SENSORWORX®

DAYLIGHT HARVESTING & ON/OFF PHOTOCELL SENSORS

0-10V DIMMING • LINE VOLTAGE • CEILING MOUNT

INSTALLATION & OPERATION INSTRUCTIONS

MODELS

CATALOG NUMBERS	DESCRIPTIONS
SWX-250-2	ON/OFF PHOTOCELL SENSOR LINE VOLTAGE, CEILING MOUNT
SWX-250-2-D	DAYLIGHT HARVESTING SENSOR 0-10V DIMMING, LINE VOLTAGE, CEILING MOUNT

ADDITIONAL OPTIONS

- **HE:** High Humidity Environment

OVERVIEW

Basic on/off photocell units are capable of directly switching lights off when ambient levels are high enough that desired overall light levels will be still be maintained. Lights will be switched back on once ambient level falls below the desired setpoint.

Units with the daylight harvesting (dimming) option track a space's overall illumination and dim connected lighting to achieve energy savings. During times of high daylight contribution to a space, controlled artificial lighting will be gradually dimmed to a minimum dimmed level. During times of no or low daylight contribution, controlled artificial lighting will increase back up to its maximum level. The sensor can also be configured to switch lighting off completely in maintained high daylight conditions. Additional configurable parameters include high & low trim levels and fade rates.

All photocells provide the option of selecting the ambient light threshold (e.g., setpoint) from a range of preset values or running an auto-selection mode where the unit will determine the setpoint based on the measured amount of light it is controlling.

FEATURES

- **Auto-Setpoint Selection Mode**
- **On/Off Control and/or Daylight Harvesting (Dimming)**
- **Adjustable High & Low Dimming Trim Level**
- **Adjustable Off Modes and Fade On/Fade Off Times**
- **Electronically Timed Switching Designed for LED Fixture Control**
- **Compact Size and Matte Finish**

SPECIFICATIONS

ELECTRICAL

OPERATING VOLTAGE
MVOLT (120-277 VAC)

LOAD RATINGS
800W @ 120 VAC
1200W @ 277 VAC

LOAD TYPES
Tungsten
Ballast
LED

DIMMING CAPACITY
50mA

DIMMING COMPATIBILITY
0-10 VDC Ballasts or Drivers
Compliant with IEC 60929 Annex E.2

PHYSICAL

SIZE
4.00" Diameter x 1.25" H
(10.16 x 3.17 cm)

WEIGHT
4.75 oz

COLOR
White

ENVIRONMENTAL

OPERATING TEMP
32°F to 122°F (0°C to 50°C) - Standard
-40° F/C (with **-HE** Option)

RELATIVE HUMIDITY
0-95% Non-Condensing, Indoor Use Only

OPERATION

Daylight Harvesting to Low Trim
Daylight Harvesting to Off
Photocell Override (On/ Off)

CODE COMPLIANCE

Sensors can be used to meet ASHRAE 90.1, IECC, & Title 24 energy code requirements

OTHER

LISTINGS
UL/CUL

c UL US LISTED

MADE IN THE USA

TAA COMPLIANT

BAA COMPLIANT

LEAD FREE RoHS COMPLIANT

TITLE 20 LISTED TITLE 24 COMPLIANT

DAYLIGHT SENSOR PLACEMENT

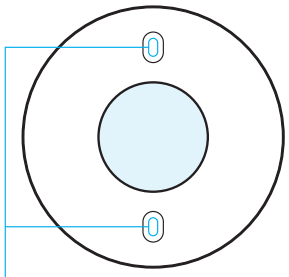
Typically, a daylight harvesting sensor should be located in the intermost area of a daylighting zone. This assures that the setpoint is maintained at a minimum across the entire daylight zone. Additionally, the lights being controlled should be visible from the sensor as this will improve the tracking accuracy. This is referred to as close loop operation. Using the sensor where it is not able to monitor the lights it is controlling (i.e. open loop operation) will result in lights being either at full bright level or full dim level, but no levels in between. Placement directly above indirect lighting fixtures is not recommended.

INSTALLATION OPTIONS

- Designed to mount to a mud ring w/ 2.75" spaced ears, screws provided.
- Also fits a 3.5" trade size octagon box.
- Note a 4.0" octagon box requires a mudring or a model #SWX-299 trim ring (see below diagrams).

