SP1+ Introduction Manual

User Manual - 2022

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Introduction

In this manual, we'll cover the main features and basic configuration of the SP1+ and the setup of notifications and the explanation of events will be in the SP1+ "Notifications" manual here as the units web interface & notifications are the same (just keep in mind this unit only has one sensor port): http://www.akcp.in.th/downloads/Manuals/SP1+/SP1+%20Notifications%20Manual.pdf

Please also see our Knowledge Base page here: https://www.akcp.com/knowledge-base/sensorprobe-plus-series-knowledge-base/

What is the SP1+?

The SP1+ is a high speed, accurate, compact, intelligent monitoring device, featuring a completely embedded host and operating system. The SP1+ is a complete redesign of the world's best-selling environmental monitoring platform, 3 years in the making with all new hardware and software. We've combined the low cost and simplicity of use of the SP1 & SP1+, along with many advanced features of our securityProbe platform.

The SP+ units support a maximum of 150 sensors (data points) per unit. This unit supports up to 1 (physical) sensor.

SP1 + Features:

- IP based, including SNMPv3, HTTPS, VPN
- Send encrypted SNMP Trap and Email Notifications
- Supports 1 Intelligent Sensors and 1 Dry Contact
- Notification Wizards
- Front and Rear Thermal Mapping for any server cabinet
- Virtual Sensors
- AKCP Swing Handle Lock support

Please check all the specifications & features on our SP1+ datasheet: https://www.akcp.com/akcp-products/sp1-plus/

Important notes:

A) Some of the pictures shown in this manual might not represent the actual Web UI of the SP1+ unit; this is because we are constantly working on improving the firmware. Some may represent the SP1+, but will still apply to the SP1+ units.

B) **All SP+ H7 type units with firmware version 1.0.5824 or higher are now shipped with DHCP enabled by default.** See below for more details. If you do not use DHCP on your network, the unit

will revert to the fixed IP address of 192.168.0.100. Please see the section in this manual on how to setup a new IP address on the unit. The SP+ F4 & F7 type units will not be affected.

C) AKCP also always highly recommends using a **dedicated 3rd party UPS on the units**. Any damage caused by unstable power or power outages *will void the warranty* on our units.

What's the difference between F4 (older) F7 & H7 (newer) processor versions?

When upgrading the firmware, there are three separate .bin files included in the firmware update packages. One for the F4 units, one for the F7 units and one for the H7 units. **All SP1+ units are shipped are the H7 type and use the same bin file as all SP+ H7 type units.**

If you try to upgrade your unit with the wrong .bin file, the firmware upgrade will fail. So please make sure you use the correct file for your unit type following the firmware upgrade instructions in the text file that is included in the compressed firmware package.

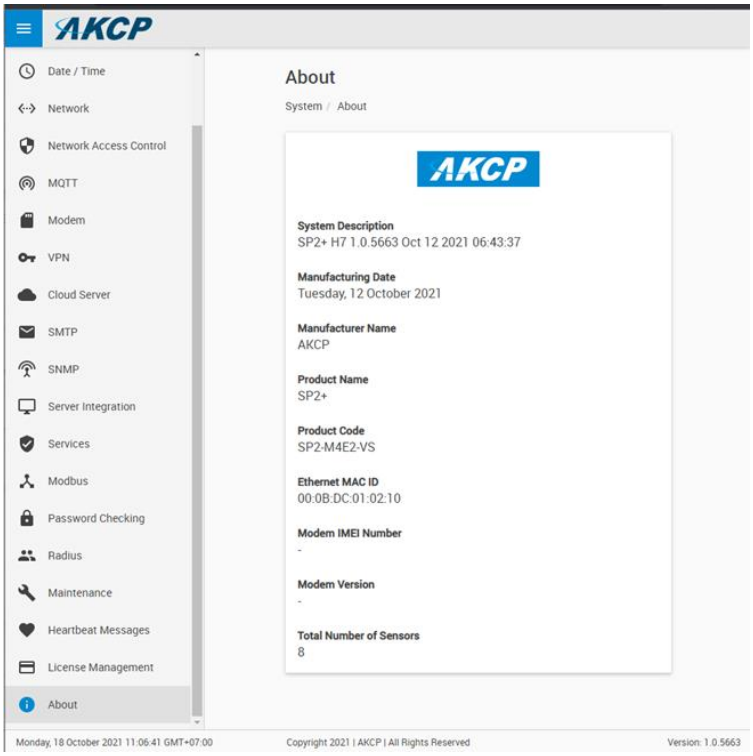
Also, **very important to note** that any backup configuration created on the F4 platform cannot be uploaded to the F7 platform unit and vice versa. This also applies to the H7 units. Backup configurations created on the F7 units are compatible with the H7 units (only SP1+ to SP1+).

H7 Units Specifications:
AKCP STM32H7 MCU
32-bit ARM micro-processor
1MB of RAM
64MB of non-volatile flash
CPU speed: 216 MHz (F7) to 460 MHz (H7) The H7 is significantly faster than the F7 in real usage.
In the SP+ units web UI you will be able to view which platform the unit is using.

This can be checked in the Settings >> General page >> System Description:

And in the Settings >> About page >> System Description:

About
System / About
System Description
SP2+ F7 1.0.4946 May 27 2019 15:37:34
Manufacturing Date
Monday, 4 February 2019
Manufacturer Name
AKCP
Product Name
SP2+


Date / Time
Network
Network Access Control
MQTT
Modem
VPN
Cloud Server
SMTP
SNMP
Server Integration
Services
Modbus
Password Checking
Radius
Maintenance
Heartbeat Messages
License Management
About
About
System / About
System Description
SP2+ H7 1.0.5663 Oct 12 2021 06:43:37
Manufacturing Date
Tuesday, 12 October 2021
Manufacturer Name
AKCP
Product Name
SP2+
Product Code
SP2-M4E2-VS
Ethernet MAC ID
00:0B:DC:01:02:10
Modem IMEI Number
-
Modem Version
-
Total Number of Sensors
8
Monday, 18 October 2021 11:06:41 GMT+07:00
Copyright 2021 | AKCP | All Rights Reserved
Version: 1.0.5663

Port assignment information for SP1+ units

Important note:

- If you're using analog pins on the sensor port (with the manually on-lined DCV sensor, and pin 7 of the RJ45 connector) make sure that the **voltage doesn't exceed 3 Volts**. Otherwise you can damage the unit!

New features on all H7 SP1+ units for no extra license fees include:

- 5 free virtual sensors.
- HTTPS and encrypted secure E-mail support.
- SNMPV3 included now as standard
- HTML5 user interface, MQTT/MQTTS, IPV6 option. (MQTTS only supported on H7 units)
- Support for all NIST2 and NIST3 temp sensors.
- Optional 5VDC USB power - External USB power supply, used in combination with PoE as a redundant power input.

Note: All SP1+ units are shipped with the single sensor port unlocked. So no unlock code is needed.

LED information for SP1+ units

Power/Ethernet Link - Sensor 1 - Sensor 2 - Sensor 3 - Sensor 4

The **Power/Ethernet LED** will become red if there's no network connection, and blinking green (according to LAN activity) when the connection is normal.

LEDs Status:
Power = Solid red when connected
Ethernet = Should be green and yellow blinking (when accessing the web UI) for good connection.
Sensor, Internal Temp Sensor & Dry Contact = Green connected & normal status.
Sensor & Temp Sensor = Slow blinking Warning status.
Sensor & Temp Sensor = Fast blinking or red critical and error status.

Reset button functions for SP1+ units

There are specific commands you can send to the unit by holding the Reset button for a specified amount of time.

You will have to use something such as a ball point pen, or paper clip to be able to press Reset. However, be careful not to damage the button by aggressively pushing it in. Gently depress the button until you feel the button depress.

The reset button is located to the left of the Ethernet RJ-45 connector.

Commands:

Time to hold	Action
< 3 sec	Speak/show IP and broadcast its info (display on LCD sensor too, if connected)
3..7 sec	Reboot (reset CPU)
7..12 sec	Web UI password reset
12..17 sec	Clear the sensor, notification and access DBs, logs Serial flash erase (DB erase without factory reset, the system configuration is kept)
17..25 sec	Reset to factory defaults (serial flash erase + config erase)
> 25 sec	No action (useful when the button was pressed by mistake)

Notes:

- When the Reset button is held for longer than 12 seconds (DB erase) and then released, the Sensor Port 1 LED will give a visual indication of the state of database erase (the reboot and password reset doesn't have visual indication).
- When the button is held longer than 17 seconds (factory reset) and then released, these sensor port LED will be blinking fast and alternate during the factory reset mode.

Setting up the unit's IP address & troubleshooting connection issues

Important Note: The unit's ship with the passwords **enabled**. The default log in for the web interface is Username: *admin* Password: *public*

IMPORTANT UPDATE – The changes below on how to connect to the SP+ (**H7 type only**) units has been implemented when upgrading or using firmware version v1.0.5824 or higher. This *DOES NOT* apply to, or affect any F7 or H7 SP+ units already in the field or previously shipped when upgrading to the v1.0.5824 firmware or higher.

Note: *This will also not apply to the F4 type units (final firmware version supported is v1.0.5606).*

Please follow the directions in this SP+ setup video or the image for first connecting your unit:

https://www.youtube.com/watch?v=OtrccRpm1cw

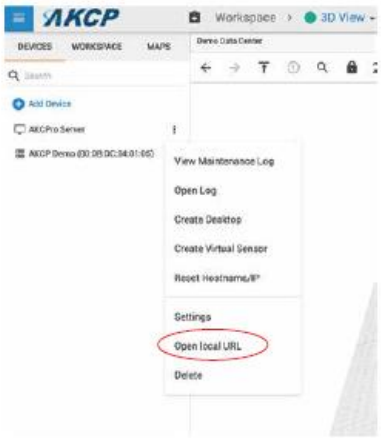
Important Note: If you do not have a DHCP server, or do not use DHCP then the unit will only try DHCP for a few seconds, if there's no reply it will fall back to the default IP address of 192.168.0.100. Then you can use the direct cross over cable connection to your laptop or PC. Or simply connect the unit to your network switch and type in the default IP address above in your browser. **This also applies if you are using the SP+ F4 or F7 type units.**

Please note: The example in the video above & below shows our SP1+ unit. These steps will be the same for all SP+ (SP1+ & SPX+ H7) units shipped with firmware v1.0.5824 or higher.

sensorProbe+ Quick Start Guide

1) Plugin the device to a DHCP Enabled network with internet connection
2) Power on the device
3) Open your web browser (Google Chrome recommended) and go to https://apscloud.akcp.com
4) Sign in, or create your account. New users can create an AKCPro Server cloud account (free for up to 4 devices for 12 months).
5) In AKCPro Server add a new AKCP Cloud Device and enter the MAC ID of the sensorProbe+

6) The unit will appear in the server explorer window of AKCPro Server. To access it's local web UI from here, open the device menu and select "Open local URL".



Additional Options for Connecting to your SP+ Units Web UI

Option #1. If **using DHCP** check your network router's DHCP assignments list.

How do I find the DHCP list on my router? (the following may be different depending on your router type)

Click the Status tab after logging into your router, then the Local Network sub-tab. Click the DHCP Client Table button under the DHCP Server section. This should bring up a list of clients that are currently connected to your network. You should see your SP+ unit in this list.

After identifying the IP address assigned, open your browser and type in the IP address.

Option #2. Use the IPSet utility.

A. You can also try using our IPSET utility which you can download using the QR code or direct link here:

http://www.akcp.in.th/downloads/Firmwares/lnuxIPSet6.0.0.zip

B. Start the IPSET utility. Press the “reset” button on the sensorProbe+ unit once. IPSET will detect the units IP address and allow you to open the units web interface.

Option #3. If you have our AKCP LCD display sensor.

Connect the LCD display to any sensor port on the unit. The IP address will be displayed in the LCD panel.

Option #4. If you are **NOT using a DHCP server** (after the unit has reverted back to the default IP address).

Connect your SP+ unit directly to your network switch with a direct connect CAT5/6 cable and type in the default IP address of 192.168.0.100.

Re-assign your desired IP address in the Network settings as shown in the SP+ manuals.

VERY IMPORTANT NOTE: If you connect your SP+ (firmware versions beginning with 1.0.5824 or higher) unit directly to your laptop or PC using a cross over cable, DHCP will be temporarily disabled.

If you do not log into the unit’s web UI and set a fixed IP address, then if you re-connect the unit to your network switch (using a straight through cable), DHCP will be re-enabled again. This does NOT apply to any H7 type SP+ units currently in the field prior to firmware v1.0.5824, or upgrading to the v1.0.5824 or higher.

Troubleshooting & Connection Problems

First please check our SP+ online Knowledge Base using this link to our website:
https://www.akcp.com/knowledge-base/sensorprobe-plus-series-knowledge-base/

A. Make sure you can ping the units assigned or default IP address.
B. Make sure your laptop, PC or network fixed IP is configured for the default network subnet as the unit (192.168.0.1 for example). And that the IPv4 is checked/enabled on your PC.
C. Check the Ethernet link LED on the unit and the PC. Check the patch cable (direct connect = crossover. Connect to switch = straight through).
D. Try temporarily disabling your Antivirus & Firewall.
E. You can also try using our IPSET utility as described above.

IMPORTANT NOTE: If you have performed a complete factory reset on your SP1+ H7 type (on firmware v1.0.5824 or higher) unit without choosing the option to retain the fixed IP address, then your unit will default back to DHCP. Please refer to the steps above again to determine your units newly assigned IP address.

Note: In some cases, your computer might not be able to connect to this default IP address. In this situation you either need to:
a) add this IP your computers routing table or
b) add a secondary IP address to the LAN card to allow access to the unit.
See below how to setup these.

Ensure the following items are available to you before starting:
- RJ45 CAT5 crossover cable with RJ45 male connection
- A PC with Ethernet card or LAN socket, logged in with Administrator rights

1) Connect the unit via the Ethernet port of the unit to your computers LAN or Ethernet port with a CAT5 crossover cable.
2) Open a web browser and type the default IP address, hit enter.

You'll be presented by the **Summary** page.
Go to the **System/Network** page to change the network settings (see below in this manual).

Once you have assigned the new IP address use the "ping" command to test the unit's reply.

How to add a manual route to the computer's routing table?

Open an Administrator Command Prompt (CMD) window and type:

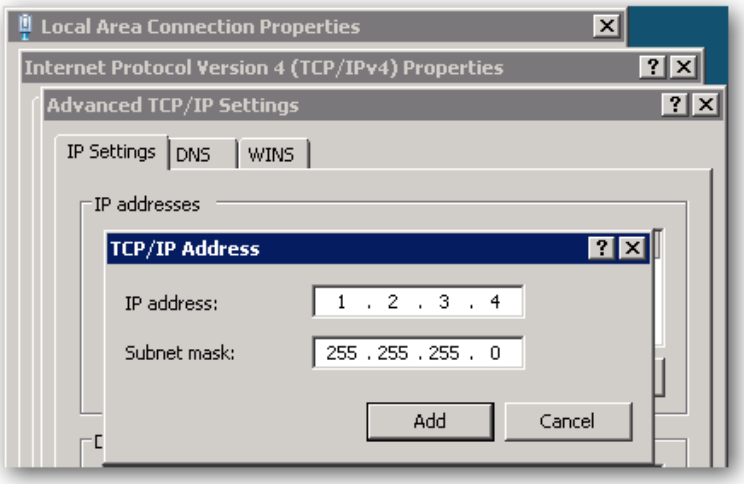
```
route add 192.168.0.100 10.1.1.20
```

Where 10.1.1.20 is the IP address of the Ethernet interface on the PC that the unit is plugged into with the crossover cable.

Note: If you do not receive an 'OK!' message then a parameter was wrong or missing.
The route is not persistent (removed upon rebooting), but you can also delete it with the `route delete 192.168.0.100` command.

How to add a secondary IP address to the computer's LAN card?

You can do this via the GUI by opening the LAN connection's properties:



Or open an Administrator Command Prompt (CMD) window and type:

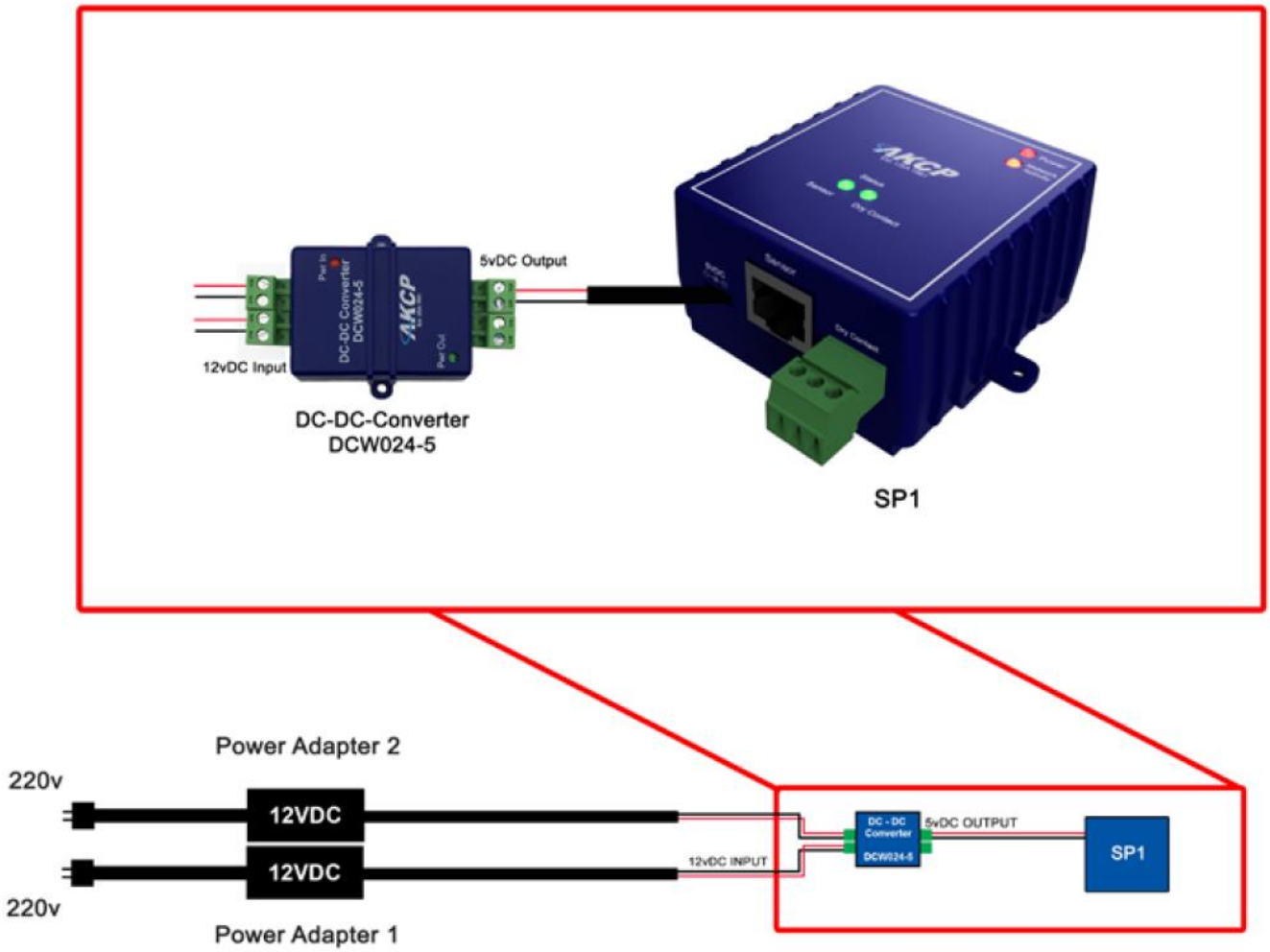
```
netsh interface ipv4 add address "Local Area Connection" 192.168.0.2
255.255.255.0
```

The above command adds the IP Address 192.168.0.2 (with Subnet Mask 255.255.255.0) to the connection titled "Local Area Connection".
You will then be able to connect to the unit with its default IP.

Note: The secondary IP address is permanent for the LAN connection; don't use it if you only need it once. Instead use the routing table method above.

SP1+ Dual Power Input Option

SP1+ can be powered with dual inputs. PoE comes as standard, and an additional AC or DC source can provide primary power with PoE providing backup power. Or, in the absence of PoE dual inputs are available through our external DC-DC conversion box.

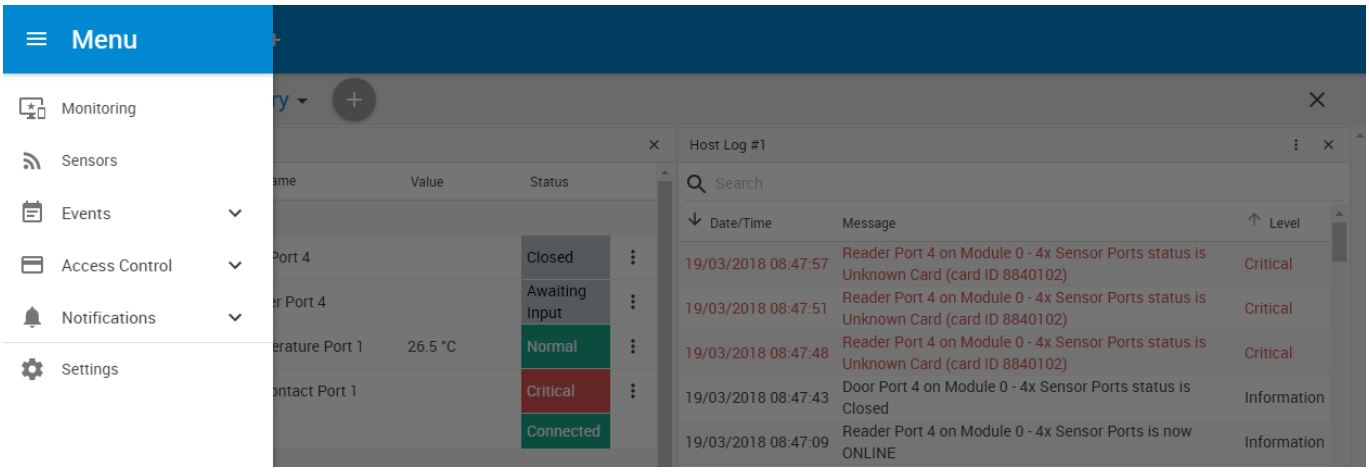


SP1+ Web UI Walkthrough

Menu navigation

With newer firmware (after 1.0.3074), the Web UI and the menu structure has been changed on all SP+ family devices. Also, please keep in mind most of these screen shots are from the SP2+ units which will be the same on the SP1+, only the SP1+ has a single sensor port.

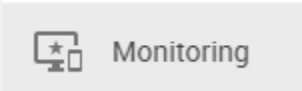
To open the menu, click on the three horizontal lines in the upper left corner:

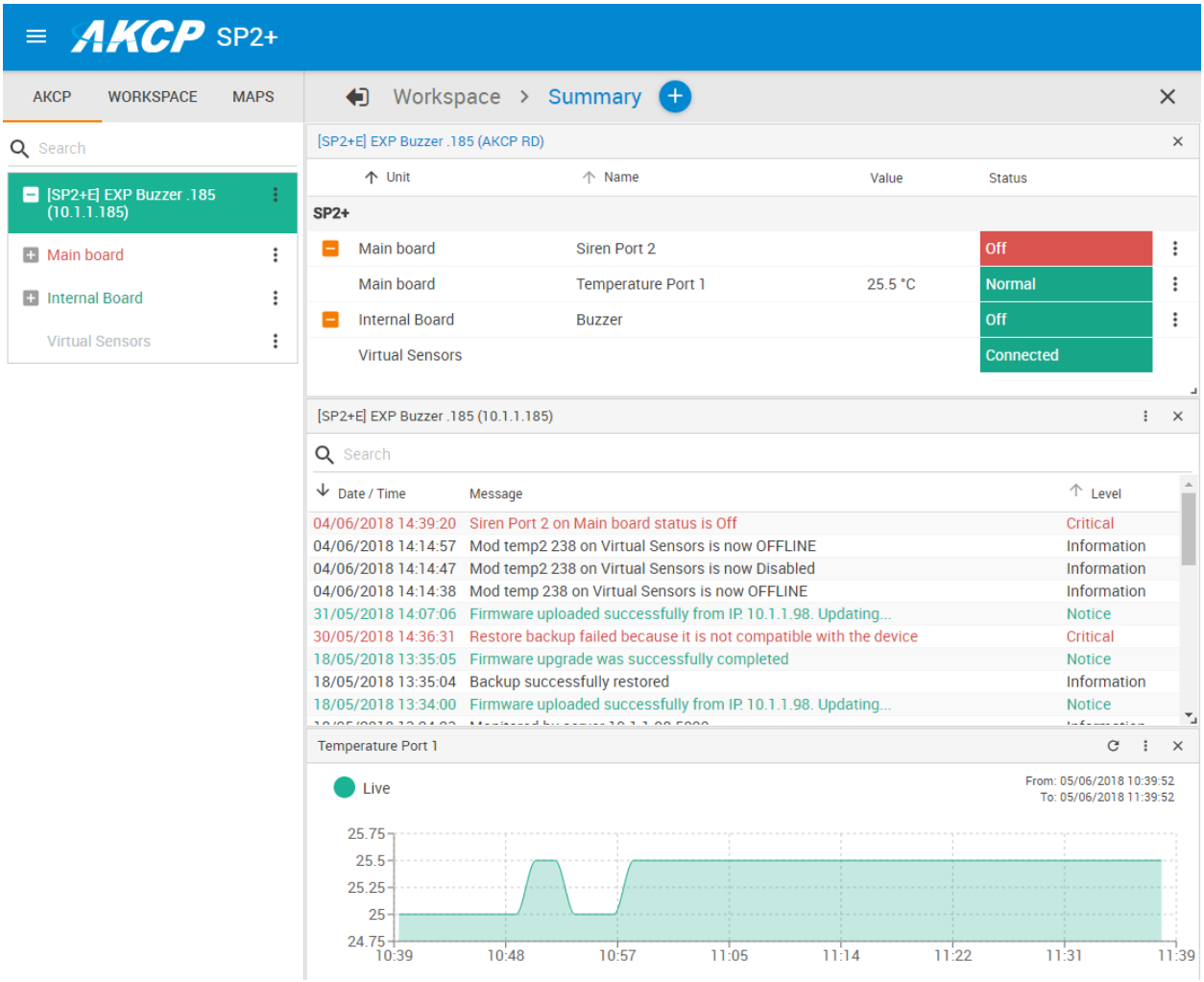


This will bring up the full menu for navigation.
Depending on the device, you might see additional menu items, such as Power.

Important Note:- As Microsoft no longer supports the Internet Explorer web browser, we also do not support any version of IE when viewing our web interface on all AKCP base units. Please use the Chrome or Firefox browsers when viewing the base units web UI.

Monitoring Summary page



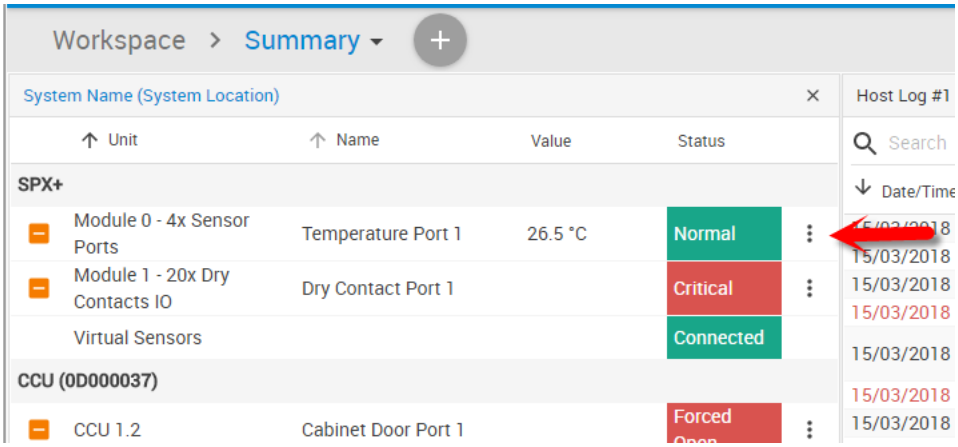


This is the Summary page with Sensor Status and the Event Log, with the Temperature Sensor Graph enabled.

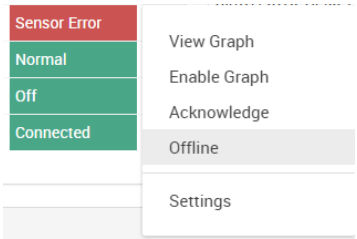
Host Log

The Host Log contains all entries from the “All Events” category. We’ll explain the different categories in the Notifications manual.
The last 30 entries are shown, but if you’re scrolling down the list, more events (30 more) will be loaded automatically. You can view the full log if you keep scrolling down.

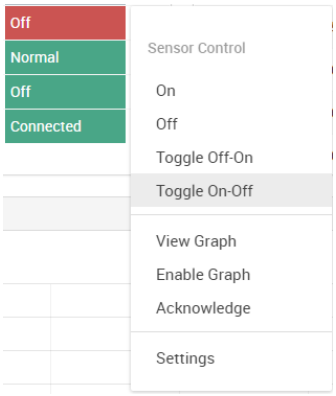
In the Summary page’s Sensors Information window you can do the following:



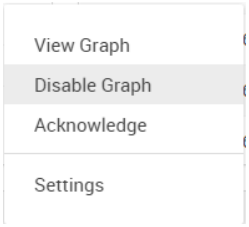
Click on the configuration menu button ⋮ directly next to the right of a sensor to access its popup menu.



Directly acknowledge a sensor's status, and put the sensor offline



Control the relay-type sensors

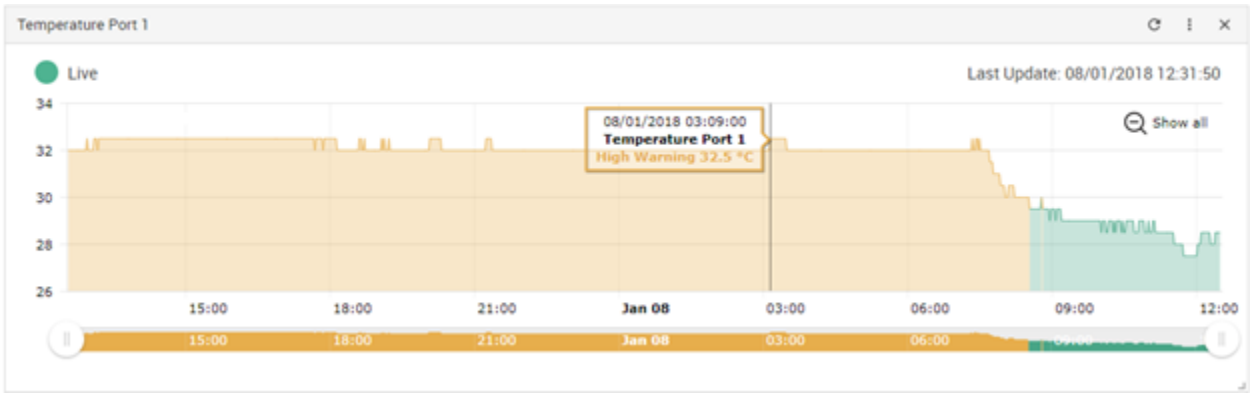


Enable/disable graph data collection per sensor (if they support it), and display the graph display window for the Summary page
We'll explain the Graph feature in more detail below.

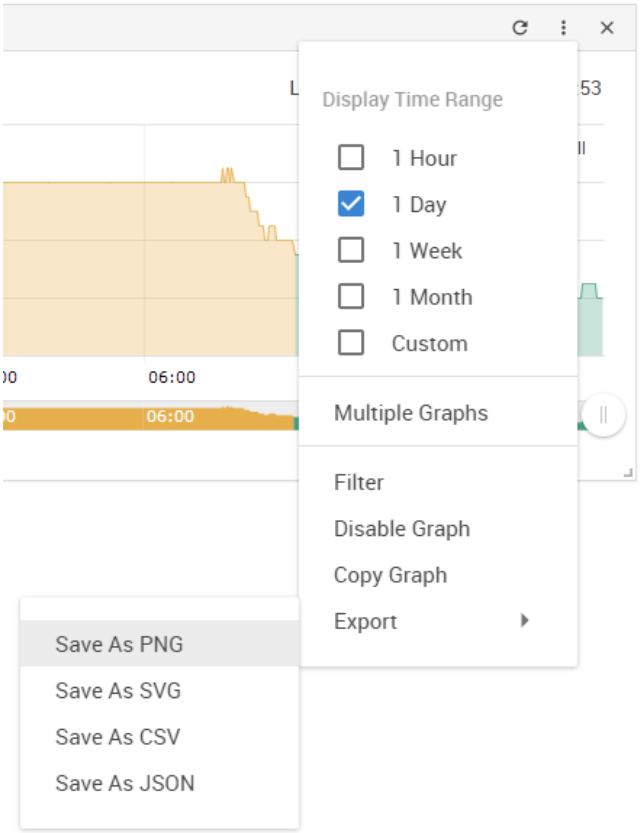
Graph feature

After you've enabled the data collection for a sensor, you can choose to display specific time intervals of the stored data: hourly/daily/weekly/monthly and custom display interval.
You can also export the recorded data in multiple formats.

Important: The maximum number of enabled graphs per unit is 14.

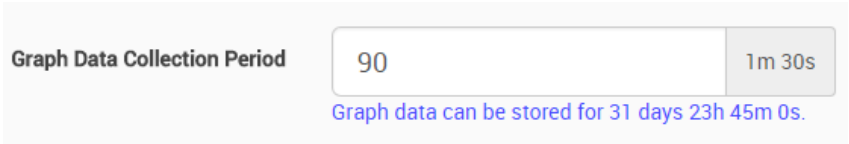


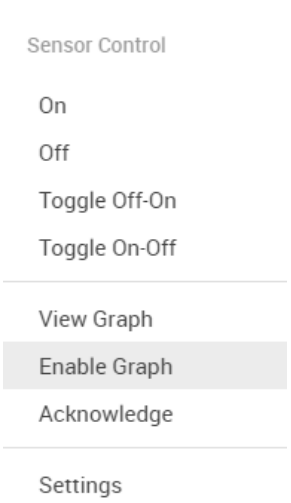
In this example picture, we've chosen to display the temperature sensor's daily maximum.
You could also resize the graph window (including full screen) and move the scale to display more or less data.



You can choose to export the graph data in selected formats by clicking on the graph's menu on the right, then by choosing the desired format from the popup menu.
The file will be downloaded automatically and assigned a file name that will contain the sensor's name, IP address of the unit, and the date and time.

