SLOVENSKI STANDARD
SIST EN 62823:2016/A1:2020

01-julij-2020

Tiristorski ventili za tiristorsko upravljane zaporedne kondenzatorje (TCSC) - Električno preskušanje (IEC 62823:2015/A1:2019)

Thyristor valves for thyristor controlled series capacitors (TCSC) - Electrical testing (IEC 62823:2015/A1:2019)

Thyristorventile für thyristorgesteuerte Reihenkondensatoren (TCSC) - Elektrische Prüfung (IEC 62823:2015/A1:2019)

Valves à thyristors pour condensateurs série commandés par thyristors (CSCT) - Essai électrique (IEC 62823:2015/A1:2019)

Ta slovenski standard je istoveten z: **EN 62823:2015/A1:2020**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
31.080.20	Tiristorji	Thyristors

SIST EN 62823:2016/A1:2020 **en,fr,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 62823:2015/A1

March 2020

ICS 29.240.99

English Version

Thyristor valves for thyristor controlled series capacitors (TCSC) - Electrical testing (IEC 62823:2015/A1:2019)

Valves à thyristors pour condensateurs série commandés par thyristors (CSCT) - Essai électrique (IEC 62823:2015/A1:2019)

Thyristorventile für thyristorgesteuerte Reihenkondensatoren (TCSC) - Elektrische Prüfung (IEC 62823:2015/A1:2019)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of document 22F/518/CDV, future IEC 62823/A1, 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 62823:2015/A1:2020.

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) 2020-10-08
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-01-08

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IEC 62823

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Thyristor valves for thyristor controlled series capacitors (TCSC) – Electrical testing

Valves à thyristors pour condensateurs série commandés par thyristors (CSCT) – Essai électrique

INTERNATIONAL
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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/518/CDV	22F/532/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

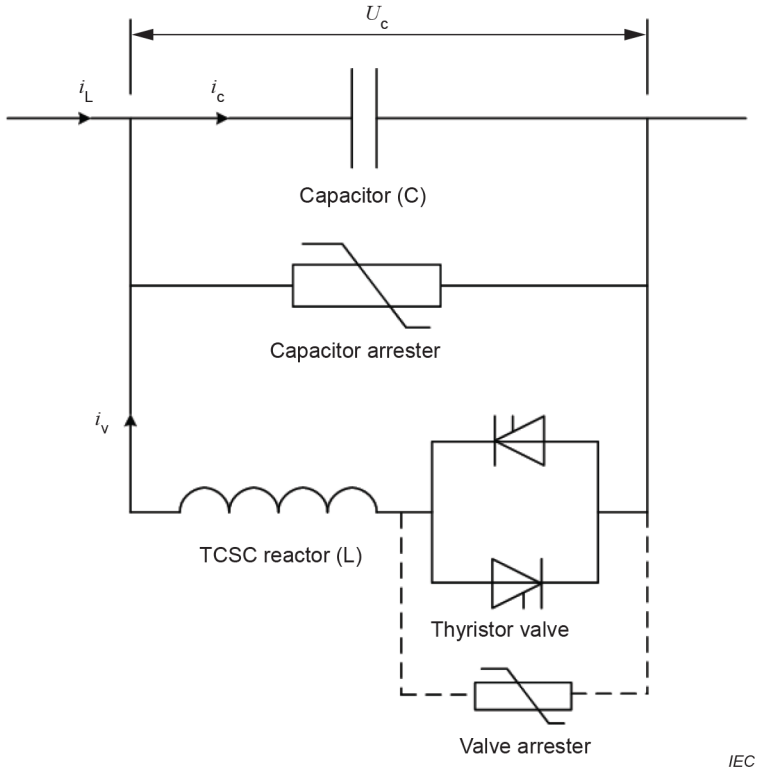
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

3.23
boost factor

Replace the words "divided by" by the word "and".

Figure 2 – TCSC subsegment

Replace the existing Figure 2 by the following new figure:



NOTE Valve arrester is optional.

Figure 2 – TCSC subsegment

Figure 4 – Thyristor valve voltage in a TCSC

Replace the existing Figure 4 by the following new figure:

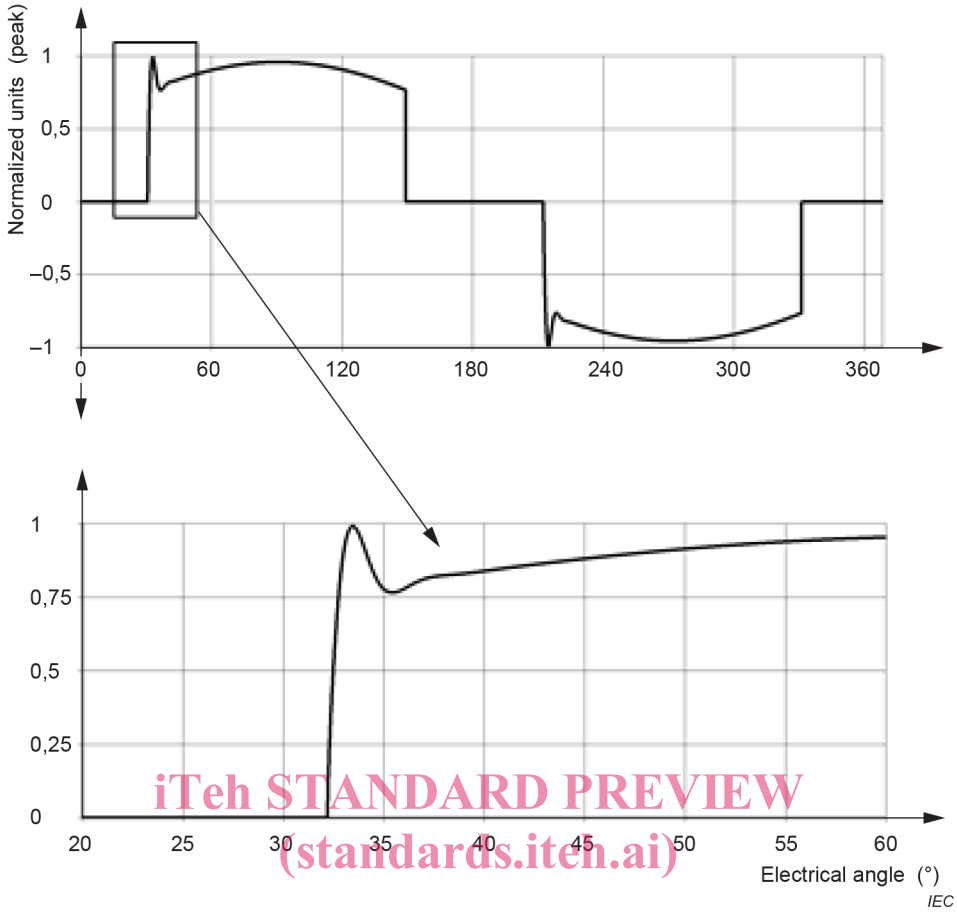


Figure 4 – Thyristor valve voltage in a TCSC

4.2.3.1 Capacitive boost operation mode

Replace the existing text by the following new text:

In TCSC capacitive boost operation mode, the TCSC valve current follows the formulation below:

$$i_v = (-1)^n \cdot \frac{\lambda^2 \cdot I_{L\_peak}}{\lambda^2 - 1} \cdot \left(\cos(\omega_N \cdot t) - \frac{\cos\beta}{\cos(\lambda \cdot \beta)} \cdot \cos(\lambda \cdot \omega_N \cdot t) \right), \qquad n \cdot \pi - \beta \le (\omega_N \cdot t) \le n \cdot \pi + \beta$$

$$i_v = 0 \qquad n \cdot \pi + \beta < (\omega_N \cdot t) < (n+1) \cdot \pi - \beta$$

$$n = 0, 1, 2, 3, \ldots$$

where

λ is the ratio of TCSC subsegment LC branch natural frequency and AC system power frequency, $\lambda = \dfrac{1}{\omega_N \cdot \sqrt{L \cdot C}}$;

I_{L_peak} is the AC system line current;

ω_N nominal angle frequency of AC system;

β is half of the maximum conduction angle of TCSC valves in one direction for capacitive boost at I_{L_peak}.

The rate of current change, di_v/dt, at thyristor turn-on and turn-off derives as follows:

$$\left.\frac{\mathrm{d}i_{\mathrm{v}}}{\mathrm{d}t}\right|_{\omega_{\mathrm{N}}\cdot t=\frac{\pi}{2}+\beta} = \frac{\lambda^2 \cdot I_{\mathrm{L\_peak}}}{\lambda^2 - 1} \cdot \left[\omega_{\mathrm{N}} \cdot \sin\beta - \omega_{\mathrm{N}} \cdot \frac{\cos\beta}{\cos(\lambda\cdot\beta)} \cdot \sin(\lambda\cdot\beta)\right]$$

The peak current through the TCSC valve is equal to:

$$i_{\mathrm{v\_peak}} = \frac{\lambda^2 \cdot I_{\mathrm{L\_peak}}}{\lambda^2 - 1} \cdot \left[1 - \frac{\cos\beta}{\cos(\lambda\cdot\beta)}\right]$$

The capacitor voltage, $U_{\mathrm{C\_N}}$, at thyristor turn-on and turn-off instants is equal to:

$$U_{\mathrm{C\_N}} = \frac{\lambda \cdot I_{\mathrm{L\_peak}}}{\lambda^2 - 1} \cdot X_0 \cdot [\sin\beta - \lambda \cdot \cos\beta \cdot \tan(\lambda\cdot\beta)]$$

where

X_0 is the TCSC subsegment LC branch impedance:

$$X_0 = \sqrt{\frac{L}{C}}$$

where

L is the inductance of TCSC subsegment LC branch (Figure 2);

C is the capacitance of TCSC subsegment LC branch (Figure 2).

The capacitor voltage peak appearing on the TCSC valve, is equal to:

$$U_{\mathrm{P}} = \lambda \cdot I_{\mathrm{L\_peak}} \cdot X_0 \cdot \left[1 + \frac{\lambda \cdot (\cos\beta \cdot \tan(\lambda\cdot\beta) - \lambda \cdot \sin\beta)}{\lambda^2 - 1}\right]$$

The capacitive boost factor of the TCSC subsegment is equal to:

$$k_{\mathrm{B}} = 1 + \frac{2}{\pi} \cdot \frac{\lambda^2}{\lambda^2 - 1} \cdot \left\{\frac{2 \cdot \cos^2\beta}{\lambda^2 - 1} \cdot [\lambda \cdot \tan(\lambda\cdot\beta) - \tan\beta] - \beta - \frac{\sin(2\cdot\beta)}{\beta}\right\}$$

5.1.1.2 Test object

Replace, in the second sentence of the existing first paragraph, the words "valve interface electronics units" *by* "valve base electronics units"*.*

5.2.3 Atmospheric correction factor

Replace, in the existing second and third dash items, the two occurrences of the word "hall" by "enclosure"*.*

Table 2 – List of tests

Delete, in the second row, the word "earth".

Replace, in the third row, second column, the reference "7.2" by "7.3.1".