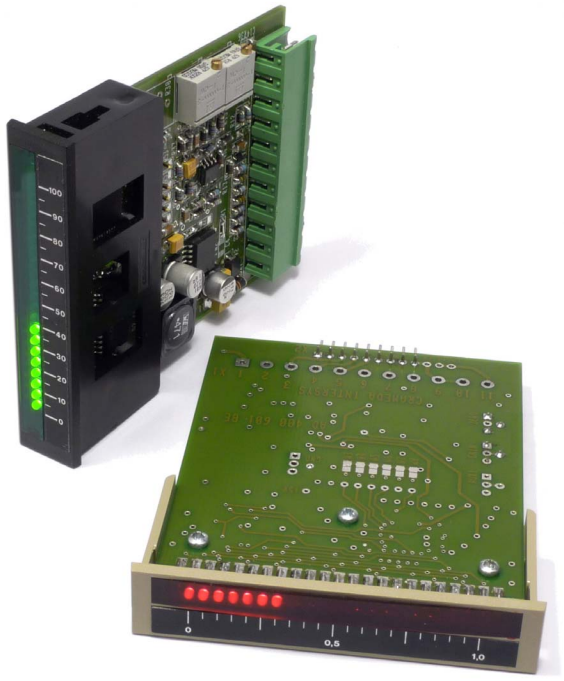
LED-Line
Analogue Display

General Description

The LED-Line range of displays are highly versatile and economic analogue bargraph indicators. The bright LEDs allow rapid reading of displayed values and trends at a glance.



Advantages

- Rapid reading of displayed values and trends
- Low energy consumption
- Minimal heat dissipation
- Slim design
- Easy installation in front panels
- Minimal wiring
- Standard and custustomised scales available

Applications

LED Line displays are ideally suited wherever the consumption, the flow, or the dosage of media such as water, gas, electricity or granules must be monitored and values read very rapidely.

– Pressure	– Temperature	– Speed
– Revolutions	– Viscosity	– Tolerance
– Flow	– Fluid levels	

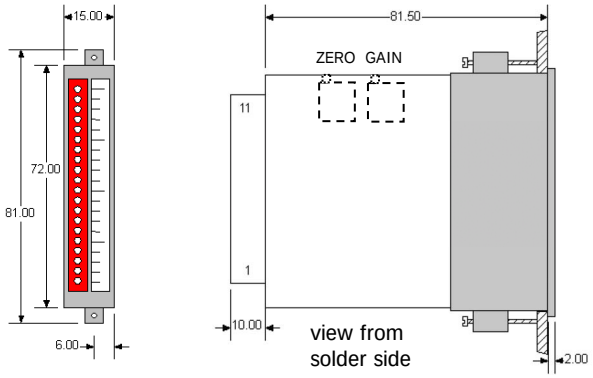
Technical Data

Display	21 dots, incl. zero
Type of display	dots or bar
Mode of display	0 - 100% or ±50%
Overflow	last three dots flash
Display brightness	fixed or external setting
Display colors	red or green
Increment per dot	5 %
Zero point	adjustable (e.g. for 4-20 mA)
Scale length	adjustable
Scales	self-adhesive, various scales available
Voltage input	
Number off inputs	4
Nominal final values	1, 5, 10 und 50 VDC
Maximum voltage	±60 VDC
Input resistance	>100 kOhm

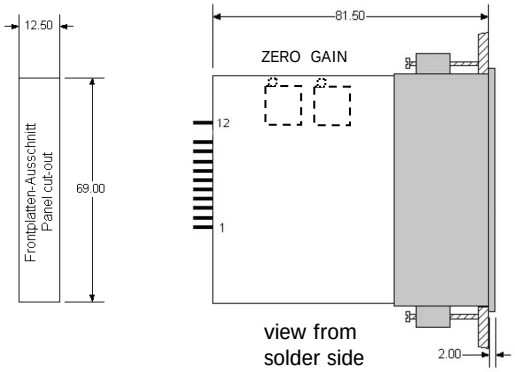
Power input	
Full scale nominal	20 mADC
Maximum current	±60 mADC
Input resistance	25.5 Ohm
Power supply	10 - 30 VDC / 8 - 100 mA
Connectors	screw terminal or pin connector
Mounting	front panel
Housing colors	grey or black
CE-Conformity	EN 61326-1 - EMV-Emission: Class B, residential envir. - EMV-Immunity t: industrial environment RoHS-compliant

Subject to technical changes

Dimensions Types L-2x40xxxC
with screw terminal



Dimensions Types L-2x40xxxB
with pin connector



Type Code

LED-Line		**L**	**-**	**2**	**X**	**4**	**0**	**X**	**X**	**X**	**X**
Build size	72 mm			**2**							
Housing color	grey				**A**						
	black				**B**						
Type						**4**	**0**				
								1	**0**		
								1	**4**		
								2	**7**		
Functions								**3**	**1**		
● Type of display	Bar			X	X	-	-				
	Dots			-	-	X	X				
● Scale	0...100%			X	-	X	-				
	-50...+50%			-	X	-	X				
● Overflow	last three dots flash			X	X	X	X				
● Zero point	LED permanently lit			X	X	-	-				
	LED switches off			-	-	X	X				
● Current meas.	25 Ohm shunt			X	X	X	X				
Display color	green									**1**	
	red									**3**	
Connector	Pin connector										**B**
	Screw terminal										**C**

Ordering example: L-2A40103C
Build size **2** = 72mm; Housing color: **A** = grey, Function: **10** = Bardisplay, 0...100%, with overrange indication;
Display color: **3** = red; Connector type: **C** = Screw terminal

LED-Line Scales

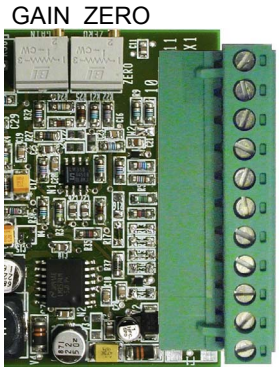
Display range	**Bestell-Nr.**			
	Horizontal mounting		Vertikal mounting	
Font	Black on Silver	Silver on Black	Black on Silver	Silver on Black
0...0,5...1,0	CU309002C	CU309002D	- -	- -
0...1,0	- -	- -	CU309003A	CU309003B
-50...0...+50	CU309008C	CU309008D	- -	- -
0...10...20	- -	- -	CU309012A	CU309012B
0...5...10	CU309013C	CU309013D	CU309014A	CU309014B
0...50...100	CU309030C	CU309030D	CU309031A	CU309031B
0...10...20.....100	- -	- -	CU309182A	CU309182B
0...5...10...15	- -	- -	CU309202A	CU309202B
0...25...50.....125 %	- -	- -	CU309207A	CU309207B
0...10…20.....100 %	- -	- -	CU309217A	CU309217B

Customised scales are available on request

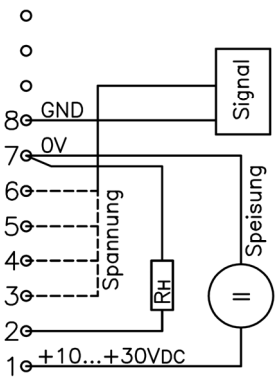
Connectors Types L-2x40xxxC

with screw terminal

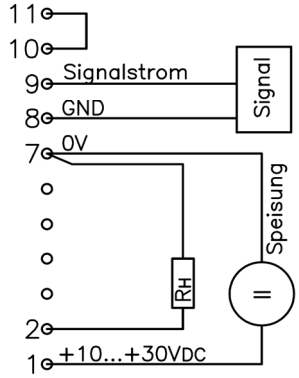
Number	Function
11	Bridge for current meas.
10	Bridge for current meas.
9	20 mADC
8	Signal GND
7	Supply 0 V
6	50 VDC
5	10 VDC
4	5 VDC
3	1 VDC
2	LED-Brightness
1	Supply +10 … +30 VDC



Voltage measurement



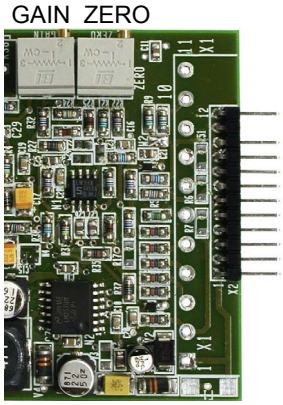
Current measurement



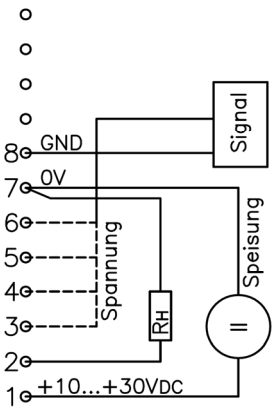
Connectors Types L-2x40xxxB

with pin connector

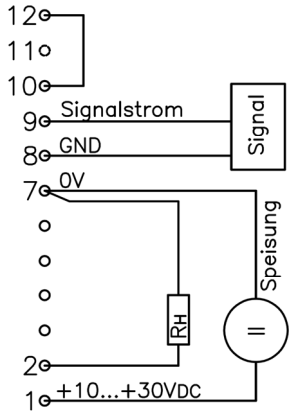
Number	Function
12	Bridge for current meas.
11	Connector-Coding
10	Bridge for current meas.
9	20 mADC
8	Signal GND
7	Supply 0V
6	50 VDC
5	10 VDC
4	5 VDC
3	1 VDC
2	LED-Brightness
1	Supply +10 … +30 VDC



