**SAFETY PROCEDURES**

**WARNING**

- Before using this product, read and understand the instructions.
- All work must be performed by qualified personnel trained in the proper application, installation, and maintenance of equipment and/or systems in accordance with all applicable codes and ordinances.
- When handling electronic components and boards, always use proper Electrostatic Discharge (ESD) equipment and follow the proper procedures.
- Make sure that all necessary safety precautions have been taken.
- Provide for proper ventilation, temperature control, fire prevention, evacuation, and fire management.
- Provide easy access to the appropriate fire extinguishers for your product.
- Consult with your local fire department, state, and local codes to ensure adequate preparation.
- Read this manual as well as all the literature provided in your owner’s packet.
- Save these instructions for future reference.
- Failure to follow the instructions set forth in this publication could result in property damage, personal injury, or death from fire and/or explosion, or other hazards that may be associated with this type of equipment.

**Be Prepared**

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- Provide easy access to the appropriate fire extinguishers for your product.
- Consult with your local fire department, state, and local codes to ensure adequate preparation.
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- Save these instructions for future reference.

**Observe National and Local Codes**

- Power, input, and output (I/O) wiring must be in accordance with the area classification for which it is used (See Safety Markings sections). This may require using connections or other adaptations in accordance with the requirements of the authority having jurisdiction.
- To comply with UL Listing requirements, Class 2 power supply, or an isolation power source and overcurrent protective device rated 5 Amp max, are required to be installed in the field. (Pour être conforme aux exigences UL, une alimentation électrique de classe 2 ou une alimentation électrique isolée et comportant un dispositif de protection contre la surtension de 5 ampères ou moins sont requises pour l’installation.) Peripheral equipment must be suitable for the hazardous location where it is installed. (L’équipement périphérique doit être adapté des endroits dangereux où il est installé.)
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**Publication Updates and Translations**

The most current English versions of all Liquid Controls publications are available on our web site, www.lcmeter.com. It is the responsibility of the local distributor to provide the most current version of LC manuals, instructions, and specification sheets in the required language of the country, or the language of the end user to which the products are shipping. If there are questions about the language of any LC manuals, instructions, or specification sheets, please contact your local distributor.
Potential Damages Caused by Exposure to ESD

To prevent electrostatic discharge (ESD) damage to LectroCount register electronic components, all LectroCount electronic register truck installations are required to properly ground truck seat(s) cushions and Epson printers. Prolonged exposure to ESD over weeks, months, or years can corrupt LectroCount registers’ CPU memory and damage the electronic components in LectroCount registers (as well as other electrical components in the truck’s electrical system).

Adjustable, shock-absorbing seats, if not grounded correctly, generate significant amounts of ESD. The pivots and hinges of these seats isolate the seat cushion from an electrical ground. Without an electrical ground, ESD builds between the seat cushion and the operator. This built-up ESD can be transferred back to the LectroCount register from any point of the truck’s electrical system, such as the cabling from the LectroCount register to the cab or the Epson printer.

Liquid Controls’ Grounding Kits

To protect electronic components from ESD, all LectroCount truck installations must include the installation of the LectroCount Ground Strap Kit (PN 82185) and the Epson Printer Ground Wire Kit (PN 82184). Properly grounded seats allow static electricity to “bleed off” the driver and the seat before it can build up, discharge, and damage the LectroCount register or any of the truck’s other electrical components.

The LectroCount Ground Strap Kit will be included with all future LCR-II LectroCount register shipments, and the Epson Printer Ground Wire Kit will be included with all future Epson printer cable kit shipments. Effected part numbers are listed below. For existing installations and previously purchased LectroCount registers and Epson printers, both ground kits are available from LC.

ESD Procedural Precautions and LectroCount Register Grounding

Installation Notes

When installing or performing maintenance on a LectroCount register, there are certain guidelines that must be followed to safeguard against ESD damage.

Grounding method

- Connect the ground screw (on the rear of LectroCount housing in the upper left corner) to a known good ground (less than 1 Ω). Use a 12 ga. or larger stranded wire.

Fixed Installations

LectroCount housings directly mounted to the meter are attached to the earth ground through the meter via the tank and the tank piping, which is grounded by the electrical system grounding rods. Division 2 or Zone II installations can ground the LectroCount housing by using shielded cables (or wiring) run through liquidtight (metal/rubber coated). The liquidtight and the liquidtight connectors provide the necessary ESD protection. AC fixed installations require and additional grounding method to ensure a proper ground.

Grounding method for AC fixed installations

- Connect the ground screw (on the rear of LectroCount housing in the upper left corner) to a known good ground (less than 1 Ω). Use a 12 ga. or larger stranded wire.

ESD Precaution

Opening LectroCount Registers

Follow this procedure each time you open a LectroCount register or approach a LectroCount register with the door open. Before opening the LectroCount register and handling the CPU board, it is important to discharge any ESD that may have built up on your person. Wipe the unit with a damp cloth before opening the cover. To discharge ESD from your person, touch a well-grounded point such as the LectroCount register housing, the meter, the truck piping, or the bumper. When the maintenance is complete and the LectroCount register door is closed, the CPU board is protected from ESD by the LectroCount register housing which is grounded to the chassis.

Safety Markings

The equipment is Listed by UL to applicable US and Canadian standards for use in hazardous locations under Liquid Controls file E180172.

CLASS I

Potentially Explosive Gas/Vapor Atmospheres

DIVISION 2

Gases and vapor are not normally present in an explosive concentration but may accidentally exist during abnormal operations

GROUPS C & D

Flammable/explosive Gas groups

T6

Temperature class for surface temperature limitations. T6 is ≤ 85º C

-40ºC ≤ Tamb ≤ 70ºC

Safe limits of ambient temperature

IP66 AND NEMA 4

Ingress protection: dust tight and protected against powerful water jetting

Consult factory for current compliance status.

