Nanjing AIYI Technologies Co., ltd.

Operator's Manual

AG310/AG311

AF110/AF111

Version : V1.5

Dear customer：

Glad to have your trust and support on AIYI Technologies, we will provide you best product and service in return.

As an ISO certified manufacturer. AIYI Technologies has been focus on safety and environment many years, we provide you gas & dust detector and systems. The design and manufacture of product is strictly follow the international standard and company regulations, and each product get a normative QC control to ensure the best quality for you.

Please read and understand this operator's manual before operating instrument. Improper use of the gas monitor could result in bodily harm or death. Please don't hesitate to contact us if you have any questions or suggestions. Thanks!

We are honored to have the opportunity to serve you.

Yours sincerely,

Dongxu Zhang
Vice-Gerneral Manager
Nanjing AIYI Technologies Co., Ltd.

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Statement

Thanks for purchasing AIYI Technologies products, please contact us anytime if you have questions or requests.

The manual is applicable to the use of AG & AF series gas detector.

There may be technical inaccuracies, or typographical errors etc. in the manual. We will update the contents including description of products and program due to the enhancement of products function. The updates will be in the new version of the manual without notice.

Attention: Before connecting and operating your device, please be advised of the manual.

Contact Us

Nanjing AIYI Technologies Co., Ltd.

Address: Building 13, No. 1318 Qingshuiting East Road, Jiangning District,

Nanjing 210000, Jiangsu, China

Tel：0086-25-87756351

Fax：0086-25-87787362

Web：www.aeindustry.com www.autequ.com

Email：sales@autequ.com

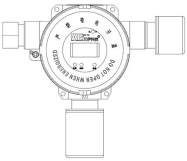
CONTENT

1. 3. Specifications

Model	AG310/AF110	AG311/AF111
Gas Detected	combustible gas/toxic gas/VOC	
Principle	catalytic combustion/electrochemical/infrared/PID	
Response Time	≤30S T90	
Accuracy	≤±5% F.S	
Repeatability	≤3%F.S	
Ambient Temp.	-40℃~+70℃	
Humidity	≤93%RH	
Power Supply	24VDC（workable voltage：18VDC~28VDC）	
Relay Output	two relays（250VAC/5A 30VDC/5A）	
Cable	RVVP3*1.5	RVVP4*1.0
Signal Output	4~20mA	RS485
Ex-grade	Ex dib ⅡC T6 Gb	
Ingress Protection	IP66	
Conduit Port	G1/2 hexagonal locknut	
Dimensions	170mm*180mm*100mm	
Body Material	316L S/S, ADC12 die-cast aluminum	
Weight	≈2.30kg (81.13oz)	

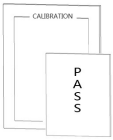
Chapter 2: Installation

2. 1. Packing list



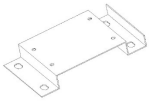
DETECTOR *1

MANUAL *1



CERTIFICATE *1

REMOTE CONTROL *1



MOUNTING PLATE *1

BOLTS *1

2. 2. Cautions

- Check if the Ex-mark is consistent with the site condition and if any appearance of obvious cracks and other defects, to ensure the perfect explosion-proof performance.
- The detector shall connect to the corresponding controller, and it is forbidden to connect with other brands or models' controller; The controller must be installed in a non-hazardous area.
- Keep the power off during installation, and ensure that the ambient temperature and humidity are in accordance with the detector's operating requirements.
- The detector is design for gas leak detection. Without permission of manufacturer, it is forbidden to use for other purposes such as internal of pipelines.
- The ingress protection grade of detector is IP66, there is no need for rain cover; keep the sensor downward and no painting and block on it.
- Keep the detector far away from the high-power equipment.
- Catalytic combustion sensor require oxygen in air, the absence of oxygen may cause the readings lower than the actual. The detector will not work properly in the oxygen below 10%VOL.

Chapter 1: Product Introduction

1.1. Brief introduction

AG310/AF110, AG311/AF111 series of gas detector is made by Nanjing AIYI Technologies Co., Ltd. independent research and development of a new generation of gas detector.

Products through the Ministry of Public Security Fire Product Conformity Assessment Center CCC fire certification, measurement equipment production license CMC certification, PCEC electrical products explosion-proof certificate and many other qualifications. Products using a new front alarm aperture design, which can effectively alert the risk of various types of gas leakage. Product selection of high-precision sensors, accurate detection, modular design, easy maintenance, with infrared remote control, can be achieved without open cover operation. IP66 protection class can be applied to all kinds of bad occasions.

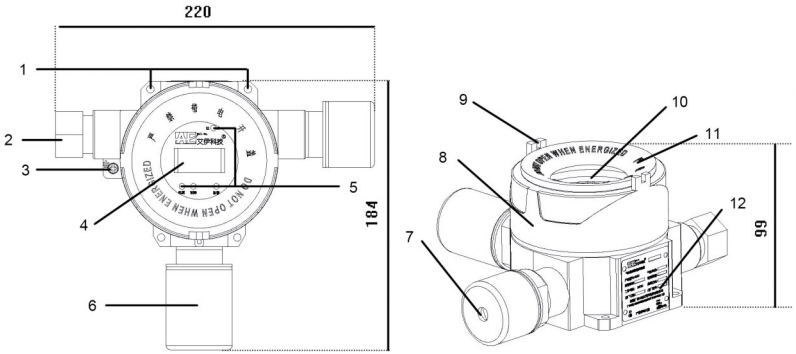
The product design, manufacture, testing follow the following national standards:

- GB15322.1-2003 *Combustible gas detectors--Part 1:Point type detectors for 0 ~100% LEL combustible gas*
- GB 3836.1-2010 *Explosive atmospheres—Part 1:Equipment—General requirements*
- GB 3836.2-2010 *Explosive atmospheres—Part 2:Equipment protection by flameproof enclosures"d"*
- GB 3836.4-2010 *Explosive atmospheres—Part 4:Equipment protection by intrinsic safety i*
- GB/T 4208-2008 *Degrees of protection provided by enclosure(IP code)*
- Explosion proof certificate number: CE.16.1058X

This series includes the following models:

Model	Signal Output
AG310/AF110	4~20mA
AG311/AF111	RS485

1. 2. Description



1, mounting hole 2, wiring hole

3, grounding screw 4, OLED display

5, the indicator light: through the light you can understand the working status of the detector, see details as follows:

Indicator	Status	Descriptions
IR	flashing	this indicator flashes red when the remote control is in operation.
POWER	on	If the power is on, the indicator light is green.
FAULT	on	If a fault has occurred, the indicator light is red.
ALARM	flashing	If the alarm is on, the indicator light is red.

6, sensor module 7, alarm

8, cover 9, slot

10, anti-electromagnetic window 11, light circle

12, nameplate

- It may hardly damage the sensitivity and life of sensor if there are long-existing H2S, halogen elements (fluorine, chlorine, bromine, iodine) and heavy metal' elements.
- Do not touch the internal circuit while wiring, and keep the case reliable grounded.
- The detector shall equip with the origin standard explosion-proof connector (outer diameter: 7.5mm-7.8mm) or others accorded with Ex d IIC in International standard.
- The installation, use and maintenance of the product shall comply with the operator's manual.

2. 3. Installation tools

- cross screwdriver
- anti-static wrist
- multimeter (if required)
- wiring screwdriver
- cable

2. 4. Location selection

The location of the gas detector is critical to achieving the best detection performance. When determining the location, the following factors need to be considered:

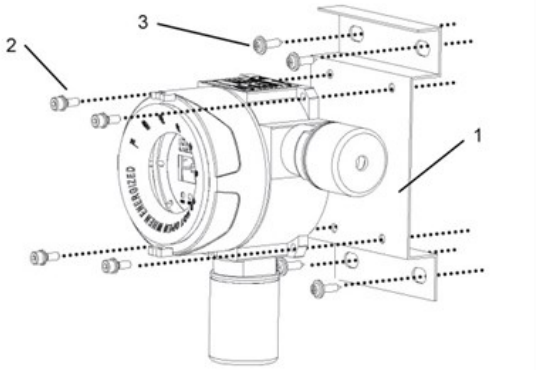
- Comply with design drawings and requirements.
- The detector should be installed at a location where the gas flow is at maximum concentration or as close as possible to the source of gas leakage.
- When installed indoors, if the leak source is outdoors, the detector should be installed at the air inlet.
- Detection range for combustible gas detection: outdoor 15 meters; indoor 7.5 meters
- Detection range for toxic gas detection: outdoor 2 meters; indoor 1 meter
- If gas leak source in closed or semi-closed area which lighter than fresh air, the detector should be install above it, and the highest point which east to accumulate gas.
- Mounting height: If the detecting gas

  Heavier-than-air, should install it at 0.3m-0.6m above the ground;

  Lighter-than-air, should install it at 0.5m-2m above the gas source;

  Similar-to-air, should install it around 1m scale of gas source.
- Detectors should be installed wherever possible without wind, dust, water, shock, vibration, and away from electromagnetic interference.

