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SERIES K: PROTECTION AGAINST INTERFERENCE

Primary protector parameters for the surge protection of equipment Ethernet ports

Recommendation ITU-T K.117



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Summary

Recommendation ITU-T K.117 specifies the common-mode, differential mode and common mode to differential mode conversion surge parameter and test circuit requirements of an Ethernet port primary protector. The preferred surge generator voltage levels are 2.5 kV, 6 kV and 12 kV, but the test circuits can be used for any surge voltage environmental. Power over Ethernet (PoE) feed requirements are also given. Ethernet signal performance parameters are not covered and standards such as [b-IEC 60603-7-7] may be used for this purpose.

This Recommendation should be used for the harmonization of existing or future specifications issued by Ethernet surge protective device (SPD) manufacturers, telecommunication equipment manufacturers, administrations or network operators.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T K.117	2016-12-14	5	11.1002/1000/13133

Keywords

Ethernet, in-line SPD, insulation resistance, overvoltage protector, Power over Ethernet (PoE), primary protector, surge protective device (SPD).

* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Primary protector parameters for the surge protection of equipment Ethernet ports

1 Scope

This Recommendation applies to surge protective devices (SPDs) to be used for Ethernet primary protection in surge voltage environments with a peak value of 2.5 kV and above. It covers the following device parameters:

- a) electrical surge
- b) electrical d.c.
- c) identification and marking.

This Recommendation does not deal with:

- a) mountings for SPDs and their effect on characteristics;
- b) mechanical dimensions;
- c) quality assurance requirements;
- d) units containing current limiters;
- e) signal performance parameters, standards such as [b-IEC 60603-7-7] may be used for this purpose;
- f) diagnostic properties such as indicators and status monitor outputs.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T K.44] Recommendation ITU-T K.44 (2016), *Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents – Basic Recommendation*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 common-mode conversion [b-ITU-T K.96]: Process by which a differential mode electrical signal is produced in response to a common mode electrical signal.

NOTE – This definition is based on the definition provided in [b-IEC 60050-161].

3.1.2 common-mode surge [b-ITU-T K.96]: Surge appearing equally on all conductors of a group at a given location.

NOTE 1 – The reference point for common-mode surge voltage measurement can be a chassis terminal, or a local earth/ground point.

NOTE 2 – Also known as longitudinal surge or asymmetrical surge.

3.1.3 connector [b-IEC 14776-153]: Electro-mechanical components consisting of a receptacle and a plug that provide a separable interface between two transmission segments.

3.1.4 differential-mode surge [b-ITU-T K.96]: Surge occurring between any two conductors or two groups of conductors at a given location.

NOTE 1 – The surge source maybe be floating, without a reference point or connected to reference point, such as a chassis terminal, or a local earth/ground point.

NOTE 2 – Also known as metallic surge or transverse surge or symmetrical surge or normal surge.

3.1.5 hard-wired [b-IEC 60601-2-1]: Term used where the features of a system can be modified only by physically removing and re-routing wires.

3.1.6 insulation [b-IEC 60664-2-1]: That part of an electrotechnical product which separates the conducting parts at different electrical potentials.

3.1.7 isolating transformer [b-IEC 60065]: Transformer with protective separation between the input and output windings.

NOTE – Isolating transformers can be divided into three groups; mains, switched mode and signal (e.g., Ethernet data).

3.1.8 impulse limiting voltage, V_P [b-ITU-T K.28]: Highest value of voltage across the terminals of the SPD during the application of a specified impulse.

NOTE – Also called voltage protection level or measured limiting voltage.

3.1.9 in-line SPD [b-ITU-T K.28]: A two-port SPD connected in series with the service feed.

3.1.10 insulation resistance (effective) [b-ITU-T K.28]: Quotient of the voltage applied to a designated terminal pair, V_{IR} , by the current, I_{IR} , drawn from the applied voltage.

3.1.11 impulse generator charge voltage, V_C [b-ITU-T K.82]: Value of impulse generator charging voltage.

3.1.12 impulse withstand voltage [b-IEC 60664-2-1]: Highest peak value of impulse voltage of prescribed form and polarity applied to a circuit or equipment, which does not cause degradation or result in breakdown or flashover.

3.1.13 let-through current [b-ITU-T K.28]: In-line SPD peak short-circuit output current when a specified impulse is applied to the SPD input.

3.1.14 overvoltage [b-IEC 60664-2-1]: Any voltage having a peak value exceeding the corresponding peak value of maximum steady-state voltage at normal operating conditions.

3.1.15 parameter [b-IEC 61643-341]: Device descriptor that is measurable or quantifiable, such as a characteristic or rating.

3.1.16 port [b-IEC 60050-131]: Access to a device or network where electromagnetic energy or signals may be supplied or received or where the device or network variables may be observed or measured.

NOTE – An example of a port is a terminal pair.

3.1.17 primary protection [ITU-T K.44]: Means by which the majority of the surge stress is prevented from propagating beyond a designated location (preferably the building entrance point).

3.1.18 rated peak impulse current [b-ITU-T K.28]: Maximum value of peak impulse current of specified amplitude and waveshape that may be applied without causing degradation.

3.1.19 sparkover [b-IEC 60050-212]: Disruptive discharge in a gaseous or liquid insulating material.

3.1.20 surge [b-ITU-T K.96]: Temporary disturbance on the conductors of an electrical service caused by an electrical event not related to the service.