

BUREAU OF INDIAN STANDARDS
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Draft Indian Standard

Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy

(First Revision)

(ICS 13.110; 29.130.99; 29.200)

Power Electronics Sectional
Committee, ETD 31

Last date for comments-08/09/2024

NATIONAL FOREWORD

This Draft Indian Standard (First Revision) which is identical with IEC 61800-5-1:2022 ‘Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy’ Issued By The International Electrotechnical Commission (IEC) is proposed to be adopted by the Bureau of Indian Standards on the recommendation of the Power Electronics Sectional Committee and approval of the Electrotechnical Division Council.

This standard was originally published in 2016. The first revision of this standard has been undertaken to align it with the latest version of IEC 61800-5-1:2022.

The text of the IEC Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words ‘International Standard’ appears referring to this standard, they should be read as ‘Indian Standard’.
- b) Comma (,) has been used as a decimal marker, while in Indian Standards the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to International Standards for which Indian Standards also exists. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
IEC 60034 (all parts), Rotating electrical machines	IS/IEC 60034 Series Rotating electrical machines	Identical

IEC 60034-1:2022, Rotating electrical machines – Part 1: Rating and performance	IS 15999 (Part 1) : 2021 IEC 60034-1: 2017 Rotating electrical machines - Part 1 : Rating and performance	Identical
IEC 60034-5:2020, Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification	IS/IEC 60034-5 : 2000 Rotating electrical machines: Part 5 degrees of protection provided by the integral design of rotating electrical machines (IP Code) - Classification	Identical
IEC 60050-131, International Electrotechnical Vocabulary (IEV) – Part 131: Circuit theory	IS 1885 (Part 57) : 2008/ IEC 60050-131 :2002 Electrotechnical vocabulary: Part 57 circuit theory (<i>Second Revision</i>)	Identical
IEC 60050-151, International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices	IS 1885 (Part 74) : 2012/ IEC 60050-151 : 2001 Electrotechnical vocabulary: Part 74 electrical and magnetic devices (First Revision)	Identical
IEC 60050-161, International Electrotechnical Vocabulary (IEV) – Part 161: Electromagnetic compatibility	IS 1885 (Part 85) : 2003/ IEC 60050-161 : 1990 Electrotechnical vocabulary: Part 85 electromagnetic compatibility	Identical
IEC 60050-192, International Electrotechnical Vocabulary (IEV) – Part 192: Dependability	IS 1885 (Part 192) : 2021/ IEC 60050-192: 2015 Electrotechnical Vocabulary Part 192 Dependability	Identical
IEC 60050-426, International Electrotechnical Vocabulary (IEV) – Part 426: Explosive atmospheres	IS 1885 (Part 60) : 2022/ IEC 60050: 426 Electrotechnical Vocabulary: Part 60 Equipment for Explosive Atmospheres (<i>Second Revision</i>)	Identical
IEC 60050-441, International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses	IS 1885 (Part 17) : 2024/ IEC 60050-441: 1984 Electrotechnical Vocabulary Part 17 Switchgear and Control Gear (<i>Second Revision</i>)	Identical
IEC 60050-551, International Electrotechnical Vocabulary (IEV) – Part 551: Power electronics	IS 1885 (Part 27) : 2008/ IEC 60050-551:1998 Electrotechnical vocabulary: Part 27 power electronics (<i>Third Revision</i>)	Identical
IEC 60050-601, International Electrotechnical Vocabulary (IEV) – Part 601: Generation, transmission and distribution of electricity – General	IS 1885 (Part 30) : 2023/ IEC 60050-601: 1985 Electrotechnical Vocabulary: Part 30 Overhead transmission and distribution of electrical energy	Identical
IEC 60068-2-1:2007, Environmental testing – Part 2-1: Tests – Test A: Cold	IS/IEC 60068-2-1) : 2007 Environmental Testing Part 2 Tests Section 1 Test A: Cold	Identical
IEC 60068-2-2:2007, Environmental testing – Part 2-2: Tests – Test B: Dry heat	IS/IEC 60068-2-2) : 2007 Environmental Testing Part 2: Tests - Test B Section 2: Dry Heat	Identical
IEC 60068-2-6:2007, Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)	IS/IEC 60068-2-6 : 2007 Environmental Testing Part 2 Tests Section 6 Test Fc: Vibration sinusoidal	Identical

IEC 60068-2-30:2005, Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)	IS/IEC 60068-2-30) : 2005 Environmental testing Part 2 Tests Section 30 Test Db: Damp heat cyclic 12 h 12 h cycle	Identical
IEC 60068-2-68:1994, Environmental testing – Part 2-68: Tests – Test L: Dust and sand	IS/IEC 60068-2-68) : 1994 Environmental testing Part 2: Tests Section 68 Test L: Dust and sand	Identical
IEC 60068-2-78:2012, Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state	IS 9000 (Part 4) : 2020/ IEC 60068-2-78 : 2012 Environmental Testing Part 4 Tests - Test Cab: Damp Heat, Steady State (<i>Second Revision</i>)	Identical
IEC 60204-11:2018, Safety of machinery – Electrical equipment of machines – Part 11: Requirements for equipment for voltages above 1 000 V AC or 1 500 V DC and not exceeding 36 kV	IS 16504 (Part 11) : 2020/ IEC 60204-11 : 2018 Safety of Machinery - Electrical Equipment of Machines Part 11 Requirements for Equipment for Voltages above 1 000 V AC or 1 500 V DC and not Exceeding 36 kV	Identical
IEC 60320 (all parts), Appliance couplers for household and similar general purposes	IS/IEC 60320 (Series) Appliance couplers for household and similar general purposes	Identical
IEC 60364 (all parts), Low-voltage electrical installations	IS 16996 : 2018/ IEC 60364-8-1 : 2014 Low-Voltage Electrical Installations - Energy Efficiency	
	IS 16997 : 2018/ IEC 60364-7-712 Requirements for Low-Voltage Special Electrical Installations or Locations Solar Photovoltaic (PV) Power Supply Systems	Identical
IEC 60529:1989, Degrees of protection provided by enclosures (IP Code)	IS/IEC 60529 : 2001 Degrees of protection provided by enclosures (IP Code)	Identical
IEC 60664-1:2020, Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests	IS 15382 (Part 1) : 2022/ IEC 60664-1:2020 Insulation Coordination for Equipment Within Low-Voltage Systems Part 1 Principles Requirements and Tests	Identical
IEC 60664-3:2016, Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution	IS 15382 (Part 3) : 2019/ IEC 60664-3 : 2006 Insulation coordination for equipment within low-voltage systems : Part 3 use of coating potting or moulding for protection against pollution	Identical
IEC 60664-4:2005, Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress	IS 15382 (Part 4) : 2017/ IEC 60664-4 : 2005 Insulation Coordination for Equipment Within Low-voltage Systems Part 4 Consideration of High-frequency Voltage Stress (First Revision)	Identical
IEC 60695-2-10:2021, Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire	IS/IEC 60695-2-10) : 2021 Fire hazard testing Part 2: Glowinghot-wire based test methods Section 10: Glow-wire apparatus	Identical

apparatus and common test procedure	and common test procedure	
IEC 60695-2-11:2021, Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)	IS/IEC 60695-2-11) : 2021 Fire Hazard Testing Part 2: Glowinghot-wire based test methods Section 11: Glow-wire flammability test method for end products GWEPT	Identical
IEC 60695-2-13:2021, Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials	IS/IEC 60695-2-13) : 2021 Fire Hazard Testing Part 2 GlowingHot wire based test methods Section 13 Glow-wire ignition temperature GWIT test method for materials	Identical
IEC 60695-10-2:2014, Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method	IS/IEC 60695-10-2 : 2014 Fire hazard testing: Part 10 Abnormal heat: Sec 2 ball pressure test method	Identical
IEC 60695-11-10:2013, Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods	IS/IEC 60695-11-10 : 2013 Fire hazard testing: Part 11 test flames :: Sec 10 50 w horizontal and vertical flame test methods	Identical
IEC 60721-3-3:1994, Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weather protected locations	IS/IEC 60721-3-3) : 2019 Classification of Environmental Conditions Part 3 Classification of groups of environmental parameters and their severities Section 3 Stationary use at weatherprotected locations	Identical
IEC 60721-3-4:2019, Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 4: Stationary use at nonweather protected locations	IS/IEC 60721-3-4) : 2019 Classification of Environmental Conditions Part 3 Classification of groups of environmental parameters and their severities Section 4 Stationary use at non- weatherprotected locations	Identical
IEC 60730-1:2013, Automatic electrical controls – Part 1: General requirements	IS/IEC 60730-1 : 1999 Automatic electrical controls for household and similar use : part 1 General Requirements	Identical
IEC 60947-4-1:2018, Low-voltage switchgear and controlgear – Part 4-1: Contactors and motorstarters – Electromechanical contactors and motor-starters	IS/IEC 60947-4-1 : 2018 Low-Voltage switchgear and controlgear : Part 4-1 Contactors and motor starters electromechanical contactors and motor-Starters	Identical
IEC 60990:2016, Methods of measurement of touch current and protective conductor current	IS/IEC 60990 : 2016 Methods of measurement of touch current and protective conductor current (<i>First Revision</i>)	Identical
IEC 61032:1997, Protection of persons and equipment by enclosures – Probes for verification	IS 1401 : 2008/ IEC 61032 : 1997 Protection of persons and equipment by enclosures - Probes for verification (<i>Second Revision</i>)	Identical

IEC 61084 (all parts), Cable trunking systems and cable ducting systems for electrical installations	IS 14927 (Part 1) : 2023/ IEC 61084-1 : 2017 Cable Trunking Systems and Cable Ducting Systems for Electrical Installations Part 1: General Requirements (<i>First Revision</i>)	Identical
	IS 14927 (Part 2/Sec 1) : 2001/ IEC 61084-2-1 : 2017 Cable Trunking and Ducting Systems for Electrical Installations : Part 2 Cable Trunking and Ducting Systems Intended for Mounting on Walls or Ceiling	Identical
IEC 61180:2016, High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment	IS 16826 : 2018/ IEC 61180 : 2016 High - Voltage Test Techniques For Low-Voltage Equipment - Definitions, Test and Procedure Requirements, Test Equipment	Identical
IEC 61189-3:2007, Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 3: Test methods for interconnection structures (printed boards)	IS/IEC 61189-3 : 2007 Test methods for electrical materials printed boards and other interconnection structures and assemblies Part 3 Test methods for interconnection structures printed boards	Identical
IEC 61230:2008, Live working – Portable equipment for earthing or earthing and short-circuiting	IS 16624 : 2017/ IEC 61230 : 2008 Live working - Portable equipment for earthing or earthing and short - Circuiting	Identical
IEC 61386 (all parts), Conduit systems for cable management	IS 16205 (Part 1) : 2017/ IEC 61386-1 : 2008 Conduit systems for cable management: Part 1 general requirements	Technically Equivalent
	IS 3480 : 2024/ IEC 61386-1 : 2008 Flexible steel conduits for electrical wiring-specification (<i>First Revision</i>)	Technically Equivalent
IEC 61558-1:2017, Safety of power transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests	IS/IEC 61558-1 : 2017 Safety of Transformers, Reactors, Power Supply Units and Combinations Thereof Part 1 General Requirements and <i>Tests (First Revision)</i>	Identical
IEC 62109-1:2010, Safety of power converters for use in photovoltaic power systems – Part 1: General requirements	IS 16221 (Part 1) : 2016/ IEC 62109-1 : 2010 Safety of Power Converters for use in Photovoltaic Power Systems Part 1 General Requirements	Identical
IEC 62271-102:2018, High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches	IS/IEC 62271-102 : 2018 High-Voltage Switchgear and Controlgear Part 102 Alternating Current Disconnectors And Earthing Switches	Identical
ISO 3864-1:2011, Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings	IS 16449 (Part 1) : 2018/ ISO 3864-1 : 2011 Graphical symbols - Safety colours and safety signs: Part 1 design principles for safety signs and safety markings	Identical

ISO 7000, Graphical symbols for use on equipment	IS 16450 : 2023/ ISO 7000 : 2019 Graphical Symbols for Use on Equipment Registered Symbols	Identical
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The technical committee has reviewed the provision of the following International Standard referred in this adopted standard and has decided that it is acceptable for use in conjunction with this standard:

<i>International Standard</i>	<i>Title</i>
IEC 60050-112	International Electrotechnical Vocabulary (IEV) – Part 112: Quantities and units
IEC 60050-442	International Electrotechnical Vocabulary (IEV) – Part 442: Electrical accessories
IEC 60050-826	International Electrotechnical Vocabulary (IEV) – Part 826: Electrical installations
IEC 60050-903	International Electrotechnical Vocabulary (IEV) – Part 903: Risk assessment
IEC 60068-2-52:2017	Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)
IEC 60364-4-41:2005	Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock
IEC 60364-5-54:2011	Low-voltage electrical installations – Part 5-54: Selection and erection of electrical equipment – Earthing arrangements and protective conductors
IEC 60417	Graphical symbols for use on equipment
IEC 60617	Graphical symbols for diagrams
IEC 60695-11-20:2015	Fire hazard testing – Part 11-20: Test flames – 500 W flame test method
IEC 60755:2017	General safety requirements for residual current operated protective devices
IEC 60799:2018	Electrical accessories – Cord sets and interconnection cord sets
IEC 62477-1:2022	Safety requirements for power electronic converter systems and equipment – Part 1: General
IEC 62477-2:2018	Safety requirements for power electronic converter systems and equipment – Part 2: Power electronic converters from 1 000 V AC or 1 500 V DC up to 36 kV AC or 54 kV DC
ISO 3746:2010	Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane
ISO 9614-1:1993	Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points

Only English language text has been retained while adopting it in this Indian Standard, and as such the page numbers given here are not the same as in the International Standard.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test, shall be rounded off in accordance with IS 2: 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

NOTE — The technical content of their document has not been enclosed as there are identical with the corresponding IEC standards for details, please refer the corresponding IEC 61800-5-1:2022 or kindly contact:

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