



BR1875

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Specification for Battery Charger Units for General Railway Signalling Purposes

British Railways Board



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SPECIFICATION NO. 1875

BATTERY CHARGER UNITS FOR GENERAL RAILWAY SIGNALLING

AMENDMENTS SINCE DECEMBER 1988

Clause 3.1 : Amendment to text.

Clause 7.3 : Addition of new text.

Appendix 2 : Amendment of notes 2 & 3.
Addition of Fig 1.



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Amendments

Amnd No	Date	Text Affected

BRITISH RAILWAYS BOARD



SPECIFICATION NO. 1875

FOREWORD

This Specification supersedes all previous Specifications for Battery Chargers for BR Railway Signalling purposes, these being BR Specification numbers 915, 926, 928, 955 and 999A and BR Specification number 911 for Power Off Detectors for use with Battery Chargers.

It is issued by the :

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

from whom further copies may be obtained.

Technical queries shall be referred to the above address.
For telephone enquiries the numbers are:-

BT (STD) 0270-532494
BT (STD) 0270-532345 Fax
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REFERENCES

Reference in this specification is made to:-

British Railways Specifications:

924 - Air Cooled Power Transformers.

966 - Appendix F3, Miniature Tractive Armature D.C. Neutral Line Relay with Medium Duty Back Contacts (Plug-In Type) for Railway Signalling purposes.

967 - Railway Signalling Apparatus Environmental Conditions.

British Railways Drawing:

BRS-SM 295 - Modular Dimensions for small rack mounted equipment.

British Standards:

- 88 - Cartridge Fuses for Voltages up to and including 1000 V ac and 1500 V dc.
- 376 - Railway Signalling Symbols.
- 714 - Cartridge Fuse-Links for use in Railway Signalling.
- 2214 - The Performance of Power Transformers (not exceeding 2 kVA rating) for Radio and other Electronic Equipment (1955).
- 3939 - Graphical Symbols for Electrical Power, Telecommunications and Electronics Diagrams.
- 4781 - Self-Adhesive plastics labels for permanent use.
- 5378 - Safety Signs and Colours.
- 6004 - PVC-Insulated Cables (non-armoured) for Electrical Power and Lighting.
- 6231 - PVC-Insulated Cables for switchgear and control gear winding.
- 4G 178 - Crimped Joints for Aircraft Electrical Cables and Wires.

DEF Standard:

- 61-12 - Wires, Cords and Cables, Electrical - (Part 1) metric units.

Act of Parliament:

Health and Safety at Work, etc Act 1974

Where this specification requires reference to British Standards, British Railways Specifications, Drawings and DEF Standards, the latest issue shall apply unless specifically stated. It is the responsibility of the Manufacturer, Supplier or User to ensure that the latest issue of this specification and other relevant specifications and drawings are obtained and complied with.

For the purpose of this specification, the Engineer is the Director of Signal and Telecommunications Engineering, British Railways Board, or his appointed representative.

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BATTERY CHARGER UNITS FOR GENERAL RAILWAY SIGNALLING PURPOSES

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1. GENERAL

- 1.1 This specification applies to Battery Charging Units, suitable for General Railway Signalling purposes, for the Charging of Lead-Acid or Nickel-Cadmium (NICAD) secondary cells.

The general requirements of the units are given in the body of this specification and special electrical output requirements in the relevant "A" series appendix to this specification.

- 1.2 Units supplied to this specification with a Current Output Rating of less than 10A may be housed during their service life in lineside apparatus cases. Units with a Current Output Rating of 10A and greater are generally housed in Relay Rooms.
- 1.3 The units shall not be fused but shall contain internal current limiting protection circuits.
- 1.4 All units supplied to this specification shall have a minimum service life of 25 years.
- 1.5 Manufacturers shall ensure that the equipment complies with the relevant parts of the Health and Safety at Work, etc Act 1974.
- 1.6 If ordered, the units shall contain a power-off detector as specified in Appendix 1.
- 1.7 Chargers to this specification will normally supply batteries with a fluctuating load. Loads may be inductive (i.e. relay coils), or electrically noisy (i.e. static inverter systems). Regulation and power-off detector circuits shall not be adversely affected by loads of these types.
- 1.8 Units may be stored un-energised under warehouse conditions for an indefinite period. The manufacturer shall not use any components which require special procedures (i.e. periodic energisation) during such storage to maintain the unit in compliance with this specification.
- 1.9 The battery charger input and output shall be electrically isolated from each other.
- 1.10 The input and output shall be electrically isolated from the battery charger earth/ground.