Two Nameplates

LectroCount LCR-II electronic registers are shipped with one of two nameplates. One nameplate is applied to UL-Listed units. The other nameplate is applied to IECEx / INMETRO / ATEX certified units.
**Materials of Construction**
- Aluminum Alloy ADC12
- Powder Coat: Corro-Coat PE 74-141 Polyester

**Weight**
- 8.4 lbs (3.8 kg)

**Display Elements**
- Liquid crystal display (LCD)

**Cable Entry**
- ½” NPT (5)
- ¾” NPT (2)

**Ambient Temperature Rating**
- -40 to 158 °F (-40 to 70 °C)
- -4 to 158 °F (-20 to 70 °C) for IECEx / INMETRO / ATEX

**Mechanical**

<table>
<thead>
<tr>
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<th>Specifications</th>
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<td><strong>Communications</strong></td>
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<tr>
<td>- RS-232: EIA-232E standard</td>
<td></td>
</tr>
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<td>- RS-485: SAE J1708 standard</td>
<td></td>
</tr>
<tr>
<td><strong>Auxiliary 1 Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Current sinking capability: 1 A</td>
<td></td>
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<tr>
<td><strong>Auxiliary 2 Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Current sinking capability: 150 mA</td>
<td></td>
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<tr>
<td><strong>Solenoid 1 Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 10.2 to 27.2 VDC</td>
<td></td>
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<tr>
<td>- Current: 1 A maximum</td>
<td></td>
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<tr>
<td><strong>Solenoid 2 Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 10.2 to 27.2 VDC</td>
<td></td>
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<tr>
<td>- Current: 1 A maximum</td>
<td></td>
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<tr>
<td><strong>Solenoid 3 Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 10.2 to 27.2 VDC</td>
<td></td>
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<tr>
<td>- Current: 1 A maximum</td>
<td></td>
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<tr>
<td><strong>Optical Sensor</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 10 to 28 VDC</td>
<td></td>
</tr>
<tr>
<td>- Current: 0.5 A maximum</td>
<td></td>
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<tr>
<td><strong>RTD Temperature Probe</strong></td>
<td></td>
</tr>
<tr>
<td>- 4 wire platinum sensor</td>
<td></td>
</tr>
<tr>
<td>- 100 Ω resistance at 0 °C</td>
<td></td>
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<td>- 138.5 Ω resistance at 100 °C</td>
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<td><strong>Printer (Epson Model 295)</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 24 VDC</td>
<td></td>
</tr>
<tr>
<td>- Current: 0.8 A maximum</td>
<td></td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td></td>
</tr>
<tr>
<td>- -22 to 104 °F (-30 to 40 °C)</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical**

<table>
<thead>
<tr>
<th>Electrical Details</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Voltage</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: 9 to 28 VDC</td>
<td></td>
</tr>
<tr>
<td>- Current: 4.5 A maximum</td>
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<tr>
<td>(including solenoid valves)</td>
<td></td>
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<tr>
<td><strong>Pulse Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Voltage: peak to peak: 5 to 28 V</td>
<td></td>
</tr>
<tr>
<td>- Frequency maximum: 10,000 Hz</td>
<td></td>
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<tr>
<td><strong>Scale Pulse Output</strong></td>
<td></td>
</tr>
<tr>
<td>- Current sinking capability: 150 mA</td>
<td></td>
</tr>
<tr>
<td><strong>Electrical Protection</strong></td>
<td></td>
</tr>
<tr>
<td>- 5 A fuse on power cable</td>
<td></td>
</tr>
</tbody>
</table>

**RTD Temperature Probe**
- 4 wire platinum sensor
- 100 Ω resistance at 0 °C
- 138.5 Ω resistance at 100 °C

**Printer (Epson Model 295)**
- Voltage: 24 VDC
- Current: 0.8 A maximum
- Operating Temperature: -22 to 104 °F (-30 to 40 °C)

**Remote Electronic Display**
- 1 A sinking capability

**Optical Sensor**
- Voltage: 10 to 28 VDC
- Current: 0.5 A maximum

**RTD Temperature Probe**
- 4 wire platinum sensor
- 100 Ω resistance at 0 °C
- 138.5 Ω resistance at 100 °C

**Printer (Epson Model 295)**
- Voltage: 24 VDC
- Current: 0.8 A maximum
- Operating Temperature: -22 to 104 °F (-30 to 40 °C)

**Remote Electronic Display**
- 1 A sinking capability
**LectroCount LCR-II Overview**

**GENERAL INFORMATION**
The Liquid Controls LectroCount LCR-II is a microprocessor-based electronic meter register that can be used for Weights & Measures approved custody transfer actions in mobile or fixed installations. The LCR-II can control a meter system as a stand-alone unit, or it can be used as a slave to a host controller such as a process controller or an in-cab data management system.

**INPUTS**
In order to calculate flow measurements from a positive displacement meter, the LCR-II receives a pulse input from an internally mounted quadrature pulser that is mechanically connected to the flow meter (retrofit kits are available for installation onto Neptune, Brooks, and Smith positive displacement meters). This pulse output can also come from a Liquid Controls external POD pulser or another pulse generator. In addition to the pulse input, the LCR-II is equipped with an input for a temperature probe, so the register can compensate volume measurements according to the temperature of the product.

**OUTPUTS**
The LCR-II is equipped with a scaled pulse output, two auxiliary outputs, and two solenoids outputs. These outputs allow the LCR-II to communicate with meter system accessories such as solenoid-controlled valves, optical air and vapor eliminators, remote displays, printers, and third-party devices.

**COMMUNICATIONS**
The LCR-II is capable of interfacing in RS-232 and RS-485 communication protocols.

**HOUSING**
The LectroCount LCR-II housing and base are aluminum die cast and powder coated. The hinge door design provides easy access to the internal connections and a Weights and Measures sealable fastener opposite the hinges. There are seven machined ports, five ½” NPT ports and two ¾” NPT ports, on the back of the LectroCount LCR-II to provide secure cable connections for all external devices.

**DISPLAY**
The 1” display is a six character, backlit LCD display.

**NAVIGATION KEYS**
The LCR-II has two domed navigation keys to perform basic configuration and functions. The keys collapse and recover to give a tactile, positive confirmation of keystrokes.

**SELECTOR SWITCH**
The selector switch controls basic stop, run, print, and shift print delivery functions. To perform calibration functions, the cover plate must be removed and the selector switch turned to the six o’clock position.

**FUNCTIONALITY AND OPERATION**
The principle functions of the LectroCount registers include:
- Calibration (single and multipoint)
- Weights & Measures custody transfer
- Multiple production selection
- Security settings
- Air and vapor elimination (with proper accessories)
- Valve control (with proper accessories)
- Electronic temperature volume compensation (ETVC) (with proper accessories)

**Meter System Components**
A Liquid Controls meter system not only accurately measures product, it also regulates and purifies product flow in order to produce the optimal conditions for measurement. Optimal systems typically include an air/vapor eliminator, strainer, meter, register, and control valve. The LectroCount LCR-II, a register, serves as the central controller of the meter system. Most components in the meter system are hard wired to the LCR-II via data communication cables. See manual M100-10.

**AIR/VAPOR ELIMINATORS**
Air and vapor eliminators sense and remove air or vapor in the piping before it enters the metering system, ensuring that only liquid will pass through the meter for measurement. Mechanical air eliminators do not require a data connection to the LectroCount LCR-II (in LPG applications, they are often plumbed to a 3-way solenoid which is wired to the LectroCount LCR-II). Optical air eliminators use an optical sensor to monitor liquid levels and a solenoid-actuated valve to turn the vapor vent on and off. The optical sensor and the solenoid valve are connected to the LectroCount LCR-II by separate data cables. See manuals M300-20 and M300-21.

