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pour des circuits de commande et des circuits auxiliaires, y compris
les contacteurs auxiliaires)

Première partie: Prescriptions générales

First supplement to Publication 337-1 (1970)
Control switches (low-voltage switching devices for control
and auxiliary circuits, including contactor relays)

Part 1: General requirements

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRST SUPPLEMENT TO PUBLICATION 337-1 (1970)
CONTROL SWITCHES (LOW-VOLTAGE SWITCHING DEVICES
FOR CONTROL AND AUXILIARY CIRCUITS,
INCLUDING CONTACTOR RELAYS)

Part 1: General requirements

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendations and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This Recommendation has been prepared by Sub-Committee 17B, Low-Voltage Switchgear and Controlgear, of IEC Technical Committee No. 17, Switchgear and Controlgear.

Pursuant to a decision taken in Brussels in 1968, partial drafts were circulated in December 1969; a more complete draft, circulated in May 1971, was examined during the meeting held in Stockholm in September 1972. The final draft was submitted to the National Committees in October 1972 for approval under the Six Months' Rule.

The following countries voted explicitly in favour of publication:

Australia	Japan
Austria	Norway
Belgium	Portugal
Canada	Romania
Denmark	South Africa
Egypt	Spain
Finland	Sweden
France	Switzerland
Germany	Turkey
Hungary	United Kingdom
Israel	United States of America
Italy	Yugoslavia

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INCLUDING CONTACTOR RELAYS)

Part 1: General requirements

A. — ADDITIONS TO PUBLICATION 337-1

**A—I ADDITIONAL REQUIREMENTS FOR CONTROL SWITCHES HAVING A POSITIVE
OPENING OPERATION**

1. Scope

These additional requirements apply to control switches intended for applications requiring certainty of opening of the device.

Note. — It is stated that such control switches also have to comply with all the relevant requirements contained in the other parts of the Publication.

2. Definition

Positive opening operation (of a mechanical switching device)

An opening operation which, in accordance with specified requirements, ensures that all the break-contact elements are in the open position when the actuator is in the position corresponding to the open position of the device.

Note. — The specified requirements may be related to the co-ordination with short-circuit protective devices.

3. Standard conditions for construction

Positive opening operation is achieved on a control switch in which all the break-contact elements are brought to their open position in such a manner that, for a significant part of the travel, there are no resilient members (e.g.: springs) between the moving contacts and the point of the actuator to which the actuating force is applied.

A—II ADDITIONAL REQUIREMENTS FOR CONTROL SWITCHES WITH POSITIVE OPENING OPERATION AND ISOLATING PROPERTIES

1. Scope

These additional requirements apply to control switches intended for applications requiring certainty of opening of the device and also providing, in a control circuit, an isolating distance in accordance with specified requirements.

Note. — In this document, such control switches will be referred to as “isolating control switches”.

2. Standard conditions for construction

2.1 Operation

- 1) An isolating control switch shall be manually operated.
- 2) An isolating control switch shall have positive opening operation.
- 3) In an isolating control switch any contact element required to provide an isolating distance shall do so when it is in the open position.
- 4) The open position of an isolating control switch shall be a position in which the switch can remain when no actuating force is applied.

2.2 Isolating distance

The clearance between open contacts (gap) shall satisfy the requirements for the minimum clearance L-A (line to exposed conductive part) appearing in the Recommendations in force for low-voltage controlgear (at present, Appendix B of IEC Publication 158-1).

Notes 1. — When the contact element of the control switch has two or more gaps in series, the total gap forming the isolating distance is the sum of the series connected gaps, in accordance with Clause 4.1 of Appendix B of IEC Publication 158-1 (2nd edition, 1970).

2. — In the second edition (1970) of Publication 158-1, the former term “accidentally dangerous part” is still used to define L-A, instead of the term “exposed conductive part” which has replaced it in the meantime.

3. Dielectric tests

3.1 Type test

An isolating control switch shall be able to withstand an additional dielectric test across the open contacts, performed as otherwise described in Clause 8.1.2.

The value of the test voltage shall be the value given in Table V.

3.2 Routine test

An isolating control switch shall be able to withstand a routine test identical to the type test (see Clause 3.1), except that the duration is reduced to about one second.

A—III D.C. TEST CIRCUIT, BASED ON ENERGY STORED

a) Adopt the following new Table II:

TABLE II

Conditions for making and breaking corresponding to the utilization categories

Kind of current	Category	Normal conditions of use						Abnormal conditions of use					
		Make			Break			Make			Break		
Alternating current	AC-11	I	U	$\cos\varphi$	I	U_r	$\cos\varphi$	I	U	$\cos\varphi$	I	U_r	$\cos\varphi$
		$10I_e$	U_e	$0.7^{(1)}$	I_e	U_e	$0.4^{(1)}$	$11I_e$	$1.1U_e$	$0.7^{(1)}$	$11I_e$	$1.1U_e$	$0.7^{(1)}$
Direct current	DC-11	I	U	$T_{0.95}$	I	U_r	$T_{0.95}$	I	U	$T_{0.95}$	I	U_r	$T_{0.95}$
		I_e	U_e	$6 \times P^{(2)}$	I_e	U_e	$6 \times P^{(2)}$	$1.1I_e$	$1.1U_e$	$6 \times P^{(2)}$	$1.1I_e$	$1.1U_e$	$6 \times P^{(2)}$

I_e = rated operational current
 U_e = rated operational voltage
 U_r = recovery voltage
 $T_{0.95}$ = time to reach 95% of the steady-state current, in milliseconds,
 $P = U_e I_e$ = steady-state power consumption, in watts.

I = current to be made or broken
 U = voltage before make

⁽¹⁾ The power-factors indicated are conventional values and apply only to the test circuits which simulate the electrical characteristics of coil circuits. It should be noted that, for the circuit with power-factor 0.4 (normal conditions of use), shunt resistors are used in the test circuit to simulate the damping effect of the eddy current losses of the actual electro-magnet.

⁽²⁾ The value " $6/P$ " results from an empirical relationship which is found to represent most d.c. magnetic loads to an upper limit of $P = 50$ W, viz. $6 \times P = 300$ ms. Loads having power-consumption greater than 50 W are assumed to consist of smaller loads in parallel. Therefore, 300 ms is to be an upper limit, irrespective of the power-consumption value.

b) Replace all the end of Clause 8.1.3.2 from § b) by the following:

"b) For d.c. tests

The circuit to be used shall consist of an iron-cored inductor, in series with a resistor if required, to obtain a duration $T_{0.95}$ as indicated in Table II.

"Note. — Attention is drawn to the influence of the source characteristics. Preference is given to a battery source and particular care is necessary in case of rectifiers, inter alia to avoid excessive ripple. For this reason, where rectifiers are used, a three-phase bridge rectifier is recommended.

"A.c. and d.c. test conditions shall be adequately described in the test report, together with the characteristics of the source because of the variations possible in the reproduction of the test conditions specified in the above paragraphs."

B. — AMENDMENTS TO PUBLICATION 337-1

B—I CONTROL SWITCHES FOR VERY LOW VOLTAGES

a) *Add at the end of the second paragraph of Clause 1.1:*

“ However, for operational voltages below 100 V, see Clause 4.2.1.2, note 2 ”.

b) *Add the following note 2 to Clause 4.2.1.2:*

“ Note 2. — Control switches dealt with in this Recommendation are not normally intended to be used at very low voltages and they may not be suitable for such a service. It is therefore recommended to seek the advice of the manufacturer concerning any application with a low value of operational voltage, e.g. below 100 V a.c. or d.c.”

c) *Add the following note to Clause 6.3:*

“ Note. — The significance of the environment, in particular of atmospheric pollution, is most important when the operational voltage is low (see also Note 2 to Clause 4.2.1.2). ”

B—II AMENDMENT TO CLAUSE 1.1

In Clause 1.1, the sentence:

“ This Recommendation does not cover switching devices intended for isolating purposes ”

shall be deleted and the following inserted:

“ Control switches intended for isolating purposes shall comply with the additional requirements given in Clause... (*) ”.

(*) At present, Part A-II of this Recommendation.