

comfort light curtain LIGI-COM

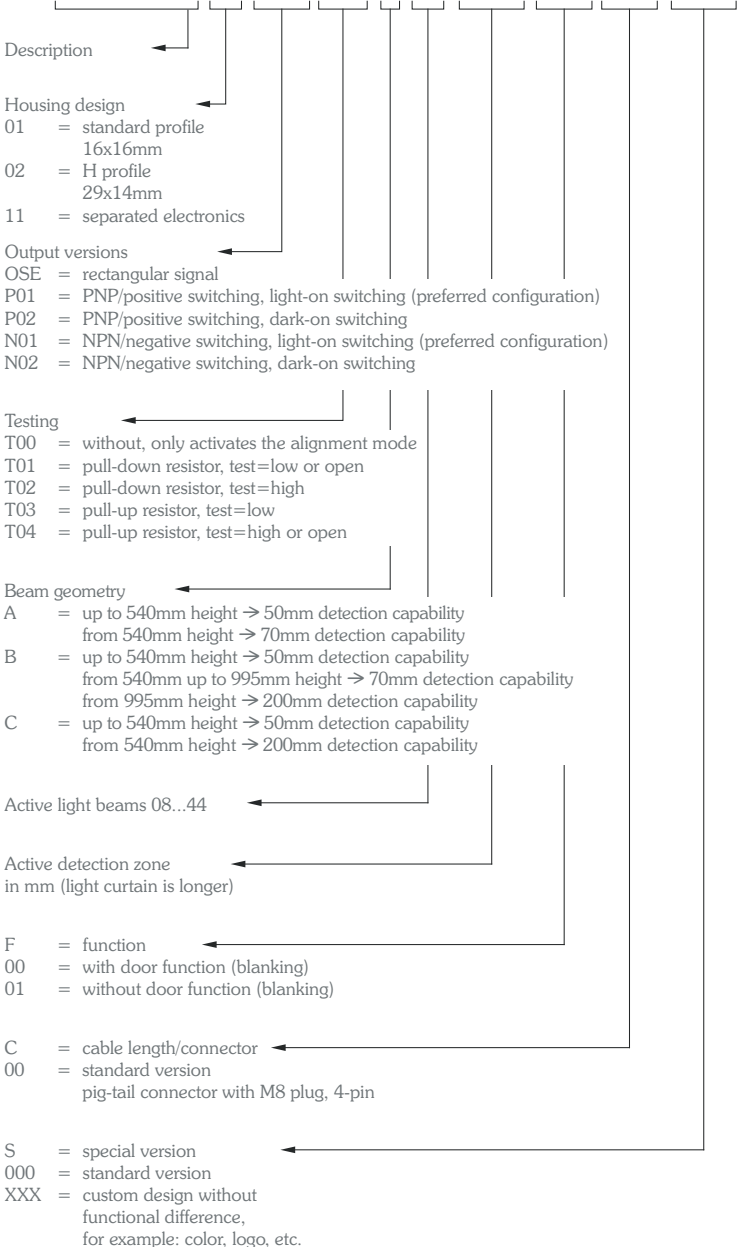
drawbar detection DEGI



Order code

LIGI-COM comfort light curtain + DEGI - drawbar detection

LIGI-COM-01-P01-T00-A-44-2555-F00-C00-S000



Key to symbols



Recommendation for optimal procedure.



Risk of death in the case of non-observance.

Safety instructions



- The safety instructions in the operating manual must be observed.
- Installation and electrical connection may only be carried out by trained personnel.
- During mounting, installation and commissioning, it must be ensured that the photo switch system cannot be influenced by other photo switch systems or sources of infrared light.
- The applicable standards and regulations – particularly EN 12453 (Safety in use of power operated doors) – are to be observed during mounting, installation, commissioning, maintenance and repair.
- The manufacturer assumes no liability for damage caused by operation and connection errors, non-observance of the operating manual or lack of maintenance or care; the manufacturer wishes to draw attention again to the possible hazardous situations that can arise in this way.
- Notwithstanding conformity with harmonised standards, it is not possible to foresee every potential risk. For this reason, persons should only be present in the hazardous area when necessary.

Purpose



The safety light curtain (LIGI) consists of a transmitter and receiver and is suitable for all automatic door types with a minimum door width of 1m. The closing speed of the door is to be selected in such a way that the force limit values as per EN 12453 are adhered to. Only objects that are 5mm larger than the beam separation distance can be detected.

Mounting, installation and commissioning



Mounting, installation and commissioning of light curtains may only be carried out by trained personnel in accordance with the specifications of the door manufacturer. The specifications in this operating manual are also to be adhered to. Operation under conditions other than those intended and modifications to the optics and casing are not permitted.

In addition, it must be ensured that the polarity of the supply voltage to the transmitter is in accordance with this manual, depending on the distance between the transmitter and receiver. This setting must also be checked on the transmitter side by means of the green and yellow LEDs. This measure ensures that the transmitter operates with an increased transmission pulse current only for ranges greater than 4m (3m DEG).

