LUTRON®

Using a Lutron Daylight Control Package in RadioRA 2 and HomeWorks QS

Revision A—06/13

Overview

Daylight control can provide numerous benefits when used in conjunction with a whole home lighting control system. Electric lights can be turned on and off, shades can be opened and closed, and temperature set points can be adjusted automatically based on changes in the amount of natural daylight being detected by the system.

Lutron's Daylight Control Package can be used as a solution to allow RadioRA2 and HomeWorks QS systems to respond to changes in natural daylight levels. The Daylight Control Package integrates with the lighting control system via a dry contact closure input and is comprised of the following 3 items:

- (1) GRX-CES Daylight Sensor *(available in an indoor, outdoor, atrium, and skylight model)*
- (1) GRX-LC8 Controller
- (1) Power Pack

The power pack is used to provide a 24V DC source to power both the daylight sensor as well as the GRX-LC8 controller. The daylight sensor wires directly to the GRX-LC8 controller which provides a dry contact closure output based on the amount of ambient light being detected.

This application note will discuss how to wire the components of the Daylight Control Package, how to calibrate the On and Off set points of the GRX-LC8 controller to open and close the contact closure output, and how to program the lighting control system to respond to the contact closure input received from the GRX-LC8 controller.

Refer to the "Daylight Control Package Specification Submittal Document" for more information on the specifications, installation, wiring, and calibration of the Daylight Control Package components.

Wiring:

1. Wire the input side of the power pack to line voltage (120V or 277V AC) and wire the low-voltage output side of the power pack to the daylight sensor and the GRX-LC8 controller. Connect the 3 wires from the daylight sensor and the 2 wires from the power pack to input terminals 1, 2, and 3 on the GRX-LC8 controller. See Figure 1 below for wiring diagram.

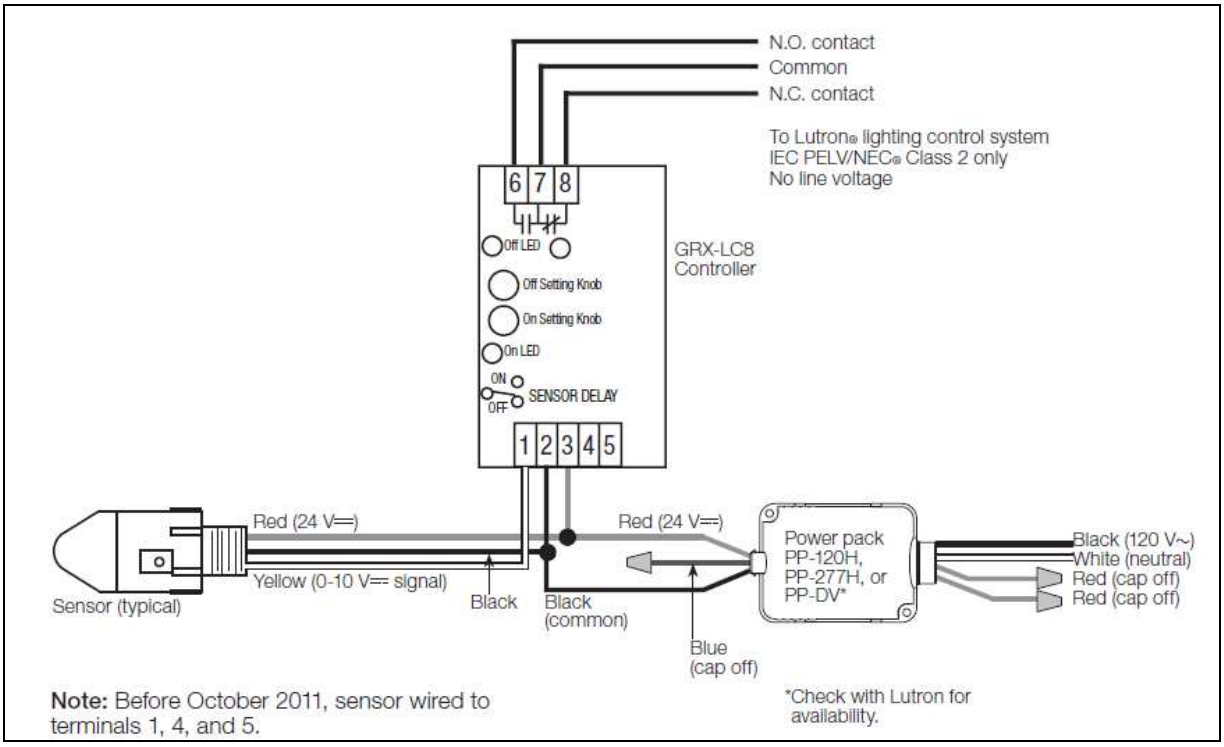

Figure 1

2. Wire the Common output terminal (#7) and the Normally Open contact (#6) from the GRX-LC8 controller to a contact closure input (CCI) of the lighting control system. The Common wire from the GRX-LC8 wires to the Common terminal of a CCI, and the Normally Open wire from the GRX-LC8 wires to one of the CCI terminals of the lighting control system.

   In a RadioRA 2 system the contact closure from the GRX-LC8 controller must be wired to either input 1 or 2 of a Visor Control Receiver (RRD-VCRX). Input 3 of the VCRX is reserved for a security system input and should not be used in this application. In a HomeWorks QS system the contact closure from the GRX-LC8 controller can be wired into any of the following devices:

   - Inputs 1 or 2 of a Visor Control Receiver (HQR-VCRX). *Do not use input #3*
   - Inputs 1 – 5 of a QS wired contact closure input/output interface (QSE-IO)
   - Inputs 1 or 2 on the back of any QS wired keypad (seeTouch, Architrave, Signature Series, GRAFIK Eye).
   - Inputs 1 – 8 of a Wallbox Control Interface (QSE-CI-WCI)

Calibration:

1. Each GRX-CES daylight sensor is calibrated during manufacturing to the light levels in its intended environment (indoor, outdoor, etc). It is critical to choose the correct daylight sensor for the application as each type of sensor has unique foot-candle threshold values. Figure 2 below is a chart of the settings for each sensor. The first column corresponds to the settings on the On/Off adjustment knobs of the GRX-LC8 controller. The other columns correspond to the foot candle thresholds of each type of GRX-CES daylight sensor.
    - GRX-CES**I** = **indoor** daylight sensor
    - GRX-CES**A** = **atrium** daylight sensor
    - GRX-CES**S** = **skylight** daylight sensor
    - GRX-CES**O** = **outdoor** daylight sensor

Adjustment Knob Setting	Corresponding Foot-Candle (fc) Thresholds (based on factory default sensor setting)			
	GRX-CESI	GRX-CESA	GRX-CESS	GRX-CESO
Below 1	0	2	10	0
1	10	100	200	25
2	20	200	400	50
3	30	300	600	75
4	40	400	800	100
5	50	500	1000	125
6	60	600	1200	150
7	70	700	1400	175
8	80	800	1600	200
9	90	900	1800	225
10	100	1000	2000	250

Figure 2

2. Using the chart in Figure 2, adjust the ON and OFF adjustment knobs to calibrate the GRX-LC8 controller to the desired trigger levels of the contact closure output. For proper operation, set the ON knob at least 1 tick mark setting below the OFF knob to create a dead band. See Figure 3 as well as examples below.
    - The **ON** adjustment knob is used to set the level at which the contact closure of the GRX-LC8 controller will **Close**
    - The **OFF** adjustment knob is used to set the level at which the contact closure of the GRX-LC8 controller will **Open**

