

INTERNATIONAL STANDARD

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**Lighting systems - Electro-mechanical interfaces -
Part 2-1: Four-pin extra-low-voltage twist-lock interface Type ZB18**

**Systèmes d'éclairage - Interfaces électromécaniques -
Partie 2-1: Interface très basse tension à verrouillage rotatif (twist-lock) à quatre
broches de type ZB18**



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**Lighting systems - Electro-mechanical interfaces -
Part 2-1: Four-pin extra-low-voltage twist-lock interface Type ZB18**

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IEC 63494-2-1 has been prepared by IEC technical committee 34: Lighting. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
34/1412/FDIS	34/1426/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the IEC 63494 series, published under the general title *Lighting systems - Electro-mechanical interfaces*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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INTRODUCTION

The IEC 63494-2 series of standards are intended to provide detailed specifications, requirements, information and any useful gauges for particular electro-mechanical interfaces used in lighting systems. The parts of the IEC 63494-2 series augment and refer to IEC 63494-1, the safety standard for general electro-mechanical interfaces used in lighting systems. Detailed specifications for both luminaire-side and device-side interfaces are included. The structure of each document in the IEC 63494-2 series parallels that of IEC 63494-1 for ease of reference. A testing sequence and useful gauges are provided in Annex A of each document. Information useful for luminaire and device design can be found in subsequent annexes.

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1 Scope

This part of IEC 63494-2 specifies the interchangeability requirements of an electro-mechanical interface with four-pin extra-low-voltage (ELV) twist-lock interface – type ZB18 for use in lighting systems. This twist-lock interface has four electrical contacts that are suitable for ELV voltages. Two connections are intended for supply power and two are intended for digital communication. This document specifies interchangeability related requirements for mechanical, electrical, ambient conditions, positional orientation, communication protocol and pin assignments for the interface. Specific requirements for the devices that can utilize the interface such as sensors, communication modules, cameras, etc., are not within the scope of this document. This document does not specify the following aspects:

- the lighting technology,
- the illumination performance,
- electromagnetic compatibility (EMC).

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-845, *International Electrotechnical Vocabulary (IEV) - Part 845: Lighting*, available at <https://www.electropedia.org>

IEC 60598-1:2024, *Luminaires - Part 1: General requirements and tests*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests*
 IEC 60664-1:2020/AMD1:2025

IEC 62504, *General lighting - Light emitting diode (LED) products and related equipment - Terms and definitions*

IEC TS 63105, *Lighting systems and related equipment - Vocabulary*

IEC 63494-1:2026, *Lighting systems - Electro-mechanical interfaces - Part 1: Safety*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-845 (IEV), IEC TS 63105, IEC 62504, IEC 63494-1, and the following apply.

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- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

luminaire extension base plate

LEX-BP

device-side interface designed to mate with a LEX-R

Note 1 to entry: The base plate can be an integral or a separable part of the luminaire extension module.

3.2

luminaire extension receptacle

LEX-R

luminaire-side interface mounted on an exterior surface designed to mate with a LEX-BP or a LEX-C

Note 1 to entry: The luminaire extension receptacle (LEX-R) can be a built-in part or an integral part of the luminaire

3.3

luminaire extension module

LEX-M

device having a LEX-BP, intended to be mounted on a luminaire having a LEX-R

3.4

luminaire extension cap

LEX-C

cap having no electrical contacts and designed to mate with a LEX-R

3.5

luminaire extension bus

LEX-B

electrical bus within a luminaire and its mounting pole

4 General

Electro-mechanical interface components specified in this document shall comply with IEC 63494-1:2026. Marking requirements are specified in Clause 5 of this document. Clause 6 of this document specifies requirements for the luminaire electro-mechanical interface. Clause 7 to Clause 10 of this document parallel the safety requirements in IEC 63494-1:2026. Annex A provides requirements on test grouping and gauges. Annex B provides information useful for luminaire and luminaire extension module design.

