SLOVENSKI STANDARD
SIST EN 61803:2001/A2:2016

01-december-2016

Ugotavljanje močnostnih izgub v visokonapetostnih enosmernih (HVDC) pretvorniških postajah s pretvorniki s komutiranjem (IEC 61803:1999/A2:2016) - Dopolnilo A2

Determination of power losses in high-voltage direct current (HVDC) converter stations with line-commutated converters (IEC 61803:1999/A2:2016)

Détermination des pertes en puissance dans les postes de conversion en courant continu à haute tension (CCHT) munis de convertisseurs commutés par le réseau

Ta slovenski standard je istoveten z: **EN 61803:1999/A2:2016**

ICS:

29.200	Usmerniki. Pretvorniki. Stabilizirano električno napajanje	Rectifiers. Convertors. Stabilized power supply

SIST EN 61803:2001/A2:2016 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61803:1999/A2

October 2016

ICS 29.200

English Version

Determination of power losses in high-voltage direct current (HVDC) converter stations with line commutated converters (IEC 61803:1999/A2:2016)

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Bestimmung der Leistungsverluste in Hochspannungsgleichstrom (HGÜ)-Stromrichterstationen (IEC 61803:1999/A2:2016)

This amendment A2 modifies the European Standard EN 61803:1999; it was approved by CENELEC on 2016-06-29. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 22F/374/CDV, future IEC 61803:1999/A2, prepared by SC 22F "Power electronics for electrical transmission and distribution systems" of IEC/TC 22 "Power electronic systems and equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61803:1999/A2:2016.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-04-14
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-10-14

Endorsement notice

The text of the International Standard IEC 61803:1999/A2:2016 was approved by CENELEC as a European Standard without any modification.

IEC 61803

Edition 1.0 2016-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 2

AMENDEMENT 2

Determination of power losses in high-voltage direct current (HVDC) converter stations with line commutated converters

Détermination des pertes en puissance dans les postes de conversion en courant continu à haute tension (CCHT) munis de convertisseurs commutés par le réseau

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FOREWORD

This amendment has been prepared by subcommittee 22F: Power electronics for electrical transmission and distribution systems, of IEC technical committee 22: Power electronic systems and equipment.

The text of this amendment is based on the following documents:

CDV	Report on voting
22F/374/CDV	22F/393A/RVC

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

CONTENTS

5.9 Series filter losse

Replace the entry as follows (to correct the misprint):

5.9 Series filter losses

3.1.1

auxiliary losses

Replace the existing definition by the following new definition and new note:

electric power required to feed the converter station auxiliary loads

NOTE 1 to entry: The auxiliary losses depend on the number of converter units used and whether the station is in no-load operation or carrying load, in which case the auxiliary losses depend on the load level.

3.1.2

no-load operation losses

Replace the term and its definition as follows:

3.1.2
equipment no-load operation losses
losses produced in an item of equipment with the converter station energised but with the converters blocked and all station service loads and auxiliary equipment connected as required for immediate pick-up of load to specified minimum power

3.1.4

operating losses

Replace the existing term by the following new term:

3.1.4
equipment operating losses

3.1.5

rated load

Replace the existing definition by the following new definition and note:

load related to operation at nominal values of d.c. current, d.c. voltage, a.c. voltage and converter firing angle

Note 1 to entry: The a.c. system shall be assumed to be at nominal frequency and its 3-phase voltages are nominal and balanced. The position of the tap-changer of the converter transformer and the number of a.c. filters and shunt reactive elements connected shall be consistent with operation at rated load, coincident with nominal conditions.

3.1.6

total station losses

Replace the existing term and its definition by the following new term, definition and notes:

3.1.6
total station operating losses
sum of all equipment operating losses (3.1.4) and corresponding auxiliary losses (3.1.1) at a particular load level

Note 1 to entry: It is recognised that some purchasers evaluate “total station no-load operation losses” (definition 3.1.8) and total station load losses individually instead of the evaluating “total station operating losses” (definition 3.1.6).

Note 2 to entry: "Operating losses” minus “no-load operation losses” may be considered as being quantitatively equivalent to “load losses” as in conventional a.c. substation practice.

Note 3 to entry: An illustrative example to derive “load losses”, “equivalent load losses” and corresponding “loss evaluation” is given in Annex D.

3.1.7

station essential auxiliary load

Delete, in the definition added by Amendment 1, the Note.

Insert, between 3.1.5 and 3.1.6 the following new entry 3.1.8:

3.1.8
total station no-load operation losses
sum of all equipment no-load operation losses (3.1.2) and corresponding auxiliary losses (3.1.1)

3.2 Letter symbols

Replace the definition of letter symbol α modified by Amendment 1, as follows:

α (trigger/firing) delay angle, in radians (rad)

4.1 Introduction

Delete, in the third sentence of the second paragraph, the additional blank spaces (misprint).

4.3 Operating parameters

Replace the second paragraph as follows:

The losses of HVDC converter stations are classified into two categories, referred to as operating losses (3.1.4 and 3.1.6) and no-load operation losses (3.1.2 and 3.1.8).

Add, to the last sentence of the subclause, the phrase "(without waiting for tap changer movement) to specified minimum power" *as follows*:

Station service loads and auxiliary equipment (e.g. cooling water pumps) shall be assumed to be connected as required for immediate pick-up of load for the converter station (without waiting for tap changer movement) to specified minimum power.

5.1.7 Turn-off losses per valve

Replace the first sentence of the subclause as follows:

These are additional losses due to reverse current flow in the thyristors at turn-off (see Figure 8).

Renumber the Note as Note 1 and add the following Note 2 at the end of the subclause:

NOTE 2 The most part of the thyristor turn-off losses resulting from this mechanism are dissipated within the thyristor itself, although part of the losses may be dissipated in other components such as the damping resistor and valve reactor.

5.2.2 No-load operation losses

Add, after the paragraph, the following new paragraph:

The transformer tap-changer position shall be as defined in 4.3.

Annex B – Typical station losses

Replace, in the table, the first line starting with "Thyristor valves" as follows:

Item	Typical losses at nominal operating conditions %
Thyristor valves	20 – 40

Replace the sentence under the table as follows:

The total station no-load operation losses range from 10 % to 20 % of the total station operating losses at rated power under nominal operating conditions.

Add, between Annex B and Annex C, the following new Annex D: