

# PRODUCT RETROFIT GUIDE

## Cabinets and Channel Letters

### Module and Stik™ Families

Qwik Mod Series, Patriot Series, Choice Modules, Tap Out Modules, Street Fighter Modules, Pinnacle Modules, Tap Out Stik™, Pinnacle HE Stik™, Patriot Stik™

### Warning

- Installation must only be performed by a licensed electrician.
- To prevent death, injury or damage to property this product must be installed in accordance with the National Electric Code in the USA or Canadian Electrical Code (CSA22.1) in Canada.
- Install according to Kit Model: PL-RT1-001. Go to [PrincipalSloan.com](http://PrincipalSloan.com) for details.
- This guide covers the kit model PL-RT1-001 and is to only include the UL recognized LED products and power supplies found in this manual and UL file E341517.
- **WARNING:** Risk of fire or electric shock. LED Retrofit Kit installation requires knowledge of sign electrical systems. If not qualified, do not attempt installation. Contact a qualified electrician.
- **WARNING:** Risk of fire or electric shock. Install this kit only in host signs that have been identified in the installation instructions and where the input rating of the retrofit kit does not exceed the input rating of the sign.
- **WARNING:** Risk of fire or electric shock. Installation of this LED retrofit kit may involve drilling or punching of holes into the structure of the sign. Check for enclosed wiring and components to avoid damage to wiring and electrical parts.
- Installer should examine all parts that are not intended to be replaced by the retrofit kit for damage and replace any damaged parts prior to installation of the retrofit kit.
- Installers should not disconnect existing wires from lampholder terminals to make new connections at lampholder terminals. Instead installers should cut existing lampholder leads away from the lampholder and make new electrical connections to lampholder lead wires by employing applicable connectors.
- **WARNING:** To prevent wiring damage or abrasion, do not expose wiring to edges of sheet metal or other sharp objects.
- Do not make or alter any open holes in an enclosure of wiring or electrical components during kit installation.
- Repair and seal any unused openings in the electrical enclosure. Openings greater than 0.5" (12.7 mm) diameter require a metal patch secured by screws or rivets and caulked with non-hardening caulk. Smaller openings may be sealed with non-hardening caulk.
- **WARNING:** To avoid potential fire or shock hazard, do not use this retrofit kit with existing shunted bi-pin lampholders in the host sign. Note: Shunted lampholders are found only in fluorescent signs with Instant-Start ballasts. Instant-start ballasts can be identified by the words "Instant Start" or "I.S." marked on the ballast. This designation may be in the form of a statement pertaining to the ballast itself, or may be combined with the marking for the lamps with which the ballast is intended to be used, for example F40T12/IS. For more information, contact the LED retrofit kit manufacturer.
- "This sign has been modified to operate LED lamps. Do not attempt to install or operate lamps in this sign." shall be marked on the retrofitted sign where readily visible by the user during normal maintenance including relamping. "Lamps in this sign shall be replaced by the original illumination type such as 'fluorescent,' 'HID,' etc." This marking shall be provided on a separate permanent label that is intended to remain in the applied position for the lifetime of the sign under conditions of normal use.



GENERAL PURPOSE  
RETROFIT SIGN CONVERSION

FOR USE ONLY IN ACCORDANCE  
WITH KIT INSTRUCTIONS

KIT IS COMPLETE ONLY WHEN ALL PARTS REQUIRED  
BY THE INSTRUCTIONS ARE PRESENT

*This product is covered by issued U.S. Patent No. 9,851,054 and 10,024,501.*

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## Cabinets and Channel Letters

All UL part number for the products listed below are based on the master part number found within E341517: **PL-XX#-BBO-Z/DD-WW-A-YYV-T(HH)**

### MODEL NUMBER NOMENCLATURE - The following describes the nomenclature of Class 2 LED Modules, designated as PL-XX#-BBO-Z/DD-WW-A-YYV-T(HH) Series:

