Electricity Specification 400C5

Issue 2 September 2014

Heavy-Duty Three-Phase Cut-Outs

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Approved for issue by the Technical Policy Panel

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## Issue and Amendment Summary

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| 0            | 30/06/98   | Issue 1  
Initial issue, introduced for the provision of heavy-duty three-phase cut-outs.                     |
|              |            | Prepared by: DP Horsman                                                                               |
|              |            | Approved by:                                                                                         |
|              | 25/09/14   | Issue 2  
The latest template has been applied and the document has been updated to the latest editorial standard.  
New Conformance Declaration Appendix added.                                                      |
|              |            | Prepared by: JP Scott                                                                               |
|              |            | Approved by the Technical Policy Panel and signed on its behalf by:                                   |
HEAVY-DUTY THREE-PHASE CUT-OUTS

1. SCOPE

This Specification covers the requirements of heavy-duty three-phase fused cut-outs for:

- Use on the cable network owned and operated by Electricity North West Ltd (Electricity North West).
- Supply voltage = 400V±10%.
- Supply load > 100A.

Current transformers are used to meter the supply.

2. DEFINITIONS

Approval: Sanction by the Electricity North West Underground Circuits Manager that specified criteria have been satisfied.

Contract: The agreement between Electricity North West and the Contractor for the execution of the Works including therein all documents to which reference may properly be made in order to ascertain the rights and obligations of the parties under the said agreement.

Contractor: The person or person's firm or company, including personal representatives, successors and permitted assigns, whose Tender has been accepted by Electricity North West.

Specification: The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.

Supplier: Any person or person's firm or company who supplies goods to Electricity North West or to its Contractor.

Tender: An offer in writing to execute work or supply goods at a fixed price.

Tenderer: The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by Electricity North West to submit a Tender.
3. GENERAL REQUIREMENTS FOR APPROVALS AND TESTING

3.1 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 Electricity North West Underground Circuits Manager and receipt of a written agreement to the proposed change from the Electricity North West Underground Circuits Manager.

3.2 Electricity North West Technical Approval

The Tenderer shall submit, with this Tender, proposals for testing which will demonstrate, to the satisfaction of the Electricity North West Underground Circuits Manager, compliance with this Specification. Such tests shall be carried out without expense to Electricity North West.

Alternatively, the Tenderer may submit technical reports and other data that he considers will demonstrate, to the satisfaction of the Electricity North West Underground Circuits Manager, compliance with this Specification. Acceptance of this evidence shall be at the discretion of the Electricity North West Underground Circuits Manager but will not be unreasonably withheld.

Approval shall be ‘factory specific’ and is not transferable to another factory without the written Approval of the Electricity North West Underground Circuits Manager.

The Supplier and product shall comply with all the relevant requirements of Electricity North West documents EPD311 and CP311.

3.3 Quality Assurance

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.

The right is reserved for the Electricity North West Underground Circuits Manager 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.

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 Electricity North West Underground Circuits Manager, fitness for installation and service.

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

The right is reserved for the Electricity North West Underground Circuits Manager 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.

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: 2004 – Environmental Management Systems.
3.4 **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 Etc Act 1974 and the Control of Substances Hazardous to Health Regulations 2002, 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 Electricity North West Underground Circuits Manager will, if requested, confirm his agreement to this prior to receipt of the information.

3.5 **Identification Markings**

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 Electricity North West Underground Circuits Manager, and shall in all cases include the Electricity North West Approved Description and Commodity Code Number.

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 Electricity North West Underground Circuits Manager.

3.6 **Minimum Life Expectancy**

The minimum life expectancy of all products covered by this Specification is 60 years.

3.7 **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.

3.8 **Confirmation of Conformance**

The Tenderer shall complete the conformance declaration sheets in Appendix A. Failure to complete these declaration sheets may result in an unacceptable bid.

4. **REQUIREMENTS FOR TYPE AND ROUTINE TESTING**

The Electricity North West Underground Circuits Manager shall set out the requirement of the following tests to be carried out by the Supplier at the Supplier’s cost.

4.1 **Requirement for Type Tests at the Supplier’s 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 Electricity North West Underground Circuits Manager.

