Electricity Specification 308

Issue 1 **November 2015**

36kV Open Terminal Disconnectors and Earthing Switches

Contents

Approved for issue by the Technical Policy Panel

Electricity North West Limited. Registered in England & Wales. Registered No. 2366949. Registered Office: 304 Bridgewater Place, Birchwood Park, Birchwood, Warrington, WA3 6XG

Issue and Amendment Summary

Amendment No. Date	Brief Description and Amending Action
0 26/11/15	Issue 1 First Issue Prepared by: M A Kayes Approved by the Technical Policy Panel and signed on its behalf by: Steve Cox, Head of Engineering.

33 kV OPEN TERMINAL DISCONNECTORS AND EARTHING SWITCHES

1. SCOPE

This Electricity Specification (ES) covers the supply, delivery and off loading of 36kV Open Terminal Disconnectors and Earthing Switches for use on a 50Hz, Resistanced or Soild earthed, three phase system of nominal voltage 33kV and highest voltage 36kV, generally in accordance with Energy Networks Association (ENA) Technical Specification (TS) 41-36, Issue 3:2012, owned by Electricity North West Limited (Electricity North West).

Schedules of information included in Appendix A and the Self Certification Conformance Declaration in Appendix B of this document shall be completed by the Tenderer and returned to Electricity North West as part of the Tender documentation.

2. DEFINITIONS

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

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.

Sub-Contractor: Any person (other than the Contractor) named in the Contract for any part of the Works or any person to whom any part of the Contract has been sub-let with the consent in writing of the Electricity North West Plant Policy Manager, and the legal representatives, successors and assigns of such person.

Supplier: Any person or person's firm or company who supply goods to Electricity North West or Electricity North West 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 Plant Policy Manager, and receipt of a written agreement to the proposed change from the Electricity North West Plant Policy Manager.

3.2 Electricity North West Technical Approval

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

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

4.2.3 Approval shall be 'factory specific' and is not transferable to another factory without the written Approval of the Electricity North West Plant Policy Manager.

4.2.4 The Supplier and product shall comply with all the relevant requirements of Electricity North West documents Electricity Policy Document (EPD) 311 and Code of Practice (CP) 311.

3.3 Quality Assurance

3.3.1 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.

3.3.2 The right is reserved for the Electricity North West Plant Policy 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 ES.

3.3.3 The Tenderer shall submit, with the 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 Plant Policy Manager, fitness for installation and service.

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

3.3.5 The right is reserved for the Electricity North West Plant Policy 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 ES and any Contract of which it forms a part.

3.3.6 The Tenderer shall submit, with the 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 the 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 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 Plant Policy Manager will, if requested, confirm his agreement to this prior to receipt of the information.

3.5 Identification Markings

3.5.1 The Tenderer shall submit, with the 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 Plant Policy Manager, and shall in all cases include the Electricity North West Approved Description and Commodity Code Number.

3.5.2 The Tenderer shall submit, with the 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 Plant Policy Manager.

3.6 Minimum Life Expectancy

The minimum life expectancy of all products covered by this ES is 40 years.

3.7 Product Conformity

Switchgear shall at the time of Tender have a valid Approval Notice or Notice of Conformity as issued by the ENA Switchgear Assessment Panel. Copies of Approvals Certificates and Notices of Conformity shall accompany the Tender.

4. REQUIREMENTS FOR TYPE AND ROUTINE TESTING.

The Electricity North West Policy 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 Plant Policy Manager.

These may or may not be destructive tests.

Type tests shall be those as specified in the standards listed in this ES. Satisfactory independent test centre type test certificates can be submitted in lieu of repeating actual type 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 Plant Policy 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 Plant Policy Manager.

Routine tests shall be those as specified in the standards listed in this ES.

5. TECHNICAL AND PERFORMANCE REQUIREMENTS

Except where modified by requirements specified elsewhere in this document, switchgear shall be designed, manufactured and tested to comply fully with the requirements of:

ENA TS 41-36, Issue 3:2012 'Switchgear for service up to 36kV (Cable and overhead conductor connected)',

BS EN 60137:2008 'Insulated Bushings for alternating voltages above 1000V'.

BS EN 62271-1:2008 'Common specification for high-voltage switchgear and control gear standards'.

