SENSORWORX®

WIRELESS POWER PACK LOAD CONTROLLER

INSTALLATION & OPERATION INSTRUCTIONS

(Units w/ Date Code 250102 and later)

CATALOG NUMBERS	DESCRIPTIONS
SWX-950	WIRELESS POWER PACK LOAD CONTROLLER
SWX-950-D1	WIRELESS POWER PACK LOAD CONTROLLER w/ 0-10V DIMMING (CLASS 1)
SWX-950-D2	WIRELESS POWER PACK LOAD CONTROLLER w/ 0-10V DIMMING (CLASS 2)
SWX-950-AX	WIRELESS POWER PACK LOAD CONTROLLER w/ AUXILIARY LOW VOLTAGE CONTROL
SWX-950-AX-D2	WIRELESS POWER PACK LOAD CONTROLLER w/ 0-10V DIMMING & AUXILIARY LOW VOLTAGE CONTROL
SWX-999	LOW VOLTAGE WIRING CHAMBER

OVERVIEW

SENSORWORX wireless power pack controllers switch on/off power to a connected lighting load as directed by wirelessly linked sensors, photocells, and wall controls. Additionally, the unit's 0-10V dimming option enables dimming control. This wireless power pack also has optional auxiliary low voltage connections for achieving hybrid wired/wireless architectures.

The **SENSOR**WORX wireless power pack is rated to switch fully loaded circuits and utilizes a powerful microprocessor to optimize its switching timing, ensuring long relay life even when controlling high-inrush LED lighting. As with all **SENSOR**WORX products, these power packs are easy to install and incorporate features which reduce contractor labor time. An elongated chase nipple with snaps for quick installation and an optional snap-on low voltage wire chamber make for a hassle free contractor experience. All **SENSOR**WORX products are proudly made in the USA.

BASIC OPERATION

A received wireless message indicating occupancy from one or more wirelessly linked sensors will trigger the pack's integrated relay to close. When configured for Vacancy operation, an ON switch message is required from a wirelessly linked wall station to initially trigger lights. Once closed, line voltage will flow through the relay and turn on the connected lighting load. The wireless power pack maintains a master time delay that is reset every time a linked sensor reports occupancy. Lights will be switched off once there hasn't been an occupancy message reported for the duration of the time delay. If linked to a photocell, the unit receives light level readings and controls connected lighting according to its photocell operating mode.

FEATURES

- **Wirelessly Links to Sensors, Photocells, & Wall Stations**
- **Links in Seconds with up to 50 Remote Devices**
- **Switches 20A Line Voltage Loads**
- **Electronically Timed Switching (i.e. Zero Crossing) Ensures Long Relay Life**
- **Integrated Test/Programming Button**
- **Plenum Rated (UL 2043)**
- **Configurable Time Delays & Operational Modes (e.g. Occupancy/Vacancy)**
- **Configurable Daylight Harvesting & Photocell Modes**
- **Optional 0-10V Dimming Output for Partial On & Partial Off Operation**
- **Optional Wired Connectivity to Low Voltage Sensors & Wall Stations**

SPECIFICATIONS

ELECTRICAL

OPERATING VOLTAGE
120/277 VAC,
Single Phase, 50/60 Hz

CLASS 2 POWER OUTPUT
18 VDC @ 70 mA (-AX version),
higher output when unloaded

LOAD RATINGS
(relays use zero-cross switching)

20A @ 120 VAC -
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
(Models with -D1 & -D2 option only)
50mA, (0-10 VDC ballasts or drivers compliant with IEC 60929 Annex E.2)

MOTOR LOAD
1 HP

ESD IMMUNITY
Tested to withstand electrostatic discharge without damage or memory loss

ENVIRONMENTAL

OPERATING TEMP
32°F to 122°F (0°C to 50°C)

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

WIRELESS

RANGE
80' line of site w/o obstruction
40' with obstruction (walls/floors)

FREQUENCY
915 MHz ISM Band

WIRELESS LINKING
Simple 3 sec. Push Button Process

SECURITY
All Wireless Data is Encrypted

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

TEST / PROGRAMING BUTTON

LED STATUS INDICATOR
Bi-color White & Blue

OPERATION

OPERATING MODES
Occupancy & Vacancy
Partial On/Off (-D1 & -D2 option)
Daylight Harvesting (-D1 & -D2 option)
On/Off/Inhibit Photocell
Ignore Occupancy

TIME DELAY OPTIONS
1, 5, 10, 15, 20, 30 min.

CODE COMPLIANCE

These power packs can be used to meet ASHRAE 90.1, IECC, & Title 24 energy code requirements

c UL US LISTED

MADE IN THE USA · TAA COMPLIANT · BAA COMPLIANT · BUILD AMERICA BUY AMERICA · LEAD FREE RoHS COMPLIANT

INSTALLATION INSTRUCTIONS

MOUNTING INSTRUCTIONS

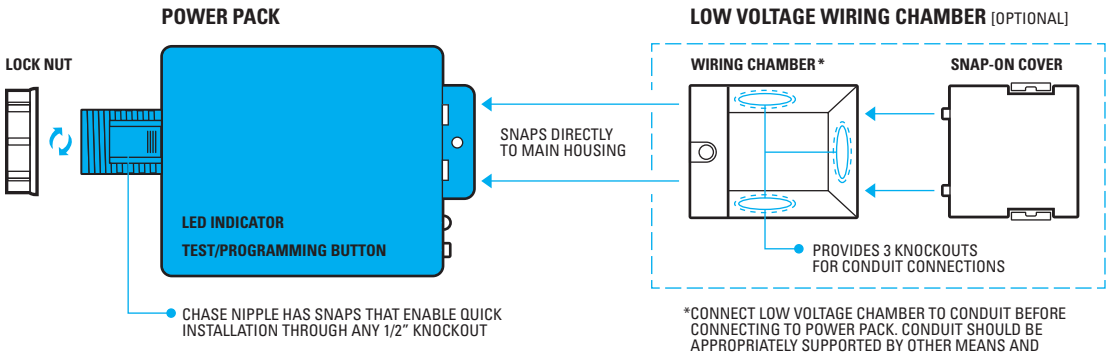
Power Packs are designed to attach to electrical enclosures with 1/2" knockouts. Do not mount unit inside a metal junction box.

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.

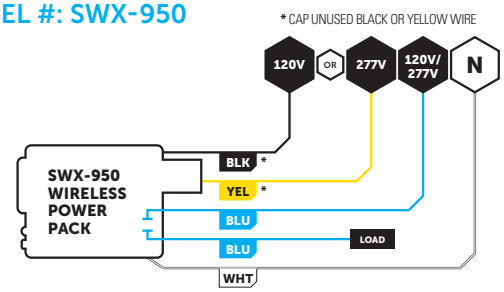
3 Risk of Electric Shock - More than one disconnect switch may be required to de-engergize the equipment before servicing.



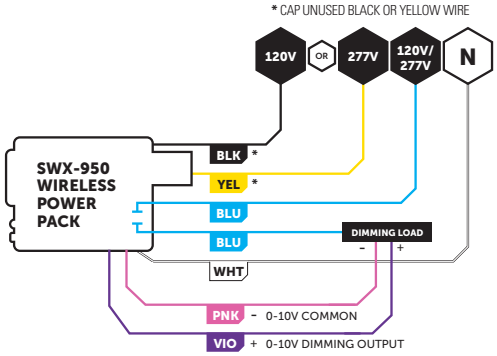
WARNING: TURN POWER OFF AT THE CIRCUIT BREAKER BEFORE WIRING

WIRING

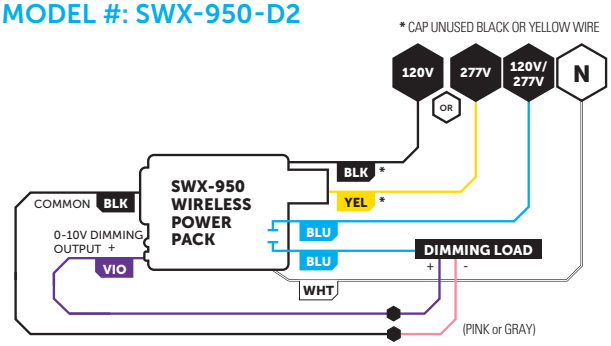
MODEL #: SWX-950



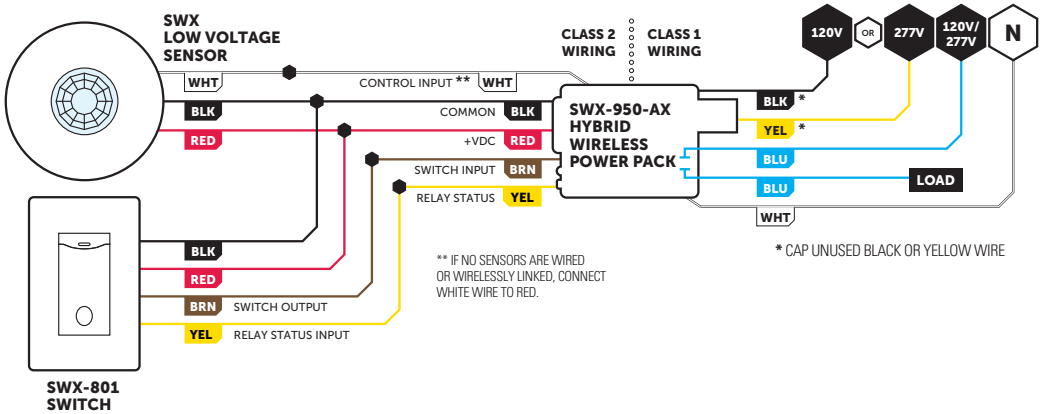
MODEL #: SWX-950-D1



MODEL #: SWX-950-D2

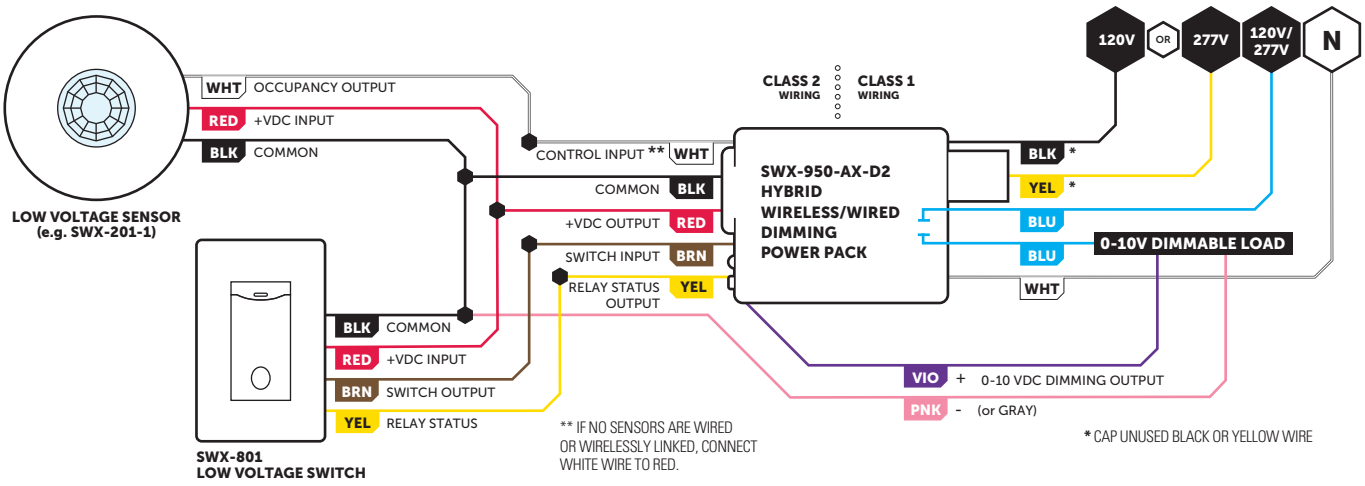


MODEL #: SWX-950-AX



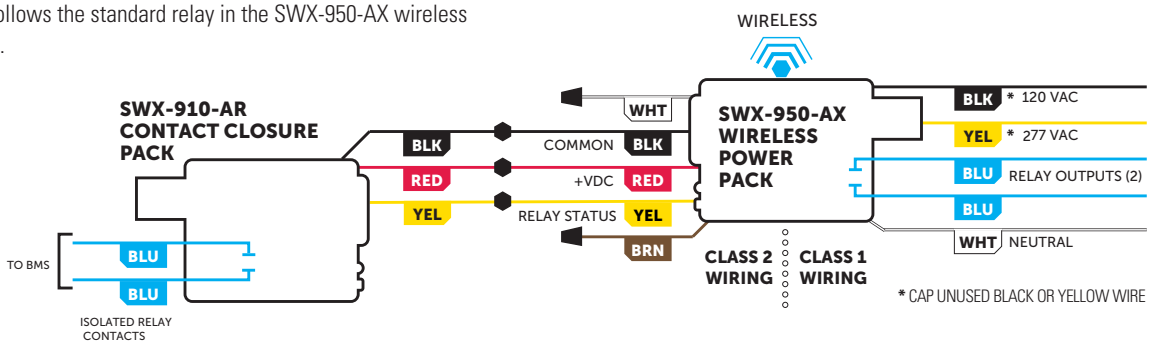
WIRING (CONT.)

MODEL #: SWX-950-AX-D2



MODEL #: SWX-950-AX with SWX-910-AR

- Configuration provides a low voltage isolated contact closure relay that follows the standard relay in the SWX-950-AX wireless power pack.



POWER PACK CAPACITY

SWX-950-AX-(D2) series power packs can supply power to several occupancy sensors and low voltage wall switches. Following the below formula ensures adequate power will be available.

[(# of PIR SENSORS*) **x5mA]** + **[(#** of DUAL TECH SENSORS) **x10mA]** + **[(#** of SWITCHES) **x5mA]** < **[(#** of **SWX-950-AX) x70 mA]**

EXAMPLE CALCULATIONS	PIR SENSORS		+	DUAL TECH SENSORS		+	LOW VOLTAGE WALL SWITCHES		=	TOTAL POWER REQUIRED	<	POWER SUPPLIED BY ONE **SWX-950-AX**
	#	TOTAL POWER REQUIRED		#	TOTAL POWER REQUIRED		#	TOTAL POWER REQUIRED				
	10	50mA	+	0	0	+	2	10mA	=	60mA	<	70mA
	0	0	+	5	50mA	+	2	10mA	=	60mA	<	70mA
	3	15mA	+	3	30mA	+	2	10mA	=	55mA	<	70mA

TESTING & TROUBLESHOOTING

TESTING CONNECTED LIGHTING

To test the unit's control of connected lighting, press and release the push button (located next to LED) one time. Lights should toggle if the unit is operating and wired to lighting properly.

LED BLINKOUT BEHAVIORS

LED BEHAVIOR	DESCRIPTION	NOTES/REMEDY
Continuous WHITE blinking "heartbeat"	Normal operation	
Repeating double BLUE flashes with 1 second pauses between sets	Power supply is overloaded.	1. Check for miswiring causing a short on the red low voltage wire. 2. Remove low voltage load from the red wire (i.e. connected sensors, secondary relay packs, or switches) until the BLUE double flash stops.
Repeating sets of 5 Blue flashes	Power present on both relay wires	Check wiring going to the blue relay wires on the power pack. Specifically, ensure there is not line power present on both wires when power pack is disconnected.
Repeating sets of 8 Blue flashes	Missing daylight sensor	Indicates that a daylight sensor has been previously paired, but is no longer detected. To clear, disable daylight/photocell mode or ensure previously paired daylight sensor is within range and transmitting.
Alternating WHITE / BLUE flashing	Wireless Learn Mode (Pairing)	To exit learn mode, press the button one time and release. The LED should return to continous WHITE "heartbeat".