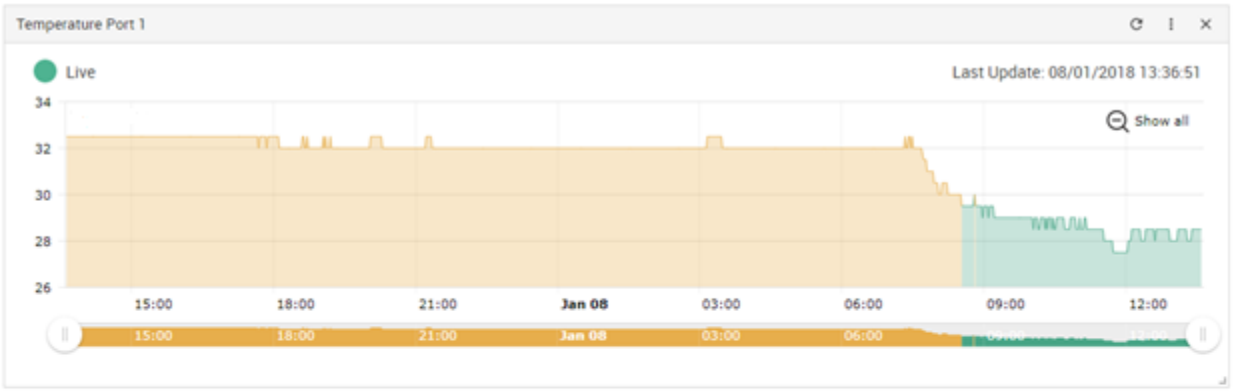
The graph is always a **Live Graph**; you can set the data collection period in the General Settings page (see below for more information).
You may also refresh the graph data manually with the refresh button on the right.

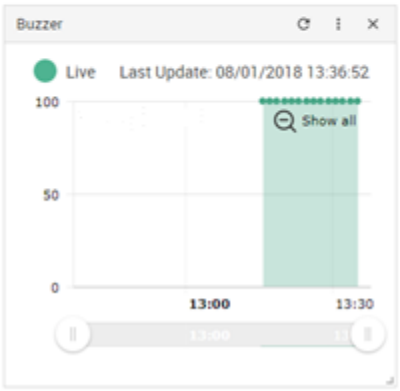




If you want to view multiple sensor graphs, first you need to **Enable Graph** for a sensor that supports graphing from the sensor's menu. Then select **View Graph** to display it. The data collection will run in the background even if you don't display the graph.

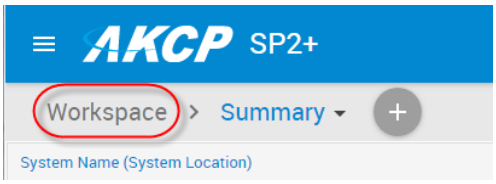
The second graph will appear below the first graph (you can freely rearrange it).


Temperature Port 1
Live
Last Update: 08/01/2018 13:36:51
Show all
34
32
30
28
26
15:00
18:00
21:00
Jan 08
03:00
06:00
09:00
12:00


Buzzer
Live
Last Update: 08/01/2018 13:36:52
Show all
100
50
0
13:00
13:30

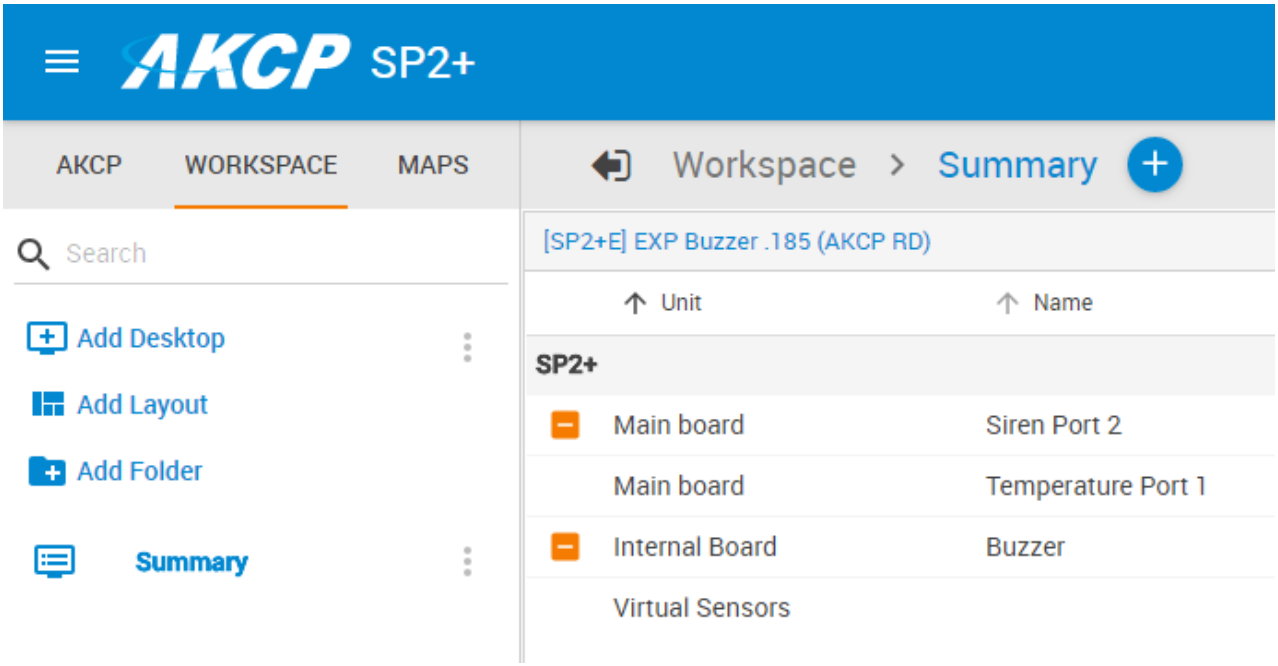
Managing Desktops and Maps

The updated SP+ Web UI has the Workspaces feature from the AKCPro Server's HTML5 UI. With this you can manage and view different Desktop layouts in a quick and easy way, create multiple custom Desktops as well as select from pre-defined layouts with placeholders for displaying your sensor gauges, logs etc.



To enter into the Workspace mode, click on the Workspace link circled in red as shown above.

The default Desktop is the Summary page on all devices.



We did add a new built in Map Feature (not the Rack Maps detailed below) which you can use to map sensors in your data center or any other facility.

Please use the link below to download the manual for setting up the maps on your sensorProbe+.
http://www.akcp.in.th/downloads/Manuals/SP1+/sensorProbe+%20and%20WTG%20Map%20Manual.pdf

If you find this limiting, you can also use our AKCPro Server for advanced mapping which can be downloaded from this link here:
https://www.akcp.com/akcp-products/akcpro-server/

Important Notes on custom desktops

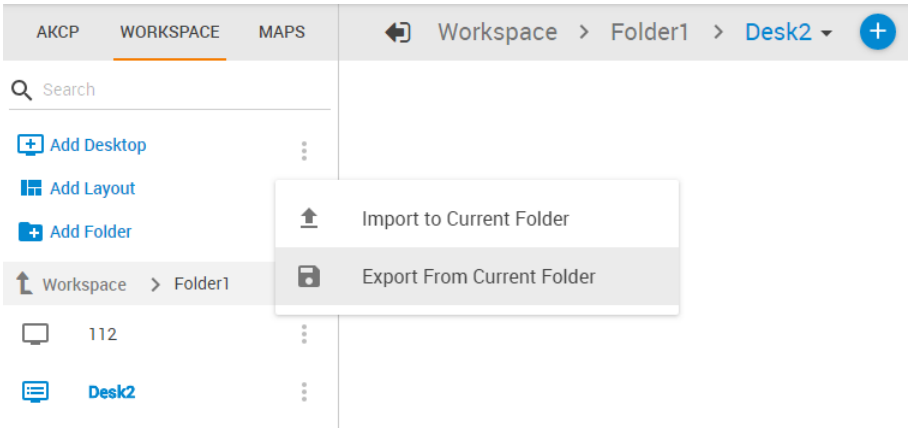
Please note the custom Desktops that are created **ARE NOT** stored in the SP+ units memory. These are HTML based, so they are stored in the browser cache, or local data on the Chrome & Firefox browsers. In other words, the Workspaces are not portable.

So, if you factory reset the unit or clear the cache on your internet browser the folders and custom desktops will be lost.

Generating a backup file from the Maintenance menu will also contain the custom desktops (added after firmware version 1.0.4209).

Without generating a full backup file, you could to export and then import the desktop configuration before you change browser, change your device or before you clear your browser cache. The configuration files will be saved as JSON files.

You can click the Export / Import command on a Desktop to save/reload it individually:



Viewing custom desktops different users & PC's

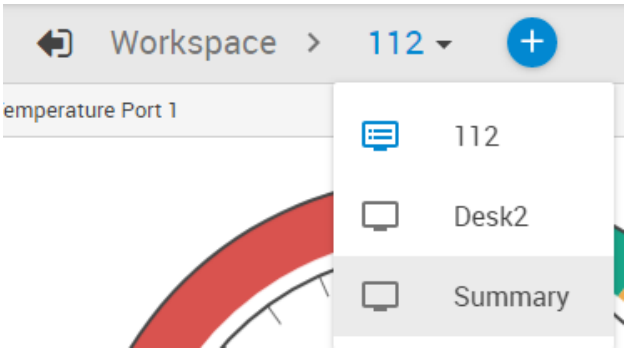
Regarding the viewing of your custom desktops via other users. Because multiple users can log into the SP+ unit from the same PC or different PC's on the network, the following applies:-

If two different users (different usernames) log in to the same SP+ unit they will not be able to view the other users custom desktops.

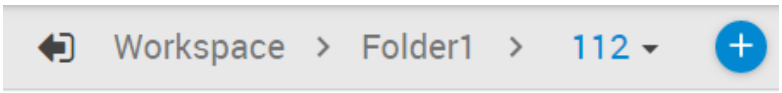
If the same user logs into the SP+ from two different PC's they will not be able to view the custom desktops (they do not synchronize), so the custom desktops will only be viewable on the original PC that they were created on as again these are stored on the PC's browser local data.

Managing Desktops

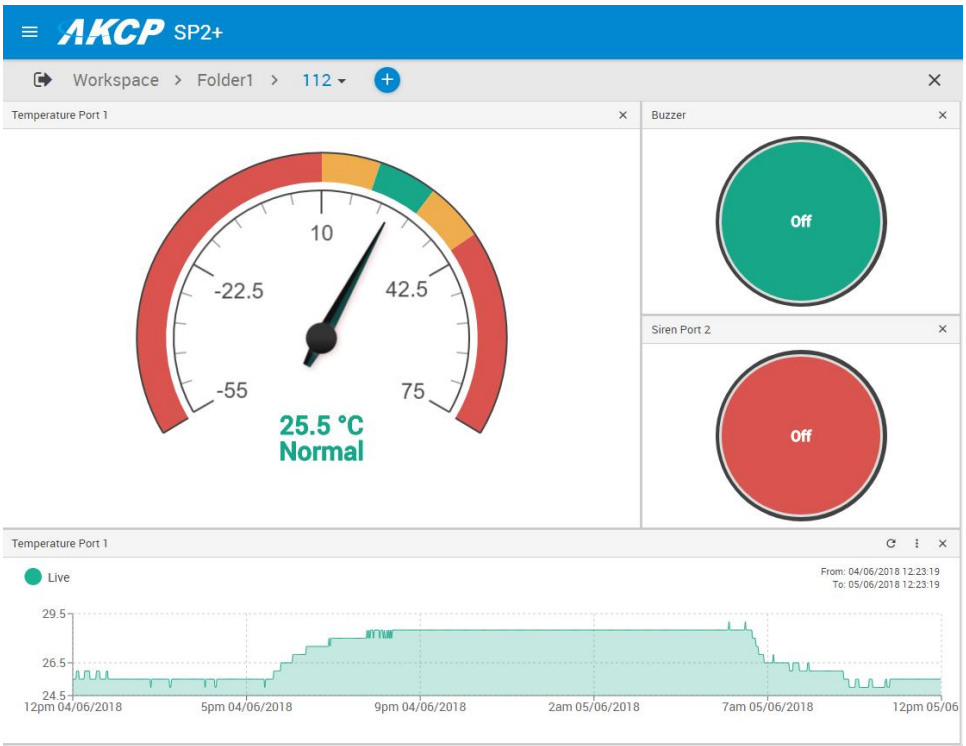
Navigation



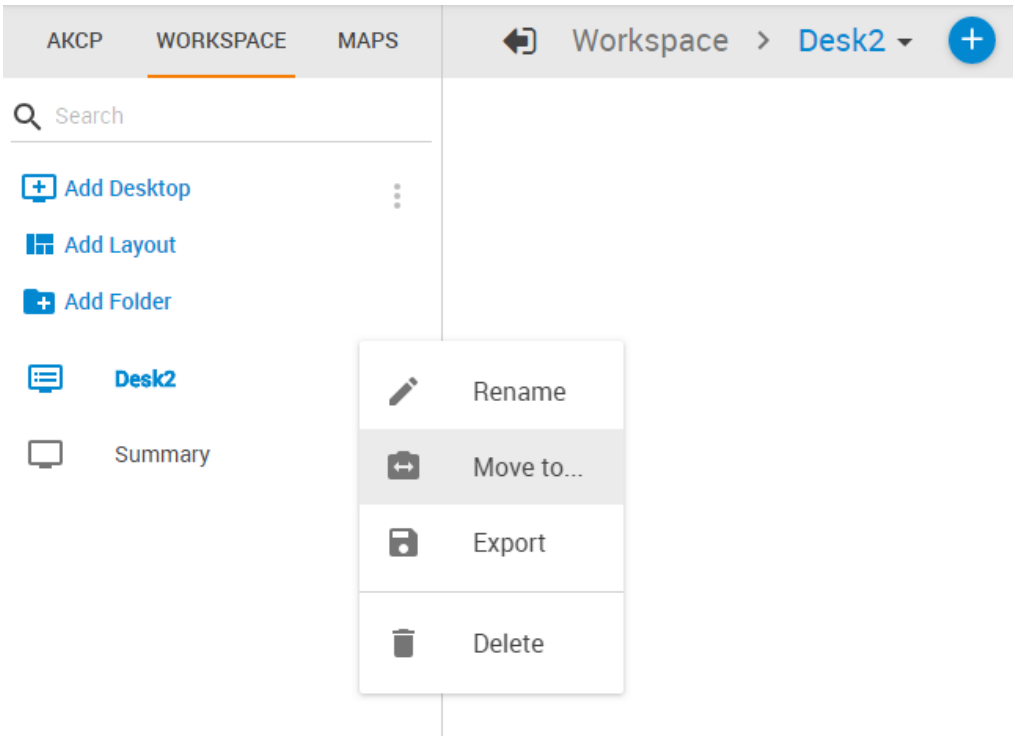
You can manually change between Desktops using the arrow menu, or by directly clicking on the desired Desktop if they are stacked under a folder.



With this button, your current Desktop will expand to the browser's screen width as shown on the screenshot below:

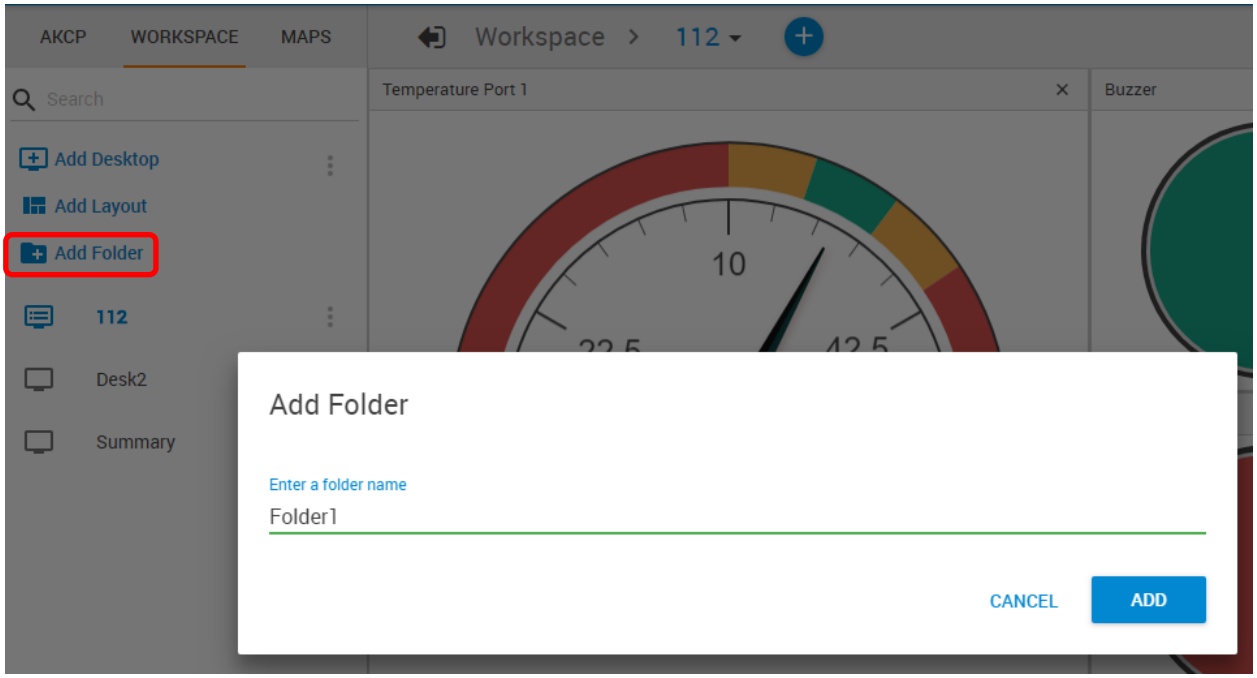


Click it again to go back to the full view.

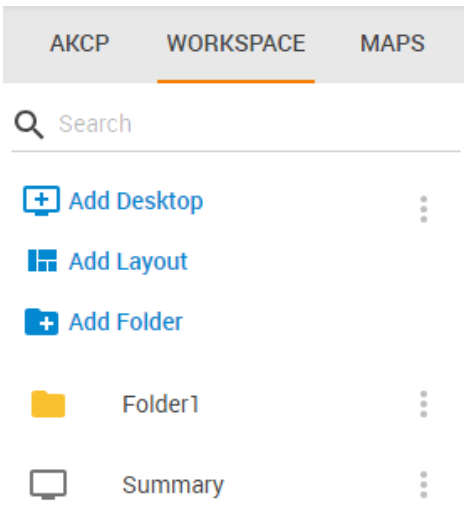


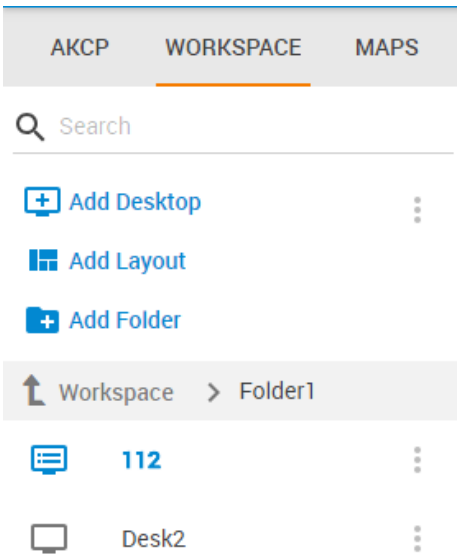
On each Desktop and Folder item, you have the option to Rename, Move, Export or Delete them. Move is useful if you've created multiple folders (see below).
As noted earlier, don't forget to export your Workspace items to save them permanently.

Folders

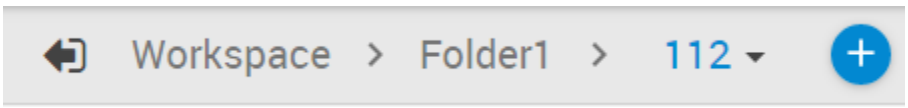


You can add Folders to arrange your desktops into a hierarchical view.



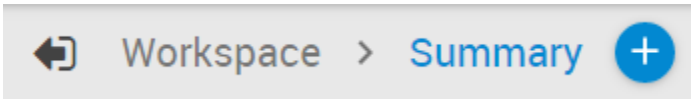


After created, you can simply drag and drop your Desktops under the folder, or use the Move menu. The folder structure will also display on the Desktop selector menu on top:

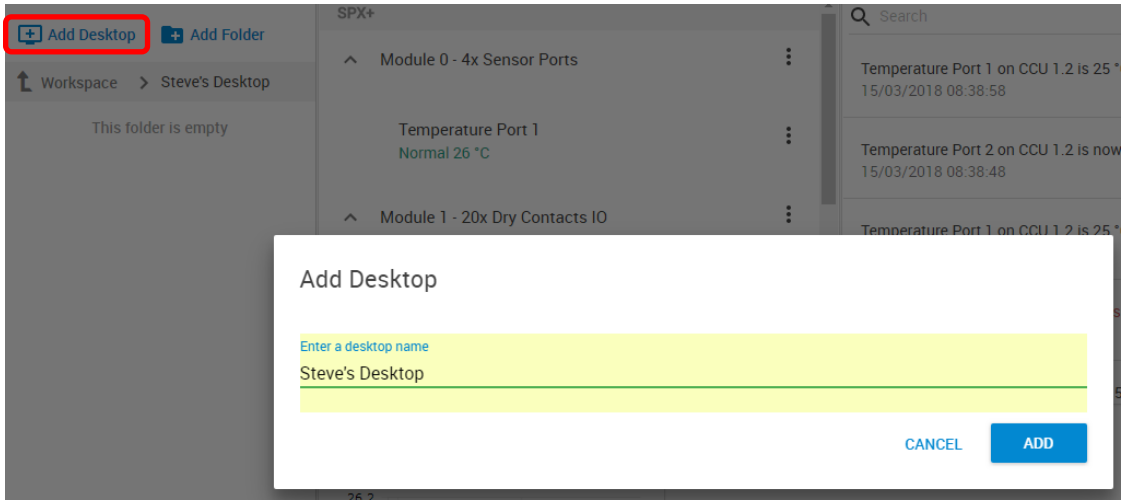


Desktops

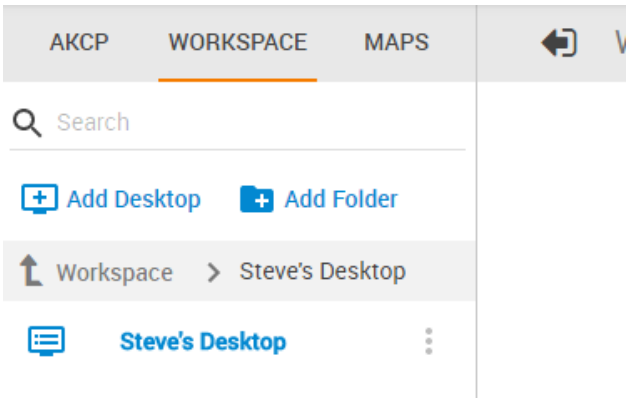
You can add new Desktops where you can customize the layout to place any sensor gadget, logs, graphs etc. on the screen.



There are two ways to add a new desktop. The first is by creating a blank desktop using the **Add Desktop** link under the Workspace tab:



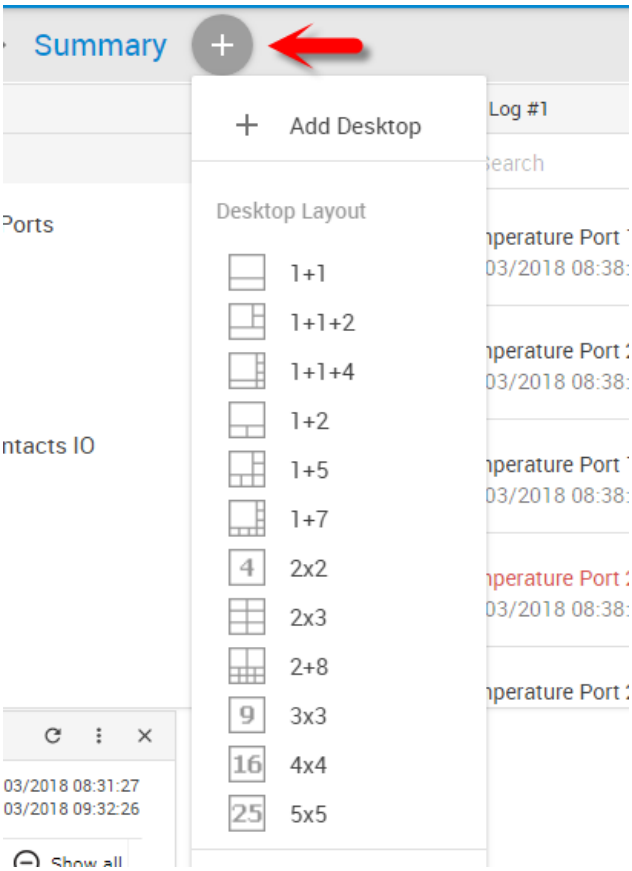
Name the new desktop and click the **Add** button.



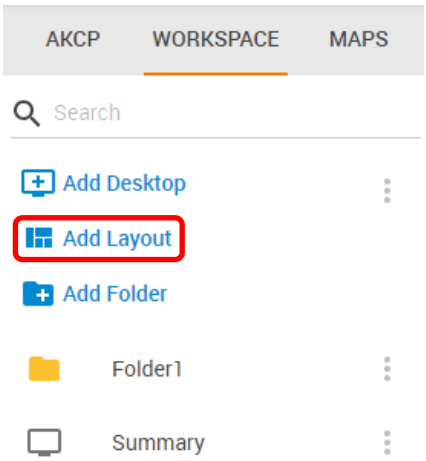
It will appear in the Workspace menu list.

In addition to the simple blank desktop, the second way to add a new desktop is via pre-defined Desktop Layouts. You could choose one that best suits your monitoring needs to drag and drop your sensor gadgets.

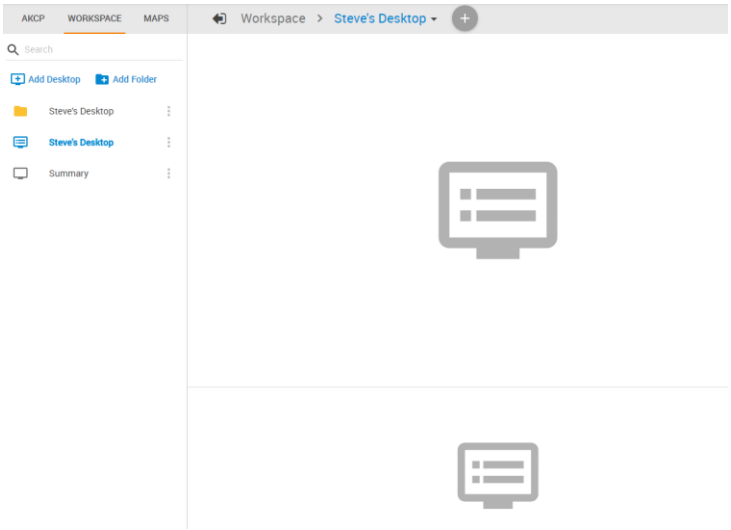
Use the plus button at the top of the page and select the layout for your new desktop:



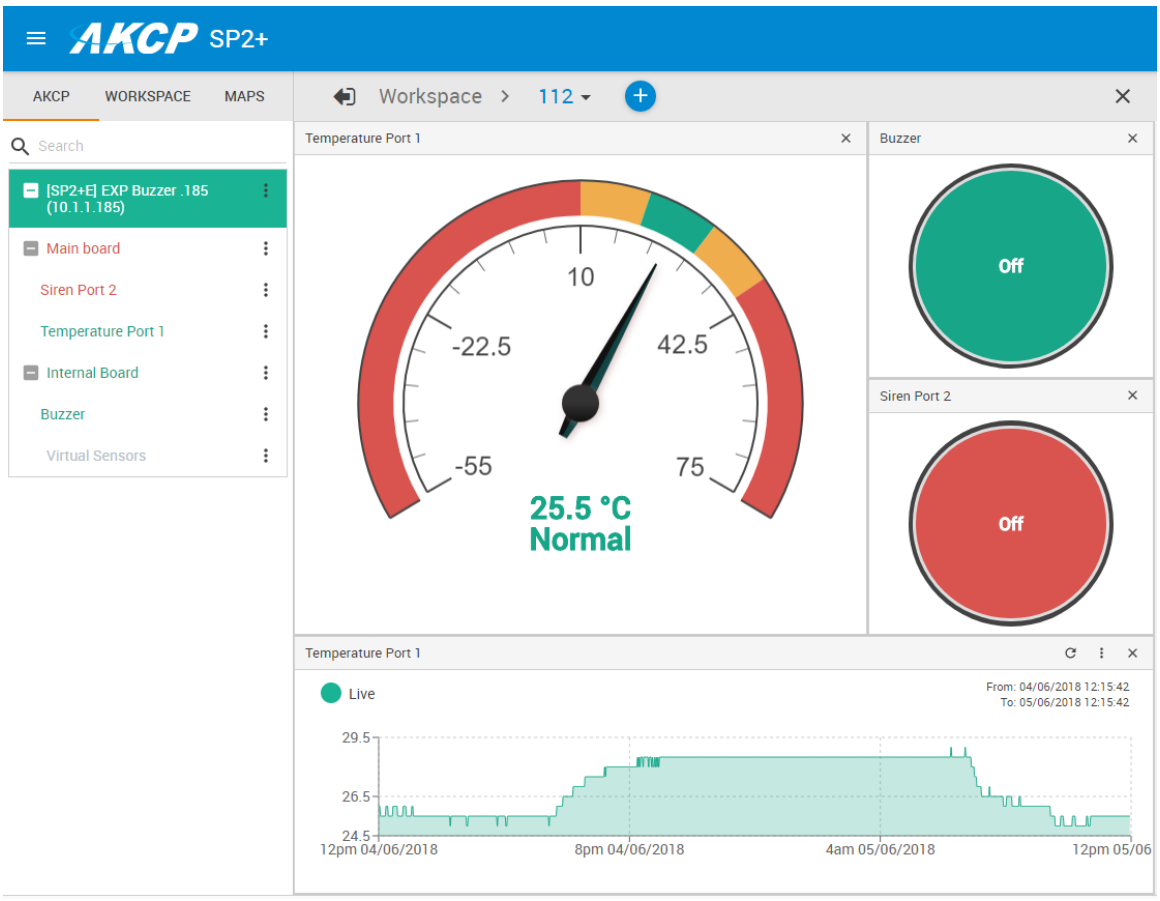
Alternatively you can click on the Add Layout link to select from layouts:



The empty desktop will have placeholders similar to this:

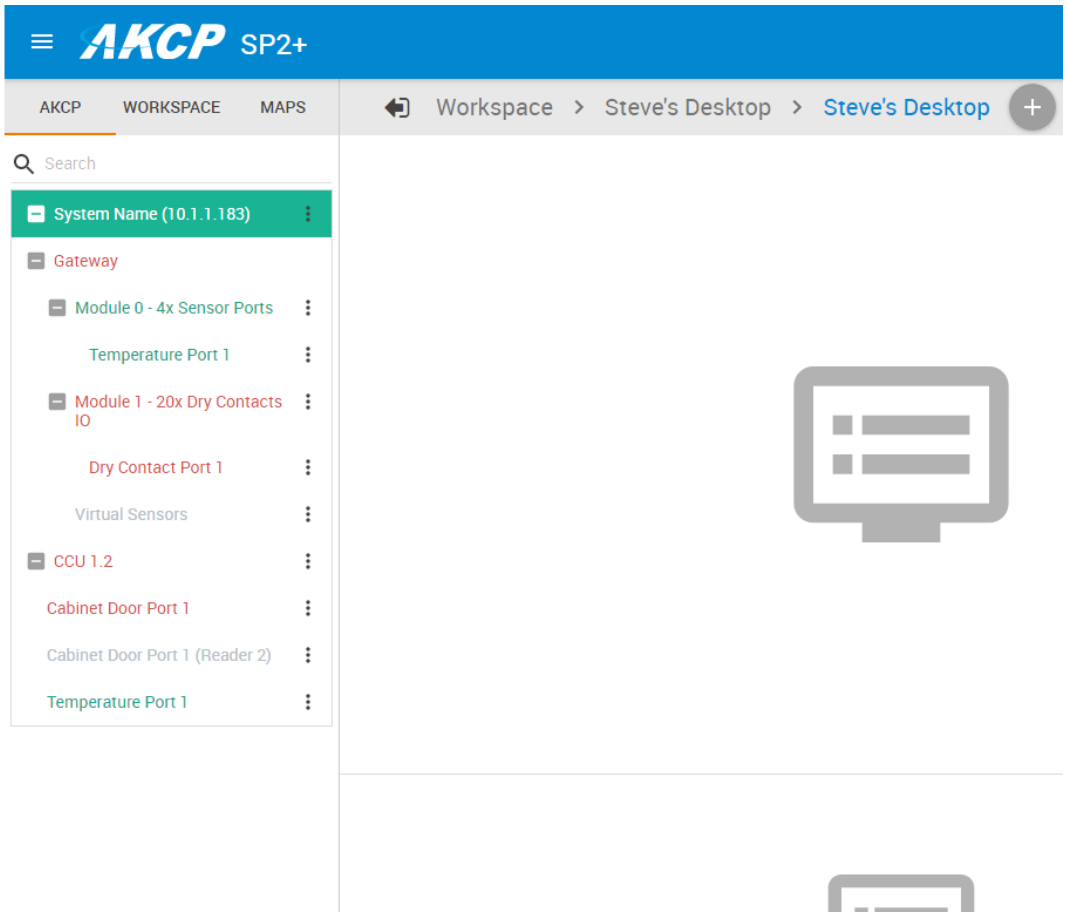


As an example below, we've selected the 1+1+2 layout.
Then you can drag and drop sensors, logs and graphs on the layout:



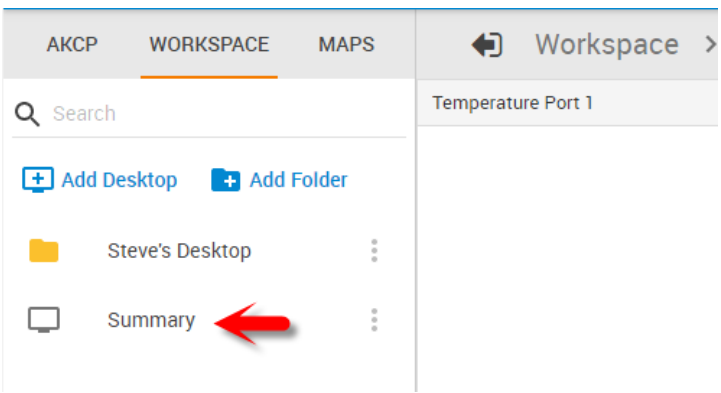
Below we'll show you how you can add sensors to the desktops.