The light curtains are designed in such a way that sunlight and light from halogen lamps and fluorescent tubes (see IEC 61496-2) do not lead to undesired activation.

In rare cases, other photo switches or sources of infrared light can lead to undesired activation. These sources of light interference must be dealt with in such cases by switching off, blocking or removing them.

Mounting, installation and commissioning



If two light curtains (in front of and behind the door) are to be used to provide protection, the separation distance between the light curtain and door should be small enough that persons cannot be present undetected between the door and the detection zones that are created. For this application, the two transmitters of the light curtains should be mounted on opposite sides of the door.

Only one light curtain can be mounted in the door opening. In this case, the “door function” of the light curtain prevents detection by the door itself.

When the light curtain is being mounted, it is to be placed on a stable subsurface. Ensure that the ground is sufficiently level so that the sensor function can work at all points.

The first fixing clamp should be around 10cm above the ground and the last clamp should be 10cm from the end; between these points, fixing clamps should be used to fasten the profile at maximum intervals of 60cm. Optical components (transmitters, receivers, LEDs) must not be covered.

A risk assessment in accordance with the machinery directive is the basis for deciding on the selected safety method.

The alignment of the light curtain should be optimised after it has been mounted. If the test input of the light curtain is activated for longer than 15s, the light curtain switches into alignment mode. The signal reserve can be optimised in alignment mode by alternately rotating the LIGI transmitter and LIGI receiver.

If the signal reserve is less than 2, the green receiver LED flashes in this mode. The green LED remains on for signal reserves greater than 2 and the red receiver LED flashes with increasing flash frequency when the signal reserve increases. The signal reserve should be a factor of 2 or greater to ensure fault-free operation as well as to tolerate a certain amount of dirt.

As soon as the test input is deactivated for a short period, the light curtain returns to normal mode.

Electrical connection:



The connections are made depending on the version according to the supplied circuit diagram.

Important note: The sync cable (white wire, or yellow wire for OSE) is an internal connection between the transmitter and receiver which must not be connected in the controller!

Adaptation to door width:

The LIGI transmitter can be adjusted for door widths of 1 to 4m and 4 to 10m (DEGI 1...3 and 3...7m) by reversing the polarity of the operating voltage.

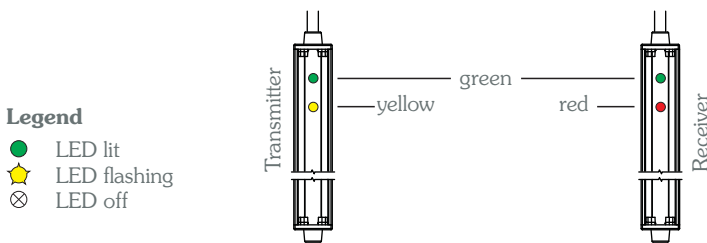
Alignment mode:

This mode allows for optimum alignment of the LIGI based on a variable flash frequency of the LEDs on the receiver.

Error messages:

The LIGI has an internal error diagnosis function which indicates errors by means of an LED code depending on the type of error. In the event of an error, the LIGI switches to safe mode and the door can then only be operated in “dead man” mode.

Operating mode



Legend

- LED lit
- ★ LED flashing
- ⊗ LED off

Transmitter	
Preset door width 1...4m LIGI-COM 1...3m DEGI	● ● ⊗
Preset door width 4...10m LIGI-COM 3...7m DEGI	● ●
Test (LEDs flashing alternately)	★ ⊗ ★ ⊗ ⊗ ★ ⊗ ★

Receiver	
Free detection zone	● ⊗
Interrupted detection zone	⊗ ●
Test (LEDs flashing alternately)	★ ⊗ ★ ⊗ ⊗ ★ ⊗ ★

Alignment mode

Legend

- LED lit
- ★ LED flashing
- ⊗ LED off



Transmitter		
Alignment mode (LEDs flashing alternately)	★ ⊗ ★ ⊗ ★ ⊗ ★ ⊗	
Receiver		
Signal reserve less than 2x	★ ⊗ ★ ⊗ ⊗ ⊗ ⊗ ⊗	Green LED flashing
Signal reserve greater than 2x	● ● ● ● ★ ⊗ ★ ⊗	Flash frequency of red LED increases with signal reserve

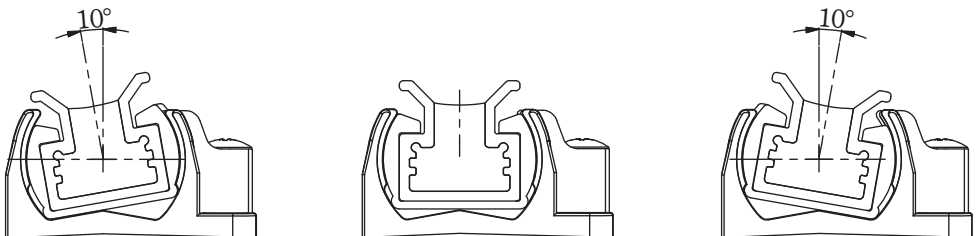
Alignment mode is accessed by activating test or alignment mode for at least 15s and for the duration of alignment. (See pages 12 and 17.)