IEC 60273 'Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V'

IEC 60815-1:2008 Selection and dimensioning of High Voltage insulators for use in polluted conditions. Definitions, information and general principles.

IEC 60185-3:2008 Selection and dimensioning of High Voltage insulators for use in polluted conditions. Polymer insulators for a.c systems.

IEC 61109 'Insulators for Overhead Lines – composite suspension and tension insulators for a.c systems with a nominal voltage greater than 1000V – definitions, test methods and acceptance criteria.

IEC 61462 'Composite Insulators – Hollow insulators for use in Outdoor and Indoor Equipment.'

IEC 62231:2006 'Composite station post insulators for substations with a.c. voltages greater than 1000V upto 245kV - definitions, test methods and acceptance criteria.

IEC 62271-102:2002 'Alternating Current Disconnectors and Earthing Switches'.

5.1 Disconnector and Earth Switch Requirements

5.1.1 Equipment Standards

Electricity North West welcomes innovation and alternatives to traditional designs that still meet the functional requirements of this Specification. Variations shall be clearly identified in Appendix C and prices for compliant and non-compliant equipment detailed separately.

5.1.2 General Requirements

The design of equipment shall meet the requirements of the Health and Safety at Work Act 1974, the Electricity at Work Regulations 1989 and the Provision and Use of Work Equipment Regulations 1998, for the maximum safety of all personnel.

5.1.3 Type

Disconnectors shall be of the three post rotating centre post type. Alternative arrangements may be considered subject to Approval by the Electricity North West Plant Policy Manager.

Earth switches shall be of the integral blade type. Alternative arrangements may be considered subject to Approval by the Electricity North West Plant Policy Manger.

5.1.4 Performance Requirements

The disconnector / earth switch assemblies will be used as busbar or line switching devices on Electricity North West 33kV system.

All assemblies (including mechanisms and interlocks) shall be weatherproof and corrosion proof.

Where the disconnectors and earthing switches are electrically operated they shall have a control scheme that fails safe in the event of an interruption to the operating mechanism power supply during operation. It shall ensure that upon supply restoration the in-complete operation does not continue until it is re-initiated by the operator.

5.1.5 Mechanisms

Disconnectors shall normally be operated manually, Tenderers shall submit with their Tender the option for electrical operation. Where electrically operated, Switches to select between local and remote electric operation shall be provided.

Earth switches shall normally be operated manually. Where the design requires the Earth Switch to be electrically operated, This shall be on-site operation only.

Crank handles for manual operation shall be provided. The disconnector and earth switch motor circuits shall be arranged to avoid motor operation when the handle is inserted.

A mechanism box shall be provided to house the disconnector control circuit and motor if applicable.

A separate mechanism box shall be provided for each earth switch.

Mechanism boxes shall have a minimum IP rating of IP54.

5.1.6 Label Fixings

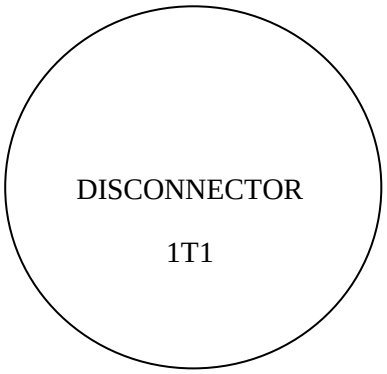
Labels shall be fixed using screws; glue fixing is not acceptable. Label text shall be maximised for legibility.

5.1.7 Circuit Labels

Disconnectors and earth switches shall be provided with labels marked with the Circuit Name. The labels shall be located on the mechanism box and shall be sized to fit the enclosure size (nominally 100mm high). Black lettering on white background shall be used. The details of the circuit names shall be in the specific contract requirements.

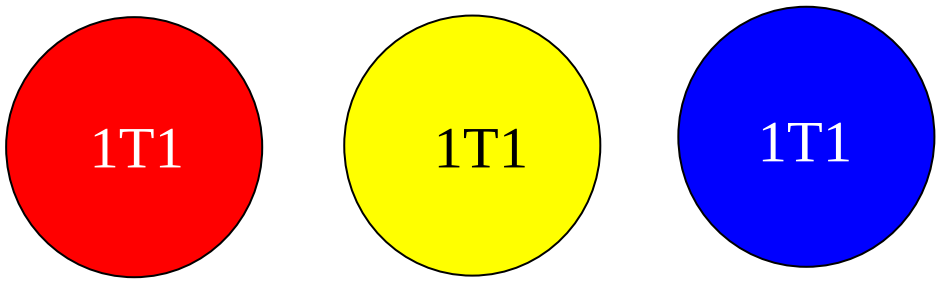
5.1.8 Main Labels.

Disconnectors and earth switches shall be provided with labels marked with the equipment number. The labels shall be located on the mechanism box and shall be sized to fit the enclosure size (nominally 160mm diameter). Black lettering on white background shall be used. Please refer to ES356 for full sign technical details. An Example is shown below –



5.1.9 Phase Labels

Labels to indicate phases (with equipment number) shall be provided. These labels shall be provided under each pole of each phase i.e. 3 labels per earth switch and 6 labels per disconnector. Nominal height of labels shall be 160mm diameter. Please refer to ES356 for full sign technical details. An Example is shown below –



5.1.10 Warning Labels

Warning labels shall be white lettering on red (BS 381c, No. 537G) background. The labels shall be located on the mechanism box and shall be sized to fit the enclosure size (nominally 100mm high). Please refer to ES356 for full sign technical details. Examples are shown below.

Line side earth switches warning labels shall be provided as follows-

WARNING

THIS EARTH SWITCH IS NOT FULLY INTERLOCKED.

Line disconnector warning labels shall be provided as follows-

WARNING

THIS DISCONNECTOR IS NOT FULLY INTERLOCKED AND MUST NOT BE OPERATED UNLESS THE CIRCUIT IS ISOLATED AT ALL POINTS OF SUPPLY

5.2 Earthing

Terminals capable of accepting 120mm^2 copper earth or equivalent via 2 x M12 bolts shall be provided for connection to the substation earth. However, the design, installation and testing of the earth installation does not form part of the scope of this ES.

Earthing terminals shall be provided on the support structure; disconnector bases, earth switches and mechanism boxes.

5.3 Interlocking Facilities

The detailed interlocking scheme is specified in the contract requirements. The statements below give the basic requirements.

The interlocking system shall, so far as is reasonably practicable,

(1) prevent the closure of any earth switch onto a live system,

(2) prevent the energising of any section of switchgear to which an earth is already applied, and

(3) Prevent disconnectors making and breaking load currents.

Interlocks shall ensure the safety of operational personnel under all conditions, in addition to preventing the imposition of faults onto the 33kV system caused by human error. However, the interlocking system shall be confined to the switchgear to be supplied, and plant within the confines of the local substation. It shall not extend to any other operational site. Any switchbay in which the interlocking facilities are, for any reason, less comprehensive than those elsewhere on the switchgear, shall be fitted with a prominent label, permanently fixed in a position close to the switchgear normal operating position. This label shall state the nature of the interlocking limitation.

5.3.1 Mechanical Interlocking

Care shall be taken that mechanical interlocks are sufficiently robust to prevent inappropriate operation through the manual application of excessive force and that they do not apply stress to any part of the equipment that is sufficient to cause permanent deformation. Key differs shall not be repeated on the same substation site.

5.3.2 Electrical Interlocking

Where electrical operation is used, The provision shall be provided in the control circuit so that an external interlock permissive signal is given to disconnector operation. This interlock shall prevent electrical and manual operation.

Interlocks shall ensure the correct sequence of on load busbar transfer switching operations at multiple busbar substations.

Electrical interlocks shall be resistant to defeat by manual interference. In addition, the loss of auxiliary power supplies and their subsequent restoration shall not cause or permit faulty operation. Electrical interlocks reliant upon interrupting the power supply to motors or solenoids shall break both the supply and neutral connections or in the case of three phase motors, all three phase connections.

5.4 Locking Facilities

Disconnectors and earth switches shall be fitted with locking facilities that are additional to the interlocking system described elsewhere in this ES. Locking facilities shall comply with the following requirements.

5.4.1 Locking of Equipment

Locking facilities shall be provided as follows.

