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Dear Electric Sign Professional:

This neon installation guide is a pocket size document intended to be in every sign mechanics' toolbox. The document is designed to be a very simple, pictorial representation to help even new apprentices understand the correct and safe manner to install the products shown.

The neon installation guide is a work in progress and as new products and procedures become available, they will be added. A web site is being designed to support the document live and will feature current, updated products and procedures. It is our hope that this site will be used to trade ideas on field and fire safety situations, new products, and anything that would be helpful in the safe installation of neon.

www.neoninstallationguide.com

NSSA wishes to express gratitude to the following:


Thomas P. Kerley, President of Kerley Signs, Inc. who through his 28 years experience in the sign industry recognized the initial need and has worked over the past year creating and developing an easily understood manual for those individuals who are involved in neon installation.

Randy Wright, RKW Consulting, whose technical expertise, which was instrumental in completing this manual, is supported by 38 years in the sign industry, 30 years in the fire service, a 10 year member on the NFPA Code Panel 18 and member on the UL Standards Advisory panels.

Gemini, Inc. and **James R. Weinel**, its President, for underwriting the printing and production of this manual.

NSSA would also like to thank the members of the Peer Review Committee (see Appendix) and the many product manufacturers who furnished pictures, products, drawings and access for our presentation in the manual.

NSSA is proud to provide this manual to all members of the sign industry.

Sincerely,

Russell Hassmann
President, NSSA

Disclaimer and Proper Use

High voltage, secondary wiring installations, should only be attempted by experienced electrical professionals. This manual is not a how-to guide covering all aspects of high-voltage neon installations. This manual is a visual reference guide used to help avoid common mistakes in secondary wiring. It can also be used as a complement to other materials in learning the basics about definitions, parts, and different types of installations found within the sign industry. This manual should not be relied upon as the sole source of information for high-voltage installations. At the time of printing, we believe the information found within is correct; however, codes and legislation change and that may outdate sections of this visual guide. The publishers or sponsors of this visual guide cannot be held liable for any damages or injury resulting from interpretations, or use of this manual as a basis for electrical installations. Installers of any high-voltage wiring should always conform to the relevant or applicable electrical practices, sign codes, electrical codes or other governing authorities.

For updates to information in this guide visit:
www.neoninstallationguide.com

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Preface

The neon installation guide is designed to be inexpensive to everyone, to visibly show the proper installation of Recognized and Listed products.

This guide will refer you to Websites for agencies, such as Underwriters Laboratories, Inc. for standard information and product manufacturers' websites for current information on listed products, installation instructions and service requirements.

Standards organizations allow access through their sites for current information on items such as the sign accessory manual (SAM) which includes products available to be used in Listed signs.

www.ul.com/signs/manual

While using this manual, please be advised listed products have electrical ratings, markings and installation instructions that must be adhered to in accordance with the NEC; and Recognized Components have "Conditions of Acceptability" that must be adhered to in order to use the component in a listed sign. Not using products within their ratings and in accordance with their markings and installation instructions or "Conditions of Acceptability" may increase the risk of fire. Additionally, many products are listed as a system of parts, using different parts not covered as part of the system may increase the risk of fire.

Authorities

The following authorities are found not only in this guide, but on various products, data sheets, and industry publications concerning neon installation. What they represent is listed below.

UL: Underwriters Laboratories, Inc.
NFPA 70: National Fire Protection Association
NEC: National Electric Code
IAEI: International Association of Electrical Inspectors
CSA: Canadian Standards Association
NRTL: Nationally Recognized Testing Laboratory These are testing laboratories that test products to the UL Standards and label with their Listing mark.

Standard & Codes

This guide has been developed based on using Listed and Recognized components to build Listed neon signs. Since there are many products in the world directed at the neon sign industry we are limiting this guide to the products and procedures, which have been tested to the applicable UL Standards.

UL Standards:

UL 814: The Standard for Gas-Tube Sign and Ignition (GTO) Cable.

UL 2161: The Standard for Neon Transformers and Power Supplies.

UL 879: This Standard for Electrode Receptacles for Gas-Tube Signs. The scope of this standard has been proposed to be changed to include all the sign and outline lighting related accessories and parts. Currently, other standards are employed for these products.

UL 48: The Standard for Electric Signs.

RECOGNIZED COMPONENTS: Components evaluated for use in a Listed sign that have conditions of acceptability placed on their use. Refer to the sign accessories manual (SAM) for the conditions of use (Conditions of Acceptability) for many of the components typically used in electric signs.

LISTED: Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or services meets identified standards or has been tested and found suitable for a specified purpose. The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

CONDITIONS OF ACCEPTABILITY (Conditions of Use): The intended use and limitations placed on a component when used in a sign or outline lighting.

NFPA 70: The National Electric code

APPROVED: Acceptable to the authority having jurisdiction.

The following quoted directly from the National Electric code:
"Authority Having Jurisdiction". The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

FPN: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction."

"600.3 Listing. Electric signs and outline lighting-fixed, mobile, or portable shall be listed and installed in conformance with that listing, unless otherwise approved by special permission."

"(A) Field Installed Skeleton Tubing. Field installed skeleton tubing shall not be required to be listed where installed in conformance with this code."

The national electric code and specifically chapter 6, article 600 refers to the installation of electric signs and outline lighting in part I and field installed skeleton tubing in part II. Chapters I-IV of the code applies to all installations; chapters V-VII modify chapters I-IV for a specific purpose.

Icons

The following icons are used at the top right hand of each installation example page to signify the conditions for which the connections shown are properly used. The definitions for each of the icons are listed below.

Letter



Channel
Front illumination

A letter shape or artform fabricated from plastic, metal, or other material recognized as suitable as an enclosure; depending on the face, to be used exposed, as a sign body or as an enclosure.



Reverse
Rear illumination

A letter shape or artform fabricated from plastic, metal, or other material recognized as suitable as an enclosure; depending on the face, to be used exposed, as a sign body or as an enclosure.



Skeleton Tubing

Neon tubing that is itself the sign or outline lighting. Skeleton tubing may be either attached to an enclosure, "sign body", or building components.

Face Type



Exposed

Channel letters without face or reverse channel letters with an open back.



**Plastic
(Sign Body)**

Channel letters or reverse channel letters with plastic (typically acrylic) translucent sign face. The addition of the plastic face creates a sign body.



**Recognized
(Enclosure Rated)**

Channel letters or reverse channel letters with recognized component (typically polycarbonate) enclosure rated sign face. Addition of enclosure rated sign face creates a complete enclosure which allows enclosure rated connections.

Wiring



Remote

Installations with transformers located behind the exterior mounting wall or surface



Direct

Installations with transformers or power supplies located inside a channel letter, fitted with a suitable sign face.



Raceway

Installations with transformers or power supplies located within a raceway.

Location



Wet Location

A location subject to saturation with water or other liquids (such as vehicle washing areas), or unprotected locations exposed to weather.

Note: All installations that meet requirements for Wet Locations can be used in Damp or Dry Locations.



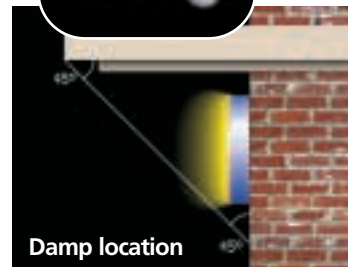
Wet location



Damp or Dry Location

DRY: A location not normally subject to dampness or wetness. May be temporarily subject to dampness or wetness, as in the case of a building under construction.

DAMP: Partially protected locations under canopies, marquees, roofed open porches, and similar locations; as well as interior locations subject to moderate degrees of moisture, such as basements, barns, and cold storage warehouses.



Damp location