

Neon/Cold Cathode Dimming Applications

Overview

Successful dimming of neon and cold-cathode sources can be achieved through proper equipment selection and installation. The following installation suggestions and Derated Luminous Tube Length Chart for Dimming Applications must be used for optimum performance.

If equipment is selected and installed as specified here, a dimming range of 95-10% light should be possible.

Note: The electrical properties of argon fill gas make it easier to dim than red neon fill gas; therefore, installations using argon fill gas will see a greater degree of success compared to neon installations. In addition to the following guidelines, all installations must meet the NEC and local codes.

Products Available

These products are U.L. listed for dimming neon/cold-cathode loads. These products require a neutral connection.

<u>Model No.</u>	<u>Maximum load</u>
Wallbox	
NLV-600	600VA
NLV-1000	1000VA
NLV-1500	1500VA
GRAFIK Eye 3000	800VA per zone

Wallbox Power Boosters

HP-2	2000VA
HP-4	4000VA
HP-6	6000VA

(Require standard Lutron incandescent dimmers or Class 2 controls for operation)

Lutron Systems

Lutron systems are designed and U.L. listed specifically for neon/cold-cathode loads. Contact Lutron for more details.

Lamps

1. Neon/cold-cathode lamps must be manufactured to proper lamp pressurization (standard lamp pressure) without impurities. If pressurization is not standard or impurities are present, poor performance will result.
2. Neon/cold-cathode tubing should be well-supported to avoid rattling when dimmed.

3. Lutron recommends using only the transformer/tube combinations spelled out in the Derated Luminous Tube Length Chart for Dimming Applications. Other combinations will result in poor performance and flicker. Note that there are few successful combinations for red neon tubes smaller than 11 mm.

Transformers

1. Normal power factor transformers must be used; electronic transformers are not dimmable.
2. When choosing transformer secondary currents, it is important to note that the higher the transformer current rating, the brighter the light from the tube.
3. Transformers must be sized according to the chart. These modified charts must be used by neon/cold-cathode transformer suppliers to size the transformer for dimming applications.
Note: Standard luminous tube length charts must not be used to size transformers in dimming applications. Poor performance will result.
4. Transformers must be thermally-protected or fused.
5. Power factor correction capacitors, if present, must be disconnected. If power correction is required, contact the toll-free **Lutron Hotline** for details on power factor correction at the lighting controller.
6. Transformers should be sized to run as close as possible to full load footage as shown in the chart.

Wiring

1. High voltage (GTO-15) cable connecting a transformer output terminal to a cold-cathode tube must not be longer than twenty feet.
2. All GTO-15 cables should be spaced a minimum of four inches from any other GTO-15 cable.
3. It is recommended that only one GTO-15 cable be run per conduit.
4. Optimal dimming performance is achieved when GTO-15 cable is enclosed in plastic conduit or run without conduit. If codes require metal conduit, aluminum is preferred and lengths must be kept to less than six feet per transformer.
5. Braided or shielded GTO-15 cable must not be used for dimming applications.

Luminous Tube Length Chart for Neon/Cold-cathode Dimming (feet)

Transformer Ratings			Approximate number of feet of tubing																					
Secondary Voltage (V)	Secondary Short Circuit Current (mA)	Input Volt-Amperes with Secondary Short Circuit (VA)	Neon Fill (clear or fluorescent red)										Argon /Mercury Fill (Colors other than neon red)											
			Tube Size (millimeters)										Tube Size (millimeters)											
			25	22	20	18	15	14	13	12	11	10	9	25	22	20	18	15	14	13	12	11	10	9
15000	60	900	77	64	58	54	45	X	X	X	X	X	X	96	80	72	64	58	51	48	44	38	35	X
	30	450	77	64	58	54	45	X	X	X	X	X	X	96	80	72	64	58	51	48	44	38	35	X
	20	270					X	X	X	X	X	X	X					X	X	X	X	X	X	X
12000	60	720	59	50	46	41	34	32	29	26	X	X	X	76	63	56	50	44	40	37	35	30	28	X
	30	360	59	50	46	41	34	32	29	26	X	X	X	76	63	56	50	44	40	37	35	30	28	X
	20	225					X	X	X	X	X	X	X					X	X	X	X	X	X	X
9000	120	1080	58	49	41	35	28	25	25	23	20	17	X	74	62	50	42	37	33	30	28	26	22	X
	60	540	50	43	36	30	25	23	22	20	18	16	X	64	54	44	36	32	29	26	26	22	20	X
	30	270	50	43	36	30	25	23	22	20	X	X	X	64	54	44	36	32	29	26	26	22	20	X
7500	20	180					21	20	18	16	X	X	X					27	25	23	22	18	16	X
	120	900	44	35	29	24	22	20	20	17	16	14	X	56	44	36	31	28	26	25	22	20	18	X
	60	450	38	31	25	21	20	18	16	16	14	13	X	49	38	31	28	25	22	22	20	18	16	X
6000	30	225	38	31	25	21	20	18	16	16	X	X	X	49	38	31	28	25	22	22	20	18	16	X
	20	150					16	16	15	14	X	X	X					22	20	18	17	15	14	X
	120	720	35	29	24	20	18	16	16	14	13	11	X	44	37	30	26	22	21	20	18	16	14	X
5000	60	360	30	25	21	17	16	14	14	12	11	10	X	38	32	26	22	19	18	17	15	14	13	X
	30	180	30	25	21	17	16	14	14	12	X	X	X	38	32	26	22	19	18	17	15	14	13	X
	20	130					14	13	12	10	X	X	X					18	16	14	14	12	10	X
4000	120	600	28	24	20	16	15	14	13	10	9	8	X	37	30	25	21	18	18	15	14	12	10	X
	60	300	25	21	17	14	13	12	11	9	8	8	X	32	26	22	18	16	15	13	13	10	10	X
	30	160	25	21	17	14	13	12	11	9	X	X	X	32	26	22	18	16	15	13	13	10	10	X
3000	20	100					11	10	10	8	X	X	X					14	13	12	11	9	8	X
	60	240	20	17	14	12	10	9	8	8	7	6	X	26	22	18	15	14	13	12	11	9	8	X
	30	140	20	17	14	12	10	9	8	8	X	X	X	26	22	18	15	14	13	12	11	9	8	X
2000	20	90					8	8	8	7	X	X	X					11	10	10	10	7	6	X
	60	180	13	10	9	8	8	7	7	6	5	5	X	18	14	13	11	10	9	8	7	6	6	X
	30	100	13	10	9	8	8	7	7	6	5	5	X	18	14	13	11	10	9	8	7	6	6	X
2000	20	75					6	6	5	5	4	3	X					8	7	6	6	5	4	X
	30	75					5	5	5	5	X	X	X					7	6	6	6	5	4	X
	20	50					5	4	4	4	X	X	X					6	6	6	5	4	3	X
Recommended gas pressure, mm/Hg			6	7	7.5	8	9	10	10	11	12	13	6	7	7.5	8	9	10	10	11	12	13		

X denotes this combination cannot be successfully dimmed.

Note:

The table has been modified for dimming applications. When calculating total length of tube, add approximately 1 foot for each section of tubing (each pair of electrodes). To determine if correct loading has been achieved, secondary current must be measured according to the transformer manufacturer's recommendations. This chart has been calculated for dimming applications and **must not** be used for non-dimming installations.

Warning:

Potentially hazardous high voltage can be present. Testing, handling, and servicing should be done only by qualified personnel.

Worldwide Technical and Sales Assistance

If you need assistance call the toll-free **Lutron Hotline:**

(800) 523-9466 (U.S.A., Canada, and the Caribbean)
Other countries call (610) 282-3800

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