Flame Detector
Operation Manual

Thank you for purchasing our products. **When you are ready to use this product, please be sure to read the instruction carefully and follow the relevant operation steps provided**, so that you can fully enjoy the service provided by our company, and avoid damage to the machine or other accidents caused by incorrect operation. If the user does not follow this manual to install or repair the replacement parts, the resulting liability of our company is not responsible.

Please keep this manual properly so that you can refer to it and get help when you need it in the future.

Symbol definition

Before using the product, please be familiar with the symbol definition possible appears in the operation manual:

 Attention - It's possible hurting yourself or others.

 Caution - It's possible damaging the detector or other equipment.

 Warning - Annotation, use tips or additional information.

User service guide

1. When receiving the device, please check whether the accessories and inspection report certificate are complete. If there is any missing, please contact the vendor or manufacturer immediately.
2. Within 12 months after the product is sold, under the normal operation by following the requirements of storage, transportation and operating, if the product quality is below the technical index, the user can get free services and repairs through the warranty card.
3. If you have any query or dissatisfaction about our product and service, product technology, quality, installation & maintenance, service attitude and charging rates, please contact the vendor or manufacturer in time. Your suggestion will be dealt immediately

Safety Information

Before using the product, please read the following safety information, and follow the related operation requirements.
1. Pay special attention to warnings and precautions.
2. The installation process and operation must strictly abide by relevant national standards.
3. Any operation inside the detector must be performed by trained personnel.
4. Never disassemble or arbitrarily disassemble the internal circuit board or sensor.
5. Do not place the detector at a temperature exceeding the recommended range.
6. Do not place the detector in organic solvents or flammable liquids.

7. When the service life of the detector is reached, it should be handled safely from the perspective of environmental protection and in accordance with the requirements of local waste management and environmental regulations. Or return to our company for centralized harmless treatment.
8. The detector must be reliably grounded, with a marked ground terminal on the internal circuit board and a ground mark on the housing. To prevent the influence of external electromagnetic interference.
9. Before opening the detector housing, in order to reduce the risk of dangerous gas ignition, the power supply must be disconnected.
10. The qualified products are not allowed to replace components or change the structure at will, so as not to affect the explosion-proof performance and product performance.
11. During maintenance, pay attention to protecting the explosion-proof surface. All explosion-proof surfaces must not be damaged or corroded.
If the sealing ring and fastener are damaged, they should be replaced in time.
12. Non-professionals are not allowed to install and disassemble at will.
13. If the product needs to replace internal components due to quality problems, the sealing ring must be restored to its original position and the box cover must be tightened.
14. When the product is used normally, the lens of the product should be clean and free of pollution.

1. Brief introduction

This series flame detectors (hereinafter referred to as detector) are newly developed products for fire and gas detection systems by our company. By adopting high-performance sensors and micro-control technology, combining with sophisticated SMT process, the detectors are with advantages of good repeatability, anti-interference, long lifespan and easy operation.

The output signals of this series of detectors include 4-20mA analog signal and 2 passive relay output (for fault alert and alarm output), which are convenient for customers to dock with multiple manufacturers' control panels.

The application include smokeless liquid and gas fires, open flames producing smoke and places where explosion possibly occurs. For example: aerospace industry, hangars, aircraft repair shops, chemical industry, highway tunnels, ammunition and explosives warehouses, paint factories, petrochemical enterprises, pharmaceutical enterprises, power stations, printing enterprises, flammable materials and other carbonaceous materials Other occasions.

2. Technical data

This series flame detector include below 4 models:

RL-F600UV	UV flame detector
RL-F600IR2	Double IR flame detector
RL-F600IR3	Triple IR flame detector
RL-F600UVIR2	Double IR and UV flame detector

2.1Technical features:

- Good accuracy, stable performance, long lifespan
- 4-20mA analog signal output
- Relay output of fault alert and alarming
- LED display of sensitivity and alarming
- Easy installation with professional installation brackets
- Based on the actual flame combustion as a model, the fault alarm rate is low.
- Adopting special optical lens, optical transmission is reliable.
- With magnetic bar to adjust the sensitivity, without removing the cover.

2.2 The R&D, production and inspection of the detectors follow the below national standards:

GB3836.1-2010	Explosive atmospheres Part 1: Equipment General requirements
GB3836.2-2010	Explosive atmospheres Part 2: Equipment protection by flameproof enclosures “d”
GB4208-2008	Degrees of protection provided by enclosure(IP code)
GB15631-2008	Special fire detector
GB12791-2006	Fixed UV flame detector
GB/T13384-2008	General specifications for packing of mechanical and electrical product

2.3 Specifications

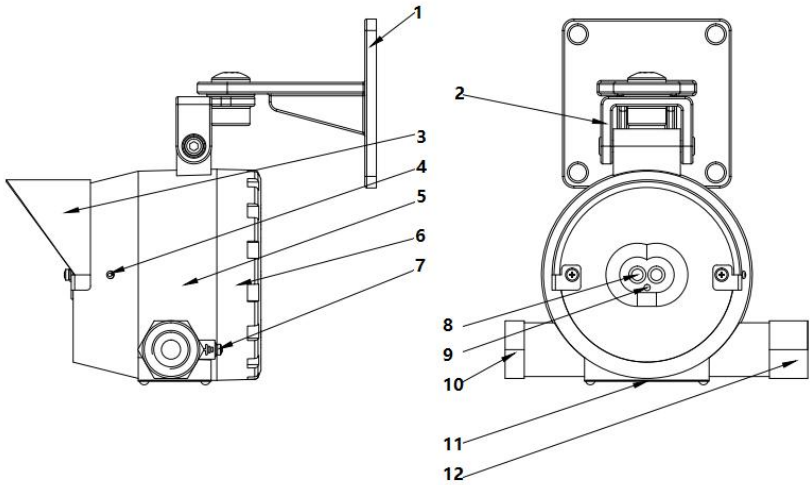
Spectrum range	RL-F600UV: 185~260nm
	RL-F600IR2: 4.3μm, 5.0μm
	RL-F600IR3: 3.8μm, 4.3μm, 5.0μm RL-F600UVIR2:185~260nm,4.3μm,5.0μm

Detection method	Real-time sampling of optical path
Display	LED lights
Status indication	Green LED flashes to indicate normal operation (the number of flashes every 3 seconds represents the sensitivity level)
	Red LED always lights to indicate an alarm
Operation method	Magnetic bar, adjust sensitivity (4 levels)
Signal output	4-20mA analog
	Passive relays (for fault and alarm)
Ex grade	Exd Ⅱ C T6 Gb/ Ex tD A21
Ingress protection	IP66
Supply voltage	DC24V±6V
Working current	≤30mA (DC24V)
Installation method	Wall mounted or lifting or holding-pipe
Response time	<30s
Detection distance (N-heptane fire)	RL-F600UV: 30m, 0.3m×0.3m
	RL-600IR2: 50m, 0.3m×0.3m
	RL-600IR3: 50m, 0.3m×0.3m
	RL-F600UVIR2: 50m, 0.3m×0.3m
Working temperature	RL-F600UV: -20~60℃
	RL-F600IR2: -25~70℃
	RL-F600IR3: -25~70℃
	RL-F600UVIR2: -20~60℃
Detection angle	RL-F600UV: 120°
	RL-F600IR2: 90°
	RL-F600IR3: 90°
	RL-F600UVIR2: 90°
Weight	1.5±0.2kg

Housing material	Copper-free cast aluminum
Cable entry screw	NPT1/2
Working humidity	≤95%RH (no condensation)

3. Structure drawing

The detectors has the same structure except for the difference in the sensor window. Here we take RL-F600IR2 as example.

