汉威科技集团
Hanwei Electronics Group Corporation

FD10 Series Flame Detector

Operation Manual

Ver: HW20221214

Hanwei Electronics Group Corporation

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.

Copyright Statement

User service guide

- 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.
- 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.
- 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.

- Pay special attention to warnings and precautions.
- The installation process and operation must strictly abide by relevant national standards.
- Any operation inside the detector must be performed by trained personnel.
- Never disassemble or arbitrarily disassemble the internal circuit board or sensor.
- Do not place the detector at a temperature exceeding the recommended range.
- Do not place the detector in organic solvents or flammable liquids.

- 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.
- The detector must be reliably grounded, with a marked ground terminal on the internal circuit board and a ground mark on the enclosure. To prevent the influence of external electromagnetic interference.
- Before opening the detector enclosure, in order to reduce the risk of dangerous gas ignition, the power supply must be disconnected.
- 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.
- 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.
- Non-professionals are not allowed to install and disassemble at will.
- 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.
- When the product is used normally, the lens of the product should be clean and free of pollution.

1. Brief introduction

FD10 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 scenarios of FD10 series detectors 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

FD10 series flame detector include below 4 models:

FD10-UV	UV flame detector
FD10-IR2	Double IR flame detector
FD10-IR3	Triple IR flame detector
FD10-UVIR2	Double IR and UV flame detector

2.1 Technical features:

- Good accuracy, stable performance, long lifespan
- 4-20mA analog signal output (optional Hart for FD10-IR3)
- 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

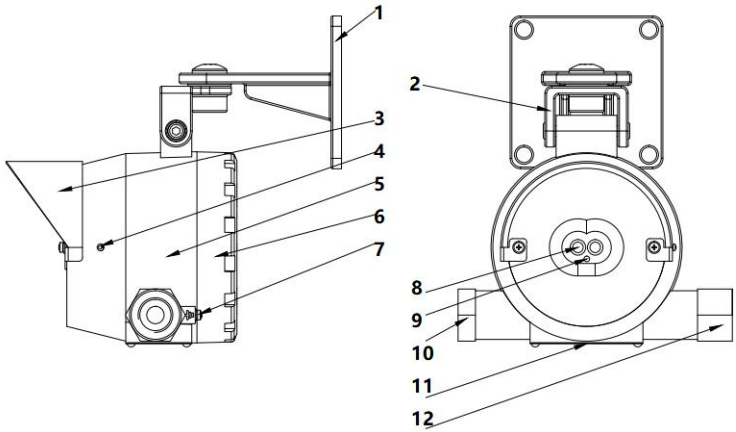
2.3 Specifications

Spectral response	FD10-UV: 185~260nm
	FD10-IR2: 4.3μm, 5.0μm
	FD10-IR3: 3.8μm, 4.3μm, 5.0μm FD10-UVIR2: 185~260nm, 4.3μm, 5.0μm
Detection type	Real-time sampling of optical path
Display	LED indicators
Status indication	Green LED flashes to indicate normal operation. The number of flashes every 3 seconds represents the alarm timing level. Default level is class II. Class I: 6 to 8 seconds Class II: 18 to 22 seconds Class III: 22 to 26 seconds Class IV: 3 to 4 seconds
	Red LED always lights to indicate an alarm

Operation	Magnetic bar, adjust sensitivity (4 levels)
Signal output	4-20mA (Hart is optional. Please refer to the sales person for details.)
	Passive relays (for fault and alarm, capacity: AC: 3A 250V, DC:3A 30V)
Ex grade	Exd Ⅱ C T6 Gb/ Ex tD A21 IP66 T80℃
IP grade	IP66
Input power	DC24V±6V
Working current	≤30mA (DC24V)
Installation	Wall mounted or lifting or holding-pipe
Detection distance (N-heptane fire)	FD10-UV: 30m, 0.3m×0.3m N-heptane fire
	FD10-IR2: 50m, 0.3m×0.3m N-heptane fire
	RD10-IR3: 50m, 0.3m×0.3m N-heptane fire
	FD10-UVIR2: 50m, 0.3m×0.3m N-heptane fire
Working temperature	FD10-UV: -20~60℃
	FD10-IR2: -25~70℃
	FD10-IR3: -25~70℃
	FD10-UVIR2: -20~60℃
Field of view	FD10-UV: 120°
	FD10-IR2: 90°
	FD10-IR3: 90°
	FD10-UVIR2: 90°(IR) / 120° (UV)
Enclosure	Aluminum alloy: around 1.5kg Stainless steel: around 4.5kg
Cable entry	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 FD10-IR2 as example.

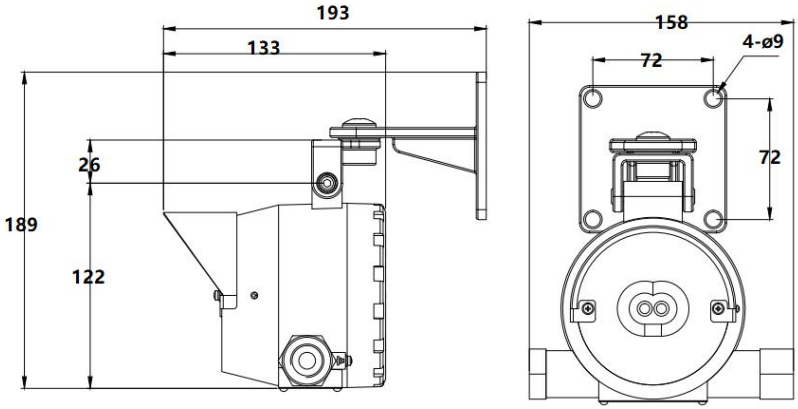


No	Name	No	Name
1	Fixing bracket	7	Earthing nut
2	Rotation bracket	8	Sensor
3	Sunshade	9	LED indicators
4	Sensitivity adjusting point	10	Metal plug
5	Enclosure	11	Nameplate
6	Rear cover	12	Cable entry

4. Installation

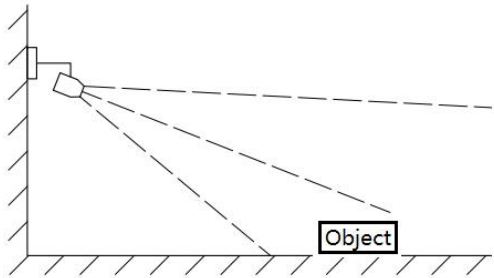
Installation of 4 models is same. Take FD10-IR2 as example.

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)

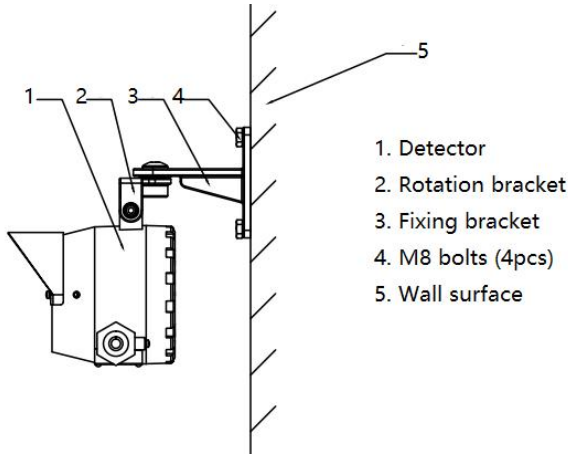


According to the actual situation of the detection site, fix the detector to the wall, horizontal pipe or vertical pipe, as described

below.

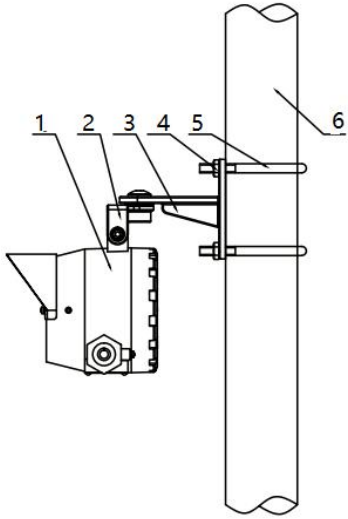
Method 1: Wall mounted or lifting installation:

Determine the hole position according to the structure drawing of the detector. 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. 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

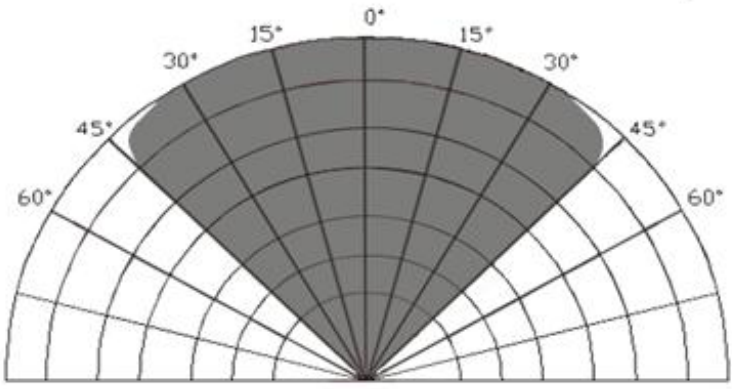
If there are horizontal or vertical pipes with a diameter not greater than 67mm (fixing brackets can match 2.5-inch pipes at most), "U" bolts with a diameter not greater than 8mm can be equipped with appropriate nuts for fixing. After the fixing bracket is fixed, select the suitable detection angle.



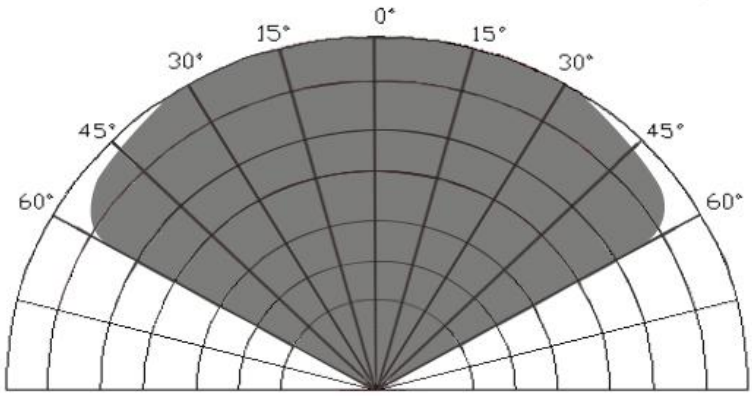
1. Detector
2. Rotation bracket
3. Fixing bracket
4. M8 bolts (4pcs)
5. M8U bracket
6. Pipe

4.3 Field of view

For IR sensor, the field of view is 90°, which meets the national standard of GB15631-2008 "Special Fire Detector" which requires the fixed IR flame detector to be 90°.



For UV sensor, the field of view 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

FD10 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	FD10-UV	FD10-IR2	FD10-IR3	FD10-UVIR2
N-heptane	30m	50m	50m	50m
Alcohol	30m	30m	30m	30m
Gasoline	30m	40m	40m	40m
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

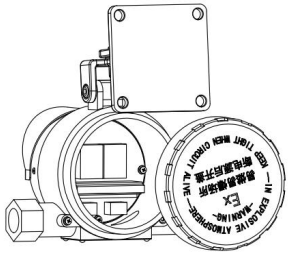
Attention:

- 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.

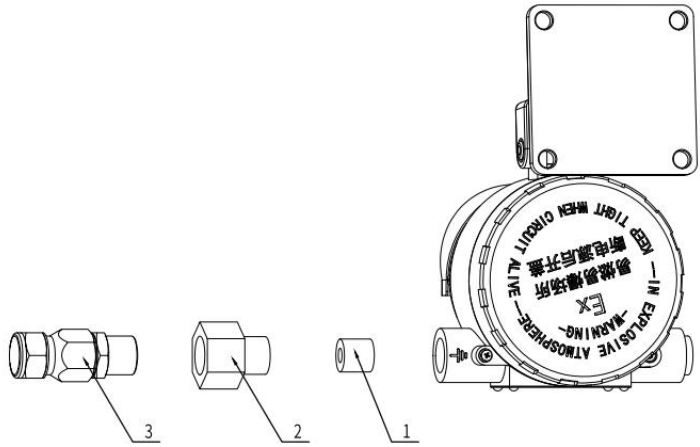
Warning: The rubber plug at the connection interface must be installed in good condition to prevent water or dust from entering the detector cavity through the pipeline or connection and damaging the detector.

5.1 Cable connection steps

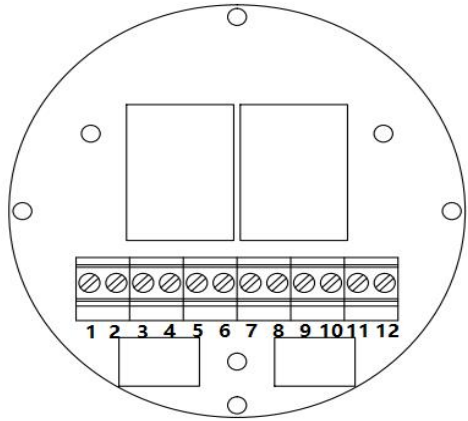
(1) Screw down the rear cover.



(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 enclosure 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 enclosure and internal circuit board at will.



(3) The cable is connected through wiring terminals in the detector enclosure. 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 enclosure 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 enclosure or ground it reliably outside the enclosure.



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

(4) After checking that the wiring is correct, then pull out the excess cable in the enclosure, 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 enclosure.

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: Working voltage range is DC18~30V, and recommended working voltage is DC24V. Any 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:

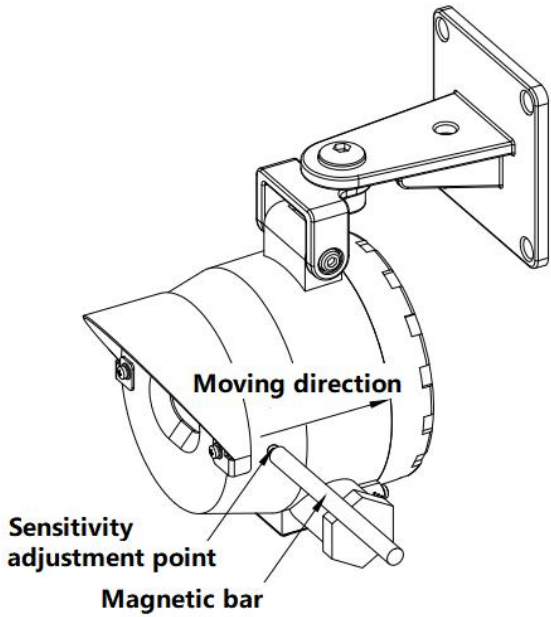
Status	Indicator	Relay	Output
No alarm	Green LED flashes	Fault relay pulls in	4mA
Alarm	Red LED is lighting	Both fault relay and alarm relays pull in	15mA

6.4 Description of normal detection status:

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:

Use the magnetic bar to adjust the sensitivity of the detector. Stick the magnetic bar to the sensitivity adjustment point. Move in the direction indicated by the arrow in the drawing, and the LED will turn red. 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. 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
No current output		Check wiring
Fault relay doesn’t pull in	Wiring error	Check wiring
Alarm relay doesn’t pull in		

If you still can't rule out the problem according to the above method, please contact the re-seller or our company. We will serve you wholeheartedly.

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