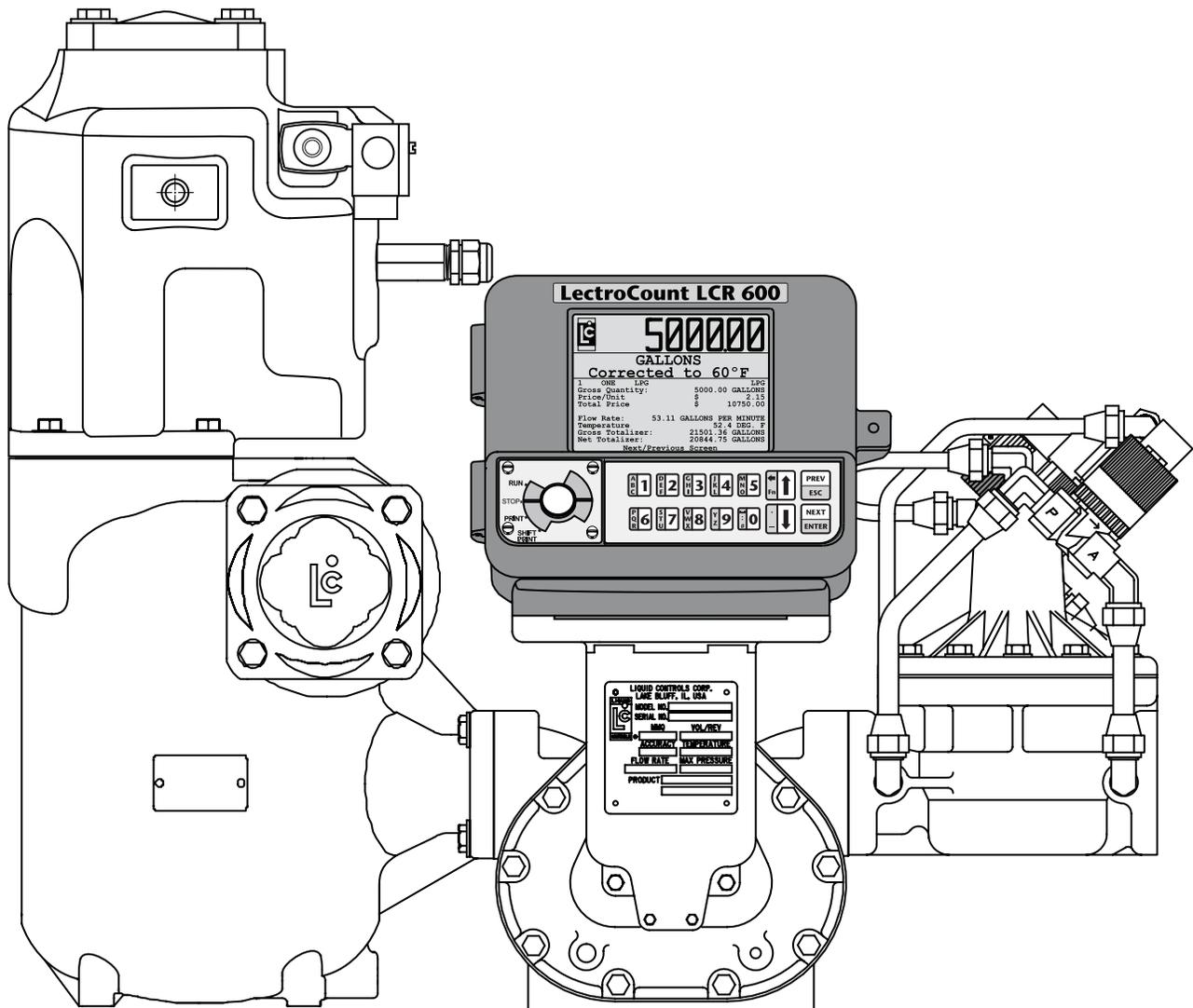




# LectroCount LCR 600<sup>®</sup>

## E3708/E3709 Series

# Installation & Parts



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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](http://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.

**Be Prepared**

**⚠ 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.

**Safely Evacuate Piping System**

**⚠ WARNING**

Before disassembly of any meter or accessory component:

**ALL INTERNAL PRESSURES MUST BE RELIEVED AND ALL LIQUID DRAINED FROM THE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE PROCEDURES.**

- Pressure must be 0 (zero) psi.
- Close all liquid and vapor lines between the meter and liquid source.

**Failure to follow this warning 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.**

**Observe National and Local Codes**

**⚠ WARNING**

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.)

**WARNING: Explosion Hazard: (AVERTISSEMENT: Risque d'explosion)**  
Substitution of components may impair suitability for Class I, Division 2 applications. (La substitution des composantes peut altérer la conformité aux applications de Classe I, Division 2.)

When in hazardous locations, turn power OFF before replacing or wiring modules. (Lorsque dans des endroits dangereux, couper le courant avant de remplacer ou de câbler les modules.)

Do NOT disconnect equipment unless power has been switched OFF or the area is known to be Non-Hazardous. (Ne pas déconnecter l'équipement sans couper l'alimentation ou sans s'assurer que la zone est non-dangereuse.)

**WARNING:**  
Use 3.5 in • lb (0.4 N • m) torque when tightening terminal block screws.

**Potential Damages Caused by Exposure to ESD**

To prevent electrostatic discharge (ESD) damage to LectroCount register electronic components, all LectroCount electronic register truck intallations 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 intallations 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 600 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.

**REGISTERS NOT MOUNTED DIRECTLY TO THE METER**

In typical LectroCount installations where the LectroCount register is mounted directly to the meter, the LectroCount housing is grounded through the meter. If the register is not mounted on the meter, you must make sure the LectroCount housing is grounded properly.

**Alternate grounding method**

Connect the green ground screw (inside the LectroCount housing in the upper right corner) to a known good ground (less than 1 ohm). Use a 12ga. 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 1 fixed installations typically require metal conduit to the conduit hubs for the wiring. The metal conduit provides the necessary ESD protection. Divison 2 installations can ground the LectroCount housing by using shielded cables (or wiring) run through liquidtite (metal/rubber coated). The liquidtite and the liquidtite connectors provide the necessary ESD protection. AC fixed installations require and additional grounding method to ensure a proper ground.

**Alternate grounding method for AC fixed installations**

Connect the green ground screw (inside the LectroCount housing in the upper right corner) to a known good ground (less than 1 ohm). Use a 12ga. 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. 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.

**Mechanical**

**Materials of Construction**

- Aluminum Alloy ADC12
- Powder Coat: Corro-Coat PE 74-141 Polyester

**Weight**

- 8.75 lbs (4 kg)

**Display Elements**

- Liquid crystal display
- 320 X 240 pixels

**Cable Entry**

- 1/2" NPT (5)
- 3/4" NPT (2)

**Temperature Rating**

- -40 to 158 °F (-40 to 70 °C)

**Electrical**

**Input Voltage**

- Voltage:** 9 to 28 VDC
- Current maximum:** 4.5 A maximum (including solenoid valves and display heater)

**Pulse Output**

- Voltage peak to peak:** 5 to 28 V
- Frequency maximum:** 7500 Hz

**Scale Pulse Output**

- Current sinking capability:** 150 mA

**Electrical Protection**

- 5 A fuse on power cable

**Input/Output**

**Communications**

- RS-232: EIA-232E standard
- RS-485: SAE J1708 standard

**Auxiliary 1 Output**

- Current sinking capability:** 1 A

**Auxiliary 2 Output**

- Current sinking capability:** 150 mA

**Solenoid 1 Output**

- Voltage:** 10.2 to 27.2 VDC
- Current** 1 A maximum

**Solenoid 2 Output**

- Voltage:** 10.2 to 27.2 VDC
- Current** 1 A maximum

**Solenoid 3 Output**

- Voltage:** 10.2 to 27.2 VDC
- Current** 1 A maximum

**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

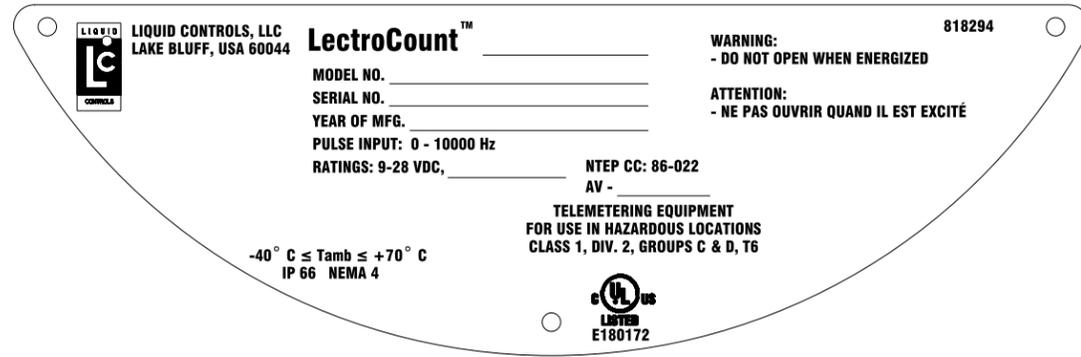
**Printer (Epson Model 295)**

- 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

# 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  $\leq 85^{\circ}\text{C}$

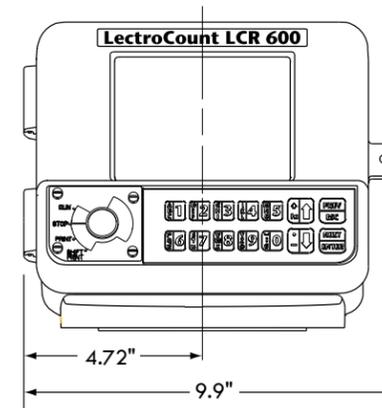
**-40°C ≤ Tamb ≤ 70°C**  
Safe limits of ambient temperature

**IP66 AND NEMA 4**  
Ingress protection: dust tight and protected against powerful water jetting

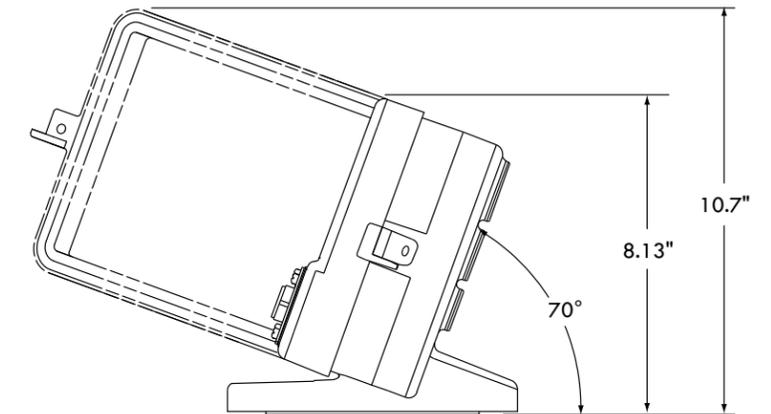
*Consult factory for current compliance status.*

