

Applies to: Power systems Staff, ICPs	UNDERGROUND SERVICES TO UNMETERED STREET FURNITURE	PR-PS-770
Classification: Public	Uncontrolled if printed	Rev:1.02

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1 INTRODUCTION

- 1.1 This document defines the requirements for services supplying street furniture directly connected to the Scottish and Southern Energy Power Distribution (SSEPD) LV distributing mains.
- 1.2 Cut-outs, cable and joints must comply with the relevant SSEPD specifications.

2 DEFINITIONS/ABBREVIATIONS

Direct Service – A service cable that directly connects an item of street furniture to an LV distributing main cable.

Distributing main - a low voltage electric line or cable which connects a distributor's source of voltage to one or more service lines or directly to a single consumer's installation.

Earth electrode - a conductor or group of conductors in intimate contact with, and providing a connection with earth.

Low Voltage (LV) – 1000V ac or less

Looped Service – An unmetered service cable connected between two items of street furniture via the cutouts.

Permanent Disconnection – The cutting and pot ending of a service cable when there is no plan to reuse the cable.

PME – protective multiple earthing, otherwise known as TN-C-S.

Reconnection – The straight jointing of a live service cable which has been temporarily disconnected to a service cable to provide a connection to a piece of street furniture.

Service line - an electric line or cable which connects a street electrical fixture (referenced from the Electricity, Safety, Quality and Continuity Regulations).

Service Transfer – Where a service is removed from a piece of street furniture and part of this service used to provide a new service to another piece of street furniture.

Street Electrical Fixture - a permanent fixture which is or is intended to be connected to a supply of electricity and which is in, on, or is associated with a highway

Street Furniture – Street electrical fixtures including street lighting columns, bollards, traffic signs, Telecoms kiosks or cabinets, advertising hoardings etc.

SWA – Steel Wire Armour

Temporary Disconnection – The cutting and pot ending of a service cable where the cut end will be reused within two weeks of the original cut.

UMC – Unmetered Connection

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3 REFERENCES

3.1 The following documents are referred to in this procedure;

BS7671– IEE Wiring Regulations.

Energy Networks Association Engineering Recommendations G12/4 and G39/2.

The Electricity Safety, Quality and Continuity Regulations 2002.

4 EARTHING OF STREET FURNITURE

- 4.1 Where the distributing mains cable is of the separate neutral and earth (SNE) type the earthing system of all street furniture will be TN-S.
- 4.2 Where the distributing main is of the combined neutral and earth (CNE) type the earthing system of street lighting, road signs and safety bollards will be TN-C-S providing the load does not exceed 500W. For further guidance see ENA ER G12-4.
- 4.3 For other street furniture (bus shelters, advertising hoardings and the like) a TT earthing system will be installed unless an earth electrode with the resistance value not exceeding the requirement of ER G12-4, 6.2.15 has been installed. Reference shall be made to BS 7671 and ER G12-4 for further details regarding this type of installation.

5 NEW UMC SERVICES

5.1 Direct Services

The length of the service cable to any single item of street furniture shall be kept to a minimum and be no greater than 3m when the street furniture is located on the route of the LV distributing main.

When the new street furniture is not on the route of distributing mains, the length of the new service may be up to a maximum of 30m. In exceptional circumstances where it is not practicable to locate the new street furniture within this limit SSEPD must be contacted and will assess the option of permitting a longer length of service.

The distances are measured from the service joint to the item of street furniture. Table 1 shows the sizes, types and lengths of cable to be used for new services to directly connect unmetered street furniture to the LV mains.

At roundabouts, road junctions, any roads or paths with no LV mains cables or sites where there are sign/bollards in the centre of the road, a single point of supply will be provided for the whole installation in accordance with clause 5.7.

5.2 Looped Services

One additional item of street furniture may be connected to the incoming side of the cutout of another item of street furniture, providing this has a direct service

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and providing also that the overall combination of the looped service plus the direct service does not exceed the requirements defined in Table 1. To comply with the requirements of ENA ER G12 a neutral to earth electrode must be connected to the remote end neutral in the cutout.

Where there is a requirement to connect additional looped services, or the requirements in Table 1 are exceeded, a single point of supply shall be provided in accordance with clause 5.7.

Bus-shelters, advertising hoardings, BT kiosks and the like shall not be looped out of street lights, road signs or bollards.

5.3 Connection of UMC Services to Service Cables providing Unmetered Supplies.

Where there is no LV distributing main within the vicinity of a sole item of street furniture it is acceptable to breach the service from a 25mm² or 35mm² concentric cable providing an unmetered supply to an existing item of street furniture. Only one additional item of street furniture may be connected in this way onto an existing service.

