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IS/ISO 10218 (Part 2) : 2024

January 2024

Superseding IS 14530 (Part 2) :
2019 & IS 17193 : 2019

भारतीय मानक मसौदा
रोबोटिक्स — सुरक्षा आवश्यकताएँ —
भाग 2 औद्योगिक रोबोट अनुप्रयोग और रोबोट सेल
(IS/ISO 10218 (Part 2) का दूसरा पुनरीक्षण)

Draft Indian Standard

Robotics — Safety Requirements —
Part 2 Industrial Robot Applications and Robot Cells
(*Second Revision of IS/ISO 10218 (Part 2)*)

ICS 25.040.30

Industrial Automation Systems and Robotics Sectional Committee, PGD 18

FOREWORD

This Indian Standard (Part 2) (Second Revision) which is identical with ISO/FDIS 10218-2 : 2022 'Robotics — Safety Requirements — Part 2 Industrial robot applications and robot cells' issued by the International Organization for Standardization (ISO) will be adopted by the Bureau of Indian Standards on the recommendation of the Industrial Automation Systems and Robotics Sectional Committee and approval of the Production and General Engineering Division Council.

This series of Indian Standards has been created in recognition of the hazards that are presented by robots when they are integrated and installed with end-effectors into robot applications and robot cells. IS/ISO 10218-1, addresses robots as partly completed machines, while this document addresses robots integrated into complete machines for specific robot applications.

This standard was originally published in 1998 and subsequently revised in 2019. First revision of this standard was identical with ISO 10218-2 : 2011. The second revision of this standard has been undertaken to align it with the latest version of ISO 10218-2. This standard, formerly printed as IS 14530 (Part 2) has been revised under a single numbering system recognizing the popularity of ISO 10218 series by PGD 18. Furthermore, it supersedes IS 17193:2019, encompassing all safety requirements for collaborative robots within this comprehensive series of standards.

The major changes in this revision are as follows:

- a) Robot application has been emphasized instead of robot system, as the robot application includes the workpieces, task program, and the machinery and equipment to support the application and intended tasks;
- b) Safety requirements for industrial robots intended for use in collaborative applications has been subsumed (formerly, the content of IS 17193 : 2019);
- c) Requirements for functional safety have been clarified;
- d) Requirements for cybersecurity as applicable have been added.

Other parts in this series is:

Part 1 Industrial robots

The text of ISO 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’ 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 certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their respective places, 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>
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 3864-2:2016 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
ISO 3864-3:2012 Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs	IS 16449 (Part 3) : 2018/ ISO 3864-3 : 2012 Graphical symbols — Safety colours and safety signs: Part 3 Design principles for graphical symbols for use in safety signs	Identical

ISO 3864-4:2011 Graphical symbols — Safety colours and safety signs — Part 4: Colorimetric and photometric properties of safety sign materials	IS 16449 (Part 4) : 2017/ ISO 3864-4 : 2011 Graphical Symbols — Safety colours and safety signs: Part 4 Colorimetric and photometric properties of safety sign materials	Identical
ISO 4413:2010 Hydraulic fluid power — General rules and safety requirements for systems and their components	IS 10481 : 2020/ ISO 4413 : 2010 Hydraulic fluid power — General rules and safety requirements for systems and their components (<i>second revision</i>)	Identical
ISO 4414:2010 Pneumatic fluid power — General rules and safety requirements for systems and their components	12725 : 2021/ ISO 4414 : 2010 Pneumatic fluid power — General rules and safety requirements for systems and their components (<i>second revision</i>)	Identical
ISO 7010:2019 Graphical symbols — Safety colours and safety signs — Registered safety signs	IS 16451 : 2023/ ISO/IEC 7010 : 2019 Graphical symbols safety colours and safety signs registered safety signs	Identical
ISO 10218-1 : 2024 Robotics — Safety requirements — Part 1: Industrial robots	IS/ISO 10218-1 : 2024 Robotics — Safety requirements: Part 1 Industrial robots	Identical
ISO 12100:2010 Safety of machinery — General principles for design — Risk assessment and risk reduction	IS 16819 : 2018/ ISO 12100 : 2010 Safety of machinery — General principles for design — Risk reduction	Identical
ISO 13849-1:2023 Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design	IS 16810 (Part 1) : 2018/ ISO 13849-1 : 2015 Safety of machinery — Safety related parts of control systems: Part 1 General principles for design	Identical
ISO 13850:2015 Safety of machinery — Emergency stop function — Principles for design	IS 16818 : 2018/ ISO 13850 : 2015 Safety of machinery — Emergency stop function — Principles for design	Identical
ISO 13854:2017 Safety of machinery — Minimum gaps to avoid crushing of parts of the human body	IS 16816 : 2019/ ISO 13854 : 2017 Safety of machinery — Minimum gaps to avoid crushing of parts of the human body	Identical

ISO 13855:2010 Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body	IS 16815 : 2019/ ISO 13855 : 2010 Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body	Identical
ISO 13856:2013 (all parts), Safety of machinery — Pressure-sensitive protective devices	IS 16835 (all parts) : 2018/ ISO 13856 (all parts) : 2013 Safety of machinery — Pressure sensitive protective devices	Identical
ISO 13857:2019 Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs	IS 16814 : 2021/ ISO 13857:2019 Safety of machinery safety distances to prevent hazard zones being reached by upper and lower limbs	Identical
ISO 14118:2017 Safety of machinery — Prevention of unexpected start-up	IS 16813 : 2019/ ISO 14118 : 2017 Safety of machinery — Prevention of Unexpected Start-Up	Identical
ISO 14119:2013 Safety of machinery — Interlocking devices associated with guards — Principles for design and selection	IS 16812 : 2018/ ISO 14119 : 2013 Safety of machinery — Interlocking devices associated with guards — Principles for design and selection	Identical
ISO 14120:2015 Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards	IS 16811 : 2018/ ISO 14120 : 2015 Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards	Identical
ISO 14122:2016 (all parts) Safety of machinery — Permanent means of access to machinery	IS 16809 (all part) : 2018/ ISO 14122 (all parts) : 2018 Safety of machinery — Permanent means of access to machinery	Identical
ISO 14738: 2002 Safety of machinery — Anthropometric requirements for the design of workstations at machinery	IS 16572 : 2017/ ISO 14738 : 2002 Safety of machinery — Anthropometric requirements for the design of workstations at machinery	Identical
ISO 15534-1:2000 Ergonomic design for the safety of machinery — Part 1: Principles for determining the dimensions required for openings for whole-body access into machinery	IS 15836 (Part 1) : 2008/ ISO 15534-1 : 2000 Ergonomic design for the safety of machinery: Part 1 Principles for determining the dimensions required for openings whole-body access into machinery	Identical

ISO 15534-2:2000 Ergonomic design for the safety of machinery — Part 2: Principles for determining the dimensions required for access openings	IS 15836 (Part 2) : 2008/ ISO 15534-2 : 2000 Ergonomic design for the safety of machinery: Part 2 Principles for determining the dimensions required for access openings	Identical
ISO 19353:2019 Safety of machinery — Fire prevention and fire protection	IS 16807 : 2020/ ISO 19353 : 2019 Safety of machinery — Fire prevention and fire protection	Identical
IEC 60204-1:2016+AMD1:2021 Safety of machinery — Electrical equipment of machines — Part 1: General requirements	IS 16504 (Part 1) : 2019/ IEC 60204-1 : 2016 Safety of machinery — Electrical equipment of machines: Part 1 General requirements (<i>first revision</i>)	Identical
IEC 61310:2007 (all parts), Safety of machinery — Indication, marking and actuation	IS 16503 (Part 1) : 2017/ IEC 61310 (all parts) : 2007 Safety of machinery — Indication, marking and actuation	Identical
IEC 61508-2:2010 Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems	IS/IEC 61508-2 : 2010/ IEC 61508-2 : 2010 Functional safety of electrical/electronic/programmable electronic safety-related systems: Part 2 Requirements for electrical/electronic/programmable electronic safety related systems (<i>first revision</i>)	Identical
IEC 62046:2018 Safety of machinery — Application of protective equipment to detect the presence of persons	IS 17332 : 2020/ IEC 62046 : 2018 Safety of machinery — Application of protective equipment to detect the presence of persons	Identical
IEC 62061:2021 Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems	IS 16501 : 2023/IEC 62061 : 2021 Safety of machinery — Functional safety of safety-related control Systems (<i>first revision</i>)	Identical

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

International Standard

Title

ISO 8995-1:2002	Lighting of work places – Part 1: Indoor
ISO/CIE 8995-3:2018	Lighting of work places – Part 3: Lighting requirements for safety and security of outdoor work places
ISO 13732-1:2006	Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces
ISO 13732-3:2005	Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 3: Cold surfaces
ISO 20607:2019	Safety of machinery — Instruction handbook — General drafting principles
ISO 20643:2005/Amd 1:2012	Mechanical vibration — Hand-held and hand-guided machinery — Principles for evaluation of vibration emission
IEC 60073:2002	Basic and safety principles for man-machine interface, marking and identification — Coding principles for indication devices and actuators
IEC 60825-1:2014	Safety of laser products — Part 1: Equipment classification and requirements
IEC 60947-5-8:2020	Low-voltage switchgear and controlgear — Part 5-8: Control circuit devices and switching elements — Three-position enabling switches
IEC 61000-6-7:2014	Electromagnetic compatibility (EMC) — Part 6-7: Generic standards — Immunity requirements for equipment intended to perform functions in a safety-related system (functional safety) in industrial locations
IEC 61496-1:2020	Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests

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 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

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For more information or copy of ISO standard please write us at pgd@bis.gov.in