



# Technical Specification PO5

Issue 5 2018

Protection of telecommunication lines from power lines

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**Operations Directorate  
 Energy Networks Association  
 6th Floor, Dean Bradley House  
 52 Horseferry Rd  
 London  
 SW1P 2AF**

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First published, as two Engineering Recommendations PO 1 (1975) and PO 2 (1975) based on BT memoranda: The Protection of British Telecom Lines from High Voltage Power Lines and The Protection of British Telecom Lines from contact with Low or Medium Voltage Power Lines.

**Amendments since publication**

Issue	Date	Amendment
Issue 1	2004	Consolidated ER PO 1 & ER PO 2 into one document ENA TS PO5.
Issue 2	June, 2007	Identical to BT document EPT/PPS/B026 and supercedes ER PO 1, ER PO 2 and ENA TS PO5 Issue 1.
Issue 3	2010	Change to the method of expressing proximities to LV power lines. It also introduced the concept of Telecommunications Providers, which includes Communication Providers in addition to BT.
Issue 4	January, 2013	Incorporated requirements for suppression of electrical interference from high voltage power lines that cross telecommunication lines previously documented in ENA ER L15/6, which was withdrawn.
Issue 5	2018	<p>Revision of Issue 4 to improve clarity in interpreting the requirements, in the light of on-going operating experience. The technical intent remains unchanged.</p> <p>Specification limited to proximities and crossings of TP lines to DNO HV power lines up to and including 132 kV.</p> <p>This issue includes the following principal technical changes.</p> <p>Clause 2 added. References updated, deleted or added as relevant.</p> <p>Clause 3: Terms and definitions for “effectively insulated conductor” and “lightly insulated conductor” added. Minor amendment to the wording of: “covered conductors” to align with the definitions of effectively and lightly insulated conductors.</p> <p>Term “open wire” amended to “bare wire”, definition unchanged. Instances of “open wire” in the document amended to “bare wire”.</p> <p>Term and definition for “sufficiently insulated TP conductor” added to apply to TP conductors. Instances of “insulated conductor” relating to power conductors in the document classified as “effectively” insulated”,</p>

