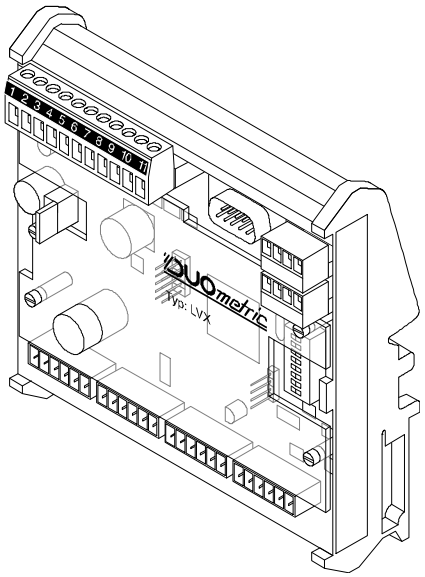
Hardware description – Date 2013-02-28

LVX Control Unit



Features:

- Most parameters can be defined as required for your interfaces. You decide which information is output and how.
- Fast cycle times, just a few µs/beam.
- Maximum beam-count 500.
- Two transmitter/receiver sets can be connected
- Numerous extension capabilities.
- Relative switching threshold for reliable object recognition.
- …

Additional information:

- Technical information on functions and parameter definition for LVX/LVE
- Initial configuration of LVX/LVE

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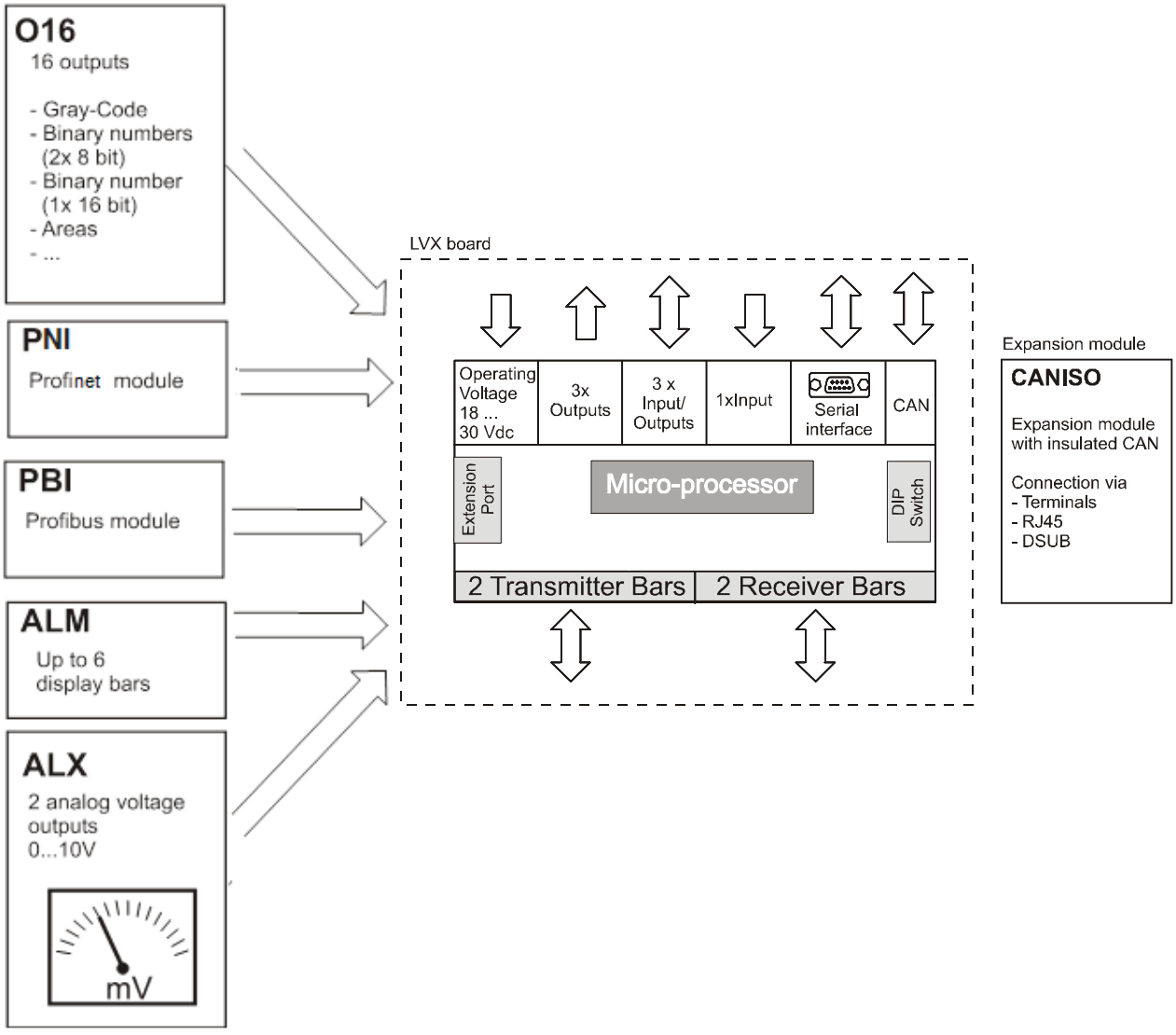
Transmitters/Receivers

A large selection of beam-resolutions and fastening options (mechanical fastening equipment) are available.

Additional publication
Light Grids

Communication schematic

Extension modules

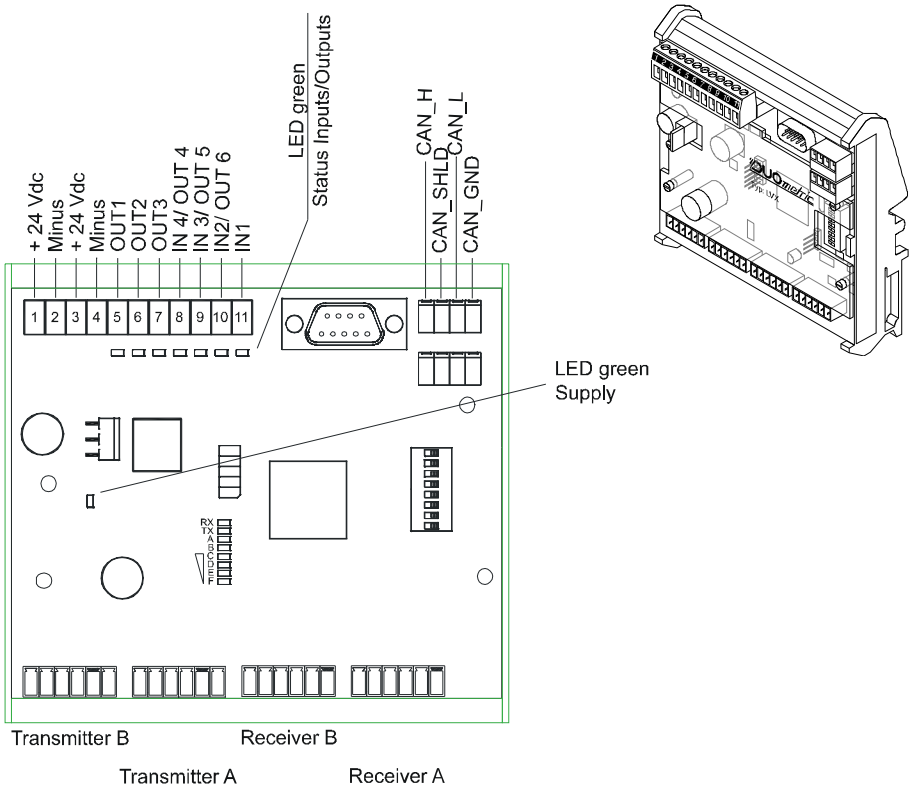


LVX

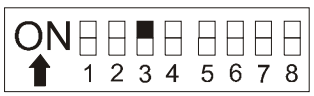
LVX short description

- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs, 3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)

LVX circuit board



DIP switch

	DIP 1: ON	Firmware update
	DIP 2: ON	Command mode[1]
	DIP 3: ON	Self-calibration when switching on the device[2]

[1] See technical information on functions and parameter definition for LVX/LVE

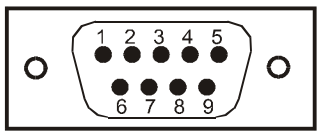
[2] See technical information: Initial configuration LVX/LVE

LVX terminal pin assignments

Terminal	Description	Comment / Function
1	+24 VDC	
2	Minus	
3	+24 VDC	
4	Minus	
5	OUT 1	Switching output 1
6	OUT 2	Switching output 2
7	OUT 3	Switching output 3
8	IN 4/ OUT 4	Combined IO: Input 4; Output 4
9	IN 3/ OUT 5	Combined IO: Input 3; Output 5
10	IN 2/ OUT 6	Combined IO: Input 2; Output 6
11	IN 1	Input 1

Serial Interface

9 pin D-type (male)



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

LVX technical data

Maximum number of beams	500 beams (diagonal beams included)
Transmitter/Receiver pairs	Terminals available for connecting 2 transmitter/receiver sets
Cycle time	depends on range and parameter definition from approx. 50µs/beam
Power supply	24 (19…30) VDC (grounded supply)
Current consumption	approx. 7 Watt[3]
Inputs	24 VDC, 12 mA, 3 kHz
Outputs	24 VDC, 0.25 A, PNP, short-circuit protected
Range	with standard transmitter/receiver 250 … 6000 mm
Temperature	-25 to +40 °C
Humidity	up to 90% relative humidity, non-condensing
Serial interface	9 pin D-type, Baud rate 300 ... 115,200 (parameter definable), 8n1

LVX mechanical data

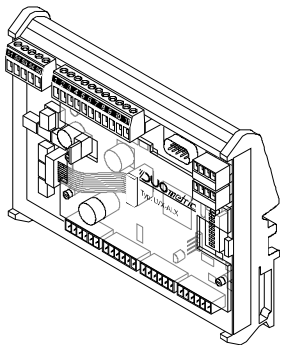
Type	DIN rail mounting module		
Protection Class	IP00		
Weight	about 180 g		
Dimensions	Length	Width	Height
LVX	125 mm	126 mm	60 mm

[3] The peak power of 7 Watts is consumed with:
- Maximum range of the light grids.
- Sender version with amplified transmitter power.

For shorter ranges, the power consumption is under 3 Watts.
These values apply for the specified range of voltage supply.
If low voltage is supplied, the current consumption can increase to almost 500 mA.
Be careful when using power supplies with current restriction!

LVX-ALX

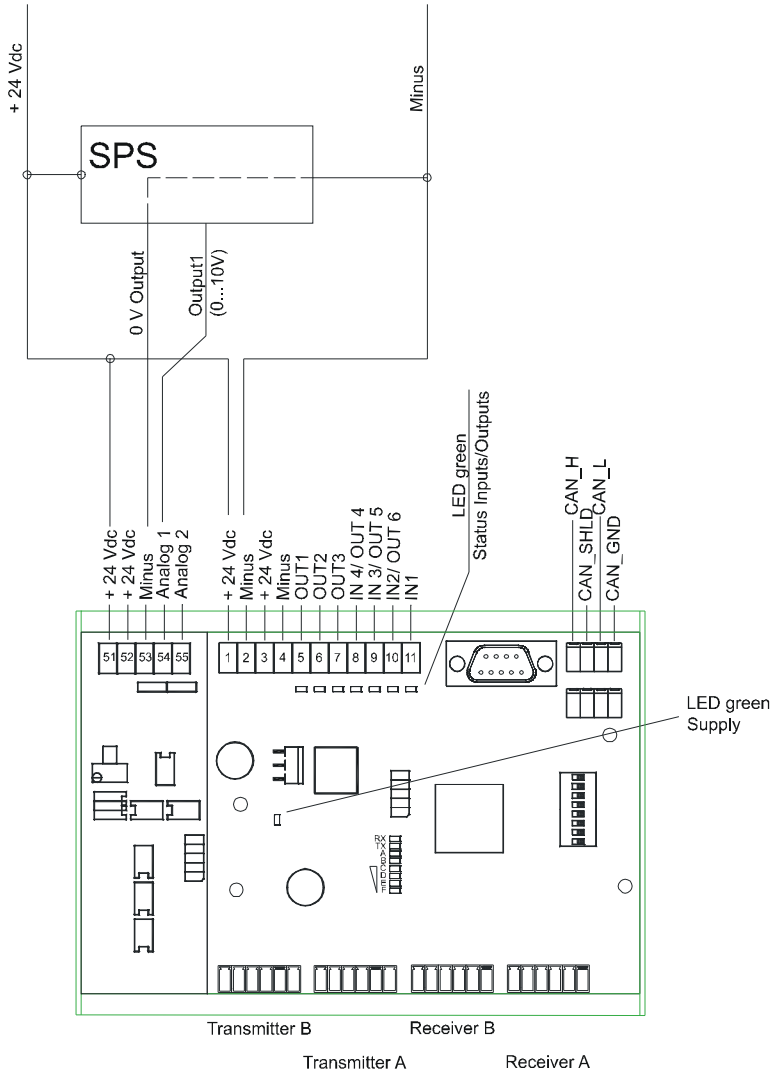
LVX-ALX short description



LVX with extension board ALX (2 x analog outputs 0…10V).

- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs, 3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)
- ALX extension module: 2 x analog outputs 0 ... 10V

LVX-ALX circuit board and connection diagram



LVX-ALX terminal pin assignments

see LVX terminal pin assignments (Page 5).
ALX extension module:

Terminal	Description	Comment / Function
51	+24 VDC	
52	+24 VDC	
53	Minus	
54	Analog 1	Output 1 (0…10 V)
55	Analog 2	Output 2 (0…10 V)

LVX-ALX installation notes

The extension board is electrically isolated from the LVX base-board and must be connected separately.
The operating current of approx. 30mA in the "0V" supply line causes a drop in voltage which influences the measurement results.
Therefore, you should be sure to:

- run this line directly to the reference potential of the signal sink (e.g. PLC).
- connect no other consumers.
- use a sufficient wire gauge.
  A line resistance of 1 Ohm causes a measurement error of 30mV and requires 0.75 mm² wire cross-section for a 40 m cable.

The feed for the +24V supply is not critical.

LVX-ALX technical data

Operating voltage	20,4…26,4 VDC
Current consumption	approx. 30 mA (without output load)
Output	Short-circuit protected: one output continuous
Load resistance	min. 1 kΩ, loads only allowed to 0 V

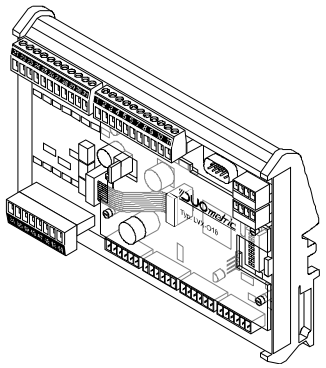
LVX-ALX housing

Type	DIN rail mounting module		
Protection Class	IP00		
Dimensions	Length	Width	Height
LVX-ALX	161 mm	126 mm	60 mm

LVX-O16

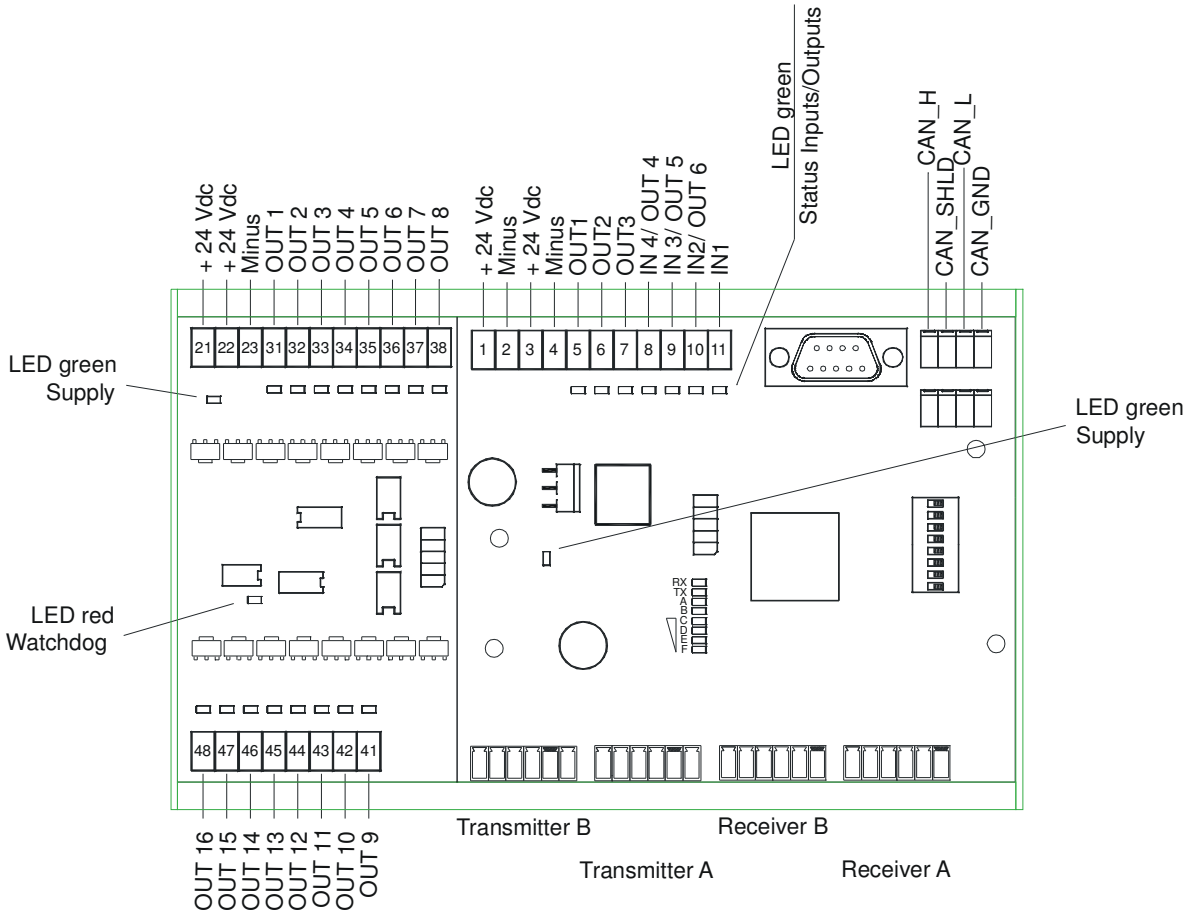
LVX-O16 short description

LVX with extension board O16 (16 outputs)



- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs, 3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)
- Extension module O16: 16 outputs

LVX-O16 circuit board



Notes on the LED Watchdog:
The LED is illuminated when the LVX is not sending data, e.g. in configuration mode or if there is no supply voltage. All outputs of the O16 are then inactive.

LVX-O16 terminal pin assignments

see LVX terminal pin assignments (Page 5).
Extension module O16:

Terminal	Description	Comment / Function
21	+24 VDC	
22	+24 VDC	
23	Minus	
31	OUT 1	Switching output 1 (extension board O16)
…		
38	OUT 8	Switching output 8
41	OUT 9	Switching output 9 (extension board O16)
…		
48	OUT 16	Switching output 16

LVX-O16 technical data

LVX technical data

Outputs O16	24 VDC, 0.2 A, PNP, short-circuit protected

LVX-O16 housing

Type	DIN rail mounting module		
Protection Class	IP00		
Dimensions	Length	Width	Height
LVX-O16	184 mm	126 mm	60 mm