Voltage Measurement



Current Meeasurement



Inputs

For each function, a dedicated connection port is provided. Only one port may be connected at a time.

Caution: There is no galvanic separation between the supply voltage and the measuring circuit.
Analog-GND and supply - 0V are hard wired.

The LED Line may only be connected to circuits of measurement category I (EN 61010-1).
These circuits must not be connected directly to the power mains.
Caution: voltages over 70 VDC, or in humid environment over 35 VDC, can be harmful if touched by humans!

LED-Brightness

Resistance R_H (at ports 2 und 7)	**Brightness of LEDs**
open / >50 kOhm	Works setting (perm.)
0 kOhm	Minimum
approx.10 kOhm	≙ approx. Works set.
50 kOhm	Maximum

Port «LED-Brightness» must never be connected to external voltage.

Note for Installation

Should the LED-Line Display be connected to power- or signal wires of more than 3 m length, measures to protect from overvoltage and EMC-emissions may be necessary.

Calibration of LED Line Displays

The scale and the zero point of LED Line displays can be calibrated according to requirements of the application. Factory pre settings of Led Line displays correspond to the mode “0 to +5” VDC.

Adjustment of settings to the scale endpoints, follows procedures referred to in sections a) to c).

Adjustment of settings by utilising switching thresholds is described in example d) below "display 0 - 100%". Adjustment of settings in display modes "± 50 %“ and „shifted zero point“ basically follow the same procedure.

a) Calibration of LED Line to „scale endpoints 0 und 100 %“ (types L-2x40**10**xxxx und L-2x40**27**xxxx)

1. Set 0 V at the input, or connect to GND. Adjust with potentiometer ZERO display so, that only the first LED remains lit.
2. Adjust voltage at the input to the final display value, e.g. +10 VDC. Adjust GAIN display with potentiometer so, that the last LED lights, but does not yet flash.
3. Check: 0V at the input, if necessary readjust ZERO with potentiometer.

b) Calibration of LED Line with „shifted zero point” (e.g. 4 to 20 mA)

1. Set 0 mA at the input, or connect to GND. Adjust ZERO indication with potentiometer so, that the first LED only remains lit.
2. Adjust current at the input to a value within the scale e.g. 16 mA. Adjust GAIN display with potentiometer so, that the last LED lights, but does not yet flash.
3. Adjust current for display value 0 %, e.g. 4 mA. Adjust ZERO indication with potentiometer so, that the first LED only lights up.
4. Adjust current at the input to the final display value, e.g. 20 mA, readjust GAIN if necessary with potentiometer.
5. Check: Adjust current at the input for display 0 %, readjust ZERO if necessary with potentiometer, see step 3.

c) Calibration of LED Line to „scale endpoints 50 %“ (types L-2x40**14**xxxx und L-2x40**31**xxxx)

1. Set 0 V at the input, or connect to GND. Adjust with potentiometer ZERO display so, that only the middle (11^{th}) LED is lit.
2. Adjust voltage at the input to the final display value, e.g. +0.5 VDC. Adjust GAIN display with potentiometer so, that the last LED lights, but does not yet flash.

3. Check: 0 V at the input, with ZERO display at 0, readjust ZERO if necessary.

d) Calibration of LED Line utilising switching thresholds (illustrated in display mode 0 to 100 %)

1. Set 2.5% of the full scale value at the input, for example, +0.25 V for +10 VDC full scale. Adjust ZERO indication with potentiometer so, that the first LED only is lit.
   Check: If more than the first LED is lit: turn potentiometer ZERO left until only the first LED is lit.
2. Set 97.5% of the full scale value at the input, for example, +9.75 V at +10 VDC full scale. Adjust GAIN indication with potentiometer so, that all but the highest LEDs are lit.
   Check: If all LEDs are lit, turn potentiometer GAIN left until the highest LED goes out and all others are lit.