

IOX-4

AXS-100 I/O Expander

1. INTRODUCTION

The IOX-4 is an input / output expander for the AXS-100 access control panel. It contains eight analog inputs and eight dry contact relays output.

Up to four IOX-4 boards may be connected to each AXS-100 control panel, for a maximum of 32 inputs and 32 outputs for each controller. All functionality programming is done from the control panel.

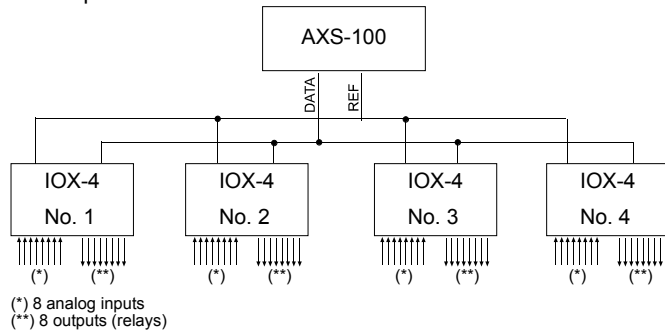


Figure 1 - Simplified Interconnection Block Diagram

The IOX-4 may be used for various purposes:

- Elevator control – up to 32 floors
- Event reporting to an alarm system –event types are separated into eight groups of which seven control relays on IOX-4 #4.
- Energy management
- Counting inputs up/down
- Emergency operation of doors

Connection of an input device to an IOX-4 input should be done via an input adapter (8 input adapters are supplied) as shown in Figure 2. The input adapter includes an EOL termination resistor.

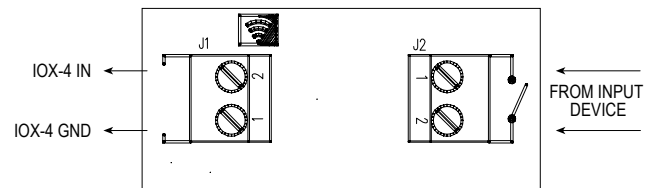


Figure 2 - IOX-4 Input Adapter (End Of Line Termination P.C.B.)

2. SPECIFICATIONS

ELECTRICAL:

Number of analog inputs: 8

Number of outputs (relays): 8 (N.C. & N.O.), 30VDC, 2A max.

Maximum IOX-4 units for each controller: 4 (for 32 inputs and 32 outputs)

IOX-4 Power Input, from PS-1 DC P.S.: 12 VDC, 0.5A

ENVIRONMENTAL:

Operating Temperature: -20°C to 50°C (-4°F to 122°F)

Storage Temperature: -20°C to 50°C (-4°F to 122°F)

PHYSICAL

Dimensions (L x W x D): 180 x 85 x 22 mm (7-1/16x3-3/8x13/16in)

Weight: 222 g (8 oz)

3. MOUNTING

It is recommended to install the IOX-4 in a Visonic Networks EXT-100 lockable metal box, Cat. No. 3-6278-0 (not supplied with the IOX-4.). It is possible to use another box but in this case the Visonic Networks warranty, will not be valid.

EXT-100 Power Input, from AC Transformer: 14-16.5 VAC, 0.5A

EXT-100 (with two IOX-4 units) Power Input, from AC Transformer: 14-16.5 VAC, 1A

An example of mounting the IOX-4 in the EXT-100 box (up to two units) is shown in figure 3.

The EXT-100 box is supplied with a 50VA transformer and a 12 VDC, 1A power supply module.

Place the EXT-100 metal box on the wall, mark 4 screw locations, drill and fasten the box to the mounting surface by using 4 screws. Then fasten each IOX-4 board to the metal box by using 4 screws.

