Installation and Records

Framework for underground networks in UK Power Networks

Appendices for ENA/OFGEM Engineering Recommendation G81 Generic Documents:

Part 3:
Installation and Records framework for low voltage housing development underground networks and associated, new, HV/LV distribution substations.

Part 6:
Framework for installation and records of industrial and commercial underground connected loads up to and including 11kV

Originator:	Hilary Grinter	**Date:**	04/02/2011
Approved By:	Gareth Davidson	**Approved Date:**	11/02/2011
Review Date:	11/02/2014		

This document forms part of the Company's Integrated Business System and its requirements are mandatory throughout UK Power Networks. If you have any queries about this document please contact the originator of the current issue.

Version	Date	Details	Originator
1.0	17/12/2004	Three area documents combined and revised	Paul Abreu
2.0	07/08/2007	Document substantially re-written	Hilary Grinter
3.0	25/10/2010	New company information	Toni Calder
4.0	04/02/2011	General update	Hilary Grinter

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1.0 Introduction

This document describes the installation, construction and asset recording requirements, in the four UK Power Networks network areas, Eastern Power Networks (EPN), London Power Networks (LPN), South Eastern Power Networks (SPN) and UK Power Networks IDNO, for:

- low voltage underground cable networks and associated new HV/LV distribution substations for Greenfield and Brownfield housing estates (G81 Appendix Part 3).
- low voltage and high voltage cable networks and associated HV/LV distribution substation for Commercial and Industrial sites (G81 Appendix Part 6).

The information in this document is subject to some local variations between the four licensed UK Power Networks distribution networks, for example, differences in:

- substation earthing specification;
- HV cable screen size;
- environment and impact on ratings, insulation, corrosion etc;
- compatibility with existing equipment.

Where possible any differences in requirements for each of the three UK Power Networks distribution areas are clearly specified in this document. However, each project undertaken by an Independent Connection Provider (ICP) will be subject to equipment and design approval and at this stage, if appropriate, UK Power Networks may specify any further area-specific requirements that are not covered in this document.

This document should be read in conjunction with the ENA Engineering Recommendation G81 suite of documents, in particular Part 3: Installation and Records and Part 6: Installation and Records Industrial & Commercial.

This document will be updated on a regular basis and you should always check for the latest version before commencing any works. **Where UK Power Networks requirements are not specified in this document ICPs should plan to undertake any works in accordance with best industry practice, complying with all appropriate legislation, including those referred to in the ENA G81 suite of documents. ICPs are also required to obtain prior approval for such works from UK Power Networks (Competition in Connections Section 01293 657730).**

Definitions

- ***ICP*** - An Independent Connection Provider.

- ***Approved Contractor*** – A contractor approved by Lloyd's Register and listed on their National Electricity Registration Scheme (NERS)

- ***Materials List*** – UK Power Networks materials appendices to ENA G81 documents

References

- ENA G81 documents
- UK Power Networks material appendices to ENA G81 documents
- The Electricity Safety, Quality and Continuity Regulations 2002.
- EI 02-0019 – Installation of Underground Cables – LV to 132kV
- EI 02-0031 – Fire protection policy for 11KV cables and joints installed in air
- DSR 01 018 - Identification of LV Cables
- EI 02-0026 - Temporary Caps for LV and 11kV Cables
- EB 02-0030 - Installation and Operation of Plastic Underground Link Boxes
- EI 07- 0102 – Secondary Substation Civil Design Standards
- ES 07-0004 - Secondary Substation Civil Design Standards

- Section 3 Earthing Construction Manual - Secondary Distribution Network Earthing Construction
- EI 09-0001 High Voltage Testing Policy
- ES 03-3400 - Signs, Labels and Notices
- Section 5.35 of the Installation and Commissioning Manual Secondary
- EI 09-0100 – The process for site recording of cables, plant and equipment
- NJUG Publication No 7 - Recommended Positioning of Utilities' Apparatus for New Works on New Developments and in Existing Streets
- NJUG Publication No.6 – Service Entries for New Dwellings on Residential Estates

2.0 Excavation and Cable Laying

The requirements for the installation of underground cables are covered in Engineering Instruction EI 02-0019. This section contains additional information for the benefit of ICPs.

2.1 Work in the Vicinity of Live Cables, Lines and Plant

All UK Power Networks cables and apparatus must be treated as live unless instructions from UK Power Networks representative are issued to the ICP confirming they are dead. Works in the vicinity of UK Power Networks electricity cables must be carried out by an Approved Contractor using safe digging techniques, HSE Guidance Note HSG 47.

All overhead lines shall be treated as live. Prior to any Works being undertaken in the vicinity of overhead lines (within 15 m) the ICP shall erect all necessary bunting and ground level signs and modify the plant to restrict its operating height in order to maintain safe working clearances.

2.2 Installation of underground cables

Mains cable is to be positioned in the footway in accordance with the requirements of NJUG Publication No 7, 'Recommended Positioning of Utilities' Apparatus for New Works on New Developments and in Existing Streets'. The ICP must excavate all trenches and joint holes to the dimensions, appropriate for the type and quantity of apparatus to be installed. The drawings within Engineering Instruction EI 02-0019 provide typical cable trench dimensions and should be strictly adhered to unless alternative dimensions have been agreed with UK Power Networks.

Where cables are laid direct, care shall be taken that the bottom of the trench is substantially smooth and free of sharp edged stones. The backfill around the cable shall be free of sharp edged stones and rubble.

2.3 Cable Ducts

Plastic ducts (Materials List) shall be laid and connected according to the manufacturer's recommendation. Ducts not immediately required shall be sealed using a plug.

All tubing and ducts entering a building, pit or chamber, whether enclosing a cable or not, shall be cut flush to the wall and suitably sealed against gas entry. The installer of the ducts must seal the gap between the outside of the ducts and the building structure and the installer of the cables must seal the annular gaps between the cables and the insides of the ducts where the cables enter the substation or building. The sealant must provide a liquid and gas tight seal and should be suitable mastic or expanding foam or an approved mechanical seal'

Where ducts are installed in concrete, prior agreement must be obtained from UK Power Networks and the use of steel pipes will be required. Steel pipes to be medium quality, screwed, complying with BS1387:1985. Any concrete surround shall have a minimum thickness of 75mm.

2.4 Blinding Cables

Selected Sand -The sand must be of a coarse type with a mixture of particle sizes and have good cohesion properties. In situ the thermal resistivity in a dried out state must be not greater than 2.7 Km/W. The composition of the material shall not contain readily visible foreign matter such as pieces of clay or organic detritus or sharp stones or flints. The particle size must not exceed 5mm.

2.5 Cable Protection Covers

Cables must be protected and/or marked to comply with Regulation 14 of The Electricity Safety, Quality and Continuity Regulations 2002.

The ICP shall cut the tile tape cleanly and install the tape so that it is overlaid at bends to provide continuous cover of the cable route. The ICP shall install stokboards to protect 33kV cables.

Where cable markers are removed from existing cables during the course of works or have not been previously installed, they should be replaced or installed as appropriate.

2.6 Cable Depths of Cover

Trench dimensions showing cable depths are detailed in Section 6 of Engineering Instruction EI 02-0019. The cable depth shown on the cross sections shall not be increased or decreased without permission from UK Power Networks.

Where it has been agreed in writing with UK Power Networks that cables are laid closer to the surface because of site difficulties, then steel plates should be used to provide additional protection and safety. In extreme cases and subject to UK Power Networks prior approval, heavy gauge corrosion protected steel channel maybe used to protect against cable strikes in the side elevation of the cables during excavation.

2.7 Cable Installed in Air

Electricity service cables which run through free space within buildings, in areas such as hallways, basement corridors and garages, must be mechanically protected with the use of appropriately sized steel pipe or capping. The type of mechanical protection is dependant on the cable environment and agreement should be obtained from UK Power Networks Competition in Connections Section prior to completion of installation.

Cables installed in air within pits or cableways shall be physically separated and, where appropriate, provided with a fire resistant or fire retardant covering, EI 02-0031.

2.8 Cable Capping

All LV, 11kV and 33kV cables on drums, or installed but not in use, shall be capped using the appropriately sized heat-shrink/push fit moulded caps. EI 02-0026 Temporary Caps for LV and 11kV Cables

2.9 LV Cable Jointing

LV joint kits are specified in the Materials List. All joints are to be made in accordance with the instructions issued by the joint kit manufacturer. Joints holes should not be back filled until resin/joint filler is fully hardened. Joints must be kept dry until resin/joint filler is fully hardened.

LV cables shall be identified in accordance with DSR 01 018.Identification of LV cables so the excavation requirements in this document shall be adhered to when an ICP is providing the excavation for the final connection.

2.10 HV Cable Jointing

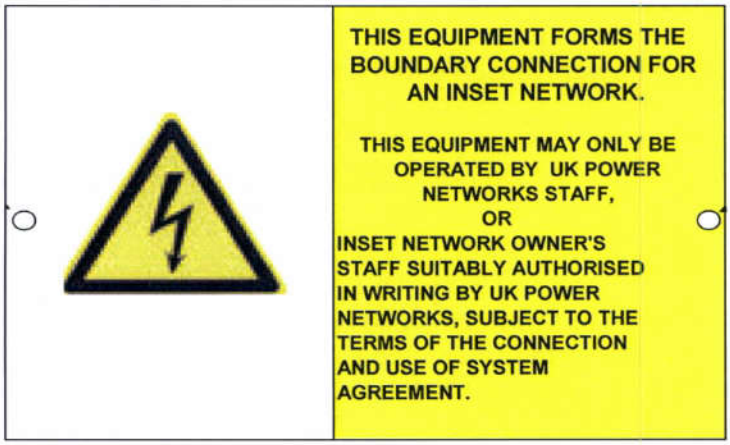
Cable Joints and Terminations kits are specified in the Materials List. All joints are to be made in accordance with the instructions issued by the joint kit manufacturer.

2.11 Underground LV Link Boxes

Link boxes should be installed in the footway supported on a suitable concrete slab. After jointing, a brick built (or approved alternative) pit of a structure appropriate to the imposed loading, shall be formed around the link box supporting an approved pavement cover. Details of approved covers and disconnecting boxes are given in Materials List. The requirements of EB 02-0030 shall be followed.

For each low voltage distributor cable connected to link boxes a suitable engraved destination label shall be attached to the distributor way. In addition it will be necessary to supply a suitable engraved destination label for any off-site location where the installation of new assets has changed existing cable destinations.

A boundary link box connecting an IDNO LV network to a UK Power Networks LV network shall be fitted with a label as shown:



The neutral at the link box shall be connected to an earth pin.

3.0 Overhead Lines

For the installation of overhead line connection arrangements ICPs are required to obtain the necessary planning consents. As this can often be a long and difficult process ICPs rarely choose the overhead line option for contestable connections installations.

All wood pole overhead lines for network voltages 11kV and 33kV shall conform to Energy Networks Association Technical Specification 43-40 (Specification for Single Circuit Overhead Lines on Wood Poles for use at High Voltage up to and including 33kV) – Issue 2 (2004).

All wood pole overhead lines for low voltages shall generally conform to Energy Networks Association Technical Specification 43-12 (Insulated Aerial Bundled Conductors Erection Requirements for Low Voltage Overhead Distribution Systems).

If you require further information on UK Power Networks overhead line installation requirements for any of the four networks please contact the UK Power Networks Competition in Connections Section on 01293 657730.

4.0 LV Service Terminations and Layouts

4.1 Domestic houses

National Joint Utilities Group Publication Number 6 - Service Entries for New Dwellings on Residential Estates (NJUG 6) shall be implemented with one exception that cavity service entry should be avoided where possible as it de-rates the service cable. This arrangement may only be used where allowed for in the design and specifically approved in writing by UK Power Networks.

UK Power Networks requires that ICPs Install black low density polythene tube (polyduct – Materials List) 38mm external, 32mm internal diameter ducts from service termination position to mains jointing position in footpath. Plastic tubing shall always be buried and never installed in air e.g. under floorboards or along walls for any distance

All meter cabinets (Materials List) must be installed in a way that maintains the manufactured fire resistance values. Service cables ducts must be terminated just inside meter cabinet through an appropriately sized entry on the cabinet casing (made with an appropriate circular cutter). Once the service cable has been pulled through ducts it must be sealed both internally and around entry into cabinet. Cabinets are to be sited so that the top of the cabinet is not more than 1.8m from the ground and the bottom of the cabinet is not less than 450m from the ground. Each cabinet should be sized to accommodate both a meter and time switch. Minimum space requirement for meter and time switch is 350mm wide by 320 mm high.

Each service should consist of a single phase service cable terminating in a 100Amp cut out. UK Power Networks' policy is to offer an earth terminal from a PME system wherever it is appropriate. Examples of inappropriate situations are construction and demolition sites; exhibitions, shows fairgrounds, amusement parks and circuses; mobile vehicles such as medical, advertising, and catering services; caravan and camping parks; boats; mines and quarries; petrol filling stations

Where alternative service arrangements are required these should be agreed with the Competition in Connections Section on 01293 657730 in advance of work on site. Any alternative arrangements must ensure that the air temperature surrounding the cut out does not exceed 30°c.

4.2 Multi-Occupancy Dwellings.

For Maisonette Type Domestic Buildings the arrangement should be as in section 4.1.

For Multiple Storey Domestic Buildings a 125mm Rigi-duct should be installed from the exterior of the building to a full height cupboard with full height door in a common access area on the ground floor of the building. The intake position is to be compliant with The Electricity at Work Regulations 1989 in regards to space, light, height and egress. A three phase service cable shall terminate in a multi-way service head or a three phase service head with an approved distribution board. A PME earth terminal is to be provided. If there is 4 or more customers the termination shall be connected to an earth pin.

4.3 Internal Rising and Lateral Connections (R&Ls)

Each licence has a different policy regarding the ownership of R&Ls in multi-occupancy buildings.

- In the distribution services area of EPN the practice is to adopt the R&Ls by default – this has been so since 1972.
- In the distribution services area of LPN the policy has always been that R&Ls will not be adopted.
- In the distribution services area SPN there has been a policy since 1988 that would allow adoption of R&Ls subject to compliance with approved arrangements;

UK Power Networks are soon to move to a single policy so for the latest position on R&Ls for any of the four networks please contact the UK Power Networks Competition in Connections Section on 01293 657730.

At the time of writing this document in EPN and SPN areas for larger buildings a central internal rising sub-main to distribution boards on each floor with Lateral connections to each dwelling may be employed.
Internal R&Ls do not form part of the UK Power Networks LPN distribution network and will remain in the ownership of the property owner (LPN will not adopt). In some circumstances and subject to a payment LPN may agree to operate, repair and maintain rising and lateral connections on behalf of the property owner.

In order for Rising and Lateral connection installations to be accepted for connection to any of the four UK Power Networks distribution networks; a safe and proper system is required. The notes below provide guidance to UK Power Networks requirements.

a) The main electrical intake position within the building must be sited so that the incoming underground service cable is terminated as close as possible to its entry point to the building. (The Electricity at Work Regulations 1989)

b) The intake position must be in a communal part of the building exclusively set aside for the purpose and NOT in a store or bin area.

c) The electrical intake position must be segregated from the gas intake and water pipes.

d) The rising and lateral connection system design and installations must be fully compliant with the requirements of both UK Power Networks and BS 7671, the IEE Wiring Regulations. A dispensation from these Regulations applies as the means of isolation and protection at the original of the circuit are one device, the fuse. .

e) Rising chases where used should be constructed of non combustible material, have an internal depth of at least 200mm, have removable covers and a fire barrier must be installed between each storey of the building. The system has to be fully withdrawable without structural alteration of the building.

f) Each Customer must be fed from separate fuse. These fuses to be housed in the cut-out of the service termination or in an approved distribution board with fuse ways complying with BS 1361. All fuses shall be of HRC type to BS 1361 & RH series 60 & 100A

g) Space to be provided for both a meter and a time switch/radio teleswitch for each customer (minimum space requirement meter & time switch 350mm w x 320mm h).

h) The maximum height of any meter should be 1.8m from floor / ground level and the minimum height should be 450mm.

i) Meter tails should be less than 1m in length unless enclosed in galvanised steel trunking, high impact PVC trunking or hard drawn galvanised steel conduit.

j) Connections between distribution boards and individual domestic dwellings should have a minimum installed rating of 60 amps.

k) Both service and sub-main cables are to be of Low Smoke and Fume specification.

l) Cables can be installed in a duct, conduit, trunking or clipped to the surface at high level or in a rising chase or clipped to a cable tray. Mechanical protection is a requirement.

m) Steel Wire Armoured and MIMS connections, if approved, cannot be terminated directly into the meter and should terminate in sealable connector blocks immediately adjacent to the meter. 16mm² or 25mm² copper stranded PVC/PVC double thermoplastic insulated single core meter tails to be provided for final connection into the meter.

n) The installation should be designed to be "withdrawable" so as to facilitate repair and replacement at a later date. Cables should not be cast directly into building slab or plastered into wall screed. When cables are clipped to the surface, all clips should be position to be accessible at a later date. If cables are to be positioned behind false ceilings they should be accessible through removable panels.

o) All equipment is only to be installed in communal areas.

p) The minimum size for service cables is 35mm^2.

q) Multi-way service heads are to have individual fuses labelled with each flat number (not plot numbers). A PME label must be fitted to all service cut-outs as appropriate.

r) In the UK Power Networks LPN area Rising and Lateral connections and internal rising sub-mains must be SNE systems. Meters may be grouped at the common access intake position or be installed in a suitable meter cabinet at each dwelling. However, the position of meter may limit the tariffs which can be offered to customers (pre-payment meters must be should be sited within the dwelling). In the LPN area cables used for unmetered rising and lateral connections must be either:-

    i. Thermoplastic insulated cables run in hard drawn screwed galvanised steel or high impact PVC conduit,
    ii. Steel Wire Armoured cables, or
    iii. MIMS cables.

4.4 Services to commercial properties

Service arrangements to commercial properties vary significantly depending on the load to be supplied. Proposed arrangements should be discussed with the UK Power Networks Competition in Connections Section on 01293 657730.

5.0 Metering

Loads below 100 Amps per phase will be metered using whole current meters. Meter positions internal to properties should be in full height cupboards with the service cutout opposite the entrance door for safety reasons.

Loads above 100 Amps per phase will require CT operated metering. The installation of CTs and VTs is contestable work. Proposed work should be discussed with the UK Power Networks Competition in Connections Section on 01293 657730.

6.0Substation Buildings, Plinths and Enclosures

6.1 New Substation Buildings

EI 07 0102 sets the policy for the design of Secondary Substations and introduces UK Power Networks standard substation and plinth drawings. This document shall be read in conjunction with ES 07-0004 Secondary Substation Civil Design Standards. Substation earthing is covered in Section 3 of the Earthing Construction Manual - Secondary Distribution Network Earthing Construction

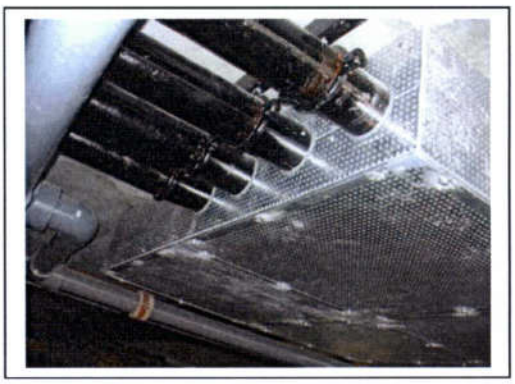
6.2 Substation Enclosures

A GRP enclosure is the preferred option but if not acceptable for a particular site ICPs will be required to provide an alternative proposal for approval by UK Power Networks. The standard drawings and ES 07-0004 provide information to a developers or contractors regarding UK Power Networks' requirements. Where necessary they can also be used as a basis for site-specific drawings.

UK Power Networks will approve civil works requirements for each substation and will inspect each substation for compliance as part of the adoption process. Due to the complex nature of the majority of substation environments within the LPN area the majority of substation buildings are one-off designs. UK Power Networks has a dedicated LPN Substation Design Team that can provide building design guidance at the design stage of developments. This team may be contacted through the CiC designer.

To comply with Regulation 3(4) of The Electricity Safety, Quality and Continuity Regulations 2002, all cable entries into substations must be sealed. The installer of the ducts must seal the gap between the outside of the ducts and the building structure and the installer of the cables must seal the annular gaps between the cables and the insides of the ducts where the cables enter the substation and where cables enter the ducts outside in the roadway/footpath. The sealant must provide a liquid and gas tight seal and should be suitable mastic or expanding foam or an approved mechanical seal. All ducts entering substations must be cut flush with to inside wall.

Electricity cables which run through free space within buildings, in areas such as hallways, basement corridors, basement car parks and garages, must be mechanically protected with the use of appropriately sized steel pipes (see photographs). Alternative arrangements may be possible but these must be discussed and agreed with UK Power Networks Design staff.



It is recommended that no electrical installation work is commenced within any substation building until the UK Power Networks civil works inspection has taken place and acceptance of the substation building structure confirmed in writing. Failure to do this may mean that installed plant may need to be removed to allow corrective works to the substation structure to take place.

