

MOUNTING INSTRUCTIONS

Paxos[®] *compact* Switching Unit VdS

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1 Brief Description

In addition to its function as an electronic code lock Paxos compact can also be used as a switching unit according to VdS (so-called 'Blockschloss') to arm or disarm a superior control centre such as the intruder detection system (IDS). Special outputs of the switching unit signal the status of the locking system to the intruder detection system. The status of the intruder detection system is signalled to the locking system through special inputs of the switching unit. If the relevant statuses correspond, the intruder detection system can be armed or disarmed after identification on the locking system.

1.1 Required components

The following components are required for the function as a switching unit VdS:

- One locking system Paxos compact Set 11 with keypad input unit (302.070) in accordance with class 2 VdS
- or – A locking system Paxos compact Set 13 with dialling knob input unit (302.073) in accordance with class 3 VdS
- or – A locking system Paxos compact Set 14 with dialling knob input unit (302.076) in accordance with class 4 VdS each comprising:
 - an input unit with integrated badge reader module (Legic security module), art. no. 302.013 (keypad input unit) or art. no. 302.014 (dialling-knob input unit)
 - three copy-protected ID cards (Legic badges) for contactless authorisation identification for arming/disarming
 - one lock unit (SW-version 66) type A, art. no. 302.010.66
 - or two lock units (SW-version 66) type D, art. no. 302.016.66
 - a switching unit box with screw connection terminals, art. no. 302.033
- Optional accessories:
 - an additional lock unit type A with connection cable, art. no. 302.061 (Set 5, SW-version 66)
 - a set of 10 additional copy-protected ID cards (Legic badges) for contactless authorisation identification for arming/disarming, art. no. IM981 in design Paxos or art. no. IM980 in neutral white

All necessary connection cables are supplied with the respective sets (except fixation screws and connection cables to the intruder detection system or external system components).

The power supply of the Paxos compact locking system when used as a switching unit in accordance with VdS must be provided by the uninterruptible power supply (UPS) of the intruder detection system. The empty battery holder (without batteries or rechargeable battery pack) must be inserted in the battery compartment of the input unit.

1.2 Features

When used as a switching unit VdS Paxos compact also includes the following features in addition to the locking system functions:

- Material or material and mnemonic identification for arming or disarming
- Up to 26 copy-protected badges can be assigned and removed (authorisation control)
- Potential-free, monitored control output 'Arm / disarm IDS'
- Monitored signal input 'Confirmation IDS armed'
- Electronic disarm disabling (authorisation disabling)
- All time functions such as date and time with automatic weekday and leap year calculation until the year 2073, programmable summer/winter time changeover, opening delays, locking periods, fast blocking, locking-period interruption etc.
All programmed data are protected against deletion in the event of a power failure.
- Sabotage-proof locking-period interruption
- Monitored for lifting and dismantling
- Event memory of at least 500 events with additional information, logging is performed either synchronously with the occurrence of the event or upon request.
- Three-level authorisation hierarchy per lock unit (master code, time code/mutation code, 26 opening codes, applicable in optional 2, 4, 6 or 8 eye principle).
- Display user guidance in four operator selectable languages: German, English, French, customer defined (optional plug-in, also at a later date).

1.3 Technical Data

Power supply (in 2-lock operation¹⁾, with dialling knob input unit):

Rated voltage:	12 V DC
Operating voltage range:	9.6 V to 15.0 V DC
Power consumption in sleep mode (display off):	115 mA at 12 V DC
Power consumption in active mode (display on) ²⁾ :	170 mA at 12 V DC
Power consumption if lock is actuated (depending on bolt load):	260 – 750 mA at 12 V DC
Prescribed capacity of the UPS (of the IDS) for Paxos:	min. 120 mA x 60 h = 7200 mAh (7.2 Ah)

¹⁾ In single-lock operation the power consumption drops by 15 mA.

²⁾ With keypad input unit the power consumption drops in active mode by 20 mA

Inputs / Outputs:

Switching capacity of the relay contacts of the control output 'Arm / disarm IDS':	1.25 A / 50 V DC
Switching capacity of the relay contacts of the output 'Tampere alarm':	1.25 A / 50 V DC
Switching capacity of the relay contacts of the output 'Duress alarm':	1.25 A / 50 V DC
Switching capacity of the lock-bolt contacts 'Lock 1, Lock 2 unlocked':	50 mA / 12 V DC
Switching capacity of the relay contacts of the output 'Night':	1.25 A / 50 V DC
Signal input 'IDS armed':	isolated, resistor monitored
Input 'Disarm disabling' (authorisation disabling):	isolated, resistor monitored
Input 'Locking-period interruption':	isolated, resistor monitored

Environmental category:

Environmental category in accordance with VdS 2110:	Class II
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All additional technical data of the locking system are contained in the respective data sheets for lock, input unit and switching unit box.

1.4 Approvals

VdS 2396 / ENV 1300: Electronic high-security lock class 2 / level B for safes (Set 1 or Set 11)	M101307
VdS 2396 / ENV 1300: Electronic high-security lock class 3 / level C for safes (Set 3 or Set 13)	M101308
VdS 2396 / ENV 1300: Electronic high-security lock class 4 / level D for safes (Set 4 or Set 14)	M101309
VdS 2119, 2227: Blocking element with lock monitoring for intruder detection systems class C	G197002
VdS 2119, 2311: Switching unit for intruder detection systems class C	G199105

This approval comprises the following functions:

- Blocking element with lock monitoring
- Locking period switch clock
- Duress alarm triggering via input unit
- Possibility of emergency opening during active locking period
- Disarming of an intruder detection system with additional mnemonic identification means

2 Functions

In addition to its function as an electronic combination code lock, Paxos compact can also be used as a switching unit VdS ('Blockschloss') for arming or disarming a superior central station, e.g. an IDS (intruder detection system). The operating procedures required for the switching unit are described in the attached Operating Instructions.

2.1 Disarming and unlocking (see Operating Instructions page 51)

The switching unit function prevents unlocking of the Paxos compact locking system as long as the intruder detection system is still armed. Unlocking is also not possible as long as the monitoring circuit of the signal input 'Confirmation IDS armed' detects sabotage.

As soon as the disarm disabling (authorisation disabling) is released and any programmed locking period has elapsed, the procedure for disarming the intruder detection system can be initiated. In accordance with the system setting (depending on the security class of the alarm system) only a material information carrier (badge) is required as authorisation identification or, in addition, also a mnemonic identification (code) is demanded.

Instead of material identification when the prompt 'Badge please' appears, this can also be confirmed with ENTER or pressing the knob and subsequently entering a valid opening code. If the alarm system has already been disarmed the opening procedure is continued normally, if the alarm system is still armed the message 'Sector armed' is followed once more by the prompt 'Badge please'.

2.2 Locking and arming (refer to the Operating Instructions pages 8 and 53)

As soon as the lock recognises the locking condition as valid (closed door-bolt contacts), the locking procedure starts automatically or, with the 'Manual locking' setting, immediately after the ENTER key or the dialling knob has been pressed.

If the locking system is locked or secured the monitored sector can be armed with the 'Arm sector' function by identification with a valid badge.

2.3 Assigning badges (refer to Operating Instructions page 54)

Up to 26 copy-protected, contactless badges can be assigned to the system as authorisation for arming/disarming. For assignment the unique number on the badge is saved in lock 1 and checked for each identification with the Legic badge for arming or disarming. The same badge can be assigned to any number of Paxos compact locking systems with the switching unit VdS option.

Paxos compact can only be used as a switching unit VdS if at least one badge has been assigned.

2.4 Removing badges (refer to Operating Instructions page 55)

Assigned badges can also be removed, i.e. declared invalid as an identification means. The badge itself is not required to this purpose (for example in the event of loss or theft).

Removed badges can be reassigned, for example, once recovered, with the 'Assign badge' function.

2.5 Possible error messages

Read error	The badge must be held closer to the reading area, this for a longer period of time or the respective badge was not programmed for this application.
Badge is already assigned !	The used badge has already been assigned to this locking system. The same badge cannot be assigned again to the locking system under a different designation.
Wrong badge !	Invalid badge, non-system badge or badge is not assigned to the locking system (the manipulation counter is not increased).
No response from alarm centre	No response from the intruder detection system or the procedure was cancelled by the operator during arming/disarming. The conditions for arming/disarming are not provided or there is a fault in the cable to the intruder detection system.

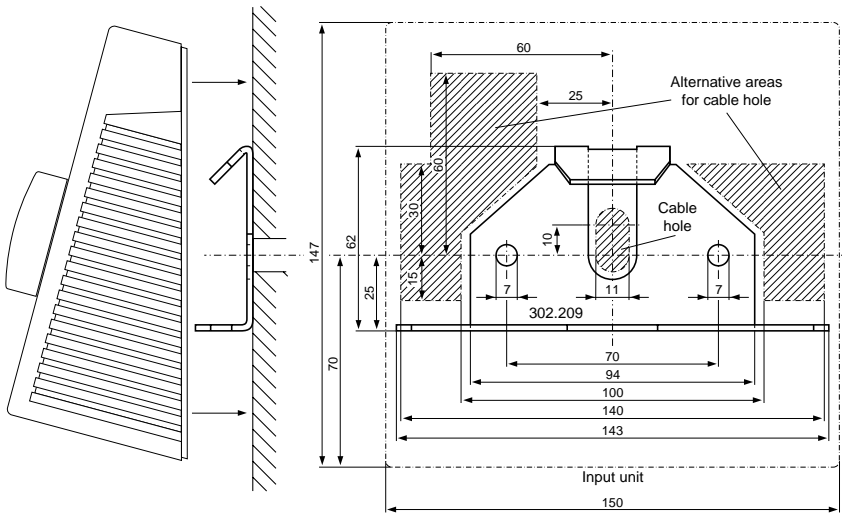
3 Installation of the Paxos compact locking system

Installation may only be performed by trained technicians (safe manufacturers or retrofitthers). Modification and manipulation of the bolt mechanism and/or the door may only be performed by the safe manufacturer or a company acting in their name.

3.1 Mounting the input unit

The input unit is only connected to the locking unit with cables. It can therefore be installed at a location on the outside of the safe which is easily accessible.

- 3.1.1 For both six-core ribbon cables with plugs, a duct into the lock chamber must be provided in the shaded area of figure 302.505. The duct may be a rectangle of 7.5 x 13 mm or a drill hole \varnothing 11 mm .



302.505

- 3.1.2 Secure the mounting bracket 302.209 to the outside of the safe door with two screws (M6).
- 3.1.3 Route the two ribbon cables 'A' and 'B' from the lock chamber to the input unit until they project by approximately 100 mm from the side of the input unit. If a drill hole with 11 mm \varnothing is used, the two ribbon cables with the miniature plugs must be folded and secured in a special position (woven tube, shrink hose, adhesive tape) so as to fit through the drill hole.
Caution: Take care to ensure that the cables are not damaged by pointed objects or similar during insertion! The cables must be provided with additional protection if routed near sharp edges!
- 3.1.4 Unscrew the set bolt of the input unit until the end of the set bolt is level with the upper part of the mounting bracket. Connect the two ribbon cables in accordance with the markings on the circuit board of the input unit: the cable marked 'A' into connector PM4 and the other cable marked 'B' into connector PM5.
- 3.1.5 Place the input unit with the tabs of the sheet-metal traverse rib onto the mounting bracket and hook it in moving it to the back. Make sure that the cables are not squeezed in!
Screw the set screw through the open battery compartment and tighten slightly until the input unit is firmly attached to the mounting surface.

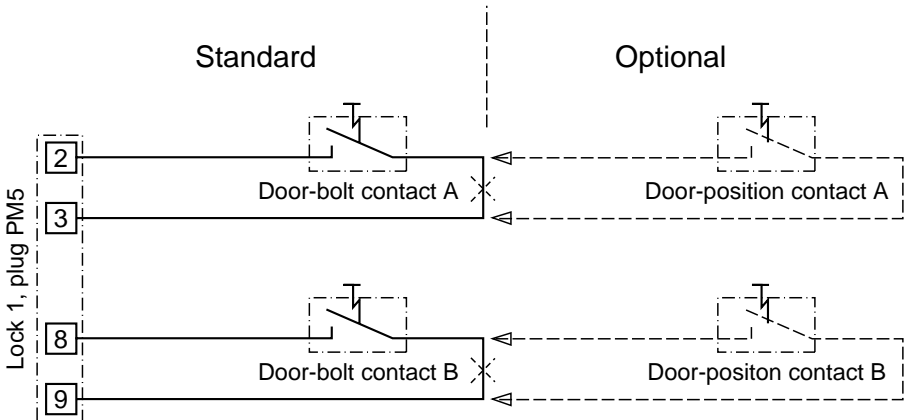
3.2 Mounting the door-bolt contacts

3.2.1 The Paxos compact locking system always requires two door-bolt contacts (two electrically separated contacts). If the door bolts are closed, these contacts must also be closed. The door-bolt contacts are connected to the connector PM5 of the first lock.

A ready-made ribbon cable with free soldering ends for connecting the door-bolt contacts, article no. 302.112, is enclosed. Contacts with a switching capacity of 50 mA at 12 V/DC are required.

3.2.2 The position of the safe door (open or closed) can also be included in the monitoring by serially connecting door-position contacts to the door-bolt contacts.

Caution: The contact loops of the two redundant system parts must be electrically isolated (galvanically separated)! Only mechanical coupling, for example by joint actuation of the switches, is permissible.



3.3 Setting the door-bolt contacts

3.3.1 The switching point of the door-bolt contacts must be set in such a way that the contacts close if the boltwork reaches a position in which the lock bolts can move to the locked position without obstruction. When the safe is secured, it must be impossible to open the door-bolt contacts by manipulating the boltwork (actuating the bolt mechanism, jolting).

3.3.2 If door-position contacts have been installed, the switching point of these contacts must be set in such a way that, when the door is being closed, they are activated before the door bolt can be moved into the door frame.

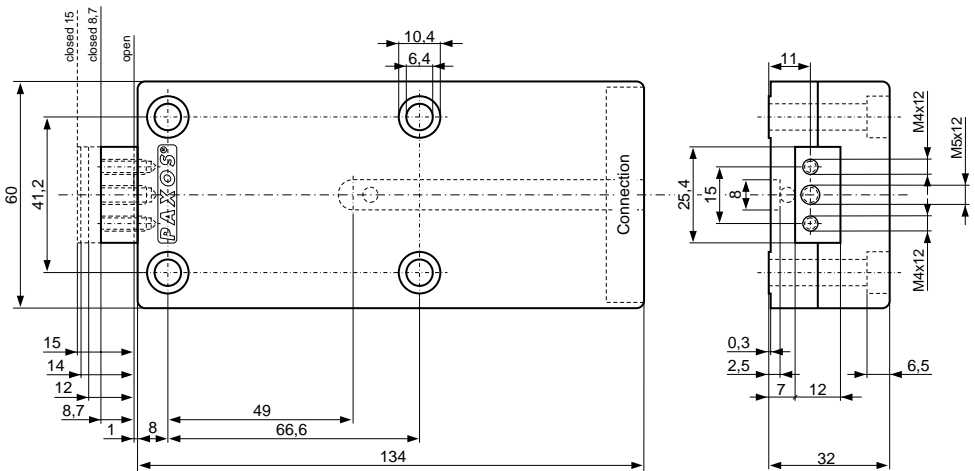
When opening the door, make sure that the door-position contacts open before the door bolt can be closed again with the door open.

3.4 Mounting the lock unit

When mounting the lock unit, i.e., integrating it into a boltwork, make sure that the lock bolt is able to move freely to its end positions and that the shifting force works only in the axial direction (direction of movement). Lateral forces should not be exerted on the lock bolt. The movement must not be inhibited or limited. Guide or support the lock bolt if an asymmetric lateral locking method is required.

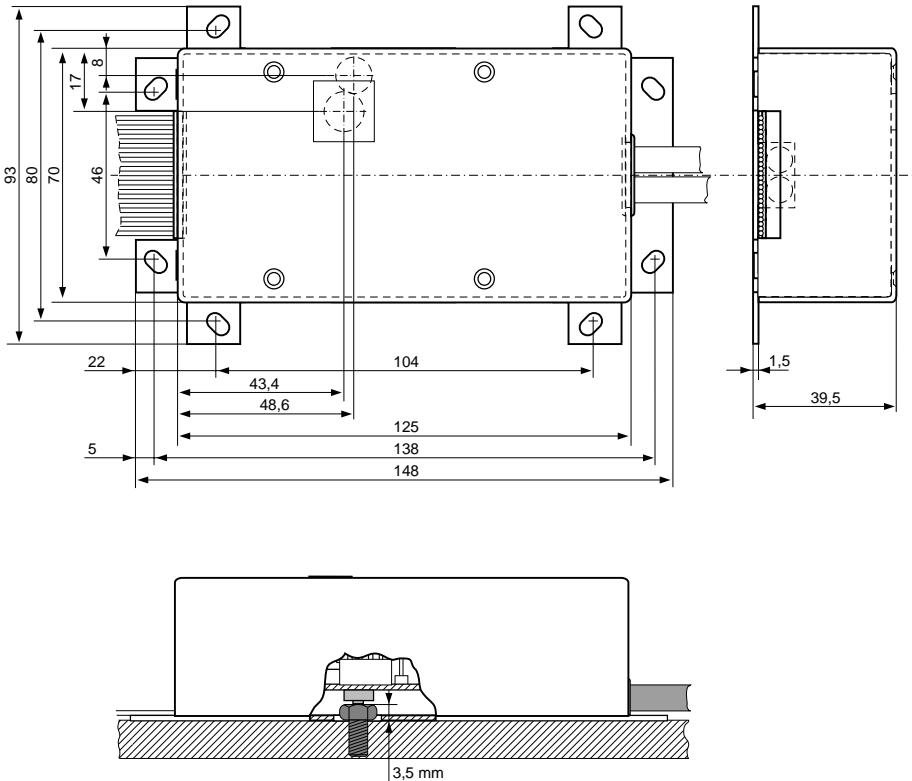
The lock bolt shifting force has a nominal value of 30 N over the mechanical life-time of min. 10'000 cycles. With full batteries a maximum force of 80 N can be exerted, but not continuously. The lock bolt can withstand a static force of at least 1000 N. After installation, there may under no circumstances be any breaches in the armouring within the immediate vicinity of the lock (mounting surface). Any such breaches must be sealed or otherwise secured.

- 3.4.1 Prior to installation of the locks the required bolt throw of the lock bolt (8,7 mm / 12 mm / 14 mm / 15 mm) must be set by adjusting the eccentric on the bottom side of the lock. The eccentric is only accessible through the hole in the lock bottom when the lock bolt is in the open position.
- 3.4.2 When used with option Switching unit VdS the microswitches (DIP switches) between the connectors PM2(A) and PM3(B) of lock 1 must be set to the position 1=OFF, 2=OFF, 3=ON with a small screwdriver. The switch position of lock 2 has no influence.
- 3.4.3 Firmly screw each of the locks to the door body with four M6 (or the equivalent in inches) grade 8.8 pan head screws. Mount the lock on a level surface or onto 4 level mounting points. Limit the tightening torque at a screwing depth of 5 mm to 500 Ncm. The mounting screws must be secured against loosening, e. g. by using screw cement, such as LOCTITE type 0243 (medium, blue). The lock(s) can be installed on all materials allowing sufficient anchorage of the components. Preference should be given to metallic materials.
- 3.4.4 If other parts of the boltwork are to be connected to the lock unit (for activating blocking disks), corresponding adapters can be fixed to the front of the lock bolt with 2 screws (M4) or a central screw (M5) (maximum tightening torque at a screwing depth of 6 mm: 200 Ncm). Ensure that all moving parts can move freely and especially that the bolt throw of the lock is not obstructed by stops or any other objects in the boltwork. The lock bolt must also have clearance in both end positions.



3.5 Mounting the switching unit box

- 3.5.1 The switching unit box is attached in the secured area (lock chamber) near the first lock on a flat surface (4 M4x10 screws). The housing of the switching unit box must be connected to the safe with an electrically conductive connection (e.g. toothed lock washers) or be connected to the earth potential (also refer to 4.3.3). Securing tabs not in use can be cut off along the apertures with cutting pliers.
- 3.5.2 The lifting contact in the inside at the bottom of the housing must be actuated (pressed) when installation has been completed. To this purpose the supplied M5 hexagon head screw must be fitted in a position where the head of the screw actuates the lifting contact when mounted (refer to drawing below).
- 3.5.3 The ribbon cable of the switching unit box is to be connected to connector PM1 of lock 1.
- 3.5.4 Drill a hole with a diameter of 10 mm in the cover of the lock chamber above the push-button for locking-period interruption so that the button can be actuated from the lock side. To prevent inadvertent or unauthorised actuation of locking-period interruption the supplied adhesive seal must be attached either over the hole or directly above the push-button (Caution: Seal is irreparably damaged when removed). The locking-period interruption function can also be triggered with an external contact (normally open) connected on the screw terminals. The external contact should be protected against inadvertent or unauthorised actuation of locking-period interruption (Recommendation: VdS-certified contact for duress alarm triggering).



3.6 Connecting the individual system components

Prior to starting any work on the wiring, always **disconnect the power supply** by disconnecting the connection to the UPS and removing the battery or rechargeable battery pack. Damage to electronic components caused by electrostatic discharge can be prevented by connecting the safe, working surface and personnel with a permanent earth connection (suitable aids are commercially available).

All cables must be laid in such a way that they do not touch any moving parts, are not routed over any sharp edges and are permanently secured in position.

In order to secure electrical connections reliably, the connectors must be inserted carefully, tightly and straight. When disconnecting plug connectors only pull the plug and not the cable. The connections are also locked with the connector cases to prevent accidental disconnection. Prior to unplugging these locks must be carefully released with suitable tools.

On locking systems with one lock establish the connections in accordance with Figure 1 and on systems with two locks in accordance with Figure 2.

Caution: The switching unit box may only be connected to a lock of the new generation (software version 65 and higher). If it is connected to a lock with an earlier software version the lock might fail to open!

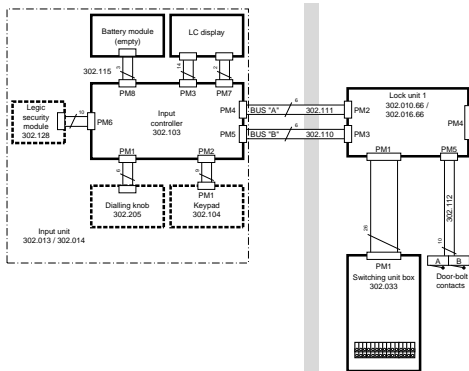


Figure 1

Connections for:
alarm centre (IDS), UPS of IDS, dis-
arm disabling (authorisation disabling),
log printer, locking-period interruption,
duress alarm, lock bolt monitoring

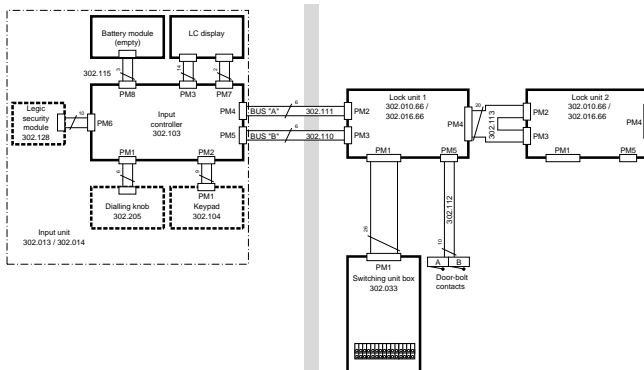


Figure 2

Connections for:
alarm centre (IDS), UPS of IDS, dis-
arm disabling (authorisation disabling),
log printer, locking-period interruption,
duress alarm, lock bolt monitoring

4 Connecting the switching unit to the alarm system

The switching unit may only be connected to the alarm system by qualified technicians (alarm system installation expert). Manipulation on or modification to the boltwork and/or the door may only be performed by the manufacturer of the safe or by a company acting in their name.

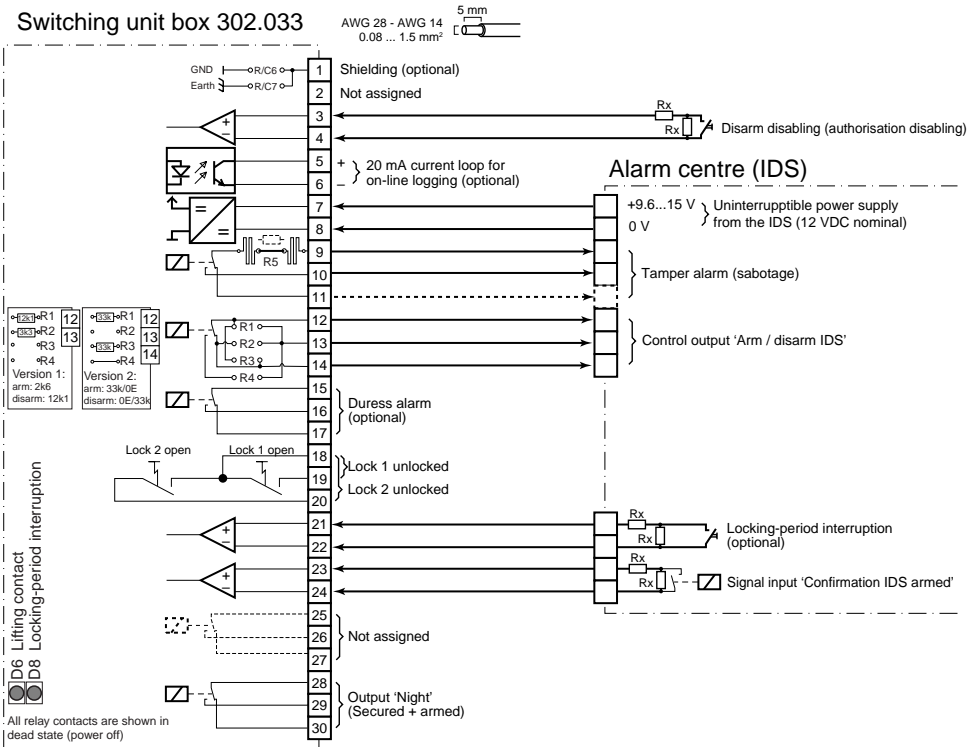
Always **disconnect the power supply** prior to commencing any work on the wiring by removing the UPS connection of the intruder detection system (screw terminals 7, 8).

Damage to electronic components caused by electrostatic discharge can be prevented by grounding the safe, working surface and personnel with a permanent earth connection (suitable aids are commercially available).

Important:

It is essential to avoid making any alterations to the existing Paxos installation and only use the prescribed connections and the individual functions for their specific intended use. If evaluation of the door position or the bolt position is required for the alarm function or for third-party installations, it is essential that separate, independent door and/or bolt position contacts are installed. The bolt position and possibly the door-position contacts used by the Paxos compact locking system must never be connected to other systems or subsystems! Non-compliance with this stipulation can cause faults and failure of the Paxos compact locking system.

The following diagram sticker is supplied with each Paxos compact switching unit VdS and must be attached next to the switching unit box.



4.1 Connection

The screw terminal strip in the switching unit box serves as an interface for all alarm functions. Please observe the following for the connection:

- Ensure that the connection wires have a minimum cross-section of 0.08 mm^2 to maximum 1.5 mm^2 .
- Ensure that the insulation of the connection wires is stripped to a length of 5 mm and, if stranded wire is used, that the ends are tinned or provided with end sleeves.
- Ensure that the connection wires are not under tension.
- Use a size 0 screwdriver for tightening and releasing the screw terminals.

If several cables are routed to the same screw terminal, these should be pressed into one single end sleeve.

It is possible to route up to two 16-core connections cables with a conductor cross-section of 0.25 mm^2 into the switching unit box. If possible it is recommended to reduce the number of conductors in favour of a larger cross-section. On various installations a suitable cable is factory installed. On other applications secured cable routing from the movable to the stationary section of the safe must be provided (possibly using an armoured tube).

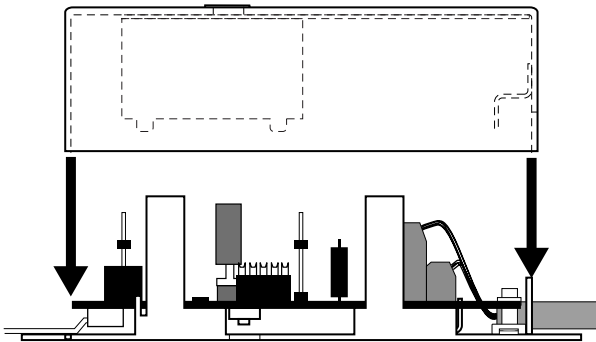
All cables must be laid so that they do not touch moving parts, are not routed over sharp edges and are permanently secured in position. The cables connected to the screw terminal strip of the switching unit box must be protected against tension strain with the supplied cable tie.

4.1.1 Opening and closing the switching unit box

After removing the four screws in the cover of the switching unit box it can be pulled off vertically upwards (the surface protection which also serves as a cover lifting contact remains in the cover).

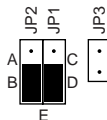
Caution: Opening the cover of the switching unit box opens the sabotage loop!

When refitting the cover ensure that it is placed vertically along the housing guides while exerting slight pressure. Take care not to damage the cables. Subsequently secure the cover once more with the four screws. Attachment of the supplied adhesive seals (security seal) over the screws (or alternatively over the housing cover and base) seals the switching unit against being opened without authorisation.



4.1.2 Jumpers in the switching unit box

Jumpers are factory placed on positions B and D to ensure the correct function of authorisation disabling and sabotage monitoring. JP3 must be empty. JP4 is provided for future applications and must also be empty.



4.2 Inputs and outputs

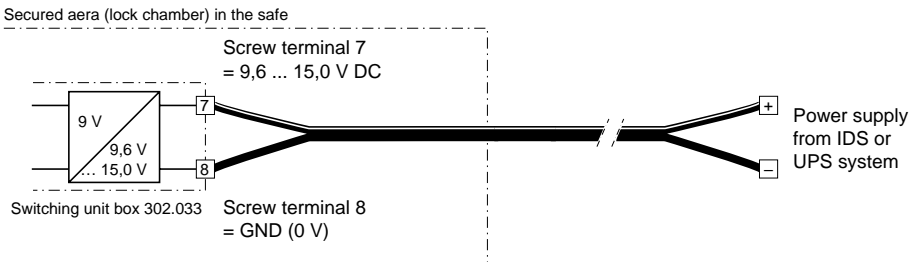
Prior to starting any work on the wiring, always **disconnect the power supply** by disconnecting the connection to the UPS. Damage to electronic components caused by electrostatic discharge can be prevented by connecting the safe, working surface and personnel with a permanent earth connection (suitable aids are commercially available). All cables must be laid so that they do not touch any moving parts, are not routed over any sharp edges and are permanently secured in position.

The cables to the terminal strip must be routed into the switching unit box so that they are secured against tension load with the supplied cable ties and are not damaged by the terminal protection (bracket in the housing cover).

If shielded cables are used, the shield must be sealed at the end with a shrink hose or insulation tape to insulate the shielding and should not be in contact with the housing or other conductive components (also refer to section 4.3.3).

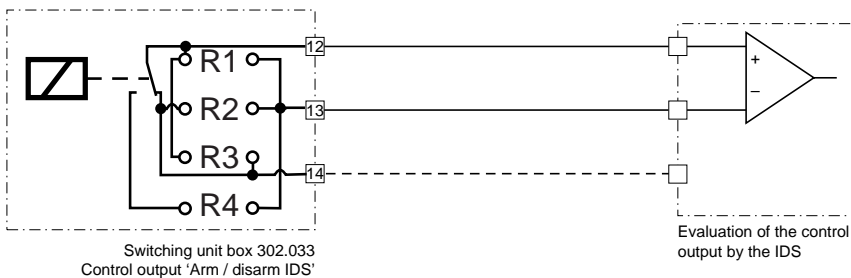
4.2.1 Supply from the intruder detection system (or another UPS system: not according VdS)

When used as a switching unit VdS power to the Paxos compact locking system must be supplied from the intruder detection system or a monitored uninterruptible power supply (UPS) with an autonomy of more than 60 hours. The connection is established on terminals 7 (+9,6...+15 VDC (nominal 12 VDC)) and 8 (GND). In the input unit the empty battery holder (without batteries) must be placed in the battery compartment to actuate the contact springs.



4.2.2 Control output 'Arm / disarm IDS'

The Paxos compact switching unit VdS is equipped with a potential-free relay contact (screw terminals 12, 13, 14) which position controls arming and disarming of the intruder detection system. The contact is protected against sabotage with surface protection and lifting contact. After the menu function 'Arm sector?' has been executed, the contact is in the position shown below:

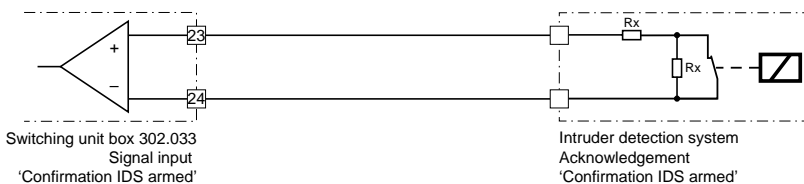


The IDS (intruder detection system) monitors the cable for sabotage. The required resistors must be soldered to the respective soldering points in the switching unit box. The necessary resistor values are to be taken out of the product documentation of the respective IDS. Two standard circuit versions are shown below:

	Version 1:	Version 2:
	<p> $12k\Omega$ R1 $3k3$ R2 R3 R4 </p>	<p> $33k\Omega$ R1 R2 $33k\Omega$ R3 R4 </p>
armed	Terminals 12-13 = 2.6 k Ω (Terminal 14 is not assigned)	Terminals 12-13 = 33 k Ω Terminals 12-14 = short-circuit (0 Ω)
disarmed	Terminals 12-13 = 12.1 k Ω (Terminal 14 is not assigned)	Terminals 12-13 = short-circuit (0 Ω) Terminals 12-14 = 33 k Ω

4.2.3 Signal input 'Confirmation IDS armed'

The potential-free signal contact of the intruder detection system (acknowledgement) is to be connected to the screw terminals 23 and 24, with which the alarm system confirms the successful arming operation to the switching unit. For monitoring of the cable the supplied resistors Rx must be fitted in accordance with the connection diagram and protected against sabotage on the signal contact.



	Loop resistance	is evaluated as (action):
Contact closed	1 x Rx (6.8 k Ω \pm 10%)	IDS is armed
Contact open	2 x Rx (13.6 k Ω \pm 10%)	IDS is disarmed
Sabotage on cable or incorrect connection	\neq 1 x Rx (6.8 k Ω \pm 10%) and \neq 2 x Rx (13.6 k Ω \pm 10%)	IDS is armed; trigger tamper alarm

The **open** Paxos compact locking system can be operated irrespective of the position of the signal input 'Confirmation IDS armed'. All functions are available, the system parameters can be set and the system also be closed.

4.2.4 Tamper alarm

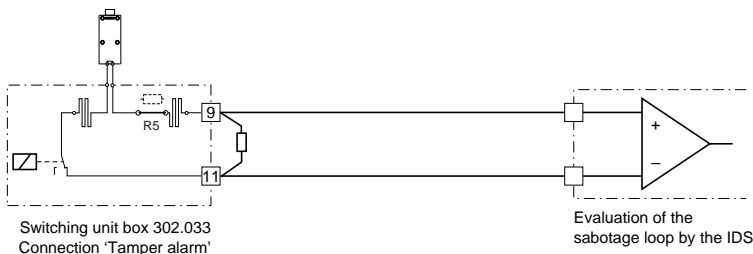
The sabotage line is to be connected to the potential-free screw terminals 9 and 10. For monitoring of the sabotage loop a (terminating) resistor can be soldered into the switching unit box (position R5). A zero-Ohm resistor (wire bridge) is factory soldered in by default.

The sabotage loop is interrupted (open) in the following cases:

- if the voltage supply is not applied.
- if the battery compartment cover of the input unit, which also serves as a dismantling protection, is open.
- if the cover of the switching unit box is open.
- if the surface protection of the switching unit box is interrupted or short-circuited.
- if the lifting contact on the bottom of the switching unit box is open (=not pressed). LED D6 lights up at the same time. The alarm can only be reset by interrupting the power supply after the fault has been corrected.
- if the connection between the lock and the switching unit is interrupted.
- if one or more of the inputs 'Confirmation IDS armed', 'Locking-period interruption' or 'Disarm disabling' has either none or an incorrect resistor connection.
- if the locking-period interruption (push-button or input 'Locking-period interruption') is actuated. LED D8 lights up at the same time. The alarm can only be reset by interrupting the power supply.



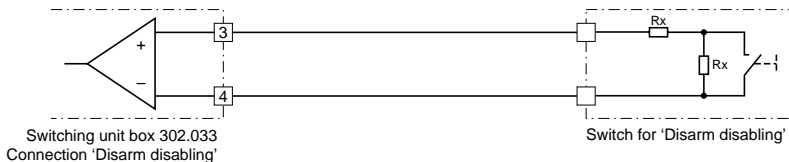
The sabotage output on the potential-free screw terminals 9 and 11 can also be tapped as a normally open contact. In the event of sabotage the sabotage loop then is closed and in the normal operating condition it is open. An additional terminating resistor should be fitted in this case between the screw terminals 9 and 11. The circuit diagram below is **not** respecting VdS regulations and is therefore **not approved!**



4.2.5 Disarm disabling (authorisation disabling)

A potential-free contact can be connected to screw terminals 3 and 4 which can be used to prevent both disarming of the alarm system and also opening of the locking system. To monitor the cable two resistors R_x included in the scope of supply must be connected in a sabotage-protected manner in accordance with the circuit diagram (near the contact), one in series, and one in parallel. When opening the contact and in the event of interruption or short-circuit (sabotage) of the cable, disarming is prevented until the evaluating circuit for the Disarm disabling input detects the correct resistance on its input again.

The **open** Paxos compact locking system can be operated irrespective of the position of the signal input 'Disarm disabling'. All functions are available, the system parameters can be set and the system also be closed and armed.



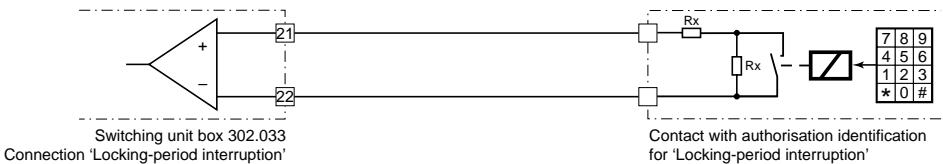
	Loop resistance	is evaluated as (action):
Contact closed	$1 \times R_x$ ($6.8 \text{ k}\Omega \pm 10\%$)	Permit disarming and opening
Contact open	$2 \times R_x$ ($13.6 \text{ k}\Omega \pm 10\%$)	Disable disarming and opening
Sabotage on cable or incorrect connection	$\neq 1 \times R_x$ ($6.8 \text{ k}\Omega \pm 10\%$) $\neq 2 \times R_x$ ($13.6 \text{ k}\Omega \pm 10\%$)	Disable disarming; trigger tamper alarm

4.2.6 Locking-period interruption

On terminals 21 and 22 an external triggering element (potential-free contact, switch etc.) can be connected which is used to temporarily (for approx. 2 minutes) interrupt an active locking period or to cancel a current opening delay. This function permits, for example, release of a person locked in a vault or secured sector which is blocked by a locking period. When the triggering element is operated from the non-secured side, identification-linked triggering (key switch, keypad entry) is preferable to a simple switch!

For monitoring the cable two resistors Rx included in the scope of supply must be connected in a sabotage-protected manner (near the triggering element) in accordance with the circuit diagram once in series and once in parallel to the contact.

Actuation of locking-period interruption (also with the push-button on the switching unit) initiates a tamper alarm and LED D8 lights up. The alarm and the LED stay activated until reset by interruption of the power supply (by disconnecting the power connection of the intruder detection system).



	Loop resistance	is evaluated as (action):
Contact closed	1 x Rx (6.8 kΩ ±10%)	Interrupt the current locking period for 2 minutes; Cancel current opening delay; Trigger tamper alarm, activate LED D8
Contact open	2 x Rx (13.6 kΩ ±10%)	Normal condition (locking period and opening delay continue normally)
Sabotage on cable or incorrect connection	≠ 1 x Rx (6.8 kΩ ±10%) ≠ 2 x Rx (13.6 kΩ ±10%)	Trigger tamper alarm, activate LED D8

4.2.7 Duress alarm

A duress alarm (discreet, 'silent' alarm) can be triggered via the input unit of the Paxos compact locking system when apparently normally opening the safe in a manner which is unnoticeable for the person threatening. This initiates approximately 2 second activation of a relay, the contacts of which are routed potential-free to the terminal strip (screw terminals 15, 17). The contact is protected against excess voltage by a transzorb diode ($U_{iz} = 51 \text{ V}$).

The duress alarm can also optionally be tapped on screw terminals 15 and 16 as a normally open contact.

4.2.8 Lock-bolt contacts (lock 1, lock 2 unlocked)

Each lock of the Paxos compact locking system contains a potential-free lock-bolt contact (normally open contact) which is only closed if the lock bolt of the respective lock is in the closed position. The contacts of both locks can be tapped both individually and/or connected in series on the switching unit box (screw terminals 18, 19, 20). The maximum load of the contacts is 50 mA / 12 V DC.

4.3 Other inputs and outputs on the switching unit box

The outputs 'Online logging' and 'Night' are not essential for the function as switching unit VdS, but provide additional (non-VdS-related) alarm and monitoring functions.

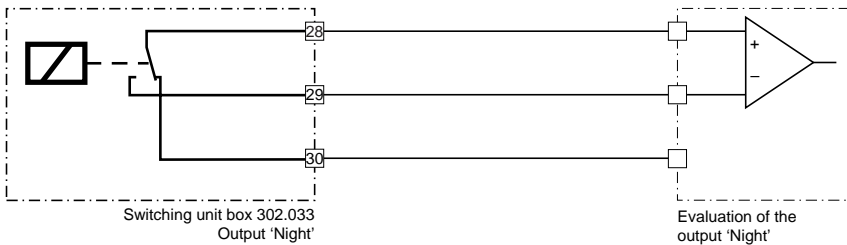
4.3.1 Online logging

A logging device (e.g. printer or computer) can be connected to the screw terminals 5 (+) and 6 (-) with a serial current loop interface (20 mA) for permanent or sporadic event logging. The interface must be supplied with 20 mA from the connected logging device (e.g. printer or computer). Detailed information is contained in the Training Documentation or the Technical Description 'Event logging' (No. 302.557).

4.3.2 Output 'Night'

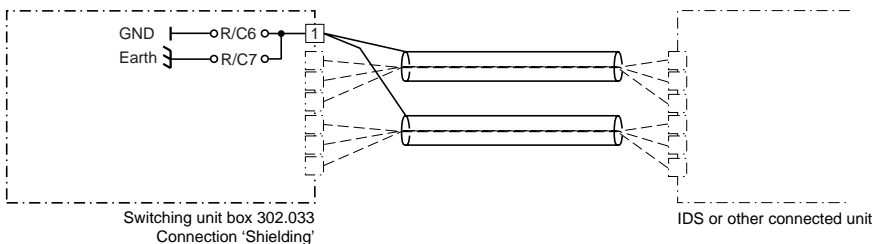
The Paxos compact switching unit VdS contains a potential-free contact (screw terminals 28, 29, 30) which signals the state 'secured and armed'.

The contact is only in the position shown below if all locks of the locking system have reached the 'closed' position ('secured state) and the intruder detection system has armed the monitored sector.



4.3.3 Screw terminal 'Shielding'

Any shielding on the cables used can be connected to screw terminal 1. Factory supplied this terminal is potential-free. If required (for suppressing cable-related interference) the screw terminal can be connected either to ground (R/C6) or earth (R/C7) with a resistor or capacitor on one of the solder points in the switching unit box provided to this purpose (refer to diagram). To this purpose only R/C6 or only R/C7 can be equipped, not, however, both at the same time.



Caution: Never connect a shielding on both ends to a potential. This can cause faulty function of the locking system, the switching unit and/or the alarm system.

It is recommended to only connect the shielding on the intruder detection system side with a suitable potential (ground or earth).

If there is no conductive connection between the housing of the switching unit box and the safe (e.g. electrically non-conductive safe) or earth potential, it is necessary to solder a wire bridge to both positions (R/C6 and R/C7).

5 Checking the function and starting-up

5.1 Checking the function of the locking system (without locking the safe door!)

- 5.1.1 Should a lock already be in the secured position, the door-bolt contacts (and the door-position contacts, if any) must be manually (adhesive tape, cardboard, magnet) closed with the safe door open.
- 5.1.2 When operating the locking system as a switching unit with power supply from the intruder detection system do not insert any batteries or rechargeable battery pack into the input unit. Instead the **empty battery holder** (without batteries) must be inserted into the battery compartment for actuating the contact switch.
As long as the voltage supply of the intruder detection system is not connected to the switching unit a battery holder fitted with 6 x 1.5 V ALKALINE batteries can be used to check the function (in this operating mode the functions of the switching unit are not available).
Insert the battery holder into the battery compartment of the input unit and secure it. The system starts an auto-diagnosis procedure and after some time displays the current system status or an error message. The latter should be treated according to the type of error and be eliminated.
- 5.1.3 Close the boltwork with the door open and manually close any door-bolt contacts and door-position contacts which are not yet closed (refer to 5.1.1). The lock(s) close(s) and the message 'Secured' appears on the display.
- 5.1.4 Open the lock(s) with the factory code 10 20 30 40 as described in the Operating Instructions. Reopen the boltwork, the door-bolt contacts and the door-position contacts. The message 'Unlocked' appears on the display.
- 5.1.5 With the boltwork open (door-bolt contacts open) change the opening code a (OCa) of lock 1 to 11 22 33 10 and the code of lock 2 to 12 22 33 10 (when the old code is requested enter the factory code 10 20 30 40). Also immediately change the second opening code b (OCb) of lock 1 to 11 22 33 20 and the code of lock 2 to 12 22 33 20 (instead of an old code enter the previously programmed opening code OCa).
- 5.1.6 With the safe door open close the boltwork and the door-bolt contacts (door-position contacts). The lock(s) close(s) again with the door open. Open the lock(s) once more with the second opening code b (OCb1: 11 22 33 20 / OCb2: 12 22 33 20). Re-open the door bolt and the contacts again.
- 5.1.7 Only then, and if all manipulations have been completed without an error message, it is possible to actually lock the door. Repeat the closing and opening procedure at least twice to reliably check the redundant system components.
- 5.1.8 Check the time functions and any already existing functions such as duress alarm, lock-bolt contacts etc. Subsequently reset the codes, if necessary for delivery, back to the factory code (10 20 30 40). To this purpose cancel all additionally activated codes (MA, OCc to OCz) first and then delete all second opening codes b (OCb). It is only then possible to reset the opening codes a (OCa), starting with the second lock.

Before closing the safe door it is essential to check the function of the opening code once more with the door open. With the door open, close the lock(s) by closing the boltwork and manual actuation of the door-bolt contacts and door-position contacts and subsequently open once more with the factory code 10 20 30 40.

5.2 Start-up and functional check of the 'Switching unit' function

First start-up the installed and connected electronic locking system Paxos compact as described in chapter 5.1 and perform the function check through to section 5.1.7. Only activate the functions of the switching unit if the system has been successfully installed as a combination code lock.

5.2.1 Activating the function 'Switching unit VdS'

5.2.1.1 Assigning badges

To activate the switching unit function the locking system must be assigned at least one material information carrier (badge).

After the system has been taken correctly into operation in accordance with the functional check up to section 5.1.7 individual codes are programmed for the opening codes OCa and OCb. With the boltwork open (door open) it is now necessary to change the master code (MA1) of lock 1 to an individual code (which must not be forgotten!).

Badges can only be assigned when the system is unlocked and if the master code of lock 1 has been activated:

- In the 'Change code ?' menu press the ENTER key (or the dialling knob), subsequently press the left arrow key once (or turn the dialling knob by one position anti-clockwise).
- Activate the 'Other code functions' menu by pressing ENTER (or the dialling knob).
- Press one of the arrow keys several times (or turn the dialling knob) until the badge which is to be assigned appears on the display (Assign badge A ... Z).
- Press the ENTER key (or the dialling knob), enter the requested mutation code or master code and confirm by pressing the ENTER key (or the dialling knob).
- Hold the respective badge in the reading area of the input unit. Correct assignment is confirmed with the message 'Badge A ... Z assigned'.

From now on it is only possible to run the opening procedure if the respective loop resistance (intruder detection system or sector is disarmed) is detected on the signal input 'Confirmation IDS armed' (refer to 4.2.3).

Note: All assigned badges are automatically removed by deleting the master code of lock 1 (MA1).

Assignment and removal of badges is described in detail in the Operating Instructions (page 54 onwards) (no. 302.500 for dialling knob input unit or no 302.501 for keypad input unit).

5.2.1.2 Setting for higher security classes (in accordance with VdS 2311)

If the alarm system is graded to a higher security class in accordance with VdS 2311, in addition to the material information carrier (badge) also a mnemonic identification (code) and/or programming of opening delays or locking periods is required for identification for disarming.

Extract of VdS directive 2311, version 1998-12 (referred to Paxos compact Switching Unit VdS):

Intruder detection system of Class B	Arming/disarming with		
	only badge	badge + code	badge + time control
SH1, SH2, SH3	X	1	1
SG1	X	1	1
SG2	X	1	1

Intruder detection system of Class C			Arming/disarming with	
Security class	only badge	badge + code	badge + time control	badge + code + time control
SG3	X	1	1	1
SG4	X	1	1	1
SG5	–	X	X	1
SG6	–	X	1	1

Key

– = not permissible

X = permissible

1 = necessary if required by the insurer on the basis of the risk

This information is purely of an informative nature and is given without guarantee. Please contact the standards authorities or the responsible insurer directly for information on the current status or revision of regulations.

Badge + code

The following setting must be made in the service menu for activating the additional mnemonic identification:

- Press the CLR key (or the dialling knob) for a prolonged period (> 3 seconds) to activate the service menu. The display prompts to enter the service code.
- Enter the service code 47 14. The first possible service function appears immediately.
- Press the arrow keys (or turn the dialling knob) to display the function 'Badge + code ?' and press ENTER (or the dialling knob). The following appears on the display: 'Badge + code ? <Off>'.
- Then press the arrow key (or turn the dialling knob) until 'Badge + code ? <On >' appears on the display. Activate the function by pressing ENTER (or the dialling knob) and enter the required master code of lock 1 as authorisation identification. If the code is valid the confirmation 'Badge + code activated !' appears on the display.
- By pressing the CLR key (or the dialling knob for a long period) or after a time-out the service menu is exit.

From now on it is only possible to disarm the intruder detection system by identification with a valid badge and an additional code entry.

Note: The 'Badge + code' function is automatically deactivated by deleting the master code of lock 1 (MA1).

Time control

The setting of opening delays and locking periods is described in the Operating Instructions and the Training Documentation (chapter 5). The values to be used can be consulted in the respective standards and/or the insurer's regulations.

5.2.2 Functional check of the switching unit

Prior to the functional check all inputs and outputs of the switching unit must be connected in accordance with chapter 4.2 and start-up completed in accordance with section 5.2.1.

Individual codes are programmed for the opening codes OCa and OCb and for the master code (MA1) of lock 1 and at least one badge is assigned. All locks are in the unlocked position and the boltwork is open.

5.2.2.1 Checking the arming procedure

- Close the boltwork with the door open and manually close door-bolt contacts and door-position contacts which are not yet closed (refer to 5.1.1). The lock(s) close(s) and the message 'Secured' appears on the display.
- Press the ENTER key (or the dialling knob), the message 'Open the lock ?' appears on the display. Press the left arrow key once (or turn the dialling knob to the left) and confirm the function 'Arm sector ?' by pressing ENTER (or by pressing the dialling knob).
- For identification an assigned badge must be held into the reading area of the input unit. An invalid badge (not assigned to the locking system or non-system badge) is refused with the message 'Wrong badge!'. If the badge is valid the switching unit signals an arm command to the intruder detection system by switching the relay contact on the screw terminals 12, 13 and 14 accordingly (refer to 4.2.2). In case of doubt the contact position can be verified with an Ohmmeter either directly on the screw terminals or on the respective cable end on the intruder detection system side.
- The switching unit then waits for 15 seconds for confirmation from the IDS (intruder detection system) whether the monitored sector is being armed (=loop resistance of $1 \times R_x$ on the screw terminals 23 and 24, refer to 4.2.3). The response of the IDS can also be simulated by connecting the respective resistor values directly to the screw terminals if the IDS is not connected yet. If no response is received from the IDS within 15 seconds, or if the procedure is cancelled by pressing the CLR key (or by pressing the dialling knob for a prolonged period), the non-completed arming procedure is signalled with the message 'No response from alarm centre!' and an acoustic 'thunderstorm'.
- When arming has been completed and confirmation has been received from the alarm centre, this is confirmed by the message 'Sector armed!'

5.2.2.2 Checking the disarming procedure

- Close the boltwork with the door open and manually close door-bolt contacts and door-position contacts which are not yet closed (refer to 5.1.1). The lock(s) close(s) and the message 'Secured' appears on the display.
- Arm the sector (refer to 5.2.2.1).
- Execute the 'Open the lock' function by repeatedly pressing the ENTER key (or the dialling knob), until the message 'Badge please!' appears.
- For identification an assigned badge must be held into the reading area of the input unit. An invalid badge (not assigned to the system or non-system badge) is refused with the message 'Wrong badge!'. If the badge is valid the switching unit signals a disarm command to the IDS (intruder detection system) by switching the relay contact on the screw terminals 12, 13 and 14 accordingly (refer to 4.2.2). In case of doubt the contact position can be verified with an Ohmmeter either directly on the screw terminals or on the respective cable end on the intruder detection system side.
- The switching unit then waits for 15 seconds for confirmation from the IDS whether the monitored sector is being disarmed (=loop resistance of $2 \times R_x$ on the screw terminals 23 and 24, refer to 4.2.3). The response of the IDS can also be simulated by connecting the respective resistor values to the screw terminals if the IDS is not connected yet. If no response is received from the IDS within 15 seconds, the unsuccessful disarming procedure is signalled with the message 'No response from alarm centre!'.
- When the disarming procedure has been completed successfully and confirmation has been obtained from the alarm centre, this is confirmed with the message 'Sector disarmed!'.

5.3 Starting-up and checking other functions

Other inputs and outputs than those previously described are not essential for the function as a switching unit VdS, but provide additional alarm functions, both VdS tested functions (disarm disabling, duress alarm, locking-period interruption, lock 1/2 unlocked) and also non-VdS-related functions (online logging, output 'Night').

Activation of disarm disabling (authorisation disabling) is described in the following section.

Please refer to sections 4.2 and 4.3 of this manual for correct connection of the other inputs and outputs and chapters 3 and 4 of the Training Documentation for their start-up and functional check.

5.3.1 Activating the function 'Disarm disabling' (authorisation disabling)

After the system has been started correctly in accordance with the functional check up to section 5.1.7 individual codes are programmed for the opening codes OCa and OCb. With the boltwork open (door open) change the master code (MA1) of lock 1 to an individual code (which must not be forgotten!).

Subsequently the following setting must be made in the service menu:

- Activate the service menu by pressing the CLR key (or the dialling knob) for longer than 3 seconds. The display prompts for entering the service code.
- Enter the service code 47 14. The first possible service function appears immediately.
- Press the arrow keys (or turn the dialling knob) until the menu 'Authorisation disabl.?' is displayed and press ENTER (or the dialling knob). The display shows 'Authorisation disabl. ? <Off>'.
- Subsequently press the arrow key (or turn the dialling knob) until the message 'Authorisation disabl. ? <On>' appears on the display. Activate the function by pressing ENTER (or the dialling knob) and enter the required master code of lock 1 for authorisation identification. If the code is valid the confirmation 'Author. disabling activated !' appears.
- By pressing the CLR key (or the dialling knob for a long period) or after a time-out the service menu is exit.

Note: The function 'Disarm disabling' is automatically deactivated if the master code of lock 1 (MA1) is deleted.

5.3.2 Checking the function 'Disarm disabling' (Authorisation disabling)

If the screw terminals 3 and 4 are correctly connected it is not possible to disarm the system if the external contact 'Disarm disabling' (Authorisation disabling) is open. The disarming or opening procedure can only be started when the contact is closed. When the opening procedure once has been started, it can be completed irrespective of the position of the contact.

- Ensure that the Disarm disabling feature of the intruder detection system is activated (contact open= loop resistance of 2 x Rx on the screw terminals 3 and 4, refer to 4.2.3). Disarm disabling can also be simulated by connecting corresponding resistors directly to the screw terminals if the intruder detection system is not connected yet.
- Close the boltwork with the door open and manually close door-bolt contacts and door-position contacts which are not yet closed (refer to 5.1.1). The lock(s) close(s) and the message 'Secured' appears on the display.
- Press the ENTER key (or the dialling knob) several times, the message 'Input disabled' must appear, the disarming procedure or the function 'Open the lock' cannot be executed.
- Deactivate the Disarm disabling feature of the intruder detection system (contact closed = loop resistance of 1 x Rx on the screw terminals 3 and 4, refer to 4.2.3) . Disarm disabling can also be simulated by connecting corresponding resistors directly to the screw terminals if the intruder detection system is not connected yet.
- Press the ENTER key (or the dialling knob) several times. After the message 'Open the lock' the message 'Badge please!' must appear and the disarming procedure or the opening procedure can be started normally.

6 Troubleshooting

6.1 Error messages

If error messages appear (e.g. the message 'Error lock 1B Service (51)') these can be acknowledged by pressing ENTER or the dialling knob. If further error messages occur proceed as described in the instructions for remedying faults (refer to chapter 8 of the Training Documentation).

6.1.4 Fault on the input 'Disarm disabling'

- For evaluation of the Disarm disabling signal it is necessary that the function 'Authorisation disabling' in the service menu has been activated. This function may only be activated if the respective system requirements have been provided to this purpose. For security reasons this function can only be activated and deactivated by entering the valid master code of lock 1 in the service menu.
- Check the correct position of the potential-free contact which signals the Disarm disabling.
- Check the correct installation of the loop resistors on the potential-free contact.
- Check the resistor connection of the Disarm disabling function. To this purpose disconnect the wires connected to terminals 3 and 4 of the switching unit box and measure the resistance between both wires. If the contact is open (position disarming disabled) the resistance must be twice as high ($2 \times R_x$) as if the contact is closed (position disarming permitted). Also refer to section 4.2.5.
- Check the position of the DIP switches (microswitches) of lock 1 between the lock connectors (1=OFF, 2=OFF, 3=ON). If there is a fault on the input 'Disarm disabling' the function also can be deactivated by setting the service menu function 'Deactivate authorisation <Off>' similar to the process described in section 5.3.1 even if the safe is closed. The intruder detection system can be disarmed in spite of the fault. As a result it is, however, possible that an alarm is set off (refer to the Operating Instructions of the intruder detection system).

6.1.5 Fault in the connection to the intruder detection system

Fault with arming/disarming:

- Check the subsequently soldered terminating resistors R1 to R4 in the switching unit box. Do they have the required values, are they in the correct position, are the soldering points executed correctly?
- Disconnect the wires on the terminals 12, 13 and 14 of the switching unit box and measure the resistance directly between the terminals. The required resistor values for arming or disarming are given in the product documentation of the intruder detection system.

Fault with confirmation from the intruder detection system:

- Check the correct installation of the loop resistors on the potential-free confirmation contact of the intruder detection system.
- Check the loop resistance of the confirmation line. To this purpose disconnect the wires on the terminals 23 and 24 of the switching unit box and measure the resistance between both wires. If the contact is open (= confirmation 'IDS disarmed') the resistance must be twice as high ($2 \times R_x$) as if the contact is closed (= confirmation 'IDS armed').

If there is a fault in the connection to the intruder detection system the function 'Switching unit VdS' can be deactivated as follows even if the safe is closed and the locking system can be opened again in spite of the fault (**Caution:** This triggers an alarm!): Remove the battery compartment cover and dismount the input unit. Remove the ribbon cable from the connector PM6 (to the right of the set bolt), remount the input unit and close the battery compartment cover. The locking system can now be opened with a valid opening code.

6.1.6 Bolt position or door position is not detected by the alarm system

- Ensure that the bolt-position contact or door-position contact used for alarm purposes is not the same one used by the Paxos locking system.
- Check the connection of the door-position contact (wiring).
- Check the switch position (contact closed if the door/bolt is closed or open).
- Check the correct setting of the switching point. Is the switch correctly and permanently actuated?

6.1.7 Lock-bolt contacts are always open

Check the connection of the contacts on the terminal strip of the switching unit box. There must be a short-circuit between terminals 18 and 19 if lock 1 is completely closed. There must be a short-circuit between terminals 18 and 20 if lock 2 is completely closed. There is only a short-circuit between terminals 19 and 20 if both locks are completely closed. Lock 1 is only completely closed if the system status 'Secured' is shown on the display. Lock 2 is only completely closed if the system status 'Secured' or 'Locked' is shown on the display.

6.1.8 Tamper alarm: Sabotage loop always open

- Check whether the empty battery holder is correctly inserted and the contact springs of the input unit make correct contact.
- Check whether the supply voltage of the intruder detection system is applied (9.6...15.0 V DC on terminals 7 and 8 of the switching unit box).
- Check the polarity of the supply voltage (+ on screw terminal 7, – on screw terminal 8).
- Check the positions of the jumpers in the switching unit box (JP2/B and JP1/D must be set, all other must be empty).
- Check the position of the DIP switches (microswitches) between the lock connectors of lock 1 (1=OFF, 2=OFF, 3=ON).
- Check whether the cover of the switching unit box is correctly fitted.
- Check whether the lifting contact on the bottom of the switching unit box is actuated (pressed). The travel between the mounting surface and the switching point of the contact is 3.5 mm. LED D6 lights up when the lifting contact is open.
- Check whether the terminating resistor (or a short-circuit wire) is soldered in on position R5 inside the switching unit box.
- Check the wiring to and the loop resistance of the inputs 'Confirmation IDS armed', 'Locking-period interruption' and 'Disarm disabling'. The loop resistors must be fitted. Actuation of locking-period interruption (by push-button or input 'Locking-period interruption') also triggers the tamper alarm and LED D8 lights up.

6.1.9 Duress alarm is not triggered

Check for correct code entry for triggering the duress alarm. Consult the Operating Instructions. The duress alarm is not triggered if the duress code is entered during the code change procedure.

