



Pedestrian push-button assemblies



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 - Hire and Rental Industry Association of Australia
 - IES: The Lighting Society
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Australian Standard®

Pedestrian push-button assemblies

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PREFACE

This Standard was prepared by the Standards Australia Committee LG-006, Road Traffic Signals, to supersede AS 2353—1999. It is one of a number of Standards that set out requirements for the equipment associated with traffic signal installations.

The objective of this Standard is to specify requirements for the design, construction and performance of push-button assemblies and associated equipment to facilitate pedestrian usage of signalized intersections or dedicated pedestrian crossings. It is intended for application by road and traffic authorities and their suppliers to facilitate the manufacture, purchase and use of pedestrian push-button assemblies.

This Standard was revised to bring it up-to-date, to include additional design detail and to include provision for cyclists.

Statements expressed in mandatory terms in footnotes to tables are deemed to be requirements of this Standard.

The terms ‘normative’ and ‘informative’ have been used in this Standard 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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STANDARDS AUSTRALIA

Australian Standard

Pedestrian push-button assemblies

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE

This Standard specifies requirements and tests for the design, construction and performance of pedestrian push-button assemblies and associated equipment, which are designed to facilitate the safe movement of pedestrians at locations controlled by traffic signals. It includes requirements for the generation of audio-tactile signals, for use in conjunction with push-button assemblies, to assist pedestrians who are vision impaired.

1.2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1231	Aluminium and aluminium alloys—Anodic oxidation coatings
1420	ISO metric hexagon socket head cap screws
2144	Traffic signal lanterns
2339	Traffic signal posts, mast arms and attachments
2700	Colour standards for general purposes
60068	Environmental testing
60068.2.2	Part 2.2: Tests—Tests B: Dry heat
60068.2.30	Part 2.30: Tests—Test Db and guidance: Damp heat, cyclic (12 + 12-hour cycle)
60529	Degrees of protection provided by enclosures (IP Code)
AS/NZS	
2053	Conduits and fittings for electrical installations
2053.4	Part 4: Flexible plain conduits and fittings of insulating material
2053.7	Part 7: Rigid metal conduits and fittings
3100	Approval and test specification—General requirements for electrical equipment
5000	Electric cables—Polymeric insulated
5000.1	Part 1: For working voltages up to and including 0.6/1 (1.2) kV
61000	Electromagnetic compatibility (EMC)
61000.4.5	Part 4.5: Testing and measurement techniques—Surge immunity test
61000.6.1	Part 6.1: Generic standards—Immunity for residential, commercial and light-industrial environments
61000.6.3	Part 6.3: Generic standards—Emission standard for residential, commercial and light-industrial environments
AS/NZS	
61210	Connecting devices—Flat quick-connect terminations for electrical copper conductors—Safety requirements

AS IEC

61672 Electroacoustics—Sound level meters

61672.1 Part 1: Specifications

AS/NZS IEC

60947 Low-voltage switchgear and controlgear

60947.1 Part 1: General rules

60947.5.1 Part 5.1: Control circuit devices and switching elements—Electromechanical control circuit devices

ANSI/IEEE

1012 Standard for system, software, and hardware verification and validation

1.3 DEFINITIONS

For the purpose of this Standard, the definitions given in AS 2144 and those below apply.

1.3.1 Audio–tactile signals

Signals that comprise both audible and tactile components of specified form and character, designed to assist vision-impaired pedestrians in—

- (a) locating the relevant push-button assembly for the purpose of registering a pedestrian demand; and
- (b) determining when it is permitted to use the crossing associated with the push-button assembly.

1.3.2 (Audio–tactile) crossing signal

A signal with specified audible and tactile components, generated by, or in association with, a pedestrian push-button assembly, which is designed to indicate to vision-impaired persons when to commence using the crossing.

1.3.3 (Audio–tactile) locating signal

A signal with specified audible and tactile components, generated by or in association with a pedestrian push-button assembly, which is designed to enable vision-impaired persons to locate the appropriate push-button assembly.