**VALVES**
Valves control the flow through a metering system. They open the line to initiate custody transfers and close the line to stop custody transfers. Some valves can partially close, slowing the flow rate to a dwell flow on preset deliveries. By slowing the flow rate, valves can lessen the hydraulic shock incurred by the meter system upon shut off and provide accurate preset deliveries. Many valves use solenoid-operated valves that require a hard wired data connection to the LectroCount LCR-II. See manuals M400-11 and M400-49.

**ELECTRONIC TEMPERATURE VOLUME COMPENSATION (ETVC) KIT**
In order to perform temperature compensation equations, the LectroCount LCR-II relies on a temperature probe inserted into the strainer housing. Installation directions for the ETVC kit are included in this manual.
Meter System Components

PRINTERS
Printers print delivery tickets to provide a physical record of custody transfers. The Epson slip printer is considered the industry standard for many applications. Multi-layered tickets are available to provide a physical record for both customers and business records. The Epson roll printer is ideal for recording multiple custody transfers over an extended time frame.

XL LED REMOTE DISPLAY
The XL LED Remote Display’s six 2½” high digits, each consisting of 18 red LED lights, are discernible from up to 250 feet away. Hard wire data communication with the LectroCount LCR-II is required. See manual EM300-55.

PULSE OUTPUT DEVICE
The Liquid Controls Pulse Output Device (POD pulser) converts the rotary motion of a positive displacement flowmeter into electronic pulses. POD pulsers can be used in place of an internal pulser. They are ideal for applications that require explosion proof components in which the LectroCount LCR-II register is installed at a distance from the meter. The POD pulser requires hard wired data communication with the LectroCount LCR-II. See EM300-11.

DIFFERENTIAL PRESSURE (∆P) TRANSUDER
The differential pressure transducer, common in aviation applications, monitors the differential pressure (pressure drop) across a full flow fuel monitor/water coalescer. The highest differential pressure reached during the custody transfer will then be printed on the ticket. Using interlocks, the LectroCount LCR-II can shut down a custody transfer if the differential pressure meets a preprogrammed differential pressure shutdown value. The ∆P Transducer requires hard wired data communication with the LectroCount LCR-II. See EM300-40.

DATA MANAGEMENT SYSTEM
The DMS is an in-cab computer with a heavy duty lap pad interface. The DMS streamlines the flow of data between the LCR-II and back office accounting software. The DMS must be hard wired to the LectroCount LCR-II. See EM300-10 and EM200-11.

LAP PAD
The lap pad programs and displays all operational functions of the LectroCount LCR registers. It has a large, tactile, alpha-numeric keyboard and a dual line, backlit display. A 3-terminal lap pad adapter is provided with each lap pad. The adapter provides a junction for the lap pad, the printer, and the LCR printer cable.

Installation Overview

If the LectroCount LCR-II was ordered as part of a meter system, it will arrive mounted on the meter and prewired to the ETVC probe, air eliminator, and valve.

Installation overview for LCR-II ordered with meter system:
1. Ground truck seat cushion, page 12
2. Install meter system onto truck or fixed installation. Refer to meter manual
3. Run the LCR-II’s data and power cable to truck cab or power supply, page 17
4. Connect any additional components to the LCR-II’s CPU board.
5. Mount printer and connect printer data cable, page 27
6. Connect the LCR-II and the printer to power supply, page 29
7. Setup and calibrate the LCR-II, refer to manual EM100-11

If you are replacing an existing register, you must mount the register onto the meter and make the proper connections to all of the components.

Installation overview for LCR-II ordered without meter system:
1. Ground truck seat cushion, page 12
2. Mount the LCR-II to the meter, page 14
3. Run the LCR-II’s data and power cable to truck cab or power supply, page 17
4. Connect all components to the LCR-II’s CPU board.
5. Mount printer and connect printer data cable, page 27
6. Connect the LCR-II and the printer to power supply, page 29
7. Setup and calibrate the LCR-II, refer to manual EM100-11.

Specific installation requirements will vary with the model of the truck, the physical layout of a fixed installation, the configuration of any existing metering equipment, the options selected, and the type of fluid being metered.

Before installation, check your shipment against the packing list and ensure that no parts are missing. The packing list is inside the red information packet along with the Installation and Operation Manuals.

All manuals are available at www.lcmeter.com.
**LECTROCOUNT GROUND STRAP KIT**

LectroCount Ground Strap Kit

All seat cushions are grounded in a similar manner. The illustrations on the next page detail the following instructions for grounding three typical types of truck seats.

**To ground a truck seat:**

1. Identify any adjustable, shock absorbing seat in the truck cab. These seats will typically have pivot points, hinges, or other mechanical design features that make seat adjustments possible.
2. Find an existing screw or hole near the back of the seat frame, close to the cab floor. If a hole or screw does not already exist, drill a 9/32” hole in the seat frame.
3. Attach one end of the ground strap to the seat frame bracket using the lock washer, flat washer and nut provided.
4. Find an existing screw or hole, or drill a 9/32” hole, in the part of the seat frame—above all pivots and adjustments—that is attached directly to the seat cushion. Make sure that there are no intervening pivot points, guides, adjustment mechanisms, etc., which could interfere with the ground path between the seat cushion and the ground strap.
4a. If the seat cushion has a wooden base, use a wood screw and washer to attach the strap lug to the bottom of the seat at a point where the seat fabric is attached to the wood. There must be good contact between the seat fabric and ground strap lug.
5. Use the wire ties provided with the kit and tie off the strap so that it doesn’t interfere with the movement of the seat and is clear of traffic areas in the cab.
6. Check the strap for a good ground connection (see below).

**Grounded Passenger Seats**

Some truck seats, typically passenger seats, are not adjustable and do not require grounding.

**Ensure a Good Ground**

Remove any dirt or oxidation from the ground strap contact point. Lock washers should penetrate any paint to ensure a good electrical connection.

**Typical Adjustable Truck Seats & Ground Check**

**AIR CUSHION SEAT**

ADJUSTABLE FOR HEIGHT

(Bostrom 914 Series, National 2000 Series, or equivalent)

![Diagram of Air Cushion Seat]

1. Mount the ground strap using an existing bolt or hardware provided, or drill a 9/32” hole in the seat cushion.
2. Allow adequate length for full travel of the seat.
3. Bundle excess ground wire using a wire tie.

**Checking for a Good Ground**

After installing the ground kits, use a multimeter to confirm that the seat and printer are both grounded properly.

To check for a good ground connection:

1. Turn OFF all accessories, including the dome light, to prevent other currents from distorting the reading.
2. Take a multimeter and measure the resistance between the brackets the two ground strap bolts are fastened to. Find a clean spot on the brackets without paint to use as contact points. Other bolts on the brackets are often suitable.
2a. If the resistance is less than 3Ω, the system is grounded adequately.
2b. If the resistance is still greater than 3Ω, check for proper metal to metal contact on both ends of the ground strap. Clean any paint, dirt, or oxidation that may block the grounding point. If the resistance remains above 3Ω, attach the ground strap to a different ground point. Repeat the process until the ground resistance is below 3Ω.

**Checking for a Good Ground**

After installing the ground kits, use a multimeter to confirm that the seat and printer are both grounded properly.

To check for a good ground connection:

1. Turn OFF all accessories, including the dome light, to prevent other currents from distorting the reading.
2. Take a multimeter and measure the resistance between the brackets the two ground strap bolts are fastened to. Find a clean spot on the brackets without paint to use as contact points. Other bolts on the brackets are often suitable.
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2a. If the resistance is less than 3Ω, the system is grounded adequately.
2b. If the resistance is still greater than 3Ω, check for proper metal to metal contact on both ends of the ground strap. Clean any paint, dirt, or oxidation that may block the grounding point. If the resistance remains above 3Ω, attach the ground strap to a different ground point. Repeat the process until the ground resistance is below 3Ω.
**Mounting Overview**

Typically, the LectroCount LCR-II is mounted directly onto a flow meter; however, some fixed installations require the register be mounted away from the meter. If the meter is equipped with an external POD pulser, the LCR-II can be mounted up to 1000 wire feet (304 meters) away from the meter (actual distance depends on pulser specifications and wire type).

Adapters are available for other PD meters such as Neptune (PNs 81364, 82641, 82642), FMC Smith (PN 81370), and Brooks/Brodie (PN 81800) meters. Each kit includes installation instructions.

**Tips for mounting an LCR-II:**
- Leave the cover assembly fastened to the base to protect the internal components.
- Make sure the vertical drive shaft from the meter is attached to the pulser drive shafts.
- Before securing the LCR-II to the meter or mounting bracket, make sure the counter is visible and the keypad and selector switch can be easily operated.

---

**WARNING**

Relieving Internal Pressure

All internal pressure must be relieved to zero pressure before disassembly or inspection of the strainer, vapor eliminator, any valves in the system, the packing gland, and the front or rear covers.

Serious injury or death from fire or explosion could result in performing maintenance on an improperly depressurized and evacuated system.

**Relieving Internal Pressure Procedure for LPG and NH₃ Meters**

1. Close the belly valve of the supply tank.
2. Close the valve on the vapor return line.
3. Close the manual valve in the supply line on the inlet side of the meter. If no manual valve exists on the inlet side, consult the truck manufacturer for procedures to depressurize the system.
4. Slowly open the valve/nozzle at the end of the supply line.
5. After product has bled off, close the valve/nozzle at the end of the supply line.
6. Slowly crack the fitting on top of the differential valve to relieve product pressure in the system. Product will drain from the meter system.
7. As product is bleeding from the differential valve, slowly reopen and close the valve/nozzle on the discharge line. Repeat this step until the product stops draining from the differential valve and discharge line valve/nozzle.
8. Leave the discharge line valve/nozzle open while working on the system.

---

**Mounting Bolt Pattern**

The LectroCount LCR-II base casting contains eight bolt holes in an industry standard bolt pattern. The holes are ¼" deep and take ¼"-20 screws.

If the installation necessitates that you fabricate a bracket, refer to the drawing to the right.

---

**LC Meters**

Remove Existing Registration Equipment

1. Depressurize the meter completely. See Warning on pg. 14.
2. Remove the four bolts on the bottom that fasten the register to the meter.
3. Remove the adjuster from the meter.
4. If the meter has a Temperature Volume Compensator (TVC), remove it as well.

Mount the LectroCount LCR-II

1. Place the end of the shaft adapter on the pulser drive shaft located on the bottom of the register.
2. Place the cotter pin through the hole, and bend open the ends of the cotter pin.
3. Lower the register onto the meter, and insert the shaft adapter onto the hex shaft on the meter.
4. Securely bolt down the register.
Neptune Meters

Remove Existing Registration Equipment
1. Depressurize the meter completely. See Warning on pg. 10.
2. Remove the mechanical register from the meter.
3. Leave the star-shaped gear and the two square-head studs.
4. Remove the bellows from the front of the meter.
5. Remove the compensator.

Mount the LectroCount LCR-II
1. Install the drive fork and extension piece (pictured below) on the pulser drive shaft located on the bottom of the LCR-II.
2. Install the bracket on the meter, and fasten with the bolts provided in the kit.
3. Lower the LCR-II on to the bracket, and securely fasten using the four bolts (¼" x ¾") provided.

Mount the LectroCount LCR-II onto previously temperature compensated Neptune meters
1. Place the shaft adapter on the pulser drive shaft under the LCR-II.
2. Place the cotter pin through the hole, and bend open the ends of the cotter pin.
3. Pass the other end of the shaft adapter through the flange assembly and the weather plate.
4. Loosely bolt to register.
5. Place the drive fork and extension piece on the shaft using two more cotter pins.
6. Bolt the flange to the meter and tighten all bolts.

Routing LCR-II Data and Power Cables

Data and Power Cable
The LCR-II shipment typically includes a gray 40' power cable and a 40' black data cable prewired to terminal blocks on the LCR-II CPU board. On typical truck installations, the cables must be routed from the back of the truck, where the LCR-II is installed, to the front of the truck, where the accessory panel is and the printer is typically installed. The black data cable connects to the printer, typically mounted in the truck cab. The gray power cable hooks up to a power source. During installation, follow these guidelines and ensure the cables remain undamaged.

Guidelines for routing the data and power cables on the outside of the truck
- LC recommends that both cables be run through ¾” automotive plastic corrugated split loom or through flexible liquid-tight conduit for protection.
- Make sure the loom or conduit runs down the inside edge of the trucks frame rail and fasten every 2’ with cable ties.
- Install rubber grommets to protect the cables where they pass through the cab wall, meter box, etc.
- Keep the cables away from heat sources such as the engine exhaust, manifold, exhaust pipe, mufflers, etc.
- If the cable glands are removed from the register, apply pipe sealant or PTFE tape on the gland threads before re-installing.
- Keep cables away from moving suspension components and other moving truck components.
- If the cables are shortened, make sure you use the proper tool for stripping off the insulation on the cables.
- Make sure cables are connected to the proper terminal.

Guidelines for routing the data and power cables inside the cab
- Layout positions for the component and pathways for the cables before beginning.
- Make sure the printer and the wires will not obstruct other vehicle components.
- Keep cable pathways away from heavy traffic areas and locations where they may be vulnerable to damage.
- Remember to save room around the components so cables can be easily connected.
- Avoid installing the cable where it will be exposed to excessive flexing.
- Make sure cables are not pulled too tight in areas that will move. For example, when wiring cab-over trucks, leave enough slack so the cab can be tilted without damaging the cable.
- Make sure cables are not fastened to adjustable seats.

Routing LCR-II Data and Power Cables

Instructions for hooking up power to the printer and the LCR-II begin on pg. 29.
Electronic Temperature Volume Compensation (ETVC) Installation

When ordered as part of a meter system with a LCR-II, the ETVC kit is bolted onto the strainer and wired to the LCR-II at the factory. ETVC kits can also be ordered and retrofit onto meter systems already in service. Although there are several installation kits—kits are specified according to meter size and application—they are all installed in the same manner. A conduit kit (PN 81024), with a 30” length of weatherproof flexible conduit, is available from Liquid Controls to provide protection for the RTD temperature probe wire between the strainer cover and the LCR-II.

To install the ETVC kit:
1. Depressurize the meter completely. See Warning on pg 14.
2. Remove the old strainer cover.
3. Clean the strainer basket and put it back in the housing.
4. Lightly coat the new cover gasket (included with the ETVC kit) with lubricant (do not use the included copper grease).
5. Fit the new cover gasket into strainer cover groove.
6. Bolt the strainer cover in place.
7. Assemble the thermowell kit (see Thermowell Kit figure on the left).
8. Coat the entire probe length with the copper grease provided. Insert and re-coat the probe 2 or 3 times to provide a uniform coating inside the thermowell and to ensure proper heat transfer from the liquid to the probe.
9. Connect the assembled thermowell kit to J14 connector on the LectroCount LCR-II using the elbow fittings provided with the conduit kit (PN 81024).
10. Connect the conduit to a ½” NPT port on the back of the LCR-II and routed off the main product flow. The solenoid operated valves close off and open the bypass pipes. The bypass pipes redirect some of the product flow in order to open and close the control valve. These solenoid-operated valves must be wired to the LCR-II CPU board during installation.

To disconnect power:
Disconnect power before working on the CPU board.

Electronic Temperature Volume Compensation

Single Stage Systems

Liquid Controls’ Valves Overview

When ordered as part of a meter system with a LCR-II, Liquid Control’s control valves are bolted onto the meter and wired to the LCR-II at the factory. Electronic control valves can also be ordered separately and retrofit onto meter systems already in service. These valves will need to be piped and wired in the field. For piping instructions, refer to the valve manual. This manual includes wiring instructions for the valves.

In order to control flow, the LCR-II energizes and de-energizes solenoid-operated valves on external bypass piping routed off the main product flow. The solenoid operated valves close off and open the bypass pipes. The bypass pipes redirect some of the product flow in order to open and close the control valve. These solenoid-operated valves must be wired to the LCR-II CPU board during installation.

Liquid Controls offers single stage and two stage electronic valves. Single stage valves have one solenoid valve (S1) and two positions—an open position and a closed position. Two stage valves have two solenoid valves (S1 & S2) and three positions—open, closed, and dwell flow. Dwell flow is a low flow rate setting controlled by the S2 solenoid and initiated shortly before the register reaches a preset value.

SINGLE STAGE VALVES

The three most common Liquid Controls meter systems with single stage valves include a block valve with a S1 solenoid-operated valve fitted onto external piping (A2847-11), a block valve (A2843) with a 3-way solenoid, and an electro-pneumatic valve with an S1 solenoid.

A2847-11 Solenoid-Operated Block Valve

Single Stage (S1) Block Valve

A2859-11 Block Valve and 3-Way Solenoid

S1 Solenoid

3-Way Solenoid

A2843 Block Valve Single Stage 3-Way Solenoid

Electro-Pneumatic Preset Valve

A2843 Valve and 3-Way Solenoid

The 3-way solenoid-operated valve—mounted directly to the top center port on the back of the LectroCount LCR-II—serves as a S1 solenoid-operated valve. The 3-way solenoid-operated valve is located at the meeting point of two pipes from the vapor eliminator (one for refined fuels applications.

A2847-11 Valve

This single stage control valve has a S1 solenoid-operated valve located at the meeting point of three external pipes: one pipe from the inlet side of the valve, one from the top of the block valve, and one from the outlet side of the valve. This valve is typically used in refined fuels applications.

A2843 Valve and 3-Way Solenoid

The 3-way solenoid-operated valve—mounted directly to the top center port on the back of the LectroCount LCR-II—serves as a S1 solenoid-operated valve. The 3-way solenoid-operated valve is located at the meeting point of two pipes from the vapor eliminator (one for refined fuels applications and one leading to the split tank) and one pipe to the top of the block valve. 3-way solenoid-operated valves are typically specified for products that hold vapor in the line such as LPG and NH3.
**Single Stage Valves (cont.)**

**A2700 Series Electro-Pneumatic Valve**

Electro-pneumatic valves use a S1 solenoid-operated valve mounted to a pneumatic actuator to open and close a V-7 valve. These valves are typically used in high viscosity applications like lube oil.

**TWO STAGE VALVES**

The three most common Liquid Controls meter systems with two stage valves are: a block valve with a S1 and a S2 solenoid-operated valve fitted onto external piping (A2848-11), a block valve with a S2 solenoid-operated valve (A2859-11) and a 3-way solenoid on the LCR-II, and an E-7 valve with a S1 and a S2 solenoid-operated valve.

**A2848-11 Valve**

This two-stage control valve has a S1 and a S2 solenoid-operated valve. The S1 solenoid-operated valve is located at the meeting point of three bypass pipes: one pipe from the inlet side of the valve, one from the top of the block valve, and one from the outlet side of the valve. The S2 solenoid valve is located on a bypass pipe that connects the inlet and outlet sides of the control valve. It opens while the control valve is closed to supply the dwell flow. This valve is typically used in refined fuels applications.

**A2859-11 Valve and 3-Way Solenoid**

A two-stage valve with a S2 solenoid-operated valve and a 3-way solenoid valve attached to the back of the LectroCount LCR-II. The 3-way solenoid-operated valve is located at the meeting point of two pipes from the vapor eliminator (one for eliminated vapor and one leading to the spit tank) and one pipe to the top of the block valve. The S2 solenoid valve is located on a bypass pipe that connects the inlet and outlet sides of the control valve. It opens while the control valve is closed to supply the dwell flow. This configuration is typically specified for products that hold vapor in the line such as LPG and NH3.

