



SPG 1025

POWER SUPPLY UNITS FOR SIGNALLING EQUIPMENT – BATTERY CHARGERS

Version 1.1

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Document control

Version	Date	Summary of change
1.0	September 2005	Replaced <i>SC 09 10 08 00 SP Power Supply Units for Signalling Equipment – Battery Chargers</i>
1.1	May 2010	Application of TMA 400 format

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1 Scope and Application

This Specification describes the specific requirements for Power Supply Units/Battery Chargers to be manufactured and supplied to RailCorp or contractors to RailCorp 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 RailCorp *Specification SPG 1020* shall form part of this Specification.

2 Applicable Standards

RailCorp Specifications

This Specification refers to the following RailCorp specifications:

<i>Specification SPG 1600</i>	<i>Electrical and Electronic Components (Ratings and Construction Requirements)</i>
<i>Specification SPG 1020</i>	<i>Power Supply Units for Signalling Equipment - General Requirements</i>

3 Types Of Units

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

RailCorp IDENTITY	ITEM DESCRIPTION	OLD(SRA) ID	SPECIFICATION
DC801	Power Supply Unit-Battery Charger 2V-15V, 10A (Pedestrian Level crossings gates)		SPG 1025
DC802	Power Supply Unit-Battery Charger 120V AC/for 12V, 20A DC (Automatic Level Crossing Battery Charger)	(Store 74)	SPG 1025
DC803	Power Supply Unit-Battery Charger 120V AC/for 12V, 30A DC (Automatic Level Crossing Battery Charger)	(Store 74-30A)	SPG 1025
DC804	Power Supply Unit-Battery Charger 24V, 20A DC	(Store 86)	SPG 1025
DC805	Power Supply Unit-Battery Charger 50V 2A	(Store 96)	SPG 1025

4 Design Requirements

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

operation has a proven record 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.

A typical circuit is shown in Figure 1.

All components shall meet the requirements of *Specification SPG 1600*.

4.1 Input Voltage

The chargers shall operate from 120V AC as per *Specification SPG 1020* Section 5.

4.2 Output Voltage & Current Ratings

The DC output voltage of the charger shall not vary by more than $\pm 3\%$ 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 +1V

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 SPG 1600*.

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 SPG 1600*.

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 SPG 1600*.

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:

- Figure 1 - M08-843 - Power Supply Unit- Battery Charger (Store 74)

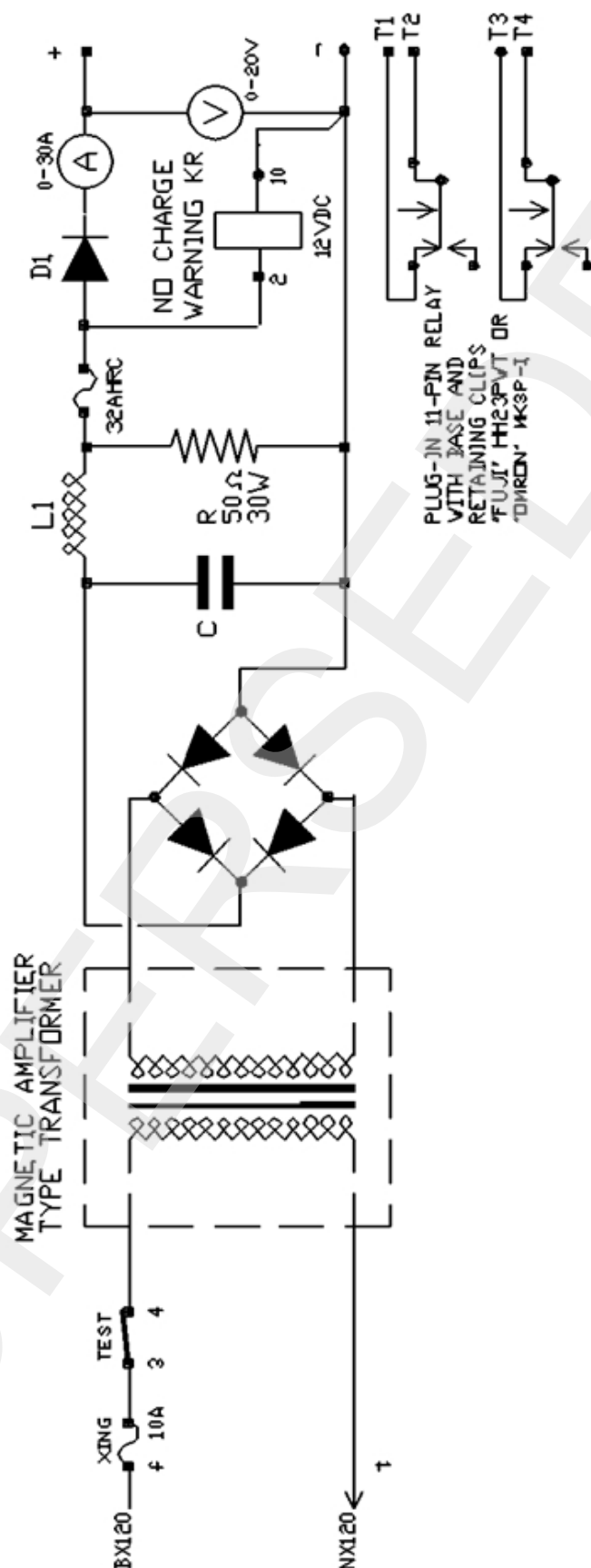


Figure 1 - M08-843 - Power Supply Unit- Battery Charger (Store 74)