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## Blank Out Sign Specification

This specification will provide information concerning the blank out and lane control signs manufactured by Southern Manufacturing.

### 1. Body

#### 1.1. Material

##### 1.1.1. Enclosure

1.1.1.1. Each enclosure is constructed from 5052 H32 sheet aluminum in a variety of sizes. Smaller signs are constructed from .090" thick materials while the larger bodies and the LCS bodies are of .125". The top and bottom of the sign body has a .125" thick reinforcement plate welded in place for additional strength when hanging the sign. This reinforcement has been tested to withstand a load greater than 6,600 lbs or 2 metric tons. Seams are continuously welded to ensure a watertight seal. Weep holes are incorporated in the bottom of the enclosure to prevent possible buildup of condensation.

Enclosures can be custom manufactured to virtually any height and width up to 36"x36" viewable area.

Enclosures use a neoprene gasket strip to provide a watertight seal between the door and the display lens.

Glare shields are available for each enclosure size and are retained with stainless steel hardware.

##### 1.1.2. Lens

Lenses are cut from .120" matt finish polycarbonate lexan.

##### 1.1.3. Hardware

All hardware is stainless steel to prevent corrosion. Door latches and keepers are a turn-lock style requiring no tools to open the enclosure. The hinges are also stainless steel piano hinge style construction. Hinges are typically riveted to the door and bolted to the enclosure body.

## 1.2. Finish

The standard finish is satin black powder coat applied on the external aluminum surfaces. The message board mask is finished in a flat black powder coat. Other colors can be available and must be specified in advance.

## 1.3. Mounting

Standard mounting patterns include Hub and Tri-stud patterns. Other patterns can be provided if specified in advance. The type of mounting must be supplied with the order. Mounting brackets are available at extra cost.

## 2. Operations

Blank Out Signs have two states of operation. The first state occurs when the sign is energized with 120VAC illuminating the symbol. The second state occurs when power is removed from the sign, de-energizing the symbol going “blank”.

Blank out signs have only one symbol. Signs with multiple symbols are considered Lane use control signals (LUCS) and are covered under the Lane use control signals specification.

Status and/or alarms (if any) are controlled by the control cabinet controller and/or conflict monitor.

## 3. Electrical

### 3.1. General

Each sign consists of electronics package that is custom designed for its particular application. In general, it consists of an AC to DC power supply, LED Light Engine, and optional dimming and or flashing circuitry. Electronics are mounted onto a panel located on the rear of the enclosure body and the message board. The modules are rated for use throughout an ambient operating temperature range of -40°C (-40°F) to +74°C (+165°F).

### 3.2. Light Engine

All light engines comply with the applicable ITE, Vehicle Traffic Control Signal Heads specifications. Including but not limited to the LED Circular Signal Supplement and LED Vehicle Arrow Traffic Signal Supplement.

The light engine consists of discrete LED's mounted onto printed circuit boards (PCB) which are custom designed for each type of application. The PCBs are mounted onto a message board mask and protected from the elements by the body lens. The PCBs have a full sized copper ground plane to provide noise shielding, and a heat sink for the LEDs.

The LEDs are connected in parallel with one another, with each LED having a dedicated current limiting resistor. This configuration insures that the remaining LEDs will continue operating should a failure occur in another path.

5v DC electrical power is delivered to the light engine through a 4 pin .156” MTA series header and connector. This connector is rated at 600v, 6a, and used on 18 AWG wire. Friction lock tabs are used to prevent connector reversal.

All LED’s will comply with ITE VTCSH: LED Vehicle Arrow Traffic Signal Supplement Section 4 (Photometric Requirements) and ITE VTCSH: LED Circular Signal Supplement Section 4 (Photometric Requirements) for luminous intensity and distribution (Section 4.1)\* color regions (Section 4.2)\* and color uniformity (Section 4.2)\*.

Package	Color	Color WL(nM) + / - 10	Intensity (mcd)		Chromaticity Coordinate		$\theta$	Conditions
			min	max	x	y		
T1-3/4	White	N/A	36900	73800	.310	.320	30°	If = 20mA
T1-3/4	Green	500	3600	10200	.085	.490	30°	If = 10mA
T1-3/4	Amber	590	4200	11800	.560	.435	30°	If = 10mA
T1-3/4	Red	630	2400	9600	.700	.299	30°	If = 20mA

### 3.3. Specific details

3.3.1. No Left/Right Turn. The light engine is constructed from 4 PCB’s to form one 24” symbolic display. It incorporates a red slashed circle centered over a white left or right arrow. LED’s are spaced on approximately .3” centers. Both the left and right PCB sets are the same. The difference between a no left and a no right turn light engine is in the specific led positions populated on the PCB.

The light engine operates on the standard 5v power supply used thought the remainder of the BOS/LCS lineup. It also incorporates refinements for increased reliability and improved performance.

Letter boards. These are used to construct static text messages with each board forming a single letter, number, or symbol. Standard letter

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\* Both the ITE VTCSH: LED Vehicle Arrow Traffic Signal Supplement and ITE VTCSH: LED Circular Signal Supplement Section 4 and sub-sections have the same section numbers and tittles. VTCSH: LED Vehicle Arrow Traffic Signal refers to VTCSH: LED Circular Signal Supplement for LED specifications.

board sizes are 5", 6", 8" and 10". The PCBs are the same among a given size with the character/symbol being determined by the LED population on the board. A variety of LED's can be used with the choice depending on the end application and use. The specific message and color must be specified when ordering.

This chart will approximate the maximum message size allowed on a single 150w power supply.

Letter board Size	DC Watts (Max)	Message Size (Characters)
5"	3	50
6"	3.5	43
8"	5.1	30
10"	5.5	28

Bar-Sign. The light engine is constructed on a 17"x15" PCB. The LED's are white and arranged in 3 Bars formed by 4 rows of 25 LEDs per row on .325" centers. This PCB has a black solder mask and does not use a message board mask like most other blank out signs. Each bar is independently powered by its own 5v power supply.

### 3.4. Power Supply

The sign model and series determines which specific power supply is used.

The Blank Out and the Standard LCS signs use Mean Well model RS-150-5 power supply or equivalent. This is a 130w switching class 1 power supply. This is a standard power supply and is used unless the application specifics require an alternate model.

The Bar-Sign and some LCS uses Mean Well model RS25-5 power supply or equivalent. This is a 25w switching class 1 power supply. The primary factor in selecting this supply is its compact size.

The NTCIP LCS sign uses Mean Well model RD35A power supply or equivalent. This is a dual output switching class 1 power supply. The 12V output operates the logic and switching and the 5V output operates the light engine.

Power Supply models and the manufacturer specifications are listed below.

\*Mean Well or Equivalent Mfg Power Supply

	*RS-150-5
Electrical specifications:	5v
Input voltage:	90 VAC to 264 Vac (Switch Selectable)
Input current:	< 3a @ 115v
Input frequency:	47 Hz - 63 Hz
Output current:	0 – 26A
Output power (rated):	130 watts max
Output ripple (peak to peak):	80mV p-p
Adjustability:	4.75 ~ 5.5V
Output indicator:	Green led, output present
Output regulation (line/load):	±1.0%
Turn-on delay:	1.25@115v
Hold-up time:	20 mSec min at nominal input 115 Vac and full load
Inrush current:	Cold start 40A@230VAC
Efficiency:	78%
Over-voltage protection:	110 ~ 150% rated output
Over-current / short circuit:	Hiccup with auto recovery
MTBF	244 Khrs at 25° c ambient
Operating temperature:	-25~+70° c
Storage temperature:	-40~+85° c
Humidity:	20 ~ 90% RH non-condensing

### 3.5. Testing

- 3.5.1. Signs have passed vibration testing IAW both NEMA TS 2-2003v2.06 and MIL-STD-883. Additionally, signs have passed thermal durability testing to -40 Degrees Fahrenheit.
- 3.5.2. Signs will comply with all internal testing procedures, including but not limited to EP-SGN-WI-001 – Work Instruction for Checking and Recording PCB Burn In, and EP-SGN-WI-002 – Work Instruction for Checking LED Array Signs.

### 3.6. Dimming & Flashing

Flashing is an optional feature that is easily incorporated into the Blank Out Signs. Dimming is a standard feature on Blank Out Signs and Lane Control Signs. The Bar-Sign, by design, has neither dimming nor flashing features.

The dimmer is a two level design (Bright/Dim) allowing the light engine to normally operate at full intensity. When the dimmer is active, the power to the light engine is reduced by approximately 50% which reduces the intensity. The dimmer incorporates a failsafe feature where the light engine will continue operating at its full intensity in the event of a dimmer relay or resistor failure.

The dimmer can be controlled locally by an optional electric photocell mounted on the enclosure, or by an external 120v AC signal. Other voltages can be used on request.

The blank out signs use an adjustable resistor to set the dim mode intensity. This value is typically adjusted to 50% of the Led's bright output. Within limits, this can be adjusted to meet particular needs or demands.

Flashing is accomplished through the use of a flasher relay with variable on and off times. This provides an infinitely adjustable combination of flash rates and durations ranging from .6 seconds to 24 Hrs.