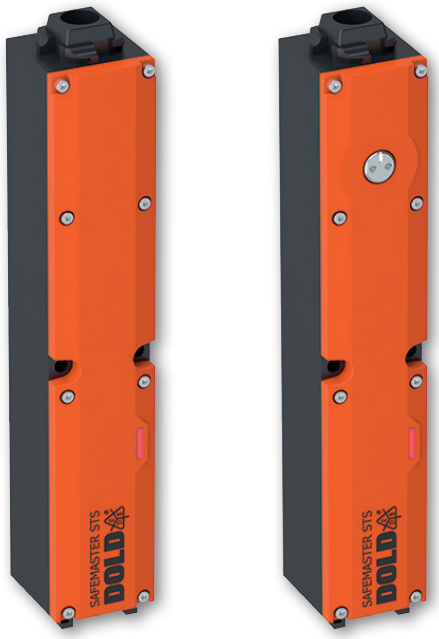

SAFEMASTER STS/K
Safety switch- and key interlock system
Locking module
YRX/K, YAX/K, YRH/K

Translation of the original instructions

0278804

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Content

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

The installation must only be done by a qualified electrican!

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.

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/K 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/K 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.

SAFEMASTER STS/K
Safety switch- and key interlock system
Locking module YRX/K, YAX/K, YRH/K

0278804

Locking module YRX/K, YAX/K
without manual unlockin

Locking module YRH/K
with manual unlockin

STS/K-System Benefits
- EU-Test certificate according to the directive 2006/42/EG, annex IX
- For safety applications up to PLe/Category 4 according to DIN EN ISO 13849-1
- Modular and expandable system
- Rugged composite version of stainless steel and plastic 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
- 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
- This modules are also available in stainless steel

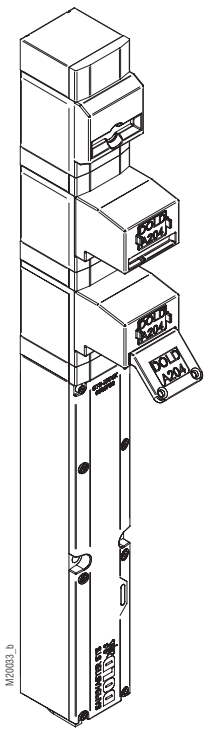
Description

Locking modules YRX/K, YAX/K and YRH/K are assembled with other modules to an STS/K 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.

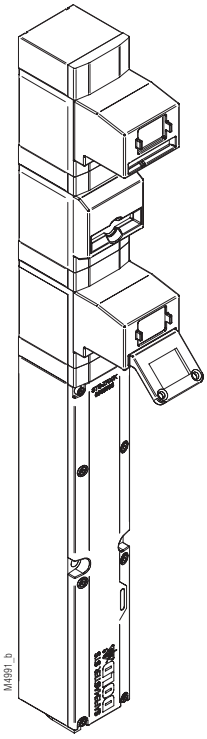
Approvals and Markings

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

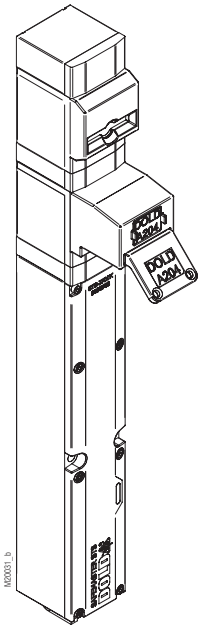
Installation Examples



YRX11BM/K



YAX10B01M/K



YRX10BM/K

Design and Operation

A 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/K, 10S/K or actuator modules such as K/K or padlock module W/K, installed directly above.

ATTENTION! !

Combination with other mechanical STS/K 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.

The Locking modules YRX/K, YAX/K and YRH/K are typically used in systems where access rights are distributed via SAFEMASTER STS/K keys. For
access authorizations users and service employees receive an key enabling entry to predefined plant area. YRH10BM/K 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 YAX11BM/K 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.

Circuit Diagrams (Example YRH10BM/K)

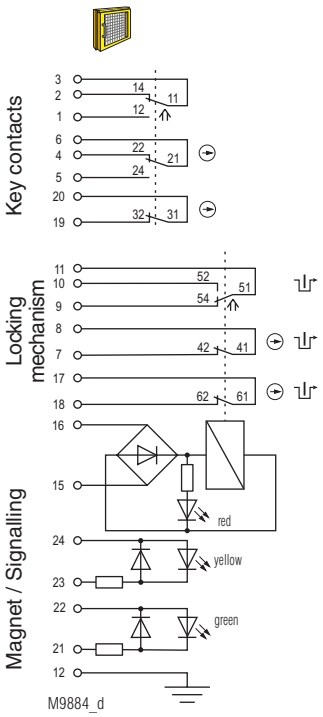


Fig. 1:
Locked while activated:
Magnet locked, key removed, actuator inserted,
Door closed

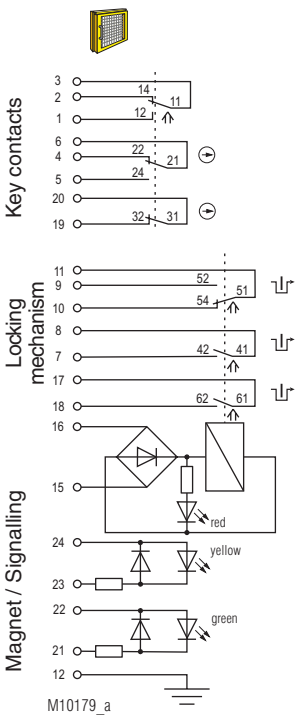


Fig. 2:
Lock deactivated:
Magnet released, key removed, actuator inserted
Door closed

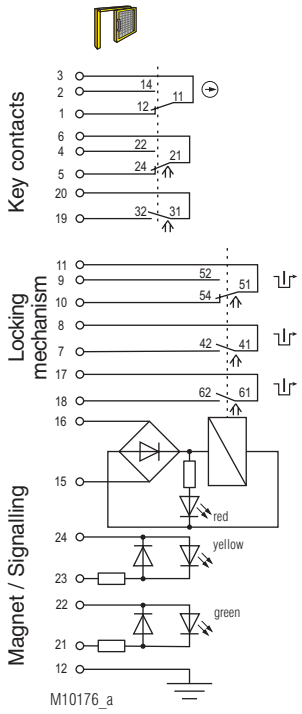


Fig. 3:
Lock deactivated:
Magnet released, key inserted, actuator removed,
Door open

Mechanical switch positions			Fig. 1	Fig. 2	Fig. 3
Circuit diagram					
Key contact	3	2	■	■	
	3	1			■
	6	4	■	■	
	6	5			■
	19	20	■	■	
Locking mechanism	11	9	■		
	11	10		■	■
	7	8	■		
	17	18	■		
Magnet / Signalling	De-energized on trip				
	15	16			
	Open circuit operation				
	15	16			

■ closed

□ open

The state shown in **Fig. 3** does not depend on the control signal of the magnet. If the control signal is applied (closed-circuit current principle) and the key is removed, the solenoid locking changes to the state shown in **Fig. 2**.
If no signal is applied and the key is removed the solenoid locking changes to the state of **Fig. 1**

Technical Data

Mechanical Data

Mechanical principle:	Rotating axis with redundant actuation and mechanical interlock
Enclosure:	PA + GF
Internal parts:	Stainless steel V4A / AISI 316 (acc. to EN 10027-2; 1.4401; 1.4404; 1.4542; 1.4301; 1.4310)
Locking force:	F_{zh} 2000 N
Degree of protection:	IP 65
Locking module principle:	Failure locking-proof
Magnetic principle:	Standby current or load current
Operating speed min. / max.:	100 / 250 mm/s

Input

Nominal voltage U_N (Measured nominal voltage):	AC/DC 24 V
Nominal voltage range:	0.85 ... 1.1 U_N (see solenoid derating graph)
Power consumption:	5.5 W

Output

Contacts	
Door position:	1 NC contact, 2 antivalent changeover contacts
Locking mechanism:	2 NC contacts + 1 C/O contact
Switching element:	IEC EN 60947-5-1 Appendix K
Switching principle:	Changeover contact with forced opening spring contact
Contact material:	Ag / $AgSnO_2$
Max. switching frequency:	360/h
Max. operating current	
De-energized on trip:	2 A
Energized on trip:	1 A
Utilization category of switching elements	
to AC 15:	1 A
to DC 13:	0.5 A
Electrical service life:	5 x 10^6 switching cycles
Short circuit strength, max. fusing:	2 A gG
Courant nominal de court-circuit conditionnel (rated conditional short circuit current):	1000 A
Mechanical life:	1 x 10^6 switching cycles

General Data

Operating mode	
Mechanical life:	100% ED
Temperature range	
Standby current principle:	- 25°C to + 45°C
Load current principle:	- 25°C to + 45°C
Storage temperature:	- 25°C to + 60°C
Rated impulse 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 mm² (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 EN ISO 13849-1
Mounting:	To DIN EN 50041
Test principles:	EN ISO 13849-1:2015 DIN EN ISO 14119:2014-03 EN 60947-5-1:2017 GS-ET-15:2015-05 GS-ET-19:2015-05 GS-ET-31:2010-02

Safety Related Data

Data suitable for the PFH_d summation method according to EN ISO13849-1:2016				
Data according to EN ISO13849-1:2016	YRX, YAX, YRH			
Category	2	3	3	4
PL	d	d	e	e
PFH_d	1,061E-09	6,84592E-10	5,44569E-10	1,00122E-10
T_{10d}	20	20	20	20
CCF required	65-100	85-100	85-100	85-100
B_{10d}	2.000.000	2.000.000	2.000.000	2.000.000
d_{op} (d/a)	365	365	365	365
h_{op} (h/d)	24	24	24	24
t_{cycle} (h)	1	1	1	1
n_{op}	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_d: 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_d total STS/K system = SUM PFH_{d1} + … PFH_{dn}
- Lowest category of a module = category of whole STS/K system
- Lowest DC of a module = DC entire STS/K unit

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

Variants

Locking module YRX/K
Locking module, de-energized on trip, without additional functions

Locking module YRH/K
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.

Locking module YAX/K
Locking module, energized on trip, without additional functions

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

Examples

YRHK01M/K
This unit functions similar to the MK01M/K, but the actuator can only be introduced into the actuator module if a signal is applied to the solenoid of the locking module unit.

YRH11BM/K
This unit functions similar to the ZRH01BM/K, 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.

YRH10BM/K
This unit functions similar to the ZRHBM/K, 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.

YAX11BM/K
This unit functions similar to the ZAX01BM/K, 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

	Selectable functions		
Locking module	Standby current	Load current	Manual unlocking
YRX/K	X		
YRH/K	X		X
YAX/K		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.
See DIN EN ISO 14119:2014-03 Abs. 5.7.1.

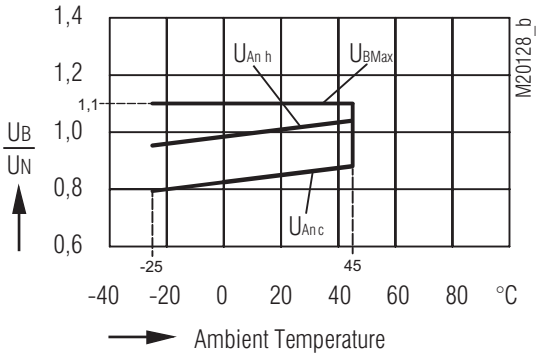
Contrary to the locking modules based on the standby current principle locking modules based on the load current principle lock only when the circuit is closed. The locking modules unlock if the circuit opens with the load current principle.

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).

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/K Installation and Operating Instructions).

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

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 x Un

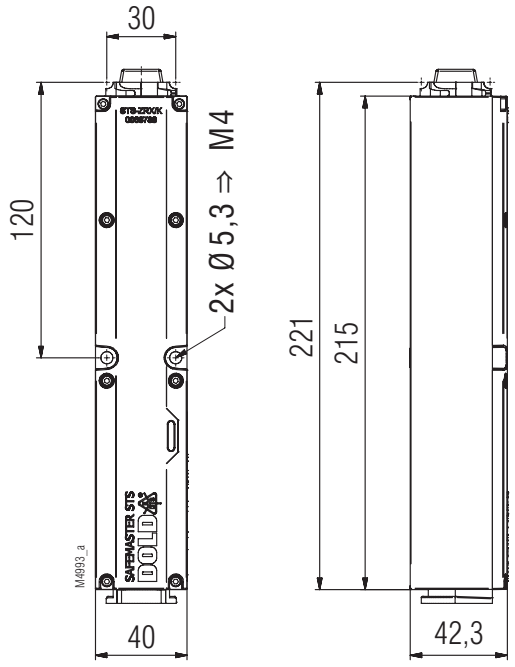
Ordering Designation

Locking module YRX/K
Article number: 0066964

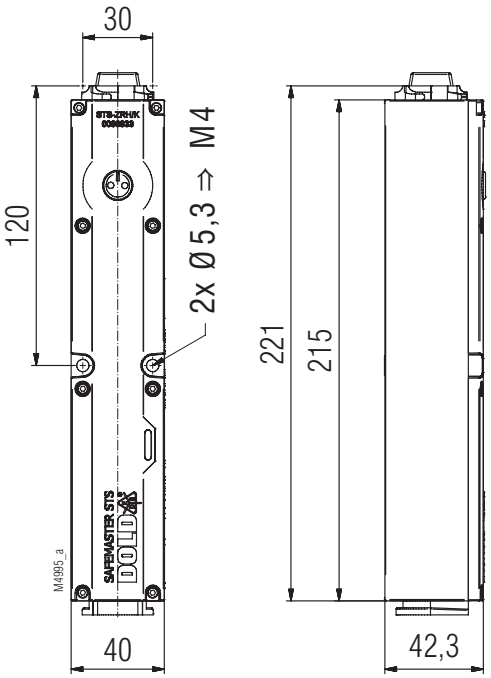
Locking module YRH/K
Article number: 0066965

Locking module YAX/K
Article number: 0066987

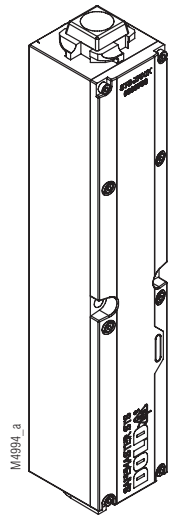
Dimensional Drawing [mm]



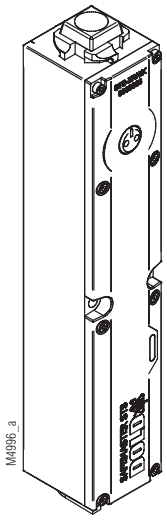
Locking module YRX/K, YAX/K without manual unlockin



Locking module YRH/K with manual unlockin

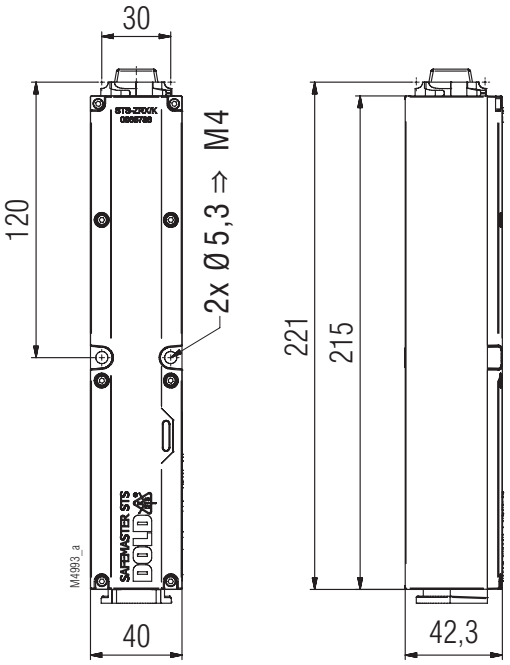


YRX/K

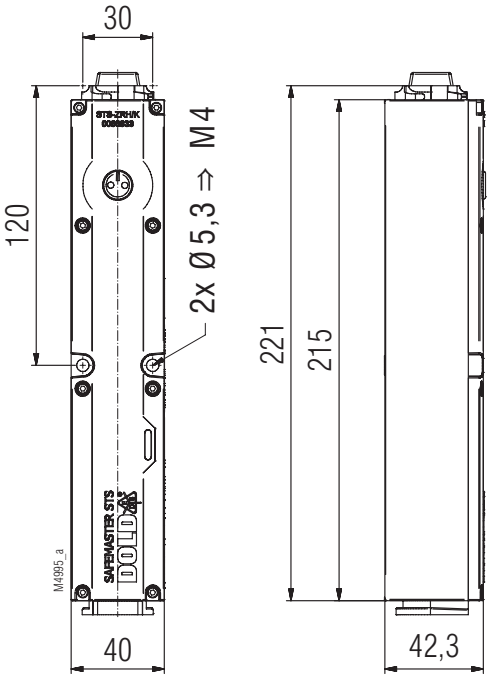


YRH/K

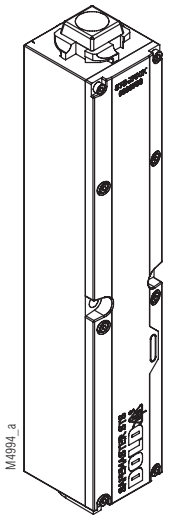
Dimensions [mm]



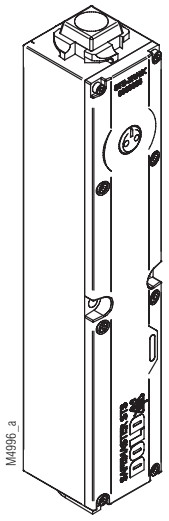
Module de verrouillage YRX/K, YAX/K sans déverrouillage auxiliaire



Module de verrouillage YRX/K, YAX/K avec déverrouillage auxiliaire



YRX/K



YRH/K

DE	**Notizen**
EN	**Notice**
FR	**Note**