



Electricity Specification 502

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Multi-way Service Distribution Boards

Contents

- 1 Introduction
 - 2 Scope
 - 3 Definitions
 - 4 General Requirements for Approval and Testing
 - 5 Requirements for Type and Routine Testing
 - 6 Technical Requirements
 - 7 Metering Requirements
 - 8 Testing Requirements
 - 9 Documents Referenced
 - 10 Keywords
- Appendix A

Approved for issue by the Policy Approval Panel

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MULTI-WAY SERVICE DISTRIBUTION BOARDS

1. INTRODUCTION

This specification covers the typical service distribution boards used by Electricity North West Limited, hereinafter referred to as Electricity North West, for providing connections to multiple occupancy premises. These connections will all be of the standard domestic 100A type and only the equipment described below shall be acceptable for use on Electricity North West's electricity distribution network.

2. SCOPE

This document specifies those distribution boards for use at 230/400V where Electricity North West is required to provide multiple 100A services within one building. It also specifies the metering requirements for distribution boards providing mixed 3 phase and single phase supplies.

3. DEFINITIONS

Approval: Sanction by the Circuits Policy 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.

ENATS: Energy Networks Association Technical Specification.

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 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.

Words: Words importing persons shall include firms and corporations; words importing the singular only, also include the plural, and vice versa where the context requires.

Work: All materials, labour and actions required to be provided or performed by the Contractor under the Contract.

Writing: Any manuscript, typewritten or printed statement under seal or hand as the case may be.

4. GENERAL REQUIREMENTS FOR APPROVALS AND TESTING

4.1 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 Plant Policy Manager, and receipt of a written agreement to the proposed change from the Plant Policy Manager.

4.2 Electricity North West Technical Approval

The Tenderer shall submit, with this Tender, proposals for testing which will demonstrate, to the satisfaction of the Circuits Policy 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 they consider will demonstrate, to the satisfaction of the Circuits Policy Manager, compliance with this specification. Acceptance of this evidence shall be at the discretion of the Circuits Policy Manager but will not be unreasonably withheld.

Approval shall be specific to a manufacturing facility and is not transferable to another site without the written approval of the Circuits Policy Manager. The supplier and product shall comply with all the relevant requirements of Electricity North West documents EPD311 and CP311.

4.3 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, they 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 Circuits 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 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 Circuits Policy 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 Circuits Policy Manager, be reasonably required for inspection and/or retention as quality control samples. The Circuits Policy Manager will confirm the requirement for samples at the time of Tendering.

The right is reserved for the Circuits 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 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: 2015 – Environmental Management Systems.

4.4 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 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 Circuits Policy Manager will, if requested, confirm his agreement to this prior to receipt of the information.

4.5 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 Circuits Policy 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 2002, 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 Circuits Policy Manager.

4.6 Minimum Life Expectancy

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

4.7 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.

5. 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.

5.1 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.

5.2 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.

6. TECHNICAL REQUIREMENTS

6.1 General

The following types of multi-way distribution board are permitted for installation on the Electricity North West network:

- Up to 3way without a fused incomer
- 4 way and above with a fused incomer

The number of ways represents the number of outgoing fuses per phase.

A list of the approved manufacturers can be found in Electricity North West Policy Document EPD307.

6.2 Incoming Cable

The distribution boards shall generally be for bottom cable entry, but have an option for side and top entry. Boards containing 4 ways or more shall be capable of accepting up to a 300mm² cable. Boards containing less than 4 ways shall be suitable for up to a 95mm² cable.

The incoming cable on the boards with 4 ways or more shall be terminated on the incoming fuse bases via mechanical connectors. The incoming cable on the boards with less than 4 ways shall be directly terminated on the busbars also via mechanical connectors.

6.3 Enclosure

The enclosure shall be manufactured from a suitable gauge sheet steel or alternatively from a robust fire-resisting insulating material. The steel enclosure shall be so constructed that all parts are permanently connected to the earth bar. If an insulated enclosure is provided it shall be suitably rigid and with no possible contact between live metalwork and any other metallic fastening or strengthening used within the unit. All types of enclosure shall have sufficient ventilation and be capable of wall mounting. The enclosure shall have a hinged door or lid (as an option this door or lid may be removable) and shall have a padlocking facility. The padlocking facility shall be capable of accepting a substation lock as detailed in Electricity North West Electricity Specification ES309.

The enclosure and components (excluding insulating parts) shall not require maintenance for a period of at least 20 years in a Category C2 environment as defined in EN ISO 12944-2. The preferred finish colour is Dark Admiralty Grey, colour 632 in BS 381c but other colours may be acceptable subject to approval by the Circuits Policy Manager.

6.4 Incoming Fuses and Busbars

The incoming fuse ways shall be of the fully shielded type having an IP 3XC rating conforming with ENA TS 37-4. Fuse links will be in accordance with ENA TS 12-8 and BS 88 for J type fuses. Typically, the incoming fuse ratings shall be 315A for units up to 5-way, fuse size to be agreed dependent on busbar rating for units between 5 and 10 way and 500A for the 10 way unit and above (max 20). (These ratings are for guidance only any queries should be directed to the Circuits Policy Manager.)

It shall be possible to use solid links, mounted in insulated fuse carriers, in place of fuses.

The busbars shall be fully insulated, ensuring no access to any bare live metalwork, with the fuse carriers in place. It shall be possible to make outgoing connections without gaining access to any live metalwork i.e. it shall all be shrouded or insulated. The busbars shall be as per ENA TS37-4 Table 4 and match the rating of the unit and incoming connection type. Typically, the busbar ratings are rated at 200A for units directly busbar connected (max 5 ways) and 315 or 500A for units that are J Type Fuse Connected as shown in ENA TS 37-4 Table 4. The normal ratings of 315A or 500A are for units between 5 and 10 way and 500 A for units 10 way and above. All types are subject to Approval by the Circuits Policy Manager.

6.5 Outgoing Cut-outs

The service cut-out shall be of 100A rating. The cut-out shall be in accordance with the requirements of BS 7657 and Electricity North West Electricity Specification ES332.

Each service cut-out shall have a suitable facility for identification of the outgoing circuit. This identification shall include the fuse rating as per ES212.

Every outgoing way shall have an individual fuse link to allow the de-energisation and isolation of its and only its circuit. Service fuse links shall be in accordance with Electricity North West Electricity Specification ES333.

Normally the fuse link rating shall be of 100A rating. In certain circumstances a smaller value of fuse link (80A, 60A) may be installed.

6.6 Outgoing Connections

All outgoing cut-outs shall be suitable for a maximum single phase service cable of 35mm² Solid Aluminium Core Polymeric Insulated SCNE or CNE. The distribution board shall provide adequate facilities to enable all phase, neutral and earth outgoing cables to exit via the top of the board, even with a top entry incoming cable.

Typically the interconnecting cable between the cutout, meter and switchfuse shall be by means of single core PVC insulated PVC sheathed cables in accordance with BS 6004, except for the earthing connections which may be unsheathed. The cable insulation shall be colour coded, brown for phase and blue for neutral, each with a grey oversheath. Earth cable shall be single insulated and colour coded green/yellow.

6.7 Neutral and Earth Bars

The distribution board shall be suitable for both PME and non-PME connections. The board shall have a suitably rated neutral bar and a separate suitably rated earth bar, with an interconnecting link of equal rating for provision of PME. Each of these bars shall have, as a minimum, the same number of ways as the outgoing fuses and each way shall be suitable for a 35mm² cable.

7. METERING REQUIREMENTS

If the board has a CT metered outgoing way the following requirements shall be met:

- All CTs, potential fuses, neutral link and secondary wiring shall be located on the same physical side of the board as the metered customer's equipment.
- The electrical connection for the potential fuses shall be after the customer's main fuse and before the location of the CT.

- All metering potential fuses including main incoming, outgoing and metering potential fuses shall be clearly labelled. These fuses shall comply with BS88 and have a 400V 80kZ breaking capacity.
- All fuse carriers shall be of 16A rating and mounted as close as possible to the primary conductors
- The potential fuses shall be mounted in a suitable space on the outgoing customer side of the board and be safely accessible with the primary circuit energised.
- The CTs shall be securely mounted within the board utilising a form of solidly fastened bracket with the CT fastened to it via tie wraps.
- The CTs shall be 400/5, Class 0.5S with a rating of 15VA.
- CT rating labels shall be visible. This shall be achieved by providing a copy of the labels on either the inside of the multi-way board door or the inside cover of the pilot termination box.
- The wiring for the CT secondary circuit shall be 2.5mm² stranded copper.
- The earth connections on the CT need to be visible. This shall be achieved by applying an earth to the D10, D30 and D50 connections at the terminal rail in the pilot box, via an isolatable earth link.
- There shall be a pilot cable termination box attached to the main board. This shall have a sealable cover and contain a 12 way termination rail, preferably utilising Wago terminals or equivalent.
- In order to be able to carry out testing, when energised, safe access is required to the customer's primary conductors; this access shall be suitable to accept a clamp type meter.
- All wiring and ferruling shall be in accordance with the diagram shown in figure 1.

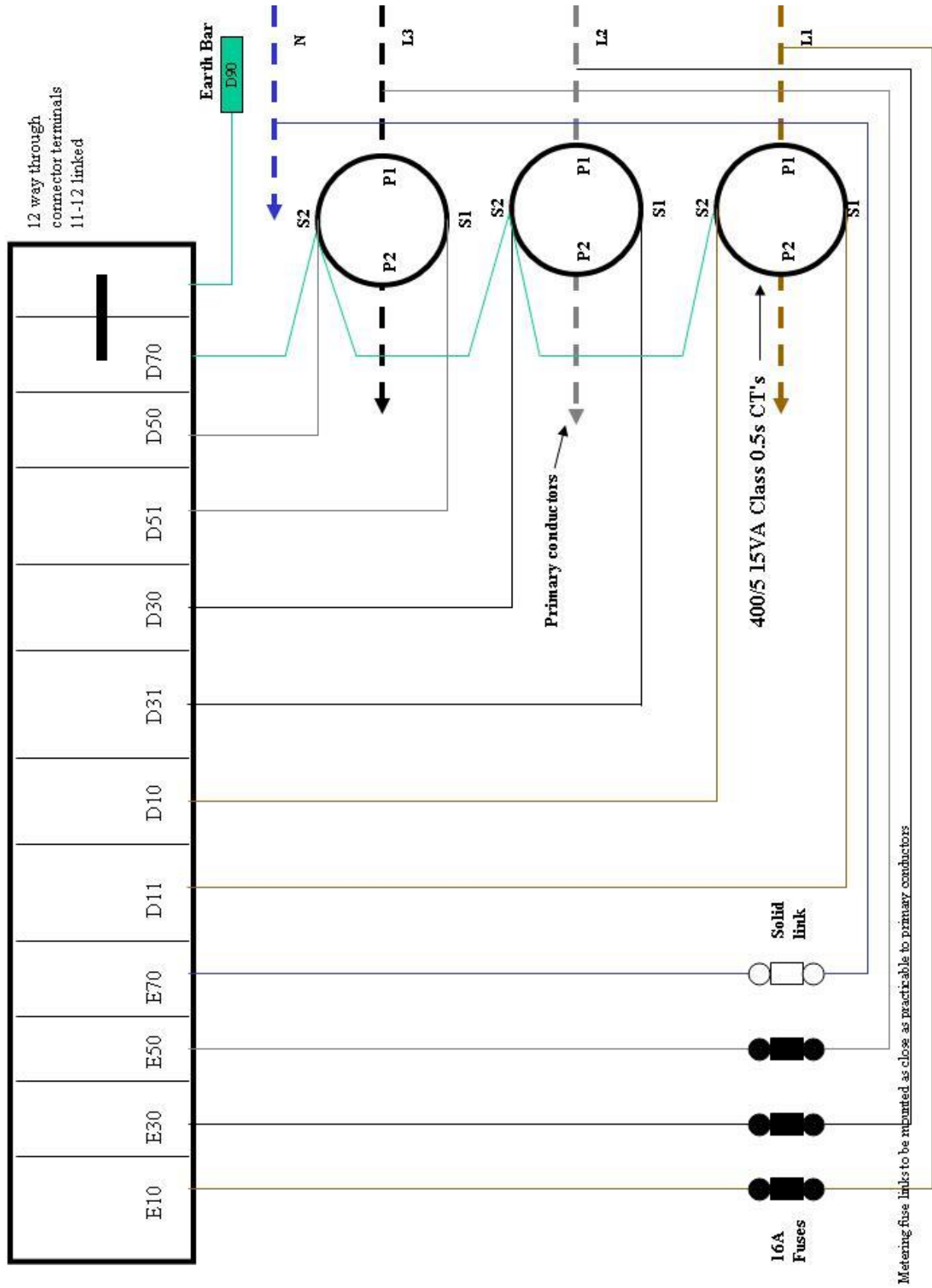


Figure 1 CT Wiring Diagram

8. TESTING REQUIREMENTS

For all the tests normal service conditions shall be simulated including the mounting of the board on temporary supports. All tests shall be carried out in accordance with the appropriate standards as detailed below.

The following tests shall be carried out:

- Verification of temperature rise limits as per clauses 9.2 and 10.10 of ENA TS 37-4
- Verification of dielectric properties as per clause 10.9 of ENA TS 37-4
- Verification of short circuit withstand strength as per clause 10.2.101 of ENA TS 37-4.
- Verification of degree of protection as per clause 8.2 of BS EN 61439-1.

An additional test confirming the protection against impact shall also be carried out. The enclosure shall be capable of withstanding an impact of 2 Joule.

Where fitted, the CT wiring shall be tested. The testing shall confirm the polarity of the CT and associated wiring. All results of these tests shall be provided with the unit.

9. DOCUMENTS REFERENCED

Health and Safety at Work Act 1974

Control of Substances Hazardous to Health Regulations 1988

Manual Handling Operations Regulations 1992

ISO 9000 Quality Systems - Guide to Dependability Programme Management

EN ISO 12944-2 Paints and Varnishes. Corrosion Protection of Steel Structures by Protective Paint Systems. Classification of Environments.

BS EN 14001 Environmental Management Systems Specification with Guidance For Use

BS EN 60439-5 Low Voltage Switchgear and Controlgear assemblies. Part 5: Particular Requirements for assemblies intended to be installed outdoors in public places – Cable Distribution Cabinets (CDCs) for power distribution in networks

BS 88 Cartridge fuses for voltages up to and including 1000V ac and 1500V dc

BS 381C Specification for colours for identification, coding and special purposes.

BS 6004 Specification for PVC insulated cables (non-armoured) for electric power and lighting.

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

BS 7671 Requirements for Electrical Installations

ENA TS 12-8	Application of Fuse Links to 11kV/415V Underground Distribution Networks
ENA TS 37-4	Multi Service Distribution Boards
EPD212	Supplies to Multi-Occupied Premises
EPD307	Equipment Approved for Use in Electricity North West
ES212	New Whole-Current-Metered Connections up to 60kVA
ES309	Locks for Substations and Associated Plant
EPD311	Approval of Equipment
ES332	100A House Service Cut-Outs ES333LV Cartridge Fuse Links
CP311	Equipment Approval Process

10. KEYWORDS

Distribution, Board, Rising Main, Service

APPENDIX A

INSTALLATION OF MULTI-WAY SERVICE DISTRIBUTION BOARDS

A1. GENERAL

The installation of Multi-Way Service Distribution Boards shall be in accordance with the conditions in this Appendix and Electricity North West Electricity Policy Document EPD212. The installer of the distribution board shall be responsible for the installation of the outgoing tails, trunking, metering blocks and reserving adequate space for the installation of the meters and consumers switch-fuses. All outgoing fuseways shall be marked or identified and each consumer's switch-fuse shall be identified to the postal address.

A2. CABLING

The interconnecting cables (tails) between the outgoing fuseways and the metering equipment and from there to the consumer's equipment (located at the meter position) shall be in accordance with section 6.6 and have stranded copper conductors of minimum cross-section:

25 mm² for 100 A service fuse links
16 mm² minimum for connection between Electricity North West earth terminal and the consumer's main earthing terminal.

The maximum length of tail between the distribution board and the meter shall be 3m. The same numbers of ways as there are known consumers shall be 'tailed out' to metering blocks for phase, neutral and earth. The metering blocks shall be 100A rated insulated blocks, (typically as supplied by BICC, Lucy, etc) for phase and neutral; earth connections may use uninsulated blocks. Blocks shall be labelled according to corresponding fuseway. The known consumers shall take account of future known phased development. The Electricity North West cut out fuse shall be removed and the fuse carrier sealed in position with an approved seal.

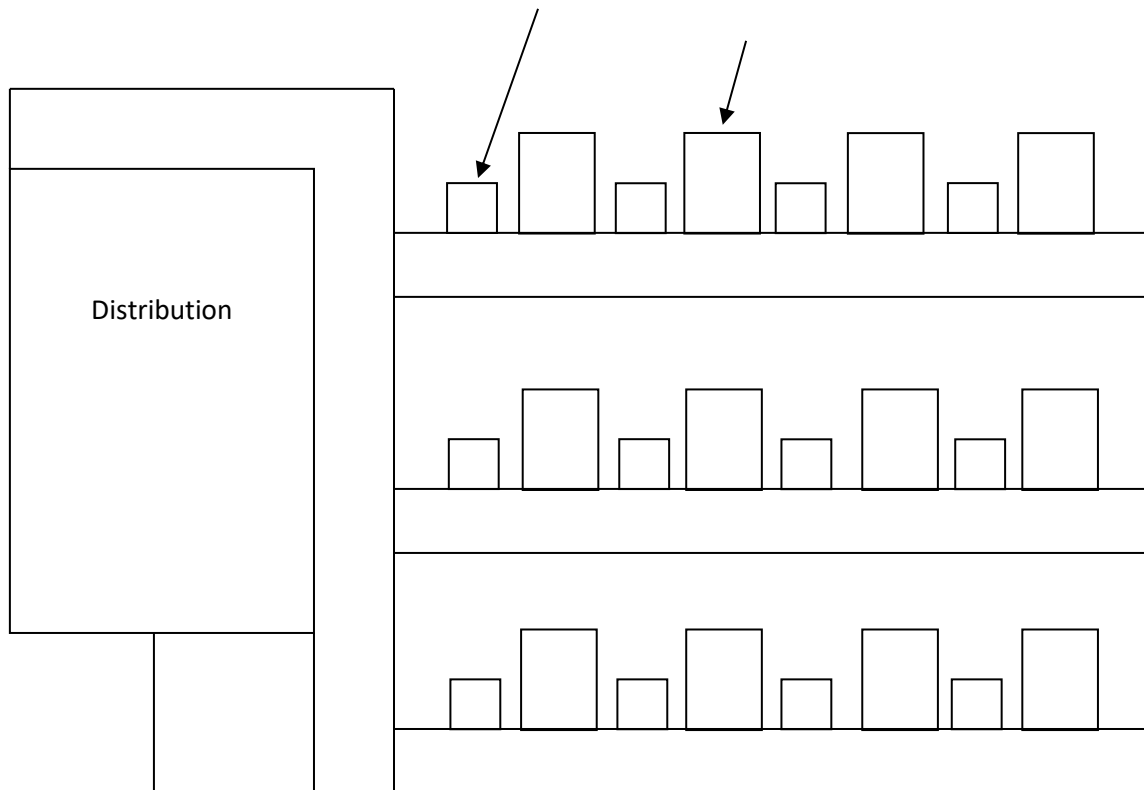
A consumer's busbar chamber shall not be connected directly to Electricity North West equipment. A consumer owned switch-fuse shall be installed to provide the necessary isolation.

A3. TRUNKING

The outgoing cabling from the distribution board shall be installed in suitably sized trunking to provide security and mechanical protection. The installer shall ensure that adequate space is reserved around the distribution board to enable the trunking to be fitted. The trunking shall be sized such that with the maximum number of Electricity North West and consumer cables installed they maintain the necessary rating in accordance with BS 7671. The trunking will be either metal or plastic, as long as it provides the necessary mechanical protection, provides a means to seal all access points with an approved seal and, if plastic is made of a suitable fire-resistant material. The trunking shall be slotted by the installer to ensure the meters fit flush with it. If metal trunking is used the slots for the meter tails shall be adequately bushed so as to protect the tails.

A4. SPACE REQUIREMENTS

The installation of the tails, blocks and trunking shall take account of the space required for meters and consumer's switch-fuses. A typical installation based on a standard domestic tariff is shown in figure 2 with typical spacing required for meters and switch-fuses. Where two rate tariffs are used additional space may be required for separate timeswitch / teleswitch, off-peak contactors and additional switch-fuses. The arrangements for these types of installations depend on how the electrical contractor has wired back to the supply point and the equipment installed, hence the space required to be reserved shall always be confirmed with the electrical contractor. The installation shall always reserve enough space for the same number of consumers as have been tailed out. While the measurements shown in figure 2 provide some guidance these shall always be confirmed on site, as they can vary depending on type of supply and type of consumer's switch-fuse.



Meter Space to be reserved: 200mm(h) x 200mm(w)

Switch-Fuse space to be reserved: 400 mm(h) x 300mm(w)

Figure 2 – Typical Distribution Board Installation

APPENDIX B

SELF CERTIFICATION CONFORMANCE DECLARATION

SECTION BY SECTION CONFORMANCE WITH SPECIFICATION

The manufacturer shall declare conformance or otherwise, section by section, using the following levels of 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.

Assessor

Manufacturer:			
Product/Service Description:			
Product/Service Reference:			
Name:	Company:	Signature:	Date:

Section	Section Topic	Conformance Code	Remarks (Must be completed if Conformance Code is not C1)
3	Scope		
4.1	Product not to be Changed		
4.2	Electricity North West Technical Approval		
4.3	Quality Assurance		
4.4	Formulation		
4.5	Identification Markings		
4.6	Minimum Life Expectancy		
4.8	Product Conformity		
5.1	Requirements for Type Tests at the Supplier's Premises		
5.2	Requirement for Routine Tests at the Supplier's Premises		
6.1	General		
6.2	Incoming Cables		
6.3	Enclosures		
6.4	Incoming Fuses and Busbars		
6.5	Outgoing Cut-outs		
6.6	Outgoing Connections		

6.7	Neutral and Earth Bars		
7	Metering Requirements		
8	Testing Requirements		

Additional Notes: