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TECHNICAL TRAINING & ASSURANCE



10 STEPS TO COMPLIANCE

Guide to aid a compliant installation of a package substation within a GRP enclosure

HSS 02 004g v2.0 - September 2025

Introduction

Audit inspections carried out on newly installed package substations within Glass Reinforced Plastic (GRP) enclosures across all Connection Providers have identified a number of non-conformances in relation to the current UK Power Networks Engineering Standards.

The purpose of this e-guidebook is to provide guidance by focusing on the 10 key stages to aid the compliant installation of a new package substation within a GRP enclosure in accordance with the UK Power Networks Engineering Standards.

This e-guidebook has been produced following a review of the recurring non-compliant themes identified during engineering audit inspections on substations installed by all Connection Providers.

The points highlighted within this document are only excerpts from the relevant Engineering Standards to reinforce the key aspects of the document.
Please ensure you are familiar with all the requirements of the relevant Engineering Standards before undertaking the installation of any asset.

You will find appropriate links to the UK Power Networks G81 Technical Document Library provided on each page of this e-guidebook for ease to access the applicable Engineering Standard. UK Power Networks staff can also find the same documents within the internal Policies, Procedures & Forms section within SharePoint.

Note: All references within this document were correct at the time this document was published. Always refer to the relevant Engineering Standard to ensure you are aware of the current requirements.

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Step 1

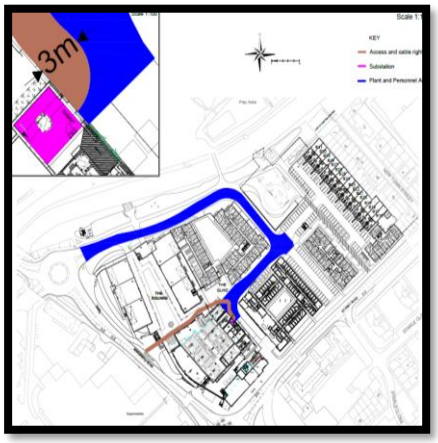
Pre-works Installation Checks / Substation Base and Location

Relevant Engineering Standards:

EAS 02-0000 Approved Equipment List - Cables and Joints
EAS 02-0000a Materials List - Cables and Joints
ECS 02-0019 Installation of Underground Cables LV to 132kV
ECS 07-3005 Precast Concrete Bases
EDS 07-3101 Pre-design Requirements for Secondary Substations
EDS 07-3102 Secondary Substation Civil Design Standard
EDS 07-3102.60 Brick Firewall for Secondary Substations
EBB 07-0058 Secondary Substation Fire Risk Mitigation
EBB 07-0058a Example Site Plan for Fire Zone Minimum Clearances
ECP 11-0503 Earthing Commissioning Procedure

Check that the proposed substation location, orientation, cable and personnel access is in accordance with the legal drawing. If the design needs amending, ensure the UK Power Networks Designer is contacted and any deviation is agreed.







Discuss the following with the customer to confirm their understanding of:

- Cable route, cable / duct depths and cable protection tape requirements
- Confirm that only UK Power Networks approved materials will be used to construct the electrical distribution network (EAS 02-0000a)
- If the finished ground level around the substation is not planned to be completed by the connection date, additional measures may need to be agreed and implemented prior to energisation to ensure a safe access and egress is in place for operational staff during the interim period
- Following energisation, ensure that unrestricted access to the UK Power Networks substation, plant and equipment will be provided at all times to ensure supplies can be restored to customers during fault situations. For this reason, access via security staff or by prior arrangement is not acceptable
    - Additional information on access arrangements can be found in EDS 07-3102, Section 6.1

Management of Fire Risk

GRP substations shall be selected only where fire safety clearances can be maintained for the life of the substation. GRP enclosures have no tested fire resistance, therefore GRP substations shall be located at least 3m or 7.5m away from the nearest building depending upon the combustible material of the building, unless a four-hour fire barrier is provided between the substation and the adjacent building (e.g. 215mm thick brick wall as tall as the substation enclosure).

- Non-combustible materials are typically masonry, concrete and steel
- **Combustible materials are typically (but not limited to) timber, plastic cladding systems and windows**

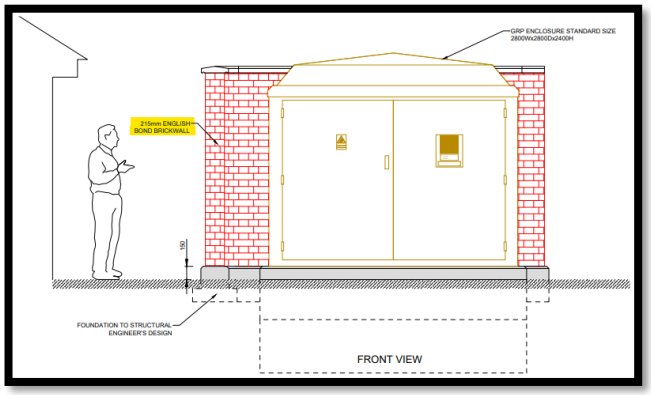
Note: The standard 'single skin' GRP enclosure does not enhance the fire safety of a substation, therefore a GRP substation is considered an outdoor substation for fire risk assessment purposes. A fire rated GRP solution is currently being trialled.

All new outdoor substations shall be designed for the installation of an oil filled transformer at a location that meets the minimum clearances. Where the minimum clearances cannot be achieved, the installation of the following shall be considered:

- A brick built (indoor) substation
- An ester filled transformer (reduced minimum clearance)
- The installation of a fire wall in accordance drawing EDS 07-3102_60

Note: Where an ester filled transformer is to be installed, the designer/planner shall record the justification. For alterations to existing outdoor substations where the design or construction is non-compliant following a fire risk assessment, consideration shall be given to the installation of an ester filled transformer or a fire wall 8m 3101

Substation Type	Transformer Type	Cooling Liquid Volume (L) [a]	Minimum Clearance (m) [b]	
			To building surface formed of non-combustible materials [c]	To building surface formed of combustile materials [d]
Outdoor	Oil	< 2000	3	7.5
	Ester	< 2000	0.9	0.9

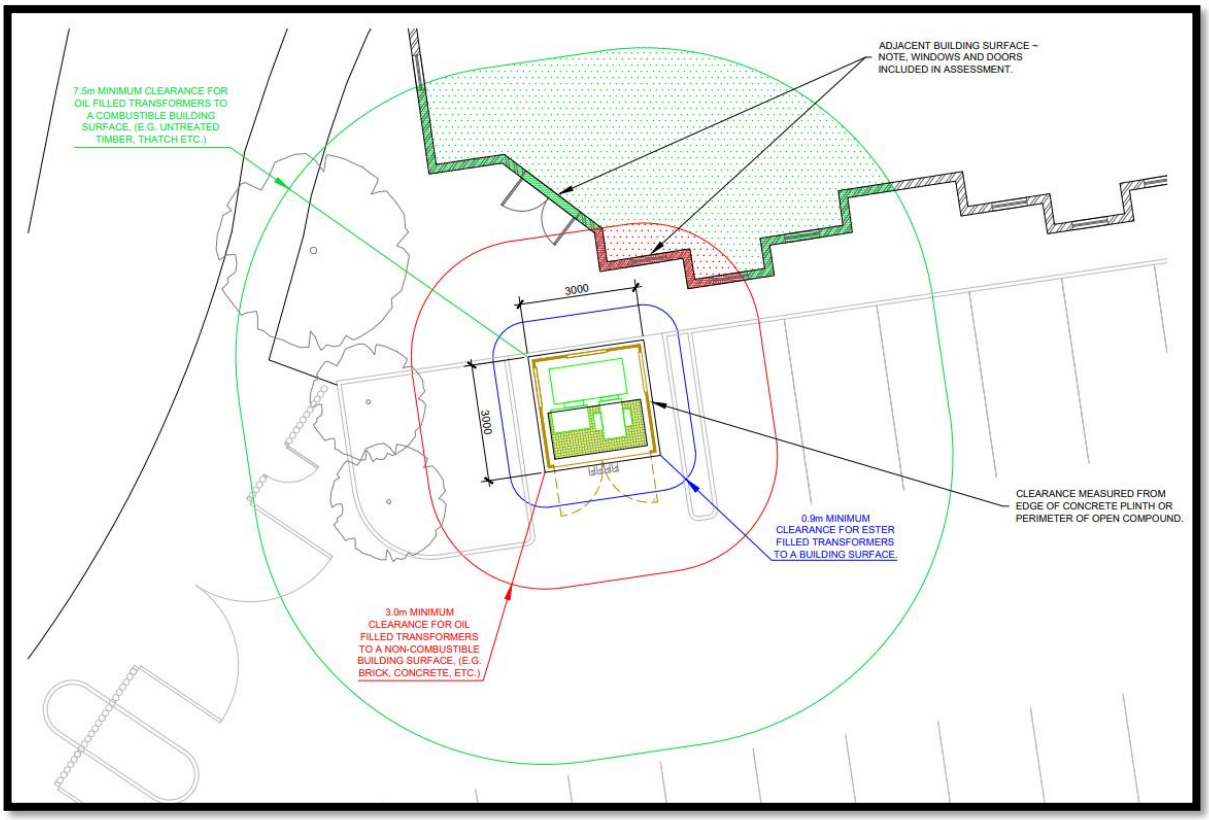




Please email Fire.safety@UKPowerNetworks.onmicrosoft.com to arrange for a new Fire Risk Assessment (FRA) to be carried out following:

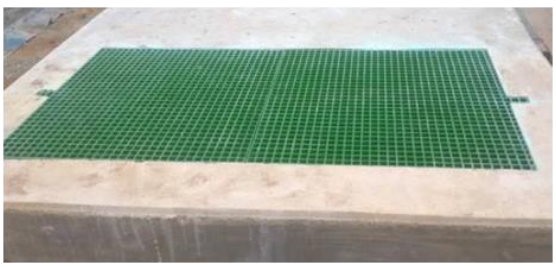
- Any project to replace, remove or add oil filled equipment to a site
- Any significant alteration of the layout or configuration of a site
- Where an assessment document is not present, or does not seem current or accurate
  - **Please ensure that before requesting a new FRA to be carried out, the project is finished, i.e. all open excavations have been backfilled and the site is safe to access**

Outdoor Substation Fire Zone Minimum Clearances



- To prevent transformer vibrations causing noise nuisance, wherever possible, substations shall be located a minimum of 10m from residential properties. In addition, 500kVA transformers and above shall be mounted on approved anti-vibration pads
- If within 10m of a watercourse or 50m of a borehole, a secondary oil containment shall be provided (See EDS 07-3102_02)
- Construct / install the substation base in accordance with the Engineering Standard
- Once the base has been installed, install the GRP floor grating to ensure a safe working platform is in place and available for the duration of the project
    - The images below illustrate the types of bases with their GRP grating in place:





- Witness the earth reading installed by the customer or check using a UK Power Networks approved earth megger:
    - This procedure shall be carried out by the Commissioning Engineer or their appointed representative, who shall be an Authorised Person having appropriate training and experience
    - When all the tests have been satisfactorily completed, sign and date the test form. Place a copy of the test form on-site in a plastic wallet and in a secure location on site when available

Step 2

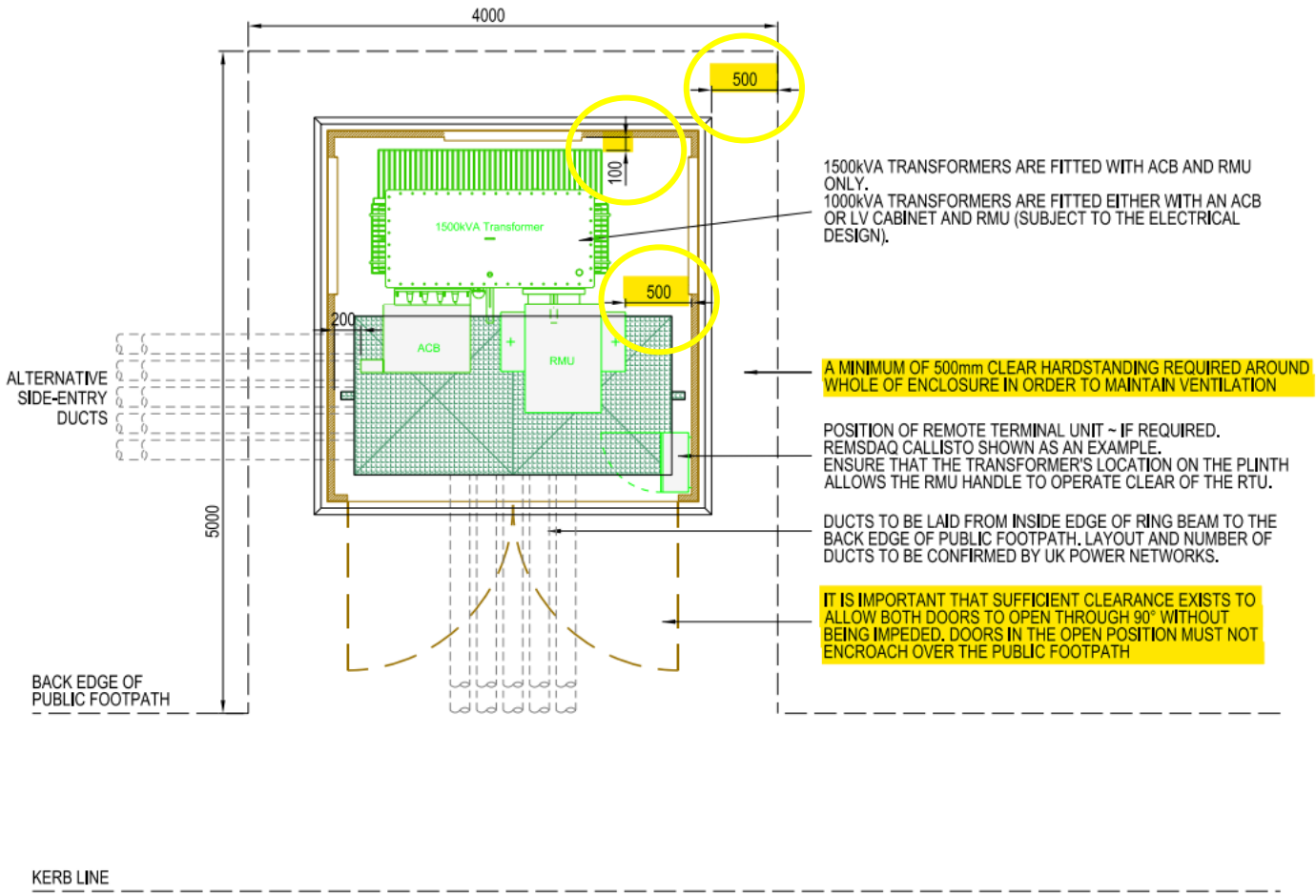
Installation of Apparatus and GRP Enclosures

Relevant Engineering Standards:

ECS 04-0081_Installation of Transformer Anti-Vibration Pads

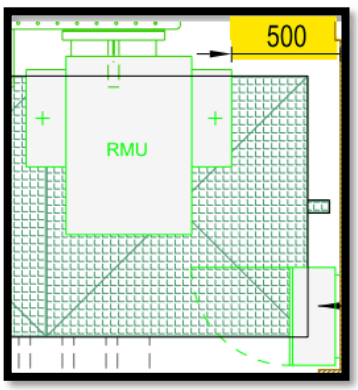
EDS 07-3102_Secondary Substation Civil Design

EDS 07-3102_01 Unit or Padmount Substation in a GRP Enclosure (Civil Layout)



PLAN VIEW OF SITE AND EQUIPMENT ARRANGEMENT

(GRP ROOF REMOVED FOR CLARITY)



- Ensure there is 500mm clearance from the right-hand end-box
- This will ensure that the operational handle will operate clear of the RTU

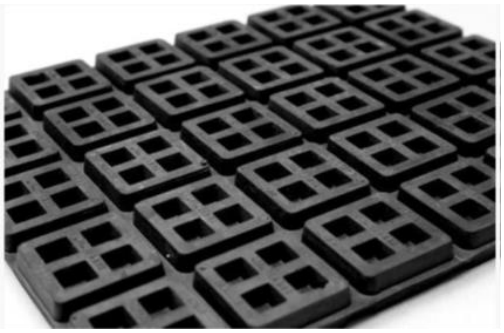
Step 2

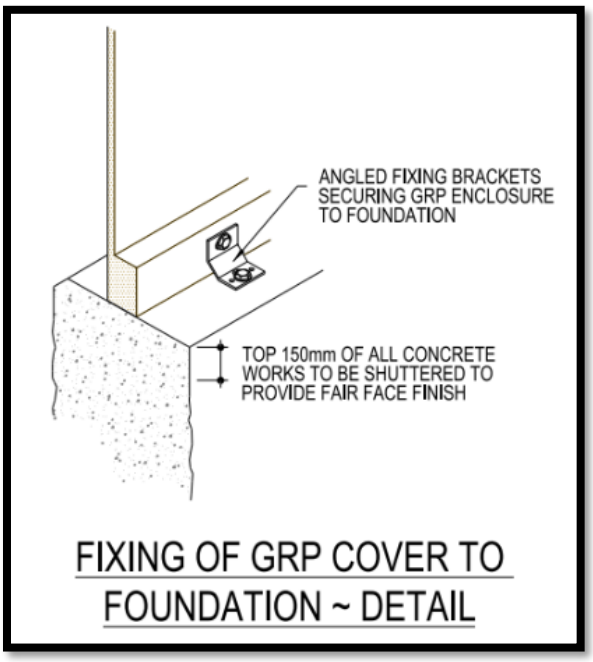
Installation of Apparatus and GRP Enclosure



- Fit anti-vibration pads on all new ground-mounted transformers that are rated 500kVA and above

- **Note:** The pads are supplied in sheets of 81 and require cutting down to the desired number. The cut down pad shall be in a strip that is three pads wide with only the middle section coming into direct contact with the transformer skid. This is for handling purposes, to prevent installers placing their hands underneath the elevated transformer





- Install the GRP enclosure and secure it in place to the foundation

Step 3

Install / Commission Remote Terminal Unit

Relevant Engineering Standards:
ECP 11-0501 Secondary Substation Commissioning Procedure
ECP 11-0504 Secondary Substation Energisation Procedure
EDS 05-4001 Fuse Ratings at Distribution Substations
EDS 05-2011 Air Circuit Breaker Protection Settings

Useful Forms:
ECP 11-0506a Distribution Transformer Test Form
ECP 11-0511e Lucy VRN2A and VRE2A Test Form
ECP 11-0514a ACB Test Form
ECP 11-0515a Schneider RN2D-RN6D Ground-Mounted Switchgear Test Form
ECP 11-0516a LV Cabinet / LV Board Metering Equipment Test Form
ECP11-0516b LV Cut-Out Metering Equipment Test Form
ECP 11-0517a HV Metering CT and VT Test Form
ECP 11-0529b Logic PLTU Test Form





- Commission all apparatus following ECP 11-0504 by completing the relevant test forms for the apparatus installed on site i.e.
  - Ring Main Unit (RMU)
  - Remote Terminal Unit (RTU)
  - Transformer
  - Air Circuit Breaker (ACB)
- The preferred method is to commission the RMU and RTU together, including Earth Fault Passage Indicator (EFPI) primary injection



- Install Time Limit Fuses (TLF's) / Relay settings
  - Refer to EDS 05-4001 / 05-2011 for TLF Ratings

Note:
- On RN2D RMU's, the RTU's come internal to the main unit. RN2D battery must have a power supply, if the AC supply is off, the battery would run for 15 hours, then shut-down.
- Once the RTU shuts down, the site is operating without HV OC/EF protection, meaning the primary feeder is the HV protection.

Step 4

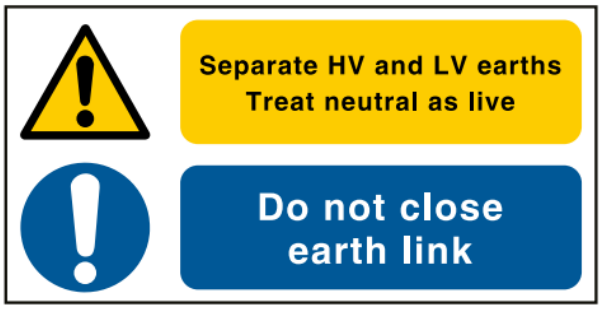
Installation of Earthing

Relevant Engineering Standards:
EAS 07-0021 Operational Signs and Labels Material List
EAS-07-0021a Operational Signs and Labels Material List
ECS 06-0023 Secondary Distribution Network Earthing Construction Standard
EDS 07-3102_01 Unit or Padmount Substation in a GRP Enclosure (Earthing Layout)
ECS 06-0023 Secondary Distribution Network Earthing Construction

- Install and connect the substation earthing / apparatus to the main earth bar
- If the substation has been designed to have separate HV / LV Earths:
  - Verify that there are two separate earth values for the HV and LV earth systems
    - Seek further guidance / advice if you are unsure

Warning Notices for Separate HV / LV Earths

- Where the HV and LV earths are separated, warning labels as detailed in ECS 06-0023 shall be installed next to the neutral-earth connection and on the site as required, i.e. warning labels 07-0009.117 and 07-0009.118 shall be installed as required:



EDS 07-0009.118 – External of TMFC Door

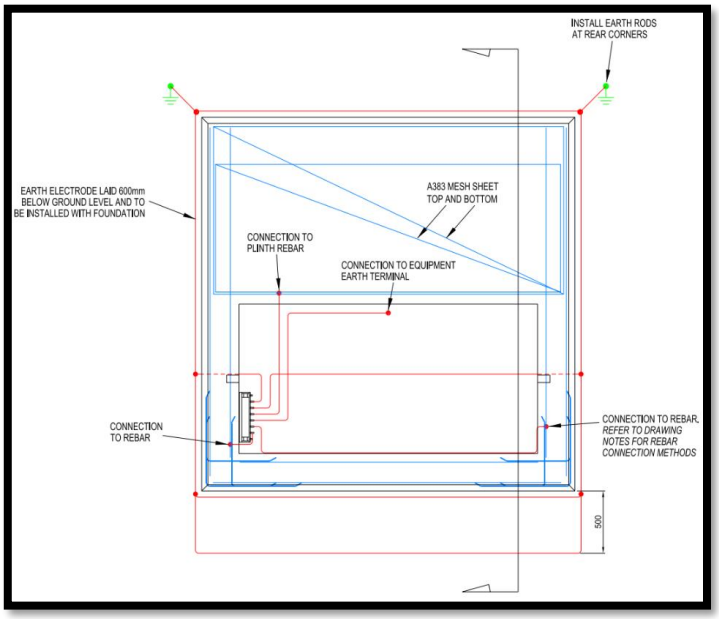


EDS 07-0009.117 – Inside the TMFC

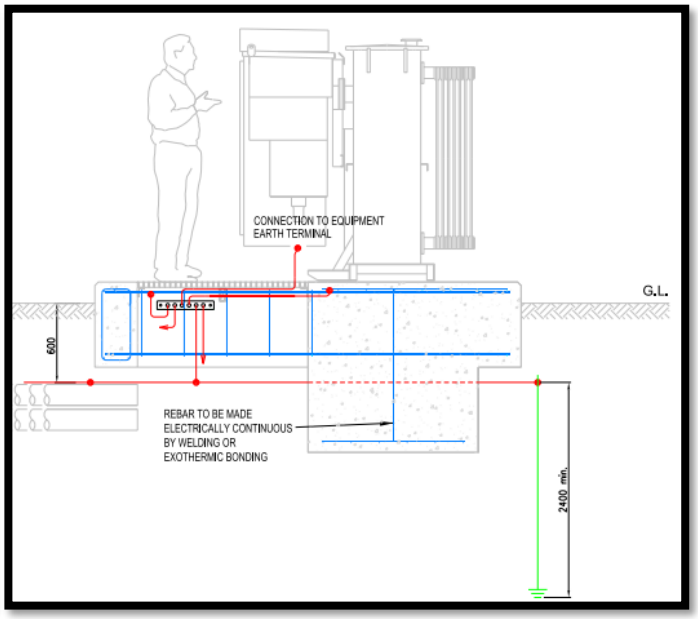
Lighting and Sockets

- Care is required when providing lighting and socket supplies to ensure that an operator cannot touch metalwork connected to different earthing systems at the same time
  - refer to Step 6 for more details

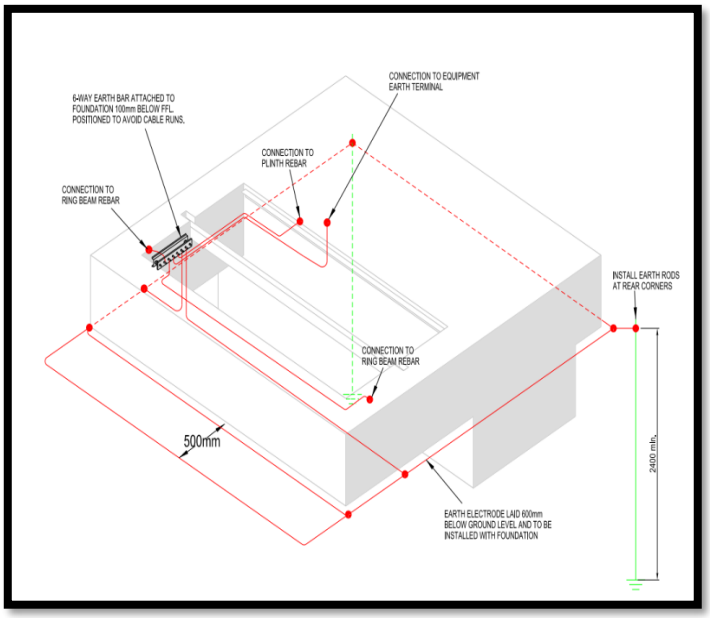
Views of the Earth Connections:



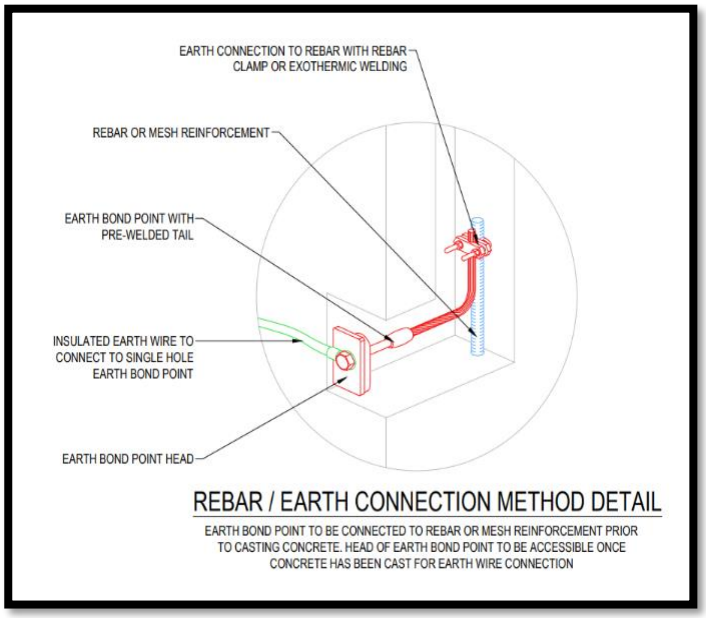
PLAN VIEW



SECTION VIEW



ISOMETRIC VIEW

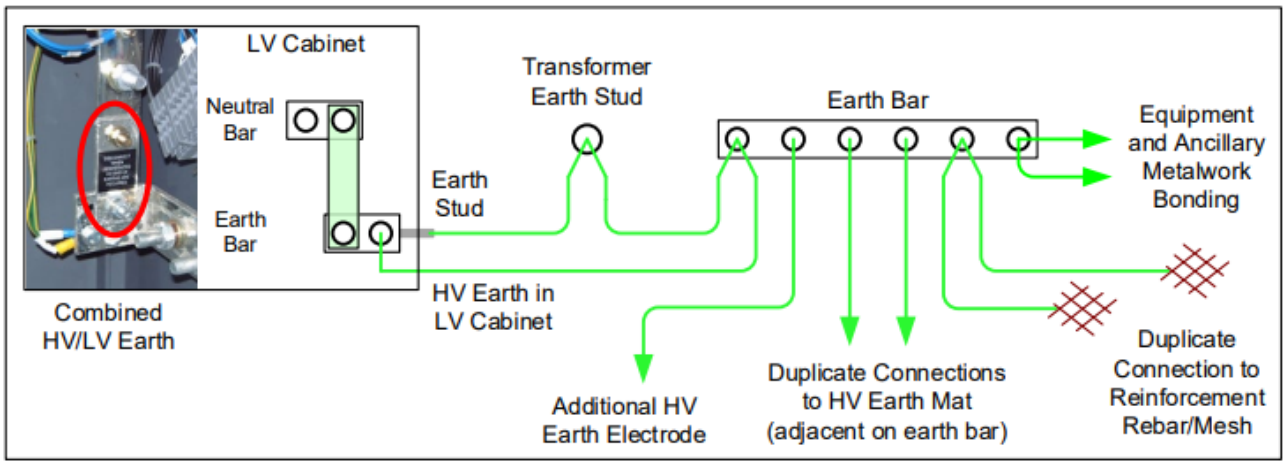


Rebar / Mesh Reinforcement

- The connection to the reinforcement within the plinth shall use exothermic welding or suitable clamps
- All connections to the reinforcement shall use a minimum of 70mm stranded hard drawn copper cable or 25mm x 3mm copper tape

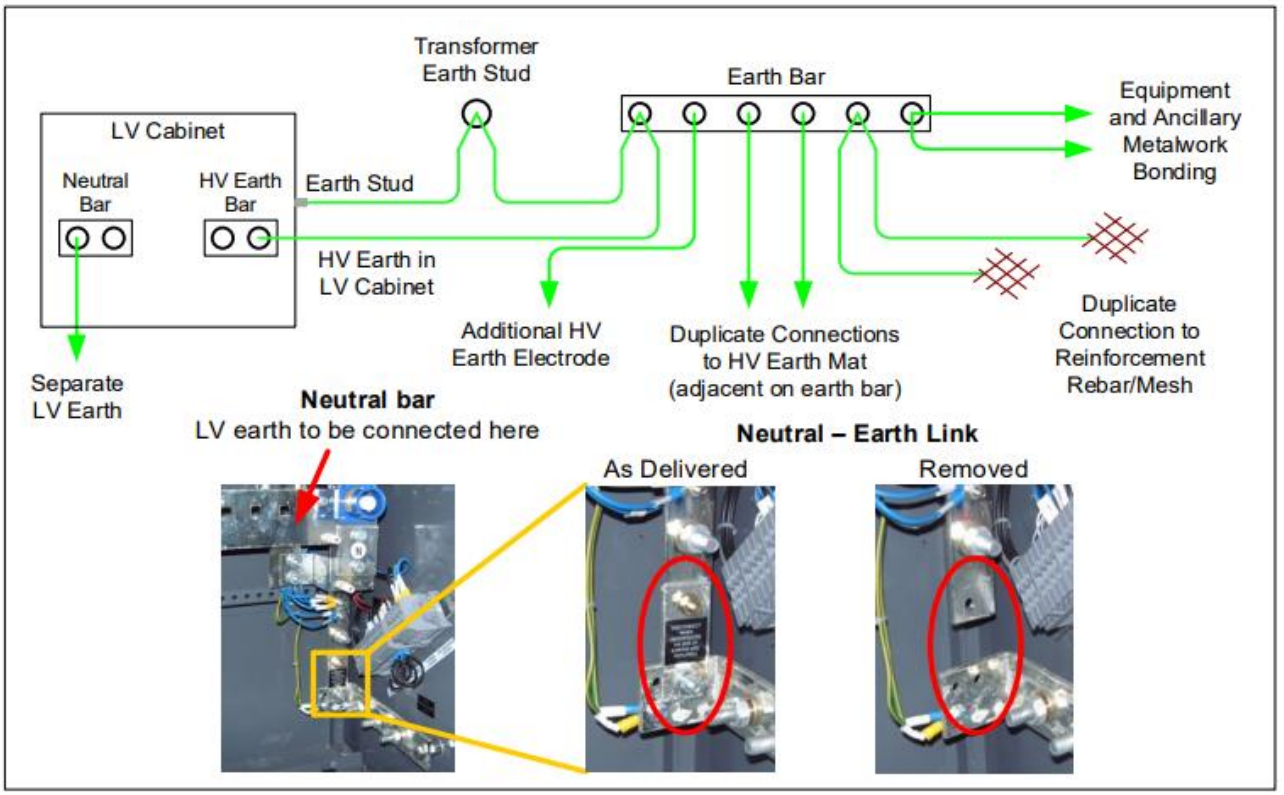
Combined HV / LV Earth Connections

- Where a combined HV/LV earth is specified, a separate LV earth is not required. The LV neutral-earth link in the LV cabinet, pillar or board, that bonds the LV neutral to the substation HV earth, shall be in place so that the HV and LV earths are combined



Separate HV / LV Earth Connections

- Where separate HV/LV earths are specified, additional requirements apply
  - Additional Separate HV/LV Earth information is included on the next page



Check the source substation earth fault current that is stated in the Earth Design to ensure that the correct sized conductor is installed as per table 7.1:

Table 7-1 – Earth Electrode Sizes

Function	Source Fault Level[1]	Secondary Fault Level	Bare Copper Stranded Conductor*	Bare Copper Tape*
Earth Electrode	Up to 8kA	-	70mm^2	25mm x 3mm
	Up to 12kA	-	120mm^2 or 2 x 70mm^2	25mm x 4mm
	Above 12kA	Up to 8kA	120mm^2 or 2 x 70mm^2	25mm x 4mm
		Above 8kA	150mm^2 or 2 x 70mm^2	25mm x 6mm
Earth Rod Electrode	Any		16mm or 19mm Copper Clad Rods	
* Other equivalent conductor and tape sizes my used.				

If the substation has separate HV and LV earths, the additional HV electrode requirements detailed below also apply:

Separate HV/LV Earths

- Where separate HV/LV earths are specified, the following additional requirements apply:
  - The HV and LV earths shall be separated
  - The HV earth electrode **shall not be installed within 8m** of the following unless a smaller distance is specified in earthing design:
    - Other LV earths e.g. PME, pole, TT etc
    - **Street lighting columns and other street furniture**
    - Communications infrastructure
    - Other metallic services
    - Third-party properties with LV supplies
- The labelled neutral-earth link shall be removed
- Any auxiliary earth wire (e.g. socket) connected to the HV earth bar shall be removed
- Appropriate warning notices shall be used (Information provided on page 9)
- An isolation transformer shall be installed for lighting and auxiliary supplies e.g. RTU
- Lighting shall use plastic fittings
- Power sockets shall be disconnected, disabled or removed
- Spare LV tails and pot-ends **shall not be installed within 8m** of the HV earth electrode
- All metalwork connected to the substation HV earth shall be more than 2m from any other metalwork, pipework etc

HV Earth Electrodes

- Bare copper cable or tape and copper clad rods shall be used as earth electrodes.
- The earth electrode should be installed at a depth of 0.6m and underneath the HV cable (or LV cable) to provide physical protection and surrounded by 150mm of fine texture non-corrosive soil which has been firmly consolidated (sand should not be used as it is likely to increase the resistance). If the indigenous soil is hostile to copper (i.e. known to be overly acidic or alkaline) suitable soil should be imported.
- The **earth electrode should be insulated where it enters the substation** and in separate ducts which are not shared with other cables. Care is required when laying stranded conductor to avoid distorting and opening the individual strands as this increases the probability of corrosion.
- Earth rods should typically be installed on the corners of the substation base, where only two rods are specified, additional rods may be installed on the other corners to help achieve the overall earth resistance. Earth inspection pits **shall not be installed** above external earth rods as they introduce a theft risk and earth resistance measurements can be carried out from within the substation.

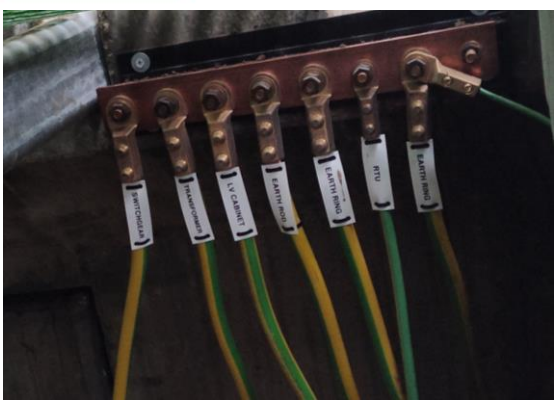
Earth Bar

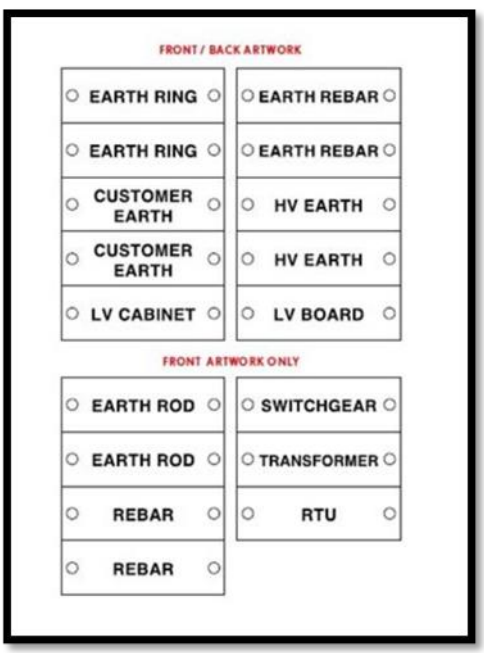
- All earth connections shall be labelled and connected via separate connections to a dedicated earth bar. UKPN Logistics Material Code for earth connection labels is 20095H, as illustrated below



EARTHING LABELS (SET VARIOUS)

Material code	20095H
Material status	Active (Stock)
Unit of issue	Bag
Cost allocation	Personal Service Order/Job Number





- The earth bar shall be connected to the main transformer/switchgear earth terminal to allow:
  - Operational personnel to determine if the earthing is intact when entering the substation
  - The earthing to be easily identified
  - The earth resistance to be measured using a clamp meter

Step 5

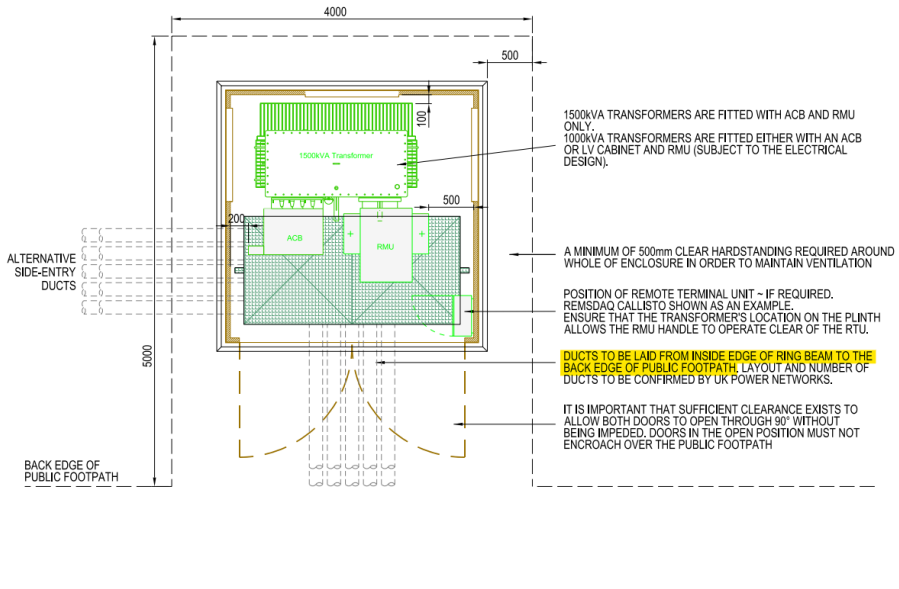
Install High and Low Voltage Cables

Relevant Engineering Standards:
ECS 02-0019 Installation of Underground Cables LV to 132kV
EDS 07-3102 Secondary Substation Civil Design
EDS 08-2000 LV Network Design

- All Low Voltage (LV) cables shall be installed to the following minimum depths, whether they are laid direct or installed in suitable ducts:
  - Footways, grass verges or private property = 450mm
  - Carriageways (including road crossings) = 600mm
  - Normal agricultural land (not subject to deep ploughing) = 1050mm
  - Agricultural land subject to deep ploughing = 1200mm

- All 11 and 20kV cables shall be installed to the following minimum depths, whether they are laid direct or installed in suitable ducts:
  - Footways, grass verges or private property = 600mm
  - Carriageways (including road crossings) = 750mm
  - Normal agricultural land (not subject to deep ploughing) = 1050mm
  - Agricultural land subject to deep ploughing = 1200mm

- Ensure that the ducts are in place and stop flush with the inside of the ring beam





- Install HV and LV cables, cut the GRP grating to suit and replace the grating above the cable trench to ensure safe access and egress is maintained

- During the installation of the new substation, the spare LV ways on transformer-mounted fuse cabinet or LV board shall be fitted with 300mm aluminium cable of sufficient length to allow future LV joints without entering the substation as shown in Figure 7-14 below
- The cable shall be pot-ended in accordance with the ECS 02-0415 and left un-energised (i.e. fuses left out)
- Where the substation has separate HV and LV earths, any LV earth shall be installed a minimum of 8 metres from the substation HV earthing system as shown in Figure 7-14
- The location of the cables, pot ends and earths shall be marked on the project plan

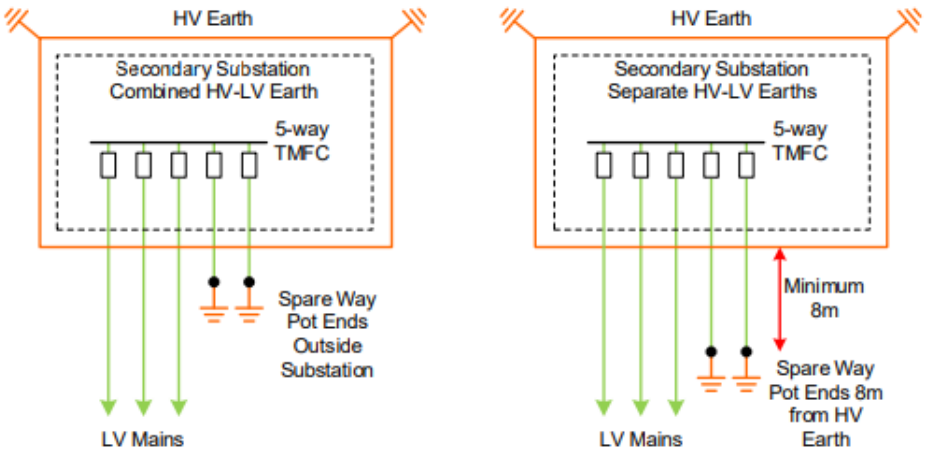


Figure 7-14 – Substation Spare Way Pot Ends

- Install the sand in the substation cable trench around the cables, i.e. 100mm above the top duct and to a minimum of 500mm below the top of the grating
- Temporary measures may have to be provided if the ground is not at the finished level around the substation as highlighted in Step 1 to allow safe access / egress to the substation
- Ensure the whole cable route is at the correct depth, sanded, backfilled and approved UKPN tile tape(s) is in position over the cable circuit(s)
- Cable protection tape or covers shall be installed so that they fully cover the width of the cable or cable duct installed below them



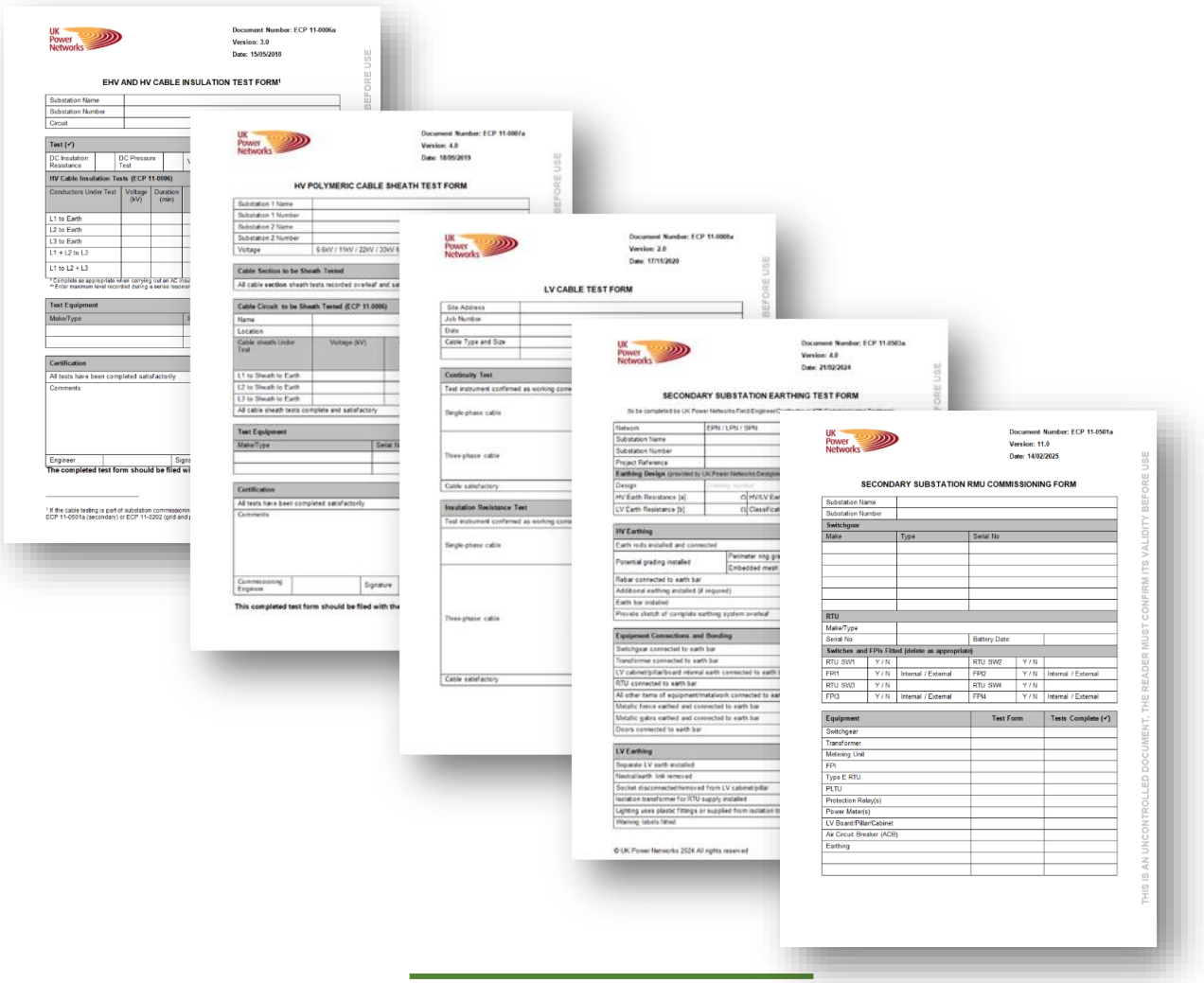
- Complete Sheath Test, Core Test and Continuity Test






Useful Forms:

ECP 11-0006a EHV and HV Cable Insulation Test Form
ECP 11-0007a HV Polymeric Cable Sheath Test Form
ECP 11-0008a LV Cable Test
ECP 11-0503a Secondary Substation Earthing Test Form
ECP 11-0501a Secondary Substation RMU Commissioning Form



Step 6

Install Power and Lighting

Relevant Engineering Standards:
EAS 07-1000a Substation Electrical Services Materials
EDS 07-1119 Substation Electrical Services
EDS 08-1112 Substation LVAC Supplies
EDS 06-0014 Secondary Substation Earthing Design
ECS 06-0023 Secondary Distribution Network Earthing Construction

- Refer to EAS 07-1000a Substation Electrical Services Materials, which provides a full list of the approved materials
- All secondary substations shall use a phase and neutral **insulated thermoplastic** distribution board (consumer unit) with a minimum degree of protection of IP56 (to BS EN 60529)
    - **Note**: **Substation single-phase metalclad distribution boards should not be installed in secondary substations**
- If a customer is installing the power and lighting, ensure they are aware of and have access to the approved materials list
- Distribution boards approved for use in secondary substations are:



ABB



Hager



Lewden



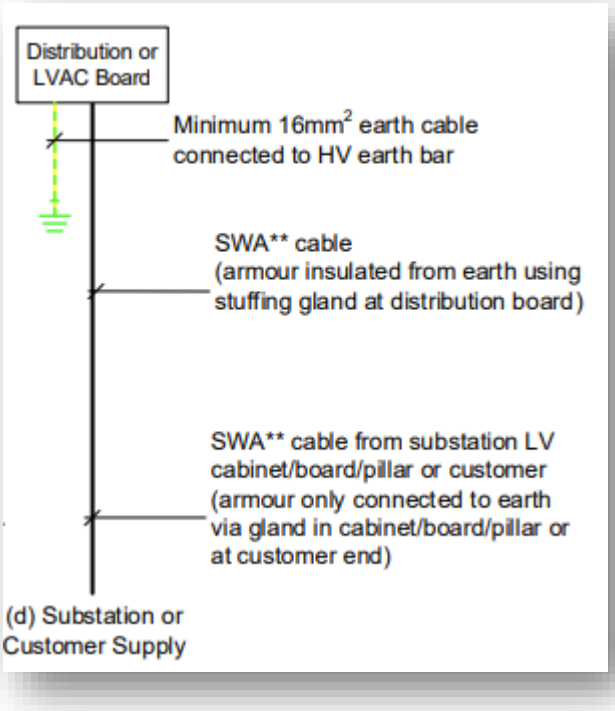
Schneider

- The distribution board shall include separate circuits protected by a suitable MCB or RCBO in accordance with Section 8. As a minimum, the distribution board shall include the following:
    - 6A MCB for lighting
    - 16A RCBO for 13A socket outlets
    - 16A MCB for 13A socket outlet (for test equipment use only)
    - 6A MCB for each RTU and PLTU (if fitted)
    - Spare way
- The distribution board shall be mounted at a typical height of 1400mm above finished floor level and installed within 3 metres of the cut-out if fitted

- The main earth terminal in the distribution board shall be bonded to the substation earth bar using a minimum 16mm insulated copper conductor

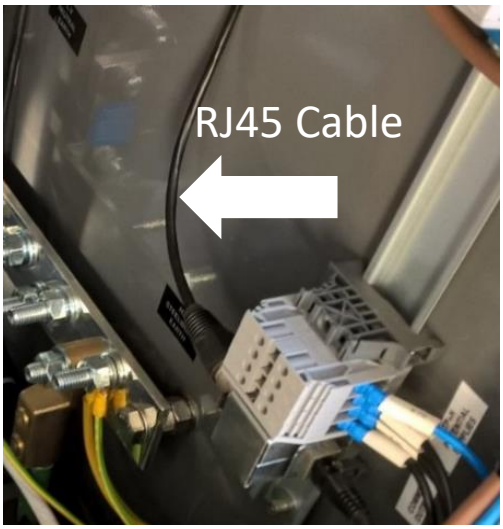






- Where required to obtain a level surface (e.g. GRP enclosed substation) the distribution board and accessories should be mounted on a weather resistant fire-retardant plywood backboard
- The plywood (to BS EN 13986) shall have a minimum thickness of 12mm, be suitable for exterior use (to BS EN 636 Class 3) and have a minimum reaction to fire of Class D (to BS EN 13501-1)
- It is important that all edges of the plywood are sealed to prevent moisture ingress by applying exterior polyurethane varnish

- The provision of LVAC supplies to substations at all voltages is detailed in EDS 08-1112. The LVAC supply shall be terminated as detailed in EDS 08-1112. The supply options include:
    - A supply from a substation auxiliary transformer terminated in a 100A cut-out
    - A single-phase or three-phase service from a local substation or local LV distribution network terminated in a 100A cut-out
    - An SWA cable from an LV cabinet, board or pillar within the substation terminated in either 100A cut-out or directly into the distribution board
    - An SWA cable from a customer switchboard terminated in either a 100A cut-out or directly into the distribution board
- The armour of an SWA cable shall only be connected to earth at the source end (i.e. LV cabinet, board or pillar or customer switchboard). **The armour shall be insulated in a plastic stuffing gland** where it enters the distribution board. An earth core shall not be provided in the SWA cable
- The un-switched spur should be located in close proximity to the RTU, which is fused at 5A
- Install the RJ45 cable between Transformer Mounted Fuse Cabinet (TMFC) and RTU
- A GRP secondary substation shall have a minimum of a single light fitted above the door on the GRP enclosure (it should not be fitted to the roof)





- A minimum of one double 13A socket outlet shall be installed in all secondary substations in addition to any socket provided in the LV cabinet
- An additional single 13A socket outlet designated and labelled as a ‘Test Equipment Socket’ and supplied via a separate MCB shall be installed in all secondary substations

Separate HV / LV Earths - Lighting and Socket Supplies

- Care is required when providing power and lighting supplies to substations with separate HV and LV earths to ensure that an operator cannot simultaneously touch metalwork connected to the different earthing systems.
- Therefore, at substations with separate HV and LV earths:
  - Lighting and power shall be provided via an isolation transformer and a distribution board – see Section 7.12.4. All unused MCB's or RCBO's **shall be removed from distribution board and blanked off**
  - An isolation transformer kit for the Schneider LV cabinet (see figures below) is available (refer to Schneider installation instruction DJ192D001 and DJ192D002 supplied with the kits for further details).

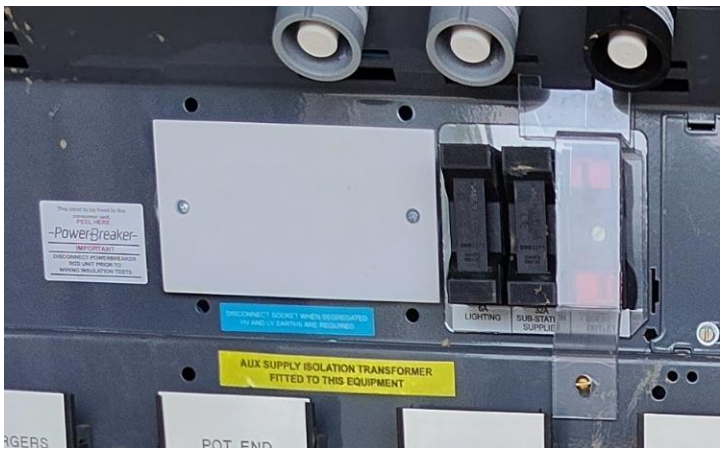




Figure 7-17 – Isolation Transformer (04526G)



Figure 7-18 – Isolation Transformer Retrofit Kit (04527R)

- Light switches and conduits shall be plastic
- All 13A sockets **shall be disconnected or removed** from the LV cabinet (refer to Schneider instruction DJ192D001 and DJ192D002)
- The 13A socket in 200kVA and 300kVA compact substations shall be disabled by locking off the RCBO and applying a warning label

Testing, Certification and Records (EDS 07-1119):

- All work shall be conducted and installed in accordance with BS 7671
- On completion of any works, the installation shall be tested in accordance with BS 7671 and an electrical installation certificate produced together with a schedule of test results as detailed in BS 7671
- The electrical system shall be recorded in the asset register and be setup with a routine test and inspection in accordance with EMS 10-0002 and EMS 10-6501
- The certificate and results using the relevant filename convention shall be sent to UK Power Networks for uploading into the asset register as follows:

    1. **UK Power Networks' field staff** – send a copy to the UK Power Networks Asset Registration Team (ART) via the appropriate mailbox below:

        - ART.EPN@ukpowernetworks.co.uk
        - ART.LPN@ukpowernetworks.co.uk
        - ART.SPN@ukpowernetworks.co.uk

    2. **Independent Connection Provider** – send a copy to UK Power Networks Competition-in-Connections Delivery Project Manager as part of the adoption acceptance processes

Step 7

Install Substation Signage / Labelling

Relevant Engineering Standards:
EAS 07-0021 Signs and Labels for Operational Sites and Equipment
EDS 09-0019 Safety Sign and Identification Labelling of Equipment

In order to comply with the Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR), the following signs **must** be displayed at every entrance of UK Power Networks operational sites in the following order (vertically):

- 1. Safety Sign (Danger of Death)
- 2. Ownership label (with emergency contact details)
- 3. Unique Site Reference (Can be site name and/or number)



Example signs to be used at UK Power Networks Sites



Example sign to be used at IDNO Sites

- In order to comply with the Health and Safety (Safety Signs and Signals) Regulations 1996 staff must be warned of specific site risks before entering operational areas. Wherever practicable, operational signs **must be placed below Danger of Death signs**
- Specific risk signs to be placed on, or on approach to, operational sites that an employee would not normally expect to encounter. These include, but is not limited to:
  - SF6 gas warning signs
  - Operational restriction signage
  - Open excavations





Step 8

Pre Energisation Requirements

Relevant Engineering Standards:
ECP 11-0006 HV Insulation Testing
ECP 11-0007 HV Polymeric Cable Sheath Testing Procedure

- Notify Technical Assurance that the site will be ready for audit prior to connection on the specified date:
  - For UKPN Projects, notifications can be made by directly contacting a Technical Assurance Auditor or via the shared mailbox address: S16Audits@ukpowernetworks.co.uk (Note: minimum eight-week notice period required)
  - For ICP / IDNO Projects, the CiC Delivery Managers will liaise with the ICP / IDNO Company to arrange an audit date as per the normal process



- Retest HV / LV cables. If the HV cable circuit does not carry the voltage specified for the required duration, the sheath test has failed and the sheath fault shall be located and repaired before the test is repeated.
- The following minimum values shall be achieved:
  - HV DC pressure test the maximum leakage current shall not exceed 10mA
  - 5kV insulation resistance tester >= 100MΩ
  - Ensure that the laminate earths on the cable end boxes have been re-connected
- Ensure a full set of commissioning notes are stored securely on site and attached as a pdf document to the relevant site in SharePoint under the Asset Management Site and Reference Library
- Independent Connection Provider (ICP)
  - Send a copy of the completed test form and the asset data form to the Competition-In-Connections Delivery Project Manager

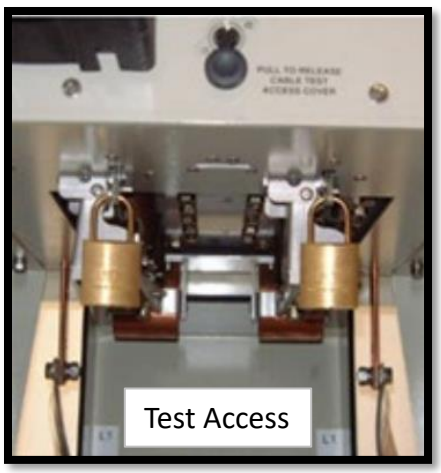
Examples of common test forms used include:
ECP 11-0501a Secondary Substation Commissioning Form (includes FPI)
ECP 11-0503a Secondary Substation Earthing Test Form
ECP 11-0506a Distribution Transformer Test Form
ECP 11-0511e Lucy VRN2a and VRE2a Test Form
ECP 11-0007a Polymeric Cable Sheath Test Form
ECP 11-0006a EHV and HV Cable Insulation Test Form

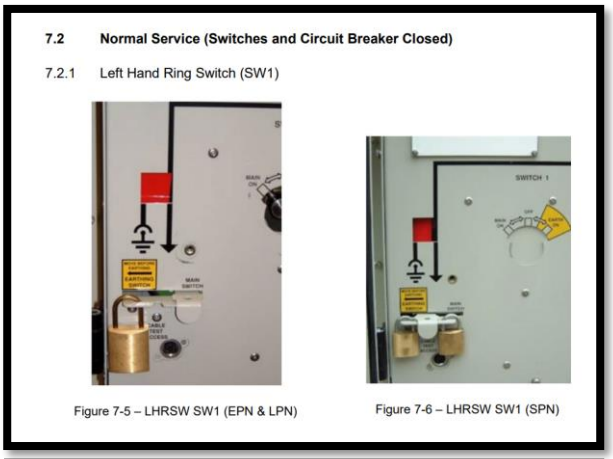
Step 9

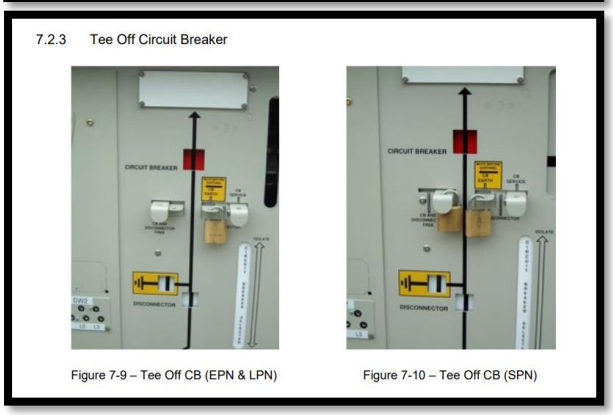
Energisation

Relevant Engineering Standards:
EDS 08-2000 LV Network Design
ECP 11-0504 Secondary Substation Energisation Procedure
ECP 11-0506 Distribution Transformer Commissioning Procedure
EOS 03-0027 Lucy Sabre 'A' Range Switchgear
HSS 40 052 Energisation and Disconnection of Electrical Apparatus and Plant including all Cables

- Replace any temporary LV / HV circuit ID labels with permanent circuit ID labels
- Install Operational Locks
  - An illustration of the correct positions of Operational Locks on Lucy Switchgear is illustrated in section 7 of EOS 03-0027, with examples highlighted adjacent / below:





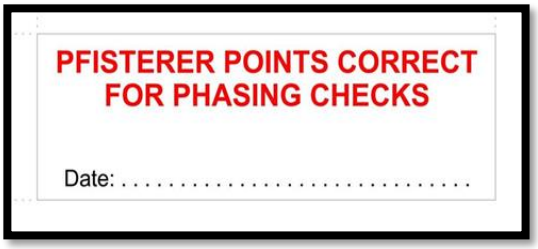




- Ensure that the Transformer Tap-Changer is secured with an Operational Lock

- On completion of the phasing tests, install a Pfisterer label next to the VIS sockets



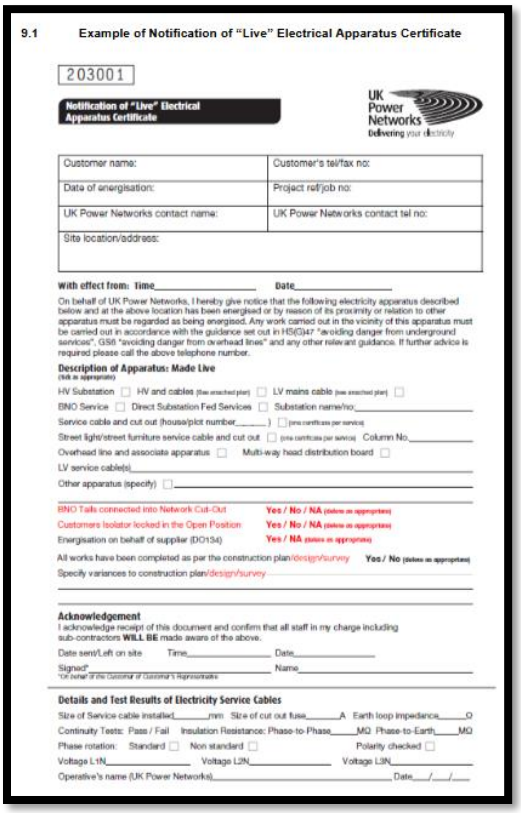


UKPN Logistics Material Code for 'Label RMU Pfisterer Test Socket' is 19996V

- Ensure that any spare pot-ended LV ways from the TMFC are left un-energised (i.e. fuses left out) as per EDS 08-2000 LV Network Design, 6.2 New Substations:
  - Spare Ways
    - The cable shall be pot-ended in accordance with the ECS 02-0415 and left un-energised (i.e. fuses left out) as previously highlighted on page 15 of this document

HSS 40 052 Energisation and Disconnection of Electrical Apparatus and Plant including all Cables:

- The aim of this procedure is to ensure the safety of our staff, contractors, landowners / occupiers, and other interested parties, such that they are made aware in advance of apparatus being energised, or where it be must be regarded as energised
- The Authorised Person (AP) or Senior Authorised Person (SAP) responsible for the connection / energisation shall:
  - Use the appropriate certificate, as detailed in this procedure, to notify all relevant persons associated with that site that apparatus is being energised
  - Send a copy of the certificate to the Project Manager
  - Copies of all documents will be held in the project files associated with the specific energisation or disconnection project
  - Where a copy is left with the customer, a photograph of the duplicate certificate shall be taken and added to the project files within SAP, where practicable



9.1 Example of Notification of "Live" Electrical Apparatus Certificate

203001

Notification of "Live" Electrical Apparatus Certificate

UK Power Networks
Delivering your electricity

Customer name:	Customer's tel/fax no:
Data of energisation:	Project ref/job no:
UK Power Networks contact name:	UK Power Networks contact tel no:
Site location/address:	

With effect from: Time_____ Date_____

On behalf of UK Power Networks, I hereby give notice that the following electricity apparatus described below and at the above location has been energised or by reason of its proximity or relation to other apparatus must be regarded as being energised. Any work carried out in the vicinity of this apparatus must be carried out in accordance with the guidance set out in HS(G)47 "avoiding danger from underground services", GS6 "avoiding danger from overhead lines" and any other relevant guidance. If further advice is required please call the above telephone number.

Description of Apparatus: Made Live
(tick as appropriate)

HV Substation ☐ HV and cables (see attached plan) ☐ LV mains cable (see attached plan) ☐
RNO Service ☐ Direct Substation Fed Services ☐ Substation name/no_____
Service cable and cut out (house/plot number_____) ☐ (pink certificate per service)
Street light/street furniture service cable and cut out ☐ (pink certificate per service) Column No._____
Overhead line and associate apparatus ☐ Multi-way head distribution board ☐
LV service cable(s)_____
Other apparatus (specify) ☐_____

RNO Tails connected into Network Cut-Out Yes / No / NA (delete as appropriate)
Customers Isolator locked in the Open Position Yes / No / NA (delete as appropriate)
Energisation on behalf of supplier (DO134) Yes / NA (delete as appropriate)
All works have been completed as per the construction plan/design/survey Yes / No (delete as appropriate)
Specify variances to construction plan/design/survey

Acknowledgement
I acknowledge receipt of this document and confirm that all staff in my charge including sub-contractors **WILL BE** made aware of the above.
Date sent/Left on site Time_____ Date_____
Signed* Name_____
*On behalf of the Customer or Customer's Representative

Details and Test Results of Electricity Service Cables
Size of Service cable installed_____mm Size of cut out fuse_____A Earth loop impedance_____Ω
Continuity Tests: Pass / Fail Insulation Resistance: Phase-to-Phase_____MΩ Phase-to-Earth_____MΩ
Phase rotation: Standard ☐ Non standard ☐ Polarity checked ☐
Voltage L1N_____ Voltage L2N_____ Voltage L3N_____
Operative's name (UK Power Networks)_____ Date__/__/__

Notification of "Live" Electrical Apparatus Certificate is used on third-party land or a construction site

Step 10

Project Completion

CON 05 018 Connections Projects Closure Procedure



The purpose of CON 05 018 is to ensure that the technical and commercial closure of all Connections Projects is handled in a consistent and robust manner, reflecting current best practices in accordance with UKPN Procedure and in order to meet the customer's requirements and regulatory reporting requirements.

Major Connections, Competition in Connections (CiC), Highway Services and Small Service works are excluded from this procedure.

- Ensuing that the project is delivered to design and cost
- Identifying any variation of costs associated with changes to the agreed design, delays or changes of scope derived from the customer or their representatives including aborted visits
- Refer variations back to the Project Designer to calculate the charges
- Obtaining the customers agreement and signature for any variation
- Requesting updates to operational systems including SAP, NETMAP where relevant
- Submitting the Asset Management data updates and validation in the relevant systems and take the formal receipt as completion
- Confirm completion of all works and all costs incurred within 3-months of physical completion of the works
- Update the status of Work Orders in SAP CP1 to WKCP to confirm that all works are completed and all costs incurred
- Submit a Project closure form via the CVR to identify jobs can be returned as complete by the Commercial Team with relevant comments to confirm completion



CiC Schemes
The process and responsibilities for CiC schemes is largely similar to that for Projects, please refer to the CiC team if you have any questions.

Further Information

If you need any further information regarding the information provided within the briefing, please consult the relevant Engineering Standard. If you require further clarification, please contact:

1) Your Line Manager
2) The Author of the Engineering Standard
3) A member of the Technical Assurance team

UK Power Networks
Delivering your electricity