking device



Snap-in pins

Board-to-Board connecting element (B2B). Bridging of PCBs.

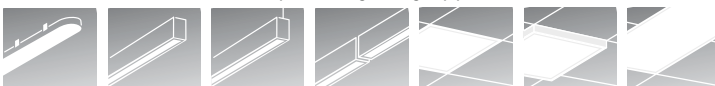


Our B2B connecting element provides a mechanical and electrical bridge between two circuit boards. In this way, Board-to-Board, or B2B for short, simultaneously establishes an electrical connection and fixes the circuit boards firmly and securely to the luminaire housing. This too is a simple technology which provides a number of positive effects: No additional wiring is required and the installation process is easier because no screws or tools are needed.

Fewer wires mean less risk of irritating shadow formation.

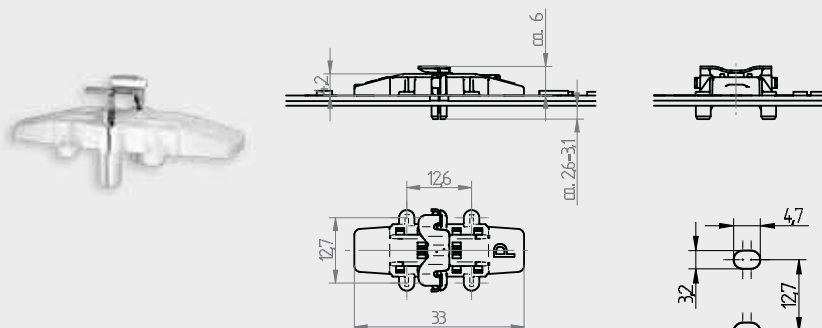
A metal spring provides permanent contact pressure and ensures that the element is securely fixed. Variable positioning of PCBs is also possible and they can be replaced individually in case of service.

Can be used in linear and panel lighting applications





part no.
47.352.1001.50



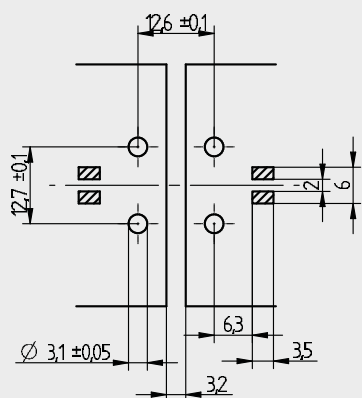
B2B - Board-to-Board connecting elements for modules in parallel connection

- Electrical bridging of modules
- Push in fixing for modules into light fitting housing
- Only for light fittings of protection class I

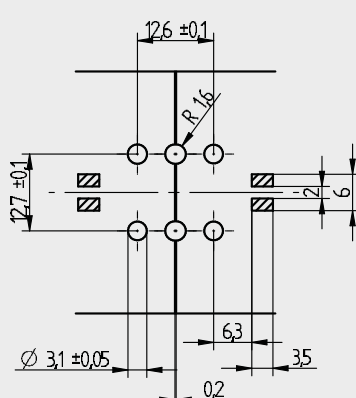
Material: Housing: PBT
Spring: CrNi
Contacts: CuSn

- Mounting and electrical connection of modules in one step
- For Printed circuit boards t=1 mm
- Release- and reapplicable

PCB Footprint Option 1

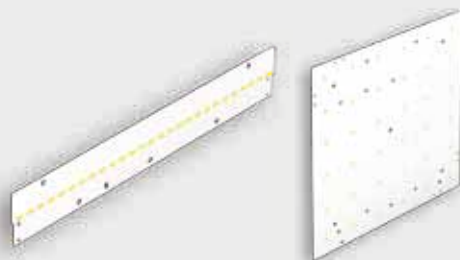


PCB Footprint Option 2



T 110	3 A 250 V		CAD	i
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For use with
linear and square modules



see page 14

see page 18



part no
47.351.1001.50

B2B - Board-to-Board connecting elements for modules in series connection

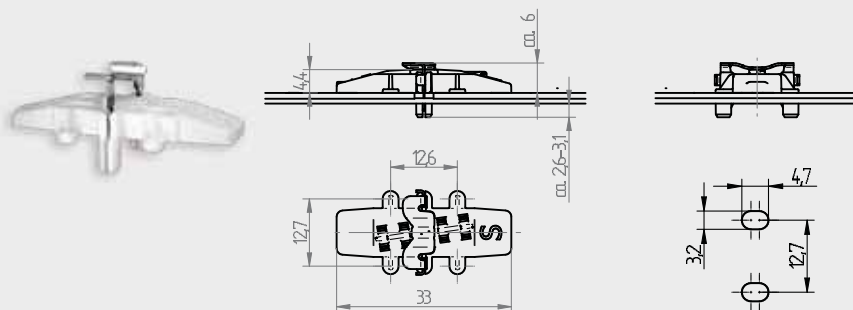
Electrical bridging of modules

Push in fixing for modules into light fitting housing

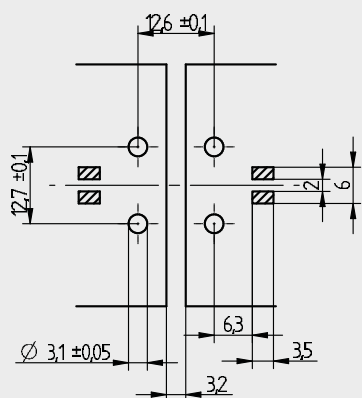
Only for light fittings of protection class I

Material: Housing: PBT
Spring: CrNi
Contacts: CuSn

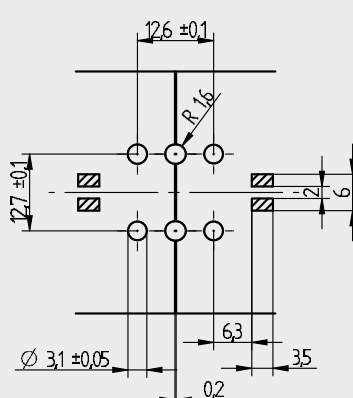
- Mounting and electrical connection of modules in one step
- For Printed circuit boards t=1 mm
- Release and reapplicable



PCB Footprint Option 1

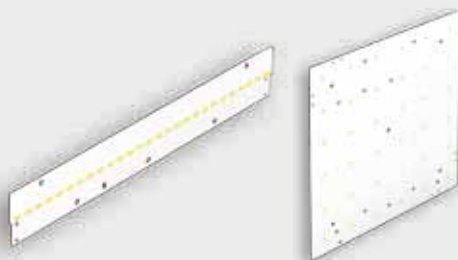


PCB Footprint Option 2



T 110	3 A 250 V		CAD	i
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For use with
linear and square modules



