

DOLD



When machines only start
with the right key

Key transfer 2.0:
Standardised safety according to EN ISO 14119

Digital safety solutions are becoming more and more important in industry. However, this is a trend that does not apply equally to all applications and all industries: key transfer systems (STS) continue to play an important role in the physical separation of man and machine. Dold combines safety switches, guard locks, key transfer and command functions with SAFEMASTER STS in a single system that also complies with the new EN ISO 14119 standard.

A look inside the production department of a large contract manufacturer. We see several employees working at CNC machines, manufacturing the appropriate products according to the exact requirements of the customer. Machine tools such as a CNC mill play an important role in the processing of complex metal components. However, when operating in an industrial environment, forces act on the machine that require regular maintenance. The safety of the employees has the highest priority: Under no circumstances should the operators come near the tool while the machine is running, as this would pose a serious safety risk. When an inspection is due, we must ensure that the machine is actually switched off and stays off. This is where key transfer system comes into play. The term describes a forced process sequence through the mechanical exchange of keys.

In the case of the CNC milling machine, this works as follows: The two access doors to the inspection area may only be opened when the machine is at a standstill. When the machine is running, the keys for the mechanical locks are inserted into a key-operated switch with a locking function. After access has been requested and the machine has come to a standstill, the keys can be removed and the employee can insert the keys into the mechanical locks on the system. If either one or both access doors are opened for inspection, the keys cannot be removed and the machine cannot be started. The key transfer system protects the machine and the employee, the inspection access doors are safeguarded without the need for wiring. In practice, STS solutions can be easily adapted to individual customer requirements. Dold offers a flexible and adaptable safety solution with its SAFEMASTER STS.

Complete package for more safety

Key transfer systems have a long history of success in industrial applications: Corresponding solutions have been known since the beginning of the 20th century. SAFEMASTER STS continues this success story and takes key transfer to a new and modern level: It is used to protect guards on machines and systems. As a hybrid safety switch and key transfer system, it combines the respective advantages of safety switches, guard locks, key transfer and command functions in a single system. A robust locking system made of stainless steel makes SAFEMASTER STS ideal for use in rough and extreme conditions, such as those found in the raw materials processing industries. Last but not least, key transfer systems are also used in explosive risk areas or in industries with very high safety requirements.

For this reason, SAFEMASTER STS is suitable for use up to safety level PL e / Cat. 4 complying to EN ISO 13849-1. The solution shows its strengths especially when used in demanding conditions, such as in sawmills, stone processing or metal foundries, in fact anywhere that has a heavy load on electrical systems. Thanks to its modular design, SAFEMASTER STS is wiring-free, which saves on maintenance, costs, electricity and materials. Thanks to its stainless steel design, the key transfer system can be used flexibly and is robust, regardless of whether it is hot or cold outside. In addition, dirt can escape independently through special cleaning openings. The mechanical components can also be cleaned with water or compressed air.

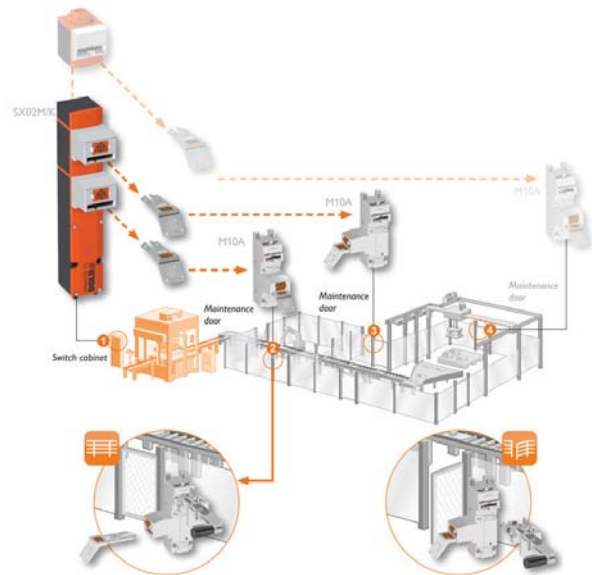


Mechanical and wireless protection of guards and protective devices

Standards have an important role

When it comes to safety, companies cannot afford to compromise. The relevant standardisation committees are also aware of this, which is why key transfer systems have always been the subject of standardisation. The most important standard for key transfer systems is EN ISO 14119, this contains guidelines for interlocking devices in conjunction with guards. It also sets out requirements for various interlocks, often known in the industry as safety switches or guard locks, in combination with access to machines. This makes the standard relevant not only for manufacturers such as Dold, but also for users who ultimately install the safety systems on their machines and systems. The latest standard was revised from 2019 to 2024 and published in September 2024.

The new edition of the standard combines the technical specifications for key transfer systems and the cascading of potential-free contacts. Previously, the different types of interlocks were divided into four types: in addition to position switches without separate actuators, these were switches and guard locks with separate and coded mechanical actuators, as well as non-contact switches with and without coding. The type with coding described non-contact switches based on RFID technology or coded magnetic switches. In EN ISO 14119:2024, key transfer systems have now been added as a separate fifth type, and the corresponding ISO specification ISO/TS 19837 has been integrated as an annex. This means that the symbols from the technical specification can now also be used in the context of the ISO guideline, although they are not prescribed by the standard. SAFEMASTER STS also uses these symbols in its data sheets.



SAFEMASTER STS from Dold combines key transfer and safety switch in one system

Check at least once a year

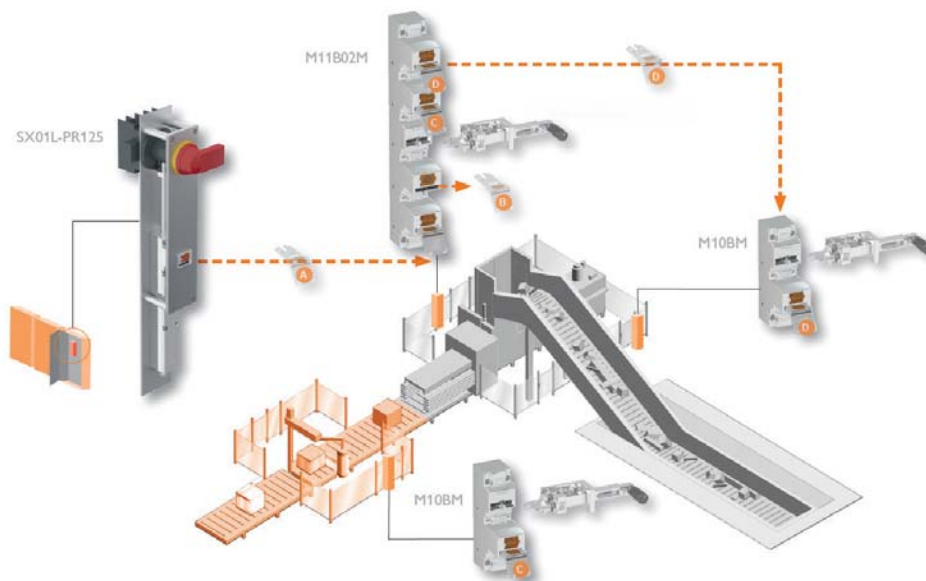
The standard also regulates the necessity of testing rarely used locks, but it does not provide any information about the test procedure. Based on the mechanical functioning of key transfer systems, Dold recommends that safety applications up to PL d be tested at least once a year and those with PL e be tested at least once a month. No less relevant is protection against manipulation: safety systems must not be surmountable due to the danger to the operators.

Dold fulfils the requirement of ensuring 'non-detachable mounting' with a special system: SAFEMASTER STS is supplied with coded Torx screws that can be loosened with the right tool. However, if the pin in the middle of the screw is bent, it can no longer be loosened and is thus safe from manipulation. A blocking function makes the system inoperable in the event of an error, thus preventing access to the machine or a restart. It is only possible to reset the blocked unit with SAFEMASTER STS after the error has been rectified. The key modules and keys can be colour-coded to prevent errors when using the keys. In addition to the standard orange colour, Dold offers a further 19 colour combinations.

Reliable all-pole disconnection with Power Interlocking

EN ISO 14119 also describes how all-pole disconnection is handled for key transfer systems in combination with switch-disconnectors. This circuit in the power section is also referred to as Power Interlocking. The technology first forces the operation of a switch-disconnector for the key release, which then interrupts the power supply to the machine. This ensures that the machine is decoupled from the mains at all poles before the key is released. However, a problem often occurs with power interlocking: If the switch-disconnector is always switched under load instead of properly switching the machine on and off, the service life is drastically reduced. Dold therefore recommends that for all-pole disconnections, the machine should be shut down first and then the switch-disconnector should be operated. This protects the switch and increases the service life.

In combination with EN ISO 14119, SAFEMASTER STS is the right solution for safeguarding people and machines in production environments. Thanks to the option of mechanical and wire-free use, the system is reliable and robust even in the event of a fault. This means that, more than 100 years after their invention, key transfer systems continue to play an important role in industry.



Here you can see how Power Interlocking works