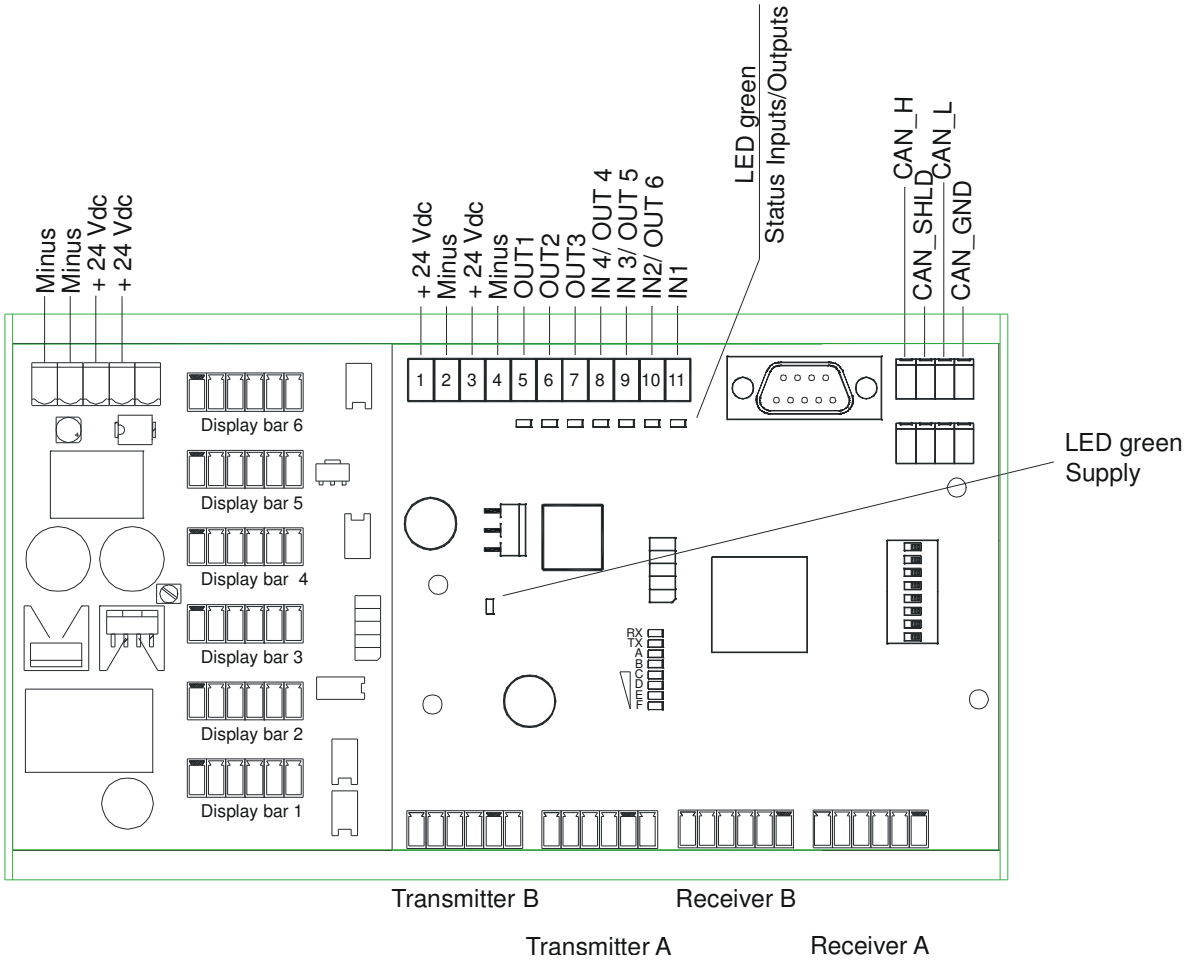
LVX-ALM

LVX-ALM short description

LVX with extension board ALM

- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs, 3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)
- ALM extension module: Up to 6 display bars can be connected

LVX-ALM circuit board



LVX-ALM terminal pin assignments

see LVX terminal pin assignments (Page 5).
ALM extension module:
Power supply and terminals are connected according to the circuit board diagram.

LVX-ALM technical data

LVX technical data

Display bar connections	6 pieces, each with max. 60 beams Connections via plug-in terminals Max. 250 simultaneously illuminated LEDs
Power supply	24 (19…30) VDC (grounded supply)
Current consumption	approx. 41 Watts with 240 illuminated LEDs (Standard edition of display bars)

LVX-ALM housing

Type	DIN rail mounting module		
Protection Class	IP00		
Dimensions	Length	Width	Height
LVX-ALM	200 mm	126 mm	60 mm

Notes

- The LVX automatically determines the length of the connected display bars during the self-comparison test.
- Connections for display-, transmitter- and receiver-profiles are coded and cannot be plugged into the wrong terminal.

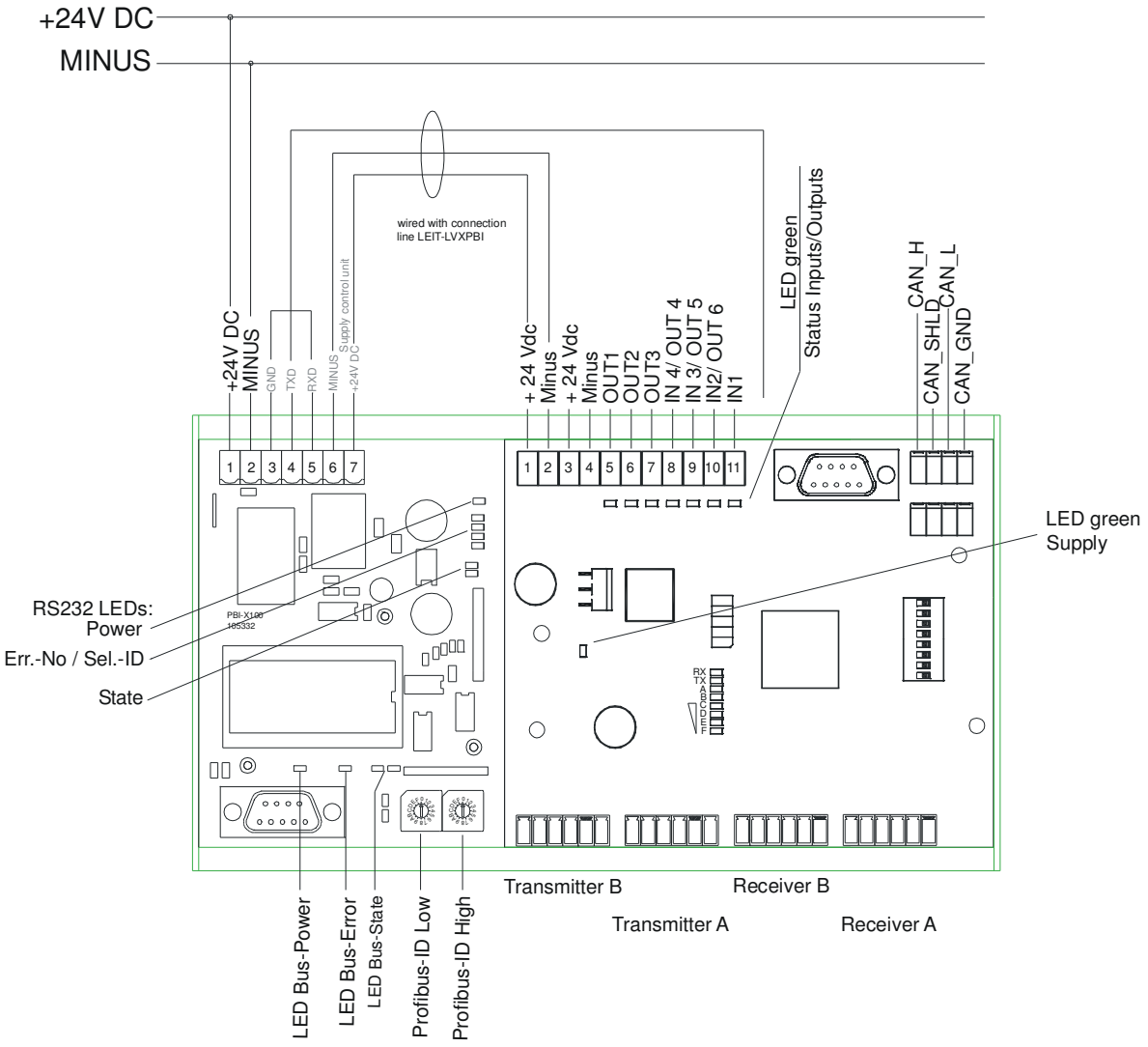
LVX-PBI

LVX-PBI short description

LVX with extension board PBI for Profibus connection

- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs,
  3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)
- Extension module PBI for Profibus connection incl. connection cable LEIT-LVXPBI

LVX-PBI circuit board and connection diagram



LVX-PBI terminal pin assignments

see LVX terminal pin assignments (Page 5). Inputs and outputs not wired.

PBI extension module:

Terminal	Description	Comment / Function
1	+24 VDC	
2	Minus	
3…7		Connecting cable to LVX

LVX-PBI technical data

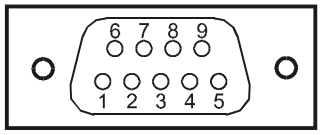
LVX technical data

LVX-PBI housing

Type	DIN rail mounting module		
Protection Class	IP00		
Dimensions	Length	Width	Height
LVX-PBI	200 mm	126 mm	60 mm
PBI (alone)	80 mm	126 mm	60 mm

