KAIROS

Noah Multifunction Sensor

Users Guide

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PN KONALALH01 rev.A

2 Important Safety Information

- Please read, follow and keep these instructions.
- Please heed all warnings.
- Please install in accordance with the manufacturer's instructions.
- Do not install near any apparatus that produces temperatures exceeding 180 °F.
- Protect the cable and connectors by installing them out of the way of high traffic areas and avoiding locations where the cable may be pinched and severed.
- Only connect Kairos membranes designated for the Noah product being installed.
- Do not place this apparatus on a bed, sofa, rug or similar surface.
- Do not place this apparatus on an unstable surface.
- Operating temperatures for this product should not exceed -4°F to 131°F (-20°C ~55°C)
- Storage temperatures should not exceed -40 °F to 185 °F (-40°C ~85°C)
- Do not submerge the device under water. It is designed to be weatherproof (IPX5) to withstand being sprayed by water.

3 United States FCC Compliance

This device **shall be submitted for testing** 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 such interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it 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 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 an experienced radio technician for help.

Any unauthorized changes or modifications to the product will void the warranty.

4 Versions

Date	Description	Note

Oct 15, 2020	Initial Draft	

5 Introduction

The Noah Multifunction Sensor and Noah Membranes are designed to monitor the presence of leaks, temperature, and tampering for many years over long distances using a long-range, low-power radio technology known as LoRa. These sensors are primarily designed for use in:

- Smart Buildings / Facilities (Commercial Office Space, Warehouses)
- Commercial Real Estate (Apartments, Condominiums)
- Single Family Neighborhoods (HOAs)

6 Features

- Real-time alerts set-up in the Kairos application (app.kairoswater.io)
  - Configurable text message notifications
  - Configurable mail notifications
- Visible and audible alerts from onboard LED and buzzer
- 10-yr battery life under normal conditions[1]
- Replaceable battery

[1] Normal conditions =constant 70 deg F, no alerts (tampers, leaks, high/low temperatures), device remains on the entire time

Figure 1: Noah Multifunction Sensor, Connecting Cable, and Noah Membrane (image may vary from actual product and specification)

7 What Comes with Package

- One (1) Noah Wireless Module
- One (1) 10" or 24" Connecting Cable (cable length specified by customer)
- One (1) Noah membrane (dimensions specified by customer)

8 Product Key

1. Enclosure (1 top, 1 bottom)
2. Stainless steel screws (4)
3. Function button
4. LED
5. 3.6V A-size battery (4100 mAh)
6. Jack-to-membrane connector cable
7. Noah membrane

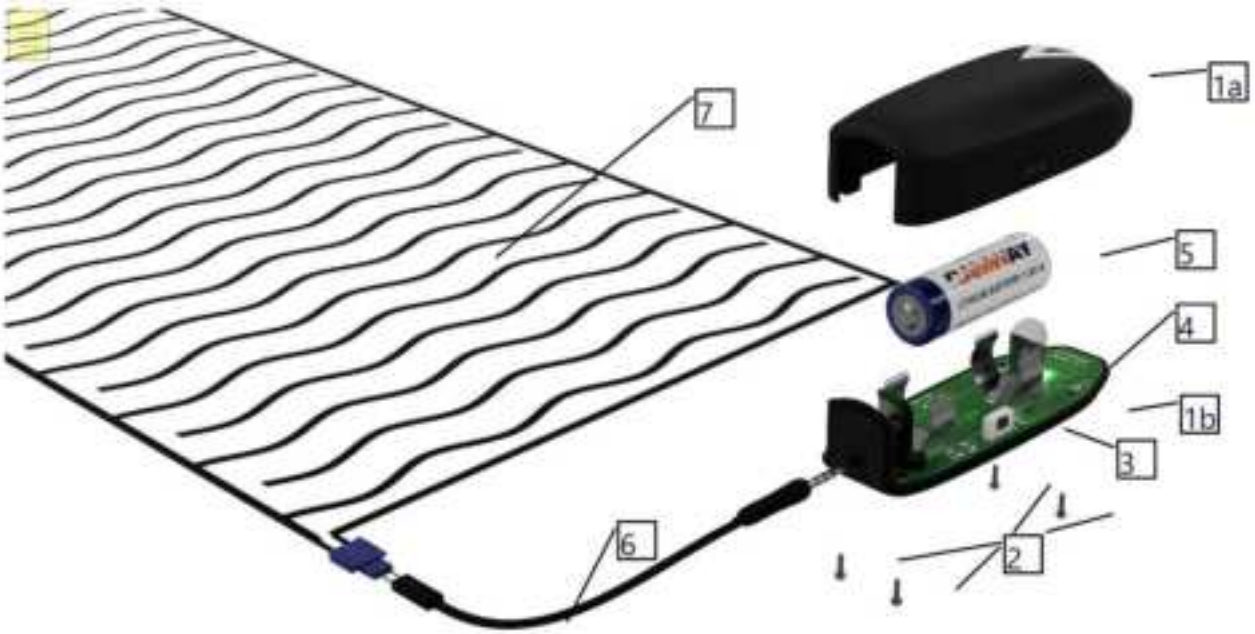


Figure 2: Noah (image may vary from actual product and specification)

9 Installation

Be sure you have a Kairos account set-up and a LoRa gateway attached to your account. Sections 8.1 and 8.2 detail these steps.

9.1 Set-up your KAIROS Account

Either set-up a new account at app.kairoswater.io *-or-* follow the link you received in your email from info@kairoswater.io

1. If you are setting up a new account, you will add the devices manually following these instructions.
2. If KAIROS has already onboarded your devices, then you should see the devices in your account once you log into kairoswater.io from the link in your email.

9.2 Set-up the K1 Gateway

If the Gateway does not show on your app.kairoswater.io account, please follow these instructions to add it.

Identify a location where you have access to standard 110v (using the supplied adapter) or USB with 2A service. This location should also have access to Ethernet or password-protected WiFi. Otherwise, please send an email to info@kairoswater.io or chat with KAIROS at kairowater.io regarding a cellular modem for the gateway.

Connect the Gateway to the internet by one of these methods:

- Ethernet – simply plug the gateway into an active ethernet port using the supplied cable. Please check with your IT to ensure no firewalls are blocking access. If they require the MAC address, it is printed on the bottom of the gateway.
- WiFi – if WiFi is the best way to connect the gateway to the internet, please refer to this guide to set-up WiFi for your gateway. Or, you may contact KAIROS to send you a gateway provisioned for your WiFi network.
- Cellular – plug the ethernet cable into the gateway and the cellular modem. Make sure the cellular modem is powered on before going to the next step.

Plug the gateway to a power source. The power LED should illuminate. Over the next few minutes, the WiFi, Internet, and LoRa LEDs will illuminate as well. If the power LED turns red, but the rest of the LEDs remain green, there is no error and the gateway will perform as expected. This gateway in your app.kairoswater.io account will show as online now.

9.3 Set-up the N1 Wireless Module

1. If the wireless module does not show on your app.kairoswater.io account, please follow these instructions to add it.
2. Press the button on the side of the wireless module to send a message to the gateway.
3. Check app.kairoswater.io to see if the module is showing as online now.

10 Preparing the Installation Area

For the best sensitivity, the membranes should be installed over a flat surface, free of debris, deep gaps, or dirt/sand/dust. It is a good practice to sweep or vacuum the space onto which the membrane will be applied. In addition, for the "Tee" sensors and some water heater installations, it will be important to ensure the surfaces on which adhesive will be applied are cleaned before adhering the membrane to the surface.

