

# INTERNATIONAL STANDARD

**IEC**  
**60364-6**

First edition  
2006-02

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## Low-voltage electrical installations – Part 6: Verification

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*This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.*



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**LOW-VOLTAGE ELECTRICAL INSTALLATIONS –****Part 6: Verification**

## FOREWORD

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International Standard IEC 60364-6 has been prepared by IEC technical committee 64: Electrical installations and protection against electrical shock.

This first edition of IEC 60364-6 replaces the second edition of IEC 60364-6-61, published in 2001, and constitutes a technical revision.

The main changes with respect to IEC 60364-6-61 are listed below:

- extension of the scope to cover, in addition to initial verification, also periodic verification of electrical installations;
- modification of verification requirements in the case of protection by automatic disconnection of the supply;
- requirements for verification of conditions for additional protection;
- requirements for reporting upon completion of initial and periodic verification;

- information concerning the measurement of earth loop impedance with current clamps;
- information concerning the evaluation of voltage drop;
- recommendations for electrical equipment which is being re-used;
- model forms of schedules that might be used for the description and for initial and periodic verification of electrical installations.

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

| FDIS         | Report on voting |
|--------------|------------------|
| 64/1497/FDIS | 64/1517/RVD      |

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

IEC 60364 consists of the following parts, under the general title: *Low-voltage electrical installations*:

Part 1: Fundamental principles, assessment of general characteristics, definitions

Part 4: Protection for safety

Part 5: Selection and erection of electrical equipment

Part 6: Verification

Part 7: Requirements for special installations or locations

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

## LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

### Part 6: Verification

#### 6.1 Scope

This Part of IEC 60364 provides requirements for initial and periodic verification of an electrical installation.

Clause 61 provides requirements for initial verification, by inspection and testing, of an electrical installation to determine, as far as reasonably practicable, whether the requirements of the other parts of IEC 60364 have been met and requirements for the reporting of the results of the initial verification. The initial verification takes place upon completion of a new installation or completion of additions or of alterations to existing installations.

Clause 62 provides requirements for periodic verification of an electrical installation to determine, as far as reasonably practicable, whether the installation and all its constituent equipment are in a satisfactory condition for use and requirements for the reporting of the results of the periodic verification.

#### 6.2 Normative references

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.

IEC 60364 (all parts), *Low-voltage electrical installations* <sup>1)</sup>

IEC 60364-4-41, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*

IEC 60364-4-42, *Electrical installations of buildings – Part 4-42: Protection for safety – Protection against thermal effects*

IEC 60364-4-43, *Electrical installations of buildings – Part 4-43: Protection for safety – Protection against overcurrent*

IEC 60364-5-51, *Electrical installation of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-52, *Electrical installations of buildings – Part 5-52: Selection and erection of electrical equipment – Wiring systems*

IEC 60364-5-53, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60364-5-54, *Electrical installations of buildings – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements, protective conductors and protective bonding conductors*

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1) The main title has been revised. Certain Parts of the IEC 60364 series still carry the old title.



IEC 61557 (all parts), *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 v d.c. – Equipment for testing, measuring or monitoring of protective measures*

IEC 61557-2, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 v d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 2: Insulation resistance*

IEC 61577-6, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 v d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 6: Residual current devices (RCD) in TT and TN systems*

### 6.3 Terms and definitions

For the purposes of this document, the following definitions apply:

#### 6.3.1 verification

all measures by means of which compliance of the electrical installation with the relevant requirements of IEC 60364 is checked

NOTE It comprises inspection, testing and reporting.

#### 6.3.2 inspection

examination of an electrical installation using all the senses in order to ascertain correct selection and proper erection of electrical equipment

#### 6.3.3 testing

implementation of measures in an electrical installation by means of which its effectiveness is proved

NOTE It includes ascertaining values by means of appropriate measuring instruments, said values not being detectable by inspection.