BASIC MOUNTING OPTIONS

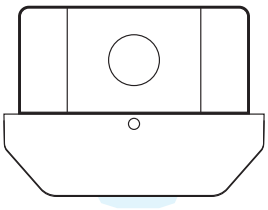
FRONT



SCREW HOLES FOR DIRECTLY MOUNTING TO:
- CEILING SURFACE
- 3-1/2" (TRADE SIZE) OCTAGON BOX
- MUD RING WITH 2-3/4" SPACED EARS

SIDE

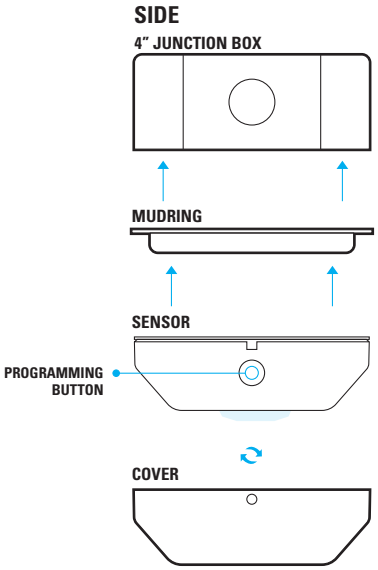
3.5" TRADE SIZE OCTAGON JUNCTION BOX



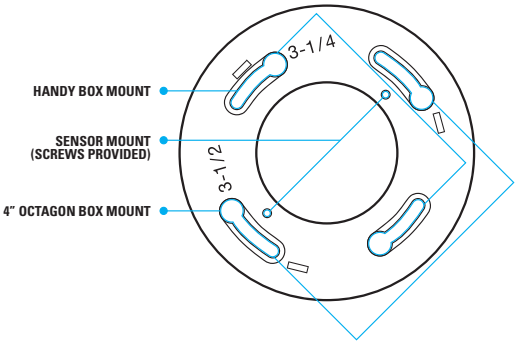
SENSOR MOUNTED DIRECTLY TO 3.5" TRADE SIZE OCTAGON BOX

