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Operation Manual for Sensor Interface LCV-USB2



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2 Imprint

Manufacturer, Place	Lorenz Messtechnik GmbH, D-73553 Alfdorf.
Valid for...	LCV-USB2 series
Copyright	© 2011 Lorenz Messtechnik GmbH, Alfdorf[1].
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3 Remarks

3.1 Designation of the Remarks

If possible remaining dangers emerge during the operation with VS2, this will be indicated by the following symbols in this operation manual:



Note:
Important points to consider

3.2 Safety Notes

3.2.1 General References

The enclosed operating instruction is intended for technically qualified personnel who have corresponding knowledge in the field of measurement and industrial process & control technology.
The precise information about all safety notes contained in this operation manual and warnings, as well as its perfect technical implementation are precondition for the safe installation, the initiation, the secure operation and the maintenance of Lorenz Messtechnik GmbH technology devices. For this purpose it is absolutely necessary that all measures are carried out by qualified personnel. All persons concerned with the project planning, installation and service of Lorenz Messtechnik GmbH devices, must be familiar to the security concepts in automatic control and should be qualified in this sense.
For clarity reasons, the enclosed operating instruction cannot represent complete details in all conceivable cases of applications for the handling of Lorenz Messtechnik GmbH devices. Further, we cannot consider the entire types of installation, handling and maintenance. If you wish further information or if special problems occur, which were not, or not at length represented in this operating instruction, contact us, please.

The oblivion of the safety notes can and will lead to material damages, body injuries and death.

Lorenz Messtechnik GmbH devices may only be operated in accordance with the applications described in this operation manual. Built-in devices may only be operated in appropriate installations.

With the connection and the initiation of the device, the customer accepts the general sale and delivery conditions of Lorenz Messtechnik GmbH. Further, he accepts eventually incomplete operation manuals. The information described is without guarantee. Errors and changes are reserved.

3.2.2 Intended Purpose, Improper Usage

A Lorenz Messtechnik GmbH device is used for displaying, processing and controlling or regulation of processes. It shall not be used as the only tool for the prevention of dangerous states to machines and plants. Machines and plants must be constructed in such a way, that erroneous states cannot lead to a dangerous situation for the staff (e.g. by independent limit switches, mechanical locking devices). It must be guaranteed in particular that device-operating errors, its malfunction or its breakdown do not lead to great property damages or danger for the staff. Consequently, the device then can be used to prevent the machine or the technical installations from error conditions.
It is also important that the use of devices does not endanger precautions for the safety of technical installations.
Emergency-off settings must remain effective in all operation modes.

3.2.3 Installation Notes

Lorenz Messtechnik GmbH devices must be installed and connected by compliance with the relevant DIN- and VDE-norms. They must be installed in such manner that an unintentional use is adequately excluded. The corresponding hardware and software safety precautions are to be observed in such manner that an interruption of the supply and signal cables cannot lead to an undefined or dangerous state. Supply and signal cables must be installed in such way, that disturbing signals (e.g. inductive or capacitive intersperses) will not cause derogations to the function of Lorenz Messtechnik GmbH devices.

3.2.4 Disturbance, Maintenance and Repair Notes

The devices do not contain parts which can be maintained on the customer side. Repairs shall be carried out by Lorenz Messtechnik GmbH exclusively.
If assuming that a safe operation of the device is not possible anymore, it must be closed down and protected against unintentional handling immediately. This, in particular, applies:

- If the device shows visible damages
- If the device is no longer operative
- If parts of the device are loose or slack
- If the connection cables show visible damages

Furthermore, we point out that all obligations of Lorenz Messtechnik GmbH exclusively result from the respective sales contract in which the guarantee has been conclusively settled.

4 Preamble

4.1 Product Description

The LCV-USB2 is a measurement amplifier for the conversion of analog signals into digital measured values. These measured data can be requested through the Computer via the USB-interface.
The LCV-USB2 is supplied from the USB-interface. No external mains adaptor is needed.
The LCV-USB2 is designed for 4 types of sensor signals (specifications see datasheet):

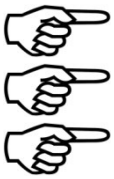
- strain gauge signals: ±3 mV/V (corresponding to ±30000 Digits)
- active signals with voltage input: ±5 V (corresponding to ±25000 Digits)
- active signals with voltage input: ±10 V (corresponding to ±25000 Digits)
- active signals with current input: 0 .. 20 mA (corresponding to 0 .. +20000 Digits)

The amplifier type and the resolution are declared on the type label, a type modification is only authorized by the manufacturer. Therefore only the corresponding sensor type may be connected.
The measuring data are signed in integer format (see above in brackets).
If the LCV-USB2 is calibrated together with the sensor, you can take the output values from the test certificate.
If the LCV-USB2 is calibrated without a sensor, you can take the output values as described above in brackets. They are pre calibrated with a high precision source.

The measuring data can be analyzed with the VS2 Software. This software supports the following functions:

- Configuration possibilities for the VS2
- Storage of sensor-related scaling and adjustment data
- Display for the presentation of measured data (actual value, tare value, minimal value and maximal value)
- Presentation of the measured data in a diagram
- Storage of measured data in CSV-format (output configurable)
- Storage of the diagram in BMP-format (output size adjustable)
- Print-out of the diagram (output size defined)
- Presentation of the sensor information

4.2 Safe and Correct Use



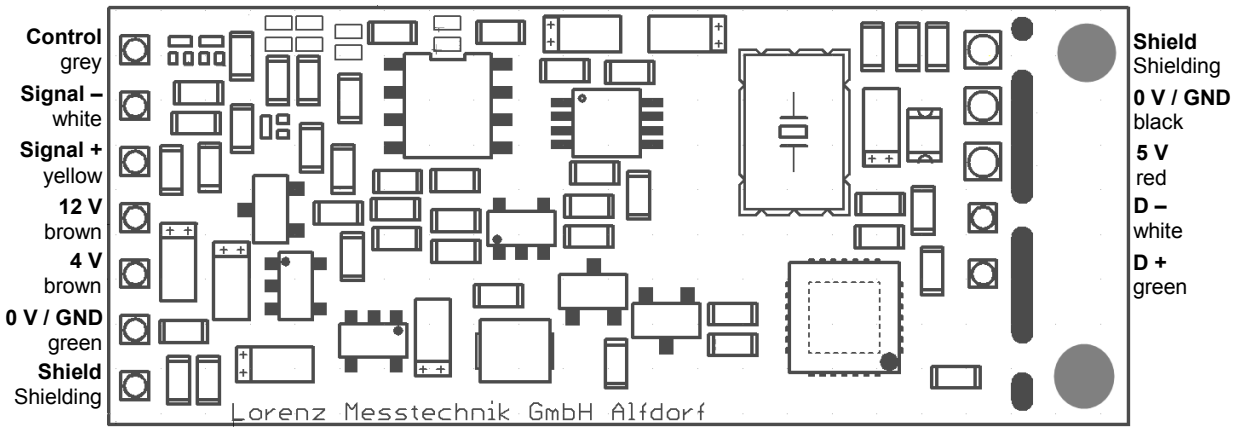
Observe the correct sensor adjustment.

Consider the correct VS2 configuration.

Choose a significant file identification/prefix when storing measured data.

5 Pin Assignment LCV-USB2

Pin Assignment Sensor **Pin Assignment USB**



5.1 Pin Assignment for Strain Gauge Sensors with mV/V Signal

Description	Pin (6 pole socket)	Color	Remark
0 V / GND	1	green	Ground of Supply voltage 4 V and 12 V
4 V	2	brown	Supply for strain gauge sensors 4 V
Signal +	3	yellow	positive signal input
Signal -	4	white	negative signal input
Control	5	grey	if available in sensor
Shield	6	shielding	do not connect shield with sensor housing