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. PL (Principal LED) - represent the series designation</li> <li>2. XX - represents different LED module series</li> <li>3. # - represents numerical designation for LED model of different lengths of assemblies</li> <li>4. BB - represents the different LED model within the LED module series</li> <li>5. O - represents the number of LED diodes on the LED model</li> <li>6. Z - represents the plastic housing of each module where N stands for No Housing and P stands for Potted with Housing</li> <li>7. DD - represents the stick designation for assembly models</li> <li>8. WW - represents the number of sides that LED modules are mounted to on assemblies</li> <li>9. A - represents different length of the PWB</li> </ol> | <ol style="list-style-type: none"> <li>10. YY - represents different color or color temperature of LEDs</li> <li>11. V - represents LED series numbering designation</li> <li>12. T - represents the plastic housing of each module where N stands for No Housing and P stands for Potted with Housing</li> <li>13. HH - represents additional assembly specifications</li> </ol> <p>PL-XX#BBO-Z/DD-WW-A-YYV-T(HH) Series, where XX may be any combination of letters for AA to ZZ; # may be any numeric character 0-999; BB may be any combination of letters AA to ZZ or may be left blank; O may be any number 0-999 or may be left blank; Z may be letter N or P or may be left blank; /DD may be any combination of letters AA to ZZ or may be left blank; WW may be letters SS (Single Sided), DS (Double Sided), TS (Triple Sided), or SH (Four Sided) or may be left blank; A may be any number 0 to 999 or may be left blank; YY may be any combination of letters AA to ZZ; V may be any number 0 TO 999 or may be left blank, T may be letter N or P or may be left blank; (HH) may be alphanumeric combination or may be left blank.</p> |
|--|--|

Product name	UL part number	SKU	Input voltage (VDC)	Power (W)	Units/60W
<b>MODULES</b>					
Qwik Mod 1	PL-QM1-YYV-P	M-QMSXO-YY	12.00	0.40	150
Qwik Mod 2	PL-QM2-YYV-P	M-QMDXO-YY	12.00	0.80	76
Qwik Mod 3	PL-QM3-YYV-P	M-QMTXO-YY	12.00	1.20	50
Qwik Mod 4	PL-QM4-YYV-P	M-QMQXO-YY	12.00	1.60	38
Choice	PL-SF-CH-P	M-SFCXO-YY	12.00	0.80	72
Choice HO	PL-SF-HO-P	M-SFCXH-YY	12.00	1.25	48
Street Fighter Pod 1	PL-OP2-PD1-P-YY	M-SFPS1-YY	12.00	1.32	44
Street Fighter Pod 2	PL-OP2-PD2-P-YY	M-SFPD2-YY	12.00	2.50	24
Street Fighter Pod 3	PL-OP2-PD3-P-YY	M-SFPT3-YY	12.00	1.32	44
Street Fighter RGB	PL-OP2-SC3-P-RG	M-SFCX3-3C	12.00	0.65	90
Street Fighter Tap Out 12V	PL-OP2-TO3-P-YY	M-SFTO3-YY	12.00	1.32	45
<b>ASSEMBLIES</b>					
Tap Out 12V Stik Single-sided	PL-OP2-TO3-P/ST-SS-A-Y	B-TO-SV-AYY	12.00	5.28-29.04	11-2
Tap Out 12V Stik Double-sided	PL-OP2-TO3-P/ST-DS-A-Y	B-TO-DV-AYY	12.00	10.56-58.08	5-1

