

FGD-112

Fixed Gas Concentration Detector



Overview

The **FGD-112** is a reliable, high-precision gas detection device designed for continuous 24/7 monitoring of gas concentrations in industrial and hazardous environments. Equipped with advanced imported sensors and fast-response processing circuits, it delivers stable signals, high accuracy, and excellent repeatability.

With integrated sound and light alarm functions, the FGD112 provides early warning in the event of gas leaks, helping to protect both personnel safety and property. Its explosion-proof design ensures safe operation in dangerous areas, making it ideal for use in oil & gas facilities, chemical plants, confined spaces, and other high-risk settings.

The detector supports multiple standard signal outputs (e.g., 4–20 mA, RS485 Modbus), allowing seamless integration with alarm systems, PLCs, DCS, and other industrial control platforms.

Features

- Utilizes high-speed, high-precision processing circuits for fast and accurate gas measurement.
- Supports three-wire 4–20 mA and RS485 digital output, enabling real-time communication with control systems or computers.
- Designed for easy on-site maintenance, reducing downtime and service effort.
- Equipped with a clear digital display showing real-time gas concentration values.
- Features an intrinsically safe circuit and explosion-proof housing for enhanced safety and reliability in hazardous environments.

Applications

- Ideal for public sectors such as fire safety, energy, marine, telecom, healthcare, and mining.
- Widely used in petroleum, chemical, and metallurgical industries.
- Suitable for environments requiring continuous gas monitoring and explosion-proof safety.

Technical Specifications

Parameters	Indicators	Unit
Casing Material	Aluminum alloy explosion-proof enclosure	
Protection Level	IP65	
Machine Weight	1.8	Kg
Operating Temperature	-20~ 70	°C
Operating Humidity	10~99%RH (Non-Condensing)	
Screen Display Content	Real-time Measurement Concentration Value	
Unit of Measurement	%LEL, %Vol or mol	
Output	4-20mA or RS485 Signal output	
Operating Voltage	24VDC	
Reference Dimension	183*192*90	mm

Detection Parameters

Detection Parameters	Measurement Range	Resolution	Accuracy	Response Time
CO	0~1000ppm	0.01ppm	±6%FS	T ₉₀ <60s
O ₂	0~25%Vol	0.1%Vol	±3%FS	T ₉₀ <10s
N ₂	0~1000ppm	1ppm	±2%FS	T ₉₀ <40s
H ₂ S	0~100ppm	1ppm	±3%FS	T ₉₀ <30s
Cl	0~10ppm	0.1ppm	±2%FS	T ₉₀ <60s
NO ₂	0~20ppm	0.1ppm	±3%FS	T ₉₀ <30s
SO ₂	0~20ppm	0.1ppm	±3%FS	T ₉₀ <30s
O ₃	0~10ppm	0.1ppm	±6%FS	T ₉₀ <60s
Alcohol	0~5ppm	0.01ppm	±10%FS	T ₉₀ <60s
CO ₂	0~5000ppm	1ppm	±3%FS	T ₉₀ <60s
H ₂	0~1000ppm	1ppm	±3%FS	T ₉₀ <60s
ETO	0~20ppm	0.01ppm	±2%FS	T ₉₀ <120s
PH ₃	0~20ppm	0.1ppm	±2%FS	T ₉₀ <60s
ClO ₂	0~50ppm	0.05ppm	±2%FS	T ₉₀ <60s
NO	0~250ppm	0.5ppm	±2%FS	T ₉₀ <40s
CH ₄	0~100%LEL	1%LEL	±5%FS	T ₉₀ <10s

Wiring Method

4-20mA output

Red	24V power supply positive
Green	24V power supply negative
Blue	4-20mA output.

Rs485 output

Red	24V power supply positive
Black	24V power supply negative
Yellow	Rs485 A
Green	Rs485 B

Communication Protocol

Communication Properties

Baud rate	default is 9600
Start bit	1 bit
Data length	8 bits
Parity type	none
Stop bit	1 bit

Format of command sent by the host station

Address field	Function code	Starting register address	Number of registers to read	CRC check lower byte	CRC check upper byte
Occupies 1 byte	Occupies 1 byte	Occupies 2 bytes	Occupies 2 bytes	Occupies 1 byte	Occupies 1 byte
(0~255)	0x03/0x06	High byte, low byte	High byte, low byte	CRC lower byte	CRC upper byte

Function Code

Data Type	Function Code		Function Code	Comments
	Decimal	Hexadecimal		
(Byte)	3	0x03	Read Holding Registers	Reads internal information from the detector (e.g. concentration).
	6	0x06	Write Single Register	Writes information to the detector (e.g. modify low value).

