

Installation and Operating Instructions Light grid controller DLVE

Function

DLVE controllers are control devices for light grids type LI. They control the measuring process, convert signals and analyze measurement data. Additionally, they function as input terminals for supply voltages as well as switching signal outputs and inputs. Configurable parameter sets support the device setup.

Intended use

DLVE controllers are used in combination with LI light grids for the detection of objects in defined control areas as part of a higher-level overall system.

Conformity

The product complies with the following standards:

EC Directive	2004/108/EC	
EMC Emissions	EN 50011	
EMC Immunity	EN 61000-4-3/6	
IP Rating	EN 60529	
cCSAus	UL 61010-1 (Third Edition):2012-05; CAN/CSA-C22.2 No. 61010-1-1	

The manufacturer possesses a certified quality management system in accordance with DIN EN ISO 9001:2008.

Assembly

The controller shall be mounted on a DIN-rail which shall be positioned in the control cabinet.

Technical data

Number of profile pairs	1 (Type LI)
max. number of beams	500 beams (diagonal beams are counted), 600 beams with special SW
Cycle time	~ 30µs/beam, depending in range and parameterization
Range	0.25...6.0 m (with standard profiles)
Operating voltage	24 VDC (18...30 VDC) with 5% ripple
Power consumption	4.2 W
Serial communication	9 pin D-Sub connector
Inputs	24 VDC, 12 mA, 3 kHz
Outputs	24 VDC, 0,25 A, PNP, short-circuit-proof
Temperature	-25 ... +40 °C
Humidity	Up to 90% relative, non-condensing

Enclosure

Type	DIN rail module
Weight	140g
Dimensions	88mm (L), 126mm (W), 60mm (H)
IP class	IP00, interior usage
Altitude	< 2000 m
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Pin assignments

Terminal	Reference	Description / function
1	+24 VDC	
2	GND	
7	OUT 1	Switching output 1
8	IN 3 / OUT 2	combined IO: Input 3; Output 2
9	IN 2 / OUT 3	combined IO: Input 2; Output 3
10	IN 1 / OUT 4	combined IO: Input 1; Output 4
11	IN 1	Input 1

DIP-switch

At delivery and in normal mode all DIP switches are in OFF state.

Functions

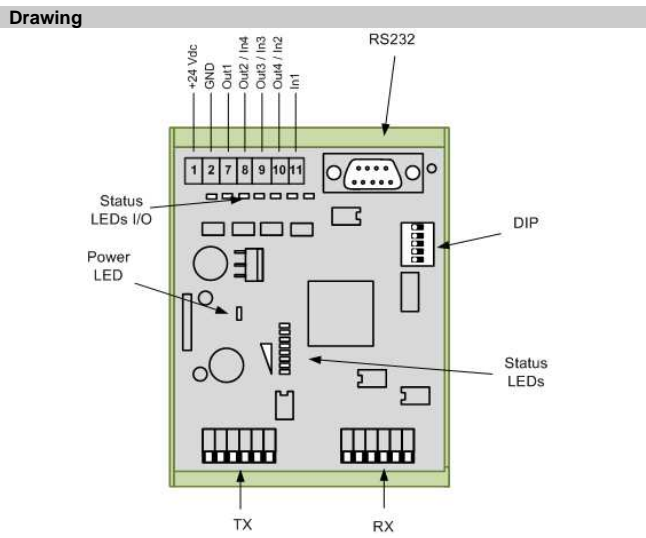
DIP 1: ON	Firmware update
DIP 2: ON	Command mode
DIP 3: ON	Calibration
DIP 4	For special use

Interfaces

RS232

Baudrate:
300...115200 (configurable), 8n1

PIN	Description
1, 4, 6-9	-
2	RxD
3	TxD
5	GND



Status LEDs

The LVX 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 errors cannot be localized with 100% 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
Double-flash	Configuration mode
continuously ON or OFF	Sync error, serial communication "crashed", defective

Error-LEDs

Signal	Error
RX (red) on	Receiver A
TX (red) on	Transmitter A
RX & TX on	Controller; SyncError

Special LED combinations

Description	Description
Hardware fault, please inform manufacturer	Hardware fault, please inform manufacturer
Parameter outside of permitted limit values => correct in configuration mode (reset to defaults if necessary)	Length of connected profiles does not correspond with stored values => perform calibration

Parameterization

The shipped module has a factory installed configuration according to the discussed functionality. Refer to details in the parameterization document.

Should it be necessary to change this parameterization then follow the the instruction in the parameterization documentation.

Command-mode

Connect the controller to the PC via a null modem cable. Use the following terminal program settings for establishing communication with the controller:

Baud rate	115200bps
Priority	none
Data bits per Byte	8
Number of Stopbits	1
Flow control	None
Delay	50 ms

Please verify that the correct COMport is selected.

Activate Command mode

Set DIP-switch 2 to "on". The light grid will respond with a status message, a line prompt and any available error messages.

```

LVXE HW=X100 FW=X281 HS311, 500 beams, S/N ....., cycle
time 0us
command mode (h for help)
->
    
```

Now the controller can be queried and configured with corresponding commands. Refer to details in the parameterization document.

- Installation**
- Mount the light grids according to the installation instructions.
 - Snap the controller onto the DIN rail.
 - Connect the transmitter and receiver to the corresponding connectors.
 - Connect the interfaces.
 - Connect all I/Os as necessary for the application.
 - Connect the supply voltage to the corresponding terminals.
 - Turn on the device by connecting the supplies.
 - Execute a calibration sequence.
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Calibration

During calibration the controller sets up the correct signal gain for the light grid profiles, stores the profile configuration and executes an error-test. The calibration has to be done with an uninterrupted monitoring area. (Exceptions: see chapter auto blanking in the parameterization documentation).

- Procedure:**
- Supply voltage must not be turned on. The device has to be turned off.
 - Set DIP3 to ON. → Calibration cycle started
 - Power up the device.
 - Signal-LED D is green. → Calibration successful
 - Set DIP3 to OFF. → Sensitivity data and configuration data are stored
- => If you don't want to save the settings: turn off the device while DIP3 is still in „ON“ position.

Note:

If the device is turned off while saving is in progress (before LED "B" flashes), unexpected beam blankings could occur.

LED-display during calibration

	LED			Description
	D	E	Rx, Tx	
	On	Off	Off	Calibration OK.
	Off	On	Off	Calibration acceptable. Possible reasons: - Distance between sender and received too large => Reduce distance; use senders with "extended range" option - Individual beams interrupted or profile contaminated - Intensity differences between strongest and weakest beam to large
	On or Off	On or Off	On or flashing	Calibration failed Individual beams have been recognized as faulty. Only limited functionality available!

Connecting light grids

All wiring and connections have to be done in an EMC-compatible manner! Take special notice that unshielded parts of a cable shall not exceed 2cm.

Don't mix up assignments! The light grid profiles can be damaged as a result of mixed up pin-assignments.

Special connector cables often differ in the pin-assignment. In case of doubt please call our technical service for information.

