IEC 62271-101

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

High-voltage switchgear and controlgear – Part 101: Synthetic testing

Appareillage à haute tension – Partie 101: Essais synthétiques

IEC 62271-101:2006/A1:2010

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High-voltage switchgear and controlgear – Part 101: Synthetic testing

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FOREWORD

This amendment has been prepared by subcommittee 17A: High-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

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

FDIS	Report on voting
17A/907/FDIS	17A/919/RVD

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 publication will remain unchanged until the stability date indicated on the IEC web site 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- withdrawn,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.

INTRODUCTION

This amendment cancels and replaces IEC 61633.

The original edition of IEC 62271-101 (2006) makes extensive reference to IEC 62271-100:2001. Since then, a new edition of IEC 62271-100 has been published (2008). Within this amendment, references are made to IEC 62271-100:2008. Unless they are explicitly mentioned in this amendment, all of the references in the original edition of IEC 62271-101 (2006) still make reference to IEC 62271-100:2001. A second amendment to IEC 62271-101, which will update all cross-references to the new IEC 62271-100:2008, is under consideration.

Change *"Tables I.1a through I.2d" to "Tables 15 through 22 of IEC 62271-100:2008" in the whole document.*

2 Normative references

Delete reference to IEC 61633.

Add the following new reference (and footnote) to the existing list:

IEC 62271-100:2008, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers* [1]

4.2.4 Other synthetic test methods

In the second paragraph, replace "IEC 61633" by "Annex O of IEC 62271-100:2008".

6 Specific requirements for synthetic tests for making and breaking performance related to the requirements of 6.102 through 6.111 of IEC 62271-100

Add the following text at the end on the first paragraph:

Annex O of IEC 62271-100:2008 gives guidelines for the testing of metal-enclosed and dead tank circuit breakers.

Add the following subclause:

6.102.4.2 Unit testing

For the application of the synthetic test methods to one or more units of a circuit breaker, the requirements of 6.102.4.2 of IEC 62271-100:2008 are applicable. In the case of metal-enclosed or dead tank circuit-breakers, Annex N gives details of some typical test circuits and Annex O of IEC 62271-100:2008 outlines appropriate testing guidelines.

6.111 Capacitive current switching tests

Add the following text:

For metal-enclosed and dead tank circuit-breakers, typical test circuits are given in Annex N and additional guidelines are given in Annex O of IEC 62271-100:2008.

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[1] Unless explicitly otherwise mentioned, all of the references to IEC 62271-100 make reference to IEC 62271-100:2001. A second amendment to IEC 62271-101, which will update all cross-references to the new IEC 62271-100:2008, is under consideration.

Figure 5

Replace the existing Figure 5 by the following new Figure 5:

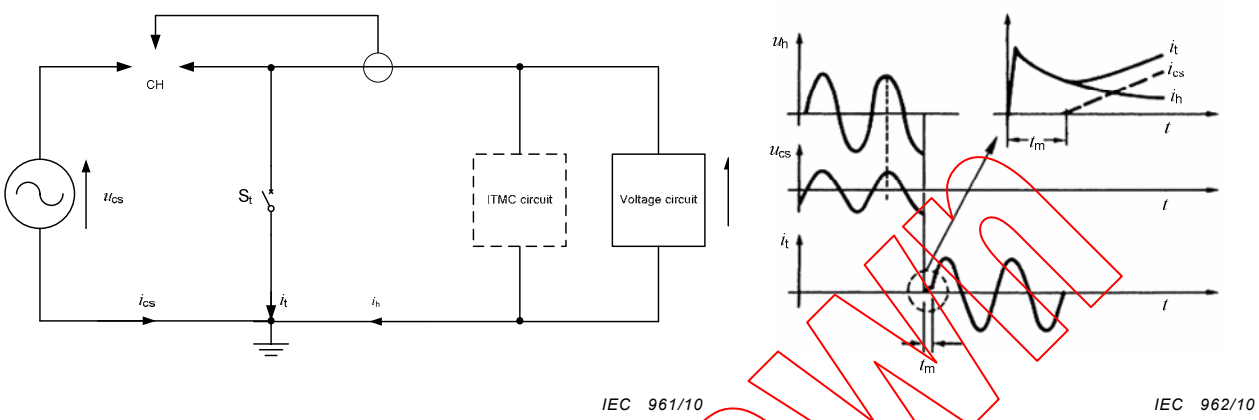


Figure 5a – Synthetic make circuit for terminal fault

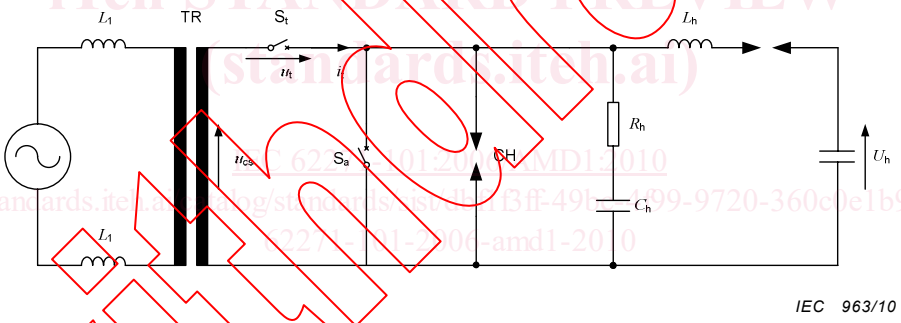


Figure 5b – Synthetic make circuit for out-of-phase (ac + dc method)

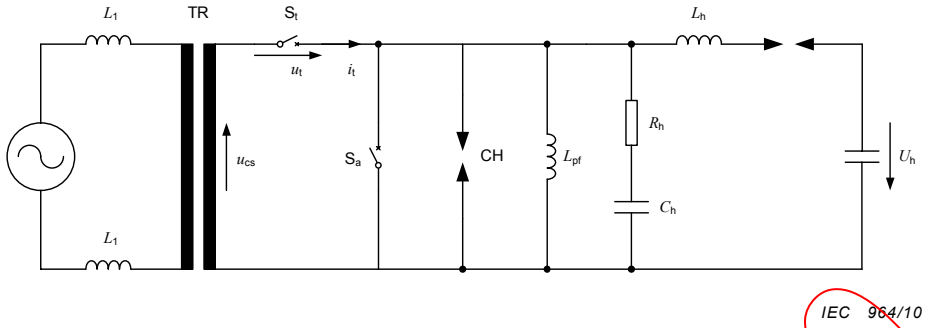


Figure 5c – Synthetic make circuit for out-of-phase (ac + ac method)

Key

S_a	auxiliary circuit-breaker	i_t	current through S_t
S_t	circuit-breaker under test	L_1	inductance of the current circuit
u_{cs}	voltage of the current circuit	L_h	inductance of the voltage circuit
i_{cs}	current of the current circuit	R_h C_h	components of the ITMC circuit
i_h	injected current	L_{pf}	parallel inductance of the voltage circuit
U_h	applied voltage	t_m	time delay of making device
CH	making device (triggered spark gap)		

Figure 5 – Typical synthetic make circuits for single-phase tests

G.1 Introduction

Add the following new text below the note:

For applicability of the mentioned methods in case of metal-enclosed or dead tank circuit-breakers, see Annex N and Annex O of IEC 62271-100:2008.

G.1.2 Recovery voltage

In the second paragraph, replace "4.3 of IEC 61633" by "O.4.3 of IEC 62271-100:2008".

Annex I

Replace the existing text of Annex I by the following new text:

For the last current loop parameters, refer to Tables 15 through 22 of IEC 62271-100:2008.

Tables I.1a and I.1b cover the last loop di/dt reduction for 50 Hz and 60 Hz, respectively, under three-phase conditions with the first pole-to-clear in phase A and the required asymmetry in phase C.

Tables I.2a and I.2b cover the corrected values for k_{pp} = 1,3 and f_r = 50 Hz; k_{pp} = 1,3 and f_r = 60 Hz and k_{pp} = 1,5 and f_r = 50 Hz, respectively.

Delete the existing Tables I.1a through I.2d, and renumber Tables I.3 to I.1 and Tables I.4 to I.2.

Add the following new Annex N:

Annex N
(informative)

Typical test circuits for metal-enclosed and dead tank circuit breakers

This annex outlines some typical synthetic test circuits for type testing relevant to short-circuit making, breaking and switching performance of metal enclosed and dead tank circuit-breakers. Other methods are not excluded provided that they supply the correct stresses to the pole terminals, between the phases and between the terminals and the enclosure of the circuit-breaker.

Many circuits are possible with different features. Some examples are given in Figures N.1 through N.9 as follows:

– terminal fault tests on one or more units of metal-enclosed or dead tank circuit-breakers (Figures N.1 to N.4);
– capacitive current switching tests (Figures N.5 to N.7);
– out-of-phase switching tests (Figure N.8);
– full pole terminal fault tests with voltage applied to both terminals and the metal enclosure (Figure N.9).

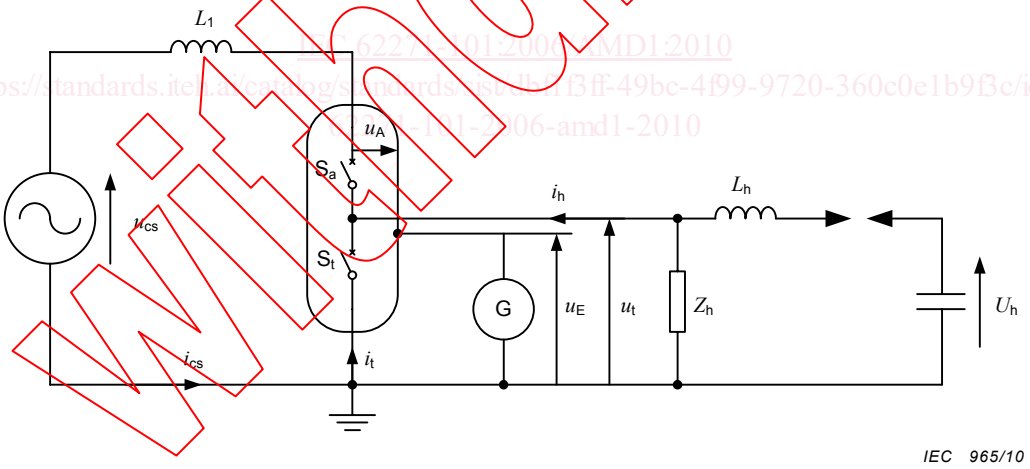


Figure N.1a – Typical injection circuit with voltage circuit in parallel with the unit(s) under test

