



VKP



Distributor manual

TABLE of CONTENTS

1.0 Introduction

- 1.1. Specifications

2.0 Installation and wiring instructions

- 2.1. Mounting instructions
- 2.2. Wiring instructions
 - 2.2.1. Connecting voltage free LEDs on 12V DC source
 - 2.2.2. Connecting voltage free LEDs on 12V AC source
- 2.3. Bus Connection
 - 2.3.1. CODIX protocol
 - 2.3.2. WIEGAND protocol
 - 2.3.3. DATA/CLOCK protocol

3.0 Programming instructions

- 3.1. Selecting the output protocol
 - 3.1.1. Entering the programming mode A or B
- 3.2. WIEGAND 26-bit Format
 - 3.2.1. Programming Dipswitch
 - 3.2.2. Entering the programming mode
 - 3.2.2.1. Programming the Site code
 - 3.2.2.2. Activation of mode 0-65535
 - 3.2.2.3. Activation of mode 1000-65535
 - 3.2.2.4. Activation of mode 10000-65535
 - 3.2.2.5. Return to default settings
 - 3.2.3. Data Output from the VKP in 26-Bits WIEGAND format
- 3.3. WIEGAND 30-bit Format
 - 3.3.1. Programming Dipswitch
 - 3.3.2. Entering the programming mode B
 - 3.3.3. Data Output from the VKP in 30-Bits WIEGAND format
- 3.4. DATA/CLOCK protocol
 - 3.4.1. Entering the programming mode
 - 3.4.2. Selecting the Maximum number of digits sent to the host
 - 3.4.3. Functioning in security mode
 - 3.4.4. Return to default settings
 - 3.4.5. Description of the DATA/CLOCK protocol
- 3.5. CODIX protocol
- 3.6. Using the VKP keypad

4.0 Visual (Yellow LED) and Audible Signals

- 4.1. VKP CODIX
- 4.2. VKP WIEGAND and DATA/CLOCK

1.0 Introduction

VKP is a vandal-resistant potted keypad with 8-core cable that is designed for both indoor and outdoor use. It functions as a slave keypad and needs to be connected to a Host 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.

For **VKP** keypad, the User can define one of the following output formats to comply with the Host, 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 12VDC supplied over the communication bus
Power Consumption:	Standby 10 mA; Maximum 25 mA
Operating Temperature:	-15°C to + 75°C
Operating Humidity:	0 to 95% (non-condensing)
Applications:	For access control or activation of alarm
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 (AWG24)

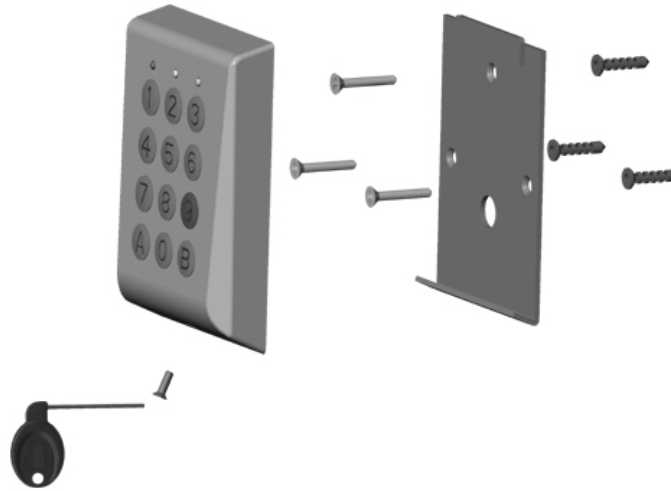
2.0 Installation and wiring instructions

2.1. Mounting instructions

1. Determine an appropriate place to mount the VKP keypad.
2. Stick the template and drill holes on the wall as indicated on the template.
3. Ensure the wiring is carried out as per the wiring instructions described in 2.2.
4. Fix the back-plate to the wall using the supplied 3 wall-mounting screws (M4x30mm CSK Philips) as per the diagram below.

Note: Ensure that magnet holder aligns perfectly within the space provided in the back-plate and also ensure that the screws are fastened firmly.

5. Fix the keypad to the back-plate with the security screw (M3x6 mm) with the security screwdriver (provided).



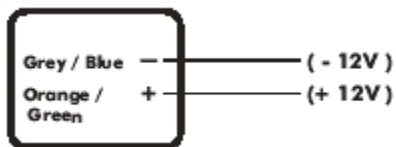
2.2. Wiring instructions

<u>Connection</u>	<u>Colour</u>
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

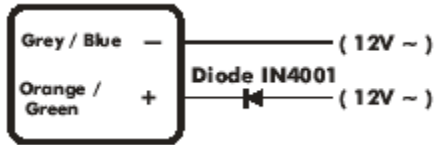
Identical for both Red LED (i.e. Grey & Orange wires) and Green LED (i.e. Blue & Green wires)

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:

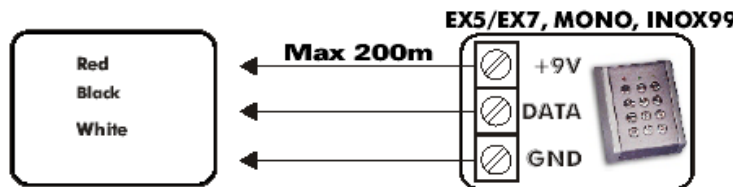


2.3. Bus Connection

Note: The distance between the VKP 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 VKP keypad to the corresponding connectors of the host system.

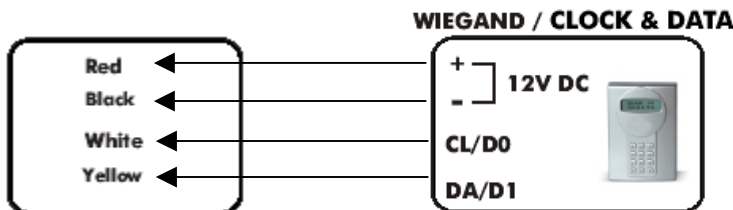


2.3.2. WIEGAND protocol

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.



3.0 Programming the VKP

3.1. Selecting the output protocol

The User can select the required data output protocol to comply with Host by a simple programming menu.

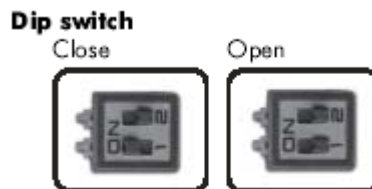
The available protocols are:

- : 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 VKP.
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.



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 initialization. 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 VKP 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 VKP will automatically quit programming mode, unless the dipswitch is returned to its closed position. In such a case, an error signal will be heard and the VKP remains in programming mode.

3.2. WIEGAND 26-bit Format

3.2.1. Programming Dipswitch

The programming dipswitch allows the user to modify several characteristics of the codes sent by the VKP 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 dipswitch. 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 VKP 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 dipswitch 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 VKP, and sent each time a valid code is entered on the VKP 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 VKP memory.

For example: Press 9 A (beep beep)

Default settings are:

1. Mode 0-65535 active
2. Site code: 0

Important Note:

When using a 26-bit WIEGAND format, the highest code that can be sent to the host is

limited to 16 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 VKP 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 Dipswitch

The programming dipswitch allows the user to modify several characteristics of the codes sent by the VKP 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 (4-bits) 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 dipswitch 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 VKP 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 XXYYYYYYY YYYYYYYY	P2
Ex. 1	E.g. Group 0010	8070942 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: Programming the number of digits that can be sent to the (beep beep) 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 dipswitch 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 VKP will automatically quit programming mode, unless the dipswitch is returned to its closed position. In such a case, an error signal will be heard and the VKP 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 VKP 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)
Example:	1101P		xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	1111P		yyyyP
			0	0	0	0	0	5	2	8				
	11010		00001	00001	00001	00001	00001	10101	01000	00010	11111		11010	

Important Notes: VKP sends a first zero bit to indicate the presence of a code and allows the Host to synchronize with the incoming data bits. Before the Start Sentinel signal, 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 VKP with CODIX protocol and it does not use the programming dipswitch.

3.6. Using the VKP 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.

4.0 Visual (Yellow led) and Audible Signals

4.1. VKP 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 VKP 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. VKP 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 VKP 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.

Warranty

XPR warrants its products to be free from defects in material and workmanship for 24 months from the date of shipment. The product to be installed in accordance with XPR's instructions and the unit should not be modified or tampered with. XPR does not assume any responsibility for damages arising from misuse of the product. XPR's sole responsibility is limited to the repair or replacement, when the product is sent to XPR's facility.