



AUSTRALIAN RAIL TRACK CORPORATION LTD

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Discipline
Engineering Standard - NSW

Category
Signalling

Title
**Power Supply Units for Signalling Equipment - DC
(Regulated & Filtered) Units**

Reference Number
SPS 30 - (RIC Standard: SC 09 10 07 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 (DC Regulated and Filtered) to be manufactured and supplied to Australian Rail Track Corporation (ARTC) or contractors to Australian Rail Track Corporation, for Signalling applications.

Document History

Primary Source – RIC Standard SC 09 10 07 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
1.3	06/05/2005	All	Document reformatted

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1. Introduction

This Specification describes the specific requirements for Power Supply Units (DC Regulated and Filtered) to be manufactured and supplied to Australian Rail Track Corporation (ARTC) or contractors to Australian Rail Track Corporation, for Signalling applications.

2. Applicable Documents

2.1 ARTC Specifications

This Specification refers to the following ARTC Specifications:

Specification. SPS 22 Power Supply Units for Signalling Equipment - General Requirements.

Specification SPS 05 Ratings of Components Construction Requirements.

3. Electrical Requirements

ARTC IDENTITY	ITEM DESCRIPTION	OLD(SRA) ID	SPECIFICATION
DC701	Power Supply Unit-regulated 24V, 4A DC	(Store 93)	SPS 30

All components shall meet the requirements of Specification SPS 05.

3.1 Input Voltage

The unit will be operated from a nominal 120Volts, supply with input 50Hz voltage variation from 110 Volts to 125 Volts (conditions of Specification SPS 22 are not applicable to this item).

3.2 Output Voltage

The output voltage shall be 24 Volts D.C. nominal and shall be regulated to +/- 0.5V. No variation outside this range shall occur for changes in load conditions from 10% load to 100% load and/or changes in input voltage over the range stated in clause 3.1.

In addition the units shall be designed so that the output voltage does not exceed 28 Volts nor reverses polarity during any switching on or off of the input A.C. supply or of the load. The output shall be protected as specified in clause 3.10 and 3.11.

3.3 Adjustment

The units shall be designed to operate over the full input and output voltage ranges without the need for adjustment of input and output tappings.

However, designs may be submitted which utilise adjustable settings provided that they meet or better the following requirements:

- a) Once the output voltage has been set at 24 +0.5Volts for a constant load between 0 and 4A, then the unit shall hold its output voltage within the range specified in clause 2.2 for an input voltage of 110V to 125V.

- b) Full details of the various settings shall be provided including the voltage range accepted on each setting.

3.4 Output Rating

The unit shall be capable of supplying a continuous load of 4A at the specified output voltage of 24V over the full range of specified input voltages and ambient temperature.

3.5 Output Ripple

The unit shall be provided with filter so that the output ripple does not exceed 0.3V peak to peak for all load conditions from zero load to full rated load.

3.6 Output Impedance

The supply unit shall have a low output impedance so that the unit is representative of a secondary battery supply.

If possible the output impedance shall be 10milliohms or lower when connected to an equipment that works directly from 24Volts D.C. and produces or receives frequencies between 1600 and 2700Hz. Details of the output impedance of the unit offered shall be included with the quotation.

3.7 Transformer

Refer to Specification SPS 05.

The transformer shall comply with AS 2374

3.8 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.

3.9 Capacitor

Refer to Specification SPS 05.

Electrolytic capacitors shall be rated at least 50V D.C. The capacitor shall be a long life industrial grade. The capacitor shall be mounted in a ventilated location.

3.10 Protection

The supply unit shall be fitted with automatic current limiting facilities, which shall become effective if the maximum load specified in clause 3.4 is exceeded.

The protection shall not rely on high-speed fuses or other similar devices on the input or output. The unit shall be capable of correct operation as soon as the overload is removed without the need for any manual resetting or adjusting. This protection shall be capable of withstanding a continuous short circuit on the output terminals without affecting the supply unit and it shall not cause the fuse on the 120V input to blow. A protective fuse is not required on the 120V input as this will be provided by ARTC and will be mounted externally to the unit.

However, the suggested rating of this external fuse, along with an absolute maximum rating for this fuse, shall be notified at time of supply. This is to enable ARTC to use a suitably rated fuse from its standard range.

The voltage during switching transients shall never exceed 28 Volts.

3.11 Transient Protection

The equipment will be subject to all transients which would be present in normal commercial 50Hz supplies. A changeover contactor will be used to switch to alternate 50Hz supplies in the event that the normal supply is interrupted and this can generate considerable transients.

During the change over there will be break in the 120V input supply which can last up to 100 milliseconds. The equipment shall be designed so that the output voltage and any transients do not exceed 28 Volts when input is re-applied.

It shall be noted that when changing between the two 120V input supplies that these may not be in phase and the unit shall be designed to accommodate this fact.

Any transients appearing on the 120V supply shall not cause the output voltage to exceed 28V or to reverse polarity, nor shall these cause damage to the power supply unit itself.

Similarly, the D.C. output side of the unit shall be protected against transients which may be generated by solenoid, motors, relays and other inductive loads.

Full details of the level of protection offered against transients shall be included with the quotation.

3.12 Temperature Variation

The unit shall be suitable for operation in an environment where the ambients vary from -5 degree C to +70 degree C.

4. Design Requirements

4.1 Standardization of components

Refer to Specification SPS 22.

4.2 Maintenance

Refer to Specification SPS 22.

The method of mounting of the unit on the rack as per drawing M08-429 must be quick and simple. The unit shall be capable of supporting itself on the rack while being secured.

4.3 Assembly

Refer clause 4.3 of the Specification SPS 22.

All components shall be firmly supported to withstand vibration without damage to connections or terminals.

4.4 Rating of Components

All components shall be capable of withstanding vibration without damage or loss of efficiency and shall be of the highest quality. They shall not be operated in excess of the following requirements.

- (i) Electronic Components: 50% of nominal voltage breakdown, current and power ratings.
- (ii) All Wiring: 50% of nominal ratings and is to be 0.6/1KV.
- (iii) All Others: 75% of nominal ratings.

4.5 Terminations

All input and output wiring shall be terminated in a readily accessible position on "Klippon" BK or an approved equivalent type terminals.

4.6 Case Details

Refer to Specification SPS 22.

The complete unit shall be mounted in a single fully enclosed ventilated metal case provided with mounting holes suitable for rack mounting on racks. The terminals shall be external to the unit. (Refer to drawing M08-429 for verification of the positioning of terminal blocks)

The mounting holes shall be large enough to accept 5mm diameter screws and shall not exceed the dimensions of the rack as shown on the drawing.

Drawings attached

M08-429: Standard rack layout for equipment