Mechanical dimensions refer to a temperature of $(25 \pm 5) ^\circ\text{C}$.

All lengths that omit an explicit unit indication are in millimetres.

5 Marking

5.1 Product identification

IEC 63494-1:2026, 5.1 applies.

5.2 Product characteristics

IEC 63494-1:2026, 5.2 applies.

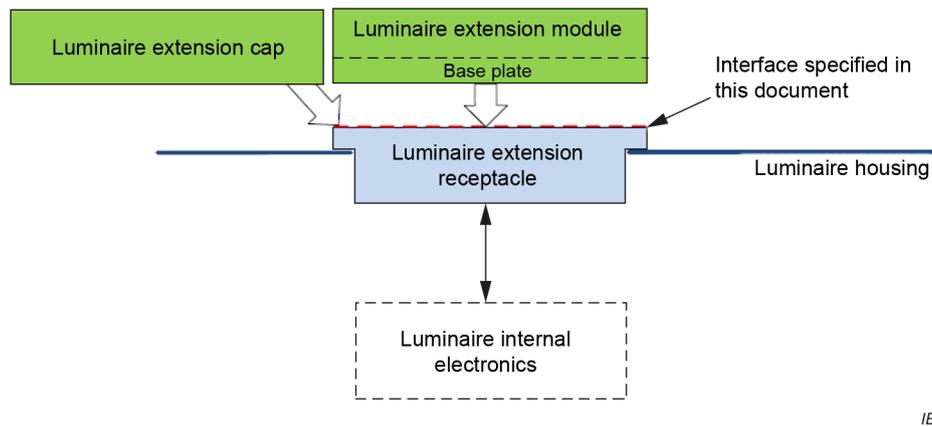
5.3 Durability and legibility

IEC 63494-1:2026, 5.3 applies.

6 Electro-mechanical interface overview and dimensions

6.1 Overview

Figure 1 gives an overview of a luminaire with luminaire extension receptacle, a luminaire extension cap and a luminaire extension module with a luminaire extension base plate. The luminaire extension receptacle is typically mounted on the exterior of the luminaire but can also be mounted on the interior of the luminaire and the contacts of this receptacle are typically connected to the luminaire internal electronics.



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Figure 1 – Luminaire extension module, cap and receptacle in a system

The luminaire extension module is a separate unit which can easily be attached to the luminaire extension receptacle by means of a twist-lock. Typically, it holds additional functionality to extend the functionality of the whole system.

The luminaire extension cap is a separate unit which can also easily be attached to the luminaire extension receptacle by means of a twist-lock. The functionality is to cover and protect the luminaire extension receptacle if no LEX-M is used.

The following interfaces are specified in this document:

- The mechanical interface between the LEX-R and the LEX-BP.
- The mechanical interface between the LEX-R and the LEX-C.
- The inclusion limit zone of the LEX-M.
- The exclusion limit zone of the luminaire to allow mounting of the LEX-M or LEX-C.
- The electrical and communication interface between the LEX-R(s) of the luminaire and one or two LEX-M(s).

6.2 Mechanical interface dimensions

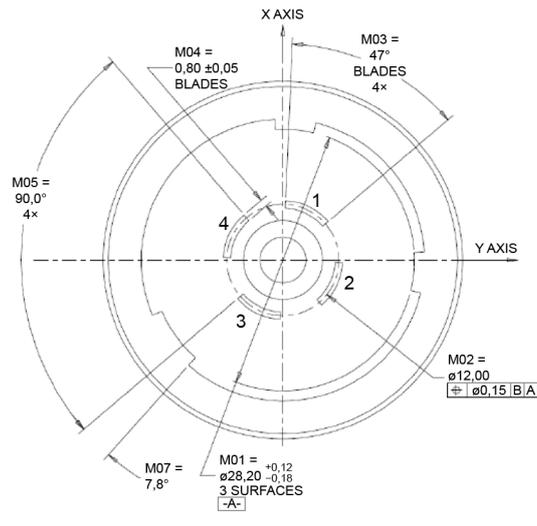
6.2.1 Luminaire extension base plate

The luminaire extension base plate (LEX-BP) shall comply with the specifications in Figure 2, Figure 3, Figure 4, Figure 5 and Figure 6. Unless indicated otherwise in the figures, the tolerance on linear dimensions is $\pm 0,12$ mm and the tolerance on angular dimensions is $\pm 1,0^\circ$.

