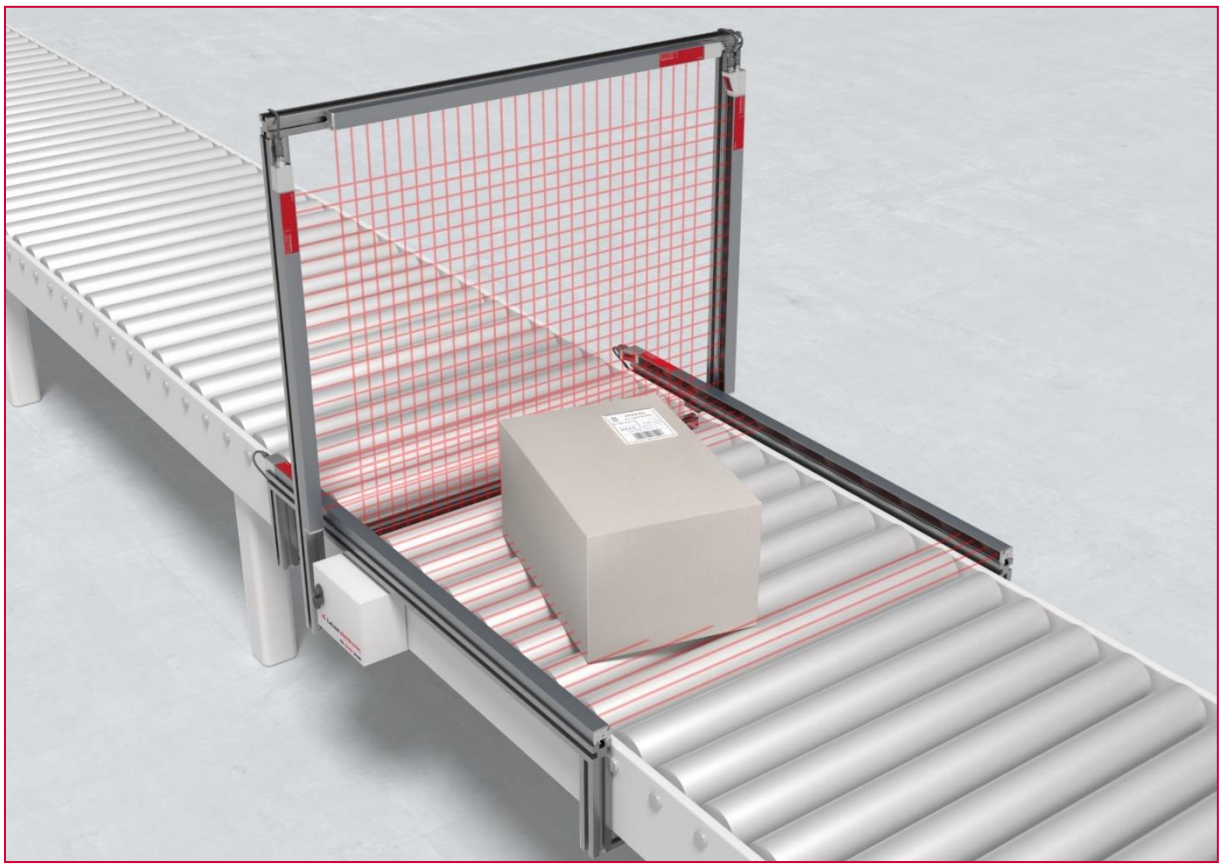
Leuze electronic

the sensor people

CMS 700i
Contour Measurement System



Original operating instructions

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Content

1 About this document

These original operating instructions contain information regarding the proper use of the contour measurement system CMS 700i. It is included in the delivery contents.

1.1 Used symbols and signal words

Table 1.1: Warning symbols, signal words and symbols

	Pay attention to passages marked with this symbol. Failure to observe the provided instructions could lead to personal injury or damage to equipment.
NOTICE	Signal word for property damage Indicates dangers that may result in property damage if the measures for danger avoidance are not followed.
	Symbol for tips Text passages with this symbol provide you with further information.
	Symbols for action steps Text passages with this symbol instruct you to perform actions.

2 Safety

The contour measurement system CMS 700i and its components were developed manufactured and tested in line with the applicable safety standards. It corresponds to the state of the art.

2.1 Intended use

The device is designed as a measuring and object-detecting, configurable, multi-sensor unit.

Areas of application

The contour measurement system is designed for the measurement and detection of objects for the following areas of application in handling and warehousing systems, the packaging industry or a comparable environment:

- Dimensional measurement of parameters like length, width and height
- Rotation angle of objects on conveyors
- Contour measurement

CAUTION
Observe intended use! ↳ Only operate the device in accordance with its intended use. The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not complying with its intended use. Leuze electronic GmbH + Co. KG is not liable for damages caused by improper use. ↳ Read the original operating instructions before commissioning the device. Knowledge of the original operating instructions is an element of proper use.

NOTICE
Comply with conditions and regulations! ↳ Observe the locally applicable legal regulations and the rules of the employer's liability insurance association.

2.2 Foreseeable misuse

Any use other than that defined under „Intended use“ or which goes beyond that use is considered improper use.

In particular, use of the device is not permitted in the following cases:

- Rooms with explosive atmospheres
- Circuits relevant to safety
- Operation for medical purposes

NOTICE
Do not modify or otherwise interfere with the device! ↳ Do not carry out modifications or otherwise interfere with the device. The device must not be tampered with and must not be changed in any way. The device must not be opened. There are no user-serviceable parts inside. Repairs must only be performed by Leuze electronic GmbH + Co. KG.

↳ The control cabinet of the device may only be opened to insert or remove the software dongle. See chapter 7.1!

2.3 Competent persons

Connection, mounting, commissioning and adjustment of the device must only be carried out by competent persons.

Prerequisites for competent persons:

- They have a suitable technical education.
- They are familiar with the rules and regulations for occupational safety and safety at work.
- They are familiar with the original operating instructions of the contour measurement system CMS 700i and its components.
- They have been instructed by the responsible person on the mounting and operation of the device.

CAUTION

Absolutely observe!
Electrical work may only be carried out by qualified electricians!

Certified electricians
Electrical work must be carried out by a certified electrician.
Due to their technical training, knowledge and experience as well as their familiarity with relevant standards and regulations, certified electricians are able to perform work on electrical systems and independently detect possible dangers.
In Germany, certified electricians must fulfill the requirements of accident-prevention regulations BGV A3 (e.g. electrician foreman). In other countries, there are respective regulations that must be observed.

2.4 Exception of liability

Leuze electronic GmbH + Co. KG is not liable in the following cases:

- The device is not being used properly
- Reasonably foreseeable misuse is not taken into account.
- Mounting and electrical connection are not properly performed.
- Changes (e.g. constructional) are made to the device

3 Device description

3.1 General information

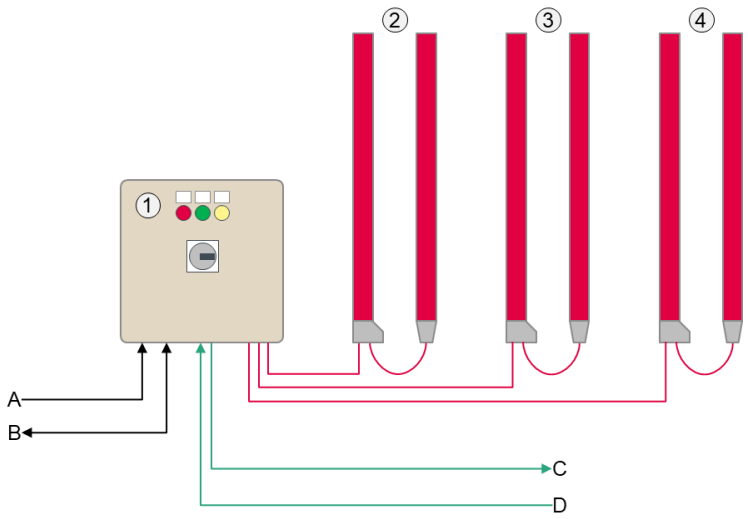
The contour measuring system CMS 700i is a complete system consisting of:

- Light curtains,
- An evaluation unit and
- An encoder, depending on the version.

The evaluation unit is responsible for data acquisition, processing and preparation. The system provides the process data via defined interfaces such as Profinet or Ethernet TCP/IP.

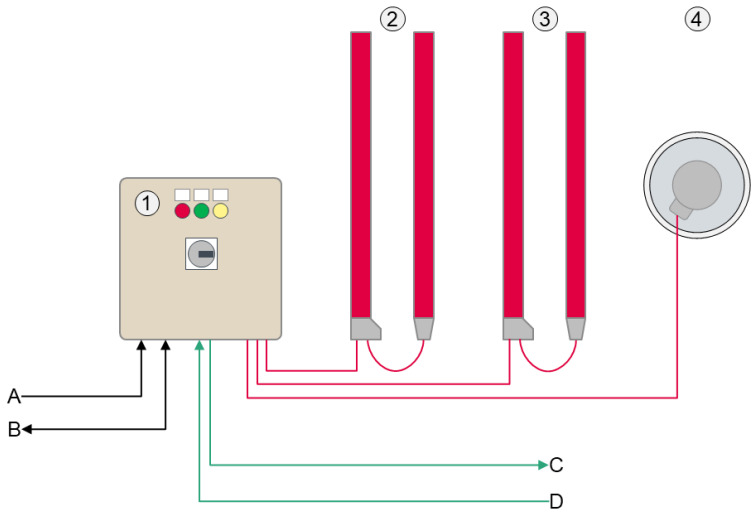
The integration of peripheral devices such as scales, barcode readers and cameras is possible. The evaluation unit loops through the peripheral data unprocessed as part of its TCP/IP protocol.

3.2 Device overview with 3 light curtains



Index
(1) Control cabinet LSC-Box
(2) Light curtain – height
(3) Light curtain – width
(4) Light curtain – length
(A) Voltage supply
(B) Ethernet TCP/IP
(C) Fieldbus OUT
(D) Fieldbus IN

3.3 Device overview with 2 light curtains and 1 rotary encoder



Index
(1) Control cabinet LSC-Box
(2) Light curtain – height
(3) Light curtain – width
(4) Rotary encoder – length
(A) Voltage supply
(B) Ethernet TCP/IP
(C) Fieldbus OUT
(D) Fieldbus IN

3.4 Control cabinet LSC-Box

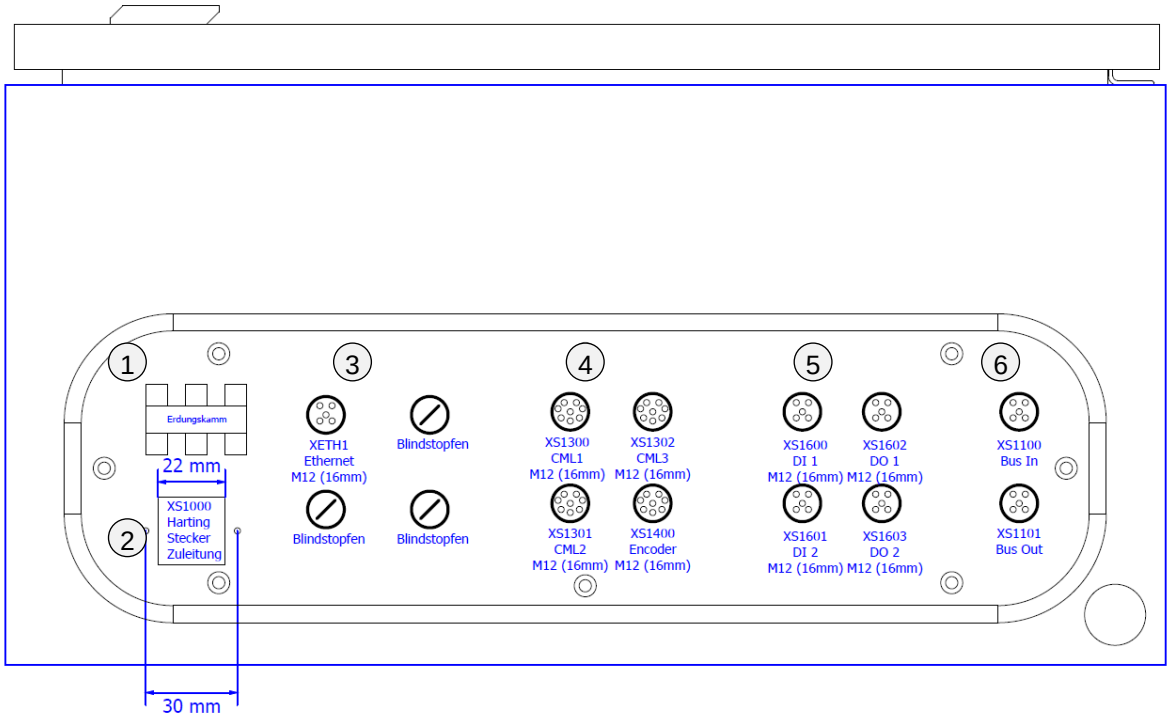
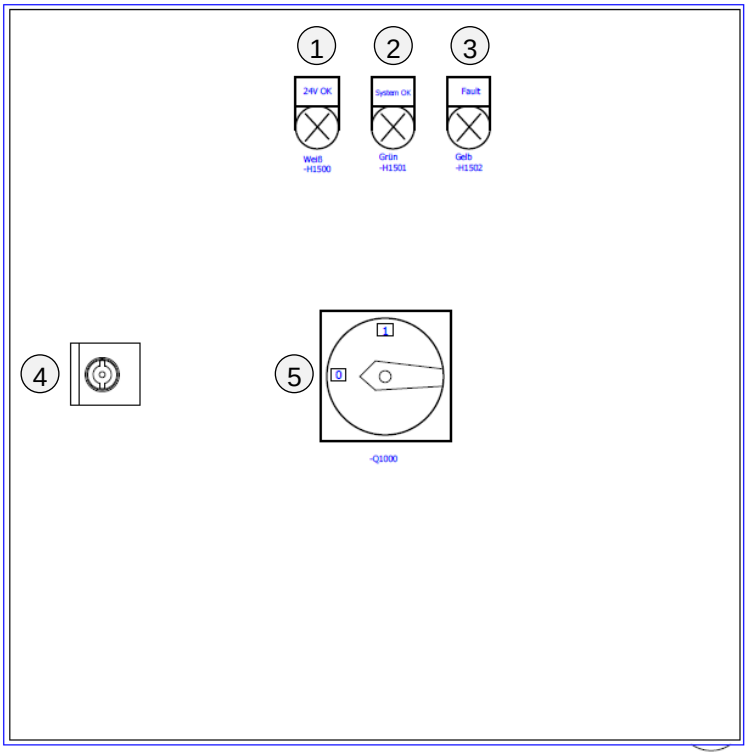


Figure 1: Connecting plate of the control cabinet LSC-Box

Index

(1) Ground
(2) Connector voltage supply
(3) Ethernet connection M12
(4) 3x interface for light curtain CML730, 1x interface for rotary encoder
(5) 2x M12 socket with 2 switching inputs each
2x M12 socket with 2 switching output each
(6) Fieldbus interface IN/OUT M12 (Only for version CMS 748i)

3.5 Display and control elements



Index:
(1) LED1
(2) LED2
(3) LED3
(4) Door lock
(5) Main switch

Figure 2: Display and control elements of the control cabinet LSC-Box

Display	Color	Condition	Description
LED1	White	ON	Power supply
LED2	Green	ON	System ready
LED3	Yellow	ON	Malfunction of peripheral elements (light curtains / encoder)

4 Functions

4.1 Operating principle

The contour measuring system CMS 700i detects of an object of any shape:

- Length, width, height of the smallest enveloping cuboid
- Rotation angle to transport direction
- Smallest vertical distance between the object and the conveyor belt.

All objects are measured as they pass through.

System setup with 3 light curtains
Measurement start: Interruption of the first beam of the length light curtain or trigger by an optional trigger.
Measurement stop: No beams of the width and height light curtain are interrupted.

System setup with 2 light curtains and 1 rotary encoder
Measurement start: Interruption of one beam of the height or width light curtain or trigger by an optional trigger.
Measurement stop: No beams of width and height light curtain are interrupted.

After the measurement, the control unit (LSC-Box) automatically forwards the calculated object data to a host via a fieldbus interface. Data from other peripheral devices such as scales or barcode readers can also be transferred in the interface protocol. After data output, the next object can be acquired.

NOTICE
Important for valid measurement! ↳ As long as the measurement is running, the beams of the light curtains must not be additionally interrupted by manual interventions or other actions! This falsifies the measured values. ↳ Observe minimum object distance and maximum transport speed! See chapter 4.5.

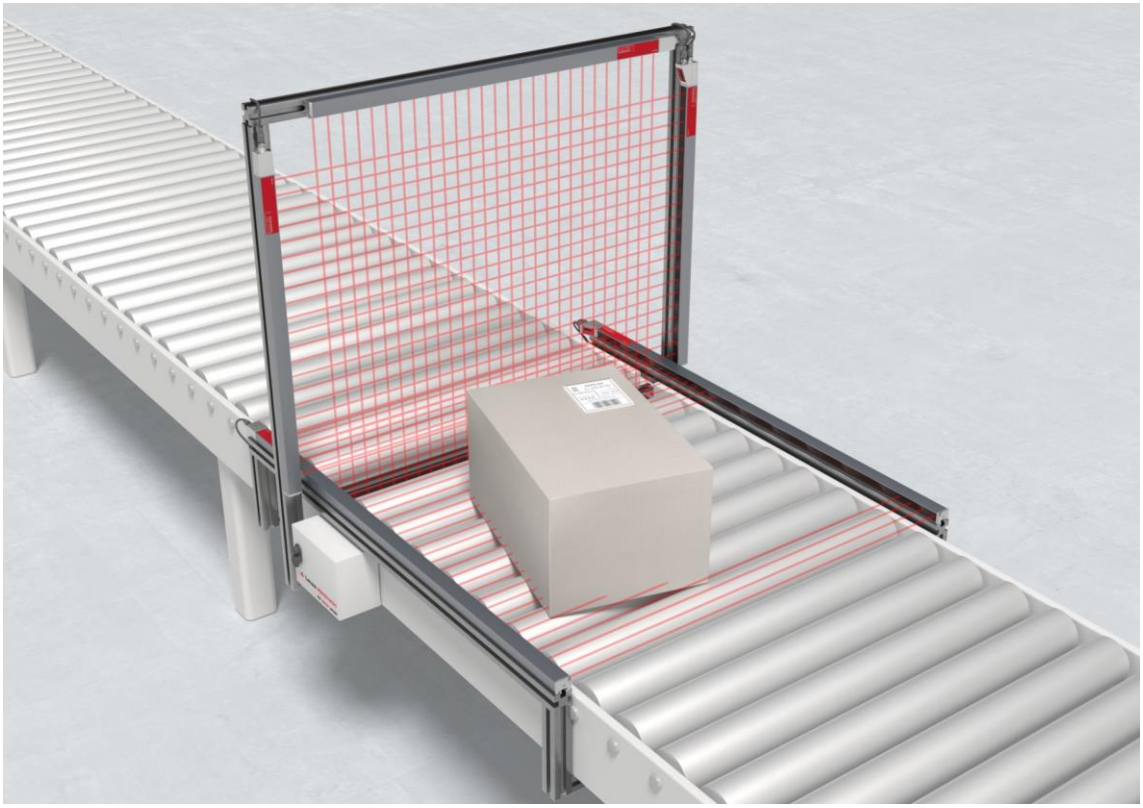


Figure 3: Contour measurement system with 3 light curtains

4.2 Object rotation angle, object length and width

Object rotation angle:
The object rotation angle determined by the CMS 700i is the angle between the longitudinal edge of the measuring object and the vector of the conveying direction.
The angle can take values between -45° and +45°. When the rotation angle of 45° is exceeded the assignment of length and width changes and the smaller value with alternate sign is sent out, see Figure 4.

