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# Electricity Specification 400 S14

Issue 5 September 2025

## Shorting and Storage Caps for de-energised cable ends

## Amendment Summary

| ISSUE NO. DATE | DESCRIPTION |
|---|---|
| **Issue 3**<br><br>**January 2022** | The new template for Engineering Specification Documents has been applied.<br>Storage Caps, Transmission Cable and Pilot Cable Shorting kits added.<br>All information has been reviewed and updated where appropriate.<br><br>Prepared by: Philip Howell<br>Approved by: Policy Approval Panel<br>and signed on its behalf by Steve Cox, DSO Director |
| **Issue 4**<br><br>**June 2024** | The new template for Engineering Specification Documents has been applied.<br>CC163798 Out of Commission HV earthing kit added<br><br>Prepared by: Philip Howell<br>Approved by: Policy Approval Panel<br>and signed on its behalf by Paul Turner, PAP Chairperson |
| **Issue 5**<br><br>**September 2025** | Section 6.3 on Conductive Service Cable Caps added<br><br>Prepared by: Philip Howell<br>Approved by: Policy Approval Panel<br>and signed on its behalf by Paul Turner, PAP Chairperson |

# Contents

# 1 Introduction

This Electricity Specification covers the supply of cable shorting kits and storage caps for use on redundant, out of commission or non-commissioned cables installed on the electricity distribution network (Network) owned by Electricity North West Limited, as Distribution Licensee, herein referred to as SP Electricity North West.

# 2 Scope

The Specification covers the material, construction and testing requirements for cable shorting kits and cable storage caps to be used on cables from LV up to 132 kV. The kits are designed for use on Dead cables to prevent moisture ingress for cables in storage (storage cap), and to prevent any accidental energisation of service cables (conductive caps) or mains and HV cables not in use by shorting out the metallic conductors and sheaths (shorting caps).

General Heat Shrink components including end caps for use on live cables are covered in a separate specification ES400HS1.

# 3 Definitions

| | |
|---|---|
| **Approval** | Sanction by the Electricity North West Circuits Policy Manager that specified criteria have been satisfied |
| **Conductive Cap** | A device to seal end of a cut service cable against moisture ingress and to provide a low resistance path between conductors and earth screen in order to give a low insulation resistance reading on any service cable which is out of commission or not yet in service. |
| **Contract** | The agreement between Electricity North West and the Contractor for the execution of the Works including therein all documents to which reference may properly be made in order to ascertain the rights and obligations of the parties under the said agreement. |
| **Contractor** | The person or person's firm or company, including personal representatives, successors and permitted assigns, who's Tender has been accepted by Electricity North West. |
| **Specification** | The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract. |
| **Shorting Cap** | A device to seal end of a cut mains or HV cable against moisture ingress and to prevent the cable becoming energised by shorting out all metallic conductors and sheaths such that an immediate short circuit would occur and activate protection on the circuit. |
| **Storage Cap** | A polymeric or elastomeric cap fitted over the end of a cut cable to seal against moisture ingress |

| | |
|---|---|
| **Supplier** | Any person or person's firm or company who supplies goods to Electricity North West or to its Contractor. |
| **Tender** | An offer in writing to execute work or supply goods at a fixed price. |
| **Tenderer** | The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by Electricity North West to submit a Tender. |

# 4 General Requirements for Approvals and Testing

## 4.1 Product not to be Changed

Compliance with this clause shall be in accordance with ES001.

## 4.2 SP Electricity North West Limited Technical Approval

Compliance with this clause shall be in accordance with ES001.

## 4.3 Quality Assurance

Compliance with this clause shall be in accordance with ES001.

## 4.4 Formulation

Compliance with this clause shall be in accordance with ES001.

## 4.5 Identification Markings

Compliance with this clause shall be in accordance with ES001.

## 4.6 Minimum Life Expectancy

The products detailed within this specification are consumable items, however wherever relevant, items used on assets installed on the network should perform their intended function for the same life period as the whole equipment, which is typically 60 years.

Products which have a shelf life shall be clearly identified with the expiry date on the packaging

## 4.7 Product Conformity

Compliance with this clause shall be in accordance with ES001.

## 4.8 Confirmation of Conformance

The Tenderer shall complete the conformance declaration sheets in Appendix B.

Failure to complete these declaration sheets may result in an unacceptable bid.

# 5 Requirements for Type and Routine Testing

Compliance with this clause shall be in accordance with ES001.

## 5.1 Requirement for Type Tests at Suppliers Premises

Compliance with this clause shall be in accordance with ES001.

## 5.2 Requirement for Routine Tests at the Supplier's Premises

Compliance with this clause shall be in accordance with ES001.

# 6 Technical Particulars

## 6.1 Cable Shorting Kits

### 6.1.1 General Requirements

Cable Shorting Kits shall provide a means to quickly "short out" all metallic conductors in cut cable ends and provide adequate sealing against ingress of moisture or other contaminants.

They shall be provided in kit form with all necessary components included.

The range of cable shorting cap kits covered by this specification are covered in the information given in Appendix A. The stated "recovered" dimensions for achieving the minimum cable diameter are critical; the expanded dimensions can be larger than those specified.

The end caps shall comply with ENA TS 09-11. The inside surface of the end caps shall be lined with hot-melt adhesive to ENA TS 09-11.

The heat shrink tubing shall be coloured green and shall have a minimum expanded length of 200mm long and shall comply with requirements for thin wall heat shrink tubing to ENA TS 09-11.

The nails shall be hardened steel clout nails to BS EN 10230-1 with dimensions shown in Appendix A

**NOTE:** Coldshrink alternatives may be offered for approval. However, in this case, kits shall be supplied with self-amalgamating waterproof tape (in place of adhesive). The tape shall be 500mm long and 20mm wide (minimum).

The tinned copper braid shall have the following dimensions (+5%, -0%):

- Minimum width of 12mm.
- Minimum length of 150mm.
- Minimum thickness of 1mm.
- Minimum cross-sectional area (CSA) of 6mm$^2$.

- Minimum diameter of individual wires of 0.15mm.
- Sufficient width, length and thickness (which may be greater than the minima specified above) to meet the requirements for continious current rating and short circuit withstand tests detailed below.

### 6.1.2 Continuous Current Rating of Tinned Copper Braid

- The tinned copper braid shall have a continuous current rating of 66 Amps in still air at an ambient temperature of 20ºC
- The temperature of the braid shall not exceed 76ºC when carrying the continious current rating.

### 6.1.3 Fault Current Withstand of Tinned Copper Braid

- The initial temperature at start of test shall be ambient at 20ºC
- The test shall be done in still air.
- A short circuit current shall be 600 Amps for 1 second shall be applied to the braid.
- Repeated tests of 600 Amps for 1 second shall be carried out when the braid has cooled to 70ºC.
- The braid shall be capable of withstanding six test cycles without any deleterious effects, i.e. cooling to 70ºC and then applying the short circuit current for 1 second again
- The temperature of the braid shall not exceed a maximum of 160ºC during any of the test cycles.

## 6.2 Out of Commission HV Cable Earthing/Shorting Kit

This kit is intended to short out the conductors and sheath of HV lead sheathed cables which are out of commission and also provide a suitable earth connection from the cables metallic sheath so it can be used as a supplementary earth electrode.

Details of the components in the kit are found in drawing ES400S14 D002.

## 6.3 Conductive Cable Caps (for LV service cables only)

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Conductive cable caps shall provide adequate protection against the ingress of moisture and contaminants for a range of LV service cables, and in addition, due to semi-conductive cap material together with conductive mastic applied within the cap, should provide a low resistance path between the exposed conductors and screen.
They are for installation on Dead service cables only which have been cut as they are being abandoned (OOC), or not yet connected.
When installed on suitable prepared ends to expose bright metal of the conductors, the mastic and cap material should provide a low insulation resistance reading during any test made before attempting to connect this cable.
The low insulation resistance test result should act as a “backstop” should the service cable be incorrectly identified for reconnection to the Live network.

### 6.3.1 Requirements

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Conductive Service Caps shall consist of a Heat Shrink Conductive Cap complying to ENA TS 09-11 with a suitable conductive mastic placed in the end. The cap shall be printed in a minimum of two locations around the circumference with an “electrical flash” mark.

The Conductive service Caps shall be cables of accommodating the range of LV service cables used by SP Electricity North West from 4mm$^2$ single phase up to 35mm$^2$ three phase and all corresponding imperial equivalents. If required, heat shrink build up tubes can be provided in the kits for smaller cables.

## 6.4 Cable Storage Caps

### 6.4.1 Requirements

Cable Storage caps should provide adequate protection of cut cable ends against the ingress of moisture and contaminants for a range of cables up to 132 kV. They are for installation on Dead cables only.

The range of cable storage caps covered by this specification are covered in the information given in Appendix A. The stated “recovered” dimensions for achieving the minimum cable diameter are critical; the expanded dimensions can be larger than those specified.

### 6.4.2 Heat Shrink Caps

Heat shrink end caps shall comply with ENA TS 09-11. The inside surface of the end caps shall be lined with hot-melt adhesive to ENA TS 09-11.

### 6.4.3 Cold Applied Caps

The cold applied end caps shall be made from an elastomeric material that will protect the cable from moisture contamination and corrosion and shall be black in colour. The Tenderer shall provide details of the material at the time of Tender.

Cold applied end caps expanded and loaded onto a removable core shall be preferred.
Other cold applied methods may be considered.

A reusable or recyclable removable core shall be preferred.

## 6.5 Product Marking and Labelling

End caps used in Cable Shorting kits, or as storage caps shall be marked with the following information:

- Manufacturer's name.
- The manufacturer's batch number (for quality assurance traceability).
- The expanded size and recovered size of the end cap in millimetres.
- Other information can also be provided optionally such as manufacturers part number , but there shall be no text or "live flash" marking included which may indicate a live cable end.

Green Heat Shrink tubing used in Cable Shorting kits should be marked with the following information:

- The manufacturer's batch number (for quality assurance traceability).

The letters and figures shall consist of upright block characters and shall appear at least once in a prominent position. The size of the letters and numerals shall not be less than 15% of the nominal overall expanded diameter but in no case greater than 13mm.

The Tenderer shall state at the time of tender how the cable shorting kits and storage caps are packaged for delivery.
All packaging shall be sufficiently durable giving regard to the function, reasonable use and contents of the packaging.

Any packaging shall be labelled with the following information as a minimum:

- Manufacturers name.
- Manufacturers Product code.
- SP Electricity North West Commodity Code.
- Expiry date of use, if applicable.
- A description of the contents.
- Minimum and maximum storage temperature.
- Any necessary hazard symbols required under COSHH Regulations.

The Tenderer can also provide other optional information such as a QR-code or equivalent containing/allowing access to fitting instructions or data sheet. Details of these additional information shall be provided at time of Tender.

# 7 Samples

The Tenderer shall submit samples for approval during the tender as required by SP Electricity North West.

Such samples shall remain the property of SP Electricity North West.

# 8 Documents Referenced

All references to documents listed below are to the latest versions, unless stated otherwise

| DOCUMENTS REFERENCED | |
|---|---|
| **Health and Safety at Work Etc Act 1974.** | |
| **Control of Substances Hazardous to Health Regulations 2002.** | |
| **Manual Handling Operations Regulation 1992.** | |
| **BS EN ISO 9000** | Quality management systems. |
| **BS EN ISO 14001: 2004** | Environmental Management Systems. |
| **ENA TS 09-11** | Heat Shrinkable Insulating Materials for use with 600/1000V Cables and Accessories |
| **BS EN 10230-1** | Steel Wire Nails Part 1: Loose Nails for General Applications |
| **CP311** | Approval Policy and Process |

# 9 Keywords

Shorting, Storage, Cap , Sealing

# Appendix A – Scope of Materials

The following equipment is currently approved for use on Electricity North West Network.
For details on individual components in each shorting kit – refer to drawings on next pages.

| ITEM | | COMMODITY CODE |
|---|---|---|
| 1 | **Shorting kit MC1**<br>for multi core cables with overall diameters between 30mm and 60mm | **163786** |
| 2 | **Shorting kit MC2**<br>for multi core cables with overall diameters between 55mm and 80mm | **163787** |
| 3 | **Shorting kit SC3**<br>for single core cables with overall diameters between 27mm and 46mm (set of three phase ends) | **163788** |
| 4 | **Shorting kit SC4**<br>for single core cables with overall diameters between 41mm and 72mm (set of three phase ends) | **163789** |
| 5 | **Transmission Cable Shorting Kit TC5**<br>for transmission cables with overall diameters between 70mm and 125mm (for single/three phase cable – one cap in kit) | **163800** |
| 6 | **HSL Shorting Kit**<br>for HSL 3 core 33 kV cables only | **163801** |
| 7 | **Pilot Cables Shorting Kit PC1**<br>for 7 to 61 pair copper telecom cables with overall diameters between 15mm and 40mm | **163812** |
| 8 | **Out of commission HV cable Earthing/Shorting Kit**<br>to allow use of redundant pilc cable metallic sheath as a supplementary earth electrode | **163798** |
| 9 | **Heat Shrink Storage Cap for Cable Diameters 8mm-18mm** | **163790** |
| 10 | **Heat Shrink Storage Cap for Cable Diameter 16mm-32mm** | **163791** |
| 11 | **Heat Shrink Storage Cap for Cable Diameter 33mm-60mm** | **163792** |
| 12 | **Heat Shrink Storage Cap for Cable Diameter 50mm-95mm** | **163793** |
| 13 | **Cold shrink Storage Cap for Cable Diameter 12mm-17mm** | **163794** |
| 14 | **Cold shrink Storage Cap for Cable Diameter 17mm-24mm** | **163795** |
| 15 | **Cold shrink Storage Cap for Cable Diameter 25mm-45mm** | **163796** |
| 16 | **Cold shrink Storage Cap for Cable Diameter 46mm-75mm** | **163797** |
| 17 | **Conductive Service Cable Cap kit (set of 5 cap ends)**<br>Suitable for all single and three phase service cables up to 35mm$^2$ | **163829** |

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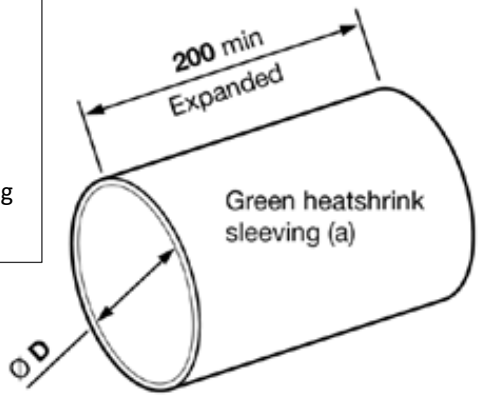
| Commodity Code | Kit Ref. | Heat Shrink End Cap (Item ( c ) | | | | Green Heat Shrink Sleeve Diameter (Item (a) | | Quantity per kit | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | A (length) | B (Inner Diameter) | | C adhesive depth | | | ( a ) | ( b ) | ( c ) | (d) | ( e ) |
| | | Recovered (min.) | Expanded | Recovered (min.) | min. | Expanded | Recovered (min.) | | | | | |
| | | +/-5mm | +/-5mm | mm | mm | mm | mm | | | | | |
| 163786 | MC1 | 150 | 65 | 30 | 50 | 80 | 40 | 1 | 1 | 1 | 6 | 0 |
| 163787 | MC2 | 160 | 105 | 45 | 80 | 100 | 50 | 1 | 1 | 1 | 6 | 0 |
| 163788 | SC3 | 150 | 55 | 25 | 80 | 50 | 25 | 3 | 3 | 3 | 0 | 12 |
| 163789 | SC4 | 150 | 75 | 35 | 80 | 80 | 40 | 3 | 3 | 3 | 0 | 12 |
| 163800 | TC5 | 160 | 150 | 75 | 80 | 150 | 75 | 1 | 1 | 1 | 7 | 0 |
| 163801 | HSL | 150 | 75 | 35 | 80 | 80 | 40 | 3 | 3 | 3* | 8 | 0 |
| 163812 | PC1 | 150 | 50 | 15 | 50 | 60 | 30 | 1 | 1 | 0 | 3 | 0 |

