

UI-8/AO-4 and UI-8/AO-4-H SmartX Controller



8 channel universal input and 4 channel analog output I/O modules

Introduction

The UI-8/AO-4 and UI-8/AO-4-H are universal input, 8 channel and analog output, 4 channel I/O modules.

The universal inputs are ideal for any mix of temperature, pressure, flow, status points, and similar point types in a building control system.

The universal inputs can be configured to read several different types of inputs:

- Digital
- Counter
- Supervised
- Voltage
- Current
- Temperature
- Resistive

As counter inputs they are commonly used in energy metering applications. As supervised inputs they are used for security applications where it is critical to know whether or not a wire has been cut or shorted. These events provide a separate indication of alarms and trouble conditions to the system.

The analog outputs are capable of supporting analog voltage or current point types. Therefore, analog outputs support a wide range of devices, such as actuators.

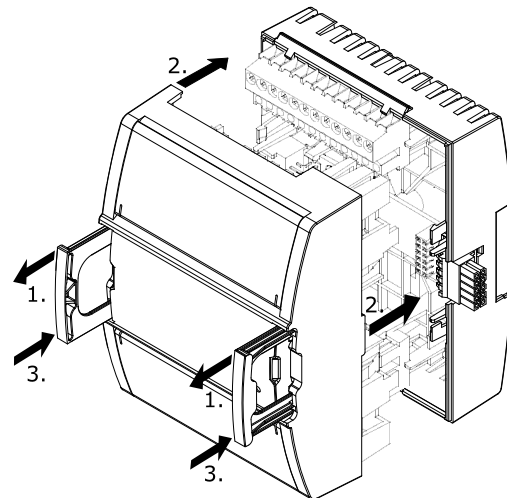
Function

Modular and scalable system

The modules are part of a modular system that delivers power and communications on a common bus. Connecting modules is a one-step process: just slide the modules together using the built-in connectors.

Patented two-piece design

Each module can be separated from its terminal base to allow the site to be wired prior to the installation of the electronics. The patented locking mechanism serves as handles for removing the module from its base. All critical components have a protective cover that permits convection cooling to occur.



Two-piece design

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Hot-connect and Hot-swap

Because critical applications require 24-hour operation, Schneider Electric designed the I/O modules for hot-connection of terminal bases and hot-swapping of the modules to their bases. This design ensures continuous power and communication during service operations.

Auto-addressing

The auto-addressing feature eliminates the need for setting DIP switches or pressing commission buttons. Each module automatically knows its order in the chain and assigns itself accordingly – significantly reducing engineering and maintenance time.

Simple DIN-rail installation

Fasteners easily snap into a locked position for panel installation. The fastener has a quick-release feature for easy DIN-rail removal.

Efficient terminal management

The I/O module terminals are clearly labeled and protected by transparent covers. The input and output terminals are at the top and bottom of each module and are accessible for maintenance without removing the module. The EcoStruxure Building Operation WorkStation software can generate custom as-built labels for each module. Pre-perforated letter and A4 size label sheets are available as an accessory.

Accommodates multiple row panel installations

The SmartX devices use built-in connectors for single row connectivity, side by side. If a panel size requires multiple rows, extension cords are available.

Specifications

Input channels	8
Output channels	4
DC input supply power	3.2 W
DC input supply voltage	24 VDC

Environment

Ambient temperature, operating	0 to 50 °C (32 to 122 °F)
Ambient temperature, storage	-20 to +70 °C (-4 to +158 °F)
Maximum humidity.....	95 % RH non-condensing

Material

Plastic flame rating	UL94-5VB
Enclosure	PC/ABS
Ingress protection rating	IP 20

LED status indicators

The I/O module has a status indicator that denotes the health and status of the module.

Each input channel has a dedicated two color status LED. The LED can be configured to display either red or green for each input state.

Hand/Off/Auto switches

The front panel of the UI-8/AO-4-H includes Hand/Off/Auto (HOA) switches to provide override control of the analog outputs.

Each output also has a potentiometer to modulate the output signal when the switch is in the Hand position.

The position of the HOA switch is readable through user interfaces, such as the EcoStruxure Building Operation WorkStation software, enabling more precise monitoring and control.

Protection

Protection components on the inputs and the outputs protect against high-voltage short-duration transient events.

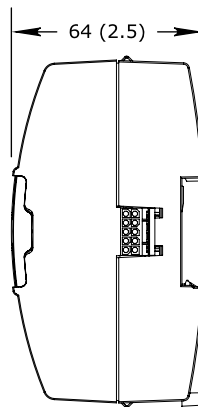
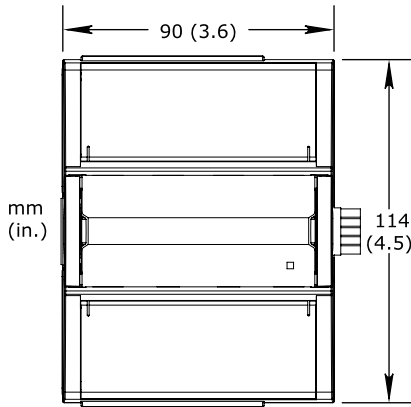
The current inputs are protected against over current.

The analog outputs have current limits to protect against permanent short-circuit to ground.

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Mechanical

Dimensions including terminal base90 W x 114 H x 64 D mm (3.6 W x 4.5 H x 2.5 D in.)



Weight including terminal base0.276 kg (0.61 lb)
 Weight excluding terminal base0.152 kg (0.34 lb)
 Terminal baseTB-IO-W1

Agency compliances

Emission.....RCM; EN 61000-6-3; FCC Part 15, Sub-part B, Class B
 ImmunityEN 61000-6-2
 Safety.....EN 61010-1; UL 916 C-UL US Listed
 ProductEN 61326-1
 Smoke control product safetyUL 864

Part numbers

UI-8/AO-4, I/O module
 8 universal inputs, 4 analog voltage/current outputsSXWUI8A4X10001
 UI-8/AO-4-H, I/O module with HOA switches
 8 universal inputs, 4 analog voltage/current outputs with Hand/Off/Auto override switches
SXWUI8A4H10001
 TB-IO-W1, terminal base for I/O module
 (Required for each I/O module)SXWTBIOW110001

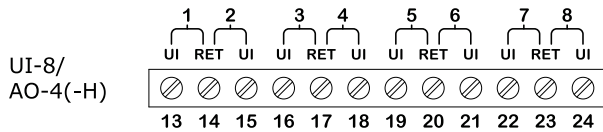
Accessory part numbers

DIN-RAIL-CLIP, DIN-rail end clip
 package of 25 piecesSXWDINEND10001
 PRINTOUT-A4-W1, printout sheets for terminal labels
 A4 sheet size, 100 sheets, 18 labels per sheetSXWTERLBL10011
 PRINTOUT-LTR-W1, printout sheets for terminal labels
 Letter sheet size, 100 sheets, 16 labels per sheetSXWTERLBL10012
 S-CABLE-L, S-cable extension cord for the I/O bus, L shaped connectors
 1.5 mSXWSCABLE10002
 S-CABLE-L, S-cable extension cord for the I/O bus, L shaped connectors
 0.75 mSXWSCABLE10003

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SmartX Controller

Universal inputs



Absolute maximum ratings-0.5 to +24 VDC

A/D converter resolution 12 bits

Digital

RangeDry contact switch closure or open collector/open drain, 24 VDC, 2.4 mA

Minimum pulse width 120 ms

LED polaritySoftware selectable, if the LED is activated when the input is high or low

LED colorRed or green, software selectable

Counter

RangeDry contact switch closure or open collector/open drain, 24 VDC, 2.4 mA

Minimum pulse width20 ms

Maximum frequency25 Hz

LED polaritySoftware selectable, if the LED is activated when the input is high or low

LED colorRed or green, software selectable

Supervised

5 V circuit, 1 or 2 resistors

Monitored switch combinationsSeries only, parallel only, and series and parallel

Resistor range1 to 10 kohm

For a 2-resistor configuration, each resistor must have the same value +/- 5 %

Voltage

Range0 to 10 VDC

Accuracy+/(7 mV + 0.2 % of reading)

Resolution2.7 mV

Impedance100 kohm

Reliability checkYes

Current

Range0 to 20 mA

Accuracy+/(0.03 mA + 0.4 % of reading)

Resolution5.6 μA

Impedance47 ohm

Reliability checkYes

Resistive

10 ohm to 10 kohm accuracy+/(7 + 4 x 10⁻³ x R) ohm
R = Resistance in ohm

10 kohm to 60 kohm accuracy+/(4 x 10⁻³ x R + 7 x 10⁻⁸ x R²) ohm

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R = Resistance in ohm

Reliability check.....Yes

Temperature

Range.....-50 to +150 °C (-58 to +302 °F)

Reliability check.....Yes

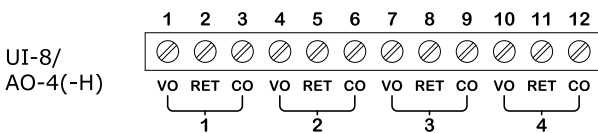
Supported thermistors

Honeywell	20 kohm
Type I (Continuum)	10 kohm
Type II (I/NET)	10 kohm
Type III (Satchwell)	10 kohm
Type IV (FD)	10 kohm
Type V (FD w/ 11k shunt)	Linearized 10 kohm
Satchwell D?T.....	Linearized 10 kohm
Johnson Controls	2.2 kohm
Xenta.....	1.8 kohm
Balco.....	1 kohm

Measurement accuracy

20 kohm, 10 kohm, 2.2 kohm, and 1.8 kohm	-50 to -30 °C: +/-1.5 °C (-58 to -22 °F: +/-2.7 °F)
.....	-30 to 0 °C: +/-0.5 °C (-22 to +32 °F: +/-0.9 °F)
.....	0 to 50 °C: +/-0.2 °C (32 to 122 °F: +/-0.4 °F)
.....	50 to 100 °C: +/-0.5 °C (122 to 212 °F: +/-0.9 °F)
.....	100 to 150 °C: +/-1.5 °C (212 to 302 °F: +/-2.7 °F)
Linearized 10 kohm	-50 to -30 °C: +/-3.0 °C (-58 to -22 °F: +/-5.4 °F)
.....	-30 to 0 °C: +/-1.0 °C (-22 to +32 °F: +/-1.8 °F)
.....	0 to 50 °C: +/-0.3 °C (32 to 122 °F: +/-0.5 °F)
.....	50 to 100 °C: +/-0.5 °C (122 to 212 °F: +/-0.9 °F)
.....	100 to 150 °C: +/-2.0 °C (212 to 302 °F: +/-3.6 °F)
1 kohm	-50 to +150 °C: +/-1.5 °C (-58 to +302 °F: +/-2.7 °F)

Analog outputs, AO



Voltage

Range	0 to 10 VDC
Accuracy	+/-100 mV
Resolution	42 mV
Minimum load resistance	5 kohm
Load range	-1 to +2 mA
Reliability check	Yes
Terminals	Voltage Output (VO), Return (RET)

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Current

Range	0 to 20 mA
Accuracy	+/-0.2 mA
Resolution	0.1 mA
Load range	0 to 650 ohm
Reliability check	Yes
Terminals	Current Output (CO), Return (RET)

For protection from excess current that could be produced by field wiring, follow these instructions:

- Connect one RET terminal on each of the I/O modules to a common chassis/power ground rail in the control panel using a size 16 AWG, 1.3 mm, or larger wire.

- Individual 24 VDC power sources to the field must be current limited to maximum of 4 amps for UL compliant installations, and no more than 6 amps in other areas.
- For more information on wiring, see Hardware Reference Guide.

Regulatory Notices

FC Federal Communications Commission

FCC Rules and Regulations CFR 47, Part 15, Class B
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.

Industry Canada

This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

Regulatory Compliance Mark (RCM) - Australian Communications and Media Authority (ACMA)

This equipment complies with the requirements of the relevant ACMA standards made under the Radiocommunications Act 1992 and the Telecommunications Act 1997. These standards are referenced in notices made under section 182 of the Radiocommunications Act and 407 of the Telecommunications Act.

CE CE - Compliance to European Union (EU)

2014/30/EU Electromagnetic Compatibility Directive
2011/65/EU Restriction of Hazardous Substances (RoHS) Directive
This equipment complies with the rules, of the Official Journal of the European Union, for governing the Self Declaration of the CE Marking for the European Union as specified in the above directive(s) per the provisions of the following standards: EN 61326-1 Product Standard, EN 61010-1 Safety Standard.



WEEE - Directive of the European Union (EU)

This equipment and its packaging carry the waste of electrical and electronic equipment (WEEE) label, in compliance with European Union (EU) Directive 2012/19/EU, governing the disposal and recycling of electrical and electronic equipment in the European community.



UL 916 Listed products for the United States and Canada, Open Class Energy Management Equipment. UL file E80146.



UL 864 Listed products for the United States. 10th Edition Smoke Control System. UL file S5527.