Object length:
The object length or length is defined as the side of the object in top view that is at an angle of less than 45 degrees to the conveying direction (= longitudinal direction).

Object width:
In the top view, the side adjacent to the object length is the object width.

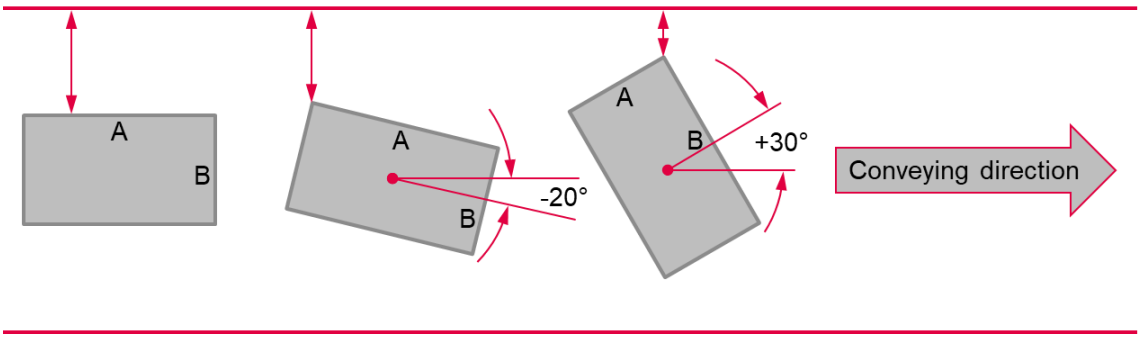


Figure 4: Relation between angle value and assignment of length and width

Output angle value:	-20°	+30° (instead of -60°)
Length	A	B

Width	B	A

4.3 Object overhangs, object bulges

This chapter describes the function of overhang suppression and the detection of bulges. For the settings of these functions in WebConfig, see Chapter 8.2.2.
The evaluation of measurement objects for projections and bulges is always carried out in 2 steps.

4.3.1 Operating principle

In stage 1, the system determines overhangs in length, width and height from the raw object data and suppresses them according to the threshold value entered. The suppression serves to ensure that overhangs on the object that do not interfere with further handling do not influence the object measurement.

In stage 2, the system determines the cuboid corner points of the object from the overhang-reduced object data and calculates the bulges between the corner points. The determination of the bulges is called deformation detection.
Deformation detection can only be selected in conjunction with object overhang detection.

Example
Figure 5 shows an object with overhang and bulge. The overhang has the width ΔA. The bulge has a maximum length of Xnet-Xmin.

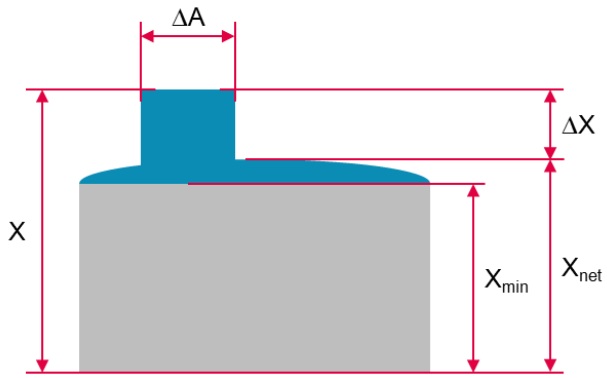


Figure 5: Object with overhang and bulge shown in blue.

The following cases may occur.

Deformation detection	Not activated		Activated	
Threshold overhang	ΔA > Threshold	ΔA ≤ Threshold	ΔA > Threshold	ΔA ≤ Threshold
Assessment overhang	ΔX is part of the object	ΔX is overhang and no part of the object	ΔX is part of the object	ΔX is overhang and no part of the object
Output ACTUAL object dimension	X	X	X	X_{net}
Output TARGET object dimension	X	X_{net}	None	X_{min}
Output deformation (Are there any bulges?)	None	None	None	Marking arrow and output X_{net}–X_{min} in mm

Error output	None	None	Deformation detection not possible	None
Status	OK	OK	NOK	OK

The overhangs and bulges can occur in longitudinal, width and height direction.
The following figure of an object (grey box) on a conveyor serves for orientation of the direction information. The red bars represent the light curtains. The grey arrows indicate the conveying direction.

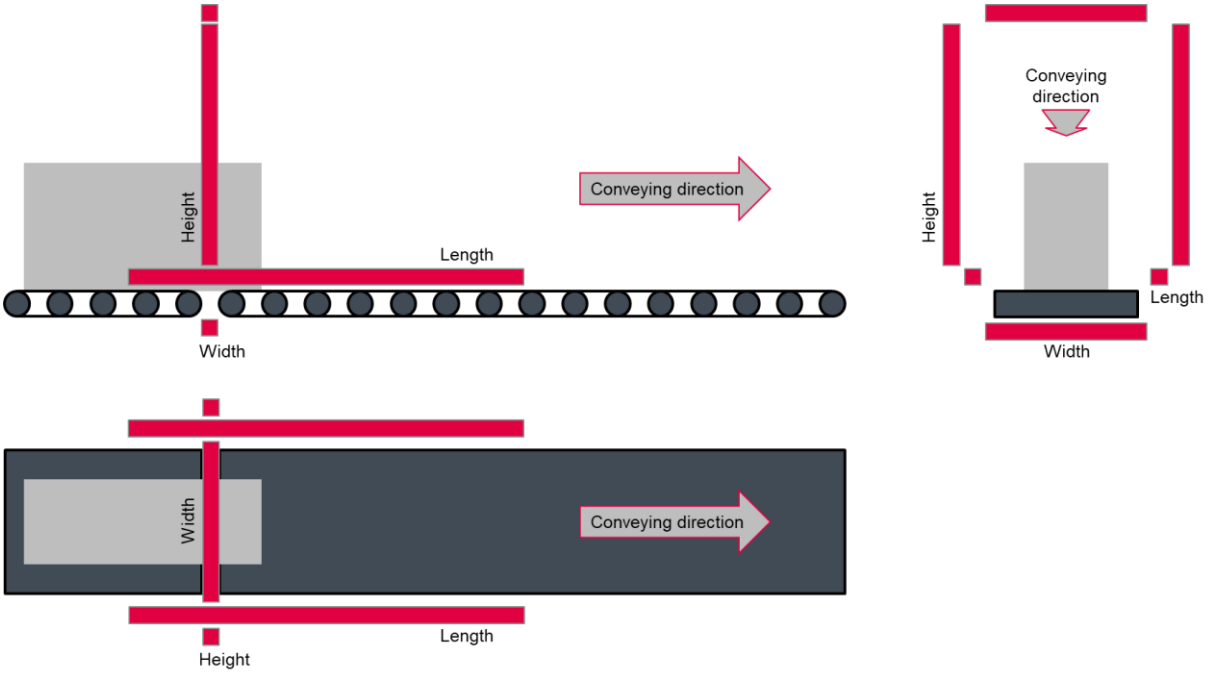


Figure 6: Views to display the direction information.

4.3.2 Overhang suppression Length

If the width of the overhang ΔA is smaller than the threshold value entered, it is suppressed and not taken into account in the length measurement.

NOTICE
↳ The overhang suppression and deformation detection is also carried out for the versions with rotary encoder for longitudinal measurement.

Figure 7: Schematic representation of an object overhang in longitudinal direction

4.3.3 Overhang suppression Width

If the width of the overhang ΔA is smaller than the entered threshold value, it is suppressed and not taken into account in the width measurement.

Figure 8: Sketch of an overhang of an object in width direction

4.3.4 Overhang suppression Height

If the width of the overhang ΔA is smaller than the entered threshold value, it is suppressed and not taken into account in the height measurement.

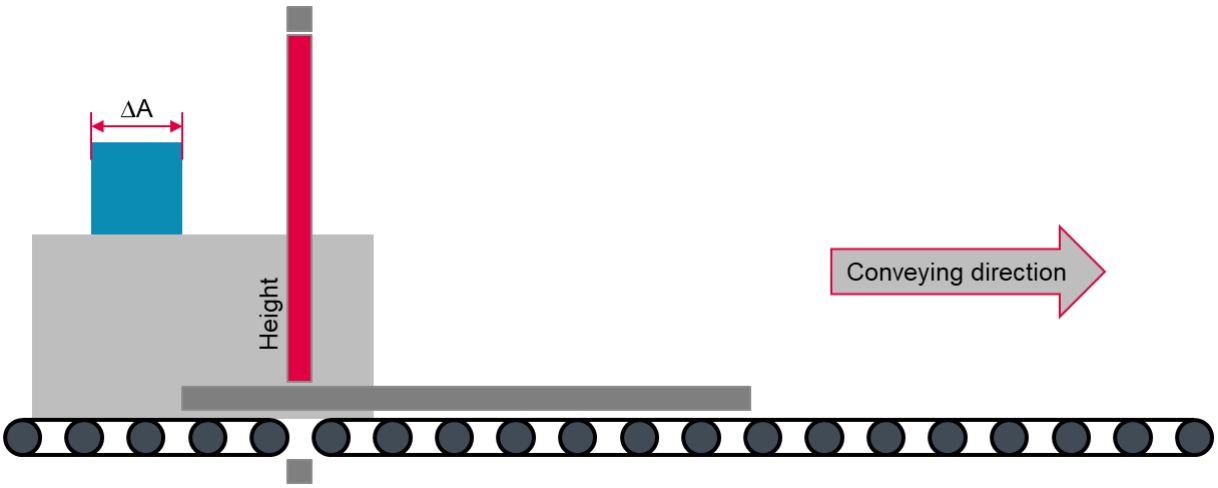


Figure 9: Sketch of an overhang of an object in height direction

4.3.5 Deformation detection

The system detects bulges as deformations that protrude from the projected view of the object, see Figure 10.

Figure 10: Top view of an object with lateral bulge

Limitations of deformation detection

Deformations that protrude into the object and are shaded by edges cannot be detected by the system as shown in the following figure. In this case Xnet < Xmin.

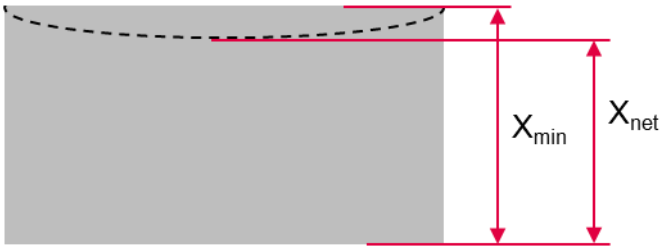


Figure 11: Object with inward bulge

If, as shown in Figure 12, the smallest enclosing perimeter (blue) is much smaller than the object perimeter (red), a deformation cannot be distinguished from the rest of the object structure.
In this case, after the measurement, the system outputs the status NOK and the length, width and height of the smallest enveloping box (including all projections of the object).

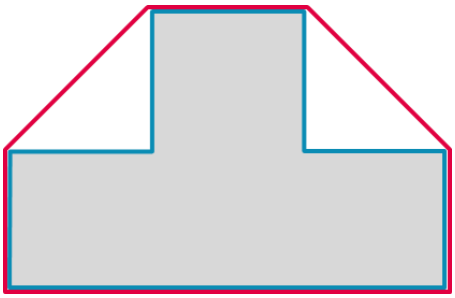


Figure 12: Object sample which smallest enclosing perimeter is much smaller than the object perimeter

4.4 Minimum distance between two objects

Formula for calculating the minimum distance D_{min} between two objects:
D_{min} = 12 x [Fix resolution of CML 730: 5mm] + [Cycle time: 50ms] x [Conveying speed v in m/s]

Sample calculation with conveying speed v = 0.8 m/s
D_{min} = 12 x 5mm + 50ms x·0.8 m/s = 100mm

4.5 Maximum conveying speed

NOTICE
Be sure to observe the maximum conveying speed! ↳ If the maximum conveying speed is exceeded, the system may not provide reliable measurement results.

The maximum conveying speed depends on the added measuring length of width and height light curtain. To determine the maximum conveying speed:

1) Read the measuring lengths on the type plates of the height and width light curtains.
2) Add both values and
3) Read off the conveyor speed in the following diagram for the appropriate sum.

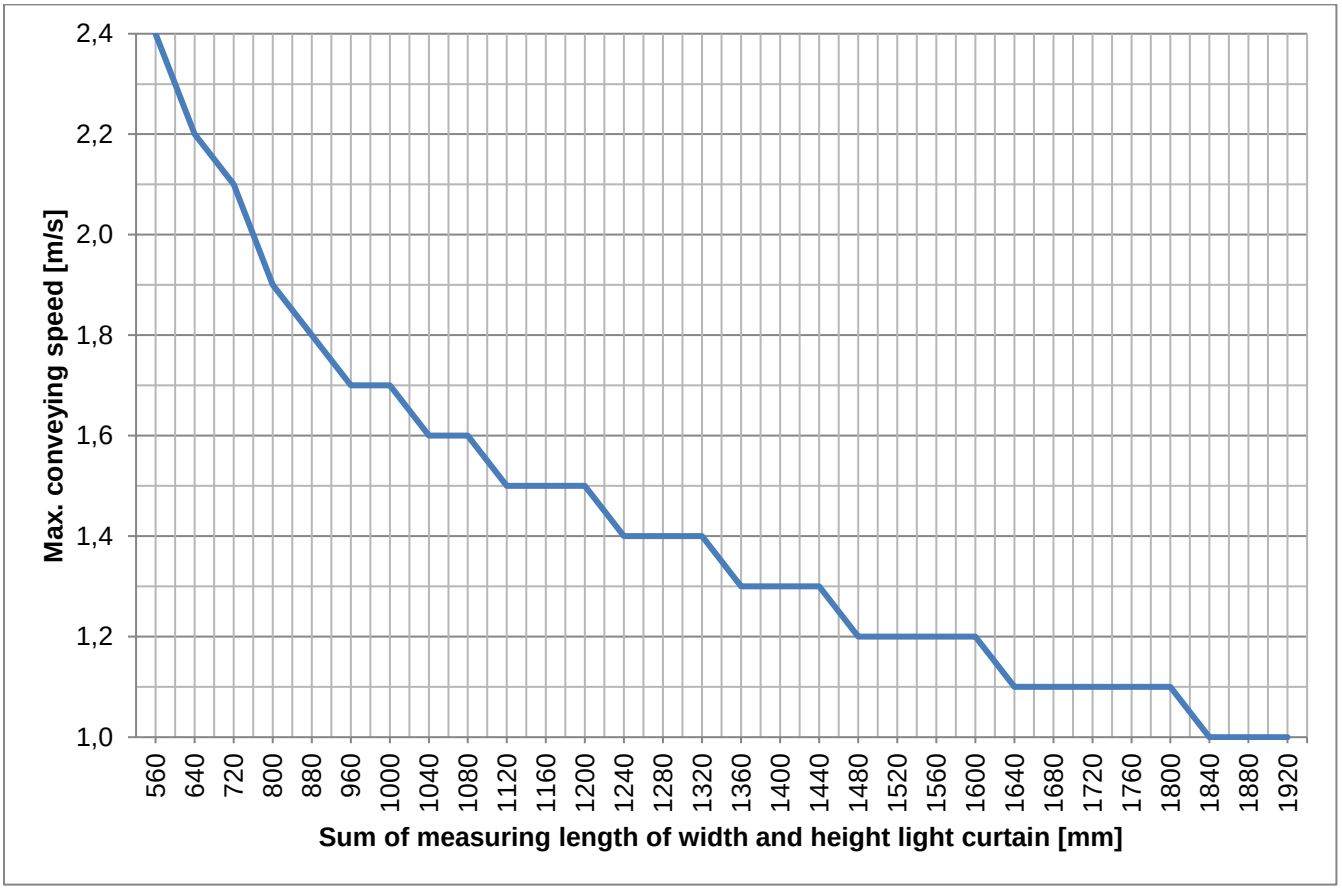
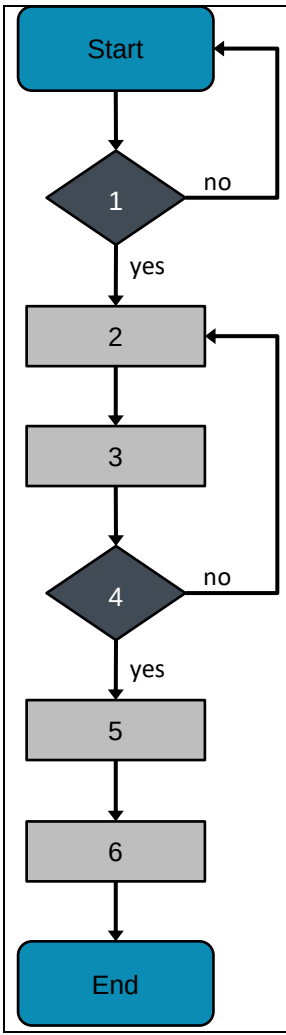


Figure 13: Maximum conveying speed

4.6 Sample of a measurement with 3 light curtains



Steps:

1. Light curtain **Length measurement**: 1st beam interrupted?
2. Measurement starts!
3. Detection of object height and width, triggered by length light curtain
4. Light curtain **Width measurement**: No interrupted beam?
5. Measurement stops!
6. Output of object dimensions, position angle, smallest distance to conveyor edge according to system configuration

5 Mounting and installation

5.1 General information

The exact alignment of the light curtain pairs to each other directly influences the quality of the measurement results. The system should be mounted on a largely vibration-free frame. Strong vibrations can falsify the measurement result. The figures are valid across all interfaces for all connection types. The respective interface chapters provide specific connection diagrams.

5.2 System with 3 light curtains

NOTICE
The following installation instructions must be observed!
↳ The light curtains for height and width must be on the same level.
↳ The first beam of the length light curtain must be in front of the plane of height and width.
↳ The light curtains for length, width and height must be at right angles to each other.
↳ The length light curtain must be oriented parallel to the conveying direction.

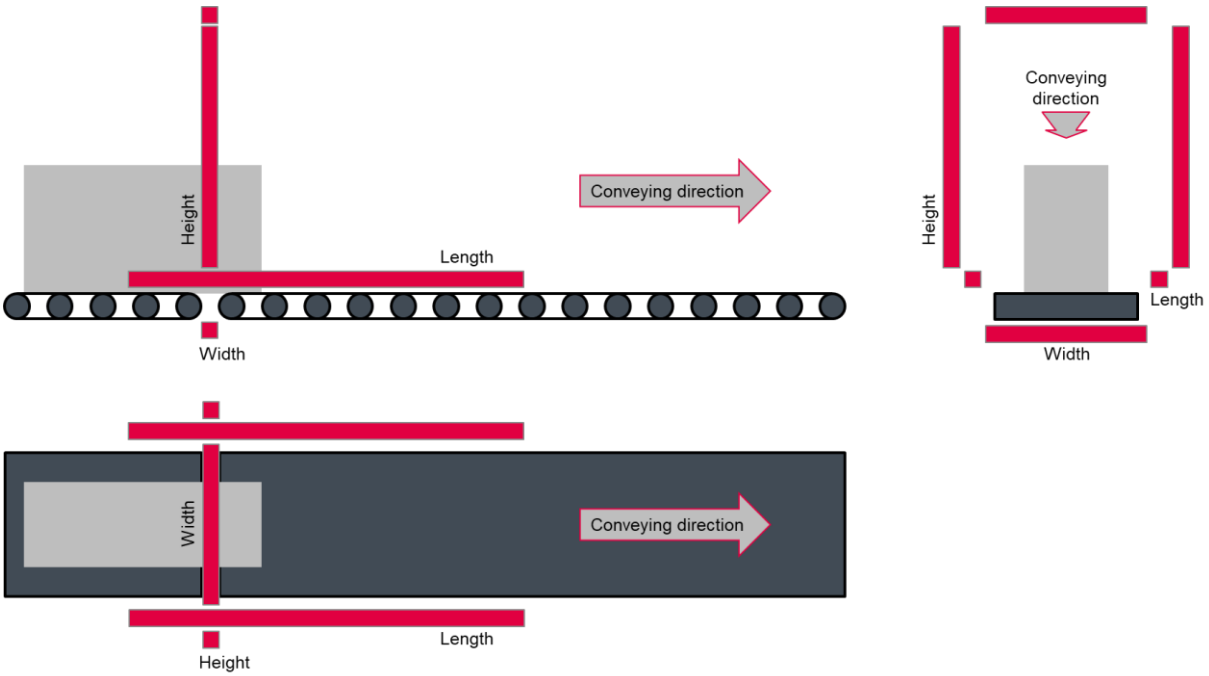


Figure 14: Schematic system structure with 3 light curtains; grey box is measuring object, grey circles are conveyor rolls

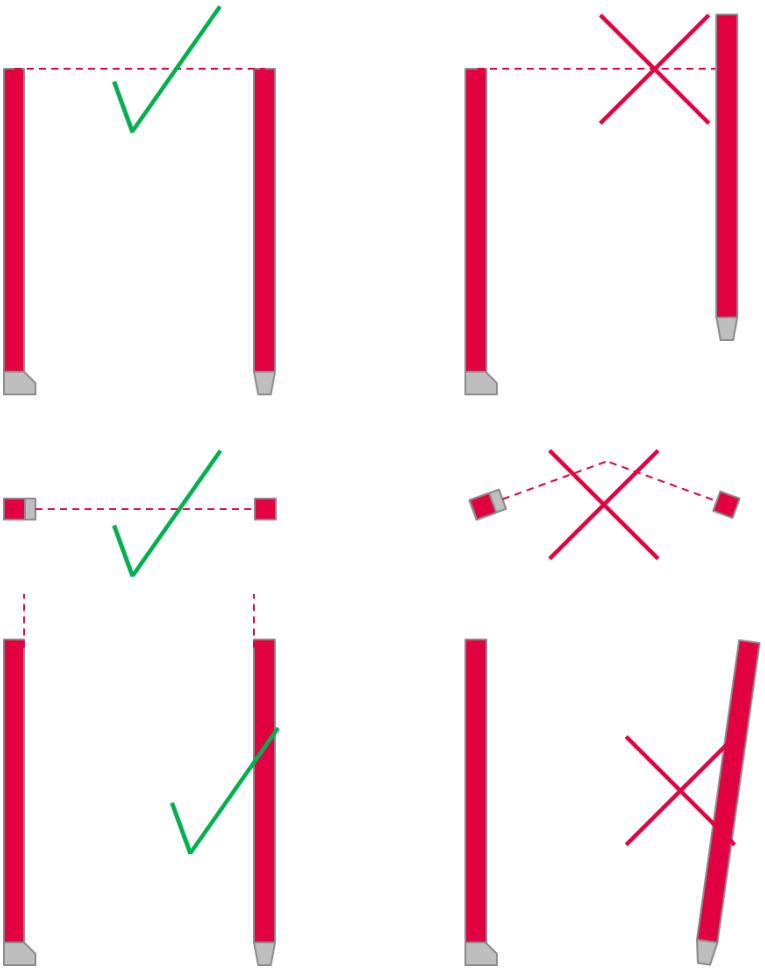
5.2.1 Mounting light curtain

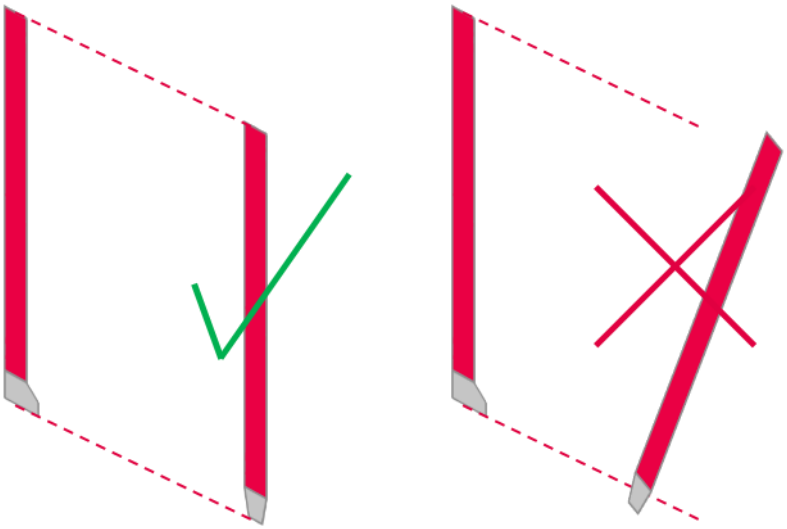
NOTICE
No reflective surfaces, no mutual interference! ↳ Avoid reflective surfaces near the light curtains. Objects may otherwise not be precisely detected due to halation. ↳ Ensure sufficient distance, suitable positioning or partitioning. Optical sensors (e.g. other light curtains, photoelectric sensors, etc.) must not interfere with one another. ↳ Avoid interference from outside light (e.g. from flash lamps, direct sunlight) on the receiver.

NOTICE
Must be observed! ↳ For horizontally mounted measuring light curtains with lengths of more than 2000 mm, use an additional mounting bracket in the middle of the light curtain. ↳ The optical surfaces of transmitter and receiver must be parallel to and opposite one another. ↳ The transmitter and receiver connections must point in the same direction. ↳ Secure transmitter and receiver against turning or sliding. ↳ Have suitable tools ready and mount the light curtain observing the instructions for the mounting locations. ↳ Mount the transmitter and receiver at the same height or with the same housing reference edge, without distortion and flat.

Mount the transmitter and receiver using one of the following mounting methods.

1. Fastening via sliding blocks (See 5.2.3).
2. Fastening via clamp holder (See 5.2.4)
3. Note the exact alignment of transmitter and receiver according to the figures below.

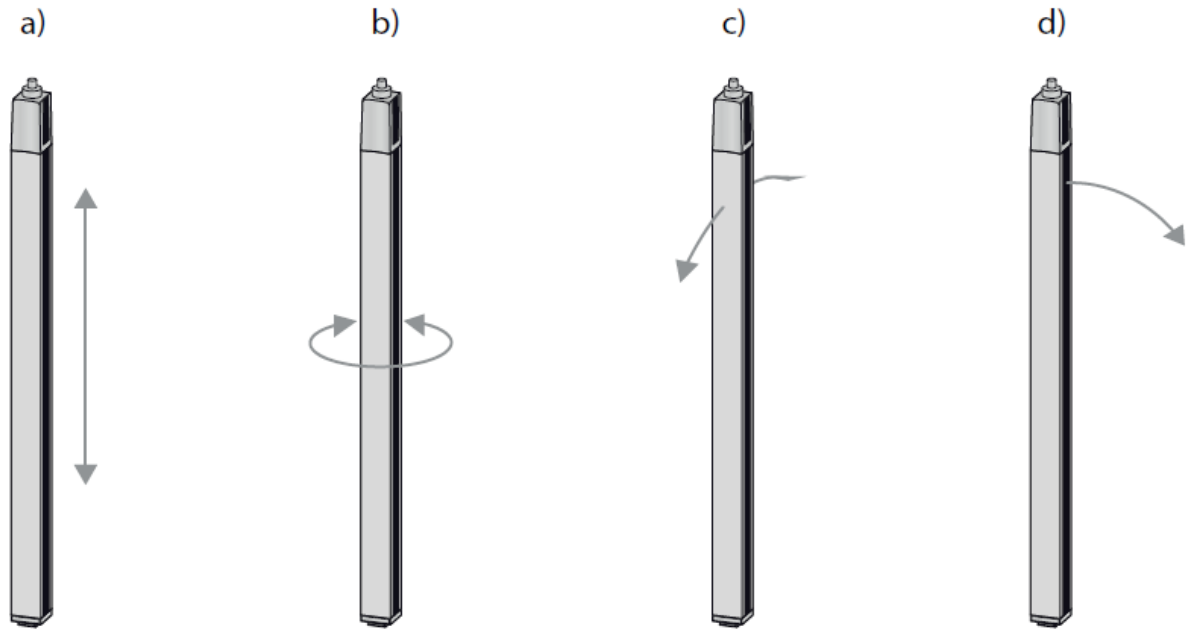




After installation, you can connect the light curtain electrically (see chapter 6) and put it into operation (see chapter 7).

5.2.2 Definition of directions of movement

The following terms for alignment movements of the light curtain around one of its individual beams are used.



a Sliding: movement along the longitudinal axis
b Turning: movement around the longitudinal axis
c Tilting: lateral turning movement diagonal to the lens cover
d Pitching: lateral turning movement in the direction of the lens cover

Figure 15: Directions of movement during alignment of the light curtain

5.2.3 Fastening via sliding blocks

By default, transmitter and receiver are delivered with two sliding blocks (three sliding blocks for measurement field lengths of more than 2000 mm) each in the side groove.

- Fasten transmitter and receiver to the machine or system via the lateral T-groove with M6 screws.
- Sliding in the direction of the groove is possible, but turning, tilting and pitching is not.

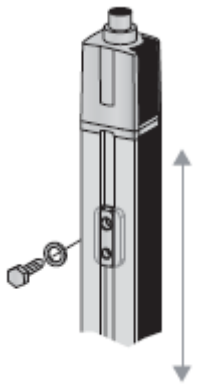
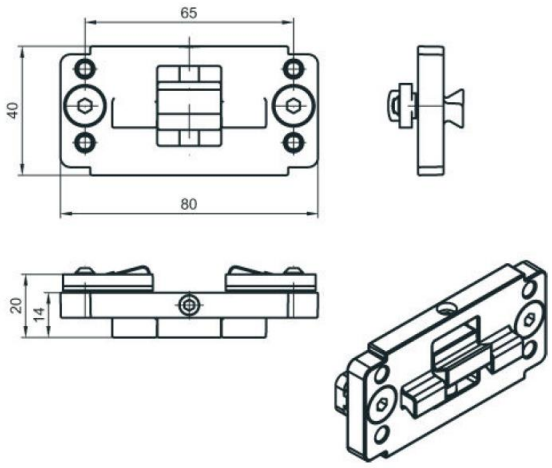


Figure 16: Mounting via sliding blocks

5.2.4 Fastening via clamp brackets

Mounting with the BT-2P40 clamp bracket allows the device to be replaced quickly. A new alignment can be omitted. The light curtain can be moved in the direction of the groove. Turning, tilting and pitching are not possible.

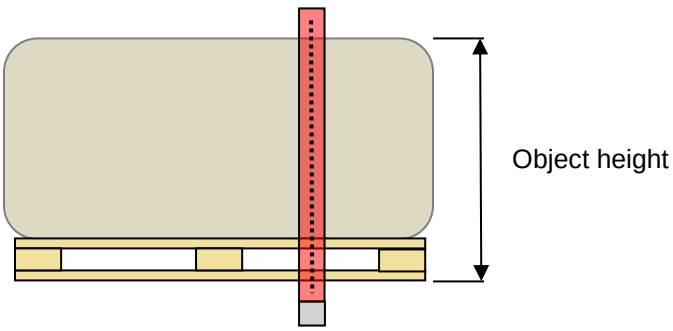


5.2.5 Positioning height measurement

Transmitter and receiver should be aligned parallel to each other. The plane of the height and width light curtains should be perpendicular to the transport direction of the measurement objects. A deviation significantly reduces the power reserve!

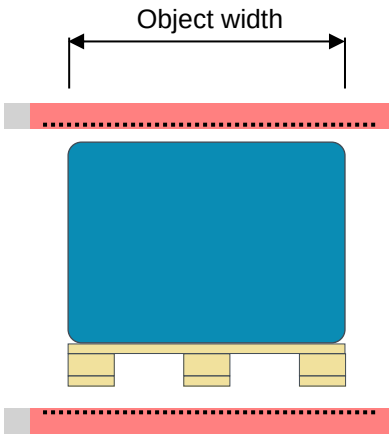
NOTICE
Must be observed! ↳ The maximum object height must not project beyond the top light beam of the HIGH light curtain!

If the lowest light beam of the HEIGHT light curtain is above the lower edge of the measurement object, the correct offset of the HEIGHT light curtain must be measured in the measurement scene and entered in WebConfig, see chapter 7.4.1.



5.2.6 Positioning width measurement

NOTICE
Must be observed! ↳ For the highest performance reserve even with very small gaps between the rollers of the conveyor, the transmitter must be mounted exactly in the middle between two rollers and parallel to it! ↳ The full width of the conveyor must be covered by the measuring length of the width light curtain! ↳ Set up the smallest gap between the rollers of the conveyor at ≥10 mm so that the width light curtain can shine through.



5.2.7 Positioning length measurement

NOTICE
Must be observed! ↳ Transmitter and receiver must be aligned in one focus line! ↳ The plane spanned by the light beams of the light curtain must be parallel to the conveying direction! ↳ The plane spanned by the light beams of the light curtain must be aligned parallel to the plane of the conveyor! ↳ Tilting between transmitter and receiver must be avoided!

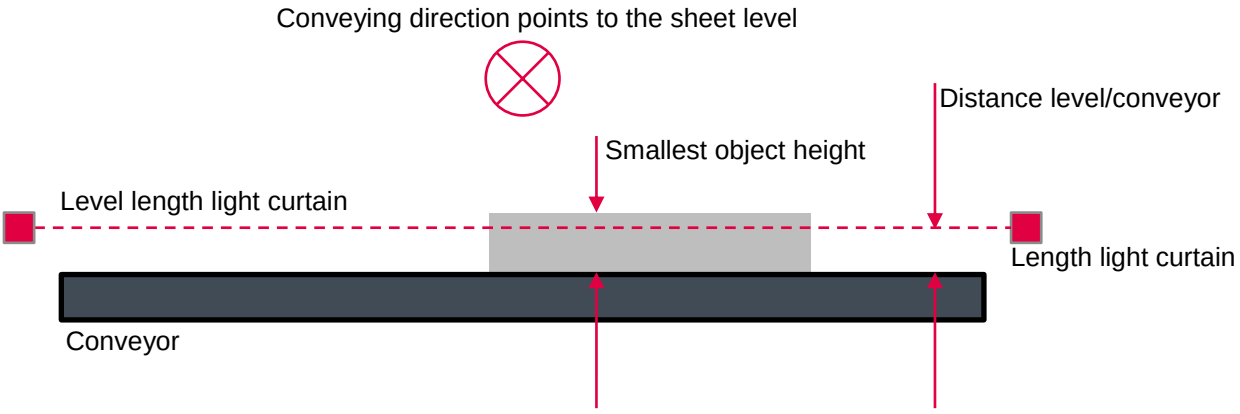


Figure 17: View of the min. object height on the length light curtain. The conveying direction points to the sheet level.

5.3 System with 2 light curtain and rotary encoder

NOTICE
Important for correct installation! ↳ The light curtain for height measurement and the light curtain for width measurement must be installed in one plane! ↳ There must be no interfering contours between the transmitter and receiver, except in the peripheral areas! ↳ The encoder must be installed in such a way that no slippage can occur between the conveyor belt and the friction wheel of the encoder! ↳ The clamping device on the friction wheel must be set so that the friction wheel can be easily moved with the conveyor belt!

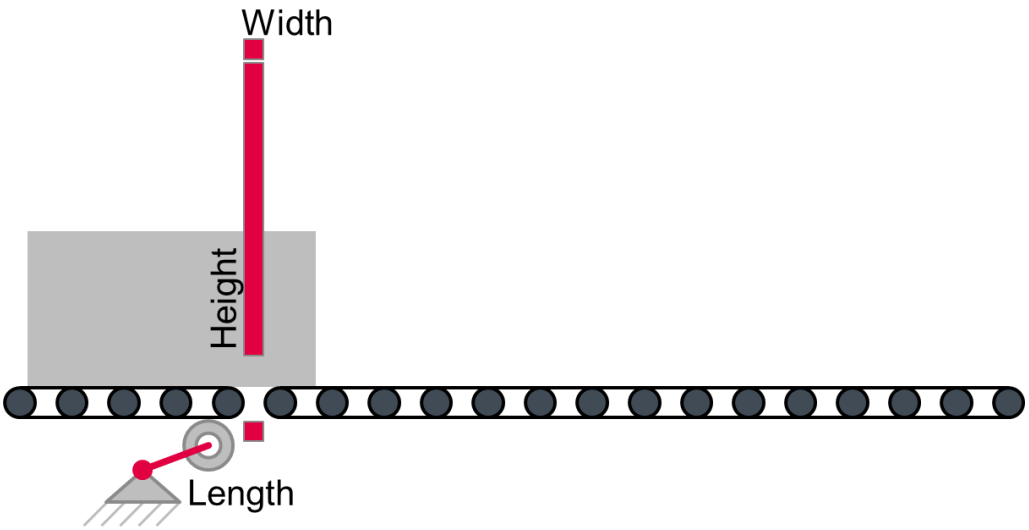


Figure 18: Schematic system setup with 2 light curtains and 1 encoder for length measurement

The installation of the light curtains for width and height measurement is carried out analogously to chapter 5.2.1.

Encoder installation
For a process-safe application, it is recommended to mount the friction wheel of the encoder from below and slip-free opposite the conveyor belt.

The assembly instructions are enclosed with the encoder as a leaflet.

To replace the measuring wheel, consult the encoder mounting instructions.

For the electrical connection of the encoder, see chapter 6.4.

5.4 Installation peripheral devices

Peripherals such as

- Barcode reader
- Cameras
- Trigger photoelectric sensor for CMS 700i (can be used optionally, not included in scope of delivery)

can be installed along the conveyor line. Peripheral devices that are to be read by the CMS 700i should be mounted close to the height and width light curtain frame in order to keep the distance between 2 measuring objects small.