# DIMENSIONS

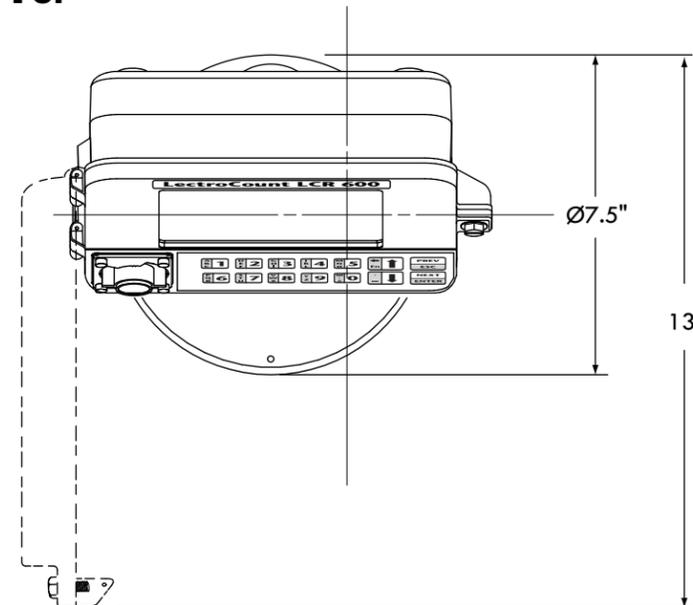
## FRONT



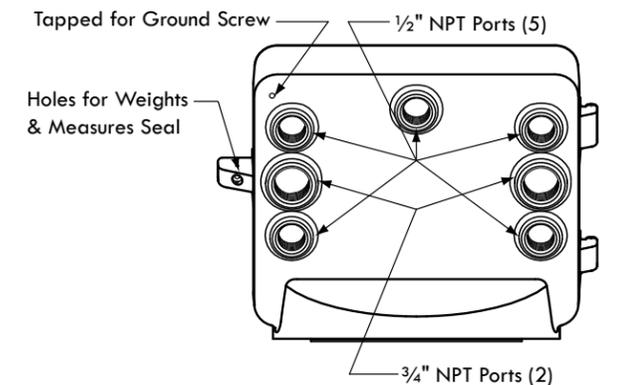
## SIDE



## TOP



## REAR



## LectroCount LCR 600 Overview

### GENERAL INFORMATION

The Liquid Controls LectroCount LCR 600 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 600 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. The LCR 600 is a self-contained unit. All operation, setup, and configuration functions can be carried out using the LCR 600s red selector switch and the alphanumeric keypad. No lap pads, laptops, or other data entry devices are required. A separate software program for PCs, EZCommand, is available to configure LCR 600s.

### INPUTS

In order to calculate flow measurements from a positive displacement meter, the LCR 600 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 600 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 600 is equipped with a scaled pulse output, two auxiliary outputs, and two solenoids outputs. These outputs allow the LCR 600 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 600 is capable of interfacing in RS-232 and RS-485 communication protocols.

### HOUSING

The LectroCount LCR 600 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 1/2" NPT ports and two 3/4" NPT ports, on the back of the LectroCount LCR 600 to provide secure cable connections for all external devices.

### DISPLAY

The display is backlit, transfective 5.7" QVGA display. It is legible in direct sunlight and at night.

### ALPHANUMERIC KEYPAD

The LCR 600's alphanumeric keypad consists of 14 domed keys. The keys collapse and pop up to give a tactile, positive confirmation of keystrokes. The keypad's multitap functionality allow users to input up to four characters with one key.

### 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.

### BASIC FUNCTIONS

- Calibration (single and multipoint)
- Weights & Measures custody transfer (product delivery and ticket generation)
- Metrological data collection
- Presetting by volume
- Multiple production selection
- Four delivery screens
- Security settings
- Air and vapor elimination (with proper accessories)
- Valve control (with proper accessories)
- Electronic temperature volume compensation (ETVC) (with proper accessories)

### POS UPGRADE FUNCTIONS

- Cash and volume discounting
- Multiple tax structures
- Priced and taxed tickets
- 16 product calibrations
- 100 product names
- Presetting by price

## Meter System Components

### METER SYSTEM

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 600, a register, serves as the central controller of the meter system. Most components in the meter system are hard wired to the LCR 600 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 600 (in LPG applications, they are often plumbed to a 3-way solenoid which is wired to the LectroCount LCR 600). 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 600 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 600. See manuals M400-40 and M400-11.

### ELECTRONIC TEMPERATURE VOLUME COMPENSATION (ETVC) KIT

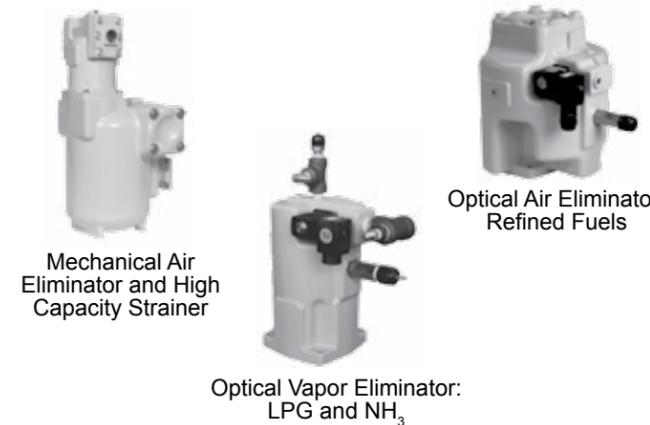
In order to perform temperature compensation equations, the LectroCount LCR 600 relies on a temperature probe inserted into the strainer housing. Installation directions for the ETVC kit are included in this manual.

### XL LED REMOTE DISPLAY

The XL LED Remote Display's six 2 1/4" 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.



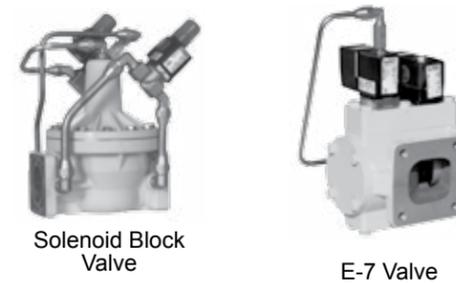
M7 Meter with LectroCount LCR 600 Electronic Register, Optical Air Eliminator, High Capacity Strainer, and E-7 Valve



Mechanical Air Eliminator and High Capacity Strainer

Optical Air Eliminator: Refined Fuels

Optical Vapor Eliminator: LPG and NH<sub>3</sub>



Solenoid Block Valve

E-7 Valve



ETVC Kit



Remote Display

**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.



Epson Slip Printer



Epson Roll Printer

**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 600 register is installed at a distance from the meter. The POD pulser requires hard wired data communication with the LectroCount LCR 600. See manual EM300-10.



POD Pulser

**DIFFERENTIAL PRESSURE (ΔP) TRANSDUCER**

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 600 can shut down a custody transfer if the differential pressure meets a preprogrammed differential pressure shutdown value. The ΔP Transducer requires hard wired data communication with the LectroCount LCR 600. See manual EM300-40.



ΔP Transducer

**DATA MANAGEMENT SYSTEMS**

The DMS is an in-cab computer with a heavy duty lap pad interface. The DMS streamlines the flow of data between the LCR 600 and back office accounting software. The DMS must be hard wired to the LectroCount LCR 600. See manuals EM200-10 and EM200-11.



DMS

**EZCOMMAND**

EZCommand is Windows®-based interface that saves and distributes LectroCount LCR 600 settings and updates. EZCommand can be loaded onto a laptop. Using a lap pad adapter (PN 81514) and a printer extension cable (PN 71815), the lap top can be quickly connected to upload settings and updates in the field. A flash cable (PN 81885), a data cable with a terminal block (J3) on one side and a 9-pin connector for your PC, can also make the connection but requires opening the LCR 600.



EZCommand, Cable, and Adapter

**Installation Overview**

If the LectroCount LCR 600 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 600 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 600's data and power cable to truck cab or power supply. Page 17
4. Connect any additional components to the LCR 600's CPU board.
5. Mount printer and connect printer data cable. Page 27
6. Connect the LCR 600 and the printer to power supply. Page 29
7. Setup and calibrate the LCR 600. Refer to manual EM150-11.

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 600 ordered without meter system:**

1. Ground truck seat cushion. Page 12
2. Mount the LCR 600 to the meter. Page 14
3. Run the LCR 600's data and power cable to truck cab or power supply. Page 17
4. Connect all components to the LCR 600's CPU board.
5. Mount printer and connect printer data cable. Page 27
6. Connect the LCR 600 and the printer to power supply. Page 29
7. Setup and calibrate the LCR 600. Refer to manual EM150-11.

**Check Each Shipment**

*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.*

**This Manual Includes**

*This manual explains and details the mechanical installation of the LectroCount LCR 600 and the temperature probe as well as the electrical and data installation of all components that connect to the LCR 600. For additional installation information, refer to the manuals of the other components. All manuals are available at [www.lcmeter.com](http://www.lcmeter.com).*

**Installation Requirements Vary**

*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*

## 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.

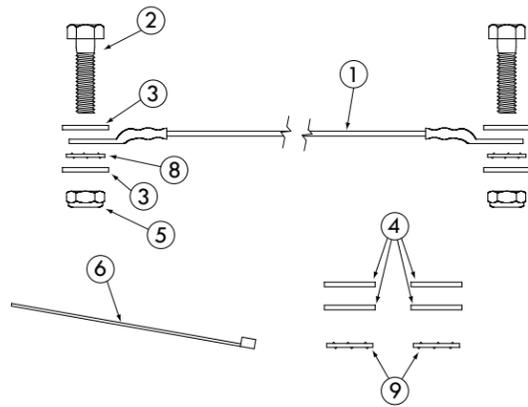
**ESD Precaution**  
Install the LectroCount Ground Strap Kit before installing the LectroCount register.

### 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.

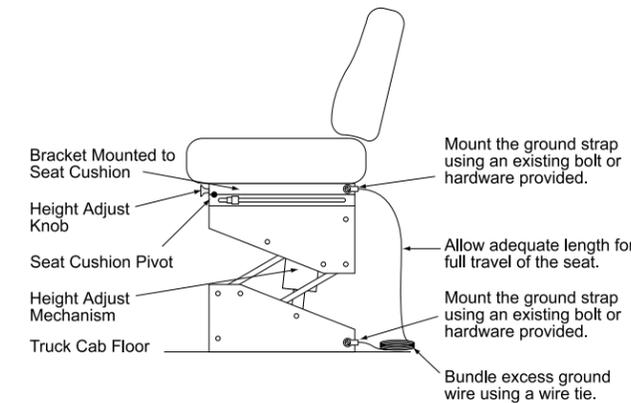
**Ensure a Good Ground**  
Remove any dirt or oxidation from the ground strap contact point. Lock washers should penetrate any paint to ensure a good electrical connection.