see page 14

see page 18

LED - Lighting and connection technology

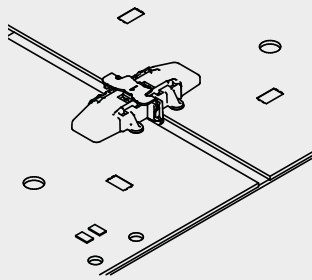
47.351
47.352

B2B - Board-to-Board connecting elements for modules

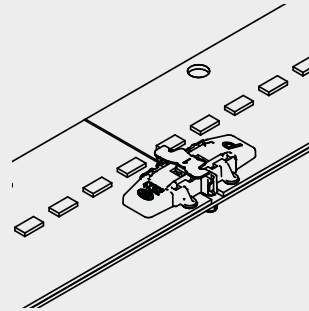


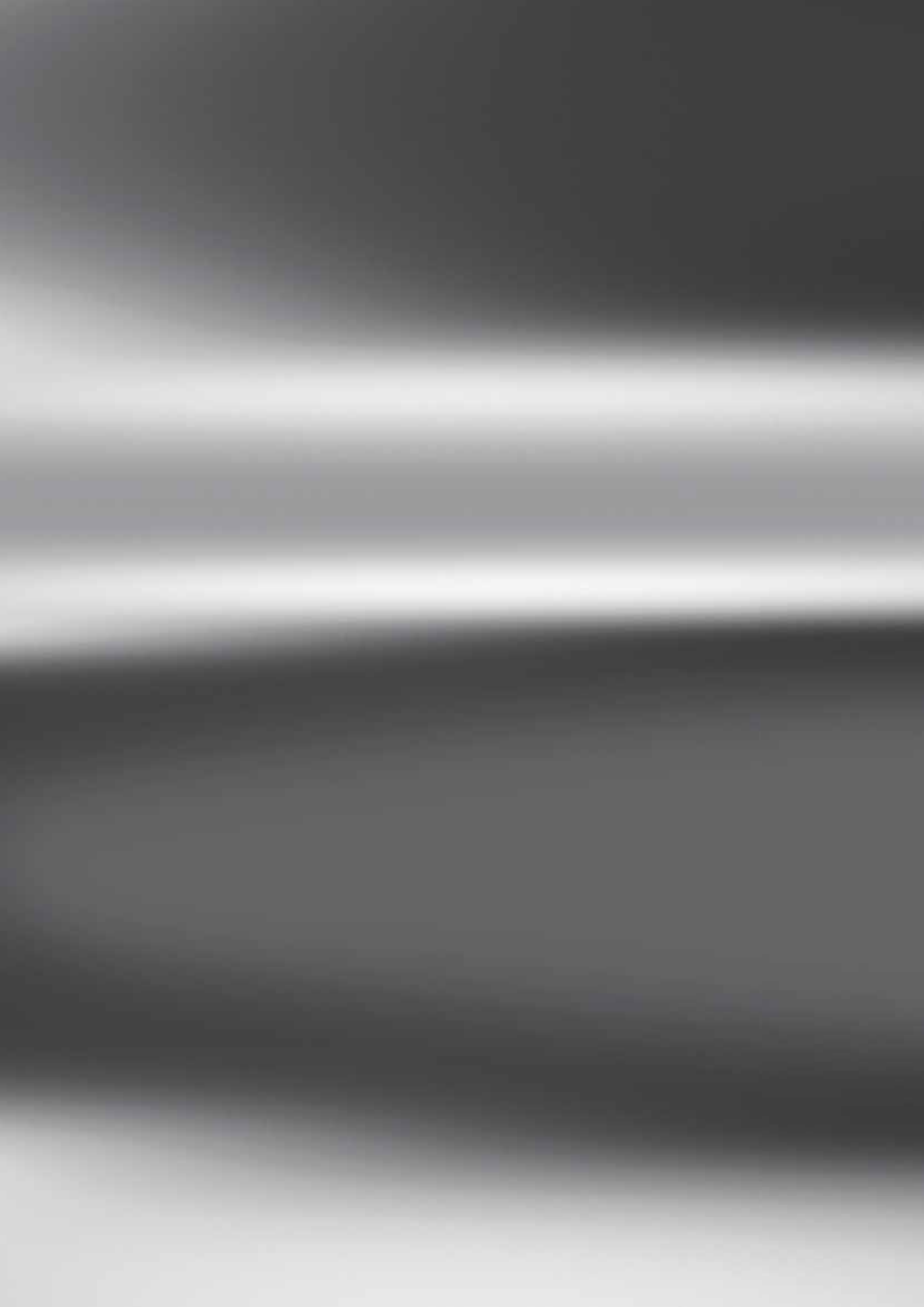
Example of application

Footprint 1



Footprint 2

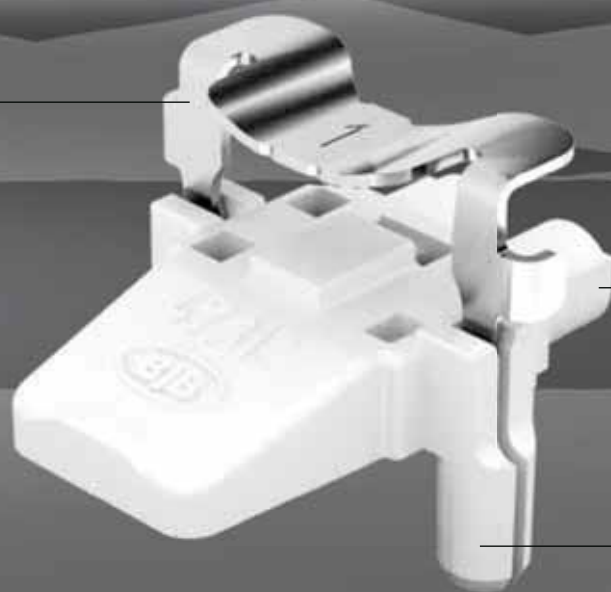




BJB///OEM-Line

The modular system for
LED luminaire production

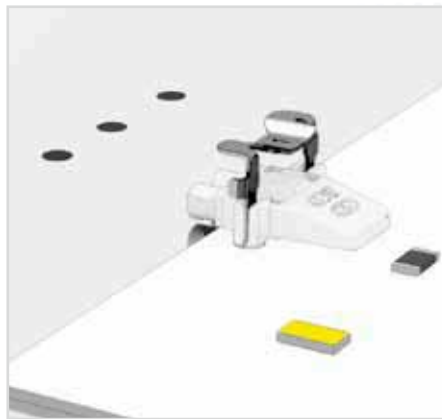
Locking device



Push wire connection

Snap-in pins

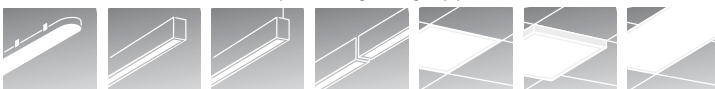
Board-to-Cable connecting element (B2C). Attachment and electrical contact in one step.



The B2C connecting element enables the mechanical attachment and electrical contacting of PCBs to be carried out in just one step and without soldering. B2C stands for Board-to-Cable and links the PCB to the electrical connection. Simple technology which provides a number of positive effects: Firstly, the risk of reverse polarity connection is reduced through clear marking to enable easy series or parallel connection. Secondly, installation is also easier as no screws or tools are required.

No further wiring is necessary in the luminaire itself, so that there are no irritating wires subsequently passing through the light cone. A metal spring provides permanent contact pressure and ensures that the element is securely fixed. In addition, suitable PCBs can be positioned variably and can be replaced individually in case of service.

Can be used in linear and panel lighting applications





part no
47.312.1001.50

B2C - Board-to-Cable - Feeder for modules

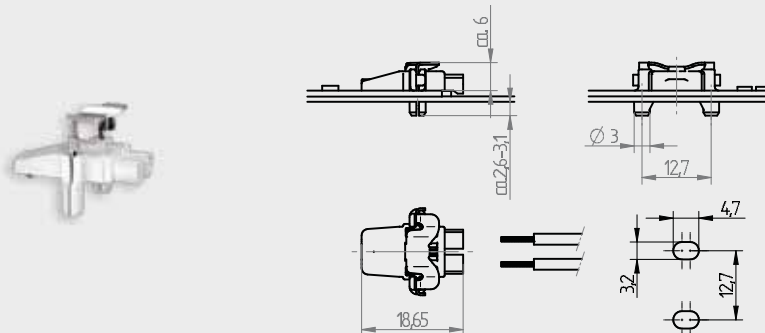
Electrical bridging of modules

Push in fixing for modules into light fitting housing

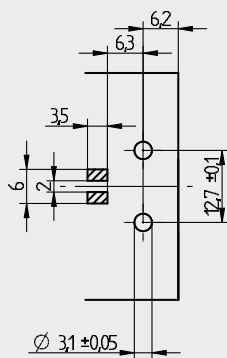
Only for light fittings of protection class I

Material: Housing: PBT
Spring: CrNi
Contacts: CuSn

- Mounting and electrical connection of modules in one step
- For Printed circuit boards t=1 mm
- Release and reapplicable

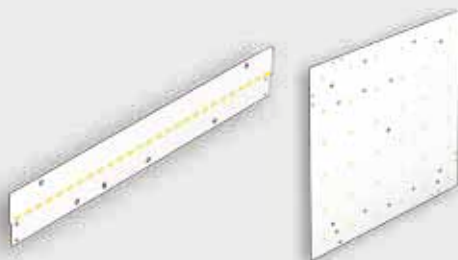


PCB Footprint



T 110	3 A 250 V					CAD	i
		0.25-0.5 mm ²	0.25-0.5 mm ²	0.5 - 1.0 mm			98...

For use with
linear and square modules

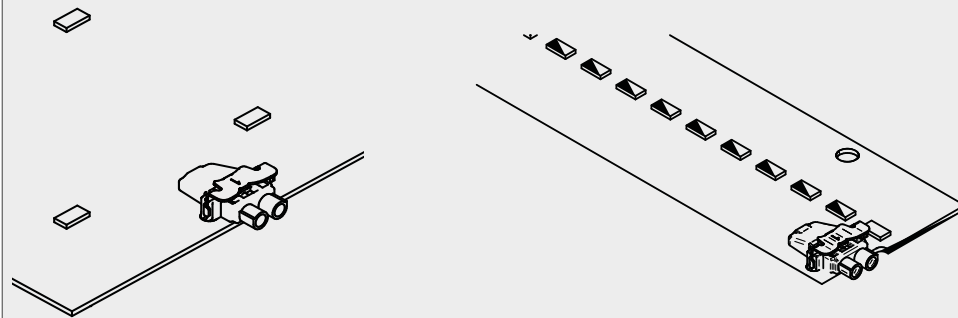


see page 14

see page 18



Example of application:



BJB///OEM-Line

The modular system for
LED luminaire production



Soldering lug

Plug-in connection for
electrical power supply

No turning of the luminaire during installation as ECG and wiring are on the same side

No shadow formation due to protruding parts

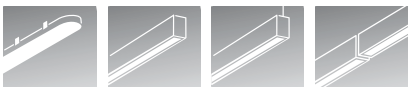
SMD terminal block for rear entry wiring. All round excellence.



SMD terminal blocks connect the circuit board to the conductors. We have developed SMD terminal blocks for rear entry wiring especially for luminaires with ECGs on the rear side. Conventional terminal blocks require the luminaire to be turned during installation. This time consuming operation is no longer necessary as the terminal block connections are now on the same side as the ECG and the other wiring.

Everything disappears elegantly behind the circuit board. There is no further risk of incorrectly routed cables obscuring individual LEDs and limiting the light output. A further advantage: Due to the low-profile design, optical components such as reflectors can be installed directly above the circuit board and standard lenses can be used without difficulty.

Can be used in linear lighting applications





part no.
46.111.1001.50

SMD Terminal block 2 pole
Wiring from below the PCB
Solder fixing
Housing: PPA
Contacts: Cu tinned/CrNi
Approbations based on: IEC 60947-7-4R
Rating: ENEC: 9 A / 320 V

- No tools required! Wires can be released by twisting and pulling the wire simultaneously.
- Terminal block and ballast on same working level

Note 1: Maximum thickness of PCB and heatsink should not exceed 3.6 mm

U _{imp} 2,5 kV			CAD	i
		0.2-0.75 mm ² AWG 24-18		98...

