

〔Before installation and application of the product, please read the Instruction Manual for Installation and Application〕

# **Instruction Manual for Installation and Application of JB-TB-TC5100 Intelligent Fire Alarm Control Panel**

**(Ver. 2.0)**

 **LIAONING·YINGKOU TIANCHENG FIRE PROTECTION EQUIPMENT CO., LTD**

## Preface

JB-TB-TC5100 Intelligent Fire Alarm Control Panel is a new generation of alarm linkage integration that is designed and developed by our company through researching the fire-fighting market demand and summarizing the fire engineering experience for many years.

This control panel adopts the cabinet structure and modular design. And it has features of strong function, high reliability and flexible configuration. The system adopts large screen and color LCD display. The printer can print all system information, such as fire, fault and various operations. And it has the ability to field program comprehensively. It is compatible with a series of addressable TC products, which are intelligent detectors, input module, output module, input/output module, sounder strobe, LCD repeater panel, etc. to form the integrated control panel of alarm linkage that integrates loop and multi-line. It is the best choice of fire protection engineering.

Refer to the corresponding installation manuals for detailed technical parameters and installation instructions of detectors, modules and other accessory devices.

This manual should be in charge of specially-assigned personnel carefully in order to use in the future.

**Statement: due to the limit of time for the preparation of this manual, mistakes are somehow unavoidable. We really appreciate it that our users can correct these mistakes!**

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# Section 1 Overview

## Chapter1 Product Introduction

JB-TB-TC5100 Intelligent Fire alarm control panel is a new generation launch by our company. It has linkage control function to meet the needs of engineering design, used with other TC products to form a flexible integrated alarm linkage control system, which is very suitable in the application to fire alarm and fire linkage control system.

### 1.1 Strong function and high reliability

The control panel adopts intelligent loop control mode, and each loop can have up to 255 addressable points (addressable detectors, modules or LCD repeater panels, etc.). The loop adopts isolation design, so that the anti-interference performance is strong and the system is stable and reliable. And it is convenient for field using and commissioning.

### 1.2 Color menu display interface

This control panel adopts menu display interface, clear and direct, and easy to use. It can achieve a variety of functions provided by the system through simple operations.

### 1.3 Flexible modular structure and multiple functional configurations

The control panel consists of various functional modules. Functional modules adopt plug-in structure. Configuration is flexible and convenient, and it is convenient for installation, commissioning, maintenance and later dilatancy.

### 1.4 Compatible with intelligent loop control panel

The control panel is compatible with intelligent loop control panel (64 points), with less wiring and high reliability. By defined, every start/stop key on the manual startup panel can be associated with any loop device connected to the system to control device's start/stop which thoroughly solves the inherent problems in the engineering wiring, equipment configuration and installation and commissioning of the integrated alarm linkage system.

### 1.5 Compatible with intelligent direct control panel

The control panel is compatible with direct control panel of two-wire or three-wire system. And it has open circuit and short circuit detecting function, which can ensure the reliability of the control panel and the connection between devices to the greatest extent.

## **1.6 Compatible with LCD repeater panel**

The control panel is compatible with LCD repeater panel through loop. It is convenient and reliable to install. It can display the alarm's device type and note information.

## Section 2 Structure·Installation·Commissioning

### Chapter 2 Structure and Configuration

#### 2.1 Configuration and Internal Structure

JB-TB-TC5100 Intelligent Fire Alarm Control Panel is installed in cabinet structure, and the typical configurations include: main board, loop control panel, direct control panel and power supply panel, etc. This system integrates alarm and linkage. With loop and direct control, the control panel not only can complete alarming, but also control fire-fighting devices' start/stop.

The appearance sketch diagram of JB-TB-TC5100 FACP is shown in Fig. 2-1:

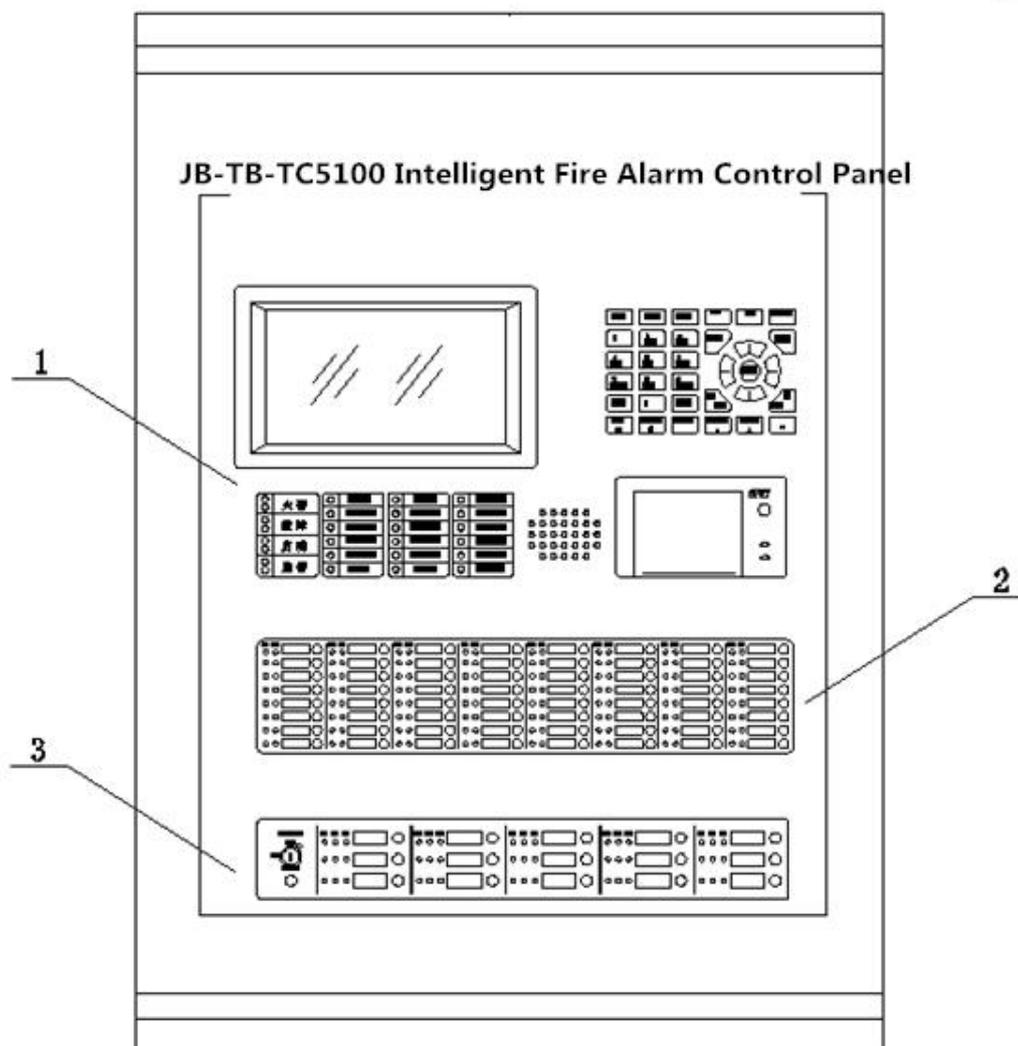


Fig. 2-1

The figure shows:

- (1) The host part
- (2) Loop control panel (64 points)
- (3) Direct control panel

## 2.2 Specification of Control Panel's Appearance

The sketch diagram of FACP's board structure is shown in Fig. 2-3. It consists of three parts, including display area, loop control area and direct control area. Refer to the corresponding manual of direct control area.

### 1) Display area

The sketch diagram of the display area is shown in Fig. 2-2.

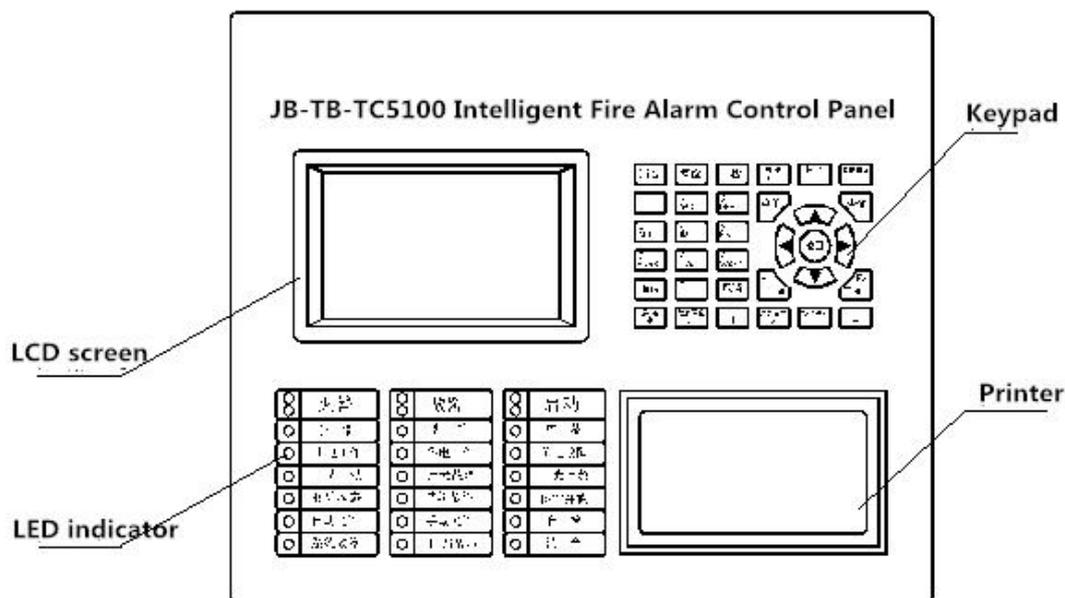


Fig. 2-2

The display area mainly consists of LCD, LED indicators, keypad and printer. The descriptions of LEDs are as follows:

- **Fire:** Red. It illuminates when FACP detects an alarm condition of connected detectors; refer to specific information on LCD. After fire condition is removed, the fire status can be only cleared by pressing *Reset* key and this LED goes out simultaneously.
- **Fault:** Yellow. It illuminates when FACP detects a fault of connected peripheral devices (detector, module, or LCD repeater panel) or itself; refer to specific information on LCD. After fault is removed,

the fault status can be only cleared by pressing *Reset* key and this LED goes out simultaneously.