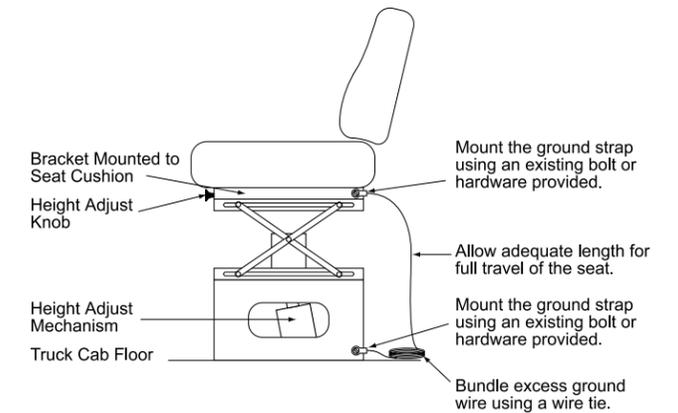
LectroCount Ground Strap Kit - 82185

## Typical Adjustable Truck Seats

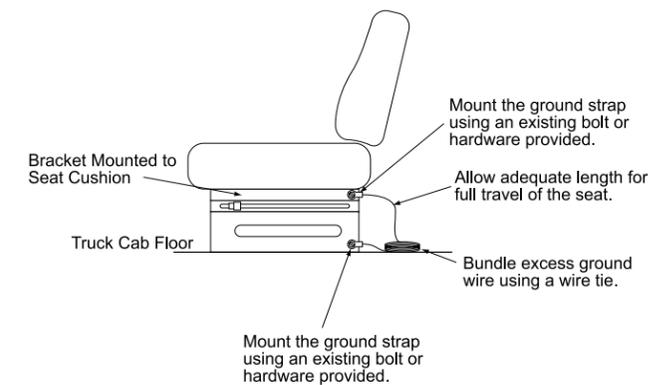
**AIR CUSHION SEAT - ADJUSTABLE FOR HEIGHT**  
(Bostrom 914 Series, National 2000 Series, or equivalent)



**AIR CUSHION SEAT - ADJUSTABLE FOR HEIGHT**  
(Dura-Form or equivalent)



**BENCH SEATS - ADJUSTABLE FOR DISTANCE TO THE STEERING WHEEL**  
(Manufacturer Standard or equivalent)



## 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.

**Turn Off Accessories**  
If the multimeter reads "MΩ" or "KΩ", typically, one of the accessories is still on.

If operator receives a ESD discharge when leaving the seat, the ground strap is not installed correctly.

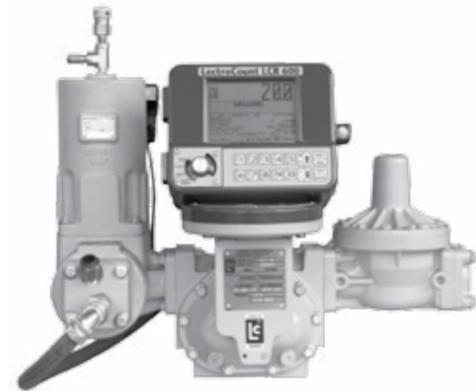
**Mounting Overview**

Typically, the LectroCount LCR 600 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 600 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 600:**

- 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 600 to the meter or mounting bracket, make sure the counter is visible and the keypad and selector switch can be easily operated.



LCR 600 with LPG Meter System



Neptune Adapter



Neptune Coupling



Smith Adapter



Brooks Adapter

**⚠ 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.**

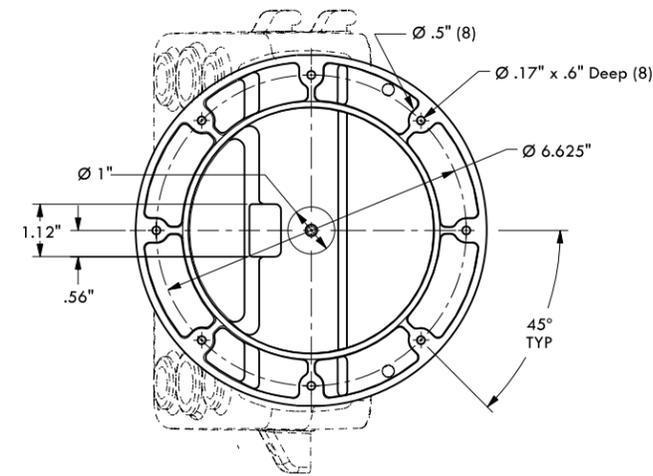
**Relieving Internal Pressure Procedure for LPG and NH<sub>3</sub> Meters**

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.

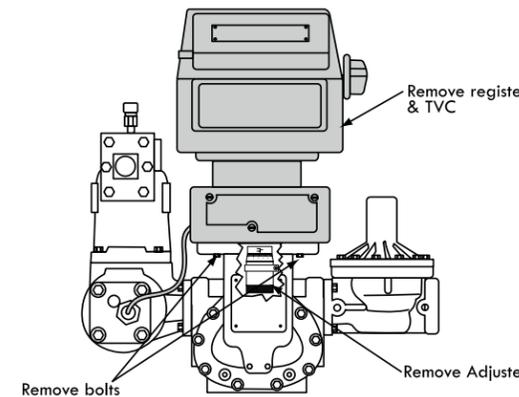
**Mounting Bolt Pattern**

The LectroCount LCR 600 base casting contains eight bolt holes in an industry standard bolt pattern. The holes are 1/2" deep and take 1/4"-20 screws.

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



LCR 600 Bolt Pattern



LC Meter Compensated

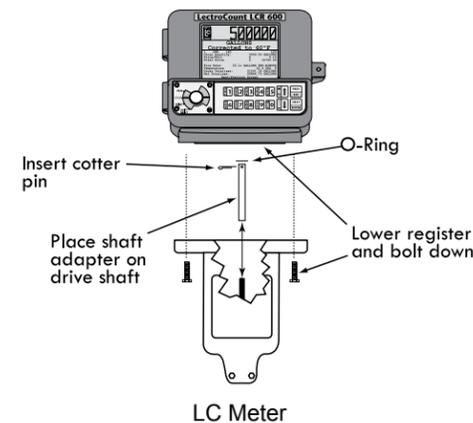
**LC Meters**

**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 600**

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.



LC Meter

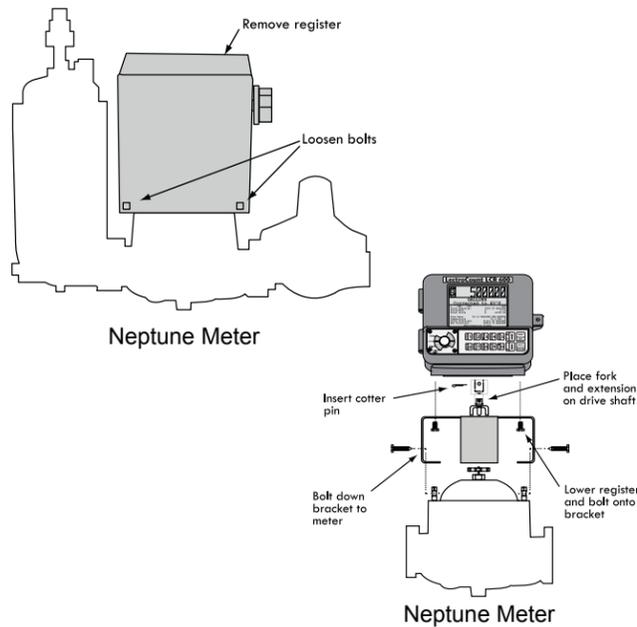
**Apply Anti-seize**

Apply anti-seize to all bolt threads to ensure easy removal at a later date.

## 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 600

1. Install the drive fork and extension piece (pictured below) on the pulser drive shaft located on the bottom of the LCR 600.



2. Install the bracket on the meter, and fasten with the bolts provided in the kit.
3. Lower the LCR 600 on to the bracket, and securely fasten using the four bolts (1/4" x 3/4") provided.

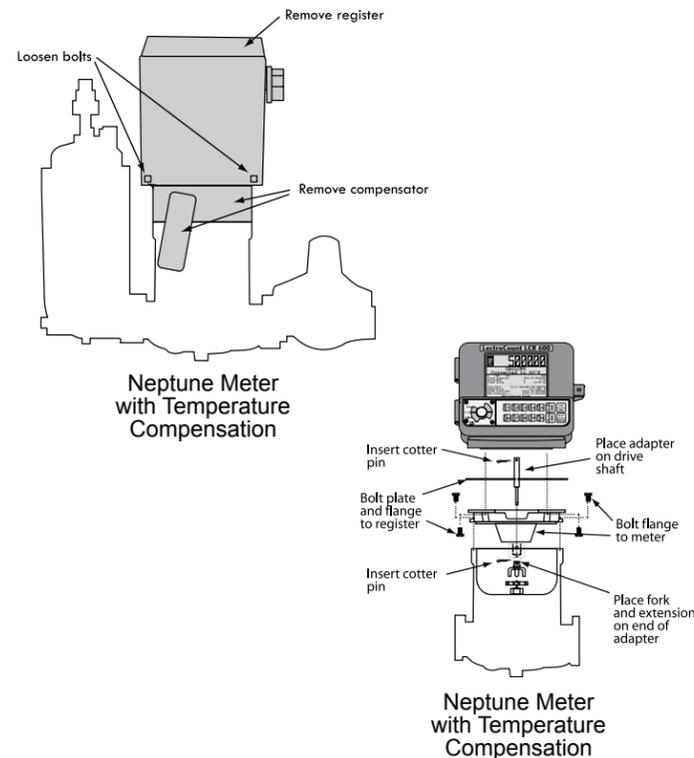
### Apply Anti-seize

Apply anti-seize to all bolt threads to ensure easy removal at a later date.

**Star Gear and Drive Fork**  
 When the register is lowered onto a Neptune meter, make sure the drive fork is not pressed against the star gear on the meter. There must be a small gap between these two parts. To lower the star gear, loosen the set screw on the side of the star gear. Failure to do so will eventually damage the internal pulser and/or the meter gear train.

### Mount the LectroCount LCR 600 on previously temperature compensated Neptune meters

1. Place the shaft adapter on the pulser drive shaft under the LCR 600.
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.



Installation kits 82641 (E-26 series) & 82642 (E-36 series) are specifically designed for previously temperature compensated Neptune meters.



## Data and Power Cable

The LCR 600 shipment typically includes a gray 40' power cable and a 40' black data cable prewired to terminal blocks on the LCR 600 CPU board. On typical truck installations, the cables must be routed from the back of the truck, where the LCR 600 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

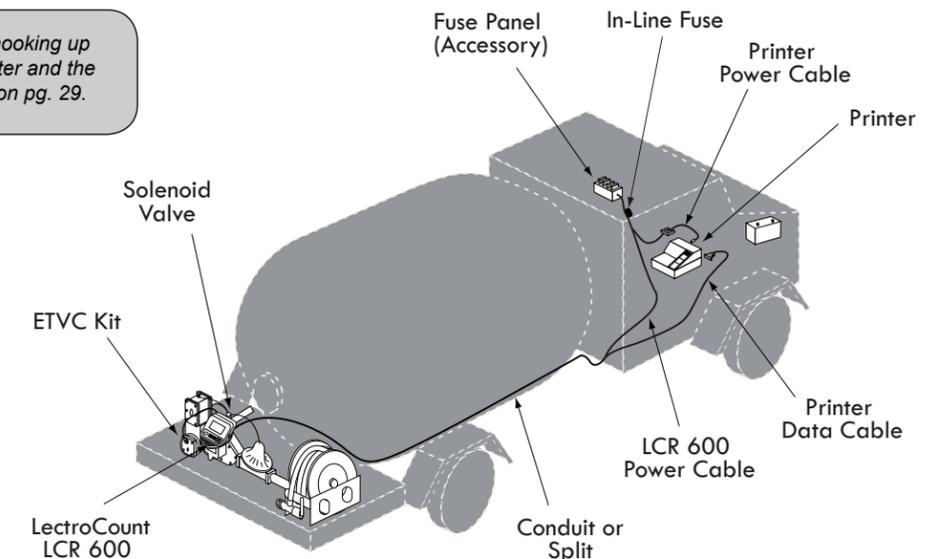
- LC recommends that both cables be run through 3/4" automotive plastic corrugated split loom or through flexible liquid-tight conduit for protection.
- Make sure the loom or conduit runs down the inside edge of the trucks frame rail and fasten every 2' with cable ties.
- Install rubber grommets to protect 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 600 Data and Power Cables

Instructions for hooking up power to the printer and the LCR 600 begin on pg. 29.

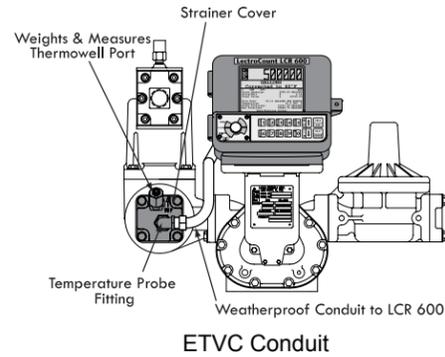


**Electronic Temperature Volume Compensation (ETVC) Installation**

When ordered as part of a meter system with a LCR 600, the ETVC kit is bolted onto the strainer and wired to the LCR 600 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 600.



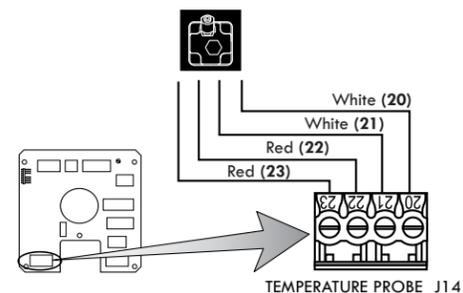
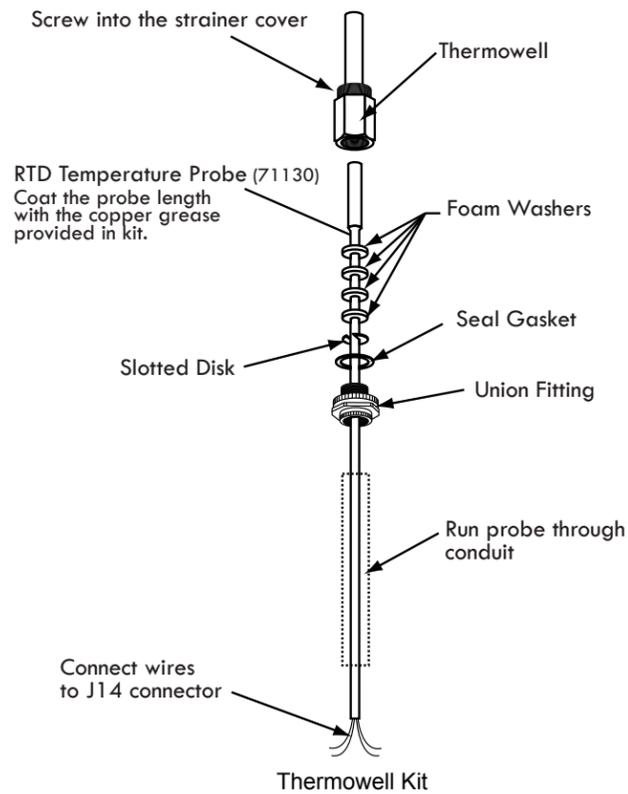
ETVC Kit



ETVC Conduit

**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. *Make sure the Weights & Measures thermowell port is at the top of the cover.*
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 to the fitting in the middle of the strainer cover. *The angled fitting at the top of the cover is for Weights & Measures purposes. See Step 6.*
10. Connect the conduit to a 1/2" NPT port on the back of the LCR 600 using the elbow fittings provided with the conduit kit (PN 81024).
11. Wire the temperature probe to the LCR 600 internal board on connector J14.



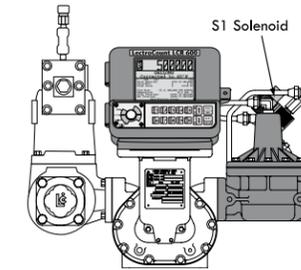
TEMPERATURE PROBE J14

**Disconnect Power**  
Disconnect the power before working on the CPU board.

**Single Stage Systems**



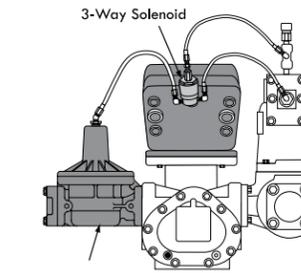
A2847-11 Solenoid-Operated Block Valve



Single Stage (S1) Block Valve



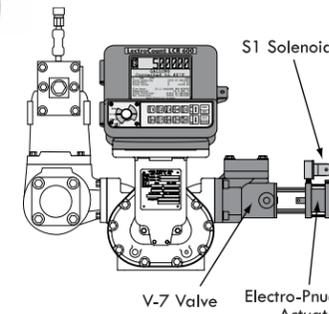
A2859-11 Block Valve and 3 Way Solenoid (PN 81527)



A2843 Block Valve  
Single Stage 3-Way Valve



Electro-Pneumatic Preset Valve



Single Stage Electro-Pneumatic Valve with V-7 Valve

**Liquid Controls' Valves Overview**

When ordered as part of a meter system with a LCR 600, Liquid Controls' control valves are bolted onto the meter and wired to the LCR 600 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 600 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 600 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.

*The LCR 600 is also compatible with many other brands and types of valves.*

**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 Valve**

This single stage control valve has a S1 solenoid-operated valve located at the meeting point of three 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 600—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 eliminated vapor and one leading to the spit 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 NH<sub>3</sub>.

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 600, 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.

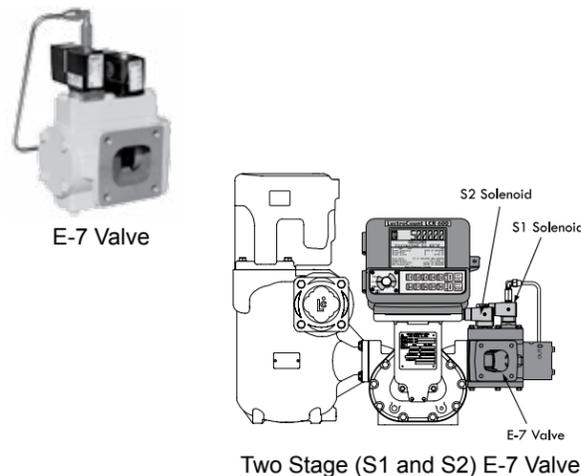
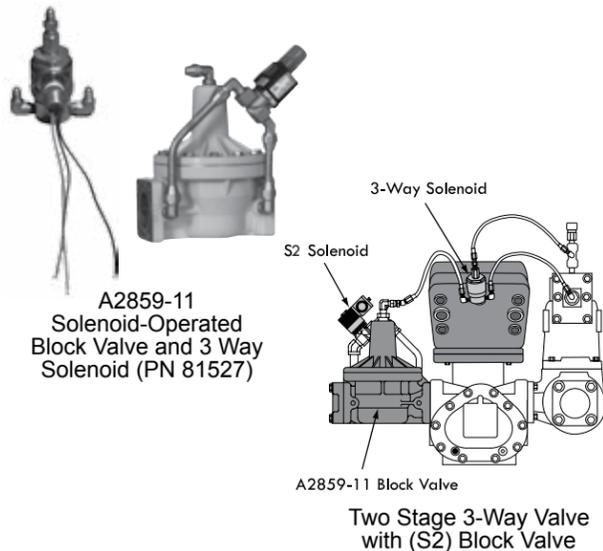
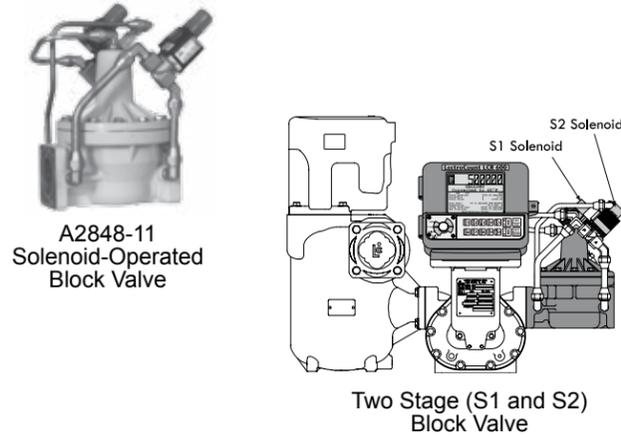
**A2859-11 Valve and 3-Way Solenoid**

A two stage valve with a S2 solenoid-operated valve and a 3-way solenoid valve attached to the back of the LectroCount LCR 600. 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 NH<sub>3</sub>.

**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 bypasses the closed valve using channels molded into its housing. This valve is typically used in refined fuels applications.

**Two Stage Systems**



**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 600 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 E-7 solenoids.*
- Weatherproof flexible conduit, 1/2" diameter and 1/2" NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

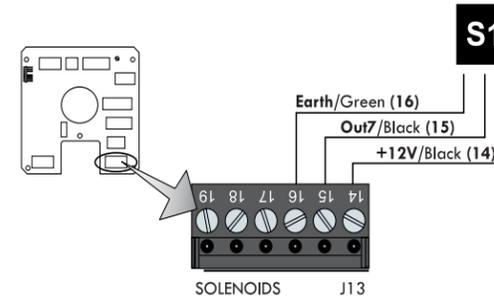
**To wire valves to the LCR 600:**

1. Attach cable glands and/or conduit connectors to the solenoid valve(s) and the LCR 600 port(s).
2. Thread the wires through a piece of weatherproof conduit that is cut-to-length from the solenoid to a LCR 600 port.
3. Run the weatherproof conduit between the solenoid-operated valve(s) and the LCR 600 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 600 CPU board.
5. Connect the S2 solenoid-operated valve wires to terminals 17 and 18 on the J13 terminal block of the LCR 600 CPU board.

