SENSORWORX ®

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

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 Ouput for Partial Off or Partial On Operation**
- **Switch Input for Stepping Betwen 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

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)

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

c (UL) US LISTED

MADE IN THE USA
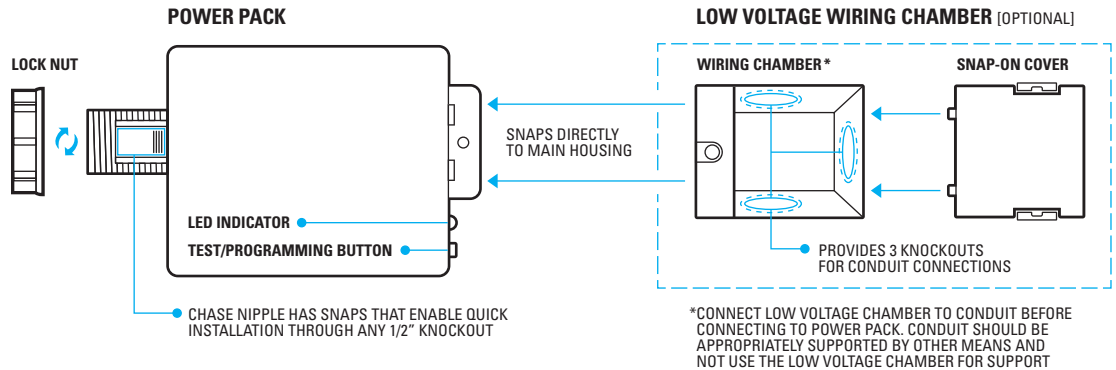
TAA COMPLIANT

BAA COMPLIANT

INSTALLATION INSTRUCTIONS

MOUNTING INSTRUCTIONS

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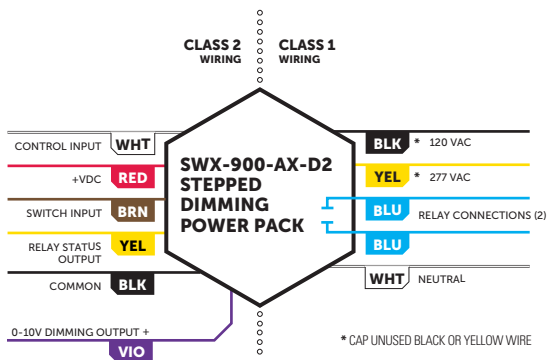
INSTALLATION NOTES

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-engergize the equipment before servicing.

POWER PACK

LOW VOLTAGE WIRING CHAMBER [OPTIONAL]

LOCK NUT

WIRING CHAMBER *

SNAP-ON COVER

SNAPS DIRECTLY TO MAIN HOUSING

LED INDICATOR ●

TEST/PROGRAMMING BUTTON ●

PROVIDES 3 KNOCKOUTS FOR CONDUIT CONNECTIONS

● CHASE NIPPLE HAS SNAPS THAT ENABLE QUICK INSTALLATION THROUGH ANY 1/2" KNOCKOUT

*CONNECT LOW VOLTAGE CHAMBER TO CONDUIT BEFORE CONNECTING TO POWER PACK. CONDUIT SHOULD BE APPROPRIATELY SUPPORTED BY OTHER MEANS AND NOT USE THE LOW VOLTAGE CHAMBER FOR SUPPORT

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

WIRING

BASIC WIRING

CLASS 2 WIRING | CLASS 1 WIRING

CONTROL INPUT | WHT
+VDC | RED
SWITCH INPUT | BRN
RELAY STATUS OUTPUT | YEL
COMMON | BLK
0-10V DIMMING OUTPUT + | VIO

SWX-900-AX-D2 STEPPED DIMMING POWER PACK

BLK | * 120 VAC
YEL | * 277 VAC
BLU | RELAY CONNECTIONS (2)
BLU |
WHT | NEUTRAL

* CAP UNUSED BLACK OR YELLOW WIRE
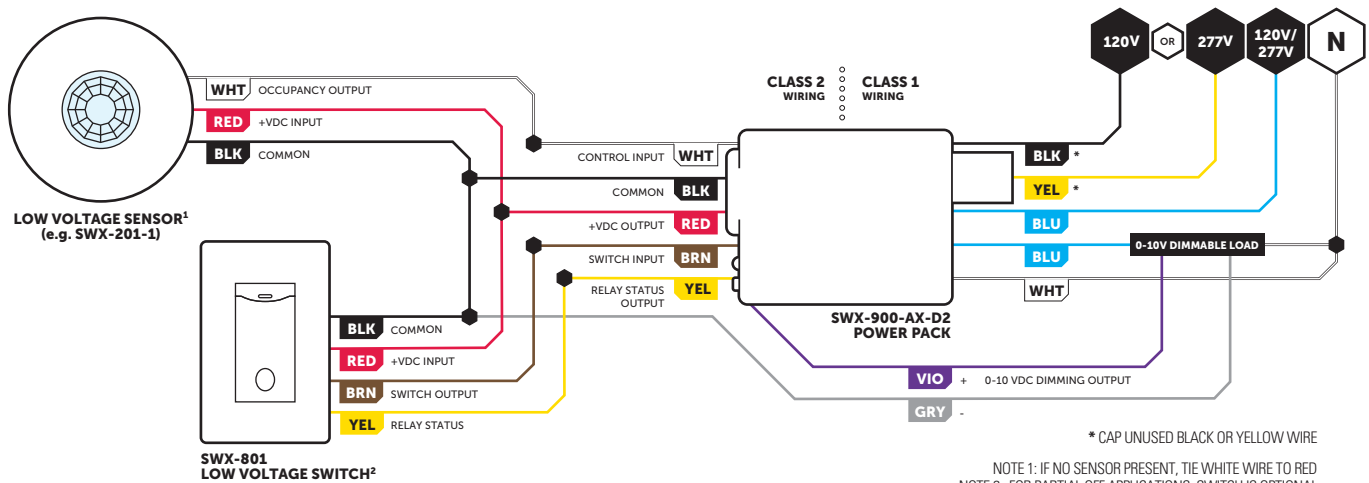
APPLICATION INFORMATION

● 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

LOW VOLTAGE SENSOR[1] (e.g. SWX-201-1)

WHT | OCCUPANCY OUTPUT
RED | +VDC INPUT
BLK | COMMON

CLASS 2 WIRING | CLASS 1 WIRING

CONTROL INPUT | WHT
COMMON | BLK
+VDC OUTPUT | RED
SWITCH INPUT | BRN
RELAY STATUS OUTPUT | YEL

SWX-801 LOW VOLTAGE SWITCH[2]

BLK | COMMON
RED | +VDC INPUT
BRN | SWITCH OUTPUT
YEL | RELAY STATUS

120V | OR | 277V | 120V/277V | N

BLK | *
YEL | *
BLU |
BLU |
WHT |

0-10V DIMMABLE LOAD

SWX-900-AX-D2 POWER PACK

VIO | + | 0-10 VDC DIMMING OUTPUT
GRY | -

* CAP UNUSED BLACK OR YELLOW WIRE

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.

$$[\ (\#\ of\ \textbf{PIR SENSORS*})\ \textbf{x2mA}\ ]\ \textbf{+}\ [\ (\#\ of\ \textbf{DUAL TECH SENSORS})\ \textbf{x10mA}\ ]\ \textbf{+}\ [\ (\#\ of\ \textbf{SWX-910})\ \textbf{x55mA}\ ]\ \textbf{<}\ [\ (\#\ of\ \textbf{SWX-900})\ \textbf{x95 mA}]$$

EXAMPLE COMBINATIONS

PIR SENSORS OR LOW VOLT. WALL SWITCHES			DUAL TECH SENSORS			SECONDARY PACKS SWX-910			TOTAL POWER REQUIRED		POWER SUPPLIED BY ONE SWX-900
#	POWER REQUIRED	**+**	#	POWER REQUIRED	**+**	#	POWER REQUIRED	**=**		**<**	
15	30mA	+	0	0	+	0	0	=	30mA	<	95mA
15	30mA	+	0	0	+	1	55mA	=	85mA	<	95mA
0	0	+	9	90mA	+	0	0	=	90mA	<	95mA
7	14mA	+	8	80mA	+	0	0	=	94mA	<	95mA

*or low voltage wall switches

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)* *DEFAULT SETTING	Lights come on automatically to the **TURN ON DIM LEVEL** (e.g. **PARTIAL ON POINT**) when an occupancy signal is received from connected sensors. A switch signal is required to step the dimming output to the full bright level (**HIGH TRIM LEVEL**). 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 **TURN ON DIM LEVEL** (e.g. **PARTIAL ON POINT**). A second switch signal is required to step the dimming output to the full bright level (**HIGH TRIM LEVEL**). 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)	Lights stay at full bright (**HIGH TRIM LEVEL**) when connected sensor is signalling occupancy. When unoccupied, lights are dimmed to **PARTIAL ON POINT** (default value is changed to 50% when **OPERATIONAL MODE** is switched to Partial Off). If a switch is connected, lights will toggle between 100% and **PARTIAL ON POINT**.
5	Override On / Logic High	Lights are held on at **HIGH TRIM LEVEL** and occupancy is ignored when auxiliary switch input wire is logic high (5-24VDC).
6	Override On / Logic Low	Lights are held on at **HIGH TRIM LEVEL** and occupancy is ignored when auxiliary switch input wire is logic low (< 5VDC).
7	Override Off / Logic High	Lights are switched off (according to **TURN OFF SCHEME**) 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 **TURN OFF SCHEME**) 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. 2 = Partial On Occupancy Mode).

3 Press the pushbutton the number times equal to the new desired setting (e.g. 4 = Partial Off 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.

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%		
4	~40%		
5	~50%*	*default	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.
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	
3	9 VDC (90%)		
4	8 VDC (80%)		Exact light output % at each voltage level depends on driver/ballast and luminaire.
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		
3	1 VDC (10%)*	*default	
4	2 VDC (20%)		Exact light output % at each voltage level depends on driver/ballast and luminaire.
5	3 VDC (30%)		
6	4 VDC (40%)		
7	5 VDC (50%)		

FUNCTION #9 FADE OFF TIME

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

FUNCTION #10 FADE ON TIME

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

TESTING & TROUBLESHOOTING

TEST MODE

To test unit by toggling the relay, press and hold pushbutton. LED will turn blue while the button is held. Release button to return to normal operation.

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.