Alternating WHITE / BLUE flashing with periodic sets of WHITE blinks	Wireless Learn Mode w' Linked Device Count	The number of periodic WHITE blinks reflects the number of linked devices. To exit learn mode, press the button one time and release. The LED should return to continous WHITE "heartbeat".
Repeating sets of 4 Blue flashes, with 1 second pause between sets	Linked sensors have stopped communicating	Check sensor battery and install location.
Double BLUE flash every 15 seconds	Photocell is overriding lights OFF	Normal operation during times of high daylight.
Steady BLUE flash	Photocell is transitioning lights ON or OFF	Normal operation when photocell operation is enabled.

COMPATIBLE WIRELESS DEVICES

The below chart lists the devices that can be used in a **SENSOR**WORX wireless application. Note that sensors, photocells, and remote switch & dimmer devices are transmit only devices and therefore must be linked to a load controller for switching and/or dimming of lighting.

MODEL #	DESCRIPTION	WIRELESS TYPE	POWER TYPE
SWX-201-B	Small Motion 360° Sensor, PIR	Transmit	Battery
SWX-211-B	Small Motion 360° Sensor, PIR w/ Integrated Daylight Harvesting Photocell	Transmit	Battery
SWX-221-B	Dual Technology Sensor (PIR/Acoustic), Small Motion 360°	Transmit	Battery
SWX-401-B	Wide View Sensor, PIR	Transmit	Battery
SWX-421-B	Dual Technology (PIR/Acoustic) Wide View Sensor	Transmit	Battery
SWX-402-B	Long Range Hallway Sensor, PIR	Transmit	Battery
SWX-250-B	Daylight Harvesting & On/Off Photocell	Transmit	Battery
SWX-851-xx	Wall Switch Load Controller, No Neutral Required, <xx = color>	Transmit & Receive	120-277 VAC
SWX-852-B-xx	Remote Switch (On/Off), <xx = color>	Transmit	Battery
SWX-852-2-xx	Remote Line Powered Switch (On/Off), <xx = color>	Transmit	120-277 VAC
SWX-852-2P-B-xx	Remote 2-Zone Switch (On/Off), <xx = color>	Transmit	Battery
SWX-854-B-xx	Remote Dimming Switch (On/Off, Raise/Lower), <xx = color>	Transmit	Battery
SWX-854-2-xx	Remote Line Powered Dimming Switch (On/Off, Raise/Lower), <xx = color>	Transmit	120-277 VAC
SWX-854-2P-B-xx	Remote 2-Zone Dimmer Wall Station, <xx = color>	Transmit	Battery
SWX-854-4S-B-xx	Remote 4-Scene + Dimmer Wall Station, <xx = color>	Transmit	Battery
SWX-874-ELV-xx	Phase Dimming Load Controller - Reverse (default) or Forward Phase, <xx = color>	Transmit & Receive	120 VAC
SWX-950	Power Pack Load Controller, 20A	Transmit & Receive	120/277 VAC
SWX-951-D1	Fixture Controller, 1A@, 0-10V Class 1 Dimming	Transmit & Receive	120-277 VAC
SWX-950-D1 (D2)	Power Pack Load Controller, 20A, 0-10V Class 1 Dimming (Class 2 model)	Transmit & Receive	120/277 VAC
SWX-950-AX	Hybrid Wireless/Wired Power Pack Load Controller, 20A	Transmit & Receive	120/277 VAC
SWX-950-AX-D2	Hybrid Wireless/Wired Power Pack Load Controller, 20A, 0-10V Dimming	Transmit & Receive	120/277 VAC
SWX-970-D1 (D2)	Advanced Load Controller w/ Mobile App, 16A, 0-10V Class 1 Dimming (Class 2 model)	Transmit & Receive	120-277 VAC

WIRELESS LINKING (PAIRING)

Linking a wireless power pack to a wireless sensor, photocell, or remote wall station is quickly done via the following procedure:

Step 1. Enter learn (pairing) mode by holding down the power pack's button for 3 seconds until the LED starts alternating white then blue, then release.

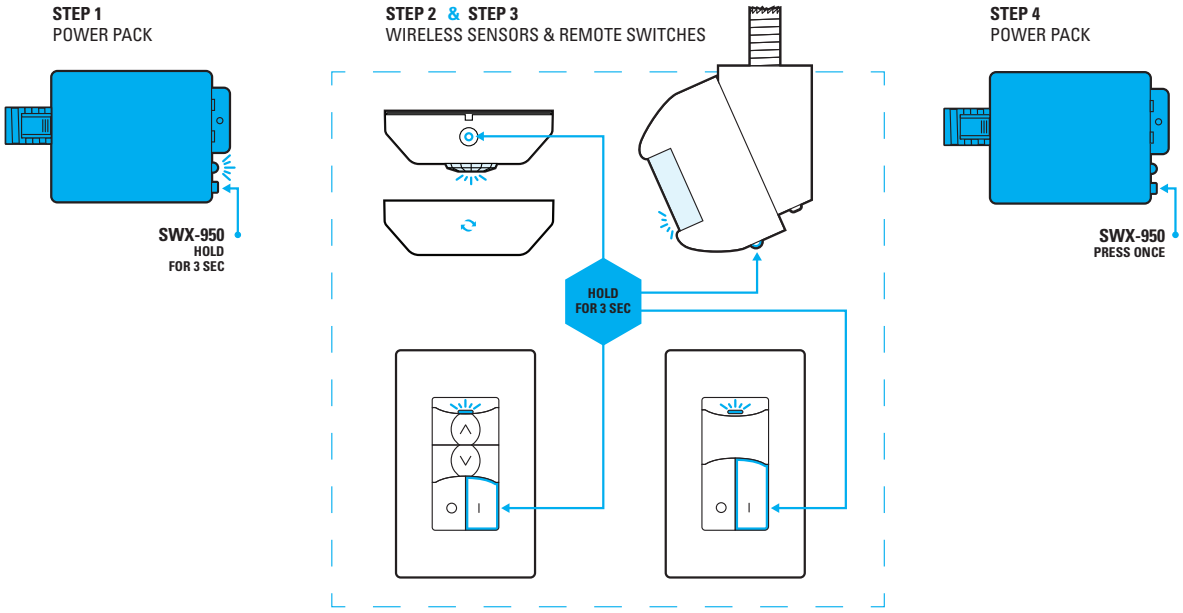
Step 2. At the sensor, photocell, or remote wall station, hold down the programming button for 3 seconds until the LED starts alternating white then blue. Releasing will link the device with the wireless power pack in learn mode (see note 1 below). The lighting load being controlled will also be toggled off/on as a visual indication of success.

Step 3. Repeat step 2 to link additional devices.

Step 4. When all devices have been linked, exit learn mode on the power pack by pressing the button 1 time. Learn mode will also be automatically closed after 15 minutes of no new devices being linked.

Note 1: When in learn mode, the alternating LED colors on the power pack will periodically pause and blink out the total number of linked devices. There will be no blinks during the pause until the first device is linked.

Note 2: To utilize "leader/follower" functionality (for multi-zone operation) the follower power pack controller must first learn the leader. This is done by initially putting both the leader and the follower device in learn (pairing) mode (i.e. Step 1 above). Next hold down the "leader's" button again for 3 seconds. Finally, press the "follower's button one time to exit learn (pairing) mode. The leader pack will still be in learn mode, so additional wireless devices can then be added by repeating Step 2 above or learn mode can be exited by pressing the leader's button one time. Once all pairing has been completed, assign leader and follower roles via Advanced Function 4.



OPERATION NOTES

GENERAL WIRELESS SENSOR OPERATION

- Wireless sensors periodically transmit their PIR and/or acoustic (if equipped) occupancy status.
- Referred to as the sensor's "heartbeat", this period is optimized to conserve battery life.
- If a sensor transmitted "unoccupied" at its last heartbeat, any new PIR detection event will be transmitted immediately.
- Using the information received from linked sensors, wirelessly linked power pack load controllers switch lighting accordingly.
- The power pack load controller has a master time delay that is initially set only when a PIR occupancy transmission is received from a linked sensor. The time delay will then be reset every time a sensor reports any occupancy (either PIR or acoustic). Lights will be switched off once all linked sensors have continuously reported unoccupied for the duration of the time delay.
- To prevent lights from staying on indefinately from just acoustic events, after ~30 minutes the power pack will stop considering acoustic events from all linked sensors until after a PIR event is received again.
- As an added safety measure after lights are switched off, acoustic detection remains enabled for 15 seconds to enable voice reactivation of lights.
- If a wireless power pack does not receive any heartbeat transmissions from a linked sensor for 10 minutes it will blink out an error code (4 blue blinks, followed by a pause) and consider itself occupied (so as to override the lights on). If more than one sensor is linked, the sensor heartbeats from all sensors must have stopped for the error warning to begin blinking.

OPERATION NOTES (CONT.)

PHOTOCELL OPERATION

- The **Ambient Setpoint** (Advanced Function #2) and **Photocell Operating Mode** (Advanced Function #1) are settings stored within the wall switch controller. For all photocell applications (e.g. daylight harvesting), the power pack controller receives the light level readings being transmitted every 15 seconds by wirelessly linked photocells. The controller will then dim, turn off, or turn on connected lighting in order to maximize energy savings while maintaining desired minimum light level.
- The setpoint value initially is established by the running the Auto-Setpoint calibration procedure that is built into the wireless photocell. Once initially determined, the setpoint can be changed at the power pack controller by selecting from a list of values.
- The wireless power pack controller will only listen to a single wireless photocell sensor. If more than one is wirelessly linked, the unit that last ran the auto-setpoint calibration procedure will be used.
- The photocell control algorithm compensates for the contribution of the controlled lighting to the overall light level of the space. This prevents lights from cycling back on shortly after they are switched off by the photocell operation.
- When the unit's **Photocell Operating Mode** (Advanced Function #1) is set to Daylight Harvesting to Off, On/Off Operation, or Inhibit Operation, there is a 45 second transition time after the ambient light level falls below the setpoint to when the connected lighting is switched on. During this transition time, the LED on the power pack controller will be slowly blinking blue.
- When the unit's **Photocell Operating Mode** (Advanced Function #1) is set to Daylight Harvesting to Off or On/Off Operation, there is a 5 minute transition time after the ambient light level surpasses the setpoint to when the connected lighting is switched off. During this transition time, the LED on the power pack controller will be slowly blinking blue. **NOTE:** if the power pack controller is put into test mode (via a sensor), the 5 minute On-to-Off transition time is shortened to 30 seconds to facilitate quicker testing.
- Whenever lights are being held off due to the photocell, the blue LED will double blink every 15 seconds.
- Dimming from high trim to low trim (or in reverse) due to daylight harvesting requires ~1.5 minutes.

LEADER / FOLLOWER OPERATION & MULTI-ZONE DAYLIGHT HARVESTING

- Power pack controllers can be configured to directly "follow" the state and dim level of another wirelessly linked power pack controller (referred to as the "leader"). Leader/follower functionality is intended for applications where two power pack are to be controlled together, but where only one (designated the leader) is within range of the wireless switch or sensor. The follower power pack must still be within range of the leader power pack.
- A power pack in follower mode does not listen to any other wireless devices except the leader to which it is paired. Therefore, all wireless devices in a zone must be in range of the leader.
- The "leader/follower" functionality of power pack controllers can also be used to accomodate **multi-zone daylight harvesting** applications. The leader would be wired to control the primary daylight zone that contains the daylight harvesting photocell, with one or more follower power packs controlling the lights in secondary daylight zones (i.e. zones located further from the windows). The follower packs can then be configured to control the lights a percentage brighter than the leader.

DIMMING OPERATION

- There are always 20 equal steps of dim level (voltage) adjustment from high trim to low trim (or reverse) when using a **SWX-854-B** wireless remote dimmer. Rapid button presses may result in misses.
- For areas such as stairwells, the **SWX-950-D1** and **SWX-950-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 can be achieved by the **SWX-950-D1** and **SWX-950-D2** unit. In this configuration 0-10V lighting is turned on to a configurable **Partial On Level** when triggered from an occupancy sensor or switch. Lighting can then be adjusted to any level via a wirelessly linked **SWX-854-B** remote dimmer. Alternatively, if the ON button is pushed on a wirelessly linked **SWX-852-B** or **SWX-854-B** remote switch, lighting will be stepped up to 100% (level is user configurable). Lighting can be turned off manually via an OFF switch press on either the **SWX-852-B**, **SWX-854-B** wireless remote switch (or single button push on a **SWX-851** switch controller).
- Configurable dimming parameters include **Turn On / Partial On Level**, **Turn Off Scheme**, **Fade On/Fade Off Rates**, and **High/Low Dimming Trim Levels**.
- A model **SWX-801-xx** wired momentary switch can be wired to the auxiliary input wire on a **SWX-950-AX-D2** model power pack to trigger the 3 step sequence of operation (i.e. Partial On, Full On, Off). Other manufacturer's switches may also be utilized.

HYBRID WIRED / WIRELESS OPERATION

- A **SWX-950-AX** or **SWX-950-AX-D2** power pack wirelessly retransmits any switch signals received on its brown input wire (typically from a **SWX-801** or **SWX-803** momentary switch or a low voltage wall switch sensor). To receive the retransmitted switch signals, a remote load controller (i.e. another **SWX-950** power pack or **SWX-851** wall switch controller) will need to be linked to the transmitting power pack.

CONFIGURATION SETTINGS

SWX-950 series power packs have many configurable functions depending on the specific model. All functions' setting values can be accessed and changed by pressing the unit's push-button and observing the LED feedback. The functions common to all SWX-950 series power packs are listed first below. Functions present in models with the dimming option (e.g. **SWX-950-D1** and **SWX-950-D2)** are listed on page 8 and the functions that are used in photocell and/or hybrid wireless/wired applications are listed starting on page 9.

FUNCTION #2: OCCUPANCY TIME DELAY

Unlike wired occupancy sensor systems, the time frame between when occupancy was detected last and connected lights turning off is a setting that is maintained in the power pack load controller and not the sensor itself. This arrangement enables the sensors to conserve battery life. See additional notes below for more information on wireless sensor communications to a power pack.

SETTING #	DESCRIPTION	
1	Test Mode Active	(entered via sensor only)
2	1 Min	
3	5 Min	
4	10 Min	(default)
5	15 Min	
6	20 Min	
7	30 Min	

NOTE: A 5-10 second time delay test mode can be initiated from a linked sensor in order to test coverage. Test mode will expire after 10 minutes. Any active photocell transition periods will also be shortened to 30 seconds while test mode is active.

CHANGING THE OCCUPANCY TIME DELAY

1. Read through the above list and note the number of the desired setting (e.g. 5 = 15 minutes).

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 (repeats 3x before exiting).

3. Interrupt blink back by pressing the button the number times equal to the new desired setting (e.g. 5 = 15 minutes).

4. The LED will blink back the new setting number as confirmation and will be saved after three confirmations. After the third confirmation sequence, a successful save will be indicated by two sets of rapid white flashes. If the blue LED rapid flashes twice, save was unsuccessful and process should be started over.

FUNCTION #3 - OPERATIONAL MODES

Wireless power packs load controllers have several sequence of operation choices.

CHANGING THE OPERATIONAL MODE

1. Read through the above list and note the number of the desired setting (e.g. 3 = Vacancy Mode).

2. Press and release the unit's pushbutton **3 times**, then wait 2 seconds. The white LED will blink back the number of the current setting (repeats 3x before exiting).

3. Interrupt blink back by pressing the button the number times equal to the new desired setting (e.g. 3 = Vacancy Mode).

4. The LED will blink back the new setting number as confirmation and will be saved after three confirmations. After the third confirmation sequence, a successful save will be indicated by two sets of rapid white flashes. If the blue LED rapid flashes twice, save was unsuccessful and process should be started over.

SETTING #	MODE	DESCRIPTION
2	Occupancy Mode (Partial On*) (default)	Lights come on automatically when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). Lights will turn off automatically if the **OCCUPANCY TIME DELAY** expires prior to receiving another occupied signal from a sensor. Lights can also be switched off manually if signaled from a wirelessly linked switch (and/or wired switch on -AX models).
3	Vacancy Mode (Manual On)	A switch signal from a linked wireless switch (and/or a wired switch on -AX models) is required to initially turn lights on. Lights will turn off automatically if the **OCCUPANCY TIME DELAY** (Function #2) expires prior to receiving another occupied signal from a sensor. Lights can also be switched off manually if signaled from a wirelessly linked switch (and/or wired switch on -AX models).
4	Partial Off Mode	Valid on dimming models only. Lights come on automatically to full bright (**HIGH TRIM LEVEL**) when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). Lights will dim down to the **TURN ON / PARTIAL ON LEVEL** (as specified in Function #4) automatically if the Occupancy Time Delay expires prior to receiving another occupied signal from a sensor. Lights can be manually dimmed between the High Trim setting and the Partial On Level manually from a wirelessly linked dimmer switch.
5	Occupancy Mode w/ Ignore Off Switch	Lights come on automatically when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). On dimming models the lights will turn on to the **TURN ON / PARTIAL ON LEVEL** as specified in Function #4. Lights will turn off automatically if the **OCCUPANCY TIME DELAY** expires prior to receiving another occupied signal from a sensor. Lights cannot be switched off manually.
6	Partial Off Mode w/ Secondary Delayed Off	Valid on dimming models only. Lights come on automatically to full bright (**HIGH TRIM LEVEL**) when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). Lights will dim down to the **TURN ON / PARTIAL ON LEVEL** automatically if the **OCCUPANCY TIME DELAY** expires prior to receiving another occupied signal from a sensor. If the additional **SECONDARY TIME DELAY** also expires the lights will turn off. Lights can be manually dimmed between the **HIGH TRIM LEVEL** setting and the **TURN ON / PARTIAL ON LEVEL** manually from a wirelessly linked dimmer switch.
7	Occupancy Mode w/ Ignore Off & Dim Switch	Lights come on automatically when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). Lights will turn off automatically if the **OCCUPANCY TIME DELAY** expires prior to receiving another occupied signal from a sensor. Lights cannot be switched off or dimmed manually from a wirelessly linked switch.
8	Occupancy Mode w/ Ignore On/Off/Dim Switch	Lights come on automatically when an occupancy signal is received from wirelessly linked sensors (and/or wired sensors on -AX models). Lights will turn off automatically if the **OCCUPANCY TIME DELAY** expires prior to receiving another occupied signal from a sensor. Lights cannot be switched on, off, or dimmed manually from a wirelessly linked switch.

CONFIGURATION SETTINGS (CONT.)

SETTING #	MODE	DESCRIPTION
9	Ignore Occupancy	Wirelessly linked sensors are ignored. Lights can be switched on or off and can be dimmed from a wirelessly linked switch
10	Ignore Occupancy & Off Switch	Wirelessly linked sensors are ignored. Lights can be switched on and dimmed but cannot be switched off from a wirelessly linked switch.
11	Ignore Occupancy & Off & Dim Switch	Wirelessly linked sensors are ignored. Lights can be switched on but cannot be switched off or dimmed from a wirelessly linked switch.
12	Ignore Occupancy & On/Off/Dim Switch	Wirelessly linked sensors are ignored. Lights cannot be switched on or off nor be dimmed manually from a wirelessly linked switch.

ADDITIONAL NOTES ON OPERATIONAL MODES

- When in **Automatic 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), the Automatic On operation will be disabled until the occupancy time delay expires.
- Except when in a **PARTIAL OFF** (setting #4 and #6) mode, lights controlled by a dimming power pack will always turn on to the **TURN ON / PARTIAL ON LEVEL** as specified in Function #4.
- The value of the **TURN ON / PARTIAL ON LEVEL** is changed to 50% when the **OPERATIONAL MODE** is switched to Partial Off from another mode.
- 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. For hybrid wired/wireless power packs, if there are no sensors wirelessly linked or wired to the unit, tie the power pack's white input wire to red (+VDC) .
- When in **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. For dimming models, the lights will return to the previous level. After 15 seconds the sensor will revert to vacancy (manual on) operation.

FUNCTION #8 - RESTORE FACTORY DEFAULTS / FORGET LINKED DEVICES

To return a wireless power pack to its original factory default settings or to clear the unit's list of linked wireless devices the following commands can be executed.

SETTING #	DESCRIPTION
3	Restore Factory Defaults
4	Restore Factory Defaults and Forget all Linked Devices
5	Enter Forget Mode (opposite of Learn Mode)
6	Forget All Linked Devices
7	Send a "Forget Me" Message

Note: If factory defaults are restored, auto-setpoint calibration will need to be reinitiated from any linked photocell/daylight harvesting sensors.