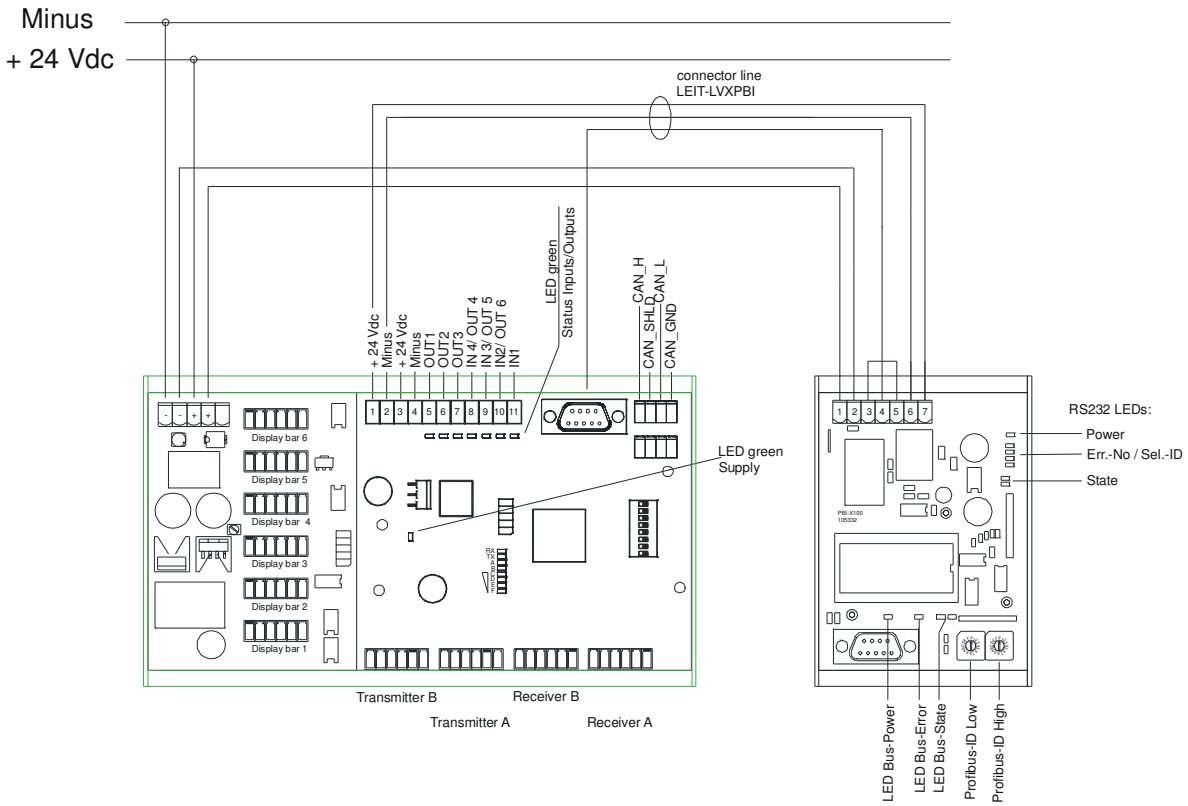
Pin assignment Profibus

9 pin D-type (female)



PIN	
1	Shield
2	-
3	Data Line Plus (B)
4	Do not connect!
5	GND
6	+5V
7	-
8	Data Line Minus (A)
9	Do not connect!

LVX-ALM and PBI connection diagram



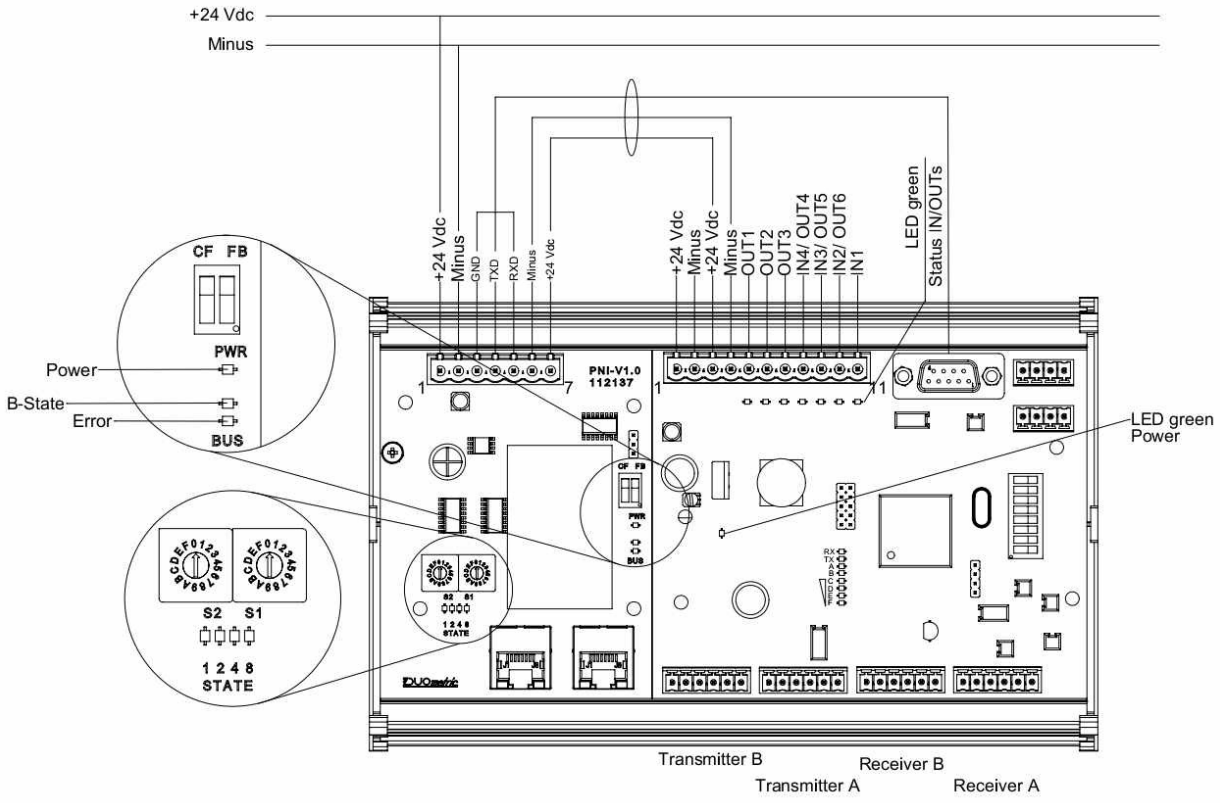
LVX-PNI

LVX-PNI short description

LVX with extension board PNI for Profinet connection

- Two transmitter/receiver sets can be connected
- 24 VDC
- Interfaces: RS232, CANopen, 3 x outputs,
  3 x combined input/outputs, 1 x input
- Diagnostic LEDs
- Parameter definable functions
- DIN rail mounting module (IP00)
- Extension module PNI for Profinet connection incl. connection cable LEIT-LVXPBI

LVX-PNI circuit board and connection diagram



LVX-PNI terminal pin assignments

see LVX terminal pin assignments (Page 5).
Inputs and outputs not wired.

PNI extension module:

Terminal	Description	Comment / Function
1	+24 VDC	
2	Minus	
3…7		Connecting cable to LVX

LVX-PNI technical data

LVX technical data

LVX-PNI housing

Type	DIN rail mounting module		
Protection Class	IP00		
Dimensions	Length	Width	Height
LVX-PNI	200 mm	126 mm	60 mm
PNI (alone)	80 mm	126 mm	60 mm

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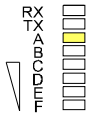
LEDs

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 the error cannot be localized with 100 percent accuracy. The LEDs only provide you with a good idea of where to start looking.

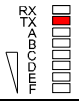
LED A

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

LED B

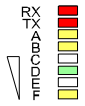
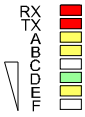
	Signal	Status
	Even flashing (approx. 2 Hz)	Normal operation.
	Double-flash	Configuration mode
	Continuously on or off	Synchronization fault, serial communication "crashed", defective

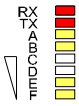
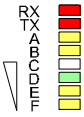
Fault LEDs

	Signal	Fault
	RX (red) illuminated	Receiver A
	TX (red) illuminated	Transmitter A
	RX & TX illuminated	Controller; Synchronization fault

	Signal	Fault
	RX (red) flashing	Receiver B
	TX (red) flashing	Transmitter B

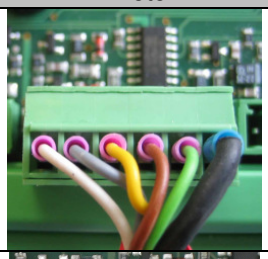
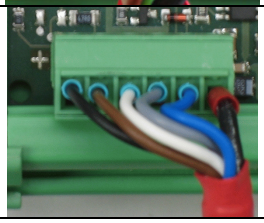
Special LED combinations

	Hardware fault, please inform manufacturer
	Parameter outside of permitted limit values => correct in configuration mode (reset to defaults if necessary)

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

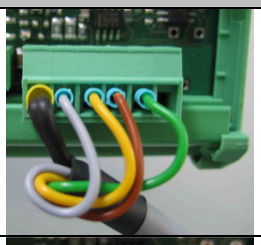
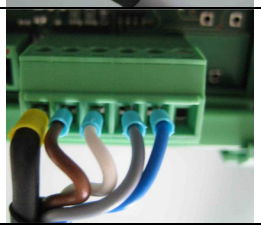
Connecting the light grid profiles

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

Grid connection wiring	Photo	Color assignments					
Standard and option A8=H		White	Gray	Yellow	Brown	Green	Shielding
M12, 5 pin plug/socket		Black	Brown	White	Gray	Blue	Shielding

The M12-connector housing and the light curtain housing have the same electric potential.

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

Grid connection wiring	Photo	Color assignments					
Standard and option A8=H		White and Shielding	Gray	Yellow	Brown	Green	
M12, 5 pin plug/socket		Black and Shielding	Brown	White	Gray	Blue	

The M12-connector housing is connected to 0V and has to be isolated.

Important notes concerning usage and handling

- The light grids are not certified security light curtains according to EN 61496. They are not safety devices 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 supply voltage switched off.

Conformity

Light grid systems consisting of profiles LI and controller LVX 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.