Note 2: Recommendation for opening in heatsink is shown with minimum diameter. For smaller diameters or other shaped pockets in heatsink the minimum creepage and clearance distances and manufacturing tolerances have to be considered.

Note 3: Recommended dimension for opening in PCB

Note 4: Recommended dimension for solder mask

Note 5: For metal core PCBs the minimum creepage distance has to be guaranteed

General note:
It is recommended to make an electrical connection between both poles of each polarity on the solder mask

Strip details

Wiring method	Plug In
Cross section (solid)	0.2 mm ² - 0.75 mm ²
Cross section (AWG)	22-18 (including ferrule)
Strip length	8.0 +1 mm
Conductor entry angle to the PCB	0 - 12°

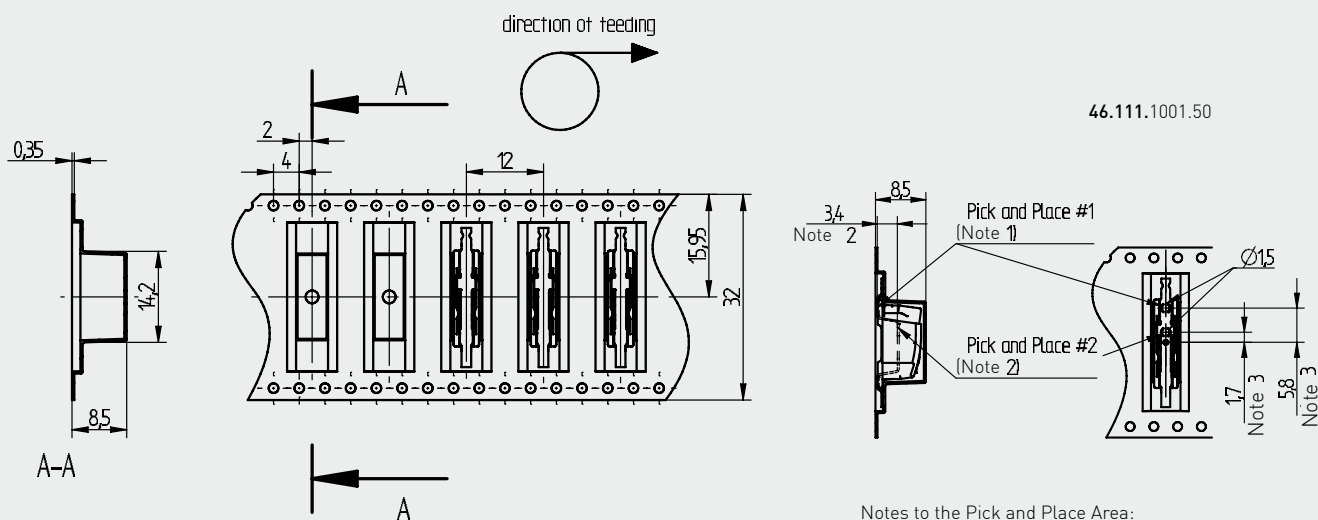
Material details

Temperature stability	-40 °C up to +105 °C
Flammability category, based on UL 94	V0
Insulating material group	I
Insulating material	PPA-GF



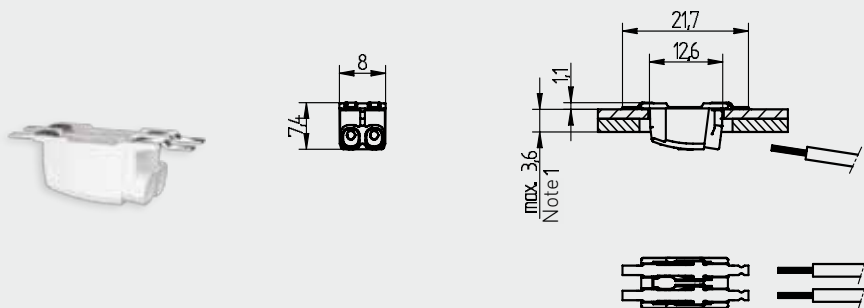
Soldering temperature higher 220 °C < 60s
 Soldering temperature up to 260 °C < 10s

Depending on the SMD soldering process and associated parameters a minor discoloration might occur. However, this will not influence the functionality.



46.111.1001.50

Notes to the Pick and Place Area:
 Note 1: Recommended Pick and Place area #1
 Note 2: Recommended Pick and Place area #2 inside the connector
 Max. ϕ of nozzle is 2.5 mm
 Pick and Place #3 (note 3): Distance from center of mass to pick and place area

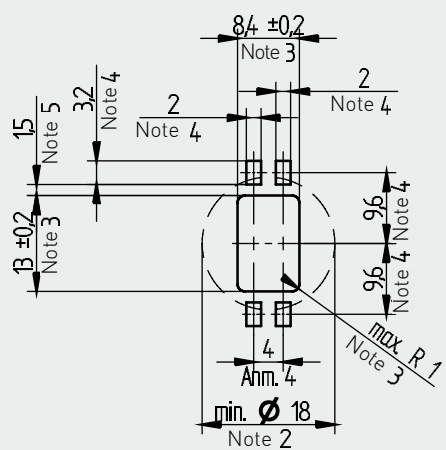
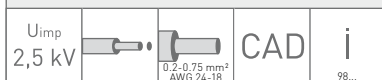


part no.
46.112.1001.50

SMD Terminal block 2 pole
Wiring from below the PCB
Solder fixing
Housing: PPA
Contacts: Cu tinned/CrNi
Approbations based on: IEC 60947-7-4R
Rating: ENEC: 9 A / 320 V

- No tools required! Wires can be released by twisting and pulling the wire simultaneously.
- Terminal block and ballast on same working level

Note 1: Maximum thickness of PCB and heatsink should not exceed 3.6 mm



Note 2: Recommendation for opening in heatsink is shown with minimum diameter. For smaller diameters or other shaped pockets in heatsink the minimum creepage and clearance distances and manufacturing tolerances have to be considered.

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Note 4: Recommended dimension for solder mask

Note 5: For metal core PCBs the minimum creepage distance has to be guaranteed

General note:
It is recommended to make an electrical connection between both poles of each polarity on the solder mask

Strip details

Wiring method	Plug In
Cross section (solid)	0.2 mm ² - 0.75 mm ²
Cross section (AWG)	22-18 (including ferrule)
Strip length	8.0 +1 mm
Conductor entry angle to the PCB	0 - 12°

Material details

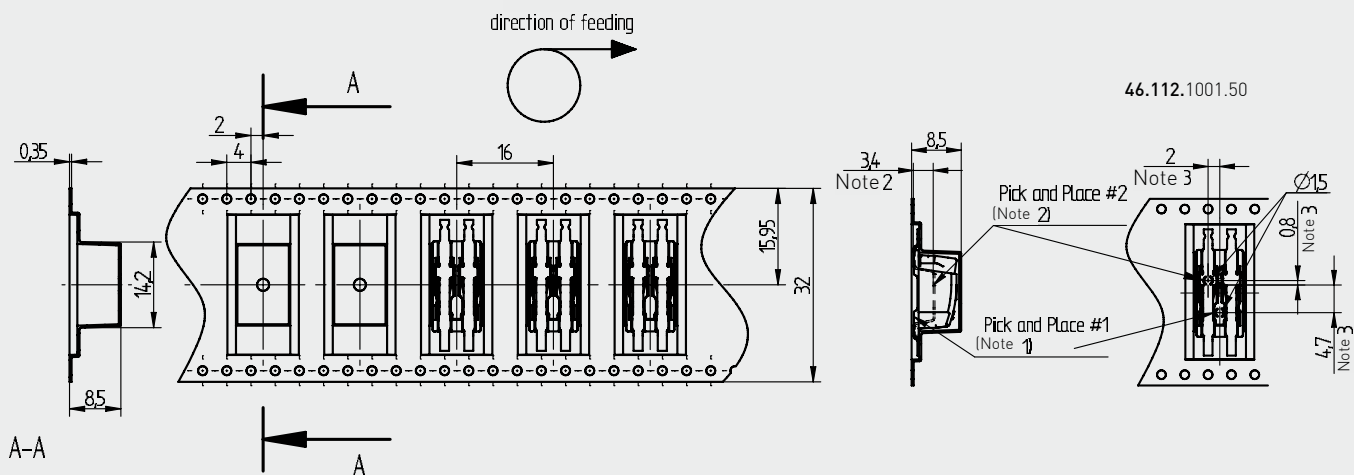
Temperature stability	-40 °C up to +105 °C
Flammability category, based on UL 94	V0
Insulating material group	I
Insulating material	PPA-GF



