Building Automation, Inc.

Installation and Operation Instructions
DLC-INTPCC
Integrated On/Off Photocell and Controller

General
1. Please read these instructions carefully to prevent any possible injury or equipment damage.
2. Installer must be a qualified and experienced service technician.
3. Verify the product ratings to confirm that this product will satisfy your requirements and application.

Introduction
The DLC-INTPCC automatically switches lighting on and off in response to changes in natural daylight. The low voltage system consists of a control module, a remotely mounted photo conductive sensor, and a Power Cube switcher unit. The DLC-INTPCC is designed to work in series with the existing wall switch and/or circuit breaker.

Installation
1. Controller
When deciding on a location for the control unit, consider that once the unit is installed and calibrated, no further attention of the unit is necessary. It is recommended that the control unit is installed near ceiling height so the wires can route above the ceiling tile. Remove the back mounting plate from the control box by prying off with a screwdriver. Fasten the mounting plate to the wall or ceiling. (with screws and/or the double back tape). Temporarily leave the unit off the mounting plate until other components are installed. For faceplate installation, place faceplate into 2x4 gang box (after wires have been run) and secure with two mounting screws after unit has been set.

2. Powercube Switcher
The Powercube Switcher can be powered by either 120 VAC or 277 VAC. Verify that you have the correct line voltage for your Powercube before any connections are made. The Powercube Switcher can be fixture or junction box mounted. It is desirable to install the cube in the fixture by using the 1/2" knockout hole provided with most fluorescent lighting fixtures. The cube goes on the inside of the fixture and fastens by bending over the clips or screwing on a nut. The low voltage wires (blue, black and red) should now be outside the fixture.

3. Sensor
The sensor is an integral part of the faceplate. Care should betaken to ensure that the controller is mounted so that the sensor views the space to be monitored without possibility of transient objects blocking the sensor's view. In all cases the sensor must be mounted so that it looks at reflected light only and not at any direct light. See figure 1.

Calibration
1. Verify that the input delay timer jumper is removed. (No time delay). This jumper is explained in the next section. See figure 3.
2. Verify that the override pin is removed. (No override). This pin is explained in the next section. See figure 3.
3. Verify that the low and high trimposts are fully counterclockwise.
4. Turn on the input power.
5. Obtain the desired natural light level required to allow the lights being controlled to be turned on. Close blinds, draw shades and turn off other lamps to simulate a lower light level condition.
6. Starting with the low trimpost knob fully clockwise, adjust the bottom knob counterclockwise until the low LED barely lights. This setting will turn on the controlled lights if the natural light level falls below this minimum.
7. Short (touch) the blue low voltage control wire coming from the Powercube Switcher to the exposed junction of the red low voltage wires. This should turn on the controlled lighting circuit. Obtain the desired light level for the lights to turn off. Open blinds and shades to simulate a higher light level condition. The off light level will be brighter than the on light level.
8. Start with the high trimpost fully clockwise. Adjust the high trimpost knob counterclockwise until the high LED just barely lights. You have now set the unit to turn off the controlled lights if the natural light levels gets above this maximum light level. The high setpoint can be increased by adjusting the high trimpost a fraction more in the counterclockwise direction.
9. Disconnect the low voltage blue wire from the junction of the red wires and reconnect the Powercube Switcher blue low voltage wire to the control unit blue wire.

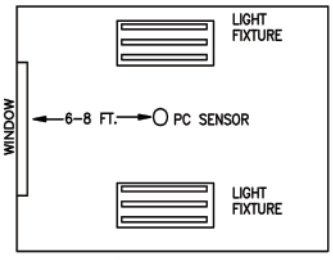

Figure 1
DLC-INTPCC Mounting

Hubbell Building Automation, Inc. • 9601 Dessau Road • Building One • Suite 100 • Austin, Texas 78754
512-450-1100 • 512-450-1215 Fax • www.hubbell-automation.com

10. For outside calibration, both high and low trimpost knobs can be adjusted to the same light level setpoint so that the unit will switch on and off at that natural light level. A deadband zone, as described in the next section, can be added if there is an influence from other electrical light sources.
11. Install the input time delay jumper, (time delay on).
12. Leave the override pin out.
13. The unit is now permanently set and no further adjustments are necessary. A once a year cleaning of the sensor lens will keep the light level settings constant.

