

Low-voltage switchgear and controlgear —

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

The European Standard EN 60947-3:1999 with the incorporation of amendment A1:2001 and amendment A2:2005 has the status of a British Standard

ICS 29.120.40

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 60947-3:1999, including amendment A1:2001 and amendment A2:2005. It is identical with IEC 60947-3:1999 including corrigenda July 1999 and August 2001 and amendments 1:2001 and 2:2005. It supersedes BS EN 60947-3:1992 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A1** **A1**.

The UK participation in its preparation was entrusted to Technical Committee PEL/17/2, Low-voltage switchgear and controlgear.

A list of organizations represented on this committee can be obtained on request to its secretary.

IEC corrigendum August 2001 corrects the footnote to table 4.

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This British Standard, having been prepared under the direction of the Electrotechnical Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 June 1999

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ISBN 0 580 32518 0

Amendments issued since publication

Amd. No.	Date	Comments
10766 Corrigendum No. 1	April 2000	
13240	5 April 2002	See national foreword
15602	29 September 2006	See national foreword

Low-voltage switchgear and controlgear
Part 3: Switches, disconnectors, switch-disconnectors
and fuse-combination units

Appareillage à basse tension
Partie 3: Interrupteurs, sectionneurs,
interrupteurs-sectionneurs et
combinés-fusibles

Niederspannungsschaltgeräte
Teil 3: Lastschalter, Trennschalter,
Lasttrennschalter und
Schalter-Sicherungs-Einheiten

This European Standard was approved was approved by CENELEC on 1999-04-01. Amendment A1 was approved by CENELEC on 2001-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 Central Secretariat or to any CENELEC member.

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CENELEC

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

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Foreword

The text of document 17B/952/FDIS, future addition 2 of IEC 60947-3, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60947-3 on 1999-04-01.

This European Standard supersedes EN 60947-3:1992 + corr. June 1997 + A1:1995 + corr. June 1997 + A2:1997.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2000-01-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2002-01-01

This standard is to be used in conjunction with EN 60947-1.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A and ZA is normative and annex B is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60947-3:1999 was approved by CENELEC as a European Standard without any modification.

Foreword to amendment A1

The text of document 17B/1059A/FDIS, future amendment 1 to IEC 60947-3:1999, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60947-3:1999 on 2001-03-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2001-12-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2004-03-01

Annexes designated "normative" are part of the body of the standard.
In this standard, annex ZA is normative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of amendment 1:2001 to the International Standard IEC 60947-3:1999 was approved by CENELEC as an amendment to the European Standard without any modification.

Foreword to amendment A2

The text of document 17B/1402/FDIS, future amendment 2 to IEC 60947-3:1999, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 60947-3:1999 on 2005-06-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2006-03-01
- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2008-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of amendment 2:2005 to the International Standard IEC 60947-3:1999 was approved by CENELEC as an amendment to the European Standard without any modification.

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

1 General

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this standard, where specifically called for. Clauses and subclauses, tables, figures and appendices of the general rules thus applicable are identified by reference IEC 60947-1, e.g., 4.3.4.1 of IEC 60947-1, table 4 IEC 60947-1, or annex A of IEC 60947-1.

1.1 Scope and object

This standard applies to switches, disconnectors, switch-disconnectors and fuse-combination units to be used in distribution circuits and motor circuits of which the rated voltage does not exceed 1 000 V a.c. or 1 500 V d.c.

The manufacturer shall specify the type, ratings and characteristics according to the relevant standard of any incorporated fuses.

This standard does not apply to equipment coming within the scope of IEC 60947-2, IEC 60947-4-1 and IEC 60947-5-1; however, when switches and fuse-combination units coming into the scope of this standard are normally used to start, accelerate and/or stop an individual motor they shall also comply with the additional requirements given in annex A.

 The requirements for single pole operated three pole switches are included in Annex C. 

Auxiliary switches fitted to equipment within the scope of this standard shall comply with the requirements of IEC 60947-5-1.

This standard does not include the additional requirements necessary for electrical apparatus for explosive gas atmospheres.

