sensorProbeX+ (SPXN+ / SPX+)

Customizable Monitoring Standard and Modular Design

Select from a standard configuration (SPXN+), or build your own customized monitoring solution (SPX+). Choose a mounting option to suit your installation, whether it be 1U, 0U rack mounting, or DIN rail. Optional modules, internal DC power supply, PoE and Cellular modem can be selected depending on your requirements. Fully SNMP compliant with SNMP V1/2/3

SPX+ is compatible with all AKCP sensors, including the latest "smart sensors" such as swing handle locks, cabinet thermal maps, LCD display and battery monitoring sensors.

Every SPX+ features an EXP port, which functions as an RS485 Modbus port as well as connecting with AKCP Expansion modules.

A Basic Expansion Bus (BEB) port expands to additional SPX+ modules. A maximum of 2x BEB units can be connected to a single SPX+ Monitor multiple SPX+ units from AKCPro Server for centralized monitoring and management of all devices.

SPXN+ / SPX+ - MTBF

Mean Time Between Failure

Since its recent release, the SPX+ has grown to an installed base of approximately 5,000 base units. On average we have 4 hardware failures per year that require RMA replacement. That is to say that the SPX+ is operating for 43,800,000 hours for every 4 failures. That is a MTBF of 10,950,000 hours. The sensors have an approximately similar record of durability. The reason that this failure rate is so low is by design. The SPX+ was created for rugged environments. The components used in the SPX+ can withstand high-temperature environments because they generate very little heat. The SPX+ operates on 1 Watt of power.

This stands in contrast to larger systems running more complex, and less reliable operating systems such as Linux. Typical small computers often run at 300 Watts requiring a fan. The SPX+ doesn't need fans or special cooling. The case is built from Aluminum, not plastic. The SPX+ has been tested in environmental chambers to be able to operate reliably at 70° C. During the manufacture every SPX+ is tested, then burned in for 96 hours in order to eliminate infant mortality.

The system is put into stock awaiting a customer order. AKCP is not only rugged in hardware, it is rugged in software. Rather than relying on large, untested, and unmaintainable open source projects, we write our own applications. This is more difficult but results in superior performance. We can maintain the code because we wrote it ourselves. If there is a bug that needs fixing, we can fix it. If there is a feature that needs adding. We can add it. This is not possible in larger systems relying on third-party applications.

sensorProbeXN+ (SPXN+)

The SPXN+ is a standard 1U configuration of the SPX+. The configuration includes PoE), Modbus RS485 port and dedicated input for an optional external 4G cellular data modem.

The configuration of modules is:
- 8 sensor ports
- 10x dry contacts
- 2x 0-5VDC analog inputs
- 2x Mini Relays

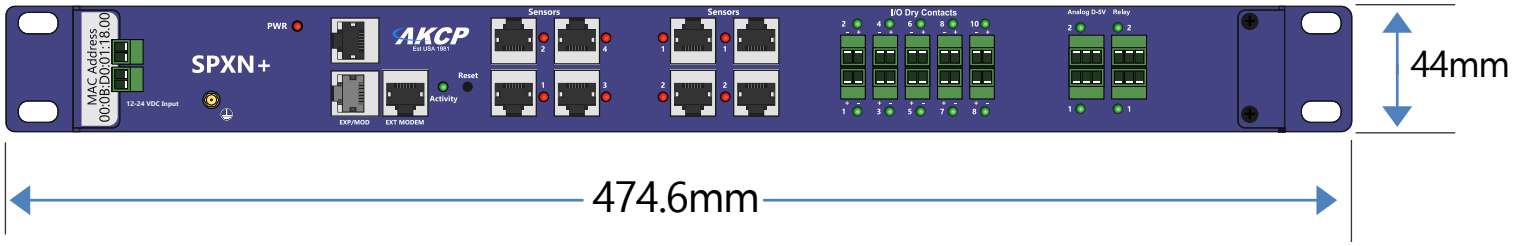
The basic SPXN+ cost includes only 4 sensor ports activated. Additional sensor ports, dry contacts, A2D inputs and mini relays can be unlocked with a one time software license code. Order with required modules unlocked, or unlock in field as your needs dictate.

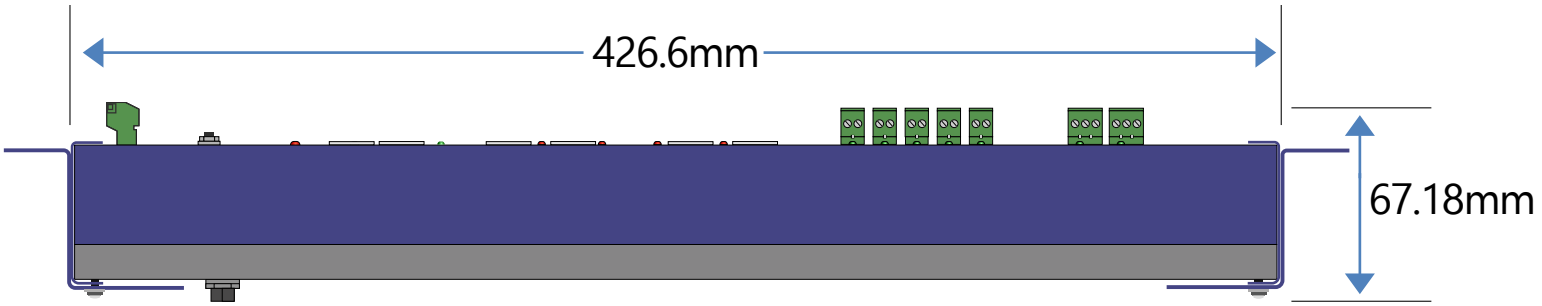
NOTE SPXN+ does not include :
- PSU or PSU Carriage (PoE comes as standard)
- BEB Port

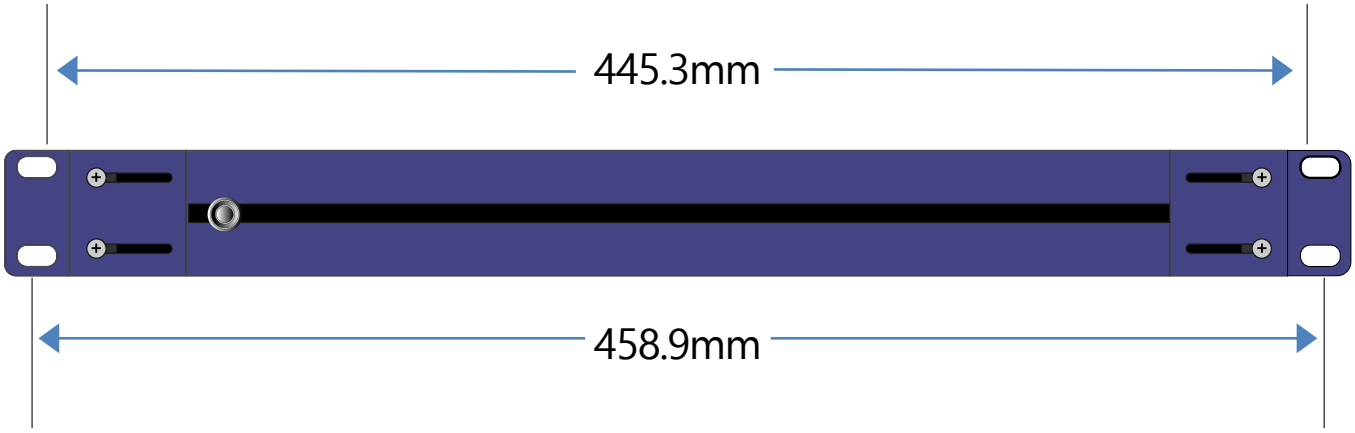
SPX+ / SPXN+ Technical Sepcification

Dimension	44 (W) x 44 (H) low profile design
Expansion Port	EXP port connecting EXP Remote Units UART port for connecting external 4G modem
Mounting	1U rack mount brackets (standard) Optional 0U Toolless rack mount Optional DIN rail brackets.
Power	Power over Ethernet (PoE) as standard Optional External 5.5V 3A Power Adapter Input Voltage and Current ratings : 100V~240V - 0.22A
Status Indication	LED indication for power LED for network connectivity LED for sensor online and threshold status
Components	Manufactured using highly integrated, low power surface mount technology to ensure long termreliability.
Operating Environment	Temperature : Min. 0°C - Max. 70°C (Industrial Option available for Min. -25°C - Max. 70°C) Humidity: Min. 20% – Max. 80% (Non-Condensing)
MTBF	1,400,000 Hours based on field experience with sensorProbe units.
Base Unit	8x Sensor Ports for connecting AKCP sensors 10x Dry contact I/O 2x Mini relays 2x 0-5VDC inputs 1x Expansion Out or Modbus RS-485 Port (supports up to 4 CCU, E-Sensor8 or E-Opto16) 1x ART external modem port 1x 10/100 Mbps Ethernet Port
Max Sensors	Maximum of 300 onlined sensors, including Expansion Units and virtual sensors.
Maximum Number of Access Control Users	500 Users 100 Users default
Supported Protocols *Requires Additional License	Rsyslog MQTT / MQTTS SNMP V1/2 IPV6 RADIUS* TACAC*S HTTPS Encrypted E-mail
Licensing	
Virtual Private Network (VPN)	VPN - Connect to AKCPro Server from your base unit through VPN over Ethernet or cellular network.
Virtual Sensor pack: VS	Virtual sensor (pack of 5 sensors). Maximum of 80 virtual sensors. * ** Every SPX+ comes with 10 free virtual sensors. Additional available through license
3rd Party PMS & Modbus	3rd Party Modbus / PMS device. Up to 4 modbus devices with 15 sensors.* **
500 Access Control user database : UA	500 users for access control (SP+ series has 100 users as standard)
IPV6: SP-IPV6	Support for IPV6 network addresses
Radius: RAD	Radius user authentication server connection. TACACS authentication to Radius. Requires Radius License
Important Notes	* the sensorProbe+ units can only have 60 Modbus RS485 sensors (virtual sensor + modbus devices) ** the sensorProbe+ units can only have 60 Modbus TCP/IP sensors (virtual sensor + modbus devices)

SPXN+ Technical Drawing







sensorProbeX+ (SPX+)

Customizable Modular Design

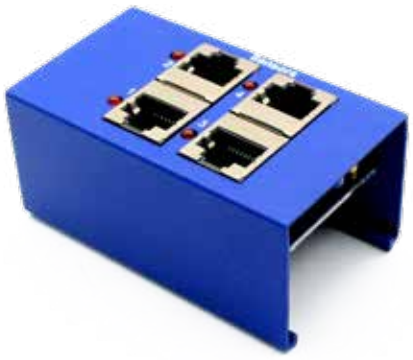
The SPX+ includes a Modbus and BEB port. Start with 4x sensor ports and add modules as required. Units can be built as short DIN rail mounted devices, 1U rack mounted or 0U mounting.

SPX+ Modules

MCU

The MCU Module is the core of the SPX+. A mandatory module it forms the base configuration of every unit. 4x intelligent sensor ports, Ethernet and a dual purpose Expansion (EXP) port for Modbus RS485 communications, or connection to AKCP Expansion. Basic Expansion Bus (BEB) port connects the SPX+ to SPX+ basic expansion units comprised of additional SPX+ modules.

sensor4



sensor4 modules give additional intelligent sensor ports, allowing you to build your SPX+ to your requirements. Connect a wide range of intelligent sensors and smartRack sensors such as Cabinet Thermal Maps, Programmable LCD Display and RFID Swing Handle Locks.