1.3.4 Driver unit

Electronic apparatus which, in association with a transducer, is designed to generate and control the operation of audio–tactile signals. It typically incorporates a housing, power supply and wiring terminals, harness and connector.

1.3.5 Pedestrian push-button assembly

An enclosure incorporating a push-button switch that is designed for use in conjunction with a signalized intersection or pedestrian crossing for the purpose of registering a demand. The assembly might also incorporate, or have associated with it, facilities for the generation of audio–tactile signals.

1.3.6 Transducer

An electromechanical device that converts the output of the driver unit into the required audio–tactile signals.

SECTION 2 PUSH - BUTTON ASSEMBLY

2.1 COLOUR AND SURFACE FINISH

2.1.1 Exterior of enclosure

The exterior of the enclosure shall have a durable black finish. The finish shall be either—

- (a) integral with the material of the enclosure, e.g. pigment in plastics moulding; or
- (b) applied to the surface, e.g. by painting.

Notwithstanding the above, the surface of the enclosure immediately surrounding the push-button, which is subject to frequent handling, shall not be painted.

NOTES:

- 1 'Durable' in terms of this Clause is intended to mean that the push-button assembly will be capable of withstanding ten years' exposure to the weather without substantial fading, colour change or other deterioration (e.g. flaking) of the exterior finish.
- 2 A paint finish is not regarded as being sufficiently durable for surfaces subject to frequent handling. Permanent finishes such as polished metal or Class AA20 aluminium anodizing in accordance with AS 1231 would be suitable.

2.1.2 Push-button

The push-button specified in Clause 2.4 shall be of polished stainless steel or of a material of similar colour and durability.

NOTE: The objective of the above requirement is to provide a push-button that is relatively light in colour, so as to visually contrast with the black enclosure, with a finish that is sufficiently durable to withstand frequent handling.

2.1.3 Direction arrow

The direction arrow specified in Clause 2.6 shall be of natural anodized aluminium or a material of similar colour and durability. The background to the direction arrow, i.e. within the circular area illustrated in Figure 2.3, shall be of a colour within the range Rich Blue (B11) to Royal Blue (B12) as specified in AS 2700.

