



*A product of Tulsa Gas Technologies*

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Installation and  
Operation of  
**LMS 120**  
LIGHTING CONTROL

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# LMS SHOULD BE INSTALLED TO MEET ALL LOCAL AND NATIONAL CODES.

## WARNING

**Disconnect external power before installation to prevent electrical shock or equipment damage.**

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

### Input Voltage:

The LMS 120 requires a dedicated circuit.  
120 volt 60Hz-65VA.  
Bring 120 V power to TB-1.

### Mounting:

Remove back plate from enclosure. Mount to wall using the pre-drilled holes, then replace the back plate.

### Installation of Photo Sensor:

Run two 600 V, #16 AWG, wire to Photo Sensor on top of canopy or building, and aim Sensor to Northern sky. The photo sensor has no polarity, wire to Terminal Board 2 marked "Photo Sensor." This is a 5V DC circuit.

## LMS 120 Specifications

PHYSICAL DIMENSIONS: 12" x 12" x 4" with hinged door

### Electrical Rating

INPUT VOLTAGE: 120 VAC 50/60 HZ dedicated circuit

POWER CONSUMPTION: 65 VA

OUTPUT VOLTAGE: 120 Volt, 3 AMP Maximum

AMBIENT TEMPERATURE RANGE: - 40°F to 140°F or (-40°C to 60°C)

HUMIDITY: 0-95% RH

SET POINT RANGE: 2 foot-candles to 80 foot-candles

SENSOR: Hermetically sealed cadmium sulfide photocell, 1000ft.  
maximum distance between sensor and LMS 120

Two independent, time of day inputs for off timer override.

Override switch provided for service.

## Calibration:

Set Service Switch to “Normal.”

Remove cover from LMS Controller

Locate Power LED, Stage 1 Reference LED, Stage 2 Reference LED, and the Set-Run Switch.

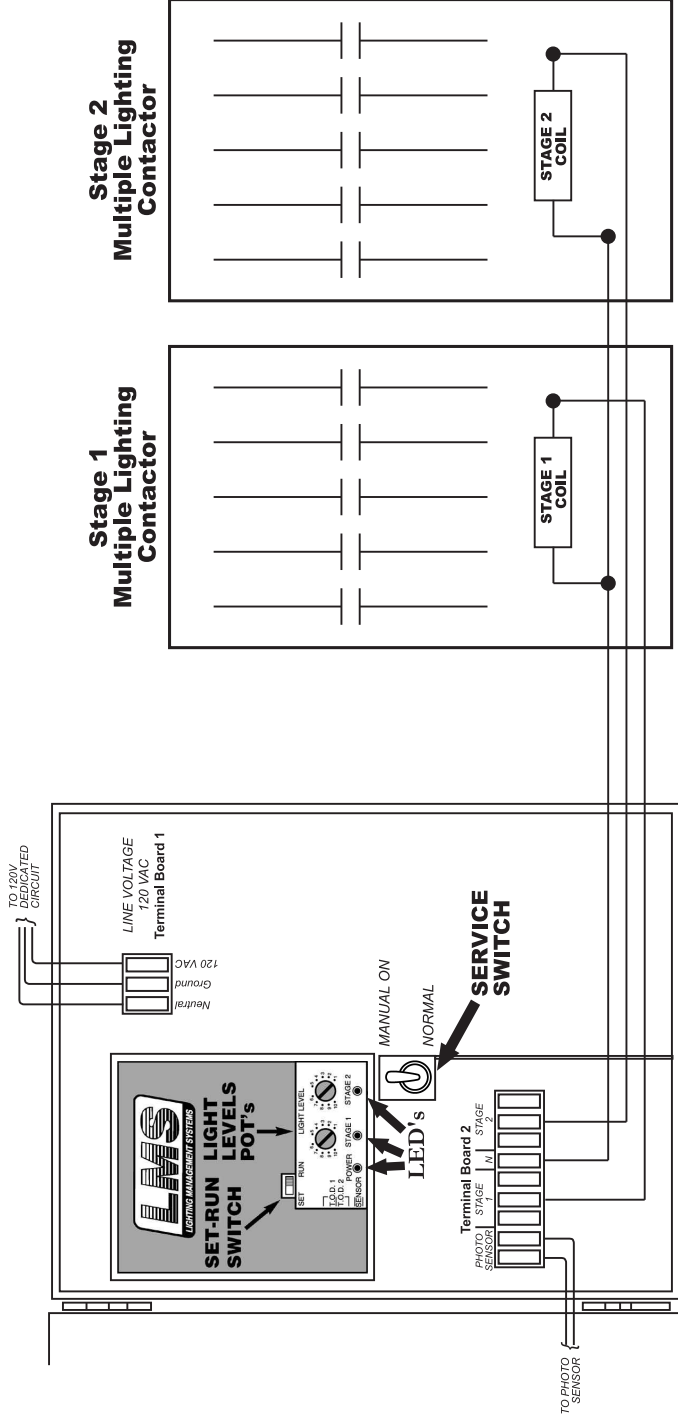
1. Turn LMS Power On, verify Green Power LED.
2. Adjust both Light Level Potentiometers (Pot.) to their full clockwise position (set them at the #1 position).
3. Move Set-Run Switch to “SET” position.
4. At the desired outdoor light level slowly rotate the Stage 1 Light Level Pot. counterclockwise until Stage 1 LED lights up. Stage 1 is now calibrated to the light level at the Sensor and Stage 1 is now energized.
5. Return Set-Run switch to “RUN” position.
6. To calibrate stage 2, repeat steps 3,4,5 except adjust state 2's Light Level Pot.
7. IMPORTANT: Return “Set-Run Switch” to the “RUN” position. There is a 10-30 second delay in the “RUN” position. This is necessary to prevent an oversensitive response from the outdoor Light Level Sensor.

## Manual Control of Lights:

Set Service Switch to “MANUAL ON” (UP), this will disconnect the LMS Controller from the LMS, and drive the Stage 1 & Stage 2 output to the “ON” position.

Returning the switch to “NORMAL” (DOWN) will reinstate the LMS Controller and return light to automatic control.

# Field Connection Diagram for LMS 120



All (hook-up) field connected control wires should be 16 AWG, 600V.

**REFER TO INSTALLATION AND OPERATION OF  
LMS 120 LIGHTING CONTROL SHEET**

# LMS Trouble Shooting and Repair

Symptom: No Reaction from LMS at a change from dark or a change to light.

- 1 Check for Green Power LED, LED must be on.
- 2 Move the hand switch in Manual ON position and this should drive contactors on, if the contactor came on the problem is either the photo sensor or the main board. The controller should fail with the lights on. See Photo Cell section
- 3 Put the Manual Switch in the Normal position verify that the Run-Set switch is in the Run Position. The Run-Set switch will put a 30 to 45 second time delay in the photocell response. Cover the photo sensor and see if the lights come on. If the lights do not come on, the system needs to be recalibrated or the main board is bad.
- 4 Recalibrating the LMS

The sun must be going down to do a real calibration on the controller. The RUN-SET switch must be in the SET position. AT the desired light level outside that you want the first stage to come ON rotate the first stage knob until the lights come on. Repeat the same step for stage two after you have the desired light level that you want the second stage to come ON. When calibration is completed put the SET-RUN switch in the RUN position.

## 5 To check the Main Board

- 1 Move the Run-Set switch into the set position then recalibrate the controller.
- 2 If you have no response open on lead of the photo censor, this should tell the controller to turn ON.
- 3 If opening the photo sensor turns ON the controller the problem will be in the photo sensor or the wiring to the sensor. You can test this with installing a new photo sensor directly to the LMS and cover it up to simulate darkness. Vary the light to simulate dusk and dawn.
- 4 Using a digital volt ohmmeter you can test the controller throughout the range of inputs against the setpoints on the control board. For example with your meter on the 5 volt DC scale and you measure 2.98v DC the on the photo sensor input connection with the photo sensor still connected the controller, it should react at level 5 and the resistance of your photo sensor will be 4.7K ohms. Disconnect the photo sensor from the controller to check resistance of the photo sensor. The voltage across the photo sensor will vary from .63 to 5.00 volts DC. Any thing below .63 volts the controller will not react and it will stay off. If you read voltage of 4.89 or greater the controller will stay on. Using a cover over the photo sensor and varying the amount of light that the sensor sees will give you a varying

voltage. This is also helpful in determining if the photo sensor is working correctly. You can simulate the photo sensor with a 6K-ohm resistor or any resistor from the chart, then verify that it is reacting with the correct setpoint, IE: 6K-ohm resistor will cause the controller to react at #4 setpoint and the voltage across the resistor will be 3.66 to 3.70 volts.

## 6 To check the photocell

The photo sensor is a light sensitive resistor it will vary in resistance with the amount of light that is collected in its eye. The controller is set up to operate from 40k to .30k, if the photo sensor will not vary between these values it will be bad. Shinning it directly at a light then covering it up will work for this test. Using a light level that is not to bright and not all the way dark measure the resistance of the photo sensor and if the photo sensors resistance is near a value on the chart the controller will react at its given set point. If you disconnect the photo sensor from the controller then measure 6K ohms you will expect the controller to react at the #4 on the setpoint dial. A good way to verify the controller is reacting to a photo sensor is to get a 6K-ohm resistor and replace the photo sensor with the 6k-ohm resistor. The controller should react at the #4 set point. Most photo sensors fail with a high resistance this will drive the lights on. The less light the photo sensor receives the higher the resistance, the more light the sensors receive the lower the resistance. Use the chart supplied to find the right resistance for the settings on the controller.

## Sequence of operation

After the set points have been adjusted (typical Stage 1 #9, Stage 2 #8.5) and the Set-Run switch is in the run position. The controller constantly monitors the voltage from the photo sensor, if the voltage is higher for 30 to 45 seconds (time delay period) than the setpoint voltage the unit will react. The controller will turn on stage 1 then stage 2. If the voltage becomes lower than the setpoint voltage for the time delay period, the controller will turn off stage 2 then stage 1 in that order. It is common to have the bulk of your lighting load on stage 2 for greater savings. The controller does not know what time it is it only sees the ambient light and react to the set point. On cloudy days it is not unusual to see the first stage turn then turn off later when the clouds go away.

### **FULL YEAR WARRANTY ON ALL PARTS**

For use on specific equipment and lighting to manufacturer's design. Warranty does not cover damage from misuse, neglect or damage from power surges and transient spikes. Warranty does not cover unauthorized modifications to original design.