SPX+ - Modules

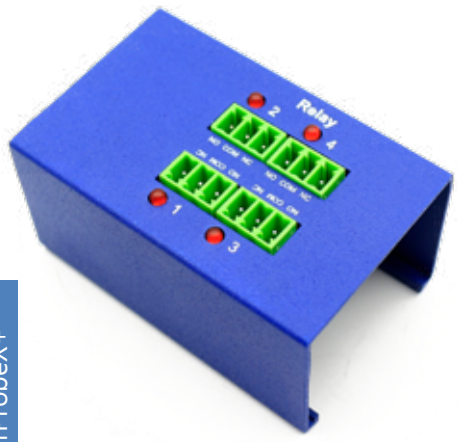
Dry Contacts

Dry contact modules can be added in x10 and x20 blocks. The dry contacts can be ordered as I/O, isolated input only (internal 5V) and isolated input only (external 5-30V). Dry contacts can be used to monitor a variety of third party devices and alarm panels.

Cellular Modem / GPS

4G Cellular Data Modem module gives a primary or backup method of communication. Send SMS and e-mail alerts directly from the device through the cell network. Ideal for remote site locations and those with unreliable DSL connection.

4x Mini Relays



This module includes 4x mini DC relays. Use them to switch on/off low current devices directly, or use them to drive larger relays. Ideal for systems and control, building and industrial automation.

SPX+ - Modules

4x Analog to Digital Inputs

This module is ideal for connecting third party analog sensors with a 0-5VDC or 4-20mAmp scale output. Many industrial sensors are available with this scale output, opening up the possibilities of monitoring many different sensors not provided by AKCP.

2x Mini Relays & 2x Analog Inputs

This module is a combination of the above modules, with 2x relays and 2x 0-5VDC or 4-20mA analog sensor inputs.

Internal Mini UPS

This module is useful in situations where the SPX+ may face power outages. An internal battery backup using 4x AA batteries can power the SPX+ for several hours (depending on sensors connected, alerts generated etc). This is ample time to be able to continue to send alerts, and most importantly notify you of the power situation so the main power can be restored.

Ideally combined with the internal cellular data modem, SMS alerts can be sent even if the rest of your network is down.

SPX+ - Modules

Internal Mini UPS

Mounting	Internal
Power	Input Voltage 5.5V 4x AA NimH batteries
Charger	Slow Charge circuit for long lasting batteries
Status Condition	Red LED indication for On Battery Status Green LED indication for charging status
Components	Manufactured using highly integrated, low power surface mount technology to ensure long term reliability.
Operating Environment	Temperature : Min. 0° C – Max. 70° C Humidity: Min. 20% – Max. 80% (Non-Condensing)
MTBF	1,400,000 Hours based on field experience with sensorProbe units.
Other	For SPX+ series only

Online Configuration

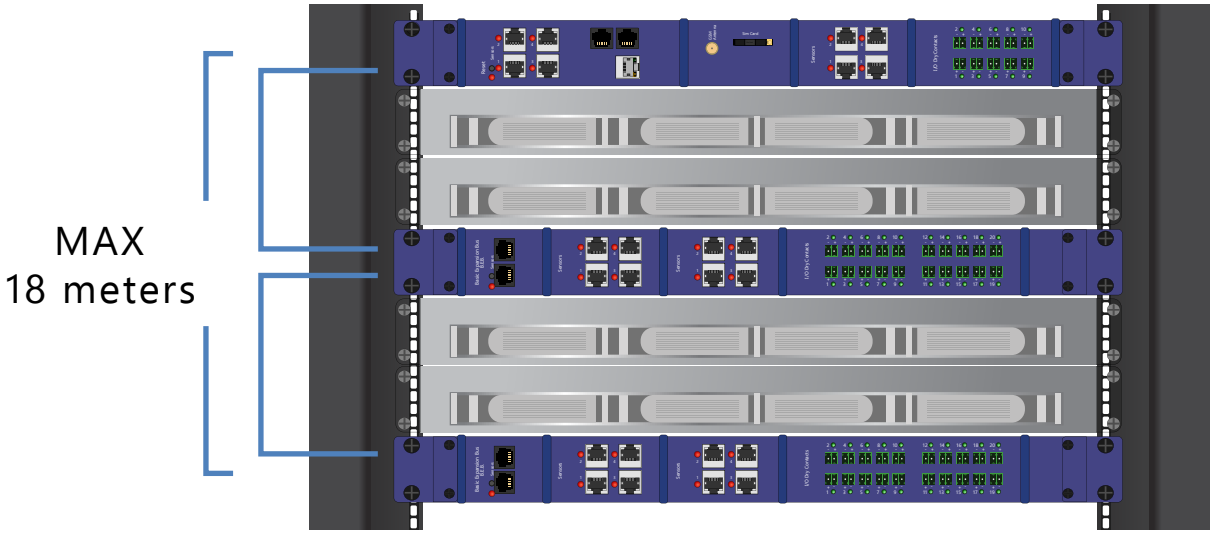
Customize your SPX+ with our online configuration tool, graphically build up your device with the modules you need and submit for quotation.

SPX+ - Expansion

Basic Expansion Bus (BEB)

Using an SPX+ Master with BEB, together with SPX+ Basic Expansion Bus devices, you can increase the number of sensor ports, and dry contacts available. Recommended for use over a short distance , within the same cabinet only, it provides a cost effective way to expand your system. The maximum distance from the SPX+ Master to the last unit in the chain is 18 meters.

- 2x BEB - Max total length 18 meters (2x 9m)
- 1x BEB - Max total length 18 meters (1x 18m)



RS485 Expansion (EXP)

Using an SPX+ Master with EXP, together with EXP units you can add dry contacts and sensor ports to your system, with the ability to place theunits up to 300 meters (1,000ft) away from each other. Supported EXP devices are the E-Sensor8 and E-Opto16 Expansion units.