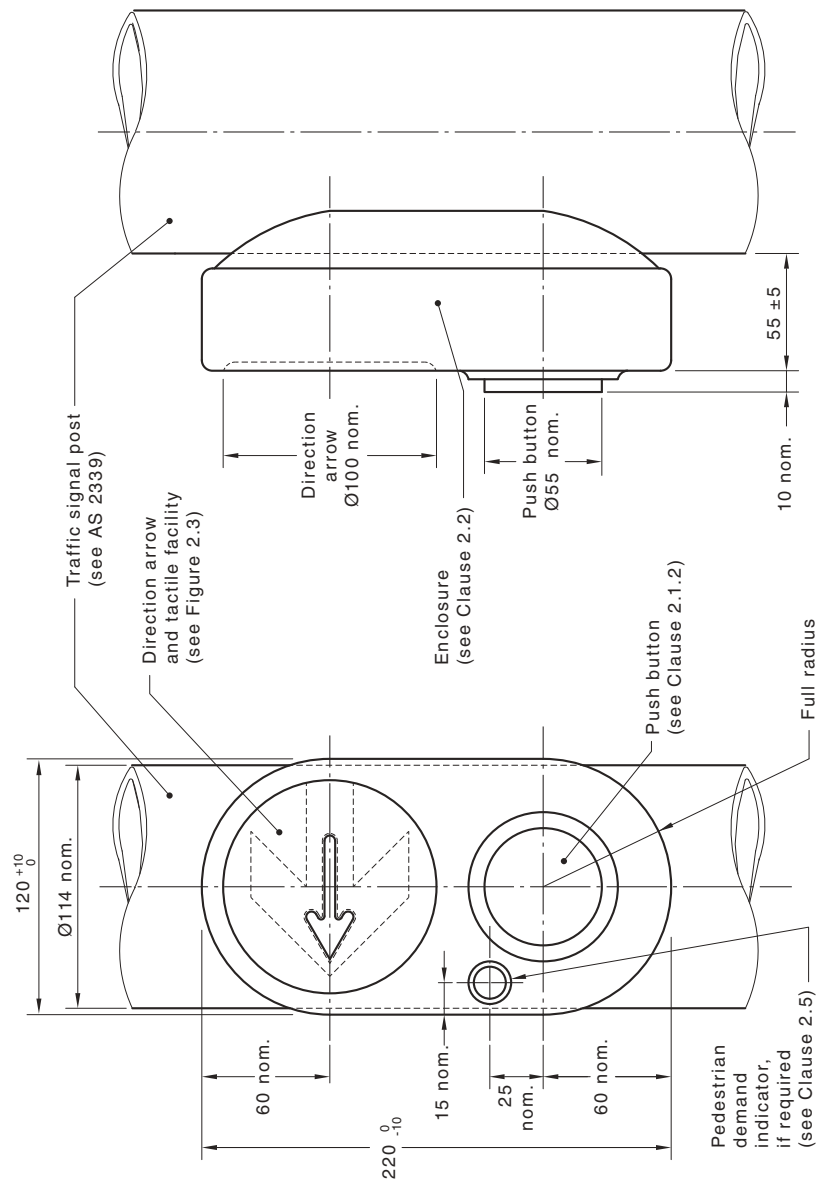
2.2 ENCLOSURE

2.2.1 Size and construction

The enclosure of the push-button assembly shall be of robust construction and shall be free from sharp corners, edges or projections. The material of the enclosure and fixing components shall either be inherently resistant to corrosion or be treated to prevent corrosion.

The form and external dimensions of the enclosure and the relative location of the components shall be in accordance with Figure 2.1. Space shall be provided within the enclosure to permit entry, at the top and bottom, of a 16 mm diameter screwed metal conduit in accordance with AS/NZS 2053.7.

NOTE: The space at the top and bottom of the enclosure is necessary to permit the entry of electrical wiring when the normal entry in the rear of the enclosure (see Clause 2.2.3) cannot be used, e.g. when the push-button assembly is mounted onto a wooden pole or the like.



NOTE: See Clause 2.2.3 and Figure 2.2 for the mounting facilities required.

DIMENSIONS IN MILLIMETRES

FIGURE 2.1 GENERAL FORM AND ARRANGEMENT OF PEDESTRIAN PUSH-BUTTON ASSEMBLY

2.2.2 Access to interior

Provision shall be made for access to terminals and internal components, including the indicator lamp of the pedestrian demand indicator (if fitted). Screws used for fixing the access cover shall be of the M6 (hexagonal) socket head type in accordance with AS 1420.

A stainless-steel tether shall be provided to secure the access cover to the base to ensure no strain is placed upon the internal wiring when the cover is unattached.

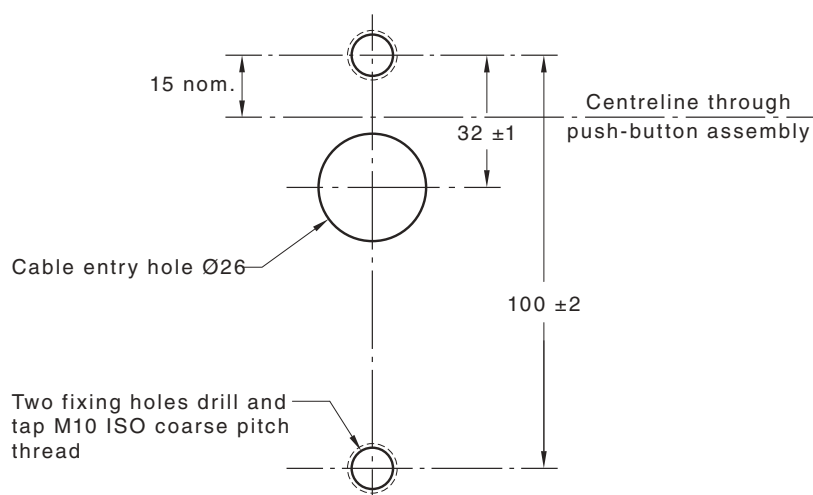
2.2.3 Mounting arrangement

The back of the enclosure shall be designed so as to enable the assembly to be rigidly mounted onto a post of 114 mm outside diameter or larger, in accordance with Figure 2.2.