2. 5. Installation

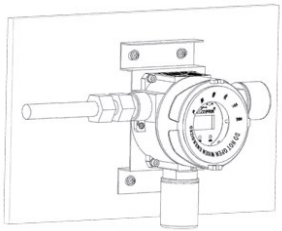


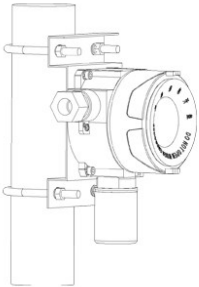
1, mounting plate

2, M5 self-tapping screw

3, M5 expansion screw

The detector is connected to mounting plate by adopting M5 self-tapping screw; There are wall-mount installation and post-mount installation as below:





2. 6. Wiring

Power supply

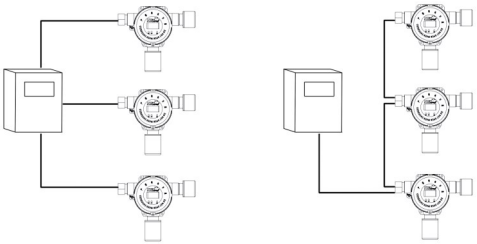
The standard operating power of the detector is 24VDC, workable range from 15-30VDC (considering the resistance of cable, please ensure the power voltage is not less than 18VDC). If the detector direct access to DCS or PLC system, please ensure that the resistance of entire loop below 300Ω.

For the condition that voltage can not meet the minimum operating voltage of the detector, there is need to install repeaters, explosion-proof boxes and other equipment.

Cable

The cable should be shielded cable, the specific specifications are as follows:

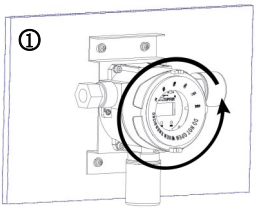
Model	AG310/AF110	AG311/AF111
Output Signal	4~20mA	RS485
Applicable Cable	RVVP 3×1.5mm^2	RVVP 4×1.0mm^2
Wiring Method	Branch-system	Bus-system

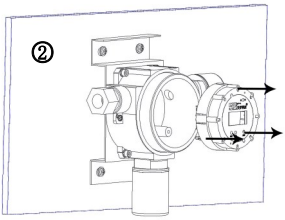


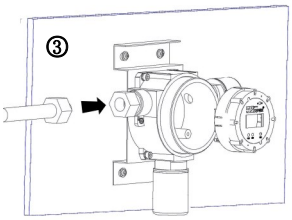
Cautions：Pay attention to the difference of branch-system and bus-system. The wiring should follow international standard and local regulations; advice using the single cable less than 1000m in branch-system, and advice adopt detectors less than 10 sets in bus-system.

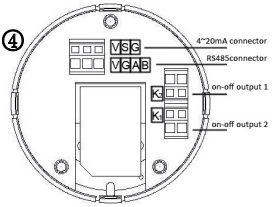
Keep away from power line when wiring in case of signal interference!

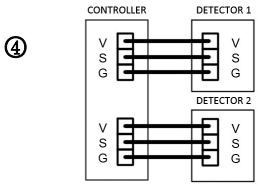
- wiring diagram of detector

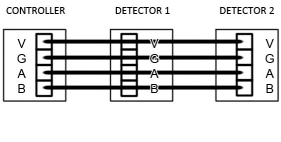












1, unscrew the detector cover counterclockwise.

2, with your fingers buckle the recess around the panel part, slowly pull out the circuit module up. Note that do not operate with violence. Because there are cable links between circuit module and the sensor.

3. Tighten the cable to the desired size, and then unscrew the compression nut, metal gasket and rubber seal of the detector connector. After passing through the parts, the cable is inserted into the detector cavity, and the cable is tightened with the tightening nut.

4, Unplug the terminal according to the circuit module's mark, select the corresponding terminal port and connect them, then put them back and re-tighten the cover.

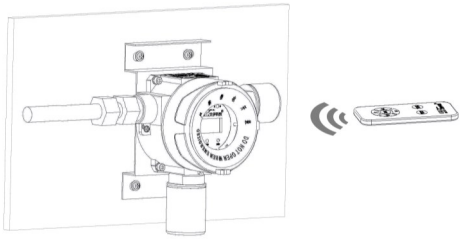
2. 7. Power-on test

Before the system is energized, please verify that the wiring and installation are correct then power up.

Keep at least 20 minutes power on at first time. And take it as normal phenomenon if any alarm happen because the initialization. After the detector work in normal status, it will continuously display the gas concentration and output signal of 4-20mA or RS485.

Chapter 3: Operation and Maintenance

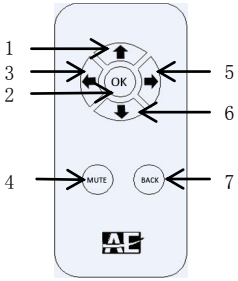
3. 1. Operation



Model AG210/AF110, AG311/AF111 can operate in site without open cover of detector by using the IR remote control. Much safe and easy to operate.

See functions of IR remote control as below:

No.	FUNCTIONS
1	UP
2	OK
3	LEFT
4	MUTE
5	RIGHT
6	DOWN
7	BACK



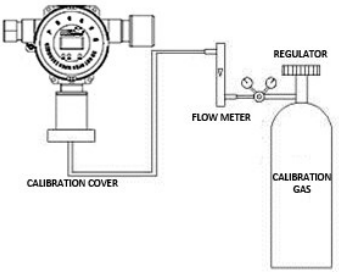
Menu details：

	Options	Description
MENU	1, ALARM SET	Set up high alarm and low alarm; alarm value is already set before out of factory, users are not recommended to modify oneself.
	2, ZERO CAL	Zero calibration
	3, SPAN CAL	Span calibration
	4, 485 ADDR SET	Set up a RS485 address
	5, FACTORY SET	Factory settings; It is forbidden to operate privately.
	6, SAVE & EXIT	Save modification and exit the menu.

3. 2. Calibration

❙ Preparation：

Tools：



1, zero gas: pure N2

2, span gas: 60% F.S.

3, regulator with meter

4, calibration cover

5, flexible pipe： 0.7meters

6, IR remote control

Connect them as above picture shown, and do calibrate when it normally work.

❙ Zero calibration

Advice adopting pure N2 to do zero calibration.

Open the regulator slowly at 0.5L/min, prepare the zero calibration until a stable readings on detector.

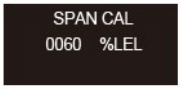
Press ok and enter the menu with password (OK,OK,OK,OK,OK,OK). Then select “ZERO CAL” with “YES” to do zero calibration. In final, select “SAVE & EXIT” to complete it. Advice to re-calibrating two time or more to keep a stable work of the detector.

- Span calibration

Gas in 60% of full measure range is recommended as the span calibration gas.

Open the regulator slowly at 0.5L/min, prepare the span calibration until a stable readings on detector.

Press ok and enter the menu with password (OK,OK,OK,OK,OK,OK). Then select “SPAN CAL”, and setting up the gas concentration (span calibration gas) with “YES” to do span calibration. In final, select “SAVE & EXIT” to complete it. Advice to re-calibrating two time or more to keep a stable work of the detector.



3. 3. Maintenance

- For keeping stable work of detector, advice do calibration every 90 days. Especially in the hard field condition.
- The operation of the detector, calibration and other maintenance work should be carried out by qualified professionals.
- Keep using the recommended calibration gas by the manufacturer.
- Do not open the cover when energized.
- Lighter and high-concentration gas is prohibited to use for testing the detector.
- Replace sensor in time once the sensor life is over.
- Using origin parts provided by manufacturer while the maintenance and the replacement of the parts. The non-company replacement parts may affect the performance and safety of the instrument itself. If the user repair themselves or replace parts themselves, the company will held no responsibility on any problems.
- Keep the instrument clean and if the gas sensor cover (part 6 on page 2) is blocked, it may affects the detection sensitivity and even damage the instrument.

3. 4. Trouble-shooting

FAULTS	REASONS	SOLUTIONS
No output signal	Wrong wiring	Re-wiring
	Wrong power supply	Check power supply
	Circuit fault	Return to factory
Lower readings	Sensor failure	Replace sensor modular
	Need calibration	Re-calibration
	Reading drift	Re-calibration
Higher readings	Sensor failure	Replace sensor modular
	Need calibration	Re-calibration
	Reading drift	Re-calibration
Unstable readings	Sensor failure	Replace sensor modular
	Electromag-netic interference	Check if it's grounded well
	On preheating	Wait a while after power-on
	Calibration failure	Re-calibration
	Circuit fault	Return to factory
Slow response	Sensor failure	Replace sensor modular
	Block on sensor cover	Clean the sensor cover
	Circuit fault	Return to factory

Chapter 4: Appendix

4. 1. Calibration record

Calibration Record

Client _____ Contact _____ Date _____
Name _____ Model _____ ID _____
Factory _____ S/N _____
Add. : □ factory □ site lab Temp. ____℃ Humidity ____%RH Other _____
Standard: □JJG365-2008 □JJG693-2004 □JJG695-2003 □JJG915-2008 □Other

1.Visual & Power-on check : _____

2.Indication Error

Standard	Actual			Average	Results (%FS)
	1	2	3		

3.Repeatability

1	2	3	4	5	6	Results (%)

4.Response Time ⊙

1	2	3	T

5.Alarm Error

Standard	Alarm value	Actual			Average	Results

6.Drift

Time								Zero Drift	Span Drift
Zero Drift									
Span Drift									

☐ Test Conclusion _____
☐ Calibrate Conclusion _____

Calibrated by _____
Confirmed by _____

Nanjing AIYI Technologies Co., Ltd.

ADD: Building 13, No. 1318 Qingshuiting East Road, Jiangning District, Nanjing 210000, Jiangsu, China

TEL: 0086-25-87756351 FAX: 0086-25-87787362

WEB: www.aeindustry.com www.autequ.com

EMAIL: sales@autequ.com