



National Grid
Technical
Specification

NGTS 2.13
Issue 3
April 1998

Electronic Equipment

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ELECTRONIC EQUIPMENT

FOREWORD

This Specification defines the requirements for electronic equipment at the National Grid Company plc (NGC) owned operational locations. This Specification is part of a hierarchical structure of documentation comprising three levels of functional specification. This document is a level two specification, and must be read in conjunction with other NGC Technical Specifications covering specific plant and equipment for use on NGC's power system.

This Specification contains general requirements, the specific requirements are in the individual equipment specifications.

1 SCOPE

This Specification covers general requirements relating to electronic equipment used in transmission locations. It includes protection equipment except where specific requirements for protection equipment are specified in NGTS 2.6, in which case, the latter shall take precedence.

All equipment supplied to NGC must meet its specified functionality and performance as set out in individual National Grid Technical Specifications and under the relevant environmental conditions stated in this Specification.

1.1 Relationship with European Standards

This Specification generally references functional requirements and tests described in IEC or BS Standards. However, in some cases there are no standards which adequately cover the unique performance and functional requirements of an electricity supply system. In these instances specific requirements and tests are detailed in this document. CENELEC document Electronic Equipment for use in Power Installation (prEN 50178) gives minimum design and manufacture requirements with which electronic equipment in general must comply. NGTS 2.13 specifies those performance requirements which must be met by electronic equipment to be used in NGC transmission locations.

1.2 Guidance to Users

NGTS 2.13 is a generic specification and therefore when used to specify requirements for equipment to be purchased, the NGTS must be supplemented by specific requirements relating to the equipment and application concerned. In most cases this will take the form, inter alia, of specifying which optional tests are to be applied and the test levels required for each port. This information will be contained in the corresponding level 3 NGTS or the contract documentation as appropriate.

1.2.1 Users other than NGC Itself

Other Users connected to the NGC system, as defined in NGTS 1, shall meet the requirements of NGTS 2.13 throughout.

1.2.2 Port Definition

For interference immunity tests, the level of test to be applied is now to be specified on a port by port basis whereas earlier issues of NGTS 2.13 specified test levels in accordance with the location of the equipment. See Section 4.2.3.2

2 REFERENCES

This Specification makes reference to, and should be read in conjunction with the following related specifications:

IEC Standards Reference Page

IEC 1000-4-8	Electromagnetic Compatibility Part 4: Testing and Measuring Techniques Section 8: Power Frequency Magnetic Field Immunity Test	20
IEC 1000-4	Electromagnetic Compatibility.....	14-20
IEC 60255	Electrical Relays	11, 14, 20
IEC 405	Nuclear Instruments: Constructional requirement to afford personal protection against ionising radiation	3
IEC 478	Stabilised Power Supplied - D.C. Output.....	20
IEC 617	Graphical symbols for diagrams (=BS 3939)	4
IEC 68-2-10	Environmental testing. Part 2-10: Test J and guidance: Mould growth (=BS 2011-2.1J)	22
IEC 68-2-1	Part 2-1: Tests A: Cold (=BS 2011-2.1A)	21
IEC 68-2-2	Part 2-2: Tests B: Dry heat (=BS 2011-2.1B)	21
IEC 68-20-30	Part 2-20: Test Db and guidance: Damp heat, Cyclic (12+12 hour cycle) (=BS2011-2.1Db).....	22
IEC 68-2-31	Part 2-31: Test Ec: Drop and topple, primarily for equipment type specimens (=BS 2011-2.1Ec)	23
IEC 68-2-42	Part 2-42: Test Kc: Sulphur dioxide test for contact and connections	23
IEC 68-2-52	Part 2-52: Test Kb: Salt mist, cyclic (sodium chloride solution) (=BS 2011-2.1Kb)	22
IEC 68-2-56	Part 2-56: and guidance: Damp Heat, Steady State (=BS 2011-2.1Cb).....	22
IEC 68-2-6	Test 2-6: Test Fc and guidance: Vibration (sinusoidal) (=BS 2011-2.1Fc)	24
IEC 801-6	Part 6: Conducted Disturbances induced by RF Fields (Draft =DD ENV 50161: 1994) ..	19

ISO Standards

ISO 10012-1	Quality Assurance Requirements for Measuring Equipment. Part 1: Metrological confirmation system for measuring equipment (=BS 5781).....	9
ISO 6428	Technical Drawings - Requirements for Microcopying.....	4

