



mono-S

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1.0 Introduction

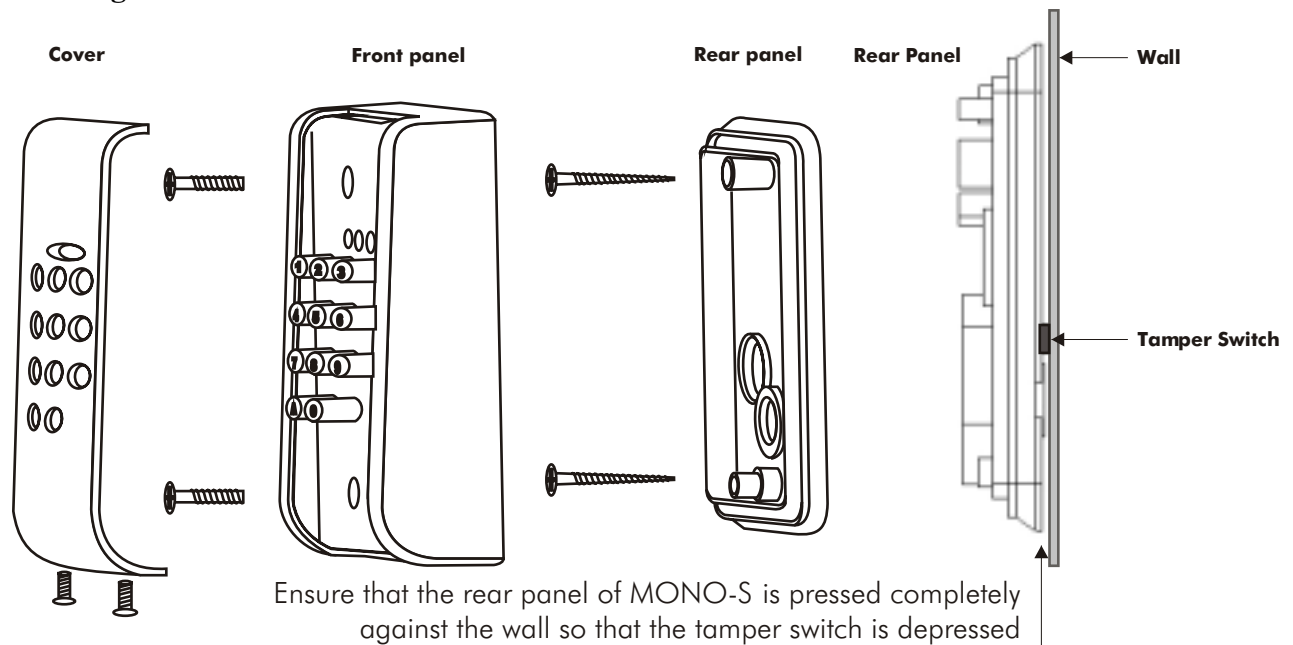
MONO-S is a multi-protocol peripheral keypad in an elegant plastic housing designed for both indoor and outdoor use. This weather resistant keypad needs to be connected to a Host over a communication bus. The protocol is user-selectable between the proprietary bus CODIX and the standard bus outputs Wiegand 26 bit, Wiegand 30 bit or Data/Clock.

1.1 Specifications

Power Supply:	9 to 12V DC supplied over the communication bus
Power Consumption:	Standby 30 mA; Maximum 40 mA
Operating Temperature:	-15°C to + 75°C
Operating Humidity:	0 to 95% (non-condensing)
Applications:	For access control or alarm activation
Signals:	1 Bicolour LED (Red/Green) 1 Red free of potential 1 Yellow LED indicates programming, correct functioning of the communication bus and valid/invalid codes 1 BUZZER indicates programming state, correct functioning of the communication bus and valid/invalid codes

2.0 Mounting and Wiring Instructions

2.1 Mounting instructions



1. Fix the mounting sticker on the wall and drill 6 mm holes to the depth of 30 mm (approximately) through the corresponding co-ordinates on the sticker.
2. Insert the plastic plugs (provided) into the drilled holes.
3. Insert the cable through the grommet in the rear panel of the MONO-S.
4. Fix the rear panel of the MONO-S to the wall with the two (8 x 30 CSK) mounting screws (supplied).
5. Ensure the wiring of the MONO-S is carried out as per the wiring instructions given in 2.2.

2.0 Mounting and Wiring Instructions

6. Fix the main panel of the MONO-S to the rear panel (back plate) with two (3 x 22 CSK) screws (supplied), after making sure the connectors meet perfectly.
7. Fix the MONO-S cover to the main panel with the two (3 x 6 CSK) security screws using the Allen security key (supplied).

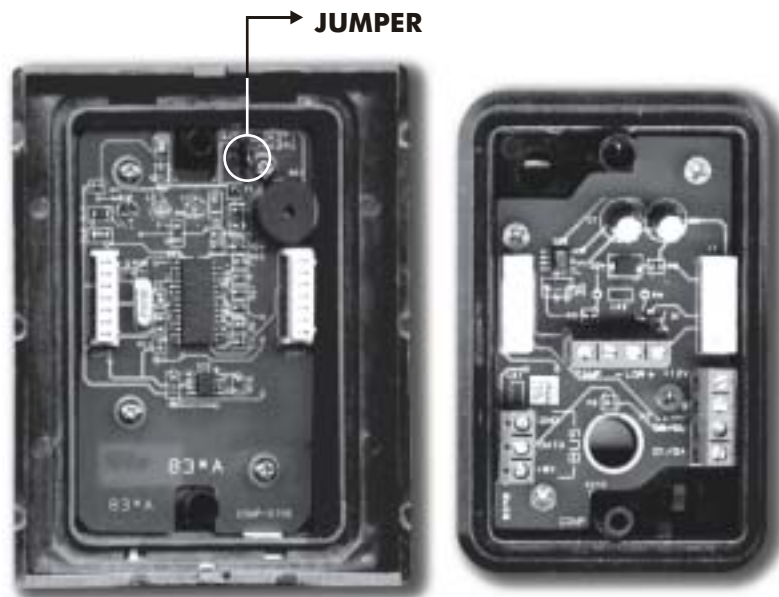
Cautionary Notes

1. Use a separate power supply when connecting a door strike. If the door strike and MONO-S are connected to the same power supply the power consumption of the door strike may effect its proper functioning.
2. Maximum recommended cable length between 2 MONO-S keypads is 100 metres and between power supply and the MONO-S is 50 metres.

Make sure the tamper switch on the rear panel of the MONO-S keypad is making direct contact with the wall.

2.2 Wiring instructions

Connections on the MONO-S

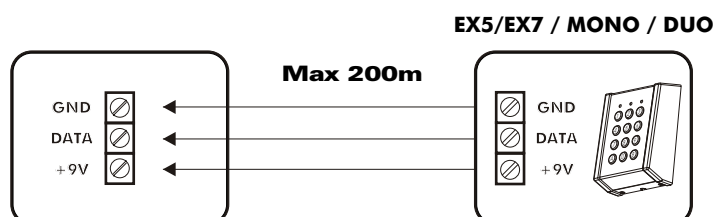


2.3 Bus Connection

Note: Power supply should be 12V DC and the distance between the MONO-S keypad and the host should not exceed 100 meters.

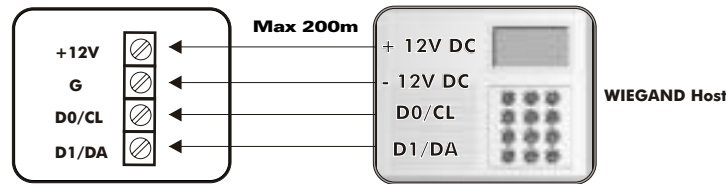
2.3.1 CODIX format

Connect the communication bus lines (GND, DATA and +9V) of the MONO-S keypad to the corresponding connectors of the host system.



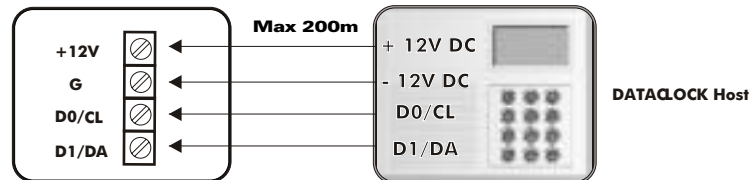
2.3.2 WIEGAND format

Connect the 2 power supply lines (G and + 12 V) and the 2 data lines (D0 and D1) to the Host system.

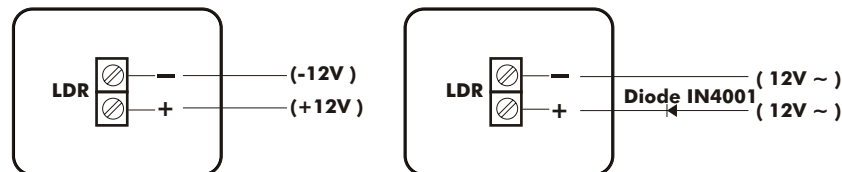


2.3.3 DATA/CLOCK format

Connect the 2 power supply lines (G and + 12 V) and the 2 data lines (CL and DA) to the Host system.

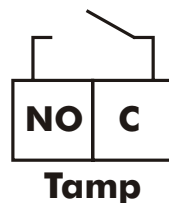


2.4 Connection of the RED Free-tension LED on a 12V AC/DC Source



2.5 Connecting Tamper switch

The tamper switch is a security contact (NC) to detect the opening or tampering of the housing. Once the keypad is installed against the wall the contact remains closed. MONO-S features double tamper protection i.e. when the entire housing is tampered with or when the front panel is interfered with or removed.



3.0 Programming the MONO-S

3.1 Selecting the output protocol

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

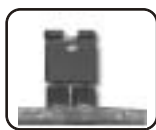
- : 26 bit Wiegand protocol
- : 30 bit Wiegand protocol
- : Data/Clock protocol
- : CODIX bus protocol

3.1.1 Entering the programming mode

1. Open the keypad housing.
2. Place the jumper in it's closed position.
3. Close the housing.
4. A long beep is heard for 4 seconds and the Yellow LED lights up. Press the 'A' key within those 4 seconds. Bi-colour LED turns Red and 3 short beeps are heard.

5. Select the required output protocol from the menu.
6. Open the housing again and place the jumper back in it's opened position.
7. Close the housing.

Jumper Opened Jumper Closed



Once in the programming mode (step 5) you have the following menu at your disposal:

- 1 + A : WIEGAND 26 bit protocol selected**
- 2 + A : WIEGAND 30 bit protocol selected**
- 3 + A : DATA/CLOCK protocol selected**
- 4 + A : CODIX bus protocol selected**

Note that this only needs to be done once during initialization. Once this operation is done the user will obtain the programming menus as described below.

Note: If programming for WIEGAND or DATACLOCK format is continued immediately after the selection of the protocol you only need to open and close consecutively the housing of the keypad. You can continue immediately with step 5 in the programming menus of the selected protocol.

3.2 WIEGAND 26 bit format

3.2.1 Programming Jumper

The programming jumper allows the user to modify several code features sent by the MONO-S to comply with the specific needs of the host and to increase the overall security level of the system.

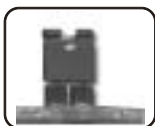
A fixed header (from 0 to 255) can be added to the 26-bit WIEGAND output with this jumper. This header may be used as a site code. Security is increased when the host control unit can be programmed in such a way that no readers can be accepted unless they have this fixed header

On the other hand, it is possible to reduce the number of codes that can be sent to the host in case there is limited available memory space. This prevents any coincidental interference between the codes sent out by the MONO-S 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.

3.2.2 Entering the programming mode

1. Open the keypad housing.
2. Place the jumper in it's closed position.
3. Close the housing
4. A long beep will be heard and the Yellow LED will light up. Wait until the beep stops. This should take about 4 seconds.
5. Select the correct settings from the menu below.
6. Open the keypad housing and place the jumper back in it's opened position.
7. Close the housing.

Jumper Opened Jumper Closed



Once in the programming mode you have the following menu at your disposal:

0 + (site code) + A	: Programming of site code (number from 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

3.2.2.1 Programming the Site code

The site code represented by the first 8 bits of the code transmitted by the MONO-S. It is sent each time a valid code is entered from it's keypad.

Note: Site code is only available for 26-bit WIEGAND format.

In programming mode when the Yellow LED is on, press 0 + site code (number from 0 to 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 the 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 4 + A to activate.

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 5 + A to activate.

3.2.2.5 Return to default settings

By using menu 9 the factory-set default settings are entered again in the MONO-S memory.

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}). 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. See below for more details.

3.2.3 Data output from the MONO-S in 26-bit WIEGAND format

	Parity bit (bit 1) P1	+ 8 bits header XXXXXXX	+ 16 bits user code = 2 bytes XXXXXXXX YYYYYYYY	+ Parity bit (bit 26) P2
Example	1	180 10110100	31527 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

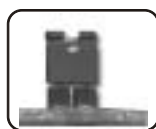
3.3.1 Programming Jumper

The programming jumper allows the user to modify several characteristics of the codes sent by the MONO-S 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 required code or a fixed header required by the host. The 24-bit user code then follows. Of course the required parity bits are added.

3.3.2 Entering the programming mode

1. Open the keypad housing.
2. Place the jumper in it's closed position.
3. Close the housing.
4. A long beep will be heard and the Yellow LED will light up. Wait until the beep stops. This should take about 4 seconds.
5. Select the correct settings from the menu below.
6. Open the keypad housing and place the jumper back in it's opened position.
7. Close the housing.

Jumper Opened Jumper Closed



Once in the programming mode (step 5) you have the following menu at your disposal:

0 + (Group number) + A:

Programming of Group number (number between 0 to 15)

Note: When the sub-menu key (0) is pressed the bi-colour LED turns Green and, when this option is validated, on pressing the "A" key, two beeps are heard and the bi-colour LED turns OFF.

Note: when using the 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 but will not be transmitted.

3.3.3 Data output from the MONO-S in 30-bit WIEGAND format

	Parity bit (bit 1)	4 bits group number (bit 2 to 5)	24 bits user code=3 bytes	Parity bit (bit 30)
	P1	AAAA	XXXXXXXX XXYYYYYY YYYYYYYY	P2
Example	1	2 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 bit group identification (number between 0 and 15)

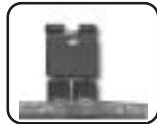
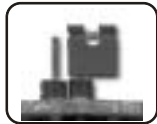
E.g. Group N° 7 = 0111 (bit 2 = 0; bit 3 = 1; bit 4 = 1; bit 5 = 1)

3.4 DATA/CLOCK format

3.4.1 Entering the programming mode

1. Open the keypad housing.
2. Place the jumper in it's closed position.
3. Close the housing.
4. A long beep will be heard and the Yellow LED will light up. Wait until the beep stops. This should take about 4 seconds.
5. Select the correct settings from the menu below.
6. Open the keypad housing and place the jumper back in it's opened position.
7. Close the housing.

Jumper Opened Jumper Closed



You are now in the programming mode 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 host (from 5 to 8).

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

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

9 + A : Return to default settings

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 allowed.

Example: if you enter "0" "6" "A" this indicates that the user can form codes with a maximum of 6 digits ("A" key not included). So codes 12A, 983A or 856374A will be accepted but 1234567A will not. 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 zeros at the beginning to obtain the defined maximum code length (e.g.: when a code length of 6 digits is defined the code "123A" will be sent to the host system as "000123")

In programming mode, when the Yellow LED is on, press 0 + the number (from 5 to 8) + A.

For example: Maximum. 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, for example, 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 one enters the code "10000A", or higher, the same confirmation beep will be heard but this time, the code will be sent to the host system.

In programming mode when the Yellow LED is 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 into the MONO-S memory.
Default settings are: 1. Default functioning mode activated (all codes sent to the host)
2. Maximum code length = 8 digits

3.4.5 Data output from the MONO-S in DATA/CLOCK format

The complete data message consists of a start character (B hex) then 8 data characters (4 bits + odd parity) followed by an end character (F hex) and a LRC checksum character (4 bits XOR over all bits + odd parity on these 4 bits).

	Start sentinel		8 digits code								End sentinel	LRC (XOR)
	1101P	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	xxxxP	1111P	yyyyP
Example		0	0	0	0	0	5	2	8			
	11010	00001	00001	00001	00001	00001	10101	01000	00010		11111	11010

Note: Before the start sentinel signal, MONO-S sends first a zero bit to indicate the presence of a code and allows the host to synchronize with the incoming data bits.

: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 format

There is no further programming menu for the MONO-S with CODIX format.

4.0 Visual (YELLOW LED) and Audible Signals

In the programming mode, when entered into any of the sub-menus, the bi-colour LED turns green.

4.1 MONO-S CODIX version

- Beeps and flashes for a period of 3 seconds (beep...beep...) indicates an operating error.
- Beeps and flashes for a period of 30 seconds (beep...beep...) indicates 8 consecutive incorrect codes.
- 5 intermittent signals (beep-beep-beep + Yellow LED blinking) indicates a communication problem on the bus for which one should check the connections to the CODIX bus.
- Once a code is entered and the key "A" is pressed the MONO-S 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 MONO-S WIEGAND and DATA/CLOCK versions

- 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 MONO-S emits an audible (beep) and visual (the Yellow LED) signal.
- If the host does not receive the sent data verify that the 2 data lines are not broken.

5.0 Using the MONO-S 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 a user has entered their keypad code it must be confirmed by pressing the "A" key. If the "A" key is not pressed the code will not be transferred to the host system.

Warranty

XPR warrants its products to be free from defects in material and workmanship for 24 months from the date of shipment. The product is 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.