5.5 Accessory mounting frame BT 7xxM-MRSET

Various mounting frame sizes are available for the CMS 700i. They offer plenty of space for mounting additional peripheral devices such as:

- Barcode reader,
- Cameras,
- Trigger photoelectric sensor for the CMS 700i (can be used optionally, not included).

In particular, the combination of the CMS 700i with a scale provided by the customer is intended. The following versions are available.

Article no.	Article description	Important features
50142039	BT 712M-MRSET	Frame height: 2000mm, inner frame width: 1200mm
50143669	BT 710M-MRSET	Frame height: 2000mm, inner frame width: 1000mm
50143670	BT 708M-MRSET	Frame height: 2000mm, inner frame width: 800mm
50143671	BT 70EM-MRSET	Encoder kit for mounting frame

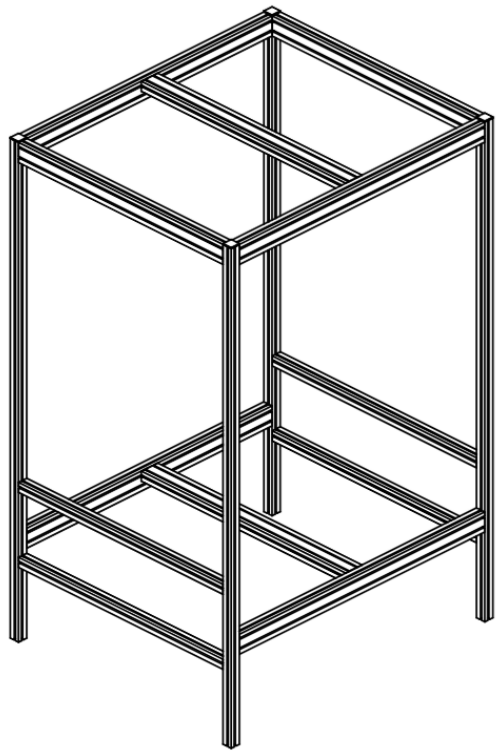
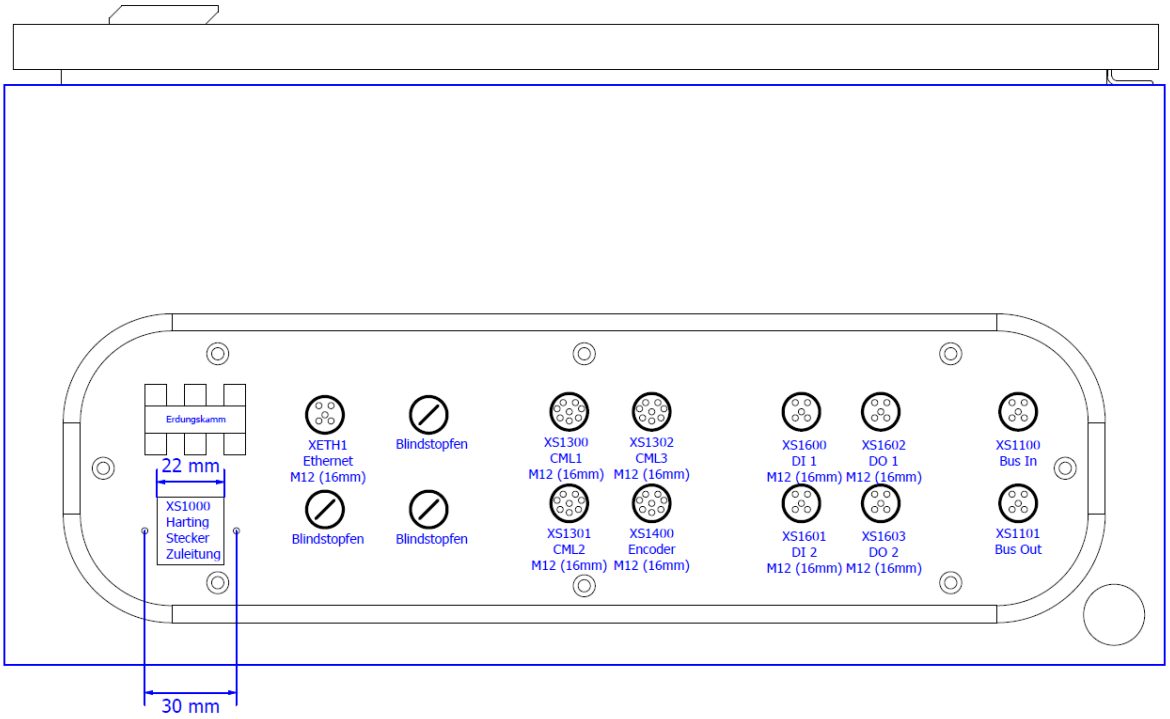


Figure 19: Similar image of the mounting frame BT 7xxM-MRSET

6 Electrical installation

6.1 Connection overview



Power Supply
Ground XS1000 – Voltage supply
Ethernet interface
XETH1 – External Ethernet TCP/IP connection
Connection light curtains and rotary encoder
XS1300* – Length light curtain XS1301 – Height light curtain XS1302 – Width light curtain XS1400* – Encoder connection
Switching input, switching output
XS1600 – Switching input with 2 switching pins, 24 VDC, GND
XS1601 – Switching input with 2 switching pins, 24 VDC, GND
XS1602 – Switching output with 2 switching pins, 24 VDC, GND
XS1603 – Switching output with 2 switching pins, 24 VDC, GND
Profinet interface
XS1100 – Bus In Profinet (CMS 748i only) XS1103 – Bus Out Profinet (CMS 748i only)

Figure 20: Connection overview bottom side of control cabinet (LSC-Box), *Encoder OR light curtain

6.2 Voltage supply XS1000

CAUTION

DANGER OF DEATH BY ELECTRIC SHOCK!

- Depending on the external wiring, dangerous currents can occur at the outputs!
- Ensure that the power supply connection is disconnected during all work and cannot be accidentally restored!
- Only qualified personnel may carry out the electrical installation!

6.2.1 Connection details

Supply voltage: 100-230 VAC
Frequency: 50-60 Hz
No-load current: 250 mA
Max. switch-on current: 4 A

6.2.2 Wiring Power supply

CAUTION

- Wiring with at least 3 x 1,5mm^2
- Wiring with maximum 3 x 2,5mm^2

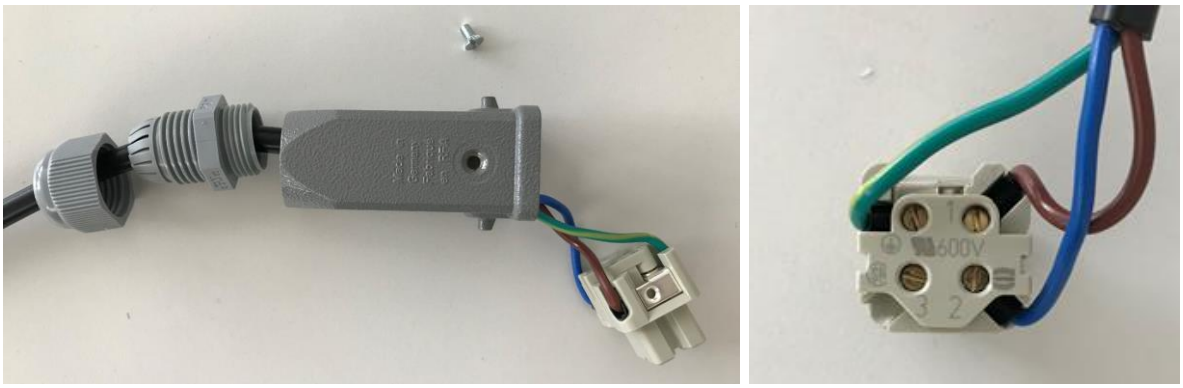


Figure 21: Overview – wiring of the enclosed power plug, protective earth conductor to ground, neutral conductor blue to 2, phase brown to 1

The fully assembled mains plug must be connected to the XS1000 connection on the bottom of the LSC-Box control cabinet.

CAUTION

- Do not make any changes to PLC components in the control cabinet!
- Do not make any changes to the file system!
- PLC components must be registered in the application software! Leuze electronic is responsible for the correct interaction of the modules. In case of changes, please contact the Leuze Service Center!

6.3 Connection light curtains

For each light curtain, the transmitter unit must be connected to the respective receiver unit at connection X2 with the cable KB DN/CAN-5000 SBA (article no. 50114698).

Each light curtain receiver must be connected to connection X1 with the cable KDS S-M12-8A-M12-8A-P1-050 (article no. 50135146) at connection X1 according to its measured variable length, width or height on the bottom side of the control cabinet LSC-Box, see Figure 20.

6.4 Connection rotary encoder

If the system has a rotary encoder for length measurement, connect it as follows.

The cable KDS S-M12-8A-M12-8A-P1-050 (article no. 50135146) must be connected with the socket to the encoder, observe the anti-twist protection!

The cable KDS S-M12-8A-M12-8A-P1-050 (part no. 50135146) must be connected with the plug to the control cabinet LSC-Box XS1400, see Figure 20!

	 SC8 8-pin	Kabel, cable, Câble, Cable, cavo
Minus U-	1	WH
Plus U+	2	BN
A	3	GN
B	4	YE
N	5	GY
A inv.	6	PK
B inv.	7	BU
N inv.	8	RD
Schirm Shield Ecran Pantalla Schermo	-	Litze Flex, Toron, Cordón, Cavetto

Figure 22: Pin configuration rotary encoder

6.5 Connection Ethernet TCP/IP (Version CMS 708i)

The LSC-Box must be connected to the higher-level system via output XETH1.

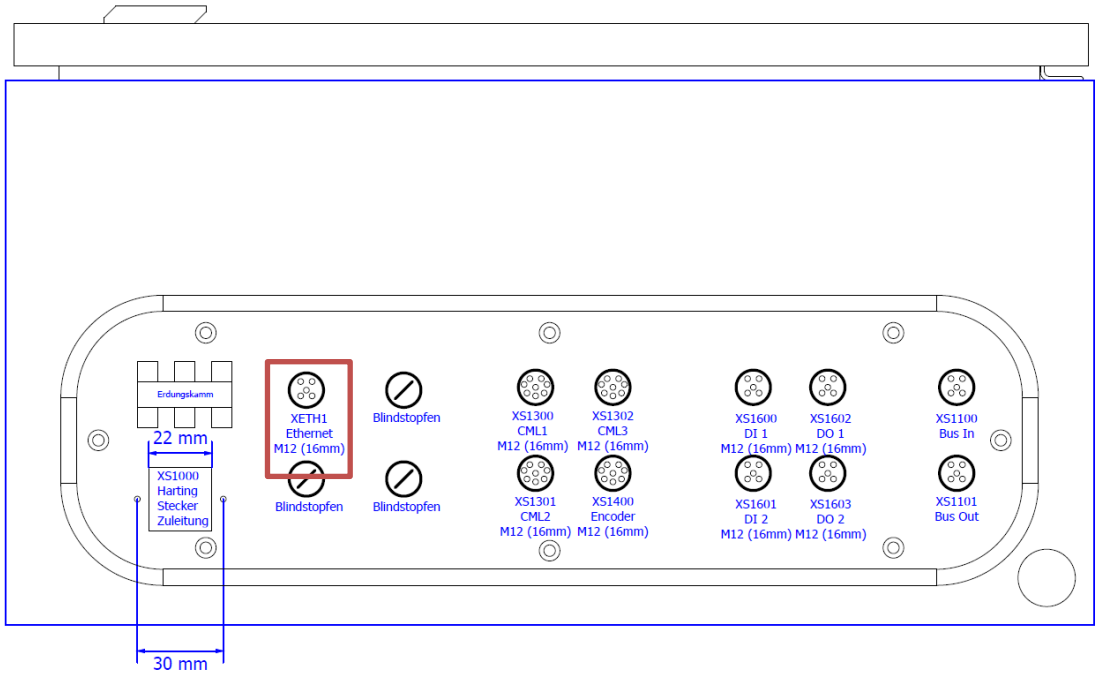


Figure 23: Socket XETH1 of the Ethernet TCP/IP interface

6.6 Connection Profinet (Version CMS 748i)

The Profinet connection of the LSC-Box is made via input XS1100 and output XS1101.

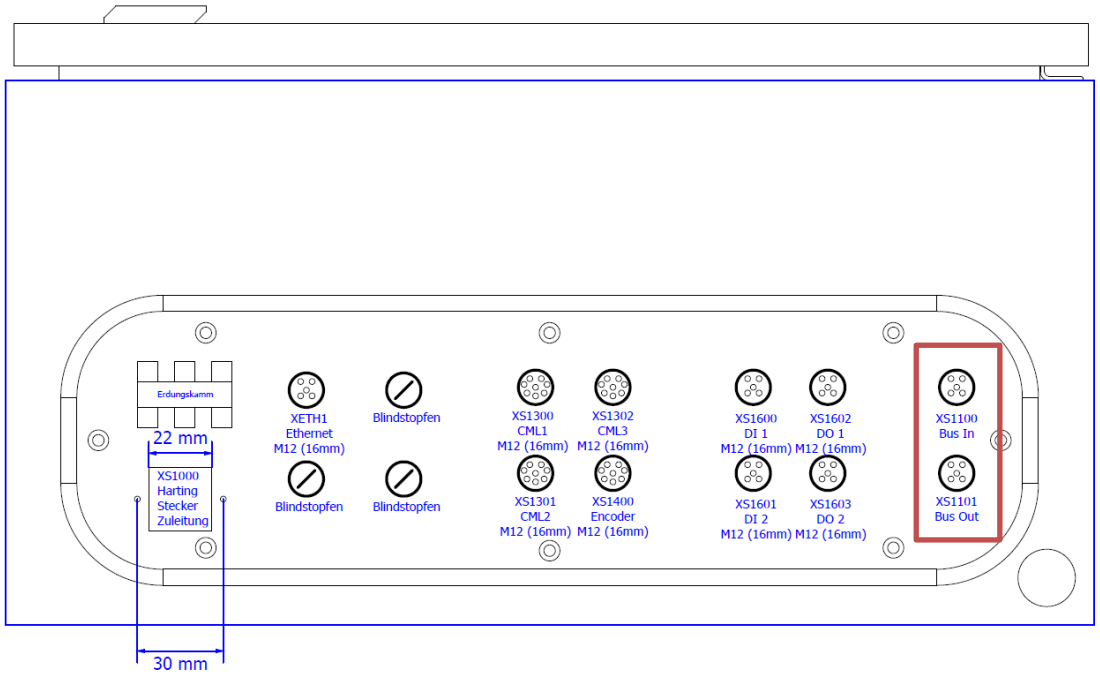


Figure 24: Profinet interface connection sockets

6.7 EMC compliant installation

6.7.1 Control cabinet LSC-Box

NOTICE
Shielding instructions control cabinet! ↳ The control cabinet LSC-Box must be earthed with a cable cross-section of ≥ 6 mm²! ↳ The functional earth must be guaranteed on all system components! ↳ A grounding element is installed on the control cabinet for this purpose.

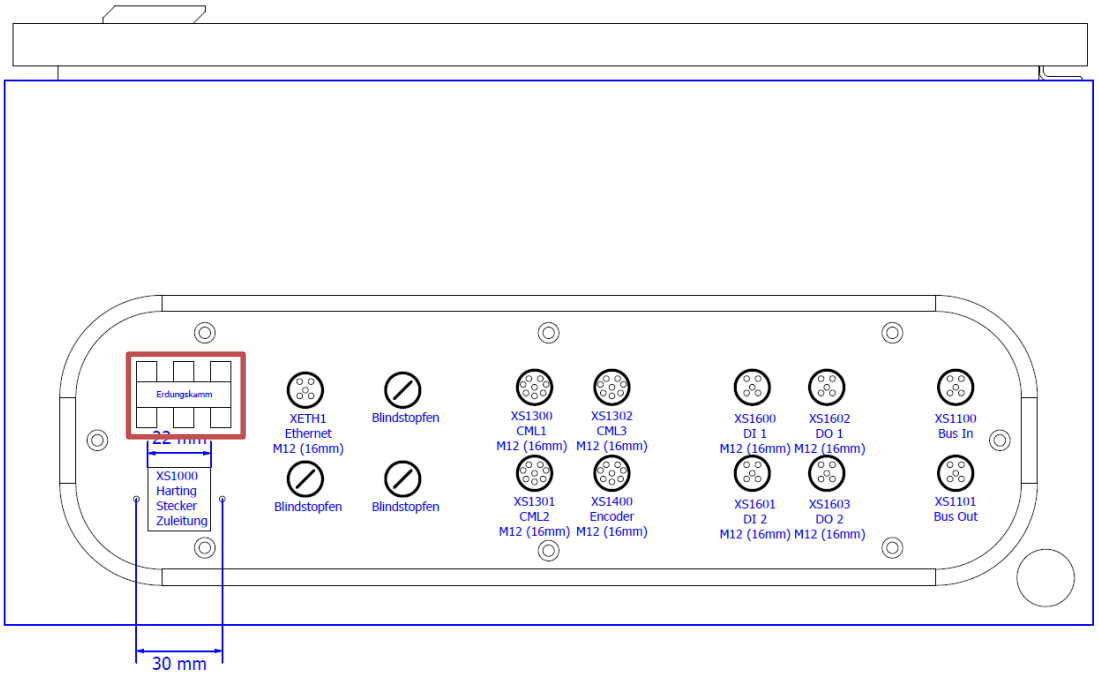


Figure 25: Grounding element on the bottom of the control cabinet LSC-Box

6.7.2 Shielding and line lengths

NOTICE
General shielding information! ↳ Avoid interference emissions when using power components (e.g. frequency inverters)! The necessary specifications under which the power component satisfies its CE Declaration of Conformity can be found in the technical descriptions of the power components. In practice, the following measures have proven effective: Properly ground the total system. Screw mains filter, frequency inverter, etc., flat to a galvanized mounting plate (thickness 3 mm) in the switch cabinet. Keep cable between mains filter and inverter as short as possible and twist cables. Shield both ends of the motor cable. ↳ Carefully ground all parts of the machine and of the switch cabinet using copper strips, ground rails or grounding cables with large cross section. ↳ Keep the length of the shield less end of the cable as short as possible. ↳ Guide the shielding untwisted to a terminal (No „RF braid“).

NOTICE
Separate power and control cables! ↳ Lay the cables for the power components (e.g. mains filter, frequency inverter, etc.) as far from the CMS 700i cables as possible (distance > 30 cm). ↳ Avoid laying power and CMS 700i cables parallel to one another.

↳ Cable crossings should be laid as perpendicular as possible.

NOTICE
Lay cables close to grounded metal surfaces! ↳ Lay the cables on grounded metal surfaces. This measure reduces interference coupling in the cables.

NOTICE
Avoid leakage currents in the cable shielding! ↳ Carefully ground all parts of the machine. Leakage currents arise from incorrectly implemented equipotential bonding. You can measure leakage currents with a clip-on ammeter.