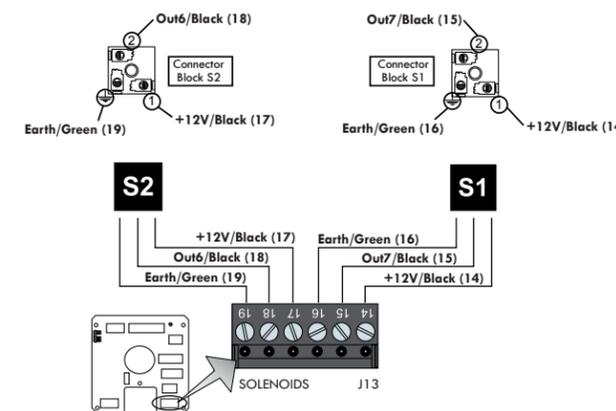
**To wire a single stage valves for presetting:**

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

**Disconnect Power**  
*Disconnect the power before working on the CPU board.*



**Earth Grounds for Solenoid Valves**  
*The Earth grounds for Terminals 16 & 19 are optional. The solenoid operated valves are grounded through the component they are mounted on.*



**Solenoid Operated Valve Cables**

*Solenoid operated valve 81527 (3-way LPG solenoid) has 3 cables potted into the housing. All other solenoid operated valves on Liquid Controls valves use cable assembly 81859, which has 2 cables.*

**VALVE INSTALLATION—110VAC SOLENOIDS**

In order for the LectroCount LCR 600 to control valves with solenoids on 110VAC 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:** +12VDC

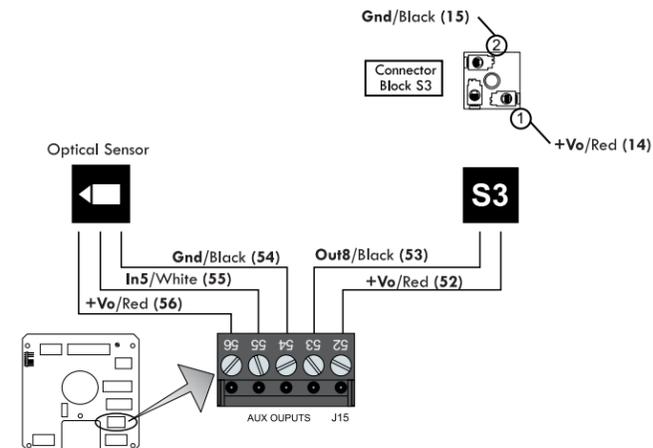
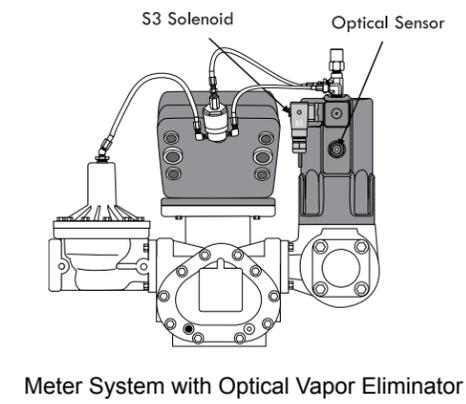
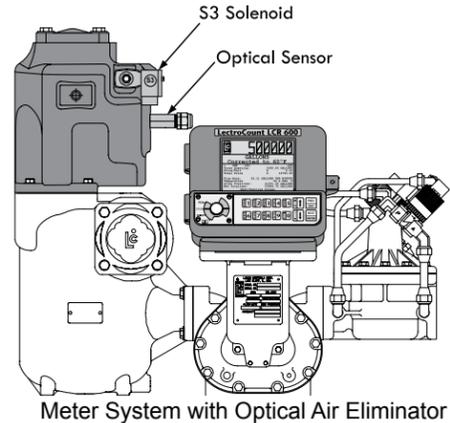
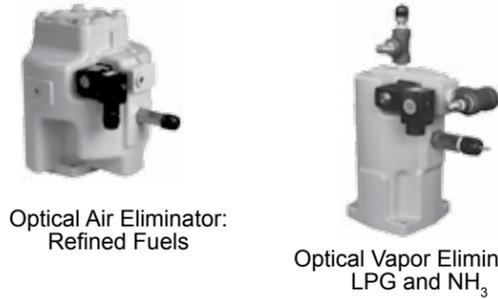
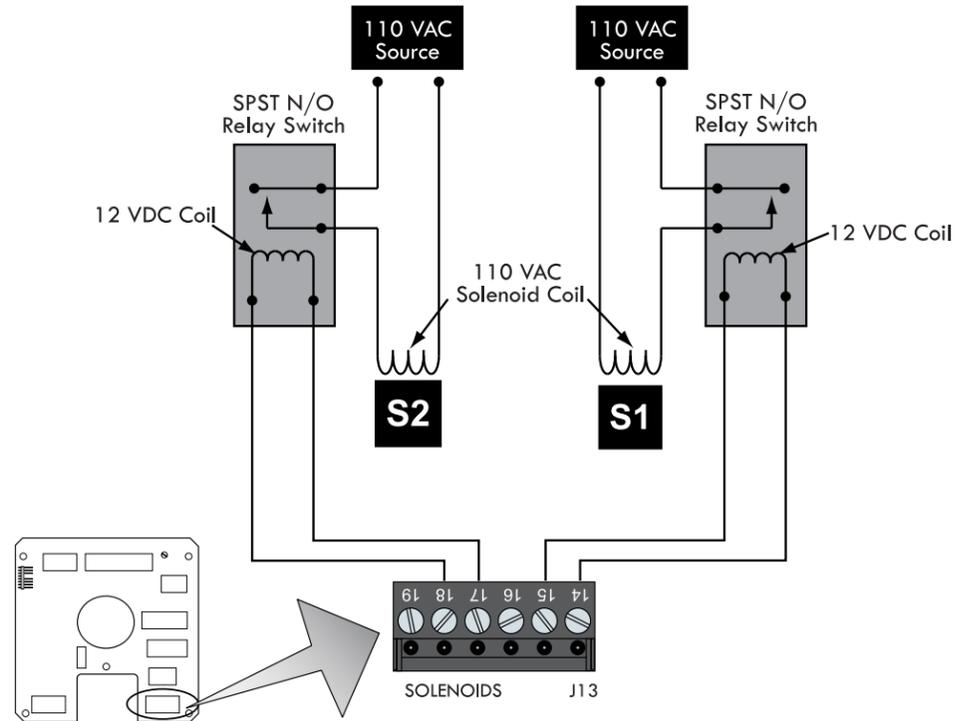
**Materials needed for wiring valves with 110VAC solenoids: Not supplied with the valve**

- SPST relay switch (1 per solenoid)
- 18 AWG stranded wire (2 per solenoid)
- Weatherproof flexible conduit, 1/2" diameter and 1/2" NPT conduit connectors or cable glands (if application requires)
- PTFE tape or pipe sealant

**To wire 110VAC solenoids to the LCR 600:**

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.

**Disconnect Power (110 VAC)**  
Turn off all 110 VAC circuits before beginning the installation.



**Optical Air and Vapor Eliminator Installations**

When ordered as part of a meter system with a LCR 600, Liquid Control's optical air and vapor eliminators are bolted onto the strainer and wired to the LCR 600 at the factory. Optical air and vapor eliminators can also be ordered separately and installed onto meter systems already in service. For mechanical installation instructions, refer to the manual specific to the optical air and vapor eliminator. Instructions for wiring optical air and vapor eliminators to the LCR 600 are provided on this page.

**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, 1/2" diameter and 1/2" NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

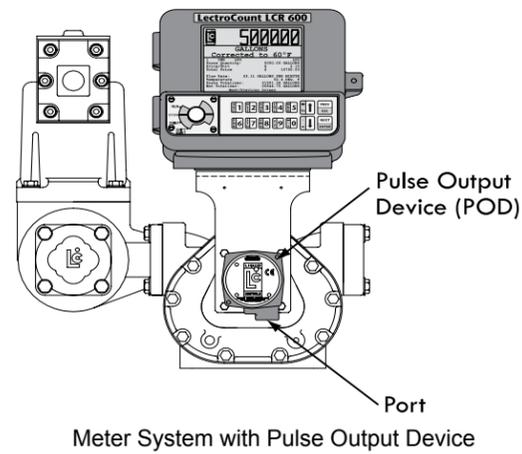
**To wire optical air and vapor eliminators to the LCR 600:**

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 600 port.
3. Run the weatherproof conduit between the S3 solenoid-operated valve and the LCR 600 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 600 CPU board.
5. Connect the optical sensor wires to terminals 54, 55, and 56 on the J15 terminal block of the LCR 600 CPU board.

**Disconnect Power**  
Disconnect the power before working on the CPU board.

## Pulse Output Device (POD) Installation

When ordered as part of a meter system with a LCR 600, Liquid Control's Pulse Output Device (POD) is installed onto the meter and wired to the LCR 600 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 600 are provided on this page.

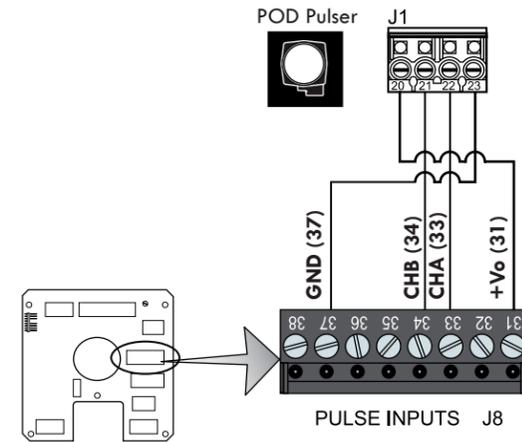


### Materials needed for wiring valves: Not supplied with the POD

- 22AWG stranded wire (4)
- Weatherproof flexible conduit, 1/2" diameter and 1/2" NPT conduit connectors or cable glands
- PTFE tape or pipe sealant

### To wire a POD to the LCR 600:

1. Attach cable glands and/or conduit connectors to the POD and the LCR 600 port(s).
2. Thread the wires through a piece of weatherproof conduit cut-to-length from the POD port to a LCR 600 port.
3. Run the weatherproof conduit between the POD and the LCR 600 housing, pull the wires through the ports, and tighten the connectors.
4. Connect the four POD terminals to the four terminals on the J18 terminal block of the LCR 600 CPU board.
  - POD terminal 20 to LCR 600 terminal 31
  - POD terminal 21 to LCR 600 terminal 34
  - POD terminal 22 to LCR 600 terminal 33
  - POD terminal 23 to LCR 600 terminal 37

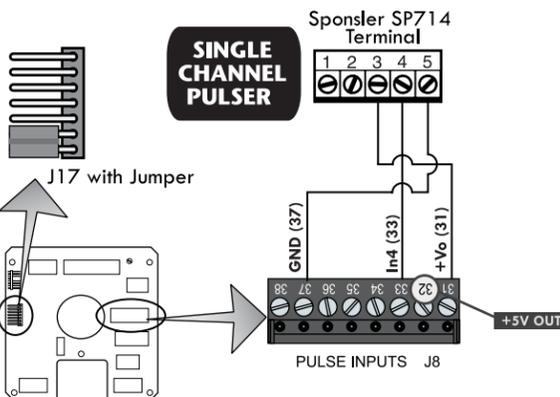


### Pulse Output Devices 1, 2, 3, & 4 Only

This wiring schematic applies to pulse output devices 1 through 4 only.

