SENKO CO.,LTD

SI-200I

Single Receiver with Built-in Battery

(SI-200I) OPERATING MANUAL

⚠WARNING

Please read this user manual thoroughly before using the device. This device must be used and maintained in accordance with the instructions, and failure to follow the instructions may result in device malfunction or risk to personal injury or life.

Warning

- If there are foreign substances on the surface of the device, remove it before use.
- Periodically test whether the alarm works properly.
- Use within the operating temperature, humidity and pressure range that meets the product specifications. Environments outside of this range may cause malfunction or failure of 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 use it after fully understanding this user manual.
- This product is not a gas meter, but a gas detector.
- If calibration failure occurs continuously, discontinue use and contact the manufacturer.

Warranty

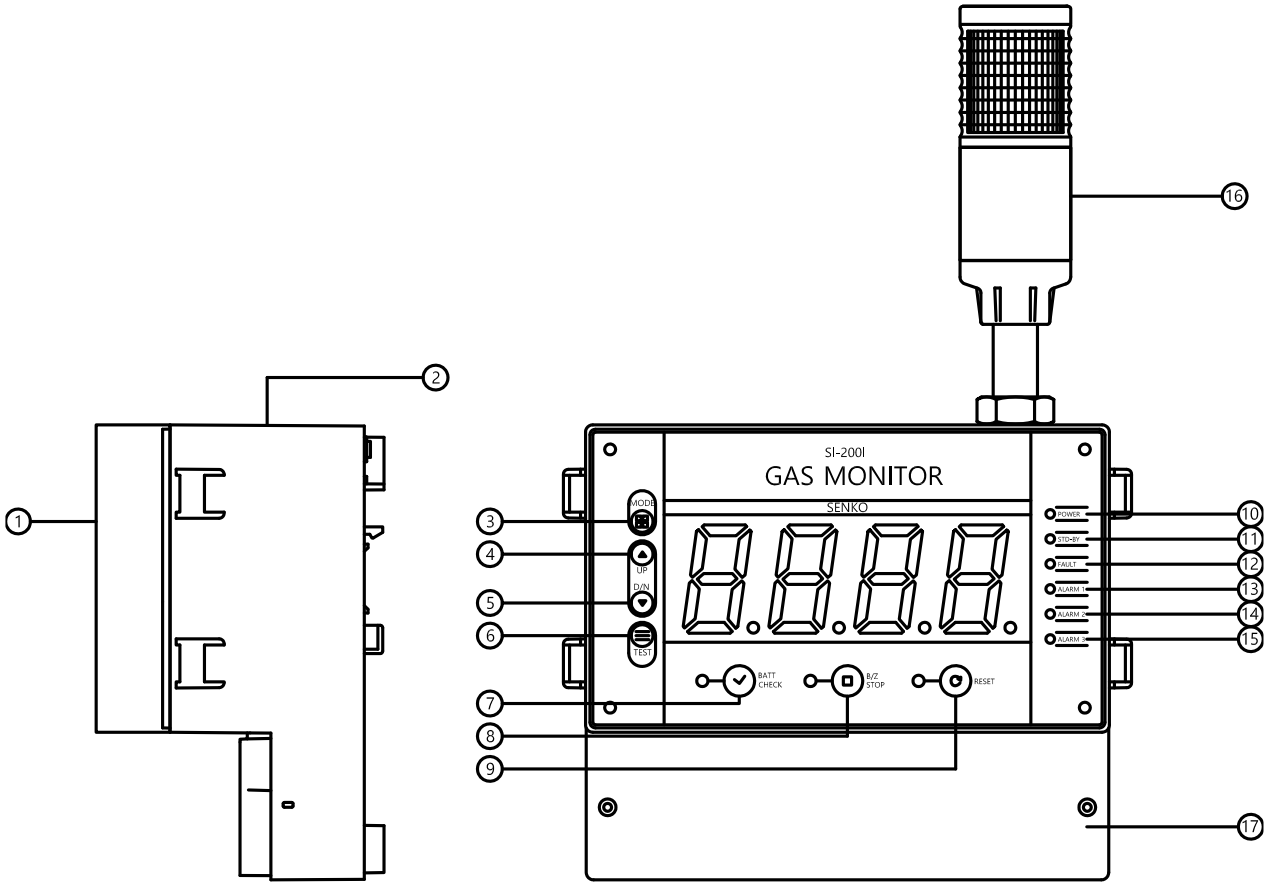
Senko Co., Ltd. guarantees the SI series products for 12 months from the date of shipment, and Senko Co., Ltd. will repair or replace any defective products free of charge during the warranty period. However, parts whose lifespan is shortened according to usage, such as sensors, batteries, or lamps, 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. Specifications

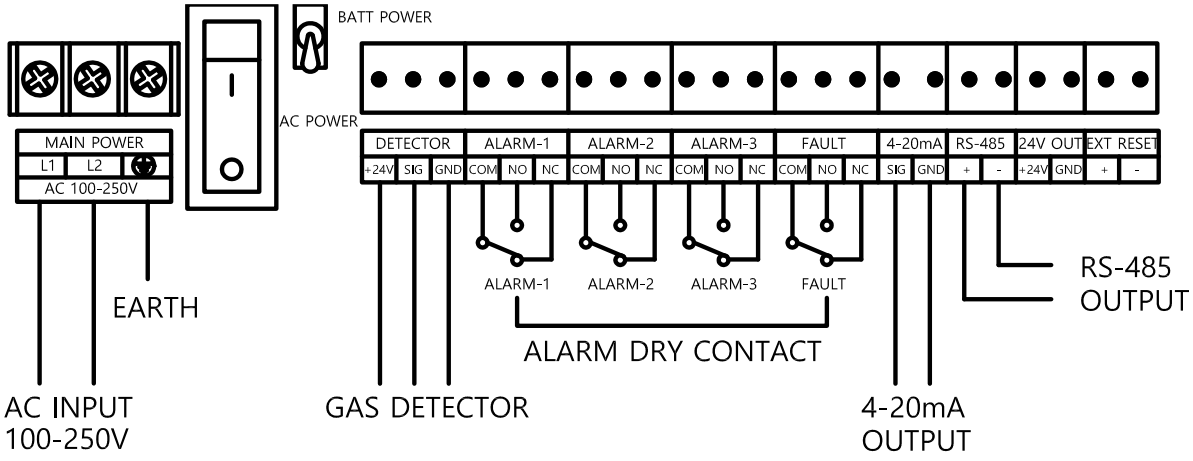
Model	SI-200I (Monitoring Panel)
Measurement Output Device	Big FND (for measured value (4-digit)), 9-LED
Enclosure Type	Non-explosion proof type
Detectible Gas	All applicable gases (for SI-100, SI-100C, SI-100D models)
Measured Value Display	4-digit big digital FND
Measurement Range	0.000 to 9,999 with user settings (digital)
Accuracy	Digital FND, ±1% +1 digit of full scale (displays a larger value)
Input Signal	4 - 20 mA, full scale
Operating Temperature	-20 - 50 ℃
Operating Humidity	5 - 99% RH (non-condensing)
Output Signal	DC 24 V / DC 4 - 20 mA / RS-485 modbus Check output: 3 mA / Calibration output: 3 mA / Fault output: 0 mA
Alarm Display	Visual indication: 3-alarm, trouble, BATT, B/Z STOP, RESET (LED), warning light Audible indication: Buzzer signal (85 dB)
Relay Contact	AC 250 V, 3A (Alarm 1, Alarm 2, Alarm 3, Fault)
Power Supply	Input: AC 100 - 250 V / DC 18 - 31 V (max: 280 mA)
Backup Battery	Li-ion rechargeable battery, 7.3 V, 2,850 mAh
Battery Level Display	Battery error indicator LED, operating time FND
Battery Run Time	1 - 2 hours or more
Cable	For standard type: (CVVS or CVVSB 1.5sq↑) + Shield
Cable Connection Length	4 - 20 mA DC signal: 2,500 m RS-485 Modbus signal: 1,000 m
Mounting type	Wall mounting type
IP Code	IP65
Dimensions and Weight	235.6(W) × 355.5(H) × 109.3(D) ㎜ / 1.75 kg

2. Name of Each Part



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

3. Terminal Wiring Diagram



Connect AC power (100 - 250 V, 50/60 Hz) to the power as shown in the figure.
Turn on the power switch and turn on the battery switch.

4. How to Operate

4.1. Power Input

When the power switch is turned on, all lamps are turned on (for 1 second), the POWER lamp is turned on, and the STD-BY lamp blinks.
And after the buzzer sounds once and information is displayed, the initial delay (30 seconds) is sequentially counted down (29, 28, 27...).
If the 2.5 - 4.0 mA input (for 3 seconds) of the detector is not detected during countdown, Err1 is displayed and an alarm (continuous sound) is generated.

When the countdown is normally completed, the concentration according to the detector input signal (4 - 20 mA) is displayed.

4.2. BATT CHECK

When the BATT CHECK lamp blinks, turn on the battery switch of the terminal.
If the battery is not detected, the BATT CHECK lamp continues to blink.
If the battery is detected but the battery level is less than 30%, the lamp blinks.
When the battery is charging, the blinking lamp turns off when it is detected that the battery level is over 30%.
If there is a problem with the battery, the alarm does not occur.
Press the BATT CHECK button to display the battery status.
(If pressed for more than 5 seconds, the LED function stops, and if pressed again for more than 5 seconds, it operates again.)
(In case of battery failure: Displays "Err", in case of charging or being fully charged: Displays available time by minute)
When using AC power: Displays the battery level as a percentage (0-100%),
When using DC power: Displays the available time in minutes

bEr 1	A defect was detected in the battery.
bEr2	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%.

Battery in use: LED on
Battery error: LED blinking

4.3. B/Z STOP

During gas detection, an alarm (---) is generated when the concentration exceeds the set alarm value (1st, 2nd, 3rd) due to a change in concentration.
(Alarm sounds change rapidly in the first, second, and third tones.)
If you operate the B/Z STOP switch after the alarm occurs, the alarm stops and the B/Z STOP lamp blinks (For all alarms).
If you operate the button again after stopping the buzzer, the alarm will be generated again (The lamp will turn off).
If the gas concentration is less than the first alarm value, the lamp turns on.

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

4.4. RESET

If the alarm generated by the change of gas concentration during gas monitoring changes to less than the primary alarm value, it can be reset with the RESET button.
At this time, the RESET lamp is lit when an alarm sounds and blinking reset is possible (At this time, the sound becomes slower than the 1st, 2nd, and 3rd alarms).
When the RESET lamp changes from blinking to on, it is possible to reset. If you press the RESET button, the alarm stops and the lamp turns off (At this time, the alarm, 1st, 2nd, 3rd lamp, and B/Z STOP lamp are also turned off).

4.5. FAULT

If the 4mA signal of the detector is not input, the FAULT lamp blinks and an alarm (continuous sound) 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.)

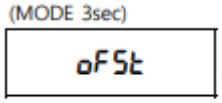
4.8. UP / DOWN

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

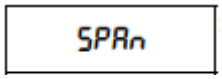
(When entering calibration mode, it goes into standby. 3 mA output.)

(MODE 3sec)



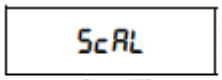
(Zero adjustment)

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".



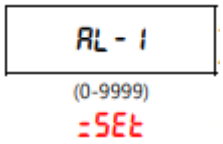
(Gas calibration)

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.

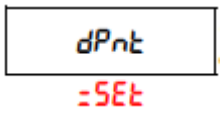


Change AL-1 (Default: 15.0; 19.0 for Oxygen)
If you press the MODE button while "AL-1" is displayed, the default value is displayed.
If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the "SEt" blinks on the screen, the setting is completed and "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.

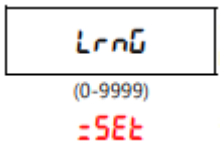


Change Decimal Point (Default: 0.1)

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.

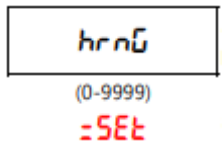
(0, 0.1, 0.02, 0.003) = (0000, 000.0, 00.00, 0.000)



Change Low Concentration Range (Default: 0.0)

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

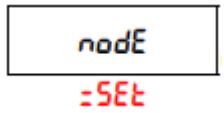
If you want to change the value, change it with the UP/DOWN button and press the setting for 1 second. After the "SEt" blinks on the screen, the setting is completed and "hrnG" is displayed.



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.

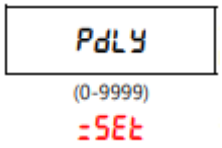


Alarm Operation Method (Default: HHH)

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.

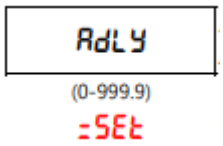
(HHH, HHL, HLH, HLL, LHH, LHL, LLH, LLL) H-AL3, H-AL2, H-AL1



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.

*. The internal settings can be changed even when "Err" is displayed on the screen.
*. All settings will proceed to the next setting after "SEt" blinks on the screen. (However, there is no need to set changes to each item individually: if you set in the last setting screen, all settings are automatically changed.)
*. If you do not set after a single change, or some or all changes, the changed value is canceled and returned to the original value.
*. Setting mode is automatically changed to monitoring mode after 60 seconds (You can change to monitoring mode with RESET button).
*. In setting mode, the UP button is used to change the number, and the DOWN button is used to move to the next item.
*. In setting mode, the RESET button is used as an undo function (Ctrl + Z on computer).
*. If you change the gas type, the previous settings are initialized. (Including calibration)

7. Gas Table

GAS TABLE	RANGE	SPAN	AL-1	AL-2	AL-3		
L in	100.0	50.0	15.0	25.0	50.0	(LEL as default)	
o2	30.0	20.9	19.0	18.0	23.0		
co	500	100	30	100	200		
co2	5000	3000	3000	3500	4000		
hcL	10.0	5.0	1.0	1.5	2.0		
nh3	100.0	50.0	25.0	35.0	50.0		
h2S	100.0	25.0	10.0	15.0	50.0		
cL2	20.0	3.0	0.5	1.0	2.0		

8. Modbus Interface of RS-485

8.1. RS-485 Communication Setting 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

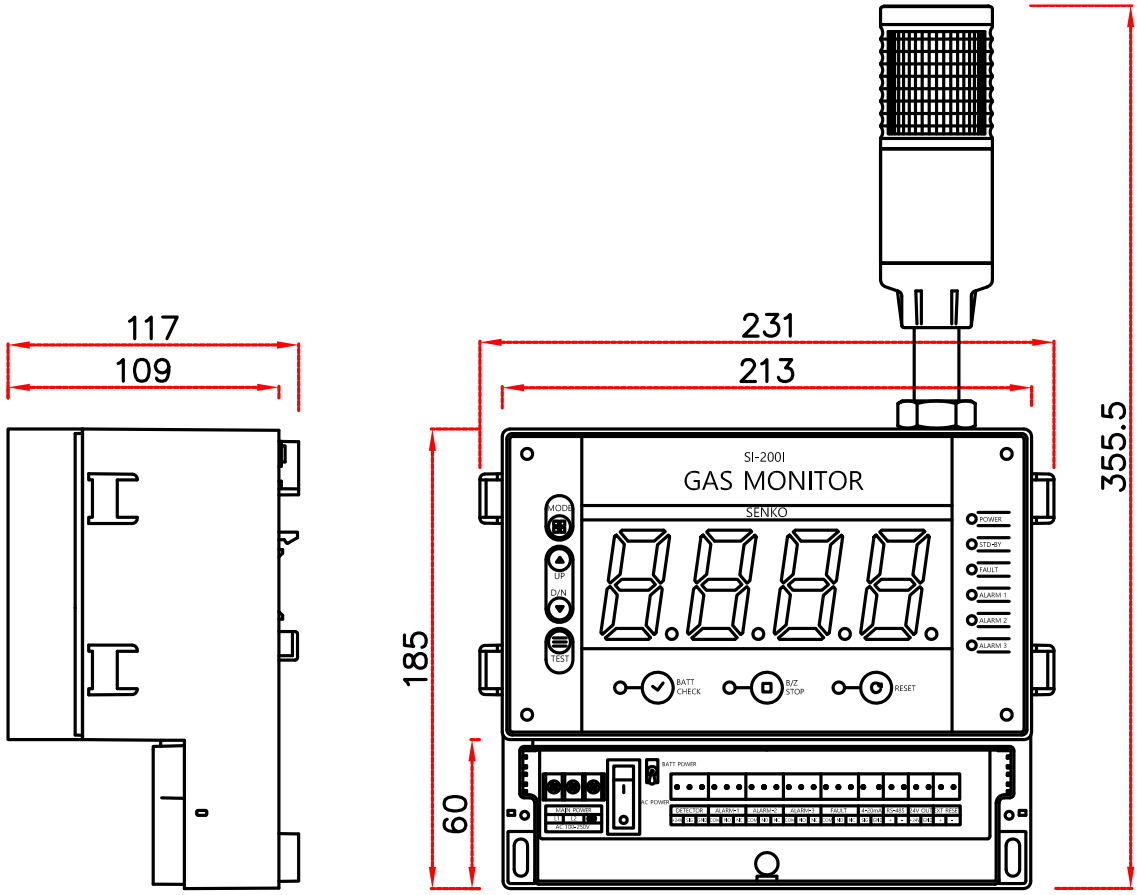
Communication Speed Setting	DIP S/W
1200	000
2400	100
4800	010
9600	110
19200	001
38400	101
57600	011
115200	111

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	

8.2. 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

9. Outline Drawing and Dimensions



SIDE VIEW

FRONT VIEW

10. Revision History

No.	Note	Contents	Revision	Revision Date
1	Initial revision		Rev 1.0	2019.07.01
2	Alarm change	Sequence change	Rev 1.1	2020.02.06
3	Total reorganization		Rev 1.2	2021.08.12

SENKO CO., LTD

www.senko.co.kr
senko@senko.co.kr