



IEC 60034-8

Edition 4.0 2026-06

INTERNATIONAL STANDARD

**Rotating electrical machines -
Part 8: Terminal markings and direction of rotation**

Sample Document

get full document from standards.iteh.ai



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2026 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search -

webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions	7
4 Symbols	9
4.1 General.....	9
4.2 DC and single-phase commutator machines.....	9
4.3 AC machines without commutator	9
4.4 Auxiliary devices.....	10
5 Direction of rotation	10
6 Rules for terminal markings	10
6.1 General.....	10
6.1.1 Application.....	10
6.1.2 Marking instructions.....	11
6.1.3 Alphanumeric marking notation.....	11
6.1.4 Duplicate winding terminals	11
6.1.5 Shared terminals	11
6.1.6 Omissions	11
6.1.7 Earthing terminal	11
6.2 Suffixes	12
6.2.1 Winding elements	12
6.2.2 Internal connections	12
6.2.3 Tapping points.....	12
6.3 Prefixes	12
6.4 Winding identification for categories of Induction machines.....	13
6.4.1 Three-phase machines	13
6.4.2 Two-phase machines.....	13
6.4.3 Single-phase machines.....	13
6.4.4 Multiple three-phase group (for example, six-phase) machines.....	13
6.5 Synchronous machines	13
6.5.1 Primary windings of synchronous machines.....	13
6.5.2 Field winding of synchronous machines	13
6.5.3 Permanent magnet machines.....	13
6.6 DC machines	13
6.7 Relation between terminal markings and direction of rotation.....	14
6.7.1 Multi-phase machines not covered by IEC 60034-3 or IEC 60034-33	14
6.7.2 Multi-phase machines covered by IEC 60034-3 or IEC 60034-33	14
6.7.3 Multi-phase, multi-speed machines	14
6.7.4 Single-phase machines.....	14
6.7.5 Multiple three-phase group (for example, six-phase) machines.....	14
6.7.6 DC machines	15
6.7.7 Relation between direction of current and magnetic field (DC machines)	15
6.8 Terminal marking figures.....	15
6.8.1 General	15
6.8.2 Three-phase electrical machines	15

6.8.3	Single-phase induction machines.....	18
6.8.4	Multiple three-phase group (six-phase) machines	18
6.8.5	DC machines	18
7	Auxiliary terminal marking rules	20
7.1	General.....	20
7.2	Marking.....	20
7.2.1	Power-related devices	20
7.2.2	Thermal and measurement devices	21
7.2.3	Switches.....	22
Annex A	(normative) Connection diagrams for common applications.....	23
A.1	General.....	23
A.2	Three-phase machines.....	23
A.2.1	Single-speed stator windings	23
A.2.2	Multi-speed stator windings	26
A.3	Single-phase induction machines.....	31
A.4	DC machines	32
Bibliography	34
Figure 1	– Single three-phase winding, three elements, open connection, six terminals	15
Figure 2	– Single three-phase winding, delta connection, three terminals	15
Figure 3	– Single three-phase winding, internal star connection with neutral conductor, four terminals.....	15
Figure 4	– Single three-phase winding, two elements per phase, open connection, twelve terminals.....	16
Figure 5	– Single three-phase winding, four elements per phase, open connection, twenty-four terminals	16
Figure 6	– Single three-phase winding, two elements per phase with four tapping points per element, open connection, thirty-six terminals	16
Figure 7	– Two separate three-phase windings with two independent functions, two elements per phase, open connection, twenty-four terminals	17
Figure 8	– Two elements, internal connection, three terminals	17
Figure 9	– Single three-phase winding, star connection, duplicate terminals for alternate connection, six terminals	17
Figure 10	– Single three-phase winding, star connection, parallel terminals for shared current, six terminals	17
Figure 11	– Three-phase wound-rotor, star connections with neutral conductors, eight terminals.....	18
Figure 12	– Main and auxiliary winding, two elements.....	18
Figure 13	– Single-phase auxiliary winding, integrally connected capacitor, one element	18
Figure 14	– Single-phase main winding, integrally connected thermal protector, one element	18
Figure 15	– Six-phase winding, open connection, six elements	18
Figure 16	– Armature winding, one element.....	18
Figure 17	– Commutating winding, one and two elements	19
Figure 18	– Compensating winding, one and two elements	19
Figure 19	– Series winding, one element, two tappings.....	19
Figure 20	– Shunt excitation winding, one element	19

Figure 21 – Separately excited excitation winding, one and two elements	19
Figure 22 – Direct-axis auxiliary winding, one element.....	19
Figure 23 – Quadrature-axis auxiliary winding, one element	19
Figure 24 – Armature winding with commutating and compensating windings, one element	19
Figure 25 – Single-phase, single voltage	20
Figure 26 – Single-phase dual voltage	21
Figure 27 – Three-phase, single voltage	21
Figure 28 – Three-phase dual voltage.....	21
Figure 29 – Two-lead devices	22
Figure 30 – Three-lead devices of type R.....	22
Figure 31 – Four-lead devices of type R	22
Figure 32 – Switch connections	22
Figure A.1 – Delta connection.....	23
Figure A.2 – Star connection – with or without neutral	23
Figure A.3 – Dual voltage, six terminals ($U_{Low}: U_{High} = 1: \sqrt{3}$)	23
Figure A.4 – Star-connected, dual voltage, nine terminals ($U_{Low}: U_{High} = 1: 2$)	24
Figure A.5 – Delta-connected, dual voltage, nine terminals ($U_{Low}: U_{High} = 1: 2$)	24
Figure A.6 – Star-delta, single voltage, six terminals.....	24
Figure A.7 – Star-delta, dual voltage, twelve terminals ($U_{Low}: U_{High} = 1: 2$)	25
Figure A.8 – Part-winding, single voltage, six terminals	25
Figure A.9 – Part-winding, dual voltage, nine terminals ($U_{Low}: U_{High} = 1: 2$)	26
Figure A.10 – Variable-torque, six terminals	26
Figure A.11 – Variable-torque, dual-voltage ($U_{Low}: U_{High} = 1: \sqrt{3}$), nine terminals	27
Figure A.12 – Constant-torque, six terminals	28
Figure A.13 – Constant power, six terminals	28
Figure A.14 – Variable-torque, six terminals	29
Figure A.15 – Constant-torque, seven terminals.....	29
Figure A.16 – Constant-power, seven terminals	29
Figure A.17 – Example of three-speed, constant torque motor using two separate windings, ten terminals	30
Figure A.18 – Example of three-speed motor using three separate windings, ten terminals.....	30
Figure A.19 – Example of four-speed, variable-torque motor using two separate windings, twelve terminals	31
Figure A.20 – Split-phase or capacitor-start reversible motor	31
Figure A.21 – Reversible capacitor-start motor with four terminals with externally connected capacitor.....	32
Figure A.22 – Shunt motor or generator, four terminals.....	32
Figure A.23 – Compound-motor or generator with compensating and commutating windings, six terminals	32
Figure A.24 – Series-wound motor, two terminals	33

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Rotating electrical machines - Part 8: Terminal markings and direction of rotation

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60034-8 has been prepared by IEC technical committee 2: Rotating machinery. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2007 and Amendment 1:2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) The inclusion of turbine-type synchronous machines in the scope.

The text of this International Standard is based on the following documents:

Draft	Report on voting
2/2291/FDIS	2/2309/RVD

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

The language used for the development of this International Standard is English.

A list of all the parts of the IEC 60034 series, under the general title *Rotating electrical machines*, can be found on the IEC website.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

Sample Document

get full document from standards.iteh.ai

INTRODUCTION

The revision of this part of IEC 60034 provides worldwide uniformity in the electrical connections for rotating electrical machines and applies the recommendations of the basic safety publication IEC 60445 in specifying marking requirements.

These standardized connections will then enable the safe interchange of electric machines with their control and protective devices using standardized terminal markings.

NOTE Electrical connections of the machines are not the unique feature to be checked for safe interchange.

Sample Document

get full document from standards.iteh.ai

1 Scope

This part of IEC 60034 applies to AC and DC machines and specifies

- a) rules for the identification of winding connection points;
- b) marking of winding terminals;
- c) direction of rotation;
- d) relationship between terminal markings and direction of rotation;
- e) terminal marking of auxiliary devices;
- f) connection diagrams of machines for common applications.

2 Normative references

The following documents are 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.

IEC 60034-1, *Rotating electrical machines - Part 1: Rating and performance*

IEC 60034-3, *Rotating electrical machines - Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines and for synchronous compensators*

IEC 60034-33, *Rotating electrical machines - Part 33: Synchronous hydrogenerators including motor-generators - Specific requirements*

IEC 60417-1, *Graphical symbols for use on equipment - Part 1: Overview and application*

IEC 60445, *Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60034-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

terminal marking

permanent identification of the external termination of winding leads or auxiliary leads at the disposal of the user for connection of the machine to the supply or apparatus that indicates the function of the termination

3.2

connection points

all current transfer points that are used to permanently interconnect winding or winding element ends internally