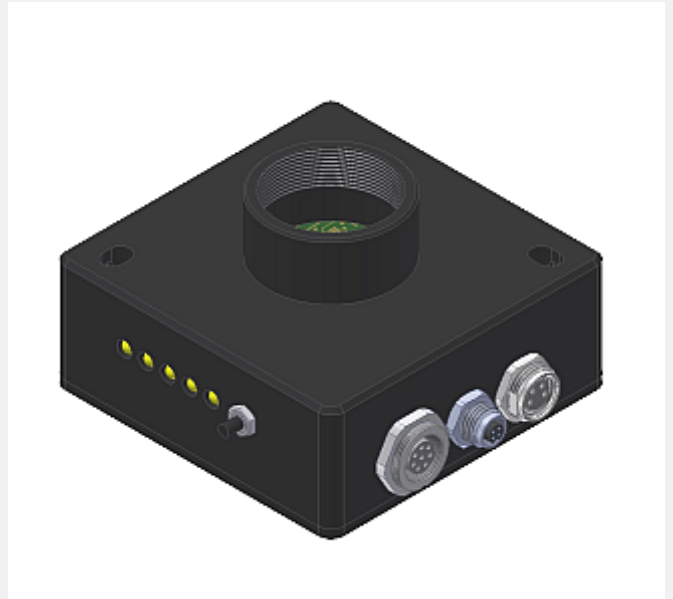


L-LAS Series

► L-LAS-CAM-512-CL

- CCD line detector (length approx. 6.4 mm), 512 pixel (4096 subpixel)
- Various precision lenses (measuring objectives) available
- Various optical filters and intermediate tubes available
- Windows® user interface
- RS232 interface (USB- or Ethernet-adaptor optional)
- Integrated TEACH/RESET button
- Switching state indication by means of 5 yellow LEDs
- 2 digital inputs (IN0, IN1)
- 3 digital outputs (OUT0, OUT1, OUT2)
- 1 analog output (0...+10V or 4...20mA, adjustable via software)
- Sturdy metal housing, suitable for use in the industry
- Optional: Connection of an external lighting unit (diffuse or laser)



Design

Product name:

L-LAS-CAM-512-CL

incl. Windows® software L-LAS-CAM-Scope

Accessories:

Measuring objectives MO-C-... (p. 8-13)

Optical filters (p. 14)

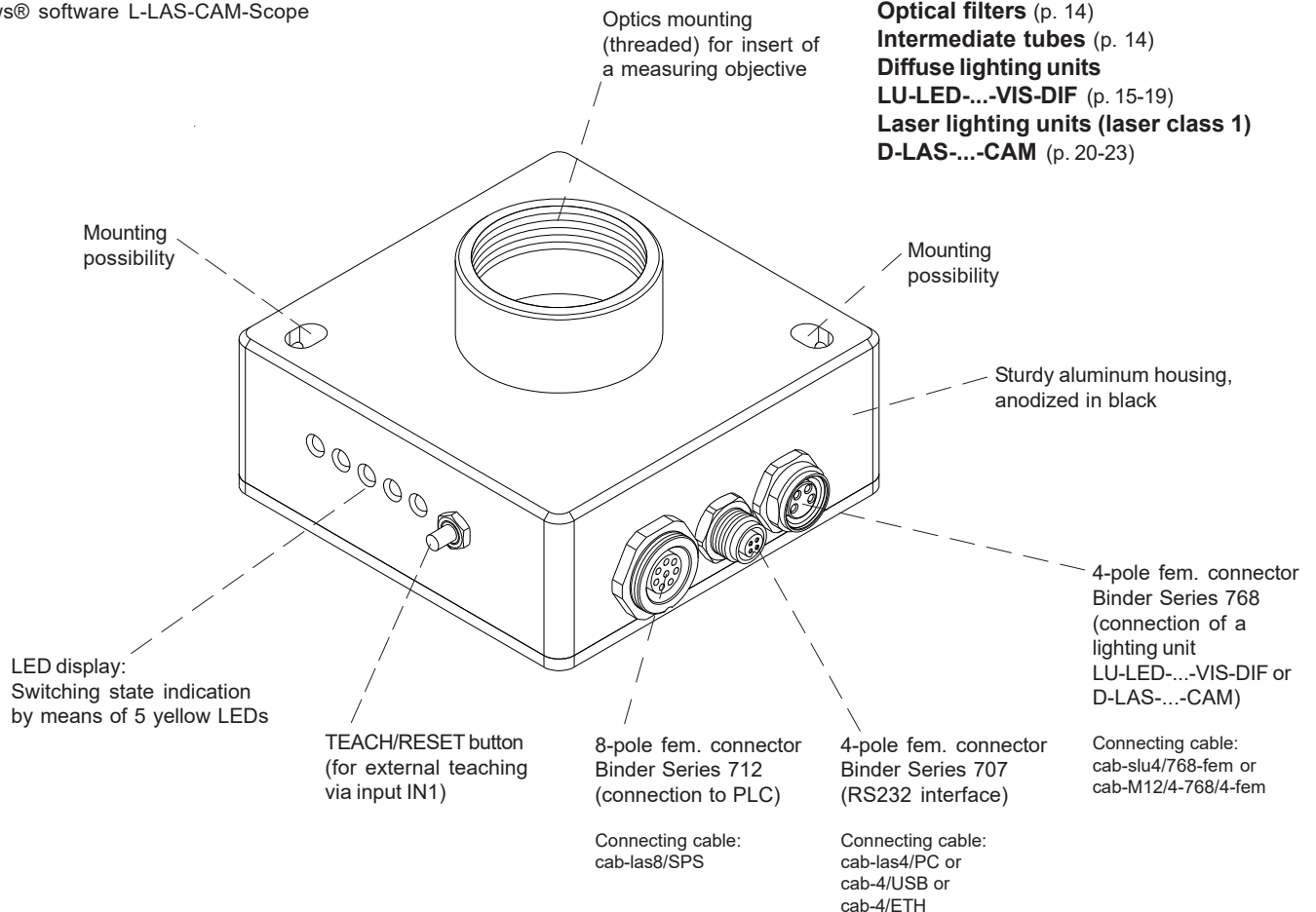
Intermediate tubes (p. 14)

Diffuse lighting units

LU-LED-...-VIS-DIF (p. 15-19)

Laser lighting units (laser class 1)

D-LAS-...-CAM (p. 20-23)



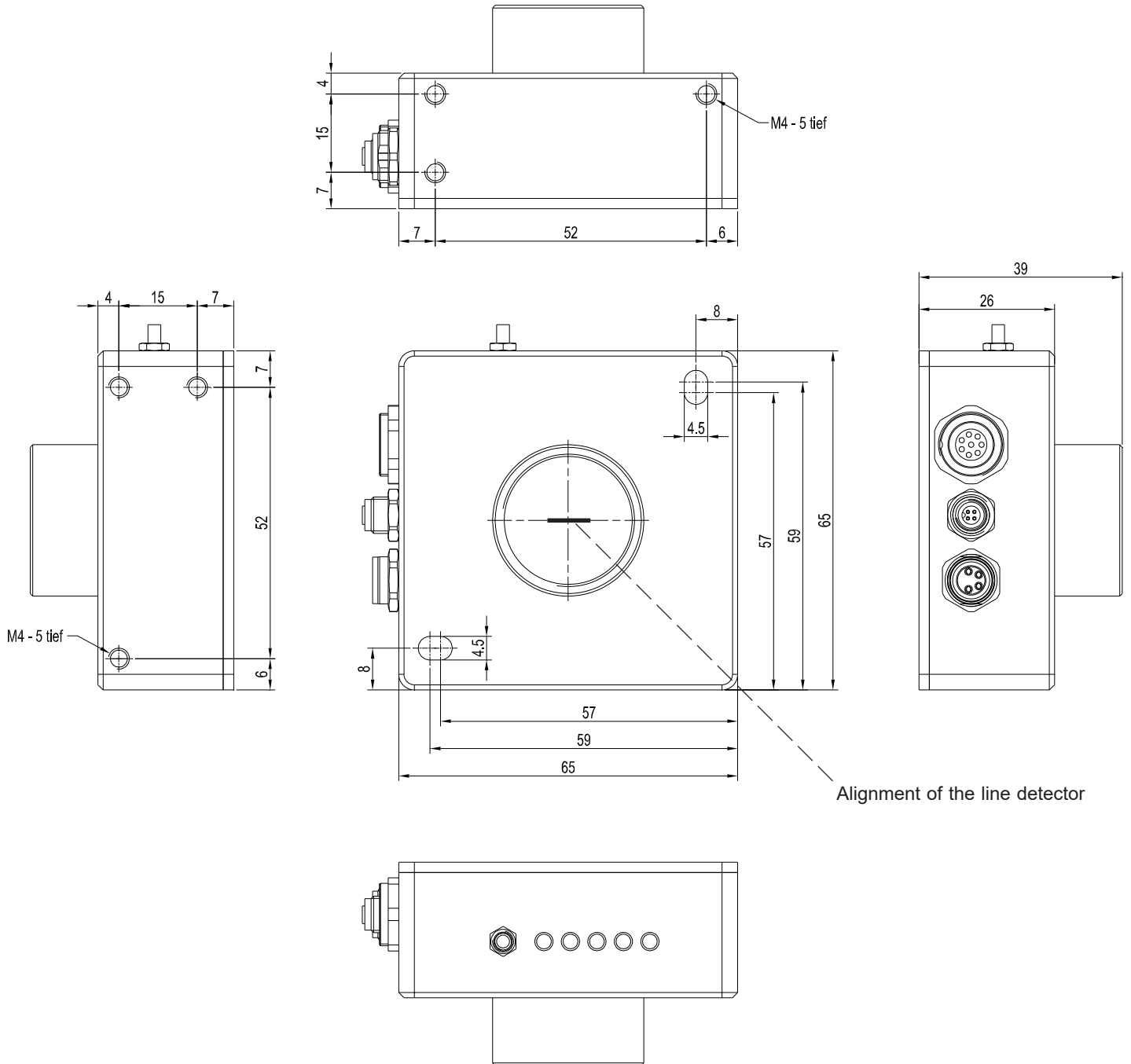


Technical Data

Model	L-LAS-CAM-512-CL
CCD line detector	length of detector approx. 6.4 mm, 512 pixel, 4096 subpixel (8-fold)
Reference distance	depends on the objective used
Working distance	depends on the objective used
Measuring range	depends on the objective used
Resolution	typ. 0.4% of measuring range
Light source	various external light sources are available: LU-LED-...-VIS-DIF (diffuse lighting units) or D-LAS-...-CAM (laser lighting units)
Analog output (ANA)	voltage (0 ... +10 V) or current (4 ... 20 mA), adjustable via Windows® software
Digital outputs (OUT0, OUT1, OUT2)	pnp bright-switching/npn dark-switching or pnp dark-switching/npn bright-switching, adjustable under Windows®, 100 mA, short-circuit proof
Digital inputs (IN0, IN1)	input voltage +Ub/0V, with protective circuit IN0: External trigger IN1: Teach/Reset
Output polarity	bright/dark-switching, adjustable via Windows® software
Voltage supply	+24VDC ± 10%
Current consumption	typ. 200 mA
Enclosure rating	IP54
Sensitivity setting	adjustable via Windows® software
Teach button (TEACH/RESET)	for norm value teaching or for reset of maximum values
Intensity correction	adjustable via Windows® software
Operating temperature range	-10°C ... +60°C
Storage temperature range	-20°C ... +85°C
Housing material	aluminum, anodized in black
Housing dimensions (without objective)	LxWxH approx. 65 mm x 65 mm x 39 mm (without flange connectors and teach button)
Type of connector	8-pole female connector type Binder Series 712 (PLC/Power), 4-pole female connector type Binder Series 707 (PC/RS232), 4-pole female connector type Binder Series 712 (connection to external lighting unit)
LED display (5x yellow)	LED (+) : Measuring value > upper tolerance threshold LED : Measuring value within tolerance window LED (-) : Measuring value < lower tolerance threshold LED : LED for sensor adjustment (multifunctional) LED : Power LED
EMC test acc. to	DIN EN 60947-5-2
Scan frequency	Normal Speed Modus (high resolution): max. 750 Hz Double Speed Modus (half resolution): max. 1.5 kHz adjustable via Windows® software
Max. switching current	digital outputs OUT0, OUT1, OUT2: 100 mA, short-circuit proof
Serial interface	RS232, parameterisable via Windows® software
Connecting cables	connection to PC: cab-las4/PC, cab-4/USB, or cab-4/ETH connection to PLC: cab-las8/SPS connection to lighting unit LU-LED-...-VIS-DIF: cab-slu4/768-fem connection to lighting unit D-LAS-...-CAM: cab-M12/4-768/4-fem oder cab-M12/4-w-768/4-fem

Dimensions

L-LAS-CAM-512-CL:



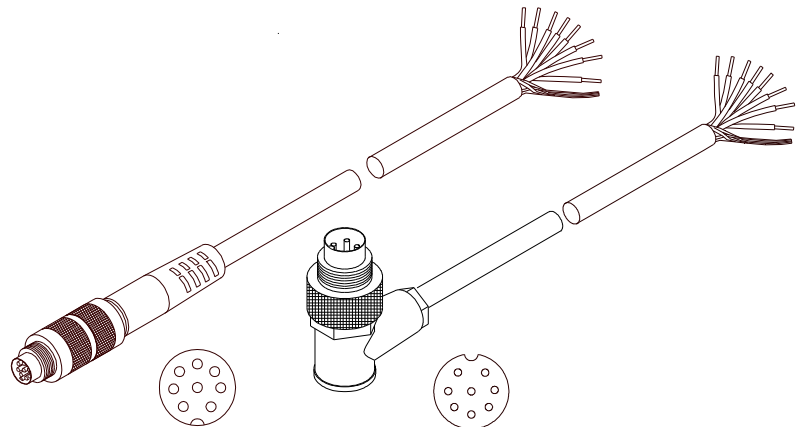
All dimensions in mm



Connector Assignment
**Connection L-LAS-CAM-512-CL to PLC:
8-pole fem. connector Binder Series 712**

Pin:	Color:	Assignment:
1	white	GND (0V)
2	brown	+24VDC ($\pm 10\%$)
3	green	IN0 (EXT TRIGGER)
4	yellow	IN1 (TEACH / RESET)
5	grey	OUT0 (-)
6	pink	OUT1 (+)
7	blue	OUT2 (OK)
8	red	Analog (0 ... +10V) or I_{OUT} (4...20mA) (can be switched via software)

Connecting cable:
cab-las8/SPS-2m or
cab-las8/SPS-w-2m (angle type 90°)
(standard length 2m)



cab-las8/SPS-...
(max. length 25m,
outer jacket: PUR)

cab-las8/SPS-w-...
(max. length 25m,
outer jacket: PUR)

**Connection L-LAS-CAM-512-CL to PC:
4-pole fem. connector Binder Series 707**

Pin:	Assignment:
1	+24VDC (+Ub, OUT)
2	GND (0V)
3	RxD
4	TxD

Connection via RS232 interface at the PC:

Connecting cable:
cab-las4/PC-(length)
cab-las4/PC-w-(length) (angle type 90°)
(standard length 2m)

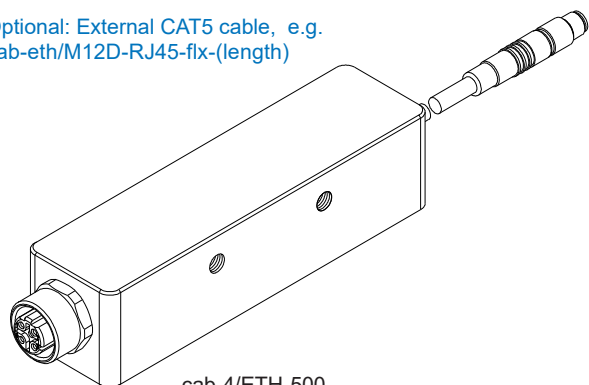
alternative:
Connection via USB interface at the PC:

USB converter (incl. driver software):
cab-4/USB-(length)
cab-4/USB-w-(length) (angle type 90°)
(standard length 2m)

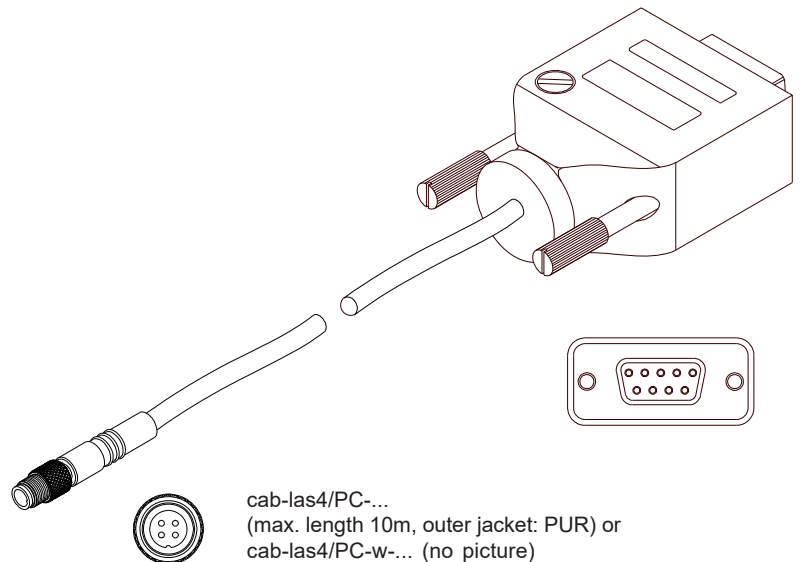
alternative:
Connection to local network via Ethernet bus:

Ethernet converter (incl. software „SensorFinder“):
cab-4/ETH-500
(standard length 0.5m)

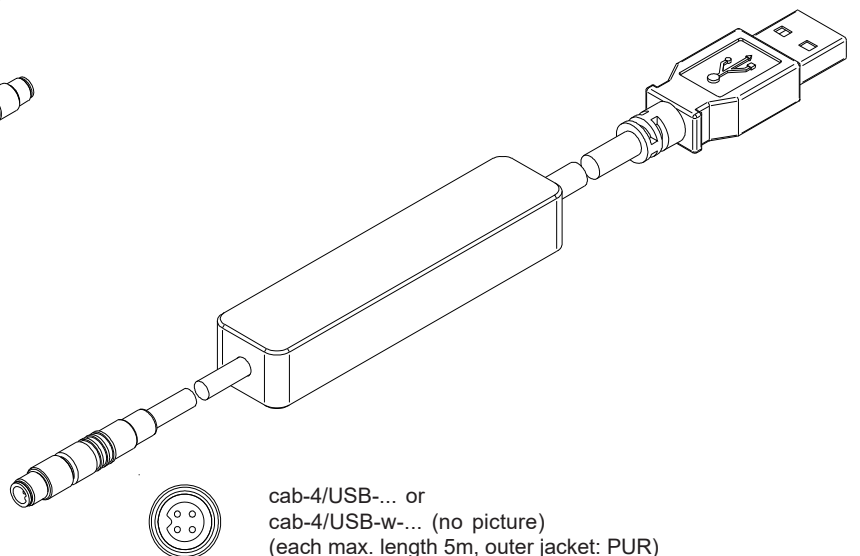
Optional: External CAT5 cable, e.g.
cab-eth/M12D-RJ45-flx-(length)



cab-4/ETH-500
(length 0.5m, outer jacket: PUR)
4-pole M12 fem. conn. (D-coded)
for connection of an external
CAT5 cable, e.g.
cab-eth/M12D-RJ45-flx-(length)



cab-las4/PC-...
(max. length 10m, outer jacket: PUR) or
cab-las4/PC-w-... (no picture)
(max. length 5m, outer jacket: PUR)



cab-4/USB-... or
cab-4/USB-w-... (no picture)
(each max. length 5m, outer jacket: PUR)



Connector Assignment

**Connection L-LAS-CAM-...-CL
to external lighting unit LU-LED-...-VIS-DIF**

**4-pole fem. connector Binder Series 768
(at the housing of the L-LAS-CAM-...-CL)**

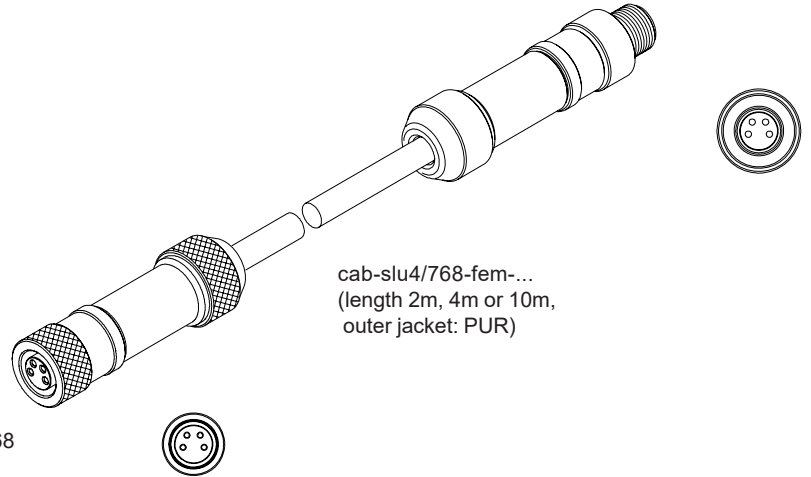
Pin:	Assignment:
1	+24VDC (±10%)
2	I-CONTROL
3	GND (0V)
4	ON/OFF

Connecting cable:
cab-slu4/768-fem-(length)
(standard length 2m, also available in 4m and 10m)

4-pole connector
Binder Series 768
Connection to
L-LAS-CAM-...-CL

4-pole fem.
connector
Binder Series 768
Connection to
LU-LED-...

cab-slu4/768-fem-...
(length 2m, 4m or 10m,
outer jacket: PUR)



**Anschluss L-LAS-CAM-...-CL
to external lighting unit D-LAS-...-CAM**

**4-pole fem. connector Binder Series 768
(at the housing of the L-LAS-CAM-...-CL)**

Pin:	Assignment:
1	+24VDC (±10%)
2	I-CONTROL
3	GND (0V)
4	ON/OFF

Connecting cable:
cab-M12/4-768/4-fem-(length) or
cab-M12/4-w-768/4-fem-(length) (M12 angle type 90°)
(standard length 2m, also available in 5m and 10m)

4-pole connector
Binder Series 768
Connection to
L-LAS-CAM-...-CL

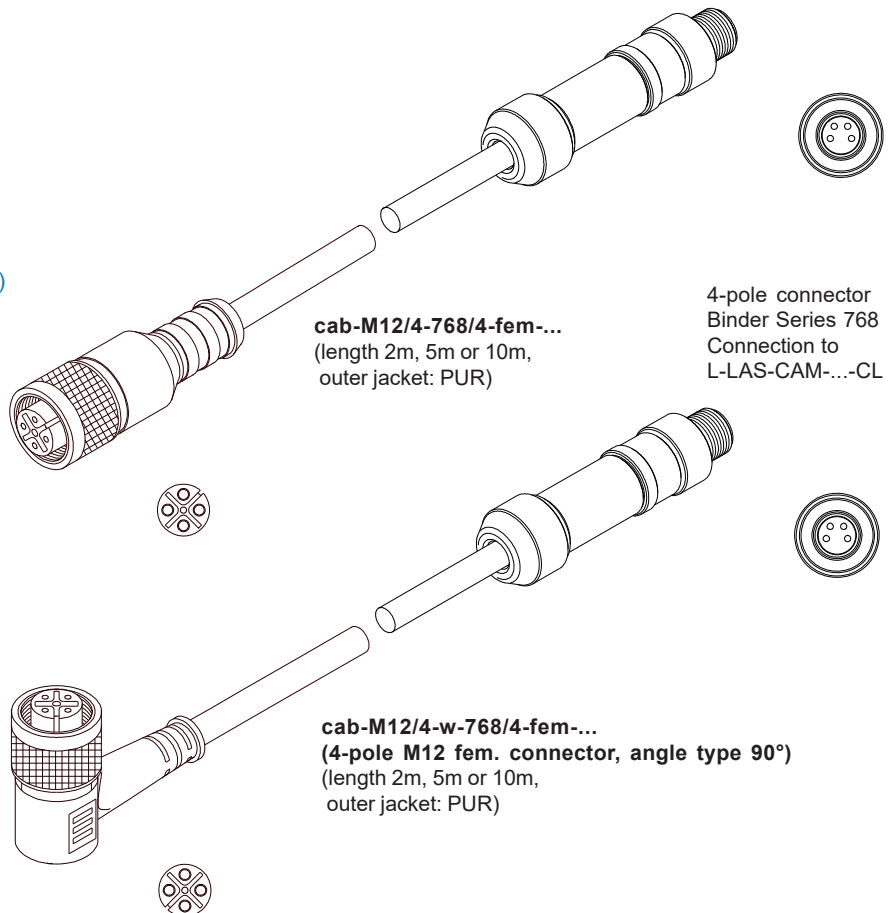
4-pole M12 fem.
connector
Connection to
D-LAS-...-CAM

cab-M12/4-768/4-fem-...
(length 2m, 5m or 10m,
outer jacket: PUR)

4-pole connector
Binder Series 768
Connection to
L-LAS-CAM-...-CL

4-pole M12 fem.
connector,
angle type 90°
Connection to
D-LAS-...-CAM

cab-M12/4-w-768/4-fem-...
(4-pole M12 fem. connector, angle type 90°)
(length 2m, 5m or 10m,
outer jacket: PUR)





LED Display

LED display:



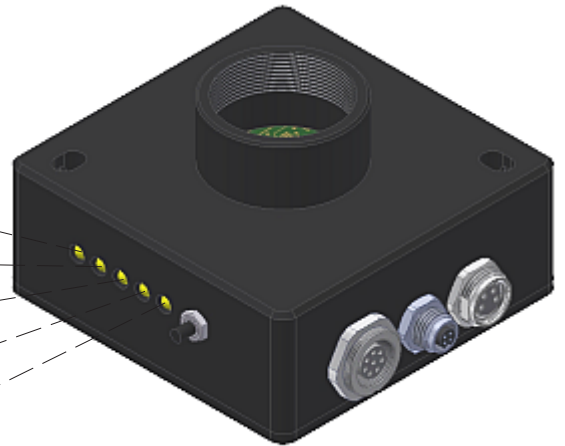
LED (+)
Measuring value > upper tolerance threshold (OUT1)

LED (ok)
Measuring value within tolerance window (OUT2)

LED (-)
Measuring value > lower tolerance threshold (OUT0)

Adjustment-LED
(multifunctional)

