SIGNAL LAB.

IRS: TC-44-88

Block bell equipment

SPECIFICATION FOR BLOCK BELL EQUIPMENT USED IN 25KV AC ELECTRIFIED AREA

TC-44-88

Rs-19a/11

0 - Foreward

0.1 This specification is issued under the [illegible] Serial No. IRS:TC 44 88. The final number indicates the year of original adoption as standard or in the case of revision, the year of last revision.

ADOPTED

0.2 This specification requires reference to the following Indian Railway Standard/Indian Standard/[illegible] Services Standard specifications.

IRS: S-23 Electrical Signalling & Interlocking

[illegible] 319 Free cutting brass bars rods and [illegible]

[illegible] Chief Engineer.

IS: 2036 Phenolic laminated sheets.

IS: 9000 (Series)- Basic environmental testing procedures for electronic and [illegible]

JSS:50805 Detail specification for [illegible] printed wiring board and insulated base

JSS:51700 General requirements for metal clad base materials, for printed circuit and printed wiring boards.

JSS:51701 Detail specification for metal clad base material for printed circuit boards of thickness 0.5mm or greater.

JSS:52300 General requirements for printed wiring boards.

0.3 Wherever in this specification any of the above mentioned specification is referred, it shall be as a

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reference to the latest issue of the specification, otherwise the particular year of the issue has to be taken as reference.

0.4 This specification is intended chiefly to cover the technical provision and does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This specification covers the requirements and provisions of tests and inspection of block bell equipment used in A.C. electrified areas.

1.2 This specification covers the constructional features, electrical characteristics and technical requirements of block bell equipment.

2. TERMINOLOGY

2.1 For the purpose of this specification, terminology given in IRS: S.23 shall be applicable.

2.2 The term referred to in the specification but not covered in IRS S-23 are defined below:-

2.2.1 Lot:- A lot is constituted by the block bell equipment of the same type manufactured in the same factory during the same period using the same process and material.

3. GENERAL REQUIREMENTS:

3.1 Block bell is a part of block instrument which is provided at the end of block sections at cabins/ASMs. DC impulses cannot be sent in AC electrified area since block circuit is converted from overhead alignment to underground cable terminated on terminating transformer at both the ends.

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3.2 Block bell equipment is used in AC electrified area to convert the DC impulses to AC at the sending end and AC impulses to DC at the receiving end.

3.3 The block bell equipment shall be capable of working on DC voltage of ~~12V~~ 24V which may vary between ~~±20%~~ +30% and -10% from the nominal value.

3.4 Unless otherwise specified, all exposed surfaces/parts shall be plated, painted or otherwise protected from corrosion.

3.5 The general requirements of workmanship limits and fits and rejection shall be in accordance with IRS: S-23 to the extent applicable.

4. LAYOUT AND TECHNICAL REQUIREMENTS OF THE EQUIPMENT

4.1 Block bell equipment shall be housed in a cabinet made of aluminium alloy sheet conforming to IS 737 NS-3, 1/2 hard. Each cabinet shall have the provision of accommodating one card and one terminal strip.

4.2 The cabinet shall be as per approved drawing supplied by the purchaser.

4.3 The front door shall be hinged and provided with knurled screw for easy opening. The back door shall be covered with a plate screwed to the cabinet with a minimum of four screws set at corners.

4.4 The cable entry hole shall be provided on the back plate and it shall be provided with suitable rubber grommet.

4.5 The terminal strip shall be made of paperbase thermosetting synthetic resin bonded laminated sheet conforming to grade P4 of IS 2036.

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4.6 Terminal strip with sixteen terminals shall be provided with terminals made of brass conforming to IS 319. All the external wiring shall be terminated on the screw terminals of the terminal strip.

4.7 Printed circuit boards used in fabrication of the equipment shall comply with JSS 51700 and JSS 51701. The conductive patterns on PCBs shall comply with JSS-52300. The spacing between conductive patterns shall not in any case be less than 1 mm. PCB's shall be made of glass epoxy and coated with epoxy base antifungal varnish to provide protection against dust, humidity and mechanical abuse. The glass epoxy PCB's of 1.58mm minimum thickness shall be used. The copper cladding thickness shall always be not less than 35 microns and suitably tinned.

4.8 Transistors and diodes whenever used shall be silicon alloy junction type with metal or epoxy encapsulated case. The integrated circuit whenever used shall be of DIP with glass goal or of ceramic package type and shall be commercially available in Indian market. All semi-conductor components shall be burnt in at rated stress levels in accordance with relevant 'MIL' specifications.

4.9 Electro magnetic relays used in the circuit shall be capable of giving one million operations under normal operating current and voltages. The connectors-plug and socket of PCB's shall comply with the requirements of JSS 50805.

4.10 The components of dissipating power of one watt or more shall not be fixed in direct contact with

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PCB's components which weighs 7 gms per piece or more shall be mounted with the aid of clamps. Transistors shall be mounted on resilient teflon or Nylon mounting pads.

4.11 The means of adjustments of the received signals shall be provided by shorting of resistances connected on the terminal strip.

4.12 The frequency of the AC impulses shall be 150Hz and the wave shape shall be sinosudial. The equipment shall be provided with means to adjust the frequency and wave shape, if required during maintenance.

4.13 Suitable arrangement shall be provided to protect the equipment against the reversal of polarity of the battery.

4.13.1 There shall be provision of LED indication when the battery is connected with reversed polarity.

5.0 CIRCUIT DESCRIPTION

5.1 The circuit diagram of the block bell equipment is enclosed as Annexure-I. The block bell equipment is designed to give an output of 45V, 150 Hz AC signalling on a load of 1120 ohms. When the bell plunger of the block instrument of sending end is pressed, electro magnetic relay energises and the transistor oscillator is switched on simulaneously. The output of the oscillator is fed on to the line through the energised contacts of the relay. At the receiving station, 150 Hz AC signalling fed from the line is applied to the rectifier via normal contacts of the electro magnetic relay. The rectified voltage is