



**SAFEMASTER STS**  
**Safety switch-**  
**and key interlock system**  
**switch module**  
**SX and SV**

**Translation**  
**of the original instructions**

**0278785**



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## Symbol and Notes Statement



**DANGER:**  
Indicates that death or severe personal injury will result if proper precautions are not taken.



**WARNING:**  
Indicates that death or severe personal injury can result if proper precautions are not taken.



**CAUTION:**  
Indicates that a minor personal injury can result if proper precautions are not taken.



**INFO:**  
Referred information to help you make best use of the product.



**ATTENTION:**  
Warns against actions that can cause damage or malfunction of the device, the device environment or the hardware / software result.

## General Notes

The product hereby described was developed to perform safety functions as a part of a whole installation or machine. A complete safety system normally includes sensors (SAFEMASTER STS System), evaluation units, signals and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for ensuring proper functioning of the whole system. DOLD cannot guarantee all the specifications of an installation or machine that was not designed by DOLD. The total concept of the control system into which the device is integrated must be validated by the user. DOLD also takes over no liability for recommendations which are given or implied in the following description. The following description implies no modification of the general DOLD terms of delivery, warranty or liability claims.

## Notes



**Risk!**  
**Danger to life or risk of serious injuries.**

- Hazards must be ruled out before a key can be entered and the movable part of the guard can then be opened!



**INFO**

- For information regarding use in the system and validation according to EN ISO 13849-2, see SAFEMASTER STS application guide.
- Take advantage of the advice of the **E. DOLD & SÖHNE KG** specialists regarding the choice of units and combination of a system.



**ATTENTION !**

- To avoid wrong usage (e.g. by overload, mounting position or usage in acid, alkaline or other hostile ambient conditions) the limitations of the product have to be observed. Please check in advance if your application requires the usage of the more robust stainless steel model of SAFEMASTER STS. The requirements of the mounting and operating instruction must be fulfilled.



Before installing, operating or maintaining this device, these instructions must be carefully read and understood.



The installation must only be done by a qualified electrician!



The installation must only be done by a qualified mechanic!



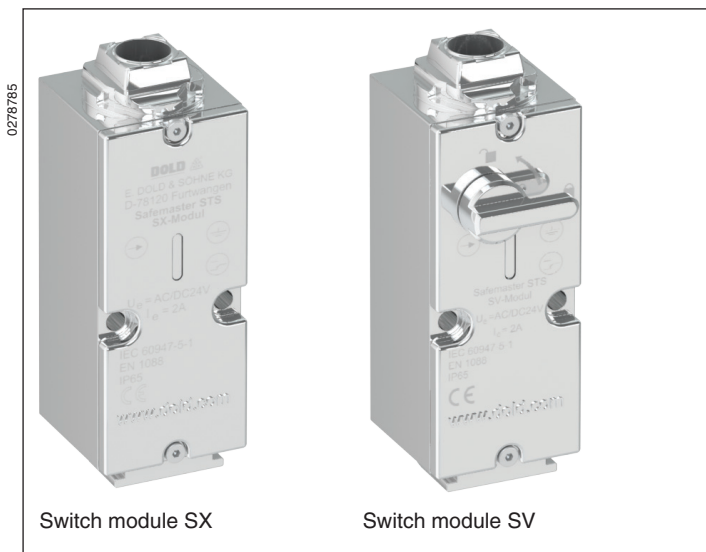
Do not dispose of household garbage!  
The device must be disposed of in compliance with nationally applicable rules and requirements.



Storage for future reference.

To help you understand and find specific text passages and notes in the operating instructions, we have important information and information marked with symbols.

## SAFEMASTER STS Safety switch- and key interlock system Switch module SX and SV



### STS-System Benefits

- EU-Test certificate according to the directive 2006/42/EG, annex IX
- For safety applications up to PLe/Cat. 4 according to DIN EN/ISO 13849-1
- Modular and expandable system
- Rugged stainless steel design
- Wireless mechanical safeguarding
- Combines the benefits of safety switch, locking module and key transfer in a single system
- Easy installation through comprehensive accessories
- Protection against lock-in
- Coding level low, medium, high according to DIN EN ISO 14119:2014-03

### Features

- Switch module for monitoring actuator and key position
- Module expansions possible only above the module
- With integrated LEDs for status indication
- Optional single-channel / redundant / diverse switch-off possible

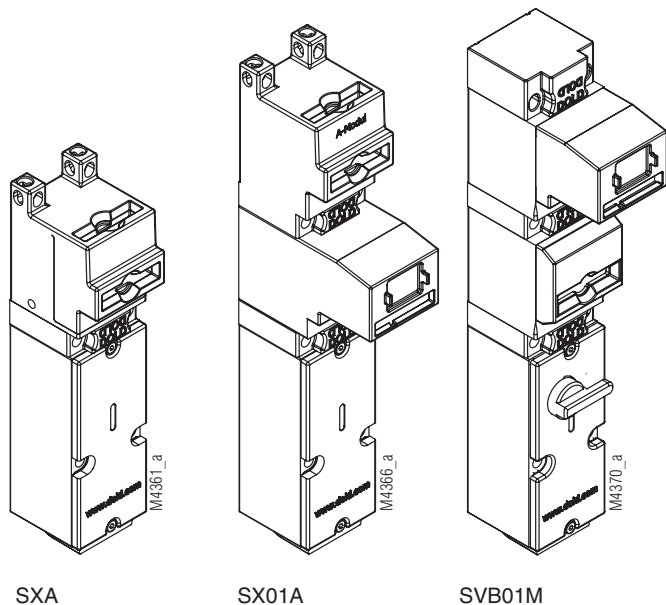
### Product Description

Switch modules SX and SV are assembled together with other modules into a STS unit. They are used to secure separating guards by switching off hazardous movements. It must be ensured here that when the switch is being actuated the hazard will be stopped and/or the entries will be unlocked.

### Approvals and Markings



### Installation Examples



### Design and Function

Switch modules SX and SV are extremely rugged and flexible switch modules monitoring the safe position of one or several entries, e.g. protective hood or door, in the system. For this purpose the modules are used in connection with other mechanical STS modules, e.g. actuator modules B and D, key modules 01, R1 and 01S and/or padlock module V. The key and padlock modules can be installed either above or below the actuator module used.

The switch module can also be used to only release keys in a key interlock system without an actuator module. This function is applied in key interlock systems with central shut-off or where the shut-off must take place outside the system, for instance in Ex zones, with strong vibration or dirt build-up, etc.

Optionally, 1-channel redundant or diverse shut-off is possible.

#### Switch module SV with manual locking module function

The switch module SV with 3-level locking module function has the same design as the SX, but is equipped with additional manual lock. It has been built in such a way that the actuator or key engages after the introduction and is mechanically blocked. Mechanical blocking is unlocked again by manual release and the actuator or key is released.

Switch module SV is especially suitable for applications with strong vibration and tensile strain from actuator or key.

The manual locking of switch module SV prevents the unintentional ejection of actuator or key. The actuator / key is released only after manual unlocking.

#### Attention!



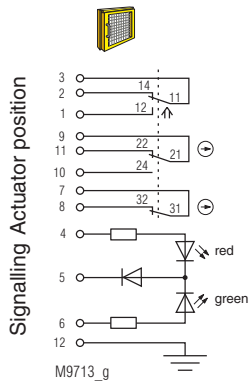
**The use of the switch module SV may cause persons to be locked in case of full body access. Additional measures against lock-in are necessary.**

### Indication

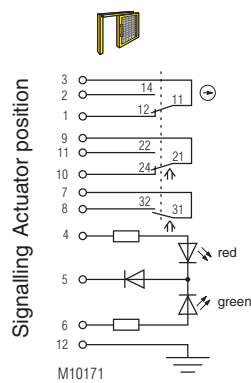
LED red/green:

Separately controllable

## Circuit Diagrams (Example SXB01M)



**Fig. 1:**  
Locked while activated:  
Actuator and key inserted,  
door closed



**Fig. 2:**  
Lock deactivated:  
Actuator removed  
Door open

Switching logic

|                   |   | Fig. 1 | Fig. 2 |
|-------------------|---|--------|--------|
| Actuator contacts | 3 | 2      | ■      |
|                   | 3 | 1      | □      |
|                   | 9 | 11     | ■      |
|                   | 9 | 10     | □      |
|                   | 7 | 8      | ■      |

■ closed  
□ open

## Technical Data

### Mechanical Data

**Mechanical principle:** Rotating axis with redundant actuation  
**Enclosure:** Stainless steel V4A / AISI 316L  
**Internal parts:** Stainless steel V4A / AISI 316 / AISI 630 / V2A (acc. to EN 10027-2 1.4401; 1.4404; 1.4542; 1.4301; 1.4310)  
**Degree of protection:** IP 65  
**Operating speed:** 100 / 500 mm/s  
**Locking force:**  $F_{zh}$  4000 N

### Input

**Nominal voltage  $U_N$  (Rated voltage):** AC/DC 24 V  
**Nominal voltage range:** 0,85 ... 1,1  $U_N$   
**Power consumption:** 0,3 W

### Output

**Contacts:** 1 NC contact, 2 antivalent changeover contacts  
**Switching element:** IEC EN 60947-5-1 Appendix K  
**Switching principle:** Change-over contact with forced opening spring contact  
**Contact material:** Ag / AgSnO<sub>2</sub>  
**Max. switching frequency:** 360/h  
**Max. operating current:** 2 A  
**Utilization category of switching elements**  
to AC 15: 1 A  
to DC 13: 0,5 A  
**Electrical service life:** 5 x 10<sup>6</sup> switching cycles  
**Short circuit strength, Max. fuse rating:** 2 A gG  
**Conditional rated short-circuit current:** (rated conditional short circuit current): 1000 A  
**Mechanical life:** 1 x 10<sup>6</sup> switching cycles

### General Data

**Temperature range:** - 25°C to + 65°C  
**Storage temperature:** - 40°C to + 80°C  
**Rated impuls voltage:** 0,8 kV  
**Rated insulation voltage:** ≤ 50 V  
**Overvoltage category:** III  
**Pollution degree:** 2  
**Connection:** Cage clamp terminals  
**Cross sections min. / max.:** 0,25 / 0,75 mm<sup>2</sup> (with ferrules and sleeve according to DIN 46228-4)  
**Cable entry with thread:** 1 x M20x1,5  
**Intended use:** Up to max. cat. 4, PL e according to EN ISO 13849-1  
**Mounting:** To DIN EN 50041  
**Test principles:** DIN EN ISO 13849-1:2008  
DIN EN ISO 14119:2014-03  
DIN EN 60947-5-1:2005  
GS-ET-15:2011-02  
GS-ET-19:2011-02  
GS-ET-31:2010-02

## Safety Related Data

| Data suitable for the PFH <sub>d</sub> summation method according to EN ISO13849-1:2016 |                         |             |             |             |
|---|-------------------------|-------------|-------------|-------------|
| Data according to EN ISO13849-1:2016  | Switch Module SX and SV |             |             |             |
| Category  | 2                       | 3           | 3           | 4           |
| PL  | d                       | d           | e           | e           |
| PFH <sub>d</sub>  | 1,061E-09               | 6,84592E-10 | 5,44569E-10 | 1,00122E-10 |
| T <sub>10d</sub>  | 20                      | 20          | 20          | 20          |
| CCF required  | 65-100                  | 85-100      | 85-100      | 85-100      |
| B <sub>10d</sub>  | 2.000.000               | 2.000.000   | 2.000.000   | 2.000.000   |
| d <sub>op</sub> (d/a)   | 365                     | 365         | 365         | 365         |
| h <sub>op</sub> (h/d)   | 24                      | 24          | 24          | 24          |
| t <sub>cycle</sub> (h)  | 1                       | 1           | 1           | 1           |
| n <sub>op</sub>   | 8760                    | 8760        | 8760        | 8760        |
| Diagnostic coverage DC  | 60%                     | 60%         | 90%         | 99%         |
| Test interval according to ISO14119   | 1 / year                | 1 / year    | 1 / month   | 1 / month   |

Category 2: The prerequisites for installation and integration into a category 2 architecture must be met

Category 3: The prerequisites for installation and integration into a category 3 architecture must be met

Category 4: The prerequisites for installation and integration into a category 4 architecture must be met, in particular 2 actuators must be used

PFH<sub>d</sub>: A single module has no function. As a result, an individual module cannot have any safety-related characteristic values. The safety-related characteristic data in the table only serve to determine the values of a unit into which it is integrated.

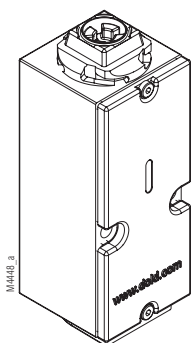
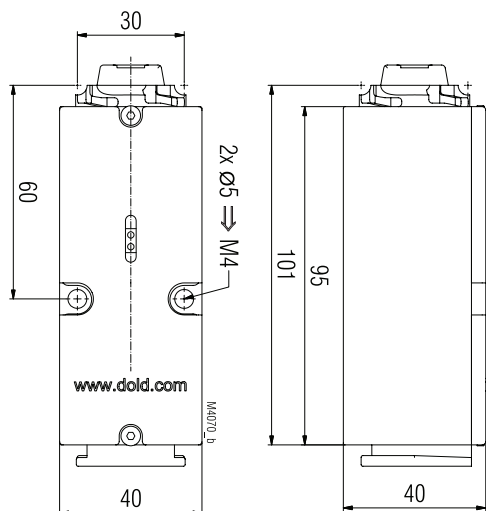
When used as part of a **key transfer system**:

- PFH<sub>d</sub> total STS system = SUM PFH<sub>d1</sub> + ... PFH<sub>dn</sub>
- Lowest category of a module = category of whole STS system
- Lowest DC of a module = DC entire STS unit

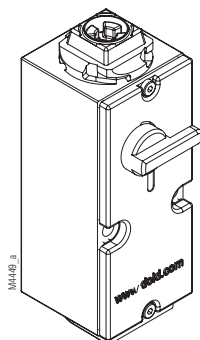
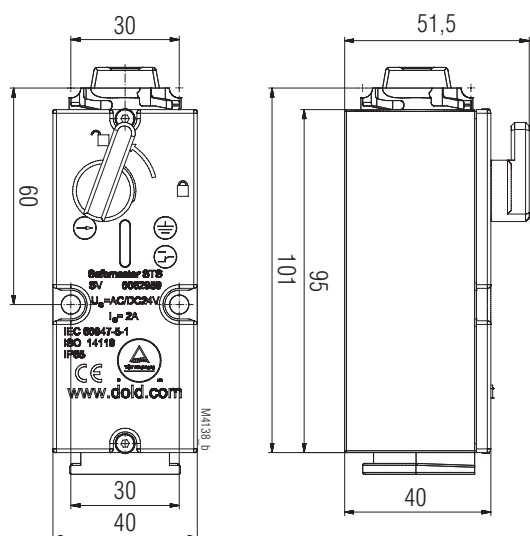


If the design of a unit is changed, the safety-related data may also change.

## Dimensional Drawings [mm]



Switch module SX



Switch module SV

## Variants and Accessories

### Switch module RX and RV

For applications where key modules 10 or 10S or an actuator module K or E shall be installed above the switch module, the RX and RV variants are available. For more information refer to the data sheet of switch modules RX and RV and also to the data sheet of actuator modules K and E.

### Ordering Designation

Switch module SX  
Article number: 0060797

Switch module SV  
Article number: 0062959

Switch module SV cover  
Article number: 0062991