# DF702 Operating Instructions



V1.0

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# 1 Overview

The DF702 series detector is a smart trash detector that can detect the empty state of the trash, whether it is on fire, whether it is dumped, and it can also detect the battery level of this equipment. And we can provide corresponding application platform and data interface (API) for customers to test or integrate.

# 2 Package Contents

The packaging picture is shown in Figure 2.1



Figure 2.1

Parts are shown in Table 2-1 and Figure 2.2:

| Part name | specification | Quantity | Note |
|---|---|---|---|
| TTL | Serial tool | 1 | Used to modify device parameters, debug devices or device upgrades |
| cable | | 3 | Used to connect TTL to the device |
| Screws | M3*80 40mm | 3 | For installing equipment |

| | thread | | |
|---|---|---|---|
| magnet | round , 20*3,mm | 1 | Used to restart the device |

Table2-1
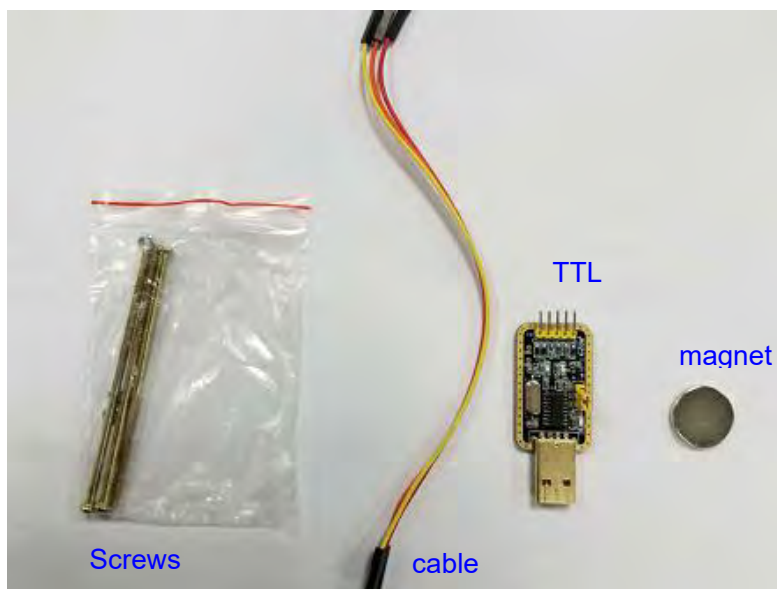


图 2.2

# 3 Equipment structure

External structure diagram:

Three screw holes for mounting the device

Three screws fixing the shell

Label indicating device version information, ID information, and serial number

Smart Recycle Bin Detector

Band: 800 Model: DF702
Wireless: NB-IoT Battery: Lithium(3.6v)
IMEI:863703032811486
S/N:20180209002
http://www.dingtek.com

Figure 3.1



Ultrasonic probe for detecting the distance from the surface of the probe to the surface of the trash.
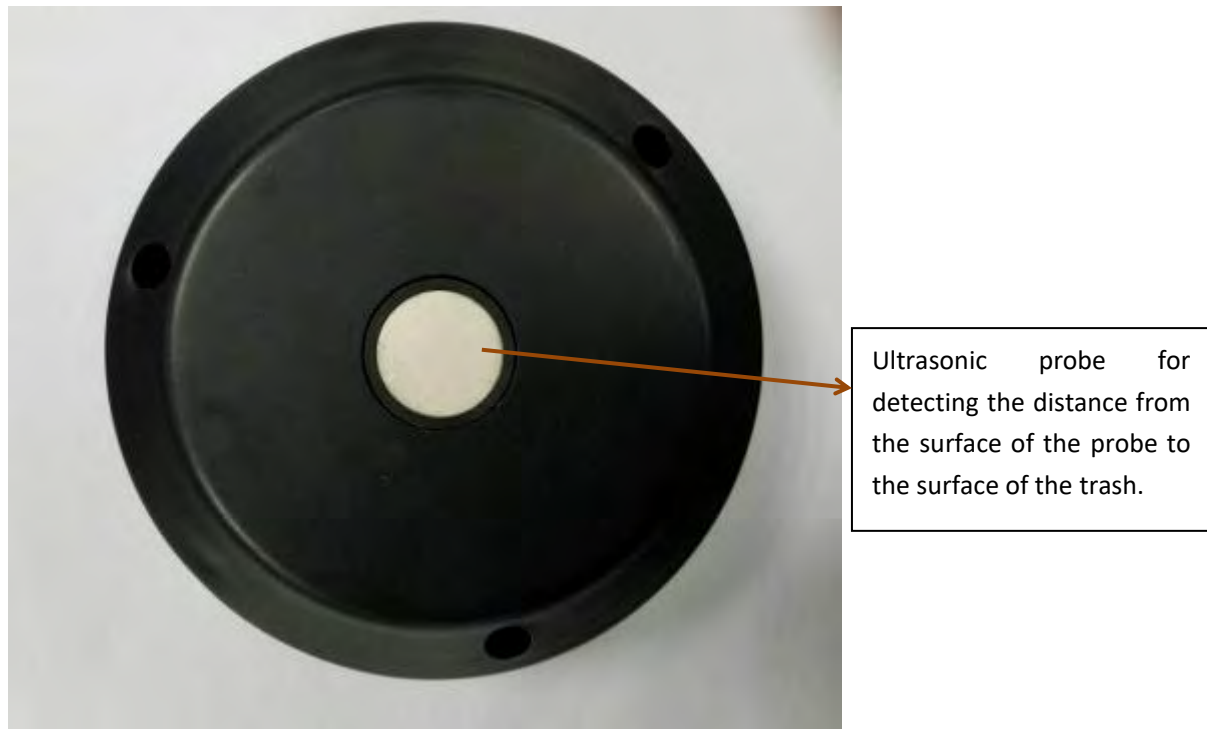
Figure 3.2

# 4 Technical Parameters

Detector principle: ultrasonic @ 112kHz

Detection distance: 2000mm (vertical)

Blind area: 150mm

Height error: 3mm

Temperature error: 2°C

Angle error: 2°C (optional)

Battery: Built-in non-rechargeable lithium battery, 7000mAh @ 3.6V,

    Lifespan: 4 hours to upload data, use 5 years

Operating temperature: -20 ~ +70°C

Storage temperature: -40 ~+85°C

Protection level: IP66

Data upload interval:

    Sensor detection time: It is detected once every 10 minutes by default. When the detected state (full) and the last state change, the data is uploaded. After uploading the data, the device enters a sleep state, otherwise the data is not uploaded. (This time can be modified through serial port or application platform delivery.)

    Fixed upload time: Upload data every four hours by default. (This time can be modified through serial port or platform delivery.) This time will not detect the time conflict.

# 5 LoRa version testing

## 5.1 Use the gateway and network server provided by our company

### 5.1.1 Preparation for Testing

Step 1 Connect to the gateway's power supply and network cable according to the gateway's instruction manual (the gateway has been configured in advance,

you do not need to configure it again);

Note: We will email you the gateway manual before shipping.

Step 2 Open the device and use a screwdriver to open the device as shown in Figure 5.1 and Figure 5.2.

Step 3 Connect the device to the power supply and connect the battery to the circuit board. (The default is not connected to the power supply. Please connect the power supply before use.) The yellow marks are shown in Figure 5.3 and .

Note: After connecting the power supply, please use a screwdriver to fix the shell of the device and tighten it to achieve a waterproof effect; then the sensor function can be tested.
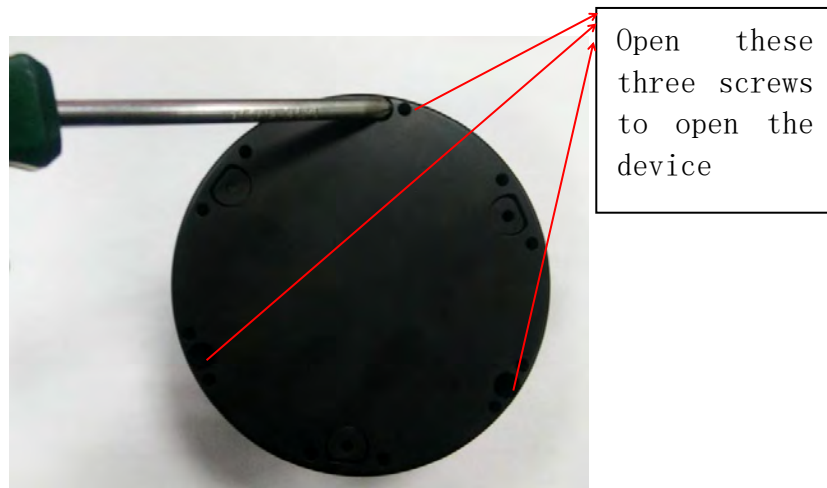


Figure 5.1

Open these three screws to open the device

Figure 5.2



Figure 5.3

## 5.1.2 Function test

* Height test (full/empty test)

Cardboard items can be used for simulated height testing before actual installation.

Testing process:

Step 1 Leave the device stationary or fixed

Step 2 Referring to Figure 5.4 or Figure 5.5, place the item above or below the probe of the device and block the probe (white part) so that d>15cm and d<30cm. This can be used to simulate the situation where the trash is full;
(Note: 1 Due to the blind area of the ultrasonic probe itself, accurate data should be measured when the distance d>15cm.)
(Note: The sensor can detect the distance d from the device probe to the object. This distance is also a sign that the trash can be empty or full. The sensor detects the distance d from the device probe to the item is less than 30cm (30cm is the default alarm threshold, this value can be When the serial port or the platform is modified downwards), the trash bin is full, otherwise the display is not full.)
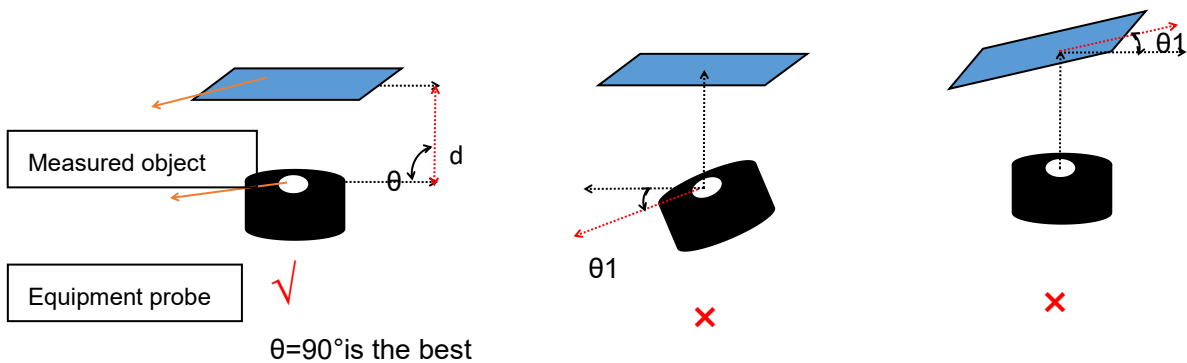
Method 1: Place the object over the probe



Figure 5.4

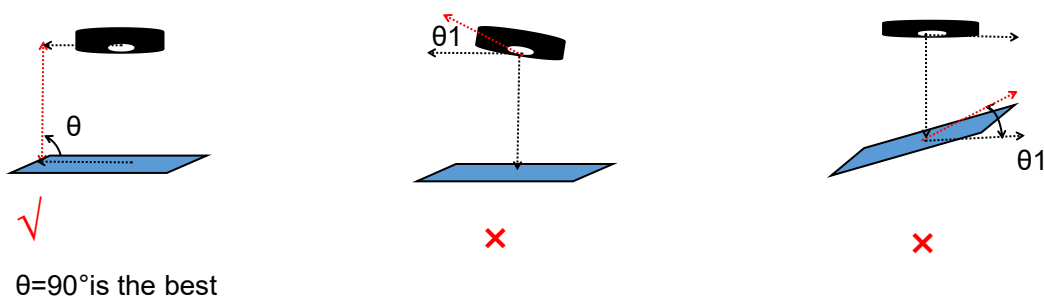Method 2: Place the Object Under the Probe



Figure 5.5

×：Indicates that the location of the device and the object is correct;

√：Indicates that the location of the device and the object is not correct;

Step 3 Use the magnet to restart the device

To restart the device: The position of the opposite side of the white marked pin is the magnetic switch position. The magnet can be restarted by placing the magnet in the magnetic switch position for 3 s and then removing the magnet.As shown in Figure 5.6.(Each time the device is restarted, the device will report the data once.)

Note:

1 When the device is restarted, there is no free LED or sound outside the casing to indicate that the restart is successful.

2 But when the restart is successful, you can see that a led on the main circuit board will be on, and when the data is sent, the led will go out.



Figure 5.6

Step 4 Observe the data of the previous step 3 on the application platform provided by our company. At this time, the trash should display full. (Note: We will provide you with a platform test account after shipment.)
Step 5 Move the object and increase the distance d to make d>30. After 10 minutes (this time is the time from the previous data), the data can be observed again. At this time, the trash can display is not full.

Repeat steps 4 and 5 to test empty/full status and different height values;

Note:

1 The device will detect once in 10 minutes. If no change of status is detected, no data will be uploaded. Only when the status change is detected will the data be uploaded. State change means: full->dissatisfaction, or dissatisfaction->full.

2 If the status does not change, the data upload interval is fixed at 4 hours.

3 Do not move the device during the test so as not to affect the accuracy of the data.

4 Some objects have some absorption of ultrasonic waves, such as foam items or carpets. So if you encounter such items, it may affect the high degree of accuracy.

5 The sensor probe must not be tilted more than 8° from the object.

6 Note that the measurement range is 150-2000mm, and the measured data beyond the range will be inaccurate.

7 Each time the device is restarted, data is reported once.

## * Fire detection

Function Description: When the device detects that the temperature is higher than 75℃ (the default threshold can be modified through the serial port or the platform), it can wake up the device and send the alarm data, otherwise it will not send the alarm data.

This function is not easy to simulate high temperature environment. You can modify the alarm threshold to test this function.

However, by changing the alarm temperature T to be less than the temperature of the device's environment, you can see that the device reported fire alarm data. Note: This parameter can be modified by referring to the DF702 Configuration Manual.

Example: When the ambient temperature of the equipment is 15°C, and the temperature alarm threshold is changed to 10°, the equipment will upload fire alarm data.

## * Battery detection

Function description: When the battery power is lower than 20% of the total power (the default value can be modified through the serial port or the platform), low battery alarm data will be sent.

You can reduce the alarm threshold to perform a simulation test. If you change the alarm threshold to 100%, you can see that when the device uploads data, it will upload battery alarm data. Note: This parameter can be modified by referring to the DF702 Configuration Manual.

## * Fall detection (only enhanced version with this function)

When the trash dump angle θ is greater than 15, as shown in Figure5.8, the alarm data is uploaded, otherwise the alarm data is not uploaded.

θ3=0



θ3

θ3>15°

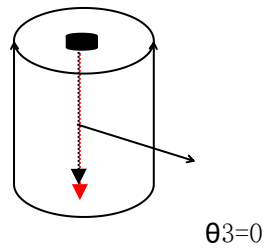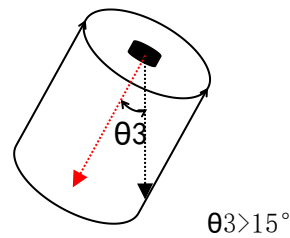Figure 5.7                                    Figure 5.8


Before the installation, the test can be simulated by pouring the device.
For example, if you tilt the device so that the tilt angle is greater than 15°, you can see that the trigger device reports the dump alarm data.
Note: The standard version does not have this feature, only enhanced version with this feature.

### 5.1.3 Actual installation

## 5.2 Use Your Own Network Server and Gateway

### 5.2.1 Preparation for Testing

Step 1 Confirm that the frequency band of the gateway is the same as the frequency band of the device.
Step 2 Add devices and gateways on the network server to add related information for the device: APB mode needs to be: Devaddr, Nwkskey, and Appskey information, and OTAA mode needs to be: Deveui, Appeui, and APPkey information. This information has been printed on the label.注：不同的 The network server may have different requirements, and specific information is filled in according to the requirements of the web server.
Step 3 Open the device, referring to step 5.1.1 step 2;
Step 4 Connect the power supply, referring to step 5.1.1 of step 3.

### 5.2.2 Functional Test

Refer to 5.1.2 Functional Test

### 5.2.3 Actual installation

Refer to 5.1.3 Actual installation

# 6 NB version testing

## 6.1 Prepare for testing

Step 1 requires you to prepare the NB card, and confirm that the NB card is enabled and can be used normally, and the test environment covers the NB network.
Step 2 Open the device. For the method, refer to Step 2 in 5.1.1.
Step 3 Install the NB card: Place the NB card outward in the slot, as shown in Figure 6.1 and figure6.2. Press the card manually, as shown in Figure 6.3.



| Figure 6.1 | Figure 6.2 | Figure 6.3 |

Step 4 Connect the power supply. Refer to step 3 in 5.1.1 for the method.

## 6.2 Function test

Refer to 5.1.2 Functional Test Method Test Equipment

And the data can be viewed through our data interface (API).

Note:

1 IP and port can be modified through serial or downlink instructions.
2 If you need product agreement or API, please contact our sales staff.

# 7 GPRS/WCDMA version

## 7.1 Prepare for testing

Step 1 requires that you prepare to support 2G/3G mobile phone cards and confirm that the data network of the card can be used normally.
Step 2 Open the device with a screwdriver. Refer to Step 2 in 5.1.1.

Step 3 Install the 2G/3G mobile phone card. Install the mobile phone card according to Step 3 in 6.1.

Step 4 Connect the power supply. Refer to step 3 in 5.1.1 for the method.

## 7.2 Function test

Refer to 5.1.2 Functional Test Method Test Equipment.

You can log in our test account or data interface (API) to view data.

Note:

1 The default upload address is our server.

2 You can modify the IP address and port number through the downlink or serial port.

3 If you are using it abroad, configure the APN for the device in advance before testing. You do not need to configure the APN separately after you use it in the country. Please refer to the product agreement for the format of the instruction.