

Roads

Master Specification

RD-ITS-C2 Mains Power for Traffic Management

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RD-ITS-C2 Mains Power for Traffic Management

1 General

- 1.1 This Part specifies the requirements for the supply and installation of low voltage (LV) mains power for ITS and Traffic Management Equipment (including ITS cabinets and traffic signal controllers). Refer to RD-EL-C1 "Installation of Lighting for Roads and Public Spaces" for the requirements for power supply for road lighting
- 1.2 The mains power supply includes Consumer's Mains, Submains (where applicable), switchboard electrics, switchboard enclosure, associated pit and ducts, and any other works necessary to meet the functional requirements.
- 1.3 All electrical installations shall be carried out by an electrical worker who is licensed to perform any electrical works and shall comply with AS/NZS 3000, the Electrical Legislation and the Service Rules and Conditions of Supply of SA Power Networks (SAPN).
- 1.4 Documents referenced in this Part are listed below:
- a) AS/NZS 3000 Electrical Installations (also referred to as the "Wiring Rules").
- 1.5 The following definitions apply to this Part:

Term	Definition
Connected Load	Sum of maximum running loads for all electrical equipment, including devices connected via socket outlet.
Electrical Legislation	The Electricity Act 1994 and associated Amendments and Regulations and Electrical Safety Act 2002 and associated Amendments, Regulations and Codes of Practice.
ELV	Extra-low Voltage: Not exceeding 50 V a.c. or 120 V ripple-free d.c.*
HV	High Voltage: Exceeding low voltage*
Installation	Switchboard, enclosure, earthing, and all cabling including consumers mains.
ITS Cabinet (formerly Outstation)	An enclosure associated with an ITS or electrical / electronic device.
LV	Low Voltage: Exceeding extra-low voltage, but not exceeding 1,000 V a.c. or 1,500 V d.c.*
Switchboard	The entire functional unit, including electrical components and switchboard enclosure.
Switchboard Enclosure	The switchboard mounting chassis.

*from AS/NZS 3000

2 Quality Requirements

- 2.1 Prior to the commencement of this work, the Contractor shall provide:
- a) a statement of currency of all electrical workers licences for all electricians working on the contract;
- b) the proposed cable sizes and details of any proposed switchboard(s);
- c) details of any planned disruptions to supply to existing connected loads; and
- d) a copy of the calculations showing current carrying capacity, voltage drop and fault loop impedance.
- 2.2 If not submitted beforehand, the documentation require by this Clause shall be submitted at least 20 working days prior to the commencement of site work.
- 2.3 Provision of this documentation shall constitute a **Hold Point**.

3 Scope

3.1 The Contractor shall:

- a) where an existing mains power supply is unavailable for alteration, provide a new protected mains power supply;
- b) where an existing protected mains power supply is available and suitable for alteration, perform alterations as necessary for the change in supply and / or connected load, including all Equipment and cabling that is entirely contained within the switchboard enclosure;
- c) where necessary, disconnect, remove and / or relocate and reconnect existing switchboards;
- d) where necessary, provide protected Consumer's Mains and / or submains to existing, replacement and new switchboards, including those in outstations and traffic signal controllers;
- e) where required to complete the mains power supply, provide pits, poles, ducts, footings and any other necessary materials, Equipment and works;
- f) connect new / replacement switchboards to the point of supply;
- g) unless specified otherwise, act as the Principal's agent concerning all aspects relating to the electricity supply;
- h) carry out all design, documentation, supply, installation, disconnection, removal, relocation, connection, testing and commissioning of the abovementioned works; and
- i) provide all Electrical Certificates of Compliance in accordance with AS/NZS 3000.

3.2 The following is excluded from the scope of this Part:

- a) supply and installation of switchboards that are integral to either outstations or traffic signal controllers; and
- b) provision of a non-mains electricity supply and associated auto changeover Equipment and / or control system.

4 Operational Requirements

General

- 4.1 Field Equipment and other electrical installations, except traffic signals and road lighting, shall be powered by a metered power supply. Traffic signals and road lighting equipment shall be included in the NEM Load Tables, refer to Australian Energy Market Operator (AEMO) approved load tables for unmetered connection point. https://www.aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Metering-Procedures/NEM-Load-Tables-For-Unmetered-Connection-Points.pdf.
- 4.2 The mains power supply shall meet the power consumption requirements of each individual installation. The switchboard shall protect supplied loads from transients and harmonics as may be expected when connected to a mains electricity supply.
- 4.3 Persons shall be protected from all points / surfaces at greater than ELV potential within the enclosure. Wherever possible, the switchboard shall maintain uninterrupted electricity supply while being serviced.
- 4.4 Unless otherwise specified and / or required by SAPN, energy consumption for unmetered installations shall be based on the connected load.

