

MODEL CUB4LP - LOOP POWERED PROCESS INDICATOR MODEL CUB4CL - CURRENT LOOP INDICATOR



- DUAL RANGE, 4 to 20 mA OR 10 to 50 mA
- 3½-DIGIT, 0.6" (15.2 mm) HIGH DIGITS
- POSITIVE IMAGE TRANFLECTIVE LCD WITH RED BACKLIGHT OR POSITIVE IMAGE REFLECTIVE LCD (CUB4LP)
- POSITIVE IMAGE TRANFLECTIVE LCD WITH RED BACKLIGHT OR NEGATIVE IMAGE TRANSMISSIVE WITH RED BACKLIGHT (CUB4CL)
- SPAN AND OFFSET CAPABILITY
- NEGATIVE AND OVERRANGE INDICATION
- SELECTABLE DECIMAL POINT POSITION
- NEMA 4X/IP65 SEALED FRONT PANEL BEZEL
- FITS DIN STANDARD CUT-OUT 2.68" (68 mm) X 1.30" (33 mm)



FOR USE IN HAZARDOUS LOCATIONS:
 Class I, Division 2, Groups A, B, C, and D
 Class II, Division 2, Groups F and G
 Class III, Division 2



DESCRIPTION

The CUB4LP and CUB4CL are additions to the CUB4 product line. The CUB4LP uses a 4 to 20 mA or a 10 to 50 mA input signal as operating power. The input signal is also used to power the backlighting on the CUB4LP40 unit. The CUB4CL uses a 4 to 20 mA or a 10 to 50 mA input signal to power the unit. An external power supply is used to power the CUB4CL backlighting to provide a brighter, more consistent display and a lower compliance voltage.

The units have a 3½-digit LCD display with 0.6" (15.2 mm) high digits and a DIP switch selectable decimal point. The CUB4LP display is available in positive image reflective (dark digits, reflective background) or positive image transfective (dark digits, illuminated background) with red backlighting. The CUB4CL display is available in positive image transfective (dark digits, illuminated background) with red backlighting or negative image transmissive (illuminated digits, dark background) with red backlighting.

The ability to scale the display allows indication in any desired unit of measurement such as temperature, pressure, humidity, fluid flow, etc. The unit is calibrated at the factory with 0.0 displayed @ 4 mA input and 100.0 displayed @ 20 mA input.

The units are contained in a lightweight, high impact plastic case with a clear viewing window. When properly installed, the sealed front panel meets NEMA 4X/IP65 specifications for wash-down and dusty environments.

SAFETY SUMMARY

All safety related regulations, local codes as well as instructions that appear in this document or on equipment must be observed to ensure personal safety and to prevent damage to either the device or equipment connected to it.

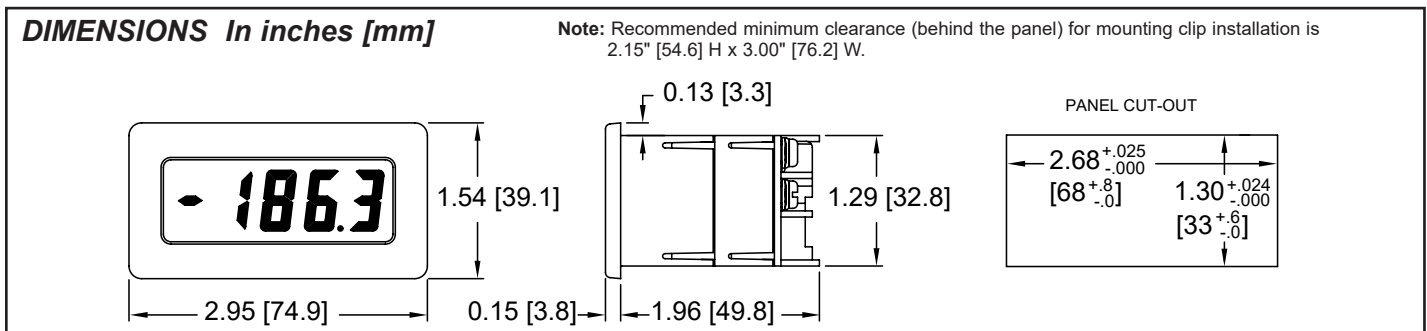
Do not use these products to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of personnel safety or consequential equipment not equipped with safeguards. Red Lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in a manner not consistent with these specifications.

CAUTION: Risk of Danger
 Read complete instructions prior to installation and operation of the unit.

WARNING - Explosion Hazard - Substitution of any components may impair suitability for Class I, Division 2 / Class II, Division 2 / Class III, Division 2.

SPECIFICATIONS

- DISPLAY:** 3½-digit (-1999 to 1999), 0.6" (15.2 mm) high digits.
 The CUB4LP is available with a positive image reflective LCD or a red backlit positive image transfective LCD. The intensity of the backlighting will vary with the input signal.
 The CUB4CL is available with a positive image transfective LCD with red backlighting or a negative image transmissive with red backlight.
 A minus sign is displayed when the indicator is adjusted for a negative offset.
Ovrange: Ovrange is indicated by a "1" in the most significant digit and the blanking of the three least significant digits.
- EXTERNAL BACKLIGHT POWER:** (CUB4CL only)
 9 - 28 VDC, @ 35 mA typ., 50 mA max. Power Supplies must be Class 2 (NEC) or SELV rated. Above 26 VDC, derate the operating temperature to 50°C.
- DECIMAL POINTS:** Three DIP switch selectable, decimal point positions allow the display to be read in tenths, hundredths or thousandths.
- MAXIMUM VOLTAGE DROP:**
 3.2 VDC for CUB4LP00
 4.0 VDC for CUB4LP40
 3.2 VDC for CUB4CL all models
- EQUIVALENT RESISTANCE:**
CUB4LP00: 800 Ω max. @ 4 mA; 160 Ω max. @ 20 mA
 320 Ω max. @ 10 mA; 65 Ω max. @ 50 mA



CUB4LP40: 1000 Ω max. @ 4 mA; 200 Ω max. @ 20 mA
 400 Ω max. @ 10 mA; 80 Ω max. @ 50 mA
CUB4CL (all models): 800 Ω max. @ 4 mA; 160 Ω max. @ 20 mA
 320 Ω max. @ 10 mA; 65 Ω max. @ 50 mA

6. **MAXIMUM ALLOWABLE INPUT CURRENT:** 100 mA

7. **SCALING RANGE:**

Span: Two potentiometers provide a coarse and fine span adjustment. Span range = 0 to 2000.

Offset: Two potentiometers provide a coarse and fine zero offset adjustment. Offset range = -1999 to 1999.

8. **LINEARITY:** (@ 23°C, Less than 85% RH) ±(0.1% + 1 digit).

9. **READING RATE:** 2.5 per second, nominal.

10. **RESPONSE TIME:** 1.5 seconds to settle for a step change.

11. **NORMAL MODE REJECTION:** 60 dB 50/60 Hz

12. **TEMPERATURE EFFECTS:**

Span Temperature Coefficient: 100 PPM/°C

Offset Temperature Coefficient: 0.2 digits/°C

13. **CONSTRUCTION:** High impact plastic case with clear viewing window. (Panel gasket and mounting clips included.) This unit is rated for NEMA 4X/IP65 indoor use. Installation Category I, Pollution Degree 2

14. **CERTIFICATIONS AND COMPLIANCES:**

CE Approved

EN 61326-1 Immunity to Industrial Locations
 Emission CISPR 11 Class B

Safety requirements for electrical equipment for measurement, control, and laboratory use:

EN 61010-1: General Requirements

RoHS Compliant

UL Hazardous: File #E184589

Type 4X Indoor Enclosure rating (Face only)

IP65 Enclosure rating (Face only)

Refer to the *EMC Installation Guidelines* of this bulletin for additional information.

15. **ENVIRONMENTAL CONDITIONS:**

Operating Temperature: 0° to 60°C

(Derate backlight voltage to 26 VDC above 50°C.)

Storage Temperature: -40° to 80°C

Operating and Storage Humidity: 85% max. (non-condensing) from 0°C to 60°C.

Vibration to IEC 68-2-6: Operational 5 to 500 Hz, 5g

Shock to IEC 68-2-27: Operational 30 g

Altitude: Up to 2000 meters

16. **WEIGHT:** 3.3 oz. (93.5 g)

EMC INSTALLATION GUIDELINES

Visit <https://www.redlion.net/emi> for more information on EMI guidelines, Safety and CE issues as they relate to Red Lion products.

INSTALLATION

When properly installed, the CUB4LP/CL meets NEMA 4X/IP65 requirements for indoor use. The units are intended to be mounted into a suitably rated enclosed panel. A sponge rubber gasket, mounting clip, two screws, and nut fasteners are provided to install and seal the unit in the panel cutout.

Installation Environment

The unit should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation. Placing the unit near devices that generate excessive heat should be avoided.

The bezel should be cleaned only with a soft cloth and neutral soap product. Do NOT use solvents.

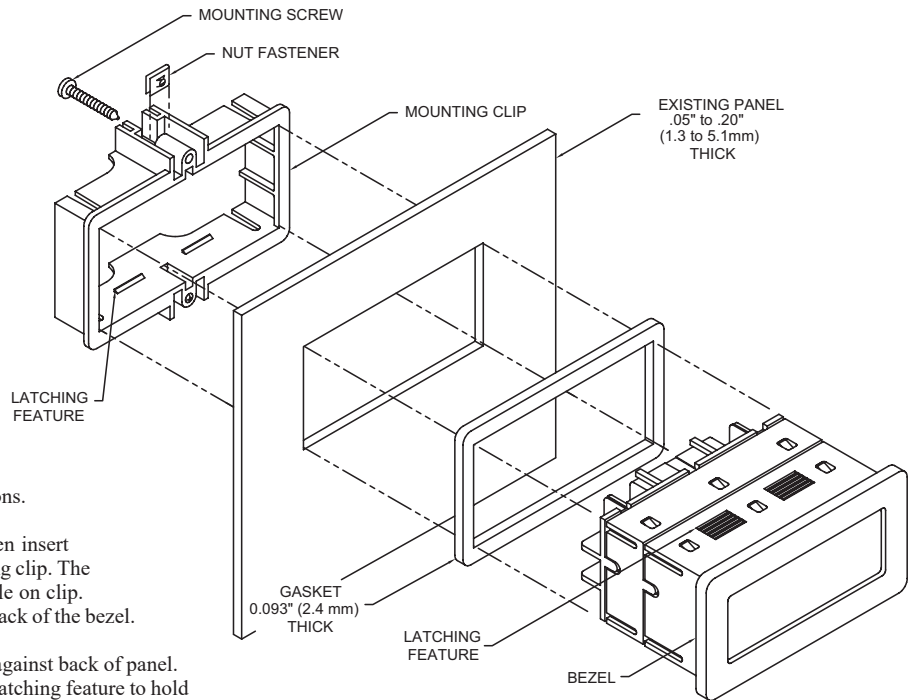
Continuous exposure to direct sunlight may accelerate the aging process of the bezel.

The following procedure assures proper installation:

1. Cut the panel opening to the specified dimensions. Remove burrs and clean the panel opening.
2. Slide nut fastener into slot on mounting clip and then insert mounting screw through nut on both sides of mounting clip. The tip of mounting screw should not project through hole on clip.
3. Slide the panel gasket over the rear of the unit to the back of the bezel. Install CUB4LP/CL unit through panel cutout.
4. Slide mounting clip over rear of unit until the clip is against back of panel. The mounting clip and CUB4LP/CL housing have a latching feature to hold the unit in place until tightened.

Note: Hold the CUB4LP/CL front bezel in place when sliding the mounting clip into position.

5. Alternately tighten each mounting screw to ensure uniform gasket pressure. Visually inspect the gasket for proper seal. The gasket should be compressed to approximately 75 to 80% of its original thickness. (Recommended torque is 28 to 36 in.-oz.)

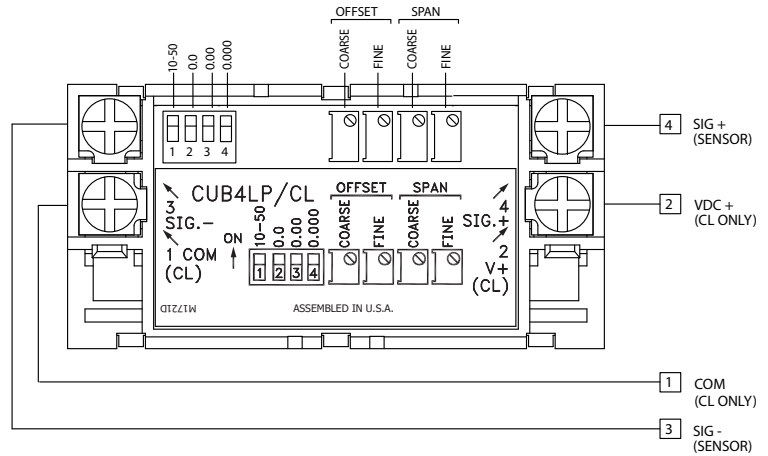


6. If the gasket is not adequately compressed and the mounting screws cannot be tightened any further, loosen the mounting screws and insure that the clip is latched as closely as possible to the panel.
7. Repeat Step #6 for tightening the mounting screws.

WIRING CONNECTIONS

All conductors should meet voltage and current ratings for each terminal. Also cabling should conform to appropriate standards of good installation, local codes and regulations. It is recommended that power supplied to the unit (AC or DC) be protected by a fuse or circuit breaker.

The electrical connections are made via screw-clamp terminals located on the back of the unit. When wiring the unit, use the label to identify the wire position with the proper function. Strip the wire, leaving approximately 1/4" of bare wire (stranded wires should be tinned with solder). Insert the wire into the screw-clamp terminal and tighten the screw until the wire is clamped tightly. Each terminal can accept up to two #14 AWG wires.



CUB4LP/CL SIGNAL INPUT

The current range is selected by setting DIP switch S1 to the OFF position for a 4 to 20 mA input or ON for a 10 to 50 mA input. Attach the signal wires to terminals 3 (SIG-) and 4 (SIG+) observing the correct polarity. The (SIG-) signal input circuit is not reverse polarity protected.

Backlight Power (CUB4CL only)

Attach a 9 to 28 VDC supply to terminals 1 (COM) and 2 (V+) to power the backlight. Terminals 3 (SIG-) and 1 (COM) are AC coupled with a capacitor. This limits the isolation between these terminals to 50 VDC maximum.

OFFSET ADJUSTMENTS

The minimum currents are not zero based with 4 to 20 mA and 10 to 50 mA signals. To obtain a zero minimum display reading, the display must be offset. The display on the CUB4LP/CL can be offset by adjusting the Coarse and Fine Offset pots.

SPAN ADJUSTMENTS

Span is defined as the numerical range that the display traverses, disregarding the decimal point, when the input signal is varied from minimum to maximum (4 to 20 mA or 10 to 50 mA). For example; if a unit is to display 250 @ 4 mA and 1000 @ 20 mA, the span is 750 (the difference between 250 and 1000). Had the minimum display been -250, the span would be 1250 (1000 - (-250) = 1250). The CUB4LP/CL can be set to operate over a wide span range by adjusting the Coarse and Fine Span adjustment pots. The Coarse Span pot is used to get the display to within a couple of counts of the desired reading, and the Fine Span pot is used to adjust for the exact reading.



WARNING - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be non-hazardous.



This equipment is suitable for use in:
Class I, Division 2, Groups A, B, C, and D
Class II, Division 2, Groups F and G
Class III, Division 2 or Non Hazardous locations.

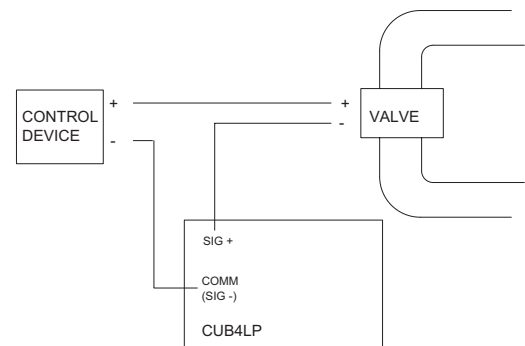
DECIMAL POINT POSITION SELECTION

The decimal point position is DIP switch selectable for one of three locations. The CUB4LP/CL can be set up to read in 10ths, 100ths, or 1000ths. If all the DIP switches are set to the "OFF" position, no decimal point will appear on the display. The DIP switches are located at the rear of the unit.

APPLICATION EXAMPLE

Operation of a refinery process required a local display of the position of a remote pipeline valve. The display would indicate 0 (zero) when the valve was fully closed with an input signal of 4 mA. When the valve was fully open the display would indicate 100 with an input signal of 20 mA.

Both the CUB4LP and the CUB4CL meet the necessary requirements.