- Mechanism box doors.
- Control position selector switches in all available positions.
- Manual operating handle

5.4.2 Padlocking

All locking shall be implemented by means of removable padlocks, which shall be supplied by Electricity North West. Padlocks will be brass with a 38mm square body and a 7mm diameter shackle, with a clear inside width 20mm and an inside length of at least 16mm.

5.5 Auxiliary Switches and Contactors

5.5.1 Quantity

Unless specified in the contract requirements disconnectors shall be provided with the following auxiliary contacts:-

Twelve (12) Normally Open (two (2) shall be early make)

Twelve (12) Normally Closed (two (2) shall be late break)

Unless specified in the contract requirements earth switches shall be provided with the following auxiliary contacts:-

Four (4) Normally Open (NO)

Four (4) Normally Closed (NC)

If required Early Make NO contacts (type vii) and NC contacts (type ii) associated with busbar protection schemes will be specified in the contract requirements.

5.6 Insulators

The support insulators shall be manufactured in accordance with ENA TS 41-36 and BS EN 62271-102:2002+A2:2003, and shall be of the composite type. All insulators shall provide minimum creepage levels of 25mm/kV in accordance with BS EN 60137:2008 type 3.

Insulators shall comply with the requirements of IEC 60815 be suitable for a pollution severity of "Heavy" as defined in IEC 60815 and insulators shall have a minimum phase to earth creepage distance appropriate to this pollution severity

Insulators shall comply with the requirements of IEC 60273, IEC 61109, IEC 62231:2006 and IEC 61462.

The creepage distances shall be specified in the contract requirements and Appendix A Schedule C of this ES. However for all sites within 5Km of the coast 31mm/kV shall be used.

5.7 Ratings

The ratings of the Switchgear shall be as described in Table 1.3 of ENA TS 41-36: Issue 3. Electricity North West nominal ratings are as below:-

Rated Voltage	36kV
Rated normal current	800A, 1250A, 2000A
Rated short circuit current	21.9kA minimum

The Disconnector minimum current rating shall be in accordance with the contract requirements.

5.8 Environment, Operating Conditions and Duty

5.8.1 Service Conditions

The normal service conditions shall be as defined in Section 1.2.1.2 of ENA TS 41-36: Issue 3

5.8.2 EMC Compatibility

Tenderers are requested to confirm that the equipment complies with the Electromagnetic Compatibility (EMC) Directive and associated standards or to state those items that are not considered a requirement for EMC Conformity.

5.9 Auxiliary Supplies

Mechanisms, alarms, indications, controls and motors shall be 110V (nominal) Direct Current (DC) operated. The maximum current drawn under operational conditions shall be declared by the manufacturer in the Tender document.

The 110V DC system normally operates with charger in feed at 125V. With charger disconnected the voltage is expected to fall to 110V and minimum operation is required at 80% of 110V.

Auxiliary equipment intended to operate on 50Hz alternating current supplies shall be declared in the Tender documents e.g. Heaters. The Tenderer shall state whether the alternating current supplies required are single or three phase.

5.10 Control Circuit Wiring Requirements

The following requirements shall apply.

5.10.1 Ferruling

All wiring shall be clearly marked with cable numbering and ferrules at each point of termination. These shall be clearly identified on the wiring diagrams such that all internal wiring is unambiguously identifiable.

All control and internal wiring shall be easily identifiable and traceable throughout the circuit schematic and wiring diagrams.

Wiring shall be fitted with interlocking numbered ferrules. Ferrules shall be fitted at both ends of the wire unless the wire is individually routed and less than 100mm long. Ferrules shall be indelibly marked. It shall be necessary to disconnect the termination to remove the ferrules.

Ferruling shall be to ENA TS 50-19.

5.10.2 Terminals and Terminal Blocks

Conductor ends for connections shall be fitted with a crimped, hooked palm type termination devices having an insulated shank or other approved method of termination that ensures that a reliable connection is made that cannot be loosened under different thermal or vibration conditions.

Terminals having different voltages shall be separated. The voltage shall be marked on the terminals. All terminals shall be fully segregated and insulated from adjacent terminals so that inadvertent contact is prevented. Sufficient spare terminals shall be provided to cater for spare cores on multicore cables.

