



BSI Standards Publication

## Robotics — Safety requirements for industrial robots

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Part 2: Manual load/unload stations

## National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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**Robotics — Safety requirements for  
industrial robots —**

**Part 2:  
Manual load/unload stations**

*Robotique — Exigences de sécurité pour les robots industriels —  
Partie 2: Stations de chargement/déchargement manuel*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 299, *Robotics*.

A list of all parts in the ISO 20218 series can be found on the ISO website.

## Introduction

The objective of a manual load/unload station is to allow an operator to interface directly with an industrial robot system, e.g. feed/remove material into and out of a robot cell. The layout of the robot cell is designed to provide a work area that is free of hazards and to lessen the motivation to circumvent or defeat the designed safeguarding.

This document supplements the requirements for industrial robot system safety specified in ISO 10218-2:2011, 5.10.6. It provides additional guidance for manual load/unload stations that are lower than 1 400 mm, to permit the work to be performed in an ergonomic manner while maintaining safety and providing guidance for an alternative method of impeding access to the robot cell. ISO 10218, ISO 6385 and ISO 10218-2:2011, Annex A, provide further information on potential ergonomic hazards.

**NOTE** ISO 10218-2:2011, 5.10.6, specifies that the minimum height of a perimeter guard (distance guard) needs to be 1 400 mm. In cases where the results of the risk assessment determine that the guard cannot meet the height of 1 400 mm or more because of the design of a manual load/unload station, this document provides an alternative design which offers the same level of operator protection according to ISO 10218-2:2011.

Implementing ISO 10218-2 involves carrying out a comprehensive risk assessment, which is used to identify all hazards associated with the manual load/unload process. This document provides guidance on mitigation of the risks to the operator. The risk assessment needs to take account of foreseeable misuse, with mitigation provided.

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# Robotics — Safety requirements for industrial robots —

## Part 2: Manual load/unload stations

### 1 Scope

This document is applicable to robot systems for manual load/unload applications in which a hazard zone is safeguarded by preventing access to it. For this type of application, it is important to consider the need for both access restrictions to hazard zones and for ergonomically suitable work places.

This document supplements ISO 10218-2:2011 and provides additional information and guidance on reducing the risk of intrusion into the hazard zones in the design and safeguarding of manual load/unload installations.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 10218-1:2011, *Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots*

ISO 10218-2:2011, *Robots and robotic devices — Safety requirements for industrial robots — Part 2: Robot systems and integration*

ISO 12100, *Safety of machinery — General principles for design — Risk assessment and risk reduction*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10218-1, ISO 10218-2 and ISO 12100, and the following, apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### **impeding device**

any physical obstacle (low barrier, rail, fixture, etc.) which, without totally preventing access to a hazard zone, reduces the probability of access to this zone by offering an obstruction to free access

[SOURCE: ISO 12100:2010, 3.29]

#### 3.2

##### **manual load/unload station**

part of the robot system designed for the direct manual intervention for the placement and removal of parts or workpieces for processing by the robot system