

Safety Information:

Any operation inside the detector must be carried out by professional personnel. Before operation and installation, please read carefully and understand clearly this manual.

Please don't expose the detector to the environment which has electric shock, strong magnetic field or serious continuous mechanic shocking.

Do not open when an explosive atmosphere is present.

Open circuit before removing cover.

Avoiding potential electrostatic charging hazard – use only damp cloth for cleaning.

It is suggested to calibrate the sensor once every 180 days (6/months).

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1 Introduction

SGD-2000 is cutting edge fixed gas detector, to detect wide range of flammable and toxic gases, available in Infra-red, Catalytic, Electrochemical and PID sensor. It is diffusion type gas detector with high stability, reliability and accuracy in response.

Additional to 4-20 mA output, 2 Alarm relay outputs considered to connect to universal FACPs, F&Gs and PLCs Control Panels.

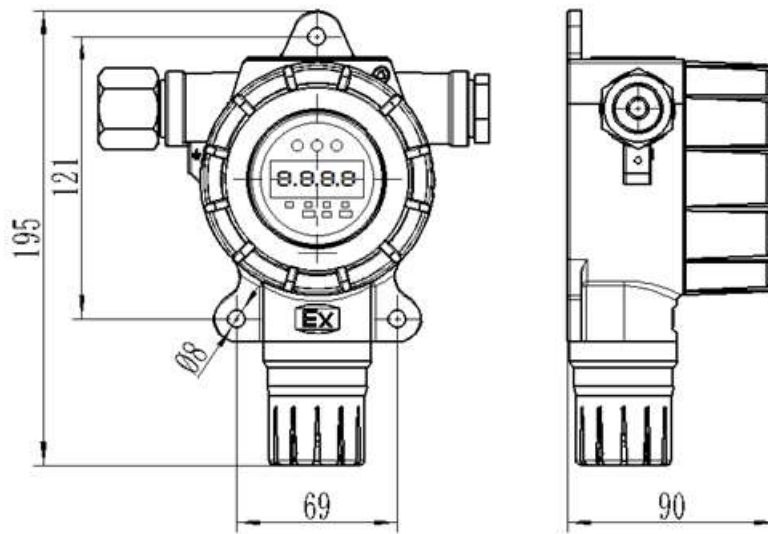
2 Main Technical Features

- 1) Detector comprised of main-control module and sensor module. Two alarm level relay and 4-20 mA output is available.
- 2) Easy Calibration by means of Remote Control.
- 3) There is an anti-error interconnection in the sensor module and detector, therefore the sensor module can be inserted to detector easily.
- 4) The detector automatically identifies and read the preset calibration data when replace the sensor module, it does not need to recalibrate. The detector will run immediately after the completion of self-diagnostic.
- 5) Easy replacement of the integrated detector makes the customer solve the problem once the sensor failed, it can prevent the interruption of operation and save money.
- 6) II 2G Ex db IIC T6 Gb ATEX approved, IP65 – Operating temperature -20° to $+55^{\circ}$ C

3 Detector and sensor casing specification

The detector casing is made of cast aluminum or stainless-steel material and sensor casing material is SS316. Two entries are available to wire 4-20 mA and relay output simultaneously if necessary. Another end could be sealed by choke plug if just using an output. The used plugs and glands shall be Eexd IIC T6, ATEX approved.

4 Dimensions



5 Installation instruction

There are no standard rules for sensor placement, since the optimum sensor location is different for each application. The customer must evaluate conditions at the facility to make this determination. Generally, SGD-2000 gas detector should be easily accessible for calibration.

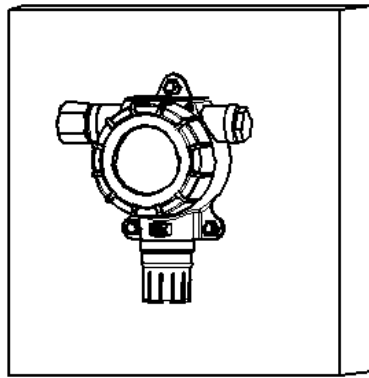
The location of detector should be within 1m around the possible gas leakage area. Try to install it as near as possible above gas leakage source, but avoid preventing the normal working of other equipment. Please do not install the detector in the environment with temperature or humidity more than the detector operation temperature and humidity range.

For the gas which is lighter than the air, the recommended location is 2m~3.5m higher than the gas source. For the gas, which is heavier than the air, the position is 0.3~0.6m above the ground and below the gas source.

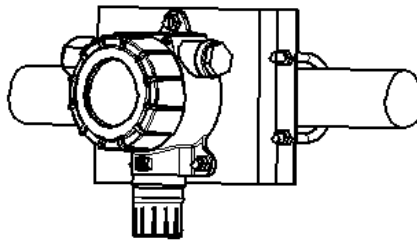
For large scale area gas detection, the detectors should be installed in the place with considering radius of detection coverage equal to about 7.5m.

Install the detector with sensor head downwards and fix it tightly.

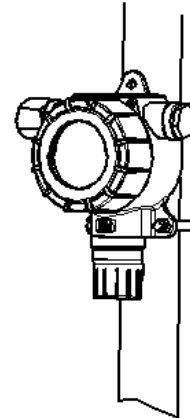
5.1 Different Mounting Types:



Wall mounted

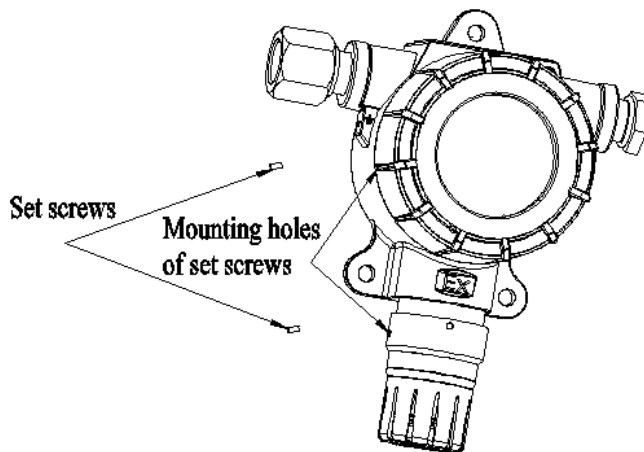


horizontal pipe type

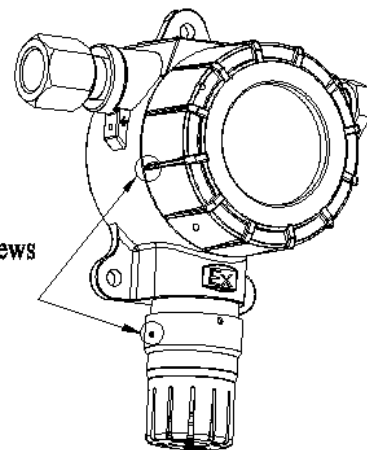


vertical pipe type

- Wall mount: fixed the detector on the wall with 3-unit M8 expansion bolts.
- Horizontal pipe mount: fix the detector on the backplate with 3-unit M8 expansion bolts, then the backplate and detector should be fixed on the horizontal pipe by 2 units U-bolt.
- Vertical pipe mount: the detector should be fixed on the vertical pipe directly by one unit 2-inch U-bolt.
- Precautions: Be sure the locking screw fixed well before installation to avoid to be open by non-specialist persons.



Fix the set screws to avoid to be disassembled incorrectly



6 Electrical Connection

Cabling to SGD-2000 must be in accordance with the recognized standards of the appropriate authority in the country concerned and meet the electrical requirements of the detector. It is recommended to use of 3-core screened cable (for 4-20 mA output) with a minimum cross-sectional area of 1.5 mm². Suitable Eexd type cable glands must be used.

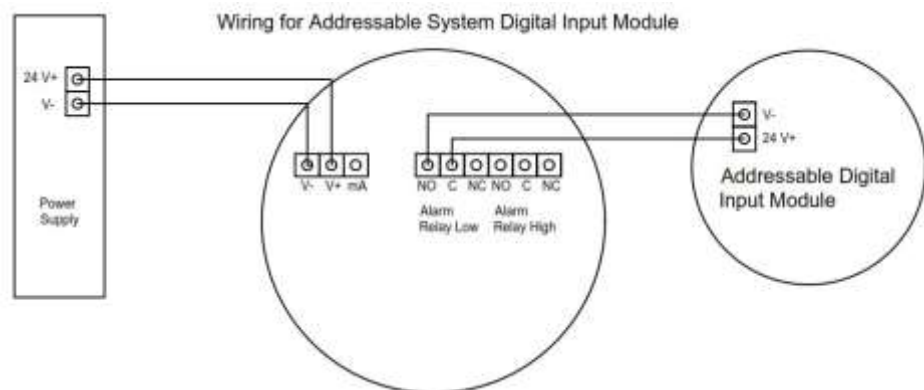
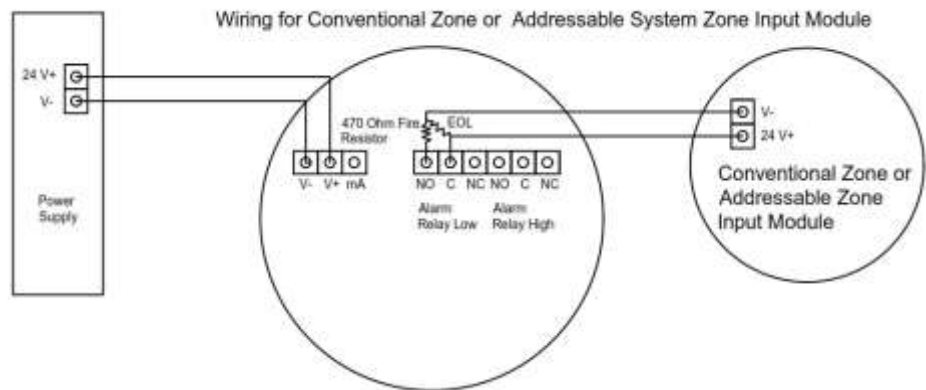
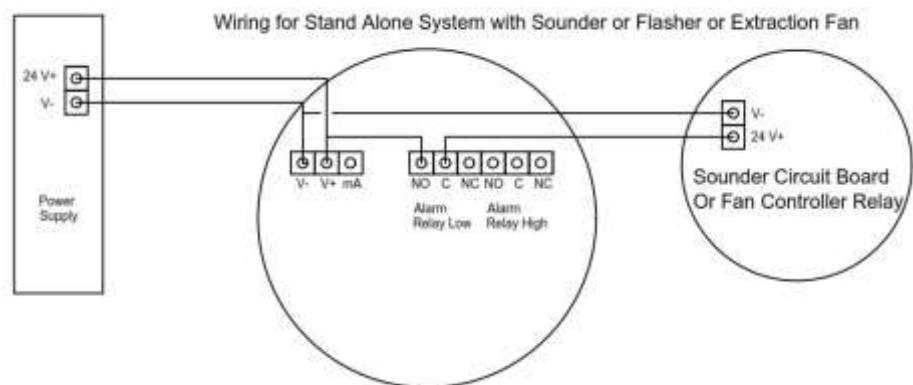
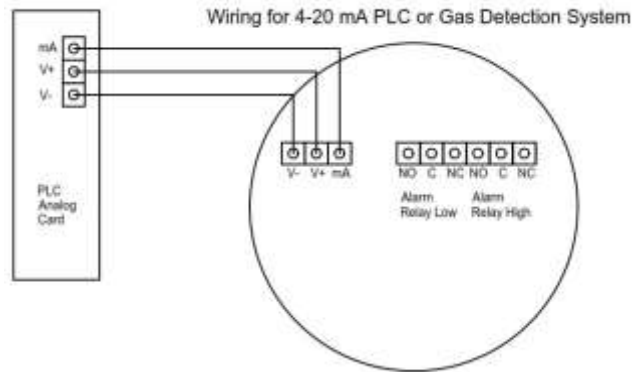
Wiring should be done by skilled workers according to the following instruction.

Note 1: Wrong wiring will lead to unrecoverable damage.

Note 2: Do not open the detector when energized.

- 1) Unscrew the locking screw of cover.
- 2) Screw off the cover in counter-clockwise and take off the display PCB.
- 3) Insert the cable through the cable entry and rubber seal to the shell.
- 4) All connections are made via the screw terminal block mounted on the PCB in the junction box. The terminals are marked 'V+' and 'V-' and 'I (mA)' and correct connection should be observed when connecting the detector to control equipment. This version of SGD-2000 is a 4-20 mA current one, and requires a dc supply of 16-30 V.
- 5) Make sure the wire connection is correct and firm. Then pull out the excess cable, the lock nut and rubber seal should be fixed firmly (ensure it comply with explosion proof design).
- 6) After checking all the connection well, install the display PCB and the front cover. Make sure the detector case is put on and connected with cover tightly.
- 7) Ground connection: The internal grounding terminal shall be used as the grounding means of the SGD-2000 gas detector. The external grounding terminal is only a supplemental bonding connection, and is only to be used where local authorities permit or require such a connection. To limit radio interference, the junction box and cable armor should be grounded (earthed) at the control panel. Ensure the earth connection is provided in a safe area only.
- 8) Precautions
 - 1: Wires are reliably connected and unused entry must be plugged.
 - 2: If just the relay outputs are used without 4-20 mA signal output, please connect power to 'V+' and 'V-' ('I (mA)' should be left without any connection).
 - 3: If the detector is used as stand-alone detection device, J4 (+ , -) power output can be used for audible and visual appliance output.

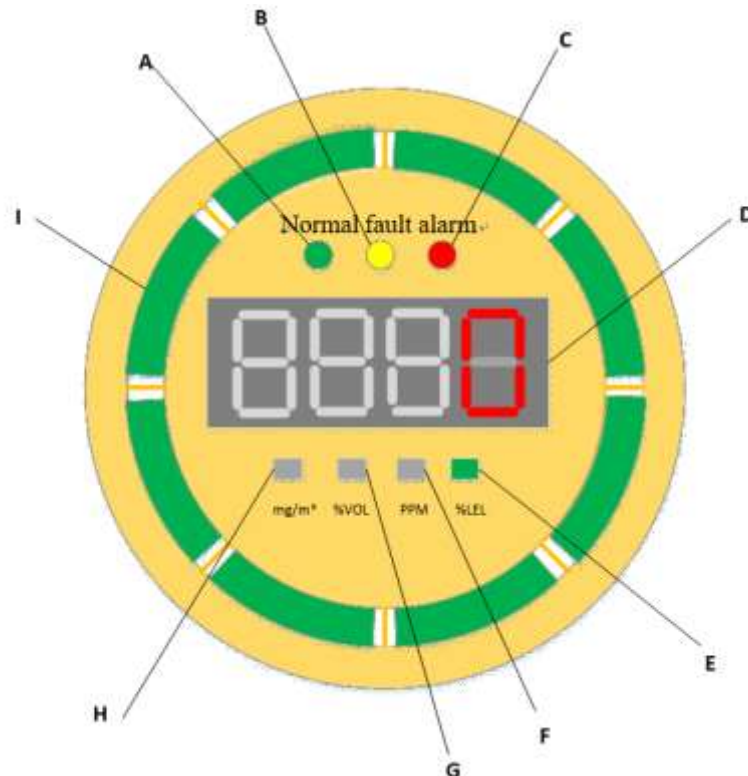
For different usage of gas detectors following wirings are recommended



7 The operation instruction

7.1 Turn on

The detector enters into normal detecting mode after it is powered and the 10s self-test and about 50 seconds countdown warm up time finished. When the read keeps steady, the read on the main display window is the detected gas concentration.



Display panel appearance

The meaning of each position is shown as follows:

- A. Power LED: Green LED is on when the power supply is normal.
- B. Fault LED: In flashes status shows the detector is failed.
- C. Alarm LED: The light will be in blink mode in high and low alarm status. The frequency of blinking in high alarm status is higher than low alarm one.
- D. Digital display: Gas concentration will be shown by 4 digits display.
- E. %LEL
- F. ppm
- G. %VOL
- H. mg/m^3 .
- I. Status Light: The green light flashes in normal status, the red-light flashes in the

alarm status, and the yellow light flashes in the fault status.

7.2 Menu instruction

In normal detecting mode, press the “menu” on the remote controller, the display screen will show _____. Input the password **1111** and then press Confirmation button.

Menu items show as below:

- | | | |
|-----|-------------|---------------------------------------|
| 1. | AL_L | low alarm |
| 2. | _dL | Hysteresis setting of low alarm |
| 3. | AL_H | High Alarm |
| 4. | _dH | Hysteresis setting of high alarm |
| 5. | ZEr0 | Zero calibration |
| 6. | CAL_ | Span calibration |
| 7. | Addr | address code 001~128 |
| 8. | bAud | baud rate 600, 1200, 2400, 4800, 9600 |
| 9. | -04- | The proofread of DA output 4mA. |
| 10. | -20- | The proofread of DA output 20mA. |
| 11. | ALDE | Alarm Delay from 0 to 30s |
| 12. | rELA | Relays Delay Configuration |
| 13. | rEco | Escape |

7.2.1 Low alarm setting

Choose Low alarm menu **AL_L**, Press the Confirmation button and it displays low alarm value, (e.g. **0020**). To revise the value, use “0-9” buttons & Up and Down buttons. Press Confirmation button to save this figure.

7.2.2 Hysteresis setting of Low alarm

Upon the menu instruction, choose Hysteresis of low alarm menu **__dL**. Press the Confirmation button and it displays Hysteresis value of low alarm (e.g. **0003**). To revise the value, use “0-9” buttons & Up and Down buttons. Press Confirmation button to save this figure.

7.2.3 High alarm setting

Choose High alarm menu **AL_H**, Press the Confirmation button and it displays high alarm value, (e.g. **0050**). To revise the value, use “0-9” buttons & Up and Down buttons. Press Confirmation button to save this figure.

7.2.4 Hysteresis setting of high alarm

Choose Hysteresis of high alarm menu **__dH**. Press the Confirmation button and it displays Hysteresis value of high alarm (e.g. **0003**). To revise the value by pressing “0-9” button & Up and Down button, press Confirmation button to remember this figure.

7.2.5 Zero Calibration

Upon the menu instruction, choose Zero calibration menu **2Ero**. Press the Confirmation button and it displays 15s countdown on the screen, when the countdown finished, the detector returns to the normal status.

Warnings: Zero calibration must be done in the clean air. Do not adjust zero calibration when the target gas exists in the working place.

For O₂ gas detector, the detector should be put into pure N₂ gas environment.

7.2.6 Span Calibration

First, connect the calibration cover to the sensor device, to feed it with the standard gas and keep gas flowing between 350ml/min to 500ml/min. Upon the menu instruction choose **CAL_** and then press Confirmation button. It displays calibration value (e.g. **0200**). The value could be revised as the same as the standard gas concentration by “0-9” button & UP and Down button. Press “Confirmation” to start 30s countdown. After the countdown finished, the span calibration is down and back to normal status.

Note: The calibration can be repeated till the value is steady.

7.2.7 Communication Address Setting

In detector version with RS485 output to set the address setting, go to **Addr** and press Confirmation button till it displays address (e.g. **0001**). Change the communication address by Up and Down button and press “Confirmation” to confirm it.

Note: It is not applicable for detectors with 4-20 mA output.

7.2.8 Baud rate Setting

In detector version with RS485 output to set the baud rate setting, go to **bAud** for Baud rate setting menu, and press “Confirmation” button, it displays baud rate value (e.g. **9600**). To revise the value by Up and Down button, and then confirm. When the baud rate value is set successfully, it will be back to the baud rate menu. Finally exit by pressing “Back” or “Exit” button.

Note: It is not applicable for detectors with 4-20 mA output.

7.2.9 Calibration for 4mA

Go to **-04-** for 4mA menu, and press Up and Down to calibrate the 4mA output. When it’s done, press “Confirmation” and then exit by click “Back” or “Exit”.

7.2.10 Calibration for 20mA

Go to **-20-** for 20mA menu, and press Up and Down to calibrate the 20mA output. When it’s done, press “Confirmation” and then exit by click “Back” or “Exit”.

7.2.11 Alarm time delay Setting

Choose alarm time delay setting menu **AIDE** and press “Confirmation”, it displays (e.g. **0003**), then press Up and Down to revise the delay time and confirm.

7.2.12 Relay Setting

Choose alarm time delay setting menu **rELA** and press “Confirmation”, it displays (e.g. **0003**), then press Up and Down to revise the relay delay time and confirm.

7.2.13 Factory Reset

Choose **rEC0** and press “Confirmation”.

8 Faults and Solutions

| Fault | Cause | Solution |
|-------------------------------|--------------------------------------------|-----------------------------------------------------------|
| Inaccurate display | Sensor is not calibrated | Please calibrate the sensor |
| No response to target gas | Something is wrong with Electronic circuit | Please contact the factory or distributor |
| | Sensor overdue | Please replace the sensor |
| Zero calibration doesn't work | Strong magnetic interference | Keep it away from the interference source or eliminate it |
| | Sensor drifts a lot | Calibrate it in time or replace the sensor |
| Err1 | No Sensor or no sensor connection | Check the sensor module and connect it well |
| Err2 | Gas sensor drifts a lot | Do zero calibration in the clean air |

9 The detector package

This package consists of one gas detector and one Allen head wrench to open enclosure cover and sensor module.

10 Attentions

- 1) Avoid being fallen from high places and vibrated mightily.
- 2) The device may stop working under environment full of excessive gas concentration.
- 3) Before using this product, please read this instruction carefully and adhere to related requirement strictly.
- 4) It is forbidden to use the detector in the places with corrosive gas and other severe conditions with exorbitant or over-low temperate, high humidity, electromagnetic environment and strong sunshine.
- 5) Please clean the detector with soft cloth in case there is dirt on the appearance. Don't clean with corrosive solvent or hard materials, which may hurt and break the appearance of the detector.
- 6) Please re-calibrate the sensor at least once every 6 months, no more than 1 year maximum. It's suggested to test or inspect the detector frequently.
- 7) Do not open the cover when energized.
- 8) Do not use it if the flameproof case is damaged.

9) Any failures not mentioned in this instruction, please contact us for solutions.

11 Spare Part List

| | |
|------------------------------------------|----------------|
| <u>Calibration Cap:</u> | <u>SGD2CC</u> |
| <u>Remote Control:</u> | <u>SGD2RC</u> |
| <u>Main PCB:</u> | <u>SGD2MP</u> |
| <u>Display PCB:</u> | <u>SGD2DP</u> |
| <u>Transmitter Body Aluminum:</u> | <u>SGD2TBA</u> |
| <u>Transmitter Body Stainless Steel:</u> | <u>SGD2TBS</u> |
| <u>Sensor Housing:</u> | <u>SGD2SH</u> |
| <u>Sunshade:</u> | <u>SGD2SS</u> |
| <u>Pipe mount 2" U Bolt:</u> | <u>SGD2PM</u> |

Sensor Module-IR Combustible Gasses:

| | |
|---------------------------------------------------|-----------------|
| - <u>Infrared Sensor for Combustible Gasses:</u> | <u>SGD2SM01</u> |
| - <u>Catalytic Sensor for Combustible Gasses:</u> | <u>SGD2SM02</u> |
| - <u>PID Sensor for VOC Gasses:</u> | <u>SGD2SM03</u> |
| - <u>Electrochemical Sensor for O2:</u> | <u>SGD2SM04</u> |
| - <u>Electrochemical Sensor for CO:</u> | <u>SGD2SM05</u> |
| - <u>Electrochemical Sensor for SO2:</u> | <u>SGD2SM06</u> |
| - <u>Electrochemical Sensor for NO2:</u> | <u>SGD2SM07</u> |
| - <u>Electrochemical Sensor for Cl2:</u> | <u>SGD2SM08</u> |
| - <u>Electrochemical Sensor for H2S:</u> | <u>SGD2SM09</u> |
| - <u>Electrochemical Sensor for NH3:</u> | <u>SGD2SM10</u> |
| - <u>Electrochemical Sensor for H2:</u> | <u>SGD2SM11</u> |
| - <u>Electrochemical Sensor for O3:</u> | <u>SGD2SM12</u> |
| - <u>Electrochemical Sensor for NO:</u> | <u>SGD2SM13</u> |
| - <u>Electrochemical Sensor for HCl:</u> | <u>SGD2SM14</u> |
| - <u>Electrochemical Sensor for HCN:</u> | <u>SGD2SM15</u> |
| - <u>Electrochemical Sensor for HF:</u> | <u>SGD2SM16</u> |
| - <u>Electrochemical Sensor for ClO2:</u> | <u>SGD2SM17</u> |
| - <u>Electrochemical Sensor for COCl2:</u> | <u>SGD2SM18</u> |
| - <u>Electrochemical Sensor for CH2O:</u> | <u>SGD2SM19</u> |
| - <u>Electrochemical Sensor for ETO:</u> | <u>SGD2SM20</u> |
| - <u>Infrared Sensor for CO2:</u> | <u>SGD2SM21</u> |
| - <u>Infrared Sensor for N2O:</u> | <u>SGD2SM22</u> |

Note: Sensor Range on each gas shall be finalized before ordering.