NOTE: The intention of the above requirements is that the one design of assembly will, without modification, be capable of being rigidly mounted onto a surface ranging from the curvature specified through to a flat surface.

Each push-button assembly shall be provided with the fixings/devices necessary to—

- (a) secure the assembly to a traffic signal post; and
- (b) protect the cable insulation.



NOTE: The diagram represents a surface onto which the push-button assembly may be mounted. The surface may be curved or flat (see Note to Clause 2.2.3).

DIMENSIONS IN MILLIMETRES

FIGURE 2.2 MOUNTING ARRANGEMENT FOR PUSH-BUTTON ASSEMBLY

2.3 TERMINAL BLOCK

One or more terminal blocks shall be provided within the enclosure of the push-button assembly for the purpose of terminating each incoming conductor. Each terminal shall be capable of accommodating conductors having a cross-sectional area of up to 4 mm² (7/0.85). An earthing terminal shall also be provided where required in accordance with AS/NZS 3100.

2.4 PUSH-BUTTON AND SWITCH MECHANISM

2.4.1 General

Pedestrian push-button assemblies with moving parts shall conform to the requirements of Clauses 2.4.2.1, 2.4.3 and 2.4.4. Alternative types of pedestrian push-button assemblies that have no moving parts shall conform to the requirements of Clauses 2.4.2.2, 2.4.3 and 2.4.4.

2.4.2 Design and construction

2.4.2.1 *Push-button assemblies with moving parts*

The push-button assembly shall incorporate a switch of the spring-return, push-button plunger-operated type with at least one set of normally open contacts. The complete push-button and switch mechanism shall be in accordance with the relevant requirements of AS/NZS IEC 60947.1 and AS/NZS IEC 60947.5.1.

The push-button switch shall be capable of being actuated when depressed by means of a flat surface having an area larger than that of the push-button. The displacement of the push-button necessary for actuation of the switch shall be between 3 mm and 6 mm. The activating and restoring forces of the push-button switch shall be in accordance with the following:

- (a) The force required to initially depress the push-button shall lie within the range 6 N to 10 N.
- (b) The force required to depress the push-button shall gradually decrease the further the push-button is depressed and this decrease shall be a minimum of 4 N.
- (c) When depressed to the extent necessary to actuate the switch, the push-button mechanism shall exert a restoring force of not less than 3 N and no greater than 5 N.

The push-button plunger and guide shall be designed so as to minimize the risk of jamming by foreign objects. The plunger mechanism shall be of robust construction.

NOTE: The manufacturer should provide instructions outlining any maintenance actions necessary to ensure the long-term serviceability of the push-button mechanism (see also Clause 2.4.3).

2.4.2.2 *Push-button assemblies with no moving parts*

The push-button switch shall be capable of being actuated when depressed by means of a flat surface having an area larger than that of the push-button.

Push-button assemblies shall incorporate a pedestrian demand indicator light in accordance with Clause 2.5 or other effective means of providing positive feedback to the user that a pedestrian demand has been registered.

Push-button assemblies shall present a clearly identifiable area for activation having a nominal diameter of 50 mm, in lieu of the push-button illustrated in Figure 2.1.

2.4.3 Rating and mechanical endurance

The switch shall be suitable for operation at 50 V a.c. or d.c. and shall have a current rating of at least 0.5 A. The complete pushbutton and switch mechanism shall be capable of withstanding, without failure, at least 10^7 operations when tested as specified in AS/NZS IEC 60947.1.

