

Model CUB5 - Miniature Electronic 8-Digit Dual Counter and Rate Indicator Installation Guide





See the Red Lion website at www.redlion.net for full user manual.

SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the manual or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Do not use this meter to directly command motors, valves, or other actuators not equipped with safeguards. To do so can be potentially harmful to persons or equipment in the event of a fault to the meter.

 CAUTION: Risk Of Danger. Read complete instructions prior to installation and operation of the unit.	 CAUTION: Risk of electric shock.
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ORDERING INFORMATION

DESCRIPTION	PART NUMBER
Dual Counter & Rate Indicator with Reflective Display	CUB5R000
Dual Counter & Rate Indicator with Backlight Display	CUB5B000

SPECIFICATIONS

POWER: Input voltage range is +9 to +28 VDC with short circuit and input polarity protection. Must use an RLC model MLPS or an NEC Class 2 or Limited Power Source (LPS) rated power supply.

MODEL NO.	DISPLAY COLOR	INPUT CURRENT @ 9 VDC WITHOUT CUB5RLY0	INPUT CURRENT @ 9 VDC WITH CUB5RLY0
CUB5R000	---	10 mA	30 mA
CUB5B000	Red (max intensity)	85 mA	115 mA
CUB5B000	Green (max intensity)	95 mA	125 mA

DISPLAY: 8 digit LCD 0.46" (11.7 mm) high digits
 Counter A Display Range: -9999999 to 99999999
 Counter B Display Range: 0 to 9999999 (postive count only)
 Rate Display Range: 0 to 999999

ENVIRONMENTAL CONDITIONS:

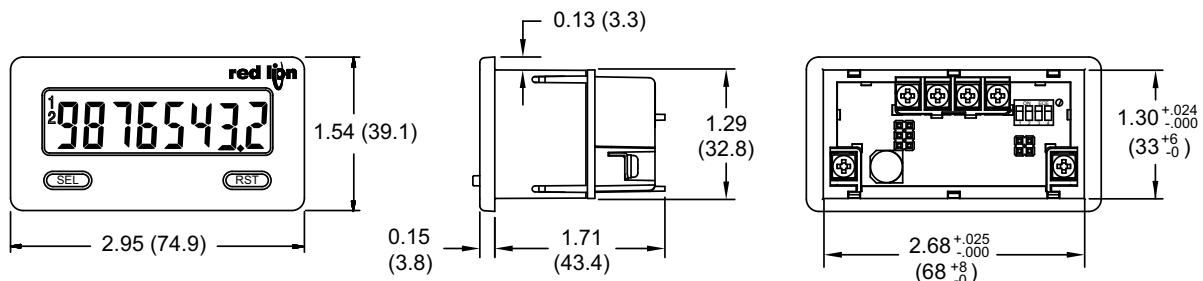
Operating Temperature Range for CUB5R000: -35 to 75 °C
 Operating Temperature Range for CUB5B000 depends on display color and intensity level as per below:

	INTENSITY LEVEL	TEMPERATURE
Red Display	1 & 2	-35 to 75°C
	3	-35 to 70°C
	4	-35 to 60°C
	5	-35 to 50°C
Green Display	1 & 2	-35 to 75°C
	3	-35 to 65°C
	4	-35 to 50°C
	5	-35 to 35°C

Storage Temperature Range: -35 to 85 °C

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.15" (54.6) H x 3.00" (76.2) W.



Operating and Storage Humidity: 0 to 85% max. relative humidity (non-condensing)
 Vibration to IEC 68-2-6: Operational 5-500 Hz, 5 g
 Shock to IEC 68-2-27: Operational 40 g

CERTIFICATIONS AND COMPLIANCES:

CE Approved
 EN 61326-1 Immunity to Industrial Locations
 Emission CISPR 11 Class A
 EN 61010-1: General Requirements
 EN 61010-2-030: Particular Requirements for Testing and Measuring Circuits
 RoHS Compliant
 UL Recognized: File #E179259
 UL Listed: File #E137808
 Type 4X Indoor/Outdoor Enclosure rating (Face only)

IP65 Enclosure rating (Face only)
 IP20 Enclosure rating (Rear of unit)
CONNECTIONS: Wire clamping screw terminals
 Wire Strip Length: 0.3" (7.5 mm)
 Wire Gage: 30-14 AWG copper wire
 Torque: 3.5 inch-lbs (0.395 N-m) max.

CONSTRUCTION: This unit rated for Type 4X/IP65 requirements for indoor/outdoor use. Installation Category I, Pollution Degree 2. High impact plastic case with clear viewing window. Panel gasket and mounting clip included.

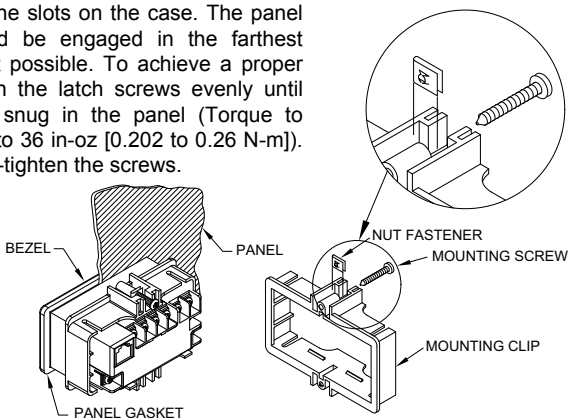
WEIGHT: 3.2 oz (100 g)

1.0 INSTALLING THE METER

INSTALLATION

The meter meets NEMA Type 4X/IP65 requirements when properly installed. The unit is intended to be mounted into an enclosed panel. Prepare the panel cutout to the dimensions shown. Remove the panel latch from the unit. Slide the panel gasket over the rear of the unit to the back of the bezel. The unit should be installed fully assembled. Insert the unit into the panel cutout.

While holding the unit in place, push the panel latch over the rear of the unit so that the tabs of the panel latch engage in the slots on the case. The panel latch should be engaged in the farthest forward slot possible. To achieve a proper seal, tighten the latch screws evenly until the unit is snug in the panel (Torque to approx. 28 to 36 in-oz [0.202 to 0.26 N-m]). Do not over-tighten the screws.



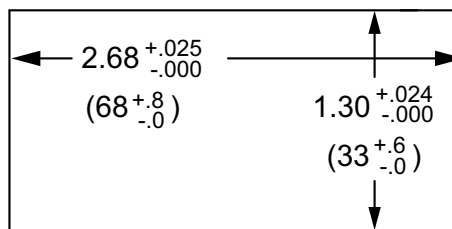
INSTALLATION ENVIRONMENT

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

The bezel should only be cleaned 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.

Do not use tools of any kind (screwdrivers, pens, pencils, etc.) to operate the keypad of the unit.

PANEL CUT-OUT



2.0 SETTING THE DIP SWITCHES

To access the switches, remove the rear cover of the meter as described below. A bank of 4 switches is located in the upper right hand corner. After setting the switches, install any optional plug-in cards before replacing the rear cover (see next section).



Warning: Exposed line voltage exists on the circuit boards. Remove all power to the meter and load circuits before accessing inside of the meter.

REMOVE/REPLACE THE REAR COVER

To remove the rear cover, locate the cover locking tab below the 2nd and 3rd input terminals. To release the tab, insert a small, flat blade screwdriver between the tab and the plastic wall below the terminals. Inserting the screwdriver will provide enough pressure to release the tab locks. To replace the cover, align the cover with the input terminals and press down until the cover snaps into place.

SETTING THE INPUT DIP SWITCHES

The meter has four DIP switches for Input A and Input B that must be set before applying power.

SWITCH 1

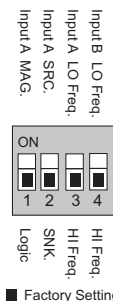
LOGIC: Input A trigger levels $V_{IL} = 1.25 \text{ V max.}$; $V_{IH} = 2.75 \text{ V min.}$; $V_{MAX} = 28 \text{ VDC}$
MAG: 200 mV peak input sensitivity; 100 mV hysteresis; maximum input voltage: $\pm 40 \text{ V peak}$ (28 Vrms); Must also have SRC switch ON. (Not recommended with counting applications.)

SWITCH 2

SNK.: Adds internal 7.8 K Ω pull-up resistor to +9 to 28 VDC, $I_{MAX} = 3.8 \text{ mA}$.
SRC.: Adds internal 3.9 K Ω pull-down resistor, 7.2 mA max. @ 28 VDC max.

SWITCHES 3 and 4

HI Frequency: Removes damping capacitor and allows max. frequency.
LO Frequency: Adds a damping capacitor for switch contact bounce. Limits input frequency to 50 Hz and input pulse widths to 10 msec.



3.0 WIRING THE METER

WIRING OVERVIEW

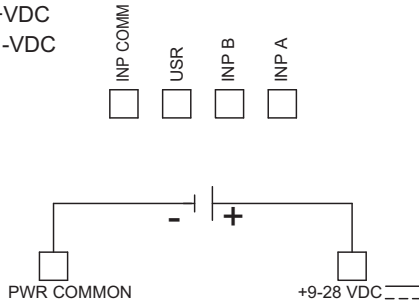
Electrical connections are made via screw-clamp terminals located on the back of the meter. All conductors should conform to the meter's voltage and current ratings. All cabling should conform to appropriate

standards of good installation, local codes and regulations. It is recommended that the power supplied to the meter (DC or AC) be protected by a fuse or circuit breaker.