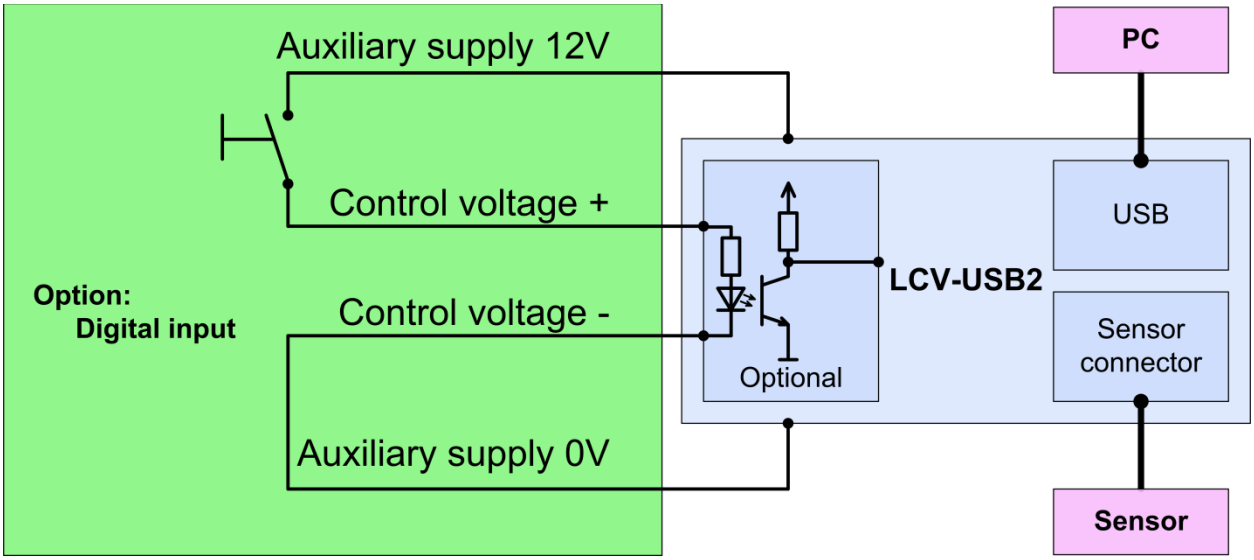
5.2 Pin Assignment for Active Sensors with ±5 V or ±10 V Signal

Description	Pin (12 pole socket)	Color	Remark
0 V / GND	E	green	Ground of Supply voltage 4 V and 12 V
12 V	F	brown	Supply for active sensors 12 V
Signal +	C	yellow	signal input
Signal –	D	white	relating to signal input (internal to 0 V / GND)
Control	K	grey	if available in sensor
Shield	M	shielding	do not connect shield with sensor housing

5.3 Pin Assignment for Active Current Sensors with 0 .. +20 mA Signal

Description	Pin (12 pole socket)	Color	Remark
0 V / GND	E	green	Ground of Supply voltage 4 V and 12 V
12 V	F	brown	Supply for active sensors 12 V
Signal +	C	yellow	signal input
Signal -	D	white	relating to signal input (internal to 0 V / GND)
Control	K	grey	if available in sensor
Shield	M	shielding	do not connect shield with sensor housing

6 Optional digital input at channel B



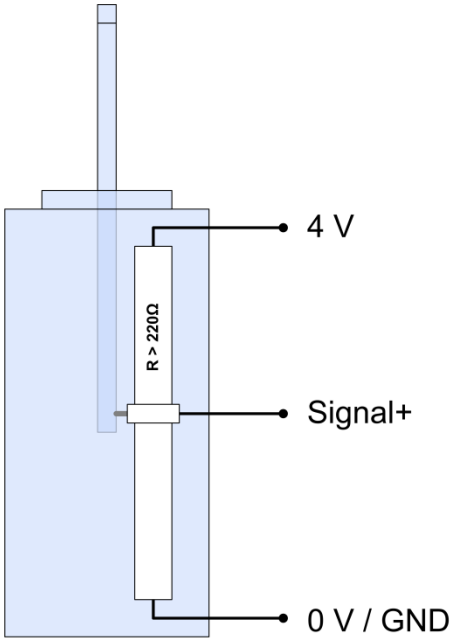
6.1 Pin Assignment for auxiliary supply and digital input

Description	Color
Auxiliary supply 12 V	brown
Auxiliary supply 0 V	green
Control voltage +	yellow
Control voltage -	white

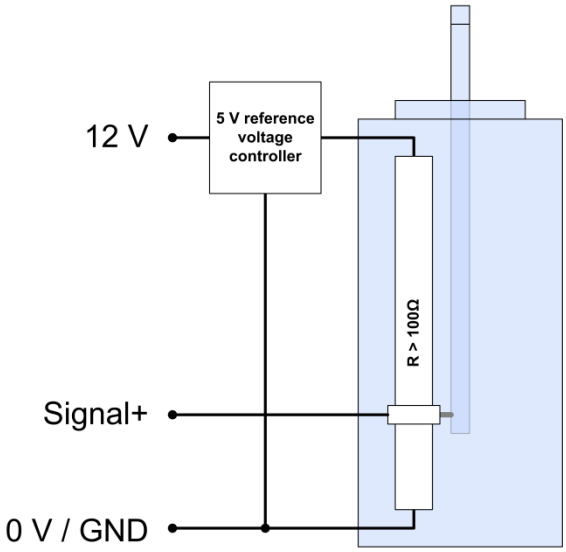
7 Other Application Examples

7.1 Displacement Sensor Potentiometric (supplied by LCV-USB2)

- With “active sensors”, only (type: U5).
- Accuracy is depending on the quality of the reference voltage.



Output 0..20000 Digits



Output 0..25000 Digits

8 Debugging

This chart helps to find frequent errors and the measures for debugging.

Error	Possible Cause	Debugging
A connection to the LCV-USB2 is not possible.	Driver not or incorrectly installed.	Install driver package. The first start-up of the LCV-USB2 must be carried out with administrator rights.
	Supply voltage is overstrained in such a way that it breaks down.	Check whether the connected sensor corresponds to the specifications of the LCV-USB2. If the sensor requires higher current than available for the LCV-USB2, this sensor can not be used together with the LCV-USB2.
	Supply voltage is shortened. .	Fix the short circuit.
Output signal remains at the positive or negative display stop device/dead stop	Active-Sensor or Current-Sensor connected to strain gauge input.	Check on type label which input type has been configured for the applied sensor connection.
	Supply voltage connected to sensor input.	Check/correct the pin assignment
Output signal highly fluctuates (strain gauge)	Open sensor input.	Connect sensor

9 Specifications

Type	LCV-USB2/DMS	LCV-USB2/U5	LCV-USB2/U10	LCV-USB2/I20
Article-No.	112311	112312	112705	112313
Input Range	±3 mV/V	±5 V	±10 V	0/4…20 mA

Evaluation Side

Supply	from USB	4…6 V DC ≤350 mA
Excitation Sensor	Strain Gauge U5/U10/I20	4 V ≤20 mA 12 V ≤80 mA
Measured Values	 Strain Gauge U5/U10 I20	±3 mV/V = ±30000 Digits ±5 V/±10 V = ±25000 Digits 0/4…20 mA = 0/4000…20000 Digits
Resolution	Strain Gauge U5 U10 I20	1 mV/V = 10000 Digits 1 V = 5000 Digits 1 V = 2500 Digits 1 mA = 1000 Digits
Zero Point	Strain Gauge/U5/U10/I20	0 Digits
Output Format		16 Bit Signed Int.
Input Resistance	Strain Gauge/U5/U10 I20 burden	>1 MΩ 62 Ω
Measuring Rate		max. 5000 Meas./s
Temperature Drift		4 Bit/10 K
Linearity Error		±32 Digits
Accuracy		±32 Digits

Miscellaneous

Cable Length LCV-USB2-Evaluation	2 m
Cable Length LCV-USB2-Sensor	1 m (max. 3 m)
Nominal Temperature Range	10 … 40 °C
Service Temperature Range	0 ... 50 °C
Storage Temperature Range	-10 ... 70 °C
Dimensions (Ø x L)	25 x 115 mm (incl. screw joint)
Weight	250 g
Level of Protection	IP67

Options/ Accessories

Article-No.	Type	Designation
110564	mV/V	mV/V adjusted sensitivity
110120	LCV-USB2/TR-EXT	Digital input at channel B

10 Continuative Documents

Following documents contain reference information about the LCV-USB2:

- Document number 090232, “Operation Manual for Sensor Interface LCV-USB2” (German 090205).
- Document number 080727, data sheet “Sensor-Interface with USB” (German 080726).
- Document number 090313, “Operation Manual for Configuration and Evaluation Software VS2“ (German 090312).
- Document number 090235, “Driver Installation Description for Sensor-Interface and LCV-USB2, SI-USB and Sensors with USB Interface (USB Driver.exe)“ (German 090198).
- Document number 090110 Lorenz protocol “A flexible command set for digital sensors and interfaces“.

11 Notes