

SAFEMASTER STS Safety Switch- And Key Interlock System Locking Module YRX, YAX and YRH

Translation of the
german original



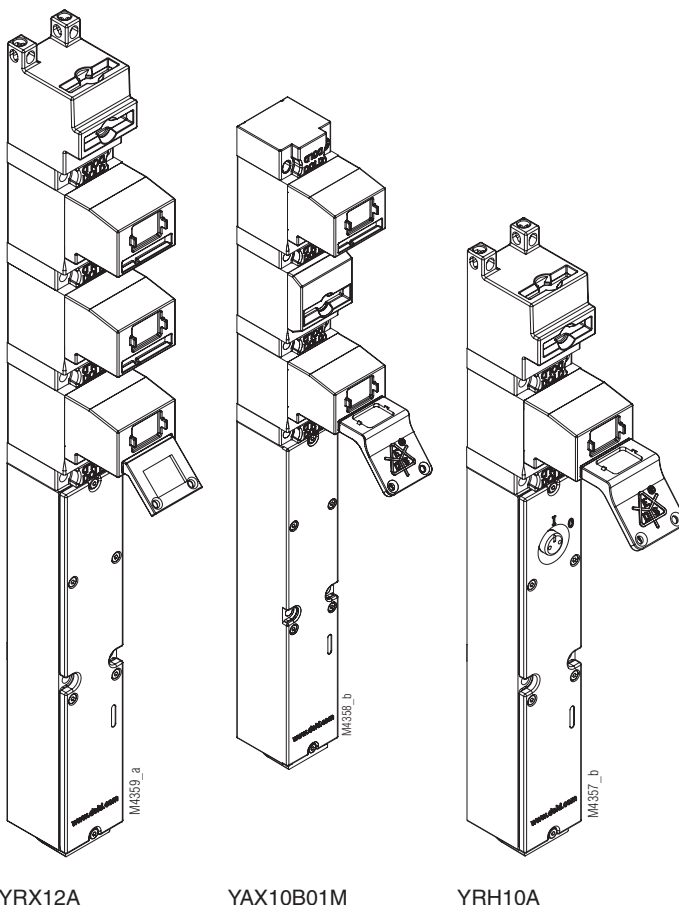
STS-System Benefits

- 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, 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

- Locking module for access authorization applications
- To monitor
 - Actuator / key position
 - Doors and entries
 - Locking module position
- Module expansions possible only above the module
- Standby current or load current principle
- Optionally with manual unlocking
- With integrated LEDs for status indication

Installation Examples



Approvals and Marking



Application

Locking modules YRX, YAX and YRH are assembled with other modules to an STS unit. They are used for access authorizations and monitoring of actuator/key positions, doors, entries and locking module positions of separating guards. It must therefore be ensured in the case of authorization applications that there is no hazard remaining when inserting the actuator / key and access can be unlocked.

Design and Operation

An extremely robust and flexible solenoid lock, which monitors the safe position of one or more entries in a system, for instance, of a guard or protective door. For this purpose, the module is used in connection with other mechanical modules such as key modules 10, 10S or actuator modules such as K, E or padlock module W, installed directly above.

ATTENTION!



Combination with other mechanical STS modules is not permitted! This may block the unit. Key and padlock modules can be installed either above or below an actuator module. Operation of the access can only be released when the safety of the system is ensured for the operating personnel.

Locking modules YRX, YAX and YRH are typically used in systems where access rights are distributed via SAFEMASTER STS keys. For access authorizations users and service employees receive a key enabling entry to predefined plant area. YRH10A represents an example of such a unit. The plant must first be in a safe condition here before the module unlocks, a key can be inserted and a door or similar can be opened.

With the unit YAX11A a key must be inserted while the condition is safe and another key must be pulled or a key changed before an access can be opened. These modules can also be used without actuator module only to release key entries in a key interlock system if they are used here as access authorizations.

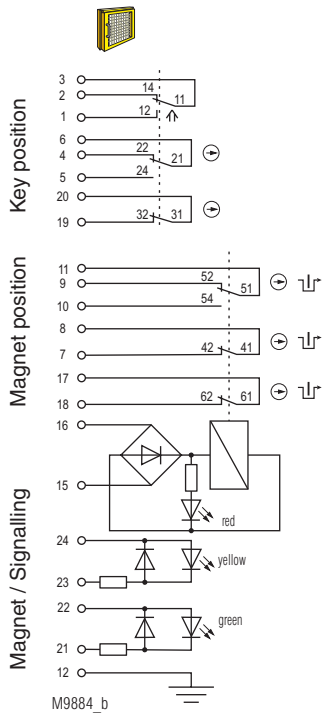


Fig. 1:
Locked while activated:
Magnet locked, key removed,
actuator inserted,
Door closed

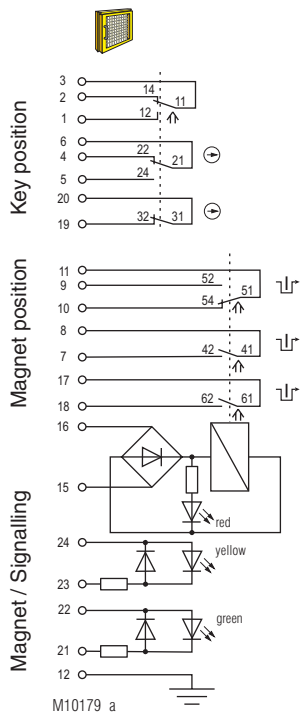


Fig. 2:
Lock deactivated:
Magnet released, key removed,
actuator inserted
Door closed

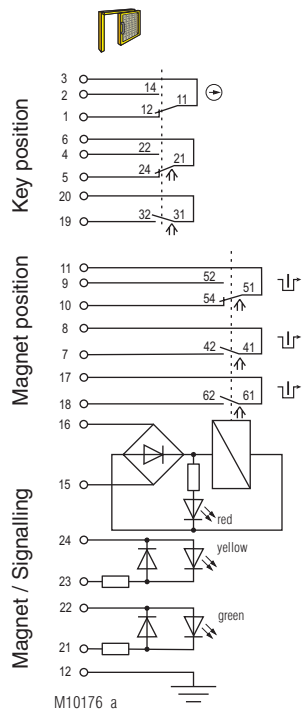


Fig. 3:
Lock deactivated:
Magnet released, key inserted,
actuator removed,
Door open

Switching logic

		Fig. 1	Fig. 2	Fig. 3
Key contacts	3	2		
	3	1		
	6	4		
Magnet contact	6	5		
	19	20		
Control signal Magnet	11	9		
	11	10		
	7	8		
Control signal Magnet	17	18		
	standby current principle U_N	15	16	
Control signal Magnet	load current principle U_N	15	16	
	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 removed the lock changes to the state of **Figure 2**.
If no signal is applied and the key is removed the lock changes to the state of **Figure 1**

Enclosure: Stainless steel V4A / AISI 316L
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: 1.5 mm²
min. connection cross-section: 1 x M20 x 1.5
max. connection cross-section: B10_d: 2 x 10⁶ switching cycles
Cable entry: 5 x 10⁶ switching cycles
Electrical service life: min. 4000 N
Locking force: depending on actuator and actuator module

Shearing force: depending on actuator
Locking module principle: Standby current, failure locking-proof
Magnetic principle: Standby current or load current
max. operating speed: 500 mm/s
min. operating speed: 100 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
Power consumption: 6 W
Rated impulse voltage: 0.8 kV
Rated insulation voltage: < 60 V

Contacts: 1 NC contact, 2 diverse changeover contacts
Door position: 2 NC contacts + 1 changeover contact
Switching principle: Changeover contact with forced-opening snap-action switches

max. operating current: 2 A
Standby current principle: 1 A
Load current principle: 0.5 A
Utilization category of switching elements: Ag / AgSnO₂
to AC 15: 2 A gG
to DC 13: LED red: Magnet energized
Contact material: LED yellow/green
Short circuit strength, max. fusing: (separate selection possible)
Indicator: EN ISO 13849-1:2008
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

Test principles: up to max. cat. 4, PL e according to EN ISO 13849-1
Installation: according to DIN EN 50041
Contact elements: IEC EN 60947-5-1 Appendix K
Diagnostic Coverage (DC): see data sheets STS basic units and STS design guide

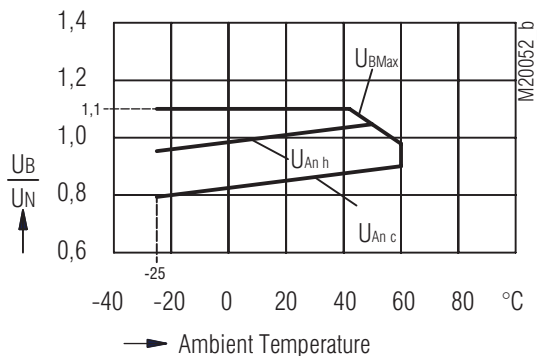


The diagnostic coverage of the units based on the locking module YAX (load current principle) corresponds to the SAFEMASTER STS units based on the switch modules RX. **Refer to the Important Notes at the end of this data sheet.**

Protection against faults joint cause: see table in STS design guide
Repair and replacement: by manufacturer only
Test intervals: semi-annually recommended
min. once a year

In case that with a design, based on a locking module according to the load current principle, both the magnet and the actuator / key positions are monitored, the same Diagnostic Coverage (DC) as with a locking module according to the standby current principle can be assumed.

Solenoid derating graph



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

Variants

Locking module YRX

Locking module, de-energized on trip, without additional functions

Locking module STS-YAX

Locking module, energized on trip, without additional functions

Locking module YRH

Locking module, de-energized on trip, with manual unlocking.
 In case of electrical faults, for instance, during power failure, the manual unlocking allows the mechanical release of a locking module with the help of a tool.

With the operation of the manual unlocking, the circuits on terminals 7 and 8; 9 and 11 as well as 17 and 18 will be cut off at the same time. Contact between 10 and 11 will be closed.

The manual unlockings are not sealed or lead-sealed because of the typically rugged application areas. When using a locking module with manual unlocking we therefore recommend combining it with acoustic and also visual warning signals and to provide additional locking on the control level.

Function inversion with locking modules

The locking modules YRX, YAX and YRH can also be combined with the actuator module K.

In this case the locking module no longer works as a door closure but rather unlocks mechanically functioning units for actuator removal. This combination is suitable for systems with a very high risk of being locked in where escape unlocking cannot be used; it is also used for escape sluices. The magnetic contacts of the locking module can only be used as signal contacts in this application. With a safety-related 2-channel contact use of the actuator / key position a safety switching device with changeover contact principle or antivalence switching is required. For more information refer to the data sheet for the actuator module K and E.

Examples

YRHK01M

This unit functions similar to the MK01M, but the actuator can only be introduced into the actuator module if a signal is applied to the solenoid of the locking module unit.

YRH11A

This unit functions similar to the ZRH01A, however, an (authorization) key must first be inserted when a signal is applied to the electric magnet of the locking module. After this the 2nd key can be removed and the actuator can then be pulled from the actuator module to open the access.

YRH10A

This unit functions similar to the ZRHA, however, an (authorization) key must first be inserted when a signal is applied to the electric magnet of the locking module. The actuator can then be removed from the actuator module to open the access.

YAX11A

This unit functions similar to the ZAX01A, however, an (authorization) key must first be inserted when a signal on the electric magnet of the locking module is obsolete. After this the 2nd key can be removed and the actuator can then be pulled from the actuator module to open the access.

Function selection / Versions

Locking module	Selectable functions		
	Standby current	Load current	Manual unlocking
STS-YRX	X		
STS-YAX		X	
STS-YRH	X		X

Important Notes

Function differences of locking modules with load current principle and locking modules with standby current principle.

Locking modules based on the standby current principle are in de-energized condition when in the locked position. This must be remembered especially when examining faults such as power failure or wire break.

Only when the safety evaluation shows, that a solenoid lock with closed circuit operation is not suitable or is not required, a solenoid lock with open circuit operation can be used.

Contrary to the locking modules based on the standby current principle locking modules based on the load current principle lock only when the circuit is closed. The locking modules unlock if the circuit opens with the load current principle.

If a locking module is used based on the load current principle terminals 7 and 8 or 17 and 18 must always be included again in the safety circuit. With the load current principle the control signal for the magnet is inverted (see switching logic).

Control signal Magnet	load current principle U_N	
	15	16
	High	Low

Emergency and escape releases

SAFEMASTER STS locking modules from the Y-series are not available with emergency or escape release, since their applications do not permit such functions. Refer to data sheet locking modules ZRN, ZAN, ZRF und ZAF.

Manual unlocking

If misuse of the manual unlocking must be suspected a locking module based on the standby current principle without manual unlocking can also be used as an alternative. In the event of a power interruption the locking module must be unlocked in this case by removing the cover and subsequently pushing back the magnetic tappet (refer to the SAFEMASTER STS Installation and Operating Instructions).

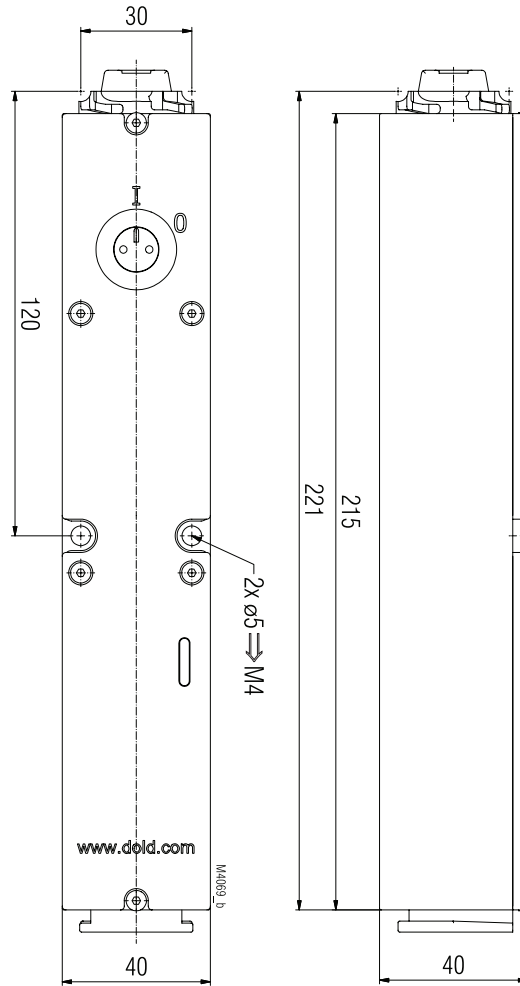
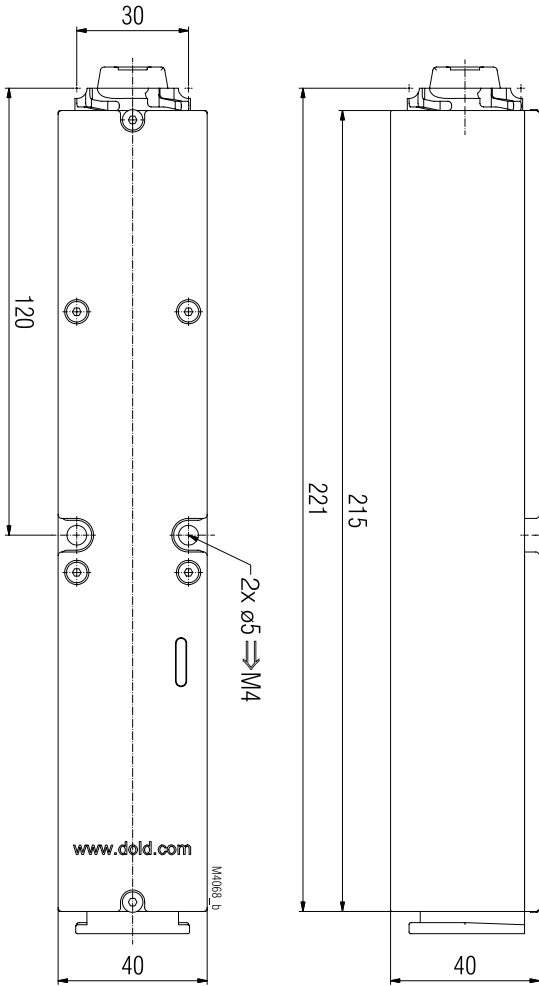
A SAFEMASTER-STS locking module based on the load current principle with manual unlocking is not available since it releases in the event of a power interruption.

Ordering Designation

Locking module YRX
 Article number: 0063506

Locking module YAX
 Article number: 0064969

Locking module YRH
 Article number: 0063953



Locking module YRX, YAX without manual unlocking

Locking module YRH with manual unlocking

