

ISS-HAKE

Trapped Key Interlocks

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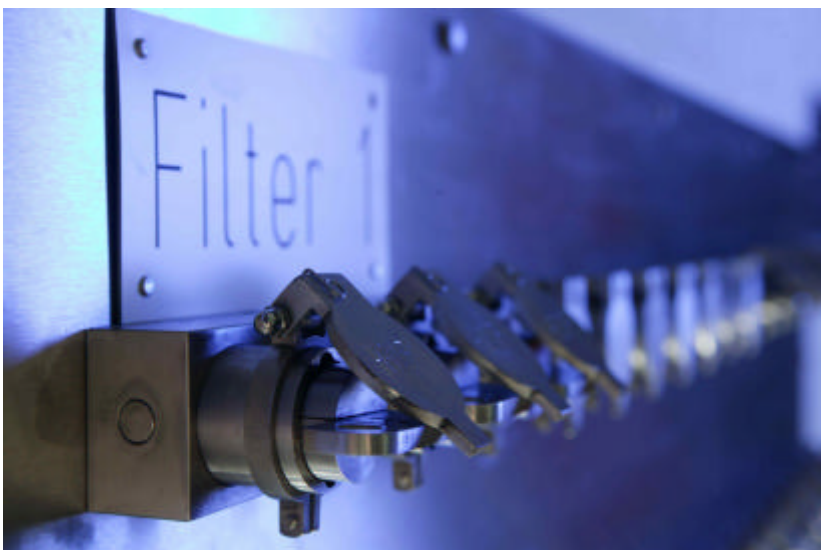


Safety of machinery

Brief description	2
User-friendliness	3
Advantages	4
Areas of application	5
Keys	6
Rotary switch HST-S	7 - 8
Rotary switch with solenoid HST-M	9 - 10
Rotary switch with Time delay HST- TD HST-BEMF	11 - 12
Bolt interlock HST-B	13 - 14
Door interlock HST-TS	15 - 16
Door interlock HST-TZ	17 - 18
Key exchange unit HST-X	19 - 20
Key exchange unit HST-W	21
Switchgear Lock HST-LS	22-23
Accessories	24
Examples	25 - 27
Enquiry form	28

Hazardous machines and systems are frequently equipped with safety elements (safety doors) with a locking mechanism to protect the operator. Their function is:

- a) to prevent hazardous machine functions if the safety door is not closed and locked,
- b) to keep the safety door closed and locked until the risk of injury has passed.



Advantages for the user

Interlock systems with locking devices of this nature include key-operated mechanical interlocks, also known as key transfer systems. They are based on the easily understood 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Another important safety characteristic is that a key can only be withdrawn in a safe condition where no hazards exist (a switch is turned off, a door interlock is closed and locked).

The great advantage of the system is the fact that a particular sequence of measures can be implemented when designing the system. It is not possible to deviate from this sequence, so a high degree of safety is achieved.

This means that virtually any hazard can be eliminated.

The systems consists of central electrical elements (e.g. in the control panel) and mechanical units on the safety doors. The devices are very often used in areas where electrical components are not suitable or expensive to install, due to space considerations, other environmental conditions or explosion hazards.



ADVANTAGE:
**Simple
construction !**

ADVANTAGE:
**High
safety level !**

Devices can be supplied with individual codes (up to 5 engraved digits). This enables the achievement of a higher degree of safety and better protection against tampering.

Advantages

Advantages of mechanical door interlocks:

- High degree of safety
- Stainless steel standard
- Dust-cap standard
- Only pre-determined secure safety sequences are possible
- No spare actuator "in the pocket"
- No cables to individual safety 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 for setup
- Time delay due to key transfer between the switch and interlock
- running-down processes come to a standstill (extend with additional unit if necessary)
- BG certified



Varied applications or personnel safety

Automotive industry
Robots
Machine tools
Automation
Packaging machines
Food
Textiles
Breweries
Building industry

Chemical industry
Pharmaceutical industry
Plastics
Oil / Gas
Steel
Mining
Power generation / distribution
Environmental protection
Power stations



KEY HST-K1

Keys are coded so that they only fit the lock for which they are intended, thus ensuring a high degree of safety.

The user selects an engraving for the key that is of relevance to him or her (max. 5 digits). This appears on the key, the respective lock and its dust-cap.

The manufacturer assigns an internal code to the desired engraving, and this code data is stored to enable delivery of the correct devices in the event of subsequent orders at a later stage.

Features / Technical data:

Key is manufactured completely of stainless steel

Alphanumeric engraving of up to 5 different digits

High quantity of different codes

**ORDERING CODE**

HST-K1-xxxxx key with engraving xxxxx

ROTARY SWITCH HST-S

The **HST-S** switch is used for isolating the machine. After the voltage has been switched off, the previously trapped key can be withdrawn and used for the next step (e.g. opening a safety door).

The unit is available as a cast aluminium housing or panel-mounted version.

Versions with multiple locks are also available (sheet-steel housing version with up to 2 locks, up to 5 for the panel-mounted version).

Moreover, versions in explosion-proof housings conforming to ATEX are also available (zones 21 and 22 and 1 and 2, documents available on request).

It is important to give consideration to the running-down duration of the drive when utilising this switch type to ensure that the hazard zone can only be reached when the drive is stationary.



HST-SU1
Panel, one lock



HST-SA1
Housing, one lock



HST-SU2
Panel, two locks

Features / Technical data:

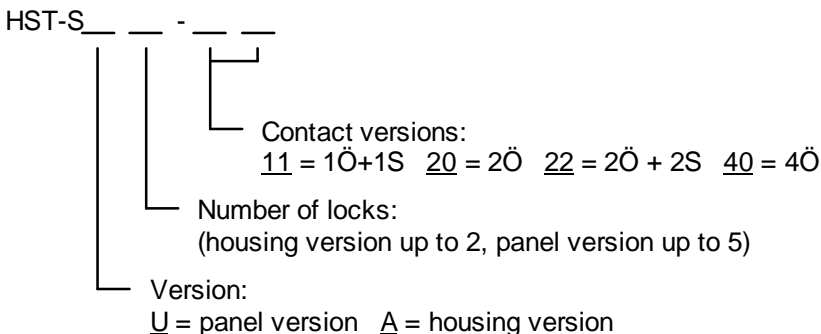
Standard reference:	DIN EN 60947-1
Ambient temperature:	0 - 55°C
Mech. service life:	1 million actuations
Switch approval:	UL, CSA, equivalent to requirements of VDE 0660 Part 107
Material of lock / actuator:	stainless steel

Degree of protection:	housing version: IP 54
Degree of protection:	panel version: IP 2X

Rated continuous current (I _u /I _{th}):	20A
Rated operating current (AC-15)	5A (240V)
Rated insulation voltage (U _i):	690 V
(which can vary in different approvals)	
Rated impulse withstand voltage resistance level (U _{imp}):	6kV
Short-circuit resistance (S _i):	max. 25 A (gl)
Connection cable cross section:	2 x 0.5 - 2 x 2.5 mm ²

Please note: This switch is a control switch, NOT a load-break switch. Version with a load-break switch on request.

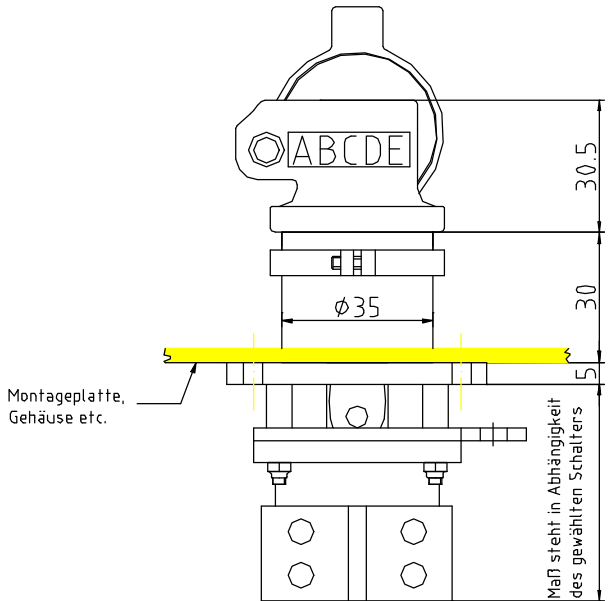
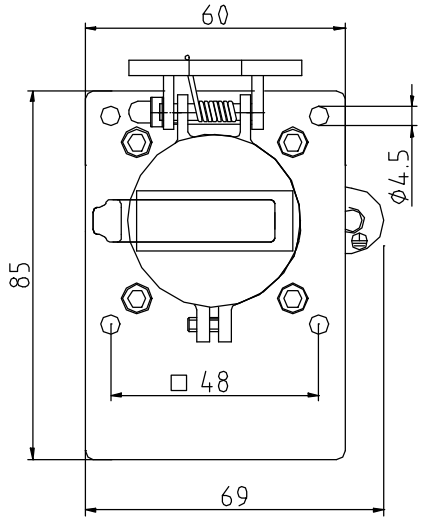
Ordering code



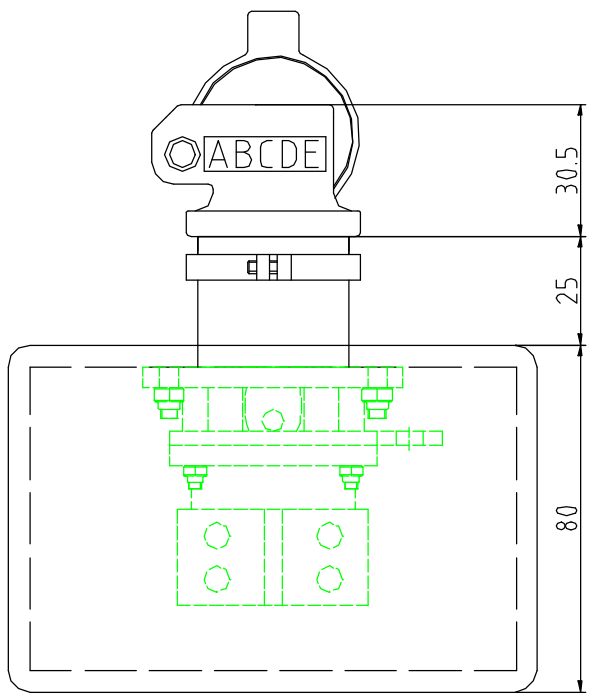
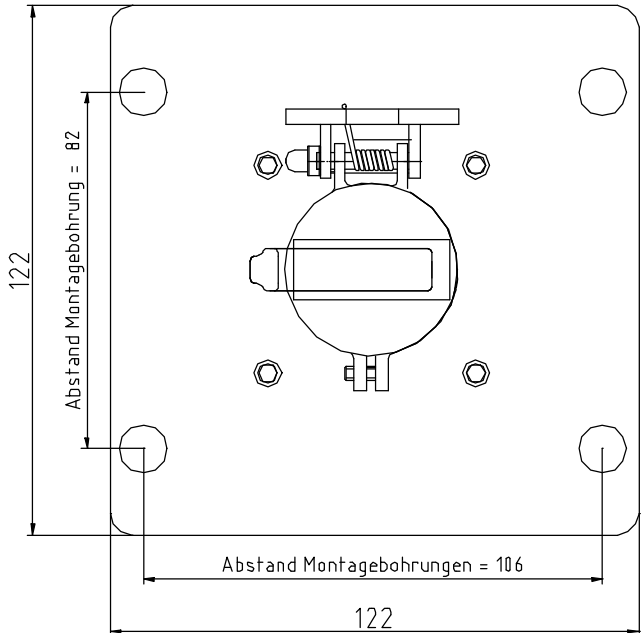
ROTARY SWITCH HST-S

Dimensions:

HST-SU1



HST-SA1



Dimensions of other versions available on request

ROTARY SWITCH with solenoid HST-M

For certain applications (e.g. machines with running-down duration, access to a safety door controlled by the PLC), it is important that it should not be possible to withdraw the key each time from a key switch. In the case of this series of electrical rotary switches fitted with a solenoid, the key can only be turned and removed when external power is applied (e.g. from a standstill monitor or a timer). A rotary switch with a selectable contact configuration (see below) and a microswitch with positively-opened contacts are actuated by turning and withdrawing the key. The magnet is characterised by 100% ON duration. However, the voltage is applied to the solenoid via a pushbutton in order to avoid continuous heating. The unit is available as a panel version (HST-MU) and in a metal housing (HST-MA). Versions with multiple locks are also available (up to 4 locks for panel and housing version).

A version in an explosion-proof housing conforming to ATEX is also available (zones 21 and 22 and 1 and 2, documents available on request).

Features / Technical data:

Standard reference:	DIN EN 60947-1, DIN EN 1088
Ambient temperature:	0 - 55°C
Mech. service life:	1 million actuations
Switch approval:	UL, CSA, equivalent to requirements of VDE 0660 Part 107
Material for lock / actuator:	Stainless steel
Degree of protection:	housing version:..IP 54
Degree of protection:	panel version: IP 2X

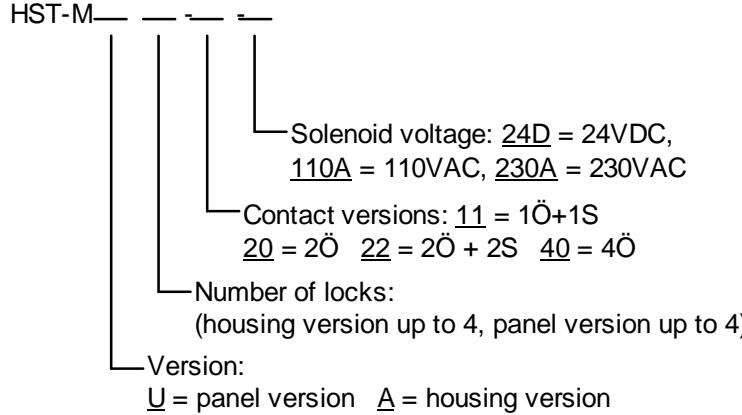
Switch data:

Rated continuous current (I _u /I _{th}):	20A
Rated operating current (AC-15):	5A (240V)
Rated insulation voltage (U _i):	690 V
(which can vary in different proportion)	
Rated impulse withstand voltage resistance level (U _{imp}):	6kV
Short-circuit resistance (S _i):	max. 25 A (gl)
Connection cable cross section:	switch: 2 x 0.5 - 2 x 2.5 mm ²
	Terminal block: 0.2 – 2.5 mm ²

Solenoid data:

Operating voltage:	DC: 24V / 110V AC: 110V / 230V
Coil value:	attraction: 35 W, retention: 8 W
ON duration:	100 %

Ordering code



HST-MU1
Panel, one lock



HST-MA1
Housing, one lock

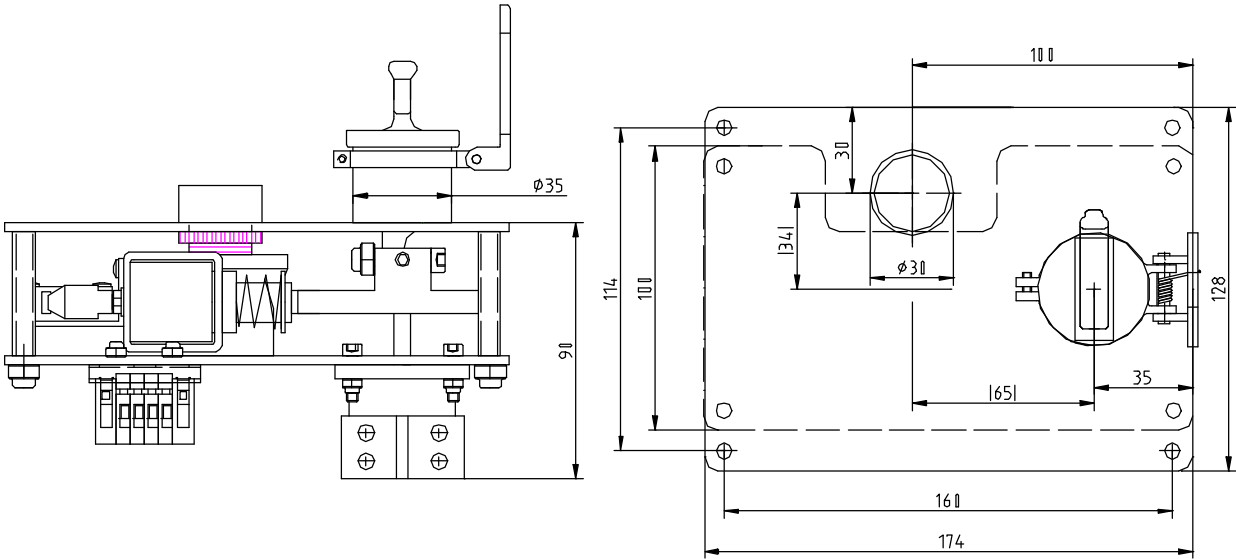


HST-MU-3
Panel, three locks

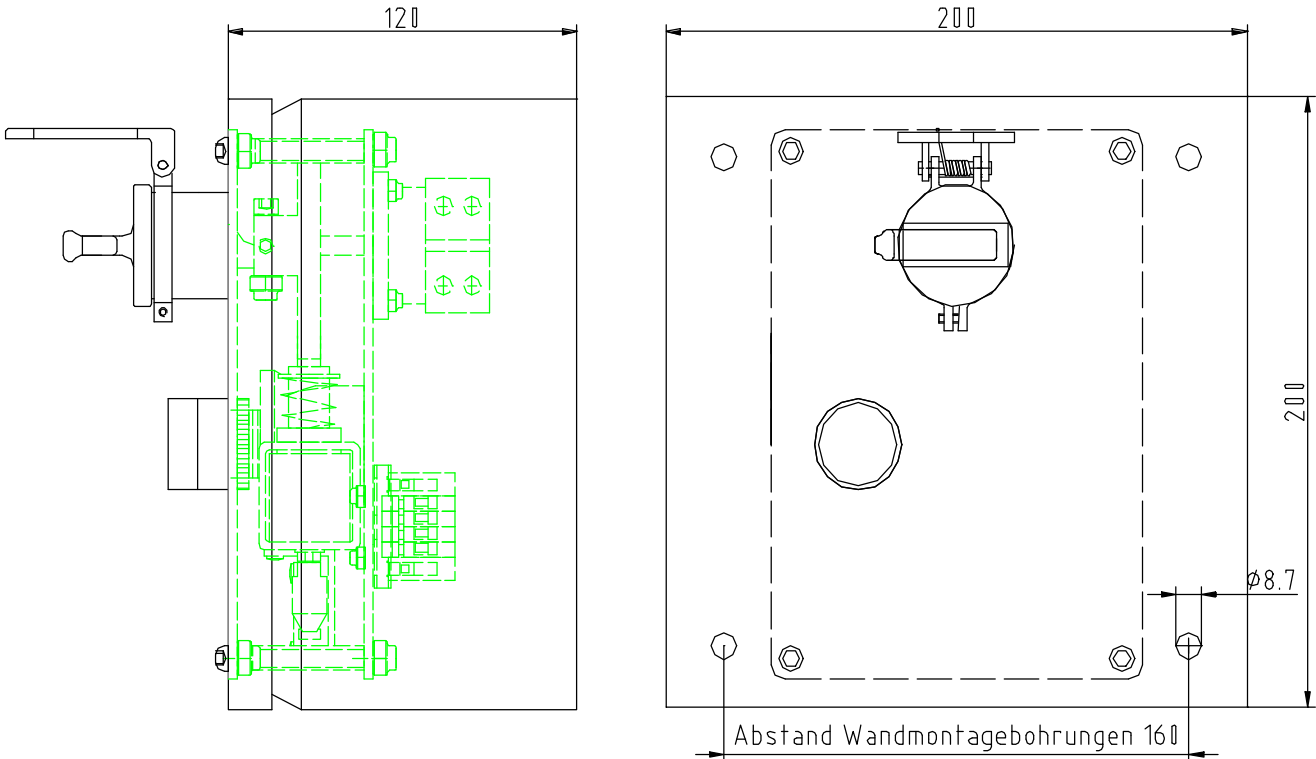
ROTARY SWITCH with solenoid HST-M

Dimensions:

HST-MU-1



HST-MA-1



Dimensions of other versions available on request

ROTARY SWITCH with Time Delay HST-TD

The HST-T is a heavy duty trapped key interlock switch controlled by a fail-safe timer and solenoid, The unit is designed to control access to hazardous machines with run down times and can be used in high risk category 4 applications. The unit incorporates: a dual channel safety timer, heavy duty continuously rated soleniod, solenoid position monitoring, 20 amp isolation switch, front panel lamp indication of machine running and up 4 coded locks for multiple access applications plus an isolation switch with a lock out feature.

Features / Technical data:

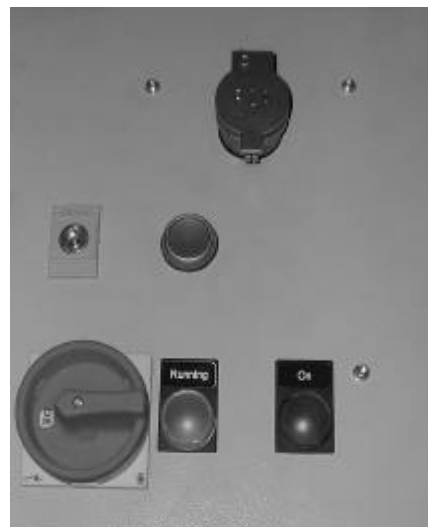
Standard reference:	DIN EN 60947-1, DIN EN 1088
Ambient temperature:	0 - 55°C
Mech. service life:	1 million actuations
Switch approval:	UL, CSA, equivalent to requirements of VDE 0660 Part 107
Material for lock / actuator:	Stainless steel
Degree of protection:	housing version:..IP 54
Degree of protection:	panel version: IP 2X

Switch data:

Rated continuous current (Iu/Ith):	20A
Rated operating current (AC-15):	5A (240V)
Rated insulation voltage (Ui):	690 V
(which can vary in different proportions)	
Rated impulse withstand voltage resistance level (Uimp):	6kV
Short-circuit resistance (Si.):	max. 25 A (gl)
Connection cable cross section:	switch: 2 x 0.5 - 2 x 2.5 mm ² Terminal block: 0.2 – 2.5 mm ²

Solenoid data:

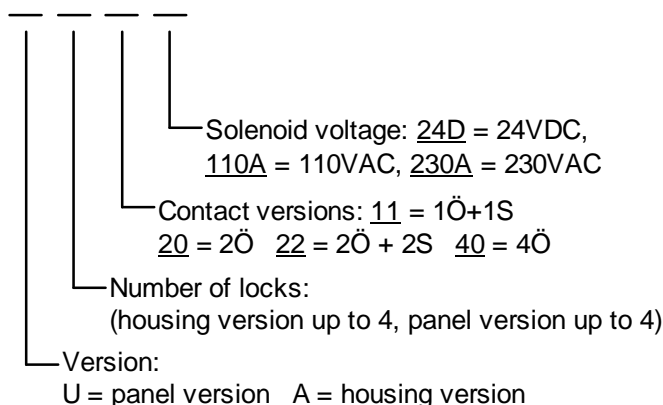
Operating voltage:	DC: 24V / 110V AC: 110V / 230V
Coil value:	attraction: 35 W, retention: 8 W
ON duration:	100 %



HST-TD-1
Surface mounted, one lock

Ordering code

HST-T - -



ROTARY SWITCH with BEMF HST-BEMF

The HST-B is a heavy duty trapped key interlock switch designed to control machinery with a run down time. The BEMF unit measures the electromotive force generated by the windings of an electric motor. Only when the motor has stopped will EMF drop to zero and allow the releases of the coded trapped key. The unit is suitable for connection to a.c. and d.c. Motors including braking systems. The unit incorporates: a motor current sensing safety unit, a safety relay, heavy duty continuously rated solenoid, solenoid position monitoring, 20 amp isolation switch, front panel lamp indication of machine running/stopped and up to 4 coded locks for multiple access applications plus an isolation switch with a lock out feature.

Features / Technical data:

Standard reference:	DIN EN 60947-1, DIN EN 1088
Ambient temperature:	0 - 55°C
Mech. service life:	1 million actuations
Switch approval:	UL, CSA, equivalent to requirements of VDE 0660 Part 107
Material for lock / actuator:	Stainless steel
Degree of protection:	housing version:..IP 54
Degree of protection:	panel version: IP 2X

Switch data:

Rated continuous current (Iu/Ith):	20A
Rated operating current (AC-15):	5A (240V)
Rated insulation voltage (Ui):	690 V
(which can vary in different proportions)	
Rated impulse withstand voltage resistance level (Uimp):	6kV
Short-circuit resistance (Si.):	max. 25 A (gl)
Connection cable cross section:	switch: 2 x 0.5 - 2 x 2.5 mm ²
	Terminal block: 0.2 – 2.5 mm ²

Solenoid data:

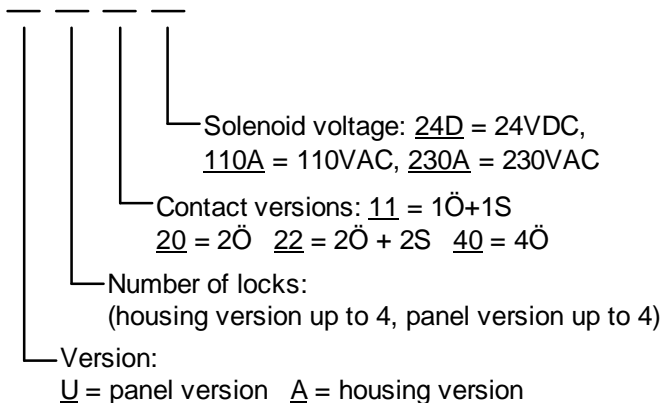
Operating voltage:	DC: 24V / 110V AC: 110V / 230V
Coil value:	attraction: 35 W, retention: 8 W
ON duration:	100 %



HST-BEMF-1
Surface mounted, one lock

Ordering code

HST-B - -



BOLT INTERLOCK HST-B

The usual application of a bolt interlock is to lock electrical switchgear (circuit breakers, disconnectors and earthing devices). The bolt is extended into a corresponding recess in the handle or control element of the switching device and blocks it.

It should be noted that this unit is not intended for use without further measures for locking safety doors. Care has to be taken to ensure that the bolt cannot be extended and the key cannot be removed when the safety door is open.

Standard unit operation is as follows: insert and turn the key - the bolt is extended - the key is trapped, or the bolt is retracted - the key is trapped. The bolt travel is 18mm from the bolt home position (0, 6, 26 mm).

Several bolt interlocks can also be arranged in series for certain applications
 Mounting: M8 tapped blind holes (from behind). Versions with through-holes instead of blind holes are also available.



HST-B1-R

Features / Technical data:

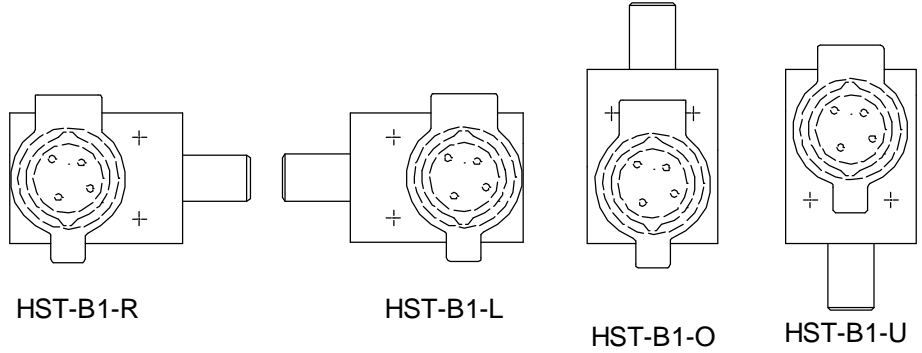
- Positive bolt movement, practically maintenance-free
- 4 installation versions available
- Optionally available with limit switch
- Standard reference: DIN EN 12100; DIN EN 1088;
- Ambient temperature: -25°C ... +80 °C (as a result of dust cap seal, higher temperatures on request)
- Material: stainless steel
- Mounting: 2 x M8
- Mech. service life: 1 million actuations

Limit switch technical data:

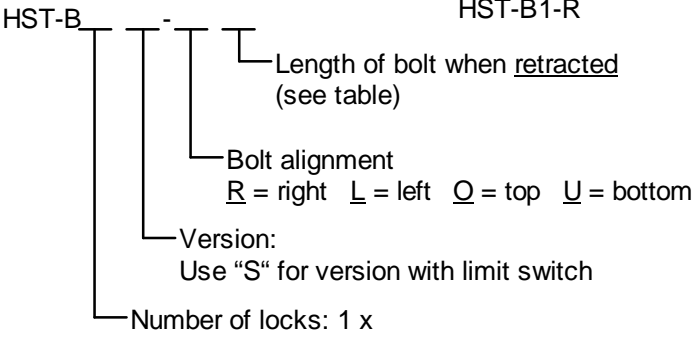
- Contacts: snap action 1Ö+1S
- N/C contact: positive break
- Ambient temperature: -25°C ... +80 °C
- Conforms to norms: IEC 947-5-1, UL 508, CSA 22-2 no.14



HST-B1S-R with limit switch



Ordering code

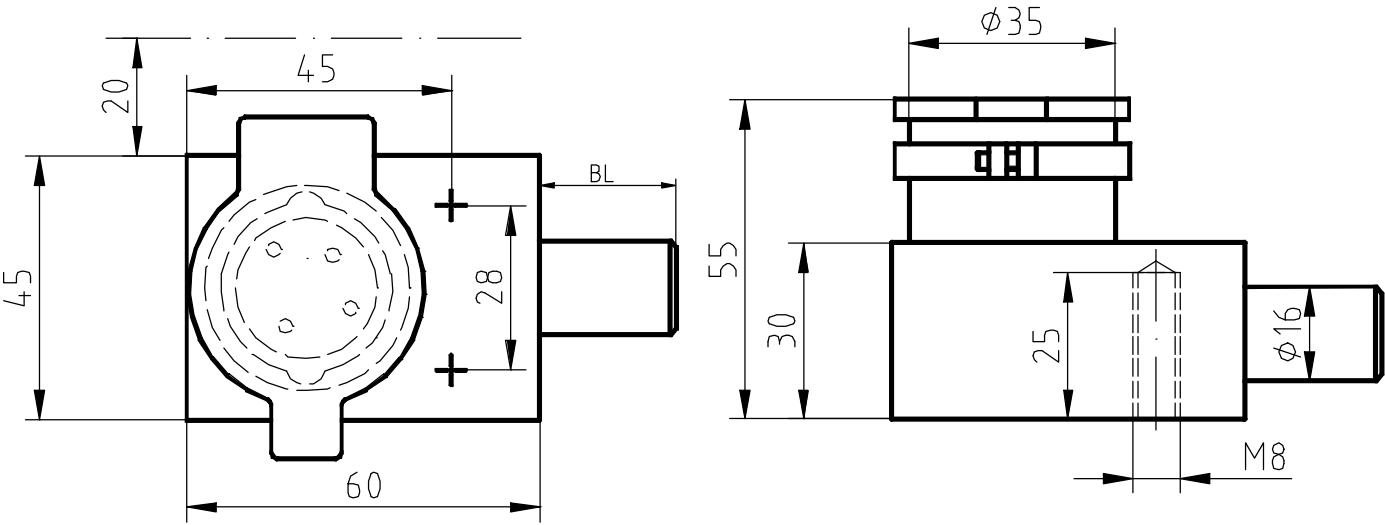


retracted	0mm	6mm	26mm
extended	18mm	24mm	44mm

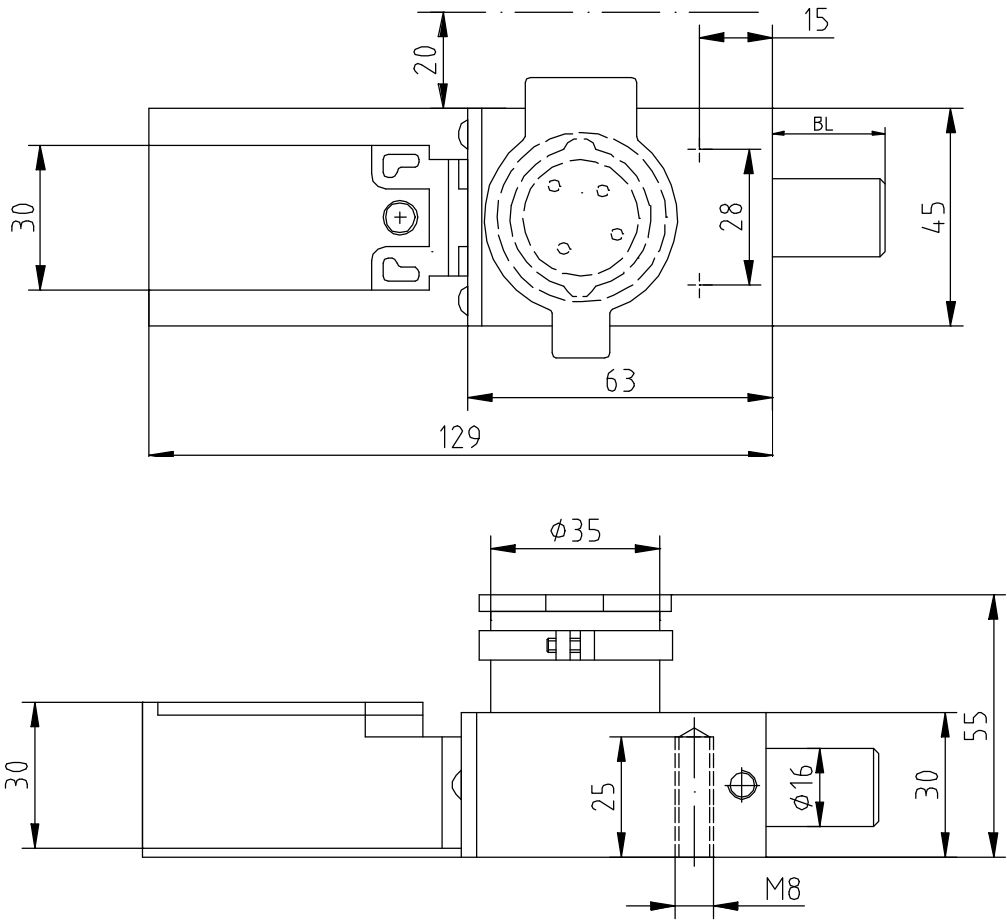
BOLT INTERLOCK HST-B

Dimensions:

HST-B1-R



HST-B1S-R



DOOR INTERLOCK HST-TS

This door interlock comprises a lock element and locking bolt element and can be used on sliding and hinged doors. The unit is made of stainless steel, making it suitable for use in rough environments where it is subject to high stress.

The flexible locking bolt design means the door interlock can also be used without any problems on misaligned and sagging doors. Versions with the locking bolt positioned on the left (L), right (R), top (O) and bottom (U) are available (a total of 4 mounting positions).

The key is inserted and turned to open the safety door. The locking bolt can then be turned through 90° and withdrawn. The key is trapped. Locking the safety door is realised in reverse fashion, with the locking bolt being inserted and rotated. The key is then free and can be removed.

Mounting: M8 tapped blind holes (from behind), M6 locking bolt.

A version with an additional personal safety key (HST-TS2) can also be supplied for applications involving a full body access area. The operator takes the key with him into the hazardous area. The door therefore cannot be locked as long as a person is still in the hazardous area.

Features / Technical data:

- Sturdy design for use in rough conditions
- Practically maintenance-free
- 4 installation versions available
- Standard reference: DIN EN 12100; DIN EN 1088;
- Ambient temperature: -25°C ... +80 °C (as a result of dust cap seal, higher temperatures on request)
- Material: stainless steel
- Mounting: 2 x M8 und 2 x M6
- Locking force: 5000N (axial)
- Mech. service life: 1 million actuations



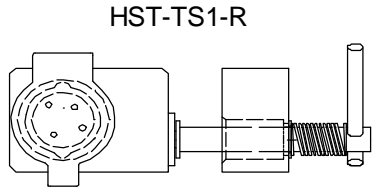
HST-TS1-R



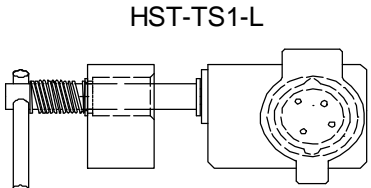
HST-TS1K-R



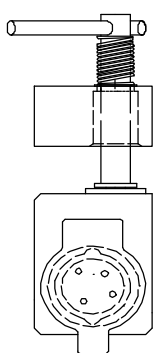
HST-TS2-R



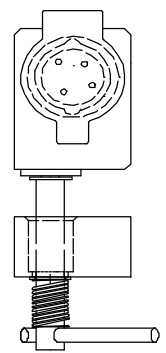
HST-TS1-R



HST-TS1-L

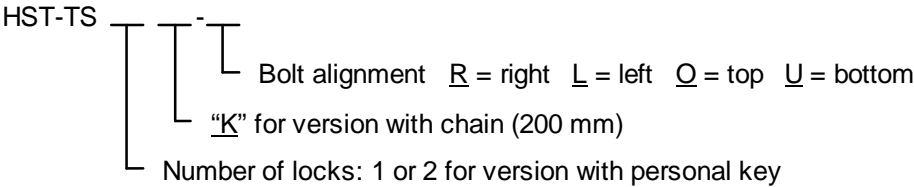


HST-TS1-O



HST-TS1-U

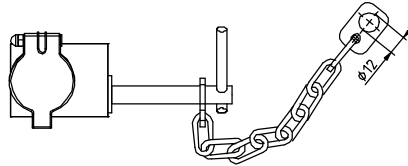
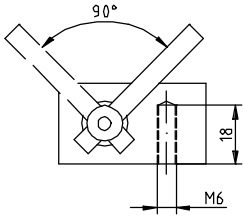
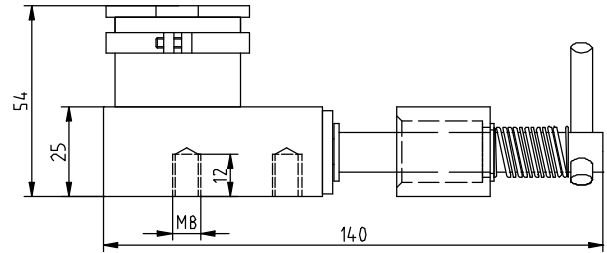
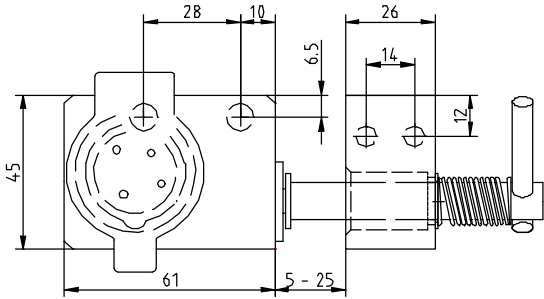
Ordering code



DOOR INTERLOCK HST-TS

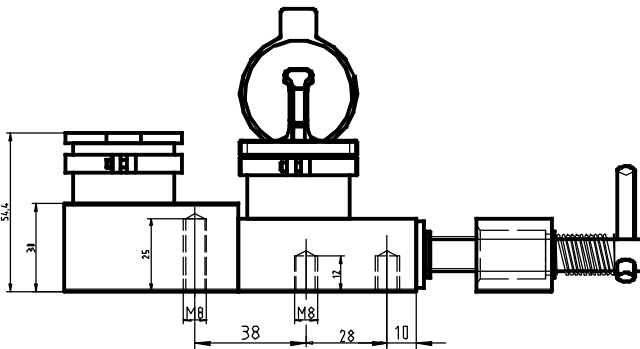
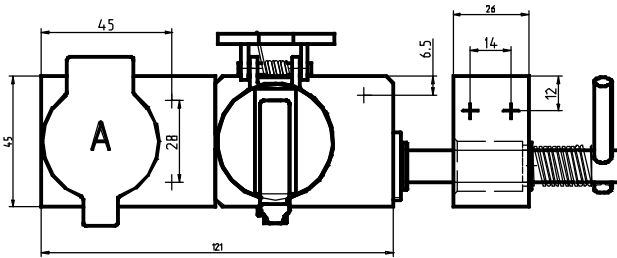
Dimensions:

HST-TS1-R



HST-TS1K-R

HST-TS2-R



DOOR INTERLOCK HST-TZ

This door interlock comprises a lock element and locking bolt element and is distinguished by a flexible slam-type mechanism, enabling its use without any problems on misaligned and sagging doors. The unit is made completely of non-corrosive steel and can therefore also be used in rough conditions. Versions with the locking bolt positioned on the left (L), right (R), top (O) and bottom (U) and bolt entry at the front (V) or rear (H) are available (a total of 8 mounting positions).

The key is inserted and turned to open the safety door. The locking bolt is then pushed out of the lock body. Locking the door is realised in reverse fashion, with the locking bolt being inserted by pushing the safety door closed and turning the key. The key is then free and can be removed. Mounting: M8 tapped blind holes (from behind), M6 locking bolt.

A version with an additional personal safety key (HST-TZ2) can also be supplied for applications involving a full body access area. The operator takes the key with him into the hazardous area. The door therefore cannot be locked as long as a person is still in the hazardous area.

Features / Technical data:

Sturdy design for use in rough conditions, practically maintenance-free
8 installation versions available

Standard reference: DIN EN 12100; DIN EN 1088;
Ambient temperature: -25°C ... +80 °C (as a result of dust cap seal, higher temperatures on request)

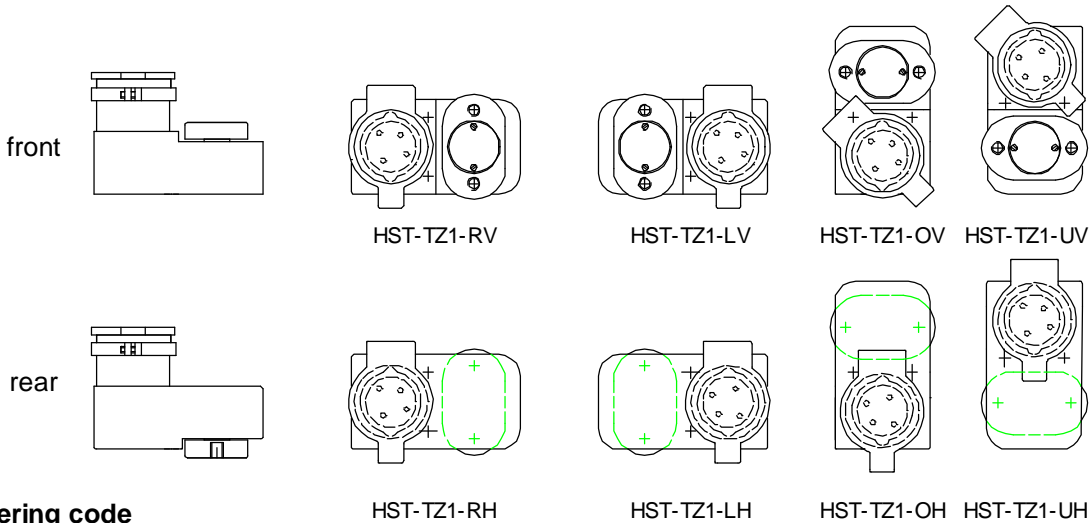
Material: stainless steel
Locking force: 5000 N
Mounting: 2 x M8 und 2 x M6 (internal thread at rear)
Mech. service life: 1 million actuations



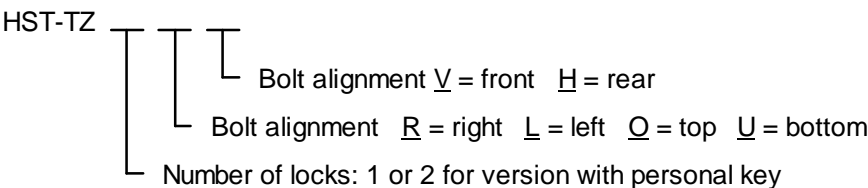
HST-TZ1-RV



HST-TZ2-RV



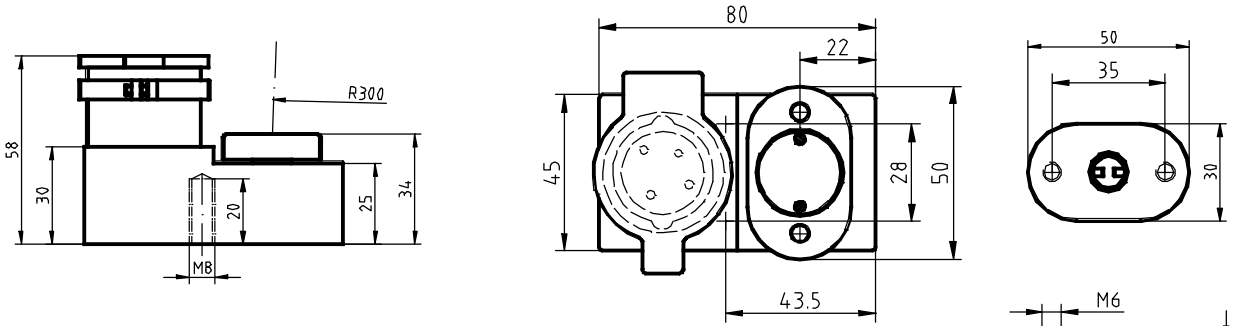
Ordering code



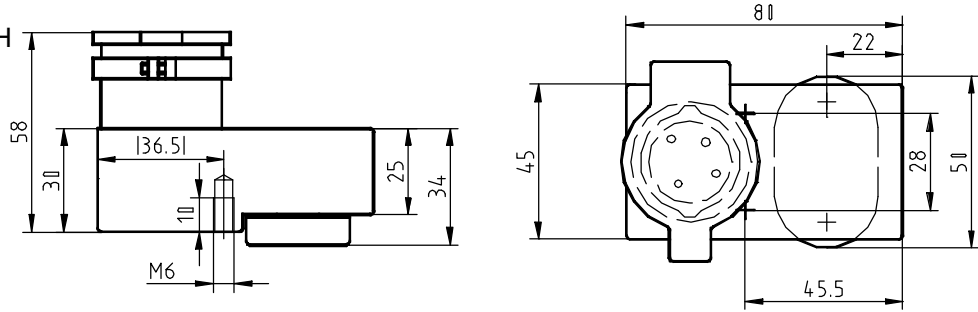
DOOR INTERLOCK HST-TZ

Dimensions:

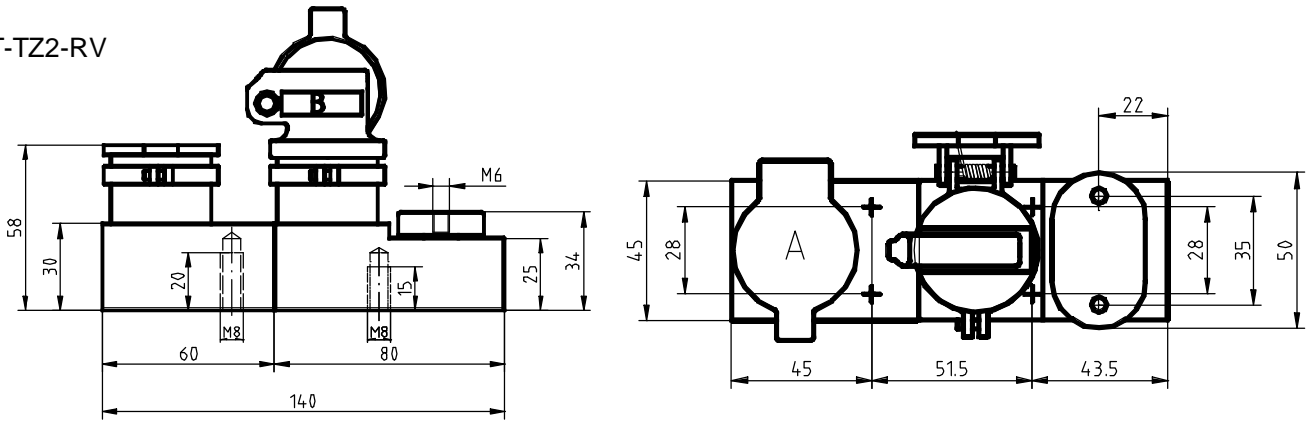
HST-TZ1-RV



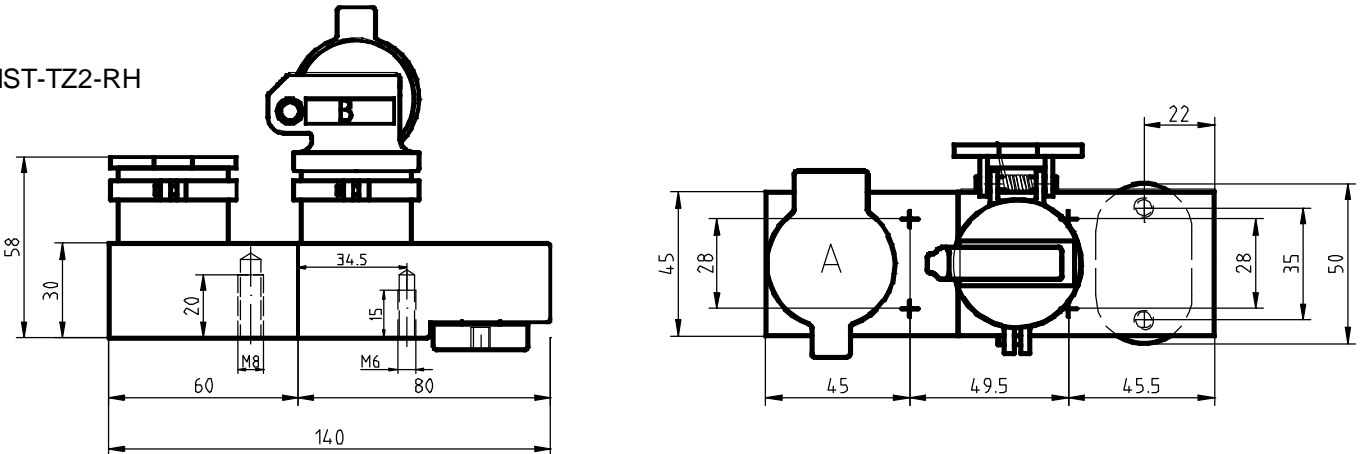
HST-TZ1-RH



HST-TZ2-RV



HST-TZ2-RH



KEY EXCHANGE UNIT HST-X

Key exchange units are normally used to multiply the number of keys or for linking certain sequences of a safety system. One or more primary keys are inserted in order to free a desired number of secondary keys.

A key exchange unit is usually used as an interface (e.g. between a switch and the safety doors).

The advantage of this system is the modular design. This means that additional lock elements can be added later (e.g. when another safety door needs to be secured).

A key exchange unit consists of bolt interlocks and comprises x primary modules and y secondary modules. The number of units is limited to 4 modules. For applications in which several keys have to be exchanged the exchange unit HST-W is on offer.

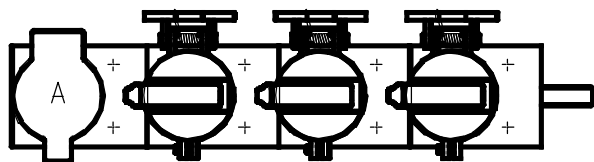
Mounting: M8 tapped blind holes (from behind). Versions with through-holes instead of blind holes are also available.

Features / Technical data:

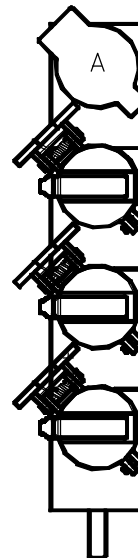
- Sturdy design for use in rough conditions
- Practically maintenance-free
- Keys are actuated successively
- 2 installation versions available (horizontal and vertical)
- Standard reference: DIN EN 12100; DIN EN 1088;
- Ambient temperature: -25°C ... +80 °C (as a result of dust cap seal, higher temperatures on request)
- Material: stainless steel
- Mounting: 2 x M8
- Mech. service life: 1 million actuations



1 x HST-X-E-H
3 x HST-X-A-H



1 x HST-X-E-H
3 x HST-X-A-H



1 x HST-X-E-V
3 x HST-X-A-V

Ordering code

(NOTE: always specify the number of primary and secondary locks in the case of exchange units - see example, max. 4 modules total)

HST-X - - -

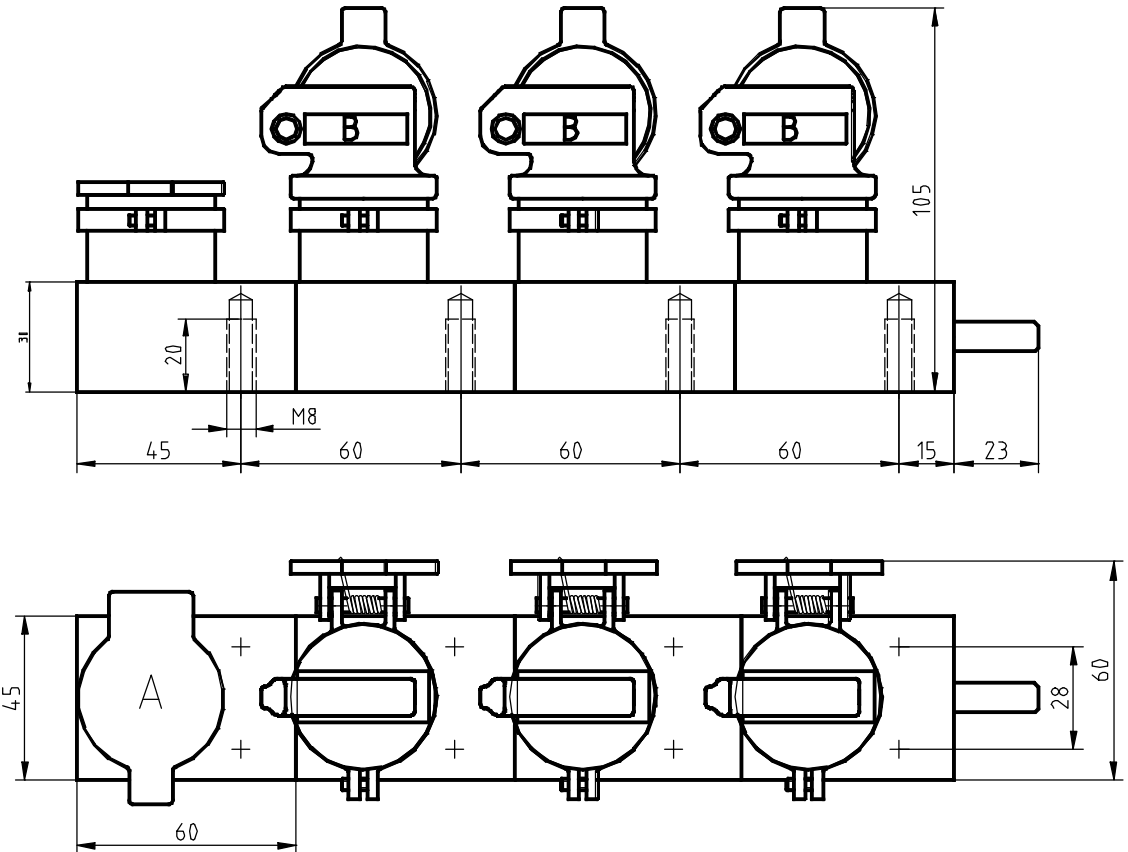
Desired mounting position H = horizontal V = vertical

Primary or secondary lock E = primary A = secondary

KEY EXCHANGE UNIT HST-X

Dimensions:

- 1 x HST-X-E-H
- 3 x HST-X-A-H



The common usage of this locking system is to secure electrical switchgears/control units. The switchgear is operated via the square shaft (? 9.5 mm). The key can only be removed from the lock in a secure position.

This module can also be employed to operate locking levers or other equivalent connection modules.

The module is built out of stainless steel, making it suitable for heavy usage in rough environments.

The assembly is carried out via the already fitted mounting plate with M6 security screws and self-locking nuts.

The module is available for both left or right-hand alignment.



HST-LS

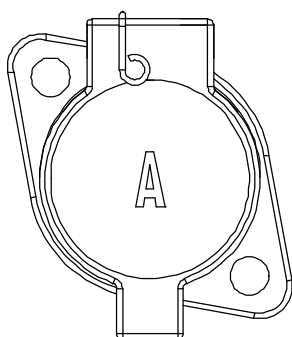
Features / Technical data:

Sturdy construction for usage in rough environments,
practically maintenance-free
2 mounting variations available

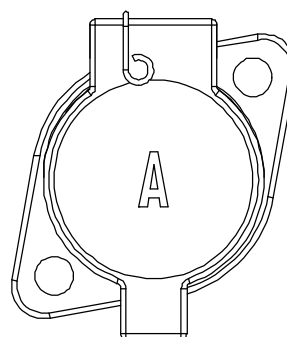
Ambient temperature:	-25°C ... +80 °C (depending on dust cap insulation, higher temperatures on request)
Material:	stainless steel
Mounting:	2 x M6
Mech. service life:	1 million actuations



HST-LS



HST-LS-L

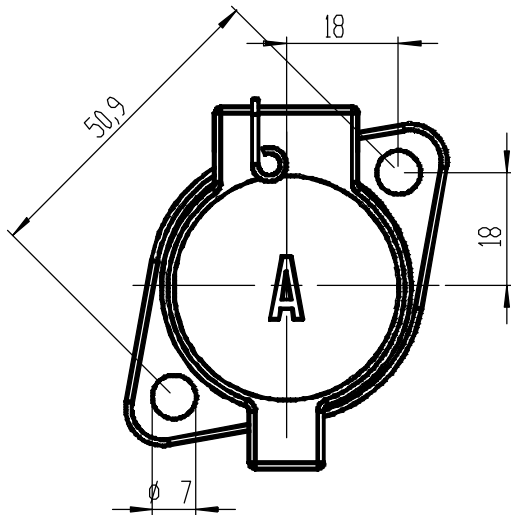
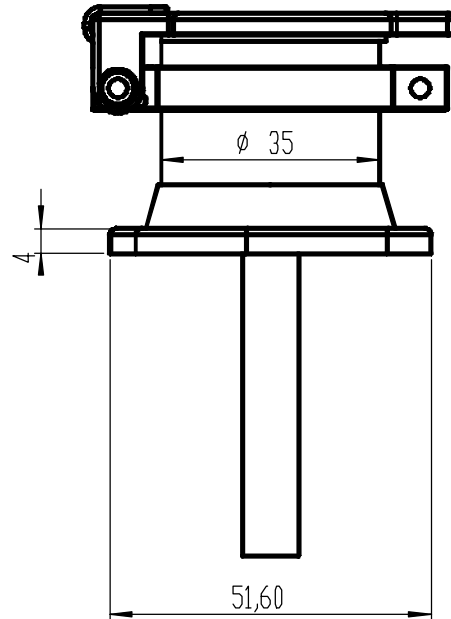
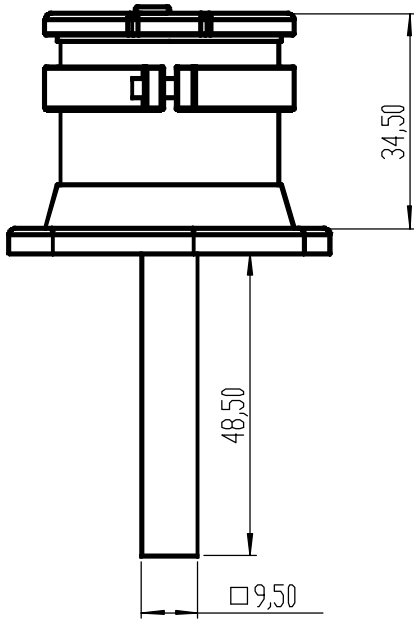


HST-LS-R

Ordering key

HST-LS-
└─ Alignment of mounting plate:
 L = left R = right

Measurements:



The module **HST-XC** can be employed as endpiece for the exchange unit. While using HST-XC the bolt of the last module of the exchange unit is covered up.

The module is built out of stainless steel and is suitable for heavy usage in rough environments.

The assembly is equivalent to HST-X with 2 x M8 inner threads.

Features / Technical data:

Sturdy construction for use in rough environments,
practically maintenance-free

Ambient temperature: -25°C ... +80 °C (higher if HST-X is built accordingly)

Material: stainless steel

Mounting: 2 x M8

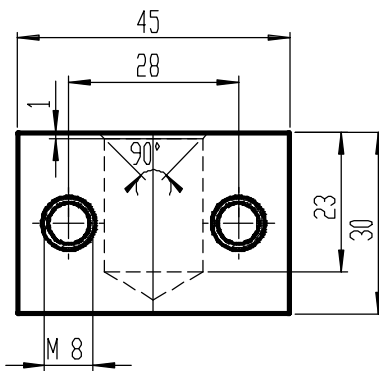


HST-XC

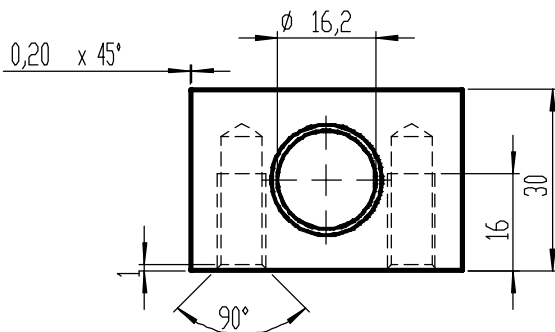
Ordering code

HST-XC

Measurements:

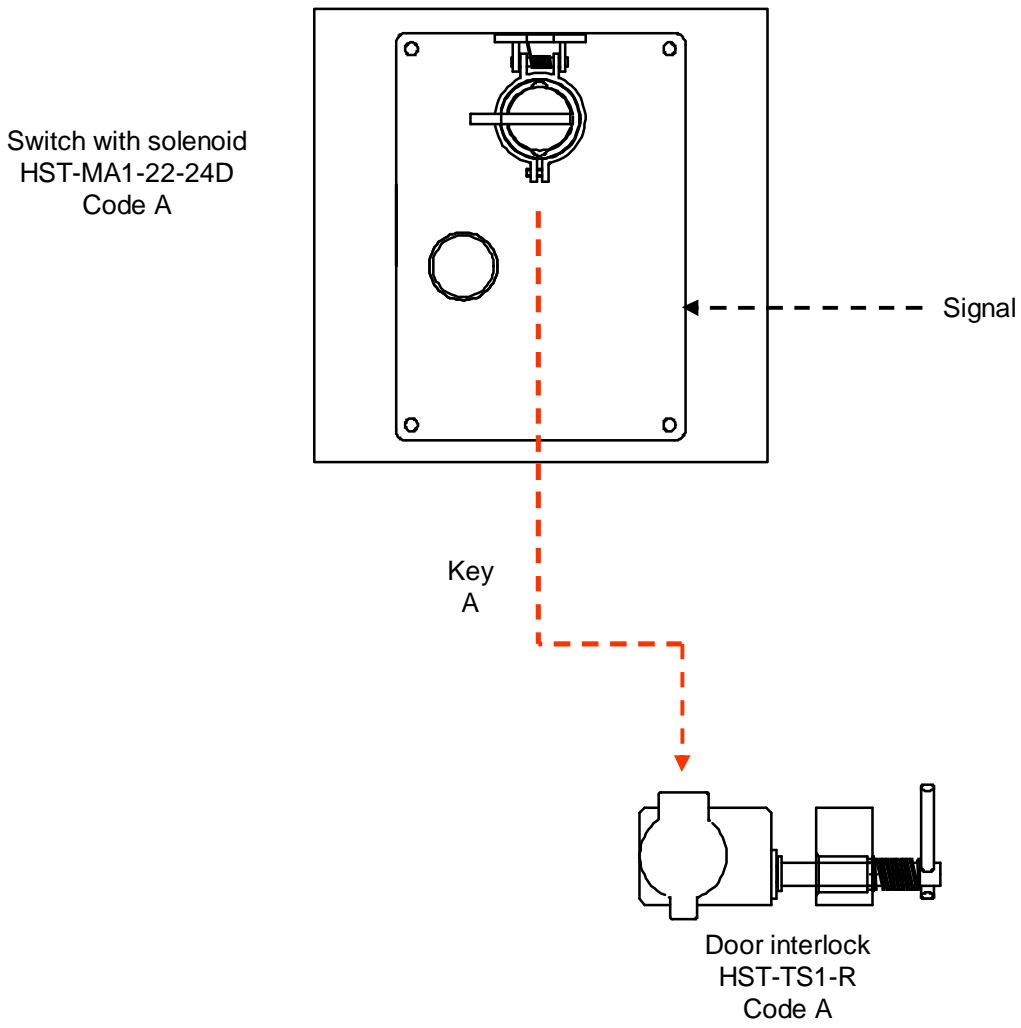


HST-XC



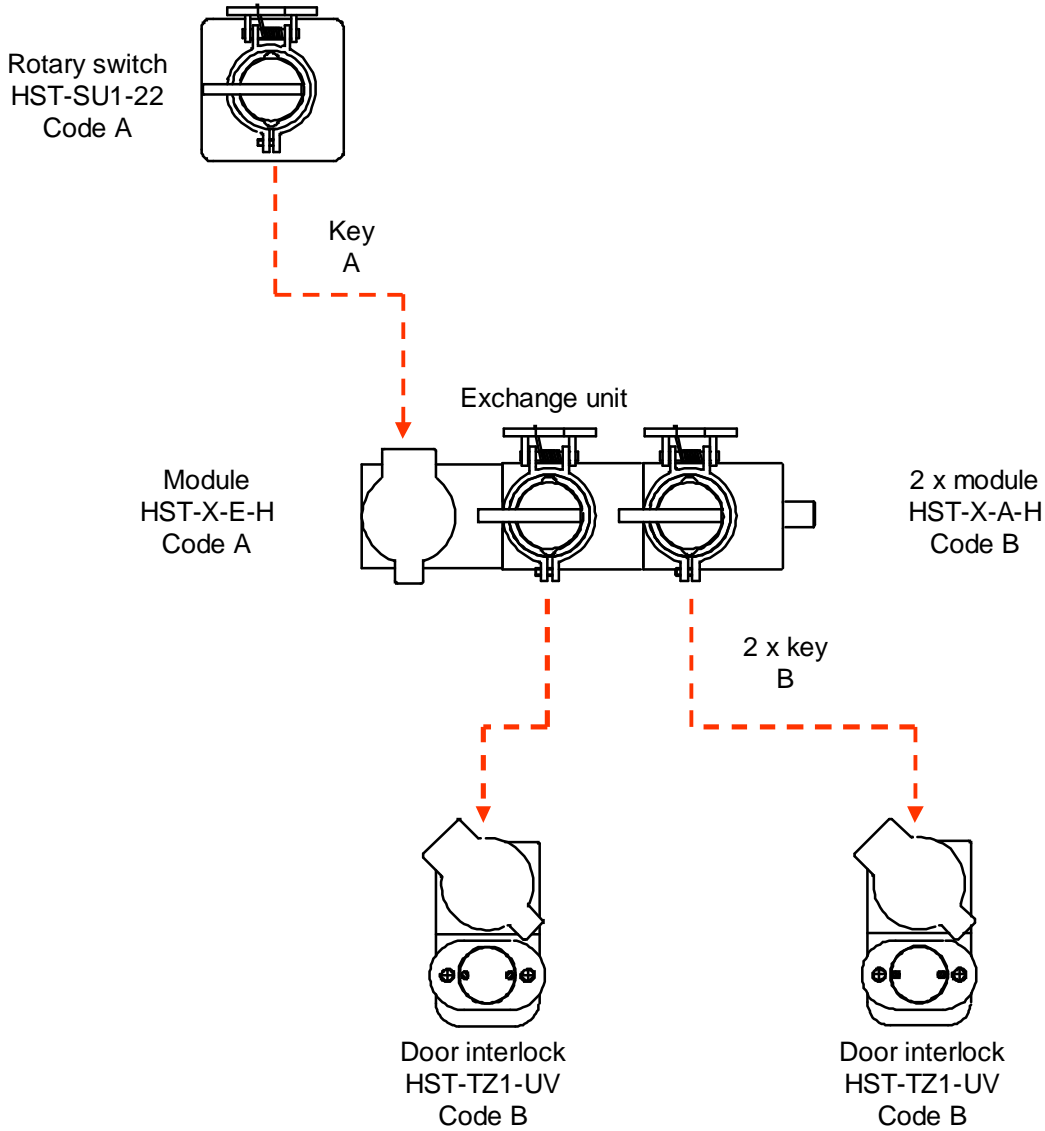
EXAMPLES

This example shows the shutting down of a machine with running-down time and a single safety door (part-body access). The rotary switch with solenoid HST-M... is used for this purpose. The machine control system generates a signal which is applied to the rotary switch solenoid after the machine has shut down and is stationary. Key A can now be turned, removed and used for opening the door interlock HST-TS... .



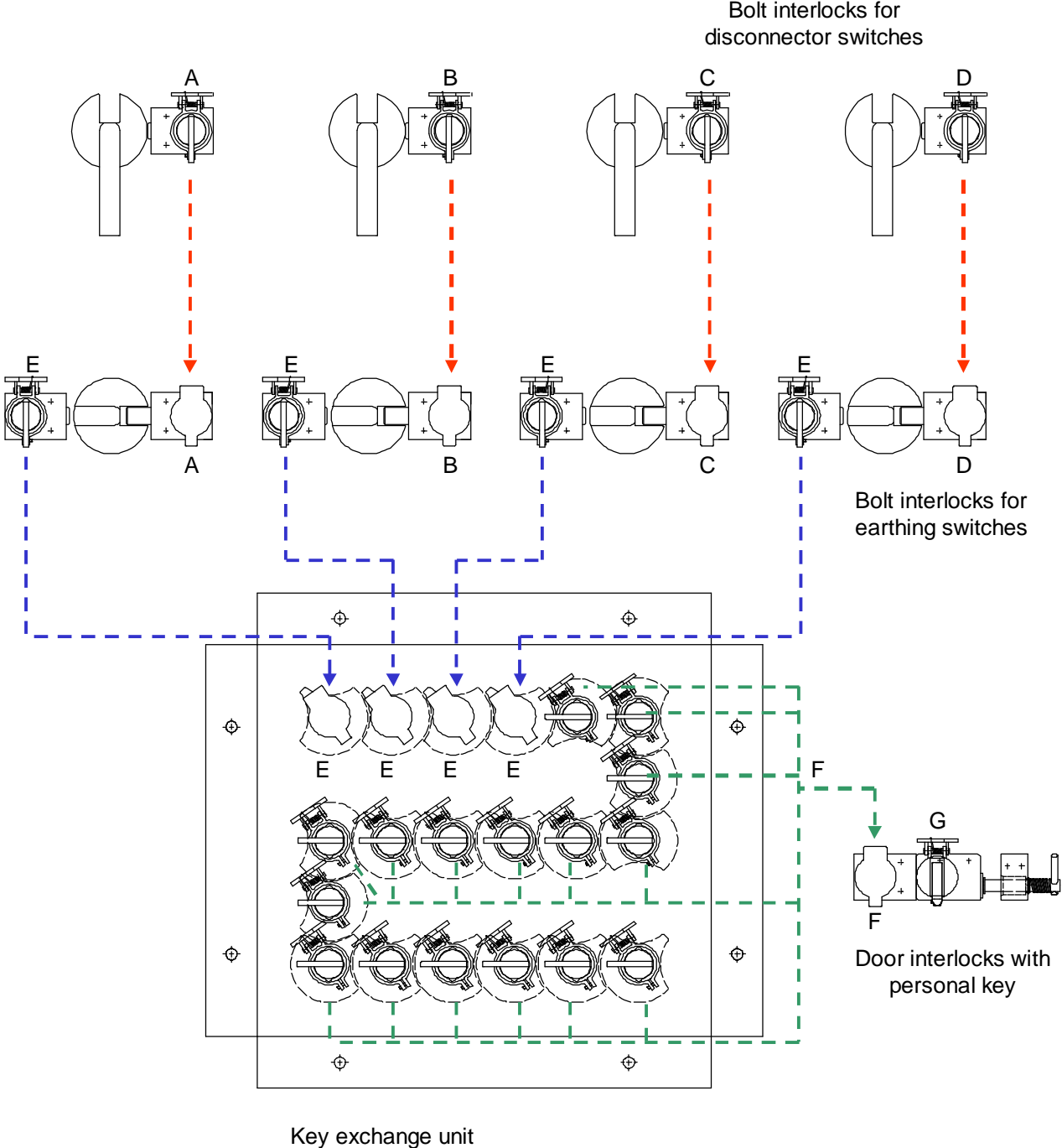
EXAMPLES

This example shows the shutting down of a machine without running-down time and two safety doors (part-body access). The rotary switch HST-SU... is used for this purpose. After switching-off, key A can be removed from the rotary switch and be used for releasing the two B keys in the key exchange unit HST-X.... The two door interlocks HST-TZ... of the safety doors can be opened with the B keys.



EXAMPLES

This example shows the more complex shutdown of a precipitator (high voltage) in a power station with disconnector switches and earthing switches and a multitude of access openings (manholes). Firstly, 4 disconnector switches should be switched off and interlocked with the aid of bolt interlocks. 4 earthing switches are then activated and interlocked via an exchange unit using these keys. The door interlocks on the manholes (full-body access) can then be opened using the freed keys and a key exchange unit.



Firm: _____ Name/Dept.: _____ Fax: _____

1. Number of doors to be interlocked: _____

2. If more than one door has to be interlocked, should it be possible to open ALL doors simultaneously?

- NO _____ No exchange unit necessary
- YES _____ Exchange unit necessary

3. Is full-body accessing of the safety door possible (hazardous area can be viewed)?

- NO _____ Single interlock version
- YES _____ Interlock with personal key necessary

4. Interlock version (depends on safety door configuration):

- Right Left e.g. standard interlock or with chain, slam-type interlock
- Top Bottom e.g. slam-type interlock

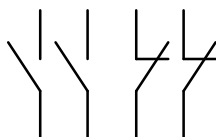
5. What engraving (max. 5 digits) is required on the key, in the lock and on the dust cap? _____

6. Has the machine a running-down time, or is access to the safety doors enabled by the machine control?

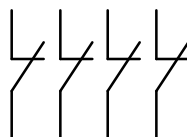
- NO _____ Single key switch
- Mounted version in housing Integrated version for panel
- YES _____ Switch with solenoid 24V DC
- Mounted version in housing Integrated version for panel 110V AC
- 230V AC

7. Desired contact configuration of built-in switch (for version with or without solenoid)

2 N.O. / 2 N.C. contacts



4 N.C. contacts



(N.C means: the contact opens when the machine has been switched off and the key removed.)