5.4 Number of new UMC connections on a single mains cable

Up to six new unmetered services may be installed on a single three phase, and, four on split phase distributing mains cable providing that they are evenly balanced across the available phases.

If any more than this are proposed, the design must be referred to SSEPD who will carry out a technical assessment of options before agreeing whether or not any additional unmetered services may be connected.

5.5 Supplies to dedicated street lighting networks

A single supply may be provided into a third party asset where the street furniture asset owner requires it. This supply can be installed in a dwarf pillar, street lighting control pillar, in a column or sign situated at the back of the footpath as close as possible to the nearest distributing main cable. The remainder of the installation at these sites will be operated by others as a private lighting network. The supply to the private network must be taken from the outgoing fuse of the cutout.

The maximum cumulative load which can be connected to this network via a UMC is 2kW.

Where a street light being repositioned/replaced is found to be supplied from a private lighting network, the replacement column and connection will be fed from the private network.

5.6 Supplies to Remote Installations

SSEPD will not make unmetered connections, new connections, service

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transfers, service extensions or reconnections - at roundabouts, road junctions, any roads or paths with no LV distributing mains cables within 30m, or sites with sign/bollards in the centre of the road. At sites that fall into this category a single point of supply will be provided for the whole installation.

This supply should be in a dwarf pillar, lighting distribution cabinet and the like supplied by others, or in a column or sign situated at the back of the footpath as close as possible to the nearest distributing LV main. The remainder of the installation at these sites will be operated by others as a private lighting network.

The above does not prevent the direct connection of services to a distributing main around the outside of a roundabout as long as it meets the requirements set out in Table 1.

Table 1 – Specification for New, Extended and Transferred Services

Street Furniture Position	Service Length	Cable to be used
New street furniture on route of distributing main	Maximum of 3m. The dimension being measured from the service joint to the base of the street furniture.	25mm ² single phase aluminium concentric cable
New Street Furniture not on route of distributing main	Maximum of 30m. The dimension being measured from the service joint to the base of the street furniture	25mm ² single phase aluminium concentric cable
New Street furniture replacing existing furniture - existing service cable a minimum of 16mm ² Aluminium, 0.0225in ² copper or 15mm ² copper	Maximum of 10m additional service length (measured from the position of the existing street furniture to the position of the new street furniture). Overall service length must not exceed 30m.	New cable — 25mm ² single phase Aluminium concentric cable.
New Street furniture replacing existing street furniture – - existing service cable less than 16mm ² Aluminium, 0.0225in ² copper or 15mm ² copper	Extension to service less than or equal to 3m.	New cable — 4mm ² Copper concentric cable
	Extension to service greater than 3m.	The existing 4mm ² copper service shall be pot-ended adjacent to the main and a new 25mm ² aluminium concentric service installed.

6 ALTERATIONS TO EXISTING SERVICES TO STREET FURNITURE

6.1 Replacement or relocation of Existing Street Furniture

Where an item of street furniture is to be replaced the service to the existing

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equipment may, where practicable, be transferred to the new street furniture. This is defined as a **“service transfer”** (see definition in Section 2) and must only be carried out with the cut-out and service cable **dead**. This may require the original service to be cut and pot ended at least 0.5m from the street furniture (**Temporary Disconnection**) to enable safe removal of the existing street furniture and the service to the new item of street furniture straight jointed (**Reconnection**) to the original service.

The size of new section of service cable used will be in accordance with Table 1.

- 6.1.1 New Location Nearer to Service Joint than Existing Equipment
When the new street furniture location is to be nearer to the existing service joint than the original location, the service to the original item of equipment may, where practicable, be reduced in length and transferred to the new street furniture. It should again be noted that installation of the cut-out and service cable in the new street furniture must only be done with the cut-out and service cable **dead**.
- 6.1.2 New street furniture located on the route of the distributing main and further from the service joint than existing furniture

The service may be extended, providing the additional service length does not exceed 10m.

6.2 Existing looped Services

Where a column currently fed via a continuous service loop from a single connection to the LV main is to be replaced, this will only be allowed to be maintained if the following criteria is met:

- The street furniture is replaced in a like for like position.
- There are no more than five columns in the consecutive looped services.
- Existing cable is standard.

Where the criteria above cannot be met, the replacement street furniture will be connected to a dwarf pillar or column situated at the back of the footpath as close as possible to the nearest distributing main and then privately fed by the Lighting Authority.

6.3 Non Standard Unsuitable Cables and Switched Wire Systems

Street furniture can be connected via non-standard cables such as PVC insulated SWA cable. These can be extended if in good condition. Note PVC insulated SWA services are not normally owned by SSEPD.

Historically, supplies to some street lights have been provided from a fifth core

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within the LV main cable. This fifth wire would have been controlled by a time switch usually located in a feeder pillar or secondary substation. In many cases this fifth core has now been jointed onto a phase of the mains cable to permanently energise the fifth core. Where this is the case links will not be installed in underground distribution boxes (link boxes).

If a switch wire connection is removed from a time clock controlled piece of street furniture, the lighting authority should be notified to enable them to provide alternative arrangements for control of the item.

7 DISCONNECTION OF STREET FURNITURE

7.1 Permanent Disconnection

When permanent disconnection of an item of street furniture, e.g. a street lighting column, is required, the service cable shall be traced back from the column to the service joint. The service cable shall then be cut and pot ended alongside the service joint.

7.2 Temporary Disconnection

When a service cable is to be reused a temporary disconnection of an item of street furniture is permitted. The service cable shall be cut and pot ended at least 0.5m clear of the street furniture.

The time between disconnection and reconnection shall be a maximum of two weeks. If disconnection is required for longer, this should be treated as a permanent disconnection and a new connection to the nearest low voltage distributing main will be required for any new equipment. Similarly, where reconnection following temporary disconnection has not taken place within two weeks of the disconnection, the original service should be permanently disconnected and pot ended beside the LV mains cable.

8 EARTH LOOP IMPEDANCE

8.1 Where the circuit has been designed in accordance with table 1 it will not be necessary to calculate the voltage drop or earth fault loop impedance to the first lamp column. If subsequent columns are connected to the outgoing way of the cut-out this may be required to ensure that correct operation of the lighting circuitry and fuse operation within 5 seconds is achievable.

8.2 Both TN-S and TN-C-S earthing requirements need the earth fault loop impedance to be sufficiently low to operate a cut-out fuse in five seconds or less (BS 7671:refers). The earth fault loop impedance shall be measured and the maximum size of cut-out fuse selected in accordance with Table 2. Table 2 is calculated for BS 88 type gG fuses. Where fuses to other types are used it will be necessary to calculate the maximum earth fault loop impedance from the characteristic curves.

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8.3 Table 2: Maximum Earth Fault Loop Impedance for BS 88 type gG fuses.

Fuse Rating (A)	6	10	16	20	25
Maximum Earth Fault Loop Impedance (Ω)	17.48	14.20	4.94	3.67	2.74

9 PROTECTION, MARKING OR INDICATION OF THE PRESENCE OF A CABLE

- 9.1 All new, diverted or reused service cables shall be identified in the ground by placing the cable in a duct or by overlaying the cable with protective tiles or warning marker tape or by a suitable combination of such measures.
- 9.2 Where a service cable is being diverted or reused only that part of the cable which has been excavated needs identifying in accordance with the above.

10 FINAL RECORDS

- 10.1 The position and depth of new, diverted or reused service cables must be recorded to allow them to be transferred to the SSEPD GIS system. SSEPD documentation PR-PS-049 refers.

11 ASSOCIATED DOCUMENTATION

Document Reference	Document Title
TG-PS-886	Planning and Design Guidance for Low Voltage Networks and Associated 11kV Distribution Substations
TG-PS-831	Miscellaneous Material Lists for use by Third Parties..
TG-PS-780	Low voltage joint construction jointing diagrams for use by ICPs
TG-PS-814	Technical Guidance for joints and terminations for electricity cables used during the installation of new connections

12 APPLICABLE STANDARDS

- 12.1 Third Parties must obtain copies of non SSEPD Standards, such as BS or ENA documents, from the issuing organisations at their own expense. These documents may be subject to copyright.
- 12.2 Documents for use by third parties are classified as Public and are available on the SSEPD website,
<http://www.ssepd.co.uk/Library/ConnectionsUsefulDocuments/>
- 12.3 Documents not displayed on the internet are not publically available as they are deemed not to be needed by third parties. Where third parties require copies of these SSEPD documents they can be requested from

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the SSEPD Power Systems Document Administrator, Inveralmond House, 200 Dunkeld Road, Perth PH1 3AQ.

- 12.4 There will be a cost of £150 for each copy of each document (irrespective of size). This cost is due to the administration required to ensure that updates to the documents (which are controlled) are sent out to third parties.

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