The outer diameter of the LEX-BP shall be less than or equal to 89 mm.

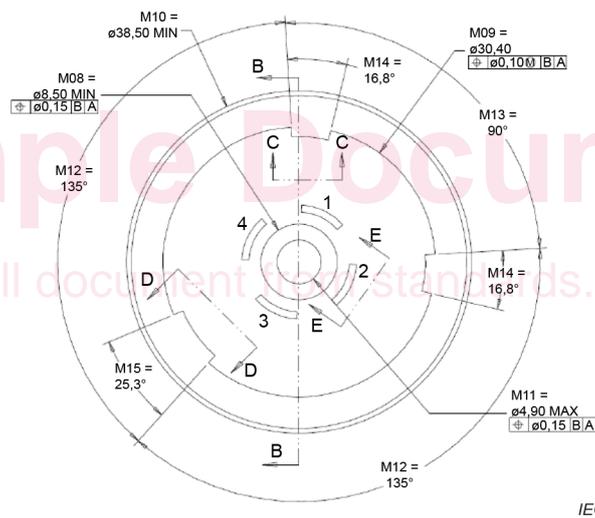
The sealing surface shall be free of obstacles that can prevent mating.

Compliance is checked by measurement.



NOTE X-axis and Y-axis coincide with the centerline of locking points as specified in Figure 5. The position of the electrical contacts can be found starting from the angle M07 referenced from the centerline of the locking points.

Figure 2 – Mechanical interface of the LEX-BP: View 1



NOTE 1 Section A-A not used

NOTE 2 Section B-B coincides with the X-axis

Figure 3 – Mechanical interface of the LEX-BP: View 2

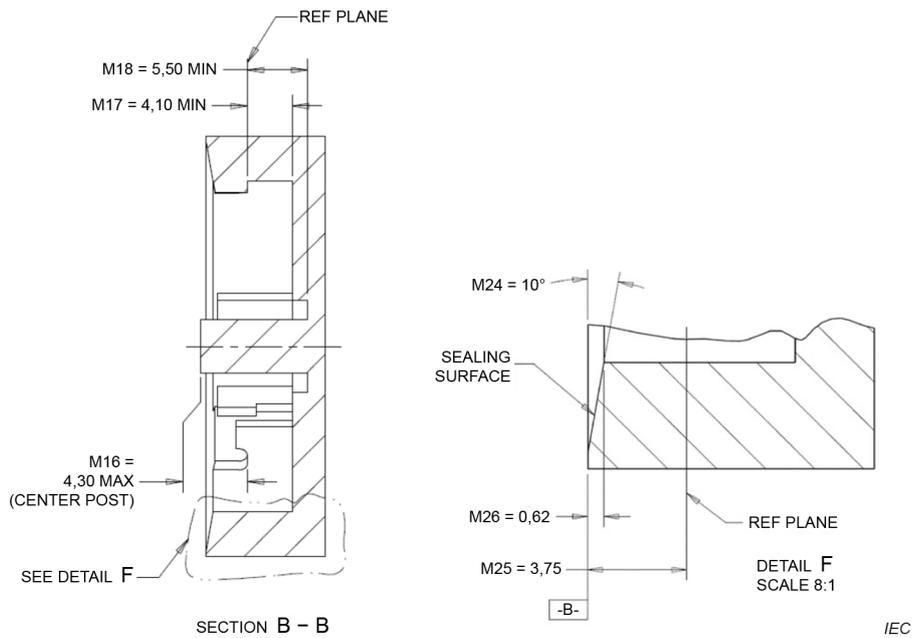
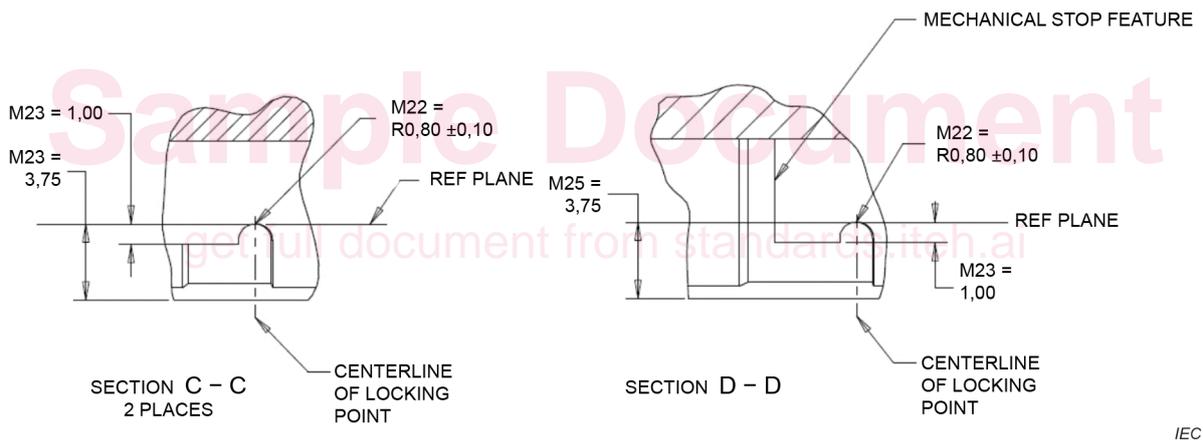


