

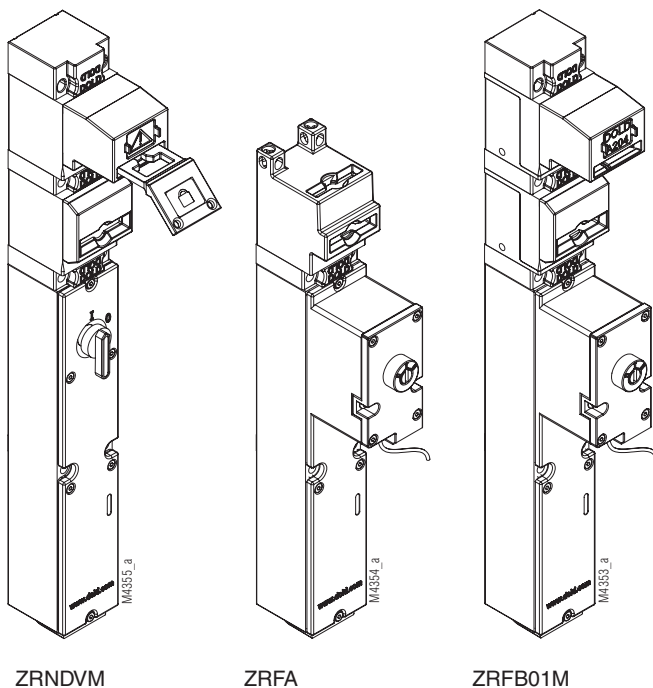
STS-System Benefits

- 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 monitoring doors and entries
- Optionally with emergency or escape unlocking
- De-energized on trip (ZRN) or energized on trip (ZAN)
- Status indication by integrated LEDs
- Separate monitoring of actuator / key position and locking module position
- Escape unlocking including 10 m pull cable, shroud tensioner, chain and spring

Installation Examples



Approvals and Marking



Application

Locking modules ZRN, ZAN, ZRF und ZAF are assembled with other modules to an STS unit. They serve as a solenoid lock of separating guards on machines with cycle or overrun times or other hazards, which may still be present even after the access query. It must therefore be ensured that there is no hazard remaining when removing the actuator or key and access can be unlocked.

Design and Operation

Extremely rugged and flexible solenoid lock monitoring the safe position of an access in the system. For this purpose the modules are used in combination with other mechanical modules, for instance, actuator, key and/or padlock modules.

Access can only be released after the safety of the equipment has been ensured for the operating personnel.

With ZRN and ZRF an access can only be opened when a signal is applied to the magnet. In addition, both modules offer protection against lock-in. In emergency situations a door can be opened through manual operation of the emergency release (ZRN) or escape release (ZRF) without a signal being applied to the magnet.

ATTENTION!



Locking modules ZRF and ZAF may not be used without actuator module only to release keys in a key interlock system.

Only the actuator modules A, B and D may be installed above a locking module ZRF and ZAF. Actuator modules K and E as well as key or padlock modules may never be installed since they would prevent the function of the escape release.

However, key modules 01, 01S as well as padlock module V can be installed above an actuator module B or D.

With the Locking modules ZAN and ZAF an entry can be opened when no signal is applied to the magnet. In addition, this module offers possible protection against lock-in. A door can be released in emergency situations by manually operating the emergency or escape release.

ATTENTION!



The modules ZAN and ZAF may be used only in connection with the mechanical modules e.g. key modules 01, 01S, padlock modul V or an actuator module A, B, D. Combination with other mechanical STS modules is not permitted and may cause the unit to be blocked.

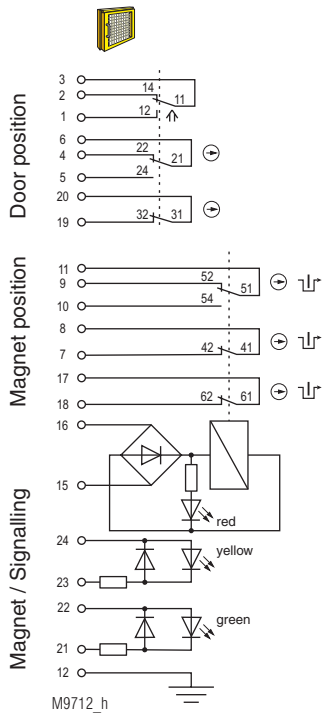


Fig. 1:
Locking module activated:
Magnet locked,
Actuator inserted,
Door closed

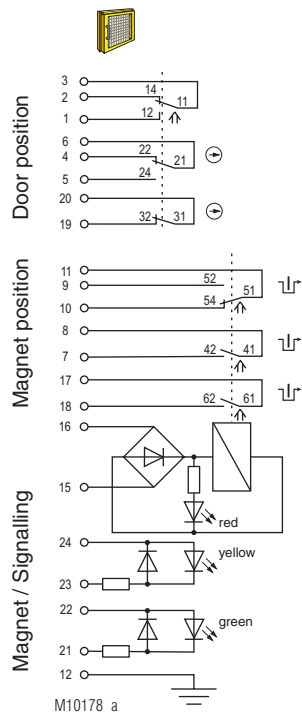


Fig. 2:
Locking module deactivated:
Magnet released,
Actuator inserted,
Door closed

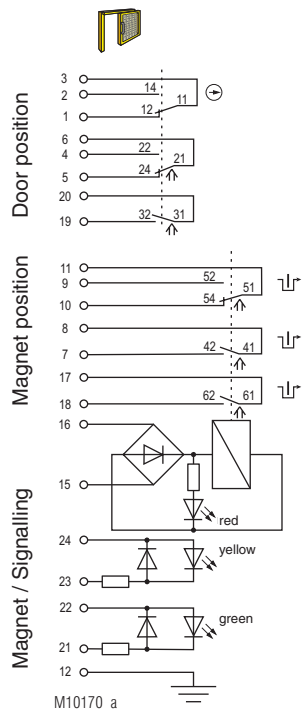


Fig. 3:
Locking module deactivated:
Magnet released,
Actuator removed,
Door open

Switching logic

		Fig. 1	Fig. 2	Fig. 3
Door contacts	3	2		
	3	1		
	6	4		
	6	5		
Magnet contact	19	20		
	11	9		
	11	10		
	7	8		
Control signal Magnet	standby current principle U_N			
	15	16		
	load current principle 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 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 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: 1.5 mm²
Cable entry: 1 x M20 x 1.5
B10_d: 2 x 10⁶ switching cycles
Electrical service life: 5 x 10⁶ switching cycles
Locking force: min. 3800 N
depending on actuator and actuator module
Shearing force: depends on actuator
Locking module principle: Failure locking-proof
Standby current (STS-ZRN, -ZRF)
Load current (STS-ZAN)
Standby current or load current
Magnetic principle: 100 mm/s
min. operating speed: 500 mm/s
max. operating speed: 360/h
max. switching frequency: 100% ED
Operating mode: „class 2“ in accordance to UL508 table 32
Power supply: AC/DC 24 V
Nominal voltage U_N : 0.85 ... 1.1 U_N
Nominal voltage range: 6 W
Power consumption: 0.8 kW
Rated impulse voltage: < 60 V
Rated insulation voltage: 1 NC contact, 2 diverse changeovers contacts
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: 1 A
Utilization category of switching elements to AC 15: 1 A
to DC 13: 0.5 A
Contact material: Ag / AgSnO₂
Short circuit strength, max. fusing: 2 A gG
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
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

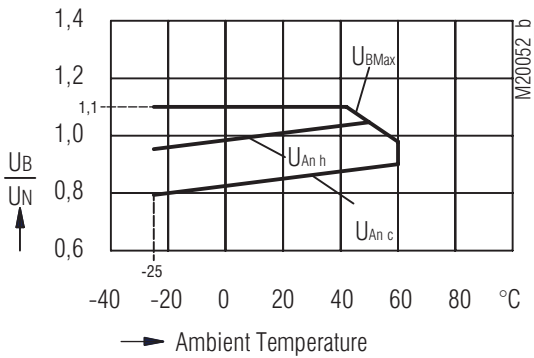


An estimation of the diagnostic coverage degree of the escape unlocking and emergency unlocking cannot be determined reliably. However, these functions have system characteristics according to category 3 when assembled correctly:
A single undetected fault does not lead to a failure of the safety function!

The diagnostic coverage level of units based on the Locking module STS ZAN (load current principle) corresponds to the SAFEMASTER STS units based on the switch modules SX.
Refer to the Important Notes at the end of this data sheet.

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

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 $1.1 \times U_n$

Variants

Locking module ZAN

Locking module, energized on trip, emergency unlocking.
 In emergency situations, for instance, in the event of confinement, the emergency release allows for the mechanical release of an access from outside the hazard area without the help of a tool.
 With the actuation of the emergency release, the circuits on terminals 7 and 8; 9 and 11 as well as 17 and 18 will be cut off at the same time and contact between 10 and 11 will be closed. This opening of the circuits must generate an emergency-stop.

Locking module ZRN

Locking module, de-energized on trip, emergency release.
 Emergency unlocking in the Locking module ZRN is equipped with a lever similar to the ZAN. After operating the lever the locking module magnet is pressed down mechanically and the locking module function of the STS unit is unlocked. Especially for machines with overrun time this means that with the emergency release activated the access is open while the machine or plant still represents hazards. When using a locking module with emergency release we recommend combining it with acoustic and also visual warning signals and to provide additional locking on the control level.
 When using the ZRN module within a dangerous area, it can also be used as an emergency release.

Locking module ZRF

Locking module, de-energized on trip, escape release.
 In emergency situations, for instance, in the event of confinement, the escape release allows for the mechanical unlocking of an access from inside the dangerous area without the help of a tool.
 With the actuation of the escape release, the circuits on terminals 7 and 8; 9 and 11 as well as 17 and 18 will be cut off at the same time and contact between 10 and 11 will be closed. This opening of the circuits must generate an emergency-stop.

The unit based on the locking module tuator is fastened to the movable part of the door. Escape unlocking functions via a mechanism integrated in the locking module and connected to a stainless steel cable. If the tension of the stainless steel cable is increased or reduced the magnet of the locking module is pressed down. The locking module unlocks and generates an emergency-stop. Through the tensioning and the independent operating direction of the cable the ZRF constantly monitors its own function.

The advantage of this version is that locked in persons can activate the escape function even from a larger distance, e.g. injured persons no longer able to reach the escape door. The stainless steel cable can also be routed through a machine enclosure without having to create major openings.

The locking module is unlocked by activating the escape release and a trapped person can escape from the hazard area. Especially for machines with overrun time this means that with the escape release activated the access is open while the machine or plant still represents hazards.
 This is also important in regard to self-monitoring of the locking module ZRF. Since the stainless steel cable is constantly under tension when installed correctly, a cable break or detachment of the mounting elements can be detected and trigger the safety function (see installation instructions). When using a locking module with escape release we recommend combining it with acoustic and also visual warning signals and to provide additional locking on the control level.

Variants

The scope of delivery includes a stainless steel cable (10 m), shroud tensioner and a return spring in addition to the unit/module. Additional accessories such as eyelets, return pulleys or mounting material are separately available.

Attention! Only the actuator modules A, B and D may be installed above a locking module ZRF and ZAF. Possible key or padlock modules may be installed only above the actuator modules B or D.



Actuator modules K and E as well as key or padlock modules may never be installed directly above these locking modules since they would prevent the function of the escape release.

Function Selection / Variants

Locking module	Selectable functions			
	Standby current	Load current	Escape unlocking	Emergency release
STS-ZRN	X			X
STS-ZRF	X		X	
STS-ZAN		X		X
STS-ZAF		X	X	

Important Notes

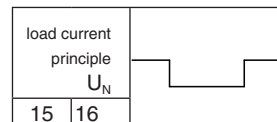
Function differences of locking modules with load current principle and locking modules with standby current principle.

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.

With the load current principle the control signal for the magnet is inverted.



Ordering Designation

Locking module ZRN
 Article number: 0063841

Locking module ZRN cover
 Article number: 0063868

Locking module ZRF
 Article number: 0063272

Locking module ZRF cover
 Article number: 0063273

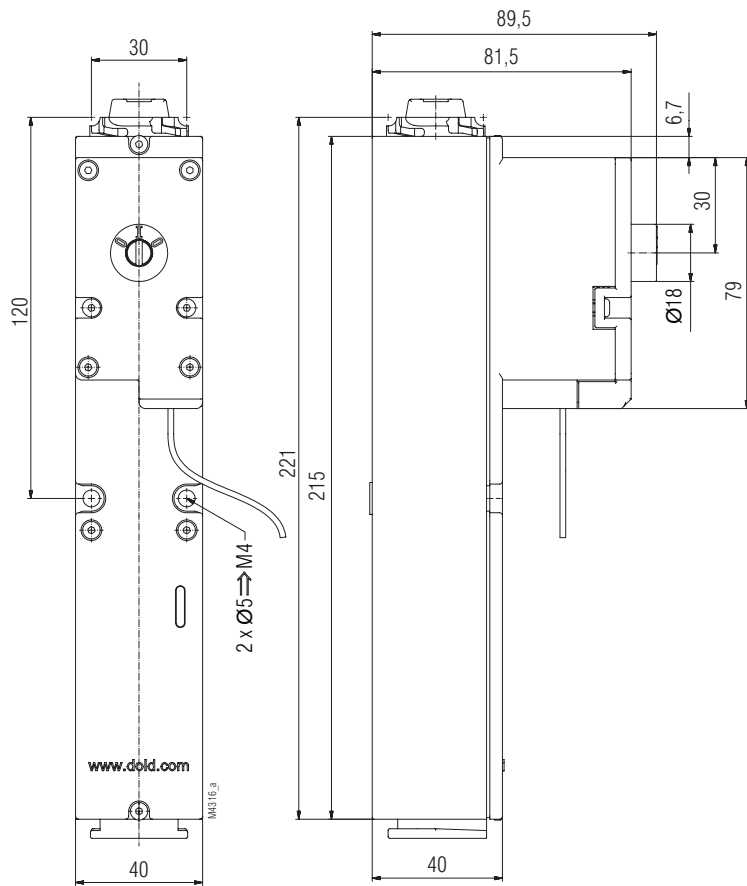
Locking module ZAN
 Article number: 0065621

Locking module ZAF
 Article number: 0065985

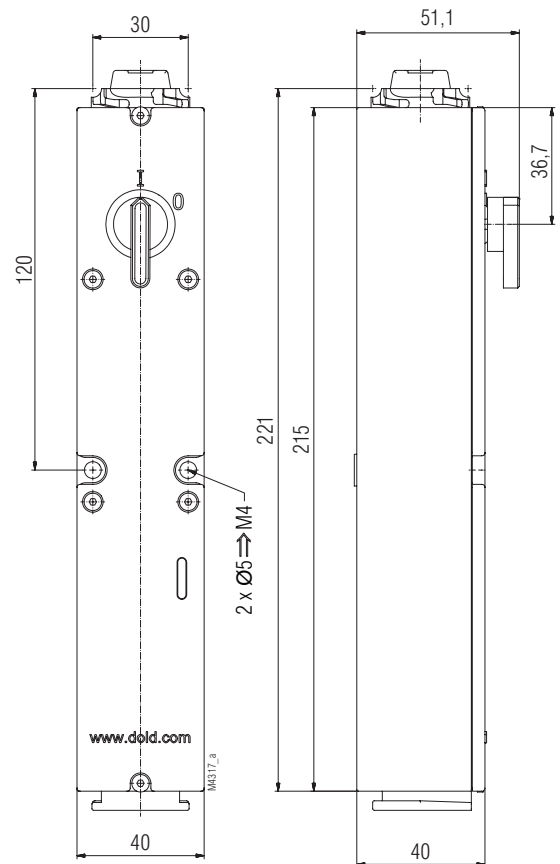
Accessories

Eyebolt set
 for locking module ZRF (4 pcs.): 0065198

Return pulley set
 for locking module ZRF (2 pcs.): 0065199

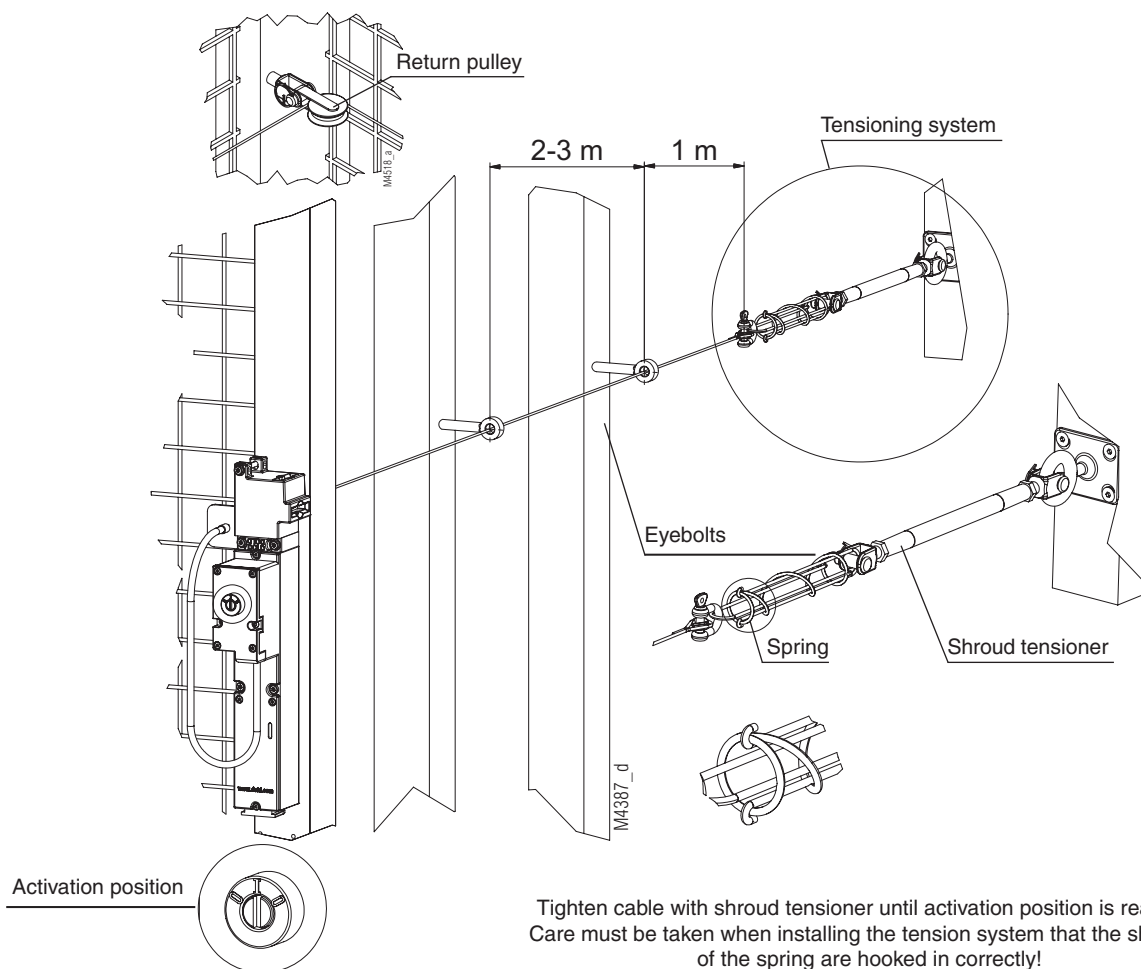


Locking module ZRF, ZAF with escape unlocking



Locking module ZRN, ZAN with emergency release

Application Examples



Tighten cable with shroud tensioner until activation position is reached. Care must be taken when installing the tension system that the shackles of the spring are hooked in correctly!