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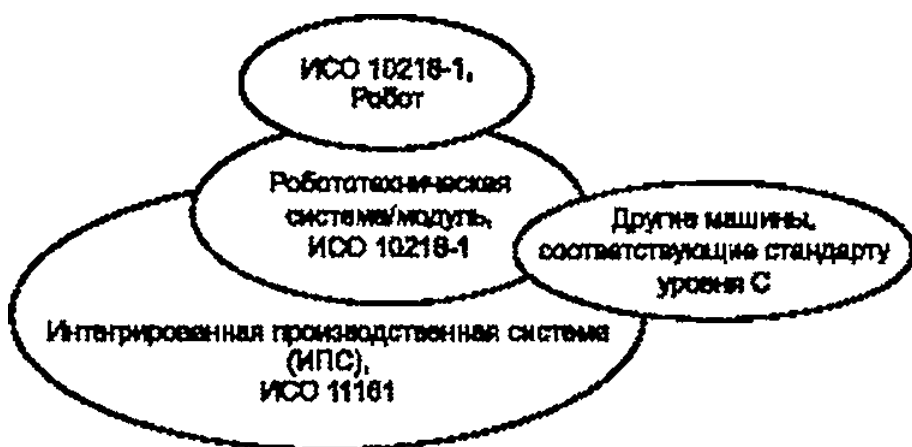
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и метрологии

Robots and robotic devices. Safety requirements for industrial robots. Part 2. Robot systems and integration

—2018—01—01

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4413	(ISO 4413. Hydraulic fluid power — General rules and safety requirements for systems and their components)
CO 4414	(ISO 4414, Pneumatic fluid power — General rules and safety requirements for systems and their components)
8995-1	1. (ISO 8995-1, Lighting of work places — Part 1: Indoor)
9946	(ISO 9946. Manipulating industrial robots — Presentation of characteristics)
10218-1	1. (ISO 10218-1, Robots and robotic devices — Safety requirements for industrial robots — Part 1: Industrial robots)
11161	(ISO 11161. Safety of machinery — Integrated manufacturing systems — Basic requirements)
12100	(ISO 12100, Safety of machinery — General principles for design — Risk assessment and risk reduction)
13849-1:2006	1. (ISO 13849-1:2006, Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design)
013850	(ISO 13850. Safety of machinery — Emergency stop — Principles for design)
13854	(ISO 13854. Safety of machinery — Minimum gaps to avoid crushing of parts of the human body)
13855	(ISO 13855, Safety of machinery — Positioning of safeguards with respect to the approach speeds of parts of the human body)
13856 ()	[ISO 13856 (all parts). Safety of machinery — Pressure-sensitive protective devices]
13857	(ISO 13857. Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs)
14118	(ISO 14118. Safety of machinery — Prevention of unexpected start-up)
14119	(ISO 14119. Safety of machinery — Interlocking devices associated with guards — Principles for design and Selection)
14120	(ISO 14120, Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards)
14122 ()	[ISO 14122 (all parts), Safety of machinery — Permanent means of access to machinery]
60204-1:2009	1. (IEC 60204-1:2009. Safety of machinery — Electrical equipment of machines — Part 1: General requirements)
61496-1	1. (IEC 61496-1, Safety of machinery — Electro-sensitive protective equipment — Part 1: General requirements and tests)
61800-5*2	5-2. (IEC 61800-5-2. Adjustable speed electrical power drive systems — Part 5-2: Safety requirements — Functional)
62046	(IEC/TS 62046, Safety of machinery — Application of protective equipment to detect the presence of persons)

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62061:2005. Safety of machinery — Functional safety of safety-related electrical, electronic and programmable electronic control systems)

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3.2 (collaborative robot): , -

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3.3 (collaborative workspace): , -

3.4 (control station): , -

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3.5 (distance guard): , -

3.6 (integration): -

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3.7 (integrator): , , -

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3.9 (industrial robot cell): , -

3.10 (industrial robot line): -

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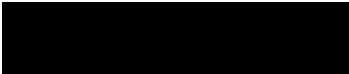
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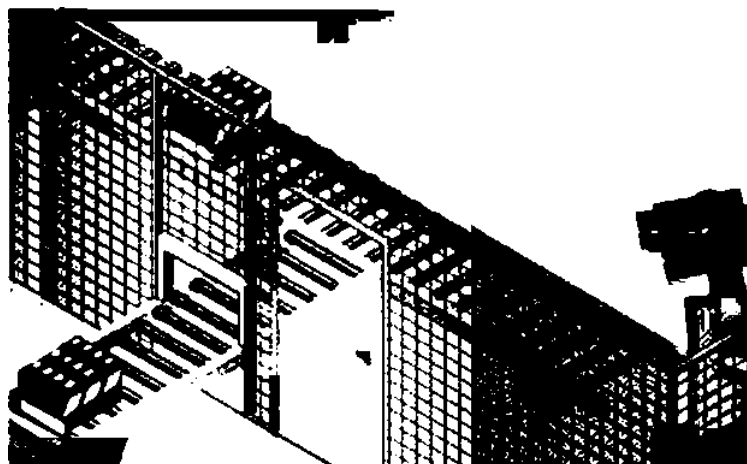
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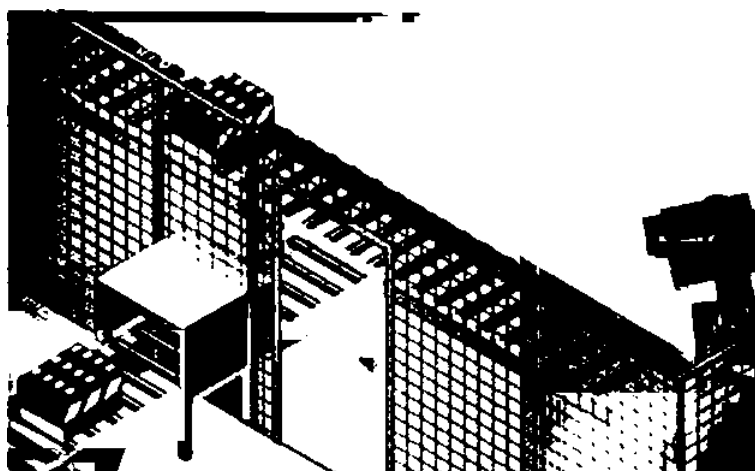
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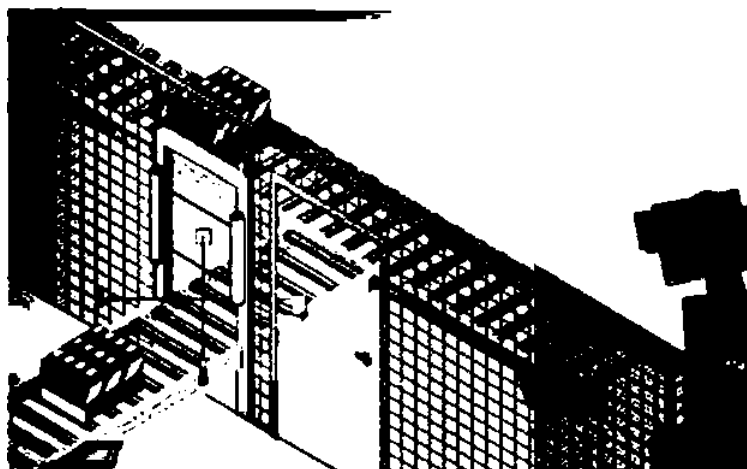
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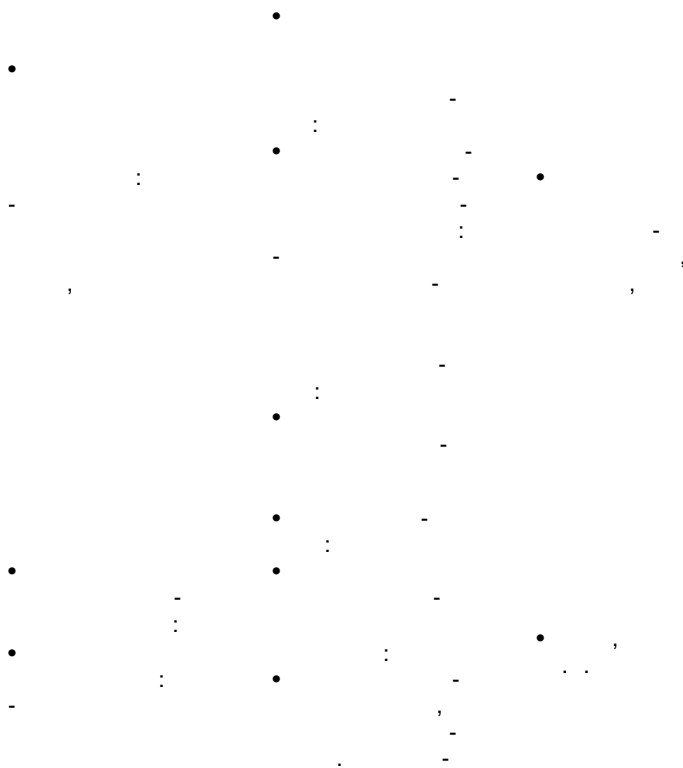
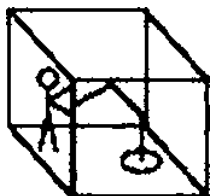
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*			<ul style="list-style-type: none"> • - • - • - • - 	<ul style="list-style-type: none"> • - • - • - • - <p>1000</p> <p>5.10.3</p>	<ul style="list-style-type: none"> • - • - • - • -
			<ul style="list-style-type: none"> • - • - • - 	<ul style="list-style-type: none"> • - • - • - • - 	<ul style="list-style-type: none"> • - • - • - • -
S			<ul style="list-style-type: none"> • - () - • - / - () - 	<ul style="list-style-type: none"> • - • - (5.11.5.4); • - 	<ul style="list-style-type: none"> - - - - -



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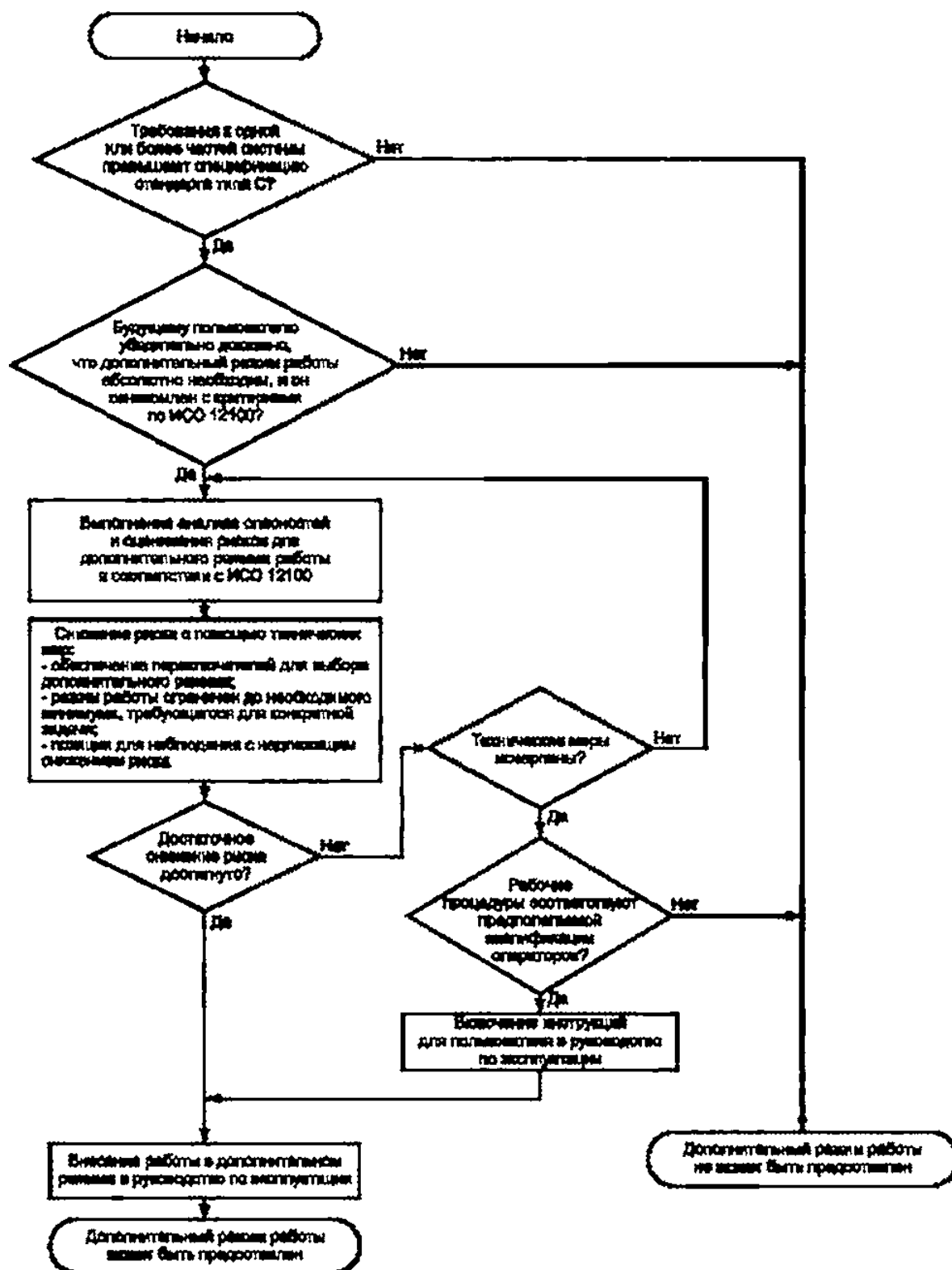


Рисунок F.1 — Обеспечение безопасности при наблюдении за технологическим процессом

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G.1—

	/	/ (. 2)									
					0		F	G		1	
5.2	()										
5.2.1	, , -	X								X	
5.2.2	=d. 3					X	X			X	
5.2.2	2. - 1 - 20					X	X			X	
5.2.3	-							X		X	
5.3											
5.3.1	, -	X			X					X	
5.3.2		X	X			X					
5.3.3	- 60204-1	X									
5.3.3	- - ,		X		X						
5.3.4	-	X		X		X				X	
5.3.4	- - , ,	X	X	X	X						
5.3.5	60204-1	X		X							
5.3.6		X	X			X					
5.3.6		X									

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					0		F	6	I
5.3.7		X	X			X			
5.3.7		X							
5.3.8.1			X			X			
5.3.8.1	-		X			X			
5.3.8.1		X				X			
5.3.8.2	-	X	X			X			
5.3.8.2	-		X			X			
5.3.8.2	-		X			X			
5.3.8.2	-		X			X			
5.3.8.2	-	X							X
5.3.8.2	5.3.8.2		X	X		X			
5.3.8.2	0 1		X			X			X
5.3.8.2	= . 3.								X
5.3.8.2			X	X					X
5.3.11									X
5.3.11	-	X							X
5.3.12	-	X							X
5.3.13		X		X	X				X
5.3.13		X	X	X	X			X	
5.3.14	-	X			X			X	X

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	/	(. 2)								
					0		F	G		1
5.3.14	- -				X	X			X	X
5.3.15	- 10218-1		X			X			X	X
5.3.15	- -	X			X	X		X	X	X
5.3.15	- -		X		X		X			X
5.3.15	- -		X		X	X	X	X	X	X
5.3.15	- -		X		X	X				X
5.4										
5.4.2	- -	X	X		X			X	X	X
5.4.2	- -		X	X				X	X	
5.4.2	- -	X	X						X	X
5.4.2	- -	X	X				X		X	X
5.4.3	- 10218-1	X	X	X					X	X
5.4.3	- 10218-1		X				X		X	X
5.4.3	- 10218-1.		X				X	X	X	X
5.4.3	- -		X	X					X	X
5.4.3	- -	X	X	X			X			X
5.4.3	- -		X	X			X		X	X

