

## MODEL CUB2LU & CUB2LQ - MINIATURE ELECTRONIC 6-DIGIT COUNTERS



- QUADRATURE OR UP/DOWN COUNTING FOR POSITION APPLICATIONS
- INTERNAL LITHIUM BATTERY PROVIDES UP TO 10 YEARS OF UNINTERRUPTED OPERATION
- RUGGED, SEALED FRONT PANEL CONSTRUCTION (NEMA 4)
- FIELD CONNECTABLE FOR FRONT PANEL RESET, REMOTE RESET, OR BOTH
- WIDE TEMPERATURE RANGE
- AVAILABLE WITH A WIDE RANGE OF OPTIONS FOR MAXIMUM FLEXIBILITY

### DESCRIPTION

The CUB2LU and CUB2LQ counters are powered by an internal Lithium Battery, which will provide up to 10 years of continuous operation.

The chart below (*right column*) is a summary of the features of these counters.

These counters use a CMOS LSI counter circuit chip, mounted on a gold-plated substrate and electrically connected by ultrasonic wire-bonding. Internal electrical interface connections use elastomeric contacts to provide a gas-tight, corrosion resistant connection. Using the latest in micro-electronic assembly and manufacturing techniques provides units with the reliability and dependability required for industrial service.

### SPECIFICATIONS

1. **DISPLAY:** 6-digit LCD - 0.35" (9.0 mm) high.
2. **POWER SOURCE:** Internal 3.0 V lithium battery to provide up to 10 years of continuous operation. Battery life is dependent upon usage. Signal and reset contacts which remain closed for long periods of time will reduce battery life.
3. **SIGNAL INPUTS:** \*

#### CUB2LU:

**Count:** 5,000 cps from a 3.0 V to 6.0 V bi-polar output with a 50% Duty cycle. 180 cps from an open collector transistor with a 50% Duty cycle.

**Down/Up:** Counter will count "UP" when the Down/Up Input is grounded through switch contact, O.C. transistor or bi-polar output. Counter will count "DOWN" when the Down/Up Input is left open or driven high by a bi-polar output.

#### CUB2LQ:

**Count:** 20,000 cps from a 3.0 V to 6.0 V bi-polar output with a 50% Duty cycle. 2,500 cps from an open collector transistor with a 50% Duty cycle.

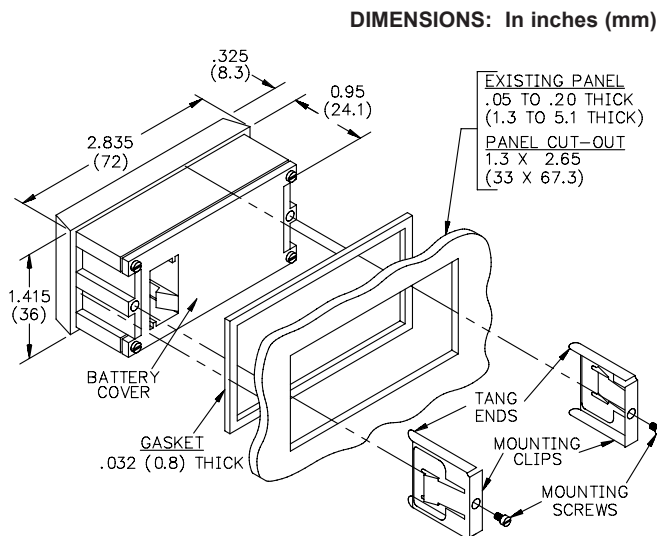
**Quad:** Quadrature direction input to be 90° out of phase with the Count Input. Counter will count "UP" on the falling edge of the Count Input when the Quad Input is low. Counter will decrement on the rising edge of the Count Input when the Quad Input is high. No count change will occur when the Quad Input is high. (See *Typical Applications, Quadrature Counting, Fig. 2*)

\* For contact inputs, external debounce filtering is required.

4. **REMOTE RESET:** Active low reset pulse width (*as specified on the Chart below*) from an open collector transistor, switch contact to ground, or a 3.0 V to 6.0 V bi-polar output.
5. **ENVIRONMENTAL CONDITIONS:**  
**Operating Temperature Range:** -30°C to +75°C  
**Vibration According to IEC 68-2-6:** Operational 5 to 500 Hz, in X, Y, Z direction for 1.5 hours, 5 g's.  
**Shock According to IEC 68-2-27:** Operational 30 g, 11 msec in 3 directions.
6. **WEIGHT:** 5.1 oz (145 g).

### DIMENSIONS & INSTALLATION

Counters should be mounted in a panel grounded to the machine frame. After cutting opening in panel, slide the panel gasket over the rear of the counter body to the back of the bezel. Then slide counter through the panel cut-out. Install mounting clips on each side of counter body with mounting screws. Make sure the side rails of the clips fit into the recesses in the side of the counter body so that the "Tang Ends" wedge between the panel opening and body as the screws are tightened.



Note: For additional application information, refer to the Cub 1 and Cub 2 Bulletin.

MODEL NO.	COUNT TYPE	DECIMAL POINT	*COUNT SPEED		RESET PULSE	OPTIONS
			O.C. TRANSISTOR	3-6 V BI-POLAR		
CUB2LU	Up/Down	none	180 cps	5,000 cps	100 µs	1,2,3
CUB2LQ0	Quad	none	2,500 cps	20,000 cps	10 µs	1,2
CUB2LQ1	Quad	0.0	2,500 cps	20,000 cps	10 µs	1,2
CUB2LQ2	Quad	0.00	2,500 cps	20,000 cps	10 µs	1,2

† Allow 8 weeks for delivery. Consult factory for special requirements & minimum quantities.  
 \* All count rates are based on a 50% duty cycle. For contact inputs, external debounce filtering is required.

