KEY 7

aero

KEY 7

aero

Congratulations choosing aero. You have selected a truly unique design with respect for architectural values. Thank you!

It has been an emotional adventure to transform complex functionality into a distinct shape. It is not hard to work with creative freedom - the real challenge is the art of limitation. Less is more.

We have filled the aero with lots of advanced technology that you'll probably never notice. Technology that simplifies your life. It is my hope that you will enjoy the ease of use.

This manual contains useful information - please read the section that concerns your application to ensure optimal performance with your new aero access point. I also recommend that you visit the web site www.key7.dk. The web site provides you with the latest up to date information about new products including software.

Enjoy your aero

Nicolaj Haarup

DESIGN by Nicolaj Haarup   © Copyright 2008

User Manual

aero AX1 & AX2

Rev. 1.1

KEY7 A/S - Denmark

Contents

General description

The aero AX-series are unique keypads / readers for the demanding user.
The high-end timeless design emphasizes architectural values in any building .

The AX-series can work in either of 3 modes to suit most applications:

    Mode 1:   *Stand-alone operation for up to 1000 users*
    Mode 2:   *KeyLink PRO access control system*
    Mode 3:   *Protocol operation for integration with 3rd party controllers*

aero AX is mounted on the wall or any other flat surface with 4 screws and a hole for the cabling.
All electronics are contained in the slim design making the aero AX-series looking almost like a
magic icon hovering over the surface of the wall.

Mode selection

First you need to decide what mode of operation you will need for your application and make your
selection - see next page:

Mode overview

Basically there are 3 different modes of operation. Make your choice based on the 3 boxes below and proceed directly to the relevant page:

MODE 1: (default)

STAND-ALONE

Choose this mode for simple 1-door access operation. Requires no PC.

MODE 2:

KeyLink PRO Access control

Choose this mode for full featured KEY7 access control system with several doors and areas.

MODE 3:

Protocol operation

Choose this mode if the AX is to be inter-faced to a third party control panel.

For instructions in how to change back to default mode (Mode 1) - please refer to section *Reset to factory default* on page 12 and page 30.

Mounting

The aero AX must be mounted on a flat surface.

1. The base is mounted on the wall using the supplied 4 screws.
2. A 8mm hole for the cable is drilled.
3. The AX is then fitted into the base and secured with the 2 set screws.
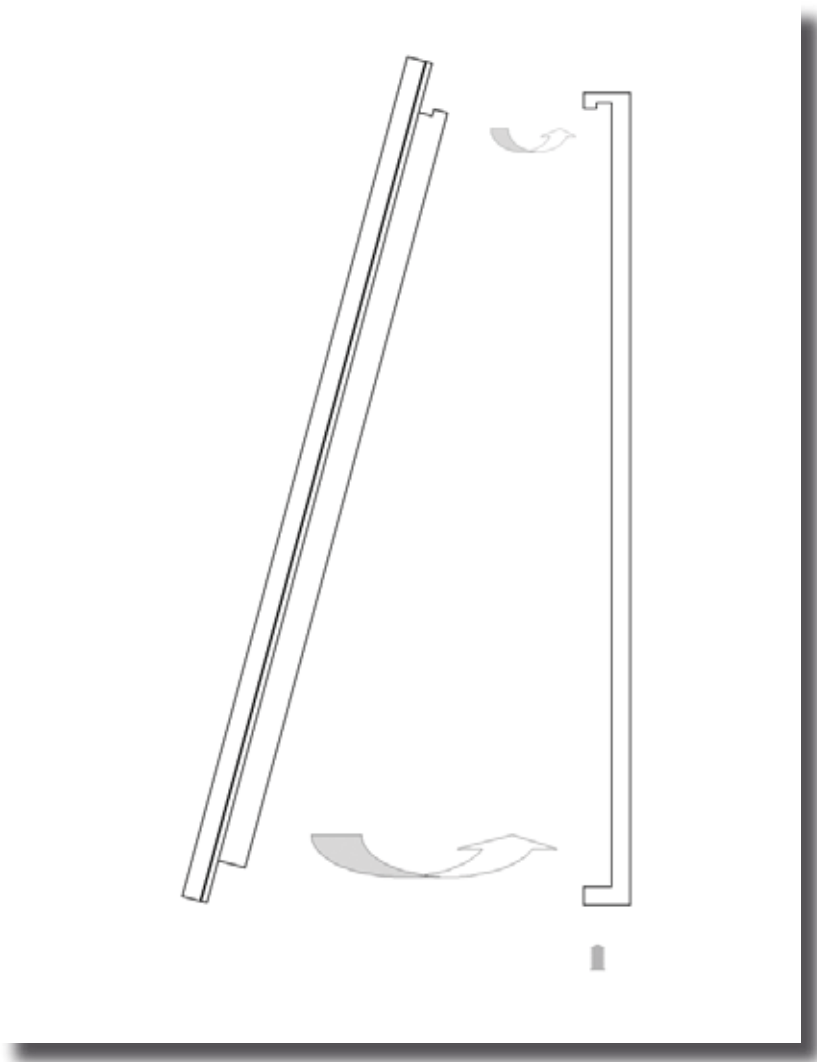
Figure 0: Assembly

SECTION

MODE 1 - *Stand-alone operation*

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Stand-alone

Stand-alone mode is the default mode of operation for the aero AX-series.
This mode is used for simple 1-door access operation and requires no PC for setup or daily use.

For instructions in how to change back to Mode 1 from another mode - please refer to section *Reset to factory default* on page 12 and page 30.
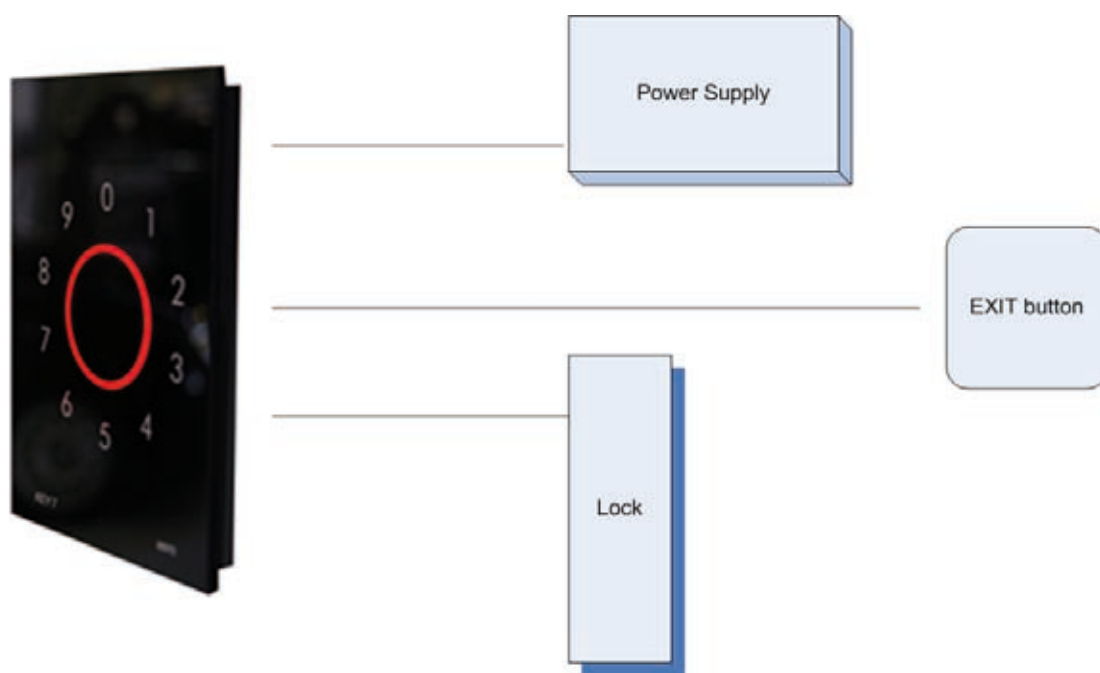
Figure1: Block diagram of components involved in stand-alone mode (Mode 1).

