KENYA STANDARD

DKS662-3:2026

ICS ##.###

Third Edition

Requirements for Electrical Installations — Part 3: Assessment of General characteristics

PUBLIC REVIEW DRAFT MARCH 2026

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KENYA STANDARD

KS 662-3: 2026

ICS ##.###

Third Edition

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Requirements for electrical installations— Part 3: Assessment of general characteristics

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Foreword

This Kenya Standard was prepared by the Electrical Installations and Distribution Systems Technical Committee under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

Kenya Bureau of Standards (KEBS) has established Technical Committees (TCs) mandated to develop Kenya Standards (KS). The Committees are composed of representatives from the public and private sector organizations in Kenya.

Kenya Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. Draft Kenya Standards are circulated to stakeholders through the KEBS website and notifications to World Trade Organization (WTO). The comments received are discussed and incorporated before finalization of the standards, in accordance with the Procedures for Development of Kenya Standards.

Kenya Standards are subject to review, to keep pace with technological advances. Users of the Kenya Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

This third edition cancels and replaces the second edition (KS 662-3:2001), which has been technically revised.

The revision of this standard is based on BS 7671:2018 (18th Edition) with its several amendments and the different parts of IEC 60364 and is split into the following parts:

Part 1, Scope, object and fundamental principles.

Part 2. Definitions.

Part 3. Assessment of general characteristics.

Part 4: Protection for safety.

Part 5. Selection and erection of electrical equipment.

Part 6. Verification.

Part 7. Requirements for special installations or locations.

These parts are in line with those of IEC 60364 and they also match the chapters and sections of BS 7671:2008.

During the preparation of this standard, reference was made to the following documents:

IEC 60364 (All parts): Low-voltage installations.

BS 7671:2008. (18th Edition) Requirements for electrical installations.

Acknowledgement is hereby made for the assistance derived from these sources.

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Requirements for electrical installations — Part 3: Assessment of general characteristics

1 Scope

This Part 3 of this Kenya standard specifies the fundamental requirements for assessing electrical installations, including new installations and modifications to existing systems. It covers the determination of installation characteristics, including the intended purpose, general structure, and supply arrangements. It also addresses external influences affecting the installation, equipment compatibility, maintainability, recognized safety services, and considerations for continuity of service.

2 Normative references

The following referenced documents referred to in the text in such a way that some or all of their content constitutes requirements 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.

KS 662-4, Requirements of Electrical Installations — *Part 4: Protection for safety — Chapter 41: Protection against electric shock*

KS 662-5, Requirements of Electrical Installations — *Part 5: Protection for safety — Selection and erection of equipment*

KS 662-2, Requirements of Electrical Installations — *Part 2: Definitions*

3 Terms and definitions

Refer to KS 662-2:2026

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Assessment Of General Characteristics

300.1 General

At the inception of every electrical installation, including alterations to existing installations, an assessment shall be made of the following characteristics of the installation in accordance with the chapters indicated:

(i) The purpose(s) for which the installation is intended to be used, its general structure and its supplies (Chapter 31)
(ii) The external influences to which it is to be exposed (Chapter 32)
(iii) The compatibility of its equipment (Chapter 33)
(iv) Its maintainability (Chapter 34)
(v) Recognized safety services (Chapter 35)
(vi) Assessment for continuity of service (Chapter 36).

These characteristics shall be taken into account in the choice of methods of protection for safety (see KS 662-4) and the selection and erection of equipment (see KS 662-5).

NOTE For telecommunications installations, account should be taken of any IEC standards and publications of the CCITT and the CCIR relevant to the type of installation concerned.

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Requirements

1. CHAPTER 31 PURPOSES, SUPPLIES AND STRUCTURE

311. MAXIMUM DEMAND AND DIVERSITY

311.1 For economic and reliable design of an installation within thermal limits and admissible voltage drop, the maximum demand shall be determined. In determining the maximum demand of an installation or part thereof, diversity may be taken into account.

312 CONDUCTOR ARRANGEMENT AND SYSTEM EARTHING

The following characteristics shall be assessed:

(i) Arrangement of current-carrying conductors under normal operating conditions

(ii) (ii) Type of system earthing.

312.1 General

The following arrangements of current-carrying conductors under normal operating conditions are taken into account in this Standard.

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312.1.1 Current-carrying conductors in AC circuits

Fig 3.1 – Single-phase 2-wire

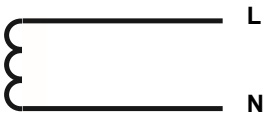
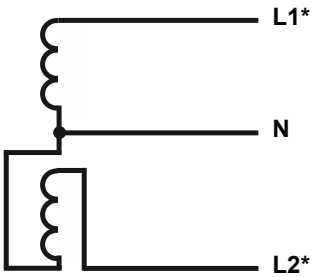
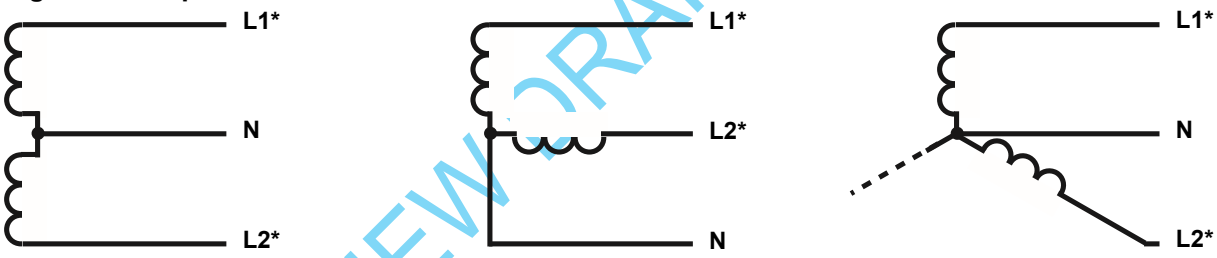


Fig 3.2 – Single-phase 3-wire



Phase angle 0°
*** Numbering of conductors optional**

Fig 3.3 – Two-phase 3-wire



Phase angle 180° **Phase angle 90°** **Phase angle 120°**

*** Numbering of conductors optional**

Fig 3.4 – Three-phase 3-wire

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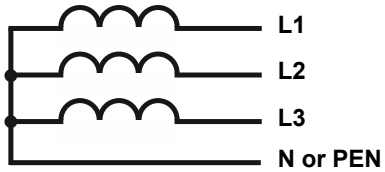
Fig 3.5 – Three-phase 4-wire



Three-phase, 4-wire with neutral conductor or PEN conductor. By definition, the PEN conductor is not a live conductor but a conductor carrying an operating current.

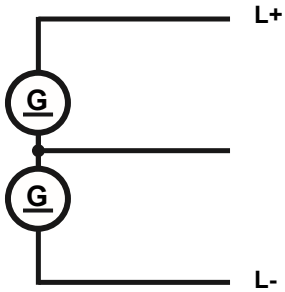
NOTE 1: In the case of a single-phase 2-wire arrangement which is derived from a three-phase 4-wire arrangement, the two conductors are either two line conductors or a line conductor and a neutral conductor or a line conductor and a PEN conductor.

NOTE 2: In installations with all loads connected between lines, the installation of the neutral conductor may not be necessary.

312.1.2 Current-carrying conductors in DC circuits

Fig 3.6 – 2-wire

Fig 3.7 – 3-wire



NOTE: PEL and PEM conductors are not live conductors although they carry operating current. Therefore, the designation 2-wire arrangement or 3-wire arrangement applies.

312.2 Types of system earthing

The following types of system earthing are taken into account in this Standard.

The recommended earthing system shall be determined by the application.

NOTE 1: Figures 31A to 31E show examples of commonly used three-phase systems. For IT, multiple source, DC and other systems see Appendix 1.

NOTE 2: For private systems, the source and/or the distribution system may be considered as part of the installation within the meaning of this standard.

NOTE 3: The codes used have the following meanings:

First letter – Relationship of the power system to Earth:

T=direct connection of one point to Earth

I =all live parts isolated from Earth, or one point connected to Earth through a high impedance.

Second letter – Relationship of the exposed-conductive-parts of the installation to Earth:

T =direct electrical connection of exposed-conductive-parts to Earth, independently of the earthing of any point of the power system

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N =direct electrical connection of the exposed-conductive-parts to the earthed point of the power system (in AC systems, the earthed point of the power system is normally the neutral point or, if a neutral point is not available, a line conductor).

Subsequent letter(s) (if any) – Arrangement of neutral and protective conductors:

S = protective function provided by a conductor separate from the neutral conductor or from the earthed line (or, in AC systems, earthed phase) conductor

C=neutral and protective functions combined in a single conductor (PEN conductor).

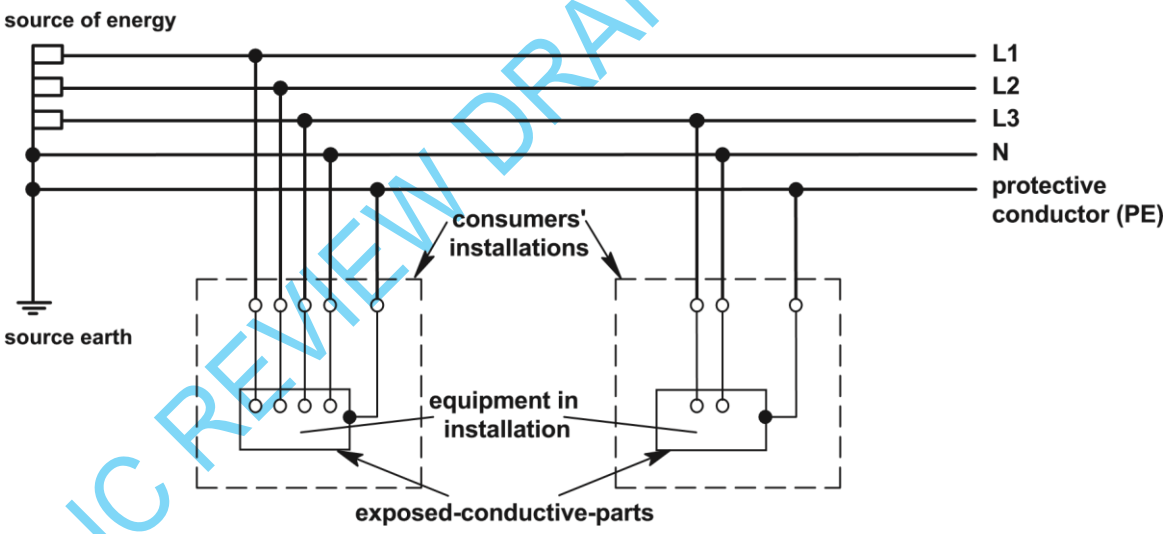
312.2.1TN systems

312.2.1.1 Single-source systems

TN systems have one point directly earthed at the source, the exposed-conductive parts of the installation(s) being connected to that point by protective conductors. Three types of TN system are considered according to the arrangement of neutral and protective conductors, as follows:

— TN-S system: in which throughout the system, a separate protective conductor is used;
— TN-C-S system: in which neutral and protective functions are combined in a single conductor in a part of the system. Also known as (PME).
— TN-C system: in which neutral and protective functions are combined in a single conductor throughout the system.

Fig 31A – TN-S system



Separate neutral and protective conductors throughout the system.

The protective conductor (PE) is the metallic covering of the cable supplying the installations or a separate conductor.

All exposed-conductive-parts of an installation are connected to this protective conductor via the main earthing terminal of the installation.

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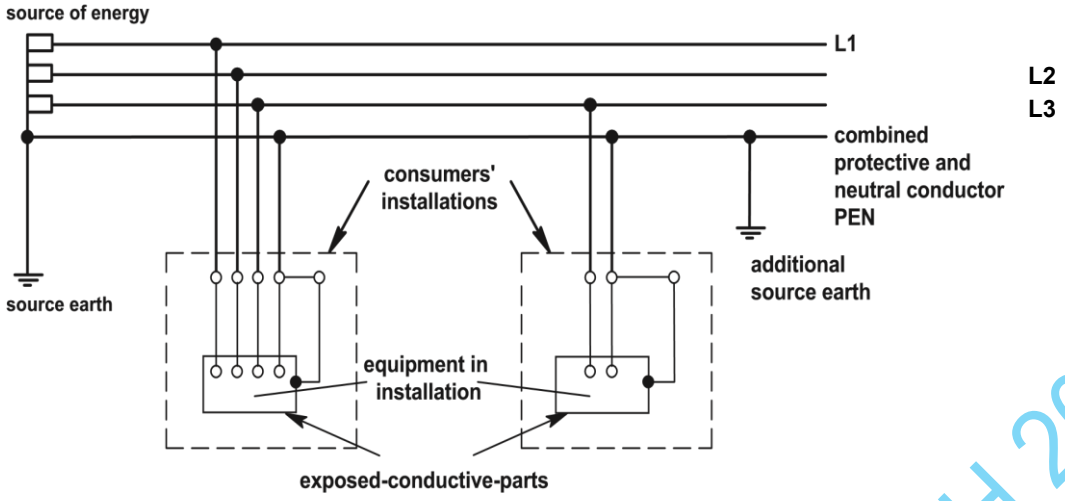
Fig 31B– TN-C-S (PME) system



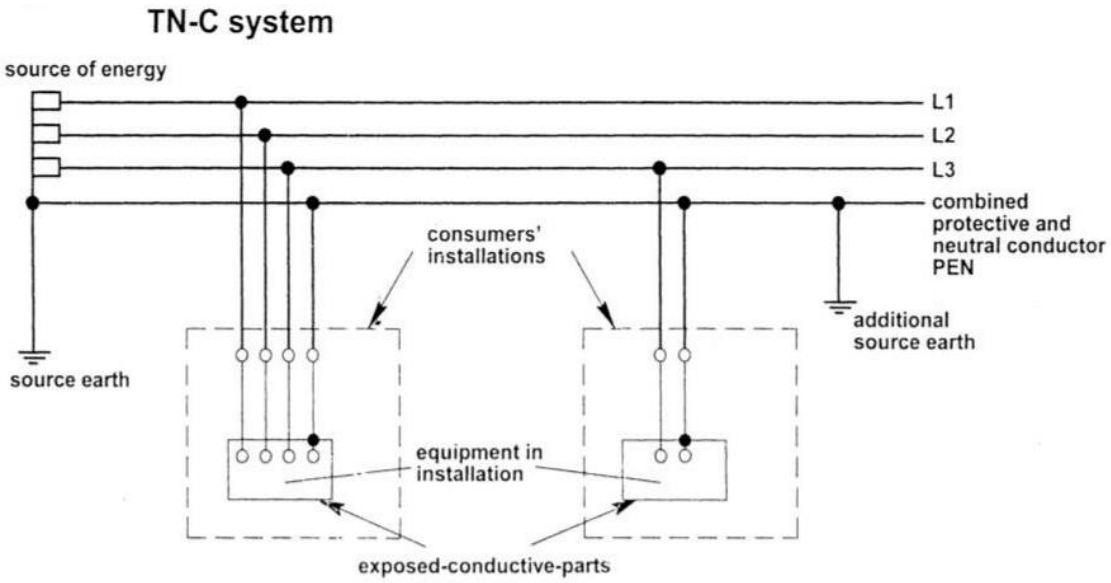
Neutral and protective functions combined in a single conductor (PEN) in a part of the system.

This type of distribution is known also as protective multiple earthing (PME).

The supply system PEN conductor is earthed at two or more points and an earth electrode may be necessary at or near a consumer's installation.

All exposed-conductive-parts of an installation are connected to the PEN conductor via the main earthing terminal and the neutral terminal, these terminals being linked together.

Figure 31 C — TN- C system



Neutral and protective functions combined in a single (conductor throughout the system)

312.2.2 TT system

312.2.2.1 Single-source system

A TT system has only one point directly earthed at the source, the exposed-conductive-parts of the installation(s) being connected to earth electrodes electrically independent of the earth electrode of the supply system (the source earth).

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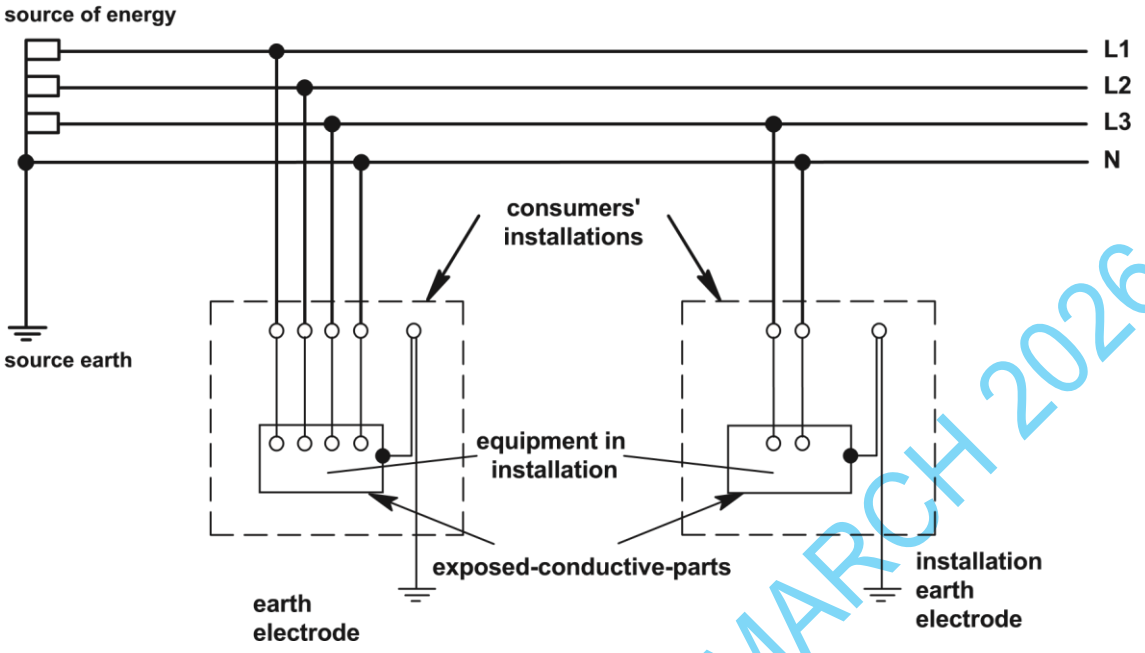
Fig 31C – TT system



All exposed-conductive-parts of an installation are connected to an earth electrode which is electrically independent of the source earth.

Separate neutral and protective conductors throughout the system.

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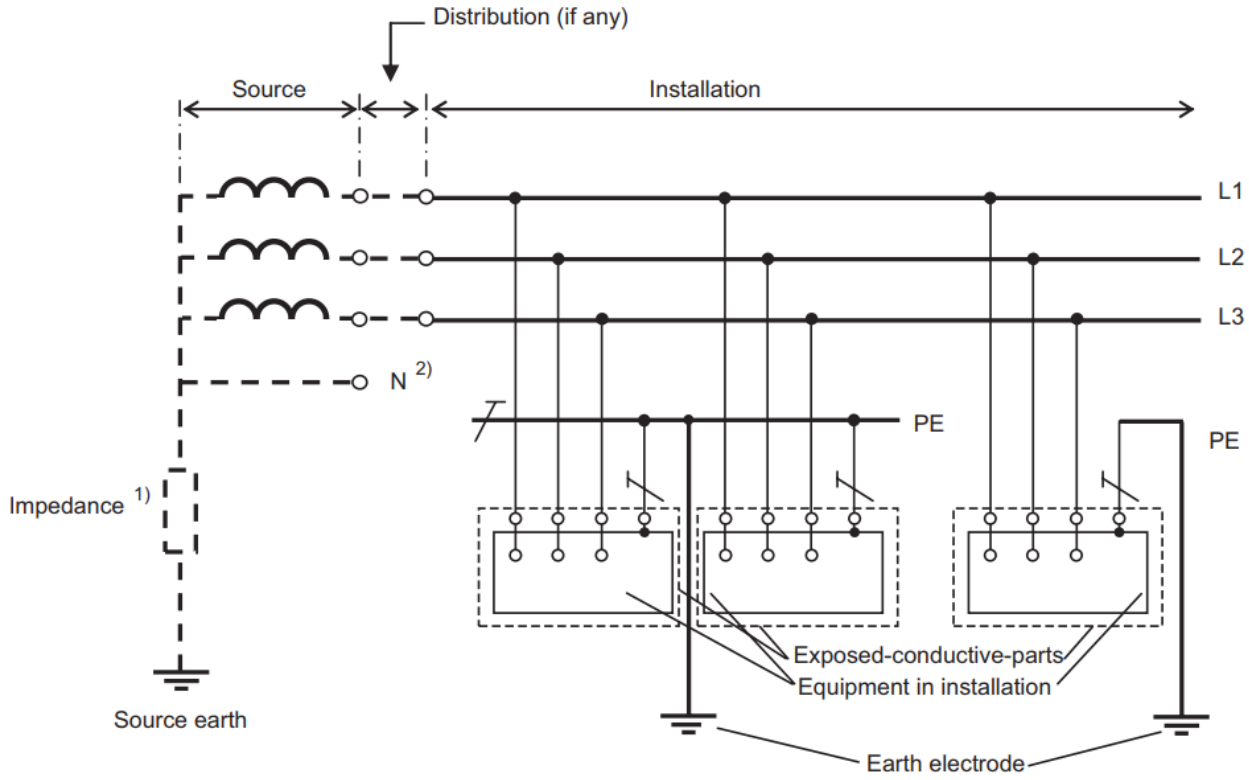
312.2.3 IT system

312.2.3.1 Single-source system

The IT power system has all live parts isolated from earth or one point connected to earth through an impedance, the exposed-conductive-parts of the electrical installation being earthed independently or collectively or to the earthing of the system (See KS 662-4, 413.1.5).

Figure 31D — IT system



1)
The system may be isolated from the earth.

The neutral may or may not be distributed.

312.4 Multiple source, DC and other systems

See Appendix 1.

313 SUPPLIES

313.1 General

313.1.1 The following characteristics of the supply or supplies, from whatever source, and the normal range of those characteristics where appropriate, shall be determined by calculation, measurement, enquiry or inspection:

(i) The nominal voltage(s) and its characteristics including harmonic distortion

(ii) The nature of the current and frequency

(iii) The prospective short-circuit current at the origin of the installation

(iv) The earth fault loop impedance of that part of the system external to the installation, Z_e

(v) The suitability for the requirements of the installation, including the maximum demand

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(vi) The type and rating of the overcurrent protective device(s) acting at the origin of the installation.

313.1.2 These characteristics shall be ascertained for an external supply and shall be determined for a private source. These requirements are equally applicable to main supplies and to safety services and standby supplies.

NOTE: The above information should be provided by distributors on request.

Supplies for safety services and standby systems

Where the provision of safety services is required, for example, by the authorities concerned with fire precautions and other conditions for emergency evacuation of the premises, and/or where the provision of standby supplies is required by the person specifying the installation, the characteristics of the source or sources of supply for safety services and/or standby systems shall be separately assessed. Such supplies shall have adequate capacity, reliability and rating and appropriate changeover time for the operation specified.

NOTE 1: For further requirements for supplies for safety services, see Chapter 35 hereafter and Chapter 56.

NOTE 2: For standby systems, there are no particular requirements in these Regulations.

314 DIVISION OF INSTALLATION

314.1 Every installation shall be divided into circuits, as necessary, to:

(i) avoid danger and minimize inconvenience in the event of a fault

(ii) facilitate safe inspection, testing and maintenance (see also Chapter 46 and Section 537)

(iii) take account of hazards that may arise from the failure of a single circuit such as a lighting circuit

(iv) reduce the possibility of unwanted tripping of RCDs due to excessive protective conductor (PE) currents not due to a fault

(v) mitigate the effects of electromagnetic interference(see also Chapter 44) (vi) prevent the indirect energizing of a circuit intended to be isolated.

314.2 Separate circuits shall be provided for parts of the installation which need to be separately controlled, in such a way that those circuits are not affected by the failure of other circuits, and due account shall be taken of the consequences of the operation of any single protective device.

314.3 The number of final circuits required, and the number of points supplied by any final circuit, shall be such as to facilitate compliance with the requirements of Chapter 43 for overcurrent protection, Chapter 46 and Section 537 for isolation and switching and Chapter 52 as regards current-carrying capacities of conductors.

314.4 Where an installation comprises more than one final circuit, each final circuit shall be connected to a separate way in a distribution board. The wiring of each final circuit shall be electrically separate from that of every other final circuit, so as to prevent the indirect energizing of a final circuit intended to be isolated.

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2. CHAPTER 32 CLASSIFICATION OF EXTERNAL INFLUENCES

Refer to Chapter 51 of KS 662-5.

3. CHAPTER 33 COMPATIBILITY

331 COMPATIBILITY OF CHARACTERISTICS

331.1 An assessment shall be made of any characteristics of equipment likely to have harmful effects upon other electrical equipment or other services or likely to impair the supply, for

example, for co-ordination with concerned parties e.g. petrol stations, kiosks and shops within shops. Those characteristics include, for example:

(i) transient overvoltages

(ii) undervoltage

(iii) unbalanced loads

(iv) rapidly fluctuating loads

(v) starting currents

(vi) harmonic currents

(vii) earth leakage current

(viii) excessive PE conductor current not due to a fault

(ix) DC feedback

(x) high-frequency oscillations

(xi) necessity for additional connections to Earth

(xii) (xii) power factor.

For an external source of energy, the distributor shall be consulted regarding any equipment of the installation having a characteristic likely to have significant influence on the supply.

332 ELECTROMAGNETIC COMPATIBILITY

332.1 All electrical equipment forming part of an electrical installation shall meet the appropriate electromagnetic compatibility (EMC) requirements and shall be in accordance with the relevant EMC standard.

332.2 Consideration shall be given by the designer of the electrical installation to measures reducing the effect of induced voltage disturbances and electromagnetic interferences (EMI). Measures are given in KS 662-4 Chapter 44.

4. CHAPTER 34 MAINTAINABILITY

341 GENERAL

341.1 An assessment shall be made of the frequency and quality of maintenance the installation can reasonably be expected to receive during its intended life. The person or body responsible for the operation and/or maintenance of the installation shall be consulted. Those characteristics are to be taken into account in applying the requirements of Parts 4 to 7 so that, having regard to the frequency and quality of maintenance expected:

(i) any periodic inspection and testing, maintenance and repairs likely to be necessary during the intended life can be readily and safely carried out, and

(ii) the effectiveness of the protective measures for safety during the intended life shall not diminish, and

(iii) the reliability of equipment for proper functioning of the installation is appropriate to the intended life.

NOTE: There may be particular statutory requirements relating to maintenance.

5. CHAPTER 35 SAFETY SERVICES

351 GENERAL

NOTE 1: The need for safety services and their nature are frequently regulated by statutory authorities whose requirements have to be observed.

NOTE 2: Examples of safety services are: emergency escape lighting, fire detection and fire alarm systems, installations for fire pumps, firefighters lifts, smoke and heat extraction equipment.

351.1 The following electrical sources for safety services are recognized:

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(i) Storage batteries

(ii) Primary cells

(iii) Generator sets independent of the normal supply

(iv) A separate feeder of the supply network that is effectively independent of the normal feeder (see 560.6.5).

352 CLASSIFICATION

A safety service is either:

— a non-automatic supply, the starting of which is initiated by an operator, or

— an automatic supply, the starting of which is independent of an operator.

An automatic supply is classified as follows according to change-over time:

— no-break: an automatic supply which can ensure a continuous supply within specified conditions during the period of transition, for example as regards variations in voltage and frequency;

— very short break: an automatic supply available within 0.15 s;

— short break: an automatic supply available within 0.5 s;

— medium break: an automatic supply available within 15 s;

— long break: an automatic supply available in more than 15 s.

6. CHAPTER 36 CONTINUITY OF SERVICE

361 GENERAL

361.1 An assessment shall be made for each circuit of any need for continuity of service considered necessary during the intended life of the installation, e.g. life-support systems. The following characteristics shall be considered:

(i) Selection of the system earthing

(ii) Selection of the protective device in order to achieve selectivity

(iii) Number of circuits

(iv) Multiple power supplies

(v) Use of monitoring devices.

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APPENDICES
Appendix 1(Informative)
DEFINITIONS-MULTIPLE SOURCE, DC AND OTHER SYSTEMS

Fig 9-Explanation of symbols used within Appendix 1

	Neutral conductor (N); midpoint conductor (M)
	Protective conductor (PE)
	Combined protective and neutral conductor (PEN)

Note 1: The dotted lines indicate the parts of the system that are not covered by the scope of the standard, whereas the solid lines indicate the part that is covered by the standard.

Note 2: For private systems, the source and/or the distribution system may be considered as part of the installation within the meaning of this standard. For this case, the figures may be completely shown in solid lines.

Fig 9A – TN-C-S multiple source system with separate protective conductor and neutral conductor to current-using equipment

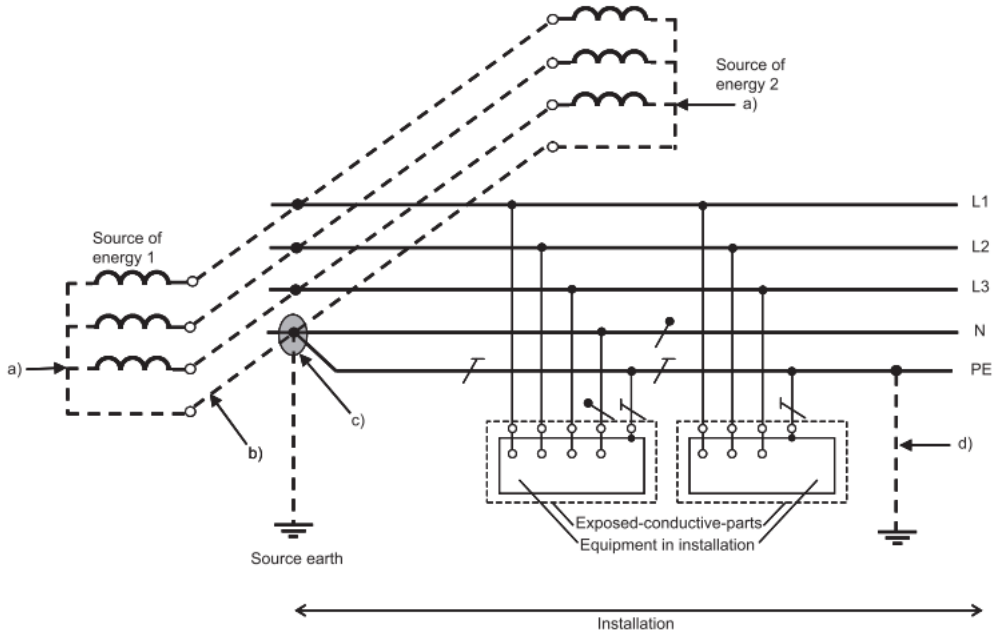

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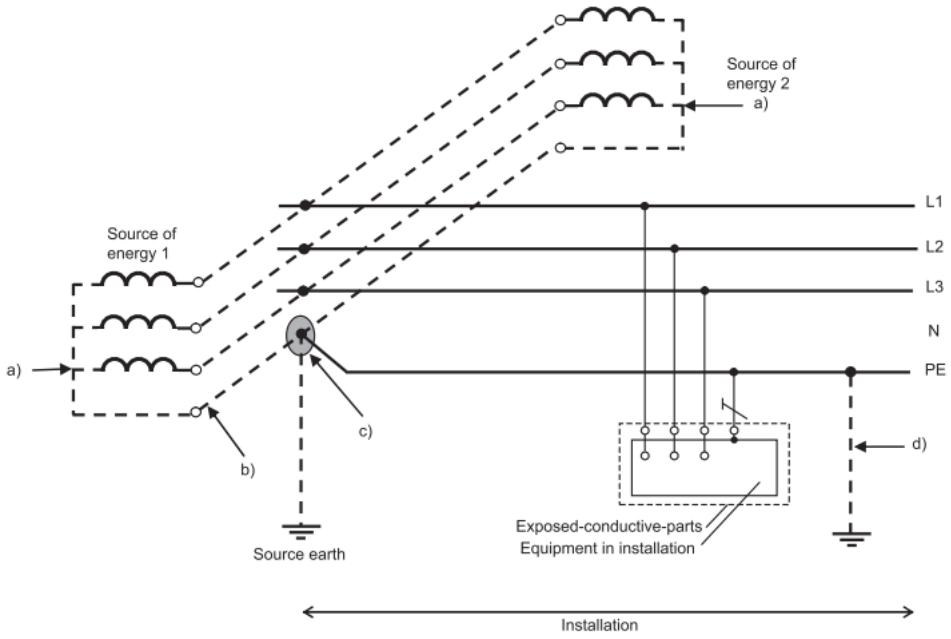
Fig 9B – TN multiple source system with protective conductor and no neutral conductor throughout the system for 2- or 3-phase load



NOTES to Figures 9A and 9B

(1) No direct connection from either the transformer neutral point or the generator star point to Earth is permitted.

(2) The interconnection conductor between either the neutral points of the transformers or the generator star points is to be insulated. The function of this conductor is similar to a PEN; however, it must not be connected to current-using equipment.

(3) Only one connection between the interconnected neutral points of the sources and the PE is to be provided. This connection is to be located inside the main switchgear assembly.

(4) Additional earthing of the PE in the installation may be provided.

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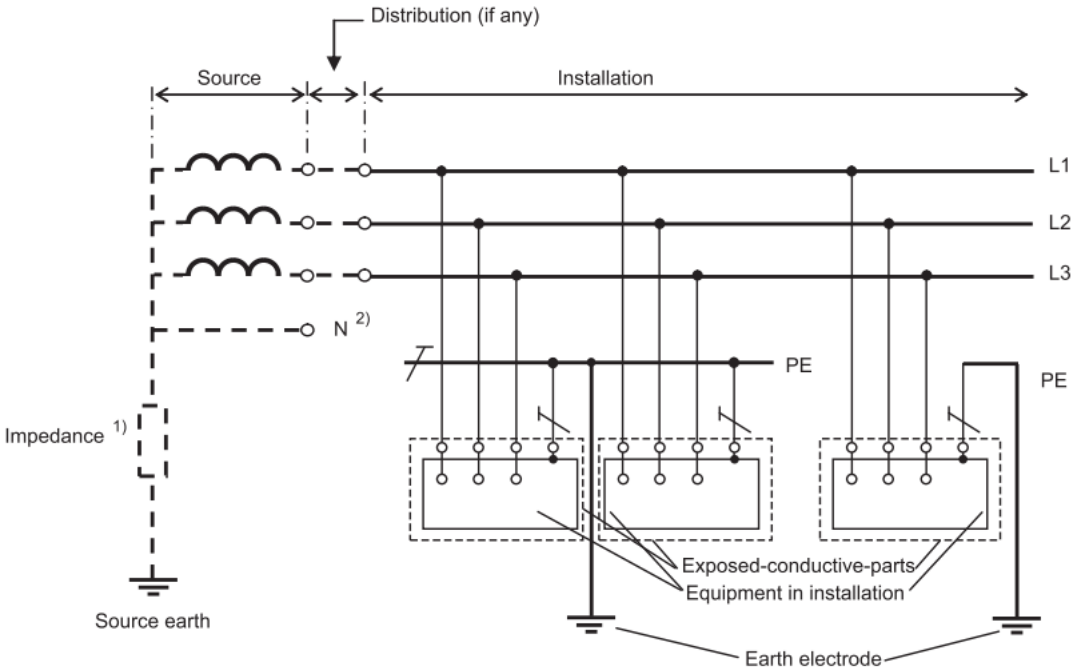
Fig 9C – IT system with exposed-conductive-parts earthed in groups or individually



NOTES

Additional earthing of the PE in the installation may be provided.

(1) The system may be connected to Earth via a sufficiently high impedance.

(2) The neutral conductor may or may not be distributed.

Fig 9D–TN-S DC system with earthed line conductor L−separated from the protective conductor throughout the installation

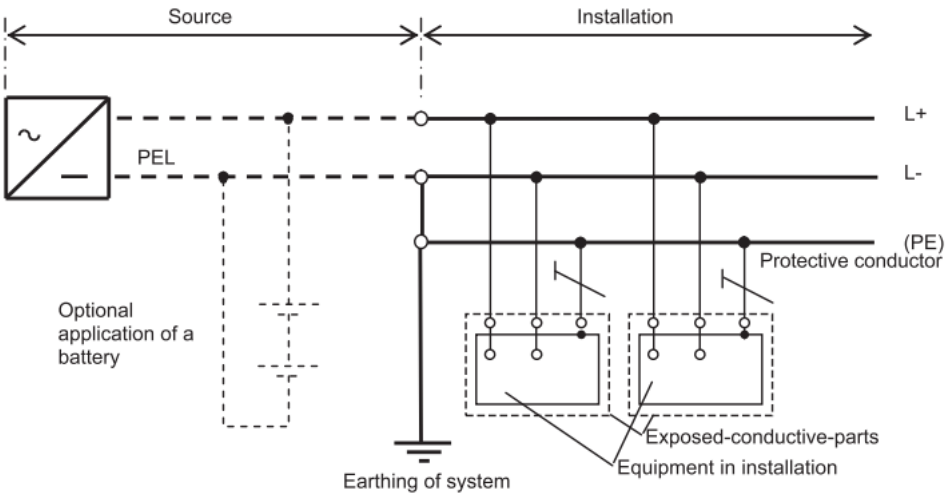


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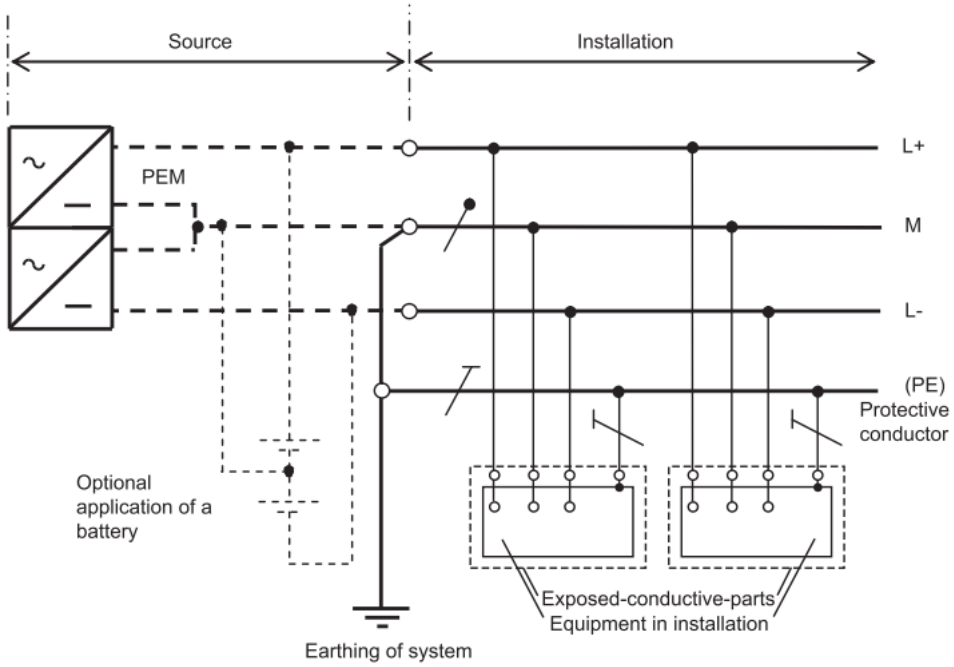
Fig 9E – TN-S DC system with earthed midpoint conductor M separated from the protective conductor throughout the installation



NOTE to Figures 9D and 9E

Additional earthing of the PE in the installation may be provided.

Fig 9F – TN-C DC system with earthed line conductor L– and protective conductor combined in one single conductor PEL throughout the installation

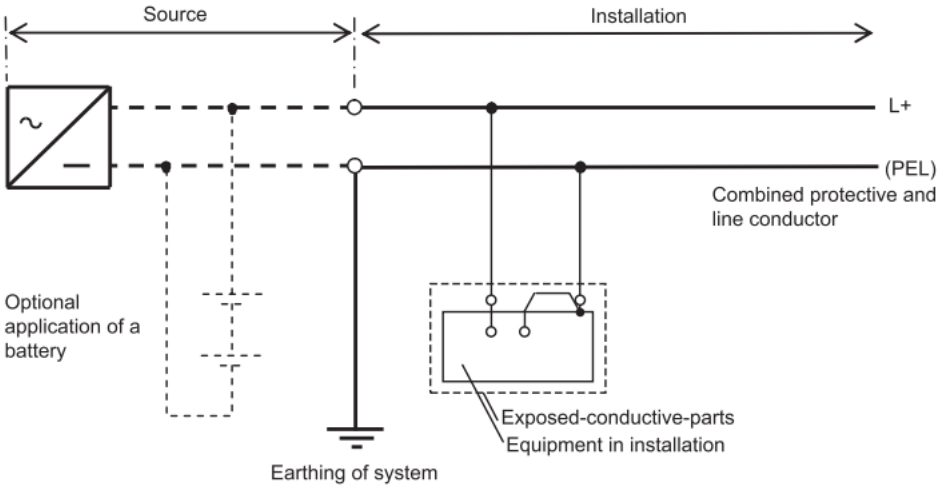


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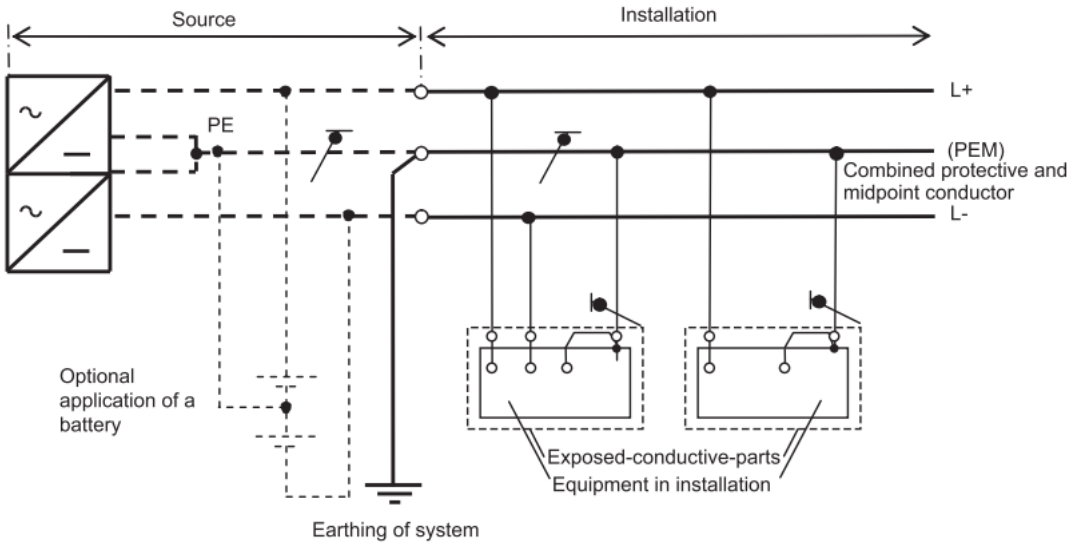
Fig 9G – TN-C DC system with earthed midpoint conductor M and protective conductor combined in one single conductor PEM throughout the installation



NOTE to Figures 9F and 9G

Additional earthing of the PEL or PEM in the installation may be provided.

Fig 9H – TN-C-S DC system with earthed line conductor L – and protective conductor combined in one single conductor PEL in a part of the installation

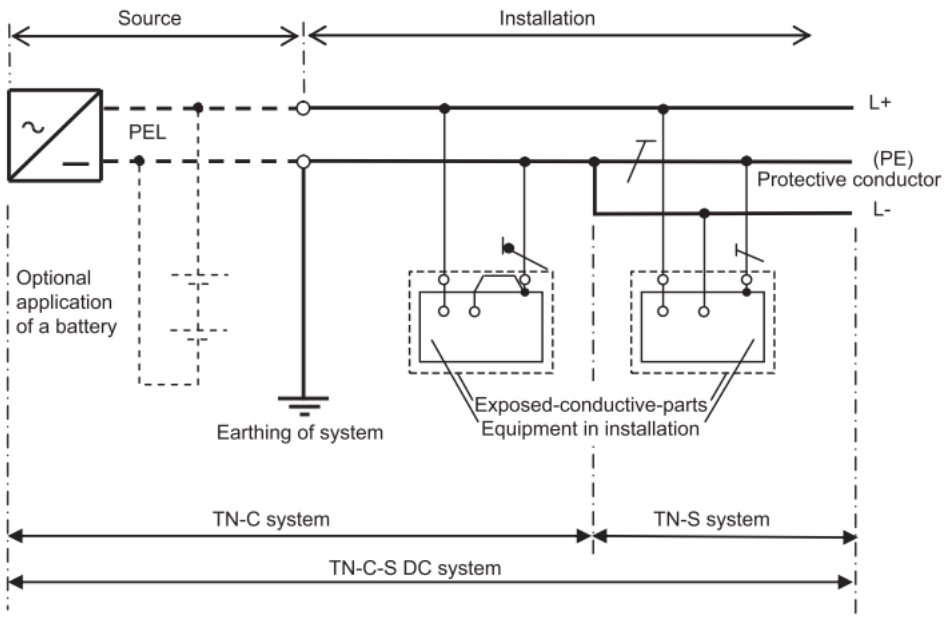
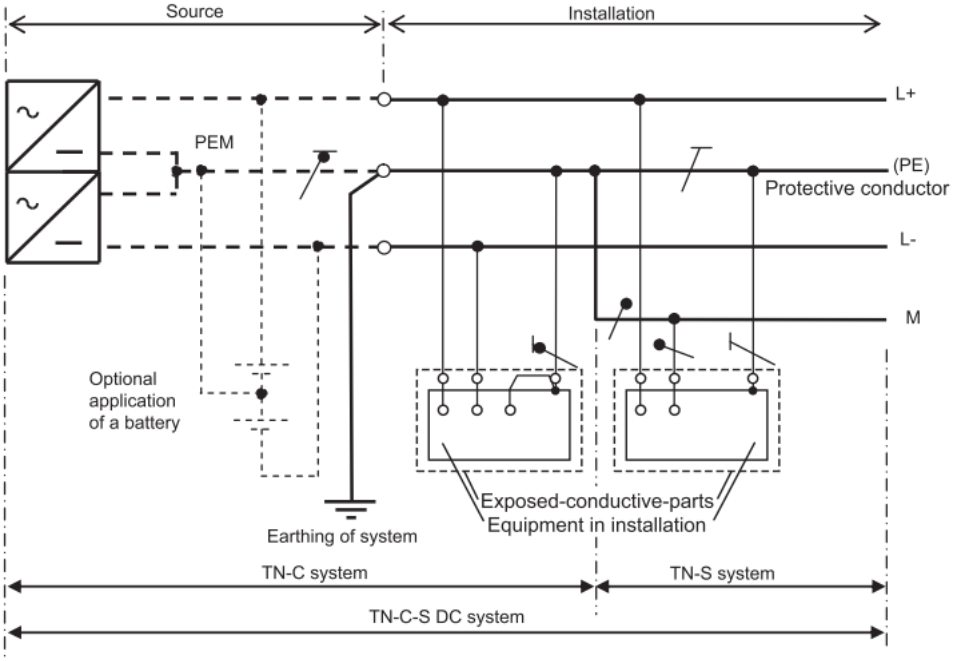


Fig 9I – TN-C-S DC system with earthed midpoint conductor M and protective conductor combined in one single conductor PEM in a part of the installation



NOTES to Figures 9H and 9I

Additional earthing of the PE in the installation may be provided.

A consumer shall not combine the neutral and protective functions in a single conductor in his consumer's installation.