NOTICE
Star-shaped cable connections! ↳ Ensure that the devices are connected in a star-shaped arrangement. You thereby avoid mutual influences from various loads. This prevents cable loops.

6.7.3 Grounding the light curtain housings

NOTICE
Must be observed! ↳ Connect the transmitter housing **and** receiver housing of the light curtain to the protective conductor on the FE machine star point via the PE screw on the grounding slot nut (see Figure 26). The cable should have an impedance as low as possible for high-frequency signals, i.e., be as short as possible and have a large cross-sectional area (grounding strip, …). ↳ FE = Functional earth oft he device. ↳ The earthing cable should be as short as possible and have a cross-section of ≥ 6 mm^2. ↳ Check that the grub screw, which fixes the grounding block to the housing, is tight. This screw is correctly tightened when delivered from the factory. ↳ Place a toothed washer under the copper screw and check the penetration of the anodized layer on the device housing.

Figure 26: Connecting the earth potential to the light curtain housing

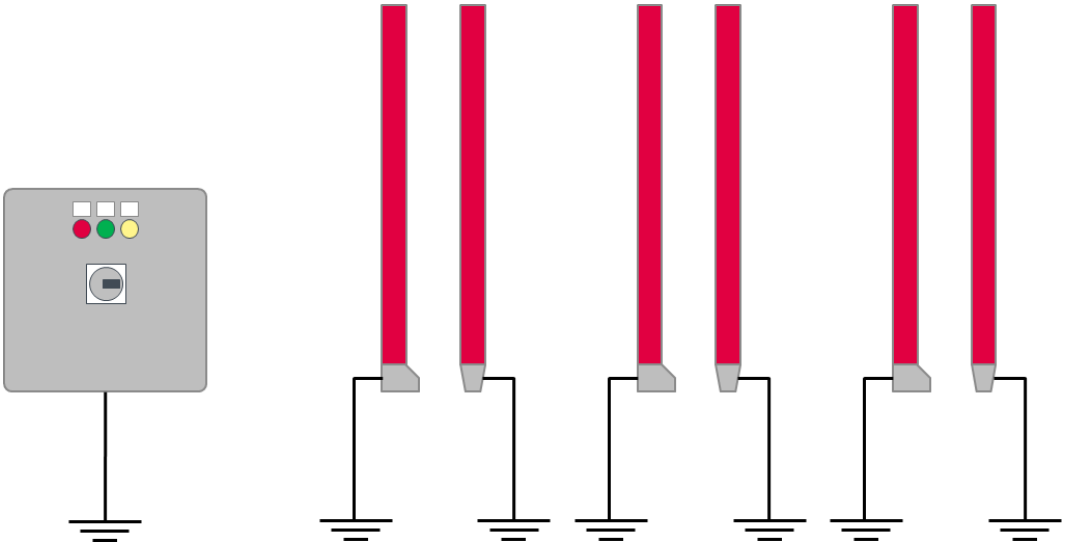


Figure 27: Grounding plan of the CMS 700i with 3 light curtains

7 Commissioning

7.1 USB stick / Software dongle

Before initial commissioning, open the control cabinet with the supplied key and plug the supplied USB stick / software dongle into the USB socket.

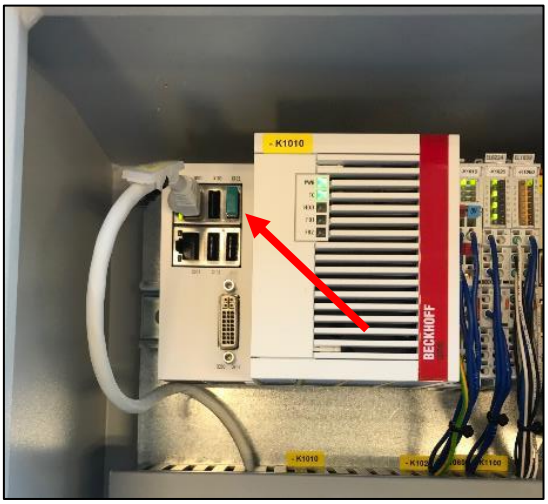


Figure 28: USB socket in control cabinet for software dongle

If the control cabinet has to be replaced, the USB dongle must be removed from the old control cabinet and plugged into the new one. The system will not work without the USB dongle.

7.2 Setting up the system coordinate origin

In order for the system to output measured values, overhangs and bulges correctly, the system coordinate origin must be set up.

7.2.1 Setup with 3 light curtains

In Figure 29, mark the respective positions of the **connection sides** of the light curtains.

NOTICE
Observe the specifications of the conveying direction!

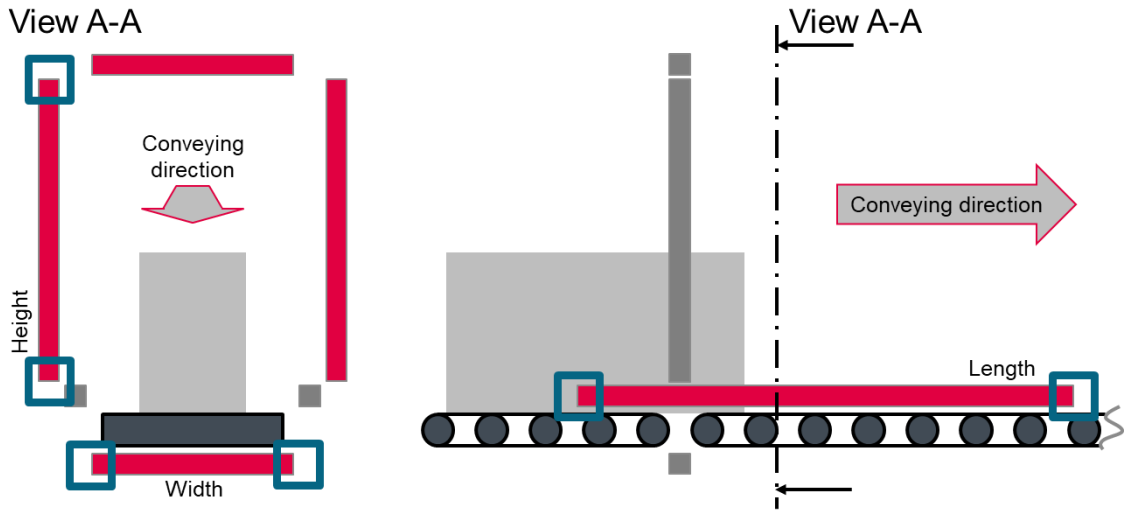


Figure 29: Determination of the coordinate origin for 3 light curtains. The conveying direction in the left picture comes out of the sheet.

NOTICE
Evaluation of Figure 29! ↳ Select your installation scenario from the table below. ↳ Mark your installation scenario in color in the table below! ↳ Depending on the existing installation situation, the counting direction of one or more light curtains may have to be inverted.

The word light curtain is abbreviated with CML.
Please make the settings in WebConfig according to chapter 8.2.1.1.

Install. scenario	Width CML	Height CML	Length CML	Settings WebConfig
1	Left	Below	Left	-
2	Left	Below	Right	Length: Reverse counting direction
3	Left	On top	Left	Height: Reverse counting direction
4	Left	On top	Right	Length and Height: Reverse counting direction
5	Right	Below	Left	Width: Reverse counting direction
6	Right	Below	Right	Length, width: Reverse counting direction

7	Right	On top	Left	Width, height: Reverse counting direction
8	Right	On top	Right	Length, width, height: Reverse counting direction

7.2.2 Setup with 2 light curtains and 1 rotary encoder

NOTICE
Enter conveying direction first! ↳ Note that you must first enter the conveying direction of the measured objects.

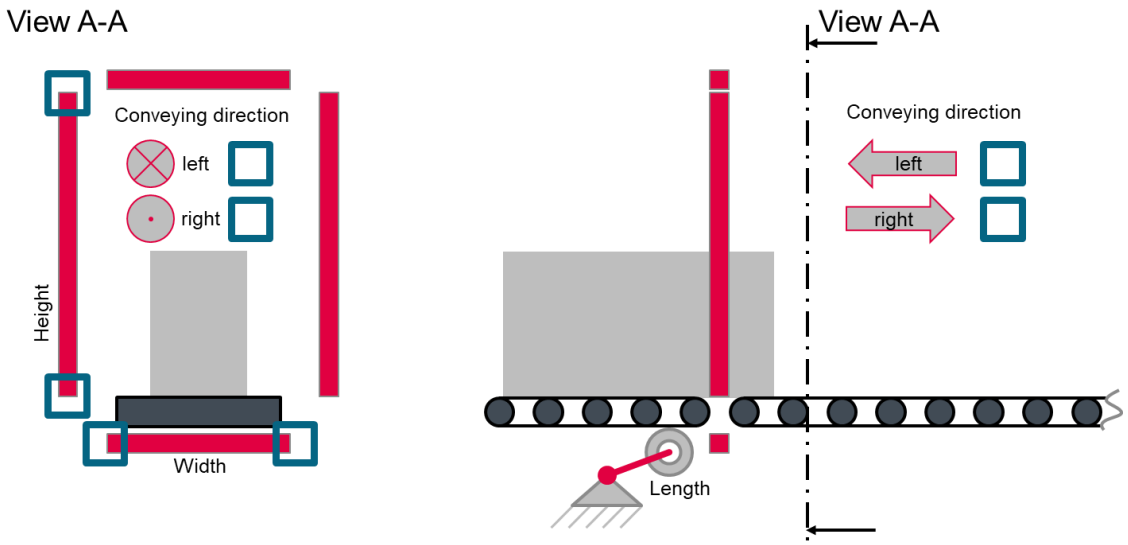


Figure 30: Determination of coordinate origin for 2 light curtains and 1 rotary encoder

NOTICE
Evaluation of Figure 30! ↳ Select your installation scenario from the table below!

The words light curtain are abbreviated as CML.

Depending on the existing installation situation, the counting direction of one or more light curtains may have to be inverted. Please make the settings in WebConfig according to chapter 8.2.1.1.

Install. scenario	Conveying direction	Width CML	Height CML	Settings WebConfig
1	Left	Left	On top	Height, Width Reverse counting direction
2	Left	Left	Below	Width Reverse counting direction
3	Left	Right	On top	Height Reverse counting direction
4	Left	Right	Below	-

5	Right	Left	On top	Height Reverse counting direction
6	Right	Left	Below	-
7	Right	Right	On top	Height, width Reverse counting direction
8	Right	Right	Below	Width Reverse counting direction

7.3 Setting up the light curtains

NOTICE
Observe correct installation and alignment! ↳ Make sure that the light curtains are correctly installed and aligned, see chapter 5.2.1ff. ↳ Make sure that the light curtains are correctly connected to each other and to the LSC-Box, see chapter 6.3.

NOTICE
Important for transparent objects! ↳ When measuring **transparent objects** (e.g. six-pack drinks), the "Sensitivity" parameter must be adjusted via WebConfig, see Chapter 8.2.1! ↳ The "sensitivity" of the CMS 700i is the reciprocal of the "functional reserve" of the CML 730i light curtains. ↳ A technical explanation can be found in the CML 730i manual, parameter "Function reserve" chapter 8.4, p. 70ff.

Switch on the LSC box so that the light curtains are energized.

NOTICE
Setting light curtains! ↳ Parameterize the light curtains on the receiver control panel, the changes take effect directly without a restart.

7.3.1 Setting up the height and width light curtain

The necessary configuration for the height and width light curtain is as follows:

- Process data length (PD Length): 32 Bytes
- Bit rate: COM3: 230,4
- Data storage: Deactivated

The configuration in the Receiver Panel menu is as follows:

Level 0	Level 1	Level 2	Description
Main			
Settings			
	Commands		

Operational settings				
IO-Link	Bit rate	**COM3: 230,4**	COM2: 38,4	
	PD Length	2 Bytes	8 Bytes	**32 Bytes**
	Data storage	**Deactivated**	Activated	

7.3.2 Setting up the length light curtain

The necessary configuration for the height and width light curtain is as follows:

- Process data length (PD Length): 8 Bytes
- Bit rate: COM3: 230,4
- Data storage: Deactivated

The configuration in the Receiver Panel menu is as follows:

Level 0	Level 1	Level 2	Description		
Main settings					
	Commands				
	Operational settings				
	IO-Link	Bit rate	**COM3: 230,4**	COM2: 38,4	
		PD Length	2 Bytes	**8 Bytes**	32 Bytes
		Data storage	**Deactivated**	Activated	

7.3.3 Setting up the rotary encoder

Make sure that the encoder is correctly installed and aligned, see the package insert of the encoder. The encoder does not require any special settings.

7.4 Determining the correct height and width offset

The offset refers to the mounting position of the light curtain. Depending on the distance to the conveyor belt, the offset can be different in each system.

7.4.1 Height offset

In principle, the 1st beam of the HEIGHT light curtain should be in alignment with the conveying medium, see Figure 31.

NOTICE

If the HEIGHT light curtain is mounted above the conveyor

↳ The mechanical offset between the conveyor level and the 1st beam of the HEIGHT light curtain must be measured in millimeters, see Figure 32.

↳ Note the value here.

↳ Enter the offset value in WebConfig, see chapter 8.2.1.2!

Another way to measure the height-offset value is

- To perform a reference measurement on an object of known height. To do this, the object must be moved through the system.
- The difference between the displayed and known height of the object must then be calculated.
- The offset must be entered as a numerical value in millimeters in WebConfig, see chapter 8.2.1.2!

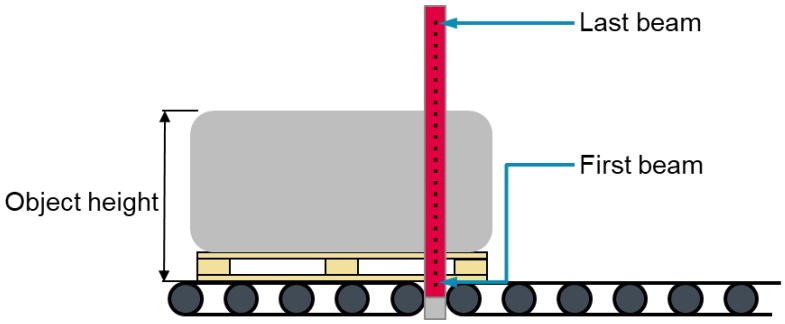


Figure 31: First beam of HEIGHT light curtain in plane with conveyor, Height offset = 0 mm

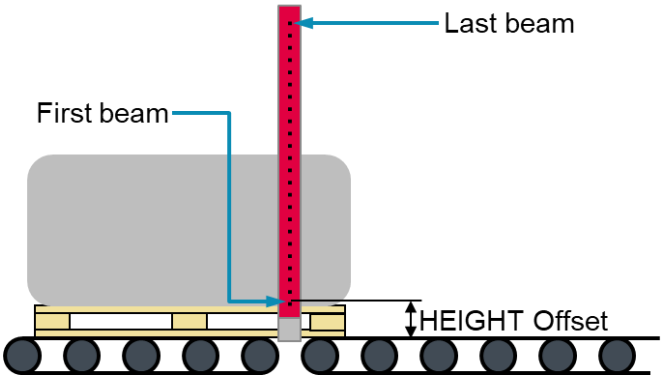


Figure 32: First beam of HEIGHT light curtain above the conveyor, Height offset = X mm

7.4.2 Width offset

The width offset is important if the smallest distance between the object and a conveyor edge is to be measured. The measuring resolution of the distance determines the beam distance of the light curtain and is 5mm.

NOTICE
Determining the width offset ↳ Make sure that the transmitter and receiver of the wide light curtain are correctly aligned, see chapter 5.2.6. ↳ Determine on which side of the width light curtain the first beam is located. ↳ Measure the shortest distance between beam 1 and the outer edge of the conveyor in millimeters, see Figure 33. Note the value here. ↳ Enter the offset value with a negative sign in WebConfig, see chapter 0.

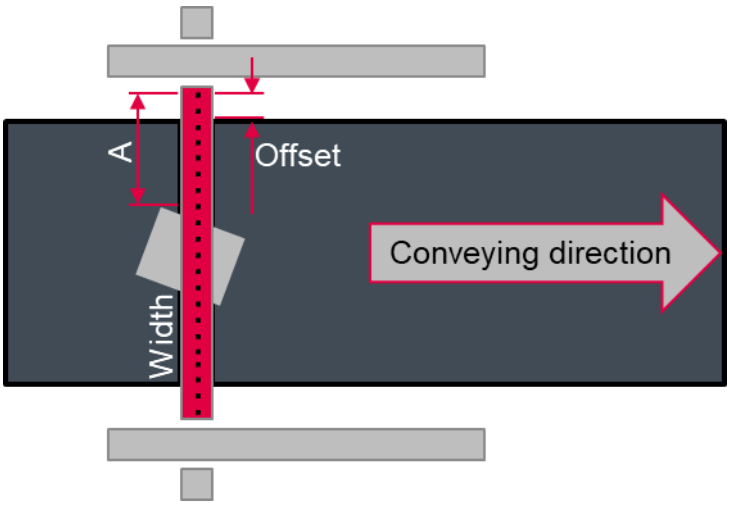


Figure 33: How to determine the width offset

8 System configuration via WebConfig

8.1 Setting IP address

Connect the PC and LSC box via the XETH1 connector see **Figure 23**. One of the following accessory cables can be used for this purpose, see chapter 13.5.

Set your network adapter to an IP address in the 192.168.60.XXX range. For example, you could use 192.168.60.100 for the computer.

The default **IP address of the LSC box is 192.168.60.101**.
In your web browser, type in the IP address of the LSC box. You will be taken directly to the WebConfig start page.
WebConfig is explained by the help texts displayed on the right.

8.2 Parameter setting

8.2.1 Light curtain setting

The following procedure is mandatory for each light curtain.

8.2.1.1 Setting for the System Coordinate Origin

NOTICE
Observe your mounting situation! ↳ First determine your mounting situation according to the chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**! The mounting situation specifies the setting of the light curtains.

Set the checkbox for **Reverse counting direction** for the length, width and height light curtain, if your determined scenario requires it.

