Safeguards for plant and machinery – important harmonized standards according to the Machinery Directive

PILZ
THE SPIRIT OF SAFETY

A standard: basic safety standard

Type A standards specify fundamental concepts, terminology and principles for design that are applicable for all machinery categories. The application of such standards in itself is not sufficient to guarantee compliance with the relevant fundamental safety and health protection requirements of the Directive, although they constitute an important framework for the correct application of the Machinery Directive; application therefore does not give rise to any blanket presumption of conformity.

EN ISO 12100 Safety of machinery – General principles for design – Risk assessment and risk reduction

B standard: safety issues and safeguards

Type B standards deal with certain machinery safety issues or certain types of safeguards that can be used across a wide range of machinery categories.

Application gives rise to a presumption of conformity with the fundamental requirements of the Machinery Directive that are thus covered.

Safety aspects

EN 60204-1 Safety of machinery – Electrical equipment of machines – **Part 1:** General requirements
EN ISO 4413 Hydraulic fluid power – General rules and safety requirements for systems and their components
EN ISO 4414 Pneumatic fluid power – General rules and safety requirements for systems and their components
EN ISO 13849-1/-2 Safety of machinery – Safety-related parts of control systems **Part 1:** General principles for design – **Part 2:** Validation
EN/IEC 62061 Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems
EN ISO 14118 Safety of machinery – Prevention of unexpected start-up
EN ISO 11161 Safety of machinery – Integrated manufacturing systems – Basic requirements
EN ISO 20607 Safety of machinery – Instruction handbook – General drafting principles

Protective measures

Guards

EN ISO 14120 Safety of machinery – Guards – General requirements for the design and construction of fixed and movable guards
EN ISO 13857 Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 349 Safety of machinery – Minimum gaps to avoid crushing of parts of the human body
(EN ISO 13854*)

Protective devices

EN ISO 13855 Safety of machinery – The positioning of protective equipment with respect to the approach speeds of parts of the human body

Supplementary protective measures

EN ISO 13850 Safety of machinery – Emergency stop function – Principles for design

Fixed

Fences, barriers, trims: permanently mounted, only removable with tools

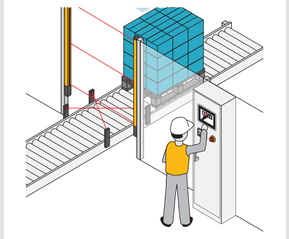
Movable

Flaps, hoods, doors, gates

EN ISO 14119
Safety of machinery – Interlocking devices associated with guards – Principles for design and selection

Approaching

Light curtains, laser scanners, safe camera systems, pressure sensitive mats, rails, plates, rods, bumpers

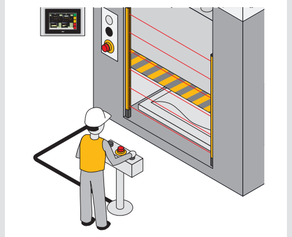


EN 61496-1, -2, -3, -4
Safety of machinery – Electro-sensitive protective equipment –

EN ISO 13856-1, -2, -3
Safety of machinery – Pressure sensitive protective devices

Remote-hold

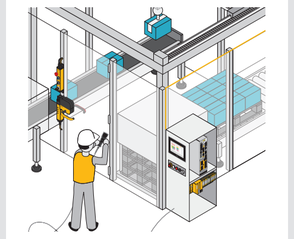
Two-hand control devices



EN 574 (EN ISO 13851*)
Safety of machinery – Two-hand control devices – Functional aspects – Principles for design

Other

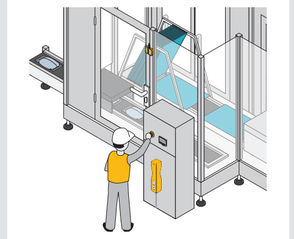
Operating mode selection, enabling devices, process parameter monitoring, safe drive functions



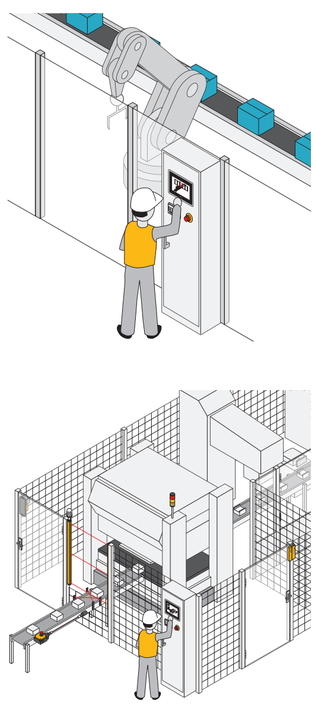
EN 61800-5-2
Adjustable speed electrical power drive systems – **Part 5-2:** Safety requirements – Functional

Complementary

E-STOP pushbuttons, rope pull switches, foot switches



Solutions



- Safety switches PSENmech, PSENmag, PSENcode
- Hinge switch PSENhinge
- Safety gate system PSENmech with guard locking, PSENslock, PSENmlock, PSENsgate
- Safety bolt PSENbolt

- Light curtains PSENopt, PSENopt Advanced, PSENopt slim, PSENopt II
- Camera-based protection systems PSENvip/PSENvip 2
- Laser scanner PSENscan
- Safe radar systems LBK
- Protection zone monitoring with radar technology

- Safe two-hand monitoring with PNOZsigma, PNOZ X, PNOZelog
- Safe small controllers PNOZmulti 2
- Automation System PSS 4000

- Operating mode selector switch PITmode
- Modular operating mode selection system PITmode fusion
- Manually operated control device PITjog
- Enabling switch PITenable
- Rotary encoder PSENenco
- Motion monitoring PMCprotego D with integrated safety card PMCprotego S

- Pushbutton unit PITgatebox
- E-STOP pushbuttons PITestop, PITestop active
- Rope pull switch PSENrope

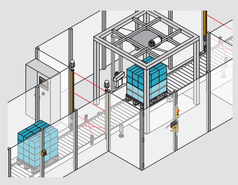
C standard: Examples of machinery safety standards

Type C standards contain specifications for a certain machinery category.

The various machine types that belong to the category covered by a Type C standard have a similar intended use and present similar hazards.

Packaging machines

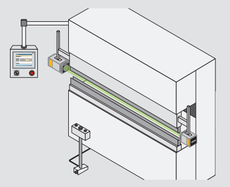
e.g. EN 415-1 to -10
Safety of packaging machines



Machine tools

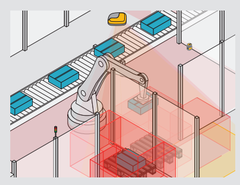
e.g. EN ISO 16092-1, -3
Machine tools safety - Presses.
Part 1: General safety requirements
Part 3: Safety requirements for hydraulic presses

e.g. EN 692 (prEN ISO 16092-2*)
Machine tools safety – Presses. Part 2: Safety requirement for mechanical presses



Robot systems

e.g. EN ISO 10218-1, -2
Robots and robotic devices – Safety requirements for industrial robots



Laws, directives, standards
Webcode: web83082
Online information at www.pilz.com

Lexicon of automation
Webcode: web150532
Online information at www.pilz.com

Pilz Academy
Webcode: web196642
Online information at www.pilz.com

Status: October 2020
(* Planned successor.
Harmonization not yet complete.)