All terminal blocks provided within the control cubicle, for multicore cable terminations, shall be able to accept a hooked palm type crimp termination.

All terminal blocks used for CT shall be able to accept ring crimps or hooked palm type terminals.

All terminal blocks shall be rail mounted, screw clamp with spring loading or insertion clamp spring, insertion, unit type without isolation facilities. They shall meet the requirements for type B terminal of ENA TS 50-18 or BS EN 60998 and shall be Weidmuller WDU10SL or RSF1 or equivalent for any current transformer circuitry and Weidmuller WDU6SL or RSF3 or equivalent for all other circuitry.

Terminal rail shall be galvanised steel either TS32 or TS35 as appropriate to match terminals and comply with ENA TS 50-18, and/or BS EN 60715.

5.10.3 Internal Wiring

The small wiring shall conform to ENA TS 50-18.

Internal wiring conductors shall have a minimum cross-section of 1.5mm^2 and a minimum of seven copper strands, unless otherwise approved. The insulation shall be LSF.

5.10.4 External Wiring

Multicore and auxiliary cables external to the switchgear are outside the scope of this specification. The operating mechanism box shall be provided with a removable undrilled gland plate to accommodate this wiring. Provision shall be made for the earthing of all multicore glands as necessary.

5.10.5 Anti-condensation Heaters

Enclosures containing electrical equipment shall contain an anti-condensation heater. Enclosures which only contain auxiliary contacts shall be completely waterproof with a small breather to avoid the need for an anti-condensation heater, unless one is required for the specific design.

5.11 Special Tools

Requirements for special tools and equipment necessary for the erection, operation, testing and maintenance of the switchgear shall be detailed and provided by the manufacturer.

5.12 Support Structure

When Specified, Each disconnector, including its associated earth switch(es), shall be provided with a single support structure, to support all three phases of the disconnector. Aluminium or galvanised steel is acceptable.

The support structure shall be Specified in Appendix A Schedule C of this ES and will be one of the following two types:-

(1) Collar / Fixing Bracket type for use on pre-existing concrete or metal structures.

(2) Free standing single support structure. The height of structure (to base of disconnector) above ground shall be specified in contract requirements and Appendix A Schedule C of this ES.

If galvanised steel is used, galvanising should be at least 610g/m^2 on steelwork of 6mm or greater thickness.

Tenderer shall supply full structure technical details with their Tender.

5.13 HV Terminals

The HV terminals shall be of the aluminium pad type and shall have four (4) 19mm diameter holes on a 127mm Pitched Circle Diameter (PCD). The HV connector and bolts are outside the scope of this ES.

6. ERECTION AND SITE ASSEMBLY

6.1 Site Works

The Supplier shall include for delivery and offloading of the disconnectors /earth switches and support structures. Erection will be by the purchaser or its chosen installation Contractor. After installation the Supplier shall inspect the disconnectors/earth switches and provide a written guarantee stating that the installation was carried out in accordance with their procedures and is fit for operation.

If a support structure is included in the scope of supply holding down bolts from the disconnector to the structure and structure to foundation shall be provided by the Supplier. Structure to foundation holding down bolts shall be of the drill and fix type.

7. DRAWINGS

Manufacturers standard versions of the following drawings shall be provided at the Tender stage.

At contract plus 2 months, the following drawings shall be submitted for review.

(1) General Arrangement Drawings showing

Full dimensions

Weights and static & dynamic loads

Civil interface information

Terminal details

Operating box internal layout

(2) Circuit Diagrams showing all control and indication equipment.

(3) Wiring Diagrams.

Within four weeks of final commissioning the following drawings shall be supplied.

(1) Contract drawing list with number, title and revision of each drawing.

(2) Two paper prints of each drawing and equivalent AutoCad (.dwg) and Adobe Acrobat (pdf) format files.

Notes on drawings and drawing format:

(a) Orthographic drawings shall use metric units and be reproduced to a scale that is declared on each print. The scale for general arrangement drawings shall not be less than 1 to 50 and that for detail drawings shall not be less than 1 to 20.

(b) All drawing, schematic and wiring diagrams shall comply with UK ESI convention and be produced on conventional format up to a maximum A1 paper size. AC and DC schemes shall be depicted as comprehensively on one drawing as possible. Multi-page **is not** acceptable.

