Line Voltage Switching Photocells
California Title 20/24 Compliant

Cat. Nos. PCC1S, PCC2S

120-277VAC 50/60Hz, No Minimum Load Required

Compatible with electronic and magnetic ballasts, electronic and magnetic low-voltage transformers and incandescent lamps

INSTALLATION INSTRUCTIONS

PK-A3046-10-00-2A

WARNINGS AND CAUTIONS:

- **TO AVOID FIRE, SHOCK, OR DEATH; TURN OFF POWER** AT CIRCUIT BREAKER OR FUSE AND TEST THAT POWER IS OFF BEFORE WIRING!

For Photocells installed to control Emergency Lighting Equipment:

If this equipment is being used for Emergency Lighting and Power Equipment, please adhere to the following information. This equipment is rated for only 25C if used on Emergency Lighting Equipment. Apply the "Emergency Circuits" label (provided) to the front cover.

IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed, including the following:

a) **READ AND FOLLOW ALL SAFETY INSTRUCTIONS.**
b) DO NOT mount near gas or electric heaters.
c) Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
d) The use of accessory equipment not recommended by manufacturer may cause an unsafe condition.
e) DO NOT use this equipment for other than the intended use.

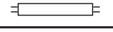
WARNINGS AND CAUTIONS:

- To be installed and/or used in accordance with appropriate electrical codes and regulations.
- If you are unsure about any part of these instructions, consult an electrician.
- Photocells must be mounted on a vibration free surface.
- Do not terminate using data type wire, such as Cat 5/5E.
- Do not touch the surface of the lens. Clean outer surface with a damp cloth only.
- Use this device with **copper or copper clad wire only**.
- **Operating Temperature:** 32˚ to 104˚F (0˚ to 40˚C).

SAVE THESE INSTRUCTIONS

All servicing shall be performed by qualified service personnel. If any Emergency Circuits are fed or controlled from this panel, it must be located electrically where fed from a UPS, generator, or other guaranteed source of power during emergencies and power outage situations.

Operating Temperature: 32˚ to 104˚F (0˚ to 40˚C)

Rating: 6A-6AX 250V   M 720-1440 W/VA 120-240 50Hz

120V 60Hz	8A, Electronic Ballast	230V 50Hz 277V 60Hz	5A, Electronic Ballast
	800W/VA, Tungsten, Ballast		1200VA, Ballast
	1/4 hp		1/3 hp

CATALOG ITEMS

Cat. No.	Description	Voltage Range	Current Consumption	Suggested Mounting Location
PCCxS-00W	Line Voltage Photocell	120-277,50/60Hz	60-30ma	8-20 ft

TOOLS NEEDED TO INSTALL YOUR PHOTOCELL

Slotted/Phillips Screwdriver Small Slotted Screwdriver Cutters Wire stripper

PARTS INCLUDED LIST

Photocell (1) 4" x 4" Mounting Plate (1) #6-32 x 1-1/2" Screw (2)
Low Voltage Connector (1) Tubing Barrier (1)
Emergency Label (1)

GENERAL DESCRIPTION

The Leviton Line Voltage Photocell is a Self Contained Daylight Harvesting System, ideal for spaces with windows like corridors, bathrooms, airport lobbies and conference rooms. The product integrates the function of a power pack and a photocell. Features include Manual and Auto-Calibration, Demand Response, Manual Switch and Emergency Inputs and Open and Closed Loop Daylight Harvesting. The photocell conserves energy usage by switching off the lights when sufficient light is present.

This product is designed to meet the new Industry Standards of Energy Conservation.

INSTALLING YOUR PHOTOCELL

NOTE: Use check boxes ☑ when Steps are completed.

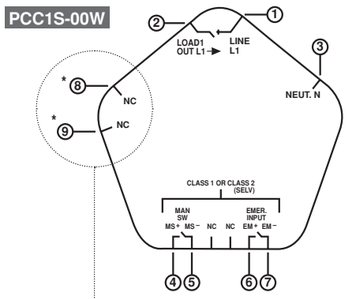
Step 1

WARNING: TO AVOID FIRE, SHOCK, OR DEATH; TURN OFF POWER at circuit breaker or fuse and TEST that power is off before wiring!

