



SAFETY FOR MAN, MACHINE AND PROCESS



Contacts that protect life.



Trapped-key interlocking systems
Door interlocks HST®

Safety for Man, Machine and Process

Since 1987, our family business has developed to become a worldwide active specialist in industrial safety.

With own subsidiaries and sales partners in all important industrial nations of the world, we are at the disposal of our customers for all questions of safety at work. The requirements of the market make it necessary to constantly review our products and redesign them on the highest-possible level within the framework of the applicable standards and directives.

Our organisation is certified to ISO 9001:2008. In addition, in May 2011 we have introduced the Full Quality Assurance System (FQA) according to Annex X of the Machinery Directive MRL 2006/42/EC for the product series HST® and HSV® and certified by the Testing and Certification Body in DGUV Test, Committee Electrical Engineering.

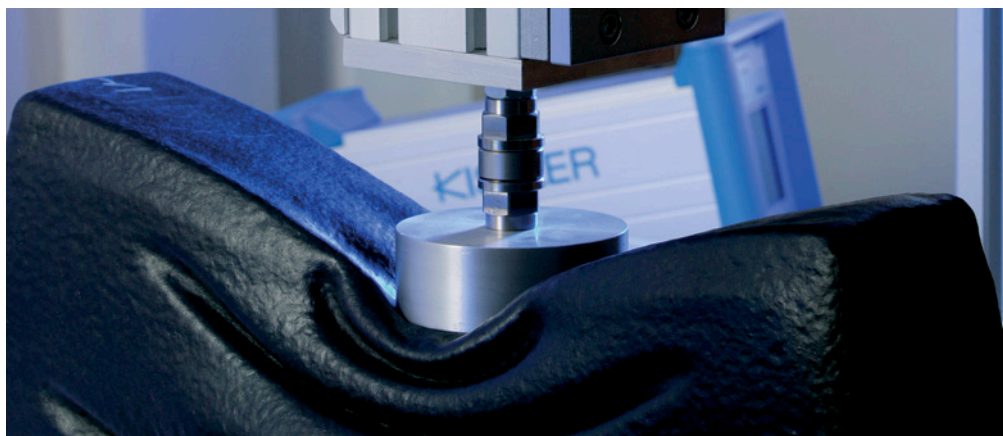
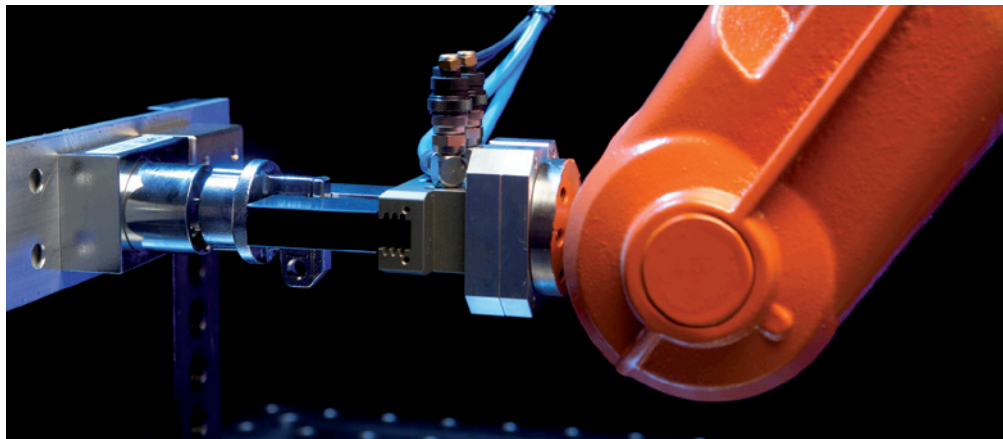
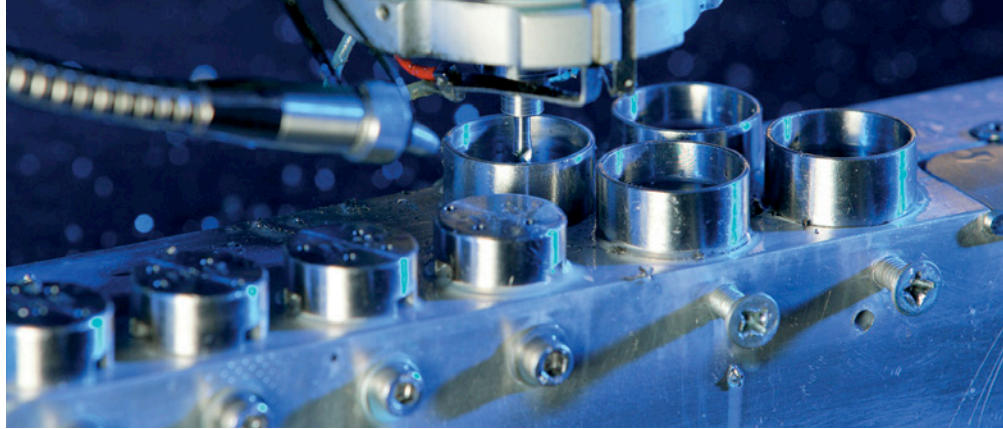
The Full Quality Assurance System (FQA) allows us to market these product series HST® and HSV® without further testing by notified testing laboratories. This is mandatory for safety components independently brought on the market and not being covered by harmonised European standards.

Our ambition with regard to safety goes even further: Regularly, we have a selection of our products tested and certified by independent bodies (DGUV Test).



Oliver und André Haake

**Inspecting,
measuring,
testing,
using...
merciless!**

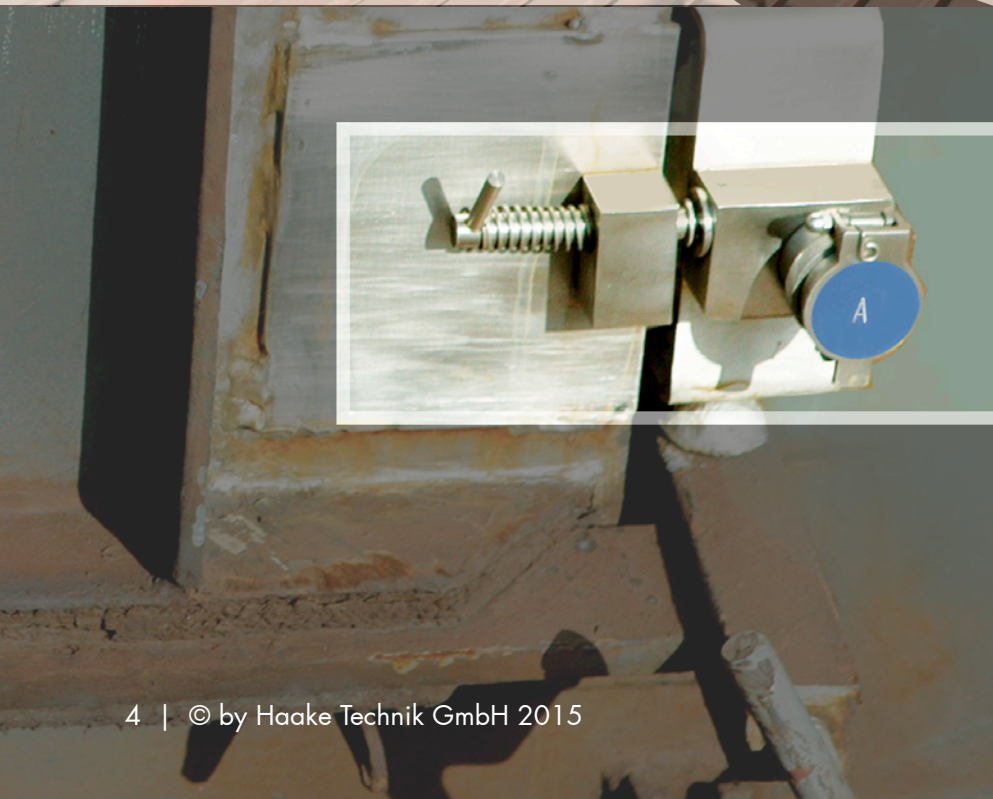




Hazardous machines and systems are frequently equipped with safety elements (guard doors) with a locking mechanism to protect the operator. Their function is to prevent hazardous machine functions if the guard door is not closed and locked and to keep the guard door closed and locked until the risk of injury has passed.

Key-operated mechanical interlocks, also called trapped-key systems assume these functions.

They are based on the easy-to-understand premise that a key cannot be in two places at the same time - it can for instance be inserted in a switch or be used for opening a door interlock. Another safety-relevant feature is that a key can only be removed in a safe condition in which no hazards are present (switch is turned off, door interlock is closed).



The big advantage of the system is the fact that a certain sequence of steps can be pre-determined when designing the system.

It is not possible to deviate from this sequence - thus a high degree of integrity is achieved. As a result, any hazard can be eliminated.



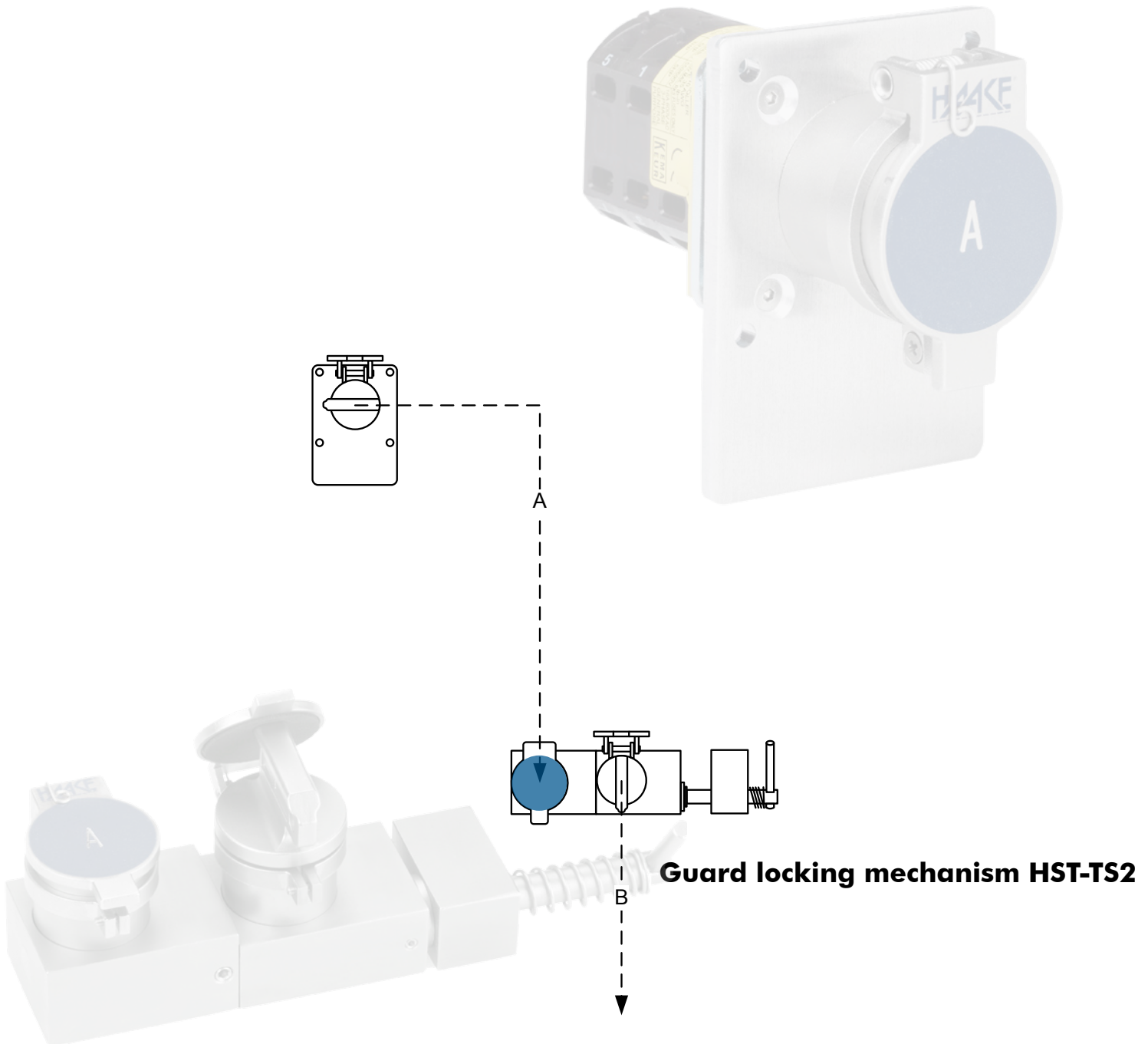


The system consists of a central electrical part (for instance in the control panel) and mechanical units at the guard doors:

- high degree of safety, individual codes
- only pre-determined secure safety sequences are possible
- no spare actuator 'in the pocket'
- no cables to individual guard doors (cost savings, fault prevention)
- easy retro-fitting
- door interlocks have a locking feature
- particularly suited when there are different energy types on the machine (electric, pneumatic...)
- in areas where people can be trapped: personal safety key
- simple option for realising safety conditions during setup
- time delay due to key transfer between switch and door interlock
- running-down processes come to a standstill (extend with additional unit if necessary)



Switching element HST-S



System name: S-B3

First safety related function:

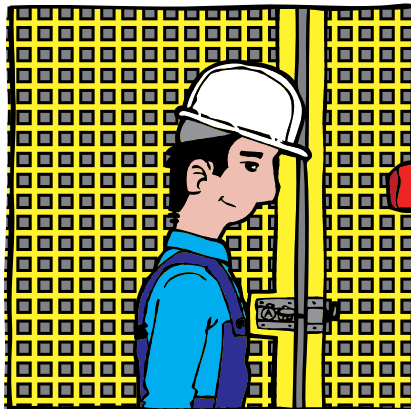
The actuator of the guard locking device can only be removed when the contacts of the switch element are open (OFF position).

Second safety related function:

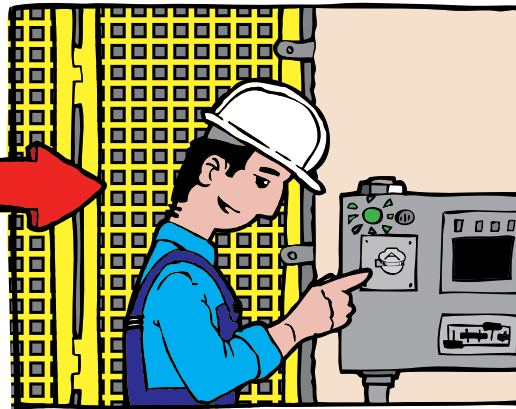
The contacts of the switching element can only be closed again (ON position), when the actuator of the guard locking is trapped.



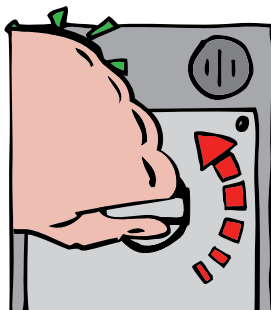
Object protection with accessible area



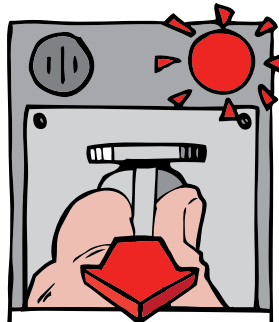
Maintenance technician Peter M. on the way to the machine he must check.



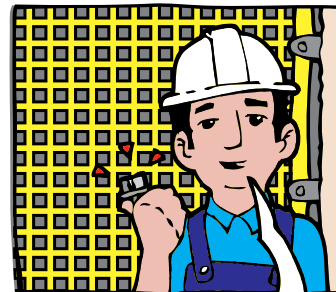
However, Peter must first unlock the access door for security reasons.



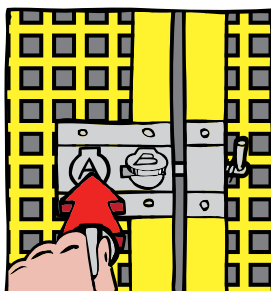
Key "A" of the switching element HST-S is used, to turn the machine into a safe state.



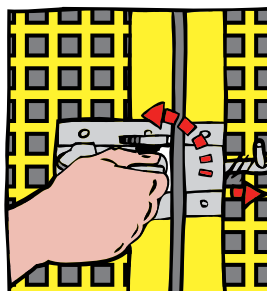
Only now, the key "A" can be pulled out of the switching element.



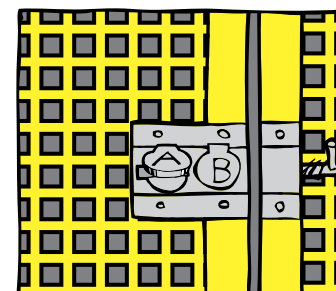
With this key, Peter goes to the guard locking mechanism HST-TS2 that locks the access door.



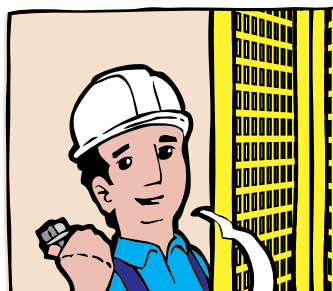
There, Peter inserts and turns the key "A" in lock "A" of the guard locking mechanism.



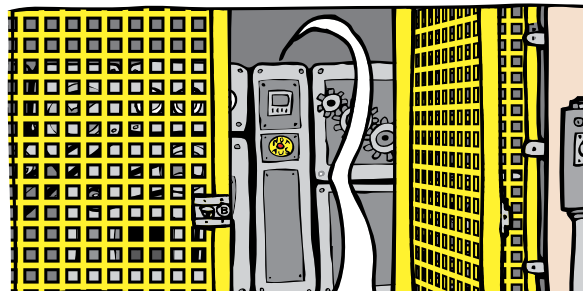
Peter can turn and remove the personal key "B" only now; this unlocks the actuator of the guard locking mechanism.



As long as Peter does not insert the key "B" back into the lock, key "A" cannot be removed.



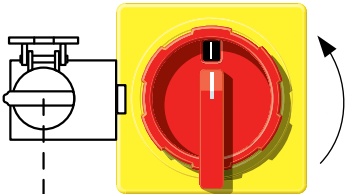
Peter takes the personal key "B" along into the service area. This ensures...



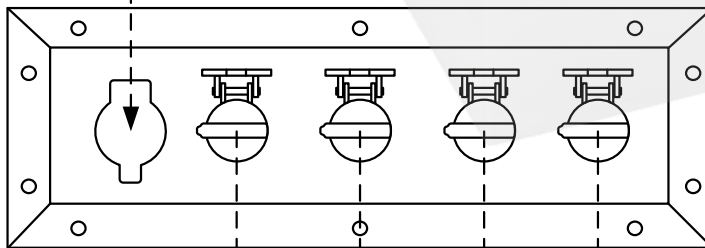
...that no one can restart the machine while Peter remains in the service area.



Interlocking device HST-B



A



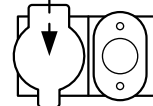
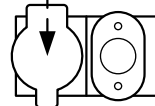
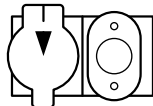
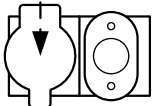
Trapped-key interlocking systems HST-W5

B

B

B

B



Guard locking mechanism HST-TZ1

System name: S-A2

First safety related function:

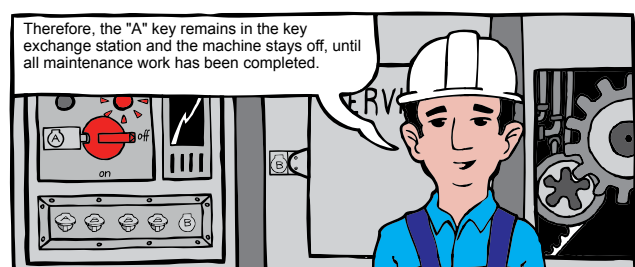
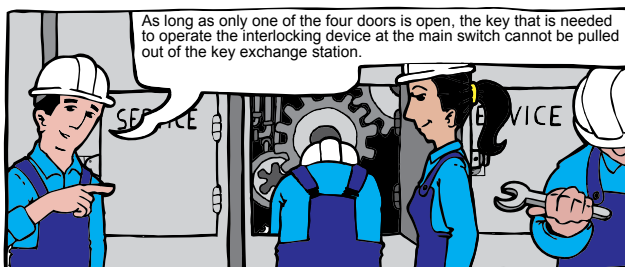
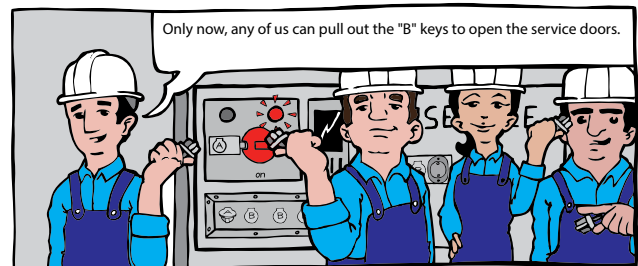
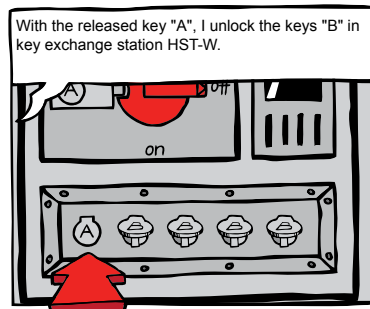
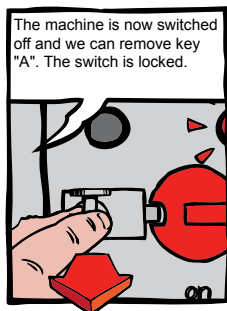
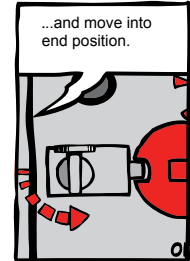
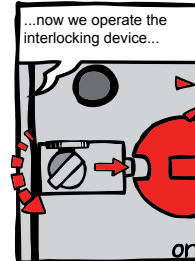
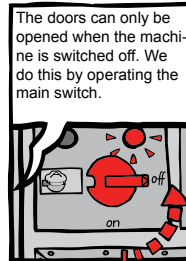
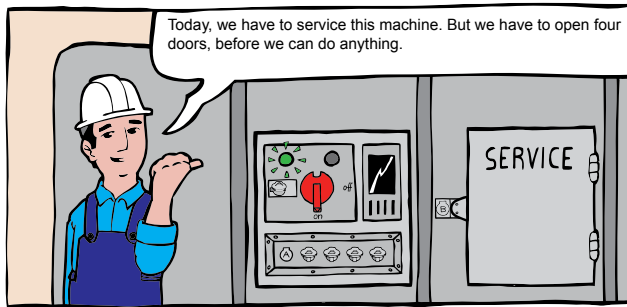
The actuator of the guard locking device can be removed only when the bolt of the mechanical switch interlock is extended.

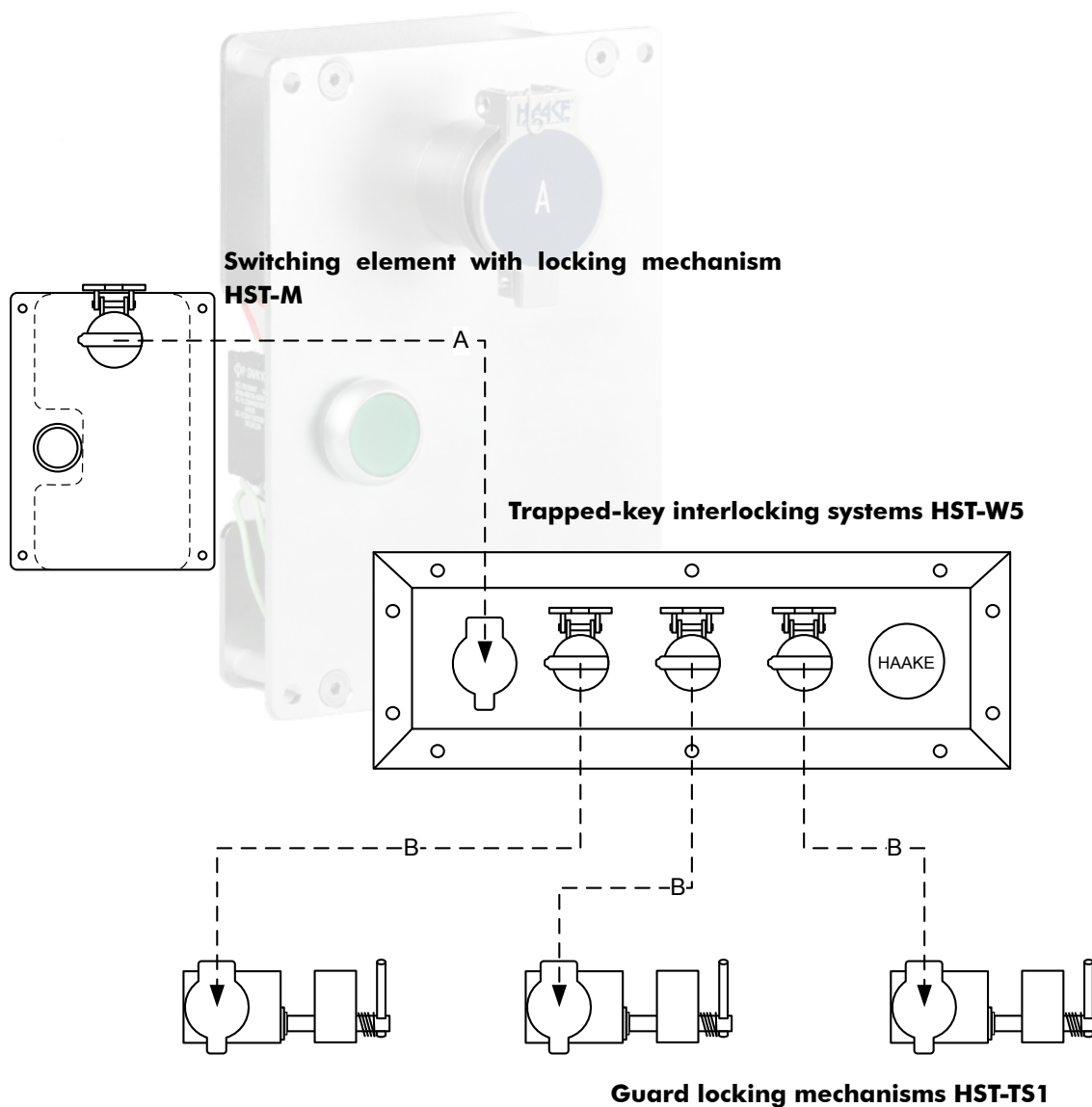
Second safety related function:

The bolt of the mechanical switch lock can be retracted only when the actuator of the guard locking device is trapped.



Object protection with non-accessible area





System name: S-C2

First safety related function:

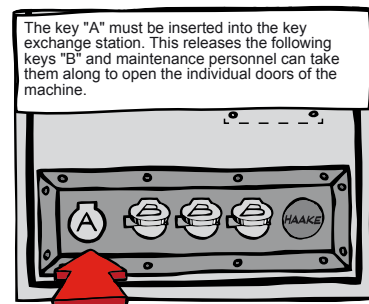
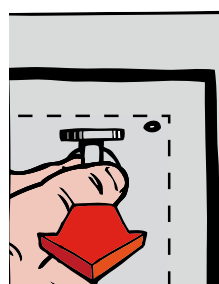
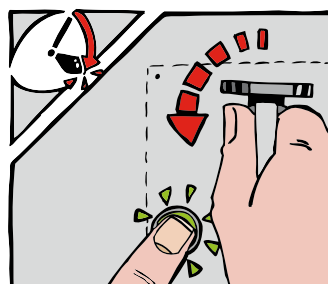
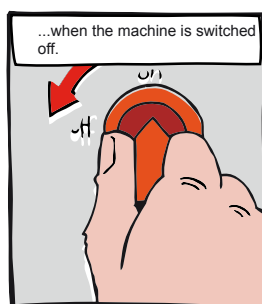
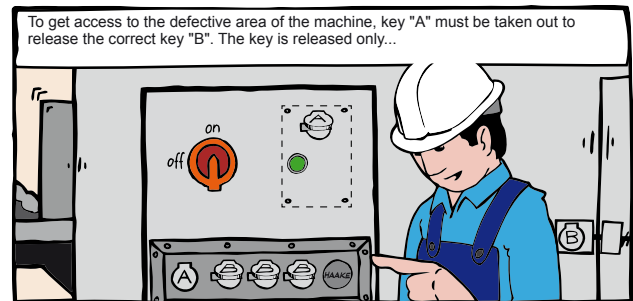
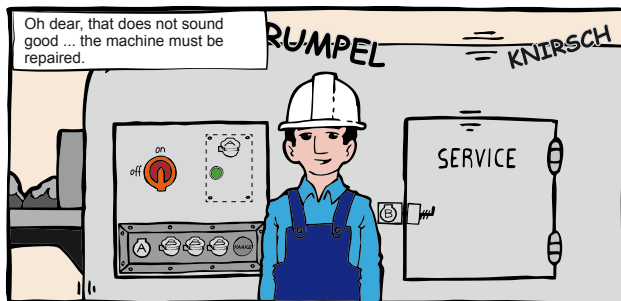
The actuator of the guard locking mechanisms can be removed only when the magnet of the locking device is energized and the contacts of the switch element are open. (OFF position).

Second safety related function:

The contacts of the switching element can only be closed again (ON position), when the actuators of the guard locking mechanisms are trapped.

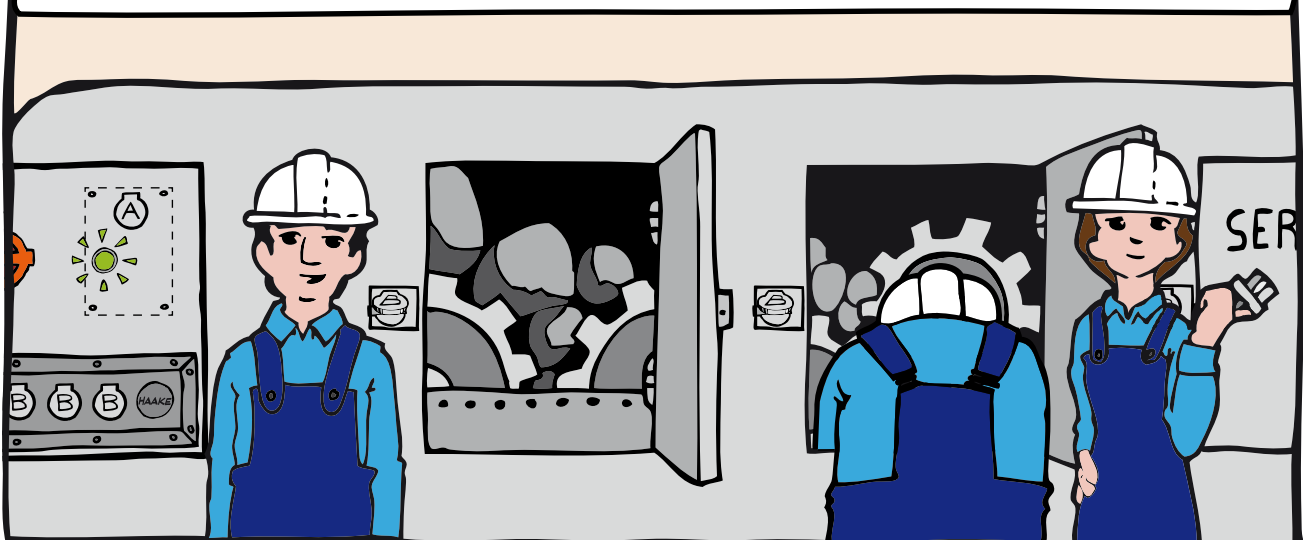


Object protection with non-accessible area



As the machine does not stop immediately, but possesses a run-down time, it is not sufficient to switch the machine simply off. You have to wait for the signal from a standstill monitor or time relay. Only after this signal has arrived at the switching element with locking device and lights up the green light of the illuminated button, the switch can be pressed and key "A" removed.

The machine can now be repaired. For as long as all "B" keys are not back in the key exchange station, it is not possible to start the machine. Only then, the key "A" required to start the machine can be removed.





Interlocking device HST® LS

is used as an attachment to existing switchgear or control units. The standard version is equipped with a 9.5 mm square bolt for actuating levers or special switching device adapters.

By turning the key, the switching device is turned off; the key is released and can be removed.



Interlocking device HST® B

is used for locking switching devices (circuit breakers, disconnectors, earthing switches etc.). By turning the key, the bolt moves into a corresponding recess on the handle or the control unit of the switching device and locks. The key can be removed only in this position.

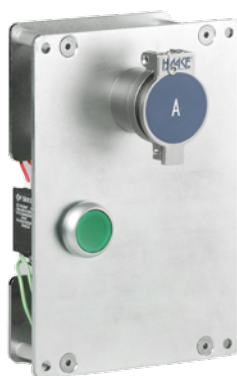
The interlocking device HST® B is not suitable for locking guard doors, flaps or similar.



Switching element HST® S

is used to switch off a machine / danger point. A switch is actuated by turning a key. The key is released and can be removed.

The HST® S is supplied as a panel version (as shown) or in metal case.



Switching element with locking mechanism HST® M

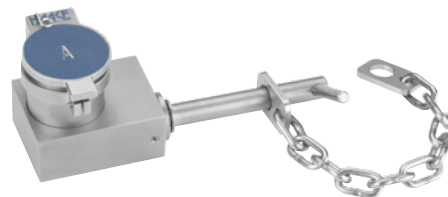
is used on machines with run-down time. The key can be removed only if a signal from the machine control is present that the dangerous movement has stopped. An illuminated pushbutton indicates the standstill. You have to press this button to remove the key. Turning the key activates a rotary switch with selectable contact configuration. The HST® M is supplied as a panel version (as shown) or in metal case. Versions with one and two locks are available.



Guard locking mechanism HST® TS 1 K

consists of a lock and a locking bolt part and can be used on swing and sliding doors or flaps. Versions with different locking bolt positions are available.

Insert the key to open the guard door or flap. The locking bolt can then be rotated by 90 ° and removed. The key is trapped.



Guard locking mechanism HST® TS 1

consists of a lock and a locking bolt part and can be used on swing and sliding doors or flaps. Versions with different locking bolt positions are available.

Insert the key to open the guard door or flap. The locking bolt can then be rotated by 90 ° and removed. The key is trapped.



Guard locking mechanism HST® TS 2

features 2 locks and is used in applications with accessible area. The operator takes the second, personal key into the danger zone. This personal key can also be used for other functions (e.g. teach mode), or the operator can carry the personal key along as described previously. Before the personal key visible in the picture can be removed, a matching key must first be inserted and turned in the empty lock part. The personal key can now be removed and the previously inserted key is trapped.



Guard locking mechanism HST® TZ 1

features a flexible slam-type locking actuator mechanism and can be used without any problems on misaligned or sagging doors and flaps. Different versions with numerous actuator orientations are available. Insert and turn the key to open the guard door or flap. The actuator is pushed out of the lock part. The key is trapped.



Guard locking mechanism HST® TZ 2

features 2 locks and is used in applications with accessible area. The operator takes the second, personal key into the danger zone. This personal key can also be used for other functions (e.g. teach mode), or the operator can carry the personal key along as described previously. Before the personal key visible in the picture can be removed, a matching key must first be inserted and turned in the empty lock part. The personal key can now be removed and the previously inserted key is trapped.



The main system components at a glance



Key exchange station HST® W 5

is used to increase the number of keys of a key exchange system. One or more primary keys are inserted to release the desired number of secondary keys.

Typically, a key exchange station is installed as inter-link between switch and guard doors.



Key exchange station HST® W 10

is used to increase the number of keys of a key exchange system.

One or more primary keys are inserted to release the desired number of secondary keys.

Typically, a key exchange station is installed as inter-link between switch and guard doors.



Haake Technik GmbH is worldwide one of the first companies where the "Full Quality Assurance System" (FQA) has been certified by a professional association (DGUV Test).

Full Quality Assurance System

Key exchange systems are logic units to ensure safety functions in accordance with Machinery Directive 2006/42/EC. The EU Directive imposes specific conformity assessment procedures for these products to ensure that only products are placed on the market that comply with directives.

As there are no harmonised standards for key exchange systems, a notified body has to issue an EC type-examination certificate or certify a Full Quality Assurance System.

To respond quickly and flexibly to our customers' wishes, Haake Technik GmbH has decided to integrate the Full Quality Assurance System in the company processes in accordance with Annex X of the Machinery Directive 2006/42/EC.

fied body.

The auditors of the notified body scrutinise in particular the methods used for design, manufacture, final inspection and testing. We consider the requirements of the relevant EU directives already during product development. We apply particular systematic design review processes and verification procedures to ensure compliance with directives.

Compliance with the requirements of the Full Quality Management System has been certified and is subject to regular monitoring by the notified body.





Valve interlocks HSV®

Valves play a key role in many industrial production lines and energy networks and assume important functions for safety and process control. The correct setting and operation of valves is decisive for the functional safety of entire plants.

Valve interlocking systems control the opening and closing of valves. They are used wherever a specific sequence for the opening and closing of several valves is required to prevent accidents, protect material or to ensure the safety of processes.



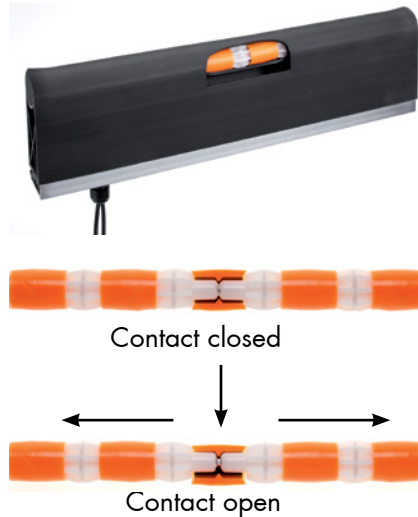
Pressure sensitive protective devices

Safety edges HSC® | Safety mats HSM® | Bumpers HSB®

Safety edges HSC®

Protection of shearing and crushing edges

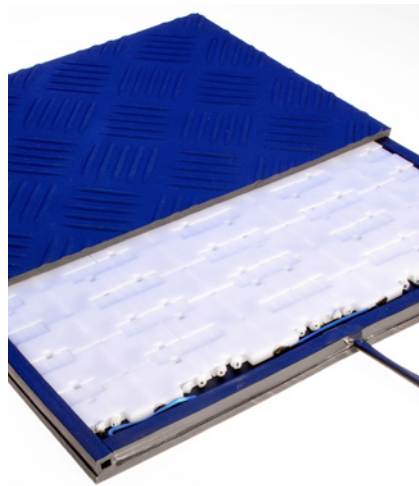
Shearing and crushing edges at automatically operated equipment represent a considerable danger potential for people. Safety edges are used as protection against these dangers.



Safety mats HSM®

For the protection against hazardous areas

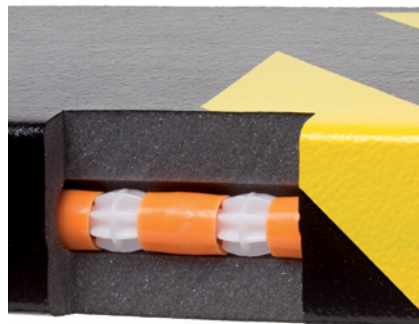
Safety mats are used for comprehensive protection of hazardous areas on machines and robots. They prevent the presence or the access of people while the machine is running.



Bumper HSB®

For the protection against hazardous movements with long follow-up distances

In these applications, so-called bumpers are used. The foam pad accommodates one or more contact chains depending on size and application of the bumper.



Haake Technik worldwide

● Headquarters and branch office- ●



Haake Technik GmbH serves customers around the world with its own subsidiaries and sales partners.

As a family-run business, the name Haake Technik GmbH is associated with the high quality of its products and services.

Haake Technik is certified according to ISO 9001: 2008. All products are made in Germany, tested and certified by independent institutes.

Haake Technik GmbH manufactures and sells

Safety edges HSC®

Safety mats HSM®

Bumpers HSB®

Trapped-key interlocking systems HST®

Valve interlocks HSV®

The web site of the Haake Technik GmbH provides detailed information on the entire product range.

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Content and pictures subject to change



SAFETY FOR MAN, MACHINE AND PROCESS