European Standards

EN 41003	Particular Safety Requirements for Equipment to be connected to Telecommunications Networks.....	8
EN 50082	Electromagnetic Compatibility - Generic Immunity standard	6
EN 50140	Electromagnetic Compatibility - Basic Immunity Standard - Radiated Radio Frequency Electromagnetic field	16, 19
EN 50141	Electromagnetic Compatibility - Basic Immunity Standard - Conducted Disturbances induced by Radio Frequency fields	16, 19
EN 50178	Electronic Equipment for use in Power Installations	1
EN 55022	Specification for limits and methods of measurement of radio interference characteristics of information technology equipment (=BS 6527)	20
EN 60529	Classification of degrees of protection provided by enclosures (=IEC 529)	5
EN 60825	Radiation safety of laser products, equipment classification, requirements, and user-s guide (=IEC 825)	3
EN 60870	Telecontrol Equipment and Systems	12-14
EN 60870-2-1	Part 2 Operating Conditions Section 1 Power Supply and Electromagnetic Compatibility	12
EN 60950	Safety of Information Technology Equipment	8
ETS 300 132-2	Equipment Engineering; Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)	21
ETS 300 386-1	Equipment Engineering; Public Telecommunications network equipment Electromagnetic compatibility requirements; Part 1: Product family overview compliance criteria and test levels.....	21

British Standards

BS 4884	Specification for technical manuals, Parts 1 and 2.....	4
BS 5288	Specifications: Sealed radioactive sources	3

Miscellaneous Standards

GS 43	Health and Safety Executive guidance note on Lithium batteries	3
MIL-HDBK-217F	Reliability prediction of electronic equipment	5

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NGTS 1	Overview - National Grid System	4-6, 21
NGTS 2.12	Substation auxiliary supplies	6
NGTS 3.12.1	48 V D.C. power supplies	6
NGTS 3.12.3	110 V D.C. power supplies	6
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3 GENERAL REQUIREMENTS

Electronic equipment for operational use within the NGC is required to comply with specific environmental performance criteria. This Specification sets out the essence of these criteria, with particular emphasis on the testing required. Section 3, General Requirements, and Section 4, Performance Requirements, state these criteria. Section 5, Test Requirements, defines the tests required to prove that these requirements have been met under various ranges of environmental conditions.

3.1 Safety

No agreement, given or implied, shall relieve either the manufacturer or supplier of any statutory safety obligations.

3.1.1 General

- (i) Isolation facilities shall be provided for all equipment connected to external site power supplies. The isolation shall operate automatically in the case of overcurrent.
- (ii) The temperature of covers and accessible items shall not exceed 65°C for metallic parts, or 75°C for insulating materials.
- (iii) Where special handling precautions are required for the equipment or its components, particularly during maintenance, this information shall be detailed in the maintenance manual. Appropriate labels shall also be attached to the equipment.
- (iv) All warning notices and labels shall be conspicuous, use clear English and be permanently fixed.
- (v) Lithium batteries shall be of the type that cannot explode. Reference should be made to Health and Safety Executive Guidance Note GS 43.

3.1.2 Electrical

- (i) The type, location and connections of fuse carriers and bases shall be such that they do not present a hazard to maintenance personnel when replacing a fuse link.
- (ii) The rating and circuit identification of each fuse shall be marked adjacent to the fuse holder.
- (iii) Neutral lines shall not be fused.
- (iv) Multiphase supplies shall have their phases switched simultaneously. The neutral shall preferably be connected via a removable link. If the neutral line is switched, it shall be interlocked to open after and close before the phase lines.
- (v) Equipment designed to operate from sources of 48 V or more shall have a separate terminal block for power connection.

3.1.3 Radioactive Hazardous Materials

Radioactive materials shall comply with IEC 405 and BS 5288. They shall not be used unless essential.

3.1.4 Laser Equipment

Equipment using lasers shall comply with EN 60825 (=IEC 825).

3.2 Service Life

The service life of the equipment shall be at least fifteen years. The Supplier shall show to the satisfaction of NGC how support for the equipment is to be provided over this period.

3.3 Maintainability

- (i) In order to facilitate first line maintenance by NGC personnel the equipment shall incorporate the relevant test points and controls; in addition a means of identifying appropriate components shall be provided.
- (ii) Where equipment incorporates firmware, whether reprogrammable or not, a unique number, traceable to the release of the firmware and the version of the system to which it pertains, shall be clearly marked on the component, as well as being documented in the instruction manual.
- (iii) Suppliers shall provide details of the methods adopted for updating software and firmware.
- (iv) Necessary maintenance aids such as printed wiring extension boards, jumper leads, and other special tools shall be provided.

3.4 External Connectors

- (i) The arrangement of external connectors shall be such that incorrect mating cannot occur. The attached cable should be relieved of stress at the plug connections without damaging the cable.
- (ii) Where multipole connectors are used, only the locking type shall be acceptable.