(c) Drawings shall be submitted for Approval by the Purchaser on paper in duplicate. They shall also be accompanied by equivalent AutoCad .dwg format files on a CDROM.

(d) The name of the site, the drawing number and the date and number of revision shall be marked on all drawings. All drawings shall be numbered according to a logical scheme.

8. OPERATIONAL LIFE, INSPECTION, MAINTENANCE AND TRAINING

8.1 Operational Life

The switchgear shall be designed and constructed for an operational lifetime of at least 40 years. The Supplier shall provide technical support and a source of spares over this period. At the Tender stage the Supplier shall submit the routine maintenance schedule.

8.2 Operating and Maintenance Manuals

Details of the recommended schedules of inspection and maintenance shall be provided with the Tender to allow Electricity North West to analyse the lifecycle costs.

All necessary operating and maintenance manuals for the equipment shall be provided within two months of the award of contract, including recommended schedules of inspection and maintenance.

Final versions of the manuals shall be provided in PDF format.

8.3 Training

The manufacturer shall provide on-site training in the operation and maintenance of the equipment to all project staff and selected Electricity North West maintenance staff as required.

9. VARIATIONS

The Tender shall include using Schedule A attached, any variations from the foregoing Technical and Performance Specification, including those that in his opinion enhance the performance of the equipment.

10. DOCUMENTS REFERENCED

Health and Safety at Work Act 1974.

The Electricity at Work Regulations 1989.

EC Directives:

'Management of Health, Safety and Welfare'.

'Manual Handling Regulations'.

'Workplace Health, Safety and Welfare'.

'Provision and Use of Work Equipment Regulations'.

Control of Substances Hazardous to Health Regulations 2002

Health and Safety Manual Handling Operation Regulations 1992

IEC 60273	'Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000V'
IEC 60815-1:2008	Selection and dimensioning of High Voltage insulators for use in polluted conditions. Definitions, information and general principles.
IEC 60185-3:2008	Selection and dimensioning of High Voltage insulators for use in polluted conditions. Polymer insulators for a.c systems.
IEC 61109	'Insulators for Overhead Lines – composite suspension and tension insulators for a.c systems with a nominal voltage greater than 1000V – definitions, test methods and acceptance criteria.
IEC 61462	'Composite Insulators – Hollow insulators for use in Outdoor and Indoor Equipment.'
IEC 62231:2006	'Composite station post insulators for substations with a.c. voltages greater than 1000V upto 245kV - definitions, test methods and acceptance criteria.
IEC 62271-102:2002	'Alternating Current Disconnectors and Earthing Switches'.
BS EN ISO 9000	'Quality Management and Quality Assurance Standards'.
BS EN ISO 14001	'Environmental Management Systems'
BS EN 60137:2008	'Insulated Bushings for alternating voltages above 1000V'.
BS EN 62271-1:2008	'Common specification for high-voltage switchgear and controlgear standards'.
BS 381c:1996	'Specification for Colours for Identification, Coding and Special Purposes'.
BS 5499-1:2002	'Graphical symbols and signs. Safety signs, including fire safety signs. Specification for geometric shapes, colours and layout'+
ENA TS 41-36	Issue 3:2012 'Switchgear for service up to 36kV (Cable and overhead conductor connected)',
ENA TS 50-19	'Standard Numbering for Small Wiring (for Switchgear and Transformers together with their associated relay panels).
CP311	'Equipment Approval Process'
EPD311	'Approval of Equipment'
ES356	Notices and Nameplates

11. KEYWORDS

33kV; SWITCHGEAR;

APPENDIX A

SCHEDULES OF INFORMATION

Schedule A - List Of Variations From The Specification

Schedule B - Recommended Tools And Spare Parts

Schedule C – General Particulars of Definite work

SCHEDULE A - LIST OF VARIATIONS FROM THE SPECIFICATION

No. of Clause	Details of item not in accordance with the Specification

Name of Tenderer _____

Note: Additional sheets may be inserted as required

SCHEDULE B – TOOLS AND SPARE PARTS

i) List of tools recommended for use with each installation

DESCRIPTION	PRICE EACH £	TOTALPRICE £

ii) Recommended spare parts, to be ordered at the discretion of the company

DESCRIPTION	PRICE EACH £	TOTALPRICE £

SCHEDULE C – GENERAL PARTICULARS OF DEFINITE WORK

(Relevant details to be completed by Purchaser)