Power-LED

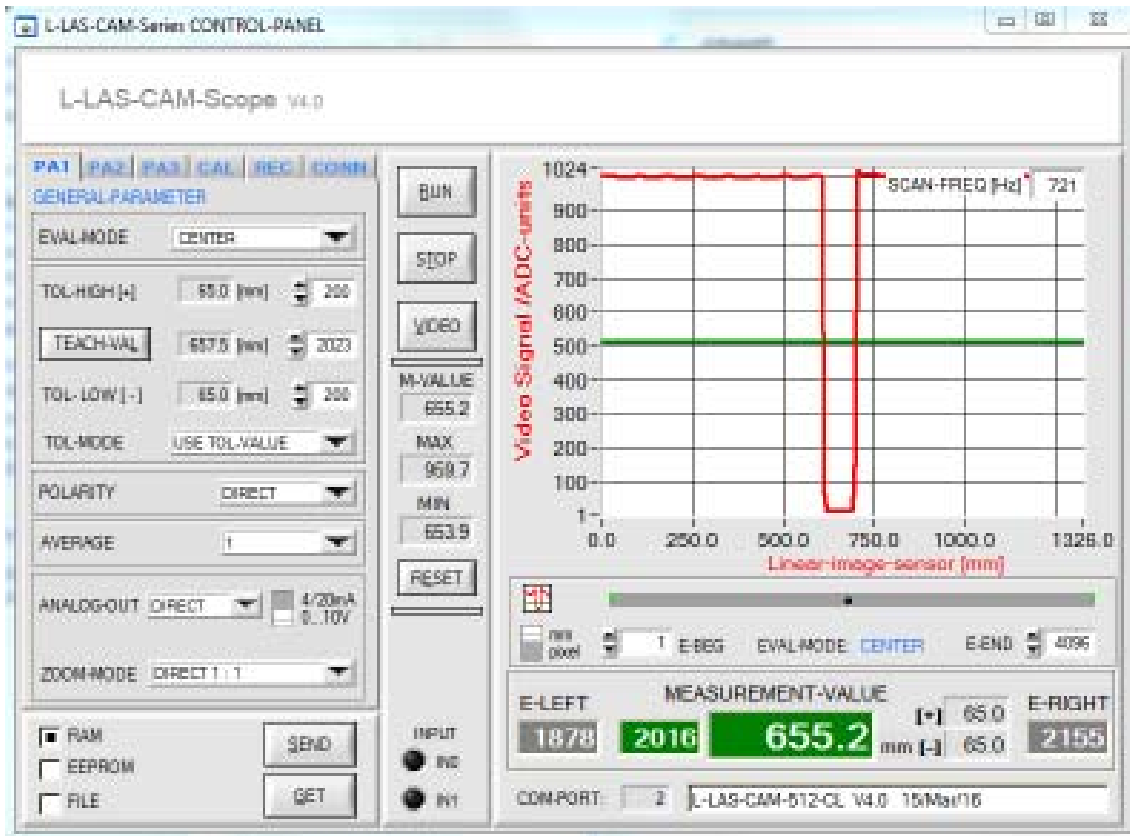


Windows® Software

Windows® software L-LAS-CAM-Scope:

The L-LAS-CAM-...-CL electronic control unit can be easily parameterised with the Windows® user interface. For this purpose the sensor is connected to the PC with the serial interface cable cab-las4/PC (optional with cable cab-4/USB or cab-4/ETH).

When parameterisation is finished, the PC can be disconnected again (press STOP button), the sensor systems then continues to operate with the current parameters in "stand alone" mode without a PC.





Variants

Examples of various measuring systems L-LAS-CAM-512-CL by using different measuring objectives:



Example:
Line camera L-LAS-CAM-512-CL with
measuring objective MO-C-1,2/6mm



Example:
Line camera L-LAS-CAM-512-CL with
measuring objective MO-C-1,8/75mm



Measuring Objectives

Measuring objectives for L-LAS-CAM-... line cameras:

MO-C-1,4/12,5mm (no picture)
 MO-C-1,4/16mm (no picture)
 MO-C-1,4/25mm (no picture)
 MO-C-1,4/35mm (no picture)
 MO-C-1,8/50mm (no picture)
 MO-C-1,8/75mm

MO-G-1,6/16mm
 MO-G-1,6/25mm
 MO-G-1,6/35mm
 MO-G-1,8/50mm

MO-J-1x/50 (no picture)
 MO-J-2x/26 (no picture)
 MO-J-4x/20
 MO-J-6x/13 (no picture)
 MO-J-8x/9 (no picture)



MO-C-1,8/75



MO-G-1,6/16



MO-G-1,6/25



MO-G-1,6/35



MO-G-1,8/50



MO-J-4x/20

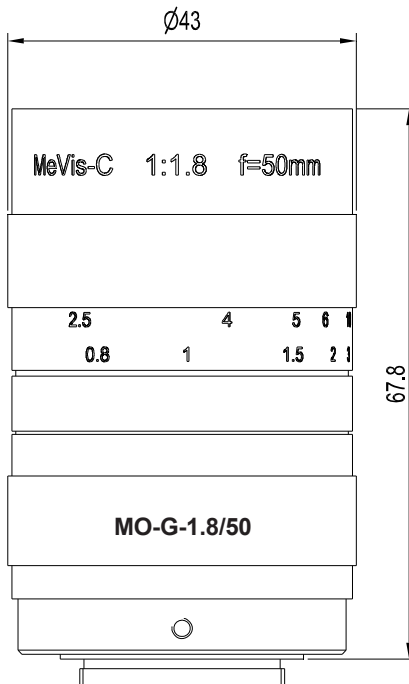
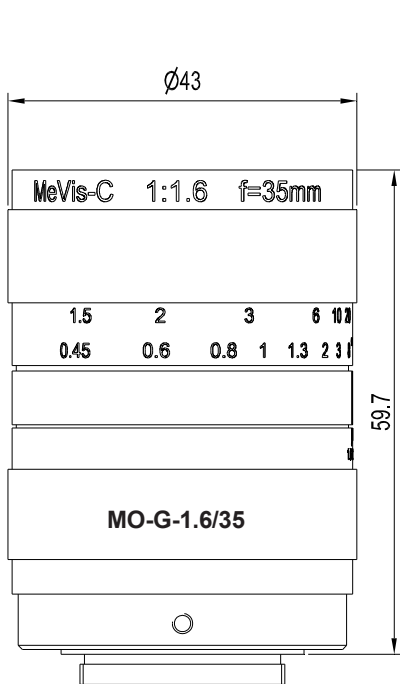
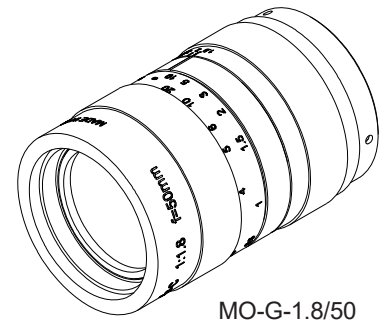
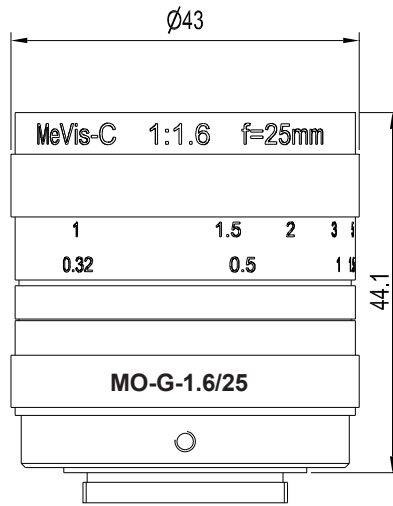
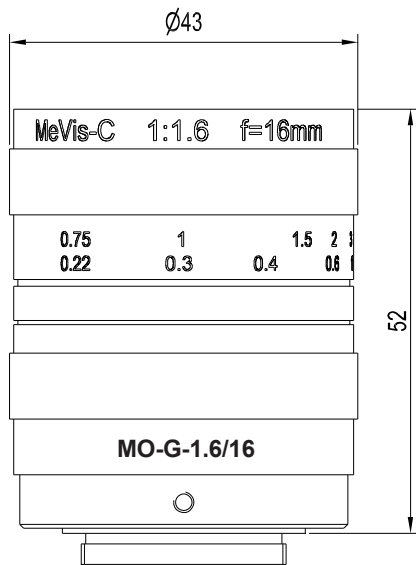
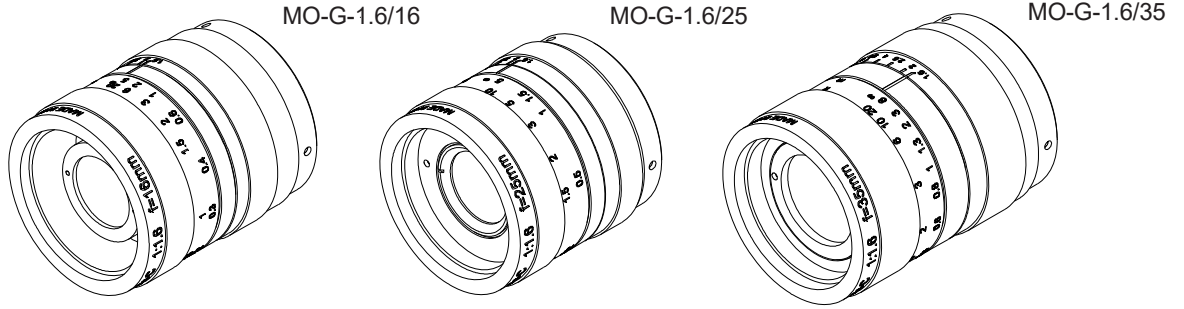
L-LAS-CAM-512-CL used with measuring objective MO-G-...:	Focus	Working distance		Measuring range
MO-G-1,6/16mm	16 mm	100 mm ... 2000 mm		depends on working distance
MO-G-1,6/25mm	25 mm	100 mm ... 2000 mm		depends on working distance
MO-G-1,6/35mm	35 mm	100 mm ... 2000 mm		depends on working distance
MO-G-1,8/50mm	50 mm	100 mm ... 2000 mm		depends on working distance
MO-C-1,8/75mm	75 mm	100 mm ... 2000 mm		depends on working distance
L-LAS-CAM-512-CL used with macroobjective MO-J-...:	Focus	Reference distance	Depth of field	Measuring range
MO-J-1x/50	50 mm	typ. 90 mm	± 0.5 mm	typ. 6.0 mm
MO-J-2x/26	26 mm	typ. 75 mm	± 0.1 mm	typ. 3.0 mm
MO-J-4x/20	20 mm	typ. 75 mm	± 0.1 mm	typ. 1.5 mm
MO-J-6x/13	13 mm	typ. 75 mm	± 0.07 mm	typ. 1.0 mm
MO-J-8x/9	9 mm	typ. 75 mm	± 0.06 mm	typ. 0.8 mm



Measuring Objectives

Measuring objectives MO-G-... for L-LAS-CAM-... -CL line cameras:

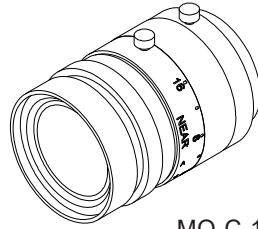
- MO-G-1,6/16mm
- MO-G-1,6/25mm
- MO-G-1,6/35mm
- MO-G-1,8/50mm



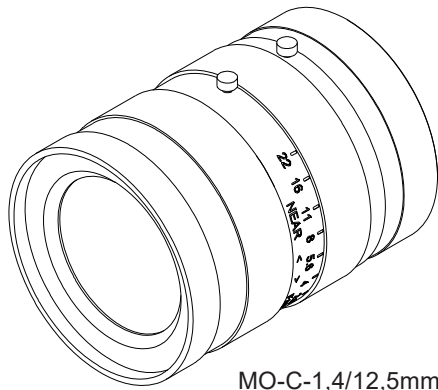
All dimensions in mm


Measuring objectives MO-C-... for L-LAS-CAM-...-CL line cameras:

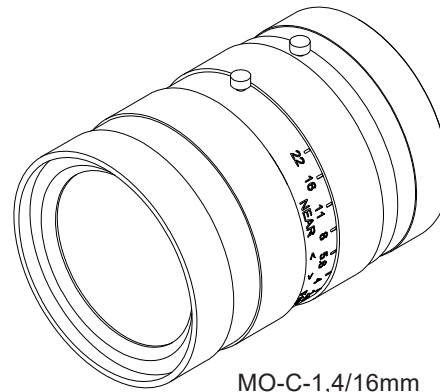
MO-C-1,2/6mm
 MO-C-1,4/12,5mm
 MO-C-1,4/16mm
 MO-C-1,4/25mm
 MO-C-1,4/35mm
 MO-C-1,8/50mm
 MO-C-1,8/75mm



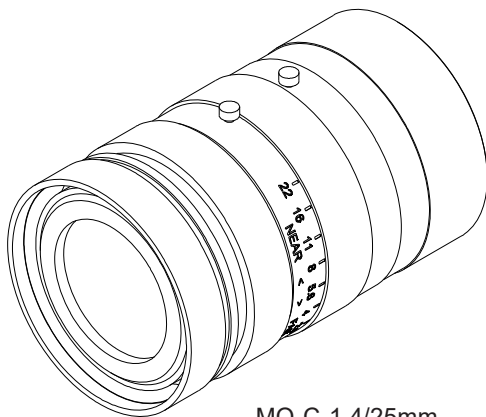
MO-C-1,2/6mm



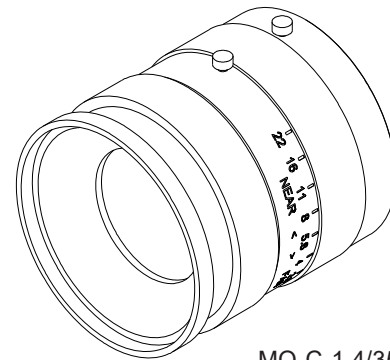
MO-C-1,4/12,5mm



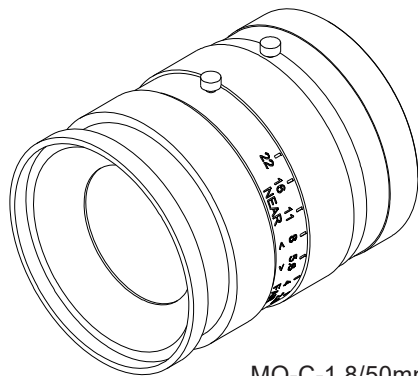
MO-C-1,4/16mm



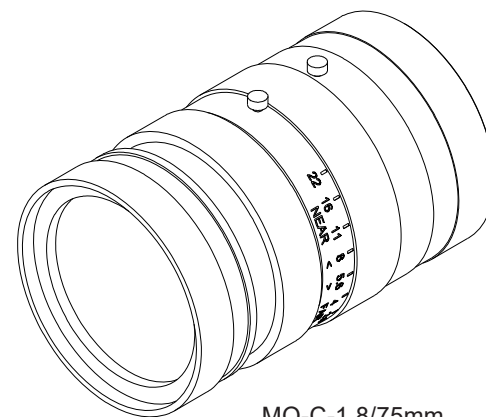
MO-C-1,4/25mm



MO-C-1,4/35mm



MO-C-1,8/50mm



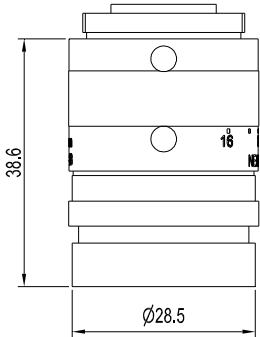
MO-C-1,8/75mm



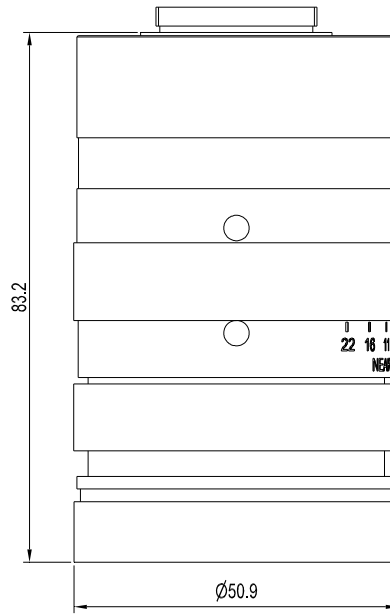
Measuring Objectives

Dimensions of measuring objectives MO-C-... for L-LAS-CAM-...-CL line cameras:

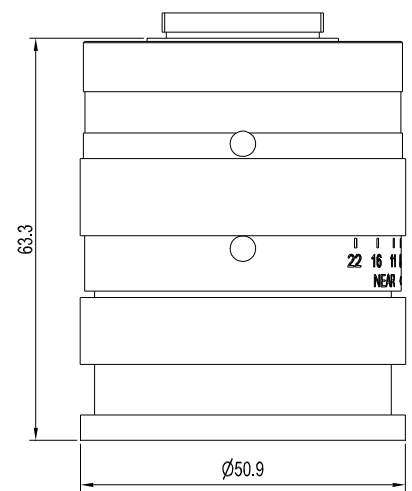
MO-C-1,2/6mm



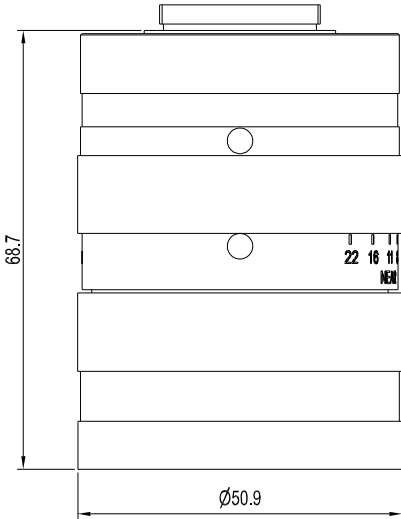
MO-C-1,4/25mm



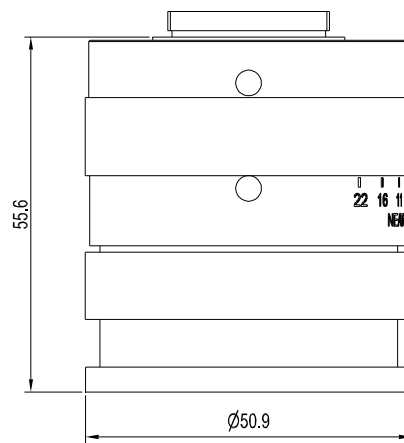
MO-C-1,8/50mm



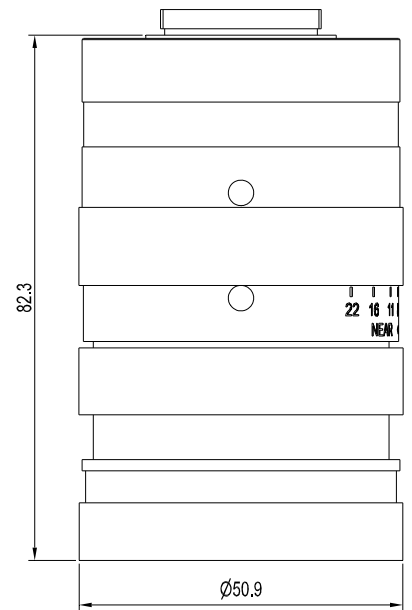
MO-C-1,4/12,5mm



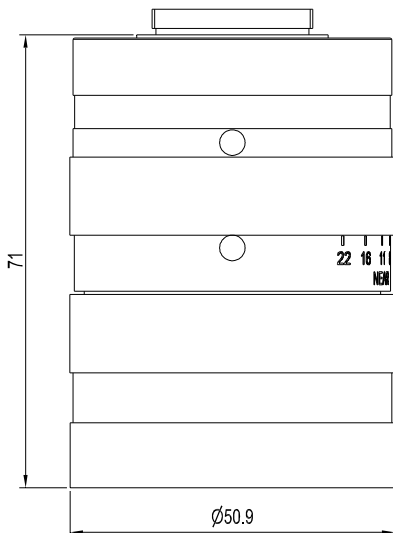
MO-C-1,4/35mm



MO-C-1,8/75mm



MO-C-1,4/16mm



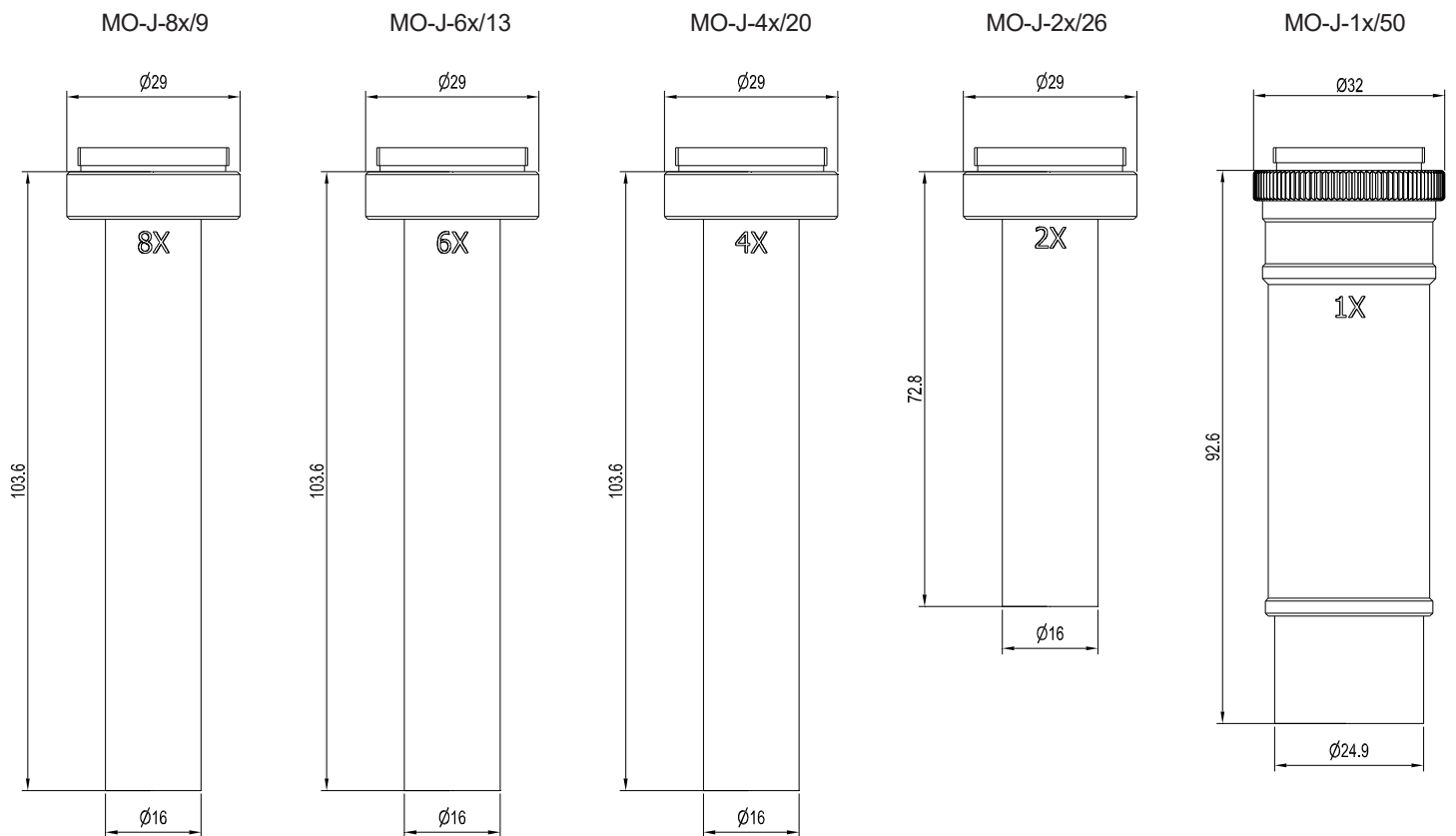
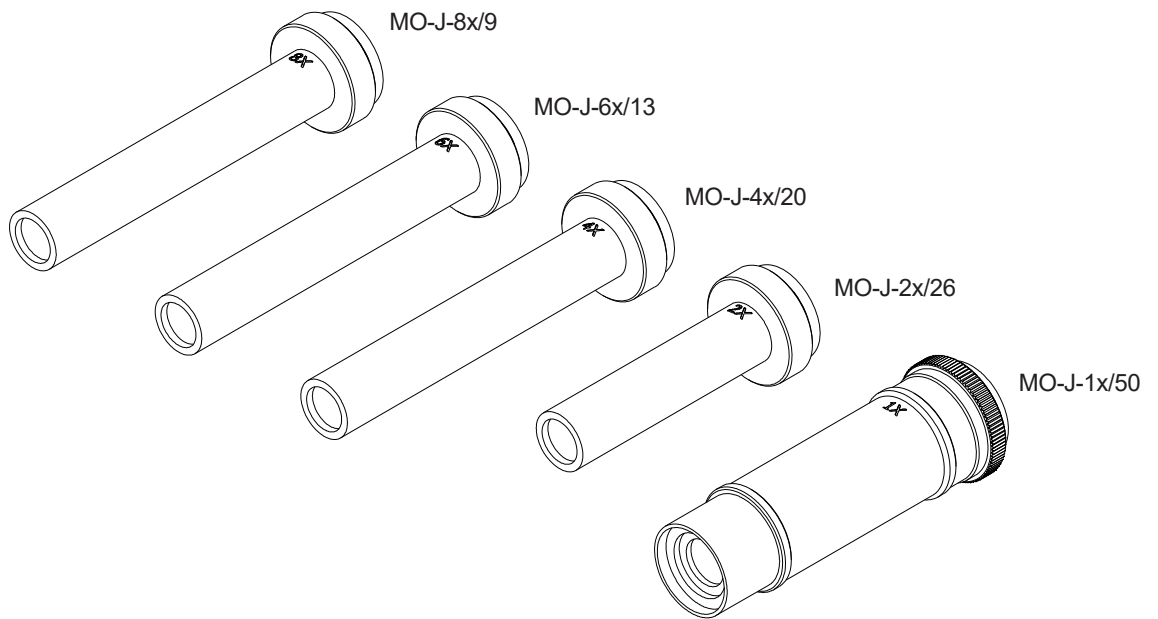
All dimensions in mm



Measuring Objectives

Measuring objectives MO-J-... for L-LAS-CAM-...-CL line cameras::

