Operating Manual

CULO-L

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● *Safety warnings*

When mounting, initiating and operating this indicator the safety precautions and regulations have to be observed. Only staff with a corresponding qualification should work with the indicator. A non-observance of the safety regulations may cause serious injuries and/or damages. Check before initial operation the suitability of the indicator for this area of application. The technical data of this manual have to be followed.
Never connect directly to a voltage supply (eg 24 VDC), that will destroy the indicator.

●

Input

Current loop:	4...20 mA
Input resistance:	Ri : < 160 ohms (U <3,2 V)

Accuracy

Resolution:	-999...+9999 digit
Measuring fault:	±0,2% of measuring range, ±1 digit
Temperature drift:	100 ppm/K

Indication

Display:	7 segments, 8 mm high, red, 4 digits
Overflow/Underflow:	to HI / to LO
Time of indication:	0,1 s - 1 s - 10 s (adjustable)

Ambient conditions

Operating temperature:	standard type: 0...+80 °C
	Ex type: 0...60 °C
Storing temperature:	-20...+80°C

Programmable features

Configuration of:	range of indication / time of indication / decimal point / unit (°C/°F)
	stabilisation zero point / calibration points / TAG number

Mechanics

Material:	polycarbonate
Protection:	front: IP 67
	connection: IP 20 or IP00
Connection:	plug-in terminal strip up to 1,5 mm²
	open ends
Carrier circular:	dimension: Ø 43/48,5/62,5 mm x 37mm
Mounting:	4 holes for M4
Weight:	approx. 55 g
Carrier angular:	dimension: 42 x 42 x 28
Mounting:	4 holes for screws 2 mm
Weight:	approx. 45 g

Accessories (enclosures for mounting the display)

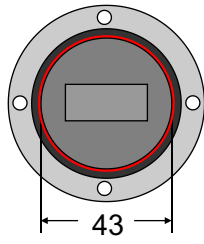|	
Plug-on:	DIN 43650 (valve plug) / M12x1
DIN BUZ-H:	special model
For wall:	top DIN BUZ-H with built-on bottom part
Magnetic:	top DIN BUZ-H with built-on bottom part and embedded magnetic foil
Tube:	top DIN BUZ-H with built-on bottom part and an additional holder for tubes
Built-on:	small-type

● *Note*

This operating manual is for use with:
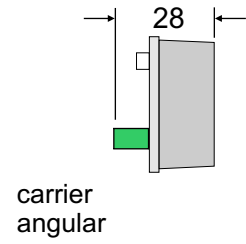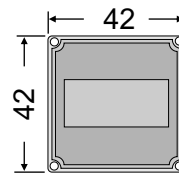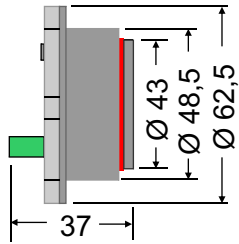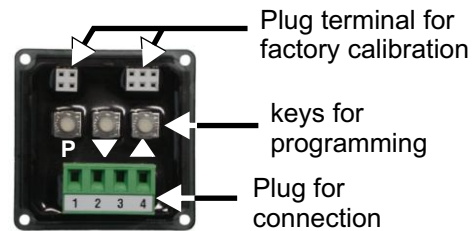Standard types: Type CL0...   Type CL3...

● *Dimensions (in mm)*
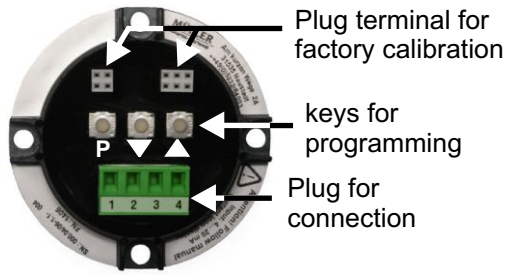

carrier
circular

carrier
angular

● *View*

Plug terminal for factory calibration
keys for programming
Plug for connection

Plug terminal for factory calibration
keys for programming
Plug for connection

● *Program table for programming the indicator*

PN	Description	Range	Delivered state*

0	Calibration mode
	  0 = sensor calibration (with applied signal, for factory settings only)
	  1 = programming of indication (indicated value at 4/20 mA)
		0/1	1

1	Final value (Programming the value at 20 mA, eg 600)	-999...9999	250
2	Initial value (Programming the value at 4 mA, eg 100)	-999...9999	0
3	Selection of decimal point or unit (Programming a unit the indication shifts to the left)	0 / 0.0 / 0.00 0.000 / °F / °C	°C
4	Time of average / refresh of display (in 1/10 seconds)	5...100	10
5**	Stabilisation zero (the +/- range where 0000 is indicated)	0...100	2
50***	Definition PIN-code for programming interlock (value >0000)	0000...9999	0000
51***	Authentication with PIN-code (removal of programming interlock)	0000...9999	0000
100**	Number of calibration setpoints (calibration points for sensor calibration only, calibration points reduce the measuring rate)	0...30	0
101...130**	Calibration points (number according PN100)	-999...9999	0
200	TAG number	0000....9999	0

*with factory configuration
** when programming a value >1 a hysteresis of 0,1% is activated. This avoids a jumping indication.
***optionally (if a PIN-code is not defined, PN50 and PN51 are hidden) The first time a PIN-code can be programmed only via interface during factory settings. When there is a definition for a PIN-code (indication of **Pin** during segment test), the programming interlock of PN51 has to be removed with the input of the defined PIN-code under PN50. When not removing PIN-code, all changings under all other PN cannot be stored. To activate the PIN-code of PN50 after a programming again, the programming mode has to be left with input of 0000 under PN50, optionally the current loop can be broken for a short time.

● *Programming of indication*

1. Connect the instrument according to the wiring diagram.
2. Switch power of the current loop on (current between 4...20 mA). This is followed by an initalisation and a segment test. Then **CULO** is indicated and afterwards the version of firmware (eg **F1.16**). Subsequent current loop display is switching into the operation mode.
3. Press the **P** key. Indication of program number **P 0** .
4. Change the program number by simultaneous pressing of **P** & ▲ keys or **P** & ▼ keys.
5. With the desired program number being chosen, go to the stored value by pressing the **P** key.
6. Short pressing of **P** results in a change of digit. The value of the chosen digit is changed with the ▼ or ▲ key.
7. Storing of the new settings is effected by pressing the **P** for approx. 2 sec. This procedure is acknowledged by transversal bars in the display.
8. If no other key is actuated, the unit switches to its operation mode after seven seconds.

Additional functions in standard mode for indication of min/max values

The ▲ key serves for indicating the value of the Max memory in the display for some seconds

The ▼ key serves for indicating the value of the Min memory in the display for some seconds

Simultaneous pressing of the ▲ and ▼ keys erases the values of the memory (minimum / maximum)

● *Underflow / overflow*

Range: 4,00...20 mA
Indicated range: 3,90...20,10 mA
Usable range: 3,6...21,50 mA
Warning underflow: 3,60...<3,9 mA
Warning overflow: >20,10...21,50 mA
Indication underflow: <3,60 mA
Indication overflow: >21,50 mA

On warning the indicator flashes (normal indication is changing with bars).
Values below 3,60 mA: a bar is changing with indication **undr**.
Values above 21,50 mA: a bar is changing with indication **over**.

Range: 4,00...20 mA
Indicated range: 3,90...20,10 mA
Usable range: 3,6...21,50 mA
Warning underflow: 3,60...<3,9 mA
Warning overflow: >20,10...21,50 mA
Indication underflow: <3,60 mA
Indication overflow: >21,50 mA

● Note for running a current loop display
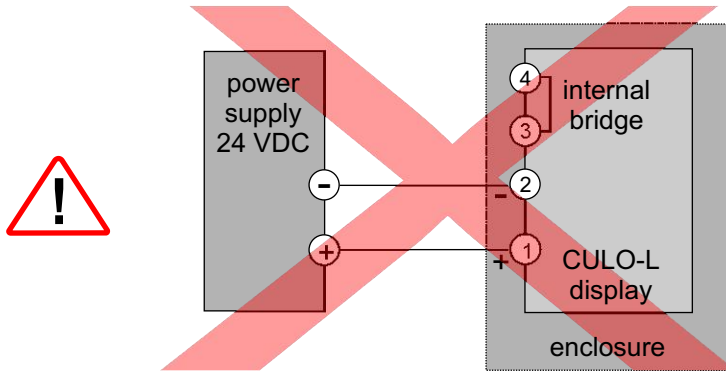
The display is operated in a current loop of 4...20 mA absolutely. A direct connection to a voltage supply (eg 24 VDC) will destroy the indicator and the guarantee does not cover this.

For an operational test the display has to be supplied out of a power source of 4...20 mA (eg mA source / calibration instrument).

In normal operation the display is connected in series with a transmitter (4...20 mA) or is connected to a 4...20 mA analogue output of a device.

● General connection (terminal strip)

current loop display
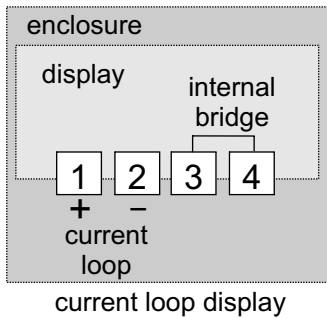
The 4-pole plug-in terminal strip to connect the current loop indicator is at the back of the display and is accessible after the enclosure is opened.

Terminal 1: positive pole of the current loop
Terminal 2: negative pole of the current loop

Terminal 3 and terminal 4 are bridged on the PCB and can be used for easy connection of a transmitter.

● General connection (open ends, flex)
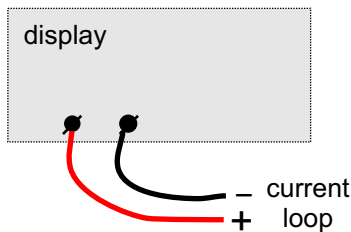
The flexible leads (open ends) to connect the current loop indicator are at the back of the display.

Red flex: positive pole of the current loop
Black flex: negative pole of the current loop

Shorten the flexible leads according to your needs and connect them expertly (eg inside of an enclosure or operator panel).
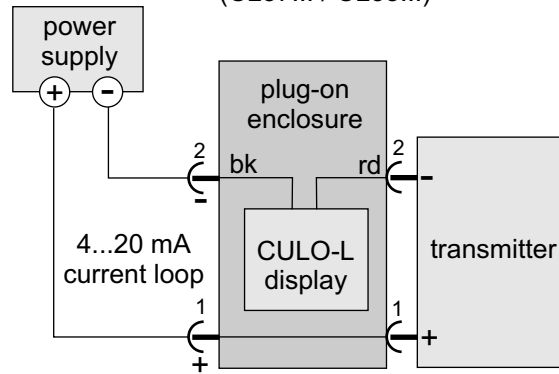
● *Examples for connection of types CL0... / CL3... (standard model in enclosure)*

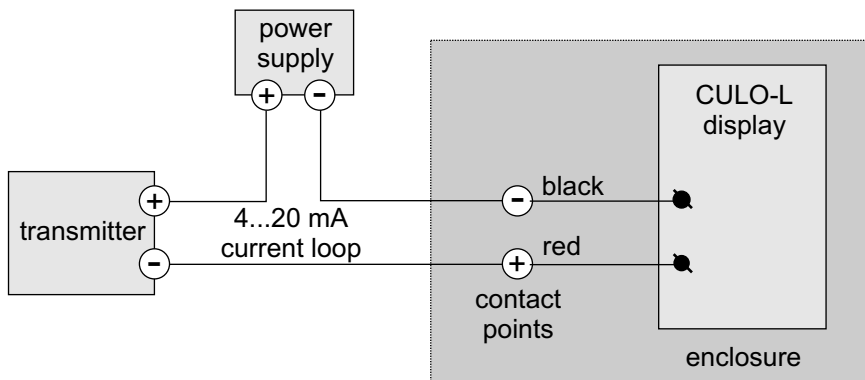Standard connection current loop
display (**except** for plug-on enclosure)
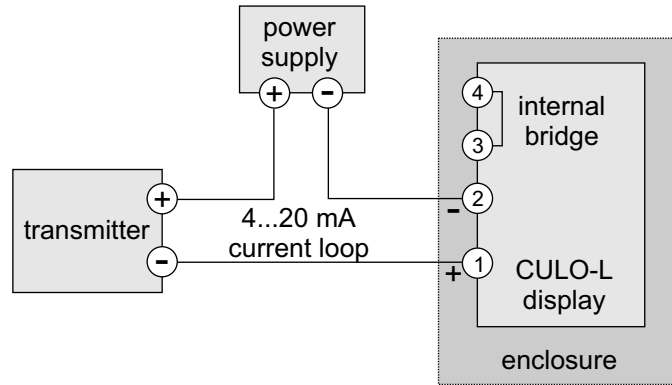
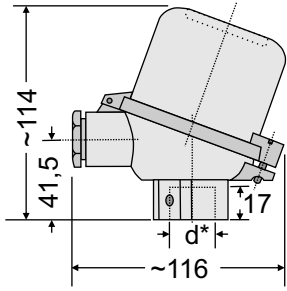● *Examples for connection of types CL0... / CL3... (standard model in enclosure)*

Standard connection for current loop
display in **plug-on enclosure**
(CL37... / CL38...)