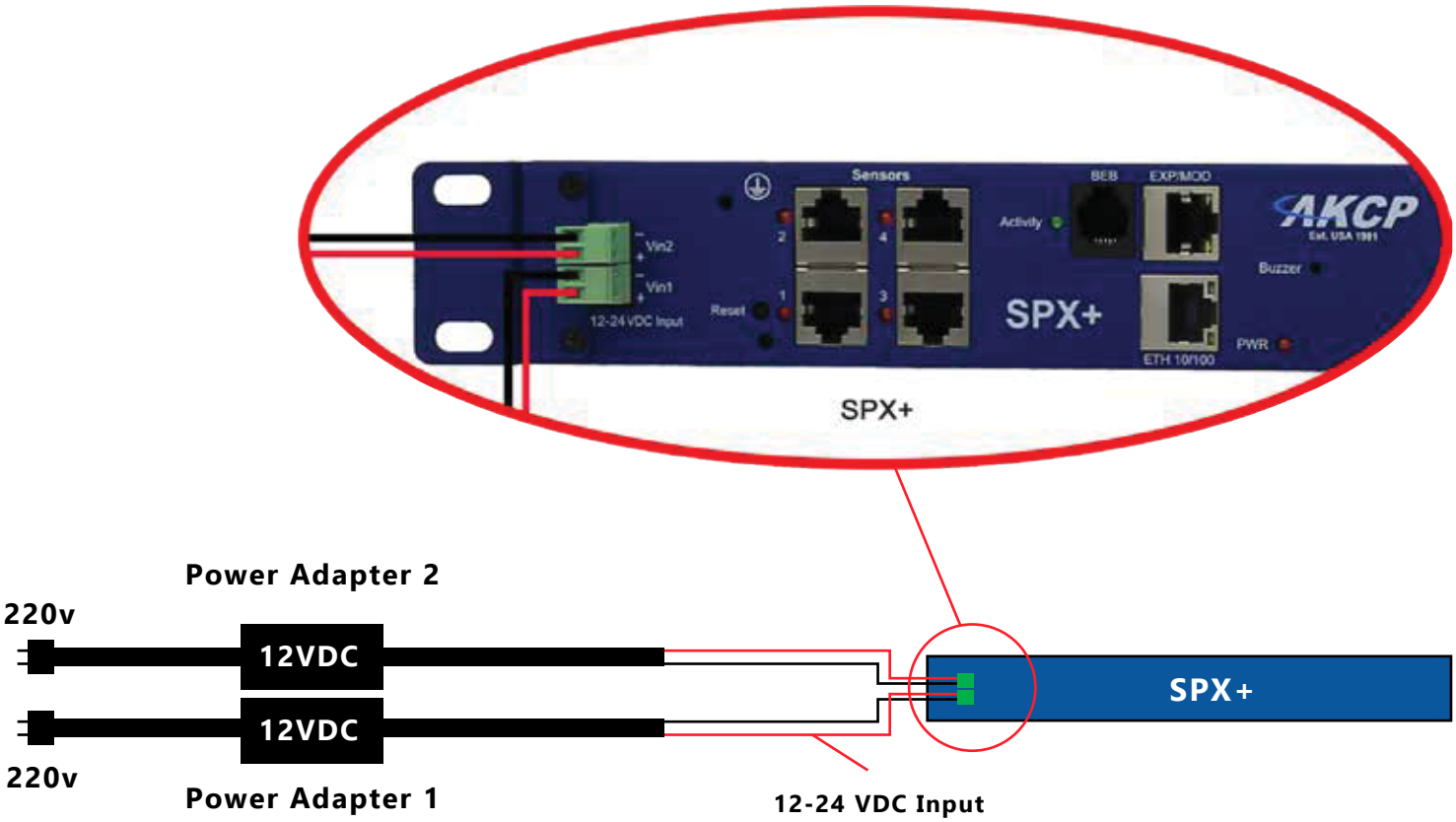
SPXN+ / SPX+ - Dual Power Inputs

Dual Power Inputs

The SPX+ is available with an internal 12-24 VDC or 48-60 VDC power supply. This power supply features dual inputs with redundant fail-over. Ideal for telecoms where DC power is available directly in the cabinets.

It can also be utilized in a data center with a dual PDU setup. Connect the 220VAC-12VDC power adapters to the separate AC power sources, and the output of the 12VDC adapters to the SPX+.

If the SPX+ features the Power over Ethernet (PoE) option, this can also be used as a redundant power input. If the power source to the DC jack is interrupted the SPX+ will switch to the PoE source.



Example of dual power source for the SPX+

The dual DC inputs are also available as an external converter under product codes DCW024-5 and DCW048-5

SPX+ Technical Specification

Dimension	427mm (W) x 44mm (H) low profile design
Expansion Port	EXP port connecting EXP Remote Units BEB port for connecting maximum 2x SPX+ BEB Remote Units
Mounting	0U Toolless rack mount, optional wall mount brackets, horizontal 1U mounting or DIN rail brackets.
Power	External 5.5V 3A Power Adapter Input Voltage and Current ratings : 100V~240V - 0.22A Options: Power over Ethernet (PoE) Dual 12-24VDC internal power supply Dual 40-60 VDC internal power supply
Status Indication	LED indication for power LED for network connectivity LED for sensor online and threshold status Internal Buzzer for audible alerts
Components	Manufactured using highly integrated, low power surface mount technology to ensure long term reliability.
Operating Environment	Temperature : Min. 0°C - Max. 70°C (Industrial Option available for Min. -25°C - Max. 70°C) Humidity: Min. 20% – Max. 80% (Non-Condensing)
MTBF	10,950,000 Hours based on field experience with sensorProbe+ units.
Base Unit	4x Sensor Ports for connecting AKCP sensors 1x Expansion Out or Modbus RS-485 Port (supports up to 4 CCU, E-Sensor8 or E-Opto16) 1x Basic Expansion Bus Port (BEB) 1x 10/100 Mbps Ethernet Port
Max Sensors	Maximum of 150 onlined sensors, including Expansion Units and virtual sensors.
SPX+ Modules	– 4x Sensor Ports module for connecting AKCP sensors or swing handle cabinet locks – 10x or 20x Dry Contacts module, 3 configurations : + Configurable Input / Output dry Contact (0VDC/5VDC)
	+ Input only 5V Dry Contact, opto-coupled input + Isolated input Dry Contact, from 5V to 30V voltage input signal + Isolated AC Detection input 5-30ACV @44mA - 4x Mini relays for driving larger relays - 4x 0-5VDC / 4-20mA input for third party sensors - 2x 0-5VDC / 4-20mA input for third party sensors with 2x Mini relays - Valve controller module
Optional	Internal mini UPS, 4x AA rechargeable batteries Internal 40-60V DC power supply 4G Cellular data modem with external antenna Power over Ethernet (PoE) Internal DC Power Supply
Maximum Number of Access Control Users	500 Users 100 Users default
Supported Protocols *Requires Additional License	Rsyslog MQTT / MQTTS SNMP V1/2 IPV6 RADIUS* TACACS* HTTPS Encrypted E-mail
Licensing	
Virtual Private Network (VPN) : VP	VPN - Connect to AKCPro Server from your base unit through VPN over Ethernet or cellular network.
Virtual Sensor pack : VS	Virtual sensor (pack of 5 sensors). Maximum of 80 virtual sensors. * ** Every SPX+ comes with 10 free virtual sensors
3rd Party PMS & Modbus : PM	3rd Party Modbus / PMS device. Up to 4 modbus devices with 15 sensors.* **
500 Access Control user database : UA	500 users for access control (SP+ series has 100 users as standard)
IPV6 : SP-IPV6	Support for IPV6 network addresses
Radius : RAD	Radius user authentication server connection. TACACS authentication to Radius. Requires additional license
Important Notes	* the sensorProbe+ units can only have 60 Modbus RS485 sensors (virtual sensor + modbus devices) ** the sensorProbe+ units can only have 60 Modbus TCP/IP sensors (virtual sensor + modbus devices)

SP+ 4G Modem (M4E / M4U) - Technical Specification

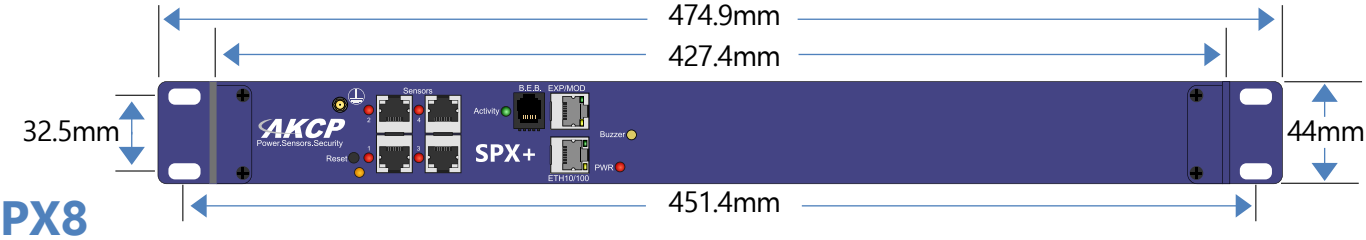
Frequencies	EU model : • LTE-TDD B38/B40/B41 • LTE-FDD B1/B3/B5/B7/B8/B20 • UMTS/HSPA+ B1/B5/B8 • GSM/GPRS/EDGE B3/B8 US model : • LTE-FDD B2/B4/B12 • UMTS/HSPA+ B2/B5
Category	CAT1
Data Transmission	HSPA+: up to 5.76 Mbps(UL), 42 Mbps(DL) LTE Category 1: up to 5 Mbps (UL), 10 Mbps (DL)
Transmitting Power	WCDMA: Class 3 (0.25W) LTE: Class 3 (0.25W
Features	SMS Internet (PPP) : email, VPN, cloud Optional GPS * + GNSS: GPS/GLONASS/Beidou/Galileo + GPS active antenna provided
SIM card	Standard SIM card size Support SAT class 3, GSM 11.14 Release 98
Antenna	3m External Antenna
Components	Manufactured using highly integrated, low power surface mount technology to ensure long term reliability.
Operating Environment	Temperature : Min. -20° C – Max.70° C Humidity: Min. 20% – Max. 80% (Non-Condensing)
Certification	EU Version : • CE-RED • IMDA • GCF • RoHS • REACH US Version : • FCC • PTCRB • IC • RoHS • REACH
Carrier Certification	EU version : • Deutsche Telekom / Vodafone US version : • AT&T / Rogers
Important Note	* GPS support on SP2+ and SP-WTS only