ENTERING A RESTORE FACTORY DEFAULTS OR FORGET LINKED DEVICES COMMAND

1. Read through the above list and note the number of the desired command.

2. Press and release the unit's pushbutton **8 times**, then wait 2 seconds. The white LED will blink back 2 times, pause, and repeat 3x before exiting.

3. Interrupt the blink back and press the pushbutton the number times equal to the desired command (e.g. 6 times to Forget all Linked Devices).

4. The LED will flash back the command number as confirmation and will be executed after three confirmations. After the third confirmation sequence, 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.

FUNCTION #12 - SECONDARY TIME DELAY

When in **PARTIAL OFF W/ SECONDARY DELAYED OFF** operational mode, the below choices can be used for the duration of the secondary time delay. Note if 0 Minutes is chosen, the Partial Off point will be bypassed and the lights will immediately turn off.

SETTING #	DESCRIPTION	
1	0 Min	
2	1 Min	
3	5 Min	
4	10 Min	(default)
5	15 Min	
6	20 Min	
7	30 Min	

CHANGING THE SECONDARY TIME DELAY

1. Read through the above list and note the number of the desired setting (e.g. 3 = 5 Min).

2. Press and release the unit's pushbutton **12 times**, then wait 2 seconds. The white LED will blink back the number of the current setting (repeats 3x before exiting).

3. Interrupt blink back by pressing the button the number times equal to the new desired setting (e.g. 3 = 5 Min).

4. The LED will blink back the new setting number as confirmation and will be saved after three confirmations. After the third confirmation sequence, a successful save will be indicated by two sets of rapid white flashes. If the blue LED rapid flashes twice, save was unsuccessful and process should be started over.

DIMMING CONFIGURATION

CHANGING DIMMING CONFIGURATION SETTINGS

Several dimming parameters (listed in the tables below) can be adjusted by following the step-by-step procedure.

1. From the below tables of detailed dimming functions, note the number (#) of the function to be modified. For example, the **Turn On/Partial On Level** function is #4.
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 4 times to access the **Turn On/Partial On Level**.
3. 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 **Turn On/Partial On Level** is setting #3, Last User Level). Continue to the next step before the current setting is blinked back 3x).
4. To change the setting number, interrupt the blink back and press and release the button the number of times equal to the new setting #. For example, 4 times for ~30%.
5. The LED will flash back the new setting number as confirmation and will be saved after three confirmations. After the third confirmation sequence, 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.

FUNCTION #4 - TURN ON / PARTIAL ON LEVEL

The level the dimming output is set to upon initially turning on when in an Automatic On or Vacancy Operating Mode. Note, changes to this setting will not be observed until the lights have cycled off and back on one time. When in Partial Off Operating Mode, setting is the level to which the dimming output is dropped when an unoccupied or an off switch signal is received.

SETTING #	VALUES		NOTES
2	100%		
3	Last User Level	(default)	Invalid if Operational Mode set to Partial Off.
4	~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.
5	~40%		
6	~50%		
7	~60%		
8	~70%		
9	~80%		

FUNCTION #5 - 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	Drop to Off (default)	Dimming output drops to low trim and relay opens
3	Fade to Off	Dimming output fades to low trim and relay opens
4	Fade to 0V	Dimming output fades to 0 volts (e.g. below a connected driver's electronic off level). Relay remains closed.
5	Fade to Low Trim	Dimming output fades down to low trim level. Relay remains closed.
6	Drop to Low Trim	Dimming output drops down to low trim level. Relay remains closed.
7	Drop to OV	Dimming output drops to 0 volts (e.g. below a connected driver's electronic off level). Relay remains closed.

FUNCTION #6 - HIGH TRIM

The maximum voltage to which the dimming output is allowed. For increased energy savings or task tuning, choose a value lower than 10 VDC (100%).

SETTING #	VALUES		NOTES
2	~10 VDC (100%)	(default)	Exact light output % at each voltage level depends on driver/ballast and luminaire. **IMPORTANT NOTICE -** After changing the high trim value, Auto-Setpoint calibration should be re-run at the linked wireless daylight sensor.
3	~9 VDC (90%)		
4	~8 VDC (80%)		
5	~7 VDC (70%)		
6	~6 VDC (60%)		
7	~5 VDC (50%)		

FUNCTION #7 - LOW TRIM

The minumum voltage to which the dimming output can lower lighting.

SETTING #	VALUES		NOTES
2	0 VDC		Exact light output % at each voltage level depends on driver/ballast and luminaire. **IMPORTANT NOTICE -** After changing the low trim value, Auto-Setpoint calibration should be re-run at the linked wireless daylight sensor.
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

The time it takes for a dimming output to reach its final level when turning off. This setting is only active when the unit's **Turn Off Scheme** is set to one of the Fade settings.

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

FUNCTION #10 - FADE ON TIME

The time it takes for a dimming output to reach its final level when turning on.

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

ADVANCED CONFIGURATION (DAYLIGHT HARVESTING/PHOTOCELL & OTHER)

Several advanced configuration settings including daylight harvesting/photocell related settings (listed in the tables below) can be adjusted by following the step-by-step programming procedure listed below.

CHANGING AN ADVANCED CONFIGURATION SETTING

1. Read through this entire 5 step procedure before performing step 2. Also, from the below tables of advance functions, note the number (#) of the function to be modified. For example, the **Daylight Harvesting / Photocell Operating Mode** function is #1
2. To enter advanced programming mode, press and hold the unit's pushbutton. The LED will initially be steady blue. After 3 seconds the LED will change to alternate white and blue, keep holding. After 6 seconds, the LED will change to rapid blue flashing indicating you can release the button.
3. Press and release the unit's button the number of times of the desired advanced function. For example, press the button 1 time to access the **Daylight Harvesting / Photocell Operating Mode.**
4. For functions #1, 3, 4, & 6 below the LED will flash back the setting number of the current value as it appears in each function's detailed table below. Continue to the next step before the current setting is blinked back 3x.
5. To change the setting number, interrupt the blink back and press and release the button the number of times equal to the new setting #. For example, 5 times for **Daylight Harvesting to Low Trim.**
6. The LED will flash back the new setting number as confirmation and will be saved after three confirmations. After the third confirmation sequence, 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.

ADVANCED FUNCTION #1 - DAYLIGHT HARVESTING / PHOTOCELL OPERATING MODE

This function defines how the power pack controls the lights when it receives ambient light values from a linked photocell that are above the **SETPOINT** value.