In stand-alone mode the user codes and configurations are done via the keypad of the aero AX.

Creating, modifying and deleting user codes requires the use of the *Master code*. See p. 16

Modifying the configuration setup requires the use of the *Service code*. See page 11

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Specifications

Mode 1 specifications:

Function	Values, typical
Power supply	8-28V DC
Power consumption	@12V: 100mA, @24V: 50mA
Dimensions	100x140x12mm
Weight	400g
Cable	white 14-lead, 3m
Prox reader	HID and EM410x (AX1-11 and AX2-11) MIFARE (AX1-21 and AX2-21)
Users	1000
Door output	open collector, <1A/24VDC
Door time	1-998 seconds or on/off
Alarm bypass	optical relay, 100mA/24V
Bypass time	1-998 seconds or on/off
Duress alarm	3 seconds, <1A/24VDC
Tamper	optical wall sensor
Tamper loop	optical relay, 100mA/24V
Operating temperature	-20°C to +65°C

Mode 1 wiring:

Wire	Description
RED	+ Power supply
BLACK	- Power supply
YELLOW	Door output, ground, <1A/24V
GREEN/WHITE	By-pass output wire 1, 100mA/50V
GREEN/BROWN	By-pass output wire 2, 100mA/50V
BLUE	Tamper output wire 1, 100mA/50V
BLUE/RED	Tamper output wire 1, 100mA/50V
VIOLET	Duress alarm output, ground, <1A/24V
PINK	EXIT-button
WHITE	Status input
BROWN	Sync / Door feed-back
GREEN	-
GRAY	-
GRAY/PINK	-

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Example connection

In basic stand-alone mode (Mode 1) the cabling is limited to only 3 wires - or 4 if an optional EXIT-button is required. Figure 2 shows the diagram.
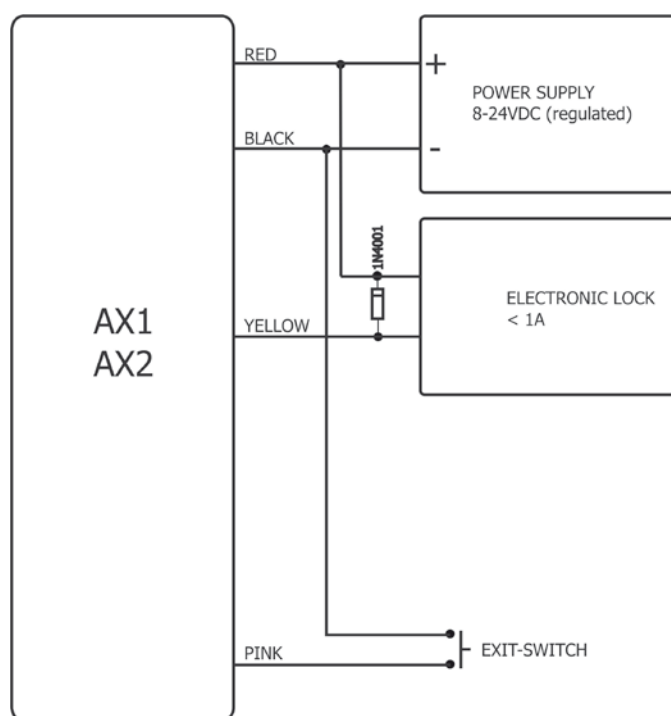
Figure 2: Wiring diagram for a simple single-door application (Mode 1).

Extended functionality

Status input

The white wire controls the mode of access validation when using aero AX1 devices with both keypad and prox readers. By default the user has to present *either* a valid pin-code *or* a valid prox tag to gain access. By changing the *access mode* the status input (white wire) is used to control whether the user has to present *both* a pin-code and a prox tag or *only one* of them.

See *Access profile* on page 15 in section "Advanced Configuration in Mode 1" to learn how to access this mode.

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Basic Configuration in Mode 1

This chapter describes the basic configuration of the aero AX. Configuration is only required when operating the device as a stand-alone access point (Mode 1). **Basic AX** configuration is divided into 5 functions.

Configuration is done by entering below sequence:

Typical programming sequence: **K** S **K** yy z **K**

K   KEY7 logo button (Approx 1½ cm above and right of logo)

O   Button in light circle
S   Service code   (Default 09876543)
M   Master code   (Default 12345678)
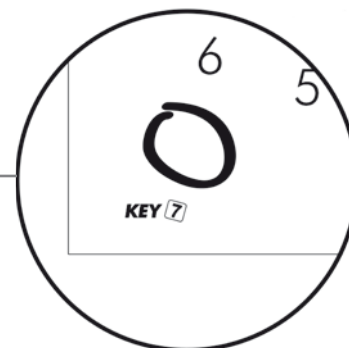yy   function code   (Always 2 digits)
z   configuration data   (1 to 16 digits)

Position of hidden K-button

Note: *Technician code* is only valid 60 minutes after applying power.

In the following sections the 5 function configurations are explained ...

Master code change [10]

The Master code is used to create and modify user codes. It is important to change the default Master code to prevent unauthorized modification the user codes.

K M **K** 10 [nm1] [nm2] **K** **O**

M   Master code (default 12345678)
nm1   The new Master code
nm2   Repeated new Master code

NOTE: Master code must always contain 8 digits.

Service code change [30]

The Service code is used to edit function parameters. It is important to change the default service code to prevent unauthorized modification the functionality.

K S **K** 30 [ns1] [ns2] **K** **O**

S   Service code (default 09876543)
ns1   The new Service code
ns2   Repeated new Service code

NOTE: Service code must always contain 8 digits.
NOTE: The Service code will time out after 60 minutes. Re-enabling can be done either way:
        * Enter the Master code + **K**
        * Disconnect power and re-connect power

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User code length [31]

This function specifies the length of the user codes. The length can be from 2 - 8 digits. Default length is 4 digits.

K S **K** 31 [z] **K O**

S   Service code (default 09876543)
z   2-8

NOTE: Changing the code length with this function should be done *before* creating the user
    code to avoid truncating or deleting the created codes.

Door output time [33]

This functions specifies the active time in seconds for the Door output. This output is activated when a user code is entered / prox is presented.
The output can be configured as a toggle output entering '0' as the z-value.

K S **K** 33 [z] **K O**

S   Service code (default 09876543)
z   0-999 (Default value: 3)

NOTE: Door output is the yellow wire. See page 9
NOTE: When active this output "makes a ground".
NOTE: When using the output as a toggle-output the output changes every time the a valid
    user code is entered. The output is only is only active as long as the status input
    (WHITE wire) is low (grounded).

Reset to factory default

Using this function resets the AX1 back to factory default settings.

1: Disconnect power supply
2: Connect PINK wire to BLACK wire
3: Re-connect power
4: Wait for 5 seconds and notice circle turns red
5: Release PINK wire from BLACK wire within 5 seconds without disconnecting the power
   supply

AX1 is now reset to factory settings and all codes are cleared.

NOTE: All user codes are deleted.

Advanced Configuration in Mode 1

This section is only required if advanced functions are needed - otherwise refer to section "Basic Configuration in Mode 1" - see page 13.

The aero AX has many very powerful functions that enable it to be used in almost any application. A complete description is far to comprehensive to be printed in this user manual. Only some are covered here and others can be found on www.key7.dk

Advanced function cue:

3-door mode
Used when needed to control up to 3 door from one AX1. Please refer to www.key7.dk

Door feed-back
Used when need for alarm when door is left open or forced open. Please refer to www.key7.dk

Sluice operation
Used when two AX1 control two doors in a sluice. Please refer to www.key7.dk

Configuration generator
A web-based tool. This is a really useful tool when configuring the aero functions. Simply make your selections and enter one single sequence. You'll find it on www.key7.dk

On/off operation
If the outputs have to be operated in an on/off toggle mode some things have to considered.
Reed more on www.key7.dk

Alarm functions
The AX1 offers a variety of alarm functions including Sabotage, Duress and Tampering.
See "Alarm output function" on page 16.

Duress alarm
During duress a secret code is entered to trigger a silent alarm. See "Duress Alarm saetup" on page 16.

Lock-out
Code tampering can be prevented . Read how in section "Lockout time" on page 17.

Buzzer
If the behavior of the buzzer need to be altered the please refer to "Buzzer function" on page 17.

By-pass operation
The AX1 has a special output specially designed to by-pass zones. See "By-pass output time" on page 17 and for advanced by-pass use please refer to www.key7.dk

Access profile
It is possible to have different security levels depending on an external signal. See "Access profiles" on page 18 and read more on www.key7.dk

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Alarm output function [43]

The aero AX contains several alarm functions:

Trigger	Trigger reason	Output (see p. 9)
Sabotage	An optical sensor in AX sees the absence of wall	Tamper
Code tamper	3 consecutive false user codes	Tamper
Duress	A secret code (see *Duress Alarm Setup* below)	Duress (3 seconds)

Sabotage is always enabled!
The other triggers can be controlled using below procedure:

K S **K** 43 [z] **K O**

S   Service code (default 09876543)
z   0 - 3 (default 0)

Alarm trigger, z:
0: Only Sabotage (can not be disabled)
1: Enable Duress open alarm trigger
2: Enable Code tampering trigger (requires that Code Tamper *Lockout time* on page 14 is con
    figured for > 0 seconds (default 30 seconds))
3: Enable Duress open alarm and Code tampering trigger

Duress Alarm setup [44]

When using this option the AX can trigger a silent alarm when a "secret" code is entered. This is especially useful during duress. The victim enters his/her normal user code but with last digit as specified in this function. Everything works normally but in addition a silent alarm is triggered.
For this function to be activeated it must be enabled - se "Alarm output function".

K S **K** 44 [z] **K O**

S   Service code (default 09876543)
z   0 - 9

NOTE: If using this function *none* of the user codes may contain the z-digit in the last position!

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Lockout time [38]

This functions specifies the lockout time in seconds after 3 invalid entries. Using this function prevents code tampering.

K S **K** 38 [z] **K O**

S   Service code (default 09876543)
z   0-999 (default is 30 seconds)

NOTE: If z=0 the lockout is disabled.

Buzzer function [36]

This functions specifies the behavior of the buzzer.

K S **K** 36 [z] **K O**

S   Service code (default 09876543)
z   Buzzer function 0-4 (default 1)

Buzzer function:
    0: Buzzer off
    1: Buzzer on during access period (door output time period)
    2: Buzzer on for ½ second during access period (door output time period)

By-pass output time [35]

This functions specifies the active time in seconds for the By-pass output. This output is activated when a user code is entered / prox is presented.

K S **K** 35 [z] **K O**

S   Service code (default 09876543)
z   0-999 (Default value: 30)

NOTE: By-pass output is an isolated output on the green/white and green/brown wires. See page 9.
NOTE: When active there will be approximately 5 ohms resistance between these wires.

Output polarity [34]

This functions specifies the output "polarity" of the by-pass and the door output.
The by-pass output can be either open circuit or closed circuit (default).
The door output can be either *high* (default) or *low*.

> **K** S **K** 34 [z] **K O**

S   Service code (default 09876543)
z   Output polarity 0,1,4,5 (default 0)

Output polarity:
   0: by-pass normal open circuit, door high. (default)
   1: by-pass normal closed circuit, door high
   4: by-pass normal open circuit, door low
   5: by-pass normal closed circuit, door low

NOTE: If by-pass is closed circuit the resistance between the output wires will be
      approximately 5 ohms.
NOTE: Door output can sink up to 1A during low. That means the lock must be connected to +
      (RED wire) and door output (YELLOW wire).

Access Profile [32]

Access profile specifies whether the user has to present *both* the pin code *and* the prox tag or
if it is sufficient to use *either* the pin code *or* the prox tag.

> **K** S **K** 32 0 [ab] **K O**

S   Service code (default 09876543)
a   0 or 1. Access profile when "Status Input" wire is *not* connected
b   0 or 1. Access profile when "Status Input" wire *is* connected to *ground*.

Access profile (a and b):
   0: Pin code *and* Prox
   1: Pin code *or* Prox

Default value for a: 1
Default value for b: 1

NOTE: Status Input is the WHITE wire. See page 9.

Pulse definition [37]

This functions specifies the pulse length used in the "Buzzer function". The time in 1/10th of
seconds is sepcified by the z-value.

> **K** S **K** 37 [z] **K O**

S   Service code (default 09876543)
z   0 - 999 (default 5)

Daily use in Mode 1

Daily use is very straight forward:

Enter user code (and/or present prox tag) and the light circle (**O**) changes from red to green indicating access. When access ends the light circle fades back from green to red.

Create / Modify User codes

This procedure creates / modifies user codes. Up to 1000 user codes and/or prox tags can be stored:

K M [aaa] [u] [p] **O**

M   Master code (default 12345678)
aaa   000-999, Memory location for user code (a total of 1000 locations are available)
u   User code. Number of digits as defined in function *Code Length (default 4).*
p   Prox tag. Hold tag to reader (in red circle)

NOTE: After touching **O** the circle keeps flashing - this indicates that a new user can be
        created / modified by continuing entering a new memory location [aaa].
        When finished then abort procedure by touching **O** once more.

Deleting User codes

This procedure deletes user codes.

K M [aaa] **O**

M   Master code (default 12345678)
aaa   000-999, Memory location for user code (a total of 1000 locations are available)

NOTE: After touching **O** the circle keeps flashing - this indicates that a new user can be
        deleted by continuing entering a new memory location [aaa].
        When finished then abort procedure by touching **O** once more.

Deleting ALL User codes

This procedure deletes all user codes.

K M **K** 120000 **K**

M   Master code (default 12345678)

NOTE: This procedure can NOT BE UN-DONE!

--- END OF MODE 1 ---

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SECTION

MODE 2 - *KeyLink PRO Access control*

KeyLink PRO Access control

In KeyLink PRO access control mode (Mode 2) the aero AX-series will be part of an access control system with an unlimited number of access points. Such a system is not based on a traditional controller but uses distributed intelligence and a KeyLink PRO software running on a server. In this mode only the addressing of the access point is required. No other configuration is required.
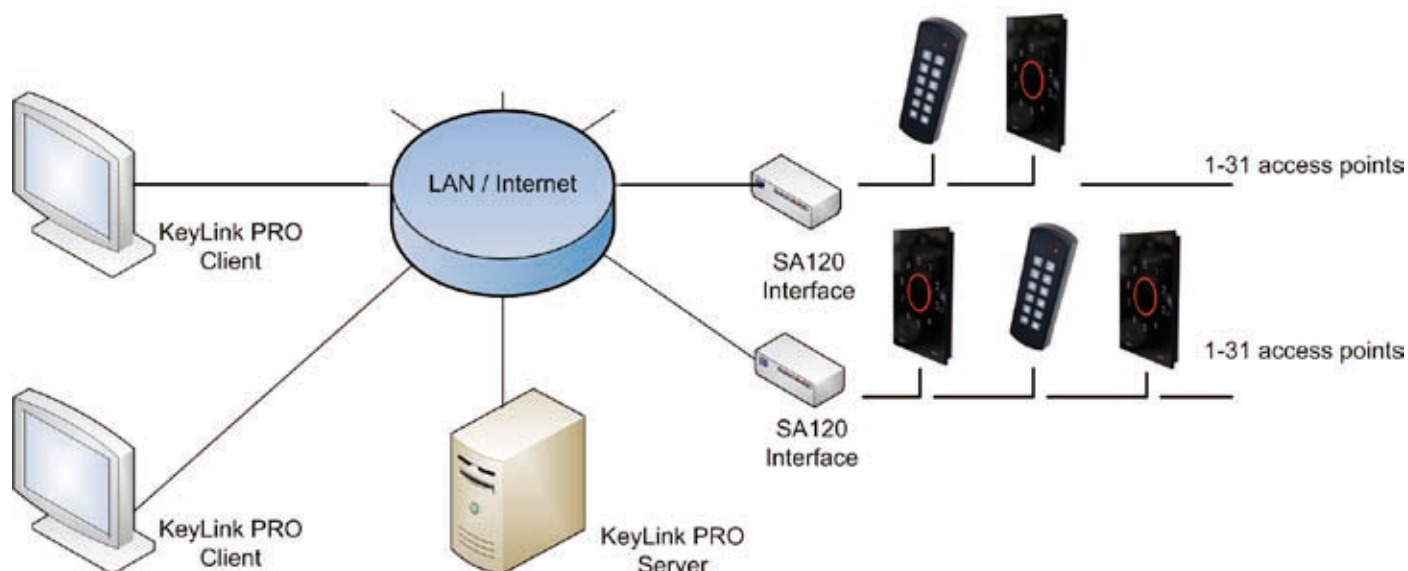

Figure 3: Basic structure of a KeyLink PRO access control setup (Mode 2).

As shown on figure 3 there is *no central controller* - only the access points and one or more interfaces. The KeyLink PRO software is executed on a Windows PC and handles only the graphical user interface, updates and logging. The access control is handled individually by the access points.

Key features:
- Up to 31 access points can be connected per 1 interface.
- An unlimited number of interfaces can be controlled from the KeyLink PRO software.
- KeyLink PRO is a server/client application allowing multiple clients. In small installations the server and client can be run from the same PC.
- Up to 1000 simultaneous users per access point.
- KeyLink PRO offers easy administration of users, sites, periods, logs and reports.

From a hardware point of view the functions of the AX is the same as in Mode 1 - e.g. the door lock is directly controlled from the AX1 and EXIT-buttons can be connected. Configuration is done using the KeyLink PRO software.

MODE SELECTION: See next page

Mode 2 selection

Selecting Mode 2 is handled automatically since the AX detects the presence of a KeyLink PRO network and switches automatically from Mode 1 (stand-alone mode) to Mode 2. The absence of the KeyLink PRO network for more than two hours brings the AX1 back to Mode 1. See the following pages on how build a KeyLink PRO network.

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Specifications

Mode 2 specifications:

Function	Values, typical
Power supply	8-28V DC
Power consumption	@12V: 100mA, @24V: 50mA
Dimensions	100x140x12mm
Weight	400g
Cable	white 14-lead, 3m
Prox reader	HID and EM410x (AX1-11 and AX2-11) MIFARE (AX1-21 and AX2-21)
Users	1000
Door output	open collector, <1A/24DC
Door time	1-998 seconds or on/off
Alarm bypass	optical relay, 100mA/24V
Bypass time	1-998 seconds or on/off
Duress alarm	3 seconds, <1A/24VDC
Tamper	optical wall sensor
Tamper loop	optical relay, 100mA/24V
Operating temperature	-20°C to +65°C

Mode 2 wiring:

Wire	Description
RED	Power supply, 8-24V DC
BLACK	Power supply, 0V
YELLOW	Door output, ground, <1A/24V
GREEN/WHITE	By-pass output wire 1, 100mA/50V
GREEN/BROWN	By-pass output wire 2, 100mA/50V
BLUE	Tamper output wire 1, 100mA/50V
BLUE/RED	Tamper output wire 1, 100mA/50V
VIOLET	Duress alarm output, ground, <1A/24V
PINK	EXIT-button
WHITE	Status input
BROWN	-
GREEN	-
GRAY/PINK	Data A
GRAY	Data B

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Building a KeyLink PRO network

A KeyLink PRO network is based on the electric RS485 bus. We recommend a CAT5 (or higher) twisted wires cable must be used and that a total bus length of 1000 meters can be obtained. The interface between this network and the PC is a SA120-U (USB) or a SA120-UL (LAN).
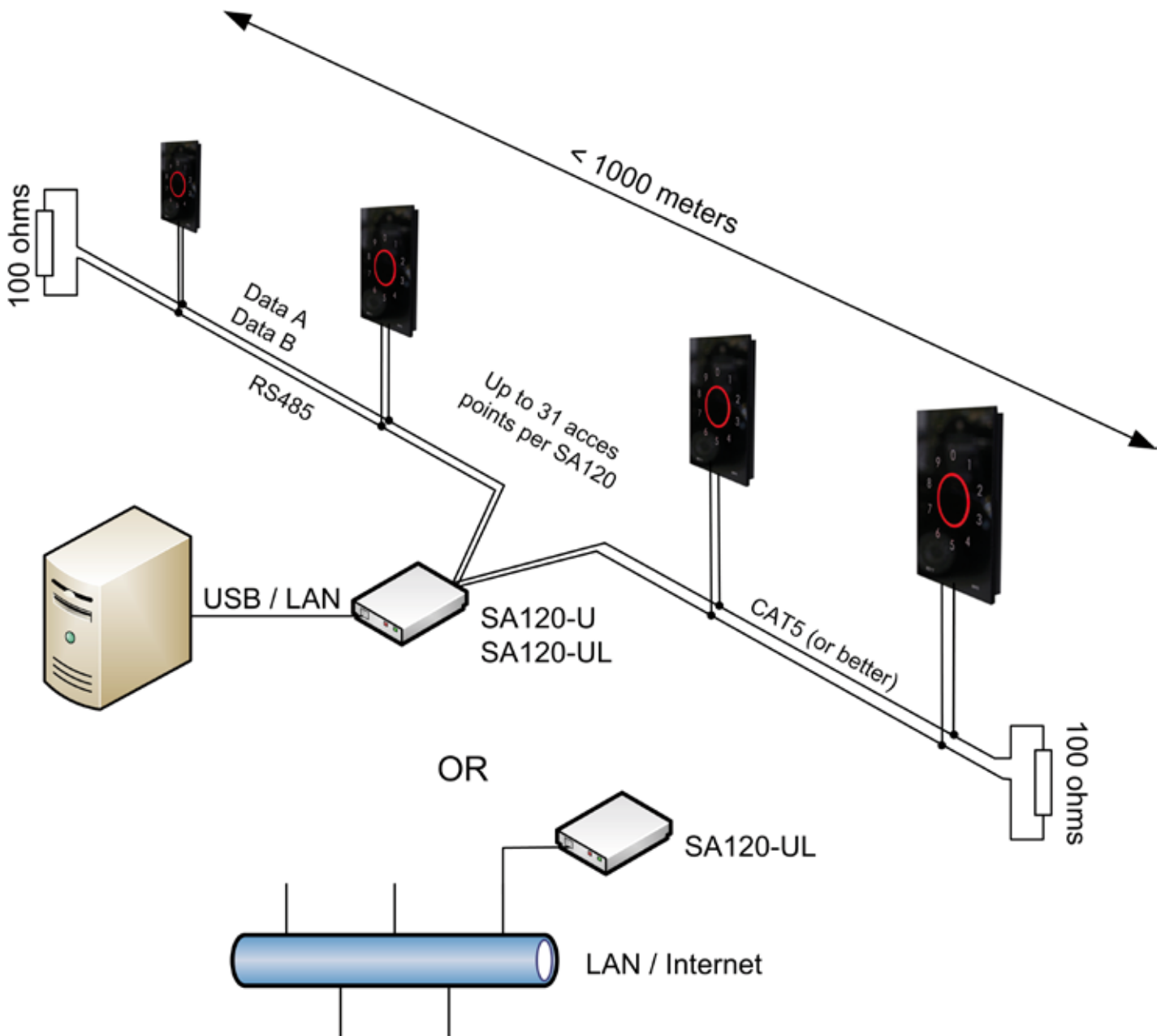
Figure 4: The KeyLink PRO access control network

Any number of SA120's can be connected to the PC. SA120-U and SA120-UL can be mixed in an installation but only 1 on each RS485-segment.
Note that a good RS485 bus is terminated with 100 ohms in each end of the cable.

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Example connection

The wiring is much like when in Mode 1 (stand-alone) but with the addition of the *bus connection (Data A and Data B)*. The EXIT button is optional. Figure 5 shows the diagram.
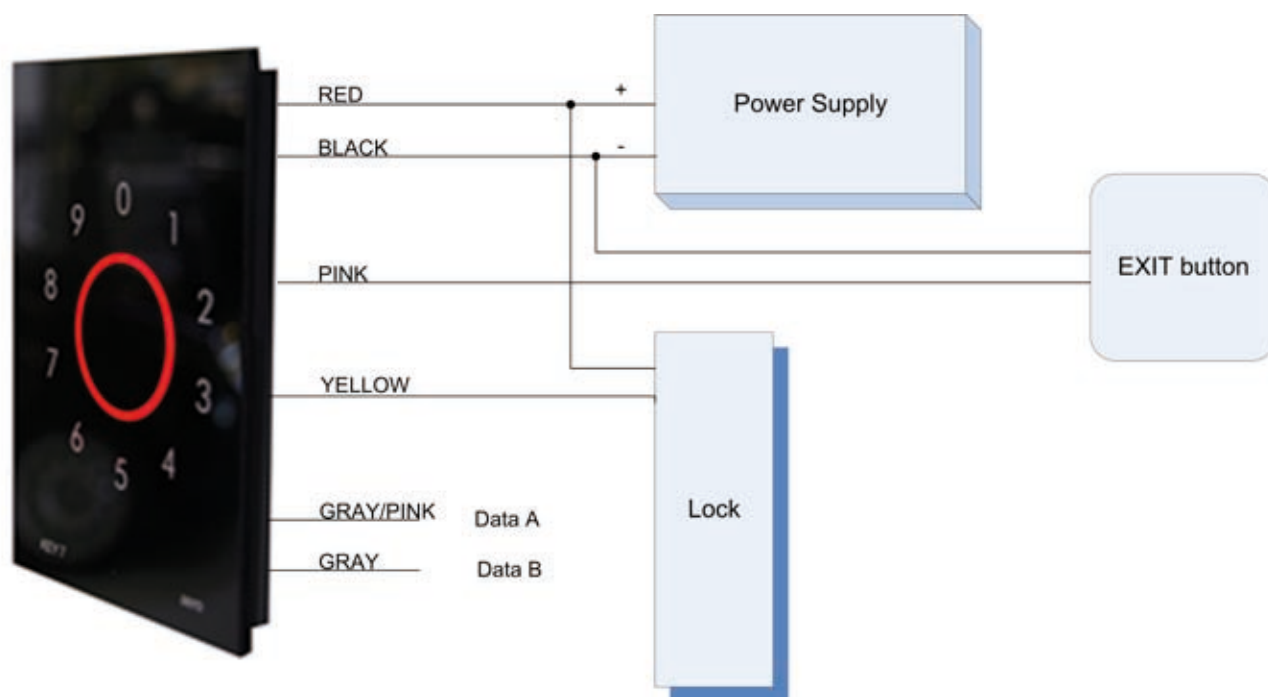

Figure 5: Typical access point wiring in a KeyLink PRO network

Configuration

The only configuration needed is the address setting:

    1) Connect power and network (Data A and B)
    2) Circle flashes red indicating the need of a valid address
    3) Enter a 2-digit address in the range from 01 to 31
   4) Circle shifts from flashing to constant red light indicating that it now has a valid address

Background: When connecting the aero AX to the KeyLink PRO network it will recognize the com-munication and knows that it has to work in Mode 2. The AX does also know that it has an invalid *address* and without a valid address it can not communicate with the KeyLink PRO server and it starts thus flashing red with its circle. This should alert the installer to enter an address in *the range from 01 to 31.*

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If, for some reason, the address has to be changed *after* it has been set enter below sequence:

K 09876543 **K** 39 [aa] **K**

K   KEY7 logo button (Approx 1½ cm above and right of logo)

aa   Address, range fro 01 to 31, (2 digits)
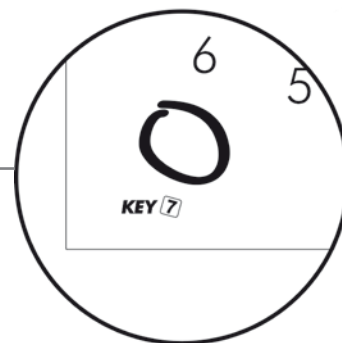
Position of hidden K-button

Note that this command must be performed within 1 hour after applying power. If 1 hour has been exceeded disconnect and reconnect power or enter this sequence:

K M **O**

M   Master code (default 12345678)

Other configuration

Besides the setting of a valid address the configuration and programming of user codes are all done in the KeyLink PRO software. *Please refer to the KeyLink PRO software manual.*

--- END OF MODE 2 ---

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SECTION

MODE 3 - *Protocol Operation*

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Protocol operation

Choose this mode if the AX is to be interfaced to a third party control panel. In *protocol operation* the AX has no user code memory. AX sends keypress and prox tag information to a control panel via the selected interface. If supported by the selected interface the control panel can send commands to the AX1 instructing it to activate its outputs.
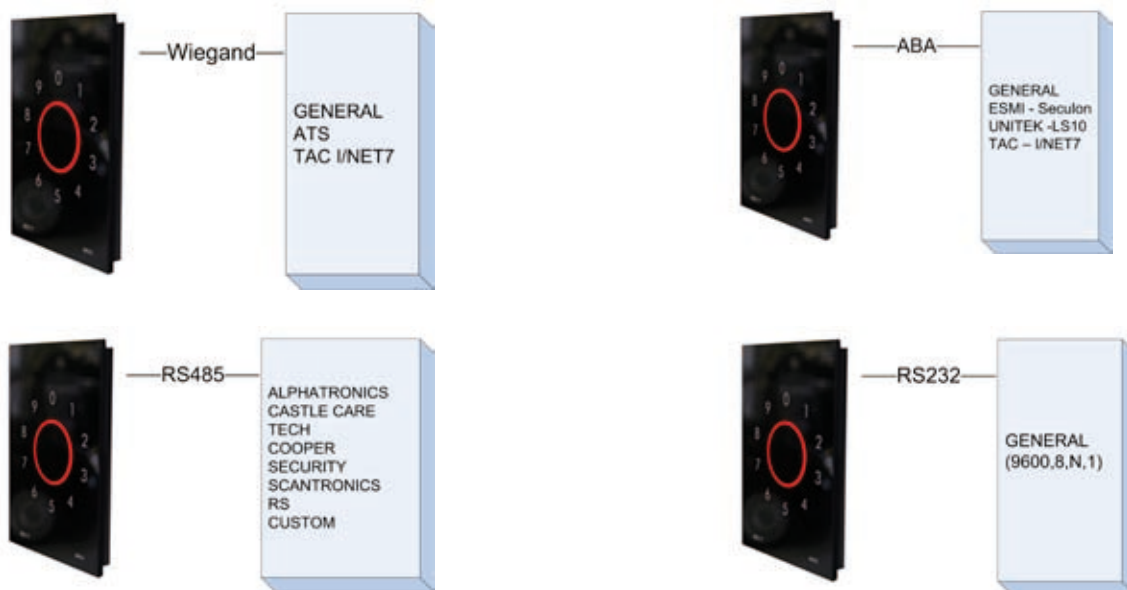

Figure 6: Basic interface types in Protocol Operation (Mode 3).

In addition to standard Wiegand, ABA and RS232 protocols the aero AX also includes dedicated protocols for integration with many third party control panels - e.g.

    * ATS
    * Castle Care Tech
    * Cooper Security
    * Alphatronics
    * Scantronics
    * TAC
    * ESMI
    * UNITEK

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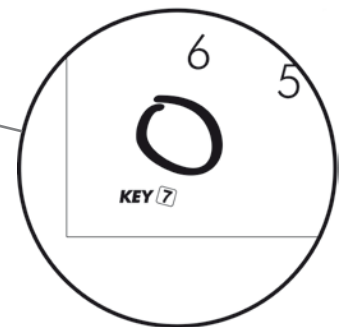
Protocol selection

The aero AX1 contains protocols for operation with most third party control panels.

Make sure the AX is in Mode 1 (factory default). If not in Mode 1 refer to section *Reset to factory default* on the next page.

Typical programming sequence: K [S] K 40 [p] [a] [t] K

K	KEY7 logo	(Approx 1½cm above and right of logo)
S	Service code	(Default 09876543)
p	protocol id	(2 digits)
a	address	(1-2 digits)
t	tamper function	(1digit)

Note: *Service code* is only valid 60 minutes after applying power.
'a' and 't' are only required on some protocols.

Position of hidden K-button

Although protocol selection is very straight forward there is one rule to remeber:

PROTOCOL SELECTION IS ONLY POSSIBLE WHEN IN MODE1 (STAND-ALONE MODE)

Protocol overview

Protocol	Description	Selection procedure
ABA	Normal ABA magnetic card rd	K S K 40 01 K
WIEGAND 26	26-bit Wiegand	K S K 40 02 K
RS232	Serial log mode	K S K 40 03 K
WIEGAND MI	Mototola/Indala Wiegand	K S K 40 04 K
ABA UT	ABA for Unitek	K S K 40 05 K
AT	Alphatronics RS485 protocol	K S K 40 06 a t K
WIEGAND 26 HID	26/8-bit Wiegand HID / ATS	K S K 40 07 K
COOPER	Cooper Security RS485 protocol	K S K 40 08 a K
WIEGAND TAC	TAC Wiegand I/Net Seven	K S K 40 09 K
CASTLE	Castle Care Tech RS485 protocol	K S K 40 10 a K
ABA TAC	ABA for TAC I/Net Seven	K S K 40 11 K
WIEGAND 32 HID	32/4-bit Wiegand HID / ATS	K S K 40 13 K
		NOTE: S is the Service code a is the desired address t=1: tamper enabled t=0: tamper disabled

Reset to factory default

If the AX is NOT IN MODE 1 (e.g. a protocol has already been selected) the device has to be reset back to factory default setting with the following procedure prior to protocol selection:

Using this function resets the AX back to factory default settings.

1: Disconnect power supply
2: Connect PINK wire to BLACK wire
3: Re-connect power
4: Wait for 5 seconds and notice circle turns red
5: Release PINK wire from BLACK wire within 5 seconds without disconnecting the power supply

AX1 is now reset to factory settings and in MODE 1.

Specifications

Mode 3 specifications:

Function	Values, typical
Power supply	8-28V DC
Power consumption	@12V: 100mA, @24V: 50mA
Dimensions	100x140x12mm
Weight	400g
Cable	white 14-lead, 3m
Prox reader	HID and EM410x (AX1-11 and AX2-11) MIFARE (AX1-21 and AX2-21)
Protocols	11
Door output	open collector, <1A/24VDC
Tamper	optical wall sensor
Tamper loop	optical relay, 100mA/24V
Operating temperature	-20°C to +65°C
Operating humidity	0-95% non condensing

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Mode 3 protocols

This section describes the protocols and their selection.

Protocol Wiegand 26

When in *Mode 1* enter this sequence to enable *Protocol Wiegand 26:*

> **K** [Service code] **K** 40 02 **K**

aero AX1 is now ready to be used as a *26-bit Wiegand* reader.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
YELLOW	Data 0	output (open collector)
GREEN	Data 1	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:
Keypress are converted and transmitted immediately. Keypress are transmitted as *10-bit Wiegand* (parity(1), key(8) parity(1)). The data format is as follows:

KEY-data:	0:	F0 Hex
	1:	E1 Hex
	2:	D2 Hex
	3:	C3 Hex
	4:	B4 Hex
	5:	A5 Hex
	6:	96 Hex
	7:	87 Hex
	8:	78 Hex
	9:	69 Hex
	K:	5A Hex
	O:	4B Hex

Prox data are transmitted as *26-bit Wiegand* (parity(1), facility(8), data(16) parity(1)).

Facility code is default '7'.

Protocol Wiegand MI

When in *Mode 1* enter this sequence to enable *Protocol Motorola / Indala Wiegand*:

K [Service code] **K** 40 04 **K**

aero AX1 is now ready to be used as a *Motorola / Indala* output-compatible Wiegand reader.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
YELLOW	Data 0	output (open collector)
GREEN	Data 1	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:
Keypress are converted and transmitted immediately. Keypress are transmitted as *8-bit Wiegand* (key(8)). The data format is as follows:

KEY-data:	0:	F0 Hex
	1:	E1 Hex
	2:	D2 Hex
	3:	C3 Hex
	4:	B4 Hex
	5:	A5 Hex
	6:	96 Hex
	7:	87 Hex
	8:	78 Hex
	9:	69 Hex
	K:	5A Hex
	O:	4B Hex

Prox data are transmitted as *26-bit Wiegand* (parity(1), facility(8), data(16) parity(1)).

Protocol Wiegand 26/26 HID

Before selecting the HID 26-bit output protocol you should decide if you would like to change the prox reader from an EM4100-compatible reader to a HID-compatible reader so the AX will accept HID cards.

K [Service code] **K** 49 0 **K**

This will make the AX read EM4100-compatible tags/cards. This is the default mode.

K [Service code] **K** 49 1 **K**

This will make the AX read HID-compatible tags/cards (125kHz).

When in *Mode 1* enter this sequence to enable *Protocol 26 HID Wiegand*:

K [Service code] **K** 40 07 **K**

aero AX is now ready to be used as a *HID* output-compatible Wiegand reader for the use with e.g. an ATS central panel. The output is 26-bit card data and 26-bit key data.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
YELLOW	Data 0	output (open collector)
GREEN	Data 1	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:

KEY data are transmitted after 4 consecutive entries followed by touching the **O**. If more than 4 digitgs are entered only the last 4 digits are transmitted.

PROX data are transmitted as *26-bit Wiegand* ((parity(1), facility(8), data(16) parity(1)).
Key data are transmitted as *26-bit Wiegand* ((parity(1), facility(8), data(16) parity(1)).

Protocol Wiegand 32/4 HID

Before selecting the HID 32-bit output protocol you should decide if you would like to change the prox reader from an EM4100-compatible reader to a HID-compatible reader so the AX will accept HID cards.

K [Service code] **K** 49 0 **K**

This will make the AX read EM4100-compatible tags/cards. This is the default mode.

K [Service code] **K** 49 1 **K**

This will make the AX read HID-compatible tags/cards (125kHz).

When in *Mode 1* enter this sequence to enable *Protocol 32/4 HID Wiegand*:

K [Service code] **K** 40 13 **K**

aero AX1 is now ready to be used as a *HID* output-compatible Wiegand reader for the use with e.g. an ATS central panel. The output is 32-bit card data and 4-bit key data.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
YELLOW	Data 0	output (open collector)
GREEN	Data 1	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:

KEY data are transmitted after 4 consecutive entries followed by touching the **O**. If more than 4 digitgs are entered only the last 4 digits are transmitted.

PROX data are transmitted as *32-bit Wiegand* ((parity(1), facility(8), data(16) parity(1)).
Key data are transmitted as *4-bit Wiegand* (data(4)).

Protocol Wiegand TAC

When in *Mode 1* enter this sequence to enable *Protocol TAC / Inet7 Wiegand*:

K [Service code] **K** 40 09 **K**

aero AX1 is now ready to be used as a Wiegand reader for the use with a TAC / Inet7 control panel.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
YELLOW	Data 0	output (open collector)
GREEN	Data 1	output (open collector)
VIOLET	AUX OUTPUT	auxiliary output
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:
Keypress are converted and transmitted immediately. Keypress are transmitted as *8-bit Wiegand* (key(8)). **O** activates teh AUX output (VIOLET). The data format is as follows:

KEY-data:	**0:**	**F0 Hex**
	1:	**E1 Hex**
	2:	**D2 Hex**
	3:	**C3 Hex**
	4:	**B4 Hex**
	5:	**A5 Hex**
	6:	**96 Hex**
	7:	**87 Hex**
	8:	**78 Hex**
	9:	**69 Hex**
	K:	**5A Hex**
	O:	**4B Hex**

PROX data are transmitted as *40-bit Wiegand* (parity(1), facility(8), dayta(24), parity(1))
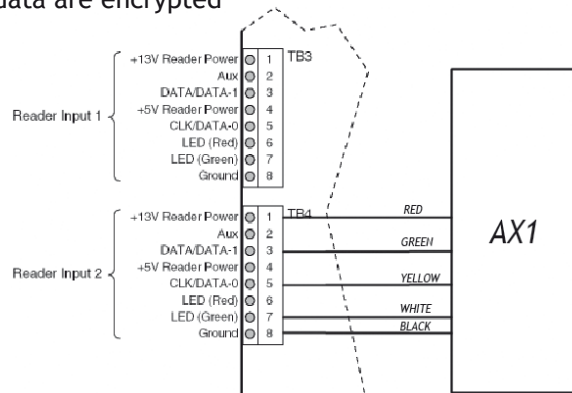
NOTE: Card data are encrypted

Figure 7: Example of connection with Protocol TAC Wiegand

Protocol ABA (Magnetic Crad Reader)

When in *Mode 1* enter this sequence to enable *Protocol ABA:*

K [Service code] **K** 40 01 **K**

aero AX1 is now ready to be used as a *Magnetic Card reader* featuring the ABA track II protocol.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GREEN	Card Clock	output (open collector)
VIOLET	Card Data	output (open collector)
YELLOW	Card Load	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:

Keypress are transmitted after pushing the **O**. Up to 8 digits can be sent. The data format is as follows:

KEY-data: B00000000xxxxxxxxF

Prox tag reading are converted from HEX to BCD and are transmitted immediatly in this format:
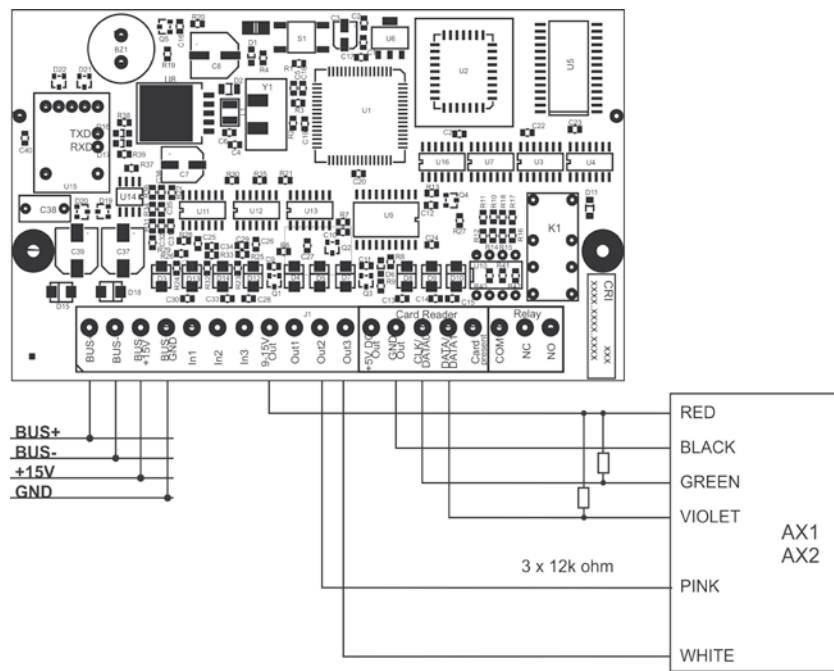
PROX-data: BxxxxxxxxxxxxxxxxxF

Figure 8: Example (ESMI) of connection with Protocol ABA

Protocol ABA UT (Magnetic Crad Reader)

When in *Mode 1* enter this sequence to enable *Protocol UT ABA:*

K [Service code] **K** 40 05 **K**

aero AX1 is now ready to be used as a *Magnetic Card reader* featuring the Unitek ABA track II protocol. The aero AX1 has same functionality as an original Unitek prox reader.

Inputs/Outputs:

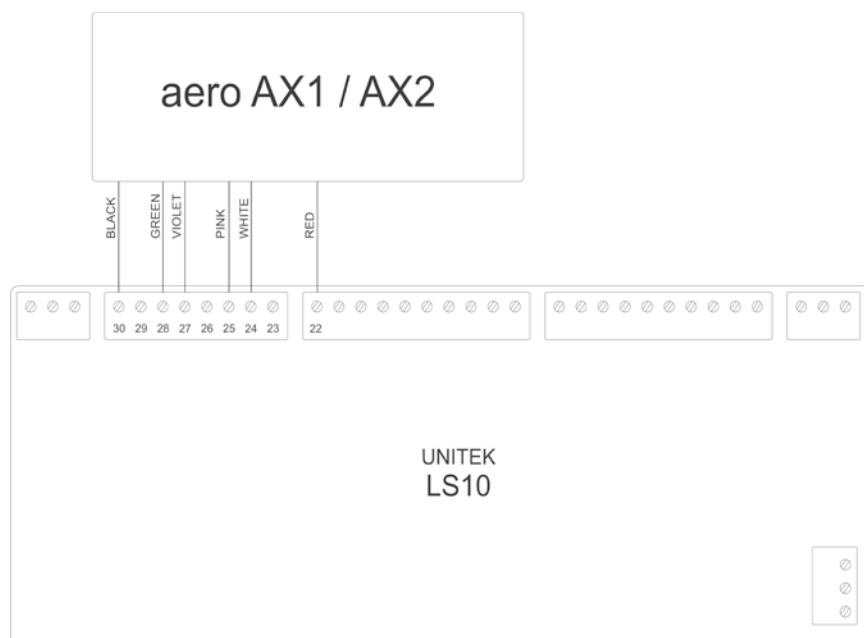| WIRE	FUNCTION	I/O TYPE
GREEN	(Terminal 28) Card Clock	output (open collector)
VIOLET	(Terminal 27) Card Data	output (open collector)
YELLOW	Card Load	output (open collector)
WHITE	(Terminal 24) High: **O** / Low: **O**	input
PINK	(Terminal 25) High: Buzzer for 1 sec.	input

Figure 9: Example of connecting a Unitek LS10 using Protocol UT ABA

Protocol ABA TAC (Magnetic Crad Reader)

When in *Mode 1* enter this sequence to enable *Protocol TAC ABA:*

| **K** [Service code] **K** 40 11 **K** |

aero AX1 is now ready to be used as a *Magnetic Card reader* featuring the TAC ABA track II protocol.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GREEN	Card Clock	output (open collector)
VIOLET	Card Data	output (open collector)
YELLOW	Card Data	output (open collector)
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:
Keypress are converted to TAC-format and are transmitted immediately. Keypress are transmitted as *5-bit* ABA

KEY-data: x

Prox tag reading are converted to TAC-format and are transmitted immediatly in this format:

PROX-data: BxxxxxxxxxxxxxxxxxF

Protocol AT

When in *Mode 1* enter this sequence to enable *Protocol AT*:

K [Service code] **K** 40 06 a t **K**

a: address ID -> 1-8 or 1-4 depending of Alphatronics controller model
t: tamper disable/enable -> 0: disable, 1: enable

aero AX1 is now ready to be used as an Alphatronics access point using its RS485-based bus.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GRAY/PINK	DATA A	RS/485
GRAY	DATA B	RS/485
PINK	MODE	input
GREEN	DOOR LOCK 1	output
YELLOW	DOOR LOCK 2	output
BROWN	SYNC	in/out

MODE (PINK wire)
Low: AX1 will behave like a normal Alphatronics access point.
High (or open connected): AX1 will behave like a normal Alphatronics by-pass switch

DOOR LOCK 1 (GREEN wire)
Ground: Led B signal from Alphatronics control panel is OFF.
High (high impedance): Led B signal from Alphatronics control panel is ON.
This output can be used to drive a door lock. Lock should be connected between '+' and GREEN.

DOOR LOCK 2 (YELLOW wire)
Ground: This indicates by-pass time.
High (high impedance): This indicates normal state (by-pass time not activated)
This output can be used to drive a door lock. Lock should be connected between '+' and YELLOW.

LIGHT RING:
O (red circle): 230V is present AND Led A is on.
O (green circle): 230V is present
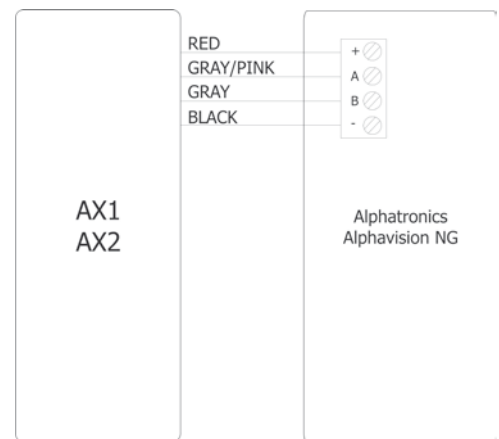**O** (dark circle): 230V not present

Figure 10: Example of connecting an Alphatronics control panel using Protocol AV

For configuring the Alphatronics control panel refer to *screen 7* in its configuration software tool.

Protocol COOPER

When in *Mode 1* enter this sequence to enable *Protocol AT:*

> **K** [Service code] **K** 40 08 a **K**

a: address ID -> 1-8

aero AX1 is now ready to be used as an COOPER/SCANTRONIC access point using its RS485-based bus. Central controllers using this protocol are RS216, RS224, RS232 and others.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GRAY/PINK	DATA A	RS/485
GRAY	DATA B	RS/485
YELLOW	DOOR LOCK 1	output
BROWN	SYNC	in/out

DOOR LOCK 1 (YELLOW wire)
This output can be used to drive a door lock. Lock should be connected between '+' and YELLOW. Refer to the COOPER/SCANTRONIC manual for instructions on how to use this.
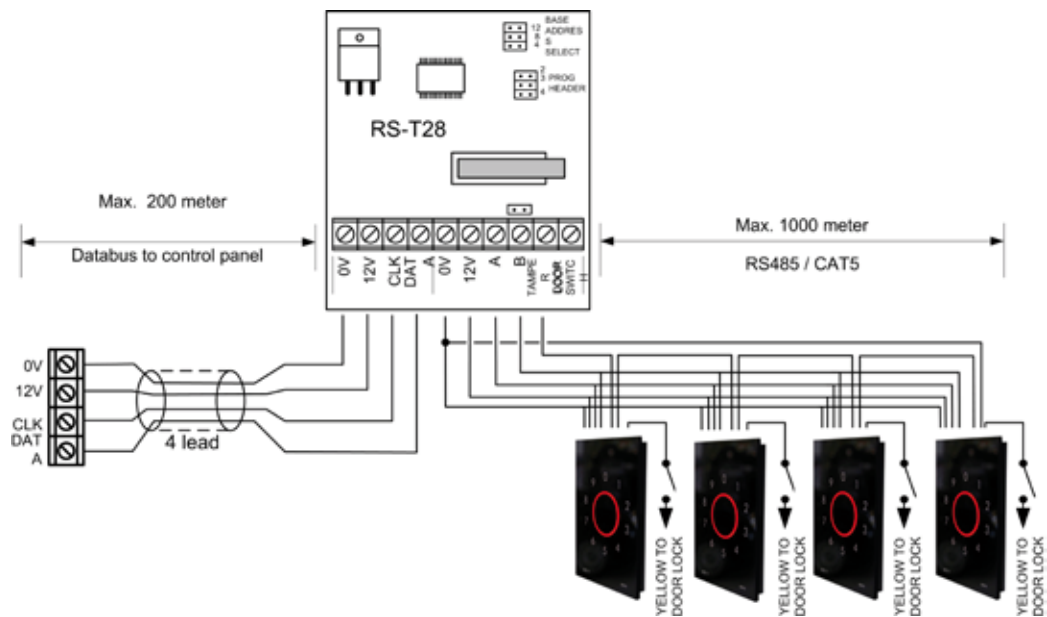

Figure 11:
Example of connecting an COOPER / SCANTRONICS control panel using Protocol COOPER

LIGHT RING:
O: This is the normal state indicating locked
O: This indicates door open time

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Protocol CASTLE

When in *Mode 1* enter this sequence to enable *Protocol AT*:

K [Service code] **K** 40 10 a **K**

a: address ID -> 1-8

aero AX1 is now ready to be used as an CASTLE CARE TECH access point using its RS485-based bus. The interface suits CS2600, CS2700 and CS2800.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GRAY/PINK	DATA A	RS/485
GRAY	DATA B	RS/485
BROWN	SYNC	in/out

LIGHT RING:
O: This is the normal state
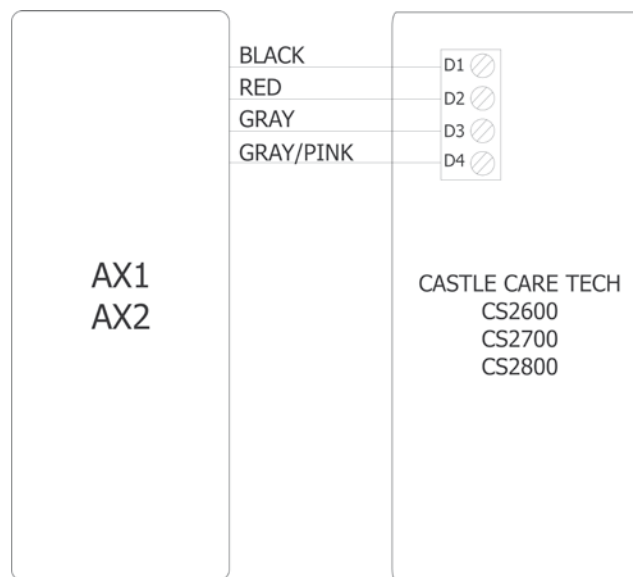**O**: This indicates code accepted

Figure 12: Example of connecting an Castle Care Tech control panel using Protocol CASTLE

For configuring the CASTLE CARE TECH products refer to its installers manuals.

Protocol RS232

When in *Mode 1* enter this sequence to enable *Protocol RS232:*

K [Service code] **K** 40 03 **K**

aero AX1 is now ready to be used as a *RS232* reader. This mode is used for logging purpose.

Inputs/Outputs:

WIRE	FUNCTION	I/O TYPE
GREEN	TX	Output data
WHITE	High: **O** / Low: **O**	input
PINK	High: Buzzer off / Low: Buzzer on	input

Operation:

Data format: 9600 Baud, 8 data bits, no parity, 1 stop bit (9600, 8, N, 1).

Keypress are transmitted immediately. The data format is as follows:

<START><DATA><CR><LF><STOP>

Prox data are transmitted immediately. The data format is as follows:

<START><DATA 9-0><CR><LF><STOP>

Field values:
<START>   : 02 Hex
<DATA>   : key value in ASCII format, eg. 49 (49 equals key press '1')
<DATA 9-0>   : 10 digits in HEX-format, eg. 0101D2F107
<LF>   : 0A Hex
<CR>   : 0D Hex
<STOP>   : 03 Hex

Protocol OEM

Manufacturers - please contact us for a dedicated protocol for your product.

--- END OF MODE 3 ---

aero models

aero AX1 is available in 2 version:

    aero AX1-11 Keypad / prox combo
    aero AX1-10 Keypad only

This manual covers both AX1-11 and AX1-10. For the AX1-10 the function referring to the proximity reader can be neglected.

Conformity

Products comply with the following EC Directives:

RoHS (2002/96/EC)

Electro-Magnetic Compatibilty Directive. (EMC) (2004/108/EC)

CENELEC EN 50130-4:1995, Amendment A1 and A2

Low Voltage Directive. (LVD) (2006/95/EC)

WEEE (2002/96/EC)

Some of the many reactions

Hey, that's really really nice!

It is so nice to see someone dare to bring up a completely new design and even more nice that they get so well away with it!

I'm so impressed! How can you do it?

You're gonna make a difference!

Whau! This new keypad should have its own place in the Museum of Modern Art!
(Said by a customer producing high end A/V entertainment systems)

What the heck??? How can KEY7 come from this (SA250/SA850) to this (aero) in just one step?
(Said by a surprised but very respected competitor)

I love you!
(Said my wife)