GDS ENGINEERING

2026 / TECHNICAL MANUAL

MCU9000S

Gas detection receiver module user manual

Current input, display, alarm and interlock settings

Installation / Operation / Maintenance

2026.11 Consolidated Revision · 2026.11.02

Before use, please verify the delivered model, detected gas, measurement range, and options.

gdseng.co.kr 031-731-0218

Things to check before use

This document is intended for personnel responsible for installation, operation, and maintenance. Please refer to the physical nameplate, the delivery specification, and the wiring diagram.

01 Pre-work safety measures

Installation, wiring and disassembly must be performed by trained personnel. Disconnect power before work. Inform the relevant personnel before calibration or output testing and manage interlocked equipment according to site procedures.

02 When an alarm is triggered

According to the on-site emergency procedures, identify the source of the leak and protect personnel. Do not disable the alarm or adjust the zero point to hide the actual gas concentration.

03 Post-test recovery

Remove calibration gas and test equipment. Confirm that normal detection, current output, communication and interlocked equipment have been restored. Record changed settings and inspection results.

> Please verify the installation location and protection class of this model. Do not apply explosion-proof detector conditions to non-explosion-proof products or panel-type receiver modules.

The menu and display examples in the manual may vary depending on the firmware. If the screen or terminal markings are different, do not arbitrarily match them; instead, verify the product number and PCB version.

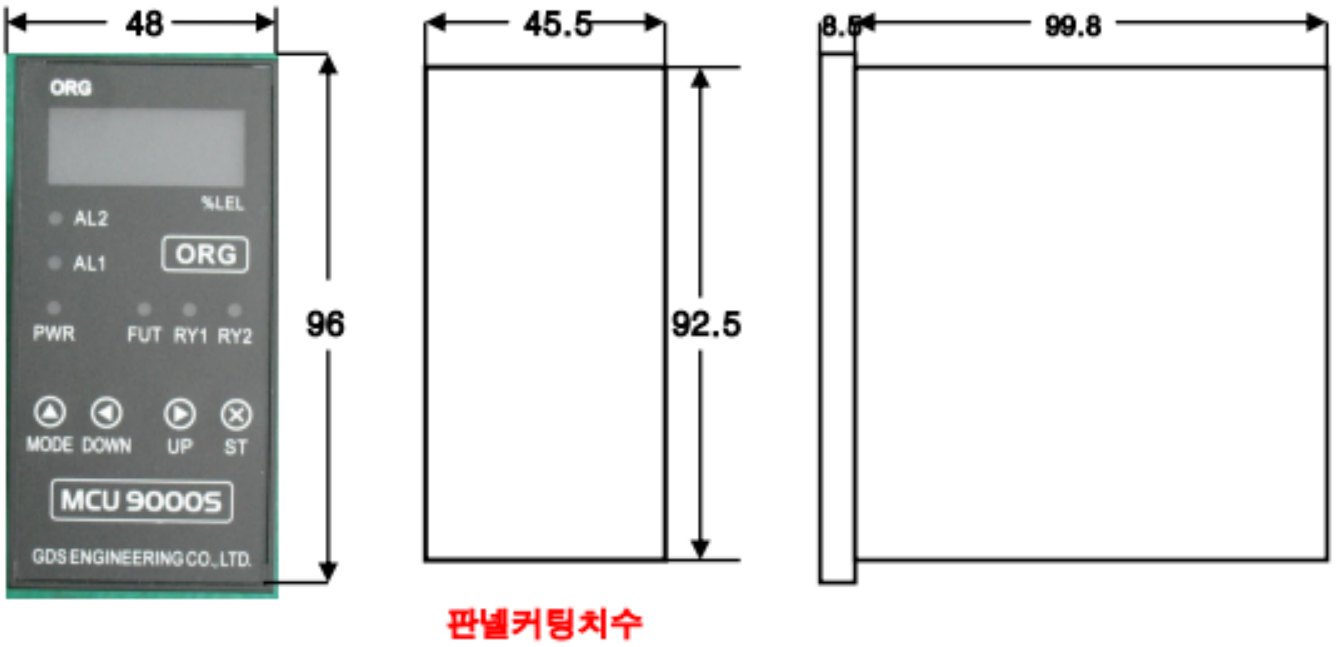
Product configuration and specifications

MCU9000S is a receiver module that receives signals from external detectors and displays concentration, fault, and alarm. It is important to distinguish between the actual sensor calibration of the detector and the current input calibration of the receiver module.

Item	Specifications
Power supply	24V DC rated / Original power consumption 2.5W
Input Signal	4-20mA / Verify support for fault, warm-up and overrange signals
Display	4-digit FND / %LEL, ppm, %V/V / Range set by delivery
Output	4-20mA (Maximum load 500Ω), RS-485
Relay Contacts	SPDT / AC 250V, 5A
Accuracy / Response time	±2% F.S. / Response and recovery under 30 seconds (original specification)
Appearance / Weight	48(W) × 96(H) × 108.3(D)mm / 0.22kg
Panel cut-out	45.5(W) × 92.5(H)mm
Environment	-20~+50°C / 20-95% RH (Condensation prevention)

> Refer to supplied specifications for panel installation conditions and allowable supply voltage. Do not apply explosion-proof detector cable-thread or certification requirements to the receiver module.

Panel dimensions and installation



Original shape and cut-out diagram. Dimensions in mm. Please verify the panel thickness and wiring allowance.

Differentiation	Width	Height	Depth
Appearance	48	96	108.3
Panel cut-out	45.5	92.5	Not applicable

Securely mount the module on the panel and ensure adequate ventilation and terminal access. Avoid excessive humidity, condensation, vibration, and strong electrical noise. Perform installation and wiring after disconnecting power.

Terminal

Number	Display	Function
1 / 13	24VDC	DC 24V Positive
2 / 14	GND	Power negative
3 / 15	PT	Power failure detection
4 / 16	A1-C	Common contact for 1st alarm
5 / 17	A1-NO/NC	1st alarm NO/NC
6 / 18	A2-C	Common contact for 2nd alarm
7 / 19	A2-NO/NC	2nd alarm NO/NC
8 / 20	DA	RS-485 (+)
9 / 21	DB	RS-485 (-)
10	Unused	Do not connect arbitrarily
11 / 12	4-20mA / GND	Current Output (+) / Common Output (-)
22 / 23 / 24	V+ / S / V-	Sensor Power (+) / Signal Input / Power (-)

> The numbers refer to the original MCU9000S terminal diagram. If the numbers or markings on the actual module are different, please refer to the supplied wiring diagram. Do not confuse the current input S(23) with the 4-20mA output (11).

Connecting the sensor and initial operation

01 Connecting the sensor power and signal

Connect the sensor V+, S, V- to the corresponding 22, 23, and 24 terminals on the receiver module. Check whether to use external power or an isolator based on the sensor's power consumption and supply method.

02 Receiver module power and interlock connections

Connect the rated 24V DC to the power terminals. Use terminals 11/12 for current transmission, DA/DB for RS-485, and the corresponding A1/A2 terminals for alarm contacts.

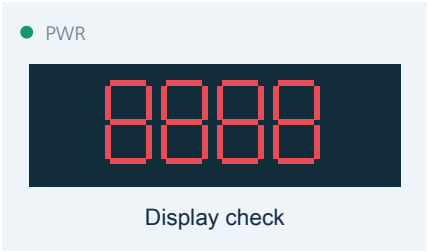
03 Verify range, units, and alarm

Match the detector's concentrations at 4mA and 20mA, units and receiver settings. Apply test current and verify the display, alarms, retransmission and interlock operation.

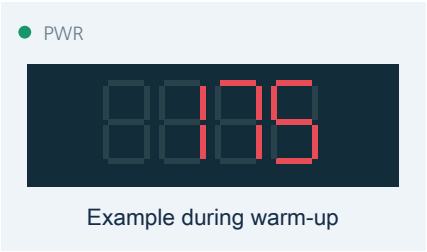
> Keep relay loads within their ratings. Verify NO/NC selection, alarm latch/pulse and power-failure contact operation against the supplied circuit and actual jumpers. A normal receiver display does not confirm the detector sensor response; check it separately.

The transmission cable must comply with shielded cable and on-site electrical design conditions. Check the cable resistance, voltage drop, noise, and receiver load, and verify the entire path after installation.

Power-up and normal operation



Display check



Example during warm-up



Example of normal display

01 Display check

When power is applied, the concentration display and status LED illuminate for approximately 3 seconds. Check the LED and numerical display and power status.

02 Warm-up for 180 seconds

The power LED turns on, and a countdown of 180 seconds begins. During warm-up, the current output is 2mA, and the alarm relay does not operate. Start operation after the product and sensor are stable.

03 Check settings

After checking the software version, address (supported configuration), measurement range, A1 and A2 settings, and relay settings, enter normal detection status. The display order may vary depending on the firmware.

Self-check

When the MODE button is pressed three times in the normal state, the SELF indicator will light up, and the display and status LED will turn on for approximately 1 second. At this time, the output is 2mA, and the relay will not operate. The buzzer will sound three times.

> A warm-up skip button, where supported, does not replace sensor stabilization. Normal concentration depends on the target gas; the normal ambient reading of an oxygen detector is not 0.

Status indication and alarm operation

Display / Operation	Function
PWR	Normal power state
F / Err	Verify sensor input and device failure status
A1 / A2	Stage 1 and 2 alarm status
ST	Buzzer stopped. This does not mean that there is no actual danger or alarm cause.
MODE 3 times	SELF self-check. Confirm the corresponding configuration for alarm release and protection return operation.
OVER / 22mA input	Verify the sensor's over-range and protection status

For high alarms, A1 flashes at stage 1. At stage 2, A1 stays lit and A2 flashes. For low alarms, such as oxygen deficiency, verify the configured direction and site requirements.

> Even after ST silences the buzzer, continue investigating the alarm cause and following site emergency measures. Once the hazard is resolved and interlocks are checked, restore operation under the approved procedure.

Current Input Calibration

> The following procedure calibrates the MCU9000S input. It does not replace detector gas zero and SPAN calibration. Use an accurate current source and the appropriate range setting.

01 Enter Settings

To enter settings mode, press DOWN(LEFT), MODE, and UP(RIGHT) in sequence from the normal state. Select the menu using the left and right buttons and confirm with MODE.

02 0000 / Zero Point Input Calibration

Apply an accurate 4mA reference signal. At 0000, press MODE to view the current value, then press MODE again. Select YES and press MODE to save. Check for good or Err.

03 SPAn / Full-scale input calibration

Apply an accurate 20mA reference signal and allow it to stabilize. At SPAn, press MODE and set the maximum value of the configured measurement range. Select YES and press MODE to save.

04 Verification and Exit

Verify the display against the range at 4mA, an intermediate value and 20mA. At OUT, press MODE to exit. Restore the actual detector connection, alarms and interlocks.

A1 and A2 Output Test

01 Alarm Value Retrieval

In settings, select A1 and press MODE to view the stage 1 alarm setpoint. Press MODE to return to A1, then use RIGHT to select A2 and view the stage 2 setpoint in the same way.

02 Alarm Value Change

Adjust LEFT/RIGHT to the approved value and save with MODE. Verify the unit, range, and upper/lower alarm directions together.

03 4-20mA Re-transmission Test

Press MODE in the 4-20 menu. Adjust the values to output 4mA from 0, and 20mA from the set maximum range. Check the received value and return to the menu to exit with OUT.

> The ORG 9500 and 9999 in the company's supplementary materials are examples for a specific site. Do not apply the same alarm values to all gases and sites.

Relay Settings

01 Enter rEL

Select rEL from the settings menu and press MODE. Select the target relay, such as r1 or r2.

02 Select Operation Function

The supported items are A1, A2, F1(Fault), and NO(Disabled). Check the meaning of the code and the contact operation in the corresponding firmware and delivery circuit.

03 Verify Continuous/Pulse Condition

The original settings are 0 continuous output, 1-30 second pulse, and 2-05 is an example of the 5-second setting for relay 2. Verify and save the actual display order and code in the installed version.

Test Items	Check Items
Normal / A1 / A2	Verify that only the specified contacts operate in each input state.
Fault / Power Off	Verify compliance with approved fail-safe design and contact status.
Buzzer / Return	Silence, latch, continuous/pulse time, and return condition.

> Contact testing can cause the actual operation of the linked equipment. Implement after prior consultation and restore the protective function after the test is complete.

Time, records and address management

Menu	Procedure / Verify
S-dt	Set year (2000-2099), month, day, hour and minute in order. Press ST to return.
dAtE	Verify the current date and time display.
ALAR	Retrieve records from the latest alarm. The record number, date, and time are displayed sequentially, and you can move between them using the left and right keys. "nuLL" indicates no record.
CLr	Selecting YES deletes the records and displays nuLL. Save required records before deletion.
Adr	Set RS-485 address. Assign it to avoid duplication with other devices.
rES	Reset to default. Perform after saving the settings and calibration values in the approved maintenance procedure.
UEr	Check firmware version.
OUT	End configuration. Return to monitoring state after approximately 30 seconds of no operation, based on the original settings.

> Time, record and address functions apply only to supporting firmware. After initialization, recheck the range, current calibration, alarms and all interlock conditions.

Inspection and Fault Response

Symptoms	Check Items
No display	DC 24V, power polarity, terminal connection, power supply status
Err / F	Detector power and sensor, terminal 23 input wire and common wire, input current
Concentration mismatch	Detector and receiver range, units, and 4mA/20mA calibration
Relay mismatch	Function assignment, NO/NC, pulse/latch settings and connected load
Communication failure	DA/DB polarity, address, baud rate, termination and wiring
Buzzer remains active	Alarm cause, fault input and latch status

Periodically check power, terminals, contacts, and display, and input/output paths. The gas response and calibration of the connected detector follow the cycle of the corresponding detector. If the problem persists, instead of a forced initialization, prepare the inspection results and firmware information and contact us.

Operation record and technical support

Record items	Site record
Installation location / product number	
Detected gas / range / unit	
Power / communication / PCB, firmware	
A1 / A2 / Relay setting	
Zero point / standard gas concentration, expiration date	
Current, communication, and alarm test results	
Calibration Date / Next Inspection Date / Responsible Person	

Technical Support

GDS ENG Co., Ltd.
031-731-0218 · gdseng@gdseng.co.kr
Room 605, Bldg. B, Ssangyong IT Twin Tower, 531 Dunchon-daero, Jungwon-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

Refer to the delivery contract for warranty and paid-repair conditions. The original guidance states a 1-year warranty. Damage caused by operating conditions such as sustained high gas concentrations, corrosive gases or excessive moisture is assessed separately.

Basis for revision: GDSENG_MCU9000S Manual and MCU9000 1st/2nd alarm value verification data
Revision date: 2026.11.02.