

## **E:COUNT LT MODEL MCR-09 SPECIFICATIONS & INSTALLATION REFERENCE**

### **Mounting:**

The E:Count LT uses a four bolt (1/4-20) mounting pattern on the foot of the unit. If the unit is to be mounted directly to the flowmeter and uses the internal pulser the appropriate mounting flange adapter and drive shaft must be ordered for the particular model and size of meter. The adapter kits are provided with cross drilled seal bolts so that the unit can be Weights & Measures sealed after mounting.

If the unit is to be remotely mounted from the meter and an external pulser used, no additional hardware is required besides the 4 bolts.

### **Electrical Wiring:**

**SUITABLE FOR USE IN CLASS 1, DIVISION 2, GROUPS C,D HAZARDOUS LOCATIONS OR NONHAZARDOUS LOCATIONS ONLY.**

**WARNING – EXPLOSION HAZARD – DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.**

**WARNING – EXPLOSION HAZARD – SUBSTITUTION OF ANY COMPONENT MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2.**

**WARNING – TO PREVENT IGNITION OF EXPLOSIVE ATMOSPHERES, DISCONNECT POWER BEFORE SERVICING.**

All wiring must be accordance with the National Electrical Code NFPA 70. In particular, if the unit is to be used in a Class 1, Division 2 hazardous location the installation and wiring must be in accordance with Article 500 of this publication.

Wire size: (refer to Field Wiring Connector Designations)

Power in, Ground, and Solenoid Connections (J1-1 to 2) (J9-1 to 6): 18-16 AWG

All other connections: 22-18 AWG

### **Terminal Blocks:**

The unit uses screw type terminal blocks that offer a good connection with vibration and temperature cycling. Prepare the wire by stripping off about .3 inches of insulation. Twist the strands tightly together. Make sure contact opening is clear, insert the wire and securely tighten the screw. Check for loose strands and pull on the wire to make sure of a good connection.

### **Power Supply Fusing:**

A UL Listed JDYX fuse rated at 5A or less MUST be provided in the output of the DC power supply circuit. (Littlefuse series 233/234 or equivalent).

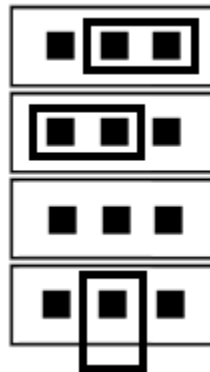
**E:COUNT LT MODEL MCR-09 SPECIFICATIONS & INSTALLATION REFERENCE**

**Power:**

- J1-1 Power In ..... **RED\***
- J1-2 Power Ground In ..... **BLACK\***
- J1-3 Authorization Input
- J1-4 Ground
- J1-5 Auxiliary Input
- J1-6 Ground
- Safety Ground - Green Screw Adjacent To Hub ..... **GREEN\***

**Pulse Outputs:**

- J13-1 Power Out (+12V DC)
- J13-2 Pulse Output 1 ..... **YELLOW\***
- J13-3 Pulse Output 2
- J13-4 Ground
- J11 Pulse Output 1 Pullup Resistor Jumper
- J12 Pulse Output 2 Pullup Resistor Jumper



470 Ω to +5 VDC

1 kΩ to +12 VDC

No Jumper or  
**Side Jumper (Default)**  
Pull-up Resistor in FMS

**RS-232 Communication:**

- J2-1 TX Printer
- J2-2 RX Printer
- J2-3 Signal Ground Printer
- J2-4 TX Host
- J2-5 RX Host
- J2-6 Signal Ground Host

**RTD Probe:**

- J2 - Compensator Board

**External Encoder (pulser):**

- J3-1 Channel B ..... **WHITE\***
- J3-2 +5V DC Power Output **RED\***
- J3-3 Channel A ..... **GREEN\***
- J3-4 Signal ground ..... **BLACK\***

**Valve Outputs:**

- J9-1 Preset valve stage 1
- J9-2 Preset valve stage 2
- J9-3 Auxiliary valve/relay 1 ..... **GREY\***
- J9-4 Auxiliary valve/relay 2 ..... **WHITE\***
- J9-5 Ground ..... **BLACK\***
- J9-6 Ground ..... **BLACK\***

**\* WIRE COLOR IF PREWIRED FROM FACTORY**

**E:COUNT LT MODEL MCR-09 SPECIFICATIONS & INSTALLATION REFERENCE****Physical:**

Height: 6.00" + Shaft (~9/32")  
 Width: 8.175" (8 3/16")  
 Depth: 2.85" (3.85" including conduit hubs, possibly more for conduits)  
 Weight: 3 pounds

Mounting: 2.5" square pad with 1.5" Square 1/4-20 bolt pattern mounts to MID:COM or user supplied adapter plates for any meter manufacturer.

Pulse drive: 1/2" slotted shaft. Receives MID:COM or user supplied cross-pinned tube shaft adapter for any meter.

Housing: Cast Aluminum with powder coat finish  
 Bezel: 0.125" thick with powder coat finish  
 Fasteners: Stainless Steel

Keyboard/Display Lens: ENDURO membrane keyboard with LEXAN lens  
 Display: Supertwist black/white 6-digit 16 segment LCD, Alpha-numeric  
 Backlit with High Brightness White LEDs  
 Viewing angle +/- 60 degrees left/right, -10 + 80 degrees down/up  
 High Contrast, readable in bright sunlight and total darkness.

**Environmental:**

Outdoor Use  
 Altitude: Up to 2000 M  
 Temperature: - 40° C to 60° C  
 Relative Humidity: 0-100%  
 Enclosure: NEMA 4

**Electrical:**

Typical Supply Voltage: 9-16 VDC Max  
 Typical Supply Current: <0.2 A (without optional solenoid valve/relay drivers active)  
 Maximum Load Current: 4.5 A (with solenoid/relay drivers active)  
 Maximum Rated Control Output: 16 VDC, 3A, Pilot Duty  
 Maximum Rated Signal I/O's: 16 VDC, 6 mA  
 Pulse Input: 0-5 VDC  
 Analog Input: 100 Ω Platinum RTD  
 Communication: RS-232  
 External connections: 1/2" NPT listed conduit hubs  
 Internal connections: Screw type terminal blocks

**Electrical Ratings:**

Temperature rating code: T4  
 For use in Class 1, Division 2, Hazardous Locations.

**Pulse Input:**

Internal: 256 PPR non-contact, non-optic, dual-channel quadrature output pulser.  
 Pulser Manufacturer: MID:COM  
 External: Dual or Single Channel Input  
 Max Pulse Freq.: 5 kHz

## **E:COUNT LT MODEL MCR-09 SPECIFICATIONS & INSTALLATION REFERENCE**

### **Inputs (2):**

Authorization Input: J1-3, see below  
Auxiliary Input: J1-5, Reserved for future use

### **Authorization Input:**

The Authorization input disables the START/STOP from initiating a delivery and will end a delivery if one has been initiated. The Authorization input can be either HIGH (greater than 3 volts) or LOW (ground) depending on the HIGH or LOW selections under HWAUTH(or AUTHR) in the Setup menu. The factory default is HIGH so that no connection to this input allows an internal pull-up resistor to authorize the delivery at all times. This input uses a relay contact closure or an open-collector/drain output.

### **Outputs (4):**

Output 1: Preset Stage 1: J9-1  
Output 2: Preset Stage 2: J9-2  
Output 3: Valve/Relay 1: J9-3, Energized at start of reset cycle  
Output 4: Valve/Relay 2: J9-4, Energized at end of reset cycle  
Software modifications available.

### **Calibration:**

Automatic or Manual Entry  
Input Pulse Prescale: 1-99 (divides input stream)  
Calibration Range: 0.0000 to 1.9999 (1 part in 10,000)

### **Temperature Compensator:** (optional)

Temperature Range: -40° - +63° C (-40° - +160° F)  
Temperature Probe Type: 100 Ω Platinum RTD  
Correction Method: API Table Lookup  
Correction Occurrence: Each 0.1 Increment in Registration  
Available API Tables: Propane, Fuel Oil, Gasoline, Lube Oils, Methanol, JetA, JetB, Ethanol, NH3, Aviation Gasoline

### **Approvals:**

UL, cUL Control #3UJ9  
NTEP COC 06-031

### **Count Capacity:**

Displayed: 99999 (6 digits)  
Printed: 99999999 (8 digits)  
Totalizer: 999999999999 (12 digits)  
Decimal: 1, 2, None

### **Printer Interface:**

Communications: Serial RS-232  
Various models of impact and thermal printers, includes MID:COM, Epson, and others.

### **External Communications:**

Parameters: 9600 Baud 8, 1, N  
Software Updates Field Programmable

## LT & FUEL MANAGEMENT SYSTEM (FMS) WIRING

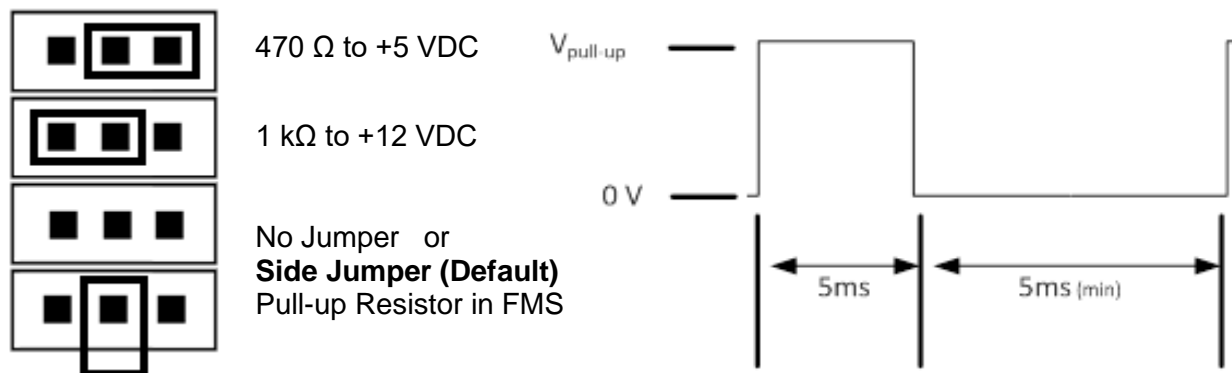
Fuel Management Systems (also known as CardLocks, KeyLocks, etc.) have been available for a long time from a number of manufacturers. There are many different models that share some commonality but they can have distinct differences. It is beyond the scope of this document to describe how to connect to any specific device but instead this document will describe how the inputs and outputs of the LT work and show some examples of the hookup to different generic types of FMS inputs and outputs. In the simplest form the connections between the FMS and LT allow for the FMS to authorize the LT to start a delivery (and also end it if necessary) as well as allow the LT to send volume pulses to the FMS so that it can record the delivery.

### PULSE OUTPUT FROM LT

The LT outputs one pulse for each increment of the right-hand digit of the display regardless of decimal position. For example, if there are 2 decimals on the display each pulse represents 0.01 units of volume (gallons or liters). If there is only one decimal then each pulse represents 0.1 units of volume. Typically dispensers use 2 decimals.

As depicted in the figure below each pulse is in a "high" state for 5 ms. The pulse output is in a "low" state for a period of time determined by the flow rate but will not be less than 5 ms at maximum flow rate. The pulse output is configured as an "open collector" or "open drain" transistor with header J11 allowing for pull-up resistors to either +5 VDC or +12 VDC. The default from the factory is that the jumper is included but not installed. For this configuration to work properly the FMS must have its own pull-up resistor on the pulse input line or the installer may install one in the FMS from the pulse input line to the FMS DC power supply or one of the pullups in the LTIS may be used. ***It is very important not to have both a pull-up in the FMS and LT.*** To determine if the FMS does not have a pull-up resistor first visually look for one connected to the pulse input terminal and if none is found do a voltmeter check. With the meter set to DC Volts check between the pulse input line and the Common terminal (usually ground). If little or no voltage is seen then there is no pull-up resistor.

**Figure 1. PULSE OUTPUT PULL-UP RESISTOR AND TIMING DIAGRAM**



Pin 2 of J13 is the pulse line and Pin 4 (ground) is the return line for the pulse line and all other inputs and outputs. The "low" state voltage is less than 0.05 VDC under any conditions and typically near 0 VDC. The "high" state voltage depends on the J11 jumper placement and whether or not the FMS has a pull-up resistor on its pulse-input line.

(continued)

**PULSE OUTPUT FROM LT (continued)**

The return line (LT ground, J13 PIN 4) must be connected to the FMS return line. This line in the FMS may or may not be independent of the FMS power supply ground and is typically labeled "common or COM".

The installer needs to determine what is the FMS signal return line and insure that it is connected to the minus side of the FMS DC power supply.

It is important to note that return line connections can be the cause of serious signal degradation and electrical noise due to "Ground Loops". The LT logic and power ground is bonded to Earth ground. For solid operation it may be necessary to bond the FMS return line to Earth ground.

Most FMS systems are compatible with old-style mechanical Reed Switch pulsers as well as electronic pulsers. Reed Switch pulsers exhibit "switch bounce" which the FMS has to filter out. The FMS will have a de-bounce feature that may be called "filter" or "high speed/low speed", etc. This is usually selectable with jumpers, dip-switches, or software settings. It is very important that the FMS be set for no filter, high speed, or "electronic" pulser; otherwise some or all of the pulses from the LTIS will be lost or filtered out.