SIDE

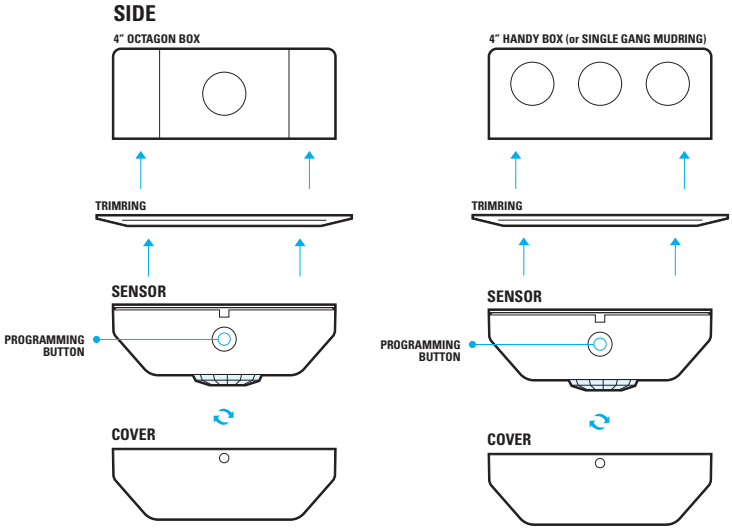
4" JUNCTION BOX



ADDITIONAL MOUNTING OPTIONS USING SWX-299 TRIM RING

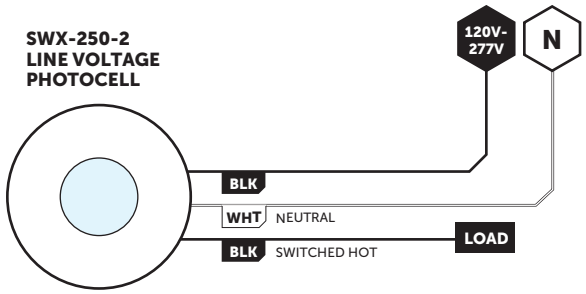


SIDE

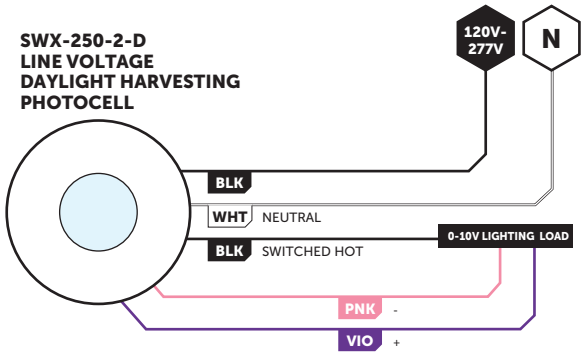


WIRING

ON/OFF PHOTOCELL APPLICATION



DAYLIGHT HARVESTING APPLICATION



WIRING NOTES

- If wiring in an additional toggle switch for override off control, connect between the sensor and the load.
- For supply connections, use wires rated for at least 75°C or equivalent.

WARNING: TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE WIRING

TESTING & TROUBLESHOOTING

PHOTOCELL MOUNTING

Do not mount sensor such that it is directly viewing into the lights it is controlling. This will cause the measured level of controlled/artificial light to be extremely high, thus preventing the sensor from ever turning lights off from ambient light.

FACTORY RESET

To restore factory settings, press and release the pushbutton 8 times, wait 2 seconds, then press and release the pushbutton 3 times again. The unit will flash back 3 sets of 3 white blinks followed by a rapid double flash indicating a successful reset.

DAYLIGHT HARVESTING & PHOTOCELL CONFIGURATION

ON/OFF PHOTOCELL CONTROL

- Recommended for public spaces (hallways, entryways, etc) where fully switching lighting off/on will not be noticed .
- Photocell will switch lights off if ambient light level surpasses threshold and back on if level drops.
- To prevent cycling of lights back on after lighting is turned off, a "deadband" level equal to the measured level of light being controlled is continuously maintained in the unit. For lighting to turn off the ambient light level must be higher than the sum of the setpoint and the deadband.

DAYLIGHT HARVESTING CONTROL (DIMMING)

- Recommended for spaces where it is important to not distract occupants (e.g., offices, classrooms).
- Unit will gradually dim lighting in order to maximize energy savings while maintaining desired overall lighting level.
- After dimming to low trim level, unit can optionally be enabled to turn off lights completely.

ON ON/OFF PHOTOCELL OPERATION NOTES

- During periods of occupancy, when the measured light level is high enough for 5 min. such that turning the lights off will not drop the level below the selected setpoint, the sensor will turn connected lighting off.
- During this 5 min. transition time the LED will blink blue at 0.5 second intervals.
- After lights are turned off, the sensor's LED double blinks blue every 15 seconds as an indication that sufficient ambient light is the reason the lights are being held off.
- If the ambient light level falls below the setpoint for more than 30 seconds, lights will switch back on. During this transition time the LED also will blink blue at 0.5 second intervals.

FUNCTION #4 - PHOTOCELL SETPOINT

The minimum overall light level that is to be maintained in a space by the sensor is referred to as the "setpoint". This value is user selectable or can be chosen by the Auto-Setpoint function that is built into the sensor.

SETPOINT CONFIGURATION

1. Read through the below setpoint values list and note the number of the desired setpoint (e.g., default is 7 = 25 fc).
2. Press and release the unit's pushbutton 4 times, then wait 2 seconds.The LED will blink back the value of the current setting in two alternating digits:
   Blue LED = 10's digit (1-12 blinks or rapid blink for 0)
   White LED = 1's digit (1-9 blinks or rapid blink for 0)
3. At any time after blinking starts, enter number of new setting (from Setpoint Value Table).
4. New setting is saved after white LED blinks new setting back 3 times. If blue LED double flashes at any time, an error condition exists and process must be repeated.

FUNCTION #4 - SETPOINT VALUE TABLE

SETTING #	DESCRIPTION	
2	Run Auto-Setpoint*	
3	2.5 fc	Manual Setpoint Options
4	5.0 fc	
5	10.0 fc	
6	15.0 fc	
7	25 fc (default)	
8	35 fc	
9	50 fc	
10	75 fc	
11	100 fc	

***AUTO-SETPOINT SELECTION DETAILS**

A Once setting 2 "Run Auto-Setpoint" has been selected (by following above steps 1-4), the sensor's LED will alternate blue and white for 30 seconds. During this time user should move away from sensor.

B Lights will then be cycled in order for sensor to calculate the controlled (artificial) light level. This is done by subtracting the light level with the lights off (relay open) from the light level with the lights on (relay closed).

C A setpoint will then be chosen using the following conditions:
- If controlled level is less than 3 fc, the application is considered open loop and the setpoint will be set to 25 fc.
- If controlled level is between 3 and 100 fc, setpoint will be set to that level times 1.25.
- If controlled level is greater than 100 fc the setpoint will be set to 125 fc.

D Unit will immediately start operating with new setpoint (i.e. blue LED may begin flashing indicating it will transition lights soon)

E To check auto selected setpoint, press and release button 4 times. Setpoint will be blinked back in two alternating digits:
Blue LED = 10's digit (1-9 blinks or rapid blink or 0)
White LED = 1's digit (1-9 blinks or rapid blink or 0)

DIMMING CONFIGURATION SETTINGS

CHANGING DETAILED DIMMING SETTINGS

The settings listed in the below function tables can be adjusted using the following programming procedure.

1 From the below tables of detailed functions, note the number (#) of the function to be modified. For example, the **HIGH TRIM** setting is #9.

3 To access a particular function, press and release the programming button the number of time of the chosen function. For example, press the button 9 times to access the **HIGH TRIM** function.

4 The LED will flash back white the setting number of the current value as it appears in each function's detailed table below. For example, the default **HIGH TRIM** is setting #2 (10V)

5 To change the setting number, press and release the button the number of times equal to the new setting #. For example, 3 times (for 9V).

6 The LED will flash back white the new setting number as confirmation and will be saved after three confirmations. If LED double flashes blue at any time, start process over.

DETAILED DIMMING FUNCTION TABLES

FUNCTION #5 - TURN OFF SCHEME

The method by which a sensor with daylight harvesting (dimming) turns off connected lighting.

SETTING #	VALUES	NOTES
2	Drop to Off	Dimming output drops to low trim level & relay opens.
3	Fade to Off (defautl)	Dimming output fades to low trim & relay opens.
4	Fade to 0V	Dimming output fades to low trim level and then drops to 0 volts (e.g. below a connected driver's electronic off level). Unit's relay remains closed.
5	Fade to Low Trim	Dimming output fades down to low trim level. Unit's relay remains closed.
6	Drop to Low Trim	Dimming output drops down to low trim level. Unit's relay remains closed.
7	Drop to 0V	Dimming output drops to 0 volts (e.g. below a connected driver's electronic off level. Unit's relay remains closed.

FUNCTION #9 - HIGH TRIM

The maximum voltage to which the sensor is allowed to raise its dimming output in the full bright state.

SETTING #	VALUES		NOTES
2	~10 VDC	(default)	
3	~9 VDC		Light output at each voltage level depends on driver/ballast and luminaire.
4	~8 VDC		
5	~7 VDC		
6	~6 VDC		
7	~5 VDC		

FUNCTION #10 - LOW TRIM

The minimum voltage to which the sensor is allowed to reduce its dimming output when measuring high levels of ambient light (or when unoccupied in an Occupancy - High/Low operational mode).

SETTING #	VALUES		NOTES
2	~0 VDC		
3	~1 VDC		Light output at each voltage level depends on driver/ballast and luminaire.
4	~2 VDC		
5	~3 VDC	(default)	
6	~4 VDC		
7	~5 VDC		

FUNCTION #11 - FADE OFF TIME

Adjustable time interval for lights to ramp down to off (or low trim).

SETTING #	VALUES	
2	0.75 Sec	
3	1.5 Sec	(default)
4	3 Sec	
5	5 Sec	
6	15 Sec	
7	Disabled	

FUNCTION #12 - FADE ON TIME

Adjustable time interval for lights to ramp up when sensor is in the occupied state.

SETTING #	VALUES	
2	0.75 Sec	
3	1.5 Sec	(default)
4	3 Sec	
5	5 Sec	
6	15 Sec	
7	Disabled	