

# NC Systems, Inc.

## Release Notes

### Extension Driver – Hubitat – Sensor API – Sensor – IP version 1.0105.01

## Extension Driver

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This release note is for the HUBITAT:Sensor Crestron Home Extension Driver.

The HUBITAT:Sensor driver is one of a series of drivers that integrate Z-Wave, Zigbee, and Wi-Fi smart devices with Crestron Home. The Hubitat Elevation C-7 or Elevation C-8 home automation hub is utilized as a REST API based gateway for the Crestron Home processor, enabling wireless communications with Z-Wave, Zigbee, and Wi-Fi devices. Support for Matter and Thread devices will be added to the Hubitat Elevation C-8 before the end of 2023.

The HUBITAT:Sensor driver allows up to 24 sensors of various types to be integrated with a Crestron Home system. Sensors may be Binary (digital) or Numeric (analog). Binary sensors provide alert and normal event triggers and Numeric sensors provide a numerical value that can be checked against a defined limit in order to generate a trigger.

Supported Binary sensors include:

Sensor Type	Alert Condition	Normal Condition
Contact	Open	Closed
Motion	Active	Inactive
Moisture	Wet	Dry
Shock	Detected	Clear
Acceleration	Active	Inactive

Supported Numeric sensors include:

Sensor Type	Units	Alert Condition	Normal Condition
Temperature	°F or °C	Greater or Less Than Defined Limit	Within Defined Limit
Humidity	%		
Illuminance	Lux		
Pressure	hPa		

This driver provides Programmable Events in the Events section of the Actions & Events page of the Crestron Home Setup App, permitting sensor alert and normal events to trigger any available action. The provided user interface shows a list of all sensors and their statuses. Additional UI pages permit individual sensors on multi-sensor devices to be disabled if not needed/used, definition of limit values for Numeric sensors, and the battery level of all sensor devices having batteries. Battery levels are checked twice a day and if any battery level is at 3% or less, a battery low event is triggered.

Events generated by the driver can be used to trigger indoor or outdoor lighting, raise or lower shades, send notifications, trigger a siren or sounder device, start and stop camera recording, shut off power, shut off water, turn on exhaust fans, activate sump pumps and other actions. Typical uses of each type of sensor follow:

- Contact – Detect the opening and closing of gates, doors, cabinets, drawers, freezers, refrigerators, etc.
- Motion – Detect people or pets entering or presence in a room, detect intrusion into an area, etc.
- Moisture – Detect burst pipes, basement flooding, water heater failure, washing machine overflow, overflow of bathroom sinks, tubs, showers and toilets, and sump pump level monitoring.
- Shock /Acceleration – Detect intrusion, glass breakage, unusual appliance vibrations, etc.
- Temperature – Monitor wine cooler temperature, tech room temperature, and frost and freeze conditions.
- Humidity – Detect excessive humidity.
- Illuminance – Detect the ambient lighting level.

This driver operates in a demonstration mode for up to two hours without entering a license key. Reloading the driver from the Crestron Home Setup application device Settings page, About tab restarts the two-hour demo mode. A full license can be purchased at <https://NCSystemsInc.com>.

In this document the following shorthand references are used: The HUBITAT:Sensor Extension Driver will be referred to as “the driver”, the Crestron Home Setup application will be referred to as “the Setup App”, the Crestron Home End-User application will be referred to as “the End-User App”, and the web browser-based Hubitat Elevation application will be referred to as “the Hubitat App”.

## Notes and Recommendations

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The driver requires either a Hubitat Elevation C-7 or a Hubitat Elevation C-8 automation hub to operate. This driver can support up to 24 sensors per instance. Many wireless sensor devices often contain two, three or more sensors of different types. For example, many moisture sensor devices contain both a moisture sensor and a temperature sensor. Since a relatively small number of sensor devices can result in a large number of actual sensors, a limit of 24 sensors was selected. There is no fixed limit to the number of instances of the driver that can be installed on a Crestron Home processor.

