



**SENSORWORX®**

# PARTIAL OFF/ON POWER PACK w/STEPPED DIMMING (0-10V)

INSTALLATION & OPERATION INSTRUCTIONS

CATALOG NUMBERS	DESCRIPTIONS
SWX-900-AX-D2	POWER PACK WITH AUXILIARY SWITCH INPUT & STEPPED DIMMING OUTPUT (0-10V) - PARTIAL OFF/ON OPERATION
SWX-999	LOW VOLTAGE WIRING CHAMBER
<b>ADDITIONAL UNIT OPTIONS</b>	
- <b>HE:</b> High Humidity Environment	

## OVERVIEW

**SENSORWORX** stepped dimming power packs enable partial off and partial on sequences of operation. When in partial off mode, connected lighting is dropped to 50% dim level when occupancy is no longer present, but is never switched off. When in partial on mode, power to the connected lighting load is switched on to the 50% level when signaled by an occupancy sensor. The unit will then raise lighting to the 100% level when a connected switch is pressed. Lighting will turn off if another switch press is detected or when all connected sensors go to their unoccupied state. Additionally, the packs transform incoming line voltage power to Class 2 low voltage as needed by sensor(s) or low voltage switches.

## FEATURES

- 0-10V Stepped Dimming Output for Partial Off or Partial On Operation
- Switch Input for Stepping Between Levels, Manual On, Hold On, or Hold Off Operation
- Powers Low Voltage Sensors
- Switches Line Voltage Loads
- Electronically Timed Switching Ensures Long Relay Life
- Integrated Test/Programming Button
- Optional Snap-On Attachment Provides Chamber for Low Voltage Wire Connections
- Plenum Rated (UL 2043)

## SPECIFICATIONS

### ELECTRICAL

#### OPERATING VOLTAGE

120/277 VAC

#### CLASS 2 OUTPUT RATINGS

18 VDC, 150 mA

Connected device power: 80 mA

#### RELAY CURRENT REQS

55 mA

#### LOAD RATINGS

20A @ 120 V -

General Purpose Plug Load

20A @ 120/277 VAC -

General Purpose, Tungsten, Magnetic Ballast

16A @ 120/277 VAC -

Electronic Ballast, LED Driver

#### DC LOAD RATINGS

20A @ 28 VDC (MAX)

1A @ 5 VDC (MIN)

#### DIMMING LOAD

50mA, (0-10 VDC ballasts or drivers

compliant with IEC 60929 Annex E.2)

#### MOTOR LOAD

1 HP

### 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

#### ROHS COMPLIANT

### PHYSICAL

#### SIZE

3.00" H x 2.25" W x 1.88" D  
(7.62 cm x 5.72 cm x 4.78 cm)

#### WEIGHT

6.00 oz.

#### COLOR

Blue

#### MOUNTING

1/2" Knockout

#### RELAY TEST BUTTON

#### LED STATUS INDICATOR

Bi-color White & Blue



# INSTALLATION INSTRUCTIONS

## MOUNTING INSTRUCTIONS

Power Packs are designed to attach to electrical enclosures with 1/2" knockouts.

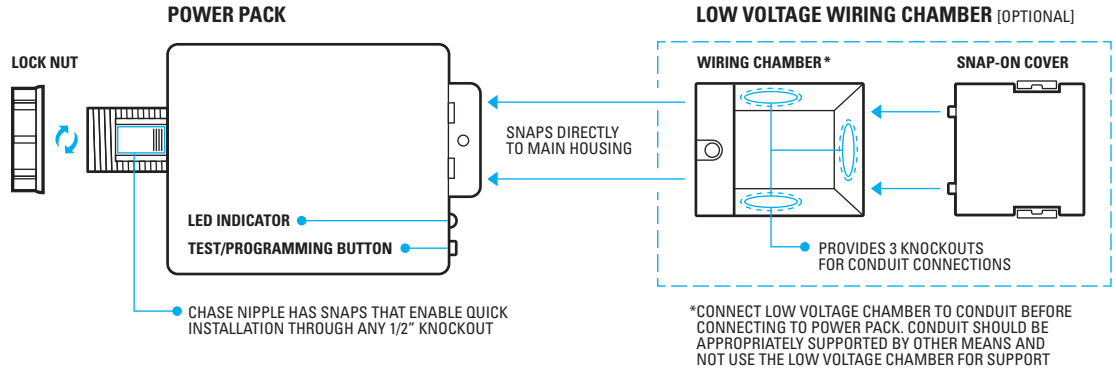
## INSTALLATION NOTES

**1** For supply connections, use 14 AWG (90°C) or larger wires.

Wire all circuits exiting chase nipple as Class 1 circuits.