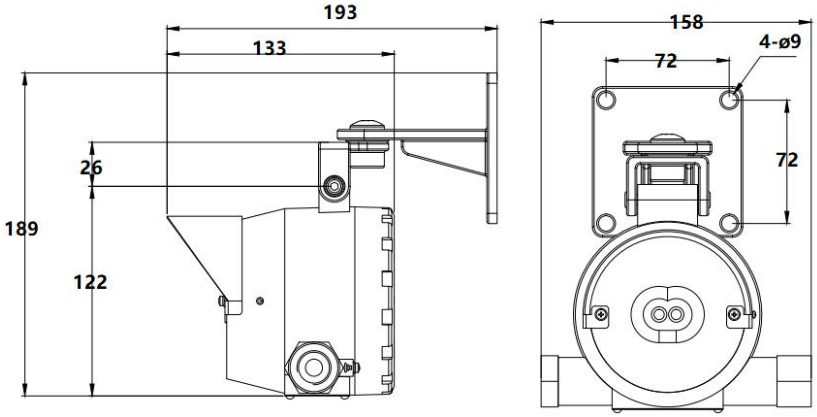


No	Name	No	Name
1	Fixing bracket	7	Earthing nut
2	Rotation bracket	8	Sensor
3	Sunshade	9	LED lights
4	Sensitivity adjusting point	10	Metal plug
5	Housing	11	Nameplate
6	Rear cover	12	Cable entry

4. Installation

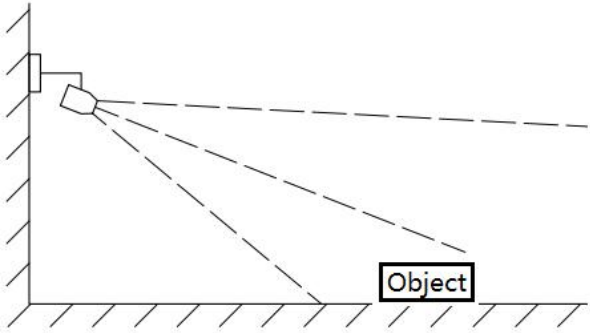
The installation of 4 models are same. Here we take RL-F600IR2 as example.

4.1 Dimension of the detector



4.2 Installation instruction

When installing, the center line of the detector needs to be slightly higher than the object which may be the source of ignition. At the same time, in order to prevent false alarms, there must be no obstruction between the flame detector and the detected object, as shown in below drawing. (The angle in the drawing is only for illustration)



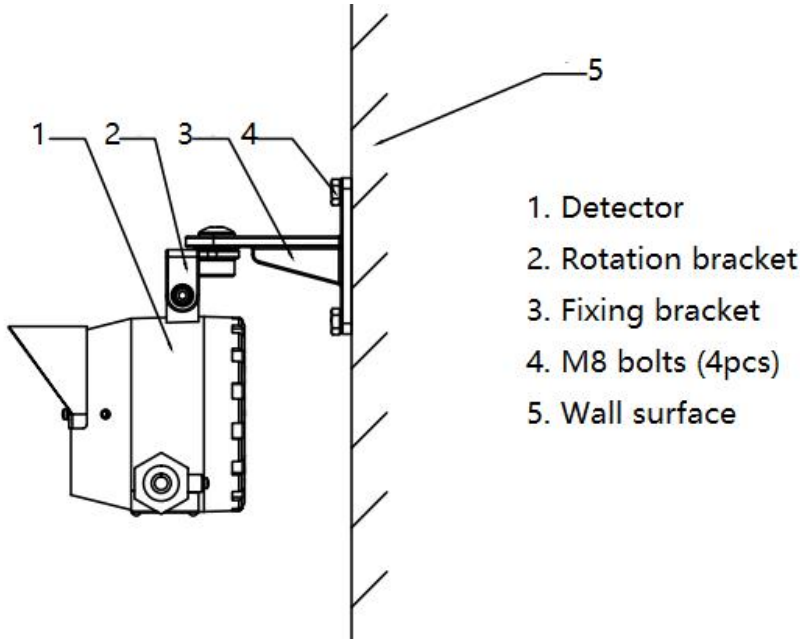
According to the actual situation of the detection site, fix the detector to the wall, horizontal pipe or vertical pipe, as described below.

Method 1: Wall mounted or lifting installation:

(1) Determine the hole position according to the structure drawing of the detector.

