

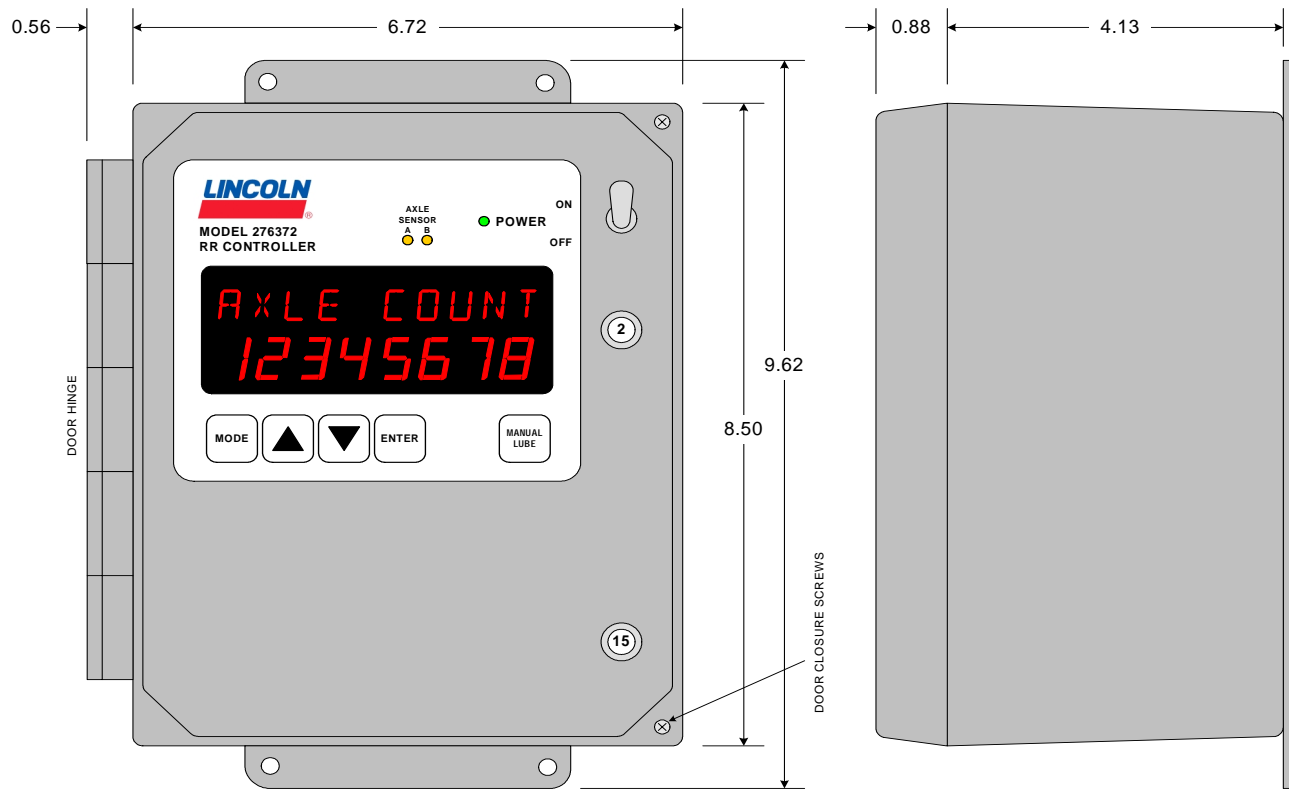


## Solid State Timers and Controllers

# EPC-13915 Track Lubrication Control System

The EPC-13915 is a microcontroller-based lubrication controller which incorporates a controller board integrating all of the system functions, replaceable power relay for controlling the lubricant pump, and connections for multiple wheel and environmental sensors mounted into a 8" x 6" plastic housing. The controller board is mounted behind the cover which has openings for the LED displays and individual status LED's, a five-key membrane keypad covers the LED openings and provides user access.

The controller accepts both +24V and low-level wheel sensor signals for two channels, and offers configurable unidirectional and bidirectional lubrication with settings dependant on direction, storage and display of total axle count and dispensed lubricant volume. It also provides an RS-232 port for communication with external communication systems to support retrieval of real time status information, and static or dynamic setting of the lubrication settings.