#### 6.3.4 reporting

recording of the results of inspection and testing

#### 6.3.5 maintenance

combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function

### 61 Initial verification

NOTE In Annex C guidance on the application of the rules of Clause 61 is given.

#### 61.1 General

**61.1.1** Every installation shall be verified during erection, as far as reasonably practicable, and on completion, before being put into service by the user.

**61.1.2** The information required by 514.5 of Part 5-51 and other information necessary for initial verification shall be made available to the person carrying out the initial verification.

**61.1.3** Initial verification shall include comparison of the results with relevant criteria to confirm that the requirements of IEC 60364 have been met.

**61.1.4** Precautions shall be taken to ensure that the verification shall not cause danger to persons or livestock and shall not cause damage to property and equipment even if the circuit is defective.

**61.1.5** For an addition or alteration to an existing installation, it shall be verified that the addition or alteration complies with IEC 60364 and does not impair the safety of the existing installation.

NOTE For re-used equipment see Annex E.

**61.1.6** The initial verification shall be made by a skilled person, competent in verification.

NOTE Requirements concerning qualifications for enterprises and persons are a matter for national consideration.

## **61.2 Inspection**

**61.2.1** Inspection shall precede testing and shall normally be done prior to energizing the installation.

**61.2.2** The inspection shall be made to confirm that electrical equipment which is part of the fixed installation is:

- in compliance with the safety requirements of the relevant equipment standards;  
NOTE This may be ascertained by examination of the manufacturer's information, marking or certification.
- correctly selected and erected according to IEC 60364 and to the manufacturer's instructions;
- not visibly damaged so as to impair safety.

**61.2.3** Inspection shall include at least the checking of the following, where relevant: <https://standards.iteh.ai/catalog/standards/sist/60364-6-2006>

- a) method of protection against electric shock (see Part 4-41);
- b) presence of fire barriers and other precautions against propagation of fire and protection against thermal effects (see Part 4-42 and Clause 527 of Part 5-52);
- c) selection of conductors for current-carrying capacity and voltage drop (see Part 4-43 and Clauses 523 and 525 of Part 5-52);
- d) choice and setting of protective and monitoring devices (see Part 5-53);
- e) presence and correct location of suitable isolating and switching devices (see Clause 536 of Part 5-53);
- f) selection of equipment and protective measures appropriate to external influences (see Clause 422 of Part 4-42, 512.2 of Part 5-51 and Clause 522 of Part 5-52);
- g) neutral and protective conductors correctly identified (see 514.3 of Part 5-51);
- h) single-pole switching devices connected in the line conductors (see Clause 536 of Part 5-53);
- i) presence of diagrams, warning notices or other similar information (see 514.5 of Part 5-51);
- j) identification of circuits, overcurrent protective devices, switches, terminals, etc. (see Clause 514 of Part 5-51);

- k) adequacy of connection of conductors (see Clause 526 of Part 5-52);
- l) presence and adequacy of protective conductors, including main and supplementary equipotential bonding conductors (see Part 5-54);
- m) accessibility of equipment for convenience of operation, identification and maintenance (see Clauses 513 and 514 of Part 5-51).

Inspection shall include all particular requirements for special installations or locations.

### 61.3 Testing

#### 61.3.1 General

The test methods described in this clause are given as reference methods; other methods are not precluded, provided they give no less valid results.

Measuring instruments and monitoring equipment and methods shall be chosen in accordance with the relevant parts of IEC 61557. If other measuring equipment is used, it shall provide no less degree of performance and safety.

The following tests shall be carried out where relevant and should preferably be made in the following sequence:

- a) continuity of conductors (see 61.3.2);
- b) insulation resistance of the electrical installation (see 61.3.3);
- c) protection by SELV, PELV or by electrical separation (see 61.3.4);
- d) floor and wall resistance/impedance (see 61.3.5);
- e) automatic disconnection of supply (see 61.3.6);
- f) additional protection (see 61.3.7);
- g) polarity test (see 61.3.8);
- h) test of the order of the phases (see 61.3.9);
- i) functional and operational tests (see 61.3.10);
- j) voltage drop (see 61.3.11).