The switch insulation shall remain effective when subjected to the high voltage test specified in AS/NZS 3100 conducted with a 50 Hz a.c. test voltage of 1000 V r.m.s.

2.4.4 Corrosion resistance

The push-button and guide shall either be of materials that are inherently resistant to corrosion or be adequately treated to prevent corrosion.

2.5 PEDESTRIAN DEMAND INDICATOR LIGHT

Where required, an internally illuminated translucent bezel or panel shall be incorporated in the front of the enclosure, to indicate when a pedestrian demand has been recorded. The indicator light shall be shielded or otherwise designed so as to provide a distinct contrast between the illuminated and non-illuminated state under all viewing conditions.

The colour of the indicator light shall be red when illuminated and white or opaque when in the unenergized state.

The indicator light shall—

- (a) be an LED light source;
- (b) be suitable for operation on an electrical supply of 32 V–42 V a.c. nominal;
- (c) have a rated wattage of not greater than 2 W; and
- (d) not illuminate as a consequence of spurious voltages induced into the electrical supply circuit.

NOTE: The purchaser should specify whether a pedestrian demand indicator light is required (see Item (a), Appendix A).

2.6 DIRECTION ARROW AND OTHER SYMBOLS

A circular recess shall be provided on the front of the enclosure, above the push-button, to permit the attachment of a direction arrow of the form and dimensions specified in Figure 2.3 or other symbols (see Figure 2.4).

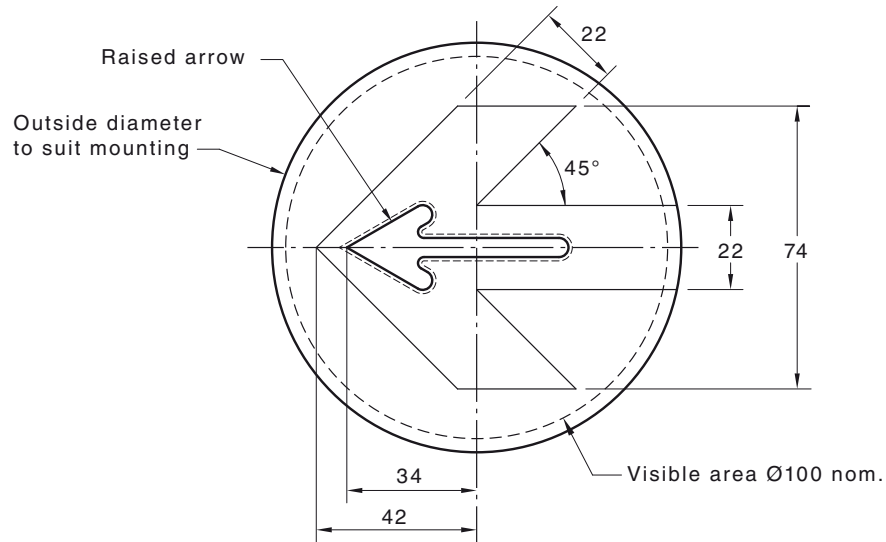
The plate assembly for the direction arrow or other symbol shall be capable of being securely fixed to the enclosure in 22.5 degree intervals from vertical to horizontal.

NOTE: It is intended that the fixing of the plate assembly will be performed by the purchaser, having regard to the configuration of the crossing. The method of fixing the plate should be such that the orientation cannot be changed by unauthorized persons without grossly damaging the symbol, or enclosure, or the associated fixings.

