SmartX AS-B Server

SmartX Server

Introduction

At the core of an EcoStruxure BMS is a SmartX server, such as the SmartX AS-B server. The SmartX AS-B server performs key functionality, such as control logic, trend logging, and alarm supervision, provides built-in I/O, and supports communication and connectivity to the field buses. The distributed intelligence of the EcoStruxure BMS ensures fault tolerance in the system and provides a fully featured user interface through WorkStation and WebStation.

Feature

The SmartX AS-B server is a powerful device with built-in power supply and I/O. The SmartX AS-B server can act as a standalone server using its built-in I/O and also monitor and manage field bus devices. In a small installation, the embedded SmartX AS-B server acts as a standalone server, mounted in a small footprint. In medium and large installations, functionality is distributed over multiple SmartX servers that communicate over TCP/IP.

Communications hub

Capable of coordinating traffic from above and below its location, the SmartX AS-B server can deliver data directly to you or to other servers throughout the site. The SmartX AS-B server can run multiple control programs, manage built-in I/O, alarms, and users, handle scheduling and logging, and communicate using a variety of protocols. Because of this, most parts of the system function autonomously and continue to run as a whole even if communication fails or individual EcoStruxure BMS servers or devices go offline.

Models

The SmartX AS-B server comes in eight models with different I/O point count and I/O mix.

Model	I/O Points
AS-B-24	24
AS-B-24H	24
AS-B-24L	24
AS-B-24HL	24
AS-B-36	36
AS-B-36H	36
AS-B-36L	36
AS-B-36HL	36

SmartX AS-B servers with “H” in the product name are equipped with a display for output override.

SmartX AS-B servers with “L” in the product name do not support Modbus, BACnet MS/TP, or hosting of BACnet/IP devices. The RS-485 port is not used.

SmartX AS-B servers with 36 I/O points have the same small footprint as SmartX AS-B servers with 24 I/O points.

Versatile and flexible mix of I/O points

The SmartX AS-B server offers a mix of I/O point types that match a wide variety of HVAC applications. Most of the I/O points are universal inputs/outputs, which are highly flexible and can be configured as either inputs or outputs.

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

SmartX AS-B servers with 24 I/O points have the following types:

- 12 Universal inputs/outputs, Ua type
- 4 Universal inputs/outputs, Ub type
- 4 Digital inputs
- 4 Relay outputs

SmartX AS-B servers with 36 I/O points have the following types:

- 20 Universal inputs/outputs, Ua type
- 8 Universal inputs/outputs, Ub type
- 4 Triac outputs
- 4 Relay outputs

Universal inputs/outputs

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

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

- Digital
- Counter
- Supervised
- Voltage
- Current (Ub only)
- Temperature
- Resistive
- 2-Wire RTD temperature
- 2-Wire RTD resistive

As counter inputs, the universal inputs/outputs are commonly used in energy metering applications. As RTD inputs, they are ideal for temperature points in a building control system. 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 events in the system.

For all analog inputs, maximum and minimum levels can be defined to automatically detect over-range and under-range values.

The universal inputs/outputs are capable of supporting analog outputs of type voltage outputs. Therefore, the universal inputs/outputs support a wide range of devices, such as actuators.

Digital inputs

The digital inputs can be used for cost effective sensing of multiple dry contact digital inputs in applications, such as equipment status monitoring or alarm point monitoring. As counter inputs, digital inputs are commonly used in energy metering applications.

Relay outputs

The relay outputs support digital Form A point types. The Form A relays are designed for direct load applications.

Triac outputs

The triac outputs can be used in many applications to switch 24 VAC on or off for external loads such as actuators, relays, or indicators. Triacs are silent and do not suffer from relay contact wear.

I/O expansion

For applications that require more I/O resources, the SmartX IP Controller – IP-IO modules provide a versatile mix of I/O points for any application. For more information, see the SmartX IP Controller – IP-IO Specification Sheet.

Manual override function

SmartX AS-B servers with “H” in the product name are equipped with an LCD display and keys to support manual override control of analog and digital outputs. This function allows you to manually override the outputs for testing, commissioning, and maintenance of equipment.

The override status is readable through EcoStruxure Building Operation WorkStation and WebStation, enabling precise monitoring and reliable control.

Built-in power supply

The device has a built-in power supply designed to accommodate 24 VAC or 24 VDC input power. The main AC/DC input (L/+ and N/-) is galvanically isolated from the electronics. This removes the risk of damage due to earth currents and permits the input power to be wired without concern for polarity matching.

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

Variety of connectivity options

A SmartX AS-B server has numerous ports that enable it to communicate with a wide range of protocols, devices, and servers.

A SmartX AS-B server has the following ports:

- Two 10/100 Ethernet ports
- One RS-485 port
- One USB host port
- One USB device port

The first Ethernet port is dedicated to the site network. The second Ethernet port is fully configurable. The second port can be configured to extend the site network so that various devices and clients can be connected. Another option is to configure the second port as a separate network, which means that the port can host a private network or act as a client to a second site network. If the second port is not used, it can be disabled.

The USB device port allows you to upgrade and interact with the SmartX AS-B server using Device Administrator.

Using a USB Ethernet adapter, you can connect a laptop PC to the USB host port and run Device Administrator, WorkStation, and WebStation to upgrade, configure, and access the SmartX AS-B server. The USB host port can also be used to provide power and communications for the AD touchscreen display.

Authentication and permissions

An EcoStruxure BMS provides a powerful permission system that is easy to manage, flexible, and adapts to all kinds of system sizes. The permission system provides a security level of the highest standards. Authentication is done against the built-in user account management system or against Windows Active Directory Domains. The built-in account management system allows an administrator to establish password policies that meet stringent cybersecurity guidelines. When Windows Active Directory is used, the administration costs are lower because users do not have to be managed in multiple directories.

WorkStation/WebStation interface

Through any client, the user experience is similar regardless of which EcoStruxure BMS server the user is logged on to. The user can log directly on to a SmartX AS-B server to engineer, commission, supervise, and monitor the SmartX AS-B server and its built-in I/O as well as its attached field bus devices. See the WorkStation and WebStation specification sheets for additional information.

Open building protocol support

One of the cornerstones of the EcoStruxure BMS is support for open standards. The SmartX AS-B server can natively communicate with two of the most popular standards for buildings: BACnet and Modbus.

Native BTL-listed BACnet support

A SmartX AS-B server communicates directly to BACnet/IP and BACnet MS/TP networks. The SmartX AS-B servers are BTL-listed as BACnet Building Controllers (B-BC), the most advanced BACnet Device Profile. This capability provides access to an extensive range of BACnet devices from Schneider Electric and other vendors. See the BTL Product Catalog for up-to-date details on BTL listed firmware revisions on BACnet International's home page. A SmartX AS-B server can also serve as a BACnet Broadcast Management Device (BBMD) to facilitate BACnet systems that span multiple IP subnets.

Native Modbus support

The SmartX AS-B server natively integrates Modbus RS-485 master and slave configurations, as well as Modbus TCP client and server. This allows full access to third-party products and the range of Schneider Electric products that communicate on the Modbus protocol, such as power meters, UPS, circuit breakers, and lighting controllers.

Web Services support

The SmartX AS-B server supports the use of Web Services based on open standards, such as SOAP and REST, to consume data into the EcoStruxure BMS. Use incoming third-party data (temperature forecast, energy cost) over the Web to determine site modes, scheduling, and programming.

EcoStruxure Web Services support

EcoStruxure Web Services, Schneider Electric's Web Services standard, is natively supported in the SmartX AS-B server. EcoStruxure Web Services offers extra features between compliant systems whether within Schneider Electric or other authorized systems. These features include system directory browsing, read/write of current values, alarm receipt and acknowledgement, and historical trend log data. EcoStruxure Web Services is secure. User name and password are required to log on to the system.

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

External log storage option

EcoStruxure BMS servers can be configured to automatically store all historical data, trend log data, event log and audit trail data, in a high-capacity, open, and well-proven database. If data needs to be available for longer periods of time, an external log storage can be incorporated into the EcoStruxure BMS without the need for extensive engineering work. The database supported is TimescaleDB, which is built on PostgreSQL. The capacity is limited only by the size of the selected storage media.

The data in the external log storage is available natively to the viewers built into the EcoStruxure Building Operation clients. No other software is required to access the data throughout the full retention period. The data is readily available for any analytics software that you already use, due to the open nature of PostgreSQL. Most reporting tools have native support for PostgreSQL.

The TimescaleDB extension to PostgreSQL optimizes the solution for time-stamped data and is well-suited for the EcoStruxure Building Operation historical data.

The system architecture is very flexible. All EcoStruxure BMS servers in an EcoStruxure BMS can write to and read from the same TimescaleDB database, or multiple databases can be used.

Two programming options

Unique to the industry, the SmartX AS-B server has both Script and Function Block programming options. This flexibility assures that the best programming method can be selected for the application.

eMMC memory for data and backup

The SmartX server has a 4 GB eMMC memory, which is used, for example, for the application, historical data, and backup storage. Users can also manually back up or restore the SmartX server to a storage location on a PC or network. Through the Enterprise Server, users have the ability to perform scheduled backups of associated SmartX servers to network storage for even greater levels of protection.

IT friendly

The SmartX AS-B server communicates using the networking standards. This makes installations easy, management simple, and transactions secure.

TLS support

Communication between clients and the EcoStruxure BMS servers can be encrypted using Transport Layer Security (TLS 1.2). The servers are delivered with a default self-signed certificate. Commercial Certification Authority (CA) server certificates are supported to lower the risk of malicious information technology attacks. Use of encrypted communication can be enforced for both WorkStation and WebStation access.

Supported protocols

- IP addressing
- TCP communications
- DHCP for easy network configuration
- DNS for simple lookup of addresses
- HTTP/HTTPS for Internet access through firewalls, which enables remote monitoring and control
- NTP (Network Time Protocol) for time synchronization throughout the system
- SMTP or SMTPS with support for SSL/TLS based authentication, enables sending email messages triggered by schedule or alarm
- SNMP enables network supervision and reception of application alarms in designated network management tools

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.

Removable terminal blocks

SmartX AS-B servers use pluggable terminal blocks, which are easy to install and remove from the device. The terminal blocks are ordered separately from Schneider Electric.

Efficient terminal management

The input and output terminals are clearly labeled. EcoStruxure Building Operation WorkStation can generate custom as-built labels for a SmartX AS-B server.

Protection

Protection components on the universal inputs/outputs, digital inputs, and triac outputs protect against high-voltage short-duration transient events. Universal inputs/outputs configured as current inputs (Ub only)

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

are protected against over current. Universal inputs/outputs configured as voltage outputs have current limits to protect against permanent short-circuit to ground.

Specifications

AC input

Nominal voltage ..... 24 VAC
Operating voltage range ..... +/-20 %
Frequency ..... 50/60 Hz
Maximum current ..... 0.5 A rms
Recommended transformer rating ..... ≥15 VA

DC input

Nominal voltage ..... 24 to 30 VDC
Operating voltage range ..... 21 to 33 VDC
Maximum power consumption ..... 10 W

Environment

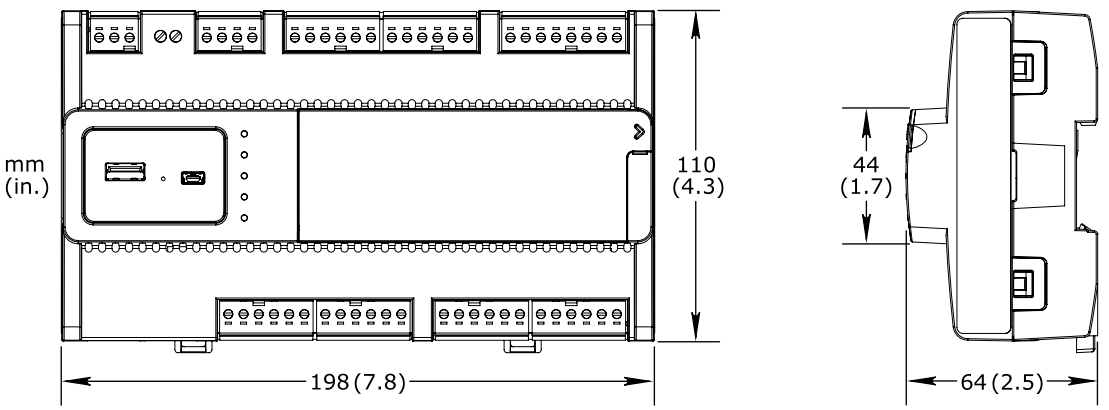
Ambient temperature, operating ..... 0 to 50 °C (32 to 122 °F)
Ambient temperature, storage ..... -20 to +70 °C (-4 to +158 °F)
Maximum humidity ..... 95 % RH non-condensing

Material

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

Mechanical

Dimensions ..... 198 W x 110 H x 64 D mm (7.8 W x 4.3 H x 2.5 D in.)



Weight, including terminal blocks ..... 0.504 kg (1.111 lb)[a]
a) The weight includes the display and keys, which are 0.022 kg (0.049 lb).

Weight, excluding terminal blocks ..... 0.420 kg (0.926 lb)[a]

SmartX AS-B Server

SmartX Server

a) The weight includes the display and keys, which are 0.022 kg (0.049 lb).

Agency compliances

Emission.....RCM; EN 61000-6-3; EN 50491-5-2; FCC Part 15, Sub-part B, Class B
Immunity.....EN 61000-6-2; EN 50491-5-3
Safety standards.....EN 60730-1; EN 60730-2-11; EN 50491-3; UL 916 C-UL US Listed
Product.....EN 50491-1

Real-time clock

Accuracy, at 25 °C (77 °F).....+/-52 seconds per month
Backup time, at 25 °C (77 °F).....10 days

Communication ports

Ethernet..... Dual 10/100BASE-TX (RJ45)
USB.....1 USB 2.0 device port (mini-B)
.....1 USB 2.0 host port (type-A), 5 VDC, 2.5 W
RS-485..... 2-wire port, bias 5.0 VDC

Communications

BACnet.....BACnet/IP, port configurable, default 47808
BACnet profile.....BACnet Building Controller (B-BC), AMEV AS-B
BACnet certification.....BTL Certification (BTL Listing[a], WSPCert)
a) See the BTL Product Catalog for up-to-date details on BTL listed firmware revisions on BACnet International'shomepage.
Modbus.....Modbus TCP, client and server
.....Serial, RS-485, master or slave
TCP.....Binary, port fixed, 4444
HTTP.....Non-binary, port configurable, default 80
HTTPS.....Encrypted supporting TLS 1.2, 1.1, and 1.0, port configurable default 443
SMTP.....Email sending, port configurable, default 25
SMTPS.....Email sending, port configurable, default 587
SNMP.....version 3
..... Network supervision using poll and trap
.....Application alarm distribution using trap

CPU

Frequency..... 333 MHz
Type.....SPEAr320S, ARM926 core
DDR2 SDRAM..... 256 MB
eMMC memory .....4 GB
Memory backup..... Yes, battery-free, no maintenance

Display

Display resolution.....128 x 64 pixels
Display size.....36 W x 17 H mm (1.4 W x 0.7 H in.)
Display type..... FSTN monochrome LCD, white color transflective backlight

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

Part numbers

SmartX Controller – AS-B-24 ..... SXWASB24X10001
SmartX Controller – AS-B-24H
Includes display SXWASB24H10001

SmartX Controller – AS-B-24L
No support for Modbus, BACnet MS/TP, or hosting of BACnet/IP devices.....SXWASB24X10002

SmartX Controller – AS-B-24HL
Includes display
No support for Modbus, BACnet MS/TP, or hosting of BACnet/IP devices SXWASB24H10002

SmartX Controller – AS-B-36..... SXWASB36X10001
SmartX Controller – AS-B-36H
Includes display SXWASB36H10001

SmartX Controller – AS-B-36L
No support for Modbus, BACnet MS/TP, or hosting of BACnet/IP devices.....SXWASB36X10002

SmartX Controller – AS-B-36HL
Includes display
No support for Modbus, BACnet MS/TP, or hosting of BACnet/IP devices SXWASB36H10002

AS-B connector kit (includes terminal blocks) SXWASBCON10001

AS-B installer kit SXWASBINS10001

Add-on options

SW-EWS-1, EcoStruxure Web Services (run-time) option
Consume only for one EcoStruxure BMS server SXWSWEWSX00001

SW-EWS-2, EcoStruxure Web Services (run-time) option
Serve & Consume for one EcoStruxure BMS server SXWSWEWSX00002

SW-EWS-3, EcoStruxure Web Services (run-time) option
Serve & Consume, plus Historical trend log data for one EcoStruxure BMS server SXWSWEWSX00003

SW-GWS-1, Web Services (Generic Consume) option
For one EcoStruxure BMS server SXWSWGWSX00001

SW-SNMP-1, Alarm notifications via SNMP option
For one EcoStruxure BMS server.....SXWSWSNMP00001

SW-SMART-CONNECT, Smart Connector deployment license
For one Smart Connector deployment SXWSWSCDL10000

SW-ASDBTS-1, TimescaleDB connection option
For one SmartX server SXWSWASDBXS001

Software requirements

External log storage option .....PostgreSQL 11.0 (or higher), TimescaleDB 1.2 (or higher)
Quality assurance testing has been performed by Schneider Electric with TimescaleDB and PostgreSQL installed natively in Windows 10, Windows Server 2012, and Windows Server 2016. Other deployment scenarios have not been tested by Schneider Electric.

Universal inputs/outputs, Ua and Ub

Channels, SmartX AS-B servers with 24 I/O points .....12 Ua, Ua1 to Ua12
.....4 Ub, Ub1 to Ub4

Channels, SmartX AS-B servers with 36 I/O points ..... 20 Ua, Ua1 to Ua20,
.....8 Ub, Ub1 to Ub8

Absolute maximum ratings .....-0.5 to +24 VDC

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

A/D converter resolution ..... 16 bits

Digital inputs

Range ..... Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA
Minimum pulse width ..... 120 ms

Counter inputs

Range ..... Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA
Minimum pulse width ..... 20 ms
Maximum frequency ..... 25 Hz

Supervised inputs

5 V circuit, 1 or 2 resistors
Monitored switch combinations ..... Series only, parallel only, and series and parallel
Resistor range ..... 1 to 10 kohm
For a 2-resistor configuration, each resistor must have the same value +/- 5 %

Voltage inputs

Range ..... 0 to 10 VDC
Accuracy ..... +/-(7 mV + 0.2 % of reading)
Resolution ..... 0.5 mV
Impedance ..... 100 kohm

Current inputs

Range ..... 0 to 20 mA
Accuracy ..... +/-(0.01 mA + 0.4 % of reading)
Resolution ..... 1 µA
Impedance ..... 47 ohm

Resistive inputs

10 ohm to 10 kohm accuracy ..... $+/-(7 + 4 \times 10^{-3} \times R)$ ohm
R = Resistance in ohm

10 kohm to 60 kohm accuracy ..... $+/-(4 \times 10^{-3} \times R + 7 \times 10^{-8} \times R^2)$ ohm
R = Resistance in ohm

Temperature inputs (thermistors)

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

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

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

Xenta.....1.8 kohm

Balco.....1 kohm

Measurement accuracy

20 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 100 °C: +/-0.2 °C (32 to 212 °F: +/-0.4 °F)
.....100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)

10 kohm, 2.2 kohm, and 1.8 kohm.....-50 to -30 °C: +/-0.75 °C (-58 to -22 °F: +/-1.35 °F)
.....-30 to +100 °C: +/-0.2 °C (-22 to +212 °F: +/-0.4 °F)
.....100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)

Linearized 10 kohm .....-50 to -30 °C: +/-2.0 °C (-58 to -22 °F: +/-3.6 °F)
.....-30 to 0 °C: +/-0.75 °C (-22 to +32 °F: +/-1.35 °F)
..... 0 to 100 °C: +/-0.2 °C (32 to 212 °F: +/-0.4 °F)
.....100 to 150 °C: +/-0.5 °C (212 to 302 °F: +/-0.9 °F)

1 kohm .....-50 to +150 °C: +/-1.0 °C (-58 to +302° F: +/-1.8 °F)

RTD temperature

Supported RTDs .....Pt1000, Ni1000, and LG-Ni1000

Pt1000

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

Measurement accuracy .....-50 to +70 °C: +/-0.5 °C (-58 to +158 °F: +/-0.9 °F)
.....70 to 150 °C: +/-0.7 °C (158 to 302 °F: +/-1.3 °F)

Ni1000

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

Measurement accuracy .....+/-0.5 °C (+/-0.9 °F)

LG-Ni1000

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

Measurement accuracy .....+/-0.5 °C (+/-0.9 °F)

RTD temperature wiring

Maximum wire resistance.....20 ohm/wire (40 ohm total)

Maximum wire capacitance.....60 nF
The wire resistance and capacitance typically corresponds to a 200 m wire.

RTD resistive

1,000 ohm

Range .....500 to 2,200 ohm
.....Including wiring resistance

Measurement accuracy.....+/-(0.2 + 1.5 x 10^{-3} x R) ohm
R = resistance in ohm

Resolution .....0.1 ohm

RTD resistive wiring

Maximum wire capacitance.....60 nF

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

Voltage outputs

Range ..... 0 to 10 VDC
Accuracy ..... +/-60 mV
Resolution ..... 10 mV
Minimum load resistance ..... 5 kohm
Load range ..... -1 to +2 mA

Digital inputs, DI

Channels, SmartX AS-B servers with 24 I/O points ..... 4, DI1 to DI4
Channels, SmartX AS-B servers with 36 I/O points 0
Absolute maximum ratings ..... -0.5 to +24 VDC

Digital inputs

Range ..... Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA
Minimum pulse width ..... 120 ms

Counter inputs

Range ..... Dry contact switch closure or open collector/open drain, 24 VDC, typical wetting current 2.4 mA
Minimum pulse width ..... 20 ms
Maximum frequency ..... 25 Hz

Relay outputs, DO

Channels, SmartX AS-B servers with 24 I/O points ..... 4, DO1 to DO4
Channels, SmartX AS-B servers with 36 I/O points ..... 4, DO1 to DO4
Contact rating ..... 250 VAC/30 VDC, 2 A, Pilot Duty (C300)
Switch type ..... Form A Relay
..... Single Pole Single Throw
..... Normally Open
Isolation contact to system ground ..... 3000 VAC
Cycle life (Resistive load) ..... At least 100,000 cycles
Minimum pulse width ..... 100 ms

Triac outputs, DO

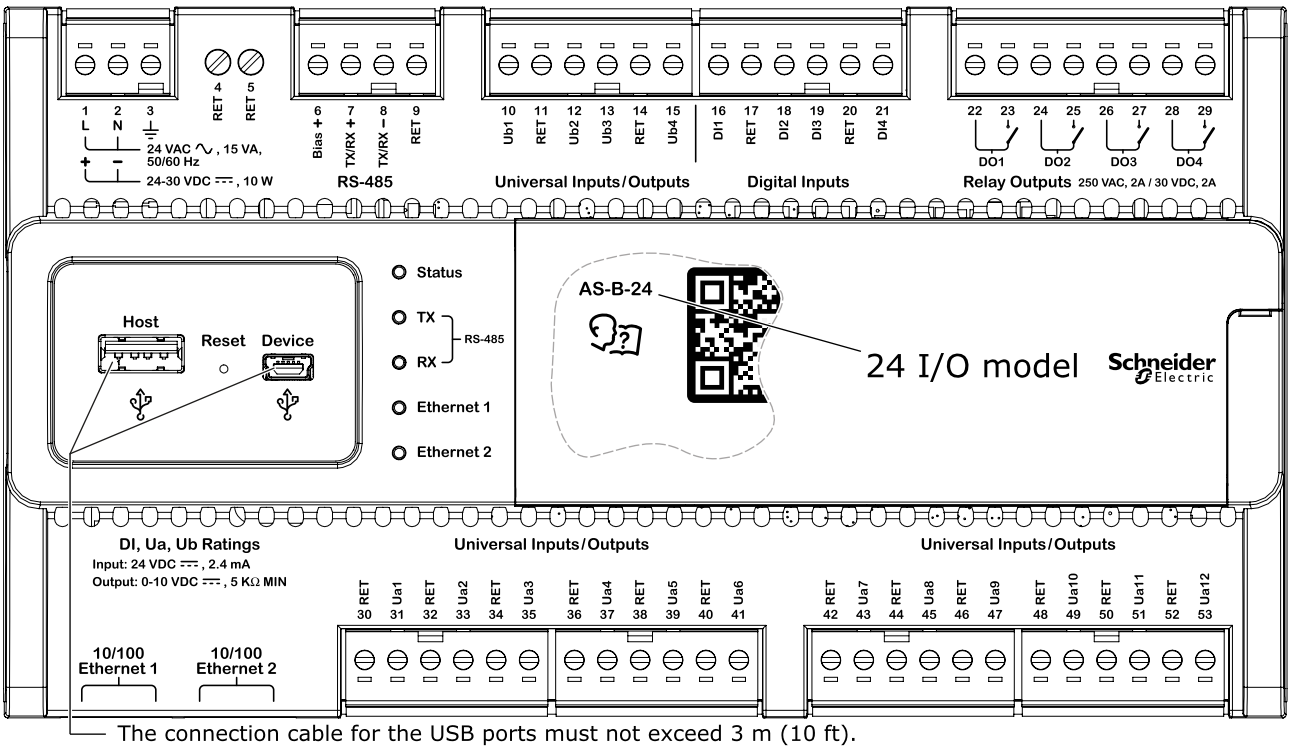
Channels, SmartX AS-B servers with 24 I/O points 0
Channels, SmartX AS-B servers with 36 I/O points ..... 4, DO5 to DO8
Output rating ..... Max. 0.8 A
Voltage ..... 24 VAC +/-20 %
Commons ..... COM1 for DO5 and DO6
..... COM2 for DO7 and DO8
The common terminals COM1 and COM2 can be connected to 24 VAC or to ground.
Common voltage, high side output ..... 24 VAC
Common voltage, low side output ..... 0 VAC (ground)
Minimum pulse width ..... 100 ms

03-30034-01-en, April 2019

SmartX AS-B Server

SmartX Server

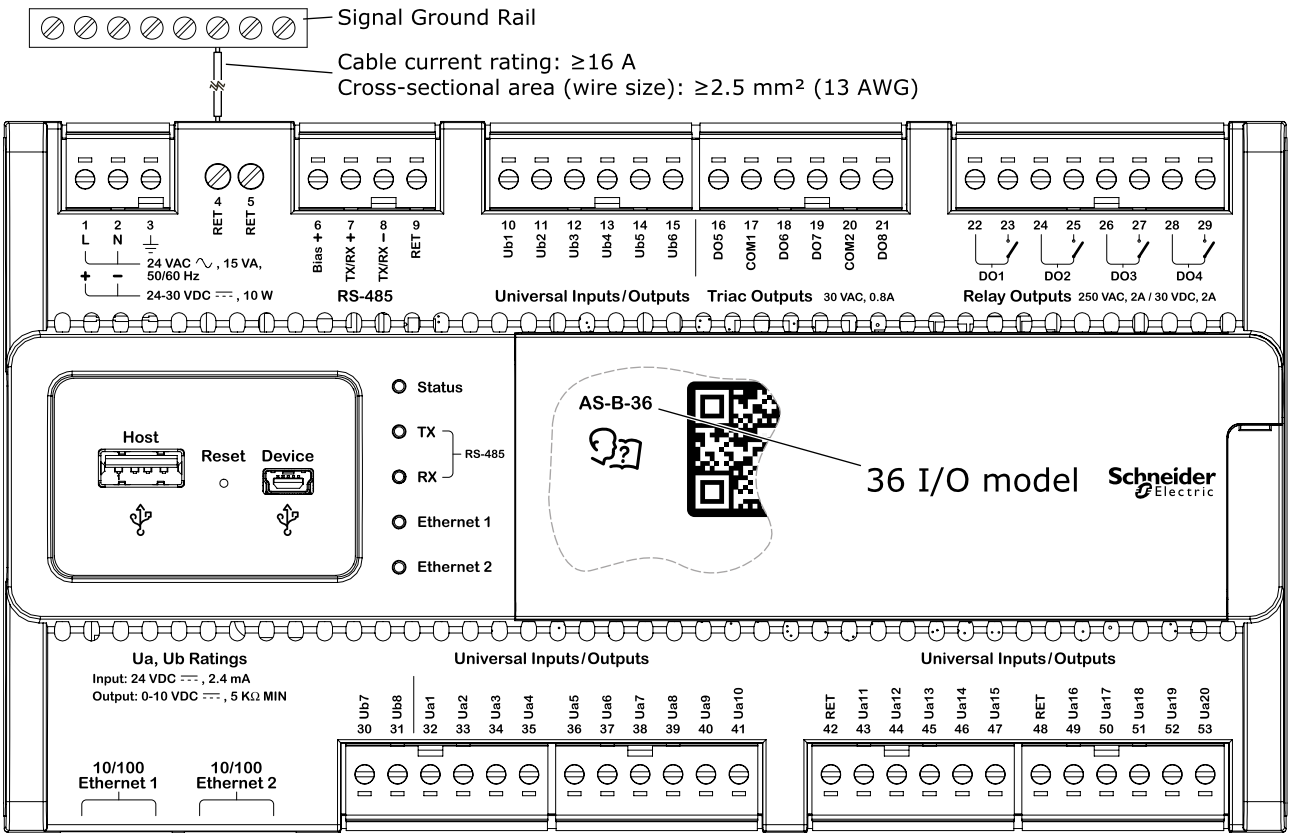
Terminals



SmartX AS-B server model with 24 I/O points

SmartX AS-B Server

SmartX Server



SmartX AS-B server model with 36 I/O points

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

- Connect RET terminal number 4 or 5 to a common chassis/signal ground rail in the control panel using a size 2.5 mm² (13 AWG) or larger wire. The wire must have a current rating greater than or equal to 16 A.
- SmartX AS-B servers with 24 I/O points have more RET terminals for connection of I/O returns, so the common chassis/signal ground rail is optional and may not be needed.
- Individual 24 VDC power sources to the field must be current limited to maximum 4 A for UL compliant installations, and maximum 6 A in other areas.

For more information on wiring, see Hardware Reference Guide.

SmartX AS-B Server

SmartX Server

Regulatory Notices

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 - Compliance to European Union (EU)
2014/30/EU Electromagnetic Compatibility Directive
2014/35/EU Low Voltage Directive
2011/65/EU Restriction of Hazardous Substances (RoHS) Directive
2015/863/EU amending Annex II to Directive 2011/65/EU
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 50491-1 Product Standard; EN 60730-1, EN 60730-2-11, and EN 50491-3 Safety Standards.

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.

03-30034-01-en, April 2019