



SLOVENSKI STANDARD
SIST HD 53.8 S4:1999

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Rotating electrical machines - Part 8: Terminal markings and direction of rotation of rotating machines (IEC 60034-8:1972 + A1:1990 (Modified))

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

Drehende elektrische Maschinen -- Teil 8: Klemmenbezeichnungen und Drehsinn von umlaufenden elektrischen Maschinen

Machines électriques tournantes -- Partie 8: Marques d'extrémités et sens de rotation des machines tournantes

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Ta slovenski standard je istoveten z: HD 53.8 S4:1993

ICS:

29.160.01 Rotacijski stroji na splošno Rotating machinery in general

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HARMONIZATION DOCUMENT

HD 53.8 S4

DOCUMENT D'HARMONISATION

HARMONISIERUNGSDOKUMENT

April 1993

UDC 621.313.1:621.315.683.777:531.15

Descriptors: Rotating electrical machines, terminal markings and
direction of rotation



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje
LJUBLJANA

ENGLISH VERSION

SIST... HD 53.8 S4
PREVZET PO METODI RAZGLASITVE

Rotating electrical machines
Part 8: Terminal markings and direction of
rotation of rotating machines
(IEC 34-8:1972 + A1:1990, modified)

-04- 1999

Machines électriques tournantes
Huitième partie: Marques
d'extrémités et sens de rotation
des machines tournantes
(CEI 34-8:1972 + A1:1990,
modifiés)

Umlaufende elektrische Maschinen
Teil 8: Klemmenbezeichnungen und
Drehsinn von umlaufenden
elektrischen Maschinen
(IEC 34-8:1972 + A1:1990,
modifiziert)

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which stipulate the conditions for implementation of this Harmonization Document
on a national level.

Up-to-date lists and bibliographical references concerning national implementation
may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French,
German).

CENELEC members are the national electrotechnical committees of Austria, Belgium,
Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg,
Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

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Ref. No. HD 53.8 S4:1993 E

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 34-8:1972 and its amendment 1:1990 could be accepted without textual changes, has shown that some common modifications were necessary for the acceptance as Harmonization Document.

The reference document, together with the following common modifications prepared by the CENELEC Technical Committee TC 2, Rotating machinery, was submitted to the CENELEC members for formal vote.

The text of the draft was approved by CENELEC as HD 53.8 S4 on 9 March 1993.

The following dates are proposed:

- latest date of announcement
of the HD at national level (doa) 1993-09-01
- latest date of publication of
a harmonized national standard (dop) 1994-03-01
- latest date of withdrawal of
conflicting national standards (dow) 1994-03-01

For products which have complied with HD 53.8 S3:1985 and its amendment A1:1989 before 1994-03-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1999-03-01.

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<https://standards.iteh.ai/catalog/standards/sist/846850b6-8b06-4a72-b54a-1855247b5> ENDORSEMENT NOTICE

The text of the International Standard IEC 34-8:1972 and its amendment 1:1990 was approved by CENELEC as a Harmonization Document with agreed common modifications as given below.

COMMON MODIFICATIONS

Add the following additional rules concerning the relation between terminal markings and the direction of rotation:

GENERAL

Terminal markings alone do not allow the mode of operation of the machine to be deduced.

It should be noted that the figures are illustrations only. They do not take the place of the Rules and the arrangement of terminals in the figures is not mandatory.

As IEC 34-8 does, the rules below deal with "external" terminals, i.e. terminals at the disposal of the user (IEC 34-8, page 7, Explanatory Note) but give further details for a clear understanding of the marking itself. In the figures attached to these Additional rules, markings of winding end points which are not "external" terminals are indicated in brackets for information purposes.

ADDITIONAL RULES

1. All terminals shall be identified by a marking.
2. The terminals to be connected to the supply are those having internal connections to the winding ends identified by the lowest suffix, viz. suffix 1 with untapped single-section windings (e.g. see Figs. 1 and 2).
3. In any electrical machine there shall be not more than one terminal with a given marking unless each of them is capable of performing the full electrical function appropriate to that marking, so that either may be used for the connection (see Figure 1).
4. If more than one terminal is provided to share the current, additional numerical markings are necessary, separated by a hyphen from the suffix of the marking (see Figure 2).
5. For windings with intermediate points, if more than two intermediate points per section are provided, the terminals corresponding to the tappings shall be marked with the following suffixes :

| | |
|-----------------|-----------------|
| 3, 31, 32 | 4 |
| 7, 71, 72 | 8 |
| etc..... | (see Figure 5). |

Note : The rules given in IEC Publication 445, sub-clause 5.2.b, for tappings in a single element, cannot be applied strictly to rotating machines with more than two intermediate points per section : see IEC 34-8, Fig.2.

6. Multi-section windings

6.1 The terminals corresponding to the ends of the sections shall be marked with the following suffixes (see Figure 3 and also Figure 3 of Publ. 34-8),

| | | |
|------------------|---|-------|
| - first section | : | 1,2 |
| - second section | : | 5,6 |
| - third section | : | 9,10 |
| - fourth section | : | 13,14 |

In any section, the end point closer to the supply shall be marked with the lower numerical suffix.

This applies to all multi-section windings, whatever arrangements they may be meant for (e.g. see Figs. 7, 8, 9 and 10).

6.2 If two or more sections of a winding are connected to a common terminal, it shall take the lowest of the suffixes of the ends connected (see Figure 4).

7. Separate windings

7.1 Separate windings are such that, whatever purposes they may be intended to serve, they only are used one at a time, whether in full or partially, i.e. they are not intended for any arrangement combining two or more windings or sections of them.

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7.2 For machines with separate windings, the requirements of Clause 5 and Clause 6 shall apply for each separate winding. In addition, all terminals shall be marked with numerical prefixes corresponding to the separate winding to which they belong, viz. :

| | | |
|------------------|---|---|
| - first winding | : | 1 |
| - second winding | : | 2 |
| - third winding | : | 3 |
| - fourth winding | : | 4 |
| - etc..... | | (see Fig. 6, and also Fig.4 of IEC Publication 34-8). |

Besides, in the case of multi-speed machines, the marking of terminals for connection to the supply shall be in accordance with Sub-clauses 8.2 and 8.3.

8. Multi-speed machines

- 8.1 If a machine has only one winding (e.g. a Dahlander or a pole modulation winding), the section end-points which are connected to the supply, when the sections are connected for the lowest speed, shall be identified by the lowest suffix.

For each speed, the terminals to be connected to the supply shall be marked with a numerical prefix. The sequence of the prefixes corresponds with the increasing speed sequence.

The suffix is omitted if the marking of a terminal has a prefix (e.g. see Figs. 7 and 8, which respectively are the same as Figs. 7 and 8 in IEC 34-8).

- 8.2 If a machine has separate single-section windings (e.g. see IEC 34-8, Fig.4, for 2 separate windings), the rules of Clause 7 shall apply with the sequence of prefixes corresponding to an increasing speed sequence.

The terminals to be connected to the supply are those having internal connections to the winding ends identified by the lower suffix.

For each speed, the suffixes of the terminals to be connected to the supply are omitted.

- 8.3 If a machine has separate windings including multi-section windings (e.g. Dahlander or pole modulation windings), rules in Sub-clauses 8.1 and 8.2 apply in combination (e.g. see Fig. 9, which is the same as Fig. 9 in IEC 34-8, and Fig.10).

- 8.4 The relation between direction of rotation and alphabetical sequence of the terminal letters given in Sub-clause 5.1 of IEC 34-8 is valid for all speeds. Should in a winding two phases be switched over to achieve this, then said switch shall be applied to terminal markings U and W and shall be applied to the arrangement for the lowest speed (e.g. see Figs 7, 8, 9 which respectively are the same as Figs 7, 8 and 9 in IEC 34-8).

9. When an end of a main winding and an end of an auxiliary winding are connected to the same terminal, that terminal shall be identified according to the rule for the main winding (see Figs. 11 and 12).

Note : Rule in Clause 9 cannot be applied to some types of small power motors. A specific terminal coding system for such motors is under consideration.