**E-7 Valves**

A two-stage valve with a S1 and a S2 solenoid-operated valve. The E-7 valve is fitted with one external pipe to divert product flow to the closing mechanism. To supply a dwell flow, the E-7 redirects the product around the closed valve using channels molded into its housing. This valve is typically used in refined fuels applications.

**Valve Installation**

If installing the valve yourself, please refer to the valve’s installation and operation manual for mechanical installation. Instructions for wiring Liquid Controls valves to the LCR-II are on the following two pages.

**Materials needed for wiring valves: Not supplied with the valve**

- 18 AWG stranded wire (3 per solenoid). Not necessary for 3-way solenoid valves. Only 2 needed for E7 solenoids.
- Weatherproof flexible conduit, 1/2” diameter and 1/2” NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

**To wire valves to the LCR-II:**

1. Attach cable glands and/or conduit connectors to the solenoid valve(s) and the LCR-II port(s).
2. Thread the wires through piece of weatherproof conduit that is cut-to-length from the solenoid to a LCR-II port.
3. Run the weatherproof conduit between the solenoid-operated valve(s) and the LCR-II housing, pull the wires through the ports, and tighten the connectors.
4. Connect the S1 solenoid-operated valve wires to terminals 14 and 15 on the J13 terminal block of the LCR-II CPU board.
5. Connect the S2 solenoid-operated valve wires to terminals 17 and 18 on the J13 terminal block of the LCR-II CPU board.

**To wire a single stage valves for presetting:**

1. Wire the S1 solenoid as instructed above.
2. Run a jumper wire from Terminal 15 to Terminal 18.

**Solenoid Operated Valve Cables**

A solenoid operated valve has 3 cables potted into the housing. All other solenoid operated valves on Liquid Controls valves use cable assembly 81589, which has 2 cables.
In order for the LectroCount LCR-II to control valves with solenoids on 110 VAC circuits, you must install a relay switch on the positive leg of the solenoid’s circuit.

**Relay switch specifications:**
- **Switch:** SPST (single pole, single throw)
- **Switch Position:** Normally open
- **Contact Rating:** Greater than maximum current of solenoid
- **Voltage:** +12 VDC

**Materials needed for wiring valves with 110 VAC solenoids:** Not supplied with the valve
- SPST relay switch (1 per solenoid)
- 18 AWG stranded wire (2 per solenoid)
- Weatherproof flexible conduit, ½” diameter and ½” NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

**To wire 110 VAC solenoids to the LCR-II:**
1. Turn off all 100 VAC circuits before beginning the installation.
2. Install the specified relay switch(es) onto one leg of the 110 solenoid power supply circuit.
3. Connect the relay switch on the S1 power supply circuit to terminals 15 and 16 on block J13.
4. Connect the relay switch on the S2 power supply circuit to terminals 17 and 18 on block J13.

**To wire optical air and vapor eliminators to the LCR-II:**
1. Attach cable glands and/or conduit connectors to the S3 solenoid valve, the optical sensor, and the LCR ports.
2. Thread the 18 AWG wires through a piece of weatherproof conduit cut-to-length from the S3 solenoid to a LCR-II port.
3. Run the weatherproof conduit between the S3 solenoid-operated valve and the LCR-II housing. Pull the wires through the ports, and tighten the connectors. Liquid Controls recommends running the optical sensor wire through weatherproof conduit as well.
4. Connect the three 18 AWG wires to the S3 solenoid-operated valve terminals and to terminals 52 and 53 on the J15 terminal block of the LCR-II CPU board.
5. Connect the optical sensor wires to terminals 54, 55, and 56 on the J15 terminal block of the LCR-II CPU board.

**Materials needed for wiring valves:** Not supplied with the air or vapor eliminator
- 18 AWG stranded wire (2 for the S3 solenoid valve)
- Weatherproof flexible conduit, ½” diameter and ½” NPT conduit connectors or cable glands
- PTFE tape or pipe sealant
Pulse Output Device (POD) Installation

When ordered as part of a meter system with a LCR-II, Liquid Control’s Pulse Output Device (POD) is installed onto the meter and wired to the LCR-II at the factory. The POD can also be ordered separately and installed onto meter systems already in service. For mechanical installation instructions, refer to the POD manual. Instructions for wiring the POD to the LCR-II are provided on this page.

Materials needed for wiring valves: Not supplied with the POD
- 22 AWG shielded twisted pair of stranded wire (4)
- Weatherproof flexible conduit, ½” diameter and ½” NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

To wire a POD to the LCR-II:
1. Attach cable glands and/or conduit connectors to the POD and the LCR-II port(s).
2. Thread the wires through a piece of weatherproof conduit cut-to-length from the POD port to a LCR-II port.
3. Run the weatherproof conduit between the POD and the LCR-II housing, pull the wires through the ports, and tighten the connectors.
4. Connect the four POD terminals to four terminals on the LCR-II J18 terminal block of the LCR-II CPU board.
- POD terminal 23 to LCR-II terminal 37
- POD terminal 22 to LCR-II terminal 33
- POD terminal 21 to LCR-II terminal 34
- POD terminal 20 to LCR-II terminal 31

Single Channel Pulse Inputs

The LCR-II is compatible with the many single channel pulse inputs and amplifiers, for example, the SP714 pulse amplifiers. For the LCR-II to accept a single channel pulsers and amplifiers, for example, the SP714 pulse amplifiers, the LCR-II must be wired to the LCR-II’s Pulse Output Device (POD). When ordered as part of a meter system with a LCR-II, the LCR-II Pulse Output Device (POD) is SR260 base software and a jumper.

To a single channel pulse output to the LCR-II
1. Flash the CPU board with version v1.15 (or higher) SR260 base software.
2. Slide the jumper onto the bottom two pins of J17. The jumper fits over the pins and under the plastic casing.
3. Wire the single channel pulse input to the J8 terminal of the board. Schematic on the right shows wiring to a Spanier SPT14 pulse amplifier.

Differential Pressure (∆P) Transducer Installation

When ordered as part of a meter system with a LCR-II, Liquid Control’s ∆P transducer is wired to the LCR-II at the factory. The ∆P transducer can also be ordered separately and installed onto a meter system already in service. Refer to the ∆P transducer manual for complete installation instructions. Instructions for wiring the ∆P transducer to the LCR-II are provided on this page.

The ∆P Transducer requires an additional board (PN 81944) that mounts directly to the LCR-II CPU board. Typically, a ∆P transducer operates in conjunction with a shutdown device, such as a valve or a dead-man. The shutdown control must be wired to the LCR-II and should draw no more than 1 A.

To wire ∆P Transducer to the LCR-II:
1. Unplug the J1 and J3 terminal blocks from the LCR-II CPU board.
2. Remove the screw at the top left corner of the LCR-II CPU board.
3. Plug the 81944 board into the J1 connectors on the LCR-II CPU board.
4. Fasten the top left side of both boards to the housing with the screw provided.
5. Plug J3 back into its original place on the LCR-II CPU board.
6. Plug the J16 terminal block into the 81944 board.
7. Remove the wires for the J1 terminal block and connect them to their corresponding terminals on the J16 terminal block on the 81944 board.
- Black to J16 terminal 20
- Blue to J16 terminal 21
- Yellow to J16 terminal 22
- Orange to J16 terminal 23
- Red to J16 terminal 24
- White to J16 terminal 25
- Brown to J16 terminal 26
8. Route the ∆P transducer cable through a cable gland in a port on the back of the LCR-II. Secure the cable gland. LC recommends running the cable through weatherproof conduit.
9. Connect the four ∆P transducer wires to terminals J3 on the CPU board and J16 on the 81944 board, and connect the shield/ground wire to the ground screw inside the housing.
- Black to J3 terminal 46
- White to J3 terminal 51
- Yellow to J16 terminal 52
- Blue to J16 terminal 53
10. Run the red jumper wire (provided with the ∆P transducer kit) from the J8 terminal 32 to J16 terminal 59 (+5 V).
11. Route a two wire cable from the shutdown control device through a cable gland in a port on the back of the LCR-II. Secure the cable gland. LC recommends running the cable through weatherproof conduit.
12. Connect the two wires from the shutdown control device to terminal block J13, terminals 14 and 15.
Auxiliary Outputs 4 & 5 (LectroCount Remote Display)

Auxiliary outputs 4 & 5 are typically used for the LectroCount Remote Display, but they can also be used with other types of displays. Signals from these outputs duplicate the volume data sent to the LCR-II display. Refer to the LectroCount remote display manual for complete installation instructions.

To wire an external display to the LCR-II:
1. Attach cable glands and/or conduit connectors to the display and the LCR-II port(s).
2. Thread the wires through a piece of weatherproof conduit cut-to-length from the display port to a LCR-II port.
3. Run the weatherproof conduit between the display and the LCR-II housing, pull the wires through the ports, and tighten the connectors.
4. Connect the four display terminals to four terminals on the J18 terminal block of the LCR-II CPU board.
   - Remote display terminal 20 to LCR-II terminal 45
   - Remote display terminal 21 to LCR-II terminal 40
   - Remote display terminal 22 to LCR-II terminal 41
   - Remote display terminal 23 to LCR-II terminal 46

Auxiliary Outputs

The LCR-II provides three open drain transistor auxiliary outputs for different external devices such as pump controls and additive injectors. The schematic to the right identifies the J13 terminals where the auxiliary outputs can be connected to the LCR-II.

Auxiliary Output 1 (Out 1)
This signal has four output settings: Off, On, On During Delivery, and Monitor Flowrate.

Auxiliary Output 2 (Out 2)
This signal has four output settings: Off, On, On During Delivery, and Flow Direction.

Pulse Output (Out 3)
This output represents the gross delivery quantity for uncompensated deliveries or the net delivery quantity (for compensated deliveries). This output is a real time 50/50 duty cycle representing the least significant digit of the LCR-II totalizers.

Printer Installation (J1 RS-232)
A Liquid Controls meter system with a LCR-II typically includes an Epson slip printer or roll printer. Installation is the same for both printers.

LCR-II’s are typically shipped with a black-sheathed data cable prewired to terminals J1 and J3 on the LCR-II CPU board.

To install the printer:
1. Find a convenient mounting spot in the truck cab where drivers can easily operate the printer.
2. Clean the mounting spot and the bottom of the printer with alcohol for the best stick.
3. Attach the Velcro to the mounting spot and the bottom of the printer and fasten the printer to the mounting spot.
4. Connect the data cable to the RS-232 data port on the back of the printer.

Printer Installation (J1 RS-232)

To communicate via true RS-232 protocol, the +VP Red wire must be connected to the J3 terminal block at terminal 47 (not 46).

Disconnect Power

Disconnect the power before working on the CPU board.

Epson Printer Ground Wire Kit Installation

Before connecting power to the LCR-II and the Epson printer, ground the printer to the truck cab floor. Epson printers sold for truck installations are all grounded in the same manner.

To ground an Epson printer:
1. Remove one of the mounting bolts fastening the printer mounting brackets to the truck cab floor.
2. Place one end terminal of the ground wire over the mounting bolt and return the bolt to its original place.

Epson Printer Ground Wire Kit

<table>
<thead>
<tr>
<th>#</th>
<th>DESCRIPTION</th>
<th>PART NUMBER</th>
<th>QTY</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Ground Wire</td>
<td>84101</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Terminal (.375 ring, 16GA)</td>
<td>71878</td>
<td>1</td>
</tr>
</tbody>
</table>

Additional Terminal

- The Epson Printer Ground Wire Kit contains an additional ⅜" ring terminal for printer brackets not purchased from Liquid Controls.
- At the back of the Epson printer, remove the silver ground screw marked “FG”.
- Place the other end terminal of the ground wire over the ground screw and return the screw to its original place.
- Check the strap for a good ground connection (see page 13).
RS-232 or RS-485 Communications
The LCR-II 840405 CPU board can communicate using RS-232 or RS-485 communication protocol. Data connections are protocols is made at the J2 and J3 terminal blocks. For standard RS-232 terminal, (other than the Lap Pad), the red input wire should be connected to J3-47.

A jumper (J10), located on the left side of the CPU board should stay in the B position for most applications; however, to use a lap pad (PN E40301 and E403011) the jumper must be moved to the A position. See the diagram and the table below.

Power Installation Overview
When you have made all of the data connections and finished installing all of the components, connect the power to the LCR-II and the Epson printer. But before making the power connections, go through the vehicle system checklist below, and ensure that the electrical system of the truck meets the minimum requirements for powering the LCR-II and the Epson printer.

Vehicle System Checklist
- Clean any corrosion from the battery terminals and battery cable to guarantee a solid, light connection.
- Charge the battery in accordance with the manufacturer’s specifications.
- Ensure the alternator is large enough to meet the total demands of the truck, including the LCR-II. The LCR-II requires a minimum of 5 A for proper operation. Run the truck at low idle with all accessories on (including hose reel), and check the voltage with a multi-meter. The voltage should not drop below 11 V.
- Inspect the electrical equipment on the vehicle, and ensure it is properly installed and operating correctly.
- Determine whether the vehicle is grounded positively or negatively. Consult Liquid Controls if the vehicle has a positive ground.
- Make sure that any radio antennas are installed in accordance with the manufacturer’s specification to prevent RF interference.