- **Start:** Red. It illuminates when FACP issues a startup command to external devices; refer to specific information on LCD. Press *Reset* key and this LED goes out simultaneously.
- **Supervisory:** Red. It illuminates when FACP issues a supervisory signal to peripheral supervision devices; refer to specific information on LCD. Press *Reset* key and this LED goes out simultaneously.
- **Feedback:** Red. It illuminates when FACP receives action feedback signal from peripheral devices; refer to specific information on LCD. This LED goes out when there is no feedback information.
- **Power:** Green. It illuminates when FACP is powered by AC220V.
- **Battery:** Green. It illuminates when FACP is powered by backup.
- **Power fault:** Yellow. It illuminates when AC220V loses power or is damaged. After the power returns normal, this LED goes out.
- **Battery fault:** Yellow. It illuminates when the battery has a fault. After the fault is removed, this LED goes out.
- **Disable:** Yellow. It illuminates when some device is disabled. When a peripheral device (detector, module, or LCD repeater panel) has a fault, it is disabled. After repairing or replacing the device, press *Enable* key to make it work normally.
- **Sounder strobe start:** Red. It illuminates when there is 24V output on sounder strobe output contact. When there is no 24V output on sounder strobe output contact, the light goes out.
- **Sounder strobe fault:** Yellow. It illuminates when there is short-circuit or the wiring is disconnected on the sounder strobe contact. After the fault is removed, this LED goes out.
- **Sounder strobe disable:** Yellow. It illuminates when sounder strobe output contact is disabled.
- **Transmit fault:** Yellow. It illuminates when there is open circuit, short circuit or abnormal communication fault in connecting wire between transmission devices. After removing the communication fault, the LED goes out.
- **Transmit status:** Red. It flashes when there is fire or fault information, and the control panel sends a signal to transmission devices. It illuminates when the control panel receives the feedback signal from transmission devices.
- **Transmit disable:** Yellow. It illuminates when a transmission device is disabled.
- **Spray request:** Red. It illuminates when there is a gas spray request.
- **Spray start:** Red. It illuminates when the gas spray is activated.

- **Gas spray:** Red. It illuminates when there is a gas spray feedback.
- **Self-test:** Yellow. It illuminates when the system is self-testing.
- **Mute:** Green. It illuminates when the control panel alarms and pressing the *Mute* key, the speaker ends alarming. When there is a new alarm, the LED goes out, and the control panel alarms again.
- **System fault:** Yellow. It illuminates when the system program cannot work normally.

Each function of operational key should be referred to “Section 3 System Application”.

## 2) Loop control panel

The schematic diagram of loop control area is shown in Fig. 2-3.

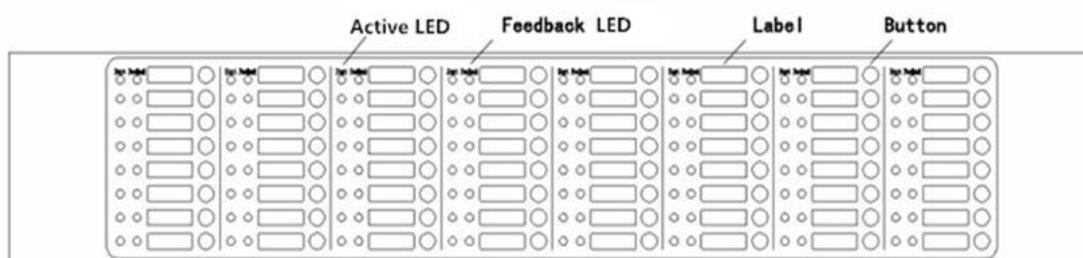


Fig. 2-3

TC5012 Loop control panel has 64 manual startup points. Every startup point has a keystroke, two LED indicators and a label. The keystroke includes start/stop control key. If press some zone’s control key, it issues out control command. And when it receives device’s startup status, the command LED illuminates (red). If the controlled device is activated and sends out feedback signal, the feedback LED illuminates (red). The user can write the name of corresponding device on the label, and then fix with the diaphragm on the manual panel.

## 3) Direct control panel

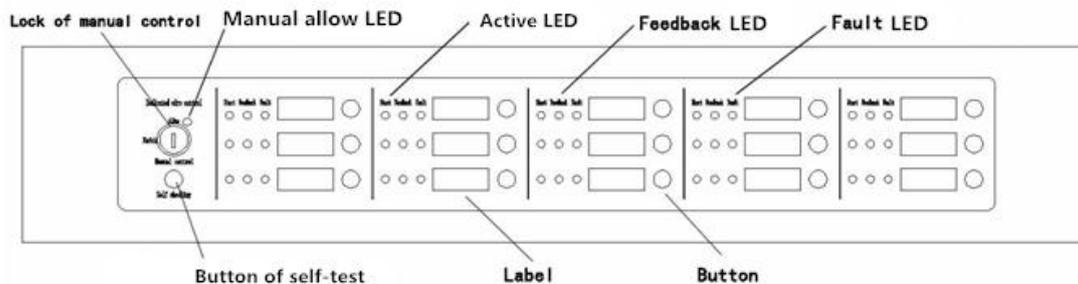


Fig. 2-4

TC5013 Direct control panel has 15 manual startup points. Every startup point has a keystroke, three LED indicators and a label. The keystroke includes start/stop control key. If press some zone’s control key,

the zone's startup LED illuminates (red), and there is control command. And if the controlled device responds, the feedback LED illuminates (red); if there is open circuit or short circuit fault on external wiring, the fault LED illuminates (yellow). The user can write the name of corresponding device on the label, and then fix with the diaphragm on the manual panel.

## 2.3 Specification of Internal Structure and Wiring

### 2.3.1 Specification of Control Panel's Structure

The control box, which is the core of the control panel, consists of four parts, including mother board, loop main board and loop sub-station board.

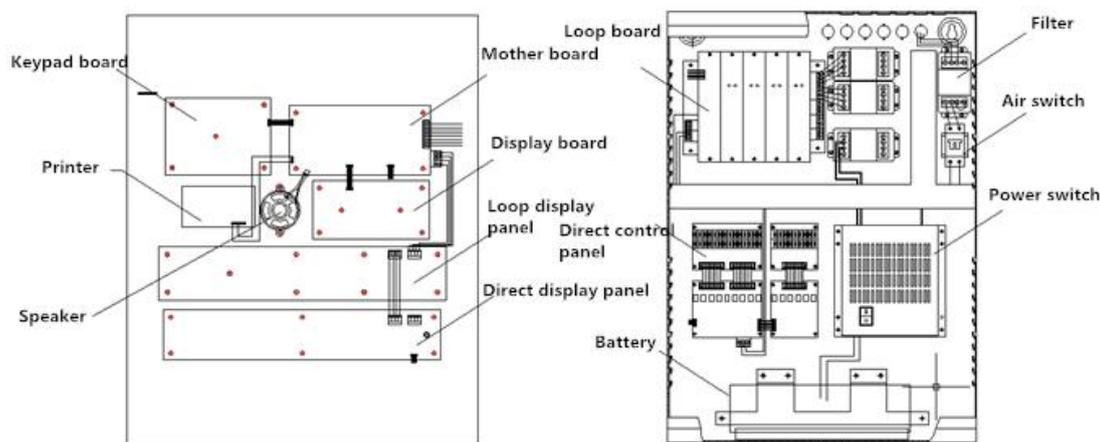


Fig. 2-5

### 2.3.2 Specification of External Terminal

Among them:

L, N, PE: AC 220V terminal and AC ground terminal;

nL+, nL-: non-polarity loop signal terminal; n: loop number 1~ 4;

HJ+, HJ-: fire alarm output terminal (voltage control contact; when there is a fire alarm, the output is DC24V. And it ends outputting DC24V after reset);

SG+, SG-: sounder strobe control output terminal (voltage control contact; when it is activated, the output is DC24V. And it ends outputting DC24V after manually stopped or reset);

A1, B1: connecting CRT's RS485 connecting terminal, and A1 is 485's B terminal, B1 is 485's A terminal;

Qn, Gn, Hn: three-wire system direct control output terminal; n: three-wire system direct control loop number;

CN+, CN-: control panel's networking loop, polarity-sensitive;

JP1: pin located on the mother board's internal networking terminal; when the mother board is internal network terminal, the short circuit block jumps to "ON";

JP2: pin located on the loop main board's external networking terminal; when the control panel is external networking terminal, the short circuit block jumps to "ON";

DC24V, GND: module or direct control panel and other linkage power output terminal;

L1, R1, G1: RS232 communication interface terminal.

## Chapter 3 Installation and Commissioning

### 3.1 Check in a State of Unpacking

Before installing, check field devices first.

#### 3.1.1 Check Configurations

Check whether the contents of packing list conform to the project configuration. After opening the packing box, check the devices one by one according to the packing list and the main checking contents include: instruction manual, the key to control panel, etc. After verifying, check the appearance of the control panel. If finding any condition that does not meet requirements, please contact our after-sales department.

#### 3.1.2 Check Internal Configuration and Connecting

Check the connection between internal components of the control panel. If connection line falls off, or the connection does not conform to instruction manual, or unclear logo, please contact our after-sales department.

### 3.2 Installation Conditions and Method

Dimensions (length×width×height): 500 mm×175mm×700 mm

Operating temperature: 0 °C~ +40 °C

Relative humidity ≤95%, non-condensation

Wall-mounted structure

### 3.3 Check after Powered-up

The control panel should be powered to be checked in field in the state of power-on. The checking contents include:

- ✧ Check LCD screen, digital tubes and LED indicators.
- ✧ Carry out self-testing operation to observe whether control panel's all sections of LED indicators and digital tubes can illuminate and whether the speaker can send out three kinds of continuous loud alarm sounds.
- ✧ After the control panel is in a state of monitoring, observe whether there is a power fault and whether all keys and the printer are normal.

If find any abnormal conditions, please contact our after-sales department.

### 3.4 Check Peripheral Devices

#### 3.4.1 Check External Connection Status

Check the control panel's loop, and measure the insulation resistance between different loops and between ground and loop, and measure the loop's load condition. Among them, the insulation resistance should be larger than  $20\text{M}\Omega$  and the loop load should be larger than  $1\text{k}\Omega$ .

#### 3.4.2 Check Devices

Take advantage of commissioning device to check loop device condition, that is, whether the number of devices, programming and working state meet design requirements. After removing the potential faults, make preparations for system connection.

### 3.5 Wiring and Setup

After checking the host and peripheral devices, if checks all meet with requirements, please refer to the specifications of **Chapter 2** to connect correctly peripheral devices to the control panel, and set up direct control panel and loop manual startup panel, etc.

### 3.6 Commissioning

**3.6.1** System wiring and check circuit and insulation resistance. When measuring the resistance is about  $5\text{k}\Omega$

(loop is full-load) between loop wires in a state of shutdown, use the tramegger to measure whether the insulation resistance between loop and ground is larger than 20M. (Before measuring, connect two loop wires in parallel, or it will destroy devices on loop.)

**3.6.2** Install bases of detectors, modules and LED repeater panels and connect wires.

**3.6.3** Program detectors and modules and install them on the bases.

**3.6.4** Operate the control panel and register correctly loop components. If there is a large loss, check linkage power and loop isolator in each floor. And then check individual devices and register them again and then observe whether they are registered completely.

**3.6.5** Field programming: to input linkage logic programming and note information.

**3.6.6** Detector's fire test. Check whether note information conforms to field situation.

**3.6.7** Automatic linkage test. If automatic linkage is abnormal, check manually modules first. If circuit and module are normal, check the logical relationship and peripheral devices.

**3.6.8** Train the operator to use correct operating method. After passed the acceptance inspection, plunge the project plunged into usage.

## Section 3 System Application

### Chapter 4 Instructions

#### 4.1 Boot-strap, Shutdown and Self-testing

After commissioning, the user can operate in the following orders:

- Turn on related devices' power.
- Turn on main power and backup power switch.

After the above operation, the system is powered to initialize (shown in Fig. 4-1). After initializing, the system enters into monitoring state. Press *Self-test* key, and the system will check its sound and light.



Fig. 4-1

The process of shutdown and boot-strap is contrary. Pay attention to turning off backup switch, otherwise, the battery may be damaged.

