GreenOK-II : Wireless Thermo-Hygro Monitor

User's Manual

dadam MICRO INC.

FCC Information

This device complies with Part 15 of the FCC Results. Operation is subject to the following two conditions:

(1) This Device may not cause harmful interface, 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 CLASS B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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 correct the interference by one or more of the following measures:

1.1. Reorient or relocate the receiving antenna.
1.2. Increase the separation between the equipment and receiver.
1.3. Connect the equipment into an outlet on a circuit different from that to which receiver is connected.
1.4. Consult the dealer or experienced radio/TV technician for help.

WARNING

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

"CAUTION: Exposure to Radio Frequency Radiation.
Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possiblility of exceeding the FCC radio frequency exposure limit. The minimum separation distance of 20 cm from the antenna to the body of user required.

DOCUMENT HISTORY

REVISION	DATE	COMMENTS
1.0	2008.01.08	1ST official version (H/W Rev.A1)
2.0	2009.04.30	Modified as per H/W Rev.B3
2.1	2009.07.20	Modified as per H/W Rev.C1 & FCC

Table of Contents

1. Introduction

- The **GreenOK-II®** Wireless Thermo-Hygro Monitor measures and transmits the temperature and humidity via 2.4GHz Zigbee wireless technology. The Wireless Sensing Units(WSU) can be installed anywhere within a 300 meters radius from the Base Monitoring Unit(BMU). Adding on additional wireless sensing units couldn't be easier. Once installed, the units work together to keep you on top of the environmental conditions.
- If the radio signal is week due to long distance than 300 meters or any radio obstacle exists, the base monitoring units can be configured as a repeater unit which retransmits the neighboring wireless sensing units data up to 8 depths.
- The GreenOK-II® also monitors the voltages, relay contact point, or AC power failure up to 2 points.
- The base monitoring unit receives the transmitted data from the wireless sensing units, displays the current values, and alarm status. Pre-defined high or low temperature alarm conditions trigger the red alarm indicators and the alarm sounds to notify you of the alarm situation in real-time.

- The GreenOK-II® can be applicable to below area.
  - ✓ Green houses, farms, barns
  - ✓ Warehouses for fresh foods, refrigerator, cold storage warehouses
  - ✓ Museum, library, galleries
  - ✓ Any temperature and relative humidity monitoring appliances
  - ✓ Intelligent building and home automation

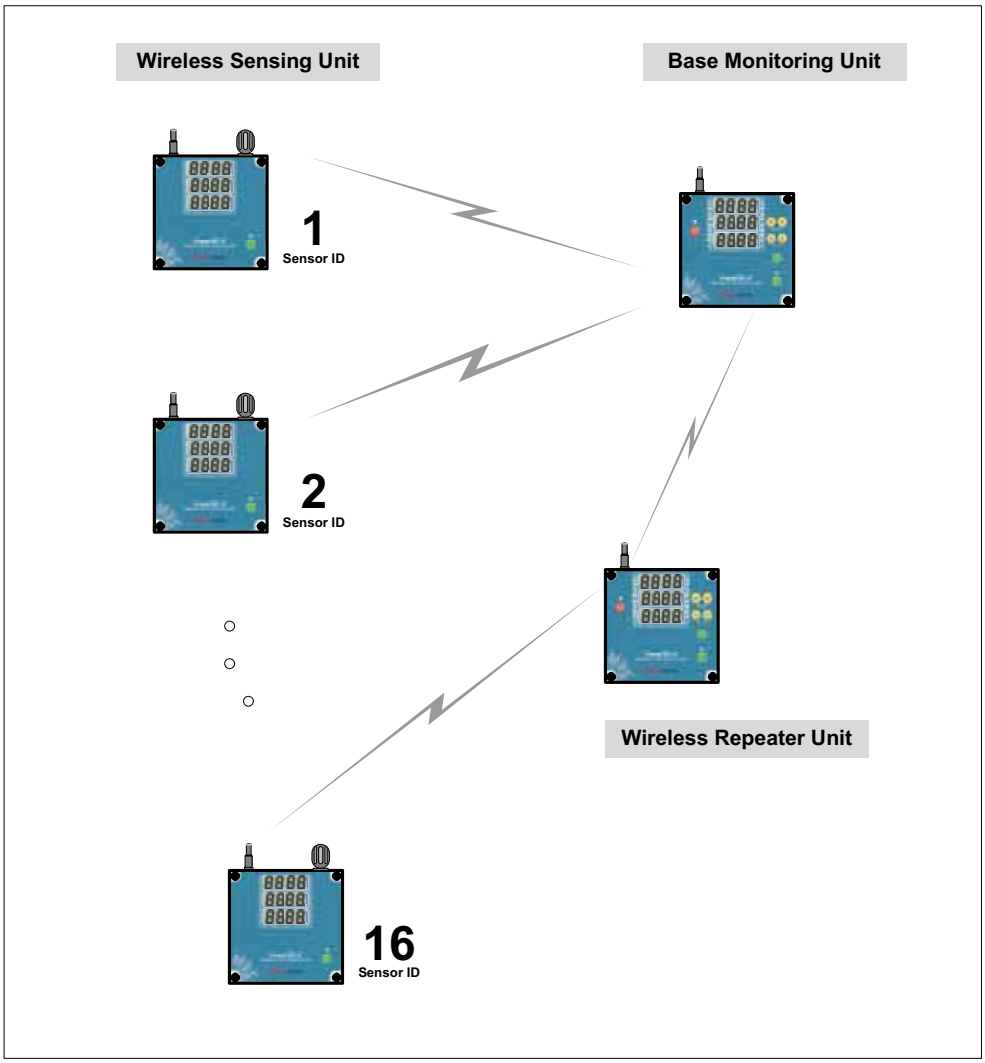
<Figure 1> Photos: Wireless Sensing Unit / Base Monitoring Unit