### Disconnect Power

Disconnect the power before working on the CPU board.



## Single Channel Pulse Inputs

The LCR 600 is compatible with the many single channel pulsers and amplifiers, for example, the SP714 pulse amplifier from Liquid Controls Sponsler. For the LCR 600 to accept a single channel pulse, you will need version v1.15 (or above) of the SR600 base software and a jumper.

### To a single channel pulse output to the LCR 600

1. Flash the CPU board with version v1.15 (or higher) SR600 (LCR 600 registers) 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 pulser to the J8 terminal of the LCR 600 CPU board. Schematic on the right shows wiring to a Sponsler SP714.

## Differential Pressure ( $\Delta P$ ) Transducer Installation

When ordered as part of a meter system with a LCR 600, Liquid Control's  $\Delta P$  transducer is wired to the LCR 600 at the factory. The  $\Delta P$  transducer can also be ordered separately and installed onto a meter system already in service. Refer to the  $\Delta P$  transducer manual for complete installation instructions. Instructions for wiring the  $\Delta P$  transducer to the LCR 600 are provided on this page.

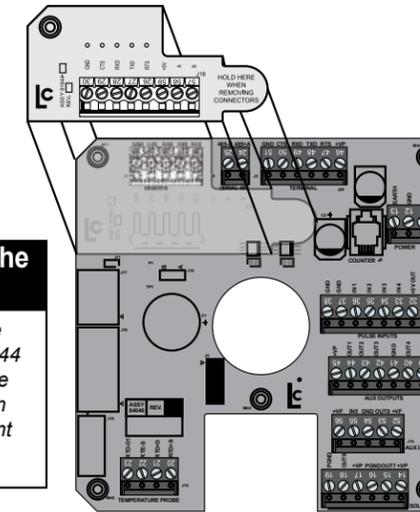
The  $\Delta P$  Transducer requires an additional board (PN 81944) that mounts directly to the LCR 600 CPU board. Typically, a  $\Delta P$  transducer operates in conjunction with a shutdown device, such as a valve or a dead-man. The shutdown control must be wired to the LCR 600 and should draw no more than 1 A.

### To wire $\Delta P$ Transducer to the LCR 600:

1. Unplug the J1 and J3 terminal blocks from the LCR 600 CPU board.
2. Remove the screw at the top left corner of the LCR 600 CPU board.
3. Plug the 81944 board into the J1 connectors on the LCR 600 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 600 CPU board.
6. Plug the J16 terminal block into the 81944 board.
  - Black to J16 terminal 30
  - Blue to J16 terminal 29
  - Yellow to J16 terminal 28
  - Orange to J16 terminal 27
  - Brown to J16 terminal 26
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 J3 terminal 46
  - White to J3 terminal 51
  - Yellow to J16 terminal 57
  - Blue to J16 terminal 58
8. Route the  $\Delta P$  transducer cable through a cable gland in a port on the back of the LCR 600. Secure the cable gland. LC recommends running the cable through weatherproof conduit.
9. Connect the four  $\Delta P$  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.
10. Run the red jumper wire (provided with the  $\Delta P$  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 600. 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.

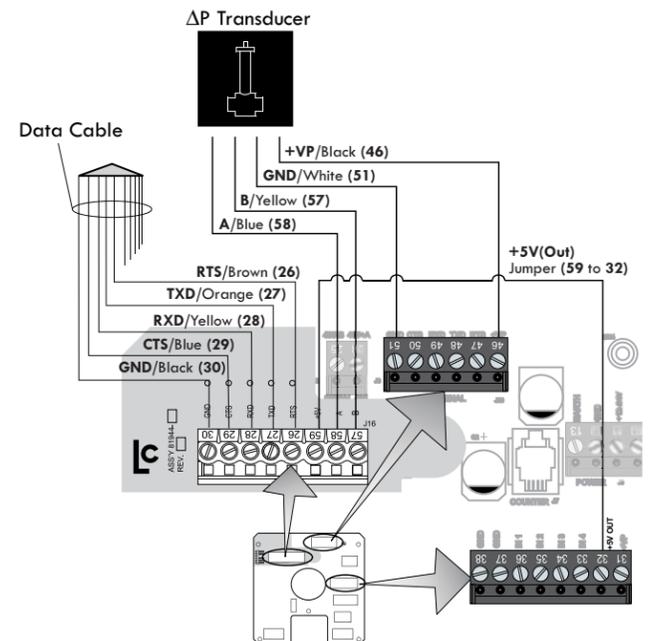
### Be Careful with the CPU Board

When removing the terminal from the 81944 board, hold down the right end of the main CPU board to prevent flexing.

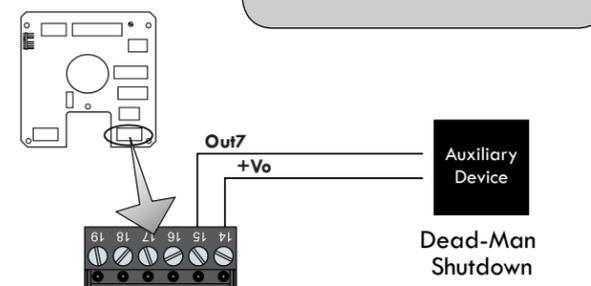


### Do Not Try To Remove J2

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

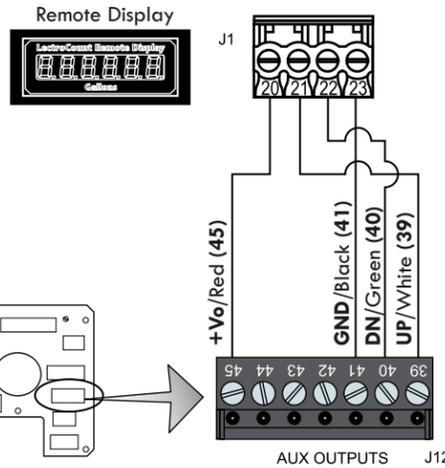


The shutdown device should draw no more than 1A.



**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 for other types of displays. Signals from these outputs duplicate the volume data sent to the LCR 600 display. Refer to the LectroCount remote display manual for complete installation instructions.

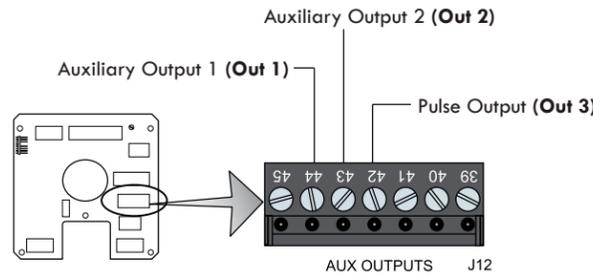


**To wire an external display to the LCR 600:**

1. Attach cable glands and/or conduit connectors to the display and the LCR 600 port(s).
2. Thread the wires through a piece of weatherproof conduit cut-to-length from the display port to a LCR 600 port, 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 600 CPU board.
  - Remote display terminal 20 to LCR 600 terminal 45
  - Remote display terminal 21 to LCR 600 terminal 39
  - Remote display terminal 22 to LCR 600 terminal 40
  - Remote display terminal 23 to LCR 600 terminal 41

**Auxiliary Outputs**

The LCR 600 provides three open drain transistor auxiliary outputs. These output can serve a variety of 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 600.



**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 600 totalizers.

**Disconnect Power**

*Disconnect the power before working on the CPU board.*

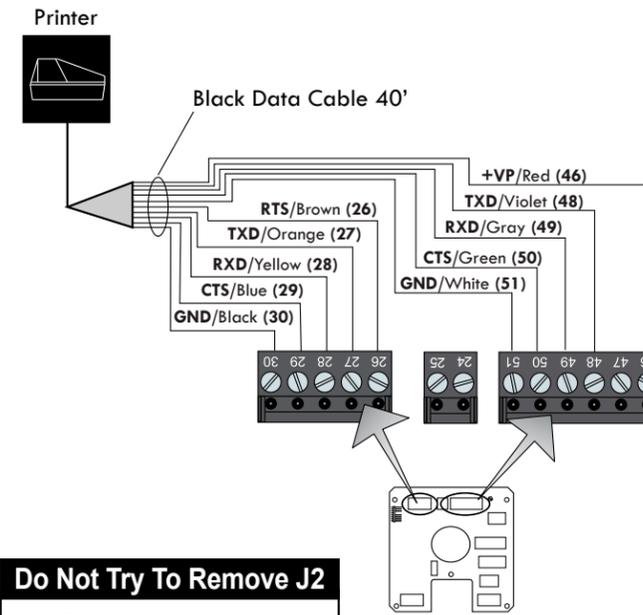
*To select the Auxiliary Output settings, refer to the LectroCount LCR 600 Setup and Operation manual.*

**Printer Installation (J1 RS-232)**

A Liquid Controls meter system with a LCR 600 typically includes an Epson slip printer or roll printer. Installation is the same for both printers.

LCR 600's are typically shipped with a black-sheathed data cable prewired to terminals J1 and J3 on the LCR 600 CPU board.

*See instructions on pages 17 for routing the data cable from the back of the truck to the cab.*



**Do Not Try To Remove J2**

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

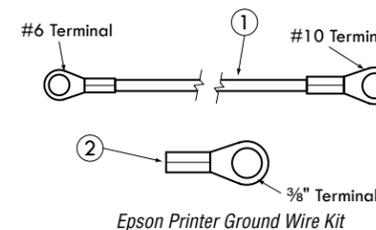
**Disconnect Power**

*Disconnect the power before working on the CPU board.*

**RS-232 Communication**

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

- 82184 - Epson Printer Ground Wire Kit			
#	DESCRIPTION	PART NUMBER	QTY
1	Ground Wire	84101	1
2	Terminal (.375 ring, 16GA)	71878	1



**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.

*For connecting power to the printer see pg. 29.*

**Epson Printer Ground Wire Kit Installation**

Before connecting power to the LCR 600 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.