## 24V Products

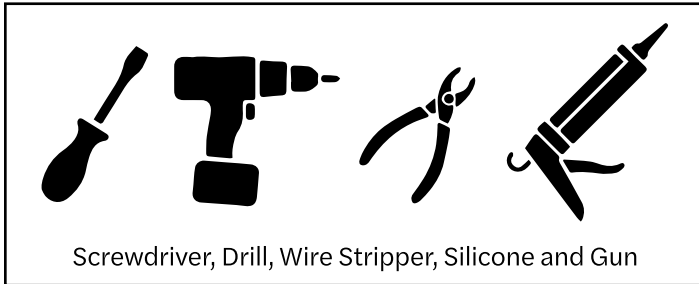
Product name	UL part number	SKU	Input voltage (VDC)	Power (W)	Units/60W
<b>MODULES</b>					
Patriot Small	PL-PT#-SM-P	M-PTSMO-YY	24.00	0.40	240
Patriot Medium	PL-PT#-MD-P	M-PTMDO-YY	24.00	0.80	120
Patriot Large	PL-PT#-LG-P	M-PTLGO-YY	24.00	1.07	90
Patriot XL	PL-PT#-XL-P	M-PTXLO-YY	24.00	1.33	72
Patriot Deep	PL-PT#-XD-P	M-PTXDO-YY	24.00	1.33	72
Pinnacle HE	PL-OP1-TO4-P	M-SFTO4-YY-24	24.00	1.32	72
Street Fighter Tap Out 24V	PL-SF24-TO3-P	MSFTO3-YY-24	24.00	1.32	72
<b>ASSEMBLIES</b>					
Patriot XL Stik Single-sided	PL-PT#-XL-P/ST-SS-A	B-PT-SV-AYY-XL	24.00	2.66-23.94	36-4
Patriot XL Stik Double-sided	PL-PT#-XL-P/ST-DS-A	B-PT-DV-AYY-XL	24.00	5.32-47.88	18-2
Patriot XL Deep Stik Single-sided	PL-PT#-XD-P/ST-SS-A	B-PT-SV-AYY-XD	24.00	2.66-23.94	36-4
Patriot XL Deep Stik Double-sided	PL-PT#-XD-P/ST-DS-A	B-PT-DV-AYY-XD	24.00	5.32-47.88	18-2
Pinnacle HE 24V Single-sided Stik	PL-OP1-TO4-P/ST-SS-A-YY	B-TP-SV-AYY-24-HE	24.00	2.64-15.84	36-6
Pinnacle HE 24V Double-sided Stik	PL-OP1-TO4-P/ST-DS-A-YY	B-TP-DV-AYY-24-HE	24.00	5.28-31.68	18-3
Tap Out 24V Stik Single-sided	PL-OP2-TO3-P/ST-SS-A-YY24	B-TO-SV-AYY-24	24.00	5.28-29.04	18-3
Tap Out 24V Stik Double-sided	PL-OP2-TO3-P/ST-DS-A-YY24	B-TO-DV-AYY-24	24.00	10.56-58.08	9-1

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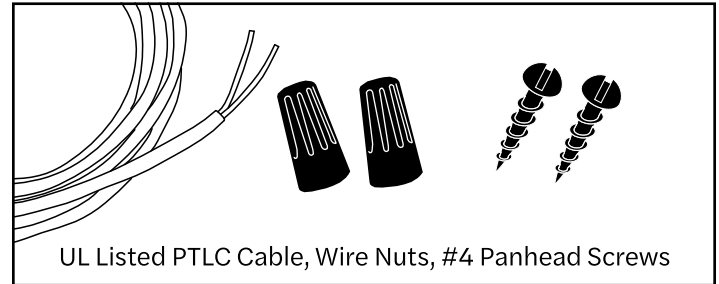
## Cabinets and Channel Letters

### Cabinet/Channel Letter Installation Guide for Modules

#### Tools required



#### Supplies required



- A.** Arrange the modules per the Principal Sloan product estimate and layout found at *PrincipalSloan.com*, remembering that this is only a guide. Be sure to test your cabinet or letters, making sure the lighting is even and output is adequate before adhering the modules to the back of the sign.
- B.** Clean mounting surface with alcohol to remove dirt or oil. Surface may be the back of the cabinet (single-sided), square tubing or extrusion (double-sided). Adhere the modules to the back of the can by peeling the release liner from the tape on the back of the module and pressing the module down firmly to the back of the sign can. **Additional security must be added by adding silicone to the edge of the module or utilizing a number #4 screw for modules with a mechanical screw hole option.** All runs should be terminated with the wire being cut down to the module and sealed using weather-rated silicone, or a wire nut covering the exposed leads at the end.
- C.** For power supply loading, refer to our website: *PrincipalSloan.com*. Use only UL (USA) or cUL/CSA (Canada) approved Class 2 wire to connect the modules from each can back to the power supply with wire nuts as shown in Figure 1. Principal Sloan module wires are generally white or colored (+) and black or gray (-).