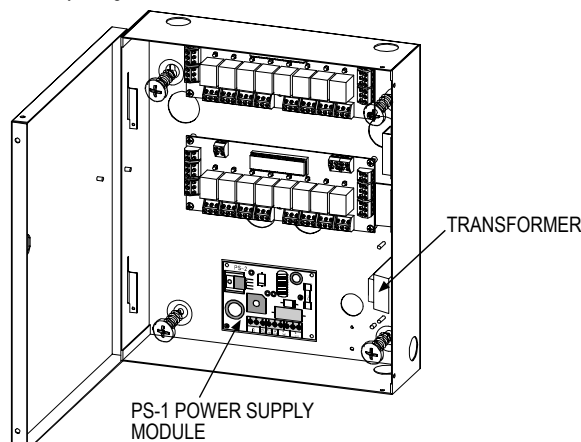


Figure 3 - Mounting Two IOX-4 PCBs in EXT-100 Box

4. WIRING

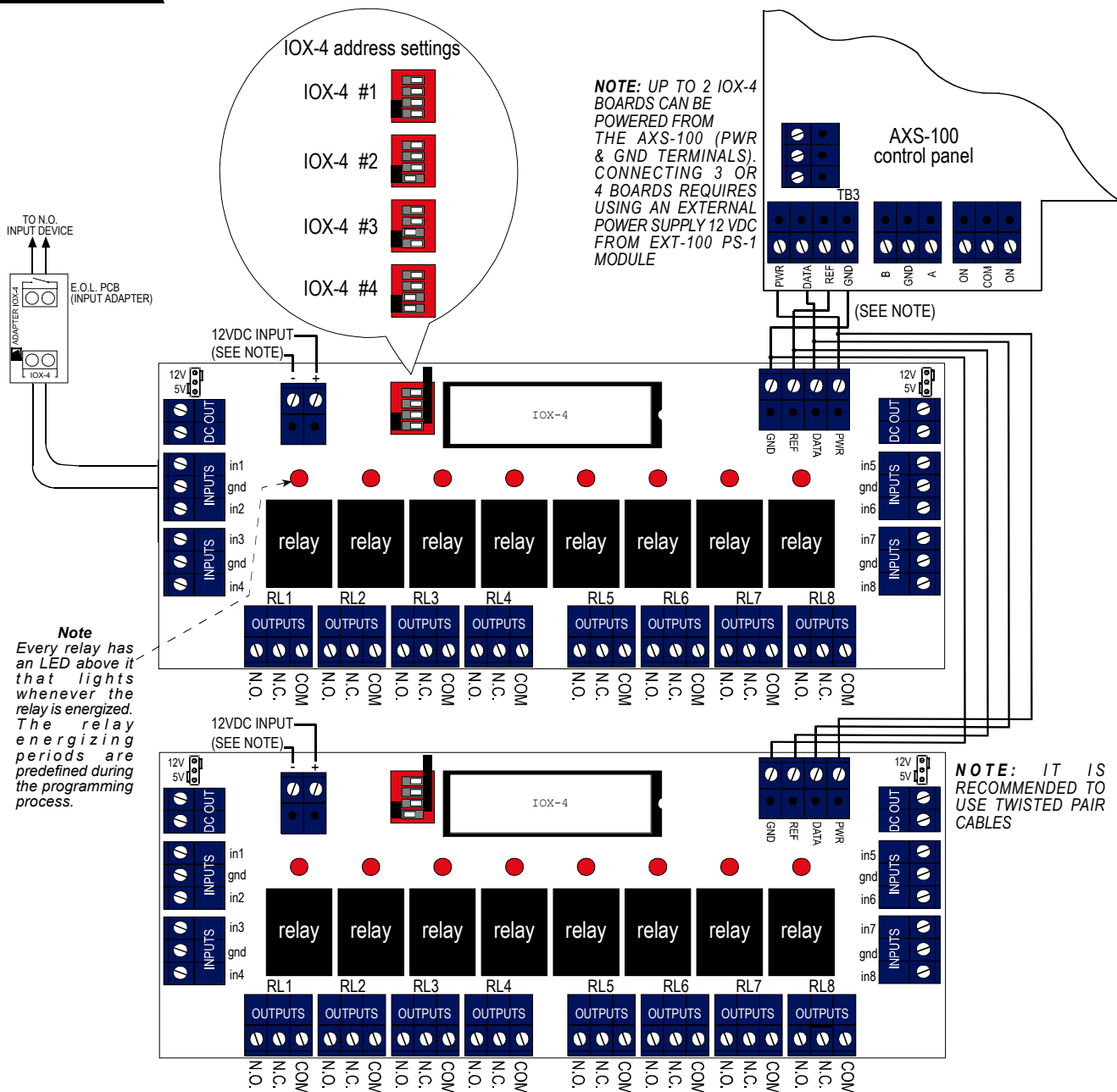


Figure 4 - IOX-4 Connection Diagram

5. SETUP

5.1 Setting Up the IOX-4 Board

The IOX-4 is connected to the AXS-100 via two or four wires. If one or two IOX-4 boards are connected to the AXS-100, power for operating the boards may be drawn from the AXS-100. Connecting three or four boards requires using an external power supply.

The IOX-4 has a four-position DIP-switch for setting the board address.

Each input device has to have an EOL PCB input adapter connected next to it (see figure 4). The IOX-4 is supplied with 8 modulars.

- Inputs and outputs #1 through #8 are on IOX-4 #1.
- Inputs and outputs #9 through #16 on IOX-4 #2.
- Inputs and outputs #17 through #24 on IOX-4 #3.
- Inputs and outputs #25 through #32 on IOX-4 #4.

Steps:

1. Connect DAT and REF terminals between AXS-100 TB3 and IOX-4. If less than 3 IOX-4 boards connected, you may also connect power from AXS TB3.
2. If more than one IOX-4 is to be connected, you will need to connect the wires in parallel between IOX-4 #1 to #2, etc.
3. Connect input devices to input terminal blocks as shown in Figure 4.
4. Connect dry contact outputs to relay terminal blocks as shown in Figure 4.
5. Program input functionality in controller setup (SETUP / INPUT SETUP).

The AXS-100 controller does not poll IOX-4 boards unless instructed to. SETUP FLAGS 5 in LOCAL SETUP contains 4 flags (see AXS-100 User's Guide, Para. 5.2.5). Flags 1 to 4 represent the IOX #. For example: If flag #1 is set to ON, the AXS-100 controller will enable IOX board 1. If flag #3 is set to ON, the AXS-100 controller will enable IOX board 3, etc.

5.2. Programming Input Functionality

The AXS-100 allows programming input functionality through the INPUT SETUP selection in the SETUP menu.

Each input can be programmed to operate in one of the modes of the IOX-4:

Disabled	Input is disabled
Timer	Output 1 is controlled by timer
Allow Entry	Allow entry through door 1 or 2 of controller
Open All	Open all doors in loop while input active
Control Reader	Enable/disable reader 1 or 2 or both readers of controller
Counter	Up/down count events
Output	Output to relay

Each input can be in one of four states:

Idle	The sensing device is present and in idle mode. It can be normally open or normally closed.
Active	The sensing device is in active mode (triggered).
Short	There is a short on the line.
Cut	There is a cut on the line – no device detected.

All enabled inputs will cause a trouble event to be generated if a short or a cut is detected on their line, and a trouble restored event when the short or cut goes away. A transition from normal to active or from active to normal will be reported for OUTPUT mode. In case of OUTPUT mode, generating an event is dependent on programming.

An enabled input can be responsive all the time or controlled by one or two devices, both physical and logical. Table #1 lists all control devices and their numbers. An input device controlled by another device will cause an action to be taken only if controlling devices are active.

Each input device has an optional secondary output relay, which is controlled in one of two modes with disregard to control devices' status. To select a secondary output relay, set its number in OUTPUT 2 screen. The secondary relay can be triggered for amount of time defined in OUT TIME 2 screen if MODE is set to 1. If mode is set to 2, the relay will be operated in toggle mode.

Table #1: Control I/O device addresses

0	No control device
1 .. 36	Physical input device (1..8 on IOX-4 #1, 25..32 on #4, 33..36 on-board)
40 .. 99	Key up/down counter
224 .. 255	Output relay condition. These outputs are used only for activating alarm relays and to receive events. To activate an alarm relay or to receive an event, add 128 to the output number found in the register.
225 .. 255	These outputs are used only to receive events and to activate the controller alarm relay

Note: If you want to receive an event and to activate the alarm relay, add 128 to the output number.

The programming for each mode varies slightly.

The following screens show the programming of the input device.

First select which input device you would like to program.

```
S E L E C T
I N P U T  1
```

Type input number followed by Enter.

Select input mode by pressing the up and down arrow keys followed by **Enter**.

```
I N P U T  M O D E
O U T P U T
```

Select input polarity (normally open or normally closed).

```
P O L A R I T Y
N O
```

Press 1 for normally closed and 0 for normally open. Press Enter to continue.

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The next two screens allow you to select controlling devices for this input (see table #1 above for device numbers). If you do not want to select a device, simply enter zero as its number.

```
C O N T R O L L E D B Y
0
```

Press **Enter** to continue.

Enter output number (may be lock number or reader number as defined in the modes below).

```
O U T P U T
1
```

Press **Enter** to continue.

Set output time for relay output.

```
O U T T I M E
1 0
```

Press **Enter** to continue.

If you would like to set the independent auxiliary output, enter its number.

```
O U T P U T  2
2 0
```

Press **Enter** to continue.

If auxiliary output number is not zero, the following screens will appear.

The mode for the auxiliary output can be 1 for pulse or 2 for toggle.

```
M O D E
1
```

Press **Enter** to continue.

Set output time for auxiliary relay output.

```
O U T T I M E
1 0
```

Press **Enter** to continue.

Note: To reset all IOX-4 outputs, enter the INPUT SETUP mode, and when asked by the controller for the input number, press the UP arrow key (see Figure 5). Then, press Enter continuously until you return to INPUT SETUP.

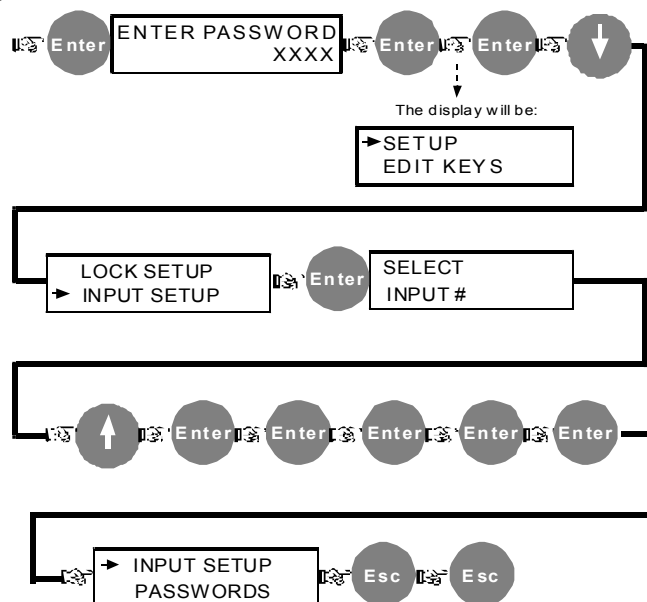


Figure 5 - INPUT SETUP Mode

Using Flag Set#2, Flag 5, to Activate to IOX-4 Relays

In Setup→Local Setup menu, it is possible to activate IOX-4 relay numbers 25 to 32 depending on event type, as follows:

Relay 26 - Valid key indication.

Relay 27 - Unknown key indication.

Relay 28 - Alarm conditions.

Relay 29 - Trouble conditions.

Relay 30 - Long read indication.

Relay 31 - Arm/disarm alarm system.

Relay 32 - Valid key failed to open

5.3 Elevator Control

The Elevator Control function enables authorized people to use an elevator, up and down, to the desired predefined floors.

AXS-100, with four IOX-4 expanders, enables / disables the function of up to 32 floor buttons in an elevator, for every authorized user.

For this purpose, connect up to 8 floor buttons to the relay outputs 1 through 8 of each IOX-4 expander. In this way, four IOX-4 expanders provide control of up to 32 floor buttons.

Inside the elevator, the user presents his tag/card to the proximity reader. If the tag/card is recognized as a valid one, certain predefined elevator floor buttons will be active for a predefined period (see AXS-100 user guide, par. 5.2.6). During this period, the user should press the desired floor button. If the user presses a floor button after this period, the button is not active.

To allocate authorized floors (doors) for any user, perform "Add Key" / "Modify Key" programming, as detailed in the AXS-100 user guide, par. 3.3.1 and 3.3.5. For example, to allocate floors 2, 8, 16, 20, 25 and 30 to a specific user (key), define doors 2, 8 and G in "Valid Doors 1" and define doors 4, 9 and E in "Valid Doors 2".

When the controller operates in toggle mode or time zone function and soft valid tag is defined and the trigger is set to ON, all the doors will open and when the trigger is set to OFF all the doors will close.

Note: In Elevator Control mode, flag set #2, flag 5 must be in OFF position.

5.4 Input Operation Modes

The following sections describe the input modes.

A. Input Disabled

This input is disabled and will cause no action to be taken.

B. Allow Entry

The input will cause left side or right side lock of the controller to be unlocked for the predefined amount of time. The OUTPUT number should be 1 or 2 respectively.

Note: Do not operate the input when unlock time operates in toggle mode (0 seconds).

C. Open All

When the controller operates in toggle mode, or when time zone function is defined as function 2 (first valid Tag) and the door is in open state. If trigger is set to ON, all the doors are open; and if trigger is set to OFF, all the doors are closed.

When the input is in this mode and it goes active, it will make ALL door locks in this loop to open until the input goes back to normal. This should be used for fire emergencies.

The OUTPUT number is not important.

Note: It is recommended, in this mode, not to use more than one input for each loop.

D. Control Reader

The input will cause left side or right side or both readers of the controller to be enabled or disabled according to its state. The OUTPUT number should be 1, 2 or 3 respectively. Data Register 3 has to be set to 65535 to enable this feature (see "EDIT REGISTERS" in AXS-100 programming manual).

Note: When completing the task in Control Reader mode, change the value of the register #3 to 0.

E. Counter

The AXS-100 can use an input for counting events expressed as pulses on any of the inputs. The counting is done in data registers 40 to 99. The OUTPUT number should reflect which data register is to be used. More than one input can affect a counting data register. Each input setup can be configured to count up and/or down. This facilitates the ability to count up using one input and count down using another input. The OUT TIME number should be 1 for up-count, 2 for down-count and 3 for both up and down count (when pressed counting is upward; when released counting is downward).

Note: If the value of the up/down counter (40 to 99) =0, the controller will not count downwards.

F. Output

An input may be used to control an output relay on the IOX-4 boards. The OUTPUT number defines which output relay is to be controlled (1 through 32). Adding 64 to relay number will cause input to operate the relay in toggle mode. Adding 128 to relay number will cause the input triggering and restoring to generate an event message. Set the OUT TIME number to amount of time in seconds to operate the relay (1 through 2000 seconds).

G. Timer

1. OUTPUT 1 is controlled by the timer. OUT TIME 1 is the period of time that the counter counts from 1 second to 2000 seconds.
2. To operate OUTPUT 1, press down on the INPUT at every counting period. After counting is completed, the OUTPUT is functional.
3. To receive an event, add the number 128 to the OUTPUT number. The received event is the INPUT TRIGGER.

5.5 Using Relay Outputs Without Inputs

The IOX-4 relay outputs can be used with no input functionality.

The following functions can be enabled by setting flags in LOCAL SETUP:

Event group type output	Set flag 5 in SETUP FLAGS 2.
Elevator control	Set controller operating mode to 9 in LOCAL SETUP.

Note: In the IOX-4, relay 25 will be activated each time a tag is presented to the reader when KEY FLAG 7 of the tag is set to ON. This has no relevance to FLAG 5 in SETUP FLAGS 2, (see AXS-100 User Guide Para. 3.3.2 Modify Key Flags).

6. TESTING

After mounting and wiring, the IOX-4 should be tested. Activate the unit inputs and verify proper operation according to the application used.

It is recommended to perform a periodical test once a week - such as presenting a tag to the reader and verifying that the relevant door is opened.

No maintenance is required for the IOX-4 unit.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WARRANTY

Visonic Technologies Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

This warranty does not apply in the following cases: improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function. However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

Warning: The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his /her safety and the protection of his/her property.

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