6.3 Land Requirement for Enclosures and Compact/Pad-Mount Substations (SPN and EPN)

In addition to an area of land the size of the plinth, a strip of land at least 500mm wide will be required at the sides and rear for ventilation and maintenance purposes. This strip shall be surfaced by the developer using either concrete, grey paving slabs set on concrete or tar macadam.

In situations where the strip forms a corridor at the sides and rear between the site and other boundaries, unauthorised access around the substation shall be prevented by means of a barrier such as a close boarded or palisade fence on either side at the front of the enclosure. In these situations consideration must be given to ensuring that these barriers or the neighbouring boundary fences do not provide a climbing unauthorised access onto the roof of the substation.

6.4 Substation Labels

It is a mandatory requirement that all Substations display external signage. All Substations must be labelled with the standard UK Power Networks signage displaying the company name, logo, an emergency contact number, a Substation identifying name or number and a danger of death sign. Plant containing SF_6 or Formel NF gas as an insulator must also be clearly identified. All other signs shall be in accordance with BS 5499: and ES 03-3400 Signs, Labels and Notices

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The ICP is responsible for providing all permanent labels, with the exception of the one displaying the company name etc, for the substation including destination labels for LV pillar and RMU, All exterior labels shall be securely fitted with appropriate non-ferrous fixings.

6.5 Power and lighting in distribution substations.

Each substation is to be wired for power and lighting through a consumer unit connected to a 100 Amp cutout. As a minimum the consumer unit will contain a 63A double pole disconnector, a 32A MCB for the power circuit and a 6A MCB for the lighting circuit.

Internal lighting shall provide a minimum luminescence of 500 lux in accordance with HSE guide HSG38 'Lighting at Work'. Utilising general purpose luminaires shall be of a fluorescent type complying with BS 4533, 1500mm long with twin 58W tubes and have a minimum degree of protection of IP65 in accordance with BS EN 60529. A 1 gang, 1 way light switch with surface back box or surface mounted pull cord shall be positioned immediately adjacent to the access into the substation building.

Trunking and accessories shall comply with BS 4678 and shall be rigid PVC suitable for indoor use, self extinguishing and shall not propagate flames.

Power Circuit Fittings shall be corrosion resistant metal clad surface units. As a minimum 1 No. 13 amp IP56 switched twin socket shall be provided. Each socket shall include a RCD with a tripping sensitivity of 30mA and an operating time of 30ms. Additional sockets/ switched spur boxes may be required for powering RTUs, battery chargers and other devices.

7.0 Plant

Plant to be used on the UK Power Networks is listed in the Materials List. There are differences in requirements between the four networks particularly in relation to remote control equipment and some plant specifications. These differences are indicated on the Materials List and advice should be obtained from the Competition in Connections Section (01293 657730).

The Talus units fitted to RMUs by Schneider and Lucy are not compatible with the control room systems employed in LPN, so remote control is provided via a RTU supplied by Remsdaq. This is a wall mounted unit requiring an unswitched power connection of a fused spur and connected to the RMU via a multicore cable. The installation of the RTU is detailed in document Section 5.35 of the Installation and Commissioning Manual Secondary.

For all networks there is a requirement to prove the motorised actuator operation although the proving remote operation will not be possible for the ICP.

The Talus units provided by Schneider and Lucy do not contain a communication card which will be supplied and installed by UK Power Networks.

A parasitic load trip unit (PLTU) will need to be installed in substations in the central London interconnected area. A PLTU is designed to remove the load (parasitic load) by means of tripping the controlling HV circuit breaker in the event of an HV phase to earth fault on the company's HV Ring.

LPN RTUs may be obtained from Remsdaq on the address below, connection equipment may be obtained from any electrical equipment supplier e.g. RS Components:

Remsdaq Limited
Parkway
Deeside Industrial Park
Deeside
Clwyd
CH5 2NL
United Kingdom

Tel: +44 (0) 1244 286495
Fax: +44 (0) 1244 286496

8.0Plant, Equipment Tests

Installation and Commissioning Manual Secondary section 5.35 covers the commissioning checks and tests to be undertaken prior to energisation with the test sheets.

Pre-commissioning test sheets must be provided for all plant items to record the tests and checks completed. These shall be signed and dated by the person who completed the tests.