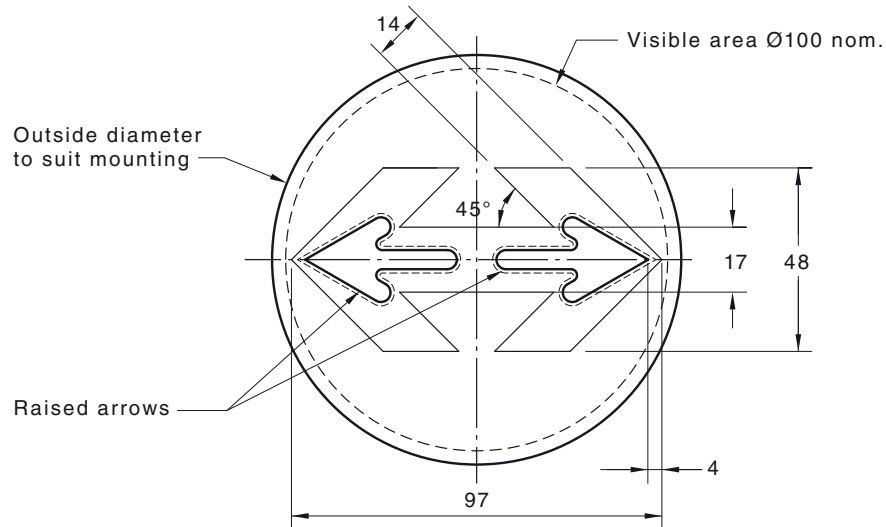
The raised arrow incorporated within the direction arrow shall conform to the requirements of Figure 2.3, and—

- (a) project at least 1.5 mm above the surrounding area; and
- (b) be free from sharp corners.

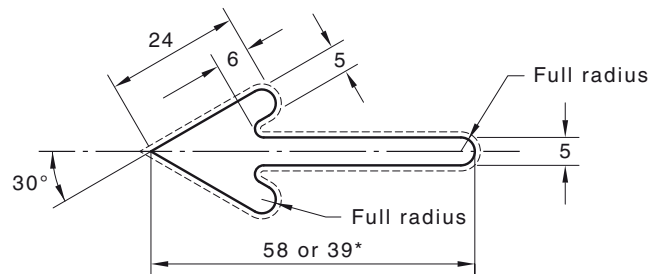
The material of the raised arrow shall be of sufficient strength that sections, e.g. the arms of the arrowhead, cannot be easily bent or broken.



