

## Fixed Combustible Gas (CH<sub>4</sub>) Detector



## 1. Overview

The AGRINOVO-GF-201-CH4 is a fixed-point methane and combustible gas (CH<sub>4</sub>) gas detector for continuous monitoring in agricultural and industrial environments. A sensing cell with automatic temperature compensation and zero/span drift correction delivers stable readings, while a flameproof aluminium alloy enclosure (Ex d IIC T6) makes it suitable for hazardous areas. The on-board LCD shows live concentration and alarm status, and three independent output paths (4-20 mA, RS485 Modbus-RTU, and two relays) integrate the unit into a controller, PLC, or DCS.

### Key Features

- Range: 0-100 %LEL
- Resolution: 0.1 %LEL
- Accuracy:  $\leq \pm 3\%$  FS
- Temperature-compensated sensing cell
- 4-20 mA + RS485 Modbus-RTU + two relays
- Two-stage alarm, freely configurable
- Flameproof Ex d IIC T6, IP65
- Wide supply: 12-30 VDC

### Applications

- Biogas plants and manure digesters
  - Dairy and livestock waste handling
  - Fuel storage and boiler rooms
  - Utility and process areas where combustible gas may accumulate
-

## 2. Specifications

### Sensing and Performance

Parameter	Specification
Target Gas	Methane / Combustible (CH <sub>4</sub> )
Measuring Range	0-100 %LEL (0-10 %VOL, 0-50 %VOL on request)
Resolution	0.1 %LEL
Accuracy	≤±3% FS
Repeatability	≤±1%
Sampling Method	Diffusion (pump-suction optional)
Response Time	≤25 s (T90)
Display	LCD with backlight
Temperature Compensation	Automatic

The same detector platform accepts replacement sensing cells for other gases; contact us for the full selection.

### Electrical and Outputs

Parameter	Specification
Supply Voltage	24 VDC (12-30 VDC)
Power Consumption	≤2 W
Analog Output	4-20 mA, 3-wire (2-wire optional)
Digital Output	RS485, Modbus-RTU, 4-wire
Alarm Output	Two relays, normally open, AC 120 V 0.5 A / DC 24 V 1 A

## Mechanical and Environmental

Parameter	Specification
Mounting	Wall mount or pipe flow-through
Enclosure	Aluminium alloy, flameproof
Ex Rating	Ex d IIC T6
Protection Rating	IP65
Cable Entry	M20×1.5 internal thread
Operating Temperature	-20 to 50°C
Humidity	10-95% RH, non-condensing
Pressure Range	86-106 kPa
Dimensions	196 × 140 × 91 mm
Weight	1.2 kg

### 3. Wiring

Terminals are accessed by unscrewing the enclosure cover. Disconnect power before opening the housing in any area where gas may be present.

#### Power and Analog Output (P2)

Terminal	Function	Description
24V+	V+	Power Supply (12-30 VDC)
GND	GND	Power ground / 4-20 mA return
mA	4-20 mA	Analog current output (+)

## RS485 (P3)

Terminal	Function	Description
A+	RS485-A	Data+
B-	RS485-B	Data-

## Alarm Relays

Terminal	Function	Contact
P4 (AL)	Low alarm relay	NO, dry contact
P5 (AH)	High alarm relay	NO, dry contact

Relay contacts are voltage-free (passive). Do not exceed the rated contact capacity (AC 120 V 0.5 A / DC 24 V 1 A) or the relay may be damaged. Connect the cable shield to the internal ground terminal.

## 4. Communication Settings

Parameter	Value
Protocol	Modbus-RTU
Baud Rate	9600 bps
Data Bits	8
Parity	None
Stop Bits	1
Default Address	0x01

RS485 is half-duplex. Use shielded twisted-pair cable, keep the bus below 1200 m, and terminate long runs as needed.

## 5. Register Map

### Measurement Registers (Function 0x03)

Address (Hex)	Description	Data Type	Range	Scaling
0x0000	Gas Concentration	UINT16	0-65535	Value ÷ 10^(decimals)
0x0011	Resolution (decimal places)	UINT16	0-3	Direct
0x0013	Full-Scale Range	UINT16	0-65535	Value ÷ 10^(decimals)

On the 0-100 %LEL / 0.1 %LEL unit the decimal-places register (0x0011) reads **1**, so the concentration register (0x0000) is divided by 10 (a raw value of 125 reads as 12.5 %LEL) and the range register (0x0013) reads **1000**.

## 6. Reading Data

Read one register from 0x0000 to obtain the live concentration:

Request: 01 03 00 00 00 01 84 0A

Response: 01 03 02 XX XX [CRC]

### Decoding (decimals = 0):

Register	Hex	Decimal	Scaling	Result
Concentration	0x007D	125	÷ 10	<b>12.5 %LEL</b>

To confirm scaling on any unit, read register 0x0011 for the number of decimal places and divide the raw concentration by 10 raised to that value.

## 7. Address Configuration

The device address is set from the front-panel menu (Settings → Device Address), not over the bus. Assign a unique address to each unit before wiring multiple detectors onto the same RS485 trunk. Example request frames reading concentration from successive addresses:

```
Address 1: 01 03 00 00 00 01 84 0A
Address 2: 02 03 00 00 00 01 84 39
Address 3: 03 03 00 00 00 01 85 E8
```

## 8. Calibration

Calibration is performed from the front-panel menu and must be carried out by trained personnel using certified gas. Recommended interval is at least once every six months.

### Zero Calibration

In clean air with no target gas present, open Calibration → Zero, wait for the reading to stabilise, then save.

### Span Calibration

1. Apply certified CH<sub>4</sub> span gas (a value near 50% of full scale is recommended) to the sensor for 2-3 minutes.
2. Open Calibration → Span and confirm the standard-gas concentration matches the cylinder.
3. Wait for the reading to stabilise, then save.

A menu option restores factory calibration parameters if a setting is changed in error.

## 9. Installation Notes

### Placement

- Methane is lighter than air: mount high, 0.3-0.6 m below the ceiling
- Install above likely release points such as digester covers and valves
- Keep sensor clear of ventilation outlets that dilute readings
- Keep clear of splashing water, oil, and mechanical impact

### Maintenance

- Keep the sensor gas inlet free of dust and deposits
- Recalibrate periodically with certified gas
- Verify alarm and output response after each calibration
- Replace the cell at end of life to maintain accuracy

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