SMOKE DETECTOR SD-1001

User Manual

Applicability

This guide is applicable to all EM series meters as shown below, except where otherwise indicated.

Model	Description
SD-1001	Smoke detector with LoRaWAN and BLE communication module

Safety Instructions

Please read this user guide as well as all other supplementary documents for the YOBIIQ Electricity Meters carefully. Please pay special attention to the safety instructions and warnings when using the YOBIIQ Electricity Meters and this user guide.

Nonobservance can lead to massive damage to persons and property.

Please respect the given electrical, mechanical and other boundaries of the YOBIIQ Electricity Meters. Nonobservance of these boundaries can lead to massive damage to persons and property.

Unauthorized changes to the YOBIIQ Electricity Meters voids all warranties and precludes any and all rights for compensation on the part of YOBIIQ B.V. in case of damage.

The usual local security and work rules must be observed. The installation of the meter must be carried out by qualified and trained personnel. Please read the installation instructions carefully.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by YobIQ B.V. for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Revision History

This guide is applicable to all EM series meters as shown below, except where otherwise indicated.

Version	Revision Date	Description
V1.0	Sept. 14, 2022	Initial release
V1.1	Feb. 9, 2023	Firmware update
V1.4	Sept. 12, 2024	Firmware update
V1.5	Sept. 24, 2024	Firmware update

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Declaration of Conformity

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Product Introduction

The SD 1001 is a smoke detection alarm, it has a built-in photoelectric smoke detector and buzzer.

It can detect the smoke density in the environment, and emit alarm sound when the smoke density exceeds the default value.

At the same time, the alarm data can be transmitted to other devices using LoRaWAN® or Bluetooth.

The SD-1001 has a self-test function which can be operated using the communication protcols supported.

Features

The SD-1001 is a Smoke Detector utilizing all digital detection technology design, avoiding false alarms due to electronic noise.

Other features include:

- Hush / Silence Alarm
- 230V Powered with backup battery, or on battery without main power
- Wired interconnect up to 48 devices
- Wireless interconnect up to 24 devices (requires additional gateway : SG01)

The device is certified by TUV Rheinland according to the EN-14604

LoRaWAN

The SD-1001 is a LoRaWAN Class A device and is LoRaWAN certified by TUV Rheinland.

The device transmits a status message on a specific interval, and transmits a status message when smoke is detected or another alarm is present.

All devices are delivered in OTAA mode by default, if you require ABP please contact support!

Bluetooth (BLE)

The SD-1001 can be grouped together by using a BLE Gateway, it supports the creation of up to 8 groups.
The detectors are interconnected without any wires.

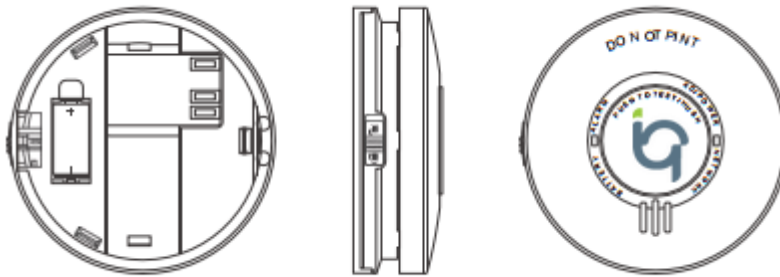Note: 230V mains supply is required when using Bluetooth

Hardware Introduction

Packing list

The Smoke detector is packaged in a carton box, the carton box contains:

- 1x Smoke Detector
- 1x Dust Cap
- 2x plug and screws
- 1x Quick start manual

Hardware overview

Specifications

Physical Characteristics	
Power	200-240VAC/50Hz
Storage temperature	0°C - +45°C
Relative humidity	10 - 80%
Current consumption	AC 0.05A
Size	⌀120*40mm
Color & Material	White, flame retardant plastic
LED Indicators	1x Battery/Alarm 1x AC Power / Network
Wireless Transmission	
Technology	LoRaWAN® or Bluetooth (BLE)
LoRaWAN®	
Antenna	Internal
Frequency	EU868/US915/AU915 please specify frequency upon order
Tx Power	16 dBm (868MHz) 22 dBm (915MHz)
Sensitivity	-137 dBm
Mode	OTAA, Class A
Bluetooth	
Antenna	Internal
Frequency band	2.4GHz ISM band
Wireless standard	Bluetooth LE 4.2/5.0
Tx Power	10.5 dBm
Sensitivity	-94 dBm

Sleeping Mode

The device is designed to enter a deep sleeping mode for power saving, this is done because the communication modules consume a lot of power.