Item	Description	
1	Site Name	
2	Site Grid Reference	
3	Configuration	Disconnector*
		Disconnector with 1 Earth Switch*
		Disconnector with 2 Earth Switches*
4	Nomenclature	
5	Use	Line Disconnector*
		Busbar Selection Disconnector*
		Bus Section Disconnector*
		Line Earth Switch*
		Busbar Earth Switch*
6	Support Structure Type	Collar / Free Standing*
7	Height of Free Standing Support Structure if required. (Ground level to base of disconnector).	
8	Number of Units	
9	Equipment Number	
10	Rating (Amps)	
11	Circuit Names	See next sheet
12	Creepage Distance Required	25mm/kV / 31mm/kV[(1)]*
13	Insulator Colour Required	
14	Interlocking Scheme	
15	Auxiliary Switches	
16	Delivery Date	

[(1)]For all sites with 5kM of the coast 31mm/kV shall be used.

*Delete as required.

SCHEDULE C – GENERAL PARTICULARS OF DEFINITE WORK (CONTINUED)

(Relevant details to be completed by Purchaser)

Circuit Names

TRANSFORMER 1 EARTH SWITCH

TRANSFORMER 1 DISCONNECTOR

CIRCUIT 1 LINE EARTH SWITCH

APPENDIX B

SELF-CERTIFICATION CONFORMANCE DECLARATION

CLAUSE BY CLAUSE CONFORMANCE WITH SPECIFICATION

The manufacturer shall declare conformance or otherwise, clause by clause, using the following levels of Conformance Declaration Codes.

Conformance Declaration Codes.

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

Manufacturer:
Product/Service Description
Product /Service Reference :

Assessor

Name:	**Company**	**Signature**	**Date**

Clause / Sub-clause		Requirement	Conformance Code	Remarks (Shall be completed if Conformance Code is not Cs1)
1		Scope		
3	1	Product not to be Changed		
3	2	Electricity North West Technical Approval		
3	3	Quality Assurance		
3	4	Formulation		
3	5	Identification Markings		
3	6	Minimum Life Expectancy		
3	7	Product Conformity		
4	1	Requirement for Type Tests at the Suppliers' Premises		
4	2	Requirement for Routine Tests at the Suppliers' Premises		
5		Technical and Performance Requirements		
5	1	Disconnector and Earth Switch Requirements		
5	1.1	Equipment Standards		
5	1.2	General Requirements		
5	1.3	Type		
5	1.4	Performance Requirements		
5	1.5	Mechanisms		
5	1.6	Label Fixings		
5	1.7	Circuit Labels		
5	1.8	Main Labels		
5	1.9	Phase Labels		
5	1.10	Warning Labels		
5	2	Earthing		
5	3	Interlocking Facilities		
5	3.1	Mechanical Interlocking		
5	3.2	Electrical Interlocking		
5	4	Locking Facilities		
5	4.1	Locking of Equipment		
5	4.2	Padlocking		
5	5	Auxiliary Switches and Contactors		

Clause / Sub-clause		Requirement	Conformance Code	Remarks (Shall be completed if Conformance Code is not Cs1)
5	5.1	Quantity		
5	6	Insulators		
5	7	Ratings		
5	8	Environment, Operating Conditions and Duty		
5	8.1	Service Conditions		
5	8.2	EMC Compatibility		
5	9	Auxiliary Supplies		
5	10	Control Circuit Wiring Requirements		
5	10.1	Ferruling		
5	10.2	Terminals and Terminal Blocks		
5	10.3	Internal Wiring		
5	10.4	External Wiring		
5	10.5	Anti-condensation Heaters		
5	11	Special Tools		
5	12	Support Structure		
5	13	HV Terminals		
6		Erection and Site Assembly		
6	1	Site Works		
7		Drawings		
8		Operational Life, Inspection, Maintenance and Training		
8	1	Operational Life		
8	2	Operating and Maintenance Manuals		
8	3	Training		
9		Variations		
Schedule B		Tools and Spare Parts		

Additional Notes: