

BACKlight 2G Installation Guide

OSRAM SYLVANIA BACKlight (B2G) modules powered by OPTOTRONIC® LED power supplies form a system designed for backlighting channel letters and both are listed in the UL Sign Accessories Manual (SAM). B2G is available on reels that contain 2 modules in a chain-like structure. Each module has 60 circuit boards containing 2 LEDs connected by flexible jumper wires for a total of 120 LEDs.



The B2G modules are a safer and longer life alternative to traditional neon lighting. In comparison to neon, the B2G system provides excellent color and brightness and can be easily installed into channel letters for extremely low maintenance operation.

Adjusting the spacing between the circuit boards, also referred to as coupon, can easily control the brightness and uniformity of the sign face. The rugged B2G modules may be mounted and shipped pre-assembled in channel letters without fear of breakage.

INSTRUCTIONS

WARNING: ONLY QUALIFIED PERSONNEL SHOULD PERFORM INSTALLATION.

TO AVOID ELECTRICAL SHOCK OR COMPONENT DAMAGE, DISCONNECT POWER BEFORE ATTEMPTING INSTALLATION OF THE POWER SUPPLIES AND/OR MODULES.

Failure to install the power supplies and/or LED modules in accordance with the National Electric Code (NEC), all applicable Federal, State and local electric codes as well as the specific Underwriter's Laboratories (UL) safety standards for the installation, location and application may cause serious personal injury, death, property damage and/or product malfunction.

These instructions are guidelines for installation of OSRAM LED modules and power supplies. Installation requirements may vary depending on the application. Licensed electricians should provide all installation services for connection of both primary and secondary (input/output) of the power supplies.



1 Sizing the application

- Use the chart on the back page to estimate the quantity of B2G modules required for replacing neon tubing. Typically 1 foot of the Amber Red B2G when fully extended should replace 1 foot of red neon.

Example:

Acrylic	Install Depth	LED Color	Neon Color	% Brightness to NEON			Color Match
				Single Stroke	Double Stroke	Triple Stroke	
Red 2283	5	Amber Red	Red	84	168	253	Good
Red 2283	5	Super Red	Red	47	94	141	Deep Red
Red 2283	5	Orange	Red	82	164	246	Orange

In the above example, a single stroke of Amber Red B2G will replace a single stroke of Red NEON with an 84% brightness level. If necessary, reduce the spacing between the coupons or add additional modules to achieve the desired brightness level.



2 Layout

- Space the coupons evenly throughout the channel letter. Additional modules can be added or wires can be cut as required to fit the contours of the letter. Do not exceed the power capacity of the power supply.

Example: from the below chart a complete reel of B2G (Amber Red) can be operated with a single 50 watt power supply.

Example:

OPTOTRONIC Power Supplies

Item Number	Ordering Description	Color	OPTOTRONIC 25W (51505)			OPTOTRONIC 50W (51508, 51509)		
			Maximum Length (ft.)	LED Load Watts	No. of Modules	Maximum Length (ft.)	LED Load Watts	No. of Modules
70143	BACKlight2G/633/BL02ST/S1	Super Red	20	24	1.3	41	50	2.6
70149	BACKlight2G/617/BL02ST/A1	Amber Red	20	24	1.3	41	50	2.6
70147	BACKlight2G/606/BL02ST/O1	Orange	20	24	1.3	41	50	2.6
70145	BACKlight2G/587/BL02ST/Y2	Yellow	20	24	1.3	41	50	2.6
70146	BACKlight2G/525/BL02ST/T2	Green	24	24	1.5	49	50	3.1
70148	BACKlight2G/470/BL02ST/B1	Blue	24	24	1.5	49	50	3.1
70144	BACKlight2G/BL02ST/W2-865	White	20	24	1.3	41	50	2.6

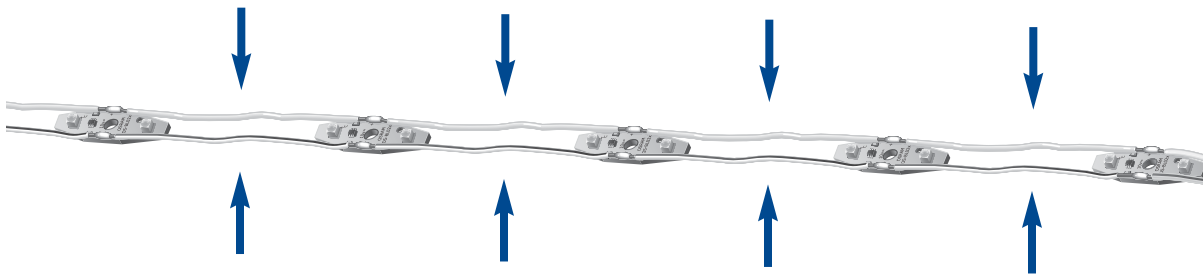
Note: Maximum length for a fully extended module. Derate the LED load for exterior or remote mount applications.
 Note: Each reel contains 2 modules.

3 Cutting BACKlight 2G Modules

- The B2G can be cut to create branch circuits or to reduce the amount of coupons within a channel letter.
- **White, Blue & Green** – the coupons are connected electrically in parallel. The flexible wires may be cut and each of the coupons is independently functional. See illustration below.
- **Super Red, Amber Red, Orange & Yellow** – the coupons are electrically in parallel in groups of two coupons. The flexible wires may be cut only at the two-conductor location. See illustration below.

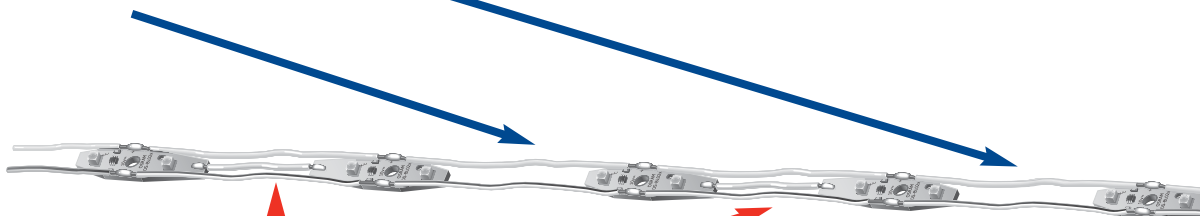
White, Blue & Green

Cut conductors between coupons



Super Red, Amber Red, Orange & Yellow

Cut **ONLY** at 2-conductor locations



**DO NOT CUT BETWEEN COUPONS
AT 3-CONDUCTOR LOCATIONS**

4 Connecting B2G Modules

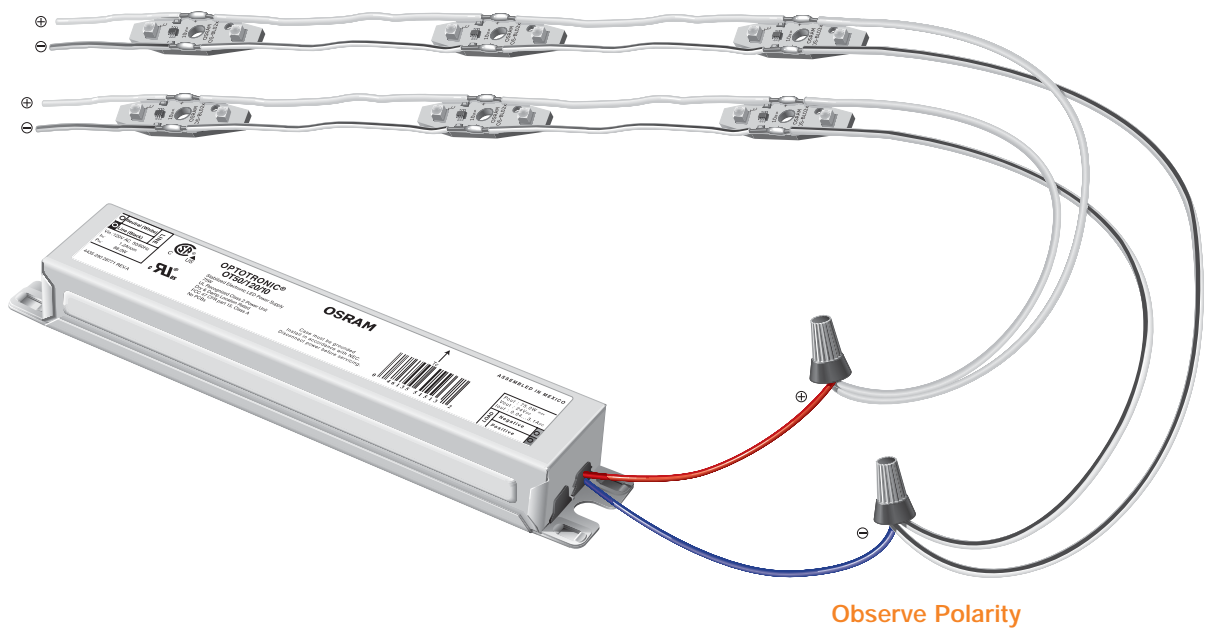
Parallel connection is required for all applications requiring greater than 1 B2G module (15.75 ft.) in length.

Do not exceed the maximum load capacity of the power supply. Derate the maximum LED load for remote mounting or exterior applications. Refer to application note LED026 – Determining the maximum LED load on a constant voltage power supply.

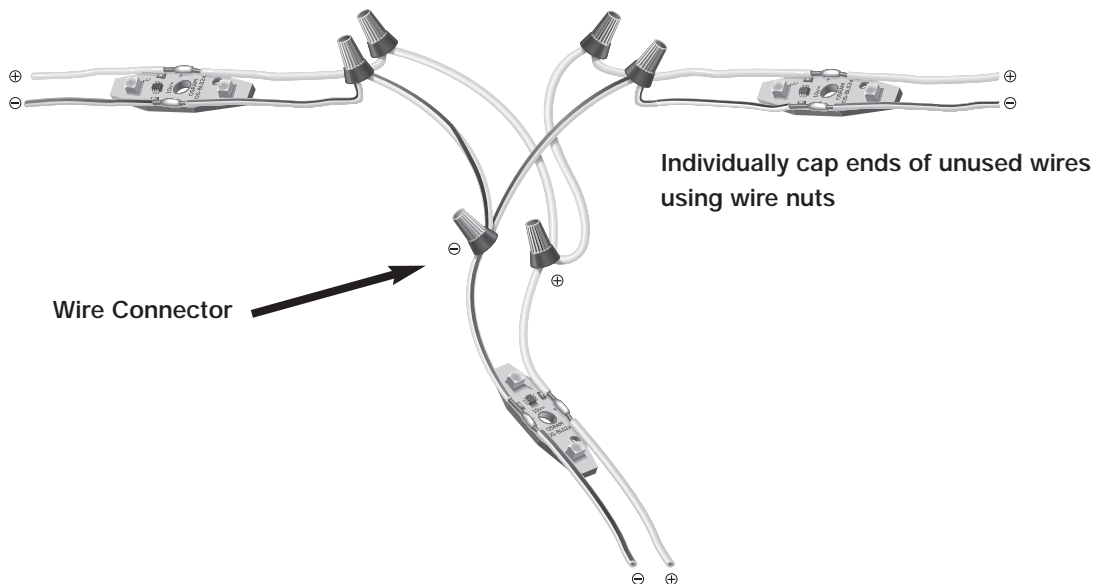
The following factors must be considered when determining the maximum LED load for the power supply: wire gauge, wire length, power supply, ambient temperature and controls.

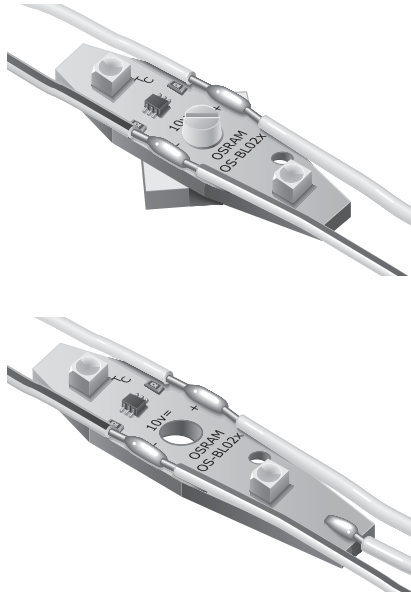
Caution! Disconnect all power to the sign before making electrical connections

Parallel Wiring



Branch Circuit





5 Mounting the B2G

- The inside surface of the channel letter should be clean and dry. Use of alcohol or oil free solvent is recommended.
- Remove all neon tubing, tube supports, transformers and hardware. Dispose of neon and/or transformers according to local and federal regulations. Removal of neon is optional as the B2G can be directly mounted onto it by use of UV resistant tie wraps.
- The B2G is equipped with a self-adhesive foam backed tape for easy installation. Remove adhesive backing from the B2G coupon and apply it to the clean surface. Apply pressure until the B2G coupon is securely mounted to the surface.
- Mounting of the B2G may also be performed with screws (#4 round head screws & washer) by using 5/32" (4mm) holes in the circuit board. Care should be taken to ensure not to over torque the mounting screws and damage the circuit board.

Power Supply Installation

Caution! Disconnect all power to the sign before making electrical connections

The power supply should be located within close proximity of the module for optimal load distribution. For remote mounting please refer to the following chart as well as the power supply specifications for the limitations on the individual power supplies.

RECOMMENDED MAXIMUM OPTOTRONIC 10V POWER SUPPLY REMOTE MOUNTING DISTANCE (ft) FOR BACKLIGHT MODULES

LED Load Wattage	14 AWG	16 AWG	18 AWG	20 AWG	22 AWG
20	52	33	21	13	8
25	42	26	17	11	7
30	35	22	14	9	6
35	30	19	12	8	5
40	26	16	10	7	4
45	23	15	9	6	4
50	21	13	8	5	3

*The maximum remote mounting distance for OPTOTRONIC power supplies is specified in the power supply data sheets. Although it is possible to exceed these distances, the installer and/or end user must take precautions to prevent and/or test the effects of EMI (electromagnetic interference).

INSTRUCTIONS

1 Location Rating

- **OPTOTRONIC Dry & Damp location** rated power supply must be installed in an appropriate NEMA enclosure or inside a channel letter.
- **OPTOTRONIC Dry location** rated power supply must be installed inside a NEMA 1 rated enclosure or inside a channel letter.
- Follow all appropriate UL, NEC and local code requirements.

2 AC Power Voltage Wiring

- Secure the power supply inside the electrical enclosure. Connect AC supply leads to the power supply input with twist style wire connectors or push in style connectors.

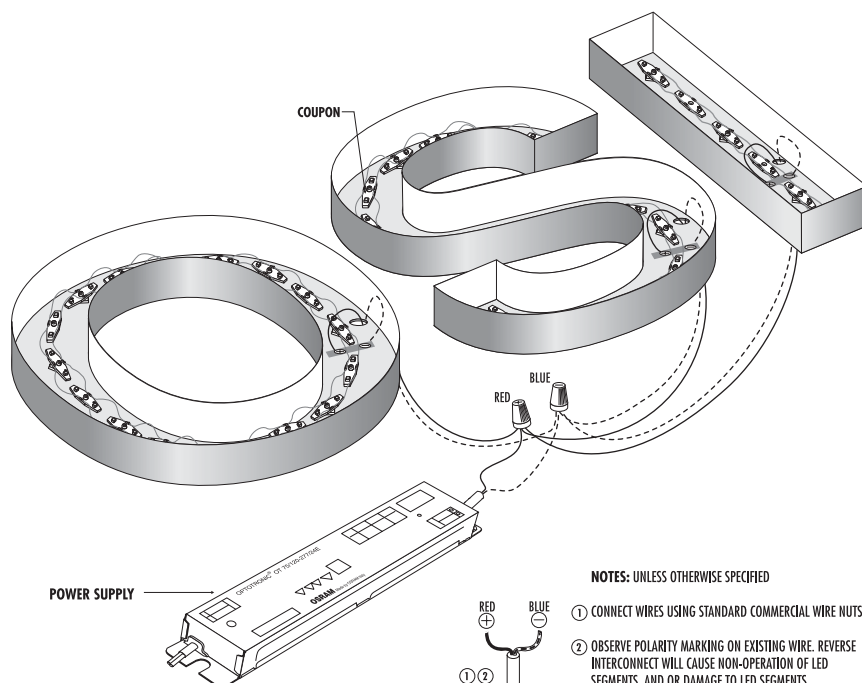
3 Low Voltage Electrical Connections

- Wire nuts are used to secure the power feed leads of the BACKlight modules to the output leads of the power supply. Cap all unused ends of wire with wire nuts.

4 Verify Polarity

- After all wire routing is complete and the lighting modules are connected to the power supply, verify the polarity of all electrical connections. The connections from power supply to the module must be positive to positive and negative to negative. Reverse polarity connections may damage the LEDs and void the product warranty.

The installation must be performed in accordance with national and local electrical codes and are subject to acceptance by the local authority.



ORDERING AND SPECIFICATION INFORMATION*

Item Number	Ordering Abbreviation	Color	Reel Length (ft.)	Coupon Spacing (in.)	Watts	Volts	Current	LEDs/ft.	Lm/Ft
70143	BACKlight2G/633/BL02ST/S1	Super Red	31.5	3	38	10.5	3.6	8	16
70149	BACKlight2G/617/BL02ST/A1	Amber Red	31.5	3	38	10.5	3.6	8	25
70147	BACKlight2G/606/BL02ST/O1	Orange	31.5	3	38	10.5	3.6	8	31
70145	BACKlight2G/587/BL02ST/Y2	Yellow	31.5	3	38	10.5	3.6	8	31
70146	BACKlight2G/525/BL02ST/T2	Green	31.5	3	32	10.5	3.0	8	14
70148	BACKlight2G/470/BL02ST/B1	Blue	31.5	3	32	10.5	3.0	8	3
70144	BACKlight2G/BL02ST/W2-865	White	31.5	3	38	10.5	3.6	8	17

* All information relates to the entire reel. Each reel consists of two modules, 15.75 ft in length. Modules may be cut into shorter segments. Data reflects statistical mean values. Actual data may differ depending on variances in the manufacturing processes.

OPTOTRONIC® 10V LED Power Supplies (DC Output)

POWER SUPPLY ORDERING INFORMATION

Item Number	Description	Nominal Input Voltage (VAC)	Nominal Input Current (Amps)	Output Voltage (VDC)	Min. Output Power (W)	Max. Output Power (W)	Max. Line Ripple (V)	Remote Mounting (ft)	Compatible with OT DIM	Compatible with OT RGB Controls	Location Rating
51500	OT6/100-240/10COS	100-240	0.150@120V 0.050@240V	10.5±0.5	0.2	6	±0.4V	26	YES	YES	Dry
51505	OT25/120/10	120	0.26@120V	10.5±1.0	3	25	±1.1V	10	NO	NO	Dry
51508	OT50/120/10	120	0.52@120V	10.5±1.0	10	50	±1.1V	8	NO	NO	Dry+Damp
51509	OT50/120-277/10E	120-277	0.51@120V 0.22@277V	10.8-11.5	0.6	50	±0.5V	32	YES	YES	Dry+Damp

NEON TO LED BACKLIGHT 2G ESTIMATOR*

Acrylic	Install Depth	LED color	Neon Color	% brightness to NEON			Color Match
				Single Stroke	Double Stroke	Triple Stroke	
Red 2283	5	Amber Red	Red	84	168	253	Good
Red 2283	5	Super Red	Red	47	94	141	Deep Red
Red 2283	5	Orange	Red	82	164	246	Orange
Red 2662	5	Amber Red	Red	84	168	253	Good
Red 2662	5	Super Red	Red	52	103	155	Deep Red
Red 2415	5	Amber Red	Red	84	168	253	Good
Red 2415	5	Super Red	Red	47	94	141	Deep Red
Red 2793	5	Super Red	Red	49	99	148	Good
Red 2157	5	Super Red	Red	54	108	162	Good
Orange 2119	5	Orange	Red	72	144	216	Good
Blue 2051	5	W2-865	White	14	28	42	Good
Blue 2051	5	Blue	Blue	8	15	23	Good
Blue 2114	5	Blue	White	24	48	73	Good
Blue 2114	5	Blue	Blue	12	23	35	Good
White 7328	5	W2-865	White	12	25	37	Good
Green 2030	5	W2-865	White	14	28	42	Good
Green 2030	5	Green	Green	6	11	17	Good
Green 2108	5	W2-865	White	14	28	42	Good
Green 2108	5	Green	Green	6	11	17	Good
Yellow 2465	5	W2-865	White	14	28	42	Good
Yellow 2465	5	Yellow	Yellow	36	72	108	Good
Yellow 2016	5	W2-865	White	14	28	42	Good
Yellow 2016	5	Yellow	Yellow	40	80	120	Good
Yellow 2037	5	Yellow	White	24	48	72	Good
Yellow 2037	5	Yellow	Yellow	30	60	90	large shift

* BACKlight 2G modules fully extended

OSRAM SYLVANIA
National Customer
Service and Sales Center
18725 N. Union Street
Westfield, IN 46074

Industrial & Commercial

Phone: 1-800-255-5042
Fax: 1-800-255-5043

National Accounts

Phone: 1-800-562-4671
Fax: 1-800-562-4674

OEM/Specialty Markets

Phone: 1-800-762-7191
Fax: 1-800-762-7192

Display/Optic

Phone: 1-888-677-2627
Fax: 1-800-762-7192

In Canada
OSRAM SYLVANIA LTD.
Headquarters
2001 Drew Road
Mississauga, ON L5S 1S4

Industrial & Commercial

Phone: 1-800-263-2852
Fax: 1-800-667-6772

Special Markets

Phone: 1-800-265-2852
Fax: 1-800-667-6772

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