SPX+ Technical Drawing

SPX+ Standard Configurations

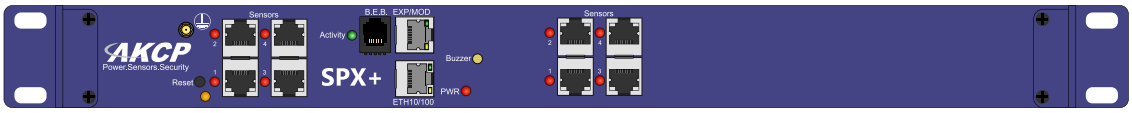
SPX4

SPX with 4 sensor ports



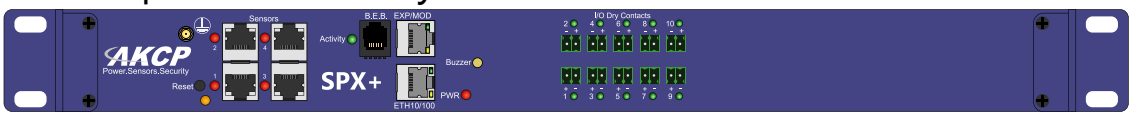
SPX8

SPX with 8 sensor ports



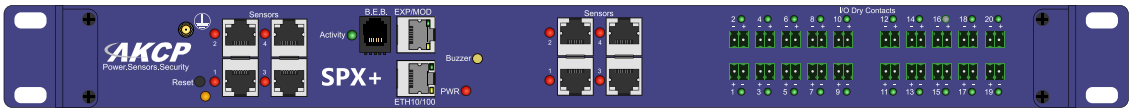
SPX4-X10

SPX with 4 sensor ports and 10 Dry Contacts



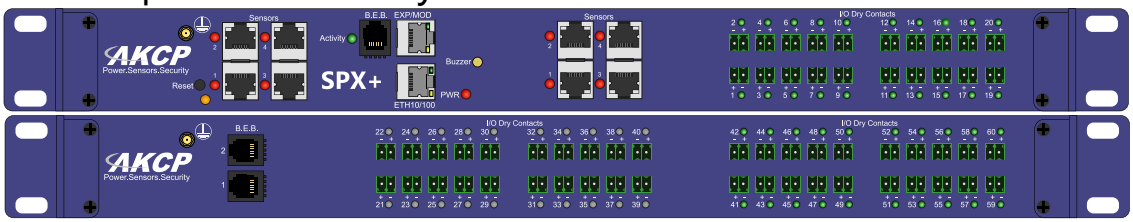
SPX8-X20

SPX with 8 sensor ports and 20 Dry Contacts

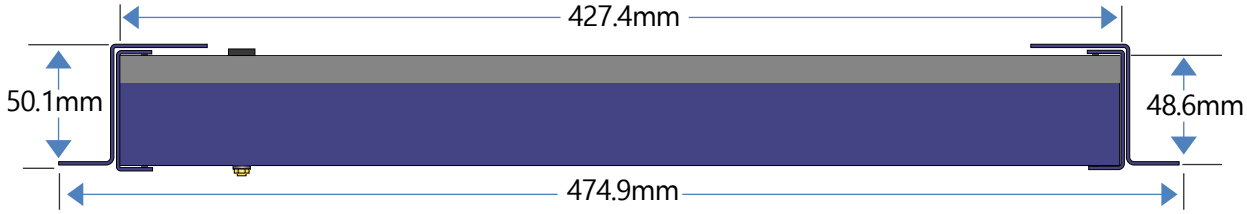


SPX8-60

SPX with 8 sensor ports and 60 Dry Contacts



TOP VIEW

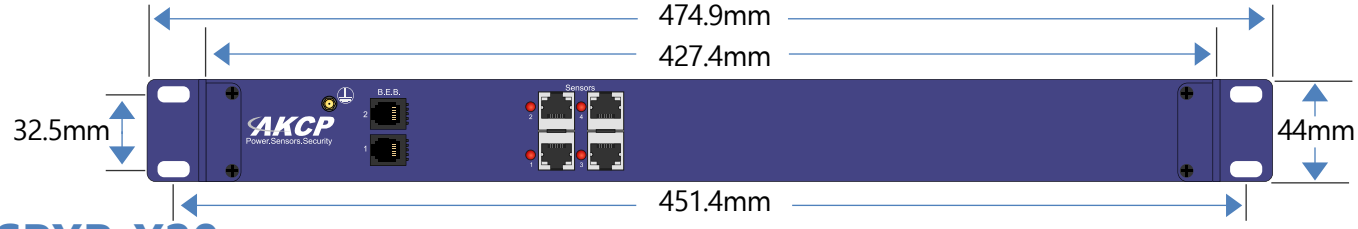


SPX+ Technical Drawing

SPX+ Standard Configurations

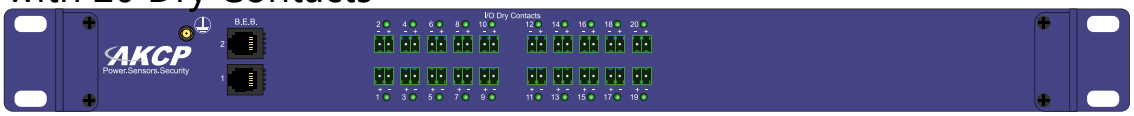
SPXB4

SPX BEB with 4 sensor ports