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	/	< .6.2)								
					0		F	6		1
5.4.3	5.2.2.	-		X	X		X		X	X
5.4.3		-							X	X
5.4.3		-						X	X	X
5.4.4			X	X	X				X	X
5.4.4	5.2	-				X	X			X
5.4.4							X		X	X
5.5										
5.5.1			X	X		X			X	X
5.5.1	5.10		X	X	X		X	X	X	X
5.5.1	13857		X		X				X	
5.5.1	13855		X		X				X	
5.5.1	13854	-	X		X				X	
5.5.2	500		X		X	X			X	X
5.5.2		-	X						X	X
5.5.2		-	X			X			X	X
5.5.2			X			X			X	X
5.5.2		-	X			X			X	X
5.5.2		-	X		X				X	

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	/	(.6.2)									
					0		F	G		1	
5.5.2	400 2000 , -	X		X				X	X		
5.5.2	, , 14122 , -	X		X					X	X	
5.5.2		X	X	X	X			X	X		
5.5.2		X	X	X	X			X	X		
5.5.4	5.6.4.2. 5.6.4.3 - - -		X			X	X	X		X	
5.6											
5.6.1	, ,		X		X	X		X	X		
5.6.1	, ,		X		X	X		X	X		
5.6.2		X	X			X	X				
5.6.2	, ,	X	X		X	X	X				
5.6.2	, -	X	X		X	X	X				
5.6.2		X	X		X						
5.6.2			X		X	X	X				
5.6.3.1	- -		X		X	X	X			X	
5.6.3.2			X		X	X	X				
5.6.3.2	-	X	X		X	X	X		X	X	
5.6.3.2	-		X		X	X					
5.6.3.3			X		X	X	X		X		
5.6.3.3	, -		X		X	X	X		X		
5.6.3.4		X	X		X					X	
5.6.3.4	-	X	X			X	X			X	

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	/	< .6.2)							
					0		F	6	1
5.6.3.4	5.2.2 -					X	X	X	X
5.6.3.4			X			X	X		
5.6.3.4	,	X	X		X	X	X		X
5.6.3.4	-	X	X		X	X			X
5.6.3.4	-		X		X	X	X		X
5.6.3.4		X			X	X	X	X	
5.6.3.4		X							X
5.6.4.1		X				X	X		X
5.6.4.1	-	X			X				X
5.6.4.1		X			X	X			X
5.6.4.1	-		X			X	X		X
5.6.4.2			X	X			X		X
S.6.4.2	250 /		X	X	X		X		X
5.6.4.2	,							X	
S.6.4.2			X		X	X	X		X
5.6.4.3	10216-1	X	X						X
5.6.4.3	-								X
5.6.5			X		X		X	X	X
5.6.5			X		X		X		X
5.6.5			X		X		X		X
5.6.5	-		X		X		X		X
5.6.5			X				X		X

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	/	(6.2)									
					0		F	G		1	
5.6.5	8							X		X	
5.7											
5.7.1	10218-1	-	X	X			X	X			X
5.7.1	5.3.8.2		X	X	X		X			X	X
5.7.1		-	X	X	X					X	X
5.7.1			X			X	X		X	X	X
5.7.2	10218-1	-	X	X		X	X				X
5.7.2	10218-1	-	X	X		X	X				X
5.7.2			X	X		X	X	X			X
5.7.2			X	X		X	X	X			X
5.7.2				X		X	X				X
5.7.2			X	X		X	X			X	X
5.7.2				X		X		X			X
5.7.3			X	X						X	
5.7.3			X	X			X	X			X
5.7.3				X		X	X			X	X
5.7.4	10218-1		X	X			X	X	X		X
5.8											
5.8.1		-	X			X			X	X	X
5.8.1		-	X							X	X
5.8.2			X	X					X	X	X
5.8.2		-	X	X		X	X			X	X
5.8.2		-	X	X		X	X		X	X	X

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					0		F	6		1
5.8.3		X	X	X					X	X
5.8.3		X	X							X
5.8.3		X	X			X		X	X	X
5.8.3		X	X			X	X	X	X	X
5.8.3		X	X			X	X	X		X
5.9	()									
5.9.1		X						X	X	X
5.9.2		X	X		X	X			X	X
5.9.2	5.3.8.2	X	X			X			X	X
5.9.2										X
5.9.3	5.2.2					X	X		X	X
5.9.3		X	X		X	X	X		X	X
5.9.4			X			X				X
5.9.4			X			X	X			
5.9.4			X		X	X	X			
5.9.4		X			X				X	X
5.9.4		X	X		X	X			X	X
5.9.4			X		X	X			X	X
5.9.5	5.3.15		X			X	X			X

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	/	(. 2)								
					0		F	G		1
5.9.5			X		X	X	X		X	X
5.9.6	10218-1		X			X	X			X
5.9.7		X	X		X	X		X	X	X
5.9.7	11161					X			X	X
5.10										
5.10.1	12100	-								X
5.10.2		-	X		X			X	X	
5.10.3.1		-	X		X				X	
5.10.3.2	14120	-			X		X		X	
5.10.3.2	13857	-			X		X		X	
5.10.3.2	13857	-			X		X		X	
5.10.3.3	5.10.5.3	-	X	X		X			X	X
5.10.3.4	5.10.5.3	-	X	X		X			X	X
5.10.4.1	12100 14120	-	X							X
5.10.4.1		-	X	X			X			X
5.10.4.1		-	X	X						
5.10.4.1	(. 5.10.4)	-	X		X			X	X	X
5.10.4.2		-			X	X			X	
5.10.4.2	1400			X						

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5.10.4.3	-		X			X				X
5.10.4.3	-	X			X				X	
5.10.4.3	,	X	X						X	
5.10.4.3	-		X		X					
5.10.4.3	(. 5.10.3.2)			X					X	X
5.10.4.3	{) -		X			X				X
5.10.4.3	5.2.2					X				X
5.10.4.3	5.6. .4		X			X				X
5.10.4.4	-		X			X				X
5.10.4.4	5.10.4.4.))		X		X					X
5.10.4.4	, -		X			X	X	X		X
5.10.4.5	-		X						X	X
5.10.5.1	-									X
5.10.5.2	-			X					X	X
5.10.5.2	-	X	X	X					X	
5.10.5.2	,		X			X	X			X
5.10.5.2	-		X			X	X			

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5.10.5.2			X			X			
5.10.5.2	- - ,			X					X
5.10.5.2	,		X			X	X		X
5.10.5.2	- - ,		X			X	X		X
5.10.5.2	-		X						
5.10.5.3	- - ,		X			X	X		X
5.10.5.3	,	X	X						X
5.10.5.3		X	X		X				X
5.10.6.1	,	X			X				
5.10.6.1	-	X	X		X	X			X
5.10.6.2	-	X	X		X				X
5.10.6.2	-			X					X
5.10.6.3	- -		X	X		X			X
5.10.6.3	- - *!	X	X			X			
5.10.6.3	- -	X	X			X			X

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5.10.7		X	X	X					X	
5.10.7	/ ,	X	X						X	
5.10.7		X	X			X		X	X	
5.10.7	(, -	X	X	X	X	X			X	X
5.10.7	13849-1					X				X
5.10.7	(, -					X		X		X
5.10.8	-	X	X		X			X	X	
5.10.8	1400			X					X	
5.10.8	4.5							X	X	X
5.10.8	, , -		X			X	X	X		X
5.10.9	-	X	X			X		X		X
5.10.9	.	X	X			X		X		X
5.10.9	-		X			X	X		X	
5.10.9			X	X				X		X
5.10.10		X				X	X	X	X	X
5.10.10			X					X	X	
5.10.10	-		X		X	X	X			
5.10.10	-		X			X	X	X		X

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	/	(. 2)									
					0		F	G		1	
5.10.10	- -		X			X	X	X		X	
5.10.10	- .		X			X	X				
5.10.10	- , ,								X	X	
5.10.11	- , ,	X	X			X	X	X		X	
5.10.11	- .	X	X			X	X			X	
5.10.11	- , 5.10.11,)—f)	X	X		X	X				X	
5.10.11	- . , ,		X		X			X	X		
5.10.11	- ,									X	
5.11	- ,										
5.11.1	- .									X	
5.11.2	- [. 5.11.2] ,							X	X	X	
5.11.2	- , 10218-1 ,					X	X		X	X	
5.11.2	- () 5.2.2					X	X			X	
5.11.2	- 5.2 ()					X	X			X	
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5.11.2	- . ,		X		X				X		