**Additional Terminal**

*The Epson Printer Ground Wire Kit contains an additional 3/8" ring terminal for printer brackets not purchased from Liquid Controls*

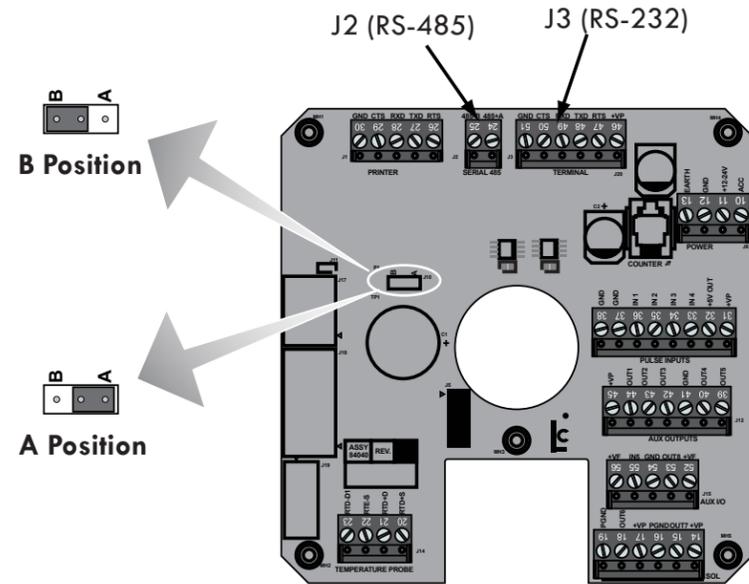
3. At the back of the Epson printer, remove the silver ground screw marked "FG".
4. Place the other end terminal of the ground wire over the ground screw and return the screw to its original place.
5. Check the strap for a good ground connection (see page 13).

## RS-232 and RS-485 Communications

The LCR 600 is capable of interfacing with RS-232 and R-S485 communication protocols. Data connections for these protocols is made at the J2 and J3 terminal blocks. A jumper, located on the left side of the CPU board, can also affect communication protocol; however, it must remain in the B position for all LCR 600 applications. See note and diagram below.

**Keep the B Position**  
 The LCR 600 is shipped with the jumper in the B position. Keep it there.  
 There are no cases in which it must be moved to the A position.

**Do Not Try To Remove J2**  
 The J2 terminal block is permanently attached to the CPU board.



## Power Installation Overview

When you have made all of the data connections and finished installing the components, connect the power to the LCR 600 and the Epson printer. 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 600 and the Epson printer.

## Vehicle System Checklist

- Clean any corrosion from the battery terminals and battery cable to guarantee a solid, tight 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 600. The LCR 600 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.

## Connect the Power

All LCR 600 shipments typically include a 40' gray power cable (100', and 300' are also available) and a 5 A fuse.

*Page 17 describes the best practices for routing the gray power cable to the truck cab's accessory panel.*

### 40' GRAY POWER CABLE

The gray power cable (PN 84046) is prewired to the J8 and J9 terminals on the display CPU board and the J6 terminal on the CPU board at the factory. It includes two 16AWG 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 600 side of the 5 A fuse.

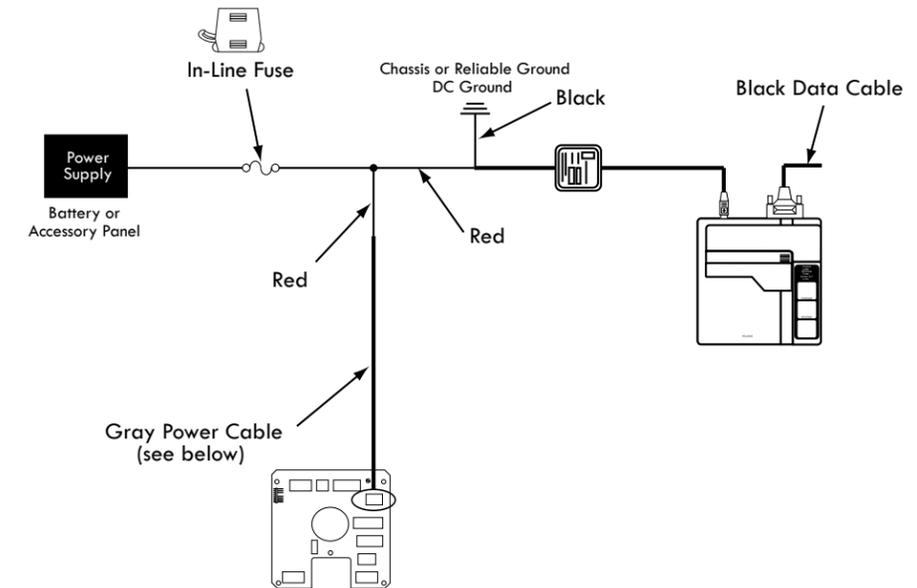
#### To connect power to the LCR 600 and the Epson printer:

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.

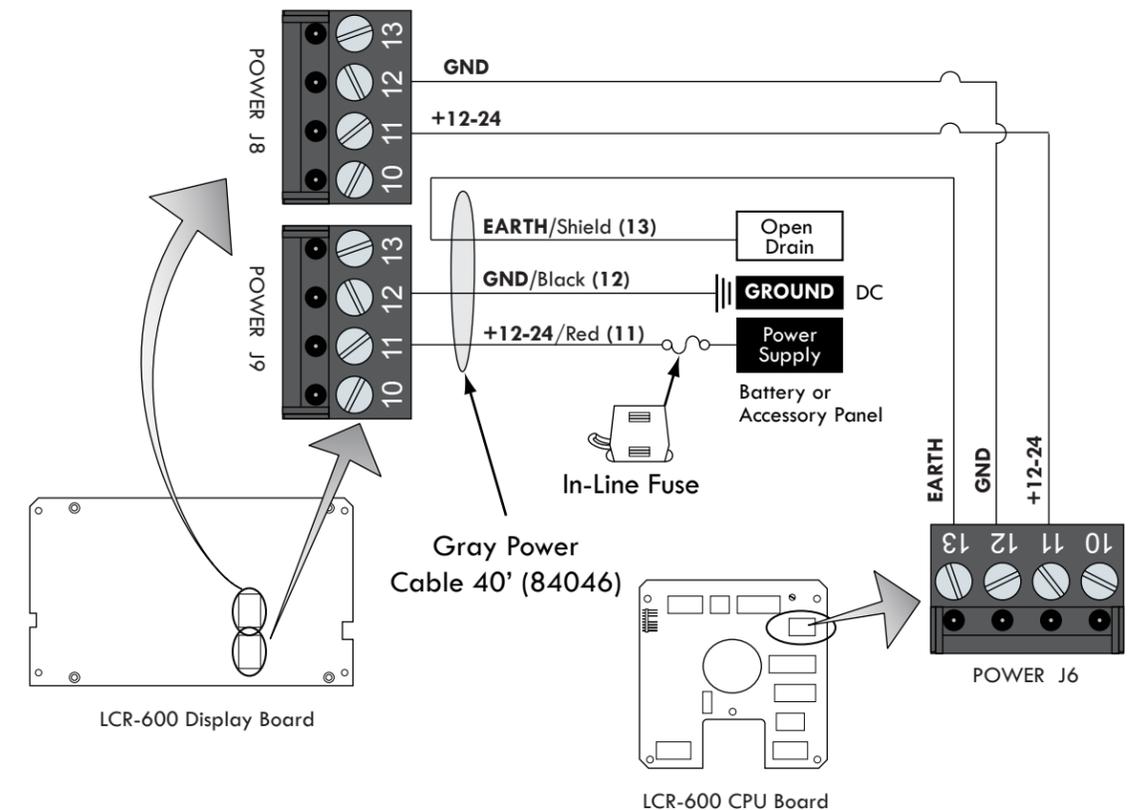
## Power Check

After the LCR 600 has been installed, check to make sure that it powers up correctly. The LCR 600 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 600 or the printer does not power up, check the wiring and the connections on the LCR 600 CPU board against the manual.

## Epson Printer Power Connections



## LectroCount LCR 600 Power Connections



**IMPORTANT: Before Sealing the LCR 600**

After the LCR 600 is powered correctly, continue on to the LectroCount LCR 600 Setup and Operation manual to setup the LCR 600 for operation. You will want to setup and test the LCR 600 before closing and sealing the unit.

**Close and Seal the Unit**

Once the unit has been setup and tested, finish the installation by closing and sealing the housing. The LCR 600 must be environmentally sealed to protect the electronics against the elements. The LCR 600 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 600 and the cables in the cab with cable ties.
2. If conduit was used during the installation, fill the conduit end inside the LCR 600 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 large 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 600 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 600 is the Responsibility of the Installer**

Any water or moisture damage to the LCR 600 as result of improper sealing will not be covered under the product warranty.

**1. Conduit Entrances**

The LCR 600 housing has seven conduit entrances, five 1/2" NPT female threads and two 3/4" NPT. Use only 1/2" or 3/4" NPT male threaded fittings on the conduit entrances. Pressed in Caplugs 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 600 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 600 cover properly, ensure that the O-ring surrounding the cover is fit snug inside the groove, and tighten the cover screw securely.

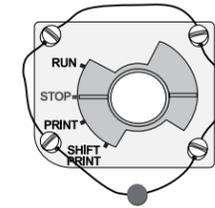
**3. Shaft Seals**

Units with internal pulsers have an O-ring around the pulse encoder drive shaft that extends through the bottom of the LCR housing. If a drive shaft adapter was attached at installation, make sure the O-ring around the shaft is securely seated in the counter bore 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 600 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 600, 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.

