Brief Operation Manual

SNE320

Wireless Gas Detector

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CONTENTS

1、Panel Functions 2

1.1、Detector Buttons 2
1.2、Button Functions 2

2、Detector Settings 2

2.1、Menu 2
2.2、Zero Calibration 3
2.3、Calibration Operation 3
2.4、Alarm Setpoint Configuration 4

3、Topic Message Publish Interval 4

4、Network Reconnection Interval 5

5、Network Configuration Function Description 5

6、Data Communication Function Description 5

7、Alarm Information Description 6

8、Common Faults and Troubleshooting Procedures 7

1、Panel Functions

1.1、Detector Buttons

Detector Button Layout

1.2、Button Functions

This detector is equipped with three physical buttons

Power/Acquisition Button

Long press: Powers the device ON or OFF

Short press (when powered on): Captures current gas concentration and detector status, then uploads the data to the server platform

Menu/Confirm Button (M)：Long press (2 seconds): Enters menu mode

Short press: Navigates through menu options and confirms settings

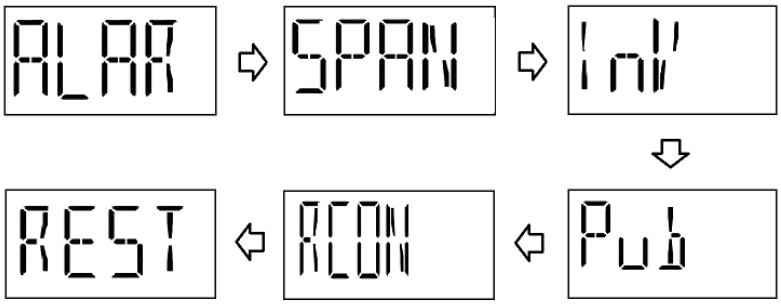
Page/Adjustment Button

Used for scrolling through menu pages and adjusting configuration parameters

2、Detector Settings

2.1、Menu

At the main interface, press and hold the center button (M) for 2 seconds to enter the parameter settings menu. Users may press the right button to cycle through different parameter setting screens. The navigation sequence of the parameter settings menus is shown in the figure below:



Parameter Settings Menu Flowchart

After entering the parameter settings menu, use the triangle button to adjust the desired value, then press M to save and return to the previous menu. To skip a parameter without making changes, press triangle to proceed directly to the next settings screen.

The system will automatically exit to the main interface after 60 seconds of inactivity in any setting mode or parameter menu.

2.2、Zero Calibration

In the parameter settings menu, press triangle to select the "SPAN" menu, then press "M" to enter. Press triangle to navigate to the "ZERO" item, then press "M" to enter zero calibration mode.

A 20-second countdown begins, indicating that zero calibration is in progress. The detector automatically adjusts its zero point.

After the countdown ends, if zero calibration is successful, the display shows "OK Z", the result is saved, and the system returns to detection mode after 5 seconds;

If zero calibration fails, the display shows "ERR", and the system returns to detection mode after 5 seconds.

For zero calibration failure causes and remedies, refer to Table 2 below:

Table 2: Zero Calibration Failure Cause Details

No.	Failure Cause	Remedy
1	Ambient air contaminated; target gas or interfering gas present	Move detector to clean air environment and repeat zero calibration
2	Sensor failure	Replace sensor and repeat zero calibration

Note: The carbon dioxide detector requires zeroing using high-purity nitrogen gas; oxygen does not require zeroing.

2.3、Calibration Operation

When the detector's measurement accuracy falls outside the specified tolerance range, the user may perform calibration using span gas.

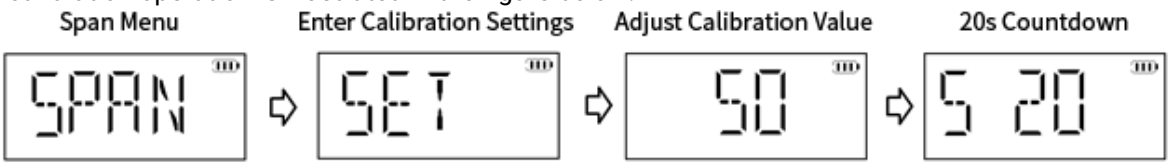
Connect the calibration cup, tubing, and cylinder gas. Adjust the constant flow device to stabilize the flow rate at 500 mL/min. Then attach the calibration cup to the detector. Pass the span gas (recommended

concentration range: 50% FS to 80% FS) through the "Calibration Cup" to deliver a uniform flow of 500 mL/min to the sensor. Allow the detector reading to stabilize (stabilization times vary by gas type).

At the parameter settings menu, press the triangle key to select the "SPAN" menu, then press the "M" key to enter. Use the triangle key to select the "SET" option and press the "M" key to access the calibration value settings menu. Within the calibration value menu, press the triangle key to adjust the calibration value. Once the calibration concentration is set, press the "M" key to initiate the calibration procedure. The automatic calibration duration is 20 seconds, with the display showing a countdown timer.

Calibration success is indicated by "OK S"; calibration failure is indicated by "ERR".

The calibration operation is illustrated in the figure below:



Calibration Configuration Diagram

Refer to the table below for span calibration failure causes and corrective actions：

No.	Failure Cause	Corrective Action
1	Detector reading unstable	Allow detector reading to stabilize before performing calibration
2	Calibration flow rate too high or too low	Adjust constant flow valve; verify calibration gas flow rate
3	Standard gas concentration inaccurate or excessive error	Verify standard gas concentration; recalibrate
4	Sensor failure	Replace sensor; recalibrate

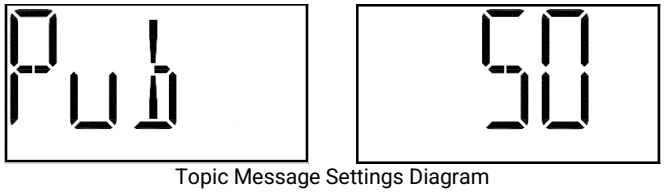
2.4、 Alarm Setpoint Configuration

From the parameter settings menu, press the triangle key to select the "ALAR" menu, then press the "M" key to enter the alarm setpoint configuration interface. The user may press the triangle key to adjust the alarm value. Upon completion, press the "M" key to save; the display will automatically return to the "ALAR" menu. The alarm setpoint configuration procedure is illustrated in the figure below:

Alarm Setpoint Setup Diagram

3、Topic Message Publish Interval

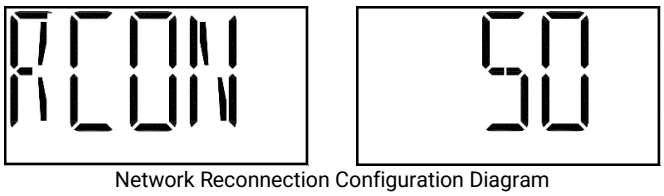
From the parameter settings menu, press the triangle key to select the "PUB" menu, then press the "M" key to enter the publish interval configuration interface. The user may press the triangle key to adjust the interval value (in minutes). Upon completion, press the "M" key to save; the display will automatically return to the "PUB" menu. The interval configuration procedure is illustrated in the figure below:



Topic Message Settings Diagram

4、Network Reconnection Interval

From the parameter settings menu, press the triangle key to select the "RCON" menu, then press the "M" key to enter the reconnection interval configuration interface. The user may press the triangle key to adjust the interval value (in minutes). Upon completion, press the "M" key to save; the display will automatically return to the "RCON" menu. The reconnection configuration procedure is illustrated in the figure below:



Network Reconnection Configuration Diagram

5、Network Configuration Function Description

This detector has built-in MQTT server login credentials, server address, account password, publish and subscribe topics, and APN information. To access factory network configuration, power off the device first, then press and hold the "M" key and triangle key simultaneously, followed by pressing the triangle key to power on. The normal indicator, alarm indicator, and network indicator will illuminate simultaneously for 3 seconds to indicate successful entry into factory network configuration mode. Release the keys after all three indicators light up.

6、Data Communication Function Description

This detector features MQTT server subscription and publication capabilities for data communication. Users may connect to the detector's NB wireless module via an MQTT platform.

Once connected to the MQTT server, the detector periodically publishes topic messages containing alarm concentration data, battery status, SIM card ICCID information, and historical concentration data. The system default settings are:

Detection concentration data: published every 24 hours

Historical record data: published every 12 hours

Historical records are stored in time-and-concentration format, with alarm status transitions logged. Real-time data subscription screenshots from the platform are shown below.

When the detector uses different SIM cards with unique ICCIDs as identifiers, data from different address detectors is transmitted in JSON format (e.g., detector publish topic data shown in Figure a below, detector subscription data shown in Figure b below).

```
{
  "ts": "1751611138000",
  "gas": "CC",
  "conc": 0,
  "unit": "%LEL",
  "state": "normal",
  "bat": 100,
  "csq": 19
}
```

```
{
  "ICCID": "898604D81023C0219242",
  "rtt": 0,
  "zeroc": 0,
  "onoff": 1,
  "recontr": 1440,
  "alarm_L": 50,
  "setmode": 0,
  "hecontr": 720,
  "hnumb": 12,
  "record": 60
}
```


a. Platform Subscription Data b. Platform Publish Data

Publish and Subscribe Data Format

> Note: The detector's platform data communication function requires the device to be powered on and within one minute after data transmission; otherwise, device configuration will not be possible. Refer to the SNE320 JSON Protocol Format Document for details.

7、 Alarm Information Description

When the instrument is in detection mode (i.e., any display window other than parameter settings), it continuously compares gas concentration against the preset alarm setpoint. Upon exceeding the setpoint, the red LED activates to transmit alarm signals, alerting the user to hazardous conditions. Additionally, alarm activation occurs when battery voltage drops below the preset minimum threshold, or when network/sensor failure or offline status is detected.

Alarm Conditions and Alarm Signals Cross-Reference Table (shown below):

Alarm Condition	Alarm Signal
Gas concentration exceeds alarm setpoint	Red alarm LED illuminates once per second; wireless module immediately initiates data upload. While alarm condition persists, uploads every 30 minutes.
Sensor fault or sensor offline	Yellow alarm LED illuminates once per second; wireless module immediately initiates data upload. While alarm condition persists, uploads every 30 minutes.
Battery voltage below 10%	Uploads battery status to platform every 2 hours for 5 seconds; detector automatically powers off when battery voltage drops below critical threshold.
Wireless module or network registration failure	Blue alarm LED illuminates once per second; network re-registration attempted every hour.

8、Common Faults and Troubleshooting Procedures

Fault Symptom	Cause Analysis	Corrective Action
No power-on response, unable to charge	1. Explosion-proof protection triggered due to battery overcharge	Reconnect charger to activate battery and initiate power-on
	2. Protection mechanism triggered due to battery over-discharge	Remove battery pack, charge separately for several minutes, then reinstall and power on; continue charging
	3. Battery damage	Contact manufacturer for battery replacement
Network fault	Network fault	1. Loose NB-IoT SIM card
	2. Poor network signal	Relocate detector to area with stronger signal coverage
	3. Server shutdown	Verify MQTT server operational status

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