ROADS AND MARITIME SERVICES

TRAFFIC SYSTEMS

SPECIFICATION NO. TSI-SP-048

PEDESTRIAN PUSH-BUTTON ASSEMBLY

AND AUDIO TACTILE FACILITY

Issue: 1.0
Dated: 16/11/2018
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**RECORD OF AMENDMENTS**

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1 SCOPE

This Specification covers technical requirements for the equipment of pedestrian push-button assembly and the audible-tactile facility applied at traffic signal control intersections in New South Wales.

This Specification supersedes RMS Specification “PB/6 Pedestrian Push-Button Assemblies” and “ATS/4 Audio-Tactile Traffic Signal Equipment”.

2 REFERENCES AND APPLICABLE DOCUMENTS

2.1 Australian and International Standards

[3] AS 61558 – Safety of power transformers, power supply units and similar – Particular requirements.

2.2 RMS Specification & Documents

[4] TS201 – Approval of ITS Field Equipment

2.3 RMS Engineering Drawing

[7] VM041-31 - Pedestrian Push-Button Assembly Die Cast Aluminium Case Side Views and Sections
[8] VM041-32 - Pedestrian Push-Button Assembly Direction Arrow/Transducer Disc
[10] VE530-15 - Audio-Tactile Driver Unit Housing Wiring
[12] VM626-04 - Audio-Tactile Housing: Dimensional Requirements for Outer Bottom Face

3 DEFINITIONS AND GLOSSARY OF TERMS

For the purposes of this Specification, the following definitions and abbreviations shall apply:

Equipment – Pedestrian push-button assembly and (or) audio-tactile facility;
RMS – Roads and Maritime Services, a New South Wales government agency.
4 OVERALL COMPLIANCE

The equipment shall meet the requirements of AS 2353 [1] unless specified otherwise in this specification.

5 PEDESTRIAN PUSH-BUTTON ASSEMBLY

5.1 General Requirement

The push-button assembly shall be designed to detect a hand touch from pedestrian and operate in conjunction with the audio-tactile facility to generate a complete set of audio-tactile signals.

The pedestrian demand indicator light is not required in application of NSW.

5.2 Enclosure

5.2.1 Size and Construction

The external dimensions of the enclosure and relative location of the components shall be in accordance with RMS engineering drawing No. VM041-30 [6] and VM041-31 [7].

5.2.2 Gaskets

Gaskets used for sealing the front cover of the push-button assembly shall be of neoprene rubber or similar material held under compression to form a weatherproof joint. The gasket shall be retained to prevent its loss when the front cover is released.

5.2.3 Mounting Arrangement

In addition to the requirements defined in Section 2.2.3 of AS 2353:2018 [1], each push-button assembly shall be supplied with two sets of 316 Marine Grade stainless steel mounting components (M10 screw, Ф10 internal star washer and Ф10 flat washer). The mounting arrangement of the assembly and length of the screw are shown in Figure 1 of this specification.

The two sets of mounting components above shall be packed in a sturdy plastic bag, which shall be secured inside of push-button assembly when packed for delivery.
5.2.4 Drain Slot

As per RMS engineering drawing No. VM041-31 [7], a 3mm wide drain slot shall be provided at the lowest point of the enclosure to allow any water which accidentally enters the assembly to escape to the exterior.

5.2.5 Direction Arrow and Other Symbols

The form and dimensions of the direction arrow shall be in accordance with RMS engineering drawing No. VM041-32 [8].

All push-button assemblies, if purchased without audio-tactile transducers, shall be supplied with dual-arrow disc affixed.

5.3 Transducer

The following clauses are additional to the requirements defined in Section 3.2 of AS 2353:2018 [1].

5.3.1 Terminals

The two input terminals for the transducer shall be 2.3 x 0.8mm slide-on tabs for miniature quick-connect termination. The maximum dimensions and mounting method of the transducer are shown in RMS engineering drawing No. VM041-33 [9].
5.3.2 Alignment of Transducer

The motor structure of the transducer shall be appropriately fitted into the push-button assembly, it is not permitted to use a trial and error procedure to align the motor structure for reduction of unwanted noise or sound-distortion.

5.4 Drop Tests

The transducer shall be able to withstand the following drop tests without change of specified performance parameters:

The push-button assembly containing the transducer shall be dropped once in each of three (3) orientations, viz. face-up, face-down and sideways, from a height of 1.5 m onto a piece of 18 mm thick, medium density fibreboard of minimum size 500 x 500 mm, which is positioned on a level concrete or similar surface.

5.5 Push-Button and Switch Mechanism

The following are additional to the requirements defined in Section 2.4 of AS 2353:2018 [1].

5.5.1 Anti-vandal Design

The design shall minimise the risk of the button being pulled out, or jammed by insertion of foreign objects or materials such as chewing gum.

5.5.2 Movement of Push-Button

As illustrated in Figure 2, the movement of the push-button shall be linked to the operation of the switch mechanism:
Note: The numbers in Figure 2 above indicate button travel in percent from the rest position (0%) to fully depressed (100%).

Figure 2: Relationship between push-button movement and switch operation

5.6  Special Marking

The following requirement is additional to the description outlined in Section 2.7 of AS 2353:2018 [1]:

If the button mechanism incorporates a permanent magnet which will attract iron filings and swarf, a durable and clearly visible notice shall be affixed inside the base casting to alert installation staff that it is important to remove such foreign matter prior to securing the cover.

6  AUDIO-TACTILE FACILITY

6.1  Enclosure

6.1.1  General

In addition to the requirements defined in Section 3.1.2 of AS 2353:2018 [1], the enclosure of the audio-tactile facility shall satisfy with dimension requirements defined in RMS engineering drawing No.VM626-01 [11] and VM626-04 [12].

The enclosure shall be supplied with a universal mounting bracket attached at the rear of the enclosure in accordance with RMS engineering drawing No. VM626-09 [13].
6.1.2 Construction Requirements

The post-mounted enclosure shall be constructed from marine grade sheet aluminium or die-cast aluminium alloy or plastic material, such as UV stabilised Polycarbonate.

No screw-heads or nuts shall protrude from the enclosure exterior. All screws through the enclosure walls shall pass through tapped holes which shall be sealed to prevent water ingress. No holes shall be drilled through the top of the enclosure.

All screws, washers and nuts in contact with the cast aluminium enclosure shall be stainless steel (316 Marine Grade).

6.2 Transformers

As shown in RMS engineering drawing No. VE530-15 [10], to derive the 40 Vac centre-tapped supply (40VA) and the 9Vac output (1VA) the enclosure shall contain isolating transformers which are connected to the following power sources:

a) Typical 240 Vac low voltage (LV) mains supply or typical 42 Vac extra low voltage (ELV) supply, connected to 240V(42V) ACTIVE terminal, for sourcing the nominated 40 Vac centre-tapped power supply;

b) Typical 240 Vac LV active or typical 42 Vac ELV active from associated pedestrian Green signal, connected to the “WALK” ACTIVE terminal, for sourcing the nominated 9Vac output.

Note that the voltage range of the pedestrian green signal is 170 - 280Vac for LV or 29 – 55Vac for ELV due to dimming operation of traffic signal controller and fluctuation of the mains supply voltage.

Where 42Vac ELV operation is required as a provision, it is permitted to implement dual voltage (LV and ELV) isolation transformers to achieve the requirements defined above.

The transformers shall comply with AS/NZS 61558 [3].

6.3 Electrical Connection

In addition to the requirements defined in Section 3.1.6 of AS 2353:2018 [1] the electronic driver board shall be connected with its external electrical arrangement via an 11-way male connector anchored to the driver board, the connector shall conform to DIN 41620 (e.g. Provertha 11 Pin Part No.: I0 50 11 02 20).

The electrical connection from the enclosure to the electronic driver board shall be by means of an 11-way female connector conformed to DIN 41620 (e.g. Provertha 11 Pin Part No.: I0 60 11 01 20).

It shall be possible to conveniently remove the electronic driver board from a fully equipped enclosure without using tools.

Conformal coating shall be applied to the driver board’s electronic circuitry.
6.4 Electrical Cabling

The following replace the relevant requirements specified in the Section 3.1.4 of AS 2353:2018 [1].

The UV-resistant black flexible conduit of 16mm nominal diameter shall be 2.3m in length measured from the point of entry to the audio-tactile facility enclosure.

The length of excess wire protruding beyond the black flexible conduit, the gauge and colour code of each wire shall be in accordance with Table 1 below (The wiring of the enclosure is shown in RMS engineering drawing No. VE530-15 [10]):

<table>
<thead>
<tr>
<th>Designation</th>
<th>Colour Code of wire</th>
<th>Excess Length of wire</th>
<th>Wire Gauge</th>
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<tr>
<td>ACTIVE: 240Vac LV or 42Vac ELV</td>
<td>Brown</td>
<td>0.7m</td>
<td>7 / 0.40 mm</td>
</tr>
<tr>
<td>‘WALK’ ACTIVE: 240Vac LV or 42Vac ELV from associated pedestrian Green signal output</td>
<td>Orange</td>
<td>0.7m</td>
<td>7 / 0.40 mm</td>
</tr>
<tr>
<td>Neutral for LV or ELV</td>
<td>Blue</td>
<td>0.7m</td>
<td>7 / 0.40 mm</td>
</tr>
<tr>
<td>Earth</td>
<td>Green/Yellow</td>
<td>0.7m</td>
<td>7 / 0.67 mm</td>
</tr>
<tr>
<td>Transducer (twisted pair or figure-8)</td>
<td>White</td>
<td>4.5m</td>
<td>24 / 0.2 mm</td>
</tr>
</tbody>
</table>

Table 1: Colour Code, Excess Length and Gauge of the Enclosure Wires
6.5 Information Label

This Clause is in addition to requirements defined in Section 3.3 of AS 2353:2018 [1].

