Electricity Specification 339

Issue 2 November 2004

30V Battery and Charging Equipment

Contents

Approved for issue by the Technical Policy Panel

Amendment Summary

Amendment No. Date	Brief Description and Amending Action
0 12/05/87	Issue 1 First Issue Prepared by: DJH Authorised by:
0 3/11/04	Issue 2 Template changed to United Utilities Electricity PLC identity and Engineering Specification altered to Electricity Specification. Title amended and minor technical changes introduced. Prepared by: S Rushton Approved by the Standards Steering Group and signed on its behalf by:

30V BATTERY AND CHARGING EQUIPMENT

1. SCOPE

This specification covers 30V battery and charging equipment, which is used to provide power supplies for plant and protection in distribution substations within Electricity North West Limited (hereinafter referred to as Electricity North West).

2. GENERAL REQUIREMENTS FOR APPROVALS AND TESTING

2.1 Product not to be changed

No change in the product, packaging or labelling shall be made after Approval has been granted without prior notice to the Engineer, and receipt of a written agreement to the proposed change from the Engineer.

2.2 Electricity North West Technical Approval

2.2.1 The tenderer shall submit, with this tender, proposals for testing which will demonstrate, to the satisfaction of the Engineer, compliance with this Specification. Such tests shall be carried out without expense to Electricity North West.

2.2.2 Alternatively, the tenderer may submit technical reports and other data that he considers will demonstrate, to the satisfaction of the Engineer, compliance with this specification. Acceptance of this evidence shall be at the discretion of the Engineer but will not be unreasonably withheld.

2.2.3 Approval shall be 'site specific' and is not transferable to another site without the written approval of the Engineer.

2.3 Quality Assurance

2.3.1 The Tenderer shall confirm whether or not approval is held in accordance with a Quality Assurance Scheme accredited under ISO 9000. If not, he shall submit a statement of the quality assurance procedures employed to control the quality of the product, including the performance of Suppliers and Sub-Contractors.

2.3.2 The right is reserved for the Engineer to require, from time to time, the repeat of such tests as he may deem to be reasonably necessary to demonstrate continued compliance with the Specification.

2.3.3 The tenderer shall submit, with his tender, a list of tests and inspections which are carried out on the product prior to despatch which shall demonstrate, to the satisfaction of the Engineer, fitness for installation and service.

2.3.4 The tenderer shall provide free of charge to Electricity North West such samples as may, in the opinion of the Engineer, be reasonably required for inspection and/or retention as quality control samples. The Engineer will confirm the requirement for samples at the time of tendering.

2.3.5 The right is reserved for the Engineer to make, from time to time, such inspections of the tenderer's facilities as he may deem to be reasonably necessary to ensure compliance with this Specification and any Contract of which it forms a part.

2.3.6 The Tenderer shall submit, with his tender, such details of product packaging disposal, as will enable Electricity North West to comply with the requirements of BS EN ISO 14001: 1996 – Environmental Management Systems.

2.4 Formulation

The Tenderer shall submit, with his tender, such details of the formulation and use of the product and associated substances as will enable Electricity North West to comply with the obligations of the Health and Safety at Work Act 1974 and the Control of Substances Hazardous to Health Regulations 1988, in the use, storage and disposal of the product. The tenderer may stipulate, prior to submission of such information, that he requires it to remain confidential and the Engineer will, if requested, confirm his agreement to this prior to receipt of the information.

2.5 Identification Markings

2.5.1 The Tenderer shall submit, with his Tender, details of markings which it is proposed to apply to the product or packaging to identify manufacturing batches or items. The forms and content of such markings shall be subject to the Approval of the Engineer, and shall in all cases include the Electricity North West Commodity Code Number.

2.5.2 The Tenderer shall submit, with his Tender, such details of marking gross weight on components, assemblies and packages, as will enable Electricity North West to comply with the Health and Safety Manual Handling Operation Regulations 1992, for components, assemblies and packages supplied with a gross weight over 1kg. The forms and content of such markings shall be subject to the Approval of the Engineer.

2.6 Manufacturers Already Approved

Clauses 2.2.1, 2.2.2, 2.3.1, 2.3.3, 2.3.4, 2.4 and 2.5 will be waived in the case of products already approved.

2.7 Product Conformity

Preference will be given to those suppliers who can provide suitable Product Conformity Certification to a recognised or specified standard, or an equivalent certification.

3. REQUIREMENTS FOR TYPE AND ROUTINE TESTING.

The specifier shall set out the requirement of the following tests to be carried out by the supplier at the suppliers' cost.

3.1 Requirement for type tests at the suppliers' premises

These are a series of one-off type tests, which are carried out to ensure the satisfactory performance of the product design, under extremes of operating stresses, and of endurance, as may be appropriate, to be determined by the specifier.

These may or may not be destructive tests.

3.2 Requirement for routine tests at the suppliers' premises

These tests may be required to be carried out on every individual unit or component, as specified, or at some regular frequency to be determined by the specifier.

The results of these tests may be required to be supplied to Electricity North West with each unit purchased or retained for inspection, at a period to be determined.

3.3 Requirement for on site tests

These will normally be included within the scope of on site commissioning, but may be included if appropriate.

4. TECHNICAL PARTICULARS

4.1 Battery Type

4.1.1 The battery shall be of the lead-acid (low maintenance) type or of the lead-acid valve regulated sealed type. The battery units shall meet the relevant requirements of BS 6290:

4.1.2 Battery units shall comprise 15 Plante cells or 5 blocks of 6V nominal rating.

4.2 Battery Capacity

Assuming an initial fully charged state, the battery shall be capable of 10 hour, 1A constant current discharge and have a minimum final voltage of 1.80V per cell.

