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Symbols employed



Warning!

Dangerous in use, or if used incorrectly; may cause personal injury and / or damage to property and the environment.



Important Note !

This symbol indicates useful information regarding installation or operation.



User Information !

Aid in achieving correct and effective operation.

Application / Purpose

Correct Use

The correct use of this access control system includes the following applications :

- checking and monitoring access to doors, gates, barriers and turnstiles
- the access control system covered by these instructions provides easy and secure access for authorised persons. As a person with an authorised access key approaches the reader unit, an action is initiated (for example, a door contact is opened), depending on the application, without the user himself or herself having to take any action

Incorrect Use

- using the product outside its area of application
- opening the product in an inappropriate manner, except for specific cases (e.g., to replace the battery)
- making changes to the product

Safety instructions



Please read and follow carefully the safety instructions set out below !

Please read these instructions carefully and thoroughly, taking note of warning notes and comments, before installing the unit and setting it in operation. This booklet contains important information covering installation, programming and use.

- always use the equipment strictly in accordance with the instructions
- ensure the equipment is always in problem-free operating condition (see the technical details in the appendix section of these instructions)

The manufacturer accepts no responsibility for damage caused by improper use or inappropriate handling.

The system is suitable for indoor or outdoor operation, provided it is installed in accordance with our instructions.

The access control system merely provides a control signal to an actuator device, such as an electrical door-opener. A mechanical / electro-mechanical system must be provided to ensure that the door is properly closed.

Store the programming key and the security card in a safe place, where it cannot be used to interfere with the correct operation of the access control system.

If the equipment is to be stored for some time, it should be kept in a dry and dust-free environment, in its original packing.

The components of the access control system - particularly the key and parts of the key - can be swallowed by small children.

The access control system covered by these instructions is a radio system which meets all relevant legal requirements. Even so, it is impossible to guarantee that no interference will be caused to other radio systems, nor that it will remain unaffected by other radio systems.

If problems of this kind occur, the systems involved should be placed at a greater distance from each other.

The reader and control unit electronics can become warm in operation - up to 10°C above the ambient temperature. This slight warming will have no effect on the operation of the electronics.

Installation, maintenance and repair work should be carried out only by authorized and trained personnel.

Always disconnect the electricity supply before carrying out installation, maintenance and repair work. Safety regulations and the requirements of the local electricity supply company must be observed.

The system must not be installed in areas where there is the risk of explosion, nor in areas where vapours may corrode metals or plastics.

Disposal :

- the packing is cardboard and can be recycled as paper waste
- plastic parts and the bags containing the screws can be recycled
- electronic components must be disposed of in accordance with regulations

System components

The following components make up the access control system security:

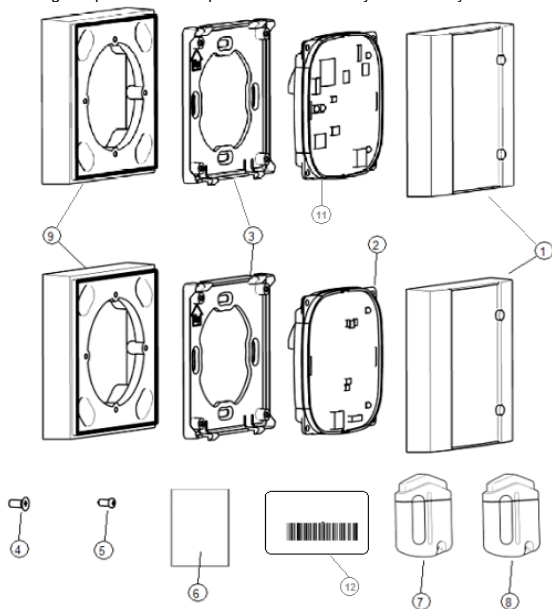


Fig. 1 : System components

1. Housing cover - 2x
2. Reader unit (with terminal block - 6 pins)
3. Chassis - 2x
4. Set of chassis screws :
8 x Phillips flat-headed, countersunk screws (M2.5 x 8)
5. Set of electronics screws :
8 x Phillips domed countersunk screws (M2.5 x 6)
6. Operating instructions
7. Programming key security (yellow) - without battery (no battery required)
8. Standard key (blue)- including CR2032 battery
9. Surface mounting frame - 2x
10. Standard concealed mounting switch base (not delivered with the system)
11. Control unit (with terminal blocks - 20 pins)
12. Security card for Programming key security

Installation



Installation must be carried out in compliance with national electrical regulations.



The reader unit must not be installed directly on a metal surface, as this can result in a reduction in the range of the device, or even complete communication failure with the key. The surface mounting frame (9) supplied with the kit will increase the distance from any metal surface and counter-act the effects described.



The reader and control unit can be installed as a concealed mounting device on a standard switch base (60 mm diameter) available from electrical retailers. Alternatively, it can be fitted as a surface-mounting device, using the surface mounting frame (9). In either case, use the drilling template provided in the Appendix.



If the reader fields for several different reader units overlap, this may cause a slight delay in recognizing the appropriate keys.



A 12 V or 24 V DC supply is required. Further details are set out in the Section : „Technical Data“.



Never connect the normal domestic or commercial electrical supply (120 or 240 V AC) or higher directly to the access monitoring system. This will cause the immediate destruction of the system !

Carry out installation in the sequence described, taking careful note of the instructions and illustrations.

Control signals to the actuator devices (door opener, etc.) from the access control system are issued via a potential-free change-over switch with terminal connections identified as NO, NC and C. This provides a potential-free opening contact (C - NC) and a potential-free closing contact (C - NO), so that a range of options is available.

**Important !**

When selecting and connecting external components (actuators, etc.) to the system, check these against the technical data in this instruction booklet in terms of dielectric strength and the current carrying capacity of the inputs and outputs.

We accept no responsibility for damage caused by the installation of unsuitable external components.

Further information on connecting components to the relay is given under the heading „Switching a wake-up input, relay ...“ on page 47.

**Very Important !**

Place the control unit to an area where unauthorised persons to not have access to for preventing from sabotage and manipulation.

Concealed Mounting

Use a standard concealed mounting switch base (10), available from any electrical retailer, with a depth of at least 42 mm and 60 mm diameter.

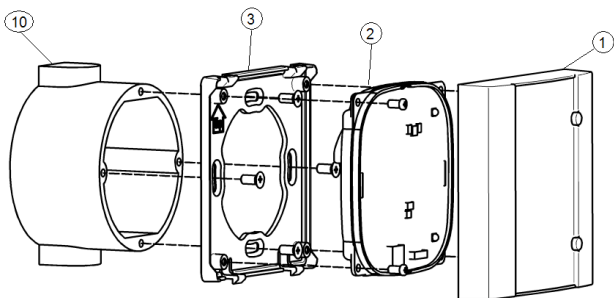


Fig. 2 : Concealed mounting

If the unit is to be installed as a concealed mounting device, ignore steps 1 and 2 of the following instructions and go to step 3.

Surface mounting

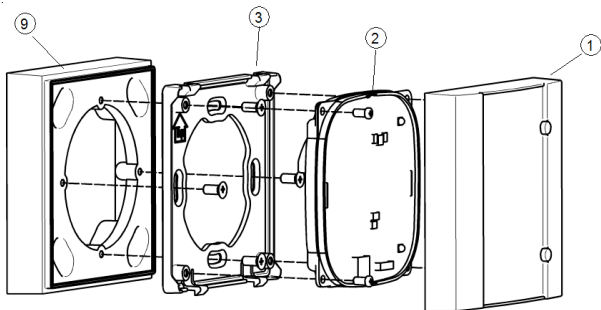


Fig. 3 : Surface mounting

1. Fix the surface mounting frame (9) in place, using the drilling template provided in the Appendix section of these instructions. The appropriate screws should be used, as well as wall-plugs, if necessary (when drilling into stone or concrete).
2. If the wiring to the reader and/or control unit is to be laid on the surface, break out an opening on the appropriate side of the surface mounting chassis, using a pair of pliers.
3. Fit the chassis (3) on the surface mounting frame (9) or the concealed mounting base (10), using the countersunk screws (4).



The arrow with the word „TOP“ must point upwards.

4. The wiring can now be fed through the opening into the centre of the chassis or surface mounting frame.
5. Before starting to wire up, pull out the plug-in terminal block on the rear of the reader / control unit (see Fig. 4 : „Removing the terminal block“)



Warning!

Do not tighten the screws in the terminal block while this is attached to the electronics section. Otherwise the contact pins may be damaged.

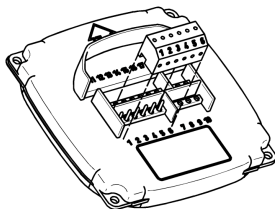


Fig. 4 : Removing the terminal block

6. Connect the components as shown in the following wiring drawing.

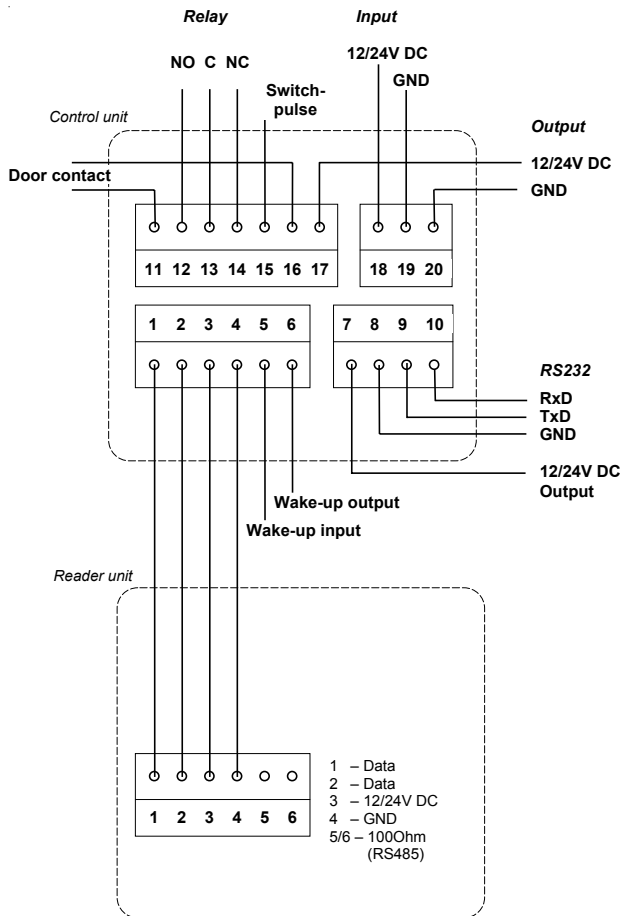


Fig. 5 : Terminal block connections

Switching a wake-up input, relay, door contact, switch pulse and RS232

If a wake-up input is not switched (standard) the relay will switch as soon as an authorised key is moved within range. No other action is required.



For further information on relay switching, see Fig. 5 and also page 43.

The wake-up input can be switched by an additional action (e.g., via a pushbutton or an induction loop) in order to activate the access control system. Only when an authorised key is moved within range and activation has been carried out via the wake-up input will the access control system be activated. If the wake-up input is connected direct to ground via a normally-closed switch, the reader will search for activation (the opening of the switch contact) for at least 3 seconds or for a longer activation, so long as the input is active, with keys within range.

The wake-up output is connected to ground internally as long as the reader will search for keys within range.



Connecting a voltage to the wake-up input will cause the destruction of this input !

Switching inductive currents via the relay can result in high voltage peaks, which may destroy the relay. This must be prevented by using external switching devices (e.g., free-running diodes).

A switch pulse of 100ms is being generated at the switch pulse output directly after detection of an authorised key

For detection of the door status (open or closed) a door contact can be connected to the control unit.

For access control system configuration purposes via RS232 or RS485 (serial communication) please contact your local supplier.

7. Replace the terminal block in its location on the rear of the electronics (2)(11).
8. Attach the unit (2) (11) to the chassis (3) with the screws (5)



The arrow with the word „TOP“ must point upwards.

9. Position the cover (1) on the chassis (3) with the LED at the right hand side and press the cover gently until it clicks into place. This can be made easier by pressing the clips back with a screwdriver.



Disassembly is in the reverse order.

Programming

To prevent undesired actuation during a programming operation, the programming key (7) is first exposed and then the range of the reader is reduced to a narrow band of a few mm. Once the programming operation has been completed, the range of the reader is expanded again to its normal band.



Hold the key for programming in close proximity to the reader unit, as shown in the following illustration.

When first delivered, keys (7) and (8) have not been programmed.

The programming key (7) first exposed to the reader unit after first power up is allocated to the unit. See also pages 56.

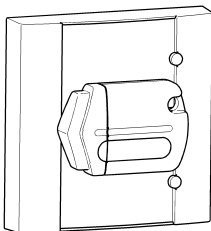


Fig. 6 : Key held close to the reader unit

Coding



LED red



LED green



Buzzer

-top (see Fig.7: Reader unit)

-bottom (see Fig.7: Reader unit)

-signal tone

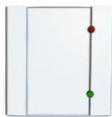


Fig. 7 : Reader unit

The time-based sequence of actions or signals is shown in different spacings from left to right (as a time ,beam').

Basic functions

Quiescent condition'



The red LED flashes briefly at intervals of ca. 10 seconds

An authorised key moves in the catchment zone

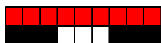
(if the key remains in the catchment zone, no further activation takes place - see „Emergency Operation“)



- the green LED remains lit for the programmed ,retention' time (see „Programming the contact ,retention' time mode“)
- the buzzer sounds briefly once (if the loudspeaker is activated - see „Programming Loudspeaker mode“)

An unauthorised key moves in the catchment zone

(if the key remains in the catchment zone, no further activation takes place - see „Emergency Operation“)



- the red LED lights briefly
- the buzzer sounds briefly twice (if the loudspeaker is activated - see „Programming Loudspeaker mode“)

Programming modes

Learning mode - allocating authorisation to keys

Hold the programming key in close proximity to the unit until the „acknowledge“ tone is heard.



- the red LED flashes briefly, ca. every second
- the buzzer sounds briefly once to confirm that the learning mode has been activated (,acknowledge' tone)

The system is now in learning mode.

Expose the key to be recognized and this will be authorised. Repeat this for all the keys to be authorised.



- the green LED lights briefly to confirm the learning operation
- the buzzer sounds briefly once

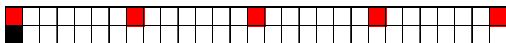
At the end of the learning operation, holding the programming key briefly to the unit will stop the operation immediately. Otherwise, if no action is taken, the learning operation stops automatically after ca. 10 seconds.



- the green LED lights to show the end of the learning mode
- the buzzer sounds for ca. 1 second

Delete mode - deleting individual keys

Hold the programming key in close proximity to the unit until the „acknowledge“ tone is heard.



Hold the programming key a second time close to the unit until two „acknowledge“ tones are heard.



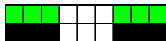
- the red LED flashes briefly twice, ca. one second apart
- the signal buzzes twice to confirm that the „delete“ mode has been activated

The system is now in „delete“ mode.

Expose the key to be deleted and this will be authorised. Repeat this for all the keys to be deleted.



To delete all authorised keys at the same time, follow the instructions under „Total Delete Mode“



- the green LED flashes briefly twice to confirm the deletion
- the buzzer sounds twice

The delete operation is ended by holding the programming key briefly to the unit. Otherwise, if no action is taken, the learning operation stops automatically after ca. 10 seconds.



- the green LED lights to show the end of the learning mode
- the buzzer sounds for ca. 1 second

Contact retention time - changing the relay hold-on time

Hold the key close to the unit (do not remove) until the following „acknowledge“ tone is heard. Then remove the programming key from the unit.



- the red LED flashes at a rate of ca. 1 second
- the buzzer sounds in synchronisation with the LED at a rate of ca. 1 second

The system is now in „contact retention time“ mode.

To set the contact retention time, hold the programming key close to the unit for the length of time, for which the contact is required to remain set.