***Note:**
Kit HSL copper braids should be min. 400mm long
Kit HSL also requires additional components:

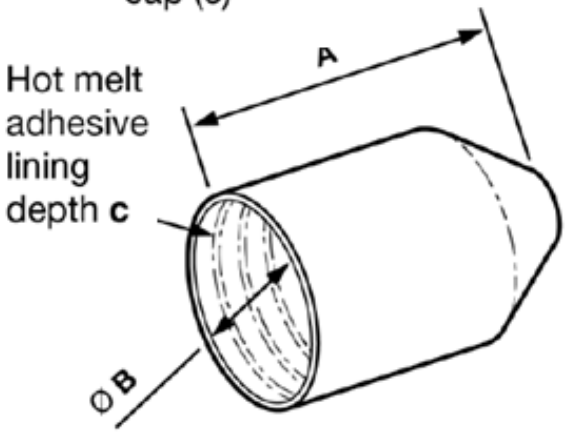
- 3 x Constant Force Spring 25mm diameter
- 1 x Stainless Steel worm drive lamp 75-125mm dia.
- 1 x Heat Shrink 3 core breakout boot 170/60
- 1 x Tinned Copper mesh 50mm wide a 1000mm long
- 3 x Mastic Sealing Strip 25mm wide x 150mm long

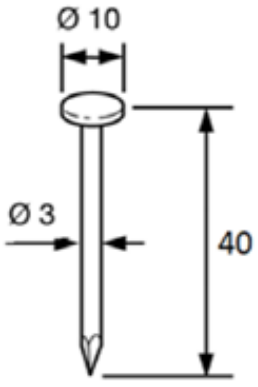
Kit PC1 green heat shrink sleeve is 100mm long



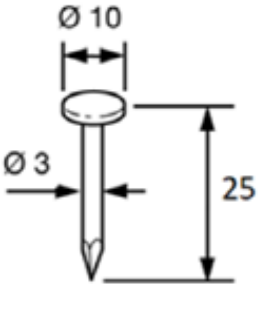


Tinned copper braid (b)



NAIL (d)



NAIL (e)

Refer to CP411Part 1, Standard Technique 16-2 for details on use of this kit

## Details of Cable Shorting Kits

electricity north west

Scale: n.t.s

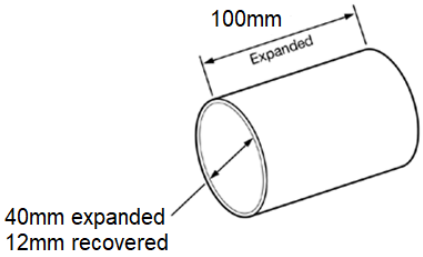
Drawn: PPH
Approved:

Drawing Number: ES400 S14 – D001

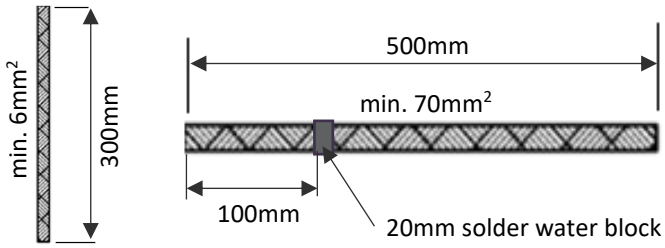
## Contents of Kit:

**2pc – Medium wall heat shrink tube, adhesive lined 40/12 x 100mm**
**4pcs – Butyl mastic sealing tape 30mm wide x 400mm long**
**2pcs – Tinned copper flat braid, 70mm² x 500mm with a 20mm solder waterblock at 100mm from one end**
**1pcs – Tinned copper flat braid, 6mm² x 300mm**
**6pcs – Galvanised Clout Nails 40mm x 3mm diameter**
**1pc – Tinned copper mesh tape, 50mm wide x 2000mm**
**1pc – S/S worm drive clamp 60-95mm diameter range**
**1pc – Constant Force Spring 40-70mm diameter range**
**1pc – Beryllium Copper alloy serrated strip, 2mm thickness, 25mm wide x 300mm**
**2pc – Brass Tunnel connector 70-95mm²**

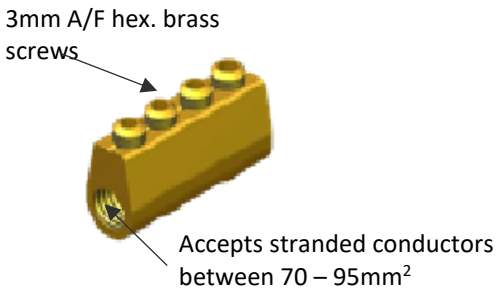
**Packed together in poly bag with label**



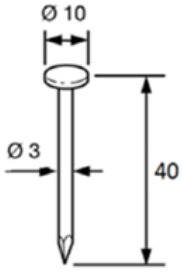

**Medium wall adhesive lined heat shrink tubing**




**Flat Tinned Copper Braid details**




**Brass mechanical tunnel connector details**




**Galvanised Clout Nail details**

Refer to CP411Part 2, Standard Technique 63 for details on use of this kit

# Details of HV Out of Commission Earthing/Shorting Kit Commodity Code 163798

Scale: n.t.s

Drawn: PPH
Approved:

Drawing Number: ES400 S14 – D002

# Appendix B – Conformance Declaration

## SECTION-BY-SECTION CONFORMANCE WITH SPECIFICATION

The Tenderer shall declare conformance or otherwise for each product/service or range of products/services, section-by-section, using the following Conformance Declaration Codes.

**Conformance Declaration Codes:**

| | |
|---|---|
| **N/A =** | Clause is not applicable/appropriate to the product/service. |
| **C1 =** | The product/service conforms fully with the requirements of this clause. |
| **C2 =** | The product/service conforms partially with the requirements of this clause. |
| **C3 =** | The product/service does not conform to the requirements of this clause. |
| **C4 =** | The product/service does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform. |

**Manufacturer:**

**Product/Service Description:**

**Product/Service Reference:**

**Name:**

**Company:**

**Signature:**

| SECTION-BY-SECTION CONFORMANCE | | | |
|---|---|---|---|
| **Section** | **Section Topic** | **Conformance Declaration Code** | **Remarks * (must be completed if code is not C1)** |
| **4.1** | **Product not to be Changed** | | |
| **4.2** | **SP Electricity North West Technical Approval** | | |
| **4.3** | **Quality Assurance** | | |
| **4.4** | **Formulation** | | |
| **4.5** | **Identification Markings** | | |
| **4.6** | **Minimum Life Expectancy** | | |
| **4.7** | **Product Conformity** | | |
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| **5.2** | **Requirement for Routine Tests at the Supplier's Premises** | | |
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| **6.1.3** | **Fault Current Withstand of Copper Braid** | | |
| **6.2.1** | **Requirements** | | |
| **6.2** | **OOC HV Cable Shorting/Earthing Kit** | | |
| **6.3** | **Conductive Service Cable Caps** | | |
| **6.4.2** | **Heat Shrink Storage Caps** | | |
| **6.4.3** | **Cold Applied Storage Caps** | | |
| **6.5** | **Product marking and Labelling** | | |
| **7** | **Samples** | | |

* Applicable specifications shall be stated in the Remarks column where alternatives are quoted within a section. The Remarks column shall also be used to indicate cases where the products or services exceed the quoted specifications.