## System Requirements and Dependencies

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The following are required to run the driver:

- Crestron Home v3.021.0214 or later
- CP4-R, MC4-R, DIN-AP4-R, or PC4-R Crestron Home processors
- Hubitat Elevation C-7 or C-8 automation hub v2.3.4.134 or later

## Installation/Upgrade Instructions

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Installation of the HUBITAT:Sensor driver involves the following steps:

- Using the Hubitat App, install a Hubitat Elevation C-7 or C-8 automation hub
- Acquire Z-Wave (by Inclusion) and Zigbee (by Pairing) devices
- Confirm proper operation of the acquired devices using the Hubitat App device control pages
- Create and name a Maker API App and select the devices to be added to it

- Note and save the App ID and Access Token for the Maker API
- Using the Setup App, add the HUBITAT:Sensor driver (Drivers->Sensor->Hubitat->Sensor API) to a room
- Give a descriptive name to the driver and enter the TCP/IP settings. Port numbers should be between 49152 and 65535 and must be unique for each driver instance installed
- Fill in the Installer Settings information (License Key, Title, Maker App ID, Access Token, and tile and settings visibility selections)
- Using the End-User App, exclude any unneeded sensors and define limits for Numeric sensors
- Using the Setup App, select available sensor events to trigger sequences/actions in the Actions & Events section as needed

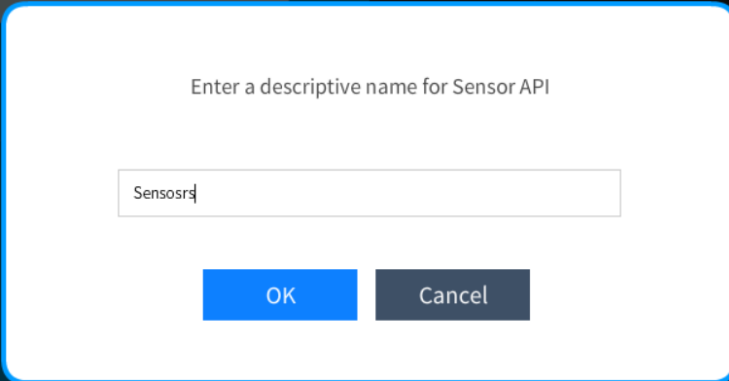
## Hubitat Installation and Setup

A detailed description of the Hubitat installation and setup process needed to prepare the Hubitat for use with the HUBITAT:Sensor driver is available at: <https://ncsystemsinc.com/pages/hubitat-installation-and-setup>.

### HUBITAT:Sensor Driver Installation

In the Crestron Home Setup App, select Pair Devices, select a Room, and under Device Types, select Drivers. When Updating Drivers completes and a list of driver types is presented, scroll down to Sensor and select it. When a list of Sensor manufacturers is shown select Hubitat. The Sensor API driver will be displayed. Click on the plus sign and the driver will be loaded from the Crestron Drivers Portal to the selected Room.

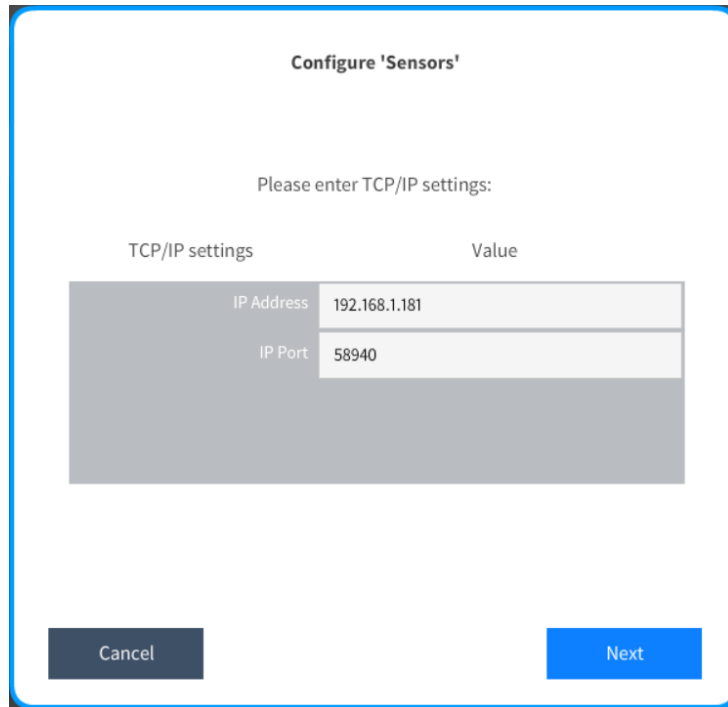
After a HUBITAT:Sensor driver has been loaded and paired to a Room, the first page that appears requires the entry of a descriptive name for the driver and IP Address and Port information. The descriptive name entered will be shown on the End-User Interface Room Tile and on the Setup App Actions & Events page under the Select an Item heading once the Room with the driver is selected.