Class 2 wire may be used to jump from one letter or run of LEDs to another; however, it is recommended that the total number of modules in a single run not exceed the recommended amount found on the individual spec sheets at *PrincipalSloan.com*.

- D.** Please see next page for power supply wiring and installation. All runs through a wall must be in conduit or pass through with Class 2 wire consistent with the National Electric Code or Canadian Electric Code.
- E.** Attach the channel letter or cabinet face and energize the sign.

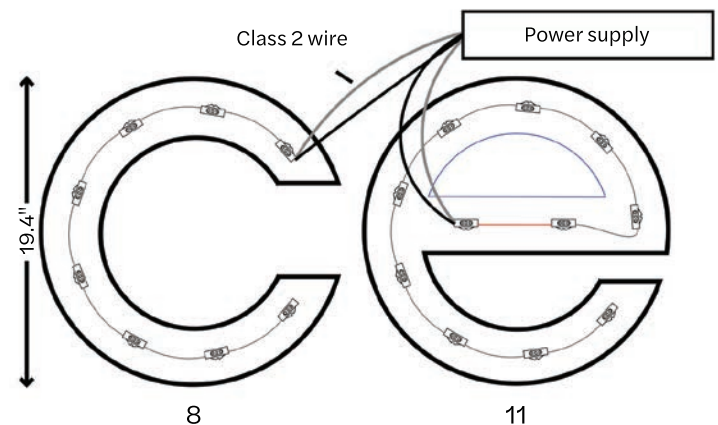


Fig. 1

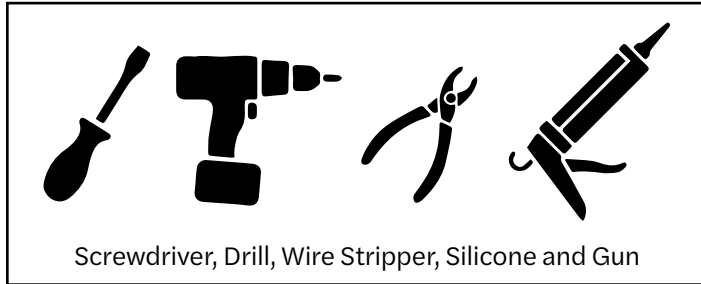
# PRODUCT RETROFIT GUIDE

Cabinets and Channel Letters

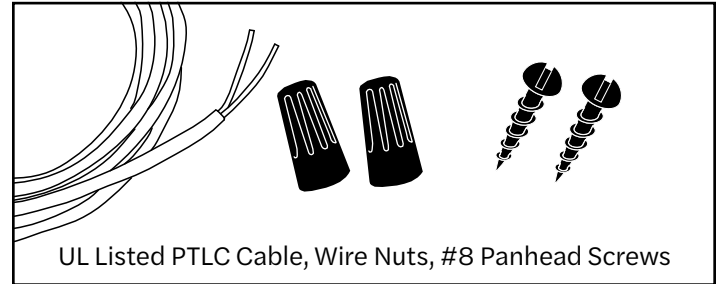
## Principal Sloan Power Supplies

PL-60-12-MU, Installation Guide, PS  
Input: 100-277 / Output: 12 VDC

### Tools required

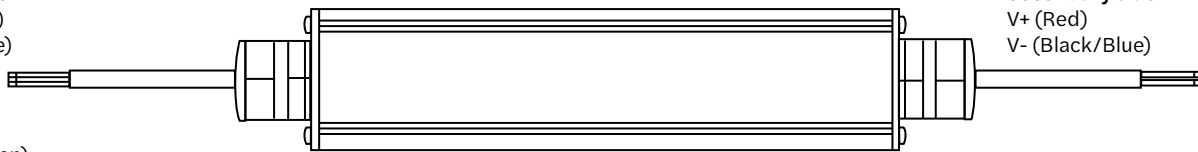


### Supplies required



### Power Supply:

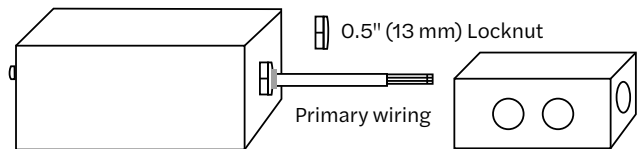
**Primary side:**  
AC/L (Black)  
AC/N (White)



**Attach power supply to J-box:** Attach power supply(s) to junction box using 0.5" locknut. Multiple power supplies may be connected and configured to the same junction box.

For wet locations, use a junction box that is UL-rated for wet use.