*This diagram is correct as to the relative sizes of the enclosure, LED display, and keypad, but is not to scale*

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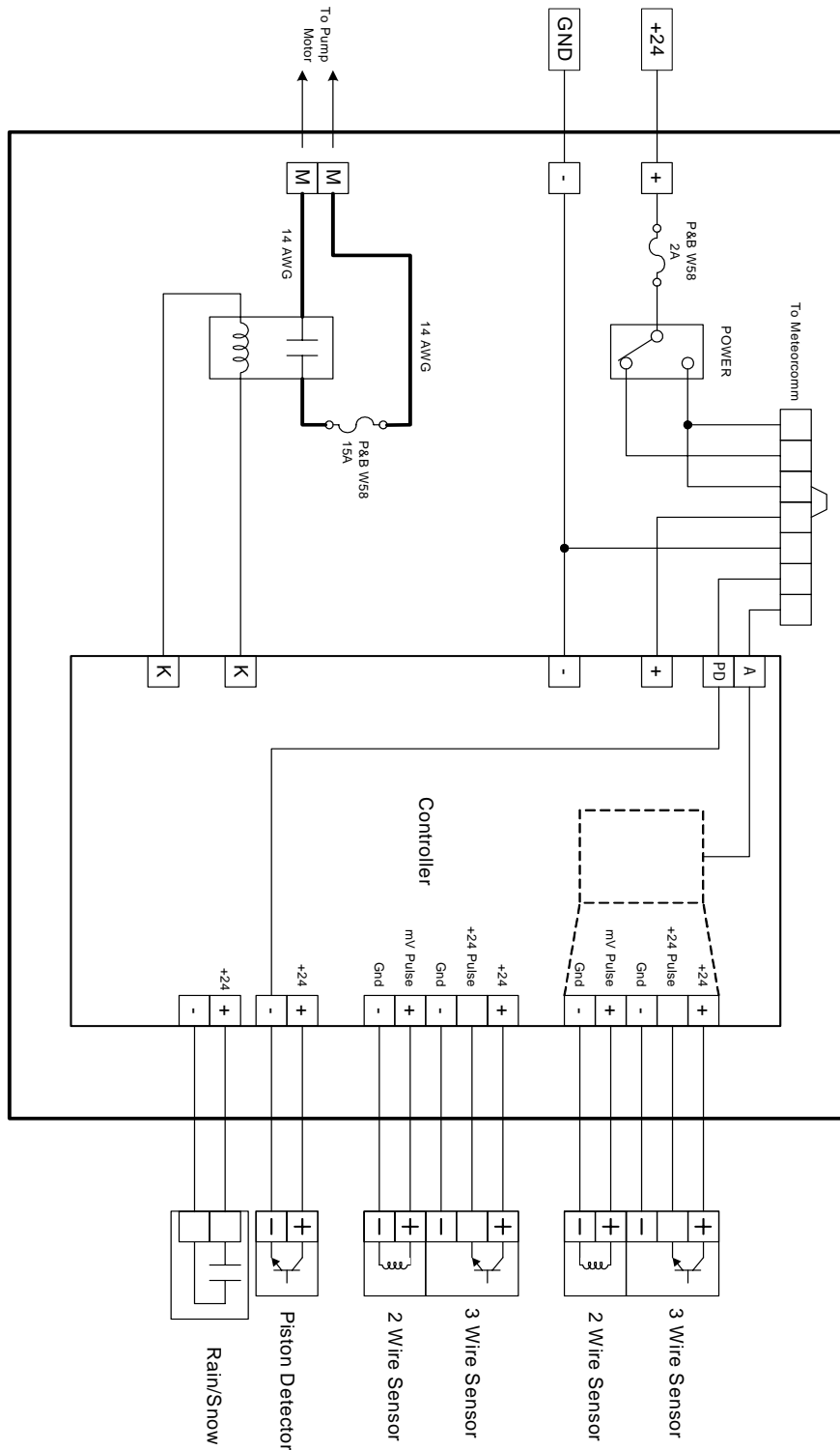
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## Block Diagram



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# Solid State Timers and Controllers

## General Operation .....

### Normal Power Conserving Operation:

1. LED displays are blank
2. POWER LED blinks once every second.
3. A or B LED's blink when input detected.
4. Controller will count axles and dispense lubricant in accordance with its settings.