<table>
<thead>
<tr>
<th>JUMPER POSITION (J10)</th>
<th>COMMUNICATION PROTOCOL</th>
<th>WIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lap Pad</td>
<td>A</td>
<td>RS-232</td>
</tr>
<tr>
<td>Flashing Software on the CPU Board EZCommand</td>
<td>B</td>
<td>RS-232</td>
</tr>
<tr>
<td>External Computing Device</td>
<td>B</td>
<td>RS-232</td>
</tr>
<tr>
<td>External Computing Device</td>
<td>B</td>
<td>RS-485</td>
</tr>
<tr>
<td>Multimeter Network</td>
<td>B</td>
<td>RS-485</td>
</tr>
</tbody>
</table>
Connect the Power
All LCR-II shipments typically include a 40' gray power cable (100', and 300' are also available) and a 5 A fuse.

40' Gray Power Cable
The gray power cable (PN 84046) is prewired to the J6 terminal on the CPU board at the factory. It includes two 16 AWG wires and a ground drain wire. The 5 A fuse should be spliced into the red 16 AWG wire as close to the power source as possible.

Epson Printer Power
Power must be supplied to the Epson printer as well. A 15' cable with a 12/24 VDC converter (825001) for printer power supply is also available. The red wire of this cable must be spliced into the red wire of the gray power cable on the LCR-II side of the 5 A fuse.

To connect power to the LCR-II and the Epson printer:
1. Route the gray power cable to the accessory panel. See page 17.
2. Splice the red wire from the printer power cable into the red wire of the gray power cable.
3. Splice the 5 A fuse into the red wire. Make the splice close to the direct power terminal connection in the accessory panel and on the power side of the splice made with the printer power cable.
4. Connect the red wire to the direct power supply terminal in the accessory panel.
5. Connect the black wire of the gray power cable to a reliable DC ground.
6. Connect the black wire of the printer power to a reliable DC ground.
7. Tape the green drain wire of the gray power cable back against the power cable.

Power Check
After the LCR-II has been installed, check to make sure that it powers up correctly. The LCR-II display and the printer power light should come on when the truck’s ignition is turned to the ON or to the ACC position. Make sure the printer power switch is on. If the LCR-II or the printer does not power up, check the wiring and the connections on the LCR-II CPU board against the manual.
Close and Seal the Unit

Once the unit has been setup and tested, finish the installation by closing and sealing the housing. The LCR-II must be environmentally sealed to protect the electronics against the elements. The LCR-II must also be sealed by a Weights & Measures representative to guarantee the register is operating at the proper regulatory standards.

1. Secure the cables behind the LCR-II and the cables in the cab with cable ties.
2. If conduit was used during the installation, fill the conduit end inside the LCR-II with silicon RTV (provided with shipment, PN 82575). Read and follow the directions of the Environmental Sealing Guidelines below.
3. Tighten the cover bolt using a flat-tip screwdriver or a 7/16" socket. Completely close the gap between the cover and the housing tab. Read and follow the directions of the Environmental Sealing Guidelines below.
4. Seal the cover bolt and the switch plate bolts with a wire/lead seal. See Weights & Measures Seals on pg. 33.

Environmental Sealing Guidelines

The LCR-II includes sensitive electronic components, including a micro-controller that can be damaged by the presence of moisture. Therefore, it is essential that all conduit ports, the cover, and the shaft seals be adequately sealed by the installer to ensure watertight integrity. The conformal coating on the board and a moisture-absorbing desiccant inside the enclosure mitigates the problem of corrosion due to moisture, but these measures only protect the board from small amounts of moisture trapped inside the enclosure when the lid is closed in humid conditions. They are not capable of protecting the unit over time if a continuous leak is present in the enclosure.

Sealing the LCR-II is the Responsibility of the Installer

Any water or moisture damage to the LCR-II as result of improper sealing will not be covered under the product warranty.

1. Conduit Entrances

The LCR-II housing has seven conduit entrances, five ½" NPT female threads and two ¾" NPT male threaded fittings on the conduit entrances. Pressed in Capluges and straight (rather than tapered) threads are inadequate as seals for these entrances. Acceptable fittings are either metal or plastic conduit, pipe plugs, or cable glands. Threads should be treated with PTFE-based “pipe dope” or a minimum of two revolutions of PTFE tape prior to installation. Threads should be engaged a minimum of four full turns. When using cable glands, be sure the gland is sized properly for the outside diameter of the cable and the elastometric seal around the cable sheath is compressed onto the cable. Use only one cable per cable gland unless the gland is designed for multiple cables. When using conduit or Liquid-Tite, make sure that the opposite end is connected to an environmentally sealed device. If the conduit is not sealed at the other device, fill the interior of the conduit at the LCR-II with a silicone rubber sealant, such as RTV, to prevent moisture from running down the conduit into the enclosure.

2. Cover Seals

To seal the LCR-II cover properly, ensure that the O-ring surrounding the cover is fit snug inside the groove, and tighten the cover screw securely.

3. Shaft Seals

Units with internal pulsers have an O-ring around the pulse encoder drive shaft that extends through the bottom of the LCR-II housing. If a drive shaft adapter was attached at installation, make sure the O-ring around the shaft is securely sealed in the counterbore of the casting, covered with the flat washer provided, and held in place with the cotter pin provided. The control switch on the front of the LCR-II is also sealed with an O-ring and held in place by a bushing secured with three socket head cap screws. When replacing a control switch in the field, make sure the O-ring is in place on the switch shaft before reinstalling the switch bushing.

Weights & Measures Seals

To detect possible intrusions into Weights & Measures approved calibrations on a LectroCount LCR-II, fillister holes have been drilled into the switchplate screw and the latch. To seal according to Weights & Measures standards, a wire is threaded through the fillister holes and closed with a lead seal.
**Bill of Materials - Internal Components**

**Bill of Materials - CPU Boards**

**840405 CPU Board**

**Optional Items** (not shown)

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roll Printer Extension Cable</td>
<td>71237</td>
</tr>
<tr>
<td>Flash Cable</td>
<td>81456</td>
</tr>
<tr>
<td>Lap Pad Adapter</td>
<td>81322</td>
</tr>
<tr>
<td>Lap Pad</td>
<td>81456</td>
</tr>
<tr>
<td>Lap Pad with Adapter</td>
<td>81456</td>
</tr>
</tbody>
</table>

**Pulser Field Install Kit — 82597**

Do Not Try To Remove J2

The J2 terminal block is permanently attached to the CPU board.