

SENKO CO., LTD.

Fixed Gas Detector Local Display Type (SI-100)





:: Features

- Product of LCD display type can measure the concentration of the flammable gas, toxic gas and oxygen gas
- Simple operation with the magnetic bar
- Big digital LCD installed the blue backlight
- Explosive proof structure for the pressure and the water/dust-proof structure
- Automatic calibration function

:: Specification

Model	SI-100			
Sampling Method	Diffusion Type			
Measuring value display	Digital LDC(Blue Backlight)			
Detecting gas	Combustible Gas		Toxic Gas	Oxygen
Detecting type	Catalytic	IR	Electrochemical	Galvanic
Detecting range	0-100% LEL	0-100%LEL	-	0-30% Vol.
Accuracy	±3% / Full Scale			
Setting & Control	Magnetic interface to configure alarm & calibrations			
Alarm signal	1 st alarm, 2 nd alarm, Relay contact(Max 30VDC, 5A)			
Output signal	Analog: 4-20mA Digital: RS-485 Modbus			
Telemetry line length	Analog output Max. 2,500m Digital output Max. 1,000m			
Operating temp. & Humi.	-20 to 50°C : 5 to 95% RH (Non - condensing)			
Calibration	2 point calibration			
Power	10 to 34VDC, MAX 500mA			
Dimension	150(W) × 165(H) × 110(D) mm , Weight: 1.8kg			
Explosion Proof	Ex d IICT5, IP65			

1. Description

Instrument Overview

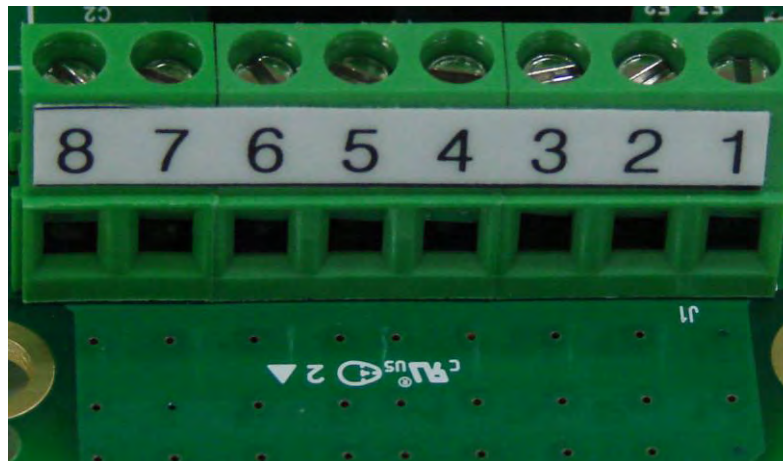


1. Zero Calibration LED
2. Span Calibration LED
3. "OK, FAULT, LOW, HIGH" alarm LED
4. LCD display
5. "+ and ↑, Mode and ●, - and ↓" Control key
6. Sensor

2. Sensor Specification

Sensor	Range	Span	Low Alarm	High Alarm
O2	0~30%	20.9%	19.5%	23.5%
CO	0~500ppm	100ppm	25ppm	50ppm
H2S	0~100ppm	50ppm	10ppm	30ppm
H2	0~1000ppm	500ppm	100ppm	500ppm
SO2	0~20ppm	10ppm	2ppm	4ppm
CH4	0~100%LEL	20%LEL	10%LEL	20%LEL

3. Electrical Wiring



Pin	Wire
1	Power Supply Positive (9~34VDC)
2	Power Supply Common
3	4-20mA Output
4	RS 485A
5	RS 485B
6	Relay High Alarm
7	Relay Low Alarm
8	Relay Common

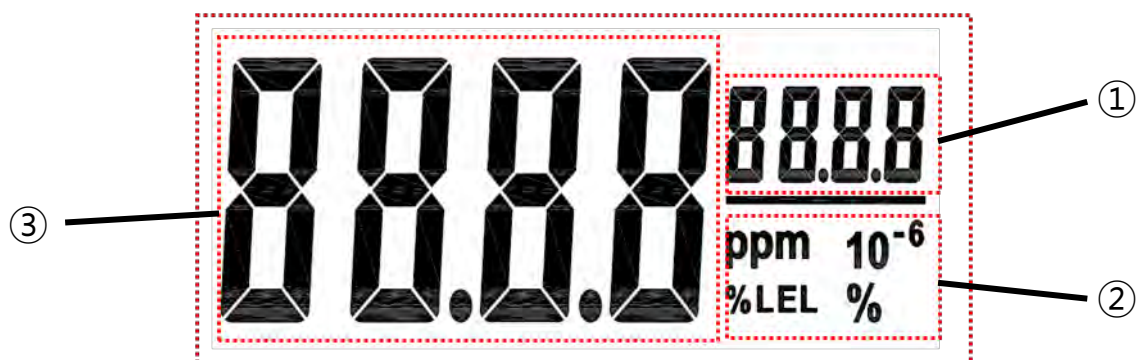
4. Default Alarm Relay Logic

	External Alarm	LED	LCD	Analog Output
Exceed Low alarm limit	Low alarm	Low	Reading	Based on reading
Exceed High alarm limit	High alarm	High	Reading	Based on reading
Sensor Fail	Low alarm	Fault	"FAIL SEN" message	2mA
Calibration Fail	Low alarm	Fault	"FAIL CAL" message	2mA
Over Range	Low alarm	Fault	"OvEr" message	2mA

5. Calibration

- ① Zero calibration – use bottle air for 60 seconds
- ② Span calibration – use span gas for 60 seconds

6. LCD Display Configuration



- ① Gas type
- ② Unit
- ③ Gas concentration

7. Button Definition

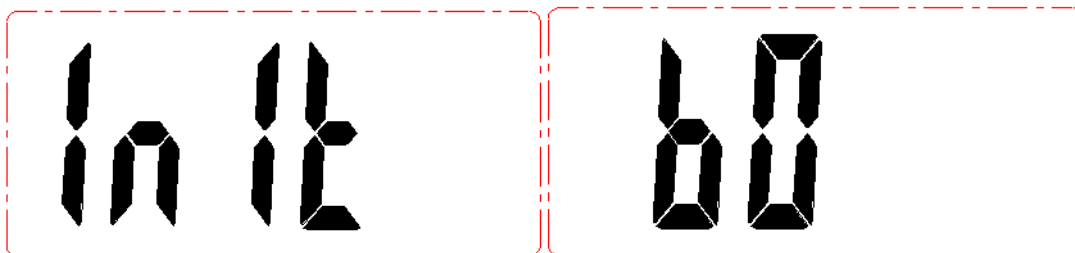
Button	Description
+ , [↑]	The [↑] button is used to increase the values in set-up mode
- , [↓]	The [↓] button is used to decrease the values in set-up mode
MODE , [●]	The [●] button is used to change the mode

8. Turning on the Instrument

- ① The instrument will be turned on by power supply.
- ② Backlight will light and software version will be displayed



- ③ After this, the instrument will go into a 60 second countdown for initialization. During the countdown sequence, "InIt" message and count number will be displayed alternately.



- ④ When initialization process finished, "OK" LED will flash once and SI-100 will be its gas reading mode.



9. Measurement Mode

Once the SI-100 enters into the Measurement Mode, gas will be continuously monitored and the readings updated on the liquid crystal display. As gas levels increase, the corresponding reading will reflect the current gas concentrations.

The instrument has two alarm set points:

- HIGH Alarm
- LOW Alarm

- ① When the gas concentrations drop below the alarm set points, the LOW LED will blink with LCD backlight, and relay LOW alarm will be activated.
- ② When the gas concentrations increase above the alarm set points, the HIGH LED will blink with LCD backlight, and relay HIGH alarm will be activated.
- ③ If the gas concentrations go out of the measurement range, Fault LED will blink with backlight and will have a 2mA analog signal output. Also, the instrument will show "over" message and relay LOW alarm will be activated.



10. Zero calibration mode

- ① Press the "**MODE**()" key twice from the Measurement Mode will put the SI-100 in the Zero Calibration Mode.
- ② Press the "**+**()" key once when ZERO LED lighted and LCD displayed "ZERO"



- ③ The instrument will go into a 60 second countdown for Zero Calibration. "ZERO" message and count number will be displayed alternately.
- ④ During the countdown sequence, the instrument will have 4mA analog signal output. Calibration will be finished after 60 second with blink OK LED once and SI-100 enters into the measurement mode.
- ⑤ The instrument will stop calibration and go back to measurement mode by pressing "**-**()" key during the Zero Calibration mode.

11. Span calibration mode

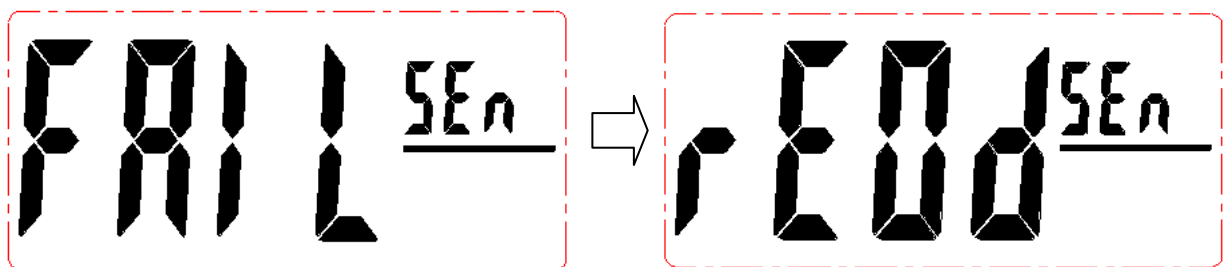
- ① Press the "**MODE**()" key twice from the Measurement Mode will put the SI-100 in the Zero Calibration Mode.
- ② Press the "**MODE**()" key once again when ZERO LED lighted and LCD displayed "ZERO"
- ③ Press the "**+**()" key once when SPAN LED lighted and LCD displayed "SPAN"



- ④ The instrument will go into a 60 second countdown for Span Calibration. "SPAN" message and count number will be displayed alternately.

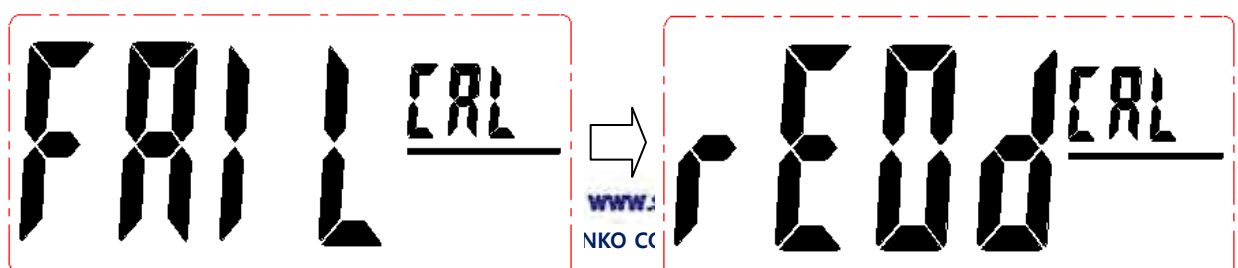


- ⑤ During the countdown sequence, the instrument will have 20mA analog signal output.
- ⑥ SI-100 will check the sensor after 60 second. If the sensor is normal, the instrument will check Calibration.
- ⑦ If the sensor's output is below 75% of setting value, "fail sen" message will blink. After that, "reod sen" message will be displayed and the instrument will have 2mA of analog signal output.



At this time, the SI-100 will redo SPAN Calibration by pressing "+(⬆)" key, will stop the calibration with previous calibration value and go back to measurement mode by pressing "-(⬇)" key.

- ⑧ At the Calibration check, when the concentration of gas which used to Calibration is within 5% of setting value from Calibration mode, the instrument will display "true".
- ⑨ If the value is exceed the 5% of setting value, "fail cal" message will blink. After that, LCD will display "reod cal" message and the instrument will have 2mA of analog signal output.



At this time, the SI-100 will redo SPAN Calibration by pressing "+(↑)" key, will stop the calibration with previous calibration value and go back to Measurement Mode by pressing "-(↓)" key.

- ⑩ Calibration will be ceased and go back to measurement mode by pressing "-(↓)" key in the SPAN Calibration Mode.

12. Calibration Gas Mode

- ① Press the "+(↑)", "-(↓)", "MODE(●)" keys in order from the Measurement Mode will put the SI-100 in the Calibration Gas Mode.
- ② After press "+(↑)" key, press "+(↑)" key once more will increase the value and press "-(↓)" key will decrease the value.
If press "-(↓)" key without press "+(↑)" key, the instrument will go back to Measurement Mode.
- ③ Press "MODE(●)" key once will save setting value and go back to Calibration Gas Mode.



13. Low Alarm Value Mode

- ① Press the "MODE(●)" key will put the SI-100 in the Low Alarm Value Mode.
- ② After press "+(↑)" key, press "+(↑)" key once more will increase the value and press "-(↓)" key will decrease the value.
If press "-(↓)" key without press "+(↑)" key, the instrument will go back to Measurement Mode.

- ③ Press "MODE(●)" key once will save setting value and go back to Low Alarm Value Mode.



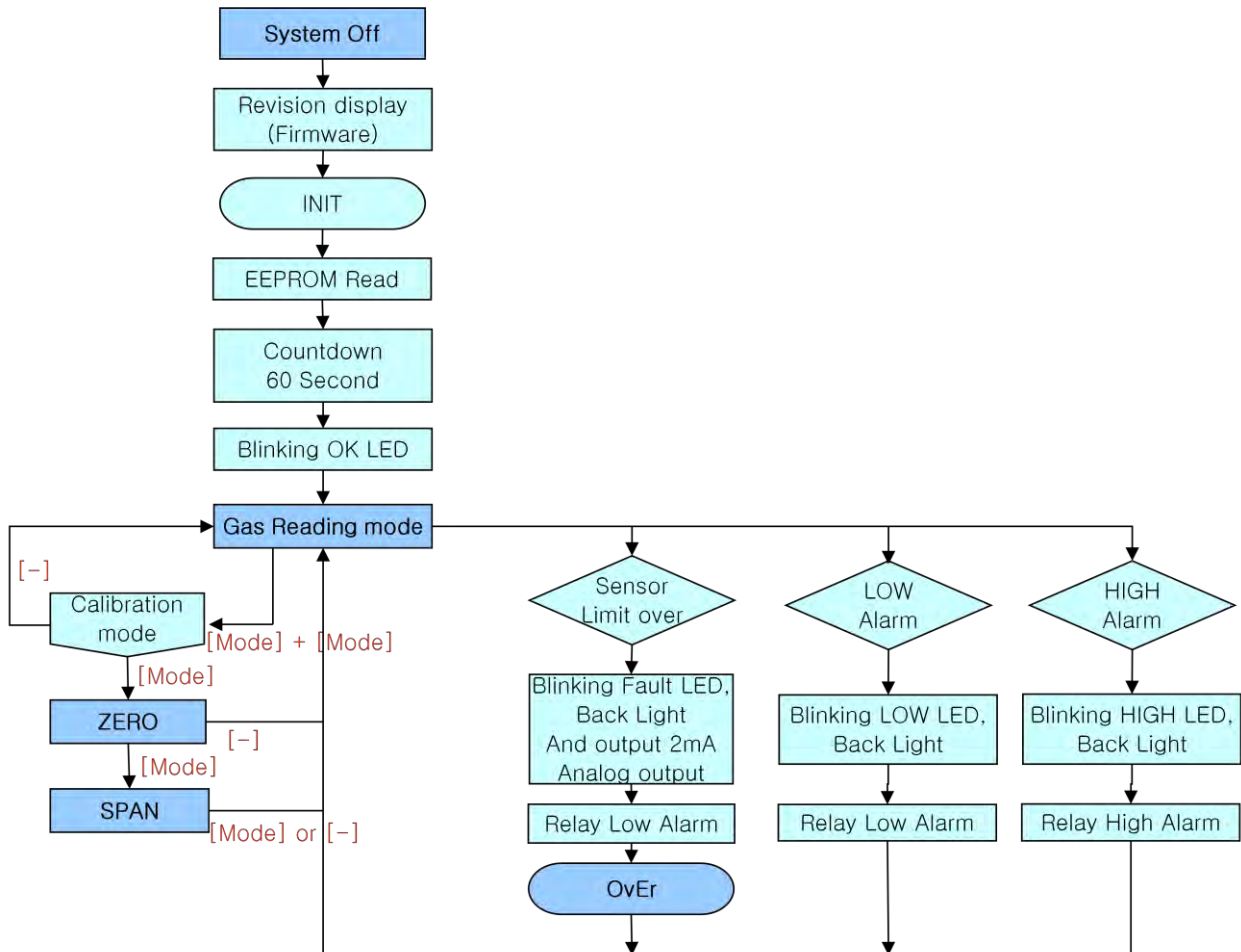
14. High Alarm Value Mode

- ① Press the "**MODE**(●)" key will put the SI-100 in the High Alarm Value Mode.
- ② After press "+(↑)" key, press "+(↑)" key once more will increase the value and press "-(↓)" key will decrease the value.
If press "-(↓)" key without press "+(↑)" key, the instrument will go back to Measurement Mode.
- ③ Press "MODE(●)" key once will save setting value and go back to High Alarm Value Mode.

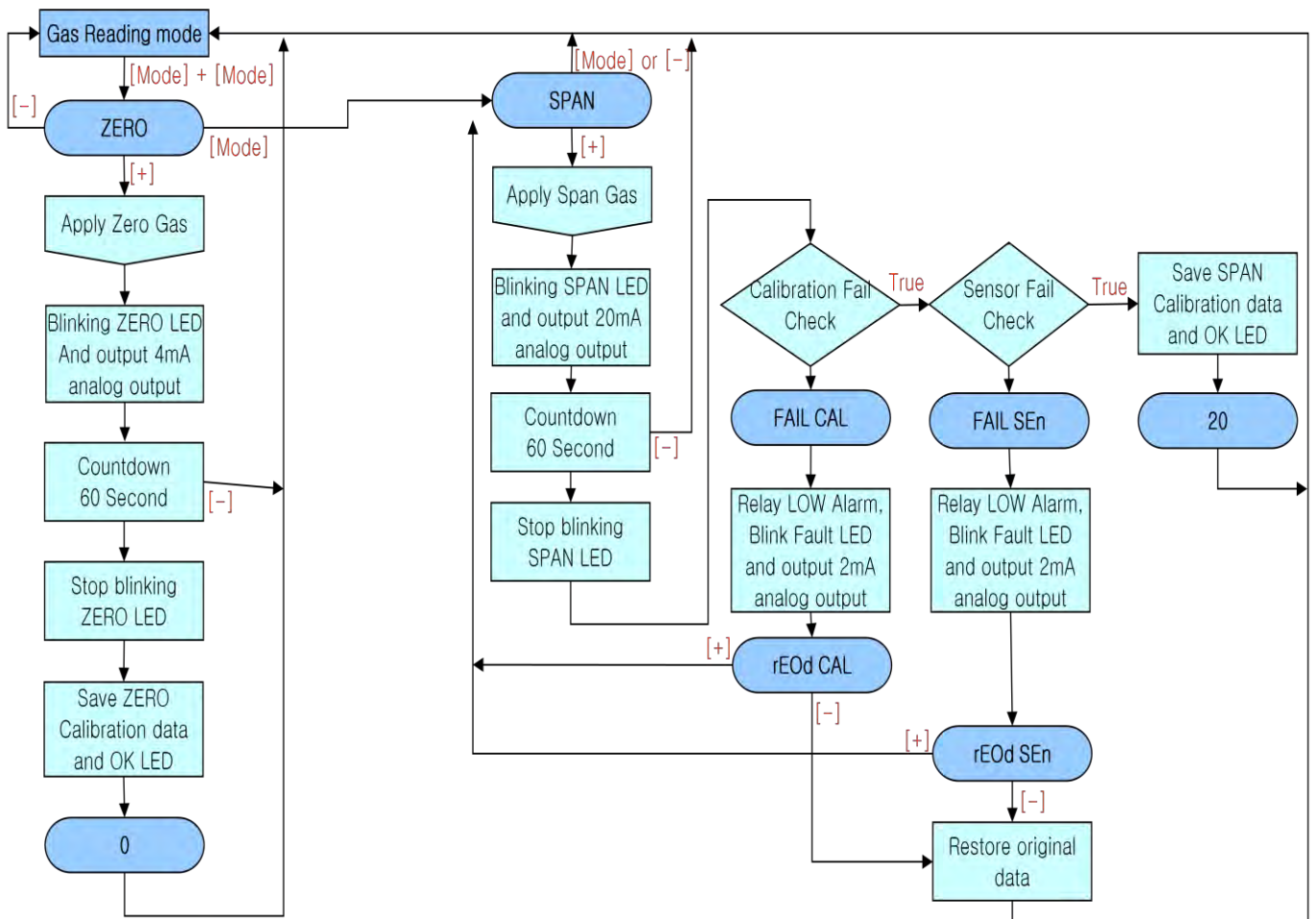


FLOW CHARTS

Primary Operation Sequence



Zero/Span Calibration



```

graph TD
    Start(( )) --> GRM[Gas Reading mode]
    GRM -- "[+][-][Mode]" --> CG([Calibration Gas])
    CG -- "[+]" --> CGVS[Calibration Gas Value setting]
    CG -- "[-]" --> LA([LOW Alarm Value])
    CG -- "[Mode]" --> HA([HIGH Alarm Value])
    CGVS <-->|"+|> Inc1[Increase]
    CGVS <-->|"-|> Dec1[Decrease]
    Inc1 --> CGVS
    Dec1 --> CGVS
    CGVS -- "[Mode]" --> BV1[Blinking Value and Value Save]
    BV1 --> Start
    
    LA -- "[+]" --> LAVS[LOW Alarm Value setting]
    LA -- "[-]" --> HA
    LAVS <-->|"+|> Inc2[Increase]
    LAVS <-->|"-|> Dec2[Decrease]
    Inc2 --> LAVS
    Dec2 --> LAVS
    LAVS -- "[Mode]" --> BV2[Blinking Value and Value Save]
    BV2 --> Start
    
    HA -- "[+]" --> HAVS[HIGH Alarm Value setting]
    HA -- "[Mode] or [-]" --> Start
    HAVS <-->|"+|> Inc3[Increase]
    HAVS <-->|"-|> Dec3[Decrease]
    Inc3 --> HAVS
    Dec3 --> HAVS
    HAVS -- "[Mode]" --> BV3[Blinking Value and Value Save]
    BV3 --> Start
  
```

The flowchart illustrates the sequence of operations for calibration and alarm setting. It begins in 'Gas Reading mode'. Pressing the [+], [-], and [Mode] keys simultaneously transitions the system to 'Calibration Gas' mode. From 'Calibration Gas', pressing [+] leads to 'Calibration Gas Value setting', while pressing [-] leads to 'LOW Alarm Value' and pressing [Mode] leads to 'HIGH Alarm Value'. Each of these three modes has a corresponding 'Value setting' screen. In 'Calibration Gas Value setting', the 'Increase' and 'Decrease' buttons adjust the value, and pressing [Mode] leads to 'Blinking Value and Value Save'. Similarly, in 'LOW Alarm Value' and 'HIGH Alarm Value' modes, the 'Increase' and 'Decrease' buttons adjust the alarm values, and pressing [Mode] leads to their respective 'Blinking Value and Value Save' screens. The 'Blinking Value and Value Save' screens for all three modes eventually lead back to the 'Gas Reading mode'.

Notice for User

Please use the instrument in the range of the applicable temperature, humidity and pressure that are appropriate for the specification of the product. Using the instrument beyond this range may cause malfunction or glitch of the instrument.

Gas concentration measurement value by the sensor or the instrument can vary according to the environment at site (temperature, pressure and humidity). Therefore the calibration of the instrument should be performed at the same or similar environment as that of the instrument use (temperature, pressure and humidity).

If temperature changes sharply during use of the instrument (for instance, using the instrument at places of far different temperatures between indoor and outdoor), the value of the measured gas concentration can be changed suddenly. Please use it after the gas concentration value is stabilized.

Severe vibration or shock to the instrument may cause the sudden change of value of the measured gas concentration. Please use it after the value of gas concentration is stabilized. Excessive shock to the unit can lead to trouble of the sensor or the instrument.