### Normal Display Active Operation:

Pressing one of the keypad keys will energize the LED displays and show the current total axle counts. If the key pressed is the MANUAL LUBE key the pump output relay is energized until the key is released, none of the other keys will cause the controller to take any action. Pressing the MODE key again will cause the controller to now display the total volume of lubricant dispensed in cubic inches. Pressing MODE again reverts back to the axle count display unless it has been disabled due to the internal thermostat or external rain snow sensor.

Once the LED displays are activated, they will remain active until no keys are pressed or axles are counted for 60 seconds.

When the LED displays are active the controller will display the following if axles are being counted:

1. **ENG DELAY** and incrementing axle count value if enabled
2. **COUNTING** and incrementing axle count value.
3. **PUMPING** and incrementing output time (XX.X seconds).

### Configuration Operation:

Once the LED displays are active, pressing and holding the MODE key *and* pressing the ENTER key puts the controller into configuration mode. Here is where the basic operating parameters are set:

1. A input axle counts causing a dispense, range of 1 - 128.
2. A input dispense time, 2.0 - 14.0 seconds in 0.5 sec increments.
3. B input axle counts, OFF or 1 - 128.
4. B input dispense time, 2.0 - 14.0 seconds in 0.5 sec increments. (if B counts set)
5. Engine delay axle counts, OFF or 4 - 36 counts.
6. Thermostat shut down temperature, OFF or -10F to 32F.
7. Rain/Snow sensor input On or OFF

The user presses the MODE key to go from parameter to parameter. If the item needs changing, the Up and Down arrows are used to change the value, then the ENTER key must be pressed to save the change. Pressing and holding MODE and pressing ENTER returns the system to normal display active operation.

### Counter Reset Operation:

Once the displays are active, pressing and holding the ENTER key and then pressing the MANUAL LUBE key puts the controller into reset operation. The user can separately reset the axle count or the lubricant volume totals, the controller will ask if the the user is sure about resetting these values before action is taken.

### Low Level Configuration Operation:

To access the low level, turn the controller off, hold the MODE and MANUAL LUBE keys and turn the controller on. This will allow the following to be configured or viewed:

1. Axle count during dispense, On/OFF
2. Piston detector value: .072, .096, .120, .144, .168, .192, .216 or .240 cu in.
3. View non-resettable total axles counted.
4. View non-resettable total volume dispensed.

To return to normal operation turn power off and back on.