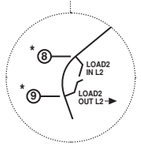
Step 2

Identifying your wiring:

PCC1S-00W



1. Line IN - L1
2. Load OUT - L1
3. Neutral - N
4. Manual Switch +
5. Manual Switch –
6. Emergency Interface +
7. Emergency Interface –

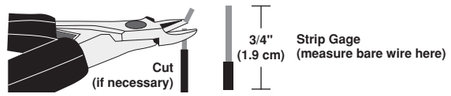


PCC2S-00W

*** 8.** Load 2 IN - L2 (PCC2S ONLY)
*** 9.** Load 2 OUT - L2 (PCC2S ONLY)

Step 3

Preparing and connecting wires:



- Make sure that the ends of the wires from the electrical box are **straight (cut if necessary)**.
- Remove insulation from each wire in electrical box as shown.
- Wire Specifications:
  Line, Neutral, Load Wires (Copper)
  Wire range: #12-18 AWG, 3.3 - 0.75 mm square - **Torque rating:** 20 lb-in, 23 kgf-cm.
  Control Wires (Manual Switch & Emergency Interface)
  Wire range: #16-26 AWG, 4.0 - 0.12 mm square - **Torque rating:** 2.5 lb-in, 2.88 kgf-cm.

Step 4

Installing your Photocell:

Connect wires per appropriate **WIRING DIAGRAM** as follows:

1. Insert wires into proper terminals. Use a screwdriver to turn terminal screws clockwise and secure wires.
   a) Line wire(s) to Line terminal(s).
   b) Neutral wire to Neutral terminal.
   c) Load wire(s) to Load terminal(s).
   d) Manual Switch, Emergency Interface Input wires to their respective marked terminals.
   NOTE: Use Class 2 wires for the Manual Switch and Emergency Interface Input connections and cover the wires with the provided tubing for insulation inside the junction box.

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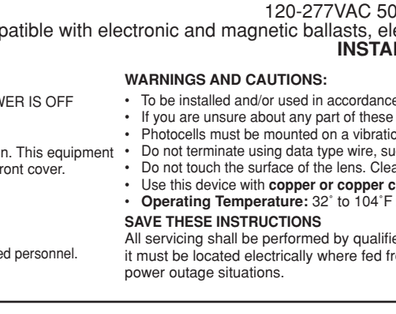


PCC2S-00W

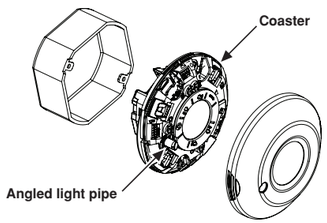
Step 5

Mounting your Photocell:

To mount inside 4" octagon 2.125" deep ceiling electrical box, refer to **Figure 1**.

- Dress line voltage wires to provide enough clearance in electrical box when device is installed.
- Cover Class 2 wires with provided tubing barrier.
- Partially thread two #8-32 screws (not included) into the mounting holes of the electrical box.
- Pull out the two coasters that align with the two screws.
- Align photocell so that it fits between the mounting holes of the electrical box and insert over mounting screws.
- Push in the two coasters that align with the two screws.
- Tighten mounting screws firmly.

Figure 1

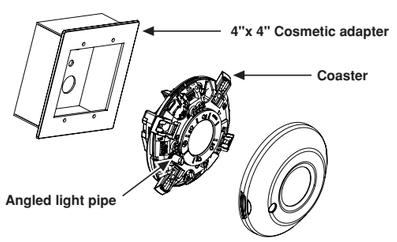


Mounting Photocell in a 4" square box with mud ring:

To mount inside 4" square 1.5" deep ceiling electrical box with mud ring, refer to **Figure 2**.