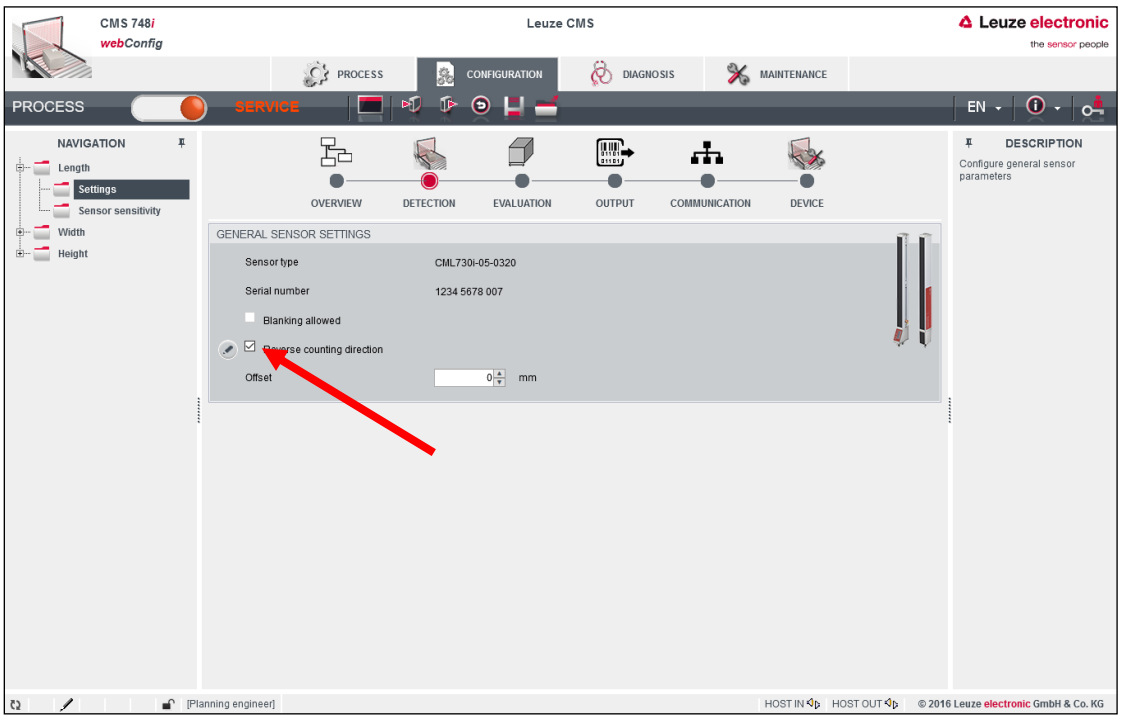


Figure 34: Checkbox Reverse counting direction of the light curtain

8.2.1.2 Setting the offset for valid height detection

NOTICE
This setting only affects the height light curtain!

In order for the CMS 700i to output the correct height of a measuring object, the mechanical distance between the conveyor plane and the first light beam of the height light curtain must be entered. The determination of the required distances in the measuring scene is described in chapter 7.4.1.

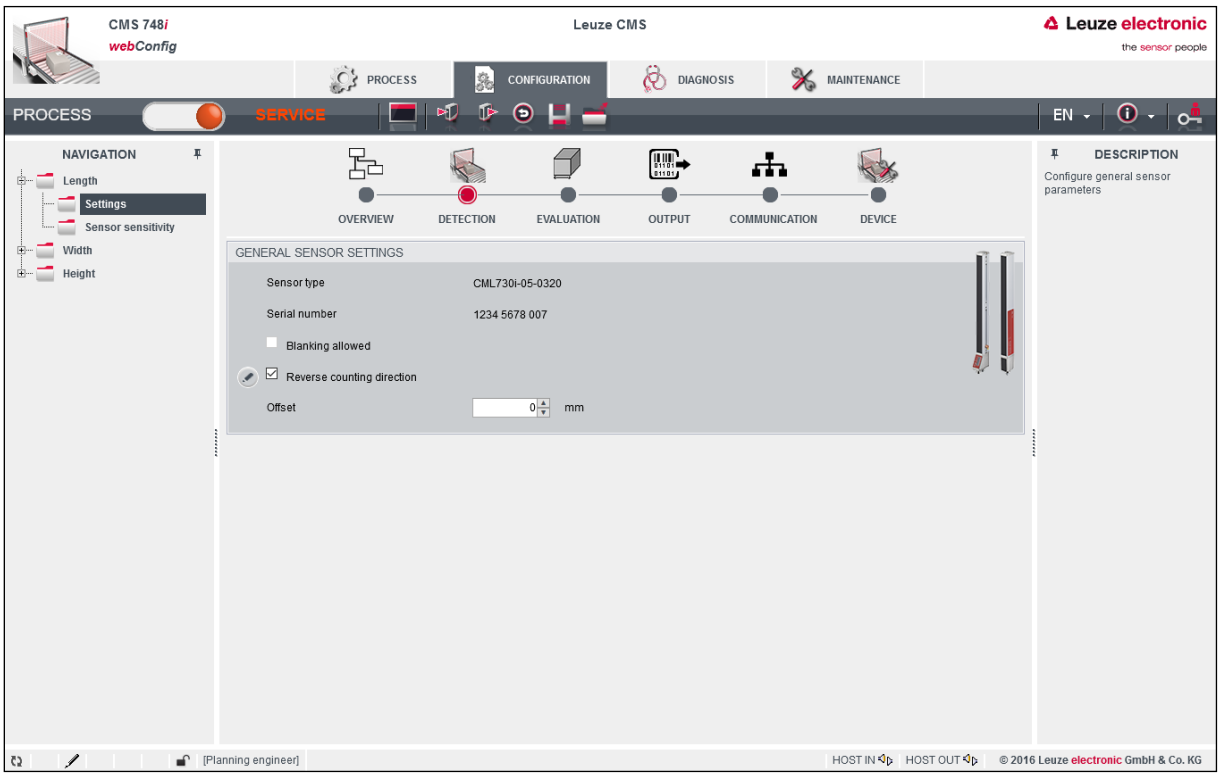


Figure 35: Input field for height offset

If the object height is less than the minimum detectable height of the light curtain,

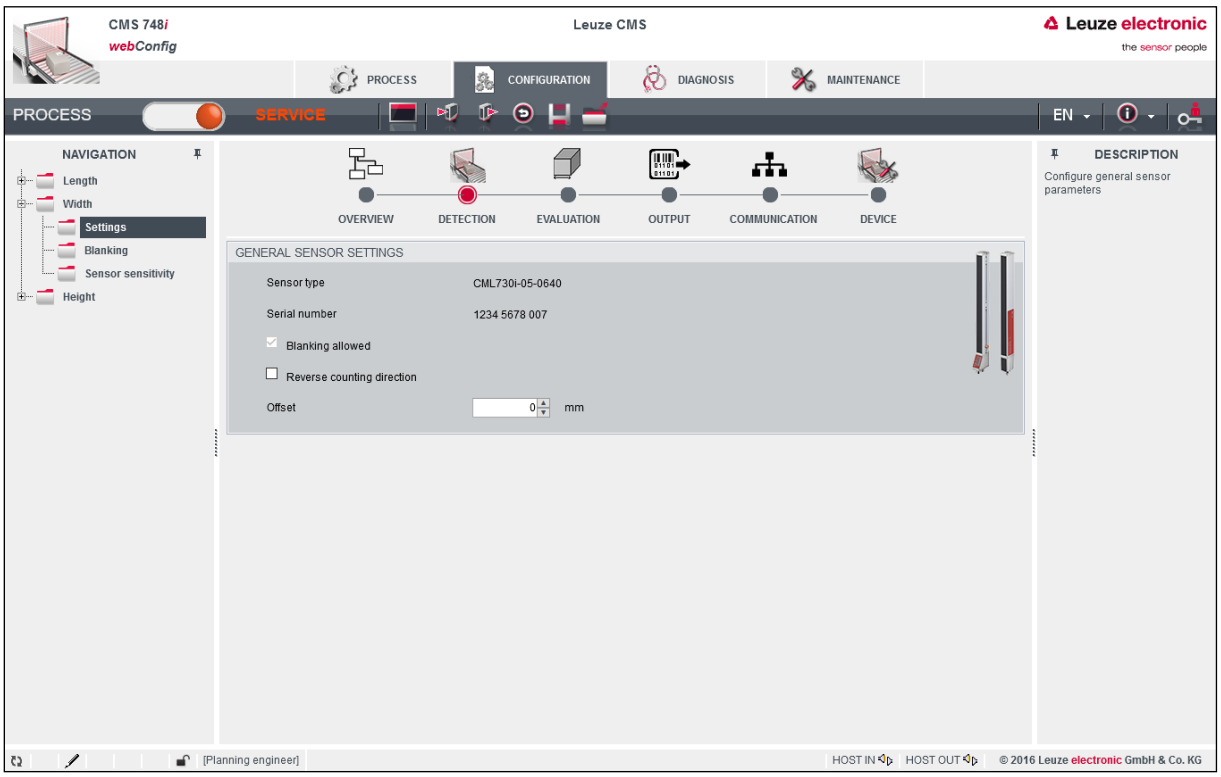
- A system with 2 light curtains and 1 encoder does not output a valid height value,
- A system with 3 light curtains does not output a value if no beams of the LENGTH light curtain are interrupted,
- A system with 3 light curtains does not output a valid height value.

8.2.1.3 Setting the offset for valid distance measurement

NOTICE
This setting only affects the width light curtain!

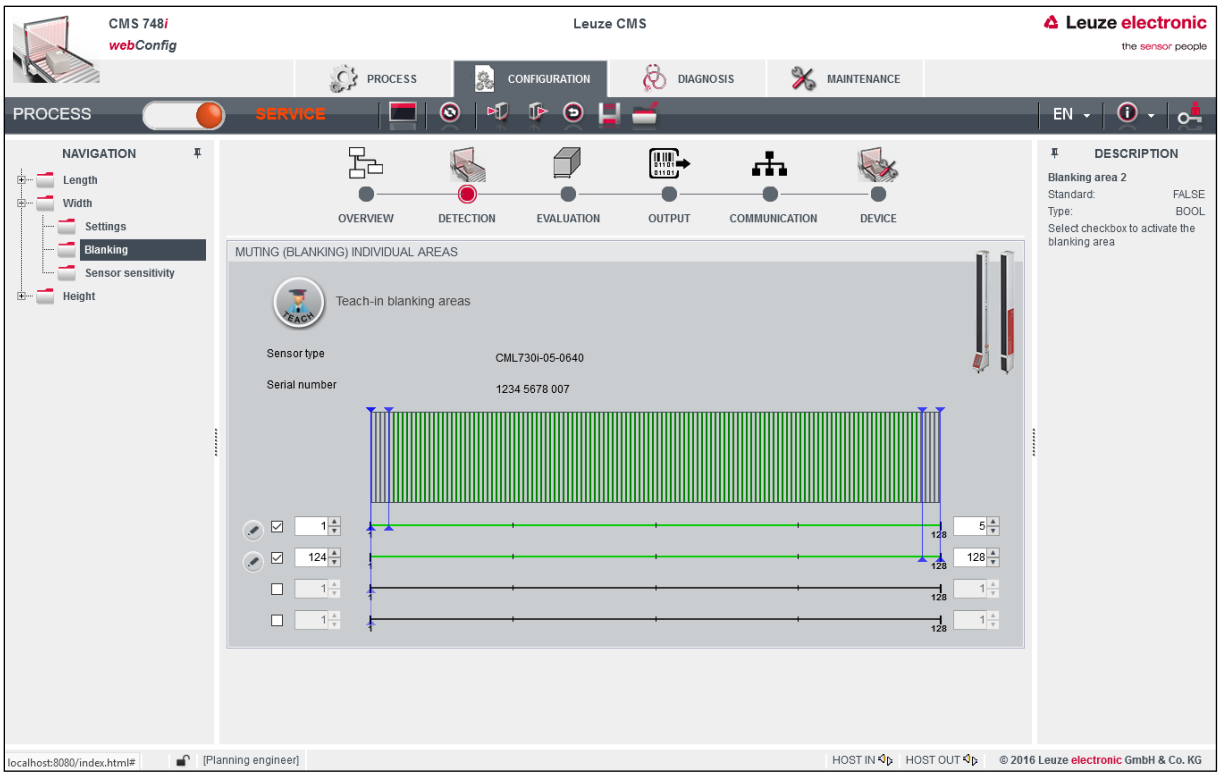
If the CMS 700i shall output the smallest distance between measuring object and conveyor edge, the mechanical distance between conveyor edge and first light beam of the width light curtain must be entered. The determination of the required distance in the measuring scene is described in chapter 7.4.2.
Enter the determined value in the field Offset in millimeters with a **negative sign**.

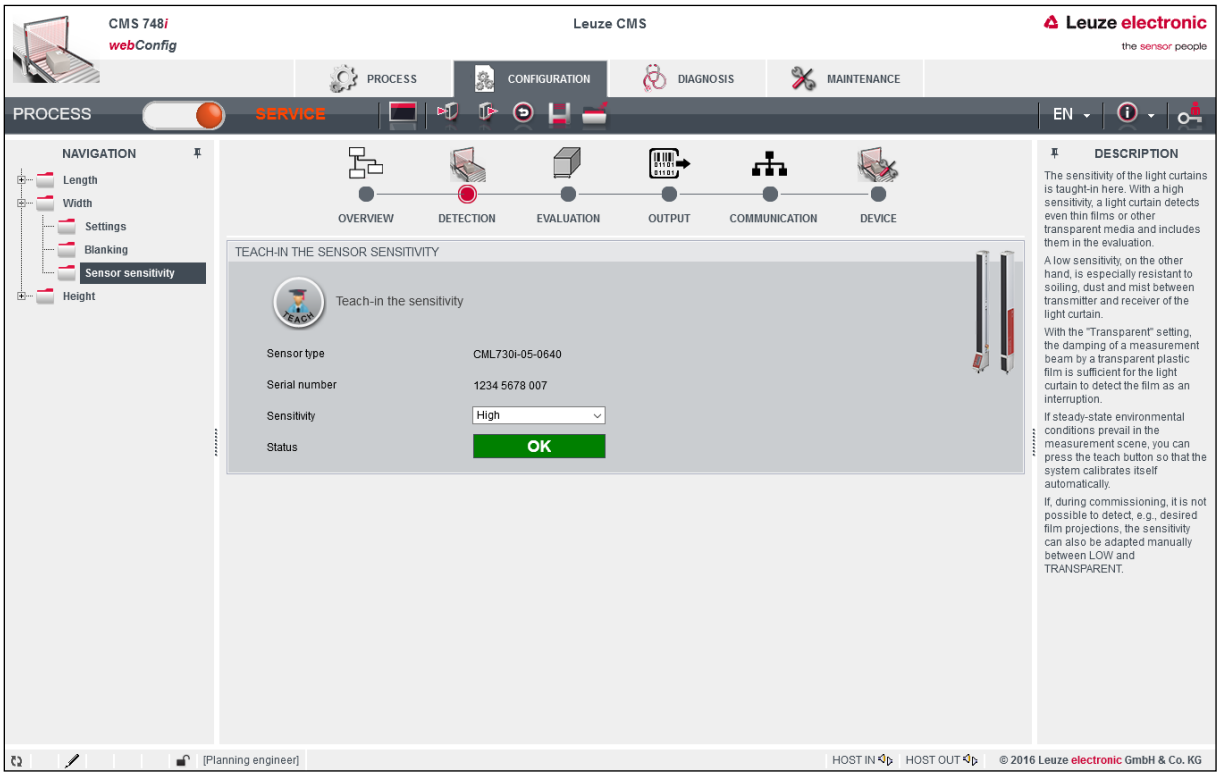
In order for the system to output the recorded distance, the parameter "Distance (outside)" must be dragged into the output string, see chapter 8.2.3



8.2.1.4 Setting and teach-in blanking

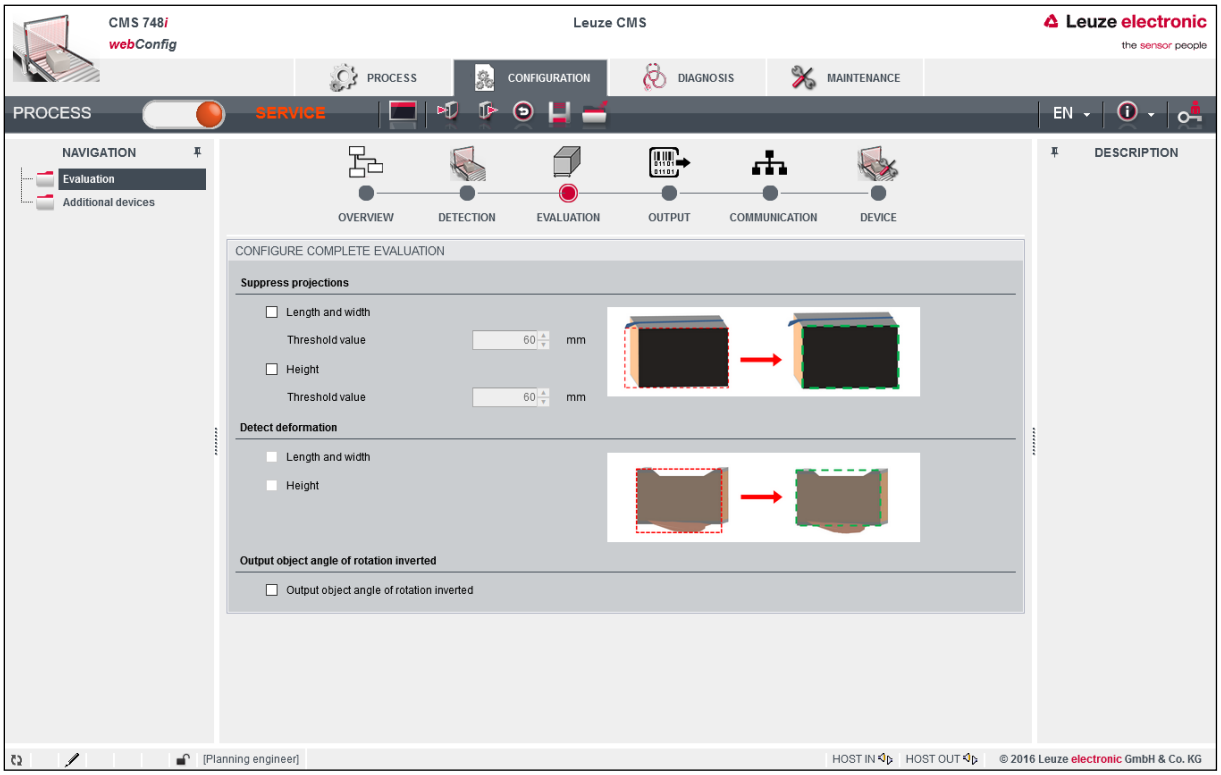
If obstacles permanently interrupt edge beams of the width or height light curtain, these areas can be blanked out.
Blanked areas must always contain the first or last beam of the light curtain.
A blanked area in the middle of the measuring range is not permissible and leads to false measurements.


CMS 748i
webConfig
Leuze CMS
Leuze electronic
the sensor people
PROCESS
CONFIGURATION
DIAGNOSIS
MAINTENANCE
PROCESS
SERVICE
EN
NAVIGATION
Length
Width
Settings
Blanking
Sensor sensitivity
Height
OVERVIEW
DETECTION
EVALUATION
OUTPUT
COMMUNICATION
DEVICE
MUTING (BLANKING) INDIVIDUAL AREAS
Teach-in blanking areas
Sensor type
CML730i-05-0640
Serial number
1234 5678 007
DESCRIPTION
Blanking area 2
Standard: FALSE
Type: BOOL
Select checkbox to activate the blanking area
localhost:8080/index.html#
[Planning engineer]
HOST IN
HOST OUT
© 2016 Leuze electronic GmbH & Co. KG

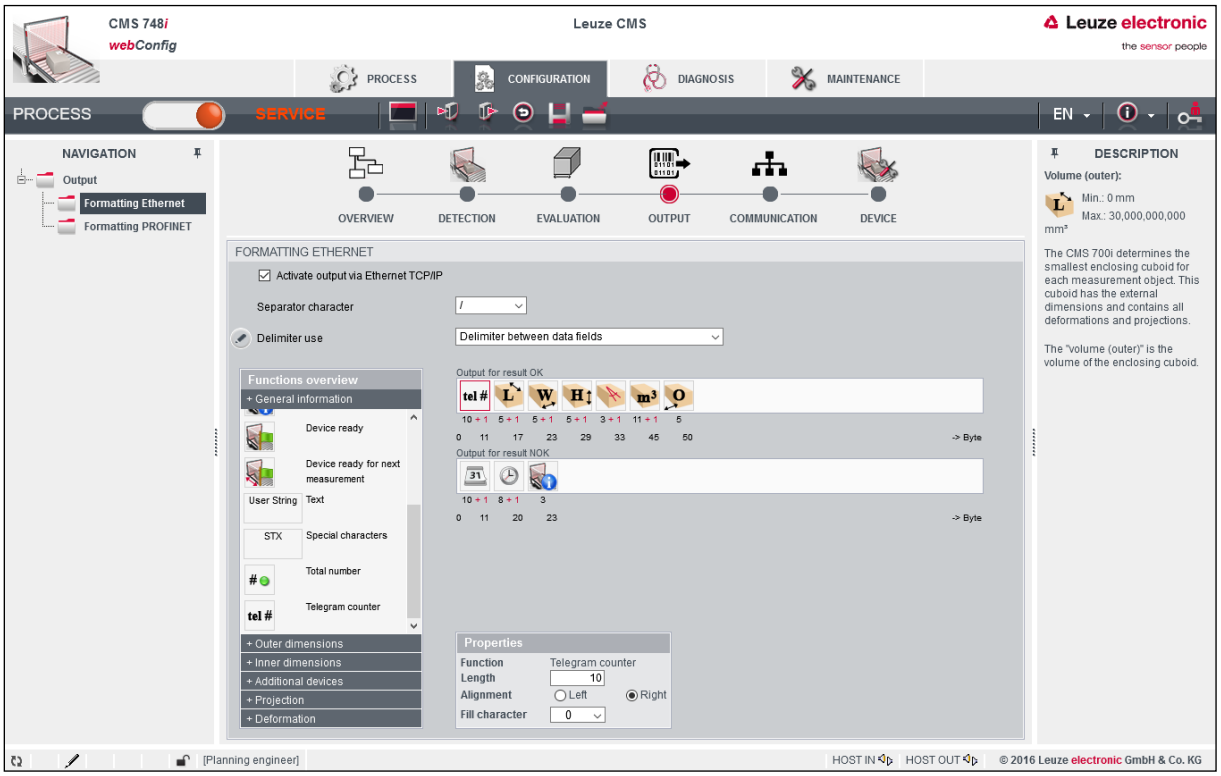

CMS 748i
webConfig
Leuze CMS
Leuze electronic
the sensor people
PROCESS
CONFIGURATION
DIAGNOSIS
MAINTENANCE
PROCESS
SERVICE
EN
NAVIGATION
Length
Width
Settings
Blanking
Sensor sensitivity
Height
OVERVIEW
DETECTION
EVALUATION
OUTPUT
COMMUNICATION
DEVICE
TEACH-IN THE SENSOR SENSITIVITY
Teach-in the sensitivity
Sensor type
CML730i-05-0640
Serial number
1234 5678 007
Sensitivity
High
Status
OK
DESCRIPTION
The sensitivity of the light curtains is taught-in here. With a high sensitivity, a light curtain detects even thin films or other transparent media and includes them in the evaluation.
A low sensitivity, on the other hand, is especially resistant to soiling, dust and mist between transmitter and receiver of the light curtain.
With the "Transparent" setting, the damping of a measurement beam by a transparent plastic film is sufficient for the light curtain to detect the film as an interruption.
If steady-state environmental conditions prevail in the measurement scene, you can press the teach button so that the system calibrates itself automatically.
If, during commissioning, it is not possible to detect, e.g., desired film projections, the sensitivity can also be adapted manually between LOW and TRANSPARENT.
[Planning engineer]
HOST IN
HOST OUT
© 2016 Leuze electronic GmbH & Co. KG

8.2.2 Setting for the evaluation of objects

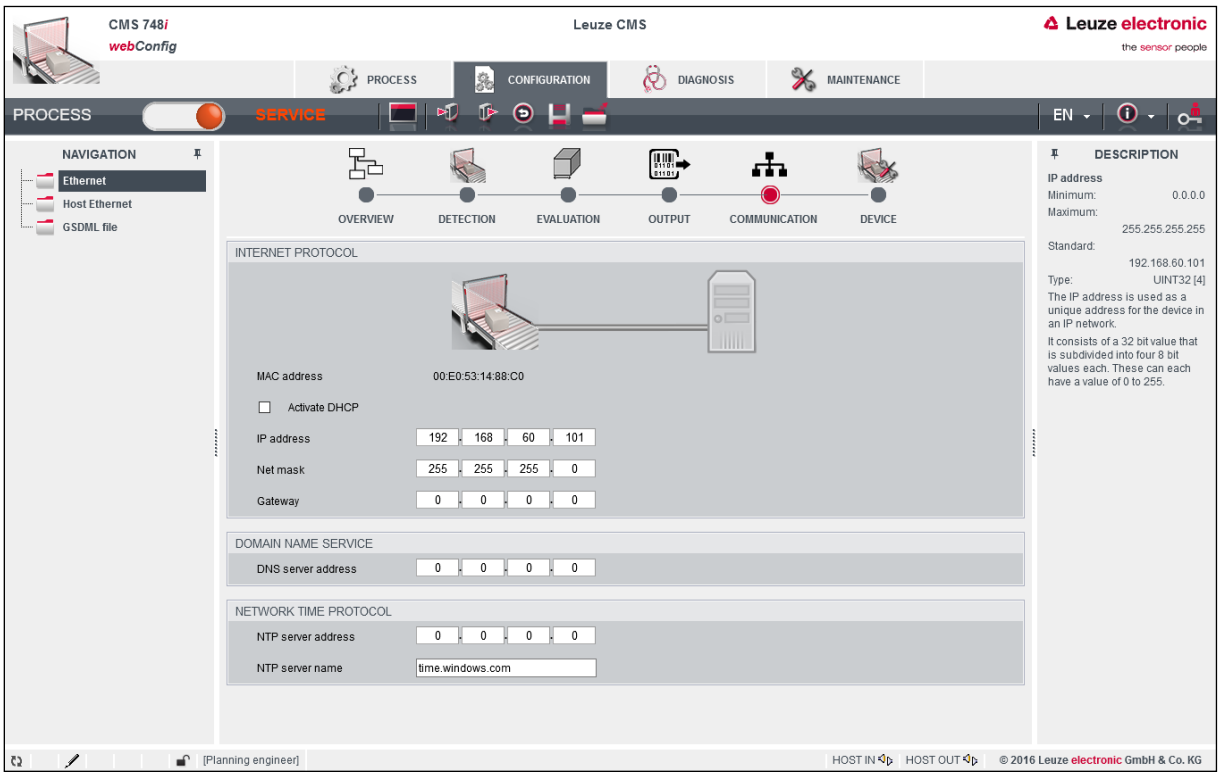
The functionality of the evaluation of measurement objects is described in chapter 4.3.

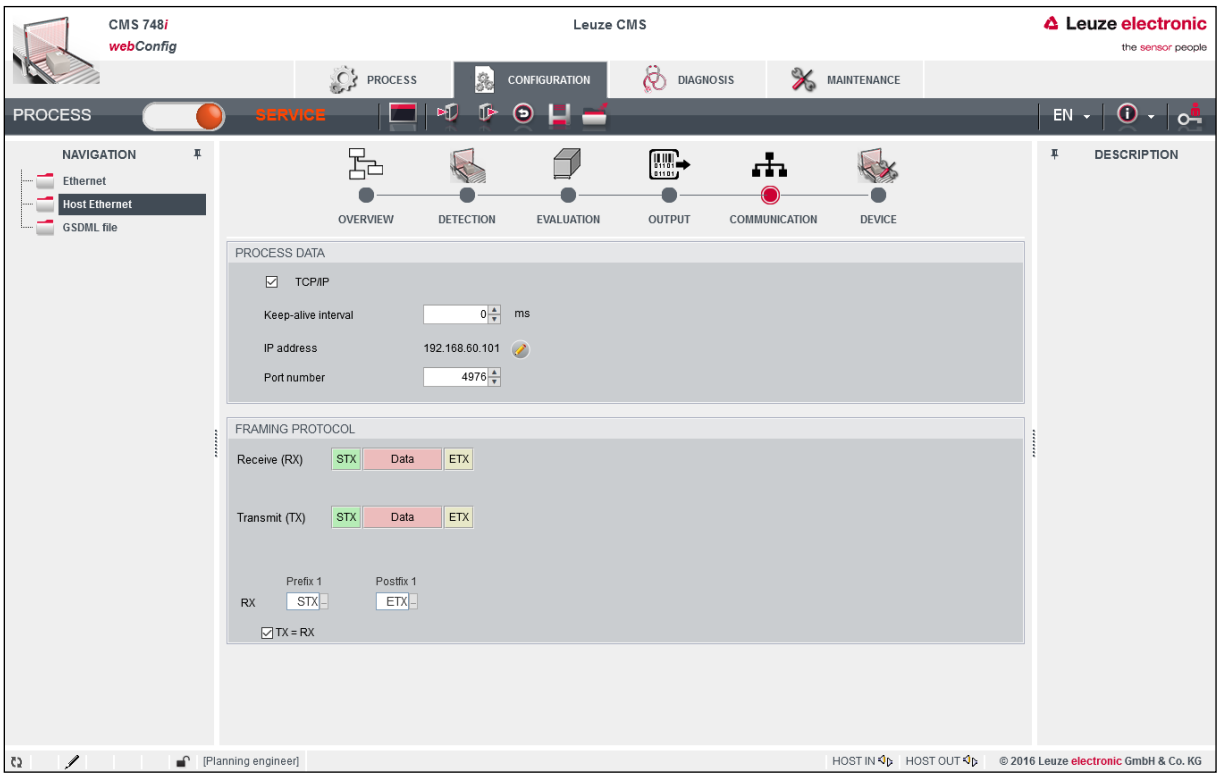


8.2.3 Setting up the output string

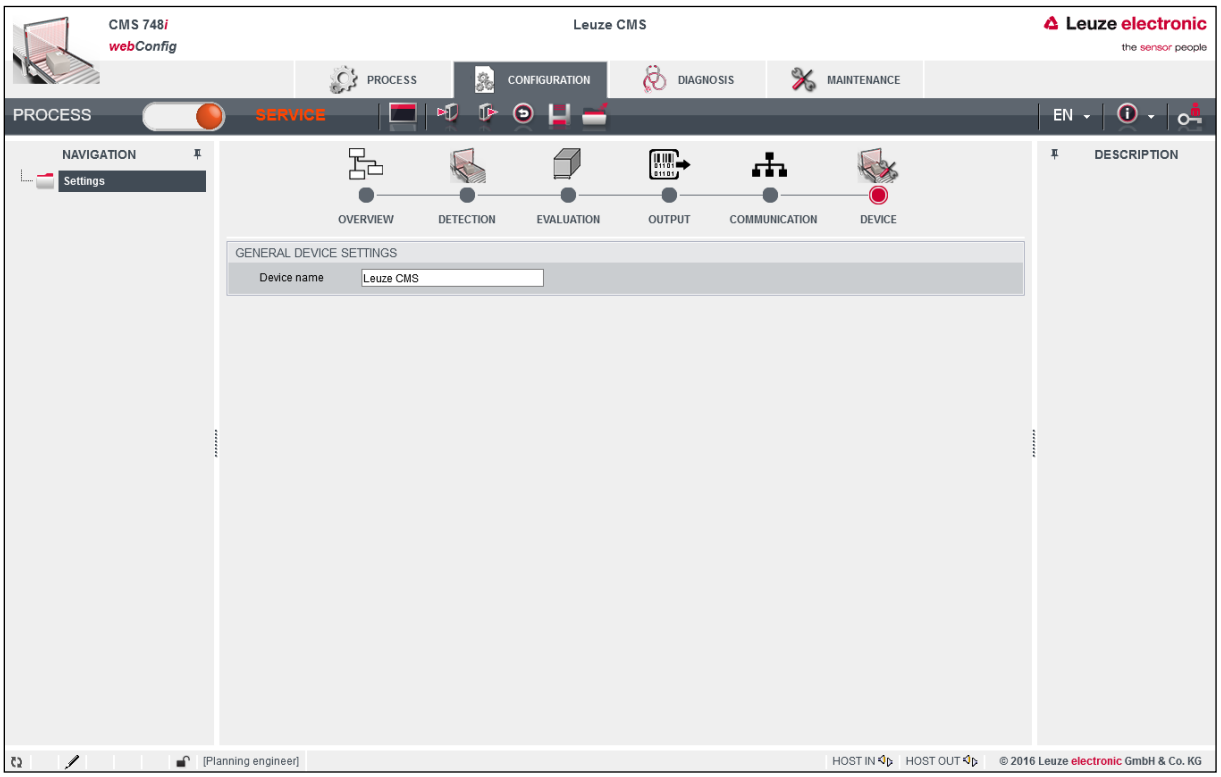


8.2.4 Setting up the Ethernet interface

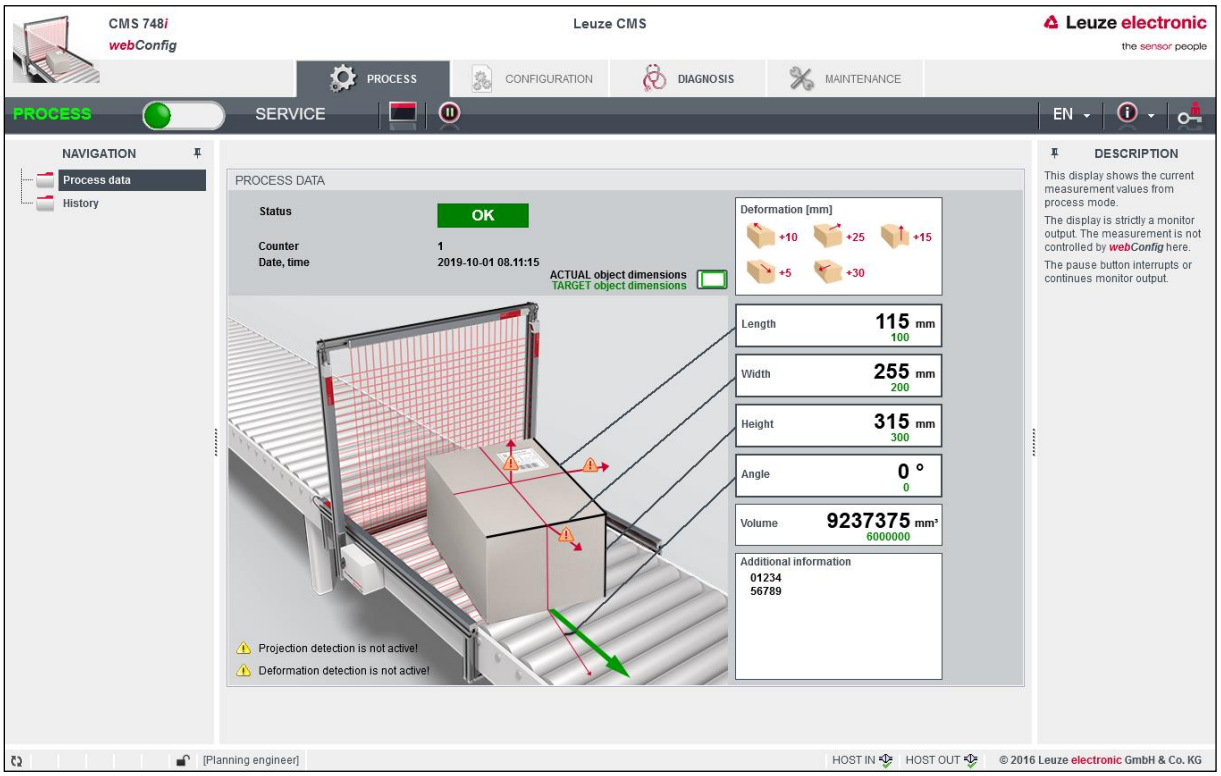




8.2.5 Setting up the device name of the CMS 700i



8.3 Visualization of process data via WebConfig



9 Interfaces

9.1 Interface description TCP/IP

- TCP-Server
- Port (Factory setting) 4967

9.1.1 Device status

The WebConfig setting of the output string provides the function „device status“. The device status is a status byte and binary coded. The evaluation follows the table below.

Bit	Description	Type	Comment
0	System-Status OK	BOOL	TRUE ≙ System okay
1	Sensor-Status OK	BOOL	TRUE ≙ Sensors okay
2	CML-Length NOK	BOOL	TRUE ≙ Failure light curtain length
3	CML-Width NOK	BOOL	TRUE ≙ Failure light curtain width
4	CML-Height NOK	BOOL	TRUE ≙ Failure light curtain height
5	SystemReadyForNextMeas	BOOL	TRUE ≙ System ready for next measurement
6		BOOL	Reserved
7	Toggle-Bit	BOOL	Toggle after each message sent

9.1.2 Last error code

Information whether there is a system error, displays the last registered error, see table 9.3!

9.1.3 Online commands

Online commands can be sent directly to the system via the interface. These are evaluated by the system and, if a valid command is contained, executed.

Framing
The TCP input data is subject to the same framing that was configured for the output data.
The default framing is: *<STX>DATA<ETX>*

All commands (if not specified separately) respond with "Command=OK" as soon as the internal command processing has been completed. This answer is also subject to the framing described above.

9.1.3.1 System activation

Command	+
Command with default framing	<STX>+<ETX>
Answer with default framing	<STX>+=OK<ETX>
Description	

9.1.3.2 System deactivation

Command	-
Command with default framing	<STX>-<ETX>
Answer with default framing	<STX>-=OK<ETX>
Description	

9.1.3.3 Data Reset

Command	DR
Command with default framing	<STX>DR<ETX>
Answer with default framing	<STX>DR=OK<ETX>
Description	

Resets the output data of the host interface.
This only affects data fields. Status and error codes are not reset.
The internal object counter of the system is not affected by this; it continues to run as usual during the next measurement.

Example:

Output before command “DR”: <STX>00004,00300,00400,00050,+02,035,000<ETX>
Cyclic output after command “DR”: <STX>00000,00000,00000,00000,000,035,000<ETX>
Output after next measurement: <STX>00005,00300,00395,00050,000,035,000<ETX>

9.1.3.4 Clear error

Command	EC
Command with default framing	<STX>EC<ETX>
Answer with default framing	<STX>EC=OK<ETX>
Description	

Confirms and deletes any errors or warnings in the system.

9.1.3.5 Soft restart of the system

Command	SRS
Command with default framing	<STX>SRS<ETX>
Answer with default framing	<STX>SRS=OK<ETX>
Description	

Executes an internal reset of the system modules.
This process takes a few seconds.
There must be no object in the measuring frame during the reset.
The process also resets the system's internal object counter, which starts from zero again after the reset has been completed.

