SENKO CO.,LTD

Single Receiver with Built-in Battery

(SI-200IS) OPERATING MANUAL)

⚠WARNING

Please read this user manual thoroughly before using device. This device must be operated and maintained in accordance with these instructions, and failure to follow the guidelines may result in equipment malfunctions, personal injury, or even a life-threatening situation.

⚠ *Warning*

- Please remove any foreign substances from the surface before use.
- Please test the alarm periodically to ensure it is functioning properly.
- Use the device within the specified temperature, humidity, and pressure ranges. Operating outside these conditions may cause malfunction or damage to the device.
- The measured value of gas concentration may vary depending on the environment (temperature, pressure, humidity) of the sensor used in the device. Therefore, when calibrating the device, perform calibration in the same or similar environment as the device's use environment (temperature, pressure, humidity).
- Applying too much shock to the device may cause damage to the sensor or device
- Since the alarm level is set according to the international standard, when changing the alarm level, it must be changed by an authorized person.

⚠ *Caution*

- Please read and fully understand the user manual before using the device.
- This device is a gas detector not a gas meter.
- In case of continuous calibration failures, discontinue use and consult the manufacturer.

⚠ *Warranty*

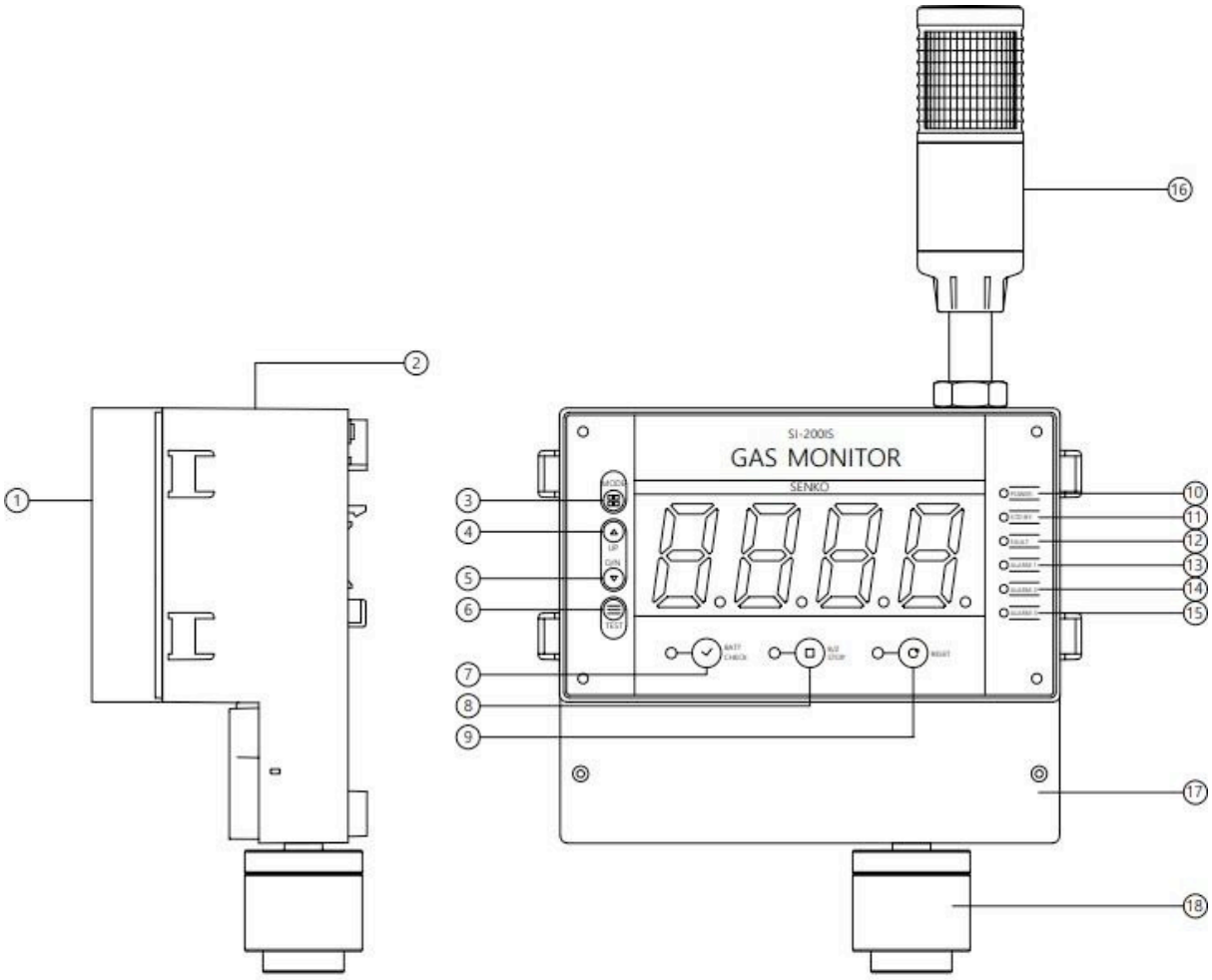
Senko Co., Ltd. guarantees the SI series products for 12 months from the date of shipment, and Senko Co., Ltd. will repair or replace any defective products free of charge during the warranty period. However, parts whose lifespan is shortened according to usage, such as sensors, batteries, or lamps, are not covered by this warranty period. In case of purchase through a route not recognized by Senko Co., Ltd., mechanical damage or deformation of the product due to incorrect use by the consumer, and failure caused by not correcting or replacing parts according to the procedure in this user manual, the product cannot be repaired or replaced free of charge. In addition, if there is any defect or quality problem in the product during the warranty period, it must be immediately notified to the manufacturer, and all costs except transportation costs are borne by Senko Co., Ltd. In principle, the cost of repair, replacement, and transportation of products or parts after the warranty period has expired shall be borne by the user. Senko Co., Ltd. is not responsible for any indirect or accidental accidents or losses arising from the use of the product, and the warranty is limited to the replacement of parts and products. This warranty applies only to users who have purchased the product from an authorized sales office or agent designated by Senko Co., Ltd., and warranty repairs must be made through a designated customer service center of Senko Co., Ltd. with skilled technicians.

Index

1. Specification

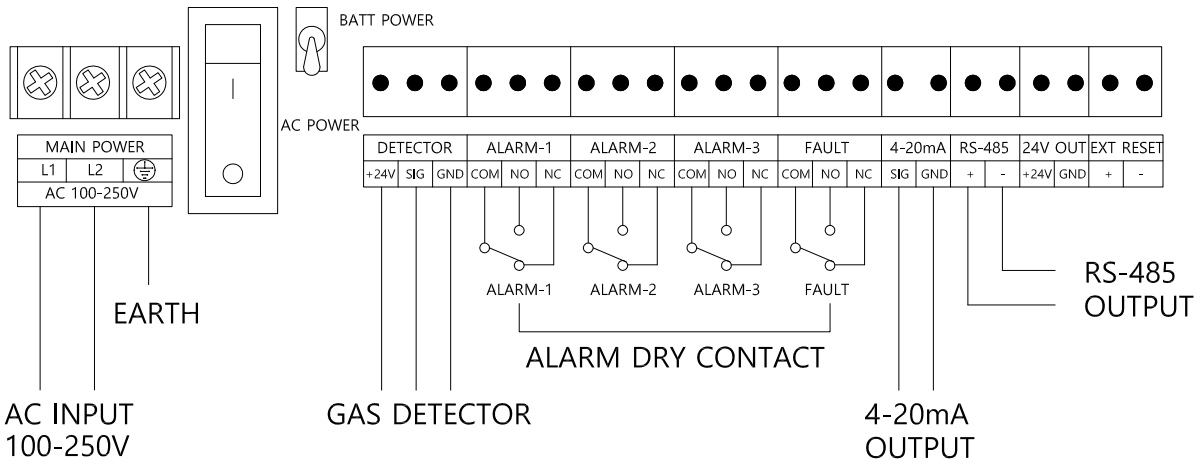
Model	SI-200IS (Built-in SENSOR MONITORING PANEL)
Measuring Output	Big FND display (For measured value(4-digit)), 9-LED
Enclosure	Non-explosion Proof type
Detectible Gas	Oxygen, Toxic, Combustible Gas
Measuring Display	4-digit big F.N.D
Measuring Method	Diffusion Type
Accuracy	FND Digital ±1% Full Scale or 1Digit (Whichever is greater)
Input Signal	4-20mA Full Scale
Operation Temperature	-20 to 50 ℃
Operation Humidity	5 to 99% RH (Non-condensing)
Output Signal	24V.DC / 4 - 20mA DC / RS-485 Modbus Test Output: 3mA / Calibration Output: 3mA / Fault Output: 0mA
Alarm display	Visual Indicator: 3-Alarm, Trouble, BATT, B/Z STOP, RESET(LED), Warning Light Audible Indication: Buzzer signal(85dB)
Relay contact	AC 250V / 3A (Alarm1, Alarm2, Alarm3, Fault)
Power Supply	Input : 100~250V.AC
Back-Up Battery	Li-ion Rechargeable Battery, 7.2V, 3,400mAh
Battery display	Battery Err LED, Operating time F.N.D Display
Battery Charging Time	4 hours
Battery Operating Time	12 hours or more
Cable	Standard type : (CVVS or CVVSB 1.5sq↑)+Shield
Cable Connection Length	4 - 20mA DC Signal : 2,500m RS-485 Modbus Signal : 1,000m
Mounting type	Wall mounting type
IP code	IP65
Dimensions& Weight	231(W) × 397.5(H) × 117(D) mm / 2kg

2. Name of Each Part



1	CASE COVER	**10**	POWER LED
2	CASE BODY	**11**	STD-BY LED
3	MODE S/W	**12**	FAULT LED
4	UP S/W	**13**	ALARM 1 LED
5	DOWN S/W	**14**	ALARM 2 LED
6	TEST S/W	**15**	ALARM 3 LED
7	BATTERY CHECK S/W, LED	**16**	WARNING LIGHT
8	B/Z STOP S/W, LED	**17**	TERMINAL BLOCK
9	RESET S/W, LED	**18**	SENSOR

3. Wiring Diagram



Connect the AC power source (100–250 V, 50/60 Hz) to the Power terminal.

Then switch Power and Battery to ON.

※ Gas Detector: Connection to an external gas detector is not supported, as this is a sensor-integrated model.

4. Operating

4.1. POWER INPUT

When the power switched is turned on, all lamps are turned on for 1 second.

After that, the POWER lamp remains on and the STD-BY lamp begins blinking.

Once the buzzer sounds one beep and the information screen appears, the initial 30-second delay starts counting down sequentially (29, 28, 27 …).

If a 2.5–4.0 mA input signal is not detected for 3 seconds during the countdown, an “Err” alarm (continuous alarm) will occur.

When the countdown is successfully completed, the gas concentration will be displayed based on the detector’s 4–20 mA input signal.

4.2. BATT CHECK

- When the BATT CHECK lamp blinks, turn on the Batt Switch on the terminal block.
- If the battery is not detected, the BATT CHECK lamp will continue blinking.
- If the battery is detected but the remaining level is below 30%, the BATT CHECK lamp will also blink.
- In case of a battery fault, no alarm will be generated.
- When the BATT CHECK button is pressed, the current battery status will be displayed:
  - Press and hold for more than 5 seconds: Enable/disable LED function
  - Battery error: “Err”
  - Charging or fully charged: Displays the available operating time (minutes)
- When using AC power, the display shows the battery level in percentage (0–100%).
- When using DC power, the display shows the remaining operating time (minutes).

b.Er 1	A defect was detected in the battery.
b.Er2	Battery level is less than 30%.
b. 120	The battery is currently available for 120 minutes.
b.065	The battery is currently available for 65 minutes.
P. 85	The battery charge is 85%.
P. 60	The battery charge is 60%.
LED on	Battery in use
LED blinking	Battery error

4.3. B/Z STOP

During gas detection, if the gas concentration exceeds any of the preset alarm levels (1st, 2nd, or 3rd), an alarm (---) will be activated. The buzzer sound changes in speed according to the alarm level—becoming faster at higher alarm stages.

When the B/Z STOP switch is pressed during an alarm, the buzzer stops and the B/Z STOP lamp begins flashing (this applies to all alarm levels).

After silencing the buzzer, pressing the switch again will reactivate the alarm, and the lamp will turn off.

If the gas concentration drops below the 1st alarm level, the lamp will continue to flash.

MODE	Sound
AL-1	- - -
AL-2	- - - -
AL-3	- - - - - -
FAULT	————
Resettable	- - -

4.4. RESET

During Gas monitoring, if the alarm caused by a change in concentration falls below the 1st alarm level, it can be reset using RESET button.

At this time, the RESET lamp flashes when the alarm occurs, and flash reset is possible. (In this case, the buzzer tone changes to a slower beep compared to the 1st, 2nd, and 3rd alarm.).

When the RESET lamp turns to lightning from flashing, reset is possible. Pressing the RESET button will stop the alarm, and all related lamps—Alarm, 1st, 2nd, 3rd, and B/Z STOP—will turn off simultaneously.

4.5. FAULT

In case of the FAULT lamp, the FAULT lamp will be blinks, and an alarm (Continuous alarm) is generated.

(Integrated sensor type determines whether to blink the FAULT lamp with the sensor value.)

4.6. TEST S/W

When you press the TEST button, the set range value (0.000 - 9999) is sequentially converted and displayed.

If you press the button for more than 1 second, the range is sequentially converted from 0 - 100% and the time is set to 10 seconds (for all ranges).

(At this time, all outputs and alarms the same as when gas is detected are generated.) (Press the button during sequential conversion to stop or start the change in concentration.)

After sequential conversion up to max range, it automatically returns after 30 seconds and enters gas monitoring mode.

All outputs: 1st, 2nd, and 3rd contacts, 4 - 20 mA, RS-485, buzzer, lamp

4.7. MODE

If you press the MODE button briefly, AL-1, AL-2, AL-3, SPAN setting value, number of calibrations, and RS-485 ID (255) are displayed.

(In the initial setting, the AL-1 setting value is displayed, and you can change it to AL-2, AL-3, SPAN, etc. by using the UP and DOWN buttons.)

You can check the value set when the product is shipped or during use (The number of calibrations increases by 1 count only in the case of gas calibration).

- The number of calibrations can be reset with the INIT button. (After 30 seconds have elapsed or the RESET button is pressed; it returns to the monitoring mode.)
-

4.8. UP / DOWN

If you press the UP button briefly, the peak value memorized after standby is displayed, and when you release the button, it enters the monitoring mode.

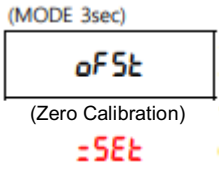
If you press the DOWN button briefly, the lowest value is displayed, and when you release the button, it enters the monitoring mode.

(The peak value is reset when you turn the power off and on or remove and insert the battery.)

5. Calibration Mode

5.1. O2 Calibration

(When user enters calibration mode, the device enters STD-BY mode. – 3mA Output)



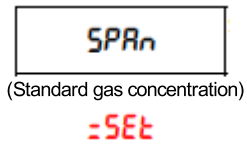
When the SET button is pressed for 3 seconds, ofSt' will be displayed. And current gas concentration will be displayed by pressing the button one more time.

If the displayed value differs from 20.9, It will be flashed as 'SEt' and adjusted to gas concentration as 20.9 by pressing the SET button for 1 second.

Once the setting is completed, then it will show 'SPAn'.

(ZERO calibration is recommended with clean indoor environment)

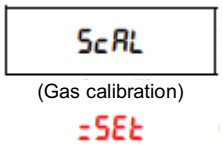
(In setting mode, it will show concentration ± value. And in the monitoring mode, ± won't be shown.)



When SPAn is displayed, By pressing setting button one more time, it will show setting calibration gas concentration. (Default value: 17.5)

If the calibration gas that user has is different than the default value, It could be adjusted by pressing UP/DOWN button If the memorized calibration gas concentration is different, use UP and DOWN buttons to input the same number as the calibration gas concentration and press the setting button for 1 second, then "SEt" will blink on the screen and the concentration value will change.

When the setting is completed, it is displayed as "ScAL".



When the calibration gas concentration change is completed, it is displayed as "ScAL". In this state, if the setting button is pressed, the current concentration is displayed. (If the concentration is different from the value of the standard gas when the concentration is held after the standard gas is injected)

When the setting button is pressed for 1 second, "Set" blinks on the screen, and when "SPAn" is displayed on the screen, it is calibrated to the set value.

(When calibration is completed, it automatically exits from the setting mode to the monitoring mode and displays the calibrated concentration.)

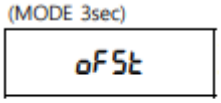
*The calibration value can be changed even when "Err" is displayed on the screen. (SPAn)

* Calibration mode is automatically changed to monitoring mode after 120 seconds. (You can change to monitoring mode with RESET button.)

5.2. Calibration Except for O2

(When entering calibration mode, it goes into standby. 3 mA output.)

(MODE 3sec)

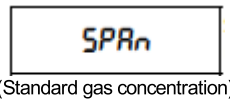


(Zero Calibration)

If the setting button is pressed for 3 seconds, “ofSt” is displayed, and if the setting button is pressed once more, the current concentration is displayed.

If the current concentration is displayed differently from 0, press the setting button for 1 second, then “SEt” will blink, and the current value will be adjusted to 0. When the setting is complete, it is displayed as “SPAn”.

(Setting mode also displays the ± value of the concentration value. In measurement mode, ± value is hidden.)

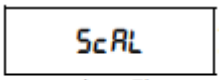


(Standard gas concentration)

If you press the setting button once again while “SPAn” is displayed, the set calibration gas concentration is displayed as a number.

If the memorized calibration gas concentration is different, use the UP and DOWN buttons to input the same number as the calibration gas concentration and press the setting button for 1 second, then “SEt” will blink on the screen and the concentration value will change.

When the setting is completed, it is displayed as “ScAL”.



(Gas calibration)

When the calibration gas concentration change is completed, it is displayed as “ScAL”. In this state, if the setting button is pressed, the current concentration is displayed. (If the concentration is different from the value of the standard gas when the concentration is held after the standard gas is injected)

When the setting button is pressed for 1 second, “Set” blinks on the screen, and when “SPAn” is displayed on the screen, it is calibrated to the set value.

(When calibration is completed, it automatically exits from the setting mode to the monitoring mode and displays the calibrated concentration.)

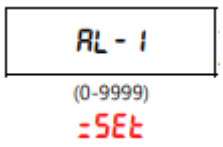
* The calibration value can be changed even when “Err” is displayed on the screen. (SPAn)

* Calibration mode is automatically changed to monitoring mode after 120 seconds. (You can change to monitoring mode with RESET button.)

6. Change Internal Settings

(When entering internal setting mode, it goes into standby. 3 mA output.)

If you press the setting button and the DOWN button for 1 second, AL-1 is displayed, and it enters the setting mode.



Change AL-1 (Default: 15.0; 19.0 for Oxygen)

If you press the MODE button while “AL-1” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed, and “AL-2” is displayed.

Change AL-2 (Default: 25.0; 18.0 for Oxygen)

If you press the MODE button while “AL-2” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed, and “AL-3” is displayed.

Change AL-3 (Default: 50.0; 23.0 for Oxygen)

If you press the setting button while “AL-3” is displayed, the default value is displayed.

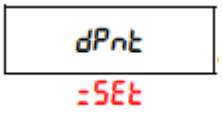
If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “StYP” is displayed.

Change Gas Type (Default: LIn)

If you press the setting button while “StYP” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “dPnt” is displayed. (You can change the gas type such as Lin, o2, etc. with the UP and DOWN buttons. Please refer to the Gas Table below.)

* When gas type is changed to o2, AL1, AL2, AL3 and SPAn values are all automatically changed to o2 default value.

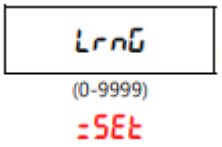


Change Decimal Point (Default: 0.1)

If you press the setting button while “dPnt” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “LrnG” is displayed.

(0, 0.1, 0.02, 0.003) = (0000, 000.0, 00.00, 0.000)



Change Low Concentration Range (Default: 0.0)

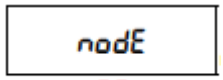
If you press the setting button while “LrnG” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “hrnG” is displayed.

Change High Concentration Range (Default: 100.0)

If you press the setting button while “HrnG” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “nodE” is displayed.

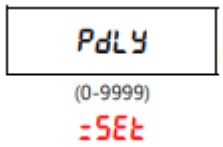


Alarm Operation Method (Default: HHH)

If you press the setting button while “nodE” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “PdLy” is displayed.

(HHH, HHL, HLH, HLL, LHH, LHL, LLH, LLL) H-AL3, H-AL2, H-AL1



Initial Delay Time (Default: 30)

If you press the setting button while “PdLy” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “AdLy” is displayed.

Alarm Delay Time (Default: 0.5, Max: 16 min)

If you press the setting button while “AdLy” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed and “hoLd” is displayed.

Alarm Reset Hold (“on”) / Auto (“oFF”) (Default: “on”)

If you press the setting button while “hoLd” is displayed, the default value is displayed.

If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the “SEt” blinks on the screen, the setting is completed.

- Internal settings can be modified even when **“Err”** is displayed on the screen.
- Each setting proceeds to the next item after **“SEt”** blinks on the display.
  (However, you do not need to adjust every item individually—changes made on the final setting screen will automatically apply to all settings.)
- If you do not confirm a change—whether a single item or multiple items—the modified value will be canceled and restored to its original state.
- Setting mode automatically returns to monitoring mode after **60 seconds** of inactivity.
  (You may also return to monitoring mode by pressing the **RESET** button.)
- In setting mode, the **UP** button is used to change numeric values, and the **DOWN** button is used to move to the next item.
- In setting mode, the **RESET** button functions as an **undo** button (similar to **Ctrl + Z** on a computer).
- When the **gas type is changed**, all previous settings—**including calibration data**—are reset to default.

7. 485 MODBUS Interface

7.1. RS-485 Communication and ID Setting

1) Baud rate: Set by dip switch
2) Data bits: 8 data bits
3) Stop bit: 1 stop bit
4) Parity: None

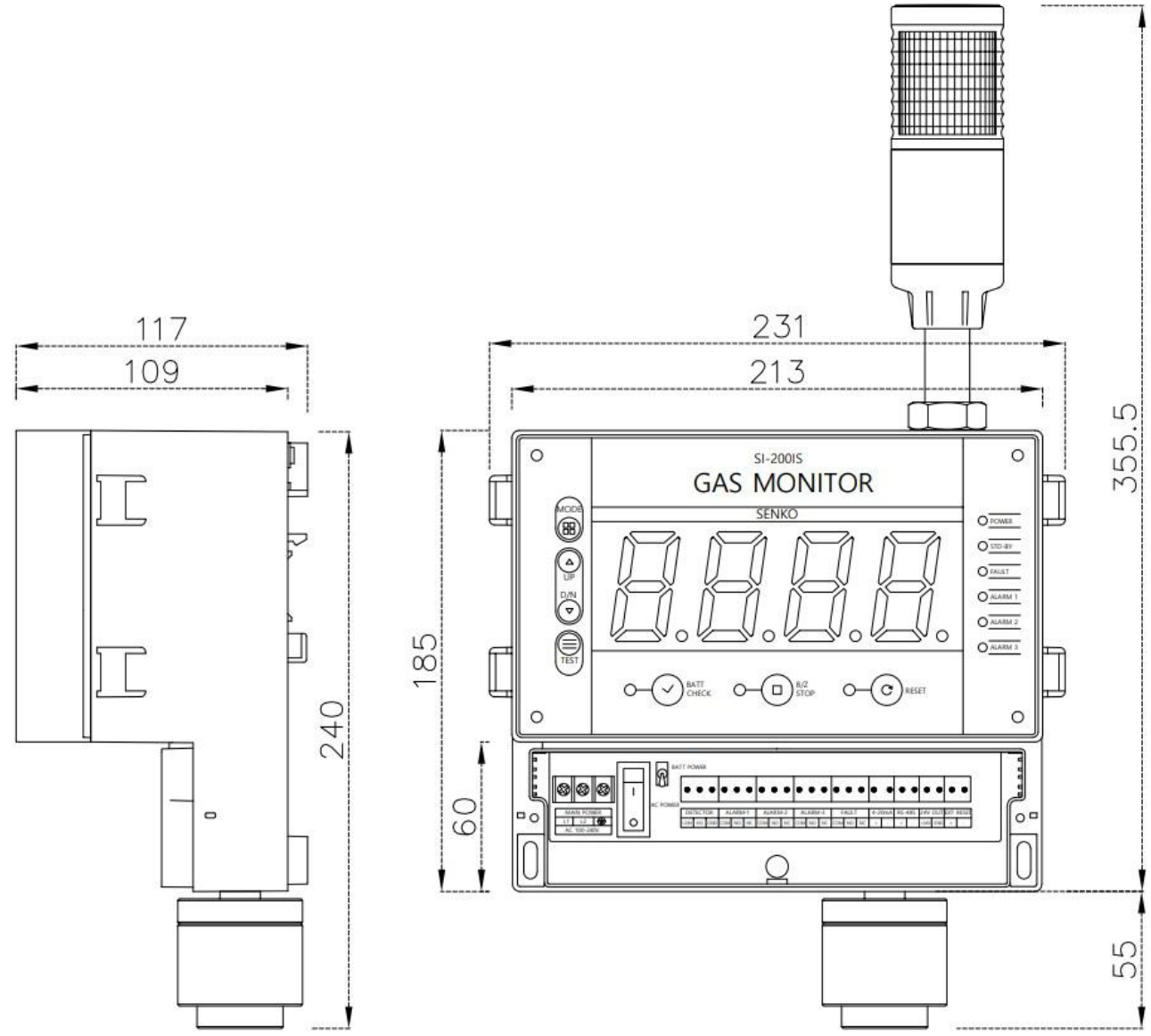
Communication Speed Setting	DIP S/W
1200	000
2400	100
4800	010
9600	110
19200	001
38400	101
57600	011
115200	111

ID Setting	DIP S/W	
S/W 1	1	ID setting is combined by adding the number of each DIP switch. For example: SW1+SW3 = ID 005 SW5+SW6 = ID 048
S/W 2	2	
S/W 3	4	
S/W 4	8	
S/W 5	16	
S/W 6	32	
S/W 7	64	
S/W 8	128	

7.2. Address Configuration

Sensor Monitoring and Measured Value (Read)				
Address	**Modbus Function**	**Function**	**Bits**	**Explanation**
40001	3, 4	Sensor and receiver status	BIT 0 ~ 4	0x*0 : Normal
				0x*1: Alarm 1
				0x*2: Alarm 2
				0x*4: Alarm 4
				0x*8 : Sensor Fault of Timeout
			BIT 5	0x1*: Buzzer start
				0x0*: Buzzer stop
			BIT 6 ~ 15	Reserved
40002	3, 4	Measured value of the sensor	BIT 0 ~ 15	Measured gas concentration x 10 (integer)
Receiver Control (White)				
50001	5	Alarm reset	BIT 0 ~ 15	0xFF00
50002	5	Buzzer start	BIT 0 ~ 15	0xFF00
		Buzzer stop	BIT 0 ~ 15	0xFF01

8. Outline Drawing and Dimensions



9. Revision History

No	Note	Contents	Revision	Revision Date
1	Initial Writing		Rev 1.0	2023. 07. 07
2	Specification	Revise Power Supply Part	Rev 1.1	2024. 01. 16
3	Calibration Mode	Revise O2 calibration	Rev 1.2	2024. 04. 02
4	Specifications	Power supply	Rev 1.3	2024. 05. 20
5	Specification	Revise Battery Part	Rev 1.4	2024.06. 25

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