NOTE 1 – Depending on its design, a switch (or disconnector) can be referred to as "a rotary switch (disconnector)", "cam-operated switch (disconnector)", "knife-switch (disconnector)", etc.

 Note deleted 

NOTE 2 – In this standard, the word "switch" also applies to the apparatus referred to in French as "commutateurs", intended to modify the connections between several circuits and *inter alia* to substitute a part of a circuit for another.

NOTE 3 – In general, throughout this standard switches, disconnectors, switch-disconnectors and fuse-combination units will be referred to as "equipment".

The object of this standard is to state

- a) the characteristics of the equipment;
- b) the conditions with which the equipment shall comply with reference to
 - 1) operation and behaviour in normal service;
 - 2) operation and behaviour in case of specified abnormal conditions, e.g. short circuit;
 - 3) dielectric properties;
- c) the tests for confirming that these conditions have been met and the methods to be adopted for these tests;
- d) the information to be marked on the equipment or made available by the manufacturer, e.g. in the catalogue.

1.2 Normative references

^{A2} The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. ^{A2}

IEC 60050(441):1984, *International Electrotechnical Vocabulary (IEV), Chapter 441: Switchgear, controlgear and fuses*

^{A2} Amendment 1 (2000) ^{A2}

^{A2} IEC 60269 (all parts), *Low-voltage fuses* ^{A2}

^{A1} IEC 60410:1973, *Sampling plans and procedures for inspection by attributes* ^{A1}

^{A2} IEC 60417-DB:2002¹, *Graphical symbols for use on equipment* ^{A2}

^{A2} IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles* ^{A2}

^{A2} IEC 60617-DB:2001¹, *Graphical symbols for diagrams* ^{A2}

^{A2} IEC 60947-1:2004, *Low-voltage switchgear and controlgear – Part 1: General rules* ^{A2}

^{A2} IEC 60947-2:2003, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers* ^{A2}

^{A2} IEC 60947-4-1:2000, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*
Amendment 1 (2002) ^{A2}

^{A2} IEC 60947-5-1:2003, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices* ^{A2}

^{A2} IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test. Basic EMC Publication*
Amendment 1 (1998)
Amendment 2 (2000) ^{A2}

^{A2} IEC 61000-4-3:2002, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated radio-frequency electromagnetic field immunity test*
Amendment 1 (2002) ^{A2}

^{A2} IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test* ^{A2}

^{A2} IEC 61000-4-5:1995, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Section 5: Surge immunity test*
Amendment 1 (2000) ^{A2}

^{A2} IEC 61000-4-6:2003, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields* ^{A2}

^{A2} CISPR 11:2003, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement* ^{A2}

^{A2} CISPR 22:2003, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement* ^{A2}

^{A2} 1 “DB” refers to the IEC on-line database. ^{A2}

2 Definitions

For the purposes of this part of IEC 60947, the definitions given in IEC 60050(441), IEC 60947-1 and the following apply

	Reference
D	
Dependent manual operation (of a mechanical switching device)	2.13
Disconnecter	2.2
Disconnecter-fuse	2.7
F	
Fuse-combination unit	2.4
Fuse-disconnector	2.8
Fuse-switch	2.6
Fuse-switch-disconnector	2.10
I	
Independent manual operation (of a mechanical switching device)	2.14
M	
Multiple tip contact system	2.12
S	
Semi-independent manual operation	2.15
Single pole operated three pole switch	2.11
Stored energy operation (of a mechanical switching device)	2.16
Switch (mechanical)	2.1
Switch-disconnector	2.3
Switch-disconnector-fuse	2.9
Switch-fuse	2.5

2.1

switch (mechanical)

a mechanical switching device capable of making, carrying and breaking currents under normal circuit conditions which may include specified operating overload conditions and also carrying for a specified time currents under specified abnormal circuit conditions such as those of short-circuit.

NOTE – A switch may be capable of making, but not breaking, short-circuit currents. [IEV 441-14-10]

2.2

disconnecter

a mechanical switching device which, in the open position, complies with the requirements specified for the isolating function.

