



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Discipline
Engineering Standard - NSW

Category
Signalling

Title
**Power Supply Units for Signalling Equipment -
Battery Chargers**

Reference Number
SPS 31 - (RIC Standard: SC SC 09 10 08 00 SP)

Document Control

Status	Date	Prepared	Reviewed	Endorsed	Approved
Issue 1 Revision 3	May 05	Standards and Systems	Standards Engineer	GM Infrastructure Strategy & Performance	Safety Committee
		Refer to Reference Number	H Olsen	M Owens	Refer to minutes of meeting 12/08/04

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The technical content of this document has been approved by the relevant ARTC engineering authority and has also been endorsed by the ARTC Safety Committee.

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About This Standard

This Specification describes the specific requirements for Power Supply Units/Battery Chargers to be manufactured and supplied to Australian Rail Track Corporation or contractors to Australian Rail Track Corporation, for Signalling power supplies.

These Battery Chargers are for specific railway signalling applications such as; road and pedestrian level crossings, telemetry systems.

Document History

Primary Source – RIC Standard SC 09 10 00 00 SP Version 3.0

List of Amendments –

ISSUE	DATE	CLAUSE	DESCRIPTION
1.1	01/09/2004		Reformatting to ARTC Standard
1.2	14/03/2005	Disclaimer	Minor editorial change Footer reformatted
1.3	06/05/2005	All	Document reformatted

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1. Introduction

This Specification describes the specific requirements for Power Supply Units/Battery Chargers to be manufactured and supplied to Australian Rail Track Corporation or contractors to Australian Rail Track Corporation, for Signalling power supplies.

The Battery Charger shall be capable of float charging and constant potential rapid charging of Nickel-Cadmium batteries and sealed lead acid batteries in some situations.

The charger shall be suitable for use as a constant potential DC Source with the battery disconnected.

The provisions of ARTC specification SPS 22 shall form part of this specification.

2. Applicable Documents

2.1 ARTC Specifications

This Specification refers to the following ARTC Specifications:

Specification SPS 05: Electronic Components Ratings construction requirements

Specification SPS 22: Power Supply Units for Equipment General Requirements

3. Types of Units

Types of power supply unit/battery chargers covered by this Specification shall be tabulated as follows:

ARTC IDENTITY	ITEM DESCRIPTION	OLD(SRA) ID	SPECIFICATION
DC801	Power Supply Unit-Battery Charger 2V-15V, 10A (Pedestrian Level crossings gates)		SPS 31
DC802	Power Supply Unit-Battery Charger 120V AC/for 12V, 20A DC (Automatic Level Crossing Battery Charger)	(Store 74)	SPS 31
DC803	Power Supply Unit-Battery Charger 120V AC/for 12V, 30A DC (Automatic Level Crossing Battery Charger)	(Store 74-30A)	SPS 31
DC804	Power Supply Unit-Battery Charger 24V, 20A DC	(Store 86)	SPS 31
DC805	Power Supply Unit-Battery Charger 50V 2A	(Store 96)	SPS 31

4. Design Requirements

High reliability is expected for power supply units/battery charger equipment, especially that used for road and pedestrian level crossing applications. Magnetic

amplifier type operation has proven records in the NSW rail network. For this application, other types of power supplies which can provide the same or better reliability than the above type may be considered. Duplicated arrangement can be accepted for consideration. Failure modes of these supplies shall be considered prior to acceptance.

All components shall meet the requirements of ARTC specification SPS 05.

4.1 Input Voltage

The chargers are to operate from 120V AC as per specification SPS 22 clause 5.

4.2 Output Voltage & Current Ratings

The DC output voltage of the charger shall not vary by more than +/-3% of the set value for the combined mains and load variations specified.

The output voltage shall be readily adjustable to any desired 'float' level.

Item-DC801 (2V-12V adjustable 10A DC)

Rated current output shall be 10A at 12V. This will be used for pedestrian boom gate applications. Batteries required for these installations shall be 25AH cells (sealed lead-acid or Ni/Cd) with stud connections and shall be supplied with the battery charger, if requested.

Coarse voltage Adjustment - 2V to 15V (adjustment to be by a screw driver) Fine voltage Adjustment - 0 to +1 V

Item-DC802 & DC803

The batteries to be charged consist of 10 to 12 Nickel-Cadmium cells up to 140AH @ 100 Hr capacities and the charger shall be readily adjustable to any float level between 13 to 20 Volts.

All adjustment for output voltage shall be carried out by tap changing. Fine adjustment shall be carried out by an adjustable resistor or device.

The rated current output shall be 20A & 30A respectively.

Item- DC804

The batteries to be charged consist of 20 Nickel-Cadmium cells with 140AH @ 100Hr capacities and the charger shall be readily adjustable to any float level between 1.2 and 1.6 Volts per cell.

The rated current output shall be 20A.

Item- DC805

The batteries to be charged consist of 23 cells with 2.5AH capacities and the charger shall be readily adjustable to any float level between 2.35 and 2.6 Volts per cell.

The rated current output shall be 2A.

4.3 Transformer

Refer to Specification SPS 05. The transformer shall comply with AS 2374.

The secondary winding may be provided with tapings to allow for the DC output voltage adjustment if necessary.

For Item-2 & 3 (Store 74 & Store 74-30A), the transformer shall be of a type incorporating magnetic regulation of the output voltage.

4.4 Adjustments

Preference will be given to units, which are designed so that they can operate over the full input and output voltage ranges without the need for adjustable input and output tapings.

Full details of the various settings to be provided, plus the voltage range accepted on each setting shall be included with the quotation if applicable.

For item 2 & 3 the output voltage shall be set to 17.5V at 10A output current.

4.5 Rectifier

Refer to Specification SPS 05.

The rectifier shall be able to supply the surge current of the smoothing capacitor without sustaining damage.

The rectifier shall have a minimum Peak Inverse Voltage of 1KV.

4.6 Capacitor

Refer to Specification SPS 05.

The electrolytic capacitors used in the circuit shall be rated for at least twice the operating DC voltage.

The capacitor shall be a long-life industrial grade. It shall be mounted in a ventilated location remote from heat source.

4.7 Ripple

Peak to peak output ripple shall not exceed 5% of the set output voltage with the battery disconnected.

4.8 Protection

Current limiting shall be provided to prevent overload of the charger when charging into a flat battery with full load current applied.

All units shall withstand a permanent short circuit on the output, without damage to the unit and without tripping the input supply fuse.

The charger shall impose no current drain on the battery during loss of AC input voltage.

4.9 Termination

All input, output and indicator relay contact wiring shall be terminated in a readily accessible position on rail mounted `Klippon' or BK terminals, or approved equivalent.

4.10 Indications

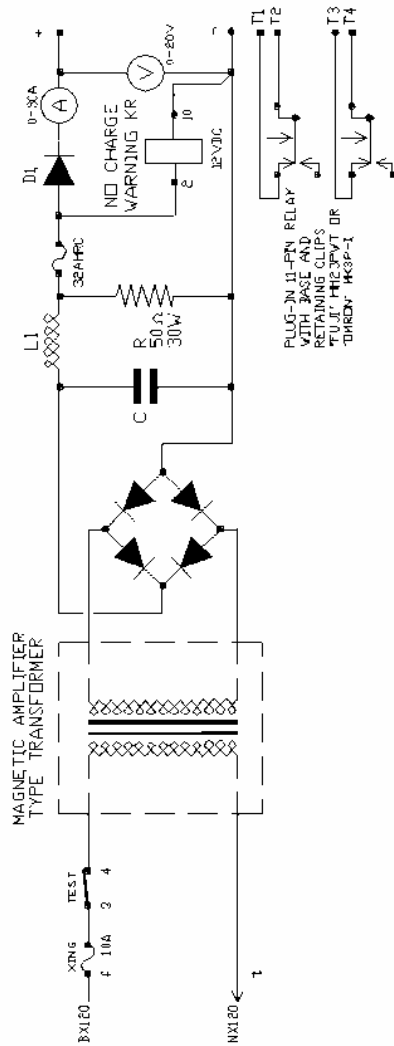
An ammeter and voltmeter measuring charger output current and voltage shall be provided.

4.11 Charge Fail Relay

All units shall be fitted with a relay to indicate the loss of battery charging supply. Relay type "Fuji" HH23PWT or "Omron" MK3P-I or an equivalent type conforming to the same pin configuration shall be used.

Drawings Attached

M08 843: Power Supply Unit Battery Charge



DRAWN: S SOGHOMONTAN
 DATE: 30/06/2000
 APPROVED:

TITLE: POWER SUPPLY UNIT
 BATTERY CHARGER (STORE 74)
 GENERAL CIRCUIT FOR SPECIFICATION PURPOSES

REVISION#0
 REPLACES:
 PAGE 1 OF 1

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 M08-843