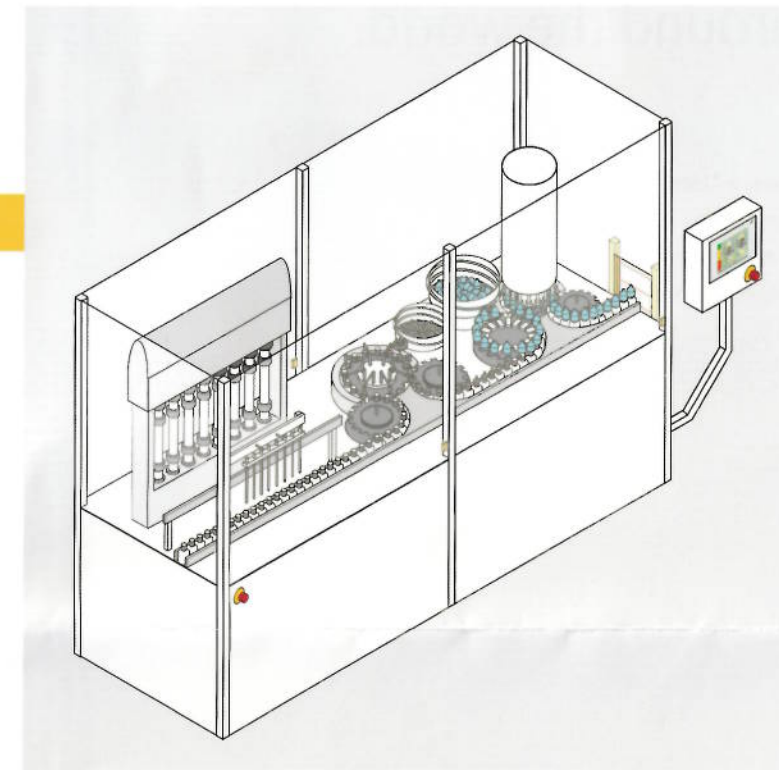


ISO 14119

New features

In contrast to the previous standard EN 1088, ISO 14119 considers additional technologies such as RFID or electromagnetic guard locking, classifies interlocking switches and regulates more clearly the specifications for installing such switches on guards. These regulations are particularly significant with regard to protection against guard manipulation. The essential changes are:

- ▶ Interlocking devices are subdivided into four types (previously only two) that demand measures in each case to prevent manipulation of the guards
- ▶ Reducing the possibilities to defeat interlocking devices, i.e. every safety gate must be examined with regard to its manipulation incentive and measures initiated where necessary
- ▶ Subdivision of coded actuating elements into different coding levels. These coding levels are critical when selecting the type of interlock
- ▶ Static and dynamic forces that act on guards must be taken into account (minimum guard locking forces). In an annex, examples are listed for maximum static action forces to be expected
- ▶ The series connection of sensors is regulated differently in the technical report ISO/TR24119



The application example is used to illustrate the potential solutions in compliance with standards.

Application description	Solution approach	Structure	Presentation of the solution
<ul style="list-style-type: none"> ▶ Servo drive with four locked guards ▶ The operator must reach into the danger area on a regular basis several times during each shift ▶ Risk assessment recognises risks to be reduced at the servo drive 	<ul style="list-style-type: none"> ▶ Fixed guards for protecting the danger area ▶ Safety gates for regular access to the danger area ▶ Check in accordance with DIN EN ISO 13855, Section 9: Is the necessary safety distance from the safety gate to the hazard complied with? ▶ This is the case in the example, therefore no guard locking required 		<ul style="list-style-type: none"> ▶ Objective: Reaching PL d ▶ By using coded safety switches PSENc at the safety gates, the requirements of DIN EN ISO 13849-1 and ISO 14119 are met. The switches conform to type 4 with high coding level in accordance with ISO 14119. Series connections in accordance with the technical report ISO/TR 24119 are possible. As a result, the functional safety and also the high requirements for protection against manipulation are achieved. ▶ The evaluation is implemented with the safety relay PNOZsigma (PNOZ s5). ▶ The servo amplifier PMCprotego DS is brought to safe torque off in SS1 stop category 1 in accordance with DIN EN 60204-1. A second PNOZsigma is required for emergency operation (emergency stop). ▶ If process guarding is required, the safe coded safety gate system PSENslock can be used instead of the PSENc in accordance with ISO 14119 type 4 with high coding level.
<ul style="list-style-type: none"> ▶ Servo drive with four locked guards ▶ The operator must reach into the danger area on a regular basis several times during each shift ▶ Risk assessment recognises risks to be reduced at the servo drive ▶ The necessary safety distance is not complied with 	<p>Guard locking at the safety doors is required due to the missing safety distance. There are two options for ensuring that the drive is safe:</p> <ul style="list-style-type: none"> ▶ Delaying the opening until after the drive is switched off for safety reasons ▶ Standstill detection via an acknowledgement in the required safety level of the servo amplifier 		<ul style="list-style-type: none"> ▶ Objective: Reaching PL e ▶ Option 1: The safety function SS2, stop category 2 in accordance with DIN EN 60204-1 can be met by installing the safety card PMCprotego S1 in the servo amplifier PMCprotego D. This has an acknowledgement to open the guard locking. ▶ Option 2: Use of the configurable safety relay PNOZmulti Mini, the worldwide safety standard for all machine types. Monitoring of the safety functions with just a few clicks in a software tool. ▶ In both cases, the guard locking can reach PL e with the safety gate system PSENsgate without fault exclusions by the designer. The requirements of ISO 14119 are met by means of the full coding of the switch. ▶ The "safe operating stop" function monitors the stop position reached by the axis and prevents any deviation from the position window. The drive's control functions are maintained in full. If the position strays outside of the monitored window, the drive is shut down safely. ▶ The minimum guard locking forces are reached in accordance with ISO 14119, Annex I "Examples for maximum static action forces".
<ul style="list-style-type: none"> ▶ Set-up mode is required and a safely monitored speed is required as a sudden excessive speed increase may occur due to many errors 	<ul style="list-style-type: none"> ▶ The set-up mode is another operating mode in accordance with MD Annex I Section 1.2.5 and is a safety function to be monitored. The specifications for the selection of operating modes must therefore be complied with. This can be achieved in the form of access restrictions, for example, to achieve a corresponding degree of safety ▶ With the special operating mode "Set-up", the incentive to manipulate the interlocking device in accordance with ISO 14119, Annex H is avoided. The safety gate can be opened with the process running, enabling easier operability 		<ul style="list-style-type: none"> ▶ Objective: Reaching max. PL d ▶ With the servo amplifier PMCprotego DS and the configurable control system PNOZmulti, the safety function Safely Limited Speed can be added. ▶ The operating mode selector switch PITmode ensures the selection of the operating mode "Set-up" in compliance with standards. ▶ With the enabling switch PITenable, an additional degree of safety is achieved.

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ISO 14119



Prevent manipulation of safeguards

The responsible ISO working group has adopted the final draft of the new ISO 14119 "Safety of machinery – Interlocking devices associated with guards". The new standard defines principles for the design and selection of safety gate systems and replaces EN 1088.

International validity, time limits

ISO 14119 will replace all national standards on this subject with a transition period of 18 months and will be valid worldwide. Formally this signifies a huge step forwards: The old standard was purely European whereas the new norm is published by ISO.

Act now!

As a machine builder, you will be at an advantage if you comply with the new ISO 14119 immediately when designing safety gate systems. All safety switches and safety gate systems from Pilz meet the specifications of the new standard. So we can help give your safeguards a future-proof design that complies with the standards.

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