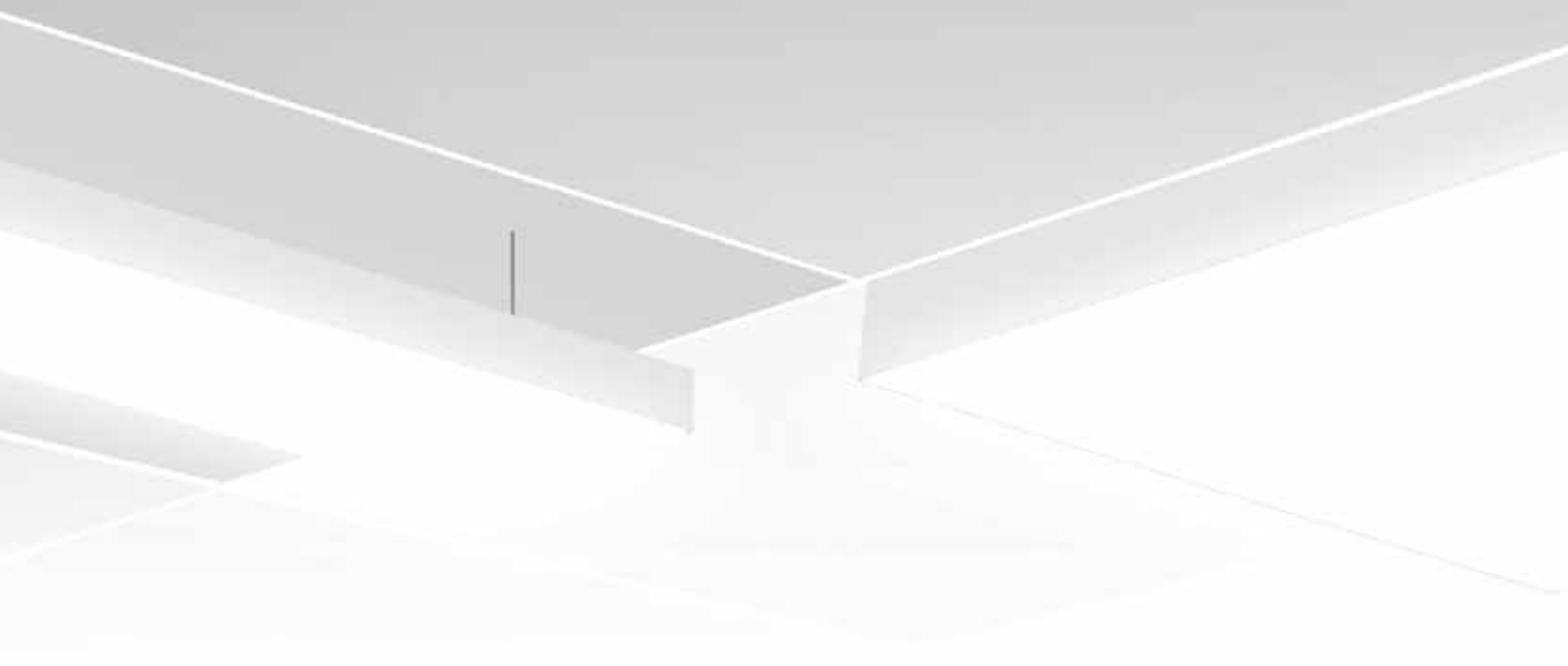
Important processing notes

Soldering temperature higher 220 °C < 60s
 Soldering temperature up to 260 °C < 10s

Depending on the SMD soldering process and associated parameters a minor discoloration might occur. However, this will not influence the functionality.



Notes to the Pick and Place Area:
 Note 1: Recommended Pick and Place area #1
 Note 2: Recommended Pick and Place area #2 inside the connector
 Max. ϕ of nozzle is 2.5 mm
 Pick and Place #3 (note 3): Distance from center of mass to pick and place area



BJB///OEM-Line

The modular system for LED luminaire production

Soldering lug



Plug-in connection for electrical power supply

Mini SMD terminal blocks for LED modules. The little ones are on the way.



Due to their overall height of only 4 mm, we also call these components SMD-Minis. They are PCB terminal blocks for fully automatic assembly with the reflow process (SMD), equipped with "plug-in" connection technology for conductor cross-sections from 0.34 to 0.75 mm².


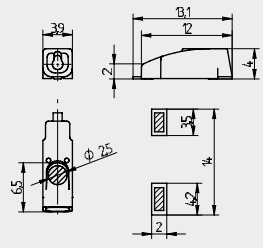
Because SMD PCBs are an increasingly popular design for LED applications in the technical/industrial lighting field, we have developed this particularly compact solution.

It is designed for direct insertion of solid and fine-stranded conductors with tinned ends. The interesting aspect: Push wire connections can be released again quite easily without tools by pulling and twisting. We supply the SMD-Minis in tape and reel packages for processing with pick and place machines. There are currently one- and two-pole versions available, both suitable for automatic wiring with our ADS systems.

Can be used in linear and panel lighting applications









pkg. wt. part no.
1500 0,25 g **46.101.1001.50**

SMD terminal block 1 pole
Solder fixing
Housing: PPA
Contacts: Cu tinned/CrNi
Approval based on: IEC 60947-7-4
Rating: ENEC: 9 A / 320 V
cULus: 3 A / 300V
UL: 9 A / 300V

- No tools required! Wires can be released by twisting and pulling the wire simultaneously.

U_{imp}
2,5 kV



0.34-0.75 mm²
AWG 24-18

CAD

i




pkg. wt. part no.
1000 0,5 g **46.102.1001.50**

SMD terminal block 2 pole
Solder fixing
Housing: PPA
Contacts: Cu tinned/CrNi
Approval based on: IEC 60947-7-4
Rating: ENEC: 9 A / 320 V
cULus: 3 A / 300V
UL: 9 A / 300V

- No tools required! Wires can be released by twisting and pulling the wire simultaneously.

U_{imp}
2,5 kV



0.34-0.75 mm²
AWG 24-18

CAD

i

Strip details

Wiring method	Plug In
Cross section (solid)	0.34 mm ² - 0.75 mm ²
Cross section (AWG)	22-18 (including ferrule)
Strip length	8.0 +1mm
Conductor entry angle to the PCB	0 - 12°

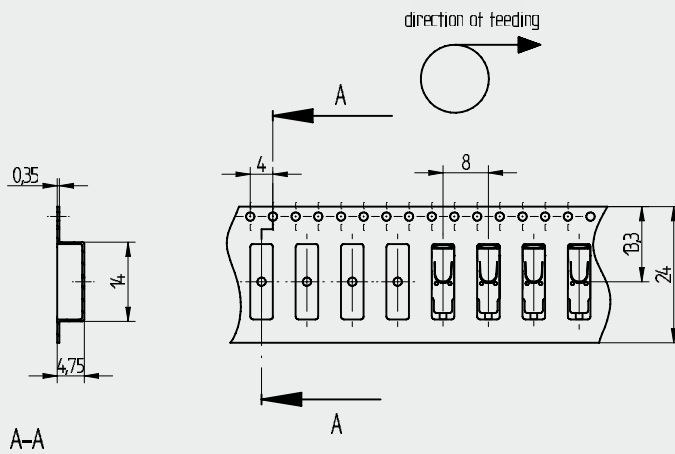
Material details

Temperature stability	-40 °C up to +105 °C
Flammability category, based on UL 94	V0
Insulating material group	I
Insulating material	PPA-GF

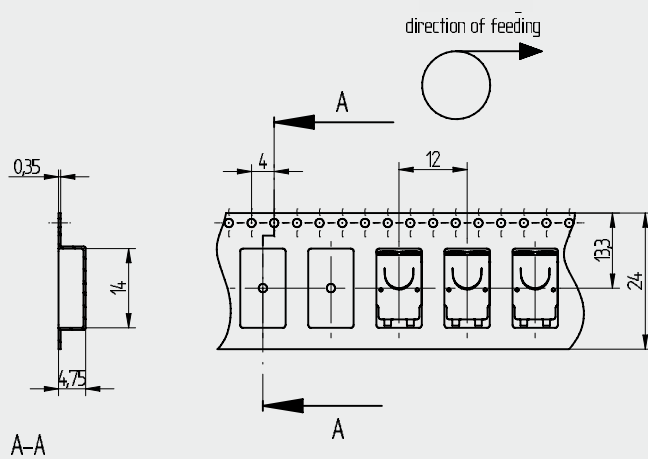
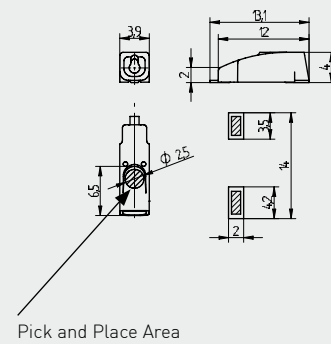
Important processing notes

Soldering temperature higher 220 °C < 60s
Soldering temperature up to 260 °C < 10s

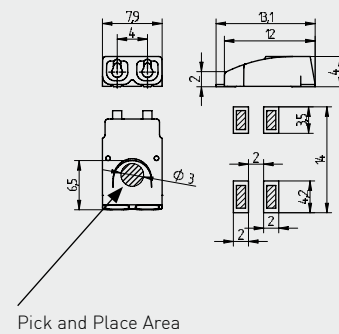
Depending on the SMD soldering process and associated parameters a minor discoloration might occur. However, this will not influence the functionality.



