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Australian STANDARD®

Variable message signs

Part 1: Fixed signs

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Preface

This Standard was prepared by the Standards Australia Committee LG–006, Road Traffic Signals, to supersede AS 4852.1—2009, *Variable message signs, Part 1: Fixed signs*.

The objective of this Standard is to specify the requirements for the design and performance of variable message fixed signs.

The AS 4852 series covers requirements for the construction and performance of electrically powered variable message signs based on light-emitting diode technologies in a matrix configuration that are intended to be used for road traffic management. These signs are expected to provide real-time information on the oncoming road in the transportation network.

The series consists of two standards:

AS 4852.1, *Variable message signs, Part 1: Fixed signs*

AS 4852.2, *Variable message signs, Part 2: Portable signs*

The major changes in this edition are as follows:

(a) Type A sign reduced from 4 to 3 text rows.

(b) Options for increased resolutions.

(c) Changes to methods of specifying text dimensions.

(d) Dimming level values aligned with sign illuminance.

(e) Upwards light not required.

(f) Dimming step duration changed to 5–15 s.

(g) Operating voltage range defined as 205 V to 264 V.

(h) Local control port may also be RS485 or Ethernet.

(i) Alarm and Event logs to be readable via Product Host Control system.

(j) Sign only required to be provided with standard size font sets 1 and 2.

(k) For the pixel element service life, luminance degradation below the minimum tabled values is not permitted.

The use of any signs, including variable message signs, for road traffic management is subject to regulation by traffic control authorities. Guidance on and requirements relating to their use are provided in the AS 1742 series.

The terms “normative” and “informative” are used in Standards to define the application of the appendix to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Variable message signs

Part 1: Fixed signs

Section 1 Scope and general

1.1 Scope

This Standard covers electrically powered, on-road, variable message signs (VMS) used for traffic management and/or driver information applications. Part 1 of this series covers fixed signs, where the display is mounted in a permanent position above or adjacent to the roadway, and Part 2 of this series covers portable signs, where the display is mounted and deployed on a re-locatable trailer.

This Standard specifies the requirements for the design, construction, performance and certain aspects of the installation of electrically powered, variable message signs, including their associated control systems.

The following types of message signs are not covered in this Standard:

(a) Passenger information signs at bus stops, on train stations etc.

(b) Variable message signs intended to advertise products and services to road users.

(c) Signs that are only capable of displaying either a single message or a blank face.

1.2 Application

Variable message signs conforming to this Standard will be used to provide traffic-related information to motorists, cyclists and pedestrians. This includes road safety messages and real-time traffic information relating to incidents, roadworks and travel times.

1.3 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

AS 1742.1, *Manual of uniform traffic control devices, Part 1: General introduction and index of signs*

AS 1743, *Road signs — Specifications*

AS 1744, *Standard alphabets for road signs*

AS 2700, *Colour Standards for general purposes*

AS 60529, *Degrees of protection provided by enclosures (IP Code)*

AS/NZS 1170.2, *Structural design actions, Part 2: Wind actions*

AS/NZS 1734, *Aluminium and aluminium alloys — Flat sheet, coiled sheet and plate*

AS/NZS 1768, *Lightning protection*

AS/NZS 3000, *Wiring rules*

AS/NZS 3100, *Approval and test specification — General requirements for electrical equipment*

AS/NZS 3190, *Approval and test specification — Residual current devices (current-operated earth-leakage devices)*

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AS/NZS 4680, *Hot-dip galvanized (zinc) coatings on fabricated ferrous articles*

AS/NZS 61000.6.1, *Electromagnetic compatibility (EMC), Part 6.1: Generic standards — Immunity for residential, commercial and light-industrial environments*

AS/NZS 61000.6.3, *Electromagnetic compatibility (EMC), Part 6.3: Generic standards—Emission standard for residential, commercial and light-industrial environments*

ISO/CIE 19476, *Characterization of the performance of illuminance meters and luminance meters*

CIE 015, *Colorimetry*

1.4 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

1.4.1
alarm
class of issue below the severity threshold of a fault

Note 1 to entry: Alarms may include minor problems with the sign itself and notifications where the sign is requested to perform an action of which it is not capable (e.g. to display a bitmap larger than the resolution of the sign).

Note 2 to entry: Alarms may also include problems with ancillary equipment connected to the VMS for its operation.

1.4.2
border
surround or extension to the sign face

Note 1 to entry: The border is used to make a message more conspicuous by isolating it from its background and to reduce the effects of glare when the sun is low and behind the sign.

1.4.3
character height
height of an upper-case character

Note 1 to entry: For additional information on character dimensions, see Figure 5.2.

1.4.4
character matrix
matrix of pixels required to display the character

Note 1 to entry: This applies to any given font.

1.4.5
character spacing
horizontal distance between the closest characters in the same word or numeral set

1.4.6
display
face of a sign used to form the message

1.4.7
equivalent area
apparent visual area of the lit pixel

Note 1 to entry: The width of the equivalent area is taken to be numerically equal to the centre-to-centre distance of any two adjacent pixels, see Figure 5.2.

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1.4.8
error code
attribute of a protocol that may contain one or more class of issues (e.g. fault, alarms and events)

1.4.9
event
activity that is logged by the VMS

Note 1 to entry: Events have the lowest severity status and are used as an audit trail of actions performed by the VMS.

1.4.10
fault
class of issue that materially prevents the VMS from performing its functions

Note 1 to entry: For a fault the root cause is the VMS itself, which may be either a hardware or software fault or both.

1.4.11
frame
stable state displayed on a VMS that is preceded by and followed by a change of state

Note 1 to entry: It will typically consist of text, symbols, a combination of the two, or a blank display.

1.4.12
line spacing
vertical distance between lines of characters

Note 1 to entry: Line spacing is expressed in terms of the number of inactive pixels.

1.4.13
luminance ratio
LR
defined relationship between the luminance generated by the sign and the luminance due to reflected incident light

Note 1 to entry: Luminance ratio is calculated by:

$$LR = \frac{(L_a - L_b)}{L_b}$$

where

L_a = the measured luminance resulting from the sign with all pixels active (i.e. energized) under external illumination

L_b = the measured luminance resulting from the sign with all pixels inactive (i.e. blanked) under external illumination

1.4.14
luminous intensity half-angle
off-axis angle at which the luminous intensity is half that of the value measured on the reference axis (i.e. mechanical axis)

1.4.15
may
indicates the existence of an option

1.4.16
message
series of frames constituting a single information block

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1.4.17
pixel
smallest switched unit from which active messages are created

Note 1 to entry: This applies to any given font on any given sign.

1.4.18
plan
defined combination of messages, complete with relative timing

1.4.19
product host control system
PHCS
software program supplied by the sign manufacturer for remote and local control, configuration, monitoring, testing and diagnostics of the sign

1.4.20
shall
indicates that a statement is mandatory

1.4.21
should
indicates a recommendation

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Section 2 Design

2.1 General

The sign shall be designed to ensure that it provides continuous and reliable operation for the roadside environment and wide environmental conditions in normal operation.

The sign and all mounting, support and access structures shall be constructed from durable materials treated to ensure optimum performance under prolonged exposure to atmospheric and site conditions prevalent in the geographical region in which they are intended to be used.

The design and installation of the sign, sign support structure, and associated equipment shall be vandal-resistant to ensure that it can withstand attempted damage to equipment and attempted unauthorized access to interiors of housings and casings by brute force.

NOTE 1 Appendix A gives further information about sign clearances and sign access.

NOTE 2 Appendix B gives guidance on placement of signs.

2.2 Design life

The designed operating life of the sign and its support structure shall be as follows:

(a) For the electrical system — not less than 15 years.

(b) For the sign enclosure — not less than 20 years.

(c) For roadside cabinet — not less than 20 years.

(d) For the sign mounting, support and access structures — not less than 50 years.

2.3 Markings and labels

2.3.1 General

All markings shall be clear, permanent, and weatherproof.

2.3.2 On sign controller

The following information shall be marked on the sign controller in a prominent position:

(a) Product/model name or brief description identifying the unit.

(b) Manufacturer's name.

(c) Manufacturer's type number.

(d) A unique serial number.

(e) Description and rating of the primary power supply system, including nominal voltage, current and power consumption for operation.

(f) Relevant regulatory compliance marking (RCM).

2.3.3 On inside of sign controller housing

The following information shall be marked on the inside of the sign-controller housing, in a prominent position:

(a) Description and rating of the reservoir battery, including battery type, voltage and capacity.

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(b) Input ratings for the auxiliary 240 V a.c. battery charger.

(c) Relevant regulatory compliance marking.

2.3.4 On rear of sign controller housing

The following information shall be marked on the rear of the sign display housing:

(a) Product/model name or brief description identifying the unit.

(b) Manufacturer's name.

(c) Manufacturer's type number.

(d) A unique serial number.

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Section 3 Mechanical requirements

3.1 Sign enclosure

3.1.1 Construction material

The sign enclosure shall be constructed from marine grade aluminium alloy 5251 H32 to conform to AS/NZS 1734. The sign enclosure shall be reinforced and/or braced to facilitate the erection and continued operation of the unit in the intended application.

All external metal sections of the completed enclosure shall be suitably treated (e.g. by a polyester powder coating). The surfaces shall be thoroughly cleaned and subject to the appropriate pre-treatment before the treatment is applied. The finish to the surface shall ensure that deterioration due to atmospheric and/or local environmental conditions has no detrimental effect on the structural integrity or appearance (including fading) of the finished enclosure for a period not less than 10 years.

All sundry components used for connection and/or bracing of the sign onto the support structure shall be manufactured or constructed from suitably protected materials. All steel works shall be hot-dip galvanized in accordance with AS/NZS 4680.

Contacts between untreated, dissimilar metals shall be avoided.

3.1.2 Surface finish

All internal and external surfaces shall be free from sharp edges or protrusions.

The colour of the front face of the sign shall be matt black.

Other surfaces should be a lighter colour, preferably matt grey, to reduce internal temperature.

3.1.3 Viewing area

The viewing area shall not be occluded, by any other part of the sign's construction from the half angles as defined in Table 5.1.

3.1.4 Access doors

Where access is required to all internal components of a sign for installation, inspection and maintenance purposes, lockable, sliding or hinged (left or right opening only, not top or bottom opening) door(s) shall be provided on the rear of the enclosure. The maximum horizontal width of each door opening shall be not greater than 1.2 m. Each door shall be provided with UV-stable closed-cell door seals and fitted with fastener(s) operated by means of a security key approved by the sign purchaser. Door stays shall be provided to secure the doors in the open position.

3.1.5 Double-socket outlet

Where a double-socket outlet is required it shall be:

(a) complete with an integral 30 mA type II residual current device conforming to AS/NZS 3190;

(b) supplied and protected by a dedicated circuit-breaker in the sign controller's housing; and

(c) mounted in an accessible position in the sign enclosure such that it provides for unobstructed insertion of mains power plug-packs, and operation of inserted mains power plug-packs with the doors of the sign enclosure closed.

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3.1.6 Mounting

The enclosure design shall facilitate adjusting the angle of the mounted sign during installation and commissioning.

3.1.7 Border

The border shall surround the active display area. It shall not let light through at any point if the sign is backlit. The front face of the border shall be matt black. The width of the border shall be at least 80 % of the minimum character height. Conspicuity devices may be incorporated in the border.

3.2 Roadside cabinet

3.2.1 General

Where specified by the purchaser, a weatherproof roadside cabinet shall be provided. Such cabinet shall be accessible at ground level.

Where a roadside cabinet is provided, it shall conform to the requirements of Clauses 3.2.2 to 3.2.6.

3.2.2 Construction and finish

The roadside cabinet shall be constructed from marine grade aluminium alloy 5251 H32 to conform to AS/NZS 1734.

The exterior shell shall be free from fasteners such as bolts, screws and pop rivets. The interior and exterior of the roadside cabinet shall be free from sharp corners and projections which may cause injury. All exterior corners and the roof shall have a minimum external radius of 3 mm. All accessible edges shall be free from burrs.

All external metal sections of the roadside cabinet shall be suitably treated and have a durable gloss finish of anti-graffiti polyester powder coating with a minimum thickness of 50 microns. The colour of the exterior finish shall be Smoke Blue (Colour No. T33) in accordance with AS 2700 unless otherwise specified by the purchaser.

3.2.3 Access doors

A door shall be incorporated in the roadside cabinet to provide direct access to all internal equipment, including cable clamps and terminals for the connection of external wiring. The required access shall be provided when the door is opened not more than 110 ° from the closed position.

The size of the door opening shall be as close as practicable to the external dimensions of the roadside cabinet, subject to the requirements for mechanical strength.

The door shall be hinged on either the left or the right side. The hinges shall be corrosion resistant and of the concealed type.

A door-retaining device shall be provided for each door to securely hold the door in the open position under all weather conditions at 110 ° and at 90 ° from the closed position.

The housing door shall be fitted with a corrosion resistant three-point locking system. This shall be operable by means of a security key approved by the sign purchaser.

All doors in the roadside cabinet shall be provided with durable and resilient weatherproof sealing gaskets. The sealing gaskets shall be securely held in position and shall be readily replaceable if the equipment is in service.

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