Fig 9J – TT DC system

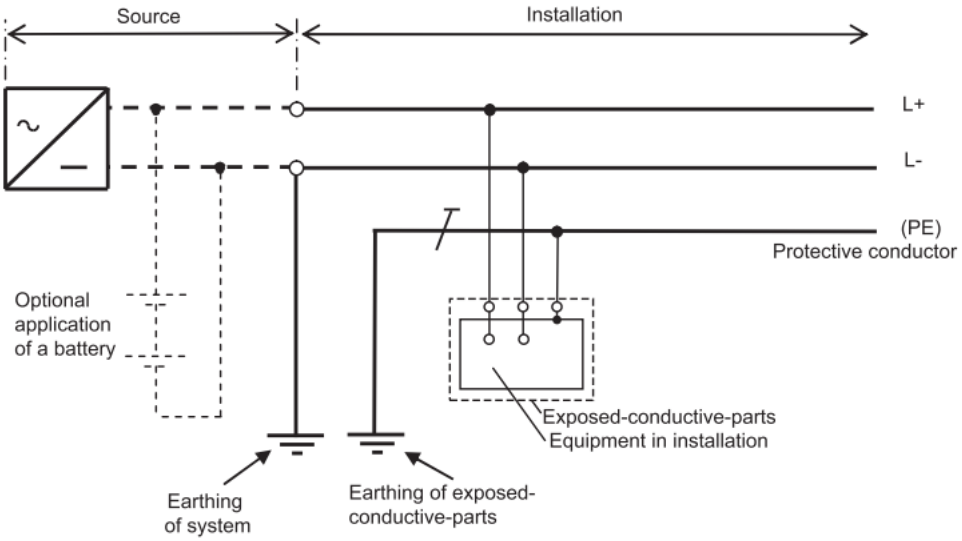


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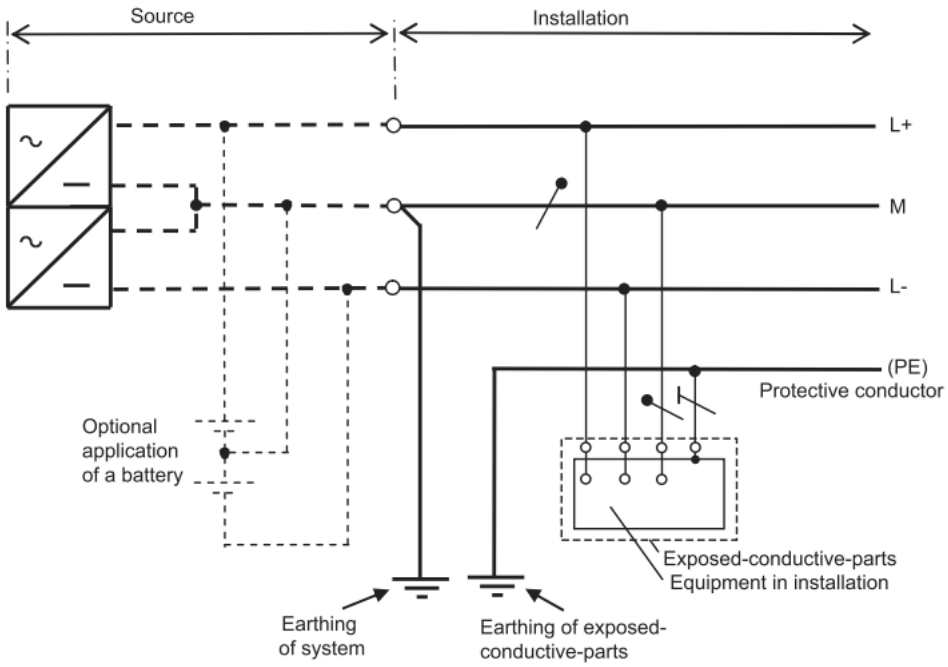
Fig 9K – TT DC system



NOTE to Figures 9J and 9K

Additional earthing of the PE in the installation may be provided.

Fig 9L – IT DC system with earthed line conductor L− and protective conductor

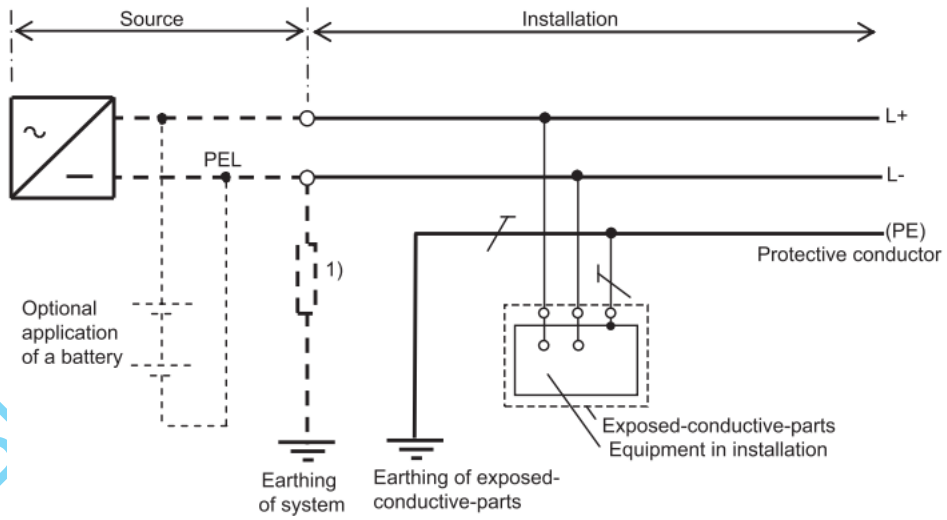


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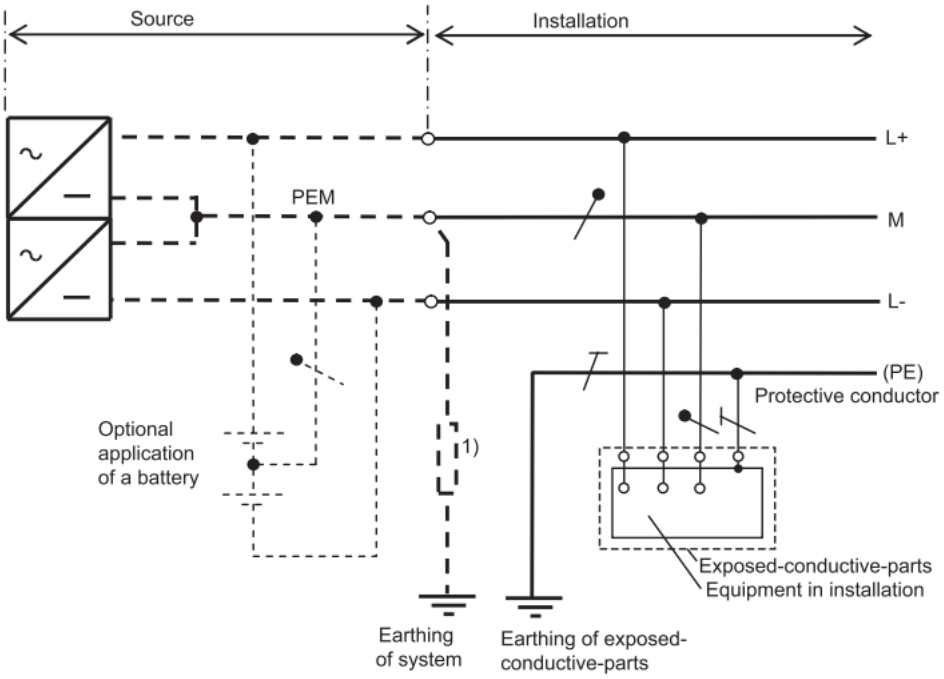
Fig 9M – IT DC system with earthed midpoint conductor M and protective conductor



NOTES to Figures 9L and 9M

Additional earthing of the PE in the installation may be provided.

(1) The system may be connected to Earth via a sufficiently high impedance.

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