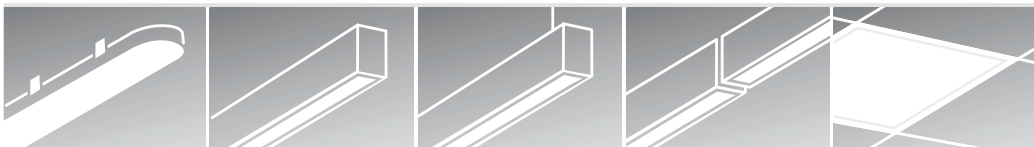
46.101.1001.50



46.102.1001.50





Component overview


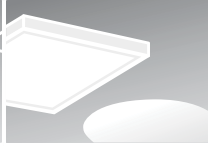

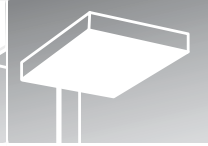


	Applications					
	BJB-Components	Waterproof luminaire with cover	Batten luminaire	Pendant luminaire	Striplight module	Recessed louvre luminaire

Components for linear and panel LED lighting

	LED modules 280 x 40 mm and 560 x 40 mm	●	●	●	●	●
	LED modules 260 x 260 mm					●
	Optical holder and optical plates	●	●	●	●	●
	Push-to-Fix (P2F)	●	●	●	●	●
	Board-to-Cable (B2C) and Board-to-Board (B2B)	●	●	●	●	●
	Mini SMD terminal blocks	●	●	●	●	●
	SMD terminal blocks for rear- entry wiring	●	●	●	●	
	GX16t-5 LED tube	●	●	●	●	●
	Linear Flat System	●	●	●	●	●

Components for Spot- and Downlights

	Spot-/Downlight system					
	Spotlight connectors					

					
Surface mounted louvre luminaire	Ceiling/wall mounted luminaire	Luminous ceiling, panel luminaire	Floor standing/table lamps	Downlight	Spotlight
•	•	•	•		
•	•	•	•		
•	•	•	•		
•	•	•	•		
•		•			
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•	•	•	•		
•	•	•	•		
				•	•
				•	•

BJB///OEM-Line

Production and test systems for
LED applications

An overview of BJB automation

- 088 BJB automation systems
- 090 Automatic wiring
- 091 ESD protection
- 092 Test systems
- 094 Parameterisation of ECGs

Assembling, wiring and testing with BJB automation systems



BJB///OEM-Line

The modular system for
LED luminaire production

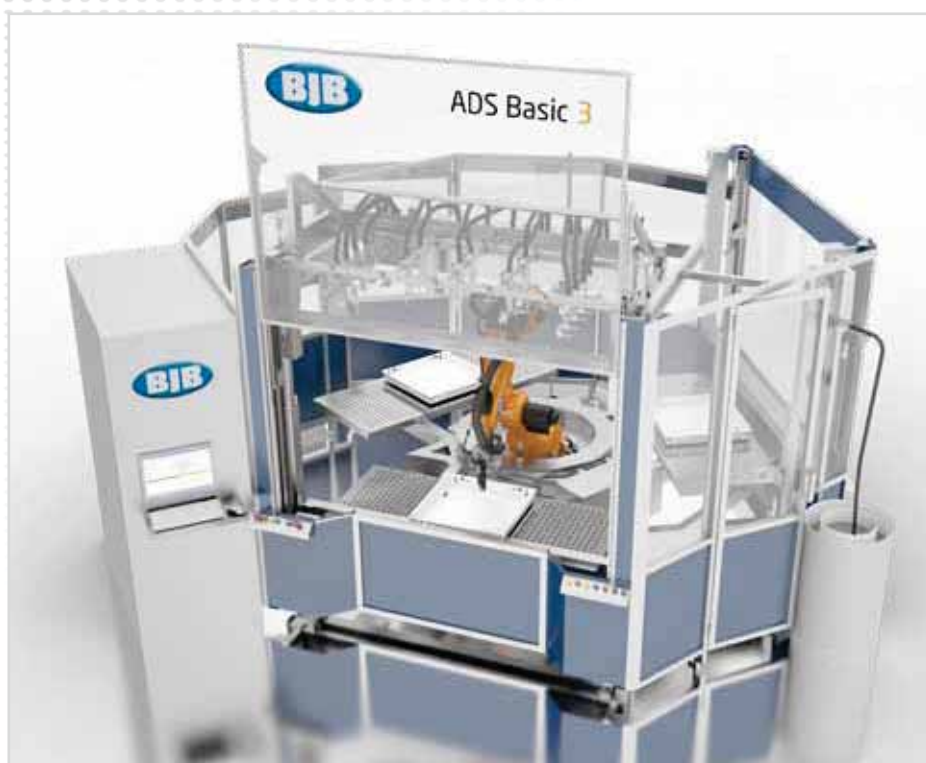


As well as components and light sources, BJB///OEM-Line also includes production processes. For this purpose, we supply individually configurable, ESD-protected systems for the automatic assembling, wiring and testing of all kinds of LED applications. Based on our three product lines, ADS One, ADS Basic and ADS Master L, we advise and support manufacturers of all sizes in putting together suitable solutions for their individual requirements.

Every conceivable variation is possible from single modules, such as an ADS One 2.0 with wiring robot as an entry level system, to scalable solutions and optional added features, up to complete production lines for large and very large volume production. Manual workstations, camera systems, tools for the parameterisation of ECGs or modularly configurable test stations – the options are as varied as the requirements of the manufacturers and customers.



Efficient wiring with BJB automation systems.



Automatic wiring of components, which has proven its worth over many years with standard applications, is also possible for LED luminaires when using BJB///OEM-Line components. Automatic wiring is carried out according to familiar principles: A wiring tool installed on an industrial robot performs pre-programmed work processes autonomously and precisely. Because these systems are

used to process LEDs, they are also equipped with comprehensive ESD protection measures (see page on right). As a result, they prove to be extremely productive instruments for the efficient manufacture of luminaires and ensure consistent high quality in the end product.

LED processing with certified* ESD protection.



When carrying out automatic wiring of luminaires with LED technology, the relevant ESD requirements have to be taken into consideration.

ESD or "electrostatic discharge" is a spark or disruptive discharge resulting from a large potential difference and causing a short voltage surge in an electrical appliance. Under unfavourable circumstances, this voltage surge may damage components in the electrical

appliance. LEDs are particularly susceptible to such damage. In order to avoid this problem, we offer the option of ADS systems with ESD protection. Equipped in this way, these systems can then be used in so-called ESD protection zones. For this purpose, we supply a comprehensive range of ESD protection articles** and ESD devices. These include protective fences with antistatic coating and conductive connection to the aluminium profiles,

ESD-safe connection of profiles, protective hoses for the wiring robots, wristbands with cables to earth the staff working at the manual workstations, ESD equipotential bonding blocks to earth the luminaire housings and earth bonding points with connection terminals and spiral cables to connect the conductors in the wire barrels to the earthing points. Safety first!



* ADS systems from BJB Automation are certified by the ESD Academy with regard to their protective measures against electrostatic discharge

** ESD protection can be retrofitted to existing ADS systems. For this purpose, there is a service kit, which is adapted to individual requirements.

BJB///OEM-Line

Production and test systems for
LED applications



Test systems for LED applications. Good to know.



Current requirements in the final testing of luminaires call for the use of flexible test systems. For this purpose, we offer modularly configurable test stations. These consist of a test bench with a protective cover of tinted polycarbonate which can lower automatically. This is for visual protection during the test process.

This protective cover enables the entire test process to be carried out without supervision. The test bench is also ESD protected and has an earth bonding point for the operating staff.

The following tests are carried out with the integrated compact tester GLP 1:

Protective conductor resistance test, insulation resistance test and functional test.

As an alternative, the PC based compact tester GLP 3 is available for the test station. As well

as the standard tests offered by the GLP 1, this can perform additional tests: DALI/DSI interface and 1-10 V interface for luminaires with dimming functions.

A camera for the visual inspection of LED luminaires can also be integrated into the test station with the compact tester GLP 1 or GLP 3.

The test results are stored in an Access or SQL database. The tested parameters can be viewed at any time via the serial number of the luminaire and can be printed out via a standard label printer connected to the tester.

The GLP 3 also offers the option of parameterising ECGs via the DALI interface prior to the final luminaire test.

Detailed information on this and the other products offered by BJB Automation is available on request.

Parameterisation of ECGs?

Now easier still with Set'n'Drive.



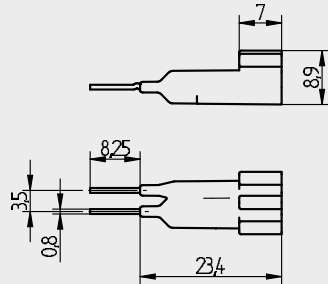
The parameterisation of ECGs (Electronic Control Gear) can be performed electronically via the DALI interface with one of our test devices, or by the insertion of a resistor on the secondary side (e.g. BAG, OSRAM, Philips, Tridonic).

For this type of parameterization, BJB has developed the Set'n'Drive resistor, which can be inserted either manually or automatically. In the case of automatic processing, the three gripping

positions of the wiring tool in ADS wiring systems enable the resistor to be inserted at the desired angle. For this purpose, the Set'n'Drive resistors are correctly pre-positioned in trays in the area of the workpiece carrier.

The advantages of the Set'n'Drive at a glance:

- Accidental contact protection
- Can be inserted manually and automatically
- No unnecessary cable lengths due to cable harness with soldered resistor



Set'n'Drive (S'n'D) parameterising resistor

for easy insertion into LED ballast for adjusting the I_{out}

Also for automatic insertion by ADS

- The resistor is protected against contact already integrated into a housing and is quick and easily inserted into the terminal block of the electronic control gear.
Push in - Ready.

part no.	resistor
47.901.1001.50	680 Ohm
47.901.1003.50	1,8K Ohm
Additional versions in preparation	

LED-LINE	T 110	CAD	i
			98...

