



EN ISO 10218-1/2

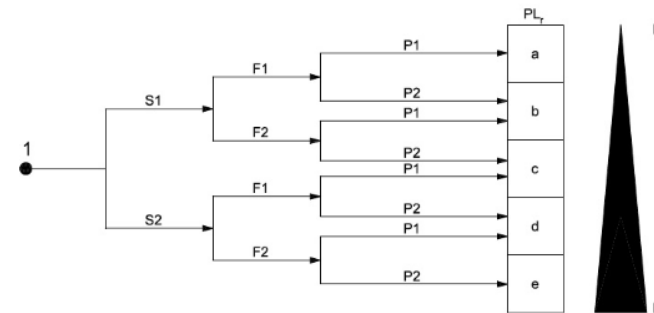
Ny robotstandard 2025

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Automasjon & Sikkerhet AS

Tjenester

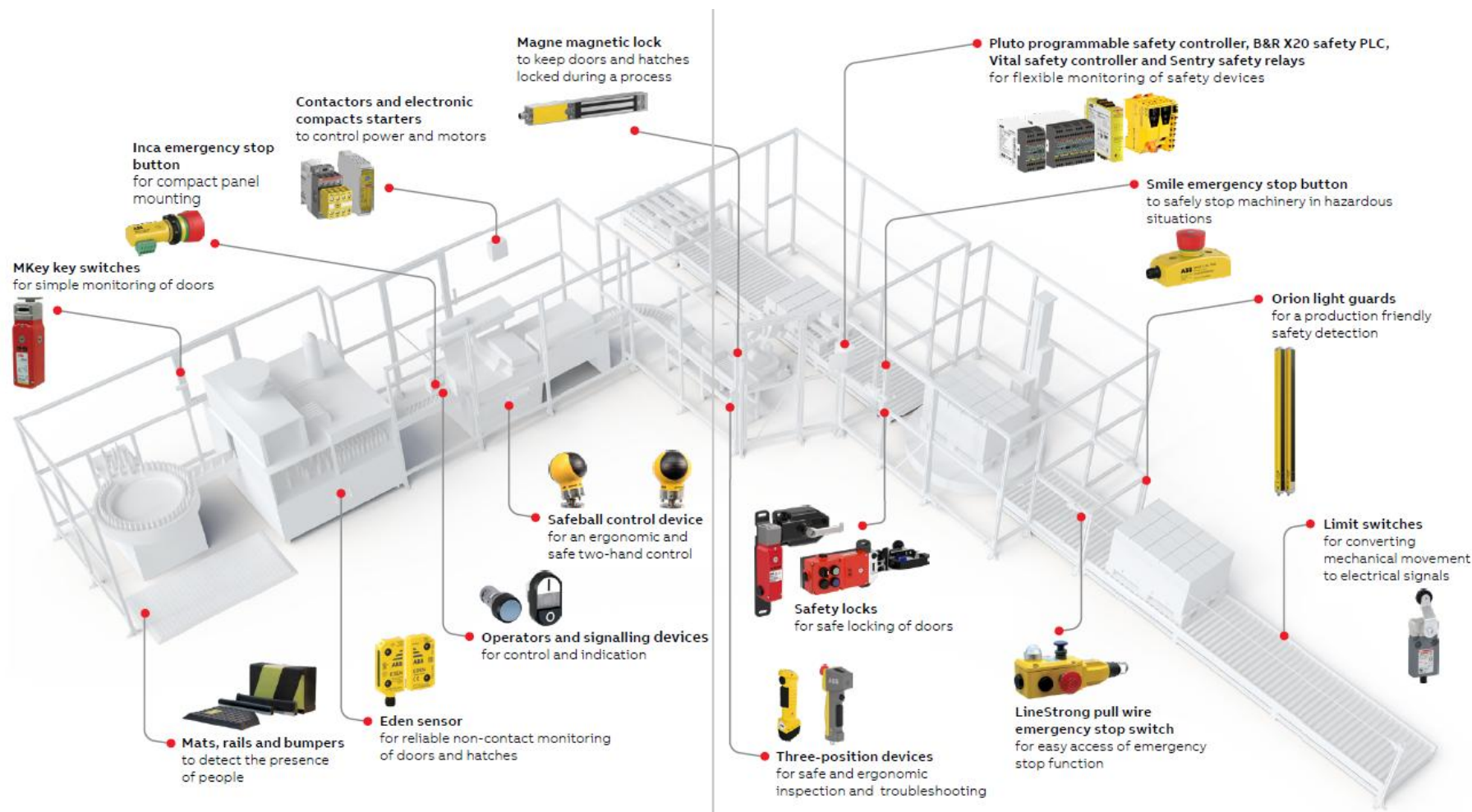
- Prosjektassistanse
- CE merking assistanse
- Kurs og opplæring i maskinsikkerhet
- Risikovurdering av maskiner og hele anlegg
- Kurs i risikovurdering
- Sikkerhets PLS programmering
- Spesifisering og tegning av gjerdesystemer
- Verifisering av sikkerhet med SISTEMA
- Kurs og opplæring i CEDOC



Automasjon & Sikkerhet AS

Komponenter

- Sikkerhetsreleer
- Sikkerhets PLS
- Lysbom, laserscanner
- Sikkerhetsbrytere og låser
- Sikkerhetsgjerder
- Trykksensitive (bumpere og matter)
- Sikker manøverenheter
- Radar for sikkerhet
- Tilbehør (kabler, koblingsbokser m.m)



Robotstandarden - fremdrift

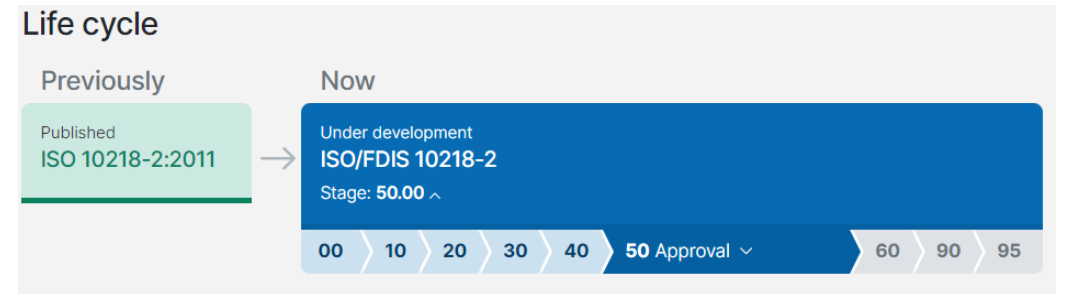
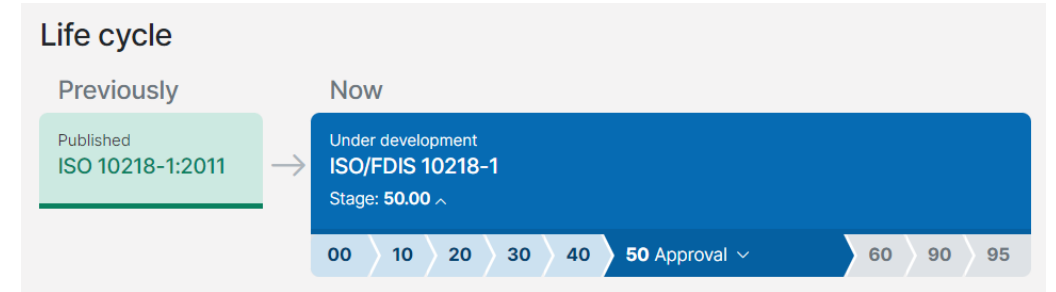
Endringer av Industrial Robot Safety Standard ISO 10218 del 1 og 2.

Det tekniske innholdet ble ferdig i 2022 og avventer gjennomgang av HAS consultant før det kan bli en harmonisert standard. Neste steg i prosessen blir publisering.

OPPDATERING 06.02.2025. Standardene er publisert på ISO. Det tar ca en måned før de er lansert som EN ISO og harmonisert mot maskindirektivet.

[ISO 10218-1:2025 Robotics - Safety requirements - Part 1: Industrial robots](#)

[ISO 10218-2:2025 - Robotics- Safety requirements - Part 2: Industrial robot applications and robot cells](#)



Robotstandarden – endringer

Standardene er lengre, mer detaljerte og har mer spesifikke krav.

Robotics — Safety requirements — Part 1: Industrial robots, gjelder hovedsakelig for de som fremstiller roboter.

Denne har nesten doblet i størrelse til 106 sider.

Robotics — Safety requirements — Part 2: Industrial robot systems, robot applications and robot cells, gjelder for de som integrerer roboter i et robot system.

Øket i størrelse fra 88 til 250 sider.

Merk at både gjeldende og ny robotstandard refererer til EN ISO 13849 og den kom i ny utgave April 2023.



Robotstandarden – endringer

Definisjon av kollaborative roboter er fjernet.

Det finnes ikke lenger kollaborativ driftsmodus, eller hastighet.

”Kollaborativ” vil være en applikasjon, ikke en robot eller driftsmodus.

Dersom roboten skal brukes i en kollaborativ applikasjon så behøves det:

- Overvåket stillstand
- Hånd guidet styring (HGC – Hand-guided controls)
- Hastighets og separasjonsovervåkning (SSM – Speed and separation monitoring)
- Kraft og energibegrensning (PFL – Power and force limiting)

Del 1 spesifisere krav til sikkerhetsfunksjoner roboten må ha dersom produsenten sier den har disse funksjonene.

Del 2 spesifiserer krav og sikkerhetsfunksjoner som må brukes.



Robotstandarden – endringer

Robot Klasser

Roboter i klasse 1 må overholde alle de listede kravene for denne klassen, ellers er de en klasse 2 robot. Kravene gjelder for den maksimale ytelsen til roboten, uten begrensende funksjoner.

Noen krav gjelder ikke for klasse 1 roboter

- Redusert hasighet
- 3-posisjons enabling device
- Begrensing av arbeidsområdet
- Vedlegg E har en test metode for klasse 1 roboter.

Bestemmelse av PL/SIL og sikkerhetssystemer vil avhenge av klasse.

Table 1: Robot class

Robot Class	Total mass per manipulator (M) [kg]	Maximum force* per manipulator (F_{MPM}) [N]	Maximum speed [mm/s]
I	10 kg and under	50 and under	250 mm/s and under
II	Over 10 kg	Over 50	Over 250 mm/s

NOTES:

M is the total mass of the moving parts of the manipulator.

See Annex E for M test methodology.

If multiple manipulators are provided, M is per manipulator.

See reference [65] FP 0317 (Mainz Study) for derivation of the 50 N maximum force per manipulator value (F_{MPM}).

* Maximum force is with a manipulator minimum contact area of 0.5cm² [65] .

Reference [65] FP 0317 (Mainz Study): the third quartile of the 29 body parts that were considered (except head and neck) study FP 0317 shows that forces of around 50N are below pain onset independent of pressure (except needles and knives). Therefore, the 50 N limit can be applied as a general borderline between robot class I and II.

Robotstandarden del 1 – endringer

Sikkerhet

Mer spesifiserte krav til sikkerhet:

5.3.3 Performance

The minimum functional safety performance for safety functions shall be at least one of the following:

Performance Level (PL) d, category 3 architecture in accordance with ISO 13849-1:2015;

or

Safety Integrity Level (SIL) 2, hardware fault tolerance (HFT) = 1 with a mission time of not less than 20 years, in accordance with IEC 62061:2015;

or

Performance Level (PL) d or SIL 2, with a PFHD less than $4.43 \times 10^{-7}/h$.

Dvs. Det er åpnet for å ikke måtte ha redundant sikkerhetskrets (Category 3).

Vedlegg C. Visse sikkerhetssystemer vil ha lavere krav til Performance Level.

Robotstandarden del 2 – endringer

Eksempel åpninger, mer detaljert i ny standard.

Hele strukturen på standarden er endret.

Flere nye vedlegg. Bla.:

- ISO/TR20218-1 Robotics - Safety design for industrial robot systems – Part 1: End-effectors
Vedlegg I (informativ) End-effectors
- ISO/TR20218-2 Robotics - Safety design for industrial robot systems - Part 2: Manual load/unload stations
Vedlegg J (Informativ) Sikkerhet for manuell inn- og utlastingsstasjoner.
- Deler av ISO/TS 15066 Robots and robotic devices - Collaborative robots, finnes i vedlegg L og M.
- Vedlegg C, safeguarding material entry and exit point.
Flyttet til vedlegg K, mer detaljer og spesifikke krav.

C.2 Example of small openings

The dimensions of the opening should be adapted to the dimensions of the materials.

No hazard zone should be reachable from the opening.

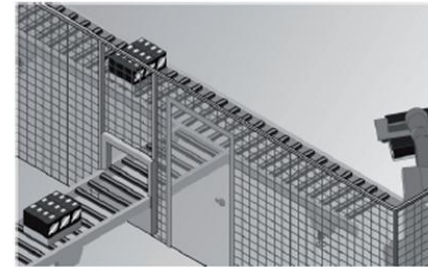
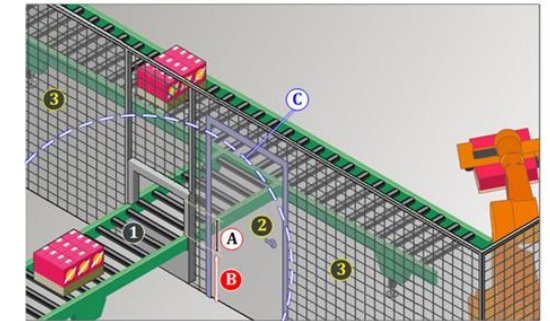


Figure C.2 — Material entry through small openings in guards

K.2.1 Small openings

In Figure K.1, the dimensions of the opening should be adapted to the dimensions of the materials. No hazard zone should be reachable from the opening.



Key

- 1 conveyor, with measures against walking on the conveyor as described in EN 619:2002, Annex F
- 2 interlocked guard for access
- 3 guards (not all are shown)
- A slot opening height that is 500mm or greater, but close to the height of the materials entering
- B conveyor height at least 600 mm from adjacent standing or walking surface to lessen the likelihood of walking on the conveyor
- C no hazard zones within 850 mm of the opening (within an arm reach)

^A If B is less than 600mm, possibly 0mm, additional measures can be required to prevent or detect entry.

Figure K.1 — Material entry through small openings in guards

Robotstandarden del 2

Sikkerhet:

Robot integrator skal betemme ytelsen til hver sikkerhetsfunksjon

- Etter vedlegg C, tabell C.1.
- Full risikovurdering etter ISO 12100 og enten ISO 13849-1 (PL) eller IEC62061 (SIL).

Dersom PLd er påkrevd så skal sikkerhetsfunksjonen ha Kategori 3 arkitektur, eller PFHd mindre enn $4,43 \times 10^{-7}$

Annex C (normative) Safety function performance requirements

C.1. Determining safety function performance level

Table C. 1 describes safety functions in terms of the triggering event and the intended result. The listed safety functions may be provided by the robot manufacturer, the integrator of the robot system/ robot application/ robot cell, or a combination.

For functional safety requirements (e.g. PL and architecture, SIL and hardware fault tolerance), see 5.5.3.

NOTE 1 There can be some exceptional cases with application risks requiring PLe or SIL 3 safety functions.

Table C. 1 - Safety functions

Clause	Mandatory, Conditional or Optional ^a	Safety Function Name	Possible Triggering Event	Intended Result unless "OR" is stated within a given group, ALL are required	default functional safety PL, or required SIL
5.2.8	Conditional	position holding	power is removed while motion is stopped	— No movement	PLd or SIL 2
5.2.9	Conditional	additional axis (axes) speed monitoring	additional axis (axes) exceeds the speed parameter	— Not exceed the parameter — If exceeded, stop category 0 or 1 (5.5.4)	PLd or SIL 2
5.4.7.3	Conditional	axis limiting	Exceed the limit. Reaching the point where a reaction shall be initiated so that the limit will not be exceeded	— Stop category 0 or 1 (5.5.4) — Prevent exceeding the limit by slowing or stopping (protective stop) before the limit is exceeded	PLd or SIL 2
5.4.7.4	Optional switching of axis limiting (5.4.7.3) settings	dynamic limiting	Safety-related input to switch active axis limit(s) (5.4.7.3)	— Axis limiting according to 5.4.7.3 — Only 1 set of axis limits shall be active at a time	PLd or SIL 2

Robotstandarden del 2

Sikkerhet:

Cybersecurity

5.5.9 Communications

When data communications are used in the implementation of a safety function, the requirements of IEC 61508-2:2010, 7.4.11 shall be applied.

Table 1 — Categories of communications transmission systems

Transmission Category	Main characteristics
1	Designed for known and fixed maximum number of participants. All properties of the transmission system are known and invariable during the lifetime of the system. Negligible opportunity for unauthorised access.
2	Properties are unknown, partially unknown or variable during the lifetime of the system. Limited scope for extension of user group. Known user group or groups. Negligible opportunity for unauthorized access (networks are trusted). Occasional use of non-trusted networks.
3	Properties are unknown, partially unknown or variable during the lifetime of the system. Unknown multiple user groups. Significant opportunity for unauthorized access.

SOURCE: IEC 62280:2014 Table B.1, first 2 columns

Table 2 — Robot external network - countermeasure requirements

Transmission Category	Repetition	Deletion	Insertion	Resequencing	Corruption	Delay	Masquerade
1	+	+	+	+	++	+	-
2	++	++	++	+	++	++	-
3	++	++	++	++	++	++	++

NOTE: The term: "masquerade" means that the true source of a message is not correctly identified. For example, a message from a non-safety element is incorrectly identified as a message from a safety element. See IEC 61508-2:2010, 7.4.11.1 [21].

Key

- Threat can be neglected.
- + Threat exists, but rare; weak countermeasures sufficient.
- ++ Threat exists; strong countermeasures required.

Kontakt oss

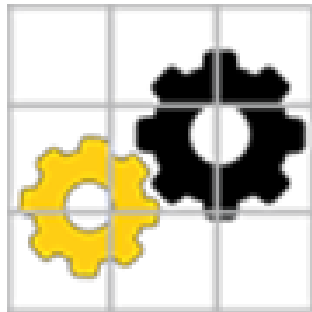
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