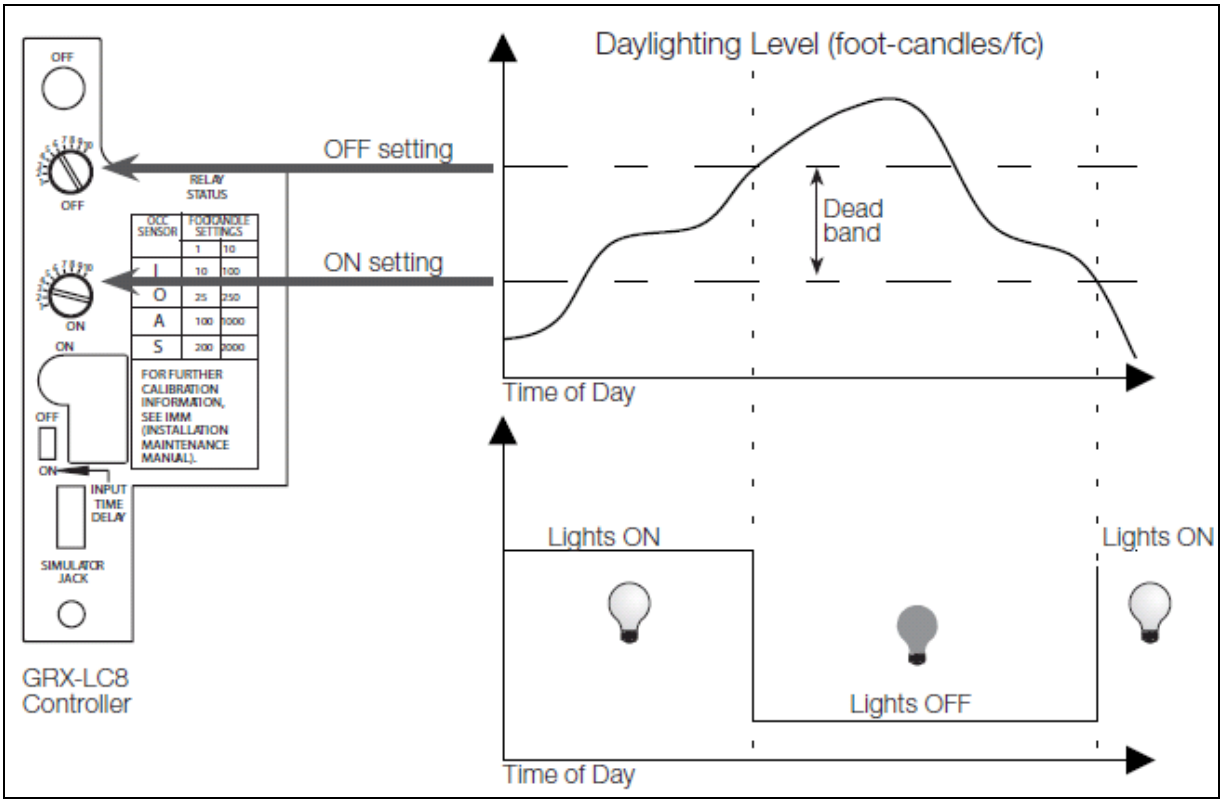

Figure 3

EXAMPLE 1: Using an indoor daylight sensor (GRX-CESI) mounted near a window to automatically exit green mode to save energy when the ambient light level in the room goes below 20 fc and automatically enter green mode when the ambient light level goes above 70 fc.

In this example, referencing the chart in Figure 2, you would want to set the ON adjustment knob to tick mark #2 and the OFF adjustment knob to tick mark #7. You would then wire the Common output and the Normally Open contact closure output from the GRX-LC8 controller to the contact closure input (CCI) of the lighting control system. Refer to the "Programming" section of this app note to determine how to program the CCI of the lighting control system.

EXAMPLE 2: Using an outdoor-mounted daylight sensor (GRX-CESO) to automatically close shades to protect decorative furnishings when the outdoor light level goes above 125 fc and automatically open the shades when the ambient light level goes below 75 fc.

In this example, referencing the chart in Figure 2, you would want to set the ON adjustment knob to tick mark #3 and the OFF adjustment knob to tick mark #5. You would then wire the Common output and the Normally Open contact closure output from the GRX-LC8 controller to the contact closure input (CCI) of the lighting control system. Refer to the "Programming" section of this app note to determine how to program the CCI of the lighting control system.

Programming:

1. Navigate to the "Program" tab in the RadioRA 2 or HomeWorks QS software and select the device that the contact closure from the GRX-LC8 controller is wired to.

2. Follow the steps below to program the contact closure input based on the system and device being used:
    - **a. RadioRA2 using a CCI on the VCRX**
        - i. Select the appropriate input and give the input a unique label name
        - ii. Under the "Input reacts on:" section, select the option for "contact opening and closing (maintained)"
        - iii. Program the "Close" to execute the desired action (i.e. dim lights down, close shades, etc.)
        - iv. Program the "Open" to execute a different desired action (i.e. dim lights up, open shades, etc.)
    - **b. HWQS using a CCI on the VCRX**
        - i. Select the appropriate input and give the input a unique name
        - ii. Set the Button Type to "Dual Action" and set the Closure Type to "Normally Open"
        - iii. Program the "Close" to execute the desired action (i.e. dim lights down, close shades, etc.)
        - iv. Program the "Open" to execute a different desired action (i.e. dim lights up, open shades, etc.)
    - **c. HWQS using a CCI on the QSE-IO**
        - i. Select the appropriate input and give the input a unique name
        - ii. Set the Button Type to "Dual Action" and set the Closure Type to "Normally Open"
        - iii. Program the "Close" to execute the desired action (i.e. dim lights down, close shades, etc.)
        - iv. Program the "Open" to execute a different desired action (i.e. dim lights up, open shades, etc.)

d. HWQS using a CCI on the back of a QS wired keypad

i. Click on the “CCI” tab above the image of the keypad, select the appropriate input on the back of the unit and give the input a unique name
ii. Set the Button Type to “Dual Action” and set the Closure Type to “Normally Open”
iii. Program the “Close” to execute the desired action (i.e dim lights down, close shades, etc.)
iv. Program the “Open” to execute a different desired action (i.e. dim lights up, open shades, etc.)

e. HWQS using an input on the QSE-CI-WCI

i. Select the appropriate button number and the button a unique name
ii. Set the Button Type to “Dual Action”
iii. Program the “Press On” to execute the desired action (i.e. dim lights down, close shades, etc.)
iv. Program the “Release” to execute a different desired action (i.e. dim lights up, open shades, etc.)

Contact Lutron:

Lutron Electronics Co, Inc.
7200 Suter Road
Coopersburg, PA 18036-1299
U.S.A.

Technical Support: 1-800-523-9466
Email: hwsupport@lutron.com