11 Installing Membranes

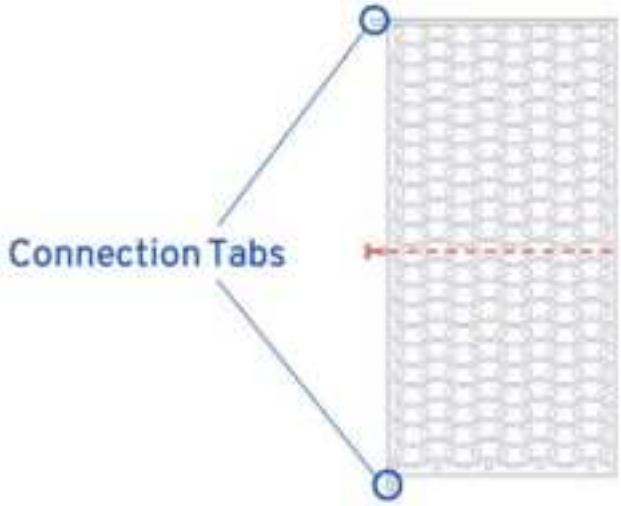
1. Ensure that the membrane you are preparing to install is appropriately sized for the area it will be monitoring. There are a variety of membrane formats available for installation. Choosing the correct one for the area you want to monitor is important. More on membrane selection in the Installing Membranes section.
2. Membranes should cover the maximum area under the monitored space without bending or buckling. Ideally, the membrane should not stick out in highly trafficked areas where they would be stepped on or kicked out of position.
3. Some membranes come with extra tabs, if the cable is attached to one tab, and the other becomes unnecessary or interferes with the installation, you may cut it off so that the edge if flush with the bulk of the membrane.
4. Connect the membranes to the wireless modules using the supplied cable.
5. If the cable is not already attached to the membrane, simply (1) slide one of the tabs sticking out from the membrane into the slot of the ribbon connector and (2) clamp the cover over the tab so that the dull black contacts on the membrane make touch the contacts inside the ribbon connector. (3) Insert the small plug into one of the wireless module's ports.

Figure 3: Connecting Multifunction Sensor to Membrane (image may vary from actual product and specification)

6. In the spaces where the membranes will be slid under the thin gap for an appliance (dishwasher, refrigerator, washing machine, etc), the wireless module can be tucked under the cabinet overhang using the 3M adhesive on its bottom. Cords can be tucked underneath, or in a space under or next to the appliance.

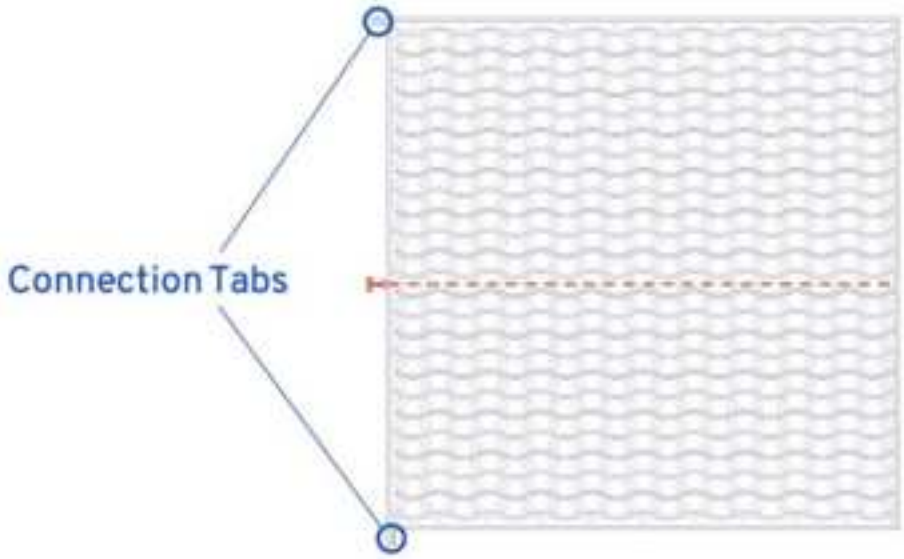
11.1 9"x18" Format

This format is recommended for Ice Machines and smaller coverage areas where the larger format will not fit. This format can be shortened by cutting it along the horizontal – as depicted below. The remaining halves can be connected to separate wireless modules or two ports on one wireless module.



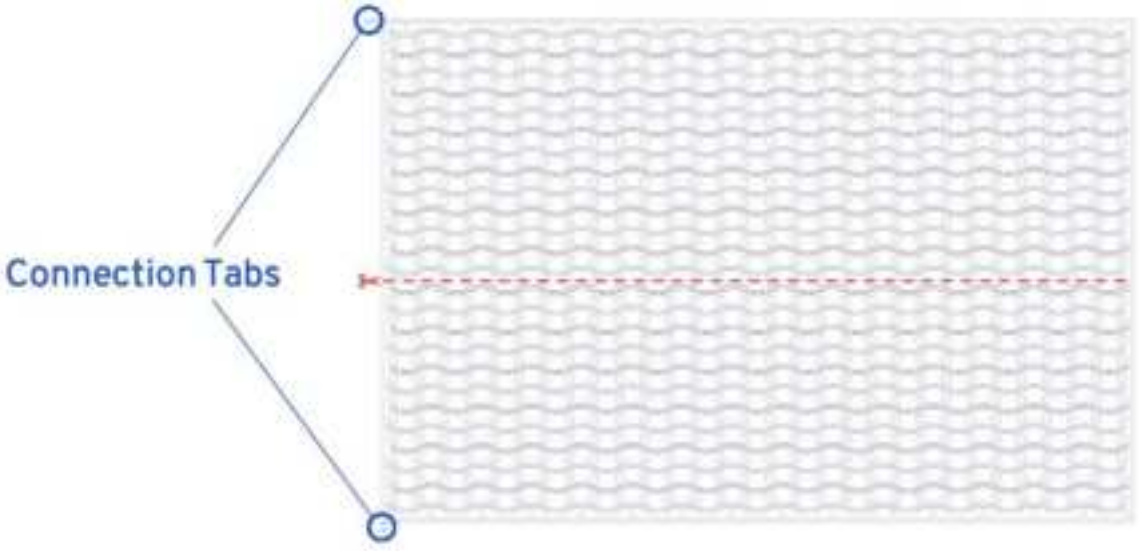
11.2 20"20" Format

This format is recommended for Clothes and Dish Washing Machines. As with the 9"x18" membrane, this format can be shortened by cutting it along the horizontal – as depicted below. The remaining halves can be connected to separate wireless modules or two ports on one wireless module.



11.3 30”30” Format

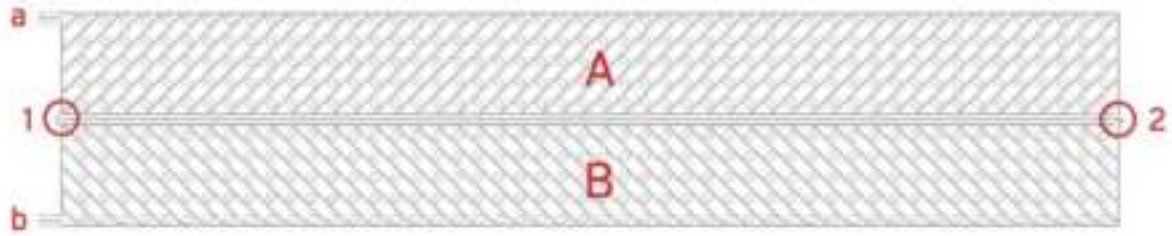
This format is recommended for refrigerators and the largest areas. Once again, this format can be shortened by cutting it along the horizontal – as depicted below. The remaining halves can be connected to separate wireless modules or two ports on one wireless module.



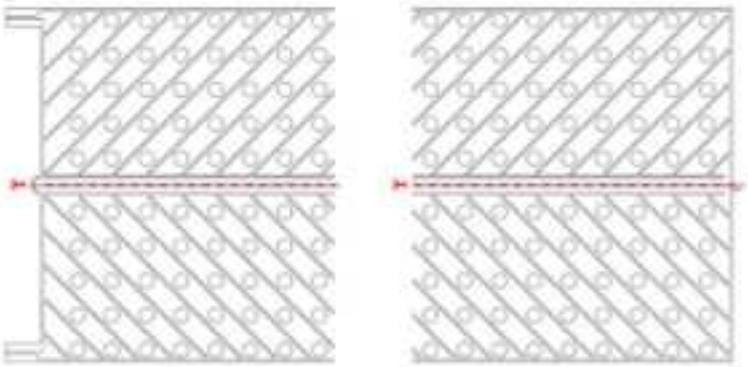
11.4 6”x30” Format

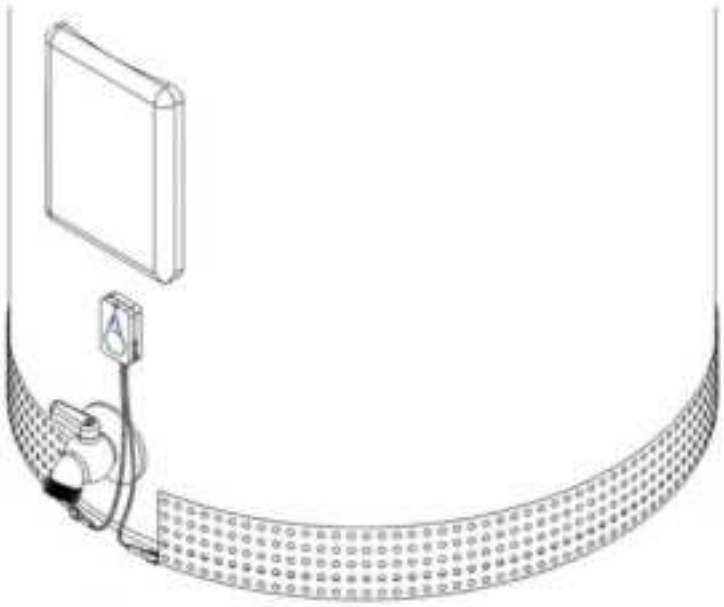
This format is designed to fit under most PTAC units and wrap around water heaters when cut in half.

After cutting "bridges" 1 and 2, regions "*A*" and "*B*" can be monitored separately by connecting the leads from "*a*" and "*b*" connection bridges into separate wireless modules. In this way, the amount of fluid covering the membrane can be determined by the number of regions that are alarming.



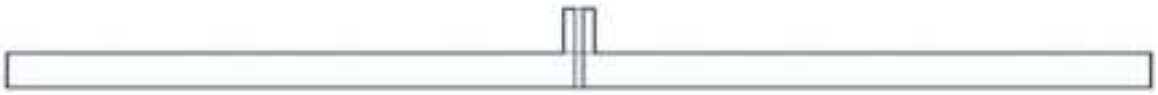
The design can be cut in half to create two 3"x30" membranes to wrap around opposing sides of a water heater . Each half should be connected to a wireless module.





11.5 1"x12" (Tee) Format

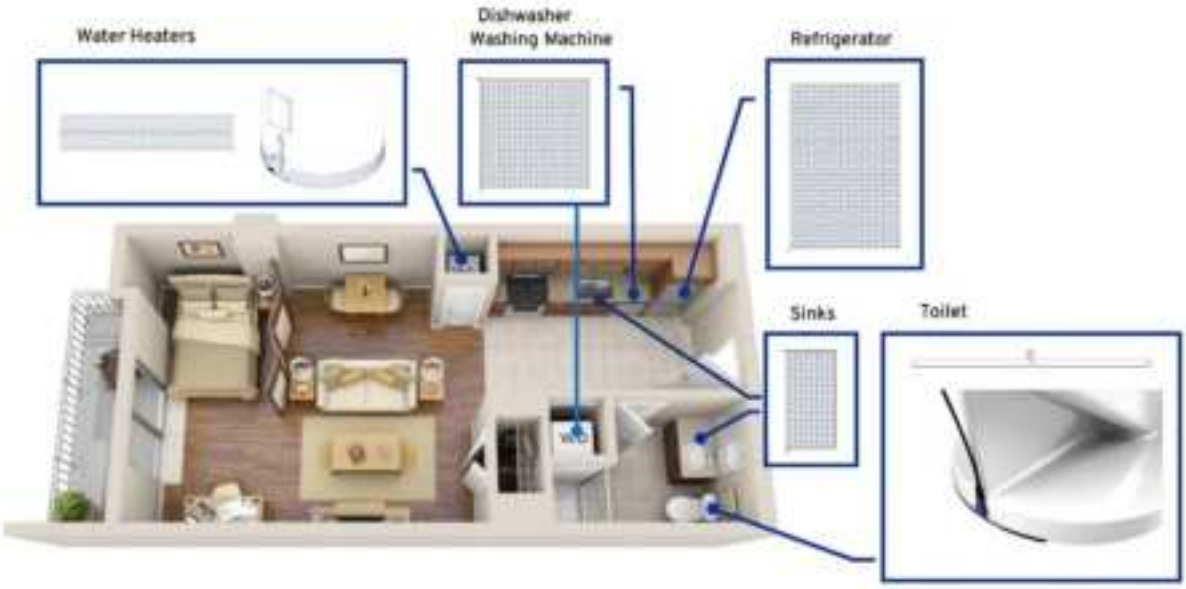
This format is recommended for tight spaces and around the base of toilets or inside overflow/condensation pans.



"Tee" design of the Noah Membrane primarily for monitoring toilet bowl overflow and leaks where a wide, flat sheet is inconvenient

Tee membrane installed on the back of a toilet base where anode (a) and cathode (b) are bridged by a leak on the floor

11.6 Common Installation Areas



12 Tips

Installing the membrane upside-down - with the conductive side facing up - desensitizes the sensor to leaks. If the leak sensor is triggered by accidental

exposure to small amounts of liquid (ice cubes falling on the floor and melting under the membrane), this orientation ensures that there must be a significant amount of water to trigger while avoiding the false alarms.

13 Operating Noah

13.1 Powering on/off & Resetting

<picture of Noah LED and button>

Turn on: All devices are shipped in the "off" state. Press and hold button underneath the unit for 3 seconds until the RGB indicator flashes once and the unit emits a chirping sound - release the button to turn on device. You will feel a faint "click" when the button has been engaged.

Turn off: Press and hold button for 8 seconds until the green LED indicator flashes quickly; then, release the button. The green indicator will flash 20 times to show that the device is turning off and the device will emit a short chirping sound.

Notes

- When the battery is removed and reinserted, NOAH defaults to the "off" state.
- Powering NOAH off restores the factory defaults.

13.2 Joining a Network

NOAH is designed to automatically check for gateways within range. In order to verify the device has found a gateway:

1. Make sure NOAH is turned on.
2. When it has located a gateway the green LED will stay on for five (5) seconds to show it has access to the network: otherwise, the green LED will continue to flash as the device listens for a response from the network. *<Picture of top-side/oblique indicating color and pattern>*
3. If the NOAH's search for a network times out, the red LED will turn on for five (5) seconds,
4. NOAH try to join a network again in fifteen (15) minutes.

13.3 Button Functions

<picture of button on underside>

Pressing the button once will wake the device, which will then send a report to the app.kairoswater.io.

Press and hold button for eight (8) seconds to reset and restore factory settings. The green LED will flash quickly twenty (20) times to indicate the reset was successful. This action also turns the device off; it will need to be turned on again.

13.4 Reporting Frequency

While turned on, NOAH sends a message to app.kairoswater.io every fifteen (15) minutes.

The only exception is when the device detects an abnormal reading, it will immediately send a report to app.kairoswater.io. Abnormal readings are when:

- A leak is detected (water is present on the leak detection membrane)
- The device is bumped or moved triggering a tamper alert
- The temperature rises above 110°F

Note: Custom alerts can be created at app.kairoswater.io. See these instructions for setting up custom alerts.

13.5 Restore to Factory Setting

<picture of button and action>

NOAH saves certain information; including network security and configuration settings. To restore factory settings:

- Press and hold button for 8 seconds until the green LED flashes; then, you should release the button. The green LED will flash quickly 20 times to indicate NOAH has successfully reset.

NOTE: NOAH will be "off" after a factory reset; and must be turned on again to resume normal operation.

13.6 Sleep Mode

NOAH is designed to be power efficient and will enter a sleep mode during operation.

- While the device is in the network, it will sleep for fifteen (15) minutes before checking back in with the network. Abnormal sensor readings will awaken NOAH, in which case it will send a report, chirp and flash the LED. <picture of LED & action>

- If NOAH is not in the network or it cannot receive messages from the network, it will enter sleep mode and wake up wake up every 15 minutes to check it the network is available. <picture of LED & action>

14 Summary of LEDs Indicator

The onboard LED that flashes at the nose of the device flashes different patterns of colors indicating various states of the device and sensors.

Figure 4: Product LED status indicators

LED Color	Status	Description
Green	Blinks 3 times	Device is being tampered with. The alarm will beep three times as well.
	Blinks rapidly 20 times	Device is turning off and factory resetting.
Red	Blinks every 30 seconds	Temperature is above 110 deg F.

Blue	Blinks rapidly	Leak is detected by an attached membrane.
Red - Green - Blue	Each color blinks once	The device has been turned on and is initializing.

15 Frequently Asked Questions

Q. Do I need a subscription with wireless service provider?

A. Not necessarily. The Kairos team will evaluate the site determine if there is a need to connect gateways to the internet over cellular if there is not sufficient locations with access to ethernet or Wi-Fi. If that is the case, Kairos has a business account with a provider for $10 per month per gateway.

Q. I have added the device to app.kairoswater.io, but it does not appear online.

A. Press the button on the bottom once to send an uplink to the app. Refresh your account to see if the device now shows as online. If not, remove the device from your account add it back again. If the problem persists, please reach out to the Kairos team using kairoswater.zendesk.com.

Q. The Noah module LED is blinking green.

A. Noah is designed to flash the green LED three times when moved. This function is a normal occurrence.

Q. The Noah module LED is blinking red.

A. Noah is designed to flash the red LED when the temperature has risen above 110 deg F. This function is a normal occurrence; however, the alert is indicative of an excessively high temperature, please be careful when checking on the area the Noah is installed, as there could be dangerous levels of heat and/or the source of the heat may be dangerous.

Noah Multifunction Sensor

Q. The Noah module LED is blinking blue.

A. Noah is designed to flash the blue LED when the attached membrane senses water. This function is a normal occurrence; however, the alert indicates the presence of water and should be checked on to see what the source is and whether a repair is needed to prevent further leaking and subsequent damage.

Q. How can I improve wireless signal strength?

A. TBD

Q. I don't understand the LED status indicators.

A. Please refer to section 13 for a detailed description of the LED indicators.

Q. Do I need to update the software in my Smarthings S100?

A. No, there are no firmware updates for these devices.

16 Notice

Kairos IoT Water Controls reserves the right to change this manual at any time without notice.

Information provided in this document is subject to change without notice.

17 Terms and Warranty

One year limited warranty

18 Support

Please contact us at info@kairoswater.io or visit our support page at kairoswater.zendesk.com for any technical or warranty repair/replacement questions.

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.

Caution: Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Radiation Exposure Statement
The device has been evaluated to meet general RF exposure requirement.

The distance between user and products should be no less than 20cm

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licenceexempt RSS(s). Operation is subject to the following two conditions:
(1)This device may not cause interference.
(2)This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs / récepteurs exemptés de licence conformes aux RSS (RSS)d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis auxdeux conditions suivantes :
(1) Cet appareil ne doit pas causer d'interférences.
(2) Cet appareil doit accepter toutes les interférences, y compris celles susceptibles deprovoquer un fonctionnement indésirable de l'appareil.

This device complies with ISED RF radiation exposure limits set forth for an uncontrolled environment.
This device must be installed and operated with a minimum distance of 20 cm between the radiator and user body.
Le présent appareil doit être installé et exploité à une distance minimale de 20 cm entre le radiateur et les corps.