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# RECORD OF AMENDMENTS

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1 PURPOSE

1.1 SCOPE

This Specification covers the general requirements for terminal blocks for Intelligent Transport System (ITS) applications in Roads and Maritime Services (RMS), where repeated access is likely to be needed for connections by technicians. This is a general specification for terminal block applications; the relevant equipment specification shall define the exact terminal block type.

1.2 Application

Terminal blocks as described by this specification are to be used for conductor terminations of electrical connections for the use of:

a) Traffic Signal Controller housings

b) Other miscellaneous ITS applications such as lantern terminal boxes, traffic signal post top assemblies etc.

Note: Terminal blocks are installed in weather protected enclosures.

2 REFERENCES AND APPLICABLE DOCUMENTS

2.1 Australian and International Standards


[7] AS 60529 Degrees of protection provided by enclosures (IP Code)


2.2 RMS Documents


2.3 Compliance with Standards

All equipment and material, where not otherwise specified, shall be in accordance with the relevant Australian Standards where such exist, or otherwise with the appropriate international/ISO specifications.
3 DEFINITIONS AND GLOSSARY OF TERMS

3.1 Definition

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

Creepage Distance – The shortest path between two conductive parts, or between a conductive part and the bonding surface of the equipment, measured along the surface of the insulating material.

DIN-Rail – A DIN rail is a metal rail of a standard type widely used for mounting terminal blocks; Manufactured to IEC/EN 60715.

Feed Through – Feed through terminal blocks allow wires/terminal points to have the conductive path managed through the housing in the centre of the terminal block. A Pass through terminal block is the same as a feed through terminal block.

Push-In – Terminal blocks which allow the connection of a conductor into the terminal by push-in method without using tools. Connections are screw less and solderless.

Screw – Terminal blocks which allow the connection of a conductor into the terminal by means of a screw and spring loaded yoke.

Probe – An insulated implement used to push the release mechanism so as to release the conductor.

Bootlace Ferrule – A commercially available crimp type cable conductor connector.

PIDG Lip Blade – A commercially available crimp type “Pre Insulated Double Grip” cable conductor connector.

3.2 Abbreviations

For the purpose of this Specification, the following abbreviations shall apply:

ITS – Intelligent Transport Systems

RMS – Roads and Maritime Services is a New South Wales government agency.

TfNSW – Transport for New South Wales.

4 FUNCTIONAL REQUIREMENT

4.1 Terminal Type

4.1.1 Terminal Structure

Terminal blocks shall be the feed through type.

4.1.2 Clamping Option

The connection method of the terminal blocks shall be either:

a) Tool free push-in type. The probe release mechanism shall be fully insulated.

b) Screw and spring clamp type. The screw shall not make direct contact with the cable or crimp.
The clamping option shall be stated in the relevant RMS equipment specification.

### 4.1.3 Mounting

Mounting shall be:

a) The terminal blocks shall be provided with means that allow them to be securely attached to a DIN Rail.

b) Partitions shall be fitted between terminals as required.

### 4.1.4 Number of Connections per Terminal and Dimensions- Push-in Type

a) The number of connections and size of the terminal shall be subject to RMS approval.

b) Where the terminals are required to be fitted into traffic signals equipment due to space restrictions, the number of connections per terminal shall be 2, 3 or 4 and the dimensions shall be subject to RMS approval.

### 4.2 Test -Access Point

Each terminal shall have a test access point.

### 4.3 Cabling Requirement

The terminal blocks shall be able to accommodate the following cabling requirements:

#### 4.3.1 Conductor size

Conductor size is typically between 1.5mm² and 6.0mm² with respect to the relevant terminal type and size capability.

### 4.4 Design Requirement

#### 4.4.1 Finger Protection

Protection shall be in accordance with AS/NZS 3100 [6] clause 8.10.3 to AS 60529 [7] IP2X.

#### 4.4.2 Release of Conductor

The crimped conductor shall be simple and easy to release from the terminal blocks.

#### 4.4.3 Jumper Link

Each terminal shall have the capability to be linked to adjacent terminal/s via insulated plug-in jumper links.

#### 4.4.4 No Exposed Conductor

All electrically conductive portions of the terminal shall be retained within the insulating and housing frame and irrespective of whether the conductor clamping mechanism is tightened or not, ie passes the finger test for accessing live conductors.
4.4.5 Pull Out Test

The terminal block shall meet the requirements of clause 8.2.4.4 and table 5 of IEC 60947.1 [2] for all conductor sizes between 1.5mm² and 6.0mm².

5 ELECTRICAL REQUIREMENTS

5.1 Voltage and Current Rating

The terminal block shall be rated to at least a voltage of 500V rms and current of 20A rms

5.2 Insulation Resistance

The insulation resistance shall be a minimum 100 MΩ when measured with a 500V DC insulation tester between terminal to an adjacent terminal and terminal to mounting rail.

5.3 Creepage distances


5.4 Insulating Material

The Insulating material shall comply with minimum Polyamide 6 (PA6) characteristics; the material shall have a Comparative Tracking Index, CTI ≥ 600 determined in accordance with IEC 60112 or Material Group 1 at pollution degree 3 as per AS/NZS IEC 60947.1 [2].

5.5 Protective Cover

An additional transparent polycarbonate protective cover or cover with equivalent characteristics to provide additional protection over the terminal blocks shall be required where stated in the relevant RMS specification.

6 ENVIRONMENTAL CONDITIONS

6.1 Metallic Parts and Coatings

All metal parts and coatings shall comply with the requirements of IEC 60068-2-11 [3], IEC 60068-2-42 [4] and IEC 60068-2-43 [5].

6.2 Relative Humidity

Terminal shall be tested to IEC 60947-7-1: RH 50% @ 40⁰C, 90% @ +20⁰C.

6.3 Vibration

The terminal block shall comply with clause 2.5 of TSI-SP-[9].

6.4 Fire and Heat Characteristics

The terminal block shall comply with section 6 of AS/NZS 3100 [6].

The material shall meet a minimum Flammability Rating UL94 V-0.
7 TERMINAL BLOCK IDENTIFICATION AND MARKING

Each terminal block shall be identified and marked at manufacture, and shall include the following information:

   a) Manufacturer’s name and identification mark
   b) Type reference or catalogue number
   c) Conductor size or range of conductor sizes
   d) The front face of each terminal shall provide or accommodate a legible label; the character height shall be a minimum of 2mm and a minimum of two characters per label. The label content shall be as per the referencing specification.

8 QUALITY ASSURANCE

8.1 General

The Supplier and the Manufacturer shall operate a quality management system complying with AS/NZS/ISO 9001 [8].

8.2 Third Party Certification

The Supplier and the Manufacturer shall have obtained third-party certification under AS/NZS/ISO 9001 [8] 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 assessments which the Manufacturer shall conduct during manufacture prior to release. This shall include sampling plans and test frequency, and a description of the records to be made.

8.4 Quality Audits

RMS reserves the right to examine the Supplier’s and Manufacturer’s quality records. RMS also reserves the right to arrange for an independent quality audit.

9 APPROVAL

This clause is not applicable to this specification.