These may or may not be destructive tests.
4.2 Requirement for Routine Tests at the Supplier’s 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 Electricity North West Underground Circuits Manager.

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 by the Electricity North West Underground Circuits Manager.

5. TECHNICAL PARTICULARS

5.1 Conditions of Operation

All cut-outs shall be designed for use on three-phase, four wire 400V, 50Hz, CNE and SCNE networks.

5.2 Classification

The cut-out type shall be classified in terms of rating, as follows:

- Type 1  Rated at up to 200A.
- Type 2  Rated at up to 400A.

6. CONSTRUCTIONAL REQUIREMENTS

6.1 General

The design of the cut-out shall conform to BS EN 60439-1.

The main fuse compartment case shall have a one piece lid, retained in the closed position by screw fixings. The lid shall be sealed in this position by the use of Ø2mm stranded steel wire and copper ferrules.

Each three-phase cut-out shall be designed to accommodate appropriately rated fuses manufactured to BS 88, Part 5.

Fuses shall have fixing centres of 82mm to enable a compact design of cut-out. For a Type 1 cut-out only a fuse of similar design, but with a fixing centre of 76mm, may be used.

Fuse carriers shall be of the wedge type, with tightening achieved by the use of permanently fitted thumb screws of insulating material with the same electrical performance as the fuse carrier (refer to Table 1).

The cut-out shall have four poles, three fused phases, one non-disconnectable neutral and an earth terminal block. Each pole shall be separated in the main case by insulating material matching the electrical and mechanical performance of the case (refer to Table 1).
6.2 Cable Terminations

Cable termination boxes shall be suitable for the termination of waveform cable to EN ATS 09-09.

Cable termination boxes shall have sufficient air space to conform to the HV test requirements as detailed in Section 7.1 below.

Cable termination enclosures shall be manufactured from the same material as the cut-out case (refer to Table 1).

The Type 1 cut-out shall be able to accommodate cable of 35mm$^2$ or 95mm$^2$ curved surface area (csa). The Type 2 cut-out shall be able to accommodate cable of up to 185mm$^2$ csa.

The design of the cable box shall be such that it is possible to cross cable cores to achieve correct phase connections, whilst not unduly bending cable cores.

The cable termination enclosure shall be of two piece construction. The outer part shall be removable for cable jointing with the inner part in place. No part of the cable termination enclosure shall be removable without the prior removal of the fuse compartment lid (refer to the Specification in Section 6.1 above for the one piece lid).

The cable termination enclosure must have cable entries to enable a cable to enter at an angle from either the left or right of the cut-out, or from directly below.

Bungs that are only removable by entry to the cable termination enclosure shall be used to prevent penetration of the enclosure through unused cable entries.

The incoming side of each fused and neutral pole of both Type 1 and Type 2 cut-outs shall enable the incoming cable to be terminated on an M12 stud or bolt, supplied with one plain and one spring washer and full nut. (All ferrous parts, ie nuts, washers etc., shall conform to the requirements of Table 1.) The position of the stud or bolt shall be such that they may be assembled using open ended spanners only.

The outgoing side of Type 2 cut-outs shall have cable termination similar to the incoming side. The outgoing neutral terminal shall be able to accept an earth cable of up to 95mm$^2$ csa in addition to the neutral cable.

The outgoing side of Type 1 cut-outs shall be a tunnel type clamp able to terminate one or two cable cores per phase of up to three cable cores of up to 95mm$^2$. The bore of the tunnels must be serrated to accept aluminium conductors, and should have two core pinching screws of a diameter that almost fills the bore. Core pinching screws shall have a flat cable contact area.

6.3 Top Plate

The top of the fuse case shall accommodate outgoing single core cable tails of varying sizes, and the top plate of the cut-out must be able to be easily drilled on site using hand tools to accommodate these cores.

The top plate shall be flat, and horizontal in both planes with the cut-out mounted on a vertical wall. It must be possible to directly abut a wooden cable plate forming the lower closure of a current transformer chamber such that no visible gap exists.
6.4 **Mounting Arrangement**

Equipment must be able to be mounted to a wall using conventional fixings to which access cannot be gained when the cut-out fuse case lid is closed.