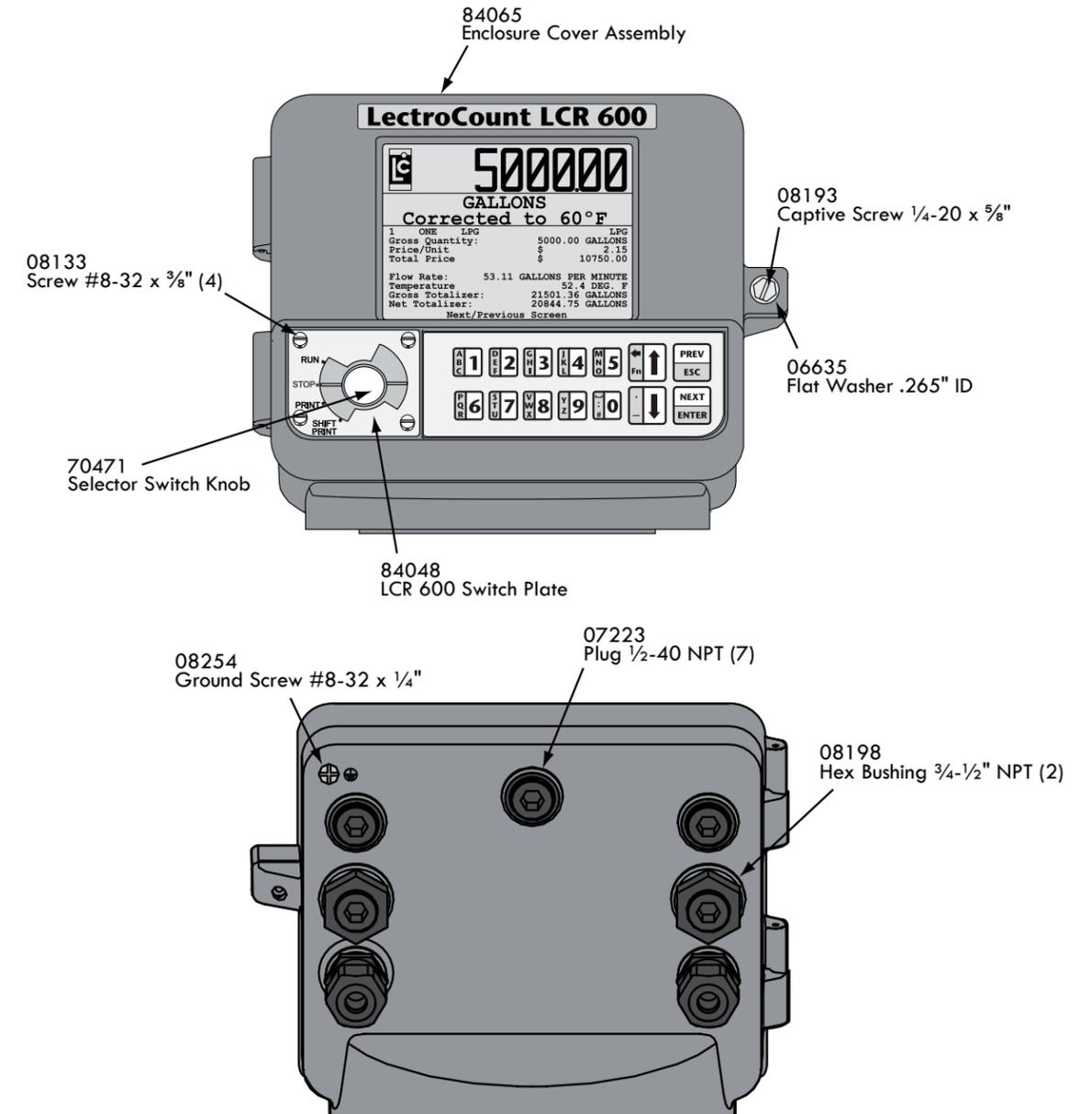
**SWITCHPLATE**



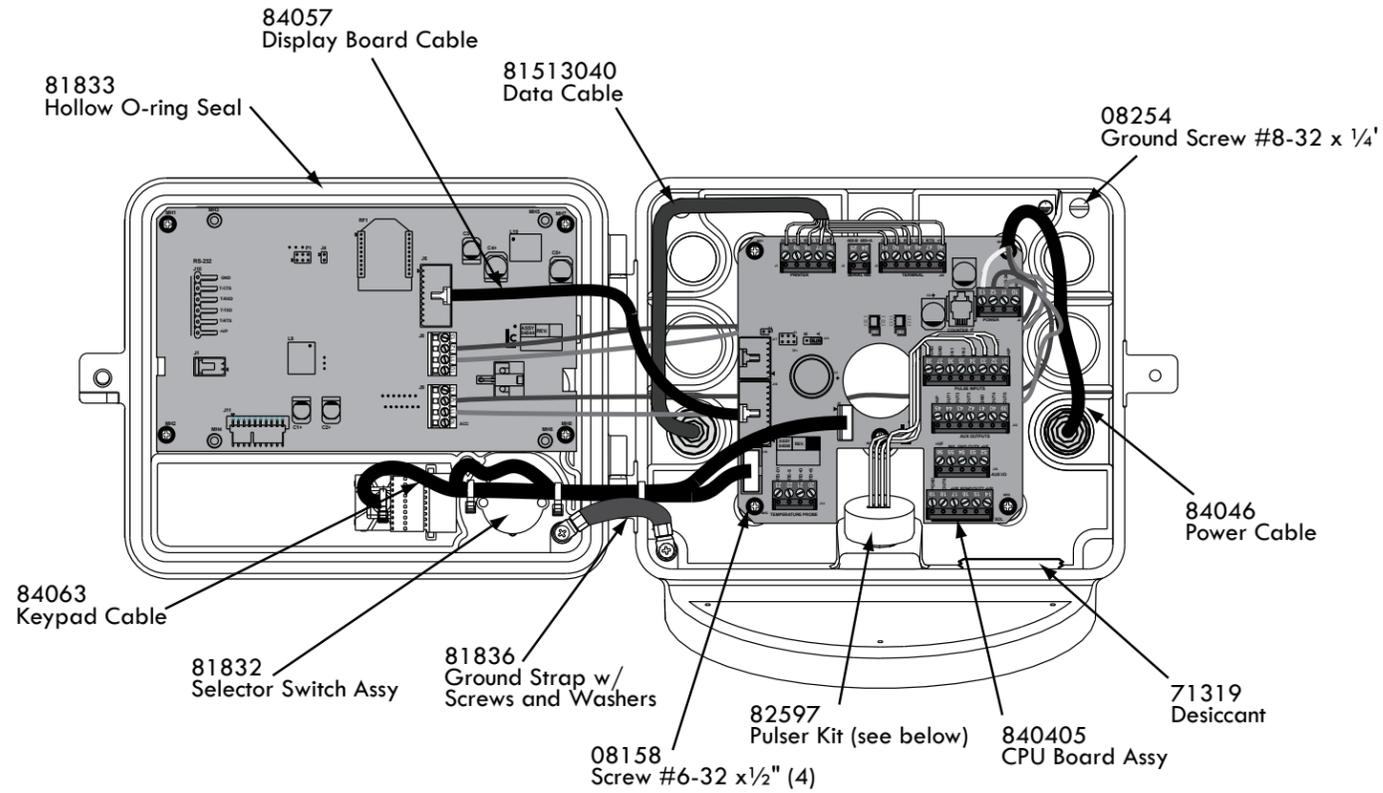
**LATCH**



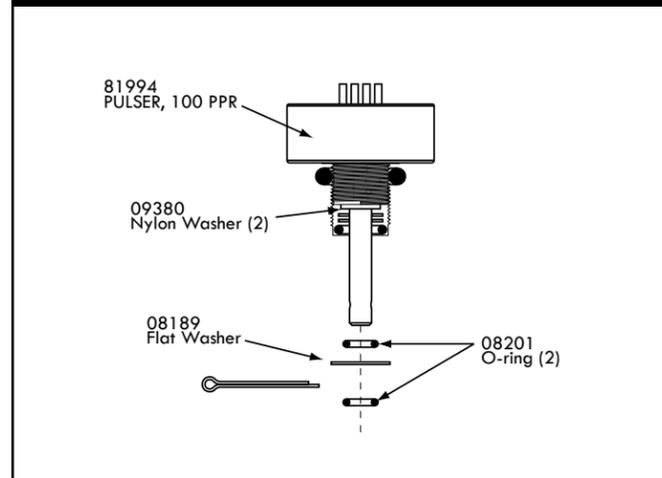
**Bill Of Materials—External Components**



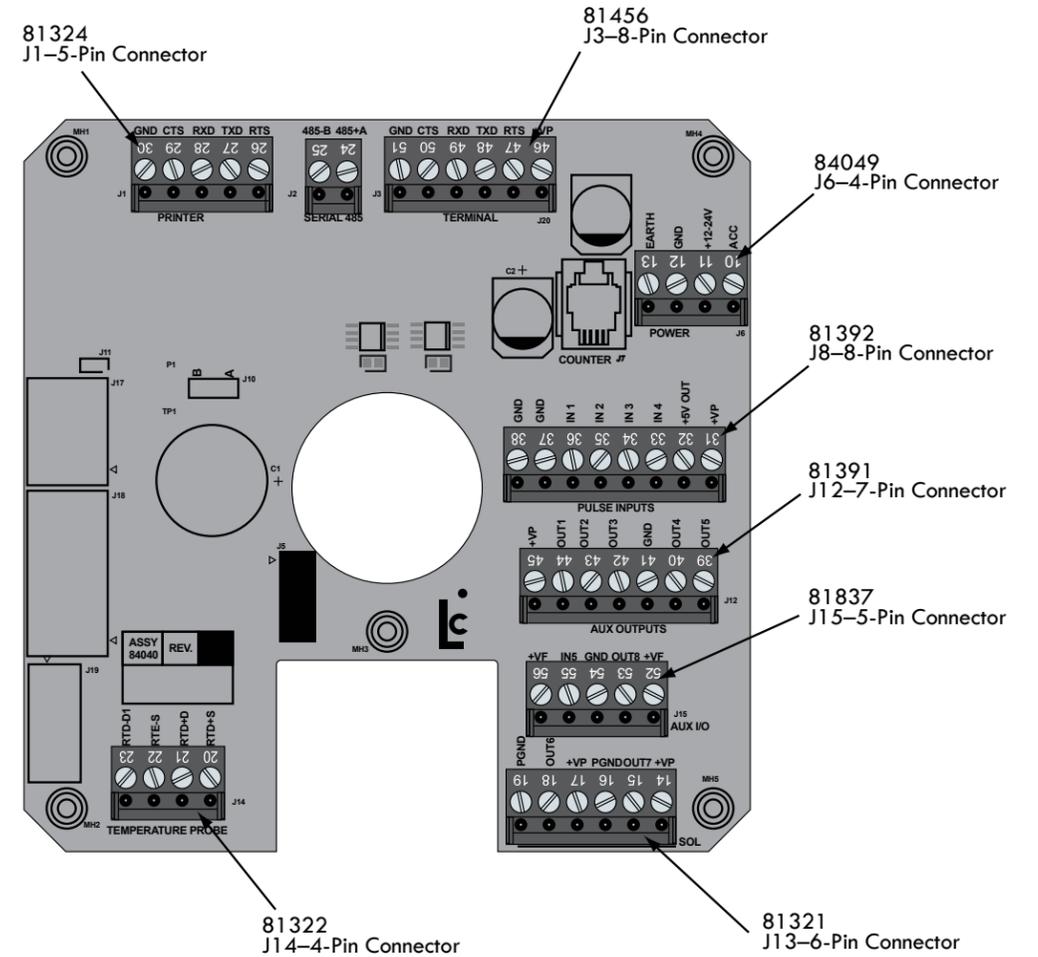
**Bill Of Materials—Internal Components**



**Pulser Field Install Kit—82597**



**840405 CPU Board**



**Do Not Try To Remove J2**  
 The J2 terminal block is permanently attached to the CPU board.

Optional Items (not shown)	
Description	Part Number
Lap Pad Adapter	81514
Roll Printer Extension Cable	71237
Flash Cable	81885

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