SETTING #	VALUES		NOTES
2	Disabled	(default)	Default setting on all **SWX-950** series controllers. Running auto-setpoint on a linked photocell or sensor will change mode to setting to #3 or #5.
3	On/Off Operation		Automatically enabled on a **SWX-950-(AX)** once auto-setpoint configuration is run from a linked wireless photocell. Lights will turn off with high daylight.
4	Inhibit Only Operation		During high daylight, lights will be prevented from coming on automatically when occupancy is detected. However, lights will not never be switched off due to high daylight.
5	Daylight Harvesting to Low Trim (i.e. Auto Dimming)		Automatically enabled on a **SWX-950-(AX)-D2** and **SWX-950-D1** once auto-setpoint configuration is run from a linked wireless photocell. As ambient light level rises, the controlled lights will be dimmed down to a minumum of the **LOW TRIM** value. Lights will not be turned off from high daylight.
6	Daylight Harvesting to Off		Lights will dim to low trim and then turn off from high daylight.

ADVANCED FUNCTION #2 - AMBIENT SETPOINT

The minimum overall light level that is to be maintained in a space is referred to as the "setpoint". **Note:** the **Auto-Setpoint Calibration** procedure must initially be run from a linked wireless photocell for this function to be enabled. Once run, the value calculated during the auto-setpoint calibration will be blinked back upon entering this function (i.e. after doing **STEPS 2-3** in the **Changing an Advanced Configuration Setting**). The blink back is done in two alternating digits as follows:

BLUE LED BLINKS = 10' digit (1-9 blinks or rapid blink for 0) WHITE LED BLINKS = 1's digit (1-9 blinks or rapid blink for 0)

To change the setpoint value, follow **STEPS 5-6** in the **Changing an Advanced Configuration Setting** procedure at the top of this page and using the below value table.

SETTING #	VALUES
2	2.5 fc
3	5.0 fc
4	10.0 fc
5	15.0 fc
6	25.0 fc
7	35.0 fc
8	50.0 fc
9	+10 %
10	- 10 %

Note: during the **Auto-Setpoint Calibration** procedure the controlled lights will cycle off then back on. If the photocell device does not see a change in light level during this cycle (i.e. the application is open loop), an auto-setpoint of 25.0 fc will be chosen. This situation will also occur if a flashlight is shined into the photocell continuosly during the calibration process (for example in an effort to acheive a high auto-setpoint). To prevent this from occuring, switch the flashlight off and back on along with the power pack controller's relay switching off and back on. This will simulate a large ambient light change and will result in a high setpoint (e.g. 99 fc) to be stored.

ADVANCED FUNCTION #3 - MANUAL DIMMING OVERRIDE

The amount of time that user is allowed to raise the dim level of a controller that is also linked to a daylight harvesting photocell. Lowering the dim level is always allowed.

SETTING #	VALUES		NOTES
2	Disabled	(default)	Dimming above the daylight harvesting level is not allowed.
3	Indefinitely		Dimming above the daylight harvesting level is always allowed.
4	1 Hour		Dimming above the daylight harvesting levels is allowed for the setting's time period after which the level will automatically return to the daylight harvesting level. Manual dimming overrides are also cancelled when ever lights switch off from occupancy sensors timing out.
5	2 Hour		
6	4 Hour		
7	8 Hour		

ADVANCED CONFIGURATION (CONT.)

ADVANCED FUNCTION #4 - LEADER / FOLLOWER (MULTI-ZONE OFFSET)

When a wireless power pack is configured to be a "follower", it will track the behavior of the "leader" power pack to which it is linked. This is useful when trying to extend the wireless range in a controlled space. In multi-zone daylight harvesting applications, the follower power pack controller can also be configured to keep lights a fixed amount brighter than the leader controller. Wireless follower power packs must be first wirelessly linked to a leader power pack (see Note 2 in the Wireless Linking (Pairing) instructions on page 4). Once a follower power pack is linked to a leader power pack, it can also act as a leader to another follower power pack using the same linking process.

SETTING #	VALUES	NOTES
2	Disabled (default)	
3	Leader	
4	Follower	
5	Follower - 10% Brighter	- Exact light output % at each voltage level depends on driver/ballast and luminaire. - Requires a leader pack capable of dimming
6	Follower - 20% Brighter	
7	Follower - 30% Brighter	
8	Follower - 40% Brighter	
9	Follower - 50% Brighter	

ADVANCED FUNCTION #6: AUXILIARY INPUT WIRE MODE

On hybrid power packs (i.e. **-AX** option models), the functionality of the brown low voltage input wire is configurable to the below functionality. To change these settings, follow the **Changing an Advanced Configuration Setting** procedure at the top of page 9.

SETTING #	MODE	DESCRIPTION
2	Switch Input (0.5 second maximum pulse) (default)	For momentary switches, the power pack will toggle on the leading edge of a pulse on the brown input wire. For maintained switches, any change of state on the brown wire that lasts longer than the respective setting's maximum pulse length will be read as one toggle action.
3	Switch Input (1.0 second maximum pulse)	
4	Switch Input (2.0 second maximum pulse)	
5	Override On / Logic High	Lights are held on at Function 6, **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 Function 6, **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 Function #5, **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 Function #5, **TURN OFF SCHEME**) and occupancy is ignored when auxiliary switch input wire is logic low (< 5VDC).

FCC INFORMATION (FCC ID: 2AVRY-SWX0003)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:
1. This device many not cause harmful interference, and
2. This device must accept any interference received, Including interference that may cause undesired operation

Changes and Modifications not expressly approved by BLP Technologies can void your authority to operate this equipment under Federal Communications Commission's rules.
In order to comply with FCC/ISED RF Exposure requirements, this device must be installed to provide at least 20 cm separation from the human body at all times.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

ISED CANADA INFORMATION (IC: 26012-SWX0003)

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

In order to comply with FCC/ISED RF Exposure requirements, this device must be installed to provide at least 20 cm separation from the human body at all times.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
3. Afin de se conformer aux exigences d'exposition RF FCC / ISED, cet appareil doit être installé pour fournir au moins 20 cm de séparation du corps humain en tout temps