The case of the cut-out shall bear directly on the wall. When used on a wall subject to damp, any mounting frame used shall be of non-deteriorating material. Wooden frames are not acceptable.

6.5 **Shielding**

The cut-outs shall have protection of IP 4X to BS EN 60529 with the fuse cover closed, and IP 2X when the fuse cover is open, and all fuse carriers are in the service position.

Equipment shall comply with the relevant requirements of ENA TS 37-2 ‘Shielded pattern’.

6.6 **Materials**

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<th>Material (2)</th>
<th>Specification (3)</th>
<th>Other notes (4)</th>
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<tr>
<td>Cut-out cases</td>
<td>Insulating material</td>
<td>BS 7657</td>
<td>Insulation coated metallic cases are not acceptable</td>
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<tr>
<td>Fuse carriers</td>
<td>Moulded insulating material</td>
<td>ENA TS 37-2, clause 13.3.1 &amp; 2</td>
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<td>Parts forming main current path</td>
<td>HC copper or brass</td>
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<td>May be electroplated with tin, cadmium or silver, if required</td>
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<tr>
<td>All ferrous parts</td>
<td>Stainless steel</td>
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<td>Other metal may be used if it is adequately plated to prevent corrosion</td>
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<td>Wood used as top cable entry plate, or cable termination enclosure bushes</td>
<td>Durable hardwood, smooth finished and sealed with varnish</td>
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<td>Oak is not to be used</td>
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<td>SRBP</td>
<td>SRBP with CTI of 500</td>
<td>BS 5901</td>
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7. TEST REQUIREMENTS

7.1 High Voltage (HV) Tests
The complete equipment shall be proven to have successfully completed relevant tests described in EATS 37-2, clause 13.3.

7.2 Temperature Rise Test
The temperature rise performance of the equipment shall match that described in EATS 37-2, clause 13.2 and/or BS 60947-1.

For new designs of cut-out, the equipment shall be tested under the conditions of a cyclic load temperature rise test as described in BS 7657, clause 8.3.3.3.4.104.

8. PACKAGING
Supplied equipment shall be appropriately packaged to prevent damage in both transit and during stores handling.

Any requirements regarding handling or stacking shall be clearly marked on the packaging.

All components forming the cut-out assembly shall be contained within the packaging of each unit.

9. DOCUMENTS REFERENCED

Control of Substances Hazardous to Health Regulations 2002.


BS EN ISO 9000 Quality management systems.


BS 7657: Specification for fuse (cut-outs), ancillary terminal blocks and interconnecting units up to 100A rating, for power supplies to buildings.

BS EN 60947-1: Specification for low voltage switchgear and control gear.

BS EN 60439-1: Specification for low voltage switchgear and control gear assemblies.

BS 5901: Method of test for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions.

BS EN 60529: Specification for degrees of protection provided by enclosures (IP code).

EATS 09-09: Wave form low voltage cable.

EATS 37-2: LV distribution fuseboards.

EPD311 Approval of Equipment.

CP311 Equipment Approval Process.

10. KEYWORDS

Three phase; termination; fuse.
APPENDIX A
CONFORMANCE DECLARATION
SECTION-BY-SECTION CONFORMANCE WITH SPECIFICATION

The Tenderer shall declare conformance or otherwise for each product/service or range of products/services, section-by-section, using the following Conformance Declaration Codes.

Conformance Declaration Codes:

N/A = Section is not applicable/appropriate to the product/service.
C1 = The product/service conforms fully with the requirements of this section.
C2 = The product/service conforms partially with the requirements of this section.
C3 = The product/service does not conform to the requirements of this section.
C4 = The product/service does not currently conform to the requirements of this section, but the manufacturer proposes to modify and test the product in order to conform.

Manufacturer:

Product/Service description:

Product/Service reference:

Assessor details

Name:

Company:

Signature:

Date:
## SECTION-BY-SECTION CONFORMANCE

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* Applicable specifications shall be stated in the Remarks column where alternatives are quoted within a section. The Remarks column shall also be used to indicate cases where the products or services exceed the quoted specifications.

### Additional Notes:

* Additional Notes:

**Electricity North West Limited.**