Figure 4 – Details of the mechanical interface of the LEX-BP: section B-B



NOTE Mechanical stop feature plane is positioned considering dimension R08 in Figure 8.

Figure 5 – Details of the mechanical interface of LEX-BP: sections C-C and D-D

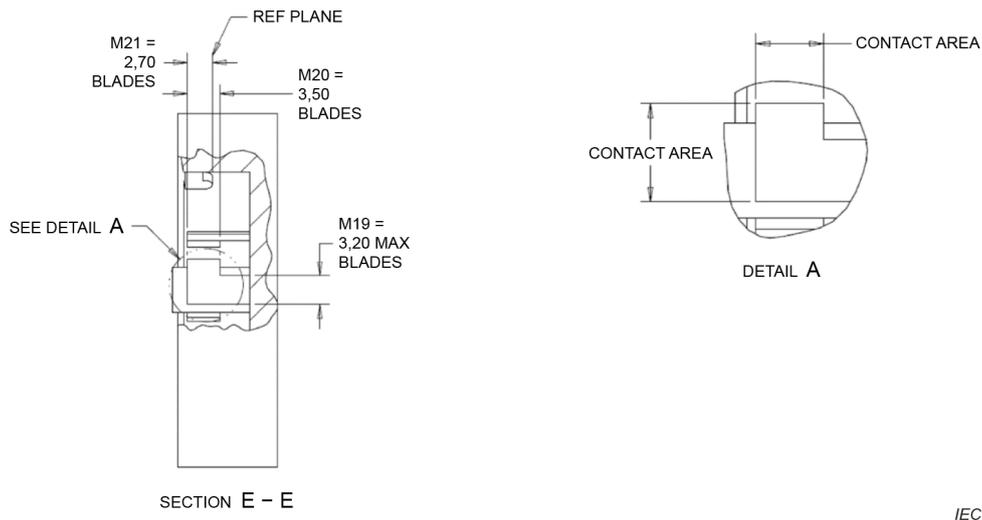


Figure 6 – Details of the mechanical interface of the LEX-BP: section E-E

The contact areas of the LEX-BP contacts are indicated by the “Contact Area” in Figure 6. The contact areas of each contact of the LEX-BP shall be completely tin plated on both sides according to the elemental composition restrictions shown in Table 1. The contacts shall not have sharp edges in the contact area.

