INOX

INOX

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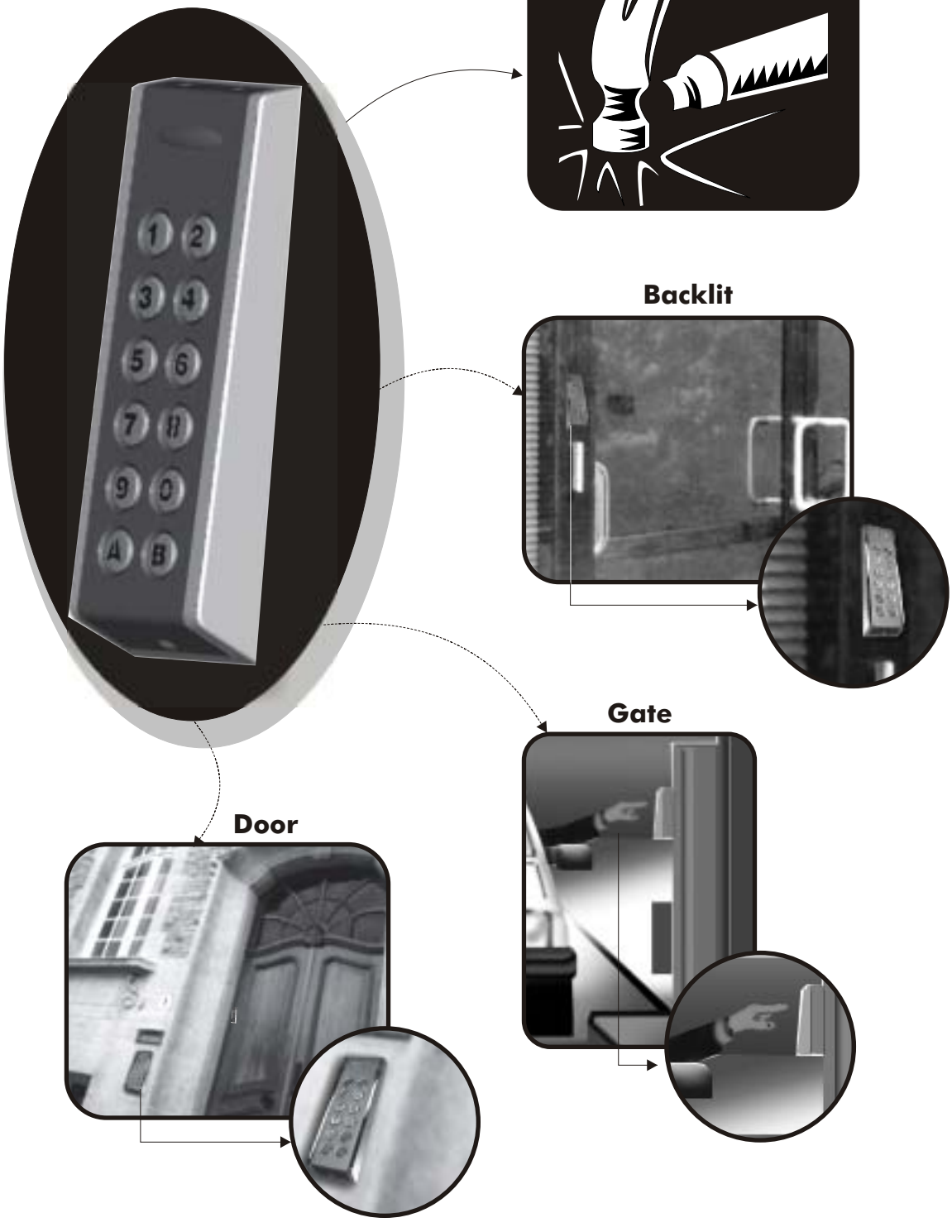


1.0 Introduction

INOX, a peripheral potted keypad with 8-core cable is designed for both indoor and outdoor use. It needs to be connected to a Host keypad over the communication bus. The communication bus can be user-selected between the XPR proprietary CODIX bus, the standard bus output 26 bits Wiegand, 30 bits Wiegand or Data/Clock. This sleek model comes with backlit metallic keys and a photoelectric sensor that automatically adjusts the illumination level of the backlighting.

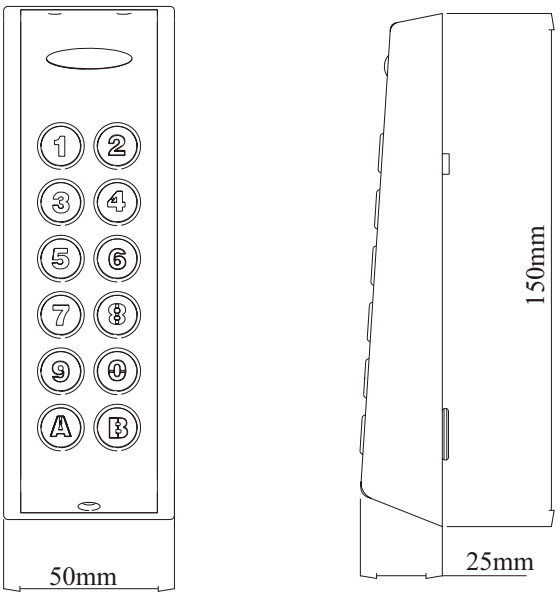
For **INOX** keypad, the User can define one of the following output formats, depending on which the programming is done accordingly on the unit:

1. WIEGAND 26 bits
2. WIEGAND 30 bits
3. DATA/CLOCK
4. XPR proprietary CODIX

1.1. Specifications

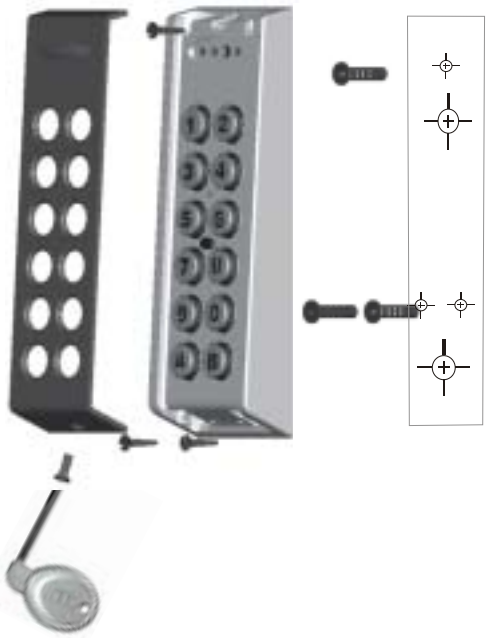
Power Supply	: 9 to 12V DC supplied over the communication bus
Power Consumption	: Standby 25 mA; Maximum 80 mA
Operating Temperature	: -15°C to + 75°C
Operating Humidity	: 0 to 95% (non-condensing)
Applications	: For access control or activation of alarm
Keypad Backlight	: 10 seconds
Signals	: 1 RED LED, free of potential 1 GREEN LED, free of potential 1 YELLOW LED indicates programming, correct functioning of the communication bus and valid/invalid codes 1 BUZZER indicates programming state and correct functioning of the communication bus and valid/invalid codes
Cable	:1m long, 8 core, 0.22 mm diameter

1.2. Physical Dimensions



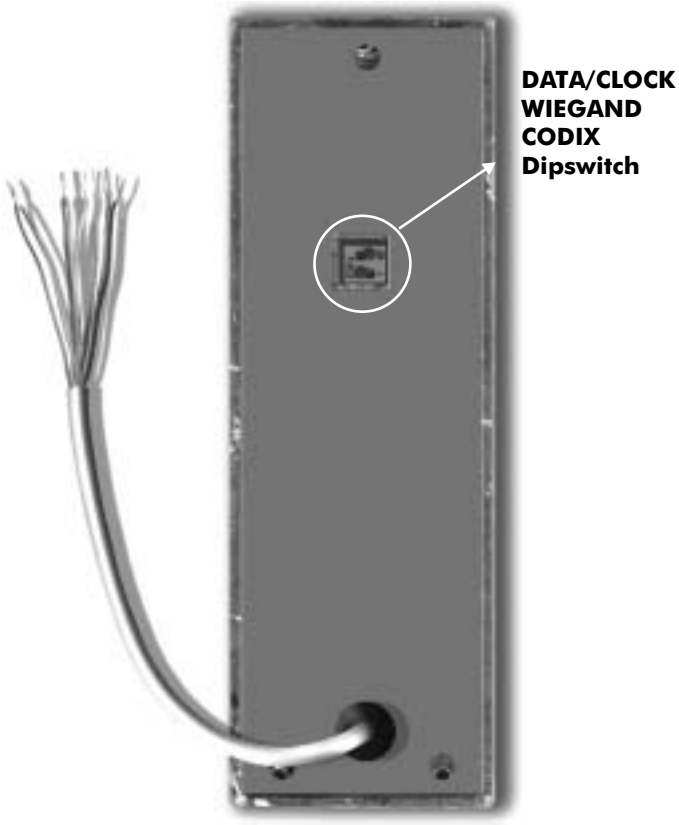
2.1. Mounting instructions

1. Determine an appropriate place to mount the keypad.
2. Stick the template and drill holes on the wall as indicated on the template.
3. Route the interface cable and/or power supply from unit to the host through the holes.
4. Remove the top cover from the INOX and fix the housing using the supplied 3-wall mounting screws (4 x 30 CSK Philips) as per the diagram.
   Note: Ensure that the screws are fastened firmly.
5. Replace the top cover on the housing with security screw (M3 x 6 mm) using the security screwdriver (provided).



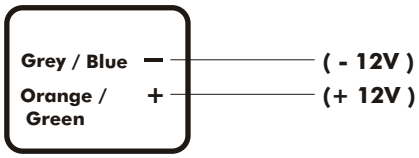
2.2. Wiring instructions

Connection	Colour codes
9/12V DC	Red
GND	Black
DATA / D0 / CL	White
D1 / DA	Yellow
- LR	Grey
+LR	Orange
- LG	Blue
+LG	Green



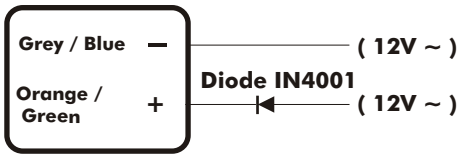
2.2.1. Connecting voltage free LEDs on 12V DC source

Identical for both Red LED (i.e. Grey & Orange wires) and Green LED (i.e. Blue & Green wires) Connect straight as shown below:



2.2.2. Connecting voltage free LEDs on 12V AC source

Connect a diode type 1N4001 in series with the positive terminal of the LED:



2.3. Bus Connection

Note: The distance between the INOX keypad and the host should not exceed 200 meters.

2.3.1. CODIX protocol

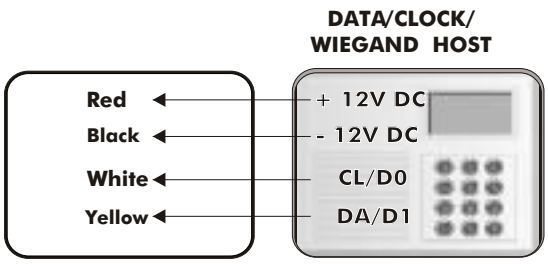
Connect the communication bus lines (GND, +9V and DATA) = (Red, Black and White wires) of the INOX keypad to the corresponding connectors of the host system.

2.3.2. WIEGAND protocol

Connect the 2 power supply lines (GND and +12V DC) = (Red and Black wires) and the 2 data lines (D0 and D1) = (White and Yellow wires) to the Host system.

2.3.3. DATA/CLOCK protocol

Connect the 2 power supply lines (GND and +12V DC) = (Red and Black wires) and the 2 data lines (CL and DA) = (White and Yellow wires) to the Host system.



3.1. Selecting the output protocol

The User can select the required data output protocol by a simple programming menu. The available protocols are:

: 26 bit Wiegand
: 30 bit Wiegand
: Data/Clock
: CODIX

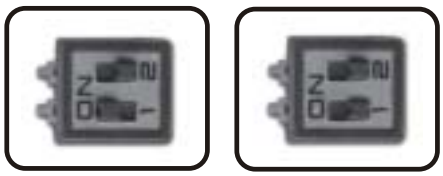
3.1.1. Entering the programming mode A or B

1. Disconnect the power supply from the INOX.
2. Open the housing of the KEYPAD.
3. Place the dipswitch in its closed position.
4. Close the housing of the keypad and reconnect the power supply.
5. The integrated BUZZER beeps in the same frequency as the YELLOW LED is blinking.
6. Place the dipswitch back in its opened position.
7. The buzzer sound continuously and Yellow LED lights ON.
8. Press the "A" key, (three long beeps are heard) to select the protocol selecting menu ("**Mode A**") OR
   Press the "B" key, (a short beep is heard) to select the protocol features menu ("**Mode B**")

Note: To enter the mode A or B you have to repeat the steps 1 to 7 and press A or B key.

Dip switch

Close Open



Mode A (You are now in the Protocol selecting menu with the following menu at your disposal):

1 + A: Wiegand 26 bits protocol

2 + A: Wiegand 30 bits protocol

3 + A: Data/Clock protocol

4 + A: CODIX protocol

B: Quit programming mode

Note that this only needs to be done once during initialisation. It isn't necessary to select again the protocol each time to change its features. In this case, press the "B" key to program directly the features of the INOX protocol that was already selected. Once this operation is done, the user will obtain the programming menu's as described hereafter.

In programming mode, if nothing is done for a period of 3 minutes, the INOX will automatically quit programming mode, unless the dip switch is returned to its closed position. In such a case, an error signal will be heard and the INOX remains in programming mode.

3.2. WIEGAND 26-bit Format

3.2.1. Programming Dip switch

The programming dip switch allows the user to modify several characteristics of the codes sent by the INOX to comply with the specific needs of the host, and to increase the overall security level of the system.

A fixed header (between 0 and 255) can be added to the 26 bits WIEGAND output with this dip switch. This header may be used as a site code. The host control unit can be set in such a way that no readers can be accounted for, that do not start their data with this fixed header, thus increasing the security level.

On the other hand, it is possible to reduce the number of codes that can be sent to the host in case this host has only limited memory space available. This prevents any coincidental interference between the codes sent out by the INOX and the codes already in the system's memory. For example, the host control unit can see the keypad code 5 as a magstripe card with code 5.

Important note: these options are only available for the 26-bit WIEGAND format.

3.2.2. Entering the programming mode B

Mode B

Once you have selected the WIEGAND 26 bits protocol (see 3.1.1. Entering the programming mode A or B), repeat the steps 1 to 7 and press the B key to program the protocol options. One short beep is heard. You are now in the programming mode B with the following menu at your disposal.

0 + (site code) + A : Programming of site code (No. between 0 to 255)

1 + A : Activation of mode 0 to 65535

4 + A : Activation of mode 1000 to 65535

5 + A : Activation of mode 10000 to 65535

9 + A : Return to default settings

B : Quit programming mode
(If dip switch is still in closed position, an error signal will be heard)

3.2.2.1. Programming the Site code

The site code represents a fixed code formed by the first 8 bits of the code transmitted by the INOX, and sent each time a valid code is entered on the INOX keypad.
Note: Site code is only available for 26-bit WIEGAND format.
In programming mode when Yellow LED is on, press 0 + site code (No. between 0 and 255) + A.
For example: Program site code is 78
Press 0 78 A (beep beep)

3.2.2.2. Activation of mode 0-65535

Once this mode is activated, codes from 1 to 5 digits between 0 and 65535 are sent to the host system.
In programming mode when YELLOW LED is on, press 1 + A.

For example: Activate mode 0-65535
Press 1 A (beep beep)

3.2.2.3. Activation of mode 1000-65535

Once this mode is activated, only the codes from 4 to 5 digits between 1000 and 65535 are sent to the host system.
In programming mode when YELLOW LED is on, press 4A to activate this mode.

For example: Activate mode 0-65535
Press 4 A (beep beep)

3.2.2.4 . Activation of mode 10000-65535

Once this mode is activated, only the codes from 5 digits between 10000 and 65535 are sent to the host system.
In programming mode when YELLOW LED is on, press 5A to activate this mode.

For example: Activate mode 0-65535
Press 5 A (beep beep)

3.2.2.5. Return to default settings

By using menu 9, the factory-set default settings are entered again the INOX memory.

For example: Press 9 A (beep beep)

Default settings are:
1. Mode 0-65535 active
2. Site code: 170

Important Note:
When using a 26-bit WIEGAND format, the highest code that can be sent to the host is limited to 65535 (2^{16}-1). A higher code can be entered on the KEYPAD, but will not be transmitted. The maximum number of bits available for the user code causes this limitation. Refer below for more details.

3.2.3. Data Output from the INOX in 26-Bits WIEGAND format

Parity bit (bit 1)+ 8 bits header + 16 bits user code=2 bytes + Parity bit (bit 26)

	P1	XXXXXXXX	XXXXYYYY YYYYYYYY	P2
Example		180	31527	
	1	10110100	01111011 00100111	0

Note: P1 = even parity calculated over the bits 2 to 13 (X).
P2 = odd parity calculated over the bits 14 to 25 (Y).

3.3. WIEGAND 30-bit format

3.3.1. Programming Dip switch

The programming dip switch allows the user to modify several characteristics of the codes sent by the INOX to comply with the specific needs of the host, and to increase the overall security level of the system.
The complete output data consists of several data blocks. The first block will indicate a group number (4bits) and can be used to emulate some special code required or a fixed header required by the host. Then the 24 bits user code follows. Of course the required parity bits are added.

3.3.2. Entering the programming mode B

Mode B
Once you have selected the WIEGAND 30 bits protocol (see 3.1.1. Entering the programming mode A or B), repeat the steps 1 to 7 and press the B key to program the protocol options. One short beep is heard. You are now in the programming mode B with the following menu at your disposal.
0 + Group number + A : Programming of group number (between 0 and 15).
B : Quit programming (If dip switch is still in closed position, an error signal will be heard)

For example: Group number 7, Press 0 7 A (beep beep)
Important Note: When using a 30-bit WIEGAND format, the highest code that can be sent to the host is limited to 16777215 (3 bytes = 24 bits). A higher code can be entered on the KEYPAD (8 digits maximum), but will not be transmitted.

3.3.3. Data Output from the INOX in 30-Bits WIEGAND format

	Parity bit (bit 1)	4 bits group emulation (bit 2 to 5)	24 bits user code=3 bytes	Parity bit (bit 30)
	P1	AAAA	XXXXXXXX XXYYYYYY YYYYYYYY	P2
Example		E.g. Group	8070942	
	1	0010	01111011 00100111 00011110	1

Note: P1 = even parity calculated over the bits 2 to 15 (A + X).
P2 = odd parity calculated over the bits 16 to 29 (Y).
4 bits group identification: (number between 0 and 15)
E.g.: Group number 7 = 0111 (bit 2 = 0, bit 3 = 1, bit 4 = 1, bit 5 = 1)

Note: The above-described protocol is a 30-bit WIEGAND format.

3.4. DATA/CLOCK protocol

3.4.1. Entering the programming mode B

Mode B

Once you have selected the DATA/CLOCK protocol (see 3.1.1. Entering the programming mode A or B), repeat the steps 1 to 7 and press the B key to program the protocol options. One short beep is heard. You are now in the programming mode B with the following menu at your disposal.

0 + (number from 5 to 8) + A (beep beep) : Programming the number of digits that can be sent to the host (between 5 to 8).

1 + A (beep beep) : Default mode. All codes sent to the host.

4 + A (beep beep) : Security mode. Only codes starting from 10000 (included) are sent to the host.

9 + A (beep beep) : Return to default settings

B : Quit programming (If dip switch is still in closed position, an error signal will be heard)

In programming mode, if nothing is done for a period of 3 minutes, the INOX will automatically quit programming mode, unless the dip switch is returned to its closed position. In such a case, an error signal will be heard and the INOX remains in programming mode.

3.4.2. Selecting the Maximum number of digits sent to the host

In menu 0, the maximum code length (between 5 to 8 digits) sent to the master unit can be set. The set code length indicates the maximum number of digits that the sent codes can have.
Example: if you enter ["0" "6" "A"], this means that the user can form codes with a maximum of 6 digits ("A" key not included). So the codes 12A or 983A or 856374A are accepted, but codes, as 1234567A will be refused. If the user enters a code with 7 or more digits ("A" key not included), an error signal (beep … beep …beep) will be heard.
Note that shorter codes are completed with zeroes at the beginning to obtain the defined maximum code length (e.g.: when a code length of 6 digits is defined, the code "123" will be sent to the host system as "000123".)

In programming mode when YELLOW LED is on, press 0 + No. between 5 to 8 + A.

For example: Max code length = 5 digits
Press 0 5 A (beep beep)

3.4.3. Functioning in security mode

Once this mode is activated by menu 4, only the codes starting from 10000 (included) are sent to the host system. This function is set to avoid entering keypad codes, which are already taken by e.g. magstripe cards.

Example: If in the system's memory, a card is programmed with card code 12, a user forming the code "12A" will be seen by the system as that specific card and thus will be given access. To avoid these kinds of problems, the security mode can be activated on the keypad.
Note that when working in security mode, a user entering a code such as "12A" will hear the confirmation beep, but the code will not be sent to the host system. If he enters the code "10000A" or higher, he will hear the same confirmation beep, but this time the code will be sent to the host system.

In programming mode (YELLOW LED on): press 4 A (*) to activate this security mode.

3.4.4. Return to default settings

By using menu 9, the factory-set default settings are entered again the INOX memory.
Default settings are: 1. Default functioning mode activated (all codes sent to the host)
2. Max code length = 8 digits

3.4.5. Description of the DATA/CLOCK protocol

The complete data message consists of a start character (B hex). Then 8 data characters (4 bits + odd parity) are transmitted, followed by a stop character (F hex) and a LRC checksum character (4 bits XOR over all digits + odd parity on these 4 bits).

Start sentinel +	8 digits code +	+End sentinel	+LRC (XOR)
1101P	xxxxP xxxxP xxxxP xxxxP xxxxP xxxxP xxxxP xxxxP	1111P	yyyyp
E.g.	0 0 0 0 0 5 2 8		
11010	00001 00001 00001 00001 00001 10101 01000 00010	11111	11010

Important Notes: INOX sends a first zero bit to indicate the presence of a code and allows the Host to synchronize with the incoming data bits.

Notes:
: Before the Start Sentinel signal, a synchronization zero bit is sent from the reader to the Host.
: 1 digit = 1 character = 5 bits.
: P = odd parity calculated over the 4 leading bits of each digit.
: XOR = logical operation calculated over the entire 10 digits, excluding the parity bit.
: Characters are encoded with the least significant bit first.

3.5. CODIX protocol

There is no further programming menu for the INOX with CODIX protocol and it does not use the programming dip switch.

3.6. Using the INOX keypad

The user can enter any code combination he wishes. There might be limitations set to the length of the code or the maximum number due to definitions done in the programming above.
After the user has entered his code, he must confirm this by pressing the 'A' key. If the 'A' key is not pressed, the code will not be transferred to the host system.

4.1. INOX CODIX

- Beeps and flashes for a period of 3 seconds (beep…beep…) indicate an operating error.
- Beeps and flashes for a period of 30 seconds (beep…beep…) indicate 8 consecutive incorrect codes.
- 5 intermittent signals (beep-beep-beep + YELLOW LED blinking) indicate a communication problem on the bus for which it will be required to check the connections of the communication bus.
- Once a code is entered and the key "A" is pressed, the INOX emits an audible (beep) and visual (YELLOW LED) signal. If the entered code is correct, a second confirmatory beep will be heard.
- If the host does not receive the sent data, verify that the data line (DATA) is not broken.

4.2. INOX WIEGAND and DATA/CLOCK

: Beeps and flashes for a period of 3 seconds (beep…beep…) indicate an operating error.
: Once a code is entered and the key "A" is pressed, the INOX emits an audible (beep) and visual (YELLOW LED) signal.
: If the host does not receive the sent data, verify that the 2 data lines (CL/D0 and DA/D1) are not broken.