The contact retention time can be set between 1 and 30 seconds

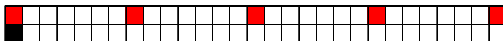


- the green LED remains lit as long as the key is held close to the unit
- the buzzer does not sound

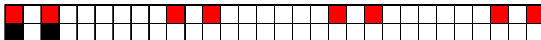
The mode is ended as soon as the key is removed.

Loudspeaker mode - buzzer on / off

Hold the programming key close to the unit until the „acknowledge“ tone is heard.



Hold the programming key a second time close to the unit until the „acknowledge“ tone is heard twice.



Hold the programming key a third time close to the unit until the „acknowledge“ tone is heard three times.



- the red LED flashes briefly three times at ca. 1 second intervals
- the buzzer sounds three times to confirm that the „loudspeaker“ mode has been activated

The system is now in „loudspeaker“ mode.

Present the programming key in order to set / reset the buzzer.

Repeatedly showing the programming key will cause the buzzer to change from „on“ to „off“ mode. The current status is shown as follows :

Buzzer on :



- the green LED flashes 3 times
- the buzzer sounds at the same frequency as the LED lights up

Buzzer off :

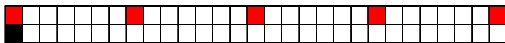


- the green LED flashes 3 times
- the lack of a buzzer sound indicates that the buzzer is off

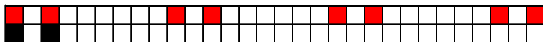
The „loudspeaker“ mode is switched off automatically after ca. 5 seconds.

„Range“ mode - changing over the reader range

Hold the programming key close to the unit until the „acknowledge“ tone is heard.



Hold the programming key close to the unit a second time until the „acknowledge“ tone is heard.



Hold the programming key close to the unit a third time until the „acknowledge“ tone is heard. **Do not remove the key from its position close to the unit.**



To ensure that the „range“ mode is not activated by accident, the red LED flashes several times in sequences of 3, without a buzzer tone.



After a short time the red LED will flash 4 times and the buzzer will sound. The programming key must now be removed from its position close to the unit.



The system is now in „range“ mode.

Present the programming key in order to change the range.

Repeatedly showing the programming key will cause the range to change from „normal“ to „reduced“ and back again. The current status is shown as follows :

Normal range



- the green LED lights for ca. 1 second
- the buzzer sounds as long as the LED is lit

Reduced range



- the green LED flashes briefly
- the buzzer sounds briefly

The mode is ended automatically after ca. 5 seconds.

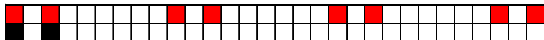
„Total Delete“ mode - delete **all** keys simultaneously**Caution !**

In this mode, all standard keys are deleted.

Hold the programming key close to the unit until the „acknowledge“ tone is heard.



Hold the programming key close to the unit a second time until the „acknowledge“ tone is heard twice.



Hold the programming key close to the unit a third time. **Do not remove the key from its position close to the unit.**



To ensure that the „range“ mode is not activated by accident, the red LED flashes three times without a buzzer sound.



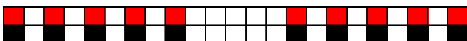
After a time, the LED will flash four times with a buzzer sound. Continue to hold the key close to the unit.



To ensure that the „total delete“ mode is not quitted by accident, the red LED again flashes four times without a buzzer sound.



The red LED now flashes five times with a buzzer sound. The programming key should now be removed.



The system is now in „total delete“ mode.

Present the programming key to delete **all the keys**.

While the „delete“ operation takes place, the following signals will be displayed (as long as the system is deleting its key memory) :



- the green LED flashes at brief intervals

- the buzzer sounds to the same rhythm as the flashing of the LED

Ordering a new programming key in case of loss of the original programming key



There are several ways of programming:

- with programming key (7)
- with laptop or PDA via infrared port of the control unit
- with PC via serial communication port (RS232)



For programming via infrared or serial communication please contact your local supplier for more information.

After the initial commissioning of the reader and control unit electronics (2) (11) the programming key (7) remains unprogrammed. It cannot be used to carry out any programming. For this reason, the key must be held close to the reader unit, so that it is firmly presented to the system.

Only this programming key can be used to carry out programming sequences.

If the programming key which is programmed after the initial commissioning is lost, send back the security card (12) to the supplier in order to get a new programming key that fits to the electronics.

That sequence guarantees that only the owner of the card gets a programming key for his electronics.



Store the programming key in a safe place, where it cannot be used to interfere with the correct operation of the access control system.

The following sequence must be followed, in order to program the new programming key. Following this sequence, the „old“ key is deleted from the system and, even if it is found, it is no longer authorised to carry out programming.

Programming key which is to be registered must be held next to the reader unit



- the green LED lights for ca. 2 seconds as acknowledgement

- the buzzer sounds for the same period as the LED is lit

Emergency Operation

If the battery in the key (8) runs down to such an extent that no signal is issued when the key is at a distance from the reader / control unit, it is possible to use the „passive“ mode. To do so, place the key (8) close to the reader, as shown in Fig. 8 :

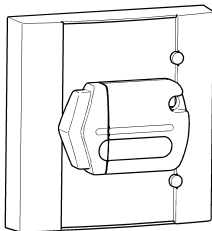


Fig. 8 : Passive mode

The key will operate in passive mode, even without a battery.

There is therefore no risk that a system cannot be opened because the battery is low or dead.

To ensure that a system is not opened by a key which has been left within range of the reader unit, any key which has been noted once as being within range is then put into „sleep“ mode by the reader unit. That key will not become active again until it has left the receiving range for a specified time-window. This time window is set to one second.

Therefore, if you wish to open a system with a key which has already been recognized once (perhaps without your noticing this) and which is still within receiving range of the reader unit, there are 2 alternatives :

1. you leave the receiving range for at least once second and then return
or
2. you place the key close to the reader, as described above.

Replacing the key battery



When carrying out the actions described below, NEVER touch the exposed printed circuit board in the key.

The electronic keys (8) use a Type CR2032 lithium cell battery which delivers a supply voltage of 3 V. If the operating range reduces, or a key no longer operates correctly, this may be caused by a dead battery (for details of battery life see the section :“Technical Data“ later in these instructions).

To replace the battery, hold the upper housing of the key and pull out the grey, lower section. This requires a degree of force, because the two sections are sealed with a rubber ring.



The key can be opened without any tools. Never use a tool, which may cause damage to the key.

The battery is located under a U-shaped metal contact plate and can now be removed. This is most easily achieved by tugging the upper section suddenly downwards, which will cause the battery to jump out of its location.



When installing the new battery, ensure this is placed in the recess in the correct polarity. In the example shown below, the positive pole is upwards. This is indicated by the , + , stamped on the retainer plate.

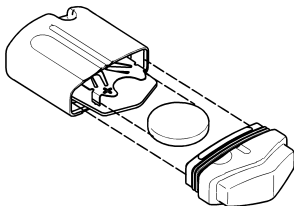


Fig. 9 : Replacing the key battery

Put the grey cover back into the upper housing in the proper orientation. The right orientation can be seen in Fig. 9 : Replacing the key battery



Dispose of the old battery in an environmentally friendly manner !
Give it to the retailer when you buy the replacement battery or place it in an officially recognized disposal bin.

Technical data

Standard key

Function	Access Control / Access authorisation
Power supply	3 V type CR2032 battery Life : ca. 3 years at 20 000 cycles / year Stand-by mode with automatic „wake/sleep“ function
Radio interfaces	UHF (433 MHz) : conforms with EN 300 220 Radiation capacity < 10 mW e.r.p LF (125 kHz): conforms with EN 300 330
Emergency operation	Operates at close range (< 10 cm) without battery
Environment	Operating temperature : -20 bis +55 °C Storage temperature : -20 bis +80 °C Relative humidity : 20% bis 95% (not condensing)
Protection	IP54 Protected against brief immersion in water
Approvals	 EMC; conforms with R&TTE guidelines
Weight (incl. battery)	ca. 23 g
Dimensions	36 × 53 × 15 mm
Identification field	8 × 25 mm
Material	Plastic: PA6 GF30
Colour	cover: RAL 7047 (grey) housing RAL 5000 (violet blue)

Programming key

Function	Registering and deleting standard keys Programming contact retention time Activating / de-activating the buzzer Changing the detection range
Power supply	No battery needed Energy is provided from the reader unit at close range (< 10 cm)
Radio interfaces	LF (125 kHz): conforms with EN 300 330
Environment	Operating temperature : -20 bis +55 °C Storage temperature : -20 bis +80 °C Relative humidity : 20% bis 95% (not condensing)
Protection	IP54 Protected against brief immersion in water
Approvals	 EMC; conforms with R&TTE guidelines
Weight	ca. 20 g
Dimensions	36 × 53 × 15 mm
Identification field	8 × 25 mm
Material	Plastic: PA6 GF30
Colour	cover: RAL 7047 (grey) housing RAL 1018 (zinc yellow)

Reader unit

Power supply	12/24 V DC $\pm 10\%$ (12VA) via connection to control unit Voltage ripple < 300mV
Installation	Concealed mounting : in switch base 60 mm Ø x 42 mm (DIN VDE 0606; DIN VDE 0471; DIN IEC 695) Surface mounting : with mounting frame supplied. Metal objects close to the reader / control unit may reduce the operating range of the unit
Contacts	Plug-in terminal block with screwed terminals
radio interfaces	UHF (433 MHz): conforms with EN 300 220 Radiation capacity < 10 mW e.r.p. LF (125 kHz): conforms with EN 300 330 Field at 10 m distance < 56 dB μ A/m
Operating range	2 - 3 metres (full range) or 1 - 1½ metres (reduced range) with standard key < 10 cm (close range) for programming and when using programming key
Communication with keys	Authentication procedure with cryptology (coding ISO/ IEC 9798-2)
Communication with control unit	4wire connection (power supply and data); cryptology datatransfer
Signalling	Green and red LEDs; buzzer
Programming	With programming key via radio interfaces
Approvals	 EMC; conforms with R&TTE guidelines
Environment	Operating temperature : -20° to +55° C Storage temperature : -20° to +80° C Relative humidity : 20% to 95% (non-condensing)
Protection	IP54 when installed
Weight	ca. 90 g
Dimensions	Concealed mounting : 85 x 85 x 16.4 mm Surface mounting : 85 x 85 x 34 mm with frame
Materials	Chassis in PA6 GF30 Cover and surface mounting frame in ASA
Housing colour	RAL 9016 (white)

Control unit

Power supply	12/24 V DC $\pm 10\%$ (12VA) Voltage ripple < 300mV
Installation	Concealed mounting : in switch base 60 mm Ø x 42 mm (DIN VDE 0606; DIN VDE 0471; DIN IEC 695) Surface mounting : with mounting frame supplied.
Contacts	Plug-in terminal block with screwed terminals
Communication with reader unit	4wire connection (power supply and data); cryptology datatransfer
Input	- Input for potential-free door contact; voltage resistance 20V - Wake-up input
Output	- Potential-free change-over switch: Voltage resistance: 30V DC / 48 V AC Current-carrying capacity: 1A DC / 0.5 A AC - Switch-pulse (100msec): 24V DC; max. 0.5A - wake-up output (ground potential as long as reader searches for key) - 12/24 V DC output (2 x 0.5 A; PIN 7 and 17)
Signalling	Green and red LEDs; buzzer
Key management	up to 32,000 keys
Programming	With laptop or PDA via infrared interface, with PC via serial communication (RS232)
Communication interface	- Infraredconnection: 890nm; angle $\pm 24^\circ$; 9.6 - 115.2 kBit/sec - RS232 (serial communication)
Time-zone management	up to 32 timeframes programmable individually
Event storage	up to 3,500 events
Data storage	Date and time: ca. 72 hours Rights and events remain
Approvals	 ; EMC
Environment	Operating temperature : -20° to +55° C Storage temperature : -20° to +80° C Relative humidity : 20% to 95% (non-condensing)

Protection	IP54 when installed
Weight	ca. 120 g
Dimensions	Concealed mounting : 85 x 85 x 16.4 mm Surface mounting : 85 x 85 x 34 mm with frame
Materials	Chassis in PA6 GF30 Cover and surface mounting frame in ASA
Housing colour	RAL 9016 (white)

Appendix

Identification labels

Use the following template to make individual identification labels for your keys :

Fig. 10 : Labelling template for keys

Remove the cap from the upper section of the key, as described in „Replacing the Key Battery“.

Take the clear plastic foil from the identification box on the key.

Place the clear plastic foil directly over the identification label.

Now insert the identification label, covered by the clear plastic foil, into the box on the key, so that the label is under the clear plastic foil and is therefore protected against dirt, water, etc.

Drilling templates

Surface mounting

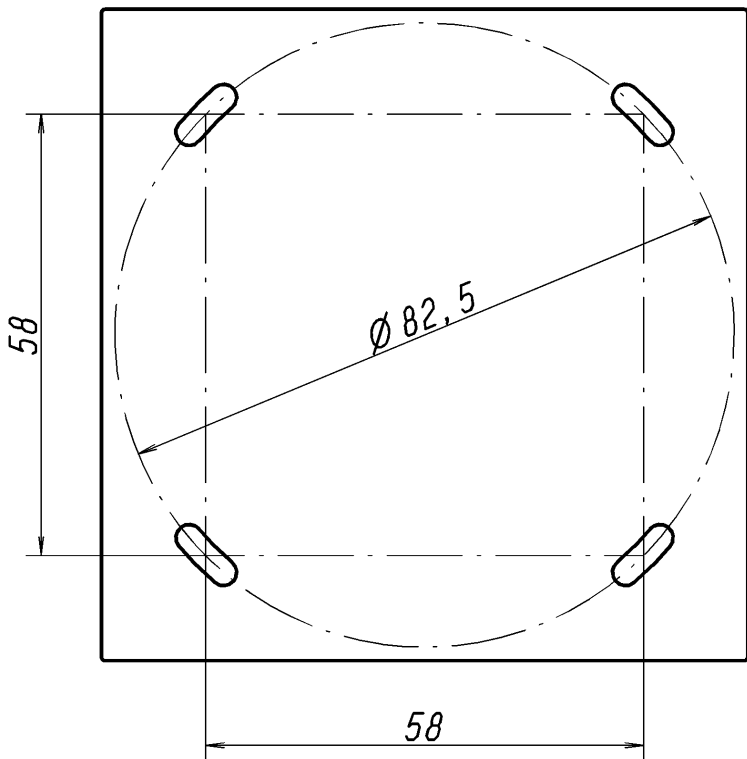


Fig. 11 : Drilling template for surface-mounting frame

Mounting chassis

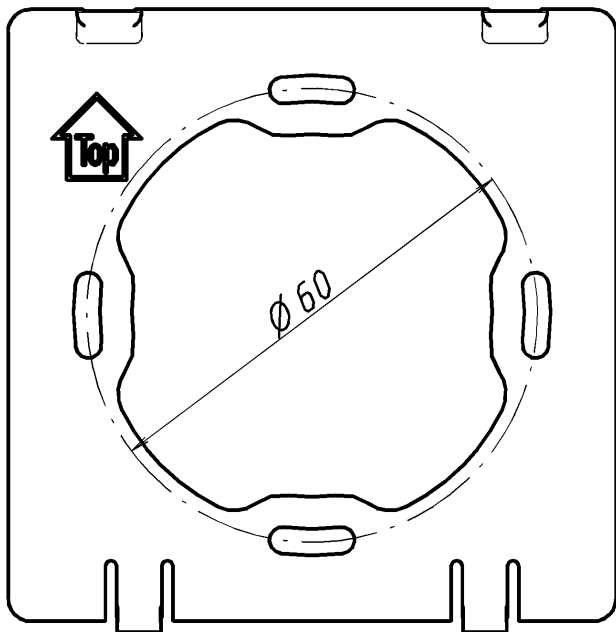


Fig. 12 : Drilling template for chassis

Access Control System

Key: Model Name: 0545KEY
FCC ID: SX4KEY



Reader: Model Name: 0545READER
FCC ID: SX4READER

FOR HOME AND OFFICE USE.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning:

Changes or modifications made to this equipment not expressly approved by KOSTAL Industrie Elektrik GmbH may void the FCC authorization to operate this equipment.

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

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