**NOTE:** Operating temperature is -22° to 140° F (-30° to 60° C) therefore it is required by UL that the power supplies are spaced at least 2" (51 mm) apart side-to-side, 1" (25 mm) end to end, and not in secondary enclosure to ensure optimal ventilation to ensure maximum lifetime of the power supply, it is highly recommended that a photo-cell or timer be used to prevent operation during daylight hours. Do not use more modules than recommended on the product installation guide. Total amperage should not exceed 5.0 A per power supply



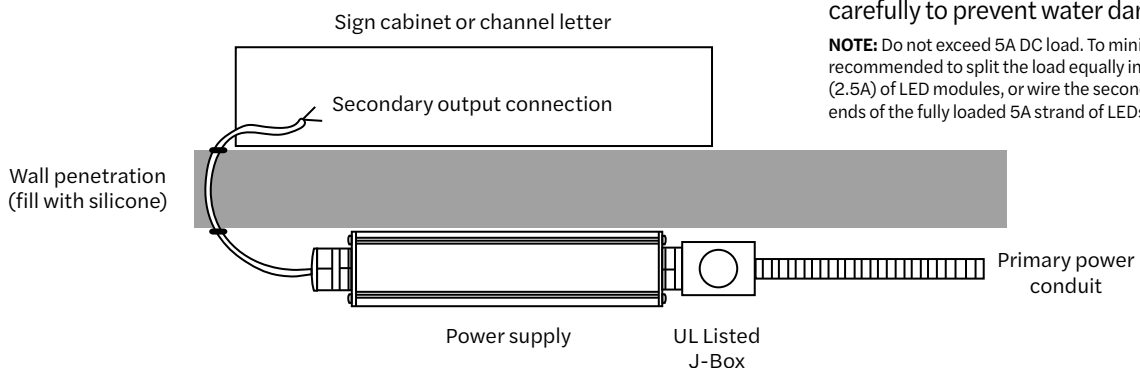
**Mount power supply:** Using a drill and the #8 Panhead screws, mount the power supply using the mounting tabs at the bottom of the supply.

**Make primary connection:** A licensed electrician is required in order to bring conduit to the junction box and make the primary connection.

### Make secondary connections:

Secondary output is 12VDC or 24VDC. Secondary Class 2 Cables DO NOT require conduit per NEC 2008 Articles 725.121-130. Always seal wall penetrations carefully to prevent water damage.

**NOTE:** Do not exceed 5A DC load. To minimize light loss it is recommended to split the load equally in two parallel runs (2.5A) of LED modules, or wire the secondary input to both ends of the fully loaded 5A strand of LEDs



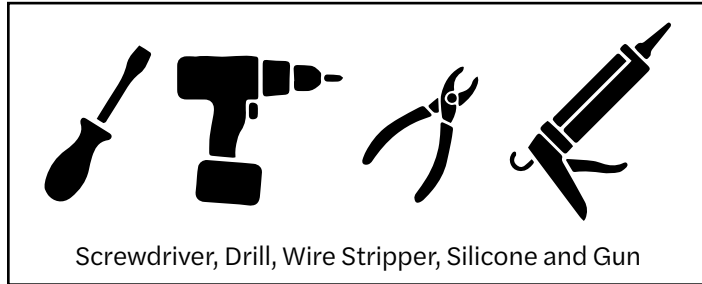
# PRODUCT RETROFIT GUIDE

Cabinets and Channel Letters

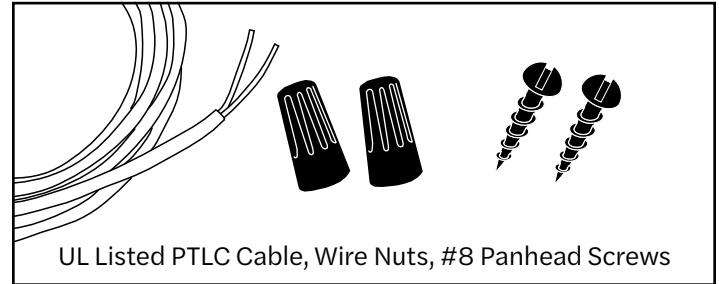
## Enclosure/Raceway Mount Power Supplies

Installation guide, self-contained PS  
Input: 100-277 VAC or 277-347 VAC / Output: 12 or 24 VDC

### Tools required



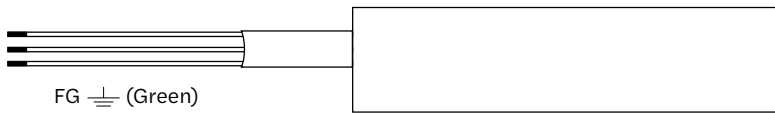
### Supplies required



### Power Supply:

#### Primary side:

AC/L (Black)  
AC/N (White)



#### Secondary side:

V+ (Red)  
V- (Black/Blue)

**NOTE:** Operating temperature is -22° to 158° F (-30° to 70° C) (see de-rating chart at [PrincipalSloan.com](http://PrincipalSloan.com) for higher temperature option), therefore it is recommended that the power supplies are spaced at least 4" (102 mm) apart side-to-side, 2" (51 mm) end-to-end (some models have been approved for 2" (51 mm) and 1" (25 mm) end-to-end), and not in secondary enclosure to ensure optimal ventilation (please see table for details). To ensure maximum lifetime of the power supply, it is highly recommended that a photocell or timer be used to prevent operation during daylight hours. Do not use more modules than recommended on the product installation guide. Total amperage should not exceed max. output current (full list on next page).

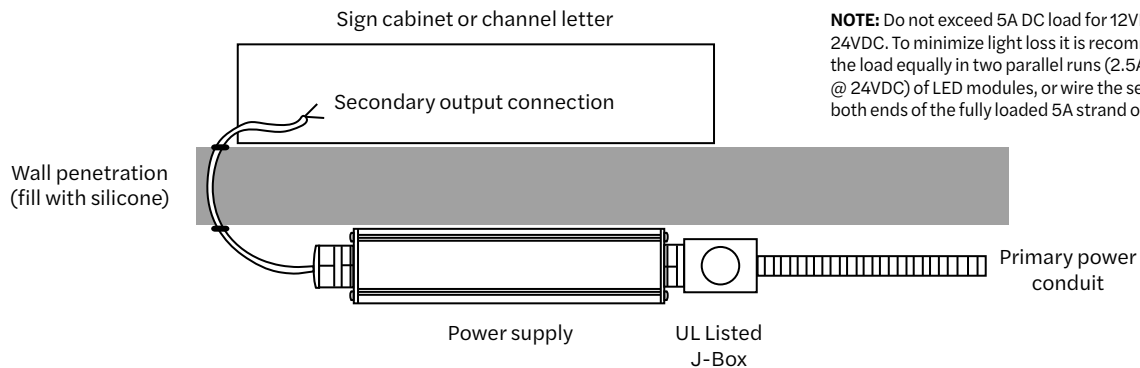
**Mount power supply:** Using a drill and the #8 Panhead screws, mount the power supply inside the channel letter, inside the raceway, or in a separate UL enclosure using the mounting tabs at the bottom of the supply.

**Make primary connection:** A licensed electrician is required in order to bring conduit to the junction box and make the primary connection.

#### Make secondary connections:

Secondary output is 12VDC or 24VDC. Secondary Class 2 Cables DO NOT require conduit per NEC 2008 Articles 725.121-130. Always seal wall penetrations carefully to prevent water damage.

**NOTE:** Do not exceed 5A DC load for 12VDC or 4 A load for 24VDC. To minimize light loss it is recommended to split the load equally in two parallel runs (2.5A @ 12VDC or 2.0A @ 24VDC) of LED modules, or wire the secondary input to both ends of the fully loaded 5A strand of LEDs



# PRODUCT RETROFIT GUIDE

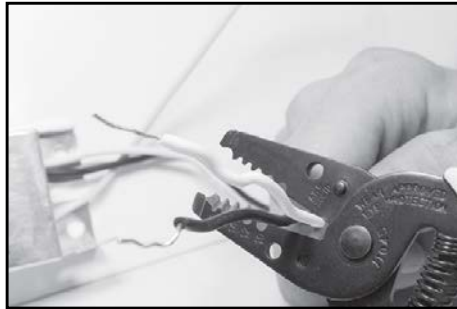
Cabinets and Channel Letters

## Enclosure/Raceway Mount Power Supplies

**NOTE:** Do not insert Stik into existing sockets until ballast has been disconnected from mains and removed.



**1:** Turn off power from main lines.



**2:** Cut power and secondary lines to the existing ballast and remove.



**3:** Remove old fluorescent lamps from existing lamp sockets.



**4:** Insert Stik into lamp socket. See depth chart to determine LED direction. Depth Chart can be found at [PrincipalSloan.com](http://PrincipalSloan.com)



**5:** Using UL Listed 12-18 gauge hook-up wire, connect gray wire (+) and white wire (-) to the 12V power unit using wire nuts.



**6:** Connect hook-up wire to the secondary output of the 12VDC power supply.

## Troubleshooting

- Check power to sign.
- Check power connection to the driver.
- Check polarity on the Direct Current side (Red+ / Black -).
- Check wire nut connections to each Stik.

## New Construction Mounting Brackets

**NOTE:** Mounting brackets are available for new construction. Use as a mounting base on each side of the cabinet.

**1:** Mount base to each side of the return.



*Tighten wing nut at each end to adjust height and stabilize the Stik.*

**2:** Insert Stik onto threaded base and adjust using wing nut to desired position and tighten.

*LEDs may be pointed to sign face or return depending on depth to face.*



This instruction sheet is meant to be used in accordance with all NEC and local electrical codes. This document does not supersede any local, state, or national regulations. For questions, please contact Principal Sloan at 325.227.4577 or visit us on the web at [PrincipalSloan.com](http://PrincipalSloan.com)

# PRODUCT RETROFIT GUIDE

Cabinets and Channel Letters

## E#341517 UL Recognized Principal Sloan LED Power Supplies

Model	SKU	Input voltage	Input current	Output voltage	Output current	Frequency	Location rating
Energizer Series 20W 12VDC Power Supply	P-OH020-12-EC	90-305 VAC	Max. 0.5 A	12 VDC	0-1.67 A	47-63 Hz	Wet/Damp/Dry
Energizer Series 20W 24VDC Power Supply	P-OH020-24-EC	90-305 VAC	Max. 0.5 A	24 VDC	0-0.833 A	47-63 Hz	Wet/Damp/Dry
Energizer Series 60W 12VDC Power Supply	P-OH060-12-EC	90-305 VAC	Max. 1.35 A	12 VDC	0-5 Amps	47-63 Hz	Wet/Damp/Dry
Energizer Series 60W 24VDC Power Supply	P-OH060-24-EC	90-305 VAC	Max. 1.35 A	24 VDC	0-2.5 Amps	47-63 Hz	Wet/Damp/Dry
Energizer Series Threaded 100W 24VDC Power Supply	P-OH100-24-EC-T	90-305 VAC	Max. 2.5 A	24 VDC	0-4 Amps	47-63 Hz	Wet/Damp/Dry
Energizer Series Threaded 60W 12VDC Power Supply	P-OH060-12-EC-T	90-305 VAC	1.33 A/100 VAC, 0.65 A/230 VAC	12 VDC	0-5 Amps	47-63 Hz	Wet/Damp/Dry
HE 120 W 12VDC Power Supply	P-OH120-12-HE	120-277 VAC	1.2 A/120 VAC, 0.51 A/277 VAC	12 VDC	0.5-5.0 Amps	50-60 Hz	Damp/Dry
HE 180 W 12VDC Power Supply	P-OH180-12-HE	120-277 VAC	1.8-0.76 A	12 VDC	0.5-5.0 Amps (per channel, 3-channel)	50-60 Hz	Damp/Dry
HE 300 W 24VDC Power Supply	P-OH300-24-HE	120-277 VAC	2.9-1.27 A	24 VDC	0.41-4.1 Amps (per channel, 3-channel)	50-60 Hz	Damp/Dry
HE 60 W 12VDC Power Supply*	P-OH060-12-HE	110-277 VAC	0.61 A/100 VAC, 0.27 A/277 VAC	12 VDC	0.5-5.0 Amps	50-60 Hz	Damp/Dry
HE 96 W 24VDC Power Supply*	P-OH096-24-HE	110-277 VAC	0.98 A/100 VAC, 0.42 A/277 VAC	24 VDC	0.41-4.1 Amps	50-60 Hz	Damp/Dry
Universal 100 W 24VDC Micro-Driver Power Supply	P-OH100-24-MD	120-277 VAC	0.9 A/120 VAC, 0.39 A/277 VAC	24 VDC	0-4.0 Amps	50-60 Hz	Damp/Dry
Universal 60 W 12VDC Micro-Driver Power Supply	P-OH060-12-MD	100-277 VAC	Max. 0.7 A	12 VDC	0-5.0 Amps	50-60 Hz	Damp/Dry

## Voltage Drop Chart

NOTE: All distance denoted in feet.

Voltage (VDC)	Current (A)	Power (W)	Wire Gauge											
			24	22	20	18	16	14	12	10	8	6	4	2
12	0.5	6	40	64	100	160	250	400	650	1000	1600	2550	4000	6500
	1.0	12	20	32	50	80	125	200	325	500	800	1275	2000	3200
	1.5	18	13	22	33	55	85	132	215	330	525	850	1400	2150
	2.0	24	10	16	25	40	62	100	160	250	400	650	1000	1600
	2.5	30	8	13	20	32	50	80	125	200	325	500	800	1290
	3.0	36	7	11	17	26	42	66	110	165	265	425	675	1100
	3.5	42	6	9	14	23	36	58	90	145	230	365	575	925
	4.0	48	5	8	13	20	32	50	78	125	200	320	500	800
	4.5	54	4	7	11	18	28	45	70	110	175	280	450	720
24	0.5	12	80	128	200	320	500	800	1300	2000	3200	5100	8000	13000
	1.0	24	40	64	100	160	250	400	650	1000	1600	2550	4000	6400
	1.5	36	26	44	66	110	170	264	430	660	1050	1700	2800	4300
	2.0	48	20	32	50	80	124	200	320	500	800	1300	2000	3200
	2.5	60	16	26	40	64	100	160	250	400	650	1000	1600	2580
	3.0	72	14	22	34	52	84	132	220	330	530	850	1350	2200
	3.5	84	12	18	28	46	72	116	180	290	460	730	1150	1850
	4.0	96	10	16	26	40	64	100	156	250	400	640	1000	1600

### Customer service and technical support

- principalsloan.com
- 325.227.4577
- 3490 Venture Dr., San Angelo, TX 76905