Address description

Data Type	Function Code		Address	Register Description	
	Decimal	Hexadecimal			
Word	3	0x03	0x00	0x00	Concentration (PM2.5)
				0x01	Concentration (PM10)
				0x02	State
				0x03	Gas Type
				0x04	Precision
	6	0x06	0x00		

Status Indication

Status Register	Comment
0	Preheat
1	Normal
2	Warning
3	Level 1 Alarm (Oxygen: Low)
4	Level 2 Alarm (Oxygen: High)

Precision Processing

Precision	Comment
0	No decimal point (divide by 1).
1	One decimal place (divided by 10).
2	Two decimal places (divided by 100)
3	Three decimal places (divided by 1000)

Data Calculation

PM2.5 Reading – Single Register

Step	Description	Value
Upper computer sends	Detector address	01
	Command (Read Holding Register - 0x03)	03
	Register address (PM2.5)	00 00
	Number of registers to read	00 01
	CRC Check	84 0A
Upper computer receives	Detector address	01
	Command	03
	Byte count	02
	High byte of PM2.5	00
	Low byte of PM2.5	00
	CRC Check	B8 44
Calculation	$PM2.5 = (\text{High byte} \times 256 + \text{Low byte}) / \text{precision}$	$(00 \times 256 + 00) / \text{accuracy}$

PM2.5 and PM10 Reading – Two Registers		
Step	Description	Value
Upper computer sends	Detector address	01
	Command (Read Holding Register - 0x03)	03
	Register address (PM2.5)	00 00
	Number of registers to read	00 02
	CRC Check	C4 0B
Upper computer receives	Detector address	01
	Command	03
	Byte count	04
	High byte of PM2.5	00
	Low byte of PM2.5	07
	High byte of PM10	00
	Low byte of PM10	08
	CRC Check	4A 34
Calculation	$PM2.5 = (00 \times 256 + 07) / \text{accuracy}$	$PM2.5 = 7 \mu\text{g}/\text{m}^3$
	$PM10 = (00 \times 256 + 08) / \text{accuracy}$	$PM10 = 8 \mu\text{g}/\text{m}^3$

Table of Gas Type

Item	Code Number	Gas
1	0x01	CH ₄
2	0x02	NH ₃
3	0x03	H ₂ S
4	0x04	CO
5	0x05	O ₂
6	0x06	H ₂
7	0x07	C ₂ H ₆
8	0x08	C ₂ H ₄
9	0x09	C ₂ H ₂
10	0x0A	C ₃ H ₈
11	0x0B	C ₃ H ₆
12	0x0C	C ₄ H ₁₀
13	0x0D	C ₄ H ₈
14	0x0E	Particulate Matter
15	0x0F	Light oil
16	0x10	Heavy oil
17	0x11	Petrol
18	0x12	Diesel oil
19	0x13	Kerosene
20	0x14	CH ₃ OH
21	0x15	C ₂ H ₅ OH
22	0x16	(CH ₃) ₂ CHOH
23	0x17	HCHO
24	0x18	C ₃ H ₇ CHO
25	0x19	C ₃ H ₆ O
26	0x1A	CH ₃ COC ₂ H ₅
27	0x1B	C ₆ H ₆
28	0x1C	C ₇ H ₈

Item	Code Number	Gas
29	0x1D	C ₈ H ₁₀
30	0x1E	C ₈ H ₈
31	0x1F	C ₆ H ₅ OH
32	0x20	C ₄ H ₁₀ O
33	0x21	C ₂ H ₆ O
34	0x22	Petroleum ether
35	0x23	C ₂ H ₇ N
36	0x24	C ₃ H ₉ N
37	0x25	CH ₃ NO
38	0x26	C ₄ H ₈ O
39	0x27	Ethyl acetate
40	0x28	C ₇ H ₇ Cl
41	0x29	C ₂ H ₄ O
42	0x2A	O ₃
43	0x2B	SO ₂
44	0x2C	NO ₂
45	0x2D	NO
46	0x2E	HCl
47	0x2F	HCN
48	0x30	CO ₂
49	0x31	Cl ₂
50	0x32	Flammable gas

Installation Guide

Installation Method

- Install the detector within 1 meter of potential dust leakage points for faster response.
- Mount the probe ≥30 cm above ground to avoid water splash.
- Probe Orientation:
 - For lighter-than-air dust → Install above equipment.
 - For heavier-than-air dust → Install near the ground.
- Always point the probe downward. For outdoor use, add a rain cover.

Precautions

Coverage:

- Each probe covers 60m² (varies with dust, wind, temp/humidity, and obstructions).

Protection Required:

- Dustproof
- Waterproof
- Heat-resistant (if needed)

Installation:

1. Mount vertically (90° to ground)
2. Protect sensor face

Wiring:

- Use shielded 3-core cable (31.5mm)
- Secure connections at terminals
- Verify wiring before closing

Safety Warnings

- Do **not open/modify** the device—contact support for issues.
- Avoid unauthorized repairs or power sources.
- Regular calibration is required.
- Follow safety protocols in **explosive (e.g., methane) environments**.