

# 1.0 INSTALLING THE METER

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

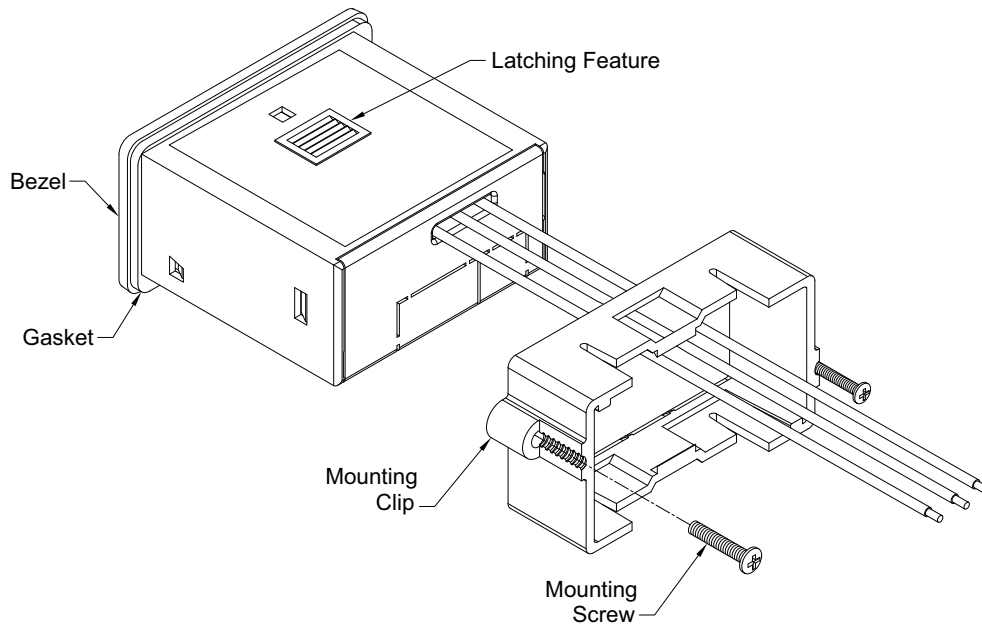
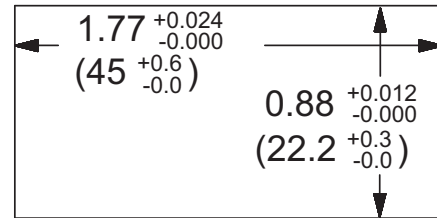
## Installation

The CUB7 series of products meets NEMA 4X/IP65 requirements for outdoor use, when properly installed. The units are intended to be mounted into an enclosed panel. The viewing window and reset button are factory sealed for a washdown environment. A sponge rubber gasket and mounting clip are provided for installing the unit in the panel cut-out.

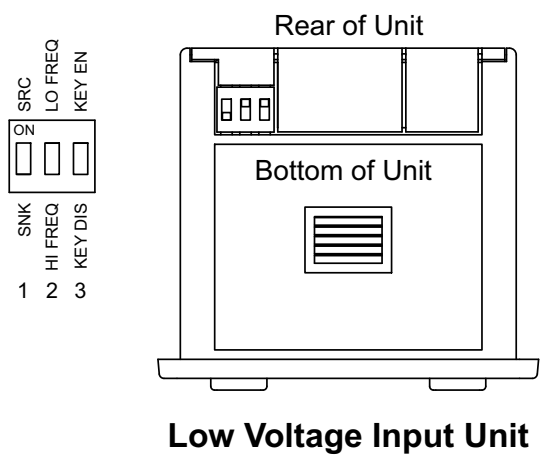
The following procedure assures proper installation:

1. Cut panel opening to specified dimensions. Remove burrs and clean around panel opening.
2. Carefully remove and discard the center section of the gasket. Slide the panel gasket over the rear of the unit to the back of the bezel. Insert the mounting screws onto both sides of mounting clip. The tip of the screw should **NOT** project from the hole in the mounting clip.
3. Install the CUB7 unit through the panel cut-out until the front bezel flange contacts the panel.
4. Slide the mounting clip over the rear of the unit until the clip is against the back of the panel. The mounting clip has latching features which engage into mating features on the CUB7 housing.
5. Alternately tighten each screw to ensure uniform gasket pressure. Visually inspect the front panel gasket. The gasket should be compressed to about 75 to 80% of its original thickness. If not, gradually turn mounting screws to further compress gasket.
6. If gasket is not adequately compressed and the mounting screws can no longer be turned, loosen mounting screws, and check that mounting clip is latched as close as possible to the panel.
7. Repeat from step #5 for tightening mounting screws.