**2** Suitable for plenum use.

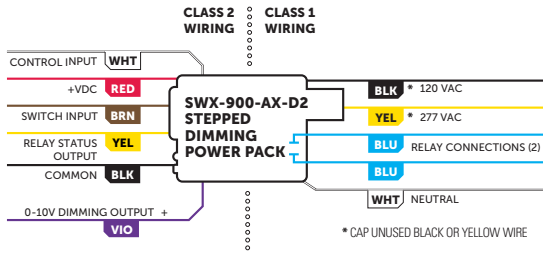
**3** Risk of Electric Shock - More than one disconnect switch may be required to de-energize the equipment before servicing.



**⚠ WARNING: TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE WIRING ⚠**

## WIRING

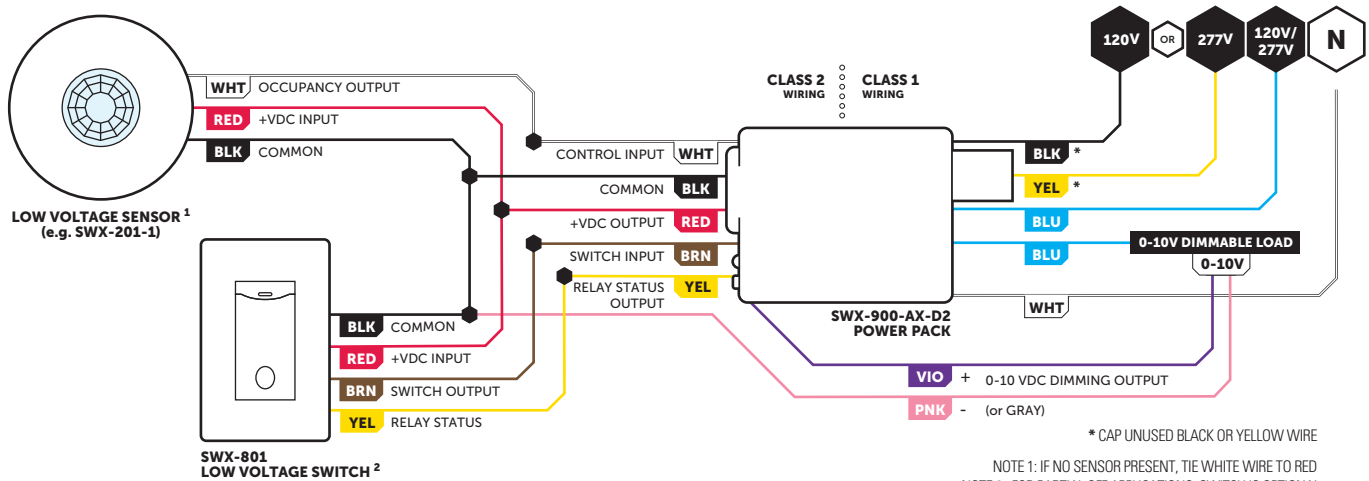
### BASIC WIRING



### APPLICATION INFORMATION

- For areas such as stairwells, the **SWX-900-AX-D2** unit can be used to achieve **Partial Off** operation where lighting is at the full bright level when occupied and dropped to the 50% (level is configurable) during unoccupied periods.
- Partial On** operation is also enabled by the **SWX-900-AX-D2** unit. In this configuration 0-10V lighting is turned on to 50% (level is configurable) when triggered from an occupancy sensor or manual switch. The unit will then step lighting up to 100% (level is user configurable) when the connected switch is pressed. Lighting will turn off if another switch press is detected or when all connected sensors go to their unoccupied state.
- Additional configurable parameters include; Turn On Dim Level, Turn Off Scheme, Fade On/Fade Off Rates, and High/Low Dimming Trim Levels.
- Using the **SENSORWORX** model# **SWX-801-xx** momentary switch is recommended for this application, however other manufacturers switches may also be utilized.