2. Systems Configuration

- GreenOK-II is composed of Wireless Sensing Unit(WSU) for temperature and humidity monitoring and Base Monitoring Unit(BMU) for displaying the data from wireless sensing unit and Wireless Repeater Unit(WRU) which retransmit the data from WSU.
- The **Wireless Sensing Unit (WSU)** measures the temperature and humidity value and transmits the data wirelessly to the base monitoring unit. It transmits the data over 2.4GHz radio frequency band and operates with 2 C-size batteries, which can be installed and replaced very easily by the end user.
- The **Base Monitoring Unit (BMU)** receives the data from the wireless sensing units, displays the current values, and alarm status. It operates with AC power adapter as well as with 2 C-size batteries. Pre-defined high temperature and low temperature alarm conditions trigger the red alarm indicators and the alarm sounds to notify you of the alarm situation in real-time. It can also be operated as repeater mode, which the AC power adapter is suggested because of relatively high battery consumption. Up to maximum 16 wireless sensing units can be monitored simultaneously by base monitoring unit.
- The **Wireless Repeater Unit (WRU)** retransmit the data between WSU and BMU up to 8 steps. By using WRU, the longer radio monitoring distance can be achieved and also be applied to cover geographical hidden area.

Type	Model Name	Description
Wireless Sensing Unit (WSU)	GMS-120ZB	TEMP & RH, 2 Volt Inputs
	GMS-130ZB	TEMP, 1 Volt Input
	GMS-140ZB	2 Volt Inputs
Base Monitoring Unit (BMU)	GMS-220ZB	Monitor up to 16 Sensing Units
Wireless Repeater Unit (WRU)	GMS-220ZB-RPT	Repeat up to 8 steps

<Table 1> GreenOK-II Product Information



<Figure 2> Systems Configuration

3. Wireless Sensing Unit

3.1 Functional Description

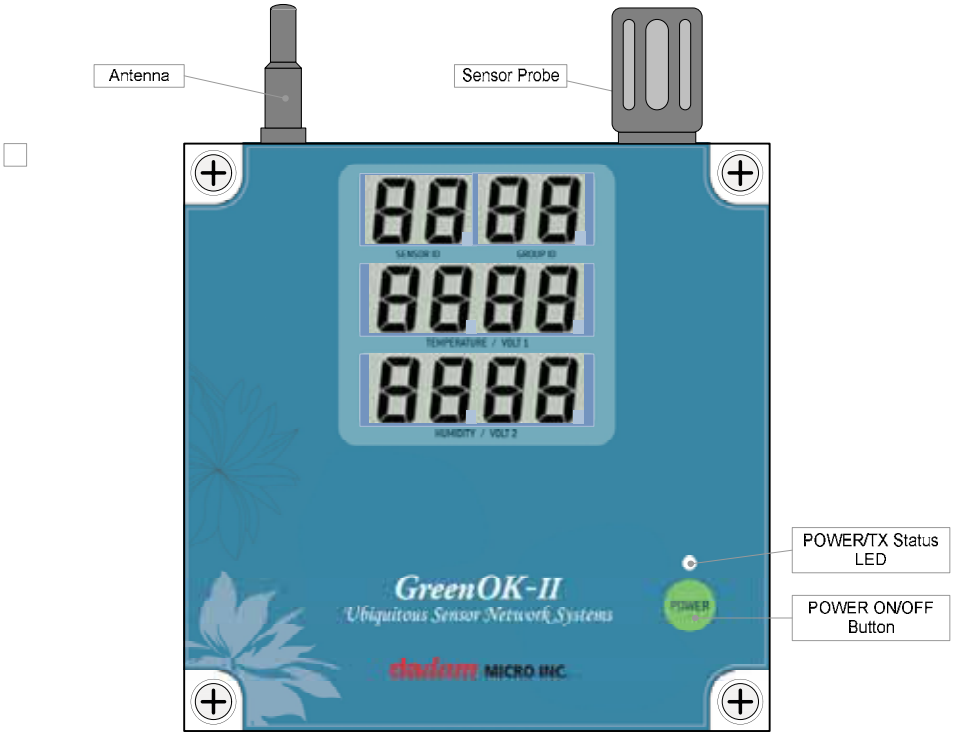
- SENSOR_ID
  - Shows the current SENSOR ID of the unit.
- GROUP ID
  - Shows the current GROUP ID of the unit.
- TEMP/VOLT1
  - Shows the current temperature, voltage 1 as per operating mode.
- HUMID/VOLT2
  - Shows the current humidity, voltage 2 as per operating mode.

< IMPORTANT >

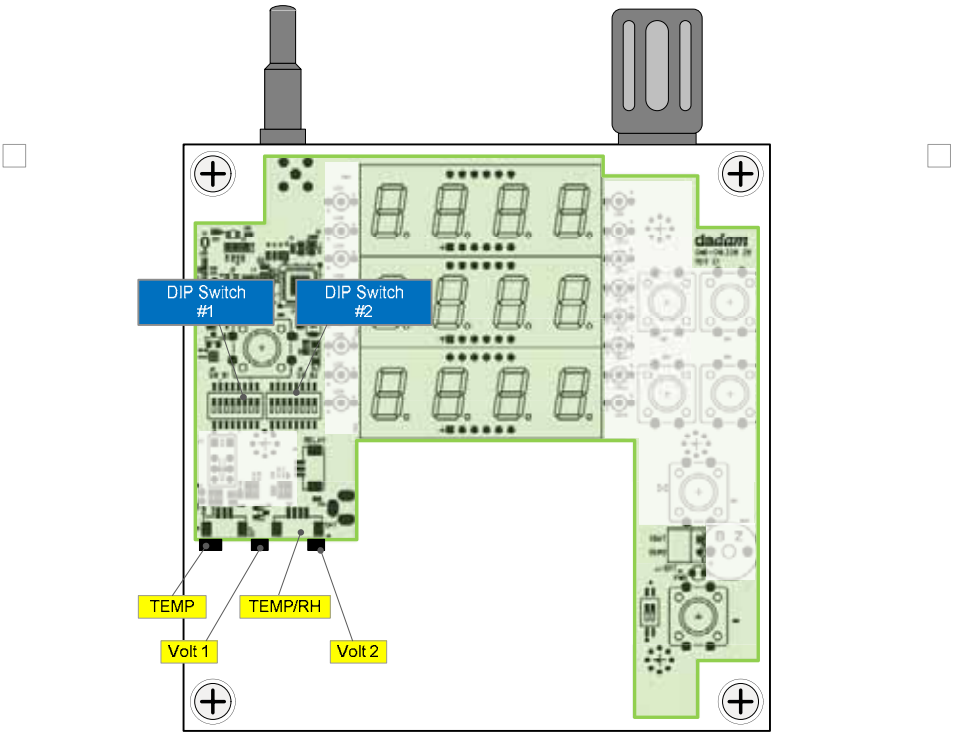
When the unit is operated by batteries, above values are displayed for 3 seconds whenever you press the POWER ON/OFF button.

- POWER ON/OFF Button
  - To turn on the WSU, press the power button for 3 seconds until the green LED blinks twice.
  - To turn off the WSU, press the power button for 3 seconds until the green LED turn off.
  - This button operates only in battery powered mode.
- POWER/TX Status LED
  - Green LED blinks whenever it transmit the data. The defaults TX interval is 15 seconds.

- Power Supply
  - As defaults, 2 C-size alkaline batteries are used.



<Figure 3> Functional Description of Wireless Sensing Unit

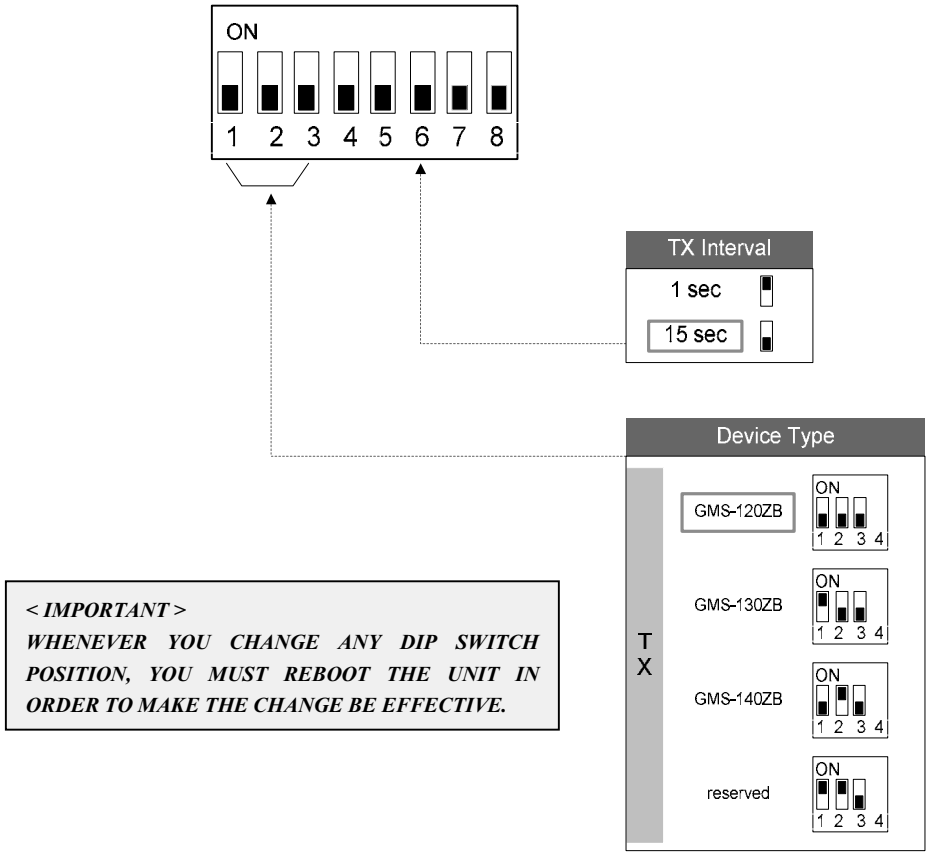


<Figure 4> DIP Switches and Connectors of Wireless Sensing Unit

3.2 How to set the DIP Switch #1

- **DEVICE TYPE**
  - ① The DEVICE TYPE can be configured as one of GMS-120ZB, GMS-130ZB and GMS-140ZB as per the sensor connected.
  - ② The default TYPE is GMS-120ZB.
  - ③ If the wrong DEVICE TYPE is configured, you may not read the correct data.

- **TX INTERVAL**
  - ① The TX INTEVAL can be configured as 15sec or 1sec.
  - ② The default INTERVAL is 15 seconds.

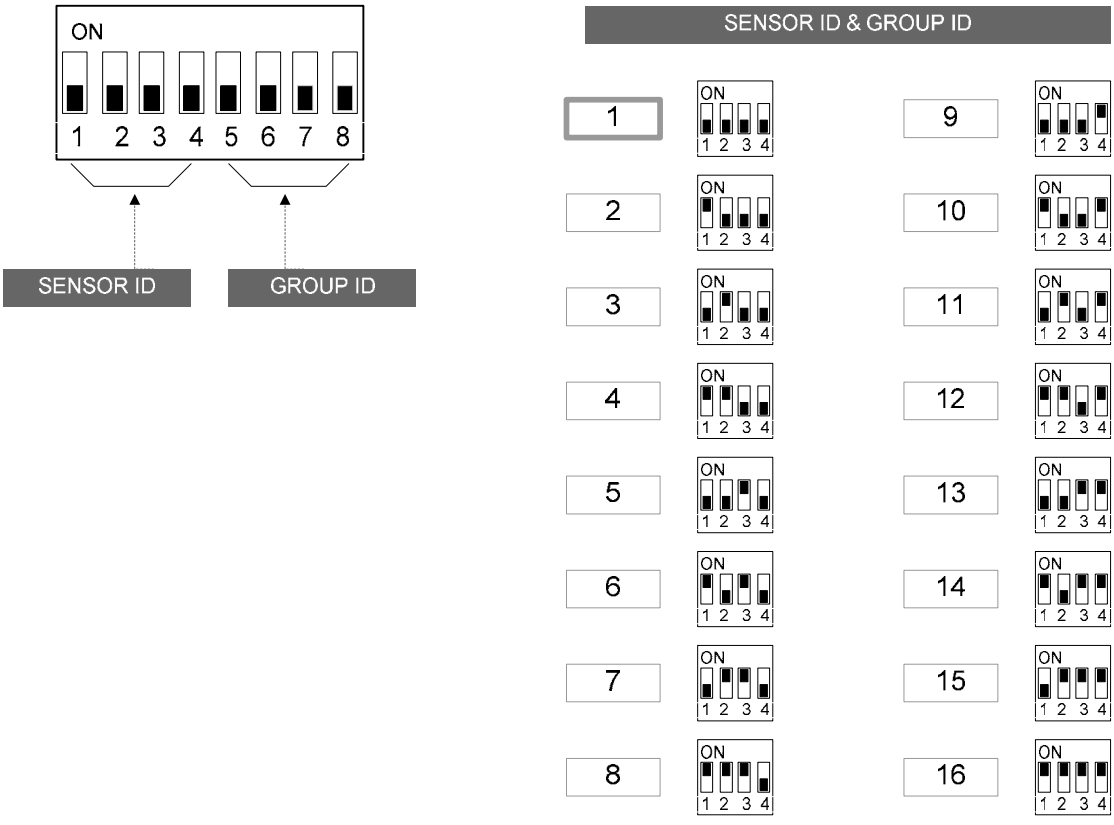


<Figure 5> DIP Switch #1 Configuration of Wireless Sensing Unit

3.3 How to set the DIP Switch #2

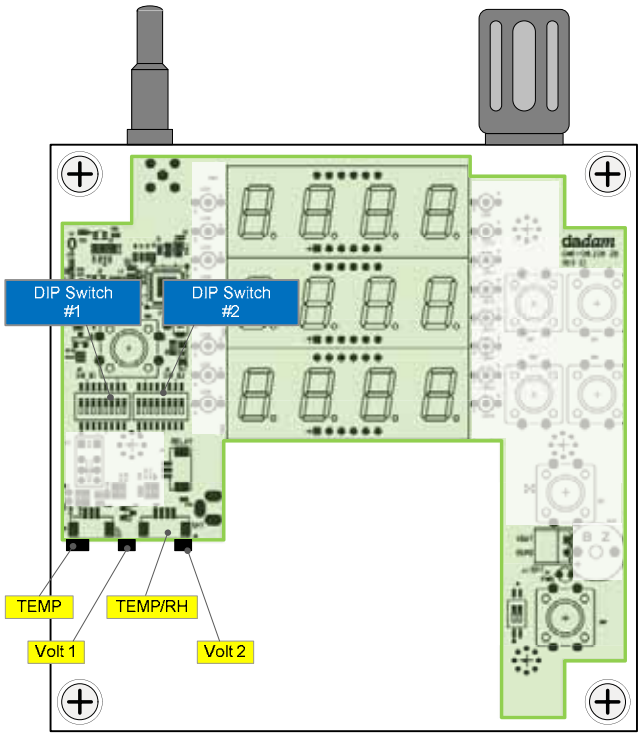
- **SENSOR ID**
  - ① The SENSOR ID can be configured as one of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16. The default ID is '1'.
  - ② Please avoid SENSOR ID duplication.

- **GROUP ID**
  - ① The GROUP ID can be configured as one of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16. The default ID is '1'.
  - ② Please avoid GROUP ID duplication.



<Figure 6> DIP Switch #2 Configuration of Wireless Sensing Unit

3.4 How to connect the Sensors



<Figure 7> Connectors of Wireless Sensing Unit

4. Base Monitoring Unit

4.1 Functional Description

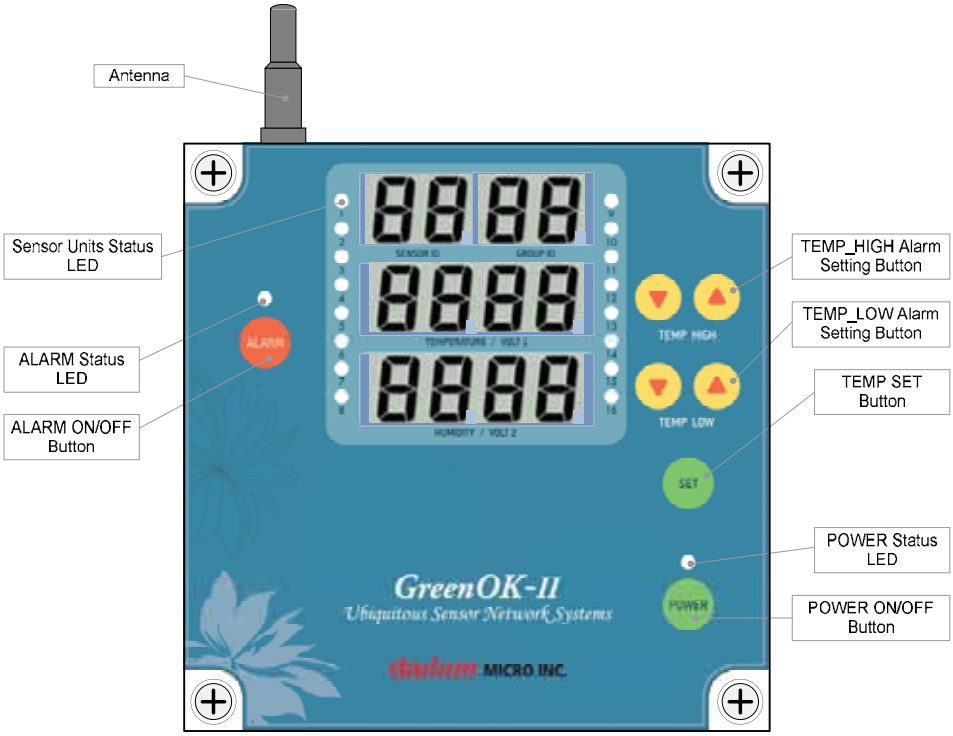
- Initialization: Power up the BMU and initialization operation follows.
  - The firmware version displays.
  - The 16 STATUS LED light red and green just one time.
  - Every LED displays from 0 to 9 in sequence.
  - Beep sounds two times.
- SENSOR_ID
  - Sensor ID automatically rotates 1, 2, 3, … , 16 in sequence at 3 seconds intervals.
- GROUP ID
  - GROUP ID can be set among 1, 2, 3, … , 16.
- TEMP/VOLT1/TEMP_HI LED
  - Shows the current temperature, voltage 1 and TEMP_HI value as per operating mode.
- HUMID/VOLT2/TEMP_LO LED
  - Shows the current humidity, voltage 2 and TEMP_LO value as per operating mode.
- 16 STATUS LED
  - When it detects the wireless remote sensing unit, LED lights green.
  - If it detects the abnormal temperature condition of WSU, LED blink in red at 1 second intervals with beep sound.
  - If it fails to detect the WSU in pre-determined time – 3 seconds, LED turns on red with beep sound.
  - If it detects the low battery of WSU, LED blink in green at 1 second intervals, but no beep sound.

- ALAMR ON/OFF Button
  - By pressing ALARM button, you can ON or OFF the alarm beep sound, which is noticed with Green alarm LED.
  - The defaults alarm setting is ON with Green alarm LED ON.

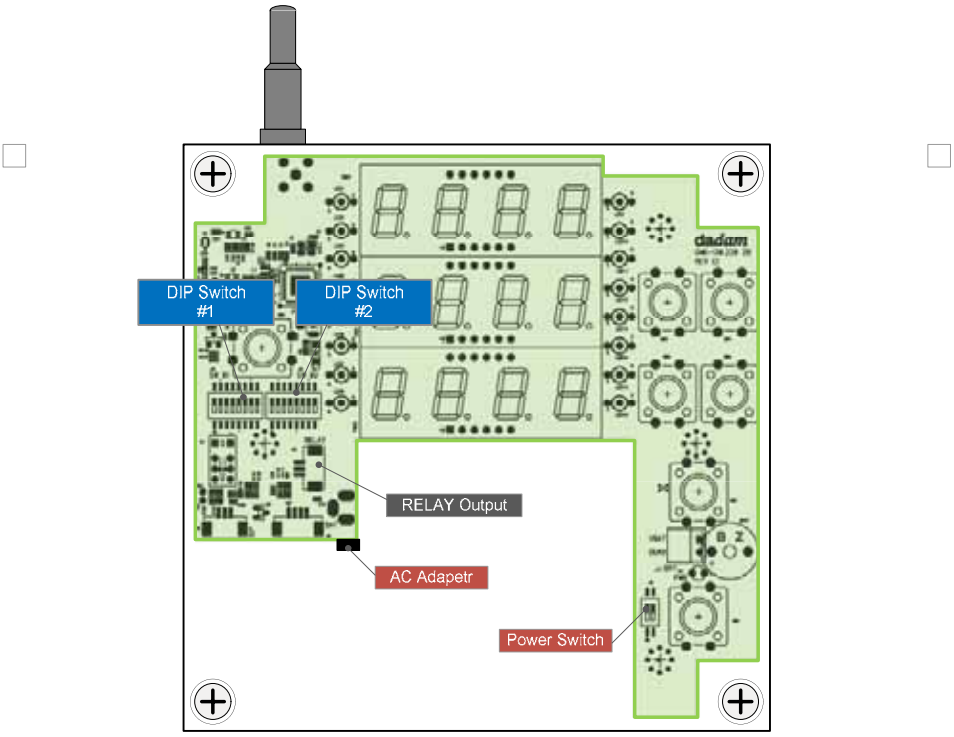
- TEMP_HIGH / TEMP_LOW Alarm Setting Button
  - To increase or decrease the TEMP_HIGH or TEMP_LOW alarm value, press these buttons until you get the desired values.
  - The default TEMP_HIGH alarm value is 40℃.
  - The default TEMP_LOW alarm value is -40℃.

- POWER ON/OFF Button
  - When AC power adapter is used, the power is continuously supplied to the unit and Power ON/OFF button does not operate.
- POWER Status LED
  - Green LED is lit when the BMU is turned on.

- Power Supply
  - As defaults, AC power adapter of DC5V/1A output is used, and the internal 'Power Switch' should be UP position.



<Figure 8> Functional Description of Base Monitoring Unit



<Figure 9> DIP Switches and Connectors of Base Monitoring Unit

4.2 How to set the DIP Switch #1

- **DEVICE TYPE**

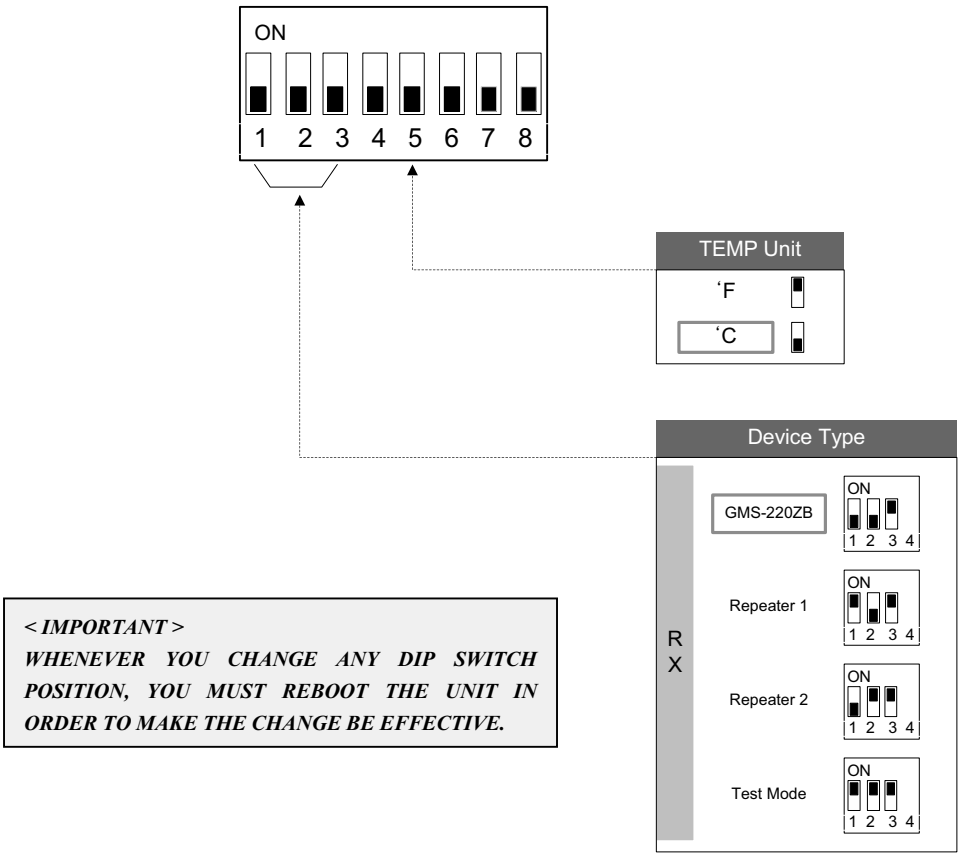
  ① The DEVICE TYPE can be configured as one of GMS-220ZB, Repeater and Test Mode as per operation mode.

  ② The default TYPE is GMS-220ZB.

- **TEMP UNIT**

  ① The TEMP UNIT can be configured as one of ℃ and 'F.

  ② The default UNIT is ℃.



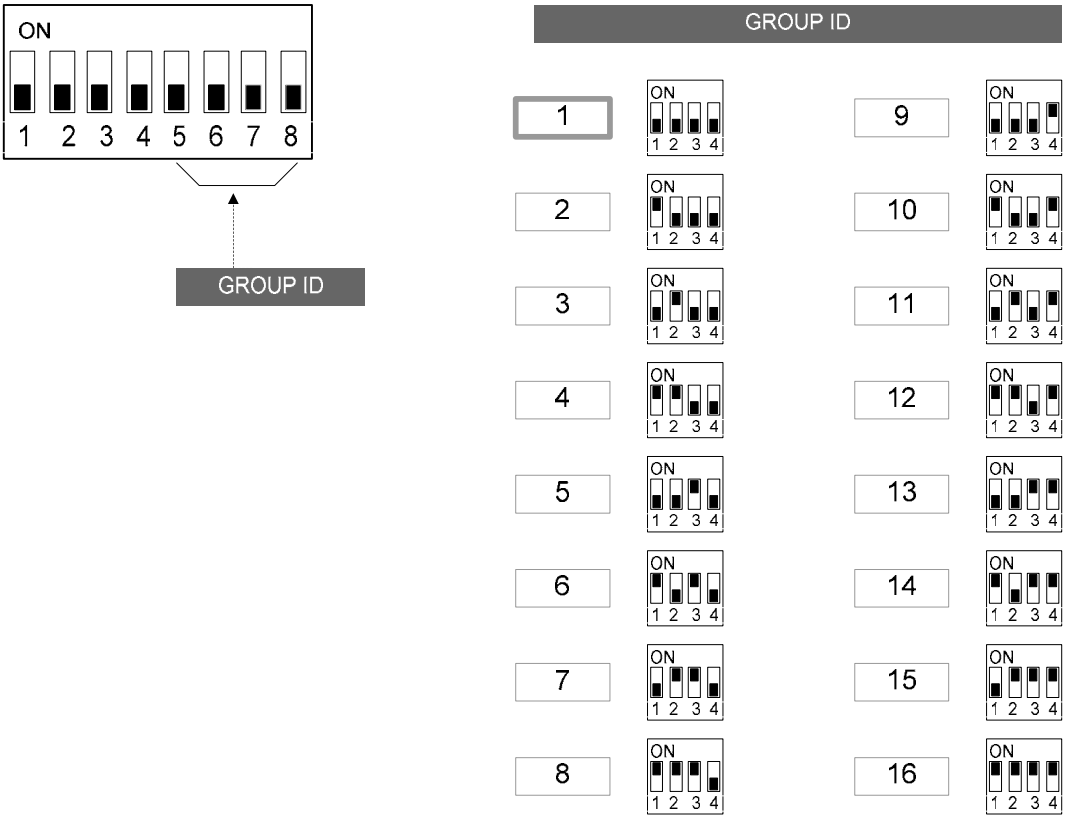
<Figure 10> DIP Switch #1 Configuration of Base Monitoring Unit

4.3 How to set the DIP Switch #2

- **GROUP ID**

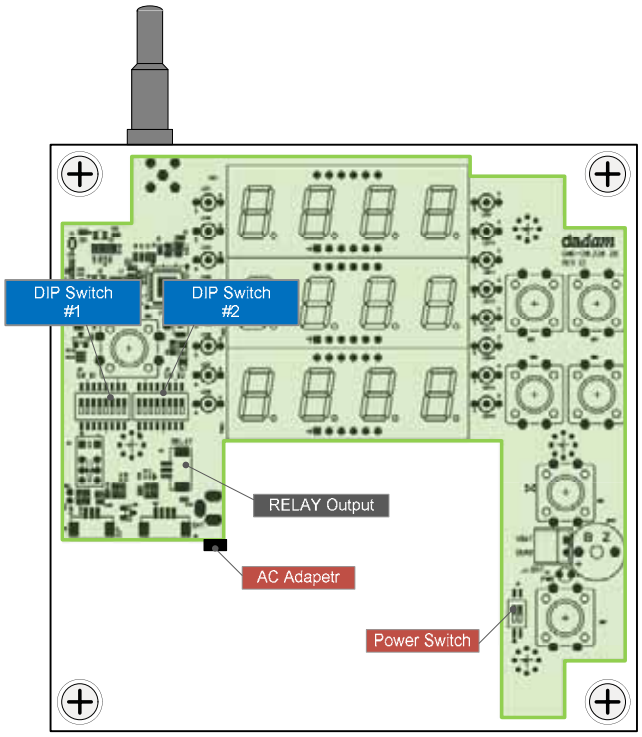
③ The GROUP ID can be configured as one of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 and 16. The default ID is '1'.

④ Please avoid GROUP ID duplication.



<Figure 11> DIP Switch #2 Configuration of Base Monitoring Unit

4.4 How to connect the Relay and AC Adapter



<Figure 12> Connectors of Base Monitoring Unit

4.5 How to set Temperature Alarm Value

① Press the SET button for 3 seconds until the TEMP_HI and TEMP_LO LED flash simultaneously which showing current temperature alarm values of SENSOR ID 1.

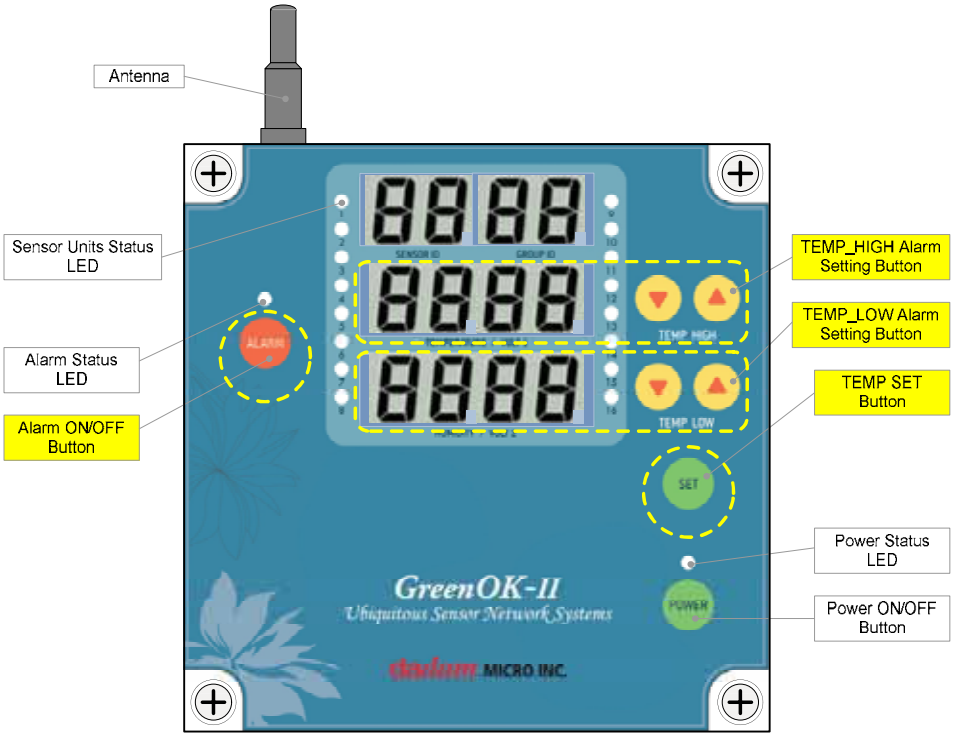
② To set the temperature high alarm value, press the UP and DN button of TEMP_HI field. The temperature high alarm value increases or decreases in 1℃ interval ranging between -40℃ to 120℃.

③ To set the temperature low alarm value, press the UP and DN button of TEMP_LO field. The temperature low alarm value increases or decreases in 1℃ interval ranging between -40℃ to 120℃.

④ Whenever pressing the SET button, the next SENSOR ID and TEMP_HI and TEMP_LO values are displayed in sequence.

⑤ When you complete the alarm setting, press the ALARM button. The LED stop flashing and current temperature and humidity value are displayed.

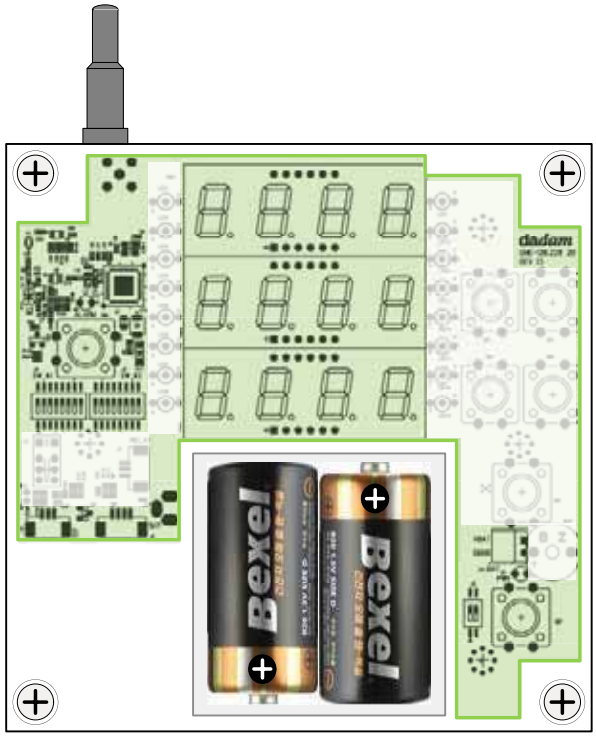
❁ ***The TEMP_HI value should be higher than TEMP_LO value. If not, abnormal temperature alarm operation may occur.***



<Figure 13> How to set Temperature Alarm Value of Base Monitoring Unit

5. Replacing the Batteries

- This product uses 2 C-size alkaline batteries. If the LED of sensing unit doesn't blinking for several minutes, follow these steps to replace the batteries;
  - Unscrew the 4 screw of the unit.
  - Remove the old batteries.
  - Make sure you install into the correct direction.
  - Place the cover and screw firmly the 4 screw.
- If you put batteries (+/-) up in the opposite direction, it could be not work or cause damage.
- Make sure to use the specified alkaline batteries and replace two batteries at same time.
- Do not charge, short, break up the batteries that could Explosion and cause liquid inside out.
- Dispose of the used batteries in an environmentally proper manner.



<Figure 14> Replacing the Batteries

6. Specifications

6.1 GMS-120ZB

Item	Description
Measurement range (Display)	Temperature: -40℃ ~ 120℃ Humidity: 1% ~ 99% RH Volt: 0.0V ~ 1.500V
Resolution	Temperature: 0.1℃ Humidity: 0.1% Volt: 0.001V
Accuracy	Temperature: ±0.5℃ @25℃ Humidity: ±3% RH Volt: 0.005V
Radio Specification	IEEE802.15.4 Zigbee 2.4GHz ISM Band Channel 11(2405MHz) RF Power: 16dBm
Power Supply	DC 3V, 2 C-size Batteries
Operating Range	-20℃ ~ 80℃, ≤ 99% RH
Dimension	130mm(H)x130mm(W)x35mm(D) Antenna Length: 180mm
Weight	430gm (including Batteries)

6.2 GMS-130ZB

Item	Description
Measurement range (Display)	Temperature: -40℃ ~ 120℃ Volt: 0.0V ~ 1.500V
Resolution	Temperature: 0.5℃ Volt: 0.001V
Accuracy	Temperature: ±0.5℃ @-14℃ ~ 59℃ ±1.0℃ @-40℃ ~ -15℃, 60℃ ~ 95℃ ±2.0℃ @96℃ ~ 120℃ Volt: 0.005V
Radio Specification	IEEE802.15.4 Zigbee 2.4GHz ISM Band Channel 11(2405MHz) RF Power: 16dBm
Power Supply	DC 3V, 2 C-size Batteries
Operating Range	-20℃ ~ 80℃, ≤ 99% RH
Dimension	130mm(H)x130mm(W)x35mm(D) Antenna Length: 180mm
Weight	430gm (including Batteries)

6.3 GMS-140ZB

Item	Description
Measurement range (Display)	Volt: 0.0V ~ 1.500V
Resolution	Volt: 0.001V
Accuracy	Volt: 0.005V
Radio Specification	IEEE802.15.4 Zigbee 2.4GHz ISM Band Channel 11(2405MHz) RF Power: 16dBm
Power Supply	DC 3V, 2 C-size Batteries
Operating Range	-20℃ ~ 80℃, ≤ 99% RH
Dimension	130mm(H)x130mm(W)x35mm(D) Antenna Length: 180mm
Weight	430gm (including Batteries)

6.4 GMS-220ZB

Item	Description
Max. Sensing Unit	16 units
Max. Group ID	16 groups
Display Range	Temperature: -40℃ ~ 120℃ Humidity: 1% ~ 99% RH Volt: 0.0V ~ 1.500V
Display Resolution	Temperature: 0.1℃ Humidity: 0.1% Volt: 0.001V
Display Contents	Sensor & Group ID Temperature & Relative Humidity Volt1 & Volts2 Temp-High, Temp-Low Alarm Setting Communication/Low Battery Status
Radio Specification	IEEE802.15.4 Zigbee 2.4GHz ISM Band Channel 11(2405MHz) RF Power: 16dBm
Power Supply	AC Power Adapter, DC5V out
Operating Range	-20℃ ~ 80℃, ≤ 80% RH
Dimension	130mm(H)x130mm(W)x35mm(D) Antenna Length: 180mm
Weight	300gm

6.5 GMS-220ZB-RPT

SAME AS GMS-220ZB SPECIFICATION.