	<p>“covered” and “lightly insulated” conductors, as appropriate, to align with the terminology of TS 43-8.</p> <p>Clause 4.1: Text added that all parties to follow guidance in HSE GS6. Sizes of exclusion zones included and requirement added that to work within the exclusion zone operators shall obtain the consent of the DNO.</p> <p>Clause 5: Guidance added to include crossings where the crossing angle is less than 90° when assessing the level of inductive interference in the TP line. Footnote added to refer to ENA EREC S37 and BT document EBT/PPS/B018 for guidance on when there is a risk that hazardous voltages may be induced.</p> <p>Clause 6:</p> <p>(i) Reference to ENA TS 43-8 added regarding safety clearances to overhead lines.</p> <p>(ii) Requirement added that separations required to meet induced voltage requirement in Clause 5 shall take preference over the minimum values.</p> <p>Clause 7: Requirement added that sufficient clearance to be provided to street furniture, chambers, joint boxes etc. and any excavations to maintain a minimum clearance of 2 m to the other party’s plant.</p> <p>Annex A: Requirements limited to crossings and proximities where the DNO HV power conductors are either bare wire or lightly insulated covered HV conductors. All requirements for effectively insulated HV conductors contained in Annex B.</p> <p>Clause A.1.2 (Issue 4, Clause A1.3): Note added to clarify that the 3.5 m minimum separation in Figures A2 and A3 is not intended to indicate that this is the minimum safety clearance between the TP line and power conductors.</p> <p>Clause A.2.1 (Issue 4, Clause A2.1):</p> <p>(i) Requirement added that preferred crossing angle is 90° but an angle between 60° and 120° is acceptable, subject to calculation to confirm that the induced voltage into the TP line meets the requirements of Clause 5.</p> <p>(ii) Note added to state that the separation distances shown in the Figures in Clause A.2 apply also to legacy bare wire TP lines subject to the power conductor and any associated plant being effectively insulated.</p> <p>Clause A.2.2: Requirements for use of TP conductors revised to align with current TP practice.</p> <p>Clause A.2.3 (Issue 4, Clause A2.9): Additional clarification below Table A.1 about the use of sag data when a TP is planning a crossing. Guidance added to consider the effects of ambient temperature, ice loading and a 45 degree swing of the TP conductor to ensure minimum separation requirements are met under all conditions.</p> <p>Clause A.2.3 (Issue 4, Clause A2.10): Requirement added that minimum clearance shall be 1.8 m to any bare live plant items, e.g. transformers, switchgear, jumper connections, etc. mounted on the support. Where DNO adds plant items to a line support, as the second comer, that will infringe the minimum separation, the DNO to contact the TP to agree the actions necessary to establish the required clearance. Where the DNO is the Second Comer it will meet the cost of any additional protection needed to safeguard the TP’s plant and staff.</p> <p>Clause A.2.4 (Issue 4, Clause A2.11):</p> <p>(i) Requirements amended to state that the horizontal separating distance between the nearest power conductor and the TP pole at a</p>
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	<p>crossing to be not less 3.0 m. A reduced horizontal separation of not less than 1.8 m may be permitted, if jointly agreed by the TP and the DNO. Any reduced horizontal separation to ensure that the vertical separating distance between the nearest power conductor and the top of the TP pole is sufficient to give a minimum clearance of 3.0 m to power conductor.</p> <p>(ii) Requirement added that where live metalwork plant items are mounted on the support, the position and height of the TP pole shall ensure a 3.0 m separation to the TP pole top from the nearest HV plant item.</p> <p>(iii) Text added to clarify that the minimum clearances stated for crossings ensure the separation from the top of the TP pole to the power conductor satisfy the minimum safety clearances required by ENA TS 43-8. New figures A5 and A6 added to illustrate the safety clearances.</p> <p>(iv) Requirement deleted for reduced vertical separation of 1.8 m to the top of the TP pole if the power cables conductors are effectively insulated and moved to Annex B to avoid confusion.</p> <p>(v) Requirement added that a reduced horizontal separation below 1.8 m may be permitted if agreed by TP and DNO, subject to overall minimum clearance of 3.0 m being maintained to the top of the TP pole and the TP putting in place a risk assessment procedure to ensure to ensure the safety of its employees.</p> <p>(vi) Requirement added that when determining the minimum separations, a 45 degree swing by the TP conductor shall be considered.</p> <p>Clause B.2 (Issue 4, Clause B1.3): Clause expanded to explicitly state the requirements relate to crossings and proximities at effectively insulated HV conductors. Situations where reduced separating distances may be used are specified.</p> <p>Clause D.1.1: Requirements clarified that crossings are only permitted where either the TP conductor is sufficiently insulated or the DNO LV power line is effectively insulated, for the voltage of the power line.</p> <p>Clause D.1.2:</p> <p>(i) Requirements added that when determining the clearances, a 45 degree swing of the conductors towards each other shall be considered.</p> <p>(ii) Clearances to ABC amended to be 600 mm for both above and below the TP conductor. Table D1 simplified by removing the separate entries where the TP conductors are above or below the LV conductors, as this is now superfluous</p> <p>Clause D.4: New clause of safety and access considerations for LV line separations.</p> <p>Annex F: Deleted and the drawings moved alongside the text where they are referred to in the document.</p> <p>Annex F (Issue 4, Annex G): Title amended to “HV covered conductor types classified as lightly insulated power conductors”. Entries for LV conductors deleted, as not required. Terminology of the Insulation level of the HV conductors amended from “adequate insulation” to “lightly insulated HV power covered conductors”. to align with the use of this term in the document..”</p> <p>Clause G.2 (Issue 4, Clause H2.1): Item b): Requirements on the crossing angle amended to state that the preferred angle is 90° but an angle between 60° and 120° is acceptable, subject to calculation that confirms that the induced voltage into the TP cable under fault conditions meets the requirements of Clause 5.</p>
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		<p>Annex H inserted to capture contact details for Transmission Network Operators.</p> <p>Bibliography added of background documents that are not normative references for the document.</p> <p>Details of all other technical, general and editorial amendments are included in the associated Document Amendment Summary for this Issue (available on request from the Operations Directorate of ENA).</p>
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**Contents**

- Foreword.....8
- 1 Scope .....10
- 2 Normative references.....10
- 3 Terms and definitions.....10
- 4 General requirements .....13
  - 4.1 Maintaining separating distance.....13
  - 4.2 Provision of extra protection.....13
  - 4.3 Fault level information.....14
- 5 Induction between power lines and telecommunication lines.....14
- 6 Crossing and proximities.....14
- 7 Underground lines.....15
- Annex A (normative) Conditions for crossings and proximities of DNO high voltage power lines (with bare wire or lightly insulated covered conductors) and telecommunication lines.....16
  - A.1 Proximities .....16
    - A.1.1 Lines with insufficient insulation to give protection .....16
    - A.1.2 Lines sufficiently insulated to give protection.....19
    - A.1.3 TP stay insulator requirements.....21
    - A.1.4 Proximity of TP underground cables to DNO steel tower lines .....21
  - A.2 Crossings.....21
    - A.2.1 General.....21
    - A.2.2 Insulation requirements TP conductors .....21
    - A.2.3 Minimum separating distance between TP conductor and HV power conductor and support .....22
    - A.2.4 Minimum separating distance between HV power conductor and a TP pole.....24
    - A.2.5 Installation of TP conductors .....26
- Annex B (normative) Conditions for effectively insulated HV aerial (power and pilot) cable crossings and proximities .....27
  - B.1 General.....27
  - B.2 Separating distances .....27
    - B.2.1 Proximities .....27
    - B.2.2 Crossings.....27
- Annex C (normative) Separation of TP cables from high voltage underground power cables .....28
- Annex D (normative) Conditions for crossings and proximities of DNO low voltage power lines and TP telecommunication lines.....29
  - D.1 Crossings.....29
    - D.1.1 General.....29
    - D.1.2 Separating distances.....29
  - D.2 Proximities for cables running parallel, or where attached to buildings.....29
  - D.3 Stays attached to poles carrying low voltage power conductors.....31

