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**BUREAU OF INDIAN STANDARDS**
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*Draft Indian Standard*

# Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters

(*Third Revision*)

ICS 29.120.99, 29.130.20

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| Low Voltage Switchgear and Controlgear Sectional Committee, ETD 07 | Last date of receipt of comments**:** 27-January-2025 |

NATIONAL FOREWORD

This draft Indian Standard (Third Revision) which is identical with IEC 60947-4-1-2023 "Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters" issued by the International Electrotechnical Commission (IEC) will be adoptedby the Bureau of Indian Standards on the recommendation of the Low Voltage Switchgear and Controlgear Sectional Committee and approval of the Electrotechnical Division Council.

This standard was first published as IS 13947 (Part 4/ Sec 1) : 1993 and was identical to IEC 60947-4-1 : 2000. This standard was then superseded by IS/IEC 60947 (Part 4/Sec 1): 2000 which was identical to IEC 60947-4-1 : 2000 with Amendment No. 1 (2002) and Technical Corrigendum 1 (2001). First revision of IS/IEC 60947 (Part 4/Sec 1): 2000 was undertaken in 2018 which was identical to IEC 60947-4-1: 2012. Second revision of IS/IEC 60947 (Part 4/Sec 1): 2012 was undertaken in 2023 which was identical to IEC 60947-4-1: 2018. This third revision has now been undertaken to align the standard with the latest international practices.

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

- objective in the scope;
- instantaneous only motor protective switching device IMPSD (3.5.33);
- kinds of equipment (5.2.1);
- methods of overload protection of motors (5.2.6);
- separately mounted overload relay of a starter (in 5.7.3 b));
- starter and contactor suitable for use downstream to basic drive module (6.1.2 w));
- wiring subject to movement (in 8.1.3);
- use of voltage transient limiting device (8.1.18);
- accessible parts subject to temperature limits (in 8.2.2.3);
- reference to Annex X of IS/IEC 60947-1:2020 for the co-ordination of MPSD with SCPD (8.2.5.4);
- update and completion of the measurement method of the power consumption of the electromagnet (9.3.3.2.1.2);

- update of Annex C including rational about AC-3e;
- determination of the critical load current for photovoltaic applications (M.8.7).

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

a) Wherever the words 'International Standard' appear 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:

| *International Standard* | *Corresponding Indian Standard* | *Degree of Equivalence* |
|---|---|---|
| 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 with IEC 60034-1: 2017 |
| IEC 60068-2-14:2023, Environmental testing – Part 2-14: Tests – Test N: Change of Temperature | IS/IEC 60068-2-14: 2009 Environmental testing Part 2: Tests Section 14: Test N: Change of temperature | Identical with IEC 60068 Part 2/Sec 14: 2009 |
| IEC 60079-14, Explosive atmospheres – Part 14: Electrical installations design, selection and Erection | IS 16724: 2018/ IEC 60079-14: 2013 Explosive atmospheres - Electrical installations design, selection and erection | Identical with IEC 60079-14: 2013 |
| IEC 60085:2007, Electrical insulation – Thermal evaluation and designation | IS 1271: 2012 / IEC 60085: 2007 Electrical insulation - Thermal evaluation and designation (*Second Revision*) | Identical with IEC 60085: 2007 |
| IEC 60715:2017, Dimensions of low-voltage switchgear and controlgear – Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories | IS/IEC 60715: 2017 Dimensions of low - Voltage switchgear and controlgear - Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories (*First Revision*) | Identical with IEC 60715 : 2017 |
| IEC 60730-1, 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 with IEC 60730-1: 1999 |
| IEC 60947-1:2020, Low-voltage switchgear and controlgear – Part 1: General rules | IS/IEC 60947-1: 2020 Low-Voltage Switchgear and Controlgear Part 1 General Rules | Identical with IEC 60947-1:2020 |
| IEC 60947-2:2016, Low-voltage switchgear and controlgear – Part 2: Circuit-breakers | IS/IEC 60947-2: 2016 Low - Voltage switchgear and controlgear: Part 2 circuit - Breakers (*First Revision*) | Identical with IEC 60947-2 : 2016 |
| IEC 60947-5-1:2016, Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices | IS/IEC 60947-5-1: 2009 Low - Voltage switchgear and controlgear: Part 5 control circuit devices and switching elements: Sec 1 electromechanical control circuit devices (*First Revision*) | Identical with IEC 60947-5-1 : 2009 |
| IEC 61140:2016, Protection against electric shock – Common aspects for installation and Equipment | IS 9409: 2023 / IEC 61140: 2016 Protection Against Electric Shock - Common Aspects for Installation and Equipment (*First Revision*) | Identical with IEC 61140 : 2016 |
| IEC 61439 (all parts), Low-voltage | IS/IEC 61439 (all parts) Low-Voltage | Identical |

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| switchgear and controlgear assemblies | Switchgear and Controlgear Assemblies | |
| IEC 61800-5-1:2022, Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, thermal and energy | IS/IEC 61800-5-1: 2016 Adjustable Speed Electrical Power Drive Systems Part 5 Safety Requirements Section 1 Electrical, thermal and energy | Identical with IEC 61800-5-1: 2016 |
| IEC 61810-1, Electromechanical elementary relays – Part 1: General and safety requirements | IS 17064 (Part 1): 2018 / IEC 61810-1: 2015 Electromechanical elementary relays: Part 1 general and safety requirements | Identical with IEC 61810-1: 2015 |
| ISO 2859-1:1999, Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection | IS 2500 (Part 1): 2000 / ISO 2859-1:1999 Sampling procedures for inspection by attributes: Part 1 sampling schemes indexed by acceptance quality limit (AQL) for lot - By - Lot inspection (*Third Revision*) | Identical with ISO 2859-1:1999 |
| ISO 3864-2, Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels | IS 16449 (Part 2) : 2021 / ISO 3864-2 : 2016 Graphical Symbols - Safety Colours and Safety Signs Part 2 Design Principles for Product Safety Labels | Identical with ISO 3864-2 : 2016 |

The technical committee has reviewed the provisions of the following international standards referred in this adopted standard and decided that they are acceptable for use in conjunction with this standard.

| *International Standard* | *Title* |
|---|---|
| IEC 60034-12: 2016 | Rotating electrical machines – Part 12: Starting performance of singlespeed three-phase cage induction motors |
| IEC 60034-30-1: 2014 | Rotating electrical machines – Part 30-1: Efficiency classes of line operated AC motors (IE code) |
| IEC 60364-1: 2005 | Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions |
| IEC 61051-2 | Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors |
| IEC 61095:2023 | Electromechanical contactors for household and similar purposes |
| IEC 61643-331 | Components for low-voltage surge protection – Part 331: Performance requirements and test methods for metal oxide varistors (MOV) |
| IEC TS 63058 | Switchgear and controlgear and their assemblies for low voltage – Environmental aspects |
| IEC TS 63208 | Low-voltage switchgear and controlgear – Security aspects |
| IEC TR 63216:2019 | Low-voltage switchgear and controlgear – Electromagnetic compatibility assessment for switchgear and controlgear and their assemblies |
| CISPR 11:2015<br>CISPR 11:2015/AMD1:2016<br>CISPR 11:2015/AMD2:2019 | Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement |

Only the 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 IEC Publication.

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 or analysis shall be rounded off in accordance with IS 2: 2022 'Rules for rounding of 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 the document is not available on website. For details, please refer the corresponding IEC 60947-4-1: 2023 or kindly contact:

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