Enter a descriptive name for Sensor API

OK Cancel

Referring to the following page, the IP Address is for the Hubitat Elevation hub that is running the Maker API App intended for the driver. The port number must be unique for each instance of any HUBITAT:Driver added to the system. The port number of 58940 is a default port number. It does not have any special significance and is simply a suggestion. The port number entered may be any desired port number as long as it is in the dynamic and/or private range and does not conflict with any other port number used in the system.



**Configure 'Sensors'**

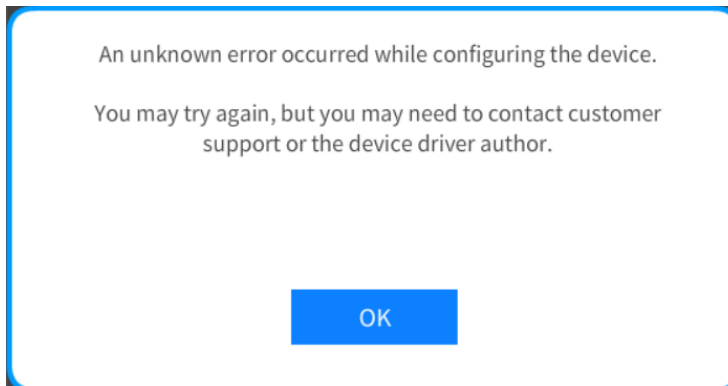
Please enter TCP/IP settings:

TCP/IP settings	Value
IP Address	192.168.1.181
IP Port	58940

Cancel Next

Once this form is complete and the OK button is selected, the Installation Settings page will be shown.

After completing the Installation Settings on the following page and selecting the Next button, if the following message is displayed, the most likely cause is specifying a port number that has already been used. Try adding the driver again, making sure that a unique port number is used.



An unknown error occurred while configuring the device.

You may try again, but you may need to contact customer support or the device driver author.

OK

Port numbers are divided into three ranges:

1. Well-known ports are 0 to 1023. DCCP well known ports should not be used without IANA registration.
2. Registered ports are 1024 to 49151. DCCP registered ports should not be used without IANA registration.
3. Dynamic and/or private ports are 49152 to 65535.

Enter “netstat -a” at the command prompt in the processor Text Console to see the port numbers used in the system. If there are any conflicts with the selected port number, change the port number.

## Installation Settings

<p><b>License Key</b></p> <p>Please go to <a href="https://NCSystemsInc.com">https://NCSystemsInc.com</a> to obtain the necessary license key. The driver will operate without a license key for 2 hours.</p>	<input type="text" value="8FA4678F-0B95-833E-8A5A-F"/>
<p><b>Sensor List Title</b></p> <p>Enter the title of the Sensor List page.</p>	<input type="text" value="Sensors"/>
<p><b>Hubitat Maker App ID</b></p> <p>Enter the Hubitat Maker App ID.</p>	<input type="text" value="460"/>
<p><b>Hubitat Access Token</b></p> <p>Enter the Hubitat Access Token.</p>	<input type="text" value="1301d070-4efe-42a4-9f7e-d4"/>
<p><b>Visible in Home Page</b></p> <p>Show a Tile in the Home Page</p>	<input checked="" type="checkbox"/>
<p><b>Visible in Room Page</b></p> <p>Show a Tile in the Room Page</p>	<input checked="" type="checkbox"/>
<p><b>Settings Button Visible</b></p> <p>Show the Settings Button</p>	<input checked="" type="checkbox"/>

**License Key** – A paid license key is required to activate this extension driver. The key can be obtained at <https://NCSystemsInc.com>. This driver will function for two hours in Demo Mode without a license key.

**Sensor List Title** – A descriptive title that appears at the top of page containing the status of all sensors.

**Hubitat Maker App ID** – Enter the ID of the Maker API App that was created for this instance of the driver.

**Hubitat Access Token** – Enter the Access Token of the Maker API App that was created for this instance of the driver

**Visible in Home Page** – Check to cause a tile to be shown on the Home Page.

**Visible in Room Page** – Check to cause a tile to be shown on the Room Page.

**Settings Button Visible** – Check to show buttons that permit various sensor settings button to be adjusted. Uncheck to hide the settings buttons.

Selecting the OK button will complete the installation of the driver and make it available for use.

### HUBITAT:Sensor Events

The HUBITAT:Sensor driver makes all sensor events available on the Action & Events page of the Setup App. For Binary sensors these include detection of Alert and Normal conditions. For Numeric sensors these include detection of the sensor value exceeding a defined limit and returning to be within that limit. These events can then be tied to any available action presented by the Setup App.

The following page shows a composite of the available events pages as you scroll down. Each item shows the Hubitat device name, the type of sensor, and a sensor condition appropriate for the type of each sensor. For Numeric sensors, the limit check type (Greater Than or Less Than) of limit check and the limit check value are shown. The Device Battery Low event will be triggered when any sensor device battery level is 3% or less.

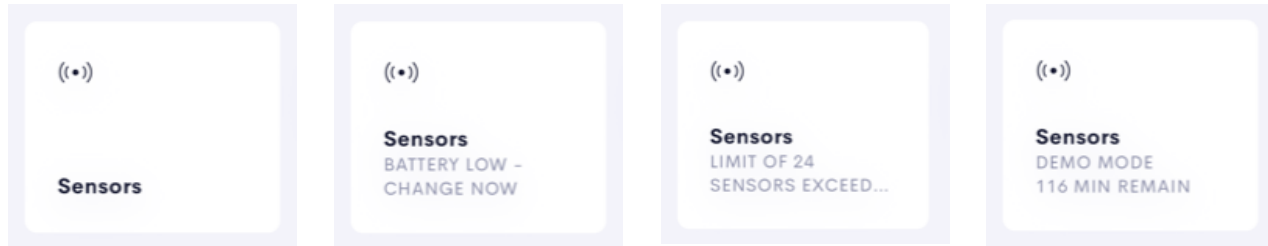
# Actions & Events

Tech Room: Sensors

	Actions
Pedestrian Gate - Contact Open	Please choose a media zone event from the left.
Pedestrian Gate - Contact Closed	
Water Heater - Moisture Wet	
Water Heater - Moisture Dry	
Garage Door - Contact Open	
Garage Door - Contact Closed	
Outdoors - Illuminance Less Than 53 lx	Please choose a media zone event from the left.
Outdoors - Illuminance Within Limits	
Storage Room - Motion Active	
Storage Room - Motion Inactive	
Tech Room - Temperature Greater Than 84.5°F	
Tech Room - Temperature Within Limits	
Tech Room - Humidity Greater Than 54%	
Tech Room - Humidity Within Limits	
Device Battery Low	

## End-User Experience

The Room Tile for this driver reflects either normal operation of a licensed driver or one of several possible demo mode or error conditions.

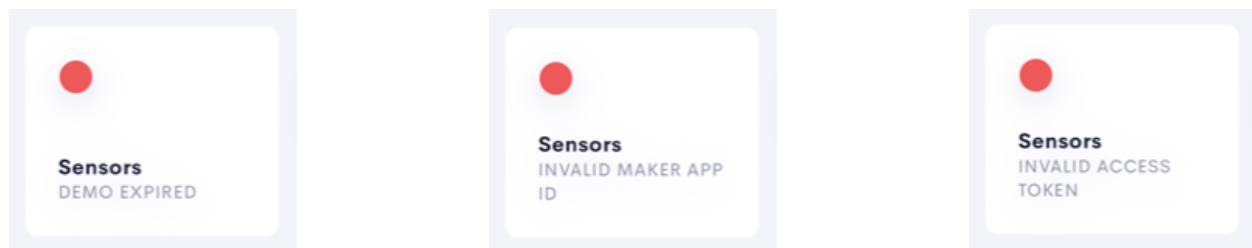


**Left:** Normal Operation.

**Left Center:** Battery Low Condition Detected—At least one device battery is at 3% or less.

**Right Center:** Device Limit Exceeded – The number of sensors found in the specific Hubitat Maker API App used by this instance of the driver has exceeded the maximum of 24. The driver will continue to operate with a truncated list of sensors. The Hubitat Maker API App should be adjusted to a maximum of 24 sensors.

**Right:** Demo Mode – Whenever the driver is added to the system without entering a license key, the driver will be started in Demo Mode. The Home Page and Room Tiles show a status of Demo Mode and time remaining in the Demo. A license key can be applied at any time during Demo Mode. Configuration, Sensor Enable/Disable, and Sensor Limit Value information entered during the Demo Mode period(s) will remain after a valid license key is provided.



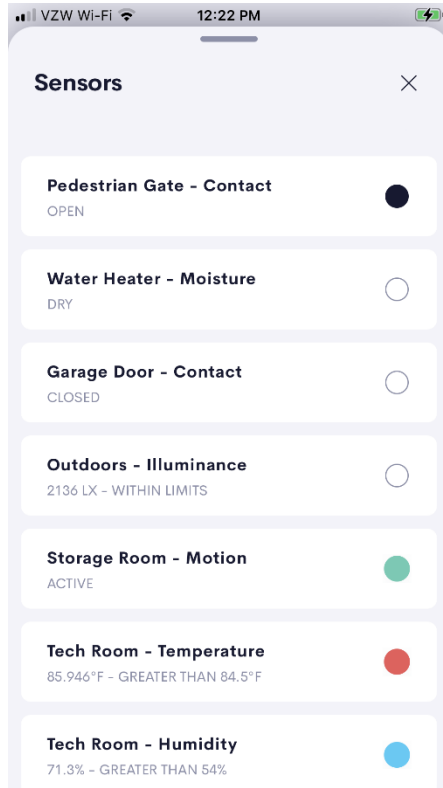
**Left:** Demo Mode Expired – When the Demo Mode expires, the Room Tile will show a red dot and a Demo Expired status. The driver will be disabled. When the Demo Mode expires or if an invalid license key is entered, reloading the driver by selecting the Check for Driver Update button on the About page of the Setup App will restart the 120-minute Demo Mode period.

**Center:** Invalid Maker App ID – The Hubitat will respond with an App Exception message if it cannot find the specified Maker API App ID. The driver will be disabled until the correct Maker API App ID is entered and the Reconfigure button on the Installer Settings page of the Setup App is selected.

**Right:** Invalid Access Token – The Hubitat will respond with an Invalid Token message if the specified Access Token does not match the Access Token associated with the Maker API App ID. The driver will be disabled until the correct the Access Token is entered and the Reconfigure button on the Installer Settings page of the Setup App is selected.

## The End-User Interface

Pressing the Home Page tile or Room tile will cause the driver to navigate to the Sensor List page where the current status of each sensor in the API for the driver is shown.



### Sensor List

The Sensor List page contains one item for each sensor included in the Hubitat Maker API App. Each sensor item contains the name of the sensor, which is in the form of "DeviceName – SensorType".

Beneath the sensor name is a text status indication. For Binary sensors this would be the Alert and Normal indications specific to each type of sensor. For Numeric sensors, the sensor value is given followed by an indication of whether or not it has exceeded its defined limit.

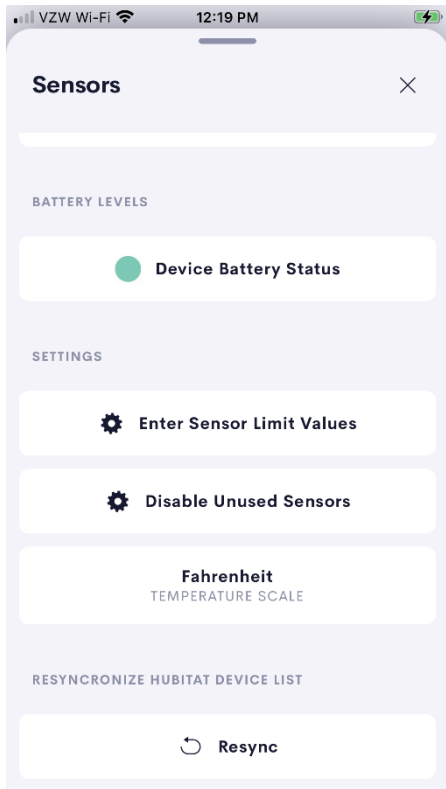
Sensor status is also indicated by an icon. The Normal state of a sensor is indicated by an empty circle. The Alert state of a sensor is indicated by a colored dot, with different colors used for different sensor types. See the chart below for color assignments.

The number of sensor items shown on this page is variable and depends on the number of sensors included in the Hubitat Maker API App.

If the number of sensors included in the Maker API App is greater than 24, the number of sensors used will be truncated to 24, the status text on the Home and Room tiles will be set to "LIMIT OF 24 DEVICES EXCEEDED", an error message will be entered in the system error log, and the driver will operate normally with 24 devices.

Icon	Alert Indication by Sensor Type
●	Contact, Tilt
●	Moisture, Humidity
●	Temperature, Pressure
●	Motion, Shock, Acceleration
●	Illuminance





### Sensor List (Continued)

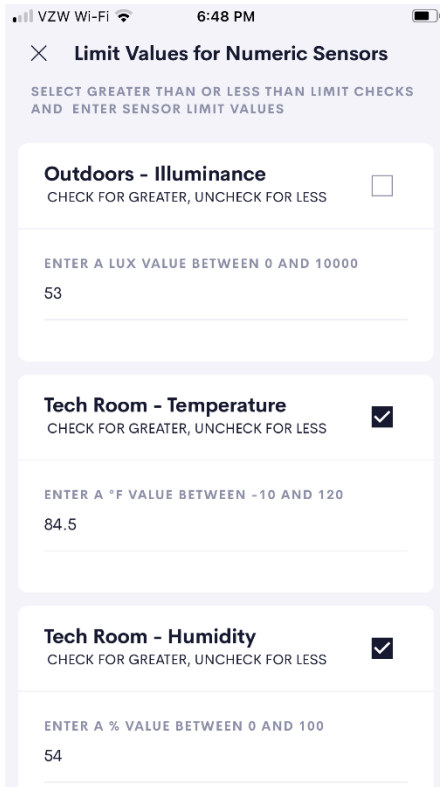
The lower portion of the Sensor List page contains buttons for showing the battery status page, entering the limit values for Numeric sensors, identifying unused sensors, setting the temperature scale, and resynchronizing the Maker API device list.

The Device Battery Status button navigates to the Battery Status page. The colored dot indicates the health of the weakest battery of those being monitored. A green dot means that all batteries are good. A yellow dot indicates that at least one battery is in a caution condition. A red dot indicates that at least one battery is in a warning condition, and that battery must be changed immediately.

Settings pages for defining limits and indicating unused sensors are provided in the user interface of the End-User App, rather than having property entries on the Installer Settings page of the Setup App, to permit the system installer to rapidly configure, setup, modify and test settings of the driver. Settings changes made in the End-User App can be seen and incorporated on the Actions & Events page of the Setup App as soon as they are made. When a suitable configuration has been achieved, the installer can uncheck the Settings Button Visible attribute on the Installer Settings page of the Setup App to preserve setup information during normal use.

Pressing the Temperature Scale button shows a Temperature Scale selector where Fahrenheit or Celcius can be selected.

The button appears at the bottom of Sensor List page. It is used to apply changes made to the number, type, and names of devices in the Hubitat Maker API. Devices can be added to, or deleted from, the Maker API. Device names can be changed in the Device Information / Device Label field of the Hubitat App Device page at any time. When the Resynchronize button is pressed, a new device list is obtained from the Hubitat and all the pages of the driver Controls Page and Settings Page are immediately updated to reflect the changes made in the Hubitat App Maker API.

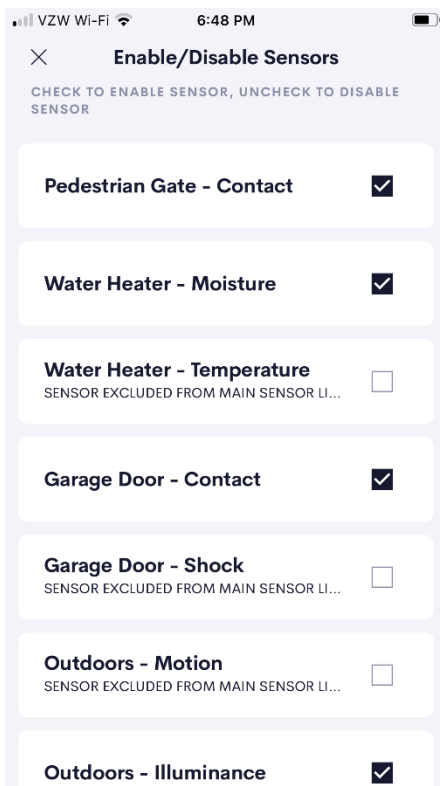


## Limit Values Page

The Limit Values Page provides Checkbox controls to specify whether a check of a Numeric sensor value is to be Greater Than or Less Than the entered limit. The limit value entered has to be within the specified range to be accepted.

The information entered on this page is reflected on the named event list in the Actions & Events page of the Setup App. Information shown includes the sensor name and a text description of the test to be made, type of test, limit value, and sensor units.

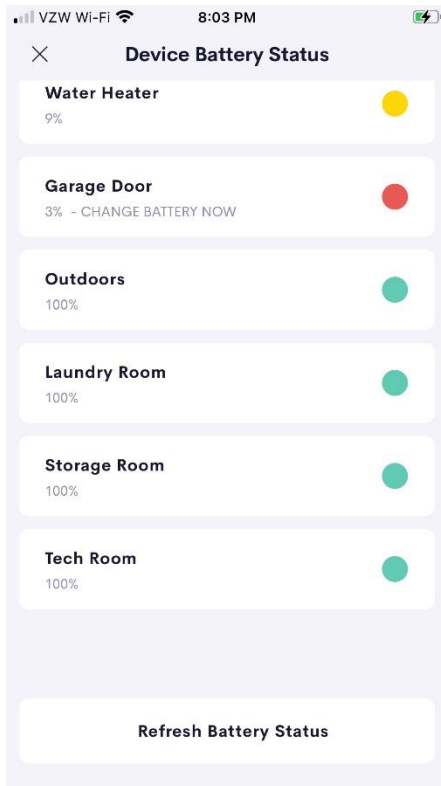
The limit check polarity and limit value may be changed at any time and they will immediately be available for display on the Actions & Events page. Any setting changed while the Actions & Events sensor events page is shown will not be updated until the next time the page is displayed (i.e. go back one page, then return).



## Sensor Enable/Disable Page

Since sensor devices often contain more than one type of sensor, and since only one or two of the sensors available on a device may actually be used, a way to disable unused sensors has been provided.

All sensors shown on this page are counted in the 24 sensor limit of the driver, whether they are being used or not. Unchecking a sensor simply removes the sensor from the list of sensors being displayed. Information on unused sensors is maintained by the driver, including sensor status updates sent by the Hubitat. This way, if a sensor is enabled again (made visible), all of its values and properties will be up-to-date.



## Device Battery Status Page

This page shows the status of the battery of each device in the Maker API. Battery status monitoring is started immediately upon installation of the driver to obtain initial battery level readings. Thereafter, battery readings are taken every 12 hours. The battery status page shows the device name, its current battery level (as of the last reading) and a colored dot indicating general battery condition. The Green dot (Good) indicates a battery with a remaining capacity of at least 10%. The Yellow dot (Caution) indicates a battery with a remaining capacity between 9% and 3%. The Red dot (Warning) indicates a battery with a remaining capacity of less than 3%. Batteries indicating red should be changed immediately.

To support a refresh of the status of all batteries after a battery change has been made, a Refresh Battery Status button is provided.

## Limitations/Known Issues

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The first issue that installers should be aware of has to do with connecting driver events to Crestron Home actions. The driver will make a list of events available to the Crestron Home Events section on the Actions & Events page. These events can then be tied to various actions in the actions section.

The issue has to do with changing the number and order of events presented to Crestron Home. The driver makes it easy to add and delete sensors and hence change the number of events presented on the Actions & Events page. Since the events provided by the driver are aligned with selected actions by position and not by name, any change to the number of events presented changes the actions to which they are tied. This means that all work performed tying events to actions will have to be done over. To avoid this problem, make sure the final number of sensors desired is in place before tying events to actions.

Another issue has to do with updating the event names shown on the Events section of the Actions & Events page. It is possible to change the names of devices and sensors for a particular Maker API in the Hubitat. When the new Maker API version is resynchronized with the driver, a changed list of event names will be presented to Crestron Home. If the Setup App is currently on the Actions & Events page, the new names do not automatically appear. To see the updated event list, simply go back one level on the Actions & Events page, and then return.

## Supported Features

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The HUBITAT:Sensor driver supports the following user features:

- Ability to support several types of wireless sensors, including Binary (digital) and Numeric (analog) types
- Ability to specify greater than or less than limit checks for all Numeric sensors
- Ability to exclude unneeded sensors from the sensor list
- Ability to display the current status of each sensor
- Ability to monitor the status of all sensor device batteries
- Availability of two trigger events for each sensor on the Actions & Events page of the Setup App
- Availability of a trigger event when any device battery is 3% or less

## Test Environment

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The HUBITAT:Sensor driver has been tested with the following:

- Crestron Home v3.021.0214
- Crestron Home App for IOS v3.21.8
- Hubitat Elevation C-7 hub v2.3.5.152
- Aqara MCGQ11LM Zigbee Door and Window Sensor
- Aeotec GP-AEOWLSUS Zigbee SmartThings Water Leak Sensor
- Zooz 700 Series ZSE43 Z-Wave Plus Tilt and Acceleration Sensor
- SONOFF SNZB-03 Zigbee Motion Sensor
- Aqara WSDCGQ11LM Zigbee Temperature and Humidity Sensor
- Aqara SJCGQ11LM Zigbee Water Leak Sensor
- Aqara HU-XI-201 Zigbee Motion and Light Sensor P1
- Aeotec IM6001-MPP Zigbee SmartThings Multipurpose Sensor

## Supported Models

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- Crestron CP4-R
- Crestron MC4-R
- Crestron DIN-AP4-R
- Crestron PC4-R
- Hubitat Elevation C-7 hub
- Hubitat Elevation C-8 hub

## Contact Information

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Company:	NC Systems, Inc.
Author:	William Brewer
Email:	<a href="mailto:william@ncsystemsinc.com">william@ncsystemsinc.com</a>
Website:	<a href="https://ncsystemsinc.com">https://ncsystemsinc.com</a>
License:	<a href="https://ncsystemsinc.com/products/lights">https://ncsystemsinc.com/products/lights</a>

## Version History

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1.0401.01                      8/18/2023

Changes since Last Version

New Features

- Initial release

## Licensing and Copyright Information

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