- Ensure that conduit/cable entry clamp is located in corner of electrical box.
- Dress line voltage wires to provide enough clearance in electrical box when device is installed.
- Cover Class 2 wires with provided tubing barrier.
- Install a two-gang mud ring (not included) on electrical box.
- Partially thread the two #6-32 screws provided into the mounting holes of the electrical box.
- Pull out the two coasters that align with the two screws.
- Align photocell so that it fits between the mounting holes of the electrical box and insert over mounting screws.
- Push in the two coasters that align with the two screws.
- Tighten mounting screws firmly.

Figure 2



CALIBRATION

After the photocell is installed, it must be configured correctly to maintain the desired light level (DDL) and to gain energy savings. To achieve this, the installer first needs to understand Closed and Open Loop daylight harvesting, and then decide which application best fits the customer's needs before configuring and calibrating the device.

- **Open Loop:** When a photocell (light pipe) is focused on an area which is primarily illuminated by natural light from windows or skylights, in addition to the amount of artificial light from the lights it is controlling.
  NOTE: The angled light pipe is used for Open Loop applications only and must be rotated so that the longer side is facing the natural light source/window **(see Figure 4A)**. Open Loop MUST be used only with Manual Calibration mode. The photocell will not enter Automatic Calibration mode if Open Loop Daylight Harvesting is selected.
- **Closed Loop:** When the center photocell is focused on an area which is primarily illuminated by the lights it is controlling. Closed Loop can be used with Manual or Auto Calibration mode.
  NOTE: The flat lens is used for Closed Loop applications.

Please allow a 15 second warm up period after applying power to the photocell. For best calibration results, personnel should maintain at least a 6 foot distance from the device during Auto and Manual Calibration. If the light level falls below 10 lux during calibration, that calibration will fail and the LED will be solid BLUE. The device enters Off Mode when this occurs. **NOTE:** Changing the state of B5 (Daylight Harvesting DIP switch) during or after calibration will put the device in Off Mode with solid Blue LED. The device will require calibration.

Off Mode: The photocell is disabled in Off Mode. This is the factory default setting. The device must be in Off Mode before calibration can be started. To enter Off Mode, turn the Blue dial to SET/OFF for longer than 5 seconds. Entering Off Mode will cancel calibration.

Manual Mode: Available for both Open and Closed Loop applications to quickly configure the Daylight Design Level (DDL). Calibration should always be done when ambient light is at user's desired level.

Manual Calibration Procedure – Open/Closed Loop:

1. Move DIP switch B5 to ON for Open Loop or to OFF for Closed Loop.
2. Turn the Blue dial fully counterclockwise to SET/OFF for 2 seconds (a solid Red LED will indicate that manual calibration has started). Then turn the dial to the desired multiplier value (preferably 1X).
3. Re-install photocell cover.
4. Lights are forced ON for 2 min (closed loop)/4 min (open loop). With solid Red LED.
5. When the 2/4 minutes have elapsed, the LED blinks Red for an additional 3 minutes. The DDL can be adjusted by turning the Blue dial.
   NOTE: The LED blinks BLUE when the dial setting has changed.
6. When manual calibration is complete, the LED will resume normal operation. The device is now operating in Manual Mode.

Auto Mode: Auto mode is available ONLY for Closed Loop applications to configure the DDL in 24 hours. The photocell will not enter Auto Calibration Mode if Open Loop Daylight Harvesting is selected.

Auto Calibration Procedure – Closed Loop Only:

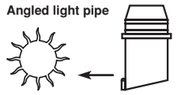
1. Move DIP switch B5 to OFF position.
2. Turn the Blue dial fully clockwise to AUTO (a solid Green LED will indicate that auto calibration has started).
3. Re-install photocell cover.
4. Auto calibration will complete in 24 hours and the LED will resume normal operation. The device is now operating in Auto Mode.