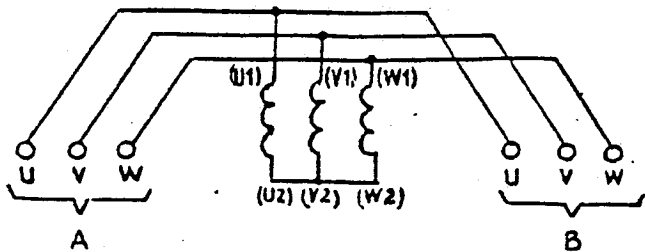


Fig. 1 Machine with two terminal boxes for alternative connections to the supply (either A or B connected with supply)

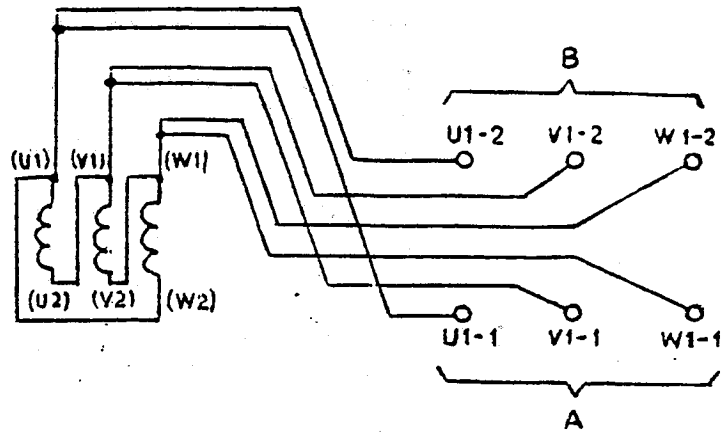


Fig. 2 Machine with parallel connected cables

(A and B connected with supply)

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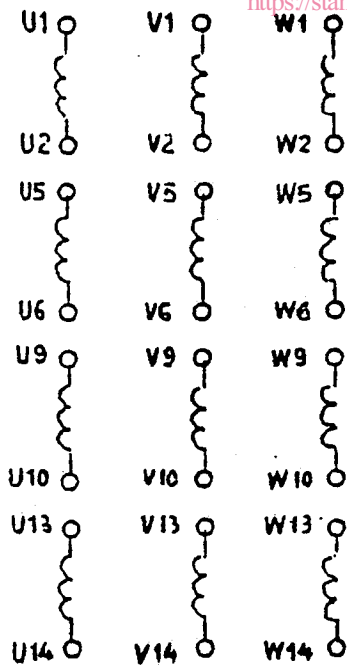


Fig. 3 Four section winding (24 terminals)

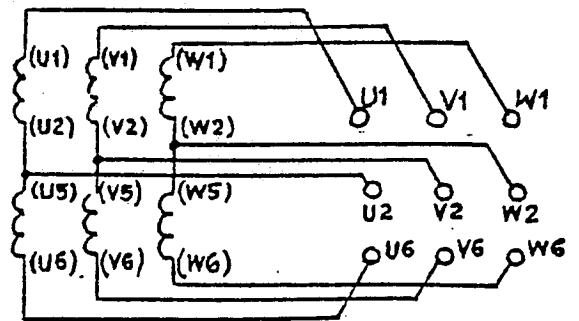
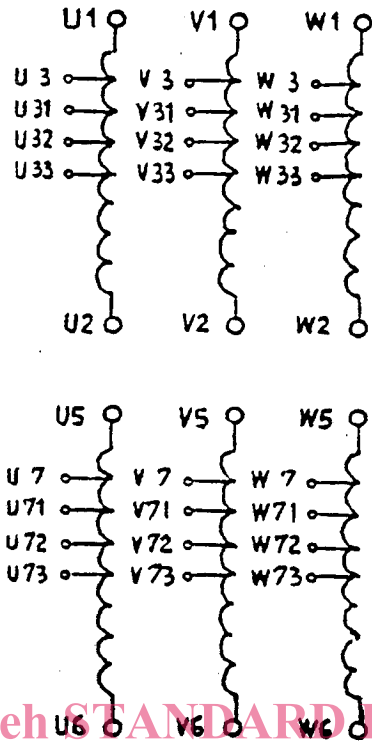


Fig. 4 Two-section winding connected to 9 terminals



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Fig. 5 Two-section winding with 4 tappings
(36 terminals) <http://standards.iteh.ai/catalog/standards/sist/846850b6-8b06-4a72-b54a-1855247b5621/sist-hd-53-8-s4-1999>

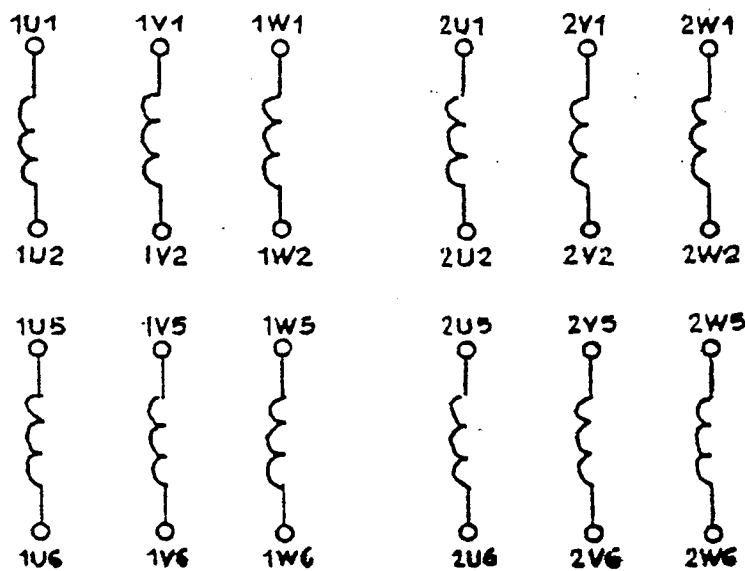
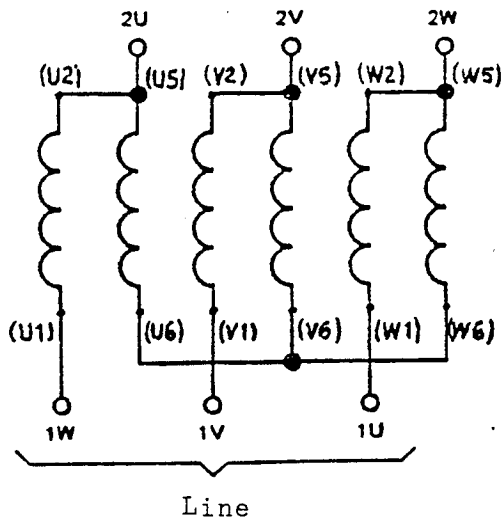
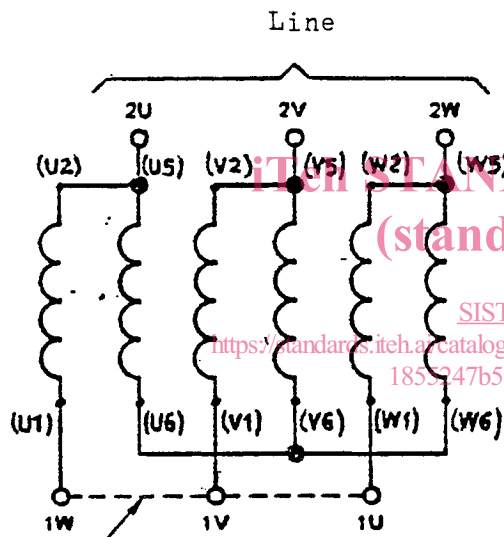


Fig. 6 Two separate two-section windings
(24 terminals)



Low speed:

1W, 1V, 1U connected with supply.
Winding connection: series star.



High speed:

2U, 2V, 2W connected with supply
1W connected to 1V and 1U

Winding connection: parallel star.