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5.11.2	- -	X	X		X				X	
5.11.2	5.2, -					X	X	X		X
5.11.3	, (, .)	X			X				X	
5.11.3	5.2.2		X			X	X			X
5.11.3	- , 5.2.2	X	X			X	X	X		
5.11.3	-	X	X		X			X		X
5.11.3		X			X			X	X	
5.11.3	- , 500	X	X	X				X	X	X
5.11.4		X	X		X	X	X	X	X	X
5.11.5.1								X		X
5.11.5.1	- - 5.3.8.3		X			X	X	X		X
5.11.5.1	- , -		X		X	X	X		X	
5.11.5.2	- - -		X		X	X		X	X	
5.11.5.3	- - , 10218-1		X		X	X	X			X
5.11.5.3	10218-1		X			X	X			X
5.11.5.3	- -	X			X				X	

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	/	/ (.6.2)							
					0		F	G	1
5.11.5.3	- , 10218-1		X		X	X	X		X
5.11.5.4	- 10218-1					X	X		X
5.11.5.4	, / 15066							X	X
5.11.5.5	- , 10218-1					X	X		X
5.11.5.5	, / 15066							X	X
5.12									
5.12.1	8 (,	X						X	X
5.12.2	- ,	X	X					X	X
5.12.2	, 5.12.3	X							X
5.12.2	- 8								X
5.12.3	, 5.12.3								X

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ISO 4413	MOO	31177—2003 (982:1996) « - » -
ISO 4414	MOO	30869—2003 (983:1996) « - » -
ISO 8995-1	—	•
ISO 9946	—	#
ISO 10218-1	—	•
ISO 11161	IDT	11161—2010 « - » -
ISO 12100	MOO	54125—2010 (12100:2010) « »
ISO 13849-1	IDT	13849-1—2003 « . 1. ' » .
ISO 13850	—	
ISO 13854	—	
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ISO 13856	—	•
ISO 13857	IDT	ISO 13857—2012 « . »
ISO 14118	IDT	51343—99 « . »
ISO 14119	—	•
ISO 14120	—	
ISO 14122 ()	IDT	14122 « . »
(60204-1:2009	IDT	60204-1—2007 « . - 1. - »

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IEC 61496-1	—	
IEC 61800-5-2	—	
IEC 62046	—	
IEC 62061:2012		62061—2013 « . - », »
<p>* . (). - — : — : — .</p>		

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- [2] ISO 13649-2. Safety of machinery — Safety-related parts of control systems — Part 2: Validation
- [3] ISO 13651. Safety of machinery — Two-hand control devices — Functional aspects and design principles
- [4] ISO 14123-1. Safety of machinery—Reduction of risks to health from hazardous substances emitted by machinery — Part 1: Principles and specifications for machinery manufacturers
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- [8] ISO/TS 15066. Robots and robotic devices — Safety requirements — industrial collaborative workspace
- [9] ISO 19353. Safety of machinery — Fire prevention and protection
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- [13] IEC 61496-2. Safety of machinery — Electro-sensitive protective equipment — Part 2: Particular requirements for equipment using active optoelectronic protective devices (AOPDs)
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- [15] IEC/TR 61496-4. Safety of machinery — Electro-sensitive protective equipment — Part 4: Particular requirements for equipment using vision based protective devices (VBPD)
- [16] IEC 62079. Preparation of instructions — Structuring, content and presentation
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- [18] EN 1093 (all parts). Safety of machinery — Evaluation of the emission of airborne hazardous substances
- [19] EN 1127-1. Explosive atmospheres — Explosion prevention and protection — Part 1: Basic concepts and methodology
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- [21] EN 1837. Safety of machinery — Integral lighting of machines
- [22] EN 12198 (all parts). Safety of machinery — Assessment and reduction of risks arising from radiation emitted by machinery
- [23] CEN/TR 14715. Safety of machinery — Ionizing radiation emitted by machinery — Guidance for the application of technical standards in the design of machinery in order to comply with legislative requirements
- [24] BGIA/DGUV study — Procedural Guideline for the Arrangement of Workplaces with Collaborative Robots

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