Operation

After installation, the DLC-INTPCC will operate without any further attention. This section describes in greater detail the indicator lights, control functions, deadband and sequence of operations.

1. Indicators

The DLC-INTPCC has two indicators. See figure 3. These indicators are defined as follows:

LOW LEVEL SETPOINT LED INDICATOR.

The current light level is below the low setpoint. The low LED will remain latched on until cleared by the high light lever relay.

HIGH LEVEL SETPOINT LED INDICATOR.

The current light level is below the high setpoint. The HIGH LED will remain latched on until the PC-Sensor signal rises above the HIGH setpoint. At that time, both the HIGH and LOW light level indicators will turn off.

2. Control Functions

The control board has a jumper that controls the **INPUT TIME DELAY.** This approximately 15-60 second time delay filters out transient events, such as bright lights, flashes, or temporary shadows. With the jumper in place the input time delay is enabled. Removing the jumper disables the input time delay.

The DLC-INTPCC is also provided with a manual **OVERRIDE PIN** that will turn on and lock on the controlled lighting circuit when it is inserted in the receptacle at the lower right hand corner of the control unit. The pin must be completely removed and stored in a safe place when the unit is operating.

3. Trouble Shooting Guide

PROBLEM: The red LED lights will not light on control unit.
SOLUTION: No power to control unit. Check that the Powercube Switcher is installed correctly and the wall switch and circuit breaker are on.

PROBLEM: Lights will not illuminate.
SOLUTION: No power to lights. With wall switch and circuit breaker on short the low voltage blue lead to the red lead. IF lights work follow the operating instructions. If not, go to Powercube Switcher Unit and again short low voltage blue lead to red lead. If lights work check low voltage wire to control.

PROBLEM: Control unit switches lights on and off rapidly.
SOLUTION: Deadband setpoints too close causing lights to turn off as soon as they turn on. Readjust setpoint as outlined above or slowly and carefully rotate the high adjustment knob a small fraction in the clockwise direction.

PROBLEM: Lights will not come on soon enough.
SOLUTION: Low setpoint too low. Readjust setpoint as outlined above or carefully rotate the low adjustment knob a small fraction in the counter clockwise direction.

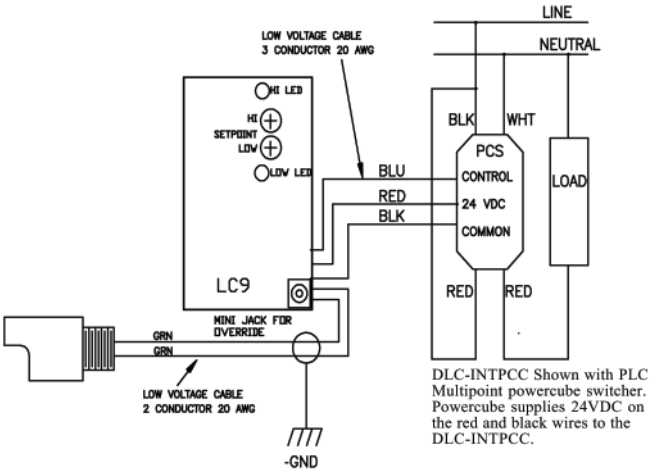

Figure 2
Wiring Connection Diagram

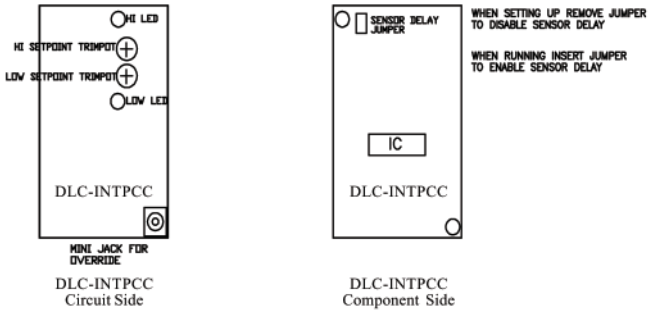

Figure 3
DLC-INTPCC Control Functions

DEADBAND
The DLC-INTPCC control board has 2 set points.

