



Electricity Specification 212

Issue 4 March 2015

New Whole-Current-Metered Connections up to 60kVA

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Approved for issue by the Technical Policy Panel

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Issue and Amendment Summary

Amendment No. Date	Brief Description and Amending Action
0 31/03/03	Issue 1 First Issue. Prepared by: P. Leather. Authorised by: Paul Whittaker Policy & Standards Manager
1 23/09/05	Issue 1 Mechanical protection for exposed cables added. Other minor corrections. Prepared by: P. Leather Approved by the Technical Policy Panel and signed on its behalf by Simon Rushton:
2 24/05/06	Issue 1 3.6.1 - minimum height above ground level of outdoor meter cabinet corrected to 500mm. Prepared by: P Leather Approved by the Technical Policy Panel and signed on its behalf by Simon Rushton:
0 21/09/07	Issue 2 Merged with ES221 - 100A Service Terminations; 4.6.4 amended to permit longer cable lengths within buildings. Prepared by: P Leather Approved by the Technical Policy Panel and signed on its behalf by Simon Rushton:
0 15/07/09	Issue 3 Company names changed. Jointing to be in accordance with CP411LV. Prepared by: P Leather Approved by the Technical Policy Panel and signed on its behalf by Simon Rushton:

Amendment No. Date	Brief Description and Amending Action
1 08/12/10	Issue 3 Ownership of OSVCs changed. Colouring of tails clarified in line with MOCOPA. Prepared by: P Leather Approved by the Technical Policy Panel and signed on its behalf by Paul Whittaker:
2 04/08/11	Issue 3 Use of small-capacity three-phase services aligned with ES213 and CP258. Prepared by: P Leather Approved by the Technical Policy Panel and signed on its behalf by Paul Whittaker:
0 04/03/15	Issue 4 New template applied. Emphasis in section 4.14 on non-provision of or responsibility for disconnectors. Minor editorial corrections. Prepared by: P Whittaker Approved by the Technical Policy Panel and signed on its behalf by Paul Whittaker:

NEW WHOLE-CURRENT-METERED CONNECTIONS UP TO 60kVA

1. INTRODUCTION

Electricity services with capacity up to 100A are provided to very many premises, the majority being domestic premises. Standard layouts of service termination equipment and service cables are required, in order to ensure adequate safety and security in the accommodation of service cables, cut-outs and meters. By applying these standards, Electricity North West Limited (Electricity North West) expects installations, which it adopts, to comply with the Electricity Safety, Quality and Continuity Regulations 2002 as amended (ESQCR) and to facilitate compliance with the Electricity at Work Regulations 1989.

2. SCOPE

This Electricity Specification (ES) details the requirements for new connections and temporary connections with ratings up to 100A and with whole current metering directly connected to the Electricity North West electricity distribution network (The Network). This ES covers connections, which are intended for adoption by Electricity North West, installed both by itself and by Independent Connection Providers. Where services are substantially altered, the alterations shall be made to comply with this ES.

This document shall be read in conjunction with ES210.

3. GENERAL

- 3.1 Any variation to this specification shall be agreed, in writing, with the Planning Policy Manager, Network Strategy directorate, Electricity North West prior to any design being accepted.
- 3.2 The Owner's Works shall comply with the requirements of ES210.
- 3.3 It is a requirement that all work shall be carried out strictly in accordance with the provisions of all relevant legislation and industry best practice.
- 3.4 The Owner's Works shall comply in all respects with the provisions of Regulations 3 (1), 6, 7, 8 (1), 8 (3), 9, 12 to 14, 21 and 22 of the ESQCR and with the Electricity at Work Regulations 1989.
- 3.5 Users will be connected to and metered at low voltage (LV) of 400/230 volts, unless otherwise agreed in writing with Electricity North West.
- 3.6 Any group of services supplied from the same three-phase distribution main shall be so connected that the load is balanced between the three phases. Electricity North West reserves the right to refuse to adopt Owner's Works having excessive phase imbalance.
- 3.7 The Network is solidly earthed and makes use of CNE conductors.
- 3.8 The cores of multicore LV mains shall not be 'bunched' or 'paired' to increase the current rating, improve voltage regulation or to reduce the loop impedance.

- 3.9 The maximum Prospective Short Circuit Current, at the exit point to the User, is not expected to exceed the following values:

Three phase = 27kA

Single phase = 16kA

4. CONNECTION ARRANGEMENTS

4.1 General

This document specifies 1- and 3-phase underground service cable connections for domestic and small commercial users within the following limitations:

- The maximum cut-out fuse size shall be 100A.
- The maximum single-phase supply capacity shall be 20kVA.
- The maximum three-phase supply capacity shall be 60kVA.
- No three-phase service shall be installed, unless the demand is to exceed 20kVA or the User has a particular requirement for a three-phase connection.
- The service cable length shall not normally exceed 30m, measured from the cut-out to the point of connection to Electricity North West's LV main. Lengths in excess of 30m shall be installed only with the written agreement of the Compliance and Performance Manager, Connections directorate, Electricity North West, or his delegated representative.
- The calculated voltage drop from the point of connection to Electricity North West's LV distributor to the cut-out, at the maximum allowable load, shall not exceed 2% and 7% overall (from the substation LV busbars). A 415/240V substation busbar voltage shall be used in all calculations.

4.2 Environmental Conditions

- 4.2.1 The equipment shall be designed and constructed to allow operation in environments defined in Clause 6 of BS EN 60947-1 as follows:

- 4.2.1.1 Equipment that is housed in a controlled environment shall be suitable for operation in Pollution Degree 2.

- 4.2.1.2 Equipment that is not housed in a controlled environment shall be suitable for operation in Pollution Degree 3.

- 4.2.2 All equipment shall be protected from the deposit of excessive levels of dust and from the influx of water or other substances liable to have a harmful effect.

4.3 Service Cable

For a PME connection the service cable to be used shall be 35mm² 600/1000V, single-core, solid-aluminium phase-core, XLPE-insulated, with helical concentric copper neutral/earth, or 25mm² 600/1000V, three-core, solid-aluminium phase-core, XLPE-insulated, with helical concentric copper neutral/earth, in either case complying with the requirements of ES400C8.

Where it is not appropriate to provide a PME connection a SNE connection may be provided using a split concentric neutral/earth (SCNE) service cable. The cable to be used shall be either 35mm² 600/1000V, single-core, solid-aluminium phase-core, XLPE-insulated, with a concentric layer of insulated copper wires (neutral) and bare copper (earth), or 25mm² 600/1000V, three-core, solid-aluminium phase-core, XLPE-insulated, with a concentric layer of insulated copper wires (neutral) and bare copper (earth), in either case complying with the requirements of ES400C8.

Occasionally, it may be appropriate to install an aerial service cable for a SNE connection. In such a case, the cable to be used shall be 16mm² 600/1000V, single-core, stranded-copper phase-core, XLPE-insulated, with a concentric layer of insulated copper wires (neutral) and bare copper (earth), complying with the requirements of ES400C8.

No other type or cross section of cable is permitted.

4.4 Earthing Conditions

All installations are to comply with EPD333 and EPD332. Where appropriate a label shall be fitted to each cut-out indicating that the system is PME (see 4.16.2).

4.5 Cable Installation and Jointing

- 4.5.1 The installation of underground service cables shall comply with ES400E4. All Low Voltage jointing shall be undertaken in accordance with CP411 Part 1.
- 4.5.2 Each underground service cable shall be laid within the curtilage of the property to be serviced, from the boundary with the adopted (or to be adopted) road or service strip. Each single phase underground service cable shall be drawn into a continuous duct, laid from the boundary to a point adjacent to the service position. The duct shall be red, have a minimum internal diameter of 32mm, comply with ES400D4 and shall be installed, where appropriate, in accordance with Electrolink No.5.
- 4.5.3 No more than four single-phase services or two three-phase services shall be connected within any one service-cable-to-main joint.
- 4.5.4 Service cables shall enter cut-outs or any protective lower enclosures from below and cable sheaths shall remain intact except on those parts of cables, which are wholly contained within cut-outs or protective lower enclosures.

4.6 Service Position

- 4.6.1 The preferred arrangement for a service installation is in an outside viewing cabinet (OSVC). However, due regard shall be paid to the long term security of the installation.

- 4.6.2 Accordingly, services shall normally be terminated on the external walls of buildings within OSVCs, complying with the requirements of ENA TS 12-3. The size selected will depend upon whether the service is 1- or 3-phase and upon the requirements of the Meter Operator, who shall be consulted. Where an OSVC is used, with the service cable entering via the wall cavity, the cable entry duct (See 4.5.2) shall continue into the wall cavity, to enter the OSVC vertically from below. Alternatively, in the case of a single-phase cable, the duct may enter the OSVC externally. In this case, the final part of the duct, comprising a slow bend and riser to enter the OSVC, may be of the same colour as the OSVC. The radius of any bend shall be not less than the bending radius of the three-phase service cable. (See sub-sections 4.3 and 4.5.) The duct, at its end adjacent to the service termination, shall be sealed to prevent the flow of gas. The height of the base of the OSVC above ground level shall not be less than 500mm or more than 800mm. The exposed part of the duct between ground level and the OSVC shall be straight, vertical and secured to the wall by a saddle or cleat no more than 200mm below the base of the OSVC, with an additional saddle or cleat, where the total exposed length of the duct exceeds 500mm. Further guidance is available in Electrolink No. 5.
- 4.6.3 Where an OSVC is to be used, the safety issues associated with the proximity of any nearby sited gas service cabinet and gas service pipe shall be considered and appropriate precautionary measures taken.
- 4.6.4 In cases where an outdoor position cannot be accommodated (eg in small terraced properties), services may be terminated in indoor positions, or inside attached garages. Service positions in garages shall preferably be on side walls, rather than on rear walls, where the risk of direct impact by vehicles is greater. The length of service cable within the building shall be as short as is reasonably practicable. The cable shall be installed through a continuous duct, as described in sub-section 4.5.2, finishing at least 20mm above the finished floor level and sealed at that end to prevent the flow of gas. Where the total length of cable within the building exceeds 2m, the duct shall have a minimum internal diameter of 100mm and be of adequate strength against impact and crushing or otherwise mechanically protected. The length of cable, between the sealed duct end and the termination, shall not exceed 2m.
- 4.6.5 Care shall be taken with the installation to minimise the risk of accidental damage. All surface-mounted cables outside buildings or where vehicles have access (eg inside garages and barns), below a height of 1.8m, shall be continuously protected either by plastic ducts complying with ES400D4 or by plastic cable guards, complying with ES400G1. Elsewhere, straight lengths of cable exceeding 1m, below a height of 1.8m, shall be similarly protected. Straight runs of cable shall be either vertical or horizontal. No bending radius shall be less than the minimum specified. Ducts shall be fixed to walls with plastic saddles, such that the ducts are adequately supported at intervals not exceeding 300mm.
- 4.6.6 Indoor service terminations shall be installed such that the meter(s) may be mounted at a height not less than 1.0m and not more than 1.35m, above the floor level, with at least 750mm clear access in front of the meter. Service terminations shall not be positioned in or under bathrooms, toilets, adjacent to sinks or in any other position where they may be subjected to water contact. The location shall provide sufficient access to the meter and adequate space to ensure the safety of any person who needs to work on it. The agreed location shall be such that access to the service termination and meter position, including that required for meter reading, will not be restricted by any future construction work.

- 4.6.7 In certain cases it will be necessary to make provision for a prepayment meter. The preferred arrangement is that a location is provided within the User's premises directly behind the OSVC. The location of the prepayment meter shall permit the installation of a standard medium size wood chipboard meter board of size 575 mm x 375 mm x 18 mm complying with BS EN 312. Interconnecting leads shall be mechanically protected and the route for the leads shall be approved by Electricity North West before installation.
- 4.6.8 Each exit point, for an individual User, shall be protected by individual fuse link(s) to allow the de-energisation and isolation of only that exit point. No more than two exit points shall be connected to any one phase of a 100A service.
- 4.6.9 All equipment, except metering equipment and OSVCs, where installed, from the Network up to the outgoing terminals of the cut-out shall be adopted by and maintained by Electricity North West. Metering equipment is the responsibility of the appropriate Meter Operator and OSVCs form part of the building into which they are installed and become the responsibility of the owner of the building.

4.7 Looped Services

Looped services shall not be used.

4.8 Cut-out Board

All termination equipment including the metering equipment shall be fixed to a wood chipboard board complying with BS EN 312. Typical dimensions of the board are 505mm × 340mm. Other dimensions of boards may be required, in order to provide adequate accommodation for equipment, to suit building requirements, or to fit the standard sizes of OSVCs. All cut-out boards shall have a minimum thickness of 18mm.

Where an OSVC is installed with an external cable entry duct, an additional angled mounting board (also wood chipboard complying with BS EN 312) for the cut-out, shall be securely fixed to the cut-out board. The additional mounting board shall have typical dimensions of 300mm × 140mm wide and be mounted with its lower end supported away from the cut-out board at an angle of 25° to the vertical.

In general a single-phase termination shall be accommodated on a small cut-out board and a three-phase termination on a medium or large board.

4.9 Cut-out

All cut-outs shall have a continuous rating of 100A and shall comply with the requirements of ES332. Live cut-outs shall be sealed. As soon as an installation is complete, permanent seals shall be applied, using approved sealing pliers, seals and sealing wire, in accordance with the Meter Operator Code of Practice Agreement (MOCO PA), or CP576, as appropriate. These permanent seals will normally be applied by the meter operator, after installation of the meter(s).

4.10 Fusing

Cut outs shall contain fuses conforming to the requirements of Type IIB of BS HD 60269-3 and ES334. Fuse link ratings of 80A and 60A are to be used where circumstances dictate that the fuse link should be sized below the 100A general standard. In particular, where a busbar extension to a single pole fuse base and carrier is installed, the total rating of the service fuse links shall not exceed 120A. If two services are to be sub-fused from a master fuse link, each service shall be fused at 60A and the master fuse link shall be rated at 100A. Reference shall also be made to CP331, Section 8.

4.11 Supplier & Meter Operator

The third party connector shall be responsible for ensuring that a Supplier is appointed on behalf on the User. The metering requirements shall be specified by the appointed Meter Operator.

4.12 Connection between Cut-out and Meter

For single-phase service terminations a pre-formed encapsulated meter security block shall be installed to connect the outgoing terminals of the cut-out to the incoming terminals of the meter. Suitable blocks are either straight or angled (for use with the cut-out mounted on a ramped mounting board, as described in 4.8). In certain circumstances it is permissible to omit the meter security block, but only with the prior permission of Electricity North West.

At three-phase terminations and otherwise where the preferred security blocks are not used, interconnecting cable between the cut-out and meter shall be stranded copper of 25mm² cross-section. Connections to time switch motors and their earthing leads shall be of stranded copper of 10mm² cross-section and the connections to the switching coil of a two rate meter shall be of stranded copper of 4mm² cross-section.

Under the terms of the MOCOPA, the responsibility for this connection between the cut-out and the meter rests with the Meter Operator. It shall be noted, however, that in addition to the use of colour coding of the insulation (and sheaths) of these cables (See 4.15.4.), they will be marked, "L1", "L2", "L3" and "N", as appropriate.

4.13 Earth Terminal

The connection of the User's installation to any earthing terminal connected to the Network shall be in accordance with EPD332.

The ESQCR prohibit the use of Protective Multiple Earthing (PME) terminals in caravans and boats. Similarly, in other situations such as for temporary connections to building sites, where the integrity of equipotential bonding of extraneous metalwork cannot be relied on, PME terminals shall not be provided, nor shall any metalwork connected to the supply system neutral remain exposed. The User's attention shall be drawn to his own need to provide earthing and/or RCD protection.

In all other situations, a suitably rated earthing terminal block shall be installed to facilitate the bonding of the User's installation's extraneous metalwork to the incoming earth. This earthing terminal block shall have a minimum of three terminals.

4.14 Disconnectors

It is no longer Electricity North West's policy to provide and install disconnectors between the meter and the User's equipment at connections that are within the scope of this document.

Where the electricity supplier, meter operator or User installs a disconnector between the meter and the User's equipment, Electricity North West will neither accept ownership of nor responsibility for that disconnector.

Where disconnectors are shown on the arrangement drawings listed in Appendix A, they are owned by and are the responsibility of the installer (i.e. the electricity supplier, meter operator or User).

4.15 Interconnection between Service Equipment and User's Equipment

- 4.15.1 All interconnecting wiring and termination equipment shall comply with the current edition of BS 7671.
- 4.15.2 Interconnecting cables between the service equipment and the User's equipment shall not normally exceed 2m in length. Mechanical protection shall be provided where necessary. Any length in excess of 2m must be approved by Electricity North West before installation.
- 4.15.3 Interconnecting cables, which shall be provided by the User, shall be XLPE insulated and sheathed stranded copper of 25 mm² cross section, complying with BS 7889, except for the earth lead connection which shall be 16mm² insulated stranded copper.
- 4.15.4 In a single-phase installation, interconnecting cable insulation shall be colour coded, brown for phase and blue for neutral. In a three-phase installation, the insulation of the neutral cable shall be blue and the insulation of phase cables may all be brown, or alternatively brown, black and grey. Cable sheaths may be the same colour as their insulation or White, but otherwise may not be brown, black, grey, red, yellow, blue or green/yellow. Earth cable shall be single insulated and colour coded green/yellow.

4.16 Labelling of Equipment

The following labels shall be attached to the termination equipment. Labels and their means of fixing shall be of such quality that they remain legible and in place for a minimum of 20 years.

4.16.1 Cut-out

At every service termination to be adopted by Electricity North West as part of its electricity distribution network, a label, with approximate dimensions of 50mm × 30mm and black lettering on a white background, shall be attached to the cut-out. This label shall read:

Electricity
Distribution Network
provided by
Electricity North
West Ltd

4.16.2 Cut-out (PME terminal available)

Only where the connection is PME, a label, with approximate dimensions of 50mm × 30mm and red lettering on a white background, shall be attached to the cut-out. This label shall read:

PME SYSTEM
EARTHING
TERMINAL

4.16.3 Cut-out (no earthing terminal provided)

Only where no earth connection is provided, a label, with approximate dimensions of 50mm × 30mm and white lettering on a red background, shall be attached to the cut-out. This label shall read:

WARNING!
NO EARTHING TERMINAL HAS
BEEN PROVIDED; A SEPARATE
CONSUMER EARTHING
TERMINAL MUST BE
PROVIDED.
DO NOT ATTEMPT
TO MAKE A PME CONNECTION.

4.16.4 Fuse Link Carrier

A label indicating the rating of the service fuse link and its voltage rating shall be attached to the fuse link carrier. This label shall have white lettering on a black background.

4.16.5 Meter Security Block

A label with approximate dimensions of 65mm × 30 mm, with red lettering on a white background shall be attached to the meter security block, reading:

WARNING!
INTERFERENCE WITH THIS
INSTALLATION IS ILLEGAL
AND COULD CAUSE
DEATH OR INJURY.

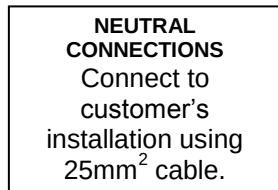
4.16.6 Earth Terminal (where provided)

A label with approximate dimensions of 50mm × 40mm, preferably with black lettering on a silver background, shall be attached adjacent to the earth terminal, reading:

EARTH
Connect to common earth
on customer's installation
only after ensuring
satisfactory cross bonding
of services. Use 16mm²
earth cable.

4.16.7 Neutral Block (where installed)

A label with approximate dimensions of 35mm × 25mm, preferably with black lettering on a silver background, shall be attached to the neutral block, reading:



Note: The use of Arial font in the illustrations of labels in this subsection does not preclude the use of existing stocks of labels printed in Times New Roman.

4.17 Arrangement of Equipment

4.17.1 Typical arrangements of termination equipment are shown in the drawings listed in Appendix A. Optimum use shall be made of space on the cut-out board, giving due regard to the bending radii of cables. The following guidelines shall always be followed.

The service cable shall enter the cut-out from below.

Where installed, any disconnecter shall be connected to the outgoing terminals of the metering equipment.

The User's tails shall be connected directly to equipment mounted on the cut-out board.

This equipment shall be:

- a) a meter, and, where separately provided, a timeswitch or teleswitch; or
- b) where fitted, a disconnecter; or
- c) where there is a need to connect more than one set of User's tails, insulated connector blocks.

4.17.2 User's equipment mounted on the cut-out board in an OSVC shall be restricted to either a disconnecter or a single switchfuse, controlling a cable to a remote consumer unit, eg in a first-floor flat. User's equipment shall not be mounted on a cut-out board in any other situation. No other item of User's equipment shall be mounted on any cut-out board.

5. EQUIPMENT RECORDS

The Installer shall provide records of all services installed, using Form C of ES210 and marked upon the latest available edition of the Ordnance Survey map for the area, at 1/500 scale with any relevant detail shown on 1/250 enlargements. The colour codes and symbols to be used for marking shall comply with CP012.

6. DOCUMENTATION

Documentation, ie Health and Safety File, operating manuals and commissioning test results, shall be as described in ES210.

7. DOCUMENTS REFERENCED

6.1 Non - Electricity North West documents

Non - Electricity North West users of this document should note that Electricity North West is not able, under any circumstances, to provide copies, in part or whole, of any Non - Electricity North West documents referenced (e.g. ENA Technical Specifications, British Standards, etc) due to copyright restrictions. All third parties will need to purchase their own copies of all such documentation.

The Electricity Safety, Quality and Continuity Regulations 2002 as amended (ESQCR)

The Electricity at Work Regulations 1989

Meter Operators' Code of Practice Agreement (MOCOPA)

BS HD 60269-3:2010 +A1:2013, BS 88-3:2010	Low-voltage fuses. Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications). Examples of standardized systems of fuses A to F
BS 7671	Requirements for Electrical Installations (IET Wiring Regulations)
BS 7889	Electric cables. Thermosetting Insulated, Non-armoured Cables with a Voltage of 600/1000V for Fixed Installations
BS EN 312	Particleboards. Specifications.
BS EN 60947-1	Specification for Low Voltage Switchgear and Control Gear
ENATS 12-3	Outdoor Meter Cupboards

6.2 Electricity North West documents

EPD332	Customer Installation Earthing
EPD333	Supply System Earthing
CP012	Electricity Geographical Information System (GIS)
CP331	Protection of LV Distributors and Distribution Transformers
CP411 Part 1	LV Jointing
CP576	Sealing of Service Termination Equipment
ES210	General Specification for Third Party Constructed New Connections, Extensions and Alterations
ES332	100 A House Service Cut-Outs
ES334	HV and LV Fuses

ES400C8	LV Service Cables
ES400D4	Plastic Ducts, Conduit and Accessories
ES400E4	Installation, Commissioning and Repair of Solid Type Underground Cables Operating on the LV and 6.6/11kV Systems and the Restoration of Excavated Areas
ES400G1	Cable Guards
Electrolink No.5	Outdoor Meter Reading Facilities

8. KEYWORDS

Connection; cut-out; disconnector; earth; fuse; meter; PME; service.

APPENDIX A

ARRANGEMENT OF TERMINATION EQUIPMENT

Drawing No.	Title
900000-53-068	Single Phase Termination
900000-53-071	Single Phase Termination Using Meter with Integral Disconnect
900000-53-072	Single-Phase Termination without Earth Terminal (for Caravans, Boats, Building Sites)
900000-53-067	Three Phase Termination (Multi-Rate Tariff)
900000-53-066	Three Phase Termination (Single Rate Tariff)
A3 - 018/02/E	Standard Meter Cupboard (Small) for External Reading and External Cable for Conventional Brick Structures with Cavity