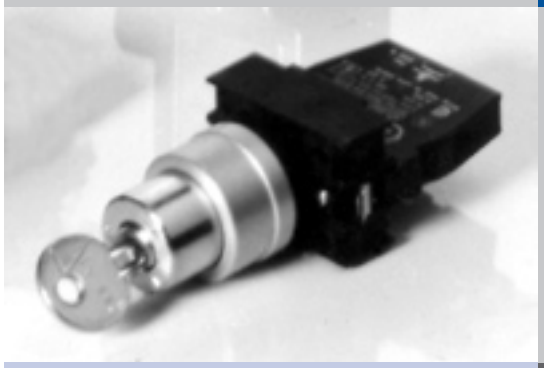
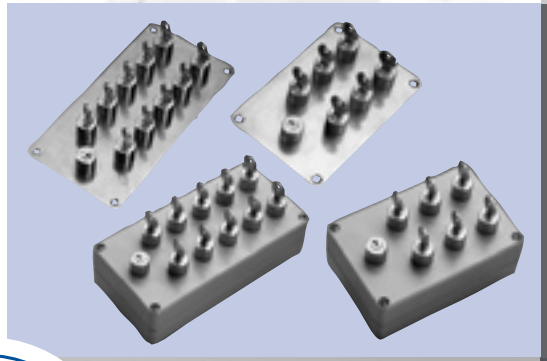
Elan Schaltelemente GmbH & Co. KG

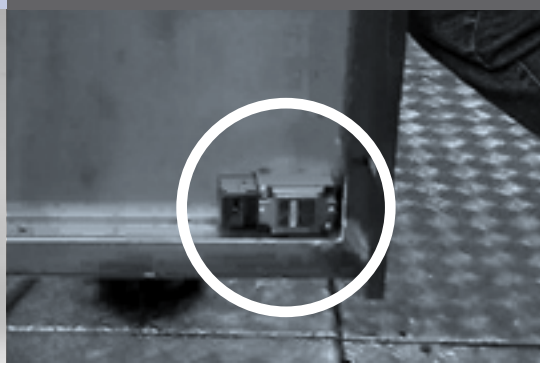
SCHMERSAL

SHGV safety door inter-locking system

Catalogue SHGV







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In the interests of a sustainable use of our world's resources, this catalogue has been printed on 100% recycled paper on the basis of the latest environmental technology.

SHGV Safety door interlocking system

Contents

Or as the ancient Greeks already knew:

The Gods do not reveal everything
to mortals from the very beginning.
But during the course of time
our search will show us what is better.

Xenophanes
(Greek philosopher, 580/577 B.C.)

Protecting safety doors without wiring:

Cost savings

The SHGV safety door interlocking system enables cost economies to be made in the protection of moving guards without affecting the safety level.

Costs economies are achieved by eliminating the wiring between moving guard and switch cabinet.

The function of electrical interlocking is achieved by means of an intelligent key transfer between a locking device with key fitted to the guard and a key-operated selector switch as control element.

Example of a safety door interlocking system of the type series SHGV in a textiles production system.

In view of the fact that the SHGV safety door interlocking system has a locking function too electromagnets to keep the safety doors locked are not needed if overtravel motions are expected, and, depending on the application, there will be no need for zero motion monitors or safe timer modules.

System classification

In the language of standardisation, systems which fall within the scope of the SHGV safety door interlocking system are also referred to as key transfer systems or “trapped key systems”.

Whilst not particularly prevalent in continental Europe, but enjoying widespread popularity in the United Kingdom and USA, key transfer systems are not a locally tolerated feature. In European machine legislation they are a recognised and fully accepted protective device in terms of the protective objectives aspired to with the use of interlocking devices*. Furthermore, the SHGV type series has been BG prototype tested by the Berufsgenossen-schaftliche Institut für Arbeitssicherheit BIA, St. Augustin (No. 953038 dated 28. 8. 2000).

* Refer here to EN 1088 – Interlocking devices with and without guard locking – General principles and provisions for design – Informative annex E: Interlocking devices with key transfer system

Application

The SGHV type series is particularly suitable in more complex production systems and plants to protect divided maintenance and service doors which are used only rarely.

Other applications include situations in which an electrical shock is possible, applications with higher ambient temperatures, specific uses in tough ambient conditions and in chemical and process engineering in view of the explosion protection feature*. By contrast, because of the key transfer, the system is less suitable for charging doors or moving guards with more frequent access.

* The suitability of the system for explosion-protected applications must be checked by the customer in each individual case.

Function

The fundamental functional characteristic of a key transfer system is that, depending on the operating state of the machine control system, the key is trapped and cannot be withdrawn either

– in automatic mode (with the guard locked) in a control element (usually in a key-operated selector switch)

or

– in the guard locking device, namely in a lock, if the guard is open (in an electrically de-energised state).

In other words, a principle feature of the system is that the removable key is trapped either in the guard locking device or in the switch lock.

The locking device of the guard is designed in such a way that the key transfer can only be enabled if the guard is closed and locked (fail-safe). Only in this way can the key be transferred from here to the key-operated selector switch.

When the machine control system is switched on the key is trapped and cannot be removed for as long as the switch is set to ON.

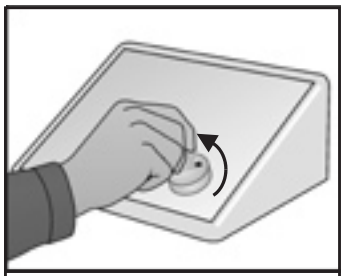
If the transfer time between the opening of the key-operated selector switch and the locking of the guard is not sufficient for a hazardous machine motion to come to a standstill, a key-operated selector switch interlocking device may also be required.

SHGV safety door interlocking system

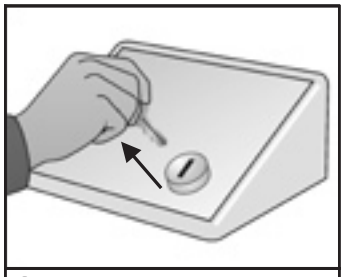
Functional sequence

The automatic mode of the machine control system is enabled when the NC contact(s) of a 2-position selector switch is/are closed. This corresponds to the position of the key-operated selector switch in which the key is trapped.

1. For interruption/shutdown of automatic mode, the key in the key-operated selector switch is turned from the trapped position to the removable position. The NC contact(s) are positively opened and the automatic mode of the machine control system is automatically disconnected.



Deactivating automatic mode

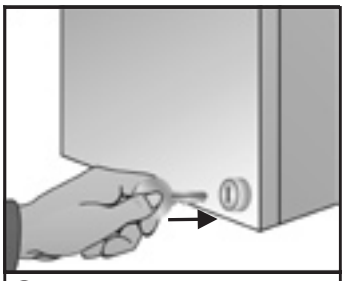


Key can be withdrawn
Key trapped

2. This enables the key to be transferred from the key-operated selector switch to the guard.

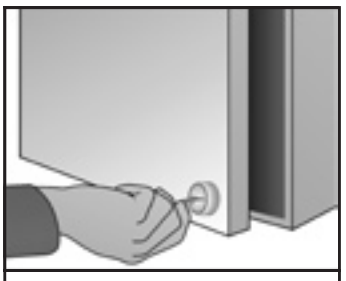
Key transfer

3. The locking device on the guard is unlocked by turning the lock barrel to trapped position.



Key can be withdrawn
Key trapped

4. The guard can be opened.



Guard open
Key trapped

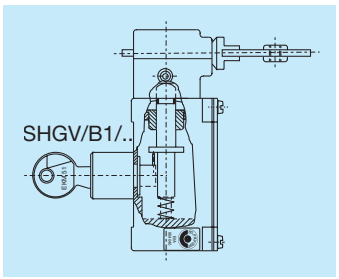
5. A mechanical fail-safe device prevents the key being switched back when the guard is open.
6. If the guard is closed again it is locked once again by turning the key back from trapped position to the position in which it can be withdrawn.
7. The key which is now back in the key-operated selector switch is used to reactivate the machine control system, i.e. by turning it back from the removable position to the trapped position.

Versions supplied

Scope of delivery

The standard SHGV system consists of the following assemblies:

- **Guard locking device (type SHGV, see page 8),** the design of which is based on that of a position switch with separate actuator, but the function of the position monitoring and locking is based exclusively on a mechanical principle of operation using the integrated lock barrel and the positively connected mechanism as well as the interaction between actuator and the articulating mechanism in the device head.



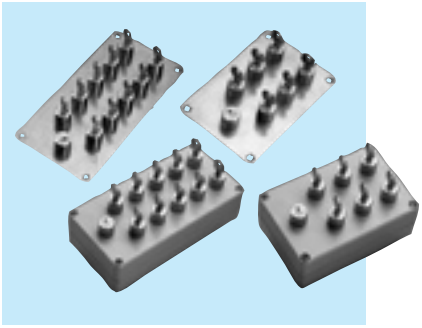
- **Version with two operating heads (see page 10),** using which divided gates, for example, can be protected.

- **Version with a second lock barrel (see page 12),** using which the operation of lock barrel 1 can be blocked if an operator needs to access a room and wishes to protect himself from unintentional start-up of the machine control system by a third party.

- **Key-operated selector switch (type SHGV/ESS, see page 13),** as control element if the access time to the guard is greater than the stopping time of a hazardous machine motion.

- **Key (with individual cut)** and a matching lock barrel in the guard locking device and in the key-operated selector switch, withdrawal of the key only being possible in the safety relevant position in each individual case.
- **Optionally: key-operated selector switch interlocking device with electromagnetic principle of operation (type SVE, see page 14)** and controllable key release (for 1 to 3 key-operated selector switches).

- **Optionally: key-operated selector switch interlocking device with mechanical principle of operation (type SVM, see page 18)** and controllable key release (for 6 or 10 keys).

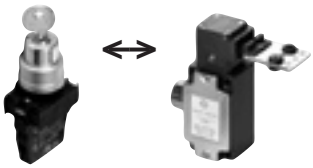


Applications

Applications for plants without overtravel motions

Use in applications without hazardous overtravel motions, i.e. for overtravel time < time for key transfer.

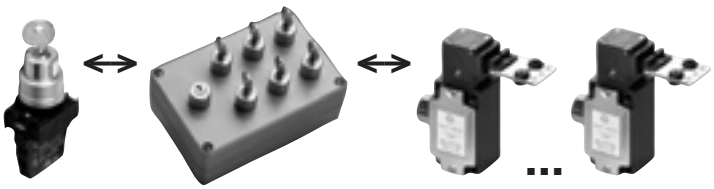
Here: one SHGV/ESS key-operated selector switch locks one moving guard.



Application for plants without overtravel motions

Use in applications without hazardous overtravel motions, i.e. for overtravel time < time for key transfer.

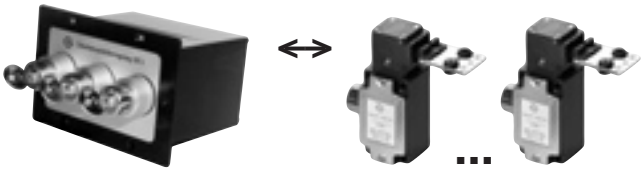
Here: one SHGV/ESS key-operated selector switch locks several moving guards by means of the SVM interlocking device.



Application for plants with overtravel motions

Use in applications with hazardous overtravel motions, i.e. overtravel time > time for key transfer.

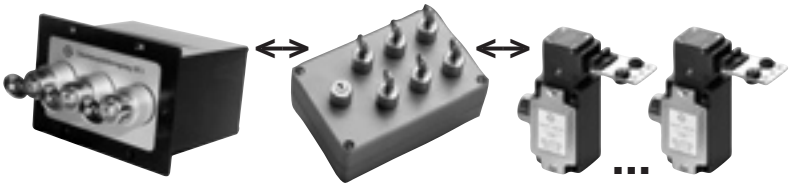
Here: one SVE key-operated selector switch interlocking device locks up to 3 moving guards.



Application for plants with overtravel motions

Use in applications with hazardous overtravel motions, i.e. overtravel time > time for key transfer.

Here: one SVE key-operated selector switch interlocking device locks several moving guards by means of SVM interlocking device.



User information

Reliable secondary protective circuit

The scope of supply does not contain a suitable follow-up protective circuit for the processing of signals from the key-operated selector switch (type SHGV/ESS) or from the key-operated selector switch interlocking device (type SVE), e.g. via a safety relay module of the make ELAN.-SRB.

The signals must be processed in the same way as an electrical interlocking device, i.e. depending on control category, the positively opening NC contact(s) must be open in the OFF position of a machine control system and vice-versa.

Framework conditions

When using the SHGV safety door interlocking system it must be ensured that

– the time between switching off at the control panel and access to the guard is greater than the stopping time of any hazardous motion, or that the key-operated selector switch interlocking device of the type SVE is used;

– only one key is used in the key transfer system and any spare keys available are stored carefully;

– the separate actuators of the SHGV guard locking devices are fitted to the guard in such a way, e.g. with the non-reusable screws supplied with the equipment, that they cannot be released by simple means;

– the entry throat for the separate actuator is fitted in the guard locking device in a concealed position where at all possible. This recommendation applies generally to interlocking devices with separate actuator.

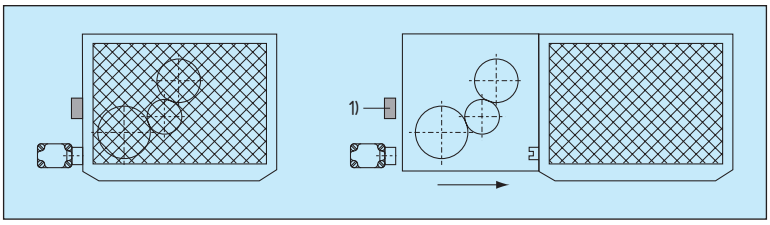
Please note:

- Owing to the key transfer system the systems are less suited to charging doors or moving guards with more frequent access.
- Even if key and lock barrel have 200 individual cuts/tumbler arrangements, a key can be copied in the same way as a separate actuator. Any damage caused as a result of such wilful manipulation of a guard no longer falls within the protection of statutory accident insurance (otherwise there would also be no BG test certificate for the SHGV system) for example.
- Every SHGV system comes with a spare key should the original one be lost under the strict condition that it is kept carefully and not used in the operational key transfer procedure.

Installation

The separate actuator is mounted on the moving guard and the SHGV locking device on the closing edge of the guard. When the guard is closed the separate actuator is inserted into the entry throat of the operating head.

The funnel shaped entry throat in the operating head automatically centres the actuator when the moving guard is closed. This function is supported by rubber buffers within integrated spacer sleeves in the mounting bores of the actuator. These design features thus permit tolerances between the guides of the moving guard and the entry throat of the operating head.



1) End stop

The separate actuators of the devices are always to be located in such a way that they do not run out in front of the closing edge and thus present an additional hazard to the operators.

SHGV devices may not be used as mechanical end stops.

Key-operated selector switches

Design

The key-operated selector switches available for the SHGV system have been taken from the traditional Elan range of control devices and signal lamps for equipment installation with 22.3 mm single hole mounting to DIN 50 007.

The devices consist of the assemblies

– operating head with mounting flange

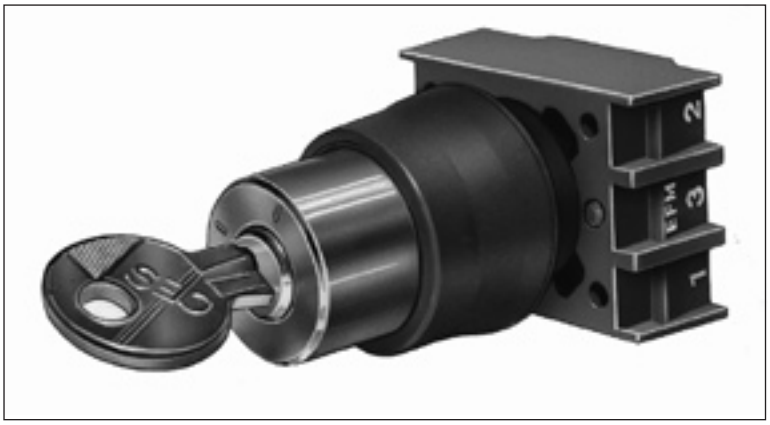
and

– contact element.

The degree of protection of the front side is IP 65.

Only single plunger key-operated selector switch operating heads of the type series SHGV/ESS21S2 with key positions S1 (key trapped) and S2 (key removable) are available for the SHGV system.

The standard scope of supply for each key-operated selector switch further includes a contact element EF 103 with one NC contact 11-12 and one NO contact 23-24, with screw type terminals, or optionally with slip-on terminals.



In key withdrawal position S2, the plunger in the operating head positively acts on the contact element and thus positively opens contact 11-12. Two additional contact elements can also be snap fitted to the mounting flange and any contact configurations can be selected.

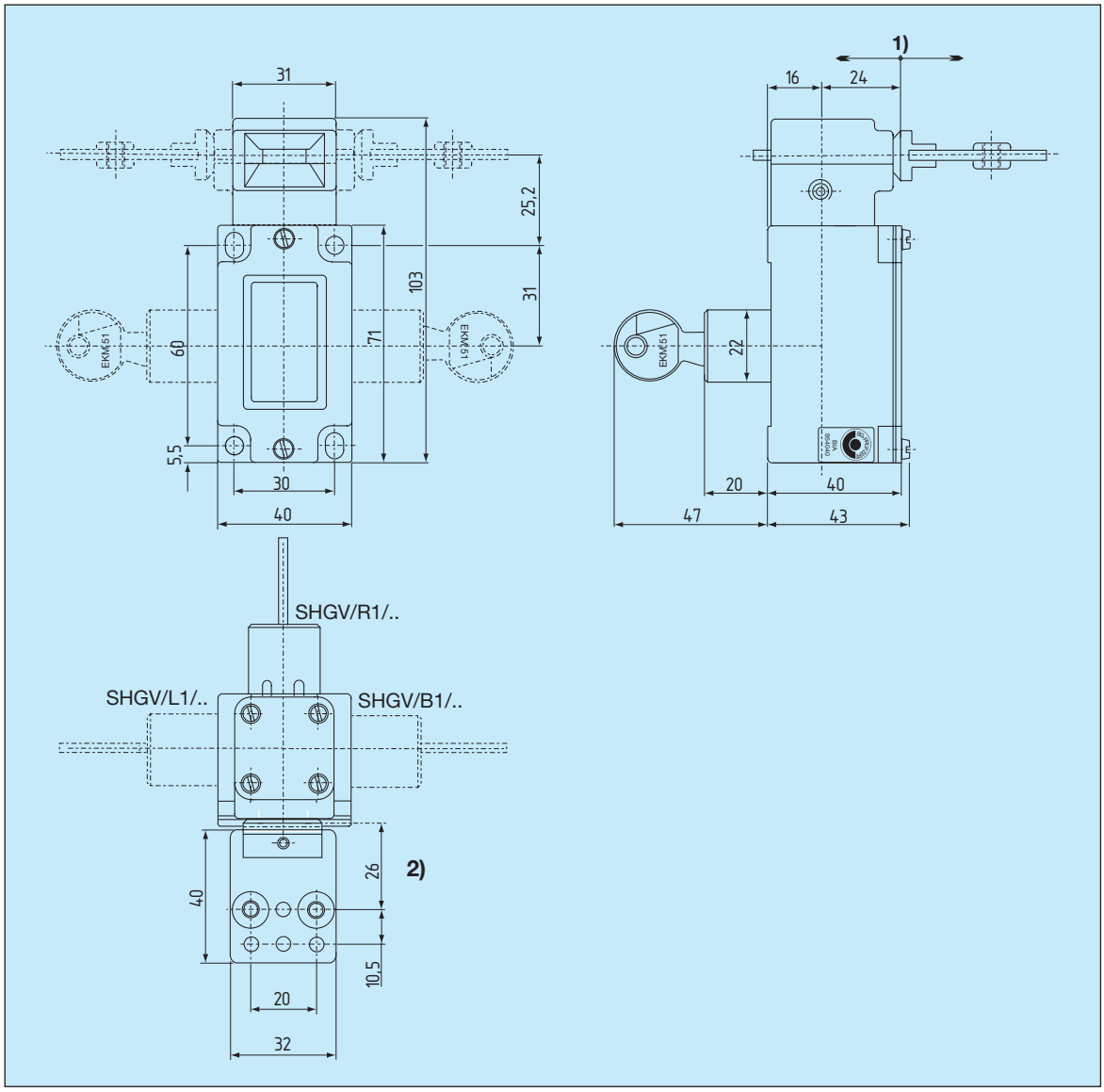
There must, however, be at least one NC contact 11-12 incorporated in the safety circuit of the machine control system, such that positive opening of this contact brings about the shutdown of automatic mode in the machine control system.

Safety door interlocking system – SHGV type series – version with 1 operating head

Functional and design features

- Key transfer system according to EN 1088
- Functionality of an interlocking device with guard locking
- No wiring to moving guard
- Operating head offset 4 x 90°
- Funnel-shaped entry throat for actuator*

Dimensions



1) Basis of measurement for actuator, 2) Control head set to front by factory

* Standard actuator BO (supplied): see page 22; other versions: see page 22 et seq.

Technical data

Degree of protection	Enclosure: IP 67 (1 m wg/30 m.) Operating head: IP 00
Actuating forces	Insertion of actuator – 15 N Withdrawal of actuator – 5 N
Ambient temperature range	–25° C ... +70° C
Storage temperature range	–40° C ... +80° C
Materials used	Enclosure: AlSi 12 painted signal red (RAL 3000) SHG cover: steel, passivated Perbunan seals: oil and petrol resistant
Mechanical life	2 x 10^6 switching cycles
Shock resistance	> 30 g/18 ms
Vibration resistance	> 15 g/10 ... 200 Hz
Climatic resistance	40/91 to DIN 50015, FW24 to DIN 50016
Key-operated selector switch	See Elan catalogue D-22.G

Supply table

Brief description, function	Type designation	Part no.
SHGV guard locking device with standard actuator BO, key-operated selector switch ESS21S2 and contact element EF 103.1 (1 NC contact/1 NO contact with screw type terminals):		
– lock barrel left/locking device	SHGV/L1/.(*)./ESS21S2/103	134 5400
– lock barrel right/locking device	SHGV/R1/.(*)./ESS21S2/103	134 5401
– lock barrel back/locking	SHGV/B1/.(*)/ESS21S2/103	134 5402

(*) Entry of the individual tumbler arrangement number at the works or by the customer

Additional text in orders required for: – additional contact elements or contact elements with other terminal types (see Elan catalogue D-22.G), – other actuators (see page 22 et seq.), – supply of key-operated selector switch interlocking devices SVE (see page 14 et seq.)

Individual device	Type designation	Part no.
– Key-operated switch	SHGV/ESS21S2/.(*)./103	134 5430
– Locking device	SHGV/(**).1/.(*).+BO	134 5410

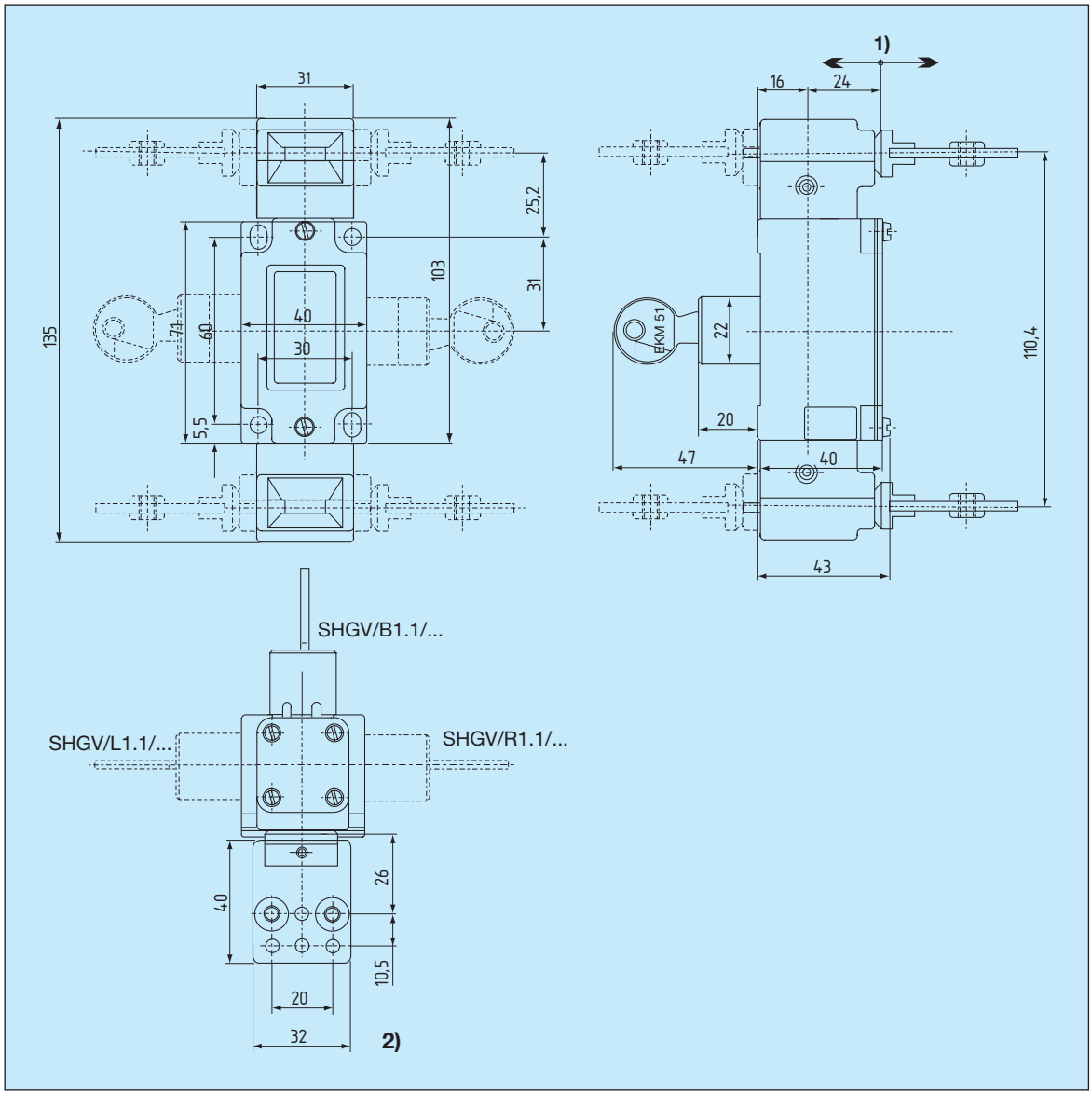
(*) Entry of the individual tumbler arrangement number at the works or by the customer
(**) When ordering, please specify the position of the lock barrel (L, R or B).

Safety door interlocking system – SHGV type series – versions with 2 operating heads

Functional and design features

- Key transfer system according to EN 1088
- Functionality of an interlocking device with guard locking
- No wiring to moving guard
- Operating heads offset 4 x 90°
- Funnel-shaped entry throat for actuator*
- with 2 operating heads for double doors

Dimensions



1) Basis of measurement for actuator, 2) Control heads set to front by factory

* Standard actuator BO (supplied): see page 22; other versions: see page 22 et seq.

Technical data

Degree of protection	Enclosure: IP 67 (1 m wg/30 m.) Operating head: IP 00
Actuating force	Insertion of actuator – 15 N Withdrawal of actuator – 5 N
Ambient temperature range	–25° C ... +70° C
Storage temperature range	–40° C ... +80° C
Materials used	Enclosure: AlSi 12 painted signal red (RAL 3000) SHG cover: steel, passivated Perbunan seals: oil and petrol resistant
Mechanical life	2 x 10^6 switching cycles
Shock resistance	> 30 g/18 ms
Vibration resistance	> 15 g/10 ... 200 Hz
Climatic resistance	40/91 to DIN 50015, FW24 to DIN 50016
Key-operated selector switch	See Elan catalogue D-22.G

Supply table

Brief description, function	Type designation	Part no.
SHGV guard locking device mit 2 standard actuators BO, key-operated selector switch ESS21S2 and contact element EF 103.1 (1 NC contact/1 NO contact with screw type terminals):		
– lock barrel left/locking device	SHGV/L1.1/.(*)./ESS21S2/103	134 5377
– lock barrel right/locking device	SHGV/R1.1/.(*)./ESS21S2/103	134 5378
– lock barrel back/locking device	SHGV/B1.1/.(*)/ESS21S2/103	134 5379

(*) Entry of the individual tumbler arrangement number at the works or by the customer

Additional text in orders required for: – additional contact elements or contact elements with other terminal types (see Elan catalogue D-22.G), – other actuators (see page 22 et seq.), – supply of key-operated selector switch interlocking devices SVE (see page 14 et seq.)

Individual device	Type designation	Part no.
– Key-operated switch	SHGV/ESS21S2/.(*)./103	134 5430
– Locking device	SHGV/.(**).1.1/.(*).+BO	134 5381

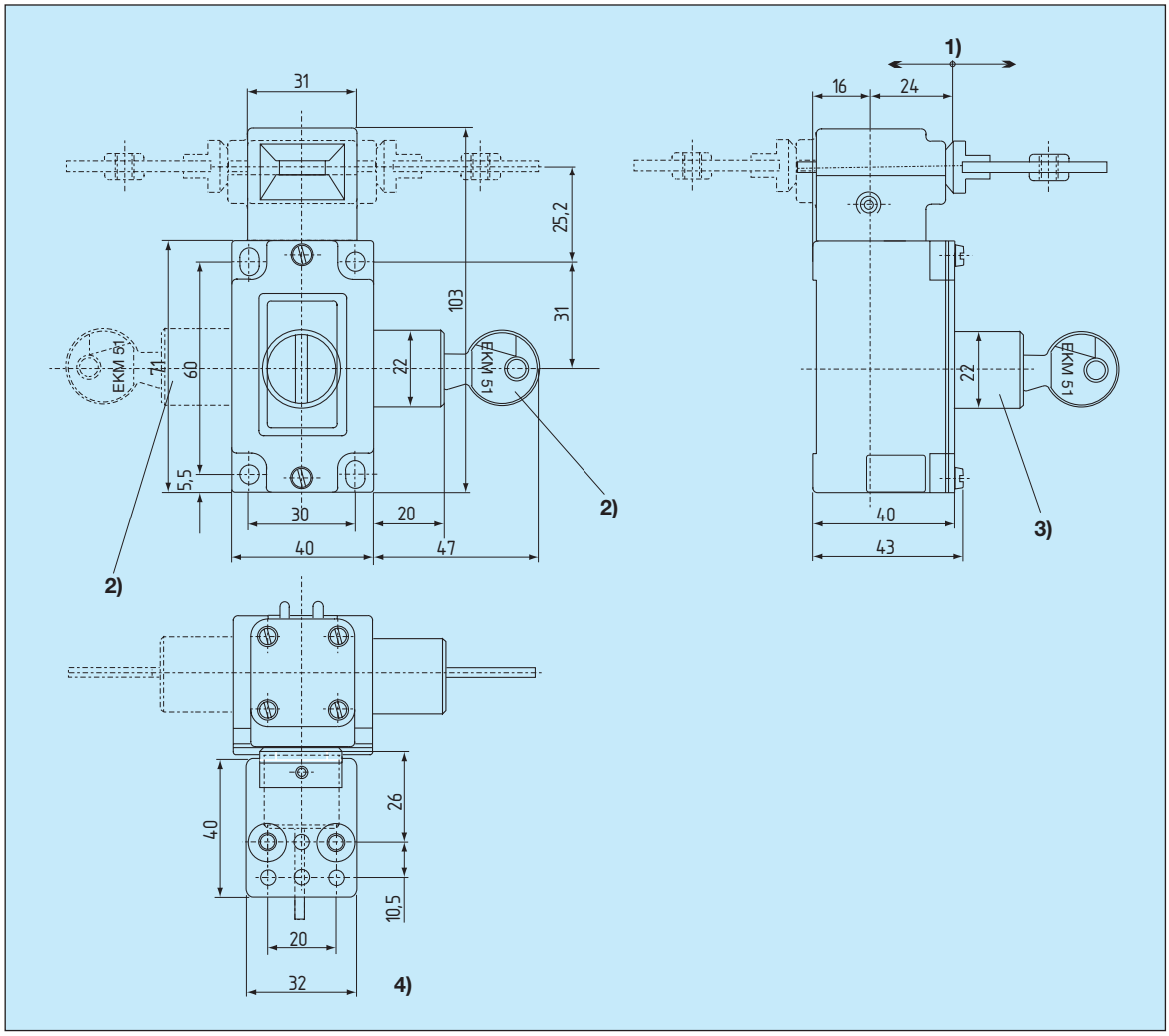
(*) Entry of the individual tumbler arrangement number at the works or by the customer
(**) When ordering, please specify the position of the lock barrel (L, R or B).

Safety door interlocking system – SHGV type series – version with additional lock barrel

Functional and design features

- Key transfer system according to EN 1088
- Functionality of an interlocking device with guard locking
- No wiring to moving guard
- Operating head offset 4 x 90°
- Funnel-shaped entry throat for actuator*
- with additional lock barrel to prevent unexpected machine start by third party

Dimensions



1) Basis of measurement for actuator, 2) Lock barrel 1 (to lock the guard), 3) Lock barrel 2 (to lock barrel 1 when guard open), 4) Control head set to front by factory

* Standard actuator BO (supplied): see page 22; other versions: see page 22 et seq.

Technical data

Degree of protection	Enclosure: IP 67 (1 m wg/30 m.) Operating head: IP 00
Actuating force	Insertion of actuator – 15 N Withdrawal of actuator – 5 N
Ambient temperature range	–25° C ... +70° C
Storage temperature range	–40° C ... +80° C
Materials used	Enclosure: AlSi 12 painted signal red (RAL 3000) SHG cover: steel, passivated Perbunan seals: oil and petrol resistant
Mechanical life	2 x 10^6 switching cycles
Shock resistance	> 30 g/18 ms
Vibration resistance	> 15 g/10 ... 200 Hz
Climatic resistance	40/91 to DIN 50015, FW24 to DIN 50016
Key-operated selector switch	See Elan catalogue D-22.G

Supply table

Brief description, function	Type designation	Part no.
SHGV guard locking device with 2 lock barrels, standard actuator BO, key-operated selector switch ESS21S2 and contact element EF 103.1 (1 NC contact/1 NO contact with screw type terminals):		
– lock barrel 1 left/lock barrel 2 in cover	SHGV/LD1/.(*)./.(*)ESS21S2/103	134 5370
– lock barrel 1 right/lock barrel 2 in cover	SHGV/RD1/.(*)./.(*)ESS21S2/103	134 5371

(*) Entry of the individual tumbler arrangement number at the works or by the customer

Additional text in orders required for: – additional contact elements or contact elements with other terminal types (see Elan catalogue D-22.G), – other actuators (see page 22 et seq.), – supply of key-operated selector switch interlocking devices SVE (see page 14 et seq.)

Individual device	Type designation	Part no.
– Key-operated switch	SHGV/ESS21S2/.(*)./103	134 5430
– Locking device	SHGV/(**)D1/.(*)./.(*)+BO	134 5372

(*) Entry of the individual tumbler arrangement number at the works or by the customer
(**) When ordering, please specify the position of the lock barrel (L, R or B).

Key-operated selector switch interlocking device with electromagnetic principle of operation – type series SVE

Application and function

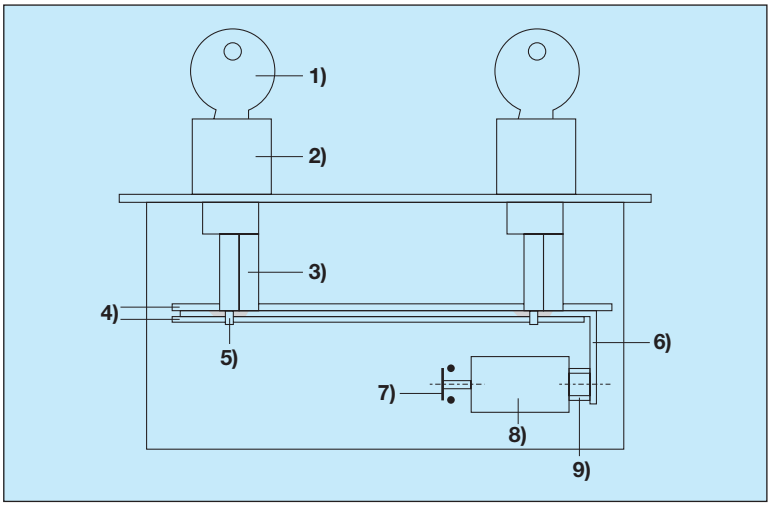
If the time required to terminate a hazardous condition is greater than the time a person requires to reach the hazardous area, the use of the key-operated selector switch interlocking device SVE allows the key transfer to be blocked until activated by, for instance, a timer module(*) or a zero motion monitor. This means that the key can only be turned from the trapped position S1 into the trapped position S2 after a time delay.

An access time of 1.6 m/s is normally used as the basis for hazardous motions (cf. EN 999).

In applications without hazardous overtravel motions, for example, it is appropriate to use key-operated selector switch interlocking devices of the type SVE when – for reasons of machine and working materials protection (to EN 60 204-1 Section 9.4.1) – an undefined interruption of the manufacturing process is to be avoided.

The blocking system is designed in such a way that a perforated mask in the device blocks or releases a specially designed plunger in the contact elements of the key-operated selector switch. The perforated mask is connected to the armature of an electromagnet. Depending on the position of the electromagnet, the bores in the mask either permit motion of the plunger or positively block such motion.

The activation of the electromagnet takes place as a function of the hazardous condition at the guard, e.g. in the form of a zero motion signal for a hazardous motion or by means of a timer module(*), which bridges the time between a stop command and the actual termination of a hazardous condition as determined by experience.



1) Key, 2) Key-operated switch, 3) Contact element, 4) Guides, 5) Interlock pin, 6) Interlock bracket, 7) NC contact, 8) Magnet, 9) Safety spring

(*) When a timer module is used to determine the time of release for deblocking, it should be noted that failure must not reduce the delay time (cf. Section 5.6 EN 1088). From this point of view, for example, a two channel timer module is necessary. Time modules: see Elan catalogue TVE-Z, page 82.

Safety-orientated function

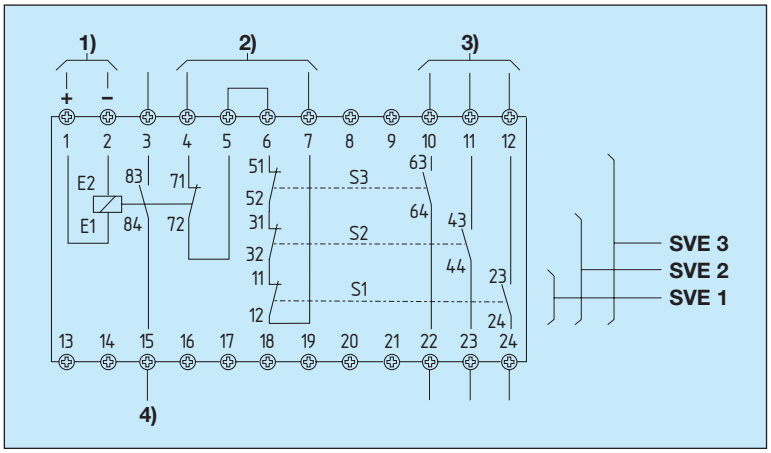
The electromagnet in the key-operated selector switch interlocking device SVE is designed as a spring loaded unit, i.e. the motion of the plunger is blocked by the spring force and actively released when a voltage is applied. In the case of interruption of the power supply, the SVE interlocking device retains its protective function.

The springs in this version are designed as safety springs. The spacing between the windings of the spring guided on a pin is smaller than the wire diameter. If a spring should break, this prevents the ends from intertwining, and the function of the safety spring is preserved.

The equipment is supplied with an additional mechanical deblocking system as standard to permit opening of the spring loaded protective device in the de-energised condition.

For position monitoring of the perforated mask, the electromagnet is fitted with an additional monitoring contact which is positively opened in the position in which the electromagnet is live and permits withdrawal of the key.

This contact is to be connected to the machine control system in such a way that a further start command can only be issued when all key-operated selector switches have been switched over from the withdrawable position S2 to the trapped position S1 and the operating voltage g for the spring loaded electromagnet has been interrupted (i.e. the perforated mask is again blocking the key-operated selector switches).



SVE example: 1) Control voltage magnet, 2) Enabling contacts terminals 4–7, Set external jumper 5–6, 3) Monitoring contacts, Key-operated switches, 4) Monitoring contact magnet

Versions supplied

The key-operated selector switch interlocking devices are supplied fully wired and ready to install in a fully insulated plastic enclosure with degree of protection IP 65 at the front. The wiring is implemented with standard commercial plug connectors.

SVE interlocking devices are available with up to 3 built-in key-operated selector switches with one NC contact and 1 NO contact in a common contact element. (Other contact arrangements on request). The switches are electromagnetically interlocked jointly.

Options (on request):

- Different contact arrangements, contact interconnection, magnet voltages, etc.
- Versions SVE 1 and 2: additional installation of other control and signalling devices (in place of a vacant location with blanking plug).

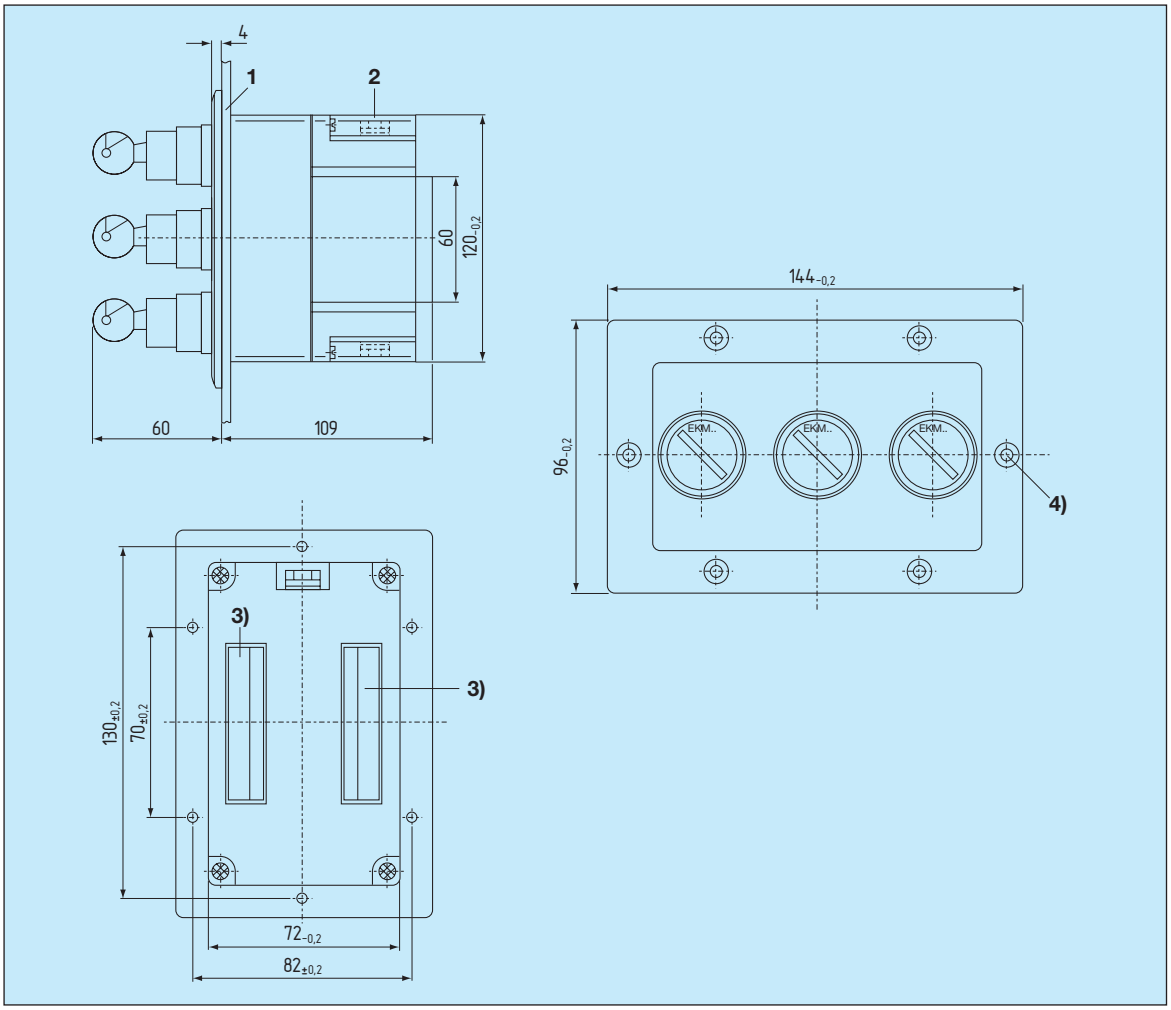
Supply table

Type designation	Selector switch position	Magnet voltage	Part no.
SVE1 24	centre	24 VDC	134 5501
SVE1 115	centre	115 VAC	134 5514
SVE1 230	centre	230 VAC	134 5511
SVE2 24	left and right	24 VDC	134 5502
SVE2 115	left and right	115 VAC	134 5515
SVE2 230	left and right	230 VAC	134 5512
SVE3 24	all	24 VDC	134 5503
SVE3 115	all	115 VAC	134 5516
SVE3 230	all	230 VAC	134 5513