A plastic Information label shall be affixed within the hinged cover of the enclosure. The information on the label shall be conveniently visible to service personnel from a ladder, when the enclosure is mounted as shown on RMS engineering drawing VM626-01 [11].

The following information are to be included on the label:

(a) The description “AUDIO TACTILE TRANSDUCER DRIVER UNIT”;
(b) Guidance for settings of the HIGH-MEDIUM-LOW volume switch;
(c) Details of replaceable fuse types and ratings;
(d) Connection diagram for the driver unit;
(e) Danger sign if the equipment is LV supplied;
(f) RMS type approval number.

7 EQUIPMENT MANUAL

7.1 Design Specification

As part of the manual, environmental conditions, mechanical and electrical parameters of the equipment shall be provided, including such as operation temperature, physical dimensions, anchoring and mounting details, operation voltage and power consumption of the equipment.

7.2 Replaceable Parts

All replaceable parts shall be described in the manual. Clear instructions for replacement of the parts, including relevant diagnostic procedures, shall be given in the manual.

The manual shall also include drawings to illustrate the access provisions for facilitating the removal and re-instatement of the replaceable parts.

For items replaceable in the field or workshop, the manual shall clearly define whether the item can be:

(a) repaired in workshop (instructions for the repair shall be provided in the equipment manual), or
(b) returned to the equipment manufacturer or supplier for repair.
8 QUALITY ASSURANCE

8.1 General

Manufacturer or supplier of the equipment shall operate a quality management system complying with AS/NZS/ISO 9001 [2].

8.2 Third Party Certification

The manufacturer or supplier shall have obtained third-party certification under AS/NZS/ISO 9001 [2] by an accredited independent organisation.

8.3 Quality Plan

The manufacturer shall document a quality plan appropriate to the item detailing the quality control tests and assessment which the manufacturer shall conduct during manufacturing prior to release. This shall include sampling plan, test frequency and a description of the records to be made.

8.4 Quality Audits

RMS reserves the right to examine the manufacturer's or supplier's quality records. RMS also reserves the right to carry out an independent quality audit.

9 TYPE APPROVAL

To gain approval the manufacturer or supplier shall follow the process defined in TS201 [4]. The manufacturer or supplier shall submit the following documentation, as a minimum, in support of a submission for type approval of the equipment to the ITS Help Desk (ITSHelpDesk@rms.nsw.gov.au):

a) A clause-by-clause statement of compliance, and associated evidence, referenced to each compliance item, with this Specification and applicable sections of referenced Australian standard(s);

b) Third party test results of relevant environmental tests required in Appendix E of AS 2353:2018 [1];

c) Evidences to demonstrate that the equipment complies with Electromagnetic Compatibility defined in Section 6.3 of AS 2353:2018 [1] and statutory requirement of EMC (i.e. RCM Mark);
d) Test reports for performance measurements defined in Appendix B, C and D of AS 2353:2018 [1] where applicable;

e) Equipment manual;

f) A copy of current suitability certificate for the equipment;

g) A copy of the manufacturer’s or supplier’s quality plan for the equipment. Evidence of third party certification of the manufacturer’s or supplier’s quality system;

h) If subsequently requested by RMS, an equipment sample shall be provided for evaluation as part of the approval process.

10 PACKING

When delivery each push-button assembly (complete with arrow disc and mounting hardware) and audio-tactile driver unit (complete with mounting hardware) shall be individually packed in a rigid cardboard box and securely sealed.

Each box shall on the outside carry the following information:

a) Description of contents, viz PEDESTRIAN PUSH-BUTTON ASSEMBLY or AUDIO TACTILE DRIVER UNIT;

b) Manufacturer’s or supplier's identification;

c) Manufacturer’s or supplier’s type or code number for the equipment;

d) RMS Type-approval Number.

Each box shall have sufficient rigidity and strength to prevent damage to any equipment contained therein during normal handling and when such boxes are stacked ten high for an indefinite period.

11 WARRANTY

Purchase of any items under this specification shall be subject to a warranty period of not less than 12 months following the date of despatch from the manufacturer’s or supplier’s premises.