Compliance is checked by inspection and assessment of the relevant material data sheet.

Table 1 – Elemental composition in plating of contacts for LEX-BP and LEX-R

Element	% mass
Tin	≥ 97,5
Copper	≤ 1,5
Zinc	≤ 0,7
Total unnamed elements	≤ 0,2
Lead	≤ 0,1

6.2.2 Luminaire extension cap

For the luminaire extension cap, the mechanical interface requirements of 6.2.1 apply except that the luminaire extension cap shall not have contacts.

Compliance is checked by measurement.

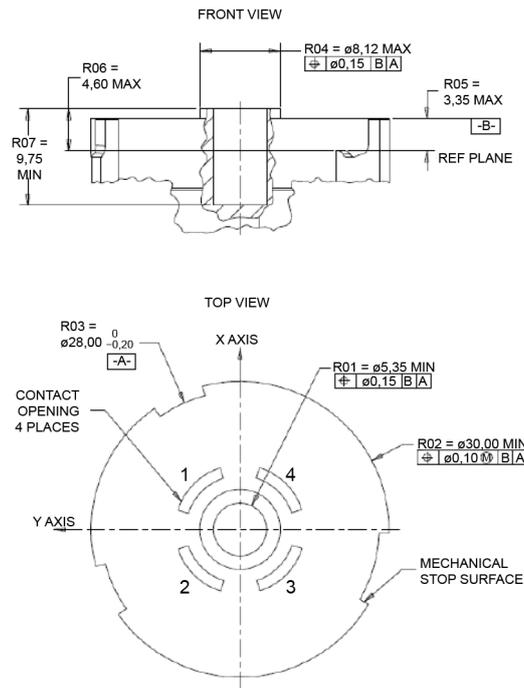
6.2.3 Luminaire extension module

For the luminaire extension module, the mechanical interface requirements of 6.2.1 apply. Compliance is checked by measurement.

6.2.4 Luminaire extension receptacle

The luminaire extension receptacle shall comply with the specifications in Figure 7 and Figure 8. Unless indicated otherwise in the figures, the tolerance on linear dimensions is $\pm 0,12$ mm and the tolerance on angular dimensions is $\pm 1,0^\circ$.

Compliance is checked by measurement.



NOTE X-axis and Y-axis coincide with centerline of locking point as specified in Figure 8.

Figure 7 – Mechanical interface of the LEX-R

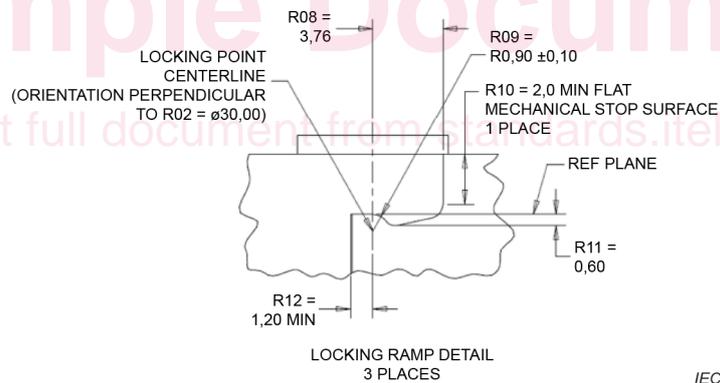


Figure 8 – Detail of the mechanical interface of the LEX-R

The LEX-R contacts shall be tin plated according to the elemental composition restrictions shown in Table 1.

Compliance is checked by inspection and assessment of the relevant material data sheet.

7 Mechanical safety

7.1 Physical protection during insertion and removal of lighting system devices

7.1.1 General

IEC 63494-1:2026, 7.1 applies. The test for LEX-M modules or LEX-BP baseplates shall be performed with the mechanical stop gauge specified in A.2.1. The test for LEX-R receptacles shall be performed with the retention gauge specified in A.3.1 (see 7.5.2).