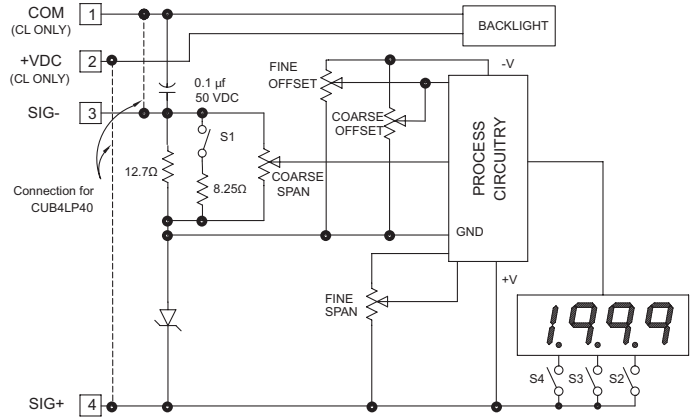
CALIBRATING THE DISPLAY

Calibrating the CUB4LP/CL requires either an accurate adjustable constant current supply or the CUB4LP/CL can be installed and scaled with the process sensor connected to the CUB4LP/CL. To calibrate the unit, proceed as follows.

1. Set DIP switching for the desired current range.
2. Select the desired decimal point position.
3. Apply the minimum input signal to the CUB4LP/CL and adjust the COARSE OFFSET to display the approximate desired minimum value.
4. Apply the maximum input signal to the CUB4LP/CL and adjust the COARSE SPAN to display the approximate desired maximum value.
5. Repeat steps 3 and 4 until the minimum and maximum values are within the desired values.
6. Apply the minimum input signal to the CUB4LP/CL and adjust the FINE OFFSET to display the exact desired minimum value.
7. Apply the maximum input signal to the CUB4LP/CL and adjust the FINE SPAN to display the exact desired maximum value.
8. Apply the minimum input signal and verify that the display indicates correctly.
9. Apply the maximum input signal and verify that the display indicates correctly.
10. Repeat Steps 6 through 9 until display reads exact.

Note: The CUB4LP/CL display is factory calibrated to indicate 0.0 to 100.0 with an input of 4 to 20 mA at approximately 25°C.

BLOCK DIAGRAM



ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS
CUB4LP	Reflective LCD Loop Powered Process Indicator	CUB4LP00
	Red Backlit LCD Loop Powered Process Indicator Positive Image Transflective LCD	*CUB4LP40
CUB4CL	Red Backlit LCD External Powered Process Indicator Negative Image Transmissive LCD	CUB4CL20
	Red Backlit LCD External Powered Process Indicator Positive Image Transflective LCD	CUB4CL40
MLPS	Micro Line/Sensor Power Supply (Non-hazardous use only)	MLPS1000

*Backlight intensity will vary depending on signal level.

RED LION CONTROLS TECHNICAL SUPPORT

If for any reason you have trouble operating, connecting, or simply have questions concerning your new product, contact Red Lion's technical support.

Support: support.redlion.net
 Website: www.redlion.net
 Inside US: +1 (877) 432-9908
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(a) Red Lion Controls Inc. (the "Company") warrants that all Products shall be free from defects in material and workmanship under normal use for the period of time provided in "Statement of Warranty Periods" (available at www.redlion.net) current at the time of shipment of the Products (the "Warranty Period"). **EXCEPT FOR THE ABOVE-STATED WARRANTY, COMPANY MAKES NO WARRANTY WHATSOEVER WITH RESPECT TO THE PRODUCTS, INCLUDING ANY (A) WARRANTY OF MERCHANTABILITY; (B) WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE; OR (C) WARRANTY AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY; WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE.** Customer shall be responsible for determining that a Product is suitable for Customer's use and that such use complies with any applicable local, state or federal law.

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(c) Subject to paragraph (b), with respect to any such Product during the Warranty Period, Company shall, in its sole discretion, either (i) repair or replace the Product; or (ii) credit or refund the price of Product provided that, if Company so requests, Customer shall, at Company's expense, return such Product to Company.

(d) **THE REMEDIES SET FORTH IN PARAGRAPH (c) SHALL BE THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY AND COMPANY'S ENTIRE LIABILITY FOR ANY BREACH OF THE LIMITED WARRANTY SET FORTH IN PARAGRAPH (a). BY INSTALLING THIS PRODUCT, YOU AGREE TO THE TERMS OF THIS WARRANTY, AS WELL AS ALL OTHER DISCLAIMERS AND WARRANTIES IN THIS DOCUMENT.**