- MO-J-8x/9
- MO-J-6x/13
- MO-J-4x/20
- MO-J-2x/26
- MO-J-1x/50



All dimensions in mm

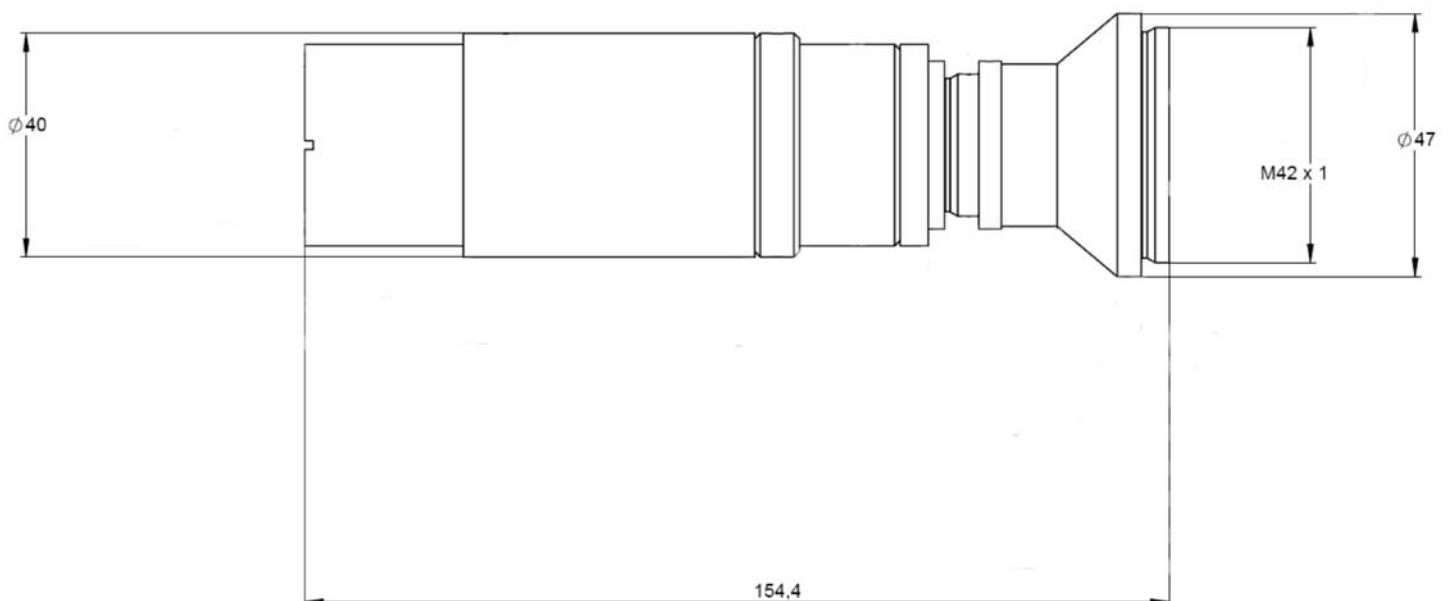

Telecentric macro objectives for L-LAS-CAM-...-CL line cameras:
MO-C-163/1.5x

(other objectives will be available soon)


 MO-C-163/1.5x
 (illustration similar)

Technical data
MO-C-163/1.5x:

Imaging scale:	1.5
Working distance:	typ. 163 mm
Length:	ca. 154,4 mm
Connector:	M42x1

Dimensions
MO-C-163/1.5x:


All dimensions in mm



Optical Filters

Optical filters (optional) for L-LAS-CAM-...-CL line cameras:

(Tool for mounting FILT-MOUNT: please order separately)

- FILT-G-9-3-IF670** (suitable for measuring objectives MO-G-...)
- FILT-G-9-3-GG475** (suitable for measuring objectives MO-G-...)
- FILT-G-9-3-KG5** (suitable for measuring objectives MO-G-...)
- FILT-G-9-3-RG715** (suitable for measuring objectives MO-G-...)

- IF670 = Interference filter 670 nm
- GG 475 = UV block filter
- KG5 = IR block filter
- RG715 = Day light block filter

- FILT-G-17-3-IF670** (suitable for measuring objectives MO-G-...)
- FILT-G-17-3-GG475** (suitable for measuring objectives MO-G-...)
- FILT-G-17-3-KG5** (suitable for measuring objectives MO-G-...)
- FILT-G-17-3-RG715** (suitable for measuring objectives MO-G-...)

Product name	A	ØB	t
FILT-G-9-3-...	M35.5x0.5	9mm	3mm
FILT-G-17-3-...	M35.5x0.5	17mm	3mm
FILT-G-26-3-...	M35.5x0.5	26mm	3mm
FILT-G-26-4-...	M35.5x0.5	26mm	4mm
FILT-C-9-3-...	M49x0.75	9mm	3mm
FILT-C-17-3-...	M49x0.75	17mm	3mm
FILT-C-26-3-...	M49x0.75	26mm	3mm

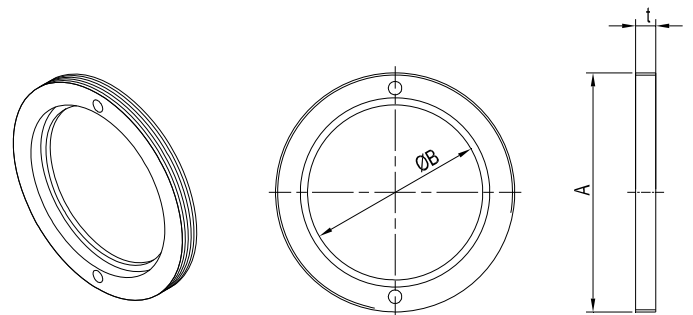
- FILT-G-26-3-GG475** (suitable for measuring objectives MO-G-...)

- FILT-G-26-4-KG5** (suitable for measuring objectives MO-G-...)

- FILT-C-9-3-IF670** (suitable for measuring objectives MO-C-...)
- FILT-C-9-3-GG475** (suitable for measuring objectives MO-C-...)
- FILT-C-9-3-KG5** (suitable for measuring objectives MO-C-...)
- FILT-C-9-3-RG715** (suitable for measuring objectives MO-C-...)

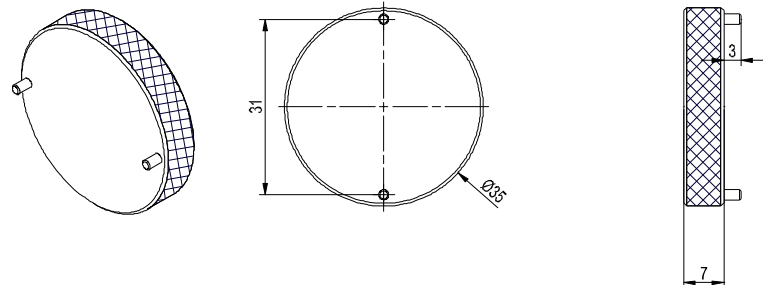
- FILT-C-17-3-IF670** (suitable for measuring objectives MO-C-...)
- FILT-C-17-3-GG475** (suitable for measuring objectives MO-C-...)
- FILT-C-17-3-KG5** (suitable for measuring objectives MO-C-...)
- FILT-C-17-3-RG715** (suitable for measuring objectives MO-C-...)

- FILT-C-26-3-GG475** (suitable for measuring objectives MO-C-...)



Tool for mounting of optical filters FILT-G-... and FILT-C:

MOUNT-FILT
(please order separately)

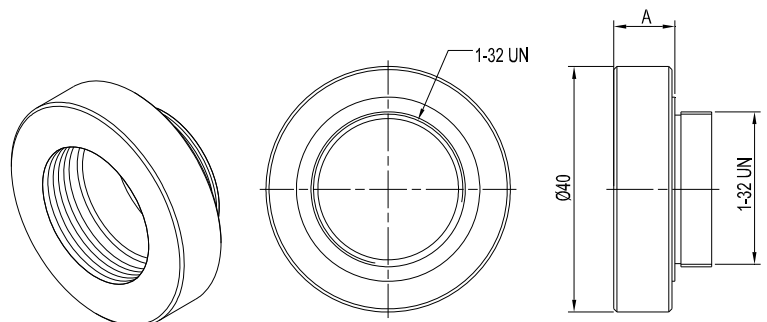


Intermediate Tubes

Intermediate tubes / adapter ring (optional) for L-LAS-CAM-...-CL line cameras:

- TUB-10** (suitable for all measuring objectives MO-...)
- TUB-20** (suitable for all measuring objectives MO-...)
- TUB-30** (suitable for all measuring objectives MO-...)
- TUB-50** (suitable for all measuring objectives MO-...)
- TUB-100** (suitable for all measuring objectives MO-...)

Product name	A
TUB-10	10mm
TUB-20	20 mm
TUB-30	30mm
TUB-50	50mm
TUB-100	100mm



All dimensions in mm

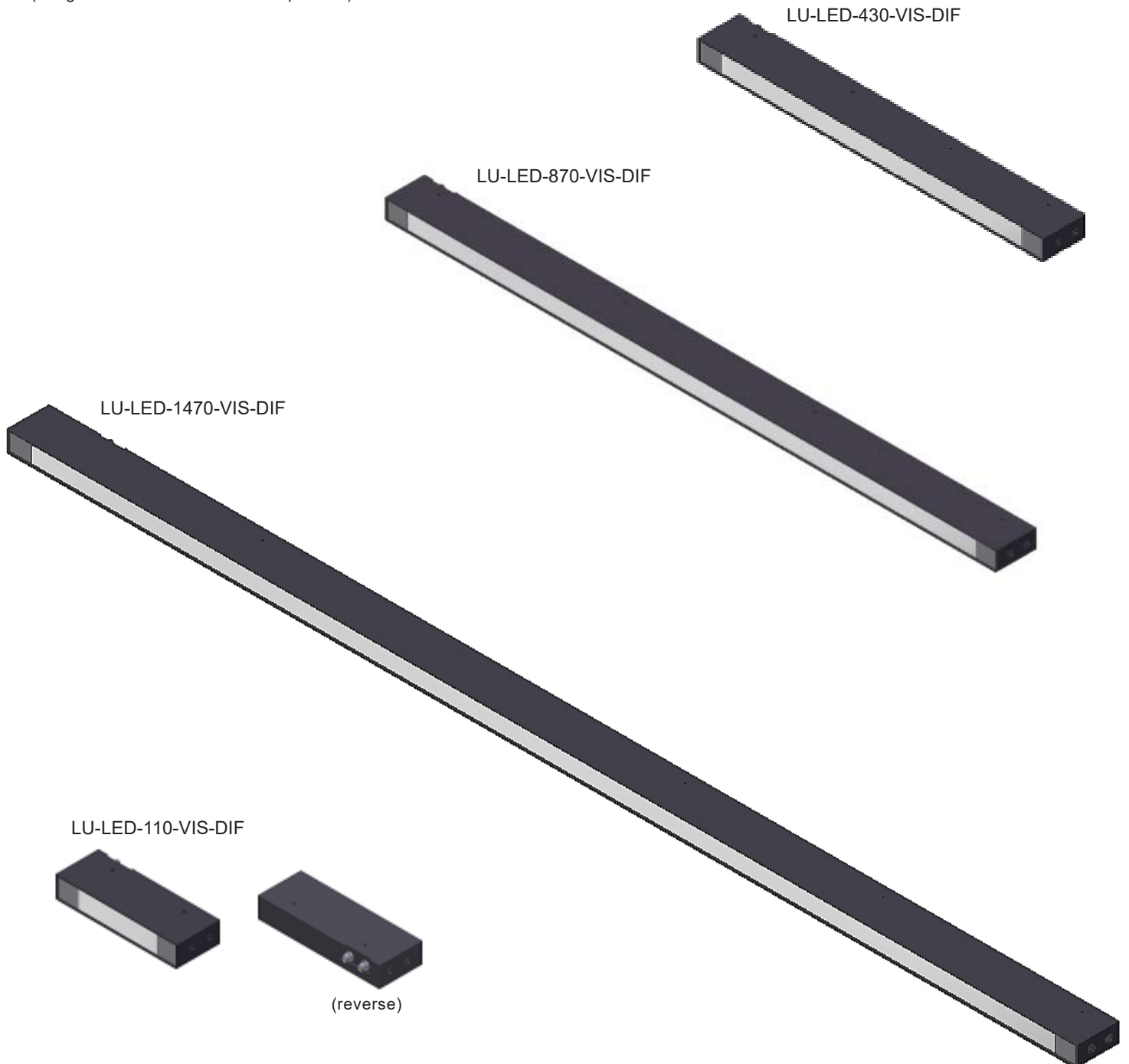


Lighting Units

Diffus lighting units for L-LAS-CAM-...-CL line cameras:

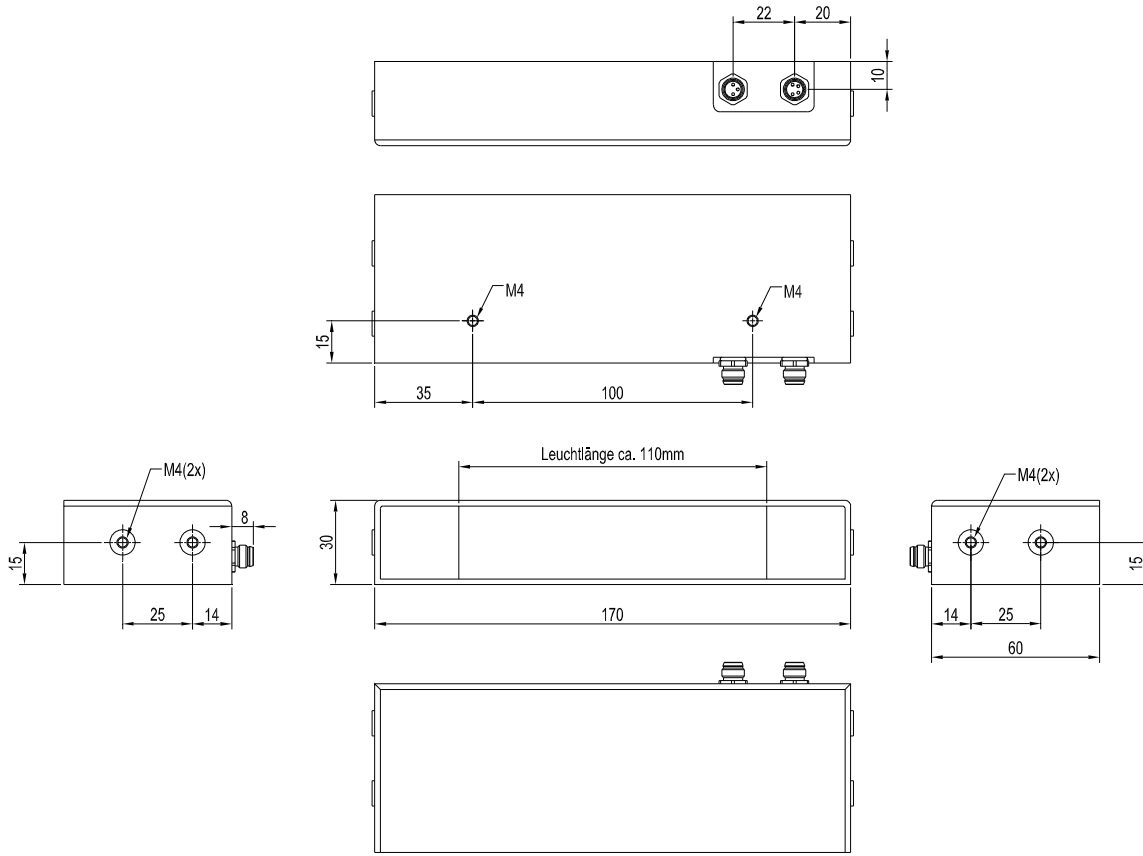
LU-LED-110-VIS-DIF	(Length of the illuminated area approximately 110 mm, <u>diffuse</u> , equable illumination through reflector system)
LU-LED-430-VIS-DIF	(Length of the illuminated area approximately 430 mm, <u>diffuse</u> , equable illumination through reflector system)
LU-LED-870-VIS-DIF	(Length of the illuminated area approximately 870 mm, <u>diffuse</u> , equable illumination through reflector system)
LU-LED-1470-VIS-DIF	(Length of the illuminated area approximately 1470 mm, <u>diffuse</u> , equable illumination through reflector system)

Suitable for transmitted and reflected light applications
 Internale high-gloss reflector system, diffuse
 (designed for 24 hrs. continuous operation)

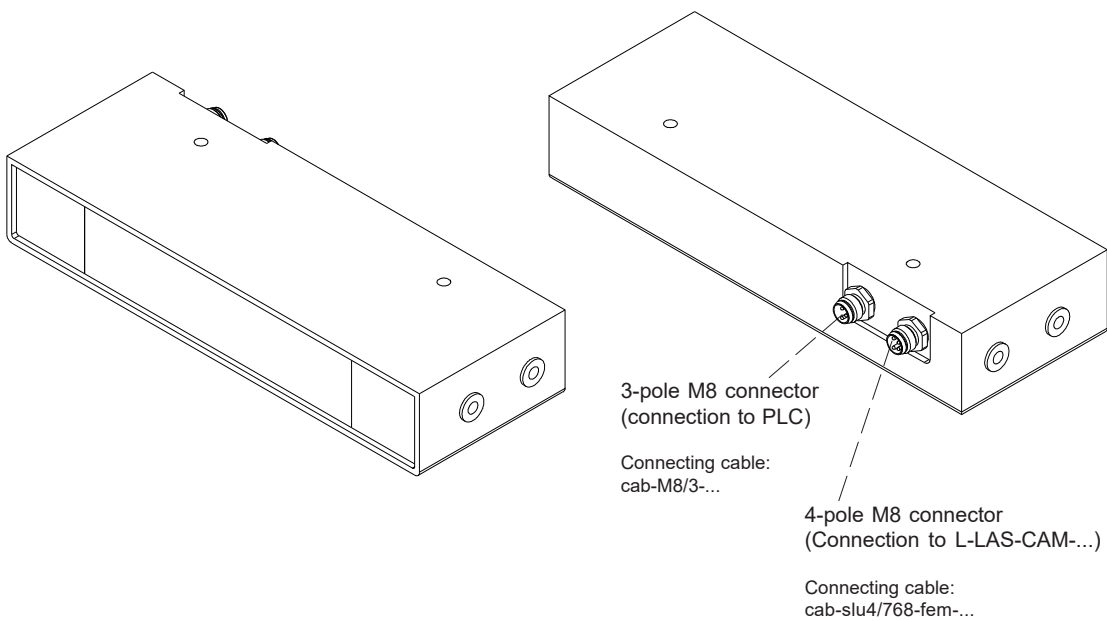


Lighting Units

Diffuse lighting unit
LU-LED-110-VIS-DIF

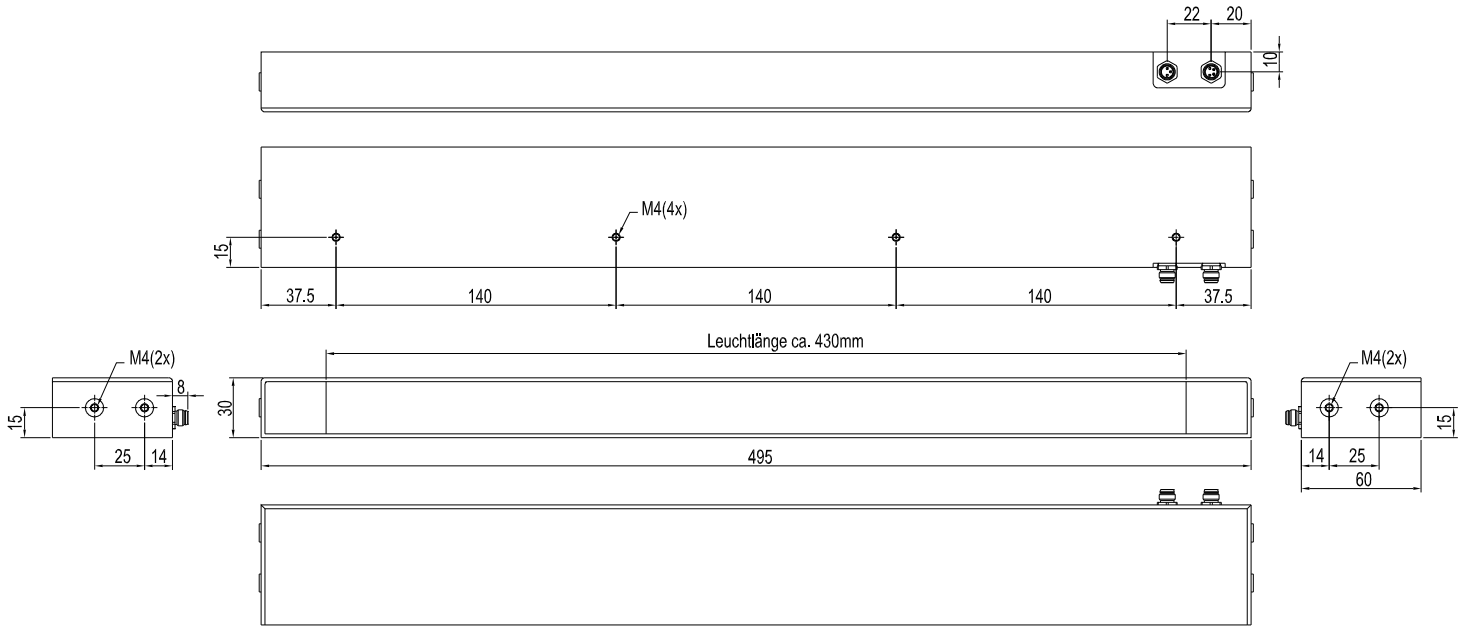


All dimensions in mm



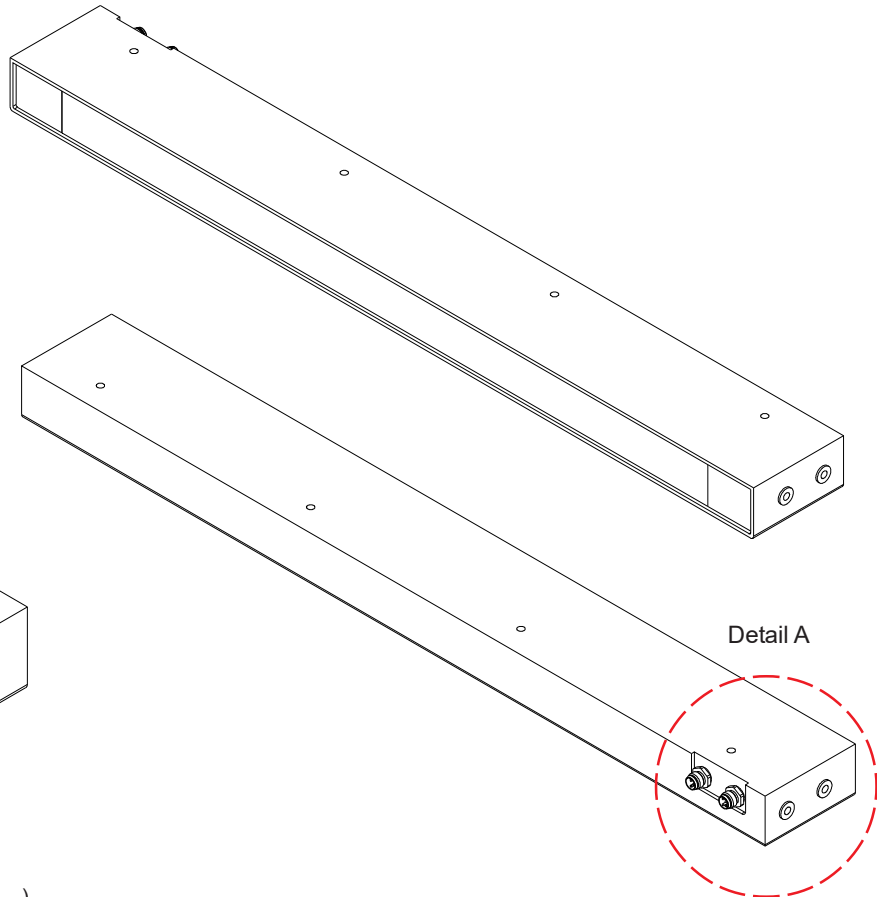
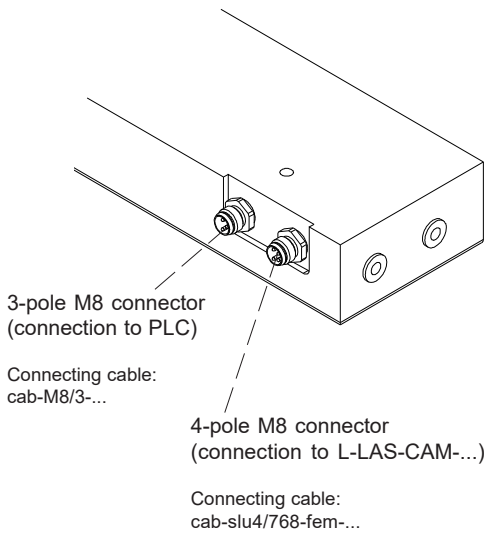
Lighting Units

Diffuse lighting unit
LU-LED-430-VIS-DIF



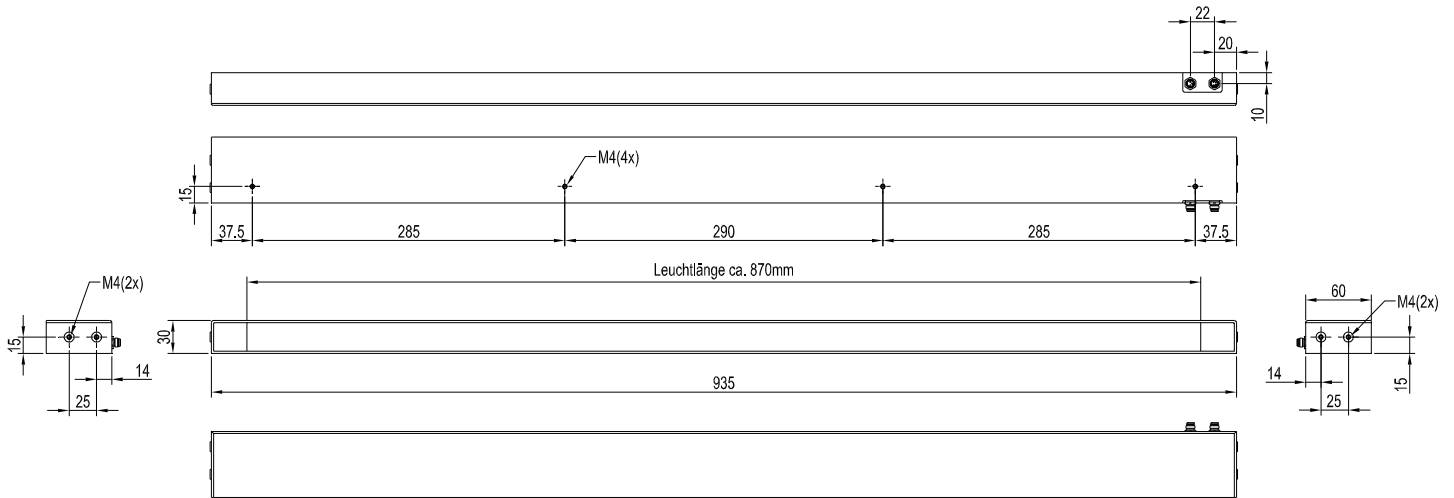
All dimensions in mm

Detail A:

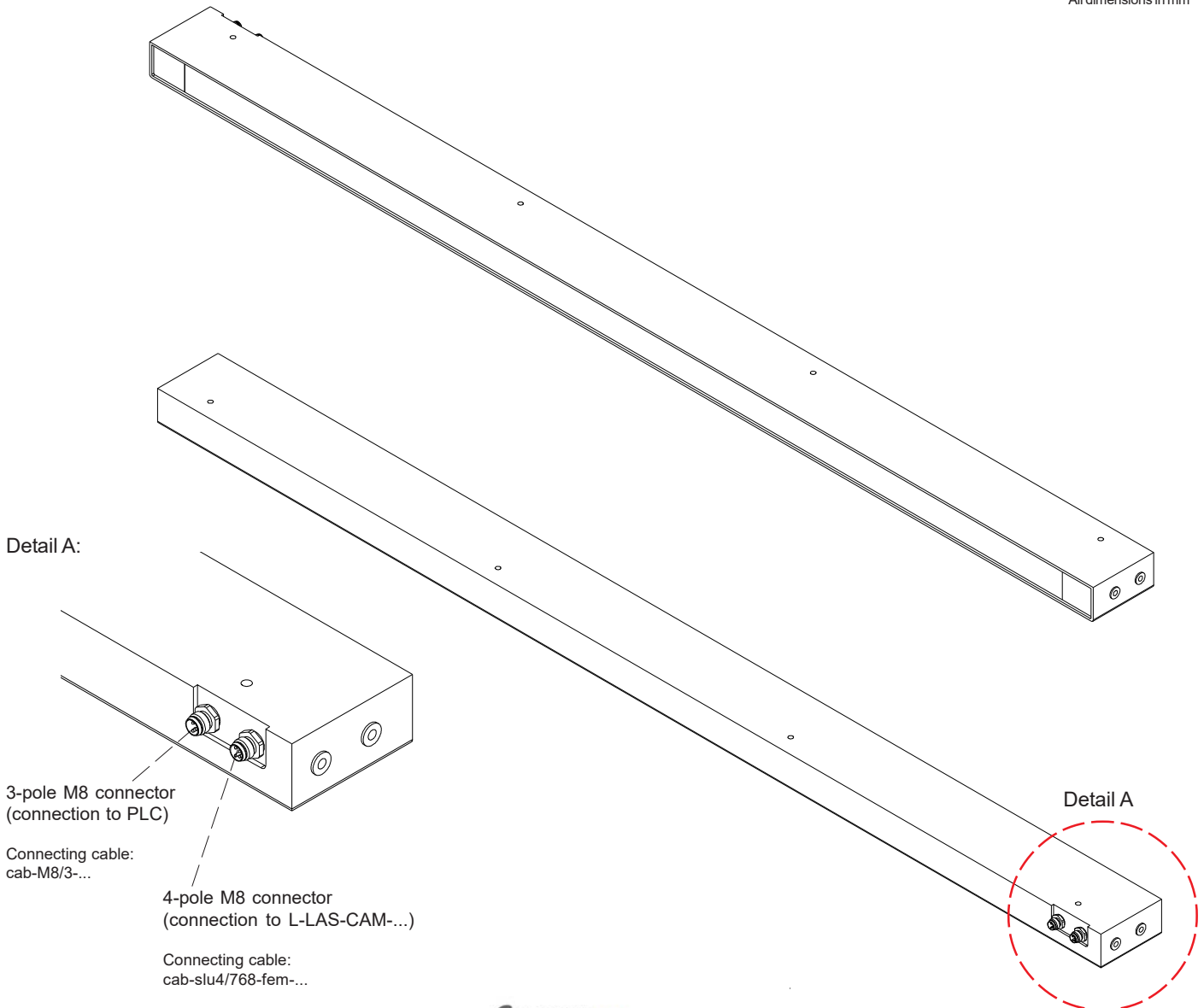


Lighting Units

Diffuse lighting unit
LU-LED-870-VIS-DIF



All dimensions in mm



Detail A:

3-pole M8 connector
(connection to PLC)

Connecting cable:
cab-M8/3-...

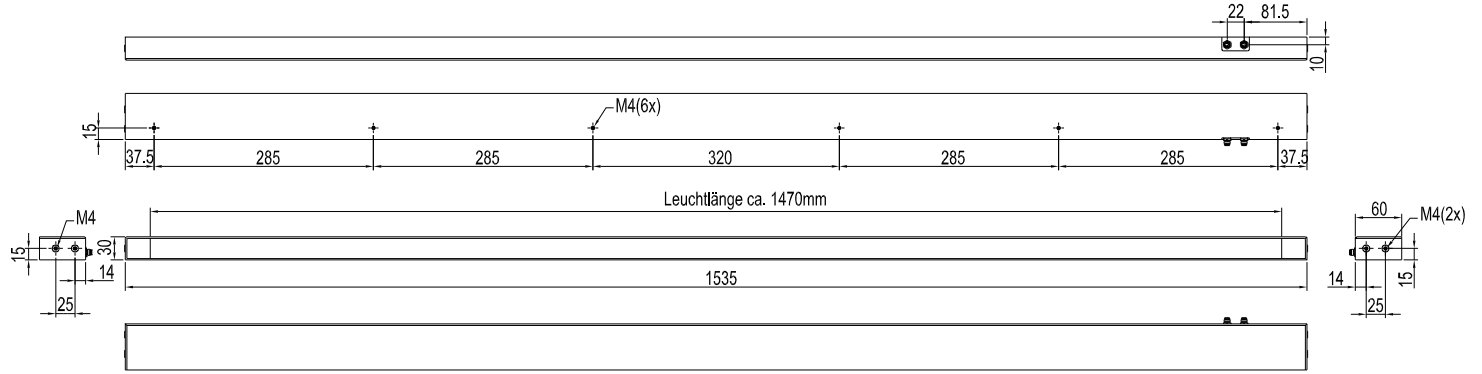
4-pole M8 connector
(connection to L-LAS-CAM-...)

Connecting cable:
cab-slu4/768-fem-...

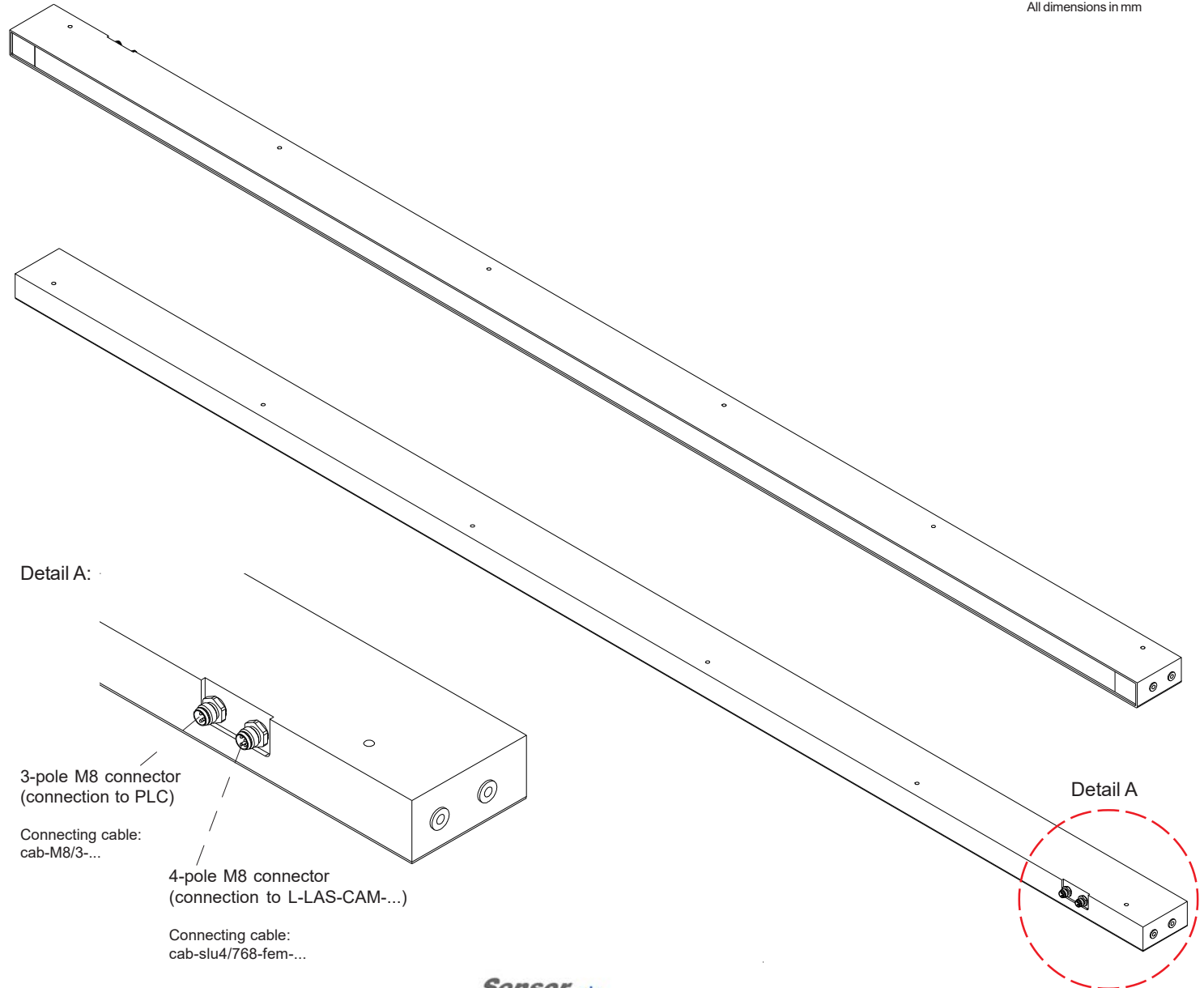
Detail A

Lighting Units

Diffuse lighting unit
LU-LED-1470-VIS-DIF

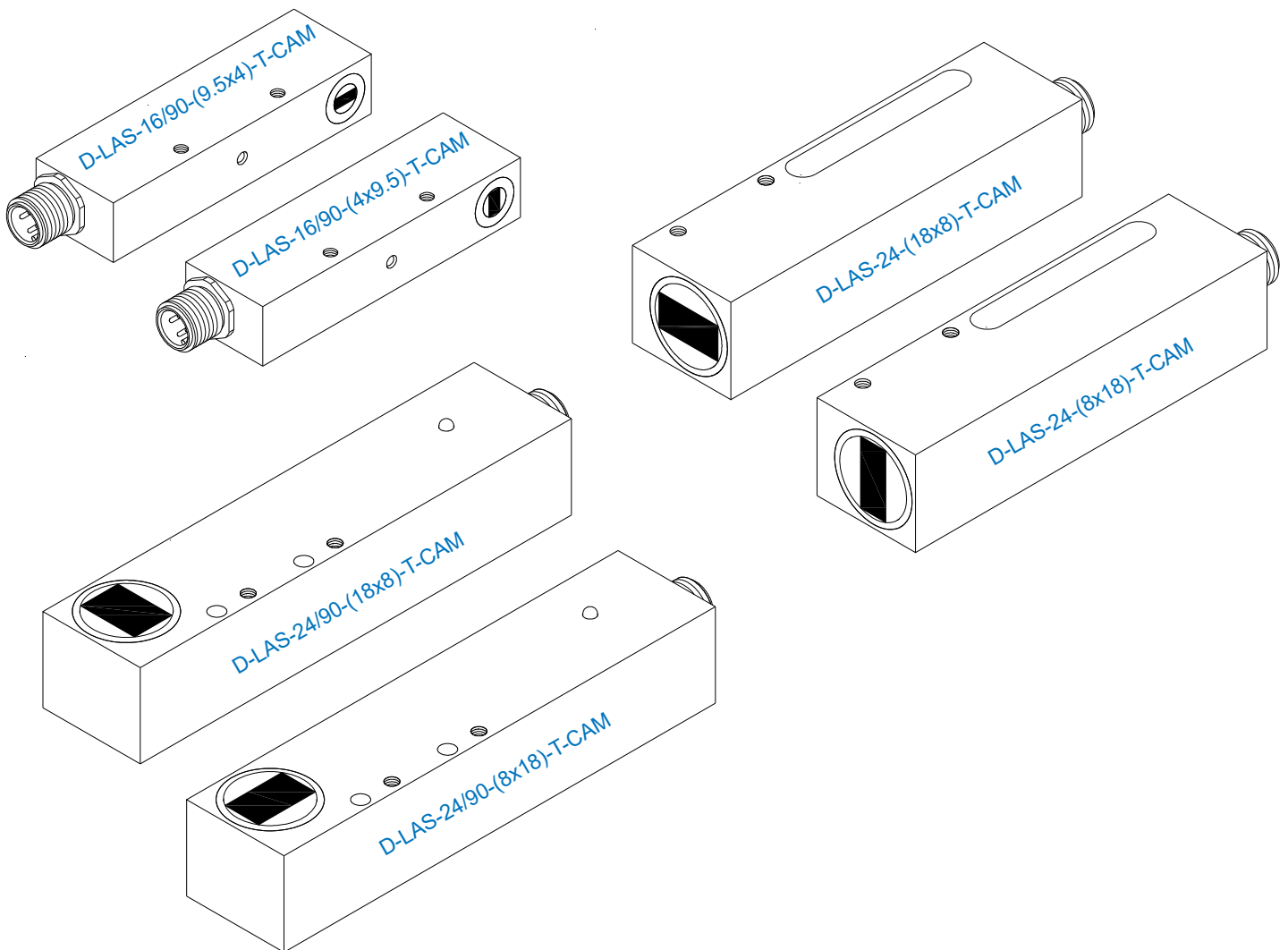


All dimensions in mm




 Lighting Units
Laser lighting units for L-LAS-CAM-...-CL line cameras:

D-LAS-16/90-(9.5x4)-T-CAM	(without aperture, laser beam cross section approx. 9.5 mm x 4 mm, DC operation, laser class 1)
D-LAS-16/90-(4x9.5)-T-CAM	(without aperture, laser beam cross section approx. 4 mm x 9.5 mm, DC operation, laser class 1)
D-LAS-24-(18x8)-T-CAM	(without aperture, laser beam cross section approx. 18 mm x 8 mm, DC operation, laser class 1)
D-LAS-24-(8x18)-T-CAM	(without aperture, laser beam cross section approx. 8 mm x 18 mm, DC operation, laser class 1)
D-LAS-24/90-(18x8)-T-CAM	(without aperture, laser beam cross section approx. 18 mm x 8 mm, DC operation, laser class 1)
D-LAS-24/90-(8x18)-T-CAM	(without aperture, laser beam cross section approx. 8 mm x 18 mm, DC operation, laser class 1)



 Laser Warning

The laser transmitters of D-LAS series comply with laser class 1 according to EN 60825-1. Under reasonably foreseeable conditions a class 1 laser is safe. The reasonably foreseeable conditions are kept during specified normal operation. The use of these laser transmitters therefore requires no additional protective measures.