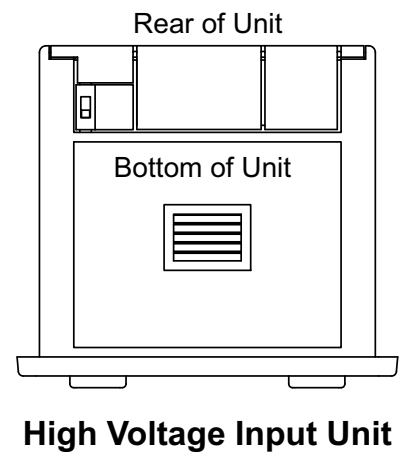
*Note: It is necessary to hold the unit in place when sliding mounting clip into position.*



## 2.0 SETTING THE DIP SWITCHES



Low voltage input units have 3 DIP switches that must be positioned appropriately prior to wiring.



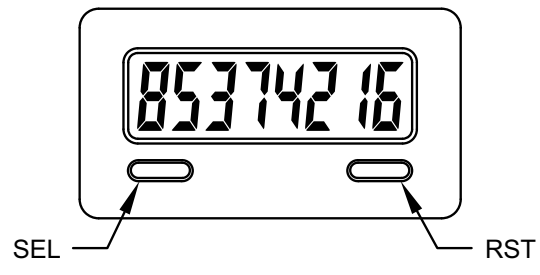
High voltage input units have 1 DIP switch to enable or disable the front bezel keypad.

*Note: Placing the KEY DISABLE/ENABLE DIP switch in the OFF position, disables all front panel keys.*

## 3.0 PROGRAMMING THE TIME RANGE

The CUB7 Timer has 9 time ranges. To change ranges, enable the front keypad with the DIP switch and press the SEL key. The currently programmed time range will be displayed (example 222222.2 = time range 2). To change the range, press the RST key. The ranges will cycle from 0-8 and back to 0. To enter your time range, press the SEL key and the unit will retain the current time range and return back to normal.

DISPLAY DURING PROGRAMMING	TIMER RANGE
00000.000	0.001 SEC
111111.11	0.01 SEC
222222.2	0.1 SEC
333333333	1 SEC
4444444.4	0.1 MIN
555555555	1 MIN
666666.66	0.01 HR
7777777.7	0.1 HR
88888888	1 HR



## 4.0 RESETTNG THE DISPLAY

The display may be reset to zero via the front RST key, the remote reset input or both.

The front RST key must be enabled for front panel reset. DIP switch # 3 on the low voltage input units or the single DIP switch on the high voltage input units. (See 2.0 Setting the DIP Switches for switch location)

The remote reset is activated via an external momentary contact closure between the reset input (blue wire) and the common (black wire). When the optional terminal blocks are used, see 5.0 Wiring The Meter, for the appropriate reset input terminal and the common terminal.

# 5.0 WIRING THE METER

## WIRING OVERVIEW

Electrical connections are made to the #22 AWG colored wires protruding from the rear of the unit. When using the optional terminal block, the #22 AWG colored wires are cut off and electrical connections are made via screwless type terminal block. All conductors should conform to the meter's voltage and current ratings. All cabling and wire terminations should conform to appropriate standards of good installation, local codes and regulations. It is recommended that the backlight power supplied to the meter (DC or AC) be protected by a fuse or circuit breaker.

## EMC INSTALLATION GUIDELINES

Although this meter is designed with a high degree of immunity to Electro-Magnetic Interference (EMI), proper installation and wiring methods must be followed to ensure compatibility in each application. The type of the electrical noise, source or coupling method into the meter may be different for various installations. The meter becomes more immune to EMI with fewer I/O connections. Cable length, routing, and shield termination are very important and can mean the difference between a successful or troublesome installation. Listed below are some EMC guidelines for successful installation in an industrial environment.

1. The meter should be mounted in a metal enclosure, which is properly connected to protective earth.
2. Use shielded (screened) cables for all Signal and Control inputs. The shield (screen) pigtail connection should be made as short as possible. The connection point for the shield depends somewhat upon the application. Listed below are the recommended methods of connecting the shield, in order of their effectiveness.
  - a. Connect the shield only at the panel where the unit is mounted to earth ground (protective earth).
  - b. Connect the shield to earth ground at both ends of the cable, usually when the noise source frequency is above 1 MHz.
  - c. Connect the shield to common of the meter and leave the other end of the shield unconnected and insulated from earth ground.

3. Never run Signal or Control cables in the same conduit or raceway with AC power lines, conductors feeding motors, solenoids, SCR controls, and heaters, etc. The cables should be ran in metal conduit that is properly grounded. This is especially useful in applications where cable runs are long and portable two-way radios are used in close proximity or if the installation is near a commercial radio transmitter.
4. Signal or Control cables within an enclosure should be routed as far as possible from contactors, control relays, transformers, and other noisy components.
5. In extremely high EMI environments, the use of external EMI suppression devices, such as ferrite suppression cores, is effective. Install them on Signal and Control cables as close to the unit as possible. Loop the cable through the core several times or use multiple cores on each cable for additional protection. Install line filters on the power input cable to the unit to suppress power line interference. Install them near the power entry point of the enclosure. The following EMI suppression devices (or equivalent) are recommended:
  - Ferrite Suppression Cores for signal and control cables:
    - Fair-Rite # 0443167251 (RLC# FCOR0000)
    - TDK # ZCAT3035-1330A
    - Steward # 28B2029-0A0
  - Line Filters for input power cables:
    - Schaffner # FN610-1/07 (RLC# LFIL0000)
    - Schaffner # FN670-1.8/07
    - Corcom # 1 VR3

*Note: Reference manufacturer's instructions when installing a line filter.*
6. Long cable runs are more susceptible to EMI pickup than short cable runs. Therefore, keep cable runs as short as possible.
7. Switching of inductive loads produces high EMI. Use of snubbers across inductive loads suppresses EMI.
  - Snubber: RLC# SNUB0000.

## USING THE COLOR CODED WIRES

The low voltage input units will contain three or four color coded wires depending on the backlight power requirements.

The high voltage input units will contain (2) orange wires and an additional two or three wires depending on the backlight power requirements.

The tables define the function of each colored wire.

### LOW VOLTAGE INPUT

Wire Colors

WHITE	BLUE	BLACK	RED
Low Voltage Input	Reset	Common	+Backlight Power

### HIGH VOLTAGE INPUT

Wire Colors

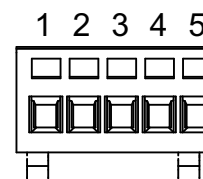
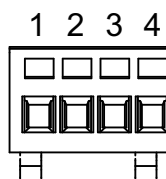
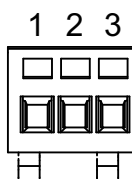
ORANGE	ORANGE	BLUE	BLACK	RED
High Voltage Input	High Voltage Input	Reset	Common	+Backlight Power

## TERMINAL BLOCK OPTION

**CONNECTIONS:** Wire clamping terminals

Wire Strip Length: 0.275" (7 mm)

Wire Gage: 24-16 AWG copper wire



## USING THE OPTIONAL TERMINAL BLOCK

1. Remove the rear cover. Refer to Figure 1. A small slotted screwdriver is required to release the side latches. Insert the screwdriver tip between the rear cover and the side of the unit. Leverage the screwdriver away from the case to unlatch the side latch and slightly lift the rear cover. Pinch the corners to hold the rear cover in place. Remove the screwdriver and repeat the same procedure on the other side of the rear cover.
2. For safety concerns, the wires should be cut off completely flush with the PC board to prevent a short.
3. Break out the break away tab(s) as required. Remove the left tab only for 3 position terminal block or both tabs for 4 and 5 position terminal blocks.
4. Reinstall the rear cover into CUB7 unit.
5. Mount the CUB7 into the panel (refer to 1.0 Installing The Meter)
6. Push the keyed terminal block onto the exposed PC board. The left most terminal, next to the DIP switch(s) is terminal #1.

*Note: Wire sizes 16-24 AWG may be used with 0.25" length exposed. The screwless type terminal block requires a small slotted screwdriver engaged in the upper slot to open the wire clamp in the lower larger slot. Removing the screwdriver will lock the wire clamp unto the wire.*

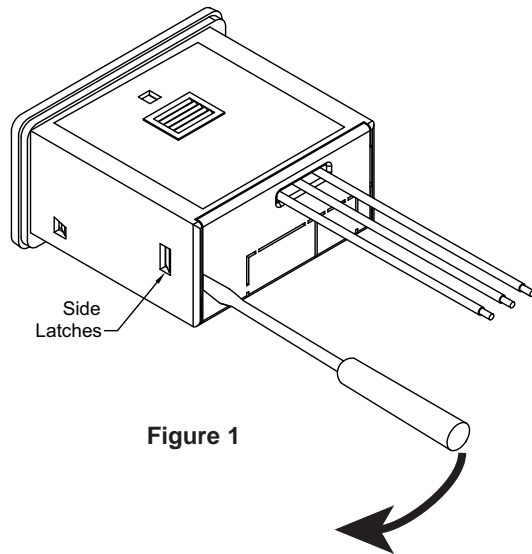
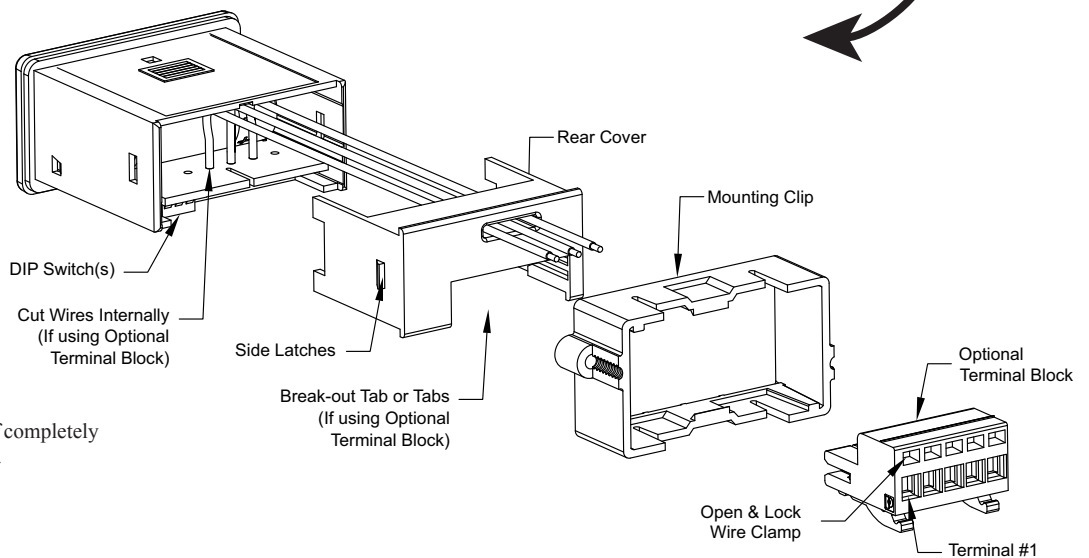
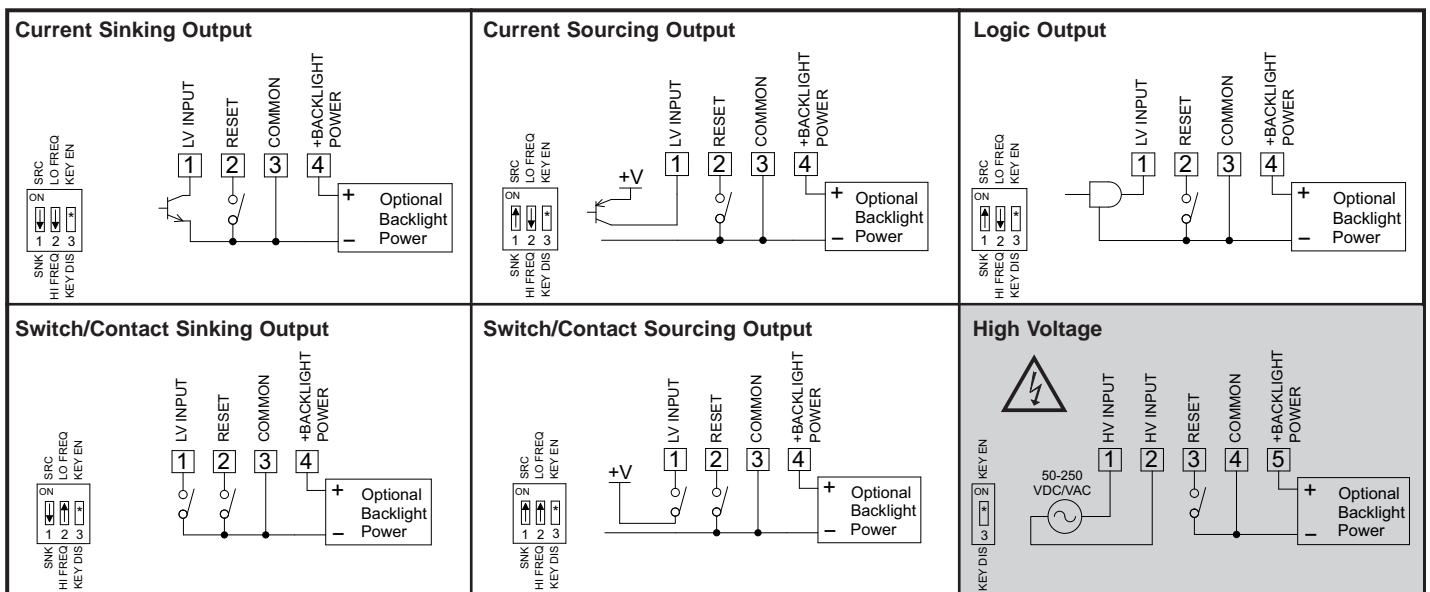


Figure 1



Wires must be cut off completely flush with PC board.



\* Switch position is application dependent.

Shaded area for high voltage applications.

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### **LIMITED WARRANTY**

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