In the event of any test indicating failure to comply, that test and any preceding test, the results of which may have been influenced by the fault indicated, shall be repeated after the fault has been rectified.

NOTE 1 When testing is in a potentially explosive atmosphere appropriate safety precautions in accordance with IEC 60079-17 and IEC 61241-17 are necessary.

NOTE 2 In Ireland, the following additional test is made to verify erroneous connections between circuits: for each circuit, its protective device is disconnected and a test voltage in accordance with Table 6A applied between the line conductors of that circuit and the line conductors of the other circuits.

#### 61.3.2 Continuity of conductors

An electrical continuity test shall be made on

- a) protective conductors, including main and supplementary equipotential bonding conductors, and
- b) in the case of ring final circuits, live conductors.

NOTE A ring final circuit is a final circuit arranged in a form of a ring connected to a single point of supply.

### 61.3.3 Insulation resistance of the electrical installation

The insulation resistance shall be measured between live conductors and the protective conductor connected to the earthing arrangement. For the purposes of this test, live conductors may be connected together.

**Table 6A – Minimum values of insulation resistance**

| Nominal circuit voltage<br>V              | Test voltage d.c.<br>V | Insulation resistance<br>MΩ |
|---|------------------------|-----------------------------|
| SELV and PELV                             | 250                    | ≥ 0,5                       |
| Up to and including 500 V, including FELV | 500                    | ≥ 1,0                       |
| Above 500 V                               | 1 000                  | ≥ 1,0                       |

The insulation resistance, measured with the test voltage indicated in Table 6A, is satisfactory if each circuit, with the appliances disconnected, has an insulation resistance not less than the appropriate value given in Table 6A.

Table 6A shall be applied for a verification of the insulation resistance between non-earthed protective conductors and earth.

Where surge protective devices (SPDs) or other equipment are likely to influence the verification test, or be damaged, such equipment shall be disconnected before carrying out the insulation resistance test.

Where it is not reasonably practicable to disconnect such equipment (e.g. in case of fixed socket-outlets incorporating an SPD), the test voltage for the particular circuit may be reduced to 250 V d.c., but the insulation resistance must have a value of at least 1 MΩ.

NOTE 1 For measurement purposes, the neutral conductor is disconnected from the protective conductor.

NOTE 2 In TN-C systems, measurement is made between the live conductors and the PEN conductor.

NOTE 3 In locations exposed to fire hazard, a measurement of the insulation resistance between the live conductors should be applied. In practice, it may be necessary to carry out this measurement during erection of the installation before the connection of the equipment.

NOTE 4 Insulation resistance values are usually much higher than those of Table 6A. When such values show evident differences, further investigation is needed to identify the reasons.

NOTE 5 In China and Spain the minimum insulation resistance for circuits up to and including 500 V is 0,5 MΩ

NOTE 6 In Spain, the insulation values given in Table 6A are designed for an installation in which the length of the wiring systems, irrespective of the number of conductors it contains, does not exceed 100 m. When this length exceeds the value cited above and the installation can be broken down into segments of approximately 100 m in length, either by sectioning, disconnecting and withdrawing fuses or opening switches, each of the parts in which the installation has been broken down must present the relevant insulation resistance. When it is not possible to break the installation down as indicated above, the insulation resistance value of the entire installation may, with respect to corresponding minimum, be inversely proportional to the overall length, in hectometres, of the wiring systems.

### 61.3.4 Protection by SELV, PELV or by electrical separation

The separation of circuits shall be in accordance with 61.3.4.1 in the case of protection by SELV, 61.3.4.2 in the case of protection by PELV and 61.3.4.3 in the case of protection by electrical separation.

The resistance value obtained in 61.3.4.1, 61.3.4.2 and 61.3.4.3 shall be at least that of the circuit with the highest voltage present in accordance with Table 6A.