

Light Emitting Diode (LED) Lane Control Signs



1.0 Scope & Background

1.1 This document provides an overview of the technical requirements incorporated by Traffic Signs, Inc. to manufacture safe and reliable signage for use in traffic control.

1.2 LED signs designed and manufactured by Traffic Signs, Inc. are far more reliable than traditionally illuminated signs and require little or no maintenance. LED signs generally use only a small fraction of the power required by earlier generation signs and, are more economical to operate.

LEDs are “solid-state” devices because they are made of semi-conductor material held in a solid form that does not move and are virtually insensitive to movement or vibration of the component. This property, along with wire wrapped connections, helps make our LED signs extremely durable.

2.0 General

2.1 The LED sign shall be capable of displaying the message when energized and be effectively blank when not energized. The signs are available various MUTCD messages as well as custom messages on demand.

3.0 Mechanical

3.1 The sign shall be constructed using a weatherproof, aluminum housing with outside dimensions of 2 7/8” wider and longer than the necessary face dimension. The housing shall consist of an 8” deep, .125” thick, extruded aluminum body, and a .063” aluminum back. All corners are TIG (Tungsten Inert Gas) welded to provide a weatherproof seal around the entire housing.

3.2 The door shall be constructed of .125” thick extruded aluminum. Two corners are TIG welded with the other two screwed together to make one side of the door removable for installation of the faceplate and 1/8” nominal polycarbonate lens. The door is fastened to the housing on the left by a full length, .040” x 1 ¼” open stainless steel hinge. The door shall be held secure onto a 5/32” thick neoprene gasket by stainless steel quarter-turn link locks.

3.3 A three-sided visor made of .063” aluminum shall be fitted to the door to act as a sunshade and improve the visibility of the message.

3.4 All surfaces of the sign shall be etched and primed in accordance to industry standards before receiving two color coats of industrial enamel.

3.5 The perimeter of the polycarbonate lens and the inside of the .063 aluminum back shall be sealed by a continuous bead of silicone caulk to prevent moisture intrusion inside the sign.

3.6 All fasteners and hardware shall be corrosion resistant stainless steel. No tools are required for routine maintenance.

4.0 Electrical – Wiring/Control

4.1 A one-amp rated fuse shall be mounted in the primary Hot AC power line for each power supply.

4.2 Field wires shall carry the control voltage of 120VAC to the sign and connect to a barrier type terminal block. All terminals shall be clearly marked as to their function.

4.3 LEDs will be wired in series strings of appropriate length using #26AWG Kynar insulated wire wrap type wire. A minimum of four turns shall be made for each connection.

5.0 Electrical - Power Supply

5.1 The power supply for the LEDs shall convert 120VAC into 48VDC. The power supply shall have a rated load current of 1.1 amperes each with a voltage regulation of 2% or better from 10 to 100% load, with a terminal block connection for input and output. Noise and ripple on the output shall not exceed 500mV Peak to Peak or 200mV RMS. The power supply shall have the ability to operate at 55C at full load. Two identical power supplies will be incorporated into each sign. Each supply is capable of handling the full load independently. This provides dual load sharing redundancy and thereby increases reliability of the system. For multiple message signs, each message will have a dedicated power supply.

5.2 Power to LEDs will be delivered through a custom Printed Circuit Board (PCB). PCB shall be capable of allowing two power supplies to be properly paralleled using diode isolation between positive terminals of the supplies.

5.3 PCB shall also contain internal circuitry to provide a night-time dimming mode of 45% less than day-time mode when activated from the controller.

5.4 PCB substrate material shall be 0.062" thick G-10 glass laminate of FR-4 grade and comply with UL-94VO flame-retardant specification. The PCB shall limit LED current to 18ma for maximum reliability. A method of precision current adjustment must be incorporated in the PCB to facilitate matching current between different colored strings of series wired LEDs. Connection of the LED series wired strings shall be made by a minimum of five wire wrap turns around a 0.025" square wire wrap pin for maximum reliability.

6.0 LEDs

6.1 All LEDs will be mounted so as to protrude through the faceplate between 0.123 and 0.133 Inches. Mounting Clips shall secure the LEDs to the faceplate. The clips shall be a one-piece configuration of a black plastic. The retaining receptor shall have the LED inserted into it and securely align and hold the LED in position perpendicular to the faceplate. LEDs shall have a minimum viewing angle of 60 degrees both horizontal

and vertically (+/- 30 degrees from center line axis) and a maximum viewing angle of 90 degrees (+/- 45 degrees from centerline axis). Apparent spacing between LEDs shall be uniform. Spacing may vary slightly when measured numerically to compensate for crossing over of two or more messages and for optimal appearance of all symbols. Sign must look as symmetrical and attractive as possible.

7.0 Environmental

7.1 Operating and storage temperature range shall be -40 degrees F to +165 degrees F. Operating and storage humidity range shall be 10 to 90% non-condensing. To maintain the product warranty, stored signs must be carefully and properly stored indoors and in an upright position.

8.0 Electromagnetic Compatibility

8.1 System shall meet FCC part 15-A for radio interference and conducted line noise.

9.0 Reliability

9.1 The LED sign unit utilizes LEDs with 100,000 hour rated life. This assumes no physical damage from external sources such as mechanical impact, fire, lightning strike, etc.