Adding items to your custom desktop

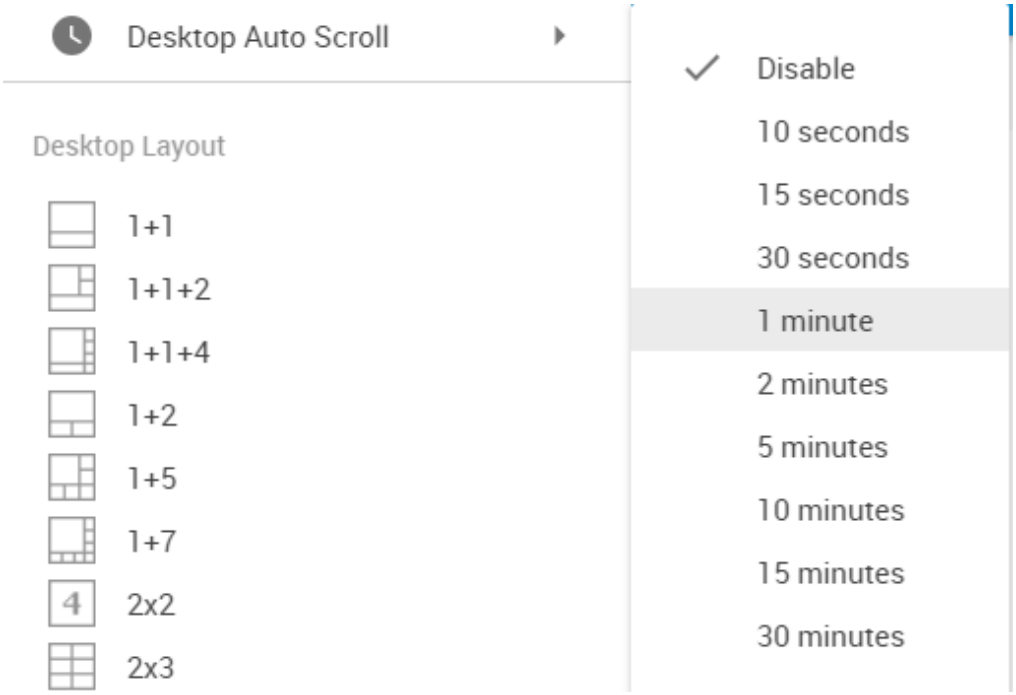


To add items from the units that are connected to the SP+ unit, you will first need to click on the AKCP link in the Navigation Tree as shown above.

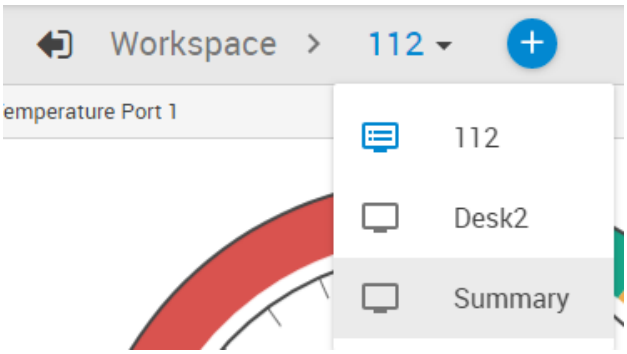
Next simply drag and drop the items you wish to add to your new desktop. This is also how you can add items to the Summary page. To navigate back to the Summary or Main Monitoring page click on the Summary link shown below.



Desktop Auto Scroll feature

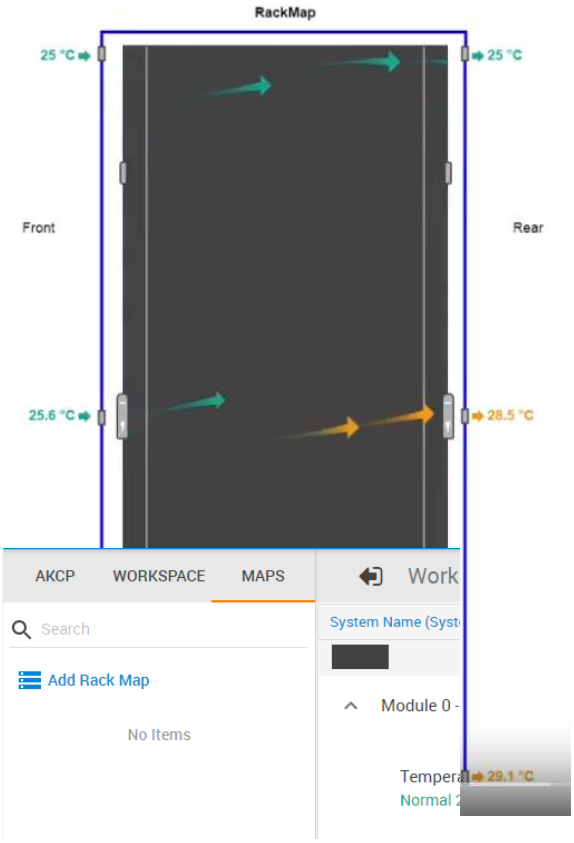


With this feature enabled, your desktop view will automatically switch between the created additional desktops within the specified time interval.



You can also manually change between Desktops using the menu.

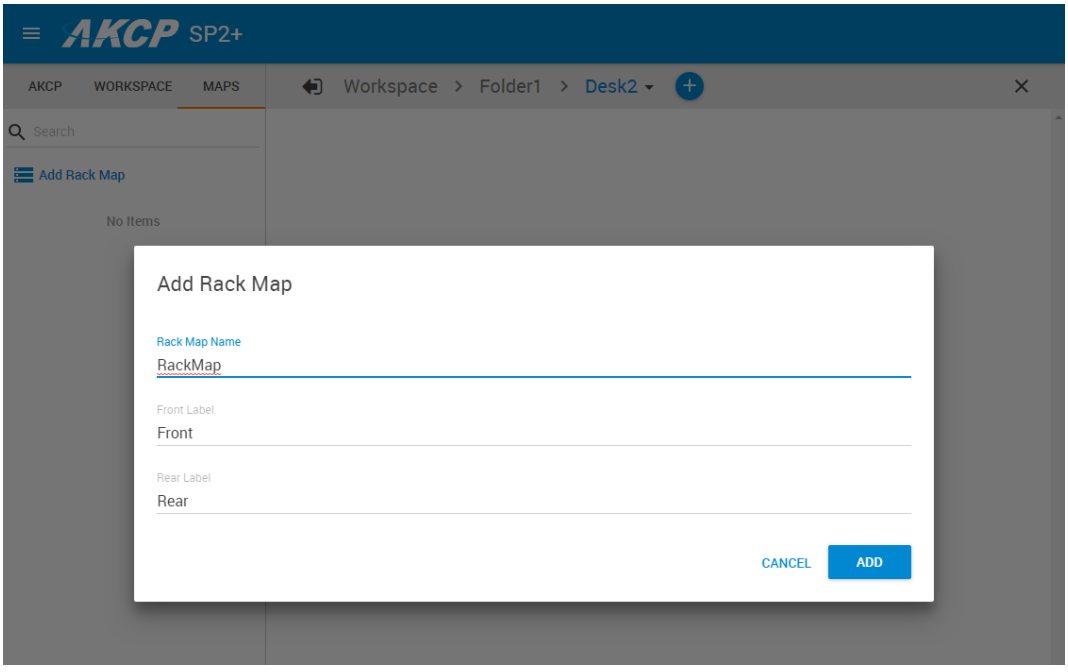
Managing Rack Maps



The Rack Map feature was originally (and still is) included in the AKCess Pro Server / AKCPro Server (HTML5) and has also been added to the SP+ units. You can add a Rack Map as a graphical representation of your server rack, and to display and record the temperature of the airflow within your server cabinets.

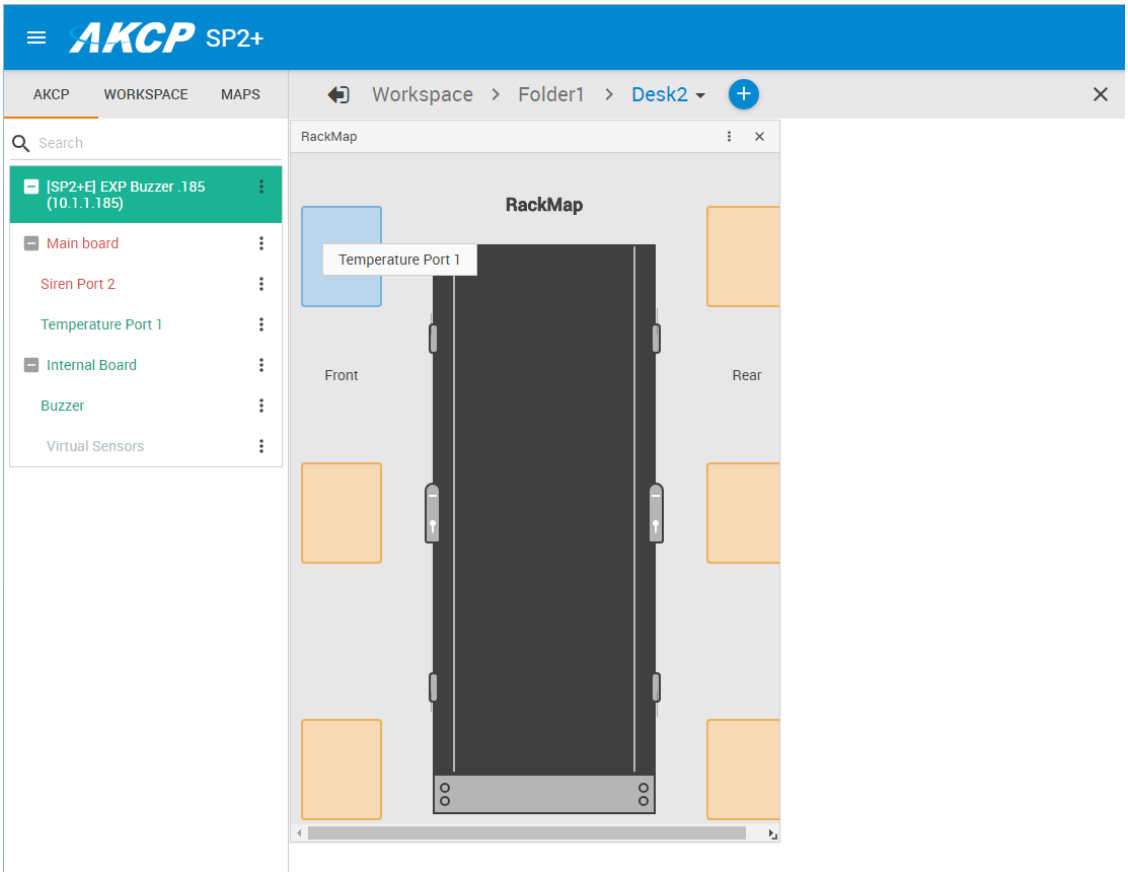
Note that on SP+ family Web UI only limited options are available for the Rack Map; for example you cannot add devices or assets.

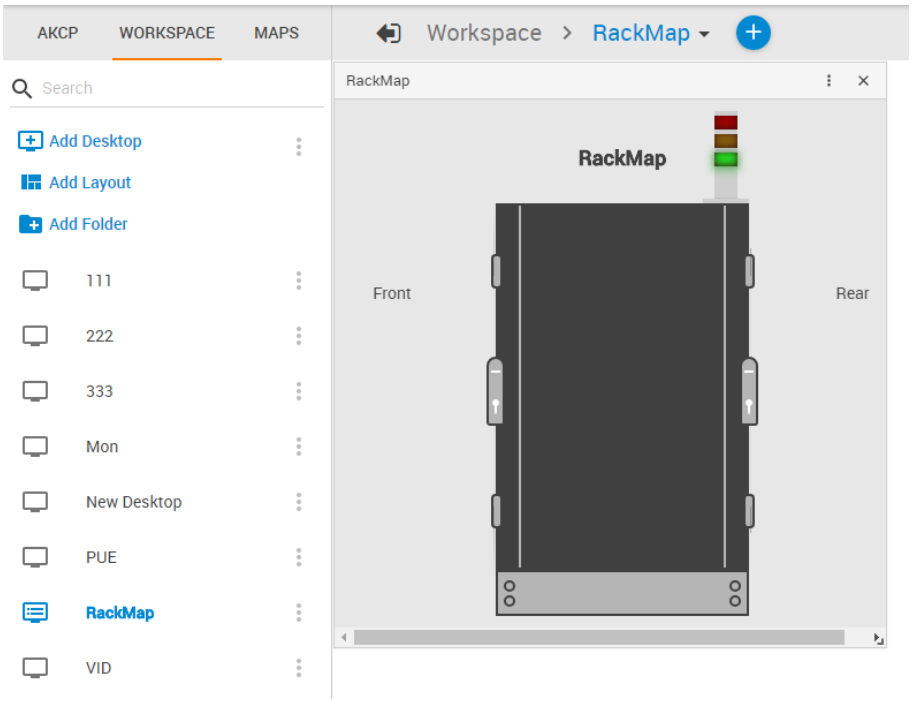
Click on the Maps tab and Add Rack Map link to add a Rack Map:



After created, you can drag and drop the Rack Map to a desktop.

You can add Temperature sensors, the Swing Handle Lock and the Sensor Status Light gadget on a Rack Map. Simply drag and drop the desired sensor from your unit's sensor list, as shown below.

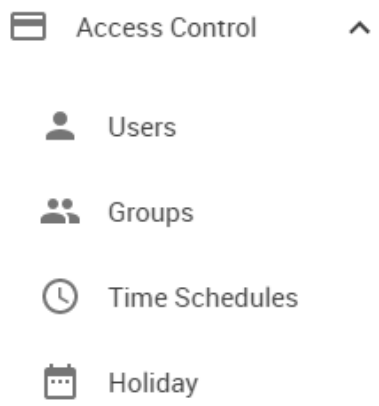




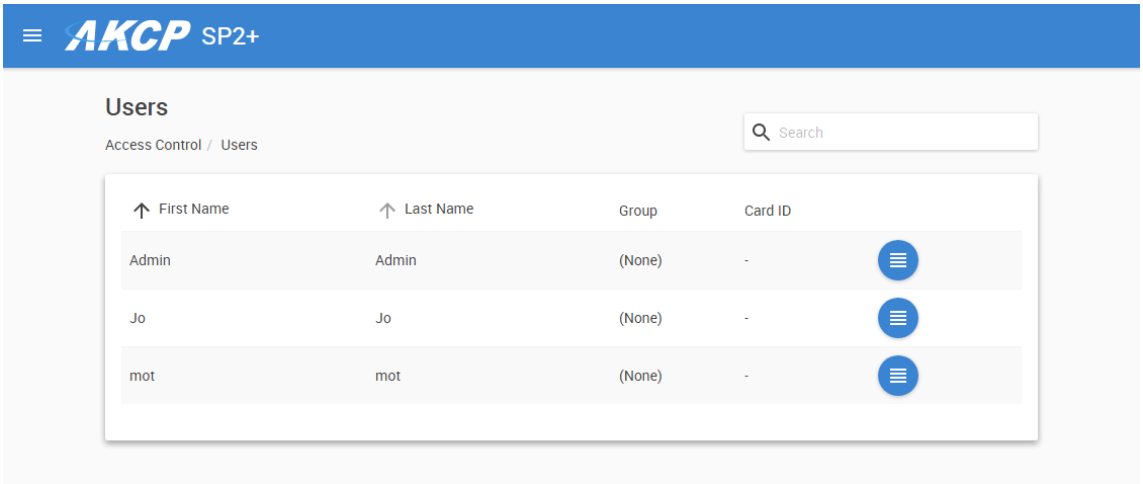
This example picture shows a Sensor Status Light added to a Rack Map.

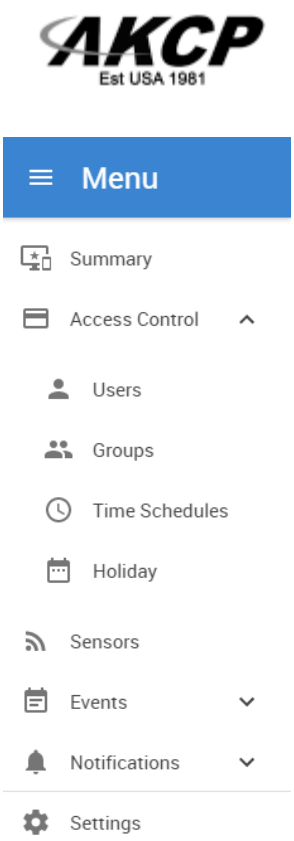
Please see the Thermal Map sensor manual for complete installation & setup instructions for the Thermal Map sensors.

Access Control Users and Groups



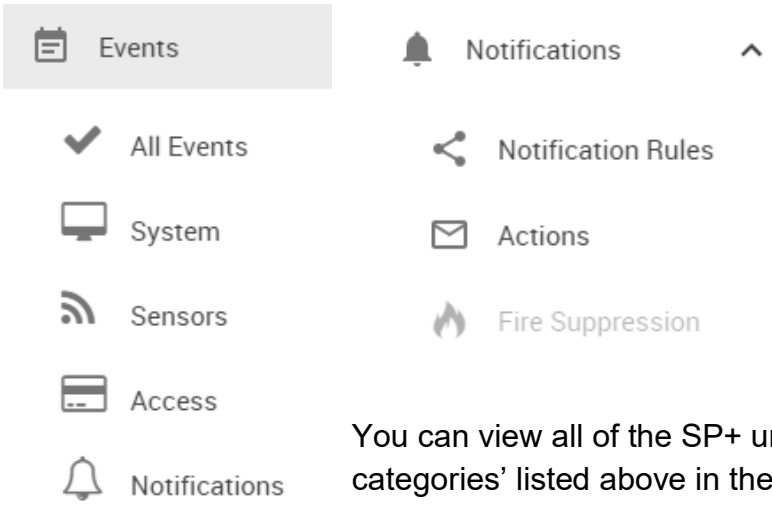
The Access Control Users and Groups are managed from the AKCPro Server and are used for accessing doors with the Swing Handle Lock. You can only view the existing users and groups from the unit's Web UI and modify only a few parameters on them.





This feature has its own manual, refer to the SP+ Swing Handle Lock Manual for more information.

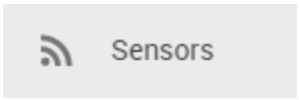
Notifications and Events



You can view all of the SP+ unit's events and filter them by each of the categories' listed above in the Events drop down menu.

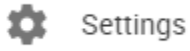
Please refer to the SP+ units "Notifications Manual" for setting up the alerts and the Event log on the units.

The Sensors menu



The "Sensors" shortcut will allow you navigate directly to the sensors setting page where you can setup the sensors connected to the unit. This is covered in the Sensors section in this manual.

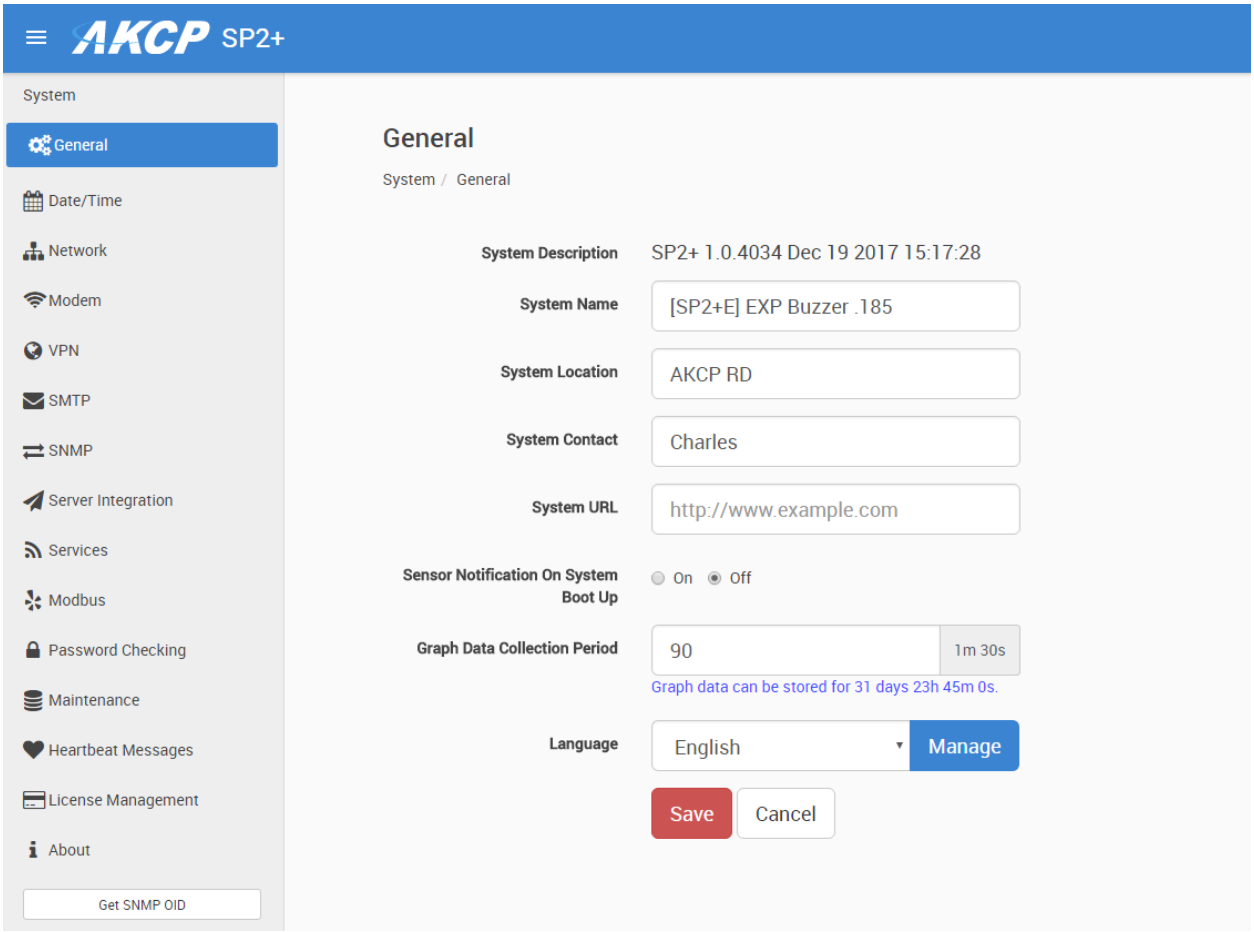
The Settings menu



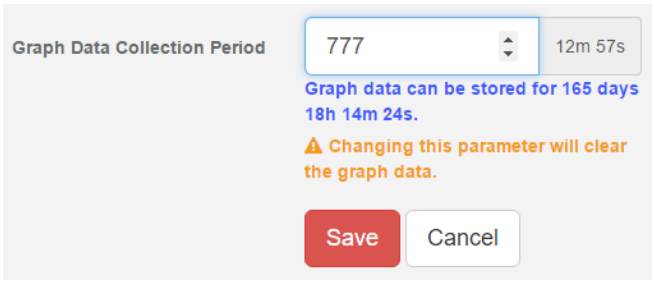
This shortcut will take you to the unit's system settings pages. Each page will be described below in detail.

System page

General



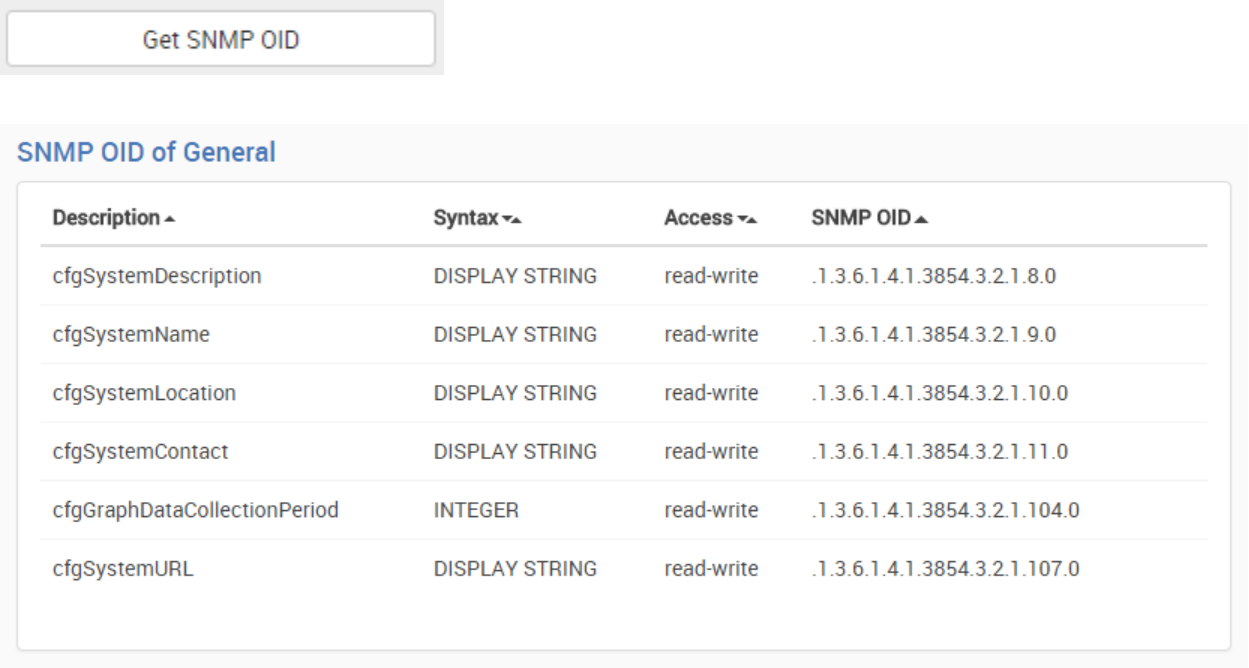
Here you can change general settings for the device.
The unit's firmware version is shown in the Description field, and the System Name/Location/Contact options are user configurable. You could also specify the System URL option, for quick access of a custom part of the Web UI for example, but you can specify any URL.
With newer firmware you can also specify GPS coordinates.



By changing the **Graph Data Collection Period**, you can choose how frequently the data is sampled. Note that if you had stored graph data previously, changing this setting will clear the data.

With the option **Sensor Notification On System Boot Up**, you can choose to allow/disallow running the notifications with sensor values read at system boot up. In some cases, invalid values are read while the unit is starting up, and you could get false alarm notifications. You can enable/disable the notification processing at startup with this option.

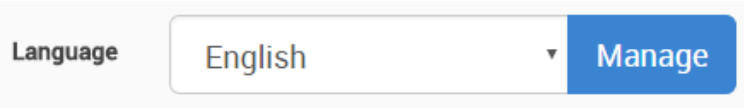
On each System subpage you can see a **Get SNMP OID** button (where applicable):



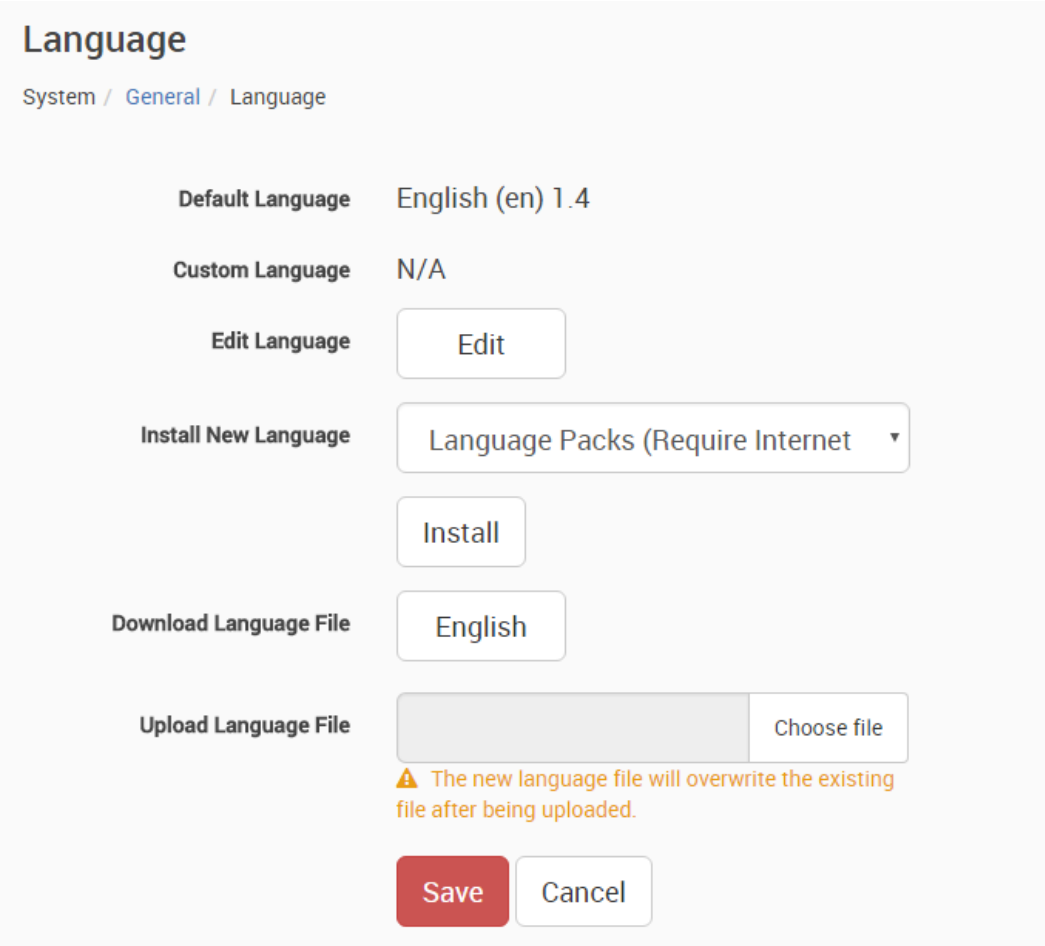
This will give you a popup window with all relevant OIDs for the actual page (here the General page is shown).
You can use OIDs for SNMP calls and in custom scripts, or for setting up the unit for monitoring by a third party NMS software such as WhatsUpGold or Paessler.

This button is also accessible on the *Sensors page* for each sensor.

Language management



You can change the display language of the Web UI with this option. Only one additional language is supported, together with the default (and fallback if there's an error) English.

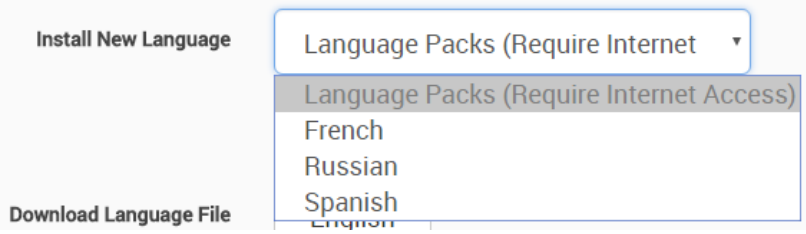


In **Manage**, you can choose to **Download Language File** if you'd like to edit the language file offline (you can also download the custom language's file if it's already present). Then upload the completed file, and it will be selectable as the Custom Language. For official translation files, the language code and version will show the correct values.

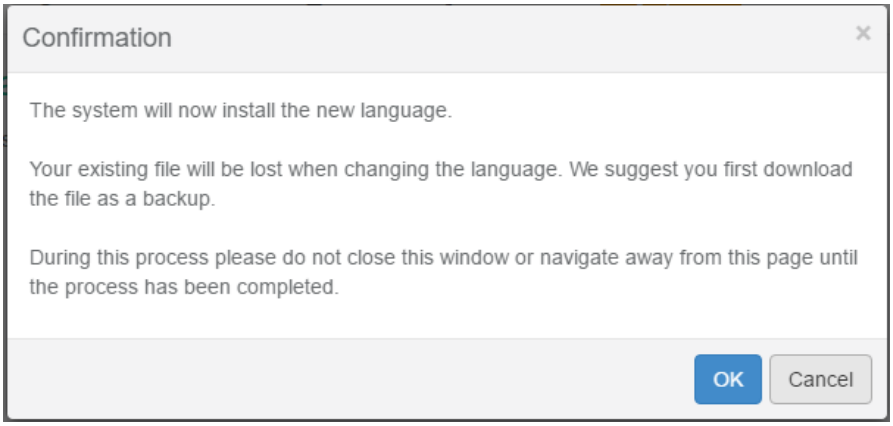
Note: Whenever you upload or install a custom language file, it will overwrite the old file. Only one additional language is supported.

You can get separately downloadable language files from our website in the Support section.

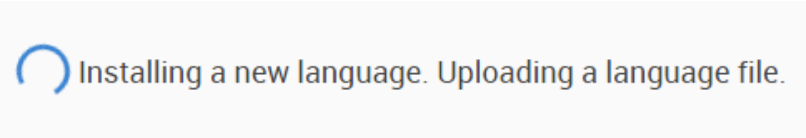
If you have active internet connection, the unit supports installing the official language files directly from our server.
Select a language from the drop-down menu **Install New Language**:



Then press the **Install** button. It will ask you to confirm the action in a popup window:

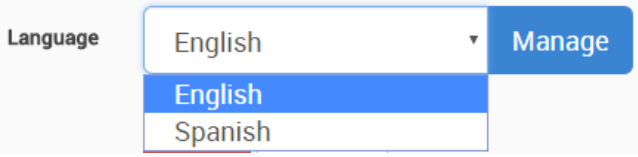


Wait until the language is downloaded and installed:

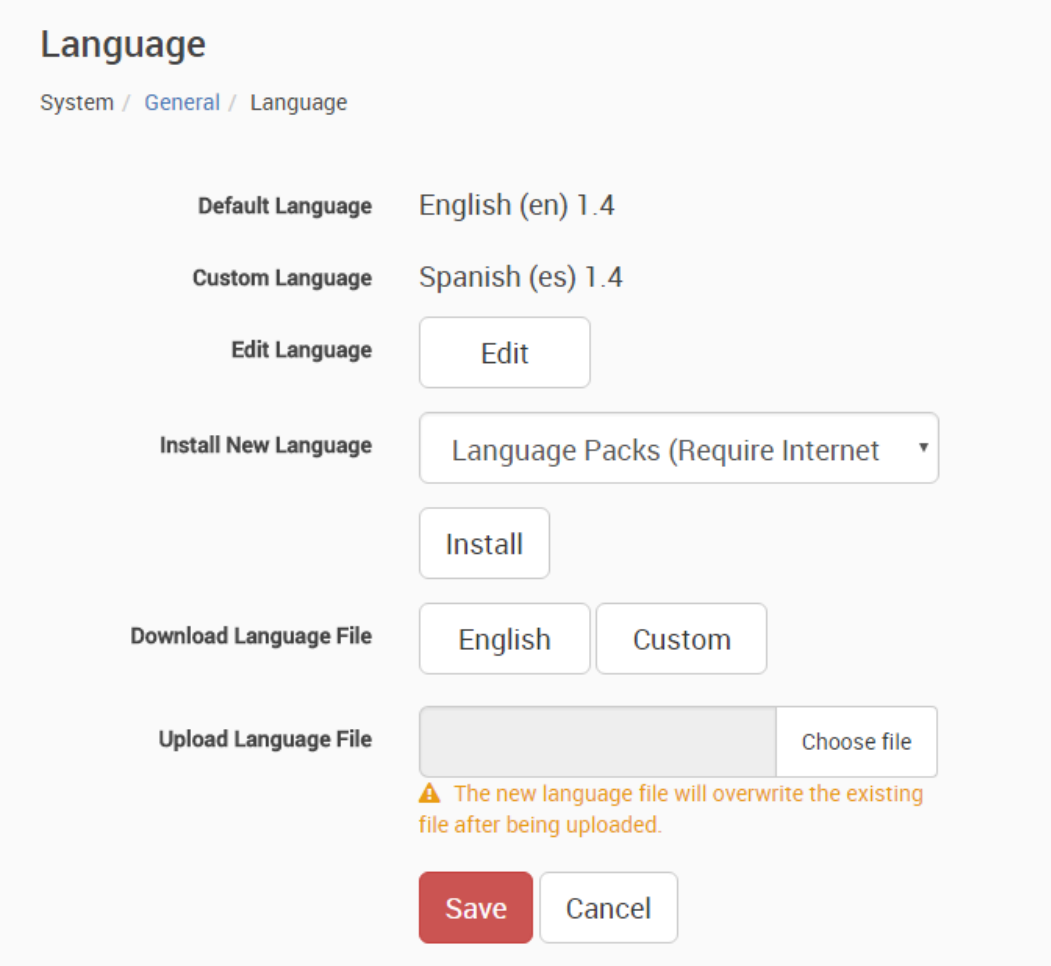


The unit will notify you about the successful language installation. If you installed it from the list, it won't change the language of the Web UI automatically.

