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Maintenance Bureau Specification 2001-01
for
Advance Warning Arrow System, Vehicle-Mount
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This document describes the features and specifications for a vehicle-mounted, “Advanced Warning Arrow System”. The arrow board shall meet or exceed the following: 1) Currently adopted edition of the MUTCD, chapter 6, section entitled “Arrow Panels”, 2) Section 741 of the current edition of the ALDOT Standard Specifications for Highway Construction , and 3) and the specification found herein. All products must be inspected by the State Signal Shop for acceptance on to the Approved Products List (APL) for the State. Proper paper work and fees shall be on file prior to any inspection taking place. All products submitted for bid shall be pre-qualified and included in the Alabama Department of Transportation’s “Materials, Sources, & Devices with Special Acceptance Requirements” (APL), List IV-3, “Work Zone Traffic Control Devices”, sub-heading “*Arrow Boards*”.

1.0 General

The following items will be addressed in the following sections: cabinet, display, control system, power source, and mounting assembly.

- 1.01 Bonded delivery and warranty of the product shall be made available
- 1.02 All wire, cable and other electrical components shall be properly sized/rated for the unit and its operation and shall be suitable for exposed, outdoor installations subject to adverse weather conditions. The wiring harness shall be securely fastened inside the arrow panel to reduce fatigue at the lamp terminals.
- 1.03 The system shall be protected against short circuit, overload, and reverse polarity by appropriate fuses and protective devices.
- 1.04 The Advance Warning Arrow System shall be supplied with all software and hardware required for the operation and maintenance of this system, this is to include all manuals and guides.
- 1.05 The circuitry and controls shall be covered by a one year warranty from the date of invoice to the final user. All components shall be covered by their respective manufacturers.
- 1.06 The mounting assembly shall be warranted for ninety (90) days against defective parts and workmanship.
- 1.07 Manufacturers exact model # including current configuration shall be readily visible.

2.0 Cabinet

- 2.01 The perimeter frame of the arrow panel shall be constructed of extruded aluminum channel, approximately 1/8 inch thick minimum.
- 2.02 The arrow panel shall be sealed to withstand all types of weather conditions.
- 2.03 Internal bracing shall be used to provide adequate resistance to twisting, bending, and vibration.
- 2.04 A weep hole shall be provided in the bottom of the panel frame to provide drainage of condensation as needed.
- 2.05 The exposed panels and framing shall be finished in non-reflective/flat black.

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3.0 Display

- 3.01 The advance warning arrow panel shall utilize a 25 lamp, PAR 36 or 46 (LED), yellow/amber element, configuration.
- 3.02 The arrow panel shall operate in the following modes
 - 1. Flashing Arrow, Left & Right
 - 2. Sequential Arrow, Left & Right
 - 3. Sequential Chevron, Left & Right
 - 4. Flashing Double Arrow
 - 5. Flashing Caution
- 3.03 The arrow panel display shall not exceed 36" x 72".
- 3.04 The minimum element on-time shall be 50% for flashing modes, and equal intervals of 25% for each sequential phase.
- 3.05 The flashing and sequential rates shall be not less than 25 nor more than 40 time per minute.
- 3.06 There shall also be a device installed to control the lamp intensity appropriate to ambient light conditions, up to 50% dimmer from full brightness, and not be affected by vehicle headlights or street lights.
- 3.07 The back of the arrow panel shall contain indicator lamps denoting what mode is in operation on the front of the panel. These indicator lamps shall be legible in daylight hours from a minimum of 300 feet.

4.0 Control System

- 4.01 The control system for the display shall house the solid state circuitry, ON/OFF switch, mode switch, manual dimming controls, and related circuitry.
- 4.02 The control system shall be capable of being mounted within the vehicle that the arrow panel is attached.
- 4.03 The control system shall also consist of a hand held device that can be used outside the vehicle.
- 4.04 The control system circuitry shall be capable of providing, at a minimum, lamp intensity regulation over the range of 10.0 volts DC to 15.0 volts DC.

5.0 Power Plant

- 5.01 The power for the arrow panel shall be accomplished through a remote battery terminal, fused, and connected to the vehicle's charging system.

6.0 Mounting Assembly

- 6.01 The mounting assembly shall be capable of raising and lowering the arrow panel from within the vehicle to which the arrow panel is attached.
- 6.02 Vehicle specific mounting assemblies shall be inspected and approved based on type of installation and vehicle installed upon.