OPTIONS: 1. External Power Available.  
 2. Count X2, X4 (Quad only) Available.  
 3. Decimal Points Available.

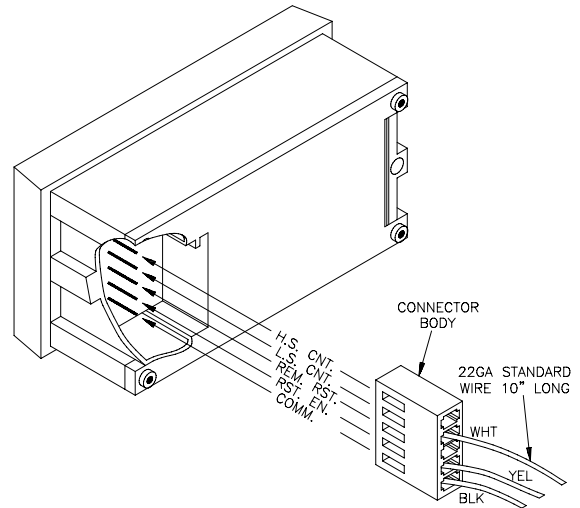
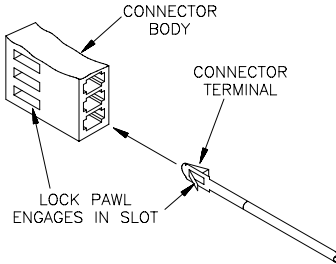
**Warning:** Lithium battery may explode if incinerated. Signal input voltage should not exceed 6.0 VDC to prevent damage to the counter.

## APPLICATION FLEXIBILITY VIA RECONNECT OPTIONS

Selection of desired operating modes is easily done by moving terminal leads in the Input Connector Body. The connector body is polarized to prevent incorrect insertion, and locked in place by the connector latch to avoid accidental disengagement. Connectors are supplied with the 4 leads installed as shown at right. A spare blue lead is supplied in the hardware pack.

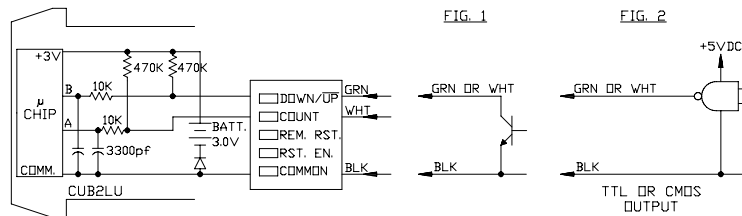
**Removing Terminal:** Insert blade of a small screwdriver into slot of connector body, and gently push in to disengage the locking pawl. Pull terminal out.

**Inserting Terminal:** When inserting into connector body, make sure the locking pawl is toward the slot in the body. Push terminal in until the locking pawl snaps into slot.



## TYPICAL APPLICATIONS

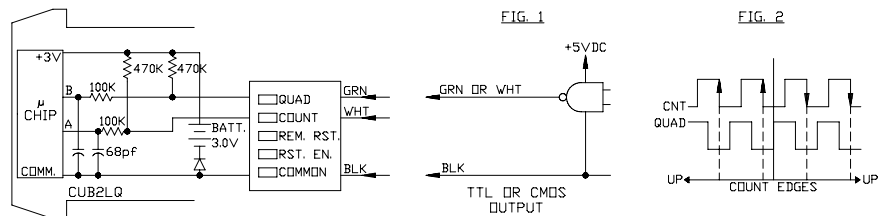
### UP/DOWN COUNTING - CUB2LU



Up/Down counting can be accomplished by using a count source and a direction signal. The count signal is applied to the Count Input and the direction is applied to the Down/Up Input. The counter will increment on the falling edge of the Count Input when the Down/Up Input is held low. The counter will decrement on the falling edge of the Count Input when the Down/Up Input is held high. If the Down/Up Input is left open, the counter will decrement because it is pulled high through an internal pull-up resistor.

### QUADRATURE COUNTING - CUB2LQ

When applying a quadrature signal to a CUB2LQ, as in positioning applications, the counter will increment with every falling edge of the Count Input if the Quad Input is low. The counter will decrement with every rising edge of the Count Input if the Quad Input is high. When the Quad Input is high, no change in count value will occur.



## ELECTRICAL CONNECTIONS

Wiring runs to count sensors or remote reset contacts can be made with almost any kind of wire and over distances of hundreds of feet, due to the advantages of low-voltage, low-current operation. The inherent noise immunity built into the CUB2LU and CUB2LQ, permits use of unshielded wiring in some applications, however the following precautions are advisable.

1. Avoid long wire runs in cable troughs or conduits with power circuits.
  2. Mount the CUB2LU or CUB2LQ counter in a panel that is grounded to the machine frame.
- Shielded wire is recommended in high electrical noise environments.

## ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBERS
CUB2LU	CUB2L Up/Down Counter	CUB2LU00
CUB2LQ0	CUB2L Quad. Counter	CUB2LQ00
CUB2LQ1	CUB2L Quad., 1st Dec. Point Counter	CUB2LQ10
CUB2LQ2	CUB2L Quad., 2nd Dec. Point Counter	CUB2LQ20

For more information on Pricing, Enclosures & Panel Mount Kits refer to the RLC Catalog or contact your local RLC distributor.