Now you can switch display languages by selecting from the drop-down list on the **General** page, then pressing **Save**:

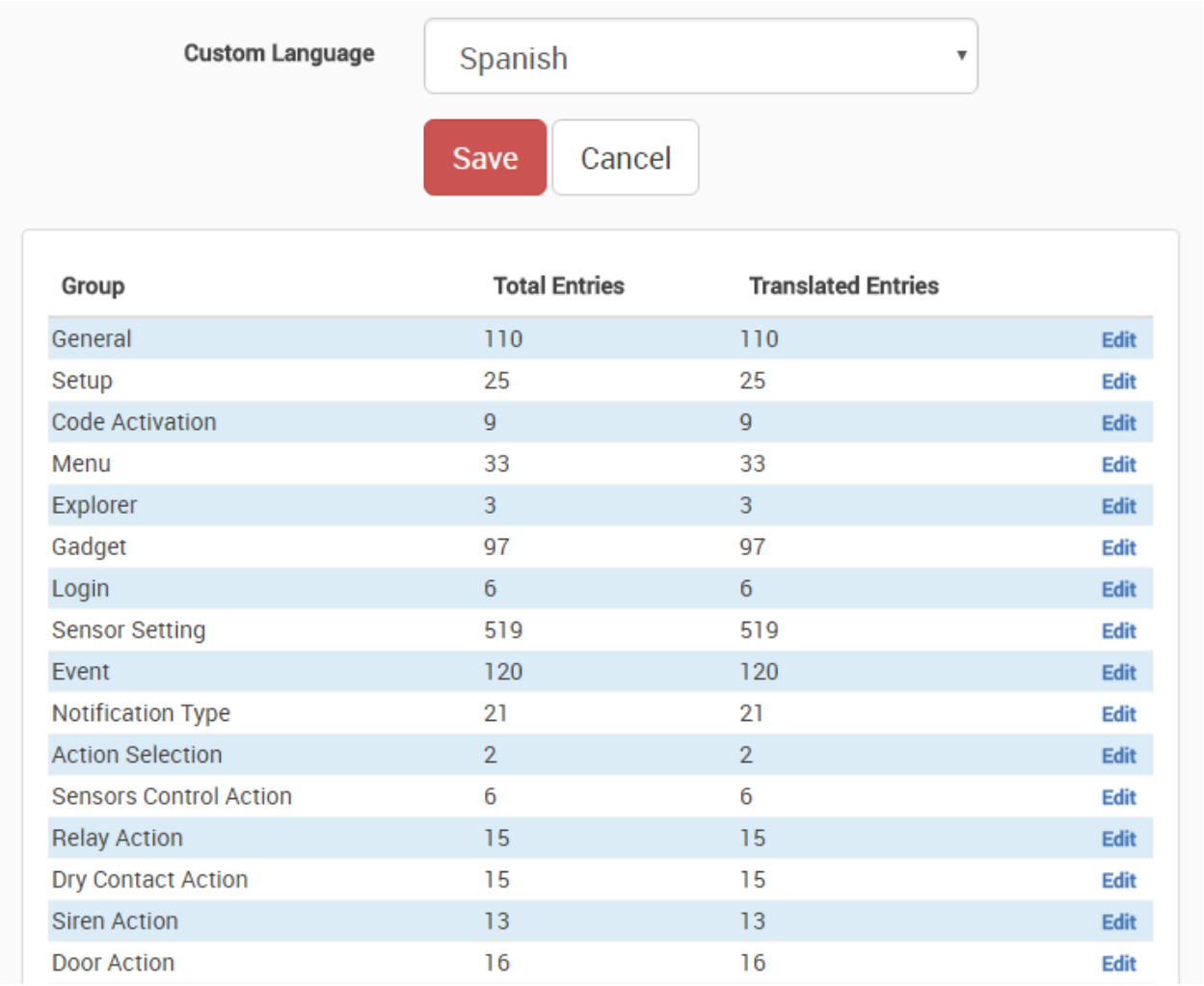


After you've added the custom language, you can manage it from the same menu:



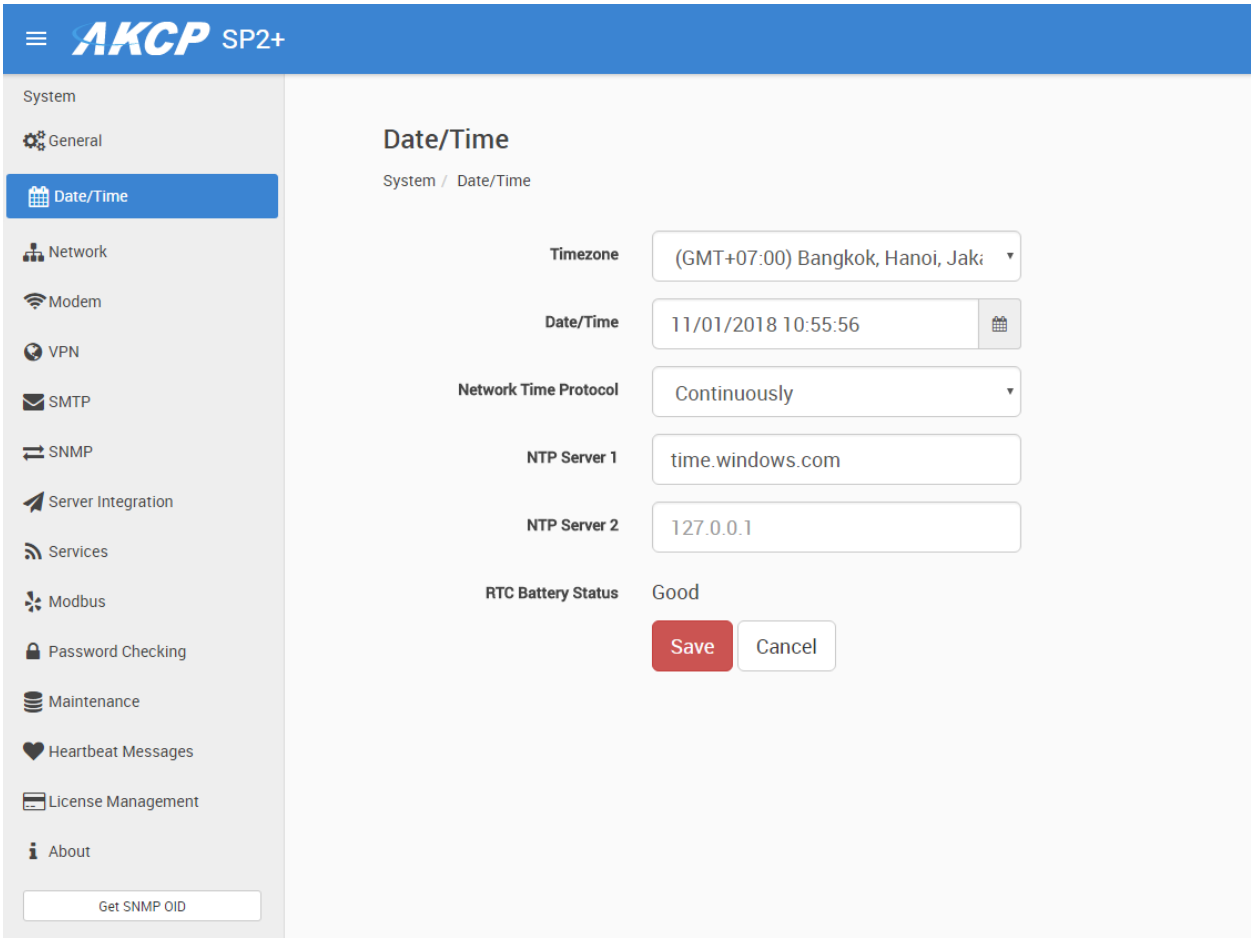
Note: The official language files are also included in the firmware update packages.

You can also edit the chosen language directly in the Web UI, if you choose **Edit Language**:

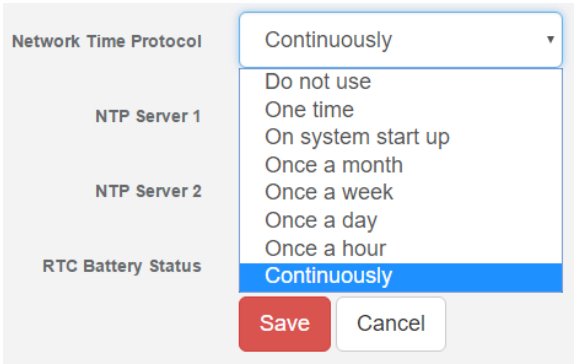


Group	Total Entries	Translated Entries	
General	110	110	Edit
Setup	25	25	Edit
Code Activation	9	9	Edit
Menu	33	33	Edit
Explorer	3	3	Edit
Gadget	97	97	Edit
Login	6	6	Edit
Sensor Setting	519	519	Edit
Event	120	120	Edit
Notification Type	21	21	Edit
Action Selection	2	2	Edit
Sensors Control Action	6	6	Edit
Relay Action	15	15	Edit
Dry Contact Action	15	15	Edit
Siren Action	13	13	Edit
Door Action	16	16	Edit

Date/Time

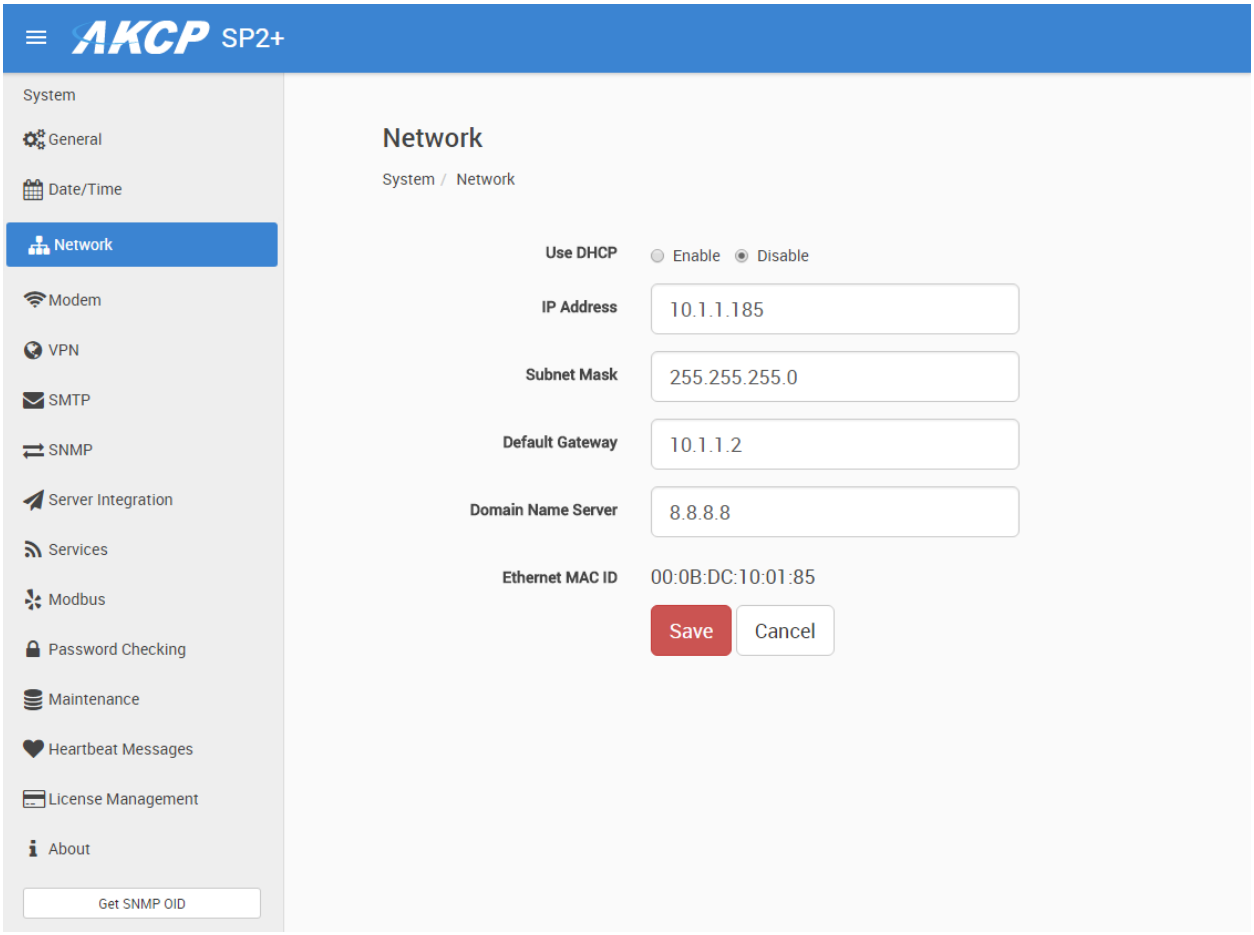


The system date and time with time zone is user configurable, with NTP server synchronization. If the unit is connected to APS (AKCPro Server), then it will sync with the APS NTP service. Also displayed is the status of the RTC battery (good/bad).
F7 units will also let you specify secondary NTP, and secured NTP servers.



You can also select the frequency of NTP synchronization with the drop-down menu.

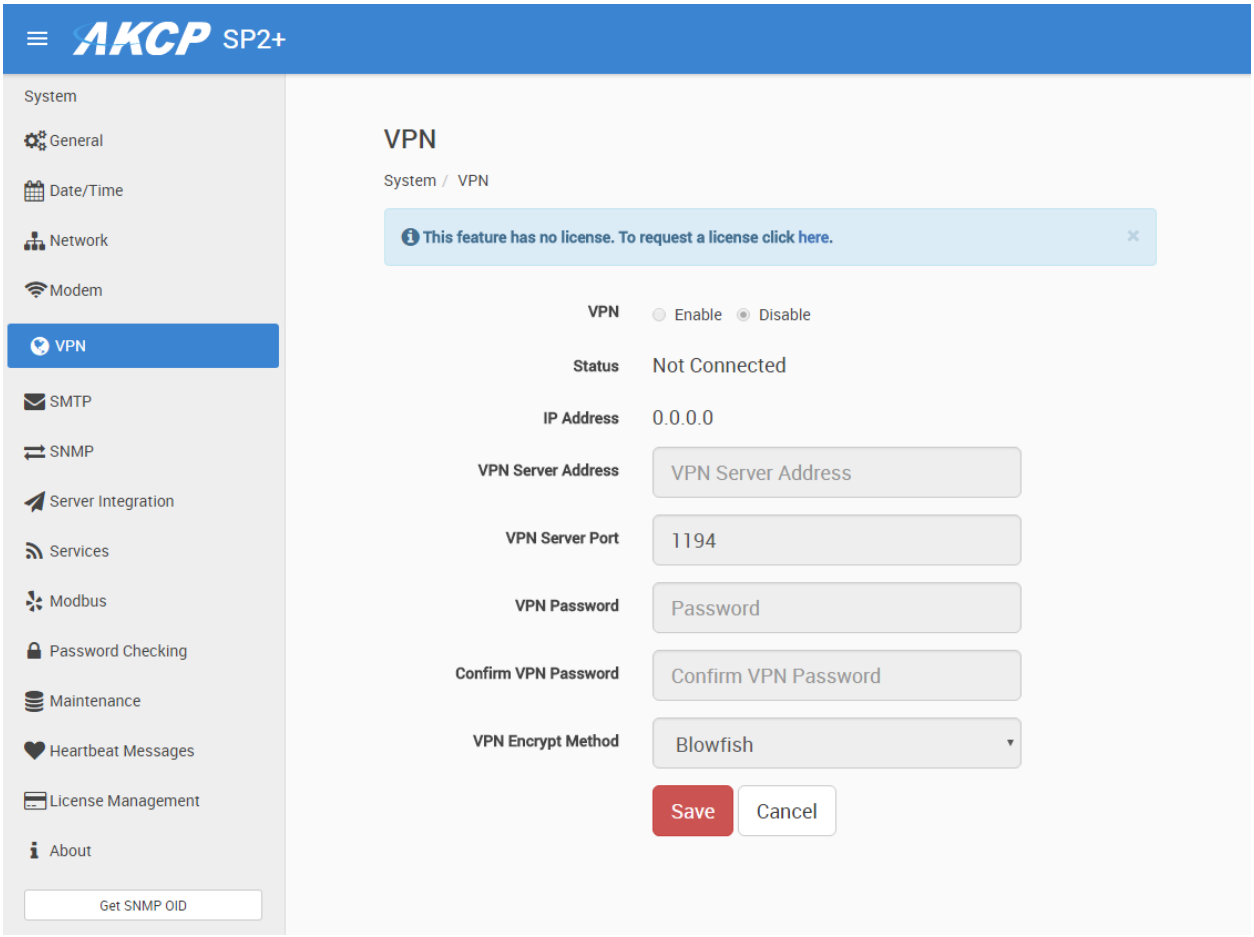
Network



The unit's MAC ID is displayed here, and all user configurable options for IPv4 with fixed IP or DHCP client mode.

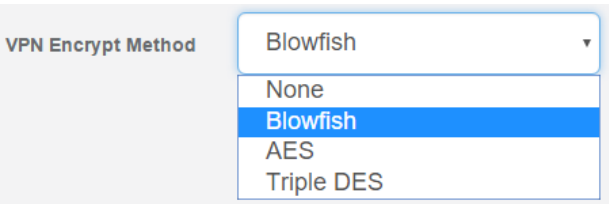
F7 units also have IPv6 settings (separately licensed feature), we have a separate manual about this feature.

VPN



This feature requires a separate license. You can read more details about the licensing later in this manual.

This feature is used by connecting the SP1+ with the APS VPN server. After the license has been activated and the APS VPN server is set up, you'll need to fill out the same options here to be able to use the VPN connection (see below).

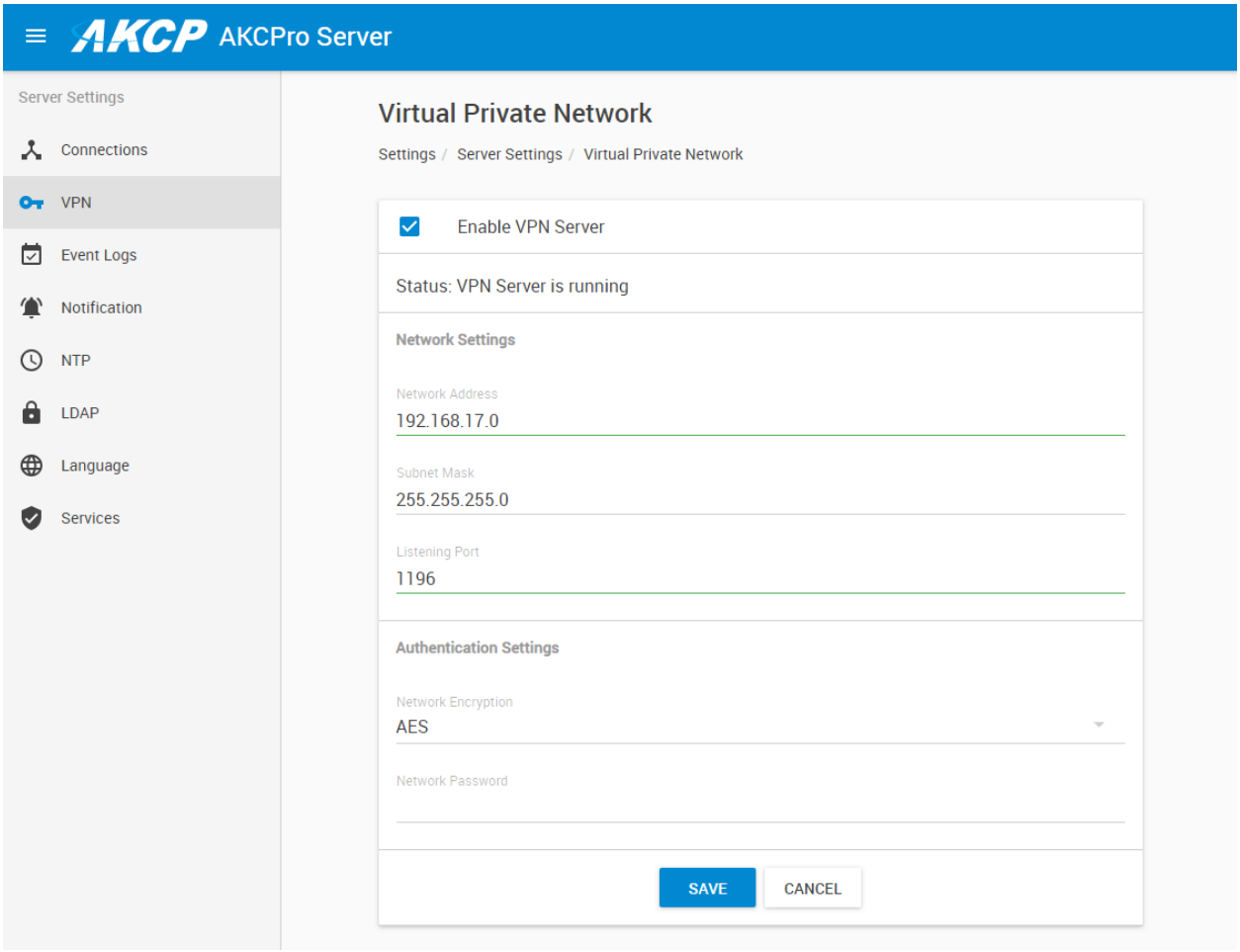


Note 1: You can also configure these settings from the APS console for the unit.
Note 2: If you use the VPN option, the maximum number of sensors that can be used by the unit will be reduced to 36 on F4 units (no limit on H7).

Set up VPN connection to APS

In the following pages, we'll describe how to set up the VPN connection to APS.

1. On APS HTML, Go to **Settings>Server Settings>Virtual Private Network**

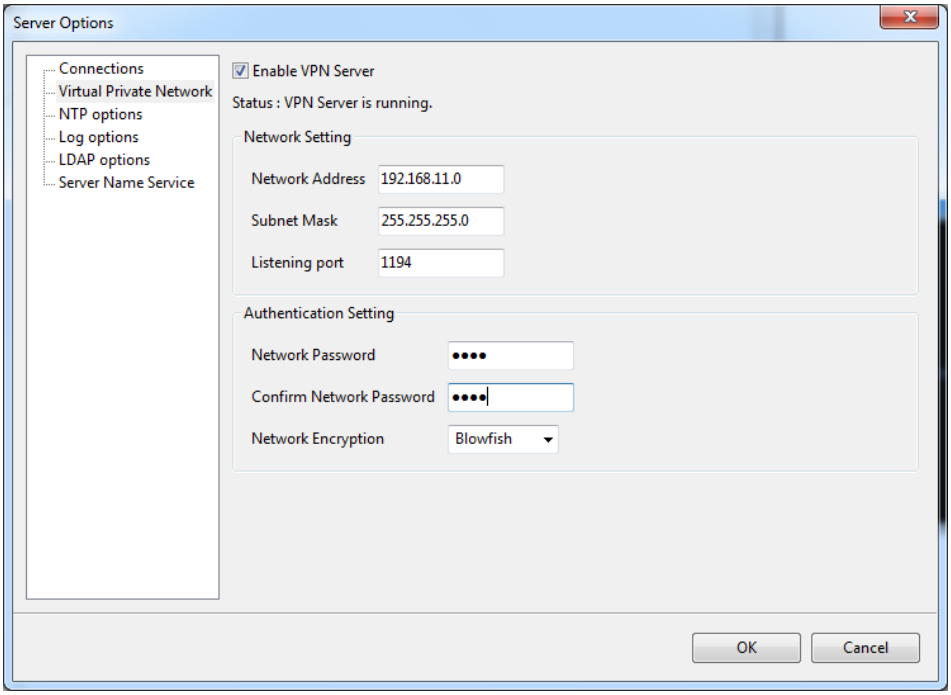


Enable the VPN Server by clicking on the checkbox, and then change the **Network Password** in Authentication Setting. Remember the **Network Encrytion Mode** that you have chosen; you'll need to provide the same setting on the SP+. See more details in the APS HTML manual.

You can also make changes to the network settings, but you'll have to use the same port on both sides of the VPN.

Note: The VPN virtual network has to be an entirely different subnet from the one you're currently using, otherwise it won't work!
Ex. if you're using 192.168.1.x network subnet on your LAN, use 192.168.11.x (or any other that's different from 192.168.1.x) for the VPN link.

You could also configure the VPN settings using the deprecated APS Windows Client interface: **Settings>Server Option>Virtual Private Network**



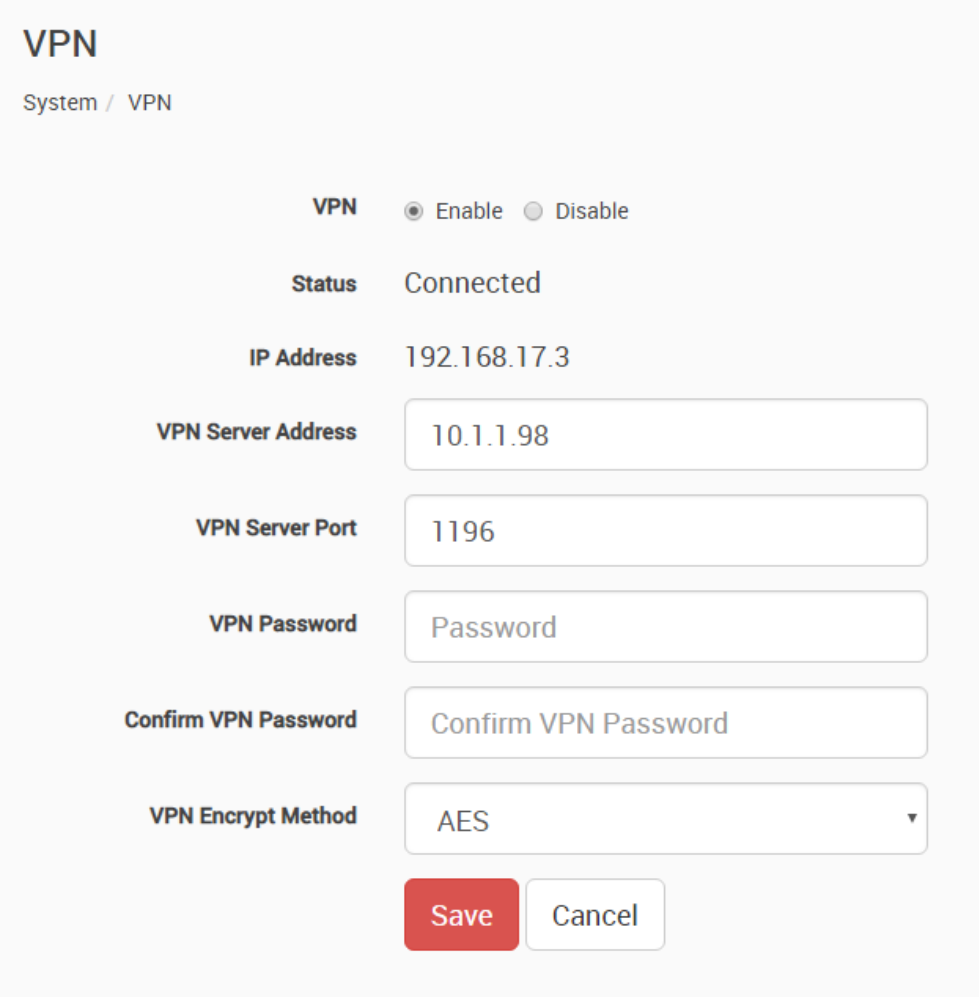
2. On the SP+ Web UI, enable the VPN

First change the VPN Client on the top to "Enabled" and configure the VPN Settings on the form:

- Specify the AKCPro Server's IP or DNS name in VPN Server Address
- Use the VPN Network Password that you have specified on APS
- Set up the the VPN Encrypt Method on the Encryption tab; use the same setting that you have specified on APS.

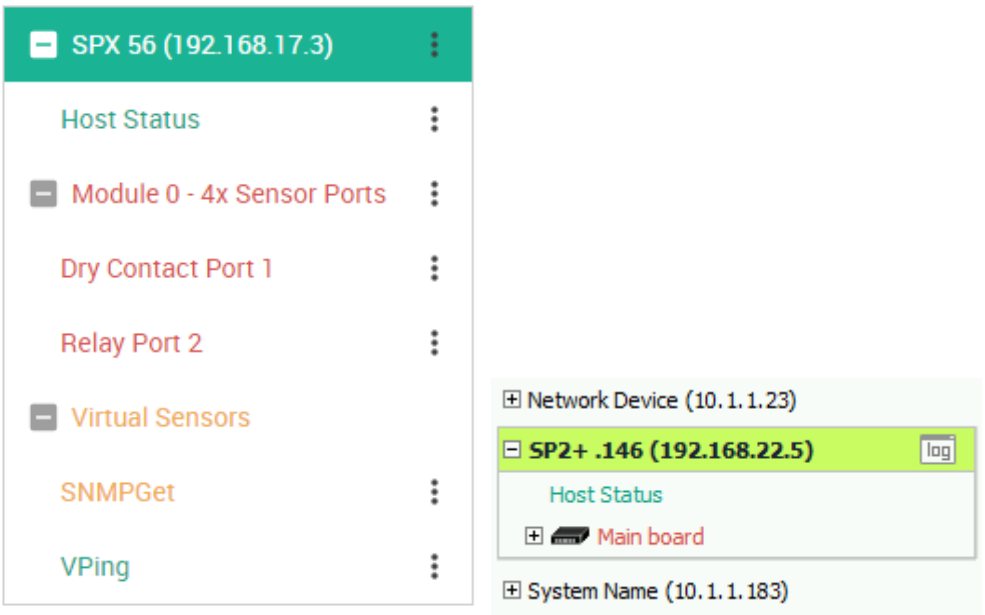
After clicking the "Save" button, the unit will ask you to reboot.

After the unit has rebooted and shows "Connected", it will show the VPN client's IP Address.



You can review the unit's syslog to see if there were any errors with connecting to the VPN server.

3. On your APS console, the SP+ unit will be added to the **Server Explorer** automatically, with an IP address automatically assigned from the range you specified.



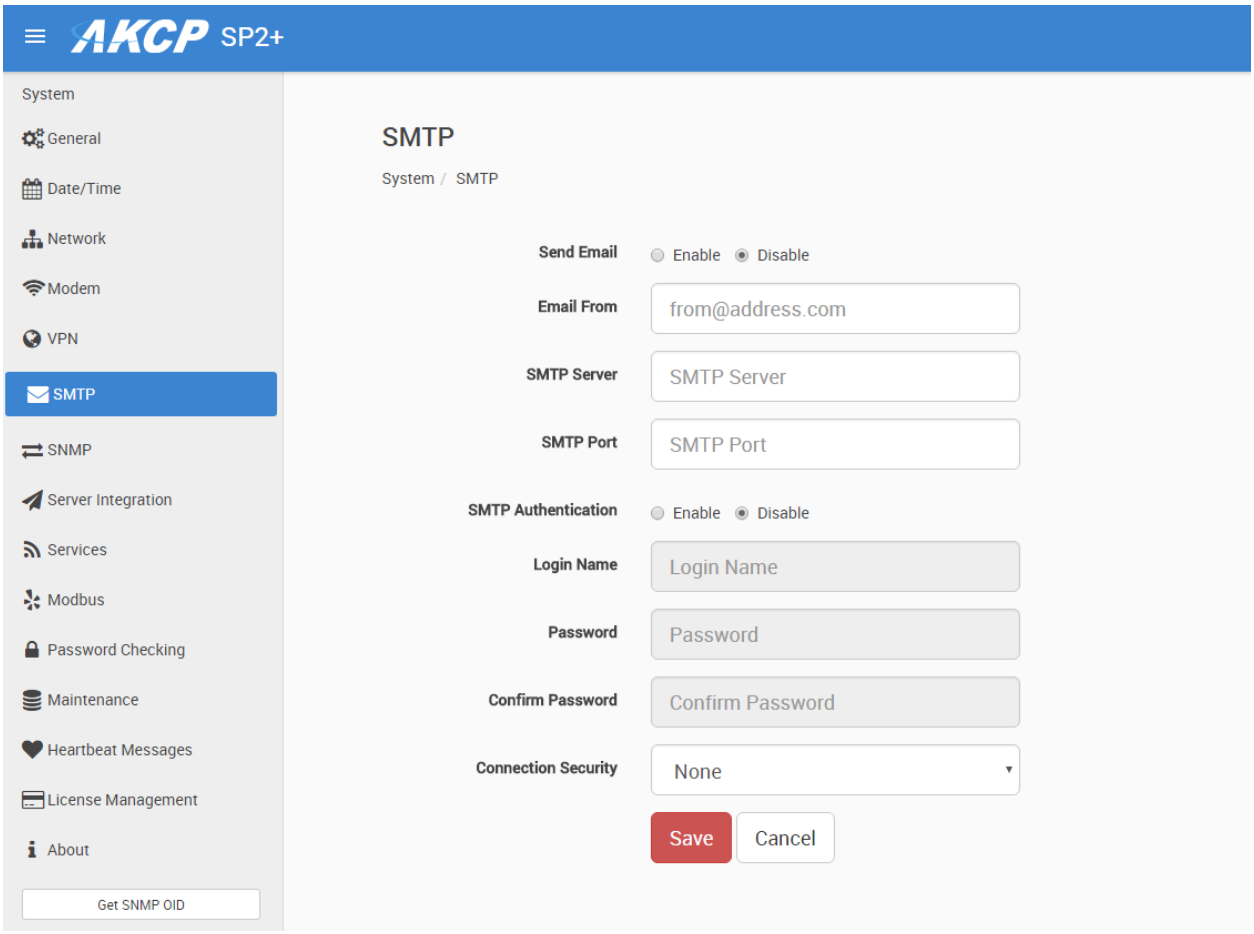
Important notes:

A) If the SP+ was previously added to the APS using a LAN IP, it has to be removed (delete host). Connecting by VPN will use a different IP address for SP+ but the unit's MAC address is the same, and they'll be in conflict. This is not an issue if the unit has never been added to APS before.

B) If the SP+ unit was previously monitored by APS, you should do a "reset to factory defaults" from the Maintenance menu to fully remove the APS integration from the unit (the existing IP configuration can be kept).

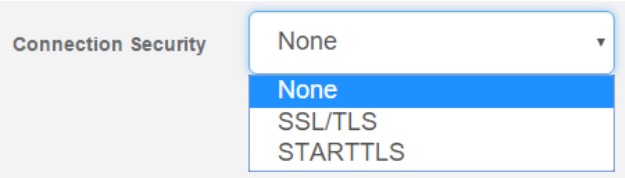
C) The Virtual Sensor Ping cannot ping an IP address on the VPN network.

SMTP



The SMTP server configuration options are shown here, it's required to be set up for the Email actions.

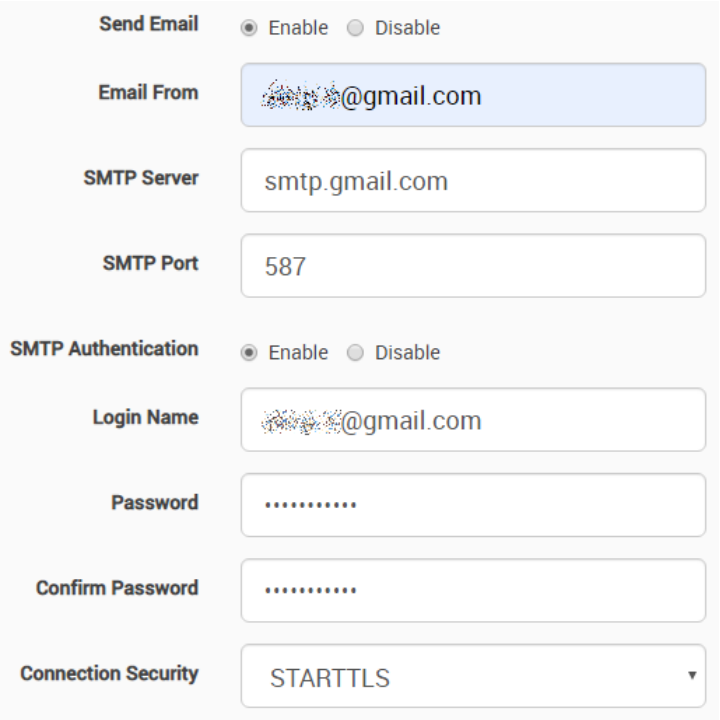
Fill out all parameters; the address in the *Email From* parameter will be used by the Email actions by default, but you could change it if your mail server supports it (when it's not required to match the SMTP user for example).



SSL/TLS and STARTTLS are supported for the connection security.

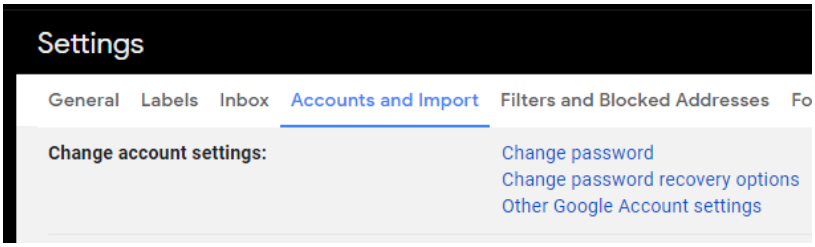
You could also turn off any email sending from the unit by disabling the *Send Email* option.

Settings for Gmail

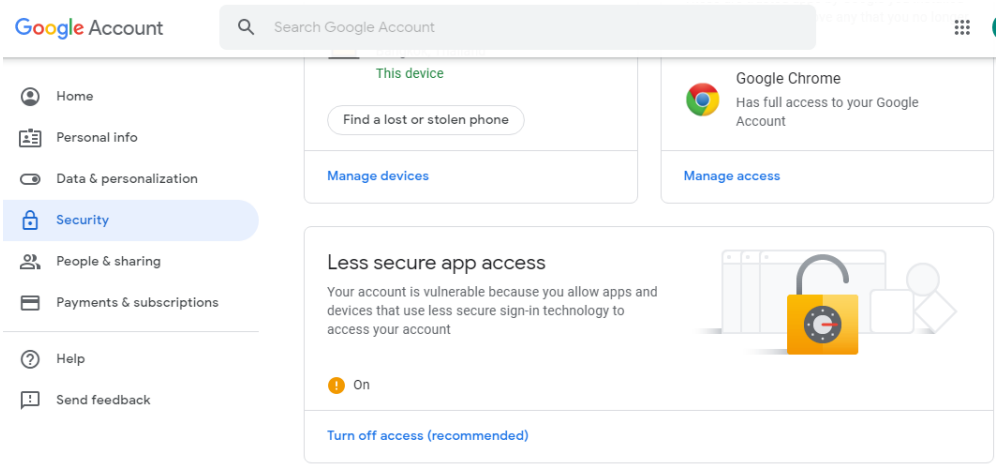


You can use Gmail account to send Email alerts with the settings shown on this screenshot on the left.

Important: before this can work, you'll need to set up an additional setting in your Google account.



Open Gmail in a web browser and go to Settings / Accounts and Import / Other Google Account settings

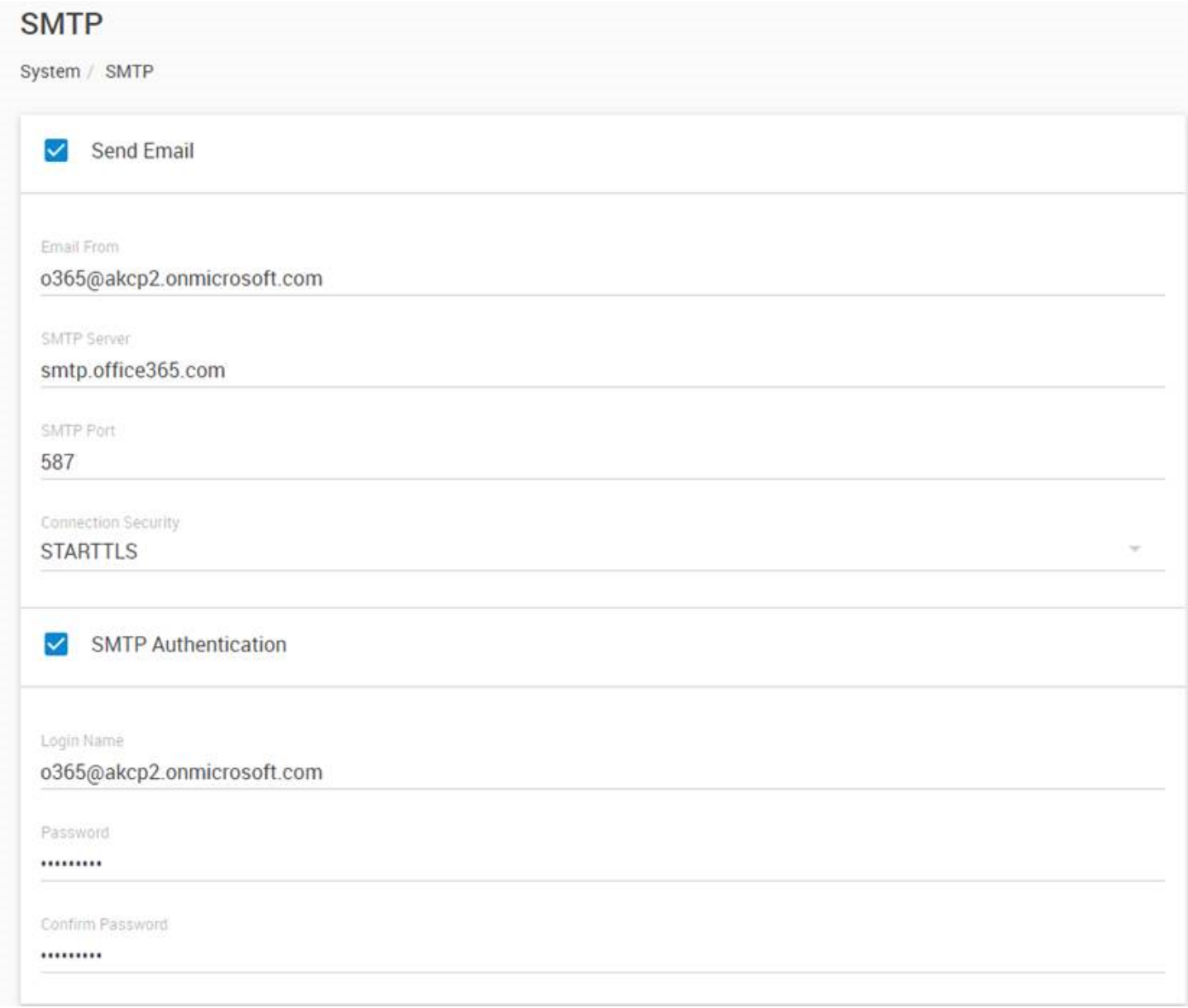


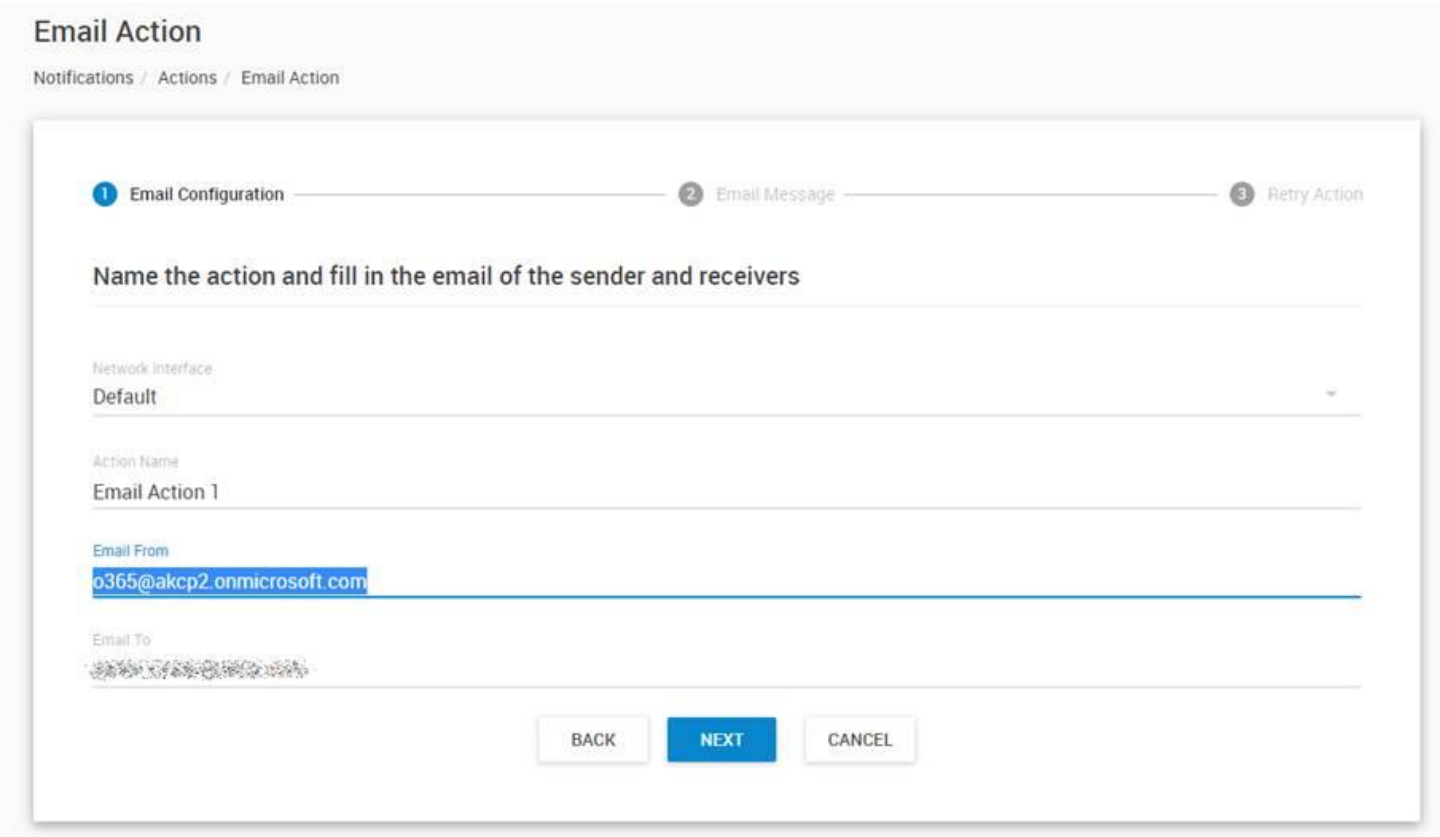
Then from the Account settings open Security tab / **Enable Less Secure Apps**

Settings for office365

Important Note: Sending office365 email alerts are only supported on the SP+ F7 & H7 units running the latest firmware on our website and are not supported on the older F4 type SP+ units.

First you need to ensure that the SMTP settings and the email action configuration are correct as follows (our account is used as an example):





Very important: the “Mail from” parameter must match the same as the SMTP login parameter in the settings.

The mail servers are strict about the "mail from" parameter for antispam methods, and it cannot be different than the email login setting.

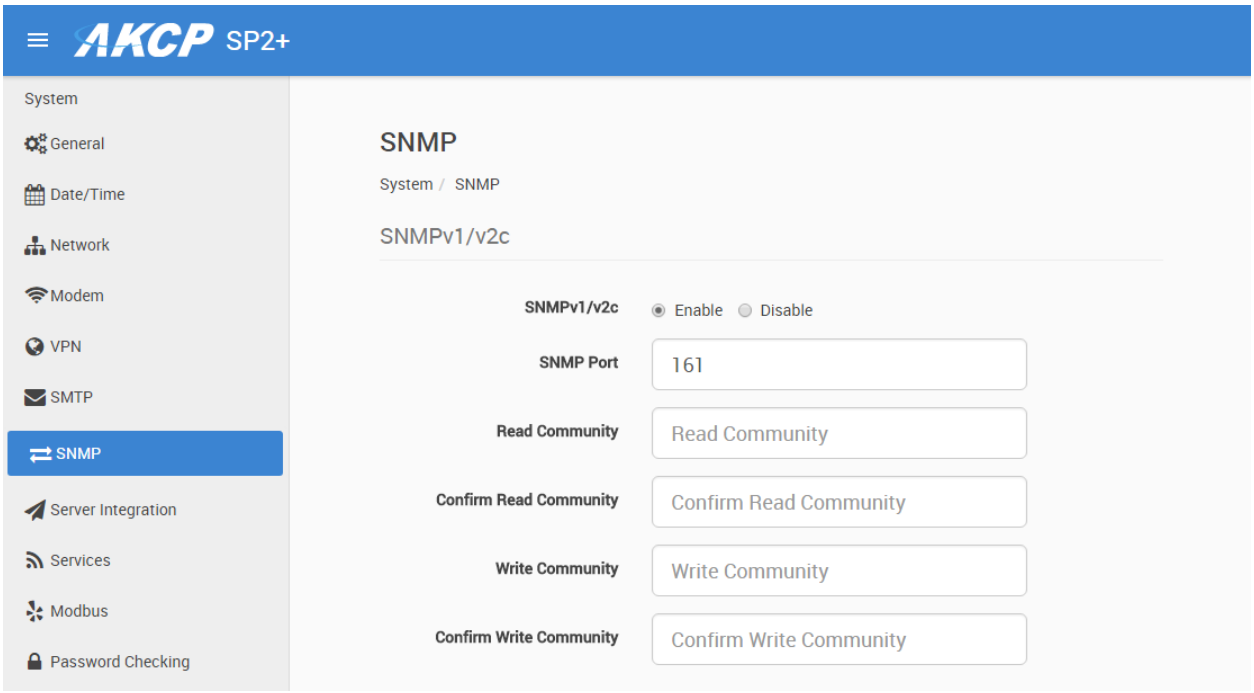
Please also check our SP+ Knowledge Base using this link:

https://www.akcp.com/knowledge-base/sensorprobe-plus-series-knowledge-base/

And also, our SP+ Email Setup Quick Start guide using this link:

http://www.akcp.in.th/downloads/Manuals/SP1+/SP+%20Email%20Alerts%20Quick%20Start%20Guide.pdf

SNMP

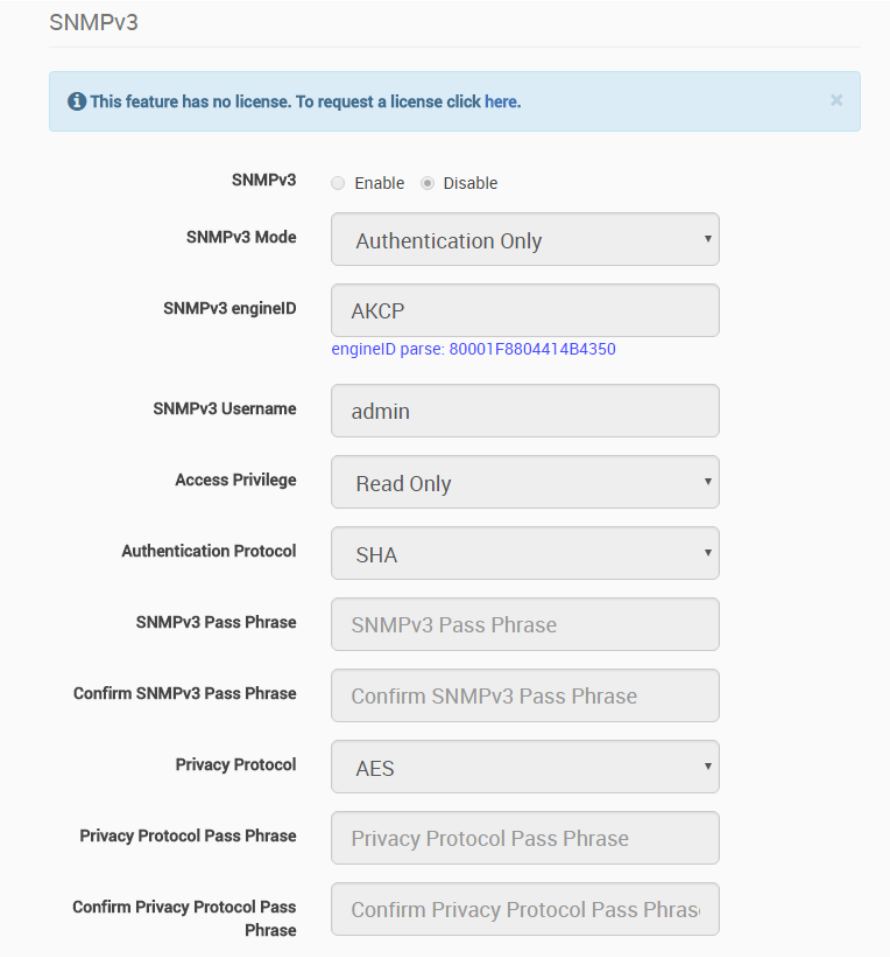


The SNMP service configuration options are shown here, it is required for SNMP operations.

SNMPv1 is enabled by default, with community password "**public**".
This is provided for the easiest integration with third party SNMP tools.
For enhanced security, it is recommended that you change the default SNMP password.

Scroll down for SNMPv3 options.

SNMPv3



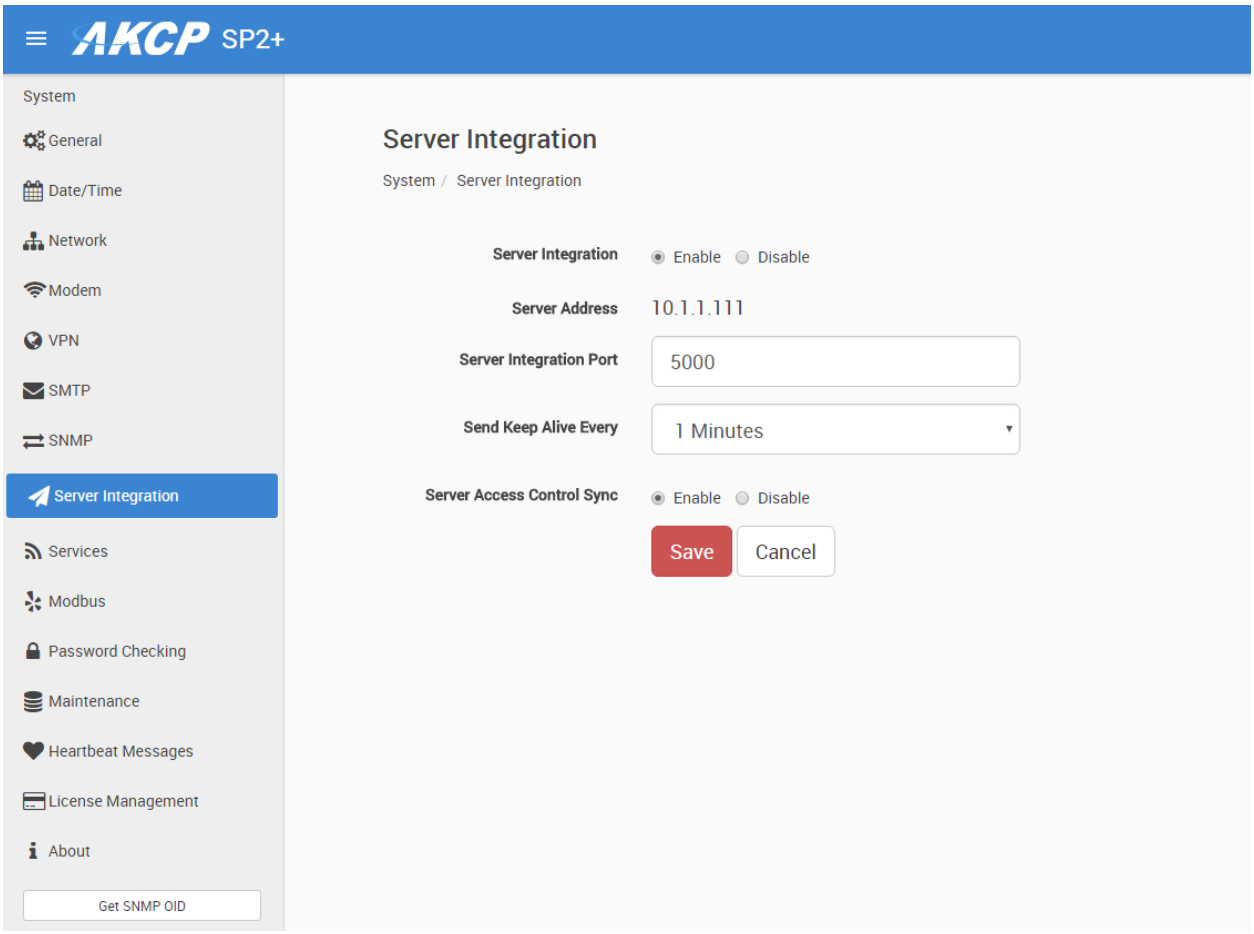
The SNMPv3 options can be found by scrolling down on the SNMP page.
This feature requires a separate license. You can read more details about the licensing below in this manual.

Below we'll give a quick description of each setting:

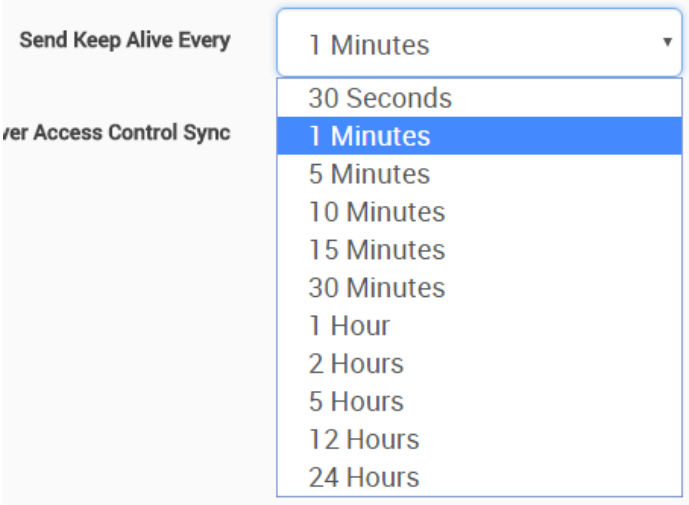
Level	**Authentication**	**Encryption**	**Description**
No Authentication	Username	No	Match Username (same as SNMP v1/v2c)
Authentication Only	MD5 or SHA	No	Auth Based on Algorithms (check password)
Auth&Privacy	MD5 or SHA	Yes - DES	Auth Algorithms and Encryption

Basically if you select **No Authentication** then the setup will be the same as with SNMP v1 and v2c versions: authentication is only checked by unencrypted username.
Authentication Only will provide password protection but no encryption.
Authentication&Privacy provides encrypted username and password protection.

Server Integration



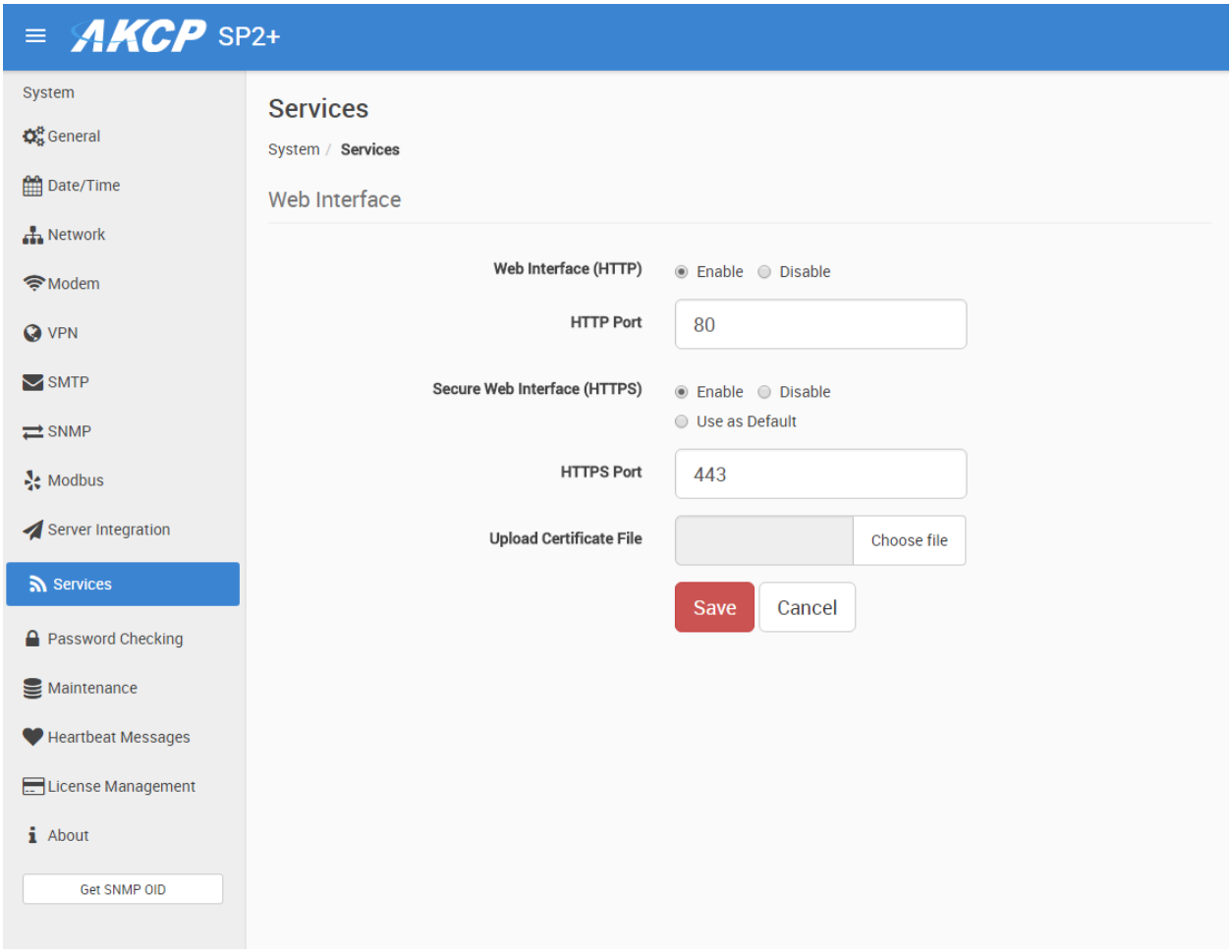
If the unit has been added to the AKCPro Server console, the server's IP address will be displayed here. User configurable options are the APS port and keep-alive period.



You can change the APS port when the server's port changes, and the keep-alive period (heartbeat sync to APS).
Alternatively you can re-initialize your unit from the APS console to re-establish communication.

You may disable the **Access Control Sync** on this device. This will disable importing the Access Control users and groups that are set up in APS. This feature is used by the Swing Handle Lock.

Services



You can close or change the ports used to access the unit's web interface, disable HTTP and enable HTTPS only, which can also be set to be used as default.

On the SP+ family, the HTTPS supports TLS v1.1 and v1.2.
The HTTPS cypher suites are not customizable.

Using the "Upload Certificate File" option you can upload an SSL certificate that will be used by the unit's Web UI for HTTPS connection (see below).

Important: the default, built-in self-signed SSL certificate is only provided for user convenience so that the HTTPS WebUI would work on the units out of the box. It WILL raise browser SSL security warnings and is not meant to be used in production environments where higher security is mandatory. To use SSL without warnings, you need to either add the units IP address to the exceptions, or replace the certificate using the method described below.

SSL Certificate

SSL certificates are generated for DNS host names and not IP addresses. You should set a host name for the SP+ unit in your local DNS server or DHCP server, and then generate the SSL certificate for that host name.

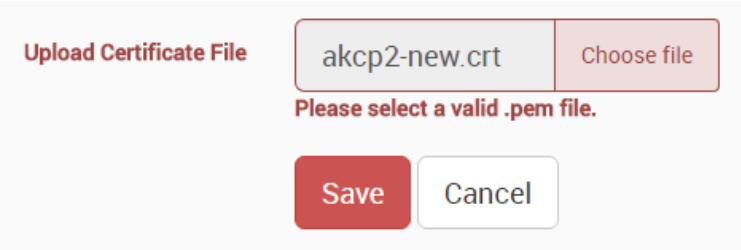
Example: spplus.mycompany.org

The unit's DNS host name is "spplus". Wildcard SSL certificates should also work, but this hasn't been tested.
If the name doesn't match with the one in the certificate, the browser will still show a security warning.

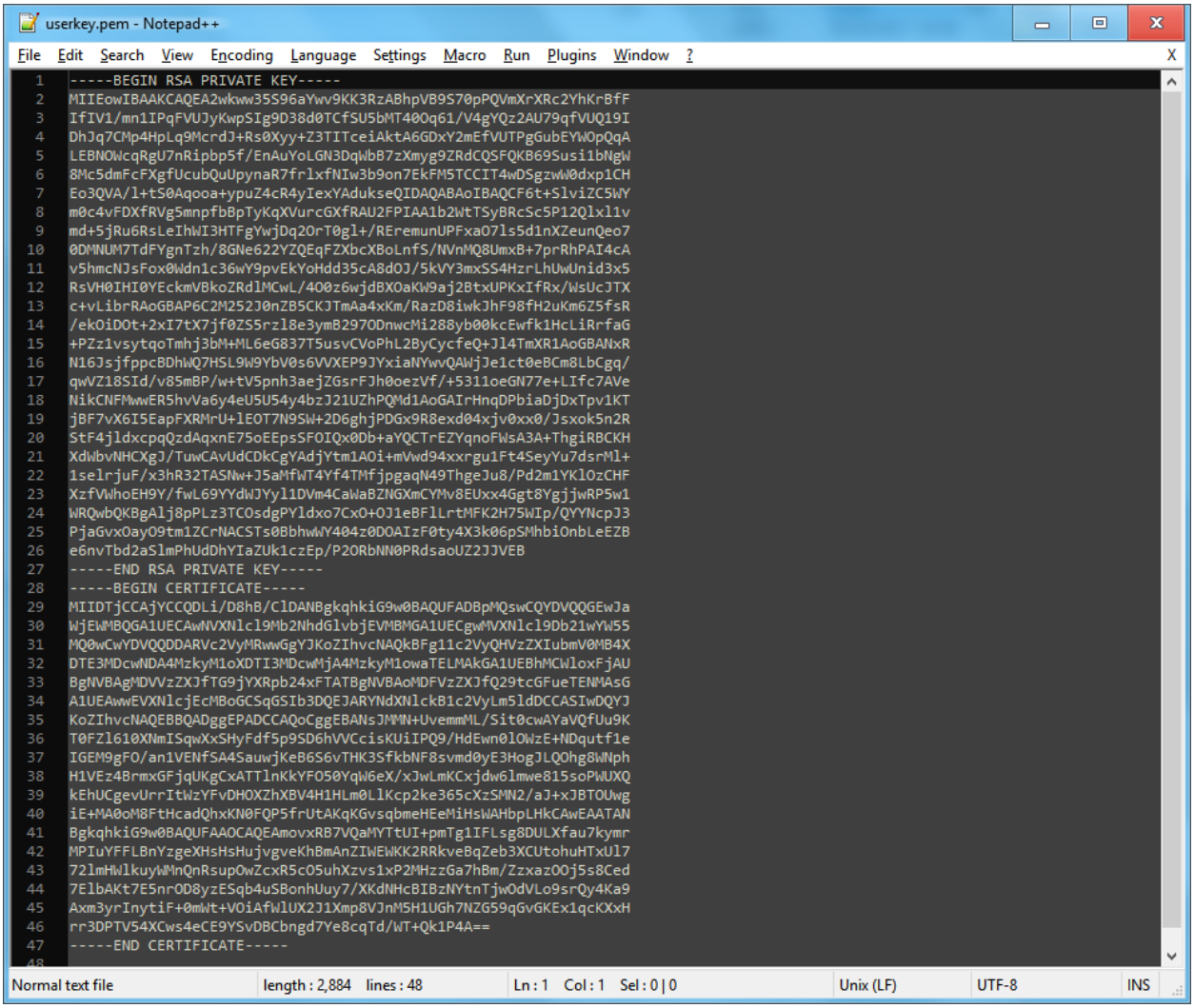
You can purchase a certificate from a trusted, verified Certificate Authority such as GoDaddy or use your company's own CA if you have one.

Please note that only non-password protected certificate files are supported.

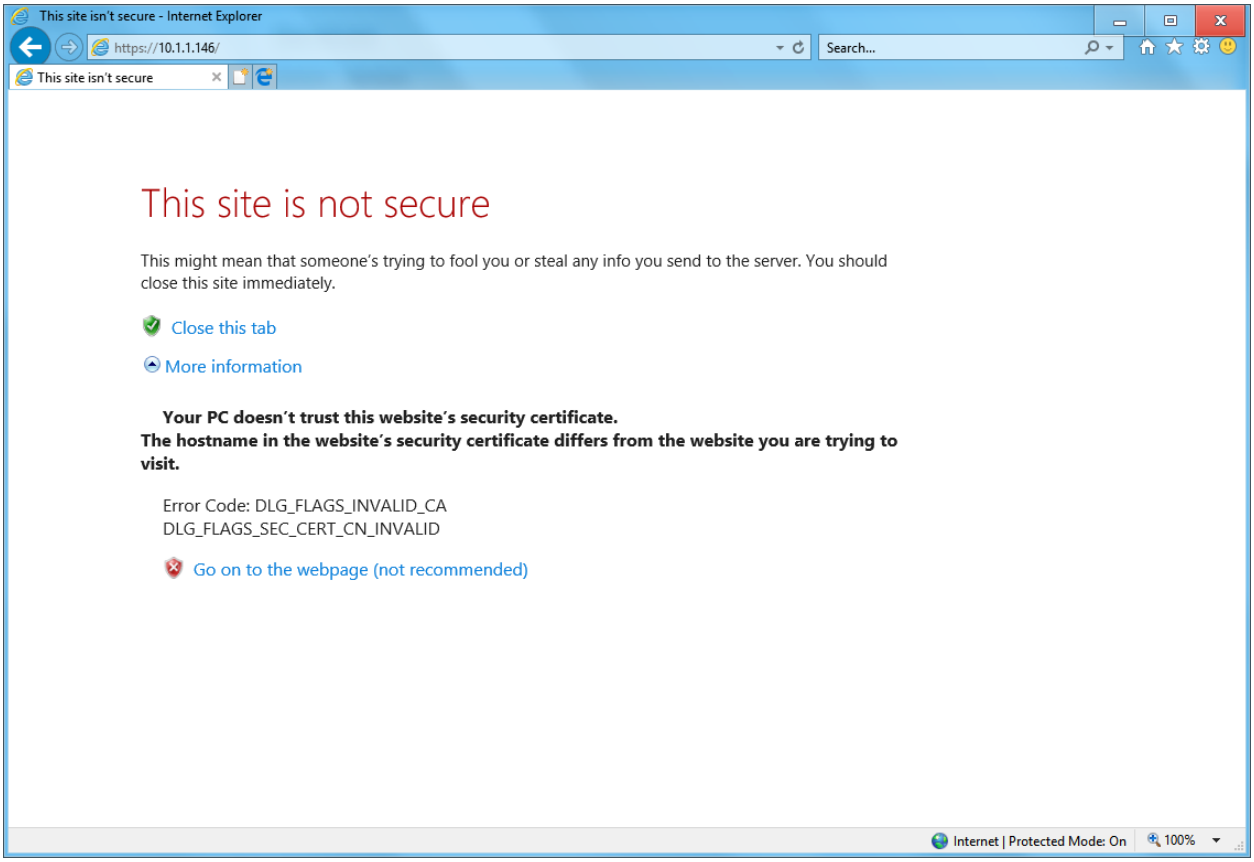
When you select the file for uploading, you'll get a warning if the file is not in .PEM format:



The .PEM file is the private key + certificate combined. You can copy them to one file using Notepad++ if you have 2 separate files, as shown below (it has to be in Unix Line Format and not Windows):



If you don't upload a certificate but enable HTTPS, a built-in certificate will be used. You'll get a browser warning upon opening the Web UI about an incorrect certificate. This is normal and you should add it as an exception or proceed, depending on your browser:



Important: the default, built-in self-signed SSL certificate is only provided for user convenience so that the HTTPS WebUI would work on the units out of the box. It WILL raise browser SSL security warnings and is not meant to be used in production environments where higher security is mandatory. To use SSL without warnings, you need to either add the units IP address to the exceptions, or replace the certificate.

Modbus RS-485 (optional on the SP1+ using the dry contact input)

MODBUS RTU is a non-proprietary serial communications protocol that is widely used in the process control industry actuation.

SP1+ only supports pre order optional Modbus with the RJ45 connector (RTU) on the dry contact input port. For just Modbus, only the pin 1 and 2 are used, being respectively, Modbus A/+ and Modbus B/-.

Note: Modbus queries are slow (up to 3 seconds). This is per Modbus protocol definition, it's not an AKCP limitation. The more sensors you have, the bigger the polling interval must be.

Configuring the Modbus options and more information about this feature is explained in the separate SP+ Modbus manual here;

http://www.akcp.in.th/downloads/Manuals/Modbus%20on%20SP+/SP+%20Modbus%20Manual.pdf

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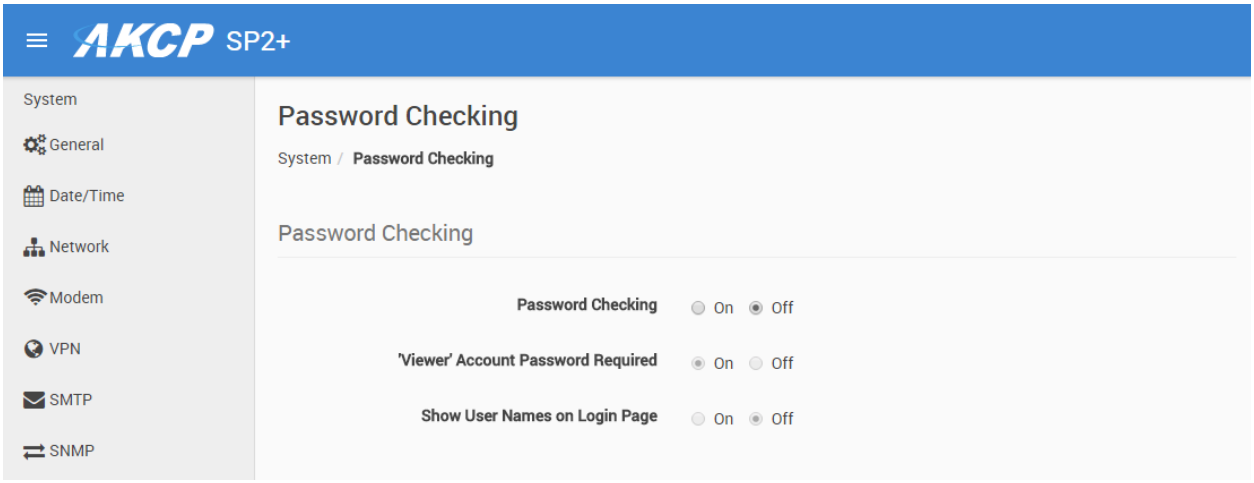
Password Checking and Security

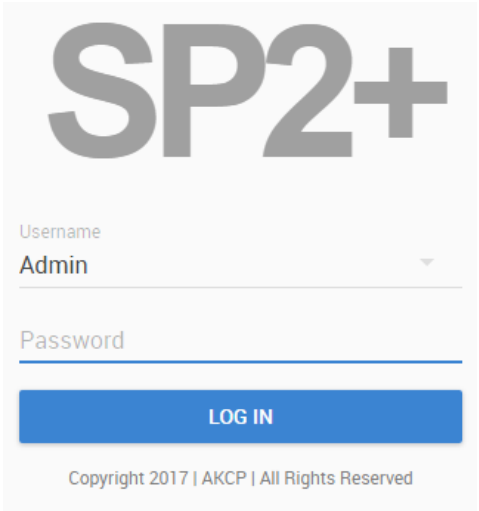


You can turn on the password checking for the Web UI to ensure only authenticated users have access to the unit. You can also specify to show all user names on the login page, or keep them confidential.
After you enable the password checking, you'll need to re-login.
If you don't remember the Admin password, you can hold the unit's reset button for 7-12 seconds to be able to log in to the Web UI without a password.

Note 1: The passwords can only be set from the unit's Web UI; this option is not available from APS.
Note 2: The default password is "public" for all access levels.

Web UI user access levels and permissions

Admin - full access to all settings, system and notification configurations
Viewer - read-only guest access for every page
User - full access to most settings except for those which are the system-related such as network

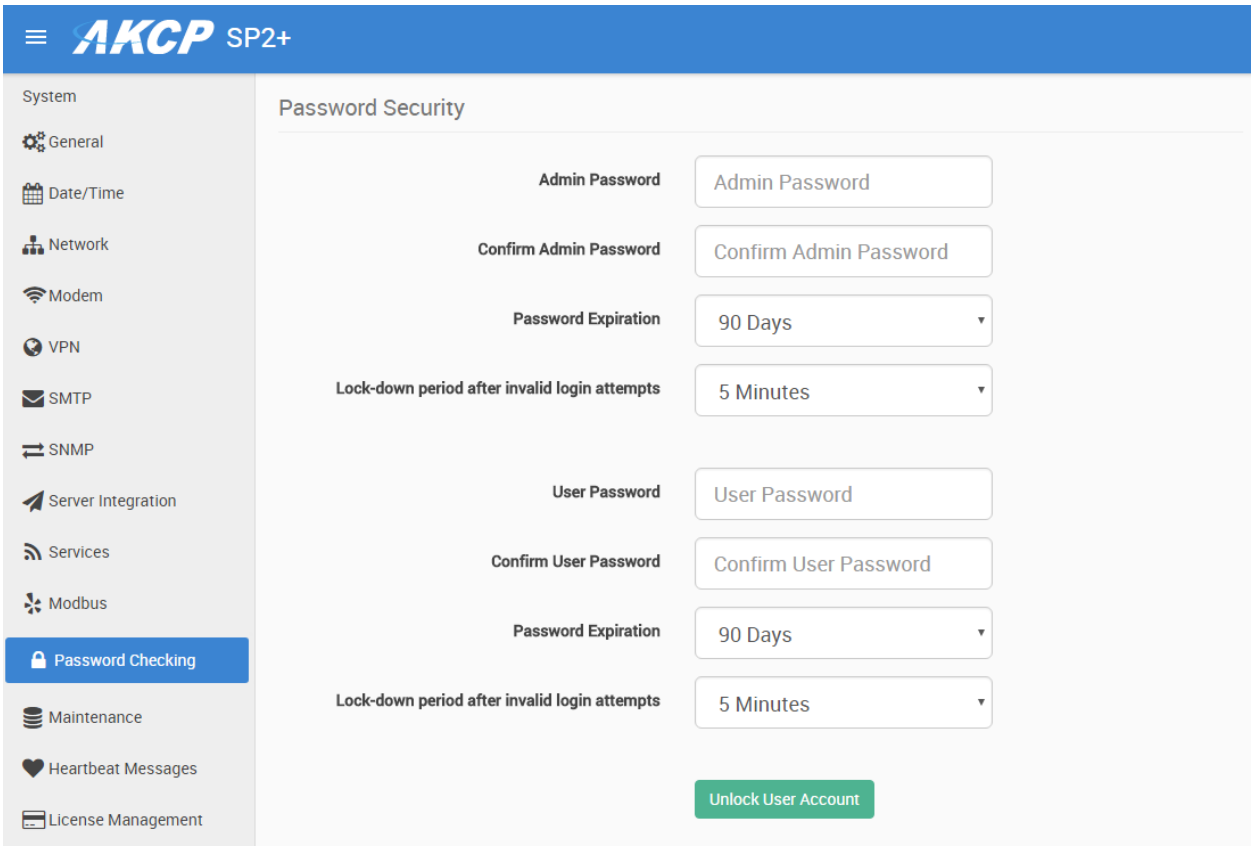


In detail, the User access level provides these permissions in addition to the Viewer level:

Allow modifying board/sensor settings
Allow add/modify/remove notifications
Allow add/modify/remove heartbeats
Allow open/close the door on the Handle Lock
Allow send configuration to Support
Allow change Graph settings

Allow change the Web UI language

Password Security options



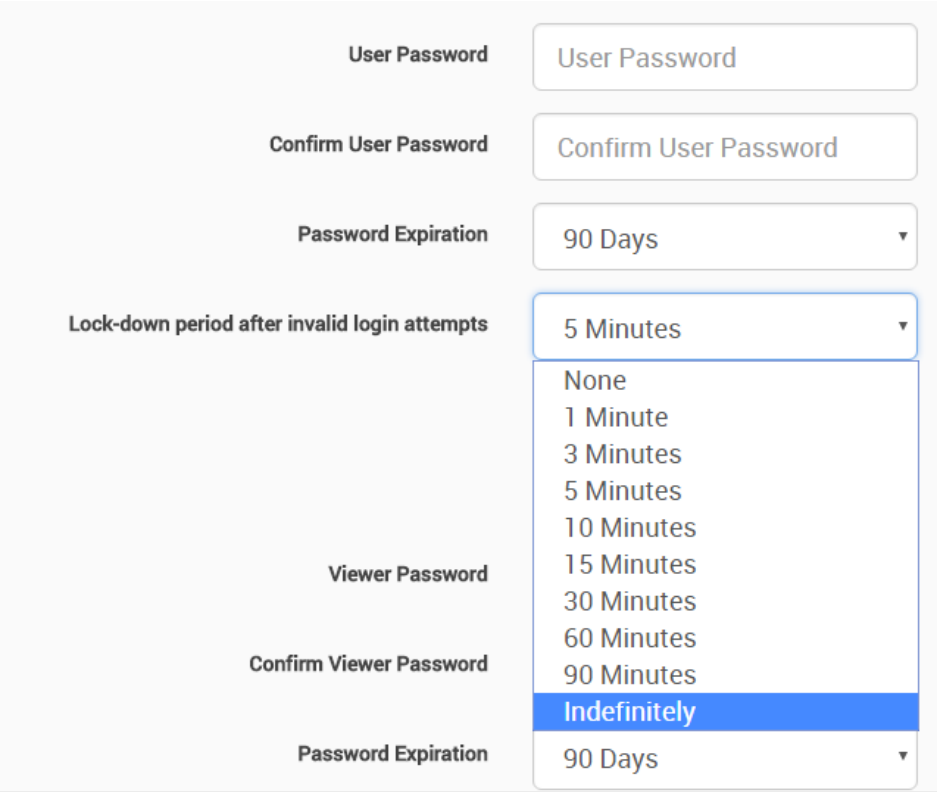
All user account types (Admin, User, Viewer) have adjustable password expiration and lockdown periods.

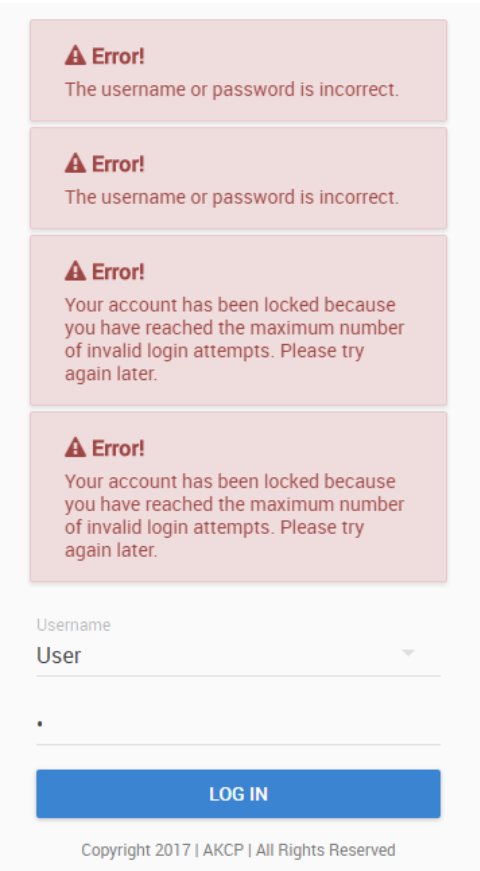
The password can be up to 15 characters (a-z, A-Z, 0-9 and special characters).

The IP address of the remote user's computer will be logged in the syslog so you can trace back each login session to its origin.

F7 units also support Radius password checking (licensed separately), we have a separate manual about this feature.

Lockdown

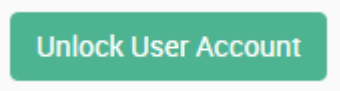

User Password
User Password
Confirm User Password
Confirm User Password
Password Expiration
90 Days
Lock-down period after invalid login attempts
5 Minutes
None
1 Minute
3 Minutes
5 Minutes
10 Minutes
15 Minutes
30 Minutes
60 Minutes
90 Minutes
Indefinitely
Viewer Password
Confirm Viewer Password
Password Expiration
90 Days



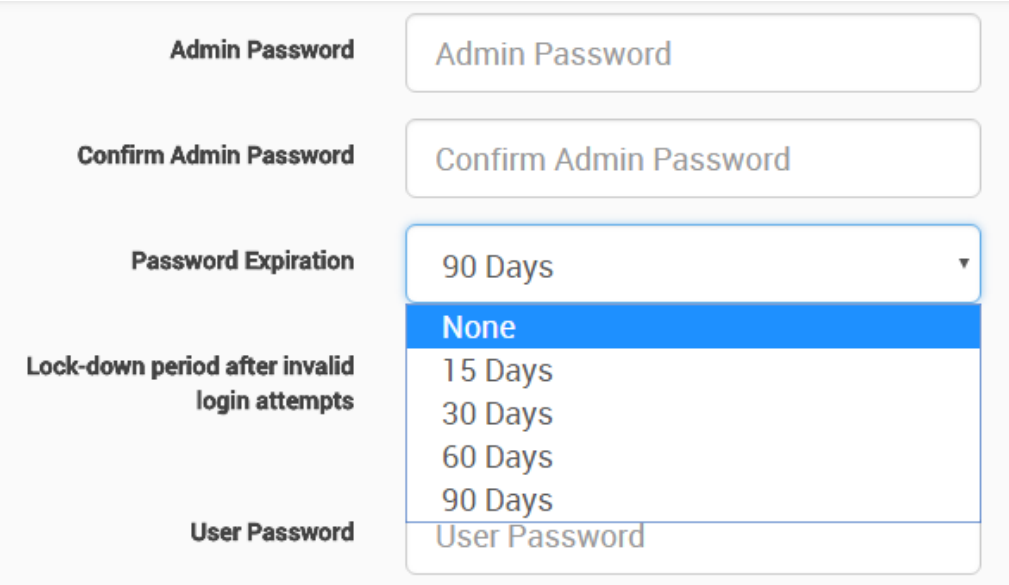
The accounts can be set to lock down the account after 3 invalid login attempts, to prevent brute-force hacking attempts.
You can specify how long the account will automatically unlock itself.

Note that for the Admin user, you can't select "indefinitely" as this would prevent you from logging in to the Web UI if it has locked itself.

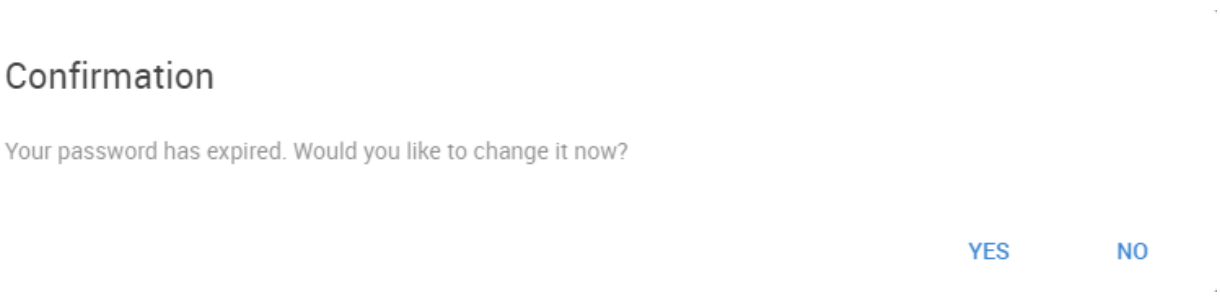
If an account has been locked, you can unlock it immediately by logging in with the Admin user, and by using the green unlock button:



Password Expiration

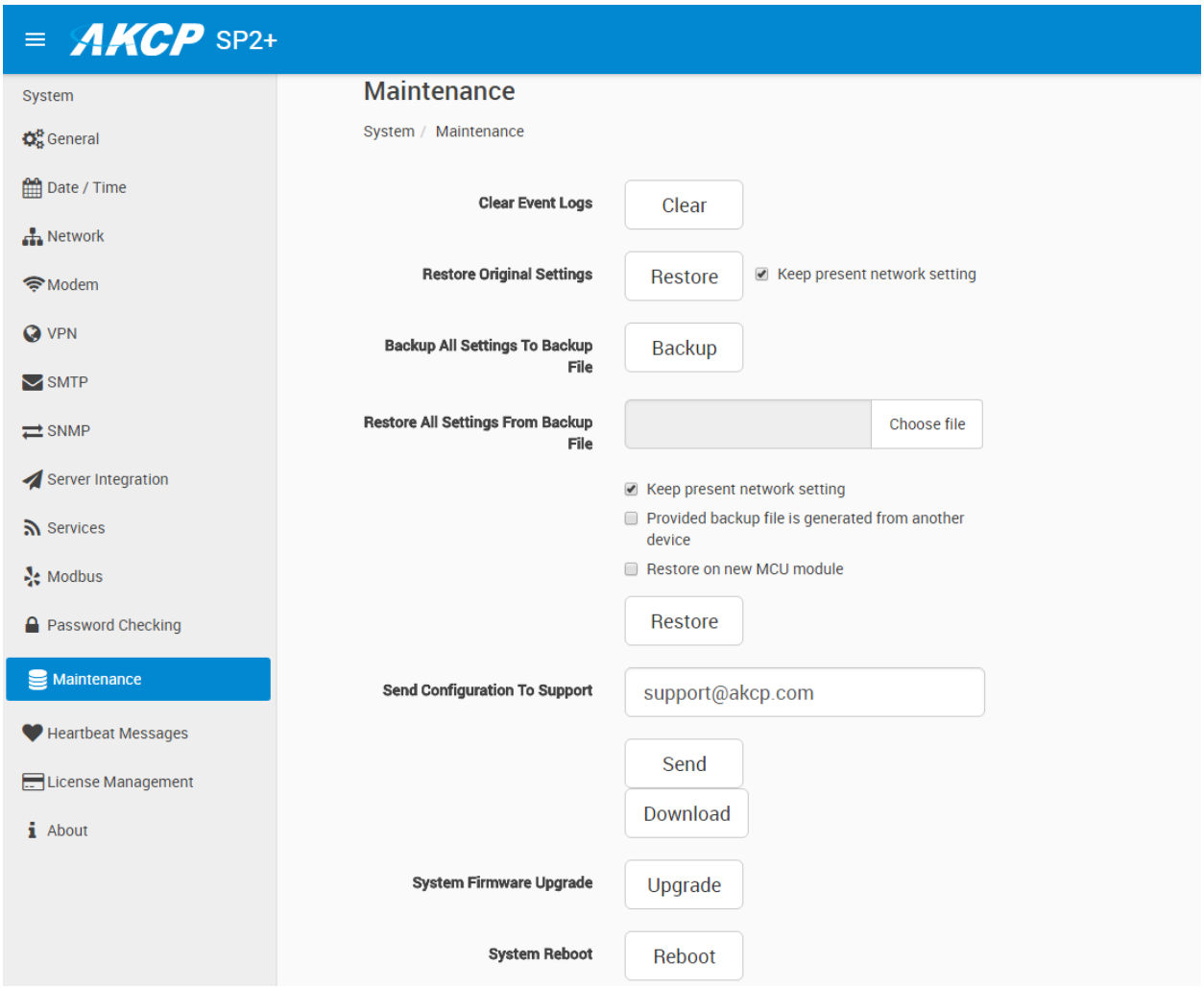


You can specify password expiration between every 15 and 90 days for all account types. You could also set “none” to disable expiration.



You’ll get a notification upon login when the password has expired, and will be asked to change it. It’s advised to change it when asked, but you can still proceed without changing.

Maintenance



On this page the following options are available:

Clear Event Logs: clears all logged events.

Restore Original Settings: removes all customized settings and returns the unit to factory defaults - you can also choose to keep the network configuration intact.

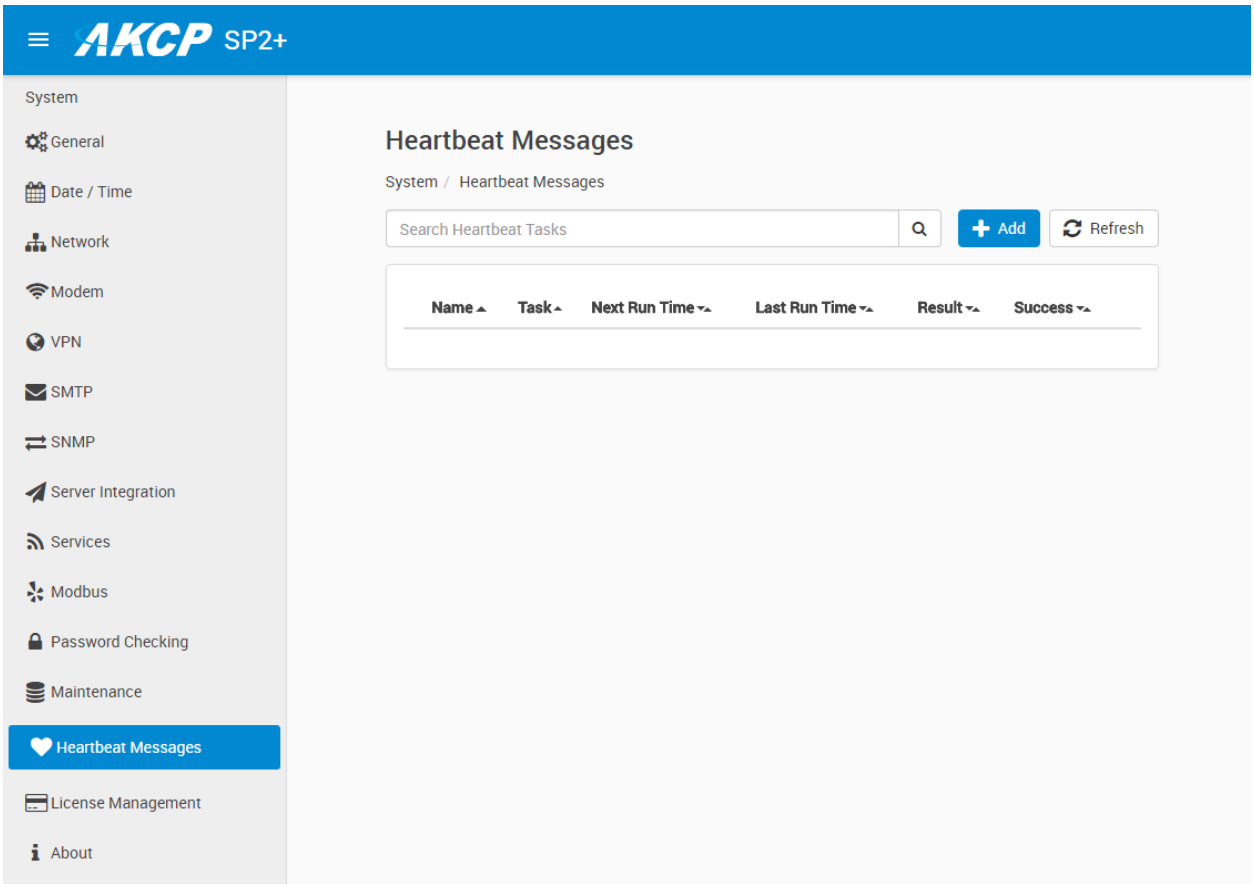
Backup/Restore All Settings: the unit's configuration can be backed up to a file and restored quickly and easily. You can choose to keep the present network settings, if the backup file is from another unit. The backup file contains all settings and notifications for the unit.

Send Configuration To Support: when asked by Support, this sends the unit's backup file to us. This also contains the device's internal logs which are useful for troubleshooting.

System Firmware Upgrade: allows you to upgrade to the latest firmware of the unit - alternatively you could upgrade from APS. We'll show you the process of the Web UI firmware upgrade below in another section.

System Reboot: this will initiate a software reboot of the unit, useful when you only have remote access. You'll need to specify the Admin user's password again.

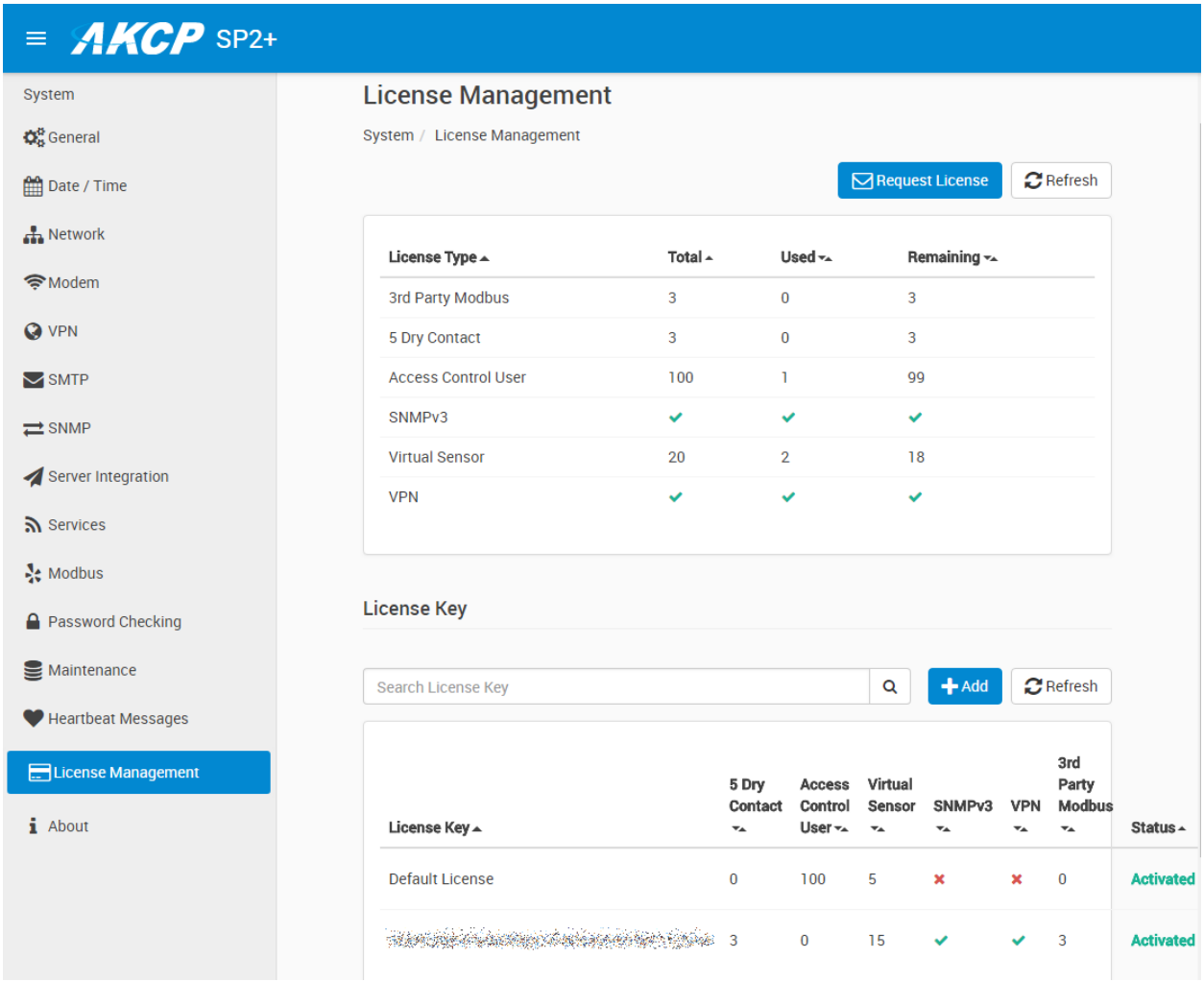
Heartbeat Messages



This feature allows you to set up periodical “keep alive” notifications task by email, SMS or SNMP Trap to indicate the unit is still working properly.

We’ll show you how to set up these in another manual with the other notifications and actions.

License Management



Here you can manage the purchased licenses for specific features on the unit.

For example you can request SNMPv3 license by clicking on the **Request License** button.
This will send an email to our Sales team with your unit's MAC ID. You can then add the purchased license key with the **Add** button and activate this feature on the unit.

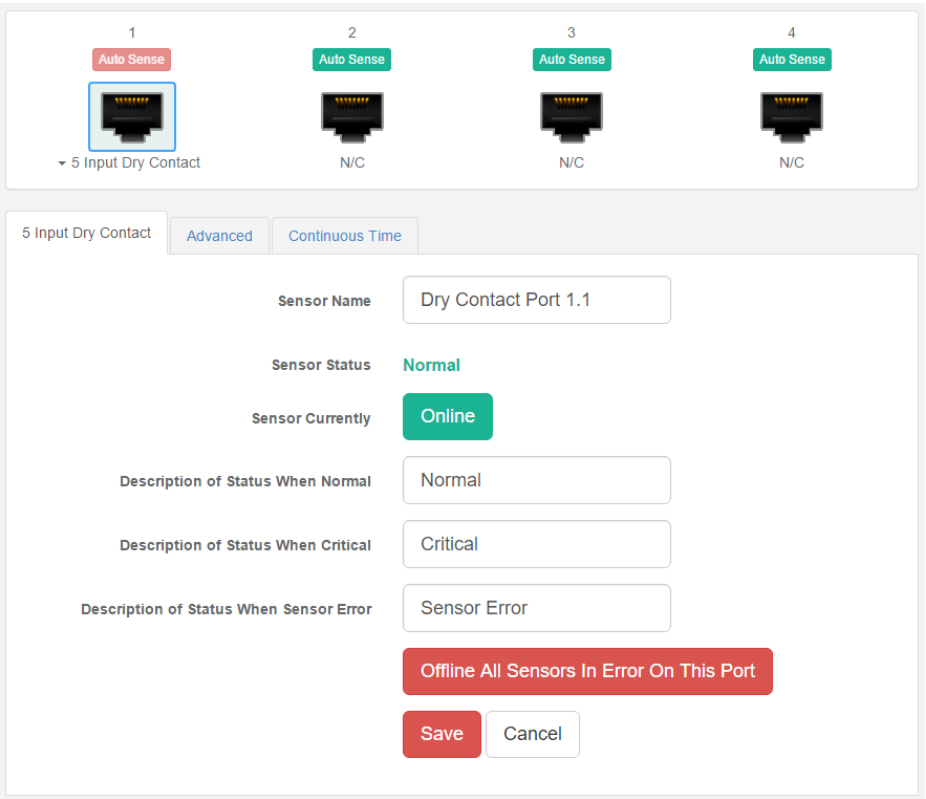
License keys can be backed up/restored with the backup file.
All keys are unique per device and per feature.

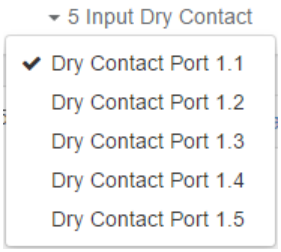
Features that needs separate licensing:

- *5 Dry Contact option:* Allows you to connect 5 dry contacts (input only) per sensor ports. See below for more information.
- *Access Control User licenses over 100:* The first 100 user licenses are free (1 is always used for the Admin user), and you can get more licensed users in blocks of 100; the limit is 1000.
- *SNMPv3 feature:* Allows you to use and configure secure, authenticated SNMP trap messages.
- *Virtual Sensors:* Allows you to use and configure virtual sensors. The first 5 sensors are free, you can get more license in blocks of 5.
- *VPN feature:* Currently the APS VPN integration is supported, to use a secure VPN channel between the unit and APS. Please note that when using this option, the number of maximum sensors that can be used by the unit will be reduced to 34 on the older F4 units.
- *3rd Party Modbus Device:* Allows you to easily integrate your Modbus devices with the SP+ units using configuration template files. This is only available on units with expansion ports.
- *F7 units:* IPv6 and Radius features (see separate manuals about these).

About Dry Contact Inputs

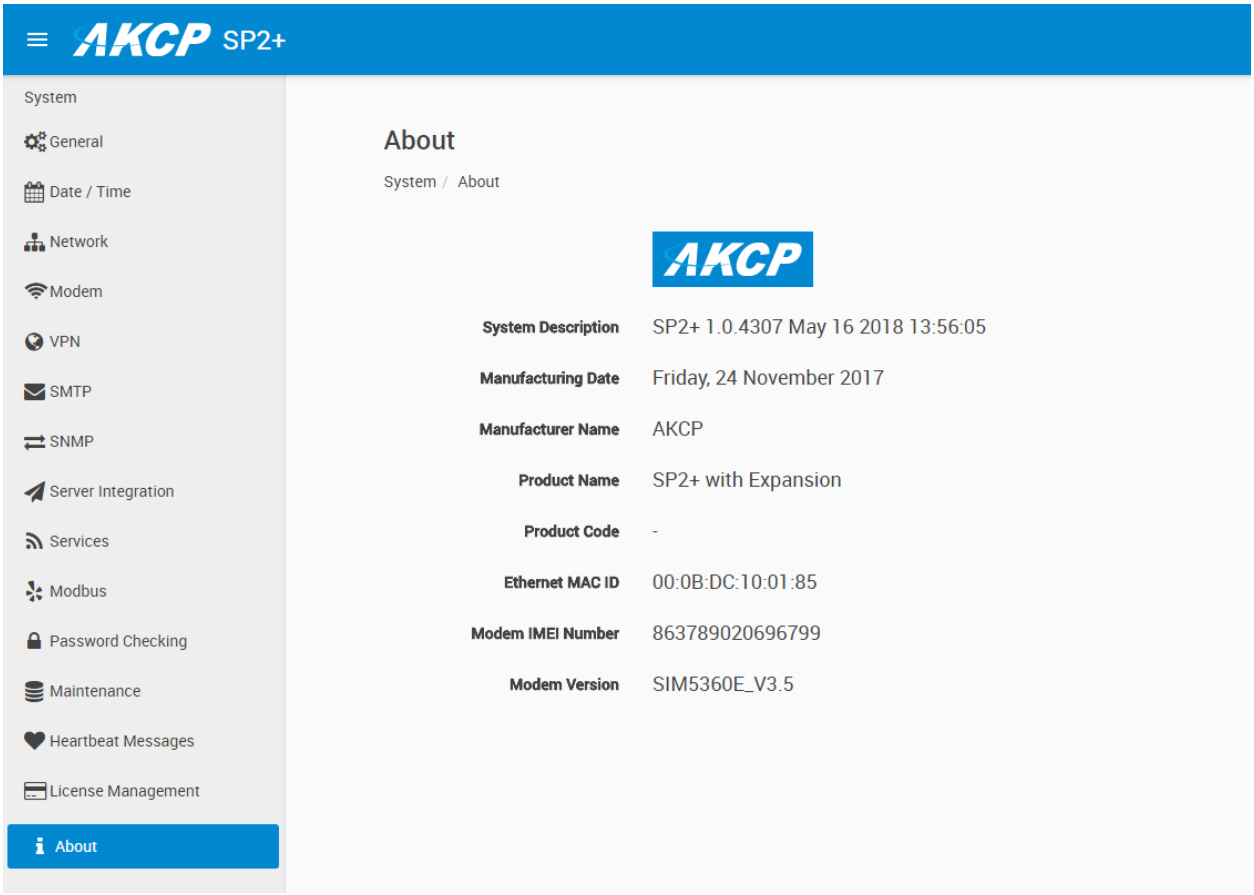
The dry contact inputs can be configured as ***inputs only* up to 5 Volts**.





Practical applications:
The dry contact inputs can be used to monitor many types of equipment, for example, you can run the connection from warning lights on alarm panels to the dry contact inputs, so that when the warning light on the alarm panel is activated, the dry contact is triggered, thus allowing you to send notifications via emails or SNMP traps.

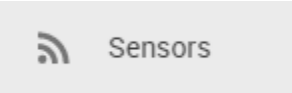
About

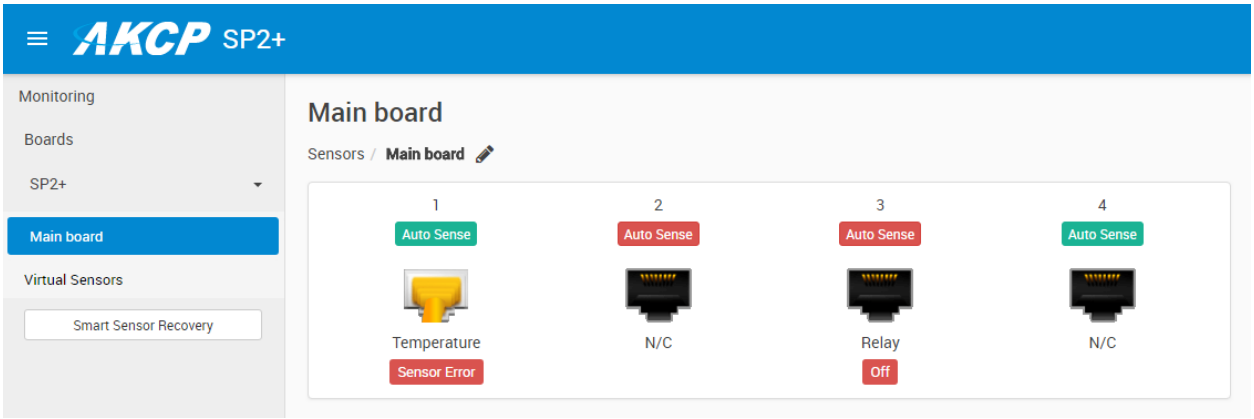


This page shows information about the **Manufacturing Date**, **Ethernet MAC ID**, **System Description** and **unit type (F4/F7)** which are important when you request support.

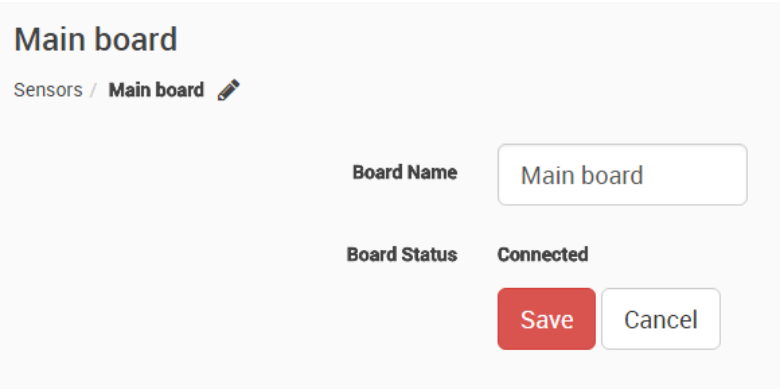
You could make a similar screenshot when you need help with your unit, as this information can help us diagnose the problem.

Sensors page





On this page you can view all sensors connected to the unit per port.
Non-connected sensors will be also displayed, until you re-attach or manually remove them from the configuration.



You could also rename the unit's Main board by clicking on the pencil icon:

Please note the **maximum supported cable length to use with Thermal Map Sensors**:
Maximum extension cable length from the SP1+ sensor port to the TMS using CAT5 = 28 Feet
Maximum extension cable length from the SP1+ sensor port to the TMS using CAT5e & CAT6 = 60 Feet

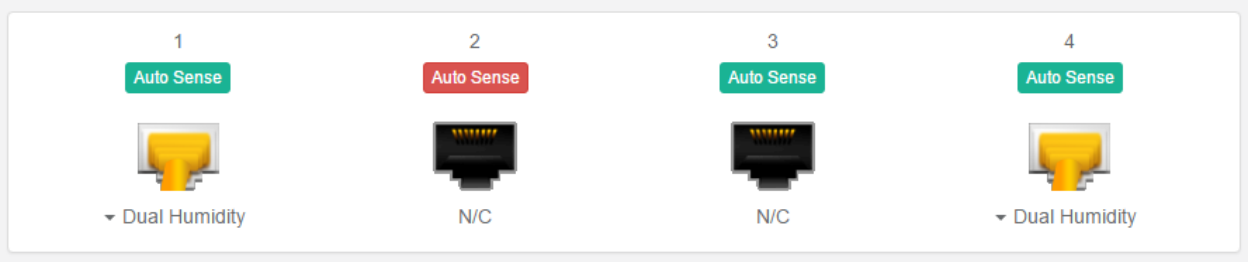
Important note: If you're using analog pins on the sensor ports (with manually on-lined DCV sensors, and pin 7 of the RJ45 connector) make sure that the **voltage doesn't exceed 3 Volts**. Otherwise you can damage the unit!

General options for all sensors

You can change the following general options for all sensors:

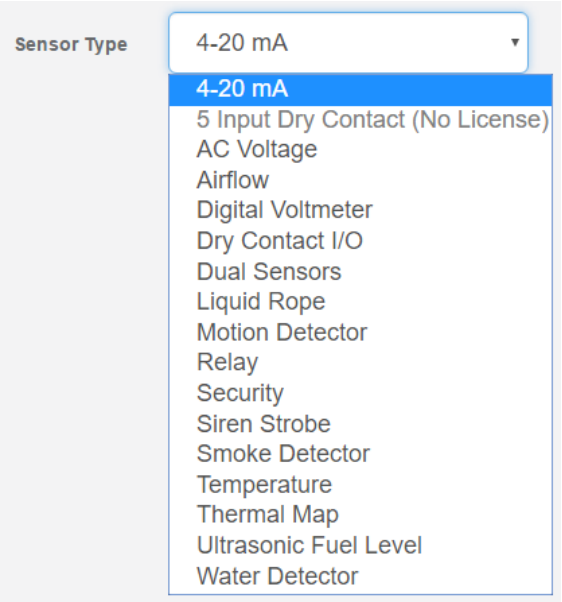
Disable Auto Sense

Click on the **Auto Sense** button to turn off the automatic sensor detection for a port.



This feature is useful if you want to simulate a sensor (this works for Relay type sensors) or to prevent a sensor from going offline state. Note however that the sensor will be in “sensor error” state if the unit can’t get any reading from the sensor.

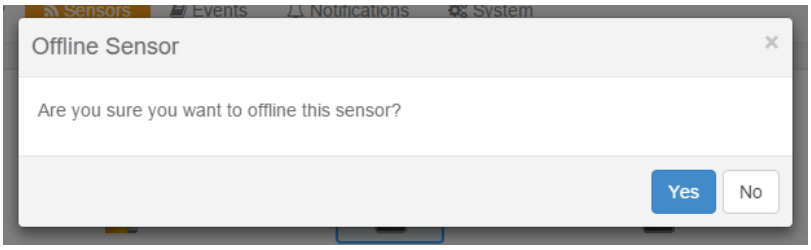
Choose Sensor Type



You can pre-configure a specific sensor type if needed, for example if you put the sensor offline before.

Offline a sensor

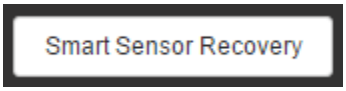
You can manually offline any sensor by clicking on the green **Online** button on the sensor's configuration page.



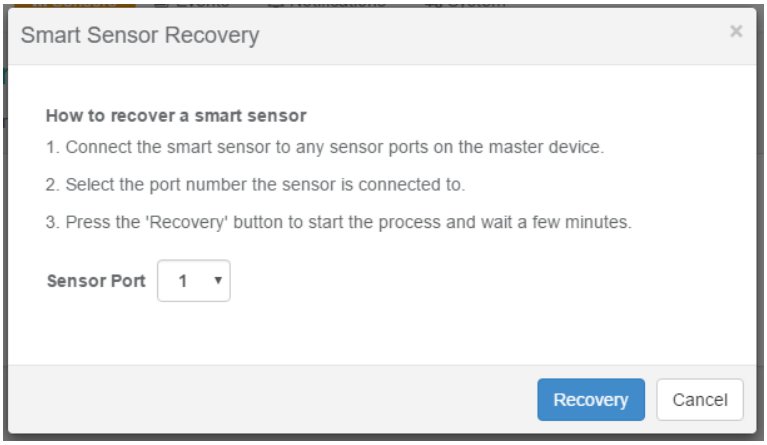
You'll be asked for confirmation in a popup window.

Note: if you change a sensor to "offline" it will no longer be displayed on the web interface. In order to reactivate it, you have to toggle it back to "online".

Smart Sensor Recovery

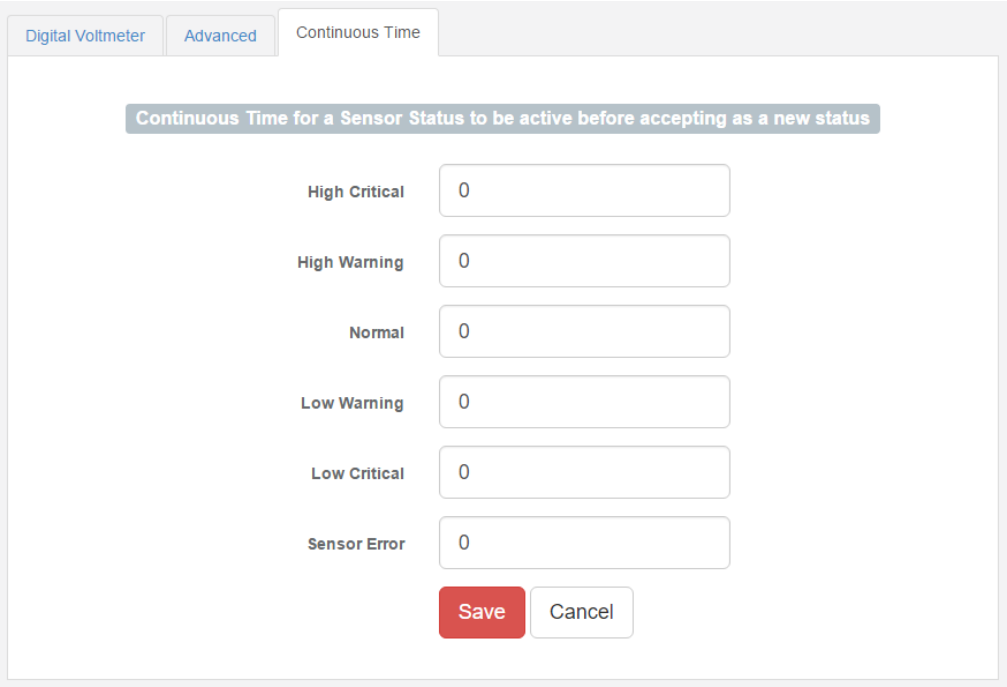


This feature will be used **only** for the new **Smart Sensor** type. The firmware can be updated on these sensors automatically, and if the upgrade has failed for some reason and the sensor becomes unresponsive, with this option you can recover them to the default firmware. It's not used by other sensor types.



Note:
If there's a difference between the version stored in the unit's firmware and the sensor's firmware, it will upgrade/downgrade the sensor's firmware upon powering up/reboot of the unit, or on sensor reconnection.
If you need to downgrade the smart sensor firmware, you can only do so together with the unit's firmware.

Change Continuous Time

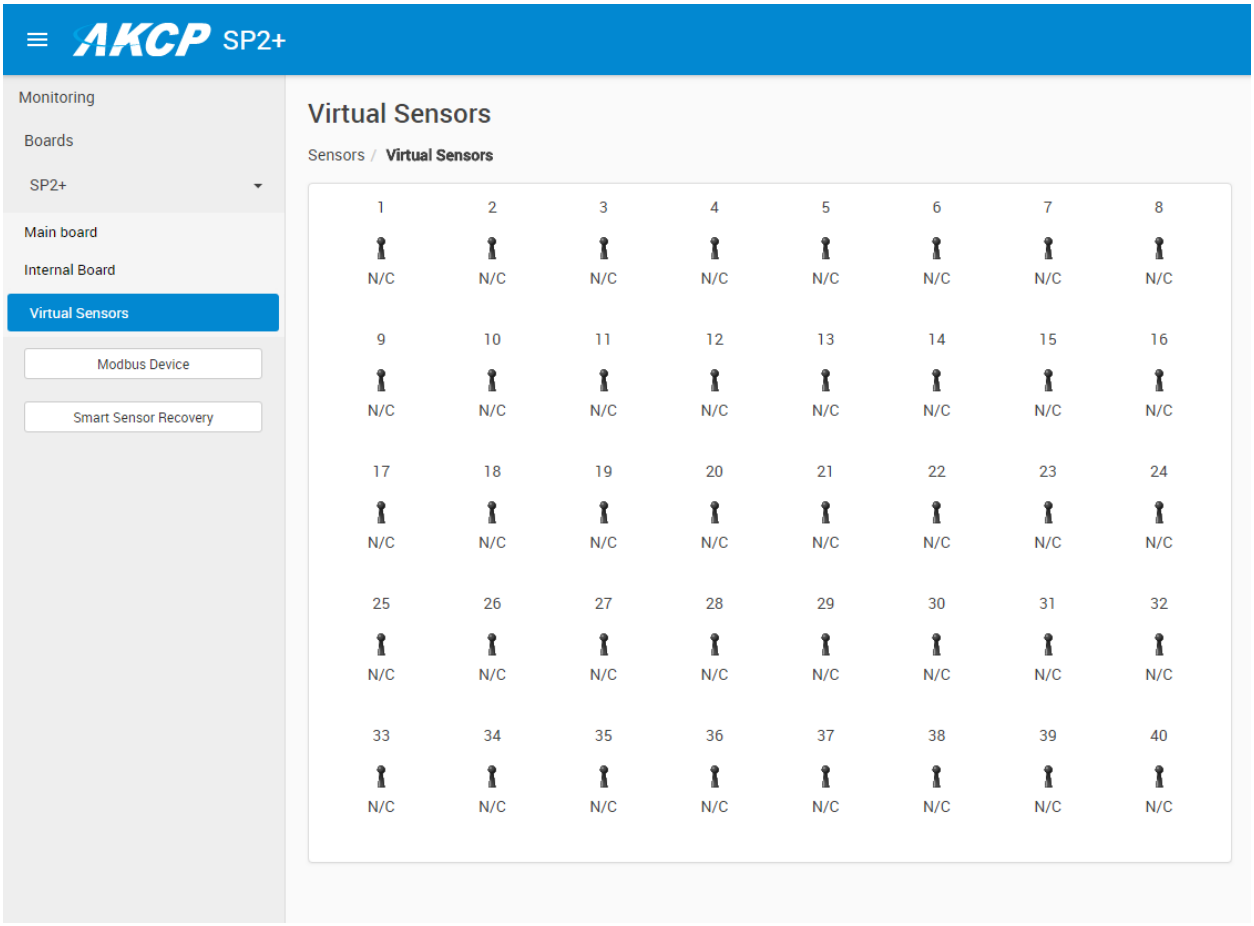


The following advanced functions are for setting the time frame in which the system should delay a notification being triggered when a sensor gives a reading that exceeds the thresholds (high warning, normal, etc).

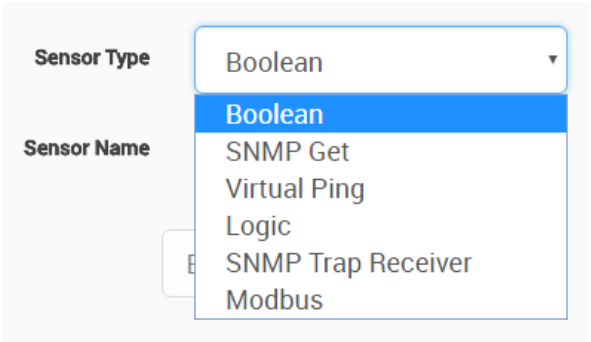
Continuous Time to Report High Critical: This helps to eliminate unnecessary messages during minor fluctuations. You can set the amount of time to delay a notification of a status change from high warning to high critical. Enter the time in seconds and press the “Save” button. The amount of time that can be entered is between 0 and 65535 seconds which equals approximately 18 hours.
Continuous Time to Report High Warning: As above but delays notification for “High Warning”.
Continuous Time to Report for Normal: As above but delays notification for return to “Normal” state.
Continuous Time to Report for Low Warning: As above, but delays notification for “Low Warning” state.
Continuous Time to Report for Low Critical: As above but delays notification for “Low Critical” state.
Continuous Time to Report for Sensor Error: As above, but delays notification being sent for sensor going into an error state.

Example: An airflow sensor or humidity sensor may have temporary drops in readings which are normal operating characteristics; a logical time limit is set to show abnormal conditions.

Virtual Sensors



On this page you can configure the Virtual Sensors. The first 5 sensors are free; if you need to use more you can purchase additional licenses (see the Licensing section in this manual).



Virtual Sensors can be a very powerful tool in your monitoring system. On the SP1+ you can have up to 32 of these virtual sensors and they allow for a multitude of applications.

SNMP Get, sensor logic evaluation and ping commands among others are all possible from the virtual sensors. An example use of this could be to use the SP1+ as a probe manager. If you had a SP1+ and multiple sensorProbe devices they could all be monitored, mapped and alerted via the SP1+. You can perform SNMP Get commands on a server to monitor memory or CPU load, or you can ping network enabled devices and be alerted if they go offline.

Please note:
The Virtual Sensor Ping cannot ping an IP address on the VPN network.

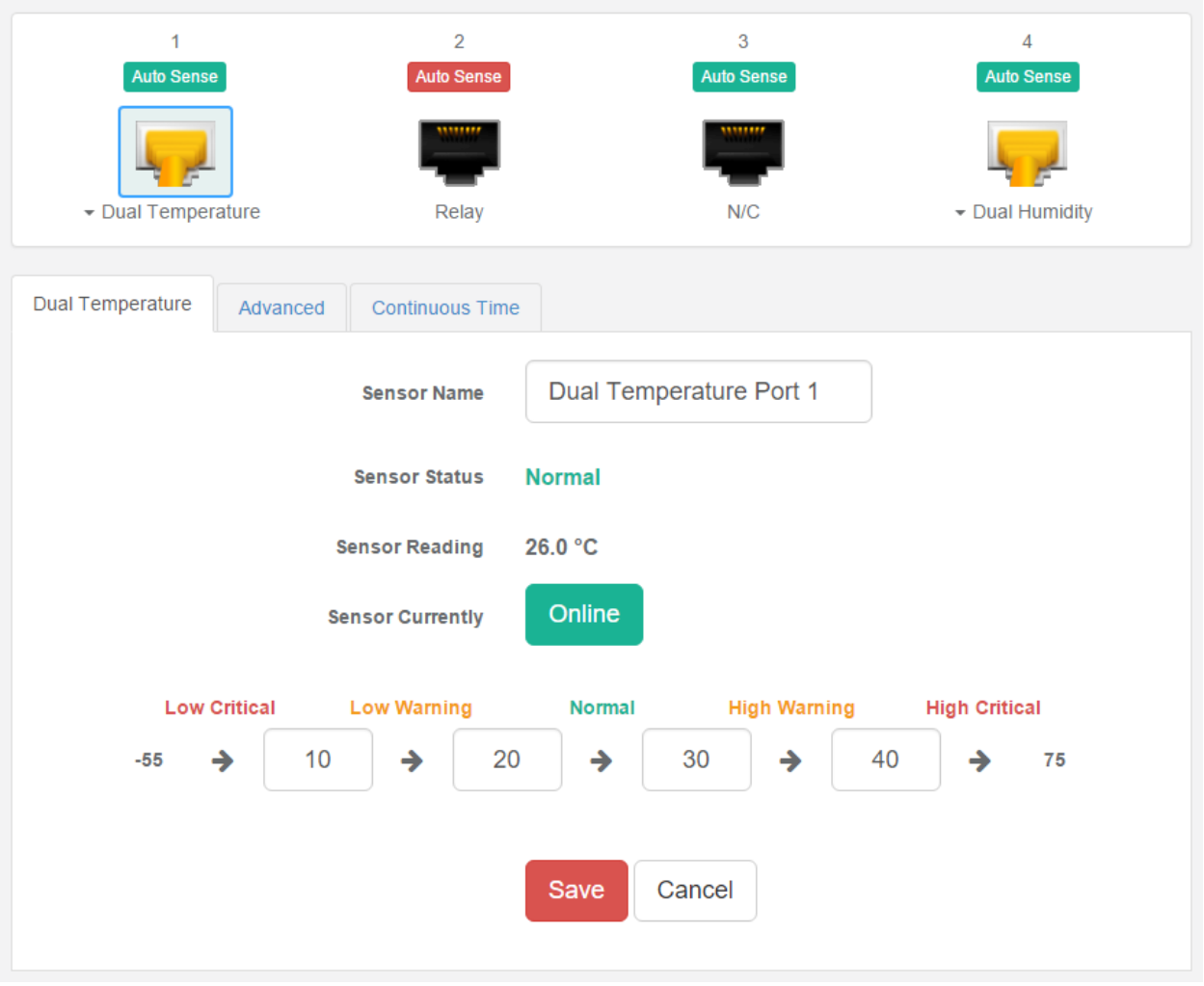
We'll explain more about the Virtual Sensors and how to configure them in the **Notifications manual**.

Example sensor configuration

Below we'll show the configuration of 2 sensor types: the Temperature/Humidity and a Relay sensor. The configuration of these 2 types of sensors covers most settings that can be configured for other sensor types.

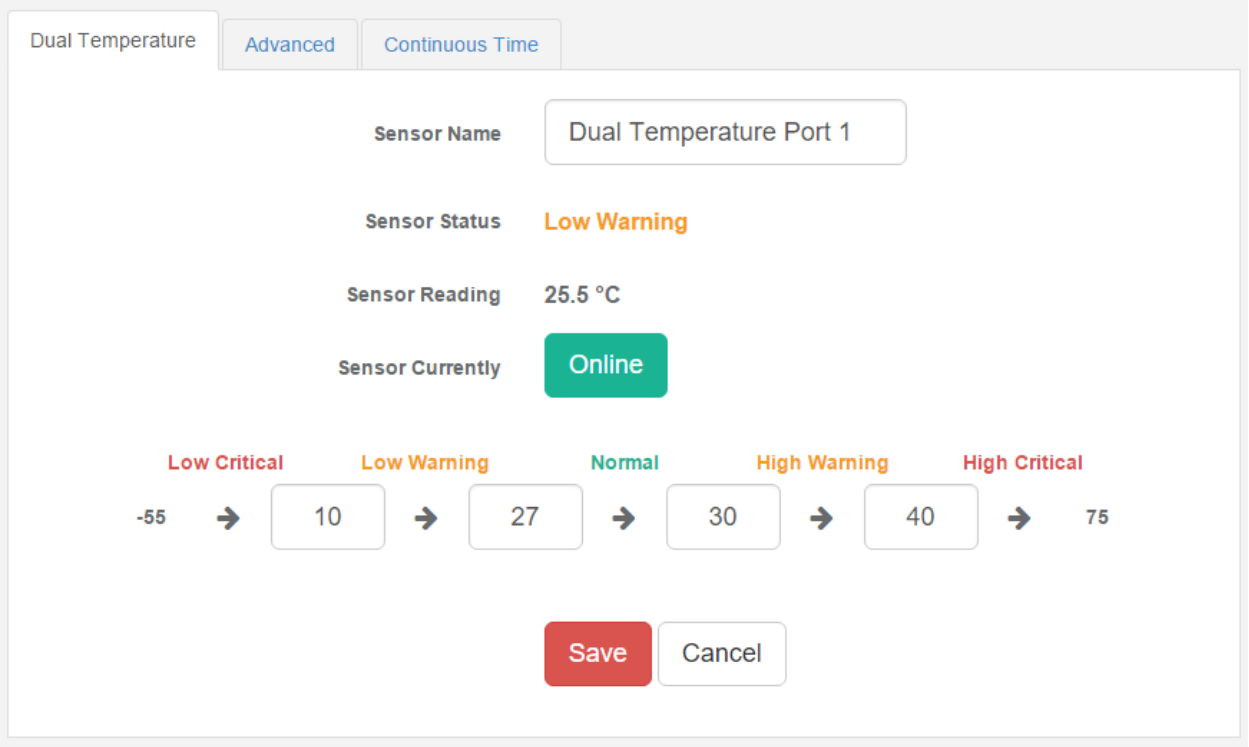
Temperature/Humidity Sensor

Click on the sensor port where the sensor is connected to open the sensor's configuration.
Note: another way of accessing this page is to click on the sensor from the Summary page.



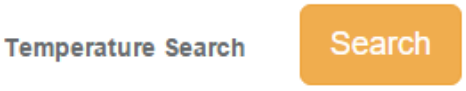
From this page you can carry out various operations. You can view the current status (normal, low critical, high critical etc), rename the sensor, put it offline and change the thresholds. In the screen shot above you can see the sensor is indicating a temperature of 26 degrees °C, and a status of Normal.

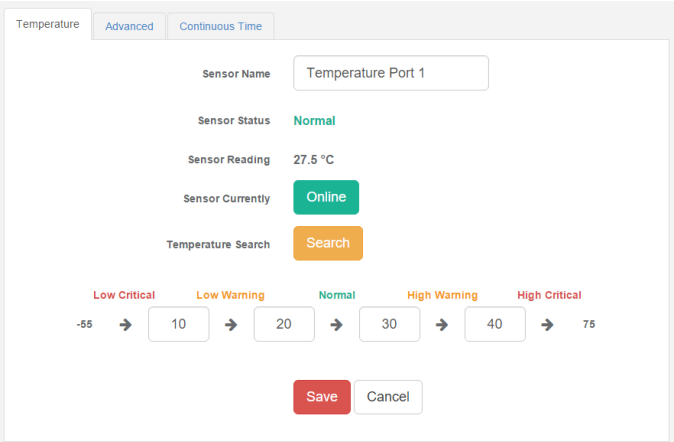
You can re-configure the thresholds for each sensor state. After changing a threshold value, click "**Save**". In the next screen shot you can see that a threshold has been changed to 27 make a new "low warning" state, and along with it the sensor status has changed:



Note: the Humidity sensor has the same configuration options as the Temperature sensor.

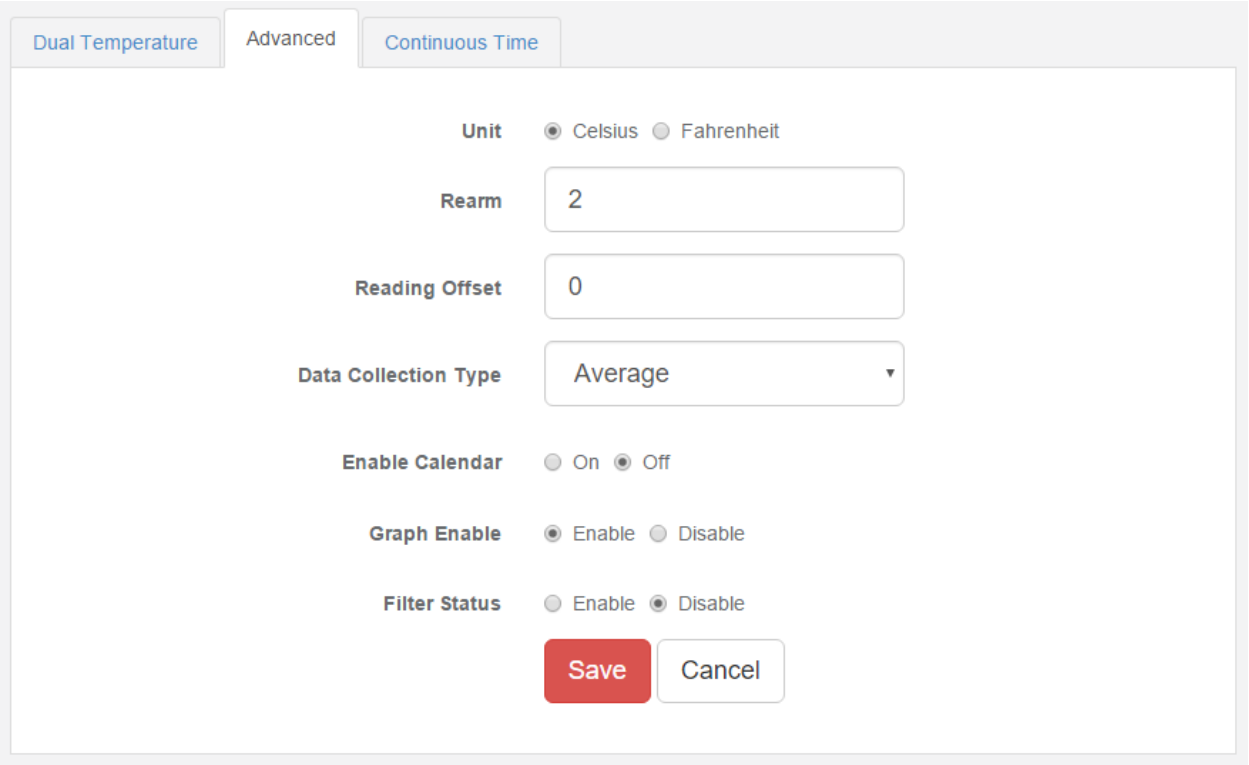
You might see a **Temperature Search** option for the connected Temperature sensors:





What this button does is to search for new temperature sensors in a chain, if you've connected more than 1 sensor in a Daisy-Chain Temperature (DCT) sensor chain.
It is **not** available for Thermal Map Sensors (TMS).

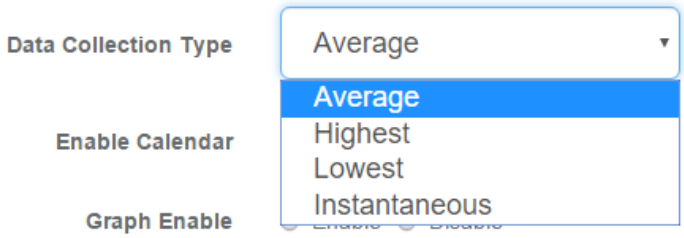
Advanced sensor configuration for Temperature/Humidity sensors



Units: changes units from °C to °F or vice versa.

Rearm: The Rearm parameter is useful for sensors whose values can vary such as the temperature and humidity sensors.
It is used to prevent the sensor from rapidly changing between two states. For example if the **Warning High** threshold for the temperature sensor is set to 80 degrees and the sensor were to vary between 79 and 80 you could be faced with a very large number of emails, traps, and events logged. The Rearm parameter prevents this by forcing the temperature to drop by the Rearm value before changing the state back to normal. In this example, if Rearm is set to 2 then the sensor would have to drop from 80 down to 77 before the status would change from **Warning High** back to normal.

Reading Offset: The Reading Offset feature is a calibration tool. If you wish to calibrate the temperature sensor, for example, you could enter an offset value of 5. This would mean if the sensor reads 20 degrees then it would record as 25 degrees. This figure can also be a minus figure (e.g. -5 would show 15 degrees instead of 20).



Data Collection Type: This refers to the data collection from the sensor and how the data is then displayed on the graphs.
There are four options for the collection of data: Average, Highest, Lowest and Instantaneous. The default setting is “Average”.
When the data collection type is set to “Average” the averaged value between 2 graph intervals is stored and output graphs for the daily, monthly, and yearly all have the same size on the screen. For the daily graph, each data point on the graph is one data point collected from the sensor. But for the monthly and yearly graph, in order to display more data into the same size as the daily graph, some consolidation on the data is needed. One data point on the monthly and yearly graph is an average of the sensor data in a range.
The maximum and minimum values showing on the monthly and yearly graphs are the value of this consolidated data and not the raw data over that period of that time.
The When the Data Collection Type is set to the Highest setting then you will get the graphing output displaying the sensors highest average readings during sampling. This is the same for the Lowest setting (lowest average).
With the Instantaneous setting you can store the actual value of the sensor at the sampling interval without averaging.

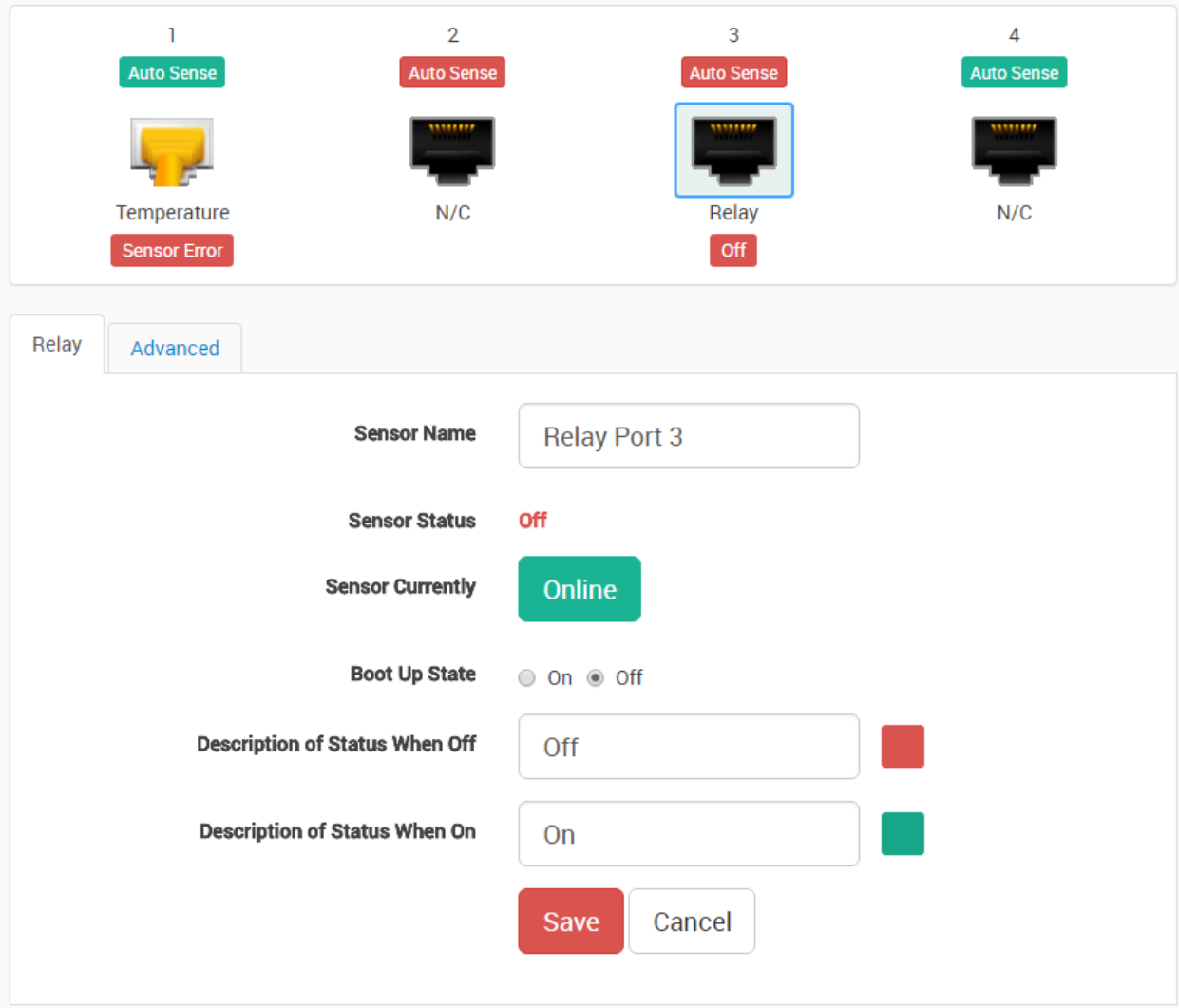
Graph Enable: In order to save the data from the sensors on the unit you will need to enable the Graphing feature on the unit. You need to change the Enable Graph to the On position and click on the Save button to enable the graphing. Note that you could also enable the graphing from the Summary page.

Filter Status: The Sensor Filter Status is a feature that you can Enable or Disable and when enabled will check the sensor status. If the status of the sensor changes very rapidly, then it will report how many times the sensor status changed, instead of having multiple separate entries in the syslog. When enabled, this will report the changes and status of a sensor only once.

Relay Sensor

Click on the sensor port where the sensor is connected to open the sensor's configuration.
Note: another way of accessing this page is to click on the sensor from the Summary page.

You can directly see the Relay's current status below the sensor port.

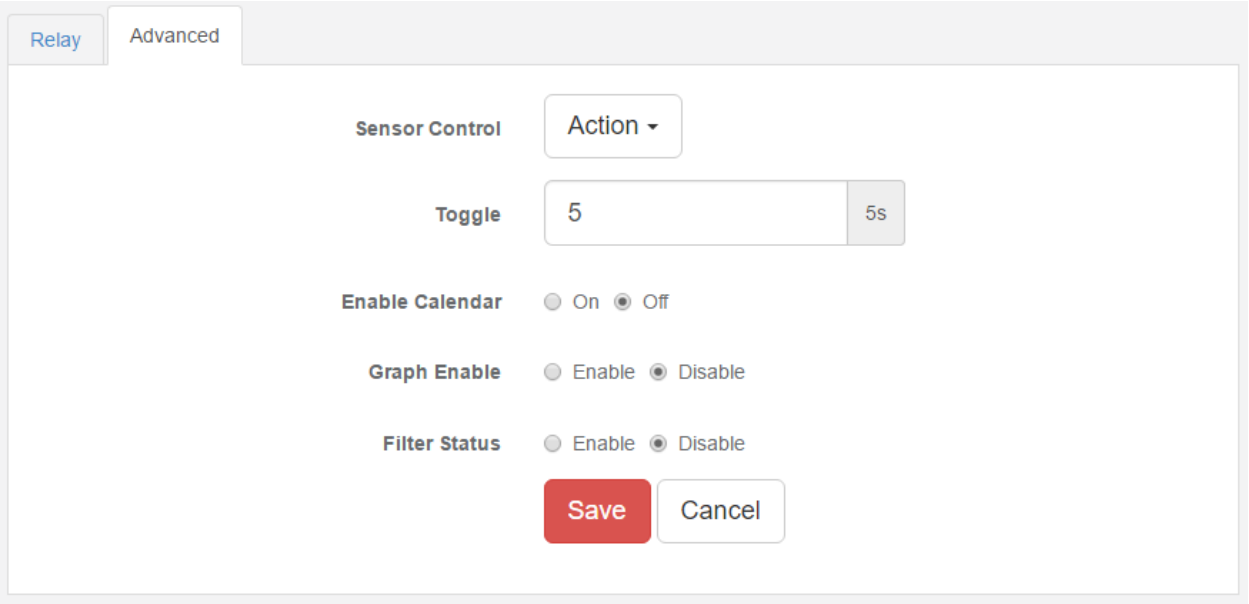


Boot Up State: You can change the state of the relay when the unit starts. The default is Off.

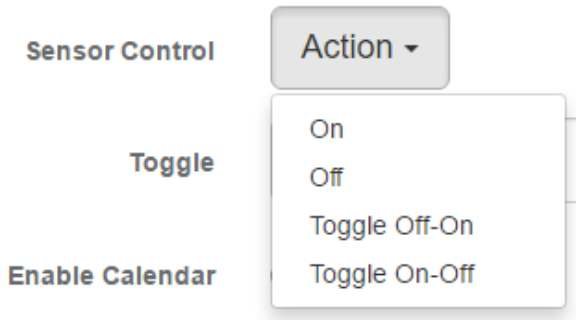
Description of Status When Relay Off/On: These fields are the custom description, which will be displayed in the Relay Status field when the relay state is off/on. The same text is listed as one of the relay actions used to turn off/on the relay. Examples for this field are Close/Open Door, Turn Pump Off/On, Turn Light Off/On, etc.

Color: You could assign a custom color for the Off/On status: click on the color and the color picker will be shown.

Advanced sensor configuration for Relay sensors



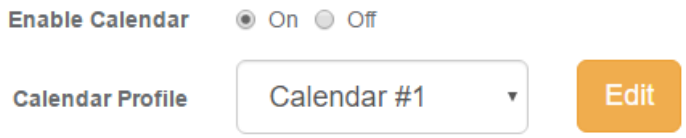
Sensor Control:



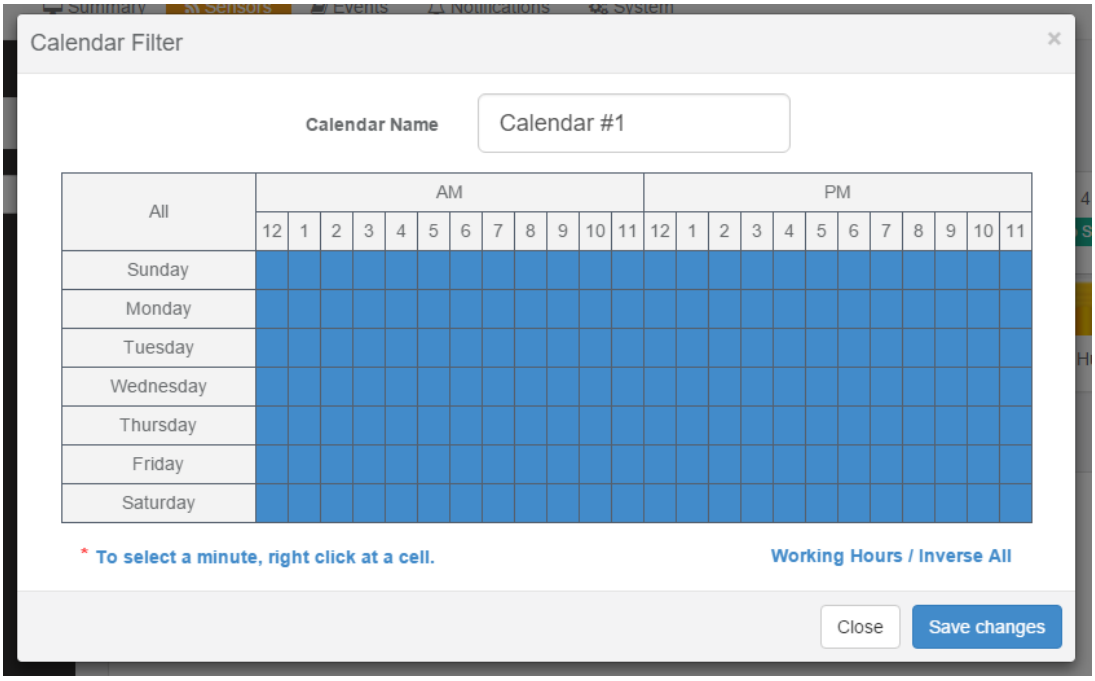
This button allows you to manually control the relay by controlling the cycle of the relay in an on-off-on or an off-on-off cycle. You can also set the “Toggle” (Cycle Time) here in seconds.

You don’t need to change an option to be able to link the relay to an action.
The following actions can be chosen in an action: Turn on until sensor normal, turn off until sensor normal, cycle the relay, turn on until acknowledged, and turn off until acknowledged.
We’ll explain more about these options in the Notifications manual.

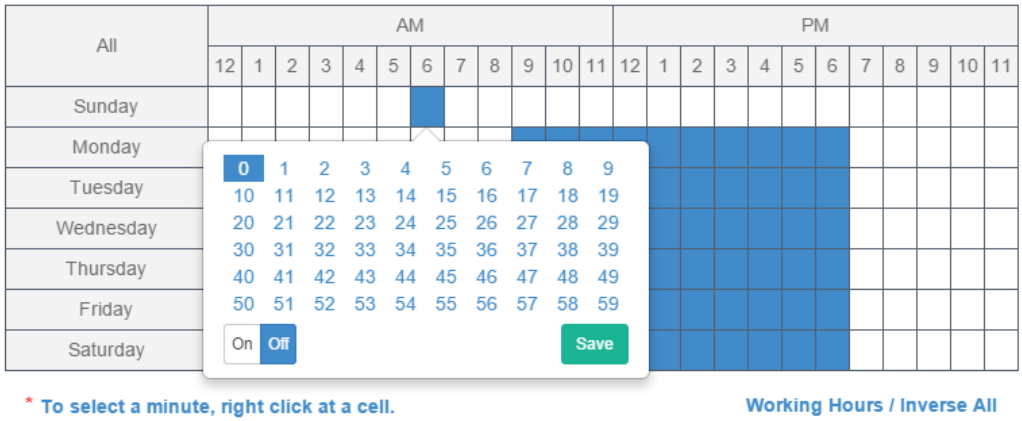
Enable Calendar: Allows you to setup a *Calendar Profile* for what days and times you want or do not want the relay to be active.



Click on the **Edit** button next to a selected calendar to modify it.

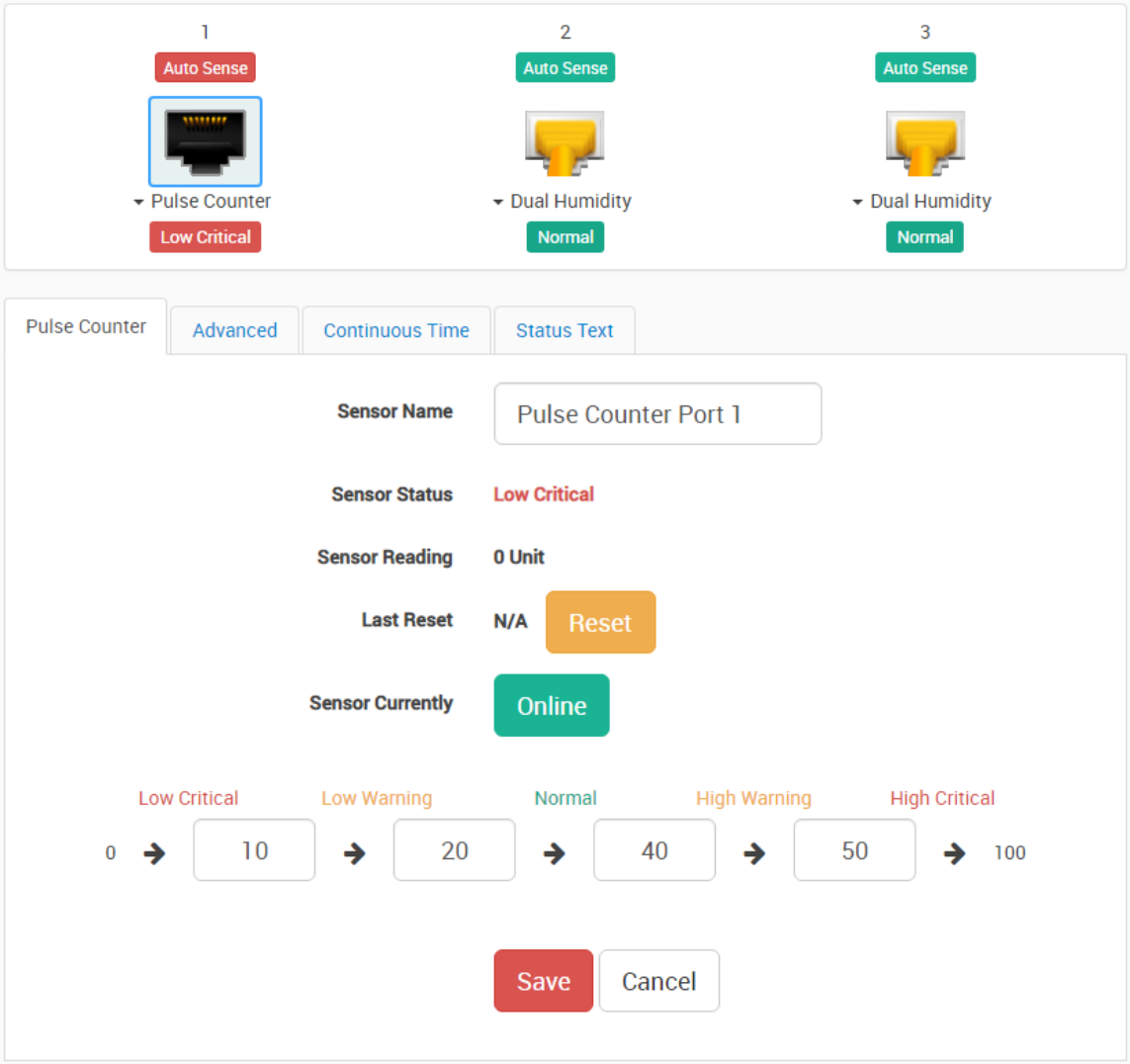


Blue cells means that the notification is on, white cells means it's off.



You can quickly select the Working Hours only, and specify a custom schedule down to minutes by right clicking on a cell.

Pulse Counter sensor



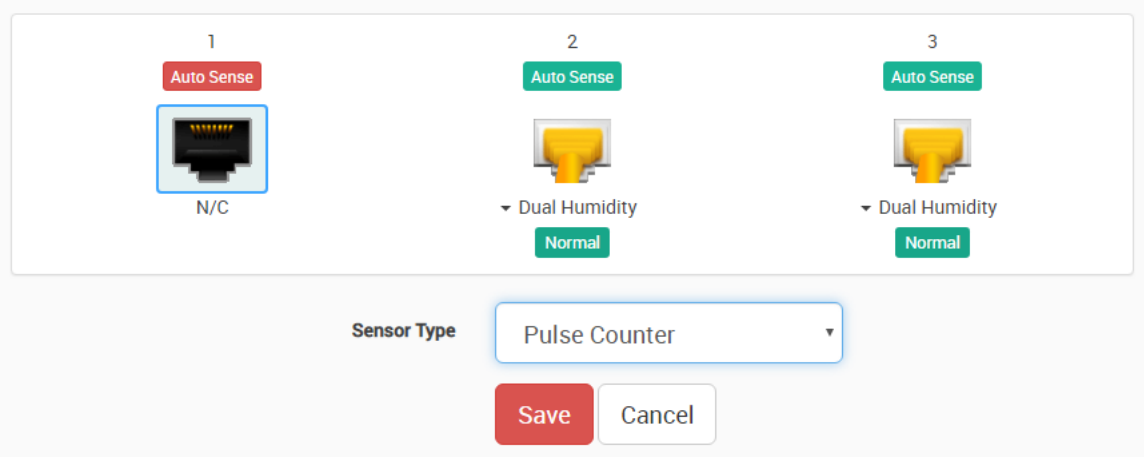
The pulse counter is available on the SP+ platform, as of firmware version 1.0.4967. It provides:
- accumulated pulse count
- flow conversion of the pulse count

It can measure up to 1000 pulses / sec (1 Kilohertz).
Normally this sensor should be used with some external sensor which outputs pulses.

Sensors that could work: basically any switch type sensor, and any custom sensor that could generate a pulse signal. For example Wind speed sensor, Electricity meter etc.

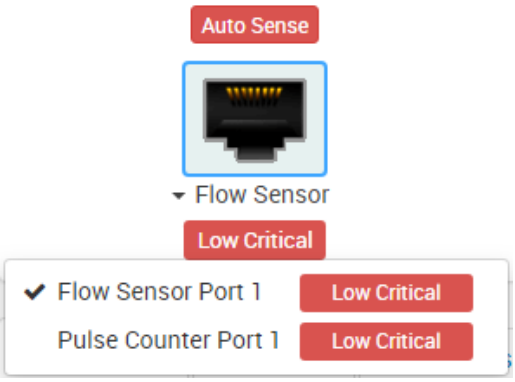
For example, you can connect the output of a third-party water flow sensor in the market to our sensor port.
The specs of those sensors will indicate how many pulses equal to, for example 1 liter: 100 pulses = 1 Liter.
Then you can set the "Number of Pulses per Unit" to 100, and change the unit to L.
Then the sensor value will be changed according to the output of the water flow sensor which is connected to the sensor port.

How to use the pulse counter?

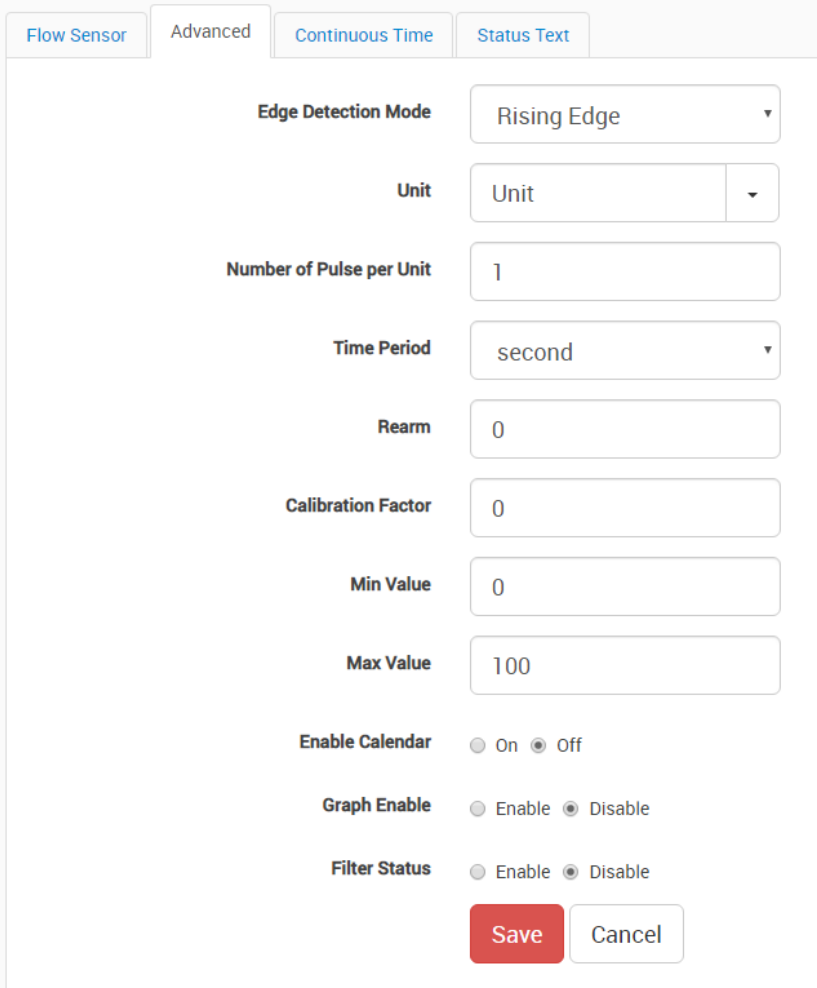


The sensor is designed to be used by disabling the Autosense and connecting an external sensor to the sensor port. This sensor will detect changes on the Data pin (Pin 1 of Sensor Port).

If there's changes:
- Flow Sensor value will show rate of the change in Unit / Second
- Pulse Counter will accumulate the pulses since the sensor is set to online



To set it up, disable Auto Sense on a sensor port and select the Pulse Counter sensor type from the list. This will give a dual sensor with Flow Sensor and Pulse Counter.

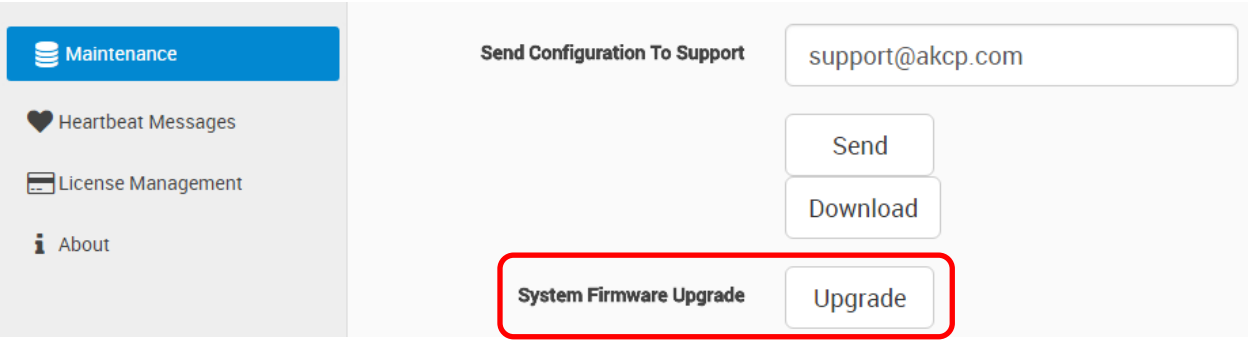


In the Flow Sensor there is "Number of Pulse per Unit" in the config.
You can use this value to adjust the sensor reading to match the real-world value.

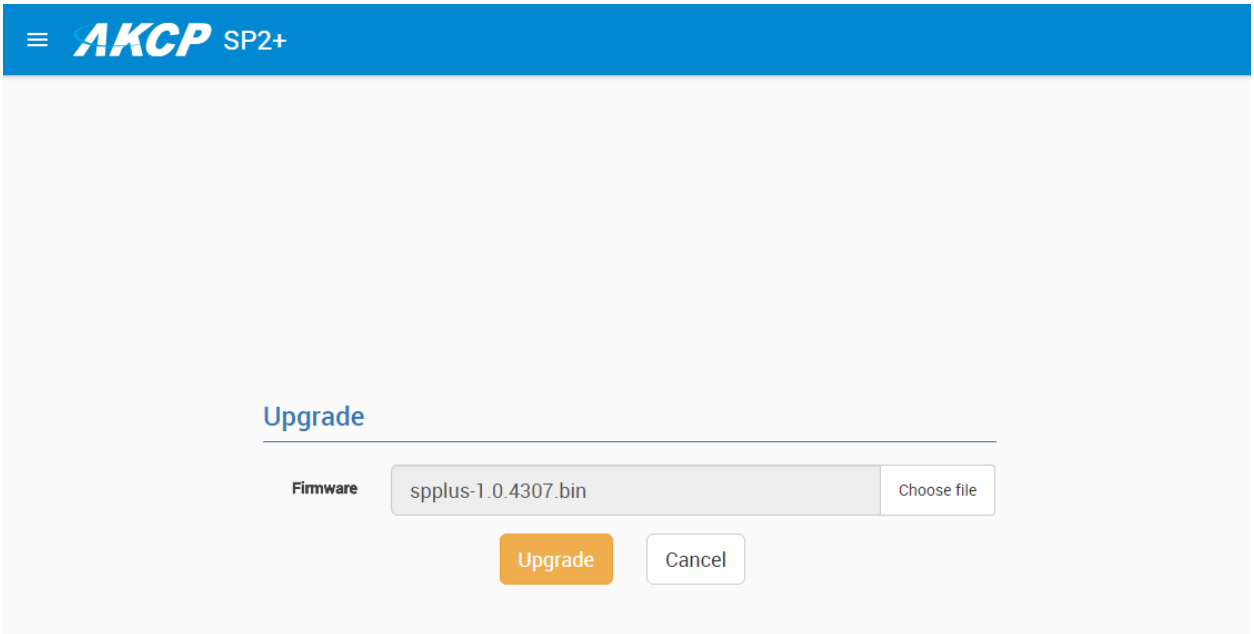
Dry contact will also work but only to count the pulses. If you want to test for the rate accuracy, you'd have to test with something that can generate a wave signal, like using an oscilloscope to generate wave form and plug it to the sensor port.
But the general idea of this sensor is that it will show the rate of received pulses and also count it.

Firmware upgrade through the Web UI

The firmware upgrade process is very simple and straight-forward.

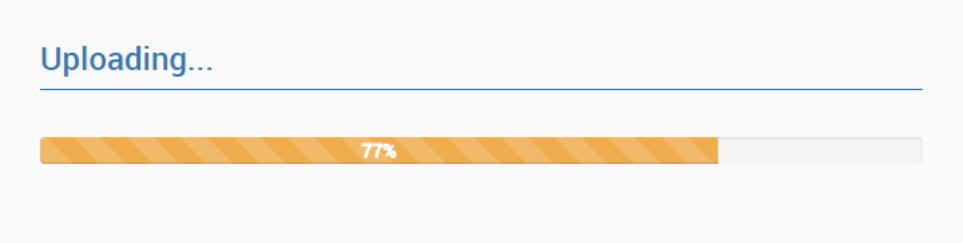


Open the **System/Maintenance** page and click on the **Upgrade** button at the System Firmware Upgrade section.

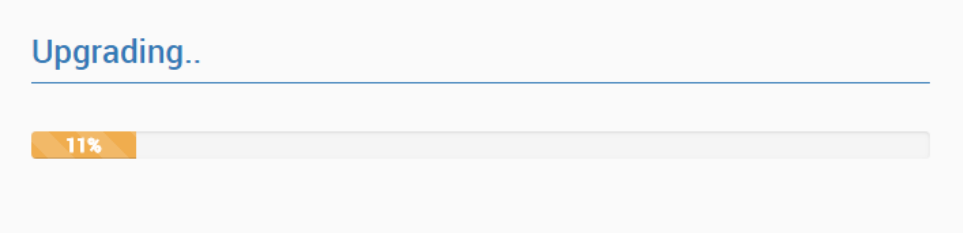


This will load the Upgrade page. Choose the firmware file from your PC and click on **Upgrade** to start the process.

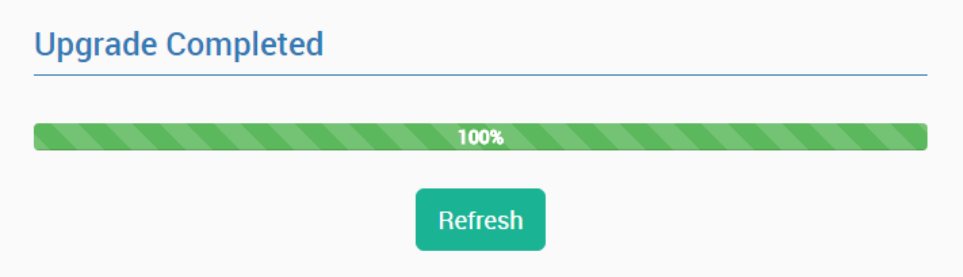
Important: There are two separate .bin files included in a firmware update package. One for the F4 units and one for the F7 units. The .bin file for the F4 units is named spplus-1.0.xxxx.bin and the .bin file for the F7 units is named spplus_f7-1.0.xxxx.bin. If you try to upgrade your unit with the wrong .bin file, the firmware upgrade will fail, so please make sure you use the correct file for your unit type.



First the file will be uploaded to the unit…



…then the upgrade process will run. The whole process can be done in a few minutes.
The Power/Ethernet LED will be red during the upgrade.



The unit will reboot at the end of the upgrade. Click on the **Refresh** button to reload the Web UI.

Network ports used by SP+ units

Below we list the ports used by our SP+ units. Most of them are needed for external communications with APS, and to use network features.
Most ports are user configurable, these are the default ports.

Main ports:

- 5000 TCP for RPC with APS - note: not fully user configurable
- 161 TCP/UDP for SNMP
- 80 TCP for HTTP of Web UI

Other ports:

- 123 TCP for NTP (Network Time Protocol) - note: port is not user configurable
- 162 TCP/UDP for SNMP Trap
- 25 TCP for Email SMTP (if used)
- 1194 TCP/UDP for VPN (if used)
- 443 TCP for HTTPS of Web UI
- 502 TCP for Modbus TCP (if used)

FCC Statement

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, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

Please contact support@akcp.com if you have any further technical questions or problems.

Thanks for Choosing AKCP!