



## **Safety of machinery**

### **Part 3301: Robots and robotic devices—Safety requirements for industrial robots—Robots**



This Australian Standard® was prepared by Committee SF-041, Safety of Machinery. It was approved on behalf of the Council of Standards Australia on 30 April 2017. This Standard was published on 13 June 2017.

---

The following are represented on Committee SF-041:

- Australian Industry Group
  - Australian Manufacturing Workers Union
  - Department of Industry, Skills and Regional Development (NSW)
  - Engineers Australia
  - Human Factors and Ergonomics Society of Australia
  - Institute of Instrumentation, Control and Automation, Australia
  - National Safety Council of Australia
  - Safety Institute of Australia
  - SafeWork NSW
  - The University of Melbourne
  - Winery Engineering Association
  - Workplace Health and Safety Queensland
  - WorkSafe Victoria
- 

This Standard was issued in draft form for comment as DR AS 4024.3301:2017.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

---

### **Keeping Standards up-to-date**

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting [www.standards.org.au](http://www.standards.org.au)

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at [mail@standards.org.au](mailto:mail@standards.org.au), or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

---

Australian Standard®

**Safety of machinery**

**Part 3301: Robots and robotic devices—Safety requirements for industrial robots—Robots**

Originated as AS 2939—1987.  
AS 2939—1987 revised and redesignated as AS 4024.3301—2009.  
Second edition 2017.

**COPYRIGHT**

© Standards Australia Limited

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76035 811 2

## PREFACE

This Standard was prepared by the Standards Australia Committee SF-041, Safety of Machinery, to supersede AS 4024.3301—2009, *Safety of machinery, Part 3301: Robots for industrial environments—Safety requirements*.

The objective of this Standard is to specify requirements and guidelines for the inherent safe design, protective measures and information for use of industrial robots. It describes basic hazards associated with robots and provides requirements to eliminate, or adequately reduce, the risks associated with these hazards.

This Standard is identical with, and has been reproduced from, ISO 10218-1:2011, *Robots and robotic devices—Safety requirements for industrial robots, Part 1: Robots*.

As this Standard is reproduced from an International Standard, the following applies:

- (a) In the source text ‘this part of ISO 10218’ should read ‘this Australian Standard’.
- (b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the annex to which they apply. A ‘normative’ annex is an integral part of a Standard, whereas an ‘informative’ annex is only for information and guidance.

## CONTENTS

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>2</b>
<b>4 Hazard identification and risk assessment</b> .....	<b>6</b>
<b>5 Design requirements and protective measures</b> .....	<b>7</b>
5.1 General .....	7
5.2 General requirements .....	7
5.3 Actuating controls .....	8
5.4 Safety-related control system performance (hardware/software).....	8
5.5 Robot stopping functions.....	9
5.6 Speed control.....	11
5.7 Operational modes .....	11
5.8 Pendant controls .....	13
5.9 Control of simultaneous motion .....	15
5.10 Collaborative operation requirements .....	15
5.11 Singularity protection .....	16
5.12 Axis limiting .....	16
5.13 Movement without drive power.....	18
5.14 Provisions for lifting.....	18
5.15 Electrical connectors .....	18
<b>6 Verification and validation of safety requirements and protective measures</b> .....	<b>19</b>
6.1 General .....	19
6.2 Verification and validation methods.....	19
6.3 Required verification and validation .....	19
<b>7 Information for use</b> .....	<b>20</b>
7.1 General .....	20
7.2 Instruction handbook.....	20
7.3 Marking.....	21
<b>Annex A (informative) List of significant hazards</b> .....	<b>23</b>
<b>Annex B (normative) Stopping time and distance metric</b> .....	<b>28</b>
<b>Annex C (informative) Functional characteristics of three-position enabling device</b> .....	<b>30</b>
<b>Annex D (informative) Optional features</b> .....	<b>31</b>
<b>Annex E (informative) Labelling</b> .....	<b>33</b>
<b>Annex F (normative) Means of verification of the safety requirements and measures</b> .....	<b>34</b>
<b>Bibliography</b> .....	<b>43</b>

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-