Low light level setpoint: Adjusted by the bottom potentiometer and accompanied by its status indicator LED.

High light level setpoint: Adjusted by top potentiometer and accompanied by its status indicator LED.

The setpoints are set at the level at which the sensor signal will energize and de-energize the output relay. The purpose of having two setpoints is to add stability in an environment where the sensor is exposed to a mixture of natural day light and artificial lighting. The separation between the low and high setpoints is termed a "deadband" because the relay output of the board will not change states in this zone of stability. Thus, the greater the deadband the greater the stability figure 4 shows a typical photoconductive sensor response.

SEQUENCE OF OPERATION
When the light level is below the high or low setpoint the corresponding LED is on. When the light level is above the set point the corresponding LED is off. See figures 5A to 5E.

1. When the light level is in the zone above the high setpoint, the output relay is in its de-energized state. The low and high LED's are both off. See figure 5A.

2. As the light level decreases and passes below the high set-point, the high LED turns on, and the low LED remains off. The light level is in the DEADBAND between the setpoints, so the output relay is de-energized, as it was in Step 1. See figure 5B.

3. When the light level falls below the low SETPOINT, the output relay is energized. Now both the high and low LED's are on. Fig 5C.

4. When the light level rises into the DEADBAND between setpoints, the output relay remains energized. The low LED turns off. Notice the transition from figures 5C to 5D.

5. When the light level rises above the high setpoint, The high LED turns off. Now both high and low LEDs are OFF. The output relay is de-energized. See figure E. Note that the cycle is ready to repeat itself in Figure 5E.

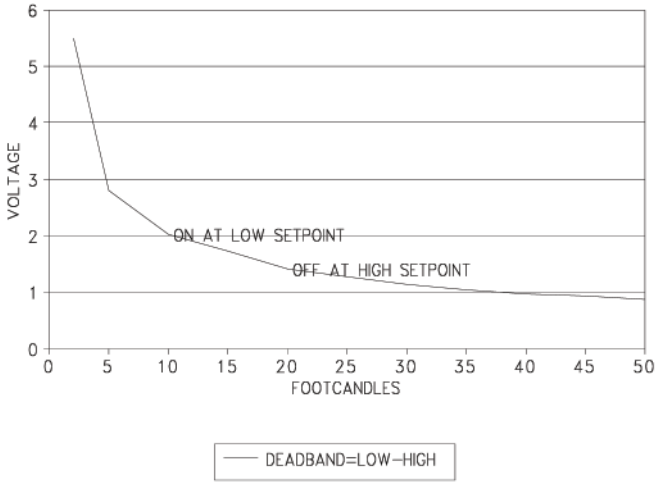

Figure 4
DLC-INTPCC Footcandle vs Voltage

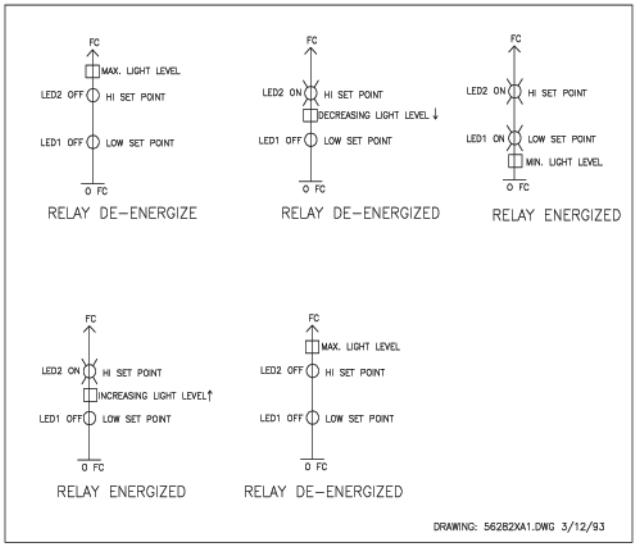

Figure 5
URE Relay Functionality

Hubbell Building Automation, Inc.
9601 Dessau Road • Building One • Suite 100
Austin, Texas 78754
512-450-1100 • 512-450-1215 Fax
www.hubbell-automation.com

72-00292