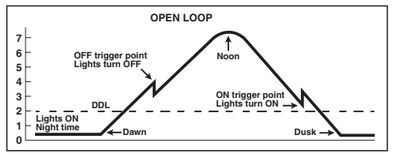
PHOTOCELL OPERATION

- To prevent unnecessary switching, there is a fixed hysteresis around the DDL which defines the ON and OFF thresholds. Also, the off time delay can be adjusted from 3-30 minutes (black time knob), and the time delay for lights to turn on is fixed at 1 minute.
- After the device is calibrated, the blue photocell knob can be used to adjust the DDL multiplier. In order to make quick adjustments to the DDL, the OFF and ON switching delays will be reduced to 30 seconds when the photocell knob is changed (indicated by a BLUE LED blink). The reduced delays will be in effect for 2 minutes after the last knob change. The LED will blink YELLOW during the 2 minutes.
- To disable the photocell or cancel calibration, turn the blue photocell knob to SET/OFF.
- Daylighting state can be overridden to the Forced-ON or Forced-OFF state using the manual switch **(see MANUAL SWITCH INPUT)**.
- **Open Loop**
  The graph in **Figure 4A** tracks the light level throughout a day. It is assumed that it is a cloudless day so the increase of the daylight is relatively linear. The far left of the graph starts out at night and shows a very low-level reading. At dawn, the level begins to increase. At some point, based on the setting of the trigger point, the lights will be turned OFF since there is enough contribution from the daylight. The photocell reading will begin to decrease around Noon until the level matches the trigger point, then lights will be turned back ON.

Figure 4A

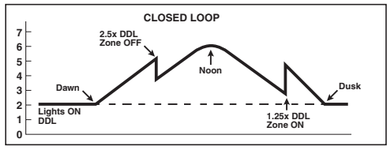
NOTE: Long side of **angled light pipe** must face toward natural light source (window).





- **Closed Loop**
  The graph in **Figure 4B** tracks the value of a linear photocell throughout a day. It is assumed that it is a cloudless day and that the desired light level is the same level without external light influence and only by the fixture(s). At the far left, the lights are ON because there is no contribution from daylighting. As dawn arrives, the photocell level begins to increase as the daylight increases. In order to keep the light level from dropping below the trigger point, and in this case below the desired light level in the area (DDL), the trigger point is set to 2.5 times the level read with only the fixture(s). That way, the light is still adequate to hold the lights OFF. This is shown in the graph at the point where the level suddenly drops. The photocell level then continues to increase until around Noon. As the daylight decreases, the area light eventually drops to near the desired light level. Before reaching this point, the lights are turned back ON, indicated by the sudden increase in the photocell level.

Figure 4B



- **Bi and Tri-Level Step Dimming**
  The following **figures (4C, 4D)** display light level throughout the day for the Bi and Tri-Level step dimming applications.

Figure 4C

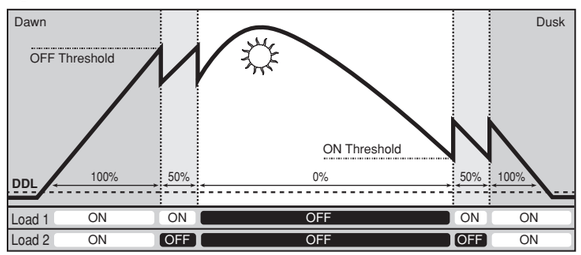
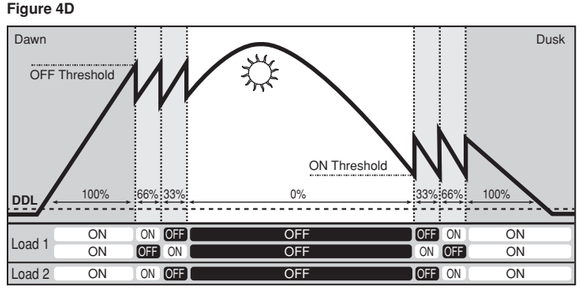


Figure 4D



DEVICE STATES

Daylighting: Light(s) state and dim level controlled by photocell.
Forced ON: Light(s) forced-ON at full brightness, for 2 hours due to manual switch override. After the 2 hours, the device will enter daylighting state.
Forced OFF: Light(s) forced-OFF due to manual switch override.

MANUAL SWITCH INPUT

- Single Press: Toggles between Daylighting and other states.
- Double Press*: Toggles between Forced-ON and Forced-OFF.
***** Two momentary switch presses must occur within 1.5 seconds.

