SAFEMASTER STS
Safety Switch- And Key Interlock System
Basic Unit STS-ZRHB01M

Original Datasheet

0258046

Presentation
in the deactivated condition:
Actuator and key 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 STS-ZRHB01M
The unit is particularly suitable for applications with:
- Full body access (lock-in danger)
- Setup mode
- Several secured entries
- Single-channel/ redundant/ diverse safety circuits
- Rugged ambient conditions

Approvals and marking

CE TÜVRheinland CERTIFIED Functional Safety Type Approved www.tuv.com ID 0600000000

Function

Safety switch (type 2) for separating guards with electromagnetic solenoid locking and optional key removal

Application

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

Design and Operation

STS solenoid locking units prevent opening of separating guards and keep them closed as long as their 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 STS 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 STS-ZRHB01M 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.

STS-ZRHB01M 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.

Circuit Diagrams

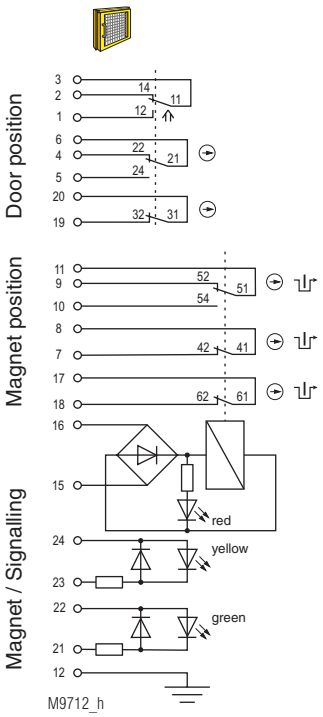


Fig. 1:
Solenoid locking activated:
Magnet locked,
actuator and key inserted,
Door closed

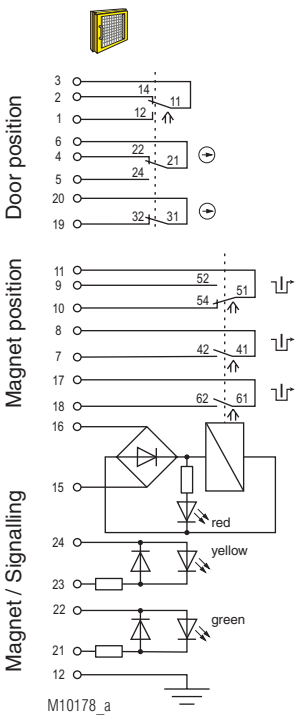


Fig. 2:
Solenoid locking deactivated:
Magnet released,
actuator and key inserted,
Door closed

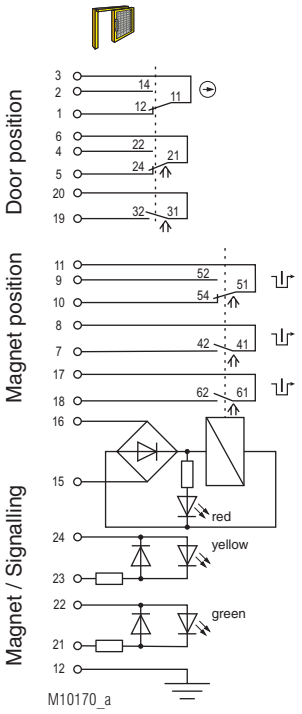


Fig. 3:
Solenoid locking deactivated:
Magnet released,
Actuator removed,
Door open

Switching logic

			Fig. 1	Fig. 2	Fig. 3
Door contacts	3	2	■	■	
	3	1			■
	6	4	■	■	
	6	5			■
	19	20	■	■	
Magnet contact	11	9	■		
	11	10		■	■
	7	8	■		
	17	18	■		
Control signal Magnet	U_N				
	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 actuator inserted the solenoid locking changes to the state of **Figure 2**.
If no signal is applied and the solenoid locking is inserted the solenoid locking changes to the state of **Figure 1**

Technical Data

Enclosure:	Stainless steel V4A / AISI 316L
Degree of protection:	IP 65
Temperature range standby current principle:	- 25 °C to + 60 °C
Temperature range load current principle:	- 25 °C to + 40 °C
Storage temperature:	- 40 °C to + 80 °C
Mechanical principle:	Rotating axis with redundant actuation
Connection method:	Cage tension spring clamping
min. connection cross-section:	0.25 mm²
max. connection cross-section:	0.75 mm²
Cable entry:	1 x M20 x 1.5
$B10_d$:	2 x 10^6 switching cycles
Electrical service life:	5 x 10^6 switching cycles
Locking force:	min. 1000 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 (by exception, 1500 mm/s is permitted)
max. switching frequency:	360/h
Operating mode:	100% ED
Nominal voltage U_N:	AC/DC 24 V
Nominal voltage range:	0.85 ... 1.1 U_N
Power consumption:	6 W
Rated impulse voltage:	0.8 kV
Rated insulation voltage:	≤ 50 V
Contacts	
Door position:	1 NC contact, 2 diverse changeover contacts
Magnet position:	2 NC contacts + 1 changeover contact
Switching principle:	Changeover contact with forced-opening snap-action switches
Max. operating current	
Standby current principle:	2 A
Load current principle:	1 A
Rated conditional short circuit current:	1000 A
Contact material:	Ag / $AgSnO_2$
Short circuit strength, max. fusing:	2 A gG
Utilization category of switching elements	
to AC 15:	1 A / AC 230 V
to DC 13:	0.5 A / DC 60 V
Indicator	LED red: Magnet energized 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
Mounting:	according to DIN EN 50041
Contact elements:	IEC EN 60947-5-1 Appendix K
Additional requirement for cat. 4 structure (as single unit):	Add 2nd actuator module, Type STS-ZRHBB01M

Diagnostic coverage (DC), (mechanical):

Logic and output	**cat. 2**	**cat. 3**	**cat. 4**
STS-ZRHB01M:	60 %	90 %	
STS-ZRHBB01M:	90 %	90 %	99 %

Protection against faults of common cause:	see table in STS design guide
Repair and replacement:	by manufacturer only
Test intervals:	
for PL a to d:	min. once a year
for PL e:	min. once a month

Ordering Example

STS- Z R H B 01 M

- M — End module M
- 01 — Key module 01
- B — Actuator module B
- H — Manual unlocking
  x — Without manual unlocking
  N — Emergency unlocking
- R — Closed circuit operation
  A — Open circuit operation
- Z — Solenoid locking

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

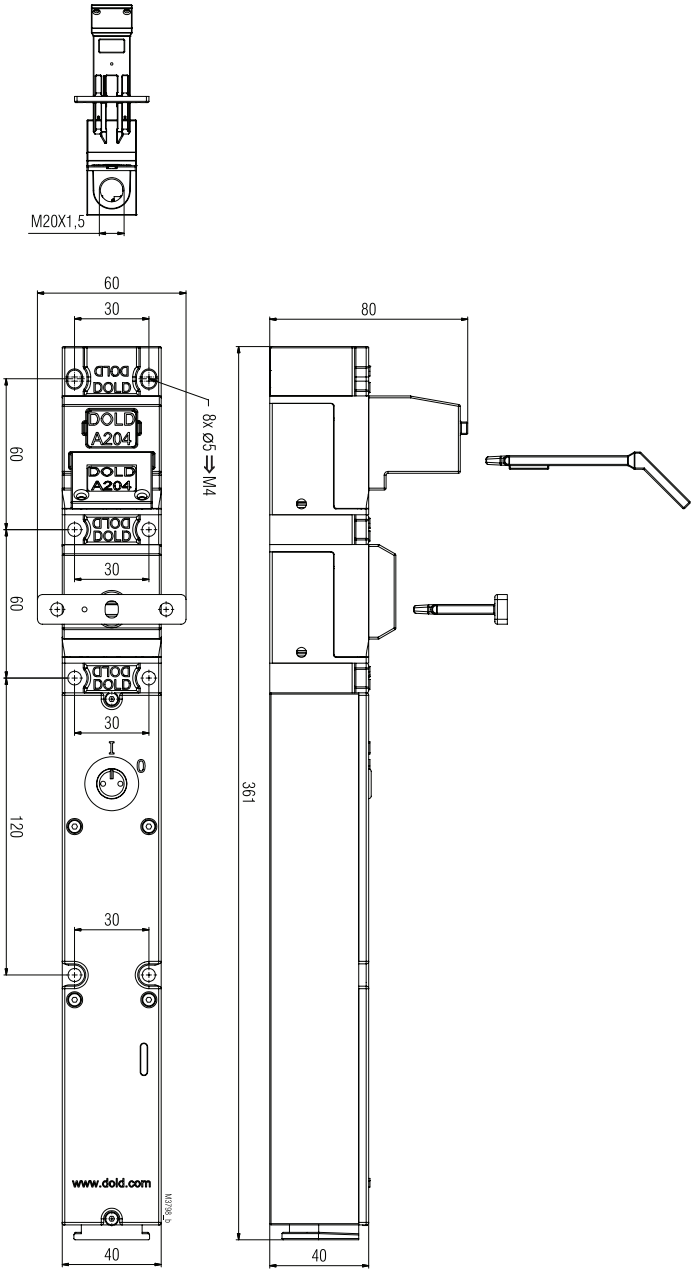
Functions	Safety switches design type 2	Safety switches design type 2 with solenoid lock	Mechanical units design type 2	Mechanical units with electrical monitoring	Mechanical units with electrical release
Units with standard function	SXA	ZRHA	M10A	RXK01M RX10A	YRXKM
Units with mechanical lock and forced key extraction	SX01A	ZRH01A	M11A	RXK11M RX11A	YRX10A
Units with optional key extraction	SXB01M	ZRHB01M	M10B01M	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

STS Solenoid locking modules ZRX/ZRH/ZAX
STS Actuator module A

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

Dimensional Drawing [mm]



Clearance tolerances ± 2%