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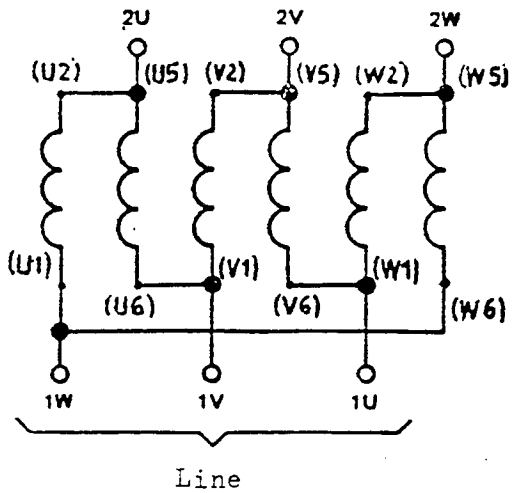
<https://standards.iteh.org/catalog/standards/sist/846850b6-8b06-4a72-b54a-1855247b5621/sist-hd-53-8-s4-1999>

Fig. 7

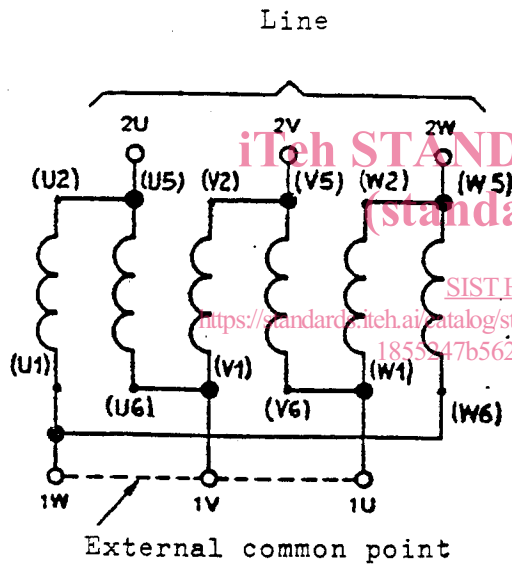
Three-phase two-speed winding with six terminals, for Dahlander or sum-modulated series star and parallel star arrangements

Note:

Terminals 1U and 1W have been switched over for the lower speed in order to have the same direction of rotation for both speeds.



Low speed:
1W, 1V, 1U connected with supply.
Winding connection: series delta



High speed:
2U, 2V, 2W connected with supply.
1U connected with 1V and 1W.
Winding connection: parallel star.

Fig. 8

Same winding as in Fig. 7 but for series delta and parallel star arrangements.

Note

Terminals 1U and 1W have been switched over for the lower speed in order to have the same direction of rotation for both speeds.

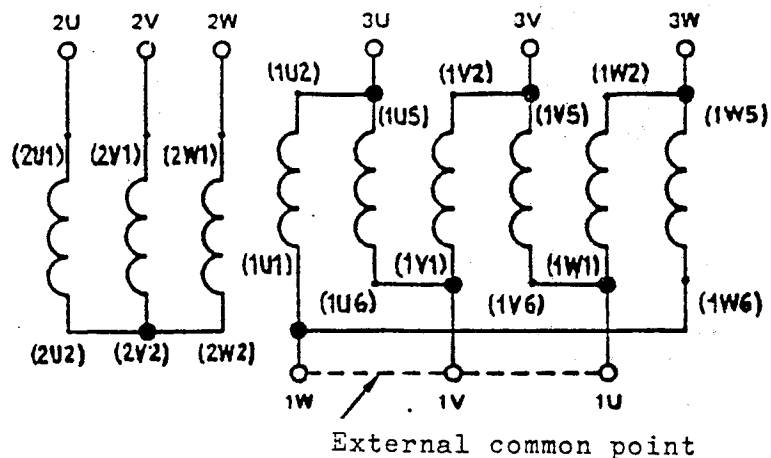


Fig. 9

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Three-phase three-speed induction motor with 2 separate windings, one being a winding like Fig. 8 for bottom and top speeds, with Dahlander or sum modulated arrangements, the other a single star-connected winding for the intermediate speed, nine terminals.

The sequence of the numerical prefixes of terminals corresponds with the speed sequence:

- Lowest speed: 1U, 1V, 1W connected with supply
- Intermediate speed: 2U, 2V, 2W connected with supply
- Highest speed: 3U, 3V, 3W connected with supply

The relation between direction of rotation and alphabetical sequence of the terminal letters given in Sub-clause 8.4 is valid for all speeds:

terminals 1U and 1W for the lowest speed have been switched over in order to have the same direction of rotation for all speeds.