

**Wireless LAN Elevator Local Monitor System  
(SJT-WZB Serial)**

# **User's Manual**

**Shenyang Bluelight Automatic Technology Co.,Ltd**

**Version: V1.2**

## 1. Product Information

### 1.1 Product Type

The monitor network of Wireless LAN Elevator Local Monitor system is composed of LAN Data Collector (SJT-WZB-V0).

LAN Data Collector is mainly for collecting elevator data and upload elevator data through wireless LAN. The product is shown in following Figure 1.1.



Figure 1.1 Wireless LAN monitor device

The main function of device is collecting elevator data and summary. This device can be set as Terminal(Routing) Device or Repeater or Coordinator according to function requirement during LAN communication. The detail function and steps refer to Chapter 4 LAN Data Collector Introduction.

**Note: The product is subject to actual item.**

## 1.2 Dimension

Product dimension is as following:

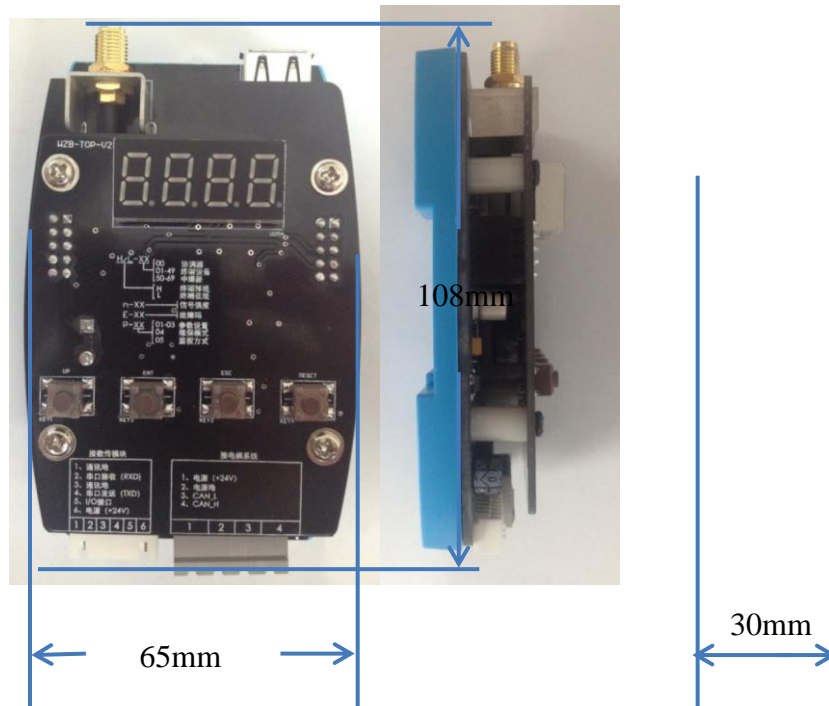


Figure 1.2 Product Dimension

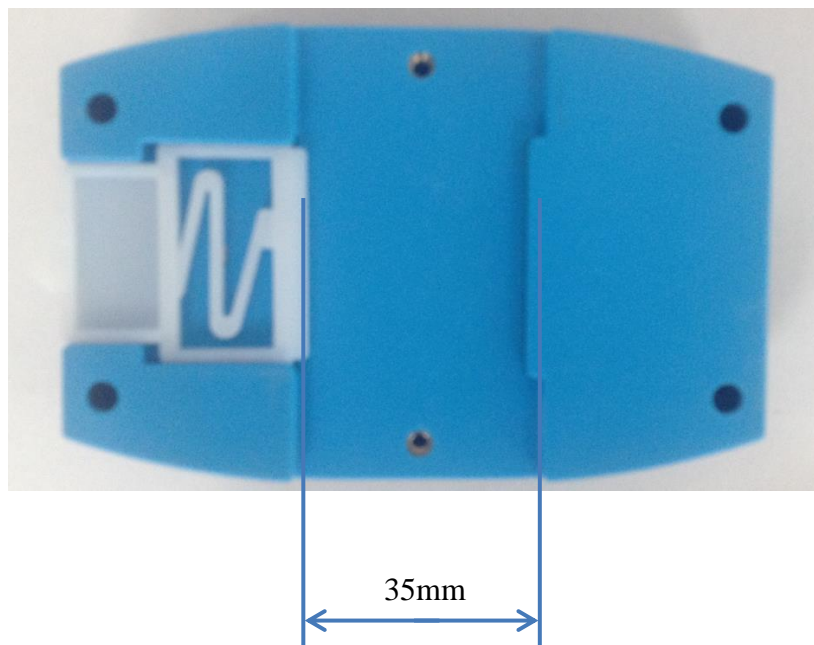


Figure 1.3 Product Dimension

Note: 1. All device have backside slot, which can be fastened on standard rail directly.

2. About dimension donot include SMA antenna.

### 1.3 Product composition

This product mainly includes following part:

Name	Model	Introduction	Note
Wireless LAN Data collector	SJT-WZB-V0	LAN elevator data collection and summary	
LAN Monitor PC Software	Ver: 0.6.0	Display current elevator data on computer	
All direction antenna	12db-50Ω, 2.4G	Enhance signal quality of monitor device	Default set
Directional antenna	200mmX150mm	Enhance signal quality of monitor device	Change according to actual condition

Chart 1. Composition of LAN Data Collector

## 1.4 System Structure

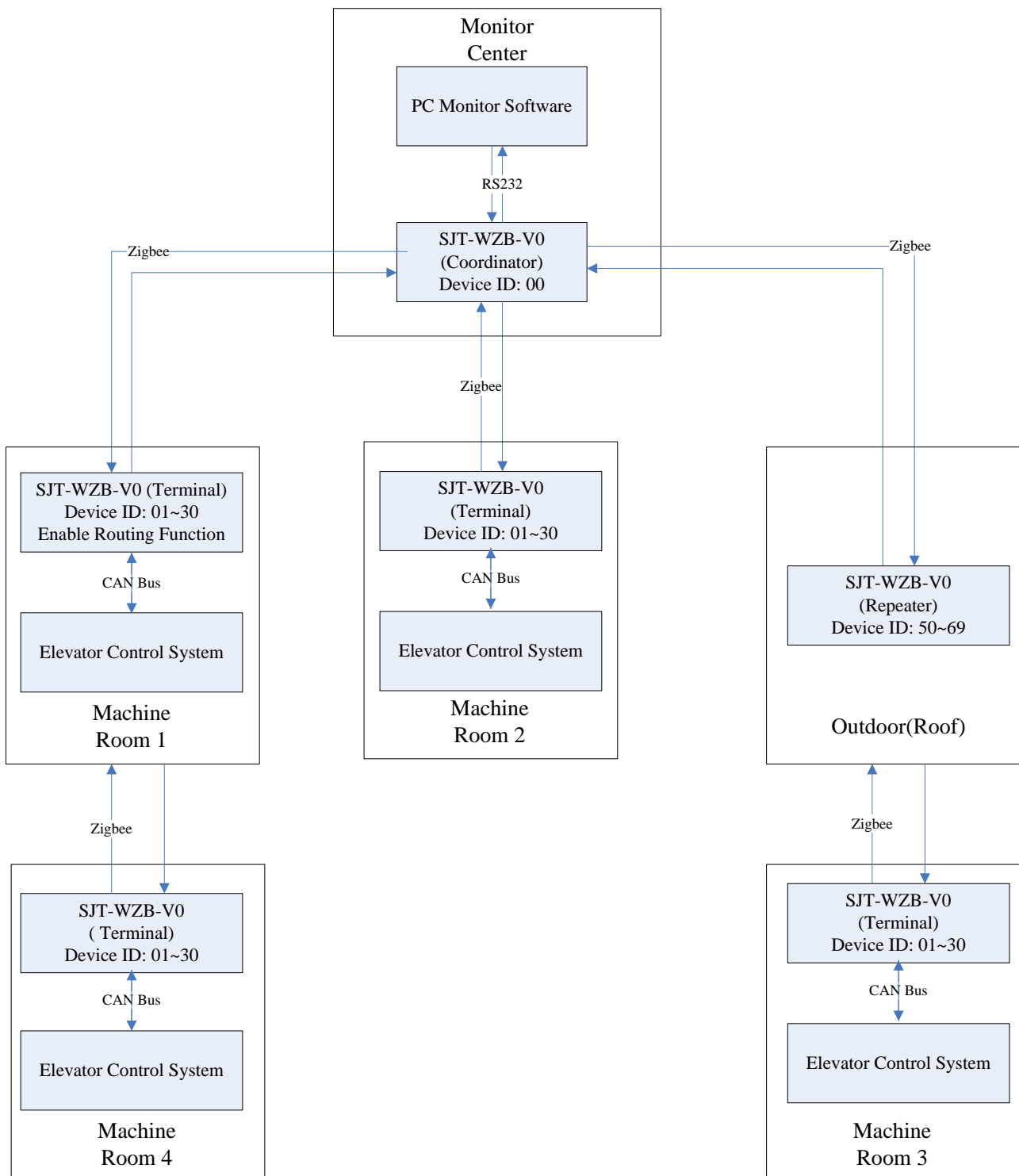


Figure 1.4 System Structure

Monitor system is composed of PC monitor software and LAN data collector. LAN data collector can be divided to Coordinator, repeater and terminal device. The hardware are same, but its function can be various through different ID as following:

Coordinator: LAN initiator. Repeater and terminal device join in LAN organization after finding

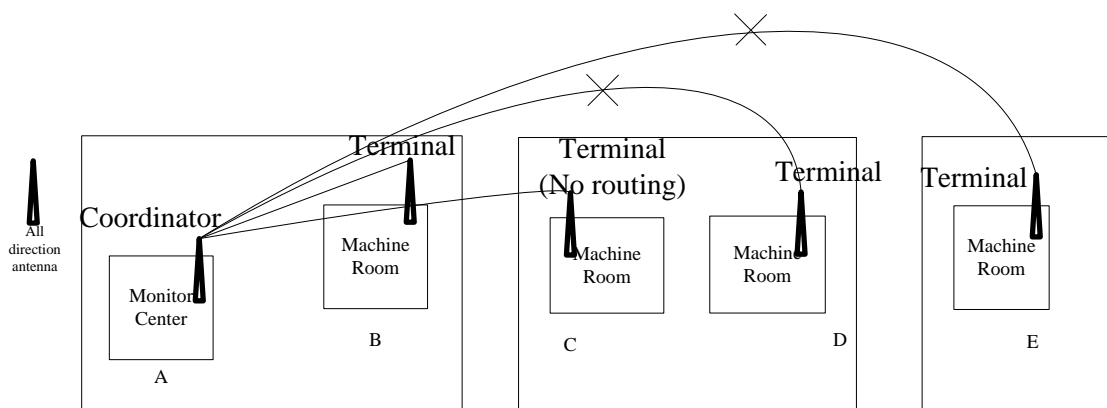
coordinator. Each group of LAN Network must have one coordinator.

**Terminal device:** Terminal of Wireless LAN. It affords elevator data collection and transmission. It gets elevator data through CAN Bus and transmit to coordinator. Terminal device can only communicate with coordinator by default, cannot communicate with other terminal device. But after enable routing function of terminal device, it can not only communicate with coordinator, but also help other device to communicate with coordinator.

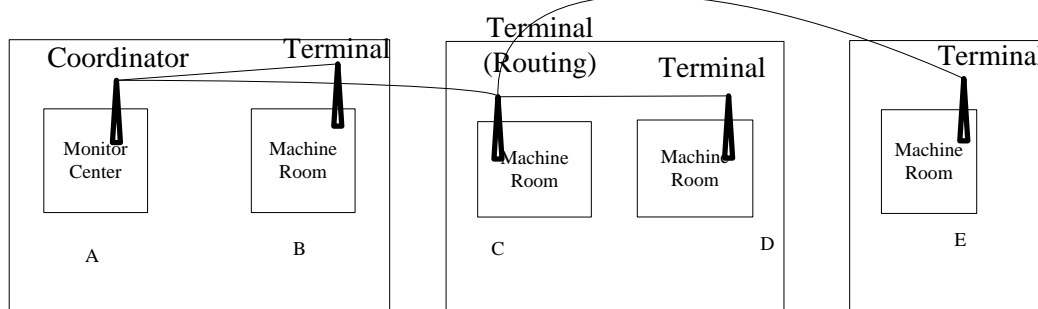
**Repeater:** When one terminal device cannot connect to coordinator because signal intensity not enough or signal intensity is too low, building repeater can help to enhance signal quality. It is only for helping communication to transmit data, but not for elevator data collection.

Coordinator will summarize elevator data from terminal device and then send to PC. Through PC monitor software, it can achieve LAN elevator monitor. When the number of monitored elevator is large, it is possible to divide them to several group LAN. Then connect coordinator of each group LAN to one PC.

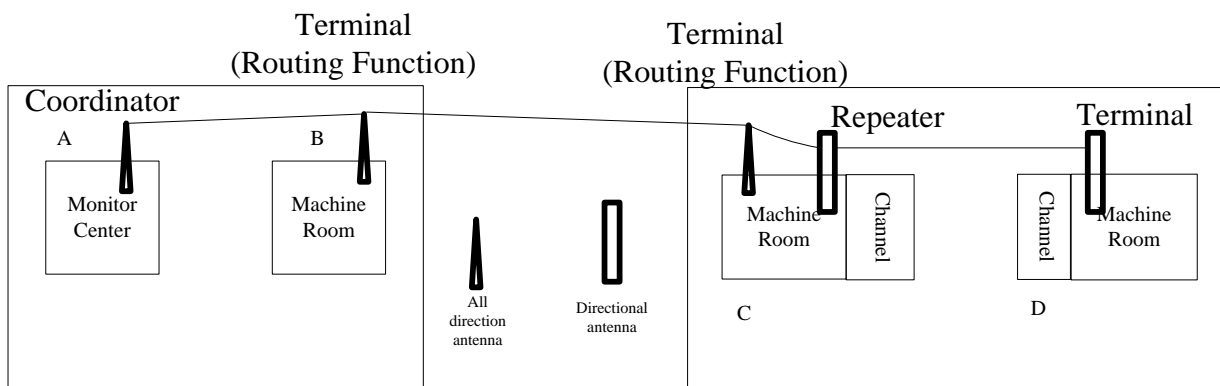
## 1.5 Installation Sample



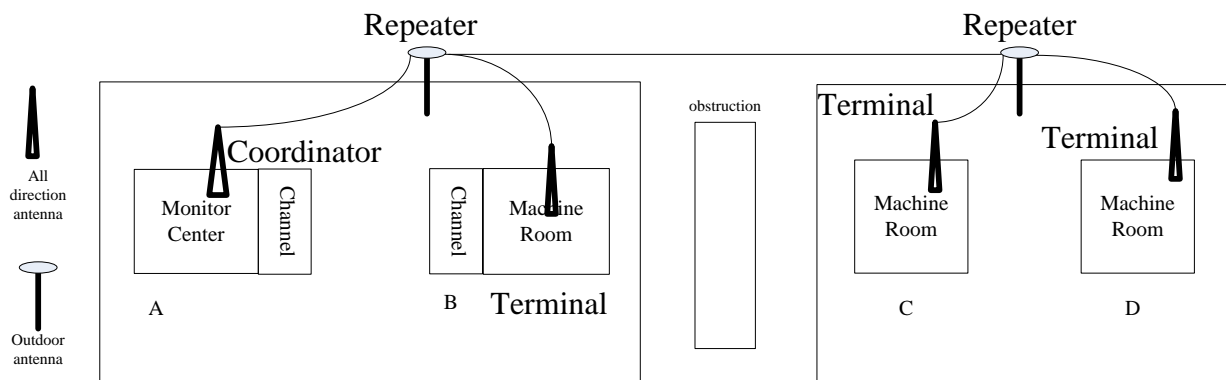
When terminal device on Elevator C haven't enable routing function, terminal device on elevator D and E cannot communicate with coordinator because of long distance from monitor center.



When terminal device on Elevator C start routing function, terminal device on elevator D and E can communicate with coordinator through terminal device on elevator C.



When terminal D device cannot connect to nearest Terminal C device because of obstruction, customer can add one repeater and use directional antenna in machine room of terminal C device. And use directional antenna to replace all direction antenna for terminal D device. Then the penetration of signals has been raised by directional antenna and it help terminal D device to connect to Network.



When Terminal B & C & D device cannot directly communicate with coordinator because of obstruction or distance, customer can consider to build repeater with outdoor antenna. As shown in the figure, build one repeater with outdoor antenna out of machine room of terminal B device and build another repeater out of machine room of terminal C & D device. Then terminal B & C & D devices can communicate with coordinator through repeater and complete networking.

## 1.6 Networking Capacity

The networking capacity of this system is maximum 30 terminals and 20 outdoor repeater in theory. That means it can monitor maximum 30 elevators at same time with one coordinator. But the capacity will be affected by environment. When communication environment is good, the capacity is strong, terminal number can be 20~30 units. When communication environment is complex (too many obstructions or too much difference among machine rooms, terminal number may drop to 10~20 units. But the environment can be improved and networking capacity can be raised by building outdoor relay antenna. When communication environment is bad, for example machine room has no window or safety channel block between two machine room or impossible to build outdoor antenna, the networking capacity will

drop below 10 units.

Above networking capacity base on experience, actual networking capacity need to be confirmed according to environment at site. Meanwhile, building outdoor relay will improve networking capacity.

## 1.7 LAN Local monitor software operation introduction

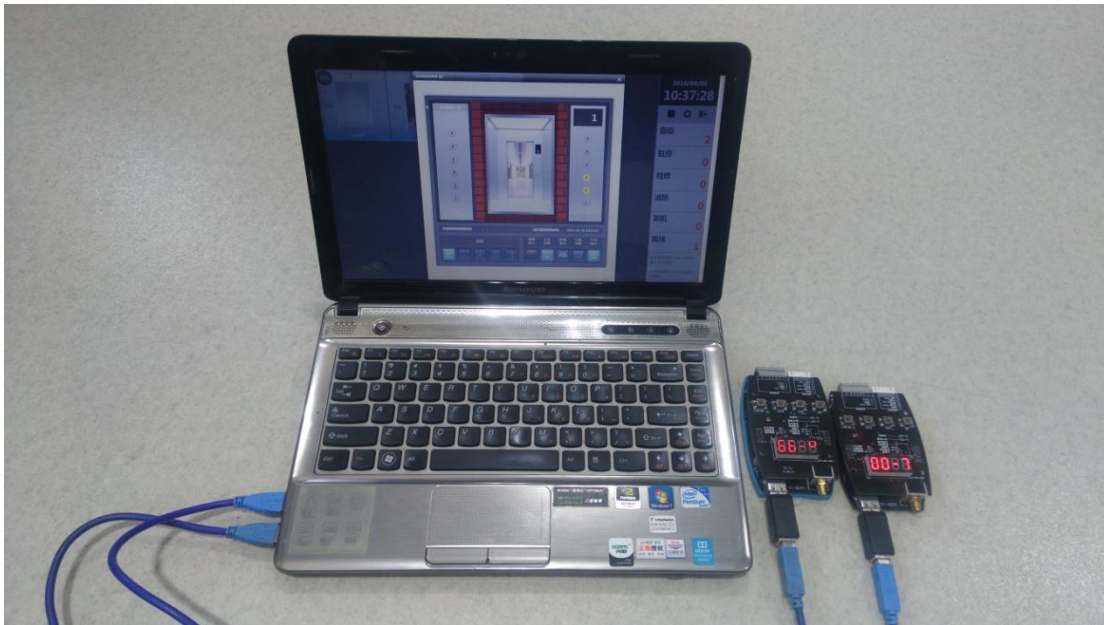
### 1.7.1 Overview

This software is for display elevator monitor information. Data is collected through Zigbee networking. Computer use RS232 to send & receive data, it support several port working at same time.

### 1.7.2 Basic function

#### 1.7.2.1 Computer connection

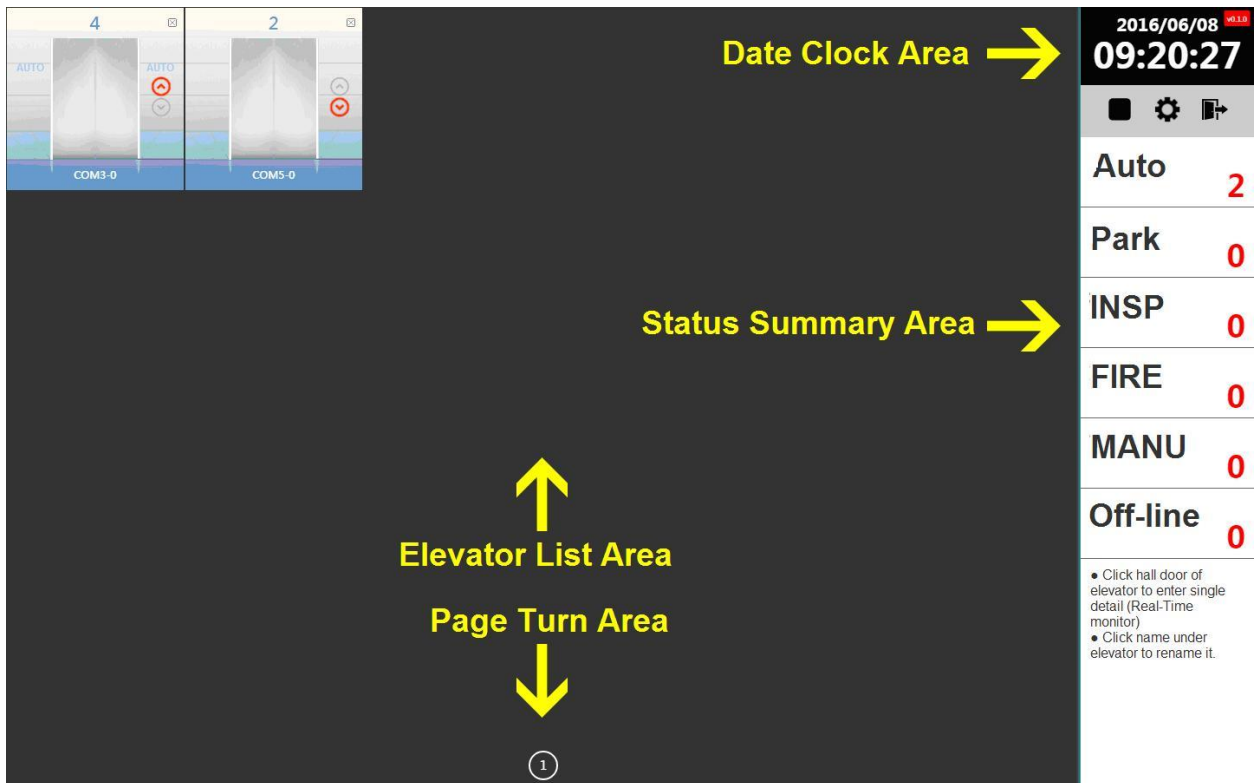
RS232 port of computer is available, USB-to-RS232 conversion is also available. As shown in following picture:



## 1. Software Start (Main Menu)

After software start, the interface is shown in following picture: including elevator list part & Page Turning part & Date/Time part & Status Statistics part.





**Elevator List Part:** After communication built, elevator list part shows elevator basic status, including “Running Mode” “Current floor” “Communication ID” “Running direction” “Open/Close door cartoon” and other information.


**Page Turning Part:** Click button to turn page. The content on each page will be confirmed according to resolution. System will turn page automatically, the default interval is 15 sec and can be changed by setting.

**Date/Time Part:** Display current date clock and version.

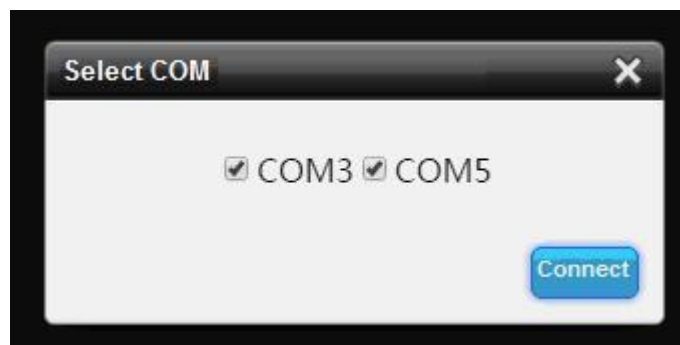
**Status Statistics Part:** Display all elevator status summary data.

## 2. Add elevator and start monitor



Click  button, then it show following message box. In the box, it list all available COM. Select correct COM (Support multi COM) and click “Enter” to start monitor.

Monitor data will refresh each 20 sec about.



Software does not support manual elevator addition. Elevator addition is automatic. Once communication connect, elevator will be shown in 20 sec.

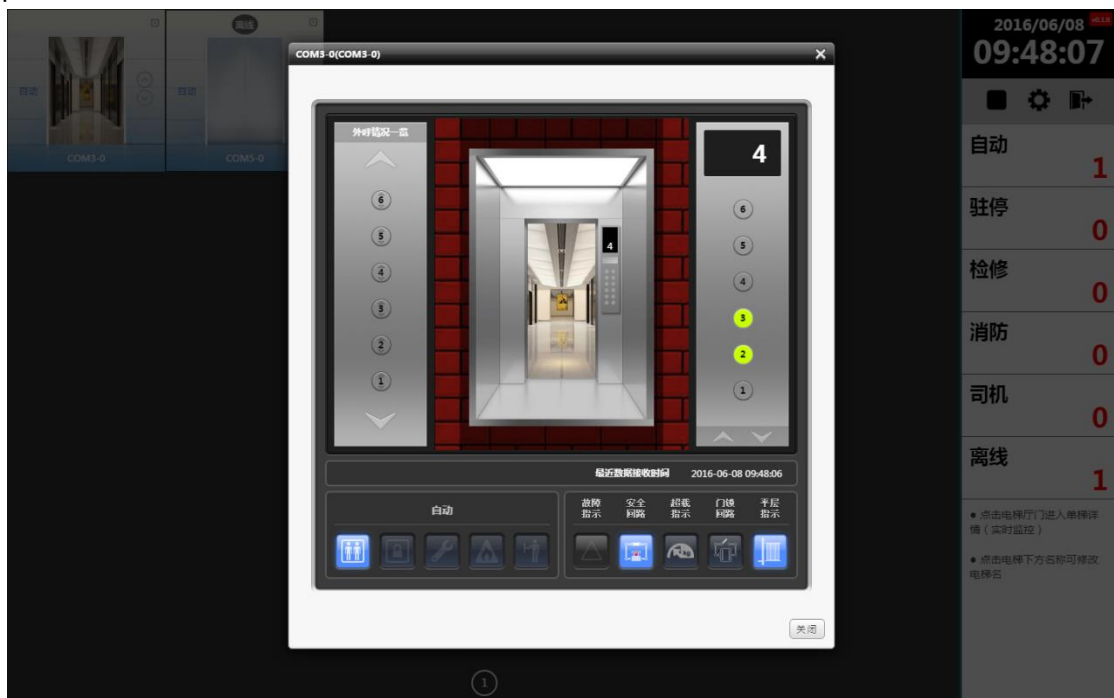
### 3. Rename elevator

After elevator added, it will display as “COM-No.” type in default. For example, “COM3-0”. For distinguishing elevator, software support rename elevator. The operation is to click default name. Then it show Rename message box, enter new name and click Enter to confirm.



### 4. Single elevator real-time monitor

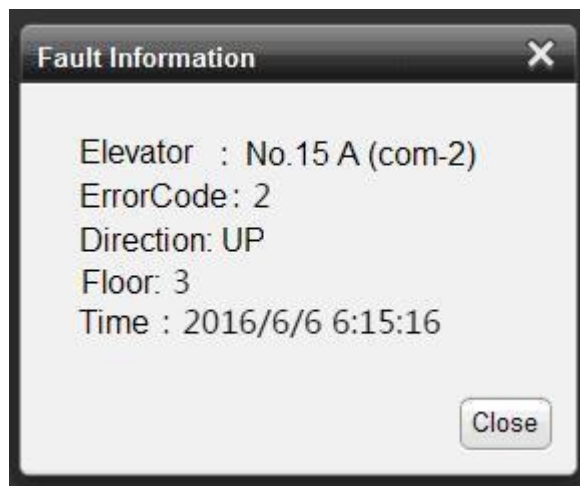
Click door part of one elevator in elevator list, it will show single elevator monitor interface as following picture.



For current elevator, the data refresh interval rise up to 1 sec. Elevator running status can be monitored.

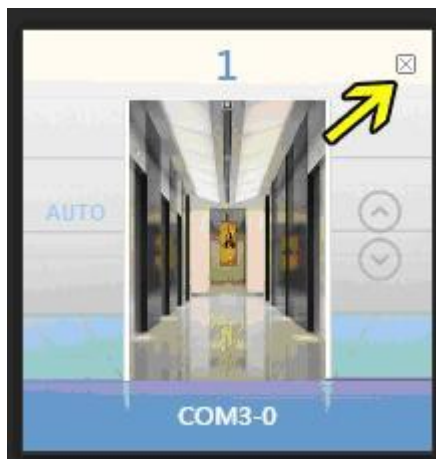
### 5. Elevator Fault

During monitoring, once elevator has fault, it will show elevator information for checking problem. As shown in following picture.




## 6. Delete elevator

If one elevator become off-line and does not need to be monitored, customer may click "X" button at right top to delete it from elevator list.



Note: Even on-line elevator can be deleted, but it will automatically be on-line again. And you need to rename it.


## 7. Setting

Click  button in Menu and enter to "Setting" as following picture.



“Language” and “Automatic page turning interval” can be set. Setting will affect immediately.

## 8. Exit software

Click  button in Menu. When showing tip of exit, press “Enter” to exit.

## 2. Terminal Definition

### 2.1 System wiring

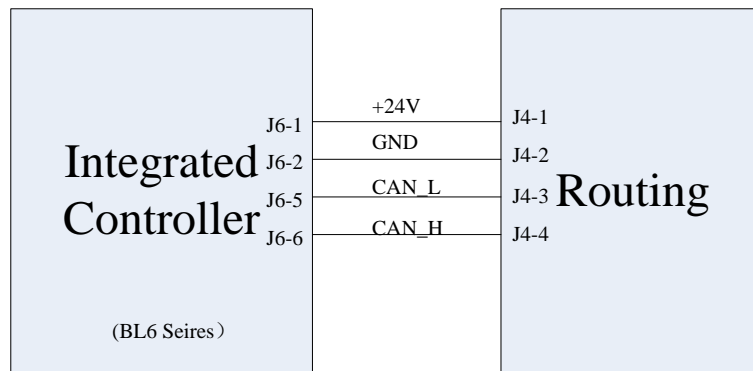


Figure 2.1 Routing Wiring

Note: For BL3 integrated controller, J6-5 is CAN H, J6-6 is CAN L. Others are same.

### 2.2 Terminal Definition

1、The Terminal Definition of Wireless LAN Data Collector is in following Chart:

Port	Name	Location	Definition	Usage
J5	SMA antenna port to connect SMA antenna			
USB1	USB port, connect to computer for monitoring			
SP0	Program upgrade jumper.			
SP2	CAN Bus terminal resistor jumper			
J4	+24V	J4-1	Power	Connect to mainboard
	GND	J4-2	Ground	Connect to ground
	CAN_L	J4-3	CAN-	Connect to CAN-
	CAN_H	J4-4	CAN+	Connect to CAN+

Chart 4 Wireless LAN Data Collector Terminal Definition

## 3. Installation Guidance

### 3.1 Tools

Screwdriver, electric drill, guide rail, tapping screw, 4 core cable.

### 3.2 Installation location of wireless LAN monitor device

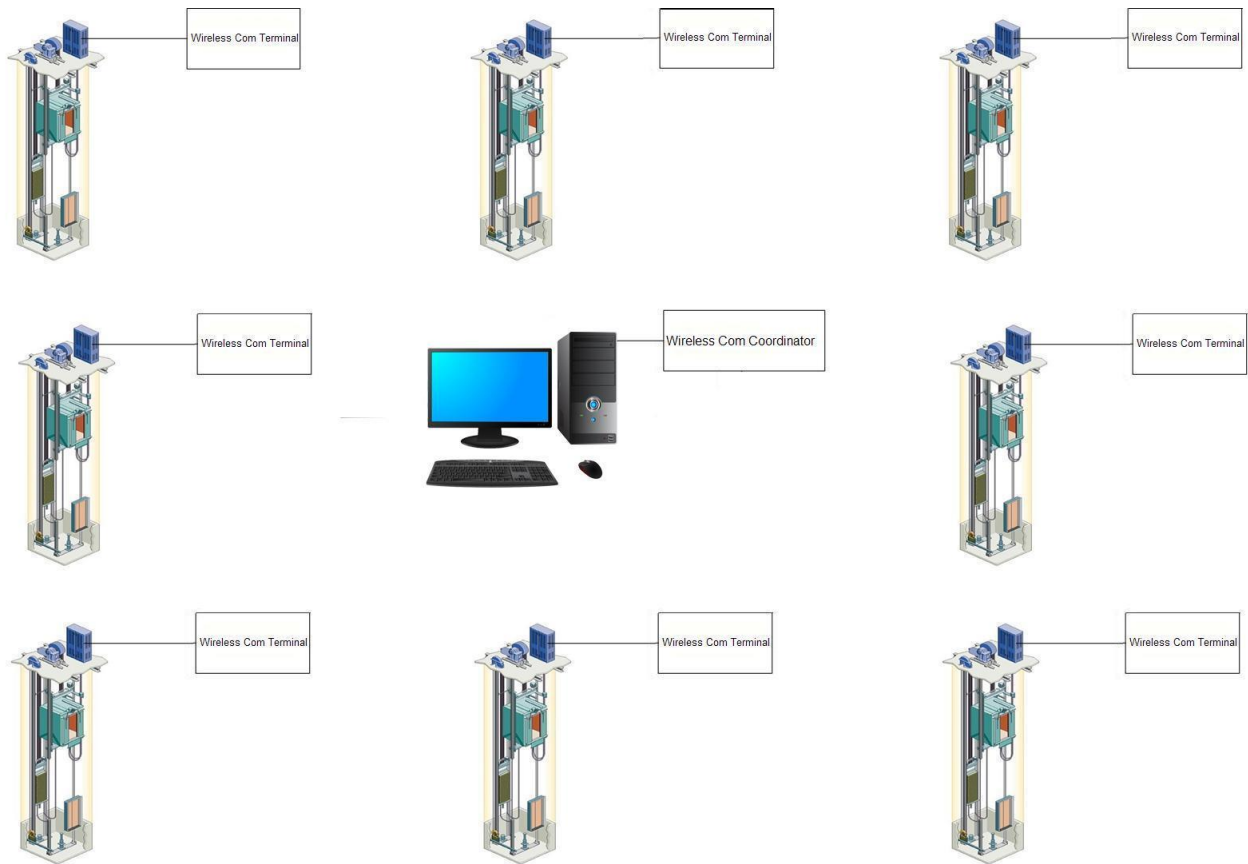


Figure 3.1 Structure of wireless LAN communication

While using, each elevator need to install one “Wireless LAN data collector”(Terminal device) according to actual condition. It is normally installed on elevator control cabinet. Meanwhile, coordinator is installed in monitor center and connect to computer through RS 232 port.

Because machine room has wall, “Wireless Repeater” is needed when wireless communication signals are weak.

**Note:** When environment is complex and there’s many obstructions, to get ideal communication effect and networking capacity, we strongly suggest customer to install outdoor wireless repeater. If outdoor repeater installation is not available, communication effect will be bad or networking capacity will drop.

### 3.3 Antenna Selection

Wireless LAN data collector in monitor system needs to work with antenna. The antenna is shown as following picture.



Figure 3.2 All direction antenna



Figure 3.3 Directional antenna

All direction antenna at left side is suggested when LAN data collector does normal networking. This kind of antenna has wide communication coverage, but signal penetration is weak. So it is mostly used when devices are visible between each other or with few obstructions.

If there are many obstructions between two nodes, directional antenna can be considered. Directional antenna can make signal has better penetration, but their signals can only shoot out in a straight line along front of antenna. So directional antenna need to work in pairs. And need face to face to ensure they can receive signal from the other.

If environment is complex and there are many obstructions between devices, please consider about outdoor antenna installation. Then install repeater and use outdoor antenna among devices. That make communication distance shorter and raise communication quality. The details of wireless repeater installation, please take Chapter 4.3 as reference.

### 3.4 Wireless Repeater Installation

Wireless Repeater is composed of wireless LAN collector & Waterproof box & Outdoor antenna & Isolated Power. It is shown in Figure 3.4.



Figure 3.4 Wireless Repeater

Wireless Repeater use wireless LAN data collector as its device. Modify it to Repeater through parameter configuration, then device will only forward data but not collect data any more.

Repeater use outdoor antenna to communicate. Because the devices are installed outside, the requirement for installation location is shown below:

1. The height antenna installed should be lower than highest point of roof, and far lower than lightning rod or lightning conductor.
2. Isolation power includes 220VAC isolation transformer and 24V switch power. Isolation power is installed in machine room. Input power is 220V from power grid. Ensure earth connection. The 24V DC output of switch power should connect to device with shielded cable.
3. Install monitor device in waterproof box and connect antenna, close box to ensure waterproof performance.
4. Outdoor antenna and waterproof box both need to be installed vertically and fastened to ensure it will not drop because of weather, such as strong wind.
5. The installation of wireless repeater should be installed in the centre of devices that need networking assistance. That makes distance between all terminals and repeater short and with less obstruction. As shown in Figure 5.5, it installed one wireless repeater outside of #1 elevator machine room, it cover #1 and #2. It installed one wireless repeater outside of #3 elevator machine room, it cover #3 and #4. The installation of these two repeater cover all machine room of 4 buildings.

**Note: To get ideal communication affect and networking capacity, we strongly suggest repeater with outdoor antenna. If outdoor repeater cannot be installed because of some reason, communication affect may be bad, networking capacity may drop.**

### 3.5 Installation of Tablet Directional Antenna

When there's many obstructions between only two nodes and cannot do networking, use tablet antenna to help networking. Directional antenna should be installed in pairs, and two tablet antenna should face to face and same level.



Following figure is a sample of wireless repeater layout.

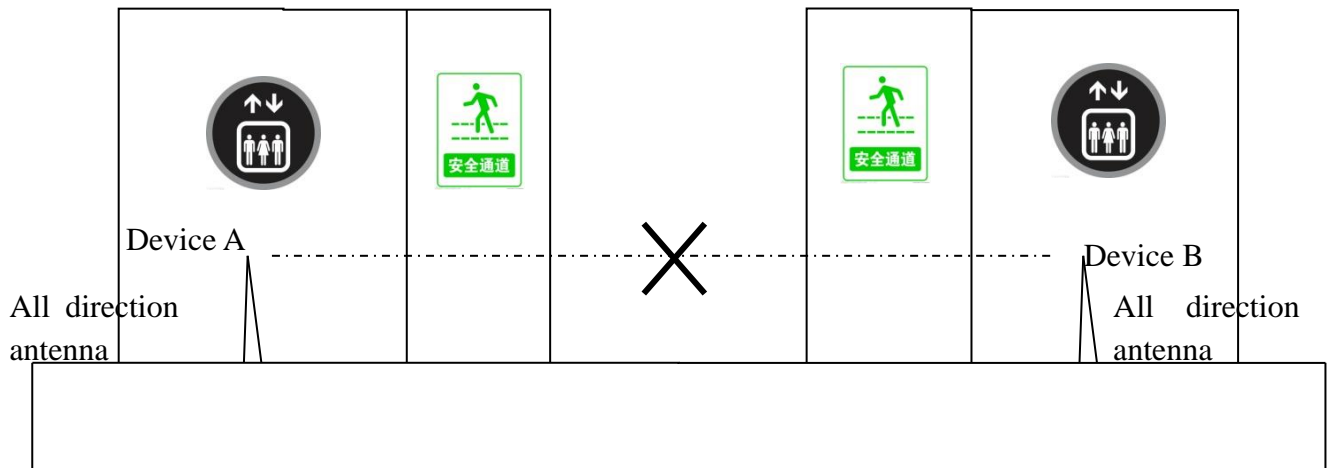


Figure 3.6 Networking cannot achieve with all direction antenna

Because of safety channel or other facilities, there's 2 or more wall between machine room. As all direction antenna has poor penetration, signal cannot go through several walls, networking cannot be achieved. At this moment, it need to change to directional antenna. The installation is shown as following:

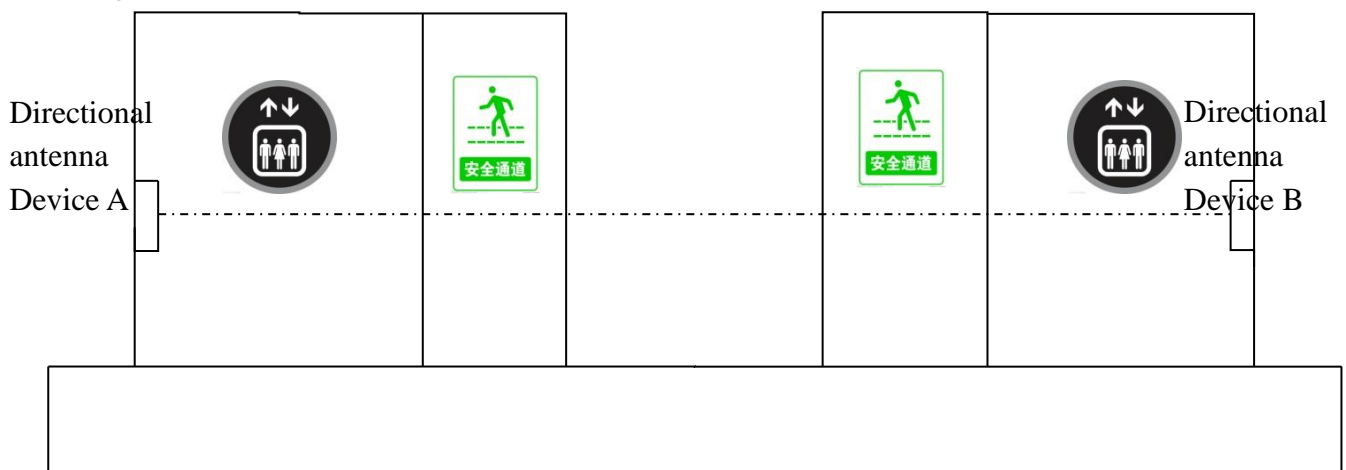


Figure 3.7 Add repeater and use directional antenna to complete networking

As shown in Figure 3.7, it raise penetration of signal by installing repeater with directional antenna, and achieve two devices networking.

1. Change antenna of A and B to directional antenna.
2. Select location that has less obstructions between two devices to fasten directional antenna, two antennas need face to face and same height, same level.。

**Note:** Tablet directional antenna can only raise communication capacity between two nodes. It cannot improve all communication capacity. If there's many obstructions in LAN, Overall signal strength is poor, then repeater is needed. If no repeater, it may cause communication turn bad or networking capacity drop.

### 3.6 Installation Step with outdoor wireless LAN repeater

Installation steps of wireless LAN elevator monitor system is shown as following:

### 3.6.1 Installation of wireless coordinator

Firstly check terrain condition. Find a centre location among building group. Installing coordinator at centre will be benefit for wireless LAN establishment.

- 1) Dig a small hole on the wall for installation, then fasten guide rail with enough length;
- 2) Coordinator of Wireless LAN data collector should be fixed on guide rail.
- 3) Install special antenna on data collector;
- 4) Connect wire from J6-1 (+24V) & J6-2(GND) of main board to J4-1 & J4-2 of coordinator. Connect wire from J6-6 (CAN+) & J6-5(CAN-) of main board to J4-3 & J4-4 of coordinator. (Detail port definition refer to “4. Wiring and Port definition”).
- 5) Installation complete.

Wireless coordinator has an obvious specification. Its ID on main interface shows L-00 and signal strength always show n-99.



Wireless coordinator modular can connect to one elevator controller, its ID is fixed as 00.

Placing the device near window can raise communication quality.

### 3.6.2 Net Parameter Set

All devices that join in wireless net must be set with same channel and label. The best way is to power on these device one by one and set same channel & label. If you can remember them, you may also set while installing.

If there's only one monitor system in area, you can use default network setting. If there's several monitor system, you must use different network setting.

Setting is shown as following (Detail information in “4.2.2 Setting interface”)

After parameter modification, reset is necessary:

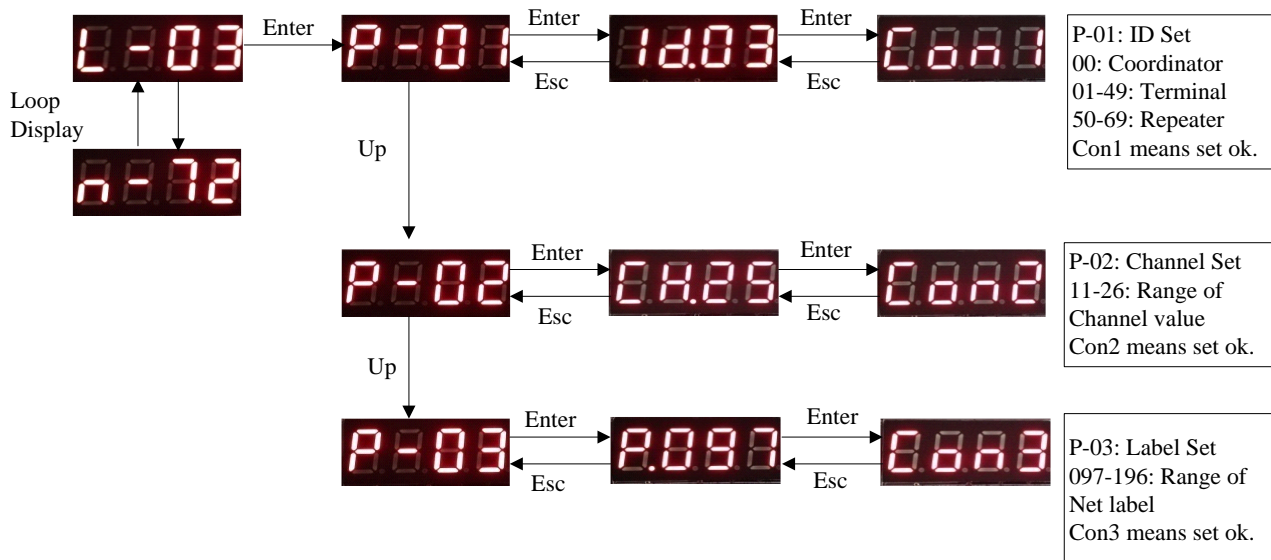


Figure 5.8 Network parameter setting

### 3.6.3 Installation of wireless terminal

Each elevator that join in networking needs to install wireless LAN data collector.

- 1) Dig a small hole on the wall for installation, then fasten guide rail with enough length;

- 2) Wireless data collector need to be fastened on guide rail, communication antenna should be installed according to environment (Check “3.3 Device Antenna Selection” for Antenna selection);
- 3) Connect wire from J6-1 (+24V) & J6-2(GND) of main board to J4-1 & J4-2 of coordinator. Connect wire from J6-6 (CAN+) & J6-5(CAN-) of main board to J4-3 & J4-4 of coordinator. (Detail port definition refer to “2. Wiring and Port definition”);
- 4) Installation complete.

Placing the device near window can raise communication quality.

### 3.6.4 Set node ID for wireless terminal

Node ID can not be repeated.

The connection label for elevator controller connection should be exclusive, and between 1 to 50. Node ID also refer to serial number of elevator controller.

Setting method is shown as following:

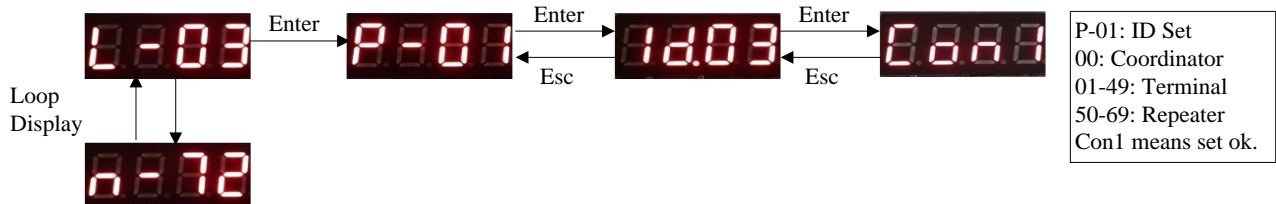


Figure 5.9 ID setting

### 3.6.5 Terminal monitor device start

After setting network parameter and Terminal device ID, reset device. After reset, enter P-XX interface through LED button as shown in Figure 5.8. Select P-06, then display should be Fun0. Modify it to Fun1 and press ENT button. Then it show Con1. After it change to Con0, press ESC to return Menu. LED display will change from H to L. It means device has connected to network. Signal strength value will change. If signal strength is lower than 20 or cannot join in network. Installing repeater between this device and nearby device that already connect to network is suggested. Through directional antenna assistance, enhance signal strength. If Con1 cannot change to Con0 after long time, then reset device and repeat above operation until succeed.

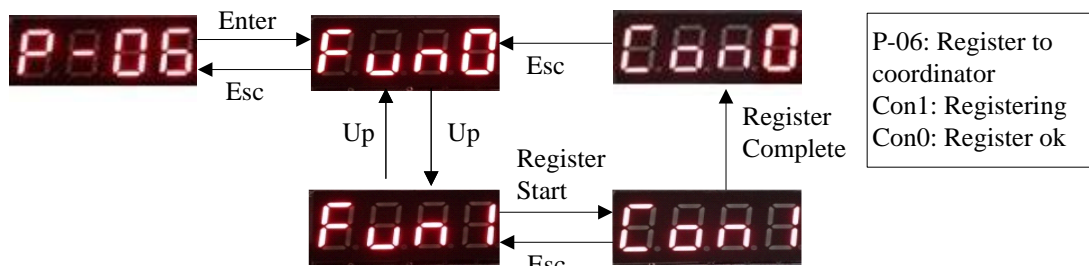


Figure 5.10 Terminal device register

At node, on-line status and signal strength can be checked.



Figure 5.11 Not join in Network



Figure 5.12 Already join in network

If networking cannot complete, adjust device location. If no obvious improvement, please consider about repeater installation.

### **3.6.6 Wireless repeater installation**

When there's too many obstruction between terminal device and coordinator, networking cannot directly build or signal strength bad after networking built. Then repeater is needed. Installation refer to "5.4 Wireless repeater installation".

After installation, you need to set parameter for device

1. Set ID. Set ID between 50 to 69. Network parameter should be same as device. Detail information is in Chapter 5.6.2 Setting network parameter.
2. Modify device type. Enter P-08 through LED button. Press ENT, then it shows FUN0. Press Up to change it to FUN1. Press ENT to confirm, and it will show CON8 as setting complete. After setting, reset device.
3. Complete above setting and place device in waterproof box, then close box.

## **3.7 Installation steps without outdoor wireless LAN repeater**

### **3.7.1 Installation of wireless coordinator and network device**

Refer to "3.6.1".

### **3.7.2 Setting network parameter**

Refer to "3.6.2".

### **3.7.3 Wireless terminal installation.**

Refer to "3.6.3".

### **3.7.4 Setting wireless terminal node ID**

Refer to "3.6.4".

### **3.7.5 Terminal monitor device start**

Refer to "3.6.5".

### **3.7.6 Terminal type modification**

After completing above 5 steps, if you find device cannot build networking, judge distance and obstruction between current device and coordinator. If distance in sight exceed 600 meters or obstruction is more than 4 walls, please consider to modify Terminal device, detail operation is shown as following:

1. Go to one normal node which is nearest to the node that cannot do networking. Modify the node type. Default node type is 0 (Terminal device), it need to be modified to 1(Routing).
2. Keep the other parameters, modify device type to routing. Enter P—08 through LED button, press ENT to enter, then it show FUN0. Press Up to modify it to FUN1, then press ENT to confirm. After that, it show CON8, means setting complete. Reset device after setting.
3. Return to original node and restart register, check if networking can communicate normally or not. If yes, it means this node can communicate with coordinator through routing, installation of this node complete.
4. If this node still cannot communicate normally. We need to install tablet directional antenna between problem node and modified node(change node type). Please refer to "3.5 Tablet directional antenna installation".

5.7.7 Following operation please refer to 5.6.7 and 5.6.8

## 4. LAN data collector instruction

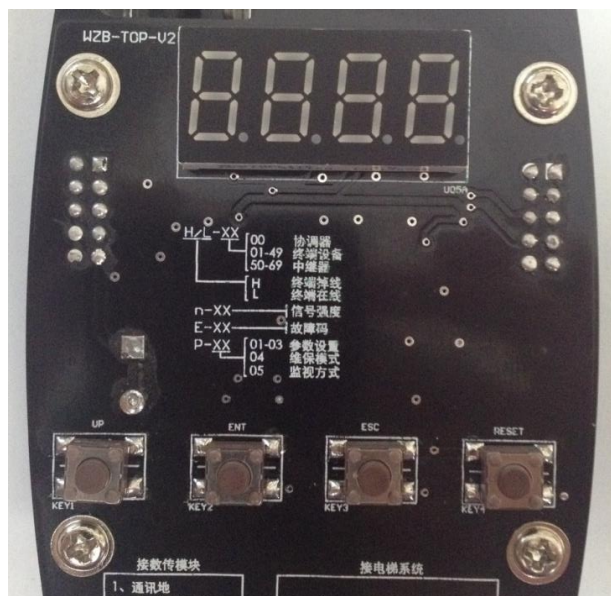
### 4.1 Adjustment and setting component

Complete adjustment and setting through LED segment and button on data collector.

### 4.2 Adjustment and setting method

#### 4.2.1 Main interface

Customer interface of data collector:




Data collector customer interface include 4 segment LED and 4 buttons.

4 Buttons are Up, Enter, Exit, Reset (from left to right).

After power on, segment display main interface as following chart.

Label	Description	Label	Description
	1. Letter show network status H: Off line L: On line 2. Number show		1. N means current value is signal strength 2. Number show signal strength, range is 0~99, high value means

	device ID 00 : Wireless coordinator		signal good.
	01-49 : Wireless Terminal device 50-69 : Wireless Repeater		<ol style="list-style-type: none"> <li>1. E means current number is communication error.</li> <li>2. Number show error code. If no error, then no number.</li> </ol>

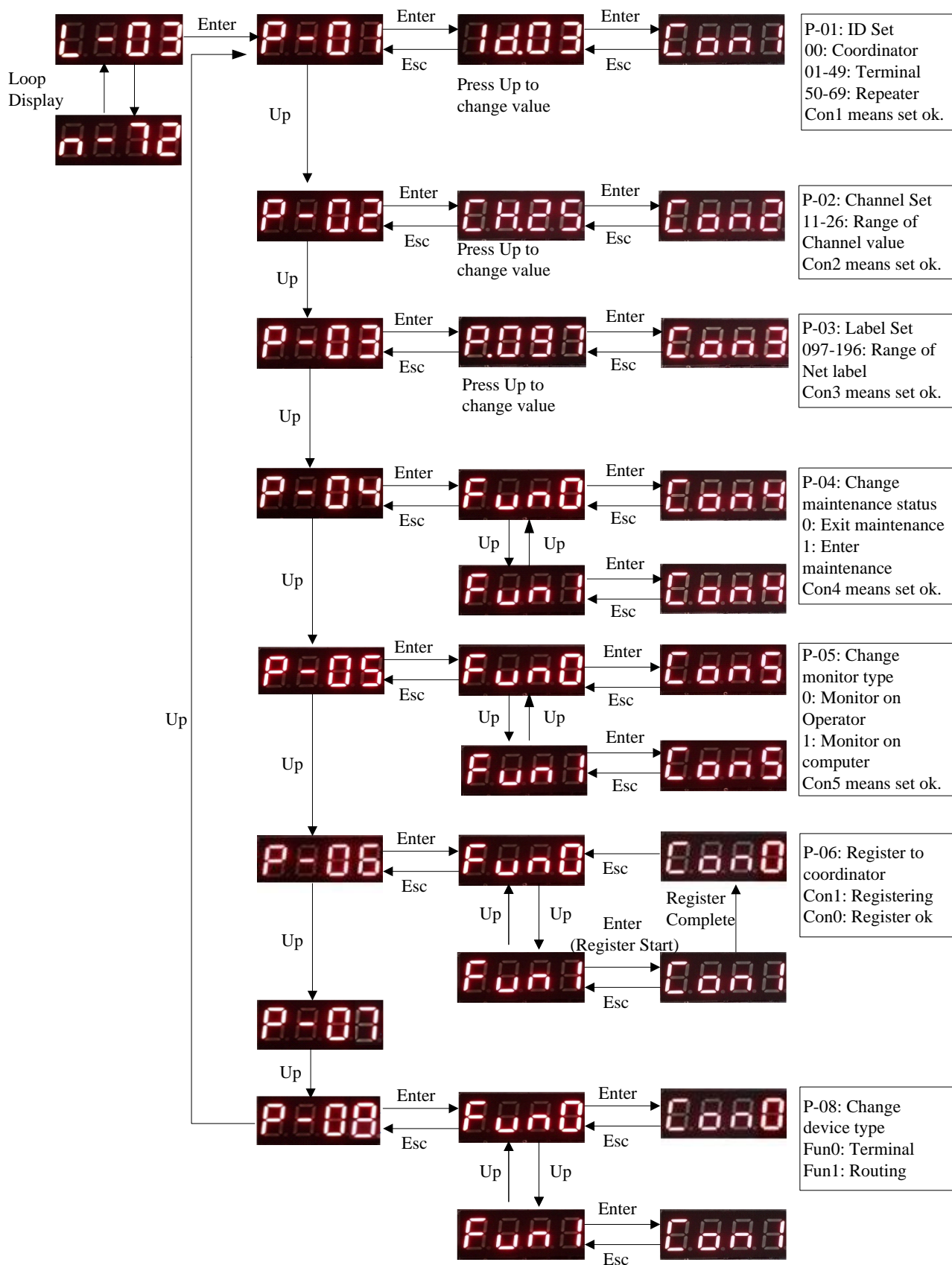
## 4.2.2 Setting Interface

When leaving factory, data collector has default setting. Use default setting can save networking time, but may have network conflict problem. So we suggest to plan network parameter before installation.

Only devices with same channel and same net label can constitute one wireless network. Wireless network use 2.4G net, it can set 11 to 26, totally 16 signal channels. In this system each signal channel support 99 network, which can be separated by net ID. Each network can install maximum 1 coordinator & 30 terminal devices & 20 repeaters.

Net parameter can be modified through LED display and button on device.

In main interface, press ENT to enter parameter modification menu. The default operation is shown as following:



Note: P-01, P-02, P-03 take effect after reset by pressing Reset Button.

### 4.3 Error Code and Error Information

Code	Content	Solution
E-01	LAN module connection fail	Change LAN communication module
E-02	Data collector inner fault	Change data collector
E-03	CAN Bus Data abnormal	Check connection with CAN Bus of integrated controller