BJB///OEM-Line

The smartest route to your
LED application

Appendix

098	Information on product pages
099	Technical information
100	Guarantee conditions
101	General terms and conditions of sale
102	Contact details and addresses

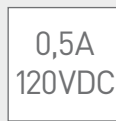
General information

All articles in this catalogue have been designed according to the appropriate national and international standards (VDE / IEC). The choice of product and correct technical embodiment is the sole responsibility of the user. Exact information can be obtained upon request. We reserve the right to modify products.

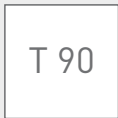
Explanation of the symbols shown on the product pages.



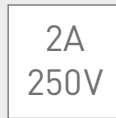
LED-Light-Engine



Rating
Indication of rated values.



Temperature rating T 90
The maximum operating temperature is given by a T marking. This is the maximum operating temperature for which the product is designed.



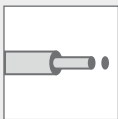
Rating
Indication of rated values.



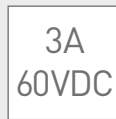
Temperature rating T 110
The maximum operating temperature is given by a T marking. This is the maximum operating temperature for which the product is designed.



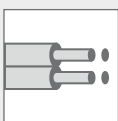
Rating
Indication of rated values.



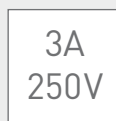
Single push wire terminals



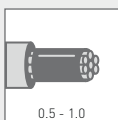
Rating
Indication of rated values.



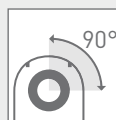
Twin push wire terminals



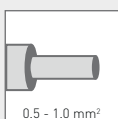
Rating
Indication of rated values.



For tinned wire ends within the cross sectional range stated
(In this example 0.5 - 1.0 mm²)
When regulations deviate from IEC, other cross sections are possible (e.g. UL / CSA: cable 18 AWG).



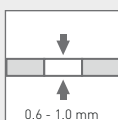
90° rotor fixing



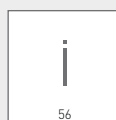
For solid conductors within the cross sectional range stated
(In this example 0.5 - 1.0 mm²)
When regulations deviate from IEC, other cross sections are possible (e.g. UL / CSA: cable 18 AWG).



CAD-Data in 2D or 3D format available



Material thickness
Indication in mm
(In this example 0.6 - 1.0 mm)



Additional information
Further information about the products shown on this page can be found on the pages shown within this symbol.

Technical information for embodiment of our products

BJB lampholders are in accordance with IEC regulations and are designed to IEC 60061-2 publication.

Where no electrical data is stated then:

- according to IEC 60238 / VDE 0616 part 1, Edison lampholders E14 rated 250 V / 2 A conform to overload capacity category II, E27 rated 250 V / 4 A voltage and E40 conform to voltage overload capacity category III ,
- according to IEC 60400 / VDE 0616 part 3 fluorescent lampholders and starter holders rated 250 V / 2 A conform to voltage overload capacity category II
- Halogen lampholders designed according to IEC 60838 / VDE 0616 part 5, conform to voltage overload capacity category II
- Bayonet lampholders according to the requirements IEC 61184 / VDE 0616 part 2 conform to voltage overload capacity category II,
- Lampholder outer threads conform to IEC 60399.

When regulations deviate from IEC, e.g. UL, other ratings may be possible. Please consult us before use.

Through our work with the relevant standardisation committees, we ensure our lampholders are developed and tested to the latest specifications.

All technical product drawings shown in this catalogue indicate only the main important dimensions and tolerance values. As a rule only where this is of importance for the intended application.

All measurements stated without tolerances are nominal.

Limit values are:

- DIN 16901, size 130 for moulded parts
- DIN ISO 2768-m for metal parts
- DIN 40680, medium for ceramic parts

Weights of single items stated in this catalogue are rounded up or rounded down to the nearest gram, therefore the final weight of a pack quantity may differ. The weights shown are only a guide and should not be used for order or shipping specification purposes.

The choice of product and correct technical embodiment in accordance with the corresponding regulations (e.g. IEC 60598 / VDE 0711, IEC 60335 / VDE 0700) is the sole responsibility of the user.

Specific attention must be given to:

- Temperature limits which must be observed in accordance with the corresponding regulations (e. g. T-markings);
- The necessary creepage and clearance distances as well as distances through insulation;
- The connecting cable and wires, which must have the correct heat and UV resistance, mechanical strength, voltage rating and a current carrying capacity corresponding to the conditions of the intended application;
- Protection against contact with live parts;
- Connectors, e.g. tab terminals, which must be selected in accordance with the requirements of their intended use (e.g. temperature, current carrying capacity, corrosion resistance);
- The influence of control gear, transformers, starters / ignitors and other circuit components, must always be taken into consideration.

The catalogue also contains technical information, to which attention must be paid during project development, construction and electrical installation or when operating lighting installations. This information must be passed on, e.g. in an installation instruction.

To ensure snap fix products locate correctly and securely, consideration must also be given to the cut-out and where applicable, attention must be paid to special requirements (e.g. degree of burr, direction of punching, radii, etc.).

Consideration must also be given to the area required around the cut-out, to allow correct insertion. Different components may require to be inserted at different angles.

During fixing, it must be ensured that the fixing surface is correctly sized.

Information regarding light fitting wall thickness, should always be interpreted as inclusive of a coating, unless stated otherwise.

If there is a requirement for one of our products to be embodied in a way other than shown in our catalogue, please contact us.

Attention must also be given to the IEC lamp standards, as well as the technical instructions of the lamp manufacturers in respect of the embodiment and correct operation of lamp.

When LED modules are connected in series, creepage and clearance distances must be observed in accordance with the overall voltage.

Our oven lamps are exclusively designed for embodiment within domestic appliances. They are not suitable to be used for general ambient lighting.

In accordance with our policy of continual product development and improvement, we reserve the right to make design modifications.

Due to the amount of information involved in compiling this catalogue, it is not always possible to avoid printer's errors or minor mistakes. Although every care is taken, BJB accepts no responsibility for the accuracy of the contents. If in doubt, or if you require confirmation of specific information, please contact us.

Edition 2014



Guarantee conditions

Guarantee conditions

These Terms apply for products and components which the acquirer has acquired from BJB GmbH & Co. KG, Werler Str. 1, 59755 Arnsberg (hereinafter referred to as "BJB"), insofar as BJB and the acquirer have agreed on these Guarantee Terms contractually, for example by making reference in the contract documents. Insofar as nothing to the contrary is agreed upon for the products and components affected, BJB GmbH & Co KG's General Terms & Conditions also apply (as of 06/2011), insofar as nothing different arises from the following terms.

Guarantee period

Subject to compliance with the terms set out here, the acquirer is granted a guarantee for the below-mentioned period.

- For active parts with a physical nominal lifetime* pursuant to the BJB product description \geq 50,000 operating hours, BJB grants a guarantee for a period of five years.
- For active parts with a physical nominal lifetime* pursuant to the BJB product description $<$ 50,000 operating hours, BJB grants a guarantee for a period of three years.

The guarantee period commences upon the respective delivery of the products and components to the acquirer.

* Life span according to TM-21 L70 (6K) as per warranty condition.

Guarantee prerequisites

The assertion of guarantee rights pursuant to these conditions requires that the products and components have been duly assembled and operated in accordance with BJB's instructions.

The guarantee lapses if changes or repairs are made to the products or components by people who are not qualified to do so. The acquirer has to keep a log sheet in this respect and have it ready for the purpose of the inspection. BJB representatives are to be given the opportunity to appraise the defective products in the necessary scope and within the time frame.

The guarantee for individual products and components applies subject to the prerequisite that the products or components are used pursuant to their agreed specifications and guidelines or specifications and guidelines arising out of BJB product publications.

Claims under the guarantee are to be notified in writing to BJB within 30 days after the appearance of the defect. The notification has to include a detailed defect description, details about the system used, the operating hours and cycles of operation, and name the installation and invoice date. If this is not done, claims under the guarantee are excluded.

Moreover, guarantee claims are excluded insofar as the notified defect is attributable to the following circumstances:

- improper use, misuse or improper treatment by the customer or a third party, particularly non-compliance with instructions or technical information in the operating instructions or in the product datasheets, including installation information in catalogues and electronic media;
- abnormal use conditions [e.g. ambient temperature, moisture];
- defective construction components which are not part of the relevant BJB products or components for which this guarantee is granted; or
- faults or fluctuations in the supply voltage or in the electric circuits outside the permissible tolerance limits.

Services in guarantee case

If the defect is notified to BJB within the guarantee period, BJB will in its own discretion repair or replace the defective product or refund the product purchase price to the acquirer. If the product is no longer available, BJB reserves the right to replace it with a similar product, which might have minor deviations with regard to design and product specification. Ownership of defective products is transferred to BJB upon their replacement. Transport costs are borne by BJB in guarantee cases, otherwise by the acquirer. Costs arising in connection with disassembling the defective products or product parts and assembly for the new products are not borne by BJB in the framework of the guarantee. More extensive compensation claims, including claims for compensation of indirect loss, consequential loss or lost profit, are excluded pursuant to this guarantee.

Scope of the guarantee

This guarantee pertains exclusively to the mortality beyond the nominal failure rate of the components. Only the full failure of the BJB products or components is deemed to be a defect and thus a guarantee case in the sense of these Guarantee Terms. Reduction in luminous flux or colour shift depending on operating time does not constitute a failure of BJB products or components and thus does not constitute a guarantee case.

Due to technical advances in LED technology as well as usage-related changes in light properties (such as colour location shifts, degradation) of products, when making subsequent deliveries of LED modules, there might be deviations in the light properties compared to the original products.

The guarantee period is not prolonged by the performance of work which falls under this guarantee service.

The Guarantee Terms pertain exclusively to commercial, industrial customers.

The acquirer's contractual or statutory warranty rights against BJB remain unaffected by this guarantee.

General Conditions of Sale

I. Entry into contract

1. These General Terms and Conditions apply to all - including future - contracts, deliveries and other services where we are the seller or the contractor. By placing an order, our customer declares itself in agreement with these Terms and Conditions. If the order placed by our customer is confirmed by the supplier only on the basis of its own Purchasing Terms and Conditions, then the latter are hereby objected to. Our Terms and Conditions are deemed to have been accepted at the latest upon accepting delivery of our goods or upon dispatch approval.
2. Our employees, insofar as they are not organs of the company, procurist or assistants, are not authorised to make binding declarations on our behalf.
3. Information such as dimensions, weights, pictures, assembly sketches in product catalogues and other printed materials are only approximate, but have been ascertained in the best possible manner.
4. Any modifications to contract terms agreed in writing also require the written form.
5. Orders placed by the customer only become binding after our written order confirmation. We can validly give the order confirmation within four weeks after receipt of the order. The order confirmation can also be given in the form of an invoice or a delivery note.

II. Oral supplementary agreements

Oral supplementary agreements as well as any modifications or additions to a contract require our express written confirmation in order to be valid.

III. Prices and payment

1. We are bound by the confirmed prices for 3 months from the date the contract comes into existence. For deliveries after that point in time, we are entitled to increase the prices in accordance with the wage, administration and materials purchasing costs which have changed since the last price determination. Insofar as the price difference is greater than 10% of the confirmed price, the customer is entitled to rescind the contract for the parts of the performance which have not already been rendered.
2. Section III.1 applies correspondingly if our purchase prices increase due to foreign exchange rate changes.
3. VAT in the amount prescribed by law on the date of the invoicing will be added to the prices.
4. The invoice amount is due without deduction of discounts 30 days after invoicing. If payment is made within 8 days after the invoice date, 2% discount can be deducted.
5. In the event of default in payment, default interest in the statutory amount can be charged. We hereby reserve the right to claim compensation for other default loss.
6. Payment by bill of exchange or cheque is only ever conditional payment. Acceptance of the same is not to be regarded as deferral of the purchase price. Liability of the contractor for timely presentation, dishonour, notification or return in the case of non-redemption is hereby excluded.
7. Set-off of pending payment is only permissible on the basis of counter-claims which are undisputed by us or which have been determined in a final and legally-binding manner.
8. The customer does not acquire any right in a tool by paying a portion of the costs of tools.
9. The customer is not entitled to transfer claims arising under this contract to third parties.

IV. Product qualities and quantities

1. Product qualities, particularly quality and material properties (e.g. plastic), are initially determined in accordance with our respectively-valid technical specifications; should there be no such specifications, then in accordance with DIN norms valid when the contract is entered into. Insofar as there are no DIN norms, the corresponding Euro norms applicable when the contract is entered into apply, and in the absence of these, established commercial practice applies.
2. Insofar as nothing to the contrary is agreed upon, we are obliged to make the delivery free from third-party intellectual property rights and copyright only in the country of the delivery location.
3. The piece numbers to be delivered are determined through weighing and measuring. The quantities of mass-produced articles or bulk commodities. Minor excess deliveries or shortfalls caused thereby are irrelevant; this is deemed to be complete performance nevertheless. The customer does not derive any rights therefrom.
4. For special orders, we hereby reserve the right to make an excess or shortfall delivery of up to 10% of the quantity ordered.
5. BJB products are components for installation by our customers into electrical equipment, such as luminaries or domestic appliances.

V. Right of rescission in the event of inability to perform

1. We are entitled to rescind the contract if despite entering into coverage transactions in a timely manner we ourselves are not supplied completely or in a timely manner and other coverage purchases are unreasonable or have failed or if we or our suppliers are unable to make timely delivery for reasons which have arisen since entering into the contract or were unknown to us and are not in our sphere of influence, such as strike, lock-out, non-culpable business shutdowns, including at our suppliers (e.g. tool breakages), supply blockades, plant closures, refusal of cash payment or export licenses, other acts of state and circumstances going beyond these, which are to be regarded as force majeure. Therefore, we assume no procurement risk.
2. We undertake to inform the customer without undue delay of the non-availability and to refund without undue delay the consideration rendered by the customer.

VI. Right of rescission, etc. in the event of default in payment and deterioration of financial position

1. We are entitled to rescind the contract or in accordance with our discretion to only effect deliveries in return for payments made in advance if the customer is in default with fulfilment of the payment obligations owed by it to us, if its bills of exchange or cheques are not honoured, or if during the term of the contract its financial circumstances significantly deteriorate, which would respectively lead to the consequence that the fulfilment of the customer's obligations arising from the commercial transaction in the manner of a prudent, proper businessperson was no longer to be expected.
2. In the event of a default in payment, all of our other claims will become due immediately. In these cases, we are also entitled to demand cash payment in advance for further (partial) deliveries and to withdraw immediately from circulation all circulating acceptances, bills of exchange and cheques - with the costs arising therefrom to be borne by the customer - and to demand cash payment for the same.

VII. Delivery period, bearing of risk and packaging disposal

1. If no transaction with a fixed date has been agreed to, but a delivery period is indicated in our offer or our order confirmation, this period can be exceeded by one week. Before bringing a claim for compensation based on non-performance, a reasonable final supplementary period for performance must be set. The delivery period is prolonged by the period during which delivery obstacles which arise due to the causes named in section V. hereof exist. If such an obstacle exists for longer than 3 months, we have the right to rescind the contract without thereby becoming liable to pay damages for the same. It remains the customer's decision whether or not to exercise the rights to which it is entitled.
2. Risk passes to the customer at the latest upon dispatch of the goods, even if partial deliveries are being effected or if we have agreed to perform other services as well, e.g. shipping expenses or transport. Upon the customer's written request, the consignment will be insured by us at the customer's expense against theft, breakage, transport damage, fire and water damage, as well as against other insurable risks.
3. If the shipment is delayed because of circumstances for which the customer is responsible, then the risk and storage costs are transferred to the customer from the day the shipment was ready; however, we are obliged upon the customer's request and at its expense to obtain the insurance so requested by it. If the delivery is delayed for more than 4 weeks for the reasons for which the customer is responsible, we are entitled to rescind the contract and to assert the statutory claims.
4. Delivered goods are to be accepted by the customer regardless of the rights arising in section VIII. hereof, even if these goods have insignificant defects.
5. Partial deliveries are permissible.
6. When the net value per shipment is above EUR 800, the goods are delivered as freight to a German receiving station including packaging, below EUR 800, 2% is added for packaging, and the customer will be invoiced for delivery costs, to a German receiving station, below EUR 100, EUR 25 is charged as a packaging, postage and handling fee.
7. The customer hereby undertakes to properly classify and then arrange for disposal and/or recycling of the packaging at its own responsibility and cost pursuant to § 5.3 and § 6 of the German Waste Recycling and Management Act (Krw-/AbfG).

VIII. Notification of defects, claims based on defects and compensation due to breach of obligation

1. The customer must inspect the goods immediately after receiving them and if a defect is found, must notify us in writing without undue delay. Otherwise, the goods are deemed to have been accepted, insofar as a defect which capable of being identified during proper inspection is concerned. The same applies when the customer does not carry out an agreed acceptance, or does not carry it out completely or in a timely manner. If a defect subsequently appears, this fact must be notified after discovery without undue delay. Later notifications of defects are excluded.
2. Insofar as there is a defect and this has been complained about in a timely manner, we are entitled to effect subsequent performance in the form of defect rectification or to supply a flawless item within a reasonable period, as we choose. We bear the work and materials costs associated with a justified subsequent improvement; other costs, particularly disassembly and installation costs, are borne by the customer. If the customer takes the goods to a location other than the acceptance location, then the customer bears the additional subsequent performance costs which arise as a result thereof. If the subsequent performance is unsuccessful or is unreasonable for the customer, then the customer is entitled to rescind the contract or to demand reduction of the remuneration (rescission). However, in the case of a contract breach which is intentional, particularly in the case of only minor defects, the customer is not entitled to any rescission right. We can refuse to effect subsequent performance if it is associated with disproportionate costs.
3. Insofar as nothing is stipulated to the contrary in sections VIII.2, VIII. 5 and/or VIII. 6 hereof, claims of the customer based on material defects or defects in title - for whatever legal reason - arising from the contract are excluded. If damage which has not occurred to the delivery object itself. In particular, we are not liable for loss of profits or other pecuniary loss suffered by the customer in this respect.
4. Insofar as nothing is stipulated to the contrary in sections VIII. 5 and/or VIII. 6 hereof, claims of the customer due to breach of an obligation arising from contractual obligations are hereby excluded.
5. The foregoing no-liability declarations (sections VIII. 3 and VIII. 4 hereof) do not apply in circumstances where we are compulsorily liable, for example (1) pursuant to the German Product Liability Act, [2] due to loss of life, personal injury or damage to health which is attributable to a negligent or intentional breach of obligation by us or one of our legal representatives or one of our vicarious agents, (3) if the cause of damage or loss was due to intentional behaviour or gross negligence by us or one of our legal representatives or one of our vicarious agents, (4) if the customer asserts rights based on a defect arising from a warranty regarding the product qualities or the particular duration of a product quality, (5) we negligently breach a fundamental contractual obligation whose fulfilment it what makes the due performance of the contract possible at all and whose fulfilment may be usually relied upon by the contract partner (cardinal obligation), (6) recourse claims in the consumer goods purchase delivery chain (§ 478 of the German Civil Code (BGB)) are involved.
6. If we negligently breach a cardinal obligation, our obligation to pay damages is limited to the contract-typical, foreseeable loss, if no intentional or grossly negligent behaviour is involved, and/or we are not liable due to loss of life, personal injury or damage to health.
7. If we have effected a partial delivery, the customer can only rescind the entire contract if it no longer has an interest in the part-performance. For successive delivery contracts, the customer's rights are limited to each respective partial delivery.
8. In the case of the elimination of a defect or replacement delivery (subsequent performance), section VII.1 and VIII.2 apply correspondingly.
9. We can refuse to carry out the elimination of defects, as long as the customer has not paid for the portion of the delivery which has not been objected to.
10. No claims against us exist based on loss for which the customer is responsible. The customer is particularly responsible for damage and loss which occurs due to the following reasons:
 - defective assembly or installation by the customer or a third party,
 - chemical corrosion and radiation (UV light) on synthetic and metal parts,
 - flawed, order dates and norms regarding the planned usage,
 - exceeding established reference values (e.g. voltage, current, operating temperature, firing voltage),
 - natural wear and tear,
 - improper or negligent handling, unsuitable means of production or substitute materials, chemical or electrochemical influences, insofar as the same is not attributable to fault on our part.

