

# DIN EN ISO 10218-1:2012-01 (E)

## Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots (ISO 10218-1:2011)

---

Contents	Page
Foreword .....	3
Introduction .....	4
1 Scope .....	5
2 Normative references .....	5
3 Terms and definitions .....	6
4 Hazard identification and risk assessment .....	10
5 Design requirements and protective measures .....	11
5.1 General .....	11
5.2 General requirements .....	11
5.3 Actuating controls .....	12
5.4 Safety-related control system performance (hardware/software) .....	12
5.5 Robot stopping functions .....	13
5.6 5.7 Operational modes .....	15
5.8 Pendant controls .....	17
5.9 Control of simultaneous motion .....	19
5.10 Collaborative operation requirements .....	19
5.11 Singularity protection .....	20
5.12 Axis limiting .....	20
5.13 Movement without drive power .....	22
5.14 Provisions for lifting .....	22
5.15 Electrical connectors .....	22
6 Verification and validation of safety requirements and protective measures .....	23
6.1 General .....	23
6.2 Verification and validation methods .....	23
6.3 Required verification and validation .....	23
7 Information for use .....	24
7.1 General .....	24
7.2 Instruction handbook .....	24
7.3 Marking .....	25
Annex A (informative) List of significant hazards .....	
Annex B (normative) Stopping time and distance metric .....	
Annex C (informative) Functional characteristics of three-position enabling device .....	4
Annex D (informative) Optional features .....	
Annex E (informative) Labelling .....	
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC .....	48

<b>Speed control .....</b>	<b>15</b>
<b>Annex F (normative) Means of verification of the safety requirements and measures .....</b>	<b>3</b>
<b>Bibliography .....</b>	<b>47</b>