9.1.3.6 Hard restart of the system

Command	SRH
Command with default framing	<STX>SRH<ETX>
Answer with default framing	*No answer* (Executes an immediate reset)
Description	

Executes a complete restart of the measuring system.
This process takes about 90 seconds.
The system does not perform any measurements during this time and cannot be reached via the host or service interface. There must be no object in the measuring frame during the reset.

9.2 Interface description PROFINET

9.2.1 PROFINET Modules

Module	Description	Parameter	Input data (B)	Output data (B)
Device control	Control bit of the device	0	0	4
Result data	Result data max. 196 Bytes	0	200	0

9.2.2 Module „Device control“

Initial data	Address	Data type	Range	Description
Error Clear	0.0	Bit	0->1: release	Confirms and clears any errors/warnings present in the system when the level changes from 0 to 1.
Data reset	0.1	Bit	0->1: release	Resets the result data module when the level changes from 0 to 1. See chapter 9.1.3.3!
Device activation	0.2	Bit	0->1: Active 1->0: Not active	Starts or ends the data input phase for external devices.
System reset	0.3	Bit	0->1: Release	Executes an internal reset of the system modules when the level changes from 0 to 1. See chapter 9.1.3.5!
System restart	0.4	Bit	0->1: Release	Executes a complete system reboot when the level changes from 0 to 1. See chapter 9.1.3.6!
Reserved	0.5	Bit	0..1	Reserved
Reserved	0.6	Bit	0..1	Reserved
Reserved	0.7	Bit	0..1	Reserved
Reserved	1	Byte	0..255	Reserved
Reserved	2	Byte	0..255	Reserved
Reserved	3	Byte	0..255	Reserved
Output data length: 4 Byte				

9.2.3 Module „Result data“

Initial data	Address	Data type	Range	Description
System OK	0.0	Bit	0..1	1: System is error free
Sensor OK	0.1	Bit	0..1	1: Sensors are error free
Length sensor NOK	0.2	Bit	0..1	1: Error at length sensor
Width sensor NOK	0.3	Bit	0..1	1: Error at width sensor
Height sensor NOK	0.4	Bit	0..1	1: Error at height sensor
System ready	0.5	Bit	0..1	1: System ready for next measurement
Reserved	0.6	Bit	0..1	Reserved
Toggle bit	0.7	Bit	0..1	Toggle bit is toggled every 500 ms
Error code	1	Byte	0..255	See chapter 9.3!
New result	2.0	Bit	0->1: New result 1->0: New result	Toggle bit indicates whether a new result is applied
Overflow	2.1	Bit	0..1	Indicates that the output data string was longer than 196 bytes and that some data were discarded.
Reserved	2.2..2.7	6x Bit	0..1	Reserved
Result data length	3	Byte	0..196	Length of the subsequent result data string
Result data	4..199	196x Byte	0..255	Result data string (ASCII coded)
Input data length: 200 Byte				

9.3 Error codes of all interface

Value	Description	Comment
000	Without any error	System okay
001	General system error	
002	General sensor error	System has a sensor error
003	General communication error	Communication disturbed or interrupted
004	General measurement error	Last measurement not valid
005 .. 019		Reserved
020	Error length sensor	General error length sensor
021	Communication error length sensor	Communication to length sensor disturbed or interrupted
022	Length sensor cleaning	Dirt on length sensor, cleaning required
023 .. 029		Reserved
030	Error width sensor	General error width sensor
031	Communication error width sensor	Communication to width sensor disturbed or interrupted
032	Width sensor cleaning	Dirt on width sensor, cleaning required
033 .. 039		Reserved
040	Error height sensor	General error height sensor
041	Communication error height sensor	Communication to height sensor disturbed or interrupted
042	Height sensor cleaning	Dirt on height sensor, cleaning required
043 .. 099		Reserved
100	Measurement dimension	Last object was too small in ≥ 1 dimension
101	Measurement plausibility	Raw data could not be evaluated correctly or completely.
102 .. 255		Reserved

10 Care, maintenance and disposal

Cleaning

In the event of dust build-up on the sensor:

↳ Clean the sensor with a soft cloth; use a cleaning agent (commercially available glass cleaner) if necessary.

NOTICE
Do not use aggressive cleaning agents! ↳ Do not use aggressive cleaning agents such as thinner or acetone for cleaning the light curtains. Use of improper cleaning agents can damage the lens cover

Firmware update

A firmware update can only be performed by Leuze electronic customer service on-site, at the company headquarters or via remote maintenance connection.

↳ For firmware updates, contact your responsible Leuze electronic subsidiary or Leuze electronic customer service (see chapter 12).

Servicing

Usually, the components of the system CMS 700i do not require any maintenance by the operator. Repairs to the device must only be carried out by the manufacturer.

↳ For repairs, contact your responsible Leuze electronic subsidiary or Leuze electronic customer service (see chapter 12).

Disposing

For disposal, observe the applicable national regulations regarding electronic components.

11 Technical data

Optical data

Operating range	Guaranteed operating range
Operating range	0,1 … 4,5m
Operating range, transparent media	0,1 … 1,75m
Operating range limit	Typical operating range
Operating range limit	0,1 … 6m
Beam spacing	5 mm

Measurement data

Minimum object height length light curtain	50 mm
Minimum object height length encoder	5 mm

Electrical data

Protective circuit	Polarity reversal protection
	Short circuit protected
	Transient protection
Supply voltage	100 … 263 VAC
Open-circuit current	250mA
Inputs/outputs selectable	None
Output current, max.	100 mA per switching output channel
Number of switching outputs	4
Number of switching inputs	4
Voltage type, outputs	DC
Switching voltage, outputs	24V
Voltage type, inputs	DC
Switching voltage, inputs	-3 .. 5V (LOW)
	11 .. 30V (HIGH)

Timing

Readiness delay	60 sec
Response time per beam	10µs

Interfaces

Profinet	
Functionality	Process data
	Parameterization
Ethernet TCP/IP	
Functionality	Process data
	Parameterization

Connections control cabinet LSC-Box

Number of connections	9
Plug outlet	Axial
Connection 1	
Type of connection	Ground terminal

Function	Connection Ground
Material	Metal
Connection 2	
Designation of connection	XS1000
Type of connection	Harting connector
Function	Voltage supply
Thread size	Rectangle
Material	Metal
Number of pins	4
Connection 3	
Designation of connection	XETH1
Type of connection	Connector
Function	External Ethernet TCP/IP connection
Thread size	M12
Material	Metal
Number of pins	4
Pin assignment	
Pin1	TD+
Pin2	RD+
Pin3	TD-
Pin4	RD-
Connection 4	
Designation of connection	XS1300
Type of connection	Connector
Function	Connection Length light curtain (Not in conjunction with rotary encoder)
Thread size	M12
Material	Metal
Number of pins	8
Pin assignment	A-coded
Pin1	V+
Pin2	IO1
Pin3	GND
Pin4	IO-Link
Pin5	IO2
Pin6	IO3
Pin7	IO4
Pin8	GND
Connection 5	
Designation of connection	XS1301
Type of connection	Connector
Function	Connection Width light curtain
Thread size	M12
Material	Metal
Number of pins	8
Pin assignment	
Pin1	V+
Pin2	IO1
Pin3	GND

Pin4	IO-Link
Pin5	IO2
Pin6	IO3
Pin7	IO4
Pin8	GND
Connection 6	
Designation of connection	XS1302
Type of connection	Connector
Function	Connection Height light curtain
Thread size	M12
Material	Metal
Number of pins	8
Pin assignment	
Pin1	V+
Pin2	IO1
Pin3	GND
Pin4	IO-Link
Pin5	IO2
Pin6	IO3
Pin7	IO4
Pin8	GND
Connection 7	
Designation of connection	XS1400
Type of connection	Connector
Function	Connection rotary encoder (Not in conjunction with length light curtain)
Thread size	M12
Material	Metal
Number of pins	5
Pin assignment	
Pin1	GND
Pin2	+U
Pin3	A
Pin4	B
Pin5	N
Pin6	A inv.
Pin7	B inv.
Pin8	N inv.
Connection 8	
Designation of connection	XS1100
Type of connection	Connector
Function	Connection Profinet IN (Optional)
Thread size	M12
Material	Metal
Number of pins	4
Pin assignment	
Pin1	TD+
Pin2	RD+
Pin3	TD-

Pin4	RD-
Connection 9	
Designation of connection	XS1101
Type of connection	Connector
Function	Connection Profinet OUT (Optional)
Thread size	M12
Material	Metal
Number of pins	4
Pin assignment	
Pin1	TD+
Pin2	RD+
Pin3	TD-
Pin4	RD-

Mechanical data

Control cabinet LSC-Box	
Design	Cubic
Dimension (W x H x L)	380 x 380 x 210
Housing material	Metal
Net weight	12 kg
Housing color	Light grey
Type of fastening	Rear side with 4 holes Ø12 mm
Light curtain length	
Design	Cubic
Dimension (W x H x L)	
Measurement length 800 mm	29 mm x 35,4 mm x 875 mm
Measurement length 960 mm	29 mm x 35,4 mm x 1035 mm
Housing material	Metal, aluminum
Lens cover material	Plastic
Net weight	
Measurement length 800 mm	1000g
Measurement length 960 mm	1150g
Housing color	Grey
Type of fastening	Groove mounting, mounting device BT-2P40
Offset btw. 1st beam of light curtain and height width frame	≥ 15mm
Light curtain width	
Design	Cubic
Dimension (W x H x L)	
Measurement length 480 mm	29 mm x 35,4 mm x 555 mm
Measurement length 560 mm	29 mm x 35,4 mm x 635 mm
Measurement length 640 mm	29 mm x 35,4 mm x 715 mm
Housing material	Metal, aluminum
Lens cover material	Plastic
Net weight	
Measurement length 480 mm	700g
Measurement length 560 mm	800g
Measurement length 640 mm	850g
Housing color	Grey

Type of fastening	Groove mounting, mounting device BT-2P40
Light curtain height	
Design	Cubic
Dimension (W x H x L)	
Measurement length 560 mm	29 mm x 35,4 mm x 635 mm
Measurement length 640 mm	29 mm x 35,4 mm x 715 mm
Measurement length 720 mm	29 mm x 35,4 mm x 795 mm
Housing material	Metal, aluminum
Lens cover material	Plastic
Net weight	
Measurement length 560 mm	800g
Measurement length 640 mm	850g
Measurement length 720 mm	950g
Housing color	Grey
Type of fastening	Groove mounting, mounting device BT-2P40
Rotary encoder length	
Resolution	100 ppt
Housing size	58 mm
Circumference measuring wheel	500 mm
Local resolution	5 mm per pulse
Measuring wheel coating	Smooth plastic

Operation and display

Control cabinet LSC-Box	
Type of display	LED
Number of LEDs	3
Type of configuration	WebConfig via integrated web server Teach-In of the light curtains
Operational controls	On-off switch
Light curtain	
Type of display	LED, OLED display
Number of LEDs	2
Type of configuration	Internally via control cabinet
Operational controls	Membrane keyboard

Environmental data

Ambient temperature, operation	0 … +45°C
Ambient temperature, storage	-20 … +70°C

12 Service and Support

Defective devices are repaired in our service center competently and quickly. Leuze electronic offers you an extensive service package to keep any necessary system downtimes to a minimum.

Our service center requires the following information:

- Customer number
- Part designation or part number
- Serial number or batch number
- Reason for return with description

24-hour on-call service at:
+49 (0)7021 573-0

Service hotline:
+49 (0) 7021 573-123
Monday to Thursday, 8:00 a.m. to 5:00 p.m. (UTC+1)
Friday, 8:00 a.m. to 4 p.m. (UTC+1)

E-Mail:
service.detect@leuze.de

Repair service and returns:
Procedure and internet form can be found at
www.leuze.com/repair

Return address for repairs:
Service center
Leuze electronic GmbH + Co. KG
In der Braike 1
D-73277 Owen / Deutschland

+49 (0) 7021 573-210
Monday to Thursday, 8:00 a.m. to 5:00 p.m. (UTC+1)
Friday, 8:00 a.m. to 4 p.m. (UTC+1)

E-Mail:
Service-Center@leuze.de

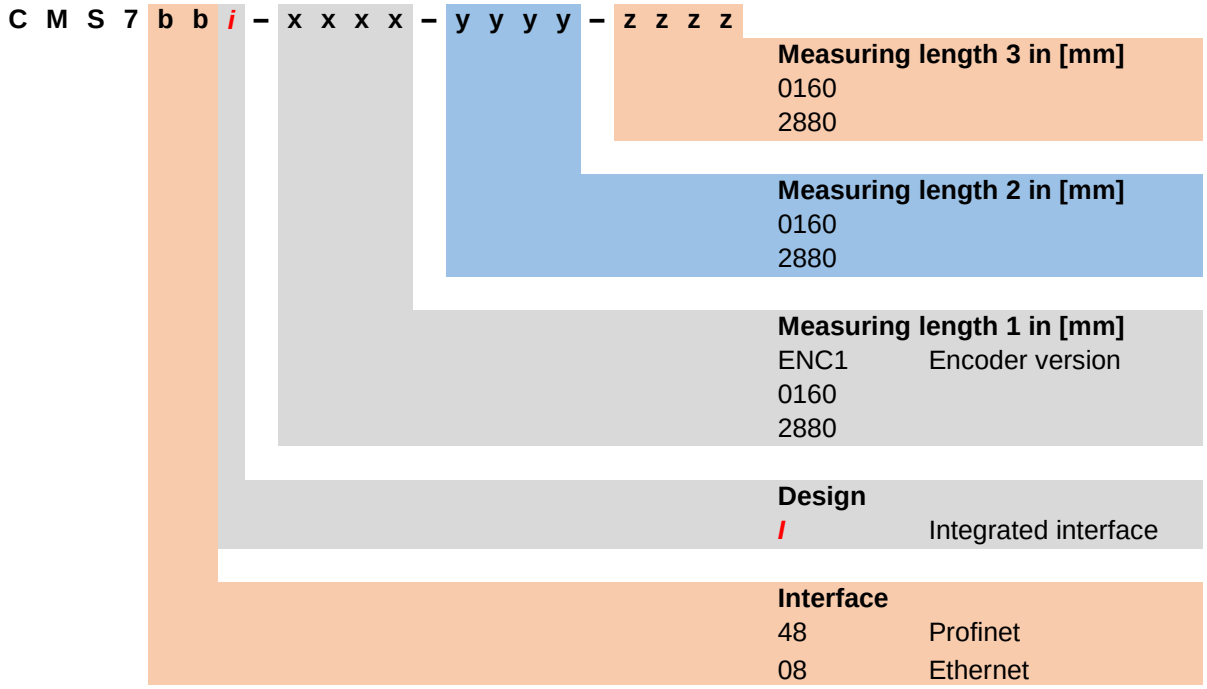
12.1 Order information services

Commissioning support:

Article No.	Type	Description
S991030	CS-KRS/AS	1 Day product training Including travel and overnight stay in Germany
S991017	CS-SSF/FR	1 Day commissioning support Including travel and overnight stay in Germany
S991037	CS-SST/HR	Remote maintenance and support via hotline

13 Ordering information and accessories

13.1 Part number code CMS 700*i*



13.2 Scope of delivery

Scope of delivery CMS 700i with 3 light curtains

Position	Component	Number
1	Control cabinet LSC-Box	1
2	Light curtain CML 730 for length measurement*	1
3	Light curtain CML 730 for width measurement*	1
4	Light curtain CML 730 for height measurement*	1
5	Mounting kit for light curtain	6
6	Harting connector for voltage supply control cabinet LSC-Box	1
7	Connection cable light curtain	3
8	Sync cable light curtain	3

*Pair of transmitter and receiver

Scope of delivery CMS 700i with 2 light curtains and 1 rotary encoder

Position	Component	Number
1	Control cabinet LSC-Box	1
2	Rotary encoder incl. measurement wheel and mounting kit	1
3	Light curtain CML 730 for width measurement*	1
4	Light curtain CML 730 for height measurement*	1
5	Mounting kit for light curtain	4
6	Harting connector for voltage supply control cabinet LSC-Box	1
7	Connection cable rotary encoder	1
8	Connection cable light curtain	2
9	Sync cable light curtain	2

*Pair of transmitter and receiver

13.3 System components

Component	Article number	
LSC-Box **Profinet** interface	50122123	
LSC-Box **Ethernet** interface	50134665	
Light curtain CML 730	Transmitter	50118923
Measuring length: 960 mm	Receiver	50119141
Light curtain CML 730	Transmitter	50118921
Measuring length: 800 mm	Receiver	50119139
Light curtain CML 730	Transmitter	50118920
Measuring length 720 mm	Receiver	50119138
Light curtain CML 730	Transmitter	50118919
Measuring length 640 mm	Receiver	50119137
Light curtain CML 730	Transmitter	50118918
Measuring length 560 mm	Receiver	50119136
Light curtain CML 730	Transmitter	50118917
Measuring length 480 mm	Receiver	50119135
Mounting kit for light curtain BT-2P40	424417	
Connection cable light curtain 5m	50135146	
Sync cable light curtain 5m	50114698	
Rotary encoder incl. wheel and mounting kit	50142538	

13.4 Accessories mounting frames

Article no.	Type	Features
50142039	BT 712M-MRSET	Frame height: 2000mm, inner frame width: 1200mm
50143669	BT 710M-MRSET	Frame height: 2000mm, inner frame width: 1000mm
50143670	BT 708M-MRSET	Frame height: 2000mm, inner frame width: 800mm
50143671	BT 70EM-MRSET	Encoder mounting kit for mounting frame

13.5 Accessories cables

Cables for field bus (Ethernet or PROFINET)

Article no.	Type	Description
M12 connector for field bus, axial cable outlet, open cable end		
50135073	KS ET-M12-4A-P7-020	Connection cable, length 2 m
50135074	KS ET-M12-4A-P7-050	Connection cable, length 5 m
50135075	KS ET-M12-4A-P7-100	Connection cable, length 10 m
50135076	KS ET-M12-4A-P7-150	Connection cable, length 15 m
50135077	KS ET-M12-4A-P7-300	Connection cable, length 30 m
M12 connector for field bus to connector RJ 45		
50135080	KSS ET-M12-4A-RJ45-A-P7-020	Connection cable, length 2 m
50135081	KSS ET-M12-4A-RJ45-A-P7-050	Connection cable, length 5 m
50135082	KSS ET-M12-4A-RJ45-A-P7-100	Connection cable, length 10 m
50135083	KSS ET-M12-4A-RJ45-A-P7-150	Connection cable, length 15 m
50135084	KSS ET-M12-4A-RJ45-A-P7-300	Connection cable, length 30 m

13.6 Accessories terminating resistor

Article no.	Type	Description
50038539	TS 02-4-SA M12	M12 connector with int. terminating resistor for BUS OUT

14 EC Declaration of Conformity

The described system has been developed and manufactured in accordance with the applicable European standards and directives.
The manufacturer of the product, Leuze electronic GmbH + Co. KG in D-73277 Owen, possesses a certified quality assurance system in accordance with ISO 9001.