● *Example for connection of types CL0... / CL3... (standard model open ends, flex)*
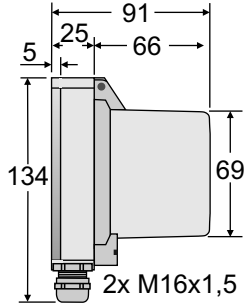
● *Special enclosure DIN BUZ-H*

*d: M24x1,5
Ø15,3
Ø22,5

~114
41,5
17
d*
~116
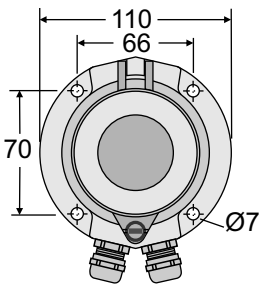
Special model
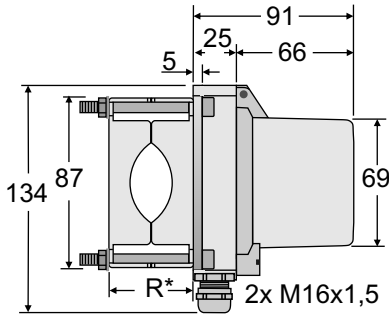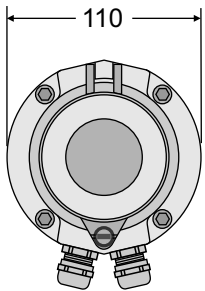Connections process: M24x1,5
                                    Ø15,3 mm
                                    Ø22,5 mm
Material: diecast aluminium with
                  powder coating
Screwed cable gland: 1x M20x1,5
Protection: IP67
Weight: approx. 350 g

● *Wall mounting enclosure, built-on enclosure with magnetic holder*

110
66
70
Ø7
91
25
66
5
134
69
2x M16x1,5

Top BUZ-H special model
Material: diecast aluminium with
                  powder coating
Bottom part: aluminium with
                  powder coating
Magnetic holder: embedded foil
Screwed cable gland: 2x M16x1,5
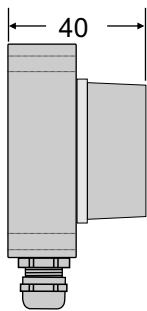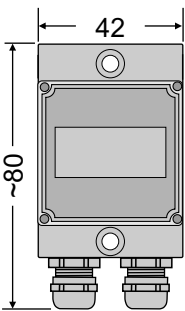Protection: IP67
Weight: approx. 500 g

● *Enclosure with holder for tubes*

110
91
25
66
5
134
87
69
R*
2x M16x1,5

*R = overall diameter of tube = 42...60 mm

Top BUZ-H special model
Material: diecast aluminium with
                  powder coating
Bottom part: aluminium with
                  powder coating
Holder for tube: sheet steel, mirror
                  finish galvanized
Diameter of tube: 42...60 mm
Screwed cable gland: 2x M16x1,5
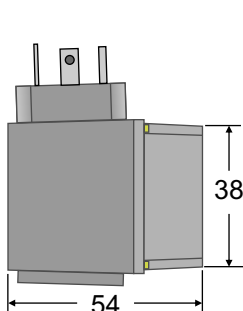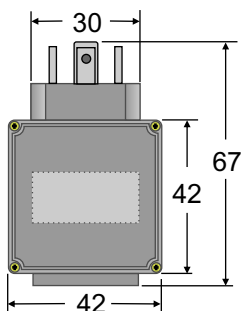Protection: IP67
Weight: approx. 950 g

● *Built-on enclosure*

42
40
~80

Dimensions: 80x42x40 mm
Material: aluminium anodized
                  natural
Mounting: 2 holes for 4 mm
Screwed cable gland: 2x M12x1,5
Protection: IP63
Weight: approx. 120 g

● *Plug-on enclosure*

30
67
42
42
38
54

Dimensions: 43x46x54 mm
                  (without plug components)
Plugable with: DIN 43650 (valve)
                  M12x1
Material: polycarbonate
Protection: IP 62
Weight: approx. 110 g