(a) Single arrow panel



(b) Double arrow panel



*Reduced length applies for double arrow

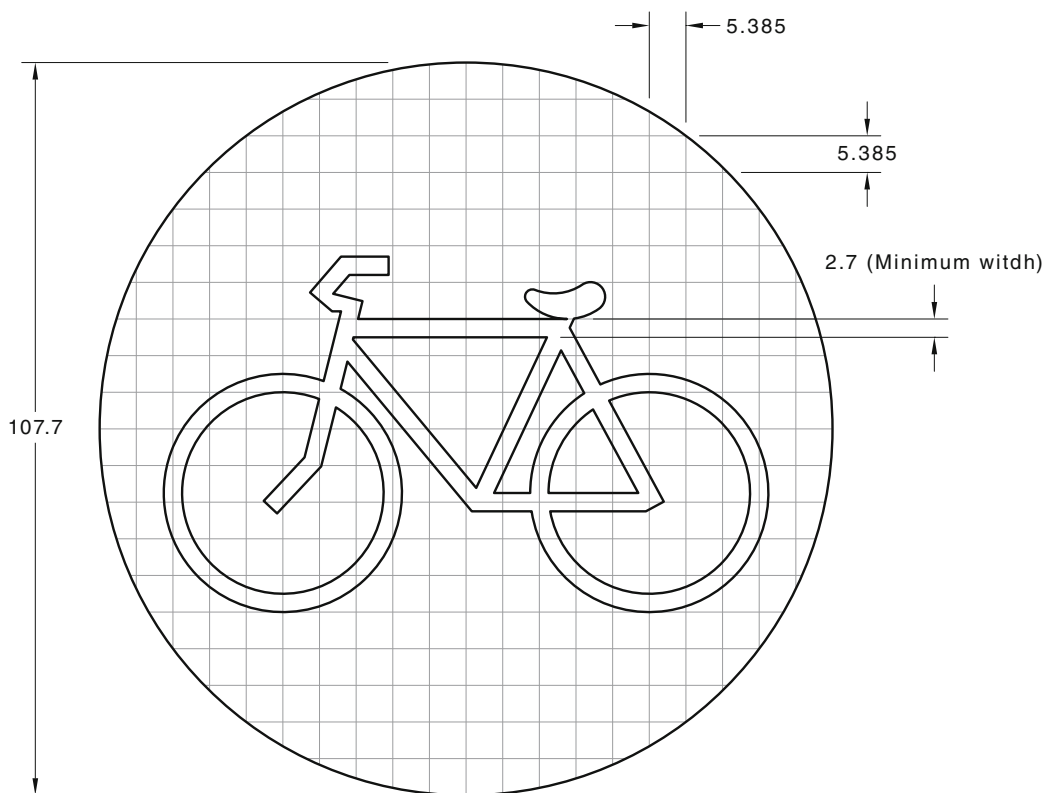
(c) Raised arrow detail

NOTES:

- 1 The double arrow shown in Figure 2.3(b) is intended for installation on medians or traffic islands where the associated crosswalk extends to either side of the push-button assembly.
- 2 The purchaser should specify the type of direction arrow required, i.e. single arrow or double arrow (see Item (b), Appendix A).

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FIGURE 2.3 FORM AND DIMENSIONS OF DIRECTION ARROW



DIMENSIONS IN MILLIMETRES

FIGURE 2.4 FORM AND DIMENSIONS OF BICYCLE SYMBOL

2.7 MARKING

Each push-button assembly shall be legibly and durably marked with the following information, as appropriate:

- (a) The name, trade name or trademark of the manufacturer or responsible supplier.
- (b) Where the manufacturer or supplier markets more than one model of the particular type of push-button assembly, the catalogue number or other marking that will distinguish it from any other model of that particular type.
- (c) Marking to facilitate product identification and traceability.

The above markings shall not be located on the front face of the push-button assembly.

SECTION 3 AUDIO-TACTILE FACILITY

3.1 DRIVER UNIT

3.1.1 Colour and finish

Where the driver unit is separate from the push-button assembly, the housing of the driver unit shall be finished in a colour within the range Neutral Grey (N23) to Lightbox Grey (N33) as specified in AS 2700.

3.1.2 Enclosure

Where a separate driver unit is provided, it shall incorporate the facilities necessary for attachment to a traffic signal post in accordance with AS 2339 by means of a U-bolt or other suitable means. The audio-tactile enclosure shall conform to the general dimensions as shown in Figure 3.1. This is required to ensure compatibility between the driver board and the enclosure. The resilient pad shall support the driver unit during installation and to counter vibration during normal operation. The maximum thickness of the pad shall be 10mm to ensure clearance from electronic components.

3.1.3 Terminal block

Where a separate driver unit is provided, it shall incorporate terminal blocks, as follows:

- (a) *For supply conductors*—a terminal block for the connection of three 240 V a.c. conductors and an earth conductor, each having a cross-sectional area of up to 4 mm² (7/0.85).
- (b) *For extra-low voltage conductors*—a terminal block or similar connecting device suitable for the termination of two extra-low voltage conductors, each having a cross-sectional area of 0.75 mm² (24/0.20).

3.1.4 Wiring loom

Where a separate driver unit is provided, it shall incorporate a wiring loom, for connection to the push-button assembly, in accordance with Table 3.1. Each conductor in the loom shall have V-90 HT grade insulation in accordance with AS/NZS 5000.1.

The white output conductors to the transducer shall be fitted with insulated miniature quick-connect receptacles, to suit flat slide-on tabs of 2.3 mm × 0.8 mm, in accordance with AS/NZS 61210.

The complete wiring loom shall be enclosed in a UV-resistant black flexible conduit of 16 mm nominal diameter, 1.8 m in length, in accordance with AS/NZS 2053.4.

3.1.5 Driver board dimensions

The audio-tactile driver board shall conform to the general dimensions as shown in Figure 3.2. This is required to ensure compatibility between the driver board and the enclosure.