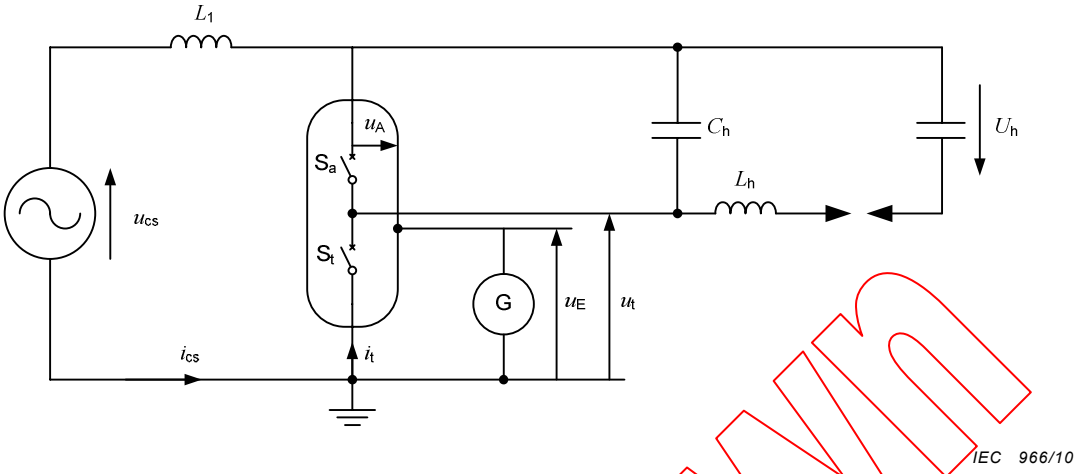
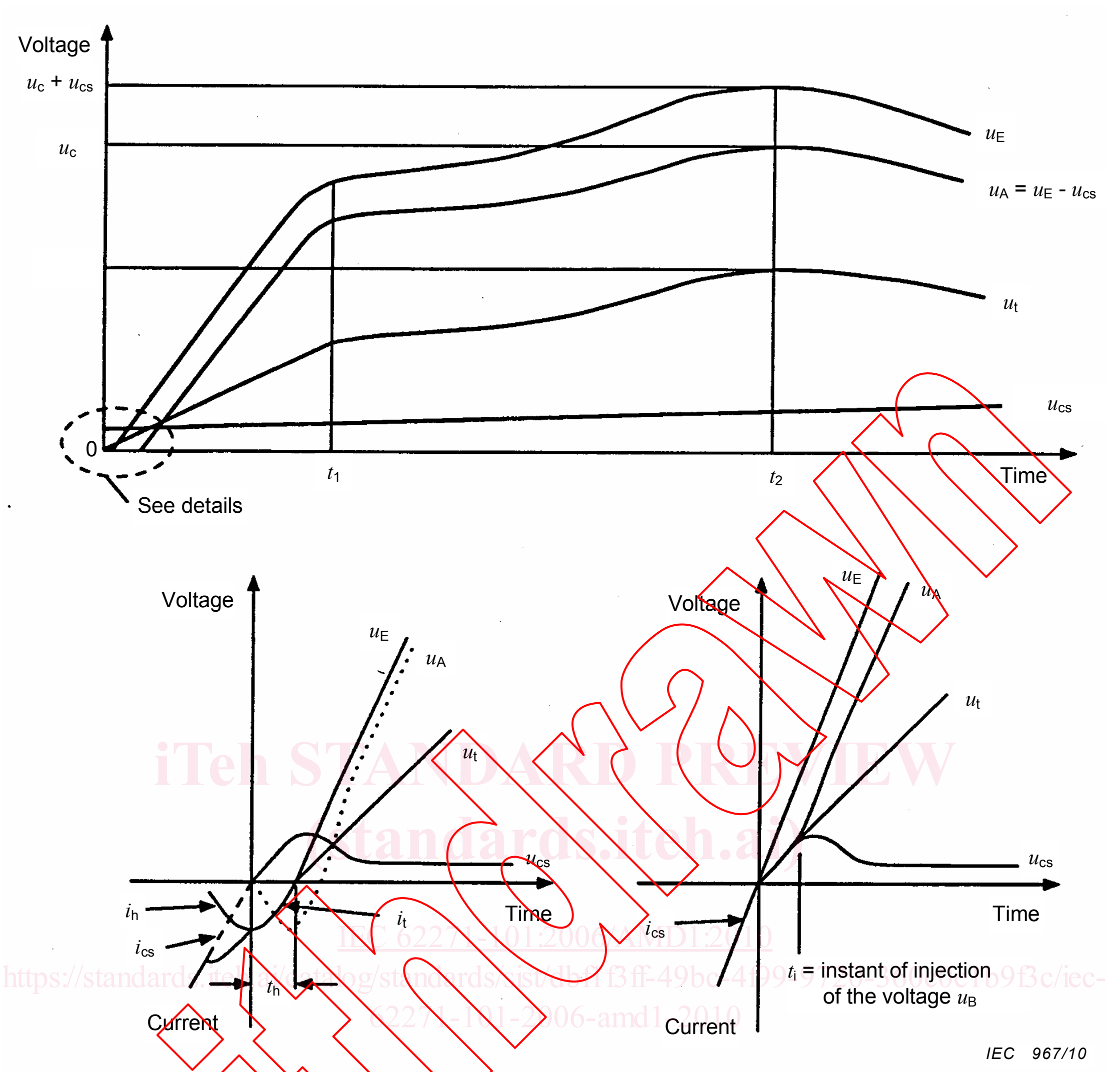


Figure N.1b – Typical injection circuit with voltage circuit in parallel with the unit(s) used as auxiliary circuit-breaker

Key

S_a	unit(s) of the circuit-breaker used as auxiliary circuit-breaker
S_t	unit(s) of the circuit-breaker used as test circuit-breaker
G	source supply of u_E, applied to the enclosure
u_{cs}	voltage of the current circuit
i_{cs}	current of the current circuit
i_h	injected current
i_t	current through S_t
L_1	inductance of the current circuit
L_h	inductance of the voltage circuit
Z_h	equivalent surge impedance of the voltage circuit
C_h	capacitance of the voltage circuit which, together with L_h, controls the major part of the TRV

Figure N.1 – Test circuit for unit testing (circuit-breaker with interaction due to gas circulation)



Typical voltage waveshapes in a current injection circuit, in accordance with Figure N.1a, with the voltage circuit in parallel with the unit(s) as test circuit-breaker

Typical voltage waveshapes in a voltage injection circuit, in accordance with Figure N.1b, with the voltage circuit in parallel with the unit(s) as auxiliary circuit-breaker

Key

u_E voltage applied to the insulated enclosure

u_B voltage applied to the contact gap of the unit(s) under test (resulting voltage between the terminal not earthed of the unit under test and the enclosure; a linear distribution of the voltage between the units is assumed)

u_{cs} voltage of the current circuit

u_A resulting voltage between one terminal and the enclosure

u_C peak of the TRV

Figure N.2 – Half-pole testing of a circuit-breaker in test circuit given by Figure N.1 – Example of the required TRVs to be applied between the terminals of the unit(s) under test and between the live parts and the insulated enclosure

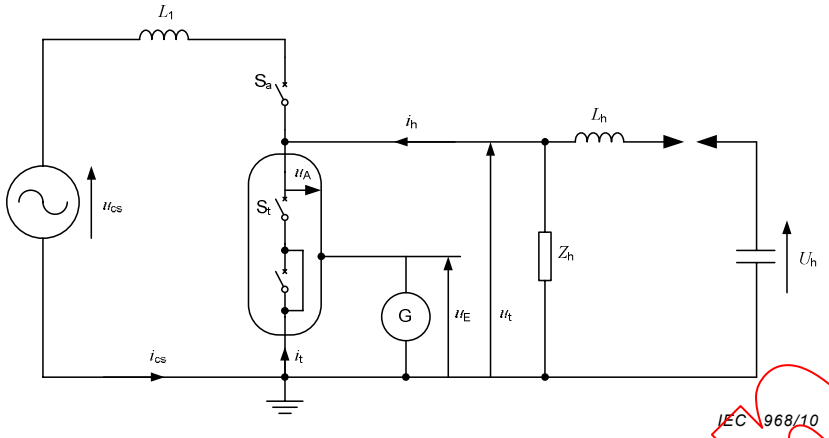


Figure N.3a – Typical injection circuit with voltage circuit in parallel with the unit(s) under test

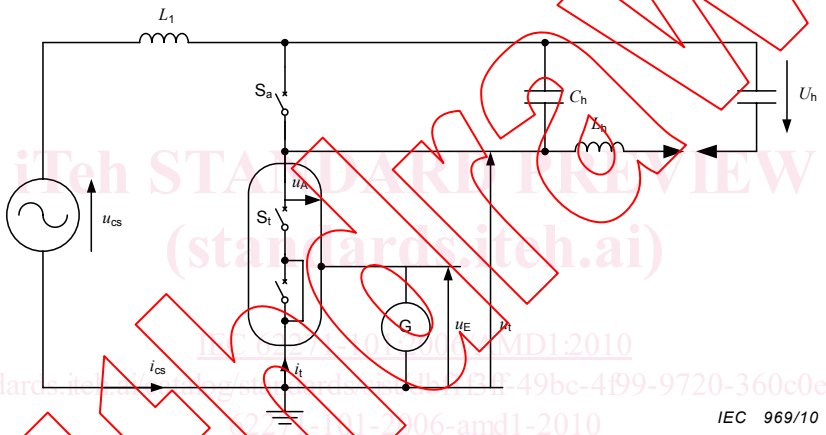


Figure N.3b – Typical injection circuit with voltage circuit in parallel with the auxiliary circuit-breaker

Key

S_a	unit(s) of the circuit-breaker used as auxiliary circuit-breaker
S_t	unit(s) of the circuit-breaker used as test circuit-breaker
G	Source supply of u_E, applied to the enclosure
u_A	resulting voltage between one terminal and the enclosure
u_{cs}	voltage of the current circuit
i_{cs}	current of the current circuit
i_h	injected current
i_t	current through S_t
L_h	inductance of the voltage circuit
Z_h	equivalent surge impedance of the voltage circuit
C_h	capacitance of the voltage circuit which, together with L_h, controls the major part of the TRV

Figure N.3 – Synthetic test circuit for unit testing (if unit testing is allowed as per Subclause 6.102.4.2 of IEC 62271-100:2008)