Flood Multisensor PAT02-A/B/C

The flood multisensor PAT02 has flood, temperature and humidity, 3 sensors function in one, based on Z-Wave™ technology.

It is the Z-Wave™ plus product, it support the security, OTA... Those newest features of the Z-Wave™ technology. Z-Wave™ is a wireless communication protocol designed for home automation, specifically to remotely control applications in residential and light commercial environments. The technology uses a low-power RF radio embedded or retrofitted into home electronics devices and systems, such as lighting, home access control, entertainment systems and household appliances.

This product can be included and operated in any Z-Wave™ network with other Z-Wave™ certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

The device adopt the Z-Wave™ 500 series chip, when your Z-Wave™ network system is all made by Z-Wave™ 500 series devices. The network system will have the advantages as below.

- Concurrent multi-channel support reduces external interference.
- Better RF range, improve about 10 meters in indoor.
- Support 100 Kbps transmit speed, speed up communication.

Function Compare A/B/C

	Flood	Temperature	Humidity
PAT02-A	V	V	V
PAT02-B		V	V
PAT02-C	V		

Add to/Remove from Z-Wave™ Network

There are one tamper keys in the back side of the device, It can add, remove, reset or association from the Z-Wave™ network.

In the first time, add the device into the Z-Wave™ network. First, make sure the primary controller is in the add mode. And then power on the device, just take out the insulation Mylar in the back side of the device. The device will auto start the NWI (Network Wide Inclusion) mode. And it should be included in 5 seconds. You will see the LED light ON one second.

Notice: Including a node ID allocated by Z-Wave™ Controller means "**Add**" or "**Inclusion**". Excluding a node ID allocated by Z-Wave™ Controller means "**Remove**" or "**Exclusion**".

Function	Description
Add	1. Have Z-Wave™ Controller entered inclusion mode. 2. Pressing the tamper key three times within 1.5 seconds to enter the inclusion mode. 3. After add successful, the device will wake to receive the setting command from Z-Wave™ Controller about 20 seconds.
Remove	1. Have Z-Wave™ Controller entered exclusion mode. 2. Pressing tamper key three times within 1.5 seconds to enter the exclusion mode. Node ID has been excluded.
Reset	***Notice: Use this procedure only in the event that the primary controller is lost or otherwise inoperable.*** 1. Pressing tamper key four times within 1.5 seconds and do not release the tamper key in the 4th pressed, and the LED will light ON. 2. After 3 seconds the LED will turn OFF, after that within 2 seconds, release the tamper key. If successful, the LED will light ON one second. Otherwise, the LED will flash once. 3. IDs are excluded and all settings will reset to factory default.
Association	1. Have Z-Wave™ Controller entered association mode. 2. Pressing tamper key three times within 1.5 seconds to enter the association mode. Note: PAT02-1A and PAT02-1C are support 2 groups, and PAT02-1B only support 1 group. The group 1 is for receiving the report message, like triggered event, temperature, humidity etc. The group 2 is for the light control, the device will send the "Basic Set" command to this group. And each group support 8 nodes maximum.
• Failed or success in add/remove the node ID can be viewed	from Z-Wave™ Controller.

Notice 1: Always RESET a Z-Wave™ device before trying to add it to a Z-Wave™ network

Notice 2: When the device into NWI mode, the sensor functionality will useless. The NWI mode will timeout after 30 seconds. You can press the tamper key 3 times to abort the NWI mode.

Z-Wave™ Notification

After the device adding to the network, it will wake-up once per day in default. When it wake-up it will broadcast the "Wake Up Notification" message to the network, and wake-up 10 seconds for receive the setting commands.
The wake-up interval minimum setting is 30 minutes, and maximum setting is 120 hours. And the interval step is 30 minutes.

Press the tamper key once. The device will wake-up 10 seconds.

Z-Wave™ Message Report

When the flood triggered the device will report the trigger event and also report the battery status, temperature and humidity.
In default the device will using Notification Report to represent the trigger event, it can be changed to Sensor Binary Report by setting the configuration NO. 7 Bit4 to 1.

* Flood Report: (PAT02-A, PAT02-C)
When the flood triggered, the device will unsolicited to send the report to the nodes in the group 1.

Notification Report (V4)
Notification Type: Water Alarm (0x05) Event: Water Leak detected, Unknown Location (0x02)

Sensor Binary Report (V2)
Sensor Type: Water (0x06) Sensor Value: 0xFF

And after the flood trigger clear, the device will unsolicited to send the report to the nodes in the group 1.

Notification Report (V4)
Notification Type: Water Alarm (0x05) Event: 0x00
Sensor Binary Report (V2)
Sensor Type: Water (0x06) Sensor Value: 0x00

*** Tamper Report: (PAT02-A, PAT02-B, PAT02-C)**
The tamper key pressed over 5 seconds. The device will into the alarm state. In that state, if the tamper key be released, the device will unsolicited to send the report to the nodes in the group 1.

Notification Report (V4)
Notification Type: Home Security (0x07) Event: Tampering. Product covering removed (0x03)
Sensor Binary Report (V2)
Sensor Type: Tamper (0x08) Sensor Value: 0xFF

*** Temperature Report: (PAT02-A, PAT02-B)**
When the flood triggered or the temperature differential over 1 Fahrenheit (in default), the device will unsolicited to send the "Sensor Multilevel Report" to the nodes in the group 1.

Sensor Type: Temperature (0x01)
Note: To disable send temperature report after the flood triggered, please setting the configuration N0.5 bit5 to 1.

*** Temperature differential report ***
This function default is enabled, to disable this function by setting the configuration NO.21 to 0.
In the default, when the temperature is changed to plus or minus one degree Fahrenheit (0.56 degree Celsius), the device will report temperature information to the nodes in the group 1.
The device will measure the temperature in every 10 seconds. And if the temperature is over 140 degree Fahrenheit (60 degree Celsius), the device will always report in each measurement.

*** Humidity Report: (PAT02-A, PAT02-B)**
When the flood triggered or the humidity differential over 5 percent (in default), the device will unsolicited to send the "Sensor Multilevel Report" to the nodes in the group 1.
Sensor Type: Humidity (0x05)
Note: To disable send humidity report after the flood triggered, please setting the configuration N0.6 bit6 to 1.

*** Humidity differential report ***
This function default is enabled, to disable this function by setting the configuration NO.23 to zero.
Enable this functionality, the device will measure the humidity in every 10 seconds. And if the humidity is changed to plus or minus the value (setting by the configuration NO.23), the device will report humidity information to the nodes in the group 1.

*** Timing Report:**
Beside the event triggered could report message, the device also support the timing unsolicited report of the status.
- Battery level report: Every 6 hours report once in default.

It could be changed by setting the configuration NO. 10.
- Low battery report: When the battery level is too low, every 30 minutes will report once.
- Temperature report: Every 6 hours report once in default. It could be changed by setting the configuration NO. 13.
- Humidity report: Every 6 hours report once in default. It could be changed by setting the configuration NO. 14.
- Flood state report: Every 6 hours report once in default. It could be changed by setting the configuration NO. 15.

Notice: The configuration NO. 10, 13, 14 and 15 could be setting to zero to disable the auto report. And the configuration NO. 20 could change the tick interval, the default value is 30, if setting to 1, that means the minimum auto report interval will be one minute. And please notice if setting this value to zero, that means disable all of the timing report except the low battery detection.

Power Up Procedure

* Battery Power Check
When the device power up, the device will detect the power level of the battery immediately. If the power level is too low, the LED will continue flash about 5 seconds. Please change another new battery.

* NWI
When the device power on, the device will check is it already adding to the network? If doesn't, it will auto start the NWI mode. The LED will flash in every second and continue 30 seconds. Until timeout or the device successful to inclusion by controller. The use can presses the tamper key 3 times to abort the NWI mode.

PS: If the device already adding to the network, the device will broadcast a node information once.

* Wake
When the device power on, the device will wake about 20 seconds. In this duration, the controller can communicate with the device. Normally the device is always sleeping to save the battery energy.

Over The Air (OTA) Firmware Update

The device support the Z-Wave firmware update via OTA.
Let the controller into the firmware update mode, and then press the tamper key once to start the update.
After finish the firmware download, the LED will start flash in every 0.5 second. At that time, ***please don't remove the battery***, otherwise it will cause the firmware broken, and the device will no function.
After the LED stop flash, it is recommended that the user power up the device. **Caution**: After remove the battery, please wait about 30 seconds, and then re-install the battery.

Security Network

The device support the security function. When the device included with a security controller, the device will auto switch to the security mode. In the security mode, the follow commands need using Security CC wrapped to communicate, otherwise it will not response.

COMMAND_CLASS_BATTERY
COMMAND_CLASS_NOTIFICATION_V4
COMMAND_CLASS_ASSOCIATION_V2
COMMAND_CLASS_CONFIGURATION
COMMAND_CLASS_SENSOR_BINARY_V2
COMMAND_CLASS_SENSOR_MULTILEVEL_V5
COMMAND_CLASS_WAKE_UP_V2

Battery Installation

When the device report the low battery message. The user should replace the battery to new one. The battery type is CR123A, 3.0V.
The way to open the front cover please press the top position, to release the cover.
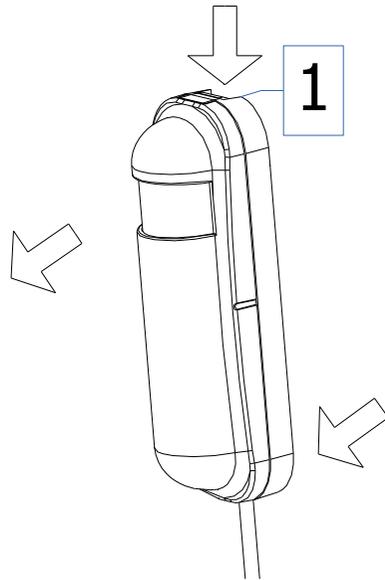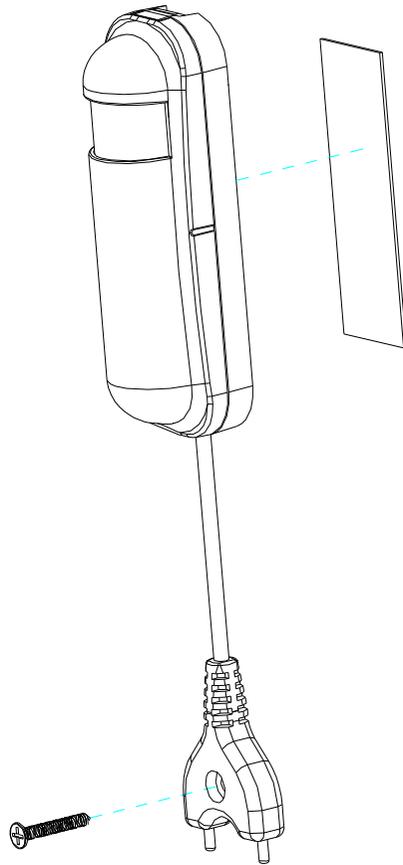
Replace the new battery and install the cover back.
1. Put the front cover bottom, and press down.
2. Push the front cover top.
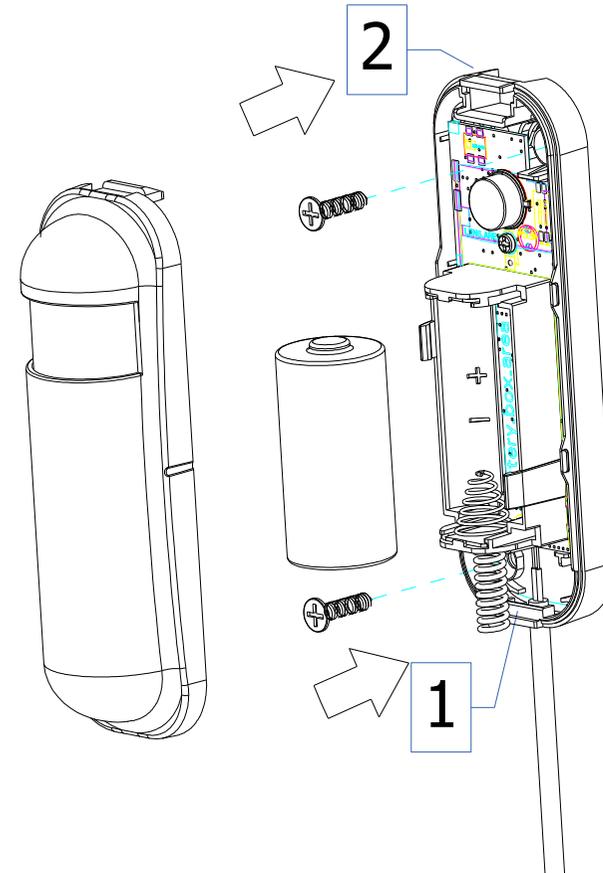
Installation

1. To mount the device on the wall, you can choose using the tape, or the screw.

2. Using the screw to fix the flood detector.

* The reserve bit or not supported bit is allowed any value, but no effect.

NO.	Name	Def.	Valid	A	B	C	Description
1	Basic Set OFF Level	0	All	☑	☐	☑	Setting the BASIC command value. When the flood trigger off(0x00), send the BASIC CC to the group 2.
2	Basic Set ON Level	0xFF	All	☑	☐	☑	Setting the BASIC command value. When the flood trigger on(0xFF), send the BASIC CC to the group 2.
5 (*)	Operation Mode		All	0	33	32	Operation mode. Using bit to control.
		0		☑	☐	☑	**Bit0**: Disable the Flood function.
		0		☐	☐	☐	**Bit1**: Reserve.
		0		☐	☐	☐	**Bit2**: Reserve.
		0		☑	☑	☐	**Bit3**: Setting the temperature scale. 0: Fahrenheit, 1:Celsius
		0		☐	☐	☐	**Bit4**: Reserve.
		0		☑	☐	☐	**Bit5**: Disable the temperature report after event triggered. (1:Disable, 0:Enable)
		0		☐	☐	☐	**Bit6**: Reserve.
		0		☐	☐	☐	**Bit7**: Reserve.
6 (*)	Mult-Sensor Function Switch		All	0	64	64	Multisensor function switch. Using bit to control.
		0		☐	☐	☐	**Bit0**: Reserve.
		0		☐	☐	☐	**Bit1**: Reserve.
		0		☐	☐	☐	**Bit2**: Reserve.
		0		☐	☐	☐	**Bit3**: Reserve.

Z-Wave Configuration Settings

Notice:
* All of the configuration, the data size is 1.
* The configuration mark with star(*), means after the remove the setting still keep, don't reset to factory default. Unless the user execute the

NO.	Name	Def.	Valid	A	B	C	Description
		0		☐	☐	☐	**Bit4**: Reserve.
		0		☐	☐	☐	**Bit5**: Reserve.
		0		☑	☐	☐	**Bit6**: Disable the humidity report after event triggered. (1:Disable, 0:Enable)
		0		☐	☐	☐	**Bit7**: Reserve.
7 (*)	Customer Function		All	0	0	0	Customer function switch, using bit control.
		0		☐	☐	☐	**Bit0**: Reserve.
		0		☐	☐	☐	**Bit1**: Reserve.
		0		☐	☐	☐	**Bit2**: Reserve.
		0		☑	☐	☑	**Bit3**: Disable send out BASIC OFF after the flood event cleared. (1:Disable, 0:Enable)
		0		☑	☑	☑	**Bit4**: Notification Type, 0: Using Notification Report. 1: Using Sensor Binary Report.
		0		☑	☑	☑	**Bit5**: Disable Multi CC in auto report. (1:Disable, 0:Enable)
		0		☑	☐	☑	**Bit6**: Disable to report battery state when the device triggered. (1:Disable, 0:Enable)
		0		☐	☐	☐	**Bit7**: Reserve.
10	Auto Report Battery	12	0 ~ 127	☑	☑	☑	The interval time for auto report the battery level. 0 means turn off auto report.

NO.	Name	Def.	Valid	A	B	C	Description
	Time						The default value is 12. The tick time can setting by the configuration No.20.
13	Auto Report Temperature Time	12	0 ~ 127	☑	☑	☐	The interval time for auto report the temperature. 0 means turn off auto report. The default value is 12. The tick time can setting by the configuration No.20.
14	Auto Report Humidity Time	12	0 ~ 127	☑	☑	☐	The interval time for auto report the humidity. 0 means turn off auto report. The default value is 12. The tick time can setting by the configuration No.20.
15	Auto Report Flood Time	12	0 ~ 127	☑	☐	☑	The interval time for auto report the flood state. 0 means turn off auto report. The default value is 12. The tick time can setting by the configuration No.20.
20	Auto Report Tick Interval	30	0 ~ 0xFF	☑	☑	☑	The interval time for auto report each tick. Setting this configuration will effect configuration No.10, No.13, No.14 and No.15. Units of one minute. **Caution1**: *Setting to **0** means turn off all auto report function.* **Caution2**: *The value is unsigned byte*
21	Temperature Differential Report	1	0 ~ 0x7F	☑	☑	☐	The temperature differential to report. 0 means turn off this function. The unit is Fahrenheit. Enable this function the device will detect every 10 seconds.

NO.	Name	Def.	Valid	A	B	C	Description
							And when the temperature is over 140 degree Fahrenheit, it will continue report.
23	Humidity Differential Report	5	0 ~ 60	☑	☑	☐	The humidity differential to report. 0 means turn off this function. The unit is percentage. Enable this function the device will detect every 10 seconds.

Z-Wave Supported Command Class

COMMAND_CLASS_ZWAVEPLUS_INFO_V2
COMMAND_CLASS_BATTERY
COMMAND_CLASS_NOTIFICATION_V4
COMMAND_CLASS_ASSOCIATION_V2
COMMAND_CLASS_CONFIGURATION
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2
COMMAND_CLASS_VERSION_V2
COMMAND_CLASS_SENSOR_BINARY_V2
COMMAND_CLASS_SENSOR_MULTILEVEL_V5
COMMAND_CLASS_WAKE_UP_V2
COMMAND_CLASS_ASSOCIATION_GRP_INFO
COMMAND_CLASS_POWERLEVEL
COMMAND_CLASS_DEVICE_RESET_LOCALLY
COMMAND_CLASS_MULTI_CMD
COMMAND_CLASS_SECURITY
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2

Specifications

Power by CR123A lithium battery.
Signal (Frequency):
　　868.40 MHz, 869.85 MHz(EU),
　　908.40 MHz, 916.00 MHz(US),
　　922~927 MHz(JP/TW),
　　921.40 MHz, 919.80 MHz(ANZ),
　　869.00 MHz(RU),
　　865.20 MHz(IN),
　　916.00 MHz(IL),

Range:
　　Minimum 40 meters indoor,
　　100 meters outdoor line of sight.
Operating Temperature: -10℃ ~ 40℃
For indoor use only.

Specifications subject to change without notice due to continuing product improvement.

FCC ID: RHHPAT02

FCC Interference Statement

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 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.

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.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Warning

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

When replacing old appliances with new once, the retailer is legally obligated to take back your old appliance for disposal at least for free of charge.