### WIRING FOR PARTIAL OFF/ON OPERATION



NOTE 1: IF NO SENSOR PRESENT, TIE WHITE WIRE TO RED  
NOTE 2: FOR PARTIAL OFF APPLICATIONS, SWITCH IS OPTIONAL

# POWER PACK CAPACITY

**SWX-900** series power packs can supply power to several occupancy sensors and additional secondary relay packs. Following the below formula ensures adequate power will be available. Note the **SWX-900's** relay has already been factored into the formula.

$$[(\# \text{ of PIR SENSORS}) \times 5\text{mA}] + [(\# \text{ of DUAL TECH SENSORS}) \times 10\text{mA}] + [(\# \text{ of SWX-910}) \times 70\text{mA}] < [(\# \text{ of SWX-900}) \times 80\text{mA}]$$

## EXAMPLE COMBINATIONS

PIR SENSORS			DUAL TECH SENSORS			SECONDARY PACKS SWX-910			TOTAL POWER REQUIRED		POWER SUPPLIED BY ONE SWX-900
#	POWER REQUIRED		#	POWER REQUIRED		#	POWER REQUIRED				
10	50mA	+	0	0	+	0	0	=	50mA	<	80mA
1	5mA	+	0	0	+	1	70mA	=	75mA	<	80mA
0	0	+	6	60mA	+	0	0	=	60mA	<	80mA
3	15mA	+	3	30mA	+	0	0	=	45mA	<	80mA

# CONFIGURATION SETTINGS

## OPERATIONAL MODES

This power pack by default has several sequence of operation choices.

SETTING #	MODE	DESCRIPTION
2	Partial On Occupancy Mode (3 States: Auto-On to 50% / Full On / Auto Off)*	Lights come on automatically to the <b>TURN ON DIM LEVEL</b> (e.g. <b>PARTIAL ON POINT</b> ) when an occupancy signal is received from connected sensors. A switch signal is required to step the dimming output to the full bright level ( <b>HIGH TRIM LEVEL</b> ). Lights can then be turned off manually via another switch signal. Lights will turn off automatically from either the partial on or full bright level if the connected sensors' time delays expire.
3	Partial On Vacancy Mode (3 States: Manual On to 50% / Full On / Auto Off)	A switch signal is required to initially turn lights on to the <b>TURN ON DIM LEVEL</b> (e.g. <b>PARTIAL ON POINT</b> ). A second switch signal is required to step the dimming output to the full bright level ( <b>HIGH TRIM LEVEL</b> ). Lights can then be turned off manually via a third switch signal. Lights will turn off automatically from either the partial on or full bright level if the connected sensors' time delays expire.
4	Partial Off Occupancy Mode (Auto-On to 100% when Occupied / 50% Dim when Unoccupied) *DEFAULT SETTING	Lights stay at full bright ( <b>HIGH TRIM LEVEL</b> ) when connected sensor is signalling occupancy. When unoccupied, lights are dimmed to <b>PARTIAL ON POINT</b> (default value is changed to 50% when <b>OPERATIONAL MODE</b> is switched to Partial Off). If a switch is connected, lights will toggle between 100% and <b>PARTIAL ON POINT</b> .
5	Override On / Logic High	Lights are held on at <b>HIGH TRIM LEVEL</b> and occupancy is ignored when auxiliary switch input wire is logic high (5-24VDC).
6	Override On / Logic Low	Lights are held on at <b>HIGH TRIM LEVEL</b> and occupancy is ignored when auxiliary switch input wire is logic low (< 5VDC).
7	Override Off / Logic High	Lights are switched off (according to <b>TURN OFF SCHEME</b> ) and occupancy is ignored when auxiliary switch input wire is logic high (5-24VDC).
8	Override Off / Logic Low	Lights are switched off (according to <b>TURN OFF SCHEME</b> ) and occupancy is ignored when auxiliary switch input wire is logic low (< 5VDC).

## TO CHANGE THE OPERATIONAL MODE

- 1 Read through the above list and note the number of the desired setting
- 2 Press and release the unit's pushbutton 2 times, then wait 2 seconds. The White LED will blink back the number of the current setting (e.g. 4 = Partial Off Occupancy Mode).
- 3 Press the pushbutton the number times equal to the new desired setting (e.g. 2 = Partial On Mode).
- 4 The LED will flash back the new setting number as confirmation and will be saved after three confirmations. A successful save is indicated by a two sets of rapid White flashes. If the Blue LED rapid flashes twice, save was unsuccessful and process should be started over.

## ADDITIONAL OPERATIONAL MODE NOTES

- When in Partial On Occupancy Mode (Setting #2) or Partial Off Occupancy Mode (Setting #4), if lights are manually switched off when there are still occupants in a space (to show a presentation for example), they will remain off until either switched back on manually or the sensor times out once the space is empty.
- In all modes, if the switch is pressed but no occupancy is ever sensed, the lights will come on for 1 minute and then shut off. If no occupancy sensor is present, tie the power pack's white input wire to red (+VDC).
- When in Partial On Vacancy (Manual On) Mode (Setting #3), there is a 15 second "grace" period after the sensor times out when the sensor will switch lights back on automatically. After 15 seconds the sensor will revert to vacancy (manual on) operation.
- To utilize a **SWX-900-AX-D2** as a **SWX-900-AX**, set the Turn-On Dim Level to Disabled (FN 3-2).