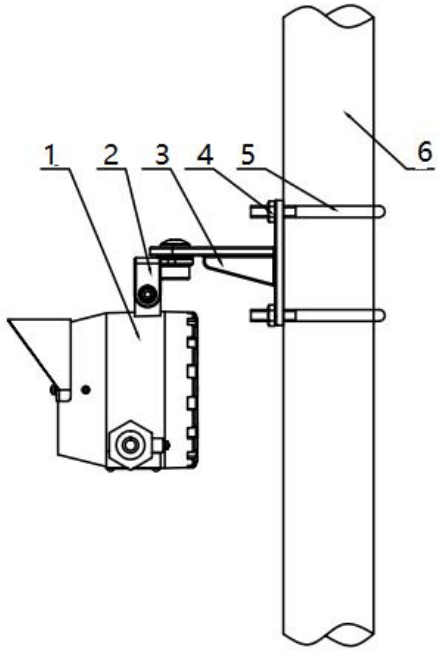
(2) Drill M8 screw holes in the wall and use M8 expansion combination screws to fix the fixing bracket to the appropriate position on the wall.

(3) Adjust the detection angle of the detector by adjusting the angle of the rotating bracket to achieve the ideal angle.



Method 2: Holding-pipe installation

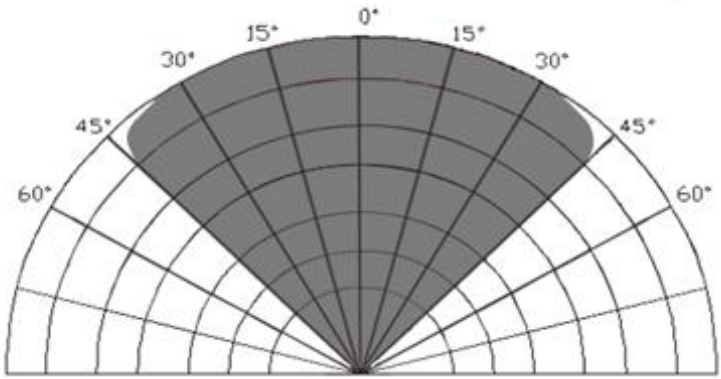
If there are horizontal or vertical pipes with a diameter not greater than 67mm (fixing brackets can match 2.5-inch pipes at most), "U" bolts with a diameter not greater than 8mm can be equipped with appropriate nuts for fixing. After the fixing bracket is fixed, select the suitable detection angle.



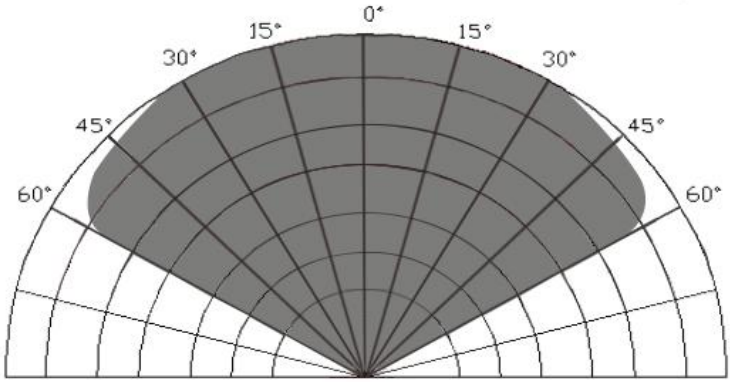
1. Detector
2. Rotation bracket
3. Fixing bracket
4. M8 bolts (4pcs)
5. M8U bracket
6. Pipe

4.3 Description of detection angle

The detection angle for IR flame detector is 90°, which meets the national standard of GB15631-2008 "Special Fire Detector" which requires the fixed IR flame detector to be 90°.



The detection angle for UV flame detector and UV & IR composite flame detector is 120°, which meets the national standard requirements of GB12791-2006 "Fixed UV flame detector" with a detection angle of not less than 120°.



4.4 Description of detection distance

This series flame detectors are measured according to national standards. The maximum detection distance in the field is 50 meters, which exceeds national standards. The detection distance of the flame detector is affected by various conditions such as flame size and angle. In order to quantify the detection standard, the national standard requires the flame detector to use a 0.1m^2 brazier for the detection distance test. The lower detection distance is 25 meters. The distance parameters of our products tested in accordance with the requirements of the national standard are shown in he below table.

Model	RL-F600UV	RL-F600IR2	RL-F600IR3	RL-F600UVIR2
N-heptane	30m	45m	45m	45m
Alcohol	30m	30m	30m	30m
Gasoline	30m	30m	30m	30m
Diesel	30m	25m	25m	25m

Caution:

UV flame detectors are generally not recommended for outdoor use, because sunlight contains a small amount of ultraviolet light, and industrial lighting and welding light contain ultraviolet light. It is easy to cause false positives.

5. Cable connection

Attention:

- Before connecting the detector, power supply must be cut off.
- According to the requirements of explosion-proof, the cable entry needs to be equipped with an explosion-proof gland that has obtained an explosion-proof certificate.
- It must be ensured that either the internal ground terminal of the detector or the external ground mark is reliably grounded.

Warning: The rubber plug at the connection interface must be installed in good condition to prevent water or dust from entering the detector cavity through the pipeline or connection and damaging the detector.

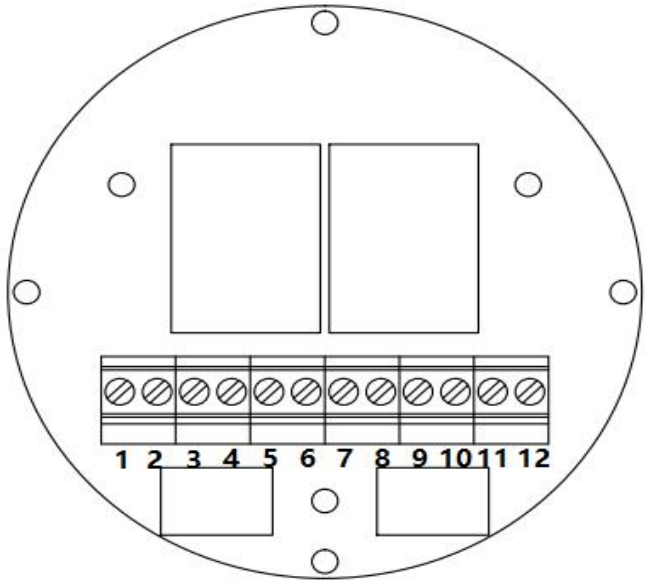
5.1 Cable connection steps

(1) Screw down the rear cover.

(2) Remove the pipe joint. Put the 3-core transmission cable on the explosion-proof gland, pipe joint, and rubber plug in order, and pass into the shell from the wiring hole. According to explosion-proof requirements, do not take out the explosion-proof plugs for unused wiring holes, and do not discard all parts of the detector housing and internal circuit board at will.

(3) The cable is connected through wiring terminals in the detector housing. The schematic diagram of the connection terminals is shown in the below drawing. The description of the terminals, their functions and specifications are shown in the below. Connect the wires to the corresponding terminals in the shell according to the marks. Pay attention to the positive and negative power input

terminals. Connect the shield of the cable to the grounding terminal inside the shell or ground it reliably outside the shell.



No.	Icon	Function	No.	Icon	Function
1	V1	Power input (free connection)	7	ANO	NO of alarm relay
2	V2		8	ANC	NC of alarm relay
3	I	4-20mA output	9	FNO	NO of fault relay
4	A	Reserved	10	FC	COM of fault relay
5	B	Reserved	11	⏚	Earthing
6	AC	COM of alarm relay	12		Earthing

(4) After checking that the wiring is correct, then pull out the excess cable in the housing, and finally tighten the compression nut, compress the rubber sealing ring, and hold the cable. When using explosion-proof hose, it can also be directly connected to this detector.

Caution: Between the controller and the detector, use a three-core shielded cable with an outer diameter of not less than 6mm (maximum distance between detector and host: ≤1000m).

(5) After the connection check of each link is correct, reinstall the detector back cover to ensure that the sealing ring is sleeved and tightly combined with the main housing.

Caution: According to the detection site conditions, the detector can be fixed before wiring, or the wiring can be fixed first. After the installation is complete, the front end of the lens must be free of stains. Please check the front glass window regularly to keep it clean.

6. Operation

Warning: The working voltage range of the detector is DC18~30V, and the recommended working voltage is DC24V. A voltage exceeding DC30V will cause permanent damage to the instrument.

6.1 Connect power supply of DC24V to the detector.

6.2 At this time, the green LED light inside the detector lens can be observed, indicating that the detector is working normally.

6.3 Various status of the detector are as below:

- Normal detection status: Green LED flashes; Fault relay pulls in; output current of 4mA.

- Alarming status: Red LED always lights; both fault relay and alarm relay pull in; output current of 15mA.

6.4 Description of normal detection status:
Green LED flashes every 3 seconds while the detector is running, and the number of flashes represents the current sensitivity level

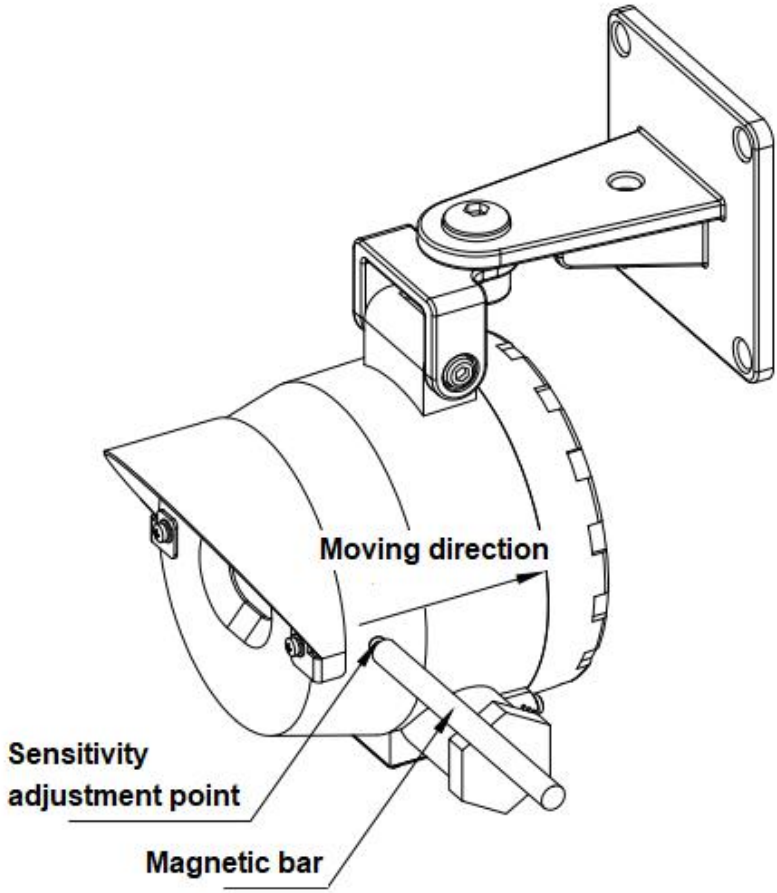
6.5 Sensitivity adjustment instructions:
(1) Use the standard magnetic bar provided included in the packaging to adjust the sensitivity of the detector by following the below drawing.

(2) Stick the magnetic bar to the sensitivity adjustment point.

(3) Move in the direction indicated by the arrow in the figure, and the LED will turn red.

(4) Remove the magnetic bar and the LED turns green. The number of flashes every 3 seconds will increase by 1 compared to the number of flashes before adjustment, which indicates that the adjustment is successful.

(5) Totally, there are 4 levels of sensitivity which can be adjusted cyclically.



Caution: Fault relay remains in the pull-in state during the entire working process until the device is powered off.

7. Trouble shooting guidance

Problems	Possible reason	Solution
False alarm	Environmental factors or sensor failure	Move the detector to a non-interfering environment for re-testing
LED doesn’t light	Wiring error or internal circuit failure	Check wiring and power supply
4-20mA no output	Wiring error or internal circuit failure	Check wiring
Fault relay doesn’t pull in	Wiring error	Check wiring
Alarm relay doesn’t pull in	Wiring error	Check wiring

If you still can't rule out the problem according to the above method, please contact the re-seller or the distributor. They will supply the satisfactory service to you.