The BLE module will only work when AC power is available on the device!
If you need to configure the smoke detector using the BLE module you can press and hold the alarm button for 10 seconds, the module will then be activated for 10 minutes.

The device will enter sleep mode under the following circumstances;

When the device is joined in a LoRaWAN® Network

The device will go into deep sleep mode after it's joined on a network, the device will wake up every Reporting Interval to send an uplink or if the device goes into an alarm state.

When not joined in a LoRaWAN® Network

The device will go into deep sleep mode after the network joining cycle.

Network Join Cycle

At first mounting to the backplate, the device will automatically start its join procedure.
The join procedure is defined as follows:

- Device will send out a join request and wait for join accept
- If no join response is received by the device, it will repeat sending a join request every minute, max. 4 further transmissions (5 join requests in total)
  - o During the join procedure the Green LED of the device indicates the result of the join procedure:
    - ▪ Fast blinking Green LED indicates that the device did not receive a join accept so far during the join procedure
    - ▪ Slow blinking Green LED indicates that a join accept was received
- Join procedure ends after 20 minutes, whether a join accept was received or not
- If no join accept was received during the join procedure, the device will send one join request every 24 hours until a join accept is received. The Green LED does not indicate these later join attempts

If the device fails to join the network, please check the configuration of the devices and consult your gateway or platform log files.

(Re)Join Requests

The LoRaWAN interface will perform automatic rejoin requests to the network as configured.

A Rejoin requests will always be sent once every 24 hours, this will allow for easy migrations to another LoRaWAN network.

Installation

Device Installation

Operation Guide

Communication Settings

Application Settings

The Application Settings can be modified by using the Tuya App over Bluetooth.

Parameter	Description
Reporting Interval (minutes)	The interval of reporting device data, default is 1440.
Test buzzer	Testing the buzzer

LoRaWAN Settings

The LoRaWAN Settings can be modified by using the Tuya App over Bluetooth.

Parameter	Description
Device EUI	Unique ID of the device, found on the label.
App EUI	Default App EUI
Working Mode	Default is Class A
Application Port	The port used for sending and receiving data, default port is 23.
Join Type	OTAA or ABP
Application Key	Appkey for OTAA mode.
ADR Mode	Allow the network server to adjust the datarate of the device.
Spread Factor	If ADR is disabled, the device will send data using this Spread Factor.
Confirmed Mode	If the device does not receive ACK packet from the network server, it will resend data 3 times at most.
Rejoin Mode	The device will send a LoRaMAC packet to check the connectivity status every 12 hours, if not receiving a response the device will rejoin.

LoRaWAN Frequency Settings

Under the LoRaWAN Settings there is an option to select the support frequency to send uplinks.

Please only change these if you have experience with the consequences of these modifications, and make sure that the channels match with your LoRaWAN® gateway.

LoRaWAN Frequency Settings

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LoRaWAN

General

The LoRaWAN Interface is in compliance with the LoRa Alliance specifications, and is based on the LoRa transmission standards.
Using the LoRa protocol the device can reliably transmit data over large distances without permanent communication.

The interface constantly adapts to the optimal transmit and receive parameters individually to ensure a stable and reliable link to the LoRaWAN Gateway.

The status of the link to the LoRaWAN network is shown on the device's display.

- The LoRaWAN interface is compatible with **LoRaWAN V1.0.4** and is a **Class A** device.
- The required parameters and configuration of the LoRaWAN interface are permanently saved inside the device.

The LoRaWAN interface will perform automatic rejoin requests to the network as configured.
A Rejoin requests will always be sent once every 24 hours, this will allow for easy migrations to another LoRaWAN network.

Infrastructure

The Customer is responsible for a working LoRaWAN Infrastructure, a typical LoRaWAN infrastructure consists out of;

- LoRaWAN Gateway
- Network Server
- Application Server

If needed YOBIIQ can support customer with the selection and configuration of the Infrastructure, this however is not covered by the normal support coverage.

YOBIIQ also supplies a turn-key LoRaWAN Infrastructure if Customer has no experience with the required infrastructure.

Device Payloads

All data are based on following format(HEX), the Data field should follow little-endian:

Channel 1	Type 1	Data 1	Channel 2	Type 2	Data 2	…
1 Byte	1 Byte	N Bytes	1 Byte	1 Byte	N Bytes	

Basic Information

The device sends basic information upon joining a network.

Channel	Type	Description
ff	09 (Hardware Version)	01 00 => V1.00
	0a (Software Version)	01 00 => V1.00
	16 (Device SN)	14 digit serial number
	0f (Device Type)	00 : Class A, 01: Class B, 02: Class C
	0b (Power Event)	00 : AC Power Off, 01: AC Power On

Example

ff 09 01 00 ff 0a 01 00 ff 16 01 01 20 22 01 00 00 ff 0f 00 ff 0b 01					
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	09 (Hardware Version)	0100 (V1.0)	ff	0a (Software Version)	01 00 (V1.00)
Channel	**Type**	**Value**	**Channel**	**Type**	**Value**
ff	16 (Device SN)	01 01 20 22 01 00 00	ff	0f (Device Type)	00 (Class A)
Channel	**Type**	**Value**			
ff	0b (Power Event)	01 (AC Power On)			

Device Data

The SD1001 reports device data according to the Reporting Intverval (24 hours by default).
If an alarm status changes the device will send an uplink immediately.

Channel	Type	Description
01	75 (Battery Level)	UINT8, Unit %
02	0b (Power Event)	00 : AC Power Off, 01: AC Power On
03	00 (Low Battery Alarm)	00 : Normal, 01 : Alarm
04	00 (Fault Alarm)	00 : Normal, 01 : Alarm
05	00 (Smoke Alarm)	00 : Normal, 01 : Alarm
06	00 (Interconnect Alarm)	00 : Normal, 01 : Alarm
07	00 (Button Pressed)	00 : Normal, 01 : Pressed

Example
Smoke detector connected to mains power supply, full battery, no errors.

01 75 64 02 0b 01 03 00 00 04 00 00 05 00 00 06 00 00					
Channel	Type	Value	Channel	Type	Value
01	75 (Battery)	64 => 100%	02	0b (Power Event)	01 (AC Power On)
Channel	Type	Value	Channel	Type	Value
03	00 (Low Battery Alarm)	00 (Normal)	04	00 (Fault Alarm)	00 (Normal)
Channel	Type	Value	Channel	Type	Value
05	00 (Smoke Alarm)	00 (Normal)	06	00 (Interconnect Alarm)	00 (Normal)

Smoke detector connected to mains power supply, 45% battery, smoke alarm.

01 75 2D 02 0b 01 03 00 00 04 00 00 05 00 01 06 00 00					
Channel	Type	Value	Channel	Type	Value
01	75 (Battery)	2D => 45%	02	0b (Power Event)	01 (AC Power On)
Channel	Type	Value	Channel	Type	Value
03	00 (Low Battery Alarm)	00 (Normal)	04	00 (Fault Alarm)	00 (Normal)
Channel	Type	Value	Channel	Type	Value
05	00 (Smoke Alarm)	01 (Alarm)	06	00 (Interconnect Alarm)	00 (Normal)

Downlink Commands

The SD1001 device supports downlink commands to configure the device, the application port is 50 by default.

Channel	Type	Description
ff	03 (Set Reporting Interval)	2 Bytes, unit: minutes
	00 (Test Smoke Detector)	00 : disregard, 01: Test Alarm The test alarm will sound the buzzer for 30 seconds, and then return to normal state.
	0a (Silence Buzzer)	2 Bytes, unit: minutes Represents the time the buzzer needs to be silence if a real smoke alarm is detected.

Example

Set the reporting interval to 12 hours.

ff030d02					
Channel	**Type**	**Value**			
ff	03 (Set Reporting Interval)	0d 02 => 02d0 => 720 minutes = 12 hours			

Test the smoke alarm.

ff0001					
Channel	**Type**	**Value**			
ff	00 (Test Smoke Detector)	01			

R&D

EAN Code

The registered EAN (GTIN) code for this product is;

Product Name	EAN/GTIN
SD-1001	8720892076700