	Daylighting		Forced-OFF		Forced-ON
	Load(s) ON	Load(s) OFF	Light Needed	Light Not Needed	
Single Press	Forced-OFF	No change	Daylighting: Load(s) ON	Daylighting: Load(s) OFF	Daylighting: Load(s) ON
Double Press	Forced-ON	Forced-ON	Forced-ON		Forced-OFF

LED INDICATORS

COLOR	STATE	WHEN
RED	Solid 2/4 min	Manual calibration start
	Blink 3 min	Manual calibration
	Solid	Device failure
GREEN	Solid 24 hr	Auto calibration
BLUE	*Blink 1x/30s	PC hold off mode
	*Blink 2x/30s	Manual switch override
	*Blink 3x/30s	Demand Response active
	Blink	Dial setting change
	Solid	Failed calibration
YELLOW	Solid	Emergency mode
	Blink	Test mode
	*Blink 5s	PC off mode

*** Disabled if B4 set to ON**

MODES OF OPERATION

Mode 1 - **Daylighting**
Loads switch ON/OFF depending on daylight contribution.

Mode 2 - **Bi-Level Step Dimming: Alternate**
Both loads switch ON (100%) when there is insufficient natural light. As natural light increases above the DDL, loads 1 and 2 alternate between ON and OFF (50%). Loads 1 and 2 switch OFF (0%) when natural light is sufficient. The reverse operation occurs as natural light decreases.

Mode 3 - **Bi-Level Step Dimming: Load 1 Primary**
Both loads switch ON (100%) when there is insufficient natural light. As natural light increases above the DDL, load 2 switches OFF first (50%). Load 1 switches OFF (0%) when natural light is sufficient. The reverse operation occurs as natural light decreases; load 1 switches ON first (50%).

Mode 4 - **Tri-Level Step Dimming**
Both loads switch ON (100%) when there is insufficient natural light. As natural light increases above the DDL, load 2 switches off (66%). As natural light continues to increase, load 2 switches ON and load 1 switches OFF (33%). Loads 1 and 2 switch OFF (0%) when natural light is sufficient. The reverse operation occurs as natural lights decreases.

DEMAND RESPONSE OPERATION

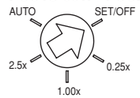
Red Dial Setting	0-24%	25-50%		51-76%		77-100%
Mode 2&3	All Loads OFF	Load 1 ON	Load 2 OFF	Load 1 ON	Load 2 OFF	No Change
Mode 4		Load 1 OFF	Load 2 ON			

NOTE: In Mode 1 Demand Response is not active.

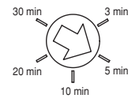
SETTINGS

Default Settings:
Adjust dial settings as per "recommended manual settings," **(refer to Figures and Tables)**.

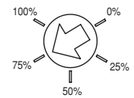
PCC1S-00W / PCC2S-00W



Photocell (Blue dial)



Delayed Off-Time (Black dial)



Demand Response (Red dial)

DIP SWITCHES

PCC1S-00W

Bank	Switch Function	OFF	ON
B1	–	–	–
B2	Power-Up Restore	Disabled	Enabled
B3	Test Mode	Disabled	Enabled
B4	LED Disable	Disabled	Enabled
B5	Daylight Harvesting	Closed Loop	Open Loop

PCC2S-00W

Mode	Bank	Switch Function	OFF	ON
1	A1	Daylighting	X	
	A2			X
2	A1	Bi-Level Step Dim. Alt.		X
	A2		X	
3	A1	Bi-Level Step Dim. RL1 Prim.		X
	A2			X
4	A1	Tri-Level Step Dim.	X	
	A2		X	
N/A	A3	Lamp Burn-In Mode	Disabled	Enabled
N/A	A4	–	–	–

Bank	Switch Function	OFF	ON
B1	External Input Select	Manual SW	Demand Response
B2	Power-Up Restore	Disabled	Enabled
B3	Test Mode	Disabled	Enabled
B4	LED Disable	Disabled	Enabled
B5	Daylight Harvesting	Closed Loop	Open Loop

ADDITIONAL FEATURES

Daylight Harvesting: Once the photocell is calibrated the device will do Automatic Daylight Control Based on Open or Closed Loop selection.

