PAT12 CO2 Sensor A/B

The PAT12 CO2 sensor uses advanced NDIR (Non Dispersive Infra-Red) detect technology. The major advantages of NDIR sensors are low life cycle cost and precise and stable long-term operation.

The PAT12 CO2 sensor is a device that allows you to check the air quality in your home by detecting and measuring CO2 concentrations.

The PAT12 sensor is easy to use and very convenient for your home. Just set the sensor on the wall in the rooms you would like to control, and you are ready to go. Moreover, the PAT12 can be integrated to other Z-Wave certified devices, and controlled with Philio app “Home Mate 2.” You can now protect your family and your business and make sure that air you are breathing is safe. Set up your PAT12 to send regular notifications and take control even when not at home.

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 devices within the network will act as repeaters regardless of vendor to increase reliability of the network.

The device adopts the Z-WaveTM 500 series chip when your Z-WaveTM network system is made by Z-WaveTM 500 series devices. This network system has the following advantages:

The product supports the Over The Air (OTA) feature for the products firmware upgrade.

Notice:

The PAT12 may exhibit a tolerance addition of 90ppm when first installed. This will get corrected by the Self Calibration Feature within the first weeks of operation.
Please continue to operate the PAT12 at a condition that was exposed, ambient reference levels of air at 400 ppm CO2, for at least 7-Days.
Opening external windows can drop the CO2 levels down to 400ppm.

Function Compare A/B

	CO2 Accuracy
PAT12-A	400-5000 ppm +/- 75 ppm or 10% of reading, whichever is greater
PAT12-B	400-5000 ppm +/- 30 ppm or 3% of reading, whichever is greater

Adding to Z-Wave™ Network

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

The table below lists an operation summary of basic Z-Wave functions. Please refer to the instructions for your Z-Wave™ Certificated Primary Controller to access the Setup function, and to Add/Remove/associate devices

Function	Description	Annotation
No node ID	The Z-Wave Controller does not allocate a node ID to the Switch.	LED light will flash for 30 seconds.

Add (Inclusion)	1. Set your Z-Wave controller into inclusion mode by following the instructions provided by the controller manufacturer.	LED light will flash slowly.
	2. Press the include button of the PAT12 three times within 3 seconds to enter inclusion mode. If the learning code is successful, the LED light will flash slowly.	
Remove (Exclusion)	1. Put your Z-Wave controller into exclusion mode by following the instructions provided by the controller manufacturer.	
	2. Press the include button of the PAT12 three times within 3 seconds to enter exclusion mode.	
	3. Node ID has been excluded.	LED light will flash for 30 seconds.
Reset	1.Press the include button of the PAT12 three times within 3 seconds to enter inclusion mode.	Use this procedure only in the event that the primary controller is lost or otherwise inoperable.
	2.Within 1 second, again press the include button of the PAT12 for 5 seconds.	
	3.IDs will get excluded.	

SmartStart	1. Product has a DSK string, you can key in the first five digits to begin with the smart start process, or you can scan QR code. Ex: mydsk 10209-46687-52248-13629-04783-07465-15776-56519 2. SmartStart enabled products can be added into a Z-Wave network by scanning the Z-Wave QR Code present on the product providing. No further action is required and the SmartStart product will be added automatically within 10 minutes of the network vicinity.	
Association	This machine provides a group of nodes. Each group can set 5 Nodes. Group 1: Used for returned events. Report type: 1.Notification report 2.Sensor multilevel report 3.Reset report	
※Adding a node ID allocated by Z-Wave Controller means inclusion. Removing a node ID allocated by Z-Wave Controller means exclusion. ※Failed or success in including/excluding the node ID can be viewed from the Z-Wave Controller.		

LED Indication

To distinguish what mode the switch is in, view the LED light description for identification.

State Type	LED Indication
No node ID	Under normal operation, when the Switch has not been allocated a node ID, the LED light will flash on and off alternately at 30 second intervals. By pressing On/Off button, the light will stop flashing temporarily.
Learning	When the PAT12 is in learning mode, if the learning code is successful, the

	LED light will flash slowly.

Programming

2. Z-Wave's Configuration

Configuration Parameter	Function	Size (Byte)	Value	Unit	Default	Description
1	Fixed timer for report Co2 concentration	1	0-127		1	Units of 1 minute.
2	Concentration change report	1	0-100		10	Units of 1 %.
3	Baseline level 1	1	0-50		6	Units of 100 ppm.
4	Baseline level 2	1	0-50		8	Units of 100 ppm.
5	Baseline level 3	1	0-50		10	Units of 100 ppm.
6	Baseline level 4	1	0-50		12	Units of 100 ppm.
7	Baseline level 5	1	0-50		16	Units of 100 ppm.

2. Firmware update over the air (OTA)

PAT12 is based on 500 series SoC and supports Firmware Update Command Class, it can receive updated firmware images sent by a controller via the Z-wave RF media. It is a helpful and convenient way to improve functions, if needed.

Command Classes

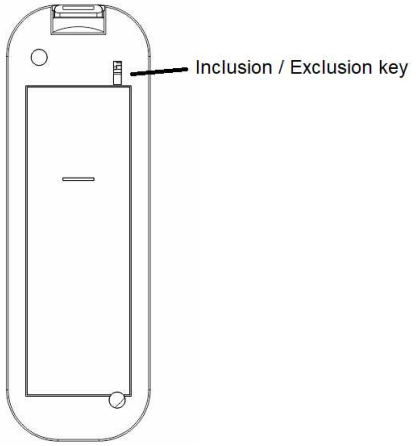
The Sensor supports Command Classes including…

COMMAND_CLASS_ZWAVEPLUS_INFO,
COMMAND_CLASS_ASSOCIATION,
COMMAND_CLASS_ASSOCIATION_GRP_INFO,
COMMAND_CLASS_TRANSPORT_SERVICE_V2,
COMMAND_CLASS_VERSION,
COMMAND_CLASS_MANUFACTURER_SPECIFIC,
COMMAND_CLASS_DEVICE_RESET_LOCALLY,
COMMAND_CLASS_POWERLEVEL,
COMMAND_CLASS_SECURITY_2,
COMMAND_CLASS_CONFIGURATION,
COMMAND_CLASS_NOTIFICATION_V3,
COMMAND_CLASS_SECURITY,
COMMAND_CLASS_SENSOR_MULTILEVEL_V11,
COMMAND_CLASS_SUPERVISION
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2

Over The Air (OTA) Firmware Update

The device supports Z-Wave firmware update via OTA.
Before starting the update, please remove the front case of the device otherwise the hardware check will fail.
Let the controller into firmware update mode, and press the front tamper key once to start the update.
After firmware download is complete, the LED light will flash intermittently.

Overview



Specification

Rated Voltage	DC 5V/1A from USB
Range	Minimum 40M in door and 100M in outdoor line of sight
Operating Temperature	-10°C ~ 40°C (85% humidity)
Storage Temperature	-20 C ~ 60°C
Location	Indoor use only
Dimension	65(L) x 44.1 (W) x 56.3 (H) mm
CO2	0-5000ppm
Frequency Range	868.40MHz; 869.85MHz (EU) 908.40MHz; 916.00MHz (USA/Canada) 916MHz (Israel) 922.5MHz, 923.9MHz, 926.3MHz (JP)
RF Maximum Power (peak)	+5dBm (peak) for EU RED directive
RF Maximum Power (Average)	-10dBm (Average) for EU RED directive
RF Modulation Type	FSK (Frequency-Shift Keying)
FCC ID	RHHPAT12

Disposal

	This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

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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.