Mains Power

- 4.5 The mains power supply design shall be in accordance with AS/NZS 3000.

Transient Suppression

- 4.6 Surge suppression shall be provided on the load-side of the main switch. The suppression device shall be designed to withstand a minimum of three (3) surge events. It shall display health status locally via integral indicators.

Automatic Change-Over Switch

- 4.7 This Clause only applies if the installation of a secondary power source has been specified.
- 4.8 An automatic change-over switch shall be provided on the load side of the mains switch. Upon detection of mains power failure, the change-over switch shall automatically switch to the alternative power source. Upon detection of stable mains power restoration in excess of one continuous minute, the change-over switch shall automatically switch back to mains power. The change-over switch shall provide display status locally via integral indicators and provide volt-free contacts for remote indication.

5 Installation Requirements

General

- 5.1 Wherever practicable, existing power supplies shall remain operational throughout the carrying out of the work under the Contract. If disruption to an existing power supply is unavoidable, the Contractor shall give 5 working days' written notice of the intention to disrupt an existing supply.
- 5.2 Provision of this notice shall constitute a **Hold Point**.
- 5.3 The use of un-metered switchboards as a source of power for temporary works during construction is permitted where approved in writing by SAPN. Where the switchboard is installed in the field on pre-cast plinths and as otherwise necessary, the Contractor shall provide a dedicated earthing system in accordance with AS/NZS 3000.

Contact with SA Power Networks (SAPN)

- 5.4 If the Principal has made arrangements for supply point locations, the locations will be shown on the Drawings. The Contractor shall confirm the position of the supply points before installing conduit runs to these points.
- 5.5 Unless specified otherwise, the Contractor shall make applications for supply, on behalf of, and in the name of, the Principal. The Principal's relevant customer details will be provided to the Contractor. The Principal shall sign all correctly completed forms prepared by the Contractor as required by SAPN. The Contractor shall advise SAPN of changes to connected loads and provide a copy of the advice to the Principal.
- 5.6 If the Contractor is to arrange supply points, the Contractor shall complete an SAPN Form. At least 7 days prior to contacting SAPN, the Contractor shall provide the following documentation as a minimum:
- a completed copy of any documents and supporting information the Contractor intends to forward to SAPN; and
 - calculations to determine the prospective unfused fault current, connected load and maximum demand at the line side of the main switch.
- 5.7 Provision of the documentation shall constitute a **Hold Point**.
- 5.8 The Contractor shall not proceed with the works until receipt of written authorisation from SAPN.

Inspection

- 5.9 The Contractor shall apply for the SAPN connection test, arrange for Certificates of Compliance in accordance with the Electricity Act and submit copies of the certificates. Any fees for connections shall be paid for by the Contractor.

6 Acceptance Test Requirements

In addition to any acceptance testing specified elsewhere in this Contract, the Contractor shall undertake the following tests:

- a) thermal (infrared) image scan of the switchboard under maximum anticipated load conditions; and
 - b) where a secondary power supply is used, reliable changeover between mains and alternate power source(s) and back to mains.
- 6.2 All "hot" joints identified on the thermal image scan shall be rectified and retested.

7 Hold Points

7.1 The following is a summary of the Hold Points referenced in this Part:

Document Ref.	Hold Point	Response Time
2.3	Quality Documentation	10 Working Days
5.2	Notice to disrupt supply	5 Working Days
5.7	Documentation to be forwarded to SA Power Networks	5 Working Days

8 Verification Requirements and Records

8.1 The following is a summary of records to be supplied by the Contractor to demonstrate compliance with this Part:

Table RD-ITS-C2 8-1 Verification Requirements

Document Ref.	Record
2	Statement of electrical workers licence
2	Details of proposed cable sizes and switchboard details
2	Details of any planned disruptions
2	Calculations
5.3	SA Power Networks Connection Test and Electrical Certificates of Compliance
6	Acceptance Test Records