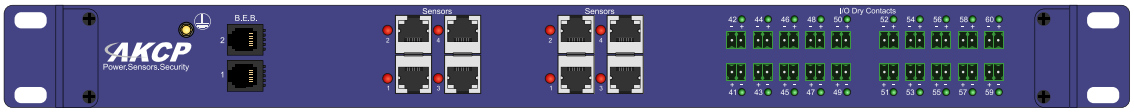
SPXB-X20

SPX BEB with 20 Dry Contacts



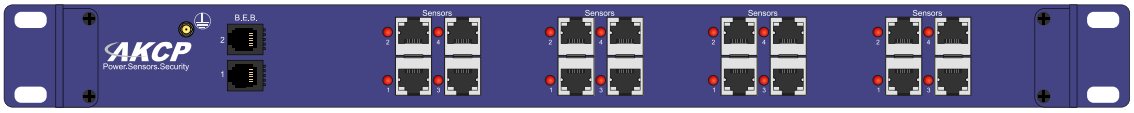
SPXB8-X20

SPX BEB with 8 sensor ports and 20 Dry Contacts



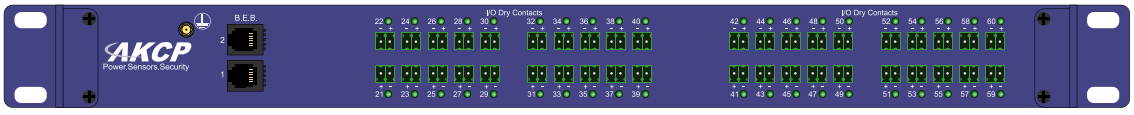
SPXB16

SPX BEB with 16 sensor ports

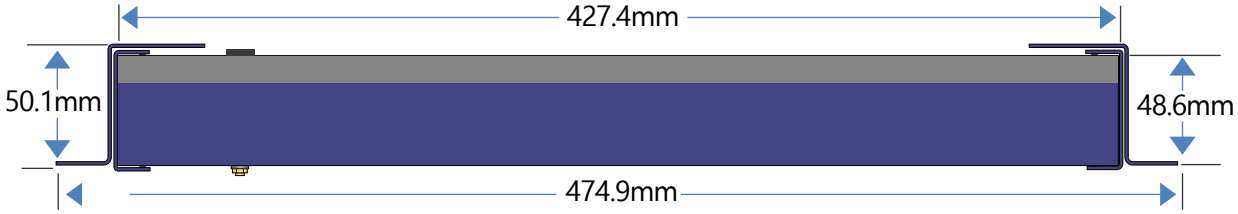


SPXB-X40

SPX BEB with 40 Dry Contacts



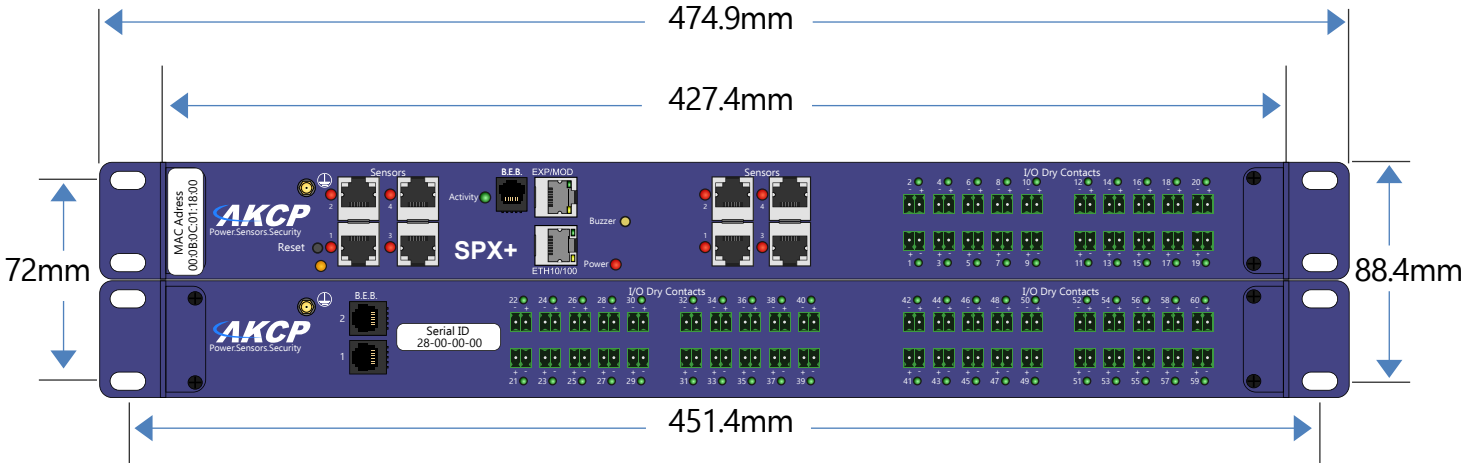
TOP VIEW

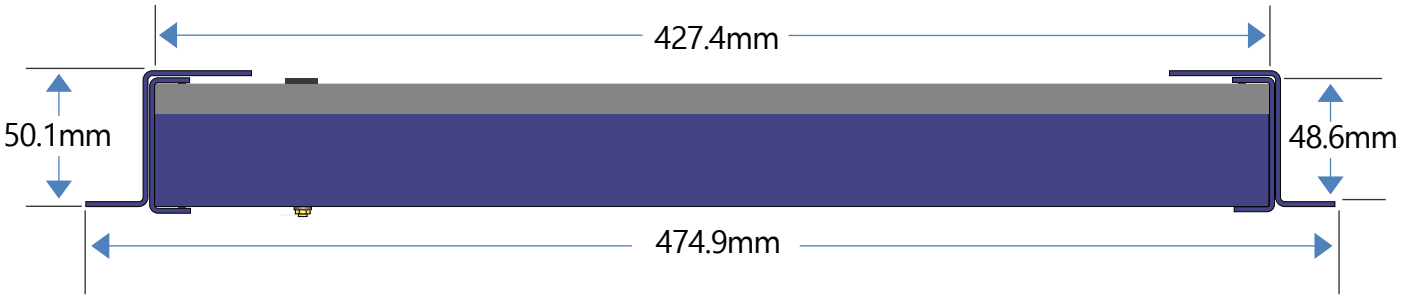


SPX+ Technical Drawing

SPX8-X60

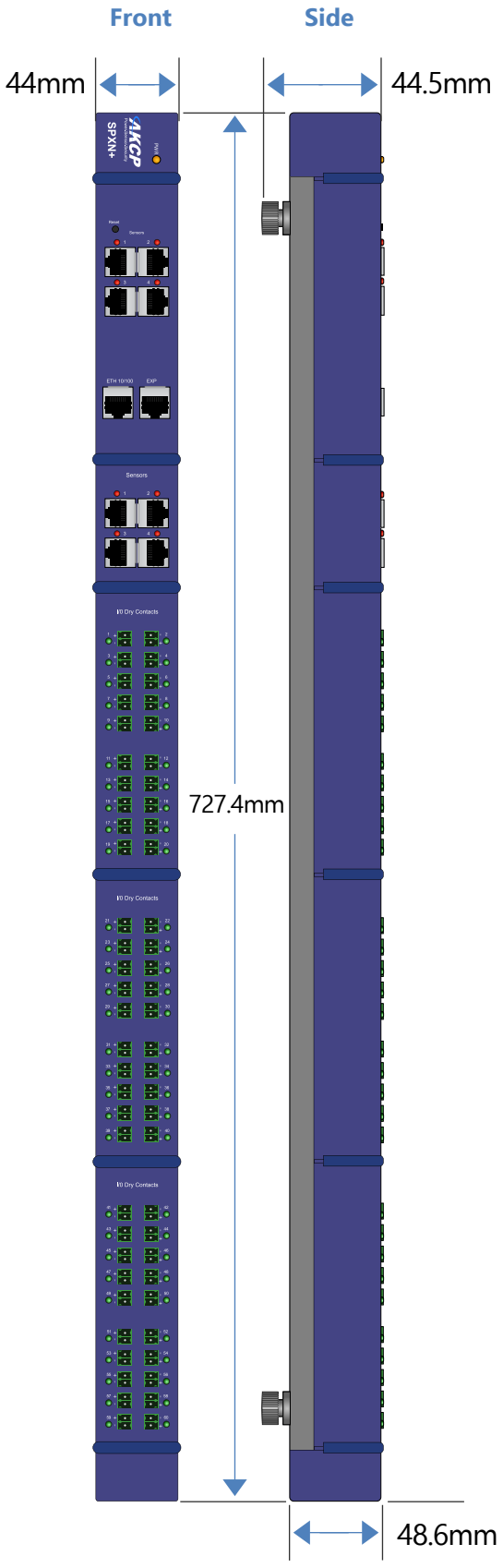
SPX8-X60 is a 2U device, comprised of an SPX+ with BEB unit. This can be mounted in 2 seperate U's, or back to back in the same U as illustrated below.



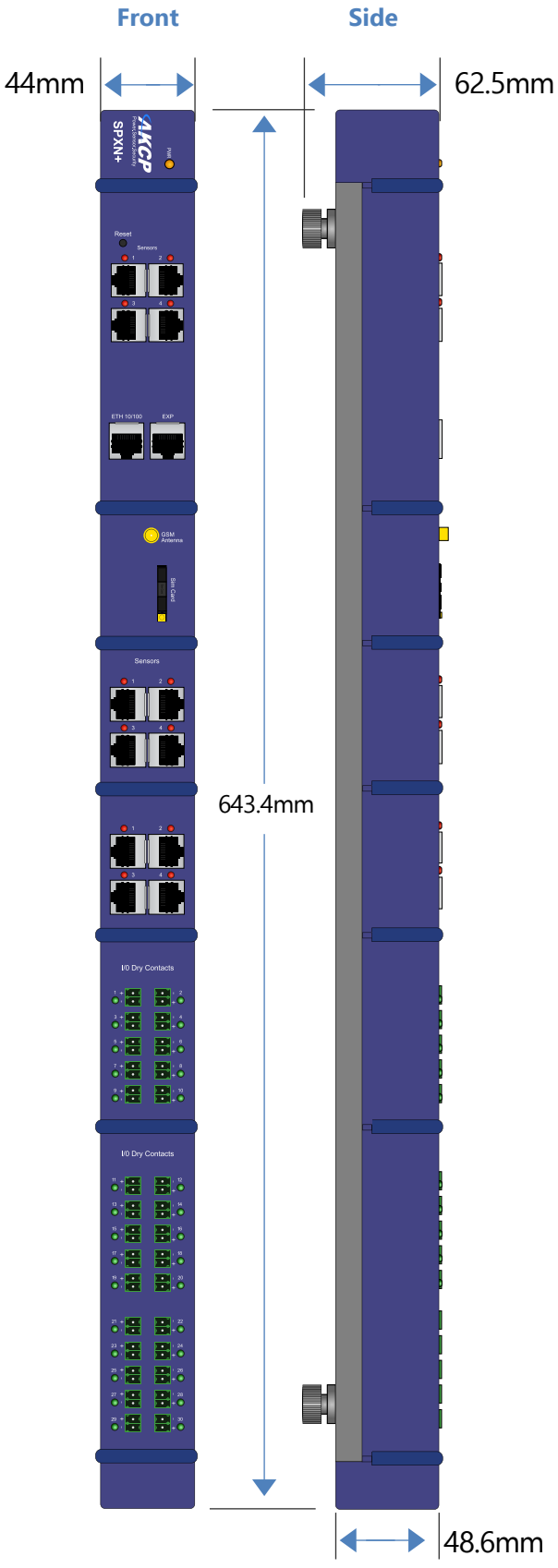


SPX+ Technical Drawing

0U SPX+ with 60x dry contacts
(configured as input only, I/O or opto isolated)

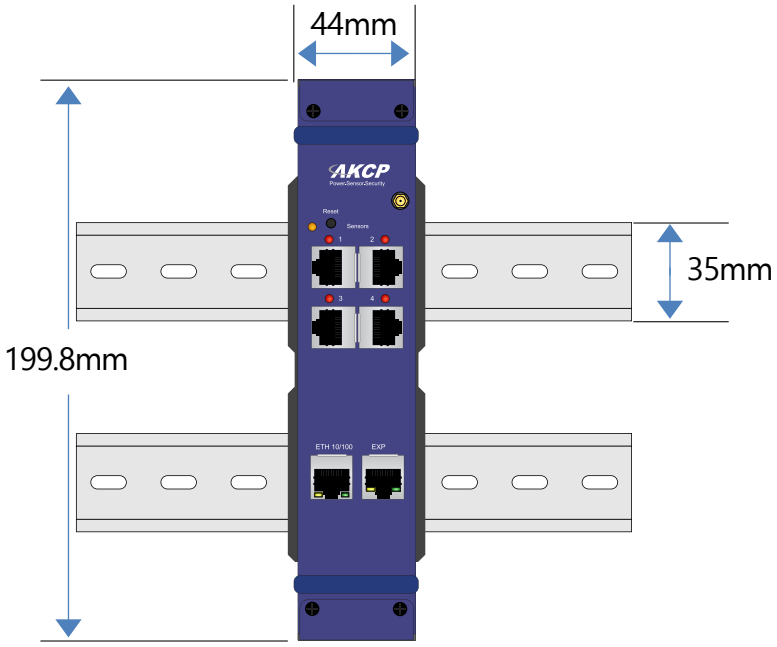


0U SPX+ with 12x sensor ports and 30x dry contacts (configured as input only, I/O or opto isolated)



SPX+ Technical Drawing

0U SPX+ with DIN rail mounting.



0U SPX+ with internal modem & DIN rail mounting