NOTE 1 – This definition differs from IEC 441-14-05 by referring to isolating function instead of isolating distance.

NOTE 2 – A disconnector is capable of opening and closing a circuit when either a negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnector occurs. It is also capable of carrying currents under normal circuit conditions and carrying for a specified time currents under abnormal conditions such as those of short circuit.

2.3

switch-disconnector

a switch which, in the open position, satisfies the isolating requirements specified for a disconnector [IEV 441-14-12]

2.4

fuse-combination unit

a combination of a mechanical switching device and one or more fuses in a composite unit, assembled by the manufacturer or in accordance with his instructions [IEV 441-14-04]

NOTE – (Not included in IEC 441-14-04.) This is a general term for fuse switching devices (see also definitions 2.5 to 2.10 and table 1)

2.5**switch-fuse**

a switch in which one or more poles have a fuse in series in a composite unit [IEV 441-14-14]

2.6**fuse-switch**

a switch in which a fuse-link or a fuse-carrier with fuse-link forms the moving contact [IEV 441-14-17]

2.7**disconnecter-fuse**

a disconnecter in which one or more poles have a fuse in series in a composite unit [IEV 441-14-15]

2.8**fuse-disconnector**

a disconnecter in which a fuse-link or fuse-carrier with fuse-link forms the moving contact [IEV 441-14-18]

2.9**switch-disconnector-fuse**

a switch-disconnector in which one or more poles have a fuse in series in a composite unit [IEV 441-14-16]

2.10**fuse-switch-disconnector**

a switch-disconnector in which a fuse-link or a fuse-carrier with fuse-link forms the moving contact [IEV 441-14-19]

A₂ 2.11**single pole operated three pole switch**

device consisting of three individually operable single pole switch disconnecting devices according to this standard, rated as a complete unit for use in a three-phase system

NOTE These devices are intended for power distribution systems where switching and/or isolation of an individual phase may be necessary and they should not be used for the switching of the primary circuit of three-phase equipment.

2.12**multiple tip contact system**

a multiple tip contact system consists of more than one contact gap per pole, which can be switched, in series and/or in parallel A₂

A₂ 2.13 A₂**dependent manual operation (of a mechanical switching device)**

an operation solely by means of directly applied manual energy such that the speed and force of the operation are dependent upon the action of the operator [IEV 441-16-13]

A₂ 2.14 A₂**independent manual operation (of a mechanical switching device)**

a stored energy operation where the energy originates from manual power, stored and released in one continuous operation, such that the speed and force of the operation are independent of the action of the operator [IEV 441-16-16]

A₂ 2.15 A₂**semi-independent manual operation**

an operation solely by means of directly applied manual energy such that the manual force is increased up to a threshold value beyond which the independent switching operation is achieved unless deliberately delayed by the operator.

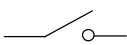
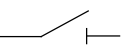
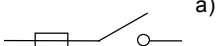
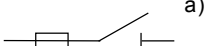
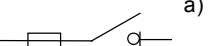
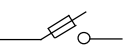
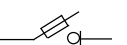
A₂ 2.16 A₂**stored energy operation (of a mechanical switching device)**

an operation by means of energy stored in the mechanism itself prior to the completion of the operation and sufficient to complete it under predetermined conditions [IEV 441-16-15]

NOTE – This kind of operation may be subdivided according to:

- a) the manner of storing the energy (spring, weight, etc.);
- b) the origin of the energy (manual, electric, etc.);
- c) the manner of releasing the energy (manual, electric, etc.).

Table 1 – Summary of equipment definitions

Function		
Making and breaking current	Isolating	Making, breaking and isolating
Switch 2.1 	Disconnecter 2.2 	Switch-disconnector 2.3 
Fuse combination unit 2.4		
Switch-fuse 2.5 	Disconnecter-fuse 2.7 	Switch-disconnector-fuse 2.9 
Fuse-switch 2.6 	Fuse-disconnector 2.8 	Fuse-switch disconnector 2.10 
NOTE 1 – All equipment may be single-break or multi-break. NOTE 2 – Numbers are subclause references of the relevant definitions. NOTE 3 – Symbols are based on IEC 60617-7.		
^a The fuse may be on either side of or in a stationary position between the contacts of the equipment.		

3 Classification

3.1 According to the utilization category

See 4.4.

3.2 According to the method of operation of manually operated equipment

- dependent manual operation (see [A2](#) 2.13 [A2](#));
- independent manual operation (see [A2](#) 2.14 [A2](#));
- semi-independent manual operation (see [A2](#) 2.15 [A2](#)).

NOTE – The method of operation on closing may be different from the method for opening.

3.3 According to suitability for isolation

- suitable for isolation (see 7.1.6 of IEC 60947-1 and 7.1.6.1);
- not suitable for isolation.

3.4 According to the degree of protection provided

See 7.1.11 of IEC 60947-1.

4 Characteristics

4.1 Summary of characteristics

The characteristics of the equipment shall be stated in terms of the following as applicable:

- type of equipment (see 4.2);
- rated and limiting values for the main circuit (see 4.3);
- utilization category (see 4.4);
- control circuits (see 4.5);
- auxiliary circuits (see 4.6).

 *List item deleted* 

4.2 Type of equipment

The following shall be stated.

4.2.1 Number of poles

4.2.2 Kind of current

Kind of current (a.c. or d.c.) and, in the case of a.c., number of phases and rated frequency.

4.2.3 Number of positions of the main contacts (if more than two)

4.3 Rated and limiting values for the main circuit

Rated values are assigned by the manufacturer. They shall be stated in accordance with 4.3.1 to 4.3.6.4 but it may not be necessary to establish all the rated values listed.

4.3.1 Rated voltages

An equipment is defined by the following rated voltages.

4.3.1.1 Rated operational voltage (U_e)

Subclause 4.3.1.1 of IEC 60947-1 applies.

4.3.1.2 Rated insulation voltage (U_i)

Subclause 4.3.1.2 of IEC 60947-1 applies.

4.3.1.3 Rated impulse withstand voltage (U_{imp})

Subclause 4.3.1.3 of IEC 60947-1 applies.

4.3.2 Currents

An equipment is defined by the following currents:

4.3.2.1 Conventional free air thermal current (I_{th})

Subclause 4.3.2.1 of IEC 60947-1 applies.

4.3.2.2 Conventional enclosed thermal current (I_{the})

Subclause 4.3.2.2 of IEC 60947-1 applies.

4.3.2.3 Rated operational currents (I_e) (or rated operational powers)

Subclause 4.3.2.3 of IEC 60947-1 applies.

4.3.2.4 Rated uninterrupted current (I_u)

Subclause 4.3.2.4 of IEC 60947-1 applies.

4.3.3 Rated frequency

Subclause 4.3.3 of IEC 60947-1 applies.

4.3.4 Rated duty

The rated duties considered as normal are as follows.

4.3.4.1 Eight-hour duty

Subclause 4.3.4.1 of IEC 60947-1 applies.

4.3.4.2 Uninterrupted duty

Subclause 4.3.4.2 of IEC 60947-1 applies.

4.3.5 Normal load and overload characteristics

4.3.5.1 Ability to withstand motor switching overload currents

See annex A.

4.3.5.2 Rated making capacity

Subclause 4.3.5.2 of IEC 60947-1 applies with the following additions.

The rated making capacity is stated by reference to the rated operational voltage and rated operational current and to the utilization category according to table 3.

 Not applicable to AC-20 or DC-20 equipment.

Note deleted 

4.3.5.3 Rated breaking capacity

Subclause 4.3.5.3 of IEC 60947-1 applies with the following additions.

The rated breaking capacity is stated by reference to the rated operational voltage and rated operational current and to the utilization category according to table 3.

 Not applicable to AC-20 or DC-20 equipment.

Note deleted 

4.3.6 Short-circuit characteristics

4.3.6.1 Rated short-time withstand current (I_{cw})

The rated short-time withstand current of a switch, a disconnector or a switch-disconnector is the value of short-time withstand current, assigned by the manufacturer, that the equipment can carry without any damage under the test conditions of 8.3.5.1.

The value of the rated short-time withstand current shall be not less than twelve times the maximum rated operational current and, unless otherwise stated by the manufacturer, the duration of the current shall be 1 s.

For a.c., the value of the current is the r.m.s. value of the a.c. component and it is assumed that the highest peak value likely to occur does not exceed n times this r.m.s. value, the factor n being given by table 16 of IEC 60947-1.

4.3.6.2 Rated short-circuit making capacity (I_{cm})

The rated short-circuit making capacity of a switch or a switch-disconnector is the value of short-circuit making capacity assigned to the equipment by the manufacturer for the rated operational voltage, at rated frequency (if any) and at a specified power-factor (or time-constant). It is expressed as the maximum prospective peak current.

For a.c., the relationship between power-factor, prospective peak current and r.m.s. current shall be in accordance with table 16 of IEC 60947-1.

 Not applicable to AC-20 or DC-20 equipment. 

4.3.6.3 Vacant

4.3.6.4 Rated conditional short-circuit current

Subclause 4.3.6.4 of IEC 60947-1 applies.

4.4 Utilization category

The utilization categories define the intended applications and are given in table 2.

Each utilization category is characterized by the values of the currents and voltages, expressed as multiples of the rated operational current and the rated operational voltage, as well as the power-factors or time-constants of the circuit. The conditions for making and breaking given in table 3 correspond in principle to the applications listed in table 2.

The designation of utilization categories is completed by the suffix A or B according to whether the intended applications require frequent or infrequent operations (see table 4).

Utilization categories with suffix B are appropriate for devices which, due to design or application, are only intended for infrequent operation. This could apply, for example, to disconnectors normally only operated to provide isolation for maintenance work or switching devices where the fuse-link blade forms the moving contact.

The distinction between frequent and infrequent operation is based on the manufacturer's rated operation and the number of operating cycles used as a test criterion in table 4.

For a particular rated operational current I_e , a device will be designated for frequent use (category A) if the manufacturer's rated operating life is more than the number of operating cycles indicated in columns 3, 4 or 5 of table 4.

Table 2 – Utilization categories

Nature of current	Utilization category		Typical applications
	Category A	Category B	
Alternating current	AC-20A *	AC-20B *	– Connecting and disconnecting under no-load conditions
	AC-21A	AC-21B	– Switching of resistive loads including moderate overloads
	AC-22A	AC-22B	– Switching of mixed resistive and inductive loads, including moderate overloads
	AC-23A	AC-23B	– Switching of motor loads or other highly inductive loads
Direct current	DC-20A*	DC-20B*	– Connecting and disconnecting under no-load conditions
	DC-21A	DC-21B	– Switching of resistive loads including moderate overloads
	DC-22A	DC-22B	– Switching of mixed resistive and inductive loads, including moderate overloads (e.g. shunt motors)
	DC-23A	DC-23B	– Switching of highly inductive loads (e.g. series motors)
* The use of these utilization categories is not permitted in the United States of America.			

Category AC-23 includes occasional switching of individual motors. The switching of capacitors or of tungsten filament lamps shall be subject to agreement between manufacturer and user.

The utilization categories referred to in tables 2 and 3 do not apply to an equipment normally used to start, accelerate and/or stop individual motors. The utilization categories for such an equipment are dealt with in annex A.

4.5 Control circuits

Subclause 4.5 of IEC 60947-1 applies.

4.6 Auxiliary circuits

Subclause 4.6 of IEC 60947-1 applies.

4.7 Relays and releases

Subclause 4.7 of IEC 60947-1 applies.

 Subclause 4.8 deleted

Subclause 4.9 deleted 

5 Product information

5.1 Nature of information

Subclause 5.1 of IEC 60947-1 applies as appropriate for a particular design.

5.2 Marking

5.2.1 Each equipment shall be marked in a durable and legible manner with the following data.

The markings for a), b) and c) below shall be on the equipment itself or on a name-plate or name-plates attached to the equipment, and shall be located at a place such that they are legible from the front after mounting the equipment in accordance with the manufacturer's instructions.

a) Indication of the open and closed position. The open and closed position shall be respectively indicated by the graphical symbols 60417-IEC-5007 and 60417-IEC-5008 of IEC 60417-2 (see 7.1.5.1 of IEC 60947-1).

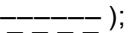
b) Suitability for isolation

The appropriate symbols of table 1 shall be used.

 c) Devices of utilization category AC-20A, AC-20B, DC-20A and DC-20B shall be marked "Do not operate under load", unless the device is interlocked to prevent such opening. 

NOTE – Symbols of the various types of equipment are given in table 1.

5.2.2 The following data shall also be marked on the equipment but need not be visible from the front when the equipment is mounted:

- a) manufacturer's name or trade mark;
- b) type designation or serial number;
- c) rated operational currents (or rated powers) at the rated operational voltage and utilization category (see 4.3.1, 4.3.2 and 4.4);
- d) value (or range) of the rated frequency or the indication "d.c." (or the symbol );
- e) for fuse-combination units, the fuse type and maximum rated current and the power loss of the fuse-link;
- f) IEC 60947-3, if the manufacturer claims compliance with this standard;
- g) degree of protection of enclosed equipment (see annex C of IEC 60947-1).

5.2.3 The following terminals shall be identified:

- a) line and load terminals unless the connection is immaterial (see 8.3.3.3.1);
- b) neutral pole terminal, if applicable, by the letter "N" (see 7.1.7.4 of IEC 60947-1);
- c) protective earth terminal (see 7.1.9.3 of IEC 60947-1).

5.2.4 The following data shall be made available in the manufacturer's published information:

- a) rated insulation voltage;
- b) rated impulse withstand voltage for equipment suitable for isolation or when determined;
- c) pollution degree, if different from 3;
- d) rated duty;
- e) rated short-time withstand current and duration, where applicable;
- f) rated short-circuit making capacity, where applicable;
- g) rated conditional short-circuit current, where applicable.

5.3 Instructions for installation, operation and maintenance

Subclause 5.3 of IEC 60947-1 applies.

6 Normal service, mounting and transport conditions

Clause 6 of IEC 60947-1 applies with the following addition.

Pollution degree (see 6.1.3.2 of IEC 60947-1).

Unless otherwise stated by the manufacturer, the equipment is intended for installation under environmental conditions of pollution degree 3.

7 Constructional and performance requirements

7.1 Constructional requirements

 Note deleted 

Subclause 7.1 of IEC 60947-1 applies, with the following additions.

7.1.1 Materials

The suitability of materials used shall be verified with respect to resistance to abnormal heat and fire by conducting tests:

- a) on the equipment; or
- b) on sections taken from the equipment; or
- c) on samples of identical material having a representative cross-section.

If an identical material having a representative cross-section has already satisfied the requirements, then those tests need not be repeated.

7.1.1.1 Resistance to abnormal heat and fire

Subclause 7.1.1.1 of IEC 60947-1 applies with the following additions.

Parts of insulating material necessary to retain current-carrying parts in position shall conform to the glow-wire tests of 8.2.1.1.1 of IEC 60947-1 at a test temperature of 960 °C. 

A1 When tests are conducted on material manufacturers samples according to **7.1.1c**), they shall be made according to the tests for flammability and hot wire corresponding to a glow-wire test of 960 °C as specified in **8.2.1.1.2**, and annex M of IEC 60947-1. **A1**

7.1.3 Clearances and creepage distances

A1 Subclause **7.1.3** of IEC 60947-1 applies with the following addition:

Guidance on the measurement of clearances and creepage distances is given in annex G of IEC 60947-1. **A1**

A1 7.1.4 Actuator

A2 Subclause **7.1.4** of IEC 60947-1 applies.

Subclause deleted **A2**

7.1.6 Additional requirements for equipment suitable for isolation

Subclause **7.1.6** of IEC 60947-1 applies with the following additions.

7.1.6.1 Additional constructional requirements for equipment suitable for isolation

The equipment shall be marked according to **5.2.1b**).

When no indication of the position of the contacts is provided, e.g. by the actuator or a separate indicator, all the main contacts shall be clearly visible in the open position. **A1**