



# **M2X LoRaWAN Controller**

## **User Manual - DRAFT**

KAIROS™ Water, Inc

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Hardware Version: 1.0.0  
Firmware Version: 1.0.0

# 1. 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™ approved peripherals to this device and ensure voltage ratings match the specifications in this document.
- 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 to 55°C)
- Storage temperatures should not exceed –40°F to 185°F (-40°C to 85°C)
- Do not submerge the device under water. It is designed to be weatherproof (IPX5) to withstand being sprayed by water.

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## 2. Introduction

The M2X LoRaWAN Controller is designed to connect to any combination of pulse meter and actuators (or other relay controlled devices) 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)
- Construction site monitoring

## 3. Features

- Real-time alerts set-up in the [KAIROSPortal](#)
- Configurable text message notifications
- Configurable mail notifications
- Visible feedback from onboard LEDs
- Onboard function buttons to interact with the controller
- 10-yr battery life under normal conditions<sup>1</sup>
- Replaceable 3.6V Lithium Thionyl Chloride battery

## 4. Package Contents

1. One (1) M2X LoRaWAN Controller
2. One (1) Outdoor-rated Antenna
3. Four (4) Mounting screws
4. Optional components
  1. 24VDC power adapter
  2. Antenna extension cable and mounting hardware

## 5. Installation

### 5. 1. Log into your KAIROS Account

You should have received an email from no-reply@kairoswater.io with your login credentials, including a temporary code. Your username will always be your email address.

If you are unable to login, please reach out to support@kairoswater.io to have your account checked or recreated.

### 5. 2. Set-up the LoRaWAN Gateways

Prior to installation of your M2X LoRaWAN Controllers, KAIROS should have visited and installed the radio network of LoRaWAN gateways. These gateways should already be listed and online in your account at portal.kairoswater.io.

If you find that the gateways are not showing in the Gateway section of the portal, please reach out to support@kairoswater.io requesting a status on those gateways.

### 5. 3. Install the M2X LoRaWAN Controller

Each controller should arrive and already be added to your account in portal.kairoswater.io. If you find that is not the case, please reach out to us at support@kairoswater.io with the devEUI you need added. Turn on the M2X following the instructions in [Operation section](#) of this manual. Check

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<sup>1</sup> Normal conditions = constant 65 deg F, no alerts (tamper, leaks, high/low temperatures), device remains on the entire time

portal.kairoswater.io to see if the module is showing as online now. When you log in to the portal, there is a "Lookup Device" feature in the upper left. Click on that and scan the QR code on the bottom of the device, or else type the characters in manually and click search. The device should be found. If you encounter any errors in searching, please reach out to us at support@kairoswater.io.

The Device should be mounted with 6 ft of the hardware it will interface with - whether a valve or meter or both. Longer cabling is available when needed, but does not come standard with the M2X kit.

## 5. 4. Mounting Options

### 5. 4. 1. Pipe Clamp

Mount directly onto a pipe using the appropriate size pipe clamp. M2X has features on its back for these bands to fit through.

### 5. 4. 2. Wall Mount

Using the screws and cardboard template provided, carefully pilot 1/8" holes where the controller will be mounted. Then line the holes with the holes on the mounting pegs of the controller. Screw in place.

### 5. 4. 3. No Mounting

While not usually recommended, if the M2X is being placed in a low-traffic area where it will not be tampered with, setting it on the floor can be an adequate option.

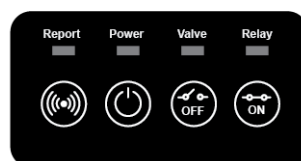
## 6. Connecting Peripherals

### 6. 1. Pulse Output Meters (example: Keyence FD-R and FD-H series)

### 6. 2. Valves ISO DIN connectors (example: Valworx Multi-Voltage Electric Actuators)

### 6. 3. 5-Wires Valves (example: Flo-Marvel)

## 7. LED Indicators



The LED indicators on the front of the M2X LoRaWAN Controller are designed to show the status of the valve/relays and confirm user-initiated activities, such as sending an uplink, powering the device on/off, and operating the valve/relays.

Report LED	Power LED	Valve LED	Relay LED	Interpretation
Off	Off	Off	Off	Device is asleep or powered off. Press the Report button to confirm the device status. If the Report LED blinks green, the device was asleep.
Green, blink once	Off	Off	Off	Uplink message has been sent.
Off	Green, blinking slowly 5 times	Off	Off	Device is powering on.
Off	Green, blinking quickly 10times	Off	Off	Device is powering off
Off	Green	Off	Off	External power is detected. If External power is disconnected, LED turns off as device reverts battery.
Off	Off	Green	Off	Valve signal is OPEN
Off	Off	Red	Off	Valve signal is CLOSED
Off	Off	Off	Green	Relay is OPEN. <sup>2</sup>
Off	Off	Off	Red	Relay is CLOSED. <sup>3</sup>

Table 1: LED Indicators

## 8. Button Functions

The button panel on the front of the M2X LoRaWAN Controller is designed for user interaction while being physically near the device in the case of testing, critical outages, and emergencies; otherwise, controlling the device is mainly performed remotely from the [KairosPortal](#).

Button Name	Hold Length	Function
Report	Short press	Device sends a General Status (FPORT 10) uplink to the <a href="#">KAIROSPortal</a> .
Power	Hold at least three (3) seconds	<ul style="list-style-type: none"> <li>• if device is on, it will begin powering off.</li> <li>• if device is off, it will begin powering on.</li> </ul>
Power	Hold for ten (10) seconds	Device restores factory default settings.
On	Short press	Signals are sent to open valve and relays are opened.
Off	Short press	Signals are sent to close valve and relays are closed.

Table 2: Button Functions

<sup>2</sup>LEDs will remain on for ninety (90) seconds from the initiation of movement

<sup>3</sup>LEDs will remain on for ninety (90) seconds from the initiation of movement

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## 9. Frequently Asked Questions

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

**The device has been added the device to portal.kairoswater.io, but it does not appear online.** 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 support@kairoswater.io.

**How can I improve wireless signal strength?** Moving the device to a location where it is not next to other electronic equipment or large metal items can improve the wireless signal strength. Trying a different orientation can sometimes improve signal strength as well.

**I don't understand the LED status indicators.** Please refer to section above about LED status indicators and what they mean.

**Do I need to update the software?** No, there are no firmware updates for these devices.

**How often do the batteries need to be replaced?** Ideally, once every ten years. However, constant alerting can reduce the life expectancy significantly - if an alert goes off continuously, it could be a only a few weeks before the battery is completely drained.

## 10. Support & Warranty

Federal Communications Commission (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.

Warning: Changes or modifications made to this device not expressly approved by Kairos Water, Inc may void the FCC authorization to operate this device.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

RF exposure statement:

The transmitter must not be colocated or operated in conjunction with any other antenna or transmitter. This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a Minimum distance of 20cm between the radiator and any part of your body.