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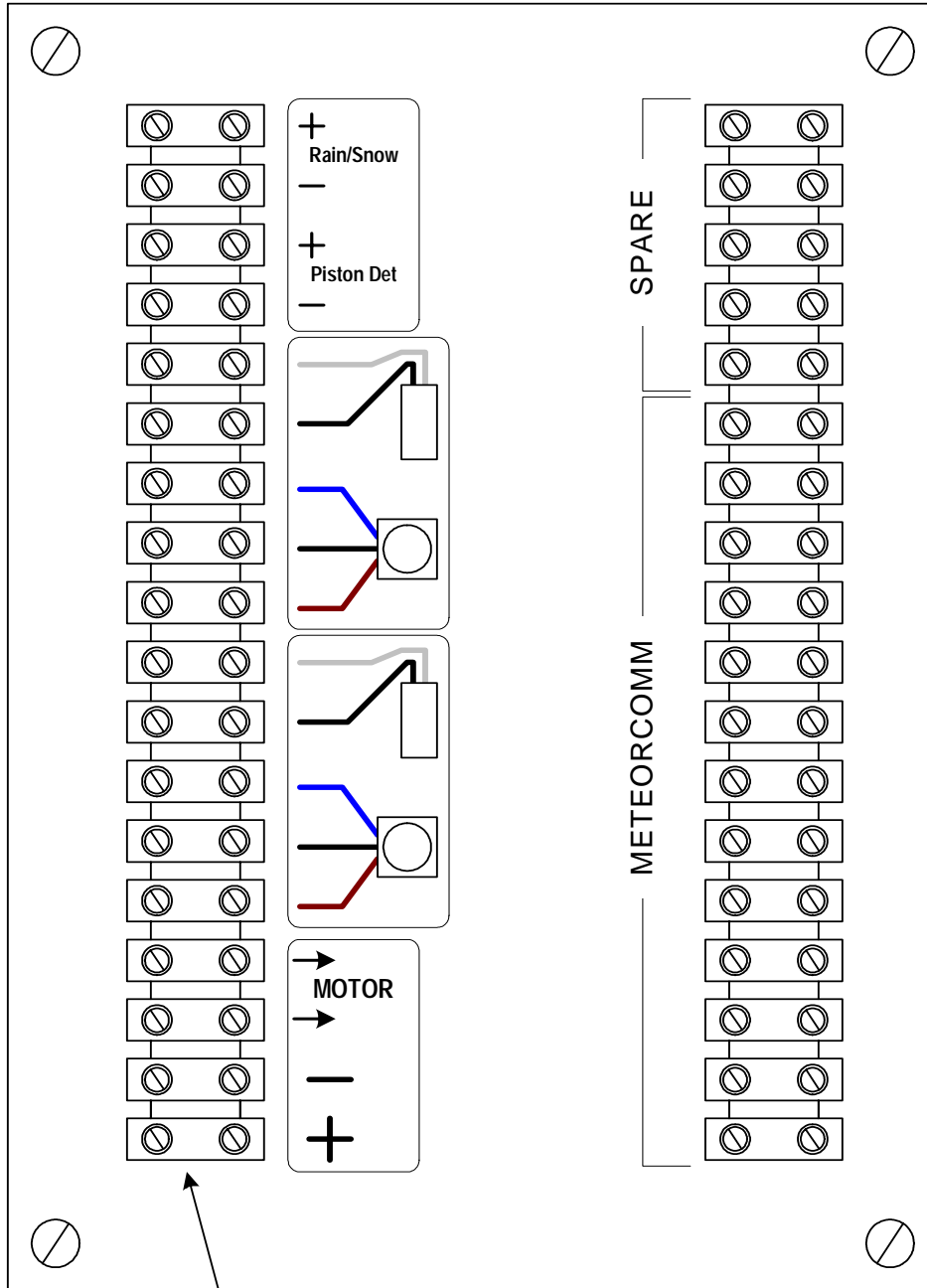
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# Solid State Timers and Controllers

## System Wiring



8mm pitch Euro style terminal blocks.  
 Rating: 20A, 300V maximum  
 Wire Gauge: 12 - 22

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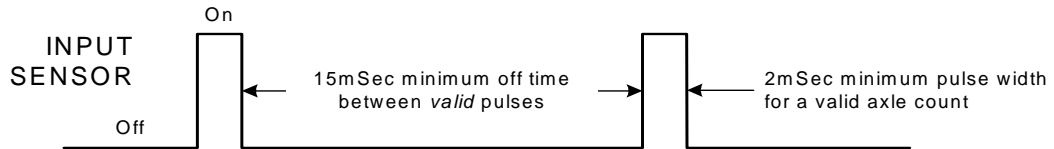