#### 4.2 Preparations before Operating Keypad

##### 4.2.1 Keypad's Command and Character Function

The keypad has double functions. The lower is marked as command function, and the upper is marked as character function. The command function only plays a role in monitoring state, and most function keys are restricted to key-lock. The character function does input data only after entering into the menu.

### 4.2.2 General Method of Data Input

There is an area highlighted indicating input's position and range on the screen. Press the character key, the original characters in the highlighted area will disappear, and then input new character again.

After editing a data block, the next data block is changed into the highlighted state, and until after editing the last data block, it will return to the starting position. Wherever the cursor is, press the *Enter* key to store all data; press the *Cancel* key to exit the present editing state, and it will not store any data.

### 4.2.3 General Method of Browsing Information

Press the *Query* key, it will display the page of alarm information query, and press numerical key to enter the corresponding page. On the page of fire linkage information, press RIGHT ARROW to change pages of fire and linkage.

Press ▲, ▼ key to gradually change highlighted bar. Press *Cancel* key to return to the upper level operating menu or the page that system is running normally.

## 4.3 Operation Level

The control panel has three operation levels, and they are "I Level", "II Level" and "III Level". When the control panel is powered on, the factory default is "I Level". And at this time, the *Mute* key, *Query* key and *Query setup* menu can be operated, and it displays *Operation level: I* on the blow of LCD screen. In the "II Level", "user setup, self-test, reset, start, stop, disable, enable, linkage, sounder control, and spray control" can be operated. And in the "III Level", "system setup, network setup, and linkage setup" can be operated.

Press *Operation level* key and then press numerical key to choose operation level. And then there is a scene that should be input a password on the LCD screen. At this time, input the correct password and press the *Enter* key, and then it will enter into corresponding operation level to gain corresponding operating authority. If there is no operation in 30 seconds, it will automatically back to "I Level".

## 4.4 Device Register and Register Check

### 4.4.1 Device Register

Press the *Menu* key to enter into the main menu, and then press number 5 to enter the page of "5. *System setup*", and then enter the page of "1. *Device register*". Press *Enter* key and it will register systematically. After registering, the system will reset automatically.

### 4.4.2 Register Check

Press the *Test* key, the screen will display the total number of the control panel’s registration, fault and disable at that time.

### 4.4.3 Check Loop Configuration

Press the *Menu* key to enter into the main menu, and then press number *1* to enter the page of “*1. System information*” and is as shown in Fig. 4-2. This page displays the type and quantity of registered devices in system.

As is shown in Fig. 4-2, press number *1* to enter the page of loop board’s information (as shown in Fig. 4-3).

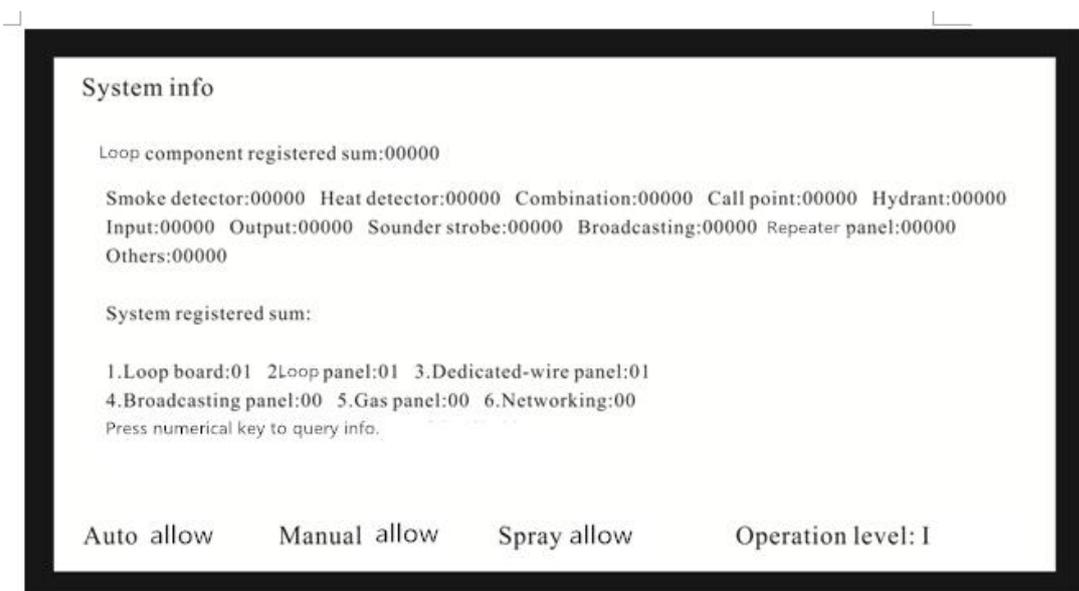


Fig. 4-2

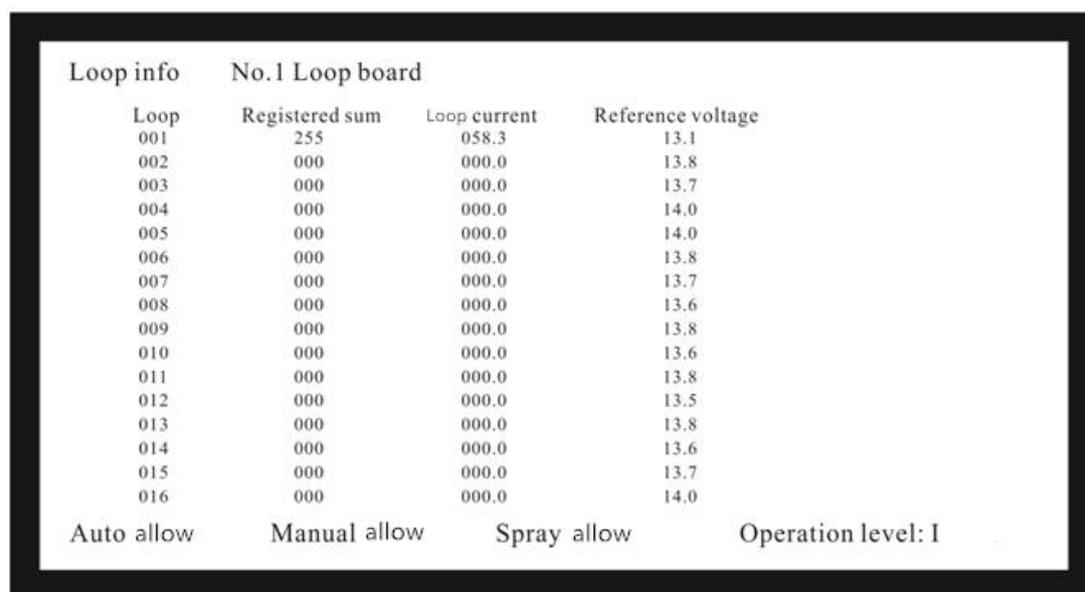


Fig. 4-3

This page shows each loop’s number of registered devices, loop current and reference voltage, and it can reflect whether the loop’s working status is normal. On the page, press ▲, ▼ key to choose loop, and then press the *Enter* key to enter the page of corresponding loop information and the information is as shown in Fig. 4-4.

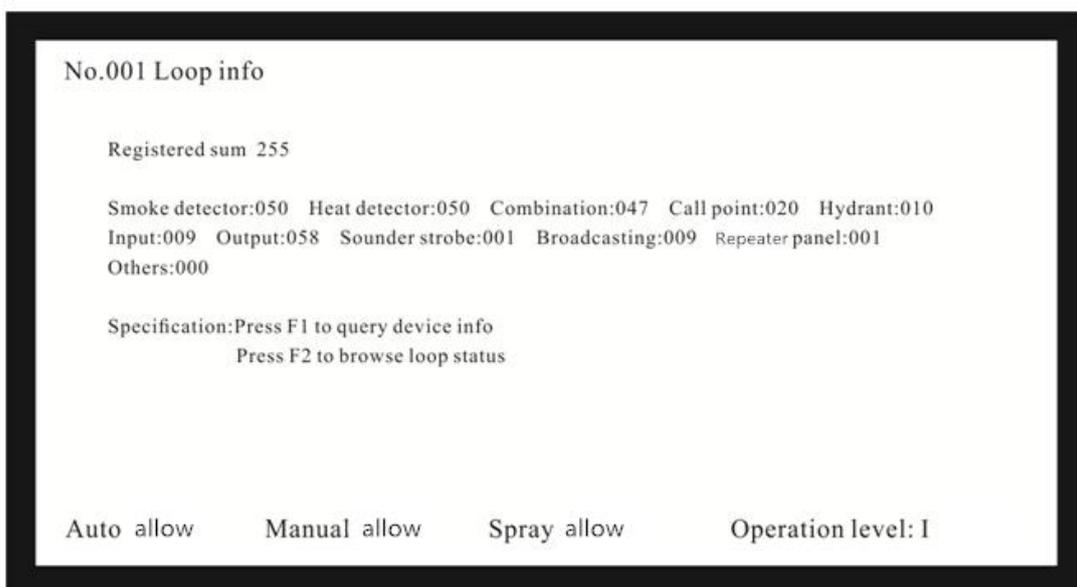


Fig. 4-4

On the page of Fig. 4-4, press the *F1* key to query device information. And then enter the page of loop device information and the information is as shown in Fig. 4-5.

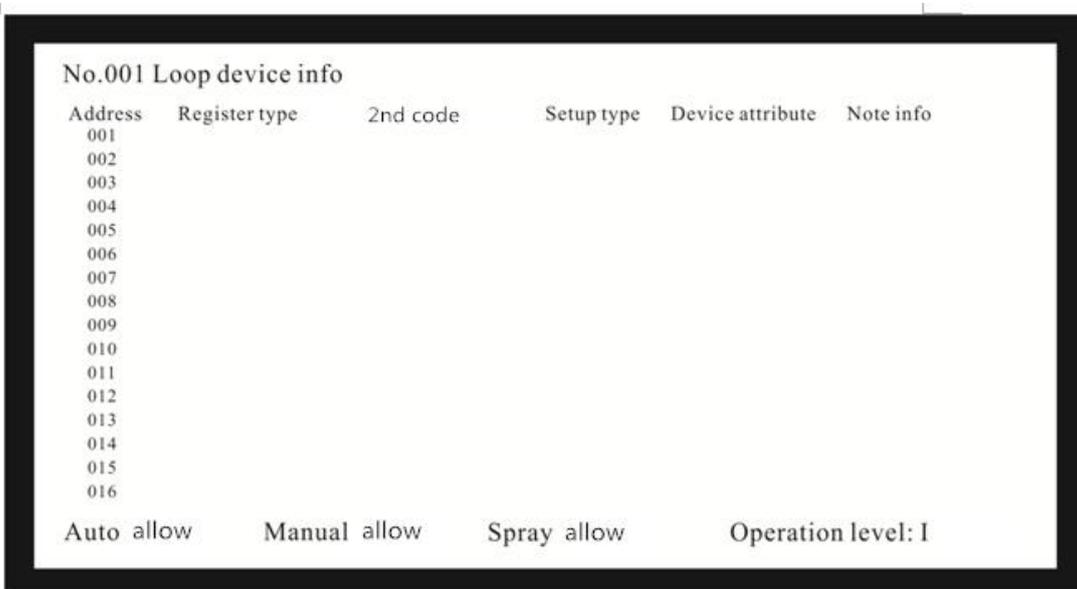


Fig. 4-5

The contents on the page of loop device information include: the device’s address, registration type, 2nd code, setup type, device attribute and note information (detailed meaning should be referred to the chapter of device’s definition). Press ▲, ▼ key to execute the last operation or query the next operation.

The registration type belongs to the front loop device type; the device attribute aims at input module's defining type including fire, feedback and supervisory.

On the page of Fig. 4-4, press the *F2* key to query loop status and then enter the page of browsing loop status, and the information is as shown in Fig. 4-6. This page shows the feedback current of loop devices on this loop, and according to the status table, the loop working status can be judged.

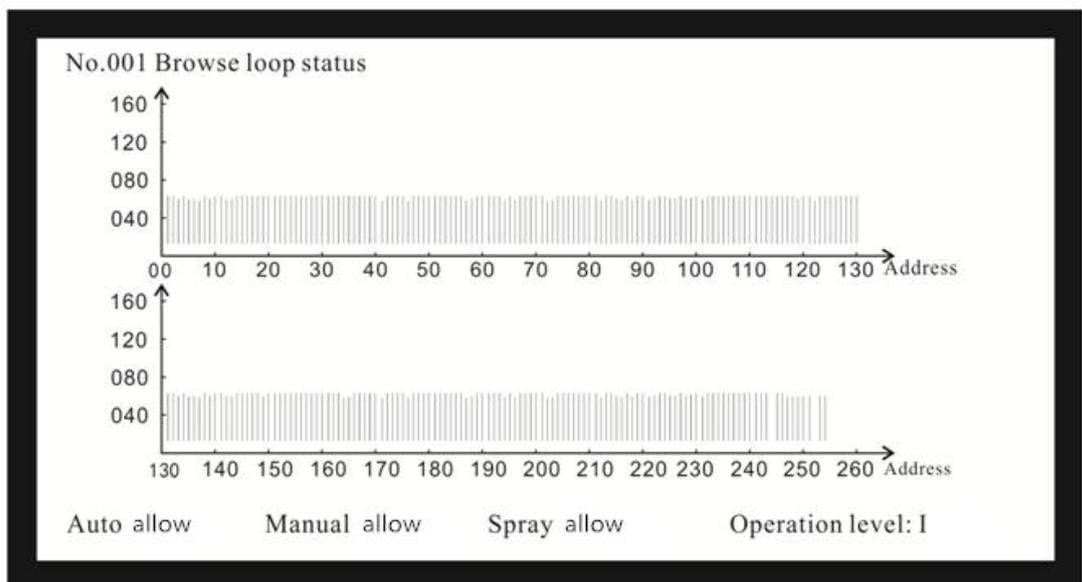


Fig. 4-6

## 4.5 Information Display and History Record

### 4.5.1 Information Display

When there is any information in the system, such as fire, linkage, supervisory, fault and isolation, the system will display the information; if there is more than one piece of information in the system, the system will display the information in the order of fire, linkage, supervisory, fault and isolation. Press the *Query* key to change pages.

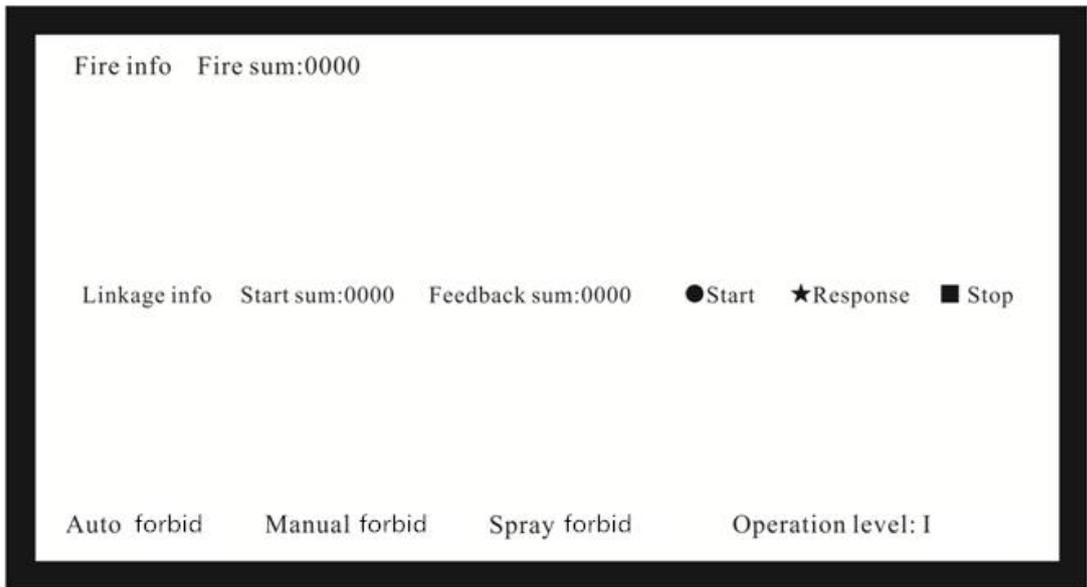


Fig. 4-7

Fig. 4-7 shows the page of fire and linkage information. Press ► key to change pages of fire and linkage information.

#### 4.5.2 View History Record

Press the *Menu* key to enter into the main menu, and then press number 3 to enter the page of history information query, as shown in Fig. 4-8.

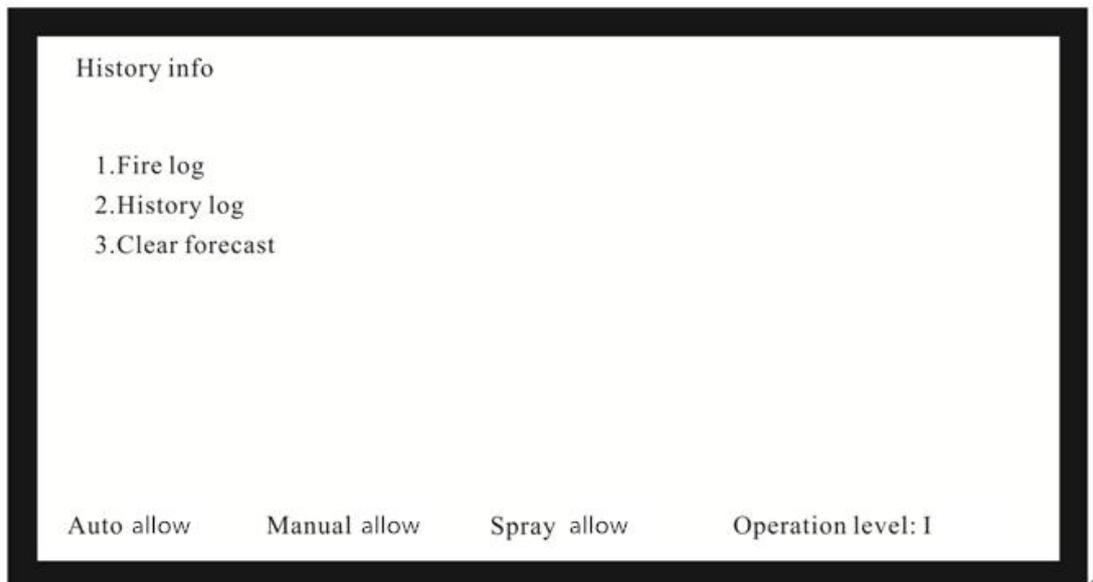


Fig. 4-8

On the page of Fig. 4-8, press number 1 to select fire record. And then enter the page of fire history information, as shown in Fig. 4-9.

Fire history info		Sum:0018		
0001	17/07/22	09:30	01-244	Smoke detector
0002	17/07/22	08:55	01-008	Call point
0003	17/07/22	08:54	01-007	Call point
0004	17/07/22	08:54	01-007	Call point
0005	17/07/22	08:53	01-009	Call point
0006	17/07/22	08:52	01-008	Call point
0007	17/07/22	08:52	01-007	Call point
0008	17/07/22	08:51	01-007	Call point

Auto allow      Manual allow      Spray allow      Operation level: I

Fig. 4-9

The system will display the fire log information, and every piece of information includes log's time, loop, address, and type, 2nd code and note information.

## 4.6 Mute

When there is a fire or fault alarm, the control panel's speaker will send out the corresponding alarm. Press the *Mute* key, the mute LED illuminates, and the speaker stops alarming. If there is a new alarm, the mute LED goes out, and it sends out an alarm sound again.

## 4.7 Handling Method of Fire and Fault

### 4.7.1 General Handling Method of Fault

Faults can generally be divided into two types. One is the main control system fault, such as power fault and battery fault, and loop fault; the other one is field device fault, such as detector fault and module fault. When there is a fault, press the *Mute* key to stop the sound of fault alarm.

If the main power is powered down, use battery to supply. Pay attention that the time of power supply should not exceed 8 hours. If it exceeds 8 hours, the control panel's power switch should be cut off (including backup's switch) in order to prevent battery from damage.

If the system breaks down, it should be examined and repaired timely. And if it needs to be shut down, make carefully detailed records.

If the field device breaks down, it should be repaired timely. If the fault cannot be removed because of

some special reasons, take advantage of isolation function provided by system to isolate device from the system temporarily. After removing faults, take advantage of canceling isolation function to recovery the operation of device.

#### 4.7.2 General Handling Method of Fire

When there is a fire, firstly check the site of fire, and then confirm whether there is a fire. In case of a false alarm, find out the cause and handle it with discretion. If there is a fire, relative personnel should be organized to put out the fire at once.

### 4.8 Device Disable and Enable

When a peripheral device (detector, module or LCD repeater panel) breaks down, it can be isolated. After repairing or replacing it, take advantage of release function to recovery the device.

#### 4.8.1 Device Disable

Press the *Disable* key (if the control panel is in locked state, input the password to unlock it), and the screen is as shown in Fig. 4-10.

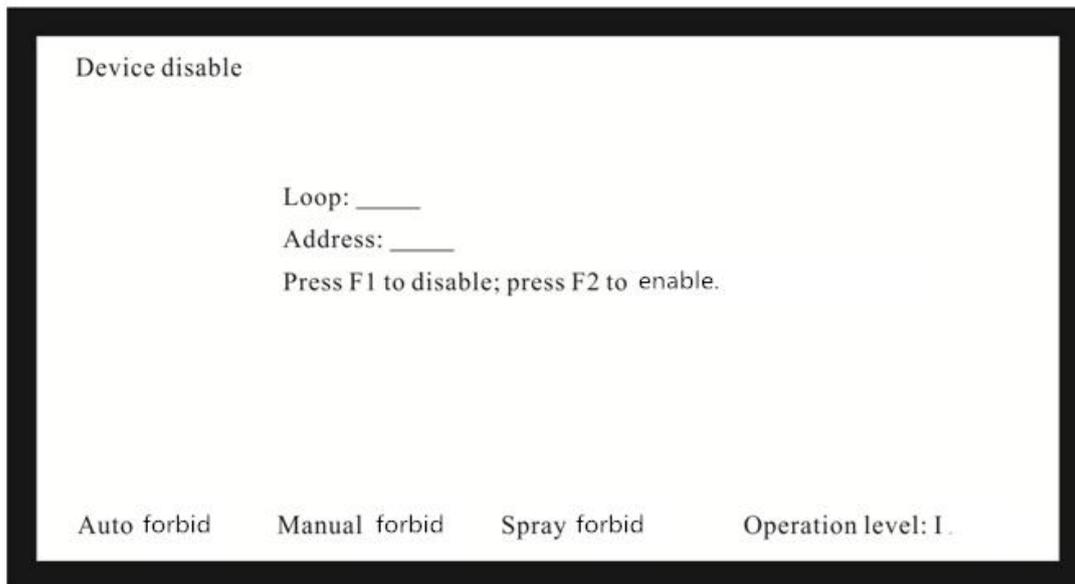


Fig. 4-10

Suppose the device that needs to be isolated is the first loop's No.1 photoelectric smoke detector, and the isolation operation should be carried out in accordance with the following steps:

- ✧ Input the loop and address of the device that needs to be isolated;
- ✧ Press the *F1* key, if the device has not been isolated, the device will be added in the isolation information on the screen.

## 4.8.2 Enable

Press the *Enable* key (if the control panel is in locked state, input the password to unlock it), and the screen is as shown in Fig. 4-11.

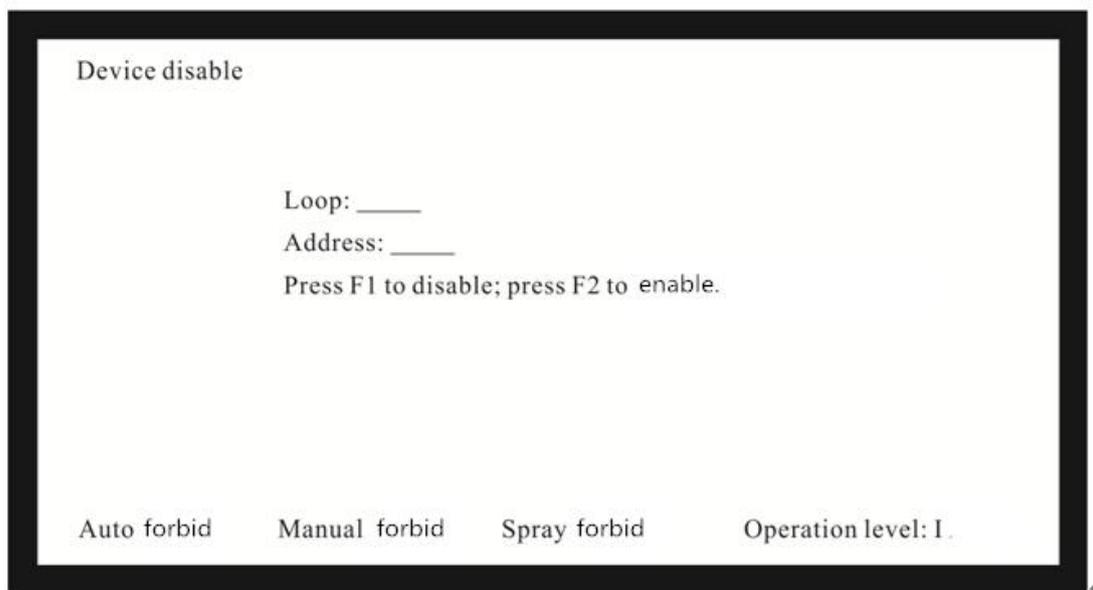


Fig. 4-11

Suppose the device that needs to be isolated is the first loop's No.1 photoelectric smoke detector, and the isolation operation should be carried out in accordance with the following steps:

- ✧ Input the loop and address of the device that needs to cancel isolation;
- ✧ Press the *F1* key, if the device has been isolated, the isolation information of the device on the screen will disappear.

## 4.9 Manual Start/stop of the Controlled Device on Loop System

### 4.9.1 Conditions of Peripheral Device's Manual Start

Pay attention that these peripheral devices are used specially in fire-fighting industry. False operation, on one hand, may lead to unnecessary losses; on the other hand, it may weaken the inherent ability of fire-fighting. The operating personnel should use them carefully!

The startup of peripheral devices should match the following conditions:

- ✧ All the operating personnel must be qualified and trained.
- ✧ Know well the controlled region and the external environment around devices that need to be activated.
- ✧ Know well the device's function and accept consequences that may have after activating the device.

The keypad on the FACP and loop control panel can both control the controlled devices. It is a common

method to use the keypad to input device's loop and address in field. It is a fast method to use loop control panel that having programmed and defined when devices are installed and commissioned.

Only when the control panel is in the state of "Manual allow" can issue the manual startup command.

#### 4.9.2 Start/stop of the Controlled Device on Keypad

Press the *Start* or *Stop* key on the control panel's keypad (if the control panel is in locked state, input the password to unlock it), and the screen is as shown in Fig. 4-12 and Fig. 4-13.

- ✧ Input the loop and address of device that needs to be activated or stopped.
- ✧ Press the *Enter* key, and the control panel issues the device's start/stop command.

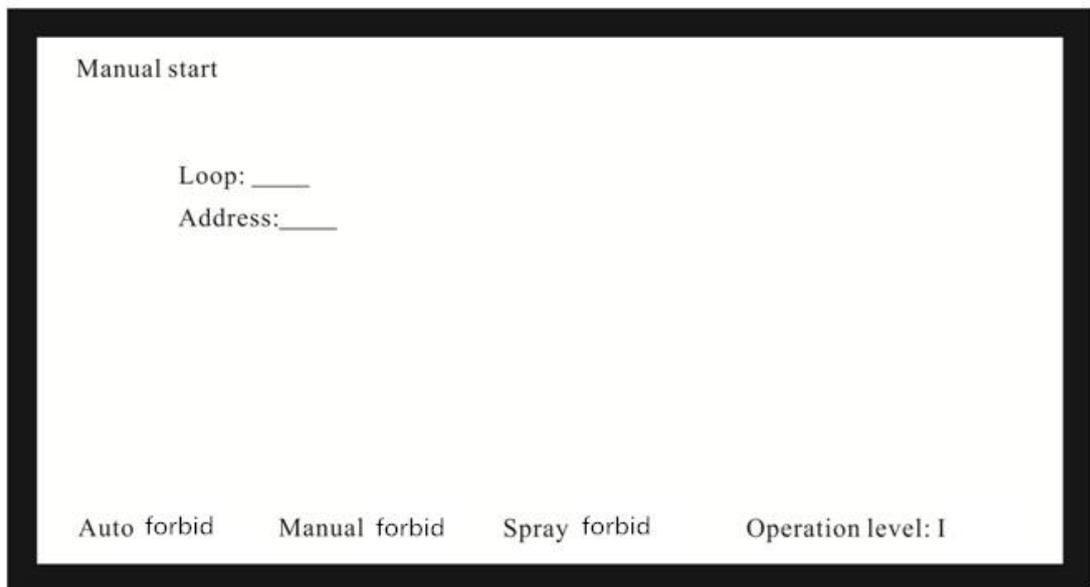


Fig. 4-12

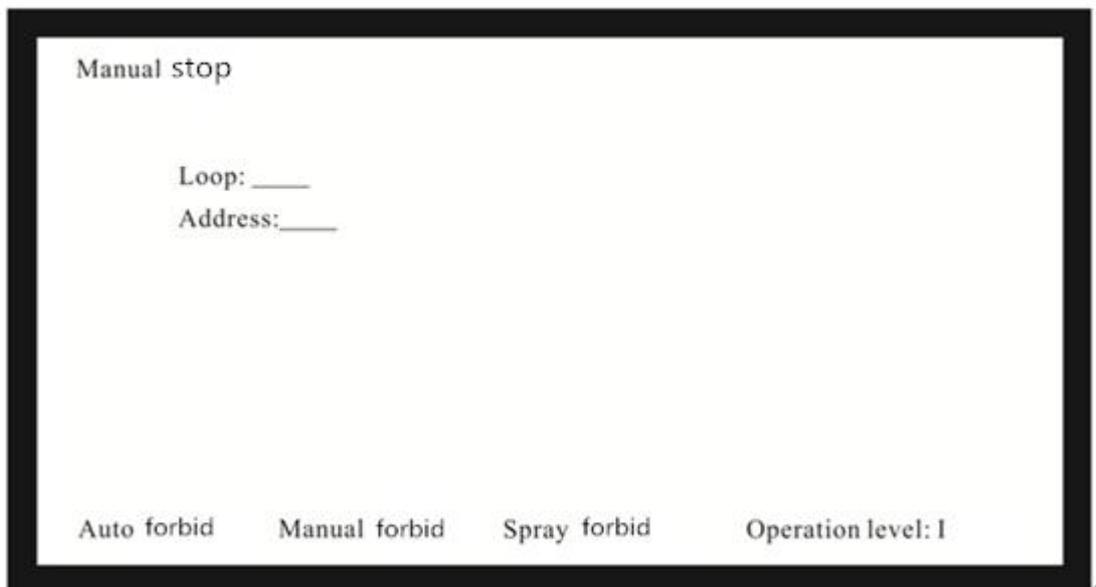


Fig. 4-13

#### 4.9.3 Manual Start/stop of the Controlled Device on Loop Control Panel

To activate a controlled loop device, according to information provided by loop control panel's transparent window, firstly find out the corresponding zone, and press manual key of this zone, and then the command LED illuminates, and the startup command is issued and the device is activated. If press this key again, the command LED goes out, the device stops working and recovers.

## 4.10 Automatic Linkage Control of the Controlled Device

### 4.10.1 Conditions of Automatic Linkage

Only when the control panel is in state of "Auto allow" can it issue automatic linkage's startup command.

If someone is on duty, he or she should try to start loop devices manually.

### 4.10.2 Automatic Linkage Logic

When the logic relationship in linkage formulas is satisfied, the control panel will automatically issue the startup command and the corresponding device will be activated. Refer to specific programming method in *5.7 Editing Method of Automatic Linkage Formula*.

## 4.11 Reset Function

After dealing with fire or fault, clear up the information on the fire alarm control panel. Press the *Reset* key, and input the user password. Resetting can achieve the following functions:

- ✧ Clear all present displays of fire, fault and action.
- ✧ Reset all controlled devices and LEDs on the loop control panel.
- ✧ Clear the requesting startup command and delay request startup command.
- ✧ Clear the mute state.
- ✧ Clear the disabled display, but the disable LED and disabled information still exists. If entering the page of disable and enable, the disabled information will be recovered to display.

## Chapter 5 Operation Guide

### 5.1 Modify Time

Press the *Menu* key to enter the page of “4. *User setup*”, and then enter the page of “1. *Date and time*”, and the screen is as shown in Fig. 5-1. And then edit and modify. After confirming, store the modified contents and then it will get a new system time.

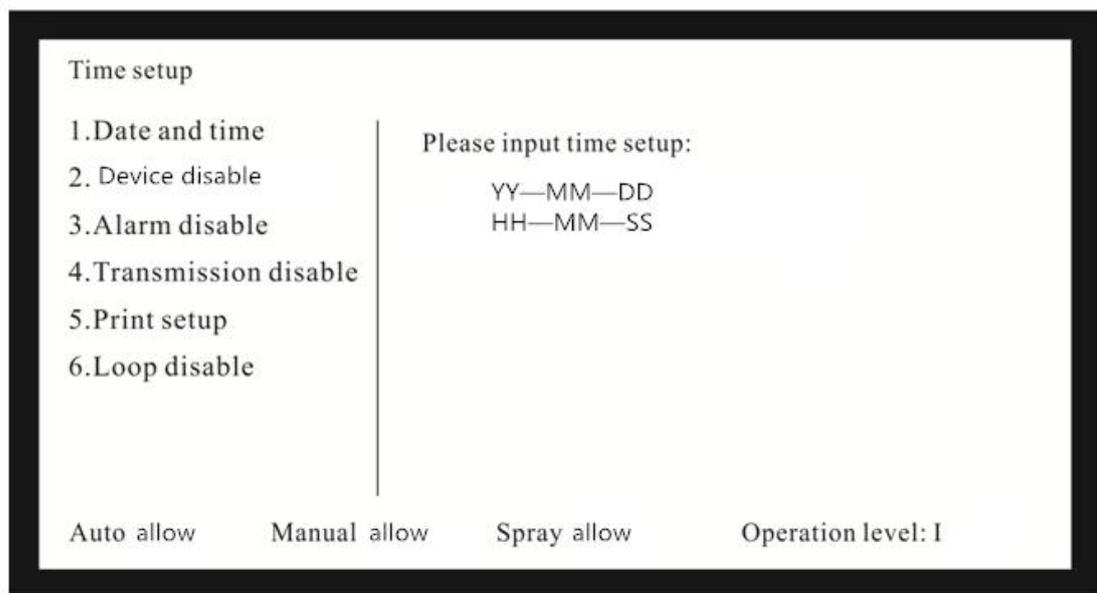


Fig. 5-1

### 5.2 Disable setup

Choose and operate “2. *Device disable*”, “3. *Alarm disable*”, “4. *Transmit disable*”, and “6. *Loop disable*” on Fig. 5-1.

### 5.3 Print Mode Setup

Enter the page of “*User setup*” to choose “*Print setup*”, and the screen is as shown in Fig. 5-2.

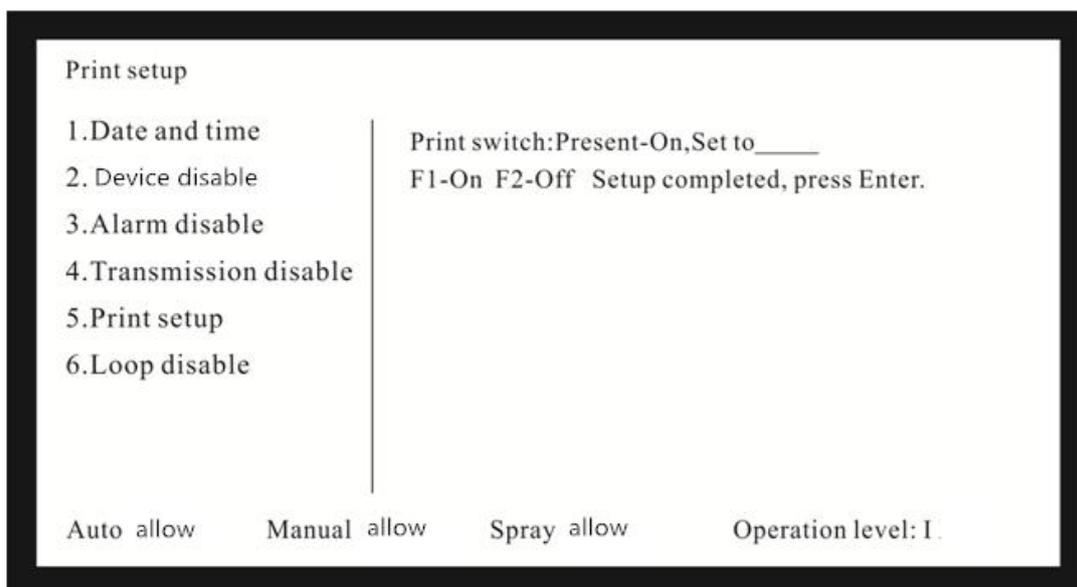


Fig. 5-2

When the printer is off, it does not print any information.

When the printer is on, it prints any new information immediately.

## 5.4 Device Definition

Enter the page of “*System setup*” and then enter the page of “*3. Loop component setup*” and is as shown in Fig. 5-3.

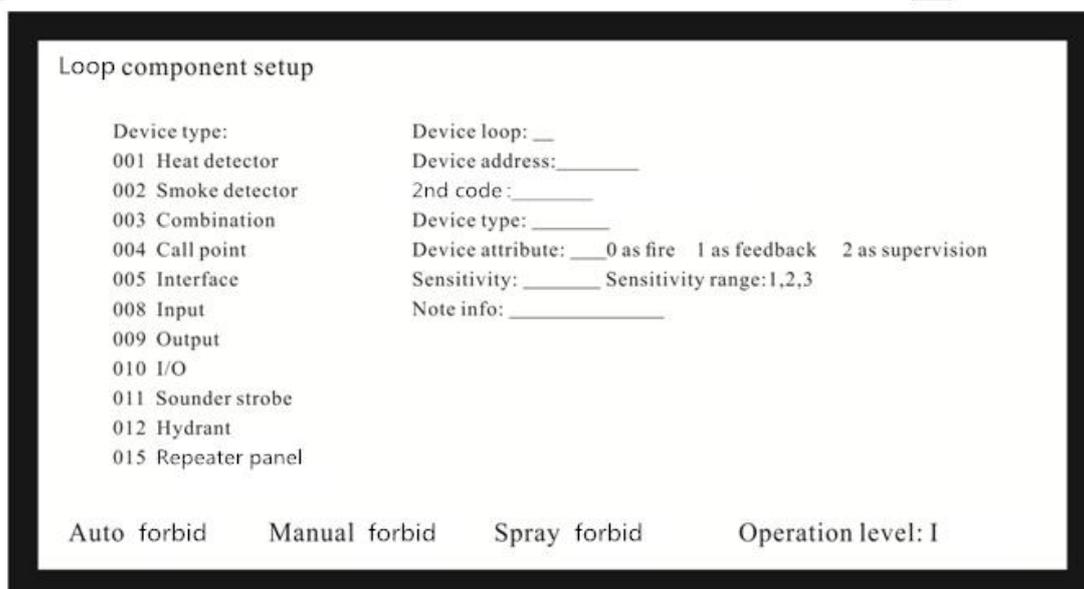


Fig. 5-3

### 5.4.1 Device Definition in Field

Peripheral field devices include detectors, modules, and LCD repeater panels, etc. And these peripheral devices are required to be programmed including original address and field programming.

Field programming of an original programming device is called device definition and as shown in the third item on the page of “*System setup*”. The device that has been registered and has not been registered in the FACP both can be referred as defined device.

Original address consists of the device’s loop number and its address number, and the loop number is set up from 1 to 32. After editing the device number, press the *Enter* key.

Field programming is “user encoding” or “2nd code”, which consists of 8 digits made up of 0 to 9. The group of number is defined by human to express this device’s specific field situation. And through the programming, the user can easily know the programmed device’s location and other information related to the device’s location. The general provisions of the user encoding are as follows (It can also be arbitrarily defined according to actual needs; it is mainly used to realize linkage programming):

The first digit and the second digit refer to the device’s building number, and the number range is from 0 to 99. The building number refers to a relative independent building. For example, a garden district is made up of several building offices, and each building can be regarded as a building number.

The third digit refers to the building’s zone number, and the number range is from 0 to 9. For example, if there are 3 units in one building, each unit refers to a zone.

The forth digit and the fifth digit refer to the floor number. In order to define devices in the underground part of the building for convenience, it is specified that 99 refers to basement 1, and 98 refers to basement 2, and so forth.

The sixth digit, the seventh digit and the eighth digit refer to the room number of the loop device or other codes that can identify characteristic.

**Device type:** refer to the device type table and input three digits.

**Device attribute:** peripheral devices can be set to as “fire”, “feedback” and “supervisory”, and they are respectively indicated as 0, 1 and 2. It is mainly aimed at defining input module’s attribute.

**Sensitivity:** peripheral device’s alarm sensitivity level can be set up including three levels, which is mainly aimed at defining smoke detector’s attribute.

**Note information:** it indicates device’s location or other relevant information.

**Specification:**

At the process of defining device, only input Arabic numeral, and other characters are as illegal.

#### 5.4.2 Example of General Device Definition

Enter the page of “*System setup*”, and then enter the page of “4. Loop component setup” and is as

shown in Fig. 5-4.

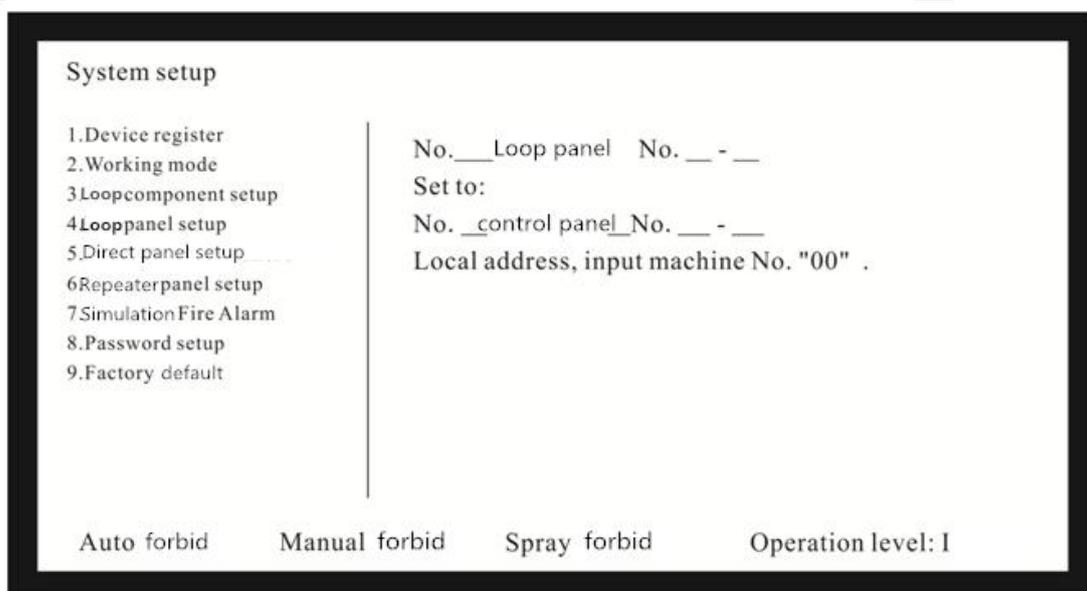


Fig. 5-4

Input loop control panel’s address number and corresponding module’s address to set corresponding linkage relation on the loop panel. And then press *Enter* key. After setting, press *Cancel* key to exit the setup. When the module is connected to the FACP, the control panel number is 00; when it is connected to other FACP, input this control panel’s number where the module is.

For example: t No.1 loop panel’s No.1-10 linkage points correspond to loop 1’s No.1-10 linkage modules and the setup method is as following:

No.01 loop panel No.001 to No.010

No.00 FACP No.01 loop No.001 to No.010

Do not input “No.010” in the second line, the FACP will automatically fill it after calculating.

## 5.5 Password Setup

According to the systemic security requirements, the password includes level II and level III, and the high-level password can take replace of low-level password.

Switch operation level to input the system password. After exiting corresponding menu, the password is invalid. Operate the above menu, and it is required to input the password again. To set operation password, enter the eighth item of Fig. 5-3 to do corresponding setup. Level II password has 3 digits, and level III password has 6 digits.

## 5.6 Other Setup

In Fig. 5-3, press numerical key or ▲, ▼ key to enter the corresponding page.

**5.6.1 Device register:** realize automatic registration function of loop device. After registering, the FACP will automatically reset.

**5.6.2 Working mode:** switch between commissioning mode and normal mode.

**5.6.3 Direct control panel setup:** direct control panel's user encoding setup. Setup items include: user encoding and device type.

**5.6.4 LCD repeater panel setup:** set LCD repeater panel's display range; it needs to connect corresponding LCD repeater panel on loop and transmit setup information to LCD repeater panel and input user encoding (Transmit a group of devices to corresponding LCD repeater panel by using wildcards. For example: 01203\*\*\*, it indicates that all alarm's device information in Floor 3, Zone 2, Building 1 is transmit to corresponding LCD repeater panel. And the information includes loop number, address number, user encoding, and device type and note information).

**5.6.5 Simulation fire:** input the device's loop number and address number. Press *F1* key, the fire LED illuminates; press *F2* key, the fire LED goes out. And it can be used to confirm device's location.

**5.6.6 Factory default:** all field programming data will be cleared including linkage programming, user encoding setup, history log, etc. Information cannot be recovered after cleared, so it is necessary to operate after confirming.

## 5.7 Editing Method of Automatic Linkage Formula

Field device mainly refers to the device that connects to FACP's loop board, non-polarity two-wire. Each device takes up an addressable point. This system provides 32 loops at most, and each loop has 255 addressable points. These devices include detectors (such as photoelectric smoke detector, rate of rise and fixed temperature heat detector, etc.), input module (such as fire hydrant module, flow indicator input interface module, etc.), I/O module (such as fire valve module, fire hydrant pump control module, etc.), and security module that install specially for the user.

### 5.7.1 Format of Linkage Formula

Linkage formula is used to define linkage relation's logic expression between alarm device and the controlled device in the system. When the detection device alarms or the state of control module changes,

according to these logic expressions, the FACP can automatically start or stop the controlled device. The linkage formula is divided into two parts by equal sign. The back part is condition, which consists of user encoding, device type and relational symbols. The front part is device that needs to be linked, which consists of user encoding and device type.

**For example:** Y (01010001 011) = (01010\*\*\* 004) \_2

**Indicate:** among manual call points, 2<sup>nd</sup> code's first five digits are 01010, if any two of them alarm, No. 01010001 sounder strobe will be activated at once.

**Note:**

1) The symbol “=” indicates that the device will be activated when all requirements are satisfied; the symbol “=X” indicates that the device will be stopped when all requirements are satisfied.

2) In linkage formula, the devices that before or after “=” symbol must consist of 2<sup>nd</sup> code and device type. Device type cannot be omitted, and the middle of 2<sup>nd</sup> code and device type is separated by a blank space. In the front of “=”, they are linkage device's 2<sup>nd</sup> code and type. At the back of “=”, they are alarm device's 2<sup>nd</sup> code and type. The “\_ \*” symbol that after each set of parentheses of alarm device indicates the number of alarm device that satisfy requirements in parentheses.

3) Relational symbols have “And” and “Or”, “+” represents “Or”, and “X” represents “And”.

**For example:** Y (01010001 011) = (01010\*\*\* 002) \_1+ (01010\*\*\* 004) \_1

**Indicate:** among smoke detectors, 2<sup>nd</sup> code's first five digits are 01010, if any one of them alarms, or among manual call points, 2<sup>nd</sup> code's first five digits is 01010, if any one of them alarms, No. 01010001 sounder strobe will be activated at once.

**For example:** Y (01010001 011) = (01010\*\*\* 002) \_1 x (01010\*\*\* 004) \_1

**Indicate:** among smoke detectors, 2<sup>nd</sup> code's first five digits is 01010, if any one of them alarms and at the same time among manual call points, 2<sup>nd</sup> code's first five digits is 01010, if any one of them alarms, No. 01010001 sounder strobe will be activated at once.

4) It is allowed to have wildcard “\*” in linkage formula and it replaces any digit from 0 to 9. At present, wildcard can only be used in 2<sup>nd</sup> code of the condition part (alarm device), and it cannot be used in device type.

For example, 0\*001315 represents:

01001315+02001315+03001315+04001315+05001315+06001315+07001315+08001315+09001315+0001315.

5) There can only be an equal sign that indicates causal relationship.

### 5.7.2 Editing of Linkage Formula

On the page of main menu, press number 7 key, and then press number 1 key to enter the page of linkage programming. The screen will display editing menu of linkage formula. (It is shown in Fig. 5-4).

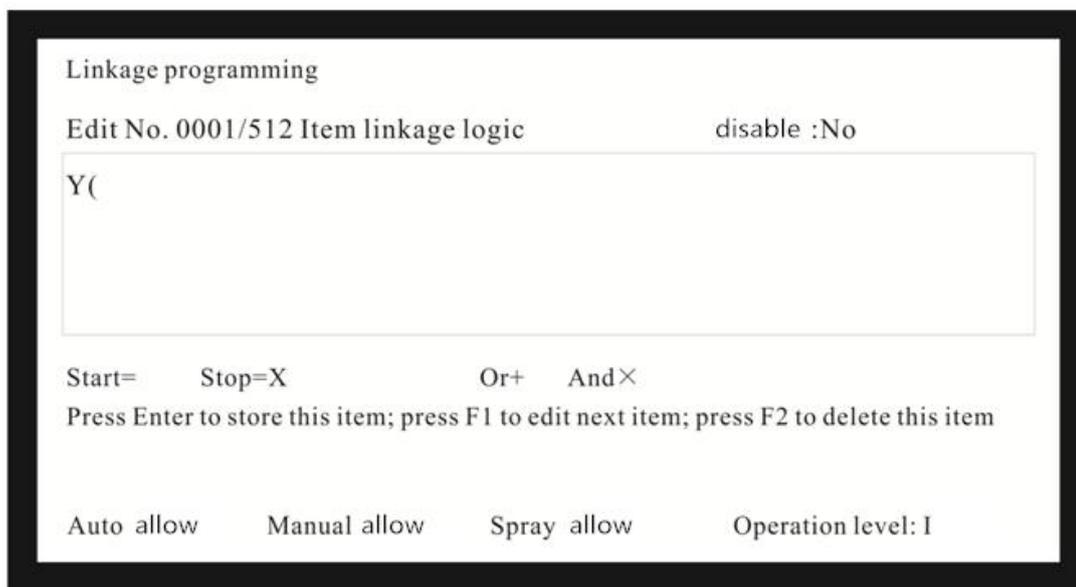


Fig. 5-4

**Browse:** press ▲, ▼ key, contents of linkage programming can be displayed item by item.

#### Note:

This system has syntax checking function for linkage formula. If there is a syntax error in the input linkage formula, at the time of pressing the *Enter* key, the system will report “Input error” and will not store the wrong linkage formula, and it needs editing again.

The middle of user encoding and device type should be separated by a blank space.

Note: The above linkage programming, notes and 2<sup>nd</sup> code can be edited on the computer, and then store them into the U Disk, and then transmit them into the FACP through the USB interface on main board. Through the USB interface, upload and download relevant information. And it is convenient for field commissioning and later maintenance.

On the page of linkage programming, press number 3 key to enter the page of offline programming. Insert the U Disk, choose the content that needs to download, and then it will be downloaded. When the screen display “Download completed”, turn off the FACP and unplug the U Disk.

Note: Do not unplug the U Disk directly at the process of downloading, otherwise it is easy to damage the U Disk. For the moment, the U Disk supports FAT16 file system.

## 5.8 Linkage Mode Setup

Press the *Linkage* key, and it displays the linkage mode menu (as shown in Fig. 5-5). And then press the direction key to select the corresponding mode. Press the *Enter* key to enter into the next item. After finishing the setup, the screen will display “*Setup completed!*” And then the system will run in the selected state.

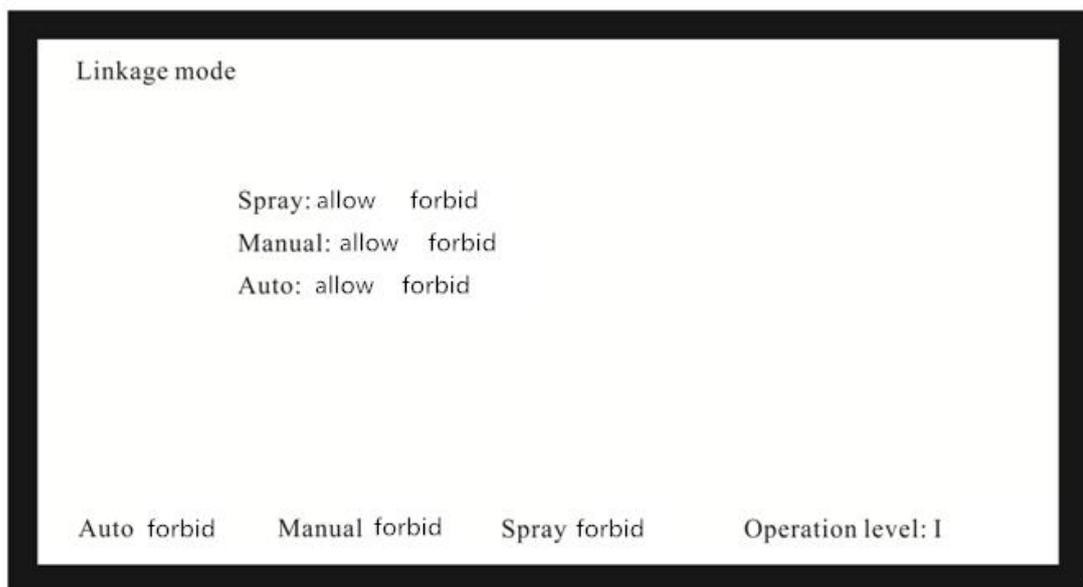


Fig. 5-5

**Specification:** Manual mode refers to manually control linkage devices through main keypad or loop control panel. “Manual” will be displayed in the state bar below the screen.

When the automatic mode satisfies linkage requirements, the system will automatically operate.

## Section 4 Equipped with Direct Control Panel

### Chapter 6 Equipped with Direct Control Panel

#### 6.1 Overview of Direct Control Panel

Direct control panel is one of components of the FACP, which is designed for reliable control of

important devices in fire control system, such as fire pump, smoke extractor, and air feeder, etc. It is divided into two-wire direct control panel and three-wire direct wire control panel. TC5013A three-wire direct control panel consists of a TC5013 display board (TC5013 Board), a TC5013A-OUT-9 output board (TC5013A-OUT-9), and a TC5013A-OUT-6 output board (TC5013A-OUT-6).

## 6.2 Feature of Direct Control Panel

A JB-TB-TC5100 intelligent fire alarm control panel can have 1 direct control panel. And each direct control panel has 15 sets of linkage output control points, and it can control 15 controlled devices. Select according to requirements. As for the device that needs both startup and stopping, the panel can control 5 devices.

Direct control panel's output terminal has short circuit and open circuit detecting function and corresponding sound and light indication.

## 6.3 Technical Specification of Direct Control Panel

1 Operating voltage: DC20V ~ DC28V

2 Output capacity:

Maximum 15 outputs, not taking up addressable points

3 Output wiring: 3-wire

4 Operating wiring: two control loop and two DC24V power wires

5 Operating environment:

Temperature: 0°C~+40°C

Relative humidity≤95%, non-condensation

## 6.4 Structure Feature of Direct Control Panel

### 6.4.1 Specification of Front-panel

- (1) Self-test key: used to check whether LEDs on the direct control panel.
- (2) The lock of manual allow/forbid: used to select manual startup mode.
- (3) Manual LED: green; it illuminates when the manual lock is in enabled state.
- (4) Fault LED: yellow; it illuminates when there is a short circuit or open circuit in external control

circuit.

(5) Active LED: red; it illuminates when the control command is issued.

(6) Feedback LED: red; it illuminates when the controlled device is in a state of feedback.

**Note:** when manual allowed, operate direct control panel manually.

## 6.4.2 Specification of Internal Structure

### 6.4.2.1 The sketch diagram of display board

It is as shown in Fig. 6-1:

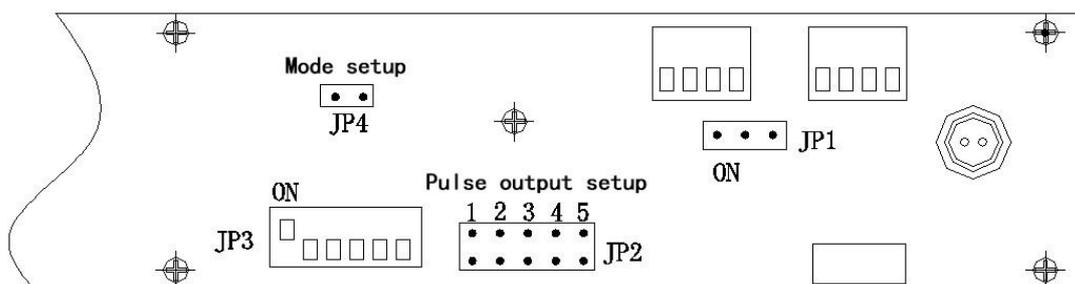


Fig. 6-1

The above figure shows:

(1) JP1: internal CAN loop is short circuited

There is a short circuit in CAN loop, and the jumper cap is on the place of “ON”.

(2) JP2: pulse output setup

Using short circuit block to make some place of JP2 short circuited means “electrical level” output mode; taking off the short circuit block means “pulse” output mode. The corresponding start/stop points of pulse mode:

The first group: the first point is startup; the second point is stop;

The second group: the fourth point is startup; the fifth point is stop;

The third group: the seventh point is startup; the eighth point is stop;

The fourth group: the tenth point is startup; the eleventh point is stop;

The fifth group: the thirteenth point is startup; the fourteenth point is stop.

The permutation order of key number on the panel is vertical from top to bottom, and then is horizontal from left to right.

(3) JP3: encoding switch

6 digit binary dial code; it is used to set address encoding.

(4) JP4: mode setup

When the display board only equips with TC5013A-OUT-9, use short circuit block to make it short circuited.

### 6.4.2.2 The sketch diagram of TC5013A-OUT-9 and TC5013A-OUT-6

It is as shown in Fig. 6-2:

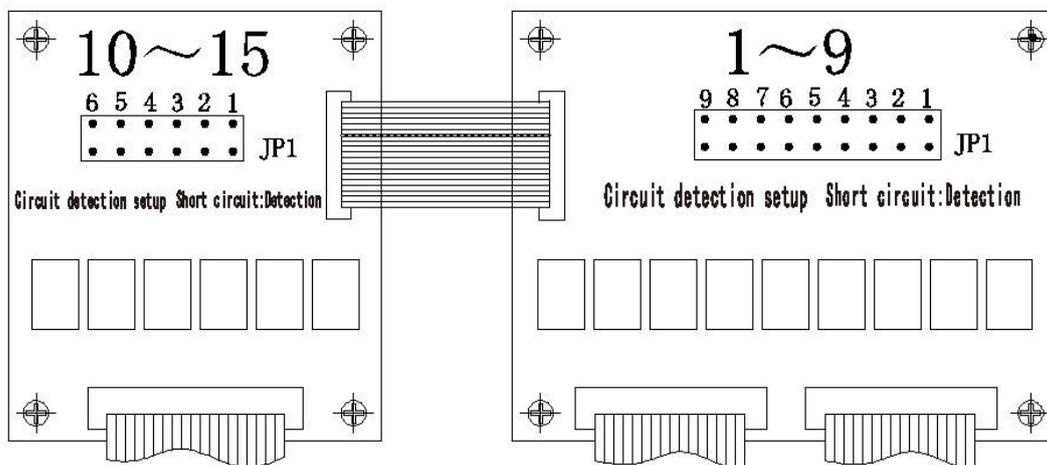


Fig. 6-2

The above figure shows:

JP1: detecting circuit

Using short circuit block to make No.1 short circuited to detect circuit fault. When some circuit does not connect a peripheral device, the circuit does not detect fault.

### 6.4.2.3 The sketch diagram of TC5013A-LB-9 Output board and TC5013A-LB-6 Output board

It is as shown in Fig. 6-3:

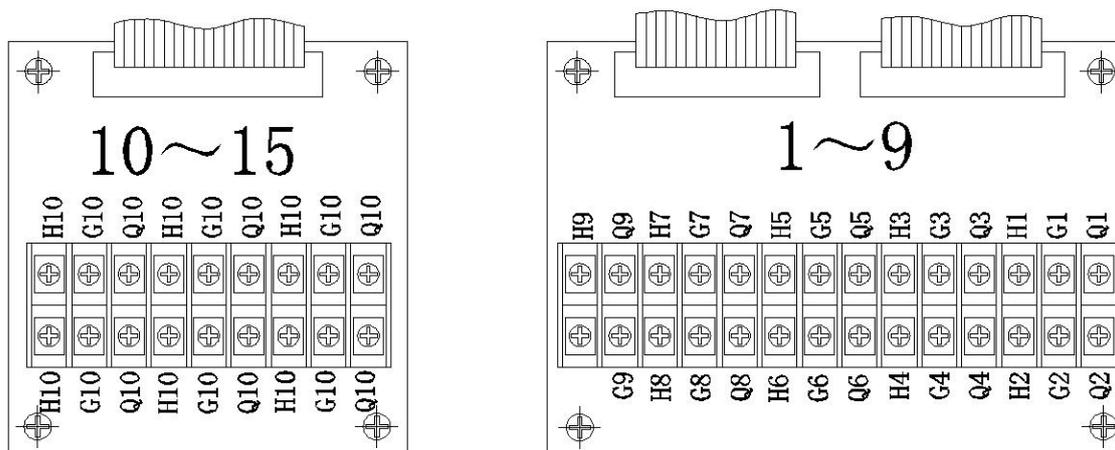


Fig. 6-3

Among them:

Q, G: start output terminal. When activated, output DC24V. When the output current is  $< 200\text{mA}$ , the

load is signal relay, and the coil resistance is 0.5-2K.

H, G: peripheral device's feedback signal input terminal. When volt-free closed, feedback input terminal, and the end-of-line resistance is 4.7K.

#### **6.4.2.4 Wiring requirements**

1.0mm<sup>2</sup> or above BV copper-core cable.

## Section 5 User Instructions

### Chapter 7 Handling Fault, Abnormal Information and Checking Regularly

#### 7.1 Troubleshooter

Table 1

No.	Problems	Possible Causes	Solutions
一	No indication on the panel or abnormal indication after power-up	a. Power is abnormal b. Loose connection with display board	a. Check 24V power supply b. Check the connection
二	Display “Power fault” after power-up	a. No AC power b. AC insurance tube is burned off	a. Check and connect AC wire b. Replace AC insurance tube (parameter is on label)
三	Display “Battery fault” after power-up	a. Insurance tube is broken b. Loose connection with battery c. Battery is discharged or damaged	a. Replace insurance tube (parameter is on label) b. Open the power box and check relative parts c. Power up for more than eight hours with the AC power supply, if the fault still exists, replace the batteries.
四	Loop board communication fault	a. Loop board is inserted badly	a. Check and insert it well
五	Unable to register repeater panels	Wrong or loose connection of communication cables	Check power supply to repeaters and communication wires
六	Cannot print	a. Print mode is disabled b. Loose connection with printer c. Printer damaged	a. Enable the print mode b. Check and connect the printer well c. Replace the printer
七	No response after pressing manual key	a. Manual key is in forbidden state b. Cable connection of linkage control panel is bad	a. Reset start mode b. Check and connect it well
八	Equipment fault	a. Equipment disconnected b. Equipment damaged	a. Check connection b. Replace equipment
九	Loop fault	Loop is shorted	a. Check the loop and repair
十	Clock and memory fault, loop fault and so on	a. External interference b. Corresponding parts are aging	a. Check if the FACP is properly earthed b. Inform our technical service

## 7.2 Checking Regularly and Replacement

Should inspect device regularly : printing paper belongs to easily-consumed product , it should be replaced when lacking of paper

## Chapter 8 Announcements

This control panel belongs to precision electronic product; it should be managed by specially trained personnel and prohibited to be touched by others.

The user should take duty's notes carefully. If there is a fire, the user should press the *Mute* key first. After there is a fire, the user can handle with discretion. After handling, do execution record, and then press the *Reset* key to remove it. If there is a false alarm, after recording, the user can disable detectors or modules and inform our company's after-sales service department to repair.

Our company is responsible for warranty. If you find the problem, please contact our after-sales service department. The users can't disassemble or repair by yourself; otherwise, you suffer all consequences.

## Appendix 1 Technic Index

### Capacity:

Maximum 4 loops, 1020 addressable points.

Maximum 60 LCD repeater panels

Maximum 1 direct control panel

Maximum 1 loop control panel

### Wiring system:

Wiring system	Connecting wire	Distance	Quantity
24V non-polarity two-wire	$\geq 1.0\text{mm}^2$ twisted pair	$< 1.5\text{km}$	255 detectors or modules
RS485 loop	Two-core shielded wire	$< 500\text{m}$	1 CRT
Two-wire direct control wire	$\geq 1.0\text{mm}^2$ RV cable	$< 1.5\text{km}$	Maximum control 15 points each panel, each point connect 1 TCMK5207
Three-wire direct control wire	$\geq 1.0\text{mm}^2$ RV cable	$< 1.5\text{km}$	Maximum control 15 points each panel

### Operation environment

Temperature:  $0^{\circ}\text{C} \sim +40^{\circ}\text{C}$

Relative humidity  $\leq 95\%$ , non-condensation

### Power supply

Main power supply: AC220V (5A)

Voltage range:  $+10\% \sim -15\%$

### Backup power supply: DC24V

Backup battery: 12V/12AH sealed lead acid battery

Liaoning • Yingkou Tiancheng Fire Protection Equipment Co., Ltd

Address: No.8 Industry Park, Hekou Development Zone, Yingkou, Liaoning, China

Website: [www.yktxf.com](http://www.yktxf.com)

E-mail: [alarm@yktxf.com](mailto:alarm@yktxf.com)

Zip code: 115004

Fax: 0417-4835568

Service hotline: 400-6939-119