3.1 POWER WIRING

DC Power

+9 to +28 VDC: +VDC
Power Common: -VDC

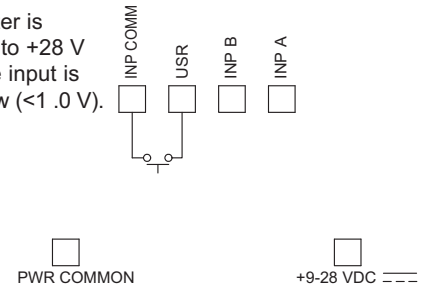


3.2 USER INPUT WIRING

Sinking Logic

INP COMM } Connect external switching device between the
USR } User Input terminal and Input Common.

The user input of the meter is internally pulled up to +9 to +28 V with 10 K resistance. The input is active when it is pulled low (<1 .0 V).



3.3 INPUT WIRING



CAUTION: Power common (PWR COMMON) is NOT isolated from input common (INP COMM). In order to preserve the safety of the meter application, the power common must be suitably isolated from hazardous live earth referenced voltage; or input common must be at protective earth ground potential. If not, hazardous voltage may be present at the Signal or User Inputs and input common terminals. Appropriate considerations must then be given to the potential of the input common with respect to earth ground; and the common of the plug-in cards with respect to input common.

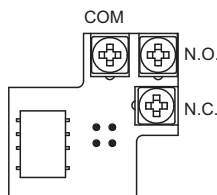
<p>Magnetic Pickup</p>	<p>AC Inputs From Tach Generators, Etc.</p>	<p>Two Wire Proximity, Current Source</p>
<p>Current Sinking Output</p>	<p>Current Sourcing Output</p>	<p>Interfacing With TTL</p>
<p>Switch or Isolated Transistor; Current Sink</p>	<p>Switch or Isolated Transistor; Current Source</p>	<p>Current Sink Output; Quad/Direction</p>

* Switch position is application dependent.

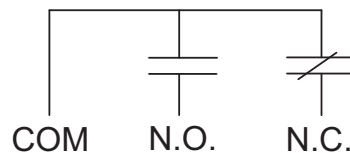
Shaded areas not recommended for counting applications.

3.4 SETPOINT (OUTPUT) WIRING

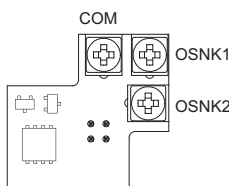
SINGLE SETPOINT RELAY PLUG-IN CARD



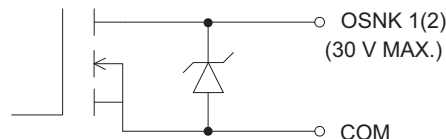
ELECTRICAL CONNECTIONS



DUAL SETPOINT N-FET OPEN DRAIN PLUG-IN CARD



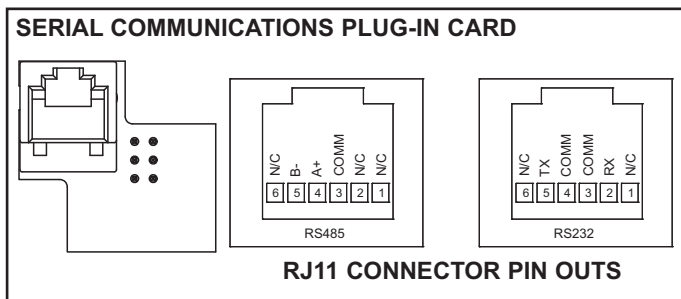
ELECTRICAL CONNECTIONS



Note: Output Common is not isolated from DC Power Common. Load must be wired between OSNK terminal and V+ of the load supply.

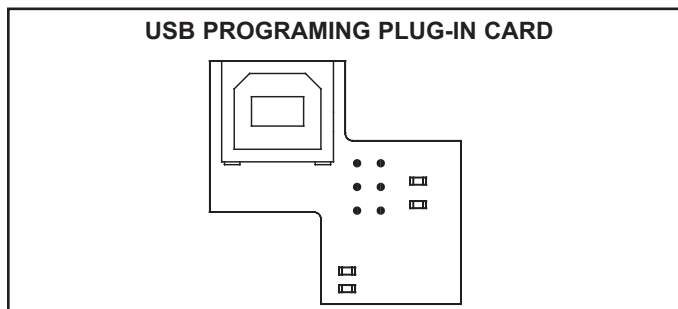
3.5 SERIAL COMMUNICATION WIRING

SERIAL COMMUNICATIONS PLUG-IN CARD



3.6 USB PROGRAMMING

USB PROGRAMING PLUG-IN CARD



LIMITED WARRANTY

(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.

(b) The Company shall not be liable for a breach of the warranty set forth in paragraph (a) if (i) the defect is a result of Customer's failure to store, install, commission or maintain the Product according to specifications; (ii) Customer alters or repairs such Product without the prior written consent of Company.

(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).