Lamp Burn-In Mode: When active, forces the load(s) ON, for seasoning fluorescent lights. Typically this is done for ~100 hours. Consult lamp manufacturer for specifics. **NOTE:** To exit the burn-in mode A3 switch must be set to OFF **(PCC2S only)**.

External Input Select: Selects functionality of the external input: manual switch or demand response **(PCC2S only)**.

Power-Up Restore: If enabled, the load(s) will be switched off upon power-up if the manual switch was previously used to turn the load(s) off (Forced-OFF). External Input Select must be set to manual switch for this setting to be functional.

Test Mode: When enabled, the Off-time will be set to 30 seconds for 60 minutes.

Demand Response: Accepts a low voltage contact closure input. When Demand Response is active the maximum allowable step-dimming level is set to the value selected by the red Demand Response dial **(PCC2S only - see Demand Response Operation table)**.

Emergency Interface: Accepts a low voltage contact closure input. When the Emergency input is active the load(s) will be forced ON.

Manual Switch: Accepts a low voltage contact closure input for a toggle or momentary switch.

Photocell Range: 1- 16,000 Lux.

DIALS

Photocell (Blue dial) - Used for photocell calibration
Off-Time (Black dial) - Sets switching delay before lights turn OFF
Demand Response (Red dial) - Sets Demand Response OFF level

TROUBLESHOOTING

- **Lights do not turn ON**
  - Circuit breaker or fuse has tripped.
  - Photocell is in forced off mode **(see LED Indicators Table)**.
  - Photocell is in override mode **(see LED Indicators Table)**.
- **Lights stay ON**
  - If the lights stay ON when enough light is present check your wiring and setting.
  - Poor photocell placement/bad calibration (Ensure proper installation and recalibrate).
  - Photocell is not calibrated (Yellow LED blink 5 seconds ON, 5 seconds OFF.
  - Photocell is in failed calibration mode (Blue LED is solid ON).
  - Lamp Burn-in mode is enabled.
  - Photocell is in 2 hour forced on mode.
  - LED illuminates solid Red for longer than 5 minutes, device malfunction, contact technical assistance **(Product Information)**.

PRODUCT INFORMATION

- For technical assistance, contact us at ***1-800-824-3005***
- Visit our website at ***www.leviton.com***

FCC COMPLIANCE STATEMENT

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device must not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation. Any changes or modifications not expressly approved by Leviton could void the user's authority to operate this equipment.

FOR CANADA ONLY

For warranty information and/or product returns, residents of Canada should contact Leviton in writing at **Leviton Manufacturing of Canada Ltd to the attention of the Quality Assurance Department, 165 Hymus Blvd, Pointe-Claire (Quebec), Canada H9R 1E9** or by telephone at **1 800 405-5320.**

LIMITED 5 YEAR WARRANTY AND EXCLUSIONS

Leviton warrants to the original consumer purchaser and not for the benefit of anyone else that this product at the time of its sale by Leviton is free of defects in materials and workmanship under normal and proper use for five years from the purchase date. Leviton's only obligation is to correct such defects by repair or replacement, at its option. **For details visit www.leviton.com or call 1-800-824-3005.** This warranty excludes and there is disclaimed liability for labor for removal of this product or reinstallation. This warranty is void if this product is installed improperly or in an improper environment, overloaded, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions or not in accordance with any labels or instructions. **There are no other or implied warranties of any kind, including merchantability and fitness for a particular purpose**, but if any implied warranty is required by the applicable jurisdiction, the duration of any such implied warranty, including merchantability and fitness for a particular purpose, is limited to five years. **Leviton is not liable for incidental, indirect, special, or consequential damages, including without limitation, damage to, or loss of use of, any equipment, lost sales or profits or delay or failure to perform this warranty obligation**. The remedies provided herein are the exclusive remedies under this warranty, whether based on contract, tort or otherwise.

This product may be covered by US Pat. Nos. 8,227,731 and 7,608,807