2. INPUT AND ELECTRICAL ENVIRONMENT

- 2.1 The Battery Charger shall be designed to operate at one of the following standard nominal input voltages: 650 V, 440 V, 240 V, 110 V or dual 240 V/110 V units, as ordered.

Other input voltages may be required, in which case the nominal input voltage and preferred range of adjustment tapplings (see clause 2.2) shall be specified in the order.

- 2.2 For an input voltage variation of +10%, -20% from nominal, the charger shall maintain an output voltage across a battery and load within the limits defined in the relevant "A" series appendix to this specification.

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2.2.1 Input adjustment tapplings may be provided to achieve 2.2 in which case the output shall be maintained within the limits defined in section 4 for a variation of $\pm 10\%$ of the value to which the unit has been adjusted, if necessary, on installation. The use of such adjustment tapplings is left to the discretion of the manufacturer.

2.2.2 Preferred ranges of tapplings, if used, for each nominal input voltage are as follows:-

- a) 110 V : 5/0/95/105/115 V
- b) 240 V : 10/0/200/220/240 V
- c) 440 V : 12.5/0/390/415/440 V
- d) 650 V : 15/0/590/620/650 V

When alternative tapplings are proposed, type approval shall be obtained, in writing, prior to their use.

Where a dual 240 V/110 V unit is offered it shall comply with the specified range of input voltages covered by the voltage tapplings shown in (a) and (b) above. It shall be made clear when tendering what input voltage tapplings are proposed for such units and full details shall be supplied for type approval.

2.2.3 If the input voltage adjustment tapplings are to be used, the preferred method of achieving such adjustment is to terminate each of the input tap points on an electrically separate point on a terminal block and to provide facilities for the incoming supply to be terminated on any two of these termination points. Where an alternative method is proposed, type approval shall be obtained, in writing, prior to its use.

Where the means of adjustment takes the form of threaded terminals, they shall be of the type and rating specified in section 7 for input or output terminals subject to the same voltage and current loading.

2.3 The mains input frequency can be assumed to vary by not more than $\pm 4\%$ from its nominal value of 50 Hz.

2.4 The units shall present an impedance to harmonics of 50 Hz up to the 20th harmonic which is not less than that presented to the fundamental 50 Hz.

2.5 The inrush current, which flows when the supply to the unit is switched on, shall be limited by design, especially the transformer, of the unit. The limitation shall not be achieved by the provision of a series resistor.

The peak of the first half-cycle of current drawn when the power supply to the unit is switched on shall not exceed fifteen times the maximum rated rms input current of the unit, under any condition. The source impedance of the power supply, as seen at the input terminals of the unit, can be taken to be not less than 0.2 ohm.

The limitation of the inrush current may be determined with reference to the characteristics of a suitable fuse; see Appendix 4 for fuse details and test methods.

- 2.6 Units shall neither be damaged nor caused to malfunction by spikes or surges of the size and duration shown in the table below. The figures apply to circuits and power supplies operating at nominal voltages up to 250 V. The spikes or surges may appear on any wire connected to the equipment and may be either positive or negative relative to the voltage of that wire. The voltages are assumed to be measured at the interface between the equipment and the wiring and can be assumed to have a rise time of 5% of the duration of the pulse. These disturbances may be considered as being non-repetitive. An acceptable tests method is given in Appendix 4.

VOLTAGE	DURATION (SECONDS)	SOURCE IMPEDANCE (OHMS)	ENERGY
1.5 kV	1×10^{-5}	200	0.1 J
600 V	1×10^{-3}	15	6 J
300 V	1×10^{-3}	2	20 J

3. ELECTRICAL OUTPUT

- 3.1 The output shall be dc smoothed and regulated, as specified in the relevant "A" series appendix to this specification.
- 3.2 The unit shall be designed to prevent any damage to it, or any of the components or wiring, under the following fault conditions:-
- a) with a battery connected in reverse across its output terminals for an indefinite duration.
 - b) when a short circuit is applied to its output terminals for an indefinite duration.

The unit shall resume normal output as soon as the fault condition is removed. A manual reset shall not be required for this purpose.

4. ELECTRONIC COMPONENTS

- 4.1 For the purpose of this section, component ratings shall be as specified by the component manufacturer at the maximum temperature of the equipment (see clause 8), unless otherwise stated.
- 4.2 For each component the specified parameters shall not exceed the quoted derating factor, under any conditions:-