



BR 955 : 1977

Specification for
**Constant potential battery
chargers**

British Railways Board



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Amendments

Amd. No.	Date	Text Affected

British Railways Board

BRITISH RAILWAYS BOARD

SPECIFICATION NO 955

CONSTANT POTENTIAL BATTERY CHARGERS

FOREWORD

This specification supersedes all previous issues and is issued by:-

British Railways Board,
Director of S. & T. Engineering,
Materials Management Group,
Room 1103,
Rail House,
CREWE,
Cheshire. CW2 6EA

from whom further copies may be obtained.

BT (STD) 0270-532494
BT (STD) 0270-532345 FAX
BR (STD) 05-32494
BR (STD) 05-32345 FAX

Technical queries shall be referred to:-

The Chief Signal & Telecommunications Engineer
Melbury House
Melbury Terrace
London
NW1 6JU.
Telephone : GPO (STD) 01-262-3232 Ext 5744
BR (STD) 015-5744

1. REFERENCES

Reference in this specification is made to:-

British Railways Drawing:- BRS - SE 90

British Railways Specification:-

- 921A - Electrical measuring instruments for S & T Technicians
- 924A - Air cooled power transformers for railway signalling.
- 950 - Design of electronic equipment - general conditions to secure reliability.
- 967 - Railway signalling apparatus : environmental conditions.

British Standard:-

- 57 - B.A. screws, bolts and nuts
- 88 - Cartridge fuses for voltages up to and including 1 000 V a.c. and 1 500 V d.c.
- 171 - Power transformers.
- 376 - Railway signalling symbols.
- 2214 - The performance of power transformers (not exceeding 2 kVA rating) for radio and allied electronic equipment.
- 2950 - Cartridge fuse-links for telecommunication and light electrical apparatus.
- 3939 - Graphical symbols for electrical power, telecommunications and electronics diagrams.
- 4781 - Self-adhesive plastics labels for permanent use.
- 6004 - PVC - insulated cables (non-armoured) for electric power and lighting.
- 6231 - PVC - insulated cables for switchgear and control gear wiring.

DEF Specification :-

61 - 12: Wires, cords and cables, electrical.

The Manufacturer should assure himself that any British Railways Drawing, British Railways Specification, British Standard or DEF Specification to which he is required to work is the latest issue.

2. GENERAL

- 2.1 This specification covers chargers of the constant potential type, i.e. a high initial charge is to be provided when the cells are in a low state of charge, and the rate of charge is automatically to taper off to a value adequate to maintain the cells in a fully charged state. Batteries of either the lead/acid or the alkaline type may be used provided the appropriate number of cells are connected in series. No adjustment of the charge characteristics is needed to suit the two different types of battery.
- 2.2 This specification does not cover battery chargers:-
- (a) for use with Aster track circuit equipment
 - (b) other than constant potential type
 - (c) for telecommunications purposes
- 2.3 The unit shall consist of a transformer, rectifying and regulating means, a power-off detector when ordered, and fuses, all suitably connected and mounted and with the appropriate terminals for external wiring and earthing purposes.

Means other than fuses or circuit breakers shall be incorporated to limit automatically the output current to the rating of the unit when connected to a battery in a low state of charge.

No ammeter or voltmeter shall be incorporated in the unit.

If it is necessary to make a measurement of current for the adjustment of the charger an internal shunt shall be provided. This shunt must be connected to external terminals suitable for the attachment of crocodile clips. The meter which will be connected to the terminals is a Lineman's Electrical Measuring Instrument to BR Specification No 921A. The shunt should be designed for the meter to be set to the 75 mA range when its full scale deflection is 0.15 V and it may be read on one of four ranges 75 mA, 300 mA, 1.5 A, 15 A.

Measurements which must be taken for adjustment purposes should be independent of load current.

- 2.4 BR Specification No. 950 shall apply to all components (including rectifiers) incorporated in the units except where any item has been otherwise specified herein.

3. INPUT

- 3.1 The units shall be designed to operate at nominal input voltages of 240 V and 110 V.

For each nominal input voltage a range of tapplings will be provided as follows:

- (a) 110 V : 5/0/95/105/115 V
- (b) 240 V : 10/0/200/220/240 V

Where economy can be achieved by constructing units with the specified range of input voltage covered by other voltage tapplings such units may be offered as an alternative and the tapplings proposed must be quoted when tendering and offering details for type approval.

Where other input voltages are required the nominal voltage and adjustment tapplings shall be provided as specified in the order.

- 3.2 The units shall be designed to work efficiently over a range of nominal input frequency from 50 Hz to 83.1/3 Hz. If it is necessary to provide input adjustment to compensate for the use of the unit on supplies of different frequency the adjustment means shall comply with the requirements for input voltage adjustment and shall be arranged for inputs at 50 Hz, 75 Hz and 83.1/3 Hz. The manufacturer, when offering units to this specification, shall clearly state whether or not this feature is to be provided.
- 3.3 The means by which the input voltage adjustment is made must be approved in writing by the Chief Signal & Telecommunications Engineer, British Railways Board.

Where the means of adjustment would take the form of terminals these shall be of the type and rating specified in Section 9 for input or output terminals subject to the same voltage and current loading.

- 3.4 The units shall be designed so as to present to harmonics of 50 Hz up to the 20th an impedance not lower than the impedance presented to the fundamental.
- 3.5 The inrush current which flows when the supply to the unit is switched on shall be limited by design and selection of the components, especially the transformer, incorporated in the unit. The limitation shall not be achieved by the provision of a series resistor.

The limitation of the inrush current shall be determined with reference to the characteristics of a fuse to BS 88 Class Q1 of the lowest rating to carry continuously the full rated input current to the unit.

When considered over the first 10 ms from switch on the specific energy (I^2t) input (assuming zero source impedance for the supply and that the full resistive load is connected to the output) to the unit shall not be greater than 50% of the pre-arcing I^2t of the fuse described above.