

**BUREAU OF INDIAN STANDARDS**  
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**Doc No.: PGD 18 (24666)WC**  
**IS/ISO 10218 (Part 1) : 2024**  
**January 2024**  
Superseding IS 14530 (Part 1)  
: 2019 & IS 17193 : 2019

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*भारतीय मानक मसौदा*  
**रोबोटिक्स — सुरक्षा आवश्यकताएँ —**  
**भाग 1 औद्योगिक रोबोट**  
( IS/ISO 10218 (Part 1) का दूसरा पुनरीक्षण )

*Draft Indian Standard*  
**Robotics — Safety Requirements —**  
**Part 1 Industrial Robots**  
( *Second Revision of IS/ISO 10218 (Part 1)* )

ICS 25.040.30

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Industrial Automation Systems and Robotics Sectional Committee, PGD 18

**FOREWORD**

This Indian Standard (Part 1) (Second Revision) which is identical with ISO/FDIS 10218-1 : 2022 'Robotics — Safety Requirements — Part 1 Industrial robots' 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 particular hazards that are presented by robotics in an industrial environment. This standard addresses robots as incomplete machines, while IS/ISO 10218-2 addresses robots integrated into complete machines (systems, applications, cells).

This standard was originally published in 1998 and subsequently revised in 2019. First revision of this standard was identical with ISO 10218-1 : 2011. The second revision of this standard has been undertaken to align it with the latest version of ISO 10218-1. This standard, formerly printed as IS 14530 (Part 1) 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) Additional requirements for design have been added;
- b) Mode requirements have been added;

- c) Requirements for functional safety have been clarified;
- d) Robot classification (Class I and Class II) for functional safety requirements has been added;
- e) Test methodology to determine the maximum force per manipulator for Class I robots has been added;
- f) Adding requirements for cybersecurity to the extent that it applies to industrial robot safety has been added;
- g) Safety requirements for industrial robots intended for use in collaborative applications has been subsumed (formerly, the content of IS 17193 : 2019).

Other parts in this series is:

Part 2 Industrial robot applications and robot cells integration

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 7010:2019 Graphical symbols — Safety colours and safety signs — Registered safety signs	IS 16451 : 2023/ ISO 7010 : 2019 Graphical symbols safety colours and safety signs registered safety signs	Identical
ISO 9283:1998 Manipulating industrial robots — Performance criteria and related test methods	IS 14533 : 2005/ISO 9283 : 1998 Manipulating Industrial robots — Performance criteria and related test methods ( <i>second revision</i> )	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 13849-1:2015 Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design	IS 16810 (Part 1) : 2018/ISO 138491 : 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 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 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 61310-1:2007 Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals	IS 16503 (Part 1) : 2017/IEC 61310-1 : 2007 Safety of machinery — Indication, marking and actuation: Part 1 Requirements for visual, acoustic and tactile signals	Identical
IEC 61310-2:2007 Safety of machinery — Indication, marking and actuation — Part 2: Requirements for marking	IS 16503 (Part 2) : 2017/IEC 61310-2 : 2007 Safety of machinery — Indication, marking and actuation: Part 2 Requirements for marking	Identical
IEC 61310-3:2007 Safety of machinery — Indication, marking and actuation — Part 3: Requirements for the location and operation of actuators	IS 16503 (Part 3) : 2017/IEC 61310-3 : 2007 Safety of machinery — Indication, marking and actuation: Part 3 Requirements for the location and operation of actuators	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 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 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
IEC 62745:2017 Safety of machinery — Requirements for	IS 17519 : 2021/IEC 62745 : 2017 Safety of machinery —Requirements	Identical

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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:

<i>International Standard</i>	<i>Title</i>
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/TS 13732-2:2001	Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 2: Human contact with surfaces at moderate temperature
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 60947-5-8:2020	Low-voltage switchgear and control gear — Part 5-8: Control circuit devices and switching elements — Three-position enabling switches

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](mailto:pgd@bis.gov.in)