# CONFIGURATION SETTINGS (CONT.)

## DETAILED DIMMING CONFIGURATION

Several dimming parameters can be adjusted using the following programming procedure.

- 1 From the below tables of detailed dimming functions, note the number (#) of the function to be modified. For example, the **TURN ON DIM LEVEL** function is #3.
- 2 To enter programming mode, press and release the unit's button the number of times of the chosen function. For example, press the button 3 times to access the **TURN ON DIM LEVEL**.
- 3 The LED will flash back the setting number of the current value as it appears in each function's detailed table below. For example, the default **TURN ON DIM LEVEL** is setting #5, 50%.
- 4 To change the setting number, press and release the button the number of times equal to the new setting #. For example, 3 times (for 3V, ~30%).
- 5 The LED will flash back the new setting number as confirmation and will be saved after three confirmations. A successful save is indicated by a two sets of rapid White flashes. If the Blue LED rapid flashes twice, save was unsuccessful and process should be started over.

## DETAILED DIMMING FUNCTION TABLES

### FUNCTION #3 TURN ON DIM LEVEL (PARTIAL ON POINT)

The level the dimming output is set to upon initially turning on (requires unit be in a Partial On operating mode).

SETTING #	VALUES	NOTES
2	Disabled	Invalid if Operational Mode set to Partial Off.
3	~30%	Actual voltage value is calculated as the % of voltage range between high and low trim levels. Light output at each voltage level depends on driver/ballast and luminaire.
4	~40%	
5	~50%* *default	
6	~60%	
7	~70%	
8	~80%	

### FUNCTION #4 TURN OFF SCHEME

The actions of the power pack's dimming output and relay when an unoccupied signal or an off switch press is received.

SETTING #	VALUES	NOTES
2	Dim to Off*	Dimming output fades down to low trim and relay opens (*default)
3	Dim to 0	Dimming output fades to 0 volts (e.g. below a connected driver's electronic off level). Relay remains closed.
4	Dim to Low Trim	Dimming output fades down to low trim level. Relay remains closed.

### FUNCTION #5 HIGH TRIM

The voltage of the dimming output at the full bright level (step).

SETTING #	VALUES	NOTES
2	10 VDC (100%)* *default	Exact light output % at each voltage level depends on driver/ballast and luminaire.
3	9 VDC (90%)	
4	8 VDC (80%)	
5	7 VDC (70%)	
6	6 VDC (60%)	
7	5 VDC (50%)	

### FUNCTION #6 LOW TRIM

The voltage to which the dimming output will drop when the unit is in the off state. This setting is only active when the unit's **Turn Off Scheme** is set to Dim to Low Trim.

SETTING #	VALUES	NOTES
2	0 VDC	Exact light output % at each voltage level depends on driver/ballast and luminaire.
3	1 VDC (10%)* *default	
4	2 VDC (20%)	
5	3 VDC (30%)	
6	4 VDC (40%)	
7	5 VDC (50%)	

### FUNCTION #9 FADE OFF TIME

SETTING #	VALUES	NOTES
2	0.75 Sec	*default
3	1.5 Sec*	
4	3 Sec	
5	5 Sec	
6	15 Sec	

### FUNCTION #10 FADE ON TIME

SETTING #	VALUES	NOTES
2	0.75 Sec	*default
3	1.5 Sec*	
4	3 Sec	
5	5 Sec	
6	15 Sec	

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# TESTING & TROUBLESHOOTING

## TEST MODE

To test unit and line voltage wiring, press and release the black pushbutton one time (located on the end of the pack opposite the chase nipple). After a short pause, the unit's internal relay (and thus also the connected lighting load) will change state briefly and then return back to its original state if wired and functioning properly.

## RESET

To restore factory settings, press and release the push-button 8 times, wait 2 seconds, then press and release the push-button 3 times again.

## LED INDICATION

- During normal operation, the LED regularly flashes white as a status "heartbeat".
- If the LED repeatedly double flashes blue, the power supply is overloaded. This is probably due to having too many sensors or secondary relay packs connected. Remove excess low voltage load from the red wire until blue double flash stops.
- If the LED regularly flashes blue, both blue relay wires are connected to power when the relay is open. This indicates probable miswiring.

## DISABLING THE LED

- To disable the LED from continuously flashing white as a "heartbeat", press and release the push-button 7 times, wait 2 seconds, then press and release the push-button 4 times.
- To turn "heartbeat" back on press and release the push-button 7 times, wait 2 seconds, then press and release the push-button 2 times.

