


















Recommended product technology		Product example	For technical protective devices	Recommended use in safety circuits according to EN ISO 13849-1 up to Performance Level (PL) ¹⁾				
sens:Control – safe control solutions				a	b	c	d	e
Safety relays		UE10 to UE48		Depending on the device type				
Safety controllers		Flexi Soft, Flexi Classic						
Safe sensor cascade		Flexi Loop						
Motion Control safety controllers		Flexi Soft Drive Monitor, Speed Monitor, Standstill Monitor						
Safety switches				a	b	c	d	e
Safety switches with separate actuator ²⁾		i12S, i16S, i17S, i110S					3)	
		With second safety switch						
Safety locking devices ²⁾		i10 Lock, i110 Lock, i14 Lock, i15 Lock, i200 Lock						
		With second safety switch						
Safety position devices ²⁾		i10P, i10R, i110P, i110R					3)	
		With second safety switch						
Inductive safety switches		IN4000 Standard, IN4000 Direct						
		IN3000 Direct						
Transponder safety switches		TR4 Direct, STR1						
Magnetic safety switches ²⁾		RE1, RE2						
Safety command devices ²⁾		ES11, ES21, i110RP, i150RP, E100						
Safety encoders				a	b	c	d	e
Safety encoders		DFS60S Pro						
Standard sensors				a	b	c	d	e
Photoelectric, magnetic and inductive sensors		W12, VS/VE-18-2, MZT8, IME12		Not for personnel detection				

¹⁾ The EN ISO 13849-1 standard and the information provided in the operating instructions are to be observed to achieve the required performance level.
²⁾ Performance Level d can be achieved with one switch only, if fault exclusion measures are taken. Please ask the experts from SICK about this.
³⁾ The Performance Level can only be achieved in combination with a suitable safety control solution.

8015259/2016-01-15 - WV_CDGM

Safe control and communication
 <ul style="list-style-type: none">Safe control units for linking and evaluating a variety of input signals of the safety functions as well as for generating output signals
Safe Motion Control
 <ul style="list-style-type: none">Monitoring of motor standstill, speed and direction of a machine or a machine part movementRelease of the locking devices of physical guards in the absence of a hazardous movementSafeguarding of automated guided vehicles in combination with opto-electronic protective devicesService mode with limited speed
Opto-electronic protection
 <ul style="list-style-type: none">Assembly workplaces for small componentsMachine operator works very close to the hazardous point of the machineMachine stopping time is very shortSafe detection of fingers with a detection capability of 14 mm
 <ul style="list-style-type: none">Assembly/handling machines for big componentsMachine operator works close to the hazardous point of the machineMachine stopping time is very shortSafe detection of hands with a detection capability up to 40 mm
 <ul style="list-style-type: none">Interaction with the machine is regular, but not frequentSafe detection of persons with a detection capability up to 150 mm or multiple light beam systems
 <ul style="list-style-type: none">Muting, entry/exit monitoringApplication for machines with automatic material transport systemsSafe detection of persons with a detection capability up to 150 mm or multiple light beam systems
 <ul style="list-style-type: none">Interaction with the machine is regular, but not frequentAllows flexible accessSafe detection of persons with multiple light beam systems
 <ul style="list-style-type: none">Stationary hazardous area protection with person detection the hazardous areaInteraction with the machine is regular, but not frequentView into the accessible hazardous area is limitedSafe detection of legs with a detection capability up to 70 mm
 <ul style="list-style-type: none">Mobile hazardous area protection with person detection when approachingProtect persons while vehicles are movingSafe detection of legs with a detection capability up to 70 mm
Interlocking and locking of physical guards
 <ul style="list-style-type: none">Interlocking of physical guards without locking device (e.g., swing doors, flaps, sliding doors)
 <ul style="list-style-type: none">Locking of physical guards with temporary prevention of entry or accessDuring operation, stopping, shutdown of a machineMachine function that presents a hazard takes too long to stopManufacturing process should not be interrupted
Safe position monitoring of machines and machine parts
 <ul style="list-style-type: none">Safe monitoring of machine positions, e.g., for robots
 <ul style="list-style-type: none">Safe monitoring of machine end positions
 <ul style="list-style-type: none">Safe position monitoring for steering axes and swivel arms, for example, to control monitoring fields of safety laser scanners on automated guided vehicles
Emergency stop, enable and reset
 <ul style="list-style-type: none">Supplementary protective measures for risk reductionEmergency stop
 <ul style="list-style-type: none">Manual and temporary disabling of safety functions to reduce risks forSafe machine setupMachine maintenance
 <ul style="list-style-type: none">Resetting the protective device



SAFETY PRODUCT NAVIGATOR

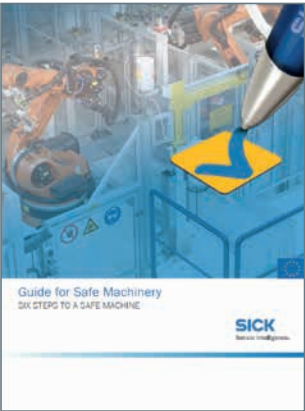
APPLICATION OF SAFETY PRODUCTS OVERVIEW

FROM YOUR SAFETY APPLICATION TO A SOLUTION FROM SICK

Safety solutions from SICK make it possible to implement safety functions on your machine. This Safety Product Navigator features the most important safety technology parameters and application recommendations. With its services, SICK supports you as a design engineer, manufacturer or operator of machines and systems in fulfilling current regulations.

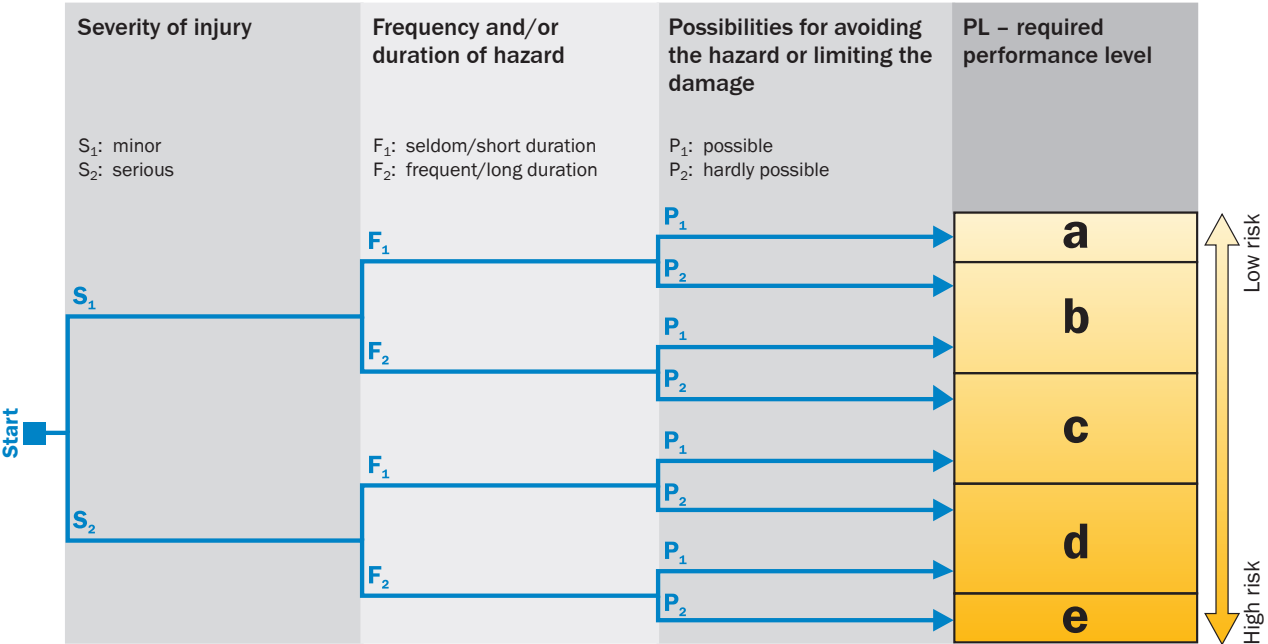


Download and further information at: www.sick-safetyplus.com


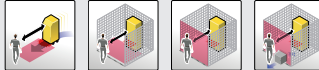



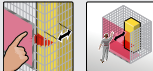

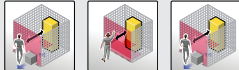



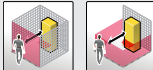



SICK's 130-page Guide for Safe Machinery has facilitated the construction of thousands of safe machines in six straightforward steps. The guide contains structured information on the following topics:

- Legal requirements for machines in the European Union and implementation
- Requirements for safe machinery in North America in the North American edition (number 708282)
- Safety-relevant European guidelines, directives and standards
- Selection and use of protective devices
- Examples of how to protect machines and persons against accidents
- Examples of how to apply the EN ISO 13849-1 and EN 62061 standards to determine PL or SIL
- Calculation of minimum distances between the hazardous point and the protective device



Risk graph for determining the required performance level in accordance with EN ISO 13849-1

Recommended product technology		Product example	For technical protective devices	Recommended use in safety circuits according to EN ISO 13849-1 up to Performance Level (PL) ¹⁾					Detection capability													
Opto-electronic protective devices									Number of beams				Resolution d/mm									
				a	b	c	d	e	1	2	3	4-9	150	70	50	40	34	30	24	20	14	
Safety laser scanners		S3000, S3000 PROFINET IO S300, S300 Mini, microScan3																				
Safety camera systems		V300 Work Station Extended																				
Safety light curtains		deTec2																				
		miniTwin2																				
		deTec4																				
		miniTwin4																				
		C4000																				
		C4000 Fusion																				
Multiple light beam safety devices		M2000																				
		M4000								2)												
Single-beam photoelectric safety switches		L2000																				
		L4000, WSU/WEU26-3																				
				Type 2 ³⁾		Type 3, 4 ³⁾			Body detection				Hand detection Finger detection									

¹⁾ The EN ISO 13849-1 standard and the information provided in the operating instructions are to be observed to achieve the required performance level.
²⁾ Electro-sensitive protective devices with 1 or 2 beams are only allowed for personnel detection if permitted by the risk assessment and in combination with

¹⁾ The EN ISO 13849-1 standard and the information provided in the operating instructions are to be observed to achieve the required performance level.
²⁾ Electro-sensitive protective devices with 1 or 2 beams are only allowed for personnel detection if permitted by the risk assessment and in combination with additional measures.
³⁾ The Type and the relation between the type and the performance level are described in the IEC 61496 series of standards.

Examples of protective devices for executing safety functions

Opto-electronic protection	
	<ul style="list-style-type: none">• Assembly workplaces for small components• Machine operator works very close to the hazardous point of the machine• Machine stopping time is very short• Safe detection of fingers with a detection capability of 14 mm
	<ul style="list-style-type: none">• Assembly/handling machines for big components• Machine operator works close to the hazardous point of the machine• Machine stopping time is very short• Safe detection of hands with a detection capability up to 40 mm
	<ul style="list-style-type: none">• Interaction with the machine is regular, but not frequent• Safe detection of persons with a detection capability up to 150 mm or multiple light beam systems
	<ul style="list-style-type: none">• Muting, entry/exit monitoring• Application for machines with automatic material transport systems• Safe detection of persons with a detection capability up to 150 mm or multiple light beam systems
	<ul style="list-style-type: none">• Interaction with the machine is regular, but not frequent• Allows flexible access• Safe detection of persons with multiple light beam systems
	<p>Stationary hazardous area protection with person detection in the presence</p> <ul style="list-style-type: none">• Interaction with the machine is regular, but not frequent• View into the accessible hazardous area is limited• Safe detection of legs with a detection capability up to 70 mm
	<p>Mobile hazardous area protection with person detection when approaching</p> <ul style="list-style-type: none">• Protect persons while vehicles are moving• Safe detection of legs with a detection capability up to 70 mm