The laser transmitters of D-LAS series series are supplied with an information label „CLASS 1 Laser Product“.

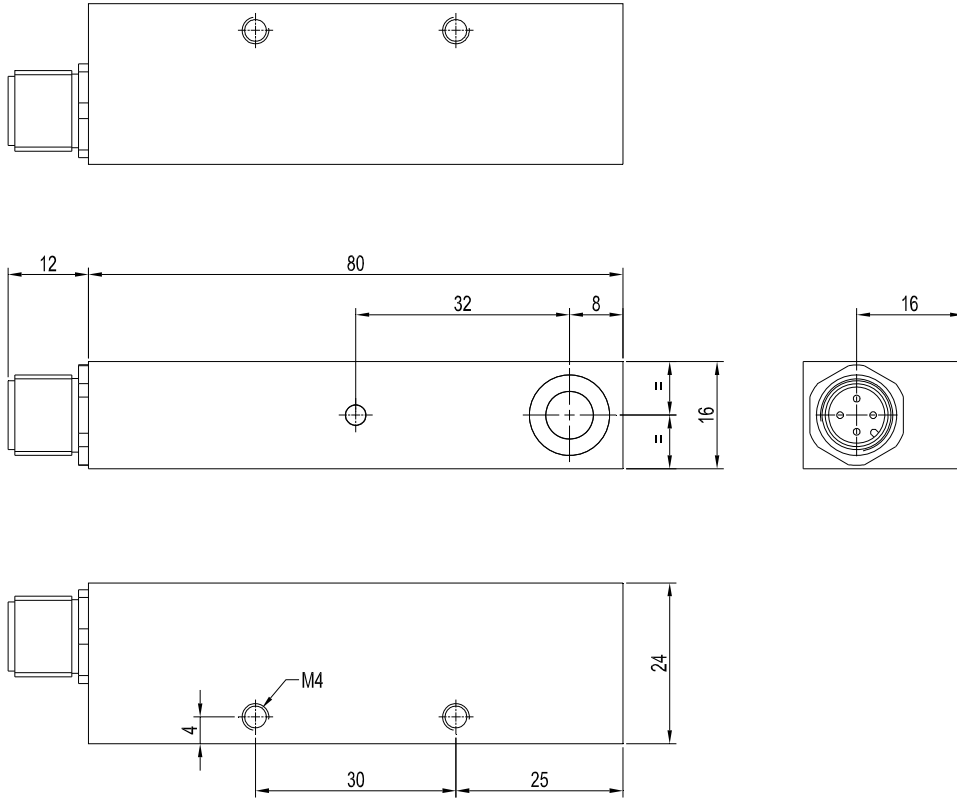


CLASS 1 LASER PRODUCT
 DIN EN 60825-1: 2015-07
 THIS LASER PRODUCT COMPLIES
 WITH 21 CFR 1040 AS APPLICABLE

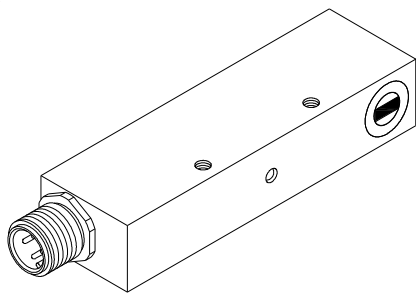


Lighting Units

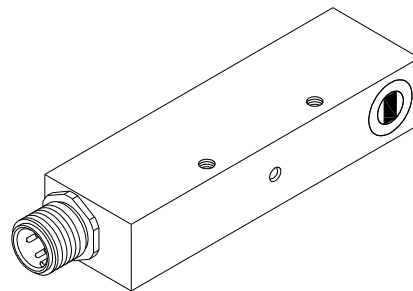
Laser lighting unit
 D-LAS-16/90-(9.5x4)-T-CAM
 D-LAS-16/90-(4x9.5)-T-CAM



All dimensions in mm



D-LAS-16/90-(9.5x4)-T-CAM

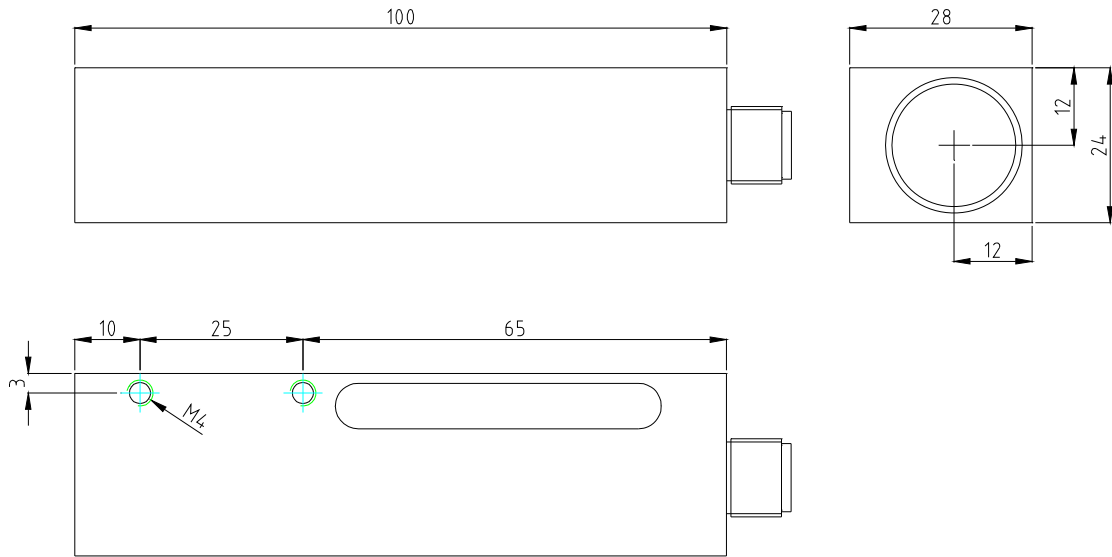


D-LAS-16/90-(4x9.5)-T-CAM

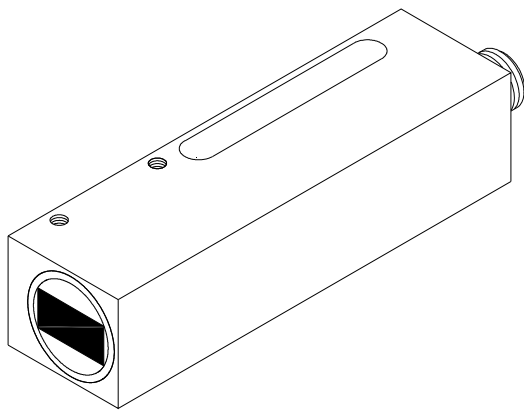


Lighting Units

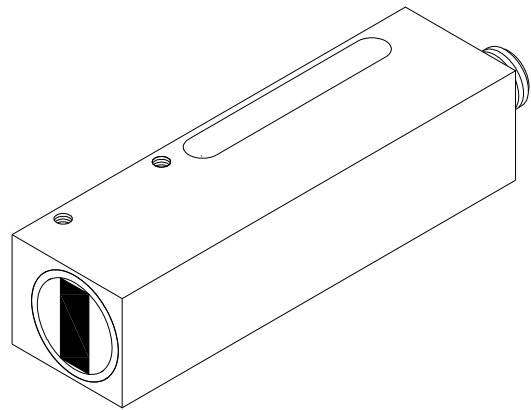
Laser lighting unit
 D-LAS-24-(18x8)-T-CAM
 D-LAS-24-(8x18)-T-CAM



All dimensions in mm



D-LAS-24-(18x8)-T-CAM

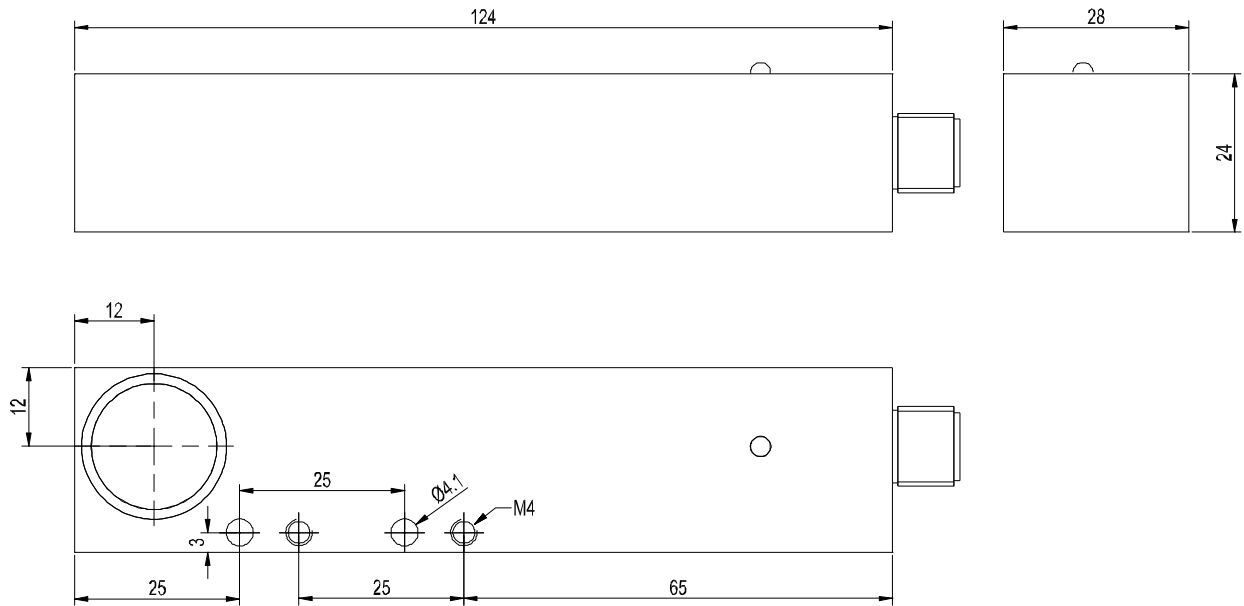


D-LAS-24-(8x18)-T-CAM

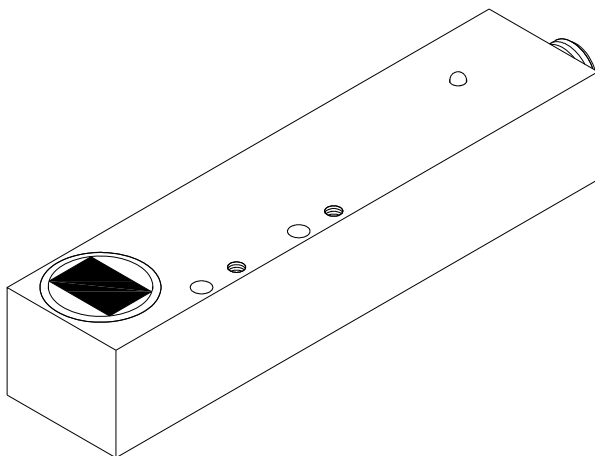


Lighting Units

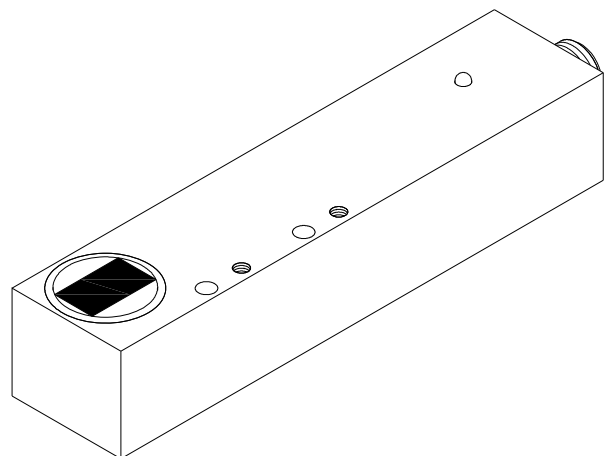
Laser lighting unit
 D-LAS-24/90-(18x8)-T-CAM
 D-LAS-24/90-(8x18)-T-CAM



All dimensions in mm



D-LAS-24/90-(18x8)-T-CAM



D-LAS-24/90-(8x18)-T-CAM