4.3 Accessories and Labelling

4.3.1 Each complete battery shall be supplied with all inter unit connections.

4.3.2 A set of 5 adhesive labels shall be supplied, for the purpose of identifying individual units. The labels shall indicate cell numbers, i.e. 1-3; 4-6; up to 13-15. The labelling shall be fixed when the battery is initially assembled, with numbering 1-3 commencing at the positive end of the battery.

4.4 Enclosures

4.4.1 The battery, charging and distribution equipment shall be accommodated within a sheet steel wall mounted cabinet. The equipment shall be combined within one cubicle and a modular design may be adopted if considered advantageous. The battery compartment shall be adequately sealed to prevent the ingress of gases into the charger and/or distribution compartments, whilst having adequate ventilation for the batteries themselves.

4.4.2 The cubicles shall have an external gloss finish in Light Admiralty Grey, colour no 697 in BS 381C. The interior may be the same colour but shall not be darker in shade. The battery shelves shall be lined with PVC or similar material.

4.4.3 The equipment shall have sufficient doors to ensure safe access to all areas of the equipment for maintenance, installation and repair purposes. Lift-off type hinges are required. The top sheet may be removable. Hinged doors shall be fitted with a hasp and staple to accommodate Electricity North West' standard padlocks. Handles with built-in locks are not acceptable, a simple handle such that the door is vibration free and reasonably close fitting will be adequate.

4.4.4 Adequate space shall be available above the battery units to allow easy access for testing and maintenance.

4.4.5 A suitable pocket shall be provided to house one set of the inspection and maintenance instructions, preferably within the cubicle.

4.4.6 The cubicle shall be drilled to accept 4 X 20mm conduits, 2 at either side of the charger compartment. One pair of holes shall be provided with blind grommets.

4.4.7 Equipment requiring earthing shall be connected to an internal earth bar of 40mm2 copper equivalent size. Connection to the substation earthing system shall be facilitated by the provision of a 40mm size M10 coarse threaded stud of phosphor bronze or high tensile brass on the outside of the cabinet.

4.4.8 All instruments shall be of a flush mounted pattern.

4.4.9 Plante cell units shall have the following label fitted:-

WARNING
The cell vent plugs must not be removed when charging and need only be removed for the purpose of topping up the electrolyte or taking specific gravity readings

4.5 Charging Equipment

4.5.1 A 1A, 30V nominal constant voltage charger shall be supplied suitable for use with Plante or sealed recombination cells. At 15°C, the float voltage of the battery shall be 2.27V per cell, i.e. 34.04V for 15 cells.

4.5.2 For temperature variations in the range 5-30°C, it is preferred that the charger output voltage shall have a negative temperature co-efficient of approximately 4mV per cell per °C (-0.06V/°C for 15 cell battery). Alternatively the voltage must be stable within ± 0.2V over the temperature range 5-30V.

4.5.3 Output voltage regulation of ± 0.2V shall be provided over a range of mains input variation of ± 10% voltage and ± 2% frequency, for 10-100% of output load variation.

4.6 Charging Equipment - Mains Transformer

4.6.1 The primary and secondary windings of all mains powered transformers shall have an effectively earthed screen between them. The insulation between each winding and other windings connected to the case and screens shall withstand 2kV rms ac at 50 Hz for one minute and immediately afterwards the insulation shall be not less than 20 megohms when measured at 500V dc.

4.6.2 The transformer tappings and the input and output terminals shall be clearly marked. They shall be mounted in an easily accessible position in the cubicle. All connections exceeding 110V ac shall be shrouded.

4.7 Charging Equipment - Small Wiring

4.7.1 Small wiring shall be PVC type B to BS 6231. All insulated wire shall be a minimum of 32/0.2mm (1 mm^2) except for connections to telephone type equipment for which 0.8mm wire may be used. Both ends of all wires or control cables shall be provided with a marker bearing a permanent inscription corresponding to the diagram of connections.

4.7.2 An instruction sheet, charger circuit diagram, distribution arrangements and parts list shall be provided.

4.7.3 The following instruments, fuses and equipment shall be provided:

- 1 Voltmeter - to BS89, suppressed zero preferred, scaled 25-40V, calibrated mark at the appropriate float voltage.
- 1 Charger input fuse - 4A
- 1 Charger output fuse - 2A
- 2 Voltmeter fuses - 0.5A
- 1 DC output fuse +ve - 32A
- 1 DC output link –ve - Link
- 2 Battery Alarm fuses (optional) - 2A
- 1 Hydrometer (not required when sealed cells are supplied).

4.8 Battery Alarms

4.8.1 Battery alarms are optional and, where required, will be specified at the time of ordering.

4.8.2 Battery alarms shall be provided by fitting a High Volts and Low Volts alarm unit.

4.8.3 The unit shall be connected to monitor the dc distribution board.

4.8.4 The Low Volts alarm shall be set at 32.25V (2.15 V/cell) and the High Volts alarm shall be set at 36.0V (2.4 V/cell).

4.8.5 A variable time delay of up to 60s shall be provided for the alarms.

4.8.6 A voltage free contact shall be available from each alarm.

4.9 Block Diagram

A block diagram for the 30V battery and charger is shown in Appendix A.

5. DOCUMENTS REFERENCED

BS6290 (1997) - Lead-acid stationary cells and batteries.

BS6231 (1998) - Specification for PVC-insulated cables for switchgear and controlgear wiring.

BS89 (1990) - Direct acting indicating analogue electrical measuring instruments and their accessories.

BS381C - Specification of colours for identification, coding and special purposes.

6. KEYWORDS

Battery; Charger; Alarms; Telecontrol; Intertripping; Automation.

Appendix A

Block Diagram of 30V Battery and Charger