

Specification for

Line traps for power line carrier systems

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- British Railways Board
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- Oil Companies Materials Association
- Post Office
- South of Scotland Electricity Board

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- BEAMA Transmission and Distribution Association
- North of Scotland Hydro-Electric Board

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Foreword

This British Standard is technically identical with Publication 353 of the International Electrotechnical Commission.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 General

1.1 Scope

This British Standard gives definitions, requirements, methods of test and recommended values of rated quantities for line traps intended to be inserted into high-voltage transmission lines to prevent undue loss of superimposed carrier signal.

It does not apply to inductors which may be connected to high-voltage transmission systems for other purposes, such as series reactors.

NOTE The titles of the British Standards referred to in this standard are listed on the inside back cover.

1.2 Service conditions

Unless otherwise agreed between the manufacturer and the purchaser, the line trap shall be suitable for operation in the service conditions given below, to which the requirements of this British Standard are related:

- 1) *Exposure*. Outdoor service, exposed to sunshine, rain, fog, hail, frost, snow and ice.

NOTE Severe atmospheric conditions such as salt-spray, industrial pollution, etc., should be covered by special agreement between the manufacturer and the purchaser.

- 2) *Altitude*. A height above sea level not exceeding 1 000 m.

NOTE Provision is made in 3.3 and 3.6 for tests on line traps designed for operation at greater altitudes.

- 3) *Temperature of cooling medium*. An air temperature between -25°C and $+40^{\circ}\text{C}$ inclusive, with average temperatures not exceeding the following:

- + 30°C for the daily average,
- + 20°C for the annual average.

NOTE Provision is made in 3.3 for tests on line traps designed for higher cooling medium temperatures.

- 4) *Wave-shape*. Power-frequency current and voltage of approximately sinusoidal wave-shape.

- 5) *Power frequency*. A power system rated frequency between zero (d.c.) and 60 Hz inclusive.

1.3 Carrier frequency

The limits of carrier frequency shall be the subject of agreement between the manufacturer and the purchaser.

2 Definitions

For the purposes of this British Standard the following definitions apply. For other definitions, reference should be made to BS 4727.

2.1 General definitions

2.1.1

line trap

a piece of electrical apparatus intended for series insertion into a high-voltage line. Its impedance is negligible at the power frequency, so as not to disturb the power transmission, but relatively high over any frequency band appropriate to carrier transmission

a line trap consists of a main coil with a protective device and, usually, a tuning device

NOTE Figure 1 shows an example of a line trap circuit.

2.1.2

main coil

the inductor which carries the power-frequency current

its rated inductance L_N is that value which corresponds to the specified characteristics of the line trap at power frequency

2.1.3

tuning device

a device which serves the purpose of obtaining a relatively high line trap impedance for one or more frequencies or frequency bands. It consists of capacitors with, possibly, inductors and resistors, and is shunt-connected to the main coil

2.1.4

protective device

a device which protects the line trap against transient overvoltages which may otherwise occur across it. It is shunt-connected to the tuning device and the main coil

NOTE Additional protective devices may be associated with tuning devices to protect individual components.

2.2 Blocking terms

NOTE Various power system elements such as transformers, busbars, lines, etc., represent an impedance connected beyond the line trap between line and earth. This impedance in series with the impedance of a line trap constitutes a shunt across the carrier-frequency signal path. The loss in signal power resulting from this shunt depends upon the vectorial sum of the two constituent impedances. In the most unfavourable case, the reactive components of the two impedances may neutralize each other and thus reduce the total shunt impedance to an unacceptably low value. In order to eliminate this possibility, and the further possibility of varying shunting effects arising out of system switching, the tuning devices of line traps may include a resistive element, and line trap performance can be assessed in terms of its effective resistance only.