11. All claims brought against us based on a material defect or a defect in title become time-barred 12 months after the legal commencement of the warranty, unless the German Product Liability Act or another Act, particularly § 431 paragraph 1, number 2 of the German Civil Code (Construction and Items for Construction), § 479.1 of the German Civil Code (Recourse Claims in the Consumer Goods Purchase Delivery Chain) or § 634a paragraph 1, number 2 of the German Civil Code (Building Defects), prescribes a longer limitation period. The time-barring of claims based on liability for damage or loss arising out of the loss of life, personal injury or damage to health which occurs due to a negligent or intentional breach of obligation by us or one of our legal representatives or vicarious agents, and for other damage or loss which is due to an intentional or grossly negligent breach of obligation by us or one of our legal representatives or vicarious agents, shall be determined pursuant to the statutory provisions.

IX. Retention of title

1. We retain title to all goods we deliver until the customer has paid all debts (including future ones) arising from the business relationship. This also applies when some of our claims are taken into a running account as payment and the balance is calculated; the retention of title then pertains to the respective account balance claim. The delivery of bills of exchange and cheques does not count as payment as long as the negotiable instrument has not been redeemed. Subject to section IX.3. hereof, in the framework of the ordinary course of business, the customer is entitled to sell to third parties the goods to which the contractor retains title. If the third-party purchaser is allowed time for payment, the customer is obliged to retain title on the same conditions as those set out above. The customer hereby assigns to the contractor the purchase price claims to which the former is entitled from the resale. In the event of resale together with goods from a third party, this assignment is only valid in the amount of the value of the goods at the time of the resale. The assignment takes place provisionally without notification; however, the vendor has to the right to collect the debts itself as soon as the customer does not comply properly with its payment obligations. The customer has to inform the purchaser of the assignment upon request by the vendor and give the latter all information necessary and useful for enforcing the transferred claims.
3. The customer only has the right to resell the goods to which the vendor retains title when it is insured that the claims arising from this sale contract pass to the vendor. Therefore, resale may not take place in the framework of a current account relationship, nor may the assignability of claims from the resale be excluded with the purchaser.
4. If the value of the securities which exist for us exceeds that of our claims by more than 20% in total, we are obliged in this respect, upon the customer's request, to release part of the securities in connection with our debt. However, only fully-paid deliveries require to be released from the goods to which we retain title.
5. The customer is obliged to take out reasonable insurance policies concerning goods to which the contractor retains title, against all usual risks, particularly fire, burglary and water hazards and to handle and store the goods with care. Insurance claims arising in the event of damage shall be assigned to the vendor.
6. In the event of levy or attachment of the goods and/or assigned claim by a third party, the contractor is to be notified in writing without undue delay, including the forwarding of a copy of the bailiff's record.

X. Rendering of services

In cases where only services are rendered by us, the German Civil Code's provisions governing the rendering of services shall apply thereto, on the condition that these General Terms and Conditions of Sale apply correspondingly.

XI. Final provisions

1. This contract is exclusively governed by substantive German law, and the application of the UN Convention on Contracts for the International Sale of Goods (CISG) is hereby excluded. The place of performance for the obligations arising under this contract is Arnsberg, Germany.
2. The courts of Arnsberg, Germany shall have jurisdiction locally and internationally for all disputes arising out of this contract.
 - a) if the other party is a businessperson or legal entity under public law or a public-law special asset,
 - b) if the other party has no general legal domicile (residence, headquarters or usual domicile) within the Federal Republic of Germany, or
 - c) if after entering into the contract, this party relocates its residence or usual domicile out of the area of the Federal Republic of Germany or its residence or usual domicile is not known at the time the lawsuit is filed.
3. The statutory provisions apply to default actions and summary proceedings for the recovery of debts.
4. Should a provision of these General Terms and Conditions of Sale and the other agreements entered into be or become invalid, then the validity of the rest of the contract shall remain unaffected thereby. The contractual parties are obliged to replace the invalid provision with one which comes as closest as possible to the economic effect of the invalid one.

1 June 2011 BJB GmbH & Co. KG, Arnsberg, Germany



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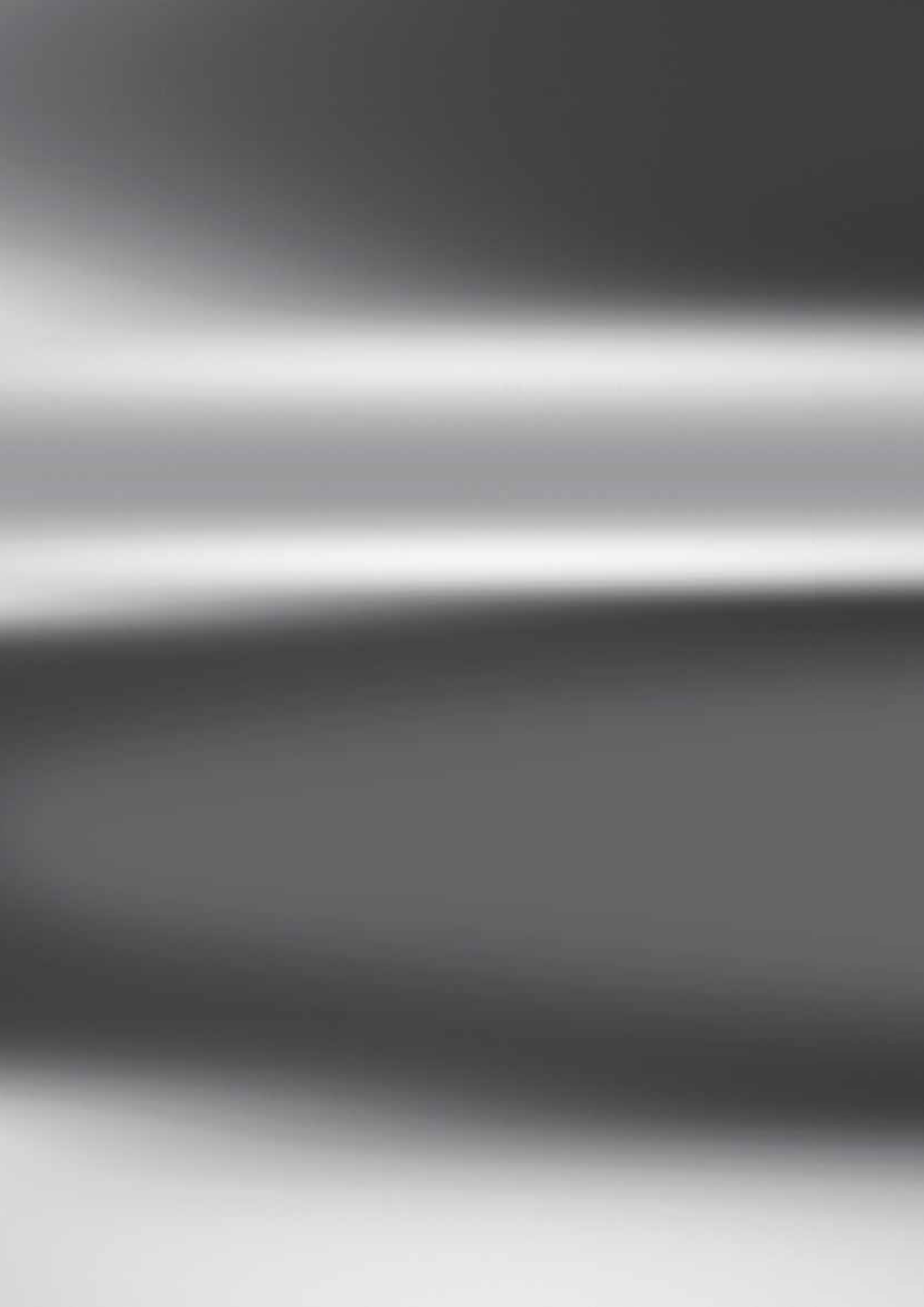
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