



Presentation in the deactivated condition:
Key and actuator removed

STS-System Benefits

- EU-Test certificate according to the directive 2006/42/EG, annex IX
- For safety applications up to PLE/Category 4 according to EN ISO 13849-1
- Modular and expandable system
- Rugged stainless steel design
- Wireless mechanical safeguarding
- Combines the benefits of safety switch, solenoid locking 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

The unit is particularly suitable for applications with:

- Full body access (lock-in danger)
- Several secured entries
- Single-channel/ redundant/ diverse safety circuits
- Rugged ambient conditions

Approvals and marking



Function

Safety switch with forced key removal and electromagnetic blocking of the key

Application

To secure separating guards such as safety gates and hoods in machine and plant engineering.

Design and Operation

Solenoid locking units prevent opening of separating guards and keep them closed as long as there is a risk of injury in the secured plant.

Attention!



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

The solenoid locking unit is to be integrated into a system and connected with a control unit so that the hazardous machine can run only when the guard is locked and closed.

An access can only be opened after a release signal was sent by the machine control to the ZRH01A solenoid locking unit. The actuator can only be removed from actuator module A and the access opened after removing the key from key module 01. Key operation is forced. Key entry is blocked when the door is open. The key can be entered again after the access was closed again. Only after entering the key is the solenoid locking activated again and the machine can be restarted. Key and magnet position are monitored by separate contacts.

ZRH01A is usually used in the system in connection with additional STS units and SAFEMASTER products (e.g. release by speed monitor UH 5947, standstill monitor LH 5946 or speed/standstill monitor BH 5932). The key with forced removal can be used as protection against lock-in.

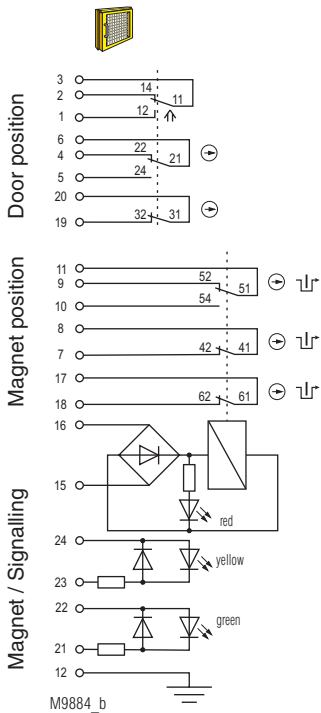


Fig. 1:
Solenoid locking activated:
Magnet locked, key
and actuator inserted,
Door closed

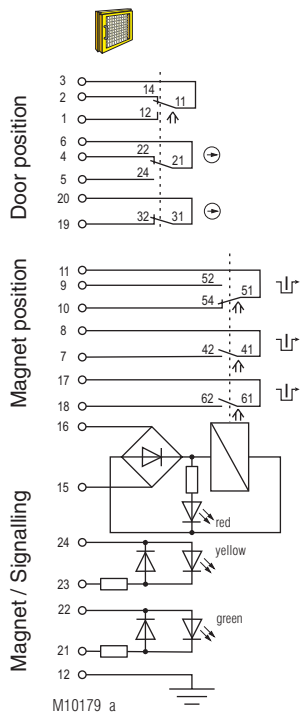


Fig. 2:
Solenoid locking deactivated:
Magnet released, key
and actuator inserted,
Door closed

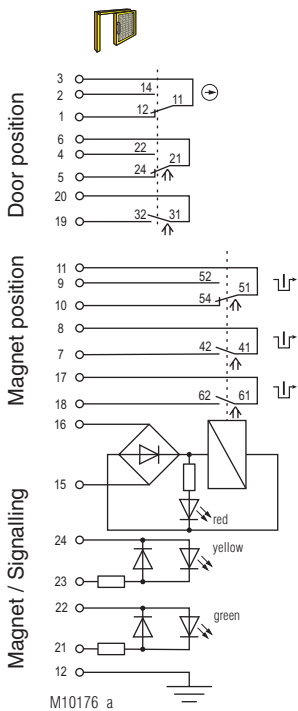


Fig. 3:
Solenoid locking deactivated:
Magnet released, key
and actuator removed,
Door open

Switching logic

| | | Door position | | |
|-----------------------|----|----------------|--------|--------|
| | | Fig. 1 | Fig. 2 | Fig. 3 |
| Door contacts | 3 | 2 | 1 | 1 |
| | 3 | 1 | 2 | 2 |
| | 6 | 4 | 5 | 5 |
| Magnet contact | 6 | 5 | 4 | 4 |
| | 19 | 20 | 19 | 19 |
| | 11 | 9 | 10 | 10 |
| Control signal Magnet | 11 | 10 | 11 | 11 |
| | 7 | 8 | 7 | 7 |
| | 17 | 18 | 17 | 17 |
| U _N | | U _N | | |
| Magnet | | Magnet | | |
| 15 | | 16 | | |

■ closed
□ open

The state shown in **Figure 3** does not depend on the control signal of the magnet.
If the control signal is applied and the key inserted the solenoid locking changes to the state of **Figure 2**.
If no signal is applied and the key inserted the solenoid locking changes to the state of **Figure 1**

Enclosure: Stainless steel V4A / AISI 316L / AISI 630
 Degree of protection: IP 65
 Temperature range: - 25 °C to + 60 °C
 standby current principle: - 25 °C to + 40 °C
 Temperature range: - 40 °C to + 80 °C
 load current principle: Rotating axis with redundant actuation
 Storage temperature: Cage tension spring clamping
 Mechanical principle: 0.25 mm²
 Connection method: min. connection cross-section: 0.75 mm²
 min. connection cross-section: 1 x M20 x 1.5
 Cable entry: B10_d: 2 x 10⁶ switching cycles
 Electrical service life: 5 x 10⁶ switching cycles
 Locking force: min. 4000 N
 Shearing force: depending on actuator
 Solenoid locking principle: Standby current, failure locking-proof
 Magnetic principle: Standby current or load current
 min. operating speed: 100 mm/s
 max. operating speed: 500 mm/s
 max. switching frequency: 360/h
 Operating mode: 100% ED
 Power supply: „class 2“ in accordance to UL508 table 32
 Nominal voltage U_N: AC/DC 24 V
 Nominal voltage range: 0.85 ... 1.1 U_N
 (at 23 °C ambient temperature)

Power consumption: 6 W
 Rated impulse voltage: 0.8 kV
 Rated insulation voltage: ≤ 50 V
 Contacts: 1 NC contact, 2 antivalent changeover contacts
 Door position: 2 NC contacts + 1 changeover contact
 Magnet position: Changeover contact with forced-opening snap-action switches
 Switching principle:

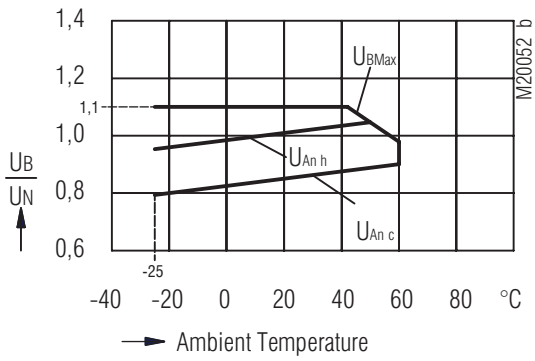
Max. operating current: 2 A
 Standby current principle: 1 A
 Load current principle: 1000 A
 Rated conditional short circuit current: Ag / AgSnO₂
 Contact material: 2 A gG
 Short circuit strength, max. fusing:
 Utilization category of switching elements: 1 A
 to AC 15: 0.5 A
 to DC 13: LED red: Magnet energized
 Indicator: LED yellow/green
 (separate selection possible)

Test principles: EN ISO 13849-1:2008
 DIN EN ISO 14119:2014-03
 EN 60947-5-1:2005
 GS-ET-15:02.2011
 GS-ET-19:02-2011
 GS-ET-31:02-2010
 Intended use: up to max. cat. 4, PL e according to EN ISO 13849-1
 according to DIN EN 50041
 IEC EN 60947-5-1 Appendix K

Mounting: Add 2nd actuator module, Type ZRH01BA
 Contact elements:
 Additional requirement for cat. 4 structure (as single unit):
 Diagnostic coverage (DC), (mechanical):

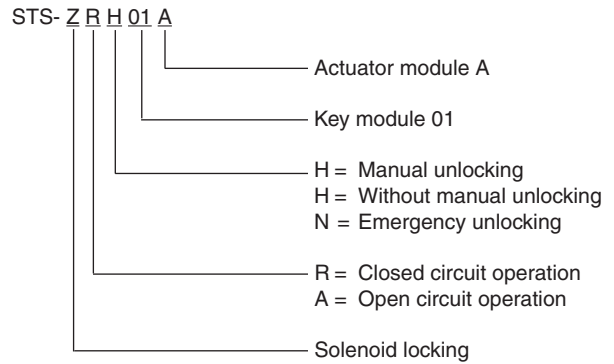
Logic and output
 ZRH01A: **cat. 2** 60 % **cat. 3** 90 % **cat. 4** 90 %
 ZRH01BA: 90 % 90 % 99 %
 Protection against faults of common cause: see table in STS design guide by manufacturer only
 Repair and replacement: Test intervals:
 for PL a to d: min. once a year
 for PL e: min. once a month

Solenoid derating graph



U_{BMax} maximum power supply dependent upon temperature
 $U_{An c}$ response voltage at coil temperature = ambient temperature
 $U_{An h}$ response voltage at preceding agitation at $1.1 \times U_n$

Ordering Example



Variants and Combination Options

Because of their modular design the basic units of the SAFEMASTER STS System can be combined and expanded according to customer requests. This allows for a variety of possible units and functions.

Overview of the basic units

| Functions | Safety switches design type 2 | Safety switches design type 2 with solenoid lock | Mechanical units design type 2 | Mechanical units with electrical monitoring | Mechanical units with electrical release |
|--|-------------------------------|--|--------------------------------|---|--|
| Units with standard function | SXA | ZRHA | M10A | RX10A RXK01M | YRXKM YRXK01M |
| Units with mechanical lock and forced key extraction | SX01A | ZRH01A | M11A | RX11A RXK11M | YRX10A YRX11A |
| Units with optional key extraction | SXB01M | ZRHB01M | M10B01M | RX10B01M RX10K01M | YRX10B01M |
| Units without actuator | SX01M | ZRH01M | M12M | RX11M | YRX11M |

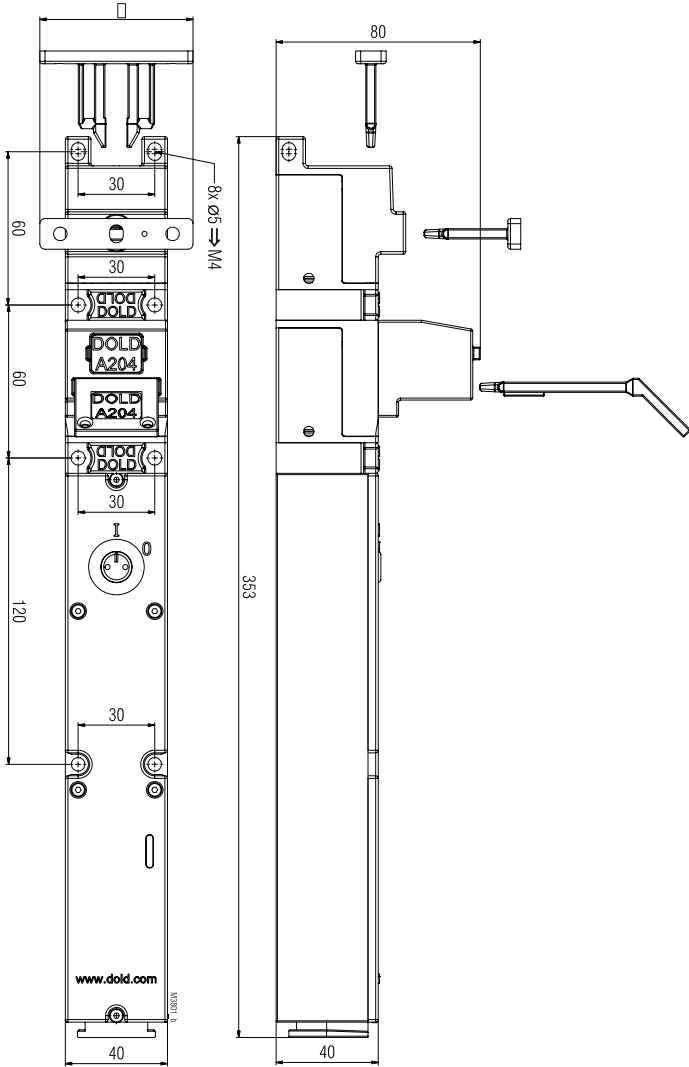
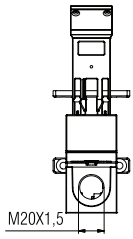
For additional information refer to the data sheets of the individual modules and other basic units.

Data sheets

Solenoid locking modules ZRX/ZRH/ZAX
 Key module 01/10
 Actuator module A



Take advantage of the advice of the **E. DOLD & SÖHNE KG** specialists regarding the choice of units and combination of a system.



Illustrations: ZRH01A

Clearance tolerances $\pm 2\%$

