

LVB Control Unit

Features

The LVB control unit has the following features:

- One transmitter/receiver set can be connected.
- Relative switching threshold for reliable object recognition.
- Increased safety: safe shut down on contact bonding and no blanking of defect beams.
- Floating relay contacts.

General description

The device switches when one or more beams are interrupted.

The output relays have positively driven contacts (2xreverser), each with one break contact lead back to a digital input. That ensures the detection of a failure („contact did not open“) of the brought out normally open contact. A watchdog unit cuts off the relays at a failure of the microcontroller.

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Extended functionality

If necessary your technical support can change parametrisation or do additional diagnosis by using the serial interface.

The following functions are disabled on delivery status, but can be enabled by parametrisation:

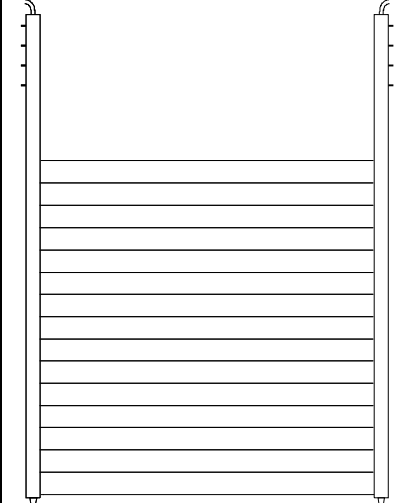
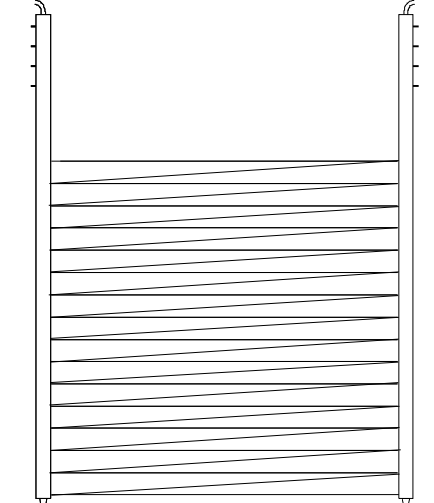
Auto blanking

Interrupted beams are automatically blanked if the configuration value "Auto blanking on cal." is set to "1".

Please notice that beams must be covered completely for the auto blanking procedure. If beams are blanked LED A turns on.

Diagonal beams

With additional diagonal beams the protection density of your light grid system can be increased.

Status	Diagonal beams off (standard)	Diagonal beams on
View		

Self calibration

On self calibration the controller set up the correct gain for the connected light grid set, determines the profile length and executes an error test. During self calibration the monitoring area has to be uninterrupted (Exception: see automatic blanking).

Procedure:

1. Supply voltage must not be turned on.
The device has to be turned off.
2. No beam is interrupted.
3. Set DIP-switch 3 to position "on".
4. Power-on the device.
5. Take notice of the LEDs:
The green LED D should illuminate permanently.
No red Error-LED is flashing or light up permanently.
6. Set DIP-switch 3 back to position "off" while the system stays powered up => D the controller stores the calculated values to the EEPROM and turns back to normal operating mode.
If you don't want to store the new values, turn off the supply voltage while the DIP-switch 3 is still in position "on".



LED states during self calibration

	LED			Status
	D	E	Rx, Tx	
	on	off	off	Self calibration o.k.
	off	on	off	Could be accepted Possible causes: <ul style="list-style-type: none"> Distance between receiver and transmitter is too large => reduce distance or use transmitter with option „increased power“. Individual beams covered or polluted. Difference between the intensity of the brightest and the darkest beam is too large.
			on or flashing	Self calibration failed! Individual beams are detected as defective. The system will only run in emergency operation!

Additional LED-combinations see chapter LEDs

Tip:

For use in elevators do the self calibration while the doors are open. Otherwise the light curtain could switch during the elevator ride.

LEDs

The LVB indicates operational errors and faults via the eight adjacent LEDs RX, TX, A... F. If the status is normal, LEDs C, D, E, F indicate the signal strength. Please note that the error cannot be localized with 100 percent accuracy. The LEDs only provide you with a good idea of where to start looking.

LED A

	Signal	Status	Possible causes
	A (yellow) illuminated	Warning	Blanked beams, watchdog.

LED B

	Signal	Status
	Even flashing (approx. 2 Hz)	Normal operation.
	Continuously on or off	serial communication "crashed", defective

Fault LEDs

	Signal	Fault
	RX (red) illuminated	Receiver
	RX & TX illuminated	Control unit

	Signal	Fault
	TX (red) illuminated	Transmitter

Special LED combinations

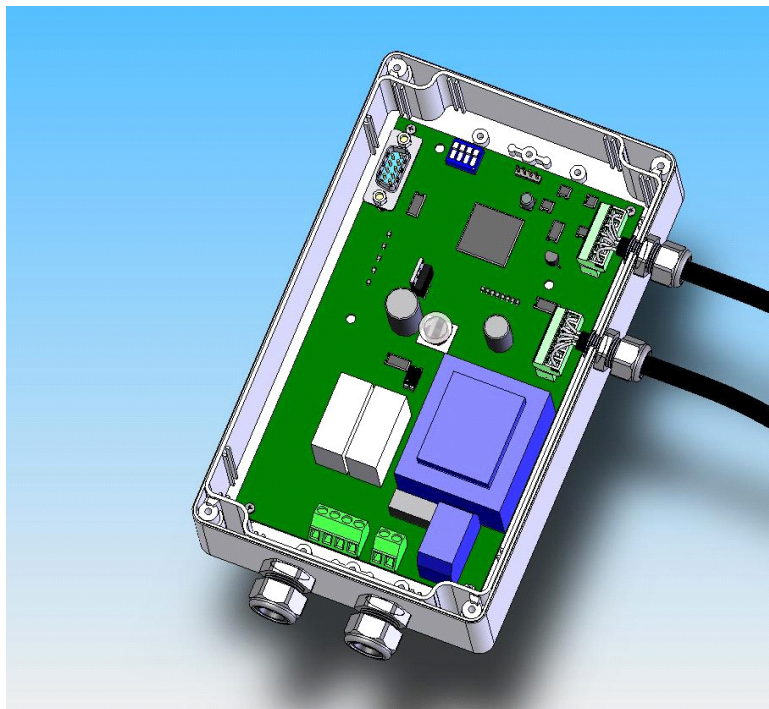
	Hardware fault, please inform manufacturer
	Length of connected rods does not correspond with stored values => perform self-comparison (self-test)

	Hardware fault, please inform manufacturer
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Initial operation

Please notice the mounting instructions for light grids! (Page 9)

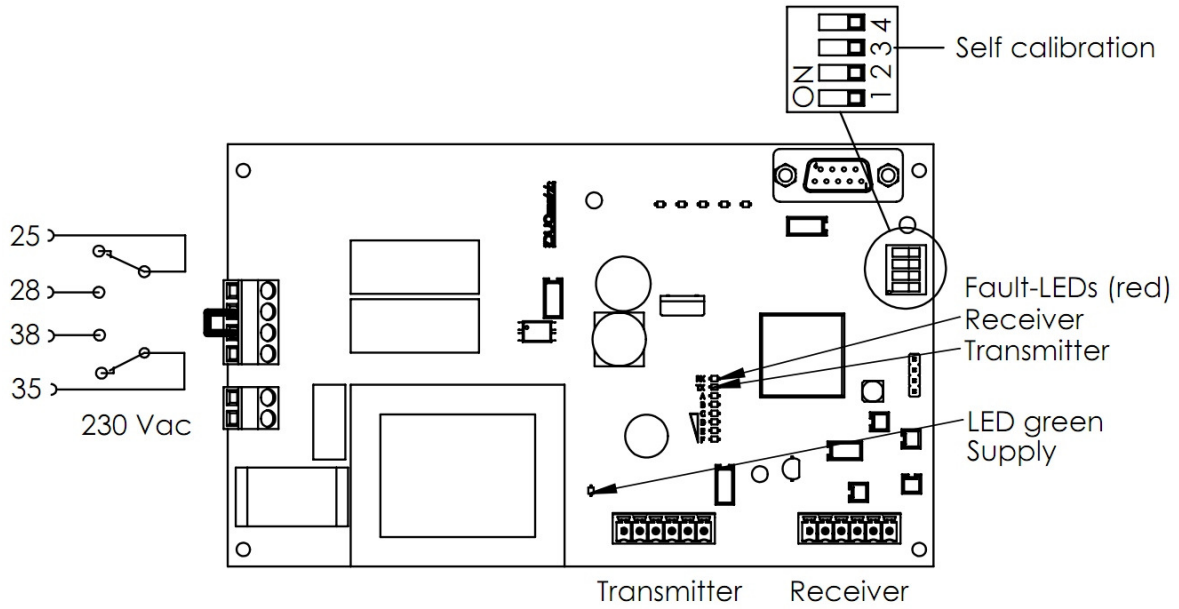
1. Remove the top of the housing and fasten the base.
Use only the specified holes for mounting the housing!
See housing diagram on page 12.
2. Plug in the connectors of transmitter and receiver, screw in the fittings loosely.
3. Set DIP 3 to „on“ for self calibration. (See page 4)
4. Connect the relay contacts.
5. Connect the power supply.
Set DIP-3 to „off“ to complete self calibration.
6. Verify that the light grid is working correct in the entire monitoring area.
7. Screw the top on the housing in its place again.
8. Screw in the fittings tight.



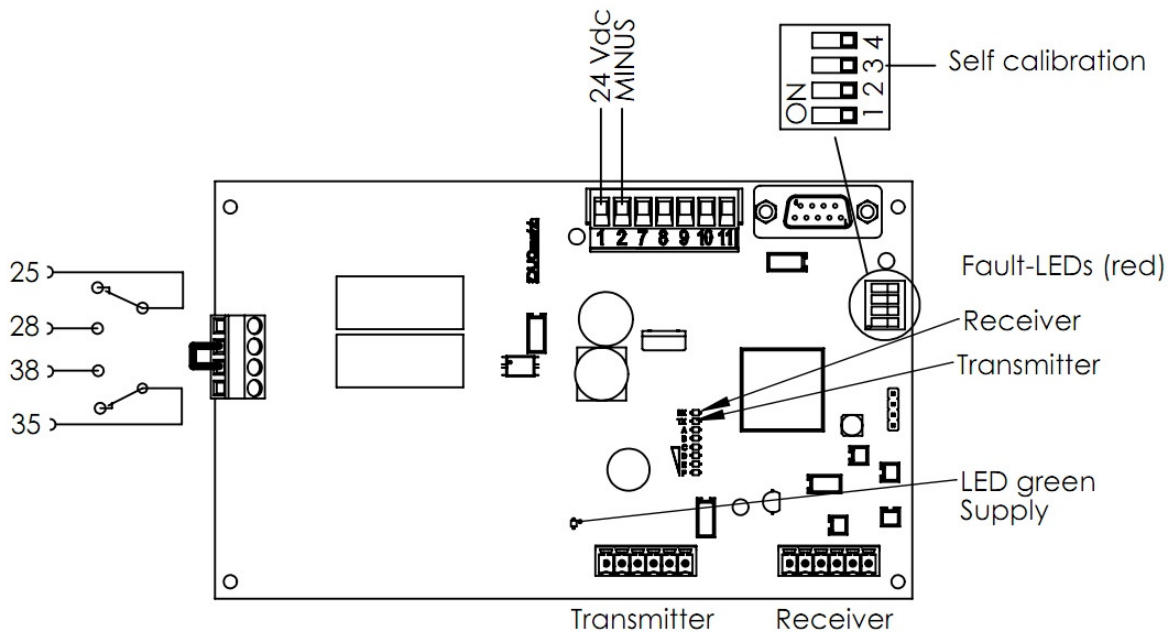
Version LVB

Circuit board view

LVB



LVB-24V



LVB

DIP-Switch

	DIP 1: ON	Firmware update
	DIP 2: ON	Command mode ¹
	DIP 3: ON	Self-calibration when power on the device
	DIP 4	For special use

Pin assignments LVB-24V

Terminal	Des.	Comment / Function
1	+24 Vdc	
2	Minus	
7-11		Do not use!

Connecting the profiles

- Disconnect power supply.
- Do not switch connections!
The light grid profiles can be damaged if poles are switched.
- Pay attention to the connector coding:
Plug components will only plug into the respective socket components.

Profile connection wiring	Detail	Color assignments ²					
Standard		White	Gray	Yellow	Brown	Green	Shielding

Connector configuration of **receiver bars** for isolated mounting or with double shielding:

Profile connection wiring	Detail	Color assignments					
Standard		White and Shielding	Gray	Yellow	Brown	Green	

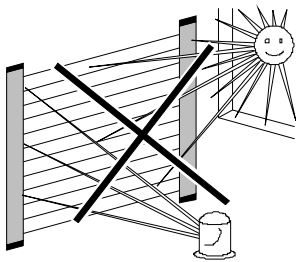
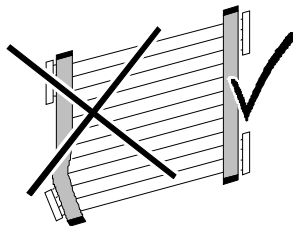
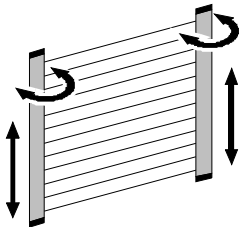
Note:

Ground of the serial interface is connected to the housing of the receiver.
For connecting to the serial interface we recommend the usage of a "RS232 isolator".

¹ See technical information on functions and parameter definition for LVX/LVE
² For Standard-Wiring. Color assignments of special wiring can differ from this table

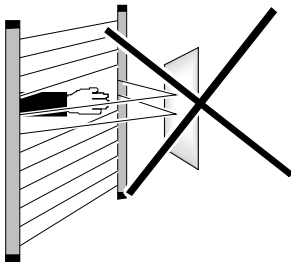
Mounting Instructions for Light Grid Profiles

- Disassembling of the plug components is not necessary.
- Profiles must be off-circuit when connecting or disconnecting the power supply.
- Do not switch connections!
The light screen rods can be damaged if poles are switched.
Pay attention to the connector coding:
Plug components will only plug into the respective socket components!
- The front panel must not be scratched. It must be kept free of obstacles and it must be kept clean (do not use any cleaning agents containing solvents).
- Use a test pin to check that the light grid is working in the entire monitoring area.



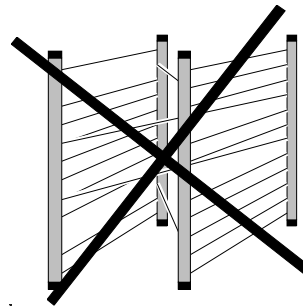
- It is generally not necessary to align the bars exactly. It should nevertheless be possible to adjust the bars in specific cases. The bars may also need to be moveable longitudinally.
- The monitored area between the transmitter and receiver bars must be clear of obstructions so that the bars can “see” each other.
- Assemble with the power supply disconnected. Do not expose the bars to stress.
- Avoid ground loops: Bar pairs must have the same earth potential.
- Avoid the effects of external light sources (e.g., from flashlights or sunlight) on the receiver.
- Condensation, fog or smoke can impair the functioning of a light grid.

LVB



- Danger from reflective surfaces: Reflective surfaces in the area around the light curtain must be avoided. Otherwise obstructions will not be detected.

- Avoid optical sensors from mutually affecting each other (e.g., other light curtains, light barriers)



Important notes concerning usage and handling



- The light grids are not certified security light screens according to EN 61496. They are not safety components in accordance with EU machine guidelines 89/392/EWG with supplement 93/44/EMW appendix 4. Therefore, they must not be used to protect individuals from danger.
- Handling of the devices and connecting/disconnecting lines is only permitted with the operating voltage switched off.

Conformity

Light grid systems consisting of wire-pair type LI and controller LVE carry the **CE** stamp and meet the requirements of the following standards:



- Emitted interference: EN 61000-6-3:2001.
- Interference resistance: EN 61000-6-1:2001.

Technical data

Transmitter/Receiver pairs	Terminals for connecting 1 light grid set Type LI, Design-Code (AC): 00000000B (pre-assembled M12 fittings), max. 500 beams (diagonal beams counted)
Cycle time	Depends on range and parameter definition from approx. 80µs/beam.
Power supply LVB LVB-24V	230 Vac (+5%/-10%) 24 (19...30) Vdc (grounded power supply)
Power consumption	10VA, approx. 8.5 Watt
Relay contacts	Closed while no beam is interrupted (standard) Switching current min./max. 10mA / 8 A Switching capacity min./max. 3 VA / 2000 VA respectively 3 W / 200 W
Connectors	Spring-type terminal allowed wire cross sections (min./max.) in mm ² for static wires 0,2/1,5 for flexible wires 0,2/1 for flexible wires with wire end ferrule with and without plastic sleeve 0,25 /0,75
Range	with standard transmitter/receiver 400...6000 mm
Temperature	0...+40 °C
Humidity	up to 90% relative humidity, non-condensing

Enclosure

Material	ABS, gray		
Fitting	2xM16 for cable diameter 3,5...10 mm		
	2xM12 pre-assembled on the connecting cable of the light grid set (AC: 00000000B); not included in delivery of the LVB!		
Protection	IP54		
Dimensions	Length	Width	Height
	200 mm	120 mm	58 mm

