

# SKYIND1

## MODBUS Bridge

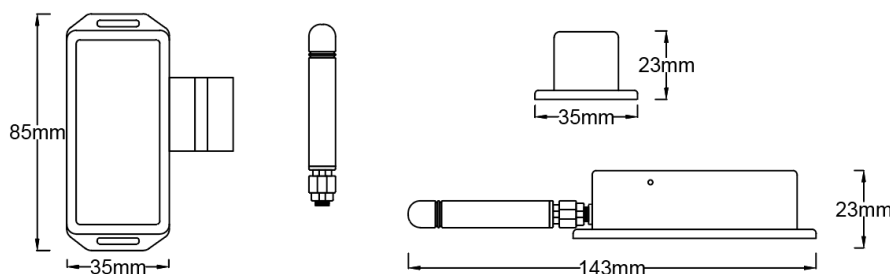


Skysens SKYIND1 MODBUS bridge is LoRaWAN MODBUS Bridge with RS485 Interface. Easy integration with existing MODBUS RTU capable machines. It is cost effective, easy to use with long battery life.

- ✓ Completely remotely programmable MODBUS RTU interface.
- ✓ Up to 10 years of battery life
- ✓ Direct integration to existing MODBUS RTU Interfaces
- ✓ Excellent long-term stability
- ✓ LED interface
- ✓ Changeable sensor reading parameters from network
- ✓ Single Pin Button For Start-Stop-Restart
- ✓ Ready with Software Application
- ✓ Battery Powered or External Power Supply Option for More Frequent Messages



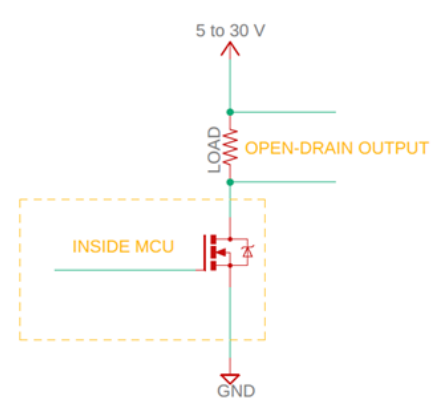
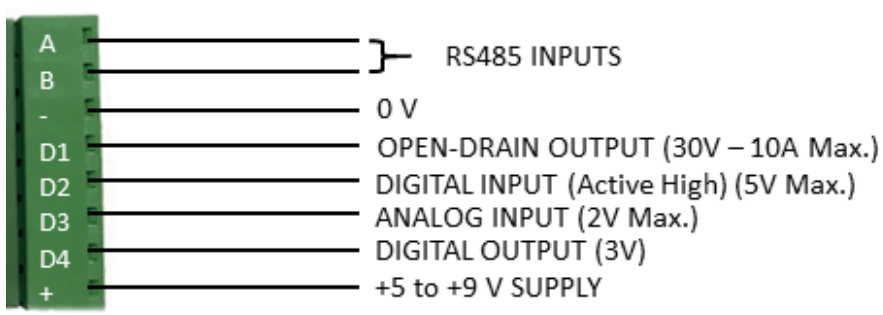
**Application Areas :** Any kind of industrial area with MODBUS RTU Connectivity.



Dimensions	35 x 85 x 23 mm	Expected Battery Life	min 5 year with 30 min interval
Weight	150 gr (apprx)	Available Frequencies	All
Casing	ABS	Interface	RS485 - ModBus
Antenna	+2 dBi or +3dBi external	Working Range	0%-100% RH, -60 °C +85°C
Battery	1 1/2 AA Battery or 5V1A Supply		

## SKYIND1

### PRODUCT IMAGES, BUTTONS AND PLUG-INS



# SKYIND1

## DEVICE INTRODUCTION

- This device is designed for reading Modbus devices remotely. It is possible to set following parameters: Modbus IDs of the devices to read, communication speed, start registers and register count to read.
- There are 10 slots to configure remotely in the device. Different IDs can be stored in these slots and/or different registers can be read from the same ID.
- Up to 17 registers can be read from a total of 5 zones per slot. For example, the reading mentioned here can be made by starting from register number 40001, followed by 4 registers, followed by 3 registers starting from register 40010.
- The settings of each slot should be made by separate downlink messages.
- Once configured remotely, the device retains its values in the EEPROM. In this way, when the device is de-energized or reset, it can continue to operate with the last set values.
- Modbus speeds should be sent to the device as coded below. The default value is 9600 bps.
- With a message sent remotely, the device can be reset to factory settings.
- The device's uplink message length is dynamic. That is, the length of the uplink message changes depending on the number of registers to be read.
- The values currently set on the device can be read with a downlink message.
- The device reads all non-0 Modbus IDs stored in the slots and sends messages repeatedly at 45-second intervals.

CODE	SPEED (BPS)
01	300
02	1200
03	2400
04	4800
05	9600
06	19200

# SKYIND1

## UPLINK STRUCTURE

### a. Regular Uplink

Message length for reading from 1 or 2 zone is given below,

$$l_m = 4 + 2x(\text{totalregisterstoberead})(\text{byte})$$

For reading from 3 or 4 zones is given below.

$$l_m = 5 + 2x(\text{totalregisterstoberead})(\text{byte})$$

### i. Reading from 1 Zone

0300030003000000000000059620000138700000C9000

In this example, 9 registers are read from a single zone. The information is as follows:

- Read Modbus ID
- Read Register Contents
- Battery Information
- Error Code

Error Code readings from one or two zones are as follows.

ERROR CODE	ERROR CONTENT
0X00	Reading is Successful
0X01	Reading Error

# SKYIND1

## UPLINK STRUCTURE

### ii. Reading from Multiple Zones

030003000300000000000059620000138700000C900000

In this example, a total of 9 registers were read from 4 zones. The information here is as follows.

- Read Modbus ID
- Read Register Contents
- Battery Information
- Error Code

The error code here is in addition to the table above. This means that each digit indicates the reading error in the respective zone.

ERROR CODE	ERROR CONTENT
0X00	Reading is Successful
0X01	Reading Error

### b. Keepalive Uplink

The device performs the regular uplink by checking if the IDs stored in the slots are 0 or not. If the device is stored in all slots 0, it sends a keepalive message in order to be able to do uplink only to be sent in this case (the downlink message is only sent immediately after the uplink message.). The standard form of this message is as follows. The message is sent from port 7.

# SKYIND1

## UPLINK STRUCTURE

### c. Writing Status Uplink

When a data is written to the device (described in detail in the downlink section), it is the message returned to ensure that the data requested is written correctly. It is sent from port 5. If all bytes of the incoming message (except the first byte) are 0, this means that writing is done without any problems.

### d. Control Uplink

It is the message that is sent by the device after sending the relevant downlink message to check the data written in the corresponding slot of the device (to be used in the Modbus reading). Sent from port 6. Its structure is as follows as standard.

000105000105000702000C01000E01

- Slot Number
- Modbus ID
- Modbus Communication Speed
- Starting Register for Zone 1  
Number of Registers to Read from Zone 1
- Starting Register for Zone 2  
Number of Registers to Read from Zone 2
- Starting Register for Zone 3  
Number of Registers to Read from Zone 3
- Starting Register for Zone 4  
Number of Registers to Read from Zone 4

# SKYIND1

## DOWNLINK STRUCTURE

### a. Downlink Message for Remote Reset

The message to remotely reset the device.

**Port: 0xFA**

**Message: 0xDE**

### b. Downlink Message for Changing Message Frequency

This is the message that is sent to change the normal message sending frequency of the device. In the last 4 digits, seconds should be added in hexadecimal form.

**Port: 0x0B**

**Message: 0x020000SSSS**

### c. Downlink Message for Reading Current Values

It is the message that should be sent for remote control of the values (to be used in reading) written in the corresponding slot of the device. LL in the message is the number of the slot to be read.

**Port: 0x16**

**Message: 0x04LL**

### d. Downlink for Factory Reset

This is the message that must be sent to restore the values of the device to the factory settings. The device then deletes the data written to the EEPROM and returns to the factory settings.

**Port: 0x014**

**Message: 0xEE**

# SKYIND1

## DOWNLINK STRUCTURE

### e. Downlink for Changing Values to Read

It is the downlink that must be sent to change the reading parameters of the device. The length varies according to the number of zones. The device detects the number of zones according to the length of the message. Examples by zone are as follows. 4 and 5 zones are same with multiple zones, there must be start address and register to read info added continuously to the message.

**Port: 0x015**

#### i. 1 Zone

Message: 03000105000105

- Prefix
- Slot Number (Starts from 0)
- Modbus ID
- Modbus Communication Speed (coded)
- Start Address
- Number of Registers to Read



# SKYIND1

## DOWNLINK STRUCTURE

### ii. 2 Zones

Message: 03000105000105000702

- Prefix
- Slot Number (Starts from 0)
- Modbus ID
- Modbus Communication Speed (coded)
- Start Address
- Number of Registers to Read
- Start Address (2. Zone)
- Number of Registers to Read (2. Zone)

### iii. 3 Zones

Message: 03000105000105000702001A05

- Prefix
- Slot Number (Starts from 0)
- Modbus ID
- Modbus Communication Speed (coded)
- Start Address
- Number of Registers to Read
- Start Address (2. Zone)
- Number of Registers to Read (2. Zone)
- Start Address (3. Zone)
- Number of Registers to Read (3. Zone)

# SKYIND1

## Reset Operation

Push the reset button and hold, red LED must light for a while and start blinking. When you see the blinking release the button. The device gets reset by this operation and after every reset operation, the device goes into sleep mode automatically by blinking red and green LEDs once.

## Wake Up

To exit sleep mode and take the device to the normal operation mode, push the reset button until you see the red LED light. When you see red light release the button and the device will go into normal operation mode by blinking LEDs in a sequence of green-red-green.

## OTAA Mode

The device requests OTAA join to the server after the device wakes up and goes into the normal operation mode. OTAA requests are represented by the blinking green LED once per request. When the device successfully joins to OTAA mode green LED lights for a while.

## Communication

The device indicates uplink communication by blinking green LED once and downlink communication by blinking red LED once.

## ABP

For ABP please contact SKYSENS.

## Error Behaviour

The first time device with a hardware problem is energized, it flashes the red led at the intervals of five hundred milliseconds, to indicate there is a hardware problem.