LV equipment

Each service	• polarity / phase rotation (3ph) • insulation resistance 500/1000V • earth loop impedance
Each new section of main	• insulation resistance ph-ph and ph-n/earth 500/1000V • continuity.
Each p.m.e. electrode	• earth resistance
Earthing resistance	• overall value measured at substation • at HV/LV substation – combined HV/LV / not combined and overlap (depends on achieving < 1 Ohm)
LV fuse cabinet	• insulation resistance 500/1000V

The testing of HV equipment shall comply with the requirements in EI 09-001 High Voltage Insulation Test Policy

9.0 Plant, Equipment and Cable Records

9.1 Engineering Instruction EI 09-0100 – The process for site recording of cables, plant and equipment

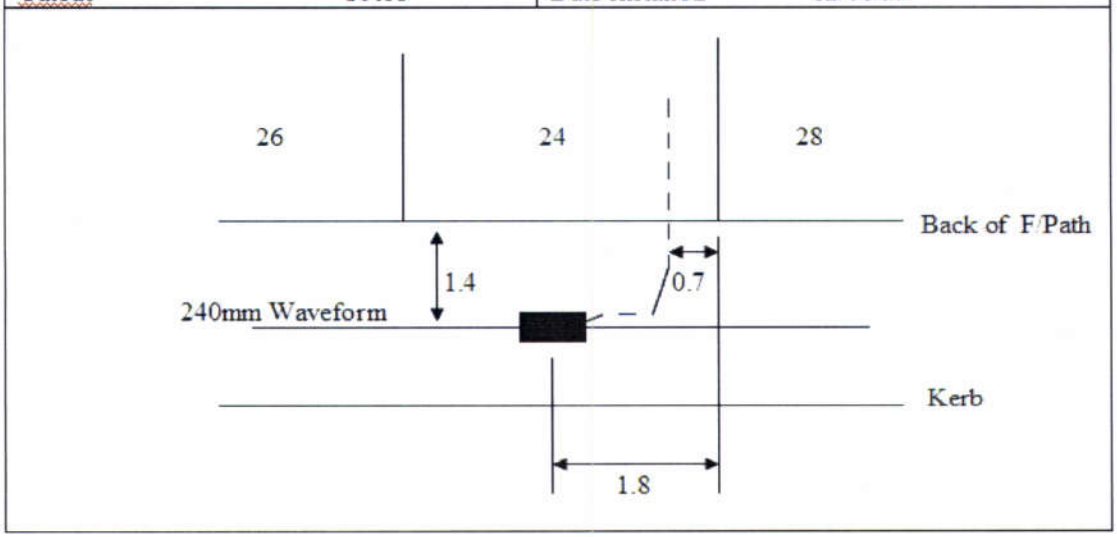
This engineering instruction details the information that is to be recorded on site, the format and timing for presenting it to UK Power Networks.

ICPs shall submit 'as laid/erected' drawings to UK Power Networks Records via their normal contacts in the Competition in Connections Section ten days prior to any energisation event on site. The extra time is to allow for auditing of the work whilst ensuring compliance with the Information and Incentives Project (IIP) obligations.

9.1.1 Service Record

A record in the form of the information and sketch as detailed below is to be provided for each service installed. Dimensions are to be given in metres to the nearest 100mm. The full postal address must be provided.

Address	24 High Street KT4 7AF		
Supply to	Single Property		
MPAN No.			
Service Cable size/Type	35mm 1c CNE	Fuse Size	60A
Service Cable Length	10m	Cutout Type	SP&N
Joint Box Type	Crutch Joint	Phase	Yellow
Main Cable Size/Type	240mm WV	Voltage	230V
Service Duct Size	38mm	Jointers Name	Bill Smith
Service Duct Matl	Plastic	Company	24seven
Cutout	100A	Date Installed	12/06/99



9.2 Substation Plant Records & Commissioning Information

The ICP will provide nameplate data for all equipment installed in the substation using the standard UK Power Networks Plant Data Forms. The information must be provided to your normal contacts in the Competition in Connections Section five working days prior to the substation being energised.

9.2.1 Asset Registration forms

CAP 01 202a - Substation Site Details

CAP 01 202b - Ground Mounted Plant

CAP 01 202c - Pole Mounted Plant

CAP 01 202d - Distribution TX and LV Type

CAP 01 202e - Battery / Charger

CAP 01 202f - Pole Type

CAP 01 202g – Link Box Details