Key-operated selector switch interlocking device SVE

Enclosure material	Glass fibre reinforced self-extinguishing thermoplastic to UL-94-V0, colour: black
Degree of protection	IP 65 at the front
Degree of protection	IP 20 for the terminals
Wiring connections with wire-end ferrules	1 x 2.5 mm^2 per terminal for individual wires or flexible conductors with wire-end ferrules
Weight	approx. 1,000 g
Operating temperature	–25° C ... +40° C
Rated voltage of magnet	24 VDC, 115 VAC, 230 VAC, other voltages on request
Rated current of magnet at 24 VDC	approx. 300 mA cold, approx. 250 mA warm
Interference suppression	Integrated freewheeling diode for magnet coil
Data of key-operated selector switch	See Elan catalogue D-22.G

Dimensions



Left top: side view, left bottom: rear view, right: front view;
1) Front panel, 2) Auxiliary deblocking mechanism, 3) Plug type MSTB 2.5/12 ST from Phoenix Contact, 4) Recess to DIN 74 for M4 screws

Key-operated selector switch interlocking device with mechanical principle of operation – type series SVM

Application and function

Key-operated selector switch interlocking devices of the type series SVM function exclusively according to a mechanical principle of operation in which (depending on version) access to 6 to 10 keys of SHGV locking devices is blocked until a central lock has been actuated.

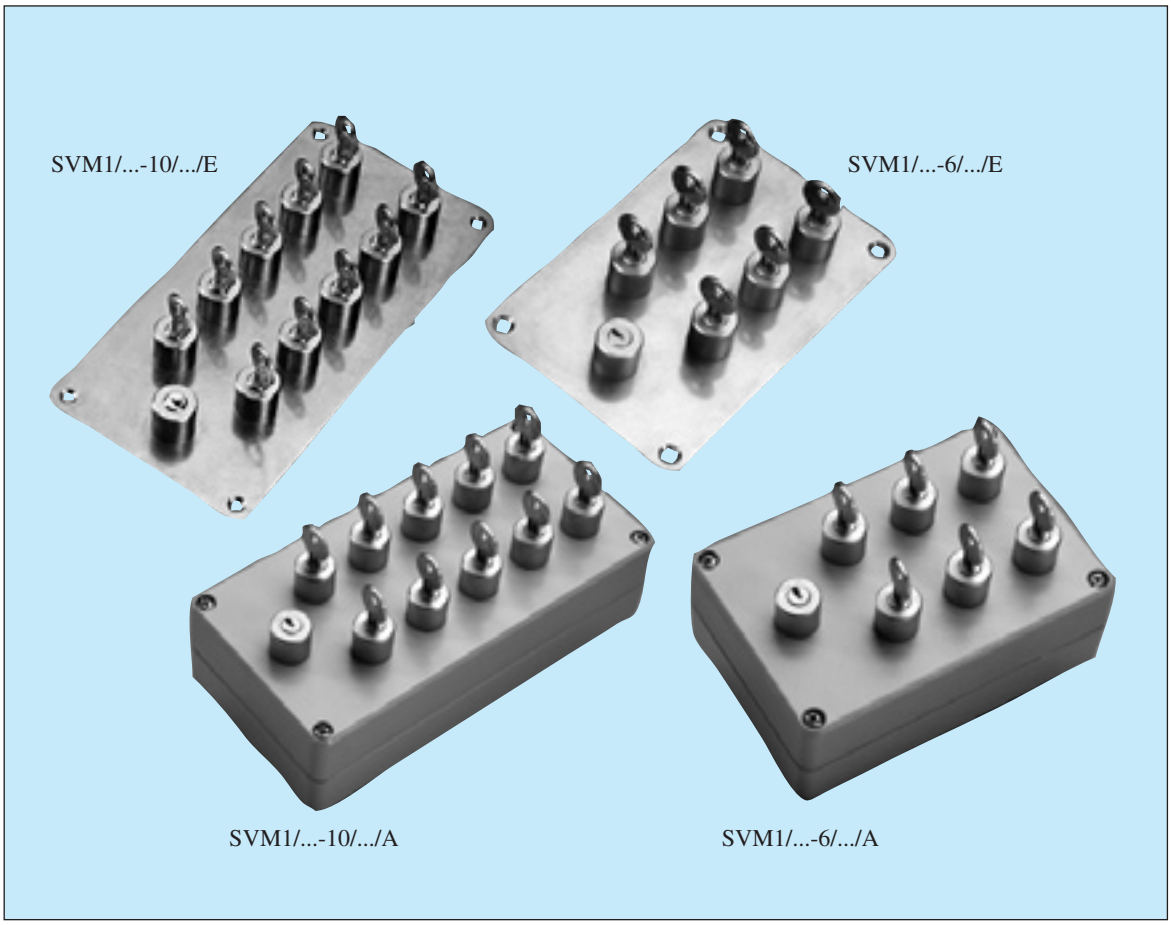
The key to the central lock comes either from a key-operated selector switch of the type series SHGV/ESS or a key-operated selector switch interlocking device of the type series SVE.

After deblocking of the central lock as soon as a/the key(s) has(ve) been withdrawn from a/the SHGV locking device(s), the central key will be trapped again.

The advantage of the key-operated selector switch interlocking device of the type series SVM is that a number of guards can be monitored using one key-operated selector switch of the type series SHGV/ESS or an interlocking device with electromagnetic principle of operation of the type series SVE.

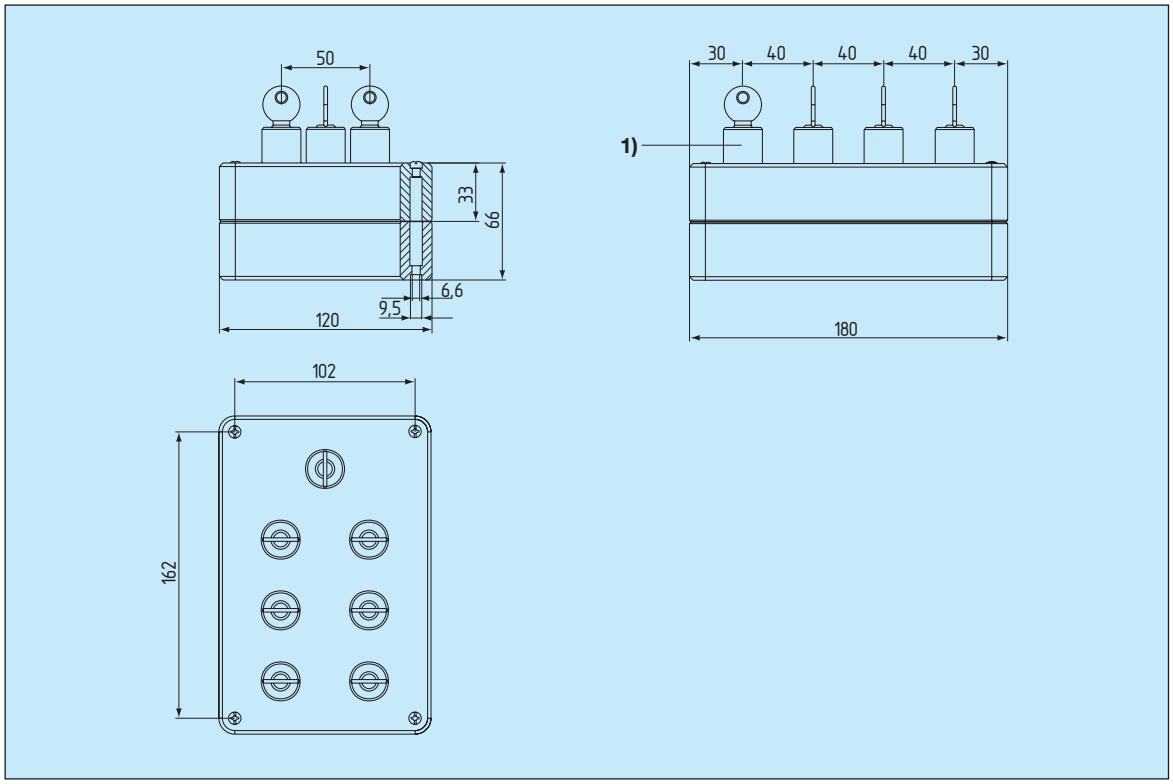
The following versions are available in the SVM type series:

- **SVM1/...-6/...:** with central lock without key* and 6 lock barrels with keys and individual tumbler arrangements for corresponding SHGV../TZV..* locking devices.
  - optionally available as surface or flush-mounted version for front panel or switch cabinet installation.
- **SVM1/...-10/...:** with central lock without key** and 10 lock barrels with keys and individual tumbler arrangement for corresponding SHGV../TZV..* locking devices.
  - optionally available as surface or flush-mounted version for front panel or switch cabinet installation.
- Degree of protection: IP 67



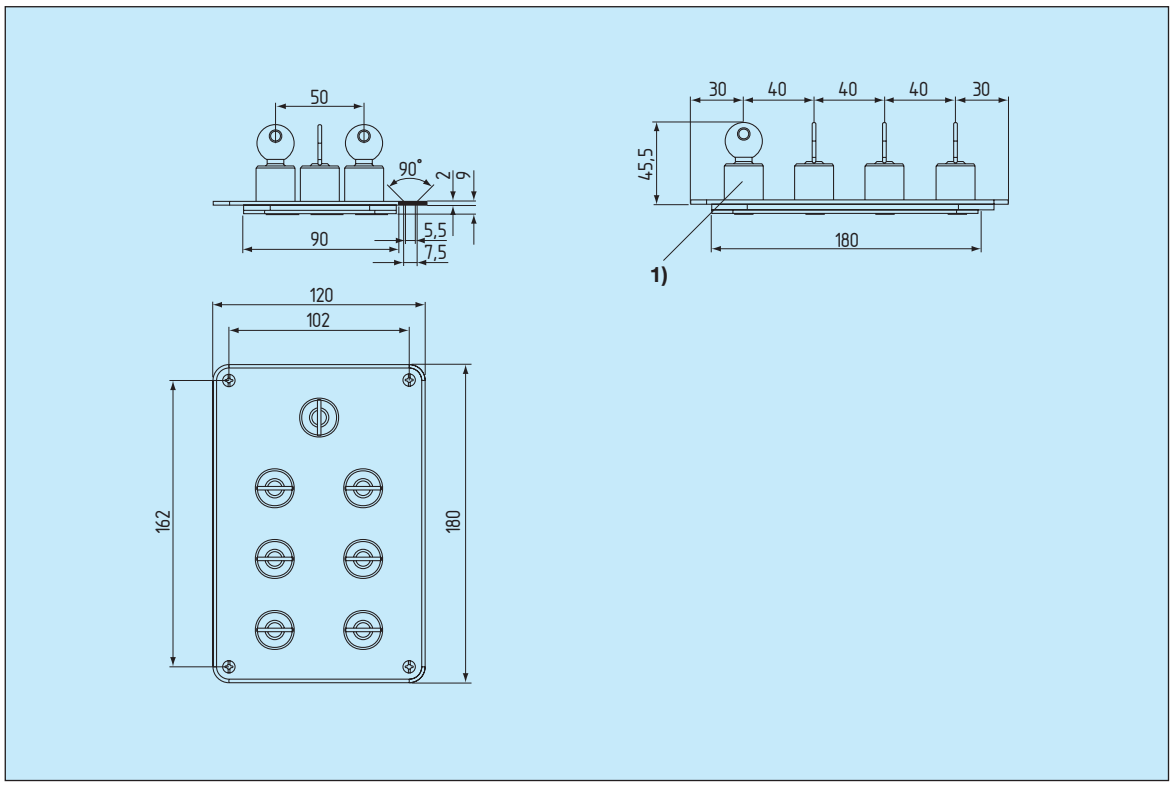
* see page 25 ff.
** Key for central lock with tumbler arrangement according to key-operated selector switch of the type series SHGV/ESS or key-operated selector switch interlocking device of the type series SVE.

Dimensions
SVM 1/..-6/../A
surface-mounted
enclosure



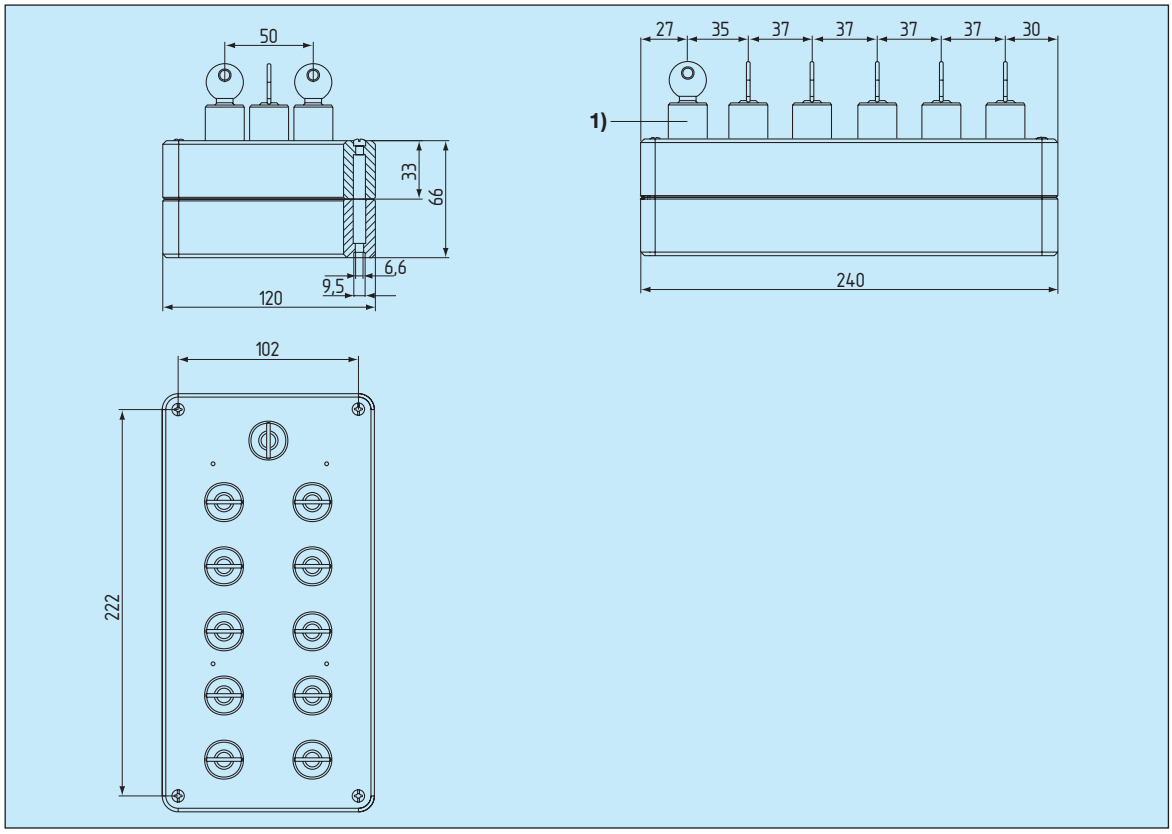
1) Central lock

SVM 1/..-6/.../E
flush-mounted
version



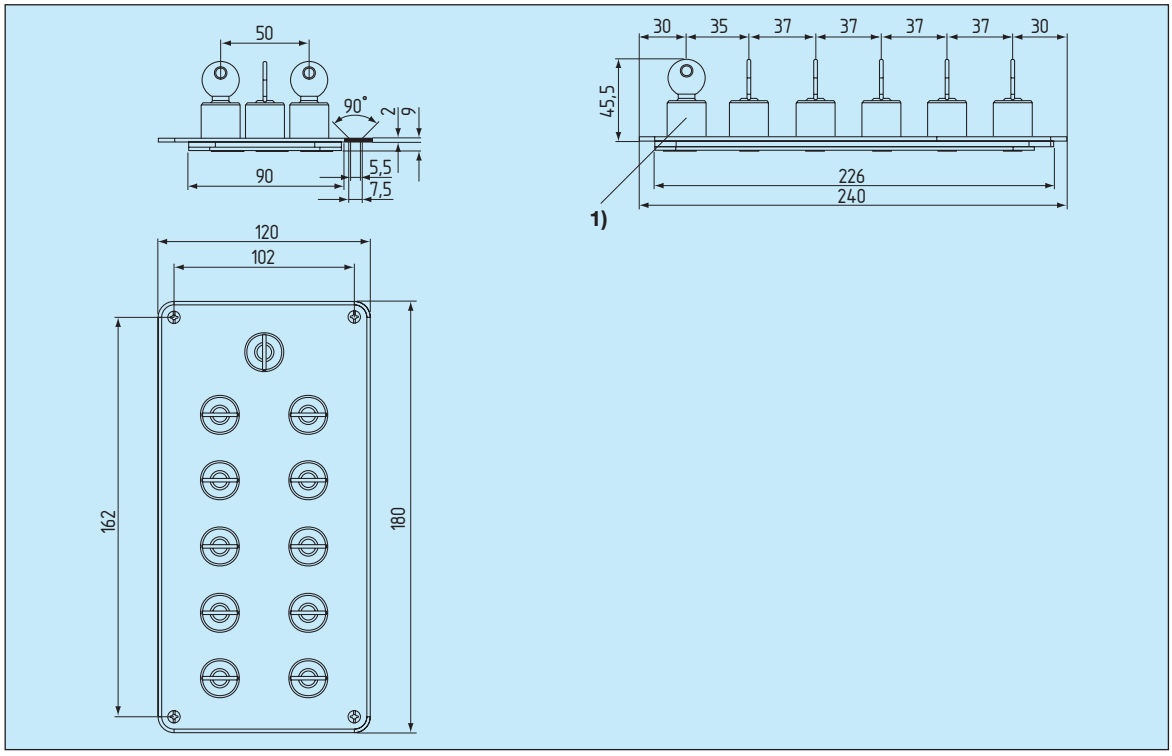
1) Central lock

SVM 1/..-10/../A
surface-mounted
enclosure



1) Central lock

SVM 1/..-10/.../E
flush-mounted
version



1) Central lock

Supply table

Brief description, function	Type designation	Part no.
Key-operated selector switch interlocking device for 1 central key and 6 keys for locking device SHGV../TZV.. with surface-mounted enclosure	SVM1/.(*).-6/.(**)./A	134 5530
Key-operated selector switch interlocking device for 1 central key and 10 keys for locking device SHGV../TZV.. with surface-mounted enclosure	SVM1/.(*).-10/.(**)./A	134 5533
Key-operated selector switch interlocking device for 1 central key and 6 keys for locking device SHGV../TZV.. for front panel or switch cabinet installation	SVM1/.(*).-6/.(**)./E	134 5536
Key-operated selector switch interlocking device for 1 central key and 10 keys for locking device SHGV../TZV.. for front panel or switch cabinet installation	SVM1/.(*).-10/.(**)./E	134 5539

(*) Entry of the individual tumbler arrangement number at the works or by the customer
(**) Entry of the individual tumbler arrangement number for locking devices (SHGV../TZV..) at the works or by the customer

Actuators for SHGV
safety door interlocking system

Functional and design features

– Scope of delivery including non-reusable screws

– Balancing of tolerances between the guide of the moving guard and the entry throat of the operating heads by means of rubber buffers and integrated spacing sleeves

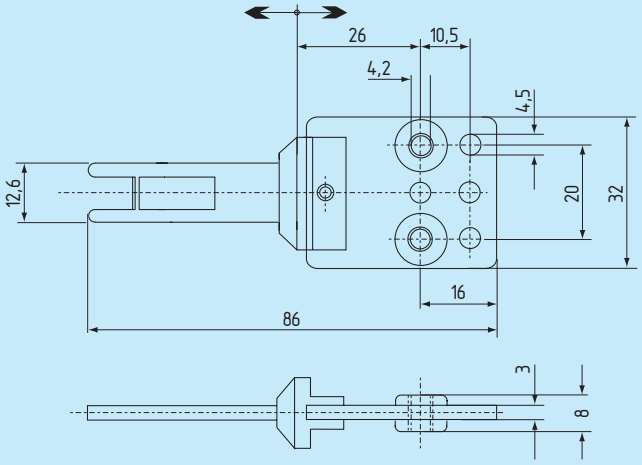
Technical data

Actuator	steel, galvanised
Auxiliary stop	glass fibre reinforced thermoplastic with self-extinguishing properties to UL 94-V-0, signal red
Rubber buffers	Perbunan, oil and petrol resistant

Actuator for radiuses >500 mm*

Type designation:
BO

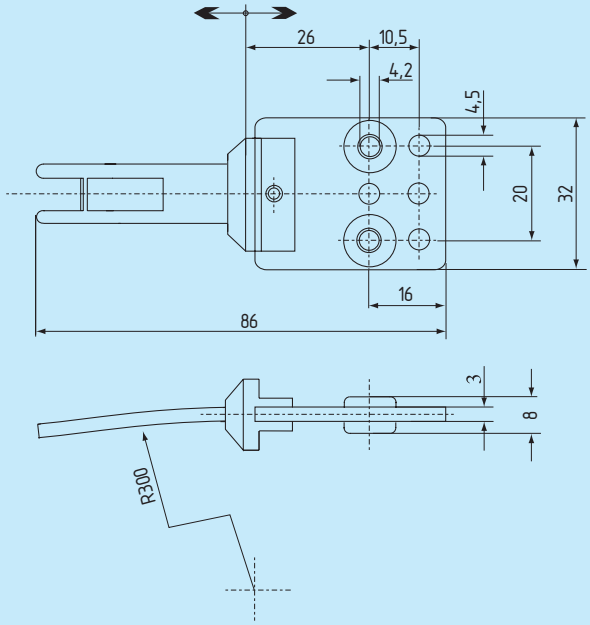
Order no.:
134 9000



Actuator for radiuses >250 <500 mm

Type designation:
BOR

Order no.:
134 9005

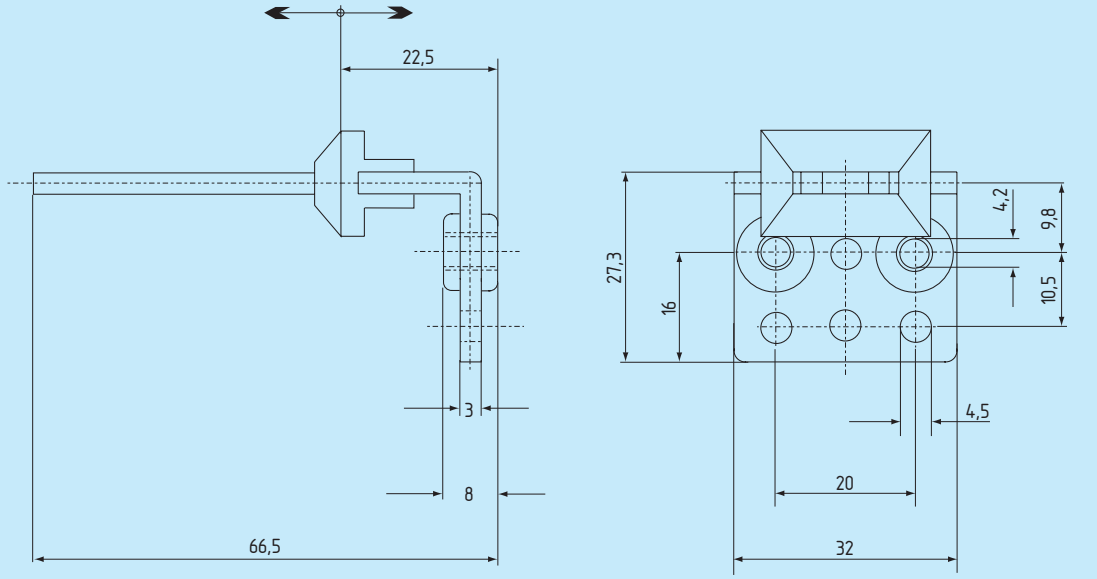


* Belongs to standard SHGV scope of delivery

Bent actuator for radiuses > 500 mm

Type designation:
BOW

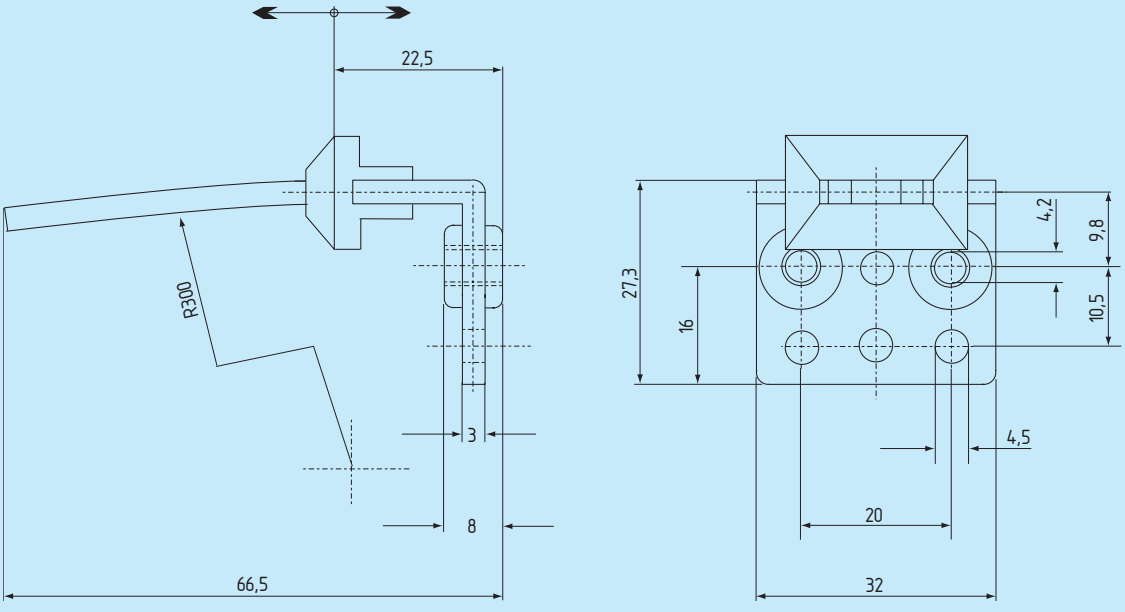
Order no.:
134 9010



Bent actuator for radiuses > 250 < 500 mm

Type designation:
BOWR

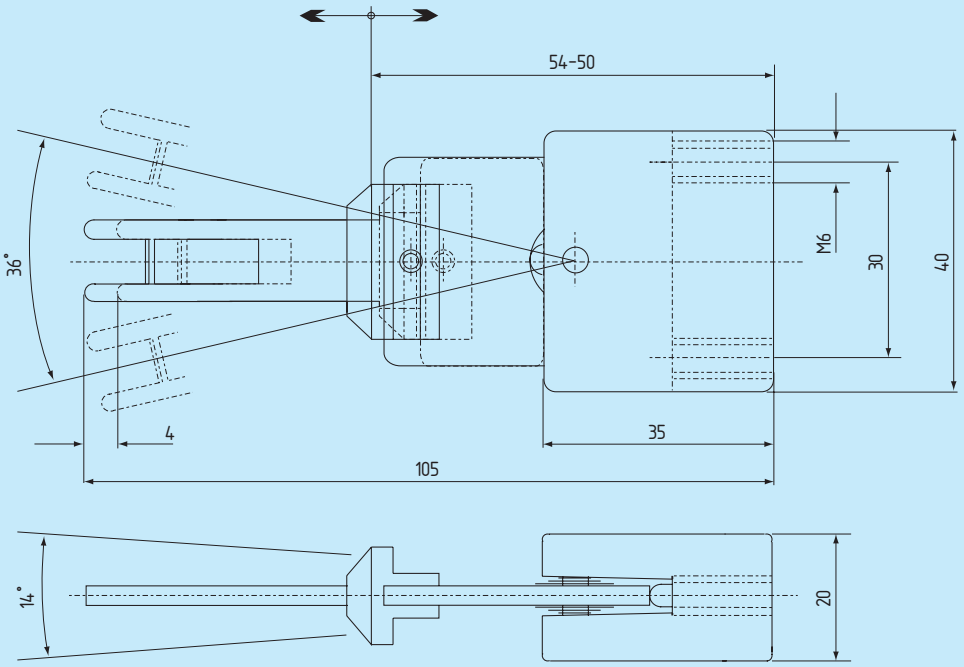
Part no.:
134 9015



Telescopic actuator, fixed from the rear

Type designation:
BOF/HIS.1

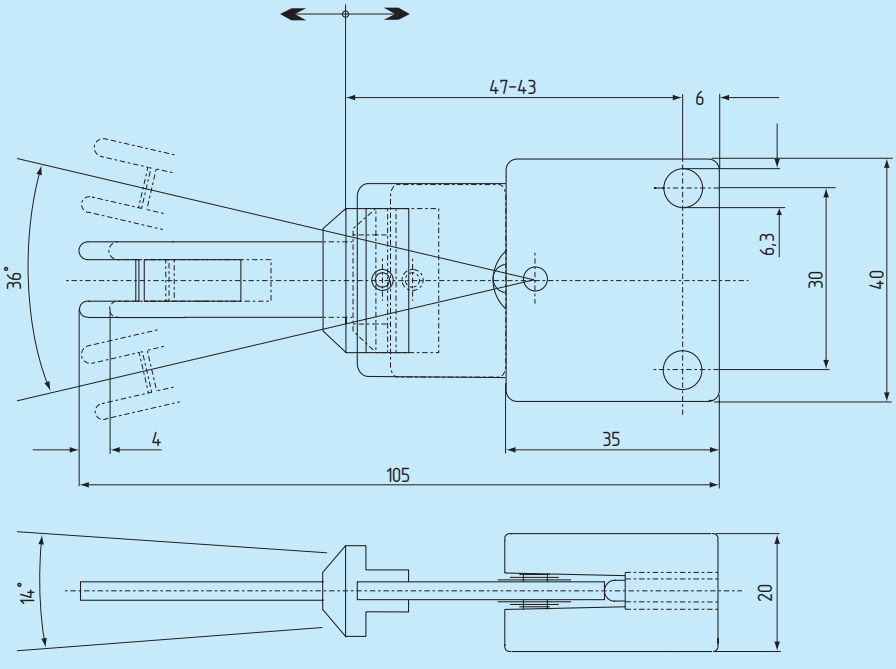
Order no.:
134 9020



Telescopic actuator, fixed from the top

Type designation:
BOF/HIS.2

Order no.:
134 9025



Special versions – safety door interlocking system – type series TZV

Brief description

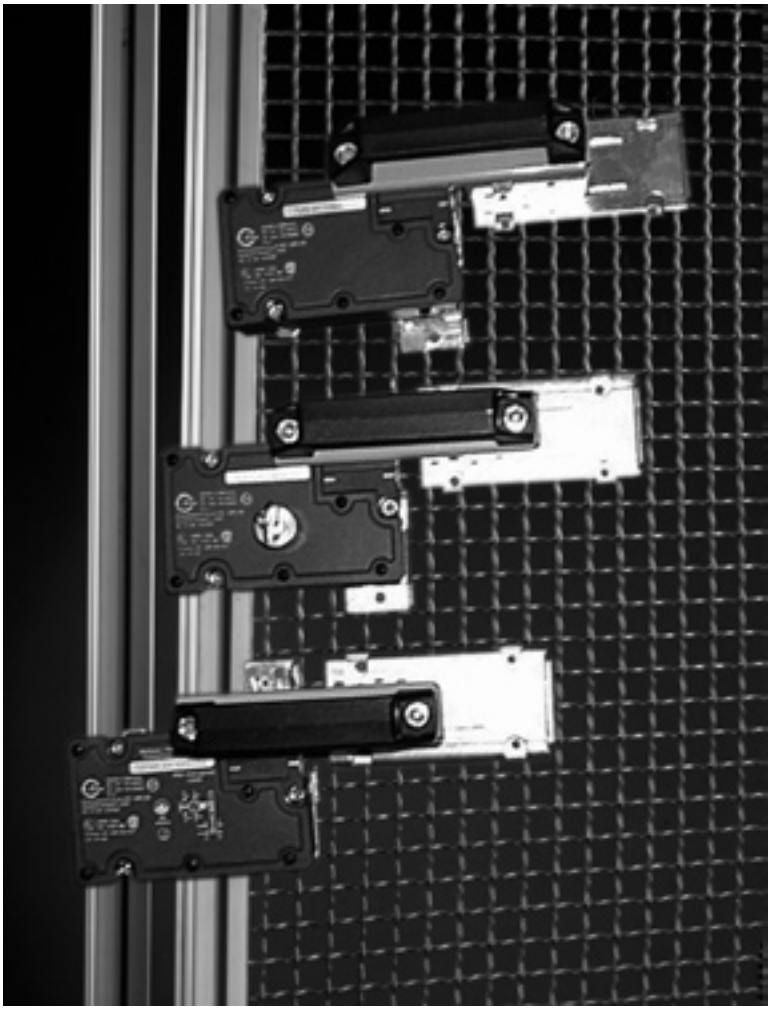
Usually contradictory aspects, namely uniformity of design, functional flexibility and simplified logistics were the behind the idea of realising three different types of interlocking devices for moving guards in only one - externally identical – version.

The following functionalities are available – also in connection with a door bar as a option:

1. Interlocking devices with locking
2. Interlocking devices without locking
3. Interlocking devices with key transfer system.

This means that depending on the protection objective both safety doors on machines and plants with hazardous overtravel movements as well as safety doors on machines and plants without hazardous movements can be protected. In addition a distinction can be made between safety doors used during operation and maintenance and safety doors.

In other words, despite different tasks there is no need for different devices and different design and logistic features. Another advantage is that the decision as to which interlocking device is selected can be left to a later stage in the production process of a machine or plant.

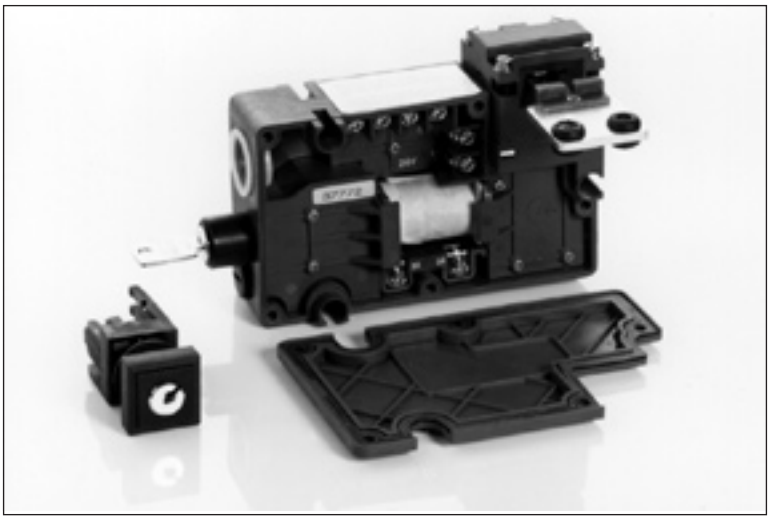


Special versions – safety door interlocks with key locks – type series TZMW.B/TZFW.B

Application

The facility of a safety door interlock of the type series TZ with key lock enables service personnel working in accessible machines and production systems which cannot be de-energised to protect themselves more efficiently.

The key lock ensures that the lock of a moving guard cannot be closed unintentionally or wilfully opened by any one else and that the automatic/normal operation of the control unit thus interrupted is restored. This problem is particularly acute in complex rooms.



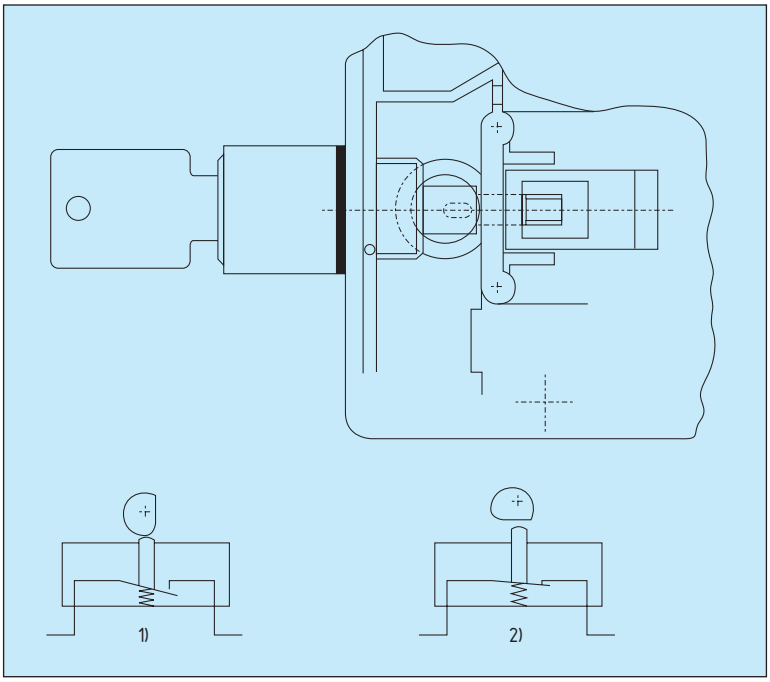
Design

A lock barrel integrated into the devices of the TZ series enables the unlocked solenoid of a safety door interlock to be blocked in such a way that the further automatic/normal operation of a control unit remains interrupted via the positively opened magnet monitoring contact.

The key in the lock barrel can then be removed in the position in which the function of the solenoid is blocked, and can then be used to switch a key-operated switch of the type ZSS21S1 on the operating panel from automatic/normal mode to a special operating mode, such as to setting-up mode.

Closing this key-operated switch only permits a withdrawal position which is provided for the automatic mode in this application (which is, however, interrupted by the blocked solenoid or the opened magnet monitoring contact of the TZ interlock).

The tumbler arrangements both in the TZ device and in the key-operated selector switch ZSS21S1 have 10,000 different possibilities, i.e. the probability that another key coincidentally fits into the lock barrel of a TZ...B version and into the key-operated switch, is extremely low.



1) Mecanically locked, 2) Mechanically unlocked

In this manner a very high level of reliability is achieved, i.e. high level of protection for service personnel of a machine or production system because erroneous or wilful intervention by third parties in the safety circuits of an interlocking device is prevented.

Functional sequence using a separate key-operated switch

1. *Automatic/normal mode with effective safety door interlocking TZ*

   Lock barrel with key in position I (key cannot be removed). The key can only be actuated if the magnet is unlocked, i.e. interrupting the automatic/normal mode by mistake is impossible.

2. *Unlocking the electromagnet*

   The positively opening magnet monitoring contact 21-22 of the TZ devices opens. The automatic/normal mode is interrupted.
   The guard can be opened.

3. *Interruption of the automatic/normal mode by blocking the magnet*

   Turn lock barrel with key to position II (key can be removed). The electromagnet of the TZ interlocking device is blocked positively by an eccentric cam.

4. *Switching from automatic/normal mode to a special operating mode*

   With key removed switch key-operated selector switch from position I (removable) to position II (trapped).

5. *RESET*

   – Reset key-operated switch from position II to position I and remove key.
   – Insert key in TZ lock barrel and reset from position II to position I (trapped).
   – The safety door interlocks of the type series TZ are fully functioning and effective again.

Versions supplied

The key locks of safety door interlocks of the type series TZ are supplied as standard in those versions with separate safety contacts 11-12 (door monitoring) and 21-22 (magnet monitoring).

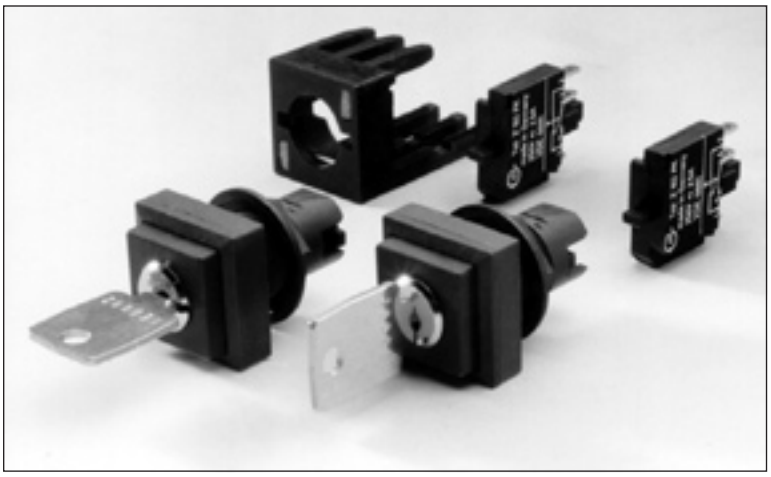
Available on request: series connection of the contacts 11-12 and 21-22, LED versions.

Not available in this version: additional manual auxiliary and emergency releases.

Key-operated selector switch ZSS21S1

The devices are designed for installation boreholes 16.2 mm (+ 0.2 mm) to DIN EN 50 007. The key-operated switches achieve the protection class IP65 by using high grade lock barrels from KABA Co. The devices are designed for 2 lock positions and have an actuating plunger. A complete key-operated switch consists of the following components: device head (with sealing ring and counter-nut), element holder and the corresponding contact elements.

The device head is fixed by tightening the counter-nut. The element holder, which is intended to accommodate three elements, is then snapped on to the device sleeve via guides.



An NC/NO contact combination (plunger not actuated = closed NC contact/open NO contact: automatic/normal mode – plunger actuated = positively opened NC contact/closed NO contact: special mode) is recommended for the above functions.

Supply table TZ

Versions (incl. standard actuator)	Operating voltage	Type designation	Part No.
Power-locked	24 VDC	TZMW.B	191 0084
	115 VAC	TZMW.B.115	on request
	230 VAC	TZMW.B.230	191 0086
Spring-locked	24 VDC	TZFW.B	191 5086
	115 VAC	TZFW.B.115	on request
	230 VAC	TZFW.B.230	191 5092

with	
key-operated selector switch with 2 latch positions 1-plunger version	ZSS21S1/TZxW.B

Accessories

Form	Part no.
Element holder ZH	012 3017

Connection system	Function	Connection	Type	Part no.
Contact elements with screw connection	1 NC contact	.1/.2	Z10	012 0010
	1 NO contact	.3/.4	Z02	012 0040
Contact elements with push-on connection 2 x 2.8 x 0.87/1 x 6.3 x 0.8	1 NC contact	.1/.2	Z10F	012 1010
	1 NO contact	.3/.4	Z02F	012 1040
Contact elements with push-on connection 1 x 2,8 x 0,8	1 NC contact/ 1 NO contact	.1/.2 .3/.4	Z102FK	012 1140

Notes

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