Rotating the transmitter and receiver increases or reduces the reception level. The more the level increases, the faster the flash frequency of the red LED will be.

When the maximum flash frequency is reached, the light curtain is optimally aligned and can be fastened in place.

The test input must now be disconnected from the fixed potential. For PNP or NPN version test input must be connected to test output of the door control panel if applicable. If the door control comes without test facility connect test output to fixed potential (see page 12).

The test input (T00 version) is only required for alignment when using the OSE output versions. Connect to 0V/GND in normal operation.



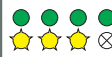







Error mode

Legend

-  LED lit
-  LED flashing
-  LED off



	Transmitter	Error mode	Receiver	
No supply voltage				Check supply voltage
Receiver polarity reversed		Yellow LED flashes 3x, long pause		Check receiver operating voltage
Short at output		Red LED flashes 2x, long pause		Check output cable, overload, wrongly connected, cable defective, output on light curtain defective
Error in sync cable		Yellow LED flashes 3x, long pause		Check sync cable (PNP/NPN: white; OSE: yellow), may only be connected between transmitter and receiver
Internal device error		All LEDs flashing		Light curtain must be replaced

Testing

The operation of the light curtain is to be tested as follows once it has been mounted.

1. A test rod with a diameter of 50mm must be continuously detected over a range of 0mm to 500mm above the ground.
2. A test object with an edge length of 200mm must be continuously detected over a range of 0mm to 2500mm above the ground. The test bodies should be moved from bottom to top during these tests.

Top view:

Door and recommended light curtain layout of T=transmitter and R=receiver

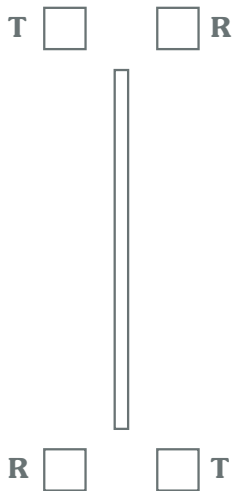


Figure 1
Without door function
(Blanking function)

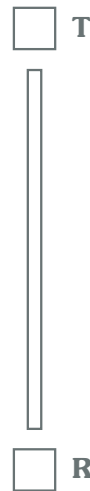


Figure 2
With door function
(Blanking function)

Maintenance and repair



The light curtain does not have any wearing parts that need to be maintained.

The light entry and exit openings are to be cleaned regularly, depending on the dirt that occurs. Use a cloth with soapy water or a water jet for this purpose. High-pressure cleaners, abrasives and organic solvents must not be used.

Check regularly whether the light curtains are correctly aligned. Adjust the alignment if necessary. The light curtain casing, the optics areas, the plug and the connection cable are to be checked regularly for damage. Parts with significant damage must be replaced.

Furthermore please check detection ability on a regular basis as per manual page 9.



If light curtains are replaced, they must only be replaced by identical light curtains or by other light curtains that are intended for the relevant door by the door manufacturer.

Transmitter and receiver light curtains must only be replaced in pairs so as to ensure that the same software and hardware status is present.

Repairs must only be carried out by trained personnel.

Versions

Number of channels: LIGI-COM from 16 to 44 channels
DEGI from 16 to 24 channels

Connection:

Connection cables 5m and 15m, the total length must not exceed 25m
Connection plug Pig-tail connector with M8 plug, 4-pin, L=130mm

Door function:

Continuous interruption starting at the top light beam and going towards lower light beams does not lead to detection as this is interpreted as lowering of the door.
After stopping for more than 1.5s interruption will be shown.
Only after complete opening of the door an uninterrupted detection zone will be signalled at the output.
After that automatic closing is possible.

Technical data

LIGI-COM	light curtain without cross beams
DEGI	light curtain with 3-time cross beam
Door widths	LIGI-COM = 1...10m DEGI = 1...7m
Rated voltage	24V DC -58% +25% (10 to 30V DC)
Current consumption	Transmitter: Approx. 30mA (24V DC) Receiver: Approx. 20mA (24V DC)
Power consumption	Approx. 1.2W
Detection zone height	Max. 2555mm
Channel count	LIGI-COM from 16 to 44 channels DEGI from 16 to 24 channels
Type of light	Modulated infrared
Type of switching:	Light switching, i.e. the following applies for free detection zones: OSE output = Alternating signal (approx. 950Hz) PNP output = High level NPN output = Low level
Aperture angle	Max. $\pm 10^\circ$ (as per IEC 61496-2)
Detection capability	0 to 500mm, detection object ≥ 50 mm 500 to 2560mm, detection object \geq beam separation distance + 5mm
Door function	Door speed ≤ 1.3 m/s min. 130mm/s at max. 195mm channel distance min. 44mm/s at max. 65mm channel distance
OSE output	Approx. 950Hz, alternating signal, typ. 3,6V bei 20mA, short proof, reverse polarity protection, max. 100nF, max. 30 μ A leakage current, integrated pull-down 220 Ω
PNP output	100mA, short proof, reverse polarity protection, max. 220nF, max. 350 μ A leakage current, integrated pull-down 10k Ω
NPN output	100mA, short proof, reverse polarity protection, max. 220nF, max. 150 μ A leakage current, integrated pull-up 10k Ω

Technical data

Ambient light safety	≥100klux
Housing material	Aluminium profile, fully filled, with 2K epoxy resin
Connection	Pig-tail M8 plug 4-pin, L=130mm
Degree of protection	IP67 as per EN 60529
Operating temperature	-20 to +60°C
Storage temperature	-30 to +70°C
Air humidity	Max. 95%
Weight	Approx. 1860g
Dimensions	2800x16x16mm (LxWxH)

Test input

Version	Normal operation	Test/alignment	Internal input wiring
T00	<2V	>7V	10kΩ pull-down resistor to 0V
T01	>7V	<2V	10kΩ pull-down resistor to 0V
T02	<2V	>7V	10kΩ pull-down resistor to 0V
T03	>7V	<2V	10kΩ pull-up resistor to 24V
T04	<2V	>7V	10kΩ pull-up resistor to 24V

Testing

Reaction of the output after activation of the test input for a free detection zone

Variant	Reaction of the output
PNP / ≤21 channels	after max. 50ms switch from high to low level
PNP / ≥22 channels	after max. 100ms switch from high to low level
NPN / ≤ 21 channels	after max. 50ms switch from low to high level
NPN / ≥ 22 channels	after max. 100ms switch from low to high level
OSE	This version is not tested.

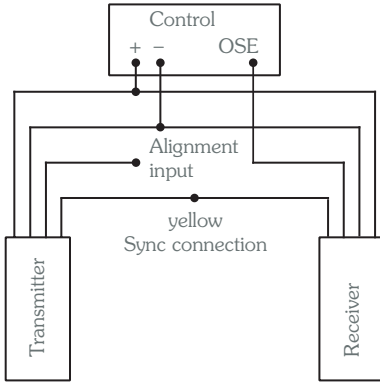
Technical data

Reaction of the output after deactivation of the test input for a free detection zone

Version	Reaction of the output
PNP / ≤ 21 channels	after max. 50ms switch from low to high level
PNP / ≥ 22 channels	after max. 100ms switch from low to high level
NPN / ≤ 21 channels	after max. 50ms switch from high to low level
NPN / ≥ 22 channels	after max. 100ms switch from high to low level
OSE	This version is not tested.

Number of channels	Switching time	Definition
≤ 21 channels	$t(\text{on}) \leq 50\text{ms}$	Interruption of light beam
	$t(\text{off}) \leq 400\text{ms}$	Detection zone becoming free
≥ 22 channels	$t(\text{on}) \leq 100\text{ms}$	Interruption of light beam
	$t(\text{off}) \leq 800\text{ms}$	Detection zone becoming free

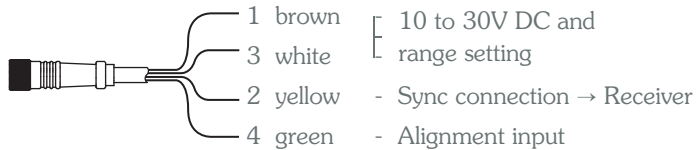
Connection scheme, OSE output



Transmitter bar



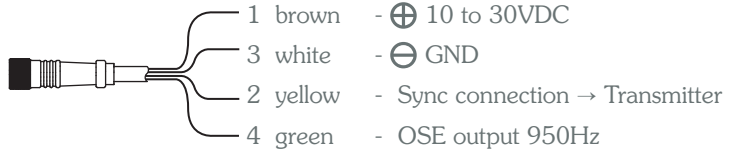
Pig-tail connector



Receiver bar



Pig-tail connector



Range setting

4 to 10m LIGI-COM

3 to 7m DEGI

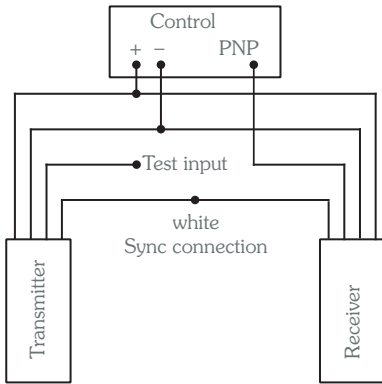


1 to 4m LIGI-COM

1 to 3m DEGI



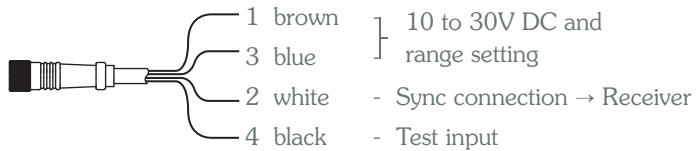
Connection scheme, PNP output



Transmitter bar



Pig-tail connector



Receiver bar



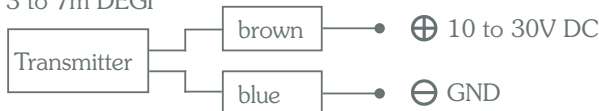
Pig-tail connector



Range setting

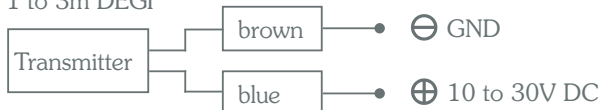
4 to 10m LIGI-COM

3 to 7m DEGI

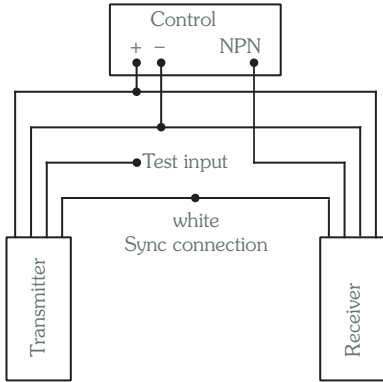


1 to 4m LIGI-COM

1 to 3m DEGI



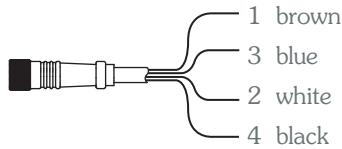
Connection scheme, NPN output



Transmitter bar



Pig-tail connector

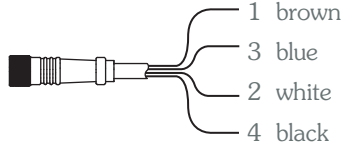


- 1 brown } 10 to 30V DC and range setting
- 3 blue }
- 2 white - Sync connection → Receiver
- 4 black - Test input

Receiver bar



Pig-tail connector

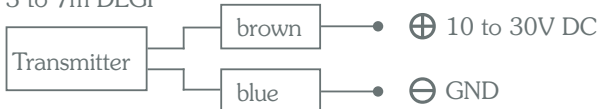


- 1 brown - ⊕ 10 to 30VDC
- 3 blue - ⊖ GND
- 2 white - Sync connection → Transmitter
- 4 black - NPN output

Range setting

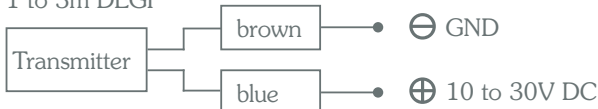
4 to 10m LIGI-COM

3 to 7m DEGI

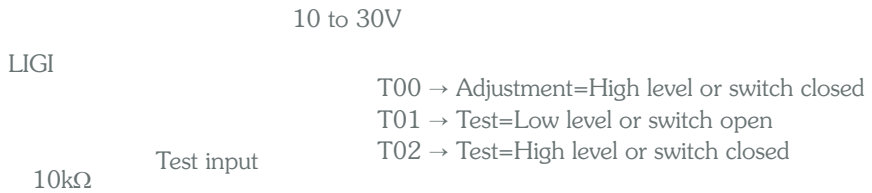


1 to 4m LIGI-COM

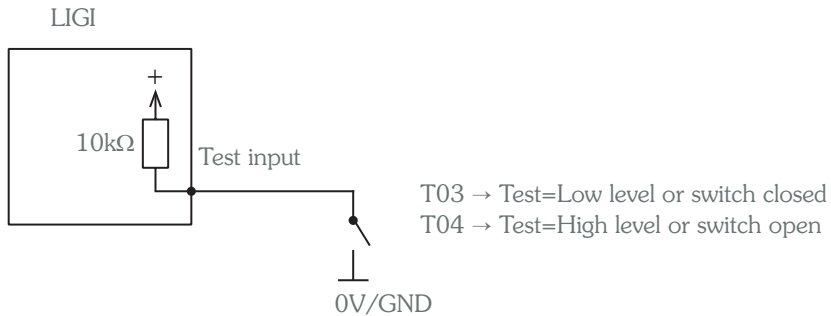
1 to 3m DEGI



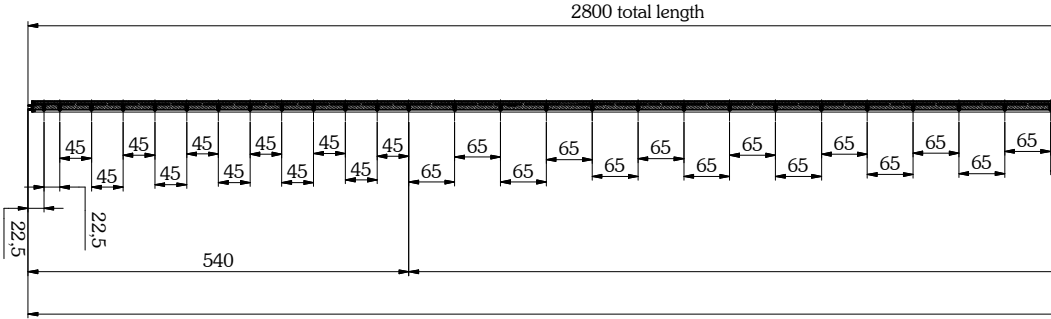
Connection scheme, test inputs T00, T01 and T02



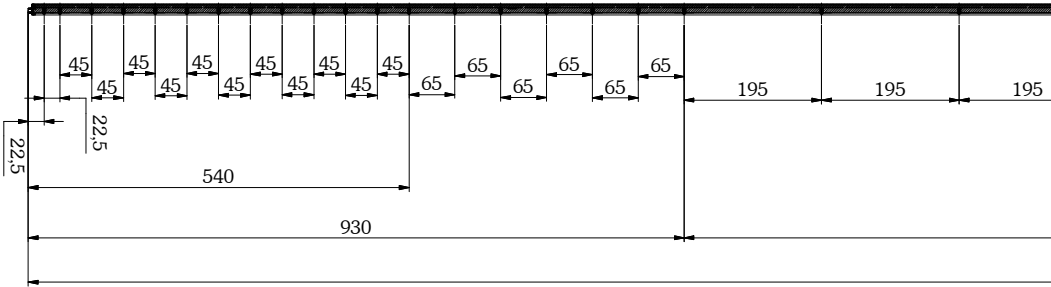
Connection scheme, test inputs T03 and T04



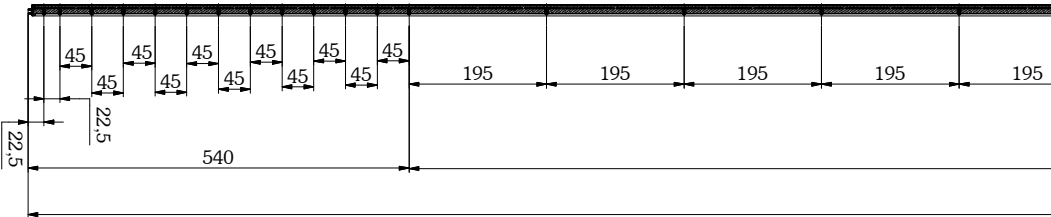
Channel selection



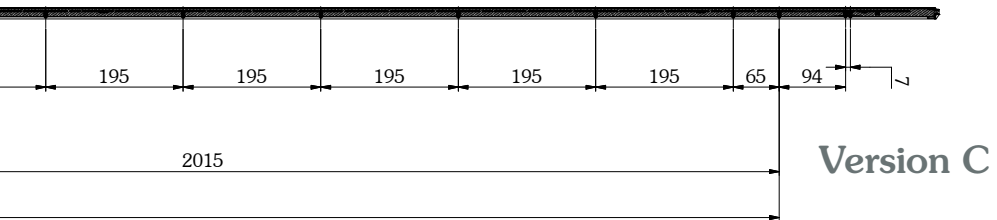
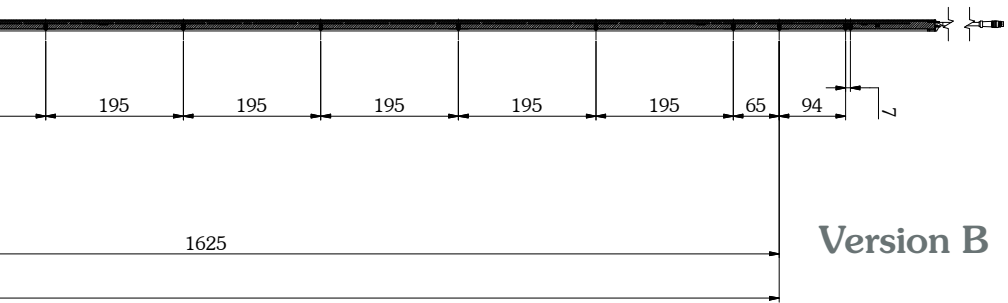
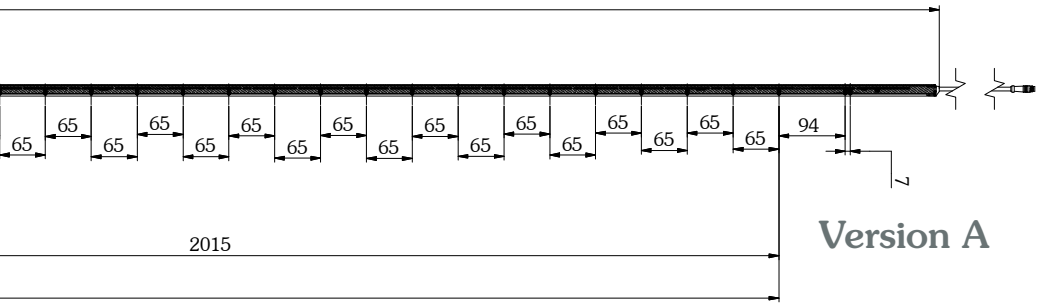
2555mm active detection zone, 44 channels

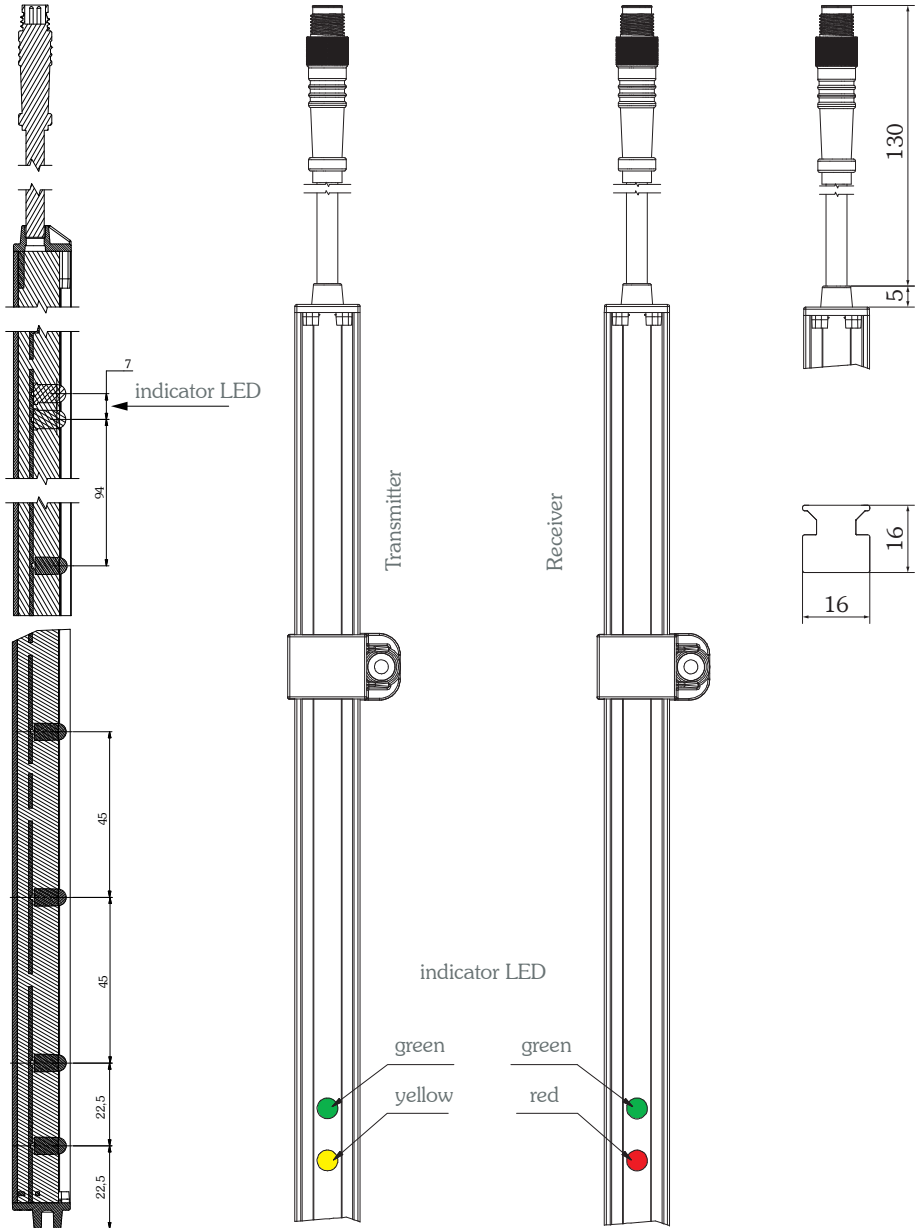


2555mm active detection zone, 28 channels



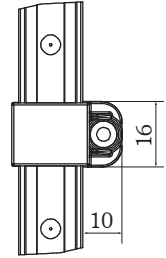
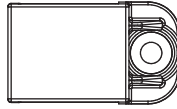
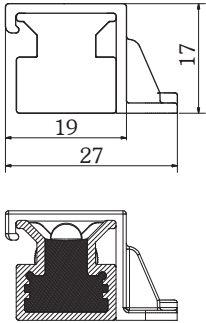
2555mm active detection zone, 24 channels



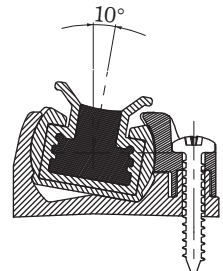
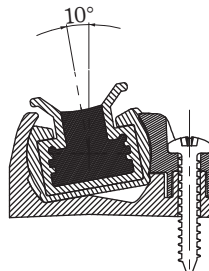
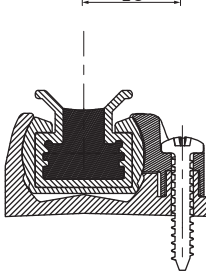
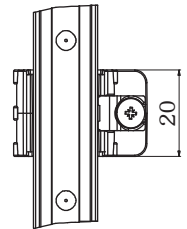
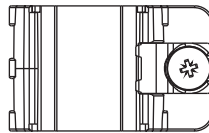
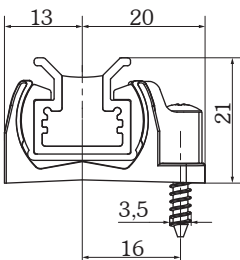


Mounting materials

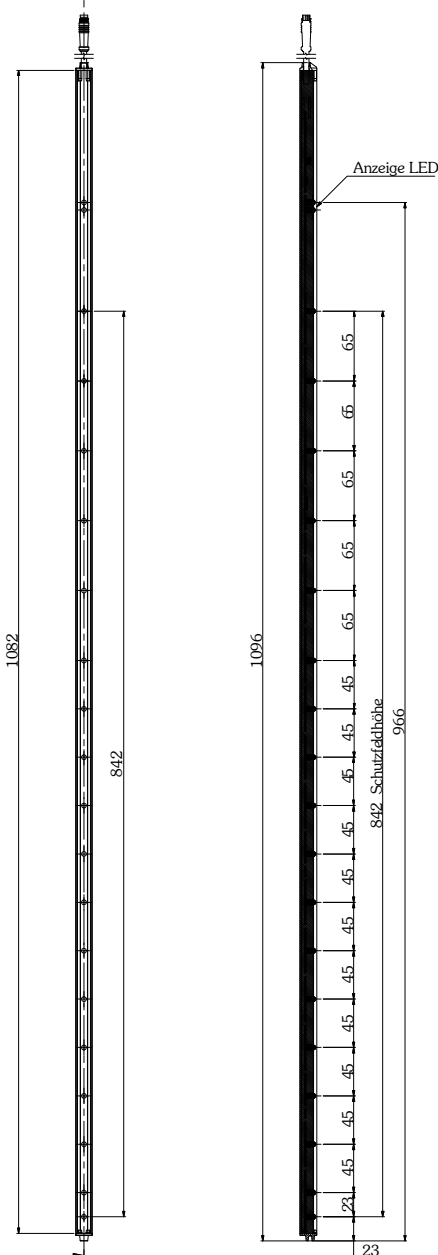
LIGI-HK 10 fixing clamp



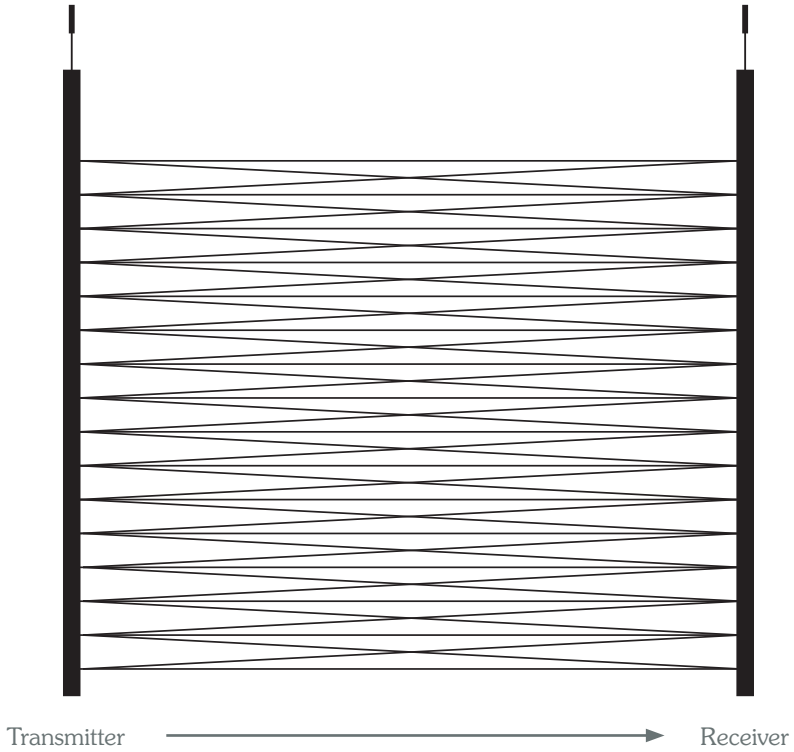
LIGI-JK 10 alignment clamp



DEGI 18 channels



Example DEGI 16 channels with cross beams





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