kaiterra

# Kaiterra Sensedge Modbus User Manual

May 2023

# 1.

## Introduction

The Kaiterra Sensedge is a smart air quality monitor that supports multiple communication methods, including Modbus.

Modbus is a serial communications protocol. It has become a widely used communication protocol in many industries for its easiness of deployment and maintenance.

The Sensedge provides Modbus TCP/IP support via the Ethernet port on the device.

The Sensedge can still upload data to the cloud via Wi-Fi when Modbus is used for local communication.

Please make sure your Sensedge is running the latest firmware.
Navigate to **Settings –> Device Details** and check the Firmware Version.

**Latest Firmware Version:** 1.15.0.2 (May 2022)

# 2.

## Setting up Modbus on the Sensedge

### Enable Modbus

By default, the Modbus feature is not turned on.
Go to **Settings –> Device Details –> Connectivity –> Modbus** to turn on the feature.

### Setting the Device ID

On the **Settings –> Device Details –> Connectivity –> Modbus** screen, the Device ID is customizable. The Device ID is used to identify the device in the system, therefore, each Sensedge should have a unique Device ID, and the Device ID should also be different from other devices in the same system.

A default Device ID is provided in the Device ID field. Please customize your Device ID and make sure each device in the same line has a unique Device ID. The range of allowed Device IDs is 1-247.

It is recommended to set the Device ID on site during or after installation so it is easier to keep track of the Device ID and installation locations.

### Setting the Connection Type

On the **Settings –> Device Details –> Connectivity –> Modbus** screen, the Connection Type can be toggled between two modes: TCP and RTU.

TCP is supported by using the Ethernet port on your Sensedge. RTU is no longer supported.

## Setting the Modbus Port

On the **Settings –> Device Details –> Connectivity –> Modbus** screen, the port is customizable.

The default UDP port is set to 30000.
The port can be set to any round number in the range of 1024 – 65535.
It is recommended, however, that the UDP port stays unchanged.

Please consult with your BMS admin before changing the port.

## Restarting the service

On the **Settings –> Device Details –> Connectivity –> Modbus** screen, there is a Restart Service button. Please use this button when you need to restart the Modbus service during setup.

# 3.

## Communication Protocol - Modbus TCP

Data type and format: Data length=8
Stop bit=1
Transmission rate=9600
Check= even

| Data format | Address | Function | Data | Error check |
|---|---|---|---|---|
| Data length | 1 | 1 | N | 16 digit CRC code |

Default Modbus address code is 0x01

### Commands

Read Input Register (0x04) command 01 04 00 00 00 05 30 09 to read all input register

Register Address

| Address | Content | R/W property | Comments |
|---|---|---|---|
| Input register 0 | PM2.5 | R | 0-999 ug/m3 |
| Input register 1 | TVOC | R | 0-9999 ppb |
| Input register 2 | Temperature | R | -30.0-50.0℃** |

| | | | |
|---|---|---|---|
| Input register 3 | Humidity | R | 0.0%-100% RH |
| Input register 4 | CO2 | R | 0-9999 ppm |

*Temperature is in absolute temperature T(k)=273.15+t(celsius)
*Temperature and humidity have resolution of 0.1, the transmitted data is 10 times of the raw data.

** Since our temperature readings in Modbus are provided in Kelvin, you must convert them to Celsius. You can use the formula above [T(k) = 273.15+t(celsius)] or you can do this:

1. Take the Modbus reading (ie. 3000)
2. Minus 2732 (ie. 3000 - 2732 = 268)
3. Divide it by 10 (ie. 268 / 10 = 26.8℃)