D.4 Safety and access considerations for LV line separations.....	32
Annex E (normative) Separation of TP cables from low voltage underground power cables .....	33
Annex F (normative) HV covered conductor types classified as lightly insulated power conductors .....	34
Annex G (normative) Additional requirements for suppression of electrical interference when high voltage power lines $\leq 11$ kV cross TP lines .....	35
G.1 General.....	35
G.2 Technical requirements.....	35
G.3 Procedure for binding in covered conductors at pin insulator positions .....	36
G.4 Consumable materials for binding-in conductors.....	36
Annex H (informative) Transmission Network Operator contact details .....	38
H.1 Transmission Network Operators in the UK .....	38
Bibliography .....	39

## Figures

Figure A1 — Minimum separating distance between the TP Line and HV power line at proximities where there is insufficient insulation to give protection .....	17
Figure A1 (continued) — Minimum separating distance between the TP Line and HV power line at proximities where there is insufficient insulation to give protection .....	18
Figure A2 — Reduced separation at discretion of local managers of the TP and the DNO (HV Lines) at proximities where there is insufficient insulation to give protection.....	19
Figure A3 — Minimum separation at proximities where TP line conductors are sufficiently insulated .....	20
Figure A4 — HV Crossings. Minimum separating distance between TP conductor and the lowermost HV power conductor and power line support .....	23
Figure A5 — HV Crossings. Minimum separating distance between TP pole top and HV power conductor.....	25
Figure A6 — HV Crossings. Minimum separating distance between TP pole top and plant item(s) on HV support.....	26
Figure D1 — Clearances of attachments of TP and DNO LV power lines attached to the same building .....	30
Figure D2 — Location of stay insulators (LV) .....	31

## Tables

Table A.1 — Typical increase in power line conductor sag.....	24
Table D.1 — Clearances for crossings of TP and DNO LV power lines .....	29
Table D.2 — Clearances of attachments of TP and DNO LV power lines attached to the same building.....	30
Table G.1 — Suggested materials for binding-in conductors .....	37

## Foreword

This Technical Specification (TS) is published by the Energy Networks Association (ENA) and comes into effect from the date of publication. It has been prepared under the authority of the ENA Engineering Policy and Standards Manager and has been approved for publication by the ENA Electricity Networks and Futures Group (ENFG). The approved abbreviated title of this engineering document is “ENA TS PO5”.

This document replaces and supersedes Technical Specification PO5 Issue 4 2013.

The specification outlines the requirements for Telecommunication Providers (TPs), Distribution Network Operators (DNOs) for the mutual protection of TP’s telecommunication lines and the DNO’s power lines and also to ensure the safety of employees and customers of the TP, the DNO, and the general public.

This specification is intended for use by the Distribution Network Operators and Telecommunications Providers. Some terminology may have historic references to British Telecom, based on previously established procedures.

This specification does not deal with the joint use of poles procedures, which are the subject of a separate document ENA EREC EB/TP [1].

Where the term “shall” or “must” is used in this document it means the requirement is mandatory. The term “should” is used to express a recommendation. The term “may” is used to express permission. Where the term “shall” is used in this document it expresses a requirement.

NOTE: Commentary, explanation and general informative material is presented in smaller type, and does not constitute a normative element.





## 1 Scope

This specification sets out the general requirements for clearances between telecommunication lines and power lines in order to provide mutual protection of the telecommunications lines and power lines.

This specification applies to power lines operated by Distribution Network Operators (DNOs). This specification does not provide advice on working access clearances, which are covered in separate documents. Additional requirements for suppression of electrical interference from high voltage power lines that cross telecommunications lines are set out in Annex G.

NOTE: For the purposes of mutual protection and clearance between transmission lines (power lines operating above 132 kV) and telecommunication lines, the reader should contact the Transmission Network Operator (refer to Annex H).

## 2 Normative references

The following referenced documents, in whole or part, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

### Standards publications

BS EN 50290-2-24, *Communication cables. Common design rules and construction. PE sheathing*

BS 6485, *PVC-covered conductors for overhead power lines*

BS 7870-5, *LV and MV polymeric insulated cables for use by distribution and generation utilities. Polymeric insulated aerial bundled conductors (ABC) of rated voltage 0.6/1 kV for overhead distribution*

### Other publications

[N1] HSE Guidance Note GS6 (Fourth edition) *Avoiding danger from overhead power lines*

[N2] ENA TS 43-8, *Overhead line clearances*

[N3] ENA TS 43-15, *Insulator binds and equivalent helical fittings for overhead lines*

[N4] ENA TS 43-93, *Line insulators*

[N5] ENA TS 43-122, *XLPE Covered Conductors for Overhead Lines (Having Rated Voltages  $U_0/U$  Greater Than 0.6/1 kV up to and including 19/33 kV)*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### apparatus

either the telecommunications apparatus (including telecommunication lines) of the TP or the apparatus (including power lines) of the DNO as the case may be

### 3.2

#### ABC

LV aerial bundled conductor, a single, helically-wound bundle of LV insulated conductors