

Industrial Gas Sensor Module Series



ZDG4 series

Product User Manual V1.3

Henan Duotesi Electronic Technology Co., LTD.

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Overview

The ZDG4 series gas sensor module is a versatile, intelligent, and miniature sensor. It can be equipped with gas sensors based on various principles, including semiconductor, catalytic combustion, electrochemical, infrared, and PID. The module supports output options such as UART (standard), I2C (optional), linear analog voltage (optional), and PWM (optional). This sensor module features mature gas sensors and high-performance processors. It transmits the sensor's concentration data to the host computer via the UART interface using the Modbus protocol. It also offers an optional linear voltage signal. Both digital and analog voltage signals have been calibrated.

characteristic :

- High sensitivity, fast response speed, no preheating, the customer's upper computer can add preheating, recommended 180s
- Both standard output and digital output are available
- Multi-protocol support for digital output, standard modbus and compatible simple protocols.
- Fast response and recovery
- temperature compensation
- long term stability
- Long service life and anti-poisoning
- Resistance to water vapor interference

Main applications:

- Detection of gas concentration in industrial and commercial environments

Indicator

working voltage	4.5~5 .5V DC
working current	<150mA (current size depends on sensor type) Electrochemistry <5mA Semiconductors <100mA Catalytic combustion <160mA Infrared <100mA PID<50mA
measuring range	The factory release has been set, subject to actual conditions
output signal	(Optional) 0.4~2V DC, PWM (Standard) UART (digital) 3.3V level, optional I2C
resolution ratio	1%FSD
preheating time	0s
response time	T90<30s
accuracy	±5%F.S

temperature range	-20°C ~60°C
Humidity range	0~95%RH (no condensation)
life span	More than 5 years
size	66mm*44mm
weight	< 300g

Ordering parameters of toxic and harmful gas sensor module

Order model	Gas type	range	Underre porting	Overrep orting	unit	remarks
Carbon monoxide	CO	0-1000ppm	35	200	ppm	Electrochem ical principles
Hydrogen sulfide	H2S	0-100ppm	10	15	ppm	Electrochem ical principles
oxygen	O2	0-30%	19.5	23.5	%VOL	Electrochem ical principles
ammonia	NH3	0-100 ppm	25	35	ppm	Electrochem ical principles
Sulfur dioxide	SO2	0-20.0PPM	2.0	5.0	ppm	Electrochem ical principles
Nitrogen dioxide	NO2	0-20.0PPM	3.0	5.0	ppm	Electrochem ical principles
chlorine gas	Cl2	0-20.0 ppm	0.5	1.0	ppm	Electrochem ical principles
chlorine dioxide	ClO2	0-20.0 ppm	0.1	0.2	ppm	Electrochem ical principles
phosphine	PH3	0-10.0 ppm	1.0	3.0	ppm	Electrochem ical principles
Hydrogen chloride	HCL	0-10 ppm	2.0	5.0	ppm	Electrochem ical principles

Hydrogen cyanide	HCN	0-50.0ppm	2.0	5.0	ppm	Electrochemical principles
Ethylene oxide	ETO	0-20 ppm	1.0	5.0	ppm	Electrochemical bias
formaldehyde	CH ₂ O	0-5 .00ppm	0.1	1.0	ppm	Electrochemical principles
Nitric oxide	NO	0-250ppm	25	50	ppm	Electrochemical principles
methanethiol	CH ₃ SH	0-10 ppm	1.0	5.0	ppm	Electrochemical principles
methanethiolate	CH ₆ S	0-10 ppm	1.0	5.0	ppm	Electrochemical principles
ozone	O ₃	0-10.0 ppm	0.1	0.3	ppm	Electrochemical principles
hydrogen	H ₂	0-1000ppm	200	500	ppm	Electrochemical principles
Hydrogen fluoride	HF	0-10.0ppm	1.0	3.0	ppm	Electrochemical principles
ethylene	C ₂ H ₄	0-100ppm	20	50	ppm	Electrochemical principles
Toluene	C ₇ H ₈	0-100ppm	20	50	ppm	semiconductor
petroleum ether	PE	0-100ppm	20	50	ppm	semiconductor
cyclohexane	C ₆ H ₁₂	0-100ppm	20	50	ppm	semiconductor
phosgene	COCl ₂	0-20.0 ppm	0.5	1.0	ppm	Electrochemical principles
Carbon dioxide	CO ₂	0-5%VOL			%VOL	NDIR

Gas sensor module order parameter table

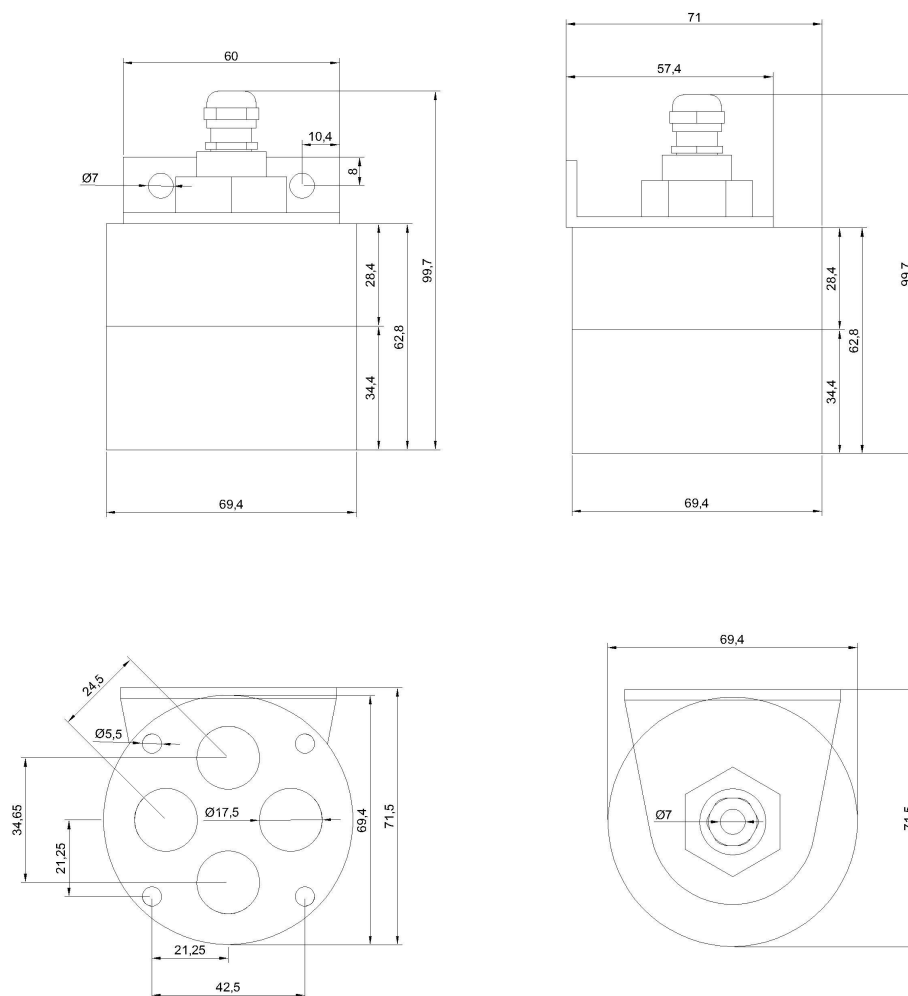
Order model	Gas type	range	Underr eportin g	Overrep orting	unit	remarks
flammable gas	LEL	0-100%LEL	20	50	%LEL	Catalytic combustion, infrared principle is optional
methane	CH4	0-100%LEL	20	50	%LEL	Catalytic combustion, infrared principle is optional
liquefied gas	LNG	0-100%LEL	20	50	%LEL	Catalytic combustion, infrared principle is optional
alcohol	C2H5OH	0-100%LEL	20	50	%LEL	catalytic combustion
leak detection	ppm	0-1000ppm	1000	5000	ppm	Principle of semiconductor
H2	H2	0-100%LEL	25	50	%LEL	Catalytic combustion, electrochemical optional
Acetylene	C2H2	0-100%LEL	20	50	%LEL	catalytic combustion
oil and gas	OIL	0-200 ppm	20	100	ppm	PID photoion

VOC gas sensor module order parameter table

Order model	Gas type	range	Underre porting	Overrep orting	unit	remarks
Organic Volatile compounds	ppm	0-10.00ppm	1.00	3.00	ppm	Semiconductors , electrochemistr y optional
Organic Volatile compounds	ppm	0-1000ppm	100	300	ppm	Semiconductors , electrochemistr y optional
Organic Volatile compounds	ppm	0-200ppm	20	50	ppm	PID photoion
Organic Volatile compounds	ppm	0-2000ppm	100	300	ppm	PID photoion

Note: It is marked as conventional gas type and supports semiconductor, catalytic combustion, electrochemical, infrared, PID photoionization and other principle gas sensors.

Structure



Unit: mm

Wire harness color	Wiring definition
Red	V+
Black	V-
Yellow	RX
Green	TX

Output

Analog voltage output

The default simulated point voltage output is the original signal of the sensor. The optional Vout output voltage range (0.4~2V) corresponds to the gas concentration (0~full scale), and the optional PWM output (0~100% duty cycle) corresponds to the gas concentration (0~full scale)

Serial port output (UART)

Hardware connection

Connect the +, -, R and T of the sensor to the user's 5V-GND-TXD-RXD respectively. (The user must use TTL level, if it is RS232 level, it must be converted). The gas concentration value can be read directly through the UART interface of the sensor without calculation.

Protocol

Inquiry reporting mode (standard Modbus protocol)

Set the serial port baud rate to 9600, data bit to 8 bits, stop bit to 1 bit, and parity check bit to no.

The Modbus-RTU communication protocol is adopted, and the format is as follows:

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

Address code: the address of the sensor (1~255), which is unique in the communication network (default 0x01 at factory).

Function code: function indication of the instruction issued by the host. This sensor uses function code 0x03 (read register data).

Data area: The data area is the specific communication data. Note that the high byte of 16bits data is in front!

CRC code: a two-byte check code with the lower bits first and the higher bits last.

Host inquiry frame structure:

address code	FC	The starting address of the register	register length	Check code low	Check code high
One byte	One byte	Two bytes	Two bytes	One byte	One byte

Sensor response frame structure:

address code	FC	Number of valid bytes	Data Zone 1	Second data area	Data area N	check code
--------------	----	-----------------------	-------------	------------------	-------------	------------

One byte	One byte	One byte	Two bytes	Two bytes	Two bytes	Two bytes
----------	----------	----------	-----------	-----------	-----------	-----------

For example, the sensor responds to the data sent by the host as follows:

Host query: 01 03 00 00 00 0A C5 CD

Sensor response: 010314000000000064012C07D000050000000045000000B687

- (1). 01: sensor address; (the first bit)
- (2). 03: Read data; (2nd bit)
- (3). 14: The number of data represents the 20byte data (excluding CRC check code) that follows; (the third bit)
- (4). 0000: indicates that the numerical unit is PPM, without decimal point, and the current concentration, low report, high report, and range are 17 and 18 bits (see parameter bit definition table); (register 00)
- (5). 0000: The current gas concentration is 0; (register 01)
- (6). 0064: The low alarm threshold is 100; (register 02)
- (7). 012C: The high alarm threshold is 300; (register 03)
- (8). 07D0: Gas range is 2000; (Register 04)
- (9). 0005: Sensor operating state 0x05 is the low report state (see status word definition table) (register 05)
- (10). 0000: Real-time AD value of sensor; (Register 06)
- (11). 0000: ambient temperature value; (Register 07) 25.5°C (the data does not include the decimal point, the temperature is equal to the value of the register minus 500 and divided by 10) Note: If it is a temperature and humidity module, the value is the same as that of register 01.
- (12). 45: Convert 10 to 69 and represent it as PH3 gas (see gas type table); (Register 08 high 8 bits)
- (13). 00: Carry bit; (low 8 bits of register 08)
- (14). 0000: environmental humidity value; (register 09) 60.8% (the data does not include the decimal point, the humidity value is equal to the register value divided by 10) Note: If it is a temperature and humidity module, the value is the same as that of register 06.
- (15). B687: CRC check code;

Mapping of 10 registers

Register number	Logical address (hexadecimal)	Register value description	remarks
0	0X00 0X00	Binary parsing of register values: Numerical unit: bit15--12 Decimal point: bit11-8 Retention bits: bit7-0	
1	0X00 0X01	Current gas concentration	
2	0X00 0X02	Set the low value	

3	0X00 0X03	Set the high report value	
4	0X00 0X04	Full range values	
5	0X00 0X05	Sensor status (low 8 bits)	
6	0X00 0X06	Real-time AD value of the sensor	
7	0X00 0X07	Ambient temperature value	
8	0X00 0X08	Gas type	
9	0X00 0X09	ambient humidity	

1.1. Register 0 value definition

Numerical definition table (binary)

Bit12-15	Bit8-11
0000: ppm	radix point
0010: %LEL	000: No decimal places
0100: %VOL	0100: A decimal
0110: mg/m3	1000: two decimal places
1000: ppb	1100: three decimal places
1010: °C	

1.2. Status state definition

Register 05 status word definition table (hexadecimal)

status word	operative mode	status word	operative mode
00	preheat	08	outrange
01	normal	09	It needs to be calibrated

02	Data error	0A	overtime
03	Sensor malfunction	0B	stel report to the police
04	early warning	0C	twa report to the police
05	Underreporting	0D	continue to have
06	Overrated	0E	continue to have
07	Access failure	0F	Communication failure

1.3. Gas type

Register 08 gas type table (decimal order)

order number	Gas type	order number	Gas type	order number	Gas type	order number	Gas type
0	NULL	30	C4H8O2	60	NO2	90	continue to have
1	AR	31	C4H8S	61	NOX	91	continue to have
2	ASH3	32	C4H10	62	NF3	92	continue to have
3	B2H6	33	C4H10O	63	NH3	93	continue to have
4	BR2	34	C5H12	64	N2	94	continue to have
5	CO	35	C6H6	65	N2O	95	continue to have
6	CO2	36	C6H6S	66	N2H4	96	continue to have
7	COCL2	37	C6H12	67	O2	97	continue to have
8	CH2O	38	C6H14	68	O3	98	continue to have
9	CH2O2	39	C7H8	69	PH3	99	continue to

							have
10	CH3BR	40	C7H16	70	PID	100	continue to have
11	CH4	41	C8H8	71	P2O5	101	continue to have
12	CH4O	42	C8H10	72	SO2	102	continue to have
13	CH4S	43	C8H18	73	SO2F2	103	continue to have
14	CH5N	44	CS2	74	SIH4	104	continue to have
15	CH6O	45	EX	75	SIF4	105	continue to have
16	CIC	46	ETO	76	SF6	106	continue to have
17	CL2	47	F2	77	THT	107	continue to have
18	CLO2	48	FX	78	TVOC	108	continue to have
19	C2CL4	49	GEH4	79	VOC	109	continue to have
20	C2HCL3	50	H2	80	VOCS	110	continue to have
21	C2H2	51	H2O2	81	SO3	111	continue to have
22	C2H3CL	52	H2S	82	NMHC	112	continue to have
23	C2H	53	HCL	83	temperature	113	continue to have
24	C2H4O	54	HCN	84	humidity	114	continue to have
25	C2H6O	55	HBR	85	wind speed	115	continue to have

26	C3H3N	56	HE	86	wind direction	116	continue to have
27	C3H6O	57	HF	87	rainfall	117	continue to have
28	C3H8	58	I2	88	noise	118	continue to have
29	C3H8O	59	NO	89	continue to have	119	continue to have

Appendix I

Compatibility with simple protocols (refer to other manufacturers' protocols, not recommended)

Set the serial port baud rate to 9600, set the data bit to 8 bits, set the stop bit to 1 bit, and set the parity check bit to no.

List and meaning of protocol command interfaces	
0x86	Read the gas concentration value
0x87	Calibrate the sensor zero (ZERO)
0x88	Calibration of the sensor Span point (SPAN)

0x86-Read the gas concentration value								
Send the command								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor number	order	-	-	-	-	-	Check value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	0x79
returned value								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor number	order	High concentration values	Low concentration values	-	-	-	Check value
0xFF	0x01	0x86	0x00	0xD1	0x00	0x00	0x00	0xA8
Gas concentration value = HIGH * 256 + LOW								

0x87-Calibrate the sensor zero point								
Send the command								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor number	order	-	-	-	-	-	Check value
0xFF	0x01	0x87	0x00	0x00	0x00	0x00	0x00	0x78
The sensor has no return value								

0x88-Calibrate the sensor span value

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	Sensor number	order	Span is high Position	Span is low Position	-	-	-	Check value
0xFF	0x01	0x88	0x07	0xD0	0x00	0x00	0x00	0xA0
The sensor has no return value								

Checksum and calculation method (LRC checksum)								
Checksum = (not (Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7)) + 1								
example :								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	number	order	-	-	-	-	-	Check value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	checksum

The calculation is as follows:								
1. From Byte1 to Byte7: 0x01 + 0x86 + 0x00 + 0x00 + 0x00 + 0x00 + 0x00 = 0x87								
2. Take the inverse: 0xFF-0x87 = 0x78								
Add 1 to the inverse: 0x78 + 0x01 = 0x79								
C language checksum routine								

```
char getChecksum(char *packet)
```

```
{
    char i,
    checksum;
    for( i
    = 1; i
    < 8;
    i++)
    {
        checksum += packet[i];
    }
    checksum = 0xff
    - checksum;
    checksum += 1;
    return checksum;
}
```

Appendix II

Compatible with Modbus protocol (refer to other manufacturers' protocols, not recommended)

register declaration

logical address	register declaration	Number of registers	remarks	pattern
0x2011	Module communication ID	1	Modbus communication address 0-255	read and write
0x2027	Name of gas	1		read only
0x2028	temperature scale	1		read only
0x2029	Underreporting	1		read only
0x202A	Overreporting	1		read only
0x202B	Gas range	1		read only
0x202C	Humidity	1		read only
0x202D	operative mode	1		read only
0x202E	Gas concentration value	1		read only
0x202F	Real-time AD value	1		read only
0x2030	Gas unit	1		read and write
0x2031	Number of decimal points	1		read and write
0x6000	operative mode	1		read only
0x6001	Gas concentration value	1		read only
0x6002	Real-time AD value	1		read only

Start: 01 03 20 27 00 0B BF C6 // module ID=0x01 reads 11 (0x0B) consecutive register values from register 0x2027;

Write: 01 03 60 01 00 01 CB CA // module ID=0x01 Read one register value (gas concentration value) from register 0x6001;

Send: 01 10 4F FF 00 01 02 55 AA B3 B4 // module ID=0x01 Send unlock write protection 0x4FFF

Return: 01 10 4F FF 00 01 27 2D // module ID=0x01 unlock write protection return data Return:

01 10 4F FF 00 01 27 2D // module ID=0x01 unlock write protection return data

Send: 01 10 20 11 00 01 02 00 01 45 13 // module ID=0x01 Send module ID write instruction 0x2011

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Return: 01 10 20 11 00 01 5A 0C // Module ID=0x01, module ID write instruction returns data

Return: 01 10 20 11 00 01 5A 0C // Module ID = 0x01, module ID write instruction returns data

Broadcast command: 0xFF to change the module address (module address unknown)

FF 10 4F FF 00 01 02 55 AA FB D0 // module ID=0xXX sends unlock write protection 0x4FFF

Return: FF 10 4F FF 00 01 32 F3 // module ID=0xXX unlock write protection return data Return:

FF 10 4F FF 00 01 32 F3 // module ID=0xXX unlock write protection return data

FF 10 20 11 00 01 02 00 01 0D 77 // module ID=0xXX Send the module ID write instruction 0x2011 and modify the ID to 0x01

Return: FF 10 20 11 00 01 4F D2 // Module ID = 0xXX, module ID write instruction returns data

Appendix III (Debugging Protocol)

Sensor debugging protocol

1. query and pivot

0X74 queries the real-time AD value of the sensor

Format of the A host query command

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X74	0X00	0X00	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X74	AD price Eight places high	AD price Low 8 bits	0X00	0X00	0X00	0X00	check bit

2. Set the parameter working mode (set status: 0X50 success, 0X51 failure)

2.1. 0X84 sets the low reporting value of the sensor

Set the command format for host A

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X84	Underreporting Eight places high	Underreporting Low 8 bits	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X84	0X00	0X50	0X00	0X00	0X00	0X00	check bit

2.2. 0X85 sets the high alarm value of the sensor

Set the command format of host A

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X85	High report Eight places high	Overrated Low 8 bits	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X85	0X00	0X50	0X00	0X00	0X00	0X00	check bit

2.3. Set the sensor baud rate on 0X86

Set the command format for host A

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X86	Baud rate Eight places high	Baud rate Low 8 bits	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X86	0X00	0X50	0X00	0X00	0X00	0X00	check bit

2.4. 0x7C query the detector to calibrate the concentration value of one point

Format of the A host query command

0	1	2	3	4	5	6	7	8	9	10
start bit	prober	main engine	order 0x7C	0x00	0x00	0x00	0x00	0x00	0x00	check bit

0xFF	address	address								
------	---------	---------	--	--	--	--	--	--	--	--

B Detector return command format

0	1	2	3	4	5	6	7	8	...	45
start bit 0xFF	main engine address	prober address	order 0x7C	potency Eight places high	potency Low 8 bits	0x00	0x00	0x00	0x00	check bit

2. 5. 0X8B sets the sensor passive query mode (standard modbus protocol format setting)

The command format for setting host A is 0X52

0	1	2	3	4	5	6	7	8	9	10
start bit 0xFF	sensor address	main engine address	order 0X8B	query 0X00	query 0X52	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0xFF	main engine address	sensor address	order 0X8B	0X00	0X50	0X00	0X00	0X00	0X00	check bit

2. 6. 0X8B sets the sensor active reporting mode (standard modbus protocol format setting)

The command format for setting host A is 0X53

0	1	2	3	4	5	6	7	8	9	10
start bit 0xFF	sensor address	main engine address	order 0X8B	query 0X00	query 0X53	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

start bit 0XFF	main engine address	sensor address	order 0X8B	0X00	0X50	0X00	0X00	0X00	0X00	check bit
----------------------	---------------------------	-------------------	-----------------------	------	------	------	------	------	------	--------------

3. Set the calibration mode

3.1. 0X90 calibrates the sensor zero point

Set the command format of host A

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X90	0 Concentration Eight places high	0 concentration Low 8 bits	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X90	0X00	0X500	0X00	0X00	0X00	0X00	check bit

3.2. 0X91 calibrates the sensor concentration point

Set the command format for host A

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	sensor address	main engine address	order 0X91	1 concentration Eight places high	1 concentration Low 8 bits	0X00	0X00	0X00	0X00	check bit

The B sensor returns the command format

0	1	2	3	4	5	6	7	8	9	10
start bit 0XFF	main engine address	sensor address	order 0X91	0X00	0X50	0X00	0X00	0X00	0X00	check bit

4. Modify the sensor address

Set the new address of the sensor in broadcast mode.

Supercommand to change address (red is the address)		
	transmit by radio	return
query	FF EE 01 CC 00 00 00 00 00 00 45	FF 01 01 CC 00 01 00 00 00 00 31
Setting: Address 01	FF EE 01 DD 00 01 00 00 00 00 33	FF 01 01 DD 00 50 00 00 00 00 D1
Setting: Address 02	FF EE 01 DD 00 02 00 00 00 00 32	FF 01 02 DD 00 50 00 00 00 00 D0
Settings: Address 03	FF EE 01 DD 00 03 00 00 00 00 31	FF 01 03 DD 00 50 00 00 00 00 CF
Settings: Address 04	FF EE 01 DD 00 04 00 00 00 00 30	FF 01 04 DD 00 50 00 00 00 00 CE
Setting: Address 05	FF EE 01 DD 00 05 00 00 00 00 2F	FF 01 05 DD 00 50 00 00 00 00 CD
Settings: Address 06	FF EE 01 DD 00 06 00 00 00 00 2E	FF 01 06 DD 00 50 00 00 00 00 CC
Setting: Address 07	FF EE 01 DD 00 07 00 00 00 00 2D	FF 01 07 DD 00 50 00 00 00 00 CB
Settings: Address 08	FF EE 01 DD 00 08 00 00 00 00 2C	FF 01 07 DD 00 50 00 00 00 00 CA

5. Multiple gas sensor

inquiry (modbus protocol)

(Note: When multiple address sensing is polled, it is recommended to inquire about each address 3 times with an interval of more than 500ms)

Example: Single inquiry

01 03 00 00 00 0A C5 CD

Four gas polling:

01 03 00 00 00 0A C5 CD

02 03 00 00 00 0A C5 FE

03 03 00 00 00 0A C4 2F

04 03 00 00 00 0A C5 98

Six gas polling:

01 03 00 00 00 0A C5 CD

02 03 00 00 00 0A C5 FE

03 03 00 00 00 0A C4 2F

04 03 00 00 00 0A C5 98

05 03 00 00 00 0A C4 49

06 03 00 00 00 0A C4 7A

Eight gas polling:

01 03 00 00 00 0A C5 CD

02 03 00 00 00 0A C5 FE

03 03 00 00 00 0A C4 2F

04 03 00 00 00 0A C5 98

05 03 00 00 00 0A C4 49

06 03 00 00 00 0A C4 7A

07 03 00 00 00 0A C5 AB

08 03 00 00 00 0A C5 54

Note: For more address polling, follow the example above

Checksum and calculation method (LRC checksum)								
Checksum = (not (Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7)) +1								
example :								
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Start byte	number	order	-	-	-	-	-	Check value
0xFF	0x01	0x86	0x00	0x00	0x00	0x00	0x00	check sum
The calculation is as follows: 1. From Byte1 to Byte7: $0x01 + 0x86 + 0x00 + 0x00 + 0x00 + 0x00 + 0x00 = 0x87$ 2. Take the inverse: $0xFF - 0x87 = 0x78$ Add 1 to the inverse: $0x78 + 0x01 = 0x79$								
C language checksum routine								
<pre> char getChecksum(char *packet) { char i, check sum; for(i = 1; i < 8; i++) { checksum += packet[i]; } checksum = 0xff - checksum; </pre>								

```
checksum += 1;  
return checksum;  
}
```