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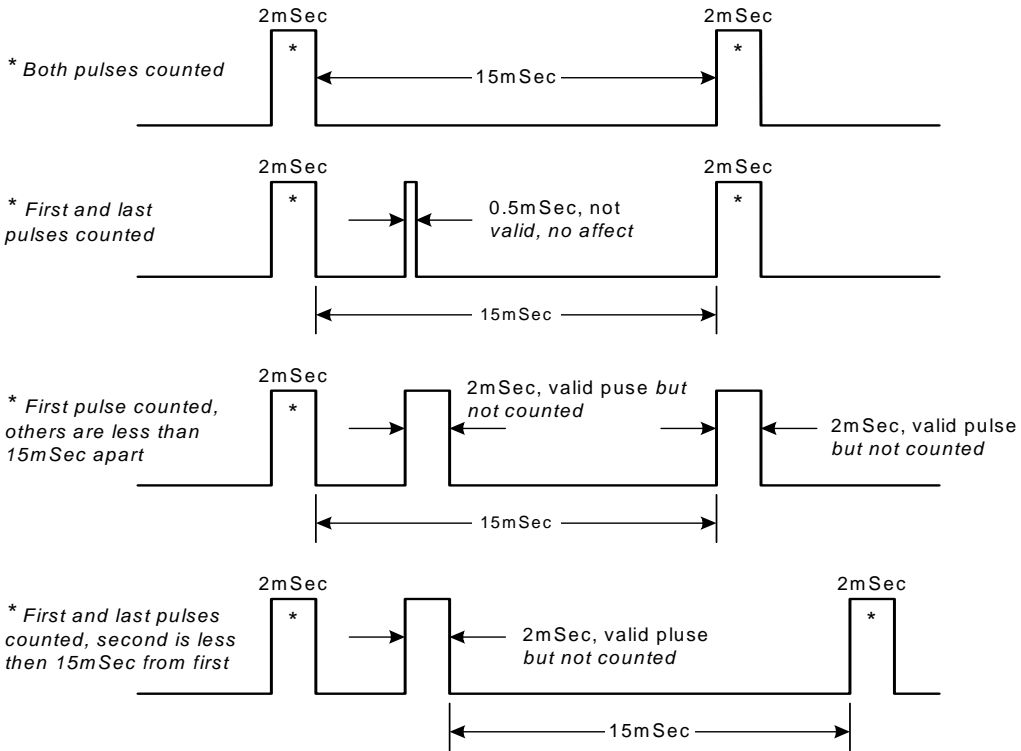
## Axle Count Timing .....

All axle count input pulses must be 2 milliseconds in width to be a valid axle pulse.  
Successive pulses must be a minimum of 15mS apart to be counted.  
These requirements apply to both A and B pulse counting inputs

### MINIMUM AXLE INPUT TIMING



### EXAMPLES



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## Solid State Timers and Controllers

### Communications .....

The EPC-13915 provides a three-wire asynchronous RS-232 port for communications with remote systems. The system can provide adjustability for all communications parameters such as baud rate, start bits, data bits, and parity. This interface can provide the status of the system such as axle counts, lubrication volume, thermostat and rain/snow sensor condition. It can also be used to permanently or temporarily set the dispensing parameters such as axle counts and dispense times.

*Communications protocol to be determined.*

### Specifications .....

**Operating Voltage:** 24 VDC  $\pm$ 20%. 2A circuit breaker on power input

**Dispense Timing:** From 2.0 seconds to 14.0 seconds in 0.5 sec increments.

**Dispense Axle Counts:** From 1 to 128 axle counts.

**Maximum Axle Counts:** LED display can show up to 99,999,999 counts.

**Maximum Dispense Volume:** LED display can show up to 9,999,999.9 cu. in.

**Recycle Time:** Operating voltage must be removed for a minimum of 200 milliseconds to guarantee system have reset.

**Relay Output:** Automotive bracket mounted relay, NO contacts rated for 40A . Connected to terminal blocks and 15A breaker with 14 AWG wires and ¼" QD lugs.

**Piston Detect - Rain/Snow Inputs:** On/Off inputs can accommodate normally open contacts or solid state outputs. Solid state outputs must provide less than 1mA leakage current @ 24VDC when off and must reliably switch a 10mA resistive load.

**Terminal Block:** Terminal blocks mounted on interior panel for wiring. 8mm euro-style blocks rated for 20A @ 300V, 12-22 AWG wires.

**Transient Protection:** On all inputs.

**Dielectric:** 500V rms all terminals to case.

**Operating Temperature:** -40°C to +85°C.

**Humidity:** 95% non-condensing.

**Construction:** PCB conformally coated. Fiberglass polyester